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December 20, 2023

Dr. Weiquan Dong, P.E.
Bureau of Industrial Site Cleanup
Nevada Division of Environmental Protection
375 E. Warm Springs Road, Suite 200
Las Vegas, Nevada 89119

RE: Refined Screening-Level Ecological Risk Assessment for Operable Unit 2, Revision 2
Nevada Environmental Response Trust
Henderson, Nevada

Dear Dr. Dong:

The Nevada Environmental Response Trust (NERT) is pleased to present the Refined Screening-Level Ecological Risk Assessment for Operable Unit 2, Revision 2 for Nevada Division of Environmental Protection (NDEP) review. This report has been revised in accordance with NDEP's comments dated July 7, 2023. As requested, NERT has also prepared an annotated response to comments summarizing the revisions addressing NDEP's comments.

If you have any questions or concerns regarding this matter, feel to contact me at (702) 960-4309 or at steve.clough@nert-trust.com.

Office of the Nevada Environmental Response Trust



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Remediation Director
CEM Certification Number: 2399, exp. 3/24/25

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Initial NDEP Comments (3/2/2022)	NERT's First Response (5/19/2022)	NDEP Comment on NERT's First Response (8/26/2022)	NERT's Second Response (5/18/2023)	NDEP July 2023 Follow-up Comment (07/07/2023)	NERT's Third Response (12/20/2023)
<p>1. 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:</p> <ul style="list-style-type: none"> 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 Las 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 	<p>Additional discussion will be added to Section 2.1.1.5 of Revision 1 of the OU-2 Refined SLERA Report to address the issue raised in this comment regarding p- values of 1 and relevance regarding site conditions compared to background, including explanation that:</p> <ul style="list-style-type: none"> The differences observed are likely a combination of geologic, analytical factors, and natural variance. With the general natural variability of alluvial geology, even within a single geologic unit, it is unlikely to obtain a perfect representation of local background for every existing site data set or relevant subset of data across this study area. <p>Therefore, not every variance between site and background data must be due to anthropological influence or analytical issues.</p>	<p>The planned response seems appropriate overall, pending review of the revised report and the added discussion of this issue. However, if the argument is made that there is no appropriate background dataset, there needs to be further discussion and justification exploring the metals not included as COPECs as a result of the background comparison tests (see bullet point 2 in the original comment). Box plots and/or quantile plots can be revealing in this situation and should be considered prior to finalizing results. The background comparisons, in effect, are used to statistically confirm what's seen in the data. Please also note that precedent has been set to use the McCullough background levels when the more local site data are less than the McCullough sitewide background data. The point of the comparisons is simply to describe what the data appear to say. Decisions can be made based on these comparisons, but other information can, and has been brought help to make final decisions.</p>	<p>The Revised Report has been updated to reflect NDEP's acceptance of NERT's May 19, 2022 response.</p> <p>It should be noted that since the report format has changed to that of a Refined SLERA, the original section this comment referred to is now Section 2.1.5.2. Text was added to Section 2.1.5.2, Section 3.2, and the uncertainty assessment in Section 4.7 regarding the discussion of background. The Gilbert's Toolbox results are consistent with NERT's May 19, 2022 response.</p>	<p>NDEP June 2023 Follow-up: There does appear to be added discussion regarding the quality of the background dataset, however, there does not appear to be added discussion of the use of McCullough background levels or considerations regarding the other metals removed from COPEC status based on this potentially not applicable background dataset.</p>	<p>The Refined Screening-Level Ecological Risk Assessment for Operable Unit 2, Revision 2 (Revised Report) has been updated to provide additional discussion of the background comparison.</p> <p>The McCullough data from the BRC/TIMET background dataset is an appropriate and agreed upon background dataset for use in the OU-2 Refined SLERA. Additional revisions to Section 4.7.4 have been made to clarifying this issue. There is no reason to suggest that there is no appropriate background dataset for the OU-2 Refined SLERA based on several constituents with background concentrations greater than concentrations at the Site. As such, there is no need to perform a secondary evaluation using a different dataset.</p> <p>Section 4.7.4 has been revised to include a discussion of the twelve chemicals that have background concentrations greater than the concentrations in OU-2. These chemicals are evaluated individually as it pertains to their potential contribution to risk to ecological receptors within OU-2. A review of these chemicals shows that they are not toxic to soil invertebrates, plants, or wildlife at the concentrations present within OU-2.</p>

