



State of New Mexico  
**ENVIRONMENT DEPARTMENT**  
**DOE OVERSIGHT BUREAU**  
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March 24, 1998

Mr. Mat Johansen, AIP POC  
 U.S. Department of Energy  
 Los Alamos Area Office  
 528 35th St - MS A316  
 Los Alamos, NM 87544

**Re: LANL's Response to NMED Request for Supplemental Information on the Hydrogeologic Workplan**

Dear Mr. Johansen:

Enclosed please find our review of the subject document. Remarks are offered in the spirit of technical comment and do not reflect the regulatory position of NMED.

If you have any questions, please call Michael Dale of my staff (672-0449) or me (672-0448).

Sincerely,

Steve Yanicak  
 POC/LANL

SY/mrd,wjs,/mrd

Enclosure

cc: Ted Taylor, DOE LAAO, MS A316  
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DOE OB Review Comments on  
**LANL's RESPONSE TO NMED REQUEST FOR SUPPLEMENTAL INFORMATION  
ON THE HYDROGEOLOGIC WORKPLAN**

**GENERAL**

1. The DOE OB urges that there be a constant interchange of findings of the ER, sitewide and watershed-management programs.
2. The conceptual hydrogeologic model can only be improved by such cooperation.

**SPECIFIC**

3. Page 15, Specific Comment 2.1.3.1 Surface Water, Comment 1A

- a) See items 9, 10, 11 and 12 from OB review comments to the Canyons Core Document,
- b) See item 1 from OB review comments to the Hydrogeologic Workplan,
- c) See NMGS technical paper (Dale and Yanicak, 1996) and
- d) See technical report (Dale, 1998, in press).

4. Page 15, Specific Comment 2.1.3.1 Surface Water, Comment 1B

See Item 1.

5. Page 16, Specific Comment 2.1.3.2, Groundwater, Comment 4

The subdivision of perched-water occurrences is not as important as the recognition that there may be more zones than can be indicated by a simple designation as "intermediate". For clarity, these should be labeled by specific geologic unit. The same goes for "shallow" perched water, for example, that in the upper Bandelier Tuff in mesas and alluvium in canyons (see NMGS paper by Stone, 1996).

6. Page 17, Specific Comment 2.1.3.2, Groundwater, Comment 6

LANL's response may be accurate; however, a break in the waterline near the Water Canyon Gallery source, located in a northern tributary to Water Canyon, occurred between October 23 and November 15, 1996. Water now flows into the tributary, but some flows into the down-dropped section of the pipe at approximately 20 gpm. Apparently this excess water has filled the tanks at the Gallery and subsequently overflows to a ditch near the TA-16 entrance. The DOE OB recommends that 1) all above-ground piping, structures, etc. related to the Water Canyon Gallery be removed as soon as possible, 2) the area be reclaimed back to its original setting, and 3) this potential recharge source be accounted for in LANL's conceptual hydrogeologic model (especially loss across the Pajarito fault zone).

7. Page 18, Specific Comment 2.1.3.2, Groundwater, Comment 7

We agree that the sources of recharge for the regional aquifer are not completely understood. Available data need to be re-evaluated by both LANL and NMED, especially the possibility of recharge by underflow along paleochannels from the north (for example, along the late Miocene trough of Purtymun, 1984).

8. Page 20, Specific Comment 2.1.3.2, Groundwater, Comment 9 (fourth paragraph)

NMED would be interested in evaluating the "ample chemical, isotopic, and hydrologic data" suggesting waters from the Pajarito and Los Alamos well fields come "from very different water

masses” (more likely, one water mass recharged by different sources). It is interesting to note that data from wells within each of these fields show considerable variation, suggesting multiple recharge sources or mixing over the long screened intervals typical of production wells. Evaluating the data from zonal sampling at PM-3 (most constituents) and O-1 (especially metals) may shed light on this question. Discrete sampling of long screened intervals is only productive where wells were constructed of alternating filter-packed screen and sealed blank sections and packers are set inside the casing at adjacent blank intervals.

