



August 31, 1994

Mr. Edward F. Mussler, Environmental Engineer
North Carolina Department of Environment,
Health, and Natural Resources
Division of Solid Waste Management (DSWM)
Solid Waste Section
P. O. Box 27687
Raleigh, North Carolina 27611-7687



Subject: Response to DSWM Letter Dated August 16, 1994
and
Request for Authorization to Install Permanent Methane Monitoring Wells
Lincoln County Landfill
DSWM Permit No. 55-03
Lincoln County, North Carolina
Law Project No. 56-0593

Fac/Perm/Co ID #	Date	Doc ID#
55-03	190 Nov 11	DIM 14443

Dear Mr. Mussler:

On behalf of Lincoln County, Law Environmental submits this response to your August 16, 1994 letter regarding permanent methane monitoring wells at the Lincoln County Landfill. This letter also serves as a formal request for authorization from the DSWM to install the methane monitoring wells described herein.

Response to DSWM Letter Date August 16, 1994

Your letter requested information in support of the permanent methane monitoring plan submitted with Lincoln County's Transition Plan Application (dated April 8, 1994). Each item requested is presented in bold type below, followed by our response.

Frequency of Testing

Lincoln County intends to test air samples from each of eight permanent methane monitoring wells and all facility structures on a quarterly schedule.

Test Procedure

A technician from Law Environmental will visit the site quarterly. The technician will place a hollow aluminum tube, four feet long, with four holes (1/32" diameter) located at six-inches and 24 inches from the bottom of the tube, into each monitoring well. An explosimeter (Mine Safety Appliances Model 62-S) calibrated to read methane gas will be attached to the threaded end of the tube and a reading taken. Measurements of percent lower explosive limit (LEL) and percent gas will be obtained and recorded.

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Response Plan for Situations in which Methane Gas Levels are Exceeded

The concentration of methane gas is required to be below 25 percent of the lower explosive limit (LEL) for methane in facility structures and below the LEL for methane at the facility property boundary (methane is explosive at 5 to 15 percent by volume; methane's lower explosive limit is 5 percent).

If the levels of methane gas exceed applicable limits, the county will immediately take steps to ensure the protection of human health and notify the DSWM. Within seven days of detection of methane levels above 25% of LEL, the methane gas levels detected will be recorded in the operations record and steps taken to protect human health. Within 60 days of detecting levels greater than 25 percent of LEL, a remediation plan for the methane gas releases will be implemented, a copy of the plan placed in the operations record, and the DSWM notified of the plan implementation.

Proposed Well Locations

The proposed locations of permanent methane monitoring wells at the Lincoln County Landfill were presented on Drawing 11 accompanying the Transition Plan Application.

Proposed Well Depths and Construction

Permanent methane monitoring wells are proposed to be constructed as shown on the attached Figure 1. A six-inch diameter borehole will be drilled to either the top of rock or ground water, whichever is encountered first. A one-inch diameter slotted PVC pipe will be placed in the borehole, and the annular space backfilled with coarse sand or gravel. A one-foot thick bentonite seal will be placed above the screened section of pipe approximately three feet below ground surface. The remaining two feet of the borehole will be filled with grout and a lockable well cover will be erected.

Rationale Regarding Spacing and Depth of Wells

In accordance with 15A NCAC 13B.1626(4)(b)(i), the following factors were considered when selecting the spacing and depth of the permanent monitoring wells:

(A) Soil Conditions

Sixteen soil test borings were drilled at the site as part of Law's Site Plan Application (reference report dated November 28, 1984). These borings revealed that soils consist of a surface veneer of topsoil underlain by clays that grade with depth into silts and sands. Within the depth of the borings drilled (the deepest boring was terminated 60 feet below grade), the silts and sands locally grade to partially weathered rock and rock.

The lower sandy/silty zone consists of variably micaceous, firm to hard sandy silt. Some of the sandy/silty soils contain rock fragments and/or small amounts of clay. Material hard enough to be termed partially weathered rock was encountered in four of the sixteen borings at depths ranging from 16 to 25 feet, based on the standard penetration resistances measured. Material hard or dense enough to prevent further advancement of the soil drilling equipment was encountered at two drilling locations 16 feet below grade. Rock underlying the site was classified as metamorphic.

