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RECEIVED APR 1997

Date: April 18, 1997
Refer to: EM/ER:97-126

Mr. Benito Garcia
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: RESPONSE TO THE NOD FOR LOS ALAMOS AND PUEBLO CANYON WORKPLAN (FORMER OPERABLE UNIT 1049)

Dear Mr. Garcia:

Enclosed is a copy of the Los Alamos National Laboratory's (the Laboratory) response to the New Mexico Environment Department's (NMED) Notice of Deficiency (NOD) concerning the Los Alamos and Pueblo Canyon Workplan. These responses also reflect input received from NMED during discussions held in Santa Fe on April 14, 1997. As opposed to reissuing the Workplan, these NMED Comments and the Laboratory's responses to the NOD will become part of the original Workplan. A certification form signed by the appropriate officials is also enclosed. The enclosed response repeats each comment from the NOD for convenience in reviewing.

Please contact Allyn Pratt at (505) 667-4308 or Bob Simeone at (505) 667-0587, if you have any questions regarding the response to the NOD.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/ss

Enclosures: (1) Response to the NOD for Los Alamos and Pueblo Canyon Workplan (Former Operable Unit 1049)
(2) Certification

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J. Harry, EES-5, MS M992
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EM/ER File, MS M992

CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title: Response to the NOD for Los Alamos and Pueblo Canyon Workplan (Former OU 1049)

Name: _____ Date: 4-18-97

Jorg Jansen, Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

or

Tom Baca, Program Director
Environmental Management
Los Alamos National Laboratory

Name: _____ Date: 4/18/97

Mathew Johansen,
Acting Assistant Area Manager of
Environment Projects
Environment, Safety, and Health Branch
DOE-Los Alamos Area Office

or

Theodore J. Taylor,
Program Manager
Environment Restoration Program
DOE-Los Alamos Area Office

RESPONSE TO NOTICE OF DEFICIENCY ON THE LOS ALAMOS AND PUEBLO CANYON WORKPLAN

General Comments

NMED COMMENT:
All references made to the Environmental Protection Agency (EPA) being the Administrative Authority (AA) should be replaced with the New Mexico Environment Department (NMED).

LANL RESPONSE:
All future Canyons RFI documents will refer to the New Mexico Environment Department as the Administrative Authority.

NMED COMMENT:
The Los Alamos National Laboratory (LANL) shall provide consistency within the report by employing the English unit measurement system in addition to references of the Metric System.

LANL RESPONSE:
As appropriate all future Canyons RFI documents will include both English and Metric unit measurements.

NMED COMMENT:
All references made to Task/Site Workplan should be replaced with RCRA Facility Investigation (RFI) Workplan.

LANL RESPONSE:
All future Canyons Workplans shall be referred to as RCRA Facility Investigation (RFI) Workplans.

NMED COMMENT:
A site map should be included within this Workplan which depicts all potential release sites (PRS) in relation to proposed sampling locations.

LANL RESPONSE:
A site map showing the locations all potential release sites within the Los Alamos and Pueblo Canyon drainage basins will be prepared.

NMED COMMENT:
Recreational land-use scenarios are proposed as exposure scenarios for determining human health risk for a majority of reaches within Pueblo and Los Alamos Canyons. Using a recreational land use scenario may allow concentrations of contaminants to remain at the site and thus hazardous constituents which have the potential to migrate off-site may pose an unacceptable risk using a residential land-use scenario.
As noted in an Environmental Surveillance (ES) Report (1992), "Most of the residual radioactivity from these historical releases is now associated with the sediments in Pueblo Canyon with an estimated total inventory of about 600 mCi of plutonium (ESG 1981). About two-thirds (400 mCi) of this total are in the DOE-owned portion of lower Pueblo Canyon." This would suggest that additional source areas due to accumulation of sediments down canyon need to be considered. Concentrations of constituents of concern may increase down canyon as a result of potential "secondary" source areas. This information indicates sediment migration is of concern when assuming a recreational land-use scenario within one reach. LANL shall propose an acceptable solution to this situation.

