NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

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

March 2, 2022

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: *Screening-Level Ecological Risk Assessment for Operable Unit 2*

Dated: August 6, 2021

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 **05/02/2022** 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 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

General Comment #1

Much of what is described in Section 3 (Risk Characterization) actually falls under Step 3a of the risk assessment process, Screening Refinement. These activities, such as use of the 95%UCL of the mean concentration in place of the maximum and use of LOAEL-based thresholds in place of NOAEL thresholds were not described in the OU-2 work plan. Section 3.1 of the OU-2 work plan stated:

> "As necessary, more realistic screening may be conducted during the screening refinement (Step 3a) using more realistic exposure estimates; however, Step 3a is not included in the SLERA Work Plan at this time".

Section 3.4 of the OU-2 SLERA WP further states:

> "If further assessment or action (i.e. the Step 3a or beyond) is needed, then a work plan addendum will be submitted to the Trust and NDEP for approval."

It does not appear that such a WP addendum was submitted, therefore it is noted that much of the analysis and discussion in Section 3 Risk Characterization in this document was conducted without an approved work plan. For all future deliverables when such a variation from an approved workplan is deemed necessary, the Department requests that such variations be submitted for review and approval.

Please note that the UCL calculations were not confirmed but they will be checked for the OU1 SLERA assuming that the same methods were used for OU-2.

<u>Essential Corrections</u>

Specific Comment #1 Section 2.1.1.5, Tables 2-5n and 2-5C and Appendices C-4 and C-5

There is insufficient discussion of the background comparisons. The Gilbert's Toolbox results presented in Table C-5b include many *p*-values that are equal to one, and several others that are very high. In a 1-sided test this implies a strong significant difference between background and site data, but the wrong way around. In principle, site concentrations cannot be greater than background, in which case these tests are run as 1-sided tests. However, when differences like this occur, then there are either unaccounted for analytical differences or the background data do not represent site conditions. At the very least some discussion is needed in the report. Here are some initial thoughts on the impact of this:

- The possibility to collect local background for this area (OU-2) probably does not exist. This is like the situation on the southern part of the NERT property, where arsenic and uranium concentrations are considerably less than those in the BRC/TIMET background data. Decisions were made for that area to acknowledge that the site concentrations

represented a new background for the southern part of the NERT property, but that any remediation decisions would still be held to the BRC/TIMET background data. This could be the case here.

- Without further explanation in the report, a case could be made to consider more metal as COPECs, considering there is no appropriate background data set that can be used for comparison.

- The working hypothesis for why this occurred in the southern part of NERT is to do with potential leaching of metals from the soil matrix, perhaps as a consequence of contaminant (acid, solvents) dumping during operational times, or perhaps as a consequence of leaking pipes near the area (e.g., those that transport water back to La Vegas from Lake Mead). The geochemistry of the southern part of NERT groundwater is clearly different than the rest of the BMI Complex, exhibiting reducing instead of oxidizing conditions for example. It seems that the same might apply to OU-2, although the mechanism for releasing metals from the soil matrix is perhaps not so clear. The effect is seen clearly in the arsenic and isotopic uranium data, but also applies to most of the chemicals for which at least one of the Gilbert's toolbox *p*-values is equal to one. This is the same effect that was seen in the southern part of NERT.

- Focusing on uranium: Curiously the elemental uranium data do not show a large difference between site and background. For example, the mean background concentration is 1 mg/kg and the mean site concentration is 0.91 mg/kg. However, the results for U-238 and U-234 are markedly different, both with background means of about 1.2 pCi/g and site means of about 0.3 pCi/g. However, the results for Th-230 and Ra-226 are reasonably consistent between background and site concentrations (hence the failure of secular equilibrium in the site data). As noted above, there are two possibilities: analytical issues, or geologic issues. The elemental uranium results reported might suggest an analytical issue with the isotopic uranium analyses (which would also apply to U-235). However, the differences seen across the rest of the metals between site and background concentrations instead suggest a more geological issue (as described above). If the latter is the case, then uranium has been leached out of the soil matrix along with arsenic and some other metals, and the elemental results for uranium should be questioned. Either way, some resolution is necessary.

