Response to the Notice of Disapproval for the Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Los Alamos National Laboratory (LANL), EPA ID No: NM0890010515, HWB-LANL-10-042, Dated August 2, 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) 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 (DOE) policy.

GENERAL COMMENTS

NMED Comment

1. *Overall, the statistical analysis and scatter plots discussed in Sections 4.1 and 4.2 and presented in Appendices H and I are technically adequate. However, reliance solely on these methods to determine constituents of potential concern (COPCs) for both nature and extent of contamination and for risk assessment purposes may result in unacceptable uncertainties. A primary concern is that uncertainty in background may be used as a line of evidence to dismiss inorganics that may drive risk (human health, ecological, or both), which is not acceptable. If the use of the background reference values for soil and Qbt 2,3,4 are not appropriate, additional Qbt 4 background samples must be collected and an appropriate background data set must be established for Qbt 4 for use at TA-49.*

LANL Response

1. The surface sampling investigation prescribed by the approved investigation work plan produced a total of 47 surface (0.0–0.5 ft below ground surface [bgs]) and shallow subsurface (0.5–1.5 ft bgs) samples from tuff, specifically Qbt 4 (LANL 2008, 102691; NMED 2008, 100464). The statistical analyses and scatter plots discussed in sections 4.1 and 4.2 and Appendices H and I describe the inorganic chemical background exceedances observed in the Qbt 4 samples for extent purposes only. It was not the intent of the Qbt 4 background analyses to eliminate any inorganic chemicals relative to background. Therefore, the determination of risk would not be affected by the analyses. However, if an appropriate background data set is established for Qbt 4, LANL will apply the background to identify COPCs and thus eliminate inorganic chemicals that are not different from background.

   LANL will collect additional Qbt 4 background samples to establish an appropriate background data set for Qbt 4 for use at Technical Area 49 (TA-49) and other areas of LANL where this tuff unit is encountered. In 2011, LANL will conduct a background study separate from the TA-49 investigations and will submit a Qbt 4 background study work plan to NMED for review and approval.

NMED Comment

2. *There are several sample locations on Plate 2 (Area 1 [SWMU 49-001(a)] inorganic chemical concentrations detected above background values) that have no sample IDs. NMED acknowledges that these locations had no detections above background (for inorganics) and that Plate 1 provides the sample IDs for all sampling locations at Area 1. However, it facilitates NMED's review if all sample IDs are identified on the same Figure or Map. The Permittees must revise all applicable Plates to include* all *sample location IDs. This revision renders Plates 1, 5, 8, 12, 16, 20, 24, and 28 unnecessary; they must therefore be removed from the Report.*

LANL Response

2. All applicable figures and plates in the investigation report have been revised to include sampling location IDs for all sampling locations shown on the figures/plates. During the teleconference with Kathryn Roberts on August 9, 2010, it was agreed that Plates 1, 5, 8, 12, 16, 20, 24, and 28 would not be removed from the investigation report.

NMED Comment

3. *Throughout the Report, the Permittees state that detection limits (DL) were greater than the soil/tuff background value (BV) for inorganic constituents. The Permittees must explain why the DLs were greater than the BVs for inorganic constituents and revise the conclusions accordingly.*

LANL Response

3. For antimony, cadmium, cyanide, mercury, selenium, silver, and thallium, the reported nondetected results are sometimes quantified at a value higher than the background values (BVs). Because the BVs for these inorganic chemicals are 1 mg/kg or less, the detection limits are more sensitive to factors that increase the variability and, therefore, may be elevated above the BVs in some samples.

   For the historical data, the elevated detection limits were the result of the method used in the mid- to late 1990s. With the exceptions of mercury, cyanide, selenium, and thallium, the radial view inductively coupled plasma emission spectroscopy (ICPES) method was used to analyze for inorganic chemicals. The radial view technology had limited sensitivity and suffered from extensive interference issues, resulting in elevated detection limits for the inorganic chemicals detected. This issue was resolved in the early 2000s when the industry transitioned to the axial view ICPES method. The shift to axial view instrumentation provided increased sensitivity and allowed for ICPES determination of the traditional graphite furnace inorganic chemicals, including antimony, selenium, and thallium, at relatively low detection limits. More recently, inductively coupled plasma mass spectroscopy (ICPMS) has been used for analysis of inorganic chemicals. However, some issues are still associated with the detection limits reported for some inorganic chemicals relative to the BVs using the current method.

