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Permit No.	Date	DIN
11-07	June 10, 2015	24504

RECEIVED
June 8, 2015
Solid Waste Section
Asheville Regional Office

June 8, 2015

Mr. Allen Gaither
Environmental Engineer
North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
2090 US Highway 70
Swannanoa, North Carolina 28778

Subject: Buncombe County Solid Waste Management Facility
Buncombe County, North Carolina
Permit No. 11-07
Subtitle D Landfill – Phase IV (Cell 7)
Permit to Construct Application
Response to Comments

Dear Mr. Gaither:

On behalf of Buncombe County, Camp Dresser McKee & Smith (CDM Smith) is pleased to submit the response to review comments regarding the Engineering Technical Review for the Phase IV (Cell 7) Permit to Construct Application for the Buncombe County Subtitle D Landfill. Buncombe County received review comments on January 23, 2015 (see **Attachment A**). The following responses are provided for your review:

Facility Plan

1. *Rule .1619(e)(4)(C)(ii) requires a description of the leachate management system including capacity of the storage. No mention of storage capacity was found in the Leachate Management System description in either the Facility Plan or Engineering Plan.*

   Response:
   A revised Section 2.3.1 is provided in the revised Facility Plan included as **Attachment B.**

Engineering Plan

2. *Rule .1620(e)(4) requires leachate collection system engineering drawings to illustrate base elevations, piping system grade and inverts, cleanouts, valves, sumps, top of protective cover elevations, and details. Piping system grades and top of protective cover elevations were not found in the engineering drawings.*

   Response:
   The liner system base grades presented on **Sheet EP-4 Piping Plan** meets the requirements of this rule because the piping system grades are consistently 18-inches above the liner system base grades. Top of protective cover elevations are presented on **Sheet EP-4A Stormwater Diversion Plan**.

Operations Plan

3. *Section 2.5, Prohibited Wastes, and Appendix 5B – Waste Screening Plan Section 3.2, Materials Prohibited from MSW Landfilling, do not include the "banned" wastes identified in N.C.G.S. 130A309.10(f).*

   Response:
   A revised Section 2.5 is provided in the revised Operation Plan included as **Attachment C. Attachment D** provides a revised Section 3.2 of the Waste Screening Plan.

4. *Section 4, Disease Vector Control states stagnant ponding water is prevented to control mosquito breeding. However, as part of the approved Bioreactor project, leachate can be applied to the working face with the use of berms which could lead to temporary ponding. Is there any concern with the leachate application at the working face reducing the efficacy of disease vector control practices?*

   Response:
   Application of leachate at the working face has never been practiced and there are no plans to apply leachate at the working face as part of the Bioreactor project. NCDENR will be notified if the County desires to consider direct application and a disease vector control plan will be developed for NCDENR review prior to implementing direct application. In the event that leachate is applied to the working face in the future, the ponding of water would be brief as the leachate will quickly percolate into the waste. If ponding did occur it would be filled in with waste and soil at the end of the working day. Therefore, the practice of leachate application at the working face would not contribute to mosquito breeding.

5. *Sections 9.1 through 9.3 discuss drainage control and water protection requirements regarding surface water over/in waste. The requirements discussed in these sections seem to contradict the planned direct application of leachate at the working face as part of the approved Bioreactor project.*

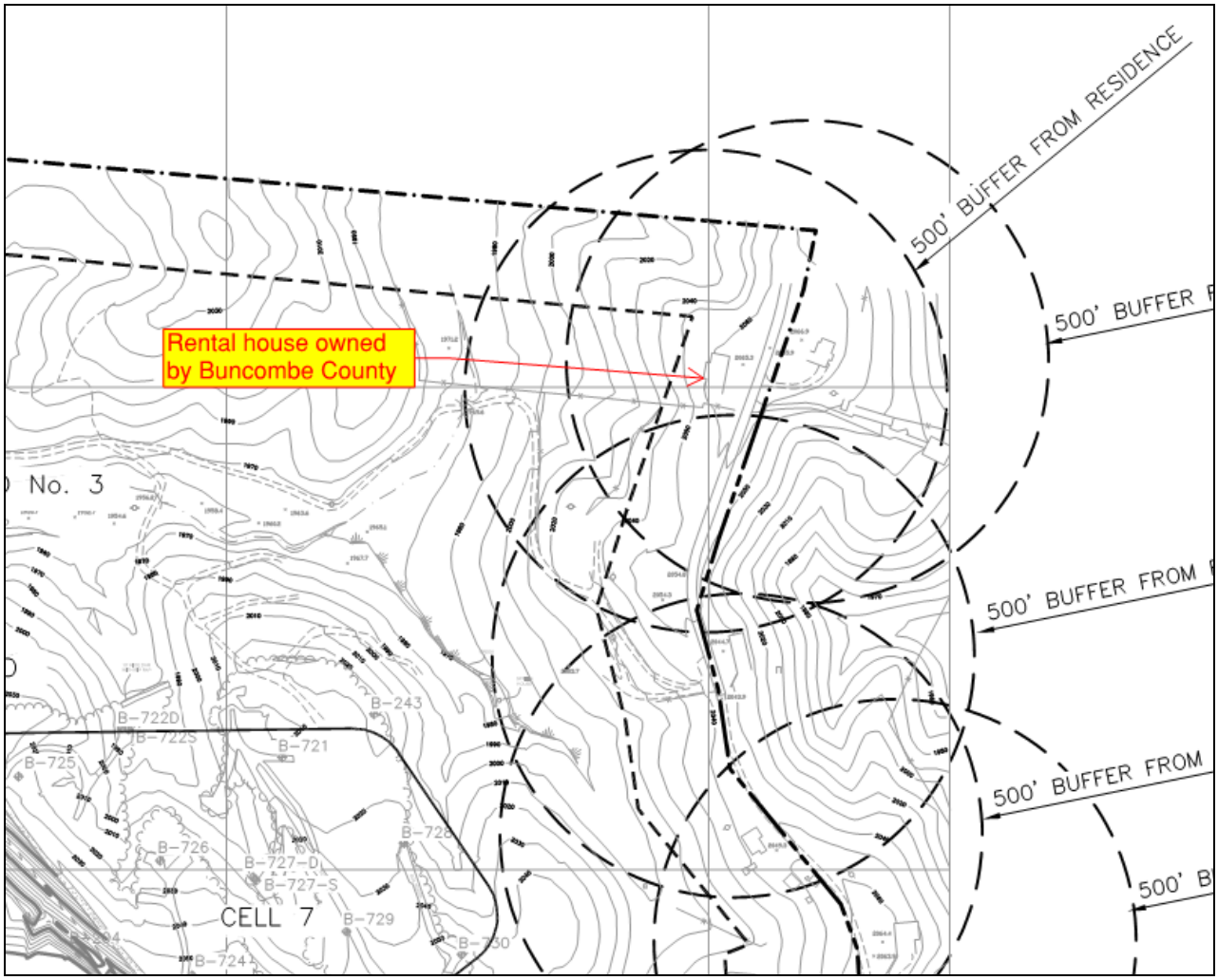
   Response:
   Please refer to the response provided for Comment 4.

6. *Section 12.1, Solid Waste Working Area states at a maximum, the width of the working face shall not exceed 100 feet. There is no regulatory requirement to limit the width of the working face to 100 feet. However, as this criteria is established in the Operations Plan, the facility will be responsible for ensuring this limit is continuously met.*

   Response:
   Section 12.1 has been revised to remove this requirement. The revised Operation Plan is included as **Attachment C**.

7. *Drawing OP-1 appears to show structures, possibly private residences, within the facility boundary on the east side of the facility.*

   Response: There is one house located on the west side of Murray DeBruhl Road that is located within the property boundary of the facility. The house is owned by the County and rented to a private citizen. The location of the house, shown in the figure below, is more than 500-ft from the limits of the Subtitle D landfill.



8. *Drawing OP-1 indicates active versus inactive areas within the MSW disposal footprint. However, the same indication is not provided for the C&D disposal footprint.*

   Response:
   A revised **Sheet OP-1** is provided as **Attachment E**.

9. *Appendix 5B – Waste Screening Plan Section 3.3, County Regulations states Medical Waste as defined above is not accepted at the Buncombe County Solid Waste Management Facility's Landfill. However, medical waste does not appear to be defined in this section.*

   Response:
   Attachment D provides a revised Section 3.3 of the Waste Screening Plan that references the medical waste definition provided in the Operations Plan.

10. *Appendix 5B – Waste Screening Plan Section 9, Random Inspection of Incoming Loads, makes no mention of inspecting loads from the Buncombe County Transfer Station, Permit number 1108TTRANSFER-1996. Also, as established in document ID 20853of the approved plan, there is no waste screening at the Transfer Station and the transfer trucks from the transfer station are inspected regularly at the Buncombe County landfill to ensure prohibited items are not landfilled. Therefore, it is recommended the inspections of the Buncombe County transfer trucks be specifically discussed in the Waste Screening Plan for the landfill.*

    Response:
    Please refer to **Attachment D**. Section 9.1 of the Waste Screening Plan has been revised to make clear that Buncombe County transfer trucks are included in the random inspections of incoming loads.

11. *Appendix 5D – Methane Monitoring Plan Section 3.4.2, Sampling Procedures discusses procedures for sampling for landfill gas in the landfill gas monitoring wells. However, there is no discussion of the procedures for sampling for landfill gas in structures.*

    Response:
    Section 3.4.2 has been revised to include sampling procedures for monitoring for landfill gas in the structures. A revised copy of the Landfill Gas Monitoring Plan is provided as **Attachment F**.

12. *Appendix 5D – Methane Monitoring Plan Section 4.1, Actions if Regulatory Limits Detected in Structures provides a list of actions to be taken if methane gas is detected at, or above, 25 percent LEL. However, the list of actions does not include immediate notification of the Division as required by 15A N.C.A.C 13B .1626(4)(c)(i).*

    Response:

Section 4.1 has been revised to include immediate notification of the Division if methane is detected at or above 25% LEL in structures. A revised copy of the Landfill Gas Monitoring Plan is provided as **Attachment F**.

13. *Documentation regarding the MW-3 Gas Issue indicated the relocation of groundwater monitoring wells MW-3 and MW-7 has been approved by the Section. Please update Sheet 1 in Appendix 5D – Methane Monitoring Plan to represent current site conditions (new well locations).*

    Response:
    A revised Sheet 1 with re-located MW-3R is included in the revised Landfill Gas Monitoring Plan (provided as **Attachment F**). It was determined that relocation of MW-7 was not required at this time but may be relocated in the future.

<u>Closure/Post-Closure Plan</u>

14. *There are no Potential Assessment and Corrective Action (PACA) cost estimate as required by N.C.G.S. 130A-295.2(h).*

    Response:
    A revised closure and post-closure plan including a PACA cost estimate of $2,000,000 was provided to NCDENR on May 6, 2014. That submittal is included as **Attachment G**.

An additional comment was provided and stated:

Additionally, as previously communicated in the Notification of Statute Change letter (DIN 22070), in order to continue with the Cell 7 PTC permitting activity, as currently proposed, Buncombe County will need to submit an environmental impact study in accordance with the new requirements of G.S. 130A-295.6(a).

Response:
The Cell 7 PTC is a "new permit" application due to the requested increase in capacity that will provide an estimated 11 years of additional landfill life. Any new permit application triggers the need to meet the requirements of G.S. 130A-295.6(a). However, we believe the Cell 7 PTC application warrants special consideration given that the increase in capacity is solely attributed to steepening the slopes of future waste placement from 4:1 to 3:1. The footprint of the landfill remains exactly the same as the original footprint approved during the landfill siting process. Given the fact that no new areas will be impacted by the proposed work we submit that the environmental impact study performed as part of the landfill siting application meets the requirements of this statute.

If you have any questions or comments, or need any additional information during your review of these responses, please do not hesitate to contact me at (919) 325-3574.

Very truly yours,

Kenton J. Yang, P.E.
CDM Smith

cc: J. Creighton/D. Cottrell/S. Hunter/K. Smith, Buncombe County
J. Wiseman, PETRA Engineering
C. Gabel/M. Colone, CDM Smith

Attachments: A-G

NORTH CAROLINA PROFESSIONAL SEAL 029928 ENGINEER KENTON J. YANG

06-08-2015

Response to Comments

Attachment A – NCDENR Comments dated January 23, 2015

CDM Smith

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

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

January 23, 2015

Mr. David Brigman
Director: Air Quality & Solid Waste
81 Panther Branch Road
Alexander, North Carolina 28701

Subject: Engineering Technical Review
Buncombe County MSW Landfill
Buncombe County, Permit # 1107-MSWLF-1996, Document ID 22939

Mr. Brigman:

The Division of Waste Management, Solid Waste Section (Section) has completed the review of the document titled *Subtitle D Landfill, Phase IV (Cell 7) Permit to Construct Application* (DIN 13037). The document was submitted on your behalf by CDM-Smith and was received in the Asheville Regional Office on April 29, 2014.

Based on this review, the Section requires clarification or additional information in order to complete the permitting activity. Please provide a response to each of the items listed below:

Facility Plan

1. Rule .1619(e)(4)(C)(ii) requires a description of the leachate management system including *capacity of the storage*. No mention of storage capacity was found in the Leachate Management System description in either the Facility Plan or Engineering Plan.

Engineering Plan

2. Rule .1620(e)(4) requires leachate collection system engineering drawings to illustrate *base elevations, piping system grade and inverts, cleanouts, valves, sumps, top of protective cover elevations, and details*. Piping system grades and top of protective cover elevations were not found in the engineering drawings.

Operations Plan

3. Section 2.5, Prohibited Wastes, and Appendix 5B – Waste Screening Plan Section 3.2, Materials Prohibited from MSW Landfilling, do not include the "banned" wastes identified in N.C.G.S. 130A-309.10(f).
4. Section 4, Disease Vector Control states s*tagnant ponding water is prevented to control mosquito breeding*. However, as part of the approved Bioreactor project, leachate can be applied to the working face with the use of berms which could lead to temporary ponding. Is there any concern with the leachate application at the working face reducing the efficacy of disease vector control practices?
5. Sections 9.1 through 9.3 discuss drainage control and water protection requirements regarding surface water over/in waste. The requirements discussed in these sections seem to contradict the planned direct application of leachate at the working face as part of the approved Bioreactor project.
6. Section 12.1, Solid Waste Working Area states *at a maximum, the width of the working face shall not exceed 100 feet*. There is no regulatory requirement to limit the width of the working face to 100 feet. However, as this criteria is established in the Operations Plan, the facility will be responsible for ensuring this limit is continuously met.

7. Drawing OP-1 appears to show structures, possibly private residences, within the facility boundary on the east side of the facility.
8. Drawing OP-1 indicates active versus inactive areas within the MSW disposal footprint. However, the same indication is not provided for the C&D disposal footprint.
9. Appendix 5B – Waste Screening Plan Section 3.3, County Regulations states *Medical Waste as defined above is not accepted at the Buncombe County Solid Waste Management Facility's Landfill*. However, medical waste does not appear to be defined in this section.
10. Appendix 5B – Waste Screening Plan Section 9, Random Inspection of Incoming Loads, makes no mention of inspecting loads from the Buncombe County Transfer Station, Permit number 1108T-TRANSFER-1996. Also, as established in document ID 20853of the approved plan, there is no waste screening at the Transfer Station and the *transfer trucks from the transfer station are inspected regularly at the Buncombe County landfill to ensure prohibited items are not landfilled*. Therefore, it is recommended the inspections of the Buncombe County transfer trucks be specifically discussed in the Waste Screening Plan for the landfill.
11. Appendix 5D – Methane Monitoring Plan Section 3.4.2, Sampling Procedures discusses procedures for sampling for landfill gas in the landfill gas monitoring wells. However, there is no discussion of the procedures for sampling for landfill gas in structures.
12. Appendix 5D – Methane Monitoring Plan Section 4.1, Actions if Regulatory Limits Detected in Structures provides a list of actions to taken if methane gas is detected at, or above, 25 percent LEL. However, the list of actions does not include immediate notification of the Division as required by 15A N.C.A.C 13B .1626(4)(c)(i).
13. Documentation regarding the MW-3 Gas Issue indicated the relocation of groundwater monitoring wells MW-3 and MW-7 has been approved by the Section. Please update Sheet 1 in Appendix 5D – Methane Monitoring Plan to represent current site conditions (new well locations).

Closure/Post-closure Plan

14. There are no Potential Assessment and Corrective Action (PACA) cost estimate as required by N.C.G.S. 130A-295.2(h).

Additionally, as previously communicated in the Notification of Statute Change letter (DIN 22070), in order to continue with the Cell 7 PTC permitting activity, as currently proposed, Buncombe County will need to submit an environmental impact study in accordance with the new requirements of G.S. 130A-295.6(a).

Review of the Hydrologic sections of the application are under review by Mr. Perry Sugg. Additional information regarding these sections will follow under separate cover.

If you should have any questions regarding this matter please contact me at (828) 296-4703, or by email at allen.gaither@ncdenr.gov .

Sincerely,

Allen Gaither
Environmental Engineer

Cc: Mr. Jon Creighton – Buncombe County
Ms. Kristy Smith – Buncombe County
Mr. Kenton Yang – CDM-Smith
Ms. Andrea Keller – SWS/ARO
Mr. Perry Sugg – SWS/RCO

Response to Comments

Attachment B – Revised Facility Plan

CDM Smith

Buncombe County
North Carolina

Buncombe County Solid Waste Management Facility
Subtitle D Landfill
Phase IV (Cell 7) Permit to Construct Application

Part 2 – Facility Plan

April 2014

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Section 1

Facility Drawings

Facility drawings were prepared in compliance with Rule .1619(d) and include all management units on the property. The drawings address site development, landfill construction and landfill operation and are provided in **Appendix 2A**.

1.1 Site Development

Five drawings were prepared using topographic surveys to provide site development. Sheet SD-1 shows the full extent of the property owned by Buncombe County for the solid waste management facility. Note that an additional parcel along Panther Branch Road was purchased in 2013 that expands the facility boundary to the north. No facilities have been built on the newly purchased parcel. Sheet SD-1a is an enlarged view that shows all existing solid waste management facilities and associated infrastructure and buffer requirements as set forth in Rule .1619(d)(1).

Sheets SD-2 and SD-3 show the phases of development and grading for the C&D and Subtitle D landfills, respectively. Sheet SD-4 shows the landfill gas-to-energy facility including planned expansions.

1.2 Landfill Construction

The following Landfill Construction sheets were prepared per Rule .1619(d)(2):

- Sheet LC-1 provides the cell limits for the Subtitle D cells and shows the active soil borrow area per Rule .1619(d)(2)(A).
- Sheets LC-1 and LC-3 depict development phases for the C&D and Subtitle D landfills per Rule .1619(d)(2)(B).
- Sheets LC-1 and LC-3 depict proposed base grades for the C&D and Subtitle D landfills per Rule .1619(d)(2)(C).
- Sheet LC-2 presents the leachate collection and force main and Sheet LC-1 presents the access roads, sedimentation basins, leachate storage and other structures related to operation of the Subtitle D landfill per Rule .1619(d)(2)(D).
- Sheets LO-5 and LO-9 present the final contours per Rule .1619(d)(2)(E) for the Subtitle D and C&D landfills, respectively.

1.3 Landfill Operation

The following Landfill Operation sheets were prepared in accordance with Rule .1619(d)(3):

- Sheet LC-2 depicts the general grade and flow direction for the drainage layer component of the leachate collection system and the size, location, and general grade for the leachate piping system as required by Rule .1619(d)(3)(A) and (B).

- Sheets LO-1 through LO-5 show the transitional contours for the future phases of development of the Subtitle D landfill in accordance with Rule .1619(d)(3)(C).
- Sheets LO-6 through LO-10 show the transitional contours for the future phases of development of the C&D landfill in accordance with Rule .1619(d)(3)(C).
- Stormwater segregation per Rule .1619(d)(3)(D) is shown on Sheet EP-4A of the Engineering Plan Drawings.

1.4 Steepening of Final Sideslopes

As shown on Sheets LO-2 through LO-5, the final sideslopes for Phase IV through VII have been steepened to a maximum 3 to 1 (horizontal to vertical) to increase capacity. The final sideslopes for those phases were previously permitted in February 2011 at 4 to 1.

Section 2

Facility Report

This report was prepared in accordance with Rule .1619(e). A separate report was prepared for the construction and demolition (C&D) landfill facility in accordance with Rule .0537(e) and is provided in **Appendix 2B**.

