Response to the Notice of Disapproval for the Investigation Report for Upper Sandia Canyon Aggregate Area, Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-10-040, Dated September 1, 2010

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. The comments are divided into general and specific categories, as presented in the notice of disapproval. Los Alamos National Laboratory's (LANL's or the Laboratory's) 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 U.S. Department of Energy policy.

GENERAL COMMENTS

NMED Comment

1. *For evaluation of noncarcinogenic hazards, hazard indices (HI) were calculated separately for inorganics/organics and total petroleum hydrocarbons (TPH). It is not clear why these were evaluated separately and hazards associated with TPH were not combined with other hazards, even though combining the HIs from TPH with the HIs from other noncarcinogens would not affect the conclusions of the assessments. For most sites, TPH did not drive risk or contribute significantly toward risk. At Areas of Concern (AOCs) 60-004(b,d), combining the HIs for the construction worker would result in an overall HI slightly above the target level of 1.0. For AOC C-03-016, TPH drove risk for the construction worker and resident, thus combining HIs would still result in excess risk (see specific comment #25).*

LANL Response

1. NMED total petroleum hydrocarbon (TPH) screening guidelines (NMED 2006, 094614) state the TPH toxicity is based only on the weighted sum of the toxicity of the hydrocarbon fractions in Table 1 of the guidelines. This is a different toxicity basis than for the other chemicals of potential concern (COPCs) identified, which are based on the sum of the toxicities of the individual constituents. Because of the different toxicity basis, the TPH hazard quotients (HQs) are presented separately from the HQs for the individual COPCs. However, the constituents of the TPH (if detected) are compared with the individual NMED soil screening levels in the screening tables in the report.

NMED Comment

2. *As part of the discussion of the ecological risks (Sections I-5.5 and I-5.6), a comparison to concentrations detected in other areas within the Laboratory (Los Alamos, Pueblo, Mortandad, Pajarito, and/or Sandia Canyons) that are being investigated as part of the biota study was addressed. A blanket statement was used indicating that concentrations were similar to these areas. However, no quantitative evidence was provided to demonstrate this assumption. While the ecological assessment and refined ecological assessment indicated no elevated risk to receptor*

species, the lack of this quantitative evidence does not impact the conclusions. However, for future assessments, if other areas being addressed under the biota studies are to be used as a line of evidence to justify elevated risk, then a more rigorous comparison (to include statistical comparison of datasets) will be required.

LANL Response

2. Comment noted. However, the intent of including the canyon ecological assessments by reference is to indicate that there have been field and/or laboratory studies conducted that go beyond the screening assessment. These studies have detected chemicals of potential ecological concern (COPECs) at comparable concentrations as reported for individual solid waste management units / areas of concern (SWMUs/AOCs) and have determined that these COPECs and COPEC concentrations do not pose a potential ecological risk. This information is another line of evidence that relates studies already performed, reported, and accepted, and a more rigorous comparison is not necessary. Statistical comparisons are not relevant with regard to ecological exposure and risk, as this information is simply relating what has been reported elsewhere. Because COPECs have been more rigorously evaluated in the field and have shown not to pose risks to receptors at the same or similar concentrations, this line of evidence generally supports the screening level conclusions using actual empirical results.

NMED Comment

3. Contradictory statements regarding characterization of nature and extent of contamination were noted in sections entitled 'Soil, Rock, and Sediment Sampling Analytical Results' and 'Nature and Extent of Contamination' for several Solid Waste Management Units (SWMUs) and AOCs. For example, for SWMU 03-002(c), the Permittees state that the existing site data are not sufficient to characterize the extent of contamination at SWMU 03-002(c); therefore, organic [chemicals of potential concern] COPCs are not defined for the site (Section 6.2.4.3). However, in the next paragraph (Section 6.2.4.4), the Permittees state that the nature and extent of all organic chemicals at SWMU 03-002(c) are defined. This comment is also applicable to characterization of nature and extent of radionuclide contamination at SWMU 03-052(f) (page 76), AOC 03-014(b2) (page 92), SWMU 03-014(u) (page 135), and AOC 60-004(f) (page 255). This comment also applies to characterization of nature and extent of organic chemical contamination at SWMU 03-002(c) (page20), SWMU 03-045(h) (page 193), SWMU 60-002 (page 242), SWMU 60-007(a) (page 265) and SWMU 60-007(b) (page 268). This comment is also applicable to characterization of nature and extent of inorganic chemical contamination at SWMU 03-056(a) (page 214) and SWMU 03-059 (page 233). The Permittees must review these sections carefully and make appropriate revisions to the text.

LANL Response

3. As a result of the NMED notice of disapproval (NOD) issued for the North Ancho Canyon Aggregate Area investigation report (NMED 2009, 108143) and the executed "Request for Concurrence on Changes to the Format and Content of Investigation Reports prepared by LANL" (LANL 2009, 108179), COPCs are identified for inorganic chemicals, organic chemicals, and radionuclides only if nature and extent are defined for all contaminants at a site. For example, if the nature and extent of inorganic and organic chemicals are defined, but a particular radionuclide is not defined, no COPCs will be identified in the report. Rather, additional investigation activities will be recommended for the site, and COPC identification will be reported after nature and extent for all contaminants are defined. In the case of SWMU 03-002(c) mentioned in NMED's comment, nature and extent were defined for

organic chemicals, but COPCs were not evaluated because nature and extent had not been defined for inorganic chemicals. This approach was followed in the approved revision 1 of the North Ancho Canyon Aggregate Area investigation report (LANL 2010, 108500.11; NMED 2010, 108675), the two Technical Area 49 investigation reports (LANL 2010, 109319; LANL 2010, 109318), and other investigation reports submitted to NMED in 2010. This methodology is also discussed in section 5.0 of the report. No revision to the text is necessary.

SPECIFIC COMMENTS

NMED Comment

1. ***Section 6.8.3.4, Site Contamination, Soil, Rock, and Sediment Field-Screening Results, page 38:*** *The text states that no organic vapors were detected during headspace gas screening at SWMU 03-029. The second bullet on page 38 does not indicate that field screening for organic chemicals was conducted. Additionally, Table 3.2-2 indicates that no samples were collected for organic vapors. The Permittees must clarify if field screening for organic vapors was conducted at the site and make appropriate corrections to the table or text to resolve the discrepancy.*

LANL Response

1. Field screening for organic vapors was not conducted at SWMU 03-029 as reported in Table 3.2-2. The first sentence discussing headspace screening in section 6.8.3.4, Site Contamination: Soil, Rock, and Sediment Field-Screening Results, has been removed.

NMED Comment

2. ***Section 6.9.4.4, Nature and Extent of Contamination, page 57:*** *Contrary to what is reported in the text, at SWMU 03-009(i), concentrations of barium increased rather than decreased with depth at location 03-608191. Barium was not detected above the background value (BV) in the sample collected from 0-1 ft below ground surface (bgs), but was detected at a concentration of 74.4 mg/kg in the sample collected from 1-2 ft. bgs (Table 6.9-2). The Permittees must revise the statement to indicate that the vertical extent of barium is not defined at this location.*

LANL Response

2. The text in section 6.9.4.4 has been revised for barium to indicate the concentrations increased with depth at location 03-608191 and the vertical extent of barium is not defined. The text in section 9.1.1 was also revised to indicate the vertical extent of barium is not defined at SWMU 03-009(i).

NMED Comment

3. ***Section 6.10.4.4, Site Contamination, Nature and Extent of Contamination, page 73:*** *The text states that the vertical extent is defined for Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene for SWMU 03-045(c). However, Table 6.10-12 indicates that higher concentrations for these chemicals were detected in the sample collected from the greater depth (i.e., 1-2 ft bgs). The error may have arisen because the reporting order has been reversed (i.e., samples collected from the deeper sampling interval are reported on the first row and samples collected from the shallower depth are reported on the second row), which is different from how results are generally reported for other sites.*

The Permittees must resolve the discrepancy and reevaluate the nature and extent of organic chemicals contamination at SWMU 03-045(c), if necessary.

LANL Response

3. Table 6.10-12 has been revised to reverse the order in which the data are reported. The sample collected at the shallower depth is now listed before the sample collected at the deeper depth. The text in section 6.10.4.4 has been revised to indicate the concentrations of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene increased with depth and the vertical extent is not defined. Section 9.1.1 has also been revised to include polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs) in the list of remaining characterization requirements for SWMU 03-045(c).

