



BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

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NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us



RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 19, 2008

David Gregory
Federal Project Director
Los Alamos Site Office
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

David McInroy
Remediation Services Deputy Project Director
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M992
Los Alamos, NM 87545

**RE: NOTICE OF DISAPPROVAL FOR THE PILOT TEST REPORT FOR
EVALUATING SOIL-VAPOR EXTRACTION AT MATERIAL DISPOSAL
AREA G AT TECHNICAL AREA 54,
EPA ID #NM0890010515
HWB-LANL-08-048**

Dear Messrs. Gregory and McInroy:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) and the Los Alamos National Security L.L.C.'s (LANS) (collectively, the Permittees) *Pilot Test Report for Evaluating Soil-Vapor Extraction at Material Disposal Area G at Technical Area 54* (Report), dated October 2008 and referenced by LA-UR-08-6883/EP2008-0557. NMED has reviewed the Report and hereby issues this Notice of Disapproval (NOD).

General Comments:

1. The goal of the soil vapor extraction (SVE) pilot test was to evaluate the effectiveness of SVE at Material Disposal Area (MDA) G and to determine its suitability as an alternative for remediation of the site. None of the Test Status Reports submitted to NMED (*Material Disposal Area G Soil Vapor Extraction Test Status*, August 15, 2008; *Material Disposal Area G Soil Vapor Extraction Test Status*, September 15, 2008 and *Response to Notice of Disapproval for Material Disposal Area G Soil Vapor Extraction Test Status Report*, September 15, 2008 (EP2008-0494), October 8, 2008) contained enough data to determine if the SVE pilot test was conducted properly or to help NMED assess the effectiveness of SVE



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as a possible remedy. In addition, this Report was received after the submittal of the Corrective Measures Evaluation (CME) Report.

The Permittees consistently refer to evaluating the suitability of SVE as a remedy for MDA G as part of the Corrective Measures Implementation (CMI) (Page 1, Section 1.0, Introduction; Page 4, Section 3.1, SVE Pilot Test Scope; Page 11, Section 5.0, Recommendations for Data Analysis; Page 12, Section 6.0, Conclusions), contrary to the process called for in Section VII of the March 1, 2005 Order on Consent (Order). Remedial alternatives are to be presented and discussed in the CME Report; the CMI work plan is the plan for the implementation of the final remedy. The evaluation of SVE for MDA G must be addressed in the CME Report for MDA G. Nevertheless, the Permittees must resubmit the Report with the necessary data and interpretation to provide NMED with the means to evaluate SVE as a possible remedy at MDA G.

2. The Permittees must provide further discussion and interpretation of the data in the revised Report. The Permittees must include the following information:
 - a.) Specify system components such as vacuum blowers, pumps, effluent air treatment, piping, extraction, and monitoring boreholes; verify operating conditions (e.g., extraction vacuum levels, airflow rates, radius of influence, time periods of operation and recovery, and contaminant vapor concentrations); estimate extraction rates and measurement instrumentation and methods.
 - b.) Discuss the physical parameters (e.g., air permeability, vacuum/pressure distribution and radius of effective air exchange, vacuum/flow rate correlation) and chemical parameters (e.g., extracted soil vapor, treated soil vapor, recovered condensate, and chemical data quality). The data must include analytical results, physical parameters (e.g., pressure, temperature, and flow rates), and soil properties (e.g., porosity, bulk density, moisture content). Discuss the relationship between the applied vacuum (or pressure) and the resulting flow from the extraction well.
 - c.) Discuss the subsurface vacuum distribution, determine the extent to which contamination is removed from different strata, make vertical profiles of the extracted concentrations and flow rates, provide a chart showing the pressure changes in the well heads over time, discuss the extracted vapor quality, and compare the final contaminant concentrations to target level concentrations.
 - d.) Describe the data reduction procedures that were used to interpret the field data results. Describe the methods of the air permeability analysis, system curve construction, mass removal calculation, and concentration extrapolation analysis. Report and interpret the spatial distribution of airflow within the zone of influence of the extraction well, report and interpret the offgas concentrations versus time history, correlate and relate field results with the geohydrologic and hydraulic properties of the stratigraphy at MDA G, and propose extraction intervals for SVE.
 - e.) Present all of the data from the pilot test and provide discussion and interpretation of the data (e.g., correlate results to stratigraphy). Plots of contaminant removal rates, flow rates, and applied vacuums as functions of time are acceptable methods of presenting

pilot-scale data. Ensure plots are legible (see Figures 4.2-4, 4.2-7, 4.2-10, 4.2-13, 4.3-4, 4.3-7, 4.3-10, 4.3-13). The Permittees must provide a discussion of the data in Appendix B and provide simplified charts of the raw data. The Permittees must re-submit this Report with the necessary changes and additions.

3. The Permittees discuss TCA concentrations measured during the test in detail, but do not discuss other data collected during the pilot test. NMED acknowledges that TCA makes up a large portion of the plume and is a useful indicator of the extent of the plume; however, the other measured VOCs must also be discussed. The Permittees must revise the Report to include a discussion of the TCE, PCE, Freon, and other gas concentrations measured during the test.
4. In Appendix C, the Permeability Testing Results section, the Permittees present the results of the permeability testing in graph form, but do not include the data (e.g., field measurements, tables), relate the results to MDA G stratigraphy, or explain the results in terms of the SVE system. The Permittees must revise the Report to discuss the results of the permeability testing.

