



DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2020-1477-02-001

June 29, 2020

Mr. Kevin Pierard
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Submittal of the Supplemental Investigation Report for Upper Mortandad Canyon
Aggregate Area, Revision 1

Dear Mr. Pierard:

Enclosed please find two hard copies with electronic files of the “Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1.” Enclosure 1 includes an electronic copy of a redline strikeout version of the report that incorporates all changes made in response to the New Mexico Environment Department’s (NMED’s) comments dated March 19, 2020. Responses to NMED’s comments (Enclosure 2) were submitted on April 17, 2020, and approved by NMED on May 4, 2020. Submittal of this report fulfills fiscal year 2020 Milestone #11 of Appendix B of the 2016 Compliance Order on Consent.

If you have any questions, please contact Kent Rich at (505) 660-6570 (kent.rich@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

**Arturo
Duran**

Arturo Q. Duran

Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

Digitally signed by
Arturo Duran
Date: 2020.06.23
10:04:37 -06'00'

Enclosures:

1. Two hard copies with electronic files (including a redline strikeout version) – Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1 (EM2020-0252)
2. Response to Draft New Mexico Environment Department Comments on the Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area, Dated March 19, 2020 (EM2020-0138)

CC (letter with hard-copy enclosure[s]):

Kent Rich, N3B

Cheryl Rodriguez, EM-LA

CC (letter with CD/DVD enclosure[s]):

Laurie King, EPA Region 6, Dallas, TX

Chris Catechis, NMED-DOE-OB

Steve Yanicak, NMED-DOE-OB

epla.docs@em.doe.gov

n3brecords@em-la.doe.gov

Public Reading Room (EPRR)

PRS Website

CC (letter emailed):

William Alexander, N3B

Emily Day, N3B

Michael Erickson, N3B

Jeff Holland, N3B

Kim Lebak, N3B

Joseph Legare, N3B

Dana Lindsay, N3B

Frazer Lockhart, N3B

Pamela Maestas, N3B

Glenn Morgan, N3B

M. Lee Bishop, EM-LA

Stephen Hoffman, EM-LA

Thomas Johnson Jr., EM-LA

David Nickless, EM-LA

Cheryl Rodriguez, EM-LA

Ben Underwood, EM-LA

**Response to Draft New Mexico Environment Department Comments on the
Supplemental Investigation Report for Upper Mortandad Canyon Aggregate Area,
Dated March 19, 2020**

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim (in italics). The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office responses follow each NMED comment. This response contains data on radioactive materials, including source, special nuclear, and byproduct material. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

GENERAL COMMENTS

NMED Comment

1. *Throughout the Report (Nature and Extent section) the DOE used comparison of total chromium, a naturally occurring ratio of trivalent chromium [Cr(III)] to hexavalent chromium [Cr(VI)], data to the Cr(III) residential soil screening level (SSL) (117,000 mg/kg) to determine whether additional sampling is warranted. Since data was analyzed for total chromium and not Cr(III), the use of Cr(III) SSL is unacceptable. Section 4.2, Screening Levels, indicated the use of total chromium screening levels were appropriate for the conditions at most sites in the Report. In the 2015 NMED Risk Assessment Guidance for Site Investigations and Remediation (SSG), it states "if site history does not indicate a known source for chromium (VI), the data (soil and/or groundwater) should be analyzed for total chromium" (section 5.1, Use of Chromium Screening Levels). NMED agrees that based on site history in the Report, if there is not a source of chromium (VI) the use of total chromium data is acceptable for risk assessment purposes. All analytical data for total chromium should be compared to the total chromium SSLs values. Revise the Report to eliminate the comparison of total chromium to residential SSLs for Cr(III).*

DOE Response

1. Soil screening levels (SSLs) are used both to evaluate risk and in the evaluation of nature and extent to determine whether additional sampling is warranted. The use of the trivalent chromium [Cr(III)] residential SSL for evaluating nature and extent of total chromium is consistent with the results of a 2017 chromium background study. In 2017, Los Alamos National Laboratory conducted a chromium background study to determine the prevalence of hexavalent chromium in soil, sediment, and tuff samples where there was no evidence of previous releases of chromium (LANL 2017, 602650). The study was conducted in accordance with a work plan approved by NMED (LANL 2017, 602400; NMED 2017, 602418). The report concluded that naturally occurring chromium is predominantly in the trivalent form and that the trivalent SSL is appropriate for data comparisons used to evaluate the extent of contamination at sites with no known chromium releases. The report also concluded that total chromium SSLs, rather than Cr(III) SSLs, will continue to be used for risk-screening comparisons to evaluate total chromium data at sites where there is no previous indication that hexavalent chromium was used and released. The chromium background study was approved by NMED in October 2017 (NMED 2017, 602678).

