Steve
Teri -

*State of New Mexico*
***ENVIRONMENT DEPARTMENT***
***DOE OVERSIGHT BUREAU***
***P.O. Box 1663, MS/J-993***
***Los Alamos, New Mexico 87545***

***GARY E. JOHNSON***
***GOVERNOR***

***MARK E. WEIDLER***
***SECRETARY***

August 25, 1997

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 "Core Document for Canyons Investigations" dated April 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 Canyons Core Document provides the framework for the preparation of canyon-specific workplans. Therefore, this review includes recommendations which are intended to help provide accurate descriptions of the hydrogeologic settings of the canyons. In addition, to assure that canyons investigations address the data requirements of risk assessors, we recommend that the document define the process of communication between the Canyons Group and the Laboratory-wide ecological and human health risk investigators.

We appreciate the efforts of the LANL FU-4 staff canyons investigators and the opportunity to participate in technical discussions as workplans are prepared. We look forward to continued technical discussions as the canyons investigations proceed.

If there are any questions, please contact me at 505-672-0448 or Chris Hanlon-Meyer, the DOE Oversight Bureau FU-4 Manager at 505-827-1536.

Sincerely,

Stephen Yanicak

Steve Yanicak, LANL POC
Department of Energy Oversight Bureau

SY:CHM:chm

Attachment

TC

6917

cc w/o attachment:

J. Parker, NMED, Chief, DOE Oversight Bureau

cc w/ attachment:

B. Garcia, NMED, Chief, HRMB
G. Saums, NMED, Program Manager, SWQB
T. Taylor, DOE LAAO, Program Manager, EM/ER, MS A316
B. Koch, DOE LAAO, FU-1 & FU-4, MS A316
J. Jansen, LANL, Project Manager, EM/ER, MS M992
J. Kniepe, LANL, Deputy Project Manager, EM/ER, MS M992
A. Pratt, LANL, FU4 FPL, MS J521
D. Broxton, LANL, EES 1, MS D462
P. Longmire, LANL, CST-7, MS J534
SF Fiche

c:\..\corecovf.wpd

**New Mexico Environment Department**
**DOE Oversight Bureau Review of**
**Core Document for Canyons Investigations,**
**Los Alamos National Laboratory, April 1997**

**General Comments:**

1. The document should be revised where appropriate to reflect changes made to the Hydrogeologic Workplan that affect the canyons investigations.

2. Communication between the Canyons Environmental Restoration group, the Environmental Surveillance group and the Laboratory-wide ecological and human health investigators will be essential prior to the development of canyon- or canyon-specific Sampling and Analysis Plans. This will assure that the data collected by the Canyons group will address the uncertainties and data gaps identified by the risk assessors.

3. This Core Document will be used in the development of canyon-specific workplans. Therefore, the following specific comments are offered to encourage the use of the most current and accurate information as the basis for the canyon-specific workplans.

**Specific comments:**

**1. § 2.3.3, paragraph 1, Page 2-10, Groundwater Monitoring.**

**"Groundwater protection activities at the Laboratory include an extensive groundwater monitoring system for assessment of water quality..."**

According to the NMED Hazardous and Radioactive Materials Bureau's Hydrogeologic Evaluation of Los Alamos National Laboratory, July 1996, the current water-supply monitoring network has been determined to be inadequate. The term "extensive" is subjective and may mislead the reader to believe that the monitoring network is adequate.

The above sentence should be changed to "...at the Laboratory includes installation of an extensive groundwater monitoring system ..."

**2. § 2.3.3.4, Table 2-3, Page 2-17, Springs**

Table 2-3 includes New Mexico planar coordinates and elevations of springs sampled by the Environmental Surveillance Program. Some of these springs are not monumented. There has been recent discussion between the DOE OB and LANL Environmental Surveillance Program regarding the exact names and locations of some springs.