LANL RESPONSE:
Initial evaluation of risks will be based on a Native American Pueblo subsistence scenario. This scenario is more conservative than EPA residential scenarios based on default assumptions, and will be used to identify any potential problems at an early stage. The iterative approach for the Canyon's investigation will result in a high degree of uncertainty after the initial sampling rounds, so not all scenarios will be used during the initial stages. Additional scenarios will be evaluated as areas of uncertainty are reduced with subsequent sampling rounds based on their importance for risk-based decision making. This approach is detailed more fully in the Canyon's Core Document.

NMED COMMENT:
The ecological risk model presented within Chapter 6 should be modified to reflect LANL's recent approach to ecological risk-assessment as described within the *Ecological Risk Assessment for LANL (1997)*.

LANL RESPONSE:
The ecological risk model will reflect the Laboratory's current ecological risk assessment approach (March 1997).

NMED COMMENT:
Numerous reaches within Los Alamos and Pueblo Canyons (e.g. DP Canyon/ Los Alamos Canyon confluence, Acid/Pueblo Canyon confluence, and upper Los Alamos Canyon (TA-2)) contain significant sediment contamination in need of stabilization. As noted by NMED DOE OB (Steve Yanicak to Court Fesmire

dated May 6, 1996), contaminants found in sediments within the canyon bottom at TAs 2 and 41 need to be stabilized: "water levels within the alluvium could rise to a point at which ground water may come into contact with contaminates (e.g., ^{90}Sr) in the vadose zone, and therefore, introduce or re-mobilize" contaminants within sediments. Until appropriate final measures can be implemented, LANL shall develop stabilization measures for known areas of significant sediment contamination to prevent further migration of contamination.

LANL RESPONSE:
Stabilization and other interim measures will be implemented in areas that contain significant sediment contamination. The Laboratory will develop internal criteria for identifying triggers for interim actions and discuss these criteria with NMED. In addition, the Laboratory will evaluate the use of Best Management Practices for areas where contaminated sediments could be mobilized by releases of potable water to the canyon floor (e.g. TA-53 and Otowi-4 discharges). The locations and schedules for these actions will be identified in the Fiscal Year 98 Replan which will be completed in July of this year.

NMED COMMENT:
All schedules shall be modified to reflect the current status of activities and completion dates of specific tasks.

LANL RESPONSE:
Schedules in the Workplan will be modified to reflect the current status of activities, completion dates of specific tasks, and report dates. Schedules will be updated as part of the Fiscal Year 98 Replan which will be completed in July.

<u>Specific Comments</u>
NMED COMMENT:
Executive Summary, pg. ES-1(Response to Regulatory Requirements): The following sentence should be changed from, ~~"This site/site work plan satisfies the regulatory requirements of Module VIII, Sections I.5 and Q, tasks 1 through 5, of the HSWA Permit..."~~ to **"This RFI Workplan intends to satisfy a portion of the regulatory requirements of Module VIII, Sections I.5 and Q, tasks 1 through 5, of the HSWA Permit...".**

LANL RESPONSE:
Executive Summary, p. ES-1: The referenced sentence will be changed to "This RFI Workplan intends to satisfy a portion of the regulatory requirements of Module VIII, Sections I.5 and Q, tasks 1 through 5, of the HSWA Permit...".

NMED COMMENT:
Table 1-2, Pg. 1-9: The schedule proposed for the submittal of all the remaining canyon Workplans is unacceptable. HRMB will initiate an agency permit modification to set a specific schedule of investigation for the 15 major canyons as a part of the HSWA Module. LANL shall resubmit a schedule which does not extend beyond the year 2000 for submitting all remaining canyon work plans.

LANL RESPONSE:
The schedule for completion of Canyon's SAPs will be modified to reflect the schedule below. This updated schedule will be incorporated in the Fiscal Year 98 Replan.

