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CDM

Pasco County Utilities

West Pasco Class I Landfill
Solid Waste Cells SW-1 and SW-2
Revised NMOC Emission Rate Report
Power Plant Certification No. PA87-23

14230 Hays Road
Spring Hill, Pasco County, Florida

January 2010

Prepared for:
Pasco County Utilities
7530 Little Road
New Port Richey, FL 34654

Prepared by:
Camp Dresser & McKee Inc.
1715 North Westshore Blvd., Suite 875
Tampa, Florida 33607

RAJENDRA D VAIDYA LICENSE No 70770 STATE OF FLORIDA PROFESSIONAL ENGINEER

R.D. Vaidya 01/28/2010

Rajendra D. Vaidya, Ph.D., P.E.
Florida-Registered
Professional Engineer No. 70770

1715 North Westshore Boulevard, Suite 875
Tampa, Florida 33607
tel: 813 281-2900
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January 28, 2010

Mr. John Power
Solid Waste Department Operations Manager
Pasco County
14230 Hayes Road
Spring Hill, FL

Subject: West Pasco Class I Landfill-Revised NMOC Emission Rate Report
Power Plant Certification No. PA87-23

Dear Mr. Power:

Camp Dresser & McKee Inc. (CDM) is pleased to provide you with the results of Tier 2 testing conducted at the West Pasco Class I Landfill (Landfill) located at Pasco County Resource Recovery Facility in Spring Hill, Florida during December 2009. The testing obtained landfill gas samples from the two solid waste cells SW-1 and SW-2 (approximately 20 acres or 8 hectares). The results of this testing were used to calculate a site-specific non-methane organic compound (NMOC) concentration, and a revised NMOC emission rate for the Landfill. The results indicate that NMOC emissions from these cells have not yet exceeded the 50 Megagram per year (Mg/yr) limit established by 40 CFR 60 Subpart WWW; which would have required the installation of a gas collection and control system. Using the results from the Tier 2 sampling, the calculated NMOC emissions at end of 2009 are about 0.48 Mg/yr. The United States Environmental Protection Agency (USEPA) requires an NMOC concentration of 4000 parts per million by volume (ppmv) as a default value for modeling, but the Tier 2 sampling showed that the actual NMOC emissions from these cells is 35.6 ppmv.

CDM conducted the Tier 2 sampling from December 1 through December 2, 2009 collecting landfill gas samples from a total of 21 locations across SW-1 and SW-2. To obtain a good representation of the landfill gas, and to ensure that all of the accessible areas in these cells were sampled, the locations of sampling gas probes were spread across the cell areas. Generally, the probes are driven into the landfill surface using a geoprobe machine that inserts a ¾ inch solid steel probe into the landfill at least one meter (approximately 3 feet) into the trash. The probe is then removed and another hollow probe is inserted and tubing threaded through the hollow rod. The top of the hole is sealed with hydrated bentonite, and the tubing is attached to the Landtec GEM 500 landfill gas analyzer to determine landfill gas quality levels. If the levels are deemed acceptable, a sampling train that includes a rotameter to measure flow is attached to the tubing, and the sampling train is purged with the landfill gas sample and sealed with a quick connect. The evacuated Summa canister is then attached and sampling commenced. **Figure 1** illustrates how the sampling apparatus is set up. At a few sampling locations, the probes were not deep enough to obtain good gas readings. In these instances the probes were driven deeper than three feet into the waste in an attempt to get better quality gas readings. There were three instances where the initial location chosen for sampling did not produce good gas quality despite deeper probe depth. In these few instances, the sampling location was moved approximately 20 to 30 feet away from the initial location in an effort to obtain better gas quality. Overall, the sampling was relatively easygoing in that no weather or landfill surface issues inhibited the sampling in any way.

Any known non-methane producing areas as well as steep slopes or the active working area of the cell SW-2 were not sampled. CDM collected samples from 21 different locations as shown on **Figure 2**. The testing protocol specified generating composite samples from the 21 locations, with no more than 3 sample locations represented in each composite. The criteria for compositing was in accordance with 40 CFR 60.754(a)(3) and Method 25C Section 8.4.1. The Tier 2 sampling protocol met the required two sample probes per hectare (i.e. 17 samples for 20 acre area) of landfill surface requirement. Of the 21 samples, 20 were grouped into 7 composites (6 composites of 3 samples each and 1 composite of 2 samples) and one separate location was used to obtain a duplicate sample. These 7 landfill gas composite canisters, one duplicate sample, and one canister used as a field blank for quality control, were shipped for analysis to Atmospheric Analysis & Consulting Inc. in Ventura, California. Of the total ten canisters shipped to the laboratory, two were intended for quality control purposes (duplicate: GP-10A and Field Blank: FB-1) and do not contribute to the calculated NMOC results. **Table 1** summarizes how the 21 sampling locations were composited into the sampling canisters.

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Table 1 – Sample Locations Composited into Canisters

Sample Identification	Sample Locations Included in Composite
Composite #1	GP-1 GP-2 GP-3
Composite #2	GP-4 GP-5 GP-6
Composite #3	GP-7 GP-8 GP-9
GP-10	GP-10
GP-10A	GP-10
Composite #4	GP-11 GP-12 GP-13
Composite #5	GP-14 GP-15 GP-16
Composite #6	GP-17 GP-18 GP-19
Composite #7	GP-20 GP-21

Each canister sample was analyzed according to Method 3C for oxygen, nitrogen, methane, and carbon dioxide and according to Method 25C for NMOC (reported by the laboratory as non-methane hydrocarbons (NMHC) as methane). The laboratory results here are reported as per 40 CFR 60.754(a)(3), which states in part "divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane." CDM divided the methane-calibrated laboratory results for the samples (7 composites and two individual samples) by six to express the NMOC concentration as hexane (see **Table 2**).

