Summary Report

LANDFILL GAS MANAGEMENT SYSTEM ANNUAL OPERATIONAL TESTING REPORT – 2004

NORTH COUNTY RESOURCE RECOVERY FACILITY
Class I and Class III Landfills
Palm Beach County, Florida

PREPARED FOR:
The Solid Waste Authority of Palm Beach County
West Palm Beach, Florida

IN ASSOCIATION WITH:
Camp Dresser & Mckee, Inc.

WET PROJECT No: 204519
October 2004

WASTE ENERGY TECHNOLOGY, LLC

ENVIRONMENTAL MANAGEMENT
ENGINEERS & CONTRACTORS

FORT WALTON BEACH, FLORIDA

WASTE ENERGY TECHNOLOGY, LLC

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LANDFILL GAS MANAGEMENT SYSTEM
ANNUAL OPERATIONAL TESTING REPORT-2004
FOR
NORTH COUNTY RESOURCE RECOVERY FACILITY
CLASS I AND CLASS III LANDFILLS
PALM BEACH COUNTY, FLORIDA

October 2004

Prepared for:

Solid Waste Authority of Palm Beach County
7501 North Jog Road
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(561) 640-4000

In Association With:

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WET Project No: 204519

LANDFILL GAS MANAGEMENT SYSTEM
ANNUAL OPERATIONAL TESTING REPORT-2004
FOR
NORTH COUNTY RESOURCE RECOVERY FACILITY
CLASS I AND CLASS III LANDFILLS
PALM BEACH COUNTY, FLORIDA

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ANNUAL OPERATIONAL TESTING REPORT-2004
FOR
NORTH COUNTY RESOURCE RECOVERY FACILITY
CLASS I AND CLASS III LANDFILLS
PALM BEACH COUNTY, FLORIDA

STATEMENT OF CERTIFICATION BY PROFESSIONAL ENGINEER

I hereby certify, based on the information and belief formed after reasonable inquiry, that the information included in the attached documents is true, complete, and accurate.

Waste Energy Technology, LLC
Certificate of Authorization No.: 8780

Matthew H. Zinke
10/07/04

Matthew H. Zinke, P.E.
Director of Engineering
Florida P.E. # 57642

STATEMENT OF CERTIFICATION BY RESPONSIBLE OFFICIAL

I, the undersigned, am the owner or authorized representative of the facility addressed in this report. I hereby certify, based on the information and belief formed after reasonable inquiry, that the information included in the attached documents is true, complete, and accurate.

Solid Waste Authority of Palm Beach County

A for John D. Booth, Executive Director

10/8/04
Date

INTRODUCTION

The Solid Waste Authority of Palm Beach County (SWA) operates a comprehensive waste disposal facility at its Jog Road location known as the North County Resource Recovery Facility (NCRRF) of Palm Beach County. The Florida Department of Environmental Protection (FDEP) issued permit amendment PSD-FL-108(D) on May 7, 1999, to the landfills operating permit for operation of a landfill gas collection system to control emissions from the NCRRF Class I and Class III landfills. The permit amendment allows for an upgrade of the blower motors for each landfill gas flare from a permitted flow rate of 900 scfm to a permitted flow rate of 1800 scfm. The permit amendment also clarifies previous permit conditions and removes a limitation on the sulfur content of the landfill gas. This permit amendment will supersede the previous permit modification, PSD-FL-108(B), which is dated February 20, 1996. The previous permit's specific conditions have been replaced entirely with the May 7, 1999 permit amendment specific conditions, which have been included as Appendix 1. Subsequent to the May 7, 1999 permit amendment, the FDEP issued Final Air Permit No. 0990234-008-AC, which addresses the decommissioning of the 1800 scfm Class I Flare and startup of a new 3500 scfm Class I Flare (see Appendix 1).

This startup occurred on June 9, 2004, and all collected landfill gas from the Class I Landfill is now routed to this flare. This annual operational testing report also serves as the initial performance test report for the new 3500 scfm Class I Flare. SWA retained Waste Energy Technology, LLC (WET) to perform the annual operational testing as specified in the above referenced FDEP permit amendment Specific Conditions.

PERMIT SPECIAL CONDITIONS REVIEW

Permit No. 0990234-008-AC Emissions Unit Specific Conditions A.6 and B.9 address the annual operating testing requirements for the Class I Flare. PSD-FL-108(D) Permit Specific Conditions 4(f)(1), 4(f)(3), 4(f)(4), and 5 address the annual operational testing requirements for the Class III Flare. The above conditions require visible emissions testing, the field collection of gas samples followed by laboratory analysis, and the determination of the landfill gas flow rate.

OPERATIONAL ASSESSMENT

LFG extraction monitoring of the Class I and Class III landfill gas collection systems was accomplished during the week of August 23, 2004. The FDEP Southeast District office was given written notice of this scheduled compliance testing; see notification letter dated July 23, 2004

included as Appendix 2. WET arrived onsite August 24, 2004, to verify steady state flow conditions and methane concentrations in preparation for permit compliance gas sampling and flow analysis. On August 25, 2004, South Florida Environmental Services (SFES), under a subcontract to WET, collected gas samples on the Class I & Class III Flares while WET performed the visible emissions testing and collected flow data. This field testing and laboratory analysis provide the basis for compliance with the following annual permit specific conditions:

Class I Flare	
Specific Condition B.9(1) :	Compliance Testing of Visible Emissions
Specific Condition B.9(3) :	Compliance Testing of Input Gas Net Heating Value
Specific Condition B.9(4)-(6) :	Compliance Testing of Flare Tip Exit Velocity
Specific Condition A.6:	Compliance Testing of Input Gas Total Sulfur Content
Class III Flare	
Specific Condition No. 4(f)(1) :	Compliance Testing of Visible Emissions
Specific Condition No. 4(f)(3) :	Compliance Testing of Input Gas Net Heating Value
Specific Condition No. 4(f)(4) :	Compliance Testing of Flare Tip Exit Velocity
Specific Condition No. 5:	Compliance Testing of Input Gas Total Sulfur Content

Concurrently with the collection of this field data and gas samples, WET recorded LFG system operating data to include Blower Flare Station gas composition (percent methane and oxygen), gas temperatures, and blower inlet and outlet pressures.

Results of the WET field analysis for the annual Specific Conditions B.9(1), B.9(4)-(6), No. 4(f)(1), and No. 4(f)(4) are presented in the report titled "Utility Flare System Compliance Study," dated August 24-25, 2004 by WET, and is included as Appendix 3 to this document. This appendix also includes copies of the field operational data recorded by WET and the visible emissions testing. The results of the landfill gas laboratory analysis performed by SFES for the annual Specific Conditions B.9(3), A.6, No. 4(f)(3), and No. 5 are included in the report titled "Sulfur Content and Net Heating Value Test Program," dated August 25, 2004. This report has been included as Appendix 4 to this document.

A summary of the field and laboratory testing results are presented in Table 1 on the page 4, and a summary of the special permit condition test methods, permit limits, and measured results are presented in Table 2.

CONCLUSIONS

Based on the results of the study, the NCRRF Class I and Class III landfill gas collection and flaring systems are currently operating in compliance with the FLDEP permits 0990234-008-AC and PSD-FL-108 (D).

Table 1: Flare Inlet Gas Testing - Summary of Testing Results

August 24-25, 2004	Class I	Class III
Pipe Duct Diameter	12.000 in	7.981 in.
Pipe Duct Area	0 7854 sf	0 3474 sf
Pipe Duct Average Gas Velocity, ft/sec	23.32 ft/sec	35 39 ft/sec
Average Gas Temperature, Deg. F, (wet / dry bulb)	138.0 F / 153.07 F	100.0 F / 110 4 F
Average Gas Moisture, % volume	17 90 %	6.04 %
Average Gas Pressure, in. Hg	30.08 in Hg	30.20 in Hg
Barometric Pressure, in. Hg	30.06 in Hg	30.06 in Hg
Average Gas Volumetric Flow Rate:		
@ Field Conditions, acfm	1098.95 acfm	737 74 acfm
@ Standard Conditions, scfm	951.59 scfm	689.33 scfm
@ Dry Standard Conditions, dscfm	781 20 dscfm	647 71 dscfm
Flare Tip Diameter, inches	15 624 in.	6.000 in.
Flare Tip Area, sf	1.3314 sf	0.1963 sf
Flare Tip Exit Velocity, fps	11.91 fps	58.51 fps
Net Heating Value, Btu/scf	449.81 Btu/scf	309.87 Btu/scf
Maximum Permitted Exit Velocity, fps	89.71 fps	61.44 fps
Gas Composition by Laboratory Analysis: For determination of Net Heating Value		
Methane, % by volume	44 00%	30.00%
Carbon Dioxide, % by volume	27 00%	27.00%
Nitrogen, % by volume	24 00%	38.00%
Oxygen, % by volume	3 40%	4.40%
Gas Composition Field Analysis.		
Methane, % by volume	54%	33%

Table 2: Flare Inlet Permit Testing - Summary of Permit Requirements and Results

	Permit Test Method	Permit Limits	Measured Results			
Flare Inlet Test location			**Class I**	**Pass/Fail**	**Class III**	**Pass/Fail**
Date			8/24/04		8/25/04	
Flare Flow Rate	Pitot Tube	3500/1800 scfm	951.59 scfm	**Pass**	689.33 scfm	**Pass**
Net Heating Value	40 CFR 60 18(f)	200 Btu/scf minimum	449.81 Btu/scf	**Pass**	309.87 Btu/scf	**Pass**
	i.e. ASTM D1946-77 and ASTM D2382-76					
Flare Tip Exit Velocity	40 CFR 60.18(f)	Vmax fps @ HT Btu/scf				
-Class I		89.71 @ 449.81 Btu/scf	11 91 ft/sec	**Pass**		
-Class III		61.44 @ 309.87 Btu/scf			58.51ft/sec	**Pass**
Sulfur Content	ASTM D1072-90	None	225.0 ppm	**n/a**	64.85 ppm	**n/a**
Visible Emissions	EPA Method 22	5 minute maximum during 2 hour observation	0 min.	**Pass**	0 min.	**Pass**
-Pilot Flame Thermocouple Temperature, Deg F			1083 F		734 F	

APPENDIX 1

Permit Conditions

NCRRF Permit No.: PSD-FL-108 (D)
and
Final Air Permit No.: 0990234-008-AC

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

May 7, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Donald L. Lockhart, Executive Director
Solid Waste Authority of Palm Beach County
7501 North Jog Road
West Palm Beach, Florida 33412-2414

Re: DEP File No. 0990234-002-AC, PSD-FL-108(D)
North County Resource Recovery Facility
Class I and III Landfill Gas Flare Upgrade

The applicant, Solid Waste Authority of Palm Beach County, applied on September 21, 1998, to the Department for an air construction permit for its Class I and III Landfill Gas Flare Upgrade located at the North County Resource Recovery Facility, 7501 North Jog Road, West Palm Beach, Palm Beach County. This permitting action will supersede the previous permit modification, PSD-FL-108(B), dated February 20, 1996, clerked February 21, 1996. The modification is to upgrade the blower motors for each landfill gas flare (emissions units 003 and 004) from a permitted flow rate of 900 scfm to a permitted flow rate of 1800 scfm. The Department has reviewed the applicant's request. The conditions of permit modification PSD-FL-108(B) are hereby replaced entirely with the following specific conditions.

New Specific Conditions:

1. Hours of Operation: These emissions units may operate continuously, i.e., 8,760 hours/year. [Rule 62-210.200, F.A.C., Definitions-potential to emit (PTE)]

2. Landfill Gas Collection and Control: The owner or operator shall comply with the applicable requirements of 40 CFR 60 Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills. [Rule 62-204.800(7)(b), F.A.C., and 40 CFR 60 Subpart WWW]

3. Landfill Gas Flow Rate: The owner or operator shall not allow more than 1800 scfm of landfill gas to be directed to each flare. The actual flow rate shall be determined for each flare on a monthly average basis by dividing the measured flow by the hours that each flare was operated each month. Compliance with this limitation shall be by measuring landfill gas flows to each flare and recording flows with a totalizing meter. Records of the totalizing meter values shall be recorded in an operators log monthly, or whenever the meter is reset for any purpose, whichever is more frequent. The owner or operator shall maintain a strip chart recorder to record the flow rate to each flare as a backup device in the event that the totalizer meter is not functioning; the strip chart recorder shall also be used in conjunction with an operators log to document the hours each month that each flare was operated. [Rule 62-4.070(3), F.A.C., and request of the applicant]

4. Pursuant to 40 CFR 60.18 General Control Device Requirements: The owner or operator shall comply with the following requirements for flares. [Note: The numbering of the rule has been preserved in the following condition for ease of reference.]

   (c) (1) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

   (2) Flares shall be operated with a flame present at all times, as determined by the methods specified in paragraph (f).

(3) Flares shall be used only with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is non-assisted. The net heating value of the gas being combusted shall be determined by the methods specified in paragraph (f).

(4) (iii) Nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), less than the velocity, Vmax, as determined by the method specified in paragraph (f)(5), and less than 122 m/sec (400 ft/sec) are allowed.

(d) Owners or operators of flares used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators of flares shall monitor these control devices.

(e) Flares used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them.

(f) (1) Reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this subpart. The observation period is 2 hours and shall be used according to Method 22.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

K = Constant, 1.740×10^{-7} (1/ppm) (g mole/scm) (MJ/kcal) where the standard temperature for (g mole/scm) is 20°C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 (Incorporated by reference as specified in 40 CFR 60.17); and

H_i = Net heat of combustion of sample component i, kcal/ g mole at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 (incorporated by reference as specified in 40 CFR 60.17) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(5) The maximum permitted velocity, Vmax, for flares complying with paragraph (c)(4)(iii) shall be determined by the following equation.

$$\text{Log10 (Vmax)} = (HT+28.8)/31.7$$

Vmax = Maximum permitted velocity, M/sec

28.8 = Constant

31.7 = Constant

HT = The net heating value as determined in paragraph (f)(3).