- Although this finding might not affect the conclusions of the screening level ecological risk assessment, it has implications for transport of chemicals through groundwater in this area. The SLERA cannot or should not be performed in a vacuum when there are data that challenge the conceptual model of transport in the area. It appears from the data that reducing conditions might have been realized in the area of OU-2, and this information should be addressed in this report and passed on to future or other work regarding groundwater contamination and remediation.

Specific Comment #2 Data Handling, 2nd bullet (detection frequency), p. 2-6

This text indicates that "USEPA and NDEP advocates that constituents with a frequency of detection less than or equal to five percent may be considered for elimination". The focal point of that indication is that the "may be considered for elimination", not that they will be eliminated. Although 5% is specified in the cited NDEP guidance, frequency of detect evaluations should always be balanced by a detection limit evaluation and by spatial analysis of those detects to ensure they do not represent a localized release or hot spot that represents unacceptable exposure or continuing source term. See also **Specific Comment #3** below.

Specific Comment #3 Figures

There are no spatial plots in the report for any chemical, let alone the COPECs. The home range for some of the animals considered as receptors in the SLERA is quite small (e.g., small rodents), perhaps similar to a residential exposure unit for a human health risk assessment. When sampling location is fairly sparse compared to the areas of interest some spatial analysis is warranted to ensure that hot spots of contamination are not being missed. This has been a *de facto* requirement of NDEP on all risk assessment reports in the past and must be included here.

Specific Comment #4 Figure 2-4 and Table C-1

For locations SA-24, SA-25, SA-26 and SA-27 there are no records in the BMI Regional Database. There are some discrepancies noted between the BMI Regional Database and Tables C-2 and C-3 due to the reporting of the practical quantitation limit (PQL) versus the sample quantitation limit (SQL). Much like for the previous efforts to reconcile some older NERT data, these data issues need to be resolved before the report is brought to completion.

Specific Comment #5 Tables

Calculating risk to receptors based on both 95%UCL concentrations and arithmetic mean concentrations appears unnecessary in this risk assessment, because for wildlife receptors the risk based on 95%UCLs results in LOAEL HQs < 1. Inclusion of the screening based on arithmetic mean concentrations unnecessarily complicates the document while contributing little to the overall conclusions. Suggest removing the risk characterization based on arithmetic mean concentrations.

Specific Comment #6 Section 2.1.2, Tables 2-4b, 2-5a, 3-1, 3-3, 3-4, and References

The Los Alamos National Library EcoRisk Database has an updated version (v4.2) as of November 2020. Please update where relevant. It may be found here and is now cited as N3B 2020: https://www.intellusnm.com/documents/document-library.cfc?method=retrieveLanlFile&nodeId=62152\

Citation: N3B (Newport News Nuclear BWXT-Los Alamos, LLC), November 2020. "ECORISK Database (Release 4.2)," on CD, Newport News Nuclear BWXT-Los Alamos, LLC, document EM2020-0575, Los Alamos, New Mexico. (N3B 2020)

Specific Comment #7 Section 2.2.2, p. 2-16

The table presented here showing the HQ summary of the nine COPECs retained for further evaluation in Section 3 is confusing and seems out of place. This table has a column labeled "Reason Retained" that specifies the receptors that are to be evaluated in Section 3 risk characterization, but the screening presented in Section 2 only compares maximum values to the most sensitive receptor. Receptor-specific screening has not yet been presented or discussed in this document. For instance, the table footnote for DDx says that it is not being evaluated in Section 3 for plants or invertebrates, presumably due to the fact that no DDx screening value is shown for plants and invertebrates in Table 2-4a. However, Table 3-1 shows a plant screening value for DDx from LANL (for DDT), and an invertebrate screening value for DDx from the EPA EcoSSLs (which was calculated for this risk assessment from data presented by EPA that EPA deemed insufficient for use in calculating an Eco-SSL). Also, the list of screening values in Table 2-4a does not include values from the LANL Ecorisk Database, even though that is identified as a source of ESVs in the text (see also **Specific Comment #6**). Table 2-4a should be updated to include ESVs from all primary sources noted in Section the text, including the LANL Ecorisk Database, and the ESVs applied consistently throughout the different sections of this document.

