Memorandum

Florida Department of Environmental Protection

To: Ron Blackburn
South District Office

Through: Clair Fancy, P.E.
Bureau of Air Regulation

From: Joseph Kahn, P.E.
Emissions Monitoring Section

Date: February 16, 2001

Subject: PSD Applicability Determination for Naples Landfill Flare Upgrade

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Alex Meng and I have reviewed the information submitted in support of the request for PSD exemption for the Naples Landfill flare upgrade project. The information included estimated emissions increases for SO_2, NOx and CO from the project, as well as the initial and revised modeling analyses for SO_2 impacts. (The applicant's consultant's calculations show that only the emission increase for SO_2 exceeds the PSD significance criteria.) The revised modeling analysis, presented with a letter from Grove Scientific and Engineering dated February 9, 2001, used ISCST3 and the meteorological data for Ft. Myers from 1987 to 1991, and was based on a maximum short term SO_2 emission rate of 13.5 grams per second (107 pounds per hour). The physical height of the flare was assumed to be 20.8 meters on a foundation that is 4 feet above ground level, for a total flare stack height of 22 meters above grade. The location of the flare will be outside the area of downwash influence from the landfill cells. The applicant used a method developed by the Texas Natural Resource Conservation Commission to calculate an effective stack diameter for the flare so that the flare could be modeled as a point source in the ISCST model.

The modeling analysis predicted maximum 3-hour, 24-hour and annual average concentrations of 16.5, 6.1 and 0.6 micrograms per cubic meter, respectively. These impacts are very low in comparison to the respective PSD Class II increments of 512, 91 and 20 micrograms per cubic meter, and the respective ambient air quality standards of 1300, 260 and 60 micrograms per cubic meter. Visibility impacts are not an issue for this project. The analysis shows that the proposed project qualifies for exemption from the PSD preconstruction review requirements as a pollution control project pursuant to Rule 62-212.400(2)(a)2.c., F.A.C.

The district office should include conditions in the construction permit that require compliance with the assumptions used in the modeling analysis. The height above grade and the location of the flare should be specified to match the assumptions used in the analysis. The short-term SO_2 emission rate, or the equivalent sulfur content of the landfill gas, should be limited to the emission rate used in the model, with an appropriate compliance mechanism specified such as routine sampling and analysis of the landfill gas. The flow rate of gas to the flare should be monitored and recorded on a regular and frequent basis to ensure that the flow rate does not exceed the design flow rate of 3000 SCFM.

Please let me know if you have any questions about this determination.

Kahn, Joseph

From: Kahn, Joseph
Sent: Friday, February 16, 2001 12:09 PM
To: Blackburn, Ron
Subject: Naples LF Flare Review

Ron,

FYI. Alex and I have finished reviewing the latest submittal from Grove Scientific. The new flare project will qualify for an exemption from PSD. You will need to put limits in the construction permit that match the assumptions used for the modeling analysis. I will send a memo to you soon with the details, after Clair reviews it.

-Joe

Kahn, Joseph

From: Blackburn, Ron
Sent: Friday, January 19, 2001 1:20 PM
To: Kahn, Joseph
Cc: Meng, Alex; Linero, Alvaro
Subject: Re: More Comments on Naples Landfill

Sensitivity: Confidential

Ron,

Feel free to just pass on our previous messages to the applicant with a request to respond to our comments/concerns. That way you won't have to rewrite them. If we have further comments I'll be sure to send them to you in a format that you can just incorporate into a request.

I have not seen any further information from January 15th. Perhaps it is in transit from our mailroom in the main building. What type of information is it?

-Joe:

The original information we requested on January 3rd (calculations for NOx,CO, & SOx) was answered by SCS Engineers in an attachment to a cover letter dated January 15th from Mr. Wong of Waste Management.
Hopefully that info will assist in your review. In fact, they comment that the information proves that they are exempt from PSD - as the new flare will not violate that consideration.

Take care

Ron

Kahn, Joseph

From: Kahn, Joseph
Sent: Thursday, January 18, 2001 2:31 PM
To: Blackburn, Ron
Cc: Meng, Alex; Linero, Alvaro
Subject: More Comments on Naples Landfill

Ron,

Alex confirmed this afternoon that, in addition to the analyses performed so far, the applicant will have to perform a comprehensive impact analysis for SO2 that must include all of the surrounding sources that consume SO2 increment. This comprehensive increment analysis is required because the consultant's analysis showed impacts that exceed the significant impact level, which triggers this type of review. Alex can advise the applicant's consultants about what is required for this analysis in more detail, and can assist with the preparation of a source inventory. Note that the changes we will require in the analysis that I noted in my previous message will only increase the impacts, so the requirement for a comprehensive analysis will not be changed when the consultant revises the analysis.

Also, a visibility analysis is required pursuant to Rule 62-212, F.A.C. Alex can also advise regarding which model is appropriate for this analysis. No visibility analysis has been received to date.