NMED Comment

4. Sections 6.14.1.6, 6.14.2.5, 6.14.4.5, 6.14.6.5, 6.14.7.6, 6.14.8.5, 6.14.9.5, and 6.14.10.5, Delayed Site Investigation Rationale, pages 89, 90, 96, 104, 105, 106, 107, and 108: *The Permittees state that previous and current investigations conducted around these sites while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely that releases occurred when these components of the former wastewater treatment plant (WWTP) were in operation. The data presented in accompanying tables clearly indicate that releases have occurred; several organic chemicals were detected and several inorganic chemicals were detected above their respective background values. These data indicate that the vertical extent is defined at most of the locations where samples were collected. NMED concurs that further investigations may be delayed until decontamination and decommissioning (D&D) of the former WWTP structures is completed. The Permittees must revise the statements to reflect that releases are indicated at these sites.*

LANL Response

4. The statement "…, provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation" has been removed. Since investigation samples could not be collected within and beneath the structures associated with the former TA-03 wastewater treatment plant (WWTP), the source of chemicals detected in samples collected in the vicinity of these structures cannot be associated with a particular structure. The data are insufficient to determine if a release has occurred from a specific structure.

   The text in Section 6.14.1.6 has been revised to read, "The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(a) be delayed until D&D of structure 03-49 has been completed. Previous and current investigations conducted around SWMUs 03-014(a,b,e,f) are not sufficient to fully determine the nature and extent of contamination." The text in sections 6.14.2.5, 6.14.4.5, 6.14.6.5, 6.14.7.6, 6.14.8.5, 6.14.9.5, and 6.14.10.5 has also been revised with the same language.

NMED Comment

5. Section 6.14.3.5, Site Contamination, Nature and Extent of Contamination, page 93: *Along with samples collected at the site, the Permittees used samples collected in reach S-2 of Sandia Canyon to define the lateral extent of several contaminants at AOC 03-014(b2). Figure 6.14-1 and Plates 18 and 19 that depict sampling locations and detected concentrations of contaminants at AOC 03-014(b2) do not include sampling locations and results for samples collected in reach S-2.*

The Tables reporting detected concentrations of contaminants for AOC 03-014(b2) also did not include results for these canyon locations. It is difficult to evaluate the lateral extent of contamination without this information. The Permittees must revise the figures and tables to include sampling locations and results of the samples collected in the Sandia Canyon Reach that were used in site characterization.

LANL Response

5. Section 6.14.3.5 was incorrectly numbered and has been revised to the correct section number 6.14.3.4. Figure 6.14-2 has been added to show the Sandia Canyon reach S-2 sampling locations (SA-600310, SA-600311, SA-600312, and SA-00008) and lead concentrations used to define the lateral extent of lead contamination at AOC 03-014(b2). The text in section 6.14.3.4 discussing the nature and extent of lead contamination has been revised to include a reference to Figure 6.14-2.

   Tables 6.14-6 and 6.14-7 were not revised to include the reach S-2 data because the tables in this report include only the sampling results from the 2009 investigations of the Upper Sandia Canyon Aggregate Area. The data for reach S-2 are presented in the investigation report for Sandia Canyon (LANL 2009, 107453).

   Organic chemical data for Sandia Canyon reach S-2 were not used to determine the lateral extent of contamination at AOC 03-014(b2). No revisions to Plate 19 are necessary.

NMED Comment

6. Section 6.14.13.4, Soil, Rock, and Sediment Sampling, page 113: *In the second bullet the Permittees state that 12 samples were proposed for collection from four locations around and downgradient of SWMUs 03-014(k,l,m,n), but eight samples were collected. In fact, 16 samples were proposed to be collected from these four locations in the approved work plan. As discussed in the deviations to the work plan (Appendix B), at three of the four locations "bed tuff interface" corresponded to the proposed sample of "0-1 ft below base of the bed"; therefore, one sample was collected to represent both sampling criteria. This should have resulted in 13 samples collected from the four locations. According to Table 6.14-24, 11 samples were collected from the four locations. The Permittees must resolve the discrepancies and revise the text accordingly.*

LANL Response

6. As reported in Table 6.14-24, 11 samples were collected from four locations around and downgradient of SWMUs 03-014(k,l,m,n). Although 16 samples were proposed in the approved work plan, at all four locations the bed-tuff interface corresponded to the same interval as the base of the bed. This eliminated one sampling interval at four locations for a total of four samples. In addition, the deepest sample at location 03-608273 could not collected because material could not be recovered during drilling. Therefore, a total of 11 samples were collected. The second bullet in section 6.14.13.4 has been revised as follows:

   "Eleven samples were collected from four locations around and downgradient of SWMUs 03-014(k,l,m,n). At each location, samples were collected from 0.0–1.0 ft bgs, 0.0–1.0 ft beneath the sand and gravel layer at the base of the bed (the bed-tuff interface), and 5.0 ft below the bed tuff interface, except at location 03-608273 where a sample could not be collected from 5.0 ft below the bed-tuff interface because material could not be recovered during drilling (see deviations in Appendix B)."

The second and third bullets in Appendix B, section B-10.0, have been combined to clarify the reason for collecting 11 samples instead of the 16 proposed samples at SWMUs 03-014(k,l,m,n). Table B-10.0-1 has also been revised.

NMED Comment

7. Section 6.14.19.4, Site Contamination, Nature and Extent of Contamination, pages 135-136:

a. NMED's Approval with Modifications (August 12, 2008) for the investigation work plan directed the Permittees to collect nine samples from three locations within and next to the location of former tank and drainline (locations 03-608281, 03-608282, and 03-608283). The Permittees only collected five samples from these three locations and provided explanation for not collecting the sixth sample. The Permittees must explain why the direction to collect nine samples was not followed.

b. The Permittees state that the vertical extent of contamination is defined for several metals. Although the detected concentrations indicate a decreasing trend, the concentrations are still significantly higher than the background values in samples collected from the deepest interval. For example, concentrations of chromium, copper, and silver decrease with depth at the sampling location 03-608281, the detected concentrations in sample collected from 1.0-2.0 ft (the deeper sample) are higher than the background values. The extent of contamination is not defined for the entire SWMU 03-014(u). The Permittees must collect additional samples at location 03-608281 to define the vertical extent of contamination.

LANL Response

7. a. The additional work requested in NMED's approval with modifications letter (NMED 2008, 102721) was inadvertently excluded from the field implementation plan for the Upper Sandia Canyon Aggregate Area investigation. Samples from an additional depth interval will be collected at locations 03-608281, 03-608282, and 03-608283 during the Phase II investigation. The text in Appendix B, section B-10.0, has been revised to include this deviation. Table B-10.0-1 has also been revised.

   b. The vertical extent of chromium, copper, and silver are defined by the significant decrease in concentrations from 0.0–1.0 ft to 1.0–2.0 ft below ground surface (bgs) at this location. Chromium decreased from 168 to 22.7 mg/kg, copper from 224 to 34.5 mg/kg, and silver from 66.7 to 9.12 mg/kg. Therefore, no revisions regarding the vertical extent of contamination for chromium, copper, and silver are necessary. However, since an additional sample at this location will be collected to define the vertical extent of cyanide, the sample will be analyzed for metals to ensure the vertical extent of contamination for all inorganic chemicals is defined at this location. No revision to the text is necessary.

NMED Comment

8. Section 6.14.20.4, Site Contamination, Nature and Extent of Contamination, pages 141-142: *Several inconsistencies were noted in the discussion of nature and extent of contamination at SWMU 03-056(d). For example, at several places, the sampling location 03-608288 is referred to as a location that is northeast of SWMU 03-056(d). However, as depicted in Plate 18, the sampling location 03-608288 is located within the SWMU boundary. The Permittees are most probably referring to location 03-608256, located northeast of the SWMU. Similarly, locations 03-608247and*

03-608263 are located south and north of the SWMU, respectively, not north and south as reported. The Permittees must revise the text accordingly.

LANL Response

8. The text in section 6.14.20.4 has been revised. In the discussion for copper and silver, locations 03-608247, 03-608256, and 03-608263, were revised to correctly reference the south, northeast, and north respectively. In the discussion for cyanide and mercury, the location referenced to the northeast was changed from location 03-608288 to location 03-608256. The reference to location 03-608263 was also revised in the cyanide discussion to be part of the investigation of SWMU 03-014(j) and not SWMUs 03-014(c) and 03-014(g).

NMED Comment

9. Section 6.19.1.4, Site Contamination, Soil, Rock, and Sediment Sampling, page 148: *The Permittees were directed to collect an additional sample in the drainage northeast of SWMU 03-015 in the Approval with Modifications letter (August 12, 2008). The Permittees neither collected additional samples from this location nor provided justification for not following the approved work plan. The Permittees must explain why samples were not collected from this additional location during the 2009 investigations.*

LANL Response

9. The additional work requested in NMED's approval with modifications letter (NMED 2008, 102721) was inadvertently excluded from the field implementation plan for the Upper Sandia Canyon Aggregate Area investigation. The additional samples requested by NMED will be collected from the drainage northeast of SWMU 03-015 during the Phase II investigation. The text in Appendix B, section B-10.0, has been revised to include this deviation. Table B-10.0-1 has also been revised.

