



June 28, 2011

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

**RE: Operations, Monitoring, and Maintenance Report – May 2011  
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 May 2010 monitoring period. Mr. Don Misenheimer and Mr. Frank Terry, both with RSG, performed the May site visit on May 3, 2011. Details of this inspection are provided below.

**ACTION LIST**

RSG has identified the following items to be addressed in order for the LFGCCS to operate as designed:

1. **W-5, W-6, W-7 & W-8:** Orifice plate sizes should continue to be evaluated and adjusted as necessary.
2. **Flare:** The ignition plug in the electronic flare igniter should be inspected and cleaned/replaced. An extended flare collar should be considered for possible high wind related issues onsite.
3. **Blower:** Blower size should continue to be evaluated for system performance.

**LFG EXTRACTION WELL MONITORING REQUIREMENTS**

As set forth in the *Off-site Landfill Gas Mitigation Plan*<sup>1</sup>, approved, via letter, on February 10, 2011 by NCDENR Division of Waste Management<sup>2</sup>, monthly monitoring of the LFGCCS will include the following:

- 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 LFGCCS to balance recovery and ensure safe operation of the system.

<sup>1</sup> *Off-Site Gas Mitigation Plan*. Richardson Smith Gardner and Assoc. January 18, 2011

<sup>2</sup> *Off-Site Gas Mitigation Plan*- Approval. Letter from Jaclynne Drummond, NCDENR, February 10, 2011

The County will maintain this LFGCCS for a period of at least 12 months to evaluate the effectiveness of increased LFG recovery from the waste mass in alleviating off-site migration of LFG. During 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.

At this time RSG has not yet submitted the revised Landfill Gas Monitoring Plan. As this plan is submitted and approved, monitoring requirements may be updated.

### **LFG EXTRACTION WELL MONITORING ACTIVITIES**

Flare station and well field monitoring was performed on May 3, 2011. The results of this event are summarized below. Recommended actions are made in **bold**. Well field data and flare station data are provided in the **attached Table 1**.

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

#### **Well Field**

- **W-1, W-2, W-3, & W-4:** These wells were adjusted to fully open during this monitoring event.
- **W-5, W-6 & W-8:** Orifice plates at these wells were changed from 0.25" to 0.5" to allow for more flow from these locations.
- **W-7:** The 0.25" orifice plate at this location was determined to be the proper size at this location. **Orifice plate sizes on wells W-5, W-6, W-7 & W-8, should continue to be evaluated and adjusted as necessary.**

#### **Flare Station**

- The flare was re-ignited and the temperature data logger at the flare was checked and determined to be operational during this site visit. **The ignition plug in the electronic flare igniter should be inspected and cleaned/replaced. An extended flare collar should be considered for possible high wind related issues onsite.**
- System vacuum readings before and after the knockout-pot were checked and since no significant loss in vacuum was noted, the knockout-pot was determined to be operating properly. The site's only condensate tank (as shown on **Figure 1**) was checked and no excessive liquid was found.
- The blower was taken apart and it was confirmed that the fan blade was not damaged and was turning in the correct direction. **Blower size should continue to be evaluated for system performance.**

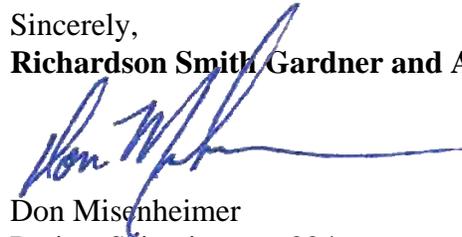
## **LFG MONITORING WELL (PERIMETER) MONITORING**

RSG personnel conducted the May 2011 monitoring of the perimeter LFG monitoring wells on May 3, 2011. Results of this monitoring event are included in **Attachment 1**. Monitoring wells P1, P3, and P7 each measured over the 100% LEL or 5% by volume of CH<sub>4</sub>, while all other wells measured no CH<sub>4</sub>. These wells will continue to be monitored and will be submitted in this reporting format.

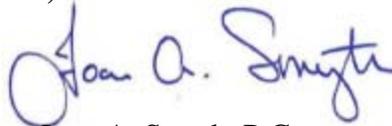
The next routine monitoring event is tentatively scheduled for the third week of June 2011. If you have any questions, or require additional information, please contact us at your earliest convenience at 919-828-0577 or by e-mail (address below).

Sincerely,

**Richardson Smith Gardner and Associates, Inc.**



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



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

### Attachments

CC: Buddy Norris – Avery County  
Bill Wagner – NCDENR  
Stacey Smith, P.E. – RSG  
File

## **Table**



DATE: May 3, 2011  
 BY: FAT, DMM

**Table 1**  
**Avery County Closed MSW Landfill**  
**Landfill Gas Collection and Control System Monitoring**  
**May 2011**