The document should include an up-to-date inventory of all

springs, including monumented elevations and coordinates of sample locations.

**3. § 2.3.3.4, Table 2-3, Page 2-17, Springs**

Table 2-3 lists Water Canyon Gallery as an alluvial spring. The gallery is a system designed to collect water from Big Spring. Big Spring issues from the Bandelier Tuff (Stearns 1948) and does not emanate from canyon alluvium.

Table 2-3 should be changed to describe the water source for Water Canyon Gallery as an intermediate perched groundwater zone.

**4. § 2.3.3.4, paragraph 3, Page 2-18, Springs**

**"An intermediate perched groundwater zone in lower Los Alamos Canyon is regularly sampled at Basalt Spring."**

DOE OB recommends that LANL sample the intermediate perched ground-water zone in Los Alamos Canyon at Los Alamos Spring rather than Basalt Spring. Basalt Spring, as stated in the document, may be affected by nearby surface-water-infiltration. Los Alamos Spring exhibits constant flow and stable water chemistry, and is located approximately 45 ft above the Los Alamos Canyon stream bed.

**5. § 2.3.3.4, paragraph 4, Page 2-19, Springs**

**"One set of springs, the Water Canyon Gallery, is located near the western boundary of the Laboratory and is used as part of the Laboratory water supply."**

The water from Big Spring, the only spring to supply Water Canyon Gallery is not believed to be in use. Surface-water from this spring now flows some distance down Water Canyon before infiltrating into the canyon alluvium west of the Laboratory.

The document should accurately describe the springs and surface water in Water Canyon including present and intended use of water collected by Water Canyon Gallery.

**6. § 2.3.4.1, Bullet 4, Page 2-19, Hydrogeologic Studies**

**"Borehole 21-2523, drilled to a depth of 707 ft (215 m) west of Material Disposal Area (MDA)-V at TA-21, passed through some moist zones, but no saturated zones were encountered."**

Information should be included on the current disposition of this borehole. If it has not been appropriately abandoned it should be considered as a potential migration pathway. LANL may want to take advantage of this borehole by advancing it to the regional aquifer and completing it as a regional-aquifer monitor well.

**7. § 2.3.4.1, Bullet 7, Page 2-20, Hydrogeologic Studies**

**"A 300-ft (91 m) borehole drilled to the top of the basalt at TA-33 encountered wet zones in basalt cinder deposits, but no perched groundwater was found."**

Wet zones in basalt cinder deposits may in fact indicate saturation. If the hole remains open, DOE OB suggests that LANL check the hole for ground-water recharge and assess the potential for contaminant migration.

**8. § 3.5.1.2, paragraph 2, Page 3-26, Descriptions of Canyon Streams.**

**"Only four of the canyons contain perennial (flowing continuously) reaches within Laboratory boundaries (Los Alamos Canyon, Water Canyon, Ancho Canyon, Chaquehui Canyon).**

Currently, perennial surface-water flow in Water Canyon does not extend across the western boundary of the Laboratory. Perennial flow in Los Alamos Canyon has not been observed by the DOE OB within the Laboratory boundary. Perennial flow in Chaquequi Canyon extends for approximately 300 ft from Spring 9A. Spring 9 flows perennially to the Rio Grande within the Laboratory boundary but is not located in Chaquequi Canyon. A perennial reach in Sandia Canyon exists as a result of the major discharge of treated sanitary sewage effluent.

The perennial reaches in Twomile Canyon and Threemile Canyon resulting from Anderson Spring and TA-18 Spring respectively, should be included in discussion of perennial reaches within the Laboratory boundary (see comment # 10).

The sentence should more accurately state "Only seven canyons contain perennial (flowing continuously) reaches within Laboratory boundaries (Pajarito Canyon, Ancho Canyon, Chaquequi Canyon, Twomile Canyon, Threemile Canyon, Cañon de Valle, Sandia Canyon".

