

STATE OF NEW HAMPSHIRE

Inter Departmental Communication

DATE: November 12, 2008

AT (OFFICE): NHDES/WMD

FROM: Karlee Kenison *KAK* & John Regan *JMR*
Hazardous Waste Remediation Bureau
Site Remediation Programs

SUBJECT: **Bethlehem** – North Country Environmental Services, Inc. Landfill Facility,
DES #198704033

Response to September 10, 2008 NHDES Comment Letter, prepared by North Country Environmental Services, Inc., dated October 13, 2008 and received October 20, 2008 (with attachments prepared by CMA Engineers, Inc., Liner Leakage Analysis, dated October 14, 2008 and Sanborn, Head & Associates, Inc., Hydrogeologic Analysis, dated October 17, 2008)

Analysis of Site Hydrogeologic Conditions Relative to Potential Leachate Leakage – Monitoring Well MW-402U/L Area, prepared by Sanborn, Head & Associates, Inc., dated October 24, 2008

TO: Pamela Hoyt-Denison & Mike Guilfooy
Solid Waste Management Bureau

This memorandum has been prepared to document comments/conclusions based on our review of the documents listed above. The additional reports were submitted in response to Section D of the Department's September 10, 2008 correspondence relative to groundwater conditions at the site. We have reviewed these and earlier submittals to assess the extent and potential sources of bromide and several volatile organic compounds detected in several monitoring wells. The water quality monitoring program for North Country Environmental Services landfill is conducted in accordance with Groundwater Management and Release Detection Permit GWP-198704033-B-005 which was issued on November 9, 2007 and subsequent Department requests for information based on water quality results submitted for the permit.

The Liner Leakage Analysis and Hydrogeologic Analysis were prepared to provide for Department consideration as to whether the concentrations of contaminants found in monitoring wells on the site could have been the results of a liner leak, and to support NCES' position that the landfill containment system is not leaking and is not the source of the bromide and volatile organic compounds detected in several monitoring wells.

D 1.- Remedial Plan Activities Near Well Couplets MW-402 and MW-403:

CMA indicates multiple assumptions were made in their estimation of leakage rates. While they believe the assumptions made are reasonable and conservative they do indicate that other assumptions could be made that would change the results of the calculations. CMA further indicates that they do not believe that any reasonable assumptions could result in substantial leakage from the landfill due to the documented secondary flows and the known properties of the double liner. Some of the assumptions used in their calculations are based on the landfill containing a liner constructed with care and using rigorous quality control and quality assurance measures and an analysis of historic leachate flows in the primary and secondary liner systems. We have not reviewed any information relative to documentation of the liner systems for the areas of the landfill being evaluated, and we have not reviewed the leachate flow records to determine whether their assumptions and assertions relative to the quality of liner construction and leachate flow rates are consistent with information in DES files and experience at other landfill sites.

While it may be plausible, based on the calculations provided, that leakage from the landfill containment system is not the source of the VOCs and bromide detected in the wells, because a great deal of assumptions were made in the calculations, there may be alternate ways to interpret the data. There is no independent field or environmental data to verify their estimations of landfill leakage rates and their conclusions that there are no releases from the landfill containment system contributing to the contaminants detected in the groundwater.

Based on our review of the information they presented along with the information that is contained in the files we do not feel that we can conclude that the contaminants are entirely from the leachate management infrastructure and handling practices, and rule out the possibility that there is a release of contaminants coming from the landfill containment system. We believe that their hypothesis on the source of the bromide and VOCs detected groundwater will need to be verified by assessing both soil and groundwater performance data.

As indicated in the DES correspondence of September 10, 2008, until the remedial work is completed and performance expectations are met, DES will be unable to definitively conclude that the leachate management infrastructure activities are the sole source of the contamination.

Proposed Groundwater Performance Standards:

We agree in concept of monthly monitoring until sampling confirms that a downward temporal trend is established. However, depending on the variability of the water quality data more than two consecutive rounds may be needed to demonstrate the trend.

