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March 2, 2009

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



RE: Response to Technical Review
 Design Hydrogeologic Report and
 Environmental Monitoring Plan
 Permit to Construct
 MSW Phases 3 & 4
 White Oak MSW Landfill Permit # 44-07
 Haywood County, North Carolina

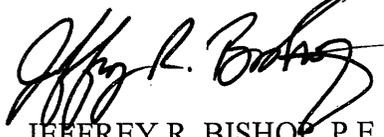
Dear Mr. Barbee:

Thank you for your review of the Design Hydrogeologic Report (DHR) and Environmental Monitoring Plan (EMP), as part of the Permit to Construct submittal for MSW Phases 3 & 4 at the White Oak Landfill in Haywood County. The original DHR and EMP for MSW Phases 3 & 4 were prepared by BLE, Inc., dated July 11, 2008. BLE, Inc. has revised the DHR to address the comments in your Technical Review letter, dated February 9, 2009. Additionally, the Permit to Construct drawings have been modified to reflect the revisions to the DHR performed by BLE, Inc. and to clarify the locations (horizontally and vertically) of the proposed ground water monitoring wells. See Permit to Construct drawings C1, C5, C22, and C23 for the locations of the proposed ground water monitoring wells.

Mr. Zinith Barbee
March 2, 2009
Page 2

Please find attached the revised DHR, prepared by BLE, Inc. and a letter from BLE that addresses the comments in the February 9, 2009 Technical Review letter. We look forward to continuing to work with you to finalize the DHR and EMP review for MSW Phases 3 & 4 at the White Oak Landfill in Haywood County. Please don't hesitate to contact us if you have any questions or require additional information.

Sincerely,
McGILL ASSOCIATES, P.A.



JEFFREY R. BISHOP, P.E.
Senior Project Manager

Enclosures

cc: ✓ Ed Mussler, NCDENR Solid Waste Section, w/o enc
Allen Gaither, NCDENR Regional Engineer, w/1 copy of enc
David Cotton, Haywood County Manager, w/o enc
Stephen King, Haywood County Solid Waste Director, w/o enc

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BUNNELL-LAMMONS ENGINEERING, INC.
GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

February 27, 2009

McGill Associates, P.A.
55 Broad Street
Asheville, North Carolina 28801

Attention: Mr. Jeffrey Bishop, P.E.

Subject: **Revisions to the *Design Hydrogeologic Report and Environmental Monitoring Plan*, Phases 3 & 4 to address NCSWS Technical Review Comments dated February 9, 2009 – Doc ID 6606**
White Oak Landfill (MSWLF – Phase 3 & 4)
Haywood County, North Carolina
Permit 44-07
BLE Project Number J07-1957-02

Dear Mr. Bishop:

The North Carolina Solid Waste Section (NCSWS) has completed their technical review of the *Design Hydrogeologic Report* (DHR) dated July 11, 2008, and *Environmental Monitoring Plan* (EMP), dated July 11, 2008 for the proposed Phase 3 & 4 areas at the White Oak MSW Landfill prepared by Bunnell-Lammons Engineering, Inc. (BLE). The NCSWS technical review comments were outlined in a letter from the NCSWS dated February 9, 2009. This letter addresses the NCSWS review comments and provides supplemental and revised information where requested. Additionally, a revised copy of the DHR is attached which incorporates the changes mentioned in this letter.

BACKGROUND INFORMATION

The White Oak Landfill is located in Haywood County, North Carolina approximately 12 miles north of Waynesville at the Fines Creek Exit (Exit 15) off of Interstate 40. The facility consists of four active or proposed waste units including:

- 1) MSWLF (Phases 1 & 2),
- 2) Proposed MSWLF Expansions (Phases 3 & 4),
- 3) C&D Landfill (Phase 1), and
- 4) an LCID Landfill.

The landfill is owned and operated by Haywood County. Currently, the Phase 1 and 2 areas have been developed. Haywood County now plans to develop the Phase 3 and 4 areas.

