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**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

August 19, 2011

George J. Rael  
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U.S. Department of Energy  
National Nuclear Security Administration  
Los Alamos Site Office  
3747 West Jemez Rd, MSA316  
Los Alamos, NM 87544

Michael J. Graham  
Associate Director Environmental Programs  
Los Alamos National Security, L.L.C.  
P.O. Box 1663, MS M991  
Los Alamos, NM 87545

**RE: APPROVAL WITH MODIFICATIONS  
COMPLETION REPORT FOR REGIONAL AQUIFER WELL R-29  
LOS ALAMOS NATIONAL LABORATORY  
EPA ID#NM0890010515  
HWB-LANL-10-062**

Dear Messrs. Rael and Graham:

The New Mexico Environment Department (NMED) is in receipt of the United States Department of Energy (DOE) and Los Alamos National Security, L.L.C.'s (collectively, the Permittees) document entitled *Completion Report for Regional Aquifer Well R-29* (Report) dated August, 2010 and referenced by EP2010-0304. NMED hereby approves the Report with the following modifications.

**1. Section 3.2, Chronological Drilling Activities, pages 2 - 3:**

As described in this section, on February 17, 2010, the water level in the open borehole was measured at 972 feet (ft) below ground surface (bgs) with a total borehole depth of 1060 ft bgs and 88 ft of standing water in the borehole. The use of foam (AQF-2) as a drilling additive was discontinued at a depth of 1047 ft bgs or 75 ft into the water column. The presence of foam on the borehole wall and the top of the water column was observed on the borehole video log generated on February 17, 2010. The borehole video log also recorded the use of defoaming agent at the



time the video log was collected. It is likely the column of water contained degraded foam and defoaming agent. It is also likely that this foam-containing water was brought down hole to the regional aquifer water table located at approximately 1151 ft bgs.

Analytical results from water samples collected since the well was installed suggest that organic compounds in the foam and/or defoaming agent may be acting as a reductant within groundwater at the screened interval. The data (Table B-1.3-2, page B-20) obtained from analysis of a groundwater sample collected at the end of well development on March 20, 2010 lists high concentrations of dissolved iron and manganese, both of which are indicative of reducing conditions. These results are not typical for the regional aquifer and suggest that the sampled water was not representative of regional aquifer conditions. Dissolved iron and manganese concentrations detected in subsequent groundwater samples collected from R-29 also indicate that groundwater collected from R-29 is not representative of aquifer conditions.

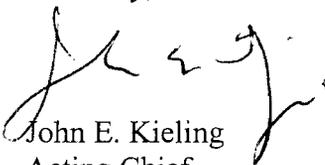
The use of 216,474 gallons of water during drilling and well construction (see Table 3.1-1, page 19) may have exacerbated the problem. The impacted groundwater likely spread outward, both upgradient and downgradient from the well, at the water table. During well development and aquifer testing, 9,875 and 5,364 gallons, respectively, were pumped from the well, which is a small fraction of the total water introduced to the aquifer during drilling.

Due to these factors, the Permittees must conduct a two-phase purge test at R-29. At a minimum, the first purge test shall include removal of 10,000 gallons from the aquifer followed by a 15-day non-pumping period and a second purge test consisting of the removal of an additional 10,000 gallons. During each purge test, the Permittees must measure pH, temperature, specific conductance, turbidity, dissolved oxygen, and oxidation-reduction potential in the field at five-minute intervals for the first 1000 gallons purged and at 30-minute intervals until purging is complete. The Permittees must collect filtered samples for major-ion chemistry and trace-metal analyses after purging 5,000 gallons and at end of each test. The Permittees must conduct the purge tests by **October 21, 2011**. The Permittees must submit a report to NMED summarizing the results of the purge tests and presenting the collected data no later than **December 21, 2011**. The report must include the Permittees' conclusions as to the usefulness of well R-29 with respect to its capability to produce representative samples and defensible data.

Messrs. Rael and Graham  
August 19, 2011  
Page 3

No revision of the Report is necessary. Please contact Michael Dale at (505) 661-2673 if you have questions.

Sincerely,



John E. Kieling  
Acting Chief  
Hazardous Waste Bureau

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File: Reading and [REDACTED] R-29 Groundwater LANL-10-062