

Remedial Investigation - Subsurface Landfill Gas Survey

**CITY OF LUMBERTON LDFL
Lumberton, Robeson County, North Carolina**

**State Contract N11001S
Task Order No. 712DP-8
MM&A Project Number NCUL233P5**

Prepared for:

**North Carolina Department of Environment and
Natural Resources**
Division of Waste Management - Superfund Section
Inactive Hazardous Sites Branch
Pre-Regulatory Landfill Unit
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July 11, 2014

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1.0 INTRODUCTION

This report was prepared by **Marshall Miller & Associates, Inc. (MM&A)** on behalf of the **North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management, Superfund Section, Inactive Hazardous Sites Branch, Pre-Regulatory Landfill Unit (*the Unit*)** to summarize the results of the *Remedial Investigation - Subsurface Landfill Gas Survey* at the City of Lumberton LDFL (NONCD0000712) located in Lumberton, Robeson County, North Carolina, herein after referred to as the “site.” The scope of work included the tasks outlined by the Unit in Task Orders 712DP-8.

Deviations from the scope of work outlined in the work plan dated March 31, 2014, prepared by MM&A included the following:

- GP-1, GP-5, GP-6, GP-8, GP-9, and GP-10 could not be installed as permanent gas probes due to a shallow water table. Flux chambers were installed at these locations.
- Due to shallow water table, GP-2 and GP-7 were each installed with a 2-foot screen interval, and GP-3 and GP-4 were installed with 3-foot screen intervals.
- Air samples were not collected from the gas probes and flux chambers using summa canisters, as per instructions from the Unit.

2.0 SAMPLING AND ANALYSES OF SUBSURFACE LANDFILL GAS

On June 9, 2014, MM&A personnel supervised the installation of four landfill gas probes (GP-2, GP-3, GP-4, and GP-7) and six flux chambers (GP-1, GP-5, GP-6, GP-8, GP-9, and GP-10) at the site and subject property. During the gas probe installation activities, soil cuttings were screened for volatile organic compounds (VOCs) using a photoionization detector (PID), while methane levels were monitored for safety using a Q-RAE meter. Elevated methane readings were detected during the installation of GP-3 and GP-5. Once the elevated readings were encountered, the drilling activities were temporarily suspended until the methane concentrations decreased to below 10% of the lower explosive limit.

2.1 GAS PROBE INSTALLATION

Gas probes GP-2 GP-3, and GP-4 were each installed within the defined waste boundary, while GP-7 was installed just outside the waste boundary. During the installation activities, each gas

probe was drilled until groundwater was encountered. The gas probes were each constructed of 2-inch PVC well casings. GP-2 and GP-7 were each installed with a 2-foot screen interval. GP-3 and GP-4 were installed with 3-foot screen intervals. A sand pack was placed around the screen and a 2 ft bentonite seal was then placed on top of the sand pack. After hydration of the bentonite seal, the remaining annulus was grouted to the surface and completed with an above-grade lockable cover and a 2 ft x 2 ft concrete pad. The screen intervals of each gas probe were set as to be a minimum of 2 ft above the local water table, and allow for a 5 ft bentonite/grout seal above the screen.

Landfill gas probe construction records are included in *Table 1*, while boring logs are provided in **Appendix A**. Gas probe locations are shown on *Figure 1*. GPS coordinates of the gas probe locations are included in **Appendix B**.

2.2 FLUX CHAMBER INSTALLATION

Due to shallow groundwater, permanent landfill gas probes could not be installed at the GP-1, GP-5, GP-6, GP-8, GP-9, and GP-10 locations with the minimum five foot seal. Therefore, flux chambers were installed at each location (*Figure 1*).

Flux chambers were constructed using inert materials and equipped with a sampling port to facilitate collection of air samples and landfill gas measurements. The flux chambers were installed by first excavating two to three inches of soil at the flux chamber location. A 3-inch hand auger was then advanced within the center of the excavated area to a depth of two feet. Bentonite was then placed around the edges of the excavation where the rim of the flux chambers met the ground. The flux chambers were then placed on the bentonite and the bentonite was hydrated. The excavated soil was placed around the flux chamber rim and compacted, to form an air-tight seal.

2.3 LANDFILL GAS READINGS

MM&A personnel collected landfill gas measurements from the four landfill gas probes and six flux chambers on June 12, 2014. Field equipment used for the landfill gas survey included:

- GEM 2000+: Methane, Carbon Dioxide, Oxygen, Hydrogen Sulfide, Barometric Pressure

- MiniRAE 3000 Photoionization Detector (PID): VOCs
- Jerome J405: Mercury vapor analyzer
- Thermohygrometer: Temperature and Relative Humidity

All field equipment was calibrated by the rental facility before the equipment was taken to the site. While on-site, all equipment was field calibrated prior to collecting the landfill gas readings, and subsequently bump tested periodically throughout the day. Calibration data is included in **Appendix C**. Initial landfill gas measurements were collected at each gas probe by first removing the locking well cap gas and replacing it with a slip cap containing a sampling port composed of Teflon tubing. The sample port was then connected to the Gem2000+ instrument and allowed to purge for 30 seconds before a landfill gas reading was collected. A mercury vapor analyzer and a PID were then each connected to the sampling port, allowed to purge, and readings were collected. If mercury concentrations were detected at a gas probe location, a duplicate mercury reading was immediately recorded for confirmation purposes. Once the initial landfill gas readings were collected from each gas probe, the slip cap was removed and replaced with the original locking well cap. Background ambient air readings were also recorded adjacent to each gas probe location. Barometric pressure, humidity, and temperature readings were recorded hourly.

Following the collection of the initial landfill gas readings, additional confirmation readings were recorded from all gas probes and flux chambers (GP-1 through GP-10). Confirmation landfill gas readings were collected from each gas probe using the same procedure as the initial readings. The locking well caps, located at each gas probe, were closed following the completion of the initial readings, and then removed immediately before the collection of the confirmation readings. Brief descriptions of the landfill gas field sampling results are summarized below:

- Reportable concentrations of methane were detected in GP-2, GP-3, and GP-4, at concentrations ranging from 14.8% to 29.8% by volume, and each exceeding 100% of the lower explosive limit (LEL).

