Sheplak, Scott

-file-

From: Linero, Alvaro
Sent: Friday, May 11, 2007 12:05 PM
To: Sheplak, Scott; Nelson, Deborah
Subject: FW: Okeechobee landfill - NSR rules
Attachments: 0930104-012-AC-013-AV_Okechobee landfill _RFI.doc

---

From: Tallam, Laxmana
Sent: Friday, January 13, 2006 11:46 AM
To: Linero, Alvaro; Grace, Rebecca
Cc: Graziani, Darrel; Phillips, Cindy; Vielhauer, Trina
Subject: Okeechobee landfill - NSR rules

2006

Al and Rebecca:

Please find the attached RFI for the Okeechobee landfill, Inc. The proposed NSR regulations may affect this application, since this project is claiming the Pollution Control Project (PCP) exemption. This exemption is not included in the proposed rules. Please review the 1st question of the RFI and let me know if you have any comments/suggestions.

Thanking you,

Laxmana Tallam
SED
561-681-6624

Al: Please let me know if you have any comments regarding the other questions. This permit application can be found in EPSAP database.

Department of Environmental Protection

Southeast District
400 N. Congress Avenue, Suite 200
West Palm Beach, Florida 33401

Colleen M. Castille
Secretary

ELECTRONIC CORRESONDENCE
DMCCONNELL@WM.COM

Robert McConnell
Waste Management Inc. of Florida
2859 Paces Ferry Road, Suite 1600
Atlanta, GA 30339

Re: Request for Additional Information ----- Construction & Title V Permit Application
File No. 0930104-012-AC & 0930104-013-AV
Okeechobee Landfill Inc., Okeechobee County

Dear Mr. McConnell:

Please be advised that we received the application for the Construction and the Title V permit revision on December 09, 2005. The application has been reviewed and deemed incomplete. In order to continue processing the application, the Department will need the following additional information pursuant to Rules 62-213.420(1)(b) 3., F.A.C. and 62-4.070(1), F.A.C.

Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. The Department issued a notice of proposed rule making that may affect the review of the new sources under Chapter 62-21, F.A.C. The submitted application was prepared, in part, based on the pollution control project (PCP) exemption present in Rule 62-212.400, F.A.C. The PCP exemptions are being removed from the proposed rules. If these regulations are finalized before the issuance of the final construction permit, the PCP exemption will not be available for this project.

2. Within this application the H2S concentration has been increased from 35.50 ppm to 5800 ppm. Please explain the increase and submit the modification applications for the existing flares. In addition, please provide justification for using an H2S concentration of 10,000 ppm in the ambient impact analysis (Appendix J)?

3. Please submi the input and output files of the ISCST modeling results (appendinx J)

4. Please submit the details of the waste deposition in the landfill and estimate the uncontrolled H2S emissions from the landfill and determine the PSD applicability.

5. In appendix I, it was stated that "....the SO2 emissions are a byproduct of a pollution control process; the control of VOCs from the facility's landfill , the emission unit 001". In appendix K, the emissions of SO2 were shown to be 175.62 lb/hr from each flare and these emissions are the result of burning H2S. Burning of non-methane organic compounds or VOCs does not produce the significant amounts of SO2. Since, H2S is neither a VOC nor an NMOC, the SO2 emissions may not be the collateral pollutant. Please clarify.

6. Appendix T refers to the permit number 0930104-012-AC and refers to the compliance plan submitted in 2003. The Department did not issue this permit. Please amend this document by removing the permit number and refer to the compliance plan submitted along with this application.

7. Appendix F refers to the conditon 4.7 of the existing permit 0930104-012-AV. The Department did not issue the permit. Please do not include the permit condition for the proposed flare since it was not included in any of the

permits issued by the Department. Please resubmit the compliance plan referencing the 40 CFR 60 Subpart WWW regulations.

8. The compliance plan (appendix F) specifies that the modification of the emission units is tied to the public notification event. However, the construction shall not be commenced without receiving the final construction permit. Please revise the compliance plan based on the final construction permit issuance date.

9. The Department has received approximately 80 complaints from nearby residents related to objectionable odors since the consent order was signed. Please explain what additional odor controls are possible.

10. Appendix H states the model number for the new flare is EF 1045I12, similar to the existing flares. However, the ambient impact analysis was performed based on the model number EF115I14 (see appendix O). Please clarify and update the submitted information if necessary.

Responsible Official (R.O.) Certification Statement: Rule 62-213.420, F.A.C. requires that the responsible official must certify all Title V permit applications.

Professional Engineer (P.E.) Certification Statement: Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature.

The Department must receive a response from you within 90 (ninety) days of receipt of this letter, unless you (the applicant) request additional time under Rule 62-213.420(1)(b) 6., F.A.C.

If you should have any questions, please contact me at 561-681-6624 or Darrel Graziani, PE at 561-681-6626.

Sincerely,

Laxmana Tallam, PE Date
Air Permitting Supervisor

cc: Mike Stallard, Okeechobee Landfill, Inc. email mstallard@wm.com
Donald Lewis, PE, Shaw Environmental, Inc. email donald.l.lewis@shawgrp.com

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: (850) 488-0114 FAX: (850) 922-6979

Colleen M. Castille
Secretary

September 1, 2006

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2869 Paces Ferry Road
Atlanta, Georgia 30339

Re: DEP File No. 0930104-014-AC and 0930104-015-AV
Berman Road Landfill Facility
Okeechobee Landfill, Inc.
Waste Management, Inc. of Florida

Michele Lersch Waste Mgmt Florida
Kelly Fagan Shaw - applicant
David Thorley Waste Mgmt
Bruce Maillet
Mike Stallard
Joe Fasulo District Manager
David C. Unger Waste Mgmt Renewal Energy Project

Dear Mr. Van Gessel:

On July 28, 2006 the Department received electronic notification of an air construction permit application for the construction of additional flares, other improvements planned at the Berman Road Landfill and to revise the facility's Title V Operation Permit. We received the fee of $7,500 on August 4 that is required for an application for an Air Construction Permit pursuant to the Rules for the Prevention of Significant Deterioration of Air Quality (AC/PSD Permit).

The application was submitted with a transmittal letter prepared by Shaw Environmental & Infrastructure Inc. (Shaw). Shaw stated "the short time frame for the application's submittal precluded completion of detailed discussions with vendors and other necessary tasks necessary for a final BACT selection". Shaw also stated "since the BACT has not been chosen as yet, the ambient air impact analysis has not been completed".

A description as to what system of continuous emissions reduction is planned and a best available control technology (BACT) proposal are needed in accordance with Paragraph 62-212.400(4)(c), F.A.C. Also Source Impact Analysis, Air Quality Analysis, and Additional Impact Analyses are also needed as described in Paragraphs 62-212.400(5), (7), (8), and possibly (9), F.A.C. depending on effects upon Class I areas.

According to the information submitted, the emissions increases for the proposed projects will exceed the respective significant emissions rates for several pollutants. The key pollutant subject to PSD and that Shaw concentrated on is sulfur dioxide (SO_2). It appears that emissions increases of nitrogen oxides (NO_X), carbon monoxide (CO), and particulate matter (PM_{10}) also exceed their respective significant emissions rates. Therefore ambient analyses and a BACT proposal are required for the additional pollutants.

A great deal of very useful information was provided in the application. In the mentioned letter, Shaw requested a meeting "to discuss the application" and our engineer, Ms. Teresa Heron, advised them to let us know when they would like to meet with us. We understand Shaw is planning to meet with us this month. We can also discuss the information necessary to complete the application.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

We will forward any comments from EPA Region IV and the National Park Service as soon as they are received. If you have any questions regarding this matter, please contact Ms. Heron at 850/921-9529 or Debbie Nelson (meteorologist) at 850/921-9537.

Sincerely,

A.A. Linero, Program Administrator
South Permitting Section

AAL/th

cc: Mike Stallard, Waste Management, Inc (via e-mail)
Joe Fasulo, Okeechobee Landfill, Inc (via e-mail)
Kristin Alzheimer, P.E., Shaw Environmental & Infrastructure, Inc (via e-mail)
Bruce K. Maillet, Shaw Environmental & Infrastructure, Inc (via e-mail)
Jim Little, U.S. EPA, Region 4 (via e-mail)
Darrel Graziani, Southeast District Office (via e-mail)
John Bunyak, National Park Service (via e-mail)

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: (850) 488-0114 FAX: (850) 922-6979

Colleen M. Castille
Secretary

September 1, 2006

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2869 Paces Ferry Road
Atlanta, Georgia 30339

Re: DEP File No. 0930104-014-AC and 0930104-015-AV
Berman Road Landfill Facility
Okeechobee Landfill, Inc.
Waste Management, Inc. of Florida

Michele Lersch Waste Mgmt Florida
Kelly Fagan Shaw. applic
David Thorley Waste Hgmt
Bruce Maillett
Mike Stallard
Joe Fasulo District Manag
David C. Unger Waste Hgmt Renewal Energy Project

Dear Mr. Van Gessel:

On July 28, 2006 the Department received electronic notification of an air construction permit application for the construction of additional flares, other improvements planned at the Berman Road Landfill and to revise the facility's Title V Operation Permit. We received the fee of $7,500 on August 4 that is required for an application for an Air Construction Permit pursuant to the Rules for the Prevention of Significant Deterioration of Air Quality (AC/PSD Permit).

The application was submitted with a transmittal letter prepared by Shaw Environmental & Infrastructure Inc. (Shaw). Shaw stated "the short time frame for the application's submittal precluded completion of detailed discussions with vendors and other necessary tasks necessary for a final BACT selection". Shaw also stated "since the BACT has not been chosen as yet, the ambient air impact analysis has not been completed".

A description as to what system of continuous emissions reduction is planned and a best available control technology (BACT) proposal are needed in accordance with Paragraph 62-212.400(4)(c), F.A.C. Also Source Impact Analysis, Air Quality Analysis, and Additional Impact Analyses are also needed as described in Paragraphs 62-212.400(5), (7), (8), and possibly (9), F.A.C. depending on effects upon Class I areas.

According to the information submitted, the emissions increases for the proposed projects will exceed the respective significant emissions rates for several pollutants. The key pollutant subject to PSD and that Shaw concentrated on is sulfur dioxide (SO_2). It appears that emissions increases of nitrogen oxides (NO_X), carbon monoxide (CO), and particulate matter (PM_{10}) also exceed their respective significant emissions rates. Therefore ambient analyses and a BACT proposal are required for the additional pollutants.

A great deal of very useful information was provided in the application. In the mentioned letter, Shaw requested a meeting "to discuss the application" and our engineer, Ms. Teresa Heron, advised them to let us know when they would like to meet with us. We understand Shaw is planning to meet with us this month. We can also discuss the information necessary to complete the application.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

We will forward any comments from EPA Region IV and the National Park Service as soon as they are received. If you have any questions regarding this matter, please contact Ms. Heron at 850/921-9529 or Debbie Nelson (meteorologist) at 850/921-9537.

Sincerely,

A.A. Linero, Program Administrator
South Permitting Section

AAL/th

cc: Mike Stallard, Waste Management, Inc (via e-mail)
Joe Fasulo, Okeechobee Landfill, Inc (via e-mail)
Kristin Alzheimer, P.E., Shaw Environmental & Infrastructure, Inc (via e-mail)
Bruce K. Maillet, Shaw Environmental & Infrastructure, Inc (via e-mail)
Jim Little, U.S. EPA, Region 4 (via e-mail)
Darrel Graziani, Southeast District Office (via e-mail)
John Bunyak, National Park Service (via e-mail)

Okeechobee Landfill Meeting - October 12, 2006

Teresa Heron	DEP	850/921-9529	teresa.heron@dep.state.fl.us
David Unger	WM	713/328-7457	DUnger@wm.com
David Thorley	WM	713-201-3752 (@ID)	dthorley@wm.com
Joe Fasulo	WM	863-357-0111	JFasulo@WM.com
Kelly FAGAN	SHAW	508.497.6172	Kelly.fagan@shawgrp.com
Bruce Mallet	SHAW	508 667-7677	BRUCE.MALLET@SHAWGRP.COM
Debbie Nelson	DEP	850-921-9537	deborah.nelson@dep.state.fl.us
Michele Lersch	WM	813/786-6807	mlersch@wm.com
SYED ARIF	DEP	850-921-9528	Syed.arif@Dep.State.fl.us

AC

2006

WM

RECEIVED

NOV 28 2006

BUREAU OF AIR REGULATION

OKEECHOBEE LANDFILL, INC.
A WASTE MANAGEMENT COMPANY

10800 NE 128th Ave.
Okeechobee, FL 34972
(863) 357-0111
(863) 357-0772 Fax

ext 222

November 27, 2006

Florida Department of Environmental Protection
Attn: Ms. Teresa Heron, Permit Engineer
2600 Blair Stone Road, MS-5505
Tallahassee, FL 32399-2400

Subject: **Request for Permit Addendum Submission**
Application No. 1270-1
Facility Identification Number 0930104 (Site Name: Okeechobee Landfill, Inc.)
Okeechobee, FL

Dear Ms. Heron:

Okeechobee Landfill Inc. respectfully requests an extension for the submittal of additional information requested by FDEP in a letter of August 30, 2006 and subsequent meetings and discussions between FDEP and Okeechobee Landfill. This request relates to the Air Construction Permit application that was submitted on July 28, 2006. Application No. 1270-1 was for processing of a PSD construction permit application. Our request for concurrent processing of a revised Title V operating permit application was previously withdrawn.

This extension request is being made to accommodate project changes recently taken under consideration which involve including the entire site footprint currently permitted for waste disposal and subsequent revised modeling based upon our BACT determination. The changes being considered also include the proposal to include landfill-gas fired electricity generating turbines utilizing the entire gas flow and relegating the flaring system to a secondary role. The additional information being provided to FDEP for the project will result in modification to many parts of the application; the addition of equipment information not included in the previous submittal (the turbines) and, will affect air quality impact assessments as a consequence of these significant changes.

We feel confident that the revised information can be provided to you in a timely manner to complete the existing application.

Sincerely,

Mike Stallard
Director, Landfill Operations

Sheplak, Scott

-file-

From: Thorley, David [DThorley@wm.com]
Sent: Monday, December 18, 2006 2:30 PM
To: Sheplak, Scott
Subject: RE: Meet at Central Landfill

Okeechobee Landfill

The existing design 142,755,440 tons or approx. 129,507,735 Mg.

-----Original Message-----
From: Sheplak, Scott [mailto:Scott.Sheplak@dep.state.fl.us]
Sent: Monday, December 18, 2006 11:11 AM
To: Thorley, David
Cc: Linero, Alvaro
Subject: RE: Meet at Central Landfill

I'm reviewing things like the current TV permit. I hope you do not mind me asking questions as I go through.

What was the existing design capacity in megagrams by mass? What is the planned capacity of the landfill? We can discuss when we meet also.

From: Sheplak, Scott
Sent: Monday, December 18, 2006 11:54 AM
To: 'Thorley, David'
Cc: Linero, Alvaro
Subject: RE: Meet at Central Landfill

I was thinking the same already w re: to PTE concept.

1/10 sounds good. What time? Let's draft an agenda to include a tour.

Scott

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Monday, December 18, 2006 11:31 AM
To: Sheplak, Scott
Subject: RE: Meet at Central Landfill

Central Landfill

2700 NW 48 street

Pompano beach FL 33073

What do you think about meeting on January 10 at the landfill to examine the Lo-Cat system? Also, I may have a couple of Title V questions for you since you seem to be the expert in that category.

In talking to Al Linero last week, I'm pretty sure that we can air permit the entire build out of the landfill, based on the PTE of the currently solid waste permitted landfill. Still would like to have your opinion on this too. My application will be changed to include this information and modeling will also reflect this too. I plan on giving direction to my consultant on how to proceed with the permit application and modeling by the end of this week.

Dave

-----Original Message-----
From: Sheplak, Scott [mailto:Scott.Sheplak@dep.state.fl.us]
Sent: Friday, December 15, 2006 2:46 PM
To: Thorley, David
Subject: RE: Meet at Central Landfill

Sounds good; I need an address. Let's firm up the time also.

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Friday, December 15, 2006 3:38 PM
To: Sheplak, Scott
Subject: RE: Meet at Central Landfill

What about January 10th or 11th or both? I may have some Title V questions for you too.

-----Original Message-----
From: Sheplak, Scott [mailto:Scott.Sheplak@dep.state.fl.us]
Sent: Friday, December 15, 2006 1:17 PM
To: Thorley, David
Subject: RE: Meet at Central Landfill

Sounds good to me. Let's discuss.

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Friday, December 15, 2006 1:06 PM
To: Sheplak, Scott
Subject: Meet at Central Landfill

Scott,
If it would work out better for your schedule, I'm also open the week of January 8th to meet at the landfill too.

Thanks again,
Dave

David Thorley, P.E.
Director of Air Programs - South
1001 Fannin, Suite 4000
Houston, TX 77002
office: 713-328-7404
fax: 713-328-7411
cell: 713-201-3752

Waste Management's renewable energy projects create enough energy to power over 1 million homes.

Sheplak, Scott -file-

From: Linero, Alvaro
Sent: Monday, February 05, 2007 11:44 AM
To: Sheplak, Scott
Subject: FW: Request for Permit Addendum Submission

They can ask for more time. I believe they would need to do that within 90 days of the first RAI response due date.

If they do ask for more time, send them something that tells them when the response is expected so it doesn't become another 90 days (unless you think it warrants 90 days).

Let Darrel know because of the enforcement issues.

Al.

From: Heron, Teresa
Sent: Tuesday, December 12, 2006 3:44 PM
To: 'Stallard, Mike'
Cc: Linero, Alvaro
Subject: Request for Permit Addendum Submission

RE: Okeechobee Landfill

Waste Management request for an extension for the submittal of additional information is granted. Your letter was received on November 28, 2006.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

If you have any questions, please feel free to call.

Thanks,
Teresa Heron, Engineer
Permitting South Section
Bureau of Air Regulation
Phone 850/921-9529
teresa.heron@dep.state.fl.us

2006

Sheplak, Scott

From: Linero, Alvaro
Sent: Thursday, December 14, 2006 9:22 AM
To: Sheplak, Scott; Nelson, Deborah
Subject: FW: Landfill Permitting

Please look this over.

-file-

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Monday, November 20, 2006 2:41 PM
To: Linero, Alvaro
Subject: Landfill Permitting

Al,
Your questions during the FLM call and our discussion last week got me thinking on some issues on permitting landfills and the difficulties of permitting them when they don't really work in the permitting realm. Landfills are really the square peg going into the round hole. However, based on similar options afforded to other industries, I think we can round off the corners of our peg to make it fit, while allowing the landfills to continue to operate as a needed public service. This would not only apply to WM landfills, but to others as well.

This leads to the question regarding why can't I permit for all the landfill gas that is going to be generated by a landfill that has already been issued its solid waste permits to be constructed? This has not necessarily happened in the past, but since the pollution control exemption was available, no one really asked the question. Here's my line of reasoning why we should actually model, determine PTE, and permit a landfill in this manner.

First, the emission unit at one of our facilities (single stationary source), like Okeechobee, is the landfill, not the control device. The EPA has been very clear the control device can not be the emission unit, it can only control the emission unit. The emission unit is the landfill and the control device for this emission unit has to be one of three options listed in the federal regulation, NSPS WWW. The only options that can be used to control the emission unit are found in 40 CFR 60.752(b)(2)(iii), which include (A) an open flare, (B) an enclosed combustion device, or (C) a treatment system.

Therefore, I have to permit an emission unit that is required to be controlled in a specific manner. In the case of Okeechobee Landfill, I would like to permit the emissions from my landfill that will be controlled with a combination of option (A) - open flare & option (B) - an enclosed combustion device which I would be using turbines.

Because of the size of my landfill and the solid waste permits that has in hand, I can perform a PTE based on common good science to determine my maximum gas generation rate and then use an assortment of calculations (AP-42, stack testing, mass balance, etc.) to determine my probable emissions during the life of my emission unit.

This is all good, however, the stumbling block that we usually run into is that PSD and NSR air permitting requirements require us to start construction of the emission unit within 18 months after receiving a permit. However, as noted above, the emission unit is the landfill, and the control device is what people tend to believe what has to have construction started on within 18 months, which I believe is wrong. The landfill is the emission unit and this emission unit is continually constructed out for several years - I don't think that PSD limits that amount of time that an emission unit can take to be constructed. The landfill is constructed be continuously building new cells that have been previously permitted by the FDEP solid waste bureau, and garbage continues to be deposited into the landfill on almost a daily basis. This garbage is the key because it is the substance that breaks down (decomposes) and one of the by-products of this breakdown is landfill gas that needs to be controlled in accordance with the NSPS.

Furthermore, I believe the PSD construction clause is met because the emission unit continues to be constructed, starting day one at Okeechobee landfill, and continues to be constructed over several years. During this construction, extra control devices must be added to aid in the control of the landfill gas produced by the landfill. Therefore, a landfill does meet the construction requirements contained in the PSD and NSR requirements and the entire solid waste permitted landfill should be applied for an air permit.

Therefore, based on this reasoning, can I permit the landfill under the PSD regulations for the entire amount of gas that is expected to be generated from the continued build out of the landfill? I would like to do this at Okeechobee. Your thoughts, opinion, and/or answer to the question would be very much appreciated.

Sincerely,

David Thorley, P.E.
Director of Air Programs - South
1001 Fannin, Suite 4000
Houston, TX 77002
office: 713-328-7404
fax: 713-328-7411
cell: 713-201-3752

Sheplak, Scott

From: Linero, Alvaro
Sent: Friday, May 11, 2007 12:06 PM
To: Nelson, Deborah; Sheplak, Scott
Subject: FW: Okeechobee landfill - NSR rules

From: Linero, Alvaro
Sent: Friday, January 13, 2006 12:43 PM
To: Tallam, Laxmana; Grace, Rebecca
Cc: Graziani, Darrel; Phillips, Cindy; Vielhauer, Trina
Subject: RE: Okeechobee landfill - NSR rules

Laxmana:

Here are my comments, but don't incorporate until you get o.k. from Darrel based on inputs from other commenters. If I were writing this and sending it on for further review prior to sending, I would consider the following for use in my writeup .....

I would refer to the fact that the existing and planned PCP exemptions for all types of facilties was vacated by a Federal Court. We, accordingly, are removing it from our SIP PCP rule that was never approved by EPA following an objection from Miami-Dade County.

I would say say that 3,800 tons per year would use up a substantial amount of Class II increment in the area. Emissions of that magnitude are greater than or equal to those from a new, very large pulverized coal-fired unit. The landfill will be the largest in the United States if not already the largest.

I would ask them if they have considered the possibility of installing H2S abatement equipment such as LoCat that Waste Management installed in Broward County. Such a technology application MIGHT allow them to avoid PSD.

Thanks.

Al.

From: Tallam, Laxmana
Sent: Friday, January 13, 2006 11:46 AM
To: Linero, Alvaro; Grace, Rebecca
Cc: Graziani, Darrel; Phillips, Cindy; Vielhauer, Trina
Subject: Okeechobee landfill - NSR rules

Al and Rebecca:

Please find the attached RFI for the Okeechobee landfill, Inc. The proposed NSR regulations may affect this application, since this project is claiming the Pollution Control Project (PCP) exemption. This exemption is not included in the proposed rules. Please review the 1st question of the RFI and let me know if you have any comments/suggestions.

Thanking you,

Laxmana Tallam
SED
561-681-6624

Al: Please let me know if you have any comments regarding the other questions. This permit application can be found in EPSAP database.

Florida Department of Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

January 30, 2007

E-MAIL - RECEIVED RECEIPT REQUESTED

jvangessel@wm.com

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2859 Paces Ferry Road
Suite 1600
Atlanta, Georgia 30339

Re: DEP File Number 0930104-014-AC
Okeechobee Landfill Facility
Okeechobee Landfill, Inc.
Waste Management, Inc. of Florida

Dear Mr. Van Gessel:

On September 1, 2006, the Department requested additional information with regard to the subject application (copy enclosed). Per the correspondence dated November 27, 2006, an extension was requested. The request to revise the Title V permit concurrently, DEP File Number 0930104-015-AV, was previously withdrawn. To continue the processing of the subject permit application, the Department needs the previously requested additional information.

Recently, I met with the Okeechobee Landfill representatives on-site to discuss the details of the project. The capacity of the current site and the proposed expanded site was discussed. The topic of potential to emit (PTE) as it specifically relates to this project, a landfill, was briefly covered. PTE is a specifically defined term in Florida Administrative Code (F.A.C.), Rule 62-210.200(232), F.A.C. In your additional information response, please include a detailed description of the basis for the PTE of the proposed project. Include pertinent supporting information like:

(i) the dependent values relied upon for the landfill's capacity, e.g., design quantity of solid waste in tons and cubic yards;

(ii) an aerial photograph clearly showing the footprint of the current and the expanded landfill site; and,

(iii) how long will it take for the landfill to reach the requested capacity in years.

The PTE of the proposed project will be relied upon for our air quality regulatory review. As I stated during the on-site visit, we need the PTE properly documented for this project.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have **90 (ninety)** days after the Department mails a timely request for additional information to submit that information to the Department ... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

If you have any questions, please contact me at 850/921-9532 regarding the permit processing review or Ms. Debbie Nelson regarding the air dispersion modeling review at 850/921-9537.

Sincerely,

Scott M. Sheplak

Scott M. Sheplak, P.E.
Air Permitting South Section
Bureau of Air Regulation
Mail Station #5505
2600 Blair Stone Road
Tallahassee, FL 32399
Scott.Sheplak@dep.state.fl.us

SMS/

Enclosure

copy to:

Mike Stallard, Okeechobee Landfill, Inc.: mstallard@wm.com
David Thorley, P.E., Waste Management, Inc.: DThorley@wm.com
Kristin Alzheimer, P.E., Shaw Environmental & Infrastructure, Inc.:
Kristin.Alzheimer@shawgrp.com
Darrel Graziani, P.E., DEP Southeast District Office: Darrel.Graziani@dep.state.fl.us
Jim Little, U.S. EPA, Region 4: little.james@epa.gov
Dee Morse, National Park Service: Dee_Morse@nps.gov

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: (850) 488-0114 FAX: (850) 922-6979

Colleen M. Castille
Secretary

September 1, 2006

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2869 Paces Ferry Road
Atlanta, Georgia 30339

Re: DEP File No. 0930104-014-AC and 0930104-015-AV
Berman Road Landfill Facility
Okeechobee Landfill, Inc.
Waste Management, Inc. of Florida

Dear Mr. Van Gessel:

On July 28, 2006 the Department received electronic notification of an air construction permit application for the construction of additional flares, other improvements planned at the Berman Road Landfill and to revise the facility's Title V Operation Permit. We received the fee of $7,500 on August 4 that is required for an application for an Air Construction Permit pursuant to the Rules for the Prevention of Significant Deterioration of Air Quality (AC/PSD Permit).

The application was submitted with a transmittal letter prepared by Shaw Environmental & Infrastructure Inc. (Shaw). Shaw stated "the short time frame for the application's submittal precluded completion of detailed discussions with vendors and other necessary tasks necessary for a final BACT selection". Shaw also stated "since the BACT has not been chosen as yet, the ambient air impact analysis has not been completed".

A description as to what system of continuous emissions reduction is planned and a best available control technology (BACT) proposal are needed in accordance with Paragraph 62-212.400(4)(c), F.A.C. Also Source Impact Analysis, Air Quality Analysis, and Additional Impact Analyses are also needed as described in Paragraphs 62-212.400(5), (7), (8), and possibly (9), F.A.C. depending on effects upon Class I areas.

According to the information submitted, the emissions increases for the proposed projects will exceed the respective significant emissions rates for several pollutants. The key pollutant subject to PSD and that Shaw concentrated on is sulfur dioxide (SO_2). It appears that emissions increases of nitrogen oxides (NO_X), carbon monoxide (CO), and particulate matter (PM_{10}) also exceed their respective significant emissions rates. Therefore ambient analyses and a BACT proposal are required for the additional pollutants.

A great deal of very useful information was provided in the application. In the mentioned letter, Shaw requested a meeting "to discuss the application" and our engineer, Ms. Teresa Heron, advised them to let us know when they would like to meet with us. We understand Shaw is planning to meet with us this month. We can also discuss the information necessary to complete the application.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

We will forward any comments from EPA Region IV and the National Park Service as soon as they are received. If you have any questions regarding this matter, please contact Ms. Heron at 850/921-9529 or Debbie Nelson (meteorologist) at 850/921-9537.

Sincerely,

A.A. Linero, Program Administrator
South Permitting Section

AAL/th

cc: Mike Stallard, Waste Management, Inc (via e-mail)
Joe Fasulo, Okeechobee Landfill, Inc (via e-mail)
Kristin Alzheimer, P.E., Shaw Environmental & Infrastructure, Inc (via e-mail)
Bruce K. Maillet, Shaw Environmental & Infrastructure, Inc (via e-mail)
Jim Little, U.S. EPA, Region 4 (via e-mail)
Darrel Graziani, Southeast District Office (via e-mail)
John Bunyak, National Park Service (via e-mail)

Sheplak, Scott

From: Harvey, Mary

Sent: Tuesday, January 30, 2007 2:46 PM

To: 'mstallard@wm.com'; 'DThorley@wm.com'; 'Kristin.Alzheimer@shawgrp.com'; Graziani, Darrel; 'little.james@epa.gov'; 'Dee_Morse@nps.gov'

Cc: Sheplak, Scott; Adams, Patty; Gibson, Victoria

Subject: Waste Management, Inc. of Florida - DEP #0930104-014-AC

Attachments: Ltr-John Van Gessel-Waste Management, Inc. of Florida - DEP File #0930104-014-AC.pdf

Dear Sir/Madam:

Please send a "reply" message verifying receipt of the attached document(s); this may be done by selecting "Reply" on the menu bar of your e-mail software and then selecting "Send". We must receive verification of receipt and your reply will preclude subsequent e-mail transmissions to verify receipt of the document(s).

The document(s) may require immediate action within a specified time frame. Please open and review the document(s) as soon as possible.

The document is in Adobe Portable Document Format (pdf). Adobe Acrobat Reader can be downloaded for free at the following internet site: http://www.adobe.com/products/acrobat/readstep.html.

The Bureau of Air Regulation is issuing electronic documents for permits, notices and other correspondence in lieu of hard copies through the United States Postal System, to provide greater service to the applicant and the engineering community. Please advise this office of any changes to your e-mail address or that of the Engineer-of-Record.

Thank you,

DEP, Bureau of Air Regulation

Shaw® Shaw Environmental, Inc.

88 C Elm Street
Hopkinton, MA 01748-1656
508.435.9561
FAX 508.435.9641

May 1, 2007

RECEIVED

MAY 02 2007

BUREAU OF AIR REGULATION

Shaw Project No. 121525

Ms. Debbie Nelson
Florida Department of Environmental Protection
Bureau of Air Regulation
Air Permitting South
2600 Blair Stone Road
MS 5505
Tallahassee, Florida 32399-2400
850-921-9537

Subject: Supplemental Information for Air Construction Permit Application, 1270-2
Class I Area Impact Analysis for Proposed Expansion
Okeechobee Landfill, Facility No. 0930104

Dear Ms. Nelson:

We are providing supplemental information for your review of the above-mentioned permit application. Attached are eight copies of the Class I Area Impact Analysis Report and two copies of the report's Appendix D, which is comprised of 8 computer discs each. If you need any additional information, you may contact me at 508-667-7677.

Respectfully,
Shaw Environmental, Inc.

Bruce Maillet
Client Program Manager

Cc(without computer discs): J. Fasulo, OLI
D. Thorley, WM
K. Alzheimer, Shaw
K. Fagan, Shaw
A. Pakrasi, Shaw

RECEIVED

MAY 02 2007

BUREAU OF AIR REGULATION

CLASS I AREA IMPACT ANALYSIS FOR PROPOSED EXPANSION IN OKEECHOBEE LANDFILL

Prepared for:

Okeechobee Landfill, Inc.
Okeechobee, Florida

Prepared by:

Shaw® Shaw Environmental, Inc.
Shaw Environmental, Inc.
Monroeville, Pennsylvania

Project No. 121525
March 2007

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

As mentioned in Section III, Air Construction Permit Application, 1270-2 the net emissions from the proposed changes in the facility exceeded the significant emission rates for New Source Review (NSR) for the following pollutants: SO_2, NOx, PM10, and CO. Therefore, a Best Available Control Technology (BACT) analysis and an air quality impact analysis in the near filed area were conducted and included in Section III of the permit application submitted on February 28, 2007.

An important element of the air quality analysis is Class I area impact analysis. The analysis requires estimation of impact of the proposed project on nearby federally designated Class I areas in terms of air quality, acidic deposition, and visibility degradation, which are part of the air quality related values (AQRVs).

A brief summary of the results of the Class I area impact analysis was included in the permit application submitted on February 28, 2007. This appendix provides details of the analysis. The appendix is arranged as follows:

- Section 2.0: Background Information
- Section 3.0: Technical Approach and Methodology
- Section 4.0: Class I Area Impact Analysis
- Section 5.0: Conclusions.

2.0 Background Information

The Okeechobee Landfill Facility (Facility), which is owned and operated by Okeechobee Landfill, Inc. (OLI), is comprised of an existing municipal solid waste (MSW) landfill and supporting operations. The facility has been operational since 1981 and under the existing solid waste permit will continue to construct and operate the landfill until approximately 2058. The landfill is an emission unit for nonmethane organic compounds (NMOCs), a landfill gas (LFG) constituent. The typical control device (CD) for NMOCs in LFG is flaring. Other destructive control devices that are sometimes used for LFG combustion are turbines, engines, enclosed combustors, and boilers. The proposed modification to the landfill includes increasing flaring capacity, adding sulfur removal equipment, and constructing a landfill-gas-to-energy (LFGTE) plant.

The Facility currently has two enclosed landfill gas flares with Evap® systems and an open, utility flare as a backup. The two enclosed flares and the backup flare are operated under the current Title V operation permit. There is currently an odor control flare that is operating under a first amended order between FDEP and Okeechobee Landfill Inc. (OLI). A second amended order allows up to five flares to be operated at the Facility. The estimated maximum potential-to-emit (PTE) based on LFG generation estimates occurs shortly after closure and will increase from current 6,000 standard cubic feet per minute (scfm) to 32,400 scfm. There is a current need to install more capacity for control of collected LFG. As the landfill emission unit continues to be constructed, turbines and flares will be installed to control the landfill gas. As the landfill gas increases to allow for the installation of the permitted turbines, the landfill gas will be diverted from the flares to the gas turbines, which will beneficially use the landfill gas by converting it into electricity. Under this preferred scenario, the landfill gas will be always combusted in turbines (numbers increasing with time) and one flare to combust residual gas after full capacity is achieved in turbines, except during turbine maintenance activities which may require additional gas to be sent to the flares. As the gas generation reaches the minimum capacity required for a turbine, gas will be transferred from being flared to a new turbine; and the flare(s) will be ready for excess gas generated from the landfill.

Although the Facility is not a permitted as a major stationary source, recent fuel analysis for hydrogen sulfide indicates that the actual emissions do qualify the Facility as a major stationary source for SO_2. Additionally, the expected emission increases from the current level to the predicted levels at the completion of the landfill construction are above the significant emission rate therefore, triggering PSD review under Chapter 62-212.400. The Application provides the information required by Chapter 62-212.400, F.A.C., for Prevention of Significant Deterioration (PSD) review.

The summary of significant emission rate evaluation for all PSD pollutants as described in Section 5.2 of the Permit Application Report is shown in Table 2-1. The pollutants exceeding the significant emission rates from the proposed changes are: i) SO_2; ii) NOx; iii) PM10; and iv) CO. A BACT analysis has been performed and would require installation of a LFG desulphurization system installed before the destructive control devices (e.g., flares and turbines) to control SO_2.

Table 2-1: PSD Significance Summary

Pollutant	PSD Emission Significant?
Nitrogen Oxides (NOx)	Yes
Carbon Monoxide (CO)	Yes
Sulfur Dioxide (SO_2)	Yes
Particulate Matter, diameter <10 microns (PM10)	Yes
Hydrogen Sulfide (H_2S)	No
Ozone as Volatile Organic Compounds (VOC)	No

Note: Other PSD regulated compounds are not emitted in any appreciable quantity during LFG combustion.

2.1 Description of Site

The Facility is located in Okeechobee County in Central Florida near Lake Okeechobee at approximately 27°20'24" latitude and 80°41'27" longitude. Figure 2-1 shows the site within the state of Florida and nearby natural features. The 4300 acre site contains the existing Berman Road Landfill, the proposed Clay Farms expansion, and auxiliary services.

The terrain surrounding the Facility is mostly flat with terrain heights reaching 60 feet within 5 kilometers (km) from the property boundary line. The vegetation is mostly grassland and mangroves. Land use in the surrounding area is mostly rural. A large water body (Lake Okeechobee) is located approximately 30 km southwest of the Facility.

The area is not industrial and there are no large industrial sources within 10 km from the Facility. Okeechobee County is in attainment for all regulated pollutants with federal NAAQS and FDEP AAQS. The nearest Class I area is Everglades National Park approximately 169 km south of the southernmost property boundary of the Facility. Biscayne Bay National Park, a Class II National Park, is located approximately 193 km from the Facility towards the southwest.

There is no USEPA-approved meteorological monitoring station at the Facility. Meteorological data from nearest National Weather Service (NWS) station in West Palm Beach (approximately 60 km southeast of Facility) shows a predominantly westerly wind pattern. Climatological data

shows that average and maximum wind speed in the area are approximately 4 meters per second (m/s) and 10 m/s. Average annual rainfall in the area is 1560 millimeter (mm).

Figure 2-2 shows a plot plan for the existing Facility. The location of the existing flares and the locations of the proposed turbines and proposed flares are also shown in Figure 2-2.

2.2 Description of Emission Sources

The post-BACT operations have been described in detail in Section 2.0 and 3.0 of the Air Permit Application. The BACT for the proposed modification is to install Low-Cat systems for removal of sulfur from the LFG. The cleaned LFG will then be combusted in the LFG turbines, with a potential for combustion in the flares as an alternative operating scenario. For the purpose of air quality analysis, the following LFG combustion emission sources have been considered:

- Primary Operating Scenario after Installation of BACT (Primary Operating Scenario):
  - Seven LFG turbines (CD011 to CD017) used as control devices each rated at 4,000 scfm of LFG;
  - One open flare (CD003) used as a control device rated at 3,300 scfm of LFG; and
  - One open flare (CD004) used as a control device rated at 3,300 scfm LFG, but only operating at one third capacity (1,100 scfm).
- Alternative Operating Scenario after Installation of BACT when LFG turbines are unavailable (Alternative Operating Scenario)
  - Eight open flares (CD003 through CD010) used as control devices each rated at 3,300 scfm of LFG
  - Two existing enclosed flares (CD001 and CD002) used as control devices each rated at 3,000 scfm of LFG.

The emission rates used for the air quality analysis from these emission sources are described in Section 3.2.

The pollutants considered for the Class I impact analyses were: i) NOx, ii) SO_2; and iii) PM10. Other pollutants such as sulfates, nitrates, ammonia, sulfuric acid mist, and nitric acid mist are not emitted from the emission sources in any appreciable amounts. The total emissions of these pollutants and distance of the emission sources from the nearest Class I area (Everglades NP) and Class II area (Biscayne Bay NP) are shown in Table 2-2a and b.

Table 2-2a: Q/D Analysis for Emission Sources for Everglades National Park

Operating Scenario	Nearest Distance to Everglades NP	Total SO_2 Emissions (tpy)	SO_2 Q/D (tpy/km)	Total NOx Emissions (tpy)	NOx Q/D (tpy/km)	Total PM Emissions (tpy)	PM Q/D (tpy/km)
Primary BACT	185.31	574.7	3.10	991.8	5.35	76.7	0.41
Alternative BACT	185.38	574.7	3.10	283.2	1.53	66.6	0.36

Table 2-2b: Q/D Analysis for Emission Sources for Biscayne Bay National Park

Operating Scenario	Nearest Distance to Everglades NP	Total SO_2 Emissions (tpy)	SO_2 Q/D (tpy/km)	Total NOx Emissions (tpy)	NOx Q/D (tpy/km)	Total PM Emissions (tpy)	PM Q/D (tpy/km)
Primary BACT	193.53	574.7	2.97	991.8	5.12	76.7	0.40
Alternative BACT	193.62	574.7	2.97	283.2	1.46	66.6	0.34

2.3 Elements of Class I Area Impact Analysis

Florida's State Implementation Plan (SIP), which contains the PSD regulations, has been approved by USEPA and therefore PSD approval authority has been granted to FDEP. FDEP's PSD regulations are codified in Rule 62.212.400, Florida Administrative Code (F.A.C.) and are same as the federal PSD regulations codified in 40 CFR Part 51.166.

Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective. Adverse impacts on Class I areas are prevented by:

- Ensuring that Class I area increments are not exceeded; and
- Ensuring that the air quality related values (AQRVs) in the Class I areas are not significantly affected.

Typically, Class I area within 100 km of the proposed source or modification is considered in the analysis. Currently, due to current emphasis in improving visibility in Class I areas via the Regional Haze Rule, Class I areas at greater distances (200 to 300 km) are also being included in the analysis.

The Federal Class I area nearest to the source is the Everglades National Park (Everglades NP) in South Florida, Located approximately 169 kilometers from the facility's southern most property line. The Biscayne Bay National Park (Biscayne Bay NP) is a Class II area located approximately 193 km from the Facility. However, it is considered important relative to air pollution impacts and is also considered in the analyses.

The Class I area air quality analysis is conducted in two phases as follows:

- Significant Impact Analysis: the net emissions increase from project is used in determining the air quality impact in the Class I area and is then compared to the Class I area significance levels concentration. The Draft New Source Review Workshop Manual (1990) lists Class I significance level concentration as 1 ug/m^3 for 24-hour average for all pollutants with NAAQS. USEPA has subsequently proposed lower significance level concentration as shown in Table 2-3. These levels in Table 2-3 have not been officially promulgated as part of the PSD review process. However, FDEP has accepted the use of these significance level concentration for Class I areas.

  If the project's air quality impact does not exceed the Class I significance level concentration, then no further air quality analyses is required.

- Class I area Increment Analysis: This analysis is needed if the project's air quality impact exceeds the Class I area significance level concentration. Table 2-3 shows the Class I area PSD increments, which can not be exceeded by the project's air quality impact.

- AQRV Analysis: The AQRV analysis is required for submission to Federal land Managers (FLM) who are charged with affirmative responsibility to protect the AQRVs. The AQRVs vary with the Class I area being considered. Based on discussions with the National Park Service (NPS), the AQRVs to be considered for the Everglades NP are: i) deposition of total nitrates and sulfates; ii) visibility degradation; and iii) impact of ozone on vegetations. These AQRVs are also considered for the Biscayne Bay NP. The results of these analyses are submitted to NPS for AQRV analyses.

Table 2-3: Reference Concentrations of Regulated Pollutants for Class I Impact Analysis

Pollutant	Averaging Period	Current USEPA Class I Significance Level (ug/m3)	Proposed USEPA Class I Significance Level (ug/m3)	Class I PSD Increments (ug/m3)
NO_2	Annual	N/A	0.1	2.5
	24-hr	1	N/A	N/A
SO_2	3-Hour	N/A	1	25
	24-Hour	1	0.2	5
	Annual	N/A	0.1	2
PM_{10}	24-Hour	1	0.3	10
	Annual	N/A	0.2	5

Note: Proposed Class I significance levels are guidelines a t this time and has not been adopted in PSD regulations.

2.4 Existing Environmental Conditions in Everglades National Park

The existing environmental conditions of the Class I area considered in the analysis is important to the analysis. Some of the Class I areas may show significant impact in concentrations or deposition which would be tolerable in other Class I areas. The following information was obtained from the NPS website for the Everglades NP.