9. Page 23, Specific Comments: 4.0 Hydrogeologic Characterization, Comment 3

LANL should install wells to characterize and monitor intermediate depth ground-water occurrences throughout the Laboratory. Data from such wells would help determine many of the unknown which exist at the Laboratory (transport pathways, recharge, etc.). Such wells will also serve as an early-warning system to protect the regional water supply.

10. Page 24, Specific Comments: 4.0 Hydrogeologic Characterization, Comment 5A

R-5 should be placed near POI-4 for a paired-well installation.

11. Page 25, Specific Comments: 4.0 Hydrogeologic Characterization, Comment 5C

R-8 should be drilled near LAO-3 or LAO-4 (east of the confluence of DP and Los Alamos Canyons). Such a well will give hydrogeologic, and contaminant-transport data. TW-3 should be modified in order to seal-off the annulus within the saturated alluvium and approximately 50' below the alluvium/tuff contact.

12. Page 25, Specific Comments: 4.0 Hydrogeologic Characterization, Comment 5E

See draft Work Plan for Pajarito Canyon. The locations of the R wells in the Pajarito Canyon watershed have be changed based on a more thorough review of existing data.

13. Page 26, Specific Comments: 4.0 Hydrogeologic Characterization, Comment 5F

See draft Work Plan for Mortandad Canyon. The locations of the R wells in the Mortandad Canyon watershed have be changed based on a more thorough review of all existing data.

14. Page 27, Specific Comments: 4.1.1.4 Type 4 Wells, Comment 1

Based on information derived from R-9 (multiple saturated zones and hydrochemical facies at or near the regional water table), it may be worth using a Westbay-type system. If perched intermediate zones are contaminated, wells in them should probably be completed and monitored separately to avoid contaminating the regional system.

15. Page 28, Specific Comments: 4.1.1.5 Type 5 Wells, Comment 1

PVC casing should not be used at depths greater than 400-450'. Multiple pipe manufactures and distributors recommend not using PVC at depths greater than 500'.

16. Page 31, Specific Comments: 4.3.2.3 Canada del Buey, Comment 1

LANL's response is incorrect. Ground water at CDBO-6 and CDBO-7 is present in the tuff, not alluvium. It should be noted that the hydrochemistry from the saturated tuff does not match that of PM-4. Ground-water flow direction in the tuff does not necessarily parallel that of the canyon alluvium. This may be the reason that other wells in the canyon are dry. Alternatively, other wells

in the canyon may not have been drilled deep enough.

17. Page 32, Specific Comments: 4.3.2.4 Pajarito Canyon, Comment 2

See draft Work Plan for Pajarito Canyon. The locations of the R wells in the Pajarito Canyon watershed have been changed, based on a more thorough review of existing data.

18. Page 33, Specific Comments: 4.3.3.1 Area Description and History, Comment 2

LANL's MDA Focus Group will soon be applying an interflow BMP at and near the Hydro nuclear shafts. All boreholes which do not contain an adequate seal (30-40' plug) across the soil/tuff interface should be either plugged or modified such that an adequate seal is provided.

19. Page 35, Specific Comments: 4.3.4.2 Ancho Canyon, Comment 3

Saturated zones in the canyon bottom alluvium and the Cerro Toledo interval may not be physically distinguishable due to the volcanoclastic nature of the Cerro Toledo interval.

20. Page 38, Specific Comments: 4.3.6.2 Potrillo Canyon, Comment 3

Another probable feature may be that the volcanoclastic sediments of the Cerro Toledo interval subcrop beneath the alluvium; hence, ground-water-flow direction, gradient, saturated thickness, contaminant transport, etc. would not be dependent on characteristics of the canyon-bottom alluvium.

21. Page 40, Specific Comments: Appendix 6, Maps, Comment 1

Individual or canyon-specific work plans should and do include detailed cross-sections.