Table 2 - Tier 2 Testing Results for Methods 25 C and 3C

Sample ID	NMHC as Methane (ppmv)	NMHC as Hexane (ppmv)	Oxygen (%)	Nitrogen (%)	Methane (%)	Carbon Dioxide (%)
Composite 1	81	13.5	5.6	20.2	45.6	28.6
Composite 2	78	13.0	0.2	1.5	64.4	33.8
Composite 3	113	18.8	0.4	1.9	58.7	39.0
Composite 4	212	35.3	0.1	0.7	56.5	42.6
Composite 5	200	33.3	0.2	1.4	55.0	43.3
Composite 6	616	102.6	1.8	7.0	52.9	38.3
Composite 7	202	33.7	0.3	1.6	57.7	40.4
GP - 10	77	12.8	0.1	0.8	62.8	36.2
GP-10 A	77	12.8	0.1	0.5	63.2	36.2

** NMHC is non-methane hydrocarbons as methane

CDM used this method to obtain the average site-specific NMOC concentration as 32.9 parts per million by volume (ppmv) from all samples. However, per Method 25C, Section 8.4.2, for the samples to be acceptable, they have to be less than 20% nitrogen or less than 5% oxygen. Sample ID Composite 1 containing gas probe locations 1, 2, and 3 had 20.2% nitrogen and 5.6% oxygen; hence these numbers are slightly above what the method requires. Averaging the results from the sampling without Composite 1, the NMOC concentration is slightly higher and is 35.6ppmv. Thus, the average NMOC concentration is not substantially different without Composite 1 for which the concentrations of nitrogen and oxygen are slightly above their requirements per Method 25C, so the 35.6 ppmv may be considered as a conservative estimate of an average NMOC value for the Landfill.

The United USEPA uses the Landfill Gas Generation Emissions Model (LandGEM) as a tool to calculate landfill gas generation. CDM performed these calculations in 2007 for Pasco County using default (Tier 1 per 40 CFR 60.754(a)(2)) values for methane generation rate decay constant (k), methane generation potential (Lo), and NMOC concentration. Using these default values, the results indicated that the NMOC emissions in 2006 were at approximately 38 Mg/Yr for waste placed through December 2005. Based on this Tier 1 modeling using LandGEM, CDM estimated that the landfill would likely exceed the 50 Mg/Yr threshold in 2007. These results for Tier 1 modeling for waste placed through December 23rd 2009 are presented in Appendix B. These results indicate that the landfill would likely have exceeded the 50 Mg/yr threshold in 2007, and is in agreement with the previous Tier 1 estimate.

Using the Tier 2 sampling results and excluding the sample that did not meet the criteria for oxygen and nitrogen, the NMOC concentration of 36 ppmv was used to revise the NMOC emission rate for the Landfill using the LandGEM model. The current site specific data shows the NMOC emission rate to be significantly below that estimated from the default modeling done in the Tier 1 analysis. The data presented in Appendix C for waste placed through December 23rd 2009, indicate that the predicted NMOC emission rate at the end of 2009 is about 0.48 Mg. Based on these results, no further action is required at this time by the Pasco County under 40 CFR 60 Subpart WWW with regard to installing a landfill gas collection and control system. In accordance with 40 CFR 60.754(a)(3)(iii), it will be necessary for the County to retest the site-specific NMOC concentration every five years in order to determine if the exempt status can be maintained, particularly if more waste is placed within the landfill during this time. In accordance with 40 CFR 60.757(b)(1), Pasco County is required to submit an annual NMOC emission estimate to FDEP until such time as the NMOC emission rate exceeds 50 Mg/Yr. The annual NMOC emission report must be based on the actual waste disposal information for the subject year and the site specific NMOC concentration of 36 ppmv as hexane. CDM suggests submitting this annual report by March 1 of each year, so that the end of calendar year tonnages can be incorporated into the report.

CDM is submitting four copies of original reports to the County. Please forward one signed and sealed original to each of the two FDEP sections listed below. If you have any questions or comments regarding this letter or the data presented herein, please call me at (813) 281-2900.

Sincerely,

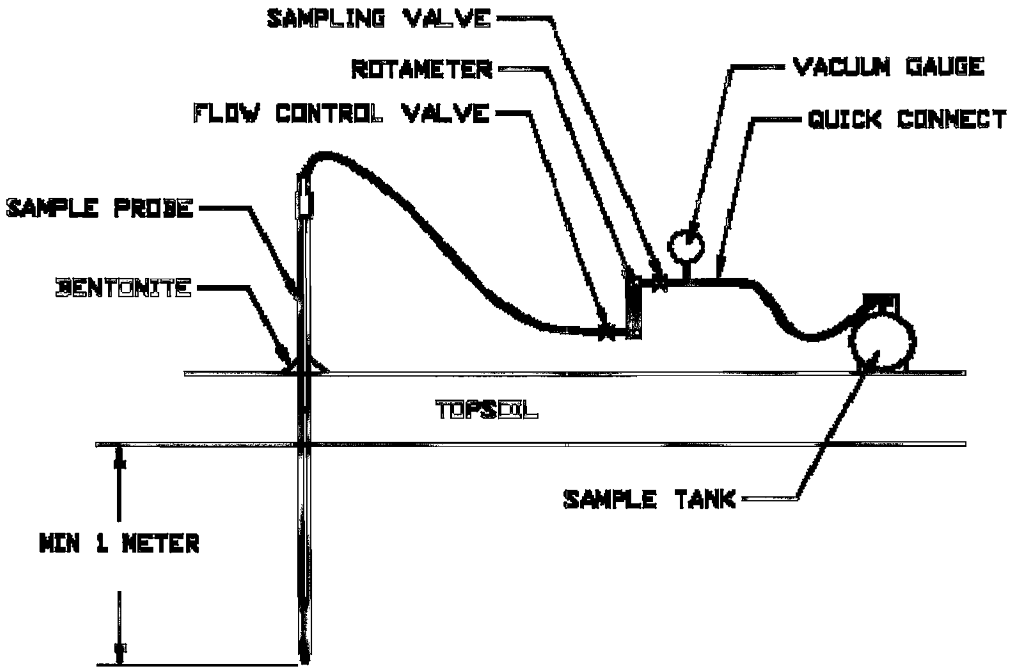
Rajendra Vaidya, Ph.D., P.E.
Environmental Engineer
Camp Dresser & McKee

