

**Response to the "Notice of Disapproval for the Investigation Work Plan for Sites at
Technical Area 49 Outside the Nuclear Environmental Site Boundary,
Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-07-032,"
Dated December 20, 2007**

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. *Table 4.4-1, Summary of Proposed Boreholes and Sampling, requires revision. The Permittees must provide the subsurface sampling strategy for all SWMUs and AOCs in a table identical to the format of Tables 4.1-1 through 4.5-1 of the Investigation Work Plan for S-Site Aggregate Area (September 2007).*

LANL Response

1. Table 4.4-1 has been reformatted to match the formatting of Tables 4.1-1 through 4.5-1 of the "S-Site Aggregate Area Investigation Work Plan." However, the content of Table 4.4-1 remains relatively unchanged.

SPECIFIC COMMENTS

NMED Comment

1. *Section 1.0, Introduction, page 1:*

Area of Concern(AOC) 49-005(b) is not included in Table IV-1, Non-Deferred Sites Within Testing Hazard Zones (Table IV-1) of the March 1, 2005 Order on Consent (Order). The Permittees must revise the Plan to correct this error.

LANL Response

1. The text in section 1.0 has been revised to read, "This work plan includes one nondeferred site (SWMU 49-006) listed on Table IV-1 of the Consent Order and one site [AOC 49-005(b)] not listed on the deferred list. Both of these sites are located within the boundaries of AOC 49-008(a)."

NMED Comment

2. *Section 1.0, Introduction, page 1; Section 4.3, Surface Investigation, page 20; Section 4.3.3, SWMU 49-004, page 23; Table 1.1-1, List of TA-49 SWMUs and AOCs Outside the NES Boundary, page 83:*

NMED agrees that AOC 49-005(b) and solid waste management unit (SWMU) 49-006 are within the boundaries of AOC 49-008(a). However, AOC 49-005(b) is not listed on Table IV-1 or Table IV-2, Deferred Sites Within Testing Hazard Zones (Table IV-2). SWMU 49-006 is listed on Table IV-1. Therefore, surface and subsurface sampling must be completed at AOC 49-005(b) and SWMU 49-006. The Permittees must revise the Plan to include proposed surface and subsurface investigation activities at these sites.

LANL Response

2. Area of Concern (AOC) 49-005(b) and Solid Waste Management Unit (SWMU) 49-006 do not have surface components. Therefore, LANL did not propose surface sampling. The text in section 1.0 has been revised to provide further clarification. The text now reads, "SWMU 49-006 and AOC 49-005(b) are both subsurface sites with no surface component. Therefore, this work plan only proposes subsurface sampling for these sites."

NMED Comment

3. *Section 4.1, Investigation Objectives, page 19, bullet 2:*

The Permittees state in Section 2.4.1.1, Site Description that "[t]he possibility that the trenches were utilized by the Laboratory for material disposal or other purposes cannot be categorically excluded." Therefore, in addition to defining vertical and lateral extent of inorganic contamination at the Areas identified above, the Permittees must define vertical and lateral extent of contamination at all four trenches located west of SWMU 49-004 and include this as an objective in the revised Plan. The Permittees must revise the Plan to propose the additional investigation.

LANL Response

3. LANL has revised the text of the work plan to incorporate the collection of soil samples from shallow boreholes or test pits. Field screening of the soil will be conducted if nonnative material is encountered during drilling or excavation.

NMED Comment

4. *Section 4.3.1, Area 5: Transformer Pads, page 20:*

The eight surface sample locations are not depicted on any of the Area 5 figures in the Plan. The Permittees must provide a figure which identifies all proposed surface sampling locations for the Area 5 transformer pads.

LANL Response

4. The eight sampling locations for the Area 5 transformer pads were added to Figure 4.4-1.

NMED Comment

5. Section 4.3.2, Area 6 West, SWMU 49-004 and Area 10: AOC 49-002 and SWMU 49-005(a), pages 21-22:

The description of the three categories of surface sampling locations proposed within each sampling array is confusing. For example, it is unclear; how many samples will be obtained, the rationale for selection of samples for off-site laboratory analysis and, the rationale for analytical suites. The Permittees must remove this language from the Plan and provide the surface sampling strategy in a table identical to the format of Tables 4.1-1 through 4.5-1 of the Investigation Work Plan for S-Site Aggregate Area (September 2007).

Additionally, Table 1.1-1, List of TA-49 SWMUs and AOCs Outside the NES Boundary, indicates that no surface sampling is proposed at SWMU 49-004. However, Section 4.3.3, states "Figure 4.3-1 illustrates the surface-sampling grid pattern to be used for SWMU 49-004." The Permittees must clarify whether surface sampling is proposed for SWMU 49-004 or otherwise resolve the discrepancy.

LANL Response

5. LANL has provided additional text, included a table in the requested format, and added a flow chart to clarify the iterative sampling strategy discussed in section 4.3.2.

Table 1.1-1 was revised to reflect the surface sampling proposed at SWMU 49-004. Figure 4.3-1 is correct and remains unchanged.

NMED Comment

6. Section 4.4.2, Subsurface Investigations, SWMU 49-004, page 24:

The Permittees must revise the Plan, where appropriate, to include proposed subsurface sampling at all four trenches located west of SWMU 49-004. Also see specific comment # 3.

LANL Response

6. Please refer to the response to Specific Comment 3. The text has been revised to incorporate subsurface sampling at the four trenches.