A DHR and EMP for the Phase 3 & 4 areas both dated July 11, 2008 were prepared by BLE (Job Number J07-1957-02) and submitted to the NCSWS. The DHR addressed the geological, hydrogeological, and geotechnical investigation required for the site permitting and design process

under applicable North Carolina Rules for Solid Waste Management 15A NCAC 13B .1623 (b). The EMP addressed the water monitoring requirements required for the site permitting and design process under applicable North Carolina Rules for Solid Waste Management 15A NCAC 13B .1631.

Mr. Zinith Barbee of the NCSWS reviewed the DHR and EMP and conveyed questions and comments in a letter dated February 9, 2009. The information provided below addresses Mr. Barbee's comments and has been incorporated into the attached revised DHR.

RESPONSE TO REVIEW COMMENTS BY THE NCSWS

NCSWS Item No. 1:

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.

Supplemental Information:

We concur with the NCSWS comment and the text of the DHR has been revised to eliminate the use of the term "cell" where the term "phase" would be appropriate.

NCSWS Item No. 2:

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."

Supplemental Information:

We concur with the NCSWS comment and the text of the DHR has been revised to use the phrase "area of investigation" where appropriate.

NCSWS Item No. 3:

2.2 Base seasonal high groundwater elevation on data collected for a year.

Supplemental Information:

Regulation .1623 (a)(7)(B) requires the "Tabulations of stabilized water table elevations over time in order to develop an understanding of seasonal fluctuation in the water table." These data are presented in the DHR. No changes have been made to the DHR except those presented in the supplemental information for NCSWS Item No. 26 shown below.

NCSWS Item No. 4:

2.4 Include the fracture trace analysis and Rose diagrams to which this section refers.

Supplemental Information:

We concur with the NCSWS comment and the pertinent text from the referenced report has been copied and is included as Appendix J (new) of the revised DHR. We understand that Plate 3 (Stream Traces) and Plate 3B (Rose Diagram) have not been located by Haywood County and were not provided to BLE.

NCSWS Item No. 5:

3.3 In the explanation of ponds and ravines, include what appears to be an unidentified pond or basin east of PZ-9.

Supplemental Information:

We concur with the NCSWS comment and the DHR text has been revised to include discussion of the subject feature. The feature has been identified as an existing sedimentation pond which receives stormwater runoff from the Phase 2 perimeter access road.

NCSWS Item No. 6:

3.4.1.3 Identify which borings shown in Figure 3 are used to establish bedrock.

Supplemental Information:

We concur with the NCSWS comment and the DHR text has been revised to include a reference to the subject borings. Those borings are identified as BLE-7D, BLE-9, P-4, and MW-2D in the text.

NCSWS Item No. 7:

3.4.2 See comment for Section 2.4.

Supplemental Information:

We concur with the NCSWS comment and the DHR text includes a reference to the newly included Appendix J.

NCSWS Item No. 8:

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.

Supplemental Information:

Information on the “upper 10 feet of bedrock” is provided in Section 3.4.1.3 of the DHR and on the boring logs in Appendix C. Please note that we have added the boring log for MW-2D to Appendix C for reference. Information on the “hydraulic conductivity of partially-weathered rock and bedrock” is provided in Section 3.5.5.1 and on Table 8 of the DHR. No changes have been made to the DHR.

NCSWS Item No. 9:

3.5.2.1 See comment for Section 2.2.

Supplemental Information:

The data required by Regulation .1623 (a)(7)(B) and Regulation .1623 (a)(7)(C) has been provided in the DHR. No changes have been made to the DHR except those presented in the supplemental information for NCSWS Item No. 26 shown below.

NCSWS Item No. 10:***3.5.2.2 See comment for Section 2.2.*****Supplemental Information:**

The data required by Regulation .1623 (a)(7)(B) and Regulation .1623 (a)(7)(C) has been provided in the DHR. No changes have been made to the DHR except those presented in the supplemental information for NCSWS Item No. 26 shown below.

