Response to the Notice of Disapproval for the Investigation Report for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary, Los Alamos National Laboratory (LANL), EPA ID No: NM0890010515, HWB-LANL-10-041, Dated August 12, 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 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 background comparison approach described in NMED's General Comment 1 was not included in, nor was it applied to, the "Investigation Report for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary" (LANL 2010, 109318). The Qbt 4 background included in the Technical Area 49 (TA-49) inside the nuclear environmental site (NES) boundary investigation report was intended to help in defining extent of contamination and not to eliminate chemicals of potential concern (COPCs). Therefore, the results of the Qbt 4 background study were not intended to be used as a line of evidence to eliminate inorganic chemicals that may drive risk. See response to General Comment 6.

   LANL will collect additional Qbt 4 background samples to establish an appropriate background data set for Qbt 4 to use at 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 5 (*Area 6 West [SWMU 49-004] 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 4 provides the sample IDs for all sampling locations at Area 6 West. 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.*

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 and plates.

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 DVD that accompanies the report.

   The quantitation limit often exceeds the BV, although the MDL is often less than the BV. For TA-49 outside the NES 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 traced to the sample preparation steps. The ICPMS method is a fast, cost-effective way to identify and quantify inorganic elements. However, several aspects of the analysis affects 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 quantify accurately 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 may be high relative to the BVs for some samples. The low MDLs 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 are 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 detected locations sampled, inorganic chemicals detected above BVs, detected organic chemicals, and radionuclides detected or detected above BVs/fallout values have been revised to include the total depths from which samples were collected at each sampling location (presented as the range of depths sampled).

NMED Comment

5. *Area 6 (solid waste management unit (SWMU) 49-004) consists of a landfill and former burn area. The Permittees assert that no hazardous waste was burned or buried at this site. However, based upon the low level organics detected in soil and pore-gas samples, this assumption is not fully justified. It is not clear from the description in the Report if the burning activities occurred in the area defined as the landfill or whether burning activities occurred in other portions of the SWMU. If burning was not limited to the landfill area, additional characterization is required.*

   Secondly, burning material containing chlorine could result in the formation of dioxin/furan congeners. The approved Work Plan did not include a requirement for analysis of dioxin/furans. Because of the low-level organics detected, it is likely that dioxin/furans are present at this site. Additionally, the forest fire that affected this area likely contributed to low-level detections of dioxin/furans. The Permittees have not sampled for dioxins and furans at this site. Therefore, the Permittees must conduct additional sampling at SWMU 49-004 for dioxins and furans. The Permittees must propose additional sampling locations in the Phase II Investigation Work Plan.

LANL Response

5. According to the Resource Conservation and Recovery Act facility investigation (RFI) work plan for Operable Unit 1144, “The landfill in Area 6 (SWMU 49-004) was used from late 1959 to mid-1961 for open pit burning of combustible construction wastes and for burial of uncontaminated residues generated during hydronuclear and related activities in other areas of TA-49 (DOE 1987, 008663; Purtymun and Stoker 1987, 006688). During the 1971 cleanup of TA-49, the Area 6 landfill was reopened for disposal of uncontaminated materials, principally from Area 11 (LANL 1992, 007670).” The site was also reopened during the 1984 general cleanup of TA-49 when a trench measuring 30 ft × 100 ft × 15 ft was excavated at the site for the disposal of uncontaminated solid materials (LANL 1992, 007670, p. 6.3-7). Therefore, the burning occurred within the boundaries of the landfill However, additional sampling around the periphery of the landfill may be necessary to define lateral extent. LANL will propose a sampling strategy and will include dioxins and furans in the analytical suites for samples collected from Solid Waste Management Unit (SWMU) 49-004 in the Phase II investigation work plan.

   As a result of the additional sampling and analysis for dioxins and furans, the report as well as Appendix I have been revised to reflect the newly proposed Phase II activities at SWMU 49-004.

NMED Comment

6. *Risks were within acceptable target levels for all receptors with the exception of the construction worker scenario at SWMU 49-004 at Area 6 West. Manganese was the primary driver with cobalt and aluminum having smaller contributions to the overall hazard index. The concentrations of these metals are likely representative of Qbt4 background (*see *General Comment # 1). Upon completion of*

the background data set specific to Qbt 4, the concentrations of aluminum, cobalt, and manganese detected at SWMU 49-004 must be re-evaluated.