NMED Comment

10. Section 6.22.4.2, Site Contamination, Soil, Rock, and Sediment Sampling Analytical Results, pages 165-166: *According to Table 6.22-1, decision-level data consisted of six fill and three tuff samples collected from six locations, not five fill samples as stated. The Permittees did not provide a reference of figures where spatial distribution of detected inorganic and organic chemicals is presented for AOC 03-027. To facilitate review of the Report, the Permittees must provide figures showing spatial distribution of detected COPCs at AOC 03-027.*

LANL Response

10. The text in section 6.22.4.2 has been revised to indicate six fill samples and three tuff samples were collected from six locations. Figures 6.22-1 and 6.22-2 have been added to show the spatial distribution of detected inorganic and organic chemicals at AOC 03-027, respectively. The callouts to the figures were also added to section 6.22.4.2.

NMED Comment

11. Section 6.23.1, Site description and Operational History, page 168: *AOC 03-036(b), the location of two former aboveground storage tanks, is southwest of an asphalt batch plant (building 03-73) as*

depicted on the Figure 6.2-1, not 100 ft west of building 03-73, as reported. Section 6.23.2 also describes the location of AOC 03-036(b) as located about 50 ft southwest of structure 03-73. The Permittees must revise the text to accurately describe the location of the former tanks.

LANL Response

11. The text in section 6.23.1 has been revised to indicate the tanks were located to the southwest of the former asphalt batch plant (structure 03-73). The text in section 6.23.2 was revised to indicate the tanks were located about 100 ft southwest of structure 03-73. Both references are now consistent and accurately depict the location of the former tanks.

NMED Comment

12. Section 6.26.4.4, Nature and Extent of Contamination, page 181: *The Permittees state that the lateral and vertical extent of tritium is defined. NMED agrees that tritium was detected at very low concentrations at two out of the six locations sampled. However, the tritium activities increased with depth at both these locations (i.e. 03-608310 and 03-608311). The vertical extent of tritium is not defined at AOC 03-038(d). Samples were collected from 0.0-1.0 and 1.0-2.0 ft bgs in accordance with the approved work plan; however, it is not clear from the review of the historical investigation report the depth at which former waste lines were located. The detected concentrations of several other chemicals also increased with depth at these locations. The Permittees propose to conduct additional investigations to define the vertical extent of antimony at AOC 03-038(d). The Permittees must also define the vertical extent of tritium at these two locations. In addition, the Permittees must provide the depth at which former waste lines were located to ascertain that samples were collected from potentially contaminated media and at appropriate depths.*

LANL Response

12. Review of engineering drawing C-17618 (LASL 1953, 110574) indicates the former drainlines associated with AOC 03-038(d) were located between 5 and 12 ft bgs. The depth intervals proposed in the approved work plan and sampled during the 2009 investigation (0.0–1.0 and 1.0–2.0 ft bgs) were not below the location of the former drainline. Therefore, the analytical results from the 2009 investigation are not representative of the site. The analytical results discussion in section 6.26.4.3 and the nature and extent discussion in section 6.26.4.4 has been removed. Analytical data presented in Figures 6.26-2, 6.26-3, and 6.23-4 and Tables 6.26-2, 6.26-3, and 6.24-4 have also been removed. The six locations sampled during the 2009 investigation will be resampled during the Phase II investigation at depth intervals below the former drainlines. This statement has been added to the text in section 6.26.4.3.

NMED Comment

13. Section 6.31.5, Delayed Site Investigation Rationale, page 189: *NMED concurs with the Permittees' rationale to delay characterization and investigation of a portion of SWMU 03-045(e) until D&D of structure 03-57, the diesel tanks, and piping associated with the power plant. However, one sample collected to characterize the outfall location indicates that concentrations of contaminants increase with depth at this location. The Permittees must define the vertical extent of contamination at this location and collect additional samples in the drainage channel to define the lateral extent of contamination in the drainage.*

LANL Response

13. Section 6.31.4.3 has been revised to indicate the existing data are not sufficient to characterize the extent of contamination at SWMU 03-045(e). Section 6.31.4.4 was added to discuss the vertical extent of contamination at location 03-608320. Section 6.31.5 was renumbered to 6.31.7 because two new sections (6.31.5, Summary of Human Health Risk Screening and 6.31.6, Summary of Ecological Risk Screening) were added. Section 10.3 was also revised to indicate additional sampling will be required at the outfall and in the drainage below the outfall to define the lateral extent of contamination associated with the outfall component of SWMU 03-045(e). Proposed locations, numbers of samples, and analytical suites will be included in the Phase II investigation work plan.

NMED Comment

14. Section 6.33.4.1, Soil, Rock, and Sediment Sampling, page 193: *The Permittees state that one 2009 sampling location (MO-604952) at SWMU 03-045(h) is shown on Figure 6.5-1. The Table 6.33-1 indicates that two samples were collected from one location at SWMU 03-045(h). However, Figure 6.5-1 does not depict this sampling location. The Pemittees must revise Figure 6.-5-1 to include the sampling location.*

LANL Response

14. Figure 6.5-1 has been revised to include location MO-604952 at SWMU 03-045(h).

NMED Comment

15. Section 6.37.4.4, Nature and Extent of Contamination, page 208: *The text indicates that the lateral and vertical extent of manganese is defined at AOC 03-052(b). Manganese was detected at two locations and the concentrations increased with depth (location 03-608335); from 873 mg/kg (1.0-2.0 ft) to 1350 mg/kg (4.0-5.0 ft). The Permittees must define the vertical extent of manganese at this location.*

LANL Response

15. A sentence was added to section 6.37.4.4 stating “Manganese was also detected at location 03-608335, and concentrations increased with depth.” The last sentence in the manganese discussion was also revised to indicate the lateral extent is defined, but the vertical extent is not. The list of remaining characterization requirements in section 9.1.1 was revised to include the vertical extent of manganese at AOC 03-052(b).

NMED Comment

16. Section 6.38.1, Site Description and Operational History, page 211: *SWMU 03-052(c) is located southwest of former Sherwood Complex (building 03-105) and northwest of the former Syllac Building (03-287). Figure 6.3-1 depicts locations of the former cooling tower and pump house, and structure 03-287, but does not include the location of former structure 03-105. This omission makes it difficult to follow the discussion on previous investigations. The Permittees must revise Figure 6.3-1 to include location of former structure 03-105.*

LANL Response

16. Figure 6.3-1 has been revised to include the location of former structure 03-105.

NMED Comment

17. Section 6.42.4.4, Nature and Extent of Contamination, page-224: *4-Isopropyltoluene was detected in the deepest sampling interval at location 03-608352, not 03-60835 as stated. Additionally, the statement that toluene was not detected at downgradient locations 03-608352, 03-608354, 03-608355, and 03-608356 is incorrect. As shown in Table 6.42-3 toluene was detected at locations 03-608352, 03-608354, and 03-608356 and at locations 03-608354, and 03-608356 the detected concentrations increased with depth. The Permittees must revise the text accordingly.*

LANL Response

17. In the paragraph discussing 4-isopropyltoluene in section 6.42.4.4, sample location 03-60835 has been revised to location 03-608352.

    The statement that toluene was not detected at downgradient locations 03-608352, 03-608354, 03-608355, and 03-608356 has been removed from the text in section 6.42.4.4. However, seven of the nine detections of toluene were below the estimated quantitation limit (EQL). The text in section 6.42.4.4 has been revised as follows;

    "Toluene was detected in nine samples at AOC 03-056(k). The maximum concentration of 0.00294 mg/kg was detected at location 03-608357 in the deepest sampling interval (3.0–4.0 ft bgs). Toluene concentrations decreased with depth at location 03-03281, and were below the EQL at locations 03-03290 and 03-608351. Toluene was also detected below the EQL at downgradient locations 03-608352, 03-608354, and 03-608356. The lateral extent of toluene is defined, and the vertical extent is not defined."

NMED Comment

18. Section 6.43.4.4, Nature and Extent of Contamination, page-228: *Contrary to the Permittees' statement that copper concentrations decreased at location 03-22333, copper concentrations in fact increased with depth at this location. However, copper concentrations decreased with depth at a nearby location (03-608364); therefore the vertical and lateral extent of copper is defined at SWMU 03-056(l). The Permittees must clarify the text accordingly.*

LANL Response

18. The text in section 6.43.4.4 has been revised to indicate the concentration of copper increased with depth at location 03-22333, but decreased with depth at an adjacent location (03-608364) 1 ft to the east.

