Response to the "Notice of Disapproval for the Notice of Disapproval for the Pilot Test Report for Evaluating Soil-Vapor Extraction at Material Disposal Area G at Technical Area 54, Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-08-048," Dated December 19, 2008

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. The comments are divided into general and specific categories, as presented in the notice of disapproval. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy policy.

GENERAL COMMENTS

NMED Comment

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 C 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 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.

LANL Response

1. The pilot study was conducted at the request of NMED to evaluate soil-vapor extraction (SVE) as a potential treatment technology for volatile organic compounds (VOCs) beneath Material Disposal Area (MDA) G. The due date for the corrective measures evaluation (CME) report did not accommodate the completion schedule of the pilot study. Therefore, the pilot study report was presented to NMED after the submittal of the CME report. Nonetheless, the pilot study report yields sufficient evidence that SVE is a suitable treatment technology for VOCs in the subsurface at MDA G, and it is hoped that NMED and the public consider SVE technology as a potential viable treatment alternative in the CME process.

LANL has revised the pilot study report to accommodate NMED's comments and to provide additional clarification and information to help NMED and the public understand why LANL believes this technology could be part of the closure remedy at MDA G.

LANL will evaluate active and passive SVE as two separate technologies in the revision of the MDA G CME report. By itself SVE technology does not meet the criteria of a remedy but LANL believes it is a possible technology that can be incorporated in a remedy alternative or alternatives as part of the CME process.

The test status reports and other related documents noted in NMED's comments were submitted to with the sole intent of presenting progress on, and supplying the raw field data for, the pilot study field activities.

NMED Comment

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.*

LANL Response

2a. The specifications of the SVE system components and the monitoring equipment are provided in Appendix E of the revised pilot study report (on CD). Information on the following SVE system components was presented in the original report.

- The vacuum blower, was described in section 3.2 (fifth paragraph).
- A gas diaphragm pump was used for purging; the effluent air was treated as shown in Appendix E, and 6-in. diameter schedule 40 polyvinyl chloride piping was used.
- A description of the shallow-extraction borehole was provided in section 3.2 (second paragraph).
- A description of the shallow-extraction borehole was provided in section 3.2 (third paragraph).
- A description of the pore-gas monitoring boreholes was provided in section 3.2 (fourth paragraph).
- Operating conditions for the shallow and deep extraction pilot tests were discussed in sections 4.2 (shallow) and 4.3 (deep).
- Various operational conditions associated with system shutdowns because of power interruptions were discussed in section 4.2.
- The radius of influence for the SVE system, contaminant vapor concentrations, and the overall impact of extraction on the VOC plume is discussed in section 4.3 (first and second paragraphs).
- A discussion of measurement instrumentation is provided in section 3.2 (sixth paragraph).

In addition, the following tables were added for clarification: Table 3.2-1, summarizing borehole characteristics; Table 3.2-2, summarizing borehole stratigraphy; and Table 3.2-3, providing an overview of the test phases of the pilot study.

2b. The permeability tests conducted as part of the pilot study were inconclusive. To evaluate permeability, a bulk permeability for the open interval was determined based on the SVE test. Differential pressure data presented in the original pilot study report were indicative of the radii of influence for the active shallow and deep extraction tests.

To help NMED and the public better understand the radii of influence, the Laboratory constructed a two-dimensional model using the parameters obtained during the pilot study (LANL report in preparation). During implementation of the model, LANL realized that the MDA G permeability values obtained as part of the pilot study were not indicative of the permeability of the stratigraphic units and probably underestimated the actual permeability because of the sampling system design. The method of determining permeability assumed downhole instrumentation and did not allow for the effects of sample tubing (e.g., friction loss) on measured values. During the permeability test, differential pressure readings were obtained at the surface using a manometer when they should have been obtained from a pressure transducer located downhole.

The inconclusive nature of the permeability values obtained as part of the SVE pilot study make these values inappropriate for modeling purposes. Therefore, the model was supplemented with stratigraphic specific permeability values extrapolated from data collected at MDA L. LANL recommends applying the resultant conservative estimates of the radii of influence estimated by the model at MDA G.

Pressure differentials were observed in the monitoring borehole locations at a distance of approximately 100 ft from the extraction well during the shallow-extraction test and approximately 25 ft from the extraction well during the deep-extraction test. The results of the modeling confirm the conservative estimates of the radii of influence for the shallow and deep extraction tests (100 ft and 25 ft, respectively), which is in agreement with the findings of the pilot study. A discussion of the supplemental modeling is provided in the revised pilot study report.

