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**ENTERED**



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**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

March 29, 2011

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**RE: APPROVAL WITH MODIFCIATIONS  
INVESTIGATION WORK PLAN  
STARMER/UPPER PAJARITO CANYON AGGREGATE AREA  
LOS ALAMOS NATIONAL LABORATORY  
EPA ID #NM0890010515  
HWB-LANL-10-077**

Dear Messrs. Rael and Graham:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) and the Los Alamos National Security L.L.C.'s (LANS) (collectively, the Permittees) revision 1, *Investigation Work Plan for Starmer/Upper Pajarito Canyon Aggregate Area* (Work Plan) and associated response to comments, dated March 2011 and referenced by EP2011-0066. NMED has reviewed the Work Plan and hereby issues this Approval with the following modifications.

34431



The Modifications to the Plan are as follows:

**1. Comment/Response 1: PCBs:**

Specifically target sampling locations where contamination is most likely to be present, such as discharge points in drainages and areas of sediment accumulation for PCB analysis. The PCB analysis must be planned for a minimum of 20 percent of the samples locations. PCB analysis is mandatory for the following sample locations.

- a. Table 4.10-1 (Proposed Sampling at SWMU 08-009(d): Proposed sample location 9d-4.
- b. Table 5.10-8 (Proposed Sampling at SWMU 09-004(h): Proposed sample location 4h-14.
- c. Table 5.10-14 (Proposed Sampling at SWMU 09-004(n): Proposed sample location 4n-20 and 4n-22.
- d. Table 6.3-7 (Proposed Sampling at SWMU 22-016): Proposed tank inlet and outlet sample locations (to be assigned a label).
- e. Table 7.1-1 (Proposed Sampling at SWMU 40-001(c): Proposed sample locations 1c-15, 1c-12, and 1c-9.
- f. Table 5.10-11(Proposed Sampling at SWMU 09-004(k) and Plate 4: Ensure the sump inlet and outlet samples at SWMU 09-004(k) (identified as 4k-3 and 4k-6 in Table 5.10-11) are analyzed for PCBs, regardless of what is identified in Table 5.10-11 and Plate 4. NMED notes that the sump inlet and outlet sample locations shown in Plate 4 are shown as 4k-4 and 4k-7. See Comment 16.

**2. General Comment/Responses 4, 28, and 61, dioxins and furans:**

The Permittees state that “[t]hese World War II-era buildings were simple wooden structures. There is no reason to suspect these wood-framed structures contained any chlorine source that would, in turn, contribute to the formation of dioxins and furans when they were burned. In other Laboratory investigation work plans approved by NMED for aggregate areas where similar structures were destroyed by burning (e.g., LANL 2006, 091698; LANL 2007, 097687; LANL 2007, 102622); analysis for dioxins and furans was not required. Structures burned as part of the decontamination and decommissioning (D&D) efforts are not a potential source of these contaminants discernible different from forest fires or other background sources. No revision to the work plan is necessary.”

The burning of wood is a significant source of dioxin-like compounds (i.e., dioxins, furans, and polychlorinated biphenyls) in the United States. According to the United States Environmental Protection Agency's (USEPA) 2006 document, *An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States for the Years 1987, 1995, and 2000*, the combustion of wood in industrial facilities was ranked the seventh highest major source of dioxin-like compounds in the year 2000. Releases of dioxin-like compounds from residential wood combustion were also measured in several studies on the burning of various types of wood in residential fireplaces.

Another published study (1984) conducted by Pettersen, *The Chemical Composition of Wood*, found that chlorine is present at various concentrations in different species of wood, thus potentially facilitating the chlorination that can lead to the formation of dioxins and furans during wood combustion processes.

Although several LANL investigation work plans (IWPs) were approved by NMED for aggregate areas where wooden structures were destroyed by burning, and analyses for dioxins and furans were not required, the lack of data on the concentrations of dioxins and furans constitutes a data gap in site characterization and risk assessments. Work plan modifications are required to include the analysis of dioxins and furans at sites where the burning of wooden structures, plastics, and other building materials and the combustion of waste in general.

