June 10, 2013

Mr. Weiquan Dong, PE
Bureau of Corrective Actions, Special Projects Branch
Nevada Division of Environmental Protection
2030 E. Flamingo Rd., Suite 230
Las Vegas, Nevada 89119

Re: NERT Response to NDEP January 17, 2013 Comments on the Annual Remedial Performance Report for Chromium and Perchlorate, July 2011 – June 2012, dated August 2012

Dear Mr. Dong:

On behalf of the Nevada Environmental Response Trust (the Trust), ENVIRON International Corporation (ENVIRON) has prepared an annotated response to the Nevada Division of Environmental Protection's (NDEP's) comments on the Annual Remedial Performance Report for Chromium and Perchlorate, July 2011 – June 2012. The comments were included as Attachment A in a letter to the Trust dated January 17, 2013.

Please contact John Pekala at (602) 734-7710 if you have any comments or questions concerning this response to comments.

Sincerely,

John M. Pekala, CEM #2347
Senior Manager

Allan J. DeLorme, PE
Principal

Attachment

cc: BMI Compliance Coordinator, NDEP, BCA, Las Vegas
Brian Rakvica, McGinley and Associates, Las Vegas
NDEP c/o McGinley and Associates, Reno

ec: Shannon Harbour, NDEP
JD Dotchin, NDEP
Greg Lovato, NDEP
Stephen Tyahla, USEPA
Nevada Environmental Response Trust
Tanya O'Neill, Foley & Lardner LLP
Jeff Gibson, AMPAC
Mark Paris, BMI
Lee Farris, Landwell
Ranajit Sahu, BMI
Joe Kelly, Montrose
Paul Sundberg, Montrose
Curt Richards, Olin
Jay Gear, Olin
Ed Modiano, *de maximis, inc.*
Chuck Elmendorf, Stauffer
Nick Pogoncheff, Stauffer
George Crouse, Syngenta
David Hadzinsky, TIMET
Steve Sarandis, GEI Consultants
Kirk Stowers, Broadbent & Associates
Victoria Tyson, Tyson Contracting
Enoe Marcum, WAPA

ENVIRON International Corp. 2200 Powell Street, Suite 700, Emeryville, CA 94608
V +1 510.655.7400 F +1 510.655.9517

environcorp.com

Attachment A

Response to NDEP's January 17, 2013 Comments on the Annual Remedial Performance Report for Chromium and Perchlorate, July 2011 – June 2012, dated August 2012

The NDEP Comments (numbered and italicized) and Response to Comments (RTCs) from ENVIRON on behalf of the Trust are presented below:

1. *General comment, in future Deliverables, please explain any discrepancy between the combined monthly discharge rate from the three well fields and the total monthly influent rate to the GWTP and the FBR Biological Treatment Plant (FBRBTP).*

   Response: Future Deliverables will explain discrepancies between the combined monthly discharge rate from the three well fields and the total monthly influent rate to the Groundwater Treatment Plant (GWTP) and fluidized bed reactors (FBRs). According to Veolia Water North America (Veolia), the Groundwater Extraction and Treatment System (GWETS) operator, discrepancies are generally due to flow into and out of GW-11, as well as additions of stabilized Lake Mead water, which is used to maintain mechanical pump seals.

2. *Section 2, page 3, condense general conditions of groundwater at the site and discuss any changes from the previous Annual Performance Deliverable.*

   Response: Future Deliverables will provide a condensed discussion of general groundwater conditions and will focus more on the observed differences from the previous year. This change has been implemented beginning with the 2012 Semi-Annual Performance Report.

3. *Section 2.1, page 5, third paragraph, the recommendation that adjusts the extraction rate of some individual wells within the Interceptor Well Field (IWF) and commences pumping at several new extraction wells (I-W, I-X, I-Y, I-AA, I-AB, I-AC, and I-AD) is likely appropriate but the analysis for this recommendation provided in Appendix E is preliminary and additional monitoring and analysis will be required to fully optimize the IWF capture zones. This also similarly applies to the Athens Well Field (AWF).*

   Response: A preliminary analysis of groundwater capture and extraction at the Interceptor Well Field (IWF) and Athens Road Well Field (AWF) is outlined in Appendix E within the 2012 Annual Performance Report. ENVIRON agrees that the analysis described in Appendix E is a preliminary step. Additional monitoring and analysis will be required (including use of the approved groundwater model where appropriate) to evaluate the proposed optimization in operation of the IWF and AWF. ENVIRON is actively discussing the proposed optimization with NDEP as part of the Remedial Investigation and Feasibility Study (RI/FS) process.