- Reportable concentrations of carbon dioxide were detected in all the gas probes and flux chambers ranging from 0.1 parts per million (ppm) to 28.7 ppm.
- Reportable concentrations of VOCs were detected in GP-1, GP-3, GP-5, GP-6, GP-7, GP-8, GP-9, GP-10, ranging from 0.5 ppm to 457 ppm.
- Reportable concentrations of mercury were detected in gas probes GP-1, GP-2, GP-4, GP-7, GP-8, and GP-9, ranging from 3.0 to 64 ug/m³.
- No reportable concentrations of hydrogen sulfide were detected in any gas probe during the landfill gas screening activities.

Landfill gas readings are presented in *Table 2* and on *Figure 2*. Field notes from the field activities are included in **Appendix C**.

3.0 INVESTIGATIVE-DERIVED WASTE

Investigative-derived waste (IDW) generated during the soil boring installation was disposed of in accordance with NCDENR guidelines. Clean soils recovered during the well installation activities were spread on the ground surface. Debris recovered during the installation of GP-2, GP-3, and GP-4, was placed into a 55-gallon drum. One drum of debris, from the current assessment activities, was stored on-site within the temporary fenced area along with the three drums of soil and three drums of water stored during the previous sampling event. The fenced area was then secured with a lock and chain.

4.0 REPORT CERTIFICATION

The report certification as specified in the NCDENR guidance document *Guidelines for Addressing Pre-Regulatory Landfills and Dumps, December 2013* is provided in **Appendix D**.

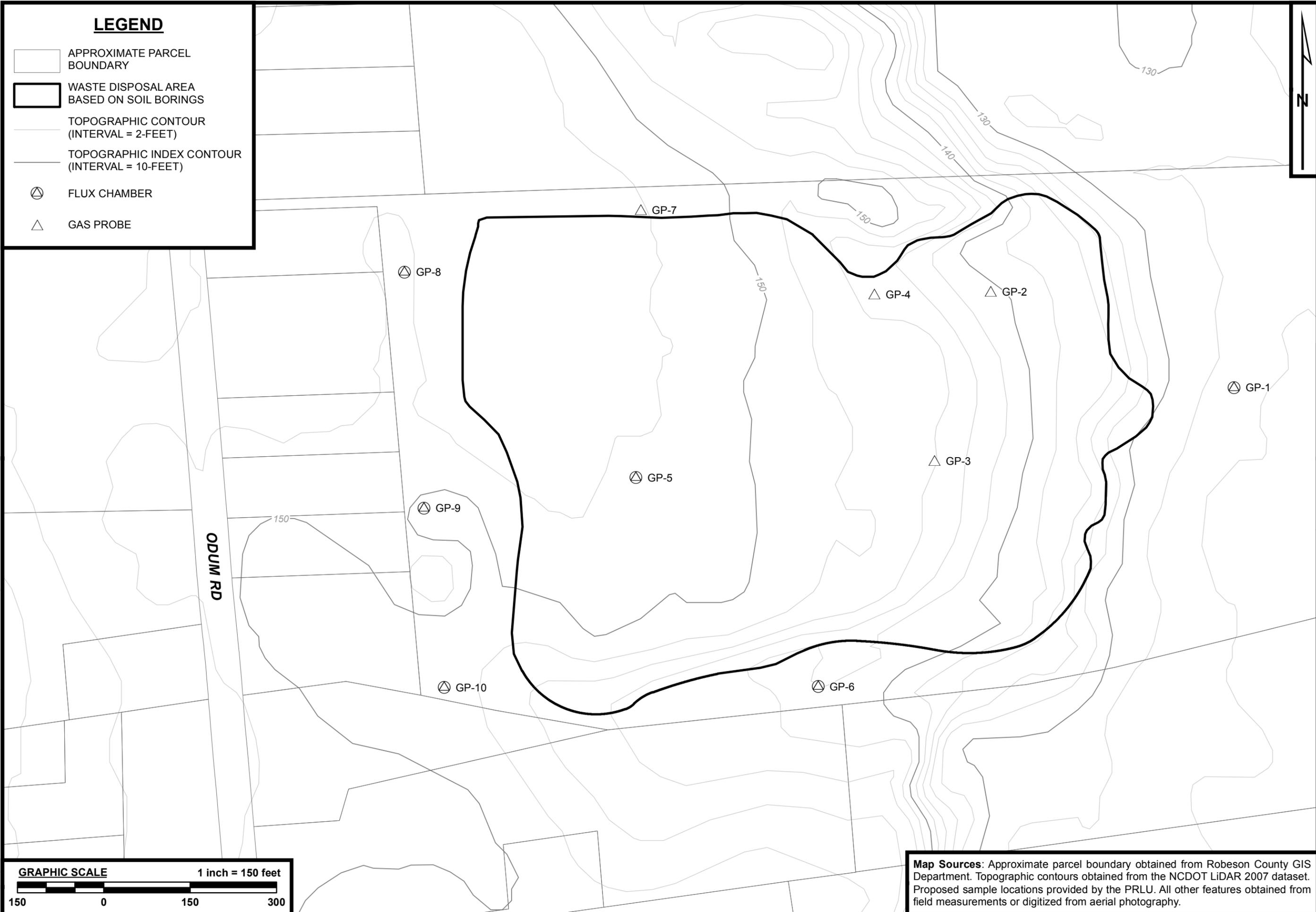
FIGURES



LEGEND

-  APPROXIMATE PARCEL BOUNDARY
-  WASTE DISPOSAL AREA BASED ON SOIL BORINGS
-  TOPOGRAPHIC CONTOUR (INTERVAL = 2-FEET)
-  TOPOGRAPHIC INDEX CONTOUR (INTERVAL = 10-FEET)
-  FLUX CHAMBER
-  GAS PROBE

T:\GIS Data\Projects\NCDENR\NCDL\Old Unlined Landfills\Maps\NCDL\NCDL233P5 Fig 1 - Site Map.mxd



Map Sources: Approximate parcel boundary obtained from Robeson County GIS Department. Topographic contours obtained from the NCDOT LiDAR 2007 dataset. Proposed sample locations provided by the PRLU. All other features obtained from field measurements or digitized from aerial photography.