2.1 Waste Stream

In accordance with Rule .1619(1), a discussion on waste stream is presented below.

2.1.1 Types of Waste [Rule .1619(e)(1)(A)]

Waste disposed of in the Subtitle D landfill is municipal solid waste (MSW) and consists of residential, commercial, and non-hazardous industrial wastes. Only waste that meets the acceptance criteria as described in the North Carolina Solid Waste Management Rules and as specified in the Permit to Operate is allowed to be disposed of at the facility. C&D waste is disposed in a separate C&D landfill.

The waste screening plan provided in the Operation Plan is used to determine if incoming waste is acceptable for the Subtitle D or C&D facilities.

Waste received at the facility that is not landfilled includes: wood and yard waste which are mulched using a tub grinder, white goods, batteries, motor oil, tires, household hazardous waste (HHW), triple-rinsed pesticide containers, and recyclables.

2.1.2 Disposal Rates [Rule .1619(e)(1)(B)]

Table 2-1 presents yearly disposal rates as recorded at the landfill scale house and includes an average daily rate assuming 284 operating days (365 days - 52 Sundays - 26 Saturdays (half days) - 3 holidays). Assuming a 5% annual increase starting from 2013, it is anticipated that the average annual MSW waste disposed will be approximately 119,000 tons (419 tons per day) over the next 5 years.

Table 2-1 MSW Disposal Rates

FY[1]	Amount Received (tons)	Daily Rate (tons/day)
98-99	109,734	386
99-00	120,143	423
00-01	122,333	431
01-02	146,690	517
02-03	160,863	566
03-04	170,170	599
04-05	173,774	612
05-06	122,034	430
06-07	117,216	413
07-08	143,994	507
08-09	129,551	456
09-10	113,497	400
10-11	116,876	412
11-12	109,317	385
12-13	107,469	378

[1]Fiscal year is from July to June.

2.1.3 Areas Served By Facility [Rule .1619(e)(1)(C)]

The Buncombe County Solid Waste Management Facility serves only Buncombe County. Buncombe County is approximately 659 square miles and, includes the incorporated municipalities of Asheville, Biltmore Forest, Black Mountain, Montreat, Weaverville, and Woodfin.

2.1.4 Waste Segregation Management [Rule .1619(e)(1)(D)]

The waste screening and segregation procedures employed by the Buncombe County Solid Waste Management Facility staff are provided in the Operation Plan.

2.1.5 Equipment Requirements [Rule .1619(e)(1)(E)]

Equipment utilized at the Subtitle D landfill includes the following:

- 2 Dozers (1 Cat D6 and 1 John Deer 850)
- 2 Compactors (Terex 1-390 & 1-TC550)
- 1 Excavator (Volvo 210)
- 1 25-yard Articulated Dump Truck (Volvo A25)
- 1 Rubber Tired Loader (Volvo L70)
- 1 Track Loader (International 250C)
- 1 Farm Tractor (Kubota 8030F)

- 1 Motor Grader (John Deere 570A)
- 1 Skid Loader (CAT 287)
- 1 Tub Grinder (Morbark 1119)
- 1 Roll-off Truck (used to haul convenience center roll-offs to working face)
- 1 Slope Mower (Kut-Kwick)
- 1 Fuel Truck (Chevrolet 1.5 ton)

2.2 Landfill Capacity

Landfill capacity calculations were prepared in accordance with Rule .1619(e)(2) as described below.

2.2.1 Data and Assumptions [Rule .1619(e)(2)(A)]

The following data and assumptions were used in estimating the volumetric capacity and life expectancy of the landfill units:

- 284 landfill operating days per year
- 4:1 waste to soil ratio
- 0.53 in-place waste density (From June 2013 Airspace Analysis Report)
- An average of 119,000 tons/year for the next 5 years (refer to Section 2.1.2.)
- 3:1 final sideslopes for Cells 7-10 and the vertical expansion

2.2.2 Volumetric Estimates [Rule .1619(e)(2)(B)]

2.2.2.1 Total Operating Capacity

AutoCAD Civil 3D 2012 software was used to estimate the total operating capacity, which is defined as the volume between the top of the landfill liner protective cover and the top of the 12-inch intermediate cover layer for the Subtitle D landfill. The total operating capacity is approximately 11.8 million cubic yards (cy) as presented in **Table 2-2.**

2.2.2.2 Operating Capacity per Phase

AutoCAD Civil 3D 2012 software was used to estimate the phased operating capacity and is presented in Table 2-2.

Table 2-2 – Operating Capacity Per Phase

Phase	Operating Capacity (cy)
I (Cells 1-3)	1,371,000
II (Cells 4-5)	974,000
III (Cell 6)	2,434,000
IV (Cell 7)	1,349,000
V (Cells 9-10)	1,580,000
VI (Cell 8)	752,000
VII (Vertical Expansion)	3,345,000
Total	11,805,000

The permanent landfill sideslopes for Phases IV through VII have been increased to 3 to 1 (horizontal to vertical) from 4 to 1 as previously permitted in February 2011 and as presented on Sheets LO-2 through LO-5. The operating capacities presented in Table 2-2 reflect the 3 to 1 sideslopes.

2.2.2.3 Waste-to-Soil Ratio

Based on information from the County regarding use of cover soils, a waste-to-soil ratio of 4:1 was assumed. The County also uses Posi-Shell as alternative daily cover. However, due to the negligible amount of additional volume it contributes, Posi-Shell is not included in the soil ratio.

2.2.2.4 Soil Resources

Current and future soil borrow sources are identified on Sheet SD-1. The amount of remaining borrow material available onsite is estimated to be 645,000 CY for the current area and 753,000 CY for the future areas. The County has purchased an adjacent property as shown on Sheet SD-1 that may be considered for future borrow material.

2.2.2.5 Soil Requirements

Estimated soil quantities for landfill construction, operation, and closure and presented in **Table 2-3**. Operation quantities include daily and intermediate cover.

The following sample calculation shows how the estimates provided in Table 2-3 were generated.

- Construction (Phase IV) = 1.5-foot thick compacted clay liner x area of cell

  = (1.5 foot x 13.3 acres x 43,560 sf/ac)/27 cf/cy

  = <u>32,200 cy</u>

- Operation (Phase IV) = operating capacity (Table 2-2) x 20% (4:1 waste to cover ratio from Section 2.2.2.3)

  = 1,349,000 cy x 20%

  = <u>269,800 cy</u>

The closure soil quantity requirement was calculated for the entire Subtitle D landfill (95-acres):

1. 6-inch erosion layer totaling 76,600 cy

2. 18-inch protective soil layer totaling 229,900 cy

The total final cover material required for the entire Subtitle D landfill is 306,500 cy.

Table 2-3 Required Soil Quantities

		Required Soil Quantities (cy)	
Phase	Area (ac)	Construction	Operation
IV (Cell 7)	13.3	32,200	269,800
V (Cells 9-10)	17.8	43,100	315,900
VI (Cell 8)	8.5	20,600	150,400
VII (Vertical Expansion)	--	--	669,000

2.2.2.6 Operating Life

The following calculations were performed to determine the landfill operating life presented in **Table 2-4**. Based on the June 2013 Airspace Analysis Report, the in-place density is 0.53 tons per cy. From Section 2.1.2, the annual amount of waste disposed will be approximately 119,000 tons of MSW per year over the next 5 years.

The following are the calculations used to complete Table 2-4.

- Operating Life (Phase IV) = (Operating Capacity (Table 2-2) x in-place density)/ annual waste disposed

= (1,349,000 cy x 0.53 ton/cy) / 119,000 ton/yr

= 6.0 yrs

Table 2-4 Operating Life

Phase	Operating Capacity (cy)	Operating Life (yr)
IV (Cell 7)	1,349,000	6.0
V (Cells 9-10)	1,580,000	7.0
VI (Cell 8)	752,000	3.3
VII (Vertical Expansion)	3,345,000	14.9
Total	7,026,000	31.2

If the operating life estimate turns out to be accurate then the County will request a vertical expansion permit amendment for Phase IV when the 5-year operating limit is reached.

2.3 Containment and Environmental Control Systems [Rule .1619(e)(3)]

The design concept for the landfill facility is to maximize the disposal capacity while providing full containment of the disposed waste and leachate. The following narrative provides a description of the containment and environmental control systems for the facility.

2.3.1 Leachate Collection and Storage

A 24-inch rock drainage layer possessing a minimum hydraulic conductivity of 1.0 cm/s is placed over the liner system to convey leachate to the sump and to protect the liner system. A heavyweight fabric cushion is used under the drainage layer to prevent puncturing of the geomembrane.

Ten-inch diameter, perforated HDPE collection pipe is installed in areas of concentrated flow to efficiently route leachate to the sump. Leachate in the collection pipes flows by gravity to the sump area in each cell where a submersible pump is used to transfer leachate from the cells to the leachate pond.

The collected leachate is pumped from the cells through a 6-inch HDPE force main to the lined, 1-million gallon, leachate storage pond. From the pond, leachate is recirculated back into the landfill as part of the bioreactor program or hauled to the Metropolitan Sewerage District (MSD) wastewater treatment facility.

2.3.2 Base Composite Liner System

A composite base liner system will be utilized to contain leachate generated in the cells consisting of a compacted, smooth subgrade, 18 inches of compacted soil with a maximum permeability of 1.0×10^{-5} cm/s, a geosynthetic clay liner (GCL) and a 60-mil textured HDPE geomembrane liner. The grades of the base liner system will be designed to retain a minimum post-settlement slope of two percent and a minimum post-settlement vertical separation of four feet above seasonal high ground water table and bedrock.

2.3.3 Final Cover System

A final cover system will be installed after waste filling is complete to minimize infiltration of stormwater and control landfill gas. The composition of the cap system will be a geomembrane overlain by an 18-inch layer of protective soil and 6-inch erosion soil layer with sufficient organic content to sustain vegetative growth. The closure cap will have a maximum grade of 4 to 1 (horizontal to vertical) for Cells 1 through 5 and a maximum grade of 3 to 1 for Cells 6 through 10. A minimum slope of five percent will be used for the final plateau.

2.3.4 Erosion & Sedimentation Control

Stormwater runoff from the landfill will be collected and routed to a series of sedimentation ponds to remove suspended solids prior to discharge. Intermediate cover slopes will be maintained with a good stand of grass to limit erosion and repairs will be made in a timely manner.

2.3.5 Landfill Gas Control

An active gas collection system consisting of vertical and horizontal wells is used to collect landfill gas. The collected gas is combusted onsite in a generator set and a flare.

2.4 Leachate Management [Rule .1619(e)(4)]

The leachate collection system is designed to collect leachate by gravity flow in the cells and convey leachate to an onsite storage pond using pressurized flow. The collected leachate is recirculated back into the landfill or hauled to the MSD wastewater treatment facility.

2.4.1 Stormwater Diversion

During initial fill placement in a cell, temporary diversion berms and tarps will be used to segregate clean stormwater from the waste. The temporary berms will be installed near the midpoint of each cell to capture stormwater in roughly half the area. Stormwater falling upstream of the berms will be collected as clean water and will be pumped to the perimeter drainage channel. Stormwater falling on the active waste fill area that comes into contact with waste or is collected downstream of the diversion berms will be collected as leachate.

2.4.2 Normal Operating Conditions

Normal operating conditions, as defined by typical weather conditions, are used to estimate the average monthly and peak daily values of leachate that will be generated by the landfill. The Hydrological Evaluation of Landfill Performance (HELP) Model program is used to estimate these site-specific leachate quantities and is provided in the Engineering Plan.

2.4.3 System Design

The capacity of the leachate collection pipes is based on the peak daily leachate generation rate for the worst case condition. The design calculations are provided in the Engineering Report. In periods of extreme precipitation, leachate may be temporarily stored in the MSW landfill as necessary to maintain control. This is intended to serve only as a short-term solution until the leachate can be transferred from the storage pond to the MSD wastewater treatment facility.

2.4.4 Contingency Plan

The primary means of leachate disposal will be recirculation. When recirculation is not being performed, the leachate will be hauled to the MSD wastewater treatment facility. Should the MSD wastewater treatment facility experience problems and not be able to accept leachate for a limited time period, the storage pond will be used to store the leachate. As stated in Section 2.4.3, the MSW landfill cells can act as temporary storage if necessary.

2.5 Special Engineering Features [Rule .1619(e)(4)]

Additional special engineering features have been incorporated into the design of Cell 7:

- No liner penetrations for leachate withdrawal
- Automated pumping stations to minimize storage time for leachate in the landfill cells.
- Leachate recirculation into the waste mass to accelerate decomposition of the MSW and increase landfill capacity and gas generation for the gas-to-energy facility.

Response to Comments

Attachment C – Revised Operation Plan

CDM Smith

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Section 1 - Purpose

Operation Plan

The purpose of this Operations Plan is to provide the Buncombe County Subtitle D Landfill staff with a manual that will serve as a guide for safe and efficient operation of the Subtitle D landfill. This Operations Plan has been prepared in accordance with the North Carolina Solid Waste Rule 15A NCAC 13B .1626, Operational Requirements for MSWLF Facilities, and therefore addresses the following issues.

- Waste Acceptance and Disposal Requirements
- Cover Material Requirements
- Disease Vector Control
- Explosive Gases Control
- Air Criteria
- Access and Safety Requirements
- Erosion and Sediment Control
- Drainage Control and Water Protection Requirements
- Liquids Restrictions
- Recordkeeping Requirements
- Spreading and Compacting Requirements
- Leachate Management Plan

Additionally, **Table 1** is provided to summarize all required documents or documentation (record keeping) which must be maintained by the County and retained at the facility. The operating record may be inserted into a 3-ring binder located at the scale house or main administration building. It is the intent that Table 1 is clearly and visually posted to ensure direction on record keeping.

1.1 Operation Drawings

In accordance with Rule .1625(b)(1), operation drawings have been prepared and are included in **Appendix 5A**.

Table 1. Buncombe County Subtitle D Landfill Operating Record Requirements

Required Recordkeeping	Rule	Reference in Ops Plan	Action
INCOMING WASTE			
Attempted disposal of any prohibited wastes	.1626(1)(a)	2.5	Report to NCDENR within 24 hrs
Attempted disposal of any waste from outside the permitted service area	.1626(1)(a)	2.5	Report to NCDENR within 24 hrs
Records of random waste inspections	.1626(10)(a)(i)	11.1	Complete form
Waste determination records	.1626(10)(a)(i)	11.1	--
Amounts by weight of solid waste received at the Subtitle D landfill	.1626(10)(a)(ii)	11.1	--
DISPOSAL OPERATIONS			
Open burning requests	.1626(5)(b)	6.2	--
Fire and explosion notification	.1626(5)(d)	6.4	Report to NCDENR verbally within 24 hrs and written by 15 days
LEACHATE MANAGEMENT MAINTENANCE AND MONITORING			
Inspect leachate pond	.1626(12)(a)	13.1.2	Annually
Jet clean leachate collection pipes	SB1492 130A-295.6. (h)(3) and Leachate Spill Corrective Action	13.1.3	Annual, note in Operating Record
Remote camera inspection	SB1492 130A-295.6. (h)(3) and Leachate Spill Corrective Action	13.1.3	Once every 5 years
Inspect pump station and audio and visual alarms	Leachate Spill Corrective Action	13.1.3	Weekly
Inspect landfill sideslopes and LCS	Leachate Spill Corrective Action	13.1.3	Weekly or following rainfall events equal to or exceeding ½ inch
Leachate generation records	.1626(12)(b)	13.2.1	Weekly
Leachate quality sampling	.1626(12)(c)	13.2.2	Semi-annual
METHANE MONITORING			
Methane monitoring reports	.1626(10)(a)(iii) .1626(4)(b)	11.1	Quarterly
Exceedance in methane levels – required action within 7	.1626(10)(a)(iii) .1626(4)(c)(ii)	11.1	Include in Operating Record detected levels and description of

days following detection			steps to protect human health
Exceedance in methane levels – required action within 60 days following detection	.1626(10)(a)(iii) .1626(4)(c)(iii)	11.1	Include in Operating Record a remediation plan for gas releases and notify NCDENR that plan has been implemented
GROUNDWATER AND SURFACE WATER MONITORING			
Groundwater and surface water monitoring reports	.1626(10)(a)(iv)	App. C	Semi-annual
TRAINING			
Certificates of training	.1626(10)(a)(i)	11.1	--
Training procedures	.1626(10)(a)(i)	11.1	--
CLOSURE/POST-CLOSURE (NOT APPLICABLE)			
Any closure or post-closure monitoring, testing, or analytical data	.1626(10)(a)(v)	11.1	--
Required Approved Documents to be included in the Operating Record			
Current Operation Plan in accordance with Rule .1626(10)(c)			
Current Water Quality Monitoring Plan in accordance with Rule .1630			
Current Permit to Construct and Permit to Operate			
Current cost estimates and financial assurance documentation in accordance with Rules .1626(10)(a)(vi) and .1628			

Section 2 – Waste Acceptance and Disposal Requirements

Operation Plan

2.1 Waste Definition

Agricultural Waste - waste material produced from raising of plants and animals, including animal manures, bedding plant stalks, hulls, and vegetative matter.

Asbestos Waste - any waste material that is determined to contain asbestos.

Blood Product - all bulk blood and blood products.

Commercial Solid Waste - all types of solid waste generated by retail stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential waste.

Construction/Demolition Waste - solid waste resulting solely from construction, remodeling, repairs or demolition of buildings, structures, or pavement but does not include inert, land-clearing or yard waste.

Hazardous Waste - any solid waste that is defined as hazardous in 15A NCAC 13A 261.3 and that is not excluded from regulation as a hazardous waste from conditionally exempt small quantity generators as defined within 15A NCAC 13A 261.5.

Hot Load - when a waste hauling vehicle is transporting solid waste that is burning or smoldering, it is referred to as a hot load.

Household Waste - any solid waste derived from households including hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas.

Industrial Solid Waste - solid waste generated by manufacturing processes that is not a hazardous waste regulated under Subtitle C of RCRA. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Inert Debris - any solid waste which consists solely of material that is virtually inert, such as brick, concrete, rock, and uncontaminated soil.

Infectious Waste - any solid waste capable of producing an infectious disease. These types of waste include microbiological waste, pathological waste, blood products, and sharps.

Land Clearing Debris - solid waste which is generated solely from land clearing activities such as stumps, trees, limbs, brush, grass, and other naturally occurring vegetative material.

Liquid Hydrocarbons - As defined under Article 21A of Chapter 143 of the North Carolina General Statutes: except that any such oils or other liquid hydrocarbons that meet the criteria for hazardous waste under the Federal Resource Conservation and Recovery Act (P.L. 94-580) as amended.

Liquid Waste - any waste material that is determined to contain free liquid by Method 9095 (Paint Filter Test).

Medical Waste – means any solid waste which is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals, but does not include any hazardous waste identified or listed pursuant to this Article, radioactive waste, or household waste as defined in 40 Code of Federal Regulations § 261.4(b)(1) in effect on 1 July 1989.

Regulated Medical Waste – means blood and body fluids in individual containers in volumes greater than 20 ml, microbiological waste, and pathological waste that have not been treated pursuant to .1207. (.1207 is the definition of treatment - see rules on page 22.) Regulated medical waste must be treated prior to disposal. After treatment these wastes may be handled as general solid waste. (.1201(9))

Microbiological Waste - includes cultures and stocks of etiologic agents. The term includes cultures of specimens from medical, pathological, pharmaceutical, research, commercial, and industrial laboratories.

Oils - As defined under Article 21A of Chapter 143 of the North Carolina General Statutes: except that any such oils that meet the criteria for hazardous waste under the Federal Resource Conservation and Recovery Act (P.L. 94-580) as amended.

Pathological Waste - includes: human tissue, organs, body parts, secretions, and excretions, blood, and body fluids that are removed during surgery and autopsies; the carcasses and body parts of all animals that were exposed to pathogens in research, were used in the production of biological or in the in-vitro testing of pharmaceuticals, or that died of known or suspected infectious disease.

Polychlorinated Biphenyls (PCB) - defined as any of several compounds that are produced by replacing hydrogen atoms in biphenyl with chlorine. PCB's were most frequently used as an additive to oil or other liquid in situations where heat is involved. PCB's have been used in paints and lubricants, however the most common application was in electric transformers.

