



**STATE OF NEVADA**  
Department of Conservation & Natural Resources  
DIVISION OF ENVIRONMENTAL PROTECTION

Brian Sandoval, Governor  
Leo M. Drozdoff, P.E., Director  
Colleen Cripps, Ph.D., Administrator

June 27, 2013

Jay A. Steinberg  
Nevada Environmental Response Trust  
35 East Wacker Drive, Suite 1550  
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: *Remedial Investigation and Feasibility Study Work Plan; Nevada Environmental Response Trust Site; Henderson, Nevada*

Dated: December 17, 2012

Dear Mr. Steinberg,

The NDEP has received and reviewed the Trust's above-identified Deliverable and provides comments in Attachment A. A revised Deliverable should be submitted **by 08/27/2013** based on the comments found in Attachment A. The Trust should additionally provide an annotated response-to-comments letter as part of the revised Deliverable.

Please contact the undersigned with any questions at [wdong@ndep.nv.gov](mailto:wdong@ndep.nv.gov) or 702-486-2850 x252.

Sincerely,

Weiquan Dong, P.E.  
Special Projects Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas City Office

WD:jd

EC: Greg Lovato, Bureau of Corrective Actions, NDEP  
James Dotchin, NDEP, BCA LV  
Adam Baas, Edgcomb Law Group  
Allan Delorme, ENVIRON  
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George Crouse, Syngenta Crop Protection, Inc.  
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Richard Pfarrer, TIMET  
Rick Kellogg, BRC  
Ron Zegers, Southern Nevada Water Authority  
Scott Bryan, Central Arizona Project  
Stephen Tyahla, U.S. Environmental Protection Agency, Region 9  
Tanya O'Neill, Foley & Lardner LLP  
Teri Copeland

## Attachment A

1. General Comment, the NDEP recommends that NERT update all cited references to the date that this Deliverable is finalized.
2. General Comment, the NDEP recommends that Executive Summary be added to the Deliverable. The executive summary should clearly states the long-term and short-term remediation goals of the NERT site.
3. General comment, the NDEP requests that NERT revise the Deliverable to include specific methods for calculating values for the 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 from environment;
  - c. Mass discharge at the Athens Road Well Field and the Seep Well Field;
  - d. Mass loading at Northshore Road. The mass loading at Northshore Road is sum of the mass discharge from BMI Complex and Common Areas, bank and stream bed storage and upper Las Vegas Wash.
4. General comment, the RI/FS study tasks are outlined in Section 6 (Remedial Investigation/Feasibility Study Tasks) of the Deliverable. Information related to data quality objectives (DQO's), methods for sample collection and analysis, methods for data evaluation and quality assurance, risk assessment methodology, and other critical components to supporting documents, such as a sampling and analysis plan (SAP), should be included in this Deliverable. It is suggested that these items could be included as appendices to allow for ease of future modification.
5. General Comment, use of the March 9, 2010 health risk assessment (HRA) Work Plan that has been developed and approved for this site is not included in this Deliverable. Since this HRA Work Plan was approved by the NDEP on March 16, 2010, the Trust should consider including it and add the information not covered in it to this RI/FS Work Plan.
6. General comment, since at least one site Chemical of Potential Concern (COPC) has been identified within the Las Vegas Wash; the Deliverable should include ecological risk. Due to the multiple sources of the downgradient water from the site discharge points, it is noted that this issue may be best addressed after aquifer restoration.
7. General comment, no discussion of radionuclide exposure and risk quantification was included in this Deliverable. The Trust should note that these risks should be addressed in any risk assessment performed for the site.
8. General comment, the RI/FS Work Plan as written does not provide any discussion as to the human health or ecological impacts for Category 1 or 2 Excavation Control Areas (ECAs), the Deliverable should clear state that potential risks for these ECAs are managed through the Site Management Plan (SMP).
9. General comment, the validation status of all data utilized in this Deliverable should be clearly stated.

10. General comment, all COPCs in groundwater should be addressed in this Deliverable, not just perchlorate and hexavalent chromium.
11. Section 2.1 Operational History, page 4, second paragraph, the Deliverables states that the 373 acres are leased to Tronox LLC. Please check the number of acreage for the NERT property, parcels proposed to sell and the leased area and make sure that they are accurate and consistent in all Deliverables.
12. Section 2.5.3 Local Hydrogeology, page 9, the Deliverable states that there is no water supply wells within four miles of the site. Please verify this through Nevada Division of Water Resources database and other related information available.
13. Section 3.1 Overview of Regulatory Actions and Environmental Investigations: 1970 to 2005, page 10. “Between 1971 and 1976” paragraph: Please specifically identify the surface impoundments constructed and refer to an existing figure, if applicable. “In July 1981” paragraph, first sentence: Please specify the “existing on-site impoundments” and refer to an existing figure, if applicable.
14. Section 3.2.1.2 Investigations of Parcel Soils, page 15, the Deliverable references the “Olin” groundwater treatment system. NDEP understands that the referenced groundwater treatment system is owned and operated by a group of companies and is generally referred to as the Olin Stauffer Syngenta Montrose (OSSM) groundwater treatment system. Please revise as necessary.
15. Section 3.2.2 Soil Gas, page 17, please discuss why some soil borings were collected at 20’ bgs. NDEP’s understanding is that the total depth of these borings was tied to the depth of the adjacent structures.
16. Section 3.2.3 Indoor Air, page 18, 2<sup>nd</sup> paragraph, NDEP provides the following comments:
  - a. The Deliverable references “occupational exposure levels”, please clarify if these are OSHA PELs or a site-specific derived number.
  - b. The Deliverable references  $10^{-5}$  as a point of departure for risk due to soil gas. Please revise the Deliverable to indicate that  $10^{-6}$  is the point of departure for risk due to soil gas.
17. Section 4.1 Interim Soil Removal Actions and Health Risk Assessments at the Facility Area, page 25, 2<sup>nd</sup> paragraph, please revise this paragraph to note that the Revised Interim soil Removal Action Completion Report was approved by NDEP on December 6, 2012. Sections 4.3 Site-wide Health Risk Assessment for Soil Gas, 5.1.3 Summary of the Soil Conceptual Site Model (CSM), and 5.1.5.2 Exposure Media and Pathways, pages 26, 44, and 49, respectively, the risk assessment should address exposure to soil gas for all EACs and all on-site receptors. Further, should the risks or HIs exceed  $10^{-6}$  or 1, respectively, for any on-site populations, then off-site exposures should be quantified as well.
18. Section 4.4.1.2 Perchlorate Removal and the Athens Road and Seep Well Fields, NDEP provides the following comments:
  - a. Page 28 – 30, chromium removal should also be discussed at the Athens Road Well Field (AWF) and the Seep Well Field (SWF). Please revise as necessary.