Canyon Groups	Associated Technical Areas	Associated Operable Units	Task/Site Work Plan Date
Core Document	N/A[b]	N/A	April 1997
Group 1			November 1995
Los Alamos/DP	Former TA[c]: 1 Current TAs: 0, 2, 3, 21, 41, 43, 53, 62, 72, 73, 74	1071, 1078, 1098, 1100, 1106, 1111, 1114, 1136	
Pueblo/Acid	Former TAs: 1, 45 Current TAs: 0, 72, 73, 74	1071, 1078, 1079, 1100, 1106	
Group 2	Current TAs:		September 1997
Mortandad and Sediment Traps	3, 4, 5, 35, 42, 48, 50, 55, 59	1114, 1129, 1147	
Group 3	Current TAs:		September 1998
Pajarito	6, 7, 8, 9, 14, 18, 22, 23, 36, 40, 46, 50, 51, 54, 65, 66, 67, 69	1093, 1111, 1129, 1130, 1140, 1157	
Twomile	3, 55, 58, 59, 64	1111, 1114, 1129	
Threemile	14, 15, 18, 36, 67	1085, 1086, 1093, 1130	
Group 4	Current TAs:		September 1999
Cañada del Buey	5, 18, 46, 51, 52, 54	1129, 1140, 1148	
Sandia	3, 53, 60, 61, 72	1100, 1114	
Group 6	Current TAs:		March 2000
Water	11, 16, 28, 36, 37, 49, 68, 71	1082, 1086, 1122, 1130, 1132, 1144	
Cañon de Valle	9, 11, 14, 15, 16, 37, 67	1082, 1085, 1086, 1157	
Group 7	Current TAs:		September 2000
Ancho	33, 39, 49	1122, 1132, 1144	
Indio	39, 49, 70	1132, 1144	
Chaquehui	33	1122	
Group 8	Current TAs:		March 2001
Potrillo	14, 15, 36, 67	1085, 1086, 1130	
Fence	36, 68, 70, 71	1122, 1130	
Group 5	Current TAs:		June 2001
Guaje	74, residences	1071	
Bayo	0, 10, 74, residences	1071, 1079	
Barrancas	74, residences	1071	
Rendija	0, 74, residences	1071	

NMED COMMENT:
Section 2.5.5.1, pg. 2-22, par. 2: The following strikeout text should be replaced with the redline text; "~~Two of the lagoons contain only sanitary waste..",~~ **"Two of the lagoons contain a mixture of industrial and sanitary waste..".**

LANL RESPONSE:
The sentence shall be modified to read "Two of the lagoons contain a mixture of industrial and sanitary waste".

NMED COMMENT:
Section 3.6.3.2, pg. 3-42: The occurrence of intermediate perched ground water in Otowi-I (Pueblo Canyon) and PM-1 (Sandia Canyon) should be noted in this section.

LANL RESPONSE:
The occurrence of intermediate perched water in Otowi-1 and PM-1 will be noted in this section.

NMED COMMENT:
Table 3-17, pg. 3-82: The well logs for TW-2A do not indicate that ground water was encountered from the Cerros Del Rio Basalts. Please revise this table and associated narrative.

LANL RESPONSE:
The title to Table 3-17 on p.3-82 will be changed to read "Water-Quality Data from Intermediate Perched Zone Wells, Pueblo Canyon". Also, the section heading for section 3.7.5.2 will be changed to "Pueblo Canyon".

NMED COMMENT:
Table 3-17, pg. 3-82: The well logs for TW-2, TW-3, and TW-4 do not indicate they were completed within the Santa Fe Group, but rather the Totavi Formation, Puye Formation and possibly the Tschicoma Formation. Please revise this table and associated narrative.

LANL RESPONSE:
The title to Table 3-18 on pp. 3-83 to 3-85 will be changed to read "Water-Quality Data from the Main Aquifer Wells, Los Alamos Canyon and Pueblo Canyon". Also, the text in section 3.7.6 will be modified to clarify that TW-1, TW-2, and TW-3 are completed in the Puye Formation (including the Totavi Lentil) in the upper part of the main aquifer, and that TW-4 is completed in the Tschicoma Formation.