(B) Hydrogeologic Conditions

Local hydrogeology was discussed in detail in Law Environmental's Construction Plan Application (reference report dated January 30, 1992). Please refer to this document for information regarding site hydrogeology (Drawing 13 of the document presents detailed profiles of subsurface hydrogeologic conditions).

(C) Hydraulic Conditions

Ground-water flow directions and seasonal high ground-water elevations were established based on the results of the site hydrogeologic study. Please refer to Appendix I of the Construction Plan Application.

(D) Facility Structures and Property Boundaries

Drawing 11 of the Transition Plan Application shows the methane monitoring wells located inside the property boundary. One well will be located near the scale house; the only facility structure on site.

Consideration of Groundwater Depth and Soil Type

Consideration was given to ground-water depth and soil type in the selection of well locations, as outlined above.

Well Diagram of Proposed Monitoring Wells

The attached Figure 1 presents a diagram of a typical methane monitoring well.

Emergency Response Plan

If the levels of methane gas exceed applicable limits, the county will immediately take steps to ensure the protection of human health and notify the DSWM. Within seven days of detection of methane levels above 25% of LEL, the methane gas levels detected will be recorded in the operations record and steps taken to protect human health. Within 60 days of detecting levels greater than 25 percent of LEL, a remediation plan for the methane gas releases will be implemented, a copy of the plan placed in the operations record, and the DSWM notified of the plan implementation.

Sampling Protocol

Methane will be the gas monitored for as an indicator gas since it is typically the most prevalent landfill gas and usually the gas with the greatest hazard (i.e., explosiveness). If methane gas is detected, then other gases may also be sampled for if it is determined to be beneficial to site operations.

A technician from Law Environmental will visit the site quarterly. The technician will place a hollow aluminum tube, four feet long, with four holes (1/32" diameter) located at six-inches and 24 inches from the bottom of the tube, into each monitoring well. An explosimeter (Mine Safety Appliances Model 62-S) calibrated to read methane gas will be attached to the threaded end of the tube and a reading taken. Measurements of percent lower explosive limit (LEL) and percent gas will be obtained and recorded. The explosimeter will be calibrated prior to each sampling event. Results of permanent well and facility structure monitoring will be recorded in the landfill operating record each quarter.

Comprehensive Monitoring Sampling and Analysis Plan

The county does not currently plan to conduct methane monitoring using its employees. If, in the future, county employees conduct routine monitoring, the employees will be trained in field procedures by Law Environmental personnel.

Request for Authorization to Install Permanent Methane Monitoring Wells

On behalf of Lincoln County, Law Environmental requests written authorization from the DSWM to install permanent methane monitoring wells at the site, as set forth herein. We note that one week will be required to mobilize our drill crew to the site. Actual field work will require an additional one to two weeks. Therefore, if the wells are to be in place by October 9, 1994 as required by 15A NCAC 13B.1625(4)(b), we must receive written authorization no later than September 16, 1994. If authorization is received after this date, Lincoln County will be unable to meet the regulatory deadline, and temporary methane monitoring will be continued as outlined in the Transition Plan Application.

If you have any questions regarding methane monitoring at the Lincoln County Landfill, please contact us.

Sincerely,

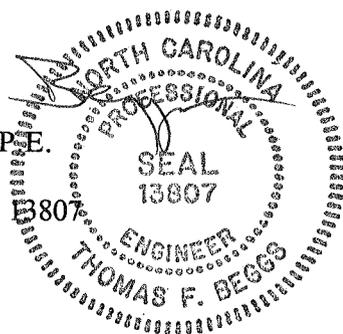
LAW ENVIRONMENTAL NC, INC.