Please let me know if you have questions, or feel free to call Alex directly.

-Joe

Superior Client Service

SCS ENGINEERS
3012 U. S. Highway 301 N., Suite 700
Tampa, FL 33619
(813) 621-0080
Fax (813) 623-6757

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facsimile transmittal

To:	Joe Kahn	**Phone:**	
Company:	FDEP	**Fax:**	(850) 922-6979
From:	David Penoyer	**Date:**	January 26, 2001
Re:	Naples Landfill Air Modeling	**Pages:**	8 (including cover)
cc:		**Project No.**	091980073.07

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

Notes:

Joe,

Ray Dever asked that I fax you the attached letter that you apparently have not yet received. Please call us if you have any questions.

Thanks.

0970073.07 CF

RECEIVED
JAN 23 2001
COLLIER COUNTY LANDFILLS
A WASTE MANAGEMENT COMPANY
BY:

P.O. Box 990400
Naples, Florida 34116
(941) 455-8062
(941) 455-0853 Fax

January 15, 2001

Mr. Ronald Blackburn
District Air Program Administrator
Department of Environmental Protection
South District
P.O. Box 2549
Ft. Myers, Florida 33902-2549

RE: Collier County - AP
Collier County Landfill / Flare Upgrade
Permit No. 02210051 – AC
Southwest Coast EMA

Dear Mr. Blackburn:

Waste Management Inc. of Florida (WMIF) is pleased to provide the additional data/calculations requested by the Department's memorandum dated January 3, 2001. SCS Engineers prepared the calculations. WMIF believes the attached SCS Engineers calculations will satisfy the Department's request.

If you have any questions, please contact me.

Sincerely,

John W. Wong
District Manager

Cc:
John M. Kasper, Grove Scientific	W/Attachments
Joe Kahn, FDEP	W/Attachments
Cleve Hollady, FDEP	W/Attachments
Philip Barbaccia, FDEP	W/Attachments
David Penoyer, SCS	W/Attachments
G. George Yilmaz, CCG - Solid Waste Director	W/Attachments

Environmental Consultants
3012 U.S. Highway 301 N
Suite 700
Tampa, FL 33619-2242
813 621-0080
FAX 813 623-6757

SCS ENGINEERS

January 12, 2001
File No. 09198073.07

RECEIVED
JAN 15 2001
BY:

Mr. John W. Wong
Waste Management, Inc. of Florida
P.O. Box 990400
Naples, Florida 34116

Subject: Response to FDEP Letter Dated January 3, 2001
Collier County Landfill Gas System Flare Upgrade
Construction Application 02210051-004-AC

Dear John:

SCS Engineers (SCS) received a copy of the correspondence sent to Waste Management from the Florida Department of Environmental Protection (FDEP) dated January 3, 2001, regarding the potential emissions from the proposed flare at Naples Landfill. For your response, SCS is enclosing calculations showing that the increase in potential emissions referred to by FDEP is below the Prevention of Significant Deterioration (PSD) significant increase level.

As shown in the calculations, the potential emission of sulfur oxides (SO_x) (reported as sulfur dioxide) is projected to increase from 264.9 tons per year (tpy) to 467.5 tpy, which is an increase of 202.6 tpy. The potential emission of nitrogen oxides (NO_x) is projected to increase by 11.6 tpy, from the current rate of 15.2 to 26.8 tpy. The carbon monoxide (CO) emission is estimated to increase from 82.7 tpy to 145.9 tpy, an increase of 63.2 tpy. These emission rates are based on maximum flow rates of 1,700 cubic feet per minute (cfm) for the existing flare and 3,000 cfm for the new flare. The proposed increases in emissions are below the PSD significant increase thresholds for NO_x (40 tpy) and CO (100 tpy).

SCS feels that it is important to remind FDEP that per Rule 62-212.400(2)(a)2.c., FAC, the new landfill gas flare appears to be exempt from the complete PSD permitting review, pending FDEP approval of the recently submitted ambient air quality modeling data. This air modeling demonstrates that the emissions increases from the proposed flare will not cause or contribute to a violation of the applicable ambient air quality standards.

Please call either of us if you have any questions or need additional information.

