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Pilot Test Report for Comparing Packer and FLUTe Vapor-Sampling Systems at Material Disposal Area H

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EXECUTIVE SUMMARY

This report presents the results of a comparison of the Flexible Underground Liner Technology (FLUTe) vapor-sampling system currently used at Material Disposal Area (MDA) H with the packer sampling system used at MDA H from 2001 to 2006. The objective of the comparison is to determine whether the FLUTe sampling system is removing trichloroethene (TCE) from the extracted air, resulting in lower concentrations in the samples. During second quarter sampling in fiscal year (FY) 2008, samples were first collected from all three monitoring boreholes using the FLUTe system; subsequently, samples were collected from all three boreholes using the packer system. During the third quarter sampling in FY2008, samples were first collected in all three monitoring boreholes using the packer sampling system, after which samples were collected using the reinstalled FLUTe system.

The comparison of volatile organic compound (VOC) data from the FLUTe and packer sampling systems does not indicate the FLUTe sampling system is removing VOCs and, therefore, affecting pore-gas results at MDA H. Both sampling systems produced similarly low pore-gas results, including TCE, during the second and third quarter sampling events in fiscal year 2008. This conclusion is in agreement with results from recent comparisons of the FLUTe and packer systems at MDA C and supports the conclusion that the FLUTe system used at MDA H is reliable and provides representative pore-gas results.

The substantially elevated TCE concentrations reported in samples collected during the April 2005 and March 2006 sampling events at MDA H may be the result of cross-contamination of the packer systems used. Before they were used at MDA H, the packer systems deployed for these two sampling events were used to sample pore gas beneath MDA L. Analysis of the pore-gas data collected at MDA H since 2001 indicates that the TCE concentrations reported from April 2005 and March 2006 are outliers and are not representative of pore gas concentrations beneath MDA H.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility located in north-central New Mexico, approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above sea level.

The site addressed in this report is Solid Waste Management Unit 54-004, also known as Material Disposal Area (MDA) H (Figure 1.0-1). MDA H is a 70 ft by 200-ft (0.3-acre) fenced area consisting of nine inactive vertical disposal shafts, arranged in line approximately 15 ft within and parallel to its southern fence line. Each shaft is cylindrical, 6 ft in diameter, and 60 ft deep. The shafts are filled with solid-form waste to a depth of 6 ft below the ground surface (bgs). The wastes in Shafts 1 through 8 are covered by a 3-ft layer of concrete placed over 3 ft of crushed tuff; the waste in Shaft 9 is covered by 6 ft of concrete. From May 1960 to August 1986, MDA H functioned as the Laboratory's primary disposal area for classified, solid-form waste. Much of the classified waste was nonhazardous; however, various hazardous chemicals, radionuclide-contaminated materials, and materials contaminated by high explosives were also disposed of at MDA H. These materials included scraps and shapes contaminated with depleted uranium, drummed radioactive waste, fuel elements, a classified unit contaminated with tritium, plutonium-contaminated shapes, and decontamination and decommissioning scrap.

Subsurface vapor samples are collected quarterly from three boreholes next to MDA H: borehole locations 54-01023, 54-15461, and 54-15462 (Figure 1.0-2). This report presents the results of a comparison of the Flexible Liner Underground Technology (FLUTe) vapor-sampling system used at MDA H since the third quarter of fiscal year (FY) 2006 with the packer sampling system used for vapor sampling at MDA H from 2001 to the second quarter of FY2006. The data were collected during the second and third quarters of FY2008.

1.1 Background and Purpose of the Comparison Study

Since third quarter FY2006, subsurface pore-gas samples have been collected in boreholes next to MDA H using the FLUTe system for vapor monitoring. Before third quarter FY2006, a packer sampling system with Teflon tubing was used to collect pore-gas samples at MDA H. The 2007 periodic monitoring report for vapor sampling at MDA H (LANL 2007, 099140) reported substantially lower volatile organic compound (VOC) concentrations, particularly for trichloroethene (TCE), than had been reported before the FLUTe system was installed. The TCE pore-gas concentrations ranged from 2200 $\mu g/m^3$ to 5700 $\mu g/m^3$ in the samples collected using the packer system during third quarter FY2005 and second quarter FY2006, while the maximum TCE concentration using the FLUTe system was 78 $\mu g/m^3$. The New Mexico Environment Department (NMED) was concerned that the FLUTe membrane may have adsorbed VOCs or influenced the concentrations reported in some other way (NMED 2007, 099277). In addition, NMED had based its final remedy for MDA H to include the encapsulation of the shafts and the use of soil vapor extraction (SVE) on the assumption that the TCE concentrations reported using the packer system (NMED 2008, 100480) were elevated.

At NMED's direction, a study was conducted to clarify whether the pore-gas sampling systems produced comparable pore-gas data. The objective of the comparison was to determine whether the FLUTe sampling system is removing VOCs from the extracted air so as to substantially underestimate the VOC concentrations measured in the pore gas beneath MDA H. Subsurface vapor samples were collected

from the boreholes at MDA H using the currently deployed FLUTe system and the previously used packer system, and the TCE concentrations collected from both systems were compared.

1.2 Vapor-Sampling Systems

The operations of the two vapor-sampling systems are described in detail below.

The FLUTe system uses a flexible liner that provides a seal against the borehole wall. The FLUTe membrane liner is made of urethane-coated nylon fabric, and the tubing is made of nylon. The sampling ports and the nylon tubing are installed in the interior sleeves of the liner, and the tubing runs to the surface where vapor samples are collected. The liner is contained in the borehole and is connected to a polyvinyl chloride riser system at the surface. Before samples are collected, the FLUTe system is inflated with air to temporarily seal the liner against the borehole wall, pressing the sampling ports against the geological formation. This pressure is maintained throughout sampling as the vapor is drawn through a permeable spacer material between the liner and the borehole wall and into the nylon tubing. Figure 1.2-1 shows a cross-section of an inflatable FLUTe sampling system.

The packer sampling system uses an inflatable packer assembly to isolate a 2-ft interval from which subsurface vapor is extracted. Air pressure is used to inflate the flexible packer membranes, while Teflon tubing transports the extracted sample air to the surface.

2.0 SCOPE OF ACTIVITES

During the second and third quarters of the FY2008 sampling events, the following sampling activities were completed at MDA H, as directed by NMED (2007, 099277). The borehole locations are shown in Figure 1.0-2.

- Vapor samples for field screening and laboratory analyses were collected from the following ports:
    - ❖ Borehole location 54-15461: 10 ft bgs; 60 ft bgs, corresponding to the base of the shafts; and total depth (TD) of 95 ft bgs.
    - ❖ Borehole location 54-15462: 10 ft bgs; 60 ft bgs, corresponding to the base of the shafts; depths of 100, 150, and 200 ft bgs; and the Cerro Toledo interval, 254 ft bgs (TD).
    - ❖ Borehole location 54-01023: the 10 ft bgs; 60 ft bgs, corresponding to the base of the shafts; depths of 100, 150, and 200 ft bgs; and the Cerro Toledo interval, 247 ft bgs (TD).
- Each sampling depth was purged to ensure formation air was sampled in accordance with standard operating procedure EP-ERSS-SOP-5074, Sampling of Subatmospheric Air. The vapor-sampling systems were purged to ensure rock formation air filled the systems. Purge time for each vapor-sampling system is based on the inside diameter of the tubing used (0.18 in. for all tubing), the length of tubing for each port, and the nominal flow rate of the pumps (30 ft^3/h).
- Pore gas from each depth was field screened for carbon dioxide and oxygen using a Landtec GEM-500.
- Vapor samples were collected from each depth in SUMMA canisters for laboratory analysis of VOCs using U.S. Environmental Protection Agency Method TO-15.

During second quarter FY2008 sampling, samples were collected from borehole location 54-01023 using the FLUTe system on April 9, 2008, and the packer system on April 25, 2008; from borehole location

54-15461 using the FLUTe system on April 9, 2008, and the packer system on April 18, 2008; and from borehole location 54-15462 using the FLUTe system on April 10, 2008, and the packer system on April 22, 2008. (Note: During the second quarter sampling event, packer samples could not be collected within 1 wk of collecting FLUTe samples because of a shortage of SUMMA canisters. The FLUTe systems were left in place following sample collection and were removed the day before the packer samples were collected from each borehole.)

During the third quarter FY2008 sampling event, samples were collected from borehole location 54-01023 using the packer system on June 20, 2008, and the FLUTe system on June 23, 2008; from borehole location 54-15461 using the packer system on June 25, 2008, and the FLUTe system on June 26, 2008; and from borehole location 54-15462 using the packer system on June 23, 2008, and the FLUTe system on June 26, 2008.

3.0 ANALYTICAL RESULTS

This report presents a summary of the pore gas data collected during the second and third quarters of FY2008 sampling events at MDA H. The analytical methods and the data quality review will be presented in the MDA H periodic monitoring report for FY2008, scheduled to be submitted to NMED in October 2008. The analytical results for the VOCs in the pore-gas samples collected in the second and third quarters of FY2008 are presented in Table 3.0-1, and all the analytical data are provided on compact disc (Attachment 1). This evaluation focuses on TCE because NMED is concerned about the TCE results reported in samples during FY2005 and FY2006 (NMED 2008, 100480). Table 3.0-2 provides the TCE results from pore-gas samples collected during the second and third quarters of FY2008 using both systems.