Radioactive Waste - any waste that contains radioactivity as defined by the North Carolina Radiation Protection Act, G.S. 104E-1 through 104E-23. Radioactivity is defined as the property possessed by some elements of spontaneously emitting alpha or beta rays and sometimes gamma rays by the disintegration of the nuclei of atoms.

Sharps - includes needles, syringes with attached needles, capillary tubes, slides and cover slips, and scalpel blades.

Spoiled Food - any food which has been removed from sale by the United States Department of Agriculture, North Carolina Department of Agriculture, Food and Drug Administration, or any other regulatory agency having jurisdiction in determining that food is unfit for consumption.

Treatment or Processing Waste - any waste that is a residual solid from a wastewater treatment or pretreatment facility.

Tires - rubber tires from vehicles.

White Goods - any inoperative and discarded refrigerators, freezers, ranges, washers, dryers, water heaters, and other large domestic commercial appliances.

Yard Trash - solid waste resulting from landscaping and yard maintenance such as brush, grass, tree limbs, and similar vegetative material.

2.2 Acceptable Waste

In accordance with 15A NCAC 13B .1626, a Municipal Solid Waste Landfill Facility (MSWLF) shall only accept those solid wastes which it is permitted to dispose of. In accordance with the North Carolina Solid Waste Management Rules, except where noted, the Buncombe County Sanitary Landfill is permitted to dispose of the following using normal operating procedures:

Agricultural Waste - This waste is acceptable with the exception of animal manures.

Bulk or Non-Containerized Liquid Waste - The waste is acceptable if the waste is a household waste other than septic waste and waste oil or the waste is leachate or gas condensate derived from the MSWLF unit.

Commercial Solid Waste

Containerized Liquid Waste - This waste is acceptable only if the liquid waste is in small containers similar in size to that normally found in household waste, and if the small containers are designed to hold liquids for use other than storage, and the waste is household waste.

Household Waste

Industrial Solid Waste

Animal Carcasses – Dog, cat, and farm animal carcasses will be accepted at the landfill, in accordance with .1626.(1)(c), all animal carcasses delivered to the landfill shall be covered immediately.

2.3 Acceptable Waste Requiring Special Handling

Several components of the acceptable waste stream will require special handling procedures. The waste stream components requiring special handling include, but are not limited to the following:

Asbestos Waste - The County can accept asbestos waste, and is permitted to dispose of it in a designated portion of the C&D landfill, however, in order to maintain an accurate record of asbestos disposal quantities and locations, landfill staff will identify specific locations in each cell that will contain these wastes.

In accordance with .1626.(1)(d), the waste shall be covered immediately with a soil in a manner that will not cause airborne conditions and must be disposed of separate and apart from other solid wastes at the bottom of the working face or in an area not contiguous with other disposal areas. Separate areas shall be clearly designated so that asbestos is not exposed by future land disturbing activities.

Barrels and Drums - Barrels and drums may be disposed of if they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained in them.

Construction/Demolition Waste - This waste is to be disposed in accordance with state and federal regulations in the approved location on site.

Hot Loads - Hot loads arriving at the site should be dumped immediately in the designated primary hot load area located near the working face. The designated area must be located only on areas containing compacted refuse covered by at least 6 inches of cover material. The location of the primary hot load area will change along with the landfill development so as to always be near the working face. Hot loads should be extinguished immediately after being dumped by applying water to the burning refuse and by covering the refuse with soil from the stockpile area. If problems are encountered, the local fire department should be called. Once extinguished, the hot load should be observed until it is certain that the fire is out. The remaining refuse should then be compacted and buried at the working face.

Land Clearing Debris/Yard Trash - This waste will be handled at the tub grinder and used as the mulch portion for the mulch/soil alternate daily cover mixture.

Spoiled Food - Spoiled food shall be placed at the bottom of the working face and covered immediately.

Tires - Tires will be accepted, placed immediately in an on-site trailer and removed periodically.

Treatment or Processing Waste - per .1626 (1) (e)

White Goods - All chlorofluorocarbon will be removed and the remainder will be sold for scrap metal.

2.4 Medical Waste Materials Not Accepted by Buncombe County

Sharps generated from a household shall be accepted at the Buncombe County Transfer Station in a specified, puncture proof container. The sharps container is transported to a medical waste disposal company. The Buncombe County Solid Waste Management Facility Landfill does not accept sharps or treated regulated medical waste. The landfill operators and manager have the right to reject properly packaged sharps or treated regulated medical waste for disposal in the landfill, even if state regulations allow landfill disposal of such wastes.

If a load contains this material, the generator will be determined, if possible, and will be assessed civil penalties and will be required to cover all costs associated with removal, treatment and safe disposal of such material.

2.5 Prohibited Wastes

The following wastes are prohibited from disposal at the Buncombe County Subtitle D Landfill.

Containerized Liquid Waste - Containerized Liquid Waste may not be placed in the landfill unless the container is a small container similar in size to that normally found in household waste. In addition, Containerized Liquid Waste may not be placed in the landfill unless the container is a small container that is designed to hold liquids for use other than storage.

Hazardous Waste – per .1626 (1) (b) (i). Hazardous waste as defined in 15A NCAC 13A 261.3, that is not excluded from regulation as a hazardous waste from conditionally exempt small quantity generators as defined within 15A NCAC 13A 261.5 shall not be accepted at the Buncombe County Subtitle D Landfill.

Inert Debris

Infectious Waste

Liquid Waste per .1626 (1) (b) (iii)

Microbiological Waste

Pathological Waste

Polychlorinated Biphenyls (PCB) per .1626 (1) (b) (ii)

Radioactive Waste

Regulated Medical Waste

Sharps

Additionally, no person shall knowingly dispose of the following solid wastes in the landfill as defined by NCGS 130A309.10 (f):

> Used oil
>
> Yard trash, except in landfills approved for the disposal of yard trash under rules adopted by the Commission. Yard trash that is source separated from solid waste may be accepted at a solid waste disposal area where the area provides and maintains separate yard trash composting facilities.
>
> White goods
>
> Antifreeze (ethylene glycol)
>
> Aluminum cans
>
> Whole scrap tires, as provided in G.S. 130A-309.58(b). The prohibition on disposal of whole scrap tires in landfills applies to all whole pneumatic rubber coverings, but does not apply to whole solid rubber coverings.
>
> Lead-acid batteries, as provided in G.S. 130A-309.70.
>
> Motor vehicle oil filters

Recyclable rigid plastic containers that have a neck smaller than the body of the container, and that accept a screw top, snap cap, or other closure. The prohibition on disposal of recyclable rigid plastic containers in landfills does not apply to rigid plastic containers that are intended for use in the sale or distribution of motor oil or pesticides.

Wooden pallets, except that wooden pallets may be disposed of in a landfill that is permitted to only accept construction and demolition debris.

Oyster shells

Discarded computer equipment, as defined in G.S. 130A-309.131.

Discarded televisions, as defined in G.S. 130A-309.131.

2.6 Receiving Prohibited Waste

The Buncombe County Solid Waste Management Facility only accepts those solid wastes that it is permitted to receive. The County will notify the North Carolina Department of Environment and Nature Resources Division of Waste Management (NCDENR DWM) within 24 hours of attempted disposal of any waste the C&D and Subtitle D landfills are not permitted to receive.

A report shall be prepared of any attempted delivery of waste of which the landfill is not permitted to receive, including waste from outside the permitted landfill service area. The report will be forwarded to:

Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

2.7 Waste Screening Program

The Rule .1626(1)(f) require all MSWLFs implement a program at the facility for detecting and preventing the disposal of hazardous and liquid waste. This program must include, at a minimum:

- Random inspection of incoming loads or other comparable procedures
- Records of inspection
- Training of facility personnel to recognize hazardous and liquid waste.
- Development of a contingency plan to properly manage any identified hazardous and liquid waste addressing identification, removal, storage, and final disposition of the waste.

A copy of the waste screening plan for the Buncombe County Subtitle D Landfill is included in **Appendix 5B** to this Operation Plan.

Section 3 – Cover Material Requirements

Operation Plan

3.1 Daily Cover

In accordance with 15A NCAC 13B .1626 (2), the operator of MSWLF units must cover disposed solid waste with six inches of earthen material (or alternative daily cover (ADC) approved by the Solid Waste Section (SWS)) at the end of each operating day, or at more frequent intervals if necessary, to control disease vectors, fires, odors, blowing litter, and scavenging. The daily cover must:

- be capable of covering solid waste after it is placed without change in its properties and without regard to weather;
- be noncombustible; and
- not include rock fragments that are greater than six inches in diameter.

3.1.1 Wet Weather Operations

During wet weather, the County may develop a wet weather working face. The wet weather working face will be kept as small as possible. At the end of disposal operations, the County will cover in accordance with Section 3.1.

3.2 Intermediate Cover

In accordance with 15A NCAC 13B .1626 (2), the owner or operator of all MSWLF units must place 12-inches of intermediate cover on all areas which will not have additional waste placed on them for 12 months or more, but where final termination of disposal operations has not occurred. The composition standards of intermediate cover shall be the same as for daily cover in addition to being capable of supporting the germination and propagation of vegetative cover.

3.3 Alternative Daily Cover

Three ADCs are described in this section; Posi-Shell, soil/mulch mixture, and tarps. Each ADC shall provide control for disease vectors, fires, odor, blowing litter, and scavenging. Through SWS required demonstration periods from February 5, 2008 to June 5, 2008 and from August 9, 2008 to November 7, 2008, each ADC has been determined to provide equal or better element control as soil.

3.3.1 Posi-Shell

The Posi-Shell Cover System will be used as an ADC on waste disposed at the Subtitle D landfill. Posi-Shell provides a thin cover that hardens over the covered waste surface.

Posi-shell will be used over disposed waste and may be left as cover for up to 30 days. Any areas that have been left for 30 days will be covered with either a lift of waste or soil. Exposed Posi-shell areas will be visually inspected daily and reapplied when necessary.

County personnel will keep a daily log and field sketch detailing disposal areas and dates of posi-shell application. The daily log is provided following this section.

3.3.1.1 Properties of Posi-Shell

The properties of each component of Posi-Shell are available in the Manufacturer's Usage Guide provided as **Appendix 5C**.

3.3.1.2 Cover System Description

As described in the Manufacturer's Usage Guide, the application rate for short-term coverage (overnight cover for daily cover operations) is approximately 8 to 10 square feet per gallon. Assuming the working face is less than one acre (100 feet wide and 400 feet long), the desired load size would be approximately 4,000 gallons. Posi-shell manufacturers may change recipes and County may use newer or better products as they become available. Currently, at a minimum, the Posi-Shell material quantities for daily use should be the following:

- 3,200 gallons of liquid (water or leachate),
- 8 bags (15 lbs each) of Posi-Pak,
- 40 bags (50 lbs each) of PSM-200 setting agent,
- 80 bags (94 lbs each) of optional Portland cement, and
- Optional waste latex paint (quantity per manufacturer's recommendations)

Posi-Pak is a specially designed plastic fiber with a proprietary finish that provides the reinforcement matrix for the finished cover. PSM-200 setting agent is a blend of clay, polymers, and adhesives that provides thickening, lubrication, and adhesion. Portland cement can be used as a binder component which will help neutralize odors and enhances the durability of the cover system.

3.3.1.3 Cover System Application Procedures

Application Procedure

Application of the Posi-shell will generally follow the manufacturer's recommendation and will employ the following minimum procedures:

- The Posi-shell will be applied in two different directions to avoid spray shadow or wind dispersion;
- The Posi-shell will be applied at the end of each working day;
- The Posi-shell surface will be visually inspected on a daily basis for exposed waste and/or inadequate coverage. Inadequate coverage is generally defined as a thickness of less than 1/8 of an inch.

Areas of exposed waste and/or inadequate coverage will receive an additional application prior to operations ending for that day.

Maximum Daily Area Coverage

Based on the May 2007 Airspace Analysis Report:

- Annual 2007 waste disposal rate (MSW only) = 125,000 tons
- Operating days per year = 284 days

- Approximate daily waste disposal rate = 440 tons
- In-place density = 0.50 tons of MSW per cubic yard
- Daily cubic yards disposed = daily waste disposal rate / in-place density = 880 yd3 or 23,800 ft3

The working face will be restricted to the smallest area feasible. The working lift is typically 4 feet high. Based on a working lift thickness of 4 feet, the working face area is 5,400 square feet (daily cubic yards disposed / working lift thickness), which is equal to the daily coverage area.

Daily Depth and Quantity to be Applied

N/A

Average Monthly Volume of Daily Cover

N/A

List of Equipment

Equipment required for the Posi-Shell consists of a standard hydroseeding unit and a towing unit.

Material and Equipment Storage

The material components of Posi-Shell will be housed in the machine shop to minimize the risk of hydration. The spraying equipment will be parked in a County designated area which will not impede daily operations.

Wet Weather Operation

The application of Posi-shell during heavy rain events will be minimized. If Posi-shell is applied during periods of heavy rain, the surface will be visually inspected following the rain event for exposed waste or inadequate coverage.

Contingency Plans

If, for any reason, the County cannot use Posi-Shell as ADC material, soil, a soil/mulch mixture, or tarps will be used.

Screening Criteria

N/A

3.3.2 Soil/Mulch Mixture

A mulch (30% maximum by volume) and soil mixture is used as another ADC material. Mulch will be hauled from the on-site mulching operations and soil will be provided from the County's on-site borrow area. The soil/mulch mixture will be free of petroleum contaminated soils. The materials will be mixed at the borrow area or the working face.

Soil/mulch mixture shall not be used more than five (5) consecutive days. If soil/mulch mixture is used on four consecutive days, soil cover will be used on the following day.

3.3.2.1 Properties of Soil/Mulch Mixture

At the Buncombe County facility, waste segregation occurs at the scale house to prevent the mulch processing of any unacceptable material, additionally the mulch processing operator segregates waste by placing unacceptable material into a dumpster located near the mulching area. Unacceptable

material includes construction and demolition debris, potentially contaminated debris, etc. Since waste segregation occurs prior to the waste processing into mulch, the resulting mulch is considered inert.

3.3.2.2 Cover System Application Procedures

Application Procedure

Application of the soil/mulch mixture will employ the following minimum procedures:

- The mixture will be prepared by combining three (3) loads of mulch and seven (7) loads of soil;
- Mix soil and mulch load and visually verify that the mixture is adequately commingled, ensure that there are no large clumps (3 inches in diameter or larger) of either soil or mulch in the mixture;
- Load and haul soil/mulch mixture to active working face using an articulating truck; and
- Use dozer to cover working face with six inches of soil/mulch mixture.

The surface will be visually inspected on a daily basis for exposed waste and/or inadequate coverage. Areas of exposed waste and/or inadequate coverage will receive additional cover.

Maximum Daily Area Coverage

See Section 3.3.1.3.

Daily Depth and Quantity to be Applied

As stated above, 6 inches of the soil/mulch mixture will be applied to the daily coverage area of 5,400 square feet. Therefore; the required daily quantity of soil/mulch mixture placed is approximately 100 yd3 (Assuming no other daily cover is used).

Average Monthly Volume of Daily Cover

As stated above, approximately 100 yd3 per day of soil/mulch mixture will be used. Assuming 24 working days per month, the average monthly volume of daily cover required for normal operating conditions is 2,400 yd3.

List of Equipment

An articulating truck and dozer will be used for the application process.

Material and Equipment Storage

Any soil/mulch mixture requiring storage will be stored at the borrow area. Mulch stock pile sizes shall not exceed 30 feet in width and 15 feet in height to avoid spontaneous combustion and to maintain a manageable pile size in the event of a fire. Landfill equipment used for ADC procedures will be stored at County designated areas.

Wet Weather Operation

The soil/mulch mixture wet weather operation will be similar to the operation the County currently follows when using soil as daily cover during wet weather.

Contingency Plans

If, for any reason, the County cannot obtain mulch for the on-site processing area for use as ADC material, soil, Posi-shell, or tarps will be used.

Screening Criteria

Each soil/mulch mixture load will be visually inspected prior to transport to the working face to determine if the material is adequately mixed. The load will not be placed if the mixture is not commingled adequately or if foreign material is observed.

3.3.3 Tarps

Tarps will be used as another ADC. The tarps will be placed either manually or by using an automatic tarping machine which uses a spreader bar to lay and roll up the tarps.

Tarps shall not be used more than five (5) consecutive days. If tarps are used on four consecutive days, soil cover will be used on the following day.

3.3.3.1 Properties of Tarps

N/A

3.3.3.2 Cover System Application Procedures

Application Procedure for Manual Placement

Application of the tarp will employ the following minimum procedures:

- Visually inspect working face to ensure that no sharp objects are protruding from the compacted waste which may tear the tarp;
- If necessary, run compacter over any protruding objections;
- Manually roll out tarp and place over working face, the side cables within the tarp and the metal bars on the short ends shall be heavy enough to weigh down the tarp; and
- Place additional tarps as needed to adequately cover working face.

The tarps will be visually inspected following placement to ensure that uplift will not occur. Additional metals bars will be placed if necessary. Soil will be placed over any areas of exposed waste and/or inadequate coverage.

Application Procedure for Equipment Placement

Application of the tarp will employ the following minimum manufacturer's recommended procedures:

- Visually inspect working face to ensure that no sharp objects are protruding from the compacted waste which may tear the tarp;
- If necessary, run compacter over any protruding objections;
- Using an automatic tarping machine, install tarp directly on working face, the side cables within the tarp and the metal bars on the short ends shall be heavy enough to weigh down the tarp; and
- Lay additional tarps as needed to adequately cover working face.

The tarps will be visually inspected following placement to ensure that uplift will not occur. Additional metals bars will be placed if necessary. Soil will be placed over any areas of exposed waste and/or inadequate coverage.

Maximum Daily Area Coverage

See Section 3.3.1.3.

Daily Depth and Quantity to be Applied

N/A

Average Monthly Volume of Daily Cover

N/A

List of Equipment

An automatic tarping machine and/or dozer will be used for the tarp installation.

Material and Equipment Storage

The automatic tarping machine and tarp will be stored in a County designated area that will not conflict with daily haul and disposal operations.

Wet Weather Operation

The tarping wet weather operation will be similar to the operation the County currently follows when using soil as daily cover during wet weather.

Contingency Plans

If, for any reason, the County cannot use tarps as ADC, soil, Posi-shell, or a soil/mulch mixture will be used.

Screening Criteria

N/A

POSI SHELL RECORD SHEET

DATE	WEATHER CONDITIONS	A.D.C.	LOAD(S)	INITIALS

Section 4 – Disease Vector Control Operation Plan

In accordance with 15A NCAC 13B .1626 (3), owners or operators of all MSWLF units must prevent or control on-site population of disease vectors using techniques appropriate for the protection of human health and the environment. Disease vectors are defined as any rodent, flies, mosquitoes, or other animals, including insects, capable of transmitting disease to humans.

Effective vector control measures are applied when necessary. Control of vectors is maintained by application of cover material over the compacted solid waste. This will protect against migration of vectors into and from the landfill. Stagnant ponding water is prevented to control mosquito breeding. Filling in low spots is performed regularly, and if necessary, County mosquito control or a licensed exterminator shall be employed to control vectors.

Section 5 – Explosive Gas Control Operation Plan

In accordance with 15A NCAC 13B .1626 (4), the owners or operators of all MSWLF units must ensure that:

- the concentration of methane gas generated by the facility shall not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components); and,
- the concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary.

Owners or operators of all MSWLF units must implement a routine methane monitoring program to ensure that the above standards are met. A Methane Monitoring Plan prepared in accordance with this rule is located in **Appendix 5D** of this Operations Plan.

Section 6 – Air Criteria

Operation Plan

6.1 State Implementation Plan

In accordance with 15A NCAC 13B .1626 (5), the owner or operator of all MSWLFs must ensure that units do not violate any applicable requirements developed under a State Implementation Plan (SIP) approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended.

All of the SIP requirements are listed in the current Title V Operating Permit for the Subtitle D landfill. The County is in compliance with the Title V Operating Permit thusly are not in violation of any SIP requirements.

6.2 Open Burning of Waste

In accordance with 15A NCAC 13B .1626 (5) (b), open burning of solid waste, except for the infrequent burning of land clearing debris generated on site or debris from emergency clean-up operations, is prohibited at all MSWLF units. Any such infrequent burning must be approved by the Division of Waste Management.