NCSWS Item No. 11:***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.*****Supplemental Information:**

We concur with the NCSWS comment and the DHR text has been revised to include references to the subject features.

NCSWS Item No. 12:***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.*****Supplemental Information:**

We concur with the NCSWS comment and the DHR text has been revised to correct the typographical errors and well location descriptions.

NCSWS Item No. 13:***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.”*****Supplemental Information:**

We concur with the NCSWS comment and the DHR text has been revised to correct the reference to the cited publication. Additionally, we understand from the NCSWS letter that an earthquake was reported near the site (approximately 2 miles northeast) in December 2008; approximately 6 months after the DHR was submitted. On February 16, 2009, we mobilized a North Carolina Licensed Geologist from our staff to the site to conduct an on-site reconnaissance for evidence of faulting on the site. The geologist conducted the reconnaissance on foot and investigated the site within the Phase 3 and 4 areas and within 200 feet of the Phase boundaries. No evidence of seismically induced features (faults, sloughs, escarpments, etc.) were observed at that time. The results of that investigation are included in the revised DHR text.

NCSWS Item No. 14:

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.

Supplemental Information:

We concur with the NCSWS comment and the DHR text has been revised to include references to the corings and to describe possible changes to groundwater flow related to the excavation of soils in Phase 4. We conclude that the groundwater elevations in the Phase 4 area will generally be lowered over time; however, groundwater flow directions should not significantly change.

NCSWS Item No. 15:

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.

Supplemental Information:

We concur with the NCSWS comment and the DHR text has been revised to include a discussion of the physical features and fill soils in Phase 3. This section now describes the previously constructed north-south trending stormwater control feature through the center of the Phase 3 area. The feature includes two retention basins separated by a small dam (roughly located between the BLE-3 and BLE-4 borings). The feature was dry during the design hydrogeologic investigation. The feature is partially filled with sediment which has appeared to accumulate from stormwater runoff. These sediments are shown on the boring logs and in the cross sections in the DHR. Sections 3.6.5 and 3.6.6 of the DHR describe the presence of these soils and the procedures to remove and replace the soils with engineered fill.

NCSWS Item No. 16:

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

Supplemental Information:

Table 3 shows seasonal high groundwater elevations as required by Regulation .1623 (a)(7)(B) and Regulation .1623 (a)(7)(C). No changes have been made to the DHR except those presented in the supplemental information for NCSWS Item No. 26 shown below.

NCSWS Item No. 17:

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

Supplemental Information:

We have included Figure 5 and Table 1 from the *Preliminary Hydrogeologic Assessment and Study Plan for a Regional Ground-Water Resource Investigation of the Blue Ridge Piedmont Provinces of North Carolina* (USGS Water-Resources Investigation Report 02-4105) in the DHR. The documents have been included in Appendix K (new). The state geologic map is still included in the DHR as Figure 2.

NCSWS Item No. 18:

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

Supplemental Information:

We concur with the NCSWS comment and Figure 3 has been revised to include a label for the feature in question.

NCSWS Item No. 19a (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section AA' to show the following corrections. One, correct the groundwater elevation at BLE-16.

Supplemental Information:

We have reviewed the groundwater elevation at BLE-16 and it is displayed correctly on Figure 4. No changes have been made.

NCSWS Item No. 19b (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section AA' to show the following corrections. Two, show that bedrock depths are inferred. Boring logs used to depict the cross section do not show depths to bedrock.

Supplemental Information:

We concur with the NCSWS comment and Figure 4 has been revised to show a dashed (bedrock) line between borings BLE-11 and BLE-16.

NCSWS Item No. 19c (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section AA' to show the following corrections. 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.

Supplemental Information:

There is a footnote on the BLE-4 boring log (Appendix C) that explains that the BLE-4 boring refused on boulders in fill soil and not on bedrock. These boulders and fill soils were discovered in test pits performed by McGill Associates on June 4, 2008 (as documented on the BLE-4 boring log). Therefore, the cross section A-A' accurately depicts the subsurface geology at the A' termination point and has not been changed.