NMED Comment

19. Section 7.8.4.1, Soil, Rock, and Sediment Sampling, page-267: *The Permittees state that at four locations (03-608417, 03-608418, 03-608419, and 03-608420)) tuff was encountered at depths less than 1 ft bgs, and samples were collected only from one depth at these locations. The approved work plan proposed collecting samples from two depths at these locations (i.e., at 0-1 ft and 1-2 ft). It is not*

clear why samples were not collected from tuff to define the vertical extent of contamination. Additionally, the Section B 10.0 of Appendix B does not include discussion of the deviations from the work plan at SWMU 60-007(b). The Permittees must revise Appendix B to explain why approved work plan was not followed.

LANL Response

19. Appendix B, section B-10.0, has been revised to include the deviation for collecting only one sample from each of the four locations at SWMU 60-007(b). The deviation reads as follows:

    "The approved investigation work plan required the collection of two sediment samples from each of the four locations within the upper drainage at SWMU 60-007(b). However, because tuff was exposed at the surface and there was very little sediment, only one sample could be obtained from each location. A later attempt to acquire the tuff samples at the four locations was unsuccessful because the site was no longer accessible as a result of extensive snow accumulation from plowing the parking lot next to the drainage. Additional samples will be collected from a second depth at locations 03-608417, 03-608418, 03-608419, and 03-608420 during the Phase II investigation."

NMED Comment

20. Section 9.1.1, Conclusions, TA-03, pages 280-281: *Several discrepancies were noted between the discussion of nature and extent in the Report and the conclusions presented in this section. Several COPCs for which the extent is not defined were omitted in this section. For example,*

a. The extent of contamination for organic chemicals is not defined for SWMU 03-012(b), as discussed on page 64. The Permittees failed to include organic chemicals in the list of COPCs for which extent is not defined. Revise the conclusions for SWMU 03-012(b) accordingly.

b. The lateral and vertical extent of acenaphthene is not defined for SWMU 03-014(o) as stated on page 130, but the Permittees did not include acenaphthene in the list of chemicals for which extent is not defined. Revise the conclusions accordingly.

c. The vertical and lateral extent of lead is not defined for AOC 03-056(k) as stated on page 222. In the conclusions, the Permittees reported that only the lateral extent of lead in not defined. The Permittees must revise the statement to indicate that both lateral and vertical extent of lead is not defined at AOC 03-056(k).

LANL Response

20. a. The list of organic chemicals for which extent is not defined at SWMU 03-012(b) was added to the list of remaining characterization requirements in section 9.1.1.

    b. The lateral and vertical extent of acenaphthene at SWMU 03-014(o) was added to the list of remaining characterization requirements in section 9.1.1.

    c. The vertical extent of lead at AOC 03-056(k) was added to the list of remaining characterization requirements in section 9.1.1.

NMED Comment

21. Section 9.1.3, Conclusions, TA-61, page 282: *As stated in NMED's Approval with Modification (August 12, 2008) SWMU 61-002 was not considered part of this investigation and was not reviewed as part of this Report. NMED issued a Notice of Disapproval (NOD) for the Remedy Completion Report for the Investigation and Remediation of Solid Waste Management Unit 61-002 at Technical Area 61 on August 9, 2007. Samples collected from the northwest locations at the site had concentrations of organic chemicals that exceeded residential, construction worker, and industrial soil screening levels. However, the Permittees used a 95% upper confidence limit (UCL) of the mean to calculate exposure point concentrations (EPCs) to conclude that the site did not pose unacceptable risk under an industrial exposure scenario (the site posed unacceptable risk under construction worker and residential scenario). The use of UCLs to calculate EPCs is inappropriate for the site because contaminated area is easily identifiable and is concentrated in the northwest area. Specific Comment # 1 of the NOD directed the Permittees to submit a work plan to conduct additional soil removal at the site. The Permittees declined to comply with the direction. The corrective action is therefore not complete at the site.*

LANL Response

21. LANL responded to the NOD for the remedy completion report on November 30, 2007, and provided the basis for corrective action complete with controls for SWMU 61-002. Because nature and extent was defined and the site posed no potential unacceptable risk to human health under the industrial scenario, a work plan was not submitted as explained in Specific Comment #1 in the remedy completion report NOD response. LANL had not received a response to the revised remedy completion report and associated NOD responses until receipt of the NOD letter for the Upper Sandia Canyon Aggregate Area investigation report, dated September 1, 2010.

    As detailed in section 3.1.1 of the revised remedy completion report (LANL 2007, 100722), the area contaminated with petroleum hydrocarbons in the northwest corner of SWMU 61-002 was excavated down to 4 ft bgs. The area of soil removal was 20 ft by 140 ft and resulted in 60 yd^3 of petroleum-contaminated soil being excavated. The excavated area was backfilled from August 18, 2005, through September 1, 2005, with clean backfill material from Classic Rock in Santa Fe, New Mexico (Figures B-10 and B-13, Appendix B) (LANL 2007, 100722). The backfill material was compacted by a trackhoe and wheel-rolled by a front-end loader for compaction. Loose soil was swept off the remaining asphalt surface area, and the northern end of SWMU 61-002 was reseeded.

    As a result of the soil removal activities, there is no surface contamination in this area. Because the industrial scenario is assessed based on surface data (0.0–0.5 ft), there is no exposure to a worker within the excavated area. The original risk-screening assessment was, therefore, conducted to evaluate exposure across the entire SWMU. The two closest surface locations to the excavated contaminated area in the northwest corner of SWMU 61-002 sampled are locations 61-24514 (located approximately 25 ft south) and 61-24332 (located approximately 50 ft east). Comparisons of the maximum detected concentrations of inorganic and organic COPCs from locations 61-24514 and 61-24332 with the industrial soil screening levels (SSLs) are presented in the remedy completion report (LANL 2007, 100722) and in the tables below.

COPC	EPC* (mg/kg)	Industrial SSL (mg/kg)	Hazard Quotient
Lead	51.9	800	0.065
Zinc	555	341,000	0.0016
Acetone	0.47	851,000	0.00000055
Butanone[2-]	0.0015	369,000	0.0000000041
Chlorobenzene	0.01	2140	0.0000047
Dichlorobenzene[1,2-]	0.0057	450	0.000013
		Hazard Index	**0.07**

COPC	EPC (mg/kg)	Industrial SSL (mg/kg)	Cancer Risk
Aroclor-1254	0.47	8.26	6×10^{-7}
		Total Excess Cancer Risk	**6×10^{-7}**

*EPC = Exposure point concentration.

Based on the risk screening results, the total excess cancer risk for the industrial scenario is 6×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070), and the hazard index for the industrial scenario is 0.07, which is below the NMED target hazard index (HI) of 1.0 (NMED 2009, 108070). Therefore, there is no potential unacceptable risk for the industrial scenario in the northwest portion of SWMU 61-002. As stated in the remedy completion report (LANL 2007, 100722), there is also no potential unacceptable risk for the industrial scenario across the SWMU (no COPC concentrations exceeded industrial SSLs in the 0- to 1.0-ft depth interval evaluated for this scenario).

The site data demonstrate that inorganic chemical and organic chemical contamination is characterized and that the nature and extent is defined. The human health risk screening assessment conducted for SWMU 61-002 indicated no potential unacceptable risk to human health under the industrial scenario. Therefore, based on the results of the assessments, as well the proximity of the site to the Los Alamos County landfill and East Jemez Road and the depth of residual contamination beneath the roadway (4.5–30 ft bgs), no further investigation or soil removal are necessary.

The Laboratory reiterates its recommendation for corrective action complete with controls for SWMU 61-002 based on the results of the investigation and remediation activities as described in revision 1 of the remedy completion report (LANL 2007, 100722). The current and reasonably foreseeable future land use is industrial. The recommendation of corrective action complete with controls is appropriate for SWMU 61-002 because the cleanup levels and goals under an industrial scenario are met. In addition, because of the site's close proximity to the Los Alamos County landfill and East Jemez Road, and the depth of residual contamination beneath the roadway, additional remediation is not warranted. Based on the results of the investigation, controls are required to restrict land use of the property. The Laboratory intends to retain ownership of the property indefinitely and will continue to restrict the property to industrial use only. Controls on future construction activities will be implemented to assure protection of construction workers through LANL's Permits and Requirements Identification System and Excavation Permit System. The text in section 10.2 has been revised to recommend corrective action complete with controls for SWMU 61-002.

