

June 30, 2014

Ms. Jaclynne Drummond  
NCDENR DWM Solid Waste Section  
1646 Mail Service Center  
Raleigh, North Carolina 27699-1646

**RE: Operations, Monitoring, and Maintenance Report – May 2014  
Avery County Closed MSW Landfill  
Spruce Pine, North Carolina**

Dear Ms. Drummond:

Smith Gardner, Inc. (S+G) is pleased to present this report concerning the operation and maintenance (O&M) of the Avery County Closed MSW Landfill (Permit No. 06-01) Landfill Gas Collection and Control System (LFGCCS) and monitoring of the on- and off-site landfill gas probes for the May 2014 monitoring period. Mr. Jorge Montezuma with S+G performed the site visit on May 12 and 23, 2014. Site visit details are provided below.

## **CURRENT STATUS**

S+G previously identified the following items to be addressed for the LFGCCS to operate as designed:

1. **LFGCCS System:** An expansion of the LFGCCS system, as proposed in the *Annual Landfill Gas Monitoring Report*<sup>1</sup>, was previously approved<sup>2</sup> by the division of Waste Management. Phase One of the expansion project has been completed. S+G is reviewing the data collected to evaluate the improvements for effectiveness. A summary of this evaluation will be provided under separate cover including recommendations for additional work.

## **LFG EXTRACTION WELL MONITORING PROGRAM**

Monthly monitoring of the LFGCCS will continue and shall include the following items:

- CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, and pressure monitoring at each extraction well head;
- CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, and pressure monitoring at the flare station; and
- Adjustment of the LFGCCS to balance recovery and ensure safe system operation.

The County will maintain this LFGCCS and will continue to evaluate the effectiveness of increased LFG recovery from the waste mass in alleviating off-site LFG migration. Results

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<sup>1</sup> *Annual Landfill Gas Monitoring Report*, Closed Avery County MSW Landfill. Submitted by Smith Gardner, Inc., November 2012.

<sup>2</sup> Approval response letter, Closed Avery County MSW Landfill (Annual Landfill Gas Monitoring Report). Sent by Jaclynne Drummond, Solid Waste Section, November 15, 2012.

from monthly monitoring events will be reported in accordance with the approved LFG Monitoring Plan.

## **LFG EXTRACTION WELL MONITORING ACTIVITIES**

S+G personnel performed the flare station and well field monitoring on May 12, 2014. Initial measurements indicated there was approximately 27 to 28 inches of available vacuum at each of the LFG wells across the well field. The results from this event are summarized below. Recommended actions are underlined. Well field data and flare station data are provided in the attached **Table 1**.

### **LFG Extraction Well Field**

- **W-1 through W-10:** S+G performed CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, and pressure monitoring. No adjustments were made to the extraction well heads during this monitoring event.

In general, liquid levels at the LFG extraction wells have slightly increased since 2011. Wells W-1 through W-4 continue to exhibit evidence that a majority of well perforations are partially or completely clogged. Liquid levels in newly installed wells W-9 and W-10 are at or just below the solid pipe, completely blocking all perforations. S+G will continue to evaluate this condition.

- **Orifice Plates:** S+G continues to evaluate orifice plate sizes at wells W-5, W-7, W-9, and W-10 during each site visit. As LFG flow potential at these locations is stable, the correct orifice plate sizes are currently installed.

### **Flare Station**

- **Condensate Tank:** The condensate tank was observed during this site visit; the liquid was at an acceptable level. S+G will continue to monitor the liquid level of the condensate tank.
- **Filter Tank:** The filter tank was emptied during this site visit. S+G will continue to monitor the liquid level of the filter tank.
- **Flare operation:** Flare operation continues to be intermittent due to poor overall gas quality and low flow rate. S+G will continue to adjust the system to optimize gas flow and quality.

## **LFG MONITORING WELL (PERIMETER) MONITORING PROGRAM**

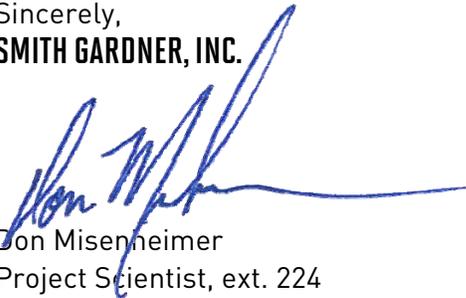
S+G personnel also performed monitoring of the perimeter LFG monitoring network on May 12 and 23, 2014. Monitoring wells P1, P3, P7 and P11 each measured over the 100% LEL or 5% by volume of CH<sub>4</sub>. Monitoring well P13 measured 78% LEL or 3.9% by volume of CH<sub>4</sub>. All other wells, monitored during this event, had no detectable concentrations of CH<sub>4</sub>. Results of

Ms. Drummond  
June 30, 2014  
Page 3 of 3

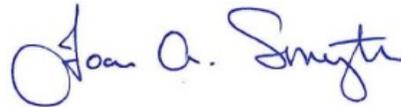
this monitoring event are included in **Attachment 1**. **Attachment 2** provides a methane concentration graph over time for monitoring wells that have historically had methane present. The current well network will continue to be monitored and data will be reported to NCDENR and the County.