Specific Comments

1. Page 4 - 5, Section 3.2 SVE Pilot Test Summary, paragraph 6

Permittees' Statement: "Active soil-vapor extraction was performed in both the shallow- and the deep-extraction boreholes for a period of 30d. Active extraction was first performed at the shallow-extraction borehole, followed by a 2-wk rebound period at the pore-gas monitoring wells. Active extraction was then performed in the deep-extraction borehole following shallow rebound monitoring. During active extraction, a Brüel&Kjær (B&K) 1302 photoacoustic multigas analyzer was used to monitor TCA, TCE, Freon, tetrachloroethylene (PCE), carbon dioxide, and water-vapor concentrations in both the pore-gas monitoring boreholes and in the vapor-extraction boreholes. Differential pressure readings (the difference between surface and subsurface pressures, measures in kilopascals [kPa]) were collected from the pore-gas monitoring boreholes using a Dwyer Series 475 Mark III digital manometer. B&K pore-gas parameters were measured once each day (generally the morning) at each of the pore-gas monitoring boreholes and every 3 min at the extraction borehole. B&K values measured at the extraction boreholes were recorded using a Campbell Scientific CD-23X data logger. Differential pressure readings were collected from each pore-gas monitoring borehole once in the morning and once in the afternoon. Data collected during the MDA G SVE pilot study are provided in Appendix B."

NMED Comment: The aforementioned data must be presented in a format in addition to the Appendix B Excel files. Appendix B may be used to supplement the data presented in the Report, but is not acceptable as the exclusive presentation of the data. Plots and charts of contaminant removal rates, flow rates, and applied vacuums as functions of time are acceptable methods of presenting pilot-scale data.

2. Page 6, Section 4.1, Baseline Monitoring

Permittees' Statement: "The VOCs and differential pressure were monitored in the pore-gas monitoring boreholes before and after active extraction to establish baseline VOC and differential-pressure conditions. Baseline monitoring was conducted before the shallow extraction test from May 29 to June 16, 2008, in borehole locations 54-24388, 54-01116, and 54-23488; and from June 5 to June 12, 2008, in borehole location 54-01117. Following the shallow-extraction test and before the deep-extraction test, baseline VOC and differential-pressure monitoring were conducted in all pore-gas monitoring boreholes from August 8 to August 22, 2008. Following the deep-extraction test, baseline VOC and differential-pressure monitoring were conducted in all pore-gas monitoring locations from September 25 to October 10, 2008."

NMED Comment: NMED recognizes the Permittees included the baseline data in the Excel files with Appendix B and in graph form for TCA and pressure differentials; however, the data in the Excel files is not explained and is therefore hard to read and interpret. The Permittees must provide definitions for the acronyms used in the Excel files. The Permittees must discuss the baseline data in the Baseline Monitoring section and summarize the data in a simplified table.

3. Page 12, Section 6.0, Conclusions, paragraph 2

Permittees' Statement: "Passive airflow monitoring in the shallow-extraction borehole indicates that changes in barometric pressure can result in airflow out of the Tshirege Member, typically during late morning and early afternoon hours. Monitoring during these times also indicates that VOCs are present in the exhaled air. Passive air flow out of the shallow formation indicates that an SVE remediation strategy that uses both active and passive extraction phases may increase the overall removal of vapor-phase VOCs from the subsurface. However, such a strategy requires further evaluation is beyond the scope of this report."

NMED Comment: The Permittees must compare active and passive extraction for removal of VOCs at MDA G and include the information in the Report.

4. Page 12, Section 6.0, Conclusions, paragraph 3

Permittees' Statement: "The pilot test results are inconclusive with respect to the effectiveness of SVE in removing subsurface tritium. Because the inventory of tritium is almost entirely present in the liquid phase rather than as a vapor, SVE is not expected to be effective in removing tritium. This conclusion is consistent with the U.S. Environmental Protection Agency directive on the use of SVE as a presumptive remedy for VOCs in soil (EPA 1996, 103427). This directive indicates that SVE is not effective with contaminants having a dimensionless Henry's law constant less than 0.01. The dimensionless Henry's law constant for tritium is on the order of 1×10^{-5} (LANL 2003, 076039, p. I-1)."

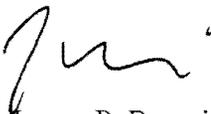
NMED Comment: In Section 4.5, *Tritium Sampling*, the Permittees state, "[t]ritium was detected in the pore-gas sample from the shallow-extraction borehole during active shallow extraction at a concentration of 432,600 pCi/L and in the sample collected following active

extraction at a concentration of 656,900 pCi/L. Tritium was detected in the pore gas sample collected from the deep-extraction borehole during active deep extraction at a concentration of 42,360 pCi/L." The purpose of the tritium sampling was to evaluate whether or not tritium was present in the extracted vapor. The Permittees do not provide sufficient data for NMED to evaluate the effectiveness of the SVE system for removing tritium. The levels of tritium extracted from the soil vapor indicate that tritium is present in the soil vapor. The Permittees must revise the Report to include the results of daily monitoring of tritium levels during the active testing of the SVE and the passive monitoring phase of the test as well as baseline data for tritium levels measured in the boreholes prior to active extraction.

The Permittees must address all comments and submit a revised Report by January 9, 2009. As part of the response letter that accompanies the revised Report, the Permittees shall include a table that details where all revisions have been made to the Report and that cross-references NMED's numbered comments. All submittals (including maps) must be in the form of two paper copies and one electronic copy in accordance with Section XI.A of the Order. In addition, the Permittees shall submit a redline-strikeout version that includes all changes and edits to the Report (electronic copy) with the response to this NOD.

Please contact Kristen Van Horn at (505) 476-6046 should you have any questions.

Sincerely,



James P. Bearzi
Chief
Hazardous Waste Bureau

cc:

D. Cobrain, NMED HWB
K. Roberts, NMED HWB
S. Yanicak, NMED DOE OB, MS J993
T. Skibitski, NMED DOE OB
L. King, EPA 6PD-N
G. Rael, DOE LASO, MS A316
M. Graham, ENV MS J591
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