NMED Comment

22. Section 9.1.3, Conclusions, TA-61, page 282: *The Permittees propose no further action for SWMU 61-005 (landfill) and SWMU 61-006 (used oil storage tank). No sampling was conducted during the 2009 investigations at SWMUs 61-005 and 61-006 because they were addressed under other regulatory programs. Corrective action complete status will not be evaluated for these sites until the appropriate documentation is provided to NMED.*

LANL Response

22. Los Alamos County is the permitted operator of the county landfill (SWMU 61-005) and the active 2500-gal. used-oil storage tank (SWMU 61-006) located at the Los Alamos County Eco Station at the west end of the county landfill. Los Alamos County is currently closing the landfill (SWMU 61-005) under the Resource Conservation and Recovery Act (RCRA) Subtitle D and New Mexico Solid Waste Management regulations. SWMU 61-006 is an active RCRA-regulated unit operated by Los Alamos County under 40 CFR 279 and 20.4.1.1002 of the New Mexico Administrative Code, Standards for the Management of Used Oil. Documentation confirming the closure of the Los Alamos County Landfill (SWMU 61-005) and used oil storage tank (SWMU 61-006) in accordance with applicable regulatory requirements will be provided to NMED by Los Alamos County.

    LANL will request certificates of completion and provide copies of regulatory closure documentation for SWMUs 61-005 and 61-006 after the sites have undergone regulatory closure. No revision to the text is necessary.

NMED Comment

23. Figure 6.4-1, Site map of SWMUs 03-015 and 03-056(l) and AOCs 03-003(d), 03-047(g), 03-051(c), and 03-053, page 302: *One concrete chip sample and ten soil samples were collected from five locations at AOC 03-003(d) during the 2009 investigations. According to the legend in the figure, red circles denote locations where only surface samples were collected and red triangles indicate locations where both surface and subsurface samples were collected. Figure 6.4-1 depicts two triangles and three circles for AOC 03-003(d). However, the Tables 6.4-1 and 6.4-2 and the text indicate that soil samples were collected from two depths at all five locations. The Permittees must revise the figure to depict the accurate sampling locations.*

LANL Response

23. Figure 6.4-1 has been revised to accurately depict the sampling location types at AOC 03-003(d). Sampling locations 03-608150 and 03-608161 are now denoted with red circles to indicate surface samples.

NMED Comment

24. Figures 7.3-1 and 7.3-2, pages 322 and 323: *Figures 7.3-1 and 7.3-2, depicting spatial distribution of all contaminants should include all historical and current sampling locations. Locations 60-10002 and 60-10003 are not depicted on these figures. Table 7.7-1 lists all decision-level data collected at SWMU 60-007(a), and includes these sampling locations. No organic and inorganic COPCs were identified. Nevertheless, these locations should have been depicted on the figures for nature and extent evaluations. The Permittees must revise these figures to include all sampled locations.*

LANL Response

24. Figures 7.3-1 and 7.3-2 have been revised to include sampling locations 60-10002 and 60-10003.

NMED Comment

25. Table 3.2.-2, Field Screening Results for Samples Collected in 2009, pages 341-359: *Table 3.2-2 presents results of field screening conducted during the 2009 investigations. NMED noted that in general, for radionuclides the same result is reported for all samples collected at a particular SWMU or AOC. For example, at SWMU 03-002(c) nine samples were collected from four locations. For gross alpha, an activity of 25.6 disintegrations per minute (dpm) is reported for all nine samples. Similarly for beta/gamma activity, all results were reported at 1860 dpm. The Permittees must explain if radioactivity was measured for each individual sample and why the same result was generated by all nine samples.*

LANL Response

25. Radiological screening was performed on each individual sample collected during the 2009 investigation. Each result reported represents the daily site background level. If the screening result was different than the site background, it was recorded. Table 3.2-2 has been revised to include a footnote that specifies the radiological screening results represent site background levels.

NMED Comment

26. Tables 6.8-7, 6.8-8, and 6.8-9, pages 378-380: *Tables 6.8-8 and 6.8-9 incorrectly report location numbers for samples RE03-09-13445 and RE03-09-13446, as 03-22536 at SWMU 03-029. In Table 6.8-7 it is reported correctly as 03-608184. The Permittees must correct the location numbers for these two samples and revise the tables accordingly.*

LANL Response

26. The locations for samples RE03-09-13445 and RE03-09-13446 in Tables 6.8-8 and 6.8-9 were changed to location 03-608184 as indicated in Table 6.8-7.

NMED Comment

27. Appendix B, Section B-10.0, Deviations from Work Plan, pages B-6 to B-8: *The second bullet states that one sample was not collected at SWMU 03-014(k) (location 03-608266) from 8-9 ft bgs because no recovery of material occurred from that interval during drilling. Sampling location 03-608266 is not associated with SWMU 03-014(k) according to Table 6.14-24 or Figure 6.14-1. The Permittees may have confused it with location 03-608273, because results from 8-9 ft bgs sampling interval at location 03-608273 are not reported in the Table 6.14-24. In addition, discussion of deviations at SWMU 60-006(a) is repeated and provided on page B-7 and B-8. The Permittees must make appropriate revisions to the text.*

LANL Response

27. The location referred to in the deviations section for SWMU 03-014(k) should have been location 03-608273 and not location 03-608266. The text in Appendix B, section B-10.0, has been revised and the location was also associated with SWMUs 03-014(k,l,m,n) and not just SWMU 03-014(k) as reported.

    The second bullet in Appendix B, section B-10.0, discussing SWMU 60-006(a) has been removed.

NMED Comment

28. Appendix B, Table B-10.0-1, Summary of Sampling Deviations from the Approved Work Plan, pages B-12: *The Permittees have associated sampling locations 03-608265, 03-608266, and 03-608268 with SWMU 03-014(k). Review of Table 6.14-24 and Plates 18 and 19 indicates that these locations are not associated with SWMU 03-014(k). The Permittees must provide correct sampling locations and note where samples were not collected in accordance with the approved work plan.*

LANL Response

28. Table B-10.0-1 has been revised to include the correct sampling locations associated with the deviation for SWMUs 03-014(k,l,m,n).

NMED Comment

29. Section I-4.3.2, Exposure Evaluation, AOC 03-038(c), page I-21: *AOC 03-038(c) had an elevated hazard quotient for the construction worker. The primary hazard drivers were manganese (85.7%) and cobalt (11.4%). Cobalt also was the primary driver for an elevated residential hazard quotient (50%). A discussion is provided indicating that the risks are overestimated for the site and to illustrate this point, the exposure point concentration is divided by the maximum background concentration resulting in a HI of 2 (for the construction worker). It is not clear why the EPC was divided by background; nonetheless, the resulting HI is still above the target hazard level. Additional lines of evidence are required to justify the elevated risks due primarily from manganese and cobalt. Alternately, site controls to ensure protection against inhalation hazards should be in place for any future development of the site. This comment also applies to the HI evaluations for SWMU 03-056(l).*

LANL Response

29. The text in sections 6.25.5, I-4.3.2, I-4.4.9, and I-6.1 have been revised. The potential risks to the construction worker and the resident at AOC 03-038(c) were due to the results from one sample. Manganese was the principal COPC for the construction worker scenario, and cobalt was the principal COPC for the residential scenario. All other COPCs did not indicate potential risks under either scenario.

    At AOC 03-038(c), manganese was detected above the soil background value (BV) at one location (03-608307) in a surface sample at a concentration of 3280 mg/kg, resulting in an exposure point concentration (EPC) of 2633 mg/kg. Manganese was not detected above BV at adjacent location 03-608308 (less than 5 ft away) or at location 03-608309 and was not above BV at depth (1−2 ft). The data indicate the maximum detected concentration is well bounded and of limited extent. The EPC is, therefore, biased high by the one manganese concentration above BV and substantially overestimates the exposure of a worker to manganese. In addition, the construction worker SSL

(463 mg/kg) is less than the soil BV (671 mg/kg), i.e., is comparable with naturally occurring manganese levels. Based on these factors, the exposure to manganese is overestimated, and the HI is not representative of the potential risk to a construction worker. If manganese is not included, the HI for the construction worker is reduced to 0.9, which is less than the NMED target HI. Therefore, there is no potential unacceptable risk under the construction worker scenario at AOC 03-038(c).

Also at AOC 03-038(c), lead is a COPC and contributes an HQ of approximately 0.2 to the residential HI. Because the lead SSL is based upon blood lead levels, lead is evaluated separately from the other noncarcinogenic COPCs. The lead EPC (62.45 mg/kg) is below the residential SSL (400 mg/kg), and the contribution to the HI is reduced by approximately 0.2. Without lead, the residential HI for AOC 03-038(c) is reduced to 1.4 (from 1.6), which is equivalent to the NMED target HI. Based on the separate lead screening, there is no potential unacceptable risk under the residential scenario at AOC 03-038(c).

In addition, cobalt was detected above the soil BV at one location (03-608307) in a surface sample at a concentration of 37.8 mg/kg, resulting in an EPC of 27.95 mg/kg. Cobalt was not detected above BV at adjacent location 03-608308 (less than 5 ft away) or at location 03-608309 and was not above BV at depth (1−2 ft). The data indicate the maximum detected concentration is well bounded and of limited extent. The EPC is, therefore, biased high by the one concentration above BV and substantially overestimates the exposure of a resident to cobalt. Without cobalt, the HI is further reduced (following the separate lead evaluation above) to 0.2, which is less than the NMED target HI. Therefore, there is no potential unacceptable risk under the residential scenario at AOC 03-038(c).

