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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

May 12, 2003

David Gregory, Program Manager
Office of Los Alamos Site Operations
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

G. Pete Nanos, Interim Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, NM 87545

**RE: REQUEST FOR SUPPLEMENTAL INFORMATION
WORK PLAN FOR SANDIA CANYON AND CAÑADA DEL BUEY
LOS ALAMOS NATIONAL LABORATORY, NM0890010515
HWB-LANL-99-031**

Dear Mr. Trollinger and Mr. Nanos:

The Hazardous Waste Bureau of the New Mexico Environment Department (NMED) is in receipt of the Work Plan for Sandia Canyon and Cañada del Buey, dated September 1999 and referenced by LA-UR-99-3610 and requests supplemental information as detailed in the attachment. LANL has forty-five (45) days to respond to the request for supplemental information from the date of receipt of this letter.



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Mr. David Gregory and Mr. G. Pete Nanos

May 12, 2003

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Should you have any questions regarding this letter, please contact me at (505) 428-2548 or John Young at (505) 428-2538.

Sincerely,



Darlene X. Goering

Project Leader

Permits Management Program

cc: J. Bearzi, NMED HWB
J. Davis, NMED SWQB
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file: Reading and TA-3

ATTACHMENT

General Comments:

1. The drilling program at LANL needs to emphasize the importance of identifying perched zones of groundwater. Deep boreholes should be drilled using methods that allow perched zones to be identified. Boreholes that encounter perched groundwater should have wells constructed to allow for monitoring and sampling of the perched zones. Alternately, if a perched zone is identified during the drilling of a regional aquifer well, a separate well, which targets the intermediate zone and is adjacent to the regional well, may be installed.
2. LANL shall provide a list of all SWMUs and AOCs in Sandia Canyon watershed and Cañada del Buey watershed, along with a list of COPCs at each SWMU and AOC.
3. LANL shall provide boring logs and monitoring well diagrams for SCO-1, SCO-2, R-12, CDBO-1 through CDBO-9, PM-1, PM-2, PM-3, PM-4, and PM-5. LANL shall provide any logs of soil borings used to determine the conceptual model in Figures A-4 and A-5.
4. LANL shall provide all available data, which have been collected from Sandia Canyon and Cañada del Buey in summary tables. LANL shall provide separate tables for each canyon, and for each different medium (soil, sediment, surface water, storm water, springs, alluvial groundwater, and regional groundwater). If the data have already been provided, LANL shall indicate a reference for the document. The requested data shall include the following:
 - a. A map with all past or present sampling locations in each canyon and for each medium clearly identified.
 - b. Tables in an electronic format (MS Excel) containing the following columns: sampling location, sampling date, matrix, analytical method, fraction (total or dissolved, if applicable), suspended sediment concentration (if applicable), constituent, units, sample depth (if applicable), qualifier as assigned by the analytical laboratory, detection limit or MDA/MDC (for radionuclides), background value (if applicable), constituent, and screening criteria.
5. LANL shall provide all available aerial photographs of Sandia and Cañada del Buey. LANL shall provide maps showing the historic changes in the topographical features of the canyons. The maps shall delineate the canyon floor, and shall include the locations of any sediment accumulation (the work plan mentioned only one such sediment accumulation area for each canyon). The maps shall also include the location of the disturbed areas in the middle of Sandia Canyon due to road-construction projects, and the locations of any areas impacted by the Cerro Grande Fire in both canyons.

