NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

STATE OF NEVADA
Department of Conservation & Natural Resources
Steve Sisolak, Governor
Bradley Crowell, Director
Greg Lovato, Administrator

November 4, 2020

Jay A. Steinberg
Nevada Environmental Response Trust
35 East Wacker Drive, Suite 690
Chicago, IL 60601

Re: **Tronox LLC (TRX) Facility**
Nevada Environmental Response Trust (Trust) Property
NDEP Facility ID #H-000539
Nevada Division of Environmental Protection (NDEP) Response to: Semi-Annual Remedial Performance Memorandum For Chromium And Perchlorate

Dated: September 4, 2020

Dear Mr. Steinberg,

The NDEP has received and reviewed the Trust's above-identified Deliverable and finds that the document is acceptable with the comments in the attachment noted for the Administrative Record. NDEP asks NERT to address the comments in the Attachment in future annual and semi-annual reports.

Please contact the undersigned with any questions at wdong@ndep.nv.gov or 702-668-3929.

Sincerely,

Dong Weiquan

Weiquan Dong, P.E.
Bureau of Industrial Site Cleanup
NDEP-Las Vegas City Office

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Attachment A

1. General Comments

General Comment #1

Several of the performance metrics presented in the Performance Memorandum (e.g., well field capture zone evaluation, horizontal mass flux across transects upgradient of the well fields, vertical mass flux per OU-1, OU-2, and OU-3) are evaluated/calculated using the Phase 5 Model. The reliability of these metrics to evaluate actual remedial system performance is dependent on how well the Phase 5 Model matches observed groundwater elevations, groundwater flow directions, and horizontal/vertical hydraulic gradients at the Site under the influence of the groundwater extraction systems. The Performance Memorandum states that the performance metrics will be evaluated in the future using the Phase 6 Model once it is approved by the NDEP.

The NDEP provided comments regarding the Phase 6 Model, dated July 22, 2020, to the Nevada Environmental Response Trust (NERT) that recommended modifications to the Phase 6 Model to improve the ability of the model to reasonably represent observed groundwater flow and contaminant transport conditions. NERT responded to these comments on October 9, 2020 effectively agreeing to implement NDEP's recommendations in the upcoming Phase 7 Groundwater Flow and Transport Model (Phase 7 Model). With NDEP's comments incorporated, the Phase 7 Model will provide a much more reliable predictive tool for the project moving forward. As a result, in future iterations of the Performance Memorandum, it is recommended that the Phase 7 Model, once completed, be used to evaluate/calculate the performance metrics to evaluate the effectiveness of the groundwater extraction systems at the Site.

General Comment 2

In future iterations of the Performance Memorandum, it could be helpful to include other lines of evidence to further demonstrate the performance of the groundwater extraction systems, consistent with the United States Environmental Protection Agency's (USEPA's) *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (USEPA, 2008). Several of the performance metrics presented in the Performance Memorandum rely on model predictions to evaluate the effectiveness of the groundwater extraction systems at the Site. Additional lines of evidence consistent with USEPA (2008) that are observation-based could be added to increase confidence in demonstrating remedial performance, such as groundwater elevation contour maps based on measured groundwater elevation data per water-bearing zone to illustrate the degree of horizontal capture achieved by the well fields in each zone, groundwater elevation difference maps between adjacent water-bearing zones to illustrate vertical hydraulic capture, and vertical hydraulic gradients at key nested monitoring wells to illustrate vertical hydraulic capture.

2. Essential Corrections

Essential Correction #1 Section 3.2.4, Page 18

It is mentioned that the Bioremediation Treatability Study is resulting in the destruction of 2 pounds of perchlorate per day while this groundwater extraction system is removing approximately 1,000 pounds of

perchlorate per day. For the evaluation of options for the final remedy, the size of the bioremediation area should be compared with the groundwater extraction area to compare the destruction rates of perchlorate per unit area.

Essential Correction #2 Section 3.2.4, Page 18, 1st paragraph, line 14

It is stated that "*Only the SWF has an overall capture efficiency of less than 100%*...", yet the table inset at the top of this page indicates a capture efficiency of less than 100% for all of the well fields. The statement likely is intended to refer to the hydraulic capture zone for the SWF from the particle tracking results shown on Figures 3a to 3b. This should be clarified.

Essential Correction #3 Section 3.2.6, Page 22

The December perchlorate concentrations for LVW 5.3 (Historic Lateral), LVW 4.75 (Calico Ridge) and LVW 6.6-1 (Sunrise Mountain) were elevated. The increase at LVW 6.6-1 is discussed and explained by the issues with the extraction system on the AMPAC/Endeavour Plume. The increased concentrations at LVW 5.3 and LVW 4.75 should also be discussed.

Essential Correction #4 Section 3.2.6, Page 23

The addition of a figure is suggested to show the effects of the shutdown of the AMPAC extraction wells AREW-1, 2 and 5 and AMEW wells 1-5 on flows and loading to the Las Vegas Wash. This figure would be similar to Figure 6 but would zoom in on the AMPAC area and show visually the changes in flow described at the top of page 23.

Essential Correction #5 Section 3.2.6, Graph Top of Page 24

A line showing a past average perchlorate loading at each location would aid in clarifying this graph.

3. Minor Corrections

Minor Correction #1 Section 1.1, Page 2, 1st paragraph, line 1; Section 3, Page 8, 3rd paragraph, line 5; and Section 3.2.4, Page 17, 1st paragraph, line 19

In the statement "…*will not be limited to the capture of perchlorate and chlorate present in groundwater west of Pabco Road*…", the word "chlorate" likely should be replaced with "chromium".

Minor Correction #2 Section 2.4, Page 6

Are the reduced chromium concentrations in groundwater extracted from the IWF and AWF part of a downward trend in chromium concentrations? It would be helpful to draw conclusions based on this observation relative to the site conditions and the success of the groundwater extraction remedy.

Minor Correction #3 Section 2.5, Pages 6-7

Are the reduced perchlorate concentrations in water extracted from the four well fields, but particularly the IWF, part of a downward trend in perchlorate concentrations? It would be helpful to draw conclusions based on this observation relative to the site conditions and the success of the groundwater extraction remedy.

Minor Correction #4 Section 3.2.6, Page 24, 2nd paragraph, line 5

The statement "…*is provided in Figure 7 and the following table*" likely is intended to reference Figure 6.

Minor Correction # Section 3.2.7

It may be helpful to divide up the environmental footprint into the different areas served by the treatment system for comparison purposes when selecting the final remedy or remedies.

4. References

Ramboll US Corporation (Ramboll), 2020. Semi-Annual Remedial Performance Memorandum for Chromium and Perchlorate, Nevada Environmental Response Trust Site, Henderson, Nevada, September 4.

USEPA, 2008. A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems, Final Project Report, Office of Research and Development, EPA 600/R-08/003, January.