- b. Page 30, 4<sup>th</sup> paragraph, the total perchlorate removed from AP-5 is 1,176 tons that is less than the number of 1,295 tons reported in Page 4 of TRX-NDEP\_RTC\_ AP5 Pond Info Req 12-10-10 (ENVIRON, 2012), please show how the value was calculated identifying what data was used. Additionally, please revise text as necessary for consistency.
19. Section 4.4.2.1 Description of the Current Groundwater Extraction and Treatment System (GWETS), page 32. The Trust should describe the GWETS in more details. Basic information should be included is:
- a. The diameter, length and capacity of the pipe lines from the lift station 1 to lift station 2, from the lift station 3 to lift station 2, from left station 2 to the GWETS, the fluidized biological reactor (FBR) to the effluent discharge point at the Las Vegas Wash;
  - b. The capacity of all pumps in the GWETS;
  - c. The hydraulic and mass loading capacity of the Groundwater Treatment Plant or GWTP for the chromium treatment;
  - d. The hydraulic and mass loading capacity of the FBR;
  - e. The capacity of GW-11 pond, the perchlorate concentration, water level elevation and volume of present GW-11 and the roles of GW-11 in the GWETS.
20. Section 4.4.2.1 Description of the Current Groundwater Extraction and Treatment System, page 32, the Deliverable states “From the equalization tanks, the blended water flows through activated carbon beds to remove organic compounds before being filtered”, NDEP provides the following comments:
- a. The Trust should consider or discuss some means of filtration prior to the activated carbon beds to extend their useful life. It is understood that this evaluation is being deferred to a future Deliverable. Please track this matter as a data gap and address this matter in that Deliverable.
  - b. NDEP is not aware of any data that has been presented to date to demonstrate what sort of efficacy the activated carbon beds have and what compounds are being addressed. This issue is of increasing importance due to the high levels of organic compounds that may be approaching the system from the west. It is understood that this evaluation is being deferred to a future Deliverable. Please track this matter as a data gap and address this matter in that Deliverable.
  - c. Last paragraph, last sentence: Is the “seep surface-flow capture sump” the same as the “weir-sump” referred to in Section 4.4.1.2 that was constructed in 1999?
21. Section 4.4.2.1 Description of the Current Groundwater Extraction and Treatment System, page 32. When referencing laboratory quantification limits, e.g., “chromium concentrations in the SWF pumping wells are below laboratory quantification limits,” the Trust should identify what reporting limit is currently being used.
22. Section 4.4.2.2 Performance of the Current Groundwater Extraction and Treatment System, page 33, the Trust should estimate on how much perchlorate mass remains in the subsurface

and this estimate (or range) may be developed for use in assessing remedial durations of various alternatives.

23. Section 4.4.2.2 Performance of the Current Groundwater Extraction and Treatment System, page 34, there is no description of chromium removal for AWF and SWF, please discuss how the chromium of AWF and SWF is removed and identify the maximum capacity of chromium removal for these two well fields.
24. Section 4.4.2.2 Performance of the Current Groundwater Extraction and Treatment System, last paragraph, page 34. The installation of new extraction wells to capture the current withdrawal gaps at the ends of the IWF and downgradient of the AWF. The Deliverable suggests upgrading the existing system and adding additional wells at IWF and AWF to capture bypass flows in those areas. It would seem that additional wells and augmented treatment between the Wash and the AWF could potentially be installed along the center line of the perchlorate plume.
25. Section 4.5 Groundwater Monitoring Program, page 35, last paragraph, the Deliverable states that samples are analyzed for perchlorate and total dissolved solids (TDS). Please clarify whether chromium is analyzed and if not; please discuss why chromium is not included. Please clarify if all of the sampling and analyses described are related directly or indirectly to NPDES permit compliance.
26. Section 4.6 Proposed Additional Interim Removal Actions, page 36, Remove “Interim” from title of this section for consistency with the National Contingency Plan (NCP).
27. Section 4.6 Proposed Additional Interim Removal Actions, page 36. As described at the February 2013 NERT Annual Stakeholder Meeting, an ion-exchange system is currently being considered by the new GWETS operator for treatment of the seep area wells. This proposed remedial alternative is not described in the RI/FS Work Plan. It would appear this effort should be considered as a treatability pilot study, similar to the intent of the permeable reactive barrier (PRB) proposal. This effort to consider ion-exchange for downstream plume remediation should be included as part of the RI/FS with the proposed approach fully described in the RI/FS Work Plan.
28. Section 4.6.2 AP-5 Pond Solids Characterization and Disposal, page 37, the Deliverable states that “step two has been completed to the extent possible utilizing the existing AP-5 pond pumping system.” Please clarify whether additional dewatering will be needed prior to implementation of Task 3 (solids removal and disposal) or if implementation of Task 3 can commence without additional dewatering.
29. Section 5.1.1 Potential Contaminant Sources and Release Mechanisms, page 40, 5<sup>th</sup> bullet the discussion should include the remainder of the ditch system and conveyance systems. Please revise as necessary.
30. Section 5.1.1.1 Source Area, page 41, this section does not address the numerous tenants that have occupied the site. Any effects that these operations have on work to be performed during development of the RI/FS should be described. Also, if current or anticipated tenant operations have the potential to impact the recommendations that may result from the RI/FS