Sincerely,

David H. Penoyer, P.E.
Project Engineer
SCS ENGINEERS

Raymond J. Dever, P.E., D.E.E.
Vice President
SCS ENGINEERS

cc: G. Randall Holcomb, WM
Carolyn McCreedy, WM
Bruno Ferraro, Grove

SCS ENGINEERS

SHEET 1 OF 6

CLIENT	PROJECT	JOB NO.
WM	Naples LFG Flare	09198073.07
SUBJECT	BY / CHECKED	DATE
Flare Emissions Summary NOx, CO, SOx	D. Pengra /	1.8.00 / 1/9/01

Objective: Determine increase in NOx, CO emissions as a result of new flare

Known:
1. Q_{Exist} = 1700 cfm LFG
2. $Q_{proposed}$ = 3000 cfm
3. Emission factors per manufacturer and AP-42 Section 13.5, Table 13.5-1 (January 1995)
   - NOx = 0.068 lb NOx / MMBtu
   - CO = 0.37 lb CO / MMBtu
4. Methane content of LFG ≈ 50% by volume
5. Sulfur content = 3634 ppmv per lab analysis

Solution:

1. Heat Value of LFG = 500 Btu / ft³

a) Existing = $\frac{1700\ ft^3}{min} \cdot \frac{500\ Btu}{ft^3} \cdot \frac{525,600\ min}{yr} \cdot \frac{MMBtu}{10^6\ Btu}$

= 44.676 x 10⁴ MMBtu/yr

b) Proposed = $\frac{3000\ ft^3}{min} \cdot \frac{500\ Btu}{ft^3} \cdot \frac{525,600\ min}{yr} \cdot \frac{MMBtu}{10^6\ Btu}$

= 78.840 x 10⁴ MMBtu/yr

2. Existing Emissions (NOx, CO)

a) $NO_x = \frac{0.068\ lb\ NO_x}{MMBtu} \cdot \frac{44.676 \times 10^4\ MMBtu}{yr} \cdot \frac{ton}{2000\ lb}$

= 15.2 tons NOx/yr

b) $CO = \frac{0.37\ lb\ CO}{MMBtu} \cdot \frac{(44.676 \times 10^4)}{2000}$

= 82.7 tons CO/yr

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SHEET 2 OF 6

CLIENT	PROJECT	JOB NO.
WM	Naples LFG Title V	09198073.07
SUBJECT	BY	DATE
Flare Emissions Summary	D. Pergrer	1.8.01
	CHECKED	DATE
		1/9/01

3. Proposed Emissions (NO_x, CO)

a) $NO_x = \frac{0.068\ lb\ NO_x}{MMBtu} \cdot \frac{78.84 \times 10^4\ MMBtu}{yr} \cdot \frac{ton}{2000\ lb}$

$= 26.8\ tons\ NO_x/yr$

b) $CO = \frac{0.37\ lb\ CO}{MMBtu} \cdot 78.84 \times 10^4 \cdot \frac{1}{2000}$

$= 145.9\ tons\ CO/yr$

4. SO_x Emissions

a) Concentration of total reduced sulfur compounds

$C_s = 3634\ ppmv\ as\ S$

b) Volumetric Total Sulfur — per AP-42 Section 2.4, equation (3)

$= (LFG\ flow\ rate)\left(\frac{C_s}{10^6}\right)$ ← m^3/yr

1. Exist Q $= \frac{1700\ ft^3}{min} \cdot \frac{525{,}600\ min}{yr} \cdot \frac{m^3}{35.32\ ft^3} = 25.298 \times 10^6\ \frac{m^3\ LFG}{yr}$

2. Proposed Q $= \frac{3000\ ft^3}{min} \cdot 525{,}600 \cdot \frac{1}{35.32} = 44.643 \times 10^6\ \frac{m^3\ LFG}{yr}$

3. Exist Sulfur $= \left[\frac{25.298 \times 10^6\ m^3\ LFG}{yr}\right]\left[\frac{3634\ m^3\ S}{10^6\ m^3\ LFG}\right] = 91{,}933\ \frac{m^3 S}{yr}$

4. Prop. Sulfur $= \left[\frac{44.643 \times 10^6\ m^3\ LFG}{yr}\right]\left[\frac{3634}{10^6}\right] = 162{,}233\ \frac{m^3 S}{yr}$

c) Mass of Total Sulfur (M_S)

$$M_S = Q_S\left[\frac{MW_S \cdot 1\ atm}{\left(\frac{8.205 \times 10^{-5}\ m^3\text{-atm}}{gmol - K}\right)\left(\frac{1000\ g}{kg}\right)(273 + 25°C)}\right]$$

1. Exist $M_S = \left(\frac{91{,}933\ m^3 S}{yr}\right)\left(\frac{(32\ g/gmol)(1\ atm)}{(8.205 \times 10^{-5})(1000)(298\ K)}\right) = 1.203 \times 10^5\ \frac{kg\ S}{yr}$

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SHEET 3 OF 6

CLIENT	PROJECT	JOB NO.
WM	Naples Title V	09198073.07
SUBJECT	BY / CHECKED	DATE
Flare Emission Summary	I. Ranger /	1.8.00 / 1/9/01

2 Proposed $M_S = \left(162{,}233 \frac{m^3}{yr}\right)\left(\frac{(32 \frac{g}{gmol})(1 mol)}{(8.205\times10^{-5})(1010)(298)}\right)$

