

January 23, 2013

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

RE: **Operations, Monitoring, and Maintenance Report – January 2013**
Avery County Closed MSW Landfill
Spruce Pine, North Carolina

Dear Ms. Drummond:

This report provides information concerning the operation and monitoring (O&M) of the Avery County Closed MSW Landfill (Permit No. 06-01) Landfill Gas Collection and Control System (LFGCCS). This report covers the January 2013 monitoring period. Mr. Don Misenheimer with Smith Gardner, Inc. (S+G) performed this site visit on January 15, 2013. Details of this inspection are provided below.

ACTION LIST

S+G has identified the following items to be addressed in order 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*¹, has been approved² by the division of Waste Management. Phase One of the expansion project will consist of:
 - installation of two (2) landfill gas extraction wells that are four inches in diameter and approximately 60 feet deep on the northern portion of the property between current landfill gas extraction wells W1 and W3 and the limits of waste near Brushy Creek Road;
 - installation of an isolation valve along the landfill gas header to isolate the southern landfill gas extraction wells; and
 - installation of a flare collar extension;

Phase One of the system expansion is currently planned for February 2013. Phase Two of the expansion project will be completed when Phase One is determined to be effective.

¹ *Annual Landfill Gas Monitoring Report*, Closed Avery County MSW Landfill. Submitted by Smith Gardner, November 2012.

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

2. **W-1, W-2, W-3, and W-4:** Wells W-1 and W-2 have been determined to be watered out/totally clogged. W-3 and W-4 have been determined to be partially watered out/partially clogged and are only able have minimal system pressure applied for LFG extraction. **The approved expansion discussed above should improve over-all gas quality at the flare as well as increasing LFG collection across the site.**
3. **Flare:** Flare “blow out” and re-lighting problems seem to be present during steady wind conditions. **The approved expansion discussed above includes the installation of a flare collar extension.**
4. **Blower:** The blower is not operational and repair is needed. **The blower has been removed and returned to the manufacturer for evaluation/repair.**
5. **Monitoring:** Monthly monitoring will continue at the site.

LFG EXTRACTION WELL MONITORING ACTIVITIES

S+G personnel arrived onsite to remove the blower and return it to the manufacturer on January 15, 2013. Prior to blower removal, the valve to the wellfield was closed. Subsequently, the blower was removed from the system, and the adjacent flare station piping was sealed closed using plastic and duct tape.

Please note that this blower is currently under evaluation by the manufacturer. The blower will be reinstalled once it is received back from the manufacturer.

The following actions were taken at the well field and flare station during this period:

Flare Station

- **Flare:** Although the system was not operational when S+G arrived, the system was free venting through the flare and the flare was burning. **The system/flare was closed (not free venting) when S+G left the site.**
- **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.**
- **Blower:** As stated above, the blower was removed and returned to the manufacturer for evaluation/repair

Ms. Jaclynne Drummond

January 22, 2013

Page 3

LFG MONITORING WELL (PERIMETER) MONITORING

S+G personnel also performed monitoring of the perimeter LFG monitoring network. Monitoring wells P1, P3, P7 and P11 each measured over the 100% LEL or 5% by volume of CH₄. All other wells had no detectable concentrations of CH₄. Results of this monitoring event are included in **Attachment 1**. These wells will continue to be monitored and data will be submitted in this reporting format.

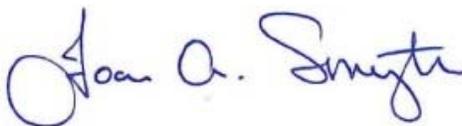
The next routine monitoring event is scheduled for February 2013. If you have any questions, or require additional information, please contact us at your earliest convenience at 919-828-0577 or by e-mail (address below).

Sincerely,

SMITH GARDNER, INC.



Don Misenheimer
Project Scientist, ext. 224
don@rsgengineers.com



Joan A. Smyth, P.G.
Senior Hydrogeologist ext. 221
joan@rsgengineers.com

Attachments

CC: Buddy Norris – Avery County
Deb Aja – NCDENR
Stacey Smith, P.E. – S+G
File

This page intentionally left blank.

FIGURE

**Operations Monitoring and Maintenance Report - LFGCCS
Avery County Closed MSW Landfill
Permit No. 06-91**

This page intentionally left blank.



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.



