



North Carolina Department of Environment and Natural Resources

Dexter Matthews, Director

Division of Waste Management

Beverly Eaves Perdue, Governor  
Dee Freeman, Secretary

June 16, 2011

Sent Via Email - [jmitchell@alexandercountync.gov](mailto:jmitchell@alexandercountync.gov)

Mr. Josh Mitchell  
Alexander County Solid Waste  
621 Liledoun Road  
Box 12  
Taylorsville, NC 28681

**Re: *Corrective Action Evaluation Report (CAER)*  
*Alexander County C&D Over MSW Landfill, Permit #02-01***

Dear Mr. Mitchell:

The Solid Waste Section has completed a review of the *Corrective Action Evaluation Report (CAER)* dated March 22, 2011 (Doc ID 13596) and the *Corrective Action Evaluation – MW-16 Area of Concern* dated May 12, 2011 (Doc ID 14075) both submitted on behalf of Alexander County by Municipal Engineering Services Company, P.A. for the Alexander County C&D Over MSW Landfill.

The *CAER* was submitted pursuant to the County's *Corrective Action Plan* dated February 6, 2009 and approved by the Solid Waste Section on February 19, 2009. The Solid Waste Section also approved the County's selected remedy for this facility that includes the implementation of Monitored Natural Attenuation (MNA), Phytoremediation, Enhanced Bioremediation (using an edible oil substrate), Active Methane Extraction System, and Acquisition of Property.

Per the *CAER*, the results of the Biochlor modeling, the contaminant concentrations, and the completed MNA baseline data indicate that the plumes within each area of concern are stabilizing and/or decreasing, and there is adequate evidence provided that natural attenuation is actively occurring at the facility. In addition, the on-site water supply well located next to the scale house was abandoned in August 2010, and an adjacent property consisting of 15.70 acres located to the east of the facility was purchased in March 2011.

Within the *CAER*, the County provides the current status of corrective action activities and is also proposing several modifications in regards to the continued corrective action within the four following areas of concern: MW-24 Area, MW-26 Area, MW-16 Area, and MW-1B Area.

**MW-24 Area of Concern**

The corrective action at the MW-24 Area of Concern consists of MNA and Phytoremediation. The MNA baseline was completed for this Area of Concern. Also, approximately 200 hybrid poplar trees were planted within the drainage area between MW-12, MW-12D, and MW-7, and a protective fencing was installed around the Phytoremediation stand.

### **MW-26 Area of Concern**

The corrective action at the MW-26 Area of Concern consists of MNA and Substrate Injection. In August 2010, groundwater monitoring well MW-31 was installed. Then four additional groundwater monitoring wells were installed on February 14, 2011. The MNA baseline was completed for this Area of Concern. The UIC Program issued Injection Permit WI0300160 for this project, and approximately 19 gallons of 1.05x concentrated Bac-9 were injected into Injection Well IW-1.

### **MW-16 Area of Concern**

The corrective action at the MW-16 Area of Concern consists of MNA, the Acquisition of Property, and Substrate Injection. The MNA baseline was completed for this Area of Concern. In August 2010, groundwater monitoring well MW-32 was installed. Then two additional groundwater monitoring wells, MW-33 and MW-34, were installed on the newly acquired property on April 27, 2011 to delineate the contamination extent for this Area of Concern. Based upon the *Corrective Action Evaluation – MW-16 Area of Concern* letter, initial analytical results indicated no detections above the Groundwater Standards within groundwater monitoring wells MW-33 and MW-34. Groundwater monitoring well MW-33 did indicate detections of benzene, cis-1,2-dichloroethene, and 1,1-dichloroethane above the laboratory established method detection limits. In addition, surface water sampling location, SW-6, will be implemented upstream from groundwater monitoring wells MW-5 and MW-16 during the next scheduled semiannual sampling event in order to monitor the newly acquired property.

### **MW-1B Area of Concern**

The corrective action at the MW-1B Area of Concern will consist of Active Methane Extraction and the Acquisition of Property. Alexander County is in the process of purchasing the adjacent property in order to provide additional buffer at this location. Also, in October 2010, three landfill gas monitoring wells, MEW-1, MEW-2, and MEW-3, were installed as test points along the northern waste boundary, within the vicinity of the scale house. The three landfill gas monitoring wells have not been connected to an active system and are currently functioning as passive vents. A one month pilot test is scheduled in 2011 for a possible active blower system.

Groundwater samples from groundwater monitoring wells MW-1 and MW-1B were sent to GEL Laboratories for tritium and low-level tritium analysis in September 2010. The low-level tritium results indicate 7.73 TU within groundwater monitoring well MW-1 and 7.10 TU within groundwater monitoring well MW-1B. Per the report, these levels correspond with naturally occurring levels on Earth's surface, and the absence of tritium indicates that landfill gas not leachate is a more probable cause of the contamination within groundwater monitoring wells MW-1 and MW-1B.

### **All Areas of Concern Requests**

Per the CAER, the County requests that the following MNA parameters be removed for this facility: Biological Oxygen Demand (BOD), Ethane, Ethane, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids.