NMED COMMENT:
Section 3.7.6.1, pg. 3-86, par.6: The barometric pressure data for TW-1A and TW-1 may indicate a time-lag observation between these two points. It does not necessarily suggest that these two zones of saturation are hydraulically disconnected. This inference should be qualified.

LANL RESPONSE:
The sentence will be removed and replaced by "Water levels in TW-1 and TW-1A increased by 80 ft and 2 to 10 ft, respectively, following the drilling of Otowi-1 in 1990. The increase in water levels may be due to lost fluid circulation in the Puye Formation during the drilling of Otowi-1. Water levels in both holes began to decline in 1992. Water levels in TW-1A began to stabilize by mid-1993 and since then the changes in water level are probably due to cyclical seasonal variations. Water levels in TW-1 stabilized in 1996 and now seem to be responding to seasonal variations. These synchronous changes in water levels along with similarities in above background tritium concentrations and major ion chemistry indicate that TW-1 and TW-1A are hydraulically connected (McLin, 1996)".

NMED COMMENT:
Section 3.7.6.1, pg. 3-86, par.7: Within this paragraph, the reference made to Otowi-4 should be Otowi-1.

LANL RESPONSE:
The reference to Otowi-4 will be corrected to Otowi-1.

NMED COMMENT:
Section 6.3.2, pg. 6-8, par. 1: "Risk calculations for this investigation will incorporate contaminant levels found in the perched zones unless field investigations demonstrate that the perched zones are not usable for water supplies." As previously conveyed in a letter from NMED to DOE/LANL (Mr. Ed Kelley to Mr G. Thomas Todd, dated July 24,1996), this approach is unacceptable. LANL shall remove this sentence from the Workplan.

LANL RESPONSE:
The sentence "Risk calculations for this investigation will incorporate contaminant levels found in the perched zones unless field investigations demonstrate that the perched zones are not useable for water supplies" shall be removed.

NMED COMMENT:
Table 7-5, pg. 7-21: As indicated in Table 7-5, the total number of full-suite analyses samples to be taken for Reaches P1 - P4 is eight. However, the

number of samples to be collected per reach is denoted as (4/reach). Please clarify the total number of samples taken.

LANL RESPONSE:
A minimum of four full-suite samples will be collected in each of two reaches in Pueblo Canyon. Upon implementing the plan in FY96, the Canyon's Technical Team actually collected 10 full-suite samples from reach P-4 and 7 full-suite samples from reach P-1.

NMED COMMENT:
Table 7-5, pg. 7-21: Although section 7.2.2.1.3 states, "Reach LA-4 may contain the highest concentrations of Laboratory-derived contaminants along lower Los Alamos Canyon", Table 7-5 indicates that Reach LA-4 samples will not be analyzed for a full-suite of organics, inorganics, and radionuclide constituents. LANL should provide an explanation of the sampling of reaches P-4 combined with LA-3 to justify the limited analysis of LA-4 within the text.

LANL RESPONSE:
Appropriate analyte suites for reaches not sampled for full-suite analyses will be determined by an evaluation of analytes above background in the closest upstream reach or reaches (e.g., analyte suite for LA-4 chosen based on analytes identified above background in reaches LA-3 and P-4).

NMED COMMENT:
7.3.3, pg. 7-36: Regional aquifer wells should be included as part of this workplan in order to investigate known releases of hazardous constituents to ground water as described within NMED's *Hydrogeologic Evaluation of* LANL dated July 1996. The following locations should be investigated as described within the above-noted document: 1) Reach P-I (immediately below the confluence of Acid/Pueblo Canyons), 2) Reach P-4 (immediately adjacent to POI-4), and 3) Reach LA-2 (immediately adjacent to LOAI-3.2). Specific single well aquifer characteristic testing should be performed as well as pumping of the regional aquifer wells, which are clustered with intermediate perched aquifer wells, to observe water-level measurements within P01-4 and LAOI-3.2.

