NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

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

December 2, 2020

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: *The Soil Background Evaluation Report, Nevada Environmental Response Trust Site, Henderson, Nevada*

Dated: February 27, 2020

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 01/31/2021** 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

WD:cp

EC:
Jeffrey Kinder, Deputy Administrator NDEP
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James Dotchin, NDEP BISC Las Vegas
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Attachment A

Except for those comments to the Response to Comments (RTCs) noted below, all responses are deemed acceptable.

RTC to General Comment #1 The original Soil Background Evaluation Report has been split into two reports. The first report, the Dataset Summary Report, is focused on the comparison of the new background data set with previous background data. Because no changes to prior lithological assignments are being made and no data from different lithologies will be combined for the forthcoming comparison to Site data, statistical data analysis beyond a summary is not presented for lithologic units other than UMCf-fg1.

The second report is the Site Soil Background Analysis, which will present the comparison between Site and background data and will be included as an appendix to the forthcoming RI Report for OU-1 and OU-2.

Comment on RTC #1 The intent of the original comment was to solicit a comparison of the new data, which is supposedly a different lithologic unit, to current background data. This would identify if the new data are from a different lithological unit and would support NERT's decision to use the new data set. If they are not statistically different, then these results can be added to the current set of background data.

RTC to Specific Comment #10 The description of the shallow background data set has been revised. While it is acknowledged that NDEP allowed for the use of 101 samples (including the 6 ENVIRON samples) at the meeting of NDEP and the Trust on December 10, 2019, we have removed the 6 ENVIRON samples from this dataset in accordance with this comment for consistency with prior and future risk assessments.

Comment to RTC #10 The requested edits to the text describing the 19 excluded samples were not made nor was a discussion of the comment included in the response.

RTC to Specific Comment #14 Field duplicates are discussed in Section 3.1 of the Dataset Summary Report, describing the statistical approach for comparing the RI UMCf data set to previous background data sets. Section 2.3 of the report only addresses data usability from a validation standpoint.

Comment to RTC #14 The inclusion of field duplicates as separate observations may be fine if they still demonstrate coming from a random sample. If, for example, the primary sample and field duplicate both show a lower concentration than other locations, then there is a problem with assuming independence which would bias the estimates for mean and variance. Please provide justification for the method in which field duplicates are used, with the inclusion of some exploratory data analysis regarding the field duplicates and the primary samples.

RTC to Specific Comment #25 The Figure 4 series included in the new Dataset Summary Report has been revised to remove the lognormal lines. The phrase “ideal lognormal distribution” was intended to

encapsulate the idea that the distribution line shown is mathematically ideal and therefore only approximates reality. For the discussion of Site arsenic distributions in Section 1.4, this phrase has been replaced with "best-fitting lognormal distribution" for clarity.

Comment to RTC #25 While a lognormal distribution may fit the data, it is an approximation and there is no scientific reason to justify why it would. It is more useful to compare the average concentration for both sets, and even with right (positive) skew data the distribution of the mean can be approximated with a normal distribution.

New Comments

General Comment

The primary concern lies in the conclusion that the RI background data and the deep BRC background data from the same geologic unit should be combined for some metals and not others. This conclusion is not supported by the statistical analysis, which instead suggests that these two datasets are quite different for several of the metals. Some further justification is needed before these data are combined given the statistical results that are presented.

Fatal Flaws.

Specific Comment #1 Section 3.3 Summary and Conclusions

The conclusions are not well supported by the statistical analysis. Consequently, if this is the preferred conclusion then additional justification is needed. It seems that the conclusion is based on a conceptual understanding that the UMCf-fg1 unit should have similar concentrations everywhere, rather than what the data suggest. See comments on Figures below, but perhaps this warrants a spatial analysis of the new RI background data to see if the 5 locations and several depths show any spatial pattern that might help explain why the new RI data and the old BRC data are different. It might also be worth looking at laboratory analytical method differences, if any. The problem otherwise is that the statistical analysis as presented does not really support the conclusion.

Essential Corrections

Specific Comment #2 Section 1.4, 3rd paragraph.

Please review and revise the text regarding the lognormal distribution. The data should not be considered lognormally distributed. It is recognized that they might approximately follow a lognormal distribution but as noted in RTC#25 above, distributional forms are statistical artifacts that allow simpler mathematical evaluation of data. There is no physical reason that contaminant data actually come from a lognormal distribution, but they might be approximated by a lognormal distribution. Please change the last sentence of this paragraph along the same lines (reference to "another lognormal distributed population" – none of these concentrations are drawn from a lognormal distribution, but the data might be approximated by such a distribution – if they were they would probably also be approximated by a

gamma distribution, or a Weibull distribution, or any other skewed distributional form, and also by a mixture of normal distributions (since any distribution can be approximated as closely as desired with a mixture of normal distributions). These are data – statistical distributional forms are used for convenience, not because they are real.

Specific Comment #3 Table 6 and supporting text.

The uranium chain radionuclides seem to show secular equilibrium, and yet some of them are consistent and some are inconsistent which does not make sense. Note that the secular equilibrium statistical tests do not appear to have been run. They should be run, even though it appears that the uranium chain isotopes will be shown statistically to be in secular equilibrium and the thorium chain isotopes will not because of the noted Ra-228 analytical issues. Some further evaluation of the data should thus, be performed so that the secular equilibrium conclusions are consistent with the conclusions from the comparison tests. Because secular equilibrium is obtained, either all the radionuclides in that chain are consistent, or they are all inconsistent.

Minor Corrections

Specific Comment #4 Section 3.3, 1st sentence

Please revise this sentence because the lack of outliers is not a reason why these data reflect background conditions. The 1.5x multiplier in a box plot is an approximation to identifying outliers based on a normality test. This does not indicate that data beyond these whiskers are not real background data.

Specific Comment #5 Section 3.3, 2nd sentence

The term "variability" is too generic in this sentence. Does this refer to standard deviation of the data, or range of the data? It is expected that the range is greater when the data are combined, but what about the standard deviation, which addresses sample size when considering variability?

Specific Comment #6 Section 3.3, final sentence, and additional conclusion discussions

As noted in the Overall Comments, the conclusion is not supported by the statistical analysis. That does not mean that the conclusion is unreasonable necessarily, it just means it is relying on the conceptual model and site knowledge rather than the statistical comparisons. Hence, this conclusion needs to be justified and further support in a manner different than currently presented.

Specific Comment #7 Figures

Is it possible to include some figures that show the spatial distribution by depth interval? This would help evaluate the locations for spatial trend. There are only five locations so the possibilities are limited, but some bubble or intensity plots might be useful. The purpose is to see if there are any spatial (or depth) differences that help explain why the new data are different from the old UMCf-fg-1 data.