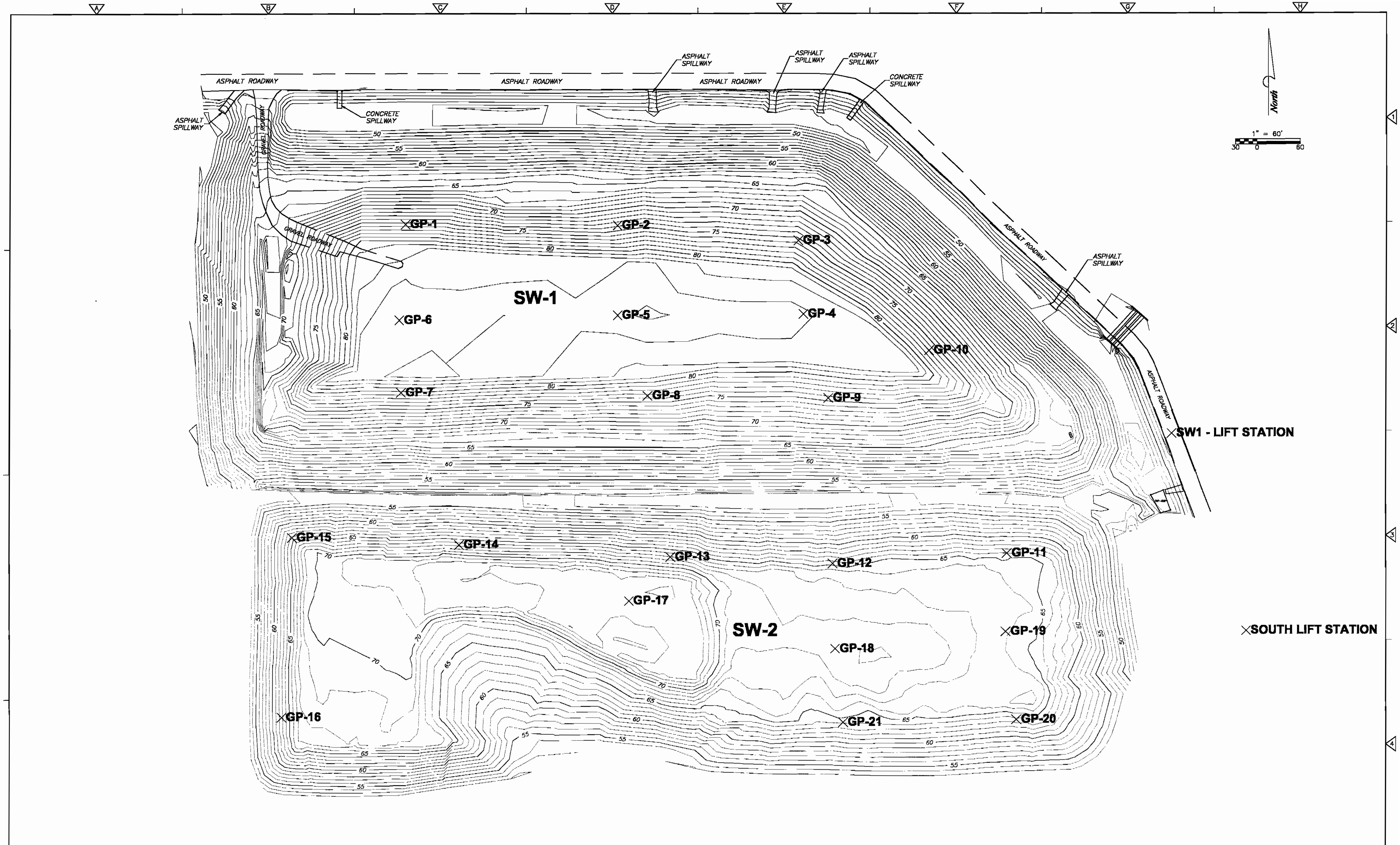
Enclosures

1) Division of Air Resource Management
   Florida Department of Environmental Protection
   Southwest District Office
   13051 N. Telecom Parkway
   Temple Terrace, Florida 33637
2) Ms. Susan Pelz, P.E.
   Solid Waste Section
   Florida Department of Environmental Protection
   Southwest District Office
   13051 N. Telecom Parkway
   Temple Terrace, Florida 33637

cc: Aamod Sonawane, CDM
Therese Schaffer, CDM (email copy only)

Figure 1 Schematic of Sampling Probe and Canister





REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: D. HIGHTOWER
DRAWN BY: B. GROTHPIETZ
SHEET CHK'D BY: D. HIGHTOWER
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2010

CDM
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consulting • engineering • construction • operations

WEST PASCO COUNTY

WEST PASCO COUNTY LANDFILL

TIER 2 TESTING SAMPLING LOCATIONS
SOLID WASTE CELLS SW-1 AND SW-2

PROJECT NO. 6104-74351
FILE NAME: Pasco Tier 2 gas probes.dwg
SHEET NO.

FIGURE 2

Appendix A

Atmospheric Analysis and Consulting Inc. Report

Atmospheric Analysis & Consulting, Inc.

CLIENT : CDM
PROJECT NAME : PASCO TIER 2 STUDY
AAC PROJECT NO. : 090963
REPORT DATE : 12/04/2009

On December 3, 2009, Atmospheric Analysis & Consulting, Inc. received ten (10) Summa Canisters for non-methane organic compounds (NMOC) analysis by EPA 25C and Fixed Gases analysis by EPA 3C. Upon receipt the samples were assigned unique Laboratory ID numbers as follows:

Client ID	Lab ID Number	Initial Pressure (mmHg)
COMPOSITE #1	090963-42253	372.3
COMPOSITE #2	090963-42254	391.8
COMPOSITE #3	090963-72255	399.5
GP-10	090963-72256	403.1
GP-10A	090963-72257	409.3
COMPOSITE #4	090963-72258	407.8
COMPOSITE #5	090963-72259	410.2
COMPOSITE #6	090963-72260	404.4
COMPOSITE #7	090963-72261	401.9
FB-1	090963-72262	0.6

EPA 3C - An aliquot of the gaseous sample is injected into the GC/TCD for analysis following EPA 3C as specified in the SOW. All samples were analyzed in duplicate.

