DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2020-1421-02-001 May 21, 2020

Mr. Kevin Pierard
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Submittal of the Periodic Monitoring Report for 2019 Vapor-Sampling Activities at Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54

Dear Mr. Pierard:

Enclosed please find two hard copies with electronic files of the "Periodic Monitoring Report for 2019 Vapor-Sampling Activities at Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54." Submittal of this report fulfills fiscal year 2020 Milestone #8 of Appendix B of the 2016 Compliance Order on Consent. This report includes presentation and analysis of subsurface vapor monitoring data for volatile organic chemicals and tritium from two sampling rounds in 2019 and 2020.

If you have any questions, please contact David Diehl at (505) 551-2496 (david.diehl@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Arturo Duran Digitally signed by Arturo Duran Date: 2020.05.21 06:51:35 -06'00'

Arturo Q. Duran
Compliance and Permitting Manager
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Enclosures:

1. Two hard copies with electronic files – Periodic Monitoring Report for 2019 Vapor-Sampling Activities at Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54 (EM2020-0189)

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May 2020
EM2020-0189

Periodic Monitoring Report for 2019 Vapor-Sampling Activities at Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54

N3B Los Alamos

EM2020-0189

Periodic Monitoring Report for 2019 Vapor-Sampling Activities at Material Disposal Area L, Solid Waste Management Unit 54-006, at Technical Area 54

May 2020

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EXECUTIVE SUMMARY

This periodic monitoring report (PMR) summarizes vapor-monitoring activities conducted for calendar year 2019 at Material Disposal Area (MDA) L, Solid Waste Management Unit 54-006, in Technical Area 54, at Los Alamos National Laboratory (LANL or the Laboratory). Submittal of this PMR fulfills the requirement in Appendix B, Milestones and Targets, of the Compliance Order on Consent, Milestone 8, that this PMR be submitted by May 29, 2020. The monitoring was conducted per the recommendations included in the “Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54.” The objectives of the current vapor monitoring at MDA L are to monitor for potential plume rebound following an interim measure conducted in 2015 and to monitor for potential new releases.

Vapor monitoring in the first round of sampling, conducted early in 2019, included collecting 163 vapor samples for volatile organic compound (VOC) analysis, along with 17 field duplicate samples and 17 field blank samples, from 163 of the168 sample ports within 28 boreholes (sentry and peripheral). Five ports were blocked and not sampled. Vapor monitoring in the second round of sampling, conducted in early January 2020, included collecting 32 vapor samples for VOC analysis, along with 7 field duplicate samples and 8 field blank samples, from 32 sample ports of the 6 sentry boreholes. Vapor samples, along with 3 field duplicate and 3 field blank samples, were also collected for tritium analysis from all 32 sample ports of the 6 sentry boreholes in the second sampling round.

Validated analytical results demonstrate the presence of 34 VOCs in subsurface vapor and confirm the 2 VOC source areas. The VOC screening evaluation identified 14 VOCs in MDA L pore gas at concentrations exceeding Tier I screening levels (SLs), which are based on groundwater SLs. The data show that there haven’t been any VOC concentrations significantly above Tier I screening levels in the basalt. Concentrations in the basalt would have to be above Tier I levels to cause concern for the regional aquifer.

VOC measurements over the last 15 yr show predominantly decreasing contaminant concentrations in sample ports of both sentry boreholes and peripheral boreholes. These drops in concentration are the result of the soil-vapor extraction operations during the interim measure, during which time more than 1000 lb of VOCs were removed from the mesa. However, recent data show that VOC concentrations in the source areas are rebounding, implying continued leakage from subsurface containers.

One peripheral borehole will be added to the sentry borehole list for semiannual sampling. Borehole 54-02089 will be added because the first round of 2019 sampling data show an increase in concentrations over the last several sampling rounds.

A preliminary screening of VOC concentrations versus vapor intrusion screening levels (VISLs), conducted for both sampling rounds shows that VISLs were exceeded in some of the shallowest sampling ports.

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1.0 INTRODUCTION

This periodic monitoring report (PMR) presents the results of vapor-monitoring activities conducted for calendar year 2019 at Material Disposal Area (MDA) L, Solid Waste Management Unit (SWMU) 54-006, in Technical Area 54, at Los Alamos National Laboratory (LANL or the Laboratory). Submittal of this PMR fulfills the requirement in Appendix B, Milestones and Targets, of the 2016 Compliance Order on Consent, (Consent Order) Milestone 8, that this PMR be submitted by May 29, 2020. The monitoring was conducted per the recommendations included in the "Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54" (N3B 2018, 700039).

The objectives of the current vapor monitoring at MDA L are to monitor for potential plume rebound following an interim measure conducted in 2015 and to monitor for potential new releases.

This report discusses the results obtained during the two vapor-monitoring rounds; however, for comparison, vapor monitoring data from previous monitoring activities from 2014 to present at MDA L are also included in the data evaluation section of this report. Vapor-monitoring activities included collecting vapor samples from vapor-monitoring boreholes. All pore-gas samples from both sampling rounds were submitted for off-site analysis of volatile organic compounds (VOCs), and samples from the second round were also submitted for off-site tritium analysis.

No regulatory criteria exist for vapor-phase contaminants; therefore, this report presents the results of a screening evaluation of the pore-gas VOC data. The maximum concentrations of VOCs in pore gas are used in a Henry's law calculation to determine the VOC concentration in groundwater if the VOC pore gas were in contact with the groundwater and contaminating it. These calculated, hypothetical concentrations of VOCs in groundwater are then compared with New Mexico Environment Department (NMED) groundwater screening levels (SLs). This conservative screening process evaluates the potential for the observed VOC pore-gas concentrations to result in contamination of groundwater above applicable regulatory criteria if the vapor plume were in contact with the groundwater.

VOC pore-gas concentrations were also compared with NMED vapor intrusion screening levels (VISLs) to ensure worker protection if the VOCs in pore gas were to migrate above ground surface (NMED 2019, 700550).

Tritium samples were collected in the second sampling round. 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 (DOE) policy.

This introductory section of the report includes a description of the site location. Section 2 describes the scope of the vapor-monitoring activities, and section 3 addresses regulatory criteria. Section 4 presents field screening results, and section 5 presents analytical data results. Section 6 summarizes the information presented in this report, and section 7 includes references and map data sources.

The appendixes include acronyms, a metric conversion table, and definitions of data qualifiers (Appendix A); field methods (Appendix B); analytical program descriptions and summaries of data quality (Appendix C); a VOC plume trend analysis (Appendix D); and analytical suites and results and analytical reports (Appendix E on CD included with this document).

1.1 Background

MDA L, also known as SWMU 54-006, is located in the east-central portion of the Laboratory on Mesita del Buey (Figure 1.1-1), within an 1100-ft- by 3000-ft- (2.5-acre-) fenced area known as Area L. MDA L operated from the early 1960s to 1986 as the designated disposal area for nonradiological liquid chemical wastes, including containerized and uncontainerized liquid wastes; bulk quantities of treated aqueous waste; batch-treated salt solutions and electroplating wastes, including precipitated heavy metals; and small-batch quantities of treated lithium hydride. Waste was disposed of in 1 pit, 3 impoundments, and 34 shafts (Figure 1.1-2).

Disposal shafts 1 through 34 were dry-drilled directly into the Tshirege Member of the Bandelier Tuff. The shafts range from 3 to 8 ft in diameter and from 15 to 65 ft in depth. The 34 disposal shafts were used to dispose of containerized and uncontainerized liquid chemical wastes and precipitated solids from the treatment of aqueous waste. Before 1982, containerized liquids were disposed of without the addition of absorbents. Small containers were typically dropped into a shaft. Larger drums were lowered by crane and arranged in layers of 1 drum in a 3- or 4-ft-diameter shaft, 4 to 5 drums in a 6-ft-diameter shaft, or 6 drums in an 8-ft-diameter shaft. The space around the drums was filled with crushed tuff, and a 6-in. layer of crushed tuff was placed between each layer of drums. Uncontainerized liquid wastes were also disposed of in the shafts. Between 1982 and 1985, only containerized wastes (including organic and inorganic liquids, precipitated heavy metals, and stabilized heavy metals) were disposed of in the shafts. These shafts are the primary source for the subsurface VOC vapor plume that is present beneath MDA L (LANL 2011, 205756).

Soil-vapor monitoring boreholes located within and around MDA L have been used to characterize the nature and extent of the subsurface vapor plume at the site since 1986. Figure 1.1-3 shows the pore-gas monitoring boreholes at MDA L. Concentrations in the subsurface VOC plume are generally highest within 150 ft below ground surface (bgs) and decrease significantly with depth to the top of the Cerros del Rio basalts. Concentrations measured in the basalt are quite low, with values less than 1 ppmv.

The hydrogeologic framework for the contaminated subsurface at MDA L is based on years of data collection, including results from a 2006 pilot soil-vapor extraction (SVE) test at the site (LANL 2006, 094152). The current interim measure uses the same two wells used during the pilot test: SVE-East and SVE-West (Figure 1.1-3). After disposal activities at the site ended, most of the site's surface was covered with asphalt and/or chemical waste storage structures. The site is currently used for Resource Conservation and Recovery–permitted chemical waste storage and treatment and for mixed waste storage under interim status authority.

2.0 SCOPE OF ACTIVITIES

Recommendations in the "Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54" (N3B 2018, 700039) include the following, which are the basis for vapor sampling activities at MDA L:

1. Conduct semiannual monitoring of sentry boreholes located in the source region to allow early detection of potential container failure. Sentry boreholes on the western side of MDA L include boreholes 54-27641 and 54-24240. On the eastern side of MDA L, sentry boreholes include boreholes 54-24241, 54-24238, and 54-27642. The second sampling round, conducted in January 2020, fulfills the fall 2019 NMED requirement for semiannual monitoring.
2. Monitor peripheral boreholes once every 2 yr for evidence of plume expansion.

3. Conduct semiannual monitoring of deep borehole 54-24399 as a sentry borehole to further characterize long-term trends of VOC concentrations in the basalt and to provide data needed to support the corrective measures evaluation process (e.g., updating the conceptual model for transport and developing cleanup goals).
4. Activate the eastern SVE unit if (1) total VOC concentrations in any ports in the eastern sentry boreholes rise above 2000 ppmv and (2) there are 2 yr of sustained concentrations of total VOCs above 2000 ppmv for ports to depths of 100 ft. Once this trend is observed for the 2-yr period, the eastern SVE system should be activated.
5. Activate the western SVE unit if (1) total VOC concentrations in any ports in the western sentry boreholes rise above 2000 ppmv and (2) there are 2 yr of sustained concentrations of total VOCs above 2000 ppmv for ports to depths of 100 ft. Once this trend is observed for the 2-yr period, the western SVE system should be activated.

The following pore-gas monitoring activities were conducted at MDA L for calendar year 2019.The first round of sampling occurred in early 2019. Because of weather and contract delays, the second round of 2019 sampling occurred in January 2020. Two additional rounds of sampling are planned for calendar year 2020, which will return the monitoring program to the prescribed schedule. Tables 2.0-1 and 2.0-2 list the vapor-monitoring locations, port depths, and corresponding sampling intervals. (For details of sampling protocols, see “Sampling Subsurface Vapor,” N3B-SOP-ER-2008.)

- Before sampling, boreholes were field-screened using the MultiRAE IR photoionization detector to measure percent methane (%CH_4), carbon dioxide (CO_2) concentration in ppm, percent oxygen (%O_2), and total VOC concentrations in ppm. In the first sampling round, a total of 163 ports in 28 vapor-monitoring boreholes (Figure 1.1-3) were field-screened and in the second sampling round, a total of 32 ports in the 6 vapor-monitoring sentry boreholes were field-screened.
- In the first sampling round, a total of 197 pore-gas samples (163 regular samples and 34 quality assurance/quality control samples) were collected for VOC analysis from 6 sentry and 22 peripheral boreholes (Figure 1.1-3). In the second sampling round, a total of 47 pore-gas samples (32 regular samples, 7 field duplicate samples, and 8 field blank samples) were collected for VOC analysis from the 6 sentry boreholes.
- In the second sampling round, a total of 38 pore-gas samples (32 regular samples, 3 field duplicate samples, and 3 field blank samples) were collected for tritium analysis from 32 ports in the 6 sentry boreholes.
- After collection, samples were submitted to the Newport News Nuclear BWXT-Los Alamos, LLC (N3B) Sample Management Office for shipment to analytical laboratories per N3B-ER-SOP-10094, “Sample Receiving and Shipping by the Sample Management Office.” Vapor samples were submitted to off-site analytical laboratories in SUMMA canisters for VOC analysis using U.S. Environmental Protection Agency (EPA) Method TO-15 and in silica-gel columns for tritium analysis using EPA Method 906.
- All analytical data were subjected to data validation reviews in accordance with N3B guidance and procedures. Field duplicate samples were collected at a minimum frequency of 1 for every 10 samples. The data validation reviews for MDA L pore-gas data are presented in Appendix C.

Waste generated from sampling activities was handled in accordance with the waste characterization strategy form for MDA L developed in accordance with N3B-ER-DIR-SOP-10021, R1, “Characterization and Management of Environmental Programs Waste.”

Further discussion of the field methods used for pore-gas field screening and sample collection is presented in Appendix B. Field chain-of-custody forms and sample collection logs are provided in Appendix E (on CD included with this document).

The pore-gas field-screening results are discussed in section 4, and the pore-gas analytical results are discussed in section 5. Any deviations from the table of monitoring wells submitted to NMED in the recommendations section of the "Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54" (N3B 2018, 700039) are discussed in the following section.

2.1 Deviations and Changes

In the first sampling round in 2019, five ports listed in Table 2.0-1 were not sampled because of purge flow rates less than 0.3 standard liters per minute (slpm) (Table 2.1-1). In an effort to ensure data quality, ports that are either fully or partially blocked are assumed to be adversely impacted and will be subsequently removed from future sampling plans. In the second sampling round, field duplicates for tritium sampling were not collected at two locations because of a sampling field crew error (Table 2.1-2).

3.0 REGULATORY CRITERIA

VOCs present in wastes disposed of at MDA L may vaporize and be released into subsurface media (e.g., soil, tuff, fractured rock). These vapor-phase contaminants may potentially be transported through the subsurface to the water table. Once in contact with the water table, vapor-phase VOCs might condense into the water. Thus, vapor-phase contaminants are a potential source of groundwater contamination. For MDA L, monitoring of subsurface vapors is being performed to evaluate the potential for groundwater contamination or, if necessary, to evaluate the need for corrective actions to prevent possible groundwater contamination.

Under the Consent Order, results of environmental investigations and monitoring are compared with SLs, which are media-specific contaminant concentrations that indicate the potential for unacceptable risk. The Consent Order specifies that SLs for soil and groundwater developed by NMED be used to evaluate soil and groundwater contamination. NMED has developed VISLs for evaluating the potential for vapor intrusion into buildings and subsequent exposure through inhalation; however, NMED's VISLs do not address potential migration of vapors to groundwater. Because the Consent Order does not identify SLs for subsurface vapor, N3B developed Tier I SLs to evaluate monitoring results.

The Tier I approach evaluates whether pore gas containing a VOC at the concentration detected in the vapor sample could contaminate groundwater above the groundwater SL. The approach assumes pore gas containing VOCs at the concentrations detected in the pore-gas sample is in hypothetical contact with the water table in sufficient quantity to condense into groundwater in accordance with Henry's law. If Tier I SLs are not exceeded, VOCs could not contaminate groundwater above cleanup levels even if the vapor plume were in direct contact with groundwater, and no further screening is necessary.

For the Tier I screen, the analysis uses Henry's law to identify the vapor-phase VOC concentration threshold that would have to be exceeded for a given VOC to potentially impact the groundwater at concentrations exceeding applicable groundwater standards.

The Tier I screening approach for VOCs is described in more detail below.

3.1 Tier I Soil-Vapor Screening

The Tier I screening analysis evaluates the potential for contamination of groundwater by VOCs in soil vapor using groundwater SLs equal to groundwater cleanup levels in the Consent Order. The analysis predicts the groundwater concentration that might be in equilibrium with the maximum soil-vapor concentrations of VOCs detected if the soil-vapor concentrations were in contact and equilibrium with groundwater. The analysis is performed using VOC concentrations in the pore gas in calculations according to Henry's law partitioning. If the predicted concentration of a particular VOC in groundwater is less than the groundwater SL, then no potential exists for exceedances of groundwater cleanup levels.

Because there are no SLs for soil vapor that address the potential for groundwater contamination, the screening evaluation is based on Consent Order groundwater cleanup levels and the Henry's law constant that describes the equilibrium between vapor and water concentrations. The source of Henry's law constants is the NMED "Risk Assessment Guidance for Site Investigations and Remediation Volume 1, Soil Screening Guidance for Human Health Risk Assessments," (NMED 2019, 700550) or the EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables). The following dimensionless form of Henry's law constant is used:

$$H' = \frac{C_{air}}{C_{water}}$$ **Equation 3.1-1**

Where, H' = the dimensionless Henry's law constant,

C_{water} = the volumetric concentration of the contaminant in water, and

C_{air} = the volumetric concentration of the contaminant in air (or soil vapor).

Equation 3.1-1 can be used to calculate the Tier I pore-gas screening level (SL_{pgl}) as follows:

$$SL_{pgI} = H' \times SL_{gw} \times 1000$$ **Equation 3.1-2**

Where, SL_{pgl} = the Tier I pore gas SL (µg/m^3),

SL_{gw} = the groundwater SL (µg/L), and

1000 = a conversion factor (to convert L to m^3).

In accordance with Section IX of the Consent Order, the groundwater SLs used in Equation 3.1-2 are determined as follows.

For each individual substance, the lower concentration of the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard or EPA maximum contaminant level (MCL) is used as the screening value. If an NMWQCC groundwater standard or an MCL has not been established for a specific substance for which toxicological information is published, the NMED screening level for tap water is used as the groundwater screening value. NMED screening levels are established for either a cancer- or noncancerous-risk type; for the cancer-risk type, screening levels are based on a 10^{-5} excess cancer risk. This report was prepared using the 2019 "NMED Risk Assessment Guidance for Site Investigations and Remediation Volume 1, Soil Screening Guidance for Human Health Risk Assessments" (NMED 2019, 700550). If an NMED screening level for tap water has not been established for a specific substance for which toxicological information is published, the EPA regional SL for tap water (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables) is used as the groundwater screening value. The EPA screening levels are established for either a cancer- or noncancerous-risk type. For the cancer-risk type, the Consent Order specifies screening at a 10^{-5} excess cancer risk. The EPA screening levels for tap water are at 10^{-6} excess cancer risk; therefore, 10 times the EPA 10^{-6} screening levels are used in the screening process.

If the hypothetical concentration of a VOC in groundwater (calculated using Equation 3.1-2) and the measured VOC concentration in a pore-gas sample is less than the groundwater SL, the concentration of the VOC in soil vapor will not exceed the groundwater SL, even if the VOC plume were to be in direct contact with groundwater. An analysis of the MDA L data is presented in section 5.0.

Table 3.1-1 presents the calculated concentrations of contaminants in soil vapor corresponding to groundwater SLs (hereafter, Tier I SLs) for the Tier I screening. Table 3.1-2 presents the results of the Tier I screening for the first round of 2019 soil-vapor data. Twelve VOCs were identified that exceeded the Tier I SL. Table 3.1-3 presents the results of the Tier I screening for the second round of soil-vapor data. Fourteen VOCs were identified that exceed the Tier I SLs.

3.2 Vapor Intrusion Screening Levels for Potential Human Exposure

NMED has developed VISLs for chemicals determined to be sufficiently volatile and toxic that are most commonly associated with environmental releases within the state (NMED 2019, 700550).

NMED guidance on evaluating a vapor intrusion pathway does not specify a sample depth that needs to be evaluated against the VISLs. The guidance does specify that evaluation is required if a pathway for exposure is complete or potentially complete; for example, detected VOC concentrations near buildings with occupants. Therefore, the concentrations of VOC contaminants in pore-gas samples located closest to buildings with occupants are the relevant locations for comparison with the VISLs for soil-gas ($\mu g/m^3$). The focus should be on VOC contaminants in the first 30 ft of subsurface based on the potential movement of the VOC vapor contaminants through the subsurface and into the building. The shallower VOC contamination has the higher potential to volatilize into the building where human exposure can take place.

The five boreholes and sampling ports shown in Table 3.2-1 were chosen to screen VISLs. The shallowest depth was chosen from each of the boreholes, and their locations relevant to structures are shown in Figure 1.1-3.

4.0 FIELD-SCREENING RESULTS

Before samples were collected, field screening was performed in each borehole at the targeted sampling interval to ensure carbon dioxide (ppm), total VOCs (ppm) and percent oxygen (%O_2) levels at each sampling port had stabilized at values representative of subsurface pore-gas conditions. Field screening at MDA L also included field screening of subsurface vapor for methane, VOCs, and water vapor (for tritium samples). Subsurface vapor monitoring was conducted at the locations and depths described in section 2.0 and shown in Tables 2.0-1 and 2.0-2. Before sampling, each interval was purged in accordance with N3B-SOP-ER-2008, R0, "Sampling Subsurface Vapor," to ensure pore gas was being collected. The pore gas from each port was field-screened using a MultiRAE IR Multi-Gas Monitor for %CH_4, CO_2 (ppm) and %O_2. Each interval was purged until these readings stabilized. The stabilized percent %CH_4, CO_2 (ppm), %O_2, and total VOC ppm values from the 2019 monitoring rounds performed at each sampling location are shown in Appendix B.

5.0 ANALYTICAL DATA RESULTS

This section presents a summary of VOC and tritium pore-gas data for 2019 and an evaluation of the pore-gas VOC data.

All analytical data were subject to validation reviews in accordance with N3B guidance and procedures. Appendix C presents a description of these data validation reviews for 2019 MDA L pore-gas data. All validated analytical results from 2019 pore-gas sampling are presented in Appendix E (on CD included with this document).

MDA L pore-gas data are also available at the Intellus New Mexico website (http://www.intellusnm.com/).

5.1 VOC Pore-Gas Results

Subsurface vapor samples were collected at MDA L from both sentry and peripheral boreholes in the first sampling round and from sentry boreholes in the second sampling round. VOC samples were collected in SUMMA canisters and submitted for laboratory analysis according to EPA Method TO-15. Tritium samples were collected in silica gel cartridges and submitted for laboratory analysis according to EPA Method 906.0.

VOC analytical data from the first round of 2019 sampling are presented in Table 5.1-1 and from the second round are presented in Table 5.1-2. Tritium analytical data from the second sampling round are presented in Table 5.1-3. The N3B data management program used to review the data is presented in Appendix C. Analytical data and reports for 2019 are included in Appendix E (on CD included with this document).

During the first sampling round, 33 different VOCs were detected at least once in vapor samples collected from MDA L. Trichloroethane[1,1,1-] (TCA[1,1,1-]) was detected in all of the 163 samples analyzed in the first round and all of the 32 samples analyzed in the second round. It was the VOC detected at the highest concentration for both rounds. TCA[1,1,1-] was detected at a concentration of 7,633,700 $\mu g/m^3$ in borehole 54-02089 at 46 ft bgs during the first round and 2,900,000 $\mu g/m^3$ in borehole 54-24238 at 64 ft bgs in the second round. Trichloroethene (TCE); 1,1-dichloroethene (DCE); 1,1,2-trichloro-1,2,2-trifluoroethane; tetrachloroethene (PCE), 1,1-dichloroethane (DCA), and 1,2-DCA were detected in all 32 samples analyzed in the second round.

In the second round, tritium was detected in 22 of the 24 samples analyzed at concentrations ranging from 261 pCi/L at 78 ft in borehole 54-24240 to 5408 pCi/L at 82 ft in borehole 54-27641.

All boreholes from which pore-gas samples were collected in the second round were sampled at all sampling depths with the exception of borehole location 54-24399. This borehole, an open borehole, was sampled only at two depths in the second round. The samples from each borehole show concentrations of contaminants decreasing with depth except for samples from borehole location 54-27642, which show concentrations did not decrease with depth for carbon tetrachloride; chloroform; cyclohexane; 1,1-DCA and 1,2-DCA; 1,2-dichloropropane (DCP); PCE; 1,1,1-TCA; and TCE.

5.2 Evaluation of VOC Pore-Gas Data for Groundwater Contamination

5.2.1 Potential for Groundwater Contamination

The VOC results from the 2019 monitoring were screened in a Tier I analysis to evaluate whether the concentrations of VOCs in the vapor would be a potential source of groundwater contamination if the vapor were in contact with the groundwater. The Tier I screening analysis calculates the groundwater concentration that would be in contact and equilibrium with the maximum soil-vapor concentrations of VOCs detected if the soil-vapor concentration were in equilibrium with groundwater according to Henry's law partitioning. If the predicted concentration of a particular VOC in groundwater is less than the appropriate groundwater SL, then no potential exists for exceedances of groundwater cleanup levels (see section 3.1).

Equation 3.1-2 was used to screen the maximum concentrations of VOCs detected in pore-gas samples at MDA L during the two sampling rounds. The evaluation included the 33 VOCs for which there are MCLs, NMWQCC standards, or EPA regional tap water SLs.

Tables 5.1-1 and 5.1-2 show the 13 VOCs that exceed Tier I groundwater screening levels. These VOCs are benzene; carbon tetrachloride; chloroform; 1,1-DCA; 1,2-DCA; 1,1-DCE; 1,2-DCP; 1,4-dioxane; methylene chloride; PCE; 1,1,1-TCA; 1,1,2-TCA; and TCE. Because some concentrations exceeded screening levels, further screening was performed using the concentrations from the deepest pore-gas sample (i.e., the sample collected closest to the regional aquifer). The deepest sample was collected from borehole location 54-24399 at a depth of 587 ft, and this sample had no VOCs detected above Tier I SLs.

5.2.2 VOC Concentration Trends in Subsurface Vapor Over Time

The objective of monitoring peripheral boreholes is to evaluate concentration trends of VOCs in subsurface vapor at MDA L over time and spatially from known VOC source areas in order to evaluate if the plume is spreading horizontally and/or vertically.

The following concentration trends over time are discussed in detail in Appendix D.

The boreholes on the east side of the site are used to sample the VOC plume within the Bandelier Tuff, with depths to 338 ft bgs. Data from boreholes 54-02089 (Appendix D, Figures D-2.0-1 through D-2.0-5) and 54-24238 (Appendix D, Figures D-2.0-6 through D-2.0-9) both show strong evidence of possible increased leakage from subsurface sources, starting during the period of SVE operation and continuing until the present, with a peak in February of 2019. The remaining eastside sentry boreholes, 54-24241 (Appendix D, Figures D-2.0-10 and D-2.0-11) and 54-27692 (Appendix D, Figures D-2.0-12 through D-2.0-14), both show concentrations rebounding towards levels seen in September 2014, although many ports remain well below pre-SVE concentrations.

Data from the westside sentry boreholes (54-24240 and 54-27641) are shown in Appendix D, Figures D-3.0-1 through D-3.0-5. Borehole 54-24240 shows the strongest rebound at 28 ft bgs (Appendix D, Figure D-3.0-2) and attains total VOC concentrations slightly above pre-SVE values. Borehole 54-27641 shows limited rebound with a maximum rebound at 32 ft bgs in February 2019 (Appendix D, Figure D-3.0-4).Concentrations of total VOCs near the base of the Otowi member of the Bandelier tuff (just above the basalt) on the west side of MDA L show little change from 2014 through 2019 (Appendix D, Figure D-3.0-5).

5.2.3 Evaluation of VOC Pore-Gas Data for Human Health Using Vapor Intrusion Screening Levels

Concentration of VOCs in the shallowest borehole port depth located closest to buildings with occupants are the relevant locations to be compared with the VISLs for soil-gas (μg/m^3). NMED lists VISLs for both Industrial soil-gas (μg/m^3) and for residential soil-gas (μg/m^3). Because MDA L is an industrial site, the comparison of VOC concentrations with VISLs was based on industrial soil-gas.

It is reasonable to work with a conceptual model that focuses on volatiles in the first 30 ft or so of subsurface based on the potential movement of the VOC gases through the subsurface and into the building. The shallower contamination has the higher potential to migrate into the building where human exposure can take place.

The majority of MDA L is covered by asphalt, which tends to block upwardly migrating VOCs from migrating. However, the trailers at MDA L are not on asphalt; thus the asphalt could focus upward VOC migration toward the trailers. There are no monitoring boreholes near the trailers shown in Figure 1.1-3 (trailers 54-0037, 0051, 0060, 0083, and 0084 are located east of the lower portion of the Mesita del Buey Rd. label on the figure).

As discussed in section 3.2, the data from the shallowest sampling ports in five boreholes located near structures were compared with VISLs for exceedances. VOCs in the borehole ports that are nearest to the trailers exceeded VISLs as shown in Tables 5.1-1 and 5.1-2. These tables serve as a preliminary screening tool to evaluate on-site worker safety. VOC samples will be collected from the surface and the trailers' interiors and these data will be evaluated in conjunction with N3B Environment, Safety and Health personnel to determine if workers are exposed to upwardly migrating VOC contamination. The recommended approach is to measure VOCs in the breathing space of the buildings and trailers at MDA L over the course of a few days/weeks, which will ensure that the barometric low pressures that may pull higher concentrations to the surface are captured.

5.2.4 Need to Restart Soil-Vapor Extraction System

Monitoring sentry boreholes allows early detection of potential waste container failure in the disposal shafts and provides data for the decision to restart either or both of the SVE systems. Recommendations included in the "Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54" (N3B 2018, 700039) are to activate the eastern and/or western SVE unit if total VOC concentrations in any ports in the eastern and or western sentry boreholes rise above 2000 ppmv, and stay consistently above 2000 ppmv with each consecutive measurement for ports to depths of 100 ft, for a period of 2 yr. Once this trend is observed, the eastern/western SVE system should be activated.

Tables 5.2-1 and 5.2-2 show VOC concentrations by analyte and total VOCs in ppmv. The highest total VOC concentration (1663 ppmv) was in borehole 54-02089 in the first sampling round at 46 ft. Because this borehole was not sampled in the second sampling round, it will be added to the sentry borehole list. The highest total VOC concentration in the second sampling round was 855 ppmv at 64 ft in borehole 54-24238. While the data demonstrate that there is not a need to restart the SVE system now, semiannual pore gas monitoring of sentry boreholes will continue and total VOC concentrations will continue to be evaluated.

6.0 SUMMARY

The purpose of monitoring VOC concentrations in pore gas at MDA L is to identify changes in the configuration of the VOC plumes, monitor changes in contaminant concentration distribution, and identify gaps in VOC pore-gas data for future modeling or trend analyses.

The results from the two sampling rounds are summarized as follows.

- VOC concentrations at MDA L are consistent with a diffusive plume as described by Stauffer et al. (2005, 090537). The diffusive plume has been significantly modified by the SVE interim measure (Behar et al. 2019, 700854). The SVE interim measure removed 1000 lb of VOCs. The graphs in Appendix D show concentrations dropping from the 2014 pre-SVE levels in nearly all ports. VOC concentrations are highest from ground surface to approximately 60 ft bgs, within the depth of the VOC disposal shafts (e.g., Figure D-2.0-1 in Appendix D).
- VOC concentrations decrease with depth from the base of the disposal units (60 ft bgs) to borehole total depth, with the exception of borehole 54-27642 (e.g., Figure D-2.0-6 in Appendix D).
- VOC concentrations in the source areas are rebounding, implying continued leakage from subsurface containers (e.g., Figure D-2.0-7 in Appendix D). The source areas are the disposal shafts shown in Figure 1.1-2.
- VOC concentrations at two wells on the east side of MDA L show strong evidence of possible increased leakage from subsurface sources, starting during the period of SVE operation and continuing until 2019. Data from the second round for one of these wells suggest that the increased leakage has not continued and concentrations are dropping back toward pre-SVE levels. This trend suggests that a logical action level would be to turn on SVE systems only in the face of a sustained leak with concentrations above 2000 ppmv for two or more sampling rounds, perhaps with an increasing trend for a full year.
- VOC concentrations measured deep below the central portion of each source area in the Cerros del Rio basalt are below Tier I SL concentrations derived from groundwater cleanup standards.
- Continued observation of data from the deepest ports will provide evidence to confirm expectations that values in the deep basalt are stabilizing after installation of the permanent packer in August 2017. Stabilization of VOC measurements in the deep basalt will allow more confidence in determinations of the MDA L VOC plume impact on the safety of regional groundwater.

Discussions with NMED in January 2020 resulted in the decision to delay the plan to replace borehole 54-24399 for the following reason. Observing the deep boreholes will reveal if the concentrations are now reaching an equilibrium that is no longer impacted by deep breathing in borehole 54-24399. If/when concentrations in borehole 54-24399 stabilize, N3B will reevaluate the original request to replace that borehole. Included in this plan is continued comparison of VOC concentrations in boreholes 54-01015 and 54-01016 to ensure that subsurface VOC values at all available monitoring points in the basalt are (1) consistent with our conceptual model (i.e., not changing rapidly or erratically) and (2) below levels of concern for impacting groundwater. If either of these conditions begin to deviate from current conditions, N3B and NMED should meet again to discuss the adequacy of the current basalt monitoring locations for ensuring groundwater safety (Stauffer et al. 2019, 700871).

7.0 REFERENCES AND MAP DATA SOURCES

7.1 References

The following reference list includes documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

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Stauffer, P.H., T. Rahn, J.P. Ortiz, L.J. Salazar, H. Boukhalfa, H.R. Behar, and E.E. Snyder, March 2, 2019. "Evidence for High Rates of Gas Transport in the Deep Subsurface," *Geophysical Research Letters,* Vol. 46, No. 7. (Stauffer et al. 2019, 700871)

7.2 Map Data Sources

Map data sources used in original figures created for this report are described below and identified by legend title.

Legend Item	Data Source
Disposal pit/ impoundment	Waste Storage Features; LANL, Environment and Remediation Support Services Division, GIS/Geotechnical Services Group, EP2007-0032; 1:2,500 Scale Data; 13 April 2007.
Disposal shaft	Waste Storage Features; LANL, Environment and Remediation Support Services Division, GIS/Geotechnical Services Group, EP2007-0032; 1:2,500 Scale Data; 13 April 2007.
Elevation contour	Hypsography, 10, 20, & 100 Foot Contour Intervals; LANL, ENV Environmental Remediation and Surveillance Program; 1991.
Fence	Security and Industrial Fences and Gates; LANL, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 10 September 2007.
LANL boundary	LANL Areas Used and Occupied; LANL, Site Planning & Project Initiation Group, Infrastructure Planning Division; 19 September 2008.
Material disposal area	Materials Disposal Areas; LANL, ENV Environmental Remediation and Surveillance Program; ER2004-0221; 1:2,500 Scale Data; 23 April 2004.
Paved road	Los Alamos National Laboratory, FWO Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Structure	Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
TA boundary	As published; Triad SDE Spatial Geodatabase: GISPUBPRD1\PUB.Boundaries\PUB.Tecareas; February 2020.
Major Road	As published; Q:\16-Projects\16-0033\project_data.gdb\line\major_road; February 2020.
Unpaved road	Dirt Road Arcs; LANL, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 10 September 2007.
Drainage	As published; Q:\16-Projects\16-0033\project_data.gdb\line\drainage_features; February 2020.
Vapor monitoring well	Point Feature Locations of the Environmental Restoration Project Database; LANL, Environment and Remediation Support Services Division, EP2007-0754; 30 November 2007.