6. The SAP for Sandia Canyon is incomplete and vague. The format of the SAP did not delineate specific phases of the SAP and the information provided is unclear. LANL shall revise the SAP to include the sections listed below:
 - a. *Background of the site.* This includes review of the historic data, review of the geologic data, soil information, environmental studies, remote sensing (aircraft or satellite photographs), and the conceptual model of the site. All provided information should be site-specific, canyon-specific, and/or reach-specific.
 - b. *Sampling Objectives.* The sampling plan should clearly state the objectives of each sampling event for each medium. The objectives shall outline what the ultimate goal and/or use of the samples will be.
 - c. *Rationale behind establishing objectives.* In establishing objectives, the SAP should ensure that the samples will provide the required data and that the data meet the DQOs.
 - d. *Sampling strategies and sampling locations.* The appropriate locations, numbers, media, and types of samples to be taken at a particular site depend upon a variety of factors. These factors include: the objectives of the sampling event, the degree of accuracy desired, and the spatial and temporal variability of the media to be sampled. If the sampling is conducted as an initial phase of site characterization, a sufficient number of samples should be collected to meet the site objectives. If LANL intends to apply a phased approach in the investigation of the canyons, a SAP shall be submitted for approval to NMED for each phase with complete reporting of data and analysis of the previous phase of the investigation.
 - e. *Sampling methodologies and procedures.* A primary objective of any sampling program should be to obtain the most accurate data possible. In order to achieve this, LANL shall use statistically valid sampling strategies so that the appropriate number of samples can be estimated, and the sampling locations can be chosen without a bias. LANL may alternately use non-statistical (judgmental or biased) sampling.
 - f. *Analytical support activities.* Include amount of background control samples, amount of QC samples, analytical methods and requirements (DQOs), detection limits, duration and frequency of sampling, reporting requirements, and schedules.

Specific Comments:

1. Section 1.4.2.3 Sandia Canyon and Cañada del Buey Decision Rules, pg. 1-9:

a. Paragraph 2:

LANL Statement: "To establish the chemicals of potential concern (COPCs) for each system, analytical results from each reach in Sandia Canyon and Cañada del Buey will be compared to comparable background values and other relevant standards....The weight-of-evidence approach will be used to determine COPCs".

HWB Comment: COPCs should be determined based on a comparison to background levels or to detection/quantitation limits only. LANL shall specify the "other relevant standards" to which contaminant concentrations will be compared to determine COPCs. LANL shall explain the "weight-of-evidence" approach for eliminating COPCs.

b. Paragraph 4:

LANL Statement: "If the uncertainty in estimated risk values is likely to influence the decision based on the risk assessment..."

HWB Comment: The main goal of a RFI is to present data with precision, accuracy, representativeness, completeness, and comparability quality, data which are useable in further risk evaluation. Premature risk analysis precludes the purpose of a RFI. Risk analysis is only logical and useful if the prerequisite RFI is complete. LANL shall explain what "estimated risk values" means.

2. Table 2.2.1-6 Routine Environmental Surveillance Monitoring Stations in Sandia Canyon, pg. 2-10:

HWB Comment: LANL shall add a column indicating the date of installation of the monitoring stations.

3. Section 2.4.5.4 MDA L, pg.2-68, paragraph 2:

LANL Statement: "Radionuclide concentrations in the samples submitted to the contract laboratory are presented in Table 2.4.5.1."

HWB Comment: The table number in the sentence should be 2.4.5.4. In addition, Table 2.4.5.4 is misidentified as applying to MDA J. LANL shall correct these mistakes.

3. Figure 3.4.3-5 Summary of environmental surveillance sampling in Sandia Canyon for metal constituents, pg.3-47:

HWB Comment: Analytical data from filtered and non-filtered samples were combined together when representing the data using graphs. Analytical data from filtered and non-filtered samples should not be combined. Moreover, filtered data should be screened against the appropriate NMWQCC standards and non-filtered data should be screened against the appropriate NMWQCC standards, or the EPA MCL or health advisories. LANL shall construct separate graphs and tables for filtered and non-filtered samples. The right axis in graph SCS-3 has a different scale from the left axis, which defeats the purpose of the plot. LANL shall correct the scale of the axis and submit a revised plot.

4. Section 3.5.4.2 Alluvial/Shallow Perched Groundwater in Cañada del Buey, pg. 3-116, paragraph 13:

HWB Comment: The reference, Environmental Protection Group 1995, 50285, p. VII-26, does not contain the preceding citation. LANL shall provide the correct reference.

