HSWA CANJL 4/1049/Mortandad

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May 28, 1998

Mat Johansen, DOE AIP POC
U. S. Department of Energy
Los Alamos Area Office, MS A316
Los Alamos, New Mexico 87544

RE: Review of Los Alamos National Laboratories "Work Plan for Mortandad Canyon" dated September 1997.

Dear Mr. Johansen:

The DOE Oversight Bureau (DOE OB) has reviewed the subject document. The attached comments are provided for the purpose of communicating the results of the review. They are not provided or intended for the purpose of representing the regulatory position of the New Mexico Environment Department.

The Work Plan for Mortandad Canyon provides the framework for the characterization of the Mortandad Canyon system including supplemental characterization of three potential release sites. Therefore, this review includes recommendations which are intended to help provide adequate characterization.

We appreciate the efforts of the LANL Canyons Focus Group staff and the opportunity to participate in technical discussions as this workplan was prepared. Many of the Bureau's comments and suggestion were taken into account. Communication such as this will help to improve the technical and regulatory acceptability of documents. We look forward to continued technical discussions as the investigation proceeds.

If there are any questions, please contact me at 505-672-0448 or Chris Hanlon-Meyer, the DOE Oversight Bureau Canyons Focus Group Manager at 505-827-1536.

Sincerely,

Stephen Yanicak

Steve Yanicak, LANL POC
Department of Energy Oversight Bureau

SY:CHM:chm

Attachment

cc w/o attachment:

J. Parker, NMED, Chief, DOE Oversight Bureau

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TL

cc w/ attachment:

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New Mexico Environment Department
DOE Oversight Bureau Review of
Mortandad Canyon Work Plan,
Los Alamos National Laboratory, September 1997

General Comments:

1. The document is an excellent synthesis of many types of existing data (some for the first time) and represents a significant effort on the part of the Canyons Focus Group.

2. The completeness of the data in the document provides a firm basis for the investigation proposed in the work plan.

3. The work plan is greatly enhanced by both the number and quality of the figures and tables.

Specific Comments:

1. § 2.3.2, paragraph 1, Page 2-8, Mortandad Canyon Garden Plot.

"Four radionuclides , all with half-lives of 115 days or less..."

The workplan should discuss any long-lived radionuclide daughter products that may remain at the site or that could be useful as tracers.

2. § 2.4.2, paragraph 3, Page 3-16, Historic Channel Changes.

"The traps are periodically cleaned out after they fill with sediment to restore their storage capacity."

The statement that "the traps are periodically cleaned out" gives little information regarding engineering or waste management practices.

The plan that LANL implements to clean out the traps should be referenced. The maximum estimated capacity of surface water (i.e. 100 year flood) that the traps can hold on-site should be included.

3. § 3.3.1.1.3, paragraph 1, Page 3-5, "Chaquehui Formation",

Although the quotation marks (and note in the text) indicate the informal nature of this name, it is also customary to not capitalize the rank term (formation) of such units.

4. § 3.3.1.2, paragraph 3, Page 3-7, Puye Formation.

"The lower part of the Puye Formation includes the "Totavi Lentil" of Griggs (1964, 8795),..."

According to the USGS lexicon and Water-Supply Paper 1753, the Totavi Lentil is a formal name and quotation marks are not needed. Also, the USGS references WSP 1753 as Griggs **and Hem**; he did the section on water quality.

5. § 3.4.2, paragraph 2, Page 3-16, Historical Channel Changes

"Progressive aggradation upstream of Ten Site Canyon apparently caused repeated flooding of the dirt road; the channel was diverted to the north side of the canyon after the 1987 floods (see Section 3.6)."

The document should reference Section 3.6.1 where information is included regarding the tendency for flow to spread across the floodplain area east of the diversion channel forming a large ($\approx$1600 ft^2) splay-like deposit.

6. § 3.4.3, paragraph 4, Page 3-17, Previous Field Screening and Sediment Analysis in Ten Site Canyon.

"The highest concentrations were restricted to one small area in the canyon floor, which was excavated as part of an interim action in 1996..."

The Interim Action Report has not yet been submitted to the RPMP. Information regarding the interim action and concentrations of contaminants remaining in the "small area" and the surrounding area are not included in the workplan.

The results of the interim action should be included and described in the workplan.

7. § 3.4.4.2.1, paragraph Page 3-35, Recent High-Resolution Survey of Plutonium and Uranium in Sediments.

"However, because only trace levels of plutonium, all attributable to global fallout, were observed from state road NM4 downstream to the Rio Grande (especially at locations A-9 and A-10), ..."

According to split sampling by the DOE OB and ESH-18 in 1996 and 1997, the annual Environmental Surveillance sampling station A-9 appears to be located in Cedro Canyon, not Mortandad Canyon. Sample data from this station may not be applicable to the characterization of the Mortandad Canyon system.