- Biological Oxygen Demand (BOD) provides evidence of anaerobic activity and measures the quantity of oxygen used by the microorganisms to oxidize all of the organic compounds.
- Ethane and Ethene provides evidence of the daughter product of vinyl chloride and complete dechlorination at a facility.
- Hydrogen is an excellent indicator of a redox environment, and the range of hydrogen concentrations is indicative of the particular biodegradation process occurring (nitrate reduction, iron reduction, sulfate reduction, methanogenic).
- Dissolved Methane provides evidence of vinyl chloride oxidation and evidence of impacts from landfill gas.
- Carbon Dioxide provides evidence of the ultimate oxidative daughter product and is a principal constituent of landfill gas.

- Volatile Fatty Acids provide insight into the types of microbial activities that are occurring in the subsurface and can serve as electron donors. Volatile Fatty Acids include pyruvic acid, lactic acid, acetic acid, propionic acid, and butyric acid.

Based upon the technical evaluation of Biological Oxygen Demand (BOD), Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids, the request for removing these parameters from the semiannual Corrective Action MNA parameter monitoring list for the Areas of Concern at the facility is not approved at this time because these MNA parameters provide insight into the subsurface geochemistry, biogeochemistry, site variability, and overall long term natural attenuation at the facility. However, the Solid Waste Section will approve an alternate frequency for these specific MNA parameters.

Therefore, the Solid Waste Section approves the following alternate frequencies beginning with the next scheduled MNA sampling event:

- Biological Oxygen Demand (BOD) shall be analyzed on a semiannual basis (both sampling events) during every *fifth* year of MNA sampling;
- Ethane and Ethene shall be analyzed on a semiannual basis (both sampling events) during every *third* year of MNA sampling;
- Hydrogen shall be analyzed on a semiannual basis (both sampling events) during every *third* year of MNA sampling;
- Dissolved Methane shall be analyzed on a semiannual basis (both sampling events) during every *second* year of water quality sampling;
- Carbon Dioxide shall be analyzed on a semiannual basis (both sampling events) during every *third* year of MNA sampling;
- Volatile Fatty Acids shall be analyzed on a semiannual basis (both sampling events) during every *third* year of MNA sampling;

These MNA parameters will not be required for the June 2011 MNA sampling event except for the newly installed groundwater monitoring wells MW-33 and MW-34. In addition, please perform the MNA screening model on an annual basis.

#### **MW-24 Area of Concern Requests**

The Solid Waste Section approves the following:

- MW-7 may be sampled on an annual basis instead of a semiannual basis due to its proximity to the waste boundary, however water level measurements will be required on a semiannual basis;
- Semiannual MNA sampling shall occur at MW-12, MW-12D, and MW-24 for all of the MNA parameters including the approved frequencies for BOD, Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids. MNA sampling at these groundwater monitoring wells are important due to their downgradient locations from the Phytoremediation stand;
- Annual MNA sampling may occur at MW-6 and MW-25 for all of the MNA parameters including the approved frequencies for BOD, Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids; and
- MW-13 may be removed from the MNA sampling network at this time.

#### **MW-26 Area of Concern Requests**

The Solid Waste Section approves the following:

- MW-3 may be sampled on an annual basis instead of a semiannual basis due to its proximity to the waste boundary, however water level measurements will be required on a semiannual basis;
- Semiannual MNA sampling shall occur at MW-11 (upgradient), MW-26 (downgradient), and MW-31 (downgradient) for all of the MNA parameters including the approved frequencies for

BOD, Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids;  
and

- Annual MNA sampling may occur at MW-27 (side gradient) for all of the MNA parameters including the approved frequencies for BOD, Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids.

#### **MW-16 Area of Concern Requests**

The Solid Waste Section approves the following:

- Annual MNA sampling may occur at MW-5 and MW-16 for all of the MNA parameters including the approved frequencies for BOD, Ethane, Ethene, Hydrogen, Dissolved Methane, Carbon Dioxide, and Volatile Fatty Acids;
- Based upon the *Corrective Action Evaluation – MW-16 Area of Concern*, initial analytical results indicated no Groundwater Standard exceedances within groundwater monitoring wells MW-33 and MW-34. As a result, please conduct a comprehensive MNA baseline for these two new groundwater monitoring wells consisting of four consecutive semiannual water quality events beginning with the next semiannual water quality monitoring event; and
- Please conduct semiannual surface water monitoring at the new location designated as SW-6.

Finally, per the April 15, 2011 letter issued to the County, please submit copies of the permits, deeds, and other recorded items in addition to the survey plat map which meets the requirements of N.C. General Statutes § 47-30.

If you have any questions or concerns regarding this letter, please contact me at 919-508-8500 or by email at [jaclynne.drummond@ncdenr.gov](mailto:jaclynne.drummond@ncdenr.gov). Thank you again for your continued cooperation with groundwater corrective action at this facility.

Sincerely,



Jaclynne Drummond  
Compliance Hydrogeologist  
Solid Waste Section

cc via email: Mark Poindexter, Field Operations Supervisor  
Deb Aja, Western District Supervisor  
C.T. Gerstell, Environmental Senior Specialist  
Larry Frost, Permitting Engineer  
Brian Wootten, Permitting Hydrogeologist