process, that should also be fully described in the Work Plan. Please discuss how this issue will be addressed in the RI/FS process.

31. Section 5.1.1.2 Neighboring Properties, NDEP provides the following comments:
  - a. Page 42, 1<sup>st</sup> paragraph of section, NDEP would like to clarify that the unlined Beta Ditch transported the contaminants from the west through the Trust site.
  - b. Page 43, 2<sup>nd</sup> paragraph, please include the LOU number for the Hazardous Waste Landfill for consistency.
  - c. Page 43, the historic BMI Dump is not listed as an off-site source. This facility was upwind of the Trust site and reportedly received asbestos containing materials (ACM) amongst other wastes streams. Please include the BMI Dump in all off-site source lists.
32. Section 5.1.2 Release Mechanisms and Potential Migration Pathways, page 44, it appears that vapor intrusion and rewetting of the soil column via rising water levels and subsequent smear zones is not addressed in this Section. Please revise to address this comment.
33. Section 5.1.3 Summary of the Soil CSM, page 44, there is the appearance of an inconsistency with respect to the emphasis on leaching to groundwater as a basis for data gaps and the site history described in earlier sections of this Deliverable. A well-documented rationale for focusing on groundwater leaching must be provided or the Deliverable must be amended to address sampling to characterize surface and near-surface exposures. Soil COPCs related to possible surface exposure pathways must include all site-related COPCs, not only those identified in groundwater. The basis for this request follows:

As described in the last paragraph of Section 5.1.3 of this Deliverable, the interim soil removal focused on the 0 to 10 ft below ground surface (bgs) horizon with the primary concern for deeper soils being leaching to groundwater. Following the interim removal, footnote 21 states that there was backfilling and grading, such that the new ground surface may consist (presumably) of clean fill of some (presumably variable) thickness. This Deliverable, therefore, addresses soils within the ECAs where grading and backfill may only partially address potential future soil exposures (that is, grading and backfill resulting in fill depth of <10 ft). The work plan also addresses soils outside of ECAs where contamination may (presumably) exist at or near the ground surface. COPCs, DQOs and sampling designs to address surface exposure pathways and groundwater-leaching pathways may substantially differ.

34. Section 5.1.3 Summary of the Soil CSM, page 45, last paragraph, please clarify if the soil horizons referenced are the pre-excavation 0 to 10 ft bgs horizon or the post-excavation 0-10 ft bgs horizon. Please note that this issue occurs several times in this Deliverable but will not be repeated. Please revise the Deliverable as necessary to address this comment.
35. Section 5.1.3 Summary of the Soil CSM and Section 5.4.1 Soil (Data Gaps), pages 44 and 65. The soil CSM focuses on accessible soils with COPCs that exceeded soil remediation goals (SRGs) in the upper 10 feet of the soil column. Based on the soils evaluation, the surface and near surface soils were placed into four categories, and ECAs were identified where soils with COPCs that exceeded the SRGs were removed. The ECAs included accessible areas and depths to 10 feet. Unfortunately, the soil removal actions did not address

inaccessible areas or those areas where high perchlorate and other COPCs exist at depths greater than 10 feet below the ground surface. The RI/FS Work Plan should also provide greater information with regards to the “access and other constraints” that did not allow characterization of some soils. A significant data gap needs to be acknowledged for the areas where soluble compounds, perchlorate specifically, exist in inaccessible areas such as beneath existing and former processing buildings or at depths greater than 10 feet. These areas should be identified in the Work Plan as requiring investigation for remediation planning.

