North Country Environmental Services, Inc.

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April 23, 2008

Mr. Wayne A. Wheeler, P.E
Solid Waste Management Bureau
NH Department of Environmental Services
Waste Management Division
29 Hazen Drive, PO Box 95
Concord, NH 03301

MAY - 7 2008
ELM

**RE: North Country Environmental Services, Inc.**
**Landfill Facility - Bethlehem, NH**
**First Quarter 2008 Progress Report for NCES Projects**

Dear Mr. Wheeler:

As required by Special Condition No. 15 within the Groundwater Management Permit No. GWP-198704033-B-005 (Permit) for the NCES (North Country Environmental Services, Inc.) landfill, issued by the NHDES (New Hampshire Department of Environmental Services) on November 9, 2007, NCES has prepared this Progress Report.

This report provides a summary of work to date with regard to the Seep Restoration and Soil Remediation Projects. Consistent with our recent discussions, we have included a summary of the history which should provide context for the current activities.

Subject to your concurrence, we anticipate that future quarterly reports would focus on the most-recent project activities.

*Seep Restoration Project*

**BACKGROUND**

The focus of the Seep Restoration Project is the development of an approach to physically remove an accumulation of iron and manganese precipitate in the area of the "Main Seep" (water quality sampling location S-1) to aesthetically remediate the area. The Seep is located off the landfill property, about 250 feet northeast of NCES's property line. The Seep emerges from the south bank of the Ammonoosuc River at an elevation approximately 80 feet above the River. The bank seepage at the Seep start spans a lateral distance of about 25 feet. The slope of the south bank of the River in the vicinity of the Seep is about 1.5H:1V, and in some areas steeper. The slope is covered with dense brush, trees and boulders and, in areas of bank seepage along the slope, wetland-type vegetation.

The presence of the Seep along the south bank of the river is a direct reflection of the hydrogeology of the area. Three prominent soil units have been observed to comprise the stratigraphy at the NCES Landfill site. From the ground surface down, these soils include an upper glacial till unit consisting mainly of fine to medium sand and silt with moderate amounts of coarse-grained material and lesser amounts of clay; a heterogeneous sequence of stratified drift deposits comprised of silt and fine sands commonly inter-fingered with coarser-grained "till-like" subunits; and a very dense lower glacial till unit comprised mainly of sand and gravel with lesser amounts of silt. In the northeast portion of the NCES site, the stratigraphy consists primarily of stratified drift overlying the lower glacial till unit. The texture and distribution of soils in the vicinity of the Seep and landfill imply a complicated depositional environment associated with glaciation of the area, and include ice-contact deposits and moving and/or stagnant water deposits inter-fingered among the prominent soil units.

In the vicinity of the Seep, groundwater moves from higher elevations in the south to the north toward the Ammonoosuc River. While groundwater moves through the entire saturated soil column (up to 250 feet in thickness in the vicinity), flow is locally more prominent in zones of coarser-grained materials. The Seep is a surficial expression of such a zone of coarser-grained materials. It is likely that either a former glacial meltwater channel or stringer of gravelly soils provides for a zone of convergent groundwater flow from south to north, discharging at the Seep. The Seep emerges at the contact between stratified drift and less permeable lower glacial till soils, discharging to the bank above the River. The Seep contains considerably higher flow than other areas of bank seepage in the vicinity. While the flow is expected to vary seasonally, on the basis of visual observations, typical flow rates at the head end of the Seep are estimated to be in the range of approximately 50 gallons per minute.

On the basis of groundwater quality conditions (discussed below) it is known that the Seep discharges groundwater migrating from beneath the former unlined landfill at the NCES Site. The exact flow pathway from the former unlined landfill vicinity to the Seep is not known and made even more evident by the fact that there are smaller seeps adjacent to the Main Seep where evidence of current or historical water quality impacts has not been observed (based on prior sampling data).