[Rule 62-204.800(7)(b), F.A.C., and 40 CFR 60.18]

5. Reporting Requirements: The owner or operator shall annually determine and report the actual exit velocity of each flare using the methods specified in 40 CFR 60.18. The owner or operator shall annually analyze and report the sulfur content of the landfill gas directed to each flare using ASTM Method D1072-90, or later method. The actual exit velocity and sulfur content shall be reported to the Department as an attachment to the facility's annual operating report. [Rule 62-4.070(3), F.A.C., and requirement of previous PSD FL-108(B), dated February 20, 1996, clerked February 21, 1996]

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes, Director
Division of Air Resources
Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this permit modification was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 5-11-99 to the person(s) listed:

Donald L. Lockhart *
Alex H. Makled, P.E., CDM
Steve Palmer, DEP, Siting Coordination Office
Isidore Goldman, P.E., SED
James Stormer, PBCHD
Gregg Worley, EPA
John Bunyak, NPS

Clerk Stamp

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

Kimi Tibbs 5-11-99
(Clerk) (Date)

FILE COPY
BINDER

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

Solid Waste Authority of Palm Beach County
7501 North Jog Road
West Palm Beach, Florida 33412-2414

Authorized Representative:
John D. Booth, Executive Director

Solid Waste Authority of Palm Beach County
North County Resource Recovery Facility
Air Permit No. 0990234-008-AC
3500 scfm Open Flare Project

Enclosed is Final Air Permit No. 0990234-008-AC, which authorizes the construction of new 3500 scfm flare to combust landfill gas collected from the existing Class I Landfill. The new flare will replace an existing 1800 scfm open flare at the North County Resource Recovery Facility located in Palm Beach County, Florida. As noted in the attached Final Determination, only minor changes and clarifications were made. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel (Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000) and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty (30) days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Trina Vielhauer

Trina Vielhauer, Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 3/24/04 to the persons listed:

Mr. John D. Booth, SWA*
Mr. Marc Bruner, SWA
Mr. Alex H. Makled, Camp Dresser & McKee Inc.
Ms. Jill Grimaldi, Camp Dresser & McKee Inc.
Mr. James Stormer, PBCHD
Mr. Tom Tittle, SED
Mr. Gregg Worley, EPA Region 4
Mr. John Bunyak, NPS

Clerk Stamp

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

Mary D. Adams (Clerk) 3/24/04 (Date)

FINAL DETERMINATION

PERMITTEE

Solid Waste Authority of Palm Beach County
North County Resource Recovery Facility
7501 North Jog Road
West Palm Beach, Florida 33412-2414

Authorized Representative:
John D. Booth, Executive Director

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation - Air Permitting South
2600 Blair Stone Road, MS #5505
Tallahassee, Florida, 32399-2400

PROJECT

Air Permit No. 0990234-008-AC
North County Resource Recovery Facility

This permit authorizes the construction of a new 3500 scfm flare to combust landfill gas collected at the existing Class I Landfill. The new equipment will be installed at the existing North County Resource Recovery Facility, which is located in Palm Beach County, Florida

NOTICE AND PUBLICATION

The Department distributed an "Intent to Issue Permit" package on February 6, 2004. The applicant published the "Public Notice of Intent to Issue" in The Palm Beach Post on February 18, 2004. The Department received the proof of publication on February 25, 2004. No petitions for administrative hearings or extensions of time to petition for an administrative hearing were filed.

COMMENTS

No comments on the Draft Permit were received from the public, the Department's Southeast District Office, the Palm Beach County Health Department or the applicant.

CONCLUSION

Only minor revisions were made to correct typographical errors. The final action of the Department is to issue the permit with the changes described above.

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

PERMITTEE:

Solid Waste Authority of Palm Beach County
7501 North Jog Road
West Palm Beach, Florida 33412-2414

Authorized Representative:
John D. Booth, Executive Director

North County Resource Recovery Facility
Air Permit No. 0990234-008-AC
Facility ID No. 0990234
SIC No. 49
Permit Expires: January 30, 2005

PROJECT AND LOCATION

This permit authorizes the construction of a new 3500 scfm flare to combust landfill gas collected at the existing Class I Landfill. The new equipment will be installed at the existing North County Resource Recovery Facility, which is located at 7501 North Jog Road in West Palm Beach, Palm Beach County, Florida. The UTM coordinates are Zone 17, 585.8 km East, and 2960.2 km North.

STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) as well as Title 40 Parts 60 and 63 of the Code of Federal Regulations. The permittee is authorized to install the proposed equipment in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department.

CONTENTS

Michael G. Cooke, Director
Division of Air Resources Management

3/22/04
(Date)

FACILITY AND PROJECT DESCRIPTION

The Solid Waste Authority operates the existing North County Resource Recovery Facility, which is a large municipal waste combustor plant designed to process 2000 tons per day of municipal solid waste (MSW). In general, the plant includes two MSW-fired boilers, a Class I Landfill, a Class III Landfill, landfill gas collection and flaring, the processing and storage of refuse-derived fuel, and the processing of oversized bulk waste. This project will add the following emissions unit.

ID	Emission Unit Description
008	New 3500 scfm open flare in Class I Landfill to replace existing 1800 scfm flare

{Permitting Note: In addition, the existing 1800 scfm flare (Emissions Unit 003) at the Class I Landfill will be permanently shutdown as the result of this project.}

REGULATORY CLASSIFICATION

Title III: The facility is identified as a major source of hazardous air pollutants (HAP).

Title IV: The facility has no units subject to the acid rain provisions of the Clean Air Act.

Title V: The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.

PSD: The facility is a PSD-major facility in accordance with Rule 62-212.400, F.A.C.

NSPS: The facility includes units subject to federal New Source Performance Standards.

NESHAP: The facility includes units subject to federal National Emission Standards for Hazardous Air Pollutants.

Siting: The facility is subject to the Electric Power Plant and Transmission Line Siting Act in accordance with the requirements of Part II in Chapter 403, F.S. and Chapter 62-17, F.A.C.

RELEVANT DOCUMENTS

The permit application and additional information received to make it complete are not a part of this permit; however, the information is specifically related to this permitting action and is on file with the Department.

APPENDICES

Appendix A. Citation Formats

Appendix B. General Conditions

Appendix C. Common Conditions

Appendix D. NESHAP Subpart AAAA Requirements

Appendix E. Summary Tables for NSPS Subpart WWW and NESHAP AAAA Requirements

SECTION 2. ADMINISTRATIVE REQUIREMENTS

1. Permitting Authority: All documents related to applications for permits to construct, modify, or operate air emissions units at this facility shall be submitted to the Bureau of Air Regulation of the Florida Department of Environmental Protection (Department) at 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400. Copies of all such documents shall also be submitted to the Compliance Authorities listed below.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Air Resources Section of the Department's Southeast District Office at 400 North Congress Avenue, West Palm Beach, Florida 33416-5425. Copies of all such documents shall also be submitted to the Air Pollution Control Section of the Palm Beach County Health Department at P.O. Box 29, West Palm Beach, Florida 33402-0029.

3. Appendices: The following Appendices are attached as part of this permit: Appendix A (Citation Format); Appendix B (General Conditions); Appendix C (Common Conditions); Appendix D (NESHAP Subpart AAAA Requirements); and Appendix E (Summary Tables for NSPS Subpart WWW and NESHAP AAAA Requirements).

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403 of the Florida Statutes (F.S.); Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.); and Title 40, Part 60 of the Code of Federal Regulations (CFR), adopted by reference in Rule 62-204.800, F.A.C. The terms used in this permit have specific meanings as defined in the applicable chapters of the Florida Administrative Code. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permits or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]

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

6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

7. Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

A. EU-008 – New 3500 scfm Open Flare

This section of the permit addresses the following new emissions unit.

Emissions Unit No. 008
New 3500 scfm open flare will be installed in the Class I Landfill to replace the existing 1800 scfm flare.

A. CONSTRUCTION REQUIREMENTS

A.1. New 3500 scfm Flare: The permittee is authorized to install a new 3500 scfm open flare designed to combust landfill gas collected from the existing Class I Landfill. The new flare is described as an open candlestick, non-steam-assisted flare and will replace the existing 1800 scfm flare. The purpose of the new flare is to provide sufficient landfill gas collection and destruction for final build out of the existing facility. The new flare shall be designed in accordance with the EPA criteria established in 40 CFR 60.18 and shall comply with the emissions standards and requirements for landfill gas disposal in utility "candle-type" flares as specified in 40 CFR 60 Subpart WWW and 40 CFR 63 Subpart AAAA. The following summarizes the preliminary design of the flare and is provided for informational purposes only.

- *Model*: The preliminary design calls for a Model CF1440112 blower and open flare system manufactured by LFG Specialties. The new flare is described as an open candlestick, non-steam-assisted flare.
- *Landfill Gas Flow Rate*: 607 to 3644 scfm
- *Design Combustion Temperature*: 1400° F
- *Minimum Destruction Efficiency*: At least 98% assuming a minimum of 30% methane composition.
- *Design Heat Input Rate*: Approximately 105 MMBtu per hour when assuming a constant heating value for the landfill gas of 500 MMBtu per million cubic feet of gas at the design capacity of 3500 scfm. Note that gas flow rates and heating values may be subject to substantial fluctuations.
- *Design Gas Composition*: 40-60% methane with the remainder as carbon dioxide and inerts
- *Flare Size*: 14 inch tip; 44 feet overall flare height
- *Turndown Ratio*: 6:1

The permittee shall provide any updated information within 60 days of installing the new equipment. The Department recognizes the preliminary nature of this information and may subsequently approve "equivalent" equipment capable of complying with the permit requirements

[Applicant Request; 40 CFR 63, Subpart WWW; NESHAP Subpart AAAA]

A.2. Permitted Capacity: No more than a monthly average of 3500 scfm of landfill gas shall be directed to the new flare. *(Permitting Note: Assuming a constant heating value for the landfill gas of 500 MMBtu per million cubic feet of gas, the design heat input rate at this capacity is 105 MMBtu per hour. Note that landfill gas flow rates as well as heating values may be subject to substantial fluctuations.)* [Rule 62-210.200(PTE), F.A.C.]

A.3. Restricted Operation: The hours of operation of the flare are not limited (8760 hours per year). [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

A.4. Shutdown of Existing 1800 scfm Flare: The permittee shall permanently shutdown the existing 1800 scfm flare (Emissions Unit 003) within 30 days of commencing operation of the new 3500 scfm flare. [Design; Rules 62-4.070(3) and Rule 212.400, F.A.C.]

A.5. Monitoring: Before commencing operation, the permittee shall install a totalizing meter to continuously measure and record gas flow to the flare. Records of the totalizing meter shall be recorded in an

operators' log on at least a monthly basis or whenever the meter is reset for any purpose. Records shall be available for review within 10 days of the following month. A strip chart recorder shall be installed to continuously record the flow rate as a backup device in the event that the totalizing meter is not properly functioning. The strip chart record shall also be used in conjunction with the operators' log to document the monthly hours of operation for the flare. Before commencing operation, the permittee shall also install a device to continuously monitor the flare combustion temperature. Such devices shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's written recommendations. [Rule 62-4.070(3), F.A.C.]

A.6. Reporting: Annually, the permittee shall sample and analyze the landfill gas for sulfur content in accordance with ASTM Method D1072-90 or later method. The actual exit velocity and sulfur content of the landfill gas shall be reported to the Compliance Authority as an attachment to the facility's Annual Operating Report. *{Permitting Note: This was a previous requirement for the existing 1800 scfm flare in Permit No. PSD-FL-108(B).}* [Rule 62-4-070(3), F.A.C.]

B. GENERAL CONTROL DEVICE REQUIREMENTS FOR FLARES IN 40 CFR 60.18

B.1. Opacity: Flares shall be designed for, and operated with, no visible emissions as determined by the methods specified in 40 CFR 60.18(f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(1)]

B.2. Flame: Flares shall be operated with a flame present at all times, as determined by the methods specified in 40 CFR 60.18(f). [Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(2)]

B.3. Gas Heating Value: Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is non-assisted. The net heating value of the gas being combusted shall be determined by the methods specified in 40 CFR 60.18(f). [Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(3)]

B.4. Velocity

(i) Steam-assisted and non-assisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18(f)(4), less than 18.3 m/sec (60 ft/sec), except as provided in 40 CFR 60.18(c)(4)(ii) and 40 CFR 60.18(c)(4)(iii).

(ii) Steam-assisted and non-assisted flares designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18(f)(4), equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

(iii) Steam-assisted and non-assisted flares designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18(f)(4), less than the velocity, Vmax, as determined by the method specified in 40 CFR 60.18(f)(5), and less than 122 m/sec (400 ft/sec) are allowed.

[Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(4)]

B.5. Air-Assisted Flares: Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, Vmax, as determined by the method specified in 40 CFR 60.18(f)(6). [Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(5)]

B.6. Flare Types: Flares used to comply with this section shall be steam-assisted, air-assisted, or non-assisted. [Rule 62-296.800, F.A.C.; 40 CFR 60.18(c)(6)]

B.7. Monitoring: Owners or operators of flares used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators of flares shall monitor these control devices. [Rule 62-296.800, F.A.C.; 40 CFR 60.18(d)]

B.8. Operation: Flares used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them. [Rule 62-296.800, F.A.C.; 40 CFR 60.18(e)]

B.9. Demonstrating Compliance

(1) Reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this subpart. The observation period is 2 hours and observations shall be conducted using EPA Method 22.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$HT = K \sum_{i=1}^{n} CiHi$$

where:

HT = Net heating value of the sample, MJ/scm: where the net enthalpy per mole of off-gas is based on combustion at 25° C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20° C;

K = Constant, 1.740×10^{-7} (1/ppm) (g-mole/scm) (MJ/kcal) where the standard temperature for (g-mole/scm) is 20° C;

Ci = Concentration of sample component "i" in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 (Incorporated by reference as specified in 40 CFR 60.17); and

Hi = Net heat of combustion of sample component "i", kcal/g-mole at 25° C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 (incorporated by reference as specified in 40 CFR 60.17) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(5) The maximum permitted velocity, Vmax, for flares complying with 40 CFR 60.18(c)(4)(iii) shall be determined by the following equation.

$$\text{Log10 (Vmax)} = (HT + 28.8) / 31.7$$

Where:

Vmax = Maximum permitted velocity, m/sec
28.8 = Constant
31.7 = Constant
HT = The net heating value as determined in 40 CFR 60.18(f)(3).