   There are two main aspects to the nondetected results with regard to the detection limits: the method detection limit (MDL) and the quantitation limit (also referred to as the estimated detection limit or practical quantitation limit). The MDL is the minimum level of an analyte that is used to determine with 99% confidence whether it is present. However, it is not the level at which a result is quantified. The quantified level (both for a nondetect and a detect) is represented by the quantitation limit, which is the value reported for each inorganic chemical in the data tables in the investigation report. Both the

MDLs and quantitation limits are provided in the electronic data for each laboratory and are provided on the data DVDs that accompany the report.

The quantitation limit often exceeds the BV, although the MDL is often less than the BV. For TA-49 inside the nuclear environmental site boundary, the MDLs for antimony, cadmium, cyanide, mercury, silver, and thallium were at or below the soil and tuff BVs, although the MDLs for selenium were below or slightly above the tuff BV. However, the quantitation limits for each inorganic chemical are above the BVs (mainly tuff BVs).

Sources of variability in soil sample MDLs and quantification limits can be tracked to sample preparation steps. The ICPMS method is a fast and cost-effective way to identify and quantify inorganic elements. However, several aspects of the analysis affect the MDLs and/or the quantitation limits for all inorganic chemicals. The MDLs and quantitation limits are established from analyses of liquid standards and are calculated based on the initial weight of the sample, percent moisture, and sample volume adjustment. These factors, along with the instrument calibration and the standard curve used to quantify the result, may cause the MDL and/or quantitation limit to vary between and among analyses and may result in higher limits, depending on the magnitude of change related to each factor. For example, if sample mass changes from 0.5 g to 1.5 g and percent moisture is between 0.5% and 20% (the typical range of moisture for LANL samples) and the same volumetric flask is used to adjust the sample volume, the solid MDLs and quantitation limits can vary by a factor of approximately 4. This variability may increase depending on other factors.

The ICPMS method is also subject to interferences (especially for selenium) as well as carryover and blank contamination (especially for antimony and thallium) that affect the quantification of the results. These issues affect all of the inorganic chemical results, but they especially affect the detection and quantification of antimony, selenium, and thallium, and often result in quantitation levels that are biased high. In addition, selenium has a poor ionization response in the plasma used for ICPMS, resulting in less resolution of the results and higher MDLs and quantitation limits. Finally, the high natural levels of iron oxide and aluminum in New Mexico soil cause high levels of interference during the inductively coupled plasma process, making it difficult to accurately quantify low levels of inorganic chemicals in samples, particularly for the inorganic chemicals with nondetect results that exceed BVs.

The ICPMS method is adequate for most inorganic chemicals, but it is not equally effective for all inorganic chemicals analyzed for. Because of sample, instrument, and analysis variables as well as interferences, carryover, and blank contamination, the MDLs and quantitation limits for inorganic chemicals may vary and be high relative to the BVs for some samples. The low MDLs obtained for most inorganic chemicals lead to the conclusion that no detected analytes are below BVs and allow confidence that the results are not missing detections above BVs. Because uncertainty is associated with some results, the inorganic chemicals with detection limits (i.e., quantitation limits) above the BVs are evaluated to determine if they should be retained as COPCs at a site. In most cases, inorganic chemicals that are not detected but have detection limits above BVs are retained as COPCs and included in risk evaluations. Therefore, the conclusions made in the report do not need to be revised and are conservative in this regard.

NMED Comment

4. *Throughout the Report, the Permittees state that detection limits (DL) were greater than the soil/tuff background value (BV) for inorganic constituents. NMED acknowledges that the Plates in the Report only depict concentrations of inorganics and radionuclides above background values (BV). In many*

cases the deepest sampling interval does not appear on the Plate because there were no detections above BV for inorganics or radionuclides and no detections for organics. However, there is no way to know that a sample was collected from a deeper interval without consulting the approved Work Plan or the "All-Analyses" tables. Without this knowledge, it would appear that the Permittees have not defined the vertical extent of several constituents. To facilitate NMED's review of the Report, the Permittees must revise the Plates to include the TD of each sampling location.

LANL Response

4. All plates presenting inorganic chemicals detected above BVs, detected organic chemicals, and radionuclides detected or detected above BVs/fallout values (FVs) have been revised to include the total depths from which samples were collected at each sampling location (presented as the range of depths sampled).