EPA 25C Analysis - Up to a 1 mL aliquot of samples is injected into the GC/FID/TCA for analysis following EPA 25C as specified in the SOW. All samples were analyzed in triplicate.

No problems were encountered during receiving, preparation, and/ or analysis of this sample. The test results included in this report meet all requirements of the NELAC Standards and/or AAC SOP# AACI-EPA 25C and EPA 3C.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. Release of the data contained in this hardcopy data package and its electronic data deliverable submitted on diskette has been authorized by the Laboratory Director or his designee, as verified by the following signature.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha S. Parmar, PhD
Technical Director

ACCREDITED IN ACCORDANCE WITH
Certificate #E87837

This report consists of 8 pages.

1534 Eastman Ave., Ste. A • Ventura, • CA 93003 (805) 650-1642 • FAX (805) 650-1644 • www.aaclab.com

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

Client	**: CDM**
Project No.	**: 090963**
Matrix	**: Air**
Units	**: %**

Sampling Date	**: 12/01-02/2009**
Receiving Date	**: 12/03/2009**
Analysis Date	**: 12/03-04/2009**
Report Date	**: 12/04/2009**

EPA Method 3C

Detection Limits: 0.1 %		Analyte					
Client ID	**AAC ID**	**Hydrogen**	**Oxygen**	**Nitrogen**	**CO**	**Methane**	**CO2**
COMPOSITE #1	090963-42253	<PQL	5.6	20.2	<PQL	45.6	28.6
COMPOSITE #2	090963-42254	<PQL	0.2	1.5	<PQL	64.4	33.8
COMPOSITE #3	090963-42255	<PQL	0.4	1.9	<PQL	58.7	39.0
GP-10	090963-42256	<PQL	0.1	0.8	<PQL	62.8	36.2
GP-10A	090963-42257	<PQL	0.1	0.5	<PQL	63.2	36.2
COMPOSITE #4	090963-42258	<PQL	0.1	0.7	<PQL	56.5	42.6
COMPOSITE #5	090963-42259	<PQL	0.2	1.4	<PQL	55.0	43.3
COMPOSITE #6	090963-42260	<PQL	1.8	7.0	<PQL	52.9	38.3
COMPOSITE #7	090963-42261	<PQL	0.3	1.6	<PQL	57.7	40.4
FB-1	090963-42262	<PQL	<PQL	0.3	<PQL	<PQL	<PQL

Sucha Parmar, Ph.D.
Technical Director

1534 Eastman Avenue • Suite A • Ventura, California 93003 (805) 650-1642 • FAX (805) 650-1644

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

Client	**: CDM**	**Sampling Date**	**: 12/01-02/2009**
Project No.	**: 090963**	**Receiving Date**	**: 12/03/2009**
Matrix	**: Air**	**Analysis Date**	**: 12/03-04/2009**
Units	**: ppmv**	**Report Date**	**: 12/04/2009**

EPA Method 25C

Detection Limit:		**0.3 ppmv**
Client Sample ID	**AAC ID**	**NMHC****
COMPOSITE #1	090963-42253	81
COMPOSITE #2	090963-42254	78
COMPOSITE #3	090963-42255	113
GP-10	090963-42256	77
GP-10A	090963-42257	77
COMPOSITE #4	090963-42258	212
COMPOSITE #5	090963-42259	200
COMPOSITE #6	090963-42260	616
COMPOSITE #7	090963-42261	202
FB-1	090963-42262	<PQL

****Non-Methane Hydrocarbons as methane**

Dr. Sucha Parmar
Technical Director

1534 Eastman Avenue • Suite A • Ventura, California 93003 (805) 650-1642 • FAX (805) 650-1644

Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 12/03/2009
Analyst : DN
Units : %

Instrument ID : TCD#5
Calb Date : 05/07/09
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
CCV	Spike Conc	20.0	5.25	20.0	20.0	20.0	20.0
	Result	20.3	4.80	18.65	19.15	18.97	19.10
	% Rec *	101.4	91.5	93.2	95.8	94.9	95.5

II - Method Blank-EPA Method 3C

AAC ID	Analyte	Hydrogen	Oxygen	Nitrogen	CO	Methane	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III-Laboratory Control Spike & Duplicate - EPA Method 3C

AAC ID	Analyte	H_2	N_2	CO	CH_4	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0
	Spike Conc	20.0	20.0	20.0	20.0	20.0
	LCS Result	19.3	20.1	18.0	17.8	18.0
	LCSD Result	19.0	19.9	17.8	17.6	17.7
	LCS % Rec *	96.7	100.4	90.1	88.8	89.9
	LCSD % Rec *	94.8	99.5	88.9	88.0	88.5
	% RPD ***	1.9	0.9	1.3	1.0	1.5

IV-Sample & Sample Duplicate - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
090963-42253	Sample	0.00	2.20	7.92	0.00	17.35	10.86
	Sample Dup	0.00	2.08	7.39	0.00	17.30	10.83
	Mean	0.00	2.14	7.7	0.00	17.33	10.84
	% RPD ***	0.00	5.46	6.92	0.00	0.29	0.32

V-Matrix Spike & Duplicate- EPA Method 3C

AAC ID	Analyte	H_2	N_2	CO	CH_4	CO_2
090963-42253	Sample Conc	0.0	3.8	0.0	8.7	5.4
	Spike Conc	10.0	10.0	10.0	10.0	10.0
	MS Result	10.1	14.1	9.2	17.6	14.5
	MSD Result	10.1	13.8	9.4	17.2	14.2
	MS % Rec **	101.3	103.1	92.4	89.5	91.0
	MSD % Rec **	100.8	99.7	93.9	85.3	87.8
	% RPD ***	0.5	3.4	1.6	4.8	3.6