36. Section 5.1.4 Summary of the Groundwater CSM, NDEP provides the following comments:
  - a. Page 45, the Deliverable states that the data has not been fully evaluated for the Category 3 and 4 areas. The data has been collected and available for evaluation. Please discuss and establish a schedule to address this comment.
  - b. Page 46, the Deliverable states that the Leaching-Based Site-Specific Level (LSSL) Deliverables have not been approved by NDEP. Please clarify the approval status of these LSSL documents. Please note that NDEP disagrees with the use of DAF 20 for any evaluation at the site without supporting documentation and approval, which affects a number of sections of the Deliverable. Please revise the Deliverable as necessary to address this comment.
  - c. Page 46, the Deliverable states “ENVIRON is currently updating the screening of vadose zone soil concentrations against the leaching-based basic comparison levels (LBCLs) using a soil dataset that has been revised to incorporate changes resulting from the interim soil removal action.” If LSSLs are not going to be derived, then please remove or modify the discussion of the LSSL Deliverable to clearly state that the LSSLs Deliverable will not be used in the future and the Trust will default to the LBCLs.
  - d. Page 46, the Trust proposes to use a 5% frequency of detection (FOD) as a screen for site-related chemicals (SRCs). NDEP disagrees with this approach as on a general site-wide basis without localized hot spots analysis. Please provide how hot spot analysis will be performed to address this concern.
37. Section 5.1.4.1 Leaching-Based Soil COPCs, page 47, 1<sup>st</sup> paragraph. Please provide the reference for the NDEP guidance that is being cited in this paragraph.
38. Section 5.1.4.2 Groundwater COPCs, NDEP provides the following comments:
  - a. Page 47, USEPA MCLs should have primacy over NDEP basic comparison levels (BCLs). Please revise.
  - b. Page 47, per the NDEP comment above, NDEP does not agree with the 5% FOD without inclusion of a hot spot analysis procedure.
  - c. Page 47, NDEP believes that TDS should be included in the future evaluations of background and upgradient conditions.
  - d. Page 48, screening metals should include mercury and selenium.
  - e. Page 48, TDS is listed as having no comparison criteria; however, there is a secondary USEPA MCL. Please revise.



39. Section 5.1.4.2 Groundwater COPCs, page 47, perchlorate and chromium are the primary site-related chemicals detected in groundwater downgradient of the site but chloroform is present in groundwater downgradient of the site and appears to have potential on-site sources. Please revise to include chloroform in this discussion.
40. Section 5.1.4.2, groundwater COPCs at the Trust site include radionuclides, which have been identified by previous soil investigations as site-related contaminants. However, external radiation is not identified as a potentially complete exposure pathway in Section 5.1.5.2. This Deliverable pertains to soils within and outside of ECAs that have not been adequately characterized. Unless there is well-documented rationale for limiting the scope of the analyses in un-sampled areas, exposure models must address all potentially complete pathways not only those related to contaminants that exceeded SRGs in existing samples.
41. Section 5.1.5.2 Exposure Media and Pathways, NDEP provides the following comments:
  - a. Page 50, regarding off-site receptors, BMI has historically collected ambient air data, which indicates elevated levels of a number of compounds possibly sourcing from the Trust site. Please contact NDEP regarding incorporation of this data into the revised Deliverable.
  - b. Page 50, regarding surface water, the Trust should also consider the impacts to stormwater channels and retention basins adjacent the unit buildings 4, 5, and 6.
  - c. Page 51, Groundwater paragraph, please contact NDEP regarding revising the text to account for uncertainty (e.g. unknown or historic domestic wells in the area, small potential for groundwater to be used as drinking water in the future, etc.)
  - d. Pages 50 and 51, for off-site receptors paragraph, the Deliverable states that, "The nine wells operating at the SWF were installed to mitigate this exposure pathway. This system has been extremely effective, reducing the amount of perchlorate entering Las Vegas Wash by approximately 90 percent (Las Vegas Water District 2012)." Please clarify whether this means that the SWF alone has reduced the perchlorate load entering Las Vegas Wash by 90% or the combined IWF/AWF/SWF.
  - e. Page 51, bulleted list of exposure pathways, this listing should include all pathways of exposure for each population. For example, the "Long term outdoor industrial/commercial workers" should have "inhalation of vapors" included even though this pathway will only be quantified should indoor risk and/or hazards be greater than  $10^{-6}$  and/or a HI of 1, respectively. Figure 5-1 should be updated accordingly.
  - f. The RI/FS Work Plan should also acknowledge that Lake Mead and the downstream Colorado River provides municipal and agricultural water sources for California, Arizona, and Mexico and that these downstream users are also affected by the noted exposure pathways, which, again, have been demonstrated as complete (as opposed to "potentially complete"). Language should be added to identify these additional off-site receptors.
42. Section 5.2.1.1 Potential Chemical-Specific ARARs and TBC Criteria, page 53, NDEP provides the following comments:

- a. None of the solid waste or RCRA regulations appear to be listed.
  - b. The National Historic Preservation Act of 1966 (NHPA) should be included as a potential ARAR. (e.g., historic places, archeological sites).
  - c. There are additional sections of NAC 445A which have not been cited such as 445A.121, .122, and .1236. Please re-review NAC445A and include a comprehensive listing of citations.
  - d. Please discuss if the spill control and countermeasures (SPCC) regulation under 40 CFR Part 112 apply to any of the facilities at the site.
  - e. There are other OSHA citations, such as PELs which appear to be applicable. Please clarify.
  - f. Please provide a specific citation for "Clark County Air Quality Regulations", also please clarify if this address issues specific to the county specific to asbestos.
43. Section 5.2.2 Potential Remedial Action Objectives (RAOs) for the Site, page 55. Under "Perchlorate:" Should add EPA's December 2008 Interim Drinking Water Health Advisory for Perchlorate (of 15 µg/L) as a TBC and PRG (Advisory: Office of Water, EPA 822-R-08-25 of December 2008; and PRG guidance: OSWER Memo of January 8, 2009).
  44. Section 5.2.2.1 Short-Term Remedial Objectives, page 55, the Deliverable states that, "This RAO is currently being achieved and (in the short-term) will be met via continued operation of the SWF, the AWF, and the IWF and Barrier Wall System." The foregoing should be restated to indicate that this RAO is "partially" being achieved, as the perchlorate load in Las Vegas Wash is currently estimated at about 60 to 80 pounds per day.
  45. Section 5.2.2.1 Short-Term Remedial Objectives, page 55, please provide perchlorate concentrations with references for Las Vegas Wash, Lake Mead, and "downgradient surface water."
  46. Section 5.2.2.2 Long-term Remedial Action Objectives, page 56. "Vadose Zone Source Control" bullet: This does not mention prevention of direct contact with constituents in soil that would cause unacceptable risks, such as the "Shallow Soil" for the short-term RAO.
  47. Section 5.3 Development General Response Objectives and Screening Technologies and Process Options, page 56. Please change "Objectives" to "Actions" in title.
  48. Section 5.3.3.1 Process Option Screening Criteria, page 60. Cost is identified as a secondary screening criterion, with a qualitative comparison of capital and O&M costs listed in Table 5-3. Have life cycle costs for the listed technologies been considering this evaluation? If a lower cost treatment will require several more years of operation, this will need to be part of the cost evaluation considered during the RI/FS process, and the approach to conduct this analysis should be clearly defined in the RI/FS Work Plan.
  49. Section 5.3.3.2 Preliminary Selection of Feasible Technology, NDEP provides the following comments:
    - a. Page 61, Source Control Options, please include soil excavation, hydraulic containment and bioremediation options.

- b. Page 62, Downgradient Plume Options, please also include slurry walls or other containment options.
  - c. Page 62, In-Situ Process Enhancement Options, please also include soil flooding and bioremediation options.
  - d. Page 63, Discharge Options, please also include the Pittman Bypass Pipeline and enhanced Zero Discharge (i.e. utilize enhanced evaporation mechanisms) as options.
50. Section 5.3.4 Preliminary Remedial Action Alternatives, NDEP provides the following comments:
- a. Page 63, it appears that this Section only address groundwater RAOs, please clarify how soil and soil vapor RAAs will be addressed.
  - b. Page 64, RAA-2, please clarify how this RAA addresses the other COPCs, which are referenced.
51. Section 5.3.4 Preliminary Remedial Action Alternatives, page 64. Criteria should be established that will be used to evaluate the various technologies/strategies that could be implemented to meet the short-term and long-term RAOs. The NERT should answer if remedial measures that satisfy short-term RAOs and are compatible with long-term RAOs are rated higher than those that satisfy only short-term or only long-term RAOs.
52. Section 5.4.1 Soil, page 65. The evaluation of soils within all ECAs should be done based on the existing soil boring data.
53. Section 5.4.1 Soil, page 65. The areas below Site unit processing buildings have been identified as a significant contaminated source area with presumably the highest levels of perchlorate and possibly other COPCs within the footprint of the contaminated plume. As indicated within earlier comments, greater investigation and characterization of the contamination within the areas below and adjacent to the unit processing buildings must be included within the RI/FS development, with the focus of identifying the potential for these areas to be sources of COPCs that may migrate to groundwater.
54. Section 5.4.2 Groundwater, NDEP provides the following comments:
- a. Page 66, the last sentence of the first paragraph should be changed to state that chromium and perchlorate impacts are “partially” mitigated.
  - b. Page 68, Trespassing Chemicals, please note and discuss that there are a number of compounds besides VOCs in the plume approaching from the west.
  - c. Pages 68 and 69, Downgradient Plume – Lateral Extent, NDEP provides the following comments:
    - i. NDEP would like to know how the suggested wells will help the Trust in its remediation, well field optimization, and mitigation efforts at the IWF, AWF, and SWF.
    - ii. Page 68, last paragraph, no basis has been provided for the 1 mg/L cut off for delineation of perchlorate versus the health-based screening level of 18 µg/l. Please include justification and discussion addressing this comment.

- iii. Page 69, 1<sup>st</sup> partial paragraph, per comments above, NDEP is not aware of any NDEP-approved Deliverable that has been submitted to date that demonstrates a separation of the Trust and AMPAC plumes with an approved screening value, please revise.
  - iv. Page 69, 1<sup>st</sup> partial paragraph, reference to Figure 5-10 should be revised to Figure 5-11.
  - v. Page 69, 1<sup>st</sup> full paragraph, NDEP disagrees with the Trust's statements regarding a separate BMI Common Areas plume due to the comparison using a 5 mg/L or 10 mg/L metric that has not been approved by NDEP.
55. Section 5.4.2.1, Groundwater Analytic Program, page 69, extensive testing of the chromium versus hexavalent chromium speciation has been completed historically. Please review historical data to confirm if this is truly a data gap and revise the Deliverable as necessary.
56. Section 6.2 Task 2: Community Relations, page 71. Refer to the NCP to identify the essentials of a community relations plan. Establishing and maintaining an administrative record and public involvement / opportunity to comment at the proposed plan stage are especially important.
57. Section 6.3 Task 3: Field Investigation, page 72, NDEP provides the following comments:
- a. Please clearly describe how the Parcels will addressed or will not be addressed as a part of this and associated future Deliverables.
  - b. The investigations or evaluation relating to soil gas or ambient air do not appear to be addressed in this Section. Please contact NDEP to discuss how these topics may be handled.
58. Section 6.3 Task 3: Field Investigation, page 72, a Field Sampling Plan should be referenced here or the relevant methodological information should be cited and provided for the activities identified in the bullets.
59. Section 6.4 Task 4: Sample Analysis and Data Verification and Validation, page 73, while some relevant references have been cited, this section lacks the details needed to provide a thorough explanation of how sample analysis and data validation will be conducted for this particular investigation. Additional information that needs to be included or identified as to be included in the SAP is:
- a. COPCs, media, and associated analytical methods
  - b. Laboratories that will be analyzing the data; required detection limits
  - c. Identity of who will be performing data validation
  - d. Procedure for establishing data quality criteria.
  - e. Additionally, please identify that electronic data deliverables will be uploaded to the NDEP Site-Wide Database and will comply with promulgated NDEP guidance on this matter.
60. Sections 6.4 Task 4: Sample Analysis and Data Verification and Validation and 6.5 Task 5: Data Evaluation, pages 73 – 74, the Trust should consider addressing the section of the process in a sub-area fashion.