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<p>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 geological issues.</p> <ul style="list-style-type: none"> 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. <p>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 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.</p>					
<p>3. 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.</p>	<p>Subsequent to NERT's submittal of the OU-2 SLERA Report Revision 0 (August 2021), NDEP provided a memorandum to clarify the format preferred for the spatial representation of data (memorandum entitled "NERT Spatial Plot Recommendations" dated February 18, 2022). The 7-page memorandum identifies bubble plots, contours/interpolation, geostatistical kriging, and empirical Bayesian kriging. Revision 1 of the OU-1 Refined SLERA will include spatial plots using a format agreed upon by NDEP, NDEP the Trust, and Ramboll after review and various calls amongst the parties to discuss the NDEP memorandum.</p> <p>Accordingly, bubble plots will be prepared with a continuous scale, using ecological screening values, or refined screening values, as appropriate for the points to be made in Revision 1 of the OU-2 SLERA. These spatial plots will be provided</p>	<p>This response will be acceptable, pending review of the revised report.</p>	<p>The Revised Report has been updated to reflect NDEP's acceptance of NERT's May 19, 2022 response.</p> <p>Specifically, spatial plots were prepared for all chemicals with Max HQ>1 and greater than background, detected chemicals with no ESVs, and chemicals not detected with SQLs>ESVs. These plots are discussed in Section 3.3.1 and presented in Figures 3-1 through 3-13.</p> <p>The plots developed for the OU-2 Refined SLERA are consistent with the approach outlined in NDEP's memorandum entitled "NERT Spatial Plot Recommendations" dated February 18, 2022.</p>	<p>NDEP June 2023 Follow-up: Spatial plots similar to the updated OU-1 versions have been added to Appendix H. This comment has been adequately addressed. In Section 4.7.3 uncertainty discussion of the low frequency of detection of di-n-butylphthalate and endrin aldehyde, please provide the figure numbers in the sentence where reference is made to "spatial plots for these constituents".</p>	<p>The Revised Report now includes figure numbers for di-n-butylphthalate and endrin aldehyde for the spatial plots referred to in the uncertainty discussion of the low frequency of detection in Section 4.7.3.</p>