Section 4.2, Screening Levels, will be revised to provide a reference to the chromium background study as justification for the use of Cr(III) SSLs for evaluating nature and extent of total chromium at sites with no known or suspected sources of hexavalent chromium.

NMED Comment

2. Section 5.1.1 lists lines of evidence to be used in determining if an inorganic chemical should be eliminated as a chemical of potential concern (COPC). The comparison to the maximum background concentration is listed as a line of evidence to be used to screen out a COPC. Except in special cases, the New Mexico Environment Department (NMED) does not consider such comparisons as a valid line of evidence for eliminating detected inorganic compounds as COPCs. Note that Section 2.7.3 of the NMED 2015 Risk Assessment Guidance for Site Investigations and Remediation (SSG) does not state that comparison to maximum background is an acceptable line of evidence. The range of values in the background data set is considered in the statistical determination of appropriate background threshold (e.g., background values, BVs). As indicated in Section 2.3.7 of the SSG, if the maximum concentration of a COPC exceeds the applicable BV, statistical tests must be used to determine if the data set for the COPC is statistically different from the applicable background data set. However, as agreed in the Friday 14, 2017 meeting, NMED would allow the upper end of the background data set to be used for comparison in special cases:

- Statistically determined BV is significantly greater than the maximum background concentration.
- Statistical tests cannot be performed because of insufficient data or a high percentage of non-detections.
- Sufficient number of samples have been collected to determine nature and extent, but results are predominately non-detect (discussion of sample number versus detections).
- There is no history to suggest the constituent is directly related to site activities. If there is site history to suspect that the constituent is present due to site activities (such as lead at a firing site), then it is possible that the constituent could be present from historical activities at low levels (in the high range of background). In these cases, the constituent still must be carried forward as a COPC and retained in the risk assessment (it will likely not be a risk driver).
- Spatial analyses do not show a pattern or trend indicating contamination.
- The maximum detected result is statistically determined to be an outlier (note, sufficient samples must be collected to show a point is an outlier and not indicative of a hotspot).

Section 5.1.1 (and the Report in its entirety) should be revised to eliminate comparisons of COPC concentrations to the maximum value in the applicable background data set as a line of evidence for eliminating a detected inorganic chemical as a COPC unless one (or more) of the special cases in the bulleted items above exists; thus, precluding the comparison of COPC data to the statistically derived BV. In such cases, lines of evidence supporting the comparison of COPC data to the maximum background value should be provided to demonstrate that one or more of the special cases exist in the area being evaluated.

DOE Response

2. Section 5.1.1 will be revised to include the bulleted criteria presented in the comment as the basis for comparing the site data with the upper end of the background data set for the purposes of identifying chemicals of potential concern (COPCs). If site data are compared with the upper end of the background data set, one or more of the criteria will be cited as a basis for this comparison (e.g., less than eight soil samples were collected, so statistical tests could not be performed). The text regarding identification of certain inorganic COPCs will be revised as appropriate to clarify or provide additional lines of evidence in support of eliminating some inorganic chemicals as COPCs.

NMED Comment

3. Section 5.2, *Extent of Contamination*, states that comparisons of sample results to screening levels/screening action levels (SSLs/SALs) are used in determining whether the extent of contamination has been defined. According to the text, the comparisons are performed after determining whether extent is defined by decreasing concentrations vertically and laterally and that concentrations are below estimated quantitation limits (EQLs) or detection limits (DLs). The DOE considers that no further sampling for extent is warranted if the applicable SSL/SAL is at least on order of magnitude greater than the maximum COPC concentration. While the above is not recommended in the SSG, as agreed during the February 14, 2017 meeting, the approach may be applied as a single line of evidence to determine that no further sampling is warranted for the COPC in question if the caveats listed below are met and sufficient justification for the applied methodology (including references) is provided in the discussion:

- Contaminant concentrations do not increase significantly with depth or laterally and appear to be isolated cases (do not indicate a trend);
- There is no history of a contaminant release due to site activities and that sample results are representative of site conditions (sufficient data are available to determine extent);
- The SSL/SAL must be at least an order of magnitude greater than the COPC concentration;
- Inclusion or exclusion of the COPC would not impact overall risk (e.g., the COPC is not a significant contributor to risk due to low toxicity; and
- There is not a contaminant release from outfall into a drainage. Transport along drainages may be significant, both along the land surface and at depth, and require additional lines of evidence to ensure transport of contamination has been fully considered and the increasing concentrations are not the result of erosion/sediment transport. Under these circumstances, and similar, it is possible to have greater concentrations away from the initial source area due to release into drainages and outfalls.