SPECIFIC COMMENTS

NMED Comment

1. Section 2.2, Deviations, page 9, paragraph 2:

Permittees' Statement: *"Four samples from two locations within Area 2B [SWMU 49-001(d)] were not collected because of the presence of a wire-mesh biointrusion barrier that covers the surface."*

NMED Comment: *The Permittees must identify the two proposed sample locations from the approved Work Plan that were not sampled because of the wire-mesh biointrusion barrier.*

LANL Response

1. The two proposed sampling locations from the approved work plan not sampled because of the presence of a wire-mesh biointrusion barrier that covers the surface were located inside the east fence around SWMU 49-001(b) and were not associated with SWMU 49-001(d). The sampling locations are shown as two green triangles on the revised Figure 2.1-2; location IDs were not assigned to the two proposed sampling locations. The text in section 2.2 of the investigation report has been revised to indicate the locations.

NMED Comment

2. Section 4.0, Statistical Methods Overview, pages 12-15:

See General Comment # 1.

LANL Response

2. See response to General Comment 1.

NMED Comment

3. Section 6.2.3.3, Soil and Rock Sample Analytical Results, Inorganic Chemicals in Tuff, page 25:

Permittees' Statement: *"Table 6.2-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no available BV, or with DLs above BV."*

NMED Comment: *The Permittees must explain why the detection limits for several metals (e.g., aluminum, barium, chromium) are higher than the background value (BV) for each of these metals.*

LANL Response

3. See response to General Comment 3 above. However, aluminum, barium, and chromium do not have detection limits above BVs in Table 6.2-4.

NMED Comment

4. Section 7.6.4, Nature and Extent of Soil and Rock Contamination, Radionuclides, page 44, paragraph 2:

a) Permittees' Statement: *"Cesium-137 was detected above FV [fallout value] (1.65 pCi/g) in three soil samples at site locations 49-610133, 49-610134, and 49-610151. Cesium-137 was not detected in samples from the overland corridors."*

NMED Comment: *Contrary to the Permittees' above statement, Cesium-137 was detected in samples from the overland corridors. Specifically, samples 49-610013, 49-610129, and 49-610046. The Permittees must revise the text to resolve this discrepancy.*

b) Permittees' Statement: *"Plutonium-238 was not detected in samples collected from the overland corridors."*

NMED Comment: *Contrary to the Permittees' above statement, Plutonium-238 was detected in a sample obtained from the overland corridors (sample 49-610038). The Permittees must revise the text to resolve this discrepancy.*

c) Permittees' Statement: *"Plutonium-238/239 concentrations decreased to the west, south, and east of location 49-610151."*

NMED Comment: *The sentence should read "Plutonium-239/240 concentrations decreased to the west, south, and east of location 49-610151." The Permittees must revise the text to correct the typographical error.*

LANL Response

4. (a) The data discussion presented in section 7.6.4 addresses only those sites in MDA AB [SWMUs 49-001(b, c, d, and g)]. Sampling location 49-610013 is in the overland corridor area associated with SWMU 49-001(e) (Area 3); sampling location 49-610129 is in the overland corridor area associated with SWMU 49-001(a) (Area 1); and sampling location 49-610129 is in the overland corridor area associated with SWMU 49-001(f) (Area 4). As shown on Plate 7, cesium-137 was not detected in any of the samples collected from the overland corridor area associated with

SWMUs 49-001(b, c, and d); no overland corridor sampling locations are associated with SWMU 49 001(g). No revision to the report text is necessary.

(b) Sampling location 49-610038 is in the overland corridor area associated with SWMU 49-001(f) (Area 4). As shown on Plate 7, plutonium-238 was not detected in any of the samples collected from the overland corridor area associated with SWMU 49-001(f). Plutonium-238 was detected at sampling location 49-611038, but this location is associated with SWMU 49-001(a), not MDA AB. No revision to the report text is necessary.

(c) The text in section 7.6.4 has been revised to read, "Plutonium-239/240 concentrations decreased to the west, south, and east of location 49-610151."