In borehole location 54-01023, TCE is detected in 5 of 12 packer samples, with concentrations ranging from 5.2 µg/m^3 to 12 µg/m^3. In borehole location 54-01023, TCE is detected in 6 of 12 FLUTe samples, with detected concentrations ranging from 2.6 µg/m^3 to 100 µg/m^3. All five TCE concentrations detected using the packer system are reported in the samples collected during the third quarter of FY2008. All six TCE concentrations detected using the FLUTe system are reported in the samples collected during the second quarter of FY2008 sampling event.

No TCE is detected in borehole location 54-15461 in any of the packer or FLUTe samples.

In borehole location 54-15462, TCE is detected in 2 of 12 packer samples, with concentrations ranging from 4.4 µg/m^3 to 5.3 µg/m^3. In borehole location 54-15462, TCE is detected in 6 of 12 FLUTe samples, with concentrations ranging from 3.9 µg/m^3 to 8.4 µg/m^3. All six TCE concentrations detected using the FLUTe system and both TCE concentrations detected using the packer system are reported in the samples collected during the second quarter sampling event.

4.0 DISCUSSION

Analytical results from second and third quarters of FY2008 sampling events show similar TCE concentrations between the two sampling systems. Therefore, the data indicate the FLUTe system is not resulting in VOC adsorption that would underestimate the TCE concentrations being reported.

Based on the results of the comparison of TCE concentrations described above, an evaluation of all TCE concentrations in pore gas at MDA H was conducted to place the elevated TCE concentrations previously reported in perspective. Table 4.0-1 presents all of the TCE pore-gas results from boreholes at MDA H since 2001. Of the 260 TCE results from samples collected at MDA H since 2001, 97 (37%) of the TCE

results were detected at 110 µg/m^3 or less, with 152 (58%) TCE results reported as not detected. Of the 125 TCE results from the packer system samples collected during the 10 packer sampling events between 2001 and 2008, TCE was not detected in 89 (71%) samples. Of the 135 TCE results from the FLUTe system samples collected during the nine sampling events since the third quarter of FY2006, TCE was not detected in 63 (47%) samples.

In borehole location 54-01023, TCE was detected in 21 of 49 (43%) samples collected using the packer sampling system; only one of the detected concentrations was greater than 110 µg/m^3: 5700 µg/m^3 from 150 ft bgs in March 2006. The mean of all the detected TCE concentrations using the packer system is 259 µg/m^3, while the mean detected concentration without the 5700 µg/m^3 is 12.1 µg/m^3. Since the FLUTe sampling system was installed, the percentage of TCE detects has increased to 70% (38 of 54) of the results. The highest TCE concentration was 100 µg/m^3 at 10 ft bgs in the second quarter FY2008 sample, and the mean detected TCE concentration was 8.1µg/m^3. Figure 4.0-1 presents all the TCE results from the packer and FLUTe samples collected from borehole location 54-01023 since 2001 and illustrates that the highest TCE concentration (5700 µg/m^3) is an outlier. The 5700 µg/m^3 result exceeds the next highest concentration and the mean detected concentration by more than an order of magnitude. The mean detected concentrations for both systems without the elevated TCE concentration are similar.

In borehole location 54-15461, TCE was detected in 4 of 27 (15%) samples collected using the packer sampling system and in 3 of 27 (11%) samples collected using the FLUTe sampling system (Table 4.0-1). The highest TCE concentrations were detected with the packer system in the samples from the April 2005 sampling event, with results ranging from 120 µg/m^3 to 2500 µg/m^3. The next highest TCE concentration was 12 µg/m^3 in 2001 using the packer system; the highest TCE concentration using the FLUTe system was 1.2 µg/m^3. Figure 4.0-2 presents the TCE results from the packer and FLUTe samples collected from borehole location 54-15461 since 2001. The figure shows that the three highest TCE concentrations are outliers: these concentrations exceed all others by 1 to 2 orders of magnitude.

In borehole location 54-15462, TCE was detected in 11 of 49 (22%) samples collected using the packer sampling system and in 31 of 54 (57%) samples collected using the FLUTe sampling system (Table 4.0-1). The highest TCE concentrations were detected with the packer system in the samples from the April 2005 and March 2006 sampling events, with results ranging from 520 µg/m^3 to 2600 µg/m^3. The highest TCE concentration detected using the FLUTe system was 78 µg/m^3. The mean detected TCE concentration was 900 µg/m^3 using all of the packer system samples but was 11.4 µg/m^3 without the elevated TCE results from the two sampling events. The mean detected TCE concentration was 9.1 µg/m^3 using all of the FLUTe system samples.

Figure 4.0-3 presents the TCE results from the packer and FLUTe samples collected from borehole location 54-15462 since 2001. Nine TCE concentrations were detected between 2001 and 2006 using the packer system; six of the TCE concentrations were reported during the April 2005 sampling event (concentrations ranged from 520 µg/m^3 at 100 ft bgs to 2400 µg/m^3 at 254 ft bgs), and one TCE concentration was reported in March 2006 (2600 µg/m^3 at 254 ft bgs). The figure shows that the highest TCE concentrations are outliers: these concentrations exceed all others by 1 to 2 orders of magnitude. In addition, the packer samples collected in the two sampling events (August and October 2005) following the April 2005 sampling event reported all 11 TCE results as not detected. For the March 2006 packer sampling system event, the only detected TCE concentration was 2600 µg/m^3 in the sample collected at 254 ft bgs; TCE was reported as not detected in all other samples. In the two packer sampling system events conducted for this comparison study, 10 of 12 TCE results were not detected and the detected TCE concentrations were 5.3 µg/m^3 and 4.4 µg/m^3. In the nine FLUTe sampling events since the March 2006 sampling event, the highest TCE concentration was 78 µg/m^3.

As the graphs indicate, the elevated TCE concentrations detected using the packer sampling system were generally isolated to one or two sampling events in each borehole at MDA H. In March 2005, the packer system used in borehole locations 54-15461 and 54-15462 was initially installed in boreholes at MDA L before the MDA H sampling event and subsequently reinstalled in the MDA H boreholes. Between March 7, 2005, and March 22, 2005, the packer systems were used to collect samples from borehole locations 54-24240, 54-24239, 54-24242, 54-24243, and 54-24244 at MDA L. The TCE concentrations in samples collected from the MDA L boreholes during the March 2005 sampling event ranged from approximately 38,000 µg/m^3 to 350,000 µg/m^3 (LANL 2005, 092591). On March 22, 2006, the packer systems were used to collect Brüel &Kræger vapor samples from the western extraction borehole (borehole location 54-25453) used in the SVE pilot test at MDA L. Given the substantial VOC concentrations at MDA L, the subsequent reuse of the packer systems could have resulted in the uncommon and transient elevated concentrations reported in the MDA H borehole samples. These were the only two occasions when pore-gas sampling with the packer systems at MDA L was followed (within 14–21 d) by pore-gas sampling with the same packer systems at MDA H.

Based on the substantially higher TCE concentrations detected at MDA L and the outlier TCE concentrations reported for the two sampling events at MDA H, the packer systems were probably contaminated with VOCs from MDA L. No other MDA H packer sampling events were preceded by MDA L packer sampling events, which is reflected by the substantially lower detected TCE concentrations and the large number of undetected TCE results reported in these two boreholes. The March 2006 5700 µg/m^3 TCE concentration in borehole location 54-01023 is an outlier of unknown origin and may have been caused by sampling system cross-contamination or a contaminated SUMMA canister. Based on the results of the comparison study of the two sampling systems and the overall pore-gas data collected at MDA H over the past 8 yr (19 quarters), the elevated TCE concentrations reported in 2005 and 2006 are not representative of the pore-gas concentrations beneath MDA H.

5.0 CONCLUSIONS

The comparison of the two sampling systems was designed to determine whether the FLUTe system was removing VOCs from subsurface vapor as it flowed from the subsurface to the SUMMA canister. The comparison of the TCE results during the second and third quarter monitoring events in FY2008 does not indicate that the FLUTe sampling system is removing VOCs from the extracted air and found no substantial difference in pore-gas concentrations using the FLUTe or the packer sampling systems. This conclusion is in agreement with the results from recent comparisons of the FLUTe and packer systems at MDA C (LANL 2008, 102651) and supports the conclusion that the FLUTe system is reliable for providing representative results.

The outlier TCE concentrations from the April 2005 and March 2006 packer sampling events appear to be the result of cross-contamination of the packer systems used to sample the vapor plume beneath MDA L before they were used in two boreholes at MDA H. The outlier TCE concentration in the other borehole is also probably from contamination of the sampling system or SUMMA canister, given the isolated nature of the elevated TCE concentration in March 2006. An evaluation of all TCE pore gas results indicate no more than a 50% to 60% detection occurrence of TCE in any of the MDA H boreholes and a general detected concentration 1 to 2 orders of magnitude below the outlier TCE concentrations. The mean detected TCE concentrations for the three boreholes without the substantially elevated TCE concentrations were 12.1 µg/m^3, 12 µg/m^3 (only remaining concentration), and 11.4 µg/m^3 using the packer system compared with 8.1 µg/m^3, 1.0 µg/m^3 (only two detected concentrations), and 9.1 µg/m^3 using the FLUTe system. Therefore, the pore-gas data at MDA H collected during the April 2005 and March 2006 sampling events are not representative of pore-gas concentrations beneath MDA H.