Further, the comparison may only be used to determine the extent of COPC contamination and may not be used to eliminate a COPC from either the human health assessment or ecological risk assessment. Review the entire Report to ensure that appropriate methodology was applied while determining nature and extent of contamination.

DOE Response

3. The comparison of sampling results with SSLs/screening action levels in the main text of the report is applied only in the determination of whether further sampling for extent is warranted. No COPCs are eliminated from the risk-screening assessments based on this comparison and no revisions to COPC evaluations are needed. The report sections evaluating nature and extent of contamination will be reviewed and revised as appropriate based on the criteria in NMED's comment.

NMED Comment

- The DOE eliminated nitrates as a COPC based on it being a naturally occurring. Where the history of a site indicates that nitrates may be present due to laboratory activities, such as when the site contains a sanitary waste line and septic tank or activities that include the use of nitrate-containing explosives, nitrates must be considered as a potential COPC. This is especially important at sites where explosives such as HMX, RDX, or TATB have been identified as COPCs or activities where release of large amounts of nitrogen oxides may have occurred. The information must be based on the potential presence of nitrates in the explosives managed at the sites and the emissions released during explosives testing, burning or firing, as well as other recommendations provided in NMED's 2015 Soil Screening Guidance (SSG) for identifying COPCs. Alternatively, additional lines of evidence may be provided to fully justify the statement that the detected concentrations of nitrates likely reflect naturally occurring levels. Appropriate lines of evidence may include site history and comparison of the maximum detected concentration to the SSL.*

DOE Response

- COPC evaluations for nitrate will be revised to indicate whether the presence of nitrate could be site-related or not. Sites included in the report that may potentially be sources of nitrate include those managing sanitary wastewater and those where explosives were handled. If nitrate is determined to be potentially site-related, it will be retained as a COPC and carried through the nature and extent discussions and risk-screening assessments.

NMED Comment

- Based on information currently provided in the SIR, it is not clear that polynuclear aromatic hydrocarbons (PAHs) can be dismissed from consideration at the sites addressed in the SIR. Two issues were identified that raise concerns regarding the potential identification of sources of PAHs detected at these sites. Most importantly it is not clear that all sources of PAHs associated with site activities have been identified at AOC 03-007 and AOC 48-001. The discussions of PAHs for both sites associate all detected PAHs with roads, large paved areas in the vicinity of the sites, and runoff from roads and paved areas, however, the potential for PAHs to be emitted during the explosion experiments detonated at AOC 03-007 and during welding at AOC 48-001 has not been addressed in the text. For completeness, the potential associations of PAHs with these AOCs should be considered.*

In addition, it appears the SIR does not always identify the potential sources of PAHs not associated with site activities. For example, Section 9.2.4.3 states that three combustion boiler stacks are found in Building 48-1, the location of AOC 48-001. According to USEPA's AP-42, PAHs can be emitted from boilers burning a variety of fuels (e.g. coal, oil, natural gas). As indicated above, the PAHs detected at AOC 48-001 are attributed to roads and large paved areas. Combustion stacks such as the three boiler stacks at Building 48-1 and consolidated Unit 42-001(a)-99, the former TA-42 Incinerator Complex, can disperse PAHs downwind and deposit back to the earth's surface. Thus, PAHs emitted from these two sources may impact sites located downwind. To convey a thorough understanding of PAH contamination in the Upper Mortandad Canyon Aggregate Area, potential sources other than roads and paved areas should be discussed in the SIR.

Revise the discussion of PAHs on pages 36 and 37 of the SIR to address the potential for PAHs to be emitted as a result of the explosion experiments conducted at AOC 03-007. If it is determined that PAHs could have been associated with the operations at AOC 03-007, revise the SIR and its appendices to include PAHs in the human health and ecological risk analyses for this AOC. In addition, revise the PAH discussion for AOC 48-001 on pages 117 and 118 to address the potential

for materials containing PAHs (e.g. coatings, sealants, adhesives) to be associated with welding activities conducted at this AOC. If PAHs could have been emitted during welding (e.g., naphthalene) revise the SIR and its appendices to include the potentially emitted PAHs in the human health and ecological risk analyses for AOC 48-001.

Also, review the discussions of PAHs presented in Sections 6.0 through 9.0 of the SIR to ensure that all potential sources of the PAHs detected at each site are identified.

DOE Response

5. Information related to historical activities at the sites where the sources of polycyclic aromatic hydrocarbons (PAHs) are evaluated will be reviewed to identify additional information, if available, on potential sources of PAHs. The discussions of PAHs presented in sections 6.0 through 9.0 will be revised to incorporate this information, and conclusions regarding whether PAHs are COPCs will be revised as appropriate. If PAHs are added as COPCs, they will be added to the nature and extent evaluations and risk assessments. If the source of PAHs is shown to be another solid waste management unit (SWMU) or area of concern (AOC), PAHs will be added as COPCs for that SWMU/AOC.