NMED Comment

5. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 51, paragraphs 2-3:

Permittees' Statement: *"The following inorganic chemicals (antimony, barium, beryllium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, perchlorate, thallium, selenium, total uranium, and vanadium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs and statistical tests indicate that the detected concentrations are different from background."*

NMED Comment: *The Permittees state later in the same section that "[a]t SWMU 49-001(e), the concentrations of several inorganic chemicals in tuff, including aluminum, manganese, nickel, and selenium are above the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4." The two statements appear to contradict one another. The Permittees must provide additional clarification as to whether or not the concentrations of inorganics are consistent with background.*

LANL Response

5. The initial statement referred to in the comment addresses the LANL-wide BVs and background concentrations typically used for background comparisons. The latter statement addresses the Qbt 4 background analyses conducted and described in sections 4.1 and 4.2 and presented in Appendixes H and I. Manganese, nickel, and selenium were detected in both soil and tuff above LANL BVs, but the concentrations in tuff are consistent with the TA-49 background for tuff, which appears to be higher than the LANL-wide BVs. Details regarding the detected concentrations of these inorganic chemicals in soil and tuff are accurately presented in section 8.2.3.4. No revision to the report text is necessary.

NMED Comment

6. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 52, paragraph 3:

Permittees' Statement: *"The vertical extent of beryllium in site samples is defined by perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609983 where beryllium decreased with depth or was not detected above BV."*

NMED Comment: *The Permittees must revise the above sentence to correct the typographical error. The sentence should read, "[t]he vertical extent of beryllium in site samples is defined by perimeter boreholes 49-609981, 49-609982, 49-609983, and* ***49-609984*** *where beryllium decreased with depth or was not detected above BV."*

LANL Response

6. The text in section 8.2.3.4 has been revised to read, "The vertical extent of beryllium in site samples is defined by perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609984 where beryllium decreased with depth or was not detected above the tuff BV."

NMED Comment

7. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 53, paragraph 2:

Permittees' Statement: *"Cobalt concentrations were essentially the same, and did not change laterally or with depth in samples collected from corridor locations. The lateral and vertical extent of cobalt are defined."*

NMED Comment: *Cobalt was detected above the residential regional screening level (RSL) (23 mg/kg) in the deepest sampling interval at corridor sample location 49-610005 (0.5 to 1.5-feet). Therefore, vertical extent is not defined for cobalt at sample location 49-610005. Additionally, cobalt was detected above the residential RSL at location 49-610007 at a depth of 0-0.5-feet. The Permittees may address the elevated levels of cobalt as part of the Phase II investigation or the corrective measures evaluation (CME) Report.*

LANL Response

7. The potential risk to receptors has not yet been assessed at any of these sites, including the overland corridor areas. Because exposure is not typically to a single detected concentration, the potential risk may not exceed NMED's target risk levels for any scenario. If there is a potential unacceptable risk, the Phase II investigation report will recommend appropriate corrective actions to address the issue.

   LANL maintains that the lateral and vertical extent of cobalt are defined at SWMU 49-001(e) because cobalt in the corridor locations decreased with depth within each transect, and cobalt was not detected above BV in all three locations at any of the transects. The text in section 8.2.3.4 has been revised accordingly.

NMED Comment

8. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 53, paragraph 5:

Permittees' Statement: *"Iron concentrations exceeded the maximum background (19,500 mg/kg) at two site locations (49-609308 and 49-609313) and one corridor location (49-610017), with a maximum detected concentration of 23,500 mg/kg at location 49-609308."*

NMED Comment: *The Permittees must specify which background dataset (soil or tuff) they are referring to in their explanations of nature and extent of contamination. One could interpret the above statement to be a comparison to either the maximum soil or maximum tuff background concentration.*

Depending on the dataset used for comparison, there would be several other detections at SWMU 49-001(e) that exceeded the maximum background concentration for iron. The Permittees must revise the text, where appropriate, to clarify the specific dataset being used for comparison.

LANL Response

8. The text in section 8.2.3.4 has been revised to read, "Iron concentrations exceeded the maximum tuff background concentration (19,500 mg/kg) at locations 49-609308 and 49-609313 and corridor location 49-610017 with a maximum detected concentration of 23,500 mg/kg at location 49-609308."