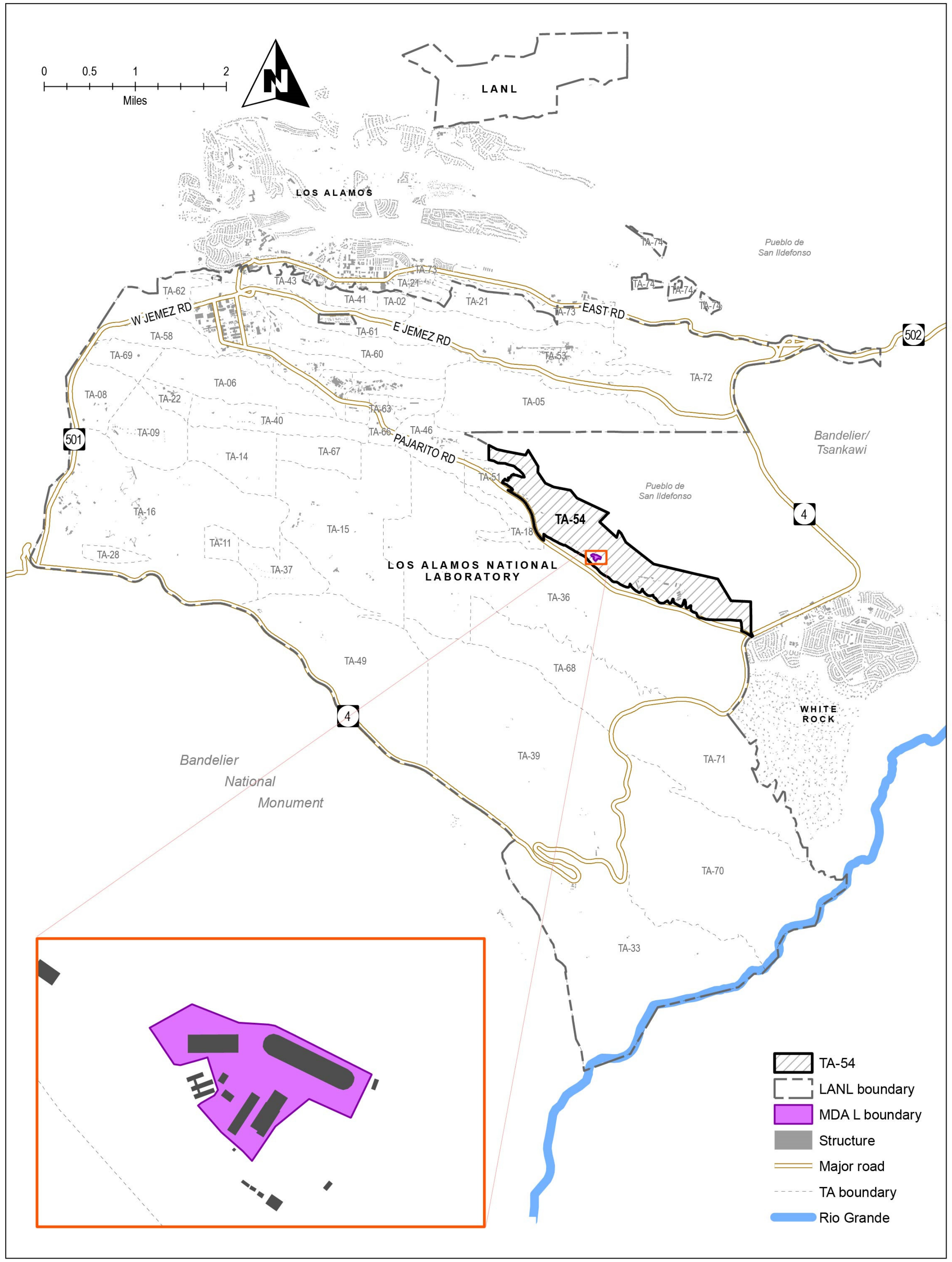

Figure 1.1-1 Location of MDA L with respect to Laboratory technical areas

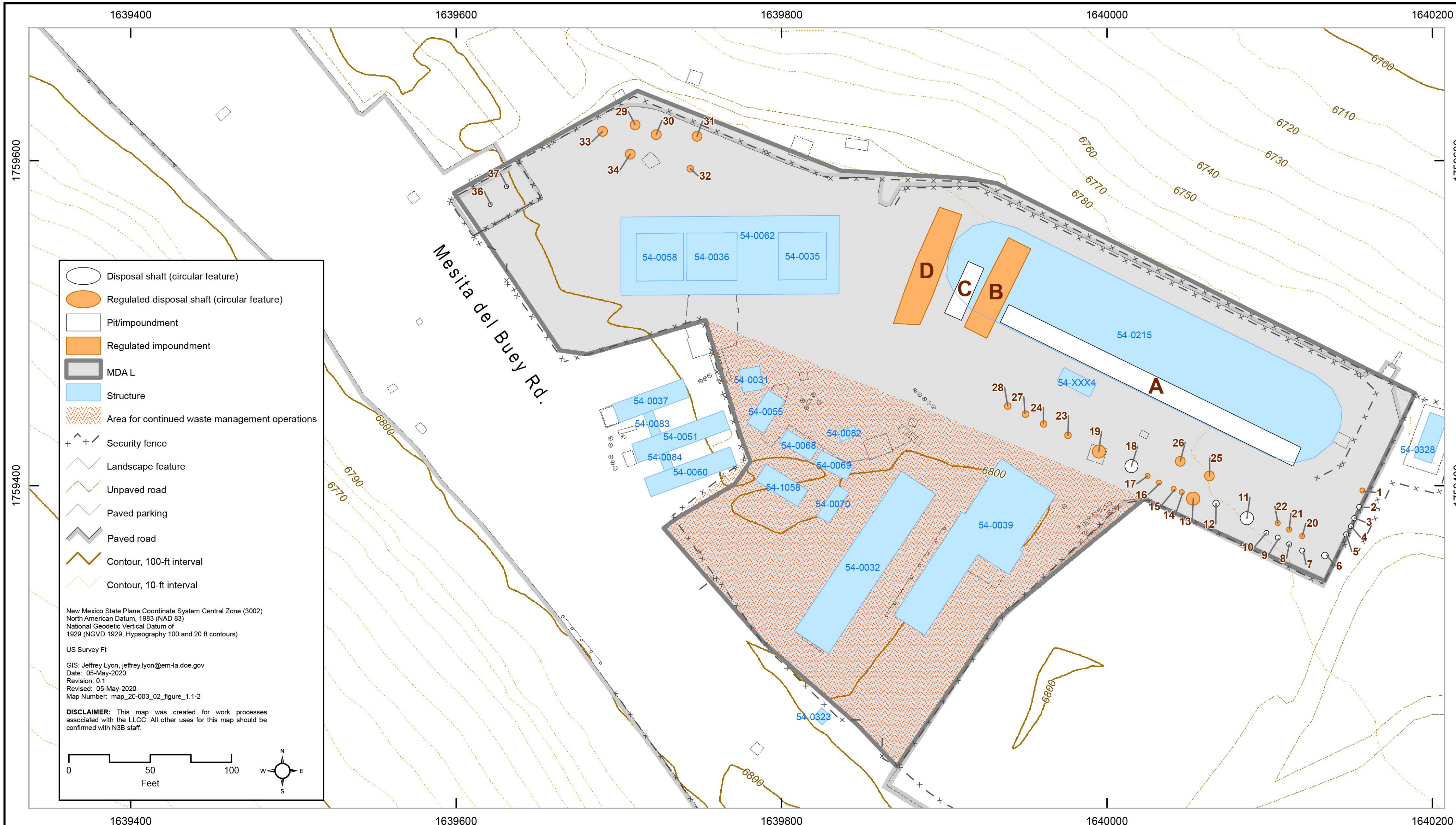

Figure 1.1-2 Inactive subsurface disposal units and existing surface structures at MDA L

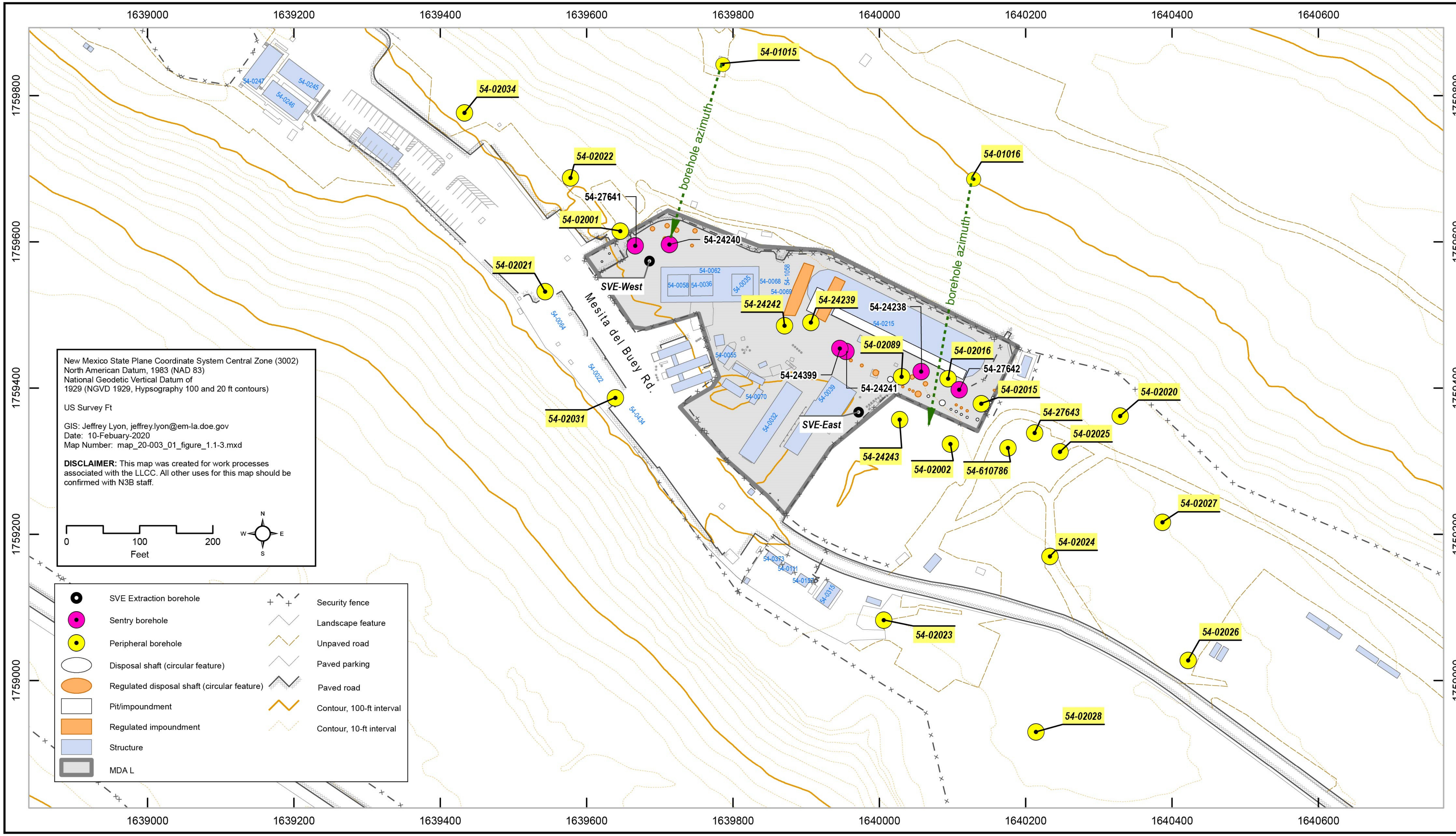

Figure 1.1-3 Location of MDA L pore-gas monitoring boreholes

Table 2.0-1
First Round 2019 MDA L
Subsurface Vapor-Monitoring Locations—Peripheral and Sentry Boreholes

Location ID	Screening Conducted	VOC Sampling Port Depth (vertical depth in ft)
54-01015	Yes	35.5,162, 300, 329, 420, 455
54-01016	Yes	30, 159, 278, 339, 414, 463, 517
54-02001	Yes	20, 40, 60, 80, 100, 120, 140, 160,180, 200
54-02002	Yes	40, 60, 120, 180, 200
54-02016	Yes	31
54-02020	Yes	20, 40, 60, 80, 95, 120, 140, 160, 180, 200
54-02021	Yes	20, 140, 160, 180, 198
54-02022	Yes	40, 60, 80, 120, 140, 160, 180, 200
54-02023	Yes	20, 40, 60, 80, 100, 159, 200
54-02024	Yes	20, 40, 60, 80, 100, 140, 160, 180, 200
54-02025	Yes	20, 60, 100, 160, 190
54-02026	Yes	20, 60, 100, 160, 200,215
54-02027	Yes	20, 60, 100, 160, 200, 220, 250
54-02028	Yes	20, 60, 100, 160, 200, 220, 250
54-02031	Yes	20, 60, 100, 160, 200, 220, 260
54-02034	Yes	20, 60, 100, 160, 200, 220, 260, 300
54-02089	Yes	13, 31, 46, 86
54-24238	Yes	44, 64, 84
54-24239	Yes	25, 50, 75, 99.5
54-24240	Yes	28, 53, 78, 103, 128, 153
54-24241	Yes	73, 93, 113, 133, 153, 173, 193
54-24242	Yes	25, 50, 75, 100, 110.5
54-24243	Yes	25, 50, 75, 100, 125
54-24399*	Yes	566.7, 587.8
54-27641	Yes	32, 82, 115, 182, 232, 271, 332.5
54-27642	Yes	30, 75, 116, 175, 235, 275, 338
54-27643	Yes	30, 74, 117, 167, 235, 275, 354
54-610786	Yes	25, 50, 75, 100 118.5

* Open borehole.

Table 2.0-2
Second Round MDA L
Subsurface Vapor-Monitoring Locations—Sentry Boreholes

Location ID	Screening Conducted	VOC Sampling Port Depth (vertical depth in ft)	Tritium Sampling Port (vertical depth in ft)
54-24238	Yes	44, 64, 84	44, 64, 84
54-24240	Yes	28, 53, 78, 103, 128, 153	28, 53, 78, 103, 128, 153
54-24241	Yes	73, 93, 113, 133, 153, 173, 193	73, 93, 113, 133, 153, 173, 193
54-24399*	Yes	567, 588	567, 588
54-27641	Yes	32, 82, 115, 182, 232, 271, 332.5	32, 82, 115, 182, 232, 271, 332.5
54-27642	Yes	30, 75, 116, 175, 235, 275, 338	30, 75, 116, 175, 235, 275, 338

* Open borehole.

Table 2.1-1
First Round 2019 Sampling Requirements Deviations

Location	Port	Deviation	Cause
54-01016	5 (414.3 ft)	No field or analytical data are available for this location.	Cancelled because the port had a purge flow rate of 0.1 slpm
54-01016	6 (459.5 ft)	No field or analytical data are available for this location	Cancelled because the port had a purge flow rate of 0.1 slpm
54-02001	1 (20 ft)	No field or analytical data are available for this location.	Cancelled because the port had a purge flow rate of 0.1 slpm
54-27642	3 (116 ft)	No field or analytical data are available for this location.	Cancelled because the port had a purge flow rate of 0.0 slpm
54-27643	7 (354 ft)	No field or analytical data are available for this location.	Cancelled because the port had a purge flow rate of 0.0 slpm

Table 2.1-2
Second Round Sampling Requirements Deviations

Location	Port Depth	Deviation	Cause
54-24240	2 (103 ft)	No field or analytical data are available for this location for FD[a].	Sampling field crew error[b]
54-24241	3 (193 ft)	No field or analytical data are available for this location for FD.	Sampling field crew error

[a] FD = Field duplicate.

[b] A total of four tritium field duplicates were planned for collection. Because of a sampling field crew error, the valve on the tee fitting for the duplicate was left closed and the FDs were cancelled.

Table 3.1-1
MDA L Tier I Pore-Gas Screening Calculations

VOC	Henry's Law Constant[a] (dimensionless)	Groundwater SL (µg/L)	Source of Groundwater SL	Tier I Pore-Gas Concentrations Corresponding to Groundwater Standard (µg/m³)
Acetone	0.0014	14,100	NMED Tap Water[b]	19,700
Benzene	0.228	5	NM GW[c]	1140
Bromodichloromethane	0.0869	1.34	NMED Tap Water	116
Butadiene[1,3-]	3.0	0.181	NMED Tap Water	546
Butanone [2-]	0.00233	5560	NMED Tap Water	13,000
Carbon disulfide	0.59	810	NMED Tap Water	478,000
Carbon tetrachloride	1.13	5	NM GW	5650
Chlorobenzene	0.128	100	EPA MCL[d]	13,000
Chlorodifluoromethane	1.66	104,000	NMED Tap Water	173,000,000
Chloroform	0.15	80	EPA MCL	12,000
Cyclohexane	6.1	13,000	EPA Tap Water[e]	79,300,000
Dichlorobenzene[1,4-l	0.0988	75	NM GW	7410
Dichlorodifluoromethane	14.1	197	NMED Tap Water	2,780,000
Dichloroethane[1,1-]	0.23	25	NM GW	5750
Dichloroethane[1,2-]	0.0484	5	NM GW	242
Dichloroethene[1,1-]	1.07	7	NM GW	7490
Dichloroethene[cis-1,2-]	0.167	70	NM GW	11,700
Dichloroethene[trans-1,2-]	0.383	100	NM GW	38,300
Dichloropropane[1,2-]	0.116	5	NM GW	580
Dioxane[1,4-]	0.000197	4.59	NMED Tap Water	0.9
Ethylbenzene	0.323	700	NM GW	226,000
Hexane	73.8	319	NMED Tap Water	23,500,000
Isooctane	na[f]	na	na	na
Isopropylbenzene	0.472	447	NM Tap Water	211,000
Methylene chloride	0.133	5	NM GW	665
Propylbenzene [1-]	0.43	660	EPA Tap Water	284,000
Styrene	0.113	100	NM GW	11,300
Isopropanol (propanol[2-])	0.00033	410	EPA Tap Water	135
Tetrachloroethene (PCE)	0.726	5	NM GW	3630
Tetrahydrofuran	na	5	NMED GW	na
Toluene	0.272	1000	NM GW	272,000
Trichloro-1,2,2-trifluoroethane[1,1,2-]	21.6	55,000	NMED Tap Water	1,190,000,000
Trichloroethane[1,1,1-]	0.706	200	NM GW	141,000
Trichloroethane[1,1,2-]	0.0338	5	NM GW	169

Table 3.1-1 (continued)

VOC	Henry's Law Constant[a] (dimensionless)	Groundwater SL (µg/L)	Source of Groundwater SL	Tier I Pore-Gas Concentrations Corresponding to Groundwater Standard (µg/m³)
Trichloroethene	0.404	5	NM GW	2020
Trichlorofluoromethane (Freon 11)	3.98	1140	NMED Tap Water	4,540,000
Trimethylbenzene[1,2,4-]	0.25	5.6	EPA Tap Water	1400
Vinyl chloride	1.14	2	NM GW	2280
Xylene[1,2-]	0.212	193	NM Tap Water	40.900
Xylene[1,3-]+xylene[1,4-][g]	0.212	193	NM Tap Water	40,900

Notes: Tier I screening concentration is the calculated concentration in pore gas exceeding groundwater standard derived from Equation 3.1-2.

[a] The source of Henry's law constants is the NMED "NMED Risk Assessment Guidance for Site Investigations and Remediation Volume 1, Soil Screening Guidance for Human Health Risk Assessments" (NMED 2019, 700550) or the EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables).

[b] NMED 2019, 700550.

[c] 20.6.2.3103 New Mexico Administrative Code.

[d] 40 Code of Federal Regulations 141 Subpart G.

[e] https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

[f] na = Not available.

[g] SL for xylene [1,3-]+xylene[1,4-] is for xylene mixture.

Table 3.1-2
Screening of VOCs Detected in Pore Gas during First 2019 Sampling Round at MDA L

VOCs	Maximum Pore-Gas Concentration (µg/m³)	Tier I Screening Level Calculated Concentrations in Pore Gas Corresponding to Groundwater Standard (µg/m³)	Tier I Potential for Groundwater Impact*
Acetone	2184 (J)	19,000	No
Benzene	2202	1140	No
Bromodichloromethane	6.7	116	No
Carbon tetrachloride	11945.9	5650	Yes
Chlorobenzene	966.173 (J)	13,000	No
Chloroform	53675.4	12,000	Yes
Cyclohexane	86,000 (J)	79,300,000	No
Dichlorodifluoromethane	18,780.1	2,780,000	No
Dichloroethane[1,1-]	80,899	5750	Yes
Dichloroethane[1,2-]	21,842.6	242	Yes
Dichloroethene[1,1-]	63,398	7490	Yes
Dichloroethene[cis-1,2-]	162.457(J+)	11,700	No
Dichloroethene[trans-1,2-]	170.382 (J)	38,300	No
Dichloropropane[1,2-]	290,959	580	Yes

Table 3.1-2 (continued)

VOCs	Maximum Pore-Gas Concentration (µg/m³)	Tier I Screening Level Calculated Concentrations in Pore Gas Corresponding to Groundwater Standard (µg/m³)	Tier I Potential for Groundwater Impact*
Dioxane[1,4-]	14,766	0.900	Yes
Ethylbenzene	256	226,000	No
Hexane	951 (J)	23,500,000	No
Isopropylbenzene	24 (J)	211,000	No
Methylene chloride	69,429	665	Yes
Propylbenzene[1-]	84 (J)	271,000	No
Tetrachloroethene (PCE)	549,034	3630	Yes
Toluene	4896	272,000	No
Trichloro-1,2,2-trifluoroethane[1,1,2-]	842,477	1,190,000,000	No
Trichloroethane[1,1,1-]	7,633.700	141,000	Yes
Trichloroethane[1,1,2-]	8179	169	Yes
Trichloroethene (TCE)	644,459	2020	Yes
Trichlorofluoromethane (Freon-11)	52,780	4,540,000	No
Vinyl chloride	510 (J)	2280	No
Xylene[1,2-]	1389	40,900	No
Xylene[1,3-]+xylene[1,4-]	651 (J)	40,900	No

Notes: Tier I screening level is the calculated concentration in pore gas exceeding groundwater standard derived from Equation 3.1-2. Shaded cells indicate VOCs that did not pass the Tier I screen.

* If concentration of a VOC measured in a pore-gas sample is less than the pore-gas SL, the concentration of the VOC in soil vapor will not exceed the groundwater SL, even if the VOC plume is in direct contact with groundwater.

Table 3.1-3
Screening of VOCs Detected in Pore Gas during Second Sampling Round at MDA L

VOCs	Maximum Pore-Gas Concentration (µg/m³)	Tier I Screening Level Calculated Concentrations in Pore Gas Corresponding to Groundwater Standard (µg/m³)	Tier I Potential for Groundwater Impact*
Acetone	88(J)	19,700	No
Benzene	1400	1140	Yes
Carbon disulfide	18(J)	478,000	No
Carbon tetrachloride	9400	5650	Yes
Chlorobenzene	780(J)	13,000	No
Chloroform	47,000	12,000	Yes
Cyclohexane	58,000(J)	79,300,000	No
Dichlorodifluoromethane	6400	2,780,000	No
Dichloroethane[1,1-]	61,000	5750	Yes

Table 3.1-3 (continued)

VOCs	Maximum Pore-Gas Concentration (µg/m³)	Tier I Screening Level Calculated Concentrations in Pore Gas Corresponding to Groundwater Standard (µg/m³)	Tier I Potential for Groundwater Impact*
Dichloroethane[1,2-]	140,000	242	Yes
Dichloroethene[1,1-]	63,000	7490	Yes
Dichloroethene[cis-1,2-]	110 (J)	11,700	No
Dichloroethene[trans-1,2-]	150 (J)	38,300	No
Dichloropropane[1,2-]	270,000	580	Yes
Dioxane[1,4-]	6800	0.900	Yes
Ethylbenzene	230(J)	226,000	No
Hexane	560	23,500,000	No
Isopropanol (propanol[2-])	2700	13.5	Yes
Methylene chloride	42,000	665	Yes
Styrene	37(J)	11,300	No
Tetrachloroethylene, (Tetrachloroethene) (PCE)	67,000	3630	Yes
Toluene	3500	272,000	No
Trichloro-1,2,2-trifluoroethane[1,1,2-]	510,000	1,190,000,000	No
Trichloroethane[1,1,1-]	2,900,000	141,000	Yes
Trichloroethane[1,1,2-]	8700	169	Yes
Trichloroethene (TCE)	1,500,000	2020	Yes
Trichlorofluoromethane (Freon 11)	62,000	4,540,000	No
Trimethylbenzene[1,2,4-]	120(J)	1410	No
Vinyl chloride	28(J)	2280	No
Xylene[1,2-]	1100	40,900	No
Xylene[1,3-]+xylene[1,4-]	400	40,900	No

Notes: Tier I screening concentration is the calculated concentration in pore gas exceeding groundwater standard derived from Equation 3.1-2. Shaded cells indicate VOCs that did not pass the Tier I screen.

* If concentration of a VOC measured in a pore-gas sample is less than the pore-gas SL, the concentration of the VOC in soil vapor will not exceed the groundwater SL, even if the VOC plume is in direct contact with groundwater.

Table 3.2-1
Boreholes and Sampling Ports used to Evaluate Vapor Intrusion Screening Levels

Borehole	Shallowest Port Depth (ft)	Description
54-02016	30.8	Located between shafts and southeast corner of building 54-215
54-24239	25	Located between shafts and southwest corner of building 54-215
54-24243	25	Located east of building 54-39 and SVE-East
54-27641	32	Located on west side of MDA L adjacent to SVE-West and near entrance to transportable office building
54-27642	30	Located between shafts and southeast corner of building 54-215