6.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), September 2005. "Investigation Report for Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54," Los Alamos National Laboratory document LA-UR-05-5777, Los Alamos, New Mexico. (LANL 2005, 092591)

LANL (Los Alamos National Laboratory), November 2007. "Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area H, Solid Waste Management Unit 54-004, at Technical Area 54, Fiscal Year 2007," Los Alamos National Laboratory document LA-UR-07-7803, Los Alamos, New Mexico. (LANL 2007, 099140)

LANL (Los Alamos National Laboratory), July 2008. "Pilot Test Investigation Report for Evaluating Vapor-Sampling Systems at Material Disposal Area C, Solid Waste Management Unit 50-009, at Technical Area 50," Los Alamos National Laboratory document LA-UR-08-4814, Los Alamos, New Mexico. (LANL 2008, 102651)

NMED (New Mexico Environment Department), December 21, 2007. "Review of Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area H, Solid Waste Management Unit 54-004, at Technical Area 54, Fiscal Year 2007," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2007, 099277)

NMED (New Mexico Environment Department), February 26, 2008. "Status of Remedy Selection at Material Disposal Area H, Solid Waste Management Unit 54-004, at Technical Area 54," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2008, 100480)

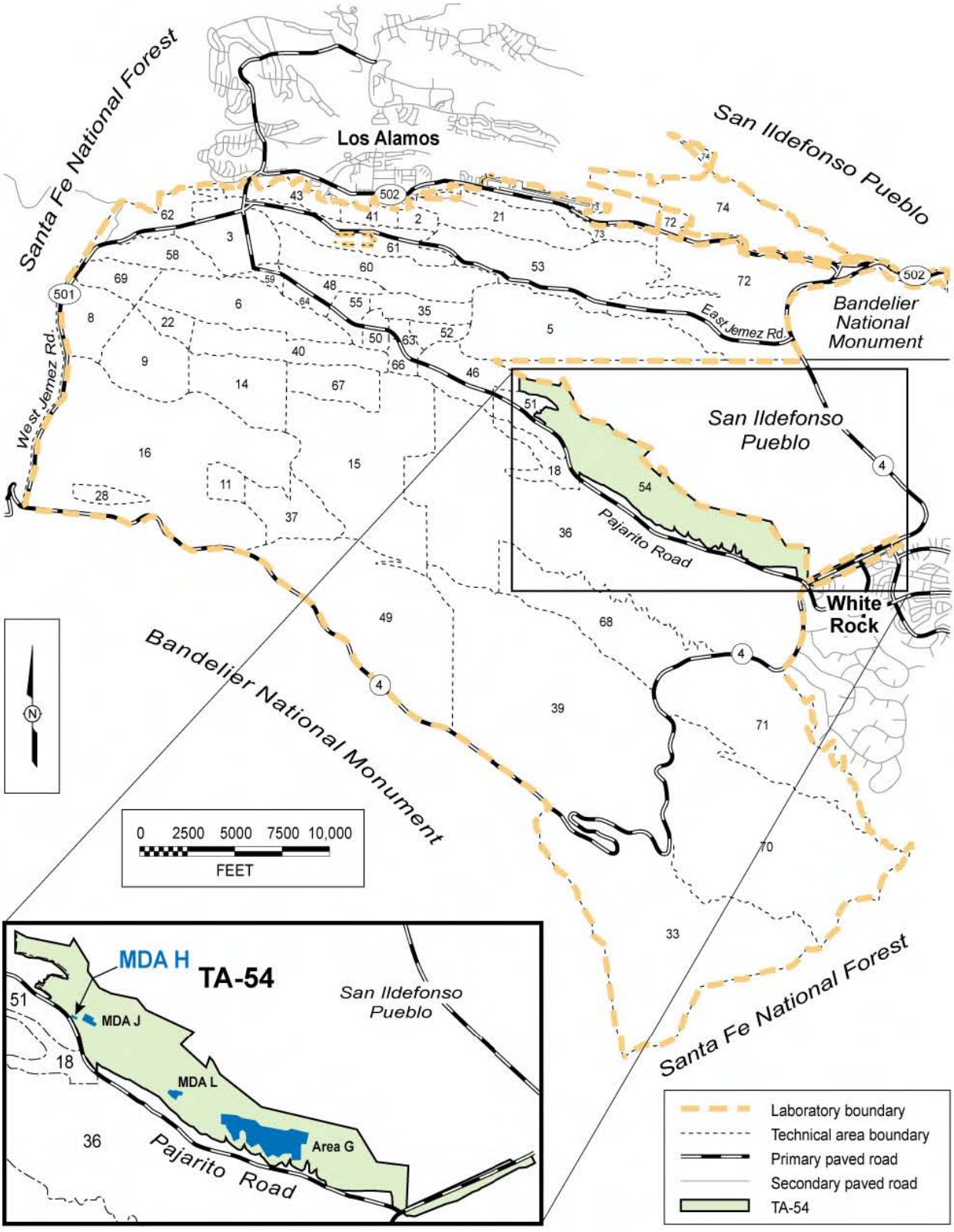

Figure 1.0-1 MDA H with respect to Laboratory technical areas and surrounding land holdings