NMED Comment

9. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Radionuclides, page 56:

Permittees' Statement: *"Cesium-137 was detected above the FV (1.65 pCi/g) in one tuff sample and three soil/fill samples at site locations 49-609324, 49-609328, 49-609330, and corridor location 49-610013."*

NMED Comment: *The Permittees state in the second sentence of the same paragraph that "[t]he maximum detected concentration (0.214 pCi/g) was in the deeper sample at site location 49-610013. If the maximum detected concentration was 0.214 pCi/g, no samples exceeded the FV of 1.65 pCi/g for Cesium-137. Furthermore, the FV (1.65 pCi/g) only applies to the 0-6-inch sampling interval. The aforementioned detections were all obtained from the 0.5-1.5-feet depth interval. The Permittees must revise the text to resolve this discrepancy.*

LANL Response

9. The text in section 8.2.3.4 has been revised to read, "Cesium-137 was detected in one tuff sample and three soil/fill samples at locations 49-609324, 49-609328, 49-609330, and associated location 49-610013. The maximum detected concentration (0.214 pCi/g) was detected in the deeper sample at location 49-609328. Concentrations increased with depth at all four locations. Cesium-137 was not detected above the soil FV (1.65 pCi/g) in surface samples collected within 25 ft of locations 49-609324 and 49-609328 and within 10 ft of corridor location 49-610013."

NMED Comment

10. Section 9.2.3.4, Nature and Extent of Soil and Rock Contamination, Radionuclides, page 65, paragraph 3:

Permittees' Statement: *"Cesium-137 was detected above the FV (1.65 pCi/g) in two soil samples at corridor locations 49-610039 and 49-610046, with a maximum detected concentration of 0.257 pCi/g at corridor location 49-610046."*

NMED Comment: *The Permittees state that the maximum detected concentration of Cesium-137 was 0.257 pCi/g. If the maximum concentration was 0.257 pCi/g, no samples exceeded the Cesium-137 FV of 1.65 pCi/g. The Permittees must revise the text to resolve the discrepancy.*

LANL Response

10. The text in section 9.2.3.4 has been revised to read, “Cesium-137 was detected in two soil samples at depths greater than 0–1 ft at corridor locations 49-610039 and 49-610046, with a maximum detected concentration of 0.257 pCi/g at corridor location 49-610046.”

NMED Comment

11. Section 10.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 73, paragraph 8:

Permittees’ Statement: *“Selenium was detected above the soil BV (1.52 mg/kg) in three samples, with a maximum detected concentration of 1.8 mg/kg at borehole location 49-610500. Additionally, one sample had a DL (2 mg/kg) above the soil BV.”*

NMED Comment: *According to Plate 21, there are several more detections of selenium than identified by the Permittees. NMED acknowledges that the detections are J-flagged, but they are nevertheless detections above BV. For example, selenium was detected at location 49-610494 at the 8-10-foot depth interval at a concentration on 2.5 mg/kg. The Permittees must revise the text to resolve this discrepancy.*

LANL Response

11. The text referred to in the comment is in regard to soil background only. The other detected concentrations of selenium above BV referred to in the comment are in tuff. Selenium was detected in tuff, as the subsequent text states: “Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3), selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.”

    Section 10.2.3.4 presents the nature and extent discussion for SWMU 49-003. Sampling location 49-610494 is associated with AOC 49-008(c). Table 10.2-2 presents the samples collected and analyses requested for SWMU 49-003, and Table 10.3-2 presents the samples collected and analyses requested for AOC 49-008(c), including former building 49-15. Although both sites are located within Area 11, in accordance with the Compliance Order on Consent, sampling data are presented for each site separately. Plates 20, 21, 22, and 23 have been revised to more clearly depict sampling location/site associations for SWMU 49-003 and AOC 49-008(c) within Area 11. No revision to the text is necessary.

NMED Comment

12. Section 10.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 73, paragraph 9:

Permittees’ Statement: *“Total uranium was detected above the soil BV (1.82 mg/kg) in two samples with a maximum detected concentration of 2.42 mg/kg at location 49-08029.”*

NMED Comment: *Contrary to the Permittees statement above, the maximum detected concentration of total uranium in soil was at location 49-08033 (3.63 mg/kg); not location 49-08029. Moreover, three other locations (49-08028, 49-08040, and 49-08034) at Area 11 had higher detected concentrations*

of total uranium than location 49-08029. The Permittees must revise the text to resolve this discrepancy.