Established in 1947 to preserve the biological features and essential primitive conditions of the subtropical everglades of Florida, Class I Everglades NP is the largest U.S. national park east of the Rocky Mountains. Spanning the southern tip of the Florida peninsula and most of Florida Bay, Everglades NP is the only subtropical preserve in North America. It contains both temperate and tropical plant communities, including sawgrass prairies, mangrove and cypress swamps, pinelands, and hardwood hammocks, as well as marine and estuarine environments. It is the largest continuous stand of sawgrass prairie in North America and the predominant water recharge area for all of South Florida. Everglades NP is consistently listed as one of the most threatened national parks, due primarily to hydrological developments that have disrupted water flow with serious ecological consequences. The park encompasses 1,509,000 acres, of which 1,296,500 acres are designated wilderness. Everglades NP was designated a Biosphere Reserve in 1976, a World Heritage Site in 1979, and a Wetland of International Importance in 1987.

Ambient Air Quality:

South Florida is in attainment status for all criteria pollutants.

Ozone has been continuously monitored at Everglades NP since 1986 (site #120250030). The data indicate no exceedences of the 1-hr human health-based primary national ambient air quality standards (NAAQS).

Acidic Deposition:

A National Atmospheric Deposition Program/National Trends Network (NADP/NTN) wet deposition monitor has been operating at Everglades NP since 1980 (site #FL11). A review of site data shows no trend in concentration of sulfate or nitrate, additionally the data shows that ammonium sulfate, nitrate, and ammonium deposition decreased from 1981 through 1985, then increased from 1989 through the present.

A Clean Air Status and Trends Network (CASTNet) dry deposition site was installed at Everglades NP (site #EVE418) in 1998. Data show no trends in dry nitrogen or sulfur deposition at the site.

Deposition of atmospheric nitrogen contributes to overenrichment and eutrophication in Everglades NP and Florida Bay. Excess nutrient loading has resulted in algae blooms and loss of seagrasses in Florida Bay.

Threatened and Endangered Species:

Drainage of wetlands, alteration of overland water flow and hunting have all contributed to species decline. The Everglades, once known for its abundant bird life, has seen its wading bird population decline drastically since the turn of the century. The Florida Panther once common throughout the state, today is on the verge of extinction. Within the four National Park areas of Everglades National Park, Biscayne National Park, Big Cypress National Preserve and Fort Jefferson National Monument there are 16 endangered and 6 threatened wildlife species. The mere physical boundaries of a National Park do not guarantee a species survival.

For the last decade the South Florida Research Center, Everglades National Park, has been studying how changes occurring outside the parks influence the fragile areas within their boundaries. Research going on today may lead to a brighter future for many species. Known endangered species in Everglades NP are:

- American crocodile (*Crocodylus acutus*)
- Green turtle (*Chelonia mydas*)
- Atlantic Ridley turtle (*Lepidochelys kempi*)
- Atlantic hawksbill turtle (*Eretmochelys imbricata*)
- Atlantic leatherback turtle (*Dermochelys coriacea*)
- Cape Sable seaside sparrow (*Ammodramus maritima mirabilis*)
- Snail (Everglades) kite (*Rostrhamus sociabilis plumbeus*)
- Wood stork (*Mycteria americana*)
- West Indian manatee (*Trichechus manatus*)
- Florida panther (*Felis concolor coryi*)
- Key Largo wood rat (*Neotoma floridana smalli*)
- Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*)
- Red-cockaded woodpecker (*Picoides borealis*)
- Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*)
- Garber's Spurge (*Chamaesyce garberi*).

Plants and Habitats:

The Everglades is a low, flat plain shaped by the action of water and weather. In the summer wet season it is a wide, grassy river. In the winter season the edge of the slough is a dry grassland. Though Everglades National Park is often characterized as a water marsh, several very distinct habitats exist within its boundaries.

Marine/Estuarine

Florida Bay, the largest body of water within Everglades National Park, contains over 800 square miles (2072 square km) of marine bottom, much of which is covered by seagrass. The seagrass

shelters fish and shellfish and sustains the food chain that supports all higher vertebrates in the bay.

Mangroves

Mangrove forests are found in the coastal channels and winding rivers around the tip of South Florida. Red mangroves (*Rhizophora mangle*), identified by their stilt-like roots, and the black (*Avicennia germinans*) and white mangroves (*Laguncularia racemosa*) thrive in tidal waters, where freshwater from the Everglades mixes with saltwater.

Coastal Prairie

Located between the tidal mud flats of Florida Bay and dry land, the coastal prairie is an arid region of salt-tolerant vegetation periodically flooded by hurricane waves and buffeted by heavy winds. It is characterized by succulents and other low-growing desert plants that can withstand the harsh conditions.

Freshwater Marl Prairie

Bordering the deeper sloughs are large prairies with marl sediments, a calcareous material that settles on the limestone. The marl allows slow seepage of the water but not drainage. Though the sawgrass is not as tall and the water is not as deep, freshwater marl prairies look a lot like freshwater sloughs.

Freshwater Slough

The slough is the deeper and faster-flowing center of a broad marshy river. This "fast" flow moves at a leisurely pace of 100 feet (30 meters) per day. Dotted with tree-islands called hammocks or heads, this vast landscape channels life-giving waters from north to south. Everglades National Park contains two distinct sloughs: Shark River Slough, the "river of grass;" and Taylor Slough, a narrow, eastern branch of the "river."

Cypress

The cypress tree (*Taxodium spp.*) is a deciduous conifer that can survive in standing water. These trees often form dense clusters called cypress domes in natural water-filled depressions. The trees in the deep soil at the center grow taller than those on the outside. Stunted cypress trees, called dwarf cypress, grow thinly-distributed in poor soil on drier land.

Hardwood Hammocks

Hammocks are dense stands of hardwood trees that grow on natural rises of only a few inches in the land. They appear as teardrop-shaped islands shaped by the flow of water in the middle of the slough. Many tropical species such as mahogany (*Swietenia mahogoni*), gumbo limbo (*Bursera simaruba*), and cocoplum (*Chrysobalanus icaco*) grow alongside the more familiar temperate species of live oak (*Quercus virginiana*), red maple (*Acer rubum*), and hackberry (*Celtis*

laevigata). Because of their slight elevation, hammocks rarely flood. Acids from decaying plants dissolve the limestone around each tree island, creating a natural moat that protects the hammock plants from fire. Shaded from the sun by the tall trees, ferns and airplants thrive in the moisture-laden air inside the hammock.

Pinelands

The slash pine (Pinus elliottii var. densa) is the dominant plant in this dry, rugged terrain that sits on top of a limestone ridge. The pines root in any crack or crevice where soil collects in the jagged bedrock. Fire is an essential condition for survival of the pine community, clearing out the faster-growing hardwoods that would block light to the pine seedlings. Pine bark is multi-layered, so only the outer bark is scorched during fires. The pinelands are the most diverse habitat in the Everglades, consisting of slash pine forest, an understory of saw palmettos (Serenoa repens), and over 200 varieties of tropical plants.

2.5 Existing Environmental Conditions at the Biscayne Bay National Park

Biscayne National Park (BNP) protects four primary ecosystems: the long stretch of mangrove forest along the mainland shoreline, the shallow southern portion of Biscayne Bay, the northernmost Florida Keys and a portion of the world's third-longest living coral reef. Each of these ecosystems is comprised of a variety of smaller communities like seagrass meadows, hardbottom areas, and hardwood hammocks. Of the park's 180,000 acres, 95% is underwater. The following information was obtained from the NPS website for Everglades NP and BNP, and the United States Geological Survey (USGS) South Florida Information access (SOFIA) website.

Ambient Air Quality:

South Florida is in attainment status for all criteria pollutants.

BNP is not part of the NADP/NTN, but as discussed previously ozone has been continuously monitored at the neighboring Everglades NP since 1986 (site #120250030). The data indicate no exceedences of the 1-hr human health-based primary national ambient air quality standards (NAAQS).

Acidic Deposition:

An NADP/NTN wet deposition monitor has been operating at the neighboring Everglades NP since 1980 (site #FL11). A review of site data shows no trend in concentration of sulfate or nitrate, additionally the data shows that ammonium sulfate, nitrate, and ammonium deposition decreased from 1981 through 1985, then increased from 1989 through the present.

Ammonium sulfate, nitrate, and ammonium deposition decreased from 1981 through 1985, then increased from 1989 through the present.

A Clean Air Status and Trends Network (CASTNet) dry deposition site was installed at Everglades NP (site #EVE418) in 1998. Data show no trends in dry nitrogen or sulfur deposition at the site.

Deposition of atmospheric nitrogen contributes to overenrichment and eutrophication in Everglades NP and Florida Bay. Excess nutrient loading has resulted in algae blooms and loss of seagrasses in Florida Bay.

Plants and Habitats:

Coral Reefs

Over 30 different kinds of corals are found in Florida waters. Individual corals are interconnected colonies of soft, fleshy polyps that secrete complex shells made of calcium carbonate. These colonies can form branching corals or massive head corals depending on species. As the colonies compete for space, and as dead colonies are replaced, they grow on top of each other and build what we call a coral reef. Coral reefs provide habitat for thousands of species of plants and animals.

Dunes

Dunes are created by wind, but are held in place by grasses that trap sand grains as they are being moved across the beach. Dunes stabilized by grasses protect the coast against winds and pounding waves. Florida beaches are important nesting sites for sea turtles and shorebirds.

Freshwater Marsh

Freshwater marshes are generally wetlands with an open expanse of grasses, sedges, rushes, and other herbaceous plants. Freshwater marshes generally contain few, if any, trees and shrubs.

Wet prairies, sawgrass marshes, ponds, and aquatic sloughs are freshwater marsh communities common in South Florida. The word "slough" (pronounced "slew") is used to describe Everglades areas where the water is slightly deeper than in the surrounding marshes and where a slow current is present.

Animals found in the marsh can include fish, invertebrates, frogs, snakes, alligators, white-tailed deer, the Florida panther, and other mammals. Many waterbirds and wading birds nest and forage in marshes as well.

Freshwater Swamps

Freshwater swamps are generally wet, wooded areas where standing water occurs for at least part of the year. During the dry season, their mucky soils may dry out.

Freshwater swamps found in Florida can be dominated by bay trees (i.e. sweetbay, sweet gum) or hardwoods (i.e. oak, elm, red maple). Other plants found in swamps include epiphytes ("air plants") growing on trees, vines, and ferns.

Many animals spend part of their lives in the swamp, moving as water levels rise and fall. Wood storks, herons, many other birds, otters, black bear, and the Florida panther are only a few of the animals that find food, homes, and nesting sites in Florida's swamps.

Hardwood Hammocks

Hardwood hammocks are localized, thick stands of hardwood trees that can grow on natural rises of only a few inches of land. Hammocks in the Everglades perpetuate themselves by building up thick layers of soil and peat, thus providing high ground for the trees to grow. Hammocks may contain trees of a temperate or tropical climate origin, such as the sabal palm, live oak, red maple, mahogany, gumbo limbo, and cocoplum. The diverse flora found in hammocks also includes many additional tree species, epiphytes ("air plants"), and ferns. More epiphytes are found in South Florida hammocks than in any forest in the United States.

Wildlife in hammocks can include tree snails, raccoons, opossums, birds, snakes, lizards, tree frogs, and large animals such as the Florida panther, bobcat, and deer.

Cypress

The cypress tree (*Taxodium spp.*) is a deciduous conifer that can survive in standing water. These trees often form dense clusters called cypress domes in natural water-filled depressions. The trees in the deep soil at the center grow taller than those on the outside. Stunted cypress trees, called dwarf cypress, grow thinly-distributed in poor soil on drier land.

Mangroves

Three species of mangroves are found in Florida: the red mangrove, black mangrove, and white mangrove. Typically, red mangroves grow along the water's edge, black mangroves grow on slightly higher elevations than the red mangrove, and white mangroves grow upland from the red and black. Red mangroves (*Rhizophora mangle*), identified by their stilt-like roots, and the black (*Avicennia germinans*) and white mangroves (*Laguncularia racemosa*) thrive in tidal waters, where freshwater from the Everglades mixes with saltwater. The buttonwood is often associated with the mangrove community. It is usually found growing with the white mangrove, upland of the red and black mangroves. Mangroves grow in saltwater and in areas frequently flooded by saltwater.

Threatened and Endangered Species:

As discussed previously Biscayne National Park is within the Everglades and the national parks share a common list of 16 endangered and 6 threatened wildlife species. The known endangered species in Everglades NP are:

- American crocodile (*Crocodylus acutus*)
- Green turtle (*Chelonia mydas*)
- Atlantic Ridley turtle (*Lepidochelys kempi*)
- Atlantic hawksbill turtle (*Eretmochelys imbricata*)
- Atlantic leatherback turtle (*Dermochelys coriacea*)
- Cape Sable seaside sparrow (*Ammodramus maritima mirabilis*)
- Snail (Everglades) kite (*Rostrhamus sociabilis plumbeus*)
- Wood stork (*Mycteria americana*)
- West Indian manatee (*Trichechus manatus*)
- Florida panther (*Felis concolor coryi*)
- Key Largo wood rat (*Neotoma floridana smalli*)
- Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*)
- Red-cockaded woodpecker (*Picoides borealis*)
- Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*)
- Garber's Spurge (*Chamaesyce garberi*).

3.0 Technical Approach and Methodology

Air dispersion and deposition modeling was performed to determine ambient concentrations, deposition, and visibility impacts of the proposed modification on the Everglades NP and the Biscayne Bay NP. The air modeling was performed generally in conformance with the following guideline documents, with appropriate modifications based on site-specific data:

- Interagency Workgroup on Air Quality Models (IWAQM) Phase 2 Summary report in Modeling Long Range Transport Impacts (USEPA,1998), commonly referred to as IWAQM Phase 2 Report;
- Federal Land Manager's Air Quality Related Values Workgroup, Phase I Report (12/00), commonly referred to as the FLAG Document.
- CALPUFF User's Guide January 2000

The elements of the analysis have been described in Section 2.3. The rest of this section describes the methodology of the modeling and input data for the model.

3.1 Long Range Transport Model

The California Puff Model (CALPUFF) is currently recommended by USEPA for long range transport of pollutants and for visibility impact analysis. There are various versions of the model used for specific purposes. One of the versions has been developed by the Visibility Improvements in States and Tribal Areas of Southeast (VISTAS), a regional planning organization (RPO), developing plans for improving visibility in Class I areas in the southeast USA. The VISTAS version of the CALPUFF (version 5.756) contains defaults, which are relevant to southeast USA. Florida is in VISTAS region (subdomain 2). Therefore, the VISTAS version of the CALPUFF was used in this analysis.

CALPUFF is a multi-layer, multi-species, non-steady state puff dispersion model which can simulate the time and space varying meteorological conditions on pollutant transport, transformation, and removal. CALPUFF uses three dimensional meteorological fields developed by the meteorological processing program CALMET.

CALPUFF contains alogorithms for near source effects such as building downwash, traditional plume rise, partial plume penetration, subgrid scale terrain interactions, as well as long range effects such as pollutant removal (dry and wet deposition), chemical transformation, vertical wind shear, overwater transport, and coastal interaction effects. Major features of the CALPUFF model are shown in Table 3-1.

Table 3-1: Major Features of CALPUFF Model

Feature Element	Details
Source Type	Point, Line, Volume, Area
Non-steady-state emissions and meteorological conditions	Gridded 3-D fields of meteorological variables
	Spatially-variable fields of mixing height, friction velocity, convective velocity scale, Monin-Obukhov length, precipitation rate
	Vertically and horizontally-varying turbulence and dispersion rates
	Time-dependent source and emissions data
Efficient sampling function	Integrated and Elongated puff formulation
Dispersion coefficient options	Direct measurements of dispersion coefficient
	Estimated values of coefficients based on similarity theory
	Pasquill-Gifford dispersion coefficients
	McElroy-Pooler dispersion coefficients
	CTDM dispersion coefficients
Vertical wind shear	Puff splitting
	Differential advection and dispersion
Plume rise	Partial penetration
	Buoyant and momentum rise
	Stack tip effects
	Vertical wind shear
	Building downwash effects
Building Downwash	Huber-Snyder method
	Schulman-Scire Method
Subgrid scale complex terrain	Above dividing streamline, puff flows over hill and experiences altered diffusion rates
	Below dividing streamline, puff deflects around hill, splits, and wraps around hill
Interface to the Emissions Production Model	Time-varying heat flux and emissions from controlled burns and wildfires
Dry deposition	Gases and particulate matter
	Full treatment of space and time variations of deposition with a resistance model option
	User-specified diurnal cycles for each pollutant option
	No dry deposition option

Feature Element	Details
Overwater and coastal interaction effects	Overwater boundary layer parameters
	Abrupt change in meteorological conditions, plume dispersion at coastal boundary
	Plume fumigation
	Option to introduce subgrid scale Thermal Internal Boundary Layers into coastal grid cells
Chemical transformation options	MESOPUFF II method
	User-specified diurnal cycles of transformation rates
	No chemical conversion
Wet removal	Scavenging coefficient approach
	Removal rate a function of precipitation intensity and type
Graphical user interface	Point-and-click model setup and data input
	Enhanced error checking of model inputs
	On-line Help files

CALPUFF generated estimates of concentration at the selected receptor (e.g. Everglades NP and Biscayne Bay NP). To estimate the deposition and visibility impacts, the results from CALPUFF model were processed with port processing utilities CALPOST and POSTUTIL.

CALPUFF requires several types of input data such as source emissions and locations (Source parameters), meteorological data, land use data and receptor data for simulation of impact of emissions sources on ambient air. These input parameters are discussed in following sections.

3.2 Source Parameters

The emission points considered under the two BACT scenarios in the air dispersion modeling have been listed in Section 2.2. All of the proposed emission points are point sources with identified stacks venting the emissions to the atmosphere. This section describes the parameters required in CALPUFF for point sources and the procedure for estimating the parameters.

Emission Rates: Emission rates were calculated using manufacturer's data where available. If not available, then USEPA's AP-42 emission factor database was used. For SO_2, mass balance was used considering all sulfur bearing compounds converted 100% to SO_2. The details of the calculations are in Appendix A. Table 3-2 summarizes the emission rates of modeled pollutants to be considered in the analyses. The same emission rates were used in the Class II PSD increment and NAAQS analyses.

For both gas turbines and flares, the short-term and annual average emission rates were the same and at full capacity of the units.

Table 3-2: Modeled Emission Rates

Pollutant	Averaging Period	Enclosed Flares[1] (lb/hr)	Open Flares[2] (lb/hr)	LFG Turbines[3] (lb/hr)
NOx	Annual	5.4	6.7	31.1
SO_2	3-Hour	12.1	13.4	16.2
	24-Hour	12.1	13.4	16.2
	Annual	12.1	13.4	16.2
PM_{10}	24-Hour	1.4	1.5	2.2
	Annual	1.4	1.5	2.2

Notes:

1: For Alternative BACT scenarios only.

2: For Primary and Alternative BACT scenario only.

3: For Primary BACT scenario only.

Stack Gas Parameters: Stack gas parameters included: i) stack gas exit temperature, and ii) stack gas exit velocity. These are discussed separately.

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

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

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

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

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

Table 3-3 shows the stack parameters used in the air dispersion modeling analysis.

Table 3-3: Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD001	Existing Enclosed Flare	530433.07	3023829.91	45	1,400	38.084	10.000
CD002	Existing Enclosed Flare	530433.07	3023836.01	45	1,400	38.084	10.000
CD003	Utility Flare 1 (backup)	530433.07	3023842.11	62.85	1,831.73	65.616	5.729
CD004	Utility Flare 2 (odor)	530433.07	3023848.2	62.85	1,831.73	65.616	5.729
CD005	Utility Flare 3	530433.07	3023854.3	62.85	1,831.73	65.616	5.729
CD006	Utility Flare 4	530433.07	3023860.39	62.85	1,831.73	65.616	5.729
CD007	Utility Flare 5	530433.07	3023866.49	62.85	1,831.73	65.616	5.729
CD008	Utility Flare 6	530433.07	3023872.59	62.85	1,831.73	65.616	5.729
CD009	Utility Flare 7	530433.07	3023878.68	62.85	1,831.73	65.616	5.729
CD010	Utility Flare 8	530433.07	3023884.78	62.85	1,831.73	65.616	5.729
CD011	Turbine 1	530470.48	3023713.24	50	894	58.68	8.371
CD012	Turbine 2	530470.48	3023719.33	50	894	58.68	8.371
CD013	Turbine 3	530470.48	3023725.43	50	894	58.68	8.371
CD014	Turbine 4	530470.48	3023731.53	50	894	58.68	8.371
CD015	Turbine 5	530470.48	3023737.62	50	894	58.68	8.371
CD016	Turbine 6	530470.48	3023743.72	50	894	58.68	8.371
CD017	Turbine 7	530470.48	3023749.81	50	894	58.68	8.371

3.3 Short-term and Long-term Emission Rates

The flares and turbines are operated only with LFG from the landfill, which is generated in a consistent manner. LFG generation rate varies slowly over time and deployment of turbines or flares are staggered to match the flow. Thus, at all time, the turbines and flares are expected to run at full capacity except for a short period during deployment of a new flare or turbine.

The emissions of SO_2 and PM from turbines and flares depend on the LFG firing rate and decreases with reduced firing rate. Since full LFG firing rate has been considered in the emission rate calculations, this represented maximum emission rate for both short-term and long-term impacts for these two pollutants.

There is a possibility of higher NOx emissions from turbines at lower loads. Thus a load analysis was performed to ensure that the highest LFG flow corresponded to highest ambient NOx impact.

The analysis was conducted at 100%, 75%, and 50% of the operating load for a single turbine. Estimated stack gas flow parameters and emission rates were obtained from the manufacturers. The analysis was performed using USEPA's SCREEN3 model (version 96043). Technically, with USEPA's discontinuation of the ISCST3 model, the SCREEN3 model was also discontinued by USEPA, and a new screening level model AERSCREEN was to be used instead. However, USEPA did not issue a final version of AERSCREEN at the time of this report. With concurrence from FLDEP, the SCREEN3 model was used therefore in this screening level analysis.

The results of the analysis are shown in Table 3-4. Model runs are included in Appendix D. The NOx impacts were highest at full load and therefore this operating load was considered for NOx in subsequent air dispersion modeling analysis.

Table 3-4: Load Analysis for LFG Turbines

Pollutant	Averaging Period	100% Load (ug/m^3)	75% Load (ug/m^3)	50% Load (ug/m^3)
NOx	1-hour	28.73	18.17	12.99

Based on this analysis, the short-term and long-term emission rates were considered same for all pollutants.

3.4 Building Downwash Analysis

Though building downwash was considered in the near filed modeling, it was not considered in the long range transport modeling because the Everglades NP was approximately 169 km from the Facility and Biscayne Bay NP was farther away. At this distance, there would be no appreciable impact of building downwash.

3.5 Meteorological Data

Meteorological data in MM5 format was processed with CALMET to develop the meteorological data set for CALPUFF. The processed data were sent to Shaw for direct use with the CALPUFF. The data was for years 2001, 2002, and 2003 and for subdomain 2 of VISTAS region. FLAG guidance requires that the modeling domain extend at least 50 km upwind of the emission source and 50 km in all sides of the Class I area being modeled. Figure 3-1 shows the extent of subdomain 2 of the VISTAS, which clearly shows that this condition is being met.

Based on information from FDEP, the MM5 data was developed for 4 km grid areas and with 10 vertical layers as required by FLAG for refined analysis.

3.6 Receptor Layout

The National park Service (NPS) has predetermined locations of receptors in each National Park. The receptors for the Everglades NP were obtained from the NPS website and are shown in Figure 3-2a. Since no receptors were available for Biscayne Bay NP in the NPS website, a receptor grid covering this national park was developed. Layout of the receptors is shown in Figure 3-2b.

3.7 Background Concentrations of Ammonia and Ozone

CALPUFF/CALPOST requires background concentration for ammonia and ozone to use the chemical transformation algorithms. The background concentrations were used as follows:

Ammonia background Concentration: There was no ammonia monitoring station in the Everglades NP or Biscayne Bay NP. FLAG recommends use of 0.5 ppb as ammonia background for CALPUFF. This was used in the modeling.

Ozone Background Concentration: One ozone monitoring station (CASTNet site) is located in the Everglades NP. USEPA's Clean Market website from the station for 2001, 2002, and 2003 showed an annual average concentration of 25.1 ppb, 25.7 ppb, and 27.4 ppb, respectively. Based on this data, an conservative value of 30 ppb was considered as the background in all three years. Appendix C includes the printouts from USEPA's "Quick Reports" for this site.

3.8 Background Light Extinction Coefficient

For visibility impact analysis, background light extinction coefficient data is required. The daily background light extinction coefficients was calculated on an hour by hour basis using hourly relative humidity data from the CALMET and hygroscopic and non-hygroscopic extinctions components of 0.9 Mm^{-1} and 8.5 Mm^{-1}, respectively, as specified in the FLAG 2000 document (i.e. MVISBK = 2). Hygroscopic particle growth was capped at relative humidity of 98% per recent FLAG guidance.

3.9 Ammonia Limiting Method

CALPUFF normally considers that all background ammonia is available to all puffs at the same concentration at all times. While this may be reasonable for a single puff or multiple puffs separated from each other, it is not realistic for overlapping puffs, as is expected in this analysis. Additionally, the CALPUFF does not take into consideration the preferential scavenging of ammonia by sulfates over nitrates. As a result, the nitrate deposition and hence overall visibility impact is overpredicted.

The post-processor POSTUTIL offers a method to correct this situation. An option called the Ammonia Limiting Method (ALM), when switched on, would preferentially scavenge the ammonia for sulfates prior to the nitrate chemistry. This option was used in the analysis.

3.10 Relative Humidity Method

Relative humidity is required at the Class I area to estimate the deposition and visibility impacts. Two methods are currently used in CALPUFF for incorporating relative humidity:

- Method 2, which requires hourly relative humidity data to be used in CALMET
- Method 6, which requires monthly averaged relative humidity data.

Per FLAG guidance, Method 2 was used in the analysis.

3.11 Rayleigh Scattering Coefficient

CALPOST uses a default Rayleigh scattering coefficient of 10 Mm^{-1}, which is based on an elevation of 5,000 meters. Rayleigh scattering depends on the density of air, with highest values at sea level (~12 Mm^{-1}) and diminishing with elevation (~12Mm^{-1} at 8,000 m elevation). The Inter agency Monitoring of Protected Visual Environments (IMPROVE) has developed site specific Rayleigh scattering coefficients for all Class I areas based on site specific pressure and temperature data encompassing 10 to 30 years. For Everglades NP, the adjusted Rayleigh scattering value of 11.3 Mm^{-1} from this new IMPROVE equation was used in this analysis. No such site specific data was available for the Biscayne Bay NP. However, since Biscayne Bay NP

is in the same general area and same general elevation as the Everglades NP, same value was used.

3.12 Size Fraction of Particulate Matter

There are no reliable particle size data available in the literature for flare or turbine emissions. However, since the particulate emissions are from combustion of a gaseous fuel, the particles are expected to be fine rather than coarse. In addition, the combustion of LFG is considered generally to result in filterable fraction only and negligible, if any at all, condensable fraction.

The light extinction coefficient for filterable coarse particles (PM10 – PM2.5) and fines (PM2.5 and lower) are 0.6 Mm^{-1} and 1.0 Mm^{-1}, respectively. In order to be conservative, all PM emissions were considered as fine fraction (PMF), with the light extinction coefficient of 1.0 Mm^{-1}.

3.13 Summary of CALPUFF Model Settings

Table 3-5 summarizes the CALPUFF model settings used in the analysis.

Table 3-5: CALPUFF Modeling Analyses Features

Model Input/Output	Description
Meteorology	CALMET (10 layers in the vertical); horizontal domain extends at least 50 km beyond outer receptors and sources being modeled; terrain elevation and land-use data processed. Dataset 2001, 2002, and 2003 for VISTAS subdomain 2 used.
Receptors	Within Class I area(s) of concern, receptor data obtained from NPS website. For Class II area, receptors were located throughout area.
Dispersion	CALPUFF with default dispersion settings as per VISTAS version.
Chemical Transformation	MESOPUFF II chemistry with wet and dry deposition.
Background Values	Ozone: 30 ppb (from monitored data) ; Ammonia: 0.5 ppb (default)
Pollutant Species from Emission Source	SO_2; NOx; and PM
Building downwash	None (Nearest NP greater than 169 kilometers from source)
Rayleigh scattering	Adjusted to elevation from default value of 11.3 Mm^{-1} (Per Revised IMPROVE algorithms March 2006)
Processing: i) Air quality	1. For Class I significance impact: Highest values (H1H) 2: For PSD Class I increments: Highest, second highest 3-hour and 24-hour average SO_2 concentrations; and highest annual average SO_2, and NO_x concentrations.
ii) Deposition	Maximum deposition at the receptors
iii) Processing: Visibility impairment	Maximum percent change of light extinction over natural background and no. of days of percent change over 5% and 10% of natural background. Natural background estimated using daily relative humidity factor [f(RH)] and FLM supplied background extinction data in the FLAG document.

4.0 Results of Analysis

This section contains the results of the Class I area impact analysis. All modeling input and output files are included in electronic form on computer disks supplied as Appendix D in this report.

The details of the analysis are included in following sections. In summary, results of this modeling analysis revealed no anticipated adverse effects resulting from this project. There were no exceedences of the Class I significant impact level or Class I PSD increment for any pollutant. The deposition flux for sulfates and nitrates were within the deposition analysis thresholds (DAT) of 0.01 kg/ha/yr. The visibility impacts were less than 5% for all 24-hour periods.

4.1 Class I Area Significance Analysis

In the analysis, the impact of the proposed emission points on ambient air quality in the Everglades NP was estimated to determine if these pollutants has "significance level" impact, which required full impact analysis.

The analysis includes emissions from proposed modification only. For the alternative BACT operating scenario, the emissions from proposed modification were the 8 new open flares and these were considered in the analysis. For the standard BACT operating scenario, the two existing enclosed flares each at 3,000 scfm (total 6,000 scfm) would be replaced by seven (7) new LFG turbines each at 4,000 scfm, an one open flare at 3,300 scfm and an open flare operating at 33-percent capacity at 1,100 scfm for a total fuel throughput of 32,400 scfm. The existing flares will be on-site as emergency but will not run under this BACT scenario (if they do run due to an outage in the turbines, their emission rates for all criteria pollutants are lower than the turbines on a cfm of LFG basis).

Thus, the new emissions are from additional 26,600 scfm (32,400 scfm – 6,000 scfm) of LFG. The net emission change (projected allowable or potential – baseline actual) is calculated as follows:

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

Where

E_{net} = Net emission increase

E_{BACT} = Potential emissions from 7 turbines and 1.3 new flares, total 32,400 scfm LFG

$E_{existing}$ = Actual emissions from 2 existing flares, total 6,000 scfm LFG

The emission increases and decreases are from two different types of sources (turbines vs. flares) which are located at two different locations in the facility; so the net emission increase could not be used directly in the model. Since the preliminary analysis is used for determination of ambient impact only, the following method was used in the preliminary analysis:

- CALPUFF was run with 7 new turbines and 1 new flare with their full potential emissions and 1 new flare operated at 30-percent capacity (i.e. at total E_{BACT});
- In a different CALPUFF run, the existing two enclosed flares were modeled with total emissions equal to $E_{existing}$; and
- The post-processor POSTUTIL was used to subtract the concentrations resulting from the existing flares from the concentrations resulting from the new sources at each receptor.

This way, the net ambient impacts of the net emissions were determined and compared with the "significance level" concentrations. Concurrence from FDEP was obtained for this approach.

Table 4-1a and b summarize the maximum predicted ground-level concentrations (H1H) and the corresponding PSD/NAAQS significance concentration levels for all pollutants for the interim scenario, the Primary BACT scenario, and the Alternative BACT scenario, respectively. In all cases, these concentrations were lower than the current Class I significance level concentration and also less than the proposed Class I significance level concentrations. In other words, the proposed modifications had no significant impact on the Everglades NP.

Table 4-1a: Significance Analysis Results for the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			µg/m³	µg/m³	%	Yes/No
Primary BACT	NO_2	Annual	0.0018	0.1	1.8	Yes
	PM10	24-Hour	0.0108	0.3	3.6	Yes
		Annual	0.0004	0.2	0.2	Yes
	SO_2	3-Hour	0.1731	1	17.31	Yes
		24-Hour	0.0494	0.2	24.7	Yes
		Annual	0.0020	0.1	2.0	Yes

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			µg/m³	µg/m³	%	Yes/No
Alternative BACT	NO_2	Annual	0.0004	0.1	0.4	Yes
	PM10	24-Hour	0.0093	0.3	3.1	Yes
		Annual	0.0003	0.2	0.15	Yes
	SO_2	3-Hour	0.1617	1	16.17	Yes
		24-Hour	0.0529	0.2	25.45	Yes
		Annual	0.0020	0.1	2.0	Yes

Table 4-1b: Significance Analysis Results for the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			µg/m³	µg/m³	%	Yes/No
Primary BACT	NO_2	Annual	0.0009	0.1	0.9	Yes
	PM10	24-Hour	0.0085	0.3	2.8	Yes
		Annual	0.0002	0.2	0.1	Yes
	SO_2	3-Hour	0.1040	1	10.4	Yes
		24-Hour	0.0418	0.2	20.9	Yes
		Annual	0.0011	0.1	1.1	Yes
Alternative BACT	NO_2	Annual	0.0002	0.1	0.2	Yes
	PM10	24-Hour	0.0070	0.3	2.3	Yes
		Annual	0.0002	0.2	0.1	Yes
	SO_2	3-Hour	0.1161	1	11.6	Yes
		24-Hour	0.0378	0.2	18.9	Yes
		Annual	0.0014	0.1	1.4	Yes

4.2 PSD Class I Increment Analysis

Since the impact of proposed modifications were less than the significant impact, PSD Class I increment analysis was not required. However, for informational purposes, Table 4-2a and b show the impact of the proposed modification as percent of Class I area increment.

Table 4-2a: PSD Class I Increment Analysis Results at the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Class I Increment	Maximum Predicted Concentration as Percentage of Class I Increment
			µg/m³	µg/m³	%
Primary BACT	NO_2	Annual	0.0018	2.5	0.07
	PM10	24-Hour	0.0108	10	0.11
		Annual	0.0004	5	0.01
	SO_2	3-Hour	0.1731	25	0.69
		24-Hour	0.0494	5	0.99
		Annual	0.0020	2	0.10
Alternative BACT	NO_2	Annual	0.0004	2.5	0.02
	PM10	24-Hour	0.0093	10	0.09
		Annual	0.0003	5	0.01
	SO_2	3-Hour	0.1617	25	0.65
		24-Hour	0.0529	5	1.06
		Annual	0.0020	2	0.10

Table 4-2b: PSD Class I Increment Analysis Results at the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Class I Increment	Maximum Predicted Concentration as Percentage of Class I Increment
			µg/m³	µg/m³	%
Primary BACT	NO_2	Annual	0.0009	2.5	0.04
	PM10	24-Hour	0.0085	10	0.09
		Annual	0.0002	5	0.00
	SO_2	3-Hour	0.1040	25	0.42
		24-Hour	0.0418	5	0.84
		Annual	0.0011	2	0.06
Alternative BACT	NO_2	Annual	0.0002	2.5	0.01
	PM10	24-Hour	0.0070	10	0.07
		Annual	0.0002	5	0.00
	SO_2	3-Hour	0.1161	25	0.46
		24-Hour	0.0378	5	0.76
		Annual	0.0014	2	0.07

4.3 Deposition Analysis

Total nitrate ($T\text{-}NO_3$) and total sulfate ($T\text{-}SO_4$) depositions were estimated at the Everglades NP and Biscayne Bay from the proposed modification. For $T\text{-}NO_3$ deposition, the species included:

- Particulate ammonium nitrate wet and dry deposition;
- Nitric acid wet and dry deposition;
- NOx dry deposition; and
- Ammonium sulfate, wet and dry deposition

For $T\text{-}SO_4$ deposition, the species included:

- SO_2 dry and wet deposition; and
- SO_4 dry and wet deposition

The CALPUFF results were processed in CALPOST and POSTUTIL programs to develop deposition impacts. The impacts were then compared with the DAT values as shown in Tables 4-3a and b. A DAT is the incremental amount of deposition from proposed modification or source in a Class I area, below which the impacts are considered insignificant.

Table 4-3a: Deposition Impact Analysis Results for Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Deposition from CALPUFF	Maximum Predicted Deposition in DAT Units	DAT (1)	Maximum Predicted Deposition as Percentage of DAT	Maximum Predicted Deposition Less Than DAT?
			μg/m²-s	Kg/ha-yr(2)	Kg/ha-yr	%	Yes/No
Primary BACT	T-NO_3	Annual	4.16E-06	0.0013	0.01	13	Yes
	T-SO_4	Annual	7.46E-06	0.0024	0.01	24	Yes
Alternative BACT	T-NO_3	Annual	1.57E-06	0.0005	0.01	5	Yes
	T-SO_4	Annual	6.13E-06	0.0019	0.01	19	Yes

Notes:

(1) Deposition analysis thresholds.

*(2) Conversion to DAT units: ug/m2-s * 1E-6 g/ug * 3.154E8 = kg/ha-yr.*

Table 4-3b: Deposition Impact Analysis Results for Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Deposition from CALPUFF	Maximum Predicted Deposition in DAT Units	DAT (1)	Maximum Predicted Deposition as Percentage of DAT	Maximum Predicted Deposition Less Than DAT?
			μg/m²-s	Kg/ha-yr(2)	Kg/ha-yr	%	Yes/No
Primary BACT	T-NO_3	Annual	1.84E-06	0.0006	0.01	6	Yes
	T-SO_4	Annual	3.57E-06	0.0011	0.01	11	Yes
Alternative BACT	T-NO_3	Annual	7.40E-07	0.0002	0.01	2	Yes
	T-SO_4	Annual	3.13E-06	0.0010	0.01	10	Yes

Notes:

(1) Deposition analysis thresholds.

*(2) Conversion to DAT units: ug/m2-s * 1E-6 g/ug * 3.154E8 = kg/ha-yr.*

4.4 *Visibility Impact Analysis*

The change in visibility is characterized by a change in light extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to scattering and absorption by gases and particulates in the atmosphere. The impact of the proposed modification is measured against the natural or background extinction coefficient to determine the percent change as follows:

$$\% \text{ Change} = (b_{ext\text{-}mod} / b_{ext\ -background}) * 100$$

CALPUFF and CALPOST were used to calculate the extinction at each Class I receptor for each day (24-hour period) due to the proposed modification. The analysis was conducted as per FLAG 2000 report. Daily background coefficients are calculated on an hour by hour basis using hourly relative humidity data and hygroscopic and non-hygroscopic extinction coefficients of 0.9 and 8.5 in Mm^{-1}.

The results of the analysis are presented in Table 4-4a and b. The maximum percent change in visibility was 3.5% on January 15th, 2003 for the Everglades NP and 1.28% on February 2, 2003 for the Biscayne Bay NP.

Table 4-4a: Visibility Impact Analysis Results at the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Visibility Impairment	Receptor Location UTM		Date	No. of Visibility Impairments Above 5%	No. of Visibility Impairments Above 10%
			(%)	Easting (m)	Northing (m)	Year / Julian Day		
Primary BACT	2001	24-hour	2.38%	1597.324	-1438.11	2001 / 319	0	0
	2002	24-hour	2.35%	1616.652	-1503.886	2002 / 35	0	0
	2003	24-hour	3.50%	1642.531	-1458.911	2003 / 15	0	0
Alternative BACT	2001	24-hour	0.74%	1593.758	-1447.368	2001 / 261	0	0
	2002	24-hour	1.10%	1577.213	-1441.603	2002 / 301	0	0
	2003	24-hour	1.55%	1619.854	-1462.95	2003 / 32	0	0

Table 4-4b: Visibility Impact Analysis Results at the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Visibility Impairment	Receptor Location UTM		Date	No. of Visibility Impairments Above 5% of Natural Background	No. of Visibility Impairments Above 10% of Natural Background
			(%)	Easting (m)	Northing (m)	Year / Julian Day		
Primary BACT	2001	24-hour	0.80%	1709.947	-1444.201	2001 / 326	0	0
	2002	24-hour	1.24%	1699.681	-1459.076	2002 / 88	0	0
	2003	24-hour	1.28%	1704.923	-1473.765	2003 / 33	0	0
Alternative BACT	2001	24-hour	0.51%	1701.047	-1466.646	2001 / 260	0	0
	2002	24-hour	0.78%	1699.681	-1459.076	2002 / 88	0	0
	2003	24-hour	0.83%	1699.681	-1459.076	2003 / 40	0	0

5.0 Conclusions

Class I Area impact analysis was performed for proposed modifications at the Okeechobee Landfill in Okeechobee County. The Class I area evaluated was the Everglades NP located approximately 169 km from the Facility. A nearby Class II national park, namely the Biscayne Bay NP, was also evaluated for informational purposes.

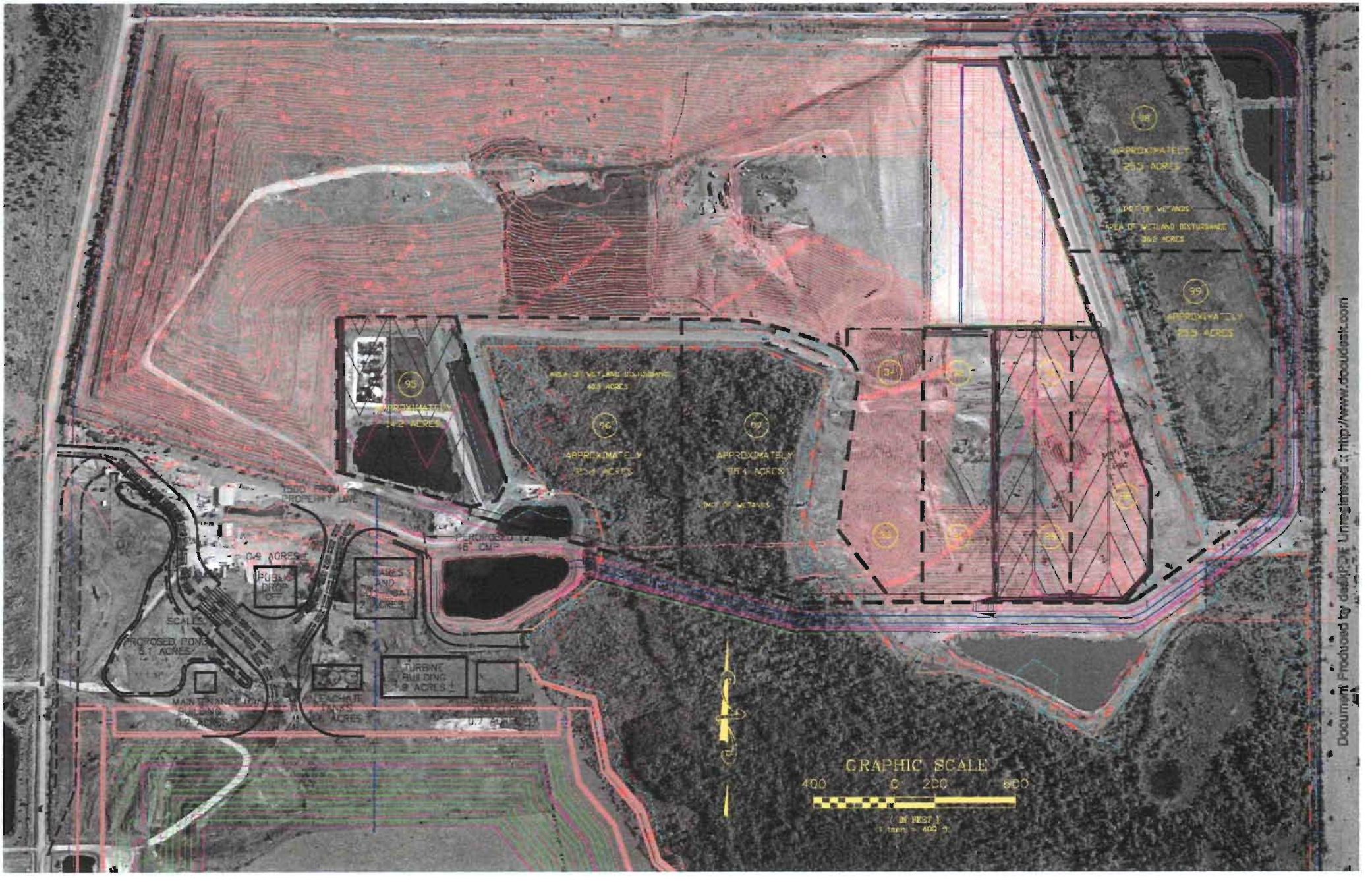
The analyses included were: i) Class I area air quality impact; ii) deposition impact; and iii) visibility impairment impact. Two operating scenarios were considered: i) Primary BACT operating scenario; and ii) Alternative operating scenario.

