

**REPORT OF METHANE MONITORING
SECOND QUARTER 2013
CITY OF ALBEMARLE LANDFILL
STANLY COUNTY, NORTH CAROLINA**

Prepared for:
CITY OF ALBEMARLE
Albemarle, North Carolina

By:
Shield Engineering
4301 Taggart Creek Road
Charlotte, North Carolina

Shield Project 1110192

May 24, 2013

DENR USE ONLY:

Paper Report

Electronic Data - Email CD (data loaded: Yes / No)

Doc/Event #:

NC DENR

Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- Prepare one form for each individually monitored unit.
- Please type or print legibly.
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i)).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

SHIELD ENGINEERING, INC.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: J. David Wallace, P.E.

Phone: (704)-971-4149

E-mail: dwallace@shieldengineering.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
CITY OF ALBEMARLE LANDFILL	40592-B STONY GAP ROAD ALBEMARLE NORTH CAROLINA, 28001	84-01	.1600	April - June, 2013

Environmental Status: (Check all that apply)

- Initial/Background Monitoring
 Detection Monitoring
 Assessment Monitoring
 Corrective Action

Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells
 Methane gas monitoring data
 Groundwater monitoring data from private water supply wells
 Corrective action data (specify) _____
 Leachate monitoring data
 Other(specify) _____
 Surface water monitoring data

Notification attached?

- No. No groundwater or surface water standards were exceeded.
 Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
 Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

J. David Wallace, P.E.

SENIOR ENGINEER

(704)-971-4149

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

Affix NC Licensed/ Professional Geologist Seal

J. David Wallace
Signature

5/23/13
Date

4301 TAGGART CREEK ROAD, CHARLOTTE, NC 28208

Facility Representative Address

F-0856

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009



May 24, 2013

Mr. Ervin Lane
Solid Waste Section
Division of Waste Management
NCDENR
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Subject: **Report of Methane Monitoring – Second Quarter 2013**
City of Albemarle Landfill
DSWM Permit No. 84-01
Shield Project 1110192

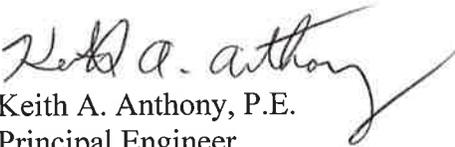
Dear Mr. Lane:

On behalf of City of Albemarle (Albemarle), Shield Engineering, Inc. (Shield) is pleased to submit this Report of Methane Monitoring for the Second Quarter of 2013 for the subject site. This report includes the results of the Second Quarter 2013 methane monitoring of permanent probes. The activities were performed in accordance with the *Landfill Gas Monitoring Guidance* dated November 2010.

If you have any questions or comments, please contact us at (704) 394-6913.

Sincerely,
SHIELD ENGINEERING, INC.




Keith A. Anthony, P.E.
Principal Engineer

JDW/KAA:

cc: Ms. Nina Underwood, Director of Public Works (City of Albemarle)



1.0 INTRODUCTION

1.1 Background

The City of Albemarle Landfill (DSWM [Division of Solid Waste Management] Permit #84-01) is located on Stony Gap Road (SR 1720), in Stanly County, North Carolina (see Figure 1). Prior to operating as a C&D Landfill, the site formerly operated as an unlined Municipal Solid Waste Landfill (MSWLF) that consisted of two units. The first unit (Unit #1) was closed prior to October 1991 with a 24-inch final soil cover. The second unit (Unit #2) was closed with an 18-inch thick cohesive soil cap with a permeability of 10^{-5} centimeters per second (cm/sec) and an 18-inch thick soil erosive layer prior to June 1999 in accordance with the *Transition Plan*. The C&D Landfill is constructed and operating on top of the Unit #1 MSWLF.

Adjacent to the C&D Landfill, across the unnamed tributary of Jacob's Creek, on the same contiguous property is the active Subtitle D lined MSWLF. The lined MSWLF is comprised of two contiguous phases (Phase 1 and 2) which are combined and treated as a single unit for continuity of the reporting to the SWS. This active MSWLF also operates under DSWM Permit #84-01 and is also reported herein.

