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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

January 18, 2008

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David McInroy
Remediation Services Deputy Project Director
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**RE: NOTICE OF DISAPPROVAL
LOS ALAMOS AND PUEBLO CANYONS GROUNDWATER MONITORING
WELL NETWORK EVALUATION AND RECOMMENDATIONS
LOS ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-07-039**

Dear Messrs. Gregory and McInroy:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy and Los Alamos National Security, LLC (collectively, the Permittees) document entitled *Los Alamos and Pueblo Canyons Groundwater Monitoring Well Network Evaluation and Recommendations* (hereafter, the Report) dated December 2007 and referenced by LA-UR-07-8114/EP2007-0701. NMED has reviewed the Report and hereby issues this Notice of Disapproval. NMED provides the following comments.

1. Evaluation of Potential Lateral Flow of Perched-Intermediate Groundwater

The Report documented the groundwater monitoring well network evaluation based on the Permittees' current conceptual models for the fate and transport of contaminants in the subsurface beneath the Los Alamos and Pueblo Canyon watersheds. The model focuses on understanding water flow and contaminant transport along the surface water



drainages from west to east. The use of the surface watershed approach appears appropriate to characterize canyon hydrology and contaminant transport in surface water and alluvial groundwater. However, groundwater flow and contaminant transport in perched-intermediate zone may not necessarily follow the surface water drainages. Therefore, the hydrologic evaluation of the perched-intermediate groundwater, being limited to movement in the vertical direction and from west to east, may not fully illustrate contaminant fate and transport and, so would not be able to adequately identify the potential breakthrough locations for contaminants to enter the regional groundwater.

NMED is concerned about lateral transport of contaminants via perched-intermediate groundwater beneath Los Alamos Canyon (including Delta Prime Canyon), especially the zone intercepted by wells LADP-3, R-6i, LAO-3.2a and LAOI-3.2 (details illustrated in Figure 2.0-1 of the Report). This zone of perched-intermediate groundwater (with a thickness from 9 to 31 feet) appears to be present in the Guaje Pumice Bed that overlies relatively impermeable silt-rich deposits of the Puye Formation. According to the Permittees' findings (LANL 2007, *Fate and Transport Modeling Report for Chromium Contamination from Sandia Canyon*), the contact between the Guaje Pumice Bed and the Puye Formation extends west to Pajarito Canyon and generally dips southwestward in the area surrounded by LADP-3, R-6i, LAO-3.2a and LAOI-3.2. Perched groundwater in this more permeable unit (Guaje Pumice Bed) will most likely move along the geologic contact until percolation to the regional aquifer occurs. Therefore, it is reasonable to project that the perched-intermediate groundwater present in this zone may primarily move southwestward, rather than along the Los Alamos Canyon surface water drainage from west to east. The Permittees have recognized a similar potential lateral movement for perched-intermediate groundwater present beneath Sandia Canyon (see the attached map).

Based on tritium concentrations shown in Figure E-2.0-1 of the Report, perched-intermediate groundwater intercepted by LADP-3, R-6i, LAO-3.2a, and LAOI-3.2 is the most contaminated zone. Given that contaminants migrate southwestward with the perched-intermediate groundwater, the pattern of contaminant distribution in the perched zone and the entry point of contaminants into the regional aquifer would change accordingly. Such a plausible scenario of contaminant migration toward the southwest is not addressed by the current conceptual model that focuses only on the two-dimensional analysis of the hydrology of perched-intermediate groundwater—in the vertical direction and from west to east. As a result, a monitoring well network based on such a two-dimensional analysis may not detect contaminants that migrate southwest beyond Los Alamos Canyon.

To address the potential movement of contaminated perched-intermediate groundwater toward the southwest, the Permittees must modify the current conceptual site model to account for lateral movement of perched-intermediate groundwater beneath Los Alamos Canyon. The modified conceptual site model must address the connectivity of the perched-intermediate groundwater identified beneath Los Alamos and Sandia Canyons. If there are data gaps limiting development of the necessary conceptual site model to address potential southwestward movement of perched-intermediate groundwater, the Permittees must propose to advance borings at appropriate locations in the central and east parts of Technical Area (TA) 53 to investigate whether perched-intermediate groundwater is present beneath the mesa between Los Alamos and Sandia Canyons. If perched-intermediate groundwater is observed, monitoring wells must be installed to evaluate the fate and transport of contaminants potentially originating from the zone intercepted by LADP-3, R-6i, LAO-3.2a, and LAOI-3.2, and any other perched groundwater that is encountered.

2. Inclusion of Technical Area 53 as a Potential Breakthrough Location

The Report identifies TA-53 as a contamination source; releases of inorganic, organic and radioactive contaminants have been identified. However, the Report excluded all of the release locations (outfalls and lagoons) as potential breakthrough points for contaminants to enter the regional groundwater in assessing the need for regional monitoring wells to detect potential releases from Los Alamos Canyon. To facilitate the design of an adequate regional groundwater monitoring well network, the Permittees must include TA-53 as a potential breakthrough location. Alternately, the Permittees may provide the rationale and site-specific data to support these exclusions.