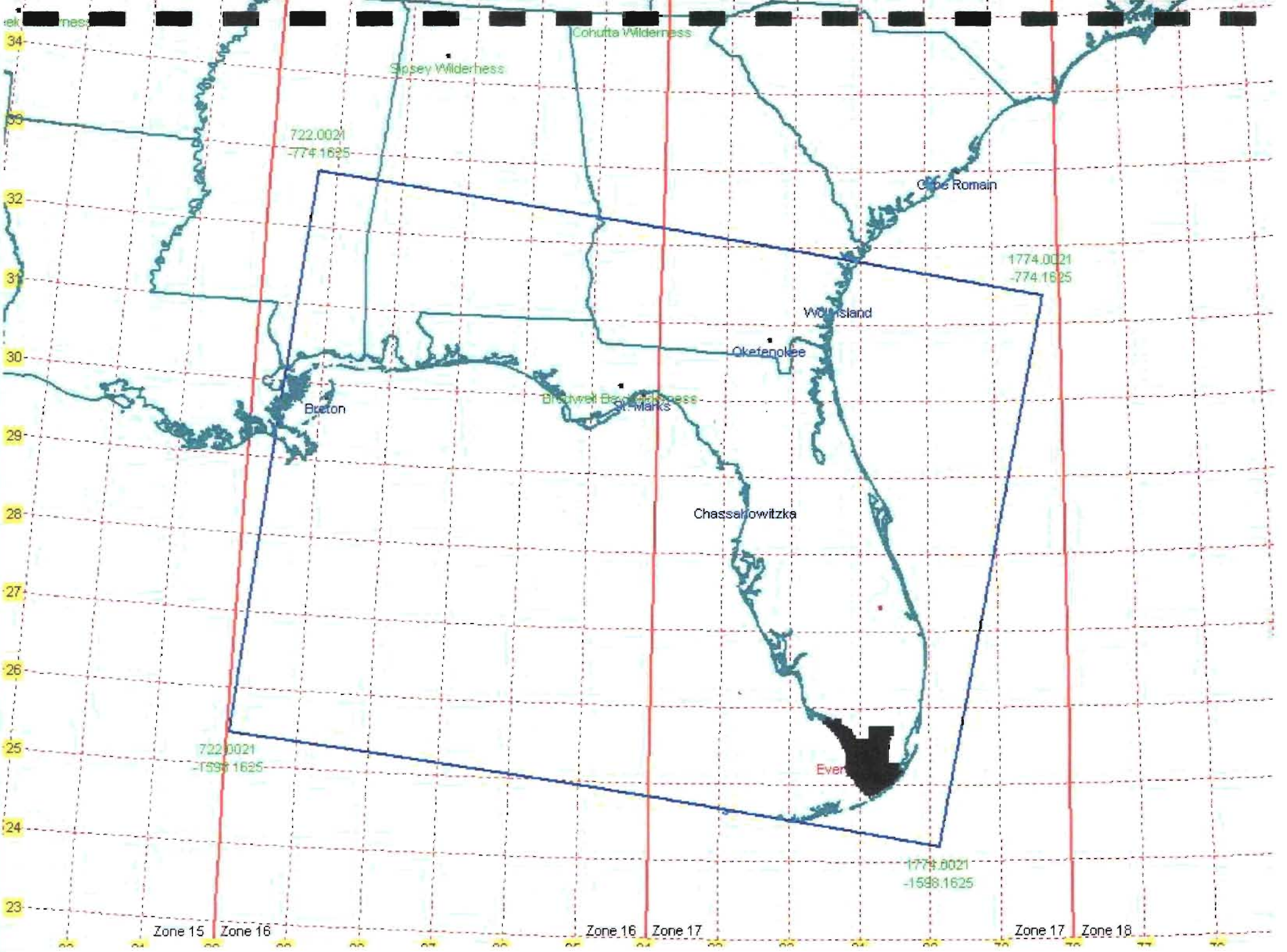
In all scenarios, there was insignificant impact on air quality at the Everglades NP and the Biscayne Bay NP. The deposition flux was estimated to be below significance threshold levels (i.e. DAT) for both nitrates and sulfates in both scenarios. The visibility impairment was measured in terms of light extinction coefficient. For all three scenarios, the percent change in light extinction coefficient over the background was less than 5% in all 24-hour period modeled.

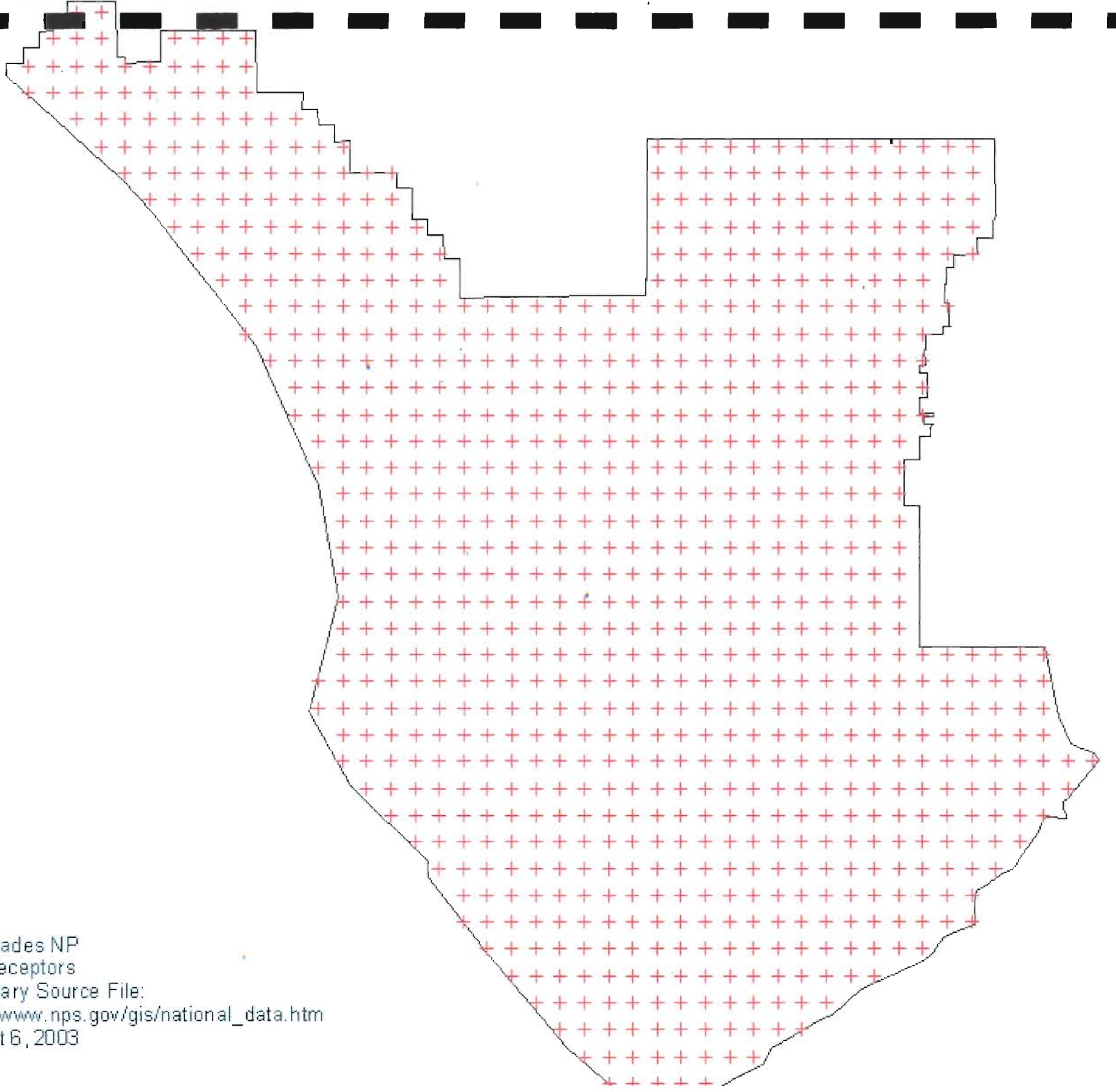
Thus, no adverse impact was predicted on soil, vegetation, wildlife and visibility in the Class I area from this project.

Figures

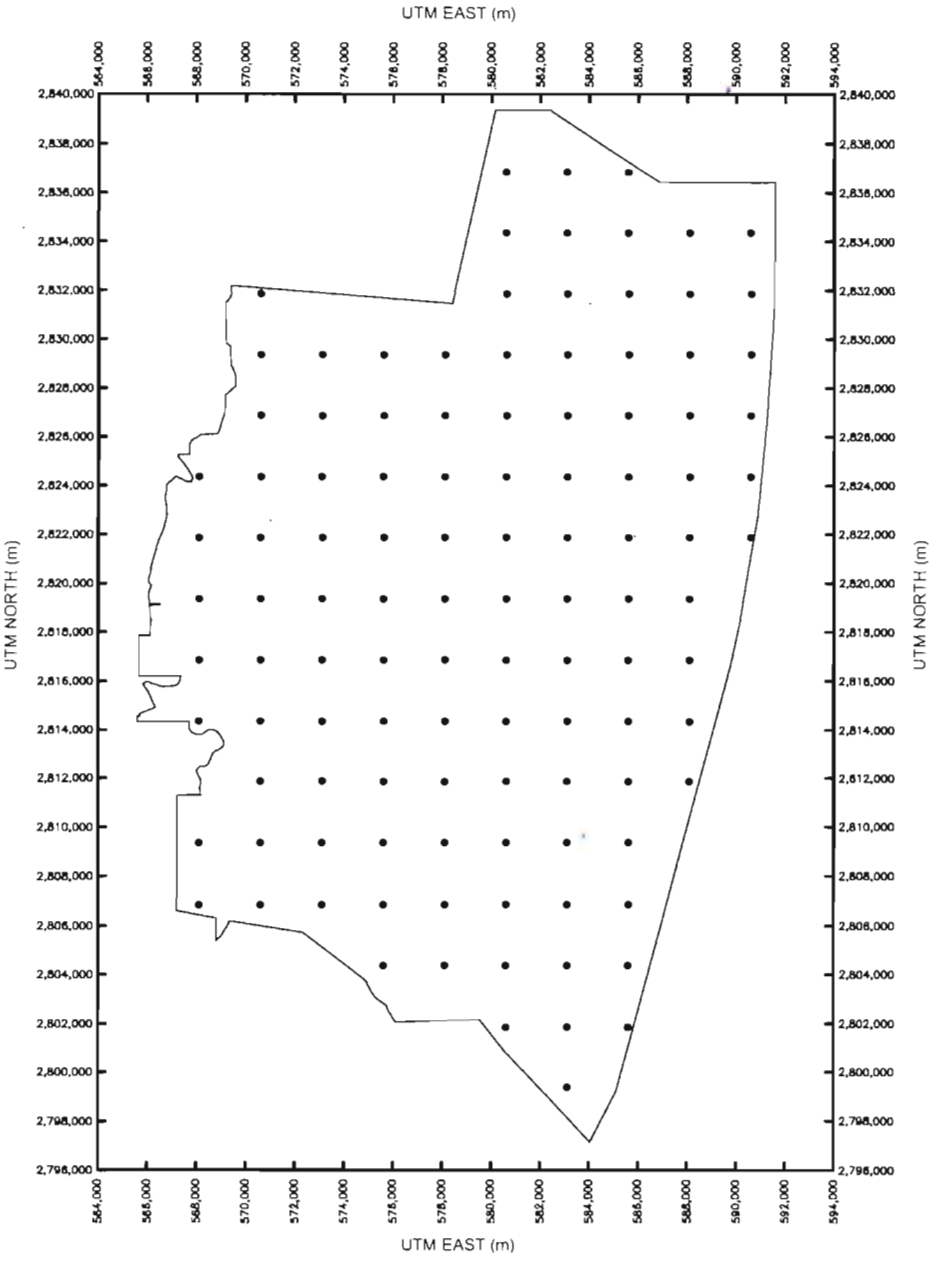
Figure 2-1 Location of Okeechobee Landfill


GRAPHIC SCALE
400 0 200 600
Document Produced by dadiPDF Unregistered © http://www.doudoslt.com


Cohutta Wilderness
Sipsey Wilderness
722.0021
-774.1625
Cape Romain
1774.0021
-774.1625
Okefenokee
Breton
St. Marks
Chassahowitzka
722.0021
-1598.1625
1774.0021
-1598.1625
34
33
32
31
30
29
28
27
26
25
24
23
Zone 15
Zone 16
Zone 16
Zone 17
Zone 17
Zone 18



Everglades NP
901 Receptors
Boundary Source File:
http://www.nps.gov/gis/national_data.htm
August 6, 2003



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	-/-/-	--	--	--	--	121525-B19

Xref :
Images :

File: O:\Project\121525\121525819.dwg
Plot Date/Time: Feb 27, 2007 - 10:44am
Plotted By: greg.jones

Shaw Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC
OKEECHOBEE, FLORIDA

FIGURE 3-2
RECEPTOR LAYOUT FOR BISCAYNE BAY NATIONAL PARK
OKEECHOBEE LANDFILL, INC
OKEECHOBEE, FLORIDA

Appendix A

Calculations and
OEPA Engineering Guide No. 69

BASELINE ACTUAL EMISSIONS														
					Emissions									
EU NO.	Description	Average 24-month flow rate (scfm)	24-month period Hours of Operation	Units	NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT [c]	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S
003	Enclosed Flare Unit 1	2,237	16,902	lb/hr	3.66	12.2	131.6	Not relevent	1.0	0.4	0.1	0.6	0.5	1.4
				tpy	15.5	51.5	556.3		4.0	1.5	0.6	2.6	2.3	5.9
005	Enclosed Flare Unit 2	2,246	17,168	lb/hr	3.67	12.25	129.56		0.96	0.36	0.14	0.62	0.54	1.40
				tpy	15.8	52.6	556.1		4.1	1.6	0.6	2.6	2.3	6.0
004	Open Flare (Backup)	2,240	847	lb/hr	4.57	24.87	131.89		1.06	0.37	0.15	0.61	0.54	0.08
				tpy	1.0	5.3	27.9		0.2	0.1	0.0	0.1	0.1	0.0
NA	Open Flare (Odor Control)	764	5,150	lb/hr	1.6	8.5	45.0		0.4	0.1	0.1	0.2	0.2	0.03
				tpy	2.0	10.9	57.9		0.5	0.2	0.1	0.3	0.2	0.0
CURRENT ACTUAL BASELINE EMISSIONS		**7,487**		lb/hr	**13.5**	**57.9**	**438.1**		**3.4**	**1.3**	**0.5**	**2.1**	**1.9**	**3.0**
				tpy	**34.3**	**120.4**	**1,198.2**		**8.9**	**3.4**	**1.4**	**5.7**	**5.0**	**12.0**

SUMMARY - PROPOSED POTENTIAL TO EMIT WITHOUT BACT [INTERIM OPERATING SCENARIO]

Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation (hours)	Units	Emissions									
					NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT [c]	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S
CD-01	Existing Enclosed Flare w/EVAP [a,b]	3,000	8760	lb/hr	5.4	18.0	176.2	Not relevent	1.4	0.5	0.19	0.8	0.7	1.87
				tpy	23.7	78.8	771.6		6.2	2.1	0.8	3.6	3.2	8.2
CD-02	Existing Enclosed Flare w/EVAP	3,000	8760	lb/hr	5.4	18.0	176.2		1.4	0.5	0.2	0.8	0.7	1.9
				tpy	23.7	78.8	771.6		6.2	2.1	0.8	3.6	3.2	8.2
CD-03	Open Unenclosed Flare (Backup)	0	0	lb/hr	0	0	0		0	0	0	0	0	0
				tpy	0	0	0		0	0	0	0	0	0.0
CD-04	Proposed Utility Flare (odor control)	3,300	8760	lb/hr	6.7	36.6	193.8		1.55	0.53	0.21	0.9	0.80	2.06
				tpy	29.5	160.4	848.7		6.8	2.3	0.9	4.0	3.5	9.0
CD-05	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8		1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	848.7		6.8	2.3	0.9	4.0	3.5	9.0
CD-06	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8		1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	848.7		6.8	2.3	0.9	4.0	3.5	9.0
TOTAL Proposed PTE without BACT		**15,900**		**lb/hr**	**31.0**	**145.9**	**933.7**		**7.5**	**2.6**	**1.1**	**4.4**	**3.9**	**10.0**
				tpy	**135.8**	**639.0**	**4,089.4**		**32.7**	**11.3**	**4.5**	**19.2**	**16.9**	**43.4**

SUMMARY - PROPOSED POTENTIAL TO EMIT FOR TURBINE OPERATING CONDITIONS WITH BACT

Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation	units	Emissions									
					NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT [c]	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S
CD-11	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-12	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-13	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-14	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-15	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-16	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-17	Turbine [a,b]	4,000	8760	lb/hr	31.07	31.3	234.9	16.2	2.2	0.6	0.3	1.0	2.5	2.49
				tpy	136	137	1,029	71	10	3	1	4	11	10.92
CD-03	Open Unenclosed Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.36	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29	160	849	59	7	2	1	4	4	9.01
CD-04	Open Unenclosed Flare	1,100	8760	lb/hr	2.2	12.2	64.6	4.5	0.5	0.2	0.1	0.3	0.3	0.69
				tpy	10	53	283	20	2	1	0	1	1	3.00
TOTAL Proposed PTE with BACT		**32,400**		lb/hr	**226.5**	**267.8**	**1,902.6**	**131.3**	**17.6**	**5.3**	**2.1**	**8.0**	**18.6**	**20.2**
				tpy	**991.9**	**1,173.0**	**8,333.0**	**574.8**	**76.8**	**23.0**	**9.0**	**35.0**	**81.1**	**88.5**

SUMMARY OF ALTERNATIVE OPERATING SCENARIO - POTENTIAL TO EMIT FOR PROPOSED FLARING															
					Emissions										
Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation (hours)	Units	NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S
CD-01	Existing Enclosed Flare w/EVAP [a,b]	3,000	8760	lb/hr	5.4	18.0	176.2	12.1	1.4	0.5	0.2	0.8	0.7	1.9
				tpy	23.7	78.8	772	53.2	6.2	2.1	0.8	3.6	3.2	8.2
CD-02	Existing Enclosed Flare w/EVAP	3,000	8760	lb/hr	5.4	18.0	176.2	12.1	1.4	0.5	0.2	0.8	0.7	1.9
				tpy	23.7	78.8	772	53.2	6.2	2.1	0.8	3.6	3.2	8.2
CD-03	Open Unenclosed Flare (Backup)	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.1
				tpy	29.5	160.4	848.7	58.5	6.8	2.3	0.9	4.0	3.5	4.0
CD-04	Proposed Utility Flare (odor control)	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	849	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-05	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	849	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-06	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	849	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-07	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	849	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-08	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	848.7	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-09	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.06
				tpy	29.5	160.4	849	58.5	6.8	2.3	0.9	4.0	3.5	9.0
CD-10	Proposed Utility Flare	3,300	8760	lb/hr	6.7	36.6	193.8	13.4	1.5	0.5	0.2	0.9	0.8	2.1
				tpy	29.5	160.4	848.7	58.5	6.8	2.3	0.9	4.0	3.5	9.0
Total Proposed PTE Flaring with BACT		32,400	8,760	lb/hr	**64.7**	**329.1**	**1,902.6**	**131.3**	**15.3**	**5.3**	**2.1**	**8.9**	**7.9**	**19.1**
				tpy	**283.2**	**1,441.2**	**8,333.0**	**574.8**	**66.6**	**23.0**	**9.0**	**39.0**	**34.4**	**83.4**

MAXIMUM POTENTIAL-TO-EMIT TO BASELINE ACTUAL NET INCREASE (highest rate used per pollutant)															
					Emissions										
Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation (hours)	Units	NO_x	CO	SO_2 w/o BACT	SO_2 w/ BACT	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S
Varies	Control Device with For each pollutant, the	32,400	8760	tpy	957.6	1,320.8	1,320.8	(623.4)	67.9	19.6	7.6	33.3	29.4	71.4
Significant Emission Rates [62-210.200(264) F.A.C.]				tpy	40	100	40	40	15	50	40	NA	NA	10

Solar Turbines
A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer: Waste Management	Model: MARS 100-15000
Job #:	Package Type: GSC
Run By: Donald C Lyons	Date Run: 24-Oct-06	Mode: 59F MATCH
Engine Performance Code: REV. 3.20	Engine Performance Date: REV. 3.0	Fuel System: GAS
		Fuel Type: CHOICE NATURAL GAS

DATA FOR NOMINAL PERFORMANCE

Elevation	feet	50
Inlet Loss	in H20	3.5
Exhaust Loss	in H20	3.5

		1	2	3
Engine Inlet Temperature	deg F	59.0	59.0	59.0
Relative Humidity	%	60.0	60.0	60.0
Specified Load*	kW	FULL	75.0%	50.0%
Net Output Power*	kW	10924	8193	5462
Fuel Flow	mmBtu/hr	114.28	90.11	68.99
Heat Rate*	Btu/kW-hr	10461	10999	12630
Therm Eff*	%	32.619	31.023	27.015
Engine Exhaust Flow	lbm/hr	342696	306920	263057
Exhaust Temperature	deg F	894	818	778

Fuel Gas Composition (Volume Percent)	
Methane (CH4)	50.00
Carbon Dioxide (CO2)	50.00
Sulfur Dioxide (SO2)	0.0001

Fuel Gas Properties					
LHV (Btu/Scf)	454.7	Specific Gravity	1.0366	Wobbe Index at 60F	446.6

*Electric power measured at the generator terminals.

Notes: Florida

EMISSIONS DATA PROVIDED BY MANUFACTURER VIA EMAIL

-----Original Message-----
From: Chris D. Lyons [mailto:Lyons_Chris_D@solarturbines.com]
Sent: Tuesday, October 24, 2006 11:52 AM
To: Unger, Dave (Renewable Energy)
Subject: Mars 100 emissions

Dave,

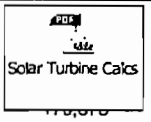
I need to get an official engineering response to your request. The landfill in Paris had a different fuel composition than your site in Florida. I am assuming 50% methane, 50% carbon dioxide.
I have attached the expected performance and below are what I believe will be the emissions.

Full	load				
NOx	=	60 ppmv @15%oxygen	=	31.067	lb/hr
CO	=	60 ppmv @15%oxygen	=	31.517	lb/hr
	75% Load				
NOx	=	42 ppmv @15%oxygen	=	16.782	lb/hr
CO	=	80 ppmv @15%oxygen	=	19.457	lb/hr
	50% Load				
NOx	=	30 ppmv @15%oxygen	=	10.278	lb/hr
CO	=	150 ppmv @15%oxygen	=	31.279	lb/hr

Let me know if you will need any other data. It will take a few days to receive an official response back from engineering.
Regards,
Chris Lyons
Solar Turbines
Phone: 1-858-694-6586

Parameter	Value	Units	Reference
Exhaust Temp	894	F	Mars 100-15000, 100% Load
Exhaust Temp	818	F	Mars 100-15000, 75% Load
Exhaust Temp	778	F	Mars 100-15000, 50% Load
Stack Height	50	ft	Bruce Maillet
Stack Side	87.5	in	Solar Turbines
Stack Side	90.5625	in	Solar Turbines
Stack Interior Diameter	100	in	Calculated
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	4000	scfm	Solar Turbines
Lanfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	2.2	lb/hr	Calculated

Calculation of Flow Rate

		100%	75%	50%
Total Mass Out	lb/hr	342,595	306,920	263,057
Solar Turbines Inc. Mass out	lb/hr	354239		
Solar Turbines Inc. Exhaust Flow	acfm	200336		
Total Flow out	acfm	193,751		148,769
Total Flow out	ft/s	58.68	52.57	45.06

Availability 51 weeks/yr 98%

Criteria Pollutant Emissions - Turbines

Operation Period	8,760	hr
LFG inlet flow, standard	4,000	scfm
Heat Input	90	MMBtu/hr
Standard Temperature[a]	60	°F
	520	°R

SO_2 Emission Rate

SO_2 concentration in exhaust gas	400.05	ppmv	
SO_2 emission rate	16.20	lb/hr	71.0 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2		
					No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.05
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.32
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.09
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	15.62
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.10
				Total Contribution to SO_2:		400.05	16.20

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
MW hexane	86.18	lb/lb-mol	
destruction efficiency	98%		
mass NMOC inlet gas	32.4	lb/hr	
NMOC emission rate	0.65	lb/hr	2.84 tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
VOC fraction of NMOC[a]	39%		
VOC concentration in inlet gas	232	ppmv	
MW hexane	86.18	lb/lb-mol	
mass VOC inlet gas	12.6	lb/hr	
destruction efficiency	98%		
VOC emission rate	0.25	lb/hr	1.11 tpy

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

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

[c]LFG Specialties Inc. (typical)

LFG inlet flow 4,000 scfm

Proposed LFG Turbines

LFG Compound	HAP	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[e,c]	turbine Exhaust (lb/hr)*	turbine Exhaust (tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	71-55-6	133.41	0.48	4.05E-02	98.0%	8.10E-04	3.55E-03
1,1,2,2 - Tetrachloroethane	x	79-34-5	167.85	1.11	1.18E-01	98.0%	2.36E-03	1.03E-02
1,1,2 - Trichloroethane (1,1,2 TCA)	x	79-00-5	133.41	0.10	8.43E-03	98.0%	1.69E-04	7.39E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	75-34-3	98.96	2.35	1.47E-01	98.0%	2.94E-03	1.29E-02
1,1 - Dichloroethene (vinylidene chloride)	x	75-35-4	96.94	0.20	1.23E-02	98.0%	2.46E-04	1.08E-03
1,2 - Dichloroethane (ethylene dichloride)	x	107-06-2	98.96	0.41	2.55E-02	98.0%	5.09E-04	2.23E-03
1,2 - Dichloropropane (propylene dichloride)	x	78-87-5	112.99	0.18	1.29E-02	98.0%	2.57E-04	1.13E-03
2-Propanol (isopropyl alcohol)	--	67-63-0	60.11	50.1	1.90E+00	98.0%	3.81E-02	1.67E-01
Acetone (2-propanone)	--	67-64-1	58.08	7.01	2.57E-01	98.0%	5.15E-03	2.25E-02
Acrylonitrile (Propenenitrile)	x	107-13-1	53.06	6.33	2.12E-01	98.0%	4.25E-03	1.86E-02
Benzene	x	71-43-2	78.12	1.91	9.43E-02	98.0%	1.89E-03	8.26E-03
Bromodichloromethane	--	75-27-4	163.83	3.13	3.24E-01	98.0%	6.48E-03	2.84E-02
Butane	--	106-97-8	58.12	5.03	1.85E-01	98.0%	3.70E-03	1.62E-02
Carbon Disulfide	x	75-15-0	76.14	0.58	2.81E-02	98.0%	5.61E-04	2.46E-03
Carbon Tetrachloride	x	56-23-5	153.84	0.004	3.89E-04	98.0%	7.78E-06	3.41E-05
Carbonyl Sulfide	x	463-58-1	60.07	0.49	1.86E-02	98.0%	3.72E-04	1.63E-03
Chlorobenzene (monochlorobenzene)	x	108-90-7	112.56	0.25	1.81E-02	98.0%	3.61E-04	1.58E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	75-45-6	86.47	1.30	7.11E-02	98.0%	1.42E-03	6.22E-03
Chloroethane (ethyl chloride)	x	75-00-3	64.52	1.25	5.10E-02	98.0%	1.02E-03	4.47E-03
Chloroform (trichloromethane)	x	67-66-3	119.38	0.03	2.26E-03	98.0%	4.53E-05	1.98E-04
Chloromethane (methyl chloride)	x	74-87-3	50.49	1.21	3.86E-02	98.0%	7.72E-04	3.38E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	106-46-7	147	0.21	1.98E-02	98.0%	3.96E-04	1.73E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	75-71-8	120.91	15.7	1.20E+00	98.0%	2.40E-02	1.05E-01
Dichlorofluoromethane (freon-21)	--	75-43-4	102.92	2.62	1.70E-01	98.0%	3.41E-03	1.49E-02
Dichloromethane (methylene chloride)	x	75-09-2	84.93	14.3	7.68E-01	98.0%	1.54E-02	6.72E-02
Dimethyl Sulfide (methyl sulfide)	--	75-18-3	62.13	7.82	3.07E-01	98.0%	6.14E-03	2.69E-02
Ethane	--	74-84-0	30.07	889	1.69E+01	98.0%	3.38E-01	1.48E+00
Ethanol (ethyl alcohol)	--	64-17-5	46.08	27.2	7.92E-01	98.0%	1.58E-02	6.94E-02
Ethylbenzene[g]	x	100-41-4	106.17	4.61	3.09E-01	98.0%	6.19E-03	2.71E-02
Ethyl Mercaptan (ethanethiol)	--	75-08-1	62.13	1.25	4.91E-02	98.0%	9.82E-04	4.30E-03
Ethylene dibromide (1,2 dibromoethane)	x	106-93-4	187.88	0.001	1.19E-04	98.0%	2.38E-06	1.04E-05
Fluorotrichloromethane (CFC-11, freon-11)	--	75-69-4	137.37	0.76	6.60E-02	98.0%	1.32E-03	5.78E-03
Hexane	x	110-54-3	86.18	6.57	3.58E-01	98.0%	7.16E-03	3.14E-02
Hydrogen Sulfide	--	7783-06-4	34.08	385.8	8.31E+00	98.0%	1.66E-01	7.28E-01
Mercury (total)	x	7439-97-6	200.61	2.92E-4	3.70E-05	0.0%	3.70E-05	1.62E-04
Methyl Ethyl Ketone (2-butanone)	--	78-93-3	72.11	7.09	3.23E-01	98.0%	6.46E-03	2.83E-02
Methyl Isobutyl Ketone (hexone)	x	108-10-1	100.16	1.87	1.18E-01	98.0%	2.37E-03	1.04E-02
Methyl Mercaptan	--	74-93-1	48.11	2.49	7.57E-02	98.0%	1.51E-03	6.63E-03
Pentane	--	109-66-0	72.15	3.29	1.50E-01	98.0%	3.00E-03	1.31E-02
ethene)	x	127-18-4	165.83	3.73	3.91E-01	98.0%	7.82E-03	3.42E-02
Propane	--	74-98-6	44.1	11.1	3.09E-01	98.0%	6.19E-03	2.71E-02
Toluene (methylbenzene)	x	108-88-3	92.14	39.3	2.29E+00	98.0%	4.58E-02	2.00E-01
Trichloroethylene (trichloroethene)	x	79-01-6	131.38	2.82	2.34E-01	98.0%	4.68E-03	2.05E-02
dichloroethylene)	--	156-60-5	96.94	2.84	1.74E-01	98.0%	3.48E-03	1.52E-02
Vinyl Chloride (chloroethylene, VCM)	x	75-01-4	62.50	7.34	2.90E-01	98.0%	5.80E-03	2.54E-02
Xylenes (m, o, p)	x	1330-20-7	106.17	12.1	8.12E-01	98.0%	1.62E-02	7.11E-02
Hydrogen Chloride	x	7647-01-0	36.50	42.0	9.69E-01	0.0%	9.69E-01	4.24E+00
Total HAP							1.10	4.8
Maximum Single HAP							0.97	4.24

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

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent and control. Control efficiencies for non-halogenated species range from 38 to 91 percent. For permitting purposes, the lower end

[c]Product of combustion

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

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

EU003 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

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

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

[b]Typical

[c]Assumed

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

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	3,000	scfm	
LFG Inlet Flow, dry standard	2,760	dscfm	
Heat Input	90	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	50,174	scfm	
Flare Tip Flow, actual	179,467	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	2,285	ft/min	38.1 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant

[b]Flare manufacturer - based on LFG model EF1045I12

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

Criteria Pollutant Emissions - Enclosed Flare
EU003 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	3,000	scfm
Heat Input	90	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 concentration in exhaust gas	5800.25	ppmv	
SO_2 emission rate	176.16	lb/hr	771.6 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	5786.00	100.0%	1	5786.0	175.72
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		5800.25	176.16

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust ga	400.05	ppmv	
SO_2 emission rate	12.15	lb/hr uncontrolled	53.2 tpy

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

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4	
PM emission rate	1.41	lb/hr	6.2 tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu	
NO_2 emission rate	5.4	lb/hr	23.7 tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu	
CO emission rate	18.0	lb/hr	79 tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
MW hexane	86.18	lb/lb-mol	
destruction efficiency	98%		
mass NMOC inlet gas	24.3	lb/hr	
NMOC emission rate	0.49	lb/hr	2.13 tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
VOC fraction of NMOC[a]	39%		
VOC concentration in inlet gas	232	ppmv	
MW hexane	86.18	lb/lb-mol	
mass VOC inlet gas	9.5	lb/hr	
destruction efficiency	98%		
VOC emission rate	0.19	lb/hr	0.83 tpy

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

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

[c] LFG Specialties Inc. (typical)

LFG inlet flow 3,000 scfm

EU003 3,000-scfm enclosed flare w/evap

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)[c]	(tpy)[c]
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	3.04E-02	98.0%	6.07E-04	2.66E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	8.83E-02	98.0%	1.77E-03	7.74E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	6.32E-03	98.0%	1.26E-04	5.54E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	1.10E-01	98.0%	2.20E-03	9.66E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	9.24E-03	98.0%	1.85E-04	8.09E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.91E-02	98.0%	3.82E-04	1.67E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	9.64E-03	98.0%	1.93E-04	8.45E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.43E+00	98.0%	2.86E-02	1.25E-01
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.93E-01	98.0%	3.86E-03	1.69E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.59E-01	98.0%	3.18E-03	1.39E-02
Benzene	x	x	71-43-2	78.12	1.91	7.07E-02	98.0%	1.41E-03	6.20E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	2.43E-01	98.0%	4.86E-03	2.13E-02
Butane	--	x	106-97-8	58.12	5.03	1.39E-01	98.0%	2.77E-03	1.21E-02
Carbon Disulfide	x	x	75-15-0	76.14	0.58	2.10E-02	98.0%	4.21E-04	1.84E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	2.92E-04	98.0%	5.83E-06	2.56E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.40E-02	98.0%	2.79E-04	1.22E-03
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.36E-02	98.0%	2.71E-04	1.19E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	5.33E-02	98.0%	1.07E-03	4.67E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	3.82E-02	98.0%	7.65E-04	3.35E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.70E-03	98.0%	3.40E-05	1.49E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	2.90E-02	98.0%	5.79E-04	2.54E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.48E-02	98.0%	2.97E-04	1.30E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	9.00E-01	98.0%	1.80E-02	7.88E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	1.28E-01	98.0%	2.56E-03	1.12E-02
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	5.76E-01	98.0%	1.15E-02	5.04E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	2.30E-01	98.0%	4.61E-03	2.02E-02
Ethane	--	--	74-84-0	30.07	889	1.27E+01	98.0%	2.53E-01	1.11E+00
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	5.94E-01	98.0%	1.19E-02	5.20E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	2.32E-01	98.0%	4.64E-03	2.03E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	3.68E-02	98.0%	7.36E-04	3.23E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	8.91E-05	98.0%	1.78E-06	7.80E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	4.95E-02	98.0%	9.90E-04	4.34E-03
Hexane	x	x	110-54-3	86.18	6.57	2.68E-01	98.0%	5.37E-03	2.35E-02
Hydrogen Sulfide	--	--	7783-06-4	34.08	385.8	6.23E+00	98.0%	1.25E-01	5.46E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	2.78E-05	0.0%	2.78E-05	1.22E-04
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	2.42E-01	98.0%	4.85E-03	2.12E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	8.88E-02	98.0%	1.78E-03	7.78E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	5.68E-02	98.0%	1.14E-03	4.97E-03
Pentane	--	x	109-66-0	72.15	3.29	1.13E-01	98.0%	2.25E-03	9.86E-03
ethene)	x	x	127-18-4	165.83	3.73	2.93E-01	98.0%	5.86E-03	2.57E-02
Propane	--	x	74-98-6	44.1	11.1	2.32E-01	98.0%	4.64E-03	2.03E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.72E+00	98.0%	3.43E-02	1.50E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.76E-01	98.0%	3.51E-03	1.54E-02
dichloroethylene)	--	--	156-60-5	96.94	2.84	1.31E-01	98.0%	2.61E-03	1.14E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	2.17E-01	98.0%	4.35E-03	1.91E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	6.09E-01	98.0%	1.22E-02	5.33E-02
Hydrogen Chloride	x	--	7647-01-0	36.50	42.0	7.27E-01	0.0%	7.27E-01	3.18E+00
Total HAP[e]								0.82	3.6
Maximum Single HAP								0.73	3.18
Hydrogen Sulfide without BACT				34.08	5785.0	9.35E+01	98.0%	1.87	8.19

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources ("AP-42"), 5th Ed.,* November 1998.Tables 2.4-1, 2.4-2, 2.4-3.

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent and control. Control efficiencies for non-halogenated species range from 38 to 91 percent. For permitting purposes, the lower end of each ranges is used here.

[c]Product of combustion

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

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

EU NEW - Proposed 3,000-scfm utility flare

Standard Conditions, Constants, and Typical Values

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

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

Fuel & Equipment - Open Flare

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

[a]Permit Applicant

Criteria Pollutant Emissions - Open Flare

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

SO_2 Emission Rate

SO_2 concentration in exhaust gas	5800.25	ppmv	
SO_2 emission rate	193.77	lb/hr	848.73 ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	5786.00	100.0%	1	5786.0	193.30
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		5800.25	193.77

SO_2 Emission Rate with BACT

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

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

PM_{10} Emission Rate

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

NO_2 Emission Rate

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

CO Emission Rate

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

NMOC Emission Rate

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

VOC Emission Rate

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

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

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

[c]LFG Specialties Inc. (typical)

Air Toxics Emissions from Open Flare *The flare's inlet* ***3,300*** ***scfm***

LFG Compound	HAP	CAS	MW	Compound Conc & Mass in Inlet Gas		Control	Flare Exhaust	
			(lb/lb-mol)	(ppmv)[a]	(lb/hr)	Eff[a,b]	(lb/hr)	(tpy)
1,1,1 - Trichloroethane (methyl chloroform)	x	71-55-6	133.41	0.48	3.34E-02	98.0%	6.68E-04	2.93E-03
1,1,2,2 - Tetrachloroethane	x	79-34-5	167.85	1.11	9.72E-02	98.0%	1.94E-03	8.51E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	79-00-5	133.41	0.10	6.96E-03	98.0%	1.39E-04	6.09E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	75-34-3	98.96	2.35	1.21E-01	98.0%	2.43E-03	1.06E-02
1,1 - Dichloroethene (vinylidene chloride)	x	75-35-4	96.94	0.20	1.02E-02	98.0%	2.03E-04	8.90E-04
1,2 - Dichloroethane (ethylene dichloride)	x	107-06-2	98.96	0.41	2.10E-02	98.0%	4.20E-04	1.84E-03
1,2 - Dichloropropane (propylene dichloride)	x	78-87-5	112.99	0.18	1.06E-02	98.0%	2.12E-04	9.29E-04
2-Propanol (isopropyl alcohol)	--	67-63-0	60.11	50.1	1.57E+00	98.0%	3.14E-02	1.38E-01
Acetone (2-propanone)	--	67-64-1	58.08	7.01	2.12E-01	98.0%	4.25E-03	1.86E-02
Acrylonitrile (Propenenitrile)	x	107-13-1	53.06	6.33	1.75E-01	98.0%	3.50E-03	1.53E-02
Benzene	x	71-43-2	78.12	1.91	7.78E-02	98.0%	1.56E-03	6.82E-03
Bromodichloromethane	--	75-27-4	163.83	3.13	2.67E-01	98.0%	5.35E-03	2.34E-02
Butane	--	106-97-8	58.12	5.03	1.52E-01	98.0%	3.05E-03	1.34E-02
Carbon Disulfide	x	75-15-0	76.14	0.58	2.31E-02	98.0%	4.63E-04	2.03E-03
Carbon Tetrachloride	x	56-23-5	153.84	0.004	3.21E-04	98.0%	6.42E-06	2.81E-05
Carbonyl Sulfide	x	463-58-1	60.07	0.49	1.53E-02	98.0%	3.07E-04	1.34E-03
Chlorobenzene (monochlorobenzene)	x	108-90-7	112.56	0.25	1.49E-02	98.0%	2.98E-04	1.31E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	75-45-6	86.47	1.30	5.86E-02	98.0%	1.17E-03	5.13E-03
Chloroethane (ethyl chloride)	x	75-00-3	64.52	1.25	4.21E-02	98.0%	8.41E-04	3.68E-03
Chloroform (trichloromethane)	x	67-66-3	119.38	0.03	1.87E-03	98.0%	3.74E-05	1.64E-04
Chloromethane (methyl chloride)	x	74-87-3	50.49	1.21	3.19E-02	98.0%	6.37E-04	2.79E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	106-46-7	147	0.21	1.63E-02	98.0%	3.27E-04	1.43E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	75-71-8	120.91	15.7	9.90E-01	98.0%	1.98E-02	8.67E-02
Dichlorofluoromethane (freon-21)	--	75-43-4	102.92	2.62	1.41E-01	98.0%	2.81E-03	1.23E-02
Dichloromethane (methylene chloride)	x	75-09-2	84.93	14.3	6.33E-01	98.0%	1.27E-02	5.55E-02
Dimethyl Sulfide (methyl sulfide)	--	75-18-3	62.13	7.82	2.53E-01	98.0%	5.07E-03	2.22E-02
Ethane	--	74-84-0	30.07	889	1.39E+01	98.0%	2.79E-01	1.22E+00
Ethanol (ethyl alcohol)	--	64-17-5	46.08	27.2	6.54E-01	98.0%	1.31E-02	5.73E-02
Ethylbenzene[g]	x	100-41-4	106.17	4.61	2.55E-01	98.0%	5.10E-03	2.24E-02
Ethyl Mercaptan (ethanethiol)	--	75-08-1	62.13	1.25	4.05E-02	98.0%	8.10E-04	3.55E-03
Ethylene dibromide (1,2 dibromoethane)	x	106-93-4	187.88	0.001	9.80E-05	98.0%	1.96E-06	8.58E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	75-69-4	137.37	0.76	5.44E-02	98.0%	1.09E-03	4.77E-03
Hexane	x	110-54-3	86.18	6.57	2.95E-01	98.0%	5.91E-03	2.59E-02
Hydrogen Sulfide	--	7783-06-4	34.08	385.8	6.86E+00	98.0%	1.37E-01	6.01E-01
Mercury (total)	x	7439-97-6	200.61	2.92E-4	3.05E-05	0.0%	3.05E-05	1.34E-04
Methyl Ethyl Ketone (2-butanone)	--	78-93-3	72.11	7.09	2.67E-01	98.0%	5.33E-03	2.34E-02
Methyl Isobutyl Ketone (hexone)	x	108-10-1	100.16	1.87	9.77E-02	98.0%	1.95E-03	8.56E-03
Methyl Mercaptan	--	74-93-1	48.11	2.49	6.25E-02	98.0%	1.25E-03	5.47E-03
Pentane	--	109-66-0	72.15	3.29	1.24E-01	98.0%	2.48E-03	1.08E-02
ethene)	x	127-18-4	165.83	3.73	3.23E-01	98.0%	6.45E-03	2.83E-02
Propane	--	74-98-6	44.1	11.1	2.55E-01	98.0%	5.11E-03	2.24E-02
Toluene (methylbenzene)	x	108-88-3	92.14	39.3	1.89E+00	98.0%	3.78E-02	1.65E-01
Trichloroethylene (trichloroethene)	x	79-01-6	131.38	2.82	1.93E-01	98.0%	3.86E-03	1.69E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	156-60-5	96.94	2.84	1.44E-01	98.0%	2.87E-03	1.26E-02
Vinyl Chloride (chloroethylene, VCM)	x	75-01-4	62.50	7.34	2.39E-01	98.0%	4.78E-03	2.10E-02
Xylenes (m, o, p)	x	1330-20-7	106.17	12.1	6.70E-01	98.0%	1.34E-02	5.87E-02
Hydrogen Chloride[c,d]	x	7647-01-0	36.50	42.0	7.99E-01	0.0%	7.99E-01	3.50E+00
Total HAP							0.91	3.97
Maximum Single HAP							0.80	3.50
Hydrogen Sulfide without BACT			34.08	5785.0	1.03E+02	98.0%	2.06	9.01

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

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent and control. Control efficiencies for non-halogenated species range from 38 to 91 percent. For permitting purposes, the lower end of each ranges is used here.

