



RICHARDSON SMITH GARDNER & ASSOCIATES
Engineering and Geological Services

January 29, 2010

Mr. Allen Gaither
Environmental Engineer II
NC DENR - Solid Waste Section
2090 U.S. Highway 70
Swannanoa, North Carolina 28778

**RE: Landfill Gas Monitoring Plan
Avery County Closed MSW Landfill
NC Solid Waste Permit No. 06-01**



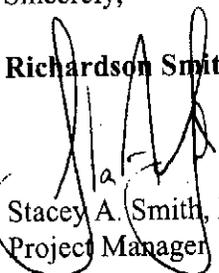
Dear Mr. Gaither:

On behalf of Avery County, Richardson Smith Gardner & Associates (RSG) is hereby submitting the **enclosed** Landfill Gas Monitoring Plan for the above referenced site. As the Division is aware, Avery County recently received a Notice of Violation (**copy attached**) for violation of 15A NCAC 13B .0503 (2)(a). The attached plan has been prepared to satisfy this requirement and, once approved, the County intends to implement the plan immediately including the installation of eight (8) landfill gas monitoring probes.

We appreciate your attention and we are prepared to respond immediately to any questions or concerns regarding this application. Please feel free to contact me by phone at (919) 828-0577 ext. 127 or by email at stacey@rsgengineers.com.

Sincerely,

Richardson Smith Gardner & Associates, Inc.


Stacey A. Smith, P.E.
Project Manager

Att.

Cc: Mr. Henry "Buddy" Norris, Avery County Solid Waste Department
Mr. Ed Mussler III, P.E., NCDENR
Mr. Bill Wagner, NCDENR
Ms. Heather Dawes, Energy Xchange
File

H:\Projects\Avery County (NC)\Avery-09-8 (Landfill Gas Management Plan)\Cover Letter 1-29-10.wpd



FACILITY COMPLIANCE AUDIT REPORT
Division of Waste Management
Solid Waste Section

UNIT TYPE: (check all that apply to this audit with same Permit number)											
Lined MSWLF		LCID		YW		Transfer		Compost		SLAS	COUNTY: Avery PERMIT NO.: 06-01 FILE TYPE: COMPLIANCE
Closed MSWLF	X	HHW		White goods		Incin		T&P		FIRM	
CDLF		Tire T&P / Collection		Tire Monofill		Industrial Landfill		DEMO		SDTF	

Date of Audit: 9/30/09

Date of Last Audit: 07/06/09

FACILITY NAME AND ADDRESS

Avery Co. MSW Landfill (Closed)
 Brushy Creek Rd. (SR-1101)
 Ingalls, NC

GPS COORDINATES: (Decimal Degrees) N: 35.96116 E: -81.96983

FACILITY CONTACT NAME AND PHONE NUMBER:

Henry Norris, Avery County Solid Waste Director
 828-859-6880 (Maintenance Shed) – 828-859-6655 (Town Office)
 Robert Wiseman, County Manager - 828-733-8201

FACILITY CONTACT ADDRESS (IF DIFFERENT):

PO Box 640,
 Newland, NC. 28657

AUDIT PARTICIPANTS:

Bill Wagner, NCDENR
 Paul Crissman, NCDENR

STATUS OF PERMIT:

Closed per 13B .0505: Waste last accepted on October 8, 1993

PURPOSE OF AUDIT:

Partial Audit

NOTICE OF VIOLATION(S) (citation and explanation):

15A NCAC 13B .0510(c) requires that "when a solid waste disposal site has been closed in accordance with the requirements of the Division, future necessary maintenance and water quality monitoring shall be the responsibility of the owner and the operator and shall be specified in the closure letter."

The December 29, 1995 Closure Letter (attached), in the POST CLOSURE CONDITIONS section item #1 (Management of Landfill Gas), states that "the owner shall take the measures necessary to ensure that the closed site shall continue to meet the design standards for landfill gas found in Rule .0503(2)(a)."

Rule .0503(2)(a) states: "The concentration of explosive gases generated by the site shall not exceed:

- (i) twenty-five percent of the limit for the gases in site structures (excluding gas control or recovery system components); and
- (ii) the lower explosive limit for the gases at the property boundary"

FACILITY COMPLIANCE AUDIT REPORT
Division of Waste Management
Solid Waste Section

Page 2 of 2

Avery County has not shown that any explosive gas monitoring has ever been performed at the closed municipal solid waste facility as required in the closure letter dated December 29, 1995. Therefore, Avery County has failed to monitor the concentration of explosive gas generated by the site, within site structures, and at the property boundary of the site, in accordance with 15A NCAC 13B .0503(2)(a)(i) and (ii).

Avery County is in violation of 15A NCAC 13B .0510(c) for failing to perform the necessary maintenance at a solid waste disposal site that has been closed in accordance with the requirements of the Division, as specified in the closure letter, in accordance with the requirements of Rule .0510(c) of this Section.

In order to achieve compliance with 15A NCAC 13B .0510(c), within 90-days of receipt of this report, Avery County must submit a new permanent methane monitoring plan to the Section for approval. This methane monitoring plan should satisfy all conditions of Rule 15A NCAC 13B .0503(2)(a)(i) and (ii). Please submit copies of the methane monitoring plan to Ed Mussler P.E., Permitting Branch Head, NC Division of Waste Management, 1646 Mail Service Center, Raleigh, NC 27699-1646 and to Bill Wagner, NCDENR, Asheville Regional Office, 2090 US Hwy 70, Swannanoa, NC 28778

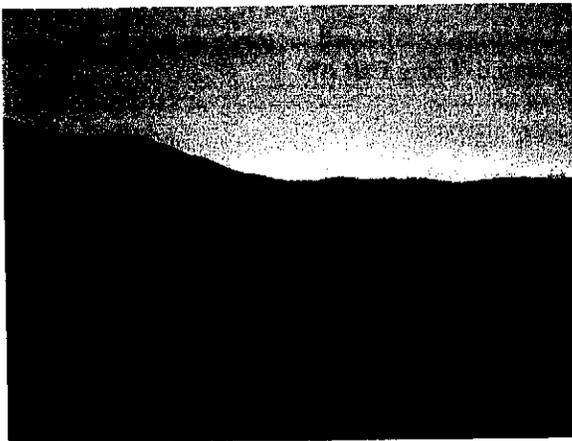
You are hereby advised that, pursuant to N.C.G.S. 130A-22, an administrative penalty of up to \$15,000 per day may be assessed for each violation of the Solid Waste Statute or Regulations. For the violation noted here, you may be subject to enforcement actions including penalties, injunction from operation of a solid waste management facility or a solid waste collection service and any such further relief as may be necessary to achieve compliance with the North Carolina Solid Waste Management Act and Rules.

STATUS OF PAST NOTED VIOLATIONS (List all noted last audit):

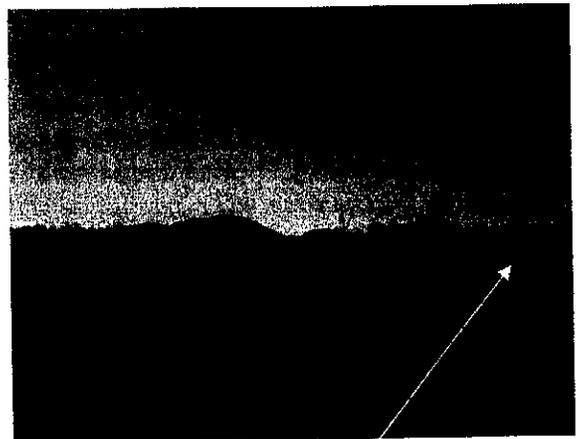
None.

AREAS OF CONCERN AND COMMENTS:

1. A cable was strung across the access road entrance to prohibit unauthorized entry.
2. The landfill was being mowed at the time of the inspection.
3. The vegetative cover is well established and well maintained.



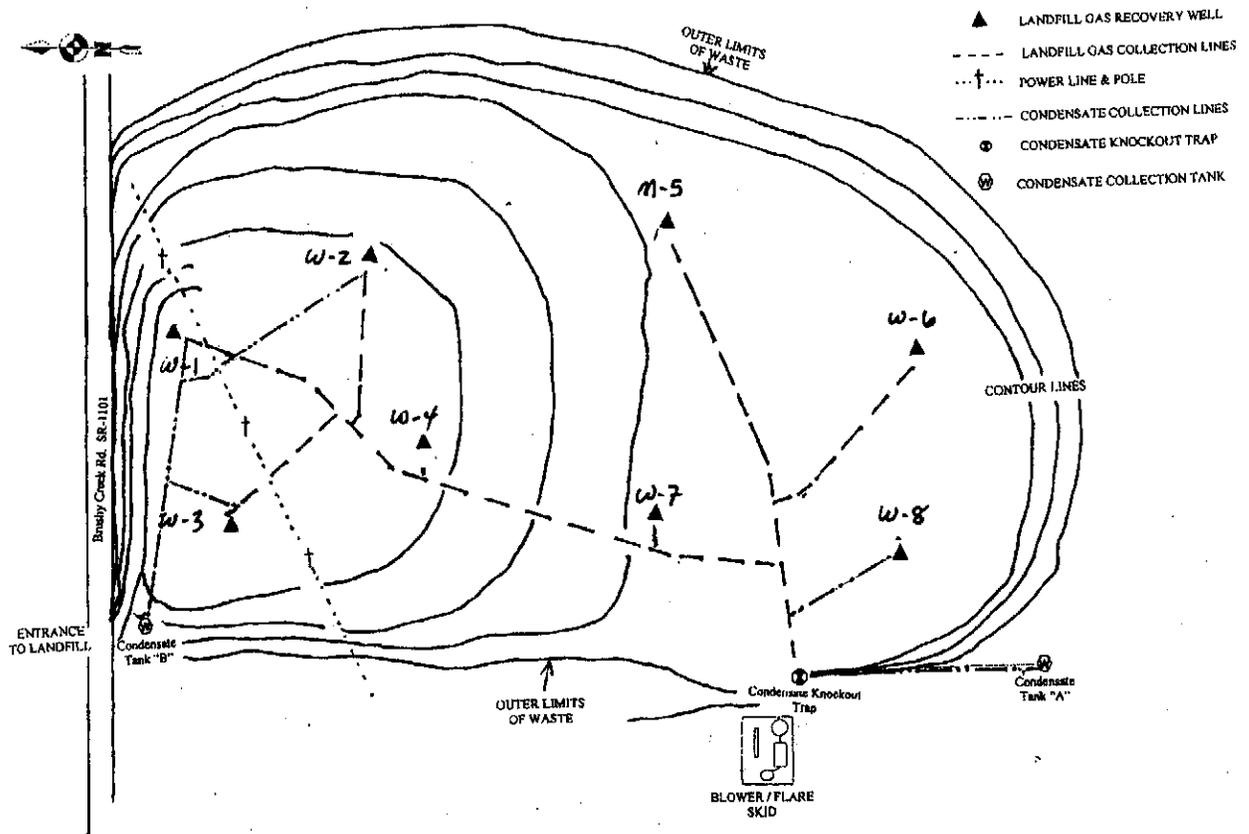
1. Looking (SW) across the top of the closed MSWLF.