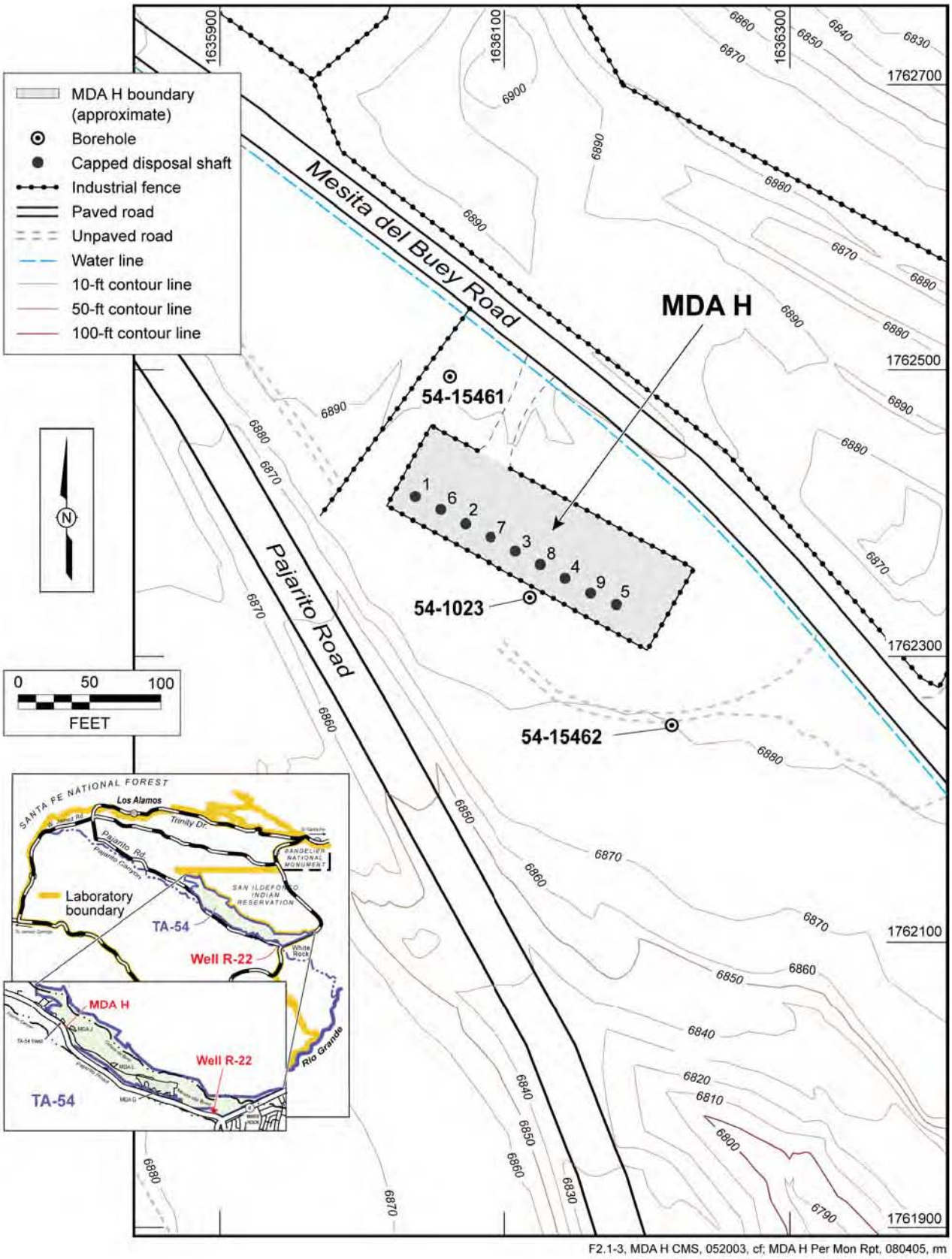

Figure 1.0-2 Locations of vapor-sampling boreholes at MDA H

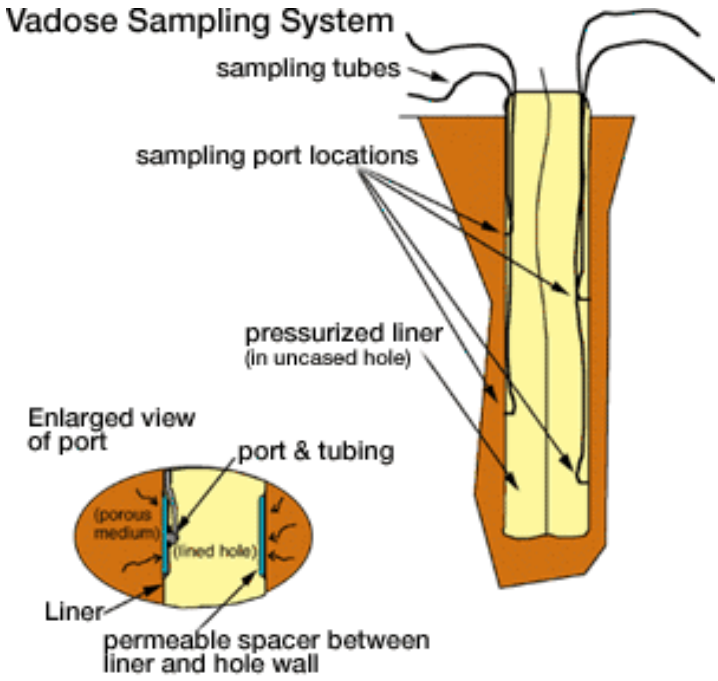

Figure 1.2-1 FLUTe vapor-sampling system

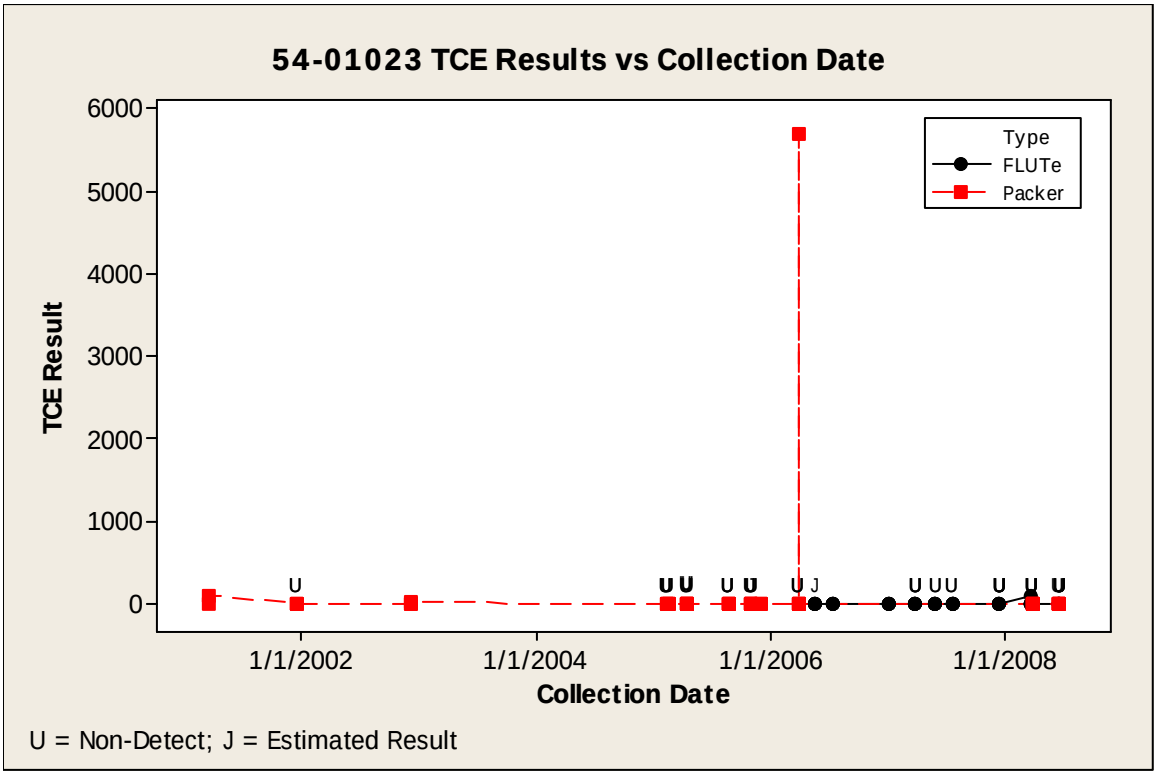

Figure 4.0-1 TCE results for all samples collected using the packer and FLUTe sampling systems in borehole location 54-01023 since 2001

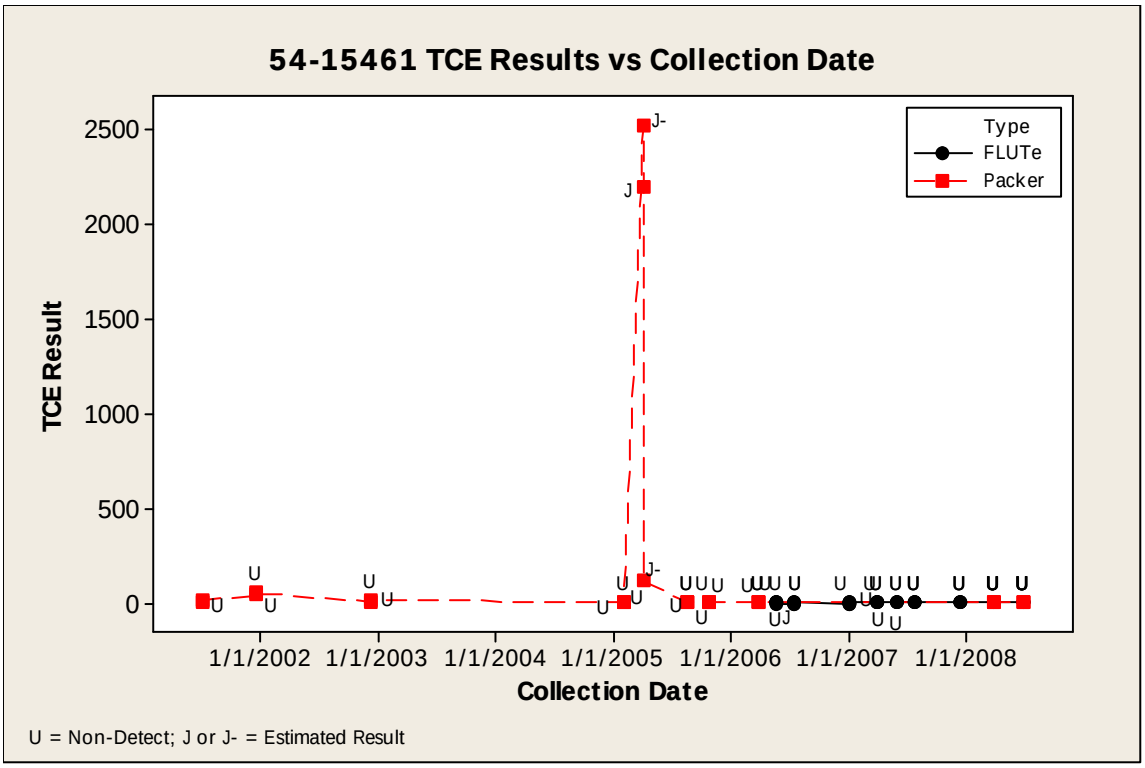

Figure 4.0-2 **TCE results for all samples collected from using the packer and FLUTe sampling systems in borehole location 54-15461 since 2001**

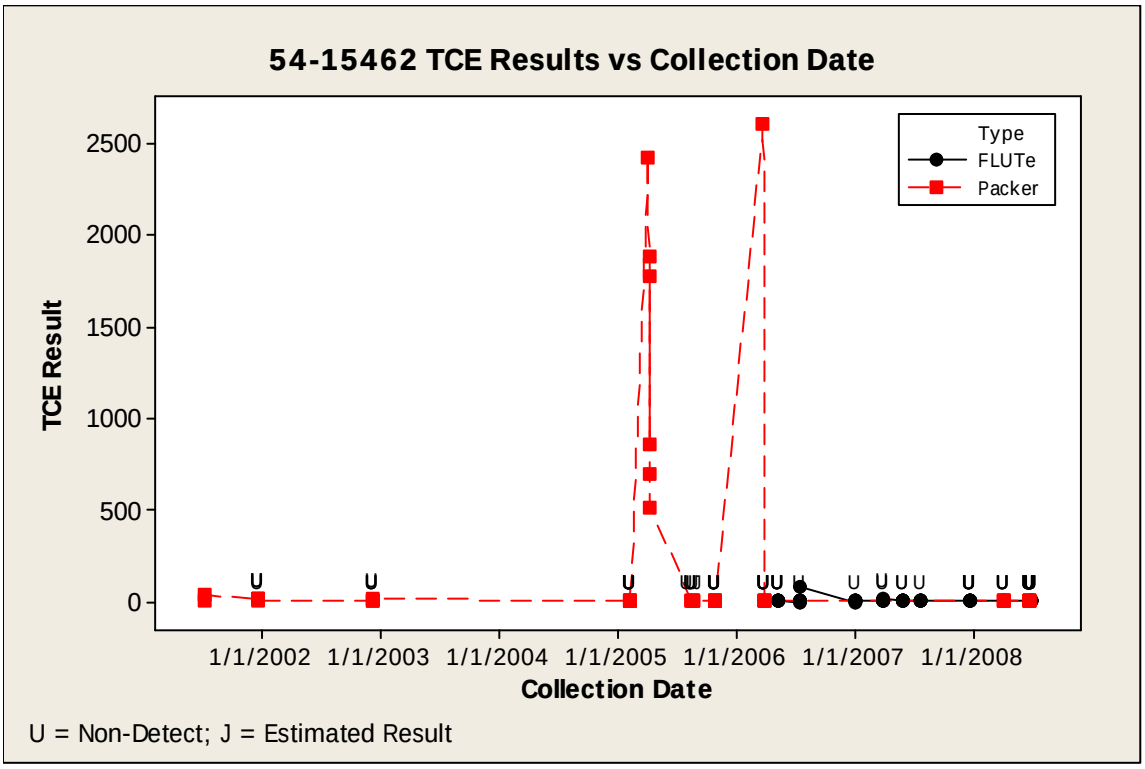

Figure 4.0-3 **TCE results for all samples collected using the packer and FLUTe sampling systems in borehole location 54-15462 since 2001**