$= 2.123\times10^5 \frac{kg\ S}{yr}$

d) Flare SO_x Emissions

1. Exist. $SO_x = \left[1.203\times10^5 \frac{kg\ S}{yr}\right]\left[\frac{2\ kg\ SO_2}{kg\ S}\right]\left[1.101\times10^{-3} \frac{ton}{kg}\right]$

$= 264.9$ tons SO_x/yr (existing)

2. Proposed $SO_x = \left[2.123\times10^5 \frac{kg\ S}{yr}\right]\left[\frac{2\ kg\ SO_2}{kg\ S}\right]\left[1.101\times10^{-3} \frac{ton}{kg}\right]$

$= 467.5$ ton SO_x/yr (proposed)

5 Proposed Emissions Increases

a) NO_x Increase = 26.8 − 15.2 = 11.6 ton/yr NO_x

b) CO Increase = 145.9 − 82.7 = 63.2 ton/yr CO

c) SO_x Increase = 467.5 − 264.9 = 202.6 ton/yr SO_x

Conclusion: The increase in NO_x and CO emissions from the proposed new flare are below the PSD increase criteria of 40 tpy and 100 tpy, respectively

UTILITY FLARE MODEL CF1228110
TECHNICAL DATA

A. Flare Tip size – 12 in.

B. Overall Height – 34 ft.

C. Maximum landfill gas flow – 3000 SCFM

D. Turndown Ratio – 10:1

E. Destruction efficiency at design flow with gas methane content 40 to 60% -- 98% overall destruction of total hydrocarbons

Guaranteed to meet E.P.A. emission standards for landfill gas disposal in utility "candle type" flares.

Note: Flare is designed in accordance with the United States Environmental Protection Agency (EPA) established criteria for open flares, 40 CFR 60.18

F. Minimum flow rate to maintain stable flame and 98% destruction efficiency -- 300 SCFM

G. Minimum methane content required to maintain stable flame and 98% destruction efficiency – 30%

H. Flow/Emissions (expected) at maximum flow, 50% methane content and 1400°F combustion temperature:

N_2	73.5 % vol.
O_2	13.6 % vol.
CO_2	6.0 % vol.
H_2O	6.9 % vol.
NO_2	0.068 lbs./MMBTU *
CC	0.37 lbs./MMBTU *

* Per the US EPA AP-42 Supplement D, Table 11.5-1

NOTE:

Wind loads: Designed for 100 mph wind loading (per ASCE 7-88, Exp. C)

RECEIVED
JAN 08 2001

Department of Environmental Protection

Jeb Bush
Governor

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549

David B. Struhs
Secretary

January 3, 2001

G. Randall Holcomb, Vice President.
Waste Management, Inc. of Florida
2700 NW 48th Street
Pompano Beach, FL. 33073

RE: Collier County – AP
Collier County Landfil / Flare Upgrade
Permit No. 0221005 1 – AC
Southwest Coast EMA

Dear Mr. Holcomb:

Thank you for the response we received December 21, 2000 from Mr. John M. Kasper, P.E. to our request for additonal information on the referenced Permit Application.

As you may be aware, our Tallahassee staff is reviewing the information for consistency with Prevention of Significant Deterioration (PSD). They have sent us the following comments which need to be addressed before the application can be considered complete.

Preliminary review by staff indicates that only SO2 emissions were modeled. While the information accompanying the analysis states that SO2 emissions are estimated to be 468 TPY, staff feels that the upgrade may have potential increases of NOx and CO that also exceed the PSD criteria of 40 TPY and 100 TPY respectively.

Please provide emissions calculations for SO2, NOx, and CO emissions from the existing flare and the new flare to show what the emissions increase is for SO2, and to determine if the NOx and CO emissions increases are also significant for PSD.

Continued.....

Please submit the requested information as you have previously, sending the necessary data simultaneously to this office and our Tallahassee staff to expedite review.

Thank you for your attention to this matter. Please feel free to contact us should you have any questions or feel further clarification is necessary.

Sincerely,

Ronald D. Blackburn
District Air Program Administrator

cc: John M. Kasper, P.E.
Joe Kahn, P.E.
Cleve Hollady
Philip Barbaccia
Raymond J. Dever, P.E.
David H. Penoyer, P.E.
John Wong
George Yilmaz

Kahn, Joseph

From: Kahn, Joseph
Sent: Thursday, January 18, 2001 10:41 AM
To: Blackburn, Ron
Cc: Meng, Alex; Linero, Alvaro
Subject: Naples LF Flare Review

Ron,

Alex Meng has reviewed the modeling analysis for the landfill flare, and he and I discussed his comments this morning. Alex raised the following issues, which, in addition to my previous comments, must be resolved in order to continue reviewing the impacts from this project.