6.3 Fire Protection Equipment

In accordance with 15A NCAC 13B .1626 (5) (c), equipment shall be provided to control accidental fires or arrangements shall be made with the local fire protection agency to immediately provide firefighting services when needed. Fires that break out close to the surface of the fill area should be dug out and smothered with cover material. Deep fires should be smothered out by placing moist soil on the surface and by constructing soil barriers around the fire. Where the smothering technique fails, the burning material must be excavated and smothered or quenched with water once the burning material is brought to the surface. Water is usually not effective unless it can be directly applied to the burning material.

6.4 Notification of Fire

In accordance with 15A NCAC 13B .1626 (5) (d), fires that occur at the MSWLF require verbal notice to the Division of Solid Waste Management within 24 hours and written notification shall be submitted within 15 days. Verbal and written notification shall be submitted to:

Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646
(919) 508-8400

Section 7 – Access and Safety Requirements

Operation Plan

7.1 Landfill Access and Security

In accordance with 15A NCAC 13B .1626 (6) (a), the Buncombe County Subtitle D Landfill provides adequate security by means of gates, chains, berms, fences and other security measures approved by the Division of Waste Management to prevent unauthorized entry.

All vehicles disposing of waste at the facility enter and leave through the access control gate. All waste entering the landfill must be weighed in at the scalehouse where a full-time Scale Operator verifies compliance with operation requirements. Unauthorized vehicle access to the site is prevented around the remaining portion of the landfill property by woods, natural topography, and storm water ditches.

7.2 Attendant

In accordance with 15A NCAC 13B .1626 (6) (b), an attendant is on duty at the site at all times while the facility is open for public use to ensure compliance with operational requirements.

A full-time Scale Operator is located in the scale house during operating hours. The Scale Operator verifies compliance with operation requirements. In addition, a Facility Supervisor is present on-site at all times during operation.

7.3 Access Road

In accordance with 15A NCAC 13B .1626 (6) (c), the access road to the site was constructed for all-weather conditions and maintained in good condition. Potholes, ruts, and debris on the roads will receive immediate attention in order to avoid damage to vehicles. Access roads are regraded as necessary to maintain positive slope for adequate drainage.

7.4 Dust Control

In accordance with 15A NCAC 13B .1626 (6) (d), dust control measures are implemented when necessary. Minimum dust control includes a water truck for wetting of dusty roads. Petroleum products are not used for dust control.

7.5 Signs

In accordance with 15A NCAC 13B .1626 (6) (e), a sign providing information on disposal procedures, operation hours, tipping fee, permit number, and other pertinent information is clearly posted at the site entrance.

In accordance with 15A NCAC 13B .1626 (6) (f), a sign is clearly posted stating that no hazardous or liquid waste can be received.

In accordance with 15A NCAC 13B .1626 (6) (g), traffic signs or markers are provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.

7.6 Waste Removal Scavenging Policy

In accordance with 15A NCAC 13B .1626 (6) (h), the removal of solid waste from the landfill is prohibited unless the County approves and the removal is not on the working face.

7.7 Barrel and Drum Disposal

In accordance with 15A NCAC 13B .1626 (6) (i), barrels and drums are not disposed of unless they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained therein.

Section 8 – Erosion and Sediment Control Requirements

Operation Plan

8.1 Control of Sediment

In accordance with 15A NCAC 13B .1626 (7) (a), adequate sediment control measures shall be utilized to capture and control sediment in order to prevent sediment from impacting wetlands and off-site properties.

Surface water runoff passing through the landfill site is diverted to sediment ponds by the use of ditches, berms, and pipes as shown on the Engineering Plan Drawings. Stormwater sediment ponds shall be constructed in accordance with the approved Sediment and Erosion Control Plan for control of on-site stormwater run off and sediment transport from landfill operation.

The sediment ponds have been designed in such a manner that releases will not overload downstream drainage features or damage adjacent property. Sediment accumulated in the ponds shall be removed as specified in the approved Erosion Control permit. Silt gages shall be installed in all ponds as shown on the Detail Sheets in the Engineering Plan. Ditches require frequent inspection for sediment buildup. At a minimum, the sediment buildup should be assessed after all significant rain events.

8.2 On-Site Erosion Control

In accordance with 15A NCAC 13B .1626 (7) (b), adequate erosion control measures, shall be utilized to prevent excessive on-site erosion of slopes and roadways.

Erosion control measures shall include:

A. Disturbing as little area as practical at any one time for landfilling operations.

B. Seeding/mulching of all disturbed areas commencing as soon as practically possible. Employing erosion netting or sod on steep slopes and other erosion prone areas.

C. Use of earthen berms, hay bales, silt fences, riprap or equivalent devices down- gradient of disturbed areas, stockpiles, around drainage pipes inlets and outlets and at intervals along grassed waterways, until such time as permanent vegetation is established.

D. Placement of riprap at the inlets and outlets of storm water piping.

8.3 Vegetative Cover

In accordance with 15A NCAC 13B .1626 (7) (c), vegetative ground cover sufficient to restrain erosion must be established within 30 working days or 120 calendar days upon completion of any phase of landfill development.

Riprap, haybales, or other acceptable temporary methods of erosion control may be required until permanent cover is established. Areas where final grade has been reached can be stabilized by mulching until a vegetative cover is established. Soil mulching can be achieved using wood chips, straw, hay, asphalt emulsion, jute matting, and synthetic fibers. Mulches allow for greater water retention; reduce the amount of runoff; retain seeds, fertilizer, and lime in place; and, improve soil moisture and temperature conditions.

Temporary seeding shall be applied in accordance with the current NC Erosion and Sediment Control Planning and Design Manual.

Section 9 – Drainage Control and Water Protection Requirements

Operation Plan

9.1 Surface Water Diverted From Operation Area

In accordance with 15A NCAC 13B .1626 (8) (a), surface water shall be diverted from the operational area. Excessive surface water at the working face creates difficulties for maneuvering equipment and prevents the operator from achieving maximum compaction of the waste. To divert surface runoff away from the working face, temporary diversion berms shall be installed on the current lift, up-gradient from the working face and in other locations as dictated by the direction of grade. The area between the temporary berm and the working face should be limited to one acre to prevent excessive ponding. The soil cover in the areas beyond the diversion berms shall be uniformly graded and compacted to prevent the formation of erosion channels. In the event that channels do form, the cover shall be promptly repaired. During the formation of the initial lift of each disposal unit additional measures shall be employed to divert surface water.

For portions of the disposal unit that have not yet received waste, surface water will be diverted by the stormwater segregation system located in the southern half of Phase IV as shown on the Engineering Plan Drawings. Since the surface water that will pond at the stormwater segregation area is clean stormwater, it can pumped from the disposal unit to the stormwater management system.

Prior to disposal activity moving into the southern area, County staff will remove the stormwater segregation berm, tarp, and pumping system.

9.2 Surface Water Shall Not Be Impounded Over Waste

In accordance with 15A NCAC 13B .1626 (8) (b), surface water shall not be impounded over or in waste. Completed areas shall be adequately sloped at a minimum of 4% to allow surface water runoff in a controlled manner.

9.3 Waste Shall Not Be Disposed Of In Water

In accordance with 15A NCAC 13B .1626 (8) (c), solid waste shall not be disposed of in water. Based on design, the minimum four foot separation from the seasonal high groundwater table to the bottom of the liner system will be maintained at all times.

9.4 Leachate Collection and Disposal

In accordance with 15A NCAC 13B .1626 (8) (d), leachate shall be contained on-site or properly treated prior to discharge. An NPDES permit is required for surface discharge prior to discharge of leachate to surface waters.

Leachate generated will be collected and disposed in accordance with the leachate management plan provided in Section 13.

9.5 Leachate Discharge

In accordance with 15A NCAC 13B .1626 (8) (e) (i), MSWLF units shall not cause a discharge of pollutants into waters of the United States, including wetlands, that violate any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402.

In accordance with 15A NCAC 13B .1626 (8) (e) (ii), MSWLF units shall not cause a discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or State wide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act, as amended.

Leachate generated is contained on-site. The management system is discussed in Section 13.

Section 10 – Liquid Restrictions

Operation Plan

Liquid waste is defined as any waste material that is determined to contain "free liquid" as defined by Method 9095 (Paint Filter Liquids Test). A description of how to conduct a paint filter test is included in Section 10.3.

10.1 Bulk or Non-Containerized Liquid Waste

In accordance with 15A NCAC 13B .1626 (9) (a), bulk or non-containerized liquid waste may not be placed in a MSWLF unit unless:

- The waste is liquid household waste other than septic waste and waste oil.
- The waste is leachate or gas condensate from gas recovery derived from the MSWLF unit, whether it is a new or existing MSWLF unit or lateral expansion, is designed with a composite liner and leachate collection system per North Carolina Solid Waste Management Rules (Rule .1624).

10.2 Containerized Liquid Waste

In accordance with 15A NCAC 13B .1626 (9) (b), containers holding liquid wastes may not be placed in MSWLF units unless:

- The container is small and similar in size to that normally found in household waste containing liquid waste,
- The container is designed to hold liquids for use other than storage; and,
- The waste is household waste.

10.3 Paint Filter Test

According to 40 CFR 264.314 and 265.314, the placement of any liquid which is not a hazardous waste in a landfill is prohibited unless the owner or operator of such landfill demonstrates to the Regional Administrator, or the Regional Administrator determines that:

- The only reasonably available alternative to the placement in such landfill is placement in a landfill or unlined surface impoundment, whether or not permitted or operating under interim status, which contains, or may reasonably be anticipated to contain, hazardous waste.
- Placement in such landfill will not present a risk of contamination of any underground source of drinking water.

To demonstrate the absence or presence of free liquids in either a containerized or bulk waste, the following test must be used: Method 9095 (Paint Filter Test). This method is used to determine compliance with 40 CFR 264.314 and 265.314.

To conduct the Paint Filter Tests, a pre-determined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-minute test period, the material is deemed to contain free liquids. The test apparatus and materials are presented in Figure 10-1. The paint filter is required to be a conical paint filter mesh number 60 (fine meshed size). If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 inch of the filter mesh to protrude should be used to support the filter. The funnel is to be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

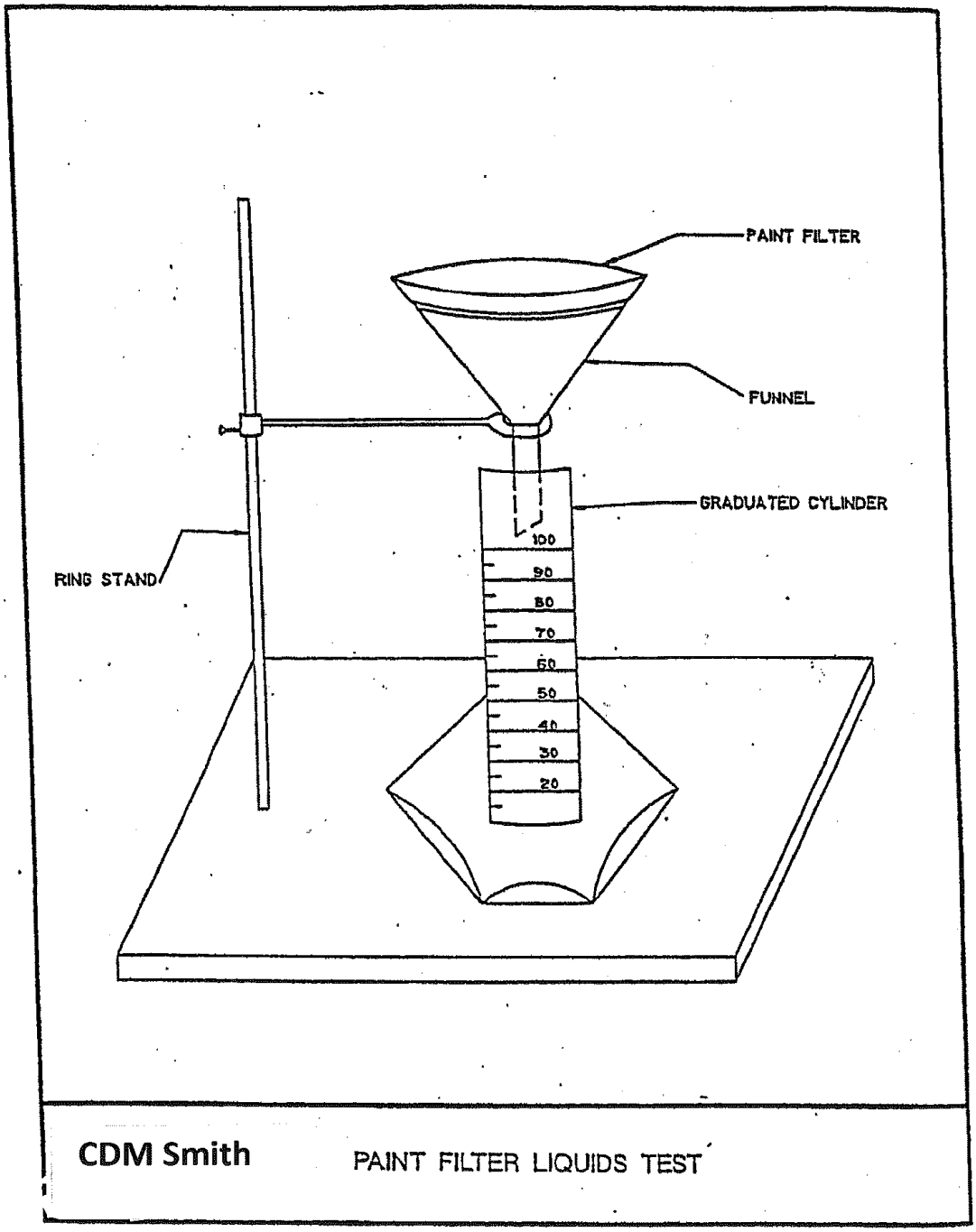
PAINT FILTER
FUNNEL
GRADUATED CYLINDER
RING STAND
100
90
80
70
60
50
40
30
20
CDM Smith
PAINT FILTER LIQUIDS TEST

Figure 10-1

Section 11 – Recordkeeping Requirements

Operation Plan

11.1 Regulatory Requirements

In accordance with 15A NCAC 13B .1626 (10), the owner or operator of a MSWLF unit must record and retain at the facility, or an alternative location near the facility approved by the Division, the following information as it becomes available:

- Inspection records, waste determination records, and training procedures;
- Amount by weight of solid waste received at the facility to include source of generation;
- Gas monitoring (methane monitoring) results and any remediation plans;
- Any demonstration, certification, findings, monitoring, testing, or analytical data required for groundwater monitoring requirements, groundwater monitoring systems, groundwater sampling and analysis requirements, detection monitoring, assessment monitoring, assessment of corrective measures, selection of remedy, and implementation of corrective action program;
- Any monitoring, testing, or analytical data required for Closure and Post-Closure Plans;
- Any cost estimates and financial assurance documentation required by financial assurance requirements;

All information contained in the operating record must be furnished upon request to the Division or be made available at all reasonable times for inspection by the Division. The owner or operator must maintain a copy of the operation plan required by Rule .1625 at the facility.

The County will keep all required documentation either at the scale house or administration building at the facility entrance.

11.2 Permit File

A file containing all appropriate permits should be kept on site. The file shall include the following permits at the minimum:

- Current solid waste permits (Permit to Construct and Permit to Operate);
- Sediment and Erosion Control Permits;
- Applicable NPDES Stormwater Permits; and
- Applicable leachate disposal permit

Section 12 – Spreading and Compacting of Waste Operation Plan

12.1 Solid Waste Working Area

In accordance with 15A NCAC 13B .1626 (11) (a), operators shall restrict solid waste within MSWLF units to the smallest area feasible. The working face is defined as where waste is unloaded, inspected, spread, compacted, and ultimately covered with cover material. The working face shall be wide enough to prevent a backlog of vehicles waiting to unload and to allow adequate working space for landfill equipment.

12.2 Solid Waste Compaction

In accordance with 15A NCAC 13B .1626 (11) (b), solid waste shall be compacted as densely as practical into cells. After solid waste is discharged from vehicles, it shall be inspected for unacceptable items and subsequently spread on the working face not steeper than four feet horizontal to one foot vertical in layers not to exceed 2 feet in thickness. All areas of each layer shall be compacted by at least four passes of a compactor in order to achieve a minimum waste density of approximately 1,000 pounds per cubic yard.

12.3 Controlling Wind Blown Material

In accordance with 15A NCAC 13B .1626 (11) (c), appropriate methods such as fencing and diking shall be provided as needed within the landfill area to confine solid waste subject to be blown by the wind.

Portable litter screens shall be placed downwind of the working face as needed. The screens shall be kept as close to the working area as possible without unduly interfering with landfill operations. The screens shall be moved promptly when required by change in wind direction or progress of the fill. Additional screens or alternative measures may be required to prevent blowing litter from escaping the working area.

At the conclusion of each day of operation, windblown material at the landfill site shall be collected and returned to the working face.

Section 13 – Leachate Management Plan

Operation Plan

This plan has been prepared in accordance with Rule .1626 (12) and the Leachate Spill Corrective Action/Permit to Operate dated July 2008.

13.1 Maintenance and Inspection of the Leachate Pond and Collection System

The maintenance plan has been prepared in accordance with Rule .1626 (12) (a).

13.1.1 System Design

The leachate collection pipes within the municipal solid waste landfill (MSWLF) cells convey collected leachate by gravity to a sump area, where a submersible pump pumps leachate to the lined leachate pond located south of the landfill. Cleanouts are located at the upstream ends of the collection pipes, and at the sump area low point. A submersible pump at the leachate pond can pump leachate through a flow metering vault, to a truck loading station, where tank trucks can be filled to haul leachate to the Metropolitan Sewerage District (MSD) wastewater treatment plant. The pond serves as an equalization basin to absorb peak flows coming from the submersible pumps in each cell.

Each leachate pump station is provided with numerical identification at the leachate pump control panel. One pump control panel is provided for each submersible leachate pump station and is provided in a common enclosure. The control panel is programmed to respond to the liquid level sensor to automatically start and stop pumps in response to changes in liquid levels and to allow manual control of the sump when needed. Each control panel is equipped with visual and audible high level alarms programmed to activate when the leachate levels exceed one foot of head.

13.1.2 Leachate Pond

Inspection of the leachate pond constructed, visible surfaces are made on an annual basis by County staff. Any stored leachate and sediment in the pond is removed so that the pond bottom is visible. The inspector performs a thorough walkover of the pond bottom, surveying the protective layer for any signs of damage, such as cracks, tears, gouges, uplift, or soft spots. Observations are recorded and photographs taken of the areas of concern and placed in the operating record.

If damage or potential problems are discovered, they should be reported to the facility supervisor so that repairs may be made as soon as possible. All repair activities should be recorded. The pond should be put back on-line as soon as possible, to minimize leachate storage time within the sump areas in the cells.

13.1.3 Leachate Collection System

The perforated leachate collection piping will be pressure cleaned and flushed to remove any accumulation of debris, sediment, or organic growth, which will be achieved by inserting a self-propelled, high pressure jetting system into the collection pipes by way of the clean-out ports. Remote camera inspections and cleaning of the leachate collection lines shall occur, following after construction, and at least once every five years thereafter.

The sump control panels are visually inspected during weekly leachate quantity data collection to ensure proper audio and visual alarm operations, reset functions and normal operations performance. Any components not properly functioning shall be promptly repaired or replaced.

Flow meter operation is validated by comparing the recorded flows at each individual sump. Flow meters not properly operating will be removed and replaced.

The operator also, on a weekly basis, visually observes the landfill sideslopes for leachate breakouts and the perimeter berm for staining, which would indicate a potential pipe failure. All exposed leachate piping shall also be monitored for leaks.

In addition to weekly observations, the operator, after substantial rainfall events equal to or exceeding ½ inch, observes the landfill sideslopes for leachate breakouts, leaks or pipe failures.

13.2 Leachate Monitoring

13.2.1 Quantitative Monitoring

Per Rule .1626 (12) (b), the County maintains leachate generation records. Each sump pump station is designed with a flow meter to measure the leachate generated from each cell. The operator reads and registers the leachate flows on a weekly basis at each of the sump pump stations.

The information collected includes the date, time, leachate quantity (in gallons), pump run time, leachate levels, and the name of the person taking measurements. Weekly measurements recorded at each sump pump station are used to detect potential pump malfunction. While taking weekly sump readings the operator also records the leachate level within the leachate pond. Should the leachate pond minimum freeboard level of 12 inches be exceeded, the NCDENR will be notified immediately.