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	<p>for the COPECs identified in the SLERA process (i.e., all constituents with at least one detected concentration that exceeds a plant, soil invertebrate, mammal, or bird ecological screening value). Constituents lacking ecological screening values will be shown in spatial plots as part of the uncertainty assessment.</p> <p>The findings of Revision 1 of the OU-2 SLERA Report will be updated to include discussion of the spatial bubble plots, as appropriate. This new information will augment the graphics with spatial representation of data for the key COPEC already provided in the OU-2 SLERA Report Revision 0.</p>				
<p>11. <u>Specific Comment #11: Section 3.3.1, 1st paragraph, p. 3-5</u> 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.</p>	<p>Section 3.3.1 of Revision 1 to the OU-2 Refined SLERA Report will include additional discussion regarding how the studies were selected and what other studies were considered.</p> <p>Further, this section will be revised to clarify that the RSVs obtained from individual studies [i.e., Novais et al. (2010), Phillips (2002)], and included in Revision 1 the OU-2 Refined SLERA Report, are not used in lieu of published ESVs, rather they are included to provide context, and balance the use of ESVs.</p>	<p>The proposed revisions are acceptable, pending review of the "additional discussion" in the revised report that is mentioned in the response</p>	<p>The Revised Report has been updated to reflect NDEP's acceptance of NERT's May 19, 2022 response.</p> <p>Specifically, text has been added to Section 4.5.3 (new section number resulting from the reorganization of the report) to include the additional discussion.</p>	<p>NDEP June 2023 Follow-up: The edits regarding RSVs derived from individual studies are acceptable. Follow-up comment: An explanation and justification should be provided for the derivation of the DDx invertebrate RSV. A footnote to Table 4-4 states that the DDx invertebrate ESV was represents the geometric mean of 5 studies from the EPA Eco-SSL for DDT, even though EPA states that data are insufficient to derive an Eco-SSL for invertebrates. There is no explanation for how the DDx invertebrate RSV was derived, although it appears that the ESV was simply multiplied by a factor of 10. Additional explanation/justification is needed for this given EPA's judgement about data adequacy for deriving an invertebrate Eco-SSL for DDT.</p>	<p>Section 4.5.3 of the Revised Report has been updated to provide a detailed summary of the derivation of the DDx RSV. To address this comment the source documents used to derive the DDT Eco-SSL in USEPA (2007b) were examined. The data and assumptions used to derive the DDx RSV are now clearly summarized.</p>

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<p>13. 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 <u>inappropriate (there is absolutely no statistical justification for such a comparison).</u></p>	<p>The section was intended to identify the constituents lacking ecological screening values retained for discussion in the uncertainty assessment. In the context of evaluating constituents lacking ESVs, the 95% UCL is used for consideration, but not decision-making. Revision 1 of the OU-2 Refined SLERA Report will include the following:</p> <ul style="list-style-type: none"> A comparison of nitrate, nitrite, and sulfate to background using the same approach as done for metals will be performed. The discussion of the 95% UCL for nitrate, nitrite, and sulfate currently in Section 3.3 will be updated to reflect that comparison. The 95% UCL will only be retained for context in Section 3.5 (the uncertainty assessment) and will not be retained in Section 3.3. Section 3.3 will state that nitrate, nitrite, and sulfate and other chemicals lacking ESVs are discussed further in the uncertainty assessment. In the uncertainty assessment, the discussion will include the updated background comparison. 	<p>The proposed revision is acceptable, pending review of the revised report.</p>	<p>The Revised Report has been updated to reflect NDEP's acceptance of NERT's May 19, 2022 response.</p> <p>Specifically, Section 4.5 (new section number resulting from the reorganization of the report) has been updated.</p> <p>It should be noted that nitrate, nitrite, and sulfate were compared to background using the same approach as for metals. Only one chemical (nitrite) was consistent with background and was excluded from further evaluation as summarized in Exhibit 3.1. The other two chemicals had no species-specific ESVs and were carried forward in the evaluation and discussed as an uncertainty in Section 4.7.1. As such, nitrate, nitrite, and sulfate are no longer included in Section 4.5.</p>	<p>NDEP June 2023 Follow-up: There are still inconsistencies that need to be resolved in the handling of nitrite. Table 3-1 shows nitrite excluded from Tier 2 because concentrations are "Consistent with background." However, footnote (a) of Table 3-1 states fluoride, nitrate, nitrite, and sulfate have background data, but site data is not compared to background. Nitrite is not included in Table 4-12 with nitrate and sulfate. These inconsistencies should be resolved.</p>	<p>The Revised Report has been updated to address footnote (a) in Table 3-1 as requested.</p> <p>Concentrations of nitrate, nitrite and sulfate within OU-2 were compared to background and the results are provided in Table 3-1.</p> <p>Nitrite is excluded from Table 4-12 because it is screened out in Table 3-1 due to consistency with background. Nitrate and sulfate were retained for further evaluation because concentrations of these constituents within OU-2 are greater than background. These constituents lack an ESV, so they are discussed in the uncertainty assessment (Section 4.7.1) and Table 4-12.</p>