Table 3.0-1
VOC Results from MDA H Borehole
Locations 54-01023, 54-15461, and 54-15462 for the Comparison Study

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	10	10–12	Acetone	5	95	27	25
54-01023	60	60–62	Acetone	8.8	32	63	100
54-01023	100	100–102	Acetone	ND[a]	13	55	34
54-01023	150	150–152	Acetone	7.1	13	59	12
54-01023	200	200–202	Acetone	7.9	11	71	30
54-01023	247	247–249	Acetone	5.5	17	130	27
54-01023	10	10–12	Benzene	ND	ND	ND	ND
54-01023	60	60–62	Benzene	ND	ND	ND	ND
54-01023	100	100–102	Benzene	ND	ND	ND	ND
54-01023	150	150–152	Benzene	ND	ND	ND	ND
54-01023	200	200–202	Benzene	ND	ND	ND	ND
54-01023	247	247–249	Benzene	ND	ND	ND	ND
54-01023	247	247–249	Butadiene[1,3-]	—[b]	ND	5.6	ND
54-01023	60	60–62	Butanol[1-]	—	ND	ND	17
54-01023	100	100–102	Butanol[1-]	—	ND	ND	25
54-01023	150	150–152	Butanol[1-]	—	ND	ND	41
54-01023	247	247–249	Butanol[1-]	—	ND	ND	110
54-01023	10	10–12	Butanone[2-]	ND	18	5.2	5.1
54-01023	60	60–62	Butanone[2-]	ND	9.3	13	20
54-01023	100	100–102	Butanone[2-]	ND	2.9	14	7.2
54-01023	150	150–152	Butanone[2-]	ND	ND	19	ND
54-01023	200	200–202	Butanone[2-]	ND	ND	36	3.8
54-01023	247	247–249	Butanone[2-]	ND	3.9	120	3.5
54-01023	10	10–12	Carbon Disulfide	ND	ND	11	ND
54-01023	60	60–62	Carbon Disulfide	ND	ND	28	ND
54-01023	100	100–102	Carbon Disulfide	ND	ND	28	ND
54-01023	150	150–152	Carbon Disulfide	20	ND	37	ND
54-01023	200	200–202	Carbon Disulfide	22	ND	50	ND
54-01023	247	247–249	Carbon Disulfide	ND	ND	85	ND
54-01023	60	60–62	Carbon Tetrachloride	4.8	ND	ND	ND
54-01023	100	100–102	Carbon Tetrachloride	7.1	ND	ND	ND
54-01023	150	150–152	Carbon Tetrachloride	14	ND	ND	ND
54-01023	200	200–202	Carbon Tetrachloride	14	ND	ND	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	247	247–249	Carbon Tetrachloride	14	ND	ND	ND
54-01023	60	60–62	Chlorobenzene	ND	ND	ND	8.1
54-01023	100	100–102	Chlorobenzene	ND	ND	ND	12
54-01023	150	150–152	Chlorobenzene	ND	ND	ND	21
54-01023	247	247–249	Chlorobenzene	ND	ND	ND	53
54-01023	60	60–62	Chloroform	2.4	ND	ND	ND
54-01023	100	100–102	Chloroform	2.2	ND	ND	ND
54-01023	150	150–152	Chloroform	2.1	ND	ND	ND
54-01023	200	200–202	Chloroform	1.5	ND	ND	ND
54-01023	247	247–249	Chloromethane	0.99	ND	ND	ND
54-01023	10	10–12	Cyclohexane	—	ND	3.4	ND
54-01023	60	60–62	Cyclohexane	—	ND	4.4	ND
54-01023	100	100–102	Cyclohexane	—	ND	4.1	ND
54-01023	150	150–152	Cyclohexane	—	ND	11	ND
54-01023	200	200–202	Cyclohexane	—	ND	31	ND
54-01023	247	247–249	Cyclohexane	—	ND	89	ND
54-01023	10	10–12	Dichlorodifluoromethane	27	ND	8.4	18
54-01023	60	60–62	Dichlorodifluoromethane	26	ND	8.9	21
54-01023	100	100–102	Dichlorodifluoromethane	27	ND	6.9	20
54-01023	150	150–152	Dichlorodifluoromethane	32	ND	6.1	22
54-01023	200	200–202	Dichlorodifluoromethane	27	ND	5.1	23
54-01023	247	247–249	Dichlorodifluoromethane	21	ND	ND	22
54-01023	60	60–62	Dichloropropane[1,2-]	1.9	ND	ND	ND
54-01023	100	100–102	Dichloropropane[1,2-]	3.9	ND	ND	ND
54-01023	150	150–152	Dichloropropane[1,2-]	8.2	ND	ND	ND
54-01023	200	200–202	Dichloropropane[1,2-]	7.3	ND	ND	ND
54-01023	247	247–249	Dichloropropane[1,2-]	5.3	ND	ND	ND
54-01023	10	10–12	Ethanol	—	ND	ND	79
54-01023	60	60–62	Ethanol	—	ND	ND	10
54-01023	100	100–102	Ethanol	—	ND	ND	13
54-01023	10	10–12	Ethylbenzene	ND	ND	7	ND
54-01023	60	60–62	Ethylbenzene	ND	ND	7.8	ND
54-01023	100	100–102	Ethylbenzene	ND	ND	8.7	ND
54-01023	150	150–152	Ethylbenzene	ND	ND	19	ND
54-01023	200	200–202	Ethylbenzene	ND	ND	40	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	247	247–249	Ethylbenzene	ND	ND	83	ND
54-01023	10	10–12	Ethyltoluene[4-]	ND	ND	7.8	ND
54-01023	60	60–62	Ethyltoluene[4-]	ND	ND	8.6	ND
54-01023	100	100–102	Ethyltoluene[4-]	ND	ND	9.5	ND
54-01023	150	150–152	Ethyltoluene[4-]	ND	ND	18	ND
54-01023	200	200–202	Ethyltoluene[4-]	ND	ND	36	ND
54-01023	247	247–249	Ethyltoluene[4-]	ND	ND	63	ND
54-01023	10	10–12	Hexane	—	ND	18	6.3
54-01023	60	60–62	Hexane	—	ND	12	9.2
54-01023	100	100–102	Hexane	—	ND	11	13
54-01023	150	150–152	Hexane	—	ND	34	4.8
54-01023	200	200–202	Hexane	—	ND	110	7.1
54-01023	247	247–249	Hexane	—	ND	290	8.1
54-01023	10	10–12	n-Heptane	—	ND	8.2	ND
54-01023	60	60–62	n-Heptane	—	ND	8.8	ND
54-01023	100	100–102	n-Heptane	—	ND	8.9	ND
54-01023	150	150–152	n-Heptane	—	ND	25	ND
54-01023	200	200–202	n-Heptane	—	ND	66	ND
54-01023	247	247–249	n-Heptane	—	ND	160	ND
54-01023	10	10–12	Propanol[2-]	—	ND	ND	9.3
54-01023	60	60–62	Propanol[2-]	—	ND	ND	10
54-01023	100	100–102	Propylene	—	ND	6.4	ND
54-01023	200	200–202	Propylene	—	ND	24	ND
54-01023	247	247–249	Propylene	—	ND	62	ND
54-01023	10	10–12	Tetrachloroethene	51	ND	ND	ND
54-01023	60	60–62	Tetrachloroethene	7.4	ND	ND	ND
54-01023	100	100–102	Tetrachloroethene	4.6	ND	ND	ND
54-01023	150	150–152	Tetrachloroethene	4.9	ND	8.2	ND
54-01023	200	200–202	Tetrachloroethene	3.5	ND	6.3	ND
54-01023	100	100–102	Tetrahydrofuran	—	ND	ND	ND
54-01023	200	200–202	Tetrahydrofuran	—	ND	ND	ND
54-01023	10	10–12	Toluene	1.8	ND	50	44
54-01023	60	60–62	Toluene	3.8	ND	63	70
54-01023	100	100–102	Toluene	ND	ND	72	66
54-01023	150	150–152	Toluene	1.2	ND	150	56