VI - Closing Continuing Calibration Verification - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
CCV	Spike Conc	20.0	5.25	20.0	20.0	20.0	20.0
	Result	18.8	5.46	19.72	17.46	17.75	17.85
	% Rec *	93.8	104.0	98.6	87.3	88.7	89.2

** Must be 85-115%*
*** Must be 75-125%*
**** Must be < 25%*
ND = Not Detected
<RL = less than Reporting Limit

Sucha S. Parmar, Ph.D
Technical Director

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed	**: 12/04/2009**			**Instrument ID**	**: TCD#5**
Analyst	**: DN**			**Calb Date**	**: 05/07/09**
Units	**: %**			**Reporting Limit**	**: 0.1%**

I - Opening Continuing Calibration Verification - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
CCV	Spike Conc	20.0	5.25	20.0	20.0	20.0	20.0
	Result	19.4	4.93	19.11	18.14	17.93	18.08
	% Rec *	97.0	93.8	95.6	90.7	89.6	90.4

II - Method Blank-EPA Method 3C

AAC ID	Analyte	Hydrogen	Oxygen	Nitrogen	CO	Methane	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III-Laboratory Control Spike & Duplicate - EPA Method 3C

AAC ID	Analyte	H_2	N_2	CO	CH_4	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0
	Spike Conc	20.0	20.0	20.0	20.0	20.0
	LCS Result	19.6	20.4	18.3	18.7	18.8
	LCSD Result	19.7	20.1	18.3	18.4	18.6
	LCS % Rec *	97.9	101.9	91.4	93.4	93.8
	LCSD % Rec *	98.6	100.3	91.7	91.9	92.8
	% RPD ***	0.7	1.6	0.3	1.6	1.1

IV-Sample & Sample Duplicate - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
090963-42260	Sample	0.00	0.77	2.96	0.00	21.27	15.41
	Sample Dup	0.00	0.72	2.67	0.00	21.55	15.61
	Mean	0.00	0.74	2.8	0.00	21.41	15.51
	% RPD ***	0.00	6.62	10.22	0.00	1.30	1.27

V-Matrix Spike & Duplicate- EPA Method 3C

AAC ID	Analyte	H_2	N_2	CO	CH_4	CO_2
090963-42260	Sample Conc	0.0	1.4	0.0	10.7	7.8
	Spike Conc	10.0	10.0	10.0	10.0	10.0
	MS Result	9.9	11.5	9.2	19.0	16.2
	MSD Result	10.2	10.9	9.3	20.4	17.2
	MS % Rec **	98.6	100.7	92.0	82.6	84.9
	MSD % Rec **	101.7	94.9	93.2	97.1	94.0
	% RPD ***	3.1	5.9	1.2	16.2	10.1

VI - Closing Continuing Calibration Verification - EPA Method 3C

AAC ID	Analyte	H_2	O_2	N_2	CO	CH_4	CO_2
CCV	Spike Conc	20.0	5.25	20.0	20.0	20.0	20.0
	Result	19.2	5.13	20.02	17.99	17.51	17.65
	% Rec *	95.9	97.8	100.1	89.9	87.6	88.2

**** Must be 85-115%***
***** Must be 75-125%***
****** Must be < 25%***
ND = Not Detected
<RL = less than Reporting Limit

Sucha S. Parmar, Ph.D
Technical Director

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Analysis Date: 12/3/2009 **Instrument ID:** FID#9
Analyst: DN **Calibration Date:** 1/18/2008
Units: ppmv

I - Opening Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
CO	11713	10653	9.5
CH4	11996	11456	4.6
CO2	11842	10686	10.3
Propane	33025	29836	10.1

II - Method Blank - Method 25C

AAC ID	Analyte	Sample Result
MB	TNMOC	ND

III - Laboratory Control Spike & Duplicate - Method 25C

AAC ID	Analyte	Spike Added	LCS Result	LCSD Result	LCS % Rec **	LCSD % Rec **	% RPD***
LCS/LCSD	TNMOC	50.0	46.3	46.4	92.7	92.8	0.1

IV - Closing Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
CO	11713	11401	2.7
CH4	11996	12508	4.2
CO2	11842	11860	0.2
Propane	33025	32840	0.6

xCF - Average Calibration Factor from Initial Calibration Curve
dCF - Daily Calibration Factor
* Must be <15%
** Must be 90-110 %
*** Must be <20%

Marcus Hueppe
Laboratory Manager

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Analysis Date: 12/4/2009 **Instrument ID:** FID#9
Analyst: DN **Calibration Date:** 1/18/2008
Units: ppmv

I - Opening Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
CO	11713	10550	10.5
CH4	11996	11214	6.7
CO2	11842	10761	9.6
Propane	33025	30711	7.3

II - Method Blank - Method 25C

AAC ID	Analyte	Sample Result
MB	TNMOC	ND

III - Laboratory Control Spike & Duplicate - Method 25C

AAC ID	Analyte	Spike Added	LCS Result	LCSD Result	LCS % Rec **	LCSD % Rec **	% RPD***
LCS/LCSD	TNMOC	50.0	51.5	46.0	103.1	91.9	11.4

IV - Closing Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
CO	11713	10892	7.3
CH4	11996	11724	2.3
CO2	11842	10872	8.5
Propane	33025	30617	7.6

xCF - Average Calibration Factor from Initial Calibration Curve
dCF - Daily Calibration Factor
* Must be <15%
** Must be 90-110 %
*** Must be <20%

Sucha Parmar, Ph.D
Technical Director

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AAC Project No. 090963 Page 1 of 1