NMED Comment

6. *A summary of human health and ecological risk screening assessments for each SWMU and AOC addressed in the SIR is provided in Section 6.0 through Section 9.0. However, the location of information that supports the reported results is never referenced in these summaries. Revise the summaries of human health and ecological risk screening in Sections 6.0 through 9.0 to include references to the appropriate sections, subsections, and/or tables of Appendix H for additional information regarding how the reported cancer risks, hazard quotients (HQs), and hazard indices (HIs) were determined. For example, Section 6.7.5 should reference Appendix H, Tables H-4.2-48 through H-4.2-60 so stakeholders can access the tabulations of risk and noncancerous hazard for Consolidated Unit 03-049(b)-00.*

DOE Response

6. The text in sections 6.0 through 9.0 provides summaries of results of the risk screening assessments presented in Appendix H. The more detailed descriptions of the human health and ecological risk screening assessments presented in Appendix H include references to the tables containing the supporting data. This approach is consistent with all previously approved supplemental investigation reports (SIRs). Therefore, the text in the main report will not be revised to provide cross-references to the risk appendix.

NMED Comment

7. *The risk assessment includes lead in the calculations of hazard indices (HI). However, as lead screening levels are based on blood lead levels and not derived in a similar fashion as other chemicals, lead should not be included in the HIs. Inclusion of lead leads to an overestimation of risk for noncarcinogens. Lead should be evaluated separately, through comparison of the appropriate exposure point concentration (EPC) to the lead screening levels.*

DOE Response

7. A similar comment has been provided on other SIRs. Following discussions with NMED, the approach agreed to for lead has been to initially include it in the overall hazard index (HI) for noncarcinogens. At most sites, the HI is less than 1, indicating no further evaluation is needed. If the noncarcinogenic HI is greater than or equivalent to 1, then the contribution of lead to these effects is evaluated separately and not included in the HI. This approach will be retained for this SIR revision. However, in future investigation reports, lead will not be included in the noncarcinogenic risk tables.

SPECIFIC COMMENTS

NMED Comment

8. *Section 3.2.7, Chemical and Radiological Sample Analyses, 2nd paragraph:*

DOE Statement: *Fluoride and total phosphorus were incorrectly analyzed as part of the anion and wet chemistry analytical suites and the results reported by the analytical laboratory. These two inorganic chemicals are not related to any site or associated with processes in the Upper Mortandad Canyon Aggregate Area. The sampling results for fluoride and total phosphorus are presented with the all analyses data in Appendix F (on DVD) but are not evaluated in this report.*

NMED Comment: *No additional information on these incorrect analyses is provided. The discussion on top of page 11 should be expanded to indicate if the analyses were performed by mistake (e.g., not requested by facility) or if the analyses were performed incorrectly by the analytical laboratory. If the analyses were performed incorrectly by the analytical laboratory, a brief discussion should be added to support the assertion that fluoride and total phosphorus are not associated with any site or activity in the Upper Mortandad Canyon Aggregate Area.*

DOE Response

8. It appears the analyses requested by Los Alamos National Laboratory (LANL) for several samples were not those specified by the investigation work plan. The approved investigation work plan for Upper Mortandad Canyon Aggregate Area (LANL 2008, 100750; NMED 2008, 101110) did not specify fluoride analysis for any samples. Analysis for nitrate was specified for all samples except those from AOC 48-012, where no inorganic analyses were performed. The method for nitrate analysis (U.S. Environmental Protection Agency [EPA] Method 300.0) is a method for analysis of inorganic anions by ion chromatography, and can be used for analysis of other anions, including fluoride. The analytical services requests on the chains-of-custody for the samples collected during the 2009 investigation at Upper Mortandad Canyon Aggregate Area included "Perchlorate+CN+NO₃+pH" for samples requiring analysis for nitrate. Nitrate was analyzed using EPA Method 300.0 and the only results reported for this method were nitrate. For samples from SWMU 50-006(a), however, the analytical service request for samples requiring analysis for nitrate was "CN+Anions+CLO₄." These samples were analyzed using EPA Method 300.0 and results were reported for bromide, chloride, fluoride, nitrate, and sulfate. Because the other anions were not identified as data needs in the investigation work plan, they were not included in the inorganic data table for SWMU 50-006(a). The reference to "incorrect analysis" for fluoride appears to relate to these samples. The text in section 3.2.7 will be revised to better explain this.