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- Lexington, KY
- Mason, KS
- Raleigh, NC
- Sheppard, LA

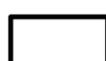
DESIGNED:	HMS
DRAWN:	EMC
CHECKED:	TG
DATE:	7/11/2014
SCALE:	1" = 150'
PROJECT NO.:	NCUL233P5

REMEDIAL INVESTIGATION - DELINEATION PHASE
 CITY OF LUMBERTON LDFL
 NONCD0000712
 ROBESON COUNTY, NC

SITE MAP

FILE NO.: NCUL233P5 Fig 1 - Site Map.mxd

LEGEND

-  APPROXIMATE PARCEL BOUNDARY
-  WASTE DISPOSAL AREA BASED ON SOIL BORINGS
-  TOPOGRAPHIC CONTOUR (INTERVAL = 2-FEET)
-  TOPOGRAPHIC INDEX CONTOUR (INTERVAL = 10-FEET)
-  FLUX CHAMBER
-  GAS PROBE
- ppm PARTS PER MILLION
- %vol PERCENT BY VOLUME
- µg/m³ MICROGRAMS PER CUBIC METER

T:\GIS Data\Projects\NCDENR\NCDUL233P5 - City of Lumberton\LDL\NCDUL233P5 Fig 2 - Landfill Gas Readings.mxd

GP-8	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	457	0.0	1.1	20.2	0.0	0.000004

GP-9	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	18.6	0.0	0.2	21.0	0.0	0.000004

GP-10	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	267	0.0	0.4	20.6	0.0	0.0

GP-4	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	0	15.8	11.6	11.0	0.0	0.000023

GP-5	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	703	0.0	0.5	20.4	0.0	0.0

GP-7	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	242	0.0	0.2	20.4	0.0	0.000009

GP-1	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	207	0.0	0.4	20.7	0.0	0.000003

GP-3	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	120	29.8	28.7	4.5	0.0	0.000064

GP-6	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	8.7	0.0	0.4	20.7	0.0	0.0

GP-2	VOCs (ppm)	CH ₄ (%vol)	CO ₂ (%vol)	O ₂ (%vol)	H ₂ S (µg/m³)	Hg (µg/m³)
	0	25.4	15.3	6.1	0.0	0.000023



Map Sources: Approximate parcel boundary obtained from Robeson County GIS Department. Topographic contours obtained from the NCDOT LiDAR 2007 dataset. Proposed sample locations provided by the PRLU. All other features obtained from field measurements or digitized from aerial photography.

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DESIGNED:	HMS
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DATE:	7/11/2014
SCALE:	1" = 150'
PROJECT NO.:	NCDUL233P5

REMEDIAL INVESTIGATION - DELINEATION PHASE
 CITY OF LUMBERTON LDFL
 NONCD0000712
 ROBESON COUNTY, NC
 LANDFILL GAS READINGS

FILE NO.: NCDUL233P5 Fig 2 - Landfill Gas Readings.mxd

TABLES

Table 2
Landfill Gas Readings
Lumberton LDFL
NONCD0000712
Lumberton, Robeson County, North Carolina

Screening ID#	Screening Date	Time	VOCs	CH ₄		CO ₂	O ₂	H ₂ S	Hg*
			ppm	%Vol	%LEL	%Vol	%Vol	ug/m ³	ug/m ³
GP-1	6/12/2014	13:22	158	0	0	0.3	20.7	0.0	0.0
		14:32	207	0	0	0.4	20.5	0.0	3.0/0.0
GP-2	6/12/2014	11:52	0.0	25.4	>100	15.3	4.4	0.0	23.0/19.0
		13:49	0.0	23.7	>100	13.7	6.1	0.0	8.0/8.0
GP-3	6/12/2014	11:41	120	29.8	>100	28.7	3.7	0.0	64.0
		13:38	0.05	29.5	>100	27.2	4.5	0.0	40.0/54.0
GP-4	6/12/2014	12:00	0.0	14.8	>100	11.6	10.5	0.0	23.0/20.0
		13:54	0.0	15.8	>100	11.4	11.0	0.0	12.0/12/0
GP-5	6/12/2014	12:15	703	0.0	0.0	0.5	19.2	0.0	0.0
		14:24	1.9	0.0	0.0	0.4	20.4	0.0	0.0
GP-6	6/12/2014	13:02	7.8	0.0	0.0	0.3	20.4	0.0	0.0
		14:19	8.7	0.0	0.0	0.4	20.7	0.0	0.0
GP-7	6/12/2014	12:08	242	0.0	0.0	0.2	18.7	0.0	8.0/9.0
		13:58	1.6	0.0	0.0	0.1	20.4	0.0	3.0/4.0
GP-8	6/12/2014	12:22	457	0.0	0.0	1.1	18.8	0.0	4.0/0.0
		12:27	1.9	0.0	0.0	1.0	20.2	0.0	0.0
GP-9	6/12/2014	12:29	Error	0.0	0.0	0.2	19.9	0.0	4.0/0.0
		14:09	18.6	0.0	0.0	0.2	21.0	0.0	0.0
GP-10	6/12/2014	12:37	267	0.0	0.0	0.4	19.7	0.0	0.0
		14:13	2.0	0.0	0.0	0.4	20.6	0.0	0.0

VOCs - Volatile Organic Compounds

ppm - parts per million

CH₄ - Methane

%Vol - Percent by Volume

CO₂ - Carbon dioxide

%LEL - Percent of the lower explosive limit

O₂ - Oxygen

ug/m³ - micrograms per cubic meter

H₂S - Hydrogen Sulfide

GP - Gas Probe

* Duplicate readings were recorded at each location with reportable concentrations of Hg.

Error = Instrument Error

Table 1
Gas Probes - Construction Details
City of Lumberton LDFL (NONCD0000712)
Lumberton, Robeson County, North Carolina

Well ID	Date Installed	Total Boring Depth (ft)	Total Probe Depth (ft)	Screen Interval (ft)	Sand Interval (ft)	Bentonite Interval (ft)	Grout Interval (ft)
GP-2	6/9/2014	14	7	5-7	5-14	3-5	0-3
GP-3	6/10/2014	14	8	5-8	5-14	3-5	0-3
GP-4	6/9/2014	14	8	5-8	5-14	3-5	0-3
GP-7	6/9/2014	14	7	5-7	5-14	3-5	0-3

Notes:

(ft) - Feet

GP-1, GP-5, GP-6, GP-8, GP-9, and GP-10 installed as flux chambers.