Because SO2 ambient air quality standards have been established for both short term (3 hour, 24 hour) and long term (annual) periods, we require that the highest expected short term emission rate be used to determine the short term ambient impacts. We allow an annual average hourly rate (the tons per year rate converted into an average emission rate in grams per second) to be used for determining the annual ambient impacts. The consultant used the annual average hourly rate for both the short term and long term analyses. The short term modeling should be based on the highest expected short term emission rate (the maximum pounds per hour converted in grams per second). I would expect that the short term emissions will often exceed the annual average hourly rate.

The consultant stated that the flare will be located far enough from the landfill cells to avoid the effects of downwash. However, the consultant assumed an effective stack height, based on an estimated plume rise effect, seemingly in an effort to have a release height that is high enough to avoid downwash considerations. The description regarding this assumption refers to a height of 17.3 meters, but a height of 20.8 meters was used in the analysis. The flare height is only 34 feet. Also, the exit velocity was assumed to be increased because of the combustion process. The cumulative effect of these assumptions is that the ambient impact is reduced. The modeling analyses should use the actual flare height as the stack height, with no assumed release height or effective stack height. Further, the exit velocity should be the actual velocity determined by the flow rate and flare tip diameter, with no assumptions made about acceleration of the flow.

The consultant will need to revise and rerun the modeling analysis to address our concerns. We will review the revised analysis, and may have further questions regarding the modeled impacts at that time.

Feel free to call Alex directly with any questions regarding the modeling. His number is 850-921-9550, or Suncom 291-9550.

-Joe

Superior Client Service

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Fax (813) 623-6757

SCS ENGINEERS

facsimile transmittal

To:	John Kasper	**Phone:**	298-2282
Company:	Gore Scientific	**Fax:**	407-790-9038
From:	David Peroyer	**Date:**	12-14-00
Re:	Naples LFG CH4 Content	**Pages:**	2
cc:		**Project No.**	0978073.05

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Notes:

Please see attached summary table for LFG quality at Naples LF for past 3 months. This data was obtained by SCS Field Services as part of the routine LFG monitoring program.

Kahn, Joseph

From: Meng, Alex
Sent: Wednesday, February 14, 2001 2:50 PM
To: Kahn, Joseph
Cc: Rogers, Tom
Subject: Naples Landfill Flare Modeling Review

Joe,

I have reviewed the modeling analysis submitted by the applicant for the proposed flare for the landfill near Naples, Florida. This flare will emit 468 tons of SO2 a year. The regulatory air quality model, ISCST3, and the meteorological data from the weather station in the nearby Ft. Myers from 1987 to 1991were used to predict the impact of SO2 in the area .

Since ISCST3 does not have the algorithm to model the flare directly, the applicant adopted a method, developed by the Texas Natural conservation Commission, that calculates the effective stack diameter so one can use the point source in ISCST to model the flare.

The modeling results showed the maximum 3-hour, 24-hour and annual averaging concentrations are 16.5 micrograms per cubic meter, 6.1 micrograms per cubic meter and 0.6 microgram per cubic meter, respectively. The mximum 24-hour average exceeded the correspondent significant impact level of 5.0 microgram per cubic meter for SO2. The maximum 3-hour and the maximum annual averages were less than their correspondent significant levels of 25.0 micrograms per cubic meter and 1.0 micrograms per cubic meter, respectively.

I have verified the methods and the values that were used in the modeling anaylsis to be correct. Although the maximum 24-hour average exceeds its significant impact level, the amount comparing to the level of Florida AAQS for SO2 for the 24-hour averaging period, 260 micrograms per cubic meter, and the level of PSD Class II increment, 91 micrograms per cubic meter, is small. In addition, there is no large SO2 emitted sources in the area for which to interact with. It is unlikely that this flare will cause violation of the Florida AAQS or PSD increment for SO2 in the area. Therefore, the full impact analysis is not necessary.

If you have any questions, please let me know.

Alex

Holladay, Cleve

From: Holladay, Cleve
Sent: Tuesday, November 19, 2002 4:54 PM
To: 'muthim@miamidade.gov'
Cc: Arif, Syed; Linero, Alvaro
Subject: Landfill Gas Enclosed Flare Air Construction Permit Application-Title V ID 0250615

Mallika, Syed Arif asked me to look at this application and give comments back to you by today. These are my comments based on a quick examination of this application.

F.A.C. Rule 62-212.400(2)(a)2.c. does not exempt the applicant from demonstrating to the Department that the increase in emissions does not violate an ambient air quality standard, maximum allowable increase (increment) or visibility limitation. The modeling associated with this demonstration can be quite extensive once the significant impact levels are predicted to be exceeded (as they appear to be for the SO2 PSD Class I area, Everglades National Park).

If SCREEN3 is going to be used as the screening model for comparison to significant impact levels then the flare option needs to be used.

