North Carolina Department of Environment and Natural Resources

Dexter Matthews, Director | **Division of Waste Management** | Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

September 28, 2010

Sent Via US Mail and Email - sgarrison@madisoncountync.org

Mr. Steve Garrison
Madison County Manager
P.O. Box 579
Marshall, NC 28753

Re: *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network*
Closed and Unlined Madison County Landfill, Permit #58-02

Dear Mr. Garrison:

The Solid Waste Section (Section) has reviewed the *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* dated July 15, 2010 and submitted by the Law Offices of Leake, Scott, and Stokes and Altamont Environmental, Inc. The *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* was submitted pursuant to a letter issued by the Section on May 11, 2010 in response to the *PCE Investigation Summary Report* dated April 14, 2010.

Within the May 11, 2010 letter, the Section required additional assessment based upon the following: (1) volatile organic compounds were detected and no further assessment activity was recommended within the report ; (2) auger refusal was shallow due to rock or soil density ranging from 11-18 feet below ground surface on the Edwards' property and therefore, limiting the understanding of the underlying geology; (3) PCE and/or daughter products were not detected within any of the soil and mulch samples on the Edwards property, indicating another source for the contamination in the Edwards' well; and (4) no recommendation was made for conducting detailed investigations to determine the interconnectivity of the landfill and the fractures identified within the Edwards' well. In addition, the current groundwater monitoring well network that monitors the three County landfill disposal areas consists of only two groundwater monitoring wells, a background spring (not a groundwater monitoring well), and two off-site residential potable wells. The current groundwater monitoring system for the facility needs to be upgraded immediately.

Review of the July 15, 2010 Proposal and the July 29, 2010 Conference Call

After reviewing the *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* response dated July 15, 2010, the Section needed clarification regarding several statements contained within the report. Therefore, on July 29, 2010, the Section initiated a conference call with you, the County Solid Waste Director (Mr. Jim Huff), and Altamont Environmental, Inc. (Mr. Joel Lenk and Mr. Stu Ryman) to discuss the *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* response. During the conference call, the following items were discussed:

- The status of an alternate source of water for the Edwards. The Section is encouraged that the County reported that it is working with the Town of Marshall regarding annexation, easements, and public water connection. During the July 29, 2010 telephone conversation, the County reported that the Edwards are not consuming the water from their well and have been purchasing bottled water.

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- The field work that has been completed thus far, and the fact that PCE did not exist in soils at the Edwards' residence indicates the existence of another contaminant source.
- The over pumping of wells could potentially exacerbate the existing contamination problem. The Section discussed concerns that based upon the present minimal understanding of the groundwater flow regime, especially in the fractured rock zones penetrated by the Edwards well, over pumping can locally and temporarily change the direction of groundwater flow and cause contaminants to move into new, unaffected areas.
- The proposed groundwater monitoring well(s) location(s) and well construction details contained within the *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* response and the figures emailed on July 28, 2010 to the Solid Waste Section were discussed for further clarification. The installation of the groundwater monitoring well(s) should be installed at the compliance boundary (250 feet from the waste boundary, or 50 feet within the property boundary, whichever point is closer to the source) pursuant to 15A NCAC 2L .0107.
- The newly installed groundwater monitoring well(s) will be measured for static water levels and developed. Later within the week, the newly installed groundwater monitoring well(s) will be measured again for static water levels. Purging will be conducted using the three well volume calculation method or if using low flow purging technology, the well shall be purged until field parameters have stabilized. Field parameters will be measured and the groundwater samples will be analyzed for Appendix I of 40 CFR 258. For reference, the Section has a guidance document for environmental sampling on our Solid Waste Section webpage (http://portal.ncdenr.org/c/ document_library/get_file?uuid=d28d4f91-4b6d-4c9d-afd9-47c47c 9ee93615f&groupId=38361).
- In the *Phased Assessment Plan and Upgrade of Groundwater Monitoring Network* response, Altamont Environmental, Inc. requested assurance that "if PCE is not detected in the new well(s), then Madison County will not be required to install additional wells to address the historical detections in the Edwards' well." During the July 29, 2010 conference call, the Section stated it could not provide assurance that additional groundwater monitoring wells will not be required near the Edwards' property because of all the present unknowns concerning the nature and extent of contaminants and the hydrogeology.