APPENDIX A
Soil Boring Logs





GP-2

City of Lumberton LDFL
NONCD0000712
NCUL233P5

Date Started : 6/9/2014
Date Completed : 6/9/2014
Hole Diameter :
Drilling Method : Hollow Stem Augers
Sampling Method :

Logged By : Chris Hanley
Drilling Firm : SAEDACCO
Northing Coord. :
Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample Interval (feet)	GP-2	PID Ready (ppm)	REMARKS
0		Silty SAND, orange/dark tan, dry, uniform.		SM		<p>Riser Grout Bentonite 0.010" Screen Sand</p>		
1								
2		SAND, gray, uniform, moist.		SP				
3		Clayey SAND, brown, dry, no plasticity.		SC				
4								
5		Silty SAND, tan, moist, uniform, no plasticity.		SM				
6								
7								
8								
9		SAND, white/very light gray, moist, no plasticity, uniform.		SP				
10								
11								
12								
13		SAND, white/very light gray, saturated, no plasticity, uniform.		SP				
14		Bottom of boring.						



GP-3

City of Lumberton LDFL
NONCD0000712
NCUL233P5

Date Started : 6/10/2014
Date Completed : 6/10/2014
Hole Diameter :
Drilling Method : Hollow Stem Augers
Sampling Method :

Logged By : Chris Hanley
Drilling Firm : SAEDACCO
Northing Coord. :
Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	LEL %	GP-3	PID (ppm)	REMARKS
0		Silty SAND, gray, stiff, dry, no plasticity, debris (plastic, glass, cloth, metal) at 2'.		SM	100%		0.2ppm	Debris 2'-6' BGS.
1								
2								
4		Silty SAND, dark gray, dry, debris 4'-6'.		SM				
5		SAND, gray, moist, no debris, no plasticity, uniform, trash odor.		SP				
6								
7		SAND, light gray, uniform, saturated, no plasticity.		SP			0.1ppm	
8								
9								
10					0%			
11								
12								
13								
14		Bottom of boring.						



GP-4

City of Lumberton LDFL
NONCD0000712
NCUL233P5

Date Started : 6/9/2014
Date Completed : 6/9/2014
Hole Diameter :
Drilling Method : Hollow Stem Augers
Sampling Method :

Logged By : Chris Hanley
Drilling Firm : SAEDACCO
Northing Coord. :
Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	LEL %	GP-4	PID (ppm)	REMARKS
0		Silty SAND, orange/dark tan, dry, no plasticity, non-uniform, debris (small plastic) starting at ~3' BGS-5' BGS.		SM	8%	<p>Riser Grout Bentonite 0.010" Screen Sand</p>	0.1ppm	Debris 3'-5' BGS.
1								
2								
3								
4								
6		Silty SAND, tan, moist, no plasticity, uniform, fine grained, no debris.		SM				
7								
8								
9								
10		Silty SAND, tan, moist, no plasticity, uniform, fine grained, no debris.		SM				
11								
12		Silty SAND, white, soft, uniform, saturated.		SM				
13								
14		Bottom of boring.						



GP-5

City of Lumberton LDFL
NONCD0000712
NCUL233P5

Date Started : 6/9/2014
Date Completed : 6/9/2014
Hole Diameter : 8 Inches
Drilling Method : Hollow Stem Augers
Sampling Method :

Logged By : Chris Hanley
Drilling Firm : SAEDACCO
Initial Water Depth :
Final Water Depth :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	LEL (%)	PID (ppm)	Sample	REMARKS
0		SAND, dark tan, non-uniform.		SW				Flux chambers installed.
1								
2								
3		Sandy CLAY, light brown, low plasticity, some moisture.		ML				
4		Silty CLAY, dark gray, low plasticity, debris (metal, plastic, cloth) at 4'-6.5'.		ML	37%	0.1ppm		
5								
6								Water in boring at ~6' BGS.
7		Silty CLAY, dark gray, wet, medium-low plasticity, debris (plastic, metal, cloth).		CL				
8								
9		Silty CLAY, dark gray, saturated, medium-low plasticity, debris (plastic, metal, cloth).		CL	0%	0.1ppm		
10		Bottom of boring.						



GP-7

City of Lumberton LDFL
NONCD0000712
NCUL233P5

Date Started : 6/9/2014
Date Completed : 6/9/2014
Hole Diameter :
Drilling Method : Hollow Stem Augers
Sampling Method :

Logged By : Chris Hanley
Drilling Firm : SAEDACCO
Northing Coord. :
Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	LEL %	GP-7	PID (ppm)	REMARKS
0		SAND, dark brown/black, non-uniform, dry.		SW			0 ppm	
1				SW				
2		SAND, light gray, non-uniform, dry.		SW				
3				SW				
4		Silty CLAY with some sand, red/brown, stiff, medium plasticity, dry.		CL	0%			
5		Clayey SAND, red/brown, moist, soft, no plasticity, medium-grained sand.		SC				
6				SC				
7				SC				
8				SC				
9				SC				
10		SILT, white/very light gray, soft, wet, no plasticity.		ML				
11				ML				
12				ML				
13				ML				
14		SILT, white/very light gray, soft, saturated, no plasticity.		ML				
15		Bottom of boring.						

APPENDIX B
Tabulated GPS Coordinates

Appendix B
Tabulated GPS Coordinates
City of Lumberton LDFL (NONCD0000712)
Lumberton, Robeson County, North Carolina

ID	Description	State Plane [*] (Meters)		Decimal Degrees [*]	
		Northing	Easting	Latitude	Longitude
GP-1	Flux Chamber	103771.8747	602146.0874	34.685433	-79.081362
GP-2	Gas Probe	103822.3038	602017.3273	34.685887	-79.082768
GP-3	Gas Probe	103733.0038	601987.6045	34.685081	-79.083091
GP-4	Gas Probe	103820.926	601955.724	34.685874	-79.08344
GP-5	Flux Chamber	103724.3969	601829.5237	34.685003	-79.084817
GP-6	Flux Chamber	103614.1827	601925.9536	34.68401	-79.083763
GP-7	Gas Probe	103865.4315	601831.9999	34.686274	-79.084791
GP-8	Flux Chamber	103832.8877	601706.984	34.68598	-79.086155
GP-9	Flux Chamber	103708.336	601717.3293	34.684857	-79.086041
GP-10	Flux Chamber	103613.7473	601727.9126	34.684004	-79.085925

* State plane coordinate system is North Carolina State Plane FIPS 3200, NAD83(86). Decimal degrees are GCS North American 1983.