5. Section 4.1.2.1 Snowmelt and Stormwater Runoff, pg. 4-3, paragraph 1:

LANL Statement: "However there are plans to install several gaging stations in 1999".

HWB Comment: LANL shall explain if the new stations were installed, provide a map showing their location, and describe how often samples were collected and the sample analyses.

6. Section 4.2.2.1 Snowmelt and Stormwater Runoff, pg. 4-9, paragraph 1:

LANL Statement: "However, the installation of a new gaging station is planned for 1999".

HWB Comment: LANL shall explain if the new station was installed, provide a map showing its location, and describe how often samples were collected and the sample analyses. This figure may be combined with that from Specific Comment #5.

7. Section 7.1 Sampling and Analysis Plan for Sandia Canyon, pg. 7-1:

HWB Comment: Although this section bears the title "Sampling and Analysis Plan for Sandia Canyon", this plan addressed middle Sandia Canyon only. The investigations of groundwater and surface water are restricted to middle Sandia Canyon. The SAP for Upper Sandia Canyon (dated March 1998) included limited sediment and surface water investigations, but did not include any groundwater wells. Similarly, lower Sandia Canyon did not include any groundwater exploratory sampling (cores and wells), and included limited surface water sampling. Since the SAP for Upper Sandia Canyon has not been implemented (to the NMED's knowledge), LANL shall include the total length of Sandia Canyon in this SAP. If some sampling and analysis of the Upper Sandia Canyon was conducted, LANL shall provide a report with the data as an attachment to the RSI response. LANL shall also include any additional sampling that is to be conducted in the Upper Sandia Canyon.

8. Section 7.1.1 Introduction, pg. 7-1, paragraph 5 and Section 7.2.1.5 Overview of Information To Be Collected, pg. 7-70, last paragraph:

LANL Statement: LANL stated that the number of initial samples would be revised in accordance with the strategies discussed in Section 5.3.7 and Section 5.3.8 of the core document. Both of these strategies refer to evaluating the uncertainties including statistical evaluations.

HWB Comment: LANL shall explain how the uncertainties will be evaluated, list the qualitative and quantitative criteria for evaluating uncertainties, the acceptance criteria, the statistical tests to be performed, and references.

9. Section 7.1.2 Sediment Sampling and Analysis Plan, pg. 7-6:

HWB Comment: The SAP for sediments in Sandia Canyon is incomplete for the following reasons:

- a. LANL considered investigating contaminants associated with post-1942[43] sediment deposits. The SAP shall include all contaminated sediments as the mobility of contaminants cannot be disregarded. Sandia Canyon is a "wet" canyon and there is a greater likelihood of subsurface (pre-1942) contamination.
- b. LANL considered premature risk evaluation of the present-day risk. The SAP's first objectives should be collecting data with precision, accuracy, representativeness, completeness, and comparability quality, before evaluating risk. The SAP's risk assessment process should include future risk evaluation associated with corrective measures in addition to the present-day risk evaluation.
- c. LANL shall revise the SAP to include investigation of the impact of the Cerro Grande Fire and the road construction disturbance.
- d. Field screening methods are not specified in the SAP, except for general radiological field screening. LANL shall include the specific designs of the field screening, like constituent field screening tests (PCB, VOCs/SVOCs, metals, and radionuclides), how the field screening techniques will be implemented, grid size of field screening area (if applicable), exploratory pit methods for vertical field screening, and the rationale behind the field screening methods and locations. The documentation for all field screening (tests, tests results, excavation records, locations of the excavations, co-located samples for identification of reliability) shall be provided with the investigation report.
- e. LANL shall design a test for the canyons conceptual model regarding reach and contaminant fate and transport. In addition, questions regarding the appropriateness of judgmental sampling and the use of this strategy for site characterization and risk assessment have arisen. NMED requests that LANL provide documentation supporting the biased sampling approach implemented during canyons investigations and/or conduct

a study within a selected "representative" canyon in which statistical sampling is performed for comparison.