2. Looking (W) across the top of the closed MSWLF. (Note the power line poles on the landfill.)

FACILITY COMPLIANCE AUDIT REPORT
Division of Waste Management
Solid Waste Section

Page 3 of 3



Avery Co. Closed MSW Landfill 06-01
 Approximate Location of
 Gas Collection Lines & Condensate
 Collection Lines

Site map drawing of the Avery County Closed MSW landfill. (Methane Recovery wells W5, W6, W7 and W8 destroyed in landfill fire on 1-23-09.)

4. There was no evidence of any ponding of water on the top of the landfill, (which has been a problem in the past), even though the area has experience heavy rains over the past week.
5. There was no evidence of any differential settling of the landfill cap. (The areas around the three power line poles, that transverse the northern summit of the landfill, should be closely monitored for any signs of differential settling for failure of the cap. See photo #2 above.) These three power line poles were in place at the time of closure.
6. A 35-gallon condensate tank "B" (that is part of the designed gas condensate collection system) that is believed to be located in the area immediately to the east of the entrance, still has not been located. **This condensate tank must be located and marked.**
7. No obvious signs of surface erosion of the cap were noted.
8. The access road at the base of the landfill, on the (W) side, has been graded to correct problems with erosion.
9. The trees and woody vegetation that were noted in previous inspections, specifically on the (S) and (W) sides of the landfill, have been removed.
10. At the time of the audit, the landfill gas flare was burning.
11. **Four methane recovery wells (W-5, W-6, W-7 and W-8) were destroyed in the landfill fire on January 23, 2009. Within 90-days of receipt of this report, Avery County must submit a summary of all actions it has taken to repair, abandon, or otherwise ensure that the four destroyed methane recovery wells do not pose a threat to human health or the environment.**

FACILITY COMPLIANCE AUDIT REPORT
Division of Waste Management
Solid Waste Section

Page 4 of 4

Please submit copies of the methane monitoring plan to Ed Mussler P.E., Permitting Branch Head, NC Division of Waste Management, 1646 Mail Service Center, Raleigh, NC 27699-1646 and to Bill Wagner, NCDENR, Asheville Regional Office, 2090 US Hwy 70, Swannanoa, NC 28778

12. The most recent semi-annual sampling of three groundwater monitoring wells and two surface water locations was done on 3/31/2009. Four (4) inorganic constituents (barium, cobalt, copper and zinc) were detected in two (2) wells above the SWSL, but below 2L or ground water protection (GWP) standards. No constituents were detected in any of the surface water samples.

Please contact me if you have any questions or concerns regarding this audit report.



Phone: 828-298-4705

Bill Wagner

*Environmental Senior Specialist
Regional Representative*

Delivered on : <u>10/29/09</u> by	Electronic Mail: Henry "Buddy" Norris	US Mail	X	Certified Mail to Robert Wiseman - Avery Co. Manager No. <u>7008 0150 0000 7473 4400</u>
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cc: Ed Mussler, Permitting Branch Head, Division of Waste Management
Allen Gaither, Permitting Engineer, Division of Waste Management
Mark Poindexter, Field Operations Branch Head, Division of Waste Management
Deb Aja, Western District Supervisor - Field Operations Branch, Division of Waste Management
Donald Herndon - Compliance Officer, Field Operations Branch, Division of Waste Management
Henry (Buddy) Norris, Avery Co. Solid Waste Director

LANDFILL GAS MONITORING PLAN

**Avery County MSW Landfill
Ingalls, North Carolina
NC Solid Waste Permit No. 06-01**

Prepared for:



**Avery County
Newland, North Carolina**

Prepared by:



14 N. BOYLAN AVENUE
RALEIGH, NORTH CAROLINA 27603
NC LICENSE NO. C-0828 (ENGINEERING)

January 2010



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LANDFILL GAS MONITORING PLAN

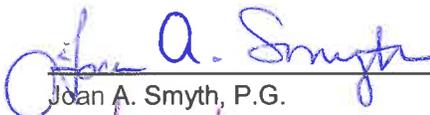
**Avery County MSW Landfill
Ingalls, North Carolina
NC Solid Waste Permit No. 06-01**

Prepared for:



**Avery County
Newland, North Carolina**

RSG Project No. **Avery-09-8**



Joan A. Smyth, P.G.
Senior Hydrogeologist

1/29/10





Stacey A. Smith, P.E.
Project Manager



January 2010



14 N. BOYLAN AVENUE
RALEIGH, NORTH CAROLINA 27603
NC LICENSE NO. C-0828 (ENGINEERING)



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**AVERY COUNTY LANDFILL
NC SOLID WASTE PERMIT NO. 06-01**

LANDFILL GAS MONITORING PLAN

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	
1.1 Project Description	1
1.2 Contact Information	2
1.2.1 Owner	2
1.2.2 Developer	2
1.2.3 Engineer	2
1.2.4 Solid Waste Regulatory Agency	3
1.2.5 Air Quality Regulatory Agency	3
1.3 Existing Site Conditions	3
1.3.1 Topography	4
1.3.2 Adjacent Areas	4
1.3.3 Site Soils Information	4
1.3.4 Energy Xchange LFGTE Project	4
1.4 Regulatory Status	5
1.4.1 Federal Clean Air Act (CAA)	5
1.4.2 Greenhouse Gas Reporting	5
2.0 MONITORING PROGRAM	
2.1 Perimeter Monitoring Network	6
2.1.1 Introduction	6
2.1.2 Probe Placement	6
2.1.3 Monitoring Probe Construction	6
2.2 Active Landfill Gas System	6
2.2.1 Overview	7
2.2.2 Monitoring	7
2.2.2.1 Wellhead Monitoring	7
2.2.2.2 Flare System Monitoring	8
2.2.3 Modifications	8
2.2.4 Shutdown	8
2.3 Monitoring and Reporting	8
2.3.1 Frequency	9
2.3.2 Personnel	9
2.3.3 Equipment	9
2.3.4 Procedures	9
2.3.5 Precautionary Action Plan	10
2.3.6 Reporting	10
2.4 Maintenance	11

3.0 CONTINGENCY PLAN
3.1 Introduction 11
3.2 Compliance Action Plan 11
 3.2.1 Immediate Action Plan 11
 3.2.2 Reporting and Documentation 12
 3.2.3 Remediation Plan 12

FIGURES

- Figure 1 Site Vicinity Map
- Figure 2 Site Plan
- Figure 3 Details

APPENDICES

- Appendix A Closure Permit
- Appendix B Boring Logs
- Appendix C Selected Historical Active Gas Collection System Information
- Appendix D Annual Training Logs
- Appendix E Monitoring Logs and Reporting Forms

AVERY COUNTY LANDFILL
NC SOLID WASTE PERMIT NO. 06-01

LANDFILL GAS MONITORING PLAN

1.0 INTRODUCTION

1.1 Project Description

This Landfill Gas Monitoring Plan (Plan) has been prepared by Richardson Smith Gardner & Associates, Inc. (RSG) to present a comprehensive landfill gas (LFG) monitoring program at the closed Avery County MSW Landfill (NC Solid Waste Permit 06-01). The site is located on Brushy Creek Road in Ingalls, North Carolina as shown in **Figure 1**. The proposed plan presents the rationale for the monitoring program as well as necessary actions required by the Owner to protect and safeguard the area surrounding the landfill and to satisfy North Carolina Solid Waste Management Rules [13B.0503(2)(a)] for monitoring and controlling LFG.

At a minimum, these regulations require owners of landfills to ensure that the facility does not exceed:

- *25% of the lower explosive limit (LEL) or 1.25% CH₄ by volume in structures; and*
- *100% of the LEL or 5% CH₄ by volume at the facility property boundary.*

The Engineer has utilized the best available site data, practices, experience, and judgment to develop this plan. However, the program may require modifications and maintenance over time to accommodate changing landfill conditions, changing receptors in areas adjacent and around the landfill, or other conditions that cannot be fully anticipated. Maintenance suggestions are also included in this plan to assist in the identification of secondary conditions that may require updates to this Plan.

Uncontrolled migration of LFG can result in loss of property, loss of life, injury, vegetative damage and intolerable odors. The monitoring of landfills includes exposure to explosive gases. All operational and/or monitoring staff should be specifically trained in the management and response for situations such as fire or explosion, confined space, drilling, and overhead hazards, and possess and awareness of changing conditions around these sites.

1.2 Contact Information

In case of emergencies, or if questions arise during the implementation of this program, please contact the following:

1.2.1 Owner

Avery County

Avery County C&D Landfill (local site office)
2175 Brushy Creek Road
Newland, North Carolina 28657

Avery County Solid Waste Department
175 Linville Street
Newland, North Carolina 28657
Phone: (828) 737-5420

Mr. Henry “Buddy” Norris, Director
Cell: (828) 387-0071
email: buddy.norris@ncmail.net

1.2.2 Developer

Energy Xchange

66 EnergyXchange Drive
Burnsville, North Carolina 28714
Phone: (828) 675-5541

Ms. Heather Dawes, Director
email: dawes@energyxchange.org

1.2.3 Engineer

Richardson Smith Gardner & Associates, Inc.

14 N. Boylan Avenue
Raleigh, North Carolina 27603
Phone: (919) 828-0577

Ms. Joan A. Smyth, P.G., Senior Hydrogeologist
email: joan@rsgengineers.com
Mr. Stacey A. Smith, P.E., Project Manager
email: stacey@rsgengineers.com

1.2.4 Solid Waste Regulatory Agency

North Carolina Department of Environment and Natural Resources
Division of Waste Management:

Raleigh Central Office (RCO)
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605
Phone: (919) 508-8400

Ms. Jaclynne Drummond, Hydrogeologist II
email: jaclynne.drummond@ncdenr.gov

Asheville Regional Office (ARO)
2090 U.S. Highway 70
Swannanoa, North Carolina 28778
Phone: (828) 296-4500

Mr. Allen Gaither, Environmental Engineer II
email: allen.gaither@ncdenr.gov
Mr. Bill Wagner, Waste Management Specialist
email: bill.wagner@ncdenr.gov

1.2.5 Air Quality Regulatory Agency

North Carolina Department of Environment and Natural Resources
Division of Air Quality:

Raleigh Regional Office
1628 Mail Service Center
Raleigh, North Carolina 27699
Phone: (919) 791-4200

Mr. Patrick Butler, Regional Supervisor

1.3 Existing Site Conditions

The Avery County Municipal Solid Waste (MSW) Landfill is a closed landfill located 0.6 miles Southeast of the intersection of Highway 19 East and Brushy Creek Road or 0.3 miles East from the Avery County Airport as shown in **Figure 1**. The facility operated from about 1970¹. until

¹ Feasibility Assessment for Landfill Gas Utilization Greenhouse Project at the Avery County MSW Landfill prepared by SCS Engineers dated September 1997.

the time of its closure in 1993². The property is approximate 14.4 acres with horizontal waste limits of approximately 9.6 acres as shown in **Figure 2**.

