February 8, 2023

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 *Health Risk Assessment for Parcel E*

Dated: November 18, 2022

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 **06/08/2023** 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 A

The Parcel E HRA was reviewed, and one issue was identified that must be addressed. It might not affect conclusions, but the general structure of the report has not followed the structure of all past risk assessment reports at the BMI Complex, which affects presentation and interim conclusions in the report. The structural issues concern placing the risk screening assessment before the background comparisons, although the background comparisons are included in an appendix. Other concerns are that the metals data do not match any previous metals data in background or other risk assessment reports from the BMI Complex. This is a data comparability issue, which might be because of analytical issues or differences but needs to be explored. This issue is problematic for the radionuclide data as well. Also, the role of institutional controls or agreements regarding development should be more explicitly stated. These are not overly apparent in the main body of the text; however, it should impact at least the future exposure scenarios considered.

General Comment #1 Order of Steps Taken to Reach Conclusions

All previous risk assessments performed at the BMI Complex have included steps to perform background comparisons followed by risk screening in that order. This risk assessment presents these two steps in the reverse order. The reason NDEP has preferred doing the background comparisons first is to understand what the data show in general, whether there appears to be contamination of metals and radionuclides. This step is taken to gain insight and understanding of the data, but is now missing because risk screening screens out nearly all metals and radionuclides before the background comparisons are brought in. Note that this is also associated with the intent of NDEP's Data Usability (DU) guidance, which was aimed at gaining insights and understanding the data, not just to support risk-based decisions, but also to demonstrate to NDEP's audiences that NDEP understood the site. The final DU step is aimed at exploring the data rather than repeating the rote data validation steps that precede the final DU step in NDEP's guidance.

General Comment #2 Need for Explicit Development Assumptions

The context of the Health Risk Assessment (HRA) and applicability of the results is not well enough defined. Section 5.2.1.2 (Potentially Exposed Human Populations and Exposure Pathways) states, "Future land use is anticipated to be restricted to industrial and/or commercial purposes through a land-use covenant" and also, "Exposure via domestic use of groundwater was not evaluated because on-Site groundwater is not and will not be used as a domestic water supply." It seems that the HRA is predicated on restrictive land-use covenants or warranty deeds prohibiting residential development and groundwater wells. This condition of the HRA should be explicit in the Executive Summary and Conclusions.

The porosity and moisture content used in the HRA vapor-phase modeling (0.358 cm^3/cm^3 and 0.148 cm^3/cm^3) results in a saturation (~41%; i.e., 0.148 / 0.358 = 41%) approximately 2-

fold greater than that based on USEPA default values (~19%; i.e., 0.076 / 0.390 = 19%). As such, indoor, outdoor, and trench air EPCs may be significantly underestimated. It is recommended that the porosity and moisture values be revisited and a more appropriate ones be used.

We further recommend that the moisture content used in the HRA vapor-phase modeling be based on a 95% UCL air saturation.

Essential Correction

Specific Comment #1 Section 5.2.2.2, penultimate paragraph on p. 5-12

The HRA vapor-phase modeling is based on soil physical parameters from samples collected in 2010, several of which appear to be adjacent to ponds (Appendix L, Figure L-1) and therefore may be biased high with respect to moisture content, from a depth of 10 feet, and none of which are on Parcel E.

Specific Comment #2 Section 4.1.1. Data Usability Evaluation for Soil

Data usability for radionuclides is discussed only in relation to the comparability of background and site soil data, where results from the historical background data set and the 2019 site soil data are said to be non-comparable due to differences in sample preparation and analytical methods. Please provide information to support the usability of the 2019 radionuclide soil data for risk-based decisions, specifically pertaining to sample preparation (digestion) and selection of analytical method for each analyte.

Specific Comment #3 Section 4.1.1.5. Evaluation of Data Quality Criteria for Soil

USEPA Method 540-R-97-028 is cited as the standard analytical method for asbestos. The asbestos analytical method should reference the Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material (Berman and Kolk, 2000). Please correct.