LANL Response

12. Section 10.2.3.4 presents the nature and extent discussion for SWMU 49-003. Locations 49-08028, 49-08033, 49-08034, and 49-08040 are associated with AOC 49-008(c). Location 49-08029 is associated with SWMU 49-003. Table 10.2-2 presents the samples collected and analyses requested for SWMU 49-003, and Table 10.3-2 presents the samples collected and analyses requested for AOC 49-008(c), which includes former building 49-15. Although both sites are located within Area 11, sampling data are presented for each site separately. Plates 20, 21, 22, and 23 have been revised to more clearly depict sampling location/site associations for SWMU 49-003 and AOC 49-008(c) within Area 11. No revision to the text is necessary.

NMED Comment

13. Section 10.2.3.4, Nature and Extent of Soil and Rock Contamination, Radionuclides, page 74, paragraph 4:

Permittees' Statement: *"Plutonium-238 was detected above FV (0.023 pCi/g) or at depths where the FV does not apply in eight soil and tuff samples, with a maximum detected concentration of 0.088 pCi/g at boreholes location 49-610496."*

NMED Comment: *According to Plate 23 (Area 11 [AOC 49-008(c) and SWMU 49-003] radionuclides detected above background or fallout values), sample location 49-08040 had the maximum detected concentration of Plutonium-238 (1.1 pCi/g), not sample location 49-610496. The Permittees must revise the text to resolve this discrepancy. Include tritium in the analytical suite proposed for this SWMU.*

LANL Response

13. Section 10.2.3.4 presents the nature and extent discussion for SWMU 49-003. Location 49-08040 is associated with AOC 49-008(c), and location 49-610496 is associated with SWMU 49-003. Although both sites are located within Area 11, sampling data are presented for each site separately. Samples collected and analyses requested for SWMU 49-003 are presented in Table 10.2-2, and samples collected and analyses requested for AOC 49-008(c) are presented in Table 10.3-2. Plates 20, 21, 22, and 23 have been revised to more clearly depict sampling location/site associations for SWMU 49-003 and AOC 49-008(c) within Area 11. No revision to the text is necessary.

    The analytical suite for Area 11 [AOC 49-008(c) and SWMU 49-003] to be presented in the Phase II work plan will include tritium.

NMED Comment

14. Section 10.2.3.4, Nature and Extent of Soil and Rock Contamination, Radionuclides, page 75, paragraph 1:

Permittees' Statement: *"Plutonium-239/240 was detected above FV (0.054 pCi/g) or at depths where FV does not apply in 10 soil and tuff samples with a maximum detected activity [concentration] of 4.87 pCi/g at location 49-610496."*

NMED Comment: *According to Plate 23 (Area 11 [AOC 49-008(c) and SWMU 49-003] radionuclides detected above background or fallout values), sample location 49-08040 had the maximum detected concentration of Plutonium-239/240 (66.1 pCi/g), not sample location 49-610496. Furthermore, this concentration exceeds both the residential and construction worker screening action levels (SALs). The Permittees must revise the text to resolve this discrepancy. The Permittees may address the elevated levels of plutonium-239/240 as part of the Phase II investigation or the corrective measures evaluation (CME) Report.*

LANL Response

14. Section 10.2.3.4 presents the nature and extent discussion for SWMU 49-003. Location 49-08040 is associated with AOC 49-008(c), and location 49-610496 is associated with SWMU 49-003. Although both sites are located within Area 11, sampling data are presented for each site separately. Plates 20, 21, 22, and 23 have been revised to more clearly depict sampling location/site associations for SWMU 49-003 and AOC 49-008(c) within Area 11. The lateral and vertical extent of plutonium-239/240 are defined at SWMU 49-003. No revision to the text is necessary.

    Because the lateral and vertical extent of tritium are not defined at SWMU 49-003, COPCs were not identified and a human-health screening assessment was not performed. Because extent is not defined, the potential dose to receptors has not yet been assessed. Because exposure is not typically to a single detected concentration, the potential dose may not exceed DOE's target dose level for any scenario. If there is a potential unacceptable dose, the Phase II investigation report will recommend appropriate corrective actions to address the issue.