4. *Section 2.4, page 8 Figure 4 reports a total influent of 842 gpm; however, the effluent reported is 901 gpm. Please discuss the 59 gpm discrepancy. Also, please clarify whether the perchlorate removed calculations are based on the influent or effluent flow rate.*

   Response: According to Veolia, the discrepancy is due to flow into and out of GW-11 as well as additions of stabilized Lake Mead water, which is used to maintain the mechanical pump seals. The perchlorate removal calculations presented in the Deliverable are based on the extraction rates at each individual extraction well for the AWF and the SWF. For the IWF, the influent flow rates prior to entering the GWTP are used for these calculations. This will be clarified in future Deliverables as will any discrepancy between the two effluent totals.

5. *Tables, add a table of the plume mass of perchlorate, chromium, and TDS for 2002, 2006, and 2012. The table should follow the format of the Table 4-1 of the Capture Zone Evaluation Report, Tronox LLC, Henderson, Nevada (Northgate, December 10, 2010).*

   Response: As allowed by available data, these tables will be prepared and included in the next Deliverable. ENVIRON plans to use the historical iso-concentration maps (where available) to estimate the mass totals.

6. *Tables 1, 2, and 3, change annual discharge rates to monthly discharge rates. The period should be the same as it in Table 6 (The period of Oct. 2002 to Jun. 2012). Add perchlorate, chromium, and the total dissolved solids (TDS) mass removal rates corresponding to the monthly discharge rates for each well.*

   Response: A new table (Table 4) will be added to future Deliverables that includes monthly discharge rates for the current reporting period. This addition has been made beginning with the 2012 Semi-Annual Performance Report. ENVIRON would like to discuss the request to include monthly discharge rates back to 2002 with NDEP prior to implementation, since it is not clear how these data will be used to assess current system performance.

   Calculations of monthly mass removal of perchlorate in the IWF, AWF, and SWF and of chromium in the IWF and AWF for the current reporting period will be included in the next Deliverable. The GWETS is not designed to remove TDS, and mass removal of TDS is not currently tracked; therefore, ENVIRON is not able to include TDS mass removal rates in the revised tables.

7. *Figures 2A, 2B, 2C, 2D, 10, and 22, please provide discussion regarding the cycles in both hydrographs and perchlorate concentrations.*

   Response: Figures 2a through 2d show that since May 2006 water levels in downgradient wells showed a continual decline until February 2008 when refurbishment of the recharge trench was completed. Refurbishment of the trench allowed increased

recharge rates and a corresponding rise in water levels was observed. Peaks in water levels in downgradient wells observed around July 2008 and May 2010 (Figures 2a through 2d) are in response to increased recharge rates during those times. These figures also show a significant decline in water elevations in the downgradient wells beginning around September 2010, when the recharge trenches were shut down and groundwater mounding associated with the recharge trench began to dissipate. This discussion will be included in future Deliverables.

Figure 10 charts perchlorate concentrations at the IWF over time and shows generally decreasing trends since sampling for perchlorate began in 2002. There is insufficient historic data regarding well operation and site conditions to determine the root cause of historic perchlorate cycles. In general, fluctuations in concentration have moderated over time since 2002. The IWF and nearby wells will continue to be monitored in an effort to understand the relationship between groundwater elevations and recent changes in perchlorate concentration. This discussion will be included in future Deliverables.

Figure 22 shows historical water elevations at the City of Henderson (COH) Water Reclamation Facility (WRF) well line. This figure indicates that many of the historical low-concentration events in the wells appear to be associated with a rapid increase in the water levels, likely the result of increased infiltration from ponds located on COH property. This discussion will be included in future Deliverables.

8. *Figures 19A and 21A, please provide more detailed analysis on the increase of perchlorate concentration from December 2011 to June 2012 for Wells MW-K4, PC-103, PC-98R, and MW-K5.*

Response: Perchlorate concentrations in MW-K4 generally declined between January 2010 (300 mg/L) and December 2011 (150 mg/L), but rebounded from January 2012 to September 2012, once again reaching 300 mg/L. During the last three months of the reporting period, perchlorate levels in MW-K4 declined to a low of 210 mg/L in December 2012. These increases and decreases in perchlorate concentration in MW-K4 do not appear related to changes in water elevation. The higher and more variable perchlorate concentrations in well MW-K4 may be influenced by the well's location with respect to subsurface alluvial channels within the UMCf. This discussion will be updated in future Deliverables to discuss current site conditions.

Figures 21 and 21a present perchlorate concentration trends for these same wells over time. While there has been some variation in concentration over the last year, during the current performance period (July to December 2012), wells PC-103, PC-98R, and MW-K5 were generally consistent with concentrations from late-2011. This discussion will be updated in future Deliverables to discuss current site conditions.

9. *Plates, add 3D plume maps of perchlorate, chromium and TDS for 2002, 2006, and 2012. The 3D plume map should follow the format of Figure 4-2 of the Capture Zone Evaluation Report, Tronox LLC, Henderson, Nevada (Northgate, December 10, 2010).*

   Response: ENVIRON would like to discuss the implications of this request with NDEP and the possibility of including this information in the forthcoming RI/FS.