LANL Response

6. As stated above in the response to General Comment 1, the Qbt 4 background was not presented, discussed, or applied to data presented in the outside the NES boundary report. The vast majority of samples collected at SWMU 49-004 were soil samples; therefore, the Qbt 4 background is not applicable to the data and was not used to remove any detected inorganic chemicals from the risk-screening assessment in this report. The primary COPC driving the potential risk to the construction worker at SWMU 49-004 is manganese. Aluminum and cobalt are not as important contributors to the hazard index (HI) as manganese is. Manganese was detected above background only in soil. Despite the statistical tests indicating manganese may be different from soil background, the box plot illustrates that all the manganese concentrations (99.7 mg/kg to 1030 mg/kg) are within the range of background concentrations (76 mg/kg to 1100 mg/kg). The only difference between the two data sets is a slightly higher median within the box relative to the background median. The box plot also illustrates that the statistical tests do not accurately reflect a real difference between the site data and background data and that the two data sets are indistinguishable as far as exposure to a receptor. The retention of manganese as a COPC based on the results of the statistical comparisons is conservative but is not a reflection of actual differences. In addition, the construction worker soil screening level for manganese (463 mg/kg) is within the range of background concentrations. Because of this low value, even background concentrations result in a risk to the construction worker. In the case of SWMU 49-004, any remediation of manganese would not reduce the potential risk because the excavation of soil would remove background or background-like concentrations. Without manganese the construction worker HI is 0.7, which is below the NMED target HI of 1.0.

   The text in section 7.2.4 and in Appendix I has been revised to remove aluminum (cobalt was not mentioned) from the discussion of risk for SWMU 49-004 and to provide additional information on the detected manganese. Data from the planned Qbt 4 background study described in the response to General Comment 1 is not required for the risk-screening assessment at SWMU 49-004 or any other sites discussed in this report.

SPECIFIC COMMENTS

NMED Comment

1. Section 6.2.3.4, Nature and Extent of Soil and Rock Contamination at AOC 49-005(b), Inorganic Chemicals, page 24, paragraph 2

a) Permittees' Statement: *"Nitrate was detected at borehole location 49-610488 at a concentration of 1.7 mg/kg. The concentration of nitrate is likely naturally occurring. The lateral and vertical extent of nitrate are defined."*

NMED Comment: *The Permittees must provide additional information supporting the assertion that the concentrations of nitrate are naturally occurring at borehole location 49-610488.*

LANL Response

1. There are no LANL-wide background data for nitrate in soil or tuff. However, during a 1979 soil and vegetation study conducted at Sigma Mesa in TA-60, 30 soil samples were collected and submitted for analysis of nitrate (Ferenbaugh et al. 1990, 110440). Concentrations of nitrate detected in the samples ranged from 0.5 mg/kg to 26 mg/kg; the mean value was 8.1 mg/kg. Based on these data as well as the fact that nitrate is naturally occurring, the nitrate concentration of 1.7 mg/kg detected at borehole location 49-610488 is likely naturally occurring.

NMED Comment

2. Section 6.2.3.4, Nature and Extent of Soil and Rock Contamination at AOC 49-005(b), Inorganic Chemicals, page 25, paragraph 2:

Permittees' Statement: *"Perchlorate was detected at borehole location 49-610488 at a concentration of 0.0065 mg/kg. Concentrations of perchlorate remain essentially the same with depth, are low, and are not indicative of a site release. Therefore, the extent is defined for perchlorate."*

NMED Comment: *The Permittees must provide additional information supporting the assertion that the concentrations of perchlorate are not indicative of a site release at borehole location 49-610488.*

LANL Response

2. Perchlorate is naturally occurring, but there are no LANL-wide background data for perchlorate in soil or tuff. Perchlorate concentrations detected across the TA-49 outside the NES boundary sites range from 0.0012 mg/kg (J) to 0.00802 mg/kg. The text in section 6.2.3.4 has been revised to read, "Concentrations of perchlorate remain low and are essentially the same with depth. The distribution of these low concentrations resembles natural variability. Therefore, the extent is defined for perchlorate."

