NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 7, 2013

Peter Maggiore
Assistant Manager, Env. Projects Office
Los Alamos Site Office, DOE
3747 West Jemez Rd, MS A316
Los Alamos, NM 87544

Jeffrey D. Mousseau, Associate Director
Environmental Programs
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M991
Los Alamos, NM 87545

RE: SUMMARY REPORT FOR REDEVELOPMENT OF REGIONAL WELL R-61
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-13-011

Dear Messrs. Maggiore and Mousseau:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy (DOE) and the Los Alamos National Security, L.L.C.'s (collectively, the Permittees) document entitled *Summary Report for Redevelopment of Regional Well R-61* (Report) dated March 2013 and referenced by EP2013-0019. The Report was received on March 28, 2013. NMED has reviewed the Report along with additional data and information relevant to well R-61. One example of additional information is the Permittees' letter *Evaluation to Determine the Cause of Reducing Conditions Observed in Regional Aquifer Monitoring Wells R-54 and R-61*, dated April 11, 2013 (EP2013-0068). In response to the Report and other documents and data, NMED has determined that R-61 does not produce representative groundwater samples for water-quality analyses.

Supporting documentation (see: EP2013-0068) indicates that an organic-based fluid, hammer oil, was introduced into the R-61 open borehole during drilling at and below the regional water table to a depth of approximately 160 feet below the water table. The presence of hammer oil in the regional aquifer at screens 1 and 2 and subsequent redevelopment actions, including the injection of acid, caustic, and bleach solutions, have drastically and irreversibly affected the groundwater

chemistry at the two screened intervals.

Prior to redevelopment, strongly reducing conditions were persistent at each screen as indicated by low dissolved oxygen/ORP, very high concentrations of redox sensitive constituents such as manganese and iron, as well as decreased levels of chromium, a major contaminant of concern. Reducing conditions at R-61 result from the partial microbial digestion of the hammer oil, which initially depletes the groundwater of dissolved oxygen, and therefore, decreases the oxidation-reduction potential of the groundwater. The aquifer system at R-61 has become moderately anaerobic, which is characteristic of manganese and iron reduction. Biochemical reduction of the aquifer system solubilizes solid phases such as ferric (oxy)hydroxide and manganese dioxide. Reducing conditions enhance precipitation of amorphous chromium hydroxide, as dissolved chromium(VI) transforms to chromium(III).

Injection of phosphoric acid and strong caustic and bleach solutions as part of the redevelopment activities have now resulted in significant increases in concentrations of dissolved phosphate, potassium, silica, and fluoride, lower pH, decreased alkalinity and decreased concentrations of calcium, sodium, and chloride. These acid-base and redox reactions have produced a potassium-phosphate-bicarbonate groundwater with an acidic pH (6.65) that is not representative of the regional aquifer.

Geochemical data collected at R-61 during several sampling and rehabilitation events that included extended purging clearly indicate that the well does not produce or yield representative samples that are adequate for use in groundwater monitoring and contaminant detection. Therefore, the Permittees must replace R-61 with a single-screened well that preferably straddles the regional water table. The Permittees must submit a work plan that includes a proposed schedule to replace R-61 to NMED no later than **June 14, 2013**.

Should you have any questions, please contact Michael Dale of my staff at (505) 661-2673.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
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File: Reading and LANL 2013, R-61 Redevelopment Rpt