APPENDIX C
Field Notes



NCAL-233P5 Air Readings
Lumberton



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

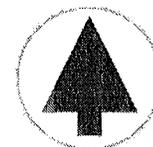
Instrument ID 8665
Description Gem 2000 +
Calibrated 6/9/2014 9:52:01AM

Manufacturer CES Landtec
Model Number GEM2000+
Serial Number/ Lot Number GM08581
Location North Carolina
Department

State Certified
Status Pass
Temp °C 22
Humidity % 53

<u>Calibration Specifications</u>							
Group # 1				Range Acc %		0.0000	
Group Name Methane				Reading Acc %		3.0000	
Stated Accy Pct of Reading				Plus/Minus		0.00	
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
50.00 / 50.00	%Volume	50.00	%Volume	50.00	50.00	0.00%	Pass
Group # 2				Range Acc %		0.0000	
Group Name Carbon Dioxide				Reading Acc %		3.0000	
Stated Accy Pct of Reading				Plus/Minus		0.00	
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
35.00 / 35.00	%Volume	35.00	%Volume	35.00	35.00	0.00%	Pass
Group # 3				Range Acc %		0.0000	
Group Name Carbon Monoxide				Reading Acc %		3.0000	
Stated Accy Pct of Reading				Plus/Minus		0.00	
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
50.00 / 50.00	PPM	50.00	PPM	50.00	50.00	0.00%	Pass
Group # 4				Range Acc %		0.0000	
Group Name Hydrogen Sulfide				Reading Acc %		0.0000	
Stated Accy Pct of Reading				Plus/Minus		0.00	
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
25.00 / 25.00	PPM	25.00	PPM	25.00	25.00	0.00%	Pass
Group # 5				Range Acc %		0.0000	
Group Name Oxygen				Reading Acc %		3.0000	
Stated Accy Pct of Reading				Plus/Minus		0.00	
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
20.90 / 20.90	%Volume	20.90	%Volume	20.90	20.90	0.00%	Pass

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 8665
Description Gem 2000 +
Calibrated 6/9/2014 9:52:01AM

<u>Test Instruments Used During the Calibration</u>				<u>(As Of Cal Entry Date)</u>	
<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Next Cal Date / Last Cal Date/ Opened Date</u> <u>Expiration Date</u>
NC 4 GAS 50/50/25/20.9 5-10-15	NC 4 GAS MIX LOT CAO-412.4	Airgas	GP 12089	CAO-412-4	5/22/2015
NC 50/35 CO2 LOT 1027FB12 11/16	NC 50 CH4/35 CO2	American Gas Group	GP 12126		11/30/2016

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Duke

All instruments are calibrated by Pine Environmental Services, LLC. according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

**Notify Pine Environmental Services, LLC. of any defect within 24 hours of receipt of equipment
Please call 866-960-7463 for Technical Assistance**



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
 Raleigh, NC 27614
 Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 12351
Description MiniRAE 2000
Calibrated 6/5/2014 9:07:20AM

Manufacturer Rae Systems	State Certified
Model Number PGM7600	Status Pass
Serial Number/ Lot Number 110-902315	Temp °C 23
Location North Carolina	Humidity % 57
Department	

Calibration Specifications

Group # 1
Group Name Isobutylene
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
100.00 / 100.00	PPM	100.00	PPM	100.00	100.00	0.00%	Pass

Test Instruments Used During the Calibration

(As Of Cal Entry Date)

<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Last Cal Date / Expiration Date</u>	<u>Next Cal Date / Expiration Date</u>
NC ISO 100 PPM 34L	NC ISO 100 PPM 34L 3/16	American Gas Group	GP 11012	Lot 0207FF12		3/31/2016
NC ZERO AIR (LOT 0223FD12) 3/16	NC Zero Air	American Gas Group	GP 12507	0223FD12		3/31/2016

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Duke

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Please call 866-960-7463 for Technical Assistance



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 17217
Description QRAE
Calibrated 6/5/2014 9:19:08AM

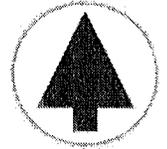
Manufacturer Rae Systems
Model Number PGM2000
Serial Number/ Lot Number 270-428129
Location North Carolina
Department

State Certified
Status Pass
Temp °C 23
Humidity % 57

Calibration Specifications

				Range Acc %			
Group # 1				3.0000			
Group Name Carbon Monoxide				Reading Acc % 0.0000			
Stated Accy Pct of Range				Plus/Minus 0			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>End As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
50 / 50	PPM	50	PPM	50	50	0.00%	Pass
Group # 2				Range Acc % 0.0000			
Group Name H2S				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>End As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
25 / 25	PPM	25	PPM	25	25	0.00%	Pass
Group # 3				Range Acc % 0.0000			
Group Name LEL				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>End As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
50 / 50	%LEL	50	%LEL	50	50	0.00%	Pass
Group # 4				Range Acc % 0.0000			
Group Name Oxygen				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.0			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>End As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
20.9 / 20.9	%	20.9	%	20.9	20.9	0.00%	Pass

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services, LLC.