Also the Significant Impact Levels (SIL) used in the report to compare modeling results to are valid only for the PSD Class II area in the vicinity of the facility. The EPA-proposed Significant Impact Levels for PSD Class I areas (which the Department accepts as a guideline) are the following:

SO2 3-hour--1 ug/m3; 24-hour--0.2 ug/m3; annual--0.1 ug/m3
PM10 24-hour--0.3 ug/m3; annual--0.2 ug/m3
NO2 Annual--0.1 ug/m3

Since the source is less than 50 km away, SCREEN3 can be used to determine whether the project is predicted to have significant impacts in the PSD Class I area. However, if any of the above Class I SIL are predicted to be exceeded, then a multi-source PSD Class I increment analysis, which includes all increment-affecting sources in the area of the Everglades National Park, will be required for that pollutant and averaging time. CALPUFF is the required model for determining Class I impacts. The applicant will need to submit the results of CALPUFF using 5 years of NWS data or 3 years of MM4/MM5 data. In addition to determining the impacts on the applicable PSD Class I increment, the applicant will need to evaluate the impacts of the project on regional haze and nitrogen and sulfur deposition in the Everglades.

Since SO2 ambient air quality standards have been established for both short term (3-hour and 24-hour) and long term (annual) periods, the Department requires that the highest expected short-term emission rate be used to determine the short-term ambient impacts. We allow an annual average hourly rate (the tons per year converted into an average emission rate in grams per second) to be used for determining the annual ambient impacts. It appears that the applicant used the annual average hourly rate for both the short-term and long-term analyses. The short-term emission rate (the maximum pounds per hour converted into grams per second) should be based on the highest expected short-term emission rate. This rate is usually higher than the annual average hourly rate.

On page 1-3, the applicant states that no PSD baseline has been triggered in Miami-Dade County. This is not correct. Statewide minor source baseline dates of December 27, 1977 have been established for PM10 and SO2 and March 28, 1988 for NO2. (F.A.C. Rule 62-204.360(1)(a), (2)(a) and (3)(a))

In section 2.6 the applicant states that landfill records show that all structures are sufficiently far enough away from the proposed source that downwash is not a consideration. Are there landfill cells close by and what is the predicted height and width of these cells in the future. Will they influence the stack at some future time and result in downwash affecting the stack. This needs to be evaluated. potentially

A good plot plan also needs to be submitted showing the locations of all structures and landfill cells.

Thank you, Cleve Holladay

Kahn, Joseph

From: Kahn, Joseph
Sent: Tuesday, February 06, 2001 5:31 PM
To: 'bruno@grovescientific.com'
Cc: Meng, Alex
Subject: Naples LF Flare Effective Stack Height

Bruno,

To confirm our second telephone conversation of this afternoon, the Department will accept an alternative modeling technique to determine an effective stack height and/or effective diameter for use in the ISC model for purposes of performing the ambient impact analysis for SO2. There are three techniques from different states that have been documented. Please refer to the following web site, select "Notes" under User Support, and use one of the techniques described in the notes for flares: www.beeline-software.com/. These all seem to be similar to the approach used in your initial analysis, but these methods have been approved by other states for use in the ISC model. They appear to be consistent with the technique used in the SCREEN models for flares. Please include in your resubmittal a description of which method best fits your situation along with your calculations. Please call me or Alex if you have any questions.

-Joe

Flares [Top]

Flares (Ohio EPA). For screening purposes, the flare option in SCREEN2 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 SCREEN2:

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

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

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 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.

Flares (LA DEQ). Flares are a special type of source, but are modeled as a point source. Use the following steps for deriving the stack parameters for modeling a flare:

STEP 1:Calculate the total heat release (H) of the flared gas based on the gas heat content and the gas consumption rate.

STEP 2:Assume that 45% of H is released as sensible heat (Q_H)

$$Q_H(cal/sec) = 0.45 \times H(cal/sec)$$

STEP 3:Calculate the effective stack diameter using the following formula

$$d_s\ (m) = 9.88 \times 10^{-4} \times [Q_H]^{1/2}$$

STEP 4:Final stack parameters for model input are as follows

h_g = height of flare stack

d_g = (calculated in STEP 3)

v_g = 20 m/sec
T_g = 1273 °K

Flares (TNRCC). Flares are a special type of elevated source that may be modeled as a point source. The technique to calculate buoyancy flux for flares generally follows the technique described in the *SCREEN3 Model User's Guide* (EPA, 1995b). Use the following parameters:

- effective stack exit velocity = 20 meters per second;
- effective stack exit temperature = 1273 Kelvin;
- actual height of the flare tip; and
- effective stack exit diameter.

