# OFFICE OF THE NEVADA ENVIRONMENTAL RESPONSE TRUST TRUSTEE

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March 25, 2021

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: Soil Background Dataset Summary Report, Revision 2
Nevada Environmental Response Trust
Henderson, Nevada

Dear Dr. Dong:

The Nevada Environmental Response Trust (NERT) is pleased to present the Soil Background Dataset Summary Report, Revision 2 for Nevada Division of Environmental Protection (NDEP) review. This revised report has been prepared to address NDEP's comments in your letter dated March 2, 2021. As requested, an annotated response-to-comments is attached to this letter.

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

Stephen R. Clough

Stephen R. Clough, P.G., CEM
Remediation Director
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| NDEP Comment | Response to Comment |
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| **Comments on RTCs** | |
| 1. **Specific Comment to RTC #14 Response:** The purpose and importance of the boxplots of 'average pair concentrations' as it relates to the discussion of field duplicates being treated as separate observations is not clear. Suggest either delete these box plots or provide some explanation of their use in Section 2.6 (currently all interpretation in Section 2.6 focuses on the difference box plots).<br><br>However, it is clear that the 'pair concentration difference' boxplot is relevant to the discussion. Please consider an option to replace the orange points showing the differences from the field duplicates and the primary samples (which are sometimes difficult to see), with a boxplot made separately for those pairs and placed to the side of the other boxplot of 'pair concentration difference'. Rephrased, that means two boxplots for each metal placed side-by-side with one showing all pairwise differences among concentrations and the other showing pairwise differences between field duplicates and their primary samples. The idea being that if there are clear differences in the boxplots, then it may not be appropriate to treat the field duplicates as separate samples. Note when interpreting the plots that the range of the differences will be greater for the sample differences than for the duplicate differences simply because of sample size, but the center boxes should be somewhat aligned.<br><br>Note that the conclusions presented in Section 2.6 otherwise seem fine. | The average pair concentration box plots have been removed from the figures and the text of Section 2.6 has been revised accordingly.<br><br>Also, as proposed in this NDEP comment, a second box plot showing only the four field duplicate sample pair differences has been added to Figures 4a through 4f. These box plots now also include the mean and standard error of the differences, as well as the percentage of the pairs affected by detection limit censoring. |
| 2. **Specific Comment to RTC #25 Response:** The point of Section 1.4 appears to be in the title - that is, rationale for collecting additional UMCf background data. The reason to do so would seem to be because the current UMCf data are considered insufficient in some way. Previous DQOs appear to suggest at least 35 samples are needed, and the current background data from the UMCf has only 24. Further rationale is provided in terms of geographic location. | As suggested in the comment, the statistical discussion of arsenic concentrations at the NERT site has been removed from the report, since the DQO and geographical location arguments were deemed sufficient to provide the rationale for collecting additional background data from the UMCf. In addition, text has been added to Section 1.4 to clarify that the site-specific target remediation goal for arsenic of 7.2 mg/kg only applies to the top ten feet of soil and no other Site-specific remediation goal for arsenic has been established to date. |

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| The 2nd paragraph provides further support for the need for background data specifically from the UMCf, although that support is based on site-specific data, which seems somewhat disconnected. It is not clear that arsenic concentrations at the site are not affected by site activities, even in the UMCf. It seems reasonable to believe that arsenic has been released from the soil matrix, at which depths is not clear, and how arsenic has then been transported is not clear, and perhaps never will be. Arsenic in groundwater plume maps clearly show unexpected, elevated concentrations. The effect of this transport of arsenic on Qal and UMCf "soil" concentrations is not clear, which is perhaps a reason for further characterizing background in the UMCf. These arguments are sufficient for justifying collecting more UMCf background samples, without the need for the rest of this section - see below. It is not clear why 7.2 mg/kg is referenced as a target remediation goal for the site - this is true for the near surface soils, but it not necessarily the same for the UMCf. Please clarify.<br><br>The remainder of the section (last 2 paragraphs) further addresses the arsenic data from the site. They are not necessary to the central argument, which is adequately made in the 1st 2 paragraphs of this section. The data shown are from the site, in which case it is not clear why further exploration of them is needed to support the need to collect more background data from the UMCf. In addition, NDEP continues to have concerns about how the lognormal distribution is used. Why does the "data approximately following a lognormal distribution" make the data “natural”? The point, still, is that continuous probability distributions are used because they simplify mathematics if they can be used as reasonable approximations to data, not because they are real or natural, which they are not. The lognormal distribution might reasonably approximate some of the data, but it is not central to the argument that more data need to be collected - in fact the distributions of the site data seem largely irrelevant to the arguments presented for the need for more background samples. Any text regarding lognormal distributions seems irrelevant, other than to say the data are right-skewed and pointing out the range of the depths that the | |