8411 Garvey Drive, Suite 113
Raleigh, NC 27614
Toll-free: (866) 646-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 17217
Description QRAE
Calibrated 6/5/2014 9:19:08AM

<u>Test Instruments Used During the Calibration</u>					<u>(As Of Cal Entry Date)</u>	
<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Last Cal Date/ Opened Date</u>	<u>Next Cal Date / Expiration Date</u>
NC 4 GAS 50/50/25/20.9 5-10-15	NC 4 GAS MIX LOT CAO-412.4	Airgas	GP 12089	CAO-412-4		5/22/2015
NC ZERO AIR (LOT 0223FD12) 3/16	NC Zero Air	American Gas Group	GP 12507	0223FD12		3/31/2016

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Brian Duke

All instruments are calibrated by Pine Environmental Services, LLC. according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

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Please call 866-960-7463 for Technical Assistance**



GP-2

Date Started : 6/9/14
 Date Completed :
 Hole Diameter :
 Drilling Method :
 Sampling Method :
 Company Rep. :
 Logged By :
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID	Rec.(Ft)	REMARKS
0		Silty sand, orange dark tan, dry, non uniform		SM				WS ~ 9' BGS
2		Sand, light gray, uniform, dry moist		SP				
3		Clayey sand, brown, dry, no plasticity		SC				
5		Same as above, but tan color Silty Sand, tan moist uniform, no plasticity		SM				
9		Sand, white/very light gray, moist, no plasticity, uniform		SP				
13'		Same as above, but SATURATED		SP				
14		BOB						

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GP-3

Date Started : 6/10/14
 Date Completed :
 Hole Diameter : 8 inches
 Drilling Method : HSA
 Sampling Method :

Company Rep. :
 Logged By :
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID	LEL Recovery (%)	REMARKS
0		Silty sand, gray, soft, dry. No plasticity debris (plastic, glass) @ 2' cloth, metal		SM				
1								
4		Silty sand, dark gray, dry, debris 4'-6"		SM			0.2 ppm	100% @ 4'
6		Sand, gray, moist, no debris no plasticity, uniform, trash & br Small amount of debris, likely from upper debris area..		SP				
4								
5								
6		Sand, light gray, uniform, Saturated, no plasticity		SP				
7								0.1 ppm
14		BOB						

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GP-4

Date Started : 6/9/14
 Date Completed :
 Hole Diameter :
 Drilling Method :
 Sampling Method :

Company Rep. :
 Logged By :
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth In Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID (RPM)	LEL Res (Et) (%)	REMARKS
0		Silty sand, orange/dark tan, dry. no plasticity Non uniform.						likely water ~10' BGS
1								
2		Small plastic debris starting at ~ 3' BGS - 5' BGS		SM				0.1 ppm 8% @ 4'
3		Silty sand, dark tan, moist, no plasticity, uniform, fine grained no debris						
4								
5								
6		Silty sand, white, moist, soft, uniform						
7		Same as above, but SATURATED						
8								
9								
10		BOB						

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6'
10'
12'
14'



GP-5

Date Started : 6/9/4
 Date Completed : 8 inches
 Hole Diameter : HSA
 Drilling Method :
 Sampling Method :
 Company Rep. :
 Logged By :
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID (ppm)	REL Rec (ft)	REMARKS
0		Sandy dark tan, nonuniform.		SW				Water in hole at 6.865
3		Sandy clay, light brown, low plasticity, some moisture		ML				Flux chamber installed.
4		Silty clay, dark gray, low plasticity. debris (metal + plastics) @ 4'-6.5'		ML		0.1 ppm	379 @ 4'	Water in boring at 6.865
6.5		Silty clay, dark gray, wet med. low plasticity debris (plastic, metal, cloth)		CL				
7		Same as above, but saturated water		CL		0.1 ppm	0.5 @ 9'	
10		to BOB						

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GP-7

Date Started : 6/9/14
 Date Completed :
 Hole Diameter :
 Drilling Method :
 Sampling Method :

Company Rep. :
 Logged By :
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID	REMARKS
0		Sand, dark brown/black, non uniform, dry		SW			Screen 7.5'
1							
2		Silty sand, light gray, Non uniform, dry,		SW			
2							
3.5		Silty clay with some sandy red brown stiff, met plasticity, clay, stiff, met dry		CL		0 ppm OS @ 4'	
3							
4.5		Clayey sand, sep/brown, moist, soft, No plasticity, med-grained sand		SC			
4							
7.9		Silt, white/very light gray, soft, some moisture, no plasticity,		ML			
7							
14		Same as above - but SATURATED.		ML			
9							
15		BOB					

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GP-8

Date Started : 6/9/14
 Date Completed :
 Hole Diameter : 8 inches
 Drilling Method : ~~Standard~~ Hollow Stem Augers
 Sampling Method :
 Company Rep. :
 Logged By : Hanley SAED ALCO
 Drilling Firm :
 Northing Coord. :
 Easting Coord. :

Depth in Feet	Surf. Elev.	DESCRIPTION	GRAPHIC	USCS	Sample	PID	LEL Feet (ft) (5)	REMARKS
0		silty clay, some large sand intermixed, light brown, soft, moist. low plasticity		ML				No Probe Installed
1								LEL 5-7.50
1.5		Silty sandy with some clay, light brown, soft, moist		SP SM				Flux Chamber Installed
3								
5		Same as above but wet Sandy coarse, wet, soft, no plasticity, uniform		SP				
7		Same as above silty sand, med grains, somewhat, no plasticity, uniform		SP SM				
9		BBB						

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43) 6/9/14 Lumberton
NCW 233PS CJH

7:30-8- load van

8-8:30 - safety meeting

~~8:30- to go~~

8:30 - travel to site

Stat mileage: 112609

10:37- onsite. 77°F, overcast, very humid

- Drillers not onsite yet.
- gate is locked.
- site not mowed for a while, grass is ~~under the~~ high, hip high

Bill Pittman

910-416-0843 (cell)

910-671-3851 (office)

- Called City manager: Mr. Horne -
- only got voice mail
- Called Mr. Bill Pittman -
- He does not work in the office - call cell only
- he will open gate soon.
- 10:45 - Drillers onsite. (SABDALL) -
- HASP. } 78225T Geoprobe relatively new.
- Calibrated meters.

184

11:00 Mr. Bill Pittman opens the gate.

Mr. Pittman mentioned several illegal tree stands on site.

11:15 - Mr. Pittman off site

11:20 - Blew a fuse in the Geoprobe.
Drillers going to get a new one.

NOTE: Need: flagging

Buckets

Bug spray.

11:30 - Drillers back onsite

- Not a fuse problem
- Drillers calling "geoprobe"
- I locate GP-8.