At any area of concern, solid waste management unit, or consolidated unit (AOC, SWMU, or CU) where burning was conducted, soil samples must be collected and analyzed for dioxin/furans. Due to the relative low mobility of these compounds in soil, NMED will accept sampling proposals for individual AOCs, SWMUs and CUs which target the upper sample interval(s) at locations proposed for sample collection at multiple depths. In proposing sample locations for these analytes, consider past and current site drainage patterns and target the drainages. Sample locations for these analytes must target areas most likely to have served as drainage pathways and areas of sediment accumulation.

This modification applies to Technical Area 9 SWMU 09-003(g) and SWMU 09-013 MDA M, Technical Area 40, SWMU 40-010, and as otherwise directed in this Approval with Modifications. In reference to SWMU 40-010, NMED is not assessing the impacts of the Cerro Grande fire but potential releases at the SWMU (dioxins and furans may have been released at this SWMU resulting from the Cerro Grande fire since the removal of debris and drums occurred after the site burned in the post-Cerro Grande Fire; see also Comment 24).

### **3. Drains, sinks, sumps (ancillary equipment) within buildings connected to drainlines:**

Many of the AOCs and SWMUs addressed in the Work Plan consist of drainlines that lead from buildings that connect to an outfall. In the Notice of Disapproval, NMED directed the Permittees to discuss, and in some instances propose, sampling locations at

floor drains, troughs, and sumps within buildings that connect to the drainlines. The Permittees frequently claim that the building(s) is not part of the AOC or SWMU and therefore, the drains/troughs/sumps within the buildings do not need to be investigated.

Floor drains, troughs, and sumps are considered to be ancillary to the drainlines which conveyed waste(s) from within building(s) to the disposal point (e.g., outfall). They are therefore sources of contamination to the subject unit, and must be sampled. If the Permittees cannot access these ancillary features within associated buildings or structures, sampling must be conducted when the buildings are demolished. If this is the case, state so in the Investigation Report.

**4. Comment/Response 9: (Section 4.2 (AOC 08-001(b), Off-Gas System):**

The Permittees have responded to the comment by stating that “[a]s with AOC 08-001(a), AOC 08-001(b) is the off-gas system that served building 08-2, not building 08-2 itself...No revision is necessary.”

Since building 08-2 was a machine shop, it is an AOC. Either address building 08-2 as part of this investigation or when it is demolished. If the latter, state so in the Investigation Report. See also Comment 3.

**5. Comment/Response 15: (Section 4.6 (SWMU 08-004(d), Drains):**

NMED directed the Permittees to discuss how they will determine if contaminants infiltrated below the concrete. The Permittees responded that “SWMU 08-004(d) consists of the drains only and does not include the loading dock (LANL 1990, 007511). The loading dock was discussed in the site description because it was the source of the contamination that was released to the drainlines (via decontamination activities). Because radioactive contamination is known to have penetrated the concrete, the affected concrete was sealed to prevent further release of contamination. When the concrete slab is removed, the DOE will determine whether radioactive contaminants are present below the slab and whether any additional characterization or cleanup is necessary. No revisions to the text were necessary.”

Figure 4.6-1 (Site Features of SWMU 08-004(d)) shows the location of former structure 08-24 and floor drains, that must be sampled from 0-1 and 2-3 feet below the base of any imported fill material. The samples must be analyzed for strontium-90 to assess whether contamination has migrated to the subsurface, including other portions of the concrete slab (Loading dock and building). Address the former building and loading dock in the Investigation Report (See also Comment 3).

**6. Comment/Response 18: Section 4.8 (SWMU 08-006(a), MDA Q):**

NMED directed the Permittees to dig three trenches within MDA Q to assess the waste and collect samples to determine the vertical and horizontal extent of contamination. The Permittees

responded that “[t]he objective of the investigation is to characterize the nature and extent of any releases from the site, not to characterize the contents of the MDA or to remove the waste, unless the results of the proposed sampling indicate the need for waste removal.”

Without adequate sampling, the Permittees cannot ascertain whether or not waste needs to be removed. If waste is left in place it must be demonstrated that contamination is not migrating from beneath the unit and that the landfill cover currently in place is adequate to prevent any migration of contamination in the future. Because the sampling as proposed is not adequate to make such a determination, two additional samples must be collected on the east and west sides, and four samples on the north and south sides of MDA Q must be collected. Two samples equally spaced from each side must also be collected from beneath MDA Q to determine if any releases have occurred. Alternatively, a second phase of work to further characterize this SWMU may be proposed in the Investigation Report. NMED will determine whether a corrective measures evaluation is necessary for MDA Q upon review of the characterization date.