Additionally, with regards to 0.4 mg/L of bromide being the target to demonstrate that background has been achieved, they will really need to look at individual well histories to see what "true" background concentrations were in the affected wells. Future monitoring results will be reviewed closely to assess trends.

D-2: Well B-913M

NCES continues to indicate that the detection of the VOC tetrahydrofuran (THF) is the result of this well being located downgradient of the leachate management infrastructure and that this will be addressed as part of the current upgrade program. NCES indicates that completion of the remedial work in this area, including relocating and improving the leachate infrastructure and soil removal, should result in a decrease in VOC concentrations in this well. The remedial work will need to be completed and soil and groundwater performance standards achieved to verify that the cause of THF in this well is in fact related to the leachate management infrastructure and not from another source such as leak in the landfill containment system.

Additionally, it will need to be further demonstrated over time that Bromide concentrations in this well are trending downward to background concentrations previously established for this well.

Proposed Groundwater Performance Standards:

As with the proposal for wells MW-402U and MW-403L, we agree in concept with monthly monitoring until sampling confirms that a downward temporal trend is established. However, depending on the water quality variability more than two consecutive rounds may be needed to demonstrate this. Additionally, in regards to 0.4 mg/L of bromide being the target to demonstrate that background has been achieved, NCES will also need to look at the individual well history to see what "true" background concentrations were in this affected well and that should be the target goal to establish concentrations have returned to background conditions. Future monitoring results will be reviewed closely to assess trends in water quality over time.

D-3: Wells B-919U, B-921M, and B-921U

We are not able to fully concur with conclusion presented at this time. Need to continue to demonstrate decreasing a trend of dichlorodifluoromethane (DCDFM) in wells B-919U and B-921M. If decreasing trend does not continue, further evaluation of the presence of this compound will be required. Barring any dramatic changes in the DCDFM results, the information from this well is less critical to the issue of whether there is an ongoing release from the landfill containment system.

In regards to bromide in B-921U, future data will need to be closely evaluated to demonstrate that the cause of the bromide in this well is consistent with the construction-related release scenario presented by NCES. If a downward trend towards background previously shown for this well is not demonstrated by future sampling results (2 years of data), then further evaluation of the presence of bromide in this well/area will need to be provided. Again barring any dramatic changes in the bromide results, the information is less critical to the issue of whether there is an ongoing release from the landfill containment system.

D-4: Well B-304UR

In regards to bromide in B-304UR, there is no additional information provided which helps to explain the occurrence of elevated bromide in this well. Rather, NCES proposes to increase the sampling frequency to monthly for bromide until two consecutive rounds of sampling confirm that the bromide levels have dropped below background at 0.4 mg/L. The Department notes that the July 2006 and November 2006 sampling data for this well indicate bromide at concentrations of .269 mg/L and .251 mg/L, respectively. As such, the target background concentration for this well should be less than the 0.4 mg/L. The elevated bromide can indicate a potential release. Therefore in order to characterize the groundwater in this well and aid in determining the source of the bromide release, the Department requests that analysis for VOCs be added to the monthly sampling. Future data will need to be closely evaluated to demonstrate that the cause of the bromide in this well is not the result of a landfill liner leak/failure.

Conclusion

In conclusion, the HWRB is not able to rule out that a release is occurring from the landfill containment system (liner systems). The recent information submitted by CMA and SHA on behalf of NCES suggests that it is plausible that the leachate management infrastructure and past handling practices could be the source or contribute a significant amount of bromide and VOCs detected in the groundwater monitoring wells. We recommend that their hypothesis relative to the source of the contaminants be verified with soil and groundwater performance data. Until the remedial actions are implemented and the soil and groundwater performance data are collected, we do not think there will be sufficient information to determine the source and conclude that it has been remediated. Some of the wells may be less critical to the issue of whether there is an ongoing release of contaminants from the landfill containment system. Regardless, all the wells should continue to be sampled until they meet the final performance standards which would be consistent with the requirements of a corrective action plan under the groundwater release detection permit rules (Env-Or 700).