[c]Product of combustion

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

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

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

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

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

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

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

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

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

TOTAL HAP EMISSIONS:

uncontrolled =	**0.30** lb/hr	**2,646.05** lbs/year
98% control =	**0.006** lb/hr	**52.92** lbs/year

a - HAPs in both LFG and in leachate

b - from EPA Characterization of MWC Ashes and Leachates from MSW Landfills, Monofills and Co-Disposal Sites, median concentration values

c - draft AP-42 (9/95), Tables 2.4-3; unlisted control efficiencies assumed to be 80%

d - product of combustion

c - Additional HAPs found in leachate > 50 ppb/mgal per reference b

x - HAP present in leachate > 50 ppb

o - non-VOC HAP

Notes:

c - draft AP-42 (9/95), Tables 2.4-1 and 2.4-2; concentration in inlet gas

d - concentration of chloride in leachate; thermal conversion to hydrogen chloride in flare is presented in the "air toxics" sheets

d - concentration of sulfate in leachate; thermal conversion to sulfur dioxides in flare is presented in the "criteria pollutants" sheets

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

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

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

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

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

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

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

TOTAL HAP EMISSIONS:

uncontrolled =	**0.30** lb/hr	**2,646.05** lbs/year
98% control =	**0.006** lb/hr	**52.92** lbs/year

a - HAPs in both LFG and in leachate
b - from EPA Characterization of MWC Ashes and Leachates from MSW Landfills, Monofills and Co-Disposal Sites, median concentration values
c - draft AP-42 (9/95), Tables 2.4-3; unlisted control efficiencies assumed to be 80%
d - product of combustion
c - Additional HAPs found in leachate > 50 ppb/mgal per reference b
x - HAP present in leachate > 50 ppb
o - non-VOC HAP

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

Notes:
c - draft AP-42 (9/95), Tables 2.4-1 and 2.4-2; concentration in inlet gas
d - concentration of chloride in leachate; thermal conversion to hydrogen chloride in flare is presented in the "air toxics" sheets
d - concentration of sulfate in leachate; thermal conversion to sulfur dioxides in flare is presented in the "criteria pollutants" sheets

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

Sample Calculations

Standard Conditions and Constants

$^{\circ}R = {}^{\circ}F + 460$
standard temperature = 60 °F
standard pressure = 1 atm
Universal gas constant (R) = 0.7302 atm-ft^3/lb-mol°R

Flow

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

CO and NO_x Emissions

(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions

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

PM_{10} Emissions

(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions

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

LFG Compound Emissions

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

HCl Emissions

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

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

Sample Calculations

Standard Conditions and Constants

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

Flow

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

CO and NO_x Emissions

(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions

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

PM_{10} Emissions

(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions

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

LFG Compound Emissions

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

HCl Emissions

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

INTENTIONALLY LEFT BLANK

Ohio EPA

Division of Air Pollution Control

Air Quality Modeling and Planning Section

Engineering Guide #69

Air Dispersion Modeling Guidance

2003

The Division of Air Pollution Control has received several questions concerning computer modeling of air pollution sources. This guide is intended to respond to those questions. Below is a list of all of the questions. The rest of the Guide contains the Division's responses. The Division welcomes comments on the application of this Guide and additional questions related to air dispersion modeling.

This document will answer the most commonly asked questions to provide a basis for consistent model application although many other questions require case-specific responses. The answers in this document do not reflect a rule or regulation, are not intended to be treated as a rule or regulation, and are subject to change on a case-by-case basis. The information within is provided so that permitting personnel, regulated entities and the public will have an understanding of the expected outcome of the situations described in this document. If you have additional questions on modeling, or comments on this guide, you should contact the Division of Air Pollution Control (614-644-2270).

.....

Table of Contents

TABLES

Question 1: What specific modeling requirements are incorporated by Ohio EPA in the review of air contaminant sources?

Question 2: What models are to be used?

Question 3: What meteorological data sets are to be used?

Question 4: What modeled emission rate(s) should be used?

Question 4.1: Are fugitive emissions modeled?

Question 4.2: Are there any exceptions to the modeling thresholds for modeling criteria pollutants and toxics contained in Table 3?

Question 4.3: Should sources be modeled that emit pollutants listed in the ACGIH book, do not have a TWA, but do have a Ceiling or STEL?

Question 4.4: Are minor and exempt sources included in the modeling for a project which exceeds the thresholds in Table 3?

Question 4.5: Do you model sources within a building that have no direct vent to the outside or do not have an identified control device for capture, control and release of the emissions from the unit?

Question 5: Is building downwash required for state modeling?

Question 5.1: What building height do I use if the building has a pitched roof?

Question 6: Reserved/Deleted

Question 7: Is there any special guidance for nonstandard point source emissions?

Question 7.1: How do I model rain caps and horizontal releases?

Question 7.2: How do I model flares?

Question 7.3: What special modeling considerations are necessary for modeling combustion turbines?

Question 8: Reserved/Deleted

Question 9: What receptor grids must I use?

Question 10: What are the state significant emission rates which trigger modeling?

Question 10.5: Can a source modification trigger a requirement for modeling even where there is no increase in emission rate?

Question 11: What are the state target concentrations for acceptable incremental impacts?

Question 12: What special requirements exist for sources of fluoride?

Question 13: How do I obtain background values when performing NAAQS analyses in Ohio?

Question 14: What sources do I include in a major source PSD and/or NAAQS analysis?

Question 15: How do I model major sources in nonattainment areas to demonstrate net air quality improvement?

Question 16: Can I use SCREEN to model multiple sources?

Question 17: If multiple pollutants are being emitted, does an individual model run have to be performed for each pollutant?

Question 18: For PSD and non-PSD sources, can facilities be installed if modeling shows that more than ½ the available PSD increment is consumed?

Question 19: What determines whether a locale is rural or urban?

.....

Question 1: What specific modeling requirements are incorporated by Ohio EPA in the review of air contaminant sources?

Answer 1: The following is intended to identify current Ohio EPA, Division of Air Pollution Control requirements for air pollution control modeling applications within Ohio. Where applicable, Ohio EPA is consistent with U.S. EPA guidance. In real world applications, the US EPA Guideline on Air Quality Models and supplementary guidance does not always address detailed problems that confront modelers.

The purpose of air dispersion modeling is to predict pollutant concentrations resulting from a source or group of sources under various meteorological conditions. Modeling is necessary to demonstrate that the subject source or sources will not 1) cause or significantly contribute to a violation of the National Ambient Air Quality Standards (NAAQS); 2) cause ambient concentrations which exceed allowable PSD increments; 3) comply with Ohio EPA's policy of no new source consuming more than one half of the available PSD increment (one half the increment is the effective goal for all new source modeling of criteria pollutants, regardless of the size or location of the new source.); and/or 4) cause ground level concentrations which exceed Ohio EPA's maximum allowable ground level concentration (MAGLC) for toxic air pollutants. For criteria pollutants which do not have identified PSD increments, maximum incremental impact of new source emissions is limited to one quarter of the NAAQS.

The combined emission increases from all of the new or modified sources must be evaluated to determine the maximum incremental impact if the total emissions exceed the amounts indicated in Table 3. For criteria pollutants, the incremental impact cannot exceed one half of any PSD increment or, if no PSD increment exists, one quarter of the NAAQS. There is no requirement to model VOC emissions for incremental impact on ozone concentrations (although specific VOC constituents may require air toxic modeling). **For exceptions to the one half PSD increment policy, see Answer 18.**

New or increased emissions of toxics that exceed the levels identified in Table 3 must be evaluated to determine the maximum incremental impact of these emissions for comparison with the MAGLC as described in Ohio EPA's current procedure for reviewing new sources of air toxics.

Where the permit includes both emission increases and decreases (generally restricted to a contemporaneous 5-year period), the net increase should be modeled. Ohio EPA must approve the 'netting' emissions prior to modeling.

Question 2: What models are to be used?

Answer 2: The specific source/receptor situation dictates the appropriate model for determining ambient concentrations for comparison with NAAQS, PSD increments, short or long term exposure limits, etc. The size and complexity of the source, the

toxicity of the emissions along with other factors will dictate whether a screening model or a refined model is appropriate.

Screening models are generally the first level tools for evaluating air quality impacts. High predicted concentrations from a screening model may indicate the need for further refined modeling. Larger more significant sources and groups of sources will require the application of a refined model.

Sources in areas where terrain elevation is significant relative to the stack height will require evaluation using receptor elevations. Where terrain exceeds the stack height, a complex or intermediate terrain modeling analysis is necessary. This applies to both criteria and toxic pollutants.

Generally, the most recent version of a model is to be used. The most recent model versions of models contained in The Guideline on Air Quality Models (GAQM) can be obtained by accessing the U.S. EPA Support Center for Regulatory Air Models (SCRAM), Technology Transfer Network at http:\\www.epa.gov\ttn\scram. The SCRAM web page also provides model users manuals, ancillary programs, meteorological data and additional model application information. This Engineering Guide and meteorological data for Ohio sources are available on the Ohio EPA DAPC web page located at http://www.epa.state.oh.us/dapc/aqmp/aqmp.html

Note: The Guideline on Air Quality Models (Appendix W of 40 CFR Part 51) will be revised. AERMOD has been identified as the replacement for the ISC models. Federal guidance has indicated that both AERMOD and ISC will be acceptable for no more than one year after the final rule is published. At which time ISC will no longer be acceptable for PSD and SIP related modeling. Ohio EPA will continue to accept ISC for state-only permits and modeling projects until further notice.

Screening models:

Note: There is currently no screening version of AERMOD to replace SCREEN3. Until further notice, SCREEN3 will still be accepted by Ohio EPA for state-only permit modeling.

The current recommended model for screening point or area sources in simple terrain is the most recent version of SCREEN3 (or its successor), for criteria pollutants or for applications where maximum ambient concentrations of neutral buoyancy pollutants are desired. A fundamental assumption for pollutants being modeled with traditional Gaussian models is that the concentration of the pollutant in the plume will not make the plume disperse or diffuse differently than air.

Applications requiring an evaluation of emergency release scenarios or sources emitting 'light' or 'heavy' plumes may use one of the commercially available toxic

release models to determine if ambient impacts exceed the applicable MAGLC. Most routine releases, even of heavy compounds, will have a density close to that of air due to high dilution.

Point sources with stacks less than good engineering height (discussed below) must be evaluated for downwash impacts using the SCREEN3 or SCREEN3C model (or their successors).

Initial screening estimates of source impacts involving intermediate or complex terrain should utilize SCREEN3 or CTSCREEN (or their successors). SCREEN3 is available as an interactive program by itself or within the TSCREEN model set.

The output from these models identifies short term (1-hour) maximum impacts. The following are the conversion factors to be used to convert these short term estimates to the averaging time of concern. Separate conversion factors have been recommended by U.S. EPA for terrain below stack tip (simple terrain) and terrain above stack tip (complex terrain).

Conversion Factors

	Desired Averaging Period						
Model output	1-hr	3-hr	8-hr	24-hr	month	qtr	ann
Simple 1-hr:	1.000	0.900	0.700	0.400	0.180	0.130	0.080
Complex 1-hr	1.000	0.700	0.500	0.150		0.060	0.030

Additional guidance on the use of SCREEN and TSCREEN is provided in Appendix A of this document.

Complex and intermediate terrain screening for state-only permit requirements can also be performed using ISC3 with five years of NWS data.

Refined models:

The most commonly used refined models for point, area and volume sources involving simple, intermediate and complex terrain are the most recent versions of ISCST3 and ISCLT3 (or their successors) using representative meteorological data in the regulatory default modes. Several commercial versions of these models have been granted model equivalency by U.S. EPA and are therefore also acceptable. For refined toxic analyses, the same procedures used for criteria pollutants are used to determine ambient concentrations. There are currently no requirements for deposition calculations. Modeling involving pollutant transformations (ozone, nitrates, sulfates) is not generally required for new or modified sources and is not addressed in this guide.

Question 3: What meteorological data sets are to be used?

Answer 3: Short Term: ISC Data Sets: Hourly surface observations are combined with twice-daily mixing height measurement to create a RAMMET meteorological input file. RAMMET data files can be created using on-site tower measurements or off-site National Weather Service (NWS) surface data sets.

If the modeling is for NAAQS or PSD analyses, at least one year of on-site or the most recent available five years of representative off-site NWS data are required. If the source of concern is located in intermediate or complex terrain, U.S. EPA believes that NWS data are not representative for the above stack portion of the analysis and are therefore not acceptable. For state-only modeling requirements, 5 years of NWS data are considered acceptable for use in a conservative screening analysis.

The most recent five-year off-site NWS data sets currently available from Ohio EPA are for the period 1987-1991. These data are acceptable. Later NWS data are also acceptable but not required. Off-site NWS data sets are assigned by county. Table 1 identifies the appropriate data set for each county in Ohio.

Certain southeastern counties of the state have been assigned Parkersburg/Huntington RAMMET and STAR data for modeling. For counties assigned 'Parkersburg' surface data, 1973-1977 data are the most recent available. This surface site is the most representative available for modeling in this region of Ohio and the older data set is considered more representative for these counties than more recent Huntington or Pittsburgh data.

NOTE: While the State of Ohio accepts NWS data for use in modeling in both simple and complex terrain for state-only modeling requirements, U.S. EPA has a more restrictive interpretation of 'representative' meteorological data when modeling impacts at receptors with elevations above the stack tip. For this and other reasons, it is important when preparing to model major PSD or nonattainment sources, that a protocol is developed and approved to assure that acceptable model calculations will be obtained for each source/receptor relationship.

AERMOD Data Sets: On-site or NWS surface data sets are combined with local surface characteristics and upper air observations within the AERMET preprocessor program to create the needed modeling meteorological data sets for AERMOD. The latest five-year data sets for use in Ohio will be provided on the Ohio EPA web page at http://www.epa.state.oh.us/dapc/aqmp/aqmp.html after Appendix W is finalized and final guidance is issued by U.S. EPA.

Long term: Long term (e.g., monthly, quarterly, annually) meteorological data sets are developed from short term on-site or off-site (NWS) surface data sets. These long term STAR (STability ARray) data sets are necessary to run ISCLT3 or other ISCLT3-based

long term models.

ISCST3 and AERMOD can also be used for long term modeling periods by modeling specific blocks of days and selecting appropriate n-day average concentrations.

Question 4: What modeled emission rate(s) should be used?

Answer 4: Tables 9-1 and 9-2 in the Guideline on Air Quality Models (Appendix W of 40 CFR Part 51) identify the various emission rates to be used in modeling a source. In general, the short term maximum potential (allowable) emission rate is used in the evaluation of a short term standard. For an existing source, a representative long term actual emission rate can be used to evaluate a longer term (quarterly or annual) standard. An annual permit restriction can also be used to develop a long term average emission rate to be used in evaluating a long term standard for a new source.

For state permit modeling, including Ohio air toxics modeling, the peak short term increase which the permit will allow is the emission rate to be modeled to determine the peak ambient impact this permit action will allow. This could involve the combined peak impact of several sources if there are several sources included in the same project.

For a federal netting or synthetic minor permit, the difference between existing actuals emissions and permit allowable emissions, as determined in the netting calculation, is modeled for comparison to the Ohio acceptable incremental impacts. For state-only netting modeling evaluations, the allowable to allowable difference is usually acceptable. For PSD or federal netting, though, modeled emissions should be consistent with the netting evaluation performed for the permit.

For a modification which involves an emission increase only, the net change allowed by the permit is evaluated. For PSD and other federal analyses, the net change is the difference between the existing actual emissions and the new potential allowable emissions. For state-only review, modeling the difference in allowables is usually acceptable.

For a modification involving a change in stack parameters which could increase the ambient impact due to the source(s), the emissions affected by the modification (potential allowable) are modeled to determine if the impact of the modification is below the Ohio acceptable incremental impacts. If necessary, the present (before modification) emissions can be modeled as negatives in a refined analysis to determine the net impact of the permitted modification for comparison to the Ohio acceptable incremental impacts.

Like-kind replacements would not need modeling if all emissions parameters remain the same since there would be no increase in impact due to the permit action. If, however, the replacement involves the use of a shorter stack, lower temperatures, etc., the

replacement may cause an increased peak impact which would need evaluation. As noted above, if the replacement, when viewed alone, exceeds the Ohio acceptable incremental impacts as identified in Table 3, the source being replaced can be modeled with a negative emission rate in a refined modeling analysis to determine the net peak impact for comparison to the Ohio acceptable incremental impacts. Also, see Question 14 for additional information on emission inventories.

Question 4.1: Are fugitive emissions modeled?

Answer 4.1: Major new source PSD and Nonattainment Review includes all significant sources, including fugitive sources such as storage piles and roadways.

In minor source state permit modeling, though, only the boiler or process source criteria and toxic emissions increases (both controlled and fugitive) are to be modeled. Non-process fugitive sources such as roadways and parking lots, material storage and material transfer operations are not modeled. Grinding, crushing, mixing and screening operations are considered processes and should be modeled. An evaluation of all project emissions may be required in a state analysis if circumstances warrant.

Question 4.2: Are there any exceptions to the modeling thresholds for modeling criteria pollutants and toxics contained in Table 3?

Answer 4.2: There are several new source emissions scenarios which Ohio EPA has historically not reviewed for state-only permits. These scenarios generally involve fugitive emissions from parking lots, roadways, material handling and storage piles. These scenarios usually represent situations where modeling results often indicate potential problems due to unreliable emission factors and/or unusual or extreme source configurations. Field experience with these sources, though, indicates that normal operating practices and compliance with required controls result in acceptable ambient impacts as demonstrated by ambient monitoring, field measurements of visible emissions or a lack of verified complaints by local citizens.

Therefore, the following list of source/pollutant scenarios will not be required to perform an air quality analysis in support of a state-only permit **unless factors such as source size, tons of emissions, particle size, pre-existing concerns or proximity to other sources or citizen populations indicate that a modeling review is warranted**:

Toxic or criteria pollutants from parking lots
Toxic or criteria pollutants from storage piles
Toxic or criteria pollutants from storage tanks
Toxic or criteria pollutants from transfer operations
Toxic or criteria pollutants from grain silos or dryers

Toxic or criteria pollutants from emergency generators
Toxic or criteria pollutants from gasoline dispensing

In addition, the following pollutants will be treated as PM but not as a toxic for modeling purposes:

Wood dust
Sand
Glass dust
Coal dust
Silica
Grain dust

Source/Toxic Pollutant combinations subject to a MACT, NESHAP or an NSPS that would restrict the amount of that pollutant that could be released are not subject to toxics modeling. Toxics modeling is also not required for pollutants subject to a NAAQS (e.g., lead).

Question 4.3: Should sources be modeled that emit pollutants listed in the ACGIH book, do not have a TWA, but do have a Ceiling or STEL?

Answer 4.3: Yes, pollutants not having a listed TWA are addressed by multiplying the Ceiling or STEL by 0.737 and then following the procedures in 'Option A' to develop a MAGLC.

Question 4.4: Are minor and exempt sources included in the modeling for a project which exceeds the thresholds in Table 3?

Answer 4.4: All sources or units contained in the permits that make up a project are initially considered significant with respect to the potential impact due to the project. Many small sources, while individually insignificant, could combine to cause or contribute to an ambient problem. Smaller sources can be removed from the modeling analysis if it can be demonstrated that their emissions are insignificant relative to the rest of the project.

Question 4.5: Do you model sources within a building that have no direct vent to the outside or do not have an identified control device for capture, control and release of the emissions from the unit?

Answer 4.5: Sources can be located within an enclosure or building with no obvious control and/or vent moving the emissions to the outside. It must be assumed that all

emissions coming from the device are either captured and controlled or are escaping to ambient air. If they are not being captured and controlled (with the cleaned air being reintroduced to the work area), the emissions must be escaping the building and the modeler must determine how the emissions are being removed from the building or enclosure to the ambient air. The emission rate leaving the building or enclosure is assumed to be the same as the emission rate from the source(s). Any credit for some portion of the emissions being retained in the building due to "building capture" must be supportable and will be evaluated on a case-by-case basis.

Often the emissions are removed by the building ventilation system. In other situations, the only exchange between indoor and outdoor air occurs through open doors and windows. In any event, the modeler must identify the egress point(s) and characterize the releases as one of the available modeling release scenarios (i.e., point, area or volume). If best engineering judgement justifies assigning a fraction of the total emissions through specific egress points, the individual points can be modeled with their assigned emission rates. When using a single source screening model, the individual modeled peaks are then added together.

If it is unclear which potential egress point the emissions are actually venting through, the worst case egress point is assumed. If it is not clear which egress point is worst case, each scenario should be tested.

Question 5: Is building downwash required for state modeling?

Answer 5: Any stack source file must include building dimension data if the stack is not at or above good engineering practice (GEP) stack height. GEP is determined by evaluating all nearby structures using the formula GEP = H + 1.5L where H is the height of the structure and L is the lesser of the height or projected width of the structure. The GEP height is the highest height calculated for any nearby structure (a structure is 'nearby' if it is within five times the lesser of its height or width from the stack). If direction specific building dimensions (discussed below) are not calculated, the most conservative dimensions should be used for all directions. The most conservative building dimensions are usually associated with the height and diagonal width of the tallest nearby building.

Direction specific building dimensions may be determined for 36 wind directions for ISCST or AERMOD and 16 wind directions for ISCLT. This allows the model to include the effects of the critical structure for each wind direction. Direction specific building dimensions are calculated using facility plot plans and manually determining the dominant structure dimensions for each wind direction for each stack. Alternatively, the BPIP program provided by the U.S. EPA as well as several commercial software packages are available which will calculate the dimensions for each wind direction from a single building or group of buildings for each stack.

Buildings with multiple segments can be viewed as multiple buildings. For example, a predominantly flat one story building is interrupted by a three-story tower, the flat, one story building is evaluated and the 'four story' building (1 + 3), with lateral dimensions of the tower is also evaluated.

Building dimensions are not contained in state or federal emissions data bases. These data need to be obtained from facility personnel if sources at that facility are subject to building downwash. Distant background sources might be modeled without downwash with Ohio EPA permission since this would most likely maximize those sources' impact in the study area and therefore be 'conservative'.

Question 5.1: What building height do I use if the building has a pitched roof?

Answer 5.1: Pitched roofs present a nonstandard modeling scenario. The horizontal dimensions at the peak are reduced to a single line. A conservative approach is to assume that the entire horizontal dimensions are covered by a flat roof at the elevation of the peak of the pitched roof. An acceptable alternative is to assume a building height one half the distance up the pitched roof and the corresponding horizontal dimensions below that 'roof' (i.e., one horizontal dimension would also be halved).

Question 7: Is there any special guidance for nonstandard point source emissions?

Answer 7: Nonstandard source emissions are not specifically addressed in the above screening or refined models. For example, if emissions do not exit the stack in an upward (vertical) direction, alternative characterizations of the source should be developed to more accurately represent the release point. If a 'point source' is still assumed, even though the exit velocity is blocked or diverted sideways or downward (such as in a rain cap, discussed below), an exit velocity of 0.001 m/s should be input to the model so that a fictitious upward momentum is not credited to that source.

If the temperature of the release is near ambient, a characterization as an area or volume source might be appropriate. If temperature is significant, a virtual stack might be created to represent the emission point. Alternative characterizations should be discussed with Ohio EPA staff prior to modeling.

Question 7.1: How do I model rain caps and horizontal releases?

Answer 7.1: U.S. EPA has provided a specific solution to address hot stack plumes that are interrupted by a rain cap or which are released horizontally. U.S. EPA requires that these sources reduce their stack exit velocity to 0.001 m/s.

While it would be conservative to simply reduce the velocity, the source would lose the effect of the buoyancy that the volume of hot gas would normally have. The Ohio EPA recommended adjustment provides for retention of the buoyancy while addressing the impediment to the vertical momentum of the release. The procedure is as follows (stack parameters' units are assumed to be in metric units):

1) The stack exit velocity (V_s) is set equal to 0.001 m/s (V_s')

2) Stack diameter (d_s) is adjusted using the equation

$$d_s' = 31.6 * d_s * (V_s)^{0.5}$$

(Where V_s is the actual stack exit velocity, NOT 0.001 m/s)

3) Use V_s' and d_s' in the model

The results of this approach can create an extremely large modeled stack diameter. Receptors should not be placed within the calculated diameter, d_s'.

Question 7.2: How do I model flares?

Answer 7.2: For screening purposes, the flare option in SCREEN3 or TSCREEN is acceptable. For refined modeling, it is necessary to compute equivalent emission parameters, i.e., adjusted values of temperature and stack height and diameter. Several methods appear in the literature, none of which seems to be universally accepted. Ohio EPA/DAPC has used the following procedure, which is believed to be consistent with SCREEN3:

1) compute the adjustment to stack height as a function of heat release Q in MMBtu/hr:

$$H_{equiv.} = H_{actual} + 0.944(Q)^{0.478} \quad (a)$$

Where H has units of meters;

2) assume temperature of 1273 deg. K;

3) assume exit velocity of 20 meters/sec;

4) assume the following buoyant flux:

$$F_b = 1.162(Q)$$

5) back-calculate the stack diameter that corresponds to the above assumed parameters. Recall the definition of buoyant flux:

$$F_b = 3.12(V)(T_{stack} - T_{ambient})/T_{stack}$$

Where V is the volumetric flow rate, actual m^3/sec.

Substituting for F_b and solving for the equivalent stack diameter $d_{equiv.}$:

$$d_{equiv.} = 0.1755(Q)^{0.5}$$

This method pertains to the "typical" flare, and will be more or less accurate depending on various parameters of the flare in question, such as heat content and molecular weight of the fuel, velocity of the uncombusted fuel/air mixture, presence of steam for soot control, etc. Hence, this method may not be applicable to every situation, and the applicant may submit his own properly documented method.

(a) Beychok, M., 1979. Fundamentals of Stack Gas Dispersion, Irvine, CA.

Question 7.3: What special modeling considerations are necessary for modeling combustion turbines?

Answer 7.3: Combustion turbines are unique in that stack temperatures and flow rates, as well as emission rates, are dependant on ambient conditions, especially ambient temperature. Determining a worst case operating scenario resulting in peak source impacts involves evaluating the source at multiple loads (50%, 75% and 100%) as well as average and extreme ambient temperatures. Three general approaches are normally followed to establish the worst case operating scenario. The approaches described below address a PSD application.

Approach 1: Each scenario is modeled using SCREEN3. If each scenario results in insignificant impact, then the demonstration is complete. If one or more scenarios result in significant impact, the worst case scenario is carried forward into the PSD and NAAQS analyses using ISC or AERMOD. If there is no clear cut worst case scenario, multiple scenarios may need to be carried forward into the subsequent comprehensive analyses. All other things being equal, it is preferable to move forward with a 100% load scenario rather than a reduced load scenario.

Approach 2: Each scenario is modeled with ISC or AERMOD using the latest year of meteorology. The worst case scenario(s) is then run with five years of meteorology to determine if the proposed project will have a significant impact. If there is a significant impact, then the worst case scenarios are carried forward into the PSD and NAAQS analyses.

Approach 3: Worst case emission rates and stack parameters from all scenarios are used to estimate a worst case impact. This virtual worst case stack can be used through all phases of the analysis.

The same approaches can be followed for state-only (e.g., synthetic minors) modeling, with the only goal to be achieved being the Ohio Acceptable Incremental Impacts.

Question 9:What receptor grids must I use?

Answer 9: Sufficient receptors are necessary in the vicinity of projected maximum concentrations to assure that the peak concentration(s) has been found. For most applications, the spacing should be 100 meters at the 'hotspot', determined from the preliminary modeling results (either ISC, AERMOD or a screening model), out to a distance sufficient to assure that the maximum concentration has been found. Additional receptors should also be placed in areas of special concern (e.g., areas of source interaction and areas of significant terrain). It is also important that the extent of the grid covers the entire area of significant impact from the proposed project.

Receptor elevations are required unless a demonstration that the study area is flat is made. The absence of terrain above stack height is not sufficient to ignore terrain heights. 'Simple' terrain does not mean 'flat' terrain. Topographical data indicating no significant terrain features in the expected significant impact area of the source(s) or indicating flat but gently sloping terrain could justify not including terrain heights for the receptors in that study area.

Receptor elevation information as well as source and receptor location information can be derived from information contained on United States Geological Service topographical maps as well as from internet sources such as www.topozone.com. Information is also available from Digital Elevation Model (DEM) files which are also available from various host sites on the internet. DEM files are available free of charge at http://data.geocomm.com/dem/.

AERMOD receptor grids must be exclusively developed using the AERMAP preprocessor using DEM data. Receptor information must contain calculated information concerning the relative height of the nearby terrain (receptor height scales) in addition to the location and elevation of the receptor.

Question 10: What are the state significant emission rates which trigger modeling?

Answer 10: A comprehensive list of emission rates which trigger state and federal modeling requirements is contained in Table 3 under the heading "Ohio Modeling Significant Emission Rates." The emissions increase which will be allowed by this permit action (potential allowable increase) are compared to these levels.

Question 10.5: Can a source modification trigger a requirement for modeling even where there is no increase in emission rate?

Answer 10.5: OAC 3745-31-01(VV)(1)(b) defines "modification" to include "Any physical change in, or change in the method of operation of any significant air contaminant source that, for the specific air contaminant . . . for which the source is classified as significant, results in an increase in the ambient air quality irnpact . ." greater than certain values specified in the rule. Thus, if the source is "significant" (as defined in OAC 3745-31-01(RRR)) and the proposed incremental impact at any receptor exceeds the specified value (listed under the "3745-31-01(VV)(1)(b)" heading in Table 3) then the change is a modification requiring a permit-to-install, notwithstanding the fact that it may entail no increase in emissions.

It should be kept in mind that the provisions for OAC 3745-31-01(VV)(1)(b) were promulgated for the sole purpose of ensuring that the ambient air quality standards are protected. If this provision is triggered, BAT is not required. Also, this provision is not required under any federal regulation and has not been submitted to U.S. EPA for approval as part of the SIP.

It should also be noted that the concentrations in (VV) are only trigger concentrations and are not maximum allowable impacts. The ambient air quality standards and, if applicable, the PSD increments would be the limiting factor.

An example is a coal-fired boiler where a scrubber is proposed to be installed to remove sulfur dioxide. Even though the actual and allowable emissions of NOx might not increase, the reduced stack temperature and velocity associated with the scrubber could result in an increase of ambient concentration at some receptor exceeding the 15 ug/m^3 limit under (VV)(1)(b), thereby triggering the requirement to obtain a PTI before beginning construction. Another example is any reduction of stack height. For either example the need for modeling is apparent, to resolve the PTI question. A screening model may be used, or if a refined model is selected, the controlling concentration will be the high-high increase of concentration anywhere on the receptor grid, for the relevant averaging period, using five years of off-site or one-year of on-site meteorological data.

Question 11: What are the state target concentrations for acceptable incremental impacts?

Answer 11: Table 3 also contains a listing of national ambient air quality standards and PSD increments as well as state target ambient concentrations for criteria pollutants and specific toxic emissions subject to the state air toxic policy. The state target concentrations for criteria and toxic pollutants listed under the heading "Ohio Acceptable Incremental Impact" represent the acceptable incremental impact of the new emissions which are the subject of a state permit requirement. The Ohio

significant impacts under OAC 3745-31-01 (VV)(1)(b) identify modeled impact levels which trigger permit to install requirements for a source modification (including stack height changes).

Question 12: What special requirements exist for sources of fluoride?

Answer 12: The potential for secondary impacts due to fluorides is greater than the probability for primary human health effects. Therefore, there may be observable impacts and actual complaints of damage to plants and property when the MAGLC has not been exceeded.

The approach to follow when evaluating the secondary impacts due to fluorides is as follows. The secondary ' target' is 0.5 ug/m^3 as a 30-day average. The screening approach is to model a 1-hour concentration using SCREEN and convert it to a 'monthly' average using the 0.18 conversion. Monthly averages can also be modeled directly using ISCST or ISCLT or AERMOD. The incremental impact of the new emissions is modeled.

This 'secondary' approach would also be appropriate for any other pollutants where it is determined that there may be significant non health related impacts at levels below the MAGLC.

Question 13: How do I obtain background values when performing NAAQS analyses in Ohio?

Answer 13: Modeling analyses which must estimate total concentrations of a pollutant (e.g., PSD analyses which evaluate the NAAQS) must account for those sources which are either too small or too distant to be included in the modeling analysis. This is accomplished by adding a background value to the modeled concentrations.

A separate background value is needed for each NAAQS pollutant and for each NAAQS averaging time. Actual monitored data for the most recent year, from a representative monitoring site(s) are the basis for acceptable background values. Ideally, the monitor should not be impacted by any major sources or any local smaller sources. If an unimpacted monitor is available, the second highest value for each short-term period would represent the short term backgrounds. The annual average is the annual background. The highest quarterly average would be used for lead.

If an unimpacted monitor is not available, nonimpacted values from monitors which are near a limited number of sources and which have nonimpacted sectors (no upwind sources) can be used to develop background values. **Unadjusted impacted monitor values can also be used as a conservative background**.

A nonimpacted value is a monitored value measured during a period when the wind was not blowing from a 90-degree sector centered on a line between the monitor and the potentially impacting source. For a 3-hour value, no winds should be from the impacting sectors. For 24-hour values, no more than two hours should have winds from the impacting sectors. For short term backgrounds, the second highest nonimpacted value is chosen as a fixed background. Long term background values are the average of the nonimpacted values for the specific averaging time period.

Question 14: What sources do I include in a major source PSD and/or NAAQS analysis?

Answer 14: Major Source NAAQS Analysis: All sources within the significant impact area (SIA) of the emissions increase with potential allowable emissions greater than the PSD significant emission rates (listed in Table 3), must be included in a new source review NAAQS analyses. SIA is defined as the region over which any exceedance of a PSD significant impact increment (listed in Table 3) occurs, based on each high-high concentration over five years of modeling (one year if on-site, representative data are available). In addition, all major sources with potential allowable emissions greater than 100 tons/yr outside of the SIA and within 50 km must also be included if they interact with the new source.

Whether to include a potentially interacting source can be determined using the '20D' approach. Under this approach, the modeler may exclude sources whose potential allowable emissions in tons/yr are less than 20 times the distance between the two sources in kilometers. Prior to commencement of final modeling, though, Ohio EPA must be advised as to what sources the modeler chooses to exclude using the 20D method. Ohio EPA reserves the right to require any or all of these sources to be included in a final analysis if Ohio EPA believes that any or all are potentially significant.

Major Source PSD Increment Analysis: All PSD sources located within an area where PSD baseline has been triggered or within the SIA of the new source, whichever is larger, must be included in the PSD increment analysis modeling inventory. PSD sources located outside of the baseline area or SIA which interacts with the new source must also be included. These sources may be screened using the 20D approach.

Inventory data should be obtained from the state emissions inventory system or the AIRS national data base system. Basic modeling source parameters (stack height or release height, diameter, temperature, exit velocity or volume flow, emission rate, etc.) are contained in these data systems.

The DAPC emissions inventory unit has placed several data sets on the Ohio EPA web page at: http://www.epa.state.oh.us/dapc/aqmp/eiu/eiu.html. While the later data sets have significant amounts of current information, it is important to check the 1990 and 1995 data bases which contain information on short term allowable emission rates.

The short term allowable rates and source capacities are included in these earlier data sets. These are important for determining maximum short term allowable emission rates for the significant sources consistent with Section 9.1 of the GAQM. If source information is missing or is suspect, you will need to contact the local air pollution agency or field office to obtain current, correct information.

Question 15: How do I model major sources in nonattainment areas to demonstrate net air quality improvement?

Answer 15: OAC 3745-31-25 discusses the requirements for determination of net air quality benefit for major sources wishing to locate in a nonattainment area (NAA). Both the rule and U.S. EPA guidance indicate the need for demonstrating area-wide benefit and progress toward attainment.

VOC emissions are not required to be modeled for net air quality benefit. All major PM and SO2 emissions increases and corresponding offsetting emissions will need to be modeled for a net air quality benefit. The entire state is attainment for CO, NOx and Pb so no net air quality benefit modeling is required.

In general, PM and SO2 NAAs have undergone SIP modeling at some time and the state has identified receptor areas which were key for the SIP attainment demonstrations. In cases where the potential offsets could impact critical receptors, those receptors must show impacts less than or equal to zero. For the remaining receptors, the receptors within the significant impact area of the increasing emissions must, on average, show no net increase for each averaging period.

If greater than zero impacts at critical receptors or net area-wide increases are modeled, the applicant may present a complete NAAQS demonstration for the significant impact area of the project.

Question 16: Can I use SCREEN to model multiple sources?

Answer 16: While the SCREEN model is a single-source model, it can be used to develop a conservative estimate of the peak potential impact of emissions from multiple egress locations.

A conservative approach combines the peak impact from each individual SCREEN run as if the peak impact from each emission point occurred at the same point in space.

In the case of multiple identical stacks, all of the emissions can be assumed to come from one stack (modeled using the combined emission rate with the stack flow parameters for a single stack).

If the egress points are not identical, all of the emission could be to assume to be emitted from the 'worst case' emission point. Sometimes the determination of worst case is straightforward (e.g., shortest, coldest, lowest flow stack). In other situations, the choice may not be clear and the Local Air Agency, District Office or Central Office should be consulted.

The approaches described above will result in conservative estimates. If the source(s) does not pass using the above assumptions, less conservative approaches can be considered in consultation with the Local Air Agency, District Office or Central Office. A multisource refined model may also be appropriate to use to model the actual separation of emission points and estimate their combined peak impact.

Question 17: If multiple pollutants are being emitted, does an individual model run have to be performed for each pollutant?

Answer 17: If the emission characteristics are identical for each pollutant (all of the pollutants are emitted in the same proportion from each of the egress points) one run can be performed and the results can be adjusted. Gaussian models such as AERMOD, SCREEN and ISC are 'linear' models in that the impacts will vary proportionally to the emission rate. Therefore, in this example case, if one pollutant is being emitted at twice the rate of another pollutant, the impact of the second pollutant will be twice as high.

In the case of multiple pollutants being emitted from a single emission point, an emission rate of 1 gram per second can be modeled and the results multiplied by each allowable emission rate (expressed in grams per second) to determine the predicted ambient concentration of each of the pollutants.

If emission characteristics vary for different pollutants, or the pollutants do not vary proportionately from each egress point, then a separate modeling analysis for each pollutant is necessary.

Question 18: For PSD and non-PSD sources, can facilities be installed if modeling shows that more than ½ the available PSD increment is consumed?

Answer 18: The purpose of PSD is to keep clean areas clean. The intent of the one half increment portion of the policy is to allow future growth by preventing any single emissions increase from consuming all of the available increment.

Non-PSD sources still consume increment and increase background concentrations. Therefore, these emissions can also threaten future growth.

As such, it is Ohio EPA's practice that any new source, whether PSD or not, will not

consume more than one half the available PSD increment (In application, state-only permits do not involve modeling which would assess available increment, therefore, one half the increment is the effective goal.) .

In some cases, Ohio EPA will grant exceptions to this policy for new PSD or non-PSD sources where modeling predicts exceedances of one half of, but less than 83 percent of the available increment. (For example: If the available increment were 30 ug/m3, between 15 and 25 ug/m3.) Exceptions will be granted on a case-by-case basis (but only when public health will not be adversely affected or where modeling ~~is~~ results are suspect). The following are examples of where exceptions will be granted:

1) Modeling shows that the exceedance of the one half of the available increment occurs in a very localized area near the emissions source either due to the source parameters or due to downwash and, in the Ohio EPA's judgement, it is unlikely that other new sources located near the facility will significantly impact the same exceedance locations. In other words, if it is unlikely that another source would be negatively impacted by the exceedance then the Ohio EPA may grant the exception. An example of this would be a fugitive source with low release points having close proximity maximum impact areas that in the Ohio EPA's judgement would not be areas that other facilities would impact.

2) If the source is located such that it is unlikely in the Ohio EPA's judgement that any other major source would locate in the same area (for instance, in an extremely remote, rural area).

3) If the source is temporary and the increment consumed will become available in the near future for future growth (for instance, at a clean up site where the source will be operated for only a couple of years.)

4) If the source is locating in a 'brownfield' area and otherwise would locate in a greenfield site.

Question 19: What determines whether a locale is rural or urban?

Answer 19: The Guideline on Air Quality Models-(Appendix W of 40 CFR Part 51) outlines two methods by which an area can be categorized as either 'urban' or 'rural'. These methods rely on evaluating either the land use or population density within a three-kilometer radius circle around the subject source. Either of these methods is acceptable for the determination of the proper classification for that source, although the land use approach is preferred.

In Ohio, many counties have had significant SIP development modeling performed which included sources from across the county. Due to the inability of the models used to incorporate both rural and urban in a single run, a single, predominate classification

was assigned for the entire county. Therefore, if multiple facilities over a wider area are being modeled as part of a PSD or NAAQS analysis, the Central Office should be consulted as to the historic classification for the overall analysis so that a consistent approach will be maintained.

