

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 April 3, 2013 Comments on the Semi-Annual Remedial Performance Report for Chromium and Perchlorate, July 2012 – December 2012, dated March 1, 2013, and

NERT Response to NDEP April 29, 2013 Supplemental Comments on the Semi-Annual Remedial Performance Report for Chromium and Perchlorate, July 2012 – December 2012, dated March 1, 2013

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 Semi-Annual Remedial Performance Report for Chromium and Perchlorate, July 2012 – December 2012. The comments were included as attachments in NDEP's letters to the Trust dated April 3 and April 29, 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
Ranjit 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

Attachment A

Response to NDEP's April 3, 2013 Comments on the Semi-Annual Remedial Performance Report for Chromium and Perchlorate, July 2012 – December 2012, dated March 1, 2013

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

1. *General comment, the Trust should start to increase the mass removal of the current system by focusing on pumping the wells installed in the Interceptor Well Field and the Athens Road Well Field. The focus on these wells is based on maximizing both the perchlorate removal from the two well fields and the system hydraulic and mass loading capacity.*

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. Further monitoring and analysis will be required to evaluate the proposed operational changes with the ultimate goal of optimizing perchlorate removal within the two well fields and increasing the overall efficiency of the GWETS. ENVIRON is actively discussing the proposed changes with NDEP as part of the RI/FS process (see response to Comment #2 in NDEP's April 29, 2013 supplementary comments below).

2. *Section 2 Area Groundwater Conditions, page 3, 3rd paragraph, in future Deliverables, please add a reference to the NDEP guidance for the water-bearing zone nomenclature (http://ndep.nv.gov/bmi/docs/090106_hydro_litho.pdf).*

Response: A reference to the NDEP guidance document for the water-bearing zone nomenclature will be included in future Deliverables.

3. *Section 2.1 Interceptor Well Field Area, page 5, Paragraph 3, the model submitted in the April 25, 2012 is just a groundwater flow model, not transport model.*

Response: ENVIRON agrees that the model submitted on April 25, 2012 is a groundwater flow model. Now that the model has been approved by NDEP, ENVIRON will use the groundwater flow model to analyze perchlorate fate and transport in the area between the barrier wall and the recharge trenches referred to as the "dead zone." This analysis will be based on the flow model, but may also include the use of a particle-tracking model, as appropriate.

4. *Section 2.3 Seep Well Field Area, page 7, paragraph 3, the extraction rate for the period of July to December, 2012 is 593.7 gpm, the highest in the previous four years. It is hard to understand why this happened. The efficiency of the perchlorate removal from groundwater in the Seep Well Field is much less than it is in the Interceptor Well Field and Athens Road Well Field.*

Response: ENVIRON agrees the perchlorate removal efficiency (as measured by the mass of perchlorate removed per unit volume of water extracted) of the Seep Well Field (SWF) is the lowest of the three well fields. Veolia Water North America (Veolia), the GWETS operator, reported that there were no significant operational adjustments to the SWF pumping rates during this period of performance. During the reporting period, groundwater elevations rose by 1.2 to 2.8 feet in monitoring wells near the SWF (PC-86, PC-90, PC-91, PC-94, and PC-97). The higher groundwater levels may have contributed to increased extraction rates within the SWF. Furthermore, decreased incidents of SWF extraction well downtime are at least partially responsible for the increase in average extraction rates during this period of performance. In 2012, the cumulative well downtime (percent downtime summed for all the SWF wells) was only 0.3% compared with 7.4%, 7.7%, 3.6%, and 4.6% in 2011, 2010, 2009, and 2008, respectively. Since the wells were operating more of the time, the average extraction rates (calculated as averages over the period of performance) would increase. ENVIRON notes that the extraction at the SWF is influenced by other features including the COH Birding Ponds as well as the Las Vegas Wash itself, which have yet to be evaluated using a groundwater flow model. The use of such a model as discussed in the RI/FS Work Plan will provide useful information in understanding the influence of these features as well as how to enhance capture while minimizing extraction at the SWF.

5. *Section 3.1 Chromium Plume Configuration, page 8, paragraph 2, the chromium plume map should be added for measuring interim remediation.*

Response: Given that the areal extent of the chromium plume is relatively stable, ENVIRON does not believe the preparation of an interim plume map is necessary to track chromium remediation. In addition, an interim plume map prepared as part of the Semi-Annual Report would not include data from many of the wells sampled during the annual sampling event (performed in May of each year). The absence of such data would limit the accuracy and comparability of an interim plume map.

