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**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

May 12, 2005

David Gregory, Federal Project Director  
Los Alamos Site Office  
Department of Energy  
528 35<sup>th</sup> Street, Mail Stop A316  
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G. Pete Nanos, Director  
Los Alamos National Laboratory  
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Los Alamos, NM 87545

**RE: NOTICE OF DISAPPROVAL  
WORK PLAN FOR THE NORTH CANYONS  
LOS ALAMOS NATIONAL LABORATORY (LANL) EPA ID #NM0890010515  
HWB-LANL-05-001**

Dear Messrs. Gregory and Nanos:

The New Mexico Environment Department (NMED) is in receipt of the *Work Plan for the North Canyons* (Work Plan) dated September 2001 and referenced by LA-UR-01-1316/ER2001-0766. NMED has reviewed this document and hereby issues this Notice of Disapproval. The Department of Energy and the Regents of the University of California (collectively, the "Permittees") must respond to the comments as outlined in this letter within thirty (30) days of receipt of this letter. The Permittees must also resubmit a redline strikeout version of the Work Plan indicating where text, required by this NOD, has been revised.

**General Comments:**

1. The Permittees must provide a brief description of investigation, sampling or analytical methods and procedures in documents submitted to NMED that includes sufficient detail to evaluate the quality of the acquired data in accordance with Section IX.A, Standard



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- Operating Procedures, of the March 1, 2005 Consent Order (Consent Order). The Permittees must not only reference Standard Operating Procedures (SOP), they must provide a brief description.
2. Figures must include all applicable features and structures, underground utilities, and existing well and/or borehole locations. For example, Figure A-1 does not depict the locations of PRSs 10-003(a-o) and 10-007 and Figure 1.4-1 does not show the current watershed boundaries. This type of information is important to determine if proposed sampling locations are adequate or if additional samples are required. The Permittees must ensure these changes are also reflected in the Investigation Report.
  3. The Permittees shall provide all relevant aerial photographs of the North Canyons. The Core Document for Canyon Investigations, dated April 1997 (core document) (section 2.3.5.2) states that aerial photographs are an integral part of the historical evaluation of movements and deposition of sediments over time in the canyons.
  4. The Permittees repeatedly uses the word “significant” throughout the document to qualify existing contaminant levels or to explain how future data will be evaluated. The meaning of the word in this context, however, is vague. The Permittees should only describe contaminant levels in terms of their relationship to background levels, cleanup standards, cleanup levels, or any other standard/level available for comparison to the corresponding constituent (or contaminant).
  5. The Permittees shall provide all available data that have been collected from the North Canyons in summary tables prior to and subsequent to the Work Plan submittal in September 2001. The Permittees shall provide separate tables for each applicable medium (soil, sediment, surface water, storm water, springs, alluvial groundwater, perched intermediate-depth groundwater, and regional groundwater). If the data have already been provided in the requested format below, the Permittees shall indicate a reference for the document. The requested data shall be submitted in the following format:
    - A) A map with all past sampling locations for each medium clearly identified for each SWMU/AOC.
    - B) Tables in an electronic format (MS Excel, MS Access, or a pdf file of the actual laboratory reports) containing the following: sampling location, sampling date, medium, analytical method, fraction (total or dissolved, if applicable), sample depth (if applicable), suspended sediment concentration (if applicable), constituent, analytical result, units, qualifier as assigned by the analytical laboratory, detection limit or MDA/MDC (for radionuclides), practical quantitation limit or Total Propagated Uncertainty (TPU) (for radionuclides), background value, and applicable

screening criteria/standard.

6. The Permittees shall provide a list (in table format) of all known SWMUs or AOCs, in the North Canyons, along with the corresponding COPCs at each SWMU/AOC as identified in previous investigations, regardless of NFA status. If such investigations were not conducted, the Permittees will make a note of that on the list. The Permittees will include in this list all contaminants detected above background levels or above detection limits as determined by the previous investigations. No COPCs shall be eliminated at this stage of the investigation.
7. The "Executive Summary" (pg. ES-1) states that one of the purposes of the investigation is to "assess present-day risk to human health and ecological systems and evaluate the potential for transport of contaminants that could cause future human health and ecological risks..." For future reference, the Permittees shall not address human or ecological risk in their work plans.
8. The Permittees shall install a regional aquifer well (R-24) in the former TA-10 site in Bayo Canyon as stated in a letter dated March 29, 2005.