Total phosphorus is included as an analyte for one sample from reaches TS-1W and TS-1C. This analysis was performed to support the objectives of the Canyons investigation and is not related to SWMU 50-006(a). As described in section 10.3.4.4 of the SIR, the data from reaches TS-1W and TS-1C were presented only for the purpose of defining lateral extent, where appropriate. Because

total phosphorus was not analyzed for samples from SWMU 50-006(a), the Canyons sample result would not be needed to define extent and is not presented in the data tables. The result is included in Appendix F. The text in section 3.2.7 will be revised to remove reference to total phosphorus.

NMED Comment

9. Section 6.3.4.3, Soil, Rock, and Sediment Sampling Analytical Results:

DOE Statement: Manganese was detected above the Qbt 2,3,4 BV (482 mg/kg) in one sample at a concentration of 599 mg/kg. The Gehan test indicated site concentrations of manganese in tuff are statistically different from background (Table G-1). However, the quantile and slippage tests indicated concentrations of manganese in tuff are not statistically different from background (Figure G-12 and Table G-1). Manganese is not a COPC.

NMED Statement: Revise this discussion to explain why a more conservative approach was not followed. For instance, the quantile and slippage tests indicated concentrations were not statistically different. However, the Gehan test indicated site concentrations of manganese in tuff are statistically different from background (Table G-1). Also, the concentration of sample CAMO-09-6280 is not only above BV levels, but is also above construction worker SSL (464, Table 6.2-2). Manganese should be retained as a COPC.

DOE Response

9. As described in section 5.1, up to three statistical tests may be used (Gehan, quantile, and slippage) depending on the characteristics of the data (e.g., percentage of nondetections). The site data for a chemical must be shown to not be statistically different from background using two tests in order to be eliminated as a COPC (i.e., it is not necessary to pass all three tests, as one of the tests might be inappropriate for the background data distribution). The text in section 5.1 will be revised to clarify that it is necessary to pass two tests to be eliminated as a COPC. For chemicals eliminated as COPCs based on statistical tests, the discussions of statistical results will be revised to refer only to the two tests for which the chemical passes.

It is not necessary to revise section 6.3.4.3 to retain manganese as a COPC based on detection above BV or SSL. Per the process for identifying COPCs, statistical analyses are run only if there are results above BV. Therefore, elimination of a constituent as a COPC on the basis of statistical tests will always involve the presence of results above BV. Since the BVs for manganese in soil and Qbt 2,3,4 are greater than the construction worker SSL, statistical tests may eliminate manganese as a COPC when results are greater than the construction worker SSL.

NMED Comment

10. Section 6.4.4.3, Soil, Rock, and Sediment Sampling Analytical Results

DOE Statement: Nitrate was detected in 21 samples with a maximum concentration of 2.88 mg/kg. Nitrate is naturally occurring, and the concentrations reflect naturally occurring levels of nitrate. Nitrate is not a COPC.

NMED Statement: The reasoning behind nitrate not being retained as a COPC is that it is naturally occurring. However, because the SWMU was part of a decommissioned firing site, nitrate is possibly present at this site because the use of explosives such as HMX, RDX, and TATB have been identified or activities where release of large amounts of nitrogen oxides have or may have occurred. The maximum detected concentration of nitrate (2.88 mg/kg) is several orders below the residential SSL

of 1.25E+05 mg/kg. The retention of nitrate would not result in any change to the conclusion of the risk assessment for nitrate. The basis for the statement that nitrate is only present as a naturally occurring constituent has not been fully justified. Either provide additional lines of evidence (such as noted above) to support that nitrate does not need to be identified as a COPC or retain nitrate as a COPC and carry forward to the risk assessment.

DOE Response

10. Sections 6.4.4.3 and 6.4.4.4 will be revised to include nitrate as a COPC and to evaluate nature and extent of nitrate. Appendix H will be revised to evaluate the risk associated with nitrate at AOC 03-007.

NMED Comment

11. Section 6.4.4.3, Soil, Rock, and Sediment Sampling Analytical Results:

DOE Statement: Manganese was detected above the Qbt 2,3,4 BV (482 mg/kg) in one sample at a concentration of 743 mg/kg. The Gehan test indicated site concentrations of manganese in tuff are statistically different from background (Table G-7). However, the quantile and slippage tests indicated concentrations of manganese in tuff are not statistically different from background (Figure G-55 and Table G-7). Manganese is not a COPC.

NMED Statement: Revise this discussion to explain why a more conservative approach was not followed. For instance, the quantile and slippage tests indicated concentrations were not statistically different. However, the Gehan test indicated site concentrations of manganese in tuff are statistically different from background (Table G-1). Also, the concentration of sample CAMO-09-6025 is not only above BV levels, but is also above construction worker SSL (464, Table 6.2-2). Manganese should be retained as a COPC.