Specific Comment #4 Section 4. Criterion IV – Analytical Methods and Detection Limits

There are several organic analyte SQLs that do not meet the 10% level of BCL or RBTC. Section 6.1.2 provides rationale for accepting the SQL level. For some analytes, the SQL calculated cancer risk range is near the lower end of 10^{-6} and 10^{-4}. For all analytes, the HQ calculated from SQL yields a value below 1. The report summarizes that the projected cancer risk based upon the SQL falling within the range will not impact the overall risk evaluation. However, this is not clear from an additive risk perspective. Please clarify.

Specific Comment #5 Table 5-4

Table 5-4 shows site and background cancer risk estimates for all eight radionuclide analytes, although Table 5-3 indicates that only thorium-230 is identified as being present in site soils at a concentration greater than background. Per NDEP guidance, because secular equilibrium is not exhibited in the uranium decay series, only thorium-230 should be carried forward in the risk assessment. Comparison of site and background radionuclide concentrations should be revised to include only thorium-230, otherwise the comparison becomes a function of the number and nature of radionuclides included in the analytical suites rather than a function of site-related COPCs. Radionuclide risk tables and associated text should be revised following this change.

The radionuclide data should also be presented while considering the difference in analytical methods per Specific Comment #2 and the conceptual site model/history. Are radionuclides expected as contaminants? Is the difference for Th-230 probably a matter of difference in analytical methods? This should be discussed.

Specific Comment #6 Table 5-4

The comparison of site and background cancer risks utilizes the 95% UCL to characterize soil concentrations for both site and background soils. The 95% UCL statistic is sensitive to sample size, so a comparison that utilizes this statistic should include a discussion of the relative sizes of the data sets and the influence this has on the resulting comparison. More generally, the rationale for using the 95% UCL to characterize soil concentrations at a contaminated site is to provide confidence that the average concentration is not underestimated. There is no comparable reason for using the 95% UCL to characterize background soil concentrations. Table 5-4 should be revised to also include the simple average of thorium-230 soil background.

The background data set is considerably larger than the site data set. Consequently, if, for example, the site data represented background, the 95% UCL for the site data will exceed that for background data. This is not helpful for good decision making. This is why EPA's RAGS document indicates essentially that background risk should not be subtracted from site risk when the risk assessment is deterministic.

Specific Comment #7 Section 5.1.1. Identification of Soil COPCs

Section 5.1.1, Identification of Soil COPCs. Per Essential Correction comment #5, thorium-230 should be identified as a COPC and evaluated in the risk assessment.

Specific Comment #8 Section 5.1.1.2

Section 5.1.1.2 explains that differences in sample preparation and analytical methods for radionuclides from the historical background data set and the 2019 site soil data set are likely the reason for the conclusion that statistical tests were not a reliable basis for radionuclide COPC selection. Logically, if these differences preclude comparison of site and background radionuclide concentrations, they should equally preclude comparison of site and background risk assessment results since the results are directly proportional to soil concentrations. Please

provide an explanation of why the background soil radionuclide data are usable for drawing conclusions related to the radionuclide incremental risk above background levels.

Specific Comment #9 Section 5.4.1. Soil Risk Characterization

Following revisions related to Specific Comments #s 5 through 7, and pending resolution of Specific Comment #8, the risk characterization for soils should be revised to discuss potential incremental cancer risk from thorium-230, based on evaluation of site and background levels of thorium-230.

Specific Comment #10 Section 6.1.4. Uncertainty Evaluation

The text states that, "radionuclides were excluded as soil COPCs based on the calculation of total cancer risks, not the statistical testing results of the background evaluation." This statement is inconsistent with the discussion in Section 5.1.1.2 (Background Evaluation) where the exclusion of radionuclides as COPCs is based on a comparison of site and background cancer risk results rather than total cancer risk. Per Specific Comment #7, this text should be revised to reflect identification of thorium-230 as a COPC and inclusion of this radionuclide in the risk assessment.