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	200	200–202	Toluene	2.5	ND	320	48
54-01023	247	247–249	Toluene	ND	ND	730	53
54-01023	10	10–12	Trichloro-1,2,2-trifluoroethane[1,1,2-]	10	ND	ND	7.8
54-01023	60	60–62	Trichloro-1,2,2-trifluoroethane[1,1,2-]	14	ND	ND	11
54-01023	100	100–102	Trichloro-1,2,2-trifluoroethane[1,1,2-]	15	ND	ND	11
54-01023	150	150–152	Trichloro-1,2,2-trifluoroethane[1,1,2-]	21	ND	ND	12
54-01023	200	200–202	Trichloro-1,2,2-trifluoroethane[1,1,2-]	18	ND	ND	12
54-01023	247	247–249	Trichloro-1,2,2-trifluoroethane[1,1,2-]	13	ND	ND	11
54-01023	10	10–12	Trichloroethane[1,1,1-]	190	ND	4.8	11
54-01023	60	60–62	Trichloroethane[1,1,1-]	33	ND	5.2	19
54-01023	100	100–102	Trichloroethane[1,1,1-]	34	ND	5	20
54-01023	150	150–152	Trichloroethane[1,1,1-]	39	ND	ND	25
54-01023	200	200–202	Trichloroethane[1,1,1-]	23	ND	ND	20
54-01023	247	247–249	Trichloroethane[1,1,1-]	11	ND	ND	17
54-01023	10	10–12	Trichloroethene	100	ND	ND	ND
54-01023	60	60–62	Trichloroethene	8.7	ND	5.3	ND
54-01023	100	100–102	Trichloroethene	4.9	ND	5.2	ND
54-01023	150	150–152	Trichloroethene	6.3	ND	12	ND
54-01023	200	200–202	Trichloroethene	3.9	ND	8	ND
54-01023	247	247–249	Trichloroethene	2.6	ND	11	ND
54-01023	10	10–12	Trichlorofluoromethane	85	ND	17	46
54-01023	60	60–62	Trichlorofluoromethane	66	ND	17	43
54-01023	100	100–102	Trichlorofluoromethane	50	ND	11	37
54-01023	150	150–152	Trichlorofluoromethane	46	ND	8.9	36
54-01023	200	200–202	Trichlorofluoromethane	36	ND	6.8	42
54-01023	247	247–249	Trichlorofluoromethane	27	ND	ND	43
54-01023	10	10–12	Trimethylbenzene[1,2,4-]	ND	ND	8.8	ND
54-01023	60	60–62	Trimethylbenzene[1,2,4-]	ND	ND	9.8	ND
54-01023	100	100–102	Trimethylbenzene[1,2,4-]	ND	ND	11	ND
54-01023	150	150–152	Trimethylbenzene[1,2,4-]	ND	ND	20	ND
54-01023	200	200–202	Trimethylbenzene[1,2,4-]	ND	ND	37	ND
54-01023	247	247–249	Trimethylbenzene[1,2,4-]	ND	ND	63	ND
54-01023	150	150–152	Trimethylbenzene[1,3,5-]	ND	ND	6.2	ND
54-01023	200	200–202	Trimethylbenzene[1,3,5-]	ND	ND	12	ND
54-01023	247	247–249	Trimethylbenzene[1,3,5-]	ND	ND	20	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	10	10–12	Xylene[1,2-]	ND	ND	9.1	ND
54-01023	60	60–62	Xylene[1,2-]	ND	ND	11	ND
54-01023	100	100–102	Xylene[1,2-]	ND	ND	12	ND
54-01023	150	150–152	Xylene[1,2-]	ND	ND	25	ND
54-01023	200	200–202	Xylene[1,2-]	ND	ND	54	ND
54-01023	247	247–249	Xylene[1,2-]	ND	ND	110	ND
54-01023	10	10–12	Xylene[1,3-]+Xylene[1,4-]	—	ND	26	ND
54-01023	60	60–62	Xylene[1,3-]+Xylene[1,4-]	—	ND	32	ND
54-01023	100	100–102	Xylene[1,3-]+Xylene[1,4-]	—	ND	36	ND
54-01023	150	150–152	Xylene[1,3-]+Xylene[1,4-]	—	ND	76	ND
54-01023	200	200–202	Xylene[1,3-]+Xylene[1,4-]	—	ND	150	ND
54-01023	247	247–249	Xylene[1,3-]+Xylene[1,4-]	—	ND	300	ND
54-15461	10	10–12	Acetone	12 (J)	2100	ND	ND
54-15461	60	60–62	Acetone	8.4 (J)	ND	ND	ND
54-15461	95	95–97	Acetone	7.4 (J)	ND	ND	ND
54-15461	10	10–12	Benzene	ND	110	ND	ND
54-15461	60	60–62	Benzene	ND	ND	ND	ND
54-15461	95	95–97	Benzene	ND	38	ND	ND
54-15461	10	10–12	Butadiene[1,3-]	—	—	3.6	ND
54-15461	60	60–62	Butadiene[1,3-]	—	—	2.7	ND
54-15461	95	95–97	Butadiene[1,3-]	—	—	2.5	ND
54-15461	10	10–12	Butanone[2-]	ND	470	ND	ND
54-15461	60	60–62	Butanone[2-]	ND	ND	21	ND
54-15461	10	10–12	Carbon Disulfide	4.1	ND	ND	ND
54-15461	60	60–62	Carbon Disulfide	3.5	ND	ND	14
54-15461	10	10–12	Carbon Tetrachloride	3.8	ND	ND	ND
54-15461	60	60–62	Carbon Tetrachloride	4.5	ND	ND	ND
54-15461	95	95–97	Carbon Tetrachloride	8.7	ND	ND	ND
54-15461	10	10–12	Chloromethane	0.9	ND	ND	ND
54-15461	60	60–62	Chloromethane	1.1	ND	ND	ND
54-15461	10	10–12	Cyclohexane	—	—	7.5	ND
54-15461	60	60–62	Cyclohexane	—	—	4.1	ND
54-15461	95	95–97	Cyclohexane	—	—	4.4	ND
54-15461	10	10–12	Dichlorodifluoromethane	27	ND	ND	18
54-15461	60	60–62	Dichlorodifluoromethane	20	21	ND	11

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15461	95	95–97	Dichlorodifluoromethane	23	ND	ND	9.7
54-15461	95	95–97	Dichloropropane[1,2-]	1.1	ND	ND	ND
54-15461	10	10–12	Ethanol	—	—	ND	23
54-15461	10	10–12	Ethylbenzene	ND	ND	9.6	ND
54-15461	60	60–62	Ethylbenzene	ND	ND	8.3	ND
54-15461	95	95–97	Ethylbenzene	ND	ND	8.2	ND
54-15461	10	10–12	Ethyltoluene[4-]	ND	ND	22	ND
54-15461	60	60–62	Ethyltoluene[4-]	ND	ND	22	ND
54-15461	95	95–97	Ethyltoluene[4-]	ND	ND	21	ND
54-15461	10	10–12	Hexane	—	—	31	ND
54-15461	60	60–62	Hexane	—	—	15	ND
54-15461	95	95–97	Hexane	—	—	16	ND
54-15461	10	10–12	n-Heptane	—	—	6.7	ND
54-15461	60	60–62	n-Heptane	—	—	5.6	ND
54-15461	95	95–97	n-Heptane	—	—	4.8	ND
54-15461	10	10–12	Propanol[2-]	—	—	ND	9 (J)
54-15461	95	95–97	Propanol[2-]	—	—	ND	430
54-15461	10	10–12	Propylene	—	—	18	ND
54-15461	60	60–62	Propylene	—	—	16	ND
54-15461	95	95–97	Propylene	—	—	15	70
54-15461	95	95–97	Tetrachloroethene	3.2	ND	ND	ND
54-15461	10	10–12	Toluene	ND	ND	59	4.6
54-15461	60	60–62	Toluene	ND	ND	44	ND
54-15461	95	95–97	Toluene	8	ND	40	5.9
54-15461	10	10–12	Trichloro-1,2,2-trifluoroethane[1,1,2-]	6.5	ND	ND	ND
54-15461	60	60–62	Trichloro-1,2,2-trifluoroethane[1,1,2-]	5.4	ND	ND	ND
54-15461	95	95–97	Trichloro-1,2,2-trifluoroethane[1,1,2-]	7.8	ND	ND	ND
54-15461	10	10–12	Trichloroethane[1,1,1-]	18	ND	ND	9.4
54-15461	60	60–62	Trichloroethane[1,1,1-]	11	ND	ND	ND
54-15461	95	95–97	Trichloroethane[1,1,1-]	16	ND	ND	4.7
54-15461	10	10–12	Trichloroethene	ND	ND	ND	ND
54-15461	60	60–62	Trichloroethene	ND	ND	ND	ND
54-15461	95	95–97	Trichloroethene	ND	ND	ND	ND
54-15461	10	10–12	Trichlorofluoromethane	19	ND	ND	16
54-15461	60	60–62	Trichlorofluoromethane	16	19	ND	7.9