FIGURE NO:	1
SCALE:	AS SHOWN
APPROVED:	D.M.M.
PROJECT NO:	AVERY 12-6
DATE:	Oct 2012
DRAWN:	W.R.B.
FILENAME:	AVERY-B0192

PREPARED FOR:

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

THIS PAGE INTENTIONALLY LEFT BLANK

Attachment 1

**Operations, Monitoring and Maintenance Report - LFGCCS
Avery County Closed MSW Landfill
Permit No. 06-91**

This page intentionally left blank.

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: 1-15-2013 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: DON MISENHEIMER

Type and Serial Number of Gas Meter: GM 2000 GM05397 Calibration Date of Gas Meter: 1/10/13

Date and Time of Field Calibration: 1-15-2013 7:45 am

Type of Field Calibration Gas (15/15 or 35/50): 15/15 Expiration Date of Field Calibration Gas Canister: 04/13

Pump Rate of Gas Meter: 0.5 L/min

Ambient Air Temperature: 50° Barometric Pressure: 30.22 General Weather Conditions: RAIN

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	7605	7:50 _a	7605	7100	7100	45.9	0.3	28.0	
P2	7605	7:52 _a	7605	0	0	0	20.0	0.2	
P3	7605	7:54 _a	7605	7100	7100	42.8	0.9	28.9	
P4	7605	7:56 _a	7605	0	0	0	17.2	2.2	
P5	7605	7:58 _a	7605	0	0	0	18.9	0.6	
P6	7605	8:00 _a	7605	0	0	0	17.9	3.4	
P7	7605	8:02 _a	7605	7100	7100	42.7	1.4	13.1	
P8	7605	8:06 _a	7605	0	0	0	19.8	2.9	
P9	7605	10:00 _a	7605	0	0	0	20.0	1.5	
P10	7605	10:02 _a	7605	0	0	0	18.6	0.5	

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.

Don Misener STG
SIGNATURE

PROJECT SCIENTIST
TITLE

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: [SAME AS 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	760s	10:07a	760s	7100	2100	32.6	2.0	24.5	
P12	760s	9:04a	760s	0	0	0	19.7	1.3	
P13	760s	10:30a	760s	0	0	0	10.2	9.6	

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

PROJECT SCIENTIST
TITLE

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: [SAME AS 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, and SW corners of Avery County Airport Structure #1, with handwritten values and checkmarks.

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.

Handwritten signature and the word 'STG' over a line labeled 'SIGNATURE'.

PROJECT SCIENTIST over a line labeled 'TITLE'.

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: [SAME AS 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	>60s	10:40a	>60s	0	0	0	✓	✓	
NW Corner	>60s	10:42a	>60s	0	0	0	✓	✓	O ₂ + CO ₂ normal
SE Corner	>60s	10:44a	>60s	0	0	0	✓	✓	
SW Corner	>60s	10:46a	>60s	0	0	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.

Conrad Ste
SIGNATURE

PROJECT SCIENTIST
TITLE

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: [SAME AS 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 #3									
NE Corner	7605	10:48g	7605	0	0	0	✓	✓	
NW Corner	7605	10:50g	7605	0	0	0	✓	✓	O2 + CO2
SE Corner	7605	10:52g	7605	0	0	0	✓	✓	normg1
SW Corner	7605	10:54g	7605	0	0	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]
SIGNATURE

PROJECT SCIENTIST
TITLE

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: [SAME AS 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	760s	11:00g	760s	0	0	0	✓	✓	
NW Corner	760s	11:02g	760s	0	0	0	✓	✓	O2 + CO2
SE Corner	760s	11:04g	760s	0	0	0	✓	✓	normal
SW Corner	760s	11:06g	760s	0	0	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] PROJECT SCIENTIST
SIGNATURE TITLE

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: [SAME AS 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 #5									
NE Corner	760s	11:08a	760s	0	0	0	✓	✓	O ₂ +CO ₂ normal
NW Corner	760s	11:10a	760s	0	0	0	✓	✓	
SE Corner	760s	11:12a	760s	0	0	0	✓	✓	
SW Corner	760s	11:14a	760s	0	0	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]
SIGNATURE

PROJECT SCIENTIST
TITLE

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: [SAME AS 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 #6									
NE Corner	>60s	11:16g	>60s	0	0	0	✓	✓	
NW Corner	>60s	11:18g	>60s	0	0	0	✓	✓	O2 + CO2
SE Corner	>60s	11:20g	>60s	0	0	0	✓	✓	normal
SW Corner	>60s	11:22g	>60s	0	0	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] Sta
 SIGNATURE TITLE PROJECT SCIENTIST