**7. Section Comment/Response 19: Section 4.9 (AOC 08-009(c), Drainline and Outfall), Figure 4.9-3 (Proposed sampling locations for AOC 08-009(c)), and Table 4.9-3 (Proposed Sampling at AOC 08-009(c)):**

The proposed sample locations found in Figure 4.9-3 do not correspond with the described locations found in Table 4.9-3. For example, Table 4.9-3 sample locations 9c-1 through 9c-4 are described as outfall samples; however, in Figure 4.9-3 these locations are drainline samples. Ensure all of the samples are collected and analyzed for the correct constituents during the investigation, and accurately presented in the Investigation Report.

**8. Comment/Response 23: Section 4.12 (AOC 09-009(f), Outfall and Figure 4.12-2 (Proposed sampling locations for AOC08-009(f)):**

Figure 4.12-2 depicts a storm drain southeast of proposed sample location 9f-1. Pending the analytical results of proposed sample locations 9f-3, 9f-4, and 9f-5, the Permittees may be required to sample around the storm drain. No revision is necessary.

**9. Comment/Response 30: Section 5.8 SWMU 09-003(h), Former Sump and Pipes) and 5.8.3 (Scope of Activities for SWMU 09-003(h)):**

The Permittees state in the Work Plan that “[e]ngineering drawings show the “sump” in building 09-3 consisted of a single catch basin that functioned as an HE settling tank...The catch basin received wastewater from drain troughs in both sections of the building...Building 09-3 was decommissioned in 1959 and removed in 1965, including the catch basin and drain troughs.” In the response letter, the Permittees state that “[t]he response to Comment 29 addresses adding the troughs to the Figure 5.8-2 and states that no discharge piping from the catch basin existed. Sampling of the troughs is not proposed because the troughs were not part of the SWMU 09-003(h). SWMU 09-003(h) is the former catch basin and its associated piping. No additional sampling locations are necessary.”

NMED agrees with the Permittees that the drain troughs are ancillary to the catch basin sump, and discharged wastewater to the catch basin. Sampling along the former drain trough locations is therefore required. Collect a minimum of one sample for every 20 feet of trough from depths of 0-1 and 2-3 feet bgs from native soils or at the soil/tuff interface, whichever is encountered first. See also Comment 3.

**10. Comment/Response 34: (Section 5.10 (Consolidated Unit 09-004(a)-99):**

The Permittees have responded to the comment by indicating “[t]he SWMUs included in Consolidated Unit 09-004(a)-99 include only the sumps, which are located outside the buildings; the buildings and the drains within the buildings are not part of the SWMUs. Further, all but two of the buildings are currently in place, and some are still active facilities. The proposed sampling is sufficient to characterize the sumps, the drainlines from the buildings to the sumps, the drainlines from the sumps to the industrial waste line, and the industrial waste line itself. No revision to the work plan is necessary.”

The floor drains within the building are ancillary to the sumps and therefore must be investigated as directed in the NOD. See also Comment 3.

**11. Comment/Response 43: (Section 5.11.3 (Scope of Activities for SWMU 09-004(g));**

The Permittees have responded to the comment by indicating “[b]uilding 09-50 is an active facility and is not part of SWMU 09-004(g), which is the sump. Samples will not be collected from the floor drain inside the building.”

The floor drains within the building are ancillary to the sumps and therefore must be investigated as directed in the NOD. See also Comment 3.

**12. Comment/Response 44: (Section 5.12.3 Scope of Activities for SWMU 09-004(o));**

The Permittees have responded to the comment by indicating “[n]o sampling will be performed at floor drains inside building 09-48, which is an active facility and is not part of SWMU 09-004(o).”

The floor drains within the building are ancillary to the sump and therefore must be investigated as directed in the NOD. See also Comment 3.