(6) The maximum permitted velocity, Vmax, for air-assisted flares shall be determined by the following equation.

Vmax = 8.706 + 0.7084 (HT)

Where:

Vmax = Maximum permitted velocity, m/sec
8.706 = Constant
0.7084 = Constant
HT = The net heating value as determined in 40 CFR 60.18(f)(3).

[40 CFR 60.18(f) and Rule 62-296.800, F.A.C.]

C. NSPS Requirements for Flares at Landfills in 40 CFR 60 Subpart WWW

C.1. Subpart WWW: The new flare shall comply with all applicable requirements for flares specified in 40 CFR 60 Subpart WWW, including the General Provisions of Subpart A for all NSPS sources. These requirements are already included in the current Title V air operation permit. *{Permitting Note: Appendix E provides summary tables for the requirements of NSPS Subpart WWW and NESHAP AAAA.}*

[40 CFR 60, Subpart WWW; Rule 62-296.800, F.A.C.; Title V Air Permit No. 0990234-004-AV]

D. NESHAP Requirements for Flares at Landfills in 40 CFR 63 Subpart AAAA

D.1. Subpart AAAA: The new flare shall comply with all applicable requirements for flares specified in 40 CFR 63, Subpart AAAA, including the General Provisions of Subpart A for all NESHAP sources. These requirements are not yet included in the current Title V air operation permit. Therefore, the standardized conditions are attached as Appendix D to this permit for completeness. *{Permitting Note: Appendix E provides summary tables for the requirements of NSPS Subpart WWW and NESHAP AAAA.}*

[40 CFR 63, Subpart AAAA; Rule 62-296.800, F.A.C.]

APPENDIX 2

FLDEP Permit Compliance Testing Notification

CIE 3600

SWA
SOLID WASTE AUTHORITY
YOUR PARTNER FOR
SOLID WASTE SOLUTIONS

July 23, 2004

Mr. Laxmana Tallam
Florida Department of Environmental Protection
400 North Congress Ave, Suite 200
West Palm Beach, FL 33401

RE: **Annual Testing Class III Landfill Flare & Initial Compliance Testing 3500 scfm Class I Landfill Flare**
North County Resource Recovery Facility (NCRRF)
Title V Air Permit 0990234-001-AV
Air Permit No. 0990234-008-AC

Dear Laxmana:

This letter serves as additional notice to 7/22/04 email to the FDEP Southeast District office that the annual testing of the Class III landfill flare and initial compliance testing of the new 3500 scfm Class I landfill flare at the North County Resource Recovery Facility (NCRRF) will be performed on August 24th- 25th , 2004. Waste Energy Technology will be conducting the testing.

If you have any questions or comments regarding the testing program, please contact Mary Beth Morrison at (561) 640-4000 ext.4613.

Sincerely,

John D. Booth, P.E., DEE
Executive Director

Cc Jim Stormer, PBCHD
Mark Hammond, SWA
Marc Bruner, SWA
Ray Schauer, SWA
Mark McLean, SWA
Bob Worobel, SWA
Alex H. Makled, CDM
Yanice Mercado, CDM

APPENDIX 3

Utility Flare System Compliance Study
Waste Energy Technology, LLC
August 24-25, 2004

WASTE ENERGY TECHNOLOGY, LLC

11 Tupelo Avenue, S.E. • Fort Walton Beach, Florida 32548-5414
Tel (850) 243-0033 • Fax (850) 243-0077

UTILITY FLARE SYSTEM COMPLIANCE STUDY

Performed by

WASTE ENERGY TECHNOLOGY, LLC

At the

Solid Waste Authority of Palm Beach County
Class I and Class III Flare Stacks
West Palm Beach, Florida
August 24-25, 2004

UTILITY FLARE SYSTEM COMPLIANCE STUDY
Performed by
WASTE ENERGY TECHNOLOGY, LLC
At the
Solid Waste Authority of Palm Beach County
Class I and Class III Flare Stacks
West Palm Beach, Florida
August 24-25, 2004

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UTILITY FLARE SYSTEM COMPLIANCE STUDY
Performed by
WASTE ENERGY TECHNOLOGY, LLC
At the
Solid Waste Authority of Palm Beach County
Class I and Class III Flare Stacks
West Palm Beach, Florida
August 24-25, 2004

1.0 INTRODUCTION

A utility flare system test program was performed by Waste Energy Technology, LLC (WET), on the Southwest, Class I landfill area and the Northeast, Class III landfill area Flare Stacks at the Solid Waste Authority of Palm Beach County (SWA) in West Palm Beach, Florida, on August 24-25, 2004. The tests were authorized by Solid Waste Authority of Palm Beach County and performed by WET and its subcontractor South Florida Environmental Services (SFES). The purpose of this test program was to determine the landfill gas flare net heating value and sulfur content, flare tip exit velocity, and visible emissions during normal operating conditions.

Andy Rodgers and Luis Soto of WET were responsible for the overall coordination of the testing program, operation of the flares, visible emissions testing, and collection of all flow data. Dr. John Jallah and Francis Morlu of SFES were responsible for sampling the gas stream at the flares for net heating value and sulfur content. Mr. Bob Worobel and Mr. Tim Nothhelfer of the SWA were present to observe the testing.

2.0 DISCUSSION OF RESULTS

Table 2.1, listed below, summarizes the test conditions and calculation results for the work performed directly by WET. SFES work summary and results are provided under a separate cover. Source operation appeared normal during the entire test program.

2.1 Table of Test Conditions and Results

Plant: Solid Waste Authority of Palm Beach County	**Source: Class I and Class III Flare Stacks**	
Test Location	Class I Flare Inlet	Class III Flare Inlet
Source Condition	Normal	Normal
Date	8/24/04	8/25/04
Average Gas Volumetric Flow Rate:		
@ Actual Conditions, acfm	1098.95	737.74
@ Standard Conditions, scfm	951.59	689.33
@ Dry Standard Conditions, dscfm	781.20	647.71
Flare tip diameter, inches	15.624	6.000
Flare tip area, square feet	1.3314	0.1963
Average Gas Temperature, deg. F	153.07	110.4
Average Flue Gas Velocity, ft/sec	23.32	35.39
Flue Gas Moisture, percent by volume	17.90	6.04
Average Flue Pressure, in. Hg	30.08	30.20
Barometric Pressure, in. Hg	30.06	30.06
Net Heating Value: (From SFES Report)		
Btu/cubic meter	15885	10,943
Btu/scf	449.81	309.87
MJ/scm	16.75	11.54
Maximum Permitted Velocity:		
ft/sec	89.71	61.44
m/sec	27.34	18.73
Exit Velocity:		
ft/sec	11.91	58.51
m/sec	3.63	17.83

3.0 TEST PROCEDURES

All testing, sampling, analytical, and calibration procedures used for this test program were performed as described in the Code of Federal Regulations, Title 40, Part 60, Appendix A (40CFR60), Methods 1 through 4 and 22 and the latest revisions thereof. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, United States Environmental Protection Agency (USEPA) 600/4-77-027b was used to determine the precise procedures.

Calculations were performed by computer and by hand; an explanation of the nomenclature and calculations along with the complete test results are appended.

3.1 Volumetric Flowrate Determination

In order to determine the flare tip gas exit velocity, the volumetric flow rate was determined using reference Method 2.

Velocity pressures were determined by traversing the test locations with a standard pitot tube. Temperatures were measured using a K-type thermocouple with a calibrated digital temperature indicator. The molecular weight of the gas was determined through laboratory analysis, which is included in the report by SFES titled "Total Sulfur & Net Heating Value Test Program" and is included in Appendix Section 4. Sampling points utilized were determined using reference Method 1. A copy of the above mentioned data and subsequent calculations have been included as Appendix 3A.

3.2 Moisture (H_2O) Determination

Determining the moisture content in the gas stream is necessary to calculate the volumetric gas flow on a dry basis. For this purpose, WET used the wet bulb/dry bulb method. The data and calculations for determination of the moisture content are also included in Appendix 3A.

3.3 Visible Emissions Determination

Reference Method 22, 40CFR60, procedures were used to make a visual determination of visible emissions from the flare stacks. The method specifies that the qualified observer stand at a distance sufficient to provide a clear view of the emissions with the sun not directly in the observer's eyes. Observations were made immediately downstream of the flame, since smoke occurring within the flame, but not downstream of the flame, is not considered a smoke emission. Observations were made at 20-minute intervals with one (1) observer at each flare for the duration of the 2-hour time period. Copies of the visible emissions test reports are included as Appendix 3B. The observer, Andy Rodgers of WET, meets the requirements of

Method 22.

4.0 QUALITY ASSURANCE PROCEDURES

Waste Energy Technology, LLC recognizes the previously described reference methods to be very technique oriented and have attempted to minimize all factors which can increase error by implementing its Quality Assurance Program into every segment of its testing activities.

4.1 CALIBRATION PROCEDURES

PITOT TUBES

The pitot tubes used during this test program are fabricated according to the specification described and illustrated in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1 through 5 as published in the Federal Register, Volume 42, No. 160; hereafter referred to by the appropriate method number. The pitot tubes comply with the alignment specifications in Method 2, Section 4, and the pitot tube assemblies are in compliance with specifications in the same section.

The pitot tubes are visually inspected for conformance to the dimensional criteria specified in EPA Method 2.

TEMPERATURE SENSING DEVICES

The k-type thermocouple used for temperature measurements is a certified thermometer and has been deemed efficient, accurate, and usable by the ITC Laboratory at the National Institute of Standards and Technology (NIST).

5.0 SAMPLE CALCULATIONS

Class I Flare Velocities

The exit velocity and maximum permitted velocity is calculated in the following manner:

$$\text{Exit Velocity (ft/sec)} = \frac{\text{Volumetric Flowrate (scfm)}}{\text{Flare Tip Area}} \times \frac{1 \text{ min}}{60 \text{ sec}}$$

Maximum Permitted Velocity (m/sec) as per 40CFR60, Section 60.18

$$\log_{10}(V_{MAX}) = \frac{H_T + 28.8}{31.7}$$

Where H_T = Net Heat Value of Landfill Gas, MJ/sm^3
28.8 and 31.7 = Constants

Example Calculation of the Class I flare stack maximum permitted velocity

$$\log_{10}(V_{MAX}) = \frac{16.75 + 28.8}{31.7}$$

Where: Net Heating Value by Lab Analysis = 15,885 Btu/sm^3
or 449.81 Btu/scf (35.31 Btu/sm^3 = 1 Btu/scf)
or 16.75 MJ/sm^3 (200 Btu/scf = 7.45 MJ/sm^3)

V_{MAX} = 27.35 m/sec

$$\frac{27.35 \text{ m/sec}}{0.3048} = 89.71 \text{ ft/sec}$$

Where: 0.3048 meters = 1 ft.

Exit Velocity

Example Calculation of Class I flare stack
Flare Tip Area: 1.3314 ft^2
Flow Rate: 951.59 scfm

$$\frac{951.59 \text{ scfm}}{1.3314 \text{ ft}^2} \times \frac{1 \text{ min}}{60 \text{ sec}} = 11.91 \text{ ft/sec}$$

11.91 ft/sec x 0.3048 = 3.63 m/sec

Class III Flare Velocities

The exit velocity and maximum permitted velocity is calculated in the following manner:

$$\text{Exit Velocity (ft/sec)} = \frac{\text{Volumetric Flowrate}}{\text{Flare Tip Area}} \text{ (scfm)} \times \frac{1 \text{ min}}{60 \text{ sec}}$$

Maximum Permitted Velocity (m/sec) as per 40CFR60, Section 60.18

$$\log_{10}(V_{MAX}) = \frac{H_T + 28.8}{31.7}$$

Where H_T = Net Heat Value of Landfill Gas, MJ/sm^3
28.8 and 31.7 = Constants

Example Calculation of the Class III flare stack maximum permitted velocity

$$\log_{10}(V_{MAX}) = \frac{11.54 + 28.8}{31.7}$$

Where: Net Heating Value by Lab Analysis= 10,943 Btu/sm^3
or 309.87 Btu/scf (35.31 Btu/sm^3 = 1 Btu/scf)
or 11.54 MJ/sm^3 (200 Btu/scf = 7.45 MJ/sm^3)

V_{MAX} = 18.73 m/sec

$$\frac{18.73 \text{ m/sec}}{0.3048} = 61.44 \text{ ft/sec}$$

Where: 0.3048 meters = 1 ft.

