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Mr. David Cobrain
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Dr. East
Building One
Santa Fe, NM 87505

RE: Draft Technical Review Comments on the "Upper Los Alamos Canyon Aggregate Area Former TA-32 Remedy Completion Report," dated November 2010

Dear Mr. Cobrain:

Attached please find draft technical review comments on the risk assessment portions of Los Alamos National Laboratory's (LANL) "Upper Los Alamos Canyon Aggregate Area Former TA-32 Remedy Completion Report", dated November 2010.

There is some concern with rounding of risk estimates as well as concluding that risks slightly above the target risk levels are acceptable. Interpretation of risk is at the discretion of the NMED. In some cases, sufficient site data, use of conservative assumptions, and other factors may lead to an acceptance of elevated risk. In other cases there may be sufficient uncertainty to conclude that while only slightly elevated, there is concern that excess risk is present and additional investigation and/or corrective actions are required. This should be done on a case-by-case basis.

For Area of Concern (AOC) 32-003, three confirmation sample locations collected at the excavated area (samples 32-611846, 32-611232, and 32-611845) revealed increasing concentrations of Aroclor-1260 with depth, suggesting that the vertical extent of Aroclor-1260 may not be defined at the excavated area. In addition, polynuclear aromatic hydrocarbons (PAHs) were detected with increasing concentrations with depth at sample location 32-611233, and Aroclor-1260 was also detected at increasing concentrations with depth at sample location 06-603608. LANL states that the vertical extent of contamination is defined since the detections were at or below the estimated quantitation limits (EQLs). As the detected concentrations do not appear significant, and are essentially within laboratory limits, the data do not necessarily indicate extensive contamination. However, it is not clear whether additional sampling at depth would result in significant detections. NMED may wish to further evaluate the nature and extent of Aroclor-1260 and PAHs at AOC 32-003.

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For Solid Waste Management Unit (SWMU) 32-002(b), analyses for organic constituents were not conducted in 2010. LANL states that the nature and extent of organic contamination had been defined previously. As shown in this report, two sample locations (06-603594 and 06-603591) had increasing concentrations of one or more congeners of dioxins and/or furans with increasing depth. Three other sample locations (00-603594, 06-603599, and 00-603596) also showed increasing concentrations of other organic constituents [bis(2-ethylhexyl)phthalate and methylene chloride] with increasing depth. Bis(2-ethylhexyl)phthalate and methylene chloride could be contributable to laboratory contamination while the dioxin/furan congeners may be fallout from forest fires; however, NMED may wish to review the nature and extent of organic contamination at SWMU 32-002(b).

Also at SWMU 32-002(b), detected concentrations of selenium at sampling locations 00-603591, 00-603592, and 00-603593 do not decrease with depth. LANL argues that the extent of selenium is defined at SWMU 32-002(b) because: 1) a sample location with negative analytical results for selenium is within 25 feet of location 00-603591; and 2) two sample locations with lower detections are downslope within 20 feet of location 00-603589. While it appears that there may be isolated "hotspots" of selenium the concentrations do not appear to warrant further investigation, as concentrations do not approach residential screening levels. However, NMED may wish to further evaluate the nature and extent of inorganic contamination for SWMU 32-002(b).

If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you,

Paige Walton

Paige Walton
AQS Senior Scientist and Program Manager

Enclosure

cc: Patricia Stewart, NMED (electronic)
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Draft Technical Comments on the Upper Los Alamos Canyon Aggregate Area Former TA-32 Remedy Completion Report, November 2010

General Comments

1. The risk and hazard results have been rounded to one significant figure. Because several of the results are at or slightly above target levels, significant digits showing that results are actually slightly above target levels should be included. Modify tables and text showing risk and hazard estimates to include at least two significant digits.

2. The USEPA Regional Screening Levels (RSLs) for mercury (inorganic salts) were utilized for the residential and industrial scenarios, and a SSL for the construction worker was calculated using toxicity data from the RSL tables and equation and parameters from NMED (2009). Clarify whether analytical results define speciation of mercury, thus justifying the use of the RSLs and toxicity data for mercury salts.