  Additionally, in accordance with 15A NCAC 2L .0106 (d)(1), a person conducting or controlling an activity under the authority of a permit which results in an increase in concentration of a substance in excess of the standards at or beyond the review boundary is required to undertake measures to prevent a violation of standards at the compliance boundary. Also, Condition #8 of the December 21, 1995 Closure Letter for Permit #58-02 provides: "Groundwater quality at this facility is subject to the "Classification and Water Quality Standards Applicable to the Groundwaters of North Carolina" (15A NCAC 2L). 15 NCAC has been re-denominated as Chapter 15A of the North Carolina Administrative Code. "This includes, but is not limited to, the provisions for detection monitoring, assessment, and corrective action." Madison County is therefore responsible for the post-closure care and monitoring of the solid waste management facility pursuant to the rules codified at 15A NCAC 13B Section .0500, *et. seq*., .0600, *et. seq*., and N.C.G.S. 130A-309.27. For reasons stated on page 1, and because of recent and historic violations of the State groundwater standards in existing groundwater monitoring wells, the current groundwater monitoring system for the facility needs to be upgraded immediately.
- The Section understands the expense of a groundwater assessment and remediation of contaminant releases. However, it is the Section's responsibility, for the protection of human health, the environment, and the protection of a State resource, to require owners and operators of solid waste management facilities to assess and remediate contaminant releases from solid waste management facilities.
- Based upon the March 5 and 9, 2010 emails from Pace Analytical, to continue to attribute common landfill leachate constituents, methylene chloride and acetone, to possible lab contamination is not acceptable. We also discussed during the telephone conference that laboratory blanks taken during the reference sampling episode did not indicate the presence of methylene chloride and acetone.
- The Law Firm representing the County requested that a copy of future correspondence be sent to them. It is not the Section's policy to correspond with attorneys representing the County. You agreed that you preferred that the Section continue to send future correspondence to you and you would

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distribute as you prefer. We also discussed your preference about the Section calling the County's consultant directly to discuss the details of the proposed monitoring well installation(s). You stated your concurrence with that approach.

- The most recent routine semiannual water quality monitoring event that occurred on April 22, 2010 indicated volatile organic compound exceedances and detections within groundwater monitoring well MW01OLD.

The County's Complete Proposal

During our telephone discussion and also via email on August 2, 2010, the Section requested additional information regarding the details of the installation of the proposed groundwater monitoring well(s). The Section received a response via email from Altamont Environmental, Inc. on August 4, 2010. To clarify and finalize the groundwater monitoring well proposal within the August 4, 2010 email, the Section discussed the email via a conference call with Altamont Environmental, Inc. on August 25, 2010, and Altamont Environmental, Inc. sent a subsequent email to the Section on August 27, 2010. Based upon a review of the email sent on August 27, 2010, the Section sent an additional email to Altamont Environmental, Inc. and the County regarding the well construction details on September 16, 2010. The Section received an email response on September 16, 2010. The County's complete proposal submitted via email to the Section has been included as an attachment. The following is the Section's understanding of the County's proposal:

- All borings will be advanced utilizing an air-rotary rig at the landfill compliance boundary in the area designated by Altamont Environmental, Inc.;
- If groundwater is encountered within the unconsolidated zone, a groundwater monitoring well will be installed and the screen will be set to intercept the phreatic surface. A second well will be installed adjacent to the shallow groundwater well and advanced to the first water-producing fracture(s) within the bedrock. Groundwater samples will be collected and analyzed for Appendix I (of 40 CFR 258) constituents to evaluate whether additional groundwater monitoring wells are needed to define the vertical extent of the groundwater contamination;
- If the boring within the unconsolidated zone is dry**,** a 4 inch groundwater monitoring well will be set in a 2-5 foot socket into competent rock. The boring will be advanced to the first water bearing fracture(s). "Water bearing" will be determined by the production of 1-2 gallons per hour. If no water bearing fractures are encountered, the termination depth of the groundwater monitoring well will be 150 feet; and
- All groundwater monitoring wells will be constructed per 15A NCAC 2C rules.