Exit Velocity

Example Calculation of Class III flare stack
Flare Tip Area: 0.1963
Flow Rate: 689.33 scfm

$$\frac{689.33 \text{ scfm}}{0.1963 \text{ ft}^2} \times \frac{1 \text{ min}}{60 \text{ sec}} = 58.51 \text{ ft/sec}$$

58.51 ft/sec x 0.3048 = 17.83 m/sec

APPENDIX 3A

Field Operational Data

GAS FLOW CALCULATION - PITOT TUBE
LANDFILL GAS MANAGEMENT SYSTEM
SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
WEST PALM BEACH, FLORIDA

TEST LOCATION: **CLASS I FLARE**
TEST DATE: **8/24/2004**
TEST TIME: **11:00 AM**

Point No.	ΔP "(Hg)	t_s °F	Point No.	ΔP "(Hg)	t_s °F	Point No.	ΔP "(Hg)	t_s °F
1	0.11	152.7	1	0.10	153.0	1	0.09	153.5
2	0.12	152.7	2	0.09	153.0	2	0.10	153.5
3	0.13	152.7	3	0 10	153.0	3	0.10	153.5
4	0.12	152.7	4	0.10	153 0	4	0.09	153.5
5	0.08	152.7	5	0.08	153.0	5	0.08	153.5
6	0.09	152.7	6	0.08	153.0	6	0.08	153.5
7	0.09	152.7	7	0 09	153.0	7	0.08	153.5
8	0.09	152.7	8	0.08	153.0	8	0.08	153.5
Average	0.104	152.7	Average	0 090	153.0	Average	0.088	153.5

Avg ΔP ("$H_2$0)	0.09	Avg $\Delta P^{1/2}$ ("H_2O)$^{1/2}$	0.31
Avg t_s (°F)	153.07	T_s = Avg t_s + 460 (°R)	613.07

Given:

Cp	0.99
T_{std} (°R)	528
P_{std} ("Hg)	29.92
K_p	85.49

Recorded:

Traverse Points (No.)	8
P_{bar} ("Hg)	30.06
P_g - Static ("H_2O)	0.30
t' - Wet Bulb °F	138
Duct ID (in)	12.000

Lab Analysis:

CH_4 (%)	44.00
CO_2 (%)	27 00
O_2 (%)	3.40
N_2 (%)	24.00

Units of K_p - (ft/sec [(lb/lb-mole)("Hg)/(°R)("H_2O)]$^{1/2}$

Equations:

$P_s = P_{bar} + (P_g/13.6)$
Duct Area = πr^2
$B_{ws} = [e' - (A * P_s * (t_s - t'))] / P_s$
$A = 3.57\ E\text{-}4 * [1 + .00064 * (t' - 32)]$
e' = saturated vapor pressure of water at t'
$M_d = .16*CH_4 + .44*CO_2 + 32*O_2 + 28*N_2$
$M_s = (M_d * 1\text{-}B_{ws}) + (18 * B_{ws})$
$V_s = K_p * C_p * [T_s / (M_s * P_s)]^{1/2} * \Delta P^{1/2}$
$Q_{acfm} = V_s * \text{Duct Area} * 60$
$Q_{scfm} = V_s * \text{Duct Area} * T_{std}/T_s * P_s/P_{std} * 60$
$Q_{dscfm} = V_s * \text{Duct Area} * T_{std}/T_s * P_s/P_{std} * (1\text{-}B_{ws}) * 60$

Calculations:

P_s ("Hg)	30.08	("Hg)
Duct Area (ft^2)	0.7854	($ft.^2$)
B_{ws}	17.90%	
A	0 00038	
e'	5.559	("Hg)
M_d	26.73	(lb/lb-mole)
M_s	25.17	(lb/lb-mole)
V_s	23.32	(ft/sec)
Q_{acfm}	1098.95	($ft.^3$/min)
Q_{scfm}	951.59	($ft.^3$/min)
Q_{dscfm}	781.20	($ft.^3$/min)

Note: e' is recorded from the Handbook of Chemistry and Physics, 52nd Edition, page D-148

FLARE TIP VELOCITY CALCULATION
LANDFILL GAS MANAGEMENT SYSTEM
SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
WEST PALM BEACH, FLORIDA
CLASS I FLARE

Recorded:		**Lab Analysis:**	
Flare Tip ID (in)	15.624	Net Heating Value H_T (BTU/m^3)	15885
		Net Heating Value H_T (BTU/$ft.^3$)	449.81
		Net Heating Value H_T (MJ/m^3)	16.75

Equations:	**Calculations:**
Maximum Permitted Velocity (V_{MAX}) as per 40 CFR 60.18:	
$\log_{10}(V_{MAX}) = (H_T + 28.8) / 31\ 7$	27 34 (m/sec)
	89.71 (ft./sec)
Flare Tip Area = πr^2	1.3314 ($ft.^2$)
Flare Tip Exit Velocity (V_{TIP}) = Q_{scfm} / (Tip Area * 60)	11.91 (ft./sec)
	3.63 (m/sec)

GAS FLOW CALCULATION - PITOT TUBE
LANDFILL GAS MANAGEMENT SYSTEM
SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
WEST PALM BEACH, FLORIDA

TEST LOCATION: **CLASS III FLARE**
TEST DATE: **8/25/2004**
TEST TIME: **8:00 AM**

Point No.	ΔP "(Hg)	t_s °F	Point No.	ΔP "(Hg)	t_s °F	Point No.	ΔP "(Hg)	t_s °F
1	0.27	110.3	1	0.27	110.4	1	0.26	110.4
2	0.28	110.3	2	0.27	110 4	2	0.26	110.4
3	0.25	110.3	3	0.27	110.4	3	0.26	110.4
4	0.24	110.3	4	0.24	110.4	4	0.23	110.4
5	0.28	110.3	5	0.27	110.4	5	0.26	110.4
6	0.29	110.3	6	0.28	110.4	6	0.27	110.4
7	0.25	110.3	7	0.27	110.4	7	0.27	110.4
8	0.24	110.3	8	0 23	110.4	8	0.23	110.4
Average	0.263	110.3	Average	0.263	110.4	Average	0.255	110.4

Avg ΔP ("$H_2$0)	0.26	Avg $\Delta P^{1/2}$ ("H_2O)$^{1/2}$	0.51
Avg t_s (°F)	110.4	T_s = Avg t_s + 460 (°R)	570.4

Given:

Cp	0.99
T_{std} (°R)	528
P_{std} ("Hg)	29.92
K_p	85.49

Recorded:

Traverse Points (No.)	8
P_{bar} ("Hg)	30.06
P_g - Static ("H_2O)	1.90
t' - Wet Bulb °F	100
Duct ID (in)	7.981

Lab Analysis:

CH_4 (%)	30.00
CO_2 (%)	27.00
O_2 (%)	4.40
N_2 (%)	38.00

Units of K_p - (ft/sec [(lb/lb-mole)("Hg)/(°R)("H_2O)]$^{1/2}$

Equations:

$P_s = P_{bar} + (P_g/13.6)$
Duct Area = πr^2
$B_{ws} = [e' - (A * P_s * (t_s - t'))] / P_s$
$A = 3.57\ E\text{-}4 * [1 + .00064 * (t' - 32)]$
e' = saturated vapor pressure of water at t'
$M_d = .16*CH_4 + .44*CO_2 + .32*O_2 + .28*N_2$
$M_s = (M_d * 1\text{-}B_{ws}) + (18 * B_{ws})$
$V_s = K_p * C_p * [T_s / (M_s * P_s)]^{1/2} * \Delta P^{1/2}$
$Q_{acfm} = V_s * \text{Duct Area} * 60$
$Q_{scfm} = V_{s*\text{Duct Area}} * T_{std}/T_s * P_s/P_{std} * 60$
$Q_{dscfm} = V_{s*\text{Duct Area}} * T_{std}/T_s * P_s/P_{std} * (1\text{-}B_{ws}) * 60$

Calculations:

P_s ("Hg)	30.20	("Hg)
Duct Area (ft^2)	0.3474	($ft.^2$)
B_{ws}	6.04%	
A	0.00037	
e'	1.940	("Hg)
M_d	28.73	(lb/lb-mole)
M_s	28.08	(lb/lb-mole)
V_s	35.39	(ft/sec)
Q_{acfm}	737.74	($ft.^3$/min)
Q_{scfm}	689.33	($ft.^3$/min)
Q_{dscfm}	647.71	($ft.^3$/min)

Note: e' is recorded from the Handbook of Chemistry and Physics, 52nd Edition, page D-148

FLARE TIP VELOCITY CALCULATION
LANDFILL GAS MANAGEMENT SYSTEM
SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
WEST PALM BEACH, FLORIDA
CLASS III FLARE

Recorded:		**Lab Analysis:**	
Flare Tip ID (in)	6.000	Net Heating Value H_T (BTU/m^3)	10943
		Net Heating Value H_T (BTU/$ft.^3$)	309.87
		Net Heating Value H_T (MJ/m^3)	11.54

Equations:	**Calculations:**
Maximum Permitted Velocity (V_{MAX}) as per 40 CFR 60.18:	
$\log_{10}(V_{MAX}) = (H_T + 28.8) / 31\ 7$	18.73 (m/sec)
	61.44 (ft./sec)
Flare Tip Area = πr^2	0.1963 ($ft.^2$)
Flare Tip Exit Velocity (V_{TIP}) = Q_{scfm} / (Tip Area * 60)	58 51 (ft./sec)
	17.83 (m/sec)

WASTE ENERGY TECHNOLOGY, LLC - FLARE LOG WORKSHEET

SITE: Solid Waste Authority - WET Project No 204519

PERSONNEL: Andy Rodgers/Luis Soto

DATE (YYMMDD)	TIME 24 HR	HDR IN ("wc)	BLWR IN / OUT ("wc)	B.P. ("wc)	LFG TEMP (°F)	PILOT TEMP. (°F)	FLOW TOTALIZER (x1000 hrs)	LFG FLOW (scfm)	BLWR#1 AMPS (amps)	BLWR#1 HRMTR (x 10 hrs)	BLWR#2 AMPS (amps)	BLWR#2 HRMTR (x 10 hrs)	LFG QUALITY O2 (%)	LFG QUALITY CH4 (%)	ACTUATOR VALVE TANK (psi)	ACTUATOR VALVE LINE (psi)	PROP. TANK (%)	COMMENTS
Class I																		
08/24/04	806	-36 2	n/a	0 3	141 0	1083	11,768 540	1079	20 0	933 5	0 0	888.8	2 8	54	1610	107	57	
Class III																		
08/25/04	800	-11 5	-14 3	1 9	110 0	734	-	643	9 0	33796 8	0.0	39875 6	3 1	33	6000	100	82	

APPENDIX 3B

Visible Emissions Test Reports

WASTE ENERGY TECHNOLOGY, LLC

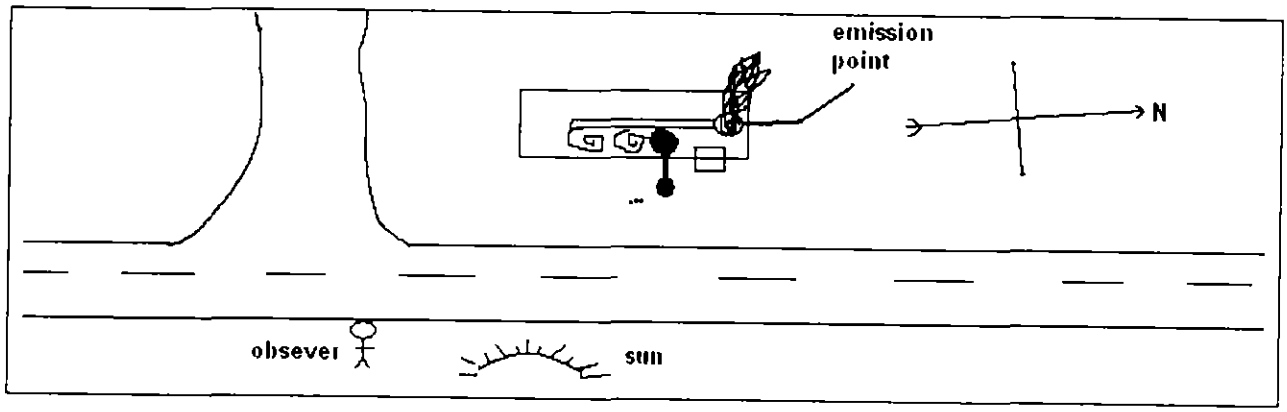
ENVIRONMENTAL MANAGEMENT
ENGINEERS & CONTRACTORS

FORT WALTON BEACH, FLORIDA

FUGITIVE OR SMOKE EMISSION ENSPECTION
OUTDOOR LOCATION

Company	Solid Waste Authority	Observer	Andy Rodgers
Location	Class I	Affiliation	WET Technician
Representative	Bob Worobel	Date	8/24/04
Sky Conditions	Partly Cloudy	Wind Direction	SW (calm)
Precipitation	None	Wind Speed	0-5 mph (calm)
Industry	Solid Waste	Process Unit	Utility Flare

Sketch process unit; indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration	Accumulated Emission Time
Begin Observation	8:30	20 min	0
	8:55	20 min	0
	9:20	20 min	0
	9:45	20 min	0
	10:10	20 min	0
	10:35	20 min	0
End Observation	10:55 am	120 min	0

11 Tupelo Avenue, S.E., Fort Walton Beach Florida 32548
Tel: (850) 243-0033 Fax: (850) 243-0077

WASTE ENERGY TECHNOLOGY, LLC

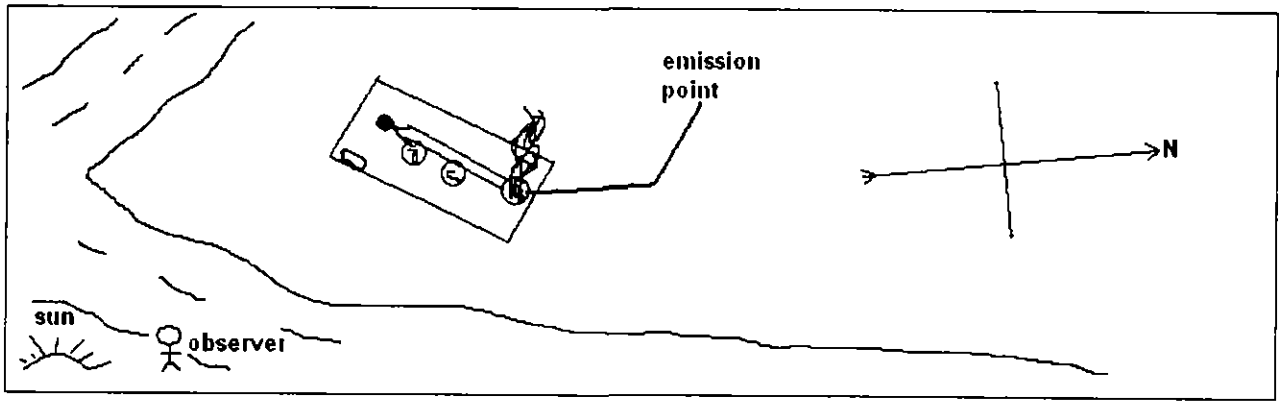
ENVIRONMENTAL MANAGEMENT
ENGINEERS & CONTRACTORS

FORT WALTON BEACH, FLORIDA

FUGITIVE OR SMOKE EMISSION ENSPECTION
OUTDOOR LOCATION

Company	Solid Waste Authority	Observer	Andy Rodgers
Location	Class III	Affiliation	WET Technician
Representative	Bob Worobel	Date	8/24/04
Sky Conditions	Cloudy	Wind Direction	Calm; NW @ 2:00pm
Precipitation	Light Rain	Wind Speed	Calm; 5-10mph@2:00pm
Industry	Solid Waste	Process Unit	Utility Flare

Sketch process unit; indicate observer position relative to source and sun; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration	Accumulated Emission Time
Begin Observation	1:10	20 min	0
	1:35	20 min	0
	2:00	20 min	0
	2:25	20 min	0
	2:50	20 min	0
	3:15	20 min	0
End Observation	3:35 pm	120 min	0

11 Tupelo Avenue, S.E., Fort Walton Beach Florida 32548
Tel: (850) 243-0033 Fax: (850) 243-0077

APPENDIX 4

Sulfur Content & Net Heating Value Test Program
South Florida Environmental Services
August 25, 2004

South Florida
Environmental Services

FINAL REPORT
COMPLIANCE TEST PROGRAM

PREPARED FOR:
Waste Energy Technology
11 Tupelo Avenue, S.E.
Walton Beach, Florida 32548-5414

CONCERNING:
Solid Waste Authority
Class I & III Landfill Gas Flares
West Palm Beach. Florida
August 25, 2004

PREPARED BY:
South Florida Environmental Services
6861 Vista Parkway North
West Palm Beach, FL 33411

I hereby certify that the information contained in this report is true and accurate to the best of my knowledge.