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15461	95	95–97	Trichlorofluoromethane	22	ND	ND	6.7
54-15461	10	10–12	Trimethylbenzene[1,2,4-]	ND	ND	30	ND
54-15461	60	60–62	Trimethylbenzene[1,2,4-]	ND	ND	30	ND
54-15461	95	95–97	Trimethylbenzene[1,2,4-]	ND	ND	28	ND
54-15461	10	10–12	Trimethylbenzene[1,3,5-]	ND	ND	8.9	ND
54-15461	60	60–62	Trimethylbenzene[1,3,5-]	ND	ND	8.9	ND
54-15461	95	95–97	Trimethylbenzene[1,3,5-]	ND	ND	8.8	ND
54-15461	10	10–12	Xylene[1,2-]	ND	ND	15	ND
54-15461	60	60–62	Xylene[1,2-]	ND	ND	14	ND
54-15461	95	95–97	Xylene[1,2-]	ND	ND	14	ND
54-15461	10	10–12	Xylene[1,3-]+Xylene[1,4-]	—	—	35	ND
54-15461	60	60–62	Xylene[1,3-]+Xylene[1,4-]	—	—	32	ND
54-15461	95	95–97	Xylene[1,3-]+Xylene[1,4-]	—	—	32	ND
54-15462	10	10–12	Acetone	4.6	300	130	20
54-15462	60	60–62	Acetone	3.4	210	190	140
54-15462	100	100–102	Acetone	53	ND	62	26
54-15462	150	150–152	Acetone	13	ND	100	84
54-15462	200	200–202	Acetone	13	ND	90	30
54-15462	254	254–256	Acetone	8.9	ND	500	11
54-15462	10	10–12	Benzene	ND	66	ND	ND
54-15462	60	60–62	Benzene	ND	9.6	ND	ND
54-15462	100	100–102	Benzene	ND	9.4	ND	ND
54-15462	150	150–152	Benzene	ND	9.1	ND	ND
54-15462	200	200–202	Benzene	1.2	6.4	ND	ND
54-15462	254	254–256	Benzene	ND	10	ND	ND
54-15462	254	254–256	Butanol[1-]	—	27 (J)	ND	ND
54-15462	10	10–12	Butanone[2-]	ND	87	17	13
54-15462	60	60–62	Butanone[2-]	ND	ND	29	520
54-15462	100	100–102	Butanone[2-]	ND	ND	6.4	21
54-15462	150	150–152	Butanone[2-]	ND	ND	11	19
54-15462	200	200–202	Butanone[2-]	ND	ND	18	4
54-15462	254	254–256	Butanone[2-]	ND	ND	90	4
54-15462	100	100–102	Carbon Disulfide	15	ND	ND	ND
54-15462	150	150–152	Carbon Disulfide	3.2	ND	ND	ND
54-15462	200	200–202	Carbon Disulfide	35	ND	ND	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15462	254	254–256	Carbon Disulfide	15	ND	ND	ND
54-15462	10	10–12	Carbon Tetrachloride	1.9	ND	ND	ND
54-15462	60	60–62	Carbon Tetrachloride	5.5	ND	ND	ND
54-15462	100	100–102	Carbon Tetrachloride	7.2	ND	ND	ND
54-15462	150	150–152	Carbon Tetrachloride	7.2	ND	ND	ND
54-15462	200	200–202	Carbon Tetrachloride	6.7	ND	ND	ND
54-15462	254	254–256	Carbon Tetrachloride	7.1	ND	ND	ND
54-15462	150	150–152	Chlorodifluoromethane	—	30	ND	ND
54-15462	254	254–256	Chlorodifluoromethane	—	22	ND	ND
54-15462	60	60–62	Chloromethane	1.3	ND	ND	ND
54-15462	100	100–102	Chloromethane	3.8	ND	ND	ND
54-15462	150	150–152	Chloromethane	1.5	ND	ND	ND
54-15462	200	200–202	Chloromethane	1	ND	ND	ND
54-15462	254	254–256	Chloromethane	1.1	ND	ND	ND
54-15462	60	60–62	Cyclohexane	—	ND	ND	14
54-15462	150	150–152	Cyclohexane	—	58	ND	ND
54-15462	200	200–202	Cyclohexane	—	3.5	ND	ND
54-15462	254	254–256	Cyclohexane	—	55	ND	ND
54-15462	10	10–12	Dichlorodifluoromethane	24	6	7	8.9
54-15462	60	60–62	Dichlorodifluoromethane	40	12	9.7	ND
54-15462	100	100–102	Dichlorodifluoromethane	44	16	12	14
54-15462	150	150–152	Dichlorodifluoromethane	41	13	6.6	15
54-15462	200	200–202	Dichlorodifluoromethane	35	20	ND	18
54-15462	254	254–256	Dichlorodifluoromethane	39	14	ND	13
54-15462	60	60–62	Dichloroethane[1,1-]	1.9	ND	ND	ND
54-15462	100	100–102	Dichloroethane[1,1-]	1.7	ND	ND	ND
54-15462	60	60–62	Dichloroethene[1,1-]	1.1	ND	ND	ND
54-15462	100	100–102	Dichloroethene[1,1-]	2.4	ND	ND	ND
54-15462	150	150–152	Dichloroethene[1,1-]	2.3	ND	ND	ND
54-15462	200	200–202	Dichloroethene[1,1-]	2.2	ND	ND	ND
54-15462	254	254–256	Dichloroethene[1,1-]	2	ND	ND	ND
54-15462	10	10–12	Dichloropropane[1,2-]	1.5	ND	ND	ND
54-15462	60	60–62	Dichloropropane[1,2-]	2	ND	ND	ND
54-15462	100	100–102	Dichloropropane[1,2-]	2.1	ND	ND	ND
54-15462	150	150–152	Dichloropropane[1,2-]	2	ND	ND	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15462	200	200–202	Dichloropropane[1,2-]	2	ND	ND	ND
54-15462	254	254–256	Dichloropropane[1,2-]	1.4	ND	ND	ND
54-15462	10	10–12	Ethanol	—	ND	ND	150
54-15462	60	60–62	Ethanol	—	ND	13	210
54-15462	150	150–152	Ethanol	—	ND	ND	7.8
54-15462	254	254–256	Ethanol	—	ND	12	ND
54-15462	10	10–12	Ethylbenzene	ND	ND	4.8	ND
54-15462	60	60–62	Ethylbenzene	ND	ND	ND	4
54-15462	10	10–12	Ethyltoluene[4-]	ND	ND	10	ND
54-15462	60	60–62	Ethyltoluene[4-]	ND	ND	11	4.3
54-15462	100	100–102	Ethyltoluene[4-]	ND	ND	6.7	ND
54-15462	150	150–152	Ethyltoluene[4-]	ND	ND	9.4	ND
54-15462	10	10–12	Hexane	—	16	4.2	3.5
54-15462	60	60–62	Hexane	—	5.5	ND	18
54-15462	100	100–102	Hexane	—	6.8	ND	5.6
54-15462	150	150–152	Hexane	—	11	4.4	3.9
54-15462	200	200–202	Hexane	—	6.5	4.7	4.3
54-15462	254	254–256	Hexane	—	12	7.5	7.7
54-15462	10	10–12	Methanol	—	ND	ND	200
54-15462	150	150–152	Methylene Chloride	ND	6.2	ND	ND
54-15462	254	254–256	Methylene Chloride	ND	4.6	ND	ND
54-15462	10	10–12	n-Heptane	—	32	ND	ND
54-15462	60	60–62	n-Heptane	—	12	ND	ND
54-15462	100	100–102	n-Heptane	—	13	ND	ND
54-15462	150	150–152	n-Heptane	—	120	ND	ND
54-15462	200	200–202	n-Heptane	—	16	ND	ND
54-15462	254	254–256	n-Heptane	—	120	9	ND
54-15462	10	10–12	Propylene	—	ND	7.1	ND
54-15462	60	60–62	Propylene	—	6.7	9.1	ND
54-15462	254	254–256	Propylene	—	ND	14	ND
54-15462	10	10–12	Styrene	ND	5	ND	ND
54-15462	10	10–12	Tetrachloroethene	3.8	ND	ND	ND
54-15462	60	60–62	Tetrachloroethene	5	ND	ND	ND
54-15462	100	100–102	Tetrachloroethene	3.3	ND	ND	ND
54-15462	150	150–152	Tetrachloroethene	2.9	ND	ND	ND

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15462	200	200–202	Tetrachloroethene	2.7	ND	ND	ND
54-15462	10	10–12	Tetrahydrofuran	—	ND	ND	ND
54-15462	60	60–62	Tetrahydrofuran	—	ND	ND	ND
54-15462	100	100–102	Tetrahydrofuran	—	ND	ND	ND
54-15462	150	150–152	Tetrahydrofuran	—	ND	ND	ND
54-15462	254	254–256	Tetrahydrofuran	—	ND	ND	ND
54-15462	10	10–12	Toluene	ND	10	18	9.5
54-15462	60	60–62	Toluene	2.9	6	17	14
54-15462	100	100–102	Toluene	ND	8	14	17
54-15462	150	150–152	Toluene	ND	13	21	9.7
54-15462	200	200–202	Toluene	4.9	5.8	8.9	8.1
54-15462	254	254–256	Toluene	1.4	16	16	9.4
54-15462	10	10–12	Trichloro-1,2,2-trifluoroethane[1,1,2-]	16	ND	ND	ND
54-15462	60	60–62	Trichloro-1,2,2-trifluoroethane[1,1,2-]	27	7.8	ND	ND
54-15462	100	100–102	Trichloro-1,2,2-trifluoroethane[1,1,2-]	32	9.4	ND	7
54-15462	150	150–152	Trichloro-1,2,2-trifluoroethane[1,1,2-]	30	7.8	ND	7.2
54-15462	200	200–202	Trichloro-1,2,2-trifluoroethane[1,1,2-]	25	12	ND	9
54-15462	254	254–256	Trichloro-1,2,2-trifluoroethane[1,1,2-]	26	7.8	ND	ND
54-15462	10	10–12	Trichloroethane[1,1,1-]	74	9	13	14
54-15462	60	60–62	Trichloroethane[1,1,1-]	100	27	16	ND
54-15462	100	100–102	Trichloroethane[1,1,1-]	88	35	21	27
54-15462	150	150–152	Trichloroethane[1,1,1-]	74	28	9.8	28
54-15462	200	200–202	Trichloroethane[1,1,1-]	70	39	ND	28
54-15462	254	254–256	Trichloroethane[1,1,1-]	49	25	ND	19
54-15462	10	10–12	Trichloroethene	6	ND	ND	ND
54-15462	60	60–62	Trichloroethene	8.4	ND	ND	ND
54-15462	100	100–102	Trichloroethene	7.2	ND	ND	ND
54-15462	150	150–152	Trichloroethene	6.2	ND	ND	ND
54-15462	200	200–202	Trichloroethene	5.7	5.3	ND	ND
54-15462	254	254–256	Trichloroethene	3.9	4.4	ND	ND
54-15462	10	10–12	Trichlorofluoromethane	24	ND	6.5	7.6
54-15462	60	60–62	Trichlorofluoromethane	38	11	8.1	ND
54-15462	100	100–102	Trichlorofluoromethane	40	15	10	12
54-15462	150	150–152	Trichlorofluoromethane	36	12	ND	13
54-15462	200	200–202	Trichlorofluoromethane	32	18	ND	15