The next routine monitoring event is scheduled for June 2014. If you have any questions, or require additional information, please contact us at your earliest convenience at 919-828-0577 or by e-mail (address below).

Sincerely,  
**SMITH GARDNER, INC.**



Don Misenheimer  
Project Scientist, ext. 224  
[don@smithgardnerinc.com](mailto:don@smithgardnerinc.com)



Joan A. Smyth, P.G.  
Senior Hydrogeologist ext. 221  
[joan@smithgardnerinc.com](mailto:joan@smithgardnerinc.com)

#### Attachments

CC: Buddy Norris – Avery County  
Deb Aja – NCDENR  
File

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**FIGURE**

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© Smith Gardner Inc.

**LEGEND**

- EXISTING LANDFILL GAS PROBE
- ④ OFFSITE STRUCTURE TO BE MONITORED

**REFERENCES**

1. ADJACENT PROPERTIES ARE FROM AVERY COUNTY GIS MAPPING DEPARTMENT.
2. MONITORING WELL LOCATIONS FROM FIELD SURVEY DATED 1/14/08, BY SURVEYING SOLUTIONS, P.C.
3. PROPERTY LINE FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS & CONSULTANTS.
4. LFG PROBES LOCATIONS FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS & CONSULTANTS. PROBE P-2, P-3, AND P-9 THROUGH P-13 LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE.

PREPARED BY: \_\_\_\_\_ NC LIC. NO. C-0828 (ENGINEERING)  
**SMITH+GARDNER**  
 14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

DRAWN:	K.C.B.	APPROVED:	D.M.M.
DATE:	Dec 2013	SCALE:	AS SHOWN
PROJECT NO.:	AVERY 13-6	FIGURE NO.:	1
FILENAME:	AVERY-B0216		

LANDFILL GAS  
 MONITORING SYSTEM  
 AVERY COUNTY CLOSED MSWLF  
 SPRUCE PINE, NORTH CAROLINA

PREPARED FOR: \_\_\_\_\_

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## TABLE

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**TABLE 1**  
**Avery County Closed MSW Landfill**  
**Landfill Gas Collection and Control System Monitoring**  
**May 2014**

DataField CS - GEM Mode Data Output

Device ID	Date/Time	CH4	CO2	O2	Balance	Adj. Temperature	Init. Static Pressure	Adj. Static Pressure	Adj. Diff. Pressure	Init. Flow	Adj. Flow	System Pressure
	mm/dd/yyyy	%	%	%	%	degF	in H2O	in H2O	in H2O	Scfm	Scfm	in H2O
AVERY-W6	5/12/2014 8:56	6.6	13.2	7.6	72.6	87	3.6	3.9	-0.119	<<>>	<<>>	-27.85
AVERY-W5	5/12/2014 9:01	35.3	25.1	0.1	39.5	79	-27.1	-27.1	0.896	2	2	-27.89
AVERY-W2	5/12/2014 9:08	55.9	26.6	0.6	16.9	76	-27.8	-27.7	-0.148	<<>>	<<>>	-27.71
AVERY-W4	5/12/2014 9:15	17.8	20.8	1.8	59.6	85	-25.3	-25.2	-0.152	<<>>	<<>>	-27.76
AVERY-W3	5/12/2014 9:21	64.3	26.5	1.3	7.9	78	-27.6	-27.7	-0.158	<<>>	<<>>	-27.67
AveryW10	5/12/2014 9:26	24.1	11.5	12.5	51.9	84	-27.6	-27.6	-0.168	<<>>	<<>>	-27.58
AVERY-W8	5/12/2014 9:32	20.4	19.2	0.4	60	84	-27.7	-27.6	-0.152	<<>>	<<>>	-27.59
AVERY-W1	5/12/2014 9:37	70.1	26.7	0.2	3	82	-27.6	-27.6	>>>>	<<>>	<<>>	-27.66
AVERY-W7	5/12/2014 9:45	5	12.6	6.4	76	79	11.3	11.3	3.551	0	0	-27.86
AVERY-W8	5/12/2014 9:50	12.4	21.1	2.6	63.9	78	0	0	-0.179	<<>>	<<>>	-27.85
Av-Flare	5/12/2014 9:57	28.3	20.5	3.2	48	N/A	13.7	N/A	N/A	<<>>	N/A	N/A