The relationship between applied vacuum (as a function of differential pressure) and calculated flow rates is discussed in section 3.2 of the revised pilot study report. A more robust discussion of the calculations and modeling parameters is included in Appendix D of the revised pilot study report, along with several spreadsheets that provide system-operating parameters (i.e., pressure, temperature, and flow rates), to further enhance the revised report.

Chemical and physical parameters for each of the contaminants field screened during the SVE pilot study are presented in Table 2.3-1 of both the original and revised pilot study reports. Section 3.2 (paragraphs 11 to 13) of the original report summarizes the results of the extracted soil vapor, treated soil vapor, and recovered condensate. These contaminants were not detected in stack vapors, and no condensate was recovered.

Soil properties are described in section 2.2 and provided in Table 2.2-1 of both the original and revised reports. Table 2.2-1 defines the parameters for the bulk density, porosity, and moisture content along with details for in situ permeability, moisture content by volume, percent saturation, saturated hydraulic conductivity, and an indication of the fracturing of the various formations for each stratigraphic unit and subunit at Technical Area 54.

2c. As noted above, the revised pilot study includes a supplemental discussion of the subsurface vacuum distribution as part of the two-dimensional model (LANL report in preparation). In addition, a qualitative discussion of the estimated volume of removed VOCs, as a function of stratigraphy, has been included in the revised pilot study report. This information is also summarized in Table 6.0-1 of the revised report. Vertical profiles of extracted concentrations and flow rates have been developed as part of the two-dimensional model (LANL report in preparation) discussed in the revised report.

Graphs detailing differential pressure changes over time for the monitoring boreholes were included as Figures 4.2-3 through 4.2-14 and 4.3-3 through 4.3-14 of the original report. These graphs depict pressure-differential data for each port within each borehole over the duration of the pilot test. In the revised report, these figures were amended to indicate the beginning dates and completion dates for each of the active extraction phases.

Four compounds were field screened at both the monitoring and extraction boreholes during the pilot test. The composition of each VOC within the extracted air and plots depicting individual compound concentrations and total VOC concentrations over time have been included in the revised pilot study (Figures 4.2-2, 4.3-2, and 4.4-2).

No target concentration levels exist for soil vapor extracted at MDA G. Because there are no screening levels for pore gas that address the potential for groundwater contamination, screening is based on groundwater standards or tap water screening levels and Henry's law constants that describe the equilibrium relationship between vapor and water concentrations. During the shallow- and deep-extraction tests, VOC concentrations decreased. Table 4.0-1 of the revised report provides the range of select VOC concentrations. In addition, Table 6.0-1 summarizes the estimated mass of VOCs removed during each phase of the pilot study.

2d. If SVE is selected as part of the final remedy for MDA G, extraction intervals will be identified as part of the design process. This design will be provided as a component of the corrective measures implementation plan, which will be submitted to NMED pursuant to Section VII of the Consent Order.

No data reduction was performed as part of the pilot study. Section 3.2 of the original pilot study report describes the data collection methods and analyses.

The revised pilot study report discusses how flow rates were calculated and how mass removal rates were estimated (Appendix D and section 3.2). The methodology and results of air permeability testing are presented in Appendix C of the original pilot study report. Appendix C of the revised report has been amended to include air permeability data in tabular format. See also the discussion of permeability data in response to General Comment 2b above.

2e. All available data collected as part of this pilot test were presented in Appendix B of the original pilot study. For the revised report, the Excel files were renamed and the column headings clarified. In addition, a discussion of the contents of Appendix B was added as a cover sheet to the revised Appendix B.

A discussion of the pilot test data is provided in the revised pilot study report pursuant to General Comment 2c (see Table 4.0-1).

The following information is shown in figures of both the original and revised pilot study reports: (1) contaminant mass removal as a function of time (see General Comment 2d), (2) flow rates as a function of time for the passive-extraction test and calculated average flow rates for the active extraction tests, and (3) average operating parameters (including average applied vacuums).

Each figure presented in the original pilot study has been revised and enlarged for readability and clarity.

Where appropriate and not already presented, a discussion of relevant information in figures has been provided in the revised pilot study report.