3. The vapor intrusion pathway was evaluated for residents at sites containing volatile organic compounds (VOCs). This pathway is also complete for the industrial receptors and risks via the vapor intrusion pathway should be evaluated for an indoor worker at all sites containing VOCs. Revise the risk assessment accordingly.

   In addition, the construction worker could also be exposed to VOCs volatilized into outdoor air. It is generally accepted that unless there is a trenching scenario where vapors could pond, the indoor air pathway is protective of the outdoor air pathway. However, a qualitative discussion of inhalation of VOCs by the construction worker should still be included in the risk assessment. Revise accordingly.

4. For sites where the vapor intrusion pathway was evaluated, the calculated risks and hazards from exposure via the vapor intrusion pathway were not added to the calculated risk and hazard estimates from exposure to soil. Cumulative risk/hazard for all potential exposure scenarios must be evaluated when assessing total risk/hazard. Revise accordingly.

Specific Comments

1. Tables F-4.2-7 and F-4.2-19. The construction worker soil screening level (SSL) for Aroclor-1260 (7.58 mg/kg) is inconsistent with the NMED (2009) value of 75.8 mg/kg. It is noted that the SSL that was used on Tables F-4.2-7 and F-4.2-19 is more conservative than the NMED (2009) value and correction of this value would not affect the results of the risk assessment. However, modify Tables F-4.2-7 and F-4.2-19 to include the correct construction worker SSL (75.8 mg/kg) for Aroclor-1260.

2. Tables F-4.2-2, F-4.2-11, F-4.2-34, and F-4.2-38. The residential SSL (15,600 mg/kg) and industrial SSL (227,000 mg/kg) for cyanide are inconsistent with the NMED (2009) values of 1,560 mg/kg and 22,700 mg/kg, respectively. Because the SSLs that were used are greater than the values listed in NMED (2009), residential and industrial hazards have been underestimated. Modify Tables F-4.2-2, F-4.2-11, F-4.2-34, and F-4.2-38 to include the

correct NMED (2009) residential and industrial SSLs for cyanide, and modify the hazard quotient (HQ) calculations and resulting hazard indices accordingly.

3. Tables F-4.2-1 and F-4.2-2. Risk estimates were calculated for indeno(1,2,3-cd)pyrene and methylene chloride for the industrial and recreational scenarios. These constituents are not listed on Table F-3.3-1, and Table 4.2-3 indicates that indeno(1,2,3-cd)pyrene and methylene chloride were not detected in surface soil at SWMU 32-002(b). Therefore, the risk calculations for the industrial and recreational scenarios should not include these constituents. It is noted that the inclusion of these two constituents results in a more conservative risk estimate and the removal of these constituents from the risk calculation would not affect the results of the risk assessment. However, delete indeno(1,2,3-cd)pyrene and methylene chloride from Tables F-4.2-1 and F-4.2-2.

4. Section 4.2.2. According to Table 4.2-2, cadmium was detected above background values (BVs) in three surface soil samples, and five non-detect results had detection limits above BVs at SWMU 32-002(b). Statistical tests were not conducted to determine if levels of cadmium at SWMU 32-002(b) are different from background nor was it carried forward as being site related. Determine if cadmium is site related at SWMU 32-002(b) and include a discussion in Section 4.2.2.

