

CDM Transmittal



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To: ~~Zinith Barber~~
Organization/Address: NCDENR – Solid Waste Section
 401 Oberlin Road Suite 150
 Raleigh, North Carolina 27605-1350

From: Mat Colone
Date: March 8, 2010

Re: Buncombe County Substantial Amendment and Phase 5 PTC Application
 Response to Comments – Landfill Gas Monitoring Plan

Job #: 6447-65973

Via: Mail: XX Overnight: Courier:

Enclosed please find:

For your information	
For your review	X
For your signature	

Approved	
Approved as noted	
Returned to you for correction	

Message:

Zinith,

Attached, please find 1 copy of the Response to Review Comments from your letter dated February 12, 2010. The response letter includes applicable revisions and attachments. In addition, I have included a CD with a PDF of the letter. I have also forwarded one hard copy each to Ed Mussler, Mark Poindexter, Allen Gaither and Andrea Keller.

I hope that you find the additional information and revisions sufficient to answer your questions and address your comments. If you have any questions, please feel free to call me at 919 787-5620 or email to colonemf@cdm.com

Thanks,

Mat

Signed



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March 5, 2010

Mr. Zinith Barbee
Solid Waste Section
North Carolina Department of Environment
and Natural Resources
401 Oberlin Road
Suite 150
Raleigh, North Carolina 27605-1350

Subject: Site Hydrogeologic Report, Design Hydrogeologic Report, Water Quality
Monitoring Plan, and Landfill Gas Monitoring Plan
Buncombe County Solid Waste Management Facility
Permit to Construct Application
Substantial Amendment and Phase 5
C&D Landfill
Response to Review Comments
Permit No. 11-07

Dear Mr. Barbee:

Camp Dresser & McKee (CDM), on behalf of Buncombe County, is pleased to submit this letter in response to the comments received in your letter dated February 12, 2009 (Doc ID 9634). Although not stated in the February 12th letter, CDM assumes this letter replaces your letter dated December 30, 2009 (Doc ID 9082) and includes responses to the comments presented in the February 12th letter.

This letter contains responses and revisions as they apply to the Landfill Gas Monitoring Plan. The comments are addressed individually with discussions and references within this letter and the attachments. Solid Waste Section comments are provided in italics with CDM response directly following. A complete revised Landfill Gas Monitoring Plan is attached.

Section 1

- 1. Revise the introduction to include the following information. Insert "aerobic" in the discussion to account for conditions in which explosions ignite and fires propagate. Identify gases expected to be generated from waste at this type of landfill. Correct the statement in which "no structures" are reported, since structures depicted on engineering drawings contradicts the statement.*

RESPONSE:



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- 1a. A sentence regarding aerobic conditions and the relation to ignitability and fire hazard has been added to Section 1.
 - 1b. A discussion was added to Section 1 identifying methane and hydrogen sulfide as gases that could potentially be generated from wastes in a C&D landfill. However, given the type of waste placed in a C&D landfill, the presence of methane is unlikely. Also, the amount of drywall in the Buncombe County waste stream that could potentially generate hydrogen sulfide is minimal.
 - 1c. This sentence has been deleted. As stated in the report, the structures shown on the engineering drawings are currently monitored as part of the approved Subtitle D landfill gas monitoring plan. This plan is intended to monitor the C&D landfill only.
- 1.2 *Include in the discussion how the composition of C&D landfill gas varies from MSW landfill gas, and list asphyxiation among the effects of "pollution" from landfill gas.*

RESPONSE: Section 1.2 has been revised to the following: "Landfill gas from MSW landfills is typically composed of 50 to 55 percent methane; 45 to 50 percent carbon dioxide; and, less than one percent non-methane organic compounds. These individual gases remain co-mingled and do not naturally separate. Because C&D wastes do not contain large quantities of organic matter, methane and carbon dioxide should not be a concern. However, if a significant amount of gypsum wallboard is present in C&D waste, hydrogen sulfide may potentially be produced, particularly if moisture is introduced into the waste." For the purpose of this response and the revised C&D landfill gas monitoring plan, "landfill gas" will include: Methane, hydrogen sulfide, carbon dioxide, carbon monoxide, oxygen, and nitrogen (as balance gas).

Asphyxiation has been added to the discussion of potential effects of pollution from landfill gas.