WFS/JTT/wfs

July 1, 2003

TABLES

Table 1

METEOROLOGICAL ASSIGNMENTS

(meteorological years 1987-1991 unless otherwise specified)

COUNTY	SURFACE	MIXING HEIGHT
ADAMS	Huntington	Huntington
ALLEN	Dayton	Dayton
ASHLAND	Akron	Pittsburgh
ASHTABULA	Erie	Buffalo
ATHENS	Parkersburg	Huntington (1973-1977)
AUGLAIZE	Dayton	Dayton
BELMONT	Pittsburgh	Pittsburgh
BROWN	Cincinnati	Dayton
BUTLER	Cincinnati	Dayton
CARROLL	Pittsburgh	Pittsburgh
CHAMPAIGN	Dayton	Dayton
CLARK	Dayton	Dayton
CLERMONT	Cincinnati	Dayton
CLINTON	Cincinnati	Dayton
COLUMBIANA	Pittsburgh	Pittsburgh
COSHOCTON	Columbus	Pittsburgh
CRAWFORD	Columbus	Dayton
CUYAHOGA	Cleveland	Buffalo
DARKE	Dayton	Dayton
DEFIANCE	Fort Wayne	Flint
DELAWARE	Columbus	Dayton
ERIE	Cleveland	Buffalo
FAIRFIELD	Columbus	Dayton
FAYETTE	Columbus	Dayton
FRANKLIN	Columbus	Dayton
FULTON	Toledo	Flint
GALLIA	Huntington	Huntington
GEAUGA	Cleveland	Buffalo
GREENE	Dayton	Dayton
GUERNSEY	Pittsburgh	Pittsburgh
HAMILTON	Cincinnati	Dayton
HANCOCK	Toledo	Dayton
HARDIN	Dayton	Dayton

METEOROLOGICAL ASSIGNMENTS

HARRISON	Pittsburgh	Pittsburgh
HENRY	Toledo	Flint
HIGHLAND	Cincinnati	Dayton
HOCKING	Columbus	Huntington
HOLMES	Akron	Pittsburgh
HURON	Cleveland	Buffalo
JACKSON	Huntington	Huntington
JEFFERSON	Pittsburgh	Pittsburgh
KNOX	Columbus	Dayton
LAKE	Cleveland	Buffalo
LAWRENCE	Huntington	Huntington
LICKING	Columbus	Dayton
LOGAN	Dayton	Dayton
LORAIN	Cleveland	Buffalo
LUCAS	Toledo	Flint
MADISON	Columbus	Dayton
MAHONING	Youngstown	Pittsburgh
MARION	Columbus	Dayton
MEDINA	Akron	Pittsburgh
MEIGS	Parkersburg	Huntington (1973-1977)
MERCER	Fort Wayne	Dayton
MIAMI	Dayton	Dayton
MONROE	Parkersburg	Pittsburgh (1973-1977)
MONTGOMERY	Dayton	Dayton
MORGAN	Parkersburg	Huntington (1973-1977)
MORROW	Columbus	Dayton
MUSKINGUM	Columbus	Pittsburgh
NOBLE	Parkersburg	Pittsburgh (1973-1977)
OTTAWA	Toledo	Flint
PAULDING	Fort Wayne	Dayton
PERRY	Columbus	Huntington
PICKAWAY	Columbus	Dayton
PIKE	Huntington	Huntington
PORTAGE	Akron	Pittsburgh
PREBLE	Dayton	Dayton
PUTNAM	Fort Wayne	Dayton
RICHLAND	Columbus	Dayton
ROSS	Columbus	Dayton

METEOROLOGICAL ASSIGNMENTS

SANDUSKY	Toledo	Flint
SCIOTO	Huntington	Huntington
SENECA	Toledo	Dayton
SHELBY	Dayton	Dayton
STARK	Akron	Pittsburgh
SUMMIT	Akron	Pittsburgh
TRUMBULL	Youngstown	Pittsburgh
TUSCARAWAS	Akron	Pittsburgh
UNION	Columbus	Dayton
VAN WERT	Fort Wayne	Dayton
VINTON	Huntington	Huntington
WARREN	Cincinnati	Dayton
WASHINGTON	Parkersburg	Huntington (1973-1977)
WAYNE	Akron	Pittsburgh
WILLIAMS	Toledo	Flint
WOOD	Toledo	Flint
WYANDOT	Columbus	Dayton

Table 2

National Weather Service Anemometer Heights and Station Number

Site	Anemometer Height	Station Number
Akron/Canton	20 feet	14895
Cincinnati/Covington	20 feet	93814
Cincinnati/Abbe Obs.	51 feet	93890
Cleveland	10 meters	14820
Columbus	20 feet	14821
Dayton	22 feet	93815(surface)
Dayton (Wright Pat)	NA	13840(upper air)
Mansfield	20 feet	14891
Toledo	30 feet	94830
Youngstown	20 feet	14852
Buffalo, NY	10 meters	14733
Erie, Pa.	20 feet	14860
Flint, Mi.	21 feet	14826
Fort Wayne, In.	20 feet	14827
Huntington, WV	20 feet	03860
Charleston WV	117 feet	13866
Elkins WV	20 feet	13729
Pittsburgh, Pa.	20 feet	94823
Parkersburg, WV	100 feet	13867

Table 3
Federal and State Modeling Standards and Significant Emission Rates

POLLUTANT	AVERAGING PERIOD	National Ambient Air Quality Standards (NAAQS) (ug/m^3)		CLASS II PSD INCREMENTS (ug/m^3)	PSD SIGNIFICANT EMISSION RATES (tons/year)	PSD SIGNIFICANT IMPACT INCREMENTS (ug/m^3)	PSD MONITORING DE MINIMIS CONC (ug/m^3)	OHIO MODELING SIGNIFICANT EMISSION RATES (tons/year)	OHIO SIGNIFICANT IMPACTS UNDER 3745-31-01(vv) (ug/m^3)	OHIO ACCEPTABLE INCREMENTAL IMPACT (ug/m^3)
		PRIMARY	SECONDARY							
PM10	Annual	50 a	c	17 a	15	1 h	-	10		8.5 a
	24-Hour	150 b	c	30 b	--	5 h	10 h	--	10 (24-hr TSP) i	15 b
Sulfur Dioxide	Annual	80 a	c	20 a	40	1 h	--	25		10 a
	24 Hour	365 b	c	91 b	--	5 h	13 h	--	15 i	45.5 b
	3-Hour	--	1300 b	512 b	--	25 h	--	--		256 b
Nitrogen Dioxide	Annual	100 a	c	25 a	40	1 h	14 h	25	15 (24-hr) i	12.5 a
Ozone	1-Hour	244 d	c	--	40 e	--	--			
Carbon Monoxide	8-Hour	10,000 b	c	--	100	500 h	575 h	100	575ia	2500 b
	1-Hour	40,000 b	c	--	--	2000 h		--		10000 b
Lead	Calendar Quarter	1.5 a	c	--	0.6	--	0.1 h	0.6	0.1 i	0.375 a
Toxics Listed by ACGIH f	1-Hour	--	--	--	--	--	--	1		g, a

a Concentration not to be exceeded
b Concentration not to be exceeded more than once per year
c Same as primary NAAQS.
d Not to be exceeded on more than one day per year, three year average.
e Emissions of volatile organic compounds.
f Any toxics included in the latest handbook of The American Conference of Governmental Industrial Hygienists.
g Value calculated by procedure outlined in current version of the Ohio EPA Division of Air Pollution Control document entitled "Review of New Sources of Air Toxic Emission"
h Peak concentration.
I Concentration that initiates PTI requirements

Appendix A

SCREEN/TSCREEN
Model Application Guidance

The type of SCREEN source to be chosen is dependant on how the emissions leave the source (if the source is not enclosed) or how they leave the building or enclosure if emitted within a building or enclosure. Once the egress points are identified and characterized, one of the following source types is applied to the emissions at the point of egress (stack, window, vent, etc.)

The following information identifies the SCREEN/TSCREEN model choices to be used when modeling for Ohio new source review. Since the TSCREEN model does not directly identify which release scenarios lead to the use of the SCREEN model, "TSCREEN pathways" are identified to assist TSCREEN users in making scenario choices that will lead to the SCREEN model and the desired source type.

Point Source

TSCREEN pathways; There are several TSCREEN release scenarios which utilize the SCREEN3 point source option including Gaseous Release Type, Stacks, Vents, Conventional Point Sources or Particulate Matter Release Type, Stacks, Vents.

- Emission rate (g/s)
- Stack Height (above ground, not roof (m))
- Stack inside diameter (m, diameter of equivalent area circle if stack is not round)
- Stack exit velocity (m/s) or flow rate (ACFM or m^3/s)
- Stack gas temperature (K)
- Ambient temperature (use default of 293 K)
- Receptor height above ground (use 0, ground level)
- Urban/Rural (based on land use within 3 km of the source)
- Building downwash (Building information is necessary if stack is within the influence of a building: i.e., within five times the lesser building dimension)
- Do not consider building cavity calculations. **Note:** After mmm dd, 2002, AERMOD will replace ISC and be the only acceptable refined model. This model does incorporate building wake and cavity effects. After mmm dd, 2002, users of SCREEN will also need to consider the building cavity calculations when determining peak impacts.
- Complex terrain (yes if terrain above stack height is present in the potential impact area of the source)
- Simple or flat (yes for simple: if terrain above stack base is present in the potential impact area of the source. When in doubt, say yes and perform the analysis)
- Choice of meteorology (option 1, full meteorology)
- Automated distance array (yes, minimum distance (m) begins at "ambient air" (usually the fence line) and should extend to a point which ensures that the

maximum concentration has been found, up to a maximum of 50,000 m)
- Discrete distance option (used for informational purposes only)
- Fumigation Option (fumigation calculations are not used for state permit modeling)

Area Source

TSCREEN pathway; There are several TSCREEN pathways which utilize the SCREEN3 area source option including Particulate Matter Release Type, Fugitive/Windblown Dust Emissions or Storage Piles or Gaseous Release Type, Multiple Fugitive Sources. The TSCREEN pathways **do not** allow the characterization of non-square area sources which is now an option with SCREEN3.

General option choices are the same as for point source except for the following;
- Emission rate ($g/s/m^2$)
- Source height (mean height of source, m)
- Length of longer side of rectangular area, (m)
- Length of shorter side of rectangular area, (m)
- Wind direction search (yes)

Volume Source

TSCREEN pathway:(the SCREEN volume source option is not available through TSCREEN)

General options choices are the same as for point source except for the following;
- Initial lateral dimension (modified per table below (m))
- Initial vertical dimension (modified per table below (m))
- Height of release (the midpoint of the opening (m))

SUMMARY OF SUGGESTED PROCEDURES FOR ESTIMATING INITIAL LATERAL DIMENSIONS (σ_{yo}) AND INITIAL VERTICAL DIMENSIONS (σ_{zo}) FOR VOLUME SOURCES

Description of Source	Initial Dimension
(a) Initial Lateral Dimensions (σ_{yo})	
Single Volume Source	σ_{yo} = length of side divided by 4.3
(b) Initial Vertical Dimensions (σ_{zo})	
Surface-Based Source ($h_e \sim 0$)	σ_{zo} = vertical dimension of source divided by 2.15
Elevated Source ($h_e > 0$) on or Adjacent to a Building	σ_{zo} = building height divided by 2.15

Elevated Source ($h_e > 0$) not on or Adjacent to a Building	σ_{zo} =	vertical dimension of source divided by 4.3

Appendix B

Back-up Data

From: Pakrasi, Arijit
Sent: Tuesday, November 21, 2006 4:55 PM
To: Blinn, Leah
Subject: FW:
Please put this up in the portal for records

thanks

Arijit Pakrasi, Ph.D., P.E.
Senior Consultant
Shaw Environmental, Inc.
2790 Mosside Boulevard
Monroeville, PA 15146
Ph: 412 858 3921
Fax: 412 372 8968
email: arijit.pakrasi@shawgrp.com

-----Original Message-----
From: Nelson, Deborah [mailto:Deborah.Nelson@dep.state.fl.us]
Sent: Tuesday, November 21, 2006 4:50 PM
To: Pakrasi, Arijit
Subject:

Just use SCREEN3 for your screening analysis. The AERSCREEN is a beta version and is not ready for distribution.

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

SOLAR TURBINES INCORPORATED DATE RUN: 22-Dec-06
ENGINE PERFORMANCE CODE REV. 3.40 RUN BY: Donald C Lyons
JOB ID:

--- SUMMARY OF ENGINE EXHAUST ANALYSIS ---
POINT NUMBER 1

GENERAL INPUT SPECIFICATIONS

ENGINE FUEL: CHOICE NATURAL GAS

29.88	in Hg	AMBIENT PRESSURE
60.0	percent	RELATIVE HUMIDITY
0.0038	---	SP. HUMIDITY (LBM H2O/LBM DRY AIR)

FUEL GAS COMPOSITION (VOLUME PERCENT)
LHV (Btu/Scf) = 454.7 SG = 1.0366 W.I. @60F (Btu/Scf) = 446.6

Methane (CH4)	= 49.9999
Carbon Dioxide (CO2)	= 49.9999
Sulfur Dioxide (SO2)	= 0.0001

*** Wobbe Index of fuel gas is outside of standard gaseous fuel ***
** limits per ES 9-98. Please submit SER for this application. **

*** Landfill and digester gas sources must be disclosed to Solar Turbines via an SER. Landfill and digester gases may contain Siloxanes which cause rapid deterioration of performance and component life. ***

*** Methane content less than 80%. ***
** Please submit SER for this application. **

GENERAL OUTPUT DATA

20617.	lbm/hr	FUEL FLOW
5747.	Btu/lbm	LOWER HEATING VALUE
455.	Btu/Scf	LOWER HEATING VALUE
77379.	Scfm	EXHAUST FLOW @ 14.7 PSIA & 60F
200336.	Acfm	ACTUAL EXHAUST FLOW CFm
354239.	lbm/hr	EXHAUST GAS FLOW
4214.7	deg R	ADIA STOICH FLAME TEMP, CHOICE GAS
4674.0	deg R	ADIA STOICH FLAME TEMP, SDNG
28.96	---	MOLECULAR WEIGHT OF EXHAUST GAS
16.24	---	AIR/FUEL RATIO

EXHAUST GAS ANALYSIS

ARGON	CO2	H2O	N2	O2	
0.88	5.60	6.15	73.28	14.08	VOLUME PERCENT WET
0.93	5.97	0.00	78.08	15.01	VOLUME PERCENT DRY
4283.	30169.	13556.	251097.	55126.	lbm/hr
0.21	1.46	0.66	12.18	2.67	G/(G FUEL)

```
-------------------------------------------------
- WARNING!!!  PLEASE SUBMIT FUEL SUITABILITY    -
- INQUIRY TO SAN DIEGO!!!!!!!!!!!!!!!!!!!!!    -
-------------------------------------------------
-------------------------------------------------
```

SOLAR TURBINES INCORPORATED DATE RUN: 22-Dec-06
ENGINE PERFORMANCE CODE REV. 3.40 RUN BY: Donald C Lyons
JOB ID:

--- SUMMARY OF ENGINE EXHAUST ANALYSIS ---
POINT NUMBER 2

GENERAL INPUT SPECIFICATIONS

ENGINE FUEL: CHOICE NATURAL GAS

29.88	in Hg	AMBIENT PRESSURE
60.0	percent	RELATIVE HUMIDITY
0.0064	---	SP. HUMIDITY (LBM H2O/LBM DRY AIR)

FUEL GAS COMPOSITION (VOLUME PERCENT)
LHV (Btu/Scf) = 454.7 SG = 1.0366 W.I. @60F (Btu/Scf) = 446.6

Methane (CH4)	= 49.9999
Carbon Dioxide (CO2)	= 49.9999
Sulfur Dioxide (SO2)	= 0.0001

*** Wobbe Index of fuel gas is outside of standard gaseous fuel ***
** limits per ES 9-98. Please submit SER for this application. **

*** Landfill and digester gas sources must be disclosed to
Solar Turbines via an SER. Landfill and digester gases
may contain Siloxanes which cause rapid deterioration of
performance and component life. ***

*** Methane content less than 80%. ***
** Please submit SER for this application. **

GENERAL OUTPUT DATA

19862.	lbm/hr	FUEL FLOW
5747.	Btu/lbm	LOWER HEATING VALUE
455.	Btu/Scf	LOWER HEATING VALUE
74854.	Scfm	EXHAUST FLOW @ 14.7 PSIA & 60F
195493.	Acfm	ACTUAL EXHAUST FLOW CFm
342170.	lbm/hr	EXHAUST GAS FLOW
4221.8	deg R	ADIA STOICH FLAME TEMP, CHOICE GAS
4682.0	deg R	ADIA STOICH FLAME TEMP, SDNG
28.92	---	MOLECULAR WEIGHT OF EXHAUST GAS
16.28	---	AIR/FUEL RATIO

EXHAUST GAS ANALYSIS

ARGON	CO2	H2O	N2	O2	
0.87	5.57	6.50	73.00	14.05	VOLUME PERCENT WET
0.93	5.95	0.00	78.08	15.02	VOLUME PERCENT DRY
4128.	28994.	13865.	241990.	53186.	lbm/hr
0.21	1.46	0.70	12.18	2.68	G/(G FUEL)

```
-------------------------------------------------
- WARNING!!!  PLEASE SUBMIT FUEL SUITABILITY    -
- INQUIRY TO SAN DIEGO!!!!!!!!!!!!!!!!!!!!!    -
-------------------------------------------------
-------------------------------------------------
```

SOLAR TURBINES INCORPORATED
ENGINE PERFORMANCE CODE REV. 3.40
JOB ID:

DATE RUN: 22-Dec-06
RUN BY: Donald C Lyons

--- SUMMARY OF ENGINE EXHAUST ANALYSIS ---
POINT NUMBER 3

GENERAL INPUT SPECIFICATIONS

ENGINE FUEL: CHOICE NATURAL GAS

29.88	in Hg	AMBIENT PRESSURE
60.0	percent	RELATIVE HUMIDITY
0.0179	---	SP. HUMIDITY (LBM H2O/LBM DRY AIR)

FUEL GAS COMPOSITION (VOLUME PERCENT)
LHV (Btu/Scf) = 454.7 SG = 1.0366 W.I. @60F (Btu/Scf) = 446.6

Methane (CH4)	= 49.9999
Carbon Dioxide (CO2)	= 49.9999
Sulfur Dioxide (SO2)	= 0.0001

*** Wobbe Index of fuel gas is outside of standard gaseous fuel ***
** limits per ES 9-98. Please submit SER for this application. **

*** Landfill and digester gas sources must be disclosed to
Solar Turbines via an SER. Landfill and digester gases
may contain Siloxanes which cause rapid deterioration of
performance and component life. ***

*** Methane content less than 80%. ***
** Please submit SER for this application. **

GENERAL OUTPUT DATA

18132.	lbm/hr	FUEL FLOW
5747.	Btu/lbm	LOWER HEATING VALUE
455.	Btu/Scf	LOWER HEATING VALUE
69041.	Scfm	EXHAUST FLOW @ 14.7 PSIA & 60F
183969.	Acfm	ACTUAL EXHAUST FLOW CFm
313581.	lbm/hr	EXHAUST GAS FLOW
4234.6	deg R	ADIA STOICH FLAME TEMP, CHOICE GAS
4696.5	deg R	ADIA STOICH FLAME TEMP, SDNG
28.73	---	MOLECULAR WEIGHT OF EXHAUST GAS
16.35	---	AIR/FUEL RATIO

EXHAUST GAS ANALYSIS

ARGON	CO2	H2O	N2	O2	
0.86	5.45	8.07	71.78	13.83	VOLUME PERCENT WET
0.93	5.93	0.00	78.08	15.05	VOLUME PERCENT DRY
3744.	26188.	15861.	219468.	48314.	lbm/hr
0.21	1.44	0.87	12.10	2.66	G/(G FUEL)

```
-------------------------------------------------
- WARNING!!!  PLEASE SUBMIT FUEL SUITABILITY    -
- INQUIRY TO SAN DIEGO!!!!!!!!!!!!!!!!!!!!!    -
-------------------------------------------------
-------------------------------------------------
```

SOLAR TURBINES INCORPORATED
ENGINE PERFORMANCE CODE REV. 3.40
JOB ID:

DATE RUN: 22-Dec-06
RUN BY: Donald C Lyons

MARS 100-15000
GSC
59F MATCH
GAS
TMF-2 REV. 3.0

DATA FOR NOMINAL PERFORMANCE

Fuel Type	CHOICE NATURAL GAS			
Elevation	feet	50		
Inlet Loss	in H20	4.0		
Exhaust Loss	in H20	4.0		
Engine Inlet Temp.	deg F	45.0	59.0	89.0
Relative Humidity	%	60.0	60.0	60.0
Elevation Loss	kW	20	19	17
Inlet Loss	kW	181	175	159
Exhaust Loss	kW	71	69	65
Gas Generator Speed	RPM	11168	11168	11168
Specified Load*	kW	FULL	FULL	FULL
Net Output Power*	kW	11429	10894	9644
Fuel Flow	mmBtu/hr	118.48	114.14	104.20
Heat Rate*	Btu/kW-hr	10367	10477	10804
Therm Eff*	%	32.915	32.568	31.582
Inlet Air Flow	lbm/hr	334793	323440	296487
Engine Exhaust Flow	lbm/hr	354239	342170	313581
PCD	psiG	254.9	246.1	225.3
Display T5 S/W	deg F	1338	1341	1342
Exhaust Temperature	deg F	883	895	923

FUEL GAS COMPOSITION (VOLUME PERCENT)
LHV (Btu/Scf) = 454.7 SG = 1.0366 W.I. @60F (Btu/Scf) = 446.6

Methane (CH4)	= 49.9999
Carbon Dioxide (CO2)	= 49.9999
Sulfur Dioxide (SO2)	= 0.0001

*** Wobbe Index of fuel gas is outside of standard gaseous fuel ***
** limits per ES 9-98. Please submit SER for this application. **

*** Landfill and digester gas sources must be disclosed to
Solar Turbines via an SER. Landfill and digester gases
may contain Siloxanes which cause rapid deterioration of
performance and component life. ***

*** Methane content less than 80%. ***
** Please submit SER for this application. **

*Electric power measured at the generator terminals.

From: Nelson, Deborah [Deborah.Nelson@dep.state.fl.us]
Sent: Friday, February 09, 2007 2:55 PM
To: Pakrasi, Arijit
Subject: RE: Clarification on Modeling Net Emissions for Preliminary Air Quality Analysis to Determine if Significance Level Concentration is Exceeded Okeechobee Landfill Project

Yes. This is OK when modeling the Significant Impact Analysis, determining the Significant Impact Area if multi-source modeling is required. In the write-up, explain this so I don't wonder what happened to the 2 exisitng flares. Also, make note that these flares will be for emergency use only.

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

From: Pakrasi, Arijit [mailto:Arijit.Pakrasi@shawgrp.com]
Sent: Friday, February 09, 2007 11:51 AM
To: Nelson, Deborah
Cc: Blinn, Leah
Subject: Clarification on Modeling Net Emissions for Preliminary Air Quality Analysis to Determine if Significance Level Concentration is Exceeded Okeechobee Landfill Project

Debbie:

We are conducting the preliminary air quality analysis for the project to determine if the ambient concentrations due to ***net*** emission increases are above the "Significance level". If they are above "significance level" then we will need to do the full impact analysis for Class II PSD increment and NAAQS compliance demonstration. We need a clarification on how we do this for the following case.

To give you a background, the existing emissions are due to 2 existing flares, combusting approximately 6,000 cfm total of landfill gas. The BACT scenario is to replace these flares with 7 LFG turbines @4000 cfm each and a new flare at 3300 cfm, totaling to 31,300 cfm. The existing flares will be on-site as emergency but will not run under this BACT scenario (If they do run due to a outage in the turbines, their emission rates for all criteria pollutants are lower than the turbines on a cfm of LFG basis).

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

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

Where

E_{net} = Net emission increase
E_{BACT} = Potential emissions from 7 turbines and 1 new flare
$E_{existing}$ = Actual emissions from 2 existing flares

Since the emission increases and decreases are from two different types of sources (turbines vs flares) which are located at two different locations in the facility, we can not just model the net emission increase. So, I was planning to determine the net ambient impact from the net emission increase in the following manner for the preliminary analysis:

- Run AERMOD with 7 new turbines and 1 new flare with their full potential emissions (i.e. at total E_{BACT})
- In the same run, add the existing flares negative emission points with total negative emissions equal to $E_{existing}$

This way, we will have the net ambient impact of the net emissions and we will compare that with the "significance level" concentrations.

Does this seem okay with you?

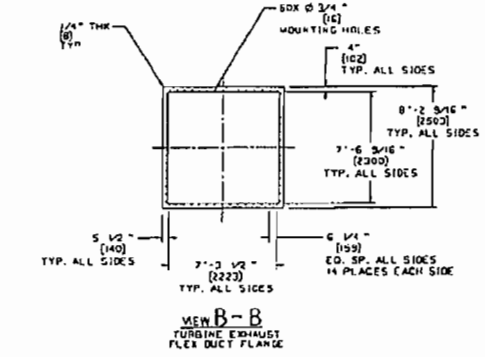
Thanks

Arijit Pakrasi, Ph.D., P.E.
Senior Consultant
Shaw Environmental, Inc.
2790 Mosside Boulevard
Monroeville, PA 15146
Ph: 412 858 3921
Fax: 412 372 8968
email: arijit.pakrasi@shawgrp.com

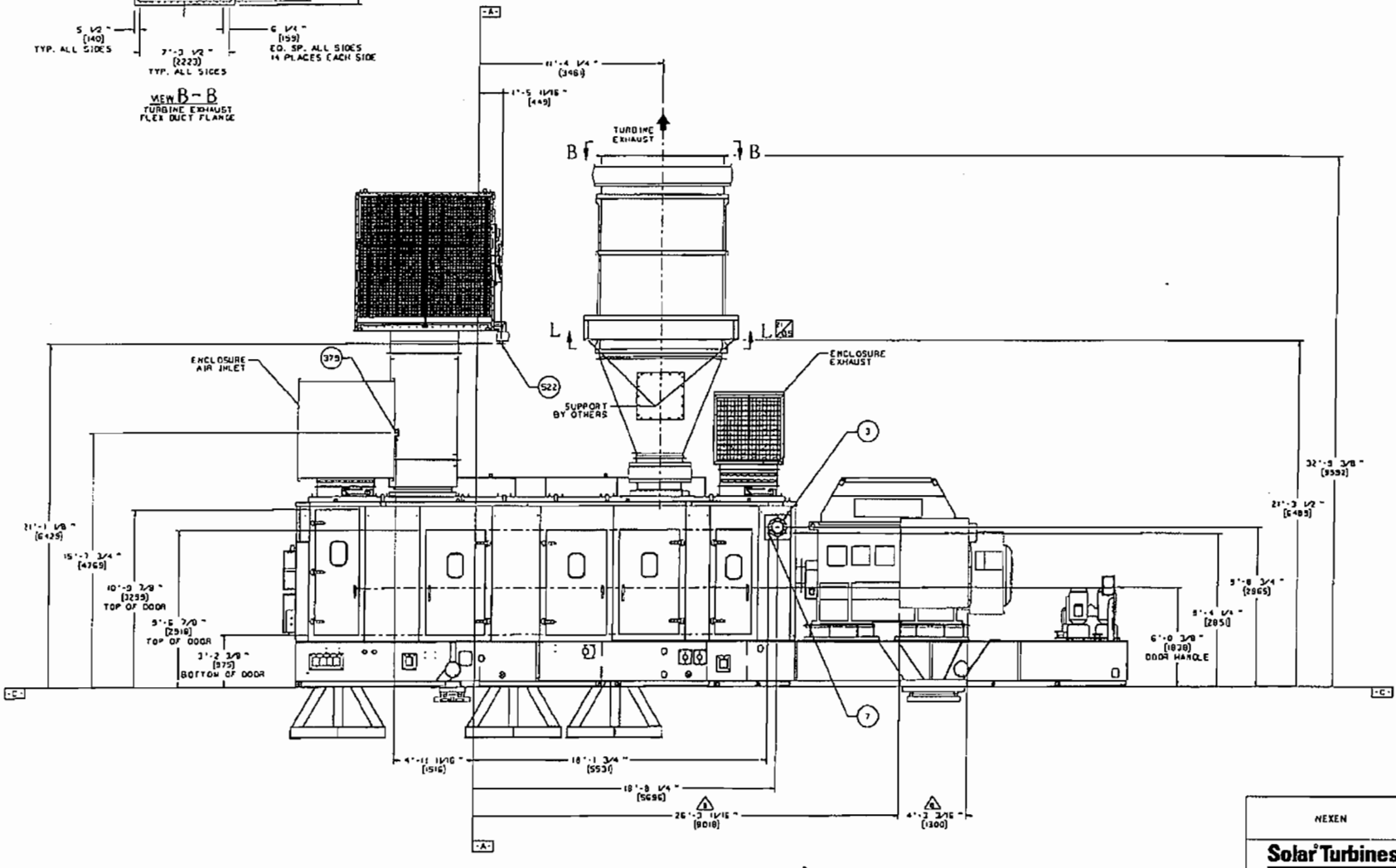
The Shaw Group Inc.
http://www.shawgrp.com

TABLE 1 - CONNECTIONS

ITEM	DESCRIPTION	Y DIMENSION SEE SHEET 8
(1)	LUBE OIL TANK VENT — 8" 150 LB RAISE FF FLANGE	
(7)	LUBE OIL COOLER VENT — 3/4" NPT FEMALE	
(379)	DC VOLTS, ENCLOSURE VENT FILTER PRESSURE SWITCH — P20	
(427)	DRAIN, UN-PLUGGED — MATES W/ 2" 150 LB RAISE FLANGE	



VIEW B-B
TURBINE EXHAUST FLEX DUCT FLANGE



LEFT SIDE ELEVATION ⚠

NEXEN

Solar Turbines
A Caterpillar Company

78421-149095 REV B SHEET 9

Solar Turbines
A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer: *Waste Management*	Model: MARS 100-15000
Job ID:	Package Type: GSC
Run By: Donald C Lyons / Date Run: 24-Oct-06	Match: 59F MATCH
Engine Performance Code: REV. 3.40 / Engine Performance Data: REV. 3.0	Fuel System: GAS
	Fuel Type: CHOICE NATURAL GAS

DATA FOR NOMINAL PERFORMANCE

Elevation	feet	50
Inlet Loss	in H20	3.5
Exhaust Loss	in H20	3.5

		1	2	3
Engine Inlet Temperature	deg F	59.0	59.0	59.0
Relative Humidity	%	60.0	60.0	60.0
Specified Load*	kW	FULL	75.0%	50.0%
Net Output Power*	kW	10924	8193	5462
Fuel Flow	mmBtu/hr	114.28	90.11	68.99
Heat Rate*	Btu/kW-hr	10461	10999	12630
Therm Eff*	%	32.619	31.023	27.015
Engine Exhaust Flow	lbm/hr	342595	306920	263057
Exhaust Temperature	deg F	894	818	778

Fuel Gas Composition (Volume Percent)

Methane (CH4)	50.00
Carbon Dioxide (CO2)	50.00
Sulfur Dioxide (SO2)	0.0001

Fuel Gas Properties

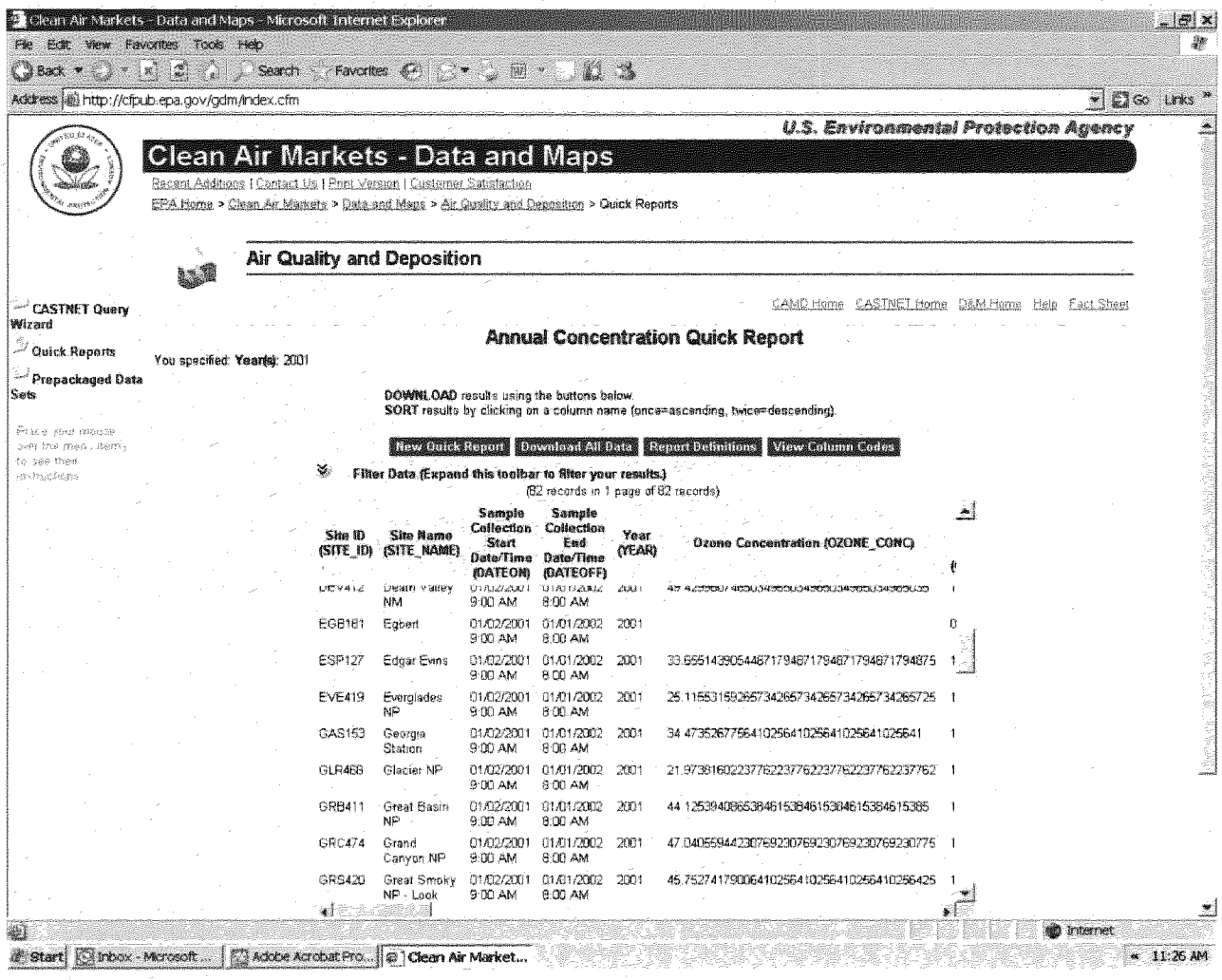
LHV (Btu/Scf)	454.7	Specific Gravity	1.0366	Wobbe Index at 60F	446.6

**Electric power measured at the generator terminals.*

Notes
Florida

Appendix C

Background Concentration Data



Clean Air Markets - Data and Maps - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://cfpub.epa.gov/gdm/index.cfm

Go Links

U.S. Environmental Protection Agency

Clean Air Markets - Data and Maps

Recent Additions | Contact Us | Print Version | Customer Satisfaction

EPA Home > Clean Air Markets > Data and Maps > Air Quality and Deposition > Quick Reports

Air Quality and Deposition

CASTNET Query Wizard

Quick Reports

Prepackaged Data Sets

CAMD Home CASTNET Home D&M Home Help Fact Sheet

Annual Concentration Quick Report

You specified: Year(s): 2001

DOWNLOAD results using the buttons below.
SORT results by clicking on a column name (once=ascending, twice=descending).

New Quick Report | Download All Data | Report Definitions | View Column Codes

Filter Data (Expand this toolbar to filter your results.)

(82 records in 1 page of 82 records)

Site ID (SITE_ID)	Site Name (SITE_NAME)	Sample Collection Start Date/Time (DATEON)	Sample Collection End Date/Time (DATEOFF)	Year (YEAR)	Ozone Concentration (OZONE_CONC)	
DEV412	Death Valley NM	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	45.4[illegible]	1
EGB181	Egbert	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001		0
ESP127	Edgar Evns	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	33.655143905446717948717948717948717948875	1
EVE419	Everglades NP	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	25.116531592667342667342667342667342665725	1
GAS153	Georgia Station	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	34.473526775641025641025641025641025641	1
GLR468	Glacier NP	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	21.973816022377622377622377622377622377622377762	1
GRB411	Great Basin NP	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	44.125394086538461538461538461538461538465385	1
GRC474	Grand Canyon NP	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	47.040559442307692307692307692307692307692307775	1
GRS420	Great Smoky NP - Look	01/02/2001 9:00 AM	01/01/2002 8:00 AM	2001	45.752741790064102564102564102564102564102566425	1

Internet

Start Inbox - Microsoft ... Adobe Acrobat Pro... Clean Air Market... 11:26 AM

Clean Air Markets - Data and Maps - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://cfpub.epa.gov/gdm/index.cfm Go Links

U.S. Environmental Protection Agency

Clean Air Markets - Data and Maps

Recent Additions | Contact Us | Print Version | Customer Satisfaction

EPA Home > Clean Air Markets > Data and Maps > Air Quality and Deposition > Quick Reports

Air Quality and Deposition

CASTNET Query Wizard

Quick Reports

Propackaged Data Sets

Place your mouse over the menu items to see their instructions

CAMD Home CASTNET Home D&M Home Help Fact Sheet

Annual Concentration Quick Report

You specified: **Year(s)**: 2002

DOWNLOAD results using the buttons below.
SORT results by clicking on a column name (once=ascending, twice=descending).

New Quick Report | Download All Data | Report Definitions | View Column Codes

Filter Data (Expand New Quick Report r your results.)

(86 records in 1 page of 86 records)

Site ID (SITE_ID)	Site Name (SITE_NAME)	Sample Collection Start Date/Time (DATEON)	Sample Collection End Date/Time (DATEOFF)	Year (YEAR)	Ozone Concentration (OZONE_CONC)	(
DEV412	Death Valley NM	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	[illegible]	1
EGB181	Egbert	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002		0
ESP127	Edgar Evins	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	32.3543075769230769230769230769230769 23	1
EVE419	Everglades NP	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	25.6872423688034188034188034188034188 0342	7
GAS153	Georgia Station	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	32.43446815384615384615384615384615384 6	1
GLR468	Glacier NP	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	22.3551140365384615384615384615384615384 6	1
GRB411	Great Basin NP	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	42.0851331868686868686868686868686868 667	7
GRC474	Grand Canyon NP	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	51.187205219551282051282051282051282051 25	1
GRS420	Great Smoky NP - Look	01/01/2002 9:00 AM	12/31/2002 8:00 AM	2002	45.6892708365384615384615384615384615385	1

javascript:void(0); Internet

Start | Inbox - Microsoft ... | Adobe Acrobat Pro... | Clean Air Market... | Microsoft Word | 11:25 AM

Clean Air Markets - Data and Maps - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://cfpub.epa.gov/gdm/index.cfm Go Links

U.S. Environmental Protection Agency

Clean Air Markets - Data and Maps

Recent Additions | Contact Us | Print Version | Customer Satisfaction

EPA Home > Clean Air Markets > Data and Maps > Air Quality and Deposition > Quick Reports

Air Quality and Deposition

CASTNET Query Wizard

Quick Reports

Prepackaged Data Sets

Place your mouse over the menu items to see their instructions

CAMD Home CASTNET Home D&M Home Help Fact Sheet

Annual Concentration Quick Report

You specified: **Year(s)**: 2003

DOWNLOAD results using the buttons below.
SORT results by clicking on a column name (once=ascending, twice=descending).

New Quick Report | Download All Data | Report Definitions | View Column Codes

Filter Data (Expand this toolbar to filter your results.)

(88 records in 1 page of 88 records)

Site ID (SITE_ID)	Site Name (SITE_NAME)	Sample Collection Start Date/Time (DATEON)	Sample Collection End Date/Time (DATEOFF)	Year (YEAR)	Ozone Concentration (OZONE_CONC)	(
EGB181	Egbert	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003		0
ESP127	Edgar Evins	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	31.17295073717948717948717948717948717 95	1
EVE419	Everglades NP	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	27.3956519166666666666666666666666675	1
GAS153	Georgia Station	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	30.7469080769230769230769230769230769 23	1
GLR468	Glacier NP	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	24.2856173452797202797202797202797202797 2	1
GRB411	Great Basin NP	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	44.8115263461538461538461538461538461 54	1
GRC474	Grand Canyon NP	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	49.4333585256410256410256410256410256 41	1
GRS420	Great Smoky NP - Look Rock	12/31/2002 9:00 AM	12/30/2003 8:00 AM	2003	43.8259448076923076923076923076923076 925	1

Internet

Start | Inbox - Microsoft ... | Adobe Acrobat Pro... | Clean Air Market... | Microsoft Word | 11:22 AM

Sheplak, Scott

From: Sheplak, Scott
Sent: Friday, March 30, 2007 3:23 PM
To: Nelson, Deborah
Cc: Linero, Alvaro
Subject: Okeechobee
Attachments: WM's Okeechobee Landfill Presentation final.pdf; FreshKills.ppt

In case you are interested. I perused both of these presentations this p.m.

++

H2S content is much higher than most had thought previously. Freshkills in NY is a 2,200 acre site. They used AP-42 H2S value of 35 ppmv.

Okeechobee with the expansion from the Berman Road site into the Clay Farms site will result in a total ~~4,300~~ 833 acre site. I find it critical to confirm the "solid waste permitted capacity."

Prevailing winds as noted in the presentation and wind rose in our PSD application are from the east to southeast.

Sheplak, Scott

file -

From: Nelson, Deborah
Sent: Thursday, March 08, 2007 10:56 AM
To: Sheplak, Scott; Adams, Patty
Cc: Graziani, Darrel
Subject: RE: Okeechobee Landfill

Darrel,

You can access the permit application at http://www.dep.state.fl.us/air/eproducts/apds/default.asp. The permit number is 0930104-014-AC. Please let me know if you have any questions. Thanks.

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

-----Original Message-----
From: Vielhauer, Trina
Sent: Thursday, March 08, 2007 10:11 AM
To: Linero, Alvaro; Nelson, Deborah; Sheplak, Scott; Adams, Patty; Gibson, Victoria
Cc: Graziani, Darrel
Subject: Re: Okeechobee Landfill

Patty is out, so if we need copies, I have asked Vickie to help us out.
Trina Vielhauer

Sent from my BlackBerry Wireless Handheld

----- Original Message -----
From: Linero, Alvaro
To: Nelson, Deborah; Sheplak, Scott; Adams, Patty
Cc: Graziani, Darrel; Vielhauer, Trina
Sent: Thu Mar 08 10:08:53 2007
Subject: Okeechobee Landfill

Patty.

We received the hardcopy of the revised Okeechobee Landfill application, previously submitted via EPSAP.

Debbie has it for the moment.

I would reset our 30-day clock to today because it contains much more than the EPSAP version, particularly the important modeling files.

Debbie.

Please inventory what we received and start a new entry on our web page. Don't know if we will need to scan the text. Maybe there were some pdf files attached to the EPSAP version.

Scott.

Work out with Debbie and Patty whether you need to make copies of what we received to send to NPS and EPA and Darrel. Let Debbie know if there indeed were any pdf files appended to the EPSAP submittal.

Also, set up a briefing session over the next couple of weeks to discuss what the main issues are with me and Trina and what might be the completeness items.

Darrel. Send us any comments after you get application or application links from Scott.

Thanks.

Al.

Sheplak, Scott -file-

From: Sheplak, Scott
Sent: Monday, February 05, 2007 12:38 PM
To: 'Thorley, David'
Cc: Linero, Alvaro; Graziani, Darrel
Subject: RE: Question regarding your Jan 30, 2007 letter

You have until February 28, 2007 to provide the requested additional information. Ninety (90) additional days to provide the requested information had been granted based on your request dated November 27, 2006.

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Monday, February 05, 2007 10:59 AM
To: Sheplak, Scott
Subject: RE: Question regarding your Jan 30, 2007 letter

Thanks

-----Original Message-----
From: Sheplak, Scott [mailto:Scott.Sheplak@dep.state.fl.us]
Sent: Monday, February 05, 2007 9:47 AM
To: Thorley, David
Cc: Linero, Alvaro
Subject: RE: Question regarding your Jan 30, 2007 letter

I will check with Al as I was assigned this project in December. I will get back to you asap.