5. Tables F-4.2-8, F-4.2-19, and F-4.2-30. Noncarcinogenic hazards for the construction worker scenario were not calculated at Solid Waste Management Unit (SWMU) 32-002(b) and Areas of Concern (AOCs) 32-003 and 32-004 for one or more of the following constituents of potential concern (COPCs): arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD. The construction worker SSLs listed in NMED (2009) for these constituents are based on noncarcinogenic endpoints and should be evaluated as noncarcinogens and included on Tables F-4.2.8, F-4.2.19, and F-4.2-30 for the construction worker scenario. The hazard indices for the construction worker have been slightly underestimated at SWMU 32-002(b) and AOCs 32-003 and 32-004, as they currently do not include the evaluation of these constituents. It is noted that the addition of arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD to the hazard index calculations would most likely not affect the overall conclusions of the risk assessments at SWMU 32-002(b) and AOCs 32-003 and 32-004. However, revise Tables F-4.2.8, F-4.2.19, and F-4.2-30 to include hazard quotients (HQs) for arsenic, bis(2-ethylhexyl)phthalate, methylene chloride, and 2,3,7,8-TCDD.

6. Tables F-3.3-1, F-3.3-7, and F-3.3-10 indicate that 95% upper confidence limits (UCLs) were calculated for exposure point concentrations (EPCs) for several constituents with datasets containing fewer than 8 samples (i.e., number of analyses). The ProUCL User's Guide advises that, "Datasets with fewer than 8 to 10 observations cannot be considered representative and reliable enough to make important cleanup and remediation decisions". In addition, Section 1.4.2 of this report specifically states that statistical analyses are not valid if there are fewer than 10 datapoints. Since fewer than eight samples are included in these datasets, maximum detected concentrations should be used as EPCs at AOCs 32-003 (organics) and 32-004 (inorganics and organics), and cesium-137 at SWMU 32-002(b). Consequently, risks and hazards have been underestimated for the industrial and recreational scenarios. Modify Tables F-3.3-1, F-3.3-7, and F-3.3-10 to include maximum detected

concentrations as EPCs, and revise all subsequent risk and hazard calculations that would be affected by the use of maximum detected concentrations as EPCs.

7. Section 4.2.4 and Section F-4.3.2. For SWMU 32-002(b), the text states that, "The total excess cancer risk for the residential scenario is 2×10^{-5}, slightly above the NMED target risk level of 1×10^{-5}. For the residential scenario, arsenic contributes to the cancer risk (6×10^{-6}). The arsenic exposure point concentration is within the ranges of background concentrations and results in an overestimation of risk. Without arsenic, the total excess cancer risk is approximately 1×10^{-5}, equivalent to the NMED target risk level." Arsenic should not be excluded from evaluation in the risk assessment for the following reasons:

   a. Statistical analyses conducted in Appendix E show that site concentrations of arsenic are different from background and are shown to be site related.

   b. It is incorrect to compare UCLs with background comparison values. The background value (i.e., 95% upper tolerance limit) is used for point-to-point comparisons. Because the UCL is not a point estimate, it cannot be used as an estimate of an individual site observation for comparison to background threshold values.

   c. Site history indicates that inorganic chemicals (e.g., arsenic) may have been used at SWMU 32-002(b) (Section 2.2.1).

   Therefore, arsenic should not be excluded from the residential risk results. Modify the text to include arsenic in the final results, and delete the text that states, "The arsenic exposure point concentration is within the ranges of background concentrations and results in an overestimation of risk." Modify the text to state that COPCs at SWMU-32-004(b) may pose unacceptable risks to residents and that further evaluation and/or removal actions are necessary. Further, the refined ecological risk assessment indicates adverse risk may be present due to mercury. Additional analyses are required to confirm that residual contamination does not pose a threat to the environment.

8. Table F-4.2-20. The EPC utilized for zinc (43.85 mg/kg) is inconsistent with the EPC of 40.58 mg/kg listed on Table F-3.3-9. It is noted that the overall results of the risk assessment are not affected by this inconsistency since the EPC that was used is greater than the EPC listed on Table F-3.3-9 and results in a more conservative risk estimate. However, modify Table F-4.2-20 to include the correct EPC and modify any calculations that would be affected.