**9. § 3.5.1.2, paragraph 9, Page 3-27, Descriptions of Canyon Streams.**

**"At this point, Homestead Spring supports another perennial reach for at least several hundred yards,..."**

Water from Homestead Spring supplies baseflow in Pajarito Canyon and merges with perennial flow in Starmer Gulch (PA-8.9) and subsequently flows downstream to some unknown distance from the confluence with Twomile Canyon. On July 22, 1994 and in June 1995, DOE OB staff traversed downstream from PA-8.9 to the Twomile Canyon confluence and observed continuous flow for the entire reach. During the spring of 1996, which was an extremely dry period, flow was measured at 0.049 cfs (22.3 gpm) at PA-8.9.

Since February 1995, periodic non-storm-water flow measurements at PA 8.9 were performed, and flow rates ranged from 0.049 to 0.446 cfs (22.3 - 202 gpm); hence, perennial flow exists within this canyon reach for several miles.

Stream flow in Starmer Gulch and Pajarito Canyon just above their confluence has been measured and estimated by DOE OB staff on several occasions. The entire surface discharge of groundwater from Homestead Spring is approximately 0.02 cfs (7 gpm). Surface-water flow from Homestead Spring continues to the confluence of Pajarito and Starmer Gulch. The perennial flow from Starmer Gulch at the confluence is approximately 3 times as much, ranging from 0.05 to 0.08 cfs (22 - 35 gpm). Also, perennial-flow measurements in Arroyo De Ladelfe (LA-UR-93-1230), a tributary to Pajarito, located about 300 m east of the confluence of Pajarito and Starmer, ranges from 0.026 to 0.030 cfs (12 - 15 gpm).

The perennial flow from Starmer Gulch and Arroyo De Ladelfe should be included in the description of perennial reaches in Pajarito Canyon.

**10. 3.5.1.2, paragraph 10, Page 3-27, Descriptions of Canyon Streams.**

**"Both Twomile Canyon and Threemile Canyon contain ephemeral and/or intermittent streams"**

Anderson Spring, located in upper Twomile Canyon, may recharge limited perched water in the alluvium, and TA-18 Spring, located in Threemile Canyon, probably recharges water in the alluvium that has been found by the Laboratory's Environmental Restoration Field Unit 2 to be contaminated with organic compounds.

Discussion of water occurrences in Twomile Canyon and Threemile Canyon should include the perennial reaches resulting from Anderson and TA-18 Springs.

**11. § 3.5.1.2, paragraph 12, Page 3-27, Descriptions of Canyon Streams.**

**"Water Canyon and its major tributary, Cañon de Valle, are ephemeral from the western Laboratory boundary across Laboratory land to a point below the confluence with Potrillo Canyon. At this point, a perennial spring, known as Spring 5AA, supports a very short perennial reach."**

Flow from the SWSC and Burning Ground Springs results in a perennial reach extending past MDA-P. Perennial flow in Cañon de Valle below MDA-P and above the confluence with Water Canyon has been periodically measured by the DOE Oversight Bureau since 1995 and ranges from 0.023 to 0.178 cfs (10 - 80 gpm).

Flow from Spring 5AA was described by Purtymun (LANL, 1996). He

stated that pools are formed but he did not mention flow. Spring 5AA has been observed by the DOE Oversight Bureau on several occasions since 1995 and has always been found to be damp with no visible flow.

The description of perennial reaches in Cañon de Valle should be changed to reflect the current conditions. Although Spring 5AA is located in Water Canyon, it does not support perennial flow. A perennial reach exists in Canyon de Valle west of its confluence with Water Canyon.