NCSWS Item No. 19d (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section BB' to show the following corrections. One, correct groundwater elevations between BLE-1 and BLE-2.

Supplemental Information:

We have reviewed the groundwater elevations between BLE-1 and BLE-2 and they are correct as shown. No changes have been made.

NCSWS Item No. 19e (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section BB' to show the following corrections. Two, show where bedrock depths are inferred.

Supplemental Information:

We concur with the NCSWS comment and Figure 4 has been revised to show a dashed (bedrock) line between borings BLE-1 and BLE-5.

NCSWS Item No. 19e (these comments refer to Figure 4 in the DHR):

Figure 4 Revise cross section BB' to show the following corrections. Three, either end the cross section at BLE-7D, or show only what is logged for BLE-8. The boring for BLE-4{sic BLE-8} terminated at 3 feet.

Supplemental Information:

We concur with the NCSWS comment and the boring logs for BLE-8 (Appendix B and C) have been revised to show the geology encountered. The B-B' transect is terminated at BLE-8 in accordance with the geology observed in the boring. No changes have been made to Figure 4.

The next 6 items refer to the NCSWS review comments for the EMP

NCSWS Item No. 20 (EMP comment):

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."

Supplemental Information:

The cited regulation specifies the requirements for the location of compliance points and not for the location of background/upgradient wells which is specified in .1631 (a)(1)(A-C). Please note that the upgradient wells MW-11S and MW-11D have been established as background points for the facility in compliance with the regulation. No changes have been made to the EMP.

NCSWS Item No. 21 (EMP comment):

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.

Supplemental Information:

The proposed monitoring well locations for Phase 4 are located within the limits specified in the regulations. Please note that the proposed wells are to be installed along the outer perimeter of the proposed access road in areas graded for drill rig access. Due to steep topography in the areas around Phase 4, drill rig access is very limited. We understand that the cost of grading to install monitoring wells at greater distances from the perimeter road would be very high. We request that the monitoring well locations be approved as proposed.

NCSWS Item No. 22 (EMP comment):

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.

Supplemental Information:

We understand that none of the monitoring wells in this area (MW-3, MW-3D, MW-4A, & MW-8) are to be abandoned as part of the construction of Phase 3. In areas where fill soils will be placed, we understand that these wells will be extended to the ground surface during grading and that new well heads (pads and protective covers) will be installed upon completion of grading. We request that the existing monitoring wells be approved as they are currently installed. In areas where waste cells will be constructed within Phase 3, the existing monitoring wells MW-5A, MW-5D, MW-12, MW-13S, and MW-13D will be abandoned and not replaced as specified in the EMP.

NCSWS Item No. 23 (EMP comment):

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.

Supplemental Information:

As specified in the EMP, all groundwater monitoring wells are to be installed with a 15-foot long screened section. The wells will be installed so that the screen brackets the water table at the time of well installation. This type of well construction allows water table fluctuations in either direction (rise or fall). Our projected well depths are based on actual water table elevations observed on February 14, 2008 as shown on Figure 3, on proposed design grade elevations at the well locations, and in accordance with the proposed well construction described above. Please note that field-specific conditions encountered during drilling/well installation are the primary factors for determining well installation depth. We request that the proposed well depths be approved as described.

NCSWS Item No. 24 (EMP comment):

3.2 Specify where the relevant point of compliance for both Phase 3 and 4 are located pursuant to .1631 (a)(2).

Supplemental Information:

The regulations specify that the relevant point of compliance will be approved by the Division based on consideration of several factors specified therein. Those data are provided in the DHR and EMP and were used by BLE to select the proposed groundwater monitoring well locations shown in the EMP. Therefore, ipso facto, the proposed relevant point(s) of compliance for Phase 3 and 4 are the proposed well locations and existing surface water sampling locations themselves. No changes have been made to the EMP.