Site controls on future construction or any other activities are unnecessary given the isolated one sample detect of manganese at AOC 03-038(c). The manganese concentration is well bounded and of limited extent and does not pose a hazard for any future development of the site.

The text in sections I-4.3.2, I-4.4.11, and 6.43.5 has also been revised for SWMU 03-056(l). The potential risk to the construction worker at SWMU 03-056(l) was due to a result from one sample. Manganese was the principal COPC for the construction worker scenario; all other COPCs did not indicate potential risk under this scenario.

The construction worker HI of approximately 2 (HI of 2.4) is from manganese, which has an HQ of 2.4. Manganese was detected above the soil BV at one location (03-22333) at a concentration of 1530 mg/kg, resulting in an EPC of 1112 mg/kg. Location 03-608364 was placed adjacent to location 03-22333 and sampled deeper and did not detect manganese above BV. Other locations surrounding location 03-22333 (locations 03-608360 and 03-608366 less than 10 ft to the north and south, respectively, and locations 03-608358 and 03-608362 10−15 ft to the northeast and southeast, respectively) also did not detect manganese above BV. The manganese EPC of 1121 mg/kg is similar to the maximum soil background concentration (1100 mg/kg). In addition, the construction worker SSL (463 mg/kg) is similar to the range of soil background concentrations (76 mg/kg to 1100 mg/kg). Therefore, the EPC and the SSL are comparable with naturally occurring manganese levels. An EPC and a SSL indistinguishable from background concentrations overestimate the exposure and risk to the construction worker. Without manganese, the HI for the construction worker is reduced to 0.002, which is less than the NMED target HI. Therefore, SWMU 03-056(l) does not require further investigation or remediation, and no potential unacceptable risk for the construction worker scenario from site operations exists.

Site controls on future construction or any other activities are unnecessary given the isolated one sample detect of manganese at SWMU 03-056(l). The manganese concentration is well bounded and of limited extent and does not pose a hazard for any future development of the site.

NMED Comment

30. Section I-4.3.2, Exposure Evaluation, AOC C- 03-016, page I-21: *AOC C-03-016 has an elevated construction worker hazard quotient with 100% of the hazard being contributed by manganese. In addition, the hazard quotient for the construction worker (HQ = 6) and the residential (HQ = 14) scenarios for the total petroleum hydrocarbon – diesel range organics (TPH-DRO) exceeded the target hazard levels. The discussion of the risk results includes manganese but does not address risks due to TPH-DRO. Both the construction worker and resident have significantly elevated HIs due to TPH-DRO. The Permittees must either provide sufficient justification demonstrating that additional investigation or remediation is not needed or propose to conduct additional work at AOC C-03-016.*

LANL Response

30. The text in section I-4.3.2 has been revised. The potential risk to the construction worker at AOC C-03-016 was due to the results from one sample. Manganese was the principal COPC for the construction worker scenario; all other COPCs did not indicate potential risks under either scenario.

    Manganese was detected above the Qbt 2,3,4 BV at one location (03-22533) at a concentration of 1490 mg/kg (the maximum detected concentration was also the EPC). Manganese was not detected above the tuff BV (482 mg/kg) at depth at location 03-22533 or at location 03-22534, which is approximately 10 ft to the north. The maximum detected manganese concentration is comparable with the maximum soil background concentration (1100 mg/kg). In addition, the construction worker SSL (463 mg/kg) is similar to the ranges of background concentrations for Qbt 2,3,4 and soil (22 mg/kg to 752 mg/kg and 76 mg/kg to 1100 mg/kg, respectively). Therefore, the EPC and SSL are comparable with naturally occurring manganese levels. The maximum detected concentration and a SSL indistinguishable from background concentrations overestimate the exposure and risk to the construction worker. The use of the maximum detected concentration represents a worst-case exposure, not a reasonable maximum exposure, which is the preferred exposure used in standard risk assessment practice. It is unrealistic to assume that a receptor (in this case a construction worker) would be exposed to the maximum detected concentration for the frequency and duration (250 d/yr for 1 yr) that are the bases for the SSL. Without manganese, the HI for the construction worker is reduced to 0.05, which is less than the NMED target HI. Therefore, there is no potential unacceptable risk under the construction worker scenario at AOC C-03-016.

    As stated in the report (section 6.20.5) and Appendix I (section I-4.2.13) “Although the TPH-DRO HQs are above 1.0, the constituents of the TPH-DRO (i.e., BTEX and PAHs) were not detected at this site.” The same can also be said for the TPH − gasoline range organics.

    As described in the report (section 6.20.1), “In the late 1980s, the area surrounding the oil cleanout bin was excavated and removed. New sand and gravel fill was placed around the bin (LANL 1995, 057590, pp. 6-26–6-27). The bin and stained soil around the bin were subsequently removed in the late 1990s (LANL 2003, 080912, p.4). The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).” The TPH, therefore, is at least 10 yr old but may be as much as 20−30 yr old. In either case, the TPH is weathered and not the result of a fresh or recent spill. As a result, the TPH constituents have degraded and/or been removed by past excavations, and all that is left are the longer chained hydrocarbons as residue in a limited area and depth. These longer chained hydrocarbons are persistent but are less toxic than the shorter chained hydrocarbons. In addition, the site is currently under a paved parking lot.

    NMED’s TPH screening guidelines state that site cleanup cannot be based solely on results of TPH sampling and that the TPH guidelines must be used in conjunction with the screening guidelines for

individual petroleum-related contaminants. The NMED screening guidelines are based on ingestion and use of groundwater as a potable water supply. However, because no individual petroleum-related contaminants are detected, the regional aquifer is over 1000 ft bgs, and extent is defined at 20 ft bgs, there are no potable groundwater issues related to the TPH detected. Therefore, for these reasons and the fact the site is currently paved, remediation of the TPH at AOC C-03-016 was not recommended. The text in sections I-4.3.2, I-4.4.13, I-6.1, and 6.20.5 have been revised to include this explanation for the TPH.

NMED Comment

31. Plates 16 and 17, Inorganic Chemical Concentrations Detected or Detected Above BVs at SWMU 03-013(i) and Organic Chemical Concentrations Detected at SWMU 03-013(i): *NMED could not locate historic sampling location 03-24451 on Plates 16 and 17. The Permittees must revise Plates 16 and 17 to include all sampling locations.*

LANL Response

31. Historical location 03-24451 is located in the same position as location 03-608221, and the two location markers are superimposed on Plates 16 and 17. Plate 16 has been revised to include the label for location 03-24451. On Plate 17, the results of organic chemicals detected at location 03-24451 are already included and are reported above the results for location 03-608221. No revision to Plate 17 is necessary.

REFERENCES

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LANL (Los Alamos National Laboratory), September 2003. "Field Implementation Plan for Asphalt Batch Plant Solid Waste Management Units and Areas of Concern at Technical Areas 3 and 60," Los Alamos National Laboratory document LA-UR-03-6161, Los Alamos, New Mexico. (LANL 2003, 080912)

LANL (Los Alamos National Laboratory), November 2007. "Remedy Completion Report for the Investigation and Remediation of Solid Waste Management Unit 61-002 at Technical Area 61, Revision 1," Los Alamos National Laboratory document LA-UR-07-7695, Los Alamos, New Mexico. (LANL 2007, 100722)

LANL (Los Alamos National Laboratory), March 21, 2008. "Structure Searches for 3-287, 3-2422, and 3-36," online search results from the MOADS internal database at Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 099214)

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LANL (Los Alamos National Laboratory), December 21, 2009. “Request for Concurrence on Changes to the Format and Content of Investigation Reports Prepared by the Los Alamos National Laboratory,” Los Alamos National Laboratory letter (EP2009-0688) to J.P. Bearzi (NMED-HWB) from M.J. Graham (LANL) and D.R. Gregory (DOE-LASO), Los Alamos, New Mexico. (LANL 2009, 108179)

LANL (Los Alamos National Laboratory), January 2010. “Investigation Report for North Ancho Canyon Aggregate Area, Revision 1,” Los Alamos National Laboratory document LA-UR-10-0125, Los Alamos, New Mexico. (LANL 2010, 108500.11)

LANL (Los Alamos National Laboratory), May 2010. “Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary,” Los Alamos National Laboratory document LA-UR-10-3304, Los Alamos, New Mexico. (LANL 2010, 109319)

LANL (Los Alamos National Laboratory), May 2010. “Investigation Report for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary,” Los Alamos National Laboratory document LA-UR-10-3095, Los Alamos, New Mexico. (LANL 2010, 109318)