8. § 3.5.3.1, paragraph 1, Page 3-57, Borehole for Moisture Access Tube MCM-5.1.

The workplan discusses the distribution of several metals with depth in the borehole.

The workplan should discuss all the data collected during drilling of this borehole, including nitrate as nitrogen.

9. § 3.5.3.3 paragraph 2, Page 3-64, Borehole MCC-8.2.

"Activities of tritium and gravimetric moisture content with depth are shown in Figure 3.5.3-12."

The workplan should discuss all the data collected during drilling of this borehole, including nitrate as nitrogen.

10. § 3.6.5, paragraph 1, Page 3-83 Surface Water Quality and contaminant Data.

"Generally, the reported quality of surface water at GS-1 does not reflect the quality of the TA-50 RLWTF discharge because the surface water samples are collected at times of high runoff in the canyon."

According to DOE OB observations, surface-water samples are usually collected by ESH-18 at GS-1 (E200) under non-flood conditions (e.g., low flow and low turbidity). ESH-18 sampling times and dates should be checked and correlated with flow data.

11. § 3.7.2, paragraph 3, Page 3-88, Alluvial Groundwater.

Based on the tritium result (<340 pCi/L, as compared to tens of thousands of pCi/L at MT-4, a short distance up canyon) MCO-13 water appears to be different than shallow Mortandad Canyon ground water. The SAP should include additional work to determine if MCO-13 water is a result of southerly flow through the Cerro Toledo along a paleotopographic surface from Sandia Canyon.

12. § 3.7.2.3, paragraph 4, Page 3-98, Recent Alluvial Groundwater Observations.

Ground water is still perched, just not in the alluvium. Also, further discussion of the "...lower perching zone...30 ft below the alluvium/Cerro Toledo interval contact" would be useful.

13. § 3.7.2.3, paragraph 5, Page 3-98, Recent Alluvial Groundwater Level Observations.

"Currently at least 16 groundwater wells are sampled as part of the Laboratory's routine monitoring program. These include MCO-3, -4, -5, -6, -7, and -7.5,..."

According to DOE OB observations, only five wells (MCO-4B, 5, 6, 7, and 7.5) are routinely sampled.

The workplan should accurately state which wells in Mortandad Canyon are sampled and the time interval between sampling.

14. § 3.7.5, paragraph 1, Page 3-119 Data Required for Understanding The Hydrogeology of Mortandad Canyon,

The presence of a perched water body in Ten Site Canyon, as well as its connection with and contribution to ground water in Mortandad Canyon via underflow, should be investigated. This is covered in 7.3.4.1.2 , p. 7-68 (Continuity) and p. 7-75 (Issue 5/Approach), but should also be discussed in Section 3.7.2, Alluvial Groundwater.

15. § 3.8.1, paragraph 9, Page 3-125, Major Ions and Total Dissolved Solids in Surface and Groundwater.

The illustrated peak nitrate values for MCO-5 in Figures 3.8.1-7 and 3.8.1-8 do not agree. This may be a result of nitrate conversion (nitrate as nitrate vs nitrate as N). See 2nd para, p. 3-125.

16. § 3.8.3, Page 3-130 Radionuclides

A paragraph regarding ^{90}Sr should be added to the discussion of radionuclides.

17. § 4.2.2, item 1, Page 4-13, Groundwater Transport and resultant Exposures.

"When flow occurs, water infiltrates rapidly from the stream directly downward to a confining zone and gradually fills available pore spaces."

The explanation of the "bathtub model", should state that water infiltrates downward to a perching rather than confining zone.

18. § 7.0, paragraph Page7-1, Sampling and Analysis Plan.

Chapter seven (the SAP) would be improved if the issues were listed in a single table. The table could be organized by aquifer, canyon or topic. Such a table would make the SAP easier for reviewers to evaluate the set of issues.

19. § 7.1, paragraph 4, Page 7-1, Introduction.

"Table 7.1-1 summarizes the known chemicals of potential concern and their potential original source areas in the Mortandad Canyon system."

PCB's are listed as chemicals of potential concern for TA's 35, 48 and 50. Dioxins and furans are commonly associated with PCBs. Breakdown products from PCBs include dioxins and furans.

Dioxins and furans should be added to the list of chemicals of potential concern.

20. § 7.1, paragraph 5, Page 7-1, Introduction.

"Table 7.1-2 shows the initial estimates of the numbers and types of samples to be collected during the investigations."

The workplan states that the numbers may be revised throughout the investigation. The table allocates 16 samples for Mortandad Canyon, 4 for Effluent Canyon, 8 for Ten Site Canyon and 8 for each of the MCW reaches for full-suite analysis.