Table 3.0-1 (continued)

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-15462	254	254–256	Trichlorofluoromethane	31	11	ND	11
54-15462	10	10–12	Trimethylbenzene[1,2,4-]	ND	ND	14	ND
54-15462	60	60–62	Trimethylbenzene[1,2,4-]	ND	ND	15	4.4
54-15462	100	100–102	Trimethylbenzene[1,2,4-]	ND	ND	9.2	ND
54-15462	150	150–152	Trimethylbenzene[1,2,4-]	ND	ND	13	ND
54-15462	10	10–12	Xylene[1,2-]	ND	ND	7.7	ND
54-15462	60	60–62	Xylene[1,2-]	ND	ND	8.2	4
54-15462	150	150–152	Xylene[1,2-]	ND	ND	7.4	ND
54-15462	10	10–12	Xylene[1,3-]+Xylene[1,4-]	—	ND	18	4.5
54-15462	60	60–62	Xylene[1,3-]+Xylene[1,4-]	—	ND	17	9.7
54-15462	100	100–102	Xylene[1,3-]+Xylene[1,4-]	—	ND	11	6.2
54-15462	150	150–152	Xylene[1,3-]+Xylene[1,4-]	—	4.9	17	4.5
54-15462	254	254–256	Xylene[1,3-]+Xylene[1,4-]	—	6.4	9.7	ND

Note: All results reported in µg/m^3.

[a] ND = Not detected.

[b] — = The analysis was not requested.

Table 3.0-2
Comparison of FLUTe and Packer TCE Results for
MDA H Borehole Locations 54-01023, 54-15461, and 54-15462

Location ID	Top Depth (ft)	Depth (ft)	Analyte	FLUTe April 2008	Packer April 2008	Packer June 2008	FLUTe June 2008
54-01023	10	10–12	Trichloroethene	100	ND*	ND	ND
54-01023	60	60–62	Trichloroethene	8.7	ND	5.3	ND
54-01023	100	100–102	Trichloroethene	4.9	ND	5.2	ND
54-01023	150	150–152	Trichloroethene	6.3	ND	12	ND
54-01023	200	200–202	Trichloroethene	3.9	ND	8	ND
54-01023	247	247–249	Trichloroethene	2.6	ND	11	ND
54-15461	10	10–12	Trichloroethene	ND	ND	ND	ND
54-15461	60	60–62	Trichloroethene	ND	ND	ND	ND
54-15461	95	95–97	Trichloroethene	ND	ND	ND	ND
54-15462	10	10–12	Trichloroethene	6	ND	ND	ND
54-15462	60	60–62	Trichloroethene	8.4	ND	ND	ND
54-15462	100	100–102	Trichloroethene	7.2	ND	ND	ND
54-15462	150	150–152	Trichloroethene	6.2	ND	ND	ND
54-15462	200	200–202	Trichloroethene	5.7	5.3	ND	ND
54-15462	254	254–256	Trichloroethene	3.9	4.4	ND	ND

* ND = Not detected.

Table 4.0-1
Summary of All TCE Results from Packer and FLUTe Sampling Systems in Borehole Locations 54-010123, 54-15461, and 54-15462 at MDA H

Location ID	Top Depth (ft)	March 2001 Packer	July 2001 Packer	December 2001 Packer	December 2002 Packer	February 2005 Packer	April 2005 Packer	August 2005 Packer	October 2005 Packer	November 2005 Packer	March 2006 Packer	May 2006 FLUTe	July 2006 FLUTe	January 2007 FLUTe	March 2007 FLUTe	May 2007 FLUTe	July 2007 FLUTe	December 2007 FLUTe	April (2Q) 2008 FLUTe	April (2Q) 2008 Packer	June (3Q) 2008 FLUTe	June (3Q) 2008 Packer
54-01023	10	—[a]	—	—	—	5.4	—	—	—	4.4 (U)[b]	4.5 (U)	3.1	5	4	4.5 (U)	5.8	5.4	4.7 (U)	100	9 (U)	4.7 (U)	4.5 (U)
54-01023	15	—	—	—	—	—	5.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-01023	50	—	—	4.2 (U)	8.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-01023	60	110	—	—	—	4.5 (U)	9.1 (U)	4.8 (U)	—	9.5	5.7	6.9	8.4	7.3	4.8 (U)	8.4	8.1	5.4	8.7	10 (U)	4.6 (U)	5.3
54-01023	100	—	—	4.4 (U)	9.7	4.5 (U)	6.4 (U)	5.3 (U)	—	10	4.5	5.3	6.9	6.9	5.5	6.3	7	4.7 (U)	4.9	5.1 (U)	4.6 (U)	5.2
54-01023	150	—	—	—	—	4.6 (U)	12 (U)	5.1 (U)	—	6.8	5700	3.3	6	6.3	5.1	5.4	6.5	4.8 (U)	6.3	4.8 (U)	4.8 (U)	12
54-01023	200	—	—	—	—	4.5 (U)	5.3 (U)	12	4.4 (U)	—	4.6 (U)	3.2	5.5	6.1	4.8 (U)	5.1	5.1	4.8 (U)	3.9	4.9 (U)	4.9 (U)	8
54-01023	245	5.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-01023	247	—	—	—	—	4.8 (U)	—	5 (U)	—	—	4.6 (U)	2.3 (J)	—	4.7	4.5 (U)	4.9 (U)	4.7 (U)	7.2	2.6	4.9 (U)	5.7 (U)	11
54-01023	248	—	—	—	—	—	—	—	4.8 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
54-01023	250	—	—	8.1	17	—	4.5 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-01023	256	—	—	—	—	—	—	—	—	—	—	—	4.1	—	—	—	—	—	—	—	—	—
54-15461	10	—	—	—	—	4.4 (U)	2500 (J-)[c]	4.6 (U)	4.5 (U)	—	4.6 (U)	2.7 (U)	1.1 (U)	1.1 (U)	4.8 (U)	4.1 (U)	5.1 (U)	4.4 (U)	2.2 (U)	58 (U)	4.9 (U)	4.9 (U)
54-15461	50	—	3.6 (U)	54 (U)	8.6 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15461	60	—	—	—	—	4.5 (U)	120 (J-)	4.5 (U)	4.3 (U)	—	4.5 (U)	2.7 (U)	1.1 (U)	1.1 (U)	4.4 (U)	4.9 (U)	5.1 (U)	4.7 (U)	2.2 (U)	11 (U)	4.9 (U)	4.9 (U)
54-15461	68	—	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15461	95	—	—	43 (U)	—	—	—	4.7 (U)	—	—	4.5 (U)	0.72 (J)	—	1.2	4.8 (U)	5.1 (U)	4.9 (U)	4.9 (U)	2.2 (U)	23 (U)	4.2 (U)	6 (U)
54-15461	96	—	—	—	17 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15461	98	—	—	—	—	—	—	—	—	—	—	—	1.2	—	—	—	—	—	—	—	—	—
54-15461	100	—	—	—	—	4.3 (U)	2200 (J)[d]	—	4.5 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15462	10	—	—	—	—	4.4 (U)	860	4.8 (U)	5.3 (U)	—	8.8 (U)	4.7 (U)	1.1 (U)	1.1 (U)	4.4 (U)	4.7 (U)	4.8 (U)	4.8 (U)	6	4.6 (U)	4.9 (U)	5.3 (U)
54-15462	50	—	9.1	17 (U)	4.3 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15462	60	—	—	—	—	4.4 (U)	700	5.5 (UJ)	4.3 (U)	—	8.8 (U)	4.7 (U)	5.9	6.3	5.3	5.6	5.2	5.4 (U)	8.4	5.1 (U)	4.7 (U)	6 (U)
54-15462	100	—	—	17 (U)	4.3 (U)	3.7 (U)	520	4.8 (U)	6.3 (U)	—	4.5 (U)	5.8	5	8.7	8.1	8.3	7.8	5.6	7.2	4.7 (U)	4.8 (U)	6.2 (U)
54-15462	150	—	—	—	—	4.5 (U)	1800		5.1 (U)	—	4.6 (U)	4.9 (U)	7.2	9.2	9.7	8.1	9.1	5.4 (U)	6.2	4 (U)	4.9 (U)	6 (U)
54-15462	200	—	—	—	—	4.3 (U)	1900	4.7 (U)	6.2 (U)	—	9 (U)	4.8 (U)	4.6	7	9.4	7.3	5.9	4.7 (U)	5.7	5.3	5.1 (U)	4.7 (U)
54-15462	233	—	34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15462	250	—	—	4.4 (U)	18 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
54-15462	254	—	—	—	—	4.5 (U)	2400	4.5 (U)	6 (U)	—	2600	4.7 (U)	78	5.7	17 (U)	4.9 (U)	4.8	4.7 (U)	3.9	4.4	4.9 (U)	4.8 (U)

Note: All results are in µg/m^3.

[a] — = No sample collected.

[b] U = The analyte was analyzed for but not detected.

[c] J- = The analyte was positively identified, and the result is likely to be biased low.

[d] J = The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.