6. *Section 3.2 On-Site Chromium Treatment System, page 10, paragraph 5, "A lesser amount of chromium is also removed in the FBRs." Please briefly explain how chromium is removed from the FBRs.*

Response: Chromium is routinely detected in the FBR solids at concentrations in the range of 510-890 milligrams per kilogram (mg/kg) measured as total chromium (based on 2012 data). During this period of performance total chromium FBR influent concentrations ranged from 0.0034J to 0.34 micrograms per liter (mg/L) and effluent concentrations ranged from 0.0043J to 0.013 mg/L. Additionally, hexavalent chromium influent concentrations ranged from 0.010 to 0.34 mg/L and effluent concentrations ranged from non-detectable (<0.000009 mg/L) to 0.00025 mg/L. Based on this analysis, the removal of chromium from the aqueous phase in the FBR

process would occur when solid-phase chromium precipitate is entrained in the biological floc (which is consistent with chromium being consistently detected in the sludge matrix). Chemical reduction of hexavalent chromium to the trivalent state would also occur in the FBR process due to the reducing conditions predominating in the FBRs. This discussion will be added to future Deliverables.

7. *Section 4.1 Perchlorate Plume Configuration, page 12, paragraph 4, the perchlorate plume map should be added for measuring interim remediation.*

Response: Given that the areal extent of the perchlorate plume is relatively stable, ENVIRON does not believe the preparation of an interim plume map is necessary to track perchlorate remediation. In addition, an interim plume map prepared as part of the Semi-Annual Report would not include data from many of the wells sampled during the annual sampling event. The absence of such data would limit the accuracy and comparability of an interim plume map.

8. *Section 4.1.1 Interceptor Well Field Area, page 13, NERT references a difference in TDS concentrations as a means of delineating plumes. Please clarify and discuss whether the plumes are indeed separated or if this is an artifact of the differences in well screen locations versus lithology. Please also include discussion on the possibility of this being the same plume but perhaps more diffuse in one direction laterally and or vertically. Stiff and or Piper diagrams may need to be used to explore this further. The Trust should note that before this analysis is completed, TDS data must be collected of sufficient quality that passes the cation-anion balance tests as discussed in several NDEP guidance documents.*

Response: For clarification, ENVIRON is not asserting that the lower total dissolved solids (TDS) concentrations definitively represent a separate perchlorate plume. We do note that this is a possibility but, as NDEP has pointed out, there are other interpretations of the data. However, ENVIRON does not believe it is necessary at this time to investigate the relationship of TDS and perchlorate concentrations to determine whether or not there are separate on-site plumes. Since the groundwater in both of these areas is being captured by the IWF, the existence of separate source areas does not have significant impact on the operation of the GWETS.

9. *Section 4.1.1 Interceptor Well Field Area, pages 12 to 14, the elevated perchlorate concentration coincides with rising groundwater table at the Interceptor Well Field Area, which suggests that additional sources of the perchlorate contribute the perchlorate to the groundwater reservoir. The Trust should investigate and discuss this issue and identify any additional sources of perchlorate.*

Response: Major perchlorate source areas were removed from the site during soil removal and excavation activities in 2011. However, it is known that additional perchlorate source areas remain at the site. These will be investigated and

discussed as part of the RI/FS activities that have been proposed in the RI/FS Work Plan submitted to NDEP in December 2012. As the RI/FS activities proceed, future Deliverables will incorporate new and relevant information on source areas and contaminant fate and transport. Monitoring of groundwater elevation and perchlorate concentration will continue as part of the Annual and Semi-Annual Performance Reports and discussions of the relationship between them will be included where appropriate.

10. *Section 4.1.3 Seep Well Field Area, page 17, paragraph 1, the concentration of perchlorate in the well of PC-133 increased from 0.63 mg/l in May 2012 to 13 mg/l in December 2012. The Trust should investigate and discuss this observation.*

Response: ENVIRON agrees that it is important to understand the observed concentration trends in PC-133, which is a pumping well within the SWF. ENVIRON has reviewed lithologic logs, groundwater levels, flow rates in the SWF wells as well as recent concentration data from wells at the SWF. Since the submittal of the Semi-Annual Report additional monthly data has been collected and is presented below in advance of the next Deliverable. Following the July – December 2012 performance period, perchlorate concentrations in well PC-133 continued to increase to 15 and 16 mg/L in January and February 2013, respectively. However, since reaching a high of 16 mg/L in February 2013, perchlorate concentrations decreased to 12 mg/L in March 2013 and 10 mg/L in April 2013. Our review of lithologic logs, water levels, nearby concentrations, and flow rates at the SWF has not identified a definitive cause for the observed concentration trend in PC-133. We note that PC-133 is on the eastern edge of the alluvial channel away from the other SWF pumping wells, which pump at significantly higher rates compared to PC-133 (PC-133 accounts for less than 1% of the total groundwater recovery at the SWF. Plans are being prepared to rehabilitate PC-133 in an effort to maximize its performance—see response to comment #11 below). Furthermore, the observance of decreasing concentrations in recent data suggest additional monitoring is necessary to understand whether this is a temporary shift in perchlorate distribution or a permanent change in the distal end of the plume. The data presented above and all subsequent monthly data will be discussed in further detail in the next Deliverable.