The differential pressure measurement should be positive. A negative differential pressure indicates no gas flow. Negative differential pressure may be the result of dirt or water obstructing the pitot tube perforations. Overpulling by adjacent extraction wells may also result in negative pressure being displayed.

<<>> = measurement out of range of GEM 2000 meter. The reading was likely too low for measurement by the instrument.

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## **ATTACHMENT 1**

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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):

Smith Gardner, Inc.

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

Name: Joan A. Smyth, P.G. Phone: 919-828-0577 x 221

E-mail: joan@smithgardnerinc.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Avery County Closed MSW landfill	Brushy Creek Rd. Spruce Pine, NC	06-01	.0500	5/12/14

**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.

Joan A. Smyth, P.G. Senior Hydrogeologist 919-828-0577 x 221

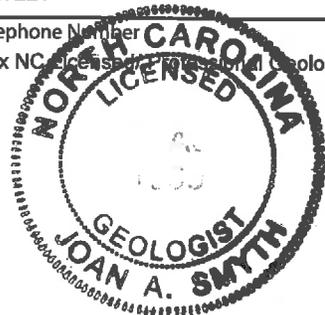
Facility Representative Name (Print) Title (Area Code) Telephone Number

*Joan A. Smyth*  
 Signature

6/30/14

Date

Affix NC Licensed Professional Geologist Seal



14 N. Boylan Avenue Raleigh, NC 27603

Facility Representative Address

C-0828

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

**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: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: 5/12/14 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: JORGE MONTEZUMA / S+G STAFF ENGINEER

Type and Serial Number of Gas Meter: GEM 2000 / GM 07002 HP Calibration Date of Gas Meter: 4/28/14

Date and Time of Field Calibration: 5/12/14 1:07 PM

Type of Field Calibration Gas: (15/15) 15/15 Expiration Date of Field Calibration Gas Canister: 9/7/17

Pump Rate of Gas Meter: 0.5 L/MIN

Ambient Air Temperature: 85°F Barometric Pressure: 27.34" Hg 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	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
P1									SEE PAGE 1A ATTACHED
P2	>60s	1358	>60s	0	0	0	20.0	0	
P3	>60s	1401	>60s	>%	>%	52.6	1.5	33.4	
P4	>60s	1413	>60s	0	0	0	17.3	4.8	
P5	>60s	1417	>60s	0	0	0	19.6	0.6	
P6	>60s	1322	>60s	0	0	0	16.9	3.3	LOCK DOES NOT LOCK
P7	>60s	1313	>60s	>%	>%	29.1	0	14.0	
P8									SEE PAGE 1A ATTACHED
P9	>60s	1334	>60s	0	0	0	19.1	0.9	
P10	>60s	1341	>60s	0	0	0	18.8	0.7	

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.

Jorge Montezuma  
SIGNATURE

STAFF ENGINEER  
TITLE

**NC Division of Waste Management - Solid Waste Section**

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: 5/23/14 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: JORGE MONTECUMA / S+G STAFF ENGINEER

Type and Serial Number of Gas Meter: GEM2000/GM070024P Calibration Date of Gas Meter: 4/28/14

Date and Time of Field Calibration: 5/12/14 1:07 PM

Type of Field Calibration Gas (15/15 or 35/50) 35/50 Expiration Date of Field Calibration Gas Canister: 9/5/14

Pump Rate of Gas Meter: 0.5 L/MIN

Ambient Air Temperature: 58°F Barometric Pressure: 27.20" Hg General Weather Conditions: CLOUDY

**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	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
P1	>60s	9:26	>60s	>1%	>1%	66.2	0.8	27.4	
P2	/	/	/	/	/	/	/	/	
P3	/	/	/	/	/	/	/	/	
P4	/	/	/	/	/	/	/	/	
P5	/	/	/	/	/	/	/	/	
P6	/	/	/	/	/	/	/	/	
P7	/	/	/	/	/	/	/	/	
P8	>60s	9:31	>60s	0%	0%	0	18.9	3.5	
P9	/	/	/	/	/	/	/	/	
P10	/	/	/	/	/	/	/	/	

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.

