



July 13, 2011

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

**RE: Operations, Monitoring, and Maintenance Report – June 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 June 2010 monitoring period. Mr. Don Misenheimer with RSG, performed the June site visit on June 9, 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:** RSG is continuing to evaluate the blower size for optimal system performance.

LFG EXTRACTION WELL MONITORING REQUIREMENTS

As set forth in the *Off-site Landfill Gas Mitigation Plan*¹, approved, via letter, on February 10, 2011 by NCDENR Division of Waste Management², monthly monitoring of the LFGCCS will include the following:

- 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.

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

² *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 June 9, 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 through W-8:** All wells were adjusted to fully open during this monitoring event.
- **W-7:** The 0.25" orifice plate at this location has been determined to be the proper size at this location. **Outstanding Action Item: 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 burning and the temperature data logger at the flare was checked and determined to be operational during this site visit. **Outstanding Action Item: The ignition plug in the electronic flare igniter should be inspected and cleaned/replaced if/when the flare is not ignited. 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.
- **Outstanding Action Item: RSG is continuing to evaluate the blower size for optimal system performance.**

LFG MONITORING WELL (PERIMETER) MONITORING

RSG personnel conducted the June 2011 monitoring of the perimeter LFG monitoring wells on June 1, 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 CH₄, while all other

Ms. Jaclynne Drummond
July 13, 2011
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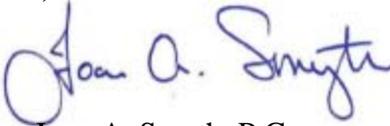
wells had no detectable concentrations of CH₄. These wells will continue to be monitored and data will be submitted in this reporting format.

The next routine monitoring event is tentatively scheduled for the third week of July 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



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

Attachments

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

Table



DATE: June 9, 2011
 BY: DMM

Table 1
Avery County Closed MSW Landfill
Landfill Gas Collection and Control System Monitoring
June 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 | 6/9/2011 16:02 | 72.2 | 26.7 | 0.9 | 0.2 | 75 | 75 | 0 | -2.5 | 27.16 | <<>> | <<>> | -0.021 | -2.44 |
| AVERY-W2 | 6/9/2011 16:06 | 73.9 | 23.8 | 1.1 | 1.2 | 75 | 75 | 0.1 | -2.5 | 27.16 | <<>> | <<>> | -0.658 | -2.48 |
| AVERY-W3 | 6/9/2011 16:13 | 70.9 | 27.6 | 0.6 | 0.9 | 75 | 75 | -2.5 | -2.4 | 27.17 | <<>> | <<>> | -0.048 | -2.98 |
| AVERY-W4 | 6/9/2011 16:16 | 66.5 | 30.5 | 0 | 3 | 75 | 75 | -2.4 | -2.5 | 27.17 | <<>> | <<>> | -0.068 | -2.92 |
| AVERY-W5 | 6/9/2011 16:26 | 65.4 | 32.4 | 0 | 2.2 | 75 | 75 | -2.8 | -2.8 | 27.17 | 1 | 1 | 0.156 | -3.33 |
| AVERY-W6 | 6/9/2011 16:30 | 41.7 | 28.8 | 0 | 29.5 | 75 | 75 | -2.4 | -2.5 | 27.24 | 2 | 2 | 0.486 | -3.1 |
| AVERY-W7 | 6/9/2011 16:33 | 37.6 | 26.4 | 0.1 | 35.9 | 75 | 75 | -0.5 | -0.5 | 27.23 | 0 | 0 | 2.5 | -3.16 |
| AVERY-W8 | 6/9/2011 16:36 | 31.6 | 27.9 | 0.2 | 40.3 | 75 | 75 | -2.8 | -2.7 | 27.23 | 1 | 1 | 0.259 | -3.55 |
| Flare Station | 6/9/2011 16:44 | 51 | 25.3 | 0.1 | 23.6 | 75 | 75 | NA | NA | NA | 24* | NA | | -3.4 |

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.

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

* The flow at the flare station was calculated with readings gathered on 6/27/11, using an orifice plate gas flow formula.

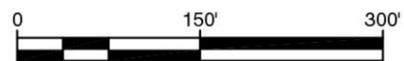
Figure

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

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

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

Attachment 1

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 | June 27, 2011 |

Environmental Status: (Check all that apply)

- Initial/Background Monitoring Detection Monitoring Assessment Monitoring Corrective Action

Type of data submitted: (Check all that apply)

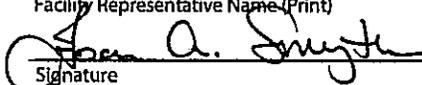
- Groundwater monitoring data from monitoring wells Methane gas monitoring data
 Groundwater monitoring data from private water supply wells Corrective action data (specify) _____
 Leachate monitoring data Other(specify) _____
 Surface water monitoring data

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, P.G. Senior Hydrogeologist 919-828-0577 x 221
 Facility Representative Name (Print) Title (Area Code) Telephone Number
 7/13/11 Affix NC Licensed/ Professional Geologist Seal
 Signature Date

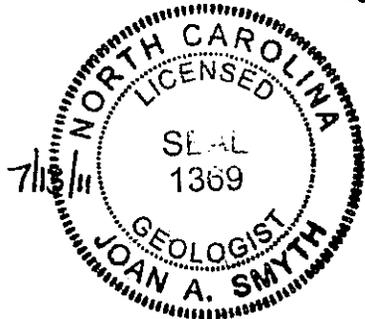
14 N. Boylan Avenue Raleigh, NC 27603

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 DASW LP Permit Number: 06-01

Date of Sampling: 6-1-11 NC Landfill Rule (.0500 or .1600): .0500

Name and Position of Sample Collector: RICHARD SHEEHAN (RSG)

Type and Serial Number of Gas Meter: GEM 2000 G/M 07002HR Calibration Date of Gas Meter: 4-29-10 IASP

Date and Time of Field Calibration: 6-1-11 2:15p

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: 82° Barometric Pressure: 30.33 General Weather Conditions: partly 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 | 760s | 4:00p | 760s | 7100 | 7100 | 61.6 | 1.7 | 25.5 | |
| P2 | 760s | 4:05p | 760s | 0 | 0 | 0 | 19.4 | 0.6 | |
| P3 | 760s | 4:08p | 760s | 7100 | 7100 | 66.7 | 0 | 29.9 | |
| P4 | 760s | 4:12p | 760s | 0 | 0 | 0 | 18.2 | 1.8 | |
| P5 | 760s | 4:17p | 760s | 0 | 0 | 0 | 19.1 | 0.6 | |
| P6 | 760s | 4:22p | 760s | 0 | 0 | 0 | 18.6 | 0.9 | |
| P7 | 760s | 4:30p | 760s | 7100 | 7100 | 32.2 | 2.0 | 12.2 | |
| P8 | 760s | 4:45p | 760s | 0 | 0 | 0 | 19.1 | 0.4 | |

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.

Richard Sheehan (RSG)
SIGNATURE

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 AFTER HIGH READINGS WERE FOUND. RETESTS YIELDED NO SIGNIFICANT CHANGES