W.A. Scharnitzky

W.A. Scharnitzky
Staff Engineer

Thomas F. Beggs

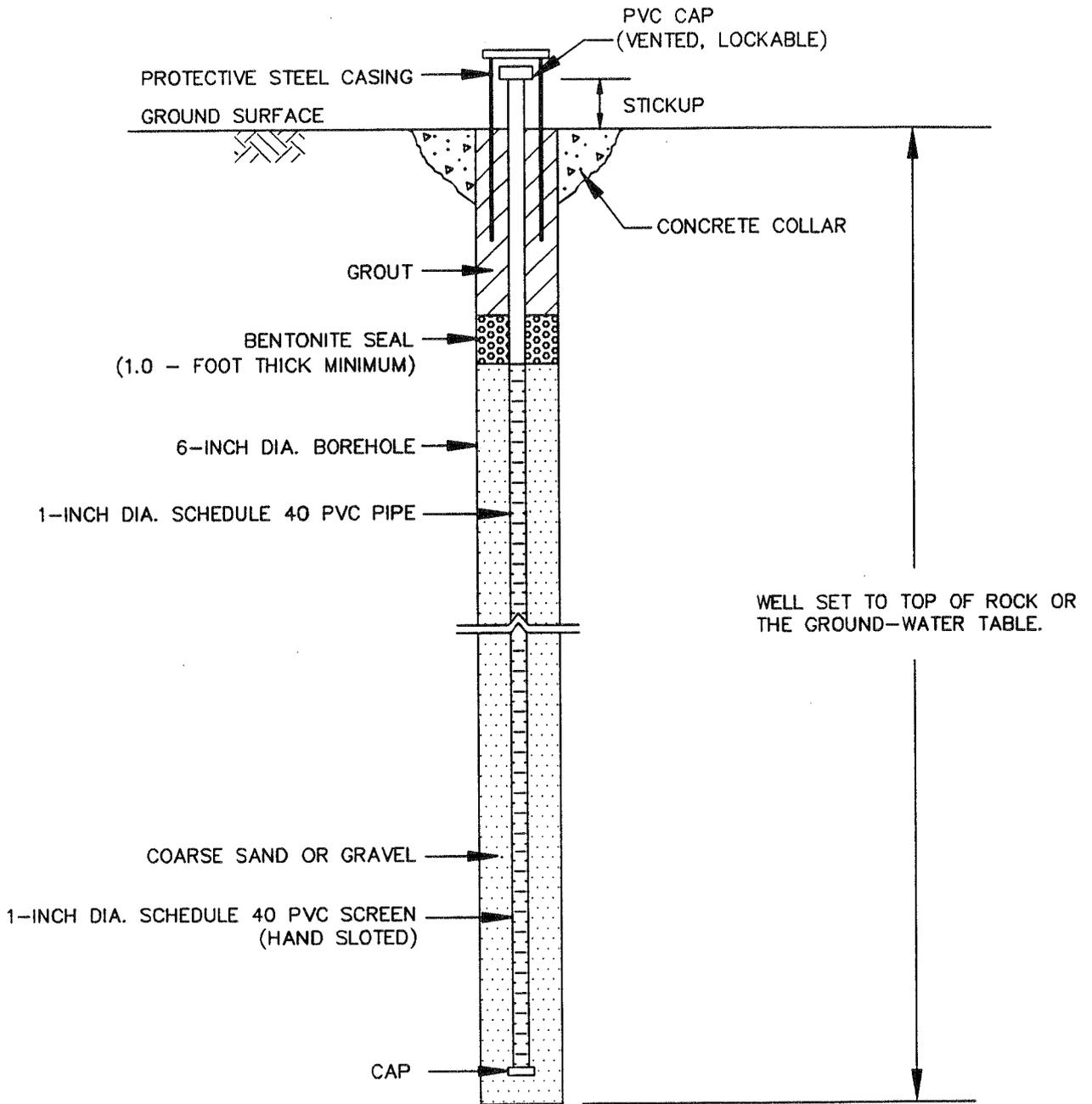
Thomas F. Beggs, P.E.
Principal
Registered NC No. 13807



attachments

cc: Mr. John Avery
Lincoln County Solid Waste Director

Figure 1



J:\560593\WELL 08/25/94 10:09 JHM

LINCOLN COUNTY LANDFILL
LINCOLN COUNTY, NORTH CAROLINA



LAW ENVIRONMENTAL, INC.
CHARLOTTE, NORTH CAROLINA

**DIAGRAM OF A
TYPICAL METHANE
MONITORING WELL**

FIGURE 1

August 16, 1994 Letter from DSWM

MEMO

DATE: 9-7-94

TO: Lincoln County

SUBJECT: LAW -

- 1) Response plan - should include
- 1) Verification of equipment of calibration
 - 2) Search for OTHER sources.
 - 3) - Vacate Building
 - 4) - Chain of whom to notify -

What steps to protect health - ?

TODO

- 1) Check monitoring location
- 2) - issue ok to install wells?
- 3) - Letter for Response plan -

From: _____



North Carolina Department of Environment,
Health, and Natural Resources



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