1.2 Methane Monitoring Program

The Methane Monitoring Program for the active C&D Landfill on top of the former MSWLF has included the monitoring of the permanent methane monitoring probes located around the site (MP-1 through MP-13; excluding MP-6, MP-8), and both the maintenance and recycling shops.

A series of methane monitoring probes have also been installed around the Subtitle D lined MSWLF (MP-14, and MP-18 through MP-30) to monitor for methane gas as required by Title 15A North Carolina Administrative Code Subchapter 13B Section .1626(4)(a)(ii) and .1626(4)(b) [15A NCAC 13B.1626(4)(a)(ii) and .1626(4)(b)].

The locations of the methane monitoring probes are shown on the attached Figure 1. Together these two groups of methane monitoring probes and the two shops comprise the current methane monitoring for the City of Albemarle Landfill.

1.3 Methane Data Collection and Presentation

The percentage of methane gas in air data from the methane monitoring probes were measured using a LANDTEC GEM-2000TM gas monitor. These methane data were entered onto the SWS forms from the LANDTEC GEM-2000 gas monitor and the original copy of these forms is retained as part of the landfill operating record (see Appendix A).

Methane is explosive at concentrations ranging from 5 percent (%) of methane gas (lower explosive limit – LEL) to 15 % of methane gas (upper explosive limit – UEL) by volume in air. SWS management guidelines state that methane concentrations should not exceed either the LEL (5 % of methane gas in air) at property boundaries or 25 % of the LEL (1.25 % of methane gas in air) in facility structures [15A NCAC 13B.1626(4)(a)].

The methane measurement procedures used for monitoring methane at this Site follow both the manufacturer’s specifications for the gas monitor and those procedures outlined in *Landfill Gas Monitoring Guidance* dated November 2010.

The methane results are summarized in Table 1. The instrument calibration records and the Landfill Gas Monitoring Data Forms as required by *Landfill Gas Monitoring Guidance* are included in Appendix A.

2.0 METHANE GAS DATA

2.1 Methane Data Results Summary

2.1.1 Active C&D and closed MSWLF

No stabilized methane concentrations above zero were found in nine of the eleven methane probes around the active C&D Landfill and closed MSWLF. Neither of the two shops exhibited the presence of methane. Stabilized methane concentrations were found to be above zero for two methane probes (i.e., MP-9, and MP-12) around the active C&D Landfill and closed MSWLF. Both of these methane concentrations exhibited methane above 5% of methane in air. The regulatory limit at the compliance boundary or property boundary is 5% of methane in air. However, the recent purchase of the adjacent property located west from these two methane probes, has moved the property boundary about 900 feet further west from MP-9, and about 900 feet further south from MP-12. The following briefly describes the historical trend to date for these two methane monitoring probes since 2010:

- MP-9: Methane has been undetected since 2010 through to the Fourth Quarter of 2012 (i.e., except for one methane detection at 4.9% of methane gas in air [May 2011]). Methane was detected above the LEL during the First Quarter of 2013.
- MP-12: Methane has been undetected since 2010 through to the Fourth Quarter of 2012 (i.e., however, methane had been previously detected for the period from July 2007 through January 2009, during which it ranged from 2 to 9% of methane gas in air). Methane was detected above the LEL during the First Quarter of 2013.

Methane measurements obtained from those methane probes closer to the property boundary (i.e., MP-1 through MP-5, and MP-13: see Figure 1) exhibited no methane during the Second Quarter of 2013.