Section 2

- 2.1 *Two revisions are necessary. Somewhere in the section: one, list Regulation 15ANCAC 13B .0554(f) to emphasize submission of "any other monitoring plan or program" and clarify that monitoring is not solely for methane; two, explain that the generation of hydrogen sulfide and/or other gases is anticipated more than methane, unless there are particular reasons for high methane emissions too.*

RESPONSE:

- 2.1a A statement addressing Rule .0544(f) has been added indicating that the Landfill Gas Monitoring Plan is part of the Monitoring Plan for the C&D landfill. In addition to the



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Landfill Gas Monitoring Plan, the Facility Monitoring Plan includes the Water Quality Monitoring Plan.

2.1b Hydrogen sulfide has been added as a potential gas of concern for the C&D landfill.

Section 3

3. *In the introduction, replace "methane" with "landfill gas". In the second paragraph, explain that both federal and state regulations apply to the landfill.*

RESPONSE: The introduction stated landfill gas correctly. A sentence stating that both federal and state regulations apply to the landfill has been added.

3.1 *Replace "methane" with "methane gas or other explosive gases". Methane is stated in the cited "Rule"; however, in the regulation containing that "Rule" is also "other explosive gases" and "mixture of explosive gases in air that will propagate a flame".*

RESPONSE: Section 3.1 has been revised accordingly.

3.2 *In both paragraphs, replace "methane" with "methane and other explosive gases".*

RESPONSE: Section 3.2 discussed personnel and staffing and was not applicable to the Plan as discussed in the Solid Waste Section rules. As such, it has been removed entirely. Following portions of Section 3 have been re-numerated accordingly in the revised Plan, however, for the purpose of this response letter they are discussed as referenced in the SWS review comments.

3.3 *Three revisions are necessary. One, in the first sentence add that "the instrument" will be calibrated according to the manufacturer's instruction. Two, in the first and second paragraphs replace "methane" with "landfill gases". Three, correct the statement about structures and report that they are adjacent to the landfill.*

RESPONSE:

3.3a The first sentence has been revised accordingly.

3.3b All references to "methane" have been replaced with "landfill gas," where appropriate.

3.3c This sentence has been deleted. Structures are currently monitored under the approved monitoring plan for the Subtitle D landfill.

3.3.1 *Required are several revisions to the text and referenced figure. One, either delete the last sentence in the section on page 3-1, since the referenced well is not pertinent to the current monitoring plan, or*



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show the well on Sheet 1 and include it in the plan for Phase 5. Two, throughout the section, replace "methane" with "landfill gas". Three, specify that well depths will equal the thickness of waste strata. Four, explain that all the vadose zone, including bedrock above the watertable, will be screened; that screens will extend to seasonal high water elevations; and flooded wells will be replaced with dry wells. Five, specify well joints to be connected using threaded couplings in lieu of slip couplings, screwed couplings, and glued couplings. Six, specify for wellheads caps with a stopcock type valve that controls gas flow, that have a barb connection fitting the sampling instrument specified in the plan, and are of sufficient quality to facilitate sampling and calibration in accordance with industry and federal standards.

RESPONSE:

- 3.3.1a The last sentence on page 3-1 has been removed.
- 3.3.1b Throughout the section, "methane" has been replaced with "landfill gas" as appropriate.
- 3.3.1c Well depths equal to thickness of waste strata is not practical for the Buncombe County C&D landfill. The C&D landfill is a valley fill and there is little to no excavation beyond natural topography. Based on the topography, the base grades of the C&D landfill, the filling sequence and geology at the C&D landfill, the top of well casing elevations will be lower than the base of the C&D landfill.
- 3.3.1d At the C&D landfill, selected 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. The Buncombe County C&D landfill is being constructed such that there is little to no excavation and the bottom of waste will be at or near existing grade. As such, well screens in some cases will be 50-feet or more below the base of the C&D landfill. CDM believes that in the case of the Buncombe County C&D 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. Flooded wells will be replaced with dry wells, if necessary.
- 3.3.1e Reference that wells will be constructed with threaded joints has been added.



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3.3.1f Wellheads will be fitted with a quick-connect stop-cock-type fitting that is of sufficient quality to facilitate sampling in accordance with industry and federal standards. Figure 3-2 has been revised to show the wellhead completion.