12:20 - Geoprobe fixed.

mob to GP-8.

- wet @ ~5'

- Satwater @ ~7'

- no stand soils

- no debris, no odor

to shallow for probe, need to be flux chamber

next to Note: No water in pit next to GP-8.

12:50 - mob to GP-7

~~mob~~ moist silt @ 9' BGS

Satwater silt @ 14' BGS

65

6/9/14

Lumberman

NUM 23385

~~Area GP-7~~

~~Screen: 7'-12'~~

~~Total depth drilled: 14'~~

~~SAND: 6'-14' BGS~~

~~Bentonite: 4'-6' BGS~~

~~Grout: 0'-4' BGS~~

GP-7

- water in bore hole @ 9'.
level with top of silt.

GP-7-

Screen: 5'-7' BGS

SAND: 5'-14' BGS

Bentonite: 3'-5' BGS

Grout: 0'-3'

- stretch up cover

GP-7

2:00-

mob to GP-5

water in bore @ ~6'.

measured with push rod.

- to shallow for gas probe.

~~mob to GP-4~~

2:50. Dean Anger,

86

6/9/14

Lumberman

3:10 - mob to GP-4

wet soils @ 10' - white sands

saturated soils @ 12' BGS white sands

moist soils @ ~6' - 10' BGS. Tan sands.

WT ~ 10'

GP-4.

Screen: 5'-8' BGS

SAND: 5'-14' BGS

Bentonite: 3'-5' BGS

Grout: 0'-3' BGS

GP-4

4:20 - mob to GP-2

wet soils @ ~9' BGS - white sands

saturated soils @ ~13' BGS.

likely WT @ ~9' BGS

Screen: 5'-7' BGS

SAND: 5'-14' BGS

Bentonite: 3'-5'

Grout: 0'-3'

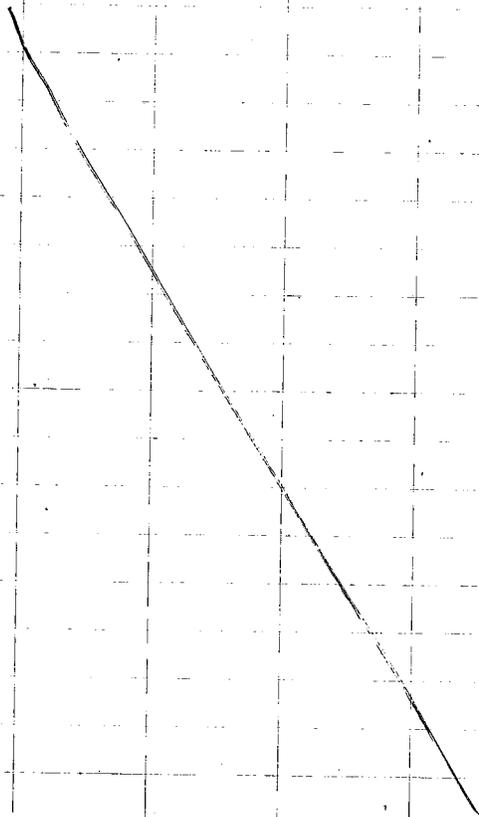
GP-2

- 4:45 - heard gun shots on neighboring property. likely an AR-15 rifle.
Mr. Pittman mentioned the neighbors shot an AR-15 on the site.

87) 6/9/14

Lumberton

- 5:15 - Driller and I - offsite
- Lock's gate
- 5:35 - at Hotel - "Fairfield"
- end mileage 112734



6/10/14

NCM-233P5
Lumberton

CTH } 88

7:15 - left ~~at~~ hotel

112741 - start mileage

7:30 - onsite, 75°F - rains the night before
- Driller onsite - gate is open

- H.A. 58

- Calibrate meters

7:45 - mob to GP-3

100% LEL @ 4'

debris @ - 2ft BGS

8:00 - let barney off gas

8:15 - LEL = ~49% - resumed drilling

saturated soils @ ~10' - light gray sand,

debris - 2'-6' BGS

GP-3

Screen: 5'-8' BGS

Sand: 5'-14' BGS

Bentonite: 3'-5' BGS

Grout: 0'-3' BGS

GP-3

9:00 - offsite - to buy buckets for
flux chambers.

9:30 - back onsite.

make flux chambers x 6.

89

6/10/14

NCL233PS

Lumberman

CSTH

- 10:30 - finish installing GP-8.
- 10:50 - finish installing GP-5
- 11:30 - finished installing GP-9
- 12:00 - finished installing GP-10

Note: Drillers using slide-stear to move drums of waste to drum fence area.

- Total of 5 drums @ site inside fencing - key is a 1600 well label key.

12:20 - finished off site.

- drillers left slide-stear outside of gate.
- locked gate.

3:20 at office

end mileage - 112902
mload van -

scan potest transfer g. chips to server.

- Call off meters

4:30 - END DAY

6/12/14

Lumberman

NCL233PS

CSTH/H5

90

7:30 load van Start mileage 112902
10:05 - onsite 79° F, partly cloudy

~~met~~

HASP

- mload to GP-6.

10:40 - finished installing GP-6.

- temp well out GP-6 - is still there is ~~was this supposed to be abandoned?~~ GP-5 will be expanded during next site visit.

Hg meter battery is very low.

- Have to change between readings

- PDD reading very high at GP-9 + GP-10

- Re calibrated ~ 12:15 pm. The >10,000 readings are likely false.

2:37 - finished gauging - see field log.

- light rain @ ~ 1 pm, but only lasted about 15 min.

- IDW - 4 soil drums

3 water drums

7 total drums.

6/12/14

NLMW23385

Lumberton

CALLS/Hs

NOTE: I took the well lock
off of the fencing for the TDW
and replaced it with a nut and Bolt.
I placed the lock on TD TW-5
next to GP-6.

2:45 - Called TG for status of
Flux chambers (Should they be left?)

- NO Answer

2:47 - off site to get drinks.

2:55 - TG called. no answer from DENISE
yet.

