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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

October 1, 2003

Mr. G. Pete Nanos, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, New Mexico 87545

Mr. Mat Johansen, Groundwater Program
Compliance Manager
DOE-OLASO
Mail Stop A316
Los Alamos, New Mexico 87544

**SUBJECT: NOTICE OF DEFICIENCY FOR THE MORTANDAD CANYON
GROUNDWATER WORK PLAN
LOS ALAMOS NATIONAL LABORATORY
EPA ID# NM0890010515**

Dear Messrs. Nanos and Johansen:

The New Mexico Environment Department (NMED) is in receipt of the Groundwater Work Plan for Mortandad Canyon at Los Alamos National Laboratory, submitted August 29, 2003 and referenced by LA-UR-03-6221 (ER2003-0541). NMED has reviewed this work plan and has determined that the document does not meet all of NMED's requirements for the investigation of groundwater in the Mortandad Canyon watershed. Consequently, NMED is providing this Notice of Deficiency for the work plan. Specific comments on the work plan are provided in two attachments. The Department of Energy and the Los Alamos National Laboratory (collectively, the "Permittees") must address the comments provided in Attachment 1 within thirty (30) days of receipt of this letter. The Permittees must address the comments provided in Attachment 2 in the Mortandad Canyon Groundwater Investigation Report scheduled for submittal to NMED on December 31, 2005.

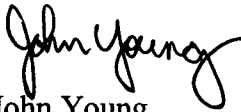


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Messrs. Nanos and Johansen
October 1, 2003
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If you have any questions regarding these comments, please contact Carolyn Cooper of my staff at (505) 428-2539.

Sincerely,



John Young
LANL Corrective Action Project Leader
Permits Management Program

cc: C. Voorhees, NMED DOE-OB
S. Yanicak, NMED DOE-OB, MS J993
J. Schoeppner, NMED GWQB
L. King, EPA, 6PD-N
D. McInroy, RRES-RS, MS M992
J. Vozella, DOE OLASO, MS A316
B. Ramsey, LANL, RRES-DO, MS J591
D. Stavert, LANL, RRES-DO, MS J591
N. Quintana, LANL, RRES-ER, MS M992
C. Nylander, RRES-WQH, MS K497

File: Reading and LANL General (TA-3, TA-50, Groundwater)

Attachment 1
Comments on the Mortandad Canyon Groundwater Work Plan

Response required within 30 days

1) Section 1.0: Introduction:

- (a) The Permittees shall clarify how the data and information collected under this work plan will achieve the objective of supporting present-day human health and ecological risk.
- (b) In the third sentence of the fifth paragraph, include remediation as a potential decision for Mortandad Canyon.

2) Section 4.2: Proposed Field Activities:

- (a) The Permittees shall provide descriptions of all investigation, sampling, field screening, hydrologic testing, and analytical methods and procedures to be employed during the groundwater investigation in Mortandad Canyon.
- (b) The Permittees shall provide a discussion of the rationale used to determine the amount of core to be collected from each borehole as well as the reasons for choosing the intervals targeted for core collection.
- (c) The second sentence of the second paragraph states, "At each drill site where saturation is not encountered within the target depth, the borehole will be backfilled with native materials and plugged according to appropriate procedures and requirements." The Permittees shall clarify this statement by providing a description of the "appropriate procedures and requirements" for plugging and abandonment of boreholes. A list of the existing wells that are proposed for plugging and abandonment shall be included in this section. In addition, plugging and abandonment may not be appropriate for every dry borehole advanced in Mortandad Canyon. Vapor monitoring and/or moisture monitoring should be considered prior to construction of wells or abandonment of boreholes. The Permittees must consult with NMED before plugging and abandoning any boreholes.
- (d) It is NMED's understanding that the Permittees will advance the 16 characterization boreholes (B-1 through B-16) and the 3 resistivity-moisture evaluation boreholes (RES-2, RES-3, and RES-4) before drilling the proposed alluvial and intermediate wells. The Permittees shall clarify whether this understanding is correct and in agreement with the proposed schedule of activities.

- (e) There is the potential that the target depths for the proposed wells may need to be extended, based on new data obtained from the characterization and resistivity evaluation boreholes or other boreholes advanced during the Mortandad Canyon groundwater investigation. Consequently, NMED does not agree that boreholes should automatically be considered complete at a specific depth, but that a range of depths should be considered. The Permittees shall modify the scope of work to include the contingency for advancing boreholes to greater depths than currently proposed if the data obtained during the investigation indicate the need to do so.