1.3.1 Topography

The landfill site lies in a relative valley between Mill Ridge and Doe Hill Mountain as shown in **Figure 1**. Existing ground surface elevations vary from El. 2670 (feet) at the southern end and El. 2770 at the top of the closed MSW landfill. Currently, much of the surrounding area is undeveloped and wooded. The Unimin properties include mining operations.

1.3.2 Adjacent Areas

The landfill site borders the Avery County airport to the west and the Unimin Corporation on all other borders. Brushy Creek Road travels along the sites northern line. Brushy Creek flows along the southeast line of the site. The site is accessed from Brushy Creek Road. The Unimin Corporation property includes a private road along the northern line of the site and is prohibited for use by landfill site personnel.

1.3.3 Site Soils Information

The native soil types at, and around the landfill are classified as the Chandler-Micaville complex and the Cullowhee loam. The Chandler-Micaville complex soils are excessively drained and are affected by soil creep in the upper solum above residuum from weathered mica gneiss or mica schist. The Cullowhee loam is found on slopes of 0% to 3%, which are the areas near the creek to the south and east of the site. These soils are somewhat poorly drained and are characterized as loamy alluvium over sandy and gravelly alluvium. Deeper soils in the area consist of silts and clayey silts. A discussion of site soil types observed during landfill gas well installation will be included with the final report and submitted with the landfill gas boring logs. Should any geologic features be observed to be different from those describe herein, this plan will be updated at that time to revise this section.

1.3.4 Energy Xchange LFGTE Project

The Energy Xchange is in currently operating a LFG collection system and energy project which was developed between 2000 and 2003 to provide LFG for a greenhouse project on the adjacent property³.

² Correspondence dated December 9, 1993 from Joseph Seegars, Attorney for Avery County, documenting the date of closure on October 8, 1993.

³ Proposals by Natural Power for Landfill Gas to Energy Project Avery County Landfill dated February 14, 2000 and May 30, 2002.

1.4 Regulatory Status

As previously mentioned, the Avery County Landfill operated between 1970 and was closed in 1993. A copy of the site permit and closure permit is provided as **Appendix A**. The Post Closure Permit, Condition No. 1 requires management of landfill gas. This plan has been prepared to satisfy this condition. Since the site was closed in 1993, it is regulated under 15A NCAC 13B .0500, Disposal Sites.

1.4.1 Federal Clean Air Act (CAA)

The EPA promulgated NSPS and Emission Guidelines (EG) for air emissions from municipal solid waste landfills⁴. These regulations were enacted under Section 111 of the Clean Air Act Amendments of 1990 (CAAA).

The NSPS/EG air emission regulations are a comprehensive program targeted at quantifying and controlling the emissions of methane and other "greenhouse" to the atmosphere. The rules bring all new landfill construction and all very large existing sites under the regulatory authority of the EPA and EPA-Approved State Air Quality programs, such as that in North Carolina. The closed Avery County MSW Landfill is not regulated by the Subpart W-Standards of Performance for Municipal Solid Waste Landfills (NSPS), due to maximum design capacity less than 2.5 million megagrams (Mg).

1.4.2 Greenhouse Gas Reporting

On September 22, 2009, the EPA issued a final rule for mandatory reporting of greenhouse gases (GHGs) from large GHG emissions sources in the United States, including certain MSW landfills. According to the rule, if a site that accepted waste after January 1, 1980, but has less than 350,000 metric tons of waste, it does not have to report under this rule.

The Avery County Landfill reportedly has an estimated volume of waste in-place of approximately 249,000 tons⁵ which equals approximately 225,900 metric tons. However, Avery County did not install scales until 1991. 40 CFR Part 98.343(a)(3) acknowledges that if waste disposal quantities are not available, a few alternative methods must be used. RSG used methodology from Section 98.343(a)(3)(I) which assumes all prior year waste disposal quantities are the same as the waste quantity in the first reporting year, or in this case, the last year waste was accepted. The waste accepted in 1993 was 13,000 tons. Based on this volume, the method estimates a volume of waste in-place of approximately 312,000 tons or 283,000 metric tons. Therefore, due to its size, the closed Avery County MSW Landfill is not required to report under this rule.

⁴ EPA, Standard of Performance for Non-Stationary Point Sources and Guidelines for Control of Existing Sources, Final Rule, March 12, 1997.

⁵ Feasibility Assessment for Landfill Gas Utilization Greenhouse Project at the Avery County Landfill, prepared by SCS Engineers, dated September 1997.

2.0 MONITORING PROGRAM

2.1 Perimeter Monitoring Network

2.1.1 Introduction

The monitoring network for the Avery County landfill includes eight (8) proposed LFG monitoring probes (P-1 through P-8) are shown on **Figure 2**. The perimeter LFG monitoring system is designed with probes located to intercept potential migrating LFG .

2.1.2 Probe Placement

The monitoring probe locations have been evaluated based on the surrounding area conditions, soil types, location of waste on property, and nearby bodies of water. As described above:

- There are no residences located on surrounding properties;
- The Avery County Airport property includes some structures and greenhouses (utilizing LFG); and
- Shallow groundwater in the vicinity of Brushy Creek (a perennial stream) to the southeast which will prevent the migration of LFG in this area.

These conclusions directed the placement of proposed LFG monitoring probes in the areas shown on **Figure 2**.

2.1.3 Monitoring Probe Construction

The LFG monitoring probes will be installed using a Geoprobe™ rig and will be constructed of one-inch diameter, manufactured PVC well screens with 10-slot per inch intake spacings. Probes will be completed with two (2) to ten (10) feet of solid PVC riser pipe. A sand filter pack will be placed around each screened interval, to a height of up to two (2) feet above the screen, and a hydrated bentonite plug of two (2) to five (5) feet in thickness will be placed above the sand pack to seal each probe. Probes will be completed with a steel protective casing and a cement pad for surface protection as shown on **Figure 3**. Each probe casing will be distinguishable as a LFG monitoring probe rather than an on-site ground water monitoring well. A “female” Colder® type quick-connect (or equivalent) fitting will be installed on the PVC portion of the probe or in the cap as a monitoring port. Once the LFG monitoring probes are completed, the boring logs will be submitted to NCDENR and Avery County under separate cover. This information will also be added to **Appendix B** of this plan.

2.2 Active Landfill Gas System

As described above, the Energy Xchange has developed and operates a LFGTE project on the closed landfill site. Recovered LFG is provided to the bordering greenhouses on the airport property.

2.2.1 Overview

The original development of the site included eight (8) LFG extraction wells (W1 through W8) installed throughout the site. As of January 2010, five (5) of these extraction wells are operational and the remaining wells have been capped. The active extraction wells are connected through an HDPE header pipe to a control flare and switching valve allowing gas to be flared, diverted to the greenhouse, or both. The flare area includes the following⁶:

- 1 HP - 50 CFM regenerative blower;
- flame arrester;
- condensate trap and storage tank;
- open candle type flare;
- valves and gauges; and
- transmission line to end user (greenhouse).

At present, the Xchange provides periodic monitoring (every other month) of the system to provide gas to the greenhouse and flare the remaining volume. Operations and maintenance is managed by the Xchange and reported to Avery County under a landfill gas development agreement⁷. Selected historical sketches, details, and information is provided in **Appendix C**.

2.2.2 Monitoring

During the active collection of gas, the system requires periodic monitoring to keep up system efficiency, minimize surface emissions from the landfill area, and (in the case of subsurface migration monitoring) meet regulatory requirements. The active gas collection system will be monitored by representatives of the Energy Xchange under the responsibility of Avery County. The system incorporates monitoring points at wellheads and the flare system to both monitor landfill gas quality and quantity. Each monitoring point is discussed in this section.

2.2.2.1 Wellhead Monitoring

At each wellhead, monitoring will be performed on a periodic basis for the following parameters (at a minimum):

- Gauge pressure in the gas collection header shall be negative, except as otherwise specified in the facility closure plan;
- Balance Gas (assumed to be nitrogen) shall be less than 20%, or Oxygen shall

⁶ Memorandum from Cindy McCoy, Natural Power, to Terry Woodruff, Energy Xchange, dated December 14, 2001 regarding the Avery County Landfill Blower Station.

⁷ Agreement between Natural Power, Blue Ridge RC&D Council, Inc, and Avery County dated December 14, 1999.

be less than 5% concentration; and

- Temperature shall not exceed 55°C (131°F).

2.2.2.2 *Flare System Monitoring*

At the flare system, monitoring will be performed by periodically to maintain efficient operations and shall include the following parameters (at a minimum):

- flame presence;
- flame arrester presence;
- condensate volumes;
- gas quality (i.e.%O₂, %CH₄, etc.); and
- valves are operable.

2.2.3 *Modifications*

The Energy Xchange has announced that the LFGTE project will be shutdown during 2010. Therefore, the existing extraction wells will be converted to more conventional passive vents. The existing extraction wells are four (4) inches in diameter. All eight (8) of the wells casings will be extended to approximately eight (8) feet above the existing final cover surface to allow venting above the breathing zone of site monitoring and maintenance personnel. Each well will be topped with a galvanized turbine to disperse venting gases as shown on **Figure 3**.

2.2.4 *Shutdown*

Upon the shutdown on the LFGTE project, the following will be performed:

- Shutdown the existing flare;
- Convert existing extraction wells to passive vents;
- Plug and cap all existing connections to the LFG header piping;
- Remove all condensate from traps and tanks and dispose;
- Plug and tag all tanks;
- Disconnect electrical power from the main breakers; and
- Notify the Division of Waste Management - Asheville Regional Office of shutdown.

Final disposition of remaining equipment will be removed at the discretion of Energy Xchange and Avery County, but the above procedures are considered the minimum required to place the system in a safe inactive state.

2.3 **Monitoring and Reporting**

Monitoring and reporting of LFG gas concentrations shall be performed in accordance with guidance by the Division of Waste Management document “[Methane Monitoring Guidance](http://www.wastenotnc.org/swhome/met_mon.html)” (www.wastenotnc.org/swhome/met_mon.html) and as outlined below.

2.3.1 *Frequency*

LFG monitoring will be completed on a quarterly frequency for a period of one year. After the initial year of monitoring the data will be reviewed and evaluated to determine an appropriate frequency of monitoring throughout the post-closure monitoring period for this site. Monthly or more frequent monitoring will be necessary if concentrations are close to the regulatory levels or demonstrate a pattern which indicate that it may be approaching this limit.

2.3.2 *Personnel*

LFG monitoring will be performed by trained personnel knowledgeable of the LFG hazard and the use of explosive gas meters. A designated landfill technician will be assigned to regular LFG monitoring duty. Annual training shall be performed and documented on the LFG monitoring training log, provided in **Appendix D**, to refresh personnel on any site changes or updates to this plan.

2.3.3 *Equipment*

The County currently owns an RKI® GX 2003 combustible gas indicator⁸. This meter operates using the infra-red spectral property of methane (CH₄) to measure concentrations in air below the LEL. This meter is calibrated to methane. Gas meter information should be included with the meter or can be found at the manufacturer's website. The RKI® meter may be used in oxygen (O₂) deficient areas (less than 10% O₂) such that oxygen is not required for a chemical combustion of flammable gases within the meter.