LASL (Los Alamos Scientific Laboratory), October 9, 1953. “Cryogenics Laboratory SM-34, Civil, Plan-Profile Sewers and Drains, TA-3, Phase 'B,' Project 1,” Engineering Drawing ENG-C-17618, Los Alamos, New Mexico. (LASL 1953, 110574)

NMED (New Mexico Environment Department), October 2006. “New Mexico Environment Department TPH Screening Guidelines,” Santa Fe, New Mexico. (NMED 2006, 094614)

NMED (New Mexico Environment Department), August 12, 2008. “Approval with Modifications Upper Sandia Canyon Aggregate Area Investigation Work Plan,” 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, 102721)

NMED (New Mexico Environment Department), November 4, 2009. “Notice of Disapproval, Investigation Report for North Ancho 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 2009, 108143)

NMED (New Mexico Environment Department), December 2009. “Technical Background Document for Development of Soil Screening Levels, Revision 5.0,” with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

NMED (New Mexico Environment Department), January 28, 2010. “Approval, Investigation Report for North Ancho Canyon Aggregate Area, Revision 1,” New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 108675)

Cross-Reference of NMED NOD Comments and Revisions to Upper Sandia Canyon Aggregate Area Investigation Report

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
General Comments				
1	For evaluation of noncarcinogenic hazards, hazard indices were calculated separately for inorganics/organics and total petroleum hydrocarbons (TPH). It is not clear why these were evaluated separately and hazards associated with TPH were not combined with other hazards, even though combining the HIs from TPH with the HIs from other noncarcinogens would not affect the conclusions of the assessments.	n/a*	n/a	NMED TPH screening guidelines state the TPH toxicity is based only on the weighted sum of the toxicity of the hydrocarbon fractions in Table 1 of the guidelines. This is a different toxicity basis than for the other COPCs identified, which are based on the sum of the toxicities of the individual constituents. Because of the different toxicity basis, the TPH hazard quotients (HQs) are presented separately from the HQs for the individual COPCs. However, the constituents of the TPH (if detected) are compared to the individual NMED soil screening levels in the screening tables in the report.
2	For future assessments, if other areas being addressed under the biota studies are to be used as a line of evidence to justify elevated risk, then a more rigorous comparison (to include statistical comparison of datasets) will be required.	Sections I-5.5 and I-5.6, p. I-36	n/a	The intent of including the canyon ecological assessments by reference is to indicate that there have been field and/or laboratory studies conducted that go beyond the screening assessment. Because COPECs have been more rigorously evaluated in the field and have shown not to pose risks to receptors at the same or similar concentrations, this line of evidence generally supports the screening level conclusions using actual empirical results.

NMED NOD Comment No.	Summary of NOD Comment Requirement	Section(s)/Page(s) in Original Report	Section(s)/Page(s) in Revised Report	Nature of Revision
3	The text states that the vertical extent is defined for Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene for SWMU 03-045(c). However, Table 6.10-12 indicates that higher concentrations for these chemicals were detected in the sample collected from the greater depth. Resolve and reevaluate the nature and extent of organic chemicals contamination at SWMU 03-045(c).	Section 6.10.4.4, p. 73; Table 6.10-12, p. 399	Section 6.10.4.4, p. 73; Section 9.1.1 p. 280; Table 6.10-12, p. 399	Table 6.10-12 has been revised to reverse the order of the data reported for SWMU 03-045(c). The text in section 6.10.4.4 was revised to indicate the concentrations for organic chemicals increased with depth and vertical extent is not defined. Section 9.1.1 has also been revised.
4	The data presented in accompanying tables clearly indicate that releases have occurred; several organic chemicals were detected and several inorganic chemicals were detected above their respective background values. These data indicate that the vertical extent is defined at most of the locations where samples were collected. NMED concurs that further investigations may be delayed until decontamination and decommissioning (D&D) of the former WWTP structures is completed. Revise the statements to reflect that releases are indicated at these sites.	Sections 6.14.1.6, 6.14.2.5, 6.14.4.5, 6.14.6.5, 6.14.7.6, 6.14.8.5, 6.14.9.5, and 6.14.10.5, pp. 89, 90, 96, 104–108	Sections 6.14.1.6, p. 89; 6.14.2.5, p. 90; 6.14.4.5, p. 96; 6.14.6.5, p. 103; 6.14.7.6, p. 105; 6.14.8.5, p. 106; 6.14.9.5, p. 107; 6.14.10.5, p. 108	The statement "..., provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation" has been removed. The text in section 6.14.1.6 has been revised to read, "The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(a) be delayed until D&D of structure 03-49 has been completed. Previous and current investigations conducted around SWMUs 03 014(a,b,e,f) are not sufficient to fully determine the nature and extent of contamination." The text in the other sections has also been revised with the same language.

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7	a. NMED's Approval with Modifications for the investigation work plan directed the Permittees to collect nine samples from three locations within and next to the location of former tank and drainline. The Permittees only collected five samples. Explain why the direction to collect nine samples was not followed. b. The extent of contamination is not defined for the entire SWMU 03-014(u). Although the detected concentrations indicate a decreasing trend, the concentrations are still significantly higher than the background values in samples collected from the deepest interval. Collect additional samples at location 03-608281 to define the vertical extent of contamination.	Section 6.14.19.4, pp. 135–136	Section B-10.0, p. B-7; Table B-10.0-1, p. B-12	a. The additional work requested in NMED's approval with modifications letter was inadvertently excluded from the field implementation plan. Samples from an additional depth interval will be collected at locations 03-608281, 03-608282, and 03-608283 during the Phase II investigation. The text in Appendix B, and Table B-10.0-1 has been revised to include this deviation. b. The decreasing trend in concentration for chromium, copper, and silver at location 03-608281 define vertical extent of contamination. No additional samples are required. However, an additional sample at this location will be collected to define the vertical extent of cyanide and will be analyzed for metals to ensure the vertical extent of contamination for all inorganic chemicals is defined at this location. No revision to the text is necessary.
8	Inconsistencies were noted in the discussion of nature and extent of contamination at SWMU 03-056(d). For example, at several places, the sampling location 03-608288 is referred to as a location that is northeast of SWMU 03-056(d). However, as depicted in Plate 18, the sampling location 03-608288 is located within the SWMU boundary. The Permittees are most probably referring to location 03-608256, located northeast of the SWMU. Similarly, locations 03-608247and 03-608263 are located south and north of the SWMU, respectively, not north and south as reported. Revise the text accordingly.	Section 6.14.20.4, pp. 141–142; Plate 18	Section 6.14.20.4, pp. 141–142	The text has been revised for copper and silver to indicate the locations 03-608247, 03-608256, and 03-608263 are located to the south, northeast, and north, respectively. In the discussion for cyanide and mercury, the sample referenced to the northeast was changed from location 03-608288 to 03-608256. The reference to location 03-608263 was also revised to be part of the investigation of SWMU 03-014(j) and not SWMUs 03-014(c) and 03-014(g).

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12	The Permittees state that the lateral and vertical extent of tritium is defined. Tritium activities increased with depth at both these locations (i.e. 03-608310 and 03-608311). The vertical extent of tritium is not defined at AOC 03-038(d). Define the vertical extent of tritium at these two locations and provide the depth at which former waste lines were located to ascertain that samples were collected from potentially contaminated media and at appropriate depths.	Section 6.26.4.4, p. 181	Section 6.26.4.3, and 6.26.4.4, p. 179; Figures 6.26-2, 6.26-3, and 6.26-4; Tables 6.26-2, 6.26-3, and 6.26-4	Based on evaluation of additional historical information, the former drainlines associated with AOC 03-038(d) were identified as being located between 5 and 12 ft bgs. The depth intervals sampled during the 2009 investigation (0.0–1.0 and 1.0–2.0) were not below the location of the former drainline. Therefore, the analytical results are not representative of the site. The analytical results and nature and extent sections have been removed. Analytical data presented in figures and tables for AOC 038(d) have also been removed. The six locations sampled during the 2009 investigation will be resampled at depths below the drainlines during the Phase II investigation. This statement has been added to the text in section 6.26.4.3.
13	NMED concurs with the rationale to delay characterization and investigation of a portion of SWMU 03-045(e) until D&D of structure 03-57. However, one sample collected to characterize the outfall location indicates that concentrations of contaminants increase with depth. Define the vertical extent of contamination at this location and collect additional samples in the drainage channel to define the lateral extent of contamination in the drainage.	Section 6.31.5, p. 189	Sections 6.31.4.3 and 6.31.4.4, pp. 187–188 Sections 6.31.5 to 6.31.7, p. 188; Section 10.3, p. 285	Section 6.31.4.3 has been revised to indicate the existing data are not sufficient to characterize the extent of contamination at SWMU 03-045(e). Section 6.31.4.4 was added to discuss the vertical extent of contamination at location 03-608320. Section 6.31.5 was renumbered to 6.31.7 because two new were added. Section 10.3 was also revised to indicate additional sampling will be required at the outfall and in the drainage below the outfall to define the lateral extent of contamination associated with the outfall component of SWMU 03-045(e). Proposed sampling will be included in the Phase II investigation work plan.