Table 5.1-1
First Round 2019 VOC Pore Gas Detected Results at MDA L (in µg/m³)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12,800	12,000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167112	54-01015	45–45	—[d]	—	—	11.9459 (J)	—	40.0126 (J)	19.9519 (J)	—	43.4907	113.258	21.0336 (J)	515.107	—	—	8.77496 (J)	—
MD54-19-167113	54-01015	187–187	—	—	—	81.7349	—	68.3142	110.08	—	192.743	258.876	—	2813.28	—	—	—	—
MD54-19-167114	54-01015	350–350	—	—	—	26.4067 (J)	—	6.83142 (J)	12.384 (J)	—	69.1897	16.9887 (J)	—	673.602	—	—	—	—
MD54-19-167115	54-01015	385–385	—	—	—	7.54476 (J)	—	18.5424 (J)	—	—	27.1817 (J)	25.8876 (J)	—	182.269	—	—	—	—
MD54-19-167116	54-01015	435–435	—	—	—	4.77835 (J)	—	15.6147 (J)	—	—	17.2974 (J)	23.4606 (J)	—	118.871	—	—	6.46576 (J)	—
MD54-19-167117	54-01015	485–485	—	—	—	—	—	14.6388 (J)	—	—	24.2164 (J)	25.8876 (J)	—	162.457	—	—	—	—
MD54-19-167118	54-01015	525–525	—	—	—	8.80222 (J)	—	20.9822 (J)	—	—	24.7106 (J)	28.719 (J)	—	158.495	—	—	—	—
MD54-19-167119	54-01016	30.8–30.8	—	**25.8609 (J)**	—	**62.873**	**5.98107 (J)**	**424.524**	**31.6479 (J)**	—	**69.1897**	**169.887**	**19.8202 (J)**	**1822.69**	—	—	**170.881**	—
MD54-19-167120	54-01016	162.2–162.2	—	446.978	—	1005.97	25.3045 (J)	2293.41	309.599	—	494.212	849.435	40.4493 (J)	17,830.6	—	17.4344 (J)	461.84	—
MD54-19-167121	54-01016	274.7–274.7	—	95.781	—	370.951	—	190.304	65.3598	—	202.627	93.0334	—	6339.78	—	—	13.3934 (J)	—
MD54-19-167122	54-01016	336.3–336.3	—	—	—	—	—	13.1749 (J)	—	—	16.8032 (J)	19.8202 (J)	—	114.909	—	—	—	—
MD54-19-167125	54-01016	517.6–517.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MD54-19-167127	54-02001	40–40	—	—	—	628.73 (J)	—	2391	894.397 (J)	—	1186.11 (J)	8089.86	7685.37	18,226.9	—	—	554.208 (J)	—
MD54-19-167128	54-02001	80–80	—	—	—	691.603 (J)	400.272 (J)	4196.44	7911.98	—	1186.11 (J)	13,752.8	17,797.7	6339.78	—	—	508.024 (J)	—
MD54-19-167129	54-02001	100–100	—	—	—	213.768 (J)	—	975.917 (J)	1582.4	—	—	7280.88	1941.57	1822.69	—	—	—	—
MD54-19-167130	54-02001	120–120	—	137.286 (J)	—	389.813 (J)	133.424 (J)	2976.55	2339.19	—	889.582 (J)	8089.86	21,842.6	11,887.1	—	—	1339.34	—
MD54-19-167131	54-02001	140–140	—	—	—	282.929 (J)	—	2049.43 (J)	1926.39	—	449.733 (J)	10516.8	8494.35	4754.84	—	—	434.129 (J)	—
MD54-19-167132	54-02001	180–180	—	—	—	—	—	1512.67 (J)	2132.79	—	—	12134.8	1779.77 (J)	2456.67	—	—	—	—
MD54-19-167189	54-02002	40–40	—	893.956	—	2263.43	690.123	12,686.9	791.198	—	1284.95	4449.42	10112.3	12,679.6	—	—	23,092	—
MD54-19-167190	54-02002	60–60	—	95.781 (J)	—	2514.92	36.3465 (J)	14,150.8	687.998	—	1581.48	3680.89	6471.89	4358.6	—	—	22,630.2	—
MD54-19-167191	54-02002	120–120	—	670.467	—	2200.56	644.115	14,150.8	825.597	—	1581.48	4449.42	12134.8	9905.91	—	—	26,324.9	—
MD54-19-167192	54-02002	180–180	—	734.321	—	2389.17	690.123	15,126.7	894.397	—	1779.16	4853.92	12943.8	10,698.4	—	—	27,710.4	—
MD54-19-167193	54-02002	200–200	—	1245.15	—	1886.19	552.099	10247.1	515.998	—	642.476	3559.54	6876.38	16,245.7	—	—	12931.5	—
MD54-19-167219	54-02016	31–31	—	—	—	3520.89	—	16,102.6	14792 (J)	—	4151.38	10112.3	14,157.3	16,245.7	—	—	17,549.9	—
MD54-19-167220	54-02020	20–20	—	24.9031 (J)	—	176.044	—	2098.22	756.798	—	113.669	606.74	444.942	2337.79	—	—	3048.14	—
MD54-19-167221	54-02020	40–40	—	76.6248	—	289.216	32.2058 (J)	3464.51	1204	—	168.032	1011.23	1051.68	3724.62	—	—	5542.08	—
MD54-19-167222	54-02020	60–60	—	127.708	—	364.663	46.0082	4196.44	1444.8	—	187.801	1253.93	1375.28	4754.84	—	—	6465.76	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12800	12000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167223	54-02020	80–80	—	188.369	—	477.835	78.214	4879.59	1788.79	—	256.99	1496.62	1779.77	5943.55	—	—	7389.44	—
MD54-19-167224	54-02020	95–95	—	239.452	—	540.708	92.0164	5367.54	1960.79	—	276.759	1658.42	2022.47	7132.26	—	—	7851.28	—
MD54-19-167225	54-02020	120–120	—	319.27	—	691.603	124.222	6831.42	2442.39	—	439.849	1941.57	2467.41	9509.67	—	—	8313.12	—
MD54-19-167226	54-02020	140–140	—	446.978	—	880.222	151.827	7807.34	2648.79	—	543.634	2103.36	2507.86	12,283.3	—	—	7851.28	—
MD54-19-167227	54-02020	160–160	—	574.686	—	1005.97	165.63	7807.34	2717.59	—	543.634	2143.81	2346.06	13,868.3	—	—	6927.6	—
MD54-19-167228	54-02020	180–180	—	574.686	—	1005.97	156.428	7807.34	2648.79	—	593.055	2062.91	1860.67	16,245.7	—	—	6003.92	—
MD54-19-167229	54-02020	200–200	—	734.321	—	1068.84	138.025	7319.38	2442.39	—	593.055	1779.77	1294.38	17,038.2	—	—	4479.85	—
MD54-19-167194	54-02021	20–20	—	—	—	17.6044 (J)	—	73.1938	34.0559 (J)	—	54.3634 (J)	210.336	145.618	554.731	—	—	37.409 (J)	—
MD54-19-167195	54-02021	140–140	—	—	—	188.619 (J)	—	585.55	261.439 (J)	—	400.312 (J)	2022.47	3761.79	5547.31	—	—	364.853 (J)	—
MD54-19-167196	54-02021	160–160	—	—	—	49.0409 (J)	—	190.304	89.4397 (J)	—	103.785 (J)	606.74	1739.32	1347.2	—	—	152.407 (J)	—
MD54-19-167197	54-02021	180–180	—	—	—	213.768 (J)	—	634.346	309.599 (J)	—	434.907 (J)	2386.51	3721.34	6736.02	—	—	309.433 (J)	—
MD54-19-167198	54-02021	198–198	—	—	—	364.663 (J)	—	878.325 (J)	412.799 (J)	—	691.897 (J)	3276.39	2993.25	10,698.4	—	—	337.143 (J)	—
MD54-19-167230	54-02022	40–40	—	—	—	75.4476 (J)	—	458.681	282.079	—	123.553 (J)	1537.07	2265.16	1743.44	—	—	272.486 (J)	—
MD54-19-167231	54-02022	60–60	—	—	—	—	—	878.325	481.599 (J)	—	276.759 (J)	3155.05	5662.9	3922.74	—	—	461.84 (J)	—
MD54-19-167232	54-02022	80–80	—	—	—	—	—	975.917	515.998 (J)	—	331.122 (J)	3316.84	7280.88	4754.84	—	—	508.024 (J)	—
MD54-19-167233	54-02022	120–120	—	—	—	—	—	—	447.199 (J)	—	360.775 (J)	4044.93	9707.83	7132.26	—	—	738.944 (J)	—
MD54-19-167234	54-02022	140–140	—	—	—	—	—	975.917	343.999 (J)	—	494.212 (J)	3478.64	5662.9	7528.49	—	—	554.208 (J)	—
MD54-19-167235	54-02022	160–160	—	—	—	—	—	1171.1 (J)	481.599 (J)	—	741.319 (J)	4449.42	5662.9	11,094.6	—	—	508.024 (J)	—
MD54-19-167236	54-02022	180–180	—	—	—	314.365 (J)	—	1268.69	687.998 (J)	—	988.425 (J)	5258.41	4449.42	15,057	—	—	554.208 (J)	—
MD54-19-167237	54-02022	200–200	—	—	—	282.929 (J)	—	829.53 (J)	550.398 (J)	—	741.319 (J)	3721.34	1982.02	13,472	—	—	281.722 (J)	—
MD54-19-167133	54-02023	20–20	—	—	—	32.694 (J)	—	536.754	233.919	—	79.074	182.022	—	990.591	—	—	217.065	—
MD54-19-167134	54-02023	40–40	—	7.34321 (J)	—	58.4719	—	878.325	343.999	—	98.8425	307.415	44.4942	1584.95	—	—	406.419	—
MD54-19-167135	54-02023	60–60	17.0927 (J)	35.1197	—	75.4476	—	409.885	189.199	—	69.1897	145.618	21.4381 (J)	1228.33	—	—	120.078	—
MD54-19-167136	54-02023	80–80	—	35.1197	—	94.3095	—	1219.9	481.599	—	123.553	444.942	117.303	2377.42	—	—	554.208	—
MD54-19-167137	54-02023	100–100	—	57.4686	—	138.321	—	1415.08	550.398	—	123.553	485.392	149.662	2971.77	—	—	600.392	—
MD54-19-167138	54-02023	159–159	—	153.25	—	396.1	—	2195.81	997.597	—	296.527	768.537	169.887	5943.55	—	—	646.576	—
MD54-19-167139	54-02023	200–200	—	213.911	—	440.111	—	2195.81	997.597	—	370.659	728.088	153.707	7132.26	—	—	508.024	—
MD54-19-167272	54-02024	20–20	—	—	—	94.3095	—	585.55	22.0159 (J)	—	59.3055 (J)	182.022	48.5392	871.72	—	—	508.024	—
MD54-19-167273	54-02024	40–40	—	—	—	113.171	—	780.734	21.6719 (J)	—	74.1319 (J)	242.696	68.7638 (J)	1109.46	—	—	738.944	—
MD54-19-167274	54-02024	60–60	—	19.4755 (J)	—	150.895	12.8823 (J)	1073.51	37.8399 (J)	—	88.9582	311.46	93.0334	1584.95	—	—	923.68	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12800	12000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167275	54-02024	80–80	—	47.8905 (J)	—	213.768	20.7037 (J)	1366.28	68.7998	—	118.611	444.942	186.067	2218.92	—	—	1200.78	—
MD54-19-167276	54-02024	100–100	—	76.6248	—	276.641	27.6049 (J)	1659.06	75.6798	—	138.379	485.392	271.01	2734.03	—	—	1339.34	—
MD54-19-167277	54-02024	140–140	—	175.598	—	477.835	50.609 (J)	2537.38	110.08	—	217.453	728.088	444.942	5151.07	—	—	1524.07	—
MD54-19-167278	54-02024	160–160	—	249.031	—	540.708	69.0123	2976.55	137.6	—	256.99	849.435	687.638	5943.55	—	—	1754.99	—
MD54-19-167279	54-02024	180–180	—	319.27	—	691.603	78.214	3318.12	151.36	—	301.47	970.783	768.537	7132.26	—	—	1754.99	—
MD54-19-167280	54-02024	200–200	—	351.197	—	754.476	73.6132 (J)	3610.89	154.8	—	326.18	970.783	728.088	7924.73	—	—	1616.44	—
MD54-19-167203	54-02025	190–190	—	702.394	—	1634.7	326.658	8295.3	378.399	—	494.212	2467.41	3721.34	15453.2	—	—	8313.12	—
MD54-19-167199	54-02025	20–20	—	—	—	754.476	—	3074.14	130.72	—	202.627	768.537	485.392	1862.31	—	—	4618.4	—
MD54-19-167200	54-02025	60–60	—	—	—	27.6641 (J)	—	126.869	—	—	5.93055 (J)	35.9999 (J)	48.5392	118.871	—	—	203.21	—
MD54-19-167201	54-02025	100–100	—	383.124	—	1005.97	262.247	9271.21	2992.79 (J)	—	474.444	2871.9	4044.93	9509.67	—	—	15,702.6	—
MD54-19-167202	54-02025	160–160	—	766.248	—	1508.95	363.465	8295.3	378.399	—	434.907	2588.76	4449.42	12283.3	—	—	11,084.2	—
MD54-19-167281	54-02026	20–20	—	—	—	—	—	58.555 (J)	—	—	—	—	—	122.833	—	—	18.4736 (J)	—
MD54-19-167282	54-02026	60–60	—	—	—	20.7481 (J)	—	126.869	—	—	23.228 (J)	28.3145 (J)	—	293.215	—	—	25.4012 (J)	—
MD54-19-167283	54-02026	100–100	—	—	—	36.4663 (J)	—	156.147	—	—	31.6296 (J)	31.955 (J)	—	396.236	—	—	29.5577 (J)	—
MD54-19-167284	54-02026	160–160	—	—	—	106.884	—	365.969	13.072 (J)	—	79.074	76.8537	—	1109.46	—	—	44.3366 (J)	—
MD54-19-167285	54-02026	200–200	—	—	—	125.746	—	390.367	15.824 (J)	—	93.9004	84.9435	—	1228.33	—	—	50.8024	—
MD54-19-167286	54-02026	215–215	—	—	—	125.746	—	331.812	17.1999 (J)	—	103.785	72.8088	—	1307.58	—	—	36.0235 (J)	—
MD54-19-167140	54-02027	20–20	—	—	—	28.9216 (J)	—	414.765	12.04 (J)	—	33.6064 (J)	101.123	16.1797 (J)	633.978	—	—	254.012	—
MD54-19-167141	54-02027	60–60	—	21.7104 (J)	—	81.7349	5.98107 (J)	1024.71	37.8399	—	84.0161	258.876	88.9885	1584.95	—	—	692.76	—
MD54-19-167142	54-02027	100–100	—	60.6613	—	163.47	16.1029 (J)	1463.88	58.4798	—	118.611	364.044	149.662	2377.42	—	—	877.496	—
MD54-19-167143	54-02027	160–160	—	162.828	—	345.802	26.2247 (J)	1951.83	85.9997	—	197.685	444.942	238.651	4358.6	—	—	785.128	—
MD54-19-167144	54-02027	200–200	—	169.213	—	352.089	21.6239 (J)	1610.26	79.1198	—	197.685	359.999	137.528	4358.6	—	—	457.221	—
MD54-19-167145	54-02027	220–220	—	95.781	—	220.056	9.20164 (J)	780.734	44.7199	—	128.495	169.887	60.674	2615.16	—	—	175.499	—
MD54-19-167146	54-02027	250–250	—	143.671	—	433.824	10.5819 (J)	1268.69	79.1198	—	256.99	275.055	44.4942	5151.07	—	—	221.683	—
MD54-19-167147	54-02028	20–20	—	—	—	13.8321 (J)	—	78.0734	—	—	12.8495 (J)	23.0561 (J)	—	146.607	—	—	28.1722 (J)	—
MD54-19-167148	54-02028	60–60	—	—	—	17.6044 (J)	—	121.99	—	—	18.7801 (J)	30.337 (J)	—	277.366	—	—	50.8024	—
MD54-19-167149	54-02028	100–100	—	—	—	36.4663 (J)	—	190.304	7.22398 (J)	—	30.6412 (J)	48.5392	—	475.484	—	—	55.4208	—
MD54-19-167150	54-02028	160–160	—	—	—	100.597	—	361.089	17.8879 (J)	—	84.0161	97.0783	13.3483 (J)	1109.46	—	—	69.276	—
MD54-19-167151	54-02028	200–200	—	—	—	125.746	—	380.608	20.9839 (J)	—	93.9004	97.0783	9.70783 (J)	1347.2	—	—	50.8024	—
MD54-19-167152	54-02028	220–220	—	—	—	125.746	—	361.089	24.4239 (J)	—	98.8425	97.0783	—	1426.45	—	—	39.7182 (J)	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12800	12000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167153	54-02028	250–250	—	—	—	106.884	—	239.1	12.04 (J)	—	98.8425	64.7189	—	1228.33	—	—	18.9354 (J)	—
MD54-19-167154	54-02031	20–20	—	—	6.69523 (J)	26.4067 (J)	—	287.896	189.199 (J)	—	64.2476	327.639 (J+)	129.438	673.602	—	—	64.6576	—
MD54-19-167155	54-02031	60–60	—	—	—	75.4476	—	414.765	34.0559	—	84.0161	525.841	647.189	1347.2	—	—	133.934	—
MD54-19-167156	54-02031	100–100	—	15.0057 (J)	—	119.459	7.36132 (J)	444.042	61.9198	—	118.611	647.189	728.088	1981.18	—	—	157.026	—
MD54-19-167157	54-02031	160–160	—	51.0832	—	326.94	7.8214 (J)	780.734	178.879	—	316.296	1213.48	889.885	5547.31	—	—	189.354	—
MD54-19-167158	54-02031	200–200	—	70.2394	—	471.548	9.20164 (J)	878.325	254.559	—	410.196	1375.28	728.088	7528.49	—	13.472 (J)	189.354	—
MD54-19-167159	54-02031	220–220	—	57.4686	—	440.111	7.36132 (J)	829.53	237.359	—	420.081	1294.38	566.29	7528.49	—	9.50968 (J)	152.407	—
MD54-19-167160	54-02031	260–260	—	54.2759	—	414.962	7.36132 (J)	683.142	220.159	—	380.544	1051.68	376.179	6736.02	—	—	115.46	—
MD54-19-167238	54-02034	20–20	—	—	—	—	—	63.4346 (J)	19.9519 (J)	—	42.008 (J)	173.932	—	396.236	—	—	—	—
MD54-19-167239	54-02034	60–60	—	—	—	11.9459 (J)	—	102.471	34.3999 (J)	—	79.074 (J)	347.864	198.202	871.72	—	—	41.5656 (J)	—
MD54-19-167240	54-02034	100–100	—	—	—	—	—	—	72.2398 (J)	—	118.611 (J)	525.841	319.549	1347.2	—	—	55.4208 (J)	—
MD54-19-167241	54-02034	160–160	—	—	—	—	—	107.351 (J)	130.72 (J)	—	187.801 (J)	525.841	—	2298.17	—	—	—	—
MD54-19-167242	54-02034	200–200	—	—	—	69.1603 (J)	—	73.1938 (J)	175.439	—	261.933	404.493	—	3011.4	—	—	—	—
MD54-19-167243	54-02034	220–220	—	—	—	57.8432 (J)	—	53.6754 (J)	151.36 (J)	—	242.164	299.325	—	3011.4	—	—	—	—
MD54-19-167244	54-02034	260–260	—	—	—	40.2387 (J)	—	22.4461 (J)	82.5598	—	192.743	88.9885	—	1941.56	—	—	—	—
MD54-19-167245	54-02034	300–300	—	—	—	11.9459 (J)	—	—	14.104 (J)	—	64.2476	—	—	515.107	—	—	—	—
MD54-19-167293	54-02089	13–13	—	—	—	2452.05	—	10,735.1	1238.4	—	3113.54	29,123.5	11,325.8	11,490.9	—	—	46,184	—
MD54-19-167294	54-02089	31–31	—	—	—	5721.44 (J)	—	14,638.8	3027.19 (J)	—	4497.33 (J)	56629	44,494.2	28529	—	—	87,749.6	—
MD54-19-167295	54-02089	46–46	—	—	—	7544.76 (J)	—	20,006.3	7567.98	—	7907.4	80,898.6	88,988.5	32491.4	—	—	184,736	—
MD54-19-167296	54-02089	86–86	—	1340.93 (J)	—	5281.33	—	40012.6	85999.7 (J)	—	8895.82	60674	72,808.8	63,397.8	—	—	290,959	—
MD54-19-167301	54-24238	44–44	—	862.029 (J)	—	7544.76	—	24,885.9	7223.98	—	7907.4	68,763.8	13,3483	34,472.6	—	—	180,118	—
MD54-19-167302	54-24238	64–64	—	1277.08 (J)	—	6287.3	—	35133	4815.99	—	9390.04	44,494.2	16,1797	34,868.8	—	—	203,210	—
MD54-19-167303	54-24238	84–84	—	1277.08 (J)	—	4966.97	—	53675.4	68799.8 (J)	—	10378.5	44,494.2	17,7977	63,397.8	—	—	258,630	—
MD54-19-167297	54-24239	25–25	—	—	—	452.686	—	3757.28	227.039	—	494.212	2871.9	4004.48	3962.36	—	63.3978 (J)	3279.06	—
MD54-19-167298	54-24239	50–50	—	—	—	496.697	—	4586.81	295.839	—	593.055	3519.09	5258.41	5547.31	—	71.3226 (J)	3879.45	—
MD54-19-167299	54-24239	75–75	—	57.4686 (J)	—	471.548	—	5855.5	343.999	—	593.055	4044.93	6876.38	7132.26	—	59.4355 (J)	4618.4	—
MD54-19-167300	54-24239	99.5–99.5	—	130.901	—	565.857	—	6831.42	378.399	—	642.476	4853.92	6876.38	8717.2	—	75.2849 (J)	5080.24	—
MD54-19-167287	54-24240	28–28	—	—	—	2703.54	—	24,397.9	20639.9 (J)	—	12849.5	38,022.3	16,179.7	12,283.3	162.457 (J+)	—	429.511	—
MD54-19-167288	54-24240	53–53	—	542.759	—	3520.89	552.099	44,404.2	24423.9 (J)	—	18780.1	33,572.9	31,550.5	7528.49	—	—	877.496	900.361 (J)
MD54-19-167289	54-24240	78–78	2184.07 (J)	670.467 (J)	—	1571.83 (J)	289.852 (J)	24,885.9	6879.98	—	3706.59	14,966.2	25,887.6	7924.73	—	—	969.864 (J)	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12800	12000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167290	54-24240	103–103	—	—	—	1005.97 (J)	—	13,662.8	4127.99	—	1235.53 (J)	10516.8	23,056.1	11,490.9	—	—	1246.97 (J)	—
MD54-19-167291	54-24240	128–128	—	—	—	628.73 (J)	—	7319.38	2063.99	—	1037.85 (J)	8494.35	16,988.7	16,245.7	—	—	1477.89 (J)	—
MD54-19-167292	54-24240	153–153	—	296.921 (J)	—	754.476 (J)	—	6343.46	1651.19	—	1284.95 (J)	8494.35	11730.3	18,623.1	—	—	1385.52 (J)	—
MD54-19-167161	54-24241	73–73	—	172.406 (J)	—	2577.79	110.42 (J)	19,518.3	1995.19	—	2718.17	12,134.8	72,808.8	10,302.1	—	158.495 (J)	20321	3961.59
MD54-19-167162	54-24241	93–93	—	201.14 (J)	—	1760.44	59.8107 (J)	15,126.7	1376	—	2569.9	9707.83	60674	11,490.9	—	170.382 (J)	18,011.8	14765.9
MD54-19-167163	54-24241	113–113	—	181.984	—	1068.84	35.8864 (J)	8295.3	756.798	—	1235.53	5662.9	16,988.7	12,283.3	—	95.0967	10,160.5	1836.74
MD54-19-167164	54-24241	133–133	—	351.197	—	1383.21	64.4115 (J)	8295.3	722.398	—	1087.27	5662.9	6876.38	19,019.3	24.5667 (J)	91.1344 (J)	7851.28	720.289
MD54-19-167165	54-24241	153–153	—	415.051	—	1634.7	50.609 (J)	7807.34	687.998	—	988.425	4853.92	6876.38	21793	—	91.1344	6465.76	468.188
MD54-19-167166	54-24241	173–173	—	446.978	—	1886.19	55.2099 (J)	8295.3	722.398	—	1037.85	5258.41	6876.38	24,,566.7	—	79.2473 (J)	6927.6	612.245
MD54-19-167167	54-24241	193–193	—	252.223	—	2011.94	—	8295.3	687.998	—	1037.85	5258.41	5662.9	24,962.9	—	75.2849 (J)	6927.6	864.346
MD54-19-167204	54-24242	25–25	—	—	—	150.895 (J)	—	1463.88	103.2	—	177.916	1092.13	1496.62	1267.96	—	—	1385.52	—
MD54-19-167205	54-24242	50–50	—	309.692	—	628.73	285.251	8295.3	550.398	—	741.319	5662.9	10516.8	8717.2	—	71.3226 (J)	7851.28	900.361
MD54-19-167206	54-24242	75–75	—	172.406	—	616.155	50.609 (J)	5855.5	412.799	—	691.897	4449.42	8089.86	5943.55	—	51.5107 (J)	5542.08	—
MD54-19-167207	54-24242	100–100	—	83.0102 (J)	—	540.708	64.4115 (J)	4342.83	337.119	—	494.212	3114.6	5662.9	3685	—	—	4433.66	—
MD54-19-167208	54-24242	110.5–110.5	—	319.27	—	628.73	271.449	9271.21	584.798	—	691.897	6067.4	10516.8	9113.44	—	103.021 (J)	8774.96	612.245 (J)
MD54-19-167209	54-24243	25–25	—	—	—	1257.46	—	7807.34	412.799	—	1383.79	6067.4	3357.29	3962.36	—	39.6236 (J)	16,164.4	—
MD54-19-167210	54-24243	50–50	—	191.562 (J)	—	2577.79	—	19,518.3	1135.2	—	3854.86	12,943.8	14561.8	11,490.9	—	—	40,641.9	—
MD54-19-167211	54-24243	75–75	—	194.755 (J)	—	1508.95	—	12,686.9	963.197	—	2767.59	7685.37	14561.8	8320.96	—	—	28,172.2	—
MD54-19-167212	54-24243	100–100	—	510.832	—	2452.05	87.4156 (J)	23,422	1788.79	—	5436.34	11325.8	33572.9	17434.4	—	95.0967 (J)	50,802.4	—
MD54-19-167213	54-24243	125–125	—	510.832	—	2514.92	105.819 (J)	21,470.2	1444.8	—	5436.34	9707.83	17797.7	21,000.5	—	87.172 (J)	41,565.6	—
MD54-19-167304	54-24399	566.3–566.3	—	—	—	13.8321 (J)	—	82.953	7.22398 (J)	—	32.618 (J)	80.8986	137.528	237.742	—	—	64.6576	—
MD54-19-167305	54-24399	587.3–587.3	—	—	—	10.6884 (J)	—	73.1938	5.15998 (J)	—	28.1701 (J)	68.7638	137.528	190.193	—	—	46.184	—
MD54-19-167168	54-27641	32–32	—	—	—	1005.97 (J)	—	4733.2	6191.98	—	1976.85 (J)	25,887.6	6471.89	4754.84	—	—	—	—
MD54-19-167169	54-27641	82–82	—	—	—	546.995 (J)	—	4781.99	6879.98	—	939.003 (J)	9707.83	19011.2	6339.78	—	—	646.576 (J)	—
MD54-19-167170	54-27641	115–115	—	—	—	389.813 (J)	—	4050.06	3783.99	—	543.634 (J)	7280.88	18,606.7	8320.96	—	—	877.496 (J)	—
MD54-19-167171	54-27641	182–182	—	172.406 (J)	—	691.603 (J)	—	3074.14	1032	—	1235.53	8494.35	13,348.3	21793	—	—	1200.78	—
MD54-19-167172	54-27641	232–232	—	—	—	880.222 (J)	—	2391	1272.8	—	1383.79	8089.86	3680.89	25,359.1	—	—	508.024 (J)	—
MD54-19-167173	54-27641	271–271	—	—	—	628.73 (J)	—	1268.69 (J)	997.597	—	1284.95 (J)	4449.42	970.783 (J)	22,189.2	—	—	—	—
MD54-19-167174	54-27641	332.5–332.5	—	—	—	188.619 (J)	—	170.785	223.599	—	370.659	444.942	315.505	4754.84	—	—	—	—
MD54-19-167175	54-27642	30–30	—	—	—	11,945.9	—	53,675.4	12728 (J)	—	4398.49	10,516.8	21842.6	19,811.8	—	—	50,802.4	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]
Groundwater Tier I SL[a]			14,100	1135	543	5650	12800	12000	79,300,000	7425	2,777,000	5750	240	7490	11,690	38,300	580	0.900
Industrial VISL[b]			5,079,686	588	124	765	8193	199	na[c]	417	16,386	2868	176	32772	na	9832	459	918
MD54-19-167176	54-27642	75–75	—	271.379	—	5092.71	—	37,572.8	11696 (J)	—	4695.02	14,561.8	9303.34	30,906.4	—	—	64,657.6	—
MD54-19-167178	54-27642	175–175	—	2202.96	—	3835.25	966.173 (J)	26,349.8	1204 (J)	—	2125.11 (J)	10,516.8	20,224.7	47548.4	—	—	39,256.4	—
MD54-19-167179	54-27642	235–235	—	1755.98	—	3395.14	377.267 (J)	20,006.3	997.597 (J)	—	2125.11 (J)	6876.38	9303.34	43586	—	—	21,706.5	—
MD54-19-167180	54-27642	275–275	—	542.759 (J)	—	4589.73	—	42,452.4	13416 (J)	—	2965.27	18,202.2	2224.71	51510.7	—	—	87,749.6	—
MD54-19-167181	54-27642	338–338	—	670.467	—	4401.11	—	37,084.9	11352 (J)	—	4003.12	12,943.8	24269.6	35265	—	—	69276	—
MD54-19-167182	54-27643	30–30	—	22.3489 (J)	—	2389.17	43.2477 (J)	7319.38	319.919	—	464.56	1537.07	2791	2773.66	—	—	13,393.4	—
MD54-19-167183	54-27643	74–74	—	293.728	—	2137.68	368.066	9759.17	481.599	—	593.055	2710.1	5662.9	5547.31	—	—	19,859.1	—
MD54-19-167184	54-27643	117–117	—	574.686	—	1634.7	506.09	9759.17	515.998	—	543.634	3276.39	6876.38	8717.2	—	30.9064 (J)	20,782.8	—
MD54-19-167185	54-27643	167–167	—	1085.52	—	1949.06	460.082	11223	550.398	—	593.055	3680.89	6471.89	17434.4	—	—	15,240.7	—
MD54-19-167186	54-27643	235–235	—	1021.66	—	1508.95	216.239	7319.38	343.999	—	494.212	2062.91	2143.81	17434.4	—	—	5542.08	—
MD54-19-167187	54-27643	275–275	—	862.029	—	1320.33	96.6173	5367.54	295.839	—	543.634	1415.73	768.537	18226.9	—	26.9441 (J)	2678.67	—
MD54-19-167214	54-610786	25–25	—	22.0296 (J)	—	2200.56	82.8148	6831.42	295.839	—	—	1537.07	2022.47	1822.69	—	—	11,084.2	—
MD54-19-167215	54-610786	50–50	—	172.406	—	3269.4	460.082	11223	550.398	18.0268 (J)	691.897	2426.96	5258.41	3764.25	—	22.9817 (J)	20,782.8	—
MD54-19-167216	54-610786	75–75	—	312.885	—	2389.17	736.132	10735.1	550.398	24.6367 (J)	691.897	2710.1	7280.88	4754.84	—	—	22,168.3	—
MD54-19-167217	54-610786	100–100	—	383.124	—	1760.44	690.123	9759.17	515.998	—	691.897	2871.9	7280.88	5943.55	—	—	20,782.8	—
MD54-19-167218	54-610786	118.5–118.5	—	606.613	—	1823.32	736.132	10735.1	550.398	—	691.897	3438.19	8089.86	8320.96	—	—	22,630.2	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167112	54-01015	45–45	—	—	—	—	76.3722 (J)	—	447.361	—	—	444.215	4907.38	—	1825.97	78.6088	—	—	—
MD54-19-167113	54-01015	187–187	—	—	—	—	190.93	—	1287.86	—	—	2450.84	15267.4	—	5263.08	387.429	—	—	—
MD54-19-167114	54-01015	350–350	—	—	—	—	—	—	230.459	—	—	919.066	926.95	—	590.754	174.062	—	—	—
MD54-19-167115	54-01015	385–385	—	—	—	—	—	—	311.797	—	—	375.285	654.317	—	386.675	44.3578 (J)	—	—	—
MD54-19-167116	54-01015	435–435	—	—	—	—	22.5645 (J)	—	216.902	—	—	275.72	463.475	—	284.636	32.5665 (J)	—	—	—
MD54-19-167117	54-01015	485–485	—	—	—	—	—	—	277.906	—	—	336.991	599.791	—	359.823	44.9193 (J)	—	—	—
MD54-19-167118	54-01015	525–525	—	—	—	—	—	—	298.241	—	—	390.603	654.317	—	418.898	46.0423 (J)	—	—	—
MD54-19-167119	54-01016	30.8–30.8	—	—	—	—	—	—	**3117.97**	—	—	**4518.74**	**14176.9**	—	**7518.68**	**460.423**	—	—	—
MD54-19-167120	54-01016	162.2–162.2	12.151 (J)	56.3609	—	—	3818.61	—	14912	—	354.012	34465	92695	—	59075.4	3930.44	14.8165 (J)	—	—
MD54-19-167121	54-01016	274.7–274.7	—	—	—	—	347.146	—	1287.86	—	13.9345 (J)	8424.77	10360	—	8592.78	1291.43	—	—	—
MD54-19-167122	54-01016	336.3–336.3	—	—	—	—	—	—	210.124	—	—	283.379	452.569	—	268.524	33.6895 (J)	—	—	—
MD54-19-167125	54-01016	517.6–517.6	—	—	—	—	—	—	22.3681 (J)	—	—	—	—	—	31.1488 (J)	—	—	—	—
MD54-19-167127	54-02001	40–40	—	—	—	—	4512.9 (J)	—	18301.1	—	—	19147.2	234464	—	118151	2021.37 (J)	—	—	—
MD54-19-167128	54-02001	80–80	—	—	—	—	1319.16 (J)	—	29824.1	—	—	46719.2	343517	—	118151	1852.92 (J)	—	—	—
MD54-19-167129	54-02001	100–100	—	—	—	—	—	—	7456.02	—	—	22976.6	196295	—	155744	673.79 (J)	—	—	—
MD54-19-167130	54-02001	120–120	—	—	—	—	2291.17 (J)	—	23045.9	—	—	26806.1	212653	—	91298.3	1796.77	—	—	—
MD54-19-167131	54-02001	140–140	—	—	—	—	—	—	13556.4	—	—	27572	239916	—	316859	1010.68 (J)	—	—	—
MD54-19-167132	54-02001	180–180	—	—	—	—	—	—	10845.1	—	—	33699.1	294443	—	263154	1010.68 (J)	—	—	—
MD54-19-167189	54-02002	40–40	186.604 (J)	112.722 (J)	—	—	14580.1	—	22368.1	1414.78	828.54	153178	272632	447.117	112780	4884.98	—	781.061	69.4276 (J)
MD54-19-167190	54-02002	60–60	—	—	—	—	187.459 (J)	—	25079.3	—	—	214449	256274	507.096	123521	2695.16	—	—	—
MD54-19-167191	54-02002	120–120	256.038	73.9737 (J)	—	—	10761.5	—	24401.5	6189.65	602.574	183813	278085	545.264	112780	3986.59	—	607.492	—
MD54-19-167192	54-02002	180–180	251.699	81.0188 (J)	—	—	12150.1	—	25757.2	5894.91	451.931	199131	305348	599.791	123521	4323.49	—	650.884	—
MD54-19-167193	54-02002	200–200	52.0756 (J)	176.128	—	—	23258.8	—	14912	—	1506.44	84247.7	207201	136.316 (J)	96668.8	6176.41	—	781.061	564.099
MD54-19-167219	54-02016	31–31	—	—	—	—	—	—	24401.5	—	—	398262	763370	—	220190	19090.7	—	—	—
MD54-19-167220	54-02020	20–20	—	—	—	—	30.896 (J)	—	2101.24	—	—	11488.3	36532.7	—	11278	898.387	—	—	—
MD54-19-167221	54-02020	40–40	—	—	—	—	177.045	—	3592.45	—	—	17615.4	59979.1	—	19333.8	1459.88	—	—	—
MD54-19-167222	54-02020	60–60	—	—	—	—	451.29	—	4270.27	41.2643	—	22210.8	70884.4	—	23630.1	1796.77	14.0501 (J)	16.4891 (J)	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167223	54-02020	80–80	10.4151 (J)	—	—	—	833.151	—	5083.65	44.2118	21.4667 (J)	26806.1	87242.3	—	28463.6	2245.97	11.751 (J)	56.4099	—
MD54-19-167224	54-02020	95–95	19.9623 (J)	—	—	—	1423.3	—	5422.56	—	28.2457 (J)	29869.6	98147.6	—	31685.9	2582.86	11.751 (J)	82.4453	—
MD54-19-167225	54-02020	120–120	35.585 (J)	—	—	—	2777.17	—	6439.29	—	45.1931 (J)	36762.6	119958	—	39741.6	3425.1	20.692 (J)	134.516	—
MD54-19-167226	54-02020	140–140	56.4153 (J)	—	—	—	5901.49	—	6778.2	—	602.574	42123.9	130863	—	46186.2	4323.49	21.7138 (J)	234.318	—
MD54-19-167227	54-02020	160–160	—	—	—	—	7984.36	—	6778.2	—	715.557	44421.5	130863	—	48871.4	4716.53	—	251.675	—
MD54-19-167228	54-02020	180–180	—	—	—	24.0722 (J)	8331.51	83.5158 (J)	6778.2	—	753.218	47485.1	130863	—	49408.5	5109.57	30.6548 (J)	177.908	—
MD54-19-167229	54-02020	200–200	60.7549 (J)	—	—	—	12150.1	—	6507.07	—	1544.1	46719.2	114506	—	47260.3	5221.87	—	216.961	20.8283 (J)
MD54-19-167194	54-02021	20–20	—	—	—	—	—	—	623.595	—	—	995.655	7633.7	—	2524.13	101.068	—	—	—
MD54-19-167195	54-02021	140–140	—	—	—	—	1110.87 (J)	—	4609.18	—	—	5054.86	65431.7	—	23630.1	729.939	—	—	—
MD54-19-167196	54-02021	160–160	—	—	—	—	—	—	1626.77	—	—	2221.08	19629.5	—	7518.68	207.752	—	—	—
MD54-19-167197	54-02021	180–180	—	—	—	—	1596.87	—	5625.91	—	—	5897.34	81789.7	—	27926.5	842.237	—	—	—
MD54-19-167198	54-02021	198–198	—	—	—	—	3193.75	—	8133.84	—	—	8424.77	119958	—	39204.6	1235.28	—	—	—
MD54-19-167230	54-02022	40–40	—	—	—	—	—	—	4948.09	—	—	6127.11	53435.9	—	17722.6	336.895 (J)	—	—	—
MD54-19-167231	54-02022	60–60	—	—	—	—	—	—	7456.02	—	—	7658.88	87242.3	—	30611.8	561.492 (J)	—	—	—
MD54-19-167232	54-02022	80–80	—	—	—	—	—	—	8133.84	—	—	8424.77	98147.6	—	35445.2	729.939 (J)	—	—	—
MD54-19-167233	54-02022	120–120	—	—	—	—	624.863 (J)	—	9489.48	—	—	7275.94	119958	—	45112.1	786.088 (J)	—	—	—
MD54-19-167234	54-02022	140–140	—	—	—	—	1562.16 (J)	—	8133.84	—	—	6127.11	109053	—	40278.7	842.237 (J)	—	—	—
MD54-19-167235	54-02022	160–160	—	—	—	—	3263.18 (J)	—	10167.3	—	—	6892.99	141769	—	49945.5	1235.28 (J)	—	—	—
MD54-19-167236	54-02022	180–180	—	—	—	—	4512.9	—	10845.1	—	—	8424.77	174485	—	59075.4	1628.33	—	—	—
MD54-19-167237	54-02022	200–200	—	—	—	—	3471.46	—	8133.84	—	—	6816.4	136316	—	44575	1403.73	—	—	—
MD54-19-167133	54-02023	20–20	—	—	—	—	—	—	569.369	—	—	3369.91	11450.6	—	3920.46	370.584	—	—	—
MD54-19-167134	54-02023	40–40	—	—	—	—	29.1603 (J)	—	813.384	—	—	5054.86	17993.7	—	5907.54	561.492	—	—	—
MD54-19-167135	54-02023	60–60	—	—	—	—	38.1861 (J)	—	420.249	—	7.53218 (J)	3446.5	9269.5	—	3920.46	415.504	—	—	—
MD54-19-167136	54-02023	80–80	—	—	—	—	118.03 (J)	—	1084.51	—	14.6877 (J)	7429.12	23991.6	—	9129.83	786.088	—	—	—
MD54-19-167137	54-02023	100–100	—	—	—	—	222.174	—	1287.86	—	35.7779	9190.66	28353.8	—	10741	1010.68	—	—	—
MD54-19-167138	54-02023	159–159	—	—	—	—	381.861	—	2033.46	—	48.9592	17615.4	49073.8	—	19333.8	2021.37	—	—	—
MD54-19-167139	54-02023	200–200	—	—	—	—	1006.72	—	2101.24	—	52.7253	19147.2	48528.5	—	21481.9	2245.97	—	—	—
MD54-19-167272	54-02024	20–20	—	—	—	—	—	—	881.166	—	—	5361.22	11995.8	—	4457.5	415.504	—	—	—
MD54-19-167273	54-02024	40–40	—	—	—	—	—	—	1084.51	—	—	6586.64	15267.4	—	5907.54	510.957	—	—	—
MD54-19-167274	54-02024	60–60	—	—	—	—	—	—	1423.42	—	—	8424.77	20174.8	21.8106 (J)	7518.68	673.79	—	—	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167275	54-02024	80–80	—	—	—	—	156.216 (J)	—	1830.11	—	—	11488.3	28353.8	23.9916 (J)	10203.9	1010.68	—	—	—
MD54-19-167276	54-02024	100–100	—	—	—	—	260.36	—	2236.81	—	—	14551.9	34351.7	28.3538 (J)	12889.2	1291.43	—	—	—
MD54-19-167277	54-02024	140–140	—	—	—	—	1319.16	—	3117.97	—	—	22210.8	52345.4	—	20944.9	2189.82	—	—	—
MD54-19-167278	54-02024	160–160	—	—	—	—	2568.88	—	3660.23	—	—	24508.4	59979.1	17.4485 (J)	25241.3	2582.86	—	19.9604 (J)	—
MD54-19-167279	54-02024	180–180	—	—	—	—	3402.03	—	3999.14	—	10.9217 (J)	28337.9	65431.7	—	29000.6	2975.91	—	27.771 (J)	—
MD54-19-167280	54-02024	200–200	—	—	—	—	4512.9	—	4202.48	—	18.4538 (J)	29869.6	70884.4	—	31148.8	3368.95	—	37.3173 (J)	—
MD54-19-167203	54-02025	190–190	—	—	—	—	10761.5	—	12200.8	—	64.0235 (J)	71993.5	174485	70.8844 (J)	75186.8	6176.41	—	203.944	—
MD54-19-167199	54-02025	20–20	—	—	—	—	—	—	5219.22	—	—	21444.9	47983.3	103.6	17722.6	898.387	—	—	—
MD54-19-167200	54-02025	60–60	—	—	—	—	—	—	230.459	—	—	995.655	2344.64	—	859.278	55.0262	—	—	—
MD54-19-167201	54-02025	100–100	19.0944 (J)	—	—	—	1596.87	—	10167.3	383.169	27.8691 (J)	49016.8	141769	430.759	51556.7	3256.65	18.9038 (J)	264.693	—
MD54-19-167202	54-02025	160–160	52.0756 (J)	38.7481 (J)	—	—	9025.8	—	12878.6	35.3694 (J)	941.522	68929.9	179937	212.653	69816.3	5221.87	—	607.492	69.4276 (J)
MD54-19-167281	54-02026	20–20	—	—	—	—	—	—	81.3384 (J)	—	—	696.958	1526.74	—	461.862	95.4536	—	—	—
MD54-19-167282	54-02026	60–60	—	—	—	—	—	—	155.899	—	—	1378.6	2780.85	—	966.688	168.447	—	—	—
MD54-19-167283	54-02026	100–100	—	—	—	—	—	—	196.568	—	—	1838.13	3544.22	—	1235.21	235.826	—	—	—
MD54-19-167284	54-02026	160–160	—	—	—	—	173.573	—	488.031	—	—	4595.33	8178.97	—	3222.29	561.492	—	—	—
MD54-19-167285	54-02026	200–200	—	—	—	—	222.174	—	542.256	—	—	5054.86	8724.23	—	3544.52	617.641	—	—	—
MD54-19-167286	54-02026	215–215	—	—	—	—	239.531	—	501.587	—	—	5208.04	8178.97	—	3437.11	673.79	—	—	—
MD54-19-167140	54-02027	20–20	—	—	—	—	—	—	508.365	—	—	3293.32	8724.23	—	2792.65	331.28	—	—	—
MD54-19-167141	54-02027	60–60	—	—	—	—	69.4293 (J)	—	1287.86	—	—	7658.88	21265.3	13.0863 (J)	6981.63	786.088	—	—	—
MD54-19-167142	54-02027	100–100	—	—	—	—	215.231	—	1762.33	—	8.2854 (J)	11488.3	29989.5	—	10203.9	1179.13	—	—	—
MD54-19-167143	54-02027	160–160	13.8868 (J)	—	—	—	1839.88	—	2372.37	—	169.474	16849.5	39804.3	—	15037.4	1909.07	—	22.1301 (J)	—
MD54-19-167144	54-02027	200–200	12.5849 (J)	—	—	—	1874.59	—	1897.9	—	278.691	15317.8	31080.1	—	12889.2	1796.77	—	14.7534 (J)	—
MD54-19-167145	54-02027	220–220	—	—	—	—	937.295	—	948.948	—	158.176	8424.77	15812.7	—	6981.63	1066.83	—	—	—
MD54-19-167146	54-02027	250–250	—	—	—	—	1041.44	—	1762.33	—	90.3861	16849.5	26172.7	—	12352.1	2077.52	—	—	—
MD54-19-167147	54-02028	20–20	—	—	—	—	—	—	88.1166	—	—	735.253	1690.32	—	590.754	78.6088	—	—	—
MD54-19-167148	54-02028	60–60	—	—	—	—	—	—	135.564	—	—	1148.83	2726.32	—	1074.1	140.373	—	—	—
MD54-19-167149	54-02028	100–100	—	—	—	—	52.0719 (J)	—	210.124	—	—	1914.72	4144.01	—	1718.56	241.441	—	—	—
MD54-19-167150	54-02028	160–160	—	—	—	—	236.059	—	454.14	—	—	4442.15	8724.23	—	3866.75	555.877	—	—	—
MD54-19-167151	54-02028	200–200	—	—	—	—	305.489	—	488.031	—	—	5054.86	9269.5	—	4242.69	617.641	—	—	—
MD54-19-167152	54-02028	220–220	—	—	—	—	305.489	—	488.031	—	—	5514.39	8724.23	—	4296.39	673.79	—	—	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167153	54-02028	250–250	—	—	—	—	34.7146 (J)	—	352.466	—	—	4518.74	6543.17	—	3114.88	561.492	—	—	—
MD54-19-167154	54-02031	20–20	—	—	—	—	—	—	1016.73	—	—	919.066	8724.23	—	3437.11	134.758	—	—	—
MD54-19-167155	54-02031	60–60	—	—	—	—	32.2846 (J)	—	2033.46	—	—	2221.08	15812.7	—	7518.68	258.286	—	—	—
MD54-19-167156	54-02031	100–100	—	—	—	—	180.516	—	2440.15	—	5.64913 (J)	3369.91	22355.8	—	9129.83	381.814	—	—	—
MD54-19-167157	54-02031	160–160	—	—	—	—	833.151	—	5558.13	—	26.3626 (J)	9190.66	59979.1	—	22556	1010.68	—	—	—
MD54-19-167158	54-02031	200–200	—	—	—	—	1249.73	—	6778.2	—	41.427	12254.2	76337	—	29537.7	1347.58	—	—	—
MD54-19-167159	54-02031	220–220	—	28.1804 (J)	—	—	1110.87	—	6778.2	—	41.427	12254.2	70884.4	—	27389.5	1347.58	—	—	—
MD54-19-167160	54-02031	260–260	—	21.4876 (J)	—	—	902.58	—	5490.34	—	35.0246 (J)	11488.3	59979.1	—	23630.1	1235.28	—	—	—
MD54-19-167238	54-02034	20–20	—	—	—	—	—	—	515.143	—	—	344.65	9269.5	—	2524.13	67.379 (J)	—	—	—
MD54-19-167239	54-02034	60–60	—	—	—	—	—	—	813.384	—	—	543.781	16357.9	—	4403.8	112.298	—	—	—
MD54-19-167240	54-02034	100–100	—	—	—	—	—	—	1220.08	—	—	842.477	23991.6	—	6444.58	196.522	—	—	—
MD54-19-167241	54-02034	160–160	—	—	—	—	211.759 (J)	—	1152.29	—	—	1455.19	31625.3	—	7518.68	—	—	—	—
MD54-19-167242	54-02034	200–200	—	—	—	—	204.816 (J)	—	948.948	—	—	1608.37	27808.5	—	6444.58	381.814	—	—	—
MD54-19-167243	54-02034	220–220	—	—	—	—	145.801 (J)	—	745.602	—	—	1531.78	23991.6	—	5370.49	370.584	—	—	—
MD54-19-167244	54-02034	260–260	—	—	—	—	34.3675 (J)	—	237.237	—	—	842.477	7633.7	—	1825.97	280.746	—	—	—
MD54-19-167245	54-02034	300–300	—	—	—	—	—	—	37.9579 (J)	—	—	291.038	1199.58	—	279.265	112.298	—	—	—
MD54-19-167293	54-02089	13–13	—	—	—	—	—	—	41347	—	—	260402	1.47E+06	1363.16	590754	52780.2	—	—	—
MD54-19-167294	54-02089	31–31	—	—	—	—	—	—	37957.9	—	1318.13 (J)	390603	4.20E+06	4580.22 (J)	408157	41550.4	—	—	—
MD54-19-167295	54-02089	46–46	—	—	—	—	—	—	42702.7	—	1280.47 (J)	543781	7.63E+06	7633.7	424269	30320.5	—	—	—
MD54-19-167296	54-02089	86–86	—	739.737 (J)	—	—	—	—	81338.4	—	—	704617	4.58E+06	8178.97	644459	20213.7	510.914 (J)	—	—
MD54-19-167301	54-24238	44–44	—	—	—	—	—	—	42024.9	—	979.183 (J)	582075	7.09E+06	7633.7	343711	26390.1	—	—	—
MD54-19-167302	54-24238	64–64	—	—	—	—	69429.3	—	51514.3	—	677.896 (J)	719935	4.25E+06	4471.17 (J)	370564	14037.3	—	—	—
MD54-19-167303	54-24238	84–84	—	951.09 (J)	—	—	14580.1	—	81338.4	—	—	842477	3.49E+06	—	537049	13475.8	—	—	—
MD54-19-167297	54-24239	25–25	—	—	—	—	—	—	**250793**	—	—	**24508.4**	**87242.3**	—	**64445.8**	**1235.28**	—	—	—
MD54-19-167298	54-24239	50–50	—	—	—	—	—	—	291463	—	—	27572	103600	51.2549 (J)	75186.8	1403.73	—	—	—
MD54-19-167299	54-24239	75–75	—	—	—	—	—	—	298241	—	—	29869.6	119958	50.7096 (J)	85927.8	1572.18	—	—	—
MD54-19-167300	54-24239	99.5–99.5	—	—	—	—	—	—	298241	—	—	32167.3	141769	54.5264 (J)	96668.8	1796.77	—	—	—
MD54-19-167287	54-24240	28–28	—	—	—	—	239.531 (J)	—	54903.4	—	—	107224	872423	—	526308	5109.57	255.457	—	—
MD54-19-167288	54-24240	53–53	—	—	172.756 (J)	—	305.489 (J)	—	46091.8	259.376 (J)	86.6201 (J)	130201	708844	—	418898	4941.13	—	—	134.516 (J)
MD54-19-167289	54-24240	78–78	—	—	—	—	—	—	42702.7	560.016 (J)	—	84247.7	321706	—	204079	2302.12 (J)	—	—	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167290	54-24240	103–103	—	—	—	—	—	—	46769.6	—	—	55909.8	261727	—	150374	2414.41 (J)	—	—	—
MD54-19-167291	54-24240	128–128	—	—	—	—	—	—	42024.9	—	—	38294.4	229011	—	118151	2358.26 (J)	—	—	—
MD54-19-167292	54-24240	153–153	—	—	—	—	—	—	40669.2	—	—	33699.1	234464	—	118151	2639.01	—	—	—
MD54-19-167161	54-24241	73–73	—	—	—	—	—	—	128786	—	—	145519	430759	196.295 (J)	204079	5614.92	—	—	—
MD54-19-167162	54-24241	93–93	—	—	—	—	295.074 (J)	—	108451	—	—	137860	343517	169.032 (J)	171856	4828.83	—	—	—
MD54-19-167163	54-24241	113–113	—	—	—	—	—	—	88116.6	—	—	76588.8	218106	81.7897 (J)	112780	3593.55	—	—	—
MD54-19-167164	54-24241	133–133	—	—	—	—	62.4863 (J)	—	94894.8	—	33.1416 (J)	69695.8	229011	54.5264 (J)	118151	4548.08	—	—	—
MD54-19-167165	54-24241	153–153	20.8302 (J)	38.7481 (J)	—	—	972.01	—	81338.4	—	263.626	65866.4	234464	37.078 (J)	118151	5109.57	—	—	—
MD54-19-167166	54-24241	173–173	—	49.3158 (J)	—	—	1909.3	—	88116.6	—	346.48	75822.9	256274	—	134262	5614.92	—	—	—
MD54-19-167167	54-24241	193–193	—	—	—	—	520.719	—	88116.6	—	71.5557 (J)	76588.8	267180	—	139633	6176.41	—	—	—
MD54-19-167204	54-24242	25–25	—	—	—	—	—	—	176233	—	—	9190.66	31080.1	—	28463.6	494.113	—	—	—
MD54-19-167205	54-24242	50–50	—	—	—	—	729.007	—	433805	120.846 (J)	35.4012 (J)	48251	174485	81.7897 (J)	123521	2358.26	—	—	—
MD54-19-167206	54-24242	75–75	—	—	—	—	312.432 (J)	—	271128	—	—	41358	130863	59.9791 (J)	85927.8	1796.77	—	—	—
MD54-19-167207	54-24242	100–100	—	—	—	—	—	—	549034	—	—	31401.4	103600	70.8844 (J)	80557.3	1347.58	—	—	—
MD54-19-167208	54-24242	110.5–110.5	—	—	—	—	451.29 (J)	—	413470	—	—	48251	185390	76.337 (J)	134262	2358.26	—	—	—
MD54-19-167209	54-24243	25–25	—	—	—	—	—	—	**17623.3**	—	—	**153178**	**414401**	**207.2 (J)**	**128892**	**4660.38**	—	—	—
MD54-19-167210	54-24243	50–50	—	—	—	—	—	—	23045.9	—	—	344650	872423	599.791	247042	7860.88	—	—	—
MD54-19-167211	54-24243	75–75	—	—	—	—	—	—	14234.2	—	—	237425	518001	288.99 (J)	145003	4548.08	—	—	—
MD54-19-167212	54-24243	100–100	—	130.335 (J)	—	—	1596.87	—	27790.6	—	—	421238	708844	490.738	230931	7299.39	—	—	—
MD54-19-167213	54-24243	125–125	—	—	—	—	281.188 (J)	—	28468.4	—	—	390603	545264	425.306 (J)	204079	7299.39	—	—	—
MD54-19-167304	54-24399	566.3–566.3	—	—	—	—	34.3675 (J)	—	1016.73	—	30.8819 (J)	696.958	1908.43	—	1288.92	67.379	—	—	—
MD54-19-167305	54-24399	587.3–587.3	—	—	—	—	26.036 (J)	—	813.384	—	35.0246	574.416	1472.21	—	1020.39	56.1492	—	—	—
MD54-19-167168	54-27641	32–32	—	—	—	—	—	—	**26435**	—	—	**63568.7**	**599791**	—	**392046**	**2302.12 (J)**	—	—	—
MD54-19-167169	54-27641	82–82	—	—	—	—	—	—	27112.8	—	—	39060.3	239916	—	85927.8	1684.47 (J)	—	—	—
MD54-19-167170	54-27641	115–115	—	—	—	—	—	—	24401.5	—	—	29869.6	185390	—	80557.3	1628.33 (J)	—	—	—
MD54-19-167171	54-27641	182–182	—	—	—	—	6942.93	—	27790.6	—	—	22210.8	245369	—	96668.8	2751.31	—	—	—
MD54-19-167172	54-27641	232–232	—	—	—	—	6248.63	—	21690.2	—	—	23742.5	245369	—	107410	2863.61	—	—	—
MD54-19-167173	54-27641	271–271	—	—	—	—	2985.46 (J)	—	12200.8	—	—	17615.4	147221	—	59075.4	2526.71	—	—	—
MD54-19-167174	54-27641	332.5–332.5	—	—	—	—	204.816 (J)	—	2101.24	—	—	5897.34	18539	—	8592.78	786.088	—	—	—
MD54-19-167175	54-27642	30–30	—	—	—	—	—	—	**39991.4**	—	—	**582075**	**654317**	—	**273895**	**6176.41**	**99.6282 (J)**	—	—