All monitoring equipment should be regularly calibrated in accordance with manufacturers specifications and operated only as instructed. The RKI® meter will have Tygon tubing, including a "male" Colder® type quick-connect (or equivalent) fitting, attached to the inlet.

2.3.4 *Procedures*

Each monitoring event should begin by calibrating the gas meter with a known calibration standard in accordance with manufacturer's recommendations and operated only as instructed.

Procedures for the LFG monitoring probes should include the following:

- Check calibration date on the meter;
- Perform "bump test" against known gas concentration;
- Connect tubing to sample port on the monitoring probe without removing the cap;

8

Model GX-2003, www.rkiinstruments.com

- Record data on the monitoring log form provided in **Appendix E**; and
 - If less than 50% LEL, move to next LFG monitoring probe.
- * If explosive gas concentrations **equal to or greater than 50%** of the LEL in any of the LFG monitoring probes, personnel should implement Precautionary Action Plan located in **Section 2.2.5**.
- * IF EXPLOSIVE GAS CONCENTRATIONS EQUAL TO OR GREATER THAN 100% OF THE LEL IN ANY OF THE LFG MONITORING PROBES, THE FOLLOWING ACTIONS SHALL BE TAKEN BY PERSONNEL:**
- (1) **Immediately** contact the Solid Waste Director.
 - (2) Recalibrate monitoring equipment and confirm results.
 - (3) If concentrations still exceed 100% LEL, Avery County and the Engineer will implement the Compliance Action Plan located in **Section 3.2**.

2.3.5 *Precautionary Action Plan*

If explosive gas concentrations are **equal to or greater than 50%** of the LEL in any of the LFG monitoring probes, personnel should perform the following additional steps:

- Monitor gas pressure in each probe head (in inches of water) using magnehelic gauge or other appropriate metering device;
- Monitor initial gas concentration through sampling port;
- Open probe cap and allow to stabilize for at least three (3) minutes;
- Monitor gas concentration inside probe just below the top of casing; and
- Evaluate surrounding areas for potential receptors to or signs of LFG migration. LFG can stress vegetation, can kill trees and grass by root asphyxiation. Note any areas of stressed/dead vegetation on the monitoring form.

Monitoring should be completed in this manner for all probes with concentrations equal to or greater than 50% LEL during all monitoring events. This information should be recorded, kept in the operating record and reported to the Solid Waste Director and to the Engineer for further evaluation.

2.3.6 *Record Keeping*

All readings will be documented on the LFG monitoring log form provided in **Appendix E**. The completed forms will be reviewed and initialed by the County Solid Waste Director following each monitoring event and placed in the landfill operating records. The monitoring logs will remain on file with other landfill records in the landfill office at the Avery County MSW Transfer Station and C&D Landfill at 2175 Brushy Creek Road **and** at the Solid Waste Director's Office in Newland. These readings should be available for review by NCDENR and EPA personnel upon request.

If readings above 100% LEL are measured, a copy of the LFG monitoring form and an Environmental Data Reporting Form also provided in **Appendix E** shall be submitted to NCDENR. A copy shall be kept in the landfill operating records.

2.4 Maintenance

In addition to the monitoring program, periodic maintenance and site observations shall be conducted to the program components as follows (at a minimum):

- Factory calibration of the gas meter;
- Maintaining access to monitoring wells and gas probes;
- Observing landfill cover conditions, potential erosion areas, landfill seeps, odors, etc.;
- Monitoring probe maintenance such accessibility, operational locks, steel casing and concrete pad conditions, etc.

Any deficiencies shall be noted on the monitoring forms and reported to the Solid Waste Director for repair or replacement as necessary.

3.0 CONTINGENCY PLAN

3.1 Introduction

In the event explosive gas concentrations exceed safe levels (>100% LEL), a contingency plan is recommended and warranted. The contingency plan includes the specific step by step actions that should be implemented to protect human health and the environment.

3.2 Compliance Action Plan

If explosive gas concentrations **equal to or greater than 100%** of the LEL in any of the LFG monitoring probes, the following actions shall be taken by personnel:

3.2.1 Immediate Action Plan

The Solid Waste Director shall take immediate action to ensure the protection of human health and safety as follows:

- (1) Determine potential receptors surrounding the site;
- (2) If warranted by the degree of intensity of the LFG concentration, check the LFG concentrations in structures of receptors surrounding the site, such as the greenhouse operation or other structures on the airport property;
- (3) If further warranted by the degree of intensity (>25% LEL) of the LFG concentration in structures, evacuate the area;
- (4) Contact the County Fire Marshal;
- (5) Notify verbally the County Manager and Waste Management Specialist in the Asheville Regional Office;
- (6) Investigate and identify the source(s) and conduit(s) for LFG migration that

- have caused the excessive readings (i.e. the path that the LFG is taking to the monitoring location);
- (7) Identify the extent of the LFG problem through additional probes or bar hole punch sampling methodology; and
 - (8) As appropriate, begin to take corrective action to control the LFG levels in building(s) surrounding the landfill site.

3.2.2 Reporting and Documentation

Following the **Immediate Action Plan**, the County must take the following actions within seven (7) days:

- (1) Place documentation of the **Immediate Action Plan** in the operating records of the landfill; and,
- (2) Provide documentation of the **Immediate Action Plan** and a description of the steps taken to protect human health in writing to the Waste Management Specialist in the Asheville Regional Office.

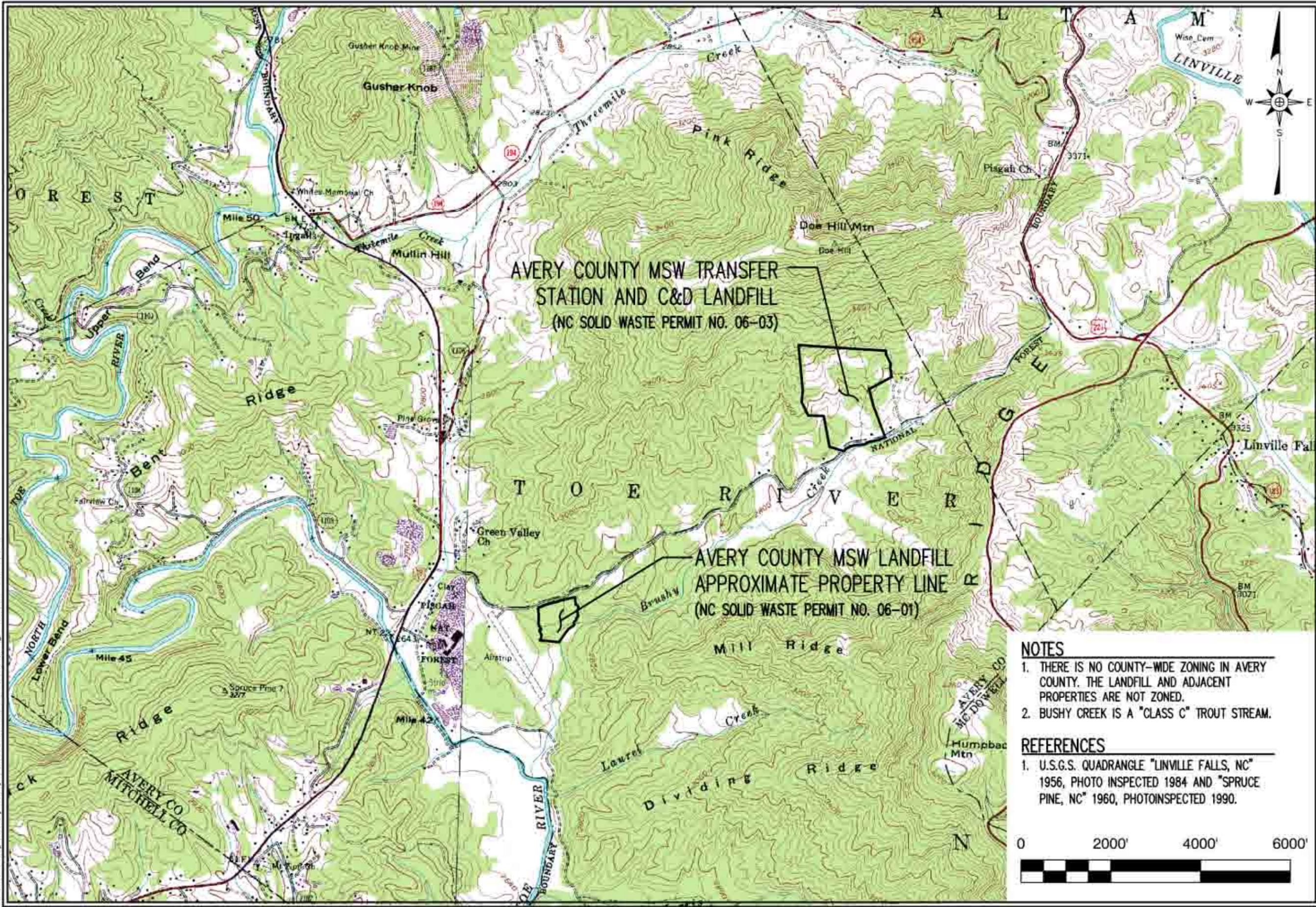
It is also suggested that at this time, a plan be developed which:

- Describes the nature and extent of the problem; and
- Proposes future actions to access/remediate the problem.

3.2.3 Remediation Plan

In the event the prolonged explosive gas concentrations exist and as identified during the **Immediate Action Plan**, the County shall prepare and implement a Remediation Plan to mitigate the migration of landfill gas off property. Extensions may be granted by the Division of Waste Management upon written request and depending on severity of the situation.

FIGURES



RICHARDSON SMITH GARDNER & ASSOCIATES
www.rsgengineers.com
14 N. Boylan Ave. Raleigh, N.C. 27603
PH: 919-828-0877 FAX: 919-828-3899

FIGURE NO.	1	FILE NAME	AVERY-B0132
SCALE:	AS NOTED	PROJECT NO.	AVERY 09-8
CHECKED BY:	S.A.S.	DATE:	Jan. 2010
DRAWN BY:	W.R.B.		