**Specific Comments:**

**1. Section 1.2 Relationship to Other Documents, page 1-3, paragraph 1:**

**Permittees' Statement:** "Environmental investigations will follow an iterative approach in which information obtained from each successive sampling event will be evaluated in the context of the existing conceptual model and will be used to update the conceptual model." "These evaluations may lead to changes in the locations, numbers, and sequence of future sampling events and the characterization/observation wells."

**NMED Comment:** Using an iterative approach is acceptable; however, as a reminder, the Permittees must submit sampling results/data to NMED for review prior to any subsequent sampling.

**2. Section 1.5.1.1 Surface Sediment Investigations, page 1-7, paragraph 2:**

**Permittees' Statement:** "If needed, subsequent sampling generally is limited to contaminants of potential health or ecological concern identified during the initial sampling and analysis."

**NMED Comment:** As a reminder, subsequent sampling should also be based on the need to determine extent of any contamination, not solely on risk. The Permittees must revise the text to reflect this change.

**Permittees' Statement:** "Sediment sampling is mainly restricted to post-1942 sediment deposits, including the active channels, adjacent floodplains, and abandoned channels."

**NMED Comment:** The Permittees shall investigate all contaminated sediment (pre- or post-1942), as the mobility of contaminants cannot be disregarded. As stated by the Permittees, the purpose of this investigation (section 1.1) is to "determine the degree to which the stream channel sediments, active floodplain sediments, and, if present, any persistent surface water and underlying alluvial groundwater in the north canyons have been affected by Laboratory release..."

**3. Section 1.5.1.2 Surface Water Investigations, page 1-8, paragraph 1:**

**Permittees' Statement:** "Characterization of storm water runoff is not part of Canyons Focus Area investigations but is included as part of some PRS investigations at the Laboratory."

**NMED Comment:** Although contamination in storm water runoff is not covered under this work plan, it should be included as part of the risk evaluation for the North Canyons Investigation Report.

**4. Section 1.5.1.3 Alluvial Groundwater Investigations, page 1-8, paragraph 1:**

**Permittees' Statement:** "No alluvial groundwater is known to be located downstream of any PRSs in the north canyons area; therefore, the need to conduct alluvial groundwater investigations is not anticipated."

**NMED Comment:** In point of fact, there is potential alluvial groundwater present in the middle to lower reaches of Guaje Canyon and the lower section of Rendija Canyon, based on a map submitted by the Permittees as part of the *2005 General Facility Information* in March 2005. The 'Requirement 6: Known and Suspected Extent of Alluvial Groundwater at Los Alamos National Laboratory' map shows that there is "potential" and "persistent" saturation in much of Guaje Canyon and "potential" saturation in the lower section of Rendija Canyon. Based on all of the above information, the Permittees must complete one alluvial groundwater well in Rendija Canyon, west of the confluence with Guaje Canyon, between wells G-6 and G-4a (based on Figure A-1 in this Work Plan). The Permittees shall sample the alluvial groundwater to determine whether the AOC and SWMUs in Rendija Canyon have contributed to alluvial groundwater contamination. If alluvial groundwater is encountered, the Permittees must construct and sample the well in accordance with Section IV.A.3.e.i of the Consent Order. Upon review of the groundwater sampling results, NMED may require further investigation.

The Permittees must also explain why there are several discrepancies between Figure A-1 included in the Work Plan and the 'Requirement 3: Locations of Monitoring Wells, Water Supply Wells, and Vapor Monitoring Boreholes at Los Alamos National Laboratory' map, which was included with the *2005 General Facility Information* submittal. For example, well G-6 is shown on Figure A-1, but it is not shown on the Requirement 3 map. The Layne Western well's location is not identified on Figure A-1, but it is listed as a Regional Aquifer Monitoring well on the Requirement 3 map. Wells G-1 and G-2 are not identified on the Requirement 3 map; however, they are shown as "other hole/well" on Figure A-1. Finally, G-3 is identified as a Regional Aquifer Monitoring Well on the Requirement 3 map, but shown as an "other hole/well" on Figure A-1.