10. *Plates 2, 6, 7, and 8, please provide these plates for each of the following years: 2002 and 2006 so that visual comparisons can be made with plume maps that are generated using consistent protocols and interpretations.*

    Response: Plate 7A included in the 2012 Annual Performance Report presents perchlorate data from 2002. ENVIRON was able to locate the requested maps with the exception of the chromium map from 2002. We will continue to look for this map and (if available) will include it, along with the other requested maps, in the next Deliverable as a one-time submittal.

11. *Appendix E, the NDEP provides the following comments:*
    a. *General comment, this analysis represents a preliminary analysis that is mostly based upon previous monitoring of the site conditions and expert judgment of the site conditions. It is important to reemphasize the point made in the report that additional monitoring and analysis will be required to fully optimize the IWF and AWF capture zones.*

       Response: ENVIRON agrees that additional monitoring and analysis will be required to evaluate optimization of the IWF and AWF. Future Deliverables will re-emphasize the need for additional monitoring and analysis during optimization of the IWF and AWF capture zones.

    b. *General comment, at the AWF site, the substantial reduction of pumping in ART-1 from 14.0 to 1.0 gpm should be reconsidered because the reduction in pumping may allow additional mass to migrate northward along the westernmost flank of the perchlorate plume. Perhaps one should consider balancing the reductions between ART-1 and ART-2 until further analysis could be performed with the groundwater model.*

       Response: Any pumping changes within the AWF will be monitored closely and pumping rates will be adjusted accordingly if it appears additional mass migration is occurring near the ends of the AWF. As discussed, additional testing will be performed prior to and during implementation of the proposed changes.

    c. *General comment, NDEP suggests that the revisions to the existing groundwater flow model be done in a timely manner so it can be used to explore various operational changes and to determine the most optimal capture strategy.*

Ultimately the capture zone analysis should be done using a combination of groundwater flow modeling and measured data (e.g. KT3D_H2O and measured water levels). Please clarify this in the next Deliverable.

Response: ENVIRON agrees. The groundwater model dated April 25, 2012 and updated on February 21, 2013 was approved for use on April 4, 2013. The approved groundwater model will be used in conjunction with measured data to analyze and enhance capture.

d. *Page E-3, the Deliverable states that water levels contours near the barrier wall were manually corrected. Please provide additional information on exactly how this was done. More specifically, clarify whether an estimated water level was used for every pumping location in place of the well function drift term and whether this manual adjustment was required for all wells or just those with very small pumping rates. Please state exactly how this problem was identified (e.g. KT3D_H2O predicted water levels at pumping locations were too high or too low).*

Response: Water levels and pumping rates were input into KT3D_H2O without any adjustments. However, the KT3D_H2O software does not have the ability to accurately interpolate contours adjacent to the groundwater barrier wall. Specifically, some of the software-created contours were not oriented perpendicular to the barrier wall, as hydrologic theory would dictate. Therefore, manual adjustments were made to groundwater contour lines directly adjacent to the barrier wall. ENVIRON is currently investigating alternative approaches to addressing the issue of representing contour lines at the barrier wall.

e. *Page E-5, please note in this section that KT3D_H2 was used to delineated the capture zones presented in Figures E-1, E-2, E-3, and E-4.*

Response: KT3D_H2O was used to develop potentiometric lines. The capture zones were then delineated by manually drawing lines perpendicular to potentiometric lines.

f. *Page E-5, please note how the perchlorate and chromium iso-concentration contours were generated for Figures E-1, E-2, E-3, and E-4.*

Response: Perchlorate iso-concentration contours in Figures E-1 and E-3 were hand drawn using contours identical to those on Plate 7 of the 2012 Annual Performance Report. Chromium iso-concentration contours in Figures E-2 and E-4 were hand drawn using contours identical to those on Plate 6 of the 2012 Annual Performance Report.

g. *Page E-5, 2nd paragraph and Figures E-3 and E-4, the hatched area shown in the center of Figures E-3 and E-4 is not shown in the legend. Please state that this is the zone in which the alluvium is unsaturated. If this zone represents an unsaturated alluvium, then please discuss how and why the iso-concentration contours were drawn in the region.*

Response: The hatched area shown in Figures E-3 and E-4 represents unsaturated alluvium as it had been presented in previous Deliverables. Iso-concentration contours were shown crossing the unsaturated alluvium since the concentrations depicted are for the Shallow Water Bearing Zone (WBZ), which, by convention, includes both the Qal and the UMCf.

h. *Sections 5.1, 2nd paragraph, please state the rationale for the increase or decrease in the discharge rate for each grouping of wells.*

Response: The adjustment of extraction rates was proposed on the basis of mass removal while also considering the maximum sustainable flow rates for each extraction well that have been established based on historical operation. For new wells that have not been operated, the maximum sustainable flows from nearby wells were used in conjunction with the lithologic logs to estimate reasonable anticipated flow rates. It is important to emphasize that the proposed flows are not meant to be permanent flows, but simply initial flow rates that will be further adjusted based on additional testing as indicated in Appendix E.