81-05

David Garrett, P.G., P.E.
Engineering and Geology

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Carmen Johnson

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Ms. Elizabeth Stewart, Hydrogeologist
NC DENR Division of Waste Management
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Response to Regulatory Review Comments
Rutherford County MSWLF Site Suitability

Dear Ms. Stewart:

Thank you for the thorough review comments provided in your letter dated December 4, 2003. I have reviewed your comments and the captioned work, and I have made several corrections and amendments. I would like to respond to your comments line by line to provide clarification on some issues. Please refer to the following responses and enclosed documents.

Per our meeting with Jim Barber, Head of the Permitting Branch of the Solid Waste Section, I am expecting a Site Suitability approval letter from the Section, indicating that the review is complete and that the site has been deemed suitable by the Section, upon providing a satisfactory response to the Section's comments, including (but not limited to) your comments regarding the hydrogeological study. I understand there may yet be comments from the Section engineers. However, County officials understand that the Site Suitability approval is based largely on the hydrogeological study and the following of proper protocols for public participation and local government approval.

Section Site Suitability Report

Subsection 2.2 – Drawing S2 has been modified with domestic well information shown in the Local Area Photo, Drawing S3. Please note that all of the identified wells are located across major streams from the proposed landfill facility; none are expected to be impacted by the existing or proposed landfill. Municipal water supplies are available throughout the area.

Subsection 2.4.2 – The "east-west" typo has been corrected.

Subsection 2.5 – The dates of advertisements and the local government public participation meetings have been identified (31 days separated the advertisement and the public meeting).

Please replace Section 2 with the revised text in your copies of the report.

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Tables

Table 5 – Ground water levels were not observed after 24 hours at all test borings due to periodic breaks in the field activities. Many of the borings recharged slowly, particularly those with deeper ground water levels. Some piezometers required several days or weeks to establish equilibrium after completion, thus it is not anticipated that the lack of 24-hour water levels is detrimental to the project. Please note that time-of-completion, 24-hour, and stabilized water level observations are summarized on Table 4, not Table 5.

Table 7 – Ground water elevations shown in the table are correct. However, Drawing S6 does not show the correct water elevations (the data are actually bedrock elevations, which is an inadvertent error in the preparation of the drawings for printing). Drawing S6 has been corrected.

Please replace the entire Tables section with the revised tables in your copies of the report.

Figures

Drawing S2: Local Area Map – Negotiations are underway for the purchase of the private residence. We understand that the house is a rental unit, and that the owners have responded favorably to the County's inquiry regarding a future sale of the property.

Drawing S6: Ground Water Contours – As discussed (under Tables), the drawing has been corrected to present data for ground water observations made June 2, 2000. Exceptions include B-14 and B-25, which were completed shortly before this date, thus the stabilized ground water levels observed June 20, 2000 are presented (and the map is thus annotated).

Drawing S7: Bedrock Contours – Bedrock data for B-2, B-4, and B-11 should have been labeled "less than" the indicated elevations, which represent the respective boring termination depths. There are no potential bedrock separation issues at these test boring locations.

The auger refusal elevation for B-33 on Drawing S7 has been corrected to show El. 899.5.

Auger refusal conditions in the vicinity of B-13 are now defined based on one test borings. The test boring log presented in Appendix C indicates that the Rock Quality Determination of the materials within the upper 15 feet beneath auger refusal are highly weathered (RQD values are less than 15%). This indicates that the materials possibly could be moved with an excavator without the need for blasting or ripping. Such being the case, this material is arguably not "bedrock" but a highly weathered "pinnacle" of harder material, embedded within a zone of highly weathered rock material (e.g., saprolite). Other borings and on-site observation support the conclusion that this is an isolated zone of boulders or a ledge of relatively shallow, rock-like material.

I would respectfully request that we defer formalizing any conclusions regarding bedrock separation on this portion of the site until additional borings for the Design Hydrogeologic Study are completed.

Facility Map: A new figure has been prepared showing the entire property boundary, along with the proposed footprints of the respective phases. This figure (modified Drawing S2), shows all known test borings and monitoring wells locations, as well as the boundaries for the active CDLF and the closed MSWLF, both of which are down gradient of the proposed MSWLF site.

Appendix C

The construction of piezometers without grouting the annular space is an outdated practice that will not be repeated. None of the piezometers constructed in this manner are down gradient from either the active CDLF or the closed MSWLF units. In this case, the risk to local ground water is minimal, since the up gradient areas have not contained solid waste units. Past activities have been agricultural and/or residential in nature. The piezometers were constructed with sand packs and bentonite seals, thus the water level observations are reliable. Upon completion of the permitting process, the affected piezometers will be properly abandoned.