NMED Comment

15. Section 10.3.3.1, Site Contamination, Soil and Rock Sampling, page 76, paragraph 1:

Permittees' Statement: *Samples were collected using a drill rig equipped with a continuous core-barrel sampling system. Investigation of AOC 49-008(c) is deferred per Table IV-2 of the Consent Order (Table 1.1-1). Therefore, surface samples were not collected for SWMU 49-003 during the 2009-2010 investigation."*

NMED Comment: *NMED assumes the second sentence is a typographical error because SWMU 49-003 is* non-deferred *(*see *Table IV-1 of the March 1, 2005 Order on Consent (Order). The Permittees must revise the text to correct the typographical error.*

LANL Response

15. The third sentence in the above comment has been revised to read, "Therefore, surface samples were not collected for AOC 49-008(c) during the 2009–2010 investigation."

NMED Comment

16. Section 11.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 88, paragraph 6:

Permittees' Statement: *"Barium was detected above the soil BV (295 mg/kg) in three samples. The maximum detected concentration of 539 mg/kg was at location 49-609907 in a sample collected from 0.5 to 1.5 ft bgs….barium in tuff is not different from background."*

NMED Comment: *The Permittees must clarify whether or not the concentrations of barium in soil or tuff are statistically similar to background. It is unclear from the above statement which dataset is being used for comparison. Furthermore, according to Plate 21, barium was only detected in soil (ALLH). The Permittees must revise the text to resolve this discrepancy.*

LANL Response

16. The text in section 11.2.3.4 has been revised to read, "The results of both the Gehan test and the quantile test indicate barium in soil is not different from background." Barium data presented in Plate 21 for AOC 49-008(d) are correct; barium was only detected above BV in soil.

NMED Comment

17. Section 12.3.4, Nature and Extent of Sediment Contamination, Radionuclides, page 98, paragraph 4:

Permittees' Statement: *"Plutonium-239-240 was detected in sediment at eight sampling locations in Water Canyon. Concentrations ranged from 0.69 to 8.08 pCi/g, with the maximum detected concentration at sampling location 49-610349. Sampling location 49-610349 is downstream of TA-49 activities, but concentrations were not detected in the deeper sample along the transect. Samples were not collected downgradient of location 49-610349"*

NMED Comment: *The maximum concentration of plutonium-239/240 was detected in the furthest downstream sample collected in Water Canyon. The Permittees must therefore provide additional justification for not sampling downgradient of location 49-610349 or propose additional sampling in the Phase II Investigation Work Plan.*

LANL Response

17. The extent of plutonium-239/240 in Water Canyon will be determined by the South Canyons investigation. The Phase I canyon reaches include reach WA-3, which extends 200 m downstream from the Cañon de Valle confluence, and reach WA-4, which extends 200 m above NM 4 and downstream of location 49-610349. Samples have been collected from reach WA-4, and data have been presented elsewhere. Six pre-fire sediment samples were collected in 2000, one post-fire sediment sample was collected in 2000 and reported in the South Canyons Historical Investigation Report (LANL 2006, 093714), and three sediment samples were collected in 2008 and reported in the 2008 Environmental Surveillance Report (LANL 2009, 108621). The results indicate plutonium-239/240 was not detected above background in any of the samples.

    Additional data from these reaches will be provided in the Water Canyon/Cañon de Valle investigation report, due to NMED on August 31, 2011.

NMED Comment

18. Section 15.0, Schedule for Recommended Activities, page 101:

NMED will establish a due date for the Phase II Investigation Work Plan in its approval of the Report.

LANL Response

18. Comment noted.

NMED Comment

19. Table 7.4-6, Summary of Radionuclides Detected or Detected above BVs/FVs at MDA AB, page 167:

The Permittees must revise the Table to include the Soil BV for Cesium-137.

LANL Response

19. Table 7.4-6 has been revised to include the soil FV of 1.65 pCi/g for cesium-137.

REFERENCES

LANL (Los Alamos National Laboratory), September 2006. "South Canyons Historical Investigation Report," Los Alamos National Laboratory document LA-UR-06-6012, Los Alamos, New Mexico. (LANL 2006, 093714)

LANL (Los Alamos National Laboratory), January 2008. "Investigation Work Plan for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1," Los Alamos National Laboratory document LA-UR-08-0447, Los Alamos, New Mexico. (LANL 2008, 102691)

LANL (Los Alamos National Laboratory), September 2009. "Environmental Surveillance at Los Alamos during 2008," Los Alamos National Laboratory report LA-14407-ENV, Los Alamos, New Mexico. (LANL 2009, 108621)

NMED (New Mexico Environment Department), February 14, 2008. "Approval with Modifications for the Investigation Work Plan for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary," 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, 100464)