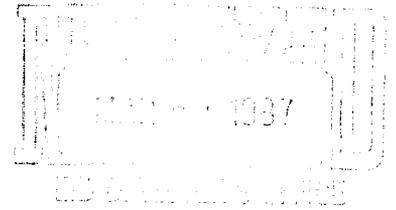




**Department of Energy**  
 Albuquerque Operations  
 Los Alamos Area Office  
 Los Alamos, New Mexico 87544

*RLW*



**MAR 30 1987**

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

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Mr. Michael Burkhardt, Director  
 New Mexico Environmental Improvement Division  
 P. O. Box 968  
 Santa Fe, New Mexico 87504-0968

HAZARDOUS WASTE SECTION

Dear Mr. Burkhardt:

**Compliance Order/Schedule dated May 7, 1985 (Docket Number 001007)**

The enclosed report is the Department of Energy's (DOE) official response to the Environmental Improvement Division's (EID) Compliance Order/Schedule, dated May 7, 1985. This final report fulfills the requirements of Paragraph 25, Tasks 1, 2, 3 and 4 (the report has an index to relate text with Compliance Order Task). With submission of this "publishable report," DOE considers all tasks and requirements set forth in the Compliance Order/Schedule to be accomplished and completed.

The report incorporates results of the other Compliance Order Tasks, namely Paragraph 25 - Tasks 5 and 6, by presenting core and pore gas analyses and analyses of the perched water, respectively. It provides; (1) a complete summary of recent work at Areas L and G, (2) published information regarding site characterization, and (3) information on the potential for chemical waste migration in the lithosphere at Areas L and G. In so doing, the report provides additional documentation for DOE's ground water monitoring waiver in compliance with Section 206.c.1.a.(3) of the New Mexico Hazardous Waste Management Regulations.

A significant amount of work has been done in 1985 and 1986 at Areas L and G and in adjacent canyons to investigate the hydrogeology of the area and to determine the potential for waste constituent migration from the land disposal units to the regional aquifer. Information gleaned from these investigations, coupled with data available from published studies, supports several conclusions regarding the efficacy of Areas L and G as containment locations for hazardous waste.

The neutron moisture logging, gravimetric moisture content, and psychrometer data provide empirical evidence that the tuff is unsaturated at depths greater than 15 to 20 feet. These empirical observations are strengthened by laboratory and field tests on the tuff which, when taken together, demonstrate the improbability of liquid movement occurring in the unsaturated tuff over any significant distance.



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This report concludes that aqueous transport of contaminants through Bandelier tuff is not a viable mechanism for contaminant migration at Areas L and G. Chemical data from the core and pore gas analyses (and information obtained from vadose zone characterization) indicate that vapor phase migration is the dominant transport mechanism in these areas. This conclusion is based on the limited migration of metals and the presence of volatile organic vapors at depths up to 100 feet. In addition, studies performed in canyons adjacent to Mesita del Buey show that the perched water system in Pajarito Canyon (no such system was found in Canada del Buey) is confined vertically and horizontally to the canyon alluvium, and hence has no connection with the Mesita del Buey subsurface of the regional aquifer.

Thus, in our estimation, further investigation and monitoring of the vadose zone aimed at determining whether liquid transport of contaminants in the tuff is a viable mechanism is not warranted. Additionally, since the perched water in Pajarito Canyon does not extend beneath Mesita del Buey, continued water quality sampling of perched water from monitoring wells in Pajarito Canyon is unnecessary.

The main issue raised by the investigation that is currently unresolved is the spatial extent of the volatile organic compound contamination observed in the core and pore gas samples from depths up to 100 feet. It is a near certainty that the contaminants are migrating as vapors and the characteristics of vapor transport in the tuff have not been completely addressed. Thus, we will perform additional sampling and analysis to determine the lateral and vertical extent of contaminant migration. Because contaminants have been detected at depths up to 100 feet, at least a portion of the sampling should be performed at greater depths.

The Laboratory has undertaken additional work in 1986 to further support their ground water monitoring waiver request, and to gather additional information on Compliance Order tasks where results were incomplete. Due to problems with sample cohesion, the moisture characteristic curves obtained in 1985 did not accurately reflect the existent moisture content and soil water tension conditions. Additional attempts utilizing another method were made in 1986 to evaluate these parameters but proved unsuccessful. Because organic vapors were detected at depths of up to 100 feet in 1985, deeper test holes were drilled. Seven additional 200 ft test holes were drilled in 1986 and core from these test holes were

Michael Burkhart

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analyzed for volatile organic contaminants. This information will complement the Compliance Order Tasks and further define the areal and vertical extent of organic migration. Once the analytical results are obtained, this information will be submitted to the EID.

With submission of this report, DOE considers all tasks and requirements set forth in the Compliance Order/Schedule to be completed. Upon your subsequent review of this report, a meeting with appropriate personnel is recommended. This meeting could be used to further detail vadose zone monitoring and characterization activities that support the DOE's application for a ground water monitoring waiver.

If you should have any questions regarding this submission, please contact James Phoenix of my staff at 667-5288.

Sincerely,



Harold E. Valencia  
Area Manager

1 Enclosure

cc w/enclosure:

A. Davis, US EPA, Dallas, Texas

cc w/o enclosure:

J. Highland, US EPA, Dallas, Texas

LTP:CEB:0523

*Handwritten notes:*  
Jed S. P...  
N2...  
R...