The Section's Response to the County's Complete Proposal

In addition to the County's proposal, please continue to sample the Edwards' well located at 79 Long Branch Road on a monthly basis until an alternate water source is connected to the residence. As a result, if you concur with the Section's summary above, the proposal is approved with the following conditions and clarifications.

1. Please begin the groundwater monitoring well installation within 30 days of receipt of this letter.
2. The general requirement of a groundwater assessment is to define the nature and extent of contamination [i.e. the vertical and horizontal extent of the plume(s)] in accordance with 15A NCAC 2C (Well Construction Standards), 15A NCAC 2L (Groundwater Classifications and Standards), 15A NCAC 2H (NC Laboratory Certification), and 15A NCAC .0601 (Groundwater Monitoring Requirements). All assessment activities proposed by the County and approved by the Section must conform to all of these requirements.
3. Number two of the proposal states, "When a fracture or fractured zone is thought to be encountered, drilling will stop and the boring will be allowed to sit for a period of no less than one-half hour in order to determine if the fracture(s) is water bearing." Please extend the time from one-half hour to 2-3 hours.
4. Number two of the proposal states, "If the fracture(s) is determined to be water bearing, a

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recharge rate will be calculated to determine if sufficient water will accumulate in the boring to collect a water sample." Based upon a September 28, 2010 conversation with Altamont Environmental, Inc., we agreed that the recharge rate would be a minimum of 1-2 gallons per hour.

5. Number two of the proposal states, "Drilling activities within the boring will cease until the sample results are received from the laboratory and a telephone conference is conducted with the Solid Waste Section." Please do not stop drilling activities to have a conference call with the Section (especially if you are unable to get in touch with the Section). The Section recommends the following responses to the specific scenarios:
    a. If the 24 hour groundwater sampling results reveal that there are no volatile organic compound detections (J flag values) and/or exceedances of the NC groundwater standards, then please continue drilling the well.
    b. If the 24 hour groundwater sampling results reveal there are volatile organic compounds detections (J flag values) and/or exceedances of the NC groundwater standards, please stop drilling, and screen and set the well pursuant to the requirements within 15A NCAC 2C. However, please drill an additional deep well adjacent to the newly screened and set well to determine the vertical extent of the plume(s).
6. Please use a NC certified laboratory that is capable of reporting all constituent concentrations at or below the designated Solid Waste Section Limits (SWSLs).
7. Please note that analytical results from NC certified laboratories that continue to attribute common landfill leachate constituents to lab contamination will not be accepted.
8. Please include the Electronic Data Deliverables (EDDs) for all sampling results using the current template established by the Section.
9. Please submit a summary report to the Section within 30 days of receiving all analytical results from a NC certified laboratory. Please also include the boring log(s) with the well construction record(s) within the summary report.

If you do not concur with the Section's summary and understanding, please contact me within 10 days of receipt of this letter. If you have any questions or concerns regarding this matter, please feel free to contact me at (919) 508-8500 or by email at jaclynne.drummond@ncdenr.gov. Thank you in advance for your anticipated cooperation with this matter.

Sincerely,

Jaclynne Drummond
Hydrogeologist
Environmental Compliance
Solid Waste Section

cc via U.S mail and email: Diane and Joel Edwards

cc via email: Jim Huff, Madison County Solid Waste Director
Douglas McVey, Madison County Health Department
Mark Poindexter, Field Operations Supervisor
Andrea Keller, Environmental Senior Specialist
Deb Aja, Western District Supervisor
Landon Davidson, Aquifer Protection (ARO)

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Madison County's Well Installation Proposal Based upon Altamont Environmental, Inc.'s Emails Submitted to the Solid Waste Section

