

**Landfill Gas Collection and Control System Expansion
Phase One Report**

**Avery County Closed MSW Landfill
Permit No. 06-91**

Prepared for:



**Avery County Solid Waste
P.O. Box 640
Newland, NC 28657**

June 2013

Prepared by:

SMITH+GARDNER

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**Avery County Closed MSW Landfill
Permit No. 06-01**

**Landfill Gas Collection and Control System Expansion
Phase One Report**

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1.0 INTRODUCTION

The Avery County Closed MSW Landfill is located on approximately 4.5 acres on Brushy Creek Road in Spruce Pine, North Carolina. This report has been prepared to document an expansion of the Landfill Gas Collection and Control System (LFGCCS) as proposed in the *Annual Landfill Gas Monitoring Report*¹, which was approved² by the division of Waste Management. Phase One of the expansion project consisted of:

- installation of a flare collar extension;
- installation of two (2) landfill gas extraction wells that are four inches in diameter 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;
- connection of the two new wells to the existing landfill gas collection system and connection repairs of W1 through W8;
- installation of an filter tank and new blower at the flare station; and
- low-pressure air test of the entire system.

The above LFG system expansions and modifications were completed to improve overall system performance. Previous to the Phase One expansion, the flow rate at current extraction wells were maximized and overall gas quality appeared to be decreasing over time; additional areas of CH₄ in the landfill were determined to be utilized to keep the LFGCCS operational. The newly installed extraction wells should improve over-all gas quality at the flare as well as increase LFG flow across the site.

2.0 EXPANSION ACTIVITIES

2.1 Flare Collar Extension

Avery County and S+G personnel installed a three (3) foot flare collar extension on February 5, 2013. This extension should help remedy flare “blow out” and re-lighting problems that have historically been present during steadywind conditions.

2.2 Landfill Gas Extraction Well Installation

On April 8, 2013 two (2) additional LFG extraction wells were installed by Geologic Explorations, Inc. (GEI). Each well was installed to a depth of 35 feet below grade under the S+G personnel supervision. These 4” extraction wells were installed with 10” hollow stem augers. Each well (W-9 and W-10) consists of 25 feet of 4” perforated and 10 feet of solid schedule 40 PVC pipe. The annular space of the wells was filled with pea gravel up to one (1) foot above the perforated pipe. A thin soil layer was placed above the pea gravel. Bentonite was added to fill the remaining annular space up to two (2) feet below grade. On-site clay was utilized to backfill the remaining space. Well cuttings were

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.

placed and sealed in 55-gallon drums and removed from the site. Approximate well locations are **provided as Figure 1**. Boring logs of these well installations are **provided in Appendix A**.

These extraction wells were installed in locations that required the use of remote wellhead connections. On April 22-25, Piedmont Industrial Services (PIS) performed minimal shallow trenching (not in waste) from the installed extraction well to the LFG system header. Details of the trenching and remote wellhead connections are **provided as Figure 2**. On April 30, 2013, S+G personnel installed new extraction wellheads on W-9 and W-10.

2.3 Landfill Gas Extraction Well System Connections

During April 22-25, 2013, PIS replaced all connections from the system laterals to LFG extraction wells W-1 through W-8 with HPDE piping and welded connections. Subsequently, PIS connected the remote extraction wells (W-9 and W-10) to the existing header near W-1 and W-3. Subsequently, PIS performed a low-pressure air test across the entire system and confirmed that no air leaks were present.

2.4 Flare Station Filter Tank and Blower Installation

During the April 22-25 site visit, PIS installed a filter tank at the flare station. The filter tank was installed between the sump and the blower and should eliminate the likelihood of solids entering the blower and causing damage. This filter tank is equipped with a site window to monitor liquid accumulation.

Additionally, PIS installed a new blower to replace the damaged, non-operational unit. This blower is the same make and model that has been present on-site for the life of the system.

2.5 Low-Pressure Air Test

Subsequent to system connection repairs and new well connections, PIS performed a low-pressure air test across the entire system. This air test confirmed that no air leaks were present.