3.3.2 *Three revisions are necessary. One, everywhere in the section, replace "methane" with "methane and other explosive gases". Two, since specifying a particular instrument, state that, at a minimum, common landfill gases detectable by that instrument -CH₄ and H₂S -will be measured. Three, since conveying a sampling plan, explain that wells compromised by flooding will not be sampled.*

RESPONSE:

3.3.2a Throughout the section, "methane" has been replaced with "landfill gas," as appropriate.

3.3.2b The section has been revised to indicate that a GEM-2000 landfill gas meter or equivalent and an Industrial Scientific M-40 4-gas meter or equivalent will be used to monitor landfill gas in the wells. The 4-gas meter will be attached to the exhaust port of the GEM-2000. The GEM-2000 will detect CH₄, CO₂, O₂, and the 4-gas meter will detect CH₄ LEL, H₂S, CO, and O₂.

3.3.2c Given the historical groundwater data at the C&D site, it is not anticipated that well flooding will be an issue. If, however, it is determined that a well is flooded above the well screen elevation, that well will not be sampled and a new dry well will be installed in its place.

3.4 *Replace "methane" with "methane and other explosive gases".*

RESPONSE: Section 3.4 has been revised such that "methane" has been replaced with "landfill gas," as appropriate.

Sheets

Sheet 1 - Show more monitoring. Space landfill gas monitoring wells no further than 500 feet apart along a perimeter around the waste boundary. Because the landfill contains no excavation beside which wells can be installed, show wells on the nearest high elevations-ridges, knolls, etc-adjacent to waste placed in valleys and low terrain. Show at least one well among the structures next to the landfill. Show wells placed on the review boundary already depicted and utilized on the drawing. If you have any questions, please contact me.

RESPONSE: CDM has installed monitoring wells M-10 and M-11. Well locations are provided on the revised Figure 3-1. Current well spacing is approximately 650 feet. Well locations were selected based on the topography and the fact that the drainage features act as preferential



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pathways for both groundwater and gas. Arbitrary well placement at 500-foot intervals is not practical for this site. Additional wells are not necessary to the east of the C&D unit, as there are currently wells between the C&D and the Subtitle D landfill that are monitored under the approved Subtitle D plan. Adjacent wells are shown on Figure 3-1.

Placement of a monitoring well adjacent to a structure is not an appropriate way to monitor structures. As stated previously, the structures are currently monitored under the approved Plan for the Subtitle D landfill. As such, quarterly monitoring is conducted within the structures themselves. No additional monitoring locations are necessary.

The review and compliance boundaries shown on Figure 3-1 are in reference to groundwater and have been removed. According to Rule .0544(d)(1)(B), the owner or operator of the landfill must ensure that the concentration of methane or other explosive gases does not exceed the lower explosive limit for methane or other explosive gases at the facility property boundary. The existing wells at the C&D landfill are approximately 125-feet from the landfill. The location of these wells will facilitate early detection of landfill gas migration, if present, before it reaches the facility property boundary.

Figures

Figure 1 - Revise the detail to convey applicable criteria listed in comment for Section 3.2.1.

RESPONSE: Figure 3-2 has been revised to show a well cap with a quick disconnect sampling port, as described in the revised Section 3.3.1.

Forms

Revise the forms. Form 1 is entitled "Methane Monitoring Log Form"; Form 2, "Methane Monitoring Data Sheet". Neither form specifies recordation of constituents other than methane; therefore, both should be revised for recording other explosive gases at the landfill.

Form 1 Everywhere replace "methane" with "methane or other explosive gases", and, in Item #1, list each well instead of total number of wells.

Form 2 Three revisions are necessary. One, in the title, replace "methane" with "methane or other explosive gases". Two, list the wells of a revised landfill gas monitoring plan. Three, expand the table to include measured explosive gases listed in comment for Section 3.3.2.

RESPONSE: Both Page 1 and 2 of the Form have been revised to read "Landfill Gas Monitoring Form." References to "methane" on Page 1 have been revised to "landfill gas."



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As mentioned, the Page 2 title has been revised to read "Landfill Gas Monitoring Form." The current revised well list (M-10 and M-11) has been updated accordingly. In addition to %CH₄ and % LEL CH₄, columns have been added for H₂S, %CO₂, %O₂, and %N (as balance gas).

Section 4

In the introduction, replace "methane" with "landfill gas".

RESPONSE: "Methane" has been replaced with "landfill gas" as requested.