Table 5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Ethylbenzene	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			226100	23540000	na	na	665	283140	3630	na	272000	1188000000	141000	168.5	2020	4537000	2274	41109	52110
Industrial VISL[b]			1835	114703	na	65544	98316	na	6554	na	819304	4915825	819304	32.8	328	114703	1043	16386	16386
MD54-19-167176	54-27642	75–75	—	253.624 (J)	—	—	263.831 (J)	—	44736.1	—	—	359967	599791	—	241672	7860.88	—	—	—
MD54-19-167178	54-27642	175–175	234.34 (J)	457.932 (J)	—	—	55543.4	—	37280.1	—	4895.92	183813	441664	—	209449	11229.8	—	1388.55 (J)	650.884 (J)
MD54-19-167179	54-27642	235–235	—	457.932 (J)	—	—	38186.1	—	25757.2	—	2184.33	176154	338064	—	166485	11229.8	—	—	—
MD54-19-167180	54-27642	275–275	—	528.383 (J)	—	—	2950.74	—	51514.3	648.44	169.474 (J)	275720	654317	—	306118	11229.8	—	—	—
MD54-19-167181	54-27642	338–338	—	387.481	149.411 (J)	—	1735.73	—	37957.9	1296.88	—	321673	545264	—	230931	7299.39	120.065 (J)	—	—
MD54-19-167182	54-27643	30–30	—	—	—	—	—	—	12878.6	22.9901 (J)	22.2199 (J)	44421.5	92695	316.253	35982.3	1347.58	—	—	—
MD54-19-167183	54-27643	74–74	52.0756 (J)	31.703 (J)	—	—	624.863	—	17623.3	4421.18	120.515	67398.2	158127	436.212	53704.9	2470.56	—	264.693	—
MD54-19-167184	54-27643	117–117	60.7549 (J)	35.2256 (J)	—	—	2152.31	—	17623.3	1562.15	259.86	75822.9	196295	512.549	69816.3	3874.29	—	477.315	—
MD54-19-167185	54-27643	167–167	86.7927 (J)	112.722 (J)	—	—	11455.8	—	16267.7	—	1431.11	84247.7	229011	229.011	85927.8	6176.41	—	694.276	56.4099 (J)
MD54-19-167186	54-27643	235–235	47.736 (J)	91.5864	60.6981 (J)	—	18398.8	—	9489.48	—	715.557	57441.6	136316	—	64445.8	5614.92	—	264.693	26.4693 (J)
MD54-19-167187	54-27643	275–275	14.3208 (J)	59.8834	41.5548 (J)	—	11455.8	—	6439.29	97.266	26.7392 (J)	46719.2	92695	22.3558 (J)	48871.4	5278.02	—	47.7315 (J)	—
MD54-19-167214	54-610786	25–25	—	—	—	—	—	—	13556.4	—	10.9217 (J)	46719.2	87242.3	310.801	40278.7	898.387	—	—	—
MD54-19-167215	54-610786	50–50	—	—	—	—	381.861	—	25079.3	—	31.2585 (J)	76588.8	152674	545.264	59075.4	1852.92	—	—	—
MD54-19-167216	54-610786	75–75	130.189 (J)	35.2256 (J)	—	—	1527.44	—	23723.7	7368.63	308.819	84247.7	169032	599.791	64445.8	2302.12	—	477.315	—
MD54-19-167217	54-610786	100–100	130.189 (J)	45.7932 (J)	—	—	2638.31	—	19656.8	11200.3	320.118	76588.8	163579	534.359	64445.8	2582.86	—	520.707	—
MD54-19-167218	54-610786	118.5–118.5	134.529 (J)	73.9737 (J)	—	—	4165.76	—	21012.4	6189.65	308.819	91906.6	201748	539.812	75186.8	3705.84	—	650.884	—

Notes: Results are in µg/m³. Data qualifiers are defined in Appendix A. Shading denotes concentrations greater than Tier 1 SLs. Bolding denotes exceedance of VISLs in shallowest sampling ports in boreholes closest to occupied buildings.

[a] Tier I SLs are based on NMED 2019, 700550.

[b] VISLs from NMED (2019, 700550).

[c] na = Not available.

[d] — = Not detected.

Table 5.1-2
Second Round VOC Pore Gas Detected Results at MDA L (in µg/m³)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethanol	Ethylbenzene
Groundwater Tier I SL[a]			14,100	1135	477,900	5650	12,800	12,000	79,300,000	2,777,000	5750	240	7490	11,690	38,300	580	0.900	na[b]	226,100
Industrial VISL[c]			5,079,686	588	114703	765	8193	199	na	16,386	2868	176	32772	na	9832	459	918	na	1835
MD54-20-191636	54-24238	44–44	—[d]	570 (J)	—	3600	—	27,000	58,000 (J)	4500	61,000	93,000	55,000	—	—	200,000	—	—	—
MD54-20-191637	54-24238	64–64	—	1400	—	4300	—	37,000	58,000 (J)	6400	53,000	140,000	63,000	—	—	270,000	—	—	—
MD54-20-191638	54-24238	84–84	—	730 (J)	—	3200	—	30,000	41,000 (J)	5400	36,000	100,000	55,000	—	—	200,000	—	—	—
MD54-20-191642	54-24240	28–28	—	350 (J)	—	3000	310 (J)	19,000	2900	2300	38,000	15,000	4000	—	—	500 (J)	—	—	—
MD54-20-191643	54-24240	53–53	—	480 (J)	—	4100	780 (J)	40,000	9300	3800	36,000	37,000	6700	—	—	790 (J)	1200 (J)	—	—
MD54-20-191644	54-24240	78–78	—	1100	—	1600	300 (J)	27,000	7600	2000	20,000	26,000	11,000	110 (J)	—	1200	680 (J)	—	—
MD54-20-191645	54-24240	103–103	—	450	—	820	150 (J)	10000	4100	1400	13,000	19,000	16,000	—	—	1500	500 (J)	—	—
MD54-20-191646	54-24240	128–128	—	300	—	880	110 (J)	8300	2300	1200	11,000	13,000	22,000	—	—	1500	—	—	—
MD54-20-191647	54-24240	153–153	—	280 (J)	—	820	97 (J)	6800	2000	1400	11,000	6500	25,000	—	—	1500	—	—	—
MD54-20-191654	54-24241	73–73	—	140 (J)	—	1800	—	13,000	7900 (J)	1100	8900	39,000	9100	—	150 (J)	13,000	1600	—	—
MD54-20-191655	54-24241	93–93	—	83 (J)	—	880	—	7800	4100 (J)	840	5300	25,000	6300	—	80 (J)	9000	6800	—	—
MD54-20-191656	54-24241	113–113	—	300	—	1000	—	7800	3800 (J)	790	5300	5700	21,000	—	75 (J)	6500	760	—	—
MD54-20-191657	54-24241	133–133	—	120	—	600	—	7800	3000 (J)	890	5300	16,000	9900	—	67 (J)	9000	940	—	—
MD54-20-191658	54-24241	153–153	—	130	—	480	18 (J)	3800	1800 (J)	430	2600	3000	9100	—	38 (J)	3000	160 (J)	—	—
MD54-20-191659	54-24241	173–173	—	380	—	1100	55 (J)	8300	3800 (J)	890	5700	6900	23,000	—	80 (J)	6900	580	—	—
MD54-20-191660	54-24241	193–193	—	200	—	750	18 (J)	5400	2400 (J)	540	3500	4000	14,000	—	59	4200	540	—	—
MD54-20-191668	54-24399	567–567	52 (J)	12 (J)	18 (J)	11 (J)	—	59 (J)	—	27 (J)	65	77	190	—	—	60 (J)	—	—	—
MD54-20-191669	54-24399	588–588	20 (J)	—	—	11 (J)	—	73	—	29 (J)	80	130	190	—	—	69 (J)	—	—	—
MD54-20-191672	54-27641	32–32	—	—	—	**41 (J)**	**32 (J)**	**220**	**200**	**42 (J)**	**970**	**340**	**200**	—	—	—	—	—	—
MD54-20-191673	54-27641	82–82	—	110	—	210	120 (J)	2000	2300	350	4000	6500	2100	—	—	280	130 (J)	—	—
MD54-20-191674	54-27641	115–115	—	67 (J)	—	160	55 (J)	1600	1400	310	2900	5700	2900	—	—	340	—	—	—
MD54-20-191675	54-27641	182–182	—	30 (J)	—	110	9.2 (J)	470	190	170	1300	1800	3400	—	—	200	—	—	—
MD54-20-191676	54-27641	232–232	—	99 (J)	—	400	38 (J)	1300	700	590	4400	2200	13000	—	—	350	—	—	—
MD54-20-191677	54-27641	271–271	—	24 (J)	—	140	—	230	200	250	890	110	5200	—	—	38 (J)	—	—	—
MD54-20-191678	54-27641	332.5–332.5	—	—	—	50 (J)	—	50 (J)	55	89	140	85	1500	—	—	—	—	—	—
MD54-20-191686	54-27642	30–30	—	—	—	**9400**	—	**47,000**	**13,000 (J)**	**3100**	**11,000**	**17,000**	**22,000**	—	—	**50,000**	—	—	—

Table 5.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethanol	Ethylbenzene
Groundwater Tier I SL[a]			14,100	1135	477,900	5650	12,800	12,000	79,300,000	2,777,000	5750	240	7490	11,690	38,300	580	0.900	na[b]	226,100
Industrial VISL[c]			5,079,686	588	114703	765	8193	199	na	16,386	2868	176	32772	na	9832	459	918	na	1835
MD54-20-191687	54-27642	75–75	—	200 (J)	—	4500	—	43,000	12,000 (J)	4200	20,000	17,000	44,000	—	—	90,000	—	—	—
MD54-20-191688	54-27642	116–116	—	100 (J)	—	2400	—	20,000	7000 (J)	690	9700	11,000	20,000	—	—	36,000	—	—	—
MD54-20-191689	54-27642	175–175	—	1800	—	3000	740	24,000	8300 (J)	1900	10,000	20,000	48,000	—	—	40,000	—	—	230 (J)
MD54-20-191690	54-27642	235–235	88 (J)	19 (J)	—	45 (J)	—	300	120 (J)	29 (J)	100	170	520	—	—	400	—	1200	21 (J)
MD54-20-191691	54-27642	275–275	—	260 (J)	—	3600	—	33,000	11,000 (J)	2900	14,000	1900	48,000	—	—	69,000	—	—	—
MD54-20-191692	54-27642	338–338	—	380 (J)	—	5200	—	40,000	15,000 (J)	4700	15,000	37,000	48,000	—	—	88,000	—	—	—

Table 5.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Methylene Chloride	Propanol[2-]	Styrene	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			23,540,000	na[b]	665	na	11,300	3630	na	272000	1,188,000,000	141,000	168.5	2020	4,537,000	na	2274	41,109	52110
Industrial VISL[c]			1147,03	na	98,316	na	163,861	6554	na	819304	4,915,825	819,304	32.8	328	114,703	na	1043	16,386	16386
MD54-20-191636	54-24238	44–44	—	—	—	—	—	48,000	—	—	360,000	2,800,000	8700	330,000	62,000	—	—	—	—
MD54-20-191637	54-24238	64–64	—	—	42,000	—	—	62,000	—	—	510,000	2,900,000	6000	380,000	31,000	—	—	—	—
MD54-20-191638	54-24238	84–84	—	—	4900 (J)	—	—	50,000	—	—	430,000	2,000,000	4000	320,000	18,000	—	—	—	—
MD54-20-191642	54-24240	28–28	—	—	—	—	—	50,000	—	—	92,000	710,000	—	1,500,000	5200	—	—	—	—
MD54-20-191643	54-24240	53–53	—	—	—	—	—	51,000	—	—	130,000	710,000	—	860,000	5600	—	—	—	—
MD54-20-191644	54-24240	78–78	220 (J)	—	—	—	—	50,000	—	—	84,000	410,000	250 (J)	310,000	2900	—	—	—	—
MD54-20-191645	54-24240	103–103	—	90 (J)	—	—	—	48,000	100 (J)	—	51,000	300,000	160 (J)	180,000	2600	—	—	—	—
MD54-20-191646	54-24240	128–128	—	70 (J)	—	—	—	45,000	—	64 (J)	38,000	280,000	130 (J)	140,000	2800	—	—	43 (J)	78 (J)
MD54-20-191647	54-24240	153–153	—	—	—	—	—	45,000	—	—	38,000	290,000	82 (J)	130,000	3000	—	—	—	—
MD54-20-191654	54-24241	73–73	—	—	900	—	—	67,000	—	—	71,000	290,000	—	110,000	3800	—	—	—	—
MD54-20-191655	54-24241	93–93	—	—	4200	150 (J)	—	50,000	—	—	48,000	170,000	—	75,000	2000	—	—	—	—
MD54-20-191656	54-24241	113–113	—	31 (J)	1100	—	—	54,000	—	120	45,000	170,000	—	86,000	3800	—	—	—	—
MD54-20-191657	54-24241	133–133	—	—	76 (J)	—	—	50,000	—	—	44,000	200,000	—	75,000	2500	—	—	—	—
MD54-20-191658	54-24241	153–153	—	—	420	—	—	26,000	—	56	21,000	82,000	—	40,000	1800	—	—	—	—
MD54-20-191659	54-24241	173–173	—	28 (J)	2000	—	—	58,000	—	220	48,000	180,000	—	97,000	4000	—	28 (J)	—	—
MD54-20-191660	54-24241	193–193	—	16 (J)	300	—	—	36,000	—	40 (J)	29,000	110,000	—	59,000	2600	—	—	—	—
MD54-20-191668	54-24399	567–567	—	—	62 (J)	340	—	750	—	120	520	1400	—	860	60 (J)	—	—	—	—
MD54-20-191669	54-24399	588–588	—	—	66 (J)	20 (J)	—	880	—	68	520	1700	—	1000	62 (J)	—	—	—	—
MD54-20-191672	54-27641	32–32	—	—	—	—	—	**1300**	—	—	**1900**	**20,000**	—	**59,000**	**90 (J)**	—	—	—	—
MD54-20-191673	54-27641	82–82	100 (J)	—	280 (J)	—	—	12,000	—	24 (J)	14,000	98,000	40 (J)	100,000	540	—	—	—	—
MD54-20-191674	54-27641	115–115	—	—	120 (J)	—	—	9500	—	—	11,000	76,000	36 (J)	41,000	530	—	—	—	—
MD54-20-191675	54-27641	182–182	—	8.4 (J)	970	—	—	4300	—	14 (J)	3400	37,000	—	14,000	380	—	—	—	—
MD54-20-191676	54-27641	232–232	—	27 (J)	3200	—	—	14,000	—	68 (J)	13,000	140,000	—	100,000	1500	—	—	—	—
MD54-20-191677	54-27641	271–271	—	—	730	—	—	2900	—	17 (J)	3700	31000	—	12,000	530	—	—	—	—
MD54-20-191678	54-27641	332.5–332.5	—	—	70 (J)	—	—	600	—	—	1500	5100	—	3500	210	—	—	—	—
MD54-20-191686	54-27642	30–30	—	—	—	2700	—	**35,000**	—	—	**410,000**	**650,000**	—	**230,000**	9000	—	—	—	—

Table 5.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Methylene Chloride	Propanol[2-]	Styrene	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Groundwater Tier I SL[a]			23,540,000	na[b]	665	na	11,300	3630	na	272000	1,188,000,000	141,000	168.5	2020	4,537,000	na	2274	41,109	52110
Industrial VISL[c]			1147,03	na	98,316	na	163,861	6554	na	819304	4,915,825	819,304	32.8	328	114,703	na	1043	16,386	16386
MD54-20-191687	54-27642	75–75	—	—	450 (J)	—	—	43,000	—	—	310,000	600,000	1400	240,000	7300	—	—	—	—
MD54-20-191688	54-27642	116–116	—	—	—	—	—	26,000	—	—	66,000	360,000	—	150,000	1500	—	—	—	—
MD54-20-191689	54-27642	175–175	560	280 (J)	42,000	—	—	28,000	—	3500	150,000	400,000	500	170,000	10,000	120 (J)	—	1100	400
MD54-20-191690	54-27642	235–235	—	—	380	50 (J)	37 (J)	280	—	80	2000	5200	—	2000	120	—	—	17 (J)	33 (J)
MD54-20-191691	54-27642	275–275	—	—	—	—	—	37,000	—	—	220,000	500,000	1300	210,000	8400	—	—	—	—
MD54-20-191692	54-27642	338–338	—	—	1300 (J)	—	—	42,000	—	—	400,000	710,000	1400	240,000	7300	—	—	—	—

Notes: Results are in µg/m^3. Data qualifiers are defined in Appendix A. Shading denotes concentrations greater than Tier 1 SLs. Bolding denotes exceedance of VISLs in shallowest sampling ports in boreholes closest to occupied buildings

[a] Tier I SLs are based on NMED 2019, 700550.

[b] na = Not available.

[c] VISLs from NMED (2019, 700550).

[d] — = Not detected.

Table 5.1-3
Detected Tritium Results in Pore-Gas Samples at
MDA L Vapor-Monitoring Wells, Second Sampling Round

Borehole ID	Sampling Port Depth (ft bgs)	Analytical Result (pCi/L)
54-24238	44	1537
	64	1623
	84	5015
54-24240	28	535
	53	380
	78	261
	128	486
54-24241	73	2156
	93	965
	113	624
	133	975
	173	735
	193	378
54-27641	82	5408
	115	314
54-27642	30	509
	75	842
	116	596
	175	575
	235	703
	275	2551
	338	2714

Table 5.2-1
First Round 2019 VOC Pore Gas Detected Results at MDA L (in ppmv)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167112	54-01015	45–45	—*	—	—	0.0019 (J)	—	0.0082 (J)	0.0058 (J)	—	0.0088	0.028	0.0052 (J)	0.13	—	—	0.0019 (J)	—	—
MD54-19-167113	54-01015	187–187	—	—	—	0.013	—	0.014	0.032	—	0.039	0.064	—	0.71	—	—	—	—	—
MD54-19-167114	54-01015	350–350	—	—	—	0.0042 (J)	—	0.0014 (J)	0.0036 (J)	—	0.014	0.0042 (J)	—	0.17	—	—	—	—	—
MD54-19-167115	54-01015	385–385	—	—	—	0.0012 (J)	—	0.0038 (J)	—	—	0.0055 (J)	0.0064 (J)	—	0.046	—	—	—	—	—
MD54-19-167116	54-01015	435–435	—	—	—	0.00076 (J)	—	0.0032 (J)	—	—	0.0035 (J)	0.0058 (J)	—	0.03	—	—	0.0014 (J)	—	—
MD54-19-167117	54-01015	485–485	—	—	—	—	—	0.003 (J)	—	—	0.0049 (J)	0.0064 (J)	—	0.041	—	—	—	—	—
MD54-19-167118	54-01015	525–525	—	—	—	0.0014 (J)	—	0.0043 (J)	—	—	0.005 (J)	0.0071 (J)	—	0.04	—	—	—	—	—
MD54-19-167119	54-01016	30.8–30.8	—	0.0081 (J)	—	0.01	0.0013 (J)	0.087	0.0092 (J)	—	0.014	0.042	0.0049 (J)	0.46	—	—	0.037	—	—
MD54-19-167120	54-01016	162.2–162.2	—	0.14	—	0.16	0.0055 (J)	0.47	0.09	—	0.1	0.21	0.01 (J)	4.5	—	0.0044 (J)	0.1	—	0.0028 (J)
MD54-19-167121	54-01016	274.7–274.7	—	0.03	—	0.059	—	0.039	0.019	—	0.041	0.023	—	1.6	—	—	0.0029 (J)	—	—
MD54-19-167122	54-01016	336.3–336.3	—	—	—	—	—	0.0027 (J)	—	—	0.0034 (J)	0.0049 (J)	—	0.029	—	—	—	—	—
MD54-19-167125	54-01016	517.6–517.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MD54-19-167127	54-02001	40–40	—	—	—	0.1 (J)	—	0.49	0.26 (J)	—	0.24 (J)	2	1.9	4.6	—	—	0.12 (J)	—	—
MD54-19-167128	54-02001	80–80	—	—	—	0.11 (J)	0.087 (J)	0.86	2.3	—	0.24 (J)	3.4	4.4	1.6	—	—	0.11 (J)	—	—
MD54-19-167129	54-02001	100-100	—	—	—	0.034 (J)	—	0.2 (J)	0.46	—	—	1.8	0.48	0.46	—	—	—	—	—
MD54-19-167130	54-02001	120–120	—	0.043 (J)	—	0.062 (J)	0.029 (J)	0.61	0.68	—	0.18 (J)	2	5.4	3	—	—	0.29	—	—
MD54-19-167131	54-02001	140–140	—	—	—	0.045 (J)	—	0.42 (J)	0.56	—	0.091 (J)	2.6	2.1	1.2	—	—	0.094 (J)	—	—
MD54-19-167132	54-02001	180–180	—	—	—	—	—	0.31 (J)	0.62	—	—	3	0.44 (J)	0.62	—	—	—	—	—
MD54-19-167189	54-02002	40–40	—	0.28	—	0.36	0.15	2.6	0.23	—	0.26	1.1	2.5	3.2	—	—	5	—	0.043 (J)
MD54-19-167190	54-02002	60–60	—	0.03 (J)	—	0.4	0.0079 (J)	2.9	0.2	—	0.32	0.91	1.6	1.1	—	—	4.9	—	—
MD54-19-167191	54-02002	120–120	—	0.21	—	0.35	0.14	2.9	0.24	—	0.32	1.1	3	2.5	—	—	5.7	—	0.059
MD54-19-167192	54-02002	180–180	—	0.23	—	0.38	0.15	3.1	0.26	—	0.36	1.2	3.2	2.7	—	—	6	—	0.058
MD54-19-167193	54-02002	200–200	—	0.39	—	0.3	0.12	2.1	0.15	—	0.13	0.88	1.7	4.1	—	—	2.8	—	0.012 (J)
MD54-19-167219	54-02016	31–31	—	—	—	0.56	—	3.3	4.3 (J)	—	0.84	2.5	3.5	4.1	—	—	3.8	—	—
MD54-19-167220	54-02020	20–20	—	0.0078 (J)	—	0.028	—	0.43	0.22	—	0.023	0.15	0.11	0.59	—	—	0.66	—	—

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167221	54-02020	40–40	—	0.024	—	0.046	0.007 (J)	0.71	0.35	—	0.034	0.25	0.26	0.94	—	—	1.2	—	—
MD54-19-167222	54-02020	60–60	—	0.04	—	0.058	0.01	0.86	0.42	—	0.038	0.31	0.34	1.2	—	—	1.4	—	—
MD54-19-167223	54-02020	80–80	—	0.059	—	0.076	0.017	1	0.52	—	0.052	0.37	0.44	1.5	—	—	1.6	—	0.0024 (J)
MD54-19-167224	54-02020	95–95	—	0.075	—	0.086	0.02	1.1	0.57	—	0.056	0.41	0.5	1.8	—	—	1.7	—	0.0046 (J)
MD54-19-167225	54-02020	120–120	—	0.1	—	0.11	0.027	1.4	0.71	—	0.089	0.48	0.61	2.4	—	—	1.8	—	0.0082 (J)
MD54-19-167226	54-02020	140–140	—	0.14	—	0.14	0.033	1.6	0.77	—	0.11	0.52	0.62	3.1	—	—	1.7	—	0.013 (J)
MD54-19-167227	54-02020	160–160	—	0.18	—	0.16	0.036	1.6	0.79	—	0.11	0.53	0.58	3.5	—	—	1.5	—	—
MD54-19-167228	54-02020	180–180	—	0.18	—	0.16	0.034	1.6	0.77	—	0.12	0.51	0.46	4.1	—	—	1.3	—	—
MD54-19-167229	54-02020	200–200	—	0.23	—	0.17	0.03	1.5	0.71	—	0.12	0.44	0.32	4.3	—	—	0.97	—	0.014 (J)
MD54-19-167194	54-02021	20–20	—	—	—	0.0028 (J)	—	0.015	0.0099 (J)	—	0.011 (J)	0.052	0.036	0.14	—	—	0.0081 (J)	—	—
MD54-19-167195	54-02021	140–140	—	—	—	0.03 (J)	—	0.12	0.076 (J)	—	0.081 (J)	0.5	0.93	1.4	—	—	0.079 (J)	—	—
MD54-19-167196	54-02021	160–160	—	—	—	0.0078 (J)	—	0.039	0.026 (J)	—	0.021 (J)	0.15	0.43	0.34	—	—	0.033 (J)	—	—
MD54-19-167197	54-02021	180–180	—	—	—	0.034 (J)	—	0.13	0.09 (J)	—	0.088 (J)	0.59	0.92	1.7	—	—	0.067 (J)	—	—
MD54-19-167198	54-02021	198–198	—	—	—	0.058 (J)	—	0.18 (J)	0.12 (J)	—	0.14 (J)	0.81	0.74	2.7	—	—	0.073 (J)	—	—
MD54-19-167230	54-02022	40–40	—	—	—	0.012 (J)	—	0.094	0.082	—	0.025 (J)	0.38	0.56	0.44	—	—	0.059 (J)	—	—
MD54-19-167231	54-02022	60–60	—	—	—	—	—	0.18	0.14 (J)	—	0.056 (J)	0.78	1.4	0.99	—	—	0.1 (J)	—	—
MD54-19-167232	54-02022	80–80	—	—	—	—	—	0.2	0.15 (J)	—	0.067 (J)	0.82	1.8	1.2	—	—	0.11 (J)	—	—
MD54-19-167233	54-02022	120–120	—	—	—	—	—	—	0.13 (J)	—	0.073 (J)	1	2.4	1.8	—	—	0.16 (J)	—	—
MD54-19-167234	54-02022	140–140	—	—	—	—	—	0.2	0.1 (J)	—	0.1 (J)	0.86	1.4	1.9	—	—	0.12 (J)	—	—
MD54-19-167235	54-02022	160–160	—	—	—	—	—	0.24 (J)	0.14 (J)	—	0.15 (J)	1.1	1.4	2.8	—	—	0.11 (J)	—	—
MD54-19-167236	54-02022	180–180	—	—	—	0.05 (J)	—	0.26	0.2 (J)	—	0.2 (J)	1.3	1.1	3.8	—	—	0.12 (J)	—	—
MD54-19-167237	54-02022	200–200	—	—	—	0.045 (J)	—	0.17 (J)	0.16 (J)	—	0.15 (J)	0.92	0.49	3.4	—	—	0.061 (J)	—	—
MD54-19-167133	54-02023	20–20	—	—	—	0.0052 (J)	—	0.11	0.068	—	0.016	0.045	—	0.25	—	—	0.047	—	—
MD54-19-167134	54-02023	40–40	—	0.0023 (J)	—	0.0093	—	0.18	0.1	—	0.02	0.076	0.011	0.4	—	—	0.088	—	—
MD54-19-167135	54-02023	60–60	0.0072 (J)	0.011	—	0.012	—	0.084	0.055	—	0.014	0.036	0.0053 (J)	0.31	—	—	0.026	—	—
MD54-19-167136	54-02023	80–80	—	0.011	—	0.015	—	0.25	0.14	—	0.025	0.11	0.029	0.6	—	—	0.12	—	—
MD54-19-167137	54-02023	100–100	—	0.018	—	0.022	—	0.29	0.16	—	0.025	0.12	0.037	0.75	—	—	0.13	—	—

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167138	54-02023	159–59	—	0.048	—	0.063	—	0.45	0.29	—	0.06	0.19	0.042	1.5	—	—	0.14	—	—
MD54-19-167139	54-02023	200–200	—	0.067	—	0.07	—	0.45	0.29	—	0.075	0.18	0.038	1.8	—	—	0.11	—	—
MD54-19-167272	54-02024	20–20	—	—	—	0.015	—	0.12	0.0064 (J)	—	0.012 (J)	0.045	0.012	0.22	—	—	0.11	—	—
MD54-19-167273	54-02024	40–40	—	—	—	0.018	—	0.16	0.0063 (J)	—	0.015 (J)	0.06	0.017 (J)	0.28	—	—	0.16	—	—
MD54-19-167274	54-02024	60–60	—	0.0061 (J)	—	0.024	0.0028 (J)	0.22	0.011 (J)	—	0.018	0.077	0.023	0.4	—	—	0.2	—	—
MD54-19-167275	54-02024	80–80	—	0.015 (J)	—	0.034	0.0045 (J)	0.28	0.02	—	0.024	0.11	0.046	0.56	—	—	0.26	—	—
MD54-19-167276	54-02024	100–100	—	0.024	—	0.044	0.006 (J)	0.34	0.022	—	0.028	0.12	0.067	0.69	—	—	0.29	—	—
MD54-19-167277	54-02024	140–140	—	0.055	—	0.076	0.011 (J)	0.52	0.032	—	0.044	0.18	0.11	1.3	—	—	0.33	—	—
MD54-19-167278	54-02024	160–160	—	0.078	—	0.086	0.015	0.61	0.04	—	0.052	0.21	0.17	1.5	—	—	0.38	—	—
MD54-19-167279	54-02024	180–180	—	0.1	—	0.11	0.017	0.68	0.044	—	0.061	0.24	0.19	1.8	—	—	0.38	—	—
MD54-19-167280	54-02024	200–200	—	0.11	—	0.12	0.016 (J)	0.74	0.045	—	0.066	0.24	0.18	2	—	—	0.35	—	—
MD54-19-167199	54-02025	20–20	—	—	—	0.12	—	0.63	0.038	—	0.041	0.19	0.12	0.47	—	—	1	—	—
MD54-19-167200	54-02025	60–60	—	—	—	0.0044 (J)	—	0.026	—	—	0.0012 (J)	0.0089 (J)	0.012	0.03	—	—	0.044	—	—
MD54-19-167201	54-02025	100–100	—	0.12	—	0.16	0.057	1.9	0.87 (J)	—	0.096	0.71	1	2.4	—	—	3.4	—	0.0044 (J)
MD54-19-167202	54-02025	160–160	—	0.24	—	0.24	0.079	1.7	0.11	—	0.088	0.64	1.1	3.1	—	—	2.4	—	0.012 (J)
MD54-19-167203	54-02025	190–190	—	0.22	—	0.26	0.071	1.7	0.11	—	0.1	0.61	0.92	3.9	—	—	1.8	—	—
MD54-19-167281	54-02026	20–20	—	—	—	—	—	0.012 (J)	—	—	—	—	—	0.031	—	—	0.004 (J)	—	—
MD54-19-167282	54-02026	60–60	—	—	—	0.0033 (J)	—	0.026	—	—	0.0047 (J)	0.007 (J)	—	0.074	—	—	0.0055 (J)	—	—
MD54-19-167283	54-02026	100–100	—	—	—	0.0058 (J)	—	0.032	—	—	0.0064 (J)	0.0079 (J)	—	0.1	—	—	0.0064 (J)	—	—
MD54-19-167284	54-02026	160–160	—	—	—	0.017	—	0.075	0.0038 (J)	—	0.016	0.019	—	0.28	—	—	0.0096 (J)	—	—
MD54-19-167285	54-02026	200–200	—	—	—	0.02	—	0.08	0.0046 (J)	—	0.019	0.021	—	0.31	—	—	0.011	—	—
MD54-19-167286	54-02026	215–215	—	—	—	0.02	—	0.068	0.005 (J)	—	0.021	0.018	—	0.33	—	—	0.0078 (J)	—	—
MD54-19-167140	54-02027	20–20	—	—	—	0.0046 (J)	—	0.085	0.0035 (J)	—	0.0068 (J)	0.025	0.004 (J)	0.16	—	—	0.055	—	—
MD54-19-167141	54-02027	60–60	—	0.0068 (J)	—	0.013	0.0013 (J)	0.21	0.011	—	0.017	0.064	0.022	0.4	—	—	0.15	—	—
MD54-19-167142	54-02027	100–100	—	0.019	—	0.026	0.0035 (J)	0.3	0.017	—	0.024	0.09	0.037	0.6	—	—	0.19	—	—
MD54-19-167143	54-02027	160–160	—	0.051	—	0.055	0.0057 (J)	0.4	0.025	—	0.04	0.11	0.059	1.1	—	—	0.17	—	0.0032 (J)
MD54-19-167144	54-02027	200–200	—	0.053	—	0.056	0.0047 (J)	0.33	0.023	—	0.04	0.089	0.034	1.1	—	—	0.099	—	0.0029 (J)

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167145	54-02027	220–220	—	0.03	—	0.035	0.002 (J)	0.16	0.013	—	0.026	0.042	0.015	0.66	—	—	0.038	—	—
MD54-19-167146	54-02027	250–250	—	0.045	—	0.069	0.0023 (J)	0.26	0.023	—	0.052	0.068	0.011	1.3	—	—	0.048	—	—
MD54-19-167147	54-02028	20–20	—	—	—	0.0022 (J)	—	0.016	—	—	0.0026 (J)	0.0057 (J)	—	0.037	—	—	0.0061 (J)	—	—
MD54-19-167148	54-02028	60–60	—	—	—	0.0028 (J)	—	0.025	—	—	0.0038 (J)	0.0075 (J)	—	0.07	—	—	0.011	—	—
MD54-19-167149	54-02028	100–100	—	—	—	0.0058 (J)	—	0.039	0.0021 (J)	—	0.0062 (J)	0.012	—	0.12	—	—	0.012	—	—
MD54-19-167150	54-02028	160–160	—	—	—	0.016	—	0.074	0.0052 (J)	—	0.017	0.024	0.0033 (J)	0.28	—	—	0.015	—	—
MD54-19-167151	54-02028	200–200	—	—	—	0.02	—	0.078	0.0061 (J)	—	0.019	0.024	0.0024 (J)	0.34	—	—	0.011	—	—
MD54-19-167152	54-02028	220–220	—	—	—	0.02	—	0.074	0.0071 (J)	—	0.02	0.024	—	0.36	—	—	0.0086 (J)	—	—
MD54-19-167153	54-02028	250–250	—	—	—	0.017	—	0.049	0.0035 (J)	—	0.02	0.016	—	0.31	—	—	0.0041 (J)	—	—
MD54-19-167154	54-02031	20–20	—	—	0.001 (J)	0.0042 (J)	—	0.059	0.055 (J)	—	0.013	0.081	0.032	0.17	—	—	0.014	—	—
MD54-19-167155	54-02031	60–60	—	—	—	0.012	—	0.085	0.0099	—	0.017	0.13	0.16	0.34	—	—	0.029	—	—
MD54-19-167156	54-02031	100–100	—	0.0047 (J)	—	0.019	0.0016 (J)	0.091	0.018	—	0.024	0.16	0.18	0.5	—	—	0.034	—	—
MD54-19-167157	54-02031	160–160	—	0.016	—	0.052	0.0017 (J)	0.16	0.052	—	0.064	0.3	0.22	1.4	—	—	0.041	—	—
MD54-19-167158	54-02031	200–200	—	0.022	—	0.075	0.002 (J)	0.18	0.074	—	0.083	0.34	0.18	1.9	—	0.0034 (J)	0.041	—	—
MD54-19-167159	54-02031	220-220	—	0.018	—	0.07	0.0016 (J)	0.17	0.069	—	0.085	0.32	0.14	1.9	—	0.0024 (J)	0.033	—	—
MD54-19-167160	54-02031	260–260	—	0.017	—	0.066	0.0016 (J)	0.14	0.064	—	0.077	0.26	0.093	1.7	—	—	0.025	—	—
MD54-19-167238	54-02034	20–20	—	—	—	—	—	0.013 (J)	0.0058 (J)	—	0.0085 (J)	0.043	—	0.1	—	—	—	—	—
MD54-19-167239	54-02034	60–60	—	—	—	0.0019 (J)	—	0.021	0.01 (J)	—	0.016 (J)	0.086	0.049	0.22	—	—	0.009 (J)	—	—
MD54-19-167240	54-02034	100–100	—	—	—	—	—	—	0.021 (J)	—	0.024 (J)	0.13	0.079	0.34	—	—	0.012 (J)	—	—
MD54-19-167241	54-02034	160–160	—	—	—	—	—	0.022 (J)	0.038 (J)	—	0.038 (J)	0.13	—	0.58	—	—	—	—	—
MD54-19-167242	54-02034	200–200	—	—	—	0.011 (J)	—	0.015 (J)	0.051	—	0.053	0.1	—	0.76	—	—	—	—	—
MD54-19-167243	54-02034	220–220	—	—	—	0.0092 (J)	—	0.011 (J)	0.044 (J)	—	0.049	0.074	—	0.76	—	—	—	—	—
MD54-19-167244	54-02034	260–260	—	—	—	0.0064 (J)	—	0.0046 (J)	0.024	—	0.039	0.022	—	0.49	—	—	—	—	—
MD54-19-167245	54-02034	300–300	—	—	—	0.0019 (J)	—	—	0.0041 (J)	—	0.013	—	—	0.13	—	—	—	—	—
MD54-19-167293	54-02089	13–13	—	—	—	0.39	—	2.2	0.36	—	0.63	7.2	2.8	2.9	—	—	10	—	—
MD54-19-167294	54-02089	31–31	—	—	—	0.91 (J)	—	3	0.88 (J)	—	0.91 (J)	14	11	7.2	—	—	19	—	—
MD54-19-167295	54-02089	46–46	—	—	—	1.2 (J)	—	4.1	2.2	—	1.6	20	22	8.2	—	—	40	—	—