2.6 Valve Installation

During the April 22-25 visit, PIS planned to install a previously proposed isolation valve. During the excavation of the header at the proposed valve installation location, it was determined that the header pipe in this area is 6-inch diameter and is larger than the valve that was ordered. Due to the entire system passing the low-pressure air test, it is our opinion that the installation of the isolation valve is not necessary at this time.

3.0 SYSTEM EVALUATION

After the first six (6) months of operation a performance evaluation on Phase 1 should be performed. If it is determined that the Phase One installations have had influence on the LFG

monitoring wells along Brushy Creek Road and on the Unimin property, the second phase of well installation should be completed. Phase Two will consist of installing one (1) additional well on the southwestern portion of the site between current well W-8 and the condensate tank area. This well is proposed to be four inches in diameter and installed to a depth of approximately 20 feet. Installing this extraction well should help intercept LFG migration from the waste mass to monitoring well P-7.

4.0 SUMMARY

The LFGCCS was re-started and has been running uninterrupted since April 30, 2013. The system improvements performed during Phase One of the LFGCCS Expansion Plan should allow for increased gas quality at the flare and increased flow across the well field. Subsequently, the LFGCCS improvements should have a greater effect on controlling LFG migration off-site.

FIGURES



© 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)

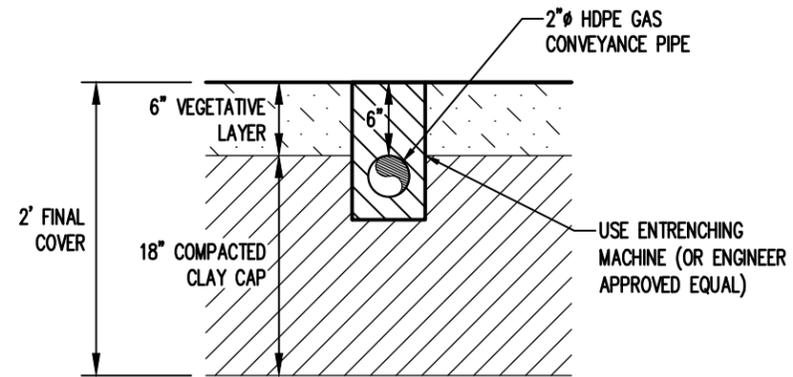
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DRAWN: W.R.B.	APPROVED: D.M.M.	SCALE: AS SHOWN	FIGURE NO: 1
DATE: Oct 2012	PROJECT NO: AVERY 12-6	FILENAME: AVERY-B0192	

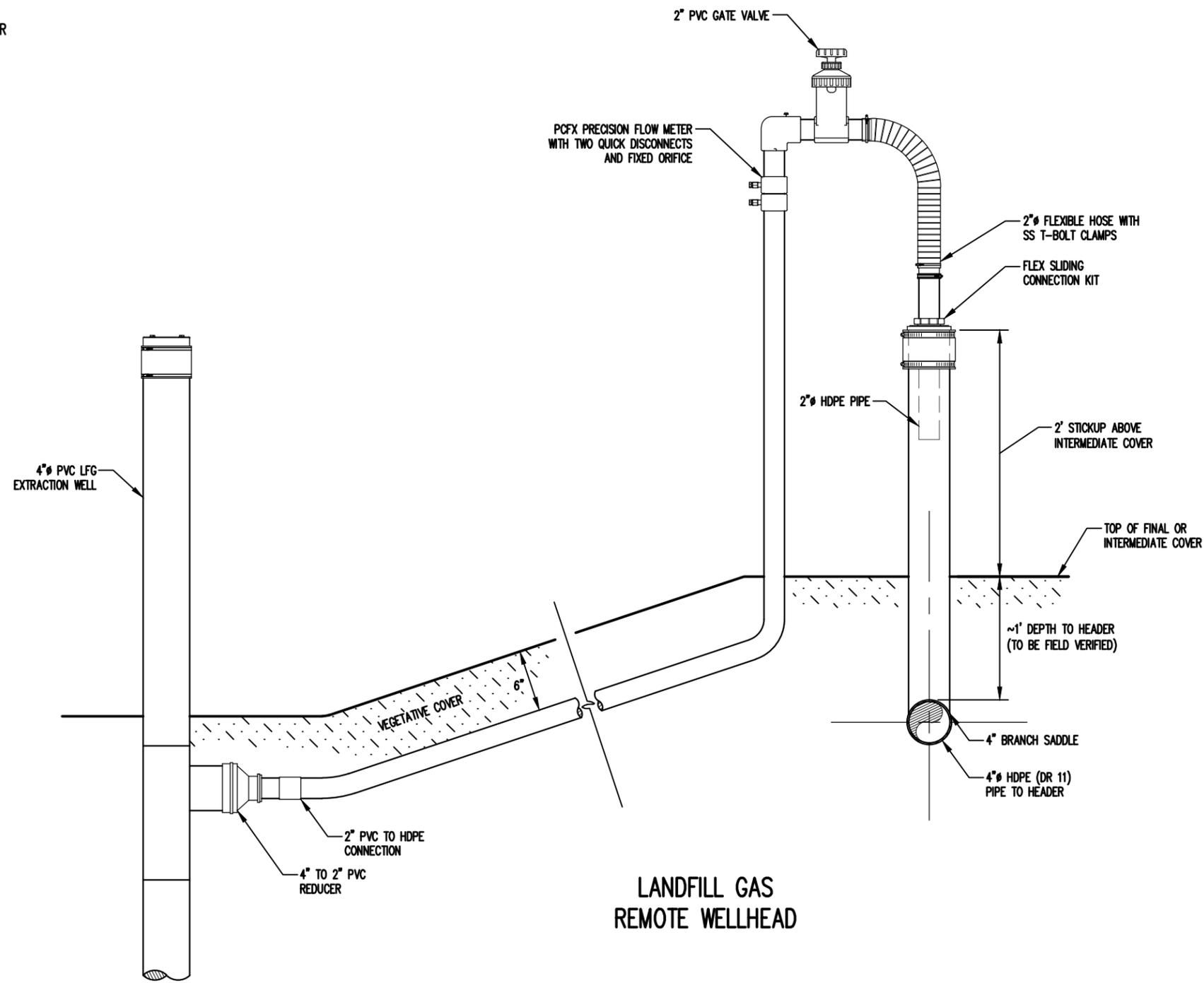
**LANDFILL GAS MONITORING SYSTEM
AVERY COUNTY CLOSED MSWLF
SPRUCE PINE, NORTH CAROLINA**

PREPARED FOR: _____

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GAS CONVEYANCE PIPE



**LANDFILL GAS
REMOTE WELLHEAD**

PREPARED BY: _____ NC LIC. NO. C-0828 (ENGINEERING)

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APPROVED:	SCALE:	FIGURE NO.
W.R.B.	AS SHOWN	2
J.A.S.		
DATE:	PROJECT NO.:	FILENAME:
Feb 2013	AVERY 12-6	AVERY-B0198

PREPARED FOR:

**LANDFILL GAS
REMOTE WELLHEAD DETAIL
AVERY COUNTY CLOSED MSWLF
SPRUCE PINE, NORTH CAROLINA**

APPENDIX A

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FIELD BOREHOLE LOG

BOREHOLE NUMBER **W-9**

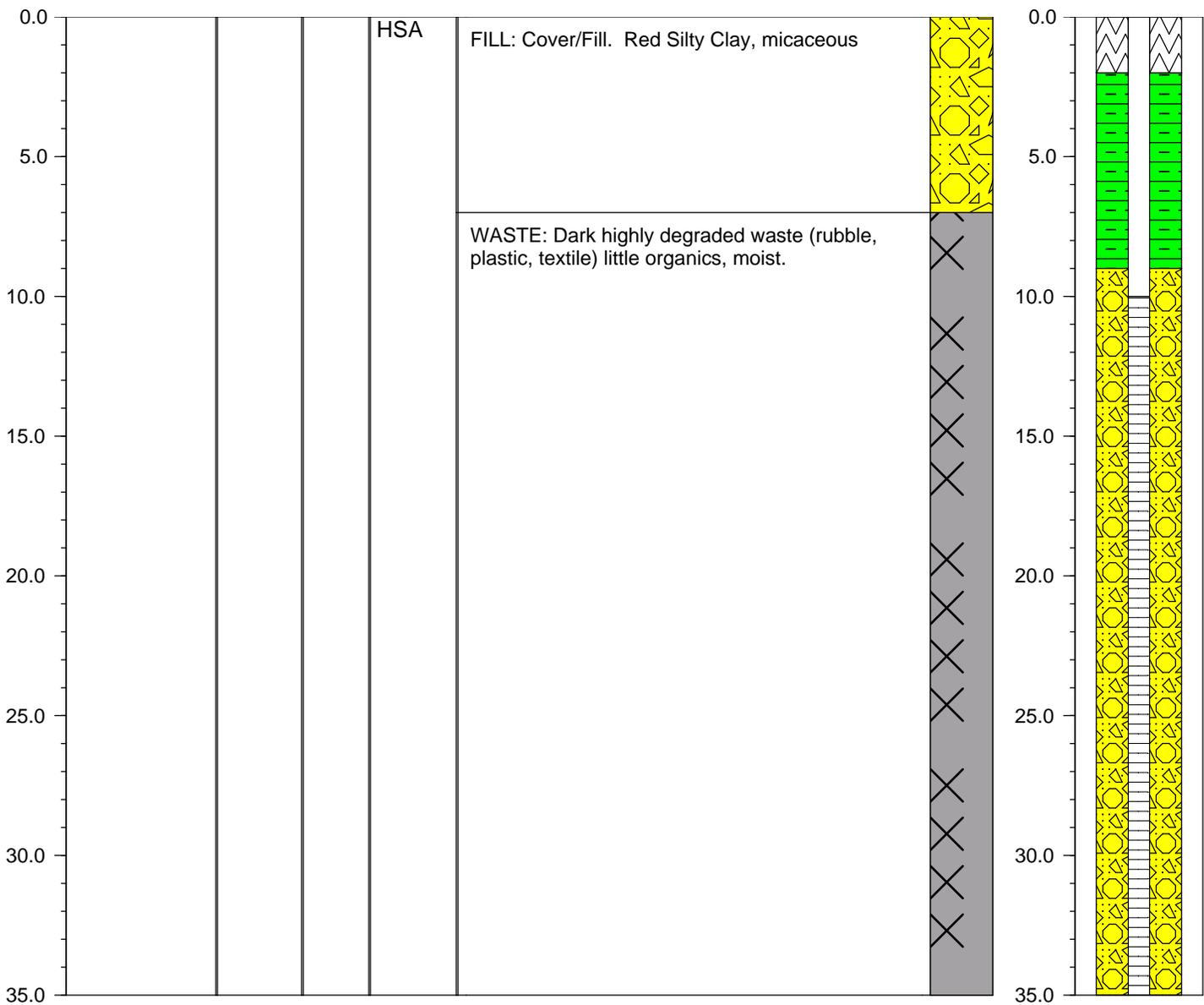
Page 1 of 1

PROJECT NAME: **Avery Closed MSW LF**
 LOCATION: **Avery County**
 DRILLING CO: **Geologic Explorations Inc.**
 DRILLING METHOD: **HSA**
 FIELD PARTY:
 GEOLOGIST: **D. Misenheimer**
 DATE BEGUN: COMPLETED:

TOTAL DEPTH: **35**
 TOP OF CASING ELEV.: GROUND ELEV.:
 NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)		
Time		
Date		

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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