4.1 Everywhere in the section, replace "methane" with "landfill gas".

RESPONSE: "Methane" has been replaced with "landfill gas" as requested.

4.2 Replace "methane" with "landfill gas."

RESPONSE: "Methane" has been replaced with "landfill gas."

4.2.1 Everywhere in the section, replace "methane" with "methane and landfill gas".

RESPONSE: "Methane" has been replaced with "landfill gas" throughout the section.

4.2.2 See comment for Section 4.2.1.

RESPONSE: "Methane" has been replaced with "landfill gas" throughout the section.

4.3 Include asphyxiation from landfill gases in the "dangerous situation" about which "the public, public service agencies, and the media" will be informed. Also, include the SWS among the notified agencies.

RESPONSE: Asphyxiation from landfill gases has been included in the dangerous situation about which public notice will be provided. The SWS has been added to the distribution list.

Section 5

In the introduction, replace "methane" with "landfill gas".

RESPONSE: Section 5 has been removed.

5.1, 5.11, 5.1.2 Understood is that this option pertains to controlling releases from interior wells. However, the option is already the proposed landfill operation. Interior wells are already "passive venting wells" comprising a "passive removal system" described in the application. Hence, should that system fail, remedial options will begin with addressing features inherent in that design-inadequate pressure in the



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landfill, air intruding the system, untreated atmospheric releases, etc. Also, installing trenches as proposed in the option will necessitate destruction of the landfill cap and may require a permit modification with a fee. That proposal will require review by a SWS environmental engineer. Therefore, options for controlling landfill gas releases should either address failure of the passive removal system presented in the application, or conversion the system to an active gas collection system. Propose an option that accomplishes one of these objectives and relate its effect to landfill gas monitoring.

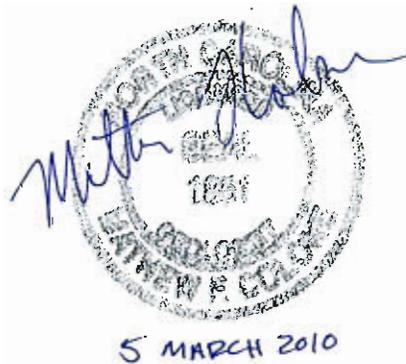
Section 5 was intended to provide options for remediation for landfill gas migration if necessary, and was not intended to serve as Corrective Action Plan. If remediation is required, a Plan with the best alternative will be provided, as described in Rule .0544(d)(3)(C). Section 5 has been removed.

We hope that you find that the additional information and revisions provided in this letter sufficient to answer your questions and address your comments. If you have any questions, please do not hesitate to contact me at (919) 787-5620 or by email at colonemf@cdm.com.

Very truly yours,

Mathew F. Colone, P.G.
Camp Dresser & McKee

cc: Ed Mussler , SWS
Mark Poindexter, SWS
Allen Gaither, SWS Asheville Regional Office
Andrea Keller, SWS Asheville Regional Office
Jerry Mears, Buncombe County
Kristy Smith, Buncombe County
Kenton Yang, CDM
File



Attachment

Landfill Gas Monitoring Plan

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Landfill Gas Monitoring Plan – C&D Landfill

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Section 1

Introduction

Landfill gas (LFG) is a natural by-product of the anaerobic decomposition of landfilled bio-degradable waste. Under aerobic conditions, LFG can ignite and propagate fires, presenting 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. Methane and hydrogen sulfide are two gases that could potentially be generated from wastes in a C&D landfill. Since this plan is for the C&D landfill, it is noted that LFG, particularly methane, generation is expected to be minimal based on the lack of organic matter in the waste stream. Also, the amount of drywall in the Buncombe County waste stream that could potentially generate hydrogen sulfide is minimal.

This Plan is intended for the C&D Landfill only. An explosive gas control plan is already in-place for the Subtitle D Landfill. The Plan for the C&D Landfill includes LFG monitoring at or near the facility boundary through monitoring wells. All structures at the Site are monitored under the plan already in place for the Subtitle D landfill.

1.1 Purpose

This Plan fulfills the requirements set forth in Rule .0544(d) for monitoring LFG. This Plan:

- is intended for the C&D Landfill only,
- describes the necessary LFG monitoring systems,
- sets forth the monitoring procedures and programs, and
- identifies the actions needed if levels of methane or hydrogen sulfide exceed regulatory limits.