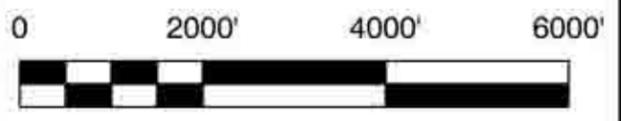
TITLE: **AVERY COUNTY CLOSED MSWLF SITE VICINITY MAP**

NOTES

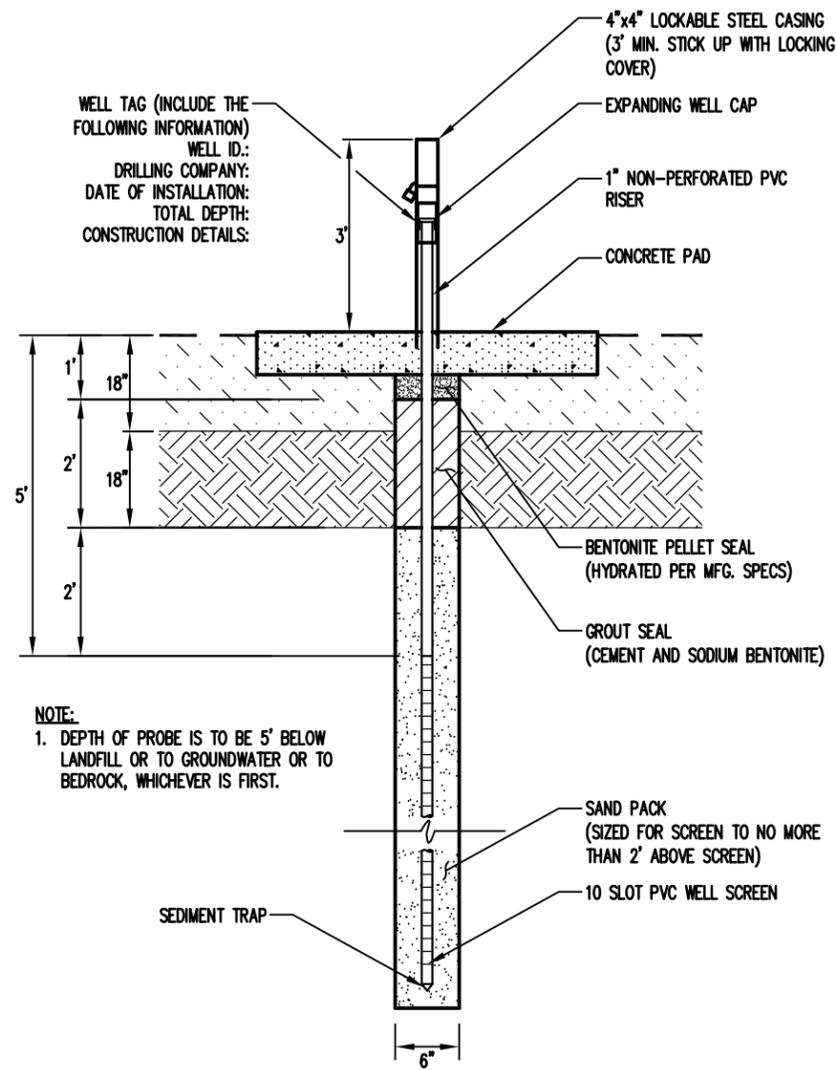
1. THERE IS NO COUNTY-WIDE ZONING IN AVERY COUNTY. THE LANDFILL AND ADJACENT PROPERTIES ARE NOT ZONED.
2. BUSHY CREEK IS A "CLASS C" TROUT STREAM.

REFERENCES

1. U.S.G.S. QUADRANGLE "LINVILLE FALLS, NC" 1956, PHOTO INSPECTED 1984 AND "SPRUCE PINE, NC" 1960, PHOTOINSPECTED 1990.



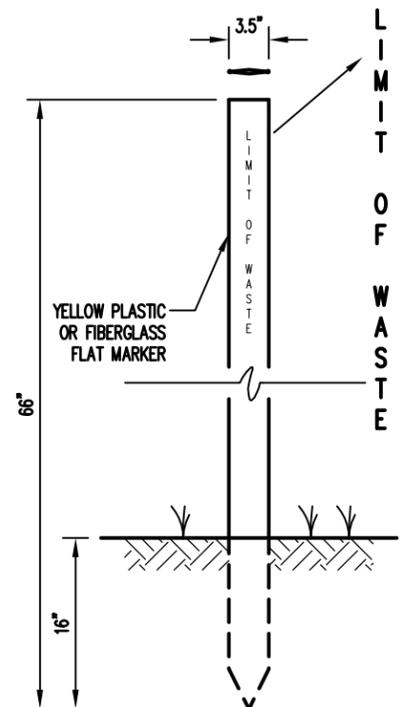
G:\CAD\Avery County\Avery 09-8\sheets\AVERY-B0135.dwg - 1/29/2010 12:35 PM



GAS PROBE

DETAIL
NOT TO SCALE

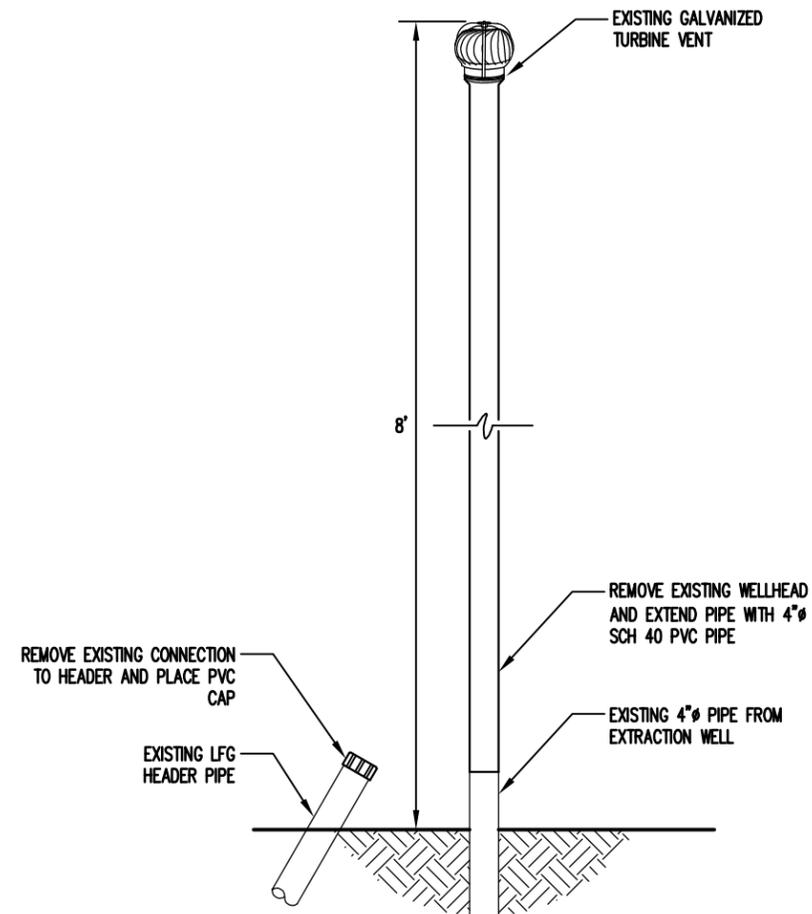
1
FIG. 3



LIMIT OF WASTE MARKER

DETAIL
NOT TO SCALE

2
FIG. 3



EXTRACTION WELL MODIFICATION

DETAIL
NOT TO SCALE

3
FIG. 3

RICHARDSON SMITH GARDNER & ASSOCIATES
P.L.L.C. (Professional Limited Liability Company)
www.rsgengineers.com
14 N. Boylan Ave.
Raleigh, N.C. 27603
ph: 919-826-0577
fax: 919-826-3899

FIGURE NO.	3	FILE NAME	AVERY-B0135
SCALE:	AS NOTED	PROJECT NO.	AVERY 09-8
CHECKED BY:	S.A.S.	DATE:	Jan. 2010
DRAWN BY:	W.R.B.		

TITLE:
AVERY COUNTY CLOSED MSWLF
MISCELLANEOUS DETAILS

APPENDIX A
CLOSURE PERMIT

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management



James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

December 29, 1995

Randall Fletcher, County Manager
Avery County
P.O. Box 54
Newland, NC 28657

SUBJECT: Closure of the Avery County Landfill
Permit #06-01

Dear Mr. Fletcher:

The Solid Waste Section (the Section) has received and reviewed documentation submitted by your consultant, Municipal Engineering, on your behalf regarding the subject facility. Based on this documentation, the Section has determined that the subject facility has been closed in accordance with the applicable requirements. This determination may be rescinded should any of the documentation prove to be inaccurate.

The subject facility is considered closed subject to the attached post closure conditions. The owner of the facility, Avery County, is responsible for compliance with these conditions.

This closure shall become effective upon written notification by Avery County that the facility shall be maintained in compliance with the post closure conditions specified in this letter. Also, Rule .0510 states that when a disposal unit is closed, the permit to operate that unit is terminated and any future disposal operations will require approval by the Section.

POST CLOSURE CONDITIONS

1. **MANAGEMENT OF LANDFILL GAS:** The owner shall take the measures necessary to ensure that the closed site shall continue to meet the design standards for landfill gas found in Rule .0503(2)(a).
 2. **MANAGEMENT OF SURFACE WATER:** The owner shall take the measures necessary to ensure that the closed site shall meet the requirements of Rule .0503(2)(c). In addition, the landfill unit shall be maintained such that surface water runoff occurs in a controlled manner, and surface water shall not be impounded over waste.
 3. **AIR QUALITY:** The owner shall ensure that landfill units do not violate any applicable requirements developed under a State Implementation Plan approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended.
 4. **FINAL COVER SYSTEM:** The integrity and effectiveness of the final cover system and any permanent erosion control devices must be maintained. This could include making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events.
 5. **PROPOSED USES:** The owner shall submit a proposal for the Section's review and approval addressing post closure uses of the facility. Proposed post closure uses shall not violate any post closure conditions found in this letter. In particular, plans for post closure uses shall avoid possibilities for the entrapment of methane gas. Routine landfill gas monitoring within structures and at the facility boundary may not be sufficient to detect potentially dangerous situations.
 6. **ONGOING SOLID WASTE MANAGEMENT ACTIVITIES:** Continuing solid waste management activities (e.g. yard waste composting, scrap tire collection, solid waste transfer) shall not violate any post closure conditions found in this letter, and must meet any other applicable requirements.
 7. **RECORDATION:** The owner shall ensure that the recordation requirements for land disposal sites found in Rule .0204 are met.
-

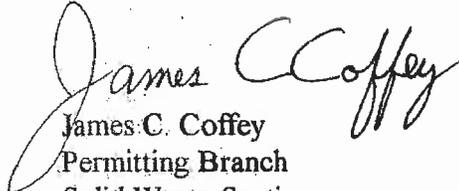
8. WATER QUALITY MONITORING AND REPORTING REQUIREMENTS:

- a. Groundwater quality at this facility is subject to the "Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina", 15A NCAC 2L. This includes, but is not limited to, the provisions for detection monitoring, assessment, and corrective action.
 - b. The permittee shall sample the detection monitoring wells and surface water sampling locations at a minimum on a semi-annual basis.
 - c. Water quality detection monitoring shall continue for a minimum of five years from the date of the Section's receipt of Avery County's notification that the facility will be maintained in compliance with the post-closure conditions specified in this letter. After five years the Section will determine if further monitoring is to be required.
 - d. Sampling equipment and methods shall conform to specifications in Attachment 1, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities". The sampling parameters and methods shall be those found in Attachment 2, "Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills", or an alternate parameter list as approved by the Section.
 - e. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the sampling events and analytical data shall be submitted to the Section in a timely manner.
 - f. The water quality monitoring system shall be upgraded for post closure monitoring purposes. Additional surface water monitoring sites shall be incorporated into the approved monitoring plan; the number and location to be approved by the Solid Waste Section. The sampling of these sites shall be included in the next scheduled sampling event.
-

Page Four
Avery County
Closure Letter

If there are questions regarding this closure letter, please call Janis McHargue in the Winston-Salem Regional Office at (910) 771-4600, or the Solid Waste Section at (919) 733-0692.