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| UMCf concentrations were taken from. Please consider deleting these paragraphs or making further changes to them.<br><br>The mean and standard deviation presented are more informative and reflective of the data and the concerns presented than an approximate lognormal distribution to each subset of Site data.<br><br>The simplest path forwards would be to delete most of the last 2 paragraphs of this section (maybe keep the final conclusion in the final sentence that more data are needed). They seem to obfuscate the point of this section and the report, rather than clarify anything. | |
| 3. **Comment to RTC #2:** The report suggests that the justification for data sources used as background for a metal is based on conceptual understanding of the Site and lithology. It is unclear how the discussion of Site data being fit by multiple lognormal distributions is necessary to the decision regarding which background data are to be collected or used.<br><br>Section 1.4, paragraph 2, second to last sentence states "Since it is unlikely that arsenic contamination has migrated to these deeper soils to such a degree, Figure 2a suggests that the background concentration of arsenic increases with depth and that this increase may be related to changes in lithology at the Site." Figure 2a shows increases in arsenic concentrations at deeper depths at the Site, but not necessarily in background. The opposite was observed in Figure 5c which shows the arsenic concentrations from both background data sources for UMCf. Please clarify.<br><br>See comments above to RTC #14, suggesting some deletion in this section, to simplify to why more background data are needed, which does not need much analysis of the site data. | Section 1.4 has been revised to remove much of the analysis of site data, per the comment above to RTC #25. However, the depth trend of Site data from both the alluvium and the UMCf observed in Figure 2a (now Figure 2) should not be compared to the depth "trend" observed in the background data from multiple sampling events within the UMCf in Figure 5c. The UMCf background samples (on Figure 5c) and the UMCf Site samples (on Figure 2) were all taken from the same lithology, but the depth of the samples is partially dependent on the thickness of the alluvium deposited above the UMCf, which should not influence UMCf concentrations. Because the alluvium-UMCf contact is at a roughly consistent depth across the Site (20-40 feet bgs) and the area is densely sampled, general trends with depth can be observed within the Site samples (note that while an increasing trend with depth is observed in the deep alluvium on Figure 2, the UMCf data on this figure shows no trend with depth). Comparatively little alluvium was deposited to the west of the Site (UMCf contact ranges from 2-25 feet bgs), resulting in shallow UMCf background samples (orange squares on Figure 5c). A significant and varying amount of alluvium was deposited to the south and east of the Site (UMCf contact ranges from roughly 20-150 feet bgs), resulting in deeper UMCf background samples (teal triangles on Figure 5c). Therefore, the depth charts in the Figure 5 series should not be used to interpret trends with depth between the data sets, but only to note qualitative differences and perhaps to observe trends within each data set. |

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| 4. **Comment to RTC #3:** The figures 5ab, 5ag, 5ai, and 6 should be updated to show open symbols for the concentrations of radium-226, uranium-234, and uranium-238 that were left censored at 1 pCi/g to match the plot description that open symbols are used for results that fall below the minimum detection limit. Likewise, if it is believed these are censored, they should be indicated as such in Table 4. Table 4 shows 100% detection frequency for each species which conflicts with the text in Section 3.3, paragraph 2, that states "up to 45%" of the results were censored at 1 pCi/g.<br><br>The decision to exclude BRC UMCf radium-226, uranium-234, and uranium-238 data from the combined dataset due to some concerns over secular equilibrium and high proportion of may be appropriate. However, for consistency in use of data this same rule should be applied to the Th-230 data as well.<br><br>The decision to exclude RI UMCf radium-228 data from the combined dataset due to secular equilibrium is accepted.<br><br>Table 7 includes one test result for SEQ analysis for each decay chain, and it is believed the test results are based only on the final, filtered and combined dataset. Another table should include the SEQ analysis of each sample separately and using the full, un-filtered and combined dataset. | The figures have been revised to show open symbols for the BRC data set for radionuclide results below the detection limit. The detection frequency column in Table 4 and associated text have also been revised accordingly.<br><br>The thorium-230 data has been excluded from the final background data set for consistency with the rest of the decay chain, as indicated with text added to the end of Section 3.3.<br><br>Additional analyses have been added to the secular equilibrium table (now Table 6) to show the secular equilibrium results from each individual data set as well as the unfiltered combined data set. |