61. Section 6.6 Task 6: Risk Assessment, page 74, NDEP provides the following comments:
- a. Superfund guidance for human health risk assessment (OSWER 9200.4-18, August 1997; OSWER 9200.4-31P, December 1999) recommends that cancer risks related to radionuclide and chemical COPCs should be summed. This consideration should inform supporting documents including the SAP and the Baseline Health Risk Assessment Work Plan.
  - b. This section is generic and does not provide any specific information or references to indicate how the risk assessment will be conducted. The methods and assumptions for the risk assessment can have a substantial impact on the identification of data gaps and identifying appropriate sampling designs. The work plan should include a discussion of risk assessment methods and assumptions related to these and other relevant subjects to inform the SAP. The references (Section 8) include Environ 2012g, which is listed as a Baseline Health Risk Assessment Work Plan (*in preparation*) but this reference does not appear in the text and was not available during review.
62. Section 6.7 Task 7: Treatability Studies, page 75. It was indicated at the February 2013 NERT Annual Stakeholder Meeting that pilot testing of an ex-situ ion exchange system will be pursued for the SWF. Is this considered another treatability study with a work plan to be developed?
63. Section 6.10 Task 10 Detailed Analysis of Alternatives, page 76. In evaluating the cost of the alternatives, suggest including alternatives' cost per mass of perchlorate removed/destroyed. In evaluating the "Short-term effectiveness," the Trust should assess the anticipated times to achieve cleanup goals will be particularly important. The RI/FS Work Plan should discuss the means and methods that will be used to identify those cost-effective alternatives that will likely provide the greatest benefit towards achieving the RAOs considering the limited funds available.
64. Section 7.1 Project Organization and Responsibilities, page 78. "Ms. Shannon Harbour, PE, previously project manager for the site," should be replaced with "Mr. Weiquan Dong, PE, project manager for the site".
65. Section 7.1 Project Organization and Responsibilities, page 78. Suggest updating to reflect transition to Envirogen, giving key milestone dates.
66. Section 7.2 Project Schedule, page 79, Add dates on schedule
67. Table 2-1 Summary of Neighboring Properties, NDEP provides the following comments that should be addressed in the revised Deliverable:
- a. AMPAC, as discussed above, NDEP has not approved the theory that the AMPAC and the Trust plumes do not commingle as it appears that this theory is based on the concentration metric selected when making this determination. Please contact NDEP to discuss this issue as necessary.
  - b. BMI Common Areas, as discussed above, the BMI Dump, the complete ditch system and other conveyances should be included in this table.
  - c. Tenants should be included in this Table.

68. Table 4-1 Summary of the Groundwater Monitoring Program. Please include units for well depth and screen interval and clarify if screen interval is referring to depths “below ground surface.”
69. Table 5-2 Initial Screening of Remedial Technologies, this table appears to only include groundwater, per NDEP’s comments above, please include how soils, ambient air or vapor intrusion will be addressed. This is an inconsistency that affects numerous sections of the Deliverable, which should be addressed throughout the Deliverable.
70. Table 5-3 Secondary Screening of Remedial Technologies, based on issues identified in above-comments, there appear to be a number of incorrect conclusions in this table. NDEP has not provided specific comments for all instances. Please review this table in regards to other comments included in this response letter. However, NDEP provides the following specific comments for this table:
- a. Steam/Hot Water Injection, Page 16 of 23, this technology is eliminated because it requires a pilot test, yet two pilot tests are proposed in this Deliverable. This seems like an incorrect and inconsistent screening. Please provide additional rationale for elimination.
  - b. In-Situ Chemical Oxidation, page 18 of 23, please note that this technology is not compatible with the chromium groundwater plume and should be eliminated in areas with chromium groundwater contamination.
  - c. Deep Re-Injection Trenches, page 22 of 23, this process option was problematic at the AMPAC in-situ remediation area. Please determine and discuss what studies should be implemented and how conditions at the Trust site are expected to be different than those for AMPAC.
  - d. Secondary Screening of Remedial Technologies. Soil excavation for offsite or onsite treatment and disposal should be retained for areas where soils with high perchlorate or other COPC concentrations are present and limited removals would have a significant benefit by eliminating a large perchlorate and/or other COPC mass from the overall source.
  - e. Phytoremediation may be a viable technology that could be implemented in the seep area where perchlorate concentrations are relatively low and groundwater is close to the ground surface. This technology should be retained for further evaluation
71. Figure 2-1 Surrounding Facilities, please depict the BMI Dump per NDEP comments above.
72. Figure 4-1 Groundwater Extraction and Treatment System Flow Diagram, NDEP provides the following comments: The ferrous sulfate is added to the Lift Station 3 of AWF. Please clarify where the precipitates are removed for this influent stream and capacity of chromium removal with this method. The comment is also applied to the SWF.
73. Figure 4-5 Well Field Extraction Rates and chromium and Perchlorate Mass Removals, the total Chromium removed from the AWF has slightly increased consistently with time; however, perchlorate has not. Please discuss in the text of the revised Deliverable.