From: Thorley, David [mailto:DThorley@wm.com]
Sent: Friday, February 02, 2007 4:23 PM
To: Sheplak, Scott
Subject: Question regarding your Jan 30, 2007 letter

Scott,
In response to your January 30, 2007, letter Mr. Van Gessel, we will include all the requested additional information (Jan 07 and Sept 06 letters) in our modified PSD permit application.

I have one question regarding the 90-day extension to submit the additional information that was described in the January 30, 2007 letter. The question is, when does this 90 days end? When the additional time was requested, it was assumed that we would be granted an additional 90 days after December 1, making the Due date February 28, 2007. However, your letter could be interpreted to mean that we were given an additional 90 days from the date of our request, November 27, 2007, and therefore have a deadline of February 24, 2007. I want to make sure that Okeechobee Landfill does not miss a deadline requiring the withdrawal of the PSD permit application. Your help in resolving this issue would be much appreciated.

Thank you for your time,

David Thorley, P.E.
Director of Air Programs - South
1001 Fannin, Suite 4000
Houston, TX 77002
office: 713-328-7404
fax: 713-328-7411

cell: 713-201-3752

Waste Management's renewable energy projects create enough energy to power over 1 million homes.

Sheplak, Scott

-Gle-

From: Adams, Patty
Sent: Wednesday, February 28, 2007 5:08 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: FW: An application was resubmitted in EPSAP on FDEP

Scott,

I assigned you rights to this EPSAP submittal.

Thanks,
Patty

-----Original Message-----
From: Oracle Account [mailto:oracle@epic30.dep.state.fl.us]
Sent: Wednesday, February 28, 2007 4:50 PM
To: undisclosed-recipients
Subject: An application was resubmitted in EPSAP on FDEP

An application was resubmitted in EPSAP for the following facility:

Application Number: 1270-2
Facility ID: 0930104
Facility Name: OKEECHOBEE LANDFILL, INC.

At your earliest convenience, please log-in to the EPSAP application located at
http://appprod.dep.state.fl.us/epsap_eng/default.asp
to begin the application review process.

Please note the following additional uploaded files included with this re-submitted application:

13 Facility File(s):

ADDITIONAL IMPACT ANALYSES (RULES 62-212.400(8) and 62-212.500(4)(e),F.A.C.) (Additional Impact Analysis.doc)
AIR QUALITY ANALYSIS (RULE 62-212.400(7),F.A.C.) (Air Qual Analysis.doc)
AIR QUALITY IMPACT SINCE 1977 (RULE 62-212.400(4)(e),F.A.C.) (Air Qual 1977.doc)
AREA MAP SHOWING FACILITY LOCATION (Figure 1 - Facility Area Map.pdf)
DESCRIPTION OF PROPOSED CONSTRUCTION, MODIFICATION, or PLANTWIDE APPLICABILITY LIMIT (PAL) (Descritpion of proposed.doc)
FACILITY PLOT PLAN (Figure 3 - Facility Plot Plan.pdf)
OTHER FACILITY INFORMATION (Air Construction PSD 02272007A.pdf)
OTHER FACILITY INFORMATION (Final AC-PSD Report 2007-02-27.pdf)
OTHER FACILITY INFORMATION (TOC whole application + covers.pdf)
PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER (Precautions to Prevent.doc)
PROCESS FLOW DIAGRAM(s) (Figure 2 - Process Flow Diagram.pdf)
RULE APPLICABILITY ANALYSIS (Rule Applicability Analysis.doc)
SOURCE IMPACT ANALYSIS (RULE 62-212.400(5),F.A.C.) (Air Quality Impact Analysis_OKI draft 02-26-2007ver01 resized.pdf)

14 Emission Unit File(s):

EU 1: COMPLIANCE DEMONSTRATION REPORTS/RECORDS (Flare Testing Report 09252006.pdf)
EU 1: CONTROL TECHNOLOGY REVIEW AND ANALYSIS (RULES 62-212.400(10) and 62-212.500(7), F.A.C.;40 CFR 63.43(d) and (e)) (Section II Appendix D - BACT Analysis.pdf)
EU 1: DESCRIPTION OF STACK SAMPLING FACILITIES (Section II Appendix G - Stack Parameters and Sampling Facilities.pdf)
EU 1: DETAILED DESCRIPTION OF CONTROL EQUIPMENT (Pages from Section II Appendix H - Control Equipment (part 2).pdf)

EU 1: DETAILED DESCRIPTION OF CONTROL EQUIPMENT (Section II Appendix H - Control Equipment (part 1).pdf)

EU 1: FUEL ANALYSIS OR SPECIFICATION (Section II Appendix C - Fuel Analysis.pdf)

EU 1: GOOD ENGINEERING PRACTICE STACK HEIGHT ANALYSIS (RULE 62-212.400(4)(d),F.A.C., and RULE 62-212.500(4)(f),F.A.C.) (Good Engineering.doc)

EU 1: OPERATION AND MAINTENANCE PLAN (O _ M Plan.doc)

EU 1: OTHER EMISSIONS UNIT INFORMATION (Figure 4 - aerial landfill.pdf)

EU 1: OTHER EMISSIONS UNIT INFORMATION (Section II Appendix A - General LF Operations.pdf)

EU 1: OTHER EMISSIONS UNIT INFORMATION (Section II Appendix B - Support Calculations.pdf)

EU 1: OTHER EMISSIONS UNIT INFORMATION (Section II Appendix E - LFG Generation n Construct Sched.pdf)

EU 1: PROCEDURES FOR STARTUP AND SHUTDOWN (Section II Appendix F - Procedures for startup and shut down.pdf)

EU 1: PROCESS FLOW DIAGRAM (Figure 2 - Process Flow Diagram.pdf)

Sheplak, Scott -file-

From: Nelson, Deborah
Sent: Sunday, April 01, 2007 10:27 PM
To: Linero, Alvaro; Sheplak, Scott
Subject: FW: Okeechobee

Al and Scott:

Below are my sufficiency questions:

1. Please submit all electronic Class I, visibility and deposition modeling files along with tables detailing the results to the Department.
2. Please explain how the terrain of the landfill was modeled. For example, was the existing landfill included in the terrain or was it assumed that the landfill was mostly flat? Provide guidance that was used in determining how to model the landfill terrain.
3. Appendix B, Page 2 of 5, shows a summary of the interim operating scenario. The interim operating scenario Significant Impact Analysis should include only the new emission units or emission increases. The existing emission units should be added only if an increment or AAQS analysis is required. Does the Significant Impact Analysis submitted to the Department for this interim scenario reflect only the new units or does it include all units listed on Page 2?
4. Please verify that the EPA Regulatory Version, Version 5.711a. was used for the Class I analyses.
5. The analysis of soil, vegetation and wildlife as part of the Additional Impact Analysis should include all pollutants subject to PSD. Please submit a full analysis to the Department.
6. Section 3.2 in the Ambient Air Quality Analysis states that short-term and long-term emission rates are the same. Are the short-term emission rates indicative of worst-case scenario/proposed short term permit emission limits?
7. Appendix B, Page 4 of 5 shows the alternative operating scenario with BACT. This table shows 7 proposed flares. Section 4.0 of the Air Quality Analysis, page 16, states that there will be 8 new flares. Please clarify. In addition, page 1 of 5 in Appendix B shows 2 existing flares with a backup flare. Section 4.1 does not include the backup flare nor do the flows correlate with each other.
8. Section 3.6 of the Ambient Air Quality Analysis details the receptor layout. Please indicate the receptor distance used for areas of highest impacts in the refined Increment analyses.
9. Please provide bpip modeling files.
10. The proposed project is PSD for NOx and is expected to emit over 100 TPY. NOx is a precursor to ozone. Please provide an ambient air quality analysis for ozone.
11. Please provide the Class I Increment and AAQS inventories used in the modeling analyses.
12. Please provide receptor information regarding the Class I analysis.

Sheplak, Scott

From: Nelson, Deborah
Sent: Sunday, May 06, 2007 6:36 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: Okeechobee Landfill - FYI

Scott,

The latest submittal we received from Shaw on May 2nd is still very incomplete. First of all, the submittal only addresses the Class I impacts, which only attempts to answer some of my questions in our sufficiency letter. Second, they used the VISTAS, not regulatory version of CALPUFF. I told them to use the regulatory version. This was prior to my knowledge that our CALMET data was the wrong version as well. Basically, all of their modeling has to be done again.

Shaw modeled Biscayne. The NPS might want additional Class II sites modeled. I will check on that.

Please note: Shaw only modeled BACT for the Class I area. They did not model the interim, no controls period.

Thanks,

Debbie

Sheplak, Scott

From: Linero, Alvaro
Sent: Monday, May 07, 2007 6:25 PM
To: Sheplak, Scott; Nelson, Deborah
Cc: Adams, Patty
Subject: RE: Okeechobee Landfill - FYI

Thanks Scott.

We need to get this one moving and have productive discussions with the company soon.

I see a willingness on their part and a need on everyone's part.

Please make it happen.

I'll consult with you when I get back.

Thanks.

Al.

-----Original Message-----
From: Sheplak, Scott
Sent: Mon 5/7/2007 3:28 PM
To: Nelson, Deborah
Cc: Linero, Alvaro; Adams, Patty
Subject: RE: Okeechobee Landfill - FYI

Patty, I pulled one of the copies of this submission.

Debbie, I will reconfirm emission rates used like I did before.

Debbie & Al, I perused this submission. They did not respond to the non-modelling items from the last incompleteness letter. {They had indicated this would be the case I just wanted to confirm.}

From: Nelson, Deborah
Sent: Sunday, May 06, 2007 6:36 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: Okeechobee Landfill - FYI

Scott,

The latest submittal we received from Shaw on May 2nd is still very incomplete. First of all, the submittal only addresses the Class I impacts, which only attempts to answer some of my questions in our sufficiency letter. Second, they used the VISTAS, not regulatory version of CALPUFF. I told them to use the regulatory version. This was prior to my knowledge that our CALMET data was the wrong version as well. Basically, all of their modeling has to be done again.

Shaw modeled Biscayne. The NPS might want additional Class II sites modeled. I will check on that.

Please note: Shaw only modeled BACT for the Class I area. They did not model the interim, no controls period.

Sheplak, Scott

From: Nelson, Deborah
Sent: Wednesday, May 02, 2007 11:07 AM
To: Sheplak, Scott
Cc: Adams, Patty
Subject: FW: Okeechobee Class I report
Attachments: Class I Area Impact Analysis_OLI_Final.pdf

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

From: Fagan, Kelly [mailto:Kelly.Fagan@shawgrp.com]
Sent: Tuesday, May 01, 2007 6:41 PM
To: Nelson, Deborah
Cc: Maillet, Bruce
Subject: Okeechobee Class I report

Hi Debbie –

Attached is the report, and the paper copies were sent out tonight for overnight delivery.

Call if you need anything.

Kelly <<Class I Area Impact Analysis_OLI_Final.pdf>>

Kelly Fagan

Client Project Manager

Shaw Environmental and Infrastructure, Inc.

88C Elm Street

Hopkinton, MA 01748

508-497-6172

508-435-3685 (fax)

From: Nelson, Deborah [mailto:Deborah.Nelson@dep.state.fl.us]
Sent: Tuesday, May 01, 2007 6:13 PM

To: Fagan, Kelly
Subject: Not read: RE:

Your message

To: Deborah.Nelson@dep.state.fl.us

Subject:

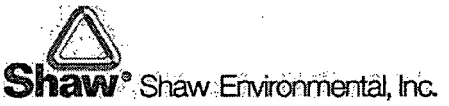
was deleted without being read on 5/1/2007 6:13 PM.

CLASS I AREA IMPACT ANALYSIS FOR PROPOSED EXPANSION IN OKEECHOBEE LANDFILL

Prepared for:

Okeechobee Landfill, Inc.
Okeechobee, Florida

Prepared by:



Shaw Environmental, Inc.
Monroeville, Pennsylvania

Project No. 121525
March 2007

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

As mentioned in Section III, Air Construction Permit Application, 1270-2 the net emissions from the proposed changes in the facility exceeded the significant emission rates for New Source Review (NSR) for the following pollutants: SO_2, NOx, PM10, and CO. Therefore, a Best Available Control Technology (BACT) analysis and an air quality impact analysis in the near filed area were conducted and included in Section III of the permit application submitted on February 28, 2007.

An important element of the air quality analysis is Class I area impact analysis. The analysis requires estimation of impact of the proposed project on nearby federally designated Class I areas in terms of air quality, acidic deposition, and visibility degradation, which are part of the air quality related values (AQRVs).

A brief summary of the results of the Class I area impact analysis was included in the permit application submitted on February 28, 2007. This appendix provides details of the analysis. The appendix is arranged as follows:

- Section 2.0: Background Information
- Section 3.0: Technical Approach and Methodology
- Section 4.0: Class I Area Impact Analysis
- Section 5.0: Conclusions.

2.0 Background Information

The Okeechobee Landfill Facility (Facility), which is owned and operated by Okeechobee Landfill, Inc. (OLI), is comprised of an existing municipal solid waste (MSW) landfill and supporting operations. The facility has been operational since 1981 and under the existing solid waste permit will continue to construct and operate the landfill until approximately 2058. The landfill is an emission unit for nonmethane organic compounds (NMOCs), a landfill gas (LFG) constituent. The typical control device (CD) for NMOCs in LFG is flaring. Other destructive control devices that are sometimes used for LFG combustion are turbines, engines, enclosed combustors, and boilers. The proposed modification to the landfill includes increasing flaring capacity, adding sulfur removal equipment, and constructing a landfill-gas-to-energy (LFGTE) plant.

The Facility currently has two enclosed landfill gas flares with Evap® systems and an open, utility flare as a backup. The two enclosed flares and the backup flare are operated under the current Title V operation permit. There is currently an odor control flare that is operating under a first amended order between FDEP and Okeechobee Landfill Inc. (OLI). A second amended order allows up to five flares to be operated at the Facility. The estimated maximum potential-to-emit (PTE) based on LFG generation estimates occurs shortly after closure and will increase from current 6,000 standard cubic feet per minute (scfm) to 32,400 scfm. There is a current need to install more capacity for control of collected LFG. As the landfill emission unit continues to be constructed, turbines and flares will be installed to control the landfill gas. As the landfill gas increases to allow for the installation of the permitted turbines, the landfill gas will be diverted from the flares to the gas turbines, which will beneficially use the landfill gas by converting it into electricity. Under this preferred scenario, the landfill gas will be always combusted in turbines (numbers increasing with time) and one flare to combust residual gas after full capacity is achieved in turbines, except during turbine maintenance activities which may require additional gas to be sent to the flares. As the gas generation reaches the minimum capacity required for a turbine, gas will be transferred from being flared to a new turbine; and the flare(s) will be ready for excess gas generated from the landfill.

Although the Facility is not a permitted as a major stationary source, recent fuel analysis for hydrogen sulfide indicates that the actual emissions do qualify the Facility as a major stationary source for SO_2. Additionally, the expected emission increases from the current level to the predicted levels at the completion of the landfill construction are above the significant emission rate therefore, triggering PSD review under Chapter 62-212.400. The Application provides the information required by Chapter 62-212.400, F.A.C., for Prevention of Significant Deterioration (PSD) review.

The summary of significant emission rate evaluation for all PSD pollutants as described in Section 5.2 of the Permit Application Report is shown in Table 2-1. The pollutants exceeding the significant emission rates from the proposed changes are: i) SO_2; ii) NOx; iii) PM10; and iv) CO. A BACT analysis has been performed and would require installation of a LFG desulphurization system installed before the destructive control devices (e.g., flares and turbines) to control SO_2.

Table 2-1: PSD Significance Summary

Pollutant	PSD Emission Significant?
Nitrogen Oxides (NOx)	Yes
Carbon Monoxide (CO)	Yes
Sulfur Dioxide (SO_2)	Yes
Particulate Matter, diameter <10 microns (PM10)	Yes
Hydrogen Sulfide (H_2S)	No
Ozone as Volatile Organic Compounds (VOC)	No

Note: Other PSD regulated compounds are not emitted in any appreciable quantity during LFG combustion.

2.1 Description of Site

The Facility is located in Okeechobee County in Central Florida near Lake Okeechobee at approximately 27°20'24" latitude and 80°41'27" longitude. Figure 2-1 shows the site within the state of Florida and nearby natural features. The 4300 acre site contains the existing Berman Road Landfill, the proposed Clay Farms expansion, and auxiliary services.

The terrain surrounding the Facility is mostly flat with terrain heights reaching 60 feet within 5 kilometers (km) from the property boundary line. The vegetation is mostly grassland and mangroves. Land use in the surrounding area is mostly rural. A large water body (Lake Okeechobee) is located approximately 30 km southwest of the Facility.

The area is not industrial and there are no large industrial sources within 10 km from the Facility. Okeechobee County is in attainment for all regulated pollutants with federal NAAQS and FDEP AAQS. The nearest Class I area is Everglades National Park approximately 169 km south of the southernmost property boundary of the Facility. Biscayne Bay National Park, a Class II National Park, is located approximately 193 km from the Facility towards the southwest.

There is no USEPA-approved meteorological monitoring station at the Facility. Meteorological data from nearest National Weather Service (NWS) station in West Palm Beach (approximately 60 km southeast of Facility) shows a predominantly westerly wind pattern. Climatological data

5.0 Conclusions

Class I Area impact analysis was performed for proposed modifications at the Okeechobee Landfill in Okeechobee County. The Class I area evaluated was the Everglades NP located approximately 169 km from the Facility. A nearby Class II national park, namely the Biscayne Bay NP, was also evaluated for informational purposes.

The analyses included were: i) Class I area air quality impact; ii) deposition impact; and iii) visibility impairment impact. Two operating scenarios were considered: i) Primary BACT operating scenario; and ii) Alternative operating scenario.

In all scenarios, there was insignificant impact on air quality at the Everglades NP and the Biscayne Bay NP. The deposition flux was estimated to be below significance threshold levels (i.e. DAT) for both nitrates and sulfates in both scenarios. The visibility impairment was measured in terms of light extinction coefficient. For all three scenarios, the percent change in light extinction coefficient over the background was less than 5% in all 24-hour period modeled.

Thus, no adverse impact was predicted on soil, vegetation, wildlife and visibility in the Class I area from this project.

Sheplak, Scott

From: Sheplak, Scott
Sent: Friday, May 11, 2007 2:44 PM
To: Linero, Alvaro
Cc: Nelson, Deborah
Subject: rules prohibiting permit issuance
Attachments: prohibition to issuing a permit w ambient air quality violations.doc

Here are the rules on ambient air quality protection which basically say that the Department shall not issue an air permit that exceeds an ambient air quality standard. (see attached Rule 62-204.220, F.A.C.)

This is a potential significant problem with the Okeechobee Landfill expansion project in-house under the PSD/AC permit application.

CHAPTER 62-204 AIR POLLUTION CONTROL - GENERAL PROVISIONS

62-204.220 Ambient Air Quality Protection. (Effective 3/13/96)

62-204.220 Ambient Air Quality Protection.

(1) Except as provided in Rule 62-212.500, F.A.C., Preconstruction Review for Nonattainment Areas, or in the Reasonably Available Control Technology rules of Chapter 62-296, F.A.C., the Department shall not issue an air permit authorizing a person to build, erect, construct, or implant any new emissions unit; operate, modify, or rebuild any existing emissions unit; or by any other means release or take action which would result in the release of an air pollutant into the atmosphere which would cause or contribute to a violation of an ambient air quality standard established under Rule 62-204.240, F.A.C.

(2) Except as provided in Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), the Department shall not issue an air permit authorizing the construction or modification of any emissions unit or facility that would cause or contribute to an ambient concentration at any point within a baseline area that exceeds either the appropriate baseline concentration for the point plus the appropriate maximum allowable increase or the appropriate ambient air quality standard, whichever is less.

(3) Ambient air quality monitors used to establish a violation of an ambient air quality standard shall meet the requirements of 40 C.F.R. Part 58, adopted and incorporated by reference in Rule 62-204.800, F.A.C.

(4) For any provision of the air pollution rules of the Department which requires that an estimate of concentrations of pollutants in the ambient air be made, the estimates shall be based on the applicable air quality models, data bases, and other requirements approved by the Department and specified in 40 C.F.R. Part 51, Appendix W – Guideline on Air Quality Models (Revised), adopted and incorporated by reference in Rule 62-204.800, F.A.C.

Specific Authority 403.061 FS. Law Implemented 403.021, 403.031, 403.061, 403.087 FS. History–New 3-13-96.

Re: Air Pollution Source Defined - Landfills
Major Stationary Source (PSD Source)
Major Source of Air Pollution (Title V Source)

Contiguous Area and Common Control Test

The existing Berman Road landfill site and proposed new Clay Farms Landfill site are only separated by a private dirt access road with fencing around the perimeter of each site. The Berman road landfill is an active landfill zoned by the property appraiser's office as "Wasteland." [i] The Berman Road site began receiving waste in approximately 1981. The Clay Farms site is currently zoned as "Pastureland" by the property appraiser's office and has not received any waste. A map from the property appraiser's office was available showing the sites.

Both sites are owned by Chambers Waste Systems of Florida which is now known as Okeechobee Landfill, Inc.[ii] Both sites were owned by the same owner when the facility became a PSD source in 2006 (the exemption from PSD for landfills was removed in 2006). The Berman Road site triggered the need for a BACT by exceeding the significant emission rate in 2007.

Using EPA's applicability determination index on the website, three key EPA determinations were found to support treating both sites as a single source. See Control Document Numbers 9700088, 0600092 and 9800025 using a key word search on "landfill."

---

[i] Okeechobee Property Appraiser Office website www.okeechobeepa.com accessed on October 24, 2007.

[ii] Division of Corporations, State of Florida website www.sunbiz.org accessed on November 1, 2007.

Sheplak, Scott

From: Sheplak, Scott
Sent: Monday, May 14, 2007 5:25 PM
To: Linero, Alvaro
Cc: Nelson, Deborah
Subject: RE: rules prohibiting permit issuance

That's correct. The landfill gas generation curves (graphs) I requested will help to show the emission levels vs. time.

Perhaps we can permit the level at which they trigger PSD and require AC permit applications for subsequent expansions.

From: Nelson, Deborah
Sent: Friday, May 11, 2007 8:54 PM
To: Linero, Alvaro; Sheplak, Scott
Subject: RE: rules prohibiting permit issuance

I spoke with their modeler this afternoon and we discussed some issues that may help their impacts. The interim period will be staged, not all of the sudden worst case. I think I cleared up a few things for them. They are requesting a sufficiency letter (which we would have to submit anyway) explaining the modeling issues. The modeler said that it would help with communications between the applicant and the consultant and the DEP. Unless anyone feels otherwise, I will compose a letter and get it out soon.

-----Original Message-----
From: Linero, Alvaro
Sent: Fri 5/11/2007 5:52 PM
To: Sheplak, Scott
Cc: Nelson, Deborah
Subject: RE: rules prohibiting permit issuance

Thank you very much Scott.

From: Sheplak, Scott
Sent: Friday, May 11, 2007 2:44 PM
To: Linero, Alvaro
Cc: Nelson, Deborah
Subject: rules prohibiting permit issuance

Here are the rules on ambient air quality protection which basically say that the Department shall not issue an air permit that exceeds an ambient air quality standard. (see attached Rule 62-204.220, F.A.C.)

This is a potential significant problem with the Okeechobee Landfill expansion project in-house under the PSD/AC permit application.

Sheplak, Scott

From: Linero, Alvaro
Sent: Saturday, May 12, 2007 9:31 AM
To: Nelson, Deborah; Sheplak, Scott
Subject: RE: rules prohibiting permit issuance

Sounds good to me if you are talking about getting something out soon.

Indicate that the actual sufficiency letter will come later.

Like I said, some support from EPA can only help.

Al.

-----Original Message-----
From: Nelson, Deborah
Sent: Fri 5/11/2007 8:54 PM
To: Linero, Alvaro; Sheplak, Scott
Cc:
Subject: RE: rules prohibiting permit issuance

I spoke with their modeler this afternoon and we discussed some issues that may help their impacts. The interim period will be staged, not all of the sudden worst case. I think I cleared up a few things for them. They are requesting a sufficiency letter (which we would have to submit anyway) explaining the modeling issues. The modeler said that it would help with communications between the applicant and the consultant and the DEP. Unless anyone feels otherwise, I will compose a letter and get it out soon.

-----Original Message-----
From: Linero, Alvaro
Sent: Fri 5/11/2007 5:52 PM
To: Sheplak, Scott
Cc: Nelson, Deborah
Subject: RE: rules prohibiting permit issuance

Thank you very much Scott.

From: Sheplak, Scott
Sent: Friday, May 11, 2007 2:44 PM
To: Linero, Alvaro
Cc: Nelson, Deborah
Subject: rules prohibiting permit issuance

Here are the rules on ambient air quality protection which basically say that the Department shall not issue an air permit that exceeds an ambient air quality standard. (see attached Rule 62-204.220, F.A.C.)

This is a potential significant problem with the Okeechobee Landfill expansion project in-house under the PSD/AC permit application.

file -

WASTE MANAGEMENT

WASTE MANAGEMENT
2859 Paces Ferry Road SE
Suite 1600
Atlanta, GA 30339
(770) 805-4130
(770) 805-9145 Fax

June 15, 2007

Mr. Scott M. Sheplak, P.E.
Air Permitting South Section
Bureau of Air Regulation
Mail Station #5505
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Florida Department of Environmental Protection Letter Dated May 21, 2007, DEP File Number 0930104-014-AC, Application No. 1270-2, Okeechobee Landfill Facility, Okeechobee Landfill, Inc.

Dear Mr. Sheplak:

In a letter dated May 21, 2007, your department requested additional information for the Okeechobee Landfill, Inc. (OLI) PSD air construction permit application submitted on February 28, 2007 (DEP File Number 0930104-014-AC). Attached is a letter from Shaw Environmental, Inc. (Shaw) to OLI dated June 13, 2007 that responds to each comment.

If you have any questions or requests for additional information, the contacts are provided in the Application or you may contact OLI's Compliance Representative for this permit, Mr. David Thorley at 713-328-7404 or dthorley@wm.com or Michele Lersch at 813-786-6807 or mlersch@wm.com.

Respectfully submitted,

John Van Gessel
Vice President and Assistant Secretary
Waste Management, Inc. of Florida

Cc: Joseph Fasulo, OLI
Mike Stallard, OLI
Michelle Lersch, WM
David Thorley, WM
Kristin Alzheimer, P.E, Shaw
Bruce Maillet, Shaw
Kelly Fagan, Shaw
Arijit Pakrasi, Shaw

Sheplak, Scott

- file -

From: Nelson, Deborah
Sent: Wednesday, June 20, 2007 4:35 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: Okeechobee

The response from Okeechobee states, "the Interim scenario should not be considered under NSR." I suggest a meeting or conference call to explain that it has to be considered.

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

Sheplak, Scott -file-

From: Nelson, Deborah
Sent: Wednesday, June 20, 2007 4:06 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: Okeechobee

Scott,

As you know, we received additional information regarding the landfill. While the Class I analysis is still out, pending Regulatory met data, the Class II analysis is troublesome. For SO2, their 176 lbs/hr is sending them over on all thresholds. Please see below (all numbers ug/m^3):

Class II SO2	3-hour	SIL	24-hour	SIL
	346	25	224	5

Increment SO2
Annual Concentration 41, Limit - 20
24-hour Concentration 285, Limit - 91

AAQS SO2
24-Hour Concentration 294, AAQS- 260.

The Inventory is probably too conservative and I will look at it but they are so far over on their own, I'm not sure that it'll help.

They most likely, barring an inventory miracle, will have to lower their emissions to receive a permit.

Debbie

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

Florida Department of Environmental Protection
Bob Martinez Center
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor
Jeff Kottkamp
Lt. Governor
Michael W. Sole
Secretary

July 18, 2007

Electronic Mail – Received Receipt Requested

jvangessel@wm.com

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2859 Paces Ferry Road
Suite 1600
Atlanta, Georgia 30339

Re: DEP File Number 0930104-014-AC
Okeechobee Landfill Expansion and Addition of Control Equipment

Dear Mr. Van Gessel:

On June 19, 2007, the Department received responses to the Department's previous requests for additional information.

After review, it has been determined that the application remains incomplete. In order to continue the processing of the subject permit application, the Department needs the following previously requested information or newly requested information.

A. Air Quality Impact Analysis Items

1. Please submit a Class I Prevention of Significant Deterioration (PSD) Significant Impact Analysis, PSD Increment Analysis (if required) and an Air Quality Related Values (AQRV) analysis for the proposed expansion for all operating scenarios, including the "Interim" period. The "Interim" period (prior to installation of controls) is subject to PSD review.

   This analysis must be completed using the regulatory version of CALPUFF. The regulatory version of the CALPUFF modeling system, along with the regulatory default settings, is recommended for use for long range air quality impact assessments by the EPA. [Note that the current regulatory CALPUFF system includes CALMET (Version 5.8), CALPUFF (Version 5.8), and CALPOST (Version 5.6397)]. The Class I analysis should also include the Class II areas, Big Cypress National Preserve and Biscayne National Park.

2. Please explain the Interim period further. The Interim period includes the installation of 3 additional flares. When are these flares expected to the installed? Can the Interim period be altered to only have 2 additional flares by installing controls at an earlier date to lower project impacts during this time?
3. The Interim period is only analyzed with regards to PSD Increment and the National Ambient Air Quality Standards. Please submit an analysis regarding additional impacts to soils, vegetation and wildlife with regards to the time period before controls are installed.
4. The Interim period Significant Impact Analyses for the Class I and Class II areas should include all new flares that will be installed prior to controls. If this modeling or analyses concludes that there is a significant impact, all other facility sources, along with other nearby sources (approved Department pollutant-specific inventory) shall be included in the PSD Increment analyses.
5. The Class II analysis submitted to the Department includes a PSD Increment Analysis and National Ambient Air Quality Analysis (NAAQS). These analyses were completed with an inventory of nearby sources which were included in the modeling. Some sources were omitted due to distance and emission rates. While the procedure used for eliminating sources for this project is accepted for the screening area, all sources in the immediate Significant Impact Area should be modeled. Please verify that all of these sources were included in the modeling.
6. Please provide tables and/or spreadsheets for the PSD Increment and NAAQS analyses listing the source id used in the modeling with the corresponding emission unit to clarify which sources were modeled.
7. With regards to the modeling analysis, the locations of the flares are very close together. Please verify the specific location of the new and existing flares for this project and identify them on your plot plan or specify where in the application such data already exists.
8. With regards to the PSD Class II Increment and NAAQS analyses, the application states that receptors were placed "only at locations where the proposed project could potentially have equal to or greater than significance concentration from proposed emission points." Please verify that receptors were placed throughout the Significant Impact Area or SIA for all averaging times. In addition, was a buffer of receptors included?
9. Please note that the Federal Land Manager and the EPA may provide comments regarding this proposed project. Any comments will be forwarded to the applicant.

B. Air Construction/PSD Permit Application Items

1. In the response to the Department's previously requested item 1.a., pages from the Department's solid waste permits were submitted with the available solid waste disposal areas circled in red for each site. Review of these pages from the permits indicates the available solid waste disposal areas for the Berman Road Landfill site is 194 acres and the Clay Farms Landfill site is 639 acres. It is claimed that the total "permitted solid waste disposal footprint" is 833 acres for the sites combined.

For your information, each site has its own unique solid waste permitted identification. The Department's solid waste permits allow (permit) phases of a landfill, citing the specific cells of each landfill to be constructed and/or operated at a time.

According to this information and the previously reported estimates, the Berman Road Landfill site occupying 194 acres when filled to its available waste disposal area is expected to hold 23,431,195 tons of waste. The Clay Farms Landfill site is planned to occupy 639 acres and hold up to 119,324,195 tons of waste.

Therefore, the proposed Clay Farms site is approximately 3 times larger in acreage and 6 times larger in solid waste disposal tonnage than the Berman Road Landfill site.

2. In the response to the Department's previously requested item 1.b., a landfill gas generation curve was provided as Attachment 6 in the June 8, 2007, letter from Shaw Environmental, Inc. The curve includes landfill gas generated from both landfill sites combined. In the Department's request dated April 2, 2007, curves were requested from each individual site.

   a. Please provide a landfill gas generation curve for each site, e.g., the Berman Road Landfill site and the Clay Farms Landfill site.

   b. Also, please provide graphs for each site showing the mass emissions rates in tons per year showing emission levels "pre-BACT" and emissions "with BACT" for the following pollutants: SO_2, CO, NOx and PM_{10}. In what year are (or were) the significant emission rates (SER's) tons per year values exceeded for each pollutant? Show on the graph the point in time at which this occurs.

3. In the Department's request dated April 2, 2007, the following question was asked - "*3. Does the landfill currently measure the H_2S content of the landfill gas? If so, at what frequency is it measured and how & where is it measured?*" The response was - "*The Facility does not currently measure H_2S content at the landfill.*" The use of dräger tubes is an inexpensive technique to sample H_2S concentrations. The Department has the following questions:

   a. Is H_2S measured at the landfill in either the ambient air or from the landfill gas extraction wells? Are levels of H_2S at the landfill site monitored by personnel detection devices?

   b. While on-site the Department found the facility using a portable analyzer unit referred to as the "GEM2000" unit to perform the sampling and analysis of landfill gas parameters. Are these analyzers capable of measuring the H_2S content of the landfill gas?

4. In the PSD permit application dated March 7, 2007, the cost of SO_2 removed in $/ton was provided as $267.03 for the LO-CAT® system. In the recent response, the revised cost effectiveness values are between $383 and $527. The cost estimates were based on an H_2S content of 6,000 ppmv.

   a. In the response, the turbine generators that may be installed at a future date have an inlet concentration of 400 ppmv. Please provide the documentation from Solar Turbines, Inc., the vendor of the Mars® 100 combustion turbines, supporting this inlet concentration specification.

The Department will resume processing your application after receipt of the requested information. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have 90 (ninety) days after the Department mails a timely request for additional information to submit that information to the Department ... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

If you have any questions, please contact Ms. Debbie Nelson at 850/921-9537 regarding the air quality impact review or Scott Sheplak at 850/921-9532 regarding the permit application review.

Sincerely,

A. A. Linero, P.E.
Program Administrator
Air Permitting South Section

AAL/dn/sms

copy to:

Mike Stallard, Waste Management, Inc.: mstallard@wm.com
Joe Fasulo, Okeechobee Landfill, Inc.: jfasulo@wm.com
Kristin Alzheimer, P.E., Shaw Environmental: kristin.alzheimer@shawgrp.com
Kelly A. Fagan, P.E., Shaw Environmental & Infrastructure, Inc.: kelly.fagan@shawgrp.com
Lee Hoefert, P.E., DEP Southeast District Office: lee.hoefert@dep.state.fl.us
Jim Little, U.S. EPA, Region 4: little.james@epa.gov
Dee Morse, National Park Service: dee_morse@nps.gov

Sheplak, Scott

From: Nelson, Deborah
Sent: Wednesday, July 18, 2007 7:39 PM
To: jvangessel@wm.com
Cc: Adams, Patty; Sheplak, Scott; Linero, Alvaro; Nelson, Deborah; mstallard@wm.com; jfasulo@wm.com; kristin.alzheimer@shawgrp.com; kelly.fagan@shawgrp.com; Hoefert, Lee; little.james@epa.gov; Dee_Morse@nps.gov
Subject: Letter - Waste Management, Inc. of Florida - Mr. John Van Gessel - Project #0930104-014-AC
Attachments: 0930104-014-AC incompleteness letter 3.pdf

Dear Sir/Madam:

Please send a "reply" message verifying receipt of the attached document(s); this may be done by selecting "Reply" on the menu bar of your e-mail software and then selecting "Send". We must receive verification of receipt and your reply will preclude subsequent e-mail transmissions to verify receipt of the document(s).

The document(s) may require immediate action within a specified time frame. Please open and review the document(s) as soon as possible.

The document is in Adobe Portable Document Format (pdf). Adobe Acrobat Reader can be downloaded for free at the following internet site: http://www.adobe.com/products/acrobat/readstep.html.

The Bureau of Air Regulation is issuing electronic documents for permits, notices and other correspondence in lieu of hard copies through the United States Postal System, to provide greater service to the applicant and the engineering community. Please advise this office of any changes to your e-mail address or that of the Engineer-of-Record.

Thank you,

DEP, Bureau of Air Regulation

Response to Comments
Florida Department of Environmental Protection
Letter Dated July 18, 2007
Facility: Okeechobee Landfill
DEP file No. 0930104-AC, Application No. 1270-2

A. Air Quality Impact Analysis Items

Comment 1: Please submit a Class I Prevention of Significant Deterioration (PSD) Significant Impact Analysis, PSD Increment Analysis (if required) and an Air Quality Related Values (AQRV) analysis for the proposed expansion for all operating scenarios, including the "Interim" period. The "Interim" period (prior to installation of controls) is subject to PSD review.

This analysis must be completed using the regulatory version of CALPUFF. The regulatory version of the CALPUFF modeling system, along with the regulatory default settings, is recommended for use for long range air quality impact assessments by the EPA. [Note that the current regulatory CALPUFF system includes CALMET (Version 5.8), CALPUFF (Version 5.8), and CALPOST (Version 5.6397)]. The Class I analysis should also include the Class II areas, Big Cypress National Preserve and Biscayne National Park.

Response: The Class I PSD Significant Impact Analysis, PSD Increment Analysis (if required) and an AQRV analysis will be submitted for all operating scenarios including the "Interim" period. The EPA 2007 CALPUFF (Version 5.8) will be used. The meteorological data was provided by FDEP on September 13, 2007 and will be reviewed for quality assurance over the next month. The modeling will begin once the review of the meteorological data is complete.

A Class I analysis was submitted with our application dated February 27, 2007. We have not received any comments from the FLM on this analysis. Therefore, we would suggest that the revision to the Class I impact analysis be performed after those comments are received. Because the changes in the CALPUFF model are out of our control and further comments from FLM have not been received, we believe resolution of this item should not be considered for determination of completeness of the application.

Also, the Applicant would like to note that it is currently taking actions which are believed to reduce the H2S concentration.

Comment 2: Please explain the Interim period further. The Interim period includes the installation of 3 additional flares. When are these flares expected to the installed? Can the Interim period be altered to only have 2 additional flares by installing controls at an earlier date to lower project impacts during this time?

Response: The interim period is the expected construction period for the BACT control device(s). During this period, the landfill will continue to generate gas in increasing rates. The construction period includes procurement, design, construction, delivery and installation. The period will begin when the

construction permit is obtained. At the time of the application submittal, the Applicant expected that during this interim period up to three new flares (including 1 odor control flare) will be needed to combust the collected gas.

The expected date for the installation of the flares during the interim period was presented in Appendix E of the permit application.

The interim period cannot be altered to have two additional flares instead of three. Although there is the potential that three flares or the full capacity of the third flare may not be necessary, the landfill gas generation rate cannot be controlled. The schedule for installation of the flares is based on landfill gas generation modeling based on the EPA's LandGEM Model. The Applicant has submitted a model believed to be conservative but landfill gas generation is unpredictable. The construction schedule presented in Appendix E of the application is based on the LandGEM modeling. Presented below is the construction schedule related to the interim period.

Year	Estimated Annual Average LFG Flow (80% Recovery)	Estimated Annual Average LFG Flow (100% Recovery)	Existing Enclosed Flare Capacity (#/scfm)	Odor Control Flare Capacity (#/scfm)	New Utility Flares Capacity (#/scfm)	Total Potential Capacity (scfm)
2007	7,494	9,356	2 / 6,000	1/ 3,300	1/ 3,300	12,600
2008	8,434	10,530	2 / 6,000	1/ 3,300	1/ 3,300	12,600
2009	9,302	11,613	2 / 6,000	1/ 3,300	2/ 6,600	15,900
2010	10,104	12,613	BACT			

Note that the estimated annual average LFG flows are shown in the above table. The actual LFG flow may be higher towards the end of the year. Therefore, in 2009 it is anticipated that 3 new flares (odor control flare plus 2 new utility flares) will be required.

Comment 3: The Interim period is only analyzed with regards to PSD Increment and the National Ambient Air Quality Standards. Please submit an analysis regarding additional impacts to soils, vegetation and wildlife with regards to the time period before controls were installed.

Response: A soils, vegetation and wildlife analysis will be competed for the Interim scenario in the revised version of the analyses.

Comment 4: The Interim period Significant Impact Analyses for the Class I and Class II areas should include all new flares that will be installed prior to controls. If this modeling or analyses concludes that there is a significant impact, all other facility

sources, along with other nearby sources (approved Department pollutant-specific inventory) shall be included in the PSD Increment analyses.

Response: The current significant modeling includes all new flares. The PSD Increment analysis, where applicable, includes the new flares, all other facility sources and other nearby sources from the Department inventory. The revised modeling report will include this information.

Comment 5: The Class II analysis submitted to the Department includes a PSD Increment Analysis and National Ambient Air Quality Analysis (NAAQS). These analyses were completed with an inventory of nearby sources which were included in the modeling. Some sources were omitted due to distance and emission rates. While the procedure used for eliminating sources for this project is accepted for the screening area, all sources in the immediate Significant Impact Area should be modeled. Please verify that all of these sources were included in the modeling.

Response: The significant impact areas for the BACT operating scenarios are within 1000 meters from the facility and there are no off-property sources within the immediate significant impact area. The revised interim scenario modeling will include all sources in the immediate significant impact area, if applicable.

Comment 6: Please provide tables and/or spreadsheets for the PSD Increment and NAAQS analyses listing the source ID used in the modeling with the corresponding emission unit to clarify which sources were modeled.

Response: The off-property sources modeled for the PSD Increment and NAAQS analyses are listed in Appendix C of the Air Quality Analysis Report, and are listed under the heading "Source ID". The modeling IDs for the on-property sources are listed in the Air Quality Analysis report in Table 3-2.

Comment 7: With regards to the modeling analysis, the locations of the flares are very close together. Please verify the specific location of the new and existing flares for this project and identify them on your plot plan or specify where in the application such data already exists.

Response: The flares are shown in Figure 2-2 of the Air Quality Analysis report. They are represented in this figure as pink dots. The flares were placed in this location to represent the most conservative location, which shows the highest impacts. The flares may be placed anywhere in the area indicated on the plot plan (Figure 2-2) as the "Flares and Lo-Cat – 2 Acres" box.

Comment 8: With regards to the PSD Class II Increment and NAAQS analyses, the application states that receptors were placed "only at locations where the proposed project

could potentially have equal to or greater than significance concentration from proposed emission points." Please verify that receptors were placed throughout the Significant Impact Area or SIA for all averaging times. In addition, was a buffer of receptors included?

Response: The "New Source Review Workshop Manual Draft October 1990" requires that NAAQS and PSD increment compliance determination need to be made within the significant impact area as determined from projects net emission increase. Page C.52 of the draft also states the following:

"When a violation of any NAAQS or increment is predicted at one or more receptors in the impact area, the applicant can determine whether the net emissions increase from the proposed source will result in a significant ambient impact at the point (receptor) of each predicted violation, and, at the time the violation is predicted to occur. The source will not be considered to cause or contribute to the violation if it's own impact is not significant at any violating receptor at the time of the predicted violation. In such a case, the permitting agency, upon verification of the demonstration, may approve the permit. However, the agency must also take remedial action through applicable provisions of the state implementation plan to address the violation(s)"

Thus, the procedure for NAAQS and PSD increment compliance determination will include the following steps:

Step 1: Determine if all receptors are in compliance with the NAAQS and PSD increment thresholds for all affected pollutants and averaging times. If yes, compliance is determined. If not identify the receptors and period(s) when thresholds are violated;

Step 2: Determine whether at these receptors and for these time periods, the impact from the net emission increase from the proposed source is by itself "significant" or not.

Step 3: If not significant, then compliance is demonstrated and no further analysis is needed.