SIGNATURE Jorge Montecuma

TITLE STAFF ENGINEER

### NC Division of Waste Management - Solid Waste Section

### Landfill Gas Monitoring Data Form

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: \_\_\_\_\_ NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

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

Pump Rate of Gas Meter: \_\_\_\_\_

Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

**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	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
P11	>60s	1347	>60s	>1	>1	50	2.1	24.3	
P12	>60s	1316	>60s	0	0	0	20.1	0	CASE FILLED W/WATER
P13	>60s	1434	>60s	0	80%	4.0	5.8	8.2	NO LOCK, CONSTRUCTION AROUND IT.

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.

[Signature]  
SIGNATURE

STAFF ENGINEER.  
TITLE

**NC Division of Waste Management - Solid Waste Section**

**Landfill Gas Monitoring Data Form**

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: \_\_\_\_\_ NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

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

Pump Rate of Gas Meter: \_\_\_\_\_

Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

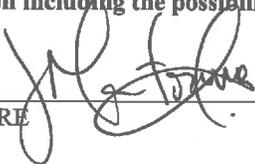
**Instructions:** Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume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

Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
AVERY COUNTY AIRPORT STRUCTURE #1									
NE Corner	>60s	1516	>60s	0	0	0	20.6	0	
NW Corner	>60s	1518	>60s	0	0	0	20.5	0	
SE Corner	>60s	1520	>60s	0	0	0	20.5	0	
SW Corner	>60s	1438	>60s	0	0	0	20.3	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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.

SIGNATURE 

TITLE STAFF ENGINEER

### NC Division of Waste Management - Solid Waste Section

### Landfill Gas Monitoring Data Form

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: \_\_\_\_\_ NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

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

Pump Rate of Gas Meter: \_\_\_\_\_

Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

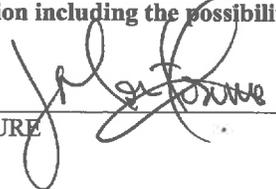
**Instructions:** Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume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

Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
AVERY COUNTY AIRPORT STRUCTURE #2									
NE Corner	7605	1440	7605	0	0	0	20.5	0	
NW Corner	7605	1442	7605	0	0	0	20.5	0	
SE Corner	7605	1522	7605	0	0	0	20.5	0	
SW Corner	7605	1524	7605	0	0	0	20.6	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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.

  
SIGNATURE

STAFF ENGINEER  
TITLE

NC Division of Waste Management - Solid Waste Section

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: Calibration Date of Gas Meter:

Date and Time of Field Calibration:

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

Pump Rate of Gas Meter:

Ambient Air Temperature: Barometric Pressure: General Weather Conditions:

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

Table with 10 columns: Location or LFG Well ID, Sample Tube Purge, Time, Time Pumped (s), Initial %LEL, Stabilized %LEL, %CH4 by Volume, %O2, %CO2, Notes. Rows include data for NE, NW, SE, SW corners of Avery County Airport Structure #3.

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.

SIGNATURE [Handwritten Signature]

TITLE STAFF ENGINEER

**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: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: \_\_\_\_\_ NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

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

Pump Rate of Gas Meter: \_\_\_\_\_

Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

**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	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
AVERY COUNTY AIRPORT STRUCTURE #4									
NE Corner	>60s	1452	>60s	0	0	0	20.6	0	
NW Corner	>60s	1454	>60s	0	0	0	20.4	0	
SE Corner	>60s	1456	>60s	0	0	0	20.4	0	
SW Corner	>60s	1458	>60s	0	0	0	20.5	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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**

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\_\_\_\_\_  
SIGNATURE

STAFF ENGINEER  
\_\_\_\_\_  
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NC Division of Waste Management - Solid Waste Section

Landfill Gas Monitoring Data Form

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Facility Name: Avery County Closed MSW Landfill Permit Number: 06-01

Date of Sampling: NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: SEE PAGE 1

Type and Serial Number of Gas Meter: Calibration Date of Gas Meter:

Date and Time of Field Calibration:

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

Pump Rate of Gas Meter:

Ambient Air Temperature: Barometric Pressure: General Weather Conditions:

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

Table with 10 columns: Location or LFG Well ID, Sample Tube Purge, Time, Time Pumped (s), Initial %LEL, Stabilized %LEL, %CH4 by Volume, %O2, %CO2, Notes. Includes data for Avery County Airport Structure #5 (NE, NW, SE, SW corners) and a row for additional locations.

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.