Dr. John Jallah
Environmental Chemist

9/30/04
Date

TABLE OF CONTENTS

APPENDICES

1.0 COMPENDIUM

On August 25, 2004, South Florida Environmental Services (SFES) conducted a Compliance Test on behalf of Waste Energy Technology on the Solid Waste Authority of Palm Beach County Landfill, located at 6501 North Jog Road, West Palm Beach, Florida.

The purpose of the program was to sample and characterize Class I and III Landfill Gas (LFG) for VOC, Mixed gases, Assorted Sulfur Compounds and Heating Value.

2.0 SAMPLING AND ANALYTICAL PROCEDURES

Landfill gas samples were collected in glass-lined cylindrical Suma-Canisters for VOC, Mixed Gases, and Heating Value. Tedlar Bag samples were also taken for the determination of assorted Sulfur Compounds.

Air Toxics, Ltd of Folsom, California provided the Canisters and Tedlar Bags, which had been prepared according to Protocol No. 1 standards. Air Toxics also analyzed both the Canister and Tedlar Bag gas samples for the chemical and physical constituents of interest.

Francis K. Morlu (Engineer & Technical Services Manager) and John Jallah (Environmental Chemist) were responsible for the Compliance Program, including LFG sampling and report preparation.

3.0 QUALITY CONTROL PROCEDURES

Throughout all phases of the test program, including sampling, analysis and data reduction, strict quality control procedures were adhered to.

Sampling was conducted by trained personnel with extensive experience in both inorganic and organic compound sampling. Analysis was conducted by Air Toxics, Ltd. of Folsom, California, which is thoroughly familiar with the requirements associated with these analytical procedures.

SFES's entire equipment inventory is on a schedule of routine maintenance and calibration. This includes meter boxes, thermocouples, barometers, pitot tubes and sampling nozzles. Meter boxes are calibrated over a full range of flow rates against a wet test meter every six months.

Analysis was conducted in accordance with the specific methods using proper laboratory procedures. These specific procedures in addition to South Florida Environmental Service's usual high standard of quality control helped validate the results obtained in this test program. SFES is staffed by a team of qualified, experienced environmental professionals. As the majority of our emissions testing work is done for compliance purposes, strict QA/QC procedures are incorporated into our everyday work performance.

4.0 RESULTS AND DISCUSSION

The results of the test are summarized in **Tables 1-1** through **1-3** of this section. **Table 1-1** shows that Nitrogen (N2), Carbon Dioxide (CO2) and Methane (CH4) are the main gaseous constituents. Air Toxics, which analyzed the gaseous samples, estimated the Heating Value (HV) at 450 Btu/ft^3 (15,885 Btu/m^3) for the Class I Flare and 310 Btu/ft^3 (10,943 Btu/m^3) for the Class III Flare. A special formula that takes into account the relative contributions of Methane and Hydrogen gases gave a total HV of 16,966 Btu/m^3 for the Class I Flare and 11,523 Btu/m^3 for the Class III Flare.

Table 1-2 summarizes the Sulfur characteristics of the Flares. The table shows that most sulfur compounds are negligible to non-detectable. The Table shows that Hydrogen Sulfide is the main sulfur constituent for both Class I & III Flares.

Volatile Organic Compounds (VOC's) in the Flares are reported in **Table 1-3**, which shows that most VOC's are non-detectable. Those that are detectable in both Class I and III Flares include: Freon-12, Ethanol, Acetone, 2-Propanol, Hexane, 2-Butanone, Tetrahydrofuran, Benzene, Heptane, 4-Methyl-2-pentanone, Toluene, Tetrachloroethene, Ethyl Benzene, m/p-Xylene, 0-Xylene, Styrene, and Benzene and Benzene-like compounds. The table also shows that Class I Flares are considerably higher than Class III Flares with respect to these VOC's.

Table 1-1
Mixed Gases and Heating Value Results.

PARAMETER	CONCENTRATION†	
	FLARE-I	FLARE-III
	Mixed Gases (%)	
Oxygen	3.40	4.40
Nitrogen	24.00	38.00
Carbon Monoxide	ND	ND
Methane	44.00	30.00
Carbon Dioxide	27.00	27.00
Ethane	ND	ND
Hydrogen	0.53	ND
Ethene	ND	ND
Total	**98.93**	**99.4**
Heating Value [GCV] (Btu/ft^3)		
Estimated by Air Toxics	450	310
Heating Value [GCV] (Btu/m^3)		
Estimated by Air Toxics*	15,885	10943
Calculated From CH4 **	16,900	11523
Calculated From H2	65	ND
Sum of CH4 & H2-Calculation	16,966	11,523

† Numbers have been corrected for blank samples; ND=Not Detected above detection limit; *GCV (Btu/m^3)= GCV (Btu/ft^3) x 35.3 ft^3/m^3; **Calculated GCV ≈ [% CH4 or H2 /100 %] x H x 273 K/298 K x 1000 L/m3 x 1.0543 Btu/kj x 1.0 mole/22.4 L; where, H=890.8 kj/mole for CH4 and 285.83 kj/mole for H2.

Table 1-2
Assorted Sulfur Analysis Results

PARAMETER	CONCENTRATIONS (PPM)†	
	FLARE-I	FLARE-III
Hydrogen Sulfide	200.00	64.00
Carbonyl Sulfide	ND*	ND
Methyl Mercaptan	11.00	0.43
Ethyl Mercaptan	ND	ND
Dimethyl Sulfide	14.00	0.42
Carbon Disulfide	ND	ND
Isopropyl Mercaptan	ND	ND
tert-Butyl Mercaptan	ND	ND
n-Propyl Mercaptan	ND	ND
Ethyl Methyl Sulfide	ND	ND
Thiophene	ND	ND
Isobutyl Mercaptan	ND	ND
Diethyl Sulfide	ND	ND
Butyl Mercaptan	ND	ND
Dimethyl Disulfide	ND	ND
3-Methylthiophene	ND	ND
Tetrahydrothiophene	ND	ND
2-Ethylthiophene	ND	ND
2,5-Dimethylthiophene	ND	ND
Diethyl Disulfide	ND	ND

†Numbers have been corrected for blank samples; *ND=Not Detected above detection limit.

Table 1-3
Landfill Gas Class I & III Flare
VOC Analysis Results

PARAMETER	VOC CONCENTRATIONS (PPB)†		VOC CONCENTRATIONS (Ug/m3)†	
	FLARE-I	FLARE-III	FLARE-I	FLARE-III
Freon 12	1900	180	9400	930
Freon 114	ND*	ND	ND	ND
Chloromethane	ND	ND	ND	ND
Vinyl Chloride	ND	110	ND	290
1,3-Butadiene	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Chloroethane	ND	40	ND	110
Freon 11	ND	40	ND	230
Ethanol	210000	22000	400000	43000
Freon 113	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
Acetone	46000	440	110000	1000
2-Propanol	30000	1400	740000	3500
Carbon Disulfide	ND	ND	ND	ND
3-Chloropropene	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
Methyl tert-butyl ether	ND	32	ND	120
trans-1,2-Dichloroethene	ND	ND	ND	ND
Hexane	900	660	32000	2400
Vinyl Acetate	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
2-Butanone (Methyl Ethyl Ketone)	66000	340	200000	1000
Cis-1,2-Dichloroethene	ND	66	ND	260
Tetrahydrofuran	4400	110	13000	340
Chloroform	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
Cyclohexane	ND	260	ND	900
Carbon Tetrachloride (CCl4)	ND	ND	ND	ND
2,2,4-Trimethylpentane	ND	240	ND	1100
Benzene	2400	260	7800	860
1,2-Dichloroethane	ND	ND	ND	ND
Heptane	1100	400	4600	1700
Trichloroethane	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND

†Numbers have been corrected for blank samples; *ND=Not Detected above detection limit.

Table 1-3 Continued
Landfill Gas Class I & III Flare
VOC Analysis Results

PARAMETER	VOC CONCENTRATIONS (PPB)†		VOC CONCENTRATIONS (Ug/m3)†	
	FLARE-I	FLARE-III	FLARE-I	FLARE-III
cis-1,3-Dichloropropene	ND*	ND	ND	ND
4-Methyl-2-pentanone	1800	ND	7500	ND
Toluene	19000	580	72000	2200
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Tetrachloroethene	820	ND	5700	ND
2-Hexanone	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dibromoethane (EDB)	ND	ND	ND	ND
Chlorobenzene	ND	54	ND	250
Ethyl Benzene	6800	740	30000	3300
m,p-Xylene	13000	460	59000	2000
0-Xylene	4000	220	17000	980
Styrene	960	29	4200	120
Bromoform	ND	ND	ND	ND
Cumene	ND	1100	ND	5300
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Propylbenzene	ND	120	ND	610
4-Ethyltoluene	3300	220	16000	1100
1,3,5-Trimethylbenzene	1200	100	6100	520
1,2,4-Trimethylebenzene	3100	280	15000	1400
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-dichlorobenzene	1900	53	12000	320
alpha-Chlorotoluene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND

†Numbers have been corrected for blank samples; *ND=Not Detected above detection limit.

APPENDIX A
NOMENCLATURE

NOMENCLATURE

%DRE	= percent destruction/removal efficiency
% ISO	= percent isokinetic sampling rate
$\%CO_2$	= percent carbon dioxide by volume (dry)
$\%H_2O$	= percent moisture
$\%N_2$	= percent nitrogen by volume (dry)
$\%O_2$	= percent oxygen by volume (dry)
µg	= micrograms
$\Delta H_@$	= pressure drop across orifice of meter for 0.75 CFM at standard conditions
ΔP_{avg}	= average velocity pressure
A_n	= sampling nozzle cross-sectional area (ft2)
Ar	= acetone residue - result of blank evaporation
A_s	= stack cross sectional area (ft2)
B_{wo}	= moisture content of stack gas; expressed as a decimal
C	= final emissions data reported by CEMs, adjusted for calibration drift
C'	= raw emissions data reported by the CEMs, uncorrected for calibration drift.
Cm	= average CEM response to initial and final span gas system calibration
Co	= average CEM response to initial and final zero gas system calibration
C_p	= pitot tube coefficient
C_s	= concentration in stack gas in pounds per standard cubic foot
$C_{s'}$	= concentration in stack gas in grains per standard cubic foot
C_{s12}	= concentration corrected to 12 percent CO_2
D_e	= equivalent diameter of rectangular stack
D_n	= nozzle diameter in inches
D_s	= stack inside diameter in feet
Delta H(abs)	= the meter orifice differential, absolute conditions in inches of mercury
Delta H	= the meter orifice differential
dgm	= dry gas meter
Dry Gas In	= temperature of the dgm inlet in degrees Fahrenheit
Dry Gas Out	= temperature of the dgm outlet in degrees Fahrenheit
F factor	= a factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted
F_c	= a factor representing a ratio of the volume of carbon dioxide generated to the calorific value of the fuel combusted
Fw	= a F factor on a wet basis

NOMENCLATURE (CONT'D)

dscf	= dry standard cubic foot
dscfh	= dry standard cubic foot per hour
dscfm	= dry standard cubic foot per minute
E	= emission rate in pounds per million BTU
End Meter	= the dgm reading in cubic feet at the end of the sampling period
F_d	= F-factor dry standard cubic feet per million BTU at zero percent oxygen
FID	= flame ionization detection
F_o	= EPA method 3 fuel factor
fps	= feet per second
GC	= gas chromatograph
GC/MS	= gas chromatograph/mass spectrograph
gr	= grain of particulate; 1lb. = 7000 grains
gr/dscf	= grains per dry standard cubic foot
gr@12%	= grains per dry standard cubic foot corrected to 12 percent oxygen
gr@7%	= grains per dry standard cubic foot corrected to 7 percent oxygen
Hg	= mercury
int/i	= initial
IN	= inches
Int Meter	= the dgm reading in cubic feet at the beginning of the test period
K	= degrees Kelvin
PIT Coeff	= pitot tube coefficient
lb/SCF	= pounds per standard cubic foot
lb/hr	= pounds per hour
lb/mmBTU	= pounds per million BTU
Cma	= concentration of the calibration gases
M_d	= dry molecular weight of flue gas
mg	= milligrams
mg/DSCM	= milligrams per dry standard cubic meter
ml	= milliliters
MM5	= modified EPA method 5
MMBTU/hr	= million BTU per hour
M_s	= molecular weight of flue gas, wet basis
Md	= molecular weight of flue gas, dry basis
ng	= nanograms
NMHC	= non-methane hydrocarbons
Θ	= net run time in minutes

NOMENCLATURE (CONT'D)