**12. § 3.5.1.2, paragraph 14, Page 3-27, Descriptions of Canyon Streams.**

**"Spring 9 and 9A, located about 0.25 mi (.4 km) upstream from its confluence with the Rio Grande, support perennial flow again. Perennial flow occurs from these two springs to the Rio Grande."**

Flows from Springs 9 and 9A have been estimated by DOE OB Staff during surveillance sampling on several occasions since 1993. Flow from Spring 9A extends for approximately 300' in Chaquehui Canyon before infiltrating into the canyon alluvium. Perennial flow from Spring 9A does not reach the Rio Grande. Spring 9 is not located in Chaquehui Canyon and does not support perennial flow in Chaquehui Canyon. Spring 9 is located on the east-facing slope of White Rock Canyon and supports perennial flow directly to the Rio Grande.

The document should reflect current knowledge related to springs and surface water in Chaquehui Canyon.

**13. § 3.7.5.2, Paragraph 2, Page 3-40, Low-Level Tritium Analyses and Age Estimates.**

**"However, samples from most of the regional aquifer production wells show such low values of tritium that they cannot contain any significant component of young water"**

The regional aquifer production wells are screened over hundreds to thousands of feet and, if not sampled at the water table under static conditions, tritium concentrations would be affected by mixing of deeper water with shallow and potentially younger water.

The description of the age estimates of water in the regional aquifer using tritium concentrations should include the possibility of mixing due to the length of the screen and pump depth in the wells sampled.

**14. § 4.1.2, Page 4-2, Relationship of the Conceptual Model to Impact Assessment.**

The bulletized scenarios in the middle of the page include "use

by Laboratory workers".

This scenario should include exposure during Laboratory worker recreation/exercise in addition to exposure resulting from working in or around the canyons.

**15. § 5.0, paragraph 2, Page 5-1, Technical Approach.**

**"NPDES-permitted discharges are not solid wastes; therefore, the consequences of these discharges are not subject to corrective action."**

Accumulations of RCRA solid or hazardous waste in soil or sediment are subject to RCRA Corrective Action. NPDES regulated outfalls may result in accumulation of RCRA solid or hazardous wastes in soil and sediment. Some former or operating NPDES Permitted Outfalls which have been designated Solid Waste Management Units are: TA-50 Radioactive Liquid Waste Treatment Facility outfall (051 outfall), 16-021(c) (Building 260 outfall) and 3-012(b) (Power Plant outfall).

**16. § 5.7.3, paragraph 2, Page 5-28, Installation of Characterization Wells.**

**"The Proposed Wells include 51 alluvial wells, 32 regional aquifer wells and 1 intermediate perched zone well."**

As described in Section 7.3.3.1 of the Los Alamos Canyon and Pueblo Canyon Workplan, "The groundwater sampling strategy requires the construction of 16 alluvial observation wells and 9 intermediate perched zone wells." The LA/Pueblo Workplan stated in the same section that "5 observation wells in Los Alamos Canyon, 2 observation wells in Pueblo Canyon, and 2 observation wells in Sandia Canyon" are required by the intermediate perched zone investigation. The DOE OB is aware that an addendum will be submitted for the Los Alamos Canyon and Pueblo Canyon workplan.

The document should include further discussion of the decision making process for intermediate-perched-zone monitor wells required by the intermediate-perched-zone investigation.

**17. § 5.7.3, paragraph 2, Page 5-28, Installation of characterization wells.**

**"(Extensive hydrogeologic characterization information will be collected in any intermediate perched zone encountered during advancement of the regional aquifer well boreholes.)"**

DOE OB suggests that LANL stop drilling at any intermediate perched zone and allow water to recharge the bore hole. At that point, the decision should be made as to the usefulness of an intermediate-perched-zone monitor well based on the amount of

saturation in the intermediate zone. If an intermediate saturated zone exists, a monitor well should be completed in that zone upon completion of the regional aquifer well. Wells monitoring the intermediate perched zone may detect contaminant migration before regional aquifer contamination occurs.

If there are any questions about this review, please contact Steve Yanicak at 505-672-0448 or Chris Hanlon-Meyer, the DOE Oversight Bureau FU-4 Manager at 505-827-1536.

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