CHAIN OF CUSTODY/ ANALYSIS REQUEST FORM

Client Name: PASCO COUNTY
Project Name: PASCO TIER 2 STUDY
Project Mgr (Print Name): TERRI SCHAFFER
Project Number: 6104-62249-TIER 2
Sampler's Name (Print Name): MIKE DOLAN / DAVE HIGHTOWER
Sampler's Signature: [signature] / [signature]

Analysis Requested: METHOD 25C, METHOD 3C

AAC Sample No.	Date Sampled	Time Sampled	Sample Type	Client Sample ID/Description	Type/No. of Containers		METHOD 25C	METHOD 3C			
COMPOSITE #1	12-1-09	11:30	SUMMA	GP-1, GP-2, GP-3	LANDFILL GAS / 1		X	X		422	53
COMPOSITE #2	↓	13:15	↓	GP-4, GP-5, GP-6	LFG / 1		↓	↓		422	54
COMPOSITE #3		14:30		GP-7, GP-8, GP-9	LFG / 1					422	55
GP-10		15:09		GP-10	LFG / 1					422	56
GP-10A		–		GP-10A	LFG / 1					422	57
COMPOSITE #4	↓	16:29	↓	GP-11, GP-12, GP-13	LFG / 1					422	58
COMPOSITE #5	12-2-09	8:54	SUMMA	GP-14, GP-15, GP-16	LFG / 1					422	59
COMPOSITE #6	↓	9:45	↓	GP-17, GP-18, GP-19	LFG / 1					422	60
COMPOSITE #7		10:17		GP-20, GP-21	LFG / 1					422	61
FB-1	↓	~~0800~~	↓	FB-1	– / 1		↓	↓		422	62

Send report:
Attn: TERRI SCHAFFER
50 HAMPSHIRE ST.
CAMBRIDGE, MA. 02139
Phone#: 617-452-6372
Fax#: ↓ SAME

Send invoice to:
Attn: SAME AS ABOVE
P.O. #

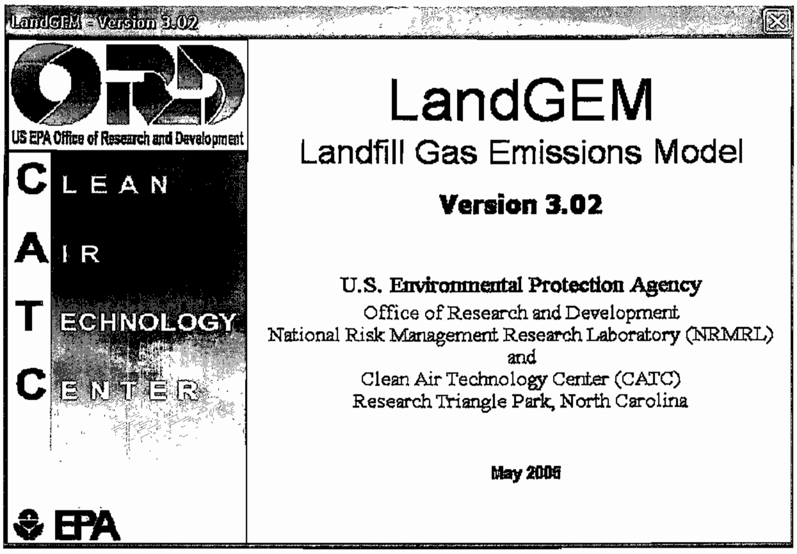
Turnaround Time
24-Hr ___ 48-Hr ___
5 Day ___ Normal ✓
Other (Specify) ___

Special Instructions/remarks:
* PLEASE CALL T. SCHAFFER WITH ANY QUESTIONS.

Relinquished by (Signature):	Print Name:	Date/Time	Received by (signature):	Print Name
[signature]	MICHAEL DOLAN	12-2-09 12:10		
Relinquished by (Signature):	Print Name:	Date/Time 12/3/2009 0955	Received by (signature): [signature]	Print Name: Benjamin Witten

Appendix B

LandGEM Tier 1 Analysis (2007)



Summary Report

Landfill Name or Identifier: Pasco County - Spring Hill, Florida

Date: Monday, January 11, 2010

Description/Comments:

About LandGEM:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-k t_{ij}}$$

Q_{CH_4} = annual methane generation in the year of the calculation *(m^3/year)*
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate *($year^{-1}$)*
L_o = potential methane generation capacity *(m^3/Mg)*

M_i = mass of waste accepted in the i^{th} year *(Mg)*
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year *(decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1991**	
Landfill Closure Year (with 80-year limit)	**2010**	
Actual Closure Year (without limit)	***2010***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**839,360**	*short tons*

MODEL PARAMETERS

Methane Generation Rate, k	**0.050**	*$year^{-1}$*
Potential Methane Generation Capacity, L_o	**170**	*m^3/Mg*
NMOC Concentration	**4,000**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**NMOC**
Gas / Pollutant #3:	
Gas / Pollutant #4:	

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1991	3,547	3,902	0	0
1992	4,028	4,431	3,547	3,902
1993	1,595	1,755	7,575	8,333
1994	1,299	1,429	9,171	10,088
1995	6,443	7,087	10,470	11,517
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2029	0	0	293,477	322,824
2030	0	0	293,477	322,824

Pollutant Parameters

	Compound	Gas / Pollutant Default Parameters: Concentration (*ppmv*)	Molecular Weight	User-specified Pollutant Parameters: Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