2.1.2 Subtitle D lined MSWLF

No stabilized methane concentrations were found to be above zero for the methane probes around the active Subtitle D lined MSWLF, except for Methane Probe MP-19. The methane in air concentration in this methane probe was at 38.3% of methane in air on May 9, 2013 (see

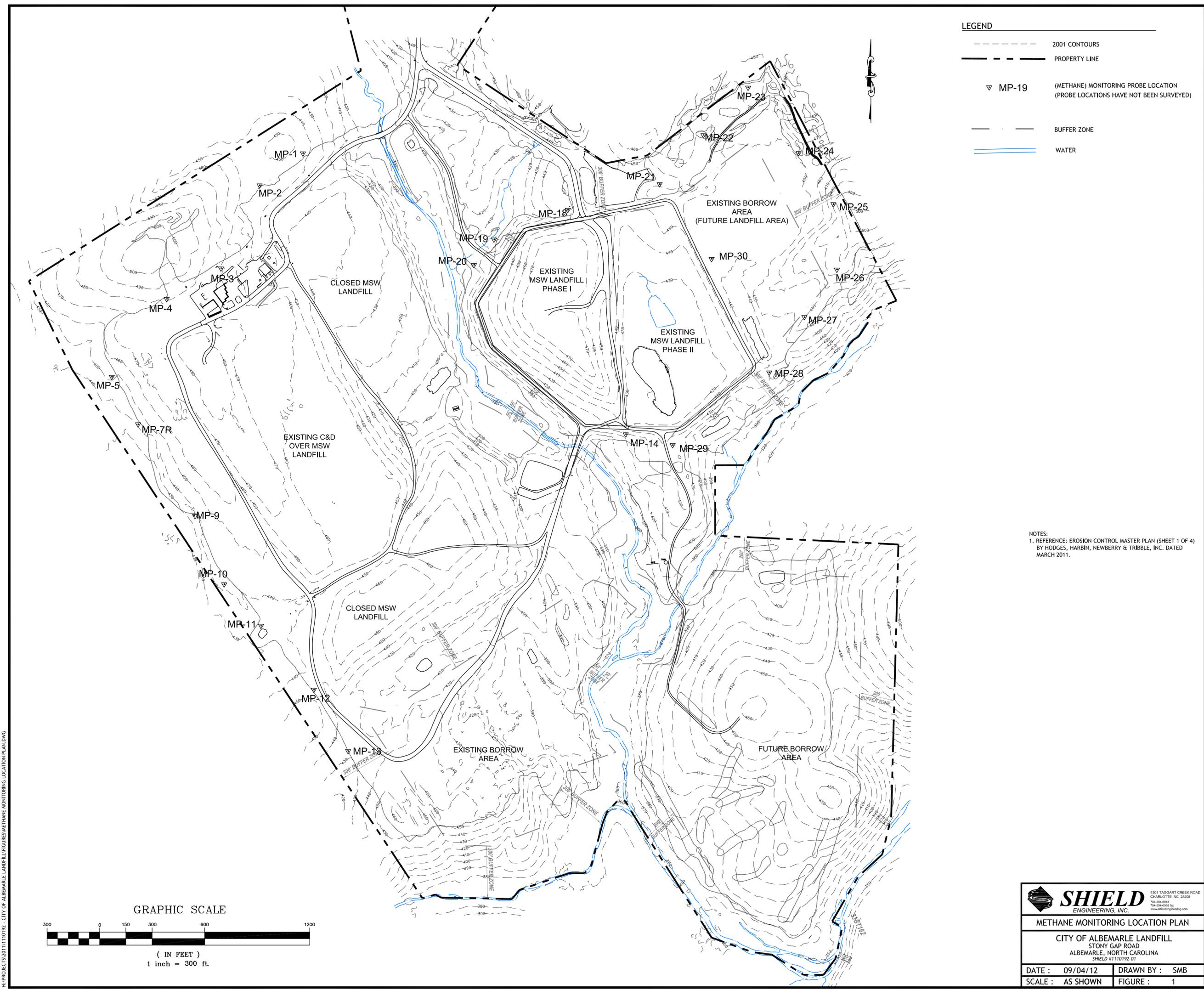
Table 1). Prior to 2013 this methane probe had exhibited previous methane detections of 3.8% of methane in air in May 2011 and 2.8% of methane in air in November 2012. However, both Methane Probes MP-18 and MP-21, which are located closer to the property boundary in this area of the property, exhibited no detections of methane during this monitoring period. The regulatory limits were met by those methane monitoring probes closer to the property boundary at this site.