Specific Comment #8 Metals, 1st bullet, p. 2-9

With regard to use of Shapiro-Wilk test, this test is unnecessary and of no real value, and thus, could be omitted. It is also not clear how this information has been used to support any decisions made in this report. If the data are normal, then the mean is normal; if the data are not normal, then the mean is possibly still normal depending on the amount of data and skew. Statistical *t*-tests assume the means are normal, not the data. Also, UCL calculations should be based on the distribution of the mean more than the distribution of the data, since it is the UCL of the mean that is of interest. Obviously, the distribution of the mean is difficult to obtain with only one sample of data, but if there are enough data and relatively little skew, then *t*-tests work well, and *t*-UCLs work well. In addition, these types of goodness-of-fit tests are known to have low power, in which case if there is not much data then normality is difficult to reject, and if there are a lot of data the central limit theorem suggests assuming normality for these types of statistical analyses anyway. No action is necessary, but just to note that the Shapiro-Wilk results are not particularly useful.

Specific Comment #9 Section 3.3.1, p. 3-4

If dioxins/furans are not described in this section for terrestrial plants and soil invertebrates, then it needs to be made explicit and cross-referenced to the relevant section for discussion.

Specific Comment #10 Section 3.3.1, p. 3-5, Excerpt from Table 3-4.

A few values within the table do not match the legend. The beta-BHC value of 40 should be highlighted green, and the perchlorate value of 1 should be unhighlighted and bolded.

Specific Comment #11 Section 3.3.1, 1st paragraph, p. 3-5

The use of RSVs calculated from individual studies [i.e. Novais et al. (2010)], in lieu of published ESVs, needs to be further justified including how the studies were selected and what other studies may have been considered.

Specific Comment #12 Section 3.3.1, pp. 3-5 and 3-6

It looks as though these paragraphs should be in a bulleted format as was done for Terrestrial Plants and Soil Invertebrates on page 3-4.

Specific Comment #13 Section 3.3, 1st paragraph, p. 3-6

For nitrate, nitrite, and sulfate, please explain why the site 95%UCL concentration is being compared to the 95%UCL background concentration for decision-making purposes instead of employing the same statistical tests for background that were used for other analytes. Comparison of UCLs is completely inappropriate (there is absolutely no statistical justification for such a comparison).

Specific Comment #14 Section 3.4.2

Total dose intake (TDI) and total daily dose (TDD) appear to be used interchangeably. Total daily dose would be more appropriate, and section 3.4.2.1 should be renamed to Total Daily Dose.

Specific Comment #15 Section 3.4.2.2, p. 3-9

More detail is needed as to how a chemical was determined to have low or high bioaccumulation potential. Furthermore, it is stated that "only bioaccumulative chemicals were evaluated in the food web model," thus, an explanation is needed as to what chemicals were not evaluated and why.

Specific Comment #16 Section 3.4.2.3, p. 3-14

The AUFs are said to be provided in Appendix D-2, however, only the home ranges are provided in every table. In only a couple of tables are site foraging frequency (SFF) values provided, but they are all equivalent to 1. AUFs should be provided in Appendix D-2 tables, and the area for OU-2 should be provided in this section; for example, the OU-2 area should be provided when the example calculation for kit fox AUF of 0.96.

Specific Comment #17 Section 3.4.5

Pleas add a discussing why bis(2-ethylhexyl) phthalate and bromine were not included in the wildlife receptor models. At the moment there is currently no discussion as to why these two chemicals do not appear in the Appendix E tables.

Specific Comment #18 Section 3.5, COPECs Lacking ESVs and COPECs Lacking Plant ESVs

For the COPECs without ESVs that have frequency of detection as a line of evidence, please provide an additional discussion of the spatial distribution of those detects and discuss whether those detects are potentially indicative of a localized release or potential hotspot. If these detects are indicative of either a localized release or hotspot, writing them off due to a low frequency of detection is not appropriate.