°C	= degrees Celsius
°F	= degrees Fahrenheit
°R	= degrees Rankine
P bar	= barometric pressure in inches of mercury
P stk	= pressure of the stack in inches of water
Pabs	= absolute pressure
ppm_{wd}	= parts per million by volume, dry
Ps	= flue gas static pressure in absolute pressure
P_{std}	= standard absolute pressure at 29.92 inches of mercury
Qa	= volumetric air flow rate actual cubic feet per minute
Q_s	= volumetric air flow rate dry standard cubic feet per minute
rh	= relative humidity
scf	= standard cubic feet
scfm	= standard cubic feet per minute
T_m	= dry gas meter temperature in degrees Fahrenheit
T_s	= flue gas temperature in degrees Fahrenheit
t_{std}	= standard temperature in degrees Fahrenheit
T_{std}	= standard absolute temperature
THC	= Total hydrocarbons
V	= volume
Vl	= total volume of liquid collected in impingers and silica gel
V_m	= volume of metered gas sampled in cubic feet
$V_{m\ std}$	= volume of metered gas sample at dry standard conditions in dry standard cubic feet
VOC	= volatile organic compounds
VS	= average flue gas velocity in feet per second
$V_{w\ std}$	= volume of water vapor in cubic feet
wscfm	= wet standard cubic feet per minute
Y	= dry gas meter calibration factor

APPENDIX B

ANALYTICAL LABORATORY RESULTS

- Results of Mixed Gases & Heating Value
- Results of Volatile Organic Compounds
- Results of Assorted Sulfur Compounds

- Results of Mixed Gases & Heating Value

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

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

This electronic report includes the following:

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

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

(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific
E-mail to:samplereceiving@airtoxics.com

@ AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0408520B

Work Order Summary

CLIENT:	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411	**BILL TO:**	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411
PHONE:	561-687-5300	**P.O. #**	
FAX:	561-687-3676	**PROJECT #**	WET-04-564 WET
DATE RECEIVED:	8/27/04	**CONTACT:**	DeDe Dodge
DATE COMPLETED:	9/10/04		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	Class I-F-C	Modified ASTM D-1945	0.5 "Hg
02A	Class III-F-C	Modified ASTM D-1945	1.0 "Hg
02AA	Class III-F-C Duplicate	Modified ASTM D-1945	1.0 "Hg
03A	Lab Blank	Modified ASTM D-1945	NA
03B	Lab Blank	Modified ASTM D-1945	NA
04A	LCS	Modified ASTM D-1945	NA
04B	LCS	Modified ASTM D-1945	NA

CERTIFIED BY: _____ DATE: 09/10/04

Laboratory Director

Certification numbers: AR DEQ - 03-084-0, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/04, Expiration date: 06/30/05
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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

LABORATORY NARRATIVE
Modified ASTM D-1945
South Florida Environmental Services
Workorder# 0408520B

Two 1 Liter Silonite Canister samples were received on August 27, 2004. The laboratory performed analysis via modified ASTM Method D-1945 for Methane and fixed gases in natural gas using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	*ASTM D-1945*	*ATL Modifications*
Normalization	Sum of original values should not differ from 100.0% by more than 1.0%.	Sum of original values may range between 75-125%. Normalization of data not performed.
Sample analysis	Equilibrate samples to 20-50° F. above source temperature at field sampling	No heating of samples is performed.
Sample calculation	Response factor is calculated using peak height for C5 and lighter compounds.	Peak areas are used for all target analytes to quantitate concentrations.
Reference Standard	Concentration should not be < half of nor differ by more than 2 X the concentration of the sample. Run 2 consecutive checks; must agree within 1%.	A minimum 3-point linear calibration is performed. The acceptance criterion is %RSD </= 25%. All target analytes must be within the linear range of calibration (with the exception of O2, N2, and C6+ Hydrocarbons).
Sample Injection Volume	0.50 mL to achieve Methane linearity.	1.0 mL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Since Nitrogen is used to pressurize samples, the Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Definition of Data Qualifying Flags

Six qualifiers may have been used on the data analysis sheets and indicate as follows:
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

AIR TOXICS LTD.

SAMPLE NAME: Class I-F-C

ID#: 0408520B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	**9090716**	**Date of Collection: 8/25/04**	
Dil. Factor:	**2.05**	**Date of Analysis: 9/7/04 01:08 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.20	3.4
Nitrogen	0.20	24
Carbon Monoxide	0.020	Not Detected
Methane	0.00020	44
Carbon Dioxide	0.020	27
Ethane	0.0020	Not Detected
Hydrogen	0.020	0.53
Ethene	0.0020	Not Detected

Total BTU/Cu.F. = 450
Total Sp. Gravity = 0.93
Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C

ID#: 0408520B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	**9090717**	**Date of Collection:**	**8/25/04**
Dil. Factor:	**2.09**	**Date of Analysis:**	**9/7/04 01:29 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	4.4
Nitrogen	0.21	38
Carbon Monoxide	0.021	Not Detected
Methane	0.00021	30
Carbon Dioxide	0.021	27
Ethane	0.0021	Not Detected
Hydrogen	0.021	Not Detected
Ethene	0.0021	Not Detected

Total BTU/Cu.F. = 310
Total Sp. Gravity = 0.99
Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C Duplicate

ID#: 0408520B-02AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	**9090718**	**Date of Collection:**	**8/25/04**
Dil. Factor:	**2.09**	**Date of Analysis:**	**9/7/04 01:51 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	4.4
Nitrogen	0.21	38
Carbon Monoxide	0.021	Not Detected
Methane	0.00021	30
Carbon Dioxide	0.021	27
Ethane	0.0021	Not Detected
Hydrogen	0.021	Not Detected
Ethene	0.0021	Not Detected

Total BTU/Cu.F. = 310
Total Sp. Gravity = 0.99
Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408520B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	9090705	**Date of Collection:**	NA
Dil. Factor:	1.00	**Date of Analysis:**	9/7/04 08:23 AM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.10	Not Detected
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408520B-03B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	9090706b	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/7/04 08:51 AM	

Compound	Rpt. Limit (%)	Amount (%)
Hydrogen	0.010	Not Detected

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408520B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	**9090731**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/7/04 09:19 PM**	

Compound	%Recovery
Oxygen	97
Nitrogen	101
Carbon Monoxide	96
Methane	99
Carbon Dioxide	99
Ethane	96
Ethene	100

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408520B-04B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1945

File Name:	9090729b	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/7/04 07:49 PM	

Compound	%Recovery
Hydrogen	98

Container Type: NA - Not Applicable

- Results of Assorted Sulfur Compounds

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This electronic report includes the following:

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

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E-mail to:samplereceiving@airtoxics.com

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0408520C

Work Order Summary

CLIENT:	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411	**BILL TO:**	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411
PHONE:	561-687-5300	**P.O. #**	
FAX:	561-687-3676	**PROJECT #**	WET-04-564 WET
DATE RECEIVED:	8/27/04	**CONTACT:**	DeDe Dodge
DATE COMPLETED:	9/1/04		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	Class I-F-T	ASTM D-5504	Tedlar Bag
02A	Class III-F-T	ASTM D-5504	Tedlar Bag
03A	Lab Blank	ASTM D-5504	NA
04A	LCS	ASTM D-5504	NA

CERTIFIED BY: _____ DATE: 09/01/04

Laboratory Director

Certification numbers: AR DEQ - 03-084-0, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/04, Expiration date: 06/30/05
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
ASTM D-5504
South Florida Environmental Services
Workorder# 0408520C

Two 1 Liter Tedlar Bag samples were received on August 27, 2004. The laboratory performed the analysis of sulfur compounds via ASTM D-5504 using GC/SCD. The method involves direct injection of the air sample into the GC via a fixed 1.0 mL sampling loop. See the data sheets for the reporting limits for each compound.

Receiving Notes

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

Analytical Notes

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

Definition of Data Qualifying Flags

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

AIR TOXICS LTD.

SAMPLE NAME: Class I-F-T

ID#: 0408520C-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b082706	Date of Collection:	8/25/04
Dil. Factor:	250	Date of Analysis:	8/27/04 11:58 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	1000	200000
Carbonyl Sulfide	1000	Not Detected
Methyl Mercaptan	1000	11000
Ethyl Mercaptan	1000	Not Detected
Dimethyl Sulfide	1000	14000
Carbon Disulfide	1000	Not Detected
Isopropyl Mercaptan	1000	Not Detected
tert-Butyl Mercaptan	1000	Not Detected
n-Propyl Mercaptan	1000	Not Detected
Ethyl Methyl Sulfide	1000	Not Detected
Thiophene	1000	Not Detected
Isobutyl Mercaptan	1000	Not Detected
Diethyl Sulfide	1000	Not Detected
Butyl Mercaptan	1000	Not Detected
Dimethyl Disulfide	1000	Not Detected
3-Methylthiophene	1000	Not Detected
Tetrahydrothiophene	1000	Not Detected
2-Ethylthiophene	1000	Not Detected
2,5-Dimethylthiophene	1000	Not Detected
Diethyl Disulfide	1000	Not Detected

Container Type: 1 Liter Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-T

ID#: 0408520C-02A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b082705	Date of Collection:	8/25/04
Dil. Factor:	100	Date of Analysis:	8/27/04 11:27 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	400	64000
Carbonyl Sulfide	400	Not Detected
Methyl Mercaptan	400	430
Ethyl Mercaptan	400	Not Detected
Dimethyl Sulfide	400	420
Carbon Disulfide	400	Not Detected
Isopropyl Mercaptan	400	Not Detected
tert-Butyl Mercaptan	400	Not Detected
n-Propyl Mercaptan	400	Not Detected
Ethyl Methyl Sulfide	400	Not Detected
Thiophene	400	Not Detected
Isobutyl Mercaptan	400	Not Detected
Diethyl Sulfide	400	Not Detected
Butyl Mercaptan	400	Not Detected
Dimethyl Disulfide	400	Not Detected
3-Methylthiophene	400	Not Detected
Tetrahydrothiophene	400	Not Detected
2-Ethylthiophene	400	Not Detected
2,5-Dimethylthiophene	400	Not Detected
Diethyl Disulfide	400	Not Detected

Container Type: 1 Liter Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408520C-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b082703	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis:	8/27/04 08:59 AM

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

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408520C-04A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b082702	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 8/27/04 08:11 AM	

Compound	%Recovery
Hydrogen Sulfide	101
Carbonyl Sulfide	93
Methyl Mercaptan	90
Ethyl Mercaptan	98
Dimethyl Sulfide	85
Carbon Disulfide	75
Isopropyl Mercaptan	108
tert-Butyl Mercaptan	109
n-Propyl Mercaptan	107
Ethyl Methyl Sulfide	89
Thiophene	85
Isobutyl Mercaptan	92
Diethyl Sulfide	91
Butyl Mercaptan	89
Dimethyl Disulfide	103
3-Methylthiophene	89
Tetrahydrothiophene	94
2-Ethylthiophene	93
2,5-Dimethylthiophene	92
Diethyl Disulfide	103

Container Type: NA - Not Applicable

- Results of Volatile Organic Compounds

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This electronic report includes the following:

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

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0408520A

Work Order Summary

CLIENT:	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411	**BILL TO:**	Dr. John Jallah South Florida Environmental Services 6861 Vista Parkway North West Palm Beach, FL 33411
PHONE:	561-687-5300	**P.O. #**	
FAX:	561-687-3676	**PROJECT #**	WET-04-564 WET
DATE RECEIVED:	08/27/2004	**CONTACT:**	DeDe Dodge
DATE COMPLETED:	09/10/2004		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	Class I-F-C	Modified TO-14A	0.5 "Hg
02A	Class III-F-C	Modified TO-14A	1.0 "Hg
02AA	Class III-F-C Duplicate	Modified TO-14A	1.0 "Hg
03A	Lab Blank	Modified TO-14A	NA
04A	CCV	Modified TO-14A	NA
05A	LCS	Modified TO-14A	NA

CERTIFIED BY: _____ DATE: 09/12/04

Laboratory Director

Certification numbers: AR DEQ - 03-084-0, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/04, Expiration date: 06/30/05
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
Modified TO-14A
South Florida Environmental Services
Workorder# 0408520A

Two 1 Liter Silonite Canister samples were received on August 27, 2004. The laboratory performed analysis via modified EPA Method TO-14A using GC/MS in the full scan mode. The method involves concentrating up to 0.2 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	*TO-14A/TO-15*	*ATL Modifications*
Continuing Calibration criteria	</= 30% Difference	</= 30% Difference with two allowed out to </= 40% Difference; flag and narrate outliers
Initial Calibration criteria	RSD<30% (TO-14A)	RSD</=30%, two compounds allowed up to 40%.
Moisture control	Nafion Dryer (TO-14A)	Multisorbent trap
Blank acceptance criteria	<0.20 ppbv (TO-14A)	<Reporting Limit
Primary ions for Quantification	Freon 114: 85, Carbon Tetrachloride: 117, Trichloroethene: 130, Ethyl Benzene, m,p- and o-Xylene: 91, Vinyl Acetate: 43, 2-Butanone: 43, 4-Methyl-2-Pentanone: 43.	Freon 114: 135, Carbon Tetrachloride: 119, Trichloroethene: 95, Ethyl Benzene, m,p- and o-Xylene: 106, Vinyl Acetate: 86, 2-Butanone: 72, 4-Methyl-2-Pentanone: 58.
Dilutions for Initial Calibration	Dynamic dilutions or static using canisters	Syringe dilutions
BFB absolute abundance criteria	Within 10% of that from previous day. (TO-14A)	CCV internal standard area counts are compared to ICAL, corrective action for > 40% D.
Sample Load Volume	400 mL (TO-14A)	Varied to 200 mL
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Concentration of IS Spike.	10 ppbv (TO-15)	25 ppbv.
BFB Abundance	CLP Protocol (TO-15)	SW-846 Protocol
IS Recoveries.	Within 40% of mean over ICAL for blanks, and within 40% of daily CCV for samples. (TO-15)	Within 40% of CCV recoveries for blanks and samples.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction no performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

AIR TOXICS LTD.