1.2 General Characteristics of LFG and Methane Generation

LFG is composed of approximately 50 percent methane in contrast to natural gas which consists of approximately 95 percent methane. What makes LFG a source of environmental pollution is its odor, its potentially explosive properties, its potential for asphyxiation, and its contribution to global warming. LFG programs which focus on the environmental hazards of landfill gas include systems to monitor the migration of gas and control or neutralize its environmental impacts.

Landfill gas from MSW landfills is typically composed of 50 to 55 percent methane, 45 to 50 percent carbon dioxide, and less than one percent non-methane organic compounds. These individual gases remain co-mingled and do not naturally separate.

Because C&D wastes do not contain large quantities of organic matter, methane and carbon dioxide should not be a concern. However, if a significant amount of gypsum wallboard is present in C&D waste, hydrogen sulfide may potentially be produced, particularly if moisture is introduced into the waste.

Section 2

Regulatory Background

Because of the real and potential dangers from LFG, particularly hydrogen sulfide or to a lesser extent methane in LFG generated from C&D landfills, to the public health and safety and to the environment, existing state regulations, as described in Rule 15A NCAC 13B .0544 (d) (1 through 5), require owners of C&D landfills to monitor and, if necessary, control it.

2.1 C&D Landfills and North Carolina Regulations

Methane gas is explosive when present within the range of 5 to 15 percent by volume in air. When present in concentrations greater than 15 percent, the mixture will not explode. The 5 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). Hydrogen sulfide is explosive when present within the range of 4 to 44 percent by volume in air. In addition, hydrogen sulfide can be immediately dangerous to life and health at concentrations of 100 parts per million. The State of North Carolina, through its 15A NCAC 13B .0544(d)(1), requires owners or operators of all C&D landfills to ensure that the facility:

- A) Does not exceed 25 percent of the LEL for methane or other explosive gases in facility structures;
- B) Does not exceed the LEL for methane or other explosive gases at the facility property boundary; and
- C) Does not release methane gas or other explosive gases in any concentration that can be detected in offsite structures.

The LEL means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25 C and atmospheric pressure per Rule .0544(d)(5).

Rule .0544(d)(2) requires that a routine methane monitoring program be implemented to ensure that these standards are met. The type of monitoring will be determined based on soil conditions, hydrogeologic conditions under and surrounding the facility, hydraulic conditions on and surrounding the facility, the location of facility structures and property boundaries, and the location of all off-site structures adjacent to property boundaries. Additionally, frequency of monitoring shall be quarterly.

Rule .0544(d)(3) requires that if methane or explosive gas levels exceed the specified limits, the owner or operator must:

- A) Immediately take all necessary steps to ensure the protection of human health and notify the Division;

- B) Within seven days of detection, place in the operating record the methane or explosive gas levels detected and a description of the steps taken to protect human health;
- C) Within 60 days of detection, implement a remediation plan for the methane or explosive gas releases, place a copy of the plan in the operating record, and notify the Division that the plan has been implemented. The plan must describe the nature and extend of the problem and the proposed remedy.

As described in Rule 15A NCAC 13B .0554 (f), this Landfill Gas Monitoring Plan is part of the Monitoring Plan for the C&D facility. In addition to the Landfill Gas Monitoring Plan, the Facility Monitoring Plan includes the Water Quality Monitoring Plan.

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

Rule .0544(d)(1) and (2) states 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 Procedures

Each quarterly monitoring procedure shall begin by verifying that the instrument has been calibrated. The instrument shall be calibrated per the manufacturer's instruction. Monitoring shall be completed with a GEM-2000 or equivalent in conjunction with an Industrial Scientific M-40 4-gas meter or equivalent. Monitoring wells around the C&D landfill shall be checked. Currently there are two landfill gas monitoring wells at the C&D landfill (M-10 and M-11). Well locations for the C&D landfill are provided on Figure 3-1.

3.2.1 Monitoring Well Installation and Construction

Wells M-10 and M-11 will be used to monitor the C&D landfill for LFG migration. The landfill gas monitoring wells are 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 was 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 was selected based on groundwater and bedrock elevations observed during well installation.

