NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

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

March 9, 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: *Baseline Health Risk Assessment Report for Ou-1 Soil Gas and Groundwater*

Dated: September 29, 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 **05/09/2022** 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,

Weiquan Dong, P.E.
Bureau of Industrial Site Cleanup
NDEP-Las Vegas City Office

WD:cp

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Attachment A

This technical memorandum summarizes a review of, and provides comments regarding, the above-referenced document. Page numbers referenced are for the hard copy version of this document.

One comment in general after the high-level review of Section 4 is that it is clear that the groundwater migrating from the OSSM subarea into OU-1 is the focus of this report. In section 4 the chloroform plume appears to contain the highest concentrations of the VOCs driving risk as presented here, hence the focus. However, there is some concern noted here that if NERT is not responsible for this risk, this report will serve little purpose in informing NDEP about the remaining risks and sources unrelated to the OSSM-derived portion of the contamination on OU-1 for which NERT could be responsible.

Essential Corrections

General Comment #1

The Deliverable, and OU-1 in general, has an east-west spatial dimension that perhaps is not directly relevant for a present-day risk assessment, but to fully understanding source terms and the potential risks from OU-1 subsurface contamination, the entirety of OU-1 has not been addressed. Much of the effort in this report has been put towards the western portion of OU-1, where soil gas and groundwater concentrations are overwhelmed by the OSSM groundwater plume that has migrated onto OU-1 and is driving risk within the delineated OU-1 boundary. This leaves the eastern portion of OU-1 undiscussed for the most part throughout Section 4. Absent the OSSM plume, for which NERT is not directly responsible, it is unclear what risks may reside from sources within OU-1 itself. Consequently, it is not clear exactly what risk NERT would be responsible for on OU-1? It is recommended that risks be tabulated with both the trespassing chemicals included (as it now stands) and excluded so that the specific contributions may be discerned, at least in the eyes of the Trust.

Specific Comment #1 — Executive Summary, p. ES-2. 1st full paragraph, last sentence.

Please clarify by expanding the sentence. As written, this sentence leaves the reader hanging.

Specific Comment #2 — Section 4.2.3 and associated Figures

The temporal bar plots in general show little data. What they mostly show is a comparison of two wells in the OSSM-derived plume area compared to one well in an area of much lower concentration in the NERT-derived plume area.

Please include more soil gas wells for temporal description of activity over time on the east side of OU-1 or explain why these wells were left out (such as those included later in the correlation plots, RISG-23, and RISG-82). It might be that even at shallow depths there were no samples from the 2008 Phase B investigation, but please make this or other reasoning more explicit in this section. It may also be helpful to include a comparable Table 4-3 for soil gas locations.

Please also explain why the temporal trends at RISG-14 might be meaningful with respect to the potential source of chloroform on the east side of OU-1.

Specific Comment #3 Section 4.2.3, *Shallow Groundwater*

First, it was helpful to see both figures 4-12a (at the same scale as figure 4-11) and 4-12b (at a scale relevant to only the data presented).

However, it is unclear why samples taken from wells upgradient of the former Beta Ditch would be excluded. It is also not clear why temporal trends for wells with concentrations over 1,000 µg/L are the only ones of interest. Chloroform exists on OU-1 upgradient of the former Beta Ditch and east, and possibly separated from the groundwater plume originating from OSSM (Figure 3-2) at levels lower than 1,000 µg/L but above the screening level of 70 µg/L. These concentration levels rule out looking temporally at any wells also used in section 4.2.4.

Please make it clearer why temporal trends were of interest for only these concentration levels. It removes a large portion of wells on OU-1 unrelated to the OSSM plume, which makes up a small spatial portion of OU-1.

Also, it is not clear why some spatial contouring has not been done to support any arguments made. These could include spatio-temporal plots that would allow more data to be brought into the analysis.

Specific Comment #4 Section 4.2.4

The correlation analysis is not compelling. It is driven by a couple of high concentrations. Have any diagnostics of the regression analysis been performed to confirm the correlation analysis? It appears that the correlation analysis is driven by one or two influential points.

Specific Comment #5 Section 4.2.5, p. 4-11, 1st full paragraph

In the third overall paragraph of this section there is text that suggests the benzene, chlorobenzene, dichlorobenzenes, and carbon tetrachloride found on OU-1 are primarily limited to the western portion of the study area, where the OSSM groundwater plume is located on OU-1. These analytes are said to correlate with chloroform and to also not have been used on OU-1 according to known documents. However, the report also states that chloroform was not reported to be used on OU-1, yet there is a chloroform plume related to the Unit 4 building.

Please provide or reference figures of groundwater plumes for these chemicals to support this statement, and please provide the correlation analysis.

