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ACTION REQUIRED

Name:	U1101653
Title:	Approval with Modifications Work Plan for Vadose Zone Moisture Monitoring at Material Disposal Area T At Technical Area 21 LANL EPA ID NM0890010515 HWB-LANL-11-056
Date Received:	9/6/2011
Addressee Name:	M. Graham, ADEP
Originator:	J. Kieling, NMED
Action Item Description:	Permittees must start applying water to the bermed area no later than January 3...
Action Due Date:	1/31/2012
Responsible for Action:	Search Graham, Michael J
Responsible Office:	ADEP
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EP2011-5412

September 1, 2011

George J. Rael, Assistant Manager
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Michael J. Graham
Associate Director, Environmental Programs
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M991
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RE: APPROVAL WITH MODIFICATIONS
WORK PLAN FOR VADOSE ZONE MOISTURE MONITORING AT
MATERIAL DISPOSAL AREA T AT TECHNICAL AREA 21
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-11-056

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 *Work Plan for Vadose Zone Moisture Monitoring at Material Disposal Area T at Technical Area 21* (Plan) dated August, 2011 and referenced by EP2011-0019. NMED hereby approves the Report with the following modifications.

1. **Section 3.3, Activity 3: Install a Vadose Zone Moisture Monitoring System at MDA T, page 7, first bullet:**

   The proposed 1400-ft-deep vertical borehole in the middle of the shaft field appears to be a typographical error. A 400-ft-deep vertical borehole is mentioned in the third paragraph in this section, as well as in Section 2.5 and in Table 3.5-1.

2. **Section 3.3, Activity 3: Install a Vadose Zone Moisture Monitoring System at MDA T, pages 7 – 8:**

   A. The Permittees must install one additional vertical vadose-zone moisture monitoring borehole in the shaft field, between shafts 10 and 18, to a minimum depth of 400 feet below ground surface (bgs). The borehole must be constructed and instrumented in a manner similar to the vertical borehole proposed by the Permittees in Section 3.3.

   B. Each vertical borehole in the shaft field must be video-logged after drilling in order to characterize the subsurface and to ensure the proper positioning of heat dissipation probes (HDPs).

   C. The Permittees must attempt to drill and core the two vertical boreholes to the base of the Guaje Pumice Bed. If reaching such depth is not technically feasible by the hollow-stem auger drilling method, the Permittees must extend the two vertical boreholes to below the 400-ft bgs depth to the greatest depth attainable by that method.

   D. Prior to installing the HDPs, the Permittees must conduct open-hole straddle-packer sampling and testing in the two vertical boreholes for the purpose of collecting discrete vapor samples for volatile organic compounds (VOCs) and tritium analysis, and collecting in-situ permeability data. Straddle- packer sampling and testing must be performed at 40 ft intervals within each borehole. Additionally, straddle packer sampling and testing must also be conducted at fractures, depositional (e.g., surge beds), lithologic and structural contacts, and any other geologic features typically associated with enhanced vapor and/or fluid transport. For each tested interval, vapor sampling for VOCs and tritium analyses must precede the in-situ permeability test.

3. **Section 3.4, Activity 4: Conduct Chemical Analyses of Core Samples, pages 8 - 9:**

   A. For the two vertical boreholes in the shaft field, the Permittees must collect samples for chemical and moisture analyses at an interval of one sample per 20 ft of core. Additional samples must also be collected (and analyzed) at fractures, depositional (e.g., surge beds), lithologic and structural contacts, and any other geologic features typically associated with enhanced vapor and/or fluid transport.

   B. For the four 140-ft angled boreholes, core samples must be collected (and analyzed) at an interval of one sample per 20 ft of core for the first 80 ft of borehole and at 10 ft intervals for the remaining 60 ft of borehole (i.e., directly beneath the shafts). Additional samples must also be collected (and analyzed) at fractures, depositional and structural contacts, and any other geologic features typically associated with enhanced vapor and/or fluid transport.

C. In addition to the proposed list of parameters and chemical constituents to be analyzed for in core samples and pore water, the Permittees must analyze each collected core sample for VOCs, and each collected pore water sample for VOCs, perchlorate, nitrate, sulfate, and total phosphorus. If the volume of pore water extracted from a core is insufficient to analyze all constituents listed above, the Permittees must first analyze the constituents that require the smallest sample volume, in order to maximize the number of analyzed constituents.

D. All core samples must be archived for potential analyses for Target Analyte List (TAL) metals. If chemical analyses of core samples and pore water for radionuclides, inorganic compounds and VOCs result in detection of any analyzed constituent above the corresponding background level, then the associated archived sample must be analyzed for TAL metals. Analyses of archived samples must be conducted within 15 days of validation of analytical results for radionuclides, inorganic compounds and VOCs.

E. Samples for VOC analysis and water content must be collected with an emphasis on maintaining the representativeness of VOCs and moisture in the sampled medium. Sample retrieval must be conducted in accordance with American Society for Testing and Materials (ASTM) method D6640 – 01(2010) or an equivalent method. As soon as the coring apparatus (e.g., split-spoon) is brought to the surface, discrete core samples for VOC analysis must be immediately extracted from the core, placed in an appropriate sampling container with a tight fitting lid, cooled to 4° Celsius, and analyzed within 14 days. Samples for water-content analysis must be collected in a similar manner. The Permittees must ensure that samples obtained for all analyses are collected using methods that minimize disturbance to the extent possible to prevent loss of VOCs and moisture.

4. **Section 4.0, SCHEDULE, page 9:**

The MDA T (SWMU 21-016(a)-99) Corrective Measures Evaluation (CME) Report is due December 11, 2012. It is imperative that the Permittees include findings from the vadose zone moisture monitoring and chemical analyses of core samples in the CME Report. Therefore, the proposed pilot study, as described in Section 3.1, must be initiated, and the Permittees must start applying water to the bermed area, no later than **January 31, 2012**. Installation and instrumentation of the six moisture-monitoring boreholes must be completed by **July 31, 2012**. A report summarizing the results of the implementation of the Plan must be submitted to NMED no later than **November 30, 2012**.

A revision of the Plan is not necessary. Should you have any questions or comments regarding this approval, please contact Michael Dale at (505) 661-2673 or Jerzy Kulis at (505) 476-6039.

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
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