Leachate that is trucked off-site is also recorded.

13.2.2 Qualitative Monitoring

Per Rule .1626 (12) (c) semi-annual leachate quality sampling is required and is completed by the County.

13.2.3 Recordkeeping

All records are maintained at the landfill by the operator and made available to Solid Waste Section (SWS) personnel for inspection when requested.

13.3 Leachate Disposal Approval

Per Rule .1626 (12) (d), approval for final leachate disposal is required. Leachate from the landfill is pumped from the leachate pond to the truck loading station, which fills trucks used to haul the leachate to the MSD sanitary sewer system for final disposal. An approval letter from MSD stating that they will accept the landfill leachate is included in the operating records.

13.4 Leachate Management Contingency Plan

The leachate management contingency plan is prepared in accordance with Rule .1626 (12) (e).

13.4.1 Leachate Sump Pump Station

Should a pump station not appear to be functioning properly, based upon weekly monitoring records, the pump will be removed and evaluated in accordance with manufacturer recommendations. If troubleshooting techniques do not provide a prompt resolution, one of the spare pumps located on-site will be installed in its place and necessary repairs will be made.

Should power be lost at the site, the pump station control panels are equipped with receptacles for a portable emergency generator to operate the pump stations until power is restored. A portable emergency generator will be available within 12 hours and used in the event of a power outage.

13.4.2 Leachate Storage

During periods when components of the leachate pond pump station are inoperative or down for maintenance, or when storm flows are extremely high, excessive leachate will be dealt with using either of two contingency plans.

The storage capacity of the leachate pond is approximately 1,000,000 gallons, when completely full to within 12 inches of the top of the pond liner. This will provide up to 17 days of storage during peak leachate flow periods, and about 69 days storage for average annual daily flows. If surface evaporation rates are considered, even longer storage periods can be achieved. This volume is also adequate to capture the leachate from the peak rainfall event from the five years of rainfall data used in the HELP model leachate projections (assuming several acres of open cell area with only the first solid waste lift installed) and still have reserve capacity for additional daily flows. Therefore, considerable storage capability is provided by the leachate pond for periods of unusually high precipitation or unusual operating conditions.

Should a period of substantial rainfall persist, and the leachate pond approach full stage, the pumping stations can be turned off. The leachate would be temporarily stored in the disposal cells until the level in the pond is adequately reduced. The cells would be monitored daily to ensure that overflow does not occur. If the leachate pond encroaches to within 6 inches of the ponds 12-inch freeboard (18 inches from the top of the pond liner), leachate hauling will be increased to a frequency adequate to deplete the leachate volume in the storage pond to an acceptable level.

Should power be lost at the site, the pump station control panel at the leachate pond is equipped with receptacles for a portable emergency generator, to operate the pumps long enough to control leachate flow volumes. A portable emergency generator will be available within 12 hours of a power outage.

13.4.3 Leachate Breakout

In the event of a breakout, leak or pipe failure, the County will immediately notify SWS and identify the areas contaminated by the breakout/leak/pipe failure, if any. Should leachate collect in a sediment pond or other surface waters, the County will analyze the contaminated water for the Appendix 1 list of constituents and BOD5, COD, phosphate, nitrate and sulfate. The sample results will be forwarded to SWS and used to determine whether the pond or surface waters are impacted by the release.

Response to Comments

Attachment D – Revised Waste Screening Plan

CDM Smith

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Section 5B: 1 – Introduction

Appendix 5B – Waste Screening Plan
Operation Plan

This Waste Screening Plan sets forth the procedures and programs implemented by the solid waste management staff of Buncombe County to identify and safely dispose of unauthorized wastes brought to the County owned landfill. This plan also presents the procedures and policies established by the County that comply with state and federal regulations requiring random waste screening by owners of Municipal Solid Waste Landfills (MSWLF).

Buncombe County solid waste management staff manages the disposal of solid wastes in accordance with state and federal regulations and in a manner that protects the public health, safety, and welfare of the residents of Buncombe County. Some of the standard operating procedures at the landfill are designed to insure that unauthorized wastes, as defined by state and federal regulations, are not landfilled.

Current County programs and procedures fulfill some state and federal regulations for waste screening to detect or prevent landfilling of prohibited or unauthorized solid wastes. Some of these programs and facilities include:

- Hazardous waste awareness certification training for landfill staff
- County owned and operated drop-off facilities for lead acid batteries, yard wastes, white goods, and whole scrap tires

Section 5B: 2 – Overview of Waste Screening Plan

Appendix 5B – Waste Screening Plan
Operation Plan

This Waste Screening Plan presents the standard operating procedures at the County landfill. It presents the procedures and contingency plan that the County will implement to comply with applicable state and federal regulations.

This Waste Screening Plan:

- identifies the federal and state regulatory authority for prohibiting the landfilling of certain categories of solid waste;
- identifies and defines the wastes to which waste screening applies;
- describes the required training for facility personnel; and, describes the designated area to be used to screen waste loads;
- presents the procedures, decisions, and actions which will be taken if a waste load is suspected of containing or is found to contain a waste covered by this plan;
- explains how records of inspections will be kept and how notification of the proper authorities will take place if prohibited waste is discovered; and
- clarifies the financial and legal responsibility of the County and the waste haulers who brings the prohibited waste to the landfills.

Section 5B: 3 – Regulatory Background

Appendix 5B – Waste Screening Plan
Operation Plan

Federal, state, and county regulations each prohibit certain categories of waste from being landfilled. This section presents the regulatory authority prohibiting certain categories of waste from being landfilled and the requirement for waste screening.

5B: 3.1 Federal and State Regulations

US EPA Subtitle D, Subpart C Operating Criteria, 40 CFR Section 258.20 (Procedures for Excluding the Receipt of Hazardous Waste) and North Carolina State Solid Waste Management Rules Title 15A NCAC 13B .1626 (1)(f) require that owners or operators of all MSWLF units to implement a program at the facility for detecting and preventing the disposal of regulated quantities of hazardous wastes and polychlorinated biphenyls (PCB) waste. This program must include:

- random inspections of incoming loads,
- records of any inspections,
- training of facility personnel to recognize regulated hazardous waste and PCB waste, and,
- a contingency plan including notification to authorized state or EPA RCRA Subtitle C administrator if a regulated hazardous waste is discovered at the facility.

5B: 3.2 Materials Prohibited From MSW Landfilling

By North Carolina and federal regulations, a MSWLF shall only accept for landfilling those solid wastes which it is permitted to receive. According to Rule .1626(1)(b), the following wastes are prohibited from disposal at a MSWLF unit:

- Hazardous waste as defined within 15A NCAC 13 A, to also include hazardous waste from conditionally exempt small quantity generators.
- PCB wastes as defined in 40 CFR 761.
- Liquid wastes unless it is household waste other than septic tank waste or waste oil.
- Containers holding liquid waste unless the container is a small container similar in size to those normally found in household wastes.
- Additionally, no person shall knowingly dispose of the following solid wastes in the landfill as defined by NCGS 130A309.10 (f):
    - Used oil

- Yard trash, except in landfills approved for the disposal of yard trash under rules adopted by the Commission. Yard trash that is source separated from solid waste may be accepted at a solid waste disposal area where the area provides and maintains separate yard trash composting facilities.
- White goods
- Antifreeze (ethylene glycol)
- Aluminum cans
- Whole scrap tires, as provided in G.S. 130A-309.58(b). The prohibition on disposal of whole scrap tires in landfills applies to all whole pneumatic rubber coverings, but does not apply to whole solid rubber coverings.
- Lead-acid batteries, as provided in G.S. 130A-309.70.
- Motor vehicle oil filters
- Recyclable rigid plastic containers that have a neck smaller than the body of the container, and that accept a screw top, snap cap, or other closure. The prohibition on disposal of recyclable rigid plastic containers in landfills does not apply to rigid plastic containers that are intended for use in the sale or distribution of motor oil or pesticides.
- Wooden pallets, except that wooden pallets may be disposed of in a landfill that is permitted to only accept construction and demolition debris.
- Oyster shells
- Discarded computer equipment, as defined in G.S. 130A-309.131.
- Discarded televisions, as defined in G.S. 130A-309.131.

5B: 3.3 County Regulations

Buncombe County only accepts materials for disposal it is permitted to receive by the state solid waste permit. This is limited to materials which comply with federal and state regulations as acceptable for MSW landfilling. Special wastes which receive state approval as described in Section 5B: 5 of this plan are accepted.

Buncombe County reserves the right to turn away any waste hauling vehicle containing materials it is not permitted to accept based on federal or state regulations and which in its judgment require special handling and cannot safely be managed by the operating staff of the Buncombe County landfill.

Cardboard disposal is prohibited based on County Ordinance No. 95-1-2. Section III, No. 2., states that corrugated cardboard in trucks, roll-offs, or flat beds which contain more than 5% by weight or volume is prohibited and the hauler will be fined. Also prohibited from disposal are sharps and medical waste.

Sharps generated from a household shall be accepted at the Buncombe County Transfer Station in a specified, puncture proof container. The sharps container is transported to a medical waste disposal

company. Buncombe County Solid Waste Management Facility Landfill does not accept sharps. The Landfill operators and manager have the right to reject properly packaged sharps or treated regulated medical waste for disposal in the landfill, even if state regulations allow landfill disposal of such wastes.

Medical Waste as defined in the Operation Plan is not accepted at the Buncombe County Solid Waste Management Facility's Landfill. If a load contains this material, the generator will be determined, if possible, and will be assessed civil penalties and will be required to cover all costs associated with removal, treatment and safe disposal of such material.

Section 5B: 4 - Applicability

Appendix 5B – Waste Screening Plan
Operation Plan

This Waste Screening Plan and related programs apply to all wastes regulated as hazardous waste as defined by Subpart D of 40 Code of Federal Register (CFR) Part 261; wastes which exhibit hazardous characteristics (including ignitability, corrosivity, reactivity, and toxicity) as defined in Subpart C of 40 CFR 261; wastes which are a mixture of hazardous and non-hazardous wastes; and PCB wastes as defined by 40 CFR Section 761.60.

This plan does not address: residential solid waste; waste that is exempt as a conditional small quantity as defined by 40 CFR Section 261.4(b) and 261.5; or, small quantities of PCB's found in items such as fluorescent ballasts and small capacitors typically found in consumer electric appliances. This plan does not apply to yard waste and scrap tires which are prohibited from landfilling primarily for recycling and waste reduction reasons. This plan does not apply to wastes that have been conditionally approved for landfilling by Buncombe County based on approval by North Carolina Department of Environment, and Natural Resources (NCDENR) through the "waste determination" process as described in Section 5B: 5 of this plan.

Section 5B: 5 – North Carolina Solid Waste Determination Process

Appendix 5B – Waste Screening Plan
Operation Plan

Some industrial and manufacturing solid wastes that may, by definition, be regulated and prohibited from being landfilled can be accepted for landfilling by Buncombe County if determined to be safe by the North Carolina Department of Environment and Natural Resources (NCDENR). A letter detailing the waste determination and the associated appropriate laboratory analysis must be completed by the generator, approved by NCDENR, and submitted to Buncombe County to receive this conditional approval for landfilling. When this waste is hauled to the landfill, the hauler must provide a letter verifying that the County has agreed to accept the waste.

Special waste disposal requires prior approval.

Section 5B: 6 - Training

Appendix 5B – Waste Screening Plan
Operation Plan

The Buncombe County Solid Waste Inspector should be certified by satisfactorily completing SWANA's Landfill Operations Specialist Course or similar. All County solid waste management staff are encouraged to complete this training. The Solid Waste Inspector has been instructed in the procedures, as described in this plan, to follow if hazardous or regulated waste is identified or suspected in a waste load received at the landfill.

Section 5B: 7 – Designated Area for Waste Screening

Appendix 5B – Waste Screening Plan
Operation Plan

Waste screening occurs at the working face of the landfill and in general accordance with the following:

- inside the landfill site on property owned and managed by the County;
- accessible to truck traffic;
- at least 100 feet within the landfill's disposal boundaries; and
- on leveled ground.

Waste loads selected for random screening and suspicious waste loads are visually observed at the working face. The composition of the load is visually observed and documented; if any items are required to be recycled or disposed of separately (such as tires, televisions, paint, etc.), the driver will be asked to offload those in the designated area. If the load contains hazardous or other wastes prohibited from being landfilled, the driver is questioned as to the origin of the load and, if necessary, the originator of such waste will be required to cover all costs associated with removal, treatment, and safe disposal of that waste load as well as any contaminated soil and surrounding natural features which occurred because of the prohibited waste. Verification of proper disposal of the waste and any additional and reasonable testing of the soil and water in the designated area, necessary to insure that no contamination remains, are the legal and financial responsibility of the party who brought the waste to the landfill.

Section 5B: 8 – Identifying Suspicious Waste Loads Via Standard Landfill Operation

Appendix 5B – Waste Screening Plan
Operation Plan

As part of the standard operating procedures at Buncombe County landfill, all drivers of incoming loads are questioned about the content and source of their wasteload. Scale house operators and landfill staff, trained as per Section 5B: 6 to recognize hazardous waste and wastes prohibited from being landfilled, have the authority to:

- detain a waste load from being unloaded at the working face of the landfill,
- request additional information from the driver about the wasteload,
- divert the driver,
- temporarily prohibit the wasteload from being deposited at the working face, and
- contact the landfill supervisor who has the authority to reject the waste load.

The procedure begins with a visual observation by landfill staff and a questioning of the driver as to the contents of the wasteload. Drivers of suspicious loads are asked if they have an approved waste determination letter as described in Section 5B: 5. Files are searched to verify whether or not this letter exists for the load in question. Depending on the satisfactory answering of these questions and the judgment of the landfill staff, either the load is disposed of at the working face or the landfill supervisor is contacted, a waste screening form/record of inspection is completed, and a further screening of the waste load takes place. If a wasteload is suspected of containing hazardous or prohibited materials covered by this plan, the waste hauler and the Buncombe County Solid Waste Inspector are immediately contacted and requested to send an authorized representative to the site of the wasteload. The driver and truck are released as soon as they have adequately completed their sections on the waste screening form and the waste hauler has been reached. If the wasteload was deposited at the working face, the wasteload is not moved or altered. Landfill operations will be moved away from the load until a final disposition can take place. Based on the discretion of the landfill supervisor and the County's Solid Waste Inspector, Buncombe County Emergency Management (BCEM) may be contacted to come to the site and determine if the materials are hazardous or prohibited waste.

If the waste is determined to be non-hazardous and is permitted for landfilling under state, federal, and county laws, the County will absorb the cost for the testing by BCEM. If the waste is found to be hazardous or prohibited, the hauler will be billed for the testing by BCEM and be required to immediately remove the waste and demonstrate to the County and the State that it was disposed of properly. The hauler will also be required to cover all costs associated with site clean-up and verification that the site is safe. If the waste is not removed within 24 hours as required, the County

shall have the waste removed and disposed of properly and bill the waste hauler for all the costs associated with its removal and site cleanup and repair.

Within one business day, the County will notify NCDENR and the waste hauler, make documentation of the load and contents and generator, the attempted illegal disposal of prohibited waste, the actions taken by the County, and the disposition of the waste. All future waste loads from a hauler found to be in violation by attempting to dispose of hazardous and prohibited materials in the Buncombe County sanitary landfill, may be subject to additional waste screening. This additional screening may include screening every load of the hauler who has been previously found to be in violation.

Section 5B: 9 – Random Inspections of Incoming Loads

Appendix 5B – Waste Screening Plan
Operation Plan

While all loads entering the landfill are visually screened by landfill staff, they are generally not inspected in detail. Therefore random inspections are used to provide a reasonable means to adequately control the receipt of prohibited wastes.

5B: 9.1 Selecting Loads for Sampling

In accordance with SWANA training courses, random inspections of incoming loads, including Buncombe County transfer trucks, is based on 1% of weight received per day.

5B: 9.2 Screening the Wasteloads

Waste loads selected for random screening will be visually inspected at the working face. The waste screening form will be completed for all loads selected for screening. Upon answering the necessary questions for the waste screening form and unloading the waste load, the driver and truck may be released. Because this load has been randomly selected for waste screening, this release of the driver and vehicle is not intended to imply the County accepts the waste load.

The waste will be spread over the area for easy visual observation. Care should be used not to break open any containers or drums. Containers and drums that are not easily identifiable or whose contents cannot be seen should be opened by properly trained waste screening personnel. Only trained waste screening personnel, wearing protective safety equipment should come in physical contact with the waste contained in the load selected for screening.

Upon verification that the solid waste passes the screening and is acceptable, Buncombe County will officially accept it for disposal.

All wastes suspected of being hazardous will be handled and stored as hazardous until proven otherwise. Some hazardous and prohibited waste testing at the landfill will be conducted by BCEM if hazard warrants or other registered hazardous waste contractor hired by the County.

5B: 9.3 Procedures

If a waste load is suspected of containing materials covered by this plan, the waste hauler and County Solid Waste Inspector are immediately to be contacted and requested to send an authorized representative to the site of the wasteload. The driver and truck are released when the waste hauler has been reached and the solid waste manager authorizes. Based on the discretion of the landfill supervisor and the County Solid Waste Inspector, BCEM may be contacted to come to the site and determine if the materials are hazardous or prohibited wastes.

If the wastes are determined to be non-hazardous and are permitted for landfilling under state, federal, and county laws, the County absorbs the cost for the testing. If the wastes are found to be hazardous or prohibited, the hauler will be billed for the testing and be required to immediately remove the wastes and demonstrate to the County and the State that they were disposed of properly. The hauler will also be required to cover all costs associated with site clean-up and verification that the site is safe. If the wastes are not removed within 24 hours, as required by the County, the County shall have the wastes removed and disposed of properly and bill the waste hauler for all the costs associated with their removal and site cleanup and repair.

The landfill owner or operator shall notify the Division with 24 hours of attempted disposal of prohibited waste. If a hauler is found to have attempted to dispose of hazardous or prohibited materials in the Buncombe County sanitary landfill, future additional waste screening for that hauler may be required. This additional screening could include screening every load of the hauler who has been previously found to be in violation. The County also reserves the right to refuse all future waste loads from a hauler found to be in violation.

Section 5B: 10 – Records of Inspections

Appendix 5B – Waste Screening Plan
Operation Plan

Figure 5B: 10-1 presents a sample waste screening inspection form. It, or a similar form, will be completed for every wasteload screened through the random inspection program and for every incident where landfill staff suspect a waste load contains prohibited or hazardous waste and the driver cannot verify that these suspicions are false. The form will be completed by landfill staff, waste screening staff, and if appropriate signed by the waste driver. One copy will be kept on file at the landfill where the wasteload was received. If the waste load is found to contain materials that are prohibited or hazardous based on this plan, copies of the form will be sent to the NCDENR and the waste hauler.

Section 5B: 11 – Contingency Plan

Appendix 5B – Waste Screening Plan
Operation Plan

If during a random screening or during regular operation of the landfill, hazardous materials or materials defined by this waste screening plan as dangerous are discovered at the landfill, the landfill supervisor on duty has the authority to contact appropriate emergency personnel (911) and request their immediate action to remove and safely dispose of the prohibited waste. All telephone and written notification will take place within the first business day of the discovery of such materials. A completed waste screening form, letters of notification, and test results will be filed as required in Section 5B: 10.

Section 5B: 12 – Responsibility Party

Appendix 5B – Waste Screening Plan

Operation Plan

Legal responsibility for all waste entering the landfill remains with the waste hauler until such a time that it is determined to be permitted solid waste and is accepted by the County. The County does not accept the legal responsibility for waste which is prohibited from being landfilled in a sanitary landfill. The hauler is defined as the responsible party who attempted to, either knowingly or unknowingly, illegally deposited the prohibited waste in the landfill. The hauler shall be billed by the County for all costs associated with illegal disposal non-acceptable of solid waste. This includes, but is not limited to, costs in testing the waste, removing the waste from the sanitary landfill, for the cost of transporting the waste to an appropriate waste management facility, for the disposal fee, and for all necessary and related site clean-up and testing.

If after testing at the landfill by BCEM or the County's authorized contractor, the waste load is found to be materials which can legally be landfilled, the County will accept legal responsibility for it. The County or their contractor (as per contract agreement) will absorb all costs for testing and removal or disposal of the waste.

