

**Response to the Approval with Modifications for the Interim Measures
Progress Report for Soil-Vapor Extraction of Volatile Organic Compounds from
Material Disposal Area L, Technical Area 54,
Los Alamos National Laboratory EPA ID No: NM0890010515, HWB-LANL-15-048,
Dated February 12, 2016**

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment.

COMMENTS

NMED Comment

1. *A detailed description of sampling methods utilized to collect the data was not provided in the Report. NMED is unable to evaluate the validity of the data without this information. References to SOPs or work plans do not clarify whether those methods were strictly adhered to during field operations. Also, calculated data is presented in the Report with no explanation of how those values were calculated. For example, Figure 4.1-1 shows cumulative mass removal with no explanation as to how variable concentration data and flow rates were interpolated over time. In addition, Figure 2.1-1 illustrates a manual dilution air valve on the intake of the SVE units, but there is no indication of whether dilution air was utilized during operation of the units.*

In the upcoming Annual Report, provide detailed descriptions of all methods used in the collection of data, including, but not limited to, how samples were collected from both the SVE units and the monitoring well ports and whether dilution air was added during operation of the SVE units. Also, include all methods for the calculation of any presented data, (e.g., VOC concentrations in ppmv, cumulative mass removal, and cumulative volume pumped) including variable values and example calculations.

LANL Response

1. Text has been added throughout the report to address NMED's comments. Specifically, the following changes were made to the report:
 - a. Text was added to sections 2.2.1 and 2.2.3 to explain more fully the sample collection procedure for the soil-vapor extraction (SVE) effluent and monitoring boreholes respectively.
 - b. Text was added to section 2.2.2 to explain how mass removal is calculated as a function of flow rate and concentration. Example calculations for effluent mass removal are included in Appendix C.
 - c. Section 2.2 was expanded to more fully explain how laboratory reported values in parts per billion by volume are converted to both parts per million by volume and mass per volume ($\mu\text{g}/\text{m}^3$).
 - d. Text was added to section 2.1 to explain that the dilution valves were closed at all times.

NMED Comment

- 2. A review of the 2014 baseline sample analysis results for well 54-24399 indicates that three samples were collected from this well/port on Sept. 23, 2014. The samples included a sample with a field duplicate sample collected at 12:47 from 568 to 608 feet (ft) below ground surface (bgs), followed by a second sample collected at 15:12 from 568 to 569 ft bgs. Analytical laboratory results for TCA, TCE, and PCE concentrations indicate that the later sample results, apparently collected with a dual packer system in place, was an order of magnitude higher in concentration than the earlier samples (e.g., 3653 ug/m³ vs 196 ug/m³ TCA). This practice was similarly conducted in the third quarter 2015 sampling. This issue was not mentioned or discussed within the Report. Compose the upcoming Annual Report to provide a detailed description of the sampling procedures for this well, including packer usage and purge volumes utilized. In addition, provide copies of field notes documenting purge procedures and volumes. Should future monitoring plans propose only one sampling method for this borehole, NMED recommends that only the dual packer system be utilized for the interval from 568 to 569 ft bgs.*

LANL Response

- 2. Text has been added to section 2.2.3 to include a detailed description of the sampling procedure for borehole 54-24399. Text was added to section 6.3 to explain the decision to use only a single packer at the base of the casing in borehole 54-24399.*

NMED Comment

- 3. Plate 1 graphically indicates that in most of the sampled wells, decreases in concentrations of VOCs were observed, with higher reductions in concentrations observed at the shallower monitoring ports. Conversely, in wells 54-02089 and 54-24238 located about 30 ft apart and approximately 80 and 100 ft, respectively, from the SVE-East extraction well, significant increases in VOC concentrations were observed between 44 and 84 ft bgs. The Report does not discuss this occurrence. Provide a discussion of these results in the upcoming Annual Report.*

LANL Response

- 3. Text has been added to section 4.3.2 to address the increase in concentration detected in boreholes 54-02098 and 54-24238.*