When first investigated in 1984, water quality conditions downgradient of the former unlined landfill at the NCES Site, including water quality at the Seep, were found to be degraded by a number of constituents present in landfill leachate. As part of subsequent development of the lined NCES landfill facility, landfilled materials and visibly stained soils in the former unlined landfill were removed by NCES, and placed in Stage I of the lined landfill. This relocation project began in December 1991 and was completed in

October 1993. The presence and concentration of leachate constituents detected in the water quality samples collected at the Seep increased. This increase was a result of exposing landfill materials during the waste relocation project and reached maximum concentrations in 1994. Leachate constituent concentrations detected in the Seep samples have decreased markedly since that time with many constituents; most notably VOCs (volatile organic compounds) no longer detected. Iron and manganese continue to persist in groundwater discharging at the Seep; although an overall decreasing trend in the concentrations of these metals is apparent, with current concentrations substantially below those historically detected prior to the waste re-location effort.

The discoloration observed at the Seep is due to precipitation of iron and manganese from groundwater when the groundwater emerges at the ground surface and is oxidized. The current appearance of the Seep is the result of over 25 years of iron and manganese deposits on the slope above the river. Since removal of the source of contamination (the former unlined landfill) in 1993, groundwater quality in the areas downgradient from the former unlined landfill has improved significantly. The primary remaining impact is the presence of iron and manganese and the discoloration associated with iron and manganese precipitation.

Decomposition of waste materials and the production of leachate in the former unlined landfill consumed oxygen present in groundwater beneath the landfill, creating anaerobic (i.e., oxygen-deficient), reducing conditions in groundwater beneath and downgradient of the landfill. Iron and manganese, which are naturally present in soils, are dissolved under reducing conditions, and transported to the north with groundwater flow. When the groundwater discharges under atmospheric (oxygen-rich) conditions at the Seep, the dissolved iron and manganese in groundwater are oxidized and precipitate out of solution, resulting in the iron and manganese oxide deposits along the bank at and below the Seep. Natural attenuation processes would eventually restore the dissolved oxygen concentration in groundwater moving beneath the former unlined landfill which would, in turn, stabilize dissolution of iron and manganese from this vicinity and its eventual deposit at the Seep. In summary, the record of water quality data for the Seep indicates that water quality conditions at the Seep continue to improve with time, as a result of removal of the former unlined landfill and natural attenuation.

**REGULATORY REQUIREMENTS**

The most-recent Permit (No. GWP-198704033-B-004), issued by NHDES on November 9, 2002, included a Special Condition that required NCES to evaluate options for reduction of iron and manganese concentrations at the Seep and removal of the associated precipitate. A report presenting an evaluation of "... all options investigated and the option of choice" was also

required. This latter requirement was addressed by submittal of SHA's (Sanborn, Head & Associates, Inc.) May 27, 2003 report entitled "Condition No. 15 Groundwater Management and Release Detection Permit No. GWP-198704033-B-004." The SHA report included a feasibility study level of evaluation of several remedial alternatives to address the NHDES requirements, and recommended physical removal of the iron / manganese deposits (along with on-going water quality monitoring) as the selected remedial alternative.

In correspondence from the NHDES dated August 3, 2006, the Department concurred with the remedial alternative recommended in the above-described SHA report. In that letter, NHDES indicated that formal approval of the recommended remedial alternative was deferred until 2006 to allow collection of on-going monitoring data to confirm downward trends in iron and manganese concentrations in the groundwater discharging at the Seep. The NHDES letter directed NCES to proceed with developing the details needed to implement the recommended remedial alternative.

**PROGRESS TO DATE**

Following the August 3, 2006 NHDES letter, NCES proceeded with preparatory activities needed to develop the specific scope of the Seep restoration plan, including the means and methods that would be used to physically remove the accumulated iron and manganese precipitate. As the Main Seep is located in a wetland area, delineation of the associated wetlands and completion of related preliminary work necessary to prepare an application for a permit from NHDES' Wetlands Bureau to complete the removal program were an integral part of the initial development work. Other regulatory permits are likely necessary prior to commencement of the project including approvals from the United States Army Corps of Engineers, U.S. Fish & Wildlife and NHDES Departments.

