



environmental management, inc.

December 8, 2010

Shannon Harbour, P.E.  
Nevada Division of Environmental Protection  
901 South Stewart Street  
Carson City, Nevada 89701

Subject: Nevada Division of Environmental Protection Revised Response dated December 1, 2010 to: *Revised Excavation Plan for Phase B Soil Remediation of RZ-C, Addendum to the Removal Action Work Plan, Tronox LLC, Henderson, Nevada*

Dear Ms. Harbour,

On behalf of Tronox LLC (Tronox), Northgate Environmental Management, Inc. (Northgate) provides this letter in response to the Nevada Division of Environmental Protection's (NDEP) December 1, 2010 comments regarding the use of soil flushing to remediate localized areas of the Tronox Henderson facility (the Site). NDEP has expressed the following three concerns:

- Full-scale operation of soil flushing may adversely impact the current groundwater treatment system;
- The pilot-scale soil flushing work plan (dated October 8, 2010) does not include a proposal for the full-scale remediation system; and
- The Capture Zone Evaluation Report is necessary to demonstrate soil source control for leachable contaminants, and the current schedule will not allow NDEP to complete its review by December 31, 2010.

Our response to NDEP's concerns is as follows:

**I. Full-scale operation of soil flushing may adversely impact the current groundwater treatment system:**

Based on the results of the column leaching tests, our assessment of potential impacts of flushing on groundwater quality, and our assessment of the groundwater treatment system, we are confident that soil flushing will not adversely impact the groundwater treatment system. Relatively minor process modifications may be needed before proceeding with full-scale flushing. These may include an expansion of the capacity of the chromium treatment system, and monitoring and adjustment of the existing bioreactor process conditions. These modifications will be further evaluated during the pilot study phase, as described in our proposal for full scale implementation (see below).



**II. The pilot-scale Soil Flushing Work Plan (dated October 8, 2010) does not include a proposal for the full-scale remediation system:**

We prepared the October 8 work plan (“Pilot-Scale Work Plan”) in accordance with Northgate’s *Soil Flushing Work Plan*, dated May 27, 2010 and approved by NDEP on June 21, 2010. The purpose of the Pilot-Scale work is to further evaluate this technology and to acquire in-situ site-specific data for use in preparing the full-scale work plan. At NDEP’s request, Tronox agreed to move forward with the full-scale work plan in our November 5, 2010 update of the Remediation Schedule. In response to NDEP’s letter of December 1, 2010, we are now preparing a proposal for an expedited soil flushing program that we believe will attain the approved remedial goals within the shortest possible time frame. We anticipate submitting the proposal to NDEP by December, 17 2010.

As demonstrated in the column tests reported to you as part of the October 8, 2010 document, soil flushing appears to be an effective way to achieve approved remedial goals in vadose zone soil. Preliminary cost estimates indicate that it is a much more cost effective alternative to soil excavation and disposal. A cost benefit analysis will be included in the proposed work plan.

**III. The Capture Zone Evaluation Report is necessary to demonstrate soil source control for leachable contaminants, and the current schedule will not allow NDEP to complete its review by December 31, 2010.**

While Tronox proposed to submit the Capture Zone Evaluation Report on December 17, NDEP did not agree to this date. Tronox submitted the Capture Zone Report to NDEP on December 3. This report demonstrates through multiple lines of evidence that the on-site Interceptor well field exceeds the goal of 95% mass capture of perchlorate and hexavalent chromium at the Site. The areas proposed for flushing are located upgradient of the barrier wall and Interceptor well field. Thus, it is our opinion that Tronox has provided adequate documentation of groundwater capture in the current configuration. We will assess the capture of water applied for soil flushing and will present the results of this analysis to NDEP prior to implementation of full scale flushing at the Site.

In your letter of December 1, 2010, NDEP requested Tronox modify the *Excavation Plan for Phase B Soil Remediation of RZ-C* (RZ-C Excavation Plan; Northgate 2010) to remove additional soil, which now exceeds 450,000 cubic yards for the Site. Tronox has spent more than \$60,000,000 to remediate Site soils, and remains committed to meet NDEP’s mandate for source control of soil contaminants in accordance with the December 14, 2009 Finding of Apparent Violation. Tronox is reviewing NDEP’s requested changes to the RZ-C excavation polygons. We anticipate that the cost impact for removal of the perchlorate impacted soils are likely to be \$3,000,000 to \$6,000,000, depending on the depth of excavation needed. Considering the magnitude of the problem, we believe that an integrated approach is essential to achieve a long-term and sustainable remedial solution. The column study report submitted to NDEP on October 8, 2010 demonstrated that soil flushing is feasible and our preliminary analysis indicates it may



be a cost effective technique, with high potential to remediate contaminated soil at the Tronox facility. Towards that end, we look forward to discussing the revised RZ-C Excavation Plan with NDEP, in conjunction with soil flushing in selected remediation polygons.

Sincerely,



Deni Chambers, C.E.M.  
Principal in Charge  
Northgate Environmental Management, Inc.