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167296	54-02089	86–86	—	0.42 (J)	—	0.84	—	8.2	25 (J)	—	1.8	15	18	16	—	—	63	—	—
MD54-19-167301	54-24238	44–44	—	0.27 (J)	—	1.2	—	5.1	2.1	—	1.6	17	33	8.7	—	—	39	—	—
MD54-19-167302	54-24238	64–64	—	0.4 (J)	—	1	—	7.2	1.4	—	1.9	11	40	8.8	—	—	44	—	—
MD54-19-167303	54-24238	84–84	—	0.4 (J)	—	0.79	—	11	20 (J)	—	2.1	11	44	16	—	—	56	—	—
MD54-19-167297	54-24239	25–25	—	—	—	0.072	—	0.77	0.066	—	0.1	0.71	0.99	1	—	0.016 (J)	0.71	—	—
MD54-19-167298	54-24239	50–50	—	—	—	0.079	—	0.94	0.086	—	0.12	0.87	1.3	1.4	—	0.018 (J)	0.84	—	—
MD54-19-167299	54-24239	75–75	—	0.018 (J)	—	0.075	—	1.2	0.1	—	0.12	1	1.7	1.8	—	0.015 (J)	1	—	—
MD54-19-167300	54-24239	99.5–99.5	—	0.041	—	0.09	—	1.4	0.11	—	0.13	1.2	1.7	2.2	—	0.019 (J)	1.1	—	—
MD54-19-167287	54-24240	28–28	—	—	—	0.43	—	5	6 (J)	—	2.6	9.4	4	3.1	0.041 (J)	—	0.093	—	—
MD54-19-167288	54-24240	53–53	—	0.17	—	0.56	0.12	9.1	7.1 (J)	—	3.8	8.3	7.8	1.9	—	—	0.19	0.25 (J)	—
MD54-19-167289	54-24240	78–78	0.92 (J)	0.21 (J)	—	0.25 (J)	0.063 (J)	5.1	2	—	0.75	3.7	6.4	2	—	—	0.21 (J)	—	—
MD54-19-167290	54-24240	103–103	—	—	—	0.16 (J)	—	2.8	1.2	—	0.25 (J)	2.6	5.7	2.9	—	—	0.27 (J)	—	—
MD54-19-167291	54-24240	128-128	—	—	—	0.1 (J)	—	1.5	0.6	—	0.21 (J)	2.1	4.2	4.1	—	—	0.32 (J)	—	—
MD54-19-167292	54-24240	153–153	—	0.093 (J)	—	0.12 (J)	—	1.3	0.48	—	0.26 (J)	2.1	2.9	4.7	—	—	0.3 (J)	—	—
MD54-19-167161	54-24241	73-73	—	0.054 (J)	—	0.41	0.024 (J)	4	0.58	—	0.55	3	18	2.6	—	0.04 (J)	4.4	1.1	—
MD54-19-167162	54-24241	93–93	—	0.063 (J)	—	0.28	0.013 (J)	3.1	0.4	—	0.52	2.4	15	2.9	—	0.043 (J)	3.9	4.1	—
MD54-19-167163	54-24241	113–113	—	0.057	—	0.17	0.0078 (J)	1.7	0.22	—	0.25	1.4	4.2	3.1	—	0.024	2.2	0.51	—
MD54-19-167164	54-24241	133–133	—	0.11	—	0.22	0.014 (J)	1.7	0.21	—	0.22	1.4	1.7	4.8	0.0062 (J)	0.023 (J)	1.7	0.2	—
MD54-19-167165	54-24241	153–153	—	0.13	—	0.26	0.011 (J)	1.6	0.2	—	0.2	1.2	1.7	5.5	—	0.023	1.4	0.13	0.0048 (J)
MD54-19-167166	54-24241	173–173	—	0.14	—	0.3	0.012 (J)	1.7	0.21	—	0.21	1.3	1.7	6.2	—	0.02 (J)	1.5	0.17	—
MD54-19-167167	54-24241	193–193	—	0.079	—	0.32	—	1.7	0.2	—	0.21	1.3	1.4	6.3	—	0.019 (J)	1.5	0.24	—
MD54-19-167204	54-24242	25–25	—	—	—	0.024 (J)	—	0.3	0.03	—	0.036	0.27	0.37	0.32	—	—	0.3	—	—
MD54-19-167205	54-24242	50–50	—	0.097	—	0.1	0.062	1.7	0.16	—	0.15	1.4	2.6	2.2	—	0.018 (J)	1.7	0.25	—
MD54-19-167206	54-24242	75–75	—	0.054	—	0.098	0.011 (J)	1.2	0.12	—	0.14	1.1	2	1.5	—	0.013 (J)	1.2	—	—
MD54-19-167207	54-24242	100–100	—	0.026 (J)	—	0.086	0.014 (J)	0.89	0.098	—	0.1	0.77	1.4	0.93	—	—	0.96	—	—
MD54-19-167208	54-24242	110.5–110.5	—	0.1	—	0.1	0.059	1.9	0.17	—	0.14	1.5	2.6	2.3	—	0.026 (J)	1.9	0.17 (J)	—
MD54-19-167209	54-24243	25–25	—	—	—	0.2	—	1.6	0.12	—	0.28	1.5	0.83	1	—	0.01 (J)	3.5	—	—

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167210	54-24243	50–50	—	0.06 (J)	—	0.41	—	4	0.33	—	0.78	3.2	3.6	2.9	—	—	8.8	—	—
MD54-19-167211	54-24243	75–75	—	0.061 (J)	—	0.24	—	2.6	0.28	—	0.56	1.9	3.6	2.1	—	—	6.1	—	—
MD54-19-167212	54-24243	100–100	—	0.16	—	0.39	0.019 (J)	4.8	0.52	—	1.1	2.8	8.3	4.4	—	0.024 (J)	11	—	—
MD54-19-167213	54-24243	125–125	—	0.16	—	0.4	0.023 (J)	4.4	0.42	—	1.1	2.4	4.4	5.3	—	0.022 (J)	9	—	—
MD54-19-167304	54-24399	566.3–566.3	—	—	—	0.0022 (J)	—	0.017	0.0021 (J)	—	0.0066 (J)	0.02	0.034	0.06	—	—	0.014	—	—
MD54-19-167305	54-24399	587.3–587.3	—	—	—	0.0017 (J)	—	0.015	0.0015 (J)	—	0.0057 (J)	0.017	0.034	0.048	—	—	0.01	—	—
MD54-19-167168	54-27641	32–32	—	—	—	0.16 (J)	—	0.97	1.8	—	0.4 (J)	6.4	1.6	1.2	—	—	—	—	—
MD54-19-167169	54-27641	82–82	—	—	—	0.087 (J)	—	0.98	2	—	0.19 (J)	2.4	4.7	1.6	—	—	0.14 (J)	—	—
MD54-19-167170	54-27641	115–115	—	—	—	0.062 (J)	—	0.83	1.1	—	0.11 (J)	1.8	4.6	2.1	—	—	0.19 (J)	—	—
MD54-19-167171	54-27641	182–182	—	0.054 (J)	—	0.11 (J)	—	0.63	0.3	—	0.25	2.1	3.3	5.5	—	—	0.26	—	—
MD54-19-167172	54-27641	232–232	—	—	—	0.14 (J)	—	0.49	0.37	—	0.28	2	0.91	6.4	—	—	0.11 (J)	—	—
MD54-19-167173	54-27641	271–271	—	—	—	0.1 (J)	—	0.26 (J)	0.29	—	0.26 (J)	1.1	0.24 (J)	5.6	—	—	—	—	—
MD54-19-167174	54-27641	332.5–332.5	—	—	—	0.03 (J)	—	0.035	0.065	—	0.075	0.11	0.078	1.2	—	—	—	—	—
MD54-19-167175	54-27642	30–30	—	—	—	1.9	—	11	3.7 (J)	—	0.89	2.6	5.4	5	—	—	11	—	—
MD54-19-167176	54-27642	75–75	—	0.085	—	0.81	—	7.7	3.4 (J)	—	0.95	3.6	2.3	7.8	—	—	14	—	—
MD54-19-167178	54-27642	175–175	—	0.69	—	0.61	0.21 (J)	5.4	0.35 (J)	—	0.43 (J)	2.6	5	12	—	—	8.5	—	0.054 (J)
MD54-19-167179	54-27642	235–235	—	0.55	—	0.54	0.082 (J)	4.1	0.29 (J)	—	0.43 (J)	1.7	2.3	11	—	—	4.7	—	—
MD54-19-167180	54-27642	275–275	—	0.17 (J)	—	0.73	—	8.7	3.9 (J)	—	0.6	4.5	0.55	13	—	—	19	—	—
MD54-19-167181	54-27642	338–338	—	0.21	—	0.7	—	7.6	3.3 (J)	—	0.81	3.2	6	8.9	—	—	15	—	—
MD54-19-167182	54-27643	30–30	—	0.007 (J)	—	0.38	0.0094 (J)	1.5	0.093	—	0.094	0.38	0.69	0.7	—	—	2.9	—	—
MD54-19-167183	54-27643	74–74	—	0.092	—	0.34	0.08	2	0.14	—	0.12	0.67	1.4	1.4	—	—	4.3	—	0.012 (J)
MD54-19-167184	54-27643	117–117	—	0.18	—	0.26	0.11	2	0.15	—	0.11	0.81	1.7	2.2	—	0.0078 (J)	4.5	—	0.014 (J)
MD54-19-167185	54-27643	167–167	—	0.34	—	0.31	0.1	2.3	0.16	—	0.12	0.91	1.6	4.4	—	—	3.3	—	0.02 (J)
MD54-19-167186	54-27643	235–235	—	0.32	—	0.24	0.047	1.5	0.1	—	0.1	0.51	0.53	4.4	—	—	1.2	—	0.011 (J)
MD54-19-167187	54-27643	275–275	—	0.27	—	0.21	0.021	1.1	0.086	—	0.11	0.35	0.19	4.6	—	0.0068 (J)	0.58	—	0.0033 (J)
MD54-19-167214	54-610786	25–25	—	0.0069 (J)	—	0.35	0.018	1.4	0.086	—	—	0.38	0.5	0.46	—	—	2.4	—	—

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorobenzene[1,4-]	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethylbenzene
MD54-19-167215	54-610786	50–50	—	0.054	—	0.52	0.1	2.3	0.16	0.003 (J)	0.14	0.6	1.3	0.95	—	0.0058 (J)	4.5	—	—
MD54-19-167216	54-610786	75–75	—	0.098	—	0.38	0.16	2.2	0.16	0.0041 (J)	0.14	0.67	1.8	1.2	—	—	4.8	—	0.03 (J)
MD54-19-167217	54-610786	100-100	—	0.12	—	0.28	0.15	2	0.15	—	0.14	0.71	1.8	1.5	—	—	4.5	—	0.03 (J)
MD54-19-167218	54-610786	118.5–118.5	—	0.19	—	0.29	0.16	2.2	0.16	—	0.14	0.85	2	2.1	—	—	4.9	—	0.031 (J)

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167112	54-01015	45–45	—	—	—	0.022 (J)	—	0.066	—	—	0.058	0.9	—	0.34	0.014	—	—	—	2
MD54-19-167113	54-01015	187–187	—	—	—	0.055	—	0.19	—	—	0.32	2.8	—	0.98	0.069	—	—	—	5
MD54-19-167114	54-01015	350–350	—	—	—	—	—	0.034	—	—	0.12	0.17	—	0.11	0.031	—	—	—	1
MD54-19-167115	54-01015	385–385	—	—	—	—	—	0.046	—	—	0.049	0.12	—	0.072	0.0079 (J)	—	—	—	0
MD54-19-167116	54-01015	435–435	—	—	—	0.0065 (J)	—	0.032	—	—	0.036	0.085	—	0.053	0.0058 (J)	—	—	—	0
MD54-19-167117	54-01015	485–485	—	—	—	—	—	0.041	—	—	0.044	0.11	—	0.067	0.008 (J)	—	—	—	0
MD54-19-167118	54-01015	525–525	—	—	—	—	—	0.044	—	—	0.051	0.12	—	0.078	0.0082 (J)	—	—	—	0
MD54-19-167119	54-01016	30.8–30.8	—	—	—	—	—	0.46	—	—	0.59	2.6	—	1.4	0.082	—	—	—	6
MD54-19-167120	54-01016	162.2–162.2	0.016	—	—	1.1	—	2.2	—	0.094	4.5	17	—	11	0.7	0.0058 (J)	—	—	42
MD54-19-167121	54-01016	274.7–274.7	—	—	—	0.1	—	0.19	—	0.0037 (J)	1.1	1.9	—	1.6	0.23	—	—	—	7
MD54-19-167122	54-01016	336.3–336.3	—	—	—	—	—	0.031	—	—	0.037	0.083	—	0.05	0.006 (J)	—	—	—	0
MD54-19-167125	54-01016	517.6–517.6	—	—	—	—	—	0.0033 (J)	—	—	—	—	—	0.0058 (J)	—	—	—	—	0
MD54-19-167127	54-02001	40–40	—	—	—	1.3 (J)	—	2.7	—	—	2.5	43	—	22	0.36 (J)	—	—	—	82
MD54-19-167128	54-02001	80–80	—	—	—	0.38 (J)	—	4.4	—	—	6.1	63	—	22	0.33 (J)	—	—	—	109
MD54-19-167129	54-02001	100–100	—	—	—	—	—	1.1	—	—	3	36	—	29	0.12 (J)	—	—	—	73
MD54-19-167130	54-02001	120–120	—	—	—	0.66 (J)	—	3.4	—	—	3.5	39	—	17	0.32	—	—	—	76
MD54-19-167131	54-02001	140–140	—	—	—	—	—	2	—	—	3.6	44	—	59	0.18 (J)	—	—	—	116
MD54-19-167132	54-02001	180–180	—	—	—	—	—	1.6	—	—	4.4	54	—	49	0.18 (J)	—	—	—	114
MD54-19-167189	54-02002	40–40	0.032 (J)	—	—	4.2	—	3.3	0.48	0.22	20	50	0.082	21	0.87	—	0.18	0.016 (J)	116
MD54-19-167190	54-02002	60–60	—	—	—	0.054 (J)	—	3.7	—	—	28	47	0.093	23	0.48	—	—	—	115
MD54-19-167191	54-02002	120–120	0.021 (J)	—	—	3.1	—	3.6	2.1	0.16	24	51	0.1	21	0.71	—	0.14	—	122
MD54-19-167192	54-02002	180–180	0.023 (J)	—	—	3.5	—	3.8	2	0.12	26	56	0.11	23	0.77	—	0.15	—	133
MD54-19-167193	54-02002	200–200	0.05	—	—	6.7	—	2.2	—	0.4	11	38	0.025 (J)	18	1.1	—	0.18	0.13	90
MD54-19-167219	54-02016	31–31	—	—	—	—	—	3.6	—	—	52	140	—	41	3.4	—	—	—	263
MD54-19-167220	54-02020	20–20	—	—	—	0.0089 (J)	—	0.31	—	—	1.5	6.7	—	2.1	0.16	—	—	—	13

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167221	54-02020	40–40	—	—	—	0.051	—	0.53	—	—	2.3	11	—	3.6	0.26	—	—	—	22
MD54-19-167222	54-02020	60–60	—	—	—	0.13	—	0.63	0.014	—	2.9	13	—	4.4	0.32	0.0055 (J)	0.0038 (J)	—	26
MD54-19-167223	54-02020	80–80	—	—	—	0.24	—	0.75	0.015	0.0057 (J)	3.5	16	—	5.3	0.4	0.0046 (J)	0.013	—	32
MD54-19-167224	54-02020	95–95	—	—	—	0.41	—	0.8	—	0.0075 (J)	3.9	18	—	5.9	0.46	0.0046 (J)	0.019	—	36
MD54-19-167225	54-02020	120–120	—	—	—	0.8	—	0.95	—	0.012 (J)	4.8	22	—	7.4	0.61	0.0081 (J)	0.031	—	44
MD54-19-167226	54-02020	140–140	—	—	—	1.7	—	1	—	0.16	5.5	24	—	8.6	0.77	0.0085 (J)	0.054	—	51
MD54-19-167227	54-02020	160–160	—	—	—	2.3	—	1	—	0.19	5.8	24	—	9.1	0.84	—	0.058	—	52
MD54-19-167228	54-02020	180–180	—	—	0.0049 (J)	2.4	0.017 (J)	1	—	0.2	6.2	24	—	9.2	0.91	0.012 (J)	0.041	—	53
MD54-19-167229	54-02020	200–200	—	—	—	3.5	—	0.96	—	0.41	6.1	21	—	8.8	0.93	—	0.05	0.0048 (J)	51
MD54-19-167194	54-02021	20–20	—	—	—	—	—	0.092	—	—	0.13	1.4	—	0.47	0.018	—	—	—	2
MD54-19-167195	54-02021	140–140	—	—	—	0.32 (J)	—	0.68	—	—	0.66	12	—	4.4	0.13	—	—	—	21
MD54-19-167196	54-02021	160–160	—	—	—	—	—	0.24	—	—	0.29	3.6	—	1.4	0.037	—	—	—	7
MD54-19-167197	54-02021	180–180	—	—	—	0.46	—	0.83	—	—	0.77	15	—	5.2	0.15	—	—	—	26
MD54-19-167198	54-02021	198–198	—	—	—	0.92	—	1.2	—	—	1.1	22	—	7.3	0.22	—	—	—	38
MD54-19-167230	54-02022	40–40	—	—	—	—	—	0.73	—	—	0.8	9.8	—	3.3	0.06 (J)	—	—	—	16
MD54-19-167231	54-02022	60–60	—	—	—	—	—	1.1	—	—	1	16	—	5.7	0.1 (J)	—	—	—	28
MD54-19-167232	54-02022	80–80	—	—	—	—	—	1.2	—	—	1.1	18	—	6.6	0.13 (J)	—	—	—	31
MD54-19-167233	54-02022	120–120	—	—	—	0.18 (J)	—	1.4	—	—	0.95	22	—	8.4	0.14 (J)	—	—	—	39
MD54-19-167234	54-02022	140–140	—	—	—	0.45 (J)	—	1.2	—	—	0.8	20	—	7.5	0.15 (J)	—	—	—	35
MD54-19-167235	54-02022	160–160	—	—	—	0.94 (J)	—	1.5	—	—	0.9	26	—	9.3	0.22 (J)	—	—	—	45
MD54-19-167236	54-02022	180–180	—	—	—	1.3	—	1.6	—	—	1.1	32	—	11	0.29	—	—	—	54
MD54-19-167237	54-02022	200–200	—	—	—	1	—	1.2	—	—	0.89	25	—	8.3	0.25	—	—	—	42
MD54-19-167133	54-02023	20–20	—	—	—	—	—	0.084	—	—	0.44	2.1	—	0.73	0.066	—	—	—	4
MD54-19-167134	54-02023	40–40	—	—	—	0.0084 (J)	—	0.12	—	—	0.66	3.3	—	1.1	0.1	—	—	—	6
MD54-19-167135	54-02023	60–60	—	—	—	0.011 (J)	—	0.062	—	0.002 (J)	0.45	1.7	—	0.73	0.074	—	—	—	4
MD54-19-167136	54-02023	80–80	—	—	—	0.034 (J)	—	0.16	—	0.0039 (J)	0.97	4.4	—	1.7	0.14	—	—	—	9

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167137	54-02023	100–100	—	—	—	0.064	—	0.19	—	0.0095	1.2	5.2	—	2	0.18	—	—	—	10
MD54-19-167138	54-02023	159–159	—	—	—	0.11	—	0.3	—	0.013	2.3	9	—	3.6	0.36	—	—	—	18
MD54-19-167139	54-02023	200–200	—	—	—	0.29	—	0.31	—	0.014	2.5	8.9	—	4	0.4	—	—	—	19
MD54-19-167272	54-02024	20–20	—	—	—	—	—	0.13	—	—	0.7	2.2	—	0.83	0.074	—	—	—	4
MD54-19-167273	54-02024	40–40	—	—	—	—	—	0.16	—	—	0.86	2.8	—	1.1	0.091	—	—	—	6
MD54-19-167274	54-02024	60–60	—	—	—	—	—	0.21	—	—	1.1	3.7	0.004 (J)	1.4	0.12	—	—	—	8
MD54-19-167275	54-02024	80–80	—	—	—	0.045 (J)	—	0.27	—	—	1.5	5.2	0.0044 (J)	1.9	0.18	—	—	—	10
MD54-19-167276	54-02024	100–100	—	—	—	0.075	—	0.33	—	—	1.9	6.3	0.0052 (J)	2.4	0.23	—	—	—	13
MD54-19-167277	54-02024	140–40	—	—	—	0.38	—	0.46	—	—	2.9	9.6	—	3.9	0.39	—	—	—	20
MD54-19-167278	54-02024	160–160	—	—	—	0.74	—	0.54	—	—	3.2	11	0.0032 (J)	4.7	0.46	—	0.0046 (J)	—	24
MD54-19-167279	54-02024	180–180	—	—	—	0.98	—	0.59	—	0.0029 (J)	3.7	12	—	5.4	0.53	—	0.0064 (J)	—	27
MD54-19-167280	54-02024	200–200	—	—	—	1.3	—	0.62	—	0.0049 (J)	3.9	13	—	5.8	0.6	—	0.0086 (J)	—	29
MD54-19-167199	54-02025	20–20	—	—	—	—	—	0.77	—	—	2.8	8.8	0.019	3.3	0.16	—	—	—	18
MD54-19-167200	54-02025	60–60	—	—	—	—	—	0.034	—	—	0.13	0.43	—	0.16	0.0098	—	—	—	1
MD54-19-167201	54-02025	100–100	—	—	—	0.46	—	1.5	0.13	0.0074 (J)	6.4	26	0.079	9.6	0.58	0.0074 (J)	0.061	—	56
MD54-19-167202	54-02025	160–160	0.011 (J)	—	—	2.6	—	1.9	0.012 (J)	0.25	9	33	0.039	13	0.93	—	0.14	0.016 (J)	71
MD54-19-167203	54-02025	190–190	—	—	—	3.1	—	1.8	—	0.017 (J)	9.4	32	0.013 (J)	14	1.1	—	0.047	—	71
MD54-19-167281	54-02026	20–20	—	—	—	—	—	0.012 (J)	—	—	0.091	0.28	—	0.086	0.017	—	—	—	1
MD54-19-167282	54-02026	60–60	—	—	—	—	—	0.023	—	—	0.18	0.51	—	0.18	0.03	—	—	—	1
MD54-19-167283	54-02026	100–100	—	—	—	—	—	0.029	—	—	0.24	0.65	—	0.23	0.042	—	—	—	1
MD54-19-167284	54-02026	160–160	—	—	—	0.05	—	0.072	—	—	0.6	1.5	—	0.6	0.1	—	—	—	3
MD54-19-167285	54-02026	200–200	—	—	—	0.064	—	0.08	—	—	0.66	1.6	—	0.66	0.11	—	—	—	4
MD54-19-167286	54-02026	215–215	—	—	—	0.069	—	0.074	—	—	0.68	1.5	—	0.64	0.12	—	—	—	4
MD54-19-167140	54-02027	20–20	—	—	—	—	—	0.075	—	—	0.43	1.6	—	0.52	0.059	—	—	—	3
MD54-19-167141	54-02027	60–60	—	—	—	0.02 (J)	—	0.19	—	—	1	3.9	0.0024 (J)	1.3	0.14	—	—	—	7
MD54-19-167142	54-02027	100–100	—	—	—	0.062	—	0.26	—	0.0022 (J)	1.5	5.5	—	1.9	0.21	—	—	—	11
MD54-19-167143	54-02027	160–160	—	—	—	0.53	—	0.35	—	0.045	2.2	7.3	—	2.8	0.34	—	0.0051 (J)	—	16

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167144	54-02027	200–200	—	—	—	0.54	—	0.28	—	0.074	2	5.7	—	2.4	0.32	—	0.0034 (J)	—	13
MD54-19-167145	54-02027	220–220	—	—	—	0.27	—	0.14	—	0.042	1.1	2.9	—	1.3	0.19	—	—	—	7
MD54-19-167146	54-02027	250–250	—	—	—	0.3	—	0.26	—	0.024	2.2	4.8	—	2.3	0.37	—	—	—	12
MD54-19-167147	54-02028	20–20	—	—	—	—	—	0.013	—	—	0.096	0.31	—	0.11	0.014	—	—	—	1
MD54-19-167148	54-02028	60–60	—	—	—	—	—	0.02	—	—	0.15	0.5	—	0.2	0.025	—	—	—	1
MD54-19-167149	54-02028	100–100	—	—	—	0.015 (J)	—	0.031	—	—	0.25	0.76	—	0.32	0.043	—	—	—	2
MD54-19-167150	54-02028	160–160	—	—	—	0.068	—	0.067	—	—	0.58	1.6	—	0.72	0.099	—	—	—	4
MD54-19-167151	54-02028	200–200	—	—	—	0.088	—	0.072	—	—	0.66	1.7	—	0.79	0.11	—	—	—	4
MD54-19-167152	54-02028	220–220	—	—	—	0.088	—	0.072	—	—	0.72	1.6	—	0.8	0.12	—	—	—	4
MD54-19-167153	54-02028	250–250	—	—	—	0.01 (J)	—	0.052	—	—	0.59	1.2	—	0.58	0.1	—	—	—	3
MD54-19-167154	54-02031	20–20	—	—	—	—	—	0.15	—	—	0.12	1.6	—	0.64	0.024	—	—	—	3
MD54-19-167155	54-02031	60–60	—	—	—	0.0093 (J)	—	0.3	—	—	0.29	2.9	—	1.4	0.046	—	—	—	6
MD54-19-167156	54-02031	100–100	—	—	—	0.052	—	0.36	—	0.0015 (J)	0.44	4.1	—	1.7	0.068	—	—	—	8
MD54-19-167157	54-02031	160–160	—	—	—	0.24	—	0.82	—	0.007 (J)	1.2	11	—	4.2	0.18	—	—	—	20
MD54-19-167158	54-02031	200–200	—	—	—	0.36	—	1	—	0.011	1.6	14	—	5.5	0.24	—	—	—	26
MD54-19-167159	54-02031	220–220	0.008 (J)	—	—	0.32	—	1	—	0.011	1.6	13	—	5.1	0.24	—	—	—	24
MD54-19-167160	54-02031	260–260	0.0061 (J)	—	—	0.26	—	0.81	—	0.0093 (J)	1.5	11	—	4.4	0.22	—	—	—	21
MD54-19-167238	54-02034	20–20	—	—	—	—	—	0.076	—	—	0.045	1.7	—	0.47	0.012 (J)	—	—	—	2
MD54-19-167239	54-02034	60–60	—	—	—	—	—	0.12	—	—	0.071	3	—	0.82	0.02	—	—	—	4
MD54-19-167240	54-02034	100–100	—	—	—	—	—	0.18	—	—	0.11	4.4	—	1.2	0.035	—	—	—	7
MD54-19-167241	54-02034	160–160	—	—	—	0.061 (J)	—	0.17	—	—	0.19	5.8	—	1.4	—	—	—	—	8
MD54-19-167242	54-02034	200–200	—	—	—	0.059 (J)	—	0.14	—	—	0.21	5.1	—	1.2	0.068	—	—	—	8
MD54-19-167243	54-02034	220–220	—	—	—	0.042 (J)	—	0.11	—	—	0.2	4.4	—	1	0.066	—	—	—	7
MD54-19-167244	54-02034	260–260	—	—	—	0.0099 (J)	—	0.035	—	—	0.11	1.4	—	0.34	0.05	—	—	—	3
MD54-19-167245	54-02034	300–300	—	—	—	—	—	0.0056 (J)	—	—	0.038	0.22	—	0.052	0.02	—	—	—	0
MD54-19-167293	54-02089	13–13	—	—	—	—	—	6.1	—	—	34	270	0.25	110	9.4	—	—	—	456
MD54-19-167294	54-02089	31–31	—	—	—	—	—	5.6	—	0.35 (J)	51	770	0.84 (J)	76	7.4	—	—	—	968

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167295	54-02089	46–46	—	—	—	—	—	6.3	—	0.34 (J)	71	1400	1.4	79	5.4	—	—	—	1663
MD54-19-167296	54-02089	86–86	0.21 (J)	—	—	—	—	12	—	—	92	840	1.5	120	3.6	0.2 (J)	—	—	1218
MD54-19-167301	54-24238	44–44	—	—	—	—	—	6.2	—	0.26 (J)	76	1300	1.4	64	4.7	—	—	—	1561
MD54-19-167302	54-24238	64–64	—	—	—	20	—	7.6	—	0.18 (J)	94	780	0.82 (J)	69	2.5	—	—	—	1090
MD54-19-167303	54-24238	84–84	0.27 (J)	—	—	4.2	—	12	—	—	110	640	—	100	2.4	—	—	—	1030
MD54-19-167297	54-24239	25–25	—	—	—	—	—	37	—	—	3.2	16	—	12	0.22	—	—	—	73
MD54-19-167298	54-24239	50–50	—	—	—	—	—	43	—	—	3.6	19	0.0094 (J)	14	0.25	—	—	—	86
MD54-19-167299	54-24239	75–75	—	—	—	—	—	44	—	—	3.9	22	0.0093 (J)	16	0.28	—	—	—	93
MD54-19-167300	54-24239	99.5–99.5	—	—	—	—	—	44	—	—	4.2	26	0.01 (J)	18	0.32	—	—	—	101
MD54-19-167287	54-24240	28–28	—	—	—	0.069 (J)	—	8.1	—	—	14	160	—	98	0.91	0.1	—	—	312
MD54-19-167288	54-24240	53–53	—	0.037 (J)	—	0.088 (J)	—	6.8	0.088 (J)	0.023 (J)	17	130	—	78	0.88	—	—	0.031 (J)	272
MD54-19-167289	54-24240	78–78	—	—	—	—	—	6.3	0.19 (J)	—	11	59	—	38	0.41 (J)	—	—	—	137
MD54-19-167290	54-24240	103–103	—	—	—	—	—	6.9	—	—	7.3	48	—	28	0.43 (J)	—	—	—	107
MD54-19-167291	54-24240	128–128	—	—	—	—	—	6.2	—	—	5	42	—	22	0.42 (J)	—	—	—	89
MD54-19-167292	54-24240	153–153	—	—	—	—	—	6	—	—	4.4	43	—	22	0.47	—	—	—	88
MD54-19-167161	54-24241	73–73	—	—	—	—	—	19	—	—	19	79	0.036 (J)	38	1	—	—	—	191
MD54-19-167162	54-24241	93–93	—	—	—	0.085 (J)	—	16	—	—	18	63	0.031 (J)	32	0.86	—	—	—	163
MD54-19-167163	54-24241	113–113	—	—	—	—	—	13	—	—	10	40	0.015 (J)	21	0.64	—	—	—	98
MD54-19-167164	54-24241	133–133	—	—	—	0.018 (J)	—	14	—	0.0088 (J)	9.1	42	0.01 (J)	22	0.81	—	—	—	100
MD54-19-167165	54-24241	153–153	0.011 (J)	—	—	0.28	—	12	—	0.07	8.6	43	0.0068 (J)	22	0.91	—	—	—	99
MD54-19-167166	54-24241	173–173	0.014 (J)	—	—	0.55	—	13	—	0.092	9.9	47	—	25	1	—	—	—	110
MD54-19-167167	54-24241	193–193	—	—	—	0.15	—	13	—	0.019 (J)	10	49	—	26	1.1	—	—	—	113
MD54-19-167204	54-24242	25–25	—	—	—	—	—	26	—	—	1.2	5.7	—	5.3	0.088	—	—	—	40
MD54-19-167205	54-24242	50–50	—	—	—	0.21	—	64	0.041 (J)	0.0094 (J)	6.3	32	0.015 (J)	23	0.42	—	—	—	136
MD54-19-167206	54-24242	75–75	—	—	—	0.09 (J)	—	40	—	—	5.4	24	0.011 (J)	16	0.32	—	—	—	93
MD54-19-167207	54-24242	100–100	—	—	—	—	—	81	—	—	4.1	19	0.013 (J)	15	0.24	—	—	—	125
MD54-19-167208	54-24242	110.5–110.5	—	—	—	0.13 (J)	—	61	—	—	6.3	34	0.014 (J)	25	0.42	—	—	—	138

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167209	54-24243	25–25	—	—	—	—	—	2.6	—	—	20	76	0.038 (J)	24	0.83	—	—	—	133
MD54-19-167210	54-24243	50–50	—	—	—	—	—	3.4	—	—	45	160	0.11	46	1.4	—	—	—	280
MD54-19-167211	54-24243	75–75	—	—	—	—	—	2.1	—	—	31	95	0.053 (J)	27	0.81	—	—	—	173
MD54-19-167212	54-24243	100–100	0.037 (J)	—	—	0.46	—	4.1	—	—	55	130	0.09	43	1.3	—	—	—	268
MD54-19-167213	54-24243	125–125	—	—	—	0.081 (J)	—	4.2	—	—	51	100	0.078 (J)	38	1.3	—	—	—	222
MD54-19-167304	54-24399	566.3–566.3	—	—	—	0.0099 (J)	—	0.15	—	0.0082 (J)	0.091	0.35	—	0.24	0.012	—	—	—	1
MD54-19-167305	54-24399	587.3–587.3	—	—	—	0.0075 (J)	—	0.12	—	0.0093	0.075	0.27	—	0.19	0.01	—	—	—	1
MD54-19-167168	54-27641	32–32	—	—	—	—	—	3.9	—	—	8.3	110	—	73	0.41 (J)	—	—	—	208
MD54-19-167169	54-27641	82–82	—	—	—	—	—	4	—	—	5.1	44	—	16	0.3 (J)	—	—	—	81
MD54-19-167170	54-27641	115–115	—	—	—	—	—	3.6	—	—	3.9	34	—	15	0.29 (J)	—	—	—	68
MD54-19-167171	54-27641	182–182	—	—	—	2	—	4.1	—	—	2.9	45	—	18	0.49	—	—	—	85
MD54-19-167172	54-27641	232–232	—	—	—	1.8	—	3.2	—	—	3.1	45	—	20	0.51	—	—	—	84
MD54-19-167173	54-27641	271–271	—	—	—	0.86 (J)	—	1.8	—	—	2.3	27	—	11	0.45	—	—	—	51
MD54-19-167174	54-27641	332.5–332.5	—	—	—	0.059 (J)	—	0.31	—	—	0.77	3.4	—	1.6	0.14	—	—	—	8
MD54-19-167175	54-27642	30–30	—	—	—	—	—	5.9	—	—	76	120	—	51	1.1	0.039 (J)	—	—	296
MD54-19-167176	54-27642	75–75	0.072 (J)	—	—	0.076 (J)	—	6.6	—	—	47	110	—	45	1.4	—	—	—	251
MD54-19-167178	54-27642	175–175	0.13 (J)	—	—	16	—	5.5	—	1.3	24	81	—	39	2	—	0.32 (J)	0.15 (J)	205
MD54-19-167179	54-27642	235–235	0.13 (J)	—	—	11	—	3.8	—	0.58	23	62	—	31	2	—	—	—	159
MD54-19-167180	54-27642	275–275	0.15 (J)	—	—	0.85	—	7.6	0.22	0.045 (J)	36	120	—	57	2	—	—	—	275
MD54-19-167181	54-27642	338–338	0.11	0.032 (J)	—	0.5	—	5.6	0.44	—	42	100	—	43	1.3	0.047 (J)	—	—	239
MD54-19-167182	54-27643	30–30	—	—	—	—	—	1.9	0.0078 (J)	0.0059 (J)	5.8	17	0.058	6.7	0.24	—	—	—	38
MD54-19-167183	54-27643	74–74	0.009 (J)	—	—	0.18	—	2.6	1.5	0.032	8.8	29	0.08	10	0.44	—	0.061	—	63
MD54-19-167184	54-27643	117–117	0.01 (J)	—	—	0.62	—	2.6	0.53	0.069	9.9	36	0.094	13	0.69	—	0.11	—	76
MD54-19-167185	54-27643	167–167	0.032 (J)	—	—	3.3	—	2.4	—	0.38	11	42	0.042	16	1.1	—	0.16	0.013 (J)	90
MD54-19-167186	54-27643	235–235	0.026	0.013 (J)	—	5.3	—	1.4	—	0.19	7.5	25	—	12	1	—	0.061	0.0061 (J)	61
MD54-19-167187	54-27643	275–275	0.017	0.0089 (J)	—	3.3	—	0.95	0.033	0.0071 (J)	6.1	17	0.0041 (J)	9.1	0.94	—	0.011 (J)	—	45
MD54-19-167214	54-610786	25–25	—	—	—	—	—	2	—	0.0029 (J)	6.1	16	0.057	7.5	0.16	—	—	—	37

Table 5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Isopropylbenzene	Methylene Chloride	Propylbenzene[1-]	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-19-167215	54-610786	50–50	—	—	—	0.11	—	3.7	—	0.0083 (J)	10	28	0.1	11	0.33	—	—	—	64
MD54-19-167216	54-610786	75–75	0.01 (J)	—	—	0.44	—	3.5	2.5	0.082	11	31	0.11	12	0.41	—	0.11	—	73
MD54-19-167217	54-610786	100–100	0.013 (J)	—	—	0.76	—	2.9	3.8	0.085	10	30	0.098	12	0.46	—	0.12	—	72
MD54-19-167218	54-610786	118.5–118.5	0.021 (J)	—	—	1.2	—	3.1	2.1	0.082	12	37	0.099	14	0.66	—	0.15	—	83

Notes: Results are in ppmv. Data qualifiers are presented in Appendix A.