74. Figure 5-1 Preliminary Conceptual Site Model Diagram: Site and Downgradient Plume, the figure does not include ecological receptors; please refer to Figure 5-4, which indicates both terrestrial and aquatic receptors.
75. Figure 5-2 Historical and Active Pond Locations, the depiction of the Northwest Ditch is inconsistent with what NDEP has seen previously. Please provide a citation for this depiction and discuss with NDEP or revise as necessary.
76. Figure 5-4 Preliminary Conceptual Site Model Illustration, please explain the relative impact scale, (e.g., minimal relative to which water quality standard, etc.).
77. Figure 5-7 Perchlorate in Shallow Groundwater, May-June 2012, please review and address the above-comments regarding justification of using 1 mg/L perchlorate as the basis for the outer concentration contours.
78. Figure 5-7 Perchlorate in Shallow Groundwater, May-June 2012. Greater resolution based on available monitoring data should be provided on the minimum isoconcentration contours to fully reflect the potential for interactions between the perchlorate plumes originating from the NERT and AMPAC sites.
79. Figure 5-8 Total Chromium in Shallow Groundwater, May-June 2012. Greater resolution based on available monitoring data should be provided on the minimum isoconcentration contours.
80. Figure 7-1 Remedial Investigation and Feasibility Study Schedule, this figure presents a timeline for a baseline HRA work plan, Please clarify whether the Trust plans on submitting a new HRA work plan or revise the existing one (Northgate 2010).
81. Plate 2 Potentiometric scaling: Gradients are flatter below the COH Bird Viewing Ponds, possibly due to higher hydraulic conductivity. This needs to be examined in more detail to optimize perchlorate capture while reducing pumping in the SWF area. It is assumed that the SWF wells are partially capturing Las Vegas Wash water, but possibly they are capturing City of Henderson (COH) waste water effluent in the downgradient SWF wells also. Examination of major or trace ion data might be an approach to this issue.
82. Plate 4 shows WMW5.7N as containing "< 3 mg/L", which is correct; but actual values are probably much lower. For example, WMW5.8SI is something over 200 µg/L. These need to be depicted in more detail to help understand the conditions near the Pabco Weir. TDS is similarly too grossly scaled, showing nothing < 5000 mg/L.
83. Plate 4 Groundwater Total Chromium Map, Shallow Water-Bearing Zone. The Call-out maps shows the perchlorate concentrations instead of the total chromium concentrations.
84. Appendix A Letter of Understanding (LOU) Roadmap, Table A-1 Road Map of Site Soil and Soil Gas investigation, NDEP provides the following comments:
  - a. Per NDEP comments above please clarify why ambient air discharges are not being evaluated as part of an HRA.
  - b. Please clarify whether vast areas of the site will never be redeveloped to justify that soil gas investigations are listed as N/A.

85. Appendix C, Table C-2 McCullough Range Background Radionuclide Concentrations, the McCullough background data appear to be inappropriately divided into depth intervals of 0-6' below ground surface (bgs), 6-10' bgs, and 0-10' bgs when the text (Section C.2.1) states that two depth intervals (0-0.5' bgs and > 0.5' bgs) exist for this dataset. It is unclear what the rationale is for sub-setting the background data into these intervals in Table C-2. Please provide clarification.
86. Appendix D PRB Treatability and Bench Scale Test Study Work Plan, Section 2.2.2 Field-Scale Pilot Objectives, page D-2, as previously stated, the Trust should consider the work completed by AMPAC in their in-situ remediation area, which could be very helpful towards addressing a number of the data gaps in this Appendix.
87. Appendix D, Section 3.2 Hydrology, page D-5, the Deliverable states that the Shallow Water-Bearing Zone will only be targeted for this study. Please include discussion as to why the Middle Zone and Deep Zone are not considered.
88. Appendix D, Section 4 Technology Overview and Rationale, page D-6, as stated above, the Trust should review AMPAC's experience immediately to the west in the downgradient area or the previous bench scale studies by Shaw and Northgate and include information from the former AMPAC In-Situ System into this work plan.
89. Appendix D, Section 5.3.1, Microcosm (Serum Bottle) Testing, page D-11, the Deliverable states the selected electron donors was "based on their ability to be applied to a variety of potential PRB morphologies (e.g., via direct injection, passive diffusion wells or within a trenched wall), their demonstrated success in similar environments based on review of case studies and published research." The stated success in similar environments appears to disregard AMPAC's experience less than one mile away. Please incorporate information from the former AMPAC In-Situ System into this work plan.
90. Appendix D, Section 5.3.1 Microcosm (Serum Bottle) Testing, page D-12, please consider including chlorate analysis.
91. Appendix D PRB Treatability and Bench Scale Test Study Work Plan. The NERT should note applicability of the bench-test results to the field scale test. The NERT may study the FBR to get some information about biomass accumulation in the PRB.
92. Appendix E In-Situ Soil Flushing Treatability Study Work Plan, Section 1.2 Purpose and Objectives, pages 2 – 3, the volume of water infiltrating from the flushing water should be evaluated before the pilot study. The evaluation should include the impact to the groundwater table elevation, the change of capture zones due to rising groundwater table elevation, and the capacity of GWETS and GWTP.
93. Appendix E, Section 1.2 Purpose and Objectives, page 2, 2<sup>nd</sup> bullet, the Deliverable states "Evaluate the potential for other constituents of concern to be mobilized during flushing operations". Prior to the commencement of any pilot study for soil flushing, please evaluate the mobilization of other COPCs using physical chemical properties and identify any COPCs that may be expected to mobilize due to soil flushing.