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17	4-Isopropyltoluene was detected in the deepest sampling interval at location 03-608352, not 03-60835 as stated. Additionally, the statement that toluene was not detected at downgradient locations 03-608352, 03-608354, 03-608355, and 03-608356 is incorrect. Revise the text accordingly.	Section 6.42.4.4, p. 224	Section 6.42.4.4, pp. 223–224	Sample location 03-60835 has been revised to location 03-608352. The statement that toluene was not detected at downgradient locations has been removed. The text now reads; "Toluene concentrations decreased with depth at location 03-03281, and were below the EQL at locations 03-03290 and 03-608351. Toluene was also detected below the EQL at downgradient locations 03-608352, 03-608354, and 03-608356."
18	Contrary to the Permittees' statement that copper concentrations decreased at location 03-22333, copper concentrations in fact increased with depth at this location. However, copper concentrations decreased with depth at a nearby location (03-608364); therefore the vertical and lateral extent of copper is defined at SWMU 03-056(i). Clarify the text accordingly.	Section 6.43.4.4, p. 228	Section 6.43.4.4, p. 227	The text has been revised to indicate the concentration of copper increased with depth at location 03-22333, but decreased with depth at a nearby location (03-608364) 1 ft to the east.
19	At four locations (03-608417, 03-608418, 03-608419, and 03-608420)) tuff was encountered at depths less than 1 ft bgs, and samples were collected only from one depth at these locations. The approved work plan proposed collecting samples from two depths at these locations. It is not clear why samples were not collected from tuff to define the vertical extent of contamination. Section B 10.0 of Appendix B does not include discussion of the deviations from the work plan at SWMU 60-007(b). Revise Appendix B to explain why approved work plan was not followed.	Appendix B, Section B-10.0	Section B-10.0, p. B-8	The text in Appendix B, section B-10.0, has been revised to include the deviation for collecting only one sample from each of the four locations within the upper drainage at SWMU 60-007(b). Additional samples will be collected from a second depth at locations 03-608417, 03 608418, 03-608419, and 03-608420 during the Phase II investigation

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21	As stated in NMED's Approval with Modification SWMU 61-002 was not considered part of this investigation and was not reviewed as part of this Report. NMED issued a Notice of Disapproval for the Remedy Completion Report for the Investigation and Remediation of SWMU 61-002 at Technical Area 61 on August 9, 2007. Samples collected from the northwest locations at the site had concentrations of organic chemicals that exceeded residential, construction worker, and industrial soil screening levels. However, the Permittees used a 95% upper confidence limit (UCL) of the mean to calculate exposure point concentrations (EPCs) to conclude that the site did not pose unacceptable risk under an industrial exposure scenario. The use of UCLs to calculate EPCs is inappropriate for the site because contaminated area is easily identifiable and is concentrated in the northwest area. Specific Comment # 1 of the NOD directed the Permittees to submit a work plan to conduct additional soil removal at the site. The Permittees declined to comply with the direction. The corrective action is therefore not complete.	Section 9.1.3, p. 282	Section 10.2, p. 285	Based on the sampling results presented in the remedy completion report, the site poses no unacceptable risk under the industrial scenario. Therefore, as explained in the NOD response for the remedy completion report, no additional soil removal is warranted. The Laboratory recommends corrective action complete with controls for SWMU 61-002 based on the results of the investigation and remediation activities. The current and reasonably foreseeable future land use is industrial. The recommendation of corrective action complete with controls is appropriate for SWMU 61-002 because the cleanup levels and goals under an industrial scenario are met. In addition, because of the site's close proximity to the Los Alamos County landfill and East Jemez Road, and the depth of residual contamination beneath the roadway, additional remediation is not warranted. Based on the results of the investigation, controls are required to restrict land use of the property. The Laboratory intends to retain ownership of the property indefinitely and will continue to restrict the property to industrial use only. Controls on future construction activities will be implemented to assure protection of construction workers through LANL's Permits and Requirements Identification System and Excavation Permit System. The text in section 10.2 has been revised to recommend corrective action complete with controls for SWMU 61-002.

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24	Figures 7.3-1 and 7.3-2, depicting spatial distribution of all contaminants should include all historical and current sampling locations. Locations 60-10002 and 60-10003 are not depicted on these figures. Revise these figures to include all sampled locations.	Figures 7.3-1 and 7.3-2, pp. 322–323	Figures 7.3-1 and 7.3-2, pp. 322–323	Figures 7.3-1 and 7.3-2 have been revised to include sampling locations 60-10002 and 60-10003.
25	Table 3.2-2 presents results of field screening conducted during the 2009 investigations. NMED noted that in general, for radionuclides the same result is reported for all samples collected at a particular SWMU or AOC. Explain if radioactivity was measured for each individual sample and why the same result was generated by all nine samples.	Table 3.2-2, pp. 341–359	Tables 3.2-2, p. 359	Table 3.2-2 has been revised to include a footnote that specifies the radiological screening results represent site background levels.
26	Tables 6.8-8 and 6.8-9 incorrectly report location numbers for samples RE03-09-13445 and RE03-09-13446, as 03-22536 at SWMU 03-029. Table 6.8-7 reported it correctly as 03-608184. Correct the location numbers for these two samples and revise the tables accordingly.	Tables 6.8-7, 6.8-8, and 6.8-9, pp. 378–380	Tables 6.8-8 and 6.8-9, pp. 379–380	The locations for samples RE03-09-13445 and RE03-09-13446 in Tables 6.8-8 and 6.8-9 were changed to location 03-608184 as indicated in Table 6.8-7.
27	The second bullet states that one sample was not collected at SWMU 03-014(k) (location 03-608266) from 8-9 ft bgs. Sampling location 03-608266 is not associated with SWMU 03-014(k) according to Table 6.14-24 or Figure 6.14-1. The discussion of deviations at SWMU 60-006(a) is repeated and provided on page B-7 and B-8. Make appropriate revisions to the text.	Appendix B, Section B-10-0, pp. B-6–B-8; Figure 6.14-1; Table 6.14-24	Appendix B, Section B-10-0, pp. B-6–B-7	The location referred to in the deviations section for SWMU 03-014(k) should have been location 03-608273 and not location 03-608266. The text has been revised and the location was associated with SWMUs 03-014(k,l,m,n) and not just SWMU 03-014(k) as reported. The second bullet discussing SWMU 60-006(a) has been removed.

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30	AOC C-03-016 has an elevated construction worker hazard quotient with 100% of the hazard being contributed by manganese. In addition, the hazard quotient for the construction worker (HQ = 6) and the residential (HQ = 14) scenarios for the total petroleum hydrocarbon – diesel range organics (TPH-DRO) exceeded the target hazard levels. The discussion of the risk results includes manganese but does not address risks due to TPH-DRO. Both the construction worker and resident have significantly elevated HIs due to TPH-DRO. Provide sufficient justification demonstrating that additional investigation or remediation is not needed or propose to conduct additional work at AOC C-03-016.	Section I-4.3.2, p. I-21	Sections 6.20.5, pp. 159–160 I-4.3.2, p. I-22–I-23 I-4.4.13, p. I-30–I-31; I-6.1, p. I-41	The text in section I-4.3.2 has been revised. The potential risk to the construction worker at AOC C-03-016 was due to the results from one sample. Manganese was the principal COPC for the construction worker scenario; all other COPCs did not indicate potential risks under either scenario. NMED's TPH screening guidelines states that site cleanup cannot be based solely on results of TPH sampling and that the TPH guidelines must be used in conjunction with the screening guidelines for individual petroleum-related contaminants. The NMED screening guidelines are based on ingestion and use of groundwater as a potable water supply. However, because no individual petroleum-related contaminants are detected, the regional aquifer is over 1000 ft bgs, and extent is defined at 20 ft bgs, there are no potable groundwater issues related to the TPH detected. Therefore, remediation of the TPH at AOC C-03-016 was not recommended. The text in sections 6.20.5, I-4.3.2, I-4.4-13, and I-6.1 have been revised to include this explanation for the TPH.
31	NMED could not locate historic sampling location 03-24451 on Plates 16 and 17. Revise Plates 16 and 17 to include all sampling locations.	Plates 16 and 17	Plate 16	Plate 16 was revised to include the label for historical sampling location 03-24451. Plate 17 has not been revised because the location was already on the plate.

*n/a = Not applicable.