SAMPLE NAME: Class I-F-C

ID#: 0408520A-01A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090923	Date of Collection:	8/25/04
Dil. Factor:	1370	Date of Analysis:	9/10/04 01:26 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Freon 12	680	1900	3400	9400
Freon 114	680	Not Detected	4900	Not Detected
Chloromethane	2700	Not Detected	5800	Not Detected
Vinyl Chloride	680	Not Detected	1800	Not Detected
1,3-Butadiene	680	Not Detected	1500	Not Detected
Bromomethane	680	Not Detected	2700	Not Detected
Chloroethane	680	Not Detected	1800	Not Detected
Freon 11	680	Not Detected	3900	Not Detected
Ethanol	2700	210000 E	5200	400000 E
Freon 113	680	Not Detected	5300	Not Detected
1,1-Dichloroethene	680	Not Detected	2800	Not Detected
Acetone	2700	46000	6600	110000
2-Propanol	2700	30000	6800	74000
Carbon Disulfide	680	Not Detected	2200	Not Detected
3-Chloropropene	2700	Not Detected	8700	Not Detected
Methylene Chloride	680	Not Detected	2400	Not Detected
Methyl tert-butyl ether	680	Not Detected	2500	Not Detected
trans-1,2-Dichloroethene	680	Not Detected	2800	Not Detected
Hexane	680	900	2400	3200
Vinyl Acetate	2700	Not Detected	9800	Not Detected
1,1-Dichloroethane	680	Not Detected	2800	Not Detected
2-Butanone (Methyl Ethyl Ketone)	680	66000	2000	200000
cis-1,2-Dichloroethene	680	Not Detected	2800	Not Detected
Tetrahydrofuran	680	4400	2000	13000
Chloroform	680	Not Detected	3400	Not Detected
1,1,1-Trichloroethane	680	Not Detected	3800	Not Detected
Cyclohexane	680	Not Detected	2400	Not Detected
Carbon Tetrachloride	680	Not Detected	4400	Not Detected
2,2,4-Trimethylpentane	680	Not Detected	3200	Not Detected
Benzene	680	2400	2200	7800
1,2-Dichloroethane	680	Not Detected	2800	Not Detected
Heptane	680	1100	2800	4600
Trichloroethene	680	Not Detected	3700	Not Detected
1,2-Dichloropropane	680	Not Detected	3200	Not Detected
1,4-Dioxane	2700	Not Detected	10000	Not Detected
Bromodichloromethane	680	Not Detected	4700	Not Detected
cis-1,3-Dichloropropene	680	Not Detected	3200	Not Detected
4-Methyl-2-pentanone	680	1800	2800	7500
Toluene	680	19000	2600	72000
trans-1,3-Dichloropropene	680	Not Detected	3200	Not Detected
1,1,2-Trichloroethane	680	Not Detected	3800	Not Detected
Tetrachloroethene	680	820	4700	5700

AIR TOXICS LTD.

SAMPLE NAME: Class I-F-C

ID#: 0408520A-01A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090923	Date of Collection:	8/25/04
Dil. Factor:	1370	Date of Analysis:	9/10/04 01:26 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
2-Hexanone	2700	Not Detected	11000	Not Detected
Dibromochloromethane	680	Not Detected	5900	Not Detected
1,2-Dibromoethane (EDB)	680	Not Detected	5400	Not Detected
Chlorobenzene	680	Not Detected	3200	Not Detected
Ethyl Benzene	680	6800	3000	30000
m,p-Xylene	680	13000	3000	59000
o-Xylene	680	4000	3000	17000
Styrene	680	960	3000	4200
Bromoform	680	Not Detected	7200	Not Detected
Cumene	680	Not Detected	3400	Not Detected
1,1,2,2-Tetrachloroethane	680	Not Detected	4800	Not Detected
Propylbenzene	680	Not Detected	3400	Not Detected
4-Ethyltoluene	680	3300	3400	16000
1,3,5-Trimethylbenzene	680	1200	3400	6100
1,2,4-Trimethylbenzene	680	3100	3400	15000
1,3-Dichlorobenzene	680	Not Detected	4200	Not Detected
1,4-Dichlorobenzene	680	1900	4200	12000
alpha-Chlorotoluene	680	Not Detected	3600	Not Detected
1,2-Dichlorobenzene	680	Not Detected	4200	Not Detected
1,2,4-Trichlorobenzene	2700	Not Detected	21000	Not Detected
Hexachlorobutadiene	2700	Not Detected	30000	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Silonite Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	96	70-130

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C

ID#: 0408520A-02A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090924	Date of Collection:	8/25/04
Dil. Factor:	41.8	Date of Analysis:	9/10/04 02:07 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Freon 12	21	180	100	930
Freon 114	21	Not Detected	150	Not Detected
Chloromethane	84	Not Detected	180	Not Detected
Vinyl Chloride	21	110	54	290
1,3-Butadiene	21	Not Detected	47	Not Detected
Bromomethane	21	Not Detected	82	Not Detected
Chloroethane	21	40	56	110
Freon 11	21	40	120	230
Ethanol	84	22000 E	160	43000 E
Freon 113	21	Not Detected	160	Not Detected
1,1-Dichloroethene	21	Not Detected	84	Not Detected
Acetone	84	440	200	1000
2-Propanol	84	1400	210	3500
Carbon Disulfide	21	Not Detected	66	Not Detected
3-Chloropropene	84	Not Detected	260	Not Detected
Methylene Chloride	21	Not Detected	74	Not Detected
Methyl tert-butyl ether	21	32	76	120
trans-1,2-Dichloroethene	21	Not Detected	84	Not Detected
Hexane	21	660	75	2400
Vinyl Acetate	84	Not Detected	300	Not Detected
1,1-Dichloroethane	21	Not Detected	86	Not Detected
2-Butanone (Methyl Ethyl Ketone)	21	340	63	1000
cis-1,2-Dichloroethene	21	66	84	260
Tetrahydrofuran	21	110	63	340
Chloroform	21	Not Detected	100	Not Detected
1,1,1-Trichloroethane	21	Not Detected	120	Not Detected
Cyclohexane	21	260	73	900
Carbon Tetrachloride	21	Not Detected	130	Not Detected
2,2,4-Trimethylpentane	21	240	99	1100
Benzene	21	260	68	860
1,2-Dichloroethane	21	Not Detected	86	Not Detected
Heptane	21	400	87	1700
Trichloroethene	21	Not Detected	110	Not Detected
1,2-Dichloropropane	21	Not Detected	98	Not Detected
1,4-Dioxane	84	Not Detected	310	Not Detected
Bromodichloromethane	21	Not Detected	140	Not Detected
cis-1,3-Dichloropropene	21	Not Detected	96	Not Detected
4-Methyl-2-pentanone	21	Not Detected	87	Not Detected
Toluene	21	580	80	2200
trans-1,3-Dichloropropene	21	Not Detected	96	Not Detected
1,1,2-Trichloroethane	21	Not Detected	120	Not Detected
Tetrachloroethene	21	Not Detected	140	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C

ID#: 0408520A-02A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090924	**Date of Collection:**	8/25/04
Dil. Factor:	41.8	**Date of Analysis:**	9/10/04 02:07 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
2-Hexanone	84	Not Detected	350	Not Detected
Dibromochloromethane	21	Not Detected	180	Not Detected
1,2-Dibromoethane (EDB)	21	Not Detected	160	Not Detected
Chlorobenzene	21	54	98	250
Ethyl Benzene	21	740	92	3300
m,p-Xylene	21	460	92	2000
o-Xylene	21	220	92	980
Styrene	21	29	90	120
Bromoform	21	Not Detected	220	Not Detected
Cumene	21	1100	100	5300
1,1,2,2-Tetrachloroethane	21	Not Detected	140	Not Detected
Propylbenzene	21	120	100	610
4-Ethyltoluene	21	220	100	1100
1,3,5-Trimethylbenzene	21	100	100	520
1,2,4-Trimethylbenzene	21	280	100	1400
1,3-Dichlorobenzene	21	Not Detected	130	Not Detected
1,4-Dichlorobenzene	21	53	130	320
alpha-Chlorotoluene	21	Not Detected	110	Not Detected
1,2-Dichlorobenzene	21	Not Detected	130	Not Detected
1,2,4-Trichlorobenzene	84	Not Detected	630	Not Detected
Hexachlorobutadiene	84	Not Detected	910	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Silonite Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	100	70-130

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C Duplicate

ID#: 0408520A-02AA

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090925	Date of Collection:	8/25/04
Dil. Factor:	41.8	Date of Analysis:	9/10/04 02:52 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Freon 12	21	180	100	900
Freon 114	21	Not Detected	150	Not Detected
Chloromethane	84	Not Detected	180	Not Detected
Vinyl Chloride	21	100	54	270
1,3-Butadiene	21	Not Detected	47	Not Detected
Bromomethane	21	Not Detected	82	Not Detected
Chloroethane	21	45	56	120
Freon 11	21	40	120	220
Ethanol	84	24000 E	160	45000 E
Freon 113	21	Not Detected	160	Not Detected
1,1-Dichloroethene	21	Not Detected	84	Not Detected
Acetone	84	460	200	1100
2-Propanol	84	1500	210	3700
Carbon Disulfide	21	Not Detected	66	Not Detected
3-Chloropropene	84	Not Detected	260	Not Detected
Methylene Chloride	21	Not Detected	74	Not Detected
Methyl tert-butyl ether	21	35	76	130
trans-1,2-Dichloroethene	21	Not Detected	84	Not Detected
Hexane	21	690	75	2500
Vinyl Acetate	84	Not Detected	300	Not Detected
1,1-Dichloroethane	21	Not Detected	86	Not Detected
2-Butanone (Methyl Ethyl Ketone)	21	290	63	860
cis-1,2-Dichloroethene	21	63	84	250
Tetrahydrofuran	21	99	63	300
Chloroform	21	Not Detected	100	Not Detected
1,1,1-Trichloroethane	21	Not Detected	120	Not Detected
Cyclohexane	21	260	73	920
Carbon Tetrachloride	21	Not Detected	130	Not Detected
2,2,4-Trimethylpentane	21	240	99	1100
Benzene	21	250	68	810
1,2-Dichloroethane	21	Not Detected	86	Not Detected
Heptane	21	390	87	1600
Trichloroethene	21	53	110	290
1,2-Dichloropropane	21	Not Detected	98	Not Detected
1,4-Dioxane	84	Not Detected	310	Not Detected
Bromodichloromethane	21	Not Detected	140	Not Detected
cis-1,3-Dichloropropene	21	Not Detected	96	Not Detected
4-Methyl-2-pentanone	21	Not Detected	87	Not Detected
Toluene	21	600	80	2300
trans-1,3-Dichloropropene	21	Not Detected	96	Not Detected
1,1,2-Trichloroethane	21	Not Detected	120	Not Detected
Tetrachloroethene	21	Not Detected	140	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Class III-F-C Duplicate

ID#: 0408520A-02AA

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	**d090925**	**Date of Collection: 8/25/04**	
Dil. Factor:	**41.8**	**Date of Analysis: 9/10/04 02:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
2-Hexanone	84	Not Detected	350	Not Detected
Dibromochloromethane	21	Not Detected	180	Not Detected
1,2-Dibromoethane (EDB)	21	Not Detected	160	Not Detected
Chlorobenzene	21	54	98	250
Ethyl Benzene	21	740	92	3300
m,p-Xylene	21	440	92	1900
o-Xylene	21	220	92	980
Styrene	21	32	90	140
Bromoform	21	Not Detected	220	Not Detected
Cumene	21	1100	100	5400
1,1,2,2-Tetrachloroethane	21	Not Detected	140	Not Detected
Propylbenzene	21	120	100	620
4-Ethyltoluene	21	220	100	1100
1,3,5-Trimethylbenzene	21	98	100	490
1,2,4-Trimethylbenzene	21	280	100	1400
1,3-Dichlorobenzene	21	Not Detected	130	Not Detected
1,4-Dichlorobenzene	21	60	130	360
alpha-Chlorotoluene	21	Not Detected	110	Not Detected
1,2-Dichlorobenzene	21	Not Detected	130	Not Detected
1,2,4-Trichlorobenzene	84	Not Detected	630	Not Detected
Hexachlorobutadiene	84	Not Detected	910	Not Detected

E = Exceeds instrument calibration range.

Container Type: 1 Liter Silonite Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	98	70-130

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408520A-03A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090905	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/9/04 10:23 AM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.6	Not Detected
Chloromethane	2.0	Not Detected	4.2	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	0.50	Not Detected	2.0	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.9	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected
2-Propanol	2.0	Not Detected	5.0	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	2.0	Not Detected	6.4	Not Detected
Methylene Chloride	0.50	Not Detected	1.8	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
Vinyl Acetate	2.0	Not Detected	7.2	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.5	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.8	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.2	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.4	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.1	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.3	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.1	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.8	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408520A-03A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090905	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/9/04 10:23 AM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
2-Hexanone	2.0	Not Detected	8.3	Not Detected
Dibromochloromethane	0.50	Not Detected	4.3	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.9	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.2	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.5	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.5	Not Detected
Propylbenzene	0.50	Not Detected	2.5	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.5	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.5	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.5	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	22	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	94	70-130

AIR TOXICS LTD.

SAMPLE NAME: CCV

ID#: 0408520A-04A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090902	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/9/04 06:54 AM	

Compound	%Recovery
Freon 12	119
Freon 114	116
Chloromethane	103
Vinyl Chloride	107
1,3-Butadiene	99
Bromomethane	98
Chloroethane	93
Freon 11	109
Ethanol	87
Freon 113	104
1,1-Dichloroethene	102
Acetone	92
2-Propanol	96
Carbon Disulfide	100
3-Chloropropene	89
Methylene Chloride	107
Methyl tert-butyl ether	97
trans-1,2-Dichloroethene	96
Hexane	97
Vinyl Acetate	89
1,1-Dichloroethane	103
2-Butanone (Methyl Ethyl Ketone)	103
cis-1,2-Dichloroethene	98
Tetrahydrofuran	102
Chloroform	106
1,1,1-Trichloroethane	105
Cyclohexane	100
Carbon Tetrachloride	106
2,2,4-Trimethylpentane	102
Benzene	93
1,2-Dichloroethane	113
Heptane	95
Trichloroethene	103
1,2-Dichloropropane	104
1,4-Dioxane	93
Bromodichloromethane	109
cis-1,3-Dichloropropene	107
4-Methyl-2-pentanone	102
Toluene	98
trans-1,3-Dichloropropene	115
1,1,2-Trichloroethane	105
Tetrachloroethene	104

AIR TOXICS LTD.