Similar to the groundwater monitoring wells at the C&D facility, the landfill gas monitoring wells were installed within the dominant drainage features associated with each Phase of C&D landfill development. 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. The Buncombe County C&D landfill is being constructed such that there is little to no excavation and the bottom of waste will be at or near existing grade. As such, well screens in some cases are 50-feet or more below the base of the C&D landfill. CDM believes that in the case of the Buncombe County C&D 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 were constructed in accordance with the North Carolina Well Construction Standards described in 15A NCAC 2C and were 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 that is of sufficient quality to facilitate sampling in accordance with industry and federal standards. Figure 3-2 includes a typical landfill gas monitoring well detail.

Flooded wells will be replaced with dry wells, if necessary.

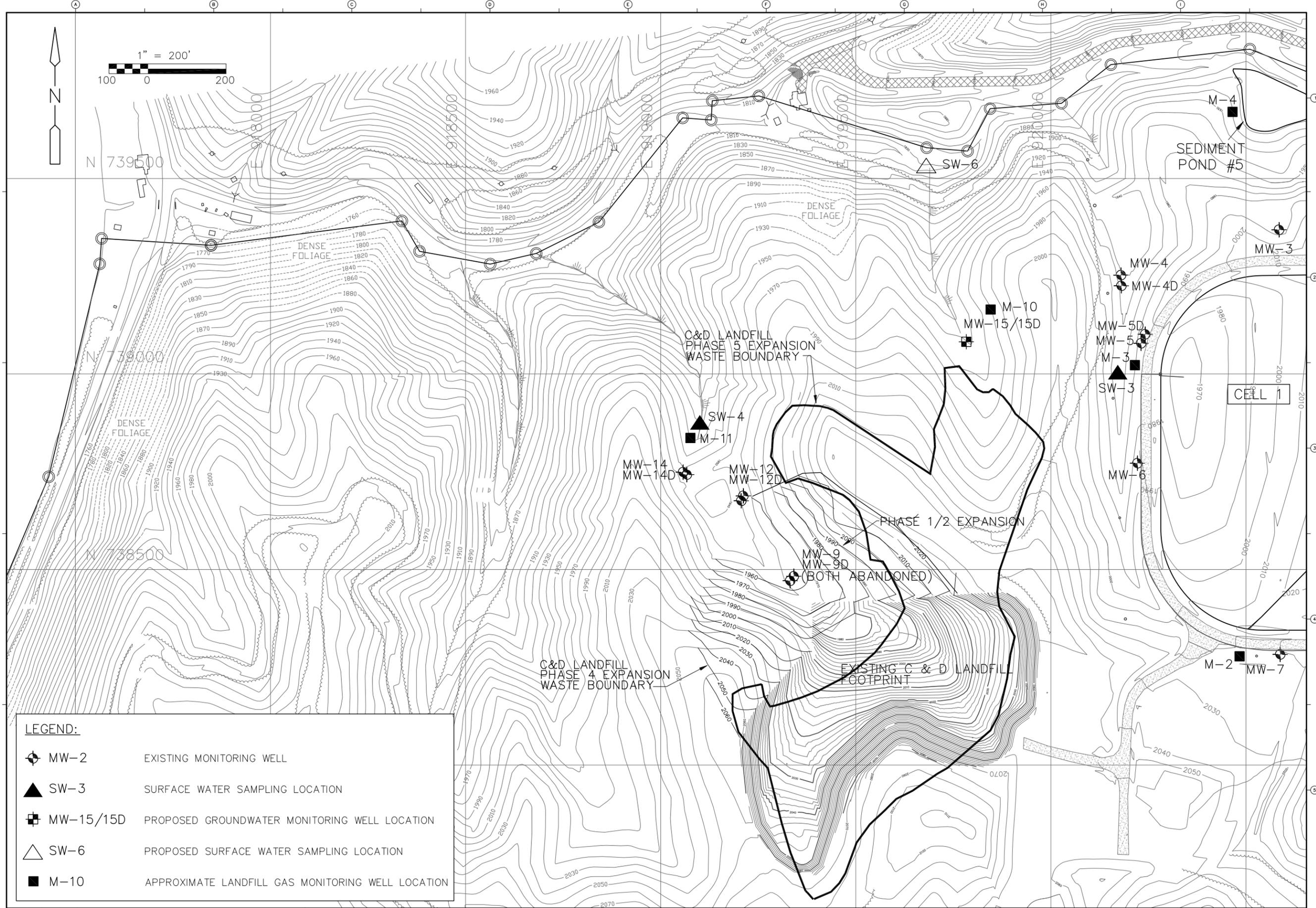
3.2.2 LFG Monitoring

An initial landfill gas reading for % methane, % lower explosive limits for methane, % carbon dioxide, and % oxygen was collected from each of the newly installed landfill gas monitoring wells with a GEM-2000 landfill gas monitoring meter or similar 24-hours after installation. Following the initial reading, readings will be collected from each well on a quarterly basis. A GEM-2000 landfill gas meter or equivalent and an Industrial Scientific M-40 4-gas meter or equivalent will be used to monitor landfill gas in the wells. The 