9. For the vapor intrusion pathway, methylene chloride, trichlorofluoromethane, acetone, and tetrachloroethene were the only VOCs evaluated. Other organic constituents detected at Upper Los Alamos Canyon Aggregate Area, such as anthracene and pyrene are considered VOCs according to NMED (2009). The Johnson and Ettinger User's Guide also considers fluoranthene, benzo(g,h,i)perylene, and chrysene to be VOCs. Clarify the criteria that were used to determine the selection of VOCs considered for this pathway and modify the vapor intrusion calculations as warranted.

10. The EPC on Table F-4.2-13 for methylene chloride (0.00489 mg/kg) is inconsistent with the maximum detected concentration of methylene chloride (0.014 mg/kg) at SWMU 32-002(b) presented on Table 4.2-3. Clarify this inconsistency and update the vapor intrusion results to utilize the correct maximum detected concentration.

11. The EPCs presented on Tables F-4.2-23 for methylene chloride (0.00799 mg/kg) is inconsistent with the maximum detected concentrations of methylene chloride (0.016 mg/kg) at AOC 32-003 presented on Table 4.3-3. Clarify this inconsistency and update the vapor intrusion results to utilize the correct maximum detected concentration.

12. Table F-4.2-36. The supporting Johnson and Ettinger spreadsheets indicate that a reference concentration (RfC) of 0.35 mg/m^3 was used to calculate the risk based indoor soil concentration for acetone. It is belived that the currently accepted RfC for acetone is 31 mg/m^3 for acetone (ATSDR). It is noted that the RfC of 0.35 mg/m^3 that was utilized in the calculation results in a more conservative risk estimate and would not affect the overall results. However, update the calculation to utilize the appropriate toxicity value (31 mg/m^3) for acetone and include the updated results on Table F-4.2-36.

13. Tables F-3.3-4, F-3.3-5, and F.3-6.The toxicity equivalency factor (TEF) of 0.001 listed for heptachlorodibenzodioxin[1,2,3,4,6,7,8-] is inconsistent with the 2005 TEF value of 0.01 listed on http://www.who.int/ipcs/assessment/tef_update/en/index.html. This has resulted in an underestimation of the EPC for 2,3,7,8-TCDD equivalent for the industrial, recreational, ecological, construction worker, and residential scenarios at SWMU 32-002(b). Revise the TEF for heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and all subsequent calculations.

14. Table F-3.3-6. An EPC of 1.6754E-7 mg/kg is listed for pentachlorodibenzofuran[1,2,3,7,8-]. This is inconsistent with the maximum detected concentration of 2.3E-7 mg/kg within the 0-10 foot exposure interval listed on Table 4.2-3. Revise Table F-3.3-6 accordingly and any subsequent calculations that would be affected.

15. Section 4.4.4 and Section F-4.3.2. The text ascertains that polynuclear aromatic hydrocarbons (PAHs) detected at AOC 32-004 are not site related and that the high concentrations of PAHs at sample location 32-06340 are upslope from the outfall. Thus, the PAH results from one sample location (32-06340) are excluded from the final risk and hazard estimates. Results from sample location 32-06340 should not be excluded from the residential risk assessment for the following reasons:

    a. PAHs were detected at high concentrations in 1996, and additional PAH sampling was conducted in 2010 to confirm the high concentrations of PAHs at AOC 32-004.

    b. PAHs are detected at multiple sampling locations at AOC 32-004, indicating that PAHs are pervasive throughout AOC 32-004 and that the removal of one sample location with the highest concentrations of PAHs is not justified.

c. Exposure to soil at AOC 32-004 via the ingestion, dermal, and inhalation pathways are complete, and human and ecological receptors would be exposed to all soil at AOC 32-004.

d. After the removal of sample location 32-06340 from the dataset, the residential risk (1.2E-5) still exceeds the target level of 1E-5.

e. After the removal of sample location 32-06340 from the dataset, the residential HI (1.2) also exceeds the target HI of one.

As such, potential unacceptable risks for a resident may exist at AOC 32-004 and further evaluation will be necessary. Modify the risk assessment at AOC 32-004 accordingly.