LANL RESPONSE:
Characterization of perched zones and the regional aquifer below Los Alamos and Pueblo Canyons is now integrated with other Laboratory groundwater investigations as outlined in the Laboratory's Hydrogeologic Workplan. The groundwater investigations proposed in the Los Alamos and Pueblo Canyons Workplan will be modified to reflect the groundwater investigation approach in the Hydrogeologic Workplan after NMED completes its review and approves the Hydrogeologic Workplan.

All of the locations suggested for placement of characterization wells in the Notice of Deficiency are already targeted for regional aquifer wells in the Hydrogeologic Workplan. Specifically, the well near the confluence of Acid and Pueblo Canyon is R-2, the well near POI-4 is R-5, and the well in reach LA-2 is R-8. The general locations of these wells are shown in Fig. 4-2 and Appendix 6 of the Hydrogeologic Workplan. The exact locations of wells may change to reflect improvements in our understanding of the hydrogeologic setting, and the NMED will be a participant in annual negotiations with the Laboratory and the DOE to decide the placement of wells.

Core samples will be collected from the intermediate zones to characterize hydrologic properties. Single well slug testing will be conducted in selected intermediate perched groundwater zones (generally 5 ft or greater in thickness). Because of the great thickness of unsaturated rocks separating the groundwater bodies, pumping the regional aquifer to observe water level fluctuations in intermediate-depth perched zones (e.g. in POI-4) does not appear to be a practical way of identifying interconnections. The interconnection between these groundwater bodies will be examined using water-level transducers to observe seasonal recharge effects and water-quality data to identify the presence of Laboratory derived contaminants and the geochemical signatures of the various modes of groundwater occurrences.

NMED COMMENT:
7.3.3, pg. 7-36: This section lacks proposed aquifer testing for all concerned modes of ground water occurrence. LANL shall include aquifer testing for all newly constructed wells and provide the results within the RFI Report. Also, water-level measurements should be obtained quarterly for all newly installed wells and reported within the RFI Report.

LANL RESPONSE:
Aquifer testing for the intermediate zones shall be performed as described in #12 above. Single well tests either pumping or slug will be performed for the regional wells. Criteria will be developed and discussed with NMED and DOE on the hydrologic testing for the regional wells. Core samples will be collected and these can provide some information on hydrologic properties. Water level transducers will be installed in all regional aquifer wells. As described in the Hydrogeologic Workplan, the decision to install dedicated wells to intermediate-depth perched groundwater will be made after evaluating the perched groundwater bodies encountered during drilling of the regional aquifer wells. Transducers will be installed in any intermediate-depth wells that are installed.

NMED COMMENT:
7.3.3.1.2, pg. 7-40: All water samples collected for compliance with RCRA and comparison with LANL SALs shall be collected as unfiltered samples. See letter from EPA to DOE\LANL (Mr. Honker to Mr. Vozella) dated May 16, 1995.

LANL RESPONSE:
Both filtered and unfiltered water samples will be collected and analyzed. Filtered samples, excluding total mercury, will be collected pursuant to State of New Mexico Water Quality Control Commission regulations. The US EPA (RCRA Ground Water Monitoring Technical Enforcement Guidance Document) recommends that filtered samples be collected in addition to unfiltered samples for metal-inorganic analyses. Unfiltered samples will also be collected for volatile organic carbon and semi-volatile organic carbon analyses. The Laboratory is no longer using SALs for comparison to water samples.

NMED COMMENT:
7. 7.3.3.1.5, pg. 7-64: The title to this section is misleading since the regional aquifer is found primarily within the Puye Formation and Totavi Lentil beneath LANL.

LANL RESPONSE:
The title to section 7.3.3.1.5 will be changed to "Main Aquifer Testing".

NMED COMMENT:
7.3.3.1.5, pg. 7-67: In general, isotope data is the most indirect and inconclusive data to support hydraulic connection between various zones of saturation. Methods for investigating hydraulic connection include direct water-level measurement, aquifer characteristic testing, tracer tests, and isotope data. The first three methods listed are the most direct and conclusive. LANL shall supplement all water chemistry data used to support hydraulic connection inferences with water-level observation data where available.