3) Section 4.2.2: Well Installation and Sampling Locations:

- (a) This section provides descriptions of the installation of intermediate wells and characterization boreholes. Discussions of the proposed piezometers, alluvial wells, and regional wells are not provided. The Permittees shall provide descriptions of the installation of piezometers, alluvial wells, and regional wells proposed as part of this investigation.
- (b) The Permittees shall clarify the circumstances under which well I-2 would be drilled.
- (c) The eighth paragraph describes the three characterization boreholes (RES-2, RES-3, and RES-4) that are proposed to evaluate the relationship between the results from the 2002 resistivity survey and the moisture profiles and potential perched groundwater in the upper vadose zone. NMED understands that these boreholes will be advanced before the other alluvial and intermediate wells are drilled. Refer to comment #2 (d) above. In addition, the Permittees shall clarify what actions will be taken if groundwater is encountered in any of the resistivity evaluation boreholes.

4) Section 4.2.3: Piezometer Installations:

- (a) The Permittees should let data collection efforts guide the number of piezometers to be installed. Installation should not be limited to six piezometers.

5) Section 4.2.4: Characterization Boreholes:

- (a) It is NMED's understanding that the Permittees will advance the 16 characterization boreholes (B-1 through B-16) before drilling the alluvial and intermediate wells. Refer to comment #2 (d) above. In addition, the Permittees shall clarify what actions will be taken if groundwater is encountered in any of the characterization boreholes. The Permittees shall modify the scope of work to include installing piezometers in boreholes B-8 through B-13 and boreholes B-14 through B-16, if groundwater is encountered during drilling.

6) Section 4.2.5.2: Sampling and Analysis of Groundwater:

- (a) This section proposes collecting “up to five” borehole groundwater screening samples during drilling for geochemical and contaminant characterization. The Permittees shall modify this section to propose collecting screening samples from all wells installed under this work plan. Because the Permittees are taking an iterative approach to locating wells and potentially advancing additional wells, all zones of groundwater encountered should be screened to provide groundwater quality data that can be used to make decisions in a timely manner.
- (b) The third paragraph of this section states that wells R-13 and R-14 will not be sampled as part of this work plan, because they have already been “adequately characterized.” NMED agrees that R-13 may not require additional sampling, because analytical data is available for three rounds of sampling. However, sufficient monitoring of well R-14 has not been conducted. It is NMED’s understanding that the only samples that have been analyzed from well R-14 are the screening samples that were collected during drilling. The Permittees shall modify the scope of work to include sampling of well R-14.

7) Section 4.3.1: Infiltration Investigation:

- (a) The Permittees shall provide a detailed description of how the investigation of Mortandad Canyon addresses infiltration in the canyon (e.g., what data will be collected for estimating volumes and rates of water input/output and evapotranspiration).

8) Section 4.3.2: Colloid Investigation:

- (a) NMED notes that nonradiological constituents may also be transported via colloids and that historical releases from TAs 35 and 50 include metals and organics. The colloid investigation must include both nonradiological and radiological constituents.

9) Tables 1, 2, and 3: DQO Matrices for Alluvial, Intermediate, and Regional Aquifer Wells in Mortandad Canyon:

- (a) Several methods of hydrologic testing that may be conducted in the wells are listed in the tables. NMED reminds the Laboratory that falling-head slug tests are not an acceptable method of hydrologic testing for any wells located on the Pajarito Plateau (refer to NMED letter dated December 14, 2001).
- (b) Wells A-3a-f should be cored in order to determine the zones of saturation and their thicknesses.

10) Table 2: DQO Matrix for Intermediate Wells in Mortandad Canyon:

- (a) The Permittees shall consider conducting cross-hole pumping tests between existing well MCOBT-4.4 and proposed well I-4.

11) Table 3: DQO Matrix for Regional Wells in Mortandad Canyon:

- (a) The Permittees shall clarify, in the column for proposed well R-1, when a cross-hole pumping test would be necessary with existing well TW-8.

- (b) The Permittees shall clarify whether core will be collected from wells R-33 and R-34.

12) Table 7: Analytical Suites for Core Samples Collected from Boreholes:

- (a) The Permittees shall clarify which analyses will be conducted on core samples collected from R-33 and R-34. Table 7 does not agree with Table 3, which states that, for these wells, "collect vadose zone core and analyze for anions, metals, radionuclides, and stable isotopes."