Sincerely,


James C. Coffey
Permitting Branch
Solid Waste Section

cc: Julian Foscoe
Jan McHargue
Bobby Lutfy
Al Hetzell
Consultant
Central Files





North Carolina Department of Human Resources
 Division of Health Services
 P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
 Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
 State Health Director

CERTIFIED COPY OF SOLID WASTE PERMIT

I do hereby certify that the attached PERMIT is an exact and true copy
 of Permit No. 6-01.

William L. Meyer

William L. Meyer, Head
 Solid & Hazardous Waste Management Branch
 Environmental Health Section

North Carolina

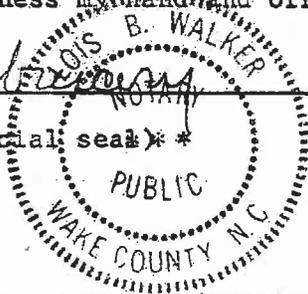
Wake County

I, Lois B Walker, a Notary Public for said
 County and State, do hereby certify that William L. Meyer,
 Head, Solid & Hazardous Waste Management Branch, Environmental Health Section
 personally appeared before me this day and acknowledged the due execution
 of the foregoing instrument.

Witness my hand and official seal, this the 9th day of

February, 1987.

(official seal) *



Lois B Walker
 Notary Public

My commission expires 1-29, 1990.

ADDENDUM TO PERMIT NO. 6-01

DATE ISSUED 2/9/87

STATE OF NORTH CAROLINA

DEPARTMENT OF HUMAN RESOURCES

DIVISION OF HEALTH SERVICES

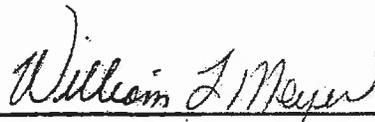
P.O. Box 2091 Raleigh 27602

SOLID WASTE PERMIT

Avery County is hereby issued a permit to
operate a Sanitary Landfill
located on S.R. 1101

in accordance with Article 9, Chapter 130A, of the General Statutes of North
Carolina and all rules promulgated thereunder and subject to the conditions set
forth in this permit. The facility is located on the below described property.

(See Attached)



William L. Meyer, Head
Solid & Hazardous Waste Management Branch
Environmental Health Section

BEGINNING on the mouth of a 16-inch culvert that is located South 67° 36' 03" East, 1147.31 feet from a PK nail in the centerline of the Northern end of Morrison Airport; thence running North 07° 20' 00" West, 26.81 feet to a point in the Southern right-of-way of N.C.S.R. 1101; thence running with said right-of-way line North 73° 22' 50" East, 737.45 feet to a point; thence leaving said road South 20° 53' 50" East, 55.27 feet to an iron at a 16-inch Poplar; thence South 20° 53' 50" East, 171.44 feet to an iron at a 14-inch White Pine; thence South 37° 59' 50" West, 241.90 feet to an iron at a 24-inch White Pine; thence South 36° 37' 50" West, 327.78 feet to an iron at a 14-inch Double Spanish Oak; thence South 54° 22' 20" West, 184.41 feet to an iron at a 14-inch Poplar; thence North 68° 48' 50" West, 242.40 feet to an iron; thence North 30° 48' 30" West, 112.99 feet to an iron at a 10-inch White Pine; thence North 03° 11' 50" East, 224.28 feet to an iron at a fence post; thence North 07° 20' 00" West, 131.84 feet to the point of beginning; containing 8.68 acres, according to a survey by William E. Arrowood, R.L.S. Number L-1510, dated February 27, 1986, and being Map Number 86A-146.

For Deed reference see that certain instrument dated February 28, 1986 and recorded the same date in Deed Book 171, Page 1107, Avery County Registry, wherein the above-described real property is excepted as being the property of Harris Mining Company, a North Carolina Corporation.

BEGINNING at a point found in 60' right-of-way margin of Brushy Creek Road, N.C.S.R. 1101 (gravel) and Branch; thence running with the line of said Branch, the following courses and distances: S 07° 32' 00" E 2.08 feet; S 14° 36' 20" W 36.06 feet; S 06° 47' 50" E 79.89 feet; S 68° 15' 40" E 48.04 feet; S 16° 52' 00" E 70.87 feet; S 11° 35' 00" W 29.70 feet; S 70° 31' 30" W 24.10 feet; S 28° 43' 20" W 23.31 feet; S 27° 24' 30" E 45.00 feet; S 06° 46' 10" W 30.46 feet; S 22° 28' 20" E 44.73 feet; S 48° 53' 30" W 74.07 feet; S 10° 47' 30" E 26.13 feet; S 38° 52' 10" W 86.38 feet; and S 01° 05' 40" W 55.95 feet to a point found in centerline of Brushy Creek; thence leaving the line of the Branch and with the line of Brushy Creek S 56° 11' 40" W 158.01 feet to a point; and S 36° 51' 30" W 351.48 feet to a point; thence leaving the line of Brushy Creek N 83° 22' 40" W 19.95 feet to a point; N 83° 22' 40" W 383.80 feet to a point; N 83° 22' 40" W 22.26 feet to a point at the edge of an existing dirt road lying Due West of the present landfill, said road running in a North-South direction, leading from N.C.S.R. 1101, Brushy Creek Road; thence running with the edge of said dirt road N 30° 41' 10" E 57.56 feet to a point; N 22° 31' 10" E 19.64 feet to a point; N 08° 34' 40" E 27.72 feet to a point; N 06° 43' 20" W 36.41 feet to a point; N 27° 40' 00" W 105.30 feet to a point; thence leaving the edge of said road N 69° 05' 20" E 51.56 feet to a point in the line of the existing Avery County Landfill site; thence running with the said line of the Avery County Landfill S 69° 48' 50" E 242.40 feet to a point; N 54° 22' 20" E 184.41 feet to a point; N 36° 37' 50" E 327.78 feet to a point; N 37° 59' 50" E 241.90 feet to a point; N 20° 53' 50" W 171.44 feet to a point; N 20° 53' 50" W 55.27 feet to a point found in the 60' right-of-way margin of Brushy Creek Road, N.C.S.R. 1101 (gravel); thence leaving the line of the existing Avery County Landfill site and with the margin of Brushy Creek Road, N.C.S.R. 1101 (gravel) N 73° 52' 40" E 128.81 feet to the point of beginning. Containing 6.02 acres, Toe River Township, Avery County, as surveyed and platted by Municipal Engineering Services Co., P.A. on October 22, 1986, Drawing No. 86-102.

SOLID WASTE PERMIT

Conditions of Permit:

1. This permit may be subject to review at an administrative hearing upon petition of anyone whose legal rights, privileges and duties may have been affected by the issuance thereof.
2. This permit shall not be effective unless the certified copy is filed in the register of deeds' office, in the grantor index under the name of the owner of the land in the county or counties in which the land is located. After recordation, the certified copy shall be returned to the Solid & Hazardous Waste Management Branch and shall have indicated on it the page and book number, date of recordation and registrar's seal.
3. When this property is sold, leased, conveyed or transferred, the deed or other instrument of transfer shall contain in the description section in no smaller type than that used in the body of the deed or instrument a statement that the property has been used as a sanitary landfill.
4. This solid waste disposal site is permitted to receive solid waste as defined in 10 NCAC 10G, .0101(36), except that hazardous waste, liquid waste and any other wastes that may pose a threat to the environment or public health are prohibited from disposal at this site unless prior authorization is obtained from the Division of Health Services.
5. This permit is for construction according to attached plans. Any modification or deviation from the approved plans shall be approved by the North Carolina Solid and Hazardous Waste Management Branch.
6. Ground water monitoring wells and monitoring requirements:
 - a. Three additional wells shall be installed at locations as shown on construction plans.
 - b. Installation shall conform to DHS well standard (Attachment 1).
 - c. A well completion record shall be submitted to DHS for each monitoring well constructed (Attachment 2).
 - d. The location of the monitoring wells shall be physically located in the field and approved by DHS prior to the well being constructed.
 - e. Ground water monitoring wells shall be constructed and sampled and conform to specifications outlined in the N.C. Water Quality Monitoring Guidance Document for Solid Waste Facilities. Complete specifications will be finalized in the document which will be provided by DHS.
 - ~~f. Surface water sampling shall be performed at the locations specified on the construction plans.~~
 - g. Avery County shall sample monitoring wells and surface waters, semi-annually, for the first year and annually thereafter.
 - h. A readily accessible unobstructed path shall be initially cleared and maintained so that 4-wheel drive vehicles may have access to the monitoring wells.

7. This facility shall conform to operating procedures in Rule .0505 of the Solid Waste Management Rules.
 8. Ground water quality at this facility is subject to the classification and remedial action provisions of 15 NCAC 2L (Attachment 3).
-

APPENDIX B
BORING LOGS

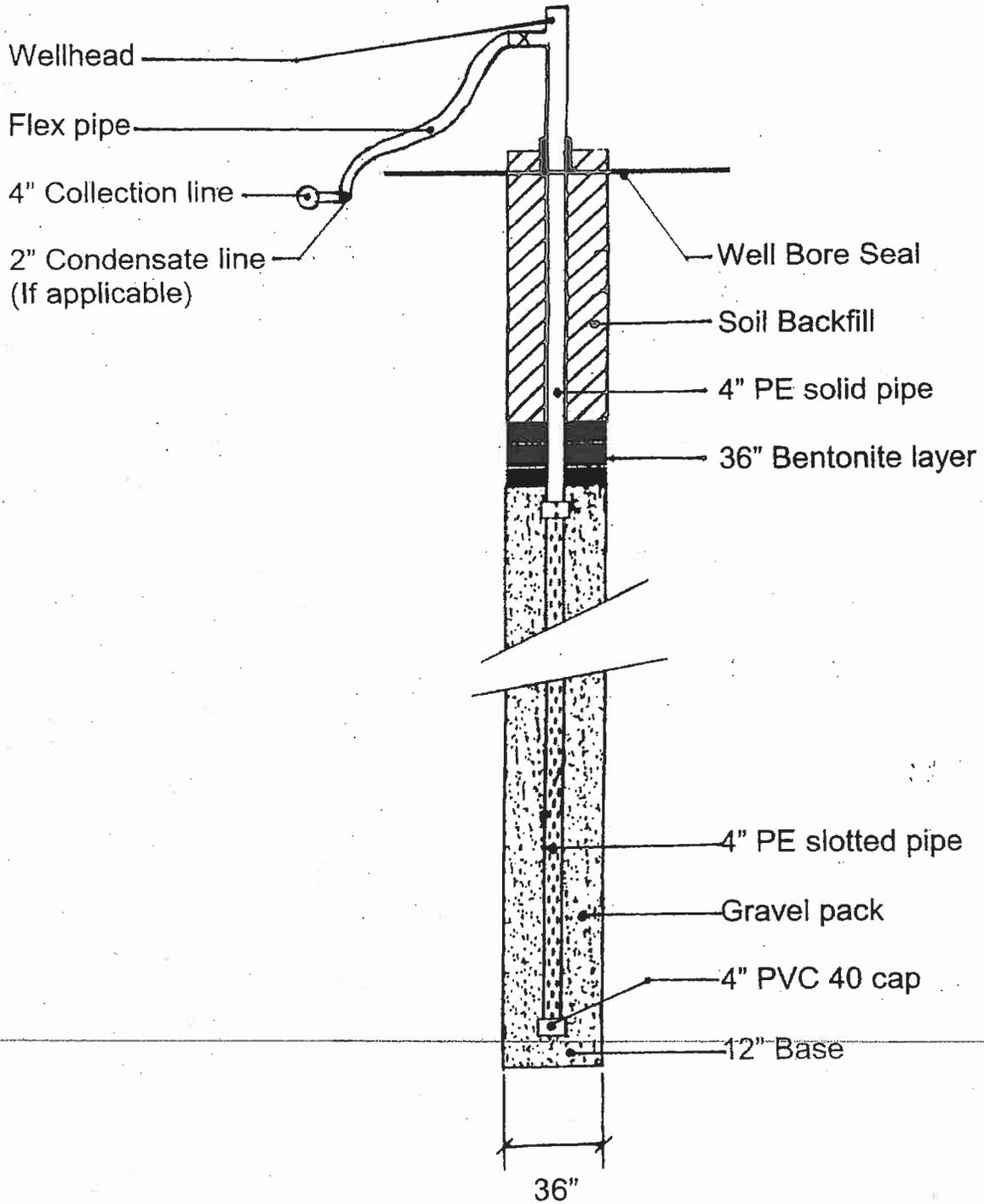
Boring logs will be inserted as probe installation is completed.