Specific Comment #11 Table B-3. Asbestos Soil Data Summary

Please confirm the sample depth for asbestos data. The column "Start Depth ft bgs" indicates that samples were collected at one foot, however samples for Asbestos are supposed to be collected within 1-2 inches bgs. If the samples were collected without scraping the first foot, then this would be an error in data collection.

Specific Comment #12 Tables B-1 and B-2

In addition to the asbestos data in Specific Comment #11, further clarification is needed for the start depth for soil and soil gas data sets Tables B-1 and B-2. Where the stated start depth is 1ft, clarification is needed for why these samples do not begin at 0 ft bgs. In ES-2 of the Executive Summary, it is stated that "Analytical results of soil samples collected at 0-10 feet (ft) below ground surface (bgs) in Parcel E were assessed through the data processing and data usability evaluation (DUE) steps (see Section 4.1.1) and data representative of current conditions were selected for purposes of the HRA," however, in 4.1.1.1 the report states "the [soil] data set includes soil samples collected at depths of 1 and 10 ft bgs, " while the B-1 and B-2 data sets have sample depths of 1-1.5 ft bgs and 10-10.5 ft bgs.

Note also that the risk assessments as presented are based on soil data from the surface. Please clarify the use of apparently applying the data from 1 ft bgs to risk assessments that assume surface soil data are used.

Specific Comment #13 Table G-1

Please be specific in the use of chemical names:

1. tert-Amyl methyl ether and 1,1,2-Trichloro-1,2,2-trifluoroethane are missing from soil Gas dataset in Table G-1 Soil Gas_Field Data_Parcel E.xlsx, but are listed as analytes in Tables 4-7a and 4-7b. Please correct as necessary.

2. "Ethylbenzene" is spelled as *Ethyl benzene* in this dataset yet is spelled as "Ethylbenzene" in Tables 4-7a and 4-7b. Please make the text consistent across these tables.

3. "tert-Butyl alcohol" is spelled as *tert Butyl alcohol* yet is spelled as "Tert-Butyl alcohol" in Tables 4-7a and 4-7b. Please make the text consistent across these tables.

Specific Comment #14 Table G-1

Table G-1 has inconsistent end and start depths. End depths that are different than their corresponding start depths are samples collected during Phase 3 RI soil gas investigation. Please explain why the end depths are represented differently, assuming there is some amount of depth that should be represented between the start and end depths for all soil gas samples.

- *Combinations of Start and end depths:*

start_depth	end_depth
5	5
5	5.5
15	15
15	15.5

Specific Comment #15 Appendix K

The pooled analytical sensitivity and risk calculations in the Appendix K asbestos Excel workbook were checked. Please provide documentation for the following inputs in the footnotes of the PEF worksheets used to calculate construction and commercial-industrial asbestos risks:

- In situ wet soil bulk density
- Gravimetric Soil Moisture Content
- Soil Silt Content
- Road Surface Silt Content

Specific Comment # 16 Table ES-1, 8-1 and Section 8

Section 8 states the HI for outdoor commercial/industrial worker is 0.0000002 while these two tables state 0.0000001. Please address this discrepancy.

Minor Corrections

Specific Comment #17 4.1.1.1 Soil Data Set and Data Processing

Please correct the following errors in data entry:

"Standardize reporting units (e.g., milligram per kilogram (mg/kg) for metals and picogram per gram (pg/g) for dioxins/furans)"

Dioxins/ Furans are neither recorded nor reported in picogram per gram (pg/g) format in any of the datasets or tables.

Specific Comment #18 4.1.1.1 Soil Data Set and Data Processing

Please correct the following errors in data entry:

In Appendix B, Table B-1 Soil HRA Dataset for Parcel E, the Final Chemical Name for 2,3,7,8-TCDD TEQ is listed as "2,3,7,8-TCDD TTEQ."