**5. Section 1.5.2.3 Decision Factors for Bayo, Barrancas, Rendija, and Guaje Canyons, page 1-10:**

**A) Permittees' Statement:** "To establish COPCs for each canyons system, analytical results from each reach in the north canyons are compared to comparable background values, post-Cerro Grande fire concentrations, and relevant standards, according to the most recent methodologies and procedures provided by the ER Project Analysis and Assessment Focus Area. A weight-of-evidence approach will be used to determine COPCs."

**NMED Comment:** COPCs should be determined based on a comparison to background levels or to detection/quantitation limits and whether they are expected at the site. In these cases where background levels are not available, LANL must retain all detected constituents as COPCs. This is the current NMED position.

The Permittees shall revise the Work Plan to implement the approach explained above. A similar approach is described in the RCRA regulations for groundwater (40 CFR 264.95-284.100) and the EPA guidance "Statistical Methods For Evaluating The Attainment of Cleanup Standards", Volume III, December 1992, for soil medium. The purpose of any investigation shall be whether the site measurements are significantly (statistically) different from the reference-area measurements.

**B) Permittees' Statement:** "If the uncertainty in estimated risk values is likely to influence a decision based on the risk assessment, the investigators consider whether additional data are needed before completing the risk assessment and uncertainty analysis."

**NMED Comment:** NMED's (and EPA's) criteria for determining a possible release from a site (SWMU, AOC, etc.) is the exceedance of background levels (or detection limits), not "estimated risk values" or "screening levels for human and ecological risk." The Permittees shall revise the Work Plan to adopt the NMED-approved approach.

**6. Section 2.3 Sources of Potential Contaminants within Bayo Canyon, page 2-9, paragraph 2:**

**Permittees' Statement:** "The information compiled in this section is based on available reports and data as of circa December 2000. Additional and updated information about the status of PRSs can be obtained from the Laboratory's ER Project office and/or the Laboratory's Public Reading Room in Los Alamos, New Mexico, as described in Section 7.2.2 of *Installation Work Plan for Environmental Restoration Project* (LANL 2000, 66802, p. 7-3)."

**NMED Comment:** See General Comment #5.

**7. Section 2.3.2.5.3 RFI Interim Action for Strontium-90 in Vegetation, pages 2-20 through 2-27:**

**Page 2-22**

**Permittees' Statement:** "The highest concentration of strontium-90 was 340.02 pCi/g in a sample from 4.2-ft (1.3m) depth."

**NMED Comment:** The Permittees must identify the location from which this sample was obtained. The Permittees must also explain why contamination was detected at 4.2-ft bgs when in paragraph three of this section, the Permittees state that "some strontium-90 remained in the bottom of the pit and all solid waste was excavated to a depth of 26 ft. Because gross beta radioactivity was near background levels, the pit was backfilled with clean fill."

**Page 2-24**

**NMED Comment:** Based on the information provided in this section, it is unclear whether the samples obtained during the RFI at PRS 10-003(a-o) in 1994 were analyzed for a full-suite of analytes. The RFI report states that analysis for SVOCs, TAL metals, total uranium, and Sr-90 were completed at 10-003(a-o). The Permittees must clarify which analyses were conducted at PRS 10-003(a-o) and, if applicable, why a full-suite analysis was not conducted.

**Page 2-26**

**Permittees' Statement:** "Samples were collected and shipped to fixed laboratories for analysis of TAL metals, HE, gamma spectroscopy, total uranium, and strontium-90."

**NMED Comment:** The Permittees must explain why a full-suite analysis (including VOCs and SVOCs) was not conducted on samples from PRS 10-008.

**8. Section 3.4.1.2, Historic Channel Changes, page 3-10, paragraph 2:**

**Permittees' Statement:** "Recent sedimentation and degradation rates vary within each watershed and have not been fully identified. Localized aggradation and degradation processes may occur to raise or incise a specific interval of the streambed."