**13. Comment/Response 54: (Section 5.16.3 (Scope of Activities for SWMU 09-009) and Table 5-16-1 (Proposed Sampling at SWMU 09-009):**

Even though NMED previously directed that only the drainlines to be sampled for PCBs, PCBs are most likely to accumulate at the surface impoundment, the sand filters, the outfalls, and downgradient of the outfalls. Analyze four samples at depth of 0-1 ft bgs at the loctions (one sample from the surface impoundments, the sandfilter, the outfall, and downgradient of the

outfall) for PCBs. If PCBs are detected in any of these samples, then the drainline samples must be analyzed for PCBs.

**14. Comment /Response 58: Section 5.21 (AOC 09-012, Disposal Pit[s]):**

The Permittees have responded that “[t]he pit depths are unknown and it is unknown if these units were excavated or simply used for surface disposal of liquids that infiltrated into the soil. The proposed samples are expected to be deep enough to extend beyond the depth of the pits, whether or not they were excavated. The depths of the pits will not be specifically investigated, but standard observations (sampled media, presence of artifacts or waste material, staining, etc.) recorded while collecting the proposed samples may indicate the depths of the pits.”

In the Investigation Report, specify whether samples are collected from fill or native materials and include the depths. Include a detailed description of the surface and subsurface samples and the materials observed at each pit location.

**15. Section 7.4.3 (Scope of Activities for SWU 40-004), page 86:**

In the Work Plan the Permittees state “[b]ecause the 1990 SWMU report (LANL 1990, 007513) stated that all contaminated soil had been removed, no sampling beneath the building is necessary. The proposed samples will determine if any residual contamination is present along the south side of building 40-9.”

The Permittees did not provide any analytical data that indicates all contamination was removed beneath the southwest wing of building 40-9. Therefore, it is not clear if sampling was conducted correctly, if all contaminated materials were removed, or whether contaminant concentrations were less than NMED’s residential soil screening levels. Upon demolition of building 40-9, confirmation samples must be collected from beneath the southwest wing of the building to confirm that all contaminants have been removed. Discuss sampling beneath the southwest wing of building 40-09 upon demolition in the Investigation Report.

**16. Table 5.10-11(Proposed Sampling at SWMU 09-004(k) and Plate 4:**

The sump inlet and outlet samples in Table 5.10-11 identified as 4k-3 and 4k-6 must be analyzed for PCBs. The sump inlet and outlet sample locations in Plate 4 for SWMU 09-004(k) appear to be 4k-4 and 4k-7. The sample designations must also be clarified in the Investigation Report.

**17. Comment/Response 63: (Section 5.23 (AOC 09-014, Firing Site), Section 5.23.3 (Scope of Activities for AOC 09-014, and Figures 5.23-2 (Propose sampling locations for 09-014):**

Collect an additional sample in the apparent drainage north of proposed sample location 14-3 shown in figure 5.23-2. Samples must be collected from 0-1 and 2-3 feet and analyzed for all constituents listed in Table 5.23-1 (Proposed Sampling at AOC 09-014) including PCBs.

**18. Comment/Response 66: (Section 5.24.3 (Scope of Activities for SWMU C-09-001):**

Collect an additional sample between proposed sample locations 1-3 and 1-4 shown in Figure 5.24-3. Samples must be collected from 2-3 and 5-6 feet below ground surface (see footnote in Table 5.24-3) and analyzed for all constituents listed in Table 5.24-3 (Proposed Sampling at SWMU C-09-001).

**19. Comment/Response 67: Section 5.24 (SWMU C-09-001, Area of Soil Contamination):**

The Permittees state in the Work Plan that “SWMU C-09-001 (Figure 5.24-1) is a former area of soil contamination located at TA-09 near the southeast corner of building 09-31 (a chemical storage building). The types of chemicals formerly stored in the building are not documented and are unknown. The contaminated area consisted of a 2 ft wide × 3 ft long region of stained soil beneath the drainpipe at the southeast corner of the building. Before being plugged (at an unknown date), the drainpipe, discharged effluent from spill containment trays within the building.”

The Investigation Report must include a figure that identifies the drainpipe, the outfall, and the area downstream of the outfall where contaminants may have migrated.