Step 4: If the impact from the net emissions from the proposed source is significant, then appropriate actions to be taken by the proposed emission source.

In order to avoid unnecessary analysis for receptors where the proposed emission source does not have "significant" impact, these receptors were identified during the preliminary analysis (or during significant impact area determination). Thus, the refined modeling (for NAAQS and PSD increment determination) included only the "significant" receptors (separately for each applicable pollutant and

averaging times). Compliance was then determined by showing compliance with the thresholds at all of these receptors.

Please note that we have used this simplification of the analysis in numerous other PSD modeling projects. We request FDEP to accept this simplified procedure. However, in case this is not acceptable for any reason, we will include all receptors in the significant impact area and conduct the insignificant receptor elimination as described earlier.

Comment 9: Please note that the Federal Land Manager and the EPA may provide comments regarding this proposed project. Any comments will be forwarded to the applicant.

Response: Comments from the Federal Land Manager and the EPA will also be addressed, as applicable and appropriate.

B. Air Construction/PSD Permit Application Items

Comment 1: In the response to the Department's previously requested item 1.a., pages from the Department's solid waste permits were submitted with the available solid waste disposal areas circled in red for each site. Review of these pages from the permits indicates the available solid waste disposal areas for the Berman Road Landfill site is 194 acres and the Clay Farms Landfill site is 639 acres. It is claimed that the total "permitted solid waste disposal footprint" is 833 acres for the sites combined.

For your information, each site has its own unique solid waste permitted identification. The Department's solid waste permits allow (permit) phases of a landfill, citing the specific cells of each landfill to be constructed and/or operated at a time.

According to this information and previously reported estimates, the Berman Road Landfill site occupying 194 acres when filled to its available waste disposal area is expected to hold 23,431,195 tons of waste. The Clay Farms Landfill site is planned to occupy 639 acres and hold up to 119,324,195 tons of waste.

Therefore, the proposed Clay Farms site is approximately 3 times larger in acreage and 6 times larger in solid waste disposal tonnage than the Berman Road Landfill site.

Response: We agree with the information you have provided. The sites do have their own unique solid waste permits; however, the Federal PSD regulations (40 C.F.R. 52.21 (b)(5) and (6)) define "stationary source" as "any building, structure, facility, or installation which emits or may emit any air pollutant subject to

regulation under the Act" and further defines "building, structure, facility, or installation" as all of the pollutant-emitting activities that

- belong to the same industrial grouping,
- are located on one or more contiguous or adjacent properties, and
- are under the control of the same person (or persons under common control.)

The two landfills, although separated by a private access road, are on a contiguous/adjacent property and are under the control of one operator. We have included four EPA determinations (**Attachment A**) which reflect this position and are specific to landfills which are similar to the Okeechobee Landfill. We have also attached a copy of the USEPA's response to questions for Solid Waste Landfills New Source Performance Standards and emission guidelines dated 1998 (**Attachment B**). The responses state that the entire site must be included in the in the GCCS calculations.

Comment 2: In the response to the Department's previously requested item 1.b., a landfill gas generation curve was provided as Attachment 6 in the June 8, 2007, letter from Shaw Environmental, Inc. The curve includes landfill gas generated from both landfill sites combined. In the Department's request dated April 2, 2007, curves were requested from each individual site.

a. Please provide a landfill gas generation curve for each site, e.g., the Berman Road Landfill site and the Clay Farms Landfill site.

b. Also, please provide graphs for each site showing the mass emissions rates in tons per year showing emission levels "pre-BACT" and emissions "with BACT" for the following pollutants: SO_2, CO, NOx and PM_{10}. In what year are (or were) the significant emission rates (SER's) tons per year values exceeded for each pollutant? Show on the graph the point in time at which this occurs.

Response: The Applicant has submitted a combined landfill gas generation because the Applicant considers that appropriate for the air construction permit application based on a single stationary source consisting of two landfills under common control and on a contiguous/adjacent property. (Please see response to Comment B.1, above.)

Graphs for the mass emission rates in tons per year for CO, NOx, PM_{10}, and SO_2 have been provided in **Attachment C** to this response letter. Please note that the BACTs for NOx, CO, and PM_{10} are "good combustion control of the turbines and flares" (please see the BACT report in the permit application).

Comment 3: In the Department's request dated April 2, 2007, the following question was asked – "*3. Does the landfill currently measure the H_2S content of the landfill gas? If so, at what frequency is it measured and how & where is it measured?*" The

response was – *"The Facility does not currently measure H_2S content at the landfill."* The use of dräger tubes is an inexpensive technique to sample H_2S concentrations. The Department has the following questions:

a. Is H_2S measured at the landfill in either the ambient air or from the landfill gas extraction wells? Are levels of H_2S at the landfill site monitored by personnel detection devices?

b. While on-site the Department found the facility using a portable analyzer unit referred to as the "GEM2000" unit to perform the sampling and analysis of landfill gas parameters. Are these analyzers capable of measuring the H_2S content of the landfill gas?

Response: a. The H_2S is not measured in the ambient air or from the landfill gas extraction wells. For certain tasks, the use of personal H_2S detection devices may be used for health and safety purposes. Please note that the devices for this purpose are for a range not more than 50 ppm.

b. The GEM 2000 is not capable of measuring the H_2S content of the landfill gas. **Attachment D** is a copy of the GEM 2000 specification sheet.

Comment 4: In the PSD permit application dated March 7, 2007, the cost of SO_2 removed in $/ton was provided as $267.03 for the LO-CAT® system. In the recent response, the revised cost effectiveness values are between $383 and $527. The cost estimates were based on an H_2S content of 6,000 ppmv.

a. In the response, the turbine generators that may be installed at a future date have an inlet concentration of 400 ppmv. Please provide the documentation from Solar Turbines, Inc., the vendor of the Mars® 100 combustion turbines, supporting this inlet concentration specification.

Response: We have provided a copy of the turbine specification sheet at **Attachment E**; the inlet gas may have as high as 10,000 ppm of H_2S.

Attachment A
Determinations of Applicability
Contiguous Landfills
Source: USEPA

U.S. Environmental Protection Agency

Compliance Assistance

Search Applicability Determination Index

Search ADI | Return to Search Results | Help | Technical Support | Recent ADI Updates | Related Links

Determination Detail

Control Number: 9800025

Category: NSPS
EPA Office: Region 10
Date: 05/30/1996
Title: Contiguous Municipal Waste LANDFILLs
Recipient: Scheibner, Gerald
Author: Frankel, Anita
Comments:

Subparts: Part 60, WWW — Municipal Solid Waste LANDFILLs

References: 60.750
60.751
60.752
60.757

Abstract:

Q: Are two contiguous municipal solid waste LANDFILLs owned by the same company considered to be one facility that is subject to NSPS Subpart WWW?

A: Yes. The older LANDFILL had a capacity of 1.8 million Mg. When the newer LANDFILL was permitted on May 20, 1993, with a capacity of 1.5 million Mg, this brought the total capacity to 3.3 million Mg. The LANDFILLs are considered to be one facility that is subject to NSPS Subpart WWW.

Letter:

Reply To
Attn Of: OAQ-107

Mr. Gerald H. Scheibner, P.E.
Regional Air Quality Section

Department of Ecology
4601 N. Monroe, Suite 202
Spokane, Washington 99205-1295

Subject: Applicability of 40 CFR Part 60, Subpart WWW to the Pasco Sanitary LANDFILL/New Waste LANDFILL Site

Dear Mr. Scheibner:

This letter is in response to your written request of May 3, 1996 regarding applicability of subject LANDFILL to the recently promulgated New Source Performance Standards (NSPS) for Municipal Solid Waste LANDFILLs (40 CFR Part 60, Subpart WWW/60 FR 9905). Based on analysis of the information provided by your office and of the rules, regulations, background documents and guidance regarding 40 CFR Part 60, Subpart WWW, the Environmental Protection Agency (EPA) has determined that the entire Pasco Sanitary LANDFILL/New Waste LANDFILL Site is one Municipal Solid Waste (MSW) LANDFILL and is subject to the NSPS.

Background

As outlined in your May 3 letter, there are two Municipal Solid Waste (MSW) LANDFILLs on one contiguous site which comprise the Pasco Sanitary LANDFILL Site. These portions of the Site are the Pasco Sanitary LANDFILL (PSL) portion and the New Waste LANDFILL (NWL) portion. Mr. Larry Dietrich is President of both portions of the Site

The PSL portion was first permitted on January 1, 1976, started receiving wastes in 1982 and stopped receiving wastes in 1993. The PSL portion is not considered closed (per the definition of a closed LANDFILL at 40 CFR Part 60.750) because it has not met the criteria of 40 CFR 258.60 (Subtitle D closure requirements). The refuse in place at the PSL portion is approximately 1.8 million megagrams (Mg) and LANDFILL emission modeling estimates emission of 105 Mg nonmethane organic compounds (NMOC) per year

The NWL portion was permitted by the Benton-Franklin Health District on May 20, 1993 and started receiving wastes in 1993. The refuse capacity of the NWL portion is estimated at 1.5 million Mg. No emission modeling estimates were provided.

The Pasco Sanitary LANDFILL As One Site

EPA has determined that the PSL and NWL portions are to be considered one MSW LANDFILL Site or disposal facility This determination is based on information provided in your May 3 letter and on the following:

40 CFR 60.751 contains the following definitions:

Municipal solid waste LANDFILL or MSW LANDFILL means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. ...Portions of an MSW LANDFILL may be separated by access roads. ....An MSW LANDFILL may be a new MSW LANDFILL, an existing MSW LANDFILL, or a lateral expansion

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

LANDFILL means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under 257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW LANDFILL. A lateral expansion is not a modification unless it results in an increase in the design capacity of the LANDFILL.

Design capacity means the maximum amount of solid waste a LANDFILL can accept as specified in the construction or operating permit issued by the State, local, or Tribal agency responsible for regulating the LANDFILL.

Additionally, the Pasco Sanitary LANDFILL Site is a state-lead Superfund site on the National Priorities List (NPL). The NPL site consists of both the PSL and NWL portions.

Applicability to 40 CFR Part 60, Subpart WWW/NSPS

EPA has determined that the entire Pasco Sanitary LANDFILL Site which includes both portions is subject to this standard. This determination is based the following: 40 CFR 60.750(a) defines applicability and designation of affected facility as:

The provisions of this subpart apply to each MSW LANDFILL that commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Physical or operational changes made to an existing MSW LANDFILL solely to comply with Subpart Cc (NOTE: the Emission Guideline for existing sources) of this part are not considered construction, reconstruction, or modification for the purposes of this section.

Ms. Martha Smith, the EPA contact for the NSPS and Emission Guidelines on MSW LANDFILLs was consulted as to whether the Pasco Sanitary LANDFILL Site is an existing or new source. According to Ms. Smith, the date that a LANDFILL opens or begins construction, reconstruction or modification is the date the permit was issued for placement of solid waste. As stated earlier, the PSL portion was permitted on January 1, 1976. The NWL portion expanded the capacity of the MSW LANDFILL, and is considered a lateral expansion or modification to the existing PSL portion which increased the design capacity and potential emissions of NMOC. The NWL permit was issued on May 20, 1993. Since this modification occurred after May 30, 1991, the MSW LANDFILL is subject to the NSPS or 40 CFR Part 60, Subpart WWW

Meeting 40 CFR Part 60 Subpart WWW Requirements

The final rule for Subpart WWW (40 CFR 60.752 and 60.757(a)) requires all new source MSW LANDFILLs to submit initial design and capacity reports to EPA. In most cases, these are due by June 10, 1996 (90 days after promulgation of the final rule). As the Pasco Sanitary LANDFILL Site is to be considered one, new source MSW LANDFILL, only one design and capacity report for the entire facility should be submitted.

According to Subpart WWW and the Background Document, submittal of the initial design and capacity reports for affected MSW LANDFILLs having design capacities less than 2.5 million Mg fulfills all of the record keeping and reporting requirements for these LANDFILLs unless the design capacity is revised above the limit in the future. MSW LANDFILLs having a design capacity equal to or

greater than 2.5 million Mg are subject to the additional provisions of the standards.

Based on the information provided in your May 3 letter, the total capacity of the Pasco Sanitary LANDFILL Site (PSL + NWL) is approximately 3.3 million Mg which is above the 2.5 million Mg threshold identified in 60.752(b). In addition, emission modeling estimates the PSL portion is emitting approximately 105 Mg/year NMOC which is above the 50 Mg/year threshold identified in 60.752(b)(2). This suggests that the Pasco Sanitary LANDFILL Site is subject to all the provisions of Subpart WWW.

Summary

For the reasons discussed above, EPA has determined that the Pasco Sanitary LANDFILL Site is considered one, new source MSW LANDFILL disposal facility and is subject to the provisions of 40 CFR Part 60, Subpart WWW. If you have any questions regarding this determination, please contact John Keenan, of my staff, at 206/553-1817.

Sincerely
/signed 5/30/96/
Anita Frankel, Director
Office of Air Quality

Centers
Planning
Sectors
Stakeholder Outreach
Applicability Determinations

Information Resources
About Us

Newsroom
Where You Live
Tips and Complaints
Training

Search Applicability Determination Index

Search ADI | Return to Search Results | Help | Technical Support | Recent ADI Updates | Related Links

Determination Detail

Control Number: 9700088

Category: NSPS
EPA Office: Region 7
Date: 02/26/1997
Title: Contiguous Sites
Recipient: Kramer, Gene
Author: Spratlin, William
Comments:

Subparts: Part 60, WWW

Municipal Solid Waste
LANDFILLs

Abstract:

Q: Are the described sites considered to be contiguous?

A: Yes, since the Grand Island Solid Waste Agency owns both sites, the land between the sites, and the drainage basin that is between the sites.

Letter:

February 26, 1997

Gene Kramer
Public Works Department
City of Grand Island
P O. Box 1968
Grand Island, NE 68802-1968

Dear Mr. Kramer

This letter is in response to your letter to Wayne Kaiser dated October 29, 1996, in which you ask if the Hall County site is contiguous to the City of Grand Island

site. After reviewing the information provided in your letter, and in a letter from Wayne L. Bennett, P.E. dated January 29, 1997, the Region has determined that the Hall County site is contiguous to the Grand Island Regional LANDFILL site as the Grand Island Solid Waste Agency owns both sites, the land between the sites, and the drainage basin. Therefore, "Hall County LANDFILL" and the Grand Island Area Regional LANDFILL are one LANDFILL for purposes of the New Source Performance Standards (NSPS).

Since the design capacity of the LANDFILL is greater than 2.5 million megagrams, the Grand Island Solid Waste Agency is required to calculate a nonmethane organic compounds (NMOC) emission rate as set forth in 40 CFR Part 60 Supbart WWW for the LANDFILL. The NMOC emission rate should include the total emissions from the Hall County site and the Grand Island Area Regional LANDFILL site. Please provide this NMOC emission rate within 60 days.

This letter does not preclude the Environmental Protection Agency from taking an enforcement or any other action authorized under the Clean Air Act.

If you have any questions, please contact Ward Burns of my staff at (913) 551-7960.

Sincerely.

William A. Spratlin
Director
Air, RCRA, and Toxics Division
cc: Susan Fields
NDEQ

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

P.O. BOX 19506, SPRINGFIELD, ILLINOIS 62794-9506

RENEE CIPRIANO, DIRECTOR

217/782-2113

CERTIFIED MAIL
7002 3150 0000 1116 7589

December 2, 2004

STS Consultants, Ltd.
Attention: John Bossert, P.E.
413 W. Monroe Street
Springfield, Illinois 62704-1864

Re: IEPA Determination of CAAPP; New Source Review (NSR) and Prevention of Significant Deterioration (PSD) Applicability

Source:	BFI Waste Systems of N.A., Inc. (Quad Cities Landfill - Phases I through III)
CAAPP Application No.:	97030074
ID No.:	161814AAA
Source:	Gas Recovery Systems of Illinois, Inc.
CAAPP Application No.:	02090057
ID No.:	161814AAB
Source:	Millennium Waste, Inc. (Quad Cities Landfill – Phase IV)
CAAPP Application No.:	02030063
ID No.:	161040ABM

Dear Mr. Bossert:

The Illinois EPA Bureau of Air (BOA) Permit Section has reviewed your correspondence, dated June 30, 2004, and the additional information submitted previously, via e-mail, which was submitted on behalf of Millennium Waste, Inc., requesting a determination regarding applicability and implementation of the Illinois Clean Air Act Permitting Program (CAAPP); New Source Review (NSR)/Prevention of Significant Deterioration (PSD); the New Source Performance Standards (NSPS) for Municipal Solid Waste (MSW) Landfills (40 CFR 60 Subpart WWW), and transfer of responsibility with regard to the NSPS to the BFI Waste Systems of N.A., Inc. (Quad Cities Landfill - Phases I through III) (BFI), Gas Recovery Systems of Illinois, Inc. (GRSI) and Millennium Waste, Inc. (Quad Cities Landfill – Phase IV). The following details the Permit Section's understanding of the present situation:

The Quad Cities Landfill - Phases I through III is a wholly owned subsidiary of BFI, which initially obtained an Illinois EPA Bureau of Land (BOL) permit in 1983. Ultimately the permitted design capacity for Phases I through III was 9.12 million cubic yards. Upon nearing capacity for

these areas, BFI applied for a permit to expand the overall MSW landfill design capacity by 7.5 million cubic yards (Phase IV), which was granted by BOL in 1994. In 1996, BFI installed a landfill gas collection system for Phases II and III and an enclosed flare. In addition, in 1996 GRSI installed a landfill gas to energy (LFGTE) facility (two landfill gas fired internal combustion gensets), which utilizes the landfill gas collected from Phases II and III. Subsequently, Phases I through III reached capacity and were closed to waste operations in 1998. In 1999, Allied Waste Industries Inc. acquired BFI's assets and BFI became a wholly owned subsidiary of Allied Waste Industries Inc. On September 29, 2000, following an anti-trust settlement agreement with the U.S. Department of Justice, Allied Waste Industries Inc. sold the active portion of the Quad Cities Landfill (Phase IV) to Millennium Waste, Inc., which is a wholly owned subsidiary of Waste Connections, Inc..

Currently, Illinois EPA BOA is evaluating a pending construction permit application, submitted by Millennium Waste, covering the installation of a landfill gas collection system for the Phase IV area. The collected gas will be sent to the existing GRSI LFGTE facility. It is indicated in your submittals that a backup control device will not be installed with the Phase IV collection system at this time. However, the on-site enclosed flare, operated by GRSI but owned by BFI, will be utilized in the event of LFGTE downtimes or during periods when not all of the gas can be burned in the LFGTE.

NSR/PSD Applicability

All phases of the landfill were considered one source when built as all were pursued by BFI. However, based upon the above circumstance and the submittal dated March 4, 2002, Illinois EPA established that the Quad Cities Landfill - Phases I through III/Gas Recovery Systems of Illinois, Inc. and Millennium Waste, Inc. (Quad Cities Landfill – Phase IV) are currently two separate sources for purposes of PSD applicability. They would likely be treated separately for any future modifications that only affected one facility. This determination is memorialized in the facility's respective CAAPP permits (See Section 5.1 of the above referenced CAAPP permits).

The Illinois EPA has determined that the GRSI LFGTE facility is currently a support facility for BFI (Quad Cities Landfill - Phases I through III) and that BFI has significant control over the GRSI facility through its control of the landfill gas derived fuel used to power the engines. Thus these two facilities are considered a single source. Even though the facilities were considered a single source, they were issued separate CAAPP permits due to the separate ownership of the facilities.

This determination also was made based upon BFI being the sole source of fuel for GRSI's facility. This is different than the scenario addressed in the USEPA guidance document accompanying your submittal (i.e., the USEPA letter from Judith Katz to Gary Graham, Titled: Common Control of Landfill, from the USEPA Applicability Determination Index ((ADI) located at http://cfpub.epa.gov/adi/), Control Number: 0300036). Note the last two (2) paragraphs of your example cite that the landfill gas to energy facility is not dependent upon landfill gas to operate. Further, it is Illinois EPA's understanding that BFI will continue to be the primary source of fuel for some time, even after the installation of a landfill gas collection system for the Phase IV

area. At some point in the future, landfill gas production at the BFI facility will drop off and the Millennium Waste, Inc. may become the "primary" provider of landfill gas for the GRSI facility, at that time, Illinois EPA will reevaluate the situation and it may determine that Millennium Waste has common control of the LFGTE facility.

Title V (CAAPP) and NSPS Applicability

As you know, the NSPS for MSW landfills (40 CFR 60 Subpart WWW) was promulgated on March 12, 1996. NSPS applicability for the Quad Cities Landfill was triggered by the 1998 Phase IV expansion (See 40 CFR 60.750(a)). Additionally, CAAPP applicability (i.e., Illinois EPA's implementation of the 40 CFR Part 70 permitting requirements) was triggered based upon the total landfill design capacity exceeding the 2.5 million megagram and 2.5 million cubic meters design capacity thresholds of the NSPS (See 40 CFR 60.752). NSPS and CAAPP applicability continue regardless of the division of the landfill into two separate landfill areas. In addition, GRSI is subject to both the CAAPP and NSPS since the GRSI LFGTE facility is considered to be the same source with BFI and because it is BFI's primary landfill gas and nonmethene organic compound (NMOC) control system.

Further, it is Illinois EPA's position that NSPS control requirements were triggered based upon when the combined NMOC emissions from both landfill areas exceeds the NSPS 50-megagram threshold (See 40 CFR 60.752(b)(2) and 60.753). This is based upon USEPA's long standing policy regarding "once in, always in" as it pertains to NSPS affected units. It is also, based upon the "entire disposal facility" (i.e., Phases I through IV) having triggered applicability of the NSPS prior to the landfill being subdivided.

Landfill Gas Treatment System and Transfer of Responsibility

Questions as to whether the landfill gas treatment system referenced in your correspondence meets the requirements for a "treatment system" in 40 CFR 60.752(b)(2)(iii)(C) should be referred to USEPA Region V. However, Illinois EPA notes that it is unclear as to whether the system described meets the minimum system requirements outlined in the guidance provided in USEPA's ADI. Specifically, as to whether the air-to-gas and gas-to-gas heat exchangers meet the de-watering requirement. As described in the guidance: "the system must de-water landfill gas using chillers or other dehydration equipment. The de-watering equipment should reduce moisture content of the gas, which will maintain low water content in the gas and will prevent degradation of combustion efficiencies".

The ADI guidance also addresses whether a landfill can transfer its responsibilities to another entity and the question of offsite treatment. The guidance indicates, "under the terms of the regulation, responsibility for compliance with NSPS Subpart WWW lies with the owner or operator of the landfill, this responsibility cannot be extinguished through contract with another entity." To paraphrase, the CAAPP permit must incorporate all aspects of NSPS Subpart WWW and require the owner and operator of the affected facility (landfill) to certify compliance with all requirements of the NSPS. GRSI as the operator of equipment used to control landfill gas emissions will also be held responsible for those aspects of compliance with WWW. However, neither BFI nor Millennium Waste, Inc. as the owner of a regulated facility can

contract away it's liability because another entity is contractually obligated to perform activities, which are also regulated. (See USEPA ADI letters (Attached for your conveyance) titled "Use of Treatment System Prior to IC Engine Combustion", From Michael Kenyon to Douglas McVay; (Control Number: 0300121); "Definition of "Treatment System"". From Donald Toensing to Larry Molder; ((Control Number: 0300028) and "Sending Landfill Gas to Separate Entity for Combustion", From Douglas Hardesty to Ali Nikukar (ADI Control Number: 0300062)).

Based upon the above, the Illinois EPA has determined that a contract between Millennium Waste, Inc. and GRSI for the treatment system will not absolve Millennium Waste, Inc. from it's responsibility to comply with the control requirements of the NSPS.

If you have any questions on this matter, please contact Mike Davidson at 217/782-2113.

Sincerely,

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

Attachment

cc: FOS, Region 2
ID File161814AAA
ID File161814AAB
ID File 161040ABM
Julie Armitage, Compliance and Enforcement
Dominic Remmes, Millennium Waste, Inc.
Matt Nourot, Gas Recovery Systems of Illinois, Inc.
Steve Smith, BFI Waste Systems of N.A., Inc.

Search Applicability Determination Index

Search ADI | Return to Search Results | Help | Technical Support | Recent ADI Updates | Related Links

Determination Detail

Control Number: 9600095

Category: NSPS
EPA Office: Region 8
Date: 10/10/1996
Title: Utah-Munical Waste LANDFILLs
Recipient: Nielsen, Carol
Author: Long, Richard
Comments:

Subparts: Part 60, WWW — Municipal Solid Waste LANDFILLs

References: 60.754
60.757
60.759

Abstract:

Question 1: Can the daily required cover and/or any nondegradable material be excluded from the design capacity figures, or was this non-emitting material included in setting the design capacity cutoff?

Answer: The daily cover can be subtracted from the total LANDFILL capacity if adequate documentation to quantify the amount of LANDFILL cover is available. Nondegradable solid waste materials that are disposed at the LANDFILL cannot be excluded from the calculation of design capacity.

Question 2: If there are two separate and different types of LANDFILLs on the same property, is the entire capacity of both LANDFILLs included in the calculation to determine the applicability cutoff or only the LANDFILL which has MSW?

Answer: If these LANDFILLs are both classified as municipal waste LANDFILLs and are only separated by a road or are located within the same general area, the LANDFILLs are considered a single source and the capacity of both LANDFILLs would be added to determine the design capacity.

Question 3: Can AP-42 emission factors be used by existing sources to determine if controls are necessary instead of the defaults indicated in 40 CFR 60 Subpart WWW?

Answer: No! The defaults indicated in 40 CFR 60 Subpart WWW Tier 1 method and the Tier 2 or Tier 3 methods for quantifying emissions are the only methods allowed to determine if controls are required. For any other purposes, AP-42 emission factors are appropriate to be used to estimate emissions from LANDFILLs.

Question 4: At least one of Utah's LANDFILLs has burned the MSW before placing it in the LANDFILL How can the LANDFILL account for this in the emission calculations?

Answer: Tier 2 or Tier 3 allows on site sampling protocol and uses the sampled emissions as determined by 40 CFR 60.754(a)(3) or 60.754(a)(4). The Tier 2 and Tier 3 methods do take into account actual conditions at the LANDFILL, including the effect of a portion of the material being burned before being placed into the LANDFILL.

Question 5: If a LANDFILL is used by a city of less than 125,000 people and does not have historical information about the size of the LANDFILL, can the State assume that the LANDFILL is below the design capacity cut off?

Answer: No The regulations and guidelines require that all MSW LANDFILLs that have accepted any waste since November 8, 1987, must submit a report about the design capacity of the LANDFILL

Letter:

October 10, 1996
Ref: 8P2-A

Carol Nielsen
Division of Air Quality
Utah Department of Environmental Quality
P.O. Box 144820
Salt Lake City, UT 84114-4820

Re: Utah asked questions about New Source Performance Standards (NSPS) for municipal waste LANDFILLs that were faxed to EPA headquarters

Dear Ms. Nielsen:

In a fax (dated August 14, 1996) to Martha Smith of the EPA Office of Air Quality Planning and Standards (OAQPS), you asked five questions. Although OAQPS verbally provided you with some generic answers to these questions, we will attempt to provide you with specific written answers to the questions that were asked. We have coordinated our responses with EPA headquarters to ensure agreement with these answers.

Question #1
Can the daily required cover and/or any nondegradable material be excluded from the design capacity figures, or was this non-emitting material included in

setting the design capacity cutoff?

The definition of "design capacity means the maximum amount of solid waste a LANDFILL can accept." From a strict reading of the regulations and a lack of additional guidance, we would say that the daily required cover could be excluded from the design capacity of the LANDFILL. The source must have adequate documentation to quantify the amount of LANDFILL cover in order to subtract the volume or weight from the total LANDFILL capacity values. However, nondegradable solid waste materials that are disposed at the LANDFILL cannot be excluded from the calculation of design capacity.

Question #2
If there are two separate and different types of LANDFILLs on the same property, is the entire capacity of both LANDFILLs included in the calculation to determine the applicability cutoff or only the LANDFILL which has MSW?

Because this question lacked specific details on how the LANDFILLs are different, it is difficult to provide a correct answer. Generally, the entire design capacity at a LANDFILL must be included to determine the applicability cutoff. There are specific provisions in the regulations to allow cells of the LANDFILL to be exempted from control requirements. if nondegradable material have been disposed at a certain location or portion of the LANDFILL site (40 CFR 60.759(a)(3)(i). However, no exemptions are available in the design capacity determination to exclude any portion of the LANDFILL. If some unique situation exists at a LANDFILL and the details are provided we can then provide a proper answer to the specific situation. If these LANDFILLs are both classified as municipal waste LANDFILLs and are only separated by a road or are located within the same general area, the LANDFILLs are considered a single source and the capacity of both LANDFILLs would be added to determine the design capacity

Question #3
Can AP-42 emission factors be used by existing sources to determine if controls are necessary instead of the defaults indicated in 40 CFR 60 Subpart WWW? If not, why are the default values so much higher than the AP-42 factors. What is the reason these values are being used? Is EPA not using AP-42 because they are inaccurate? If so, how does this affect the use of the other information in the document?

No! The defaults indicated in 40 CFR 60 Subpart WWW Tier 1 method and the Tier 2 or Tier 3 methods for quantifying emissions are the only methods allowed to determine if controls are required. For any other purposes, AP-42 emission factors are appropriate to be used to estimate emissions from LANDFILLs.

The Tier 1 default values of k, Lo, and CNMOC tend to overstate NMOC emission rates for most LANDFILLs, and are intended to be used to indicate the need to install a collection and control system. As an alternative, a site specific Tier 2 or Tier 3 analysis can be used that establishes site-specific values for k, Lo, and CNMOC to determine if emission controls are required. It is recommended that the default values in Tier 1 not be used for estimating LANDFILL emissions for purposes other than the NSPS and EG. The EPA document "Compilation of Air Pollution Emission Factors" (AP-42) provides emission estimation procedures and default values that can be used for emissions inventories and other purposes.

Question #4
At least one of Utah's LANDFILLs has burned the MSW before placing it in the LANDFILL. How can the LANDFILL account for this in the emission calculations? The regulation does not give LANDFILL owners the option of figuring a site

specific " Lo" value which varies according to the amount of cellulose in the refuse.

There are two methods available to determine if emission controls are required: One is Tier 1 using the emission estimation equation in 40 CFR 60.754(a)(1) No adjustments are allowed to the emission estimation equation in Tier 1 for determining if controls are required. The other method is to use Tier 2 or Tier 3 which allows on site sampling protocol and uses the sampled emissions as determined by 40 CFR 60.754(a)(3) or 60.754(a)(4). The Tier 2 and Tier 3 methods do take into account actual conditions at the LANDFILL, including the effect of a portion of the material being burned before being placed into the LANDFILL.

Question #5
If a LANDFILL is used by a city of less than 125,000 people and does not have historical information about the size of the LANDFILL, can the State assume that the LANDFILL is below the design capacity cut off? (FR March 12, 1996 Vol. 61, Number 49, Section VI B).

The FR only makes a statement that a LANDFILL of 2.5 million Mg design capacity corresponds to cities with a population greater than about 125,000 people. The answer to the question is no! The regulations and guidelines require that all MSW LANDFILLs that have accepted any waste since November 8, 1987, must submit a report about the design capacity of the LANDFILL. As identified in 40 CFR 60.757(2), the contents of the design capacity report must include a map or plot of the LANDFILL and the design capacity of the LANDFILL. If a different party from the source prepares this information, the source must certify the accuracy of the submitted design capacity report. The maximum design capacity of the LANDFILL can be determined using good engineering practices and basic information about the depth of solid waste and compaction practices. The method used to calculate the design capacity of the LANDFILL must be included in the report. If the design capacity is shown to be less than 2.5 million Mg or 2.5 million cubic meters, then that specific LANDFILL is not subject to any additional requirements, regardless of the population of the city from which the waste was disposed.

One method available to calculate the amount of refuse in the LANDFILL, when specific records are not available, is based on the population served by the LANDFILL over time. If the population was 1,000 in 1980, using 5 lbs./day/person; the LANDFILL accepted 1,825,000 lbs. in 1980 alone. A similar calculation needs to be done for each year the LANDFILL was open, reflecting any change in population.

I hope these written responses to your questions are adequate. If additional clarification is needed about our answers, please contact John Dale at (303) 312-6934 or Lee Hanley at (303) 312-6555.

Sincerely,

Richard R. Long, Director
Air Program

cc: Ursula Trueman (UDAQ)
Lyn Menlove (UDAQ)
Martha Smith (OAQPS)

FCD:October 8.

Attachment B

MUNICIPAL SOLID WASTE LANDFILL NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND EMISSION GUIDELINES (EG) -- QUESTIONS AND ANSWERS

Revised

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina

November 1998

MUNICIPAL SOLID WASTE LANDFILL NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND EMISSION GUIDELINES (EG) -- QUESTIONS AND ANSWERS

Revised

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina

November 1998

B. Design and Installation of Collection Systems

2. Question: For purposes of submitting a collection and control system design plan, does this design submittal cover the entire permitted landfill area (even those areas that are not currently constructed, although permitted)? Since the influence from extraction wells is predicted on the depth of waste, the design of the system will vary as landfilling continues. As such, is the design submittal called out in the NSPS for the entire permitted area, or for only those areas warranting control (i.e., those active areas that have waste in place that is 5 years or older or closed areas 2 years or older)? This is an important issue. A registered engineer who must sign the design for the entire permitted footprint may not feel comfortable because the interim system installations may be different than his total plan. Please clarify.

Answer: The plan must cover the area to be controlled over the intended period of use (lifetime) of the gas control system, not the entire landfill. As specified in § 60.752(b)(2)(ii), the collection system must be designed to handle the maximum expected gas generation rate from the entire area of the landfill that warrants control over the intended period of use of the gas control or treatment system. Active areas in which the initial waste has been in place 5 years and closed or final grade areas where the initial waste has been in place 2 years must be controlled. As the landfill expands, the collection system must be expanded into areas that meet these criteria. Thus, if a control system is expected to last 15 years (for example), the design plan must take into account all active areas of the landfill that are expected to meet the 2 year/5 year criteria within the next 15 years, given the expected waste acceptance rate. The design plan should include the initial design and plans for system expansion.

Attachment C
Mass Emission Rates

PM10 Emissions

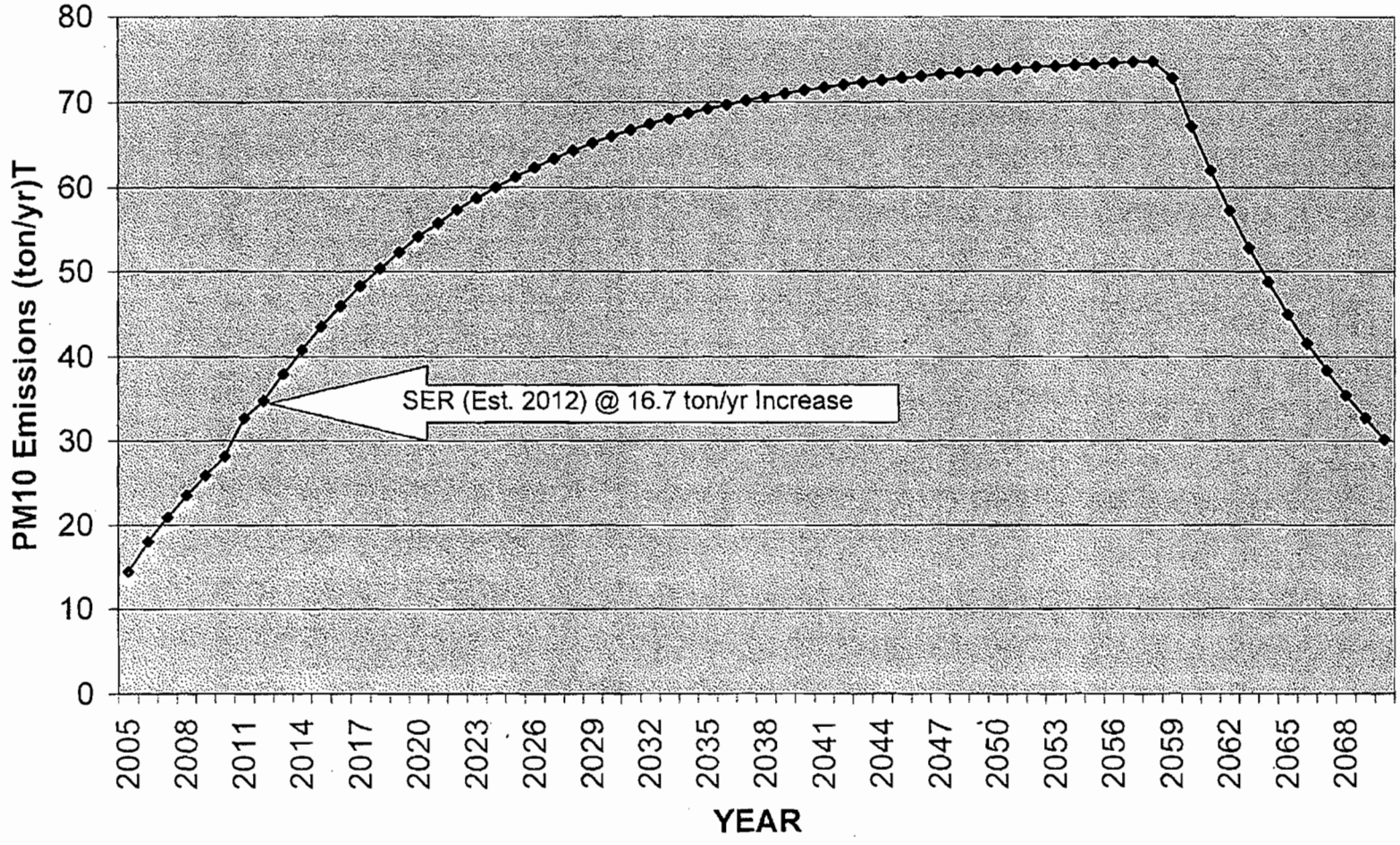
Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	PM10 Emissions lb/yr	PM10 Emissions ton/yr	Change in Emissions ton/yr	Notes
2005	6,463	LandGEM	flare	28,872	14.44		
2006	8,084	LandGEM	flare	36,118	18.06		A
2007	9,356	LandGEM	flare	41,799	20.90	2.84	
2008	10,530	LandGEM	flare	47,043	23.52	5.46	
2009	11,613	LandGEM	flare	51,883	25.94	7.88	
2010	12,613	LandGEM	turbines	56,352	28.18	10.12	
2011	13,537	LandGEM	turbines	65,457	32.73	14.67	
2012	14,389	LandGEM	turbines	69,579	34.79	16.73	B
2013	15,692	LandGEM	turbines	75,880	37.94		
2014	16,895	LandGEM	turbines	81,696	40.85		
2015	18,005	LandGEM	turbines	87,066	43.53		
2016	19,030	LandGEM	turbines	92,022	46.01		
2017	19,977	LandGEM	turbines	96,598	48.30		
2018	20,850	LandGEM	turbines	100,822	50.41		
2019	21,657	LandGEM	turbines	104,720	52.36		
2020	22,401	LandGEM	turbines	108,320	54.16		
2021	23,088	LandGEM	turbines	111,642	55.82		
2022	23,722	LandGEM	turbines	114,709	57.35		
2023	24,308	LandGEM	turbines	117,541	58.77		
2024	24,848	LandGEM	turbines	120,154	60.08		
2025	25,347	LandGEM	turbines	122,567	61.28		
2026	25,808	LandGEM	turbines	124,794	62.40		
2027	26,233	LandGEM	turbines	126,850	63.42		
2028	26,625	LandGEM	turbines	128,748	64.37		
2029	26,988	LandGEM	turbines	130,500	65.25		
2030	27,322	LandGEM	turbines	132,117	66.06		
2031	27,631	LandGEM	turbines	133,610	66.80		
2032	27,916	LandGEM	turbines	134,988	67.49		
2033	28,179	LandGEM	turbines+flare	136,260	68.13		
2034	28,422	LandGEM	turbines+flare	137,434	68.72		
2035	28,646	LandGEM	turbines+flare	138,518	69.26		
2036	28,853	LandGEM	turbines+flare	139,519	69.76		
2037	29,044	LandGEM	turbines+flare	140,443	70.22		
2038	29,220	LandGEM	turbines+flare	141,296	70.65		
2039	29,383	LandGEM	turbines+flare	142,083	71.04		
2040	29,533	LandGEM	turbines+flare	142,810	71.40		
2041	29,672	LandGEM	turbines+flare	143,480	71.74		
2042	29,800	LandGEM	turbines+flare	144,100	72.05		
2043	29,918	LandGEM	turbines+flare	144,671	72.34		
2044	30,028	LandGEM	turbines+flare	145,199	72.60		
2045	30,128	LandGEM	turbines+flare	145,686	72.84		
2046	30,221	LandGEM	turbines+flare	146,136	73.07		
2047	30,307	LandGEM	turbines+flare	146,551	73.28		
2048	30,386	LandGEM	turbines+flare	146,934	73.47		
2049	30,460	LandGEM	turbines+flare	147,288	73.64		
2050	30,527	LandGEM	turbines+flare	147,614	73.81		
2051	30,589	LandGEM	turbines+flare	147,915	73.96		
2052	30,647	LandGEM	turbines+flare	148,194	74.10		
2053	30,700	LandGEM	turbines+flare	148,451	74.23		
2054	30,749	LandGEM	turbines+flare	148,688	74.34		
2055	30,794	LandGEM	turbines+flare	148,907	74.45		

PM10 Emissions

Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	PM10 Emissions lb/yr	PM10 Emissions ton/yr	Change in Emissions ton/yr	Notes
2056	30,836	LandGEM	turbines+flare	149,109	74.55		
2057	30,875	LandGEM	turbines+flare	149,295	74.65		
2058	30,910	LandGEM	turbines+flare	149,467	74.73		
2059	30,108	LandGEM	turbines+flare	145,587	72.79		
2060	27,793	LandGEM	turbines	134,394	67.20		
2061	25,656	LandGEM	turbines	124,061	62.03		
2062	23,684	LandGEM	turbines	114,523	57.26		
2063	21,863	LandGEM	turbines	105,718	52.86		
2064	20,182	LandGEM	turbines	97,590	48.80		
2065	18,630	LandGEM	turbines	90,087	45.04		
2066	17,198	LandGEM	turbines	83,161	41.58		
2067	15,876	LandGEM	turbines	76,767	38.38		
2068	14,655	LandGEM	turbines	70,865	35.43		
2069	13,528	LandGEM	turbines	65,417	32.71		
2070	12,488	LandGEM	turbines	60,387	30.19		

Note: A) Polllution Control Project (PCP) exemption removed and PSD permit application Submitted.
B) Significant Emission Rate achieved.