94. Appendix E, Section 5.2 Flushing Fluids Characterization, page 8, please clarify whether the cost benefit of not using stabilized Lake Mead water outweighs the complications of using GWETS effluent and the potential negative consequences of using this effluent. Additionally, the Trust should commence discussions with NDEP Bureau of Water Pollution Control prior to planning or implementing any pilot studies. If the GWETS effluent is used, new column leaching tests with the effluent should be completed prior to the commencement of the pilot study. Besides studying the perchlorate recovery from the leaching experiment, other COPCs should be evaluated. The TDS of the effluent from the column leaching experiment should also be determined.
95. Appendix E, Section 6 Preliminary Pilot System Design & Operation, page 9, please clarify what sort of air emissions monitoring is expected as part of this work plan.
96. Appendix E, Section 7.3 Groundwater Monitoring, page 14, please specify the anticipated screened intervals of the wells: specifically which lithologies will be screened and if any wells will be cross-screened.
97. Appendix E, Figure 5 Interceptor Trench Projected Capture Zone, please specify the concentrations that were used to develop the inferred capture zone.
98. Appendix E Treatability Study Work Plan In-Situ Soil Flushing. The NERT should note that
- a. Column tests are unlikely to be representative of field conditions, due to the presence of soil structure and lithologic layering and anisotropic hydraulic properties.
  - b. In practice, maintaining full saturation in soils on a large scale would appear to be difficult, due to development of preferred pathways within the vadose zone (for example, see publications by Dr. Robert Glass, of Los Alamos National Laboratory). There is a substantial body of literature on the spatial variability of vadose zone hydraulic properties.
  - c. The hydraulic conductivity and ability to transport perchlorate would be substantially lower in vadose zone areas adjoining the preferred pathways. This would act to prolong perchlorate residence time within the soils being treated.
  - d. Even if perchlorate-bearing soils are fully saturated (downward unit gradient conditions) the effects of hydrodynamic dispersion and anisotropy due to stratification are likely to prolong the time required for flushing of soils.
  - e. Removal of solute from dead-end and tight pore spaces is a diffusion-limited process, again suggesting a relatively long timeframe to clean the soils, which means that the flushing system must operate for an extended period.
  - f. Flushing with water from sources outside the GWETS (for example, City of Henderson wastewater treatment plant effluent) for an extended period of time would add to the mass of contaminated water within the plume and increase the likelihood that perchlorate would escape the capture zones (see 10b above).
99. Appendix F Groundwater Extraction and Treatment System Optimization Study: Preliminary Analysis of Groundwater Capture and Extraction Rates at the Interceptor and Athens Road

Well Fields, please note that the NDEP response letter of January 17, 2013 regarding the *Annual Remedial Performance Report for Chromium and Perchlorate* should also be applied to the Appendix F.

100. Appendix F Groundwater Extraction and Treatment System Optimization Study. The NDEP recommends that capture zone analysis of the SWF should be conducted in the current study. The SWF should be included in the current evaluation and not be delayed for future studies.
101. Appendix F, Section 1 Introduction, page F-1, the Trust should consider using a RAO for capture of perchlorate, chromium, and any other COPCs above an applicable concentration metric (i.e. an ARAR). Please note that NDEP would require justification for and approval of the establishment of such a benchmark.
102. Appendix F, Section 2.2, "constraints" listed in bullet format: Hydraulic loading limitations are identified, but potential increases in mass loadings to the perchlorate and chromium treatment systems are not mentioned. Were mass loadings found to be insignificant or manageable through equalization/blending?
103. Appendix F, Section 3 Estimated Capture Zones and Potential Gaps in Capture, page F-5, with regards to the IWF, the Deliverable states, "To address this gap, ENVIRON proposes to begin pumping the several new wells, which is described in more detail in the following sections." Additionally, with regards to the AWF, the Deliverable states, "To address this gap, ENVIRON proposes to begin pumping some of the new wells, which is described in more detail in the following sections." Given that pumping and treatment system is at/near capacity, please explain how the foregoing will be accomplished and what is expected to be accomplished.
104. Appendix F, Section 3 Estimated Capture Zones and Potential Gaps in Capture, page F-5, this Deliverable has not discussed potential underflow beneath or through the slurry wall. NDEP is aware that Northgate collected samples for permeability testing of the slurry wall and reported the results on September 29, 2010; however, no report discussing the potential underflow beneath or flow through the slurry was submitted. Please discuss how this data gap will be addressed.
105. Appendix F Groundwater Extraction and Treatment System Optimization Study, Section 5.4, page F-10. The RI/FS Work Plan should clearly identify how the model will be used and potentially upgraded to characterize capture zones, plume migration, fate and transport of COPCs, and effects of operational changes. A specific section within the RI/FS Work Plan should be dedicated to this discussion.
106. The NERT should test alternative capture well placement and pumping scenarios using the model and use these to guide installation of additional wells in the SWF and AWF.