**NMED Comment:** The Permittees shall examine relevant aerial photographs and documentation in order to define the approximate locations where construction and excavation within the North Canyons have contributed to the alteration of the natural topography of the canyons. Such a study may lead to eliminating the surface investigations of certain areas of the canyon floors, and investigating to a greater extent the impacted groundwater (alluvial and intermediate). The Permittees shall focus their resources on investigations that would gain the maximum amount of useful information based on current canyon conditions.

**9. Section 3.4.1.3.2, Former TA-10 Site in Bayo Canyon, page 3-11, paragraph 2:**

**Permittees' Statement:** "Stations A and B (upstream and within Bayo Site) were analyzed for gross alpha and beta activity, plutonium-238 and plutonium-239. Stations C and D (downstream of Bayo Site) were analyzed only for plutonium-238 and plutonium-239. Analytical results from Stations A and B (upstream of Bayo Site and within Bayo site) showed that gross alpha activity and plutonium concentrations were approximately background levels while gross beta concentrations were approximately twice background levels."

**NMED Comment:** The Permittees must provide information regarding the analytical results for Stations C and D.

**10. Section 3.4.1.3.5.1, Summary of Soil and Sediment Sampling at TA-0, Upper Bayo Canyon, page 3-18:**

**Permittees' Statement:** "The results showed that three samples contained lead above BV but below the screening action level (SAL) value."

**NMED Comment:** See Specific Comment #5A.

**11. Section 3.4.4.1, Alluvial Groundwater Investigations, pages 3-42 through 3-44:**

**Permittees' Statement:** "In fall 1966, two shallow test holes were drilled in Guaje Canyon between the Rendija Canyon fault and the Guaje Mountain fault. The boreholes GCTH-1 and GCTH-2 were located approximately 3 mi (4.8 km) downstream of the Guaje Reservoir."

“Saturation in the boreholes was reported from the approximate level of the Guaje Canyon stream channel to total depth (Purtymun 1995, 45344, p. 299). Groundwater samples were not collected and the wells have not been monitored routinely.”

**NMED Comment:** The Permittees must provide additional information regarding these wells (GCTH-1 & GCTH-2) drilled in Guaje Canyon. Information should include general construction detail, depth of the well, and the most recent sampling event water levels and corresponding results.

**12. Section 5.0, Technical Approach, page 5-1:**

**Permittees’ Statement:** “The technical approach employed in the North Canyons investigations is identical to that described in Chapter 5 of the “Core Document for Canyons Investigations”

**NMED Comment:** NMED agrees with the technical approach. However, as a reminder, if the core document conflicts with the Consent Order in any way, the Permittees must defer to the Consent Order requirements.

**13. Section 7.2.3, Sampling and Analysis Plan for Sediment Investigation, page 7-8, paragraph 2:**

**Permittees’ Statement:** “Field surveys and mapping, as well as sampling and analysis tasks, initially will concentrate on 10 reaches but may be expanded to include additional canyon reaches.”

**NMED Comment:** The Permittees must explain the criteria for the addition and elimination of reaches, and the number of samples that will be collected from the additional (or expanded) reaches. The Permittees shall not eliminate reaches (and therefore eliminate parts of the canyon) from further investigation or choose new reach locations until the report from the initial investigation has been reviewed by NMED.

**14. Section 7.2.4, Canyon Reaches Planned for Investigation, page 7-11 through 7-13:**

**Permittees’ Statement:** “...if significant concentrations of contaminants are found, a contingency reach may be sampled downstream...to determine the extent and distribution of contaminants.”

**NMED Comment:** See Specific Comment #13, above.

**15. Section 7.2.5.1, Sampling Design, page 7-13, paragraph 4:**

**Permittees' Statement:** "Due to the scarcity of information available on contaminants in the north canyons system, the initial samples collected in each reach will be sent to an off-site laboratory for full-suite analyses, to ensure that no contaminants were overlooked during the historical analyses."

**NMED Comment:** The Permittees shall list the subreaches intended for sampling within each reach for the initial round of full-suite analyses.

**16. Section 7.2.5.1, Sampling Design, page 7-13 through 7-14:**

**NMED Comment:** Considering the large area of the North Canyons and the "scarcity of information available on contaminants", the Permittees shall revise its sampling design to include field screening specially designed to assess the reaches in the canyons and the contaminants in each reach prior to full-suite analyses sampling.