If BCEM or the County's authorized contractor, finds that the waste load contains hazardous or regulated materials that should not be landfilled, the County will not absorb the costs for any further testing either at the landfill or at another laboratory. If further testing by other laboratories indicate the materials could legally be landfilled, the County will be assumed to have "acted in good faith" to protect the public health and safety by refusing to landfill the waste. The County will not reimburse any cost associated with removal of the materials from the landfill site or its subsequent testing or disposal.

Section 5B: 13 – Fines and Penalties

Appendix 5B – Waste Screening Plan

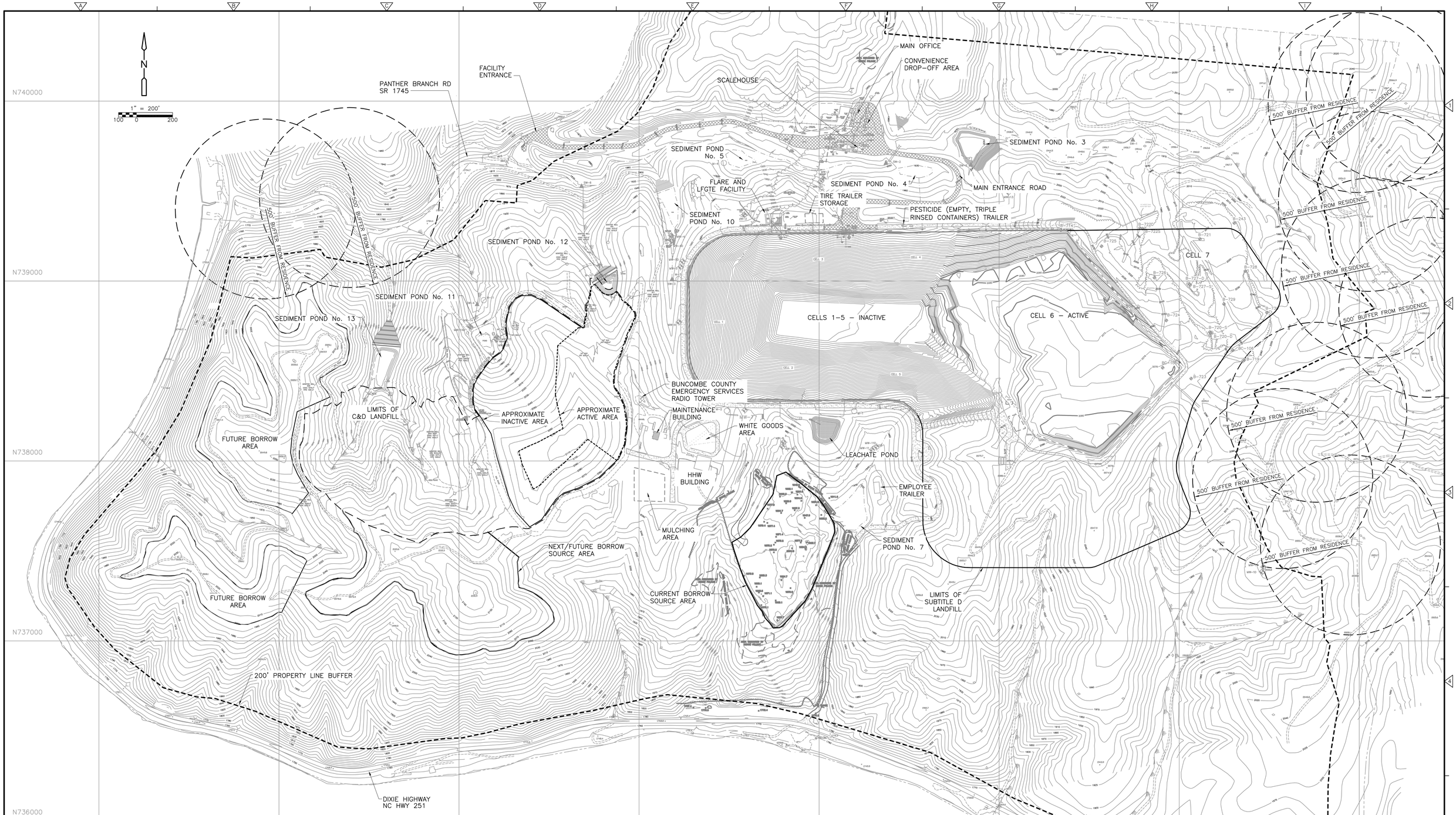
Operation Plan

Buncombe County reserves the right to institute fines and penalties to any person found to have attempted to landfill waste prohibited from being landfilled by state or federal regulations. These fines and penalties are in addition to the costs identified in Section 5B: 12.

Response to Comments

Attachment E – Revised Sheet OP-1

CDM Smith



NOTES

1. SURVEY OF MSW LANDFILL (CELLS 1–5) BY ED HOLMES AND ASSOCIATES DATED APRIL 2008. SURVEY OF MSW LANDFILL (CELL 6) BY ED HOLMES AND ASSOCIATES DATED AUGUST 2010. SURVEY C&D LANDFILL BY ED HOLMES AND ASSOCIATES DATED JUNE 2008. SURVEY OF MSW LANDFILL (CELL 7) BY ED HOLMES AND ASSOCIATES DATED SEPTEMBER 2012.
2. TOPOGRAPHY OUTSIDE OF MSW AND C&D BOUNDARY LIMITS DERIVED FROM AERIAL SURVEY PROVIDED BY AERODYNAMICS, CHARLOTTE, N.C. JULY 1993.
3. NORTH CAROLINA 1983 GRID DATUM.
4. THIS MAP MEETS NATIONAL MAP ACCURACY STANDARDS FOR 1"=100' SCALE, 10' CONTOUR INTERVAL.
5. CONTOURS WITHIN DENSE FOLIAGE AREAS INDICATE DOUBTFUL ACCURACY DUE TO OBSCURED VIEW FROM VEGETATION, SHADOWS, ETC.

LEGEND

- 2010 — INDEX CONTOUR
- PROPERTY LINE
- ASPHALT ROAD (MAIN ACCESS ROAD)
- UNIMPROVED ROAD
- STONE ROAD
- BLEVIN BRANCH (PERENNIAL STREAM)
- TREELINE
- STRUCTURE
- 200' PROPERTY LINE BUFFER
- MW-10 — EXISTING GROUNDWATER MONITORING WELL
- M-3 — EXISTING METHANE MONITORING WELL
- SW-2 — SURFACE WATER MONITORING LOCATOIN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: C. GABEL
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BUNCOMBE COUNTY
NORTH CAROLINA
BUNCOMBE COUNTY SOLID WASTE MANAGEMENT FACILITY
PERMIT AMENDMENT APPLICATION, SUBTITLE D LANDFILL-PHASE IV (CELL 7)
OPERATION PLAN DRAWINGS

EXISTING CONDITIONS

PROJECT NO. 6447-97693
FILE NAME: OP-1.DWG
SHEET NO.
OP-1

PERMIT DRAWINGS - NOT FOR CONSTRUCTION

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Response to Comments

Attachment F – Revised Landfill Gas Monitoring Plan

CDM Smith

Professional Certification

The certification statement below must be signed and sealed by a Professional Geologist and submitted with the Landfill Gas Monitoring Plan.

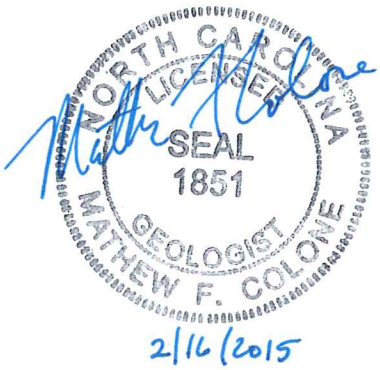
> The landfill gas monitoring plan for this facility has been prepared by a qualified geologist who is licensed to practice in the State of North Carolina. The plan has been prepared based on first-hand knowledge of site conditions and familiarity with North Carolina solid waste rules and industry standard protocol. This certification is made in accordance with North Carolina Solid Waste Regulations, indicating this Landfill Gas Monitoring Plan should provide early detection of any release of hazardous constituents to the uppermost aquifer, so as to be protective of public health and the environment. No other warranties, expressed or implied, are made.

Signed Mathew Colone

Printed MATHEW F. COLONE

Date 02/16/2015

Not valid unless this document bears the seal of the above mentioned licensed professional.



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Section 1
Introduction

Landfill gas (LFG) is a natural by-product of the anaerobic decomposition of landfilled bio-degradable waste. LFG can present a danger to human health and the environment and therefore must be monitored. For these reasons, LFG is regulated by Federal and North Carolina state legislation. This Plan describes the systems and programs needed to fulfill federal and state regulations concerning LFG. In addition, this Plan describes the characteristics of LFG and its migration patterns; and provides alternative methods to control and destroy its harmful components. This additional background information is presented in the Plan to insure it is readily available should a situation occur that requires information and action beyond that described in this Plan.

1.1 Purpose

This Plan fulfills the requirements set forth in Rule .1626(4) for monitoring and controlling LFG. This Plan:

- Describes the necessary LFG monitoring systems,
- Sets forth the monitoring procedures and programs, and
- Identifies the actions needed if levels of methane exceed regulatory limits.

1.2 General Characteristics of LFG and Methane Generation

LFG can be an energy resource as well as a source of environmental pollution. The methane content is what makes LFG valuable as an energy resource. LFG is composed of approximately 50 percent methane in contrast to natural gas which consists of approximately 95 percent methane. LFG programs which focus on recovering gas as an energy resource include collection and extraction systems used to maximize its recovery. What makes LFG a source of environmental pollution is its odor, its potentially explosive properties, and its contribution to global warming. LFG programs which focus on the environmental hazards of landfill gas include collection systems to monitor the migration of gas and control or neutralize its environmental impacts.

LFG is composed of 50 to 55 percent methane (CH4); 45 to 50 percent carbon dioxide (CO2); and, less than one percent non-methane organic compounds (NMOC). These individual gases remain co-mingled and do not naturally separate.

1.2.1 Decomposition Rate and Volume

The decomposition of biodegradable waste begins with aerobic decomposition that typically lasts 3 to 18 months until the oxygen in the landfill is depleted. Following this, the anaerobic phase begins which results in LFG production. This anaerobic phase continues until all of the carbon-based materials are broken down or oxygen is reintroduced. Some historical LFG production generation models suggest that LFG generation continues for as long as 20 years. However, recent LFG recovery projects have demonstrated that production may continue beyond these 20 year estimates.

A reintroduction of oxygen does not stop the production of LFG, it just retards it. The volume of LFG generated over the life of a landfill is a function of the total volume of organic waste in the landfill as Influenced by age, moisture, compaction, and pH.

1.2.2 LFG Migration

The production of LFG creates a positive pressure within the landfill that forces the gas to migrate. LFG is lighter than air and moves upward unless there is a barrier. LFG will move laterally along the path of least resistance or lowest pressure. LFG migration is a function of soil conditions, hydrogeologic conditions, and weather conditions. LFG moves through porous soils, along underground pipes, and through trenches. In some cases the LFG migration path can be observed at the surface through observations of stressed vegetation. In these instances, LFG replaces the oxygen in root structures and eventually destroys the plants.

If tightly capped, LFG will move downward or laterally. Unless LFG is collected, it may migrate laterally, off the landfill site. If the landfill does not have an impermeable cover cap, LFG may migrate upward, through the landfill surface and cause odor and air quality problems. The lining and capping of a landfill does not affect the production of gas, it only improves the potential to collect and control it.

Section 2

Regulatory Background

2.1 Introduction

Because of the real and potential dangers from LFG and the methane in landfill gas, to the public health and safety and to the environment, existing and pending federal and state regulations require owners of municipal solid waste landfills (MSWLFs) to monitor and control it. The regulations are contained in Title 15A NCAC Subchapter 13 B Section .1626 (4).

2.2 Subtitle D and North Carolina Regulations

Methane gas is explosive when present within the range of 5 percent to 15 percent by volume in air. When present in concentrations greater than 15 percent, the mixture will not explode. The five percentage mixture is referred to as the Lower Explosive Limit (LEL) while the 15 percentage concentration is referred to as the Upper Explosive Limit (UEL). The State of North Carolina, through its 15A NCAC 13B .1626 (4) (a) requires that owners or operators of all MSWLF units ensure that the concentration of methane gas generated by the facility does not exceed:

- 25 percent of the lower explosive limit for methane in facility structures; and
- the lower explosive limit at the facility property boundary.

The lower explosive limit means the lowest percent by volume of a mixture of explosive gases in air that will promulgate a flame at 25° C and atmospheric pressure.

Paragraph (4)(b) of Section .1626 of the North Carolina regulations require that a routine methane monitoring program be implemented to ensure that these standards are met. A methane monitoring program typically involves sampling LFG emissions using a specially designed meter through a system of strategically located and specifically designed monitoring wells on a regularly scheduled basis. The time and frequency of monitoring must be determined based on soil conditions, hydrogeologic conditions and hydraulic conditions surrounding the facility, and locations of structures and property boundaries. However, compliance with Subtitle D requires that the minimum frequency of monitoring be quarterly. Buncombe County has been conducting an on-going methane monitoring program for the Subtitle D Landfill. The County has been monitoring methane concentrations in on-site structures and a network of monitoring wells along the perimeter of the landfill property. The County currently conducts the quarterly monitoring with a GEM 2000 landfill gas meter.

Part (4)(c) of Section .1626 of the North Carolina regulations require that if methane levels exceed the specified limits, the owner or operator must:

- immediately take all necessary steps to ensure the protection of human health;
- immediately notify the State (it is assumed that this will be the DWM Compliance officer);
- within seven days of detection, place in the operating record the methane gas levels detected;

- within seven days of detection, provide a description of the steps taken to protect human health;
- within 60 days of detection, implement a remediation plan for the methane gas release; the plan shall describe the nature and extent of the problem and the proposed remedy;
- within 60 days of detection, place a copy of the plan in the operating record of the landfill; and
- within 60 days of detection, notify the State that the plan has been implemented.

Section 3

Gas Control Plan

The gas control plan includes a schedule for reading or monitoring LFG emission levels at designated locations quarterly and a system for reporting the concentration levels.

The requirements for quarterly monitoring, and the plan for actions if readings exceed safe levels should, at a minimum, be based on compliance with federal and state regulations.

3.1 Frequency of Routine Monitoring

Subtitle D regulations require that a quarterly methane monitoring program be implemented to ensure that the concentration of methane or other explosive gases do not exceed regulatory limits.

3.2 Monitoring Well Installation and Construction

Existing landfill gas monitoring wells M-1 through M-4 monitor Cells 1 through 6 of the Subtitle D landfill for LFG migration. Wells M-5 and M-6 will be used to monitor the Cell 7 expansion. Existing and proposed landfill gas monitoring wells, including those associated with future expansions, are provided on **Sheet 1**.

The new monitoring wells will be constructed with 2-inch diameter schedule 40 PVC with threaded couplings with a minimum of 10 feet of 0.010-inch slotted screen with a #2 sand filter pack extending 1 foot above the top of the screen. A 1 to 2-foot thick bentonite seal will be placed on top of the sand filter pack and hydrated. The remainder of the borehole annulus was completed with a Portland cement/bentonite grout. Screen length will be selected based on groundwater and bedrock elevations observed during well installation.

Similar to the existing and proposed groundwater monitoring wells at the facility, the landfill gas monitoring wells will be installed within the dominant drainage features associated with the Cell 7 expansion. Well locations are in or adjacent to low-lying drainage feature areas down-gradient of the landfill unit where seasonal high groundwater elevations are typically within the partially weathered rock or alluvium. Because of the existing topography at the site, well screens will likely be 10-feet or more below the base of the landfill. CDM Smith believes that in the case of the Buncombe County landfill, it is unreasonable to install landfill gas monitoring wells into the fractured bedrock. If groundwater data in fractured bedrock or other indicators such as distressed vegetation indicate that a landfill gas migration problem may exist, additional deeper monitoring wells may be installed to assess gas migration.

All landfill gas monitoring wells will be constructed in accordance with the North Carolina Well Construction Standards described in 15A NCAC 2C and will be completed with locking above grade protective covers and 2-foot by 2-foot concrete pads. Following installation, the wells will be surveyed to State Plane coordinates.

The wellhead caps will be fitted with a stopcock type fitting or quick-connect that is of sufficient quality to facilitate sampling in accordance with industry and federal standards. **Figure 3-1** includes a typical landfill gas monitoring well detail. Flooded wells will be replaced with dry wells, if necessary.

3.3 Staffing

LFG monitoring requires a trained technician using calibrated equipment that is designed to determine the level of methane escaping the landfill through monitoring wells and inside structures on the landfill site. Available options include training existing staff, hiring a special contractor, or hiring and training part-time staff to perform this task.

3.4 Monitoring Procedures

Each regular quarterly monitoring event should begin by checking methane levels in the scale-house and any occupied structure on the landfill site. Next, the non-occupied buildings at the landfill should be checked. Finally, the landfill gas monitoring wells around the Subtitle D landfill should be checked.

The following monitoring procedures, as described in the Solid Waste Section Guidance Documentation for landfill gas monitoring, shall be followed:

- The technician using the landfill gas monitoring instrument must understand the principles of operation and follow the manufacturer's instructions. This includes calibrating the instrument according to the manufacturer's specifications.
- The following shall be included on the top portion of the landfill gas monitoring form: facility name, permit number, type and serial number of gas monitoring instrument, calibration date of the instrument, date and time of field calibration, type of gas used for field calibration (15/15 or 35/50), expiration date of field calibration gas canister, date of landfill gas monitoring event, name and position of sample collector, pump rate of instrument being used, ambient air temperature, and general weather conditions.
- Verification that the equipment was calibrated in accordance with the manufacturer's specifications is required. When determining which field calibration gas to use, take into consideration the expected levels of methane in the landfill gas monitoring wells. If the methane levels are expected to be low, use the 15/15 gas canister (15% CO2/15% CH4). If the methane levels are expected to be high, use the 35/50 gas canister (35% CO2/50% CH4).

For every landfill gas monitoring well, verify sample tube purge prior to each sample taken (should be one minute), the time pumped in seconds (should be at least one minute), barometric pressure, time stabilized reading collected, percent lower explosive limit, percent methane by volume, percent oxygen, percent carbon dioxide, and any observations or comments.

The landfill gas monitoring data form and results should be retained in the operating record unless an exceedance has occurred and/or is requested by the Solid Waste Section.

3.4.1 Monitoring Times

Monitoring times are also important when conducting landfill gas monitoring. Proper landfill gas monitoring should include sampling during times when landfill gas is most likely to migrate. Landfill gas can migrate and accumulate not only in landfill gas monitoring wells; it can also migrate and accumulate in buildings and other structures. Because subsurface gas pressures are considered to be at a maximum during the afternoon hours, monitoring should be conducted in the afternoon or whenever the barometric pressure is low.

Scientific evidence also indicates that weather and soil conditions influence the migration of landfill gas. Barometric pressure and precipitation have significant effects on landfill gas migration. Increased barometric pressure generates decreased landfill gas venting from the subsurface, until the pressure within the subsurface is greater than the atmospheric (barometric) pressure. On the other hand, when the barometric pressure decreases, the landfill will vent the stored gas until a pressure equilibrium is reached. Capping of a landfill can influence the effect of barometric pressure on landfill gas migration. Generally, a more permeable landfill cap will allow greater influence by barometric pressure than a less permeable landfill cap. As a result, landfill gas monitoring should be conducted when the barometric pressure is low and soils are saturated. During the winter season when snow cover is just beginning to melt or when the ground is frozen or ice covered, landfill gas monitoring should be conducted when the barometric pressure is low.

3.4.2 Sampling Procedures

Structures

Any accumulation of landfill gas in structures may be the result of landfill gas migration. The following procedure is a recommended example for conducting landfill gas monitoring in structures at the site, but always read and follow the manufacturer's instructions because each instrument will be different.

Step 1 – Calibrate the instrument according to the manufacturer's specifications. In addition, prepare the instrument for monitoring by allowing it to properly warm up as directed by the manufacturer. Make sure the static pressure shows a reading of zero on the instrument prior to taking the first sample.

Step 2 – Purge sample tube for at least one minute prior to taking reading at each structure.

Step 3 – Monitor ambient conditions within each structure.

Step 4 - Record the stabilized reading for each structure including the oxygen concentration and barometric pressure.