2.2 Comments

Based on results of recent methane monitoring data for both the sites, methane gas concentrations at the methane monitoring probes closest to the property boundary are below regulatory limits for the Second Quarter of 2013.

TABLE 1
 METHANE MONITORING DATA
 CITY OF ALBEMARLE LANDFILL
 STANLY COUNTY, NORTH CAROLINA

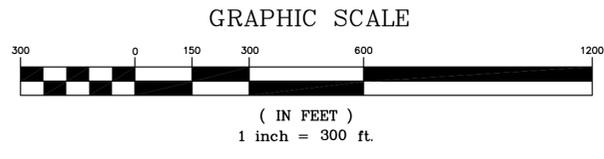
Methane Monitoring Probe Identification	Date of Readings: May 9, 2013	
	Methane in Air (%)	% of LEL
ACTIVE C&D AND CLOSED MSWLF		
MP-1	ND	ND
MP-2	ND	ND
MP-3	ND	ND
MP-4	ND	ND
MP-5	ND	ND
MP-7R	ND	ND
MP-9	50.4	>100
MP-10	ND	ND
MP-11	ND	ND
MP-12	70.8	>100
MP-13	ND	ND
SUBTITLE D LINED MSWLF		
MP-14	ND	ND
MP-18	ND	ND
MP-19	38.3	>100
MP-20	ND	ND
MP-21	ND	ND
MP-22	ND	ND
MP-23	ND	ND
MP-24	ND	ND
MP-25	ND	ND
MP-26	ND	ND
MP-27	ND	ND
MP-28	ND	ND
MP-29	ND	ND
MP-30	ND	ND
Maintenance Shop	ND	ND
Recycling Shop	ND	ND
NOTES: 1) LEL - Lower Explosive Limit (5 % of methane in Air) 2) ND - Not Detected 3) Whenever percentage of Methane in Air is less than 5%, Methane readings are provided in terms of percentage of LEL. 4) Whenever percentage of Methane in Air is greater than LEL (5% of Methane in Air) no LEL reading is provided.		



LEGEND

---	2001 CONTOURS
---	PROPERTY LINE
▽ MP-19	(METHANE) MONITORING PROBE LOCATION (PROBE LOCATIONS HAVE NOT BEEN SURVEYED)
---	BUFFER ZONE
---	WATER

NOTES:
 1. REFERENCE: EROSION CONTROL MASTER PLAN (SHEET 1 OF 4)
 BY HODGES, HARBIN, NEWBERRY & TRIBBLE, INC. DATED
 MARCH 2011.



H:\PROJECTS\2011\110192 - CITY OF ALBEMARLE LANDFILL\FIGURES\METHANE MONITORING LOCATION PLAN.DWG

		<small>4301 TAGGART CREEK ROAD CHARLOTTE, NC 28208 704-384-0913 704-384-0988 fax www.shieldengineering.com</small>	
		METHANE MONITORING LOCATION PLAN	
CITY OF ALBEMARLE LANDFILL STONY GAP ROAD ALBEMARLE, NORTH CAROLINA <small>SHIELD #110192-01</small>			
DATE :	09/04/12	DRAWN BY :	SMB
SCALE :	AS SHOWN	FIGURE :	1

NC Division of Waste Management - Solid Waste Section

Landfill Gas Monitoring Data Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Facility Name: City of Albemarle Landfill Permit Number: #84-01

Date of Sampling: 5/9/13 NC Landfill Rule (.0500 or .1600): .1600

Name and Position of Sample Collector: DANNY HEFNER - SHIELD ENGR FIELD SERVICES MANAGER

Type and Serial Number of Gas Meter: LAUDREC GEN 2000 GM 07614 Calibration Date of Gas Meter: _____

Date and Time of Field Calibration: 5/8/2013

Type of Field Calibration Gas (15/15 or 35/50): 35/50 Expiration Date of Field Calibration Gas Canister: 12/2015