SAMPLE NAME: CCV

ID#: 0408520A-04A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090902	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/9/04 06:54 AM

Compound	%Recovery
2-Hexanone	108
Dibromochloromethane	114
1,2-Dibromoethane (EDB)	112
Chlorobenzene	104
Ethyl Benzene	100
m,p-Xylene	101
o-Xylene	98
Styrene	106
Bromoform	118
Cumene	98
1,1,2,2-Tetrachloroethane	101
Propylbenzene	99
4-Ethyltoluene	100
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	98
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	95
1,2-Dichlorobenzene	95
1,2,4-Trichlorobenzene	90
Hexachlorobutadiene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	98	70-130

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408520A-05A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090903	**Date of Collection:**	NA
Dil. Factor:	1.00	**Date of Analysis:**	9/9/04 07:44 AM

Compound	%Recovery
Freon 12	128
Freon 114	120
Chloromethane	127
Vinyl Chloride	123
1,3-Butadiene	104
Bromomethane	114
Chloroethane	114
Freon 11	114
Ethanol	56 Q
Freon 113	109
1,1-Dichloroethene	109
Acetone	105
2-Propanol	112
Carbon Disulfide	112
3-Chloropropene	92
Methylene Chloride	109
Methyl tert-butyl ether	108
trans-1,2-Dichloroethene	108
Hexane	111
Vinyl Acetate	82
1,1-Dichloroethane	114
2-Butanone (Methyl Ethyl Ketone)	117
cis-1,2-Dichloroethene	110
Tetrahydrofuran	119
Chloroform	118
1,1,1-Trichloroethane	118
Cyclohexane	113
Carbon Tetrachloride	121
2,2,4-Trimethylpentane	121
Benzene	107
1,2-Dichloroethane	129
Heptane	108
Trichloroethene	118
1,2-Dichloropropane	128
1,4-Dioxane	104
Bromodichloromethane	122
cis-1,3-Dichloropropene	116
4-Methyl-2-pentanone	121
Toluene	114
trans-1,3-Dichloropropene	125
1,1,2-Trichloroethane	121
Tetrachloroethene	122

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408520A-05A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	d090903	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 9/9/04 07:44 AM	

Compound	%Recovery
2-Hexanone	131
Dibromochloromethane	128
1,2-Dibromoethane (EDB)	132 Q
Chlorobenzene	117
Ethyl Benzene	114
m,p-Xylene	116
o-Xylene	107
Styrene	113
Bromoform	132
Cumene	87
1,1,2,2-Tetrachloroethane	111
Propylbenzene	94
4-Ethyltoluene	115
1,3,5-Trimethylbenzene	100
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	102
1,4-Dichlorobenzene	98
alpha-Chlorotoluene	106
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	101
Hexachlorobutadiene	117

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	96	70-130

CDM
1601 Belvedere Road, Suite 211 South
West Palm Beach, Florida 33406
tel 561 689-3336
fax: 561 689-9713

October 14, 2003

Mr. Steven L. Palmer, P.E.
Siting Coordination Office
Florida Department of Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Subject: Solid Waste Authority (SWA) of Palm Beach County
Proposed Lime Recalcination and Biosolids Pelletization Facilities
Modification of Conditions of Certification, PA84-20
Transmittal of Response to Request for Additional Information, dated April 8, 2003

Dear Mr. Palmer:

The enclosed Power Plant Site Certification application is being submitted to you in response to your Request for Additional Information, dated April 8, 2003. Your April 8th letter contained a comment from Mr. Cleve Holladay requesting additional information for this application, and we apologize for the delay in providing a response. The proposed Lime Recalcination and Biosolids Pelletization Facilities project has undergone some substantial changes since the receipt of the April letter. In addition to providing the dispersion modeling that Mr. Holladay requested, we are submitting a revised application to modify the Power Plant Site Certification that reflects the project changes. This transmittal letter describes the project changes, as well as our approach in this submittal to addressing both Mr. Holladay's comment and comments that we have also received from Ms. Teresa Heron of the Air Resources Management Division.

Project Changes

The following changes have been made to the Lime Recalcination Facility (LRF) and Biosolids Pelletization Facility (BPF) projects and to Class I Landfill gas flare(s) since the January 2003, submittal of the application to modify the Power Plant Site Certification:

- The BPF has been increased in size from 200 wet tons per day (wtpd) to 400 wtpd. This is being accomplished by adding a second 200-wtpd process train, identical to the one described in the original application. There will now be two stacks (one for each train), and

two of each of the pieces of equipment described in the original application. This doubles the air pollutant emission rates from this facility.

- The 2,300-scfm back-up flare that was described in the January 2003 submittal has been eliminated. The landfill gas pressurization system has been moved from the LRF and BPF site south of 45th Street to a pad just north of the Composting Facility, adjacent to the Class I Landfill. A 4,000-scfm pressurized landfill gas line will run from this new location south, under 45th Street, to the LRF and BPF projects. Although the supply line will be sized for 4,000-scfm, the maximum design landfill gas demand of the LRF and BPF projects will be 2,700-scfm, including the increased demand from the newly enlarged BPF.

- The PM_{10} emission rates from the LRF's kiln exhaust and lime cooler stack have been reduced to be consistent the proposed Maximum Achievable Control Technology (MACT) Standards for Lime Manufacturing Plants (40 CFR 63 Subpart AAAAA), signed as a final rule on August 25, 2003, but not yet published in the Federal Register. The LRF's air pollution control equipment, a three-field electrostatic precipitator (ESP), will be enlarged to a four-field ESP to reduce the emission rate to the proposed MACT level of 0.1 lb PM / ton of "stone" feed from the LRF's current 0.21 lb PM / ton of "stone" feed.

- The existing 1,800-scfm flare at the Class I Landfill will be decommissioned and replaced by the 3,500-scfm Class I flare, not by the 2,300-scfm back-up flare.

- The new 3,500-scfm Class I flare is needed in the short term (within the next few months) to serve landfill gas collection system expansion in the Class I Landfill. Because of this urgent need, SWA would like to request that FDEP issue a separate minor preconstruction permit for this flare. We understand that this could be possible if we demonstrate that the flare can be exempt from PSD permitting (see further discussion in Approach, below).

- The 3,500-scfm Class I flare will not be sufficient to handle all the gas produced by the Class I Landfill at build-out. Two more flares, a 2,000-scfm flare and a 1,000-scfm flare would be needed at the Class I Landfill by 2020, the approximate build-out year. The 6,500-scfm capacity of the three flares together could handle the expected maximum gas generation rate of about 6,000 scfm. In addition, they could be used in combinations of one or two to handle smaller gas flows when the LRF and BPF are drawing off the 2,700 scfm of gas that these facilities need. All three flares have been included in the dispersion modeling portion of this application, with emission rates based on Class I Landfill build-out conditions, as discussed in Approach, below.

FDEP Comments

You observed, in the April 8th comment letter, that the pollution control exemption for landfill gas flares required by the New Source Performance Standards only applies, "provided the owner or operator demonstrates to the Department that such increase would not cause or contribute to a violation of any ambient air quality standard, maximum allowable increase, or visibility limitation." (Rule 62-212.400(a)2.c., FAC). You requested that this demonstration be made by including the proposed new Class I flare in a cumulative dispersion modeling analysis with the LRF and BPF for all pollutants that would have a "significant" increase in emissions after addition of the flare. It is likely that this would include the modeling done for carbon monoxide (CO), nitrogen oxides (NO_X) and particulate matter less than 10 microns (PM_{10}).

In addition to this written comment, Ms. Teresa Heron of FDEP's Department of Air Resources Management submitted a verbal request on April 21, 2003, to Ms. Cynthia Hibbard of CDM to provide more information in the PSD application about the 3,500-scfm Class I flare. Specifically, she wanted to know whether or not the 3,500-scfm Class I flare plus the LRF, BPF and back-up flare would have sufficient capacity to handle all of the gas generated by the Class I Landfill at full build-out, or whether SWA would seek to increase the capacity of the Class I flare at some point in the future. She requested information on when landfill capacity would be reached and how much gas would be generated at that point. She also requested information on how large the Class I Landfill is now, how many cells contain waste, how large it would be when supplying all of the needed gas to the LRF and BPF projects, and how large it would be at build-out.

Approach for Revised Application Submittal

Because of the project changes described above, edits have been made throughout all three volumes of this application submittal to update project information. We are, therefore, submitting complete revised copies of the application, rather than just correction pages or sections.

As requested by Mr. Holladay, the dispersion modeling presented in Volume III, Sections 6 and 7, includes the proposed new 3,500-scfm Class I flare in a cumulative dispersion modeling analysis with the LRF and BPF for all pollutants that would have a "significant" increase in emissions after addition of the flare. If the modeling shows that these projects together would not cause or contribute to a violation of an ambient air quality standard, maximum allowable increase (PSD Increment), or visibility limitation, then the flare would be exempt from the other requirements of PSD permitting. That is, a Best Available Control

Technology (BACT) analysis would not be required for the flare, and the flare could receive a separate minor modification preconstruction air permit on a more expedited schedule than the major modification for the LRF and BPF projects.

The emissions from the additional 1,000-scfm and 2,000-scfm Class I flares have also been included in the dispersion modeling. The 1,000-scfm and 2,000-scfm flares have been included:

- to determine if they can also meet the conditions of the exemption from PSD permitting;
- to address concerns raised by FDEP about how much landfill gas would be generated at landfill build-out, and about granting incremental approvals for each landfill gas collection and control system expansion; and
- to give SWA maximum flexibility on when they could install the 1,000-scfm and 2,000-scfm flares, and on how to operate the Class I Landfill gas collection and control system. The current proposed plan is to install the 1,000-scfm and 2,000-scfm flares at about the same time as the LRF and BPF. Each flare has a turndown ratio of 10:1 (that is, they can operate at flows down to 1/10th of their maximum design flow rate). Having a range of flare sizes also available at the Class I Landfill Flare Station would allow SWA to combust possibly large swings in leftover gas flow to the flares as the LRF and BPF come on- (and off-) line. The three flares could be used in any combination of one, two or three to handle fluctuating flows, and all three together could handle the Class I Landfill expected build-out flow by themselves, even if the LRF and BPF projects were not built.

All three flares, therefore -- the immediately needed 3,500-scfm Class I flare, as well as the planned 1,000-scfm and 2,000-scfm flares -- have been included in the dispersion modeling to evaluate their combined air pollutant concentration impacts with those of the LRF and BPF, and to determine if all three flares could qualify for the PSD permitting exemption.

Dispersion modeling was performed for SO_2, NO_X, CO, PM_{10} and lead (even though significant emissions increases would occur only for NO_X, CO and PM_{10}). The dispersion modeling results presented Table 6-5 in the enclosed Volume III, Section 6, show that the combined project impacts would not exceed any Significant Impact Levels or Class II PSD Increments. Table 6-6 confirms that when background concentrations are added in, modeled concentrations would not exceed any ambient air quality standards. Table 6-7 shows that the combined projects would not cause any exceedances of Class I Significant Impact Levels or Class I Increments at either the Everglades National Park or at the Big Cypress National

Preserve. Section 7 in Volume III presents the results of the visibility modeling, and shows that the combined projects would not impair visibility at either the Everglades National Park or at the Big Cypress National Preserve. Since these demonstrations appear to fulfill the condition for granting the PSD permitting exemption to the three proposed landfill gas flares, the flares were excluded from the BACT analysis in this Application. In addition, a separate set of ELSA forms for a minor modification preconstruction permit application for the three flares has been prepared, and is transmitted herewith. Copies of both the PPSA (3-Volume) and Minor Modification permit applications are also being copied to the Southeast District Office.

We greatly appreciate FDEP's review of this application, and look forward to continuing to work with you throughout the review process. If you or any FDEP staff have any additional questions, or would like any clarifications on this revised application submittal, please feel free to contact myself or Jill Grimaldi at (772) 231-4301.

Very truly yours,

10/14/03

Alex H. Makled, P.E., DEE
Vice President
Camp Dresser & McKee Inc.

Enclosures

File: 2678-39378-064

cc: John D. Booth, SWA
Raymond H. Schauer, SWA
Marc C. Bruner, SWA
Tom Tittle, FDEP Southeast District Office
James Golden, South Florida Water Management District
Jeaneanne Gettle, U.S. EPA
John O'Malley, PBC Health Department

Department of Environmental Protection

Jeb Bush
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Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

September 18, 2002

Mr. Gregg Worley, Chief
Air, Radiation Technology Branch
Preconstruction/HAP Section
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

RE: Solid Waste Authority of Palm Beach County
North County Resource Recovery Facility
DEP File No. 0990234-006-AC, PSD-FL-108

Dear Mr. Worley:

Enclosed for your review and comment is an application submitted by the Solid Waste Authority of Palm Beach County for a PSD modification for the above referenced facility in Palm Beach County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Teresa Heron, review engineer, at 850/921-9529.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa

Enclosure

Cc: Teresa Heron

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

September 18, 2002

Mr. John Bunyak, Chief
Policy, Planning & Permit Review Branch
NPS – Air Quality Division
Post Office Box 25287
Denver, Colorado 80225

RE: Solid Waste Authority of Palm Beach County
North County Resource Recovery Facility
DEP File No. 0990234-006-AC, PSD-FL-108

Dear Mr. Bunyak:

Enclosed for your review and comment is an application submitted by the Solid Waste Authority of Palm Beach County for a PSD modification for the above referenced facility in Palm Beach County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Teresa Heron, review engineer, at 850/921-9529.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa

Enclosure

Cc: Teresa Heron