Specific Comment #19 Section 3.5, pp. 3-20 and 3-21

There needs to be more substantial discussion surrounding the COPECs without ESVs because simply eliminating them because they lack an ESV is not acceptable. There are many statements that these COPECs are not bioaccumulative, detected only once, or have a low frequency of detection. However, some further discussion is needed to remove chemicals based on frequency of detection (and 10% is not an appropriate target for frequency of detection as discussed in **Specific Comments #2 and 3** above). Detected chemicals without ESVs should be discussed in the context of the conceptual site model. For example, are these chemicals expected to be present on site, or to have migrated to the area of the detected samples? The COPECs without ESV sections need to provide more detail and conclude whether these chemicals potentially pose a risk.

Specific Comment #20 Section 3.5, 1st paragraph, p. 3-21

It is unclear why bromine was used as a surrogate for bromide. Provide discussion as to why this is an appropriate surrogate and make it clear that the bromine calculations are a surrogate for bromide.

Specific Comment #21 Section 3.5, 2nd paragraph, p. 3-21

See **Specific Comment #13**, and further discuss whether these chemicals pose a potential risk to receptors at the site. Straight comparison of averages is not appropriate, and neither is comparison of UCLs. Background comparison plots and tests are presented in Appendix C and should be used (excepting the concerns about the background data per **Specific Comment #1**).

Specific Comment #22 Section 3.5, p. 3-22, Additional OU-2 SLERA Uncertainties

Please provide more detail on the modeling uncertainties including exposure parameters and derivation of TRVs used. Each bullet point needs more discussion. For example, why is an HQ less than a LOAEL but greater than a NOAEL an uncertainty? The true effects levels generally occur between the NOAEL and LOAEL. Some consideration of that uncertainty may affect the overall conclusion regarding whether risk is acceptable or unacceptable. For all of these bullet points, is risk underestimated or overestimated and how do these uncertainties affect the risk estimates?

Specific Comment #23 Table 3-1

Please change the column headers from "BERA" to "SLERA". This is not a baseline risk assessment. The values presented in the columns are no-effects based thresholds that are appropriate for a SLERA.

Specific Comment #24 Table 3-1

It is unclear how the "No Plant ESV" listed for beta-BHC differs from the "NC" (no criterion) designation listed for other analytes. Please explain or edit for consistency.

Specific Comment #25 Table 3-10

The exclusion of TPH - Oil range organics and ortho-phosphate based on a detection frequency < 10% is inconsistent with NDEP guidance, which specifics a detection frequency threshold of <5% for consideration for elimination of analytes as COPECs after also considering relevant site-specific factors such as spatial distribution. See the current NDEP BCL Guidance as well as Section 7 of the ITRC TPH Risk Evaluation at Petroleum Contaminated Sites for additional risk assessment information of TPH, including references to potentially applicable soil screening levels. https://tphrisk-1.itrcweb.org/

Specific Comment #26 Appendix C, Table C-1

Comparison between Table C-1 and the BMI Regional Database: For locations SA-24, SA-25, SA-26 and SA-27 (from ENSR), indicates there are no records in the BMI database or the sample or location tables for these location IDs. Please verify these samples were included in an NDEP-approved DVSR/EDD and identify the DVSR.

Specific Comment #27 Appendix E, Tables E1 though E9

These tables present two sets of NOAEL and LOAEL HQ calculations, one set for AUF = 1 and one set for AUF <= 1. For the column entitled AUF <=1, please put in the actual AUF used in the calculation. This applies mainly to Tables E6, E8, and E9, which obviously use an AUF < 1 in the final two columns. For tables E1 - E5, and E7, the final two columns are redundant with the previous two columns and should be removed. Also, the term AUF in Appendix E is inconsistent with the terminology in the Appendix D exposure parameter tables, which use the term site foraging frequency (SFF). All SFF values in the exposure parameter tables show SFF = 1, so the SFF (or AUF) values < 1 used to calculate HQs in Tables E6, E8, and E9 are never defined. Please revise accordingly.

Specific Comment #28 Background Comparison

The background information on habitat suitability based on direct field evidence and the opinion of a qualified biologist/ecologist appears to come exclusively from the Checklist for Ecological Assessment in Appendix A, which was completed in 2018. Have any more recent assessments been done by a biologist or ecologist? If so include them. The 2018 form indicates that a prior assessment was conducted in 2015. How do the assessments compare? Have any other field-

based biological assessments been conducted and made available? It may be worth including a discussion of observations from both assessments depending on the nature of the 2015 checklist.