Step 5 – Proceed to the next structure and repeat Steps 2 – 4.

If the methane levels detected within on-site buildings are greater than 25 percent of the lower explosive limit, the technician shall immediately follow the actions presented in Section 4 of this report.

Monitoring Wells

Any accumulation of landfill gas in the landfill gas monitoring wells may be the result of landfill gas migration. The following procedure is a recommended example for conducting landfill gas monitoring at the site, but always read and follow the manufacturer's instructions because each instrument will be different.

Step 1 – Calibrate the instrument according to the manufacturer's specifications. In addition, prepare the instrument for monitoring by allowing it to properly warm up as directed by the manufacturer. Make sure the static pressure shows a reading of zero on the instrument prior to taking the first sample.

Step 2 – Purge sample tube for at least one minute prior to taking reading at monitoring wells. Connect the instrument tubing to the landfill gas monitoring well cap fitted with a stopcock valve or quick connect coupling.

Step 3 – Open the valve and record the initial reading and then the stabilized reading. A stable reading is one that does not vary more than 0.5 percent by volume on the instrument's scale.

Step 4 - Record the stabilized reading including the oxygen concentration and barometric pressure. A proper reading should have two percent oxygen by volume or less. If levels of oxygen are higher, it may indicate that air is being drawn into the system giving a false reading.

Step 5 – Turn the stopcock valve to the off position and disconnect the tubing.

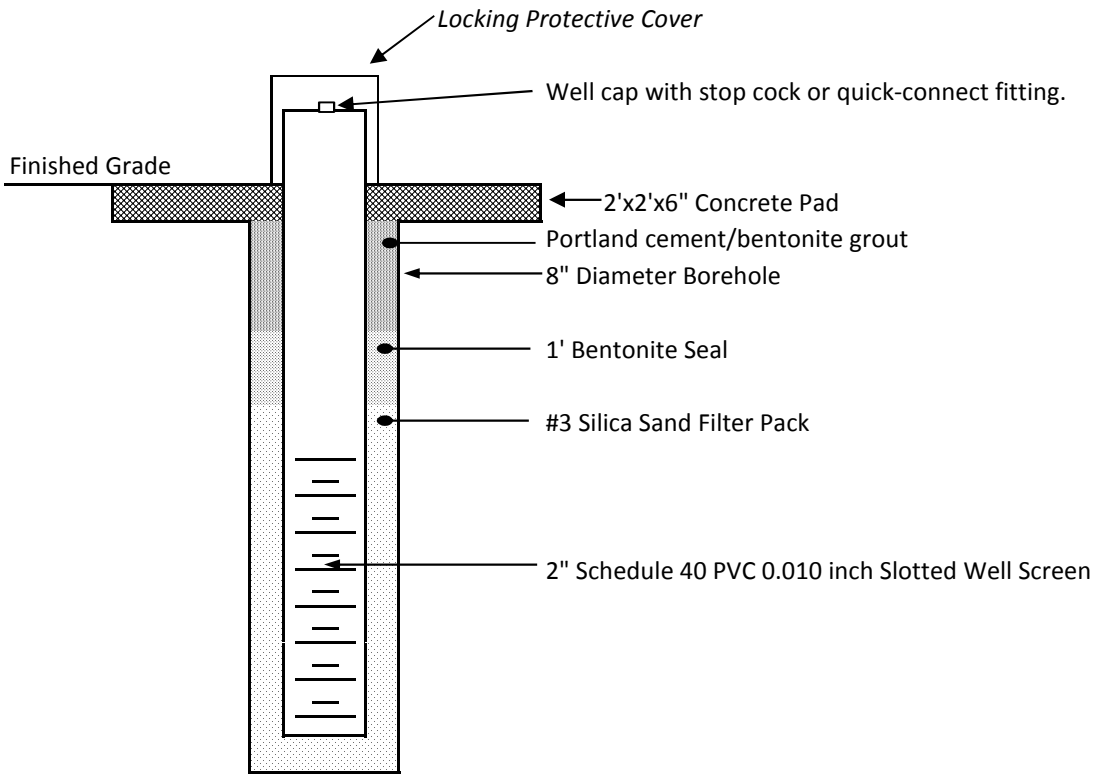
Step 6 – Proceed to the next landfill gas monitoring well and repeat Steps 2 – 5.

If methane levels detected at the wells exceeds the lower explosive limit, the technician shall immediately follow the action plan presented in Section 4.

3.5 Record Keeping

All readings will be recorded on a standard methane monitoring log form. A sample methane monitoring log is provided at the end of this section. These forms will be reviewed and initialed by the landfill supervisor and then placed in the landfill operating records.

These quarterly methane monitoring logs will remain on file at the landfill with other landfill records. These readings should be available for review by the State upon request.



Notes:
Stick-up will extend between 2.5 and 3 feet above finished grade.
Silica sand filter pack will extend at least 1 feet above top of screen elevation.
Well depth and screen length will vary upon depth to groundwater or bedrock.

Figure 3-1
Typical Landfill Gas Monitoring Well Detail

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: _____ Permit Number: _____

Date of Sampling: _____ NC Landfill Rule (.0500 or .1600): _____

Name and Position of Sample Collector: _____

Type and Serial Number of Gas Meter: _____ Calibration Date of Gas Meter: _____

Date and Time of Field Calibration: _____

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

Pump Rate of Gas Meter: _____

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

Instructions: Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume can be converted to % LEL as follows: % methane by volume = % LEL/20

Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes

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 TITLE

N

1" = 200'

100 0 200

LEGEND

1980	INDEX CONTOUR
	INTERMEDIATE CONTOUR
	CELL BOUNDARY
MW-10	EXISTING GROUNDWATER MONITORING WELL
MW-16	PROPOSED GROUNDWATER MONITORING WELL LOCATION
M-3	EXISTING METHANE MONITORING WELL
M-5	FUTURE PROPOSED METHANE MONITORING WELL
SW-2	SURFACE WATER MONITORING LOCATOIN

NOTE:

SURVEY OF CELL 6 WAS PERFORMED IN APRIL 2011 BY ED HOLMES AND ASSOCIATES.

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REV. NO.	DATE	DRWN	CHKD	REMARKS

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DRAWN BY: A. WEISPFENNING
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BUNCOMBE COUNTY
NORTH CAROLINA

BUNCOMBE COUNTY SOLID WASTE MANAGEMENT FACILITY

GROUNDWATER AND METHANE MONITORING WELL LOCATIONS

PROJECT NO. 6447-105257
FILE NAME: SITEMAP2014.DWG

SHEET NO.
1

Section 4
Detection Plan

Both Subtitle D and the North Carolina Solid Waste Management Rules require a contingency plan for action if methane levels exceed the regulatory concentration limits. The plan for action includes the specific step by step actions needed should regulatory limits be detected.

4.1 Actions if Regulatory Limits Detected in Structures

If any structures on the landfill property have detections of methane equal to or greater than 25 percent of the LEL the following actions should be taken:

- the building should be immediately evacuated;
- the landfill supervisor should be immediately contacted;
- immediately notify the Division of Waste Management. The Asheville Regional Office phone number is (828) 296-4521;
- all individuals in and around the structure should be ordered to immediately stop smoking;
- all space heaters and similar appliances should be immediately disconnected from their power source;
- all doors and windows in the structure which gave the reading should be opened to permit the methane to escape;
- as a precautionary measure, the landfill operator will open doors and windows in all structures on the landfill property; and
- equipment used to take the readings should be tested immediately to verify it was giving accurate readings.

The technician will then proceed to take readings at all methane monitoring wells at the landfill. All levels should be verified and recorded on the methane monitoring log form. This information, including the verification that the equipment is providing accurate readings, the current readings, and the levels at all monitoring locations for the previous three quarters should be provided to the County's landfill supervisor. The Buncombe County landfill supervisor will make the decision to return to business as usual; temporarily evacuate the site; or follow the plan proposed in Section 4.3.

4.2 Actions if Regulatory Limits Detected at Monitoring Wells

If any of the methane monitoring wells measure a level equal to or more than the 100 % lower explosive limit (5% methane) as defined by Subtitle D, the technician should:

- immediately contact the landfill supervisor; and

- recheck the methane levels inside the facility structures. (If levels are close to or exceed 25 percent of the lower explosive level the actions in Section 4.1 should be followed.)

Once it is verified that levels inside the buildings are safe, the technician should check and record readings at all remaining methane monitoring wells on the site. In addition, the equipment used to take the readings should be tested to verify it is giving accurate readings.

This information, the current readings, and the levels for the previous three quarters should be provided to the Buncombe County landfill supervisor who will make the decision to: return to business as usual; temporarily evacuate the site; or, follow the plan proposed in Section 4.3.

4.3 Compliance Action Plan

If upon verification as described in Sections 4.1 and 4.2, the methane monitoring levels are equal to or exceed the regulatory limits as defined by Solid Waste Rule .1626(4)(a), the following actions are proposed to both comply with the regulations as well as protect the health and safety of the individuals at or near the landfill site.

4.3.1 Immediate Action

If methane levels exceed the specified limits, the landfill operator or the landfill supervisor will take immediate action to ensure the protection of human health and safety. This will include:

- evacuate all buildings on the site;
- open all doors and windows in buildings on the landfill site;
- notify the Buncombe County Manager's Office about the concentration levels;
- if warranted by the degree of intensity of the methane concentration, check the methane levels in structures near the landfill yet outside the facility boundary;
- if warranted by the degree of intensity of the methane concentration, evacuate the landfill area or evacuate the area adjacent to the landfill;
- notify the State compliance program about the reading;
- begin to identify or narrow down the source of the methane causing the readings exceeding the regulatory limits (i.e. the path that the methane is taking to the monitoring location);
- begin to identify the extent of the methane problem; and,
- as appropriate, begin to take corrective action to control the methane levels in building at the landfill site, at the boundaries to the landfill, and at the landfill site.

4.3.2 Actions Within Seven Days

If methane levels exceed the regulatory limits, in order to comply with the Solid Waste rules, the County must take the following actions within seven days:

- place in the operating records of the landfill, the gas levels detected; and,

- provide a description to the Solid Waste Section of the steps taken to protect human health.

It is also suggested that at this time, the operator begin to develop a plan which:

- describes the nature and extent of the problem, and
- proposes the remedy for the problem.

4.3.3 Actions Within Sixty Days

If methane levels exceed the specified limits, the County must take the following actions within 60 days:

- implement a remediation plan for the methane gas release;
- place a copy of the plan in the operating record of the landfill; and
- notify the appropriate Solid Waste Section official that the plan has been implemented.

4.4 Public Relations and Information

As with any potentially dangerous situation, it is important to keep the public, public service agencies, and the media informed. False information, inaccurate information, or the lack of information concerning potential explosions at a public facility could create panic.

If the County Manager determines that a potentially dangerous situation exists, it is recommended that a one page explanation of the situation be written and distributed to all homes and businesses within a one-half mile radius of the landfill. This should be done within the first two to four hours of making the determination that a potential danger to human health and safety exists. It is recommended that the County Manager appoint one individual to provide information to; the media; the police authorities with jurisdiction in the area; and area medical facilities. Area hospitals and police departments may receive calls once the local media releases the story. Centralizing the flow of information will avoid conflicting information and inaccurate information. Providing detailed and honest facts about the situation being under control is critical.

Response to Comments

Attachment G – Revised Closure/Post-Closure Plan

CDM Smith

CDM Smith

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Raleigh, North Carolina 27612
tel: 919 787-5620
fax: 919 781-5730

May 6, 2014

Mr. Allen Gaither
Environmental Engineer
North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
2090 US Highway 70
Swannanoa, North Carolina 28778

Subject: Buncombe County Solid Waste Management Facility
Buncombe County, North Carolina
Permit No. 11-07
Subtitle D Landfill – Phase IV (Cell 7) – Revised Closure/Post-closure Section

Dear Mr. Gaither:

On behalf of Buncombe County, Camp Dresser McKee & Smith (CDM Smith) is pleased to submit the revised closure/post-closure section of the Permit to Construct Application for Phase IV (Cell 7) of the Buncombe County Subtitle D Landfill. As discussed, the revised potential assessment and corrective action amount requirement was not addressed in the submittal dated April 28, 2014. Please replace the original closure/post-closure section with the attached hard copy. A DVD of the entire permit application with the revised Closure/Post-closure Section is also attached to replace the current DVD found in the front cover of the permit application.

If you have any questions or comments, or need any additional information during your review, please do not hesitate to contact me at (919) 325-3574.

Very truly yours,

NORTH CAROLINA PROFESSIONAL SEAL 023828 ENGINEER KENTON J. YANG
05/06/2014

Kenton J. Yang, P.E.
CDM Smith

cc: J. Creighton/D. Cottrell/K. Smith/S.Hunter, Buncombe County
J. Wiseman, PETRA Engineering
C. Gabel, CDM Smith

Attachments: Closure/Post Closure Section hard copy – Gaither, Smith (2x), Wiseman
Revised Permit Application DVD – Gaither, Smith (2x), Wiseman

Buncombe County, North Carolina

Buncombe County Solid Waste Management Facility Subtitle D Landfill Phase IV (Cell 7) Permit to Construct Application

Part 6 – Closure/Post-Closure Plan

Original Submittal Date: April 2014

Revised: May 2014

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Section 1

Closure Plan

Rule .1617 (a)(1)(E) of the North Carolina Solid Waste Regulation Section 15A NCAC 13B .1600, requires municipal solid waste landfill (MSWLF) owners/operators to prepare a closure plan that describes the steps necessary to partially close a MSWLF at any point during its active life as well as the steps necessary to facilitate final closure. Partial closure refers to the closure of a landfill phase, while final closure is the closure of an entire landfill. In providing this information, the closure plan will assist the County towards achieving the goals of closure implementation, which are: to prevent exposure of the disposed solid waste, minimize leachate generation, and control landfill gas in order to protect public health and the environment. Specifically, this closure plan establishes: design criteria for the closure cap system and the landfill gas collection system, a closure sequence and construction schedule, construction cost estimates, and other important information relating to closure. This plan was prepared in accordance with Rule .1629.

1.1 Final Cover System

In accordance with Rule .1629 (b)(1)(A), the final cover system has been designed to minimize the amount of storm water infiltration into the landfill and to resist erosive forces. The final cover system consists of an erosion layer, protective soil layer, drainage layer, barrier layer, and gas venting layer. The multi-layered cap system will provide a permeability less than or equal to the bottom liner system of the landfill.

The cap system will consist of the following layers (listed from top to bottom):

- A six-inch Erosion (Vegetative Soil) Layer consisting of soil capable of supporting native plant growth;
- An 18-inch Protective Soil Layer to prevent damage due to freezing or puncture to the Drainage and Barrier Layers;
- A Drainage Layer consisting of a geocomposite. The geocomposite is designed to horizontally drain storm water that has percolated through the Erosion and Protective Soil Layers in order to prevent the build-up of water over the Barrier Layer (thus minimizing infiltration);
- A Barrier Layer consisting of a geomembrane; and
- A Gas Venting Layer placed over a compacted soil subgrade.

Due to the highly elastic nature of the geomembrane, the final cover system will accommodate the differential settlement during the post-closure period. Detail A on Sheet EP-12 provides a detail of the final cover system.

1.2 Landfill Gas Collection System

Per Rule .1627 (c)(3)(B) a gas collection system will be installed to minimize uplift pressure exerted on the final cover system. To prevent uplift of the closure cap, horizontal gas collection trenches and vertical gas wells will be used in conjunction with a gas venting layer below the closure cap geomembrane.

The horizontal gas collection trenches consist of perforated plastic pipe surrounded by a clean gravel backfill. Near the surface of the closure cap, a bentonite seal and synthetic boot will be installed around the pipe to prevent storm water infiltration. The length of the trenches will vary from elevation to elevation with the longest trenches positioned near the bottom of the landfill. **Figure 1-1** provides a section detail of the horizontal collection trench design. Generally, the spacing between trenches will be 100-feet horizontal and 30-feet vertical.

As with the horizontal gas collection trenches, a bentonite seal and synthetic boot will be installed around the vertical gas well to prevent storm water infiltration. The depth of the vertical gas wells will extend from final grade to within 15 feet of the bottom liner. **Figure 1-2** provides a section detail of the vertical gas well design. The exact location of the vertical gas wells will be determined at the time of closure. Generally, one vertical well per acre is anticipated to be installed.

Also, negative pressure will be induced in the leachate collection system to eliminate formation of deep gas pockets. The horizontal gas collection trenches, vertical gas wells, and the leachate collection system will be connected to a gas header that will be installed along the perimeter of the landfill that will deliver the gas to the flare station/LFTE facility where the gas will be combusted.

1.3 Estimate of Largest Closure

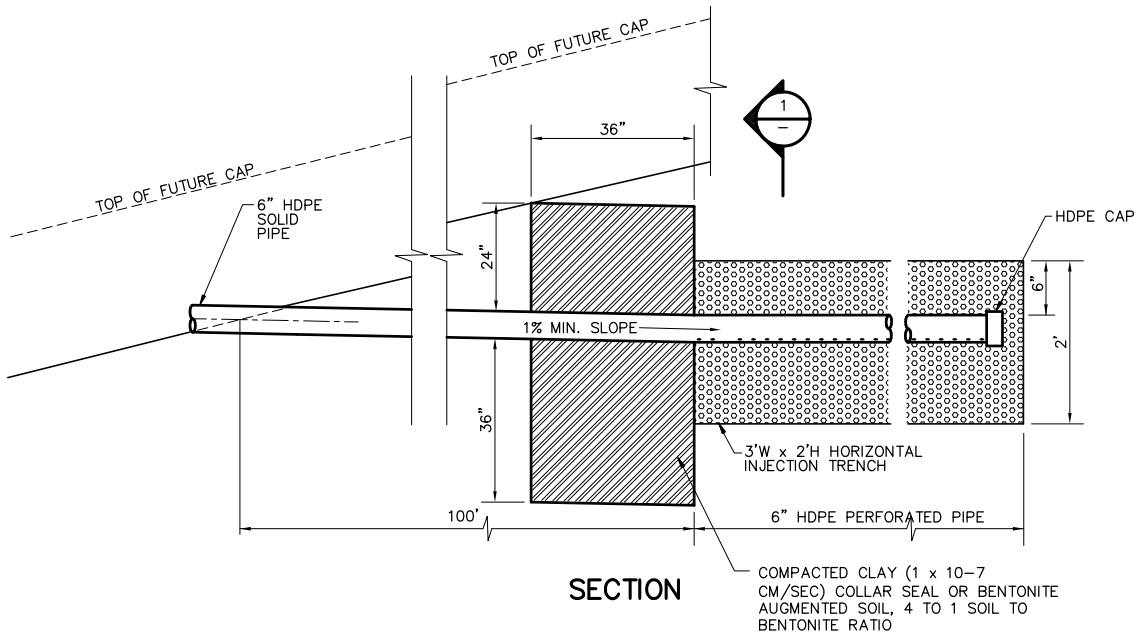
The construction of the landfill will occur in 6 phases, with each phase providing approximately 5 years of capacity. Existing Phases I and III (Cells 1 through 6) are a total of 56 acres, whereas Phase IV (Cell 7) is approximately 13 acres. Thusly, Phases I through IV would be the largest closure to date, covering an area of approximately 69 acres.

1.4 Estimate of Maximum Inventory of Waste On-Site

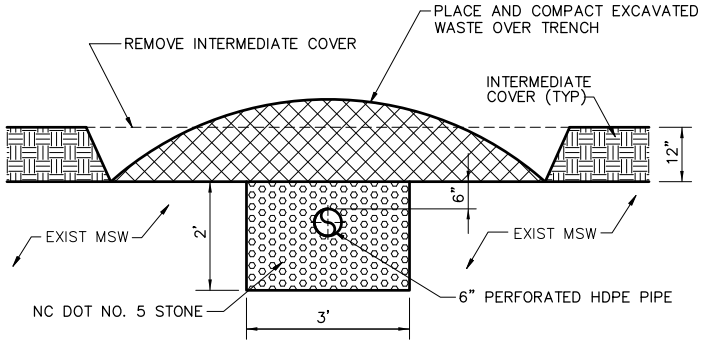
The maximum amount of waste that is expected to be landfilled at the Buncombe County Subtitle D Landfill through final build-out was calculated using the Earthworks Module of Softdesk. The total gross airspace available between the top of base liner protective cover to proposed top of intermediate cover is approximately 11,804,000 cubic yards. This volume is available for waste and intermediate and daily cover.