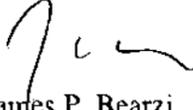
3. Validation of Statistical Analysis

In Appendix C of the Report, a t-test was used to compare the sequence in which a potential contaminant plume can reach monitoring wells, water supply wells, and the laboratory boundary. The Report recognized the prerequisite of a normal distribution of the variables to validate the statistical analysis results, but did not examine the distribution patterns. The protection efficiency calculated for the designed monitoring well network is determined according to the statistical comparison results, and is one of the most critical parameters for evaluating the adequacy of the monitoring network. The Permittees must therefore show the distribution pattern of the calculated particle travel times. If the log-transformed particle travel time data do not follow a normal distribution pattern, an appropriate transformation of the data must be conducted to validate the calculated protection efficiency.

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The Permittees must incorporate above comments into a revised report, and submit the Report to NMED no later than February 29, 2008. Should you have any questions or comments, please contact Hai Shen of my staff at (505) 476-6039.

Sincerely,



James P. Bearzi
Chief
Hazardous Waste Bureau

JPB:hs

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file: Reading and LANL General (Los Alamos and Pueblo Canyons, Groundwater, TA-21)

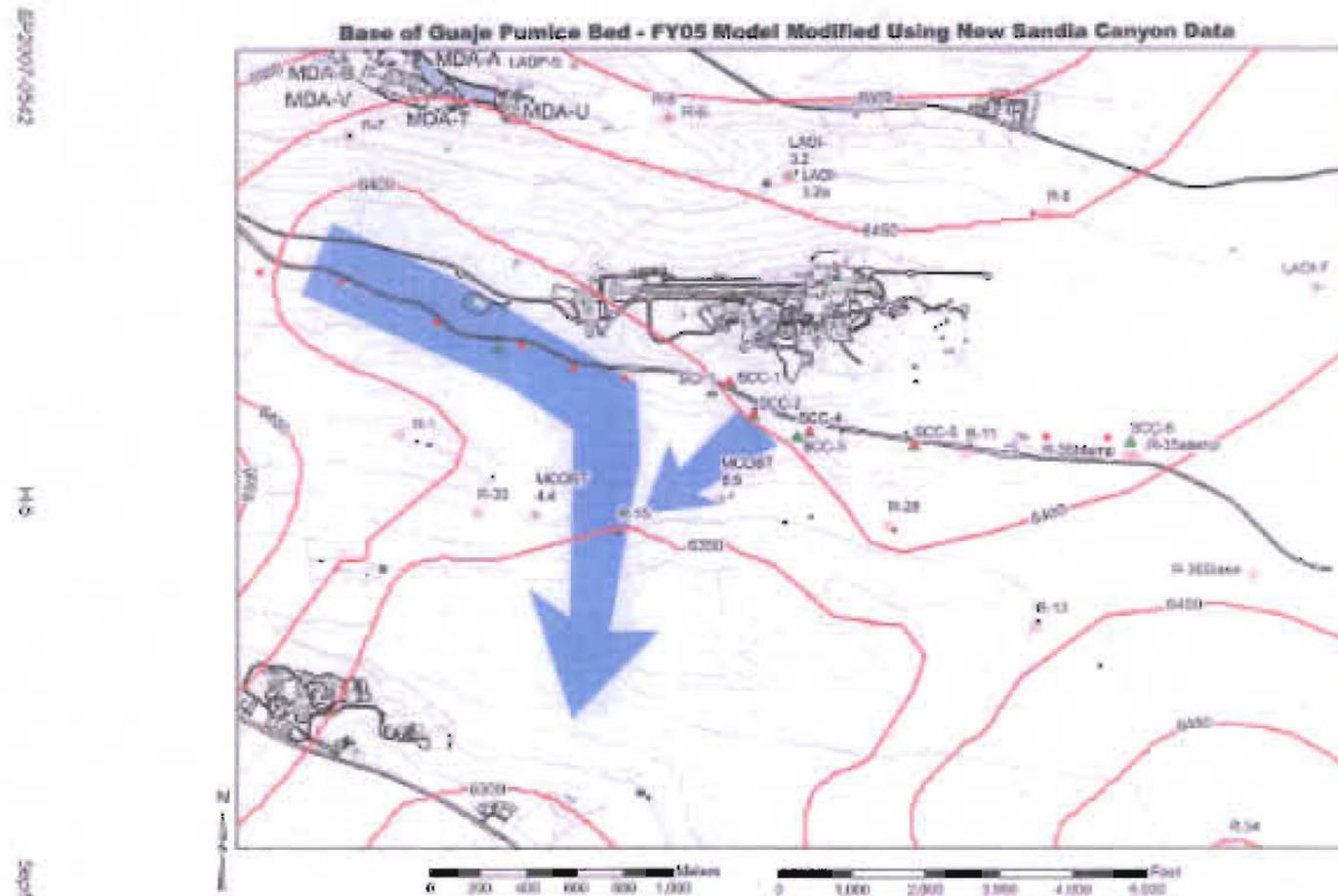


Figure H-1 Structure contour map for the base of the Guaje Pumice Bed in the vicinity of Sandia Canyon. Arrows show inferred direction of movement for water diverted along this contact.