



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



**Thomas S. Burack, Commissioner**

February 8, 2010

John Schwalbe  
Casella Waste Management, Inc.  
25 Greens Hill Lane  
Rutland, VT 05701-3804

**Subject:** Bethlehem – North Country Environmental Services Landfill, 581 Trudeau Road,  
DES #198704033, Project #1737

**Corrective Action Plan North Country Environmental Services  
Landfill**, prepared by Sanborn, Head & Associates, Inc., dated November  
24, 2009, and received December 1, 2009

Dear Mr. Schwalbe:

This letter provides comments by the Department of Environmental Services (Department) regarding North Country Environmental, Inc.'s (NCES) proposed Corrective Action Plan (CAP), referenced above.

**Background:**

The CAP was submitted in response to the Department's request for a comprehensive Work Plan that clearly identifies the soil and groundwater performance standards to be achieved following completion of both proposed and already performed corrective action work at the site, and addresses the comments provided in our July 17, 2009 letter. The Department's expectations for the comprehensive CAP were further discussed with NCES representatives and Sanborn, Head & Associates, Inc. (SHA) at meetings held on October 7, 2009, and November 13, 2009.

The proposed CAP provides a summary of the corrective actions taken to date, and outlines a framework to objectively evaluate potential contamination sources and determine the effectiveness of each corrective action taken.

**Comments:**

Based on our review of the CAP, the Department has the following comments. The requested clarifications and CAP revisions must be addressed before the Department can render a final decision on the CAP.

1. **Section 1.0 – Introduction** - Regarding the sixth bulleted item, the Department agrees with the proposed approach to: a) identify the source(s) of contamination detected for each monitoring well, b) document that each specific remedial action taken to address the source(s) of contamination detected in each well is effective, and c) determine there are two consecutive rounds that are consistent with decreasing trends demonstrated through the application of Mann-Kendall methodology or other approved statistical methods. The Department does not concur with NCES' proposal that following two consecutive sampling rounds showing decreasing concentration trends for bromide and VOCs in MW-402U and B-913M that NCES be allowed to return to triannual monitoring of **all wells**. The water quality conditions at MW-402U and B-913M cannot be used to determine sampling requirements for all wells at the site. If water quality conditions in other wells warrant a more aggressive sampling schedule than currently required, the Department reserves the right based on new information to request that *more frequent sampling of impacted wells be performed*.

DES Web Site: [www.des.nh.gov](http://www.des.nh.gov)

P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095  
Telephone: (603) 271-2908 Fax: (603) 271-2181 TDD Access: Relay NH 1-800-735-2964