* — = Not detected.

Table 5.2-2
Second Round VOC Pore Gas Detected Results at MDA L (in ppmv)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethanol	Ethylbenzene
MD54-20-191636	54-24238	44–44	—*	0.18	—	0.58	—	5.5	17	0.91	15	23	14	—	—	43	—	—	—
MD54-20-191637	54-24238	64–64	—	0.43	—	0.68	—	7.5	17 (J)	1.3	13	35	16	—	—	59	—	—	—
MD54-20-191638	54-24238	84–84	—	0.23 (J)	—	0.51	—	7	12 (J)	1.1	8.9	30	14	—	—	40	—	—	—
MD54-20-191642	54-24240	28–28	—	0.11 (J)	—	0.48	0.067 (J)	3.9	0.85 (J)	0.47	9.4	3.6	1	—	—	0.1 (J)	—	—	—
MD54-20-191643	54-24240	53–3	—	0.15 (J)	—	0.66	0.17 (J)	8.2	2.7	0.76	8.9	9.2	1.7	—	—	0.17 (J)	0.32 (J)	—	—
MD54-20-191644	54-24240	78–78	—	0.34	—	0.25	0.06 (J)	5.6	2.2	0.4	4.9	6.4	2.8	0.028 (J)	—	0.27	0.19 (J)	—	—
MD54-20-191645	54-24240	103–103	—	0.14	—	0.13	0.033 (J)	3	1.2	0.29	3.2	4.7	4.1	—	—	0.32	0.14 (J)	—	—
MD54-20-191646	54-24240	128–128	—	0.093	—	0.14	0.023 (J)	1.7	0.68	0.25	2.7	3.2	5.6	—	—	0.33	—	—	—
MD54-20-191647	54-24240	153–153	—	0.087	—	0.13	0.021 (J)	1.4	0.58	0.28	2.8	1.6	6.4	—	—	0.32	—	—	—
MD54-20-191654	54-24241	73–73	—	0.044	—	0.28	—	2.6	2.3 (J)	0.23	2.2	9.7	2.3	—	0.038 (J)	2.9	0.45	—	—
MD54-20-191655	54-24241	93–93	—	0.026	—	0.14	—	1.6	1.2 (J)	0.17	1.3	6.2	1.6	—	0.02 (J)	2	1.9	—	—
MD54-20-191656	54-24241	113–113	—	0.1	—	0.16	—	1.6	1.1 (J)	0.16	1.3	1.4	5.2	—	0.019 (J)	1.4	0.21	—	—
MD54-20-191657	54-24241	133–133	—	0.037	—	0.1	—	1.6	1 (J)	0.18	1.3	3.9	2.5	—	0.017 (J)	2	0.26	—	—
MD54-20-191658	54-24241	153–153	—	0.041	—	0.076	0.004 (J)	0.77	0.51 (J)	0.087	0.64	0.75	2.3	—	0.0097 (J)	0.7	0.045 (J)	—	—
MD54-20-191659	54-24241	173–173	—	0.12	—	0.17	0.012 (J)	1.7	1.1 (J)	0.18	1.4	1.7	5.8	—	0.02 (J)	1.5	0.16	—	—
MD54-20-191660	54-24241	193–193	—	0.05	—	0.12	0.0039 (J)	1.1	0.71 (J)	0.11	0.86	0.9	3.6	—	0.015	0.92	0.15	—	—
MD54-20-191668	54-24399	567–567	0.022 (J)	0.0037 (J)	0.0057 (J)	0.0018 (J)	—	0.012 (J)	—	0.0055 (J)	0.016	0.019	0.048	—	—	0.013 (J)	—	—	—
MD54-20-191669	54-24399	588–588	0.0086 (J)	—	—	0.0017 (J)	—	0.015	—	0.0058 (J)	0.02	0.032	0.047	—	—	0.015 (J)	—	—	—
MD54-20-191672	54-27641	32–32	—	—	—	0.0066 (J)	0.0069 (J)	0.046	0.057	0.0085 (J)	0.24	0.083	0.04	—	—	0	—	—	—
MD54-20-191673	54-27641	82–82	—	0.035	—	0.033	0.026 (J)	0.41	0.68	0.071	1	1.6	0.53	—	—	0.061	0.036 (J)	—	—
MD54-20-191674	54-27641	115–115	—	0.021 (J)	—	0.026	0.012 (J)	0.32	0.41	0.062	0.72	1.4	0.73	—	—	0.073	—	—	—
MD54-20-191675	54-27641	182–182	—	0.0095 (J)	—	0.017	0.002 (J)	0.097	0.054	0.034	0.33	0.44	0.85	—	—	0.04	—	—	—
MD54-20-191676	54-27641	232–232	—	0.031 (J)	—	0.07	0.0083 (J)	0.27	0.2	0.12	1.1	0.54	3.3	—	—	0.076	—	—	—
MD54-20-191677	54-27641	271–271	—	0.0075 (J)	—	0.022	—	0.047	0.05	0.051	0.22	0.026	1.3	—	—	0.0082 (J)	—	—	—
MD54-20-191678	54-27641	332.5–332.5	—	—	—	0.008 (J)	—	0.01 (J)	0.016	0.018	0.035	0.021	0.37	—	—	0	—	—	—
MD54-20-191686	54-27642	30–30	—	—	—	1.5	—	9.6	3.7 (J)	0.62	2.6	4.2	5.6	—	—	10	—	—	—

Table 5.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroform	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,1-]	Dichloroethane[1,2-]	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloroethene[trans-1,2-]	Dichloropropane[1,2-]	Dioxane[1,4-]	Ethanol	Ethylbenzene
MD54-20-191687	54-27642	75–75	—	0.063 (J)	—	0.72	—	8.8	3.6 (J)	0.84	4	4.3	11	—	—	20	—	—	—
MD54-20-191688	54-27642	116–116	—	0.03 (J)	—	0.38	—	5	2 (J)	0.14	2.4	2.8	4	—	—	7.8	—	—	—
MD54-20-191689	54-27642	175–175	—	0.56	—	0.48	0.16	4.9	2.4 (J)	0.38	2.5	4	12	—	—	8	—	—	0.053 (J)
MD54-20-191690	54-27642	235–235	0.037 (J)	0.0058 (J)	—	0.0072 (J)	—	0.06	0.034 (J)	0.0059 (J)	0.025	0.042	0.13	—	—	0.09	—	0.66	0.0048 (J)
MD54-20-191691	54-27642	275–275	—	0.082 (J)	—	0.57	—	6.8	3.1 (J)	0.58	3.4	0.47	12	—	—	15	—	—	—
MD54-20-191692	54-27642	338–338	—	0.12 (J)	—	0.82	—	9	4.4 (J)	0.96	3.7	9.2	12	—	—	19	—	—	—

Table 5.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Methylene Chloride	Propanol[2-]	Styrene	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-20-191636	54-24238	44–44	—	—	—	—	—	7.1	—	—	47	510	1.6	62	11	—	—	—	—	758
MD54-20-191637	54-24238	64–64	—	—	12	—	—	9.1	—	—	66	540	1.1	71	5.6	—	—	—	—	855
MD54-20-191638	54-24238	84–84	—	—	1.4 (J)	—	—	8	—	—	56	400	0.74	59	3.2	—	—	—	—	642
MD54-20-191642	54-24240	28–28	—	—	—	—	—	7.4	—	—	12	130	—	280	0.93	—	—	—	—	450
MD54-20-191643	54-24240	53–53	—	—	—	—	—	7.5	—	—	17	130	—	160	0.99	—	—	—	—	348
MD54-20-191644	54-24240	78–78	0.063 (J)	—	—	—	—	7.4	—	—	11	76	0.046 (J)	57	0.52	—	—	—	—	175
MD54-20-191645	54-24240	103–103	—	0.02 (J)	—	—	—	7.1	0.05 (J)	—	6.6	55	0.029 (J)	34	0.46	—	—	—	—	121
MD54-20-191646	54-24240	128–128	—	0.015 (J)	—	—	—	6.6	—	0.017 (J)	4.9	52	0.024 (J)	26	0.49	—	—	0.0098 (J)	0.018 (J)	105
MD54-20-191647	54-24240	153–153	—	—	—	—	—	6.7	—	—	4.9	54	0.015 (J)	25	0.54	—	—	—	—	105
MD54-20-191654	54-24241	73–73	—	—	0.26	—	—	9.9	—	—	9.3	54	—	21	0.67	—	—	—	—	118
MD54-20-191655	54-24241	93–93	—	—	1.2	0.062 (J)	—	7	—	—	6.3	32	—	14	0.4	—	—	—	—	77
MD54-20-191656	54-24241	113–13	—	0.0067 (J)	0.32	—	—	7.9	—	0.032	5.9	32	—	16	0.68	—	—	—	—	75
MD54-20-191657	54-24241	133–133	—	—	0.022 (J)	—	—	7.4	—	—	5.8	30	—	14	0.45	—	—	—	—	71
MD54-20-191658	54-24241	153–153	—	—	0.12	—	—	3.8	—	0.015	2.8	15	—	7.4	0.32	—	—	—	—	35
MD54-20-191659	54-24241	173–173	—	0.006 (J)	0.59	—	—	8.5	—	0.059	6.3	33	—	18	0.71	—	0.011 (J)	—	—	81
MD54-20-191660	54-24241	193–193	—	0.0035 (J)	0.1	—	—	5.3	—	0.01 (J)	3.8	21	—	11	0.46	—	—	—	—	50
MD54-20-191668	54-24399	567–567	—	—	0.018 (J)	0.14	—	0.11	—	0.032	0.068	0.25	—	0.16	0.01 (J)	—	—	—	—	1
MD54-20-191669	54-24399	588–588	—	—	0.019 (J)	0.01 (J)	—	0.13	—	0.018	0.068	0.31	—	0.2	0.011 (J)	—	—	—	—	1
MD54-20-191672	54-27641	32–32	—	—	—	—	—	0.19	—	—	0.25	3.6	—	11	0.016 (J)	—	—	—	—	16
MD54-20-191673	54-27641	82–82	0.03 (J)	—	0.081 (J)	—	—	1.7	—	0.0064 (J)	1.8	18	0.0074 (J)	20	0.097	—	—	—	—	46
MD54-20-191674	54-27641	115–115	—	—	0.036 (J)	—	—	1.4	—	—	1.4	14	0.0066 (J)	7.6	0.094	—	—	—	—	28
MD54-20-191675	54-27641	182-182	—	0.0018 (J)	0.28	—	—	0.63	—	0.0038 (J)	0.45	6.8	—	2.6	0.067	—	—	—	—	13
MD54-20-191676	54-27641	232–232	—	0.0057 (J)	0.92	—	—	2.1	—	0.018 (J)	1.7	26	—	19	0.26	—	—	—	—	56
MD54-20-191677	54-27641	271–271	—	—	0.21	—	—	0.43	—	0.0044 (J)	0.48	5.6	—	2.3	0.094	—	—	—	—	11
MD54-20-191678	54-27641	332.5–332.5	—	—	0.02 (J)	—	—	0.088	—	—	0.19	0.93	—	0.65	0.038	—	—	—	—	2
MD54-20-191686	54-27642	30–30	—	—	—	1.1	—	5.2	—	—	54	120	—	42	1.6	—	—	—	—	262

Table 5.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Hexane	Isooctane	Methylene Chloride	Propanol[2-]	Styrene	Tetrachloroethene	Tetrahydrofuran	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethane[1,1,2-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Vinyl Chloride	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Total VOCs
MD54-20-191687	54-27642	75–75	—	—	0.13 (J)	—	—	6.3	—	—	41	110	0.25	44	1.3	—	—	—	—	256
MD54-20-191688	54-27642	116–116	—	—	—	—	—	3.8	—	—	8.6	66	—	28	0.27	—	—	—	—	131
MD54-20-191689	54-27642	175–175	0.16	0.059 (J)	12	—	—	4.2	—	0.92	19	74	0.1	31	1.8	0.024 (J)	—	0.26	0.1	179
MD54-20-191690	54-27642	235–235	—	—	0.11	0.02 (J)	0.0086 (J)	0.042	—	0.02	0.3	0.95	—	0.37	0.021	—	—	0.004 (J)	0.0075 (J)	3
MD54-20-191691	54-27642	275–275	—	—	—	—	—	5.4	—	—	29	90	0.23	39	1.5	—	—	—	—	207
MD54-20-191692	54-27642	338–338	—	—	0.38 (J)	—	—	6.2	—	—	50	130	0.26	44	1.3	—	—	—	—	291

Notes: Results are in ppmv. Data qualifiers are presented in Appendix A.

* — = Not detected.

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

ADR	Automated Data Review
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylene
COC	chain of custody
Consent Order	Compliance Order on Consent
DCA	dichloroethane
DCE	dichloroethene
DCP	dichloropropane
DOE	Department of Energy (U.S.)
EDD	electronic data deliverable
EIM	Environmental Information Management (database)
EPA	Environmental Protection Agency (U.S.)
FB	field blank
FD	field duplicate
LANL	Los Alamos National Laboratory
MCL	maximum contaminant level
MDA	material disposal area
N3B	Newport News Nuclear BWXT-Los Alamos, LLC
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NS	not sampled
PCE	tetrachloroethene
PID	photoionization detector
PMR	periodic monitoring report
QA	quality assurance
QC	quality control
SCL	sample collection log
SL	screening level
slpm	standard liters per minute
SMO	Sample Management Office
SOP	standard operating procedure
SQL	Structured Query Language
SWMU	solid waste management unit
TCA	trichloroethane

TCE	trichloroethene
VISL	vapor intrusion screening level
VOC	volatile organic compound

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft.)
meters (m)	3.281	feet (ft.)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft.)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb.)
grams (g)	0.0353	ounces (oz.)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot ($lb./ft^3$)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
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.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control parameters.

Appendix B

Field Methods

B-1.0 INTRODUCTION

This appendix summarizes the field methods used during the calendar year 2019 sampling activities at Material Disposal Area (MDA) L Solid Waste Management Unit 50-006, in Technical Area 54 at Los Alamos National Laboratory (LANL or the Laboratory). All activities were conducted in accordance with the applicable standard operating procedures (SOPs), quality procedures, and Newport News Nuclear BWXT-Los Alamos, LLC (N3B) implementation and procedural requirements. Table B-1.0-1 summarizes the field methods used, Table B-1.0-2 lists the applicable procedures, and Table B-1.0-3 lists the field screening data.

B-2.0 FIELD METHODS

All work was conducted according to site-specific health and safety documents and an integrated work document. The field activities conducted according to SOPs are discussed below.

B-2.1 Volatile Organic Compound Pore-Gas Sample Collection

Samples were collected following purging of the sample port and stabilization of field parameters. Monitored field parameters include static pressure of port, purge flow rate, methane, carbon dioxide, oxygen, and volatile organic compounds (VOCs). Each port was purged for a minimum of 10 min, after which oxygen, carbon dioxide, and VOCs were monitored to ensure levels were stable before sample collection. A minimum sample purge flow rate of 0.3 standard liters per minute (slpm) is required for collection. Ports with purge flow rates of less than 0.3 slpm were considered plugged and not sampled. A MultiRAE gas detector was used to screen for oxygen, carbon dioxide, and VOCs. Once stabilization occurred, the sample was collected in a SUMMA canister. Field crews noted the pressure measurements of the SUMMA canister before and after the sample was taken and noted all field parameters . Field duplicates were collected immediately following the original sample. Field blanks were collected with the use of ultrapure nitrogen gas (99.9%). Information was recorded on the appropriate sample collection logs (SCLs). Field chain-of-custody (COC) forms and SCLs are provided in Appendix E (on CD included with this document).

All VOC samples were collected in accordance with the current version of N3B-SOP-ER-2008, “Sampling Subsurface Vapor.”

All samples were submitted to the N3B Sample Management Office (SMO) for processing and transport to off-site contract analytical laboratories.

B-2.2 Volatile Organic Compound Pore-Gas Field Screening

All VOC samples were field screened in accordance with the current version of N3B-SOP-ER-2008, “Sampling Subsurface Vapor.” This procedure covers the use of the MultiRAE IR Multi-Gas Monitor. All field screening results were recorded on the appropriate SCLs in the field logbook and/or in tables and are provided in Appendix E (on CD included with this document).

Before each sampling event, each sampling port was purged of stagnant air and then monitored with a MultiRAE IR Multi-Gas Monitor until the percent carbon dioxide (%CO_2) and percent oxygen (%O_2) levels stabilized at values representative of subsurface pore-gas conditions. In addition, VOC concentrations were estimated in parts per million using the MultiRAE IR Multi-Gas Monitor equipped with an 11.7-electonvolt lamp photoionization detector (PID). Each rented instrument was shipped factory-calibrated to the subcontractor, and the calibration was checked daily.

Oxygen values should be near the zero point for O_2. The CO_2 reading should be near zero. Readings deviating from the zero points for O_2 and CO_2 may be because of subsurface conditions or a need for calibration.

Drawing sufficient air from the sampling interval through the line ensured that the vapor-sample tubing was purged of stagnant air. To ensure that the sample collected was representative of the subsurface air at depth, every sampling activity included a purge cycle.

The %CO_2 and %O_2 screening levels are presented in Table B.1-0.3.

B-2.3 Tritium Pore-Gas Sample Collection

All tritium samples were collected in accordance with the current version of N3B-SOP-ER-2008. Silica gel was the medium used to collect moisture from pore-gas samples. To collect water vapor intended for tritium analysis from pore gas, a pore-gas sample was pulled through a canister of silica gel (silica-gel column), and the sample information was recorded on the appropriate SCL (included in Appendix E [on CD included with this document]). The moisture was analyzed for tritium by means of liquid scintillation counting. Silica-gel column field duplicate samples were also collected at a frequency greater than or equal to 10% per sampling event in accordance with the current version of N3B-ER-SOP-20235, “Sample Containers, Preservation, and Field Quality Control.”

Silica gel was prepared for sampling by drying at a temperature above 100°C. Drying removes moisture from the silica gel but does not remove bound water, as demonstrated when the bound water percentage in each batch of silica gel is measured. Before sample collection, the amount of silica gel used in each sample was weighed (typically about 135 g). The sample canister with silica gel was also weighed before sampling. N3B-SOP-ER-2008 requires that at least 5 g of moisture be collected. After sampling, the sample canister with silica gel was weighed again to verify that 5 g of water vapor had been collected.

The sample (canister plus silica gel) was shipped to the analytical laboratory where it was weighed again. The silica gel was emptied into a distillation apparatus and heated to 110°C, driving moisture off the silica gel. This moisture was collected and analyzed for tritium by liquid scintillation. The analytical laboratory also weighed the empty canister and calculated the percent moisture of the sample as the amount of moisture collected divided by the calculated weight of the wet silica gel. The value of the tritium activity and the calculated percent moisture were reported to N3B in the analytical data package and the electronic data deliverable.

Table B-1.0-1
Summary of Field Methods

Method	Summary
General Instructions for Field Investigations	General instructions for field investigations (e.g., pre-work briefings, plan-of-the-day meetings, tailgate meetings) provide an overview of instructions regarding activities performed before, during, and after field investigations. Field investigations are assumed to involve standard sampling equipment, personal protective equipment, waste management, and site-control equipment/materials; and general fieldwork guidance covers premobilization activities, mobilization to the site, documentation and sample collection activities, sample media evaluation, surveillance, and completion of lessons learned.
Sample Containers and Preservation	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on the U.S. Environmental Protection Agency guidance for environmental sampling, preservation, and quality assurance. Specific requirements were met for each sample and were printed in the SCLs provided by N3B's SMO (size and type of container, preservatives, etc.).
Handling, Packaging, and Transporting Field Samples	Field team members sealed and labeled samples before packing to ensure sample and transport containers were free of external contamination. All environmental samples were collected, preserved, packaged, and transported to the SMO under COC (N3B-ER-SOP 10094 R1, "Sample Receiving and Shipping by the N3B Sample Management Office"). The SMO arranged for shipping of the samples to analytical laboratories. Any levels of radioactivity (i.e., action-level or limited-quantity ranges) were documented in SCLs submitted to the SMO.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented in standard forms generated by the SMO. These forms include SCLs, COC forms, sample container labels, and custody seals. Collection logs were completed at the time of sample collection and were signed by the sampler and a reviewer who verified the logs for completeness and accuracy. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around container lids or openings. COC forms were completed and signed to verify that the samples were not left unattended.
Field Quality Control Samples	Field quality control samples were collected as follows: Field duplicates were collected at a frequency of 10% and at the same time as a regular sample and submitted for the same analyses. Field blanks required for all field events that include collecting samples for VOC analyses were collected. Field blanks were kept with the other sample containers during the sampling process and were submitted for laboratory analyses.
Sampling Subsurface Vapor	Vapor sampling was performed at 28 monitoring wells in accordance with the current version of N3B-SOP-ER-2008, and samples were analyzed for VOCs and tritium. This SOP describes the process of sampling subsurface air from vapor ports in monitoring wells and boreholes. The procedure covers presampling activities, sampling to detect and quantify gaseous organic concentration in air, SUMMA sampling (a passive collection and containment system of laboratory-quality air samples), adsorbent column sampling, sampling through the packer system (a sampling system that uses inflatable bladders to seal off a desired interval in an open borehole or at the end of a drill casing to obtain a sample from a discrete section), and post-sampling activities.

Table B-1.0-2
List of Procedures Used for MDA L Pore-Gas Monitoring Activities

Document Number	N3B Procedure Title
N3B-AP-ER-1002	Environmental Remediation (ER) Field Work Requirements
N3B-ER-SOP-20235	Sample Containers, Preservation, and Field Quality Control
N3B-ER-SOP-10093, R1	Sample Control and Field Documentation
N3B-SOP-ER-2002	Field Decontamination of Equipment
N3B-SOP-ER-2008	Sampling Subsurface Vapor
N3B-P101-6	Personal Protective Equipment
N3B-ER-SOP-20145	Requesting and Managing Data Sets
N3B-POL-QAT-0019	Investigation of Abnormal Events
N3B-OIO-SOP-5269	Chain-of-Custody and Final Records Preparation for Analytic Data
N3B-ER-SOP10094, R1/ N3B-SOP-SDM-1002	Sample Receiving and Shipping by the N3B Sample Management Office
N3B-AP-ER-1001	Environmental Remediation Project Preparedness Review
N3B-EP-DIR-SOP-10021, R1	Characterization and Management of Environmental Programs Waste

Table B-1.0-3
Field-Screening Results with MultiRAE IR Multi-Gas Monitor

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-01015	45	CH_4 (%)	0	NS[b]
		CO_2 (ppm)	1280	NS
		O_2 (%)	20.9	NS
		VOC (ppm)[c]	0.5	NS
	187	CH_4 (%)	0	NS
		CO_2 (ppm)	1500	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	2.7	NS
	350	CH_4 (%)	0	NS
		CO_2 (ppm)	1870	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0.2	NS
	385	CH_4 (%)	0	NS
		CO_2 (ppm)	1280	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
	435	CH_4 (%)	0	NS
		CO_2 (ppm)	1310	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-01015 (cont.)	485	CH_4 (%)	0	NS
		CO_2 (ppm)	1120	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
	525	CH_4 (%)	0	NS
		CO_2 (ppm)	1340	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
54-01016	30.8	CH_4 (%)	0	NS
		CO_2 (ppm)	2650	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	3.5	NS
	162.2	CH_4 (%)	0	NS
		CO_2 (ppm)	4150	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	27.1	NS
	274.7	CH_4 (%)	0	NS
		CO_2 (ppm)	2050	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	4.4	NS
	336.3	CH_4 (%)	0	NS
		CO_2 (ppm)	1590	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
	414.3	CH_4 (%)	0	NS
		CO_2 (ppm)	n/a[d]	NS
		O_2 (%)	n/a	NS
		VOC (ppm)	n/a	NS
	459.5	CH_4 (%)	0	NS
		CO_2 (ppm)	n/a	NS
		O_2 (%)	n/a	NS
		VOC (ppm)	n/a	NS
	517.6	CH_4 (%)	0	NS
		CO_2 (ppm)	640	NS
		O_2 (%)	21.2	NS
		VOC (ppm)	0	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02001	20	CH_4 (%)	n/a	NS
		CO_2 (ppm)	n/a	NS
		O_2 (%)	n/a	NS
		VOC (ppm)	n/a	NS
	40	CH_4 (%)	0	NS
		CO_2 (ppm)	4650	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	57.5	NS
	80	CH_4 (%)	0	NS
		CO_2 (ppm)	6250	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	45.3	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	6390	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	74.1	NS
	120	CH_4 (%)	0	NS
		CO_2 (ppm)	6390	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	74.1	NS
	140	CH_4 (%)	0	NS
		CO_2 (ppm)	6390	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	130	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	7300	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	130	NS
54-02002	40	CH_4 (%)	0	NS
		CO_2 (ppm)	8420	NS
		O_2 (%)	20	NS
		VOC (ppm)	8.6	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	7160	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	11.6	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02002 (cont.)	80	CH_4 (%)	0	NS
		CO_2 (ppm)	5970	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	12.9	NS
	120	CH_4 (%)	0	NS
		CO_2 (ppm)	5900	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	21.1	NS
	140	CH_4 (%)	0	NS
		CO_2 (ppm)	5900	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	15.3	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4640	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	24.4	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	4280	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	23.6	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4370	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	22.9	NS
54-02016	31	CH_4 (%)	0	NS
		CO_2 (ppm)	21,800	NS
		O_2 (%)	17.5	NS
		VOC (ppm)	96	NS
54-02020	20	CH_4 (%)	0	NS
		CO_2 (ppm)	3310	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	4.3	NS
	40	CH_4 (%)	0	NS
		CO_2 (ppm)	3970	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	9.5	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02020 (cont.)	60	CH_4 (%)	0	NS
		CO_2 (ppm)	4020	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	12.1	NS
	80	CH_4 (%)	0	NS
		CO_2 (ppm)	4150	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	15.3	NS
	95	CH_4 (%)	0	NS
		CO_2 (ppm)	4240	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	17.2	NS
	120	CH_4 (%)	0	NS
		CO_2 (ppm)	4280	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	21.9	NS
	140	CH_4 (%)	0	NS
		CO_2 (ppm)	4200	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	25	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4240	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	27.5	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	3970	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	28	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	3840	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	28.3	NS
54-02021	20	CH_4 (%)	0	NS
		CO_2 (ppm)	4950	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	0.8	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02021 (cont.)	140	CH_4 (%)	0	NS
		CO_2 (ppm)	4200	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	9	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4770	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	2.6	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	4240	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	10.9	NS
	198	CH_4 (%)	0	NS
		CO_2 (ppm)	4110	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	15.4	NS
54-02022	40	CH_4 (%)	0	NS
		CO_2 (ppm)	8420	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	8.6	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	7160	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	11.6	NS
	80	CH_4 (%)	0	NS
		CO_2 (ppm)	5970	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	12.9	NS
	120	CH_4 (%)	0	NS
		CO_2 (ppm)	5900	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	21.1	NS
	140	CH_4 (%)	0	NS
		CO_2 (ppm)	5900	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	15.3	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02022 (cont.)	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4640	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	24.4	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	4280	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	23.6	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4370	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	22.9	NS
54-02023	20	CH_4 (%)	0	NS
		CO_2 (ppm)	9570	NS
		O_2 (%)	19.8	NS
		VOC (ppm)	1.2	NS
	40	CH_4 (%)	0	NS
		CO_2 (ppm)	9500	NS
		O_2 (%)	19.8	NS
		VOC (ppm)	2	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	670	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0.3	NS
	80	CH_4 (%)	0	NS
		CO_2 (ppm)	7930	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	3.3	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	7020	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	4.1	NS
	159	CH_4 (%)	0	NS
		CO_2 (ppm)	5060	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	8.2	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02023 (cont.)	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4240	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	9.2	NS
54-02024	20	CH_4 (%)	0	NS
		CO_2 (ppm)	4110	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	1.5	NS
	40	CH_4 (%)	0	NS
		CO_2 (ppm)	4370	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	2	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	4640	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	2.9	NS
	80	CH_4 (%)	0	NS
		CO_2 (ppm)	5000	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	4.2	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	4950	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	5.4	NS
	140	CH_4 (%)	0	NS
		CO_2 (ppm)	4640	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	8.4	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4730	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	12.1	NS
	180	CH_4 (%)	0	NS
		CO_2 (ppm)	4280	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	12.1	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02024 (cont.)	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4150	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	13.5	NS
54-02025	20	CH_4 (%)	0	NS
		CO_2 (ppm)	4150	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	10.6	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	470	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	4070	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	24.4	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	5270	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	40.1	NS
	190	CH_4 (%)	0	NS
		CO_2 (ppm)	4730	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	43.6	NS
54-02026	20	CH_4 (%)	0	NS
		CO_2 (ppm)	5060	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	0	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	6600	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	0.2	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	6530	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	0.3	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02026 (cont.)	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4910	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	1	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4640	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	1.2	NS
	215	CH_4 (%)	0	NS
		CO_2 (ppm)	3710	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	1.1	NS
54-02027	20	CH_4 (%)	0	NS
		CO_2 (ppm)	4150	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	0.9	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	4190	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	2.4	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	5270	NS
		O_2 (%)	20.7	NS
		VOC (ppm)	3.6	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4370	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	5.3	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	3620	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	4.2	NS
	220	CH_4 (%)	0	NS
		CO_2 (ppm)	2870	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	2.6	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02027 (cont.)	250	CH_4 (%)	0	NS
		CO_2 (ppm)	3840	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	4.2	NS
54-02028	20	CH_4 (%)	0	NS
		CO_2 (ppm)	3310	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	0	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	3400	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0.1	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	3530	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0.3	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	2870	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	1.1	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	2780	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	1.2	NS
	220	CH_4 (%)	0	NS
		CO_2 (ppm)	2810	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	1.5	NS
	250	CH_4 (%)	0	NS
		CO_2 (ppm)	2460	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	1	NS
54-02031	20	CH_4 (%)	0	NS
		CO_2 (ppm)	9350	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	0.8	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02031 (cont.)	60	CH_4 (%)	0	NS
		CO_2 (ppm)	7370	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	2.5	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	5060	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	4.3	NS
	160	CH_4 (%)	0	NS
		CO_2 (ppm)	4240	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	9.6	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	3800	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	12.3	NS
	220	CH_4 (%)	0	NS
		CO_2 (ppm)	4060	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	11.1	NS
	260	CH_4 (%)	0	NS
		CO_2 (ppm)	4110	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	9	NS
54-02034	20	CH_4 (%)	0	NS
		CO_2 (ppm)	10,400	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	0.8	NS
	60	CH_4 (%)	0	NS
		CO_2 (ppm)	8500	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	1.6	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	7020	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	2.6	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-02034 (cont.)	160	CH_4 (%)	0	NS
		CO_2 (ppm)	5200	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	3.7	NS
	200	CH_4 (%)	0	NS
		CO_2 (ppm)	4820	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	3.6	NS
	220	CH_4 (%)	0	NS
		CO_2 (ppm)	4730	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	3.1	NS
	260	CH_4 (%)	0	NS
		CO_2 (ppm)	3620	NS
		O_2 (%)	20.6	NS
		VOC (ppm)	0.9	NS
	300	CH_4 (%)	0	NS
		CO_2 (ppm)	2150	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
54-02089	13	CH_4 (%)	0	NS
		CO_2 (ppm)	17,500	NS
		O_2 (%)	18.3	NS
		VOC (ppm)	192	NS
	31	CH_4 (%)	0	NS
		CO_2 (ppm)	27,000	NS
		O_2 (%)	17.0	NS
		VOC (ppm)	200	NS
	46	CH_4 (%)	0	NS
		CO_2 (ppm)	27,000	NS
		O_2 (%)	16.9	NS
		VOC (ppm)	229	NS
	86	CH_4 (%)	0	NS
		CO_2 (ppm)	21,000	NS
		O_2 (%)	17.8	NS
		VOC (ppm)	231	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-24238	44	CH_4 (%)	0	NS
		CO_2 (ppm)	28,200	34,100
		O_2 (%)	16.3	16.4
		VOC (ppm)	245	284
	64	CH_4 (%)	0	NS
		CO_2 (ppm)	18,700	28,400
		O_2 (%)	17.8	17
		VOC (ppm)	238	284.6
	84	CH_4 (%)	0	NS
		CO_2 (ppm)	20,200	26,600
		O_2 (%)	17.6	17.6
		VOC (ppm)	283	267.9
54-24239	25	CH_4 (%)	0	NS
		CO_2 (ppm)	6950	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	66.2	NS
	50	CH_4 (%)	0	NS
		CO_2 (ppm)	7300	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	77.6	NS
	75	CH_4 (%)	0	NS
		CO_2 (ppm)	7090	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	82.9	NS
	99.5	CH_4 (%)	0	NS
		CO_2 (ppm)	7580	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	91.2	NS
54-24240	28	CH_4 (%)	0	NS
		CO_2 (ppm)	12,600	23,200
		O_2 (%)	19.5	19.2
		VOC (ppm)	220	556.1
	53	CH_4 (%)	0	NS
		CO_2 (ppm)	11,900	20,900
		O_2 (%)	19.5	19.5
		VOC (ppm)	203	545.1

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-24240	78	CH_4 (%)	0	NS
		CO_2 (ppm)	8350	14,500
		O_2 (%)	20.0	20
		VOC (ppm)	11.2	287.6
	103	CH_4 (%)	0	NS
		CO_2 (ppm)	6460	11,600
		O_2 (%)	20.2	20.2
		VOC (ppm)	65.5	254.3
	128	CH_4 (%)	0	NS
		CO_2 (ppm)	5480	10,000
		O_2 (%)	20.3	20
		VOC (ppm)	65.5	293.7
	153	CH_4 (%)	0	NS
		CO_2 (ppm)	5200	9500
		O_2 (%)	20.4	20.2
		VOC (ppm)	64.7	294.2
54-24241	73	CH_4 (%)	0	NS
		CO_2 (ppm)	4950	14,100
		O_2 (%)	19.8	19.5
		VOC (ppm)	29.1	69.3
	93	CH_4 (%)	0	NS
		CO_2 (ppm)	6460	12,100
		O_2 (%)	19.6	19.2
		VOC (ppm)	77.5	41.5
	113	CH_4 (%)	0	NS
		CO_2 (ppm)	4680	7300
		O_2 (%)	20.0	20
		VOC (ppm)	52.4	45.2
	133	CH_4 (%)	0	NS
		CO_2 (ppm)	4680	8900
		O_2 (%)	20.2	19.8
		VOC (ppm)	65.2	24.9
	153	CH_4 (%)	0	NS
		CO_2 (ppm)	4280	6000
		O_2 (%)	20.3	20.2
		VOC (ppm)	62.3	25.3

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-24241 (cont.)	173	CH_4 (%)	0	NS
		CO_2 (ppm)	4510	7000
		O_2 (%)	20.2	20.1
		VOC (ppm)	71.3	35
	193	CH_4 (%)	0	NS
		CO_2 (ppm)	6180	7100
		O_2 (%)	20.1	20.1
		VOC (ppm)	103	36
54-24242	25	CH_4 (%)	0	NS
		CO_2 (ppm)	4730	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	50.4	NS
	50	CH_4 (%)	0	NS
		CO_2 (ppm)	7580	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	141	NS
	75	CH_4 (%)	0	NS
		CO_2 (ppm)	8000	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	148	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	7370	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	131	NS
	110.5	CH_4 (%)	0	NS
		CO_2 (ppm)	8140	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	140	NS
54-24243	25	CH_4 (%)	0	NS
		CO_2 (ppm)	11,300	NS
		O_2 (%)	19.5	NS
		VOC (ppm)	60	NS
	50	CH_4 (%)	0	NS
		CO_2 (ppm)	14,500	NS
		O_2 (%)	19.2	NS
		VOC (ppm)	96.4	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-24243 (cont.)	75	CH_4 (%)	0	NS
		CO_2 (ppm)	15,100	NS
		O_2 (%)	18.8	NS
		VOC (ppm)	106	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	12,600	NS
		O_2 (%)	19.0	NS
		VOC (ppm)	84.5	NS
	125	CH_4 (%)	0	NS
		CO_2 (ppm)	9710	NS
		O_2 (%)	19.3	NS
		VOC (ppm)	68.6	NS
54-24399	566.3	CH_4 (%)	0	NS
		CO_2 (ppm)	910	1400
		O_2 (%)	20.9	20.9
		VOC (ppm)	0.6	0
	587.3	CH_4 (%)	0	NS
		CO_2 (ppm)	940	1400
		O_2 (%)	20.9	20.9
		VOC (ppm)	0.4	0.1
54-27641	32	CH_4 (%)	0	NS
		CO_2 (ppm)	8000	11,500
		O_2 (%)	19.9	19.7
		VOC (ppm)	181	4999.9
	82	CH_4 (%)	0	NS
		CO_2 (ppm)	6810	8400
		O_2 (%)	19.9	19.9
		VOC (ppm)	55.1	1479.2
	115	CH_4 (%)	0	NS
		CO_2 (ppm)	6180	7600
		O_2 (%)	20.1	19.9
		VOC (ppm)	45.1	369.4
	182	CH_4 (%)	0	NS
		CO_2 (ppm)	5000	1400
		O_2 (%)	20.3	20.9
		VOC (ppm)	57.3	98.2

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-27641 (cont.)	232	CH_4 (%)	0	NS
		CO_2 (ppm)	5060	5900
		O_2 (%)	20.3	20.1
		VOC (ppm)	57.2	332.9
	271	CH_4 (%)	0	NS
		CO_2 (ppm)	4200	4700
		O_2 (%)	20.4	20.3
		VOC (ppm)	29.6	115.9
	332.5	CH_4 (%)	0	NS
		CO_2 (ppm)	2750	2700
		O_2 (%)	20.5	20.4
		VOC (ppm)	6.3	31.9
54-27642	30	CH_4 (%)	0	NS
		CO_2 (ppm)	17,500	24,900
		O_2 (%)	18.5	18.3
		VOC (ppm)	113	124.7
	75	CH_4 (%)	0	NS
		CO_2 (ppm)	12,000	16,900
		O_2 (%)	19.1	19.2
		VOC (ppm)	134	136.8
	116	CH_4 (%)	NS[e]	NS
		CO_2 (ppm)	NS[e]	12,200
		O_2 (%)	NS[e]	20.1
		VOC (ppm)	NS[e]	88.9
	175	CH_4 (%)	0	NS
		CO_2 (ppm)	7510	9299
		O_2 (%)	20.0	20.2
		VOC (ppm)	155	110.8
	235	CH_4 (%)	0	NS
		CO_2 (ppm)	6670	10,800
		O_2 (%)	20.0	20
		VOC (ppm)	93.9	84.9
	275	CH_4 (%)	0	NS
		CO_2 (ppm)	9280	11,600
		O_2 (%)	19.7	20
		VOC (ppm)	178	90.5

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-27642 (cont.)	338	CH_4 (%)	0	NS
		CO_2 (ppm)	9920	18,700
		O_2 (%)	19.3	18.8
		VOC (ppm)	132	108.9
54-27643	30	CH_4 (%)	0	NS
		CO_2 (ppm)	5550	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	0	NS
	74	CH_4 (%)	0	NS
		CO_2 (ppm)	6810	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	0	NS
	117	CH_4 (%)	0	NS
		CO_2 (ppm)	6180	NS
		O_2 (%)	20.4	NS
		VOC (ppm)	0	NS
	167	CH_4 (%)	0	NS
		CO_2 (ppm)	5340	NS
		O_2 (%)	20.5	NS
		VOC (ppm)	0	NS
	235	CH_4 (%)	0	NS
		CO_2 (ppm)	3930	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
	275	CH_4 (%)	0	NS
		CO_2 (ppm)	3620	NS
		O_2 (%)	20.9	NS
		VOC (ppm)	0	NS
54-610786	25	CH_4 (%)	0	NS
		CO_2 (ppm)	6250	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	0	NS
	50	CH_4 (%)	0	NS
		CO_2 (ppm)	7370	NS
		O_2 (%)	20.1	NS
		VOC (ppm)	0	NS

Table B-1.0-3 (continued)

Borehole ID	Sampling Port Depth (ft bgs[a])	Analyte	Result First Round 2019	Result Second Round 2019
54-610786 (cont.)	75	CH_4 (%)	0	NS
		CO_2 (ppm)	7580	NS
		O_2 (%)	20.0	NS
		VOC (ppm)	0	NS
	100	CH_4 (%)	0	NS
		CO_2 (ppm)	6810	NS
		O_2 (%)	20.3	NS
		VOC (ppm)	0	NS
	118.5	CH_4 (%)	0	NS
		CO_2 (ppm)	7160	NS
		O_2 (%)	20.2	NS
		VOC (ppm)	0	NS

[a] bgs = Below ground surface.