- f. According to Table 7.1.2-1, there are nine reaches to be investigated in Sandia Canyon, and Table 7.1.1-2 states that the initial number of sediment samples is between 45 and 90. Keeping in mind that each reach contains at least four geomorphic units, this gives at most 1 to 2 samples per geomorphic unit. NMED considers this number of initial sediment samples to be insufficient in order to statistically evaluate uncertainties, means, variances, distributions, etc. in each geomorphic unit. LANL shall collect at least two samples per stratum in each identified geomorphic unit (as seen in other reach reports each geomorphic unit may have several strata with respect to the contamination source). This minimum number of samples will allow for the initial variance calculation within each stratum during the initial phase of the investigation.
- g. LANL did not address the sampling strategies and methodologies for vertical subsurface sediment/soil sampling. LANL shall address field screening activities, sampling design, and sampling locations in determining the vertical extent of the contamination.
- h. LANL stated that the subreaches may be approximately 100m to 500m long. Later on, LANL stated that initially some subreaches may be short (100m to 200m) and may be expanded or eliminated from the investigation, depending on the sediment sampling. NMED disagrees with this approach. The reaches and subreaches shall be as long as approved in this SAP. The field screening tests and surveys, and/or initial sampling may determine a change in the length of the reach, after LANL presents the appropriate basis for that change to NMED.
- i. LANL shall include DQOs in the SAP for Sandia Canyon.
- j. LANL shall extend the eastern end of reach S-3 to include the tributary to the north of Sandia Canyon (into which outfall 03A-114 drained).
- k. In Section 7.1.2.5.1.2, LANL states that "constituents present at levels that may contribute significantly to present-day risk will be selected as key contaminants." LANL, shall list these "levels" for each contaminant and describe who will determine what is "significant".
- l. In Section 7.1.2.5.1.3, LANL states that "[t]he number of samples will be determined by the technical team based on the complexity of the contamination and will be sufficient to develop a defensible, representative statistic for present-day risk assessment purposes". The number of samples shall be determined according to statistical procedure or a probabilistic method according to the sampling design and the contamination source in order to be defensible, representative data and be useable in a risk assessment evaluation. LANL shall report the results from the full-suite sampling to NMED before initiating any limited-suite sampling.

- m. In Section 7.1.2.5.3, LANL states that “the sediment samples will be homogenized in the field using a stainless steel bowl and spoon before being placed in a container. All samples will be sieved, in either the field or the laboratory, to remove stones and organic matter greater than 2 mm (0.08 in.) in diameter”. 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. LANL shall not sieve samples in the field or in the laboratory.
 - n. Even if contamination is not found in subreach S-5 East, this does not preclude the presence of contamination further downstream. LANL shall revise the SAP to include sediment sampling beyond the eastern boundary of the lab in Sandia Canyon (subreaches S-6 West and S-6 East).
10. Section 7.1.3 Surface Water Sampling and Analysis Plan, pg. 7-21:

HWB Comment: The SAP for surface water is incomplete for the following reasons:

- a. LANL states that “[b]efore data can be used in groundwater-flow, contaminant-transport or risk-analysis models, the data must be checked for consistency with the conceptual hydrogeologic model.” NMED does not agree with this statement. The conceptual model is based on the data collected. LANL shall not ignore or disregard data because it doesn’t match the model.
- b. LANL shall provide a map with all surface water sampling points and runoff sampling points in Sandia Canyon. LANL shall provide all available data from sampling points SCS-1, SCS-2, SCS-3, TA-3, and runoffs at SC below Power Plant, SC below wetland, SC near roads and grounds at TA-3, SC truck route, and Sandia Spring in the format described in General Comment #4b, including data for sampling events in 2001.
- c. LANL states that it will determine the extent and nature of contaminants in continuous surface water in Sandia Canyon. LANL shall revise the SAP to also include investigation of all ephemeral surface water.
- d. LANL shall include in this section the SAP for surface water in Upper Sandia Canyon. If the SAP has been implemented, LANL shall provide the results from the investigation as part of this SAP and describe if any monitoring of surface water is currently conducted in Upper Sandia Canyon.
- e. Table 7.1.3-4 listed 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. LANL shall revise the table to show lower detection limits and advise the analytical laboratories of the required detection limits.