Specific Comment #6 Section 4.2.5, p. 4-11, 2nd full paragraph

In the fourth overall paragraph of this section, it is stated that 'soil gas concentrations generally decrease with depth', however there are no supporting analyses for this in Section 4. This is shown somewhat in Figures 4-13 and 4-14, but this should be analyzed more explicitly based on the data included in this report and should include more wells. Please include some type of

analysis (spatial plot, correlation, etc.) of soil gas chloroform concentrations across OU-1 with depth.

Minor Corrections

Specific Comment #7 Executive Summary Figures ES-4 and ES-5

On Figures ES-4 and ES-5, the area around RISG-14 contains more samples at 15 ft bgs than at 5 ft bgs. Why the difference in sampling density in this location?

Specific Comment #8 Executive Summary, p. ES-6

For clarity, the closing sentence of the Executive Summary on page ES-6 should include the phrase "of the vapor intrusion pathway" before the phrase "is not warranted". This recommendation should not be construed as agreement from NDEP with the resulting phrase. The recommendation is intended to make clear to other readers that the BHRA only evaluates the vapor intrusion pathway.

Specific Comment #9 Section 2.3, p. 2-3

The last paragraph on page 2-3 refers to narrow paleochannels. It would be helpful to update relevant figures with the location of these paleochannels relative to the soil gas and groundwater sample locations.

Specific Comment #10 Section 4.2.3

Much of section 4.2 is devoted to chloroform. Yet the opening paragraph of section 5.1 states that there are 34-66 COPCs depending on matrix and depth. Additionally, table 7-4 lists chlorobenzene as a driver of HI. Please reiterate again at the beginning of section 4.2.3 why chloroform is the only analyte examined temporally.

Specific Comment #11 Section 4.2.4

Please explain why the highest area of highest concentration within the chloroform plume on the east side of OU-1 had no soil gas samples.

Specific Comment #12 Section 4.2.4

In the first line of text on page 4-10, please change 'concertation' to 'concentration'.

Specific Comment #13 Section 4.2.5

In the fourth paragraph of this section correlations in Figures 4-13 and 4-14, it is understood that the source of soil gas VOCs is likely chloroform in groundwater, and it does support the CSM, however what is shown in Figures 4-13 and 4-14 is driven largely by the two very high concentrations in the OSSM plume, representing potentially a different source than the operations area itself and representing a very small spatial area of the Operations Area. The correlations may not be representative of most of OU-1.

Please discuss uncertainties with these correlations with respect to the entire operations area. This is discussed briefly in the first bullet point of section 4.2.4, but please reiterate some of that discussion here or at minimum provide some thoughts regarding the correlation being driven by two data points on the far western side of the Operations Area and that absent these two points the relationship between chloroform and soil gas is much more variable across the rest of OU-1.

Note that correlation analysis is a special case of regression analysis (a simple linear regression), and regression diagnostics should be considered before presenting results of a correlation when it is clear that the apparent effect is driven by a few "influential points" or "outliers".

Specific Comment #14 Table 4-5

This table has several cells with "#value!" and "/FALSE". Please address accordingly.

Specific Comment #15 Section 5.2.2

Provide representative BIOVAPOR and Johnson & Ettinger modeling spreadsheets for chloroform and benzene for the various scenarios and simulated depths. In addition, the uncertainty in the BIOVAPOR and Johnson & Ettinger modeling results should be qualitatively or quantitively discussed.

Specific Comment #16 Figure 5-5

The transfer factors in Table 5-5 are more than 10 orders-of-magnitude less than those for the other COPCs and suggest that benzene will not be detected in indoor air under any circumstances. The low transfer factors for benzene are likely the result of the modeled degradation rates. It has been our experience that benzene is routinely detected in outdoor air (and indoor air) in most (if not all) urban/suburban areas suggesting that the modeled degradation rates may be incorrect of there are other sources (e.g., automobiles and trucks). Please comment in the Uncertainty Analysis.

Specific Comment #17 Figure 3-1

This includes all spatial plots, but there is a noticeable 'pinch' of the plume around wells MW-16, M-5A, RISG-80, and other locations in this area. This did not seem to be highlighted in the text.

Please provide an interpretation or description of the underlying mechanism by which the OSSM plume is essentially 'splitting'.

Specific Comment #18 Section 5.1

This document attributes 6 COPCs entirely to the OSSM plume and references the Ramboll 2021a document for this, however that document is still under review. Please provide a brief explanation of why all of these are being attributed solely to the OSSM plume in this report.

Specific Comment #19 Table E-1

The OU-1 Groundwater BHRA Data Set has a result of 0.000005 µg/L for formaldehyde in sample M-249-60-20171113 while the BMI has a result of 5 µg/L (converted from 0.005 mg/L in the EDD). Please check on this sample and verify the result reported in Table E-1.