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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 6, 2007

David Gregory
Federal Project Director
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David McInroy
Remediation Services Deputy Project Director
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RE: APPROVAL WITH DIRECTION
MORTANDARD CANYON GROUNDWATER MONITORING WELL NETWORK EVALUATION, LOA ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-GROUNDWATER MISC

Dear Messrs. Gregory and McInroy:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy (DOE) and Los Alamos National Security, LLC (collectively, the Permittees) document entitled *Mortandad Canyon Groundwater Monitoring Well Network Evaluation* (hereafter, the Report) dated June 2007 and referenced by LA-UR-07-4343/EP2007-0386. NMED has reviewed the Report and hereby issues this Approval with Direction.

1. **Further Evaluation of Groundwater Monitoring Needs for MDA C**

The Report concludes that further evaluation of groundwater monitoring needs for Material Disposal Area (MDA) C will be addressed during the Corrective Measures Evaluation (CME) process. The current investigation at MDA C discovered that there is a vapor-phase plume of volatile organic compounds (VOC) in the subsurface. Tritium also was detected in subsurface vapor samples collected during the

investigation. Certain VOCs, including tetrachloroethylene (PCE) and trichloroethylene (TCE), are present at concentrations that are high enough to potentially cause degradation of groundwater quality if the plume comes in contact with groundwater. The Permittees believe that higher moisture content in the Otowi Member may effectively inhibit downward diffusion of the vapor plume. However, both PCE and TCE have a relatively high solubility in water, and thus vapor-phase contamination can readily partition into liquid phase if the moisture content becomes higher. This suggests that the dominant mechanism for transport of VOCs in the Otowi Member could shift from vapor-phase diffusion to percolation which is driven by gravity or capillary flow. Both liquid-phase and gas-phase transport has been recognized as important mechanisms for VOC migration in the vadose zone (*Los Alamos National Laboratory's Hydrogeologic Studies of the Pajarito Plateau: A Synthesis of Hydrogeologic Workplan Activities 1998-2004*, LA-14263-MS, December 2005). In any case, VOCs have been detected in the subsurface pore gas at a depth of 600 feet below ground surface, which is located either below or in the lower end of the Otowi Member. This strongly indicates that the contaminants of concern (COCs) at MDA C could reach the regional groundwater table earlier than the year 2048 as predicted in the Report.

The vapor-phase VOC plume at MDA C is subject to remedial action in order to safeguard groundwater. Selection of a remedy at MDA C will, in part, depend on the availability of groundwater monitoring data that must be collected from an appropriately designed monitoring network. The MDA C investigation is already behind the schedule (as originally contemplated in the March 1, 2005 Order on Consent (the Consent Order)), and the Permittees are currently preparing for a second phase of investigation at the site. Waiting until the CME Report is submitted to address the groundwater monitoring needs for MDA C could result in further delay of the Permittees's implementation of selected remedies.

The Permittees must therefore conduct a comprehensive study for evaluating the current groundwater monitoring network and the need of more wells to address potential releases of contaminants from MDA C to the regional aquifer. Specifically, the fate and transport simulations, as presented in Appendix C of the Report, must be conducted by assuming MDA C as a direct source of contamination to the regional groundwater to demonstrate that the network is capable of capturing, with a degree of confidence or probability greater than 95%, the potential plumes arising from MDA C.

2. <u>Other Comments</u>

a. Appendix C provided details regarding the analysis of the capability of the current regional groundwater monitoring network to detect contaminant releases to the regional aquifer. A Monte Carlo simulation of regional groundwater flow and

contaminant transport was used as a quantitative means to address uncertainties in key hydraulic parameters and boundary conditions, whose spatial variations in the regional aquifer introduce flow field heterogeneity and uncertainty. In terms of the Monte Carlo simulations, the adequacy of the predicting results is primarily dependent on the input hydraulic parameters and boundary conditions that are randomly sampled within a given range of values according to a distribution type. However, no such information has been provided in the Report. The Permittees must list the key hydraulic parameters and boundary conditions that have undergone the stochastic analysis in the Report, including the parameter names, their given value ranges, distribution types, and other relevant information. The Permittees must also provide discussions to support that the input hydraulic parameters and their given ranges of values reflect the natural variability of the regional aquifer.

b. In Figure 2-1, both MOR1 and MOR3 are listed as modeled source areas. However, only MOR3 was quantitatively analyzed using the Monte Carlo simulation in Appendix C (Figure C-1). The Permittees must correct the discrepancy in the Report.

The Permittees must incorporate the above comments in the Report, and submit a revised report to NMED no later than September 30, 2007. To implement the recommendations that have been identified in Section 5.0 of the Report, the Permittees must submit a work plan to NMED for approval no later than October 31, 2007. The work plan must include details for implementation and a schedule for each action. If the Permittees fail to implement the modifications or provide the required additional information, the approval for this document will be automatically rescinded.

Should you have any questions or comments, please contact John Young at (505) 476-6038 or Hai Shen at (505) 476-6039.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

JPB:hs

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file: Reading and LANL TA-3 (TA-50, Mortandad Canyon, MDA C, Groundwater)