2. Section 3.3 – Potential Sources of Groundwater Contamination – Although the discussion on potential sources for the observed concentrations of VOCs and bromide in groundwater did not include the breach in the capping system membrane and rub sheet of the gabion-lined Stage 1 stormwater downchute as a potential source, a discussion relative to the discovery and subsequent repair of this area is documented in Section 4.3. In Section 4.3, it is noted that the breach allowed leachate seeping from beneath the Stage 1 synthetic cap to enter the storm water swale and discharge in the area up-gradient from one of the impacted wells, B-913M. Therefore, the Department considers the breach to be a potential source for the elevated concentrations of bromide and VOCs detected in B-913M. The CAP should explicitly identify this as a potential source.
3. Section 3.3.2 – Landfill Gas - Because no site specific Landfill Gas (“LFG”) data was available when the CAP was prepared, SHA’s discussion of the presence of VOCs in LFG and its potential relationship to VOCs detected in groundwater monitoring wells at the site, is based on a review of available literature pertaining to LFG at municipal solid waste landfills comparable to the NCES site. However, the Department notes that NCES recently submitted a proposed Sampling and Analysis Plan for Landfill Gas and Condensate on January 12, 2010, and that the data collected under this Plan will provide site specific LFG and condensate data to further evaluate whether LFG is in fact the source of several VOCs detected in site monitoring wells.
4. Section 5.2 – Monitoring Well B-913M - SHA indicates that the leachate-related sources of VOCs and bromide detected in this well have been remediated. SHA also concludes that the August 7, 2006 leachate spill is the predominant cause of contamination detected in B-913M, and while releases from the aforementioned hole in the capping system may have contributed contaminants to B-913M, the contaminant concentration trends in their view are inconsistent with an ongoing release. However, the Department notes that in B-913M the concentrations of both 1,4-dioxane and bromide have increased since the October 14, 2009 sampling event. Specifically, 1,4-dioxane was detected at a concentration of 4 ug/L in the November 9, 2009 sample and bromide was detected at a concentration of 0.2 mg/L and 0.3 mg/L in the November 9, 2009 and the December 8, 2009 sampling events, respectively. The December 8, 2009 bromide data were received after the CAP was submitted. The Department does not have 1,4-dioxane data more recent than the November 9, 2009 event. The Department notes that 1,4-dioxane was consistently detected in multiple samples from the most-recent (July 2009) leachate sampling round. This is the first time leachate samples have been analyzed for 1,4-dioxane. In order to demonstrate the validity of the conceptual model that all sources of contaminants in B-913M have been remediated, additional groundwater quality data must be obtained and closely analyzed to show that the concentrations of VOCs and bromide in B-913M are in fact decreasing. NCES shall continue the monthly monitoring to collect additional data to determine if the concentrations are decreasing.
5. Section 5.3 – Monitoring Wells to the Northeast - The data collected under the proposed Sampling and Analysis Plan for Landfill Gas and Condensate, as submitted to the Department by SHA on January 12, 2010, will be evaluated to help assess the validity of the conceptual model being presented by NCES/SHA for the presence of the VOCs in these wells (i.e., that the source of VOCs detected in these wells results from the historical unlined landfill plume migration). Specifically, LFG samples will be reviewed for the presence of dichlorodifluoromethane (DCDFM), trichlorofluoromethane (TCFM) and 1,1-dichloroethane (1,1-DCA) to determine whether the VOCs detected in these groundwater monitoring wells could be related to LFG migration.

Review of future water quality data will also be a part of this assessment. On February 1, 2010, the Department issued a technical review comment letter in response to the proposed Sampling and Analysis Plan for Landfill Gas and Condensate. A revised Sampling and Analysis Plan which incorporates the technical details discussed in our February 1, 2010 letter is anticipated.

6. Section 6.1 – Enhanced LFG Extraction – Stage I Landfill – In the CAP, NCES proposes additional LFG collection measures to counteract the potential for LFG migration from the western end of the northern anchor trench. NCES also proposed to install and collect samples from two soil-vapor probes in the area directly north of the Stage I Landfill anchor trench (and south of the well MW-402U area) prior to and two weeks following commencement of the additional LFG-collection measures. As indicated by SHA, this pre- and post- sampling effort would provide a direct measure of whether LFG was in fact migrating away from the western end of the northern anchor trench and if the enhanced LFG extraction measures are effective at stopping/preventing further LFG migration in this area. Along with the demonstration of a decreasing trend of groundwater contaminant concentrations in well 402U, the pre- and post- LFG data from the probes was intended to provide convincing data showing that LFG was the source of specific VOCs and that the enhanced LFG extraction effort effectively remediated this source. The value of taking this approach was discussed at the November 13, 2009 meeting. While the Department concurs with the proposed additional corrective actions as presented, we understand that some of the LFG extraction measures (i.e. sealing the leachate sump riser structures and installation of the additional gas extraction wells such that there is a net increase in LFG extraction), commenced prior to the installation of the soil vapor probes. While the Department concurs with implementing LFG enhancements as one of the measures to control potential sources of some of the VOCs detected in groundwater, by increasing the vacuum on the LFG extraction system prior to sampling the soil-vapor probes, the ability to directly correlate the effectiveness of the LFG enhancements was diminished. As a result, there will need to be greater reliance on groundwater quality data to demonstrate the effectiveness of this particular corrective action measure. This may require more time than might have been required if the probes had been sampled beforehand.