1. One boring will be installed in the proposed location of the 'Water Table Well' as depicted on Figure 2 (provided via email to the Solid Waste Section on July 28, 2010). This boring will have a diameter sufficient to accommodate a water table groundwater monitoring well, or PVC surface casing and a grouted annulus if necessary. The consultant anticipates that air rotary or sonic drilling methods will be used to advance the borings discussed in this well proposal. All drilling described in this well proposal will be conducted under the supervision of a North Carolina Professional Licensed Geologist with experience in bedrock drilling and drilling contractor oversight. Based upon data obtained from the Edwards' well, the consultant is proposing to extend the 'Water Table Well' boring through unconsolidated material, saprolite, weathered and partially weathered rock and into the top of competent bedrock, for a distance of 5 feet. The existence of competent rock will be determined by conducting a standard penetration test for which the "n-value" needed to drive a standard split spoon sampler is greater than 50 blows over a six-inch interval. When it is determined that the borehole has been extended 5 feet into the top of competent bedrock the boring will be allowed to sit for a period of approximately one hour in order to determine if the boring is capable of producing water sufficient to justify the installation of a 'Water Table Well'. Based on observations of the boring made during the one-hour interval, one of the following actions will be taken:
    1. If the boring **does not** produce sufficient water within the one hour period to justify the installation of a 'Water Table Well', the boring will be extended an additional 5 feet into bedrock and a PVC surface casing will be installed and grouted into place using a neat cement grout. The surface casing will be allowed to cure for a period of no less than 24 hours before drilling activities resume within the boring.
    2. If the boring **does** make sufficient water within the one hour period to justify installation of a 'Water Table Well', a 'Water Table Well' will be constructed within the boring. Three-eighths inch bentonite clay chips will be placed, via a tremie pipe, in the bottom two feet of the boring. Bentonite would be added to limit the possibility for interconnection between the water table aquifer and the fractured bedrock aquifer, if the unconsolidated zone is saturated and in case the water table aquifer is contaminated. Filter sand will then be installed from the top of bentonite to a thickness of one foot. A slotted PVC well screen will then be installed such that it brackets the water table. The well screen will have a length of no less than five feet. Filter sand will be installed in the boring annulus around the well screen and will extend to an elevation of one foot above the well screen. Three-eighths inch bentonite clay chips will be installed above the filter sand to an elevation of six inches below ground surface. The annulus will be capped with a neat cement grout and an appropriate surface completion will be installed on the well head. The well's construction will follow applicable North Carolina well construction standards for monitoring wells. Following the installation, the 'Water Table Well' will be sampled for Appendix I constituents, and the sampling results will be communicated to Ms. Jaclynne Drummond of the Solid Waste Section.
2. Assuming the boring **does not** make water and a surface casing is installed as described above, a smaller diameter boring will be drilled through the surface casing and into the

competent bedrock below in order to create a cased bedrock groundwater monitoring well. If the water table well is dry and is to be converted into the surface casing boring for the Type III well, a surface casing will be properly installed, grouted into place and allowed to cure for 24 hour per NC 2C regulations before a smaller diameter boring is installed through the surface casing as the boring for the Type III well. Drilling beneath the surface casing will be advanced slowly and will be conducted dry, meaning that water or other fluids will not be added to the boring as it is being drilled. The onsite North Carolina Professional Licensed Geologist will pay close attention to drill bit advancement, will note apparent fracture interception, and if those fractures appear to be water bearing. When a fracture or fractured zone is thought to be encountered, drilling will stop and the boring will be allowed to sit for a period of no less than one-half hour in order to determine if the fracture(s) is water bearing. If the fracture(s) is determined to be water bearing, a recharge rate will be calculated to determine if sufficient water will accumulate in the boring to collect a water sample. If the recharge rate is sufficient to allow the collection of a water sample within the one-hour time period, a sample will be collected and sent to a NC certified laboratory and analyzed for Appendix I constituents using a 24 hour turnaround time. Drilling activities within the boring will cease until the sample results are received from the laboratory and a telephone conference is conducted with the Solid Waste Section. It is expected that the boring will extend until either a water bearing fracture(s) is encountered or an elevation of approximately 150 feet below ground surface is reached. The maximum depth of waste is estimated to be approximately 75 feet below ground surface at this location.

If a water bearing fracture or zone is not encountered within the target depth of the groundwater monitoring well (150 feet below ground surface), the bedrock boring will be allowed to stand for a period of at least 24 hours and then checked to determine if there is any recharge of groundwater. If the well does not make water, Madison County will enter into a discussion with the Solid Waste Section to determine if the boring should be abandoned.

3. If the initial ‘Water Table’ boring makes water and a ‘Water Table Well’ is installed in that initial boring, a cased, bedrock, telescoping well, will be installed in a secondary, adjacent, boring, and will be completed as described above.