DataField CS - GEM Mode Data Output

Device ID	Date/Time mm/dd/yyyy	CH4 %	CO2 %	O2 %	Balance %	Adj. Temperature degF	Init. Temperature degF	Adj. Static Pressure in H2O	Init. Static Pressure in H2O	Baro in Hg	Adj. Flow Scfm	Init. Flow Scfm	Adj. Diff. Pressure in H2O	System Pressure in H2O
AVERY-W1	5/3/2011 11:29	70.6	28.3	0.9	0.2	75	75	0	-3.6	27.24	<<>>	1	-0.582	-3.63
AVERY-W2	5/3/2011 11:31	72.1	27	0.2	0.7	75	75	-3.6	-3.7	27.18	2	3	0.004	-3.63
AVERY-W3	5/3/2011 11:33	70.8	28.7	0.4	0.1	75	75	-0.1	-3.6	27.19	4	1	0.011	-3.55
AVERY-W4	5/3/2011 11:36	69.6	29.9	0.4	0.1	75	75	-3.5	-3.4	27.19	<<>>	<<>>	-0.006	-3.7
AVERY-W5	5/3/2011 9:30	67.5	32	0.4	0.1	75	75	-3.9	-3.9	27.26	1	1	0.305	-4.23
AVERY-W6	5/3/2011 9:26	68.8	29.9	0.1	1.2	75	75	-3.8	-3.7	27.26	3	3	1.241	-4.84
AVERY-W7	5/3/2011 8:31	38.3	27.8	0	33.9	75	75	-0.6	-0.6	27.25	1	1	4.983	-5.49
AVERY-W8	5/3/2011 9:21	54.8	33.9	0.1	11.2	75	75	-4.4	-4.4	27.27	2	2	0.512	-4.87
Flare Station	5/3/2011 11:15	60.4	29.9	0.2	9.5	75	75	--	--	--	13*	--	0.25	-3.9

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 extractions wells may also result in negative pressure being displayed.

\* The flow at the flare station was calculated using a formula, not the GEM 2000.

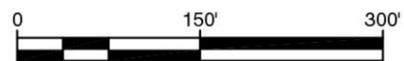
**Figure**

G:\CAD\Avery County\Avery 11-3\sheets\AVERY-B0170.dwg - 7/1/2011 10:21 AM



**REFERENCES**

1. ADJACENT PROPERTIES ARE FROM AVERY COUNTY GIS MAPPING DEPARTMENT.
2. LANDFILL GAS EXTRACTION WELL LOCATIONS FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS AND CONSULTANTS. PIPING IS APPROXIMATE.
3. PROPERTY LINE FROM FIELD SURVEY DATED APRIL 9, 2010, BY APPALACHIAN PROFESSIONAL LAND SURVEYORS & CONSULTANTS.
4. SHOWN PIPE DIAMETERS ARE ASSUMED FROM "AVERY COUNTY LANDFILL - NATURAL GAS-TO-ENERGY PROJECT PROPOSAL", BY NATURAL POWER, INC., FEBRUARY 14, 2000, AND RSG SITE VISIT ON APRIL 6-7, 2011.



**RICHARDSON SMITH GARDNER & ASSOCIATES**  
INC. LIC. NO. C-282 (Engineering)  
 www.rsgengineers.com

ph: 919-826-0577  
 fax: 919-826-3899

14 N. Boylan Ave.  
 Raleigh, N.C. 27603

DRAWN BY:	J.A.L.	CHECKED BY:	D.M.M.
DATE:	Jul. 2011	PROJECT NO.:	AVERY 11-3
SCALE:	AS NOTED	FIGURE NO.:	1
FILE NAME:	AVERY-B0170		

**TITLE:**  
 EXISTING LANDFILL GAS EXTRACTION SYSTEM  
 AVERY COUNTY CLOSED MSWLF  
 SPRUCE PINE, NC

## **Attachment 1**

DENR USE ONLY:

Paper Report

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

Doc/Event #:

NC DENR

Division of Waste Management - Solid Waste

# Environmental Monitoring Reporting Form

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

### Instructions:

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

### Solid Waste Monitoring Data Submittal Information

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

Richardson Smith Gardner and Associates, 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@rsgengineers.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Closed Avery Co. MSW Landfill	Brushy Creek Road Spruce Pine, NC	06-01	.0500	May 3, 2011

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

Senior Hydrogeologist

919-828-0577 x 221

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

Signature

Date

Affix NC Licensed/ Professional Geologist Seal

14 N. Boylan Avenue Raleigh, NC 27603

Facility Representative Address

C0828

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

Revised 6/2009



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: CLOSED AVERY COUNTY MSW LANDFILL Permit Number: 06-01

Date of Sampling: 5/3/2011 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: DON MISENHEIMER (RSG) PROJECT SCIENTIST  
GEM 2000

Type and Serial Number of Gas Meter: GEM 0700ZHP Calibration Date of Gas Meter: 4/24/10

Date and Time of Field Calibration: 5/3/2011 9:30a

Type of Field Calibration Gas (15/15 or 35/50): 15/15 Expiration Date of Field Calibration Gas Canister: 4/2013

Pump Rate of Gas Meter: 0.5 L/min

Ambient Air Temperature: 80's Barometric Pressure: 29.85 General Weather Conditions: Mostly 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	7605	9:35a	7605	7100	7100	21.8	14.3	16.1	
P2	7605	9:40a	7605	0	0	0	22	0	
P3	7605	9:45a	7605	7100	7100	58.4	0	30.4	
P4	7605	9:51a	7605	0	0	0	20.0	2.7	
P5	7605	9:59a	7605	0	0	0	22.0	0	
P6	7605	10:07a	7605	0	0	0	21.1	0.5	
P7	7605	10:12a	7605	7100	7100	31.8	2.0	11.1	
P8	7605	10:21a	7605	0	0	0	21.0	1.1	

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

Certification

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

[Signature]  
 SIGNATURE RSG

PROJECT SCIENTIST  
 TITLE

NOTE

\* METER WAS FIELD CAL'D USING 15/15 GAS, therefore High Readings may not have a high level of Accuracy. The GEM 2000 was RE-CAL'D (FIELD) 16 AFTER HIGH READINGS WERE FOUND. RETESTS YIELDED NO SIGNIFICANT CHANGES