Pump Rate of Gas Meter: 621.7 cc/min

Ambient Air Temperature: _____ Barometric Pressure: 29.54-29.56 General Weather Conditions: SUNNY

Instructions: Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume can be converted to % LEL as follows: % methane by volume = % LEL/20

Location or LFG Well ID	Sample Tube Purge Min	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
MP-1	3	12:18	60	0	0	0.0	19.3	1.0	BARO PRESS. (11kg) 29.54
MP-2	2	12:22	60	0	0	0.0	14.3	2.7	
MP-3	2	12:26	60	0	0	0.0	19.0	0.7	
MP-4	2	12:46	60	0	0	0.0	19.9	0.5	
MP-5	3	12:51	60	0	0	0.0	7.6	13.1	
MP-7R	3	12:55	60	0	0	0.0	9.5	7.6	
MP-9	2	12:59	60	>100	>100	50.4	0.6	36.3	
MP-10	3	13:04	60	0	0	0.0	18.1	2.2	
MP-11	3	13:10	60	0	0	0.0	19.2	1.1	
MP-12	3	13:16	60	>100	>100	70.8	0.9	11.1	

If your facility has more gas monitoring locations than there is room on this form, please attach additional sheets listing the same information as contained on this form.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Danny Hefner
SIGNATURE

FIELD SERVICES MANAGER
TITLE

CERTIFICATION OF CALIBRATION

ISSUED BY: Landtec North America Instrument Services Facility
Date Of Calibration: February 20, 2013
Certificate Number: GM07614_6/8597



Page 1 of 2



Landtec North America Instrument Services Facility,
850 South Via Lata, Suite 112, Colton CA, 92324
www.LANDTECSA.com

Approved By Signatory

Jose Conferas
Laboratory Inspection

Customer: *Enviro Equipment, Inc.*
11180 Downs Road
Pineville, NC 28134
USA

Description: Gas Analyser

Model: GEM2000

Serial Number: GM07614

Accredited Results:

Methane (CH ₄)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
50.0	49.4	1.40
15.0	14.8	0.80
5.0	4.8	0.43

Carbon Dioxide (CO ₂)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
50.0	50.0	1.50
15.0	14.7	0.99
5.0	4.8	0.49

Oxygen (O ₂)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
21.0	21.0	0.28

Gas cylinders are traceable and details can be provided if requested.

CH₄, CO₂ readings recorded at: 32.7 °C/90.8 °F

Barometric Pressure: 28.86 "Hg

O₂ readings recorded at: 23.6 °C/74.4 °F

Method of Test: The analyser is calibrated in a temperature controlled chamber using reference gases.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATION OF CALIBRATION

PJLA ACCREDITED CALIBRATION LABORATORY NO. 66916

Certificate Number
GM07614_6/8597

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Non Accredited results:

Pressure Transducers (inches of water column)					
Transducer	Certified (Low)	Reading (Low)	Certified (High)	Reading (High)	Accuracy
Static	0"	0.0"	40"	39.9"	2.0
Differential	0"	0.0"	4"	4.0"	0.7

Barometer (mbar)	
Reference	Reading
0977 mbar / 28.86 "Hg	0975 mbar / 28.78 "Hg

As received gas check readings:

Methane (CH ₄)	
Certified Gas (%)	Instrument Reading (%)
60.0	61.1
15.0	14.8
5.0	4.9

Carbon Dioxide (CO ₂)	
Certified Gas (%)	Instrument Reading (%)
40.0	38.8
15.0	15.1
5.0	6.2

Oxygen (O ₂)	
Certified Gas (%)	Instrument Reading (%)
21.0	21.1

As received Gas readings recorded at 32.7 °C/90.8 °F

As received Barometric Pressure recorded at 23.6 °C/74.4 °F

End of Certificate

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LANDTEC North America Instrument Services Facility - 850 South Via Lata, Suite 112, Colton, CA 92324