The number of samples for full-suite analysis allocated for each of the canyons and reaches does not appear to be sufficient to account for the variation of contaminant concentrations in each canyon and/or reach. The number allocated should be at a minimum 4 samples for each designated reach within the canyon system. The plan should allocate additional samples for full-suite analysis for those reaches that are either variable in geomorphology, are known to have a substantial inventory of contaminants or are longer that 1 km.

21. § 7.1.3, paragraph 2, Page 7-4, Historical Data.

"This plant routinely discharged treated waste and occasionally discharged raw wastes (unintentionally) to Pratt Canyon and Ten Site canyon."

The description of the raw waste releases is not clear. The waste was stored in treatment tanks, and for an unintentional release to occur, the tanks would have to rupture or leak in some other way. It seems that the release was intentional and the transfer of waste to the tanks faster than the treatment rate was unintentional.

The workplan should describe the nature of the releases of raw wastes.

22. § 7.1.4, paragraph 1, Page 7-4, Regulatory Requirements.

"The primary regulatory requirements are found in the Hazardous and Solid Waste Amendments (HSWA) Module of the Laboratory's Resource and Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit (EPA 1990, 1585).... The Environmental Protection Agency and the New Mexico Water Quality Control Commission have set standards for nonradionuclides and some radionuclides for drinking water, surface water and groundwater that may be applicable to water examined during these investigations;..."

On April 3, 1996, New Mexico Environment Department required LANL to prepare a plan for the discharge of contaminants from the Radioactive Waste Treatment Facility at TA-50. A Ground Water Discharge Plan application was submitted by LANL in August 1996 and is being reviewed by the Ground Water Quality Bureau. In part, the purpose of the actions described in the plan is to monitor the quality of Mortandad Canyon's alluvial ground water and to demonstrate that improvements in water quality are consistent with NMWQCC standards.

Significant information will be developed during the implementation of the discharge plan that will be used during the Mortandad Canyon investigation. Therefore, the data quality objectives and the activities proposed in the discharge plan should be summarized in the Mortandad Canyon RFI Work Plan.

23. § 7.2.2.1, paragraph 4, Page 7-8, Geomorphic and Radiological Survey Data Quality Objectives.

"Limited sampling of older sediments may be conducted to test the validity of criteria for distinguishing post-1942 sediment and to gauge the importance of other potential contaminant transport pathways."

It is unclear how the migration of contaminants into the pre-1942 sediments will be addressed during the implementation of the Surface Water and Groundwater Sampling and Analysis Plan.. Neither Section 7.2 Sediment Sampling and Analysis Plan nor Section 7.3 Surface Water and Groundwater Sampling and Analysis Plan describes how the coreholes, other than those located inside the sediment traps, will be used during the sediment investigation.

Analysis of the cored alluvial material obtained during drilling activities defined in section 7.3 Surface Water and Groundwater Sampling and Analysis Plan should be used to test the validity of the criteria for distinguishing post-1942 sediments and to gauge the importance of other potential contaminant transport pathways.

24. § 7.2.2.2, paragraph 5, Page 7-10, Sediment Sampling Data Quality Objectives.

Decision Rule #3:
"Any contaminant identified at concentrations above the 95% UTL of the current background or whose statistical distribution is different from that of the background data will be evaluated in the risk assessment for that reach."

According to the New Mexico Environment Department Hazardous and Radioactive Materials Bureau RCRA Permits Management Program Risk Based Decision Tree Box 3, maximum constituent concentrations should be compared to Administrative Authority approved: background for inorganic constituent concentrations, fallout for radionuclide concentrations, or MDLs, PQLs, or EQLs for organic constituent concentrations.

The workplan should be consistent with the NMED HRMB RPMP Risk Based Decision Tree.

25. § 7.2.4.1, paragraph 2, Page 7-15, Reach TS-2: Downstream of Pratt Canyon.

"Reach TS-2, located downstream of Pratt Canyon (Figure 7.2.4-4), is expected to have the highest concentrations of contaminants derived from the former TA-35 wastewater treatment plant in addition to contaminants from farther upstream in Ten Site canyon"

Although the confluence of Pratt Canyon with Ten Site Canyon is located within reach TS-2, the reach does not include Pratt Canyon where contaminants from TA-35 have been investigated. The workplan does not discuss the reason why Pratt Canyon is not included in this reach. Much of the potential inventory of contaminants in Pratt canyon has the potential to be transported into reach TS-2.

The boundaries for this reach should be expanded to include Pratt Canyon. Previously reported and unreported data should be used to guide the investigation of the sediments in Pratt Canyon.

26. § 7.2.4.5, paragraph 1, Page 7-26, Reach M-6: Below the Laboratory Boundary downstream to state road NM4 on San Ildefonso Pueblo Land.