DOE Response

11. See response to Specific Comment 9. It is not necessary to revise section 6.4.4.3 to include manganese as a COPC.

NMED Comment

12. Section 9.5.4.3, Soil, Rock, and Sediment Sampling Analytical Results

DOE Statement: Nitrate was detected in 16 samples with a maximum concentration of 6.88 mg/kg. Nitrate is naturally occurring, and the concentrations reflect naturally occurring levels of nitrate. Nitrate is not a COPC.

NMED Statement: The site is a former septic system. The retention of nitrate would not result in any change to the conclusion of the risk assessment for nitrate. The basis for the statement that nitrate is only present as a naturally occurring constituent has not been fully justified. Either provide additional lines of evidence to support that nitrate does not need to be identified as a COPC or retain nitrate as a COPC and carry forward to the risk assessment.

DOE Response

12. Sections 6.5.4.3 and 6.5.4.4 will be revised to include nitrate as a COPC and to evaluate nature and extent of nitrate. Appendix H will be revised to evaluate the risk associated with nitrate at SWMU 03-045(h).

NMED Comment

13. Section 10.2.4.4, Nature and Extent of Contamination:

DOE Statement: Tritium was detected in 67 samples with a maximum concentration of 2.6 pCi/g. Concentrations decreased or did not change substantially with depth (0.01 pCi/g to 0.095 pCi/g) at 28 locations. Concentrations increased slightly with depth (2.14 pCi/g or less) at 5 locations. The residential SAL was approximately 327 times the maximum concentration. Tritium was not detected at locations MO-605106 and MO-605473 in the drainage to the east. The lateral extent of tritium is defined, and further sampling for vertical extent is not warranted.

NMED Statement: Concentrations increased slightly with depth (2.24 pCi/g or less) is not accurate when comparing the magnitude of the increase. For instance, 2.24 pCi/g increase is approximately 24 times greater than the BV for sediment 0.093 pCi/g. Remove increased slightly from the statement or give more explanation why it is not a significant increase.

DOE Response

13. The text will be revised to indicate that tritium activities increased with depth rather than increased slightly with depth.

NMED Comment

14. Appendix H. Section H.4.4.2, Exposure Assessment, Pages H-38 and H-39

DOE discusses the subtraction of the radiation soil BV for thorium-230 from the total doses obtained (and reported) for the industrial, construction worker, and residential scenarios at AOC 48-001 and SWMUs 48-002 (a, b). According to Section 5.1.1, Inorganic Chemical and Radionuclide Background Comparisons, page 15 of the SIR, the BV for radionuclide BVs will be identifying COPCs. However, Section 5.1.1 does not address how radionuclides BVs will be considered in the determination of dose under the three exposure scenarios addressed in the human health risk assessment. Such a discussion should be added to the main text of the SIR and/or Appendix H to clarify how radiological BVs are incorporated into the determination of dose to potential receptors. Revise the SIR and/or Appendix H to address the issue.

DOE Response

14. The 25 mrem/yr target dose from DOE Order 458.1 applies only to dose from DOE-related exposure sources, and does not apply to background dose. The dose contribution from thorium-230 for AOC 48-001 and SWMUs 48-002(a) and 48-002(b) was evaluated because the dose from thorium-230 constituted a significant portion of the total dose at these sites, indicating dose was likely overestimated in comparison to the 25 mrem/yr target. The text in Appendix H, section H-4.4.2 will be revised to clarify the reason for this background evaluation.

NMED Comment

15. Appendix H, Section H-5.4.5, Population Area use Factors, Pages H-63 through H-67

The Permittees present the SWMU- and AOC- specific results for adjusted ecological hazard quotients (HQs) and hazard indices (HIs) based on the value of the site-specific population area use factor (PAUFs). The wording used to report the results is awkward and introduces confusion into the presentation. For example, the results for SWMU 48-003 are reported as: "The adjusted HIs for SWMU 48-003 are less than 1 for all receptors. The earthworm had an unadjusted HI equivalent to 1 and the plant had an unadjusted HI of 3." Because the earthworm and plant are also ecological receptors at the site, it is recommended that the result statement be revised to read: "The PAUF adjusted HIs for SWMU 48-003 are less than 1 for all affected receptors. The earthworm had an unadjusted HI equivalent to 1 and the plant had an unadjusted HI of 3 as these receptor populations are not subject to PAUF adjustment." Revise the presentation of the results for PAUF adjusted HIs.

DOE Response

15. The text will be revised to clarify that HIs for earthworms and plants are not adjusted for population area use factors (PAUFs).