NCSWS Item No. 25 (EMP comment):

3.4 Without a sufficiently characterized seasonal high groundwater table pursuant to Regulation .1624 (b)(7), proposed well depths cannot be evaluated.

Supplemental Information:

Please refer to the supplemental information provided for NCSWS Item No. 23 above. Please also note that Regulation .1624 (b)(7) refers to geotechnical analysis of landfill subgrades and is not applicable to proposed well depths.

The next 2 items refer to the NCSWS review comments for the DHR

NCSWS Item No. 26 (DHR comment):

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.

Supplemental Information:

We have evaluated the historical groundwater elevation data shown on Table 3 for wells monitored prior to and during the September 20, 2007 through February 14, 2008 DHR monitoring period to establish when seasonal high groundwater elevations may occur at the site. The majority of the data consists of April and October measurements with no other measurements collected during the year. With only two points per year there is not sufficient data to determine the time frame during which the average seasonal high occurs. However, the April groundwater elevations were higher than the October groundwater elevations.

To determine when seasonal high groundwater elevations occur in Haywood County, we downloaded groundwater level monitoring data from the North Carolina Division of Water Resources – Water Data Retrieval site (<http://www.ncwater.org/wrisars/>). There are four groundwater wells (M 90T1, M 90T2, M 90U1, M 90U2) in Haywood County which DWR personnel measured water levels from approximately June 1985 through December 1990. These wells are located approximately 12 miles east-southeast of the subject site. We have prepared time series plots for each well and have included them in Appendix E of the DHR. The plots show that the average seasonal high groundwater elevations occur in (or near) April each year.

Since the monitoring period at the subject site ended in February 2008, we have prepared an additional table (Table 3B) for inclusion in the DHR to project a new seasonal high for April 2008. Table 3B calculates a difference between the highest April groundwater elevation (from either 2005, 2006, or 2007) and the measured seasonal high for monitoring wells MW-5A, MW-5D, MW-12, MW-13S and MW-13D from the 2007-2008 DHR monitoring period. These wells are within the Phase 3 area and have sufficient water level data history. An average head difference of 1.35 feet (range of 0.83 to 1.69 feet) was calculated for these wells. The 1.35 foot correction factor was added to the previously measured seasonal high to estimate a new projected seasonal high (April 2008) for each piezometer and well (Table 3B). Figure 7 (in the DHR) has been revised to show the projected seasonal high for April 2008. McGill Associates has incorporated the new April 2008 projected seasonal high groundwater levels in their subgrade design.

Post-settlement separation between bottom of clay liner and seasonal high groundwater (September 2007 through February 2008) were calculated by BLE and presented in Appendix I (Geotechnical Calculations) of the DHR. The post settlement liner-groundwater separations range from 6.95 feet at the P-6 location to 43.27 feet at the BLE-17 location. Since the revised seasonal high groundwater elevation has been increased 1.35 feet the resulting revised post-settlement separation from the water table to the bottom of the clay liner would range from 5.6 feet to 41.92 feet. The revised separations continue to exceed the 4 foot minimum specification in the regulations.

Haywood County is included in NOAA NC Division 1 and that data is routinely used as a representative measure for estimation of local precipitation and other atmospheric phenomenon.

NCSWS Item No. 27 (DHR comment):

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 {sic}”, which occurs in the upper aquifer before reaching fractures oriented north and south in the deeper aquifer.

Supplemental Information:

The text in this section accurately describes the groundwater flow at the subject site. No changes have been made to the DHR text.

CLOSING

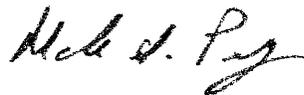
We appreciate the opportunity to serve as your hydrogeological and geotechnical consultant at this site. If you have any questions, please do not hesitate contacting us at (864) 288-1265.

Sincerely,

BUNNELL-LAMMONS ENGINEERING, INC.



Andrew W. Alexander, P.G.
Senior Hydrogeologist



Mark S. Preddy, P.G.
Senior Hydrogeologist

Attachments: Revised DHR

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