A legend for the Field Borehole Log records, describing the relevant subsurface materials and well construction materials, is enclosed.

The "collar elevation" on the Test Boring Records refers to the ground surface. This term came from NC DOT work, in which the "collar" was a reference point for measuring stratigraphic changes.

The several borings that had several weeks between the start and completion dates were initially advanced to refusal conditions with a machine-turned auger, typically without encountering ground water, then an air-hammer was utilized to penetrate the denser materials until water was encountered.

Test boring records for B-9s and B-26D have been revised (see enclosure).

Discrepancies between the drilling dates on the logs and Table 1A have been resolved with the correction of the table.

The discrepancy with the ground elevation at B-30d between the log and Table 1A has been resolved with the correction of the boring log. The depth of the well was corrected on Table 1A.

Appendix D

Table 2 was corrected to reflect a 15 percent fraction of gravel in the sample.

Table 2 has been corrected to show a 68 percent fraction of sand in the sample, per the lab data.

The classification of the referenced samples has been reexamined. Most of the samples exhibit a fraction of "fines" (smaller than the No. 200 sieve size) just under 50 percent, leaving slightly more than 50 percent in the "coarse" range (sands, gravels, etc.). The USCS classification system establishes a threshold between ML and CL soil types (silts and clays) as 50 percent or more of the

sample passing the No. 200 sieve, as opposed to the coarser SM, SC, GM classifications, which have less than 50 percent passing the No. 200 sieve. Technically, all the referenced samples should be SM on the basis of 35 to 45 percent (less than 50 percent) passing the No. 200 sieve.

However, in reality it is often difficult to distinguish between a fine sand and a silt, and when the samples have a high silt-clay content, the engineering behavior of the soils tends to mimic the finer grain varieties (e.g., soil-moisture relationships, plasticity, affinity for water), characteristics that influence earthwork and water movement. Plus, these soils tend to contain a high percentage of mica, which can skew the soil-weight measurements to the coarser fractions, leading to an erroneous conclusion regarding the behavior of the soils in the field. Some practitioners, myself included, use dual classifications (SM-ML) on borderline soils to indicate that, while the soils classify as sands based on the laboratory tests, "hands-on" experience indicates the soils may behave more like finer soils than the lab tests indicate.

Appendix E

The test boring records for monitoring wells in the Appendix (cordially furnished by others) and the enclosed data table provide a fairly complete summary of conditions within the existing monitoring well network. BPA Environmental will be contacted to check for any further well construction records they may have.

There are no available records for MW-1 through MW-4, based on an earlier check with BPA. The date of installation is unknown, but believed to be late 1980s. My search of the County's records turned up no records for these wells.

See the enclosed table for well construction summary for these wells (furnished by BPA).

The boring log for MW-11A (see Appendix E of the site Suitability application) indicates that no water-bearing fractures were encountered below a depth of 37 feet, thus the well screen was set at 45 feet. Presumably, the deeper boring was grouted – the well completion records from BPA should verify this. I have initiated contact with my colleagues at BPA for their records.

Appendix F

The discrepancies between the aquifer thicknesses shown on the field conductivity test reduction and those shown on Table 3 were resolved by correcting Table 3. Please note that the Bouwer-Rice and/or Hvorslev calculations are not particularly sensitive to the aquifer thickness input parameter.

The discrepancy in Table 3 for B-9s has been noted, but the correction is superceded (see below).

Slug tests for three borings, B-4, B-15, and B-22, when reduced by the Hvorslev method resulted in an inexplicable negative value (see Appendix F). Obviously, negative values are not correct. However, upon further examination of the slug test calculations, another error was noted.

All of the slug tests were reduced using an incorrect value for pipe radius and effective well radius (diameters had been input instead of radii!). Thus, all of the slug test calculations have been rerun, which changed a few of the values. All calculations produced positive values. Table 3, 7, and 8 have been corrected. Please replace the enclosed calculations in Appendix F and discard the previous calculations. The changes are not detrimental to the suitability of the site.

These corrections necessitated revisions to Section 4 of the report. Please note changes to the text on pages 4-9, 4-17, and 4-18 (and other minor revisions throughout this section). Please replace Section 4 with the revised text in your copies of the report.

Closing

I appreciate the opportunity to provide these corrections, and I look forward to completing this phase of the project (pursuant to Site Suitability approval) at your earliest convenience. Please contact me if there are any further questions or comments regarding this submittal.

On behalf of Rutherford County, I appreciate your effort and sincerely value our cordial working relationship.

Very Truly Yours,

G. David Garrett, P.G., P.E.

cc: Don Baynard, Director, Rutherford County Solid Waste Department

Enclosures