NMED Comment

3. The Permittees discuss 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.

LANL Response

3. The revised pilot study report discusses the VOC concentrations monitored in the extracted vapor. Figures depicting the mass of VOCs removed and the change in extracted concentrations over time have been amended in the revised report to include trichlorethene (TCE), tetrachloroethane (PCE), and Freon-11. Table 6.0-1 of the revised report shows the total mass of VOCs and the percentage of 1,1,1-trichloroethane (TCA), TCE, PCE, and Freon-11 recovered during extraction.

NMED Comment

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.

LANL Response

4. Limitations associated with the permeability data collected as part of this pilot study are discussed in the Laboratory's response to General Comment 2b. Appendix C of the original pilot study report discussed the site-specific permeability values obtained during the pilot study. Appendix C has been amended to include the permeability data in tabular form.

SPECIFIC COMMENTS

NMED Comment

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 [kPaI) 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.*

LANL Response

1. During the two active extraction tests, field-screening data were collected once per day at four monitoring boreholes and every 3 min at the extraction borehole. In addition, differential pressure readings were taken twice daily at four monitoring boreholes. The data collected represent over 28,000 records and are presented in three separate Excel files in Appendix B. Because of the large volume of data, 26 figures were provided in the original submission of the pilot study report to distill

the information into more manageable, meaningful, and easier to interpret packages. The figures included trends and scatter plots for concentrations of TCA, scatter and box plots of differential pressure, and TCA concentrations in each of the boreholes for both extraction texts. For the revised pilot study report, many figures have been amended to include additional contaminants (Freon-11, PCE, TCA, and TCE). These figures show changes in concentrations for these contaminants during both the shallow- and deep-extraction tests and the passive-extraction period.

Figures 4.2-2 and 4.3-2 provide the estimated removal rates of TCA during both the shallow- and deep-extraction tests. The estimated removal rates of Freon-11, PCE, and TCE were added to Figures 4.2-2 and 4.3-2 in the revised pilot study report. Figure 4.4-3 was added to the revised report to show the estimated mass removed for all four contaminants (Freon-11, PCE, TCA, and TCE).

The vacuum applied to each of the monitoring boreholes is best demonstrated by the box plots provided in the original pilot study report (Figures 4.2-3, 4.2-6, 4.2-9, 4.2-12, 4.3-3, 4.3-6, 4.3-9, and 4.3-12). The flow rate is calculated at the extraction borehole for each active extraction test and is shown in Figures 4.2-2 and 4.3-2 of the original and revised pilot study report. The flow rate for the passive test is shown in the new Figure 4.4-3 of the revised report. Dwyer's formula, used to calculate the airflow at the extraction boreholes, is presented in Appendix D of the revised report.

NMED Comment

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.*

LANL Response

2. The column headings in the Excel files were revised to clarify their meaning.

   Section 4.0 of the revised report was expanded and now includes a detailed explanation of the data. Table 4.0-1 provides a summary of the field-screening results of samples collected during each phase of the pilot study. Tables 4.1-0, 4.2-0, 4.3-0, and 4.4-0 were added to the revised pilot study report to present the average, minimum, and maximum concentrations of field-screened contaminants. Box plot comparisons of the changes in differential pressure for both the shallow- and deep-extraction tests for each of the monitoring boreholes are shown in Figures 4.2-3, 4.2-6, 4.2-9, 4.2-12, 4.3-3, 4.3-6, 4.3-9, and 4.3-12 of both the original and revised reports.

NMED Comment

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.*

LANL Response

3. The estimated mass of VOCs removed during the active shallow-extraction test, active deep-extraction test, and passive venting is estimated at 278 lb, 15 lb, and 0.7 lb, respectively. The report was revised to include a more detailed discussion. Table 6.0-1 was added to provide the estimated mass removed during each phase of the pilot study. Section 3.2 was revised, and Appendix D was added to include the calculations used to arrive at the estimates presented in Table 6.0-1.

NMED Comment

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 laws constant for tritium is on the order of 1×10^{-5} (LANL 2003, 076039, p. 1-1)."*

NMED Comment: *In Section 4.5, Tritium Sampling, the Permittees state, "tritium 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.*

LANL Response

4. LANL agrees that it did not provide sufficient data to evaluate the effectiveness of the SVE system for removing tritium. Since the work plan was submitted, LANL found information (U.S. Environmental Protection Agency and industry studies) that demonstrates SVE technology is not effective for the treatment of tritium.