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Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

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

Pump Rate of Gas Meter: \_\_\_\_\_

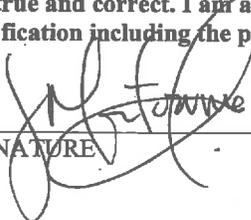
Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

**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	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
AVERY COUNTY AIRPORT STRUCTURE #6									
NE Corner	7605	1508	>605	0	0	0	20.6	0	
NW Corner	7605	1510	>605	0	0	0	20.5	0	
SE Corner	7605	1512	>605	0	0	0	20.4	0	
SW Corner	7605	1514	>605	0	0	0	20.6	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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.

  
 \_\_\_\_\_  
 SIGNATURE

STAFF ENGINEER  
 \_\_\_\_\_  
 TITLE

## **ATTACHMENT 2**

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**TABLE 1**  
**Avery County Closed MSW Landfill**  
**Landfill Gas Collection and Control System Monitoring**  
**May 2011 - May 2014**

DATE	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13
May-11	21.8	0	54.8	0	0	0	31.8	0	NA	NA	NA	NA	NA
Jun-11	61.6	0	66.7	0	0	0	32.2	0	NA	NA	NA	NA	NA
Jul-11	56	0	64.8	0	0	0	34.9	0	NA	NA	NA	NA	NA
Aug-11	36.8	0	44.5	0	0	0	32.5	0	NA	NA	NA	NA	NA
Sep-11	29.9	0	45.5	0	0	0	33.4	0	NA	NA	NA	NA	NA
Oct-11	30	0	50.4	0	0	0	35	0	NA	NA	NA	NA	NA
Nov-11	43.8	0	54.2	0	0	0	42.3	0	0	0	36.2	0	0
Dec-11	36.8	0	44.1	0	0	0	36.7	0	0	0	39.3	0.2	1.6
Jan-12	49.4	0	0	0	0	0	36.6	0	0	0	26.8	0	2.1
Feb-12	27.3	0	36.4	0	0	0	34.4	0	0	0	41.4	0	0.6
Mar-12	65.7	0	62.9	0	0	0	35.6	0	0	0	38.2	0	1.7
Apr-12	58.1	0	51.1	0	0	0	34.2	0	0	0	45.1	0	1.9
May-12	54.5	0	2.8	0	0	0	33.1	0	0	0	34.2	0	2.3
Jun-12	56.3	0	2.3	0	0	0	36.9	0	0	0	34.9	0	1.3
Oct-12	55.1	0	63.6	0	0	0	34.2	0	0	0	47.5	0	2.4
Nov-12	56.2	0	66.3	0	0	0	37	0	0	0	41.7	0	0.1
Dec-12	52.6	0	59.7	0	0	0	42.9	0	0	0	45.7	0	0.3
Jan-13	45.9	0	49.8	0	0	0	42.7	0	0	0	39.6	0	0
Feb-13	65.6	0	64.1	0	0	0	32.3	0	0	0	53.8	0	0
Mar-13	33.6	0	58.9	0	0	0	32	0	0	0	58.4	0	1.8
Apr-13	36.7	0	59.9	0	0	0	31.4	0	0	0	59.9	0	0
May-13	28.1	0	56.2	0	0	0	24.9	0	0	0	49.1	0	0
Jun-13	17.7	0	51.9	0	0	0	28.2	0	0	0	41	0	6.5
Jul-13	27.4	0	55	0	0	0	24.2	0	0	0	46.2	0	0
Aug-13	9	0	60.8	0	0	0	26.1	0	0	0	41.7	0	0
Sep-13	7.3	0	63.7	0	0	0	33.3	0	0	0	58.2	0	0
Oct-13	8.1	0	50.4	0	0	0	32.1	0	0	0	54.2	0	0
Nov-13	4.1	0	19.2	0	0	0	33.1	0	0	0	41.4	0	0.8
Dec-13	34.8	0	47.7	0	0	0	32.2	0	0	0	39.7	0	1.8
Jan-14	36.2	0	48	0	0	0	39.9	0	0	0	44.7	0	0
Feb-14	58.4	0	62.6	0	0	0	33	0	0	0	53.3	0	3.2
Mar-14	61.3	0	0	0	0	0	29.3	0	0	0	43.1	0	1.8
Apr-14	59.4	0	40.2	0	0	0	30.1	0	0	0	52.7	0	0
May-14	66.2	0	52.8	0	0	0	29.3	0	0	0	50.3	0	3.9

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## Avery County MSW Landfill Landfill Gas Monitoring Well Network Methane Concentrations Between May 2011 and May 2014

% CH4 by  
Volume