11. *Table 3, the pumping rate of PC-133 from July 2011 to December 2012 is less than the pumping rate for the period of July 2008 to July 2011. This well has a big increase in perchlorate concentration during the period of July 2012 to December 2012. Please provide justification for decreasing the pumping rate in the well of PC-133 when the pumping rate for most of the other wells in the Seep Well Field increased from previous periods.*

Response: No operational changes were reported in well PC-133 between July 2008 and the current reporting period. The valve and well were inspected on April

25, 2013 to ensure PC-133 is pumping at maximum capacity. Roots were observed in the well. ENVIRON is currently evaluating options for pulling the pump and rehabilitating the well to remove the roots that may be restricting flow. This would likely result in shutdown of the well for a day to complete the work. Once a plan is in place, ENVIRON will contact NDEP for approval of this work before proceeding.

12. *Table 5, the “gpm” from the note should be removed.*

Response: Future Deliverables will not include “gpm” in Table 5.

13. *Table 6, all perchlorate removals from the Seep Well Field are marked as estimated due to malfunctioning flow meter but Table 4 has the flow rate of each well in the Seep Well Field without an estimation mark. Please check the consistency from Table 4 and Table 6.*

Response: Table 6 (*Weekly Chromium in FBR Influent and Effluent, July-December 2012*) does not include information regarding the removal of perchlorate from the Seep Well Field. Assuming that the comment refers to Table 7 (*Perchlorate Removed from the Environment*), instead of Table 6, future Deliverables will be updated to include notations for estimated values.

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Response: As discussed in our response to comment #1 of the April 3, 2013 Comments on the Semi-Annual Remedial Performance Report for Chromium and Perchlorate, July 2012 – December 2012, dated March 2013, preliminary analysis of groundwater capture and extraction at the IWF and AWF is outlined in Appendix E within the 2012 Annual Performance Report. Further monitoring and analysis will be required to evaluate the proposed optimization changes with the ultimate goal of enhancing perchlorate removal within the two well fields and increasing the overall efficiency of the GWETS. ENVIRON is actively discussing the proposed changes with NDEP as part of the RI/FS process (see comment #2 below).

2. *NDEP requests that the NERT immediately implement Appendix F of the RI/FS Work Plan and to develop metrics for following four performance criteria:*
 - a. *The concentrations at which NERT is achieving 90% and 99% capture of perchlorate and chromium;*
 - b. *Pounds per day mass removal;*
 - c. *Mass discharge at the Athens Road Well Field;*
 - d. *Mass loading at Northshore Road.*

Response: Upon receipt of these supplemental comments on April 29, 2013, ENVIRON immediately began developing a scope and a budget for implementing this work. Because this work must be coordinated with the operator of the GWETS, Envirogen Technologies, Inc. (Envirogen), who takes over sole operations of the GWETS from Veolia Water on August 15, 2013, is currently reviewing this scope of work to determine how it may impact their operations and whether the work will incur any additional costs that are outside their existing contract with the Trust. Following Envirogen's review, the Trust plans to provide NDEP with a summary of costs to implement the work on or about June 21st.

As part of the implementation of this work, ENVIRON will develop the metrics that will be used to evaluate the proposed optimization changes. ENVIRON plans to prepare a Work Plan for NDEP review and comment describing the development of these metrics as well as detailing other critical aspects of the implementation.

- 3. The NERT should provide quantitative performance on these criteria in next semi-annual report.*

Response: ENVIRON can provide quantitative discussions of performance in relation to these criteria in future Deliverables, but notes that the specific metrics still need to be agreed upon by the Trust and NDEP.

- 4. The NERT should provide a complete assessment on the limitations of fully optimizing current the groundwater extraction and treatment system. This assessment should include the well production rates at each well field, the land availability, the pump capacity of each well field, the capacity of the pipe lines for influent and effluent, the discharge permit, GW -11 capacity, the chromium treatment system capacity and the FBR system capacity.*

Response: ENVIRON is actively discussing with NDEP the implementation of this scope of work as part of the RI/FS process. As part of the implementation of the GWETS Optimization Project, ENVIRON, with the assistance of the GWETS Operator, will perform the assessment consistent with this request. A Work Plan describing this assessment will be submitted to NDEP for review prior to implementation.