11. Section 7.1.4 Groundwater Sampling and Analysis Plan

HWB Comment: The SAP for groundwater is incomplete for the following reasons:

- a. The extent of the shallow alluvial groundwater body in Sandia Canyon is not fully characterized. Yet, the SAP did not include any exploratory boreholes in the Upper Sandia Canyon, upstream of the Middle Sandia Canyon, and the Lower Sandia Canyon. LANL shall explain how the fundamental questions posed in Section 7.1.4.2.1 for the alluvial system in Sandia Canyon will be answered if all alluvial wells are planned to be installed in the Middle Sandia Canyon.
- b. LANL shall determine the horizontal and vertical gradient of the alluvial groundwater.
- c. Section 7.1.4.2.3 states that the alluvial wells will be drilled through the alluvium, the Cerro Toledo, and at least 10 ft into the Otowi Member. LANL also stated that the unit thickness (Cerro Toledo) is unknown. LANL shall describe how the field findings will reflect on the final depth of the wells.
- d. When drilling the wells in Sandia Canyon, LANL shall focus extra attention on the lithology of the Cerro Toledo interval, or other units or structures that may provide a lateral pathway not coinciding with the orientation of the canyon. The potential presence of buried paleochannels would greatly impact the conceptual model, as the model assumes that buried channels do not coincide with the canyon and, therefore, groundwater and possible contamination do not flow laterally away from the stream channel.
- e. Table 7.1.4-3 did not specify the exact depth of the core samples for the corresponding analytical suite. LANL shall explain how sampling depths will be determined, describe if these samples will be composite or discrete samples, and describe if any field screening will be conducted when collecting the core samples. Considering the limited information about the alluvium, sediments/soil, and geology of Sandia Canyon, LANL shall collect the samples from the boreholes for full-suite analysis every 10 ft of each borehole. LANL shall propose to modify the sampling intervals based on field observations.
- f. The analytical data for surface and runoff water from the Upper and Middle Sandia Canyon showed exceedances of lead, aluminum, iron, beryllium, cadmium, mercury, silver, copper, selenium, and gross alpha radiation. The intermediate perched groundwater will be the first to show if the contaminants are being transported to the regional aquifer. LANL shall install one intermediate groundwater well in the vicinity of regional well R-12.



- g. LANL shall provide all available data for wells PM-1 and PM-3 in the format described in General Comment #4b, including any data from sampling events in 2001.
- h. In Section 7.1.4.4.2 (pg 7-58) LANL stated that only the first sample from each alluvial and regional aquifer well will be analyzed for full-suite chemicals and radionuclides, and that any non-detected analyte will be excluded from subsequent analyses. NMED disagrees with this sampling approach. LANL shall monitor all alluvial, intermediate, and regional wells for the full suite of chemicals and radionuclides on a quarterly basis for at least one year. After the data is reported and reviewed by NMED, some constituents may be excluded with NMED's approval.
- i. Table 7.1.4-16 lists the detection limits for beryllium to be 5µg/L and for thallium to be 2µg/L. The detection limits for any constituent cannot be equal to or higher than the corresponding EPA MCL, EPA health advisory, NMWQCC standard, or any other standard or screening level. LANL shall revise the table to show lower detection limits and advise the analytical laboratories of the required detection limits.

12. Section 7.1.6 Biological Sampling and Analysis Plan, pg. 7-65:

HWB Comment: LANL shall submit a biological SAP as a part of response to this RSI. LANL shall use the SAP created for the Los Alamos/Pueblo Canyon Surface Aggregate as a model.