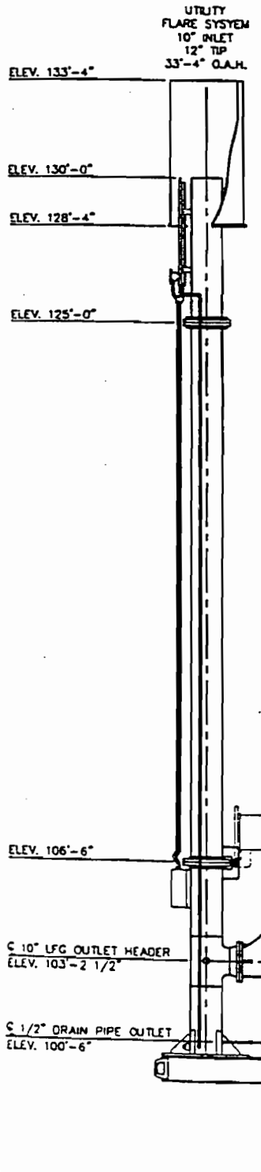
The effective stack diameter (D) in meters is calculated using the following equations:

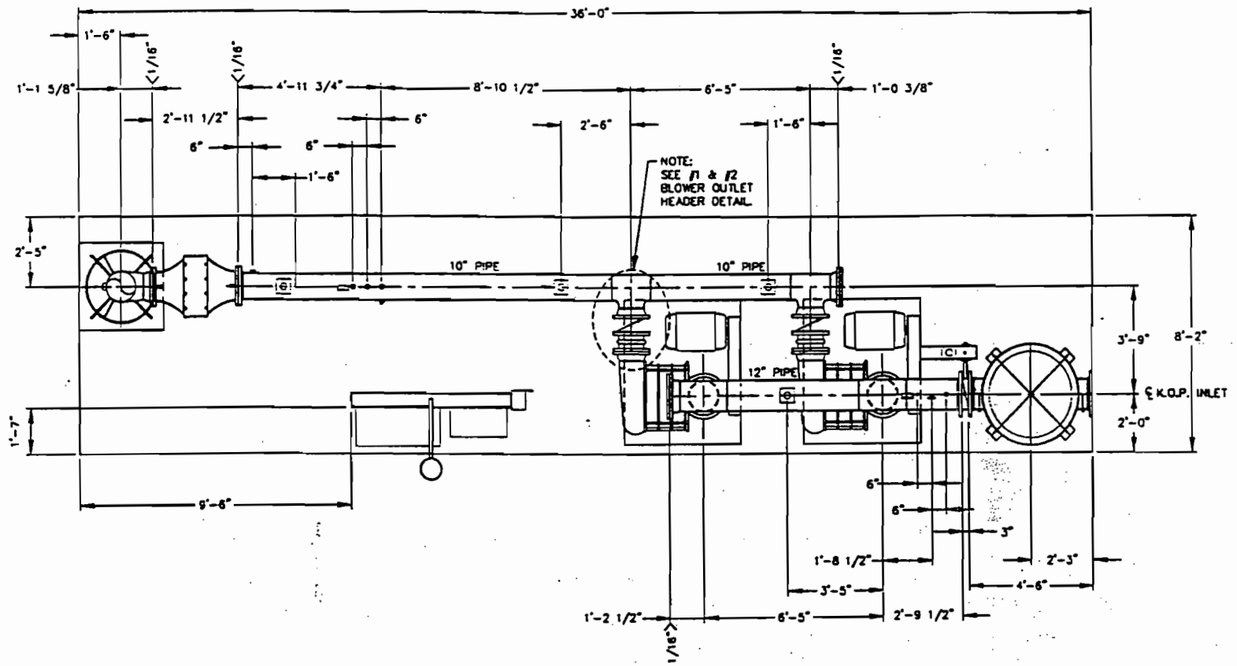
$$D = \sqrt{(10^{-6} q_n)} \quad \text{and}$$

$$q_n = q(1 - 0.048\sqrt{MW})$$

where
q = gross heat release in cal/sec;
q_n = net heat release in cal/sec; and
MW = weighted (by volume) average molecular weight of the compound being flared.

Note that enclosed vapor combustion units should not be modeled with the preceding parameters but instead with stack parameters that reflect the physical characteristics of the unit.