- leave Flux chambers in place

3:02 - locked gate - off site

5:00 - at office

5:15 - end day

113145 - end message

LANDFILL GAS SURVEY FORM



Project #: **NCUL233P5** Project Name: **Lumberton** Task Order: _____ Page: _____ of _____
 Client: **NC DENR** Sampled By: **CH/HB** Weather Conditions: **Sunny 79°** Date: **6/12/14**

Meters Used:

Manufacturer:	Model #:	Serial #:	Factory Calibration:	Set-up Parameters:	Detection Limit:
Rae Systems, Inc.	MiniRAE 2000	110-013318		see Calibration Notes	VOCs: 0-15,000 ppm
Landtec, Inc.	GEM 2000+	Gm 08581/06	4/3/14	see Calibration Notes	CH ₄ : 0-100%, CO ₂ : 0-60%, O ₂ : 2-25%, H ₂ S: 0-500 ppm
Fluke	271-Temperature Humidity Meter		n/a	n/a	R.H.: 0-100%, Temp: -40°C to 60°C
Digisense	Humidity LogR Thermohygrometer	277471	n/a	n/a	R.H.: 0-100%, Temp: -40°C to 60°C
Dielectric	MGD-2002				
Arizona Instrument	Jerome 431-X	431-3998	10/1/13	Factory Calibrated Zero in field.	0.001 - 0.999 mg/m ³

Calibration Notes:

Calibration Gases:
GEM 2000+:
 CH₄ 50% - Lot# 13-4639 - Exp. 9-5-14
 CH₄ 2.5% - Lot# GAN - Exp. 3/12/15
~~MAN-4125~~
~~MGD-2002:~~
 Helium -
~~Lot#~~
~~Exp.~~

MiniRAE 2000:
 100ppm Isobutylene -
 Lot# 0402FD13
 Exp. 05/2017

Sample ID#	Time	PID	CH ₄		CO ₂	O ₂	H ₂ S	Barometric Pressure	Temp	Relative Humidity
		(ppm)	(%Vol)	(%LEL)	(%Vol)	(%Vol)	(ppm)	Hg (inches Hg)		
GP-3 ^{AMB}	11:36	0.0	00.0	000	00.0	20.3	0000	29.80	22.6	46.0
GP-3	11:41	120	29.8	>>>	28.7	3.7	0000	Hg=0.064		
GP-2 ^{AMB}	11:50	0.0	00.0	000	00.0	20.0	0000	0.00		
GP-2	11:52	0.0	25.4	>>>	15.3	4.4	0000	0.023	0.019	
GP-4 ^{AMB}	11:58	0.0	00.0	000	00.0	19.8	0000	0.00		
GP-4	12:00	0.0	14.8	>>>	11.6	10.5	0000	0.023		
GP-7 ^{AMB}	12:05	0.0	00.0	000	00.0	19.7	0000	0.00		
GP-7	12:08	242	00.0	000	00.2	18.7	0000	0.008	0.009	
GP-5 ^{AMB}	12:13	0.0	0.0	00.0	000	19.8	0000	0.00		
GP-5	12:15	703	00.0	000	00.5	19.2	0000	0.00		
GP-8 ^{AMB}	12:19	0.0	00.0	000	00.0	19.8	0000	0.00		
GP-8	12:22	457	00.0	000	01.1	18.8	0000	0.004	0.000	
GP-9 ^{AMB}	12:27	0.0	00.0	000	00.0	20.0	0000	0.00		
GP-9	12:29	>10,000	00.0	000	00.2	19.9	0000	0.004	0.000	
GP-10 ^{AMB}	12:35	0.0	00.0	000	00.0	20.4	0000	0.00	29.80	24.6
GP-10	12:37	267	00.0	000	00.4	19.7	0000	0.000	0.000	57.6

HB

0

D

LANDFILL GAS SURVEY FORM



Project #:		Project Name:				Task Order:		Page: of		
Client:		Sampled By: CH/HG		Weather Conditions:			Date: 6/12/14			
Sample ID#	Time	PID	CH ₄		CO ₂	O ₂	H ₂ S	Barometric Pressure	Temp	Relative Humidity
		(ppm)	(%Vol)	(%LEL)	(%Vol)	(%Vol)	(ppm)	Hg (Inches Hg)	(°C)	(%)
GP-6 ^{AMB}	12:57	0.0	00.0	000	00.0	20.6	0000	0.000		
GP-6	13:02	7.8	00.0	000	00.3	20.4	0000	0.000		
GP-1 ^{AMB}	13:21	0.0	00.0	000	00.0	21.1	0000	0.000		
GP-1	13:22	158	00.0	000	00.3	20.7	0000	0.000		
GP-3	13:38	0.05	29.5	>>>	27.2	4.5	0000	0.004	23.8	7400
GP-2	13:49	0.0	23.7	>>>	13.7	6.1	0000	0.008		
GP-4	13:54	0.0	15.8	>>>	11.4	11.0	0000	0.012		
GP-7	13:58	1.6	00.0	000	00.1	20.4	0000	0.003		
GP-5	14:24	1.9	00.0	000	00.4	20.4	0000	0.000		
GP-8	14:04	1.9	00.0	000	01.0	20.2	0000	0.000		
GP-9	14:09	18.6	00.0	000	00.2	21.0	0000	0.000		
GP-10	14:13	2.0	00.0	000	00.4	20.6	0000	0.000		
GP-6	14:14	8.7	00.0	000	00.4	20.7	0000	0.000		
GP-1	14:32	207	00.0	000	00.4	20.5	0000	0.005		

APPENDIX D
Report Certification

CERTIFICATION

Document Name: Remedial Investigation Report: Subsurface Landfill Gas Survey.

Site Name: City Of Lumberton LDFL

Site ID: NONCD0000712

Task Order: 712DP-8

I certify that, to the best of my knowledge, after thorough investigation, the information contained in or accompanying this certification is true, accurate, and complete.

Timothy D. Grant, P.G.

Timothy Grant
Signature

7-11-14
Date

Before me personally appeared Timothy D. Grant, P.G. to me known and known to me to be the person described in and who executed the foregoing instrument, and acknowledge to and before me that Timothy D. Grant, P.G. executed said instrument for the purposes therein expressed.

Witness my hand and official seal this 11th day of July, 2014.

Kelly L. Lilley
Notary Public

8/4/17
My Commission Expires On

North Carolina
State Of

Wake
County Of



Official Seal