13. Table 7.2.1-1 Chemicals of Potential Concern in Cañada del Buey and Source Areas, pg. 7-67:

HWB Comment: LANL shall explain why the table does not include TA-51, a potential source of contamination in Cañada del Buey. LANL shall explain why the table does not include VOCs as known COPCs if it is known that there is a VOC plume originating from MDA L. LANL shall include TA-54 as a source of thorium, since this area received all kinds of radioactive waste.

14. Section 7.2.2 Sediment Sampling and Analysis Plan, pg. 7-71:

HWB Comment: The SAP for sediments in Cañada del Buey is incomplete for the following reasons. See also the Specific Comment #9 for additional reasons.

- a. LANL shall include reach CDB-3 West in the investigation instead of labeling it a contingency reach. LANL shall identify and sample an additional reach west of reach CDB-2 Central, based on the alluvial groundwater data from CDBO-6 and CDBO-7.
- b. LANL shall explain why Table 7.2.2-5 did not include thorium. LANL shall revise the table to include thorium in the analyte list.

- c. Please, correct "Sandia Canyon" (appearing twice) in the last paragraph on page 7-84 to "Cañada del Buey" since this section relates to this canyon.

15. Section 7.2.3 Surface Water Sampling and Analysis Plan, pg. 7-85:

HWB Comment: The SAP for surface water is incomplete since there is no investigation of surface water proposed. The surface water collected as runoff at SR-4 (White Rock) shows great exceedances of gross alpha and gross beta radiation being transported beyond the laboratory boundary. The investigation for surface water has to address this contamination by determining the source, and determining how far the contamination extends beyond the laboratory boundary. LANL shall provide a SAP to address any investigations of surface water in Cañada del Buey.

16. Section 7.2.4 Groundwater Sampling and Analysis Plan, pg. 7-85:

HWB Comment: The SAP for groundwater is incomplete for the following reasons:

- a. LANL shall provide the boring log and the monitoring well diagram for R-16. LANL shall provide all available data for R-16 in the format specified in General Comment #4b.
- b. The source and boundaries of the alluvial saturation in Cañada del Buey has not been determined and is integral to understanding the groundwater pathways in the canyon bottom. LANL shall install three alluvial wells upgradient of CDBO-6 to investigate the source of alluvial saturation. At a minimum, the borings shall be advanced to the depth of the vapor-phase notch. Four alluvial wells shall be installed between wells CDBO-6 and CDBO-7 to identify the boundaries of alluvial saturation. LANL shall install at least one additional alluvial well downgradient of CDBO-7 to determine the extent of the alluvial groundwater. One additional alluvial well shall be installed in Cañada del Buey to investigate potential contamination associated with MDA L. Two additional alluvial wells shall be installed in Cañada del Buey to investigate potential contamination associated with MDA G.
- c. When drilling the wells in Sandia Canyon, LANL shall focus extra attention on the lithology of the Cerro Toledo interval, or other units or structures that may provide a lateral pathway not coinciding with the orientation of the canyon. The potential presence of buried paleochannels would greatly impact the conceptual model, as the model assumes that buried channels do not coincide with the canyon, and, therefore, groundwater and possible contamination do not flow laterally away from the stream channel.
- d. Section 7.2.4 states that two groundwater wells are planned for this investigation: 1 alluvial well, and 1 regional aquifer well. However, Table 7.2.4-1 does not reflect any newly installed alluvial wells. LANL shall explain this discrepancy.

- e. The SAP for alluvial groundwater failed to provide a table with the constituents to be analyzed during the investigation. NMED notes that previous sampling of the wells CDBO-6 and CBDO-7 did not include analysis for thorium, which is a COPC in Cañada del Buey due to TA-46. LANL shall revise the SAP to include thorium as well as a table with the description of the suites to be analyzed during the investigation.

17. Section 7.2.6 Biological Sampling and Analysis Plan

HWB Comment: LANL shall submit a biological SAP as a part of response to this RSI. LANL shall use the SAP created for the Los Alamos/Pueblo Canyon Surface Aggregate as a model.