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NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

March 10, 2005

Mr. Timothy Grant, L.G.
Camp Dresser & McKee
5400 Glenwood Avenue, Suite 300
Raleigh, North Carolina 27612

And

Ms. Joan Smyth, L.G.
G.N. Richardson & Assoc.
14 N. Boylan Avenue
Raleigh, N.C. 27603

RE: Black Bear Disposal, LLC,
a subsidiary of Waste Industries, USA, Inc.
Site Study and Site Hydrogeologic Report, March 2004, as Revised September, 2004, and further revised March 2005
Camden County, North Carolina

Dear Mr. Grant and Ms. Smyth,

The revisions submitted in February and March, 2005, for the above referenced Site Study and Site Hydrogeologic Report for the proposed Black Bear Disposal Facility have been reviewed for hydrogeologic concerns by the Solid Waste Section. There still appear to be some items in the Reports that require clarification, revision, or additional information. Please respond to the following questions and comments:

SITE STUDY:

Section 2 - Regional Characterization Study:

Figure 2-1 Regional Characterization Map: This map is not legible. Since the USGS Topographic Map for this area is an aerial photograph, it would be best to submit an original copy of the map to enhance the ability to interpret the information presented on the figure.

Section 3 - Local Characterization Study:

Figure 3-2B In contrast with some information presented previously, this figure shows all surface water in both the southern and northern ditches flowing west toward a discharge to the Dismal Swamp Canal. Is this correct? And no surface water flow is to the east in either of the ditches?

Section 4 - Site Hydrogeologic Investigation:

- The review comments for the Site Hydrogeologic Report appear after the Site Study review, since it was submitted as a separate report.

Section 5 - Location Restrictions:

5-5 As referenced in my earlier review letter of August 5, 2004, the USGS is constantly updating and revising the Seismic Hazard Maps. Please check the USGS website and provide a copy of the more recent appropriate seismic hazard map for this area.

Section 7 - Facility Plan:

Drawing SD-2, Site Development: The language on Page 2 of the March 2, 2005, Response To Comments Letter from CDM is not consistent with the decision to delay specific design considerations for the sedimentation/infiltration basins to the Permit To Construct Application.

Section 8 - Preliminary Geotechnical Evaluation:

- The language on Page 4 of the March 2, 2005, Response To Comments Letter from CDM is not consistent with the newly revised report of March 2005.

8.5.3 Why would "water levels measured in the test borings and piezometers" "not necessarily be considered to represent stabilized groundwater levels"? The text of the revised Report needs to be changed to reflect that only the "initial" water levels may not be representative due to the use of mud-rotary drilling techniques.

Table 8-1 As referenced in my previous review letter of August 5, 2004, For Boring B-1, the Strata Thickness values do not add up to the Total Drilling Depth. It appears that some of the values are incorrect. After finding errors in the Table for B-1 and B-2, I did not check the values for the other borings. Please check the data in Table 8-1 for accuracy and make revisions as necessary.

8.5.4 and Table 8-2 The Sample Depth for B-1, S-14, is incorrect. According to the Boring Logs, for many of the samples more than one "Strata" was included in the sample interval. Was only the portion of the sample from the finer grained soils sampled in the field using the pocket penetrometer?

Table 8-3 As referenced in my previous review letter of August 5, 2004, The Grain Size Analysis Data (and Moisture Content data) for the two B-7 samples appear to be reversed. I was not able to locate the support documentation in Appendix C for some of the values in the Table, such as Void Ratio, Porosity, CIUC and UUC Triaxial Test data. I was not able to locate a Sample No. S-1A for boring B-26 on the Boring Log. With 49.6% fines in this sample, is there soil test data to support that this soil sample is Non-Plastic? For several of the borings, the soil classification reported on the Boring Logs is inconsistent with the Laboratory Test soil classifications.

SITE HYDROGEOLOGIC REPORT:

Section 4 - Site Hydrogeologic Report:

4.2 Field Observations: Since the ditches and borrow areas largely control surface water flow and shallow ground-water flow, it is very important to understand the surface water flow patterns and present this information in detail in the Report.

4.2.1 The text describing the surface water flow in the ditches is inconsistent with the text and Sheet No. 3-2B in the Local Characterization Study (Section 3 of the Site Study).

4.3 Borings: Did deep boring B-102D encounter the Yorktown Confining Unit? If so, at what depth? Was this boring properly abandoned according to 15A NCAC 2C?

4.7 There does not appear to be any specific discussion of Long-term Seasonal High Water Table or their estimated values.

4.8.1.2 Vertical Groundwater Flow: In the Table at the top of Page 15, the "Screen Midpoint Separation" value for the B-4 location is calculated incorrectly. Several of the Vertical Gradient values appear to have been rounded off incorrectly. Some evaluation and discussion should also be provided regarding variations of vertical gradient values over time.

It appears that all locations show a fairly consistent downward gradient over time, except for the B-4 boring location. This location also shows a downward gradient except for the February 6, 2004 data set used for this Table.

4.8.2 Hydraulic Conductivity: Hydraulic conductivity (porosity and effective porosity) values need to be clearly identified representative "for each lithologic (hydrogeologic) unit of the uppermost aquifer". At the end of this section, it references "an average estimated effective porosity of 35 percent was used for calculation of the groundwater flow velocities presented in Table 8". Why is the average effective porosity value used in Table 8 of Section 4 different from the value used in Table 3 of Appendix E?

4.12.1 Geologic and Hydrologic Features: The Report states that "The potentiometric contour map shows ... the major component of flow towards the west". While I would guess overall ground-water flow under natural conditions would predominately be toward the west, the Potentiometric Contour Map (Sheet 2) indicates most of the ground-water flow under existing conditions to be toward the north.

