General

NEW MEXICO ENVIRONMENT DEPARTMENT

ENTERED

Hazardous Waste Bureau

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 9, 2011

George J. Rael
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Los Alamos Site Office
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Michael J. Graham
Associate Director Environmental Programs
Los Alamos National Security, L.L.C.
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Los Alamos, NM 87545

RE: NOTICE OF APPROVAL WITH MODIFICATIONS
WORK PLANS TO PLUG AND ABANDON WELLS AND BOREHOLES AT LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-MISC-GW

Dear Messrs. Rael and Graham:

The New Mexico Environment Department (NMED) has reviewed the United States Department of Energy (DOE) and the Los Alamos National Security L.L.C.'s (LANS) (collectively, the Permittees) *Work Plans to Plug and Abandon Wells and Boreholes at Los Alamos National Laboratory* (Plan), dated November 2010 (referenced by LA-UR-10-6972 and EP2010-0482). NMED hereby issues this Notice of Approval with the following Modifications.

1. Prior to plugging and abandonment activities, attempt to video log each well and borehole to total depth to document the pertinent features of each well (*e.g.*, screen depth, presence of perched groundwater, elevation of the water table, geologic contacts). All video logs must be labeled and stored with appropriate chain of custody.

2. Measure depth to water in all wells and boreholes to an accuracy of 0.01 foot from to ground surface and the top of the casing or surface completion, if present.

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3. For wells and borings that cannot be located through visual observation, the Permittees must attempt to use all available means (*e.g.*, review of historical aerial photographs, use of metal detectors, interviews) to locate and access the wells and borings. These actions must be documented and reported (see below) by the Permittees.

4. **Section 2.0 - WORK PLAN TO PLUG AND ABANDON WELL H-19**

   Conduct video logging of well H-19 to identify the obstruction referenced in the work plan and make an attempt to remove the obstruction. If the obstruction can be removed, video log the open hole to total depth. Assuming the borehole is open to a depth greater than approximately 525 ft below ground surface (bgs), backfill the open hole as described in the work plan. If the open hole is less than 525 ft deep after the obstruction has been cleared, overdrill the well to the total depth of the well boring and backfill as proposed in the work plan. If the obstruction cannot be removed, attempt to remove the surface casing in a manner that does not compromise the open hole, assuming open-hole conditions exist. If, after removing the surface casing, the borehole is open, video log the borehole to total depth and record the depth to water and any other pertinent observations. After video logging, backfill the borehole as described in the work plan.

5. **Section 3.0 - WORK PLAN TO PLUG AND ABANDON LAYNE WESTERN WELL**

   Install a temporary pump in the Layne Western Well, purge at least three well casing volumes of groundwater, and collect groundwater samples for laboratory analysis for major anions, low-level perchlorate, dissolved and total nonfiltered Target Analyte List (TAL) metals, dissolved (filtered) lithium, silicon, strontium and uranium, total nonfiltered americium-241, plutonium-238, plutonium-239/240, strontium-90, gamma emitters (e.g., cesium-137) and uranium, low-level tritium, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and stable isotopes of oxygen and hydrogen in water and nitrogen and oxygen in nitrate. After sampling, plug and abandon the well as specified in the work plan.

6. **Section 4.0 - WORK PLAN TO PLUG AND ABANDON SIGMA MESA WELL**

   Attempt to seal the annular space from total depth to within 10 ft of the ground surface with bentonite slurry using a tremie pipe inserted between the 20-inch casing and the borehole wall. Neat cement must be placed above the bentonite seal to the surface. If this approach is unsuccessful, perforate four sections of the 20-inch casing at depth intervals of approximately 1250 to 1425 ft, 875 to 1050 ft,

500 to 675 ft, and 125 to 300 ft bgs and place lifts of neat cement at the four perforation locations and along the annular space.

7. **Section 6.0 - WORK PLAN TO PLUG AND ABANDON SEISMIC HAZARD BOREHOLES 1, 3, AND 4**

   Before initiating abandonment activities at boring SHB-3, install a temporary pump in the well, remove at least three casing volumes of groundwater, and collect groundwater samples for laboratory analysis for major anions, low-level perchlorate, dissolved and total nonfiltered TAL metals, dissolved (filtered) lithium, total silicon, strontium and uranium, low-level tritium, explosive compounds, VOCs, SVOCs, and stable isotopes of oxygen and hydrogen in water and nitrogen and oxygen in nitrate.

   Within the second text box of this work plan (entitled "***Construction***") the Permittees state that the boreholes were drilled in 1950. This statement is incorrect. The boreholes are cased wells that were installed during the winter of 1991-1992 (see LANL document LA-12460-MS). Note this in all future documentation concerning these wells.

   Prior to backfilling the well casings with neat cement, conduct a cement-bond log in borings SHB-3 and SHB-4 wells. If the bond logs indicate that the integrity of cement in the annular space will not adequately prevent infiltration of liquids, then either overdrill the well(s) to total depth and backfill to near surface with high-solids hydrated bentonite or perforate and inject sealant in the area(s) where the integrity of original cement is compromised.

8. **Section 8.0 - WORK PLAN TO PLUG AND ABANDON TECHNICAL AREA 46 DISTILLATION HOLES**

   Conduct a cement-bond log in each of the six distillation wells. If the bond logs indicate that the annular space between the casing and the formation in any boring does not adequately prevent infiltration of liquids, then either overdrill the wells before backfilling to near surface with high-solids hydrated bentonite or perforate and inject sealant in the area(s) where the integrity of original cement is compromised.

The Permittees must complete the plugging and abandonment of the first ten priority wells and boreholes as indentified in the Plan by **December 31, 2011**. A completion report summarizing the activities conducted to abandon these wells and boreholes must be submitted to NMED no later than **March 31, 2012**. The Permittees must provide e-mail notification 15 days prior to initiating field activities for each well and borehole.

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

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

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File: Reading and LANL Groundwater 2011 – Work Plans to P&A Wells and Boreholes
HWB-LANL-MISC-GW