



North Carolina Department of Environment and Natural Resources

Division of Waste Management

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February 9, 2009

Mr. Stephen King
Haywood County Solid Waste Director
278 Recycle Road
Clyde, North Carolina 28721

Subject: Design Hydrogeologic Report and Environmental Monitoring Plan
White Oak MSW Landfill
Haywood County
Permit 44-07
Doc ID 6606

Dear Mr. King

The Solid Waste Section (SWS) performed a technical review of the Design Hydrogeologic Report (report) and Environmental Monitoring Plan (plan) for the proposed construction of Phases 3 and 4 of the White Oak Municipal Solid Waste Landfill (MSW). The landfill is located on the west side of SR 1338 and approximately 0.2 mile south of the intersection of SR 1338 and I-40 in northern Haywood County. Bunnell-Lammons Engineering, Inc. submitted the report and plan for McGill Associates, P.A. on September 9, 2008.

Required revisions to the report and plan are listed below. The numbers correspond to the numbered paragraphs in the reports.

Design Hydrogeologic Report

- 1.0 Clarify what is to be constructed. Consistent use of the proper terminology as defined in Regulation .1619(c) is required throughout the application.
- 2.1 Correct what is stated in the regulation cited in the study. Regulation .1623 (b) specifies borings per acre of "area of investigation", not a cell within a phase, nor does it specify "150 feet downgradient of cells."
- 2.2 Base seasonal high groundwater elevation on data collected for a year.
- 2.4 Include the fracture trace analysis and Rose diagrams to which this section refers.
- 3.3 In the explanation of ponds and ravines, include what appears to be an unidentified pond or basin east of PZ-9.

- 3.4.1.3 Identify which borings shown in Figure 3 are used to establish bedrock.
- 3.4.2 See comment for Section 2.4
- 3.4.3 Include information about the “upper 10 feet of bedrock” pursuant to Regulation .1623 (b)(2)(D). Also, include the value for hydraulic conductivity for partially-weathered rock and bedrock.
- 3.5.2.1 See comment for Section 2.2
- 3.5.2.2 See comment for Section 2.2
- 3.5.4 Two revisions are necessary. One, see comment for Section 3.3 to account for all the locations where the reported groundwater mounding will occur. Two, correct the final sentence to convey that groundwater receptors—two buffered streams—exist downgradient of proposed Phase 3. The current sentence appears to refer to “cell construction” of existing Phase 1, which consists of four cells in another drainage basin.
- 3.5.6 In the table included in the text, replace “Phase 4” with “Phase 3” and replace “PZ-“ with “BLE-“ to reflect what is shown in Table 9.
- 3.6.1 Correct the reference to Horton and Zullo to reflect what they reported about faults near the site. Explain what is a “Holocene fault” and cite where in the reference the authors defined and discussed it. Regulation .1622(4)(a) specifies “a fault that has had displacement in Holocene time”, which the USGS reported occurred in an earthquake near the site in December 2008. In Regulation .1622(4)(a)(b)(iii) Holocene is defined as “extending from the “Pleistocene Epoch to the present.”
- 3.6.5 Two revisions are necessary. One, see comment for Section 3.4.1.3, which address locations of corings. Two, explain and show how groundwater flow will be altered by the deep excavation in Phase 4.
- 3.6.6 This section is topically about engineered fill, but excavation in Phase 3 is actually described. Mentioned is “an apparent existing storm water control feature” about which more information is required pursuant to .1623(b)(2)(A), which refers to specifications in .1623(a)(12). In addition, explain the “existing fill soil near BLE-3”, which is located in the groundwater discharge feature shown in drawings.

Tables

- Table 3 Show seasonal high for the year instead of the highest groundwater elevation measured during the seasonal low.

Figures

- Figure 2 Include the state hydrogeologic map, which more relevant to the report.

Figure 3 Identify what appears to be an unlabeled basin or pond located east of PZ-9.

Figure 4 Revise cross section AA' to show the following corrections. One, correct the groundwater elevation at BLE-16. Two, show that bedrock depths are inferred. Boring logs used to depict the cross section do not show depths to bedrock. Three, either end the cross section at BLE-3, or show only what is logged for BLE-4. The boring for BLE-4 terminated at 2.5 feet.

Revise cross section BB' to show the following corrections. One, correct groundwater elevations between BLE-1 and BLE-2. Two, show where bedrock depths are inferred. Three, either end the cross section at BLE-7D, or show only what is logged for BLE-8. The boring for BLE-4 terminated at 3 feet.

Environmental Monitoring Plan

The SWS evaluated groundwater monitoring plans for Phase 3 and 4. For Phase 3 include an upgradient monitoring well at the relevant point of compliance. Pursuant to Regulation .1631 (a)(2)(A) the relevant point of compliance is “established no more than 250 feet from a waste boundary.” Locate the groundwater monitoring system for Phase 4 away from areas of excavation, fill, stockpile, and road construction, and locate the system at the point of relevant compliance. In the areas of excavation, fill, road construction, and sediment basins proposed for Phases 3, show where existing downgradient groundwater monitoring wells for Phase 1 will be relocated.

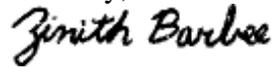
Additional required revisions are listed below. The numbers correspond to the numbered paragraphs in the plan.

- 3.1 See comment in Section 2.2 for the Design Hydrogeologic Report, which is relevant to determining depths and screen depths for groundwater monitoring wells for both Phase 3 and Phase 4.
- 3.2 Specify where the relevant point of compliance for both Phase 3 and 4 are located pursuant to .1631 (a)(2).
- 3.4 Without a sufficiently characterized seasonal high groundwater table pursuant to Regulation .1624 (b)(7), proposed well depths cannot be evaluated.
- 3.5.2.1. Use the historical data accumulated at the site to determine when seasonal high groundwater occurs. Data from the National Oceanic and Atmosphere Administration (NOAA) does not reflect local variation within Haywood County.
- 3.5.3. Delete the sentence where groundwater is described as flowing “to the north.” In the sentence before it, groundwater reportedly “flows in a radial pattern”, which occurs in the upper aquifer before reaching fractures oriented north and south in the deeper aquifer.

Stephen King
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Please contact me if you have questions. I can be reached at 919-508-8401.

Sincerely,



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