[b] Blanks for 2019 sampling not sampled (NS).

[c] VOC (ppm) = PID used.

[d] n/a = Not applicable.

[e] Port 3 of 54-27642 had a purge flow rate of 0.0 and the sample was canceled.

Appendix C

Analytical Program

C-1.0 INTRODUCTION

This appendix discusses the analytical methods and data-quality review for samples collected during vapor-sampling activities at Material Disposal Area (MDA) L, Solid Waste Management Unit (SWMU) 54-006, at Technical Area 54 at Los Alamos National Laboratory (LANL or the Laboratory).

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) uses the Environmental Information Management (EIM) database for data management. This is a cloud-based data management platform used for managing sampling events, tracking the packaging and transportation of samples, and storing the resultant data. In addition to N3B, Triad National Security, LLC (Triad) and the U.S. Department of Energy (DOE) Oversight Bureau of the New Mexico Environment Department (NMED) share EIM for all LANL environmental analytical data. EIM interfaces with Intellus New Mexico (Intellus), a fully searchable database available to the public through the Intellus website (http://www.intellusnm.com).

The system, written and maintained by Locus Technologies, consists of a cloud-based Structured Query Language server database platform coupled with a web-based user interface. It is a comprehensive sample and data management application, designed to manage the process from sample planning through data review and reporting. It includes modules for sample planning, sample tracking, manual and electronic field data upload, electronic data deliverables (EDDs) upload, Automated Data Review (ADR) routines, notification emails, and reporting tools.

Laboratory data packages and EDDs adhere to the requirements specified in N3B's Exhibit D Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services.

N3B ensures that reported external analytical laboratory data are of sufficient quality to fulfill their intended purpose and that the condition of the data is documented so that future users of analytical laboratory results produced for the Los Alamos Legacy Cleanup Contract can use the data. The data collected must have sufficient quality and quantity to support defensible decision-making as described in U.S. Environmental Protection Agency (EPA) https://www.epa.gov/quality/guidance-systematic-planning-using-data-quality-objectives-process-epa-qag-4. The N3B Sample Data Management Program has data quality objectives detailing minimum quality assurance (QA)/quality control (QC) requirements.

Data examination, verification, and validation include application of data qualifiers and reason codes to analytical results, and modification of detection status, based on outcome of specific laboratory QC sample analyses (e.g., spikes, duplicates, surrogates, method blanks, laboratory control samples, and tracers), holding times, proper preservation, and field QC samples as applicable. The process also includes a best-selection evaluation to determine the best value for multiple analytical results of the same analyte from the same sample. Qualification of 100% of analytical data occurs during verification using the EIM ADR module, and a minimum of 10% of analytical data is also subjected to a more in-depth validation by an N3B chemist.

The entire data validation process includes a description of the reasons for any failure to meet method, procedural, or contractual requirements and an evaluation of the impact of such failure on the associated data or data set.

During this process, individual sample results are qualified as accepted or rejected. Data that are accepted as per the validation criteria are the following: not detected (U), estimated but not detected (UJ), estimated (J), or detected without data qualification (NQ). Accepted data can then be used as needed, assuming that no problems occurred during the sampling events. Data that are rejected (R) as per the validation criteria are unusable. In addition, the analytical results can also be further labeled with data validation reason codes that explain the reason for the qualification. (See Appendix A of this document, which includes data qualifier definitions.)

The analytical data, instrument printouts, and data validation reports are provided in Appendix E (on CD included with this document). In addition to the laboratory analytical data, sample collection logs (SCLs) and chain of custody forms (COCs) are also provided in Appendix E.

N3B data validation is performed externally from the analytical laboratory and end users of the data, and this data validation process applies a defined set of performance-based criteria to analytical data, which may result in qualification of that data. Data validation provides a level of assurance, based on this technical evaluation, of the data quality. N3B validation of chemistry data includes a technical review of the analytical data package, covering the evaluation of both field and laboratory QA/QC samples, the identification and quantitation of analytes, and the effect of QA/QC deficiencies on analytical data, as well as other factors affecting the data quality.

C-2.0 ANALYTICAL DATA

Data evaluated in this report were collected during semiannual vapor-sampling activities at MDA L. All investigation samples were submitted to and analyzed by approved off-site analytical laboratories. These data are determined to be of sufficient quality for decision-making purposes and have been reviewed and revalidated to current QA standards.

In the first 2019 sampling round, a total of 197 samples (163 regular samples, 17 field blanks (FBs) and 17 field duplicates (FDs) were collected and analyzed for volatile organic chemicals (VOCs). In the second 2019 sampling round, a total of 40 samples (32 regular samples, 4 FBs, and 4 FDs) were collected and analyzed for VOCs. Also in the second sampling round, a total of 39 samples (32 regular samples, 4 FBs, and 3 FDs) were collected and analyzed for tritium. These 79 samples for the second sampling round come from a total of 32 sampling ports at the 6 sentry boreholes The analytical methods used are listed in Table C-2.0-1.

Tables within the main text of this MDA L vapor-sampling periodic monitoring report summarize the analytical results from all samples collected at MDA L for calendar year 2019. All VOCs and tritium analytical results are provided in Appendix E (on CD included with this document). Analytical chemical and radiological data presented in this report can also be found in the public Intellus database at http://www.intellusnm.com.

C-2.1 Procedures, Definitions, and Methods Used

Sampling and data validation were conducted using standard operating procedures (SOPs) and other documents that are part of N3B's comprehensive QA/QC program. Procedures and other documents include the most current version of the following:

- N3B-SOP-ER-2008, "Sampling Subsurface Vapor"
- N3B-SOP-ER-10093, "Sample Control and Field Documentation"
- N3B-SOP-ER-10094, "Sample Receiving and Shipping by the N3B Sample Management Office"
- N3B-ER-AP-20309, "Validation of Volatile Organic Compound Analytical Data"

- N3B-ER-AP-20314 , “Validation of Gamma Spectroscopy, Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Analytical Data”

After the sampling event is planned using the EIM Sample Request module, sample collection logs are created and printed to serve as COC documents and analytical request forms.

The sampling events included collection of FB and FD field QA/QC samples. Detection of analytes in FBs may indicate contamination resulting from sample collection, transportation, or the analytical laboratory processes. Differences in analytical results between an FD and its regular sample may indicate the samples were not uniform or that significant variation in analysis occurred between the two samples.

The FBs are SUMMA canisters filled with pure nitrogen (99.9%) that are subjected to the same conditions as regular samples. FBs are collected at a minimum frequency of 10% of all VOC samples and 10% of all tritium samples collected during the monitoring event. FBs are collected from locations where the regular samples are collected.

FDs are collected at a rate of 10% of all VOC samples and 10% of all tritium samples collected during the monitoring event. FDs are split samples collected from locations where the regular samples are collected.

Following sample collection, sampling personnel deliver the samples and the field collection log to sample management personnel at the N3B Sample Management Office (SMO). An analytical COC is then created, which includes the field sample identification number, the date and time of field sample collection, the analytical parameters group code, and the number of bottles for each analytical parameter group. The N3B SMO shipped the samples to the appropriate laboratory for analysis.

The laboratory QA/QC process is defined in the appropriate analytical method (Table C-2.0-1) and the external analytical laboratory statement of work,

The external laboratory uploads the EDD and its corresponding analytical data pdf data package to EIM. The data are then validated both manually and in the EIM autovalidation process, then reviewed by an N3B chemist at the appropriate level, and then fully transferred into EIM.

**Table C-2.0-1
Volatile Organic Compound and
Radionuclide Analytical Methods for Samples Collected at SWMU 54-006**

Analytical Method	Analytical Description	Analytical Suite
VOCs		
EPA Air Method Toxic Organics (TO15)	Determination VOCs in air collected in specially prepared canisters and analyzed by gas chromatography/mass spectrometry	VOCs
Radionuclides		
EPA 906.0	Tritium in water (liquid scintillation)	Tritium

Appendix D

Volatile Organic Compound Plume Trend Analysis

D-1.0 INTRODUCTION

This appendix summarizes data from the Material Disposal Area (MDA) L volatile organic compound (VOC) plume at Technical Area 54, Los Alamos National Laboratory (LANL) (Figure D-1.0-1). The data were collected as part of an ongoing soil-vapor extraction (SVE) interim measure (N3B 2018, 700039) and represent a first phase, pilot-project-scale demonstration of the ability of SVE to effectively remove plume mass and reduce the likelihood of VOCs impacting groundwater beneath MDA L. Boreholes reported in this document include a set of sentry wells in the source region of the plume designed to provide an early warning of leakage from buried drums of VOCs. Table D-1.0-1 lists the sentry wells that will be discussed. These sentry wells have been modified slightly from those presented in the 2018 interim measures report and now include borehole 54-02089. Although previously not called out as a sentry well (N3B 2018, 700039), borehole 54-24399 was included in semiannual monitoring to better characterize the lower reaches of the VOC plume. Sentry wells were chosen as the likeliest to see any new leakage from the subsurface VOC waste drums. Current recommendations from the interim measures report (N3B 2018, 700039) call for an analysis of restarting the SVE pumping units if total VOC concentrations at any port rise above 2000 parts (of VOCs) per million by volume (ppmv). The units of ppmv were chosen for the following reasons: (1) these units are directly scalable to the units of measurement reported by the analytical laboratory (ppbv) and (2) ppmv units remove the molecular weight of each compound and normalize to mole fraction.

D-2.0 EASTSIDE SENTRY BOREHOLE DATA

The boreholes on the east side of the site sample the VOC plume within the Bandelier tuff, with depths to 338 ft below ground surface (bgs). Data from boreholes 54-02089 (Figures D-2.0-1 through D-2.0-5) and 54-24238 (Figures D-2.0-6 through D-2.0-9) both show strong evidence of possible increased leakage from subsurface sources, starting during the period of SVE operation and continuing until the present, with a peak in February of 2019. Increased leakage is relative to pre-SVE leakage from subsurface sources of VOC that was supporting plume concentrations seen in September 2014.

The remaining eastside sentry boreholes, 54-24241 (Figures D-2.0-10 and D-2.0-11) and 54-27642 (Figures D-2.0-12 through D-2.0-14), both show concentrations rebounding towards levels seen in September 2014, although many ports remain well below pre-SVE concentrations. A single port in 54-27642 at 30 ft (Figure D-2.0-12) shows an increase in total VOCs from pre-SVE levels, although the increase returned to a total VOC concentration close to September 2014 levels in the second 2019 sampling round. Note that the increase in total VOCs is not from the primary seven analytes of concern, and the increase above pre-SVE values is not seen in the data for 1,1,1-trichloroethane (TCA) versus depth (Figure D-2.0-13). Histograms for these boreholes are limited to selected depths to highlight specific behaviors. Concentrations of total VOCs near the base of the Otowi member of the Bandelier tuff (just above the basalt) on the east side show little change from 2014 through 2019 (Figure D-2.0-14).

D-2.1 Borehole 54-02089

D-2.1.1 Concentration versus Depth through Time

Increasing concentrations in Borehole 54-02089 can be seen in Figure D-2.0-1 (TCA) and Figures D-2.0-2 through D-2.0-5 (total VOCs), where concentrations at all depths (13, 31, 46 and 83 ft bgs) rise through time. Values initially dropped from the pre-SVE measurements in September of 2014; however by

May 2017, concentrations had increased to above pre-SVE values, culminating in the first sampling round with values of TCA approaching 1400 ppmv (1,400,000 ppbv) at 46 ft bgs. Borehole 54-02089 was not sampled in the second sampling round.

D-2.1.2 Histograms of Total VOC Changes through Time at Individual Depths

In Figure D-2.0-5, the maximum total VOC trigger of 2000 ppmv total VOCs is located at the top of the figure. Each figure represents a single depth and shows the evolution of seven analytes of interest plus an 'other' category, such that the height of each bar is the sum of all moles of VOCs, or the total VOCs. Figure D-2.0-4 shows that the total VOC concentration at 46 ft bgs with data from February 2019 is approaching the 2000 ppmv proposed action level. Borehole 54-02089 was not sampled in the second sampling round; however, this borehole has been added to the sentry borehole list and will be sampled in the future as part of the sentry borehole sampling plan.

D-3.0 WESTSIDE SENTRY BOREHOLE DATA

Data from the westside sentry boreholes (54-24240 and 54-27641) are shown in Figures D-3.0-1 through D-3.0-5. Borehole 54-24240 shows the strongest rebound at 28 ft bgs (Figure D-3.0-2) and attains total VOC concentrations slightly above pre-SVE values. Borehole 54-27641 shows limited rebound with a maximum rebound at 32 ft bgs in February 2019 (Figure D-3.0-4).

Concentrations of total VOC near the base of the Otowi member of the Bandelier tuff (just above the basalt) on the west side of MDA L show little change from 2014 through 2019 (Figure D-3.0-5).

D-4.0 DEEP BASALT SENTRY BOREHOLE 54-24399 DATA

Borehole 54-24399 is completed deep in the Cerros del Rio basalt, with an open interval extending beneath casing that ends at a depth of 566.7 ft bgs (Figure D-4.0-1). The open interval extends from 566.7 to 660 ft bgs; however, attempts to video log deeper sections of the open interval were halted after unstable conditions were encountered. Borehole video logs show alternating consolidated sections and sections containing cavernous voids. Figure D-4.0-1 shows that the shoe and bottom of the casing are completed in consolidated basalt, reducing the likelihood that there is a flowing connection on the outside of the casing, a short-circuit connection that has previously been hypothesized.

In August 2017 a packer was permanently installed in the casing just above the open borehole. The packer is designed with two sampling ports, one that collects gas from directly beneath the packer, and another that collects gas from 20 ft below the packer in a section of the basalt that contains cavernous voids. The new permanent packer has several benefits including (1) a simpler sampling process needing no drill rig, (2) a substantial reduction in borehole breathing because of new construction of the well head, and (3) the ability to maintain longer periods of packer inflation to ensure isolation of the deep basalt.

Figures D-4.0-2 through D-4.0-8 plot individual concentrations for seven analytes from borehole 54-24399. Data in this plot are for 1,1,1-TCA; trichloroethene (TCE); tetrachloroethene; 1,2-dichloroethane (DCA); methylene chloride, 1,1-dichloroethene (DCE); and 1,2-dichloropropane (DCP) and span April 2005 to January 2020. These plots also contain data from two nearby boreholes (54-01015 and 54-01016 [Figure D-1.0-1]) that have vapor sampling ports completed in the basalt. The nearby borehole data from February 2019 are presented to confirm that concentrations seen in borehole 54-24399 are representative of values throughout the deep basalt. Each figure also shows a vertical black line representing the timing of the installation of the permanent packer and a horizontal line at the Tier I screening level for each of the VOCs. Tier I values are based on calculating maximum contaminant levels for drinking water using Henry's law partitioning of the compound into water from the measured vapor phase concentration.

The figures show concentrations of all compounds measured in the second round are at the Tier 1 screening levels (1,2-DCA [Figure D-4.0-5]) or below. Figure D-4.0-5 also includes the laboratory detection limit for 1,2-DCA (15 ppbv) showing that recently measured values are quite close to the laboratory detection limit. The same pattern is seen in the February 2019 data, with 1,2-DCA slightly above the Tier I screening level. However, measurements from February 2019 in boreholes 54-01015 and 54-01016 within the basalt are below detection limits and plot on the horizontal axis in Figure D-4.0-5.

Data from the first sampling round also show that concentrations of each of the seven analytes measured in borehole 54-24399 are consistent with measurements in boreholes 54-01015 and 54-01016. Further, the measurements in the two sampling rounds appear to be stabilizing and are now representing the true state of VOC concentrations in the deep basalt. Recommendations from these observations are to continue monitoring boreholes 54-24399, 54-01015, and 54-01016 to ensure that long-term data from these boreholes are representative of concentrations in the deep basalt.

Data from the two sampling rounds are quite similar and may be indicating that the packer in borehole 54-24399 is finally providing stable deep measurements that are no longer being impacted by breathing that occurred from the installation of 54-24399 until placement of the deep packer in August 2017. The deep breathing caused measurable increases in benzene, toluene, ethylbenzene, and xylene (BTEX) compounds relative to other parts of the VOC plume. BTEX compounds are components of exhaust from vehicles, such as from the vehicles that often idled near the top of borehole 54-24399 (N3B 2018, 700039).

D-5.0 REFERENCES AND MAP DATA SOURCES

D-5.1 References

The following reference list includes documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

N3B (Newport News Nuclear BWXT-Los Alamos, LLC), August 2018. "Interim Measures Final Report for Soil-Vapor Extraction of Volatile Organic Compounds from Material Disposal Area L, Technical Area 54," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2018-0008, Los Alamos, New Mexico. (N3B 2018, 700039)

D-5.2 Map Data Sources

Map data sources used in original figures created for this report are described below and identified by legend title.

Legend Item	Data Source
Disposal pit/ impoundment	Waste Storage Features; LANL, Environment and Remediation Support Services Division, GIS/Geotechnical Services Group, EP2007-0032; 1:2,500 Scale Data; 13 April 2007.
Disposal shaft	Waste Storage Features; LANL, Environment and Remediation Support Services Division, GIS/Geotechnical Services Group, EP2007-0032; 1:2,500 Scale Data; 13 April 2007.
Elevation contour	Hypsography, 10, 20, & 100 Foot Contour Intervals; LANL, ENV Environmental Remediation and Surveillance Program; 1991.
Fence	Security and Industrial Fences and Gates; LANL, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 10 September 2007.
LANL boundary	LANL Areas Used and Occupied; LANL, Site Planning & Project Initiation Group, Infrastructure Planning Division; 19 September 2008.
Material disposal area	Materials Disposal Areas; LANL, ENV Environmental Remediation and Surveillance Program; ER2004-0221; 1:2,500 Scale Data; 23 April 2004.
Paved road	Los Alamos National Laboratory, FWO Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Structure	Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
TA boundary	As published; Triad SDE Spatial Geodatabase: GISPUBPRD1\PUB.Boundaries\PUB.Tecareas; February 2020.
Major Road	As published; Q:\16-Projects\16-0033\project_data.gdb\line\major_road; February 2020.
Unpaved road	Dirt Road Arcs; LANL, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 10 September 2007.
Drainage	As published; Q:\16-Projects\16-0033\project_data.gdb\line\drainage_features; February 2020.
Vapor monitoring well	Point Feature Locations of the Environmental Restoration Project Database; LANL, Environment and Remediation Support Services Division, EP2007-0754; 30 November 2007.

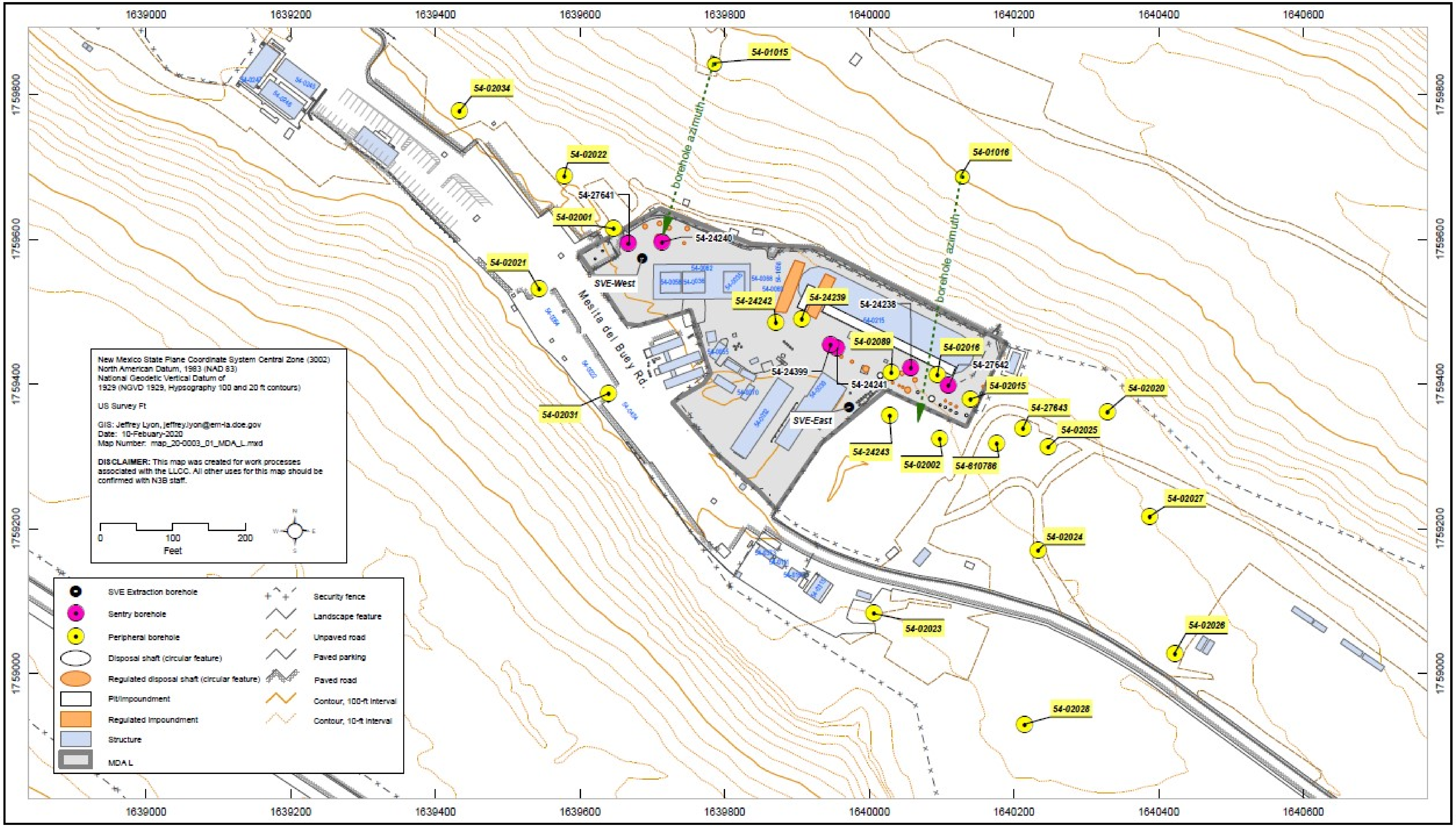

Figure D-1.0-1 MDA L site map showing borehole locations

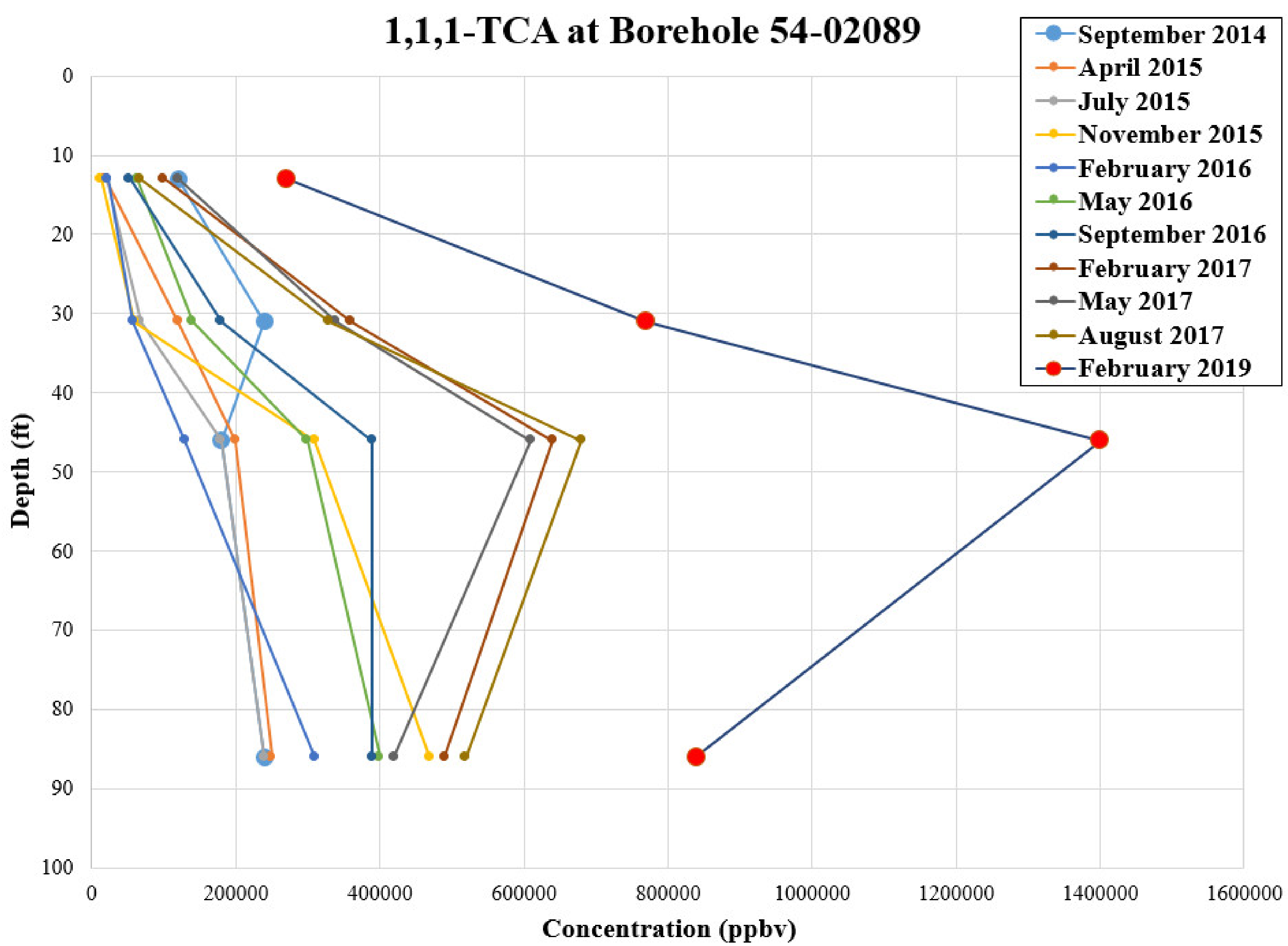

Figure D-2.0-1 TCA[1,1,1-] concentration versus depth and time for borehole 54-02089

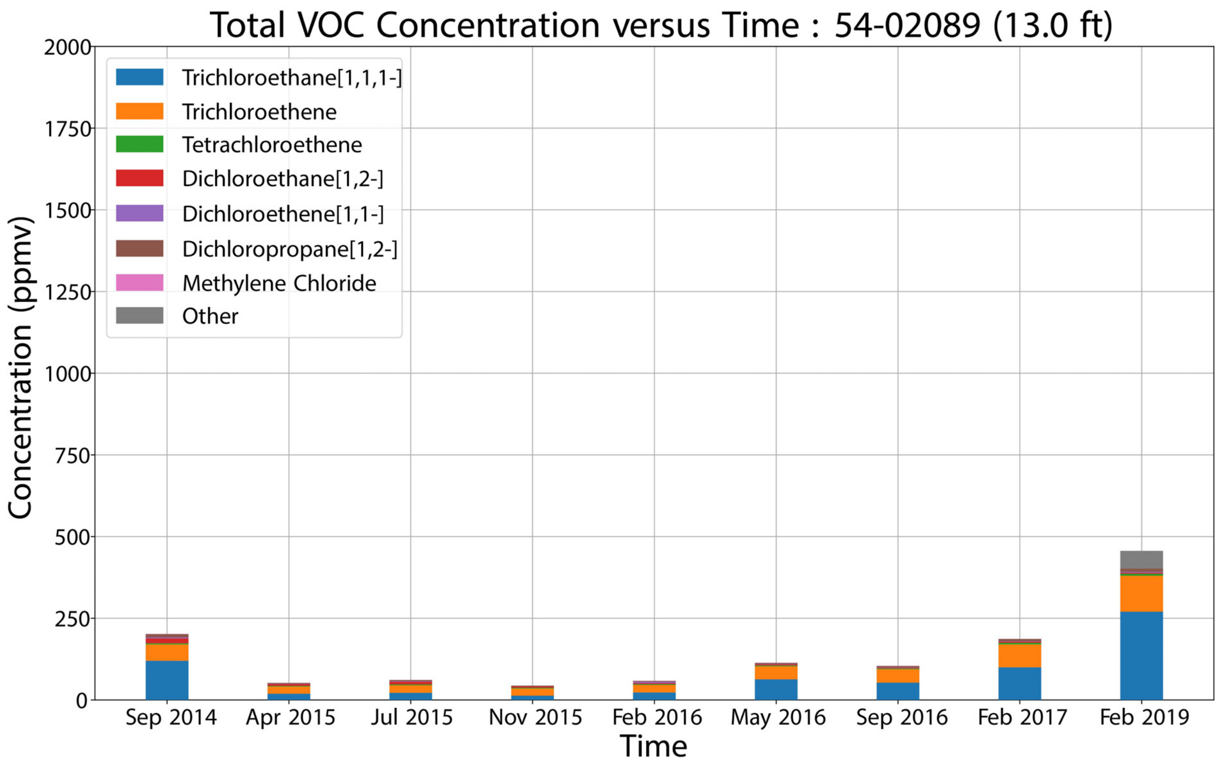

Figure D-2.0-2 Total VOC concentration through time at 13 ft bgs for borehole 54-02089

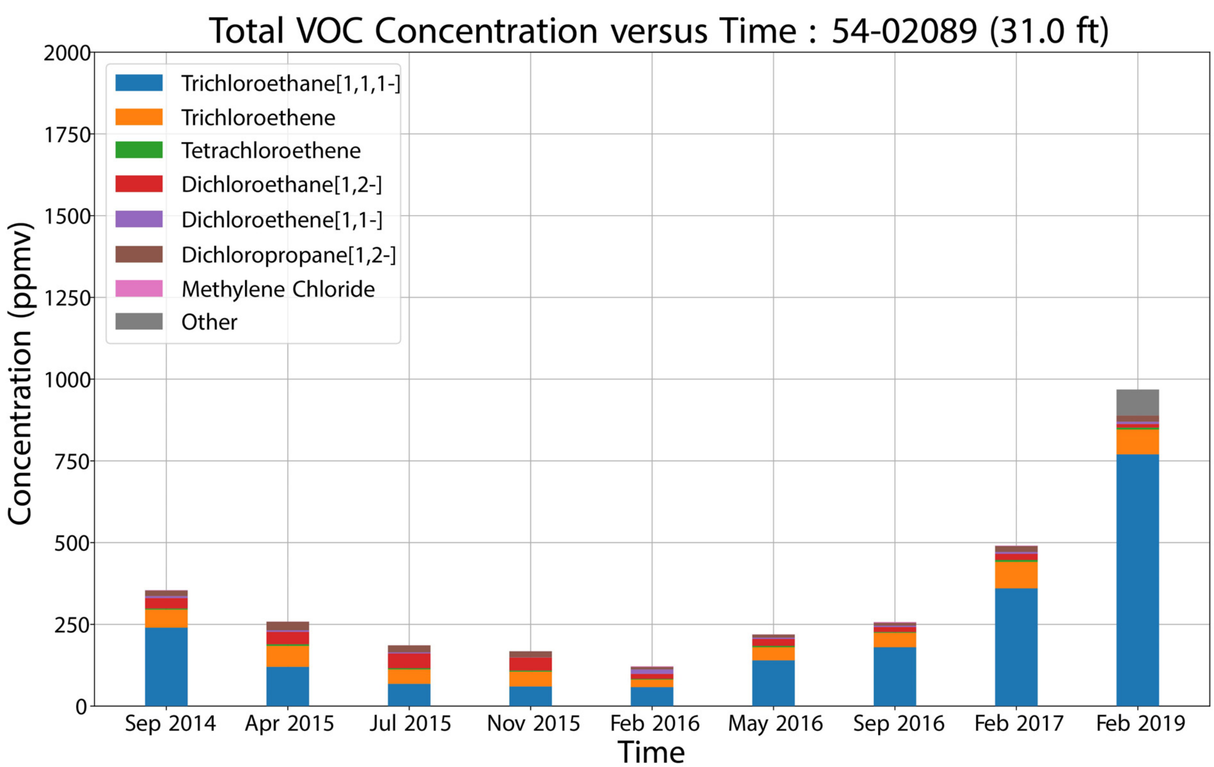

Figure D-2.0-3 Total VOC concentration through time at 31 ft bgs for borehole 54-02089

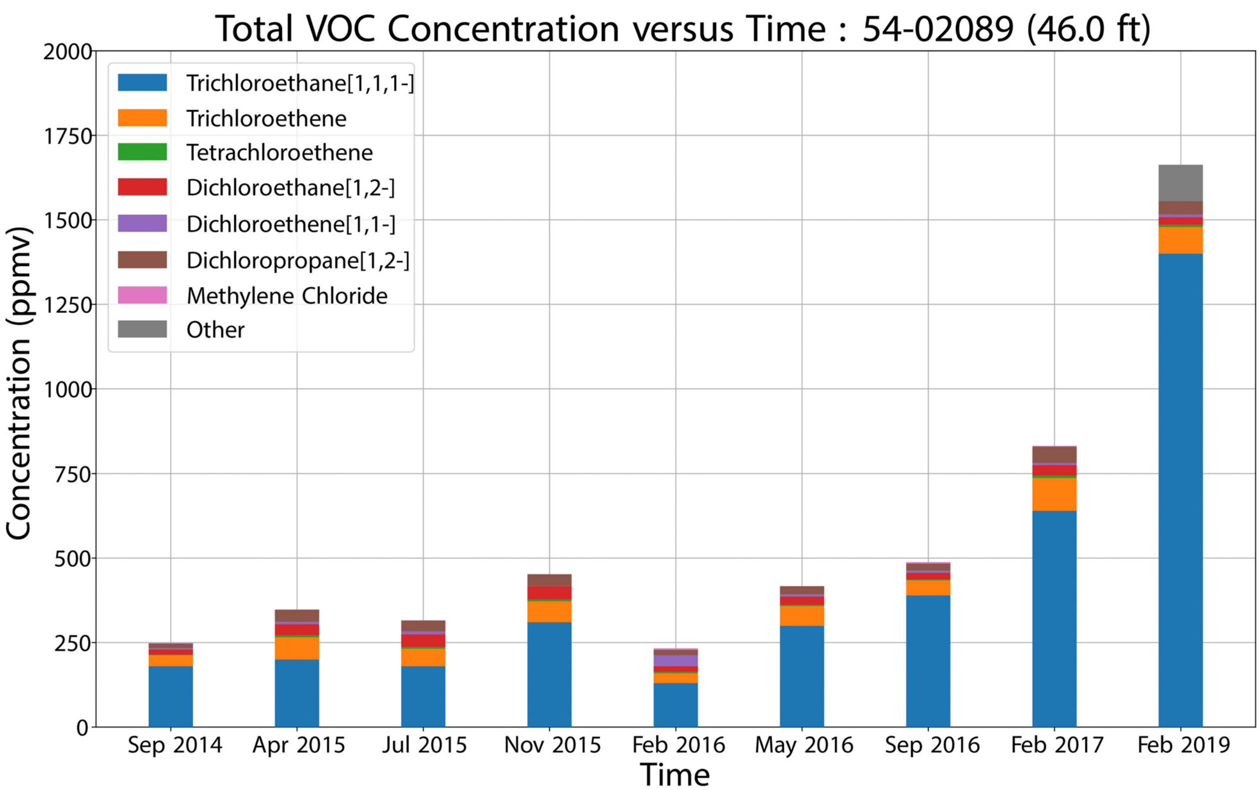

Figure D-2.0-4 Total VOC concentration through time at 46 ft bgs for borehole 54-02089