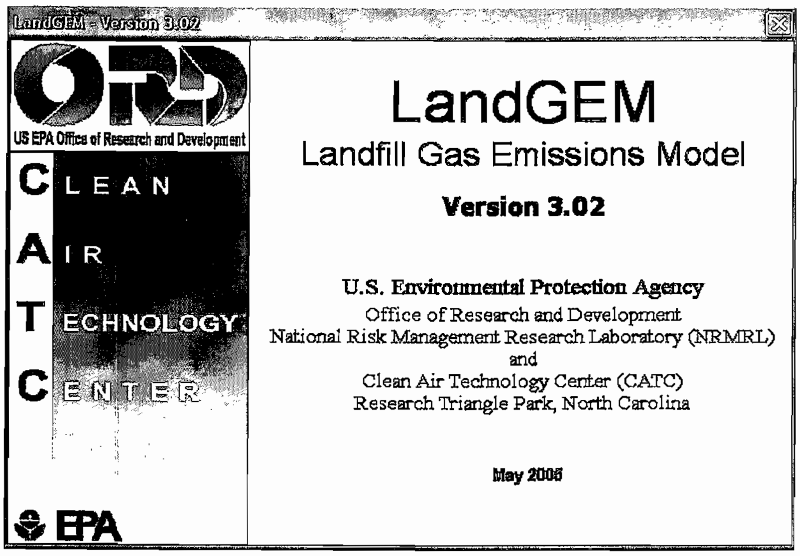
Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1991	0	0	0	0	0	0
1992	7.364E+01	5.897E+04	3.962E+00	8.455E-01	2.359E+02	1.585E-02
1993	1.537E+02	1.231E+05	8.268E+00	1.764E+00	4.922E+02	3.307E-02
1994	1.793E+02	1.436E+05	9.647E+00	2.059E+00	5.743E+02	3.859E-02
1995	1.975E+02	1.582E+05	1.063E+01	2.268E+00	6.327E+02	4.251E-02
1996	3.216E+02	2.576E+05	1.731E+01	3.693E+00	1.030E+03	6.922E-02
1997	4.524E+02	3.623E+05	2.434E+01	5.194E+00	1.449E+03	9.736E-02
1998	5.764E+02	4.615E+05	3.101E+01	6.617E+00	1.846E+03	1.240E-01
1999	5.918E+02	4.739E+05	3.184E+01	6.795E+00	1.896E+03	1.274E-01
2000	9.543E+02	7.642E+05	5.134E+01	1.096E+01	3.057E+03	2.054E-01
2001	1.665E+03	1.333E+06	8.959E+01	1.912E+01	5.333E+03	3.583E-01
2002	1.922E+03	1.539E+06	1.034E+02	2.207E+01	6.157E+03	4.137E-01
2003	2.194E+03	1.757E+06	1.180E+02	2.519E+01	7.026E+03	4.721E-01
2004	2.122E+03	1.699E+06	1.142E+02	2.436E+01	6.797E+03	4.567E-01
2005	2.496E+03	1.999E+06	1.343E+02	2.865E+01	7.994E+03	5.371E-01
2006	3.282E+03	2.628E+06	1.766E+02	3.769E+01	1.051E+04	7.064E-01
2007	4.534E+03	3.630E+06	2.439E+02	5.205E+01	1.452E+04	9.757E-01
2008	4.885E+03	3.911E+06	2.628E+02	5.608E+01	1.565E+04	1.051E+00
2009	4.675E+03	3.743E+06	2.515E+02	5.367E+01	1.497E+04	1.006E+00
2010	4.567E+03	3.657E+06	2.457E+02	5.244E+01	1.463E+04	9.829E-01
2011	4.344E+03	3.479E+06	2.337E+02	4.988E+01	1.392E+04	9.350E-01
2012	4.133E+03	3.309E+06	2.223E+02	4.745E+01	1.324E+04	8.894E-01
2013	3.931E+03	3.148E+06	2.115E+02	4.513E+01	1.259E+04	8.460E-01
2014	3.739E+03	2.994E+06	2.012E+02	4.293E+01	1.198E+04	8.047E-01
2015	3.557E+03	2.848E+06	1.914E+02	4.084E+01	1.139E+04	7.655E-01
2016	3.383E+03	2.709E+06	1.820E+02	3.885E+01	1.084E+04	7.282E-01
2017	3.218E+03	2.577E+06	1.732E+02	3.695E+01	1.031E+04	6.926E-01
2018	3.062E+03	2.452E+06	1.647E+02	3.515E+01	9.806E+03	6.589E-01
2019	2.912E+03	2.332E+06	1.567E+02	3.344E+01	9.328E+03	6.267E-01
2020	2.770E+03	2.218E+06	1.490E+02	3.180E+01	8.873E+03	5.962E-01
2021	2.635E+03	2.110E+06	1.418E+02	3.025E+01	8.440E+03	5.671E-01
2022	2.507E+03	2.007E+06	1.349E+02	2.878E+01	8.029E+03	5.394E-01
2023	2.384E+03	1.909E+06	1.283E+02	2.737E+01	7.637E+03	5.131E-01
2024	2.268E+03	1.816E+06	1.220E+02	2.604E+01	7.265E+03	4.881E-01
2025	2.157E+03	1.728E+06	1.161E+02	2.477E+01	6.910E+03	4.643E-01
2026	2.052E+03	1.643E+06	1.104E+02	2.356E+01	6.573E+03	4.417E-01
2027	1.952E+03	1.563E+06	1.050E+02	2.241E+01	6.253E+03	4.201E-01
2028	1.857E+03	1.487E+06	9.991E+01	2.132E+01	5.948E+03	3.996E-01
2029	1.766E+03	1.414E+06	9.503E+01	2.028E+01	5.658E+03	3.801E-01
2030	1.680E+03	1.345E+06	9.040E+01	1.929E+01	5.382E+03	3.616E-01
2031	1.598E+03	1.280E+06	8.599E+01	1.835E+01	5.119E+03	3.440E-01
2032	1.520E+03	1.217E+06	8.180E+01	1.745E+01	4.870E+03	3.272E-01
2033	1.446E+03	1.158E+06	7.781E+01	1.660E+01	4.632E+03	3.112E-01
2034	1.376E+03	1.102E+06	7.401E+01	1.579E+01	4.406E+03	2.960E-01
2035	1.309E+03	1.048E+06	7.040E+01	1.502E+01	4.191E+03	2.816E-01
2036	1.245E+03	9.967E+05	6.697E+01	1.429E+01	3.987E+03	2.679E-01
2037	1.184E+03	9.481E+05	6.370E+01	1.359E+01	3.792E+03	2.548E-01
2038	1.126E+03	9.019E+05	6.060E+01	1.293E+01	3.607E+03	2.424E-01
2039	1.071E+03	8.579E+05	5.764E+01	1.230E+01	3.432E+03	2.306E-01
2040	1.019E+03	8.160E+05	5.483E+01	1.170E+01	3.264E+03	2.193E-01