NMED Comment

3. Section 6.4.3.4, Nature and Extent of Soil Contamination, page 33, paragraph 3:

Permittees' Statement: *"The approved work plan (LANL 2008, 102215) incorrectly identified this as a data need for AOC 49-008(a). The data need is acknowledged; however, no subsurface investigations were prescribed in the work plan for AOC 49-008(a) nor are they warranted at this time for the site. Investigation of AOC 49-008(a) is deferred per Table IV of the Consent Order due to the presence of proximate firing sites."*

NMED Comment: *NMED acknowledges that area of contamination (AOC) 49-008(a) is deferred per the March 1, 2005 Order on Consent (Order); however, once operations cease at the adjacent firing sites, AOC 49-008(a) must be fully investigated.*

LANL Response

3. Comment noted.

NMED Comment

4. Section 7.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 45, paragraph 4:

Permittees' Statement: *"The vertical extent of copper at locations 49-608978 and 49-608998 are defined by deeper samples collected from nearby borehole location 49-609885."*

NMED Comment: *This paragraph discusses the detected concentrations of lead, not copper. The above sentence may have been intended to reference the lead concentrations at locations 49-608978 and 49-608998 rather than copper concentrations. The Permittees must revise the text to correct the error, or otherwise clarify this passage.*

LANL Response

4. The text in section 7.2.3.4 has been revised to read, "The vertical extent of lead at locations 49-608978 and 49-608998 is defined by deeper samples collected from nearby borehole location 49-609885."

NMED Comment

5. Section 7.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 46, paragraph 5:

Permittees' Statement: *"Thallium was detected above the BV at surface samples 49-608979 and 49-608998."*

NMED Comment: *Thallium is not identified on Plate 5 as being detected at location 49-608998. The Permittees must revise the text to resolve this discrepancy.*

LANL Response

5. The text in section 7.2.3.4 has been revised to read, "Thallium was detected above BV in surface samples at locations 49-608979 and 49-608966."

NMED Comment

6. Section 7.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 46, paragraph 6:

Permittees' Statement: *"Uranium was detected above BV at borehole locations 49-06213, 49-06214, 49-06217, 49-06218, and 49-06219 and 18 surface locations across the site. Samples collected in 2009-2010 were not analyzed for total uranium."*

NMED Comment: *The Permittees must revise the text to provide an explanation as to why the 2009-2010 samples were not analyzed for total uranium.*

LANL Response

6. Total uranium is a common analyte for many of the site characterization samples collected from SWMUs and areas of concern (AOCs) throughout LANL during the 1990s. The samples collected

from borehole locations 49-06213, 49-06214, 49-06217, 49-06218, and 49-06219 and 18 surface locations across SWMU 49-004 were collected during the 1995 RFI. Because of the presence of naturally occurring uranium in geologic formations throughout northern New Mexico and across LANL, isotopic uranium has replaced total uranium in the analytical suites for site characterization samples collected at many SWMUs and AOCs at LANL. Analysis of site characterization samples for isotopic uranium is more accurate than the analysis for total uranium, and isotopic uranium results more clearly indicate if detected uranium is natural or from historical LANL operations at the site. The text in sections 2.1.3 and 2.1.4 has been revised to include this information.

NMED Comment

7. Section 8.0, Area 10 Background and Field Investigation Results, page 49, paragraph 2:

Permittees' Statement: *"During the 2009-2010 investigation, a field assessment of the AOC 49-002 calibration chamber and elevator shaft was conducted to determine whether the area could be safely sampled. The results of the field assessment identified several large (18 to 24 in.) shafts open to variable depths, exposed 6-in. casing broken off at ground surface, and partially buried wire and cable located in an area overgrown with grass and brush. The area was determined unsafe and was roped off to prevent field crews from stepping into or falling over the open shafts. No sampling was conducted near the shafts."*

NMED Comment: *The Permittees must revise Plates 8, 9, 10, and 11 to identify the locations of the open shafts, exposed casing, and partially buried wire and cable discovered during the field assessment at AOC 49-002.*

LANL Response

7. The open shafts, exposed casing, and buried wire at AOC 49-002 have been surveyed, and Plates 8, 9, 10, and 11 have been revised to show the locations of the open shaft, exposed casing, and debris.