The Permittees shall include in this Work Plan the specific design of the field screening. This information should include field screening tests to be conducted (HE, PCB, VOCs/SVOCs, metals, and radionuclides, whichever are appropriate), detection limits of the field methods, grid size of the field screening area, and the rationale behind the field screening methods and locations. The results of the field screening (tests results, screening locations, QA/QC) must be provided as part of the investigation report, so that NMED can evaluate the Permittees' assessment of which reaches (or subreaches) shall be addressed with higher priority in the subsequent phases of the investigation.

**17. 7.2.5.3, Analytical Methods, page 7-15:**

**Permittees' Statement:** "To meet the objectives for representativeness and comparability, the sediment samples will be homogenized in the field using a stainless steel bowl and spoon before they are placed in a container. Gravelly samples will be sieved, in either the field to remove stones greater than 2 mm (0.08 in.) in diameter."

**NMED Comment:** Homogenization of discrete samples collected for analyses other than VOCs and SVOCs shall be performed by the analytical laboratory and not in the field unless prior approval is received from NMED. Any samples collected for analyses of VOCs and SVOCs shall not be homogenized. Sieving of samples is not always necessary and can cause bias in the sampling results. The Permittees shall not sieve samples in the field. The laboratory may sieve the soil samples only if it has a standard operating procedure on the subject.

**18. Section 7.3.4.2, Analysis of Surface Water Samples, Table 7.3-3, page 7-24:**

**NMED Comment:** The Permittees list the detection limits for beryllium to be 5 µg/L and for thallium to be 2 µg/L. The detection limits for any constituent shall not be equal to or higher than the corresponding EPA MCL, EPA health advisory, NMWQCC standard, or any other standard or screening level. The Permittees shall revise the table to show lower detection limits and advise the analytical laboratories of the required detection limits.

The estimated detection limits (EDL) for antimony, cadmium, cobalt, silver, selenium, and thallium are greater than the corresponding background values. Such detection limits would make it impossible to determine if a release occurred based on background levels. The Permittees shall revise the EDLs to ensure that they are below the relevant background values.

Table 7.3-4 lists the Minimum Detectable Activity (MDA) for americium-241 and plutonium-238 to be 0.05 pCi/g, when the background levels are 0.04 pCi/g and 0.006 pCi/g, respectively. LANL shall revise its MDA value to ensure that they are below the background levels.

**19. Section 7.4, Alluvial Groundwater Sampling and Analysis Plan, page 7-25:**

**Permittees' Statement:** "No alluvial groundwater is known or suspected to occur in significant quantities downstream of Laboratory-affected portions of the north canyons. Therefore, no alluvial groundwater monitor wells are planned."

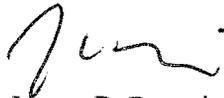
**NMED Comment:** See NMED Specific Comment #4. In addition, according to the *Geologic and Hydrogeologic Records of Observation Wells, Test Holes, Test Wells, Supply Wells, Springs, and Surface Water Stations in the Los Alamos Area*, by W. D. Purtymun (1995), the Layne Western well had a water level of 100 ft when it was completed in 1950. Neither the report nor the Permittees specify whether this well has been removed. The 'Requirement 3: Locations of Monitoring Wells, Water Supply Wells, and Vapor Monitoring Boreholes at Los Alamos National Laboratory' map included with the *2005 General Facility Information* submittal shows the Layne Western well as a Regional Aquifer Monitoring well in Guaje Canyon.

Based on the above information, if this well still exists, NMED requires that the Permittees assess the condition and integrity of the well, obtain groundwater samples from the well, and complete a full analytical suite (the same analyses proposed for surface water and sediment samples). This information should be documented in the Investigation Report. Also, NMED reserves the right to require additional groundwater investigations contingent upon the results of the required alluvial groundwater well and the initial groundwater sampling at the Layne Western well.

Messrs. Gregory and Nanos  
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Should you have any questions, please contact Kathryn Chamberlain at (505) 428-2546.

Sincerely,



James P. Bearzi  
Chief  
Hazardous Waste Bureau

JPB:kc

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