APPENDIX C

SELECTED HISTORICAL ACTIVE GAS COLLECTION SYSTEM INFORMATION

Please note that this information was obtained from NCDENR files and has not been documented for as-built conditions. However, the information appears to provide general information of the site system. Actual site verification is recommended.

Avery County Landfill Extraction Well Schematic



Excavation Detail

Backfill Detail

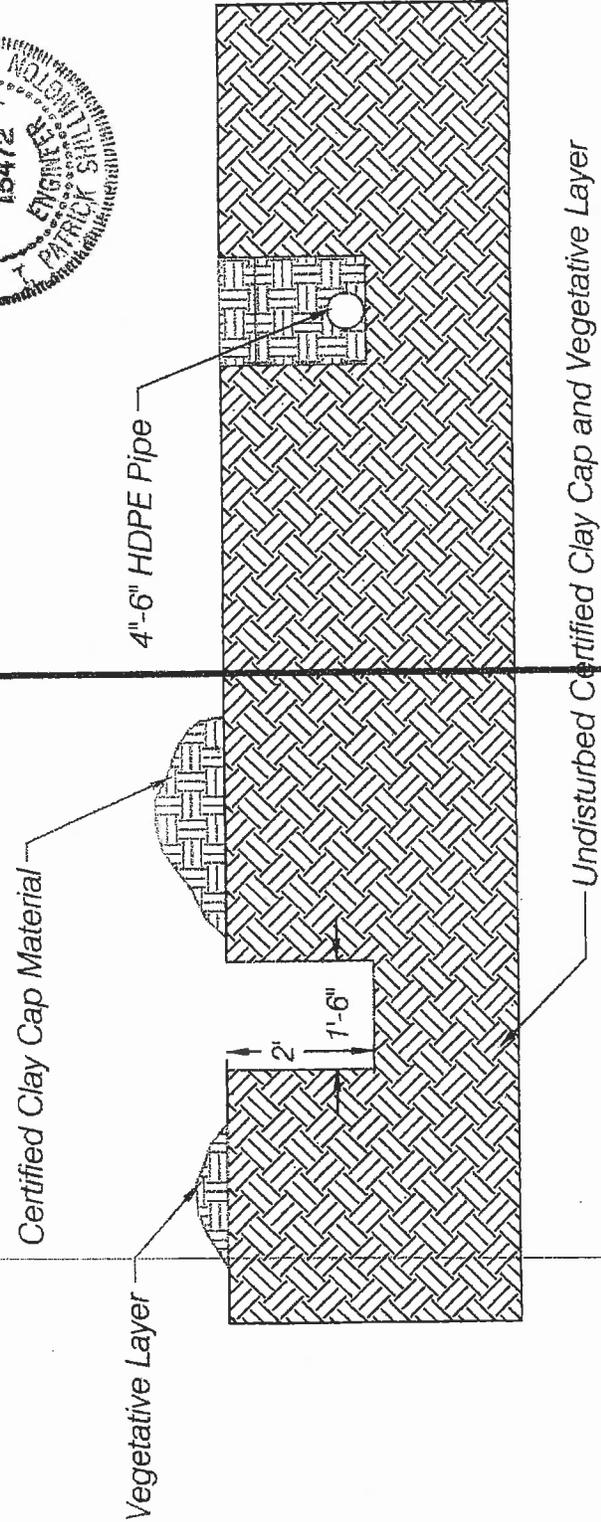
- General Notes**
1. The vegetative soil is separated from the clay cap material during excavation.
 2. The clay is backfilled and compacted around the pipe.
 3. Vegetative layer is then placed on top of the clay and compacted.
 4. Any additional cover materials will be delivered by Avery County, only as needed.

No.	Revision/Issue	Date
	Drawn: CRM	



ACLF
EXCAVATION DETAIL

ACLF	06/23/00	NO SCALE
------	----------	----------



REGENAIR® R4 Series

MODELS R4110-2/R4310A-2
 (52" H₂O MAX. PRESSURE, 92 CFM OPEN FLOW)
 (48" H₂O MAX. VACUUM, 88 CFM OPEN FLOW)

PRODUCT FEATURES

- Oilless operation
- TEFC motor mounted
- Can be mounted in any plane
- Rugged construction/low maintenance
- Can be operated with no air flow through unit
- Class B Insulation on motors
- Automatic restart thermal protection on single phase motors

COMMON MOTOR OPTIONS

- ★ 115/208-230V, 60 Hz; 110/220-240V, 50 Hz, single phase
- ★ 208-230/460V, 60 Hz; 190-220/380-415V, 50 Hz, three phase
- 575V, 60 Hz, three phase

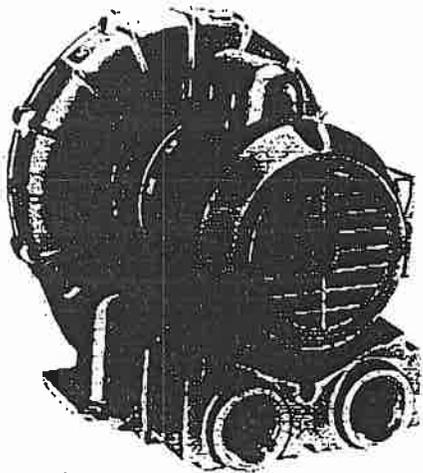
RECOMMENDED ACCESSORIES

- Pressure gauge AJ498
- Filter AJ128D (pressure)
- Vacuum gauge AJ497
- In-line filter AJ151D (vacuum)
- Muffler AJ121D
- Relief valve AG258
- Nema motor starter size - 0/00 (R4110-2), 00/00 (R4310A-2), for 60 Hz operation
- Moisture separator RMS160 (vacuum)

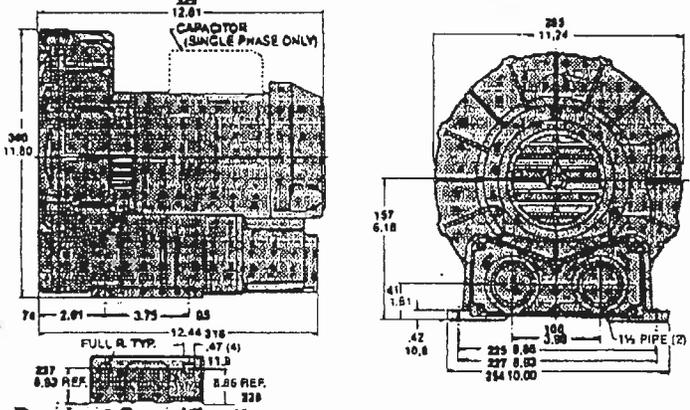
Various brand name motors are used on any model at the discretion of Gast Mfg. Corp.

Important Notice:

Pictorial, performance and dimensional data is subject to change without notice.



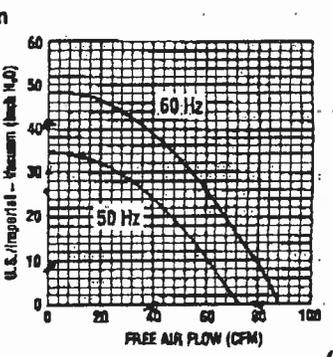
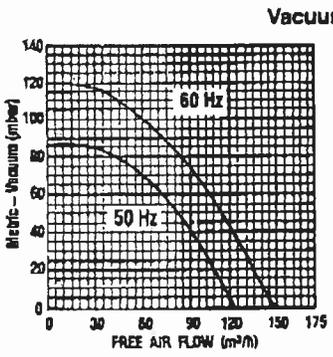
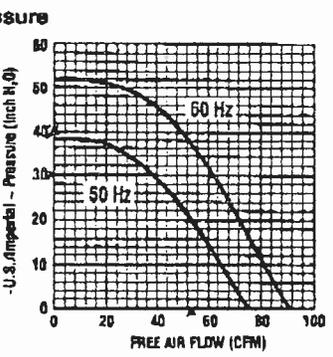
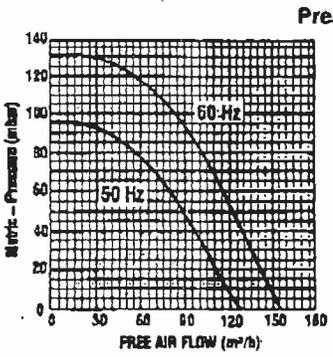
Product Dimensions Metric (mm) U.S. Imperial (inches)