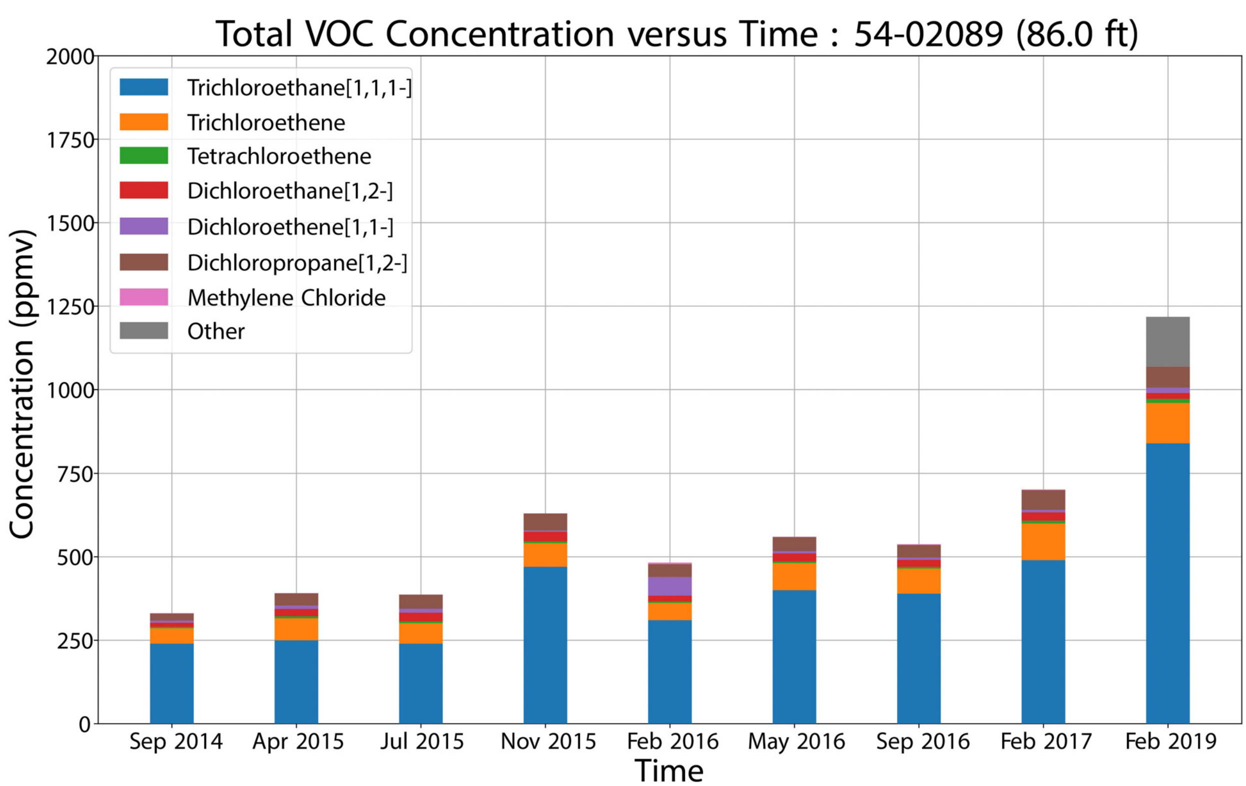

Figure D-2.0-5 Total VOC concentration through time at 86 ft bgs for borehole 54-02089

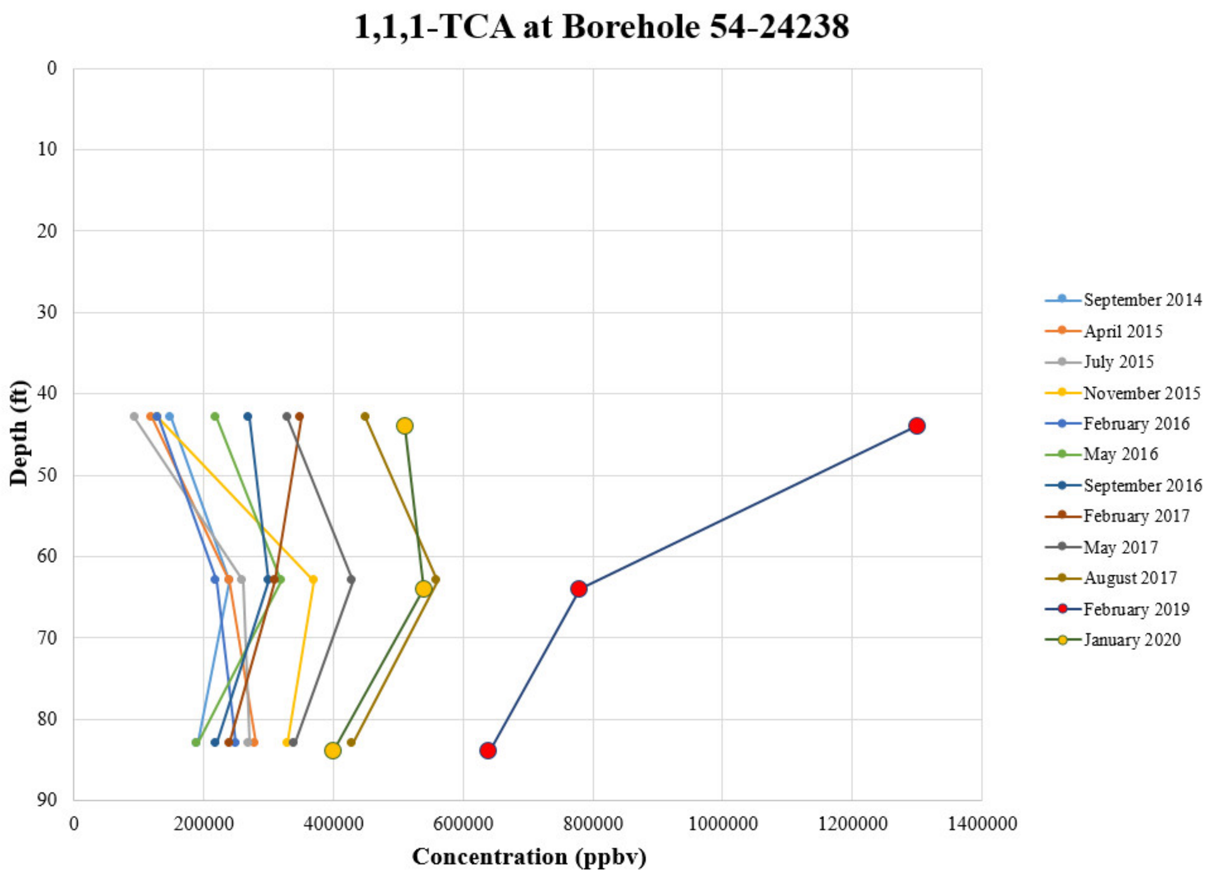

Figure D-2.0-6 TCA[1,1,1-] concentration versus depth and time for borehole 54-24238

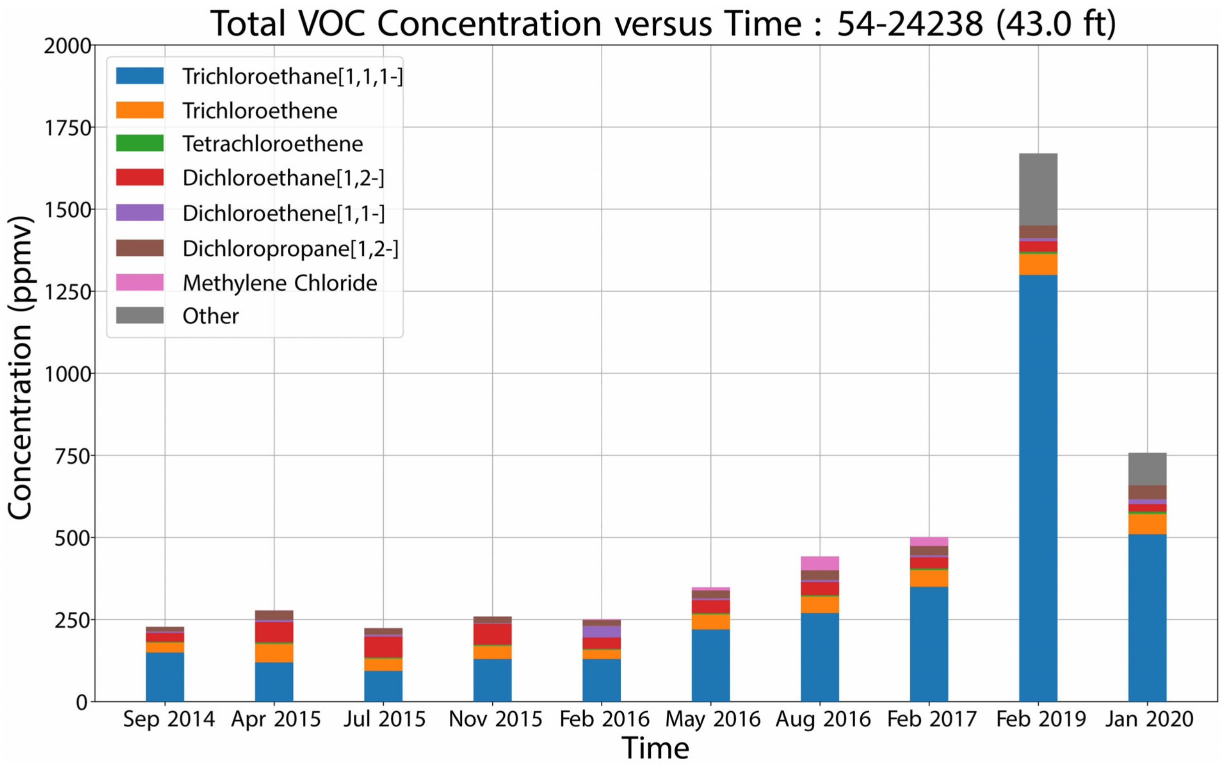

Figure D-2.0-7 Total VOC concentration through time at 43 ft bgs for borehole 54-24238

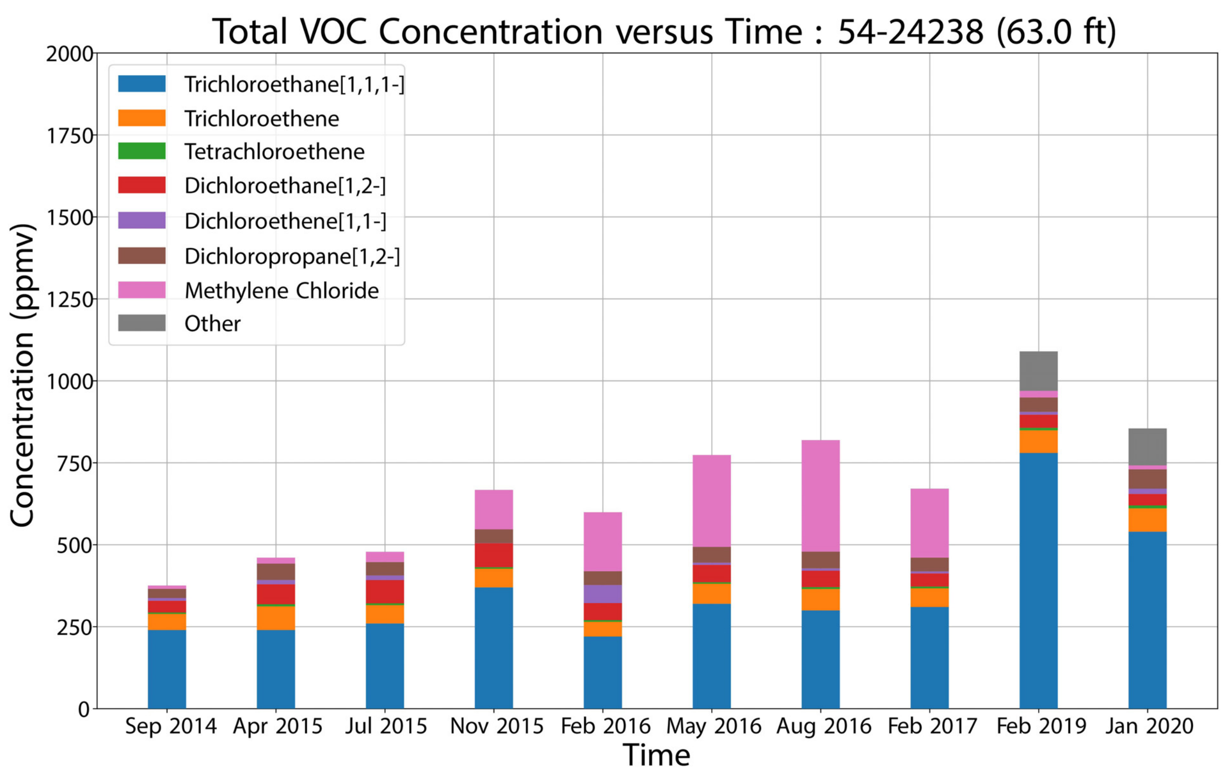

Figure D-2.0-8 Total VOC concentration through time at 63 ft bgs for borehole 54-24238

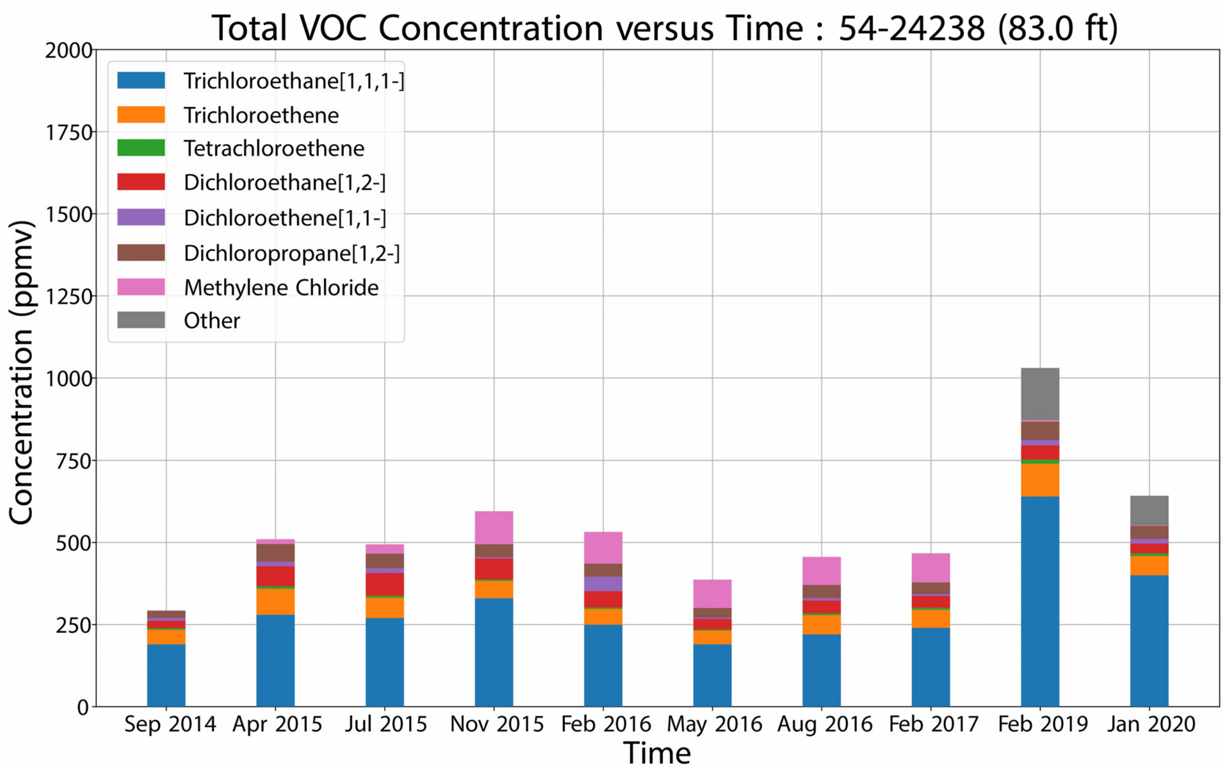

Figure D-2.0-9 Total VOC concentration through time at 83 ft bgs for borehole 54-24238

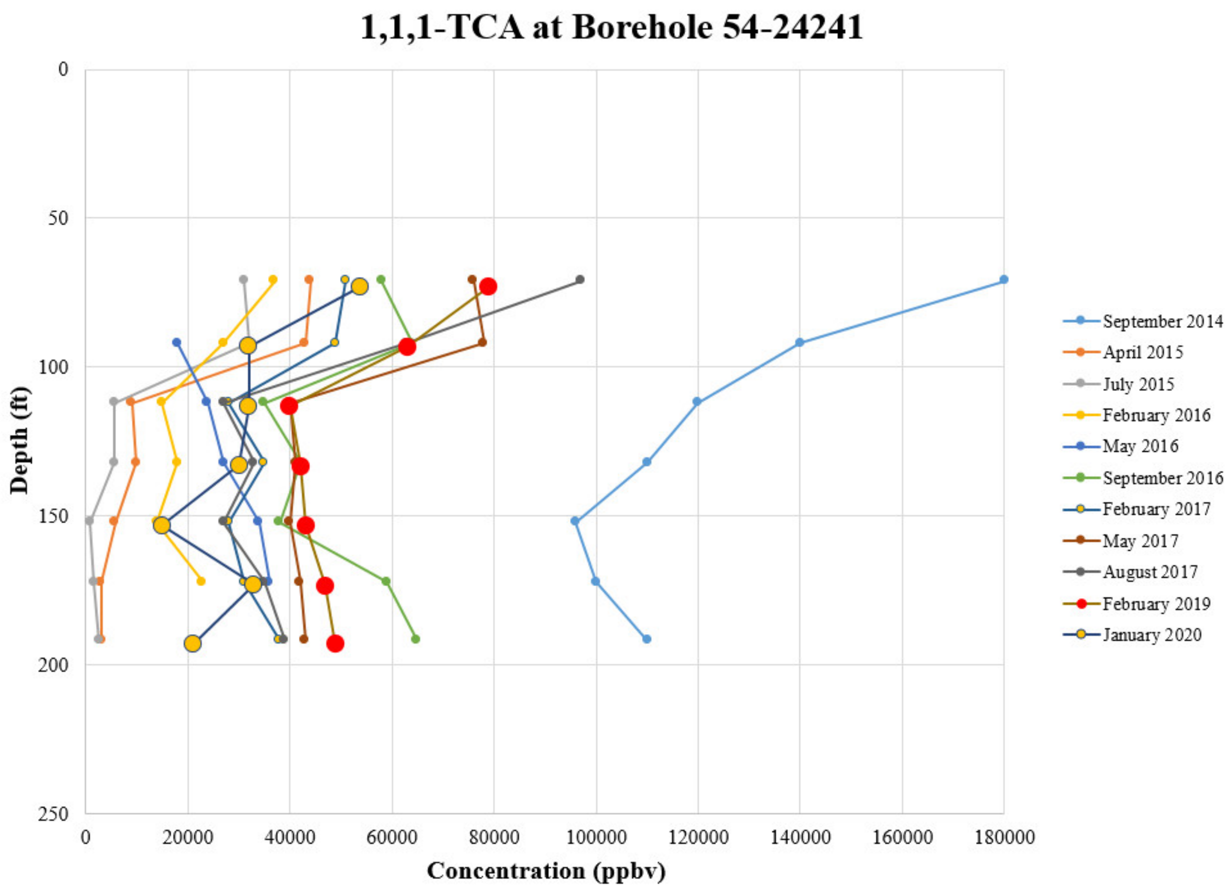

Figure D-2.0-10 TCA[1,1,1-] concentration versus depth and time for borehole 54-24241

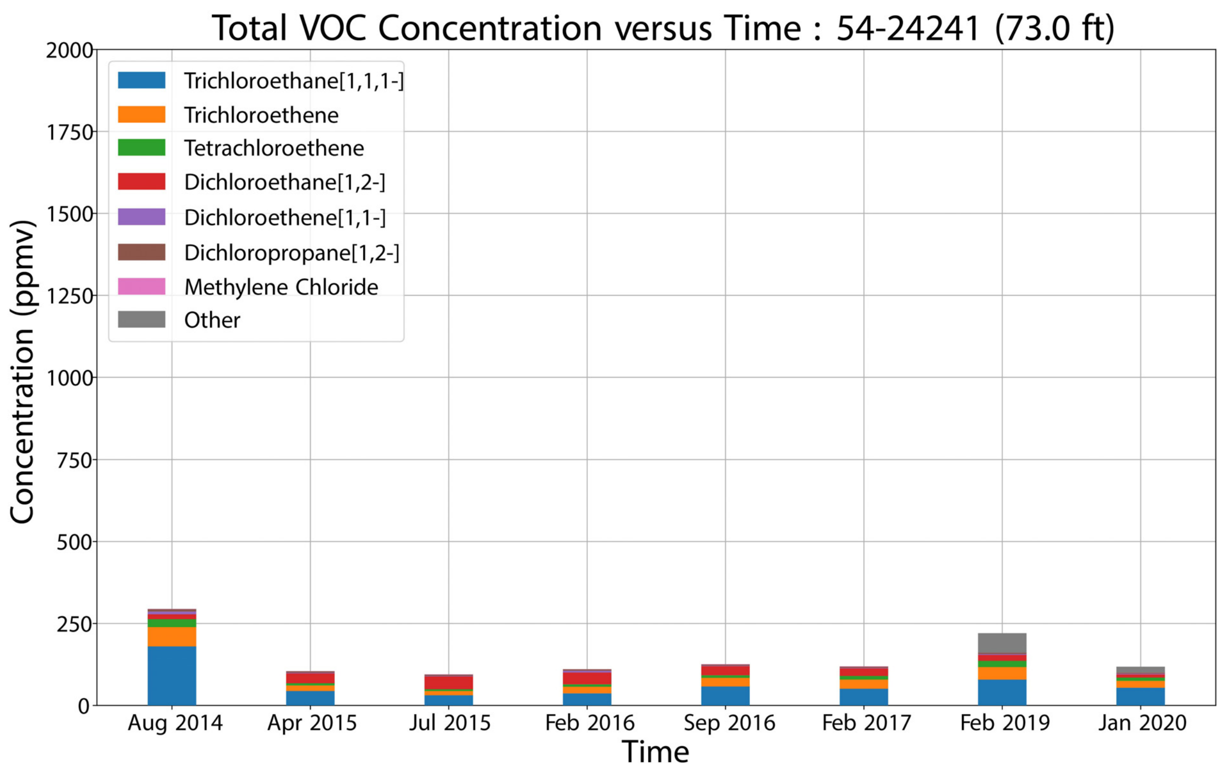

Figure D-2.0-11 Total VOC concentration through time at 73 ft bgs for borehole 54-24241

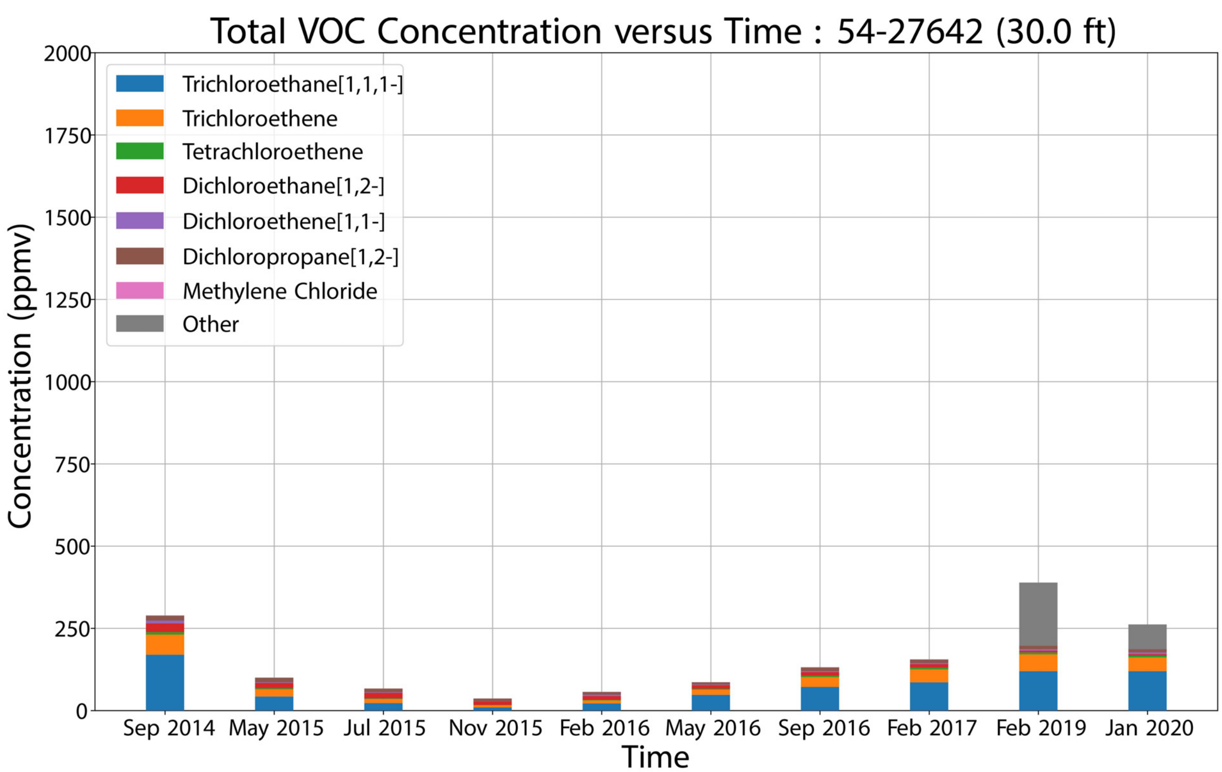

Figure D-2.0-12 Total VOC concentration through time at 30 ft bgs for borehole 54-27642

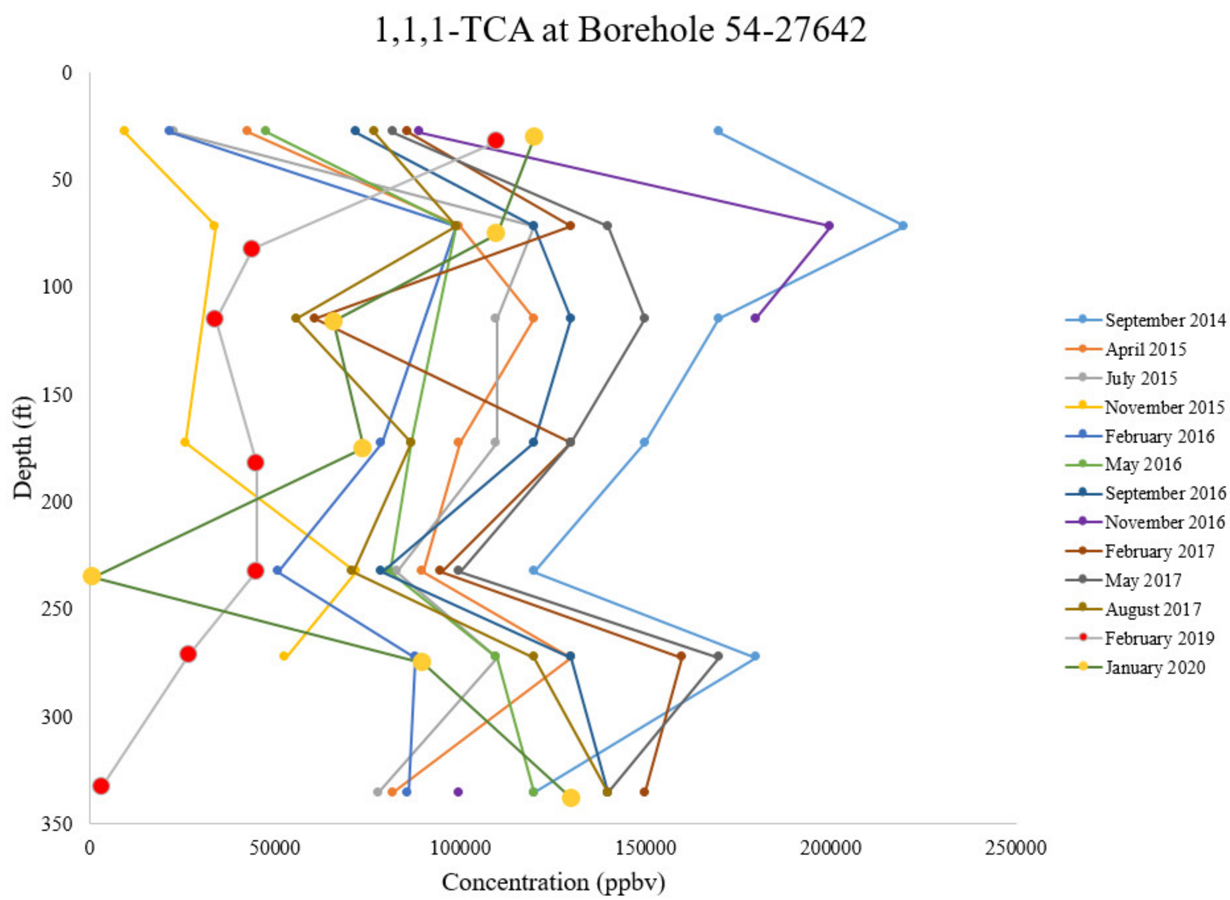

Figure D-2.0-13 TCA[1,1,1-] concentration versus depth and time for borehole 54-27642

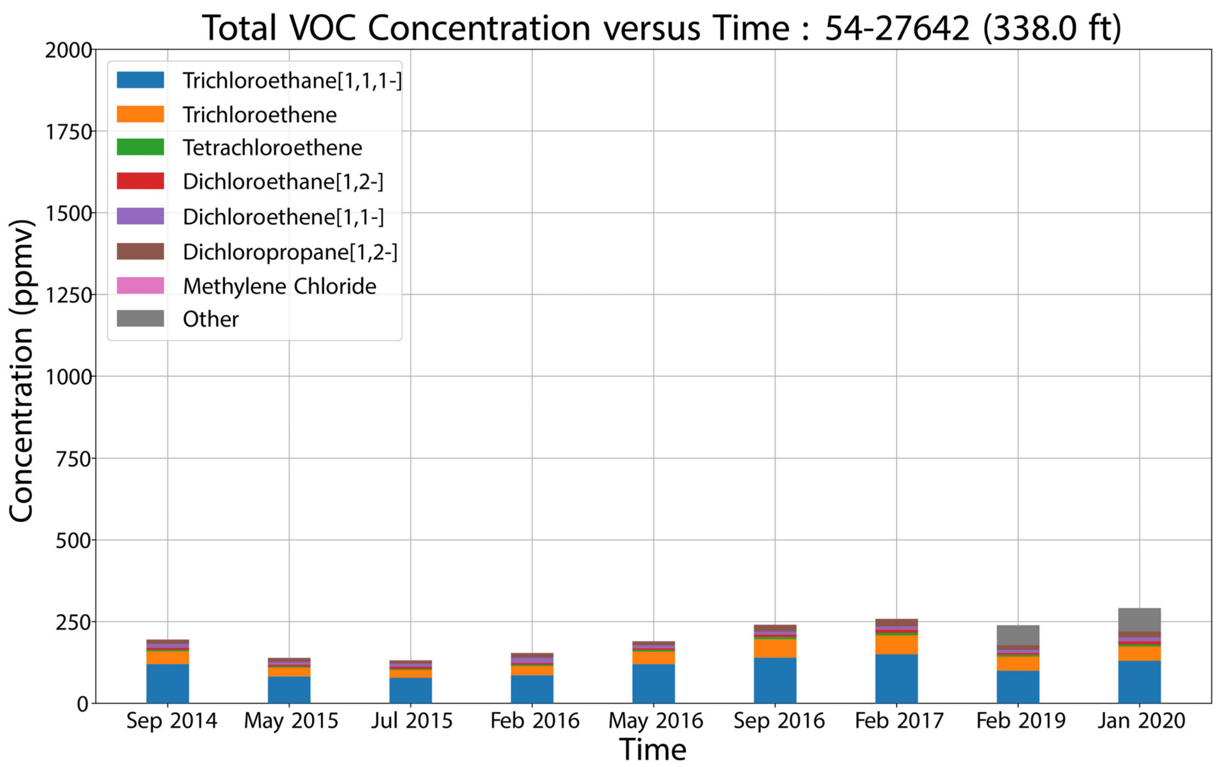

Figure D-2.0-14 Total VOC concentration through time at 338 ft bgs for borehole 54-27642

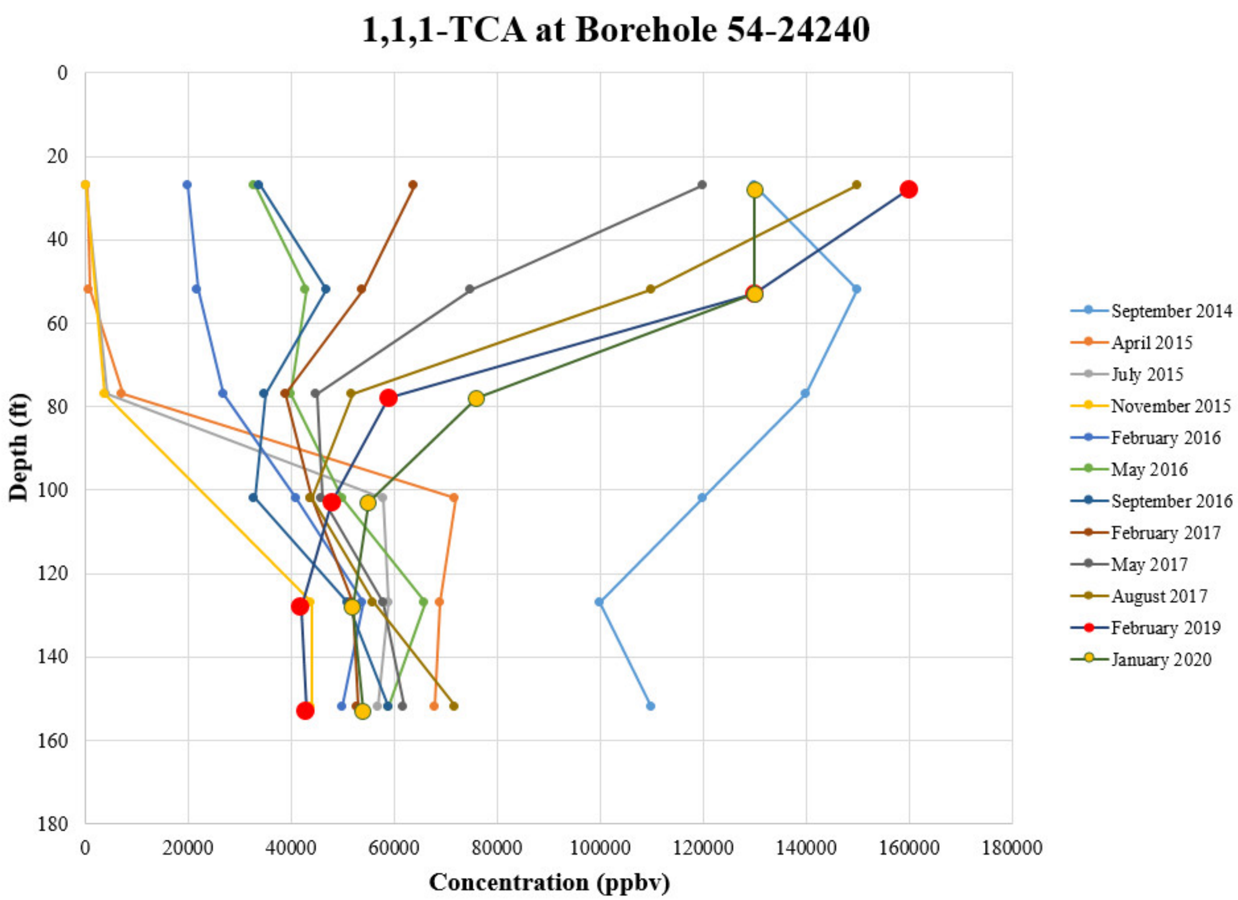

Figure D-3.0-1 TCA[1,1,1-] concentration versus depth and time for borehole 54-24240

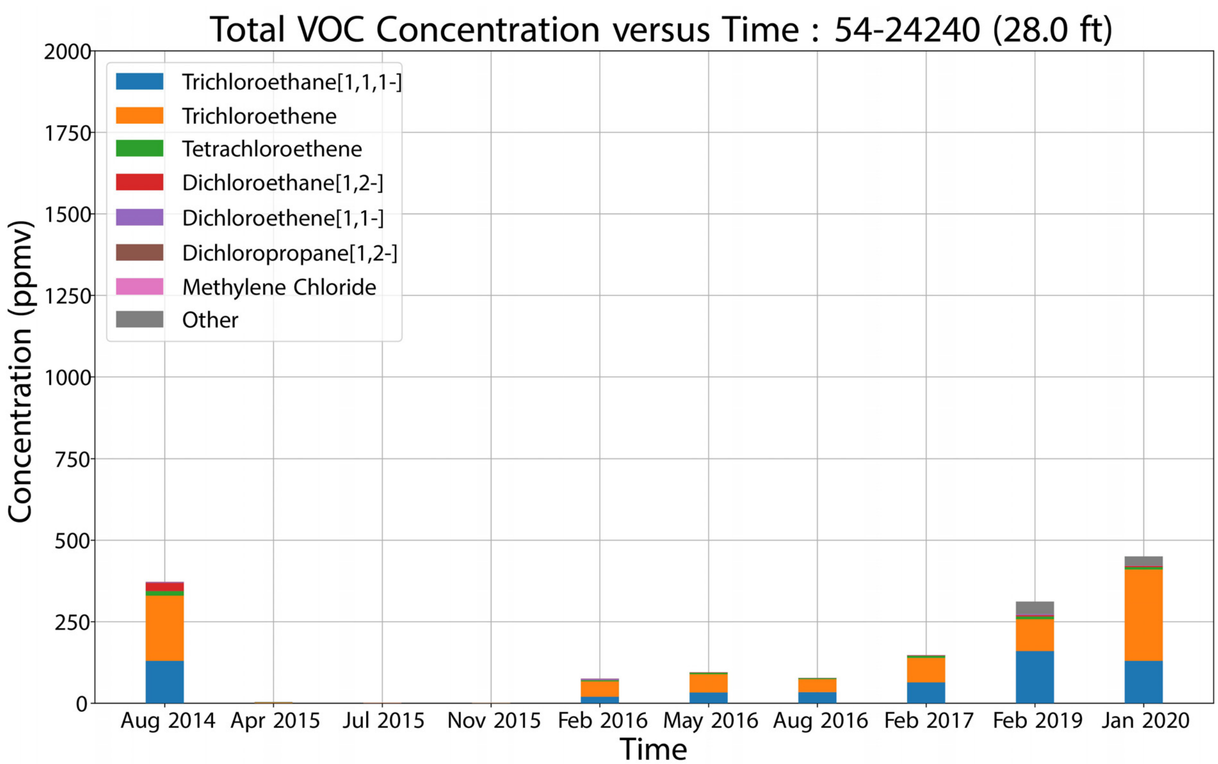

Figure D-3.0-2 Total VOC concentration through time at 28 ft bgs for borehole 54-24240