4-gas meter will be attached to the exhaust port of the GEM-2000. The GEM-2000 will detect CH₄, CO₂, O₂, and the 4-gas meter will detect CH₄ LEL, H₂S (ppm), CO (ppm), and % O₂. If landfill gas levels detected at the monitoring wells exceeds the LEL, the technician shall immediately follow the action plan presented in Section 4.1.

Given the historical groundwater data at the C&D site, it is not anticipated that well flooding will be an issue. If, however, it is determined that a well is flooded above the well screen elevation, that well will not be sampled and a new dry well will be installed in its place.

3.3 Record Keeping

All readings will be recorded on a standard landfill gas monitoring log form. A sample landfill gas monitoring log is provided at the end of this section. This form or similar will be used. These forms will be reviewed by the landfill supervisor or the County's environmental consultant and placed on file at the landfill with other landfill records. These readings should be available for review by the State upon request.



LEGEND:

	MW-2	EXISTING MONITORING WELL
	SW-3	SURFACE WATER SAMPLING LOCATION
	MW-15/15D	PROPOSED GROUNDWATER MONITORING WELL LOCATION
	SW-6	PROPOSED SURFACE WATER SAMPLING LOCATION
	M-10	APPROXIMATE LANDFILL GAS MONITORING WELL LOCATION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. COLONE
 DRAWN BY: J. KILLINGSWORTH
 SHEET CHECKED BY:
 CROSS CHECKED BY:
 APPROVED BY:
 DATE: FEBRUARY 2010

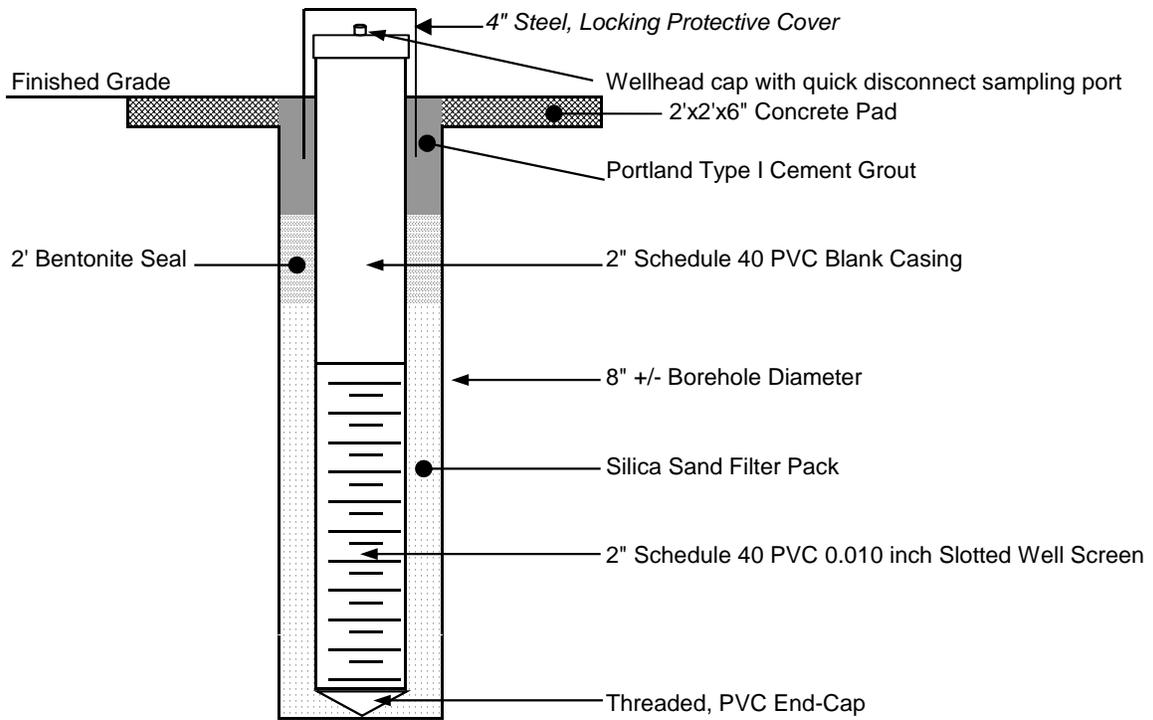
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BUNCOMBE COUNTY
 NORTH CAROLINA
 LANDFILL GAS MONITORING