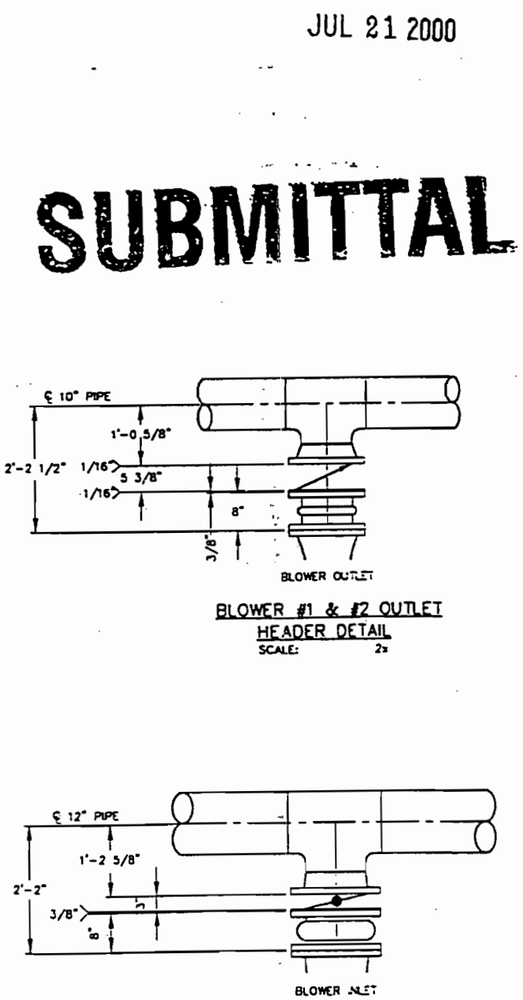




PLAN VIEW

1/2" DRAIN PIPE
ASSEMBLY DETAIL
SCALE: 4x

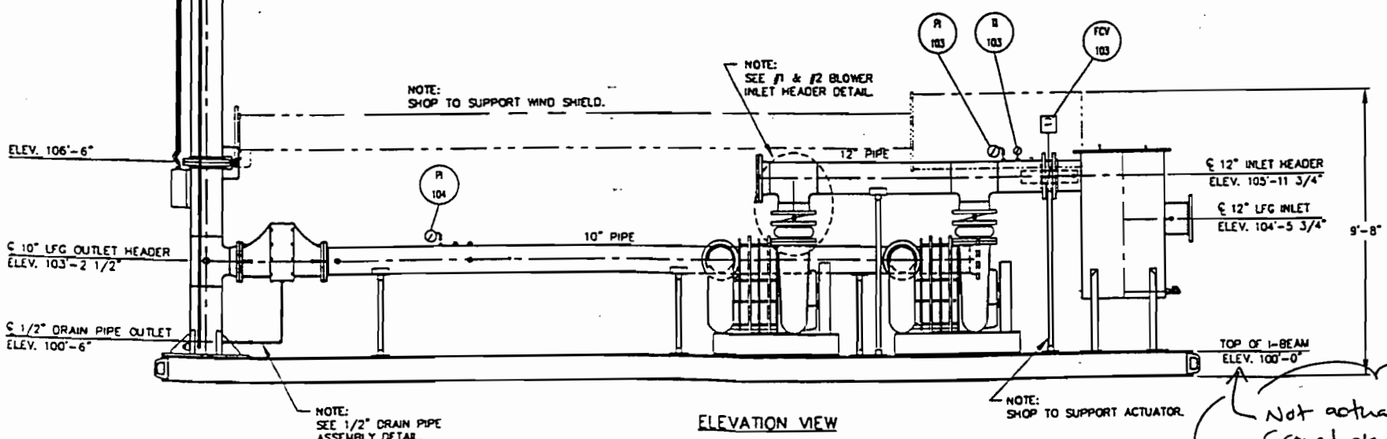
BLOWER #1 & #2 OUTLET
HEADER DETAIL
SCALE: 2x



BLOWER #1 & #2 INLET
HEADER DETAIL
SCALE: 2x

NOTES:

1. EXTERNAL PIPE SURFACES TO BE SAND BLASTED TO SP-7 SPECIFICATIONS. APPLIES TO CARBON STEEL PIPING ONLY.
2. VESSELS AND PIPE EXTERNALS TO BE COATED WITH RUST PROHIBITING PRIMER AND FINISHED WITH A 3 MIL COAT OF PEWTER COLORED INDUSTRIAL ENAMEL. APPLIES TO CARBON STEEL PIPING ONLY.
3. PIPE INTERNALS TO BE COATED WITH HI-SOLID EPOXY.
4. INSTALL GAUGES TO FACE CONTROL RACK SIDE.
5. SHOP TO SUPPORT WINDSHIELD FOR SHIPPING PURPOSES.
6. * - SHIP LOOSE.



ELEVATION VIEW

Not actual elevation.
Ground elev. at flare station is approx. 10 or 11 ft.

JUL 21 2000

SUBMITTAL

REV.	DESCRIPTION	DATE	BY
A	ISSUED FOR SUBMITTAL	07/06/00	CSH

LFG SPECIALTIES INC.
A Member of The IT Group
16408 US ROUTE 224 E
FINDLAY, OH 45840-9761
PHONE: (800) 331-7683 or (419) 424-4999
FAX: (419) 424-4939 or (419) 424-4981

SCALE	3/8"= 1'-0"
DATE	07/06/00
ENGINEER	LWZ
DRAWN BY	CSH
APPROVED BY	LK
PROJECT NUMBER	B01033
P.O. NUMBER	
TITLE	SKID AND PIPING ASSEMBLY PLAN, ELEVATION AND DETAILS
PROJECT NAME	LANDFILL GAS UTILITY FLARE NAPLES LANDFILL NAPLES, FL
CUSTOMER	WASTE MANAGEMENT
DRAWING NUMBER	1683-M1 SHEET 1 OF 1