NMED Comment

16. Appendix H, Section H-5.4.7, LOAEL Analyses, page H-67

The Permittees states: "HI analyses and adjusted HI analyses were conducted using the LOAEL-based ESLs." This statement introduces confusion into the discussion as the adjustment referred to in the quoted sentence is not clearly defined. Based on the wording used in Section H-5.4.5, it appears that the adjusted HI analysis refers to a PAUF adjusted HI analysis that is based on the LOAEL. To clarify the purpose of the "adjusted HI analyses" noted in the quoted sentence, it is recommended that the statement be revised to read: "HI analyses and PAUF adjusted HI analyses were conducted using the LOAEL-based ESLs;" Revise Section H-5.4.7 to address this issue.

DOE Response

16. The text in section H-5.4.7 will be revised to clarify that the adjustment of HIs refers to the PAUF adjustment.

NMED Comment

17. Appendix H, Section H-5.4.5, Population Area use Factors, pages H-63 through H-67

The Permittees mention "adjusted HI analyses" in discussing SWMU 03-049(a), AOC 48-001, and SWMUs 48-002(a and b). This statement introduces confusion into the discussion as the adjustment referred to in the quoted phrase is not clearly defined. Based on the wording used in Section H-5.4.5, it appears that the adjusted HI analysis refers to a PAUF adjusted HI analysis that is based on LOAEL. It is recommended that references to "adjusted HI analyses" be revised to refer to "PAUF adjusted HI analyses" to clarify the types of analyses being discussed. Revise Section H-5.4.5 to address this issue.

DOE Response

17. The text in section H-5.4.5 will be revised to clarify that the adjustment of HIs refers to the PAUF adjustment.

NMED Comment

18. Appendix H, Section H-5.4.5, Population Area use Factors, pages H-68 and H-69

The discussion of the potential ecological risks at Consolidated Unit 03-049(b)-00, notes that the maximum detected concentration was used as the ecological EPC for selenium, acenaphthene, and naphthalene. The discussion also notes that if the 95% upper confidence limit (95% UCL) had been used as the EPC instead of the maximum detected concentration, the HQ for each of these chemicals would be less than the target level of 1. An EPC based on the 95% UCL is listed for each of the three chemicals. Based on this information, the text asserts that the HQ based on the maximum detected concentration overestimates the potential risk to the plants. However, additional information is needed to determine the validity of this line of evidence as it is not clear why EPCs based on the 95% UCL were not calculated initially for selenium, acenaphthene, and naphthalene. Revise the discussion of selenium, acenaphthene, and naphthalene to explain why EPCs based on the 95% UCL were not calculated initially for these three chemicals. In addition, provide information demonstrating that the data sets for the three chemicals meet the requirements for determining a valid 95% UCL outlined in Section 2.7.7, Calculation of Exposure Point Concentrations, of the NMED SSG.

DOE Response

18. DOE notes that the text on pages H-68 and H-69 is in section H-5.4.8, Site Discussions, rather than section H-5.4.5, Population Area Use Factors. Acenaphthene was detected in 4 of 22 samples, naphthalene in 4 of 25 samples, and selenium in 3 of 35 samples. Because there were fewer detections than specified for calculation of upper confidence limits (UCLs) (at least 5 detections), the maximum detected concentration was used as the exposure point concentration (EPC). The purpose of the text on pages H-68 and H-69 is to provide lines of evidence that use of the maximum detected concentration as EPC overestimates the ecological risks associated with acenaphthene, naphthalene, and selenium. Although the numbers of detections were less than the requirements for calculating UCLs, the UCLs were calculated for comparison with the maximum detected concentrations as an indication of the degree to which risk might be overestimated. The text will be revised to describe why UCLs were calculated and to provide additional lines of evidence, including other indicators of the central tendency of data, that ecological risks due to acenaphthene, naphthalene, and selenium are overestimated.

NMED Comment

19. Appendix H, Section H-5.4.8, Site Discussions, page H-70

The Permittees indicate that the SWMUs 48-002(a and b) are not affected by the stack emissions for AOC 48-001. In fact, the discussion states: "SWMUs 48-002(a and b) are adjacent container storage areas next to and immediately south of building 48-1 and are not affected by the stack emissions given their historical operation and location." No other information is provided to support the assertion that the SWMUs are not impacted by the stack emissions. Revise this discussion to identify any design features or operating procedures that prevent stack emissions from impacting the two storage areas as the descriptions and figures included in the SIR and its appendices do not provide this information. If air dispersion modeling or soil sampling of stack emissions has been performed, the results should be presented and discussed to support the assertion that SWMUs 48-002(a and b) are not impacted by AOC 48-001.