"Plutonium concentrations are near worldwide fallout levels, although isotopic ratios indicate some Laboratory contributions."

Because isotopic ratios of plutonium indicate that sediments on San Ildefonso Pueblo land have been affected by Laboratory operations, reaches M-6 and M-7 should be characterized regardless of the concentrations of contaminants found in reaches located further upstream. The nature and extent of laboratory contributions of contaminants to sediments should be characterized. Characterization of these sediments will help to describe possible exposures resulting from Laboratory operations.

27. § 7.2.5, paragraph 3, Page 7-31, Field Surveys and Mapping of the canyon Reaches.

"It is expected that concentrations of radionuclides in many reaches will be too low to recognize with field instruments; therefore, these field measurements may not be taken in all reaches."

The workplan suggests that the use of field instruments should be limited based on expected concentrations rather than attempted measurements.

Field screening should be attempted in each reach or further information should be included to justify why the use of field screening instruments should be limited.

28. § 7.2.6.3.2, Table 7.2.6-3, Page 7-37, Analyte List, Estimated Detection Limits, and Analytical Methods for Inorganic Chemicals in Sediment Samples.

The information presented in this table should be consistent with the RPMP-approved background data set.

29. § 7.2.7.1, Characterization of PRS No. 00-001, Page 7-45, Issue Number 2 Approach.

"Samples in the 10-ft-deep boreholes will be collected from the following intervals..."

The sample collection intervals appear to be based on depth rather than morphology and screening.

Sample collection intervals should be based on sediment morphology and screening data. So that contaminant migration can be adequately characterized, discreet samples should be collected

from each sediment unit beneath the sediment traps.

31. § 7.3.1, Page 7-51, Objective.

The list for the field investigation phase should include drilling of the proposed wells.

32. § 7.3.2.1 , Page 7-52 Surface Water and Alluvial groundwater Data Quality Objectives.

In order to provide full penetration of the unit of interest, all Cerro Toledo wells should be drilled to the top of the Otowi member.

33. § 7.3.4.1 ,paragraph 1, Page 7-60, Alluvial, Bandelier Tuff, and Regional Groundwater Investigations.

Table 1 is attached to these comments illustrating the DOE Oversight Bureau's suggestions and rationale for well and gaging station additions, replacements and relocations.

34. § 7.3.4.1.2 ,Issue 2, Approach, Page 7-73, Proposed Alluvial Groundwater/Cerro Tolledo Interval Wells and Hydrogeologic and Geochemical Investigations.

The specific evapotransporation measurement method should be identified (laser, sonic, etc). Measurement methods of the type proposed were developed for cultivated crops and are intended to be made across the top of large stands of a single plant type. Thus, it should be specified that ET stations will be set so as to measure moisture above uniform stands of the local vegetation. Furthermore, all major vegetation types should be included.

If there are any questions about this review, please contact Steve Yanicak at 505-672-0448 or Chris Hanlon-Meyer, the DOE Oversight Bureau Canyons Focus Group Manager at 505-827-1536.

Document reviewed by: Chris Hanlon-Meyer, William Stone and Michael Dale.

TABLE 1

DOE Oversight Bureau Proposed Changes to Wells and Gaging Stations for Mortandad Canyon RFI

No. or Location	Proposed change by OB	Rationale for Change
	Wells for Saturation in Alluvium (drilled through Qal)	
MCO-0.6	no change	
replace MCO-3	no change	
between MCO-3 & 4	**add well**	**large data gap**
MCO-4B	no change	
	Wells for Saturation in Bandelier Tuff (drilled through Qb)	
MCOBT - 4.4	no change	
MCOBT - 8.5	no change	
just below confluence of Pratt & Ten Site Canyon	**add well**	**for deeper intermediate water**
	Wells for Saturation in Cerro Toledo (drilled through Qct)	
MCO-6.8	**move near MCO-6**	**detect any saturation below Tshirege**
MCO-7.2	**move South of road**	**evaluate southerly flow**
near MCO-8	**add well**	**fills in data gap**
North of MCM-7.5 on North side of canyon	**add well**	**provides 3-well triangle for flow direction determination**
near MCM-10	**add well**	**fills in data gap**
2 wells at MCO-13	**spread out**	**for water-table slope**
TSWB-6A	**replace with 3 well transect up canyon**	**evaluate inflow to Mortandad Canyon**
35-2028	**redrill**	**for deeper intermediate water**
	Gaging Stations	
GS-1.3	**move to 3000 ft East of GS-1**	**1000 ft is too close**
GS-3	**redo**	**fills in data gap**
TSGS-1	**move upstream 500'**	**narrower part of canyon**
just below mouth of Pratt Canyon	**add gage**	**for storm runoff**