Pursuant to the requirements of the August 3, 2006 NHDES letter, NCES has completed the following work on this project to date:

- On February 2007 we had an on site meeting with remedial contractors to review conditions in the area of the Main Seep and discuss potential means and methods that the contractors may employ to remove the precipitate. The site meeting provided a basis for the responding contractors to prepare preliminary cost estimates. It is anticipated that final costing would be developed following completion of the wetlands permitting work.

- Development of an access agreement (executed May 1, 2007) with the off-Site property owner (Daniel Tucker), allowing NCES to access the area of the Main Seep for purposes of implementing the selected remedy.

- Topographic survey of the Main Seep area, tied into the existing NCES Site datum (work completed by Alpine Survey in May 2007);

- Delineation of the wetland areas in the vicinity of the Main Seep (work completed by BH Keith Associates in June 2007), and survey of wetlands flags to show the limits of the wetland areas on the May 2007 topographic plan;

- Meeting with NHDES (September 21, 2007) to review the wetlands delineation work and discuss, in concept, the general scope of the project and the anticipated wetlands permitting process/requirements.

- Meeting with NHDES (October 31, 2007) to familiarize Wetlands Bureau staff assigned to the project with the information presented at the initial (September 21, 2007) meeting.

- An on site meeting with NHDES (November 27, 2007), as suggested by NHDES Wetlands Bureau staff, to review conditions in the area of the Main Seep.

- Development of a draft plan set presenting the wetlands delineation and a suggested construction sequence (including proposed wetlands protection and sedimentation/erosion controls) for implementation of the selected remedy.

- Meeting with Mr. Bill Thomas, NHDES Wetlands Bureau Supervisor (April 4, 2008) to review the scope of the project in response to re-assignment of personnel from the Wetlands Bureau.

*Soil Remediation Project*

**BACKGROUND**

The soil remediation work area is located upgradient of monitoring well couplets MW-402 and MW-403, and in the vicinity of the current leachate loading, storage and transfer areas. A source of the low level volatile organic compounds (VOCs) detected in groundwater samples from well MW-402U could possibly be remnants of leachate released into the upgradient vadose zone soils. A potential source of these compounds is leachate that is collected, stored and transferred in underground facilities in this area.

In November 2006, SHA reported on an assessment of vadose zone soil quality upgradient of well MW-402 and MW-403. The assessment focused on where leachate is handled and stored, past leachate breakouts from the landfill, and storm water infiltration from Detention Pond #2. The assessment included drilling 18 soil borings on a grid pattern. It was necessary to locate borings to avoid damaging active underground leachate storage tanks and transfer piping. As such, soil samples located adjacent to or below these

structures were not collected or analyzed. SHA did not observe or smell evidence of leachate contamination, and field screening and laboratory analyses of the soil samples did not detect leachate constituents in concentrations that would indicate a source for the observed groundwater impacts at well MW-402U.

**REGULATORY REQUIREMENTS**

NCES submitted a work plan to NHDES in September 2007 to address Special Condition 16 of the Revised Groundwater Management and Release Detection Permit GWP-198704033-B-004. The objective of the Work Plan is to delineate soils impacted by leachate, and excavate and place any impacted soil in the landfill. The targeted soils are located adjacent to or below leachate handling, storage and transfer facilities that are to be demolished and relocated to different locations. These facilities were installed above the water table. The scope of work is intended to remove impacted soil above the water table that could be a source for downgradient groundwater quality impacts. The scope of work applies to demolition activities that take place outside the limits of the lined landfill.