DOE Response

19. The discussion in section H-5.4.8 regarding AOC 48-001 is intended to provide lines of evidence that the ecological risk due to mercury and selenium is overestimated. Because AOC 48-001 consists of contamination from stack releases, risk for AOC 48-001 was evaluated using data from all surface samples collected within Technical Area 48, including those associated with other SWMUs and AOCs. Reference is made to SWMU 48-002(a) because it is a known source of mercury contamination and the highest concentrations of mercury in the AOC 48-001 data set are from samples associated with SWMU 48-002(a). Selenium was retained as a COPC at SWMUs 48-002(a) and (b) on the basis of elevated detection limits unrelated to releases from AOC 48-001. Rather than stating SWMUs 48-002(a) and (b) are not impacted by stack emissions from AOC 48-001, it would have been clearer to state that the high mercury concentrations and selenium detection limits in the AOC 48-001 data set are associated with SWMUs 48-002(a) and (b) rather than stack emissions. The text will be revised to provide a clearer basis that risk from mercury and selenium at AOC 48-001 is overestimated.

NMED Comment

20. Appendix H, Section H-5.4.8, Site Discussions, page H-71

In this section, the Permittees discuss the results of LOAEL-based and PAUF adjusted HI analyses for the shrew and deer mouse at AOC 48-001. The discussion indicates that if the maximum detected concentration of 2,3,7,8-TCDD is eliminated from the calculations, the 95% UCL is reduced by an order of magnitude and the HQs for the shrew and deer mouse fall below the target level of 1. The discussion also states that 2,3,7,8-TCDD should not be associated with AOC 48-001. However, no lines of evidence supporting an alternative source for the 2,3,7,8-TCDD are offered. The discussion on the elimination of the maximum detected concentration from the 95% UCL calculation should be removed from the text unless it can be demonstrated that the concentration is an outlier. In addition, a discussion of potential sources of the 2,3,7,8-TCDD detected at AOC 48-001 should be added to the text. As part of the discussion, the lines of evidence resented supporting all potential sources should be weighed and the most probable source identified. Revise the discussion of AOC 48-001 to address these issues.

DOE Response

20. The text will be revised to identify additional non-site-related sources of dioxins/furans to support the conclusion that these COPCs are not associated with AOC 48-001 stack emissions and the ecological risk associated with dioxins/furans is overestimated.

NMED Comment

21. Appendix H, Section H-5.4.9, COPCs without ESLs, page H-73

This section lists carbon tetrachloride among the chemicals for which no toxicity data are available. It is not clear why carbon tetrachloride is included in this list as it does appear that the chemical was addressed in the supplemental investigation. In addition, some ecological toxicity information (e.g., EPA Region 5 ecological soil screening value of 2.8 mg/kg) is available for carbon tetrachloride. Review this information and revise the list of chemicals accordingly.

DOE Response

21. Section H-5.4.9 will be revised to incorporate the use of the EPA Region 5 ecological soil screening value for carbon tetrachloride.

MINOR EDITORIALS

NMED Comment

Appendix H, Tables H-2.3-30, H-4.2-111, and H-4.2.11

Table H-2.3-30 list the EPC for tritium as 0.0035 pCi/g and tables H-4.2-111 and H-4.2-114 has the tritium EPC listed as 0.0038 pCi/g. Review the information and revise the table for accuracy and consistency.

DOE Response

The tables will be revised to incorporate the correct EPC for tritium for the construction worker and residential scenarios.

NMED Comment

Appendix H, Table H-4.2-24, page H-167

The dose for Tritium is incorrectly listed at 0.0000072 (mrem/yr) and should be corrected at 0.00000072 (mrem/yr). Please correct typographical error.

DOE Response

The text will be revised to present the correct dose for tritium.

REFERENCES

- LANL (Los Alamos National Laboratory), February 2008. "Investigation Work Plan for Upper Mortandad Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-1272, Los Alamos, New Mexico. (LANL 2008, 100750)
- LANL (Los Alamos National Laboratory), May 22, 2017. "Chromium Background Study Work Plan," Los Alamos National Laboratory document LA-UR-17-23664, Los Alamos, New Mexico. (LANL 2017, 602400)
- LANL (Los Alamos National Laboratory), September 2017. "Chromium Background Study Report," Los Alamos National Laboratory document LA-UR-17-28239, Los Alamos, New Mexico. (LANL 2017, 602650)
- NMED (New Mexico Environment Department), March 24, 2008. "Approval with Modifications, Investigation Work Plan for Upper Mortandad Canyon Aggregate Area," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 101110)
- NMED (New Mexico Environment Department), June 1, 2017. "Approval [for the] Chromium Background Study Work Plan," New Mexico Environment Department letter to D. Hintze (DOE-EM-LA) and B. Robinson (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2017, 602418)
- NMED (New Mexico Environment Department), October 12, 2017. "Approval, Chromium Background Study Report," New Mexico Environment Department letter to D. Hintze (DOE-NA-LA) and B. Robinson (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2017, 602678)