**20. Comment/Response 68: (Section 6.1 (SWMU 22-011 Disposal Pit):**

The Permittees maintain that SWMU 22-011 disposal pit is the same disposal pit as MDA F [SWMU 06-007(a)]. For purposes of verification, Laboratory documents indicate that SWMU may be a duplicate of MDA F and that buried waste is not present. Install one soil boring or excavate a test pit to a depth of 10 feet or until undisturbed tuff is encountered in the center of SWMU 22-011 as depicted in Figure 1-3 of the RFI Work Plan for Operable Unit 1111 Environmental Restoration Program, (OU-111) dated August 1993, referenced by LA-UR-93-2611. Samples do not need to be collected for chemical analysis, but boring or pit contents must be examined to ascertain the presence of waste. A description of the observations and boring or test pit log must be included in the Investigation Report.

**21. Comment/Response 69: Section (Section 6.2 (SWMU 22-015(c), Drainline and Outfall):**

The Permittees responded that “[t]he floor drains inside building 22-52 are not part of SWMU 22 015(c), and therefore will not be sampled as part of this investigation. Sampling is proposed along the drainline from where it exits the building to the outfall and from the outfall down the drainage to the toe of the slope in Pajarito Canyon. No revision to the work plan is necessary.”

The floor drains within the building are part of the drain system and therefore must be investigated as directed in the NOD. See also Comment 3.

**22. Comment/Response 75: (Section 6.3.4 (SWMU 22-015(e), Sump):**

The Permittees state in the Work Plan that “SWMU 22-015(e) is an HE sump that was located at TA-22 on the exterior south wall of building 22-1 (Plate 11)...The sump was installed in 1950 to receive discharge from a sink and floor troughs located within building 22-1, as well as wastewater from an equipment wash area (SWMU 22-012) located directly south of the sump. The sump discharged to an outfall that daylighted approximately 210 ft south of the building” and that “[s]ampling of the floor troughs was not proposed because the floor troughs are not part of SWMU 22-015(e). No revision to the work plan is necessary.”

The floor troughs are ancillary to the sump and conveyed the same waste that was received by the sump and therefore must be investigated as directed in the NOD. See also Comment 3.

**23. Comment/Response 87: (Section 7.3.3 (Scope of Activities for AOC 40-003(b):**

The Permittees have responded that “[s]ampling is not proposed in the drainage because the burn pit had no surface releases that could affect the drainage.”

NMED does not require additional sample locations in the drainage at this time; however, emissions related to the burn events could have resulted in deposition in the drainage. Because the treatment activities consisted of burning waste, all samples must be analyzed for dioxins and furans. The Investigation Report must include documentation of this sampling.

**24. Comment/Response 98: Section 7.13.3 (Scope of Activities for SWMU 40-010):**

The Permittees states in the Work Plan that “Post-Cerro Grande fire activities removed all the drums and exposed debris, with the exception of the pre-Manhattan Project debris, which is considered to be of archaeological importance” and in the response letter states “[a]nalyzing the potential consequences of an event such as the 2000 Cerro Grande fire is beyond the scope of activities for this work plan and of the Consent Order. No revision to the text is necessary.”

Analysis of dioxins and furans at this SWMU was not directed toward an assessment of potential consequences of the Cerro Grande Fire, except to investigate SWMU 40-010 for potential releases of contaminants to media that may have resulted from waste that was burned during the fire. Proposed sample locations 10-4, 10-5, and 10-10 must therefore be analyzed for dioxins and furans.

Messrs. Rael and Graham

March 29, 2011

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All other elements of the Work Plan are approved. Modifications presented in this letter must be executed as provide in Section III.M.2 of the Consent Order. The Starmer/Upper Pajarito Canyon Aggregate Area Investigation Report is due no later than **December 31, 2012**.

Please contact Hope Petrie at (505) 476-6045 if you have any questions.

Sincerely,



James P. Bearzi  
Chief  
Hazardous Waste Bureau

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J. McCann, LANS, EP-CAP, MS M992  
E. Worth, DOE-LASO, MS A316

File: 2011 LANL, Investigation Work Plan for Upper Water Canyon Aggregate Area (dated August 2010)

References: 1) EPA, *An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States for the Years 1987, 1995, and 2000*  
<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=159286> (EPA/600/P-03/002F, November 2006).

2) Pettersen, Roger, C. *The Chemical Composition of Wood*, U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, Madison, WI 53705, 1984.