1.5 Landfill Closure Sequence

The development of the landfill will be integrated so that one phase will be in operation while another phase is being constructed. Additionally, closure activities may be initiated in phases. Although not mandatory, the County may elect to complete a partial closure for an area or may complete a final closure at the end of operations. The steps for implementing the closure process are described in the following subsections. The steps are the same for partial closure and final closure.



SECTION



SECTION 1
NTS

CDM Smith

Figure No. 1-1
HORIZONTAL GAS COLLECTION TRENCH

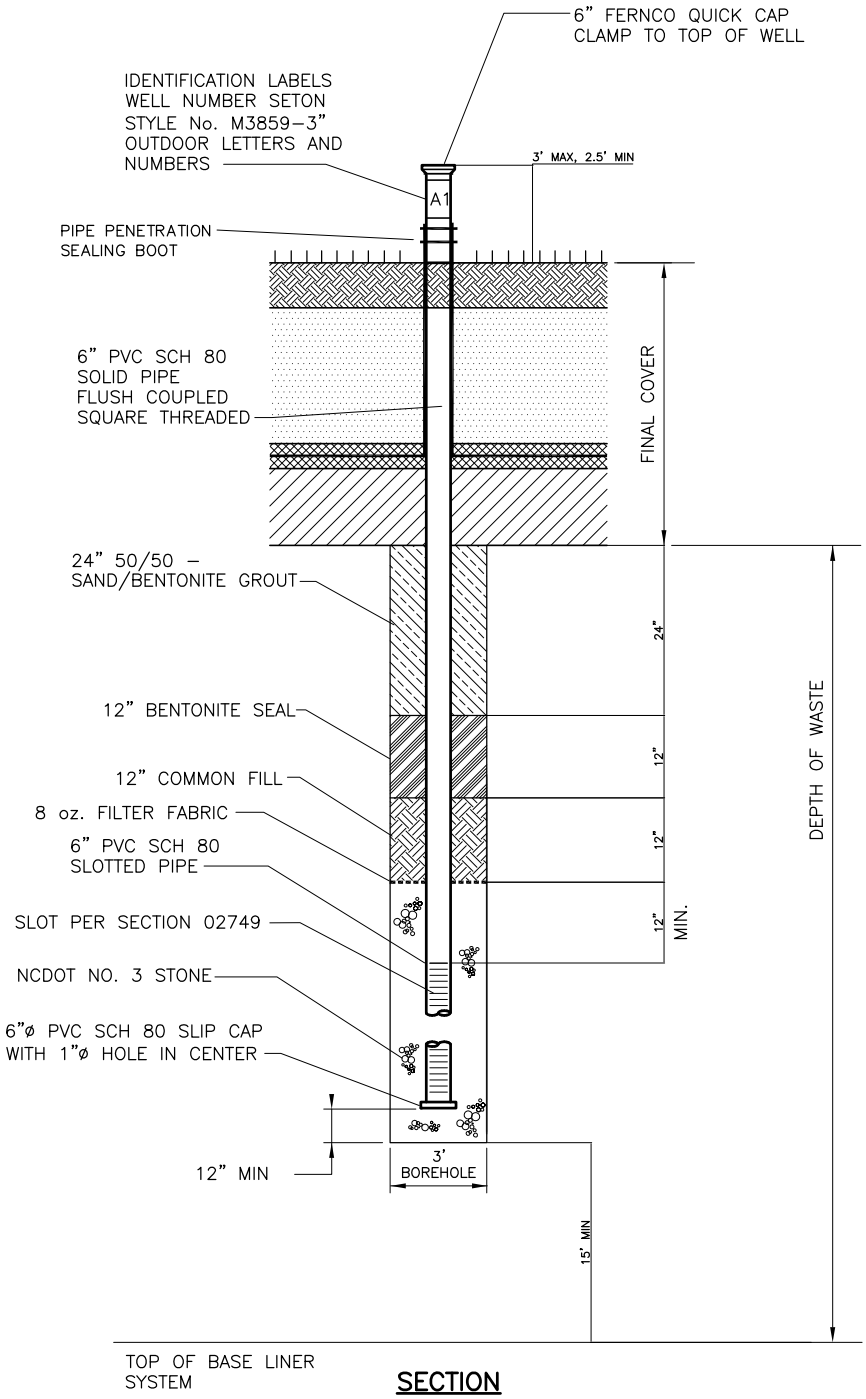


Figure No. 1-2
VERTICAL GAS WELL

1.5.1 Determination of Closure Area

The County will determine the location and acreage of areas to be closed. Closure procedures should not be instituted until an adequate area (approximately 10 acres or more) of the landfill has reached final grade. An estimate of landfill area that has reached final grade should be determined periodically by the surveyor for the site during the active life of the facility.

1.5.2 Notification of Intent to Close

Per Rule .1627(c)(4), once the County has determined that an area will be closed, a Notice of Intent to Close must be placed in the operating record and the Solid Waste Section (SWS) must be notified of the action, including location, acreage, and scheduling of the closure activities. The final cover design, area to be closed, and scheduling of closure activities presented in this Permit Application shall be reviewed and updated as necessary.

1.5.3 Develop Closure Schedule

The County will prepare a schedule for bidding and construction of the closure activities. Per Rule .1627(c)(6), closure activities must be completed within 180 days of beginning closure activities unless the County gains approval from the SWS by demonstrating that the construction period, by necessity, will require an extended schedule and that measures to protect human health and the environment have been implemented in the interim.

1.5.4 Prepare Construction Contract Documents

For the purpose of bidding, construction documents will be prepared for the area to be closed. The bidding documents will allow contractors to estimate the quantity of materials needed to properly implement the closure plan, as well as estimating the construction costs.

1.5.5 Develop Closure Schedule

Once the SWS has reviewed and commented on the closure schedule, the County will prepare a final schedule for bidding and construction of the closure activities.

1.5.6 Selecting a General Contractor

After receiving sealed bids, a contractor will be awarded the job of constructing the final cover according to the approved closure plan. The contractor will be required to complete all closure activities within 180 days of beginning such activities, or as otherwise approved by the SWS.

1.5.7 Securing Borrow Material for Landfill Cover

The material to be used for construction of the closure cap system will be obtained from on-site sources. Once usable on-site material has been exhausted, borrow material will be obtained from off-site sources.

1.5.8 Certification of Closure Construction

Per Rule .1627(c)(7), the project engineer shall provide certification at the completion of construction to verify that closure has been completed in accordance with the closure CQA plan. The County shall place the certification in the operating record and forward a copy of the certification to the SWS.

1.5.9 Record Notation to Deed

Per Rule .1627(c)(8), after final closure of the property, a notation will be placed on the deed to the property stating that the property was used as a landfill facility, and its use is restricted under the closure plan approved by the SWS.

Closure Sequence	
Activity	**Process Date**
Determination of Closure Area and Initiate Closure Process	No later than 30 Days after the final receipt of waste
Notification of Intent to Close	Once an area has been determined to be closed
Develop Closure Schedule for Closure Activities	-
Prepare Construction Contract Documents	-
Develop Closure Schedule	Once the SWS has commented on the closure schedule
Select a General Contractor	After receiving sealed bids
Closure Construction	Closure activities must be completed within 180 Days of beginning closure activities or as otherwise approved
Certification of Closure Construction	At completion of construction
Record Notation to Deed	After final closure of property

1.6 Financial Assurance

Per Rule .1629 (b)(3), a detailed cost estimate based on current costs has been prepared for closure of the largest active area of the landfill facility at any time during the life of the facility and is provided in **Table 1-1**. A copy of the cost estimate has been placed in the operating record. The cost estimate will be annually adjusted to account for inflation and any changes in conditions at the facility or in the design. If conditions call for a reduction in the amount to be financially assured, approval of the SWS must be obtained prior to officially reducing the amount.

Table 1-1

Closure Cost Estimate
Buncombe County Subtitle D Landfill
Buncombe County, North Carolina
May 2014

	Quantity	Unit	Cost	Total
Final Cover System (Phases I through IV)				
Grade Intermediate Cover	69	ac	$ 2,000.00	$ 138,000
Cap System Components (top to bottom):				
a. 6-inch Thick Vegetative Layer	55,660	cy	$ 20.00	$ 1,113,200
b. 18-inch Thick Protective Cover	166,980	cy	$ 17.00	$ 2,838,660
c. Stormwater Geocomposite Drainage Net	333,960	sy	$ 7.00	$ 2,337,720
d. 40-mil Textured LLDPE Geomembrane	333,960	sy	$ 6.00	$ 2,003,760
e. GasVenting Geocomposite Drainage Net (13 acres only, Cell 7 at 3:1)	62,920	sy	$ 7.00	$ 440,440
Temporary Erosion Control	69	ac	$ 1,000.00	$ 69,000
Permanent Erosion Control				
Diversion Berms/Downdrains	69	ac	$ 35,000.00	$ 2,415,000
Landfill Gas Management				
Vertical Gas Wells (69 @ Avg. Depth of 75′)	5,175	vf	$ 125.00	$ 646,875
Horizontal Gas Collection Trenches	6	ea	$ 50,000.00	$ 300,000
Surveys	69	ac	$ 500.00	$ 34,500
Final Landscaping				
Seeding, Fertilizing & Mulching	69	ac	$ 3,000.00	$ 207,000
Subtotal				$ 12,544,155
Bonds and Mobilization/Demobilization (5% of Subtotal)				$ 627,208
Engineering Services, CQA/CQC (12% of Subtotal)				$ 1,505,299
Contingency (25% of Subtotal)				$ 3,136,039

TOTAL	**$ 17,812,700**
COST PER ACRE	**$ 258,155**

Section 2

Post-Closure Plan

Rule .1617(a)(1)(E), of the North Carolina Solid Waste Regulation Section 15A NCAC 13B .1600, requires owners/operators of municipal solid waste landfill (MSWLF) units to prepare a post-closure plan. The purpose of the plan is to provide the necessary information for preserving the integrity of the landfill facility in its post-closure life. This post-closure plan specifically addresses maintenance activities for the closure cap, landfill gas control system, leachate collection system, groundwater monitoring wells, and erosion and sedimentation control system. This plan also addresses certification and financial assurance requirements.

Post-closure care will begin immediately following final closure of the landfill. Post-closure care may be decreased from the minimum time period of 30 years specified in the regulations if the County can demonstrate that the reduced period will pose no threat to human health or the environment. However, the Solid Waste Section (SWS) reserves the right to increase the post-closure care period if it is deemed necessary to protect human health and the environment.

2.1 Maintenance and Monitoring Activities

Per Rule .1629 (c)(1), post-closure maintenance and monitoring activities for the Subtitle D Landfill will include the activities discussed in the following sections.

2.1.1 Final Cover System

Per Rule .1627 (d)(1)(A), maintaining the integrity and effectiveness of the cap system is required. Inspection of the final cover system will take place quarterly and encompass the entire landfill. Items of concern to be noted by the inspector include but are not limited to: signs of erosion (ruts, sediment deposits, etc.), patches of stressed or dead vegetation, animal burrows, recessed areas or ponding, upheaving, leachate seepage stains and/or flowing leachate, cracks in the cap, damaged gas vents and tree saplings (especially species with tap roots). Following each inspection, a summary report of the condition of the cover and the items of concern should be recorded in the post-closure log book of the facility. Areas that require further attention should be photographed and delineated on a map of the facility. These items should also be entered in the log book. Since post-closure inspection personnel will most likely change during the post-closure period, the post-closure log book should be kept in a standardized format that allows for new inspection personnel to easily review the results of past post-closure inspections of the site.

Action should be taken immediately to address any items of concern identified during the inspection. Obvious repair items should be performed under the supervision of the post-closure maintenance manager. If an item of concern requires further study to determine a course of action, the engineer responsible for closure design should be contacted for consultation.

As part of general maintenance, the vegetative cover should be mowed at least twice a year to suppress weed and brush growth. If vegetative cover is not adequate in any particular area, soil amendments should be applied as necessary and the area re-seeded in order to re-establish vegetation. Insecticides may be used to eliminate insect populations that are detrimental to the

vegetation. Animal burrows and eroded or depressed areas should be filled in with compacted soil and reseeded.

2.1.2 Leachate Collection System

Per Rule .1627 (d)(1)(B), maintenance of the leachate collection system is required. Inspection of the accessible items of the leachate collection system (ie. clean-outs, pond, and pump stations) will be made on a quarterly basis. Inspection of the collection lines will be performed concurrent with the annual cleaning service. As part of the quarterly inspection the leachate holding pond will be inspected for damage to the liner system. Depending on seasonal conditions, the pond may be drained so that a thorough inspection may be made (a complete inspection should be made at least once a year). The inspector should survey the pond for items of damage such as tears in the protective layer and/or liner, heaving, and exposed liner in the anchor trench. The outside slope of the pond should be inspected for leachate seepage. Signs of leachate seepage may include damage to vegetation, staining of the soil and vegetation, or actual leachate flow.

The pump stations and flow meter vault should be inspected quarterly by a qualified inspector who is knowledgeable in the construction and operation of pump stations and flow meters. The inspector should manually operate each pump to ensure that they are working properly. The high and low level alarms should be checked at this time, and the overall condition of the wiring and support structures should be inspected also. The flow meter calibration shall be checked (and scheduled for recalibration as required) quarterly and flow meter records shall be monitored and placed in the post-closure log book. The pump control panel shall be fully inspected at the same time, to ensure proper alarm operations, reset functions, and normal operations performance. Run time readings shall be recorded for each pump. A summary report of the condition of the leachate pond, pump station and metering facilities should be recorded in the post-closure log book along with photographs of any items of concern.

The clean-outs should be inspected for damage on a quarterly basis. The protruding portion of each clean-out should be checked for damage and the cap should be checked for proper operation.

If problems with the leachate collection system are discovered, or abnormally high or low flows are recorded from the pump station, assessment and/or repairs should begin immediately.

All piping of the leachate collection system will be pressure cleaned and flushed annually to remove the build-up of biological growth and sediments.

2.1.3 Groundwater Monitoring Wells

Per Rule .1627 (d)(1)(C), maintenance of the groundwater monitoring wells is required. Inspection of the ground water monitoring wells will take place semi-annually during sampling events. The inspection will consist of verifying the condition of the monitoring wells to ensure that they are providing representative samples of the ground water. The inspector should note the following:

1) The total depth of the well should be recorded every time a water sample is collected or a water level reading is taken to check if sediment has accumulated at the bottom. If sediment build-up has occurred, the sediment should be removed by pumping or bailing.

2) If turbid samples are collected from a well, redevelopment of the well will be necessary.

3) The above-ground protective casing should be inspected for damage. The protective casing should be of good structural integrity and free of any cracks or corrosion. The lockable cover and lock should also be checked at this time.

4) The surface seals should be inspected for settling and cracking. If the seal is damaged in any way, the seal should be replaced.

5) The well casing and cap should be inspected. The casing and cap should be of good structural integrity and free of any cracks or corrosion. Any debris should be removed from around the cap to prevent it from entering the well.

The condition of the ground water monitoring system should be recorded in the post-closure log book following each sampling event. Monitoring of the groundwater wells shall be conducted as described in the groundwater monitoring plan.

2.1.4 Landfill Gas Monitoring and Control System

Per Rule .1627 (d)(1)(D), maintenance of the landfill gas monitoring system is required. Inspection of the landfill gas monitoring and control system should take place at least quarterly. The inspection should consist of verifying the condition and operation of the vents, collection well, and monitoring wells. The full depth of all vents, collection wells, and monitoring wells should be checked for blockage that may be caused by settlement or cracks in the casing. The summary of each inspection of the landfill gas monitoring and control system should be recorded in the post-closure log book along with photographs of any items of concern.

Testing of the monitoring wells and on-site buildings shall be conducted as described in the monitoring plan provided in the Operation Plan.

If any vents or wells are not properly working, they should be flushed and pressure cleaned. If all attempts to repair a vent or well are unsuccessful, a replacement will be installed.

2.2 Erosion and Sedimentation Control System

Inspection of the erosion and sedimentation control system should occur semi-annually and after major storm events. During each inspection, the elements of the system including ditches, pipes, ponds, and inlet/outlet structures should be checked for obstructions and damage. The ditches should be inspected for obstructions, erosion of side slopes, loss of vegetative cover, shifting of riprap, excessive buildup of sediment, or any other item that may prevent the proper functioning of the ditch. Drainage piping should be checked for blockages and the inlets/outlets should be inspected for undercutting and rutting. The sediment level in the detention ponds should be measured to determine if removal is required. The condition of the riser/barrel should be checked to ensure that adequate gravel surrounds the riser and that the barrel is not filled with sediment. The berms of each pond should be inspected for stability. Following each inspection, a summary report should be entered in the post-closure log book along with photographs of any items of concern.

Maintenance and/or repairs should be performed as prescribed by the inspectors review.

2.3 Certification of Post-Closure

Following completion of the post-closure care period, a certification verifying that post-closure care was performed in accordance with the post-closure plan and signed by a registered professional

engineer will be made part of the operating record. The County will notify the SWS that the certification has been placed in the operating record.

2.4 Name of Individual Responsible for Post-Closure Maintenance of the Site

Mr. Jon Creighton of Buncombe County will be responsible for operations and maintenance of the site during the post-closure period. Mr. Creighton can be reached at the following address:

Buncombe County
Planning and Development
46 Valley Street
Asheville, NC 28801
828-250-4830

Mr. Creighton most likely will not be employed with Buncombe County throughout the entire 30 year post-closure period. A new individual will be appointed at the time Mr. Creighton's employment with the County ends.

2.5 Planned Use of Landfill After Closure

There are no planned uses for the landfill site after closure. The property will remain County property, maintained by the County, with public access prohibited.

2.6 Financial Assurance

The County will submit a financial assurance package to SWS in accordance with the criteria set forth under Rule .1628. A detailed cost estimate for post-closure care has been prepared and is provided herein (**Table 2-1**) and a copy has been placed in the operating record. The cost estimate is based on 30 years of post-closure care. Each year, the estimate will be adjusted for inflation and any changes to the activities of post-closure care.

In June 2011, Session Law 2011-262 reduced the potential assessment and corrective action (PACA) amount from a minimum of three million dollars to two million dollars. The SWS provided verbal direction stating that post-closure activities as previously included in PACA cost estimates could no longer be included there and had to be included in post-closure cost estimates. In a letter from Ed Mussler dated August 12, 2013(see attached), PACA amounts do not require a cost estimate but must present a minimum of two million dollars for the facility.

Therefore, PACA equates to $2,000,000.

Table 2-1

Post-closure Cost Estimate
Buncombe County Subtitle D Landfill
Buncombe County, North Carolina
May 2014

	Quantity	Unit	Cost	Total
Administration/Inspection/Recordkeeping				
Project Engineer (84 hrs/yr @ $100/hr)	30	yr	$ 8,400	$ 252,000
Technician (68 hrs/yr @ $60/hr)	30	yr	$ 4,080	$ 122,400
Clerical (48 hrs/yr @ $50/hr)	30	yr	$ 2,400	$ 72,000
Monitoring				
20 Groundwater Monitoring Wells Sampled and Analyzed Semi-Annually for 30 years	1200	events	$ 750	$ 900,000
1 Surface Water Locations Sampled and Analyzed Semi-Annually for 30 years	60	events	$ 750	$ 45,000
12 Landfill Gas Wells Sampled and Analyzed Quarterly for 30 years	1440	events	$ 500	$ 720,000
Maintenance				
Fencing, Gates, Signs, etc.	30	yr	$ 500	$ 15,000
Access Roads	30	yr	$ 2,000	$ 60,000
Mowing ($100 per acre, 69 acres)	30	yr	$ 6,900	$ 207,000
Stormwater Structures	30	yr	$ 2,000	$ 60,000
Leachate Collection and Storage	30	yr	$ 5,000	$ 150,000
Final Cover System Maintenance ($400 per acre, 69 acres)	30	yr	$ 27,600	$ 828,000
Groundwater and Gas Monitoring Wells	30	yr	$ 1,500	$ 45,000
Leachate Closeout				
Cleanout and Demo Leachate Pond	1	ls	$ 300,000	$ 300,000
Fees				
Annual Permit Fee	30	yr	$ 1,000	$ 30,000
Subtotal				$ 3,806,400
Contingency (15%)				$ 570,960

TOTAL	**$ 4,377,360**
ANNUAL COST	**$ 145,912**