Appendix C
LandGEM Tier 2 Analysis (2010)



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	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
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	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1991	0	0	0	0	0	0
1992	7.364E+01	5.897E+04	3.962E+00	7.525E-03	2.099E+00	1.410E-04
1993	1.537E+02	1.231E+05	8.268E+00	1.570E-02	4.381E+00	2.943E-04
1994	1.793E+02	1.436E+05	9.647E+00	1.832E-02	5.111E+00	3.434E-04
1995	1.975E+02	1.582E+05	1.063E+01	2.018E-02	5.631E+00	3.783E-04
1996	3.216E+02	2.576E+05	1.731E+01	3.287E-02	9.169E+00	6.161E-04
1997	4.524E+02	3.623E+05	2.434E+01	4.623E-02	1.290E+01	8.665E-04
1998	5.764E+02	4.615E+05	3.101E+01	5.890E-02	1.643E+01	1.104E-03
1999	5.918E+02	4.739E+05	3.184E+01	6.047E-02	1.687E+01	1.134E-03
2000	9.543E+02	7.642E+05	5.134E+01	9.751E-02	2.720E+01	1.828E-03
2001	1.665E+03	1.333E+06	8.959E+01	1.701E-01	4.747E+01	3.189E-03
2002	1.922E+03	1.539E+06	1.034E+02	1.964E-01	5.480E+01	3.682E-03
2003	2.194E+03	1.757E+06	1.180E+02	2.242E-01	6.253E+01	4.202E-03
2004	2.122E+03	1.699E+06	1.142E+02	2.168E-01	6.049E+01	4.064E-03
2005	2.496E+03	1.999E+06	1.343E+02	2.550E-01	7.115E+01	4.780E-03
2006	3.282E+03	2.628E+06	1.766E+02	3.354E-01	9.357E+01	6.287E-03
2007	4.534E+03	3.630E+06	2.439E+02	4.632E-01	1.292E+02	8.683E-03
2008	4.885E+03	3.911E+06	2.628E+02	4.991E-01	1.392E+02	9.356E-03
2009	4.675E+03	3.743E+06	2.515E+02	4.777E-01	1.333E+02	8.954E-03
2010	4.567E+03	3.657E+06	2.457E+02	4.667E-01	1.302E+02	8.748E-03
2011	4.344E+03	3.479E+06	2.337E+02	4.439E-01	1.238E+02	8.321E-03
2012	4.133E+03	3.309E+06	2.223E+02	4.223E-01	1.178E+02	7.915E-03
2013	3.931E+03	3.148E+06	2.115E+02	4.017E-01	1.121E+02	7.529E-03
2014	3.739E+03	2.994E+06	2.012E+02	3.821E-01	1.066E+02	7.162E-03
2015	3.557E+03	2.848E+06	1.914E+02	3.635E-01	1.014E+02	6.813E-03
2016	3.383E+03	2.709E+06	1.820E+02	3.457E-01	9.645E+01	6.481E-03
2017	3.218E+03	2.577E+06	1.732E+02	3.289E-01	9.175E+01	6.165E-03
2018	3.062E+03	2.452E+06	1.647E+02	3.128E-01	8.727E+01	5.864E-03
2019	2.912E+03	2.332E+06	1.567E+02	2.976E-01	8.302E+01	5.578E-03
2020	2.770E+03	2.218E+06	1.490E+02	2.831E-01	7.897E+01	5.306E-03
2021	2.635E+03	2.110E+06	1.418E+02	2.693E-01	7.512E+01	5.047E-03
2022	2.507E+03	2.007E+06	1.349E+02	2.561E-01	7.145E+01	4.801E-03
2023	2.384E+03	1.909E+06	1.283E+02	2.436E-01	6.797E+01	4.567E-03
2024	2.268E+03	1.816E+06	1.220E+02	2.318E-01	6.465E+01	4.344E-03
2025	2.157E+03	1.728E+06	1.161E+02	2.204E-01	6.150E+01	4.132E-03
2026	2.052E+03	1.643E+06	1.104E+02	2.097E-01	5.850E+01	3.931E-03
2027	1.952E+03	1.563E+06	1.050E+02	1.995E-01	5.565E+01	3.739E-03
2028	1.857E+03	1.487E+06	9.991E+01	1.897E-01	5.293E+01	3.557E-03
2029	1.766E+03	1.414E+06	9.503E+01	1.805E-01	5.035E+01	3.383E-03
2030	1.680E+03	1.345E+06	9.040E+01	1.717E-01	4.790E+01	3.218E-03
2031	1.598E+03	1.280E+06	8.599E+01	1.633E-01	4.556E+01	3.061E-03
2032	1.520E+03	1.217E+06	8.180E+01	1.553E-01	4.334E+01	2.912E-03
2033	1.446E+03	1.158E+06	7.781E+01	1.478E-01	4.123E+01	2.770E-03
2034	1.376E+03	1.102E+06	7.401E+01	1.406E-01	3.921E+01	2.635E-03
2035	1.309E+03	1.048E+06	7.040E+01	1.337E-01	3.730E+01	2.506E-03
2036	1.245E+03	9.967E+05	6.697E+01	1.272E-01	3.548E+01	2.384E-03
2037	1.184E+03	9.481E+05	6.370E+01	1.210E-01	3.375E+01	2.268E-03
2038	1.126E+03	9.019E+05	6.060E+01	1.151E-01	3.211E+01	2.157E-03
2039	1.071E+03	8.579E+05	5.764E+01	1.095E-01	3.054E+01	2.052E-03
2040	1.019E+03	8.160E+05	5.483E+01	1.041E-01	2.905E+01	1.952E-03