Attachment 2
Comments on the Mortandad Canyon Groundwater Work Plan

Response required in the Investigation Report

1) Section 1.0: Introduction:

(a) NMED does not agree with the need to include the disclaimer regarding radioactive waste data in this section or on the title page of the document. NMED maintains that it has the authority to regulate radioactive wastes, other than source, special nuclear and byproduct material as narrowly defined in the Atomic Energy Act of 1954, and to require the monitoring and reporting of radionuclides as necessary to properly regulate non-exempt wastes. The Permittees shall not include this disclaimer in the Investigation Report.

(b) The Permittees shall clarify the meaning of the second sentence in the fifth paragraph of this section, which states, "For the purpose of this document, the nature and extent of contamination is defined as bounding spatial and temporal (100 years) uncertainties in contaminant concentrations and distributions." Provide this clarification in the Investigation Report.

2) Section 2.0: Background:

(a) The Permittees shall provide summary tables of analytical data with previous contaminant detections in groundwater in Mortandad Canyon in the Investigation Report. Analytical data from the regional R-wells must also be provided. The data table shall include both nonradiological and radiological constituents.

(b) The Permittees shall provide a more thorough discussion of the releases of nonradiological contaminants into Mortandad Canyon.

(c) The fourth paragraph discusses releases from TA-35 to Mortandad Canyon. The Investigation Report should also note the total mass of Strontium-90 released from TA-35.

(d) The fifth paragraph describes well MCO-7.2 as an alluvial well. The well is actually screened in the Cerro Toledo interval, not the alluvium. The Permittees shall correct this statement.

(e) The Permittees shall correct the last sentence of the second paragraph on page 3 to reflect the fact that pore-water concentrations of nitrate and perchlorate in well MCOBT-8.5 are actually higher (not "significantly lower", as stated) than in the other wells listed. In addition, the paragraph shall be modified to include a statement noting the maximum perchlorate detection of 1662 µg/L in the Cerros del Rio Basalt in regional well R-15.

- (f) The Investigation Report for groundwater in Mortandad Canyon must include summary analytical data obtained from the groundwater samples collected from the monitoring locations within and surrounding the Permeable Reactive Barrier. The report must also provide a figure depicting the construction of the barrier and the locations of the monitoring points within and surrounding the barrier.

3) Section 3.2: Hydrology:

- (a) The Permittees shall provide a detailed description of the hydrology of Mortandad Canyon (e.g., known lateral and vertical extent of all zones of saturation, both known and unknown hydrologic features and parameters).
- (b) The Permittees shall provide a detailed description of the hydrology of Ten Site Canyon (e.g., discharges to the canyon, surface water flow, and alluvial saturation, both known and unknown).

4) Section 4.1: Conceptual Model:

- (a) NMED believes that there is too much emphasis on the conceptual model for this type of document. Investigation activities must be the primary focus of all work plans. This section is more appropriate for inclusion in the Investigation Report.
- (b) The Permittees shall clarify the frequency of monitoring of alluvial wells that is described in the sixth paragraph of this section, which states, "Alluvial wells in Mortandad Canyon have been routinely monitored since discharges to the canyon began from TA-50." Provide this clarification in the Investigation Report, as well as any concerns with this data, including the comparability of the data.
- (c) The seventh paragraph of this section states, "Geomorphic investigations conducted to date indicate that over half of the inventory of strongly adsorbing radionuclides (e.g., cesium-137 and americium-241) released in the TA-50 effluent has been deposited within the canyon reach between TW-8 and the sediment traps." The Permittees shall clarify, to the extent known, what the fate was of the other half of the inventory of these radionuclides. Provide this clarification in the Investigation Report.

5) Section 4.2.1: Surface Water Sampling Locations:

- (a) The Permittees shall clarify the months of the year when the "wet" sampling event is planned and upon what data this decision is based. Provide this clarification in the Investigation Report.

Comments requiring response in the Investigation Report

(b) The Permittees shall provide a figure that shows the locations of the proposed surface water sampling stations that are described in this section. Provide this figure in the Investigation Report.

6) Section 4.3: Other Investigations:

(a) The Permittees shall provide detailed descriptions of both the Infiltration and the Colloid Investigations in the Investigation Report.

7) Section 6.2: Investigation Report:

(a) The Permittees shall clarify the rationale for providing the results of the geophysical investigations, infiltration studies, modeling, geochemistry, and contaminant chemistry investigations as separate documents. The Investigation Report must also provide a schedule for submittal of these documents.

8) Figure 2: Locations of proposed wells and boreholes, selected existing wells, and existing and proposed DC resistivity lines:

(a) The Permittees shall revise Figure 2 to include the locations of the proposed intermediate wells I-2, I-7, and I-9. Provide the revised figure in the Investigation Report.