The work would be conducted as part of construction of leachate management modifications, and specifically as part of the current leachate management system demolition. The work would be conducted by a Contractor (or its subcontractors) engaged by NCES. The construction work related to soil remedial actions would be conducted under the guidance and supervision of our Consulting Engineering firm. To meet the project objective, we propose to complete the following scope of work:

1. Demolish the leachate structures and remove the underground storage tanks and leachate force main piping. Demolition involves excavation of soil, protection of existing utilities and other facilities, and segregation of clean and impacted soils as determined by the Engineer. Any usable equipment would be salvaged by NCES. All other demolished materials would be hauled to locations on the site for recycling or disposal.

2. Actual vertical and horizontal limits of the excavations would be determined by the Engineer in the field based on indications of leachate and other factors. All impacted soil, as determined by the Engineer based on appearance, odor and organic vapor readings (using a photoionization detector), shall be excavated and disposed in the active landfill. The excavations are not anticipated to extend below the water table. Soil located above the tanks and piping that appears to be free of impacts (clean), along with other clean soil, shall be stockpiled at a location designated by NCES.

3. Our Engineer would inspect and document the condition of all underground storage tanks and piping relative to evidence of damage,

corrosion or leakage. Documentation would include photographs and a written assessment of each tank and length of piping.

4. After all impacted soils are removed, as determined in the field by our Engineer, the Engineer would screen and sample soils on the excavation side walls and bottom for the presence of leachate impacts. Two discrete samples would be obtained from each tank excavation, and one sample would be obtained for each 100-foot length of piping removed. Additional samples would be obtained at the discretion of the Engineer based on the observed limits of the impacts. In addition to the samples taken of the soil exposed in the excavations, samples would be obtained from the clean soil stockpile to document the quality and appropriate use of those soils. The clean soil stockpile would be sampled at a rate of one composite sample for every 200 tons of soil up to 2,000 tons, and at a rate of one composite sample per 500 tons thereafter.

5. Soil samples would be collected in accordance with NHDES Env-Or 600 and Env-Or 700. Samples would be obtained by a trowel, scoop or spade. All samples would be identified, handled, shipped, tracked and maintained under chain of custody.

6. Each soil sample would be analyzed by a laboratory certified by the State of New Hampshire. The samples would be analyzed for chloride, bromide and the NHDES full list of volatile organic compounds using Method 8260B.

7. The tanks and associated piping may be located at considerable depth below the ground surface. The Contractor is responsible for maintaining a safe excavation and protecting adjacent structures, utilities and the landfill.

8. The excavations would not be backfilled until the results of confirmatory laboratory tests indicate the remaining soils are not impacted above NHDES Risk Characterization and Management Policy (RCMP) Method 1 Soil Standards, Category S-1, revised in April 2007.

9. The work would be conducted in compliance with all applicable provisions of federal, state and local health and safety statutes, codes and regulations, including 29 CFR Parts 1910 and 1926.

10. Existing monitoring wells and gas probes would be protected throughout the course of the work. Any wells that are modified through lowering, extension, decommissioning or replacement of monitoring wells would be completed by a licensed New Hampshire well contractor.

11. The work would be conducted in full accordance with project erosion and sedimentation control plans and Site Specific Permit conditions.

12. After completion of the work, the Engineer would prepare a report summarizing the work completed and documenting all test results, the proper disposition of the excavated soils, and the quality of soils left in place.

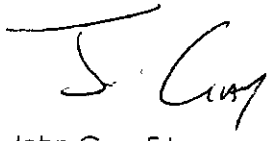
**PROGRESS TO DATE**

- Final design and construction documents are now being prepared, with an expected completion date by the end of this month.
- Construction approval submittal to NHDES in early May.
- Out to bid in mid-May.
- Construction starts in July.

We trust that the information provided above adequately addresses NHDES' requirements for this initial quarterly summary report. Should you have any questions or require additional information, please contact me at (802) 223 – 7221 or (802) 236 – 5973.

Sincerely,

NORTH COUNTRY ENVIRONMENTAL SERVICES, INC.



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