LANL RESPONSE:
The Laboratory will supplement all water chemistry data used to support hydraulic connection inferences with water level observational data, field data (temperature, specific conductance, turbidity, and pH), and hydrologic properties where available.

NMED COMMENT:
7.3.3.1.5, pg. 7-67; Water-level transducer data shall be collected and analyzed from POI-4, TW-IA, and TW-I during the zonal sampling of Otowi-I. Pumping rates and water-levels observed within O-I should be documented and reported within the RFI Report.

LANL RESPONSE:
Zonal sampling of the Otowi-1 municipal water supply well was completed between December 12, 1996 and January 10, 1997. The New Mexico Environment Department's Notice of Deficiency was dated March 17, 1997. Hence the zonal sampling at Otowi-1 had already been completed by the time this notice was received at the Laboratory. The new production pump was installed in Otowi-1 in March, 1997 and the well is no longer available for further zonal sampling.

Routine hourly water level measurements were collected at test wells TW-1 and TW-1A during the zonal sampling efforts at Otowi-1. However, no water levels were collected at well POI-4. During a previous 24-hour step-drawdown pump test at Otowi-1 conducted in 1990 (Purtymun et al., 1993), no water level declines were recorded in wells TW-1 or TW-1A. During this 1990 test, the Otowi-1 water production rate varied between 676 and 1375 gpm. Hence there was no reason to suspect that zonal sampling at 15 gpm would result in observable water level declines at TW-1, TW-1A, or POI-4. In addition, water levels in the Otowi-1 well were not recorded because of the low pumping rate required for the zonal sampling procedure.

Five separate 46-foot long zones were sampled over the screened interval in Otowi-1. A constant-length sampling interval was maintained with two K-packers separated by a 4-inch (ID) perforated pipe. A five-horsepower submersible pump was placed inside the 4-inch perforated pipe, and the entire assembly was lowered inside the 16-inch diameter wellbore using 2.375 inch drill pipe. Water was pumped to a 16,800 gallon holding tank before final discharge into the permitted NPDES outfall at the well-site. Individual water samples were collected at the wellhead through a small gate valve. A total of 100,320 gallons of water was pumped; the average pumping rate was approximately 15 gallons per minute (gpm).

NMED COMMENT:
7.3.3.1.5, pg. 7-67: Within the Workplan, 10 ft screen intervals are proposed for alluvial monitoring wells. Anticipated water-level fluctuations should be considered during the design of well construction for the alluvial monitoring wells. LANE shall propose screen lengths for all shallow perched "alluvial" monitoring wells to NMED for approval on a site-by-site basis. Twenty-foot screened intervals should be utilized for all other proposed monitoring wells (regional aquifer and intermediate perched ground water) unless data exists to justify the need for longer screened intervals.

LANL RESPONSE:
We agree that anticipated water-level fluctuations should be considered during the design of well construction for the alluvial monitoring wells. The Laboratory will propose screen lengths to NMED for approval on all alluvial monitoring

wells on a case by case basis. The Laboratory will also propose screen lengths to NMED for approval on all regional aquifer wells on a case by case basis. Water-levels have declined as much as 100 ft in 40 years in the eastern part of the Laboratory, thus wells with 20 ft screens (presumably with 5 ft of screen above water and 15 ft below water) would be limited in their utility as potential monitoring wells. Screen lengths should be determined based on local trends of water level decline and the desired design life expectancy of the well.

References

McLin, S.G., 1996, Analysis of water level fluctuations in Pajarito Plateau wells, NM Geological Society Guidebook, 47th Field Conference, Jemez Mountains Region, pp. 421-426.

Purtymun, W.D., McLin, S.G., Stoker, A.K., Maes, M.N., and Hammock, B.G., 1993, Water Supply at Los Alamos during 1990, Los Alamos National Laboratory Report LA-12471-PR, 50 p.