Figure 1 - Annual Average Mass Emission Rate for Particulate Matter



CO Emissions

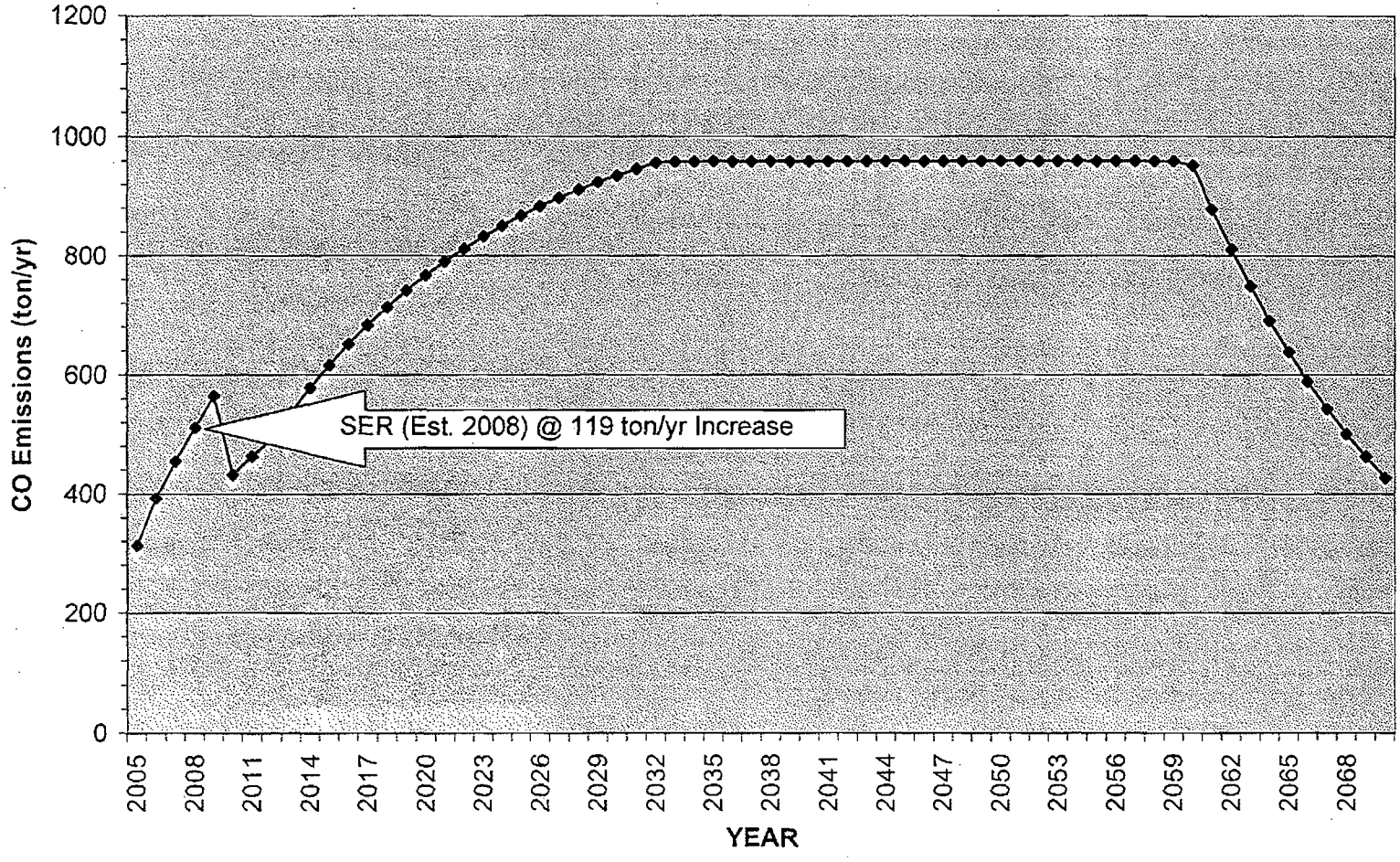
Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	CO Emissions lb/yr	CO Emissions ton/yr	Change in Emissions ton/yr	Notes
2005	6,463	LandGEM	flare	628,400	314.20		
2006	8,084	LandGEM	flare	786,102	**393.05**		A
2007	9,356	LandGEM	flare	909,738	454.87	61.82	
2008	10,530	LandGEM	flare	1,023,869	511.93	118.88	B
2009	11,613	LandGEM	flare	1,129,225	564.61		
2010	12,613	LandGEM	turbines	864,033	432.02		
2011	13,537	LandGEM	turbines	927,281	463.64		
2012	14,389	LandGEM	turbines	985,665	492.83		
2013	15,692	LandGEM	turbines	1,074,927	537.46		
2014	16,895	LandGEM	turbines	1,157,327	578.66		
2015	18,005	LandGEM	turbines	1,233,391	616.70		
2016	19,030	LandGEM	turbines	1,303,607	651.80		
2017	19,977	LandGEM	turbines	1,368,425	684.21		
2018	20,850	LandGEM	turbines	1,428,259	714.13		
2019	21,657	LandGEM	turbines	1,483,493	741.75		
2020	22,401	LandGEM	turbines	1,534,480	767.24		
2021	23,088	LandGEM	turbines	1,581,548	790.77		
2022	23,722	LandGEM	turbines	1,624,996	812.50		
2023	24,308	LandGEM	turbines	1,665,104	832.55		
2024	24,848	LandGEM	turbines	1,702,129	851.06		
2025	25,347	LandGEM	turbines	1,736,307	868.15		
2026	25,808	LandGEM	turbines	1,767,857	883.93		
2027	26,233	LandGEM	turbines	1,796,981	898.49		
2028	26,625	LandGEM	turbines	1,823,867	911.93		
2029	26,988	LandGEM	turbines	1,848,685	924.34		
2030	27,322	LandGEM	turbines	1,871,595	935.80		
2031	27,631	LandGEM	turbines	1,892,744	946.37		
2032	27,916	LandGEM	turbines	1,912,266	956.13		
2033	28,179	LandGEM	turbines+flare	1,918,115	959.06		
2034	28,422	LandGEM	turbines+flare	1,918,234	959.12		
2035	28,646	LandGEM	turbines+flare	1,918,343	959.17		
2036	28,853	LandGEM	turbines+flare	1,918,444	959.22		
2037	29,044	LandGEM	turbines+flare	1,918,537	959.27		
2038	29,220	LandGEM	turbines+flare	1,918,623	959.31		
2039	29,383	LandGEM	turbines+flare	1,918,702	959.35		
2040	29,533	LandGEM	turbines+flare	1,918,775	959.39		
2041	29,672	LandGEM	turbines+flare	1,918,843	959.42		
2042	29,800	LandGEM	turbines+flare	1,918,905	959.45		
2043	29,918	LandGEM	turbines+flare	1,918,963	959.48		
2044	30,028	LandGEM	turbines+flare	1,919,016	959.51		
2045	30,128	LandGEM	turbines+flare	1,919,065	959.53		
2046	30,221	LandGEM	turbines+flare	1,919,110	959.56		
2047	30,307	LandGEM	turbines+flare	1,919,152	959.58		
2048	30,386	LandGEM	turbines+flare	1,919,191	959.60		
2049	30,460	LandGEM	turbines+flare	1,919,226	959.61		
2050	30,527	LandGEM	turbines+flare	1,919,259	959.63		
2051	30,589	LandGEM	turbines+flare	1,919,290	959.64		

CO Emissions

Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	CO Emissions lb/yr	CO Emissions ton/yr	Change in Emissions ton/yr	Notes
2052	30,647	LandGEM	turbines+flare	1,919,318	959.66		
2053	30,700	LandGEM	turbines+flare	1,919,344	959.67		
2054	30,749	LandGEM	turbines+flare	1,919,368	959.68		
2055	30,794	LandGEM	turbines+flare	1,919,390	959.69		
2056	30,836	LandGEM	turbines+flare	1,919,410	959.70		
2057	30,875	LandGEM	turbines+flare	1,919,429	959.71		
2058	30,910	LandGEM	turbines+flare	1,919,446	959.72		
2059	30,108	LandGEM	turbines+flare	1,919,055	959.53		
2060	27,793	LandGEM	turbines	1,903,853	951.93		
2061	25,656	LandGEM	turbines	1,757,478	878.74		
2062	23,684	LandGEM	turbines	1,622,357	811.18		
2063	21,863	LandGEM	turbines	1,497,624	748.81		
2064	20,182	LandGEM	turbines	1,382,481	691.24		
2065	18,630	LandGEM	turbines	1,276,191	638.10		
2066	17,198	LandGEM	turbines	1,178,073	589.04		
2067	15,876	LandGEM	turbines	1,087,498	543.75		
2068	14,655	LandGEM	turbines	1,003,887	501.94		
2069	13,528	LandGEM	turbines	926,705	463.35		
2070	12,488	LandGEM	turbines	855,456	427.73		

Notes: A) Pollution Control Project (PCP) exemption removed and PSD permit application Submitted.
B) Significant Emission Rate achieved.

Figure 2 - Annual Average Mass Emission Rate for Carbon Monoxide



NOx Emissions

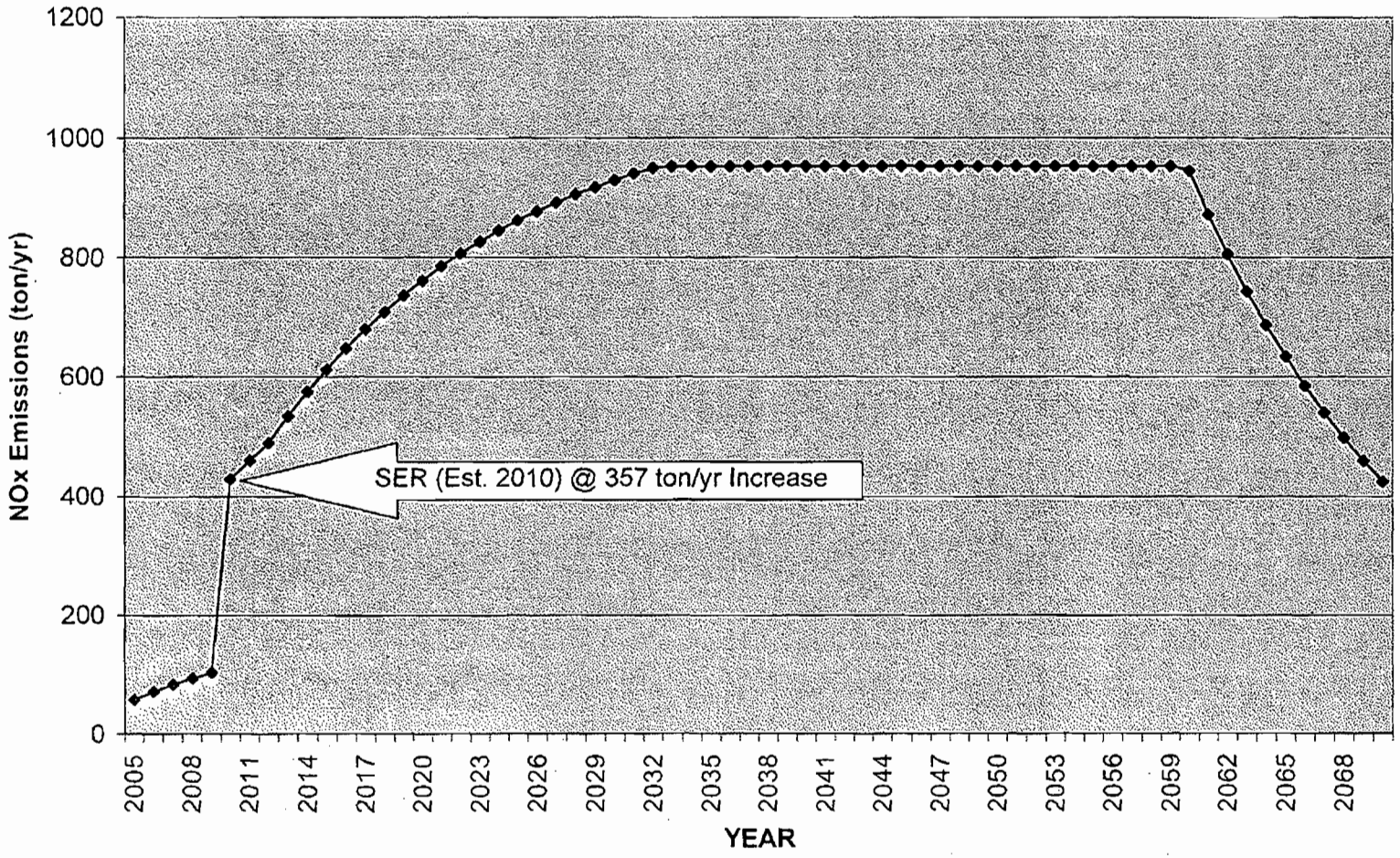
Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	NOx Emissions lb/yr	NOx Emissions ton/yr	Change in Emissions ton/yr	Notes
2005	6,463	LandGEM	flare	115,490	57.74		
2006	8,084	LandGEM	flare	144,473	72.24		A
2007	9,356	LandGEM	flare	167,195	83.60	11.36	
2008	10,530	LandGEM	flare	188,171	94.09	21.85	
2009	11,613	LandGEM	flare	207,533	103.77	31.53	
2010	12,613	LandGEM	turbines	858,177	429.09	356.85	B
2011	13,537	LandGEM	turbines	920,996	460.50		
2012	14,389	LandGEM	turbines	978,984	489.49		
2013	15,692	LandGEM	turbines	1,067,642	533.82		
2014	16,895	LandGEM	turbines	1,149,483	574.74		
2015	18,005	LandGEM	turbines	1,225,031	612.52		
2016	19,030	LandGEM	turbines	1,294,772	647.39		
2017	19,977	LandGEM	turbines	1,359,150	679.57		
2018	20,850	LandGEM	turbines	1,418,579	709.29		
2019	21,657	LandGEM	turbines	1,473,438	736.72		
2020	22,401	LandGEM	turbines	1,524,080	762.04		
2021	23,088	LandGEM	turbines	1,570,828	785.41		
2022	23,722	LandGEM	turbines	1,613,982	806.99		
2023	24,308	LandGEM	turbines	1,653,819	826.91		
2024	24,848	LandGEM	turbines	1,690,592	845.30		
2025	25,347	LandGEM	turbines	1,724,538	862.27		
2026	25,808	LandGEM	turbines	1,755,875	877.94		
2027	26,233	LandGEM	turbines	1,784,802	892.40		
2028	26,625	LandGEM	turbines	1,811,505	905.75		
2029	26,988	LandGEM	turbines	1,836,155	918.08		
2030	27,322	LandGEM	turbines	1,858,910	929.45		
2031	27,631	LandGEM	turbines	1,879,915	939.96		
2032	27,916	LandGEM	turbines	1,899,305	949.65		
2033	28,179	LandGEM	turbines+flare	1,905,044	952.52		
2034	28,422	LandGEM	turbines+flare	1,905,066	952.53		
2035	28,646	LandGEM	turbines+flare	1,905,086	952.54		
2036	28,853	LandGEM	turbines+flare	1,905,105	952.55		
2037	29,044	LandGEM	turbines+flare	1,905,122	952.56		
2038	29,220	LandGEM	turbines+flare	1,905,138	952.57		
2039	29,383	LandGEM	turbines+flare	1,905,152	952.58		
2040	29,533	LandGEM	turbines+flare	1,905,166	952.58		
2041	29,672	LandGEM	turbines+flare	1,905,178	952.59		
2042	29,800	LandGEM	turbines+flare	1,905,190	952.59		
2043	29,918	LandGEM	turbines+flare	1,905,200	952.60		
2044	30,028	LandGEM	turbines+flare	1,905,210	952.60		
2045	30,128	LandGEM	turbines+flare	1,905,219	952.61		
2046	30,221	LandGEM	turbines+flare	1,905,227	952.61		
2047	30,307	LandGEM	turbines+flare	1,905,235	952.62		
2048	30,386	LandGEM	turbines+flare	1,905,242	952.62		
2049	30,460	LandGEM	turbines+flare	1,905,249	952.62		
2050	30,527	LandGEM	turbines+flare	1,905,255	952.63		
2051	30,589	LandGEM	turbines+flare	1,905,260	952.63		
2052	30,647	LandGEM	turbines+flare	1,905,265	952.63		
2053	30,700	LandGEM	turbines+flare	1,905,270	952.64		

NOx Emissions

Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	NOx Emissions lb/yr	NOx Emissions ton/yr	Change in Emissions ton/yr	Notes
2054	30,749	LandGEM	turbines+flare	1,905,275	952.64		
2055	30,794	LandGEM	turbines+flare	1,905,279	952.64		
2056	30,836	LandGEM	turbines+flare	1,905,282	952.64		
2057	30,875	LandGEM	turbines+flare	1,905,286	952.64		
2058	30,910	LandGEM	turbines+flare	1,905,289	952.64		
2059	30,108	LandGEM	turbines+flare	1,905,217	952.61		
2060	27,793	LandGEM	turbines	1,890,950	945.47		
2061	25,656	LandGEM	turbines	1,745,567	872.78		
2062	23,684	LandGEM	turbines	1,611,361	805.68		
2063	21,863	LandGEM	turbines	1,487,474	743.74		
2064	20,182	LandGEM	turbines	1,373,111	686.56		
2065	18,630	LandGEM	turbines	1,267,541	633.77		
2066	17,198	LandGEM	turbines	1,170,088	585.04		
2067	15,876	LandGEM	turbines	1,080,128	540.06		
2068	14,655	LandGEM	turbines	997,083	498.54		
2069	13,528	LandGEM	turbines	920,424	460.21		
2070	12,488	LandGEM	turbines	849,658	424.83		

Notes: A) Polllution Control Project (PCP) exemption removed and PSD permit application Submitted.
B) Significant Emission Rate achieved.

Figure 3 - Annual Average Mass Emission Rate for Nitrous Oxides



SO2 Emissions

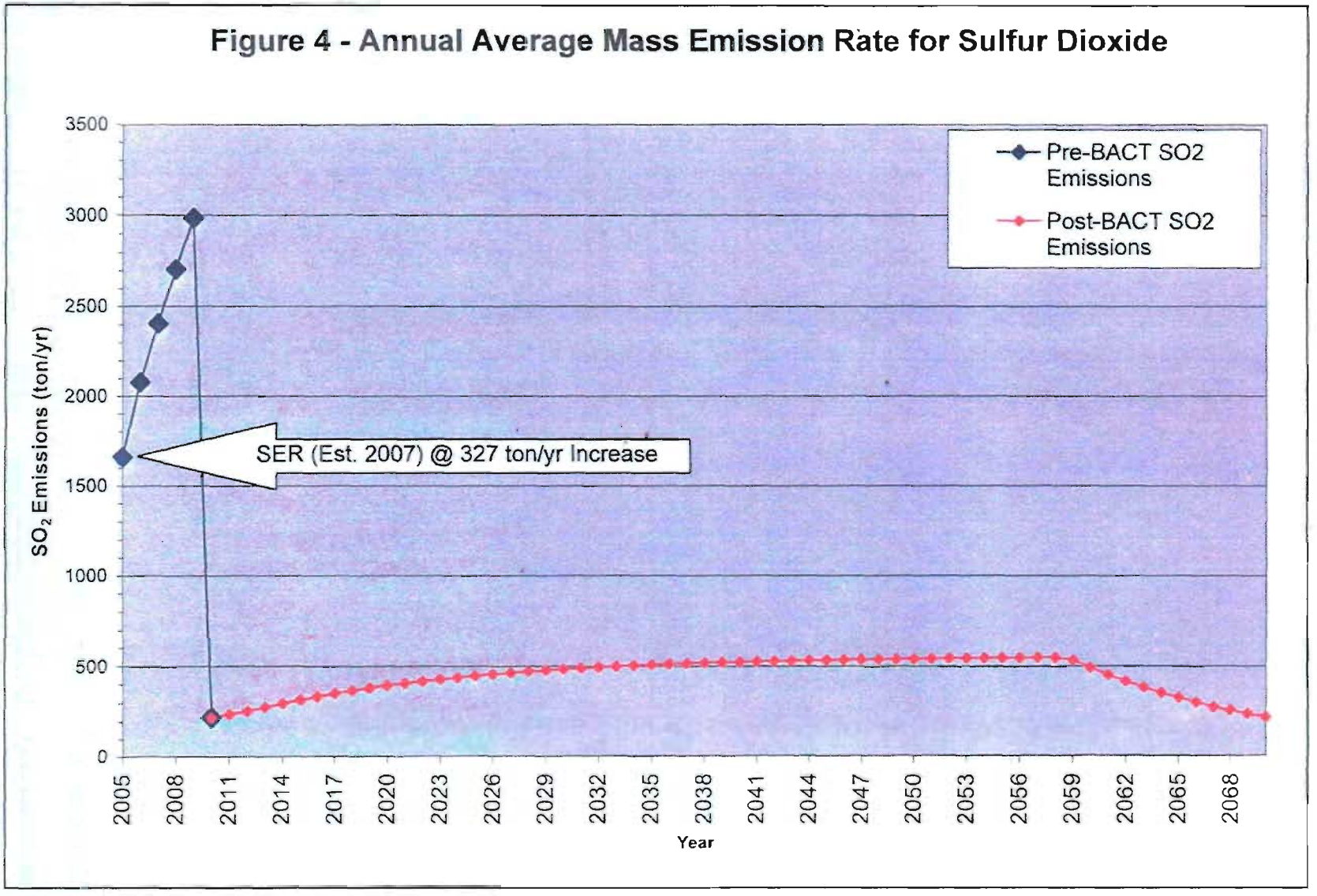
Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	SO2 Emissions lb/hr	SO2 Emissions lb/yr	SO2 Emissions ton/yr	Change in Emissions ton/yr	Notes
2005	6,463	LandGEM	flare	379	3,324,247	1,662		A
2006	8,084	LandGEM	flare	475	4,158,494	2,079		B
2007	9,356	LandGEM	flare	549	4,812,532	2,406	327.02	C
2008	10,530	LandGEM	flare	618	5,416,285	2,708		
2009	11,613	LandGEM	flare	682	5,973,619	2,987		
2010	12,613	LandGEM	turbines	51	447,488	224		D
2011	13,537	LandGEM	turbines	55	480,244	240		
2012	14,389	LandGEM	turbines	58	510,482	255		
2013	15,692	LandGEM	turbines	64	556,711	278		
2014	16,895	LandGEM	turbines	68	599,386	300		
2015	18,005	LandGEM	turbines	73	638,780	319		
2016	19,030	LandGEM	turbines	77	675,146	338		
2017	19,977	LandGEM	turbines	81	708,715	354		
2018	20,850	LandGEM	turbines	84	739,704	370		
2019	21,657	LandGEM	turbines	88	768,310	384		
2020	22,401	LandGEM	turbines	91	794,716	397		
2021	23,088	LandGEM	turbines	94	819,093	410		
2022	23,722	LandGEM	turbines	96	841,595	421		
2023	24,308	LandGEM	turbines	98	862,367	431		
2024	24,848	LandGEM	turbines	101	881,542	441		
2025	25,347	LandGEM	turbines	103	899,243	450		
2026	25,808	LandGEM	turbines	105	915,583	458		
2027	26,233	LandGEM	turbines	106	930,667	465		
2028	26,625	LandGEM	turbines	108	944,591	472		
2029	26,988	LandGEM	turbines	109	957,444	479		
2030	27,322	LandGEM	turbines	111	969,310	485		
2031	27,631	LandGEM	turbines	112	980,263	490		
2032	27,916	LandGEM	turbines	113	990,374	495		
2033	28,179	LandGEM	turbines+flare	114	999,707	500		
2034	28,422	LandGEM	turbines+flare	115	1,008,323	504		
2035	28,646	LandGEM	turbines+flare	116	1,016,277	508		
2036	28,853	LandGEM	turbines+flare	117	1,023,619	512		
2037	29,044	LandGEM	turbines+flare	118	1,030,396	515		
2038	29,220	LandGEM	turbines+flare	118	1,036,653	518		
2039	29,383	LandGEM	turbines+flare	119	1,042,428	521		
2040	29,533	LandGEM	turbines+flare	120	1,047,760	524		
2041	29,672	LandGEM	turbines+flare	120	1,052,681	526		
2042	29,800	LandGEM	turbines+flare	121	1,057,224	529		
2043	29,918	LandGEM	turbines+flare	121	1,061,418	531		
2044	30,028	LandGEM	turbines+flare	122	1,065,290	533		
2045	30,128	LandGEM	turbines+flare	122	1,068,863	534		
2046	30,221	LandGEM	turbines+flare	122	1,072,162	536		
2047	30,307	LandGEM	turbines+flare	123	1,075,208	538		
2048	30,386	LandGEM	turbines+flare	123	1,078,019	539		
2049	30,460	LandGEM	turbines+flare	123	1,080,614	540		
2050	30,527	LandGEM	turbines+flare	124	1,083,010	542		
2051	30,589	LandGEM	turbines+flare	124	1,085,221	543		
2052	30,647	LandGEM	turbines+flare	124	1,087,262	544		

SO2 Emissions

Year	Flow Rate ft3 /min	Flow Rate Data Basis	Control Device(s)	SO2 Emissions lb/hr	SO2 Emissions lb/yr	SO2 Emissions ton/yr	Change in Emissions ton/yr	Notes
2053	30,700	LandGEM	turbines+flare	124	1,089,147	545		
2054	30,749	LandGEM	turbines+flare	125	1,090,886	545		
2055	30,794	LandGEM	turbines+flare	125	1,092,492	546		
2056	30,836	LandGEM	turbines+flare	125	1,093,974	547		
2057	30,875	LandGEM	turbines+flare	125	1,095,343	548		
2058	30,910	LandGEM	turbines+flare	125	1,096,606	548		
2059	30,108	LandGEM	turbines+flare	122	1,068,139	534		
2060	27,793	LandGEM	turbines	113	986,017	493		
2061	25,656	LandGEM	turbines	104	910,208	455		
2062	23,684	LandGEM	turbines	96	840,228	420		
2063	21,863	LandGEM	turbines	89	775,628	388		
2064	20,182	LandGEM	turbines	82	715,995	358		
2065	18,630	LandGEM	turbines	75	660,947	330		
2066	17,198	LandGEM	turbines	70	610,131	305		
2067	15,876	LandGEM	turbines	64	563,222	282		
2068	14,655	LandGEM	turbines	59	519,919	260		
2069	13,528	LandGEM	turbines	55	479,946	240		
2070	12,488	LandGEM	turbines	51	443,046	222		

Notes: A) Landfill Gas Sample Analysis determined Sulfide Content was higher than AP-42 default
B) Polllution Control Project (PCP) exemption removed and PSD permit application Submitted.
C) Significant Emission Rate achieved.
D) SO2 BACT Installed (early 2010)

Figure 4 - Annual Average Mass Emission Rate for Sulfur Dioxide



Attachment D
GEM 2000 Specification sheet

GEM™2000
GEM™2000 Plus

GAS ANALYZER & EXTRACTION MONITOR

OPERATION MANUAL

For further information contact:

LANDTEC
850 S. Via Lata, Suite 112
Colton, CA 92324
Telephone: (800) 821-0496 or (909) 783-3636
Fax: (909) 825-0591
www.CES-LANDTEC.com

LANDTEC Release Date: August 2, 2005

9 Technical Specifications

9.1 Physical

Weight	4.4 lbs.
Size	L 2.48" x W 7.48" x D 9.92".
Case material	Anti-static ABS.
Keys	Membrane panel.
Display	Liquid Crystal Display 40 x 16 characters. Fiber optic woven backlight for low light conditions.
Filters	User replaceable integral fiber filter at inlet port and external PTFE water trap filter.

9.2 General

Certifications	UL Certified to Class 1, Zone 1, AEx Ib d IIa T4
Temperature measurement	With optional probe 14°F to 167°F.
Temperature accuracy	±0.4°F (± probe accuracy).
Visual and audible alarm	User selectable CO_2, CH_4 and O_2 Min/Max levels via DataField CS software.
Communications	RS232 protocol via download lead with variable baud rate.
Relative pressure	±250 mbar from calibration pressure

9.3 Power supply

Battery type	Rechargeable Nickel Metal Hydride battery pack containing six 4AH cells. **Not user replaceable.** Lithium Manganese battery for data retention.
Battery life	Typical use 10 hours from fully charged condition.
Battery charger	Separate intelligent 2A battery charger powered from AC voltage supply (110-230V).
Charge time	Approximately 2 hours from complete discharge.
Alternative power	Can be powered externally for fixed-in-place applications only. Contact LANDTEC for further information.
Battery lifetime	Up to 1,000 charge/discharge cycles.

9.4 Gas Ranges

Detection principle	CO_2 and CH_4 by dual wavelength infrared cell with reference channel. O_2 by internal electrochemical cell.			
Oxygen cell lifetime	Approximately 18 months in air.			
Typical Accuracy 0 - Full Scale	**Gas**	**0-5% volume**	**5-15% volume**	**15%-FS**
	CH_4	±0.3%	±1%	±3% (100%)
	CO_2	±0.3%	±1%	±3% (60%)
	O_2	±1%	±1%	±1% (21%)
Response time, T90	CH_4	≤20 seconds		
	CO_2	≤20 seconds		
	O_2	≤20 seconds		
Range	CH_4	0-70% to specification, 0-100% reading.		
	CO_2	0-40% to specification, 0-100% reading.		
	O_2	0-25%		

9.5 Pump

Typical flow	300 cc/min.
Flow fail point	50 cc/min approximately.
Flow with 200 mbar vacuum	250 cc/min approximately.
Vacuum	70 inches H_20.

9.6 Operating Conditions

Operating temp range	32°F to 104°F.
Relative humidity	0-95% non-condensing.
Atmospheric pressure range	700-1200 mbar. Displayed in Inches of Mercury (5.9 – 35.4"Hg). Not corrected for sea level.
Atmospheric pressure accuracy	±5 mbar approximately.
Case seal	IP65.

9.7 Optional Gas Pods

Typical Accuracy (Subject to User calibration).	**Gas**	**0-Full Scale**
	CO	±10% FS
	H_2S	±10% FS
	SO_2	±10% FS
	NO_2	±10% FS
	CL_2	±10% FS
	H_2	±10% FS
	HCN	±10% FS
Response time, T90	CO	≤60 seconds
	H_2S	≤60 seconds
	SO_2	≤60 seconds
	NO_2	≤60 seconds
	CL_2	≤60 seconds
	H_2	≤60 seconds
	HCN	≤60 seconds
Range	CO	0-500ppm
	H_2S	0-50 or 0-200ppm
	SO_2	0-20 or 0-100ppm
	NO_2	0-20ppm
	CL_2	0-20ppm
	H_2	0-1000ppm
	HCN	0-100ppm

ATTACHMENT E

Solar Turbine Specification Sheet

Liquid Fuel Suitability Form

Project			
Characteristics	**ES 9-98**	**Project**	**Comments**
Solids	≤2.6 mg/liter of sediment, solid or hard contaminants, 90% of the 2.6 mg shall be less than 5 micron in size. Max allowable size ≤ 10 micron		
Liquid	≤ 0.25 cc free water per liter at an ambient temp of 80 °F (27 °C)		
Sulfur	**Restrictions apply for** SoLoNOx liquid operation ≤10,000 ppmw for conventional and SoLoNOx gas		
Sodium & Potassium	≤ 1 ppmw		
Vanadium	≤ 0.5 ppmw		
Lead	≤ 1 ppmw		
Ca & Mg	≤ 2 ppmw		
Flourine	≤ 1 ppmw		
Chlorine	≤ 0.15 % wt		
Others – Mercury, Cadmium, Bismuth, Arsenic, Antimony, Phosphorous, Boron, Gallium, Indium.	≤ 0.5 ppmw		
Kinematic Viscosity	12 centistokes max 1 centistoke min at 100 °F (38 °C)		
Specific Gravity	0.775 min 0.875 max		
Reid vapor pressure	< 3 psia < 20.6 kPa		
Cloud point	At least 10 °F (6 °C) below expected min ambient temp.		
Pour point	At least 10 °F (6 °C) below cloud point		
Flash point	≥ 100 °F (38 °C) or ≥ legal limit		
Distillation	90% evaporated at 640 °F (338 °C) maximum. End point at 690 °F (366 °C) maximum		
Aromatics	35% by volume maximum		
Olefins and Diolefins	5% by volume maximum		
LHV	>18,000 Btu/lb >41838 kJ/kg		
Carbon residue on 10% distillation residue	≤ 0.35 %		
Ash	≤ 0.005 % max		
Copper strip corrosion	No 3 (3hr at 122 °F (50 °C)) in ASTM D130		
Expected annual liquid operating hours			

From: Fagan, Kelly [mailto:Kelly.Fagan@shawgrp.com]
Sent: Monday, October 15, 2007 7:15 PM
To: Linero, Alvaro; VanGessel, John
Cc: Fasulo, Joe; Stallard, Mike; Thorley, David; Christiansen, Jim; Delgado, Miguel; Alzheimer, Kristin; Pakrasi, Arijit; Maillet, Bruce
Subject: DEP file No. 0930104-AC Okeechobee Landfill

Dear Mr. Linero:
Please find attached the response to your comments in a letter dated 18 July 2007. The original signed cover letter has been sent to you via overnight mail.
It would be appreciated if you would kindly reply to acknowledge your receipt of this email
Sincerely,
Kelly

Kelly Fagan
Client Program Manager
Shaw Environmental and Infrastructure, Inc.
88C Elm Street
Hopkinton, MA 01748
508-497-6172
508-435-3685 (fax)

-file-

WASTE MANAGEMENT

WASTE MANAGEMENT
2859 Paces Ferry Road SE
Suite 1600
Atlanta, GA 30339
(770) 805-4130
(770) 805-9145 Fax

A.A. Linero, P.E.
Program Administrator
Air Permitting South Section
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: DEP file No. 0930104-AC; Application No. 1270-2
Okeechobee Landfill Expansion and Addition of Control Equipment

Dear Mr. Linero;

We are pleased to submit this response to your letter of 18 July 2007 requesting additional information on the above-mentioned matter.

We are available to meet with you or discuss the contents of this letter and the attachments should you or your staff so desire.

Sincerely,

John Van Gessel
Vice President and Assistant Secretary

Cc: Kristin Alzheimer, P.E., Shaw Environmental: kristin.alzheimer@shawgrp.com
Joe Fasulo, Okeechobee Landfill, Inc.: jfasulo@wm.com
David Thorley, Okeechobee Landfill, Inc.: dthorley@wm.com

Sheplak, Scott

-file-

From: Pakrasi, Arijit [Arijit.Pakrasi@shawgrp.com]
Sent: Friday, October 19, 2007 4:32 PM
To: Nelson, Deborah
Cc: Sheplak, Scott
Subject: RE: Okeechobee Landfill

Thanks Debbie.

arijit

From: Nelson, Deborah [mailto:Deborah.Nelson@dep.state.fl.us]
Sent: Fri 10/19/2007 3:07 PM
To: Pakrasi, Arijit
Cc: Sheplak, Scott
Subject: Okeechobee Landfill

The letter we received on 10/15/07 states that the NPS has not provided comments regarding the initial application. No Class I modeling was with that submittal and I notified the Park Service that the application was incomplete with regards to many issues. I told them that I would inform them once complete modeling has been done for their review. In the meantime, they have provided comments regarding the need for the "interim" modeling and sensitive Class II modeling. If you need comments from the Park Service regarding procedure, you might want to prepare a modeling protocol for their review. I would be happy to forward that to them if necessary.

Regards,

Debbie

Debbie Nelson
Meteorologist
Air Permitting South
850-921-9537
deborah.nelson@dep.state.fl.us

2007

-file-

Sheplak, Scott

From: Fagan, Kelly [Kelly.Fagan@shawgrp.com]
Sent: Tuesday, October 30, 2007 1:31 PM
To: Sheplak, Scott
Cc: Linero, Alvaro
Subject: RE: DEP file No. 0930104-AC Okeechobee Landfill

Dear Scott,
Per our telephone discussion on October 15, 2007, I understood that you did not require the professional engineer's certification only the responsible official. We have copied Kris Alzheimer on work to date including these responses. Per this request, we will be forwarding his certification through the RO.
Thank you
Kelly

Kelly Fagan
Client Program Manager
Shaw Environmental and Infrastructure, Inc.
88C Elm Street
Hopkinton, MA 01748
508-497-6172
508-435-3685 (fax)

From: Sheplak, Scott [mailto:Scott.Sheplak@dep.state.fl.us]
Sent: Wednesday, October 24, 2007 10:11 AM
To: Fagan, Kelly
Cc: Linero, Alvaro
Subject: DEP file No. 0930104-AC Okeechobee Landfill

Thank you for the response dated 10/15/2007. In the response I do not see a Professional Engineer certification. The request and response contained items of an engineering nature (calculations, design specs.) unique to this project.

Sincerely,

Scott M. Sheplak
State of Florida, Department of Environmental Protection
Mail Station #5505
2600 Blair Stone Road
Tallahassee, FL 32399

850/921-9532
Scott.Sheplak@dep.state.fl.us

-file-

WASTE MANAGEMENT

2859 Paces Ferry Road SE
Suite 1600
Atlanta, GA 30339
(770) 805-4130
(770) 805-9145 Fax

VIA FEDERAL EXPRESS

November 5, 2007

A.A. Linero, P.E.
Program Administrator
Air Permitting South Section
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: DEP file No. 0930104-AC; Application No. 1270-2
Okeechobee Landfill Expansion and Addition of Control Equipment

Dear Mr. Linero;

Per the request of your Mr. Scott Sheplak, Kris Alzheimer, P.E. has provided a certified copy of the response to your letter dated 18 July 2007 and submitted to your office on 15 October 2007. With the exception of the certification, these responses to your comments are unchanged from that previously submitted.

Sincerely

John Van Gessel
Vice President and Assistant Secretary

Attachment

Cc: Mike Stallard, Okeechobee Landfill, Inc.: mstallard@wm.com
Joe Fasulo, Okeechobee Landfill, Inc.: jfasulo@wm.com
David Thorley, Okeechobee Landfill, Inc.: dthorley@wm.com
Kristin Alzheimer, P.E., Shaw Environmental: kristin.alzheimer@shawgrp.com
Kelly Fagan, Shaw Environmental.: Kelly.fagan@shawgrp.com

Permit File Scanning Request from Elizabeth

Priority: ☐-ASAP (Public Records Request, etc.) ☒-Place in Normal Scanning Queue

Facility ID	Project#	Type	PSD #	Submittal Date	Batch #
0930164	014	AC	382	SEP 30 2010	

☒ File Approved For Disposal
☐ Return File to BAR

☒ Correspondence ☐ Intent ☐ Permit ☐ Draft
☐ Amendment ☐ Application ☐ OGC ☐ Proposed

Document Date 11-16-07

Shaw® Shaw Environmental, Inc.

88C Elm Street
Hopkinton, MA 01748-1656
508-435-9561
FAX: 508-435-9641

November 1, 2007

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2859 Paces Ferry Road
Suite 1600
Atlanta, Georgia 30339
JVanGessel@wm.com

RE: Florida Department of Environmental Protection Letter Dated April 2, 2007, DEP File Number 0930104-014-AC, Application No. 1270-2, Okeechobee Landfill Facility, Okeechobee Landfill, Inc.

Dear Mr. Van Gessel:

Please find attached our response to comments dated October 15, 2007 for the letter from the Florida Department of Environmental Protection dated April 2, 2007. If you need further assistance please call me at 609-584-6873 or Kelly Fagan at 508-497-6172.

Sincerely,

Kristin A. Alzheimer, P.E.

Signature 11/1/07
Date

(Seal)

Cc: M. Stallard, Okeechobee Landfill, Inc.: mstallard@wm.com
J. Fasulo, Okeechobee Landfill, Inc.: jfasulo@wm.com
David Thorley, Okeechobee Landfill, Inc.: dthorley@wm.com
K. Fagan, Shaw Environmental, Inc.: kelly.fagan@shwgrp.com

Florida Department of Environmental Protection

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

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

November 14, 2007

Electronic Mail – Received Receipt Requested

jvangessel@wm.com

Mr. John Van Gessel
Vice President & Assistant Secretary
Waste Management, Inc. of Florida
2859 Paces Ferry Road
Suite 1600
Atlanta, Georgia 30339

Re: DEP File Number 0930104-014-AC
Okeechobee Landfill Facility
Okeechobee Landfill, Inc.

Dear Mr. Van Gessel:

On October 16, 2007, the Department received responses to the Department's previous requests for additional information.

After review, it has been determined that the application remains incomplete. In order to continue the processing of the subject permit application, the Department needs the following previously requested information.

A. Air Quality Impact Analyses Items

1. With regards to the Department's previous letter dated July 18, 2007, please submit the requested item A.1.

   Further, the letter the Department received on October 16, states that the National Park Service (NPS) has not provided comments regarding the initial application. Class I modeling was not included in that submittal and the Department notified the Park Service that the application was incomplete with regards to many issues. The Department notified the NPS that the Department would inform them upon completion of the modeling so they may perform their review. Regardless, the NPS has provided comments regarding the need for the "interim" modeling and sensitive Class II modeling, which has been forwarded to Shaw Environmental, Inc. If comments from the Park Service regarding procedure is required, the NPS frequently recommends that applicants with procedural issues prepare a modeling protocol for their review.

2. With regards to the July 18, 2007 letter, please submit the requested item A.3.

3. With regards to the response to the letter dated July 18, 2007, items A.4. and A.5., the Department helped create inventories. However, the Department did not conduct modeling to determine the significant impact area (SIA) for this project. Please include all sources in your SIA for increment modeling. Please provide all modeling discussed in this response.

4. With regards to the response to the letter dated July 18, 2007, item A.8., the initial modeling should determine a significant impact area, if significant. This entire significant impact area, plus a buffer, should be modeled for Increment and National Ambient Air Quality Standards. Please contact the Department if further clarification is needed.
5. With regards to the letter dated July 18, 2007, item A.9. remains applicable.

The Department will resume processing your application after receipt of the requested information. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): "The applicant shall have 90 (ninety) days after the Department mails a timely request for additional information to submit that information to the Department ... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

If you have any questions, please contact Ms. Debbie Nelson at 850/921-9537 regarding the air quality impact review or me at 850/921-9523 regarding the permit application review.

Sincerely,

for A. A. Linero, P.E.
Program Administrator
Air Permitting South Section
Bureau of Air Regulation
Mail Station #5505

AAL/sms/dn

copy to:

Mr. Mike Stallard, Waste Management, Inc.: mstallard@wm.com
Mr. Joe Fasulo, Okeechobee Landfill, Inc.: jfasulo@wm.com
Mr. Kristin Alzheimer, P.E., Shaw Environmental & Infrastructure, Inc.: Kristin.Alzheimer@shawgrp.com
Ms. Kelly A. Fagan, P.E., Shaw Environmental & Infrastructure, Inc.: Kelly.Fagan@shawgrp.com
Mr. Lee Hoefert, P.E., DEP Southeast District Office: Lee.Hoefert@dep.state.fl.us
Mr. Jim Little, U.S. EPA, Region 4: little.james@epa.gov
Mr. Dee Morse, National Park Service: Dee_Morse@nps.gov

Sheplak, Scott

From: Harvey, Mary

Sent: Wednesday, November 14, 2007 11:55 AM

To: 'r. Mike Stallard, Waste Management, Inc.:'; 'Mr. Joe Fasulo, Okeechobee Landfill, Inc.:'; 'Kristin.Alzheimer@shawgrp.com'; 'Ms. Kelly A. Fagan, P.E., Shaw Environmental & Infrastructure, Inc.:'; Hoefert, Lee; 'Mr. Jim Little, U.S. EPA, Region 4:'; 'Mr. Dee Morse, National Park Service:'; 'jvangessel@wm.com'

Cc: Sheplak, Scott; Adams, Patty; Gibson, Victoria

Subject: Letter-Mr. John Van Gessel - DEP File Number 0930104-014-AC

Attachments: letter-John Van Gessel-Okeechobee Landfill Facility.pdf

Dear Sir/Madam:

Please send a "reply" message verifying receipt of the attached document(s); this may be done by selecting "Reply" on the menu bar of your e-mail software and then selecting "Send". We must receive verification of receipt and your reply will preclude subsequent e-mail transmissions to verify receipt of the document(s).

The document(s) may require immediate action within a specified time frame. Please open and review the document(s) as soon as possible.

The document is in Adobe Portable Document Format (pdf). Adobe Acrobat Reader can be downloaded for free at the following internet site: http://www.adobe.com/products/acrobat/readstep.html.

The Bureau of Air Regulation is issuing electronic documents for permits, notices and other correspondence in lieu of hard copies through the United States Postal System, to provide greater service to the applicant and the engineering community. Please advise this office of any changes to your e-mail address or that of the Engineer-of-Record.

Thank you,

DEP, Bureau of Air Regulation