On February 8, 2010, the Department received a letter report from SHA, "Re: Fall 2009 Landfill Gas System Improvement Projects, North Country Environmental Services, Inc., Bethlehem, New Hampshire, Permit No. DES-SW-SP-03-002", which contained a summary of activities performed in the fall of 2009 related to the installation of eight LFG extraction wells. The eight LFG extraction wells were installed between November 19 and December 2, 2009. SHA's letter states that the LFG modification components were placed in service sequentially as individual segments were completed. The CAP should include a summary and timeline of when all the landfill gas extraction measures, including the sealing of leachate sump risers and installation of the eight additional LFG extraction wells, were completed and increased gas extraction occurred.

7. Section 6.2 – Evaluation of Groundwater Analytical Data - The CAP proposes that once NCES has implemented the measures in Section 6.1 to provide additional direct extraction of LFG from the Stage I Landfill (see discussion in Item #6) and there are two consecutive sampling rounds that are consistent with decreasing concentration trends using the Mann-Kendall methodology, or other approved statistical method, for bromide and VOC concentrations at MW-402U and B-913M, that NCES be permitted to return to triannual monitoring.


SHA asserts that the VOCs detected in groundwater at MW-402U since December 2008 (diethyl ether, 1,1-DCA, and occasionally cis-1,2-DCE) originated from LFG, likely emanating from the anchor trench on the north side of Stage I, and migrating along the bed of the former drainage pipe that discharged to the swale near well MW-402U. SHA indicates that the VOC concentrations now present in this well are attributable to the residual effects of historical LFG migration. It is the Department's position that the groundwater sampling data used to demonstrate that there is a consistent decreasing concentration trend in MW-402U, must be taken beginning from that point in time when the remedial work is completed, not before. In this instance, the specific remedial action is the start up of the enhanced LFG gas extraction effort. Groundwater data collected before that event can not be used because it is data that is influenced by other remedial actions taken to improve groundwater quality, such as removing soil, piping, tanks and other leachate management infrastructure. In order to demonstrate that LFG is the source of diethyl ether, 1,1-dichloroethane and cis-1,2-dichloroethene, and that the decreasing concentrations of these VOCs are in fact due to the enhanced LFG extraction efforts, the statistical analysis of trends must be based on water quality data collected after the enhanced LFG extraction effort was initiated. Please revise the Table in Section 5.4, Analysis of Groundwater Quality Trends, to reflect this.

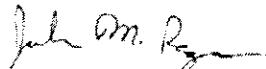
If the performance standards are not achieved as needed to verify the conceptual model for the presence of VOCs and bromide in site wells, and the data indicate the presence of an additional source or sources, the Department will require NCES to look further for other potential sources and to implement other corrective action work.

The Department notes that the November 2009 Water Quality Monitoring Results report, submitted by SHA on behalf of NCES and received December 21, 2009, is still under review and any review comments will be issued under separate cover.

Please contact us if you have questions .

Sincerely,

  
Karlee Kenison, P.G.  
Waste Management Division  
Tel: (603) 271-6542  
Fax: (603) 271-2181  
E-mail: [karlee.kenison@des.nh.gov](mailto:karlee.kenison@des.nh.gov)

  
John Regan, P.G.  
Waste Management Division  
Tel: (603) 271-3744  
Fax: (603) 271-2181  
E-mail: [john.regan@des.nh.gov](mailto:john.regan@des.nh.gov)

Waste  
Management  
Division

Digitally signed by Waste  
Management Division  
DN: cn=Waste Management  
Division, o=NHDES, ou=WMD,  
email=kimberly.durgin@des.nh.  
gov, c=US  
Date: 2010.02.08 14:04:27 -05'00'

ec: Bryan Gould, Esq., Brown, Olson & Gould  
Richard Head, Esq., NHDOJ  
Michael Wimsatt, P.G., Director, WMD/NHDES  
Michael Guilfooy, P.E., Administrator, SWMB/NHDES  
Paul Rydel, P.G., SHA  
Kevin Roy, NCES – Bethlehem  
Town of Bethlehem, Board of Selectmen