

July 2, 2013

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

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

Dear Ms. Drummond:

This report provides information 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) as well as monitoring of the landfill gas probes located both on- and off-site. This report covers the June 2013 monitoring period. Mr. Don Misenheimer with Smith Gardner, Inc. (S+G) performed the site visit on June 19, 2013. Details of this site visit are provided below.

ACTION LIST

S+G previously 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, was previously approved² by the division of Waste Management. **Phase One of the expansion project has been completed and is currently being evaluated for effectiveness.**
2. **Monitoring:** Monthly monitoring will continue at the site.

LFG EXTRACTION WELL MONITORING PROGRAM

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

- CH₄, O₂, CO₂, and Pressure monitoring at each extraction well head;
- CH₄, O₂, CO₂, and Pressure monitoring at the flare station; and
- Adjustment of LFGCCS to balance recovery and ensure safe operation of the system.

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 migration of LFG. During

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.

this time, LFG monitoring at the landfill and for off-site properties will be continued on a monthly basis. Reporting of these results will be accordance with the approved LFG Monitoring Plan.

LFG EXTRACTION WELL MONITORING ACTIVITIES

S+G arrived on-site to perform the flare station and well field monitoring on June 19, 2013. When S+G arrived to the site, it was noted that the flare was not burning. S+G shut down the blower to investigate the source of air intrusion. After a system investigation, it was found that air was being drawn into the system at the condensate tank location due to an inadequate liquid level at the sump. A ball valve which was previously installed at the condensate tank was closed by S+G in order to stop the air intrusion. The results of this event are summarized below. Recommended actions are made in **bold**.

LFG Extraction Well Field

- **W-1 through W-10:** S+G was unable to perform wellhead monitoring at the site in June 2013 due to the system being turned off for investigation. Upon the system being restarted, wellheads and extraction wells were visually checked for damage and seal tightness. Wellhead monitoring for CH₄, O₂, CO₂, and pressure will continue during the next site visit. The system was restarted, and the flare was observed to be burning before S+G left the site.
- **Orifice Plates:** S+G continues to evaluate orifice plate sizes on the site as necessary.

Flare Station

- **Condensate Tank:** The condensate tank was observed during this site visit; the liquid was not adequate. Subsequently, the valve at the condensate tank was closed. **S+G will add liquid to the sump, if required, during the next site visit.**
- **Filter Tank:** The filter 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 filter tank.**

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.

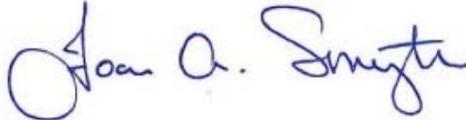
Ms. Drummond
July 2, 2013
Page 3 of 3

The next routine monitoring event is scheduled for July 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

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FIGURE

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

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

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

PREPARED FOR: _____

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Attachment 1

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

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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: 6-19-13 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: DON MISENHEIMER

Type and Serial Number of Gas Meter: WEM 2000, 07002 Calibration Date of Gas Meter: 2-1-13

Date and Time of Field Calibration: 6-19-13, 11:00A

Type of Field Calibration Gas (15/15 or 35/50): 15/15 Expiration Date of Field Calibration Gas Canister: 2016

Pump Rate of Gas Meter: 0.5 L/min

Ambient Air Temperature: 80° Barometric Pressure: 29.87 General Weather Conditions: Overcast

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	11:42a	7605	7100	7100	17.7	9.8	12.1	
P2	7605	11:40a	7605	0	0	0	17.0	0.2	
P3	7605	11:38a	7605	7100	7100	51.9	2.1	27.2	
P4	7605	11:35a	7605	0	0	0	15.8	2.7	
P5	7605	11:29a	7605	0	0	0	16.4	0.3	
P6	7605	11:23a	7605	0	0	0	17.0	1.7	
P7	7605	11:21a	7605	7100	7100	28.2	2.0	12.9	
P8	7605	11:17a	7605	0	0	0	16.8	1.0	
P9	7605	11:47a	7605	0	0	0	16.2	2.2	
P10	7605	11:49a	7605	0	0	0	15.1	2.8	

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

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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	760s	11:53a	760s	7100	7100	41.0	6.5	18.5	
P12	760s	11:19a	760s	0	0	0	16.0	1.9	
P13	760s	12:02p	760s	0	0	0	5.9	7.2	

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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: _____

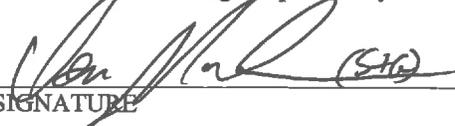
Instructions: Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume can 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 #1									
NE Corner	7605	12:04p	7605	0	0	0	20.9	0	
NW Corner	7605	12:06p	7605	0	0	0	20.2	0	
SE Corner	7605	12:08p	7605	0	0	0	20.1	0	
SW Corner	7605	12:10p	7605	0	0	0	20.1	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.

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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	12:12p	760	0	0	0	20.1	0	
NW Corner	7605	12:14p	760	0	0	0	20.2	0	
SE Corner	7605	12:16p	760	0	0	0	20.1	0	
SW Corner	7605	12:18p	760	0	0	0	20.1	0	
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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	↔	12:20p	760s	760s	0	0	0	20.1	0
NW Corner		12:22p	760s	760s	0	0	0	20.2	0
SE Corner		12:24p	760s	760s	0	0	0	20.2	0
SW Corner		12:26p	760s	760s	0	0	0	20.2	0
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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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	12:28p	760s	760s	0	0	0	20.1	0	
NW Corner	12:30p	760s	760s	0	0	0	20.1	0	
SE Corner	12:32p	760s	760s	0	0	0	20.1	0	
SW Corner	12:34p	760s	760s	0	0	0	20.1	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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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	%CH ₄ by Volume	%O ₂	%CO ₂	Notes
AVERY COUNTY AIRPORT STRUCTURE #5									
NE Corner	12:36p	760s	760s	0	0	0	20.2	0	
NW Corner	12:38p	760s	760s	0	0	0	20.1	0	
SE Corner	12:40p	760s	760s	0	0	0	20.7	0	
SW Corner	12:42p	760s	760s	0	0	0	20.1	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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Pump Rate of Gas Meter: _____

Ambient Air Temperature: _____ Barometric Pressure: _____ General Weather Conditions: _____

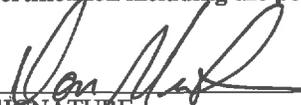
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Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes
AVERY COUNTY AIRPORT STRUCTURE #6									
NE Corner	7603 7603	12:44p	7605	0	0	0	20.2	0	
NW Corner	7603 7603	12:46p	7605	0	0	0	20.2	0	
SE Corner	7603 7603	12:48p	7605	0	0	0	20.1	0	
SW Corner	7603 7603	12:50p	7605	0	0	0	20.1	0	
ADD ANY ADDITIONAL LOCATIONS AT OR NEAR STRUCTURE WITH METHANE PRESENT BELOW OR ON ADDITIONAL SHEETS									

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 (S+G)
SIGNATURE

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