   LANL did not collect tritium samples in the subsurface on a daily basis during the pilot study. Periodic monitoring of beta radiation was conducted but only to ensure that proper health and safety protocols were followed. The same instrument was used to monitor beta radiation at the SVE system's exhaust stack. No elevated beta readings were detected during the health and safety monitoring or at the exhaust stack.

   LANL did collect tritium samples during specific phases of the pilot study. These data are presented in section 4.5 and Table 4.5-1 of the original and the revised pilot study reports.

Cross-Reference of New Mexico Environment Department Notice of Disapproval Comments and Revisions to the Pilot Test Report for Evaluating Soil-Vapor Extraction at Material Disposal Area G

NMED Comment No.	Section(s), Table(s), or Figure(s) in Original Report	Page(s) in Original Report	Section(s), Table(s), or Figure(s) in Revised Report	Nature of Revision to Report
General Comments				
1	Sections 1.0, 3.1, 5.0, and 6.0	1, 4, 11, and 12	Executive Summary and Sections 1.0 and 3.0	Text was revised to discuss soil-vapor extraction (SVE) as a treatment technology that could be employed as a remedy or part of a remedy at Material Disposal Area (MDA) G.
2	Entire document	All	Executive Summary; Sections 3.2, 4.0, and 6.0; Tables 2.3-1, 3.2-1, 3.2-2, 3.2-3, 3.2-4, 4.0-1, 4.1-1, 4.2-1, 4.3-1, 4.4-1, and 6.0-1; all original figures (revised) and Figure 4.4-3 (new); and Appendixes C, D, and E	Text was revised to include discussions on the permeability, radii of influence, and differential pressure trends. Eleven tables were added to provide summaries of the data presented in Appendix B, clarify information presented in the text, provide background information on the boreholes, and summarize the mass of volatile organic compounds (VOCs) extracted during each phase of the pilot study. All figures provided in the original pilot study report were revised for readability and clarity, and one new figure was added. Appendix C was revised; Appendix D was added to clarify the derivation of airflow; Appendix E was added to clarify information presented in section 3.2.
3	Sections 2.3, 3.2, and 4.0	2 and 4 through 11	Sections 2.3, 3.2, and 4.0; Table 3.2-4; Figures 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.4-2, and 4.4-3 (new)	A discussion of the inherent properties of 1,1,1-trichloroethane (TCA) was added to the text. Table 3.2-4 was added to demonstrate the VOC composition of the extracted vapor. Five figures were revised to show total VOCs, TCA, trichloroethene (TCE), Freon-11, and tetrachloroethane (PCE). One figure was added to show the estimated mass of VOCs removed during passive venting.
4	Section 4.0 and 6.0, and Appendix C	6 through 11, and C-1 through C-4	Sections 4.0 and 6.0 and Appendix C	Text was revised to discuss the permeability data collected during the pilot study. Appendix C was revised.
Specific Comments				
1	Section 3.2	4 and 5	All original figures (revised); Tables 4.0-1, 4.1-1, 4.2-1, 4.3-1, and 4.4-1; and Appendix B	Five tables were added to provide summaries of the data presented in Appendix B and to clarify information presented in the text. All figures provided in the original pilot study report were revised for readability and clarity. A cover page explaining the contents of Appendix B was added, and two new worksheets were added.

NMED Comment No.	Section(s), Table(s), or Figure(s) in Original Report	Page(s) in Original Report	Section(s), Table(s), or Figure(s) in Revised Report	Nature of Revision to Report
2	Section 4.1	6	Sections 4.0 and 4.1; and Tables 4.0-1 and 4.1-1	The baseline data are summarized in Tables 4.0-1 and 4.1-1, and discussed further in the text. The column headings in Appendix B were revised for clarification, and a cover page explaining the contents of Appendix B was added.
3	Section 6.0	12	Executive Summary; Sections 4.0 and 6.0; Figure 4.3-3 (new); and Table 6.0-1	Text in sections 4.0 and 6.0 were revised to include discussions of the active and passive extraction of VOCs. Table 6.0-1 was added to summarize the estimated mass of VOCs removed during each phase of the pilot study, and Figure 4.4-3 was added to graph the passive-venting mass removal.
4	Section 6.0	12	Executive Summary and Sections 4.0 and 6.0	Text was revised to discuss the role of beta activity monitoring in the pilot study activities and to discuss the reason SVE is not a suitable treatment technology for removing tritium.