NMED Comment

- 4. In Appendix A, the Microsoft Excel file titled "SVE Data" appears to provide analytical data for effluent samples collected from the two SVE units. The data does not provide information on whether the sample was collected from the SVE-East or SVE-West well since the location code for both wells is the same. Provide the data for each well on separate spreadsheets for SVE-East and SVE-West or a column in the existing spreadsheet indicating the sampled well in order to enable sorting. Provide the data incorporating one of the options above in the upcoming Annual Report.*

LANL Response

- 4. Appendix B includes SVE effluent data in two separate tables, one for each SVE unit.*

NMED Comment

5. Section 3.2.3, *SVE Plan, in the September 2014 approved Interim Measures Work Plan for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54, Revision 1(IMWP) states, “[m]onitoring data will be used to generate concentration versus time plots (similar to Figure 2.0-2) ...”. These plots were not presented in the report. In the upcoming Annual Report, provide these plots for 1,1, 1-TCA, TCE, and PCE for both SVE-East and SVE-West.*

LANL Response

5. Figure 4.2-1 has been added, showing concentrations of effluent versus time for 1,1,1-trichloroethane (1,1,1-TCA); trichloroethene (TCE); tetrachloroethene (PCE); Freon-113; and 1,2-dichloroethane (1,2-DCA) for both SVE-East and SVE-West. In addition, Figure 4.2-2 has been added to show how the ratios of these compounds, as a percent of the total effluent concentration, changes through time for both SVE-East and SVE-West.

NMED Comment

6. Section 3.2.4, *Sampling Plan during SVE, of the IMWP states, “[p]er SOP 5074, the static pressure of the formation at each sampling interval will be documented, and no samples will be collected at ports that are clogged.” The data presented in Table 4.3-1, Differential Pressure Data at Sampling Ports Monitored during SVE Operations, indicates that pressure data was not collected at each sampling interval. For instance, the only data provided for well 54-02001 is for the port located 20 ft bgs; the other nine ports for this well are missing from the table. In addition, wells/ports that are a part of the quarterly monitoring program are shown as “[n]ot measured as part of quarterly sampling” or are missing from the table. Some wells/ports are shown as “[n]ot collected” with no explanation. Either include the missing data or include a section that lists and provides explanations for all deviations from the approved IMWP in the upcoming Annual Report. Also, provide two separate tables, one for baseline monitoring that includes all wells/ports listed on Table 2.0-1 of the IMWP and one for quarterly monitoring that includes all wells/ports listed on Table 3.2-1 of the IMWP. To facilitate NMED’s review, provide the data in these tables in the same order listed in Tables 2.0-1 and 3.2-1 of the IMWP.*

LANL Response

6. Tables 2.2-2 and 2.2-3 split out annual and baseline(2014) sampling from quarterly sampling for all subsurface ports. These tables include detailed reasons why samples are missing. Similarly, the differential pressure table (Table 4.3-1) has been modified to indicate any samples that were not collected. Comments for why pressure samples were not collected are included in Tables 2.2-2 and 2.2-3. Table 4.3-1 contains all pressure data for both quarterly and annual sampling, with samples collected only annually indicated by a dash in the columns presenting quarterly data. The list of boreholes in Tables 2.2-2, 2.2-3, and 4.3-1 are all now in the same order as originally presented in the Interim Measures Work Plan (IMWP).

NMED Comment

7. *Quarterly monitoring data for several wells/ports are missing from the Report. For instance, Plate 1 indicates that samples were not collected at the 20 ft port or the 100 ft port for well 54-02022. No explanation is provided for this deviation from the IMWP. Provide a section that lists, describes, and provides explanations for all deviations from the approved IMWP in the upcoming Annual Report.*

LANL Response

7. Section 6 includes explanations for deviations from the approved IMWP. Tables 2.2-2 and 2.2-3 include comments for why samples are missing.

NMED Comment

8. *Flow rate measurement data were not provided in the Report. Include flow measurements as both a summary table in the upcoming Annual Report and a Microsoft Excel spreadsheet in the Appendices.*

LANL Response

8. Tables 4.1-2 and 4.1-3 include all flow-measurement data. These data are also included as Appendix E as an Excel spreadsheet.