4.13 Report Summary: The Report states "Eventually, water from the County will be supplied to the area, eliminating the need for domestic wells". Is there any estimated time when County water will be made available to this area? Will County water be made available to all of the residents in the vicinity of the proposed landfill, or just those near Highway 17?

Table 1 It appears that page 2 of Table 1 is missing, since data for many of the wells and piezometers used in the Report is missing. As referenced in my previous review letter of October 28, 2004, "The sand Filter Intervals and Bentonite Seal Intervals are contradictory for most of borings B-1 through B-7 shallow". Also, as previously referenced, "For the deep borings, the effective Sand Filter Intervals have been extended to the bottom of the borehole, since the annular space below the screen was filled with filter sand". These piezometers are improperly constructed and hydraulic data from these wells may not be valid. It will also be important to drill these wells out to their full depth prior to proper well abandonment with grout. The Date of Construction for B-3 and B-7 are inconsistent with the dates on the Boring Logs.

Table 2 Note 1 should reference Appendix C, rather than B. Several of the USCS Classifications are different from those reported on the Boring Logs, though consistent with the Laboratory testing data.

Table 3 The header information for two of the columns appears to be mis-labeled Ground Elevation, rather than Groundwater Elevation. The TOC Elevations for boring B-103 and B-103d are inconsistent with the elevations on the Boring Logs.

Table 4 The Average Monthly Precipitation values for May and December appear to be calculated incorrectly. The Annual totals for 1998 and 1999 appear to be calculated incorrectly. Since the October 1997 value is not available, the Annual total for this year should not be used in calculating an overall Annual Average value.

Table 5 The header immediately above the Table appears to be mis-labeled "Monthly Precipitation (inches)". Since this Table deals with Streamflow Data, it is not clear what the values in the Table really represent or what the units are for these values.

Table 6 It is not clear how the Hydraulic Conductivity values were determined. Appendix F has raw data and graphs, but I am still not able to find any actual Hydraulic Conductivity calculations or values in the appendix that are complete and accurate. It is not clear what some of the supplemental calculations added to Appendix F are based on, what the units are, etc. What little information I could make sense of did not appear to match that found in Table 6. In the Table, what are the definitions for: Le, Yo, and Yt? As previously referenced, some of the deep piezometers with extended sand packs are not constructed properly and hydraulic data from these wells are suspect.

Table 8 Refer to previous comment regarding the discrepancy between the Average Effective Porosity value used in this Table and that used in Table 3 of Appendix E.

Figures 3 and 4 These two figures are not labeled. What is the significance and interpretation of these two hydrographs?

Figure 5 Corrections needed for Table 4 may make it necessary to revise Figure 5.

Drawings:

Sheet 1 The facility boundaries are not indicated on Sheet 1. The Ground Elevation for Boring GP-33 is incorrect. What are the structures located near Boring GP-20? The TOC Elevations for Borings B-103 and B-103D are inconsistent with those on the Boring Logs. A number of the GE and TOC values only go to tenths, not hundredths. What is the significance of the I and S suffixes for some of the borings? It is not clear where Borings GP-104S and GP-26 are located, since both arrows appear to point to the same symbol on the Drawing.

Sheet 2 The facility boundaries are not indicated on Sheet 2. The 15 foot ground-water contour in the vicinity of B-107 does not appear to accurately reflect the water table data.

Sheet 3 The legend does not identify the heavy line that appears to indicate the Water Table. For the first boring location on Cross-section A - A'(GP-32), the ground surface and water table elevations are not consistent with the Boring Logs and Tables. I was not able to locate a Boring Log or Field Notes describing the lithologic profile at this boring location. What is the basis for showing a shallow Silty Clay layer at this location? Due to the apparent errors for the first boring location reviewed (GP- 32), I made no further attempt to evaluate the cross-sections. Please check the accuracy for all information shown on the cross-sections on Sheets 3 and 4.

Appendix B Well Construction Records: Why is lithology and other boring log data not provided in the Well Records for many of the Borings?

Appendix C Laboratory Testing Records: Some of the documentation for soil test data used in the Report appears to be missing from Appendix C.

Appendix D Field Logs: Why is lithology and other boring log data not provided in the Field Logs for many of the Borings? There appear to be duplicate copies for some of the Field Logs. For a few of the Field Logs, it is not clear which Boring is being logged.

Appendix E Surficial Aquifer Pump Test and Model:

1.4 The Report describes the test well pattern as "2 observation wells were located upgradient and 1 observation well was located downgradient". However the Drawing seems to indicate that 1 well is upgradient and 2 are downgradient.

1.12 The Average Ground Water Velocities included in Table 3 would appear to range from 1.22E-02 to 2.29E-01 ft/day rather than the values listed in the text

2.1 What are the definitions for N and L?

3.0 The gradient should be from south to north, not north to south.

Figures:

Figure 4 Why does this Potentiometric Map differ from that for the same set of data that appears as Sheet No. 2 in the Revised Site Hydrogeologic Report?

- Please provide a brief description of the context and conditions represented by each of the figures 3 through 7.

Appendix F Slug Test Data: Refer to previous comment made for Table 6.

Please respond to the questions and comments raised above, and provide additional information and revisions as necessary. If you would like to arrange for a meeting discuss any items in this letter, you may contact me at (919) 733-0692, extension 258.

Sincerely,

Bobby Lutfy

Bobby Lutfy
Hydrogeologist
Solid Waste Section

cc:	Jim Barber	Solid Waste Section
	Ed Mussler	Solid Waste Section
	John Crowder	SWS - Wilmington
	Chuck Boyette	SWS - Washington
	Jerry Johnson	Waste Industries