NMED Comment

7. Section 4.4.6, Analysis Plan, page 26, paragraph 1:

The Permittees state in the third paragraph of Section 4.4.6 that "[a]ll subsurface core samples will be submitted to an analytical laboratory for analyses of HE compounds, perchlorate, nitrate, cyanide, and TAL metals. If indicated by field-screening, samples will also be analyzed for isotopic americium, isotopic plutonium, isotopic uranium, tritium, VOCs, and SVOCs." NMED understands this statement to mean that core samples will be selected based on the criteria above and those core samples will be submitted to an off-site analytical laboratory for the list of analyses given above. The Permittees must clarify whether it is their intention to send either a subset or all subsurface core samples to an off-site analytical laboratory for analysis.

The Permittees have not proposed vapor-phase sampling in this Plan. The Permittees must propose pore-gas sampling similar to the vapor-sampling proposed in the Investigation Work Plan for sites at TA-49 inside the NES Boundary, or provide justification for omitting pore-gas sampling from the Plan.

LANL Response

7. The text in section 4.4.6 has been clarified to indicate that samples will be submitted for laboratory analysis based on the criteria detailed in the plan; therefore, only a subset of samples will be submitted for laboratory analysis.

Vapor-phase sampling will be conducted in shallow, angled boreholes beneath the Area 5 landfill [AOC 49-005(b)] and Area 10 landfill [SWMU 49-005(a)] and within one 65-ft angled borehole beneath the Area 6 West landfill (SWMU 49-004), following the completion of borehole installation and core sampling and screening activities. Pore-gas samples collected from these boreholes will be submitted for laboratory analyses of volatile organic compounds (VOCs) and tritium. If VOCs are detected in vapor-phase samples at concentrations greater than 10% of screening levels based on equilibrium partitioning with groundwater cleanup levels (maximum contaminant levels [MCLs]), or if tritium is detected in vapor-phase samples at concentrations greater than the groundwater MCL, each borehole will be completed as a vapor-monitoring well.

Because there are no screening levels for VOCs in pore gas that address the potential for groundwater contamination, screening levels are based on U.S. Environmental Protection Agency groundwater MCLs or New Mexico Water Quality Control Commission groundwater standards and Henry's law constants that describe the equilibrium relationship between vapor and water concentrations.

The following equation can be used to evaluate whether vapor-phase concentrations exceed 10% of a VOCs equilibrium partitioning screening level:

$$C_{air} \geq (10\%)(1000 \times H' \times MCL)$$

where C_{air} is the concentration of VOC in the vapor-phase sample ($\mu\text{g}/\text{m}^3$), H' is the dimensionless Henry's law constant, and 1000 is a conversion factor from L to m^3 . This screening approach is conservative because the distance from the deepest vapor-phase samples to groundwater is greater than 600 ft

Sections 4.4, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6, 5.3.4, and Table 4.4-1 of this work plan have been amended to reflect the addition of pore-gas sampling activities. In addition, section 5.4.2 has been added to this work plan to reflect VOC field-screening activities that will be conducted on core samples collected during borehole installation. VOC headspace vapor screening is necessary for determining which core samples will be submitted for laboratory analysis of VOCs and semivolatile organic compounds, as well as for determining the pore-gas sampling intervals in select boreholes.

NMED Comment

8. *Section 5.4, Field-Screening Method, page 31:*

According to Sections 2.3 through 2.6 of the Plan, previous sampling results indicate that inorganics, radionuclides and, in some cases, organics are present at TA-49. Pursuant to Section IX.B.2.d, the Permittees must use X-ray fluorescence (XRF) to field-screen for inorganics and headspace vapor-screening for VOCs in addition to radiological screening.

Section 5.2.3 states "[i]f field screening indicates the presence of VOCs, samples will be collected and submitted for laboratory analysis. Vapor-monitoring wells will be installed if vapor-phase contamination is confirmed by field screening results." The Permittees must explain how they will verify the presence of vapor-phase contamination, particularly in light of their intention not to conduct field screening or pore-gas sampling. Alternatively, the Permittees must conduct headspace vapor-screening for VOCs.

LANL Response

8. LANL has added field-screening methodologies for vapor-screening for VOCs to sections 5.3.4 and 5.4.

Radionuclides are the primary contaminants of concern at Technical Area (TA) 49 based on past operations and confirmed by the results of Resource Conservation and Recovery Act facility investigation activities. Inorganic chemicals that are present due to historic operational activities would potentially occur with radionuclides because they were used concurrently during historical operations (i.e., experimental activities). Furthermore, concentrations of lead and other metals detected above background values (BVs) have been limited to central portions of each investigation area. Therefore, gross alpha and gross beta screening techniques will be used to target low-level radionuclide activity (see sections 4.3.1.1, 4.3.1.2, and 5.1.3). LANL has evaluated and eliminated x-ray fluorescence (XRF) as an field-screening method at TA-49. XRF was eliminated because TA-49 lacks widespread, low-level inorganic contamination and because XRF screening data at LANL has historically indicated significant false positives (with respect to detecting the presence of inorganics above their respective BVs).

The iterative approach will evaluate the extent of contamination using gross alpha and gross beta field screening, and subsequent laboratory results will identify the presence of radionuclides as well as any coexisting inorganic contaminants.

NMED Comment

9. *Figure 2.4-5, Figure 2.4-7, and Figure 2.4-8, pages 51, 53, and 54:*

The Permittees must revise Figures 2.4-5, 2.4-7, and 2.4-8 to clearly identify the boundary of AOC 49-008(b).

LANL Response

9. Figures 2.4-5, 2.4-7, and 2.4-8 have been revised to show an approximate boundary based on historical use as an added point of reference for AOC 49-008(b).