LANDFILL GAS MONITORING WELL LOCATIONS

PROJECT NO. 6447-65973
 FILE NAME: METHANE FIG. 1.dwg
 FIGURE
 3-1

Landfill Gas Monitoring Plan Buncombe County C&D Landfill



Notes:

Stick-up will extend between 2.5 and 3 feet above finished grade.

All PVC well material will be threaded joint.

Silica sand filter pack will extend at least 2 feet above top of screen elevation.

Anticipated screen length will vary depending on depth to groundwater or bedrock.

LANDFILL GAS MONITORING LOG FORM

(this report must be completed quarterly)

Buncombe County C&D Landfill
Buncombe County, North Carolina

Technician Name: _____

Date: (mo/day/year)_____

General weather conditions: _____

Temperature: _____

Barometric condition pressure: _____

MONITORING INSTRUCTIONS

1. Measure landfill gas levels at C&D landfill gas monitoring wells M-10 and M-11 located around the C&D landfill. The landfill gas reading must not exceed 100% of the methane L.E.L. If landfill gas measurements exceed 100% of the L.E.L., contact the landfill supervisor and follow the outlined plan in Appendix B of the operations manual.
2. If landfill gas levels exceed the above-mentioned levels at any monitoring location, report the measurements to the County for further action as described in the Gas Control Plan - C&D Landfill.
3. File this landfill gas monitoring log sheet in the landfill office in the appropriate record keeping section with other landfill records.

Section 4

Detection Plan

The North Carolina Solid Waste Management Rules, .0544(d)(3), require a detection plan for action if landfill gas 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 at Monitoring Wells

If any of the landfill gas monitoring wells measure a level equal to or more than the LEL as defined by in the Rules, the technician should:

- immediately contact the landfill supervisor; and
- recheck the landfill gas levels at each well.

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 4.2.

4.2 C&D Compliance Action Plan

If upon verification as described in Sections 4.1, the landfill gas monitoring levels are equal to or exceed the regulatory limits as defined by state and federal regulations, the following actions are proposed to comply with state regulations as well as protect the health and safety of the individuals at or near the C&D landfill.

4.2.1 Immediate Action

If landfill gas 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:

- monitor all structures at the facility;
- if landfill gas levels are detected in the onsite structures, open all doors and windows in buildings on the landfill site;
- if warranted by the degree of intensity of the landfill gas concentration in the onsite structures, evacuate all buildings on the site;
- notify the Buncombe County Manager Office's about the concentration levels;

- if warranted by the degree of intensity of the landfill gas concentration in the wells, check the landfill gas levels in structures on adjacent properties to the facility boundary;
- if warranted by the degree of intensity of the landfill gas concentration, evacuate the landfill area or evacuate the area adjacent to the landfill;
- notify the Division about the reading;
- begin to identify or narrow down the source of the landfill gas causing the readings exceeding the regulatory limits (i.e. the path that the landfill gas is taking to the monitoring location);
- begin to identify the extent of the landfill gas problem; and
- as appropriate, begin to take corrective action to control the landfill gas levels in building at the landfill site, at the boundaries to the landfill, and at the landfill site.

4.2.2 Actions Within Seven Days

If landfill gas levels exceed the regulatory limits, the County must, within seven days, place in the operating record the gas levels detected and a description 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 a remedy for the problem.

4.2.3 Actions Within Sixty Days

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

- implement a remediation plan for the landfill gas release;
- place a copy of the plan in the operating record of the landfill; and
- notify the Division that the plan has been implemented.

4.3 Public Relations and Information

As with any potentially dangerous situation, including asphyxiation from landfill gases, it is important to keep the public, public service agencies, regulatory 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 it is determined 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 appropriate regulatory agency; 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.