NMED Comment

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

Permittees' Statement: *"Antimony was detected above BV at location 49-07542 where only a surface sample was collected."*

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 AOC 49-002 that exceeded the maximum background concentration for antimony. 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, "Antimony was detected above the soil BV at location 49-07542 where only one surface sample was collected. Antimony was not detected above the soil BV at locations 49-609543 or 49-609545, located within 20 ft of location 49-07542 where soil

samples were collected from similar and deeper depths. The lateral and vertical extent of antimony are defined."

NMED Comment

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

Permittees' Statement: *"Cobalt was detected above BV in the deep sample at locations 49-609548 and 49-609560. The sample from location 49-609560 was a mixture of soil and tuff and the cobalt concentration is below the soil BV."*

NMED Comment: *Cobalt was also detected above the tuff BV at location 49-609988 at the 4-5-foot depth interval at a concentration of 4.9 mg/kg, and at location 49-609987 at two depths: 3-5-feet at a concentration of 6.4 mg/kg, and at 5-6.5-feet at a concentration of 3.2 mg/kg. NMED acknowledges that these detections are qualified as estimated (i.e., J-flag); however, that does not preclude them as detections. Furthermore, Section 8.3.3.4 states that the maximum concentration of barium detected at 49-005(a) was 165 mg/kg. This concentration is qualified as estimated (J+). To ensure consistency throughout the Report, the Permittees must revise the text, where appropriate, to include all detections above BV.*

LANL Response

9. Locations 49-609988 and 49-609987 are associated with SWMU 49-005(a) (Table 8.2-4). The discussion in section 8.2.3.4 addresses the nature and extent of contamination for inorganic chemicals detected above BVs at AOC 49-002. Plates 8, 9, 10, and 11 have been revised to clearly show sampling locations associated with AOC 49-002 and with SWMU 49-005(a). Section 8.3.3.4 discusses the nature and extent of inorganic chemicals detected above BVs, including a discussion of inorganic chemicals detected at locations 49-609988 and 49-609987 and the maximum detected concentration of barium (165 mg/kg) at SWMU 49-005(a). The inorganic chemicals detected above BVs at locations 49-609988 and 49-609987 and the maximum detected concentration of barium at SWMU 49-005(a) are shown on Plate 9 and are presented in Table 8.3-2. All concentrations of inorganic chemicals above BVs are included in the report, figures, tables, and plates. Therefore, no revisions to the investigation report are necessary.

NMED Comment

10. Section 8.2.3.4, Nature and Extent of Soil and Rock Contamination, Inorganic Chemicals, page 54, paragraph 2:

Permittees' Statement: *"Copper was detected above BV at locations 49-07536, 49-07548, 49-609544, and 49-609560."*

NMED Comment: *According to Plate 9, copper was not detected above BV at location 49-07536. The Permittees must revise the text to resolve this discrepancy.*

LANL Response

10. The text in section 8.2.3.4 has been revised to read: "Copper was detected above BVs at locations 49-07539, 49-07548, 49-609544, and 49-609560."

NMED Comment

11. Section 8.3.3.4, Nature and Extent of Soil and Rock Contamination, page 58, paragraph 2:

Permittees' Statement: *"Arsenic was detected above BV at four boreholes locations. Concentrations decreased with depth at three borehole locations and increased with depth at borehole location 49-07527. The concentration of arsenic at depth was of 3.1 mg/kg, which is below the maximum tuff background concentration (5 mg/kg)."*

NMED Comment: *It is unclear which sampling location the Permittees are referencing in the second sentence. The Permittees must revise the text to indicate that arsenic was detected at location 49-07527 at a concentration of 3.4 mg/kg and at location 49-609986 at a concentration of 3.1 mg/kg.*

LANL Response

11. The text in section 8.3.3.4 has been revised to read, "Arsenic was detected above BV at four borehole locations. Concentrations were 3.1, 3.2, and 2.9 mg/kg at locations 49-609986, 49-609987, and 49-609988, respectively. The concentrations decreased with depth at these three borehole locations. Arsenic concentrations increased with depth at borehole location 49-07527. The concentration of arsenic at depth at location 49-07527 (7.3–10.0 ft) was 3.4 mg/kg, which is below the maximum tuff background concentration (5 mg/kg)."

NMED Comment

12. Section 8.3.3.4, Nature and Extent of Soil and Rock Contamination, page 59, paragraph 3:

Permittees' Statement: *"Copper was detected above BV at five borehole locations, with a maximum concentration of 8.2 mg/kg."*

NMED Comment: *According to Plate 9, the maximum concentration of copper is 8.5 mg/kg. The Permittees must revise the text to indicate that the maximum concentration of copper at SWMU 49-005(a) was detected at location 49-609988 at a concentration of 8.5 mg/kg.*

LANL Response

12. The text in section 8.3.3.4 has been revised to read, "Copper was detected above BV at five borehole locations, with a maximum detected concentration of 8.5 mg/kg at borehole location 49-609988."

NMED Comment

13. Section 9.1.2, Nature and Extent of Contamination, Area 6 West, page 62, paragraph 1:

Permittees' Statement: *"The nature and extent of contamination in solid media at SWMU 49-004 are defined by existing data."*

NMED Comment: *See General Comment # 5.*

LANL Response

13. See response to General Comment 5.

NMED Comment

14. Section 10.1, Recommendations, Additional Field Characterization Activities, page 64:

NMED is aware that the Permittees did not propose to investigate the extent of contamination at the bottom of the 64-foot shafts associated with the Calibration Chamber Facility (AOC 49-002), and that NMED did not require such investigation in the Approval with Modifications of February 14, 2008. Nevertheless, the Permittees must propose to drill at least two boreholes, each within 10-feet, if possible, of the calibration shaft and the elevator shaft as part of the additional investigation activities proposed for AOC 49-002 (i.e., vertical extent of zinc contamination). The proposed sampling and borehole locations must be presented in the Phase II Investigation Work Plan.

LANL Response

14. LANL will propose drilling two boreholes, each within 10 ft of the calibration shaft and the elevator shaft, if possible, as part of the Phase II investigation activities proposed for AOC 49-002. The proposed sampling and borehole locations will be presented in the Phase II investigation work plan.

NMED Comment

15. Section 10.2, Recommendations for Corrective Action – Complete, page 65:

NMED concurs that the nature and extent of contamination is defined at AOCs 49-005(b) and 49-006 in Area 5. To facilitate the review process and for administrative completeness, the Permittees must submit their request for Certificates of Completion under separate cover.

Additionally, NMED does not agree that the nature and extent of contamination are defined at SWMU 49-004 in Area 6 West. See General Comment # 5.

LANL Response

15. Comment noted. See response to General Comment 5.

NMED Comment

16. Section 11.0, Schedule for Recommended Activities, page 65:

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

LANL Response

16. Comment noted.

NMED Comment

17. Table 1.1-1, Status of SWMUs and AOCs Located Outside the NES Boundary at TA-49, page 79:

In the "Site ID" column of the Table, the Permittees identify site 49-008(b) in Area 6 East as a SWMU and site 49-005(a) in Area 10 as an AOC. However, the approved Work Plan identifies site

49-008(b) as an AOC and site 49-005(a) as a SWMU. The Permittees must revise Table 1.1-1 to resolve this discrepancy.

LANL Response

17. Table 1.1-1 has been revised accordingly.

NMED Comment

18. The Permittees must revise Plate 2 to include the boundary of AOC 49-008(a).

LANL Response

18. Plate 2 has been revised to include the boundary of AOC 49-008(a).

REFERENCES

Ferenbaugh, R.W., E.S. Gladney, and G.H. Brooks, Jr., October 1990. "Sigma Mesa: Background Elemental Concentrations in Soil and Vegetation, 1979," Los Alamos National Laboratory report LA-11941-MS, Los Alamos, New Mexico. (Ferenbaugh et al. 1990, 110440)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1144," Los Alamos National Laboratory document LA-UR-92-900, Los Alamos, New Mexico. (LANL 1992, 007670)

LANL (Los Alamos National Laboratory), January 2008. "Investigation Work Plan for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary, Revision 1," Los Alamos National Laboratory document LA-UR-08-0449, Los Alamos, New Mexico. (LANL 2008, 102215)

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)