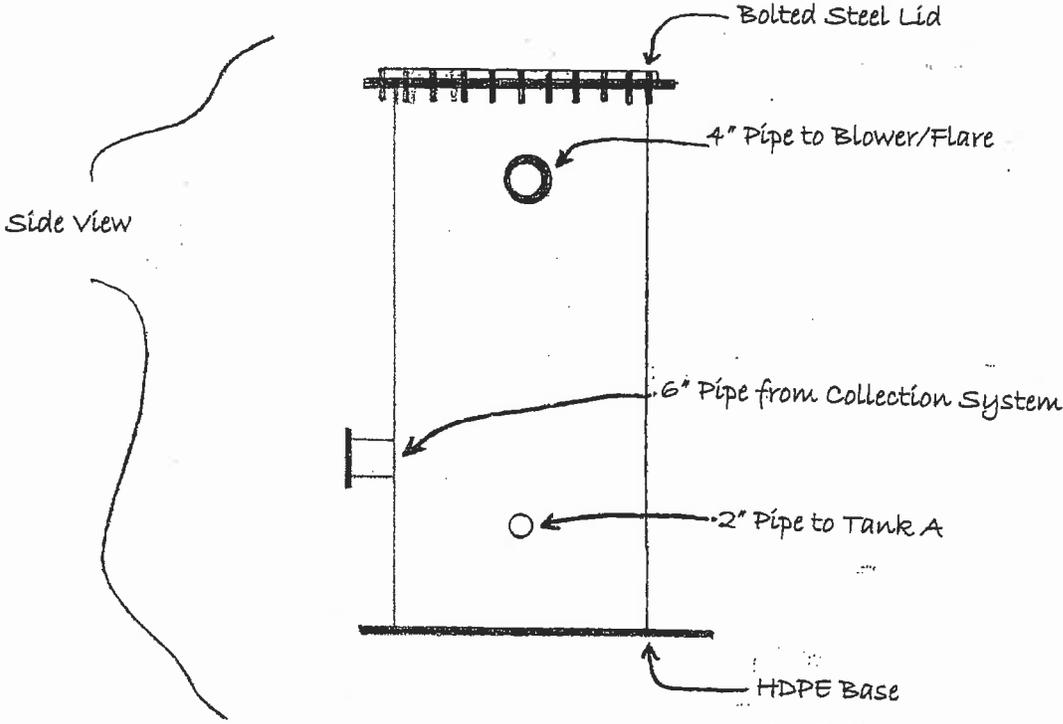
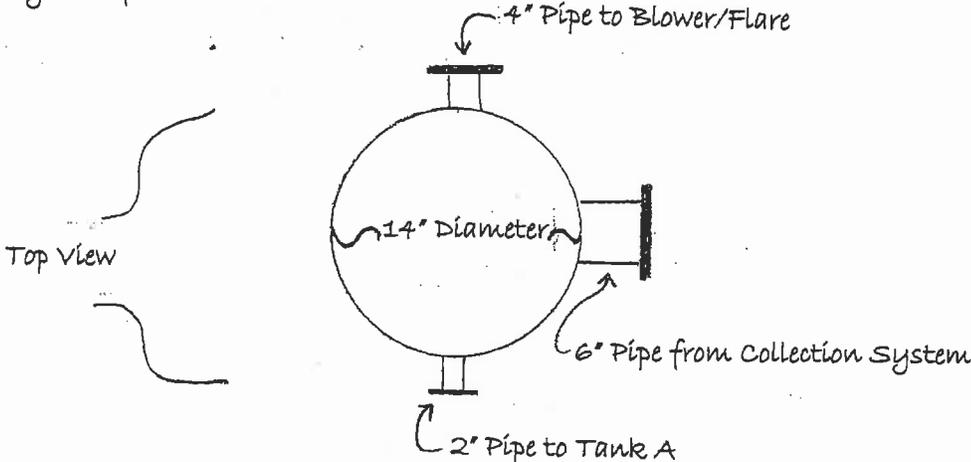
Product Specifications

Model Number	Motor Specs	Full Load Amps	Locked Rotor Amps	HP	RPM	Max Vac "H ₂ O	Max Pressure "H ₂ O	Max Flow cfm	Max Flow m ³ /h	Net Wt. lbs.	Net Wt. kg
R4110-2	110/220-240-50-1	9.0/4.5-5.7	31.2 @ 230V	0.6	2850	34	85	74	126	41	18.6
	★ 115/208-230-60-1	9.8/5.2-4.9		1.0	3450	48	120	92	156		
R4310A-2	190-220/380-415-50-3	2.6-3.3/1.3-1.4	26.5 @ 230V	0.6	2850	34	85	74	126	41	18.6
	208-230/460-60-3	3.4-3.2/1.6		1.0	3450	48	120	92	156		

Product Performance (Metric U.S. Imperial)



Sketch of
Condensate Knockout Trap
For Avery County Landfill



~Not to Scale~

Overall Notes

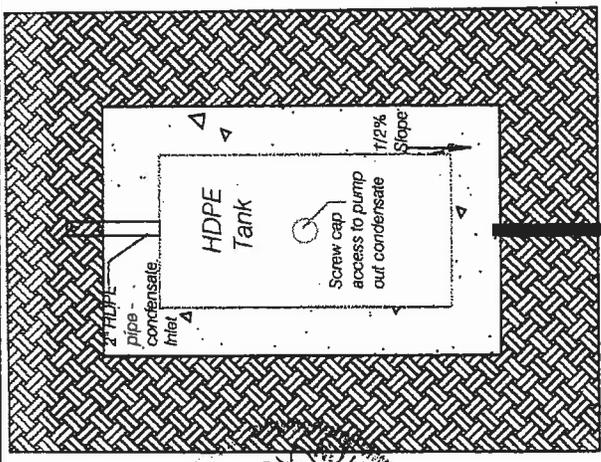
1. Foundation design for less than 2,000 lbs./sq. ft.
2. 3000 PSI concrete to be used, slump 3-5" with air content between 4-6%.
3. Slope concrete surface 1/2% to drain rainwater from containment basin.
4. Containment area to be sized to fit around each tank to specifications.

Drawn: CRM
Designed: TPS
Check: []
Date: []



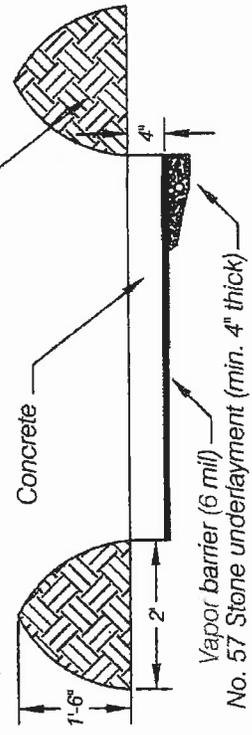
Project Name and Address
 Avery County Landfill
 Condensate Tanks
 & Pads

Project: ACLF
Date: 06/23/00
Scale: NO SCALE

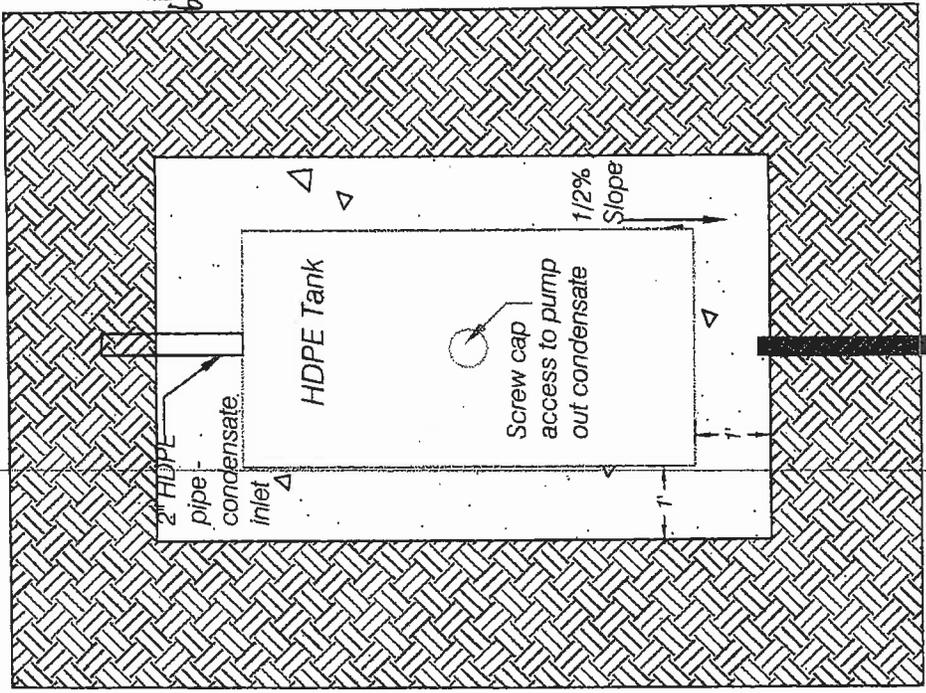


2" PVC SCH 40 Drain pipe

~35 Gallon tank near main road~



Concrete pad to be 1' wider than tank on all sides
 Earthen containment berm to be 2' wider than pad on all sides



2" PVC SCH 40 Drain pipe with 2" Valve

~225 Gallon tank near blower station~

APPENDIX D
ANNUAL TRAINING LOGS



LFG MONITORING TRAINING LOG
(This log must be completed annually)

**AVERY COUNTY MSW LANDFILL
INGALLS, NORTH CAROLINA
NC SOLID WASTE PERMIT NO. 06-01**

INSTRUCTOR INFORMATION:

Name(s): _____

Company: _____

Address: _____

TRAINING INFORMATION:

Date(s) (MM/DD/YYYY): _____

Program Content: _____

Instrument Type(s): _____

ATTENDANCE:

<u>Name</u>	<u>Title</u>	<u>Training Date</u>	<u>Trainee Signature</u>	<u>Instructor Initials</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Instructor Signature: _____ Date: _____

Avery County Representative Signature: _____ Date: _____

Note: This form should be maintained in the landfill operating record.

APPENDIX E

MONITORING LOG AND REPORTING FORMS



**LFG MONITORING LOG
 AVERY COUNTY MSW LANDFILL
 NC SOLID WASTE PERMIT NO. 06-01**

Measurement date: _____

Meter Used: RKI® GX 2003

Meter Calibration date: _____

Meter Calibration Type: Factory or Gas (circle one)

Barometric Pressure: _____

Error: +/-10% per the manufacturer (RKI)

Weather: _____

Gas Monitoring Locations	% LEL (5% CH ₄ = 100% LEL)	% O ₂	H ₂ S (ppm)	CO (ppm)	Is % LEL reading equal to or above 100% in probes? *,** (circle yes or no)
P-1					Y or N
P-2					Y or N
P-3					Y or N
P-4					Y or N
P-5					Y or N
P-6					Y or N
P-7					Y or N
P-8					Y or N

* If yes, contact RSG immediately at (919) 828-0577.

** Notification to DWM must be provided if levels exceed limits.

The following is to collect information about the maintenance of the gas probes. This checklist focuses on the physical characteristics of the probe and its vicinity.

Please circle yes or no for the following areas of concern. If you answer NO, please explain in the comment box.

AREA OF CONCERN	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8
Probe is accessible and surrounding area is safe for employees.	Y or N							
Lock operates properly.	Y or N							
Concrete pad is present and in good condition.	Y or N							
Steel casing is not movable and cemented in, and is in good working condition.	Y or N							

Comments/ items addressed or to be addressed:

Measurements taken by: _____

Signature: _____

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):

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: _____ Phone: _____

E-mail: _____

Facility name:

Facility Address:

Facility Permit #

NC Landfill Rule:
(.0500 or .1600)

Actual sampling dates (e.g.,
October 20-24, 2006)

--	--	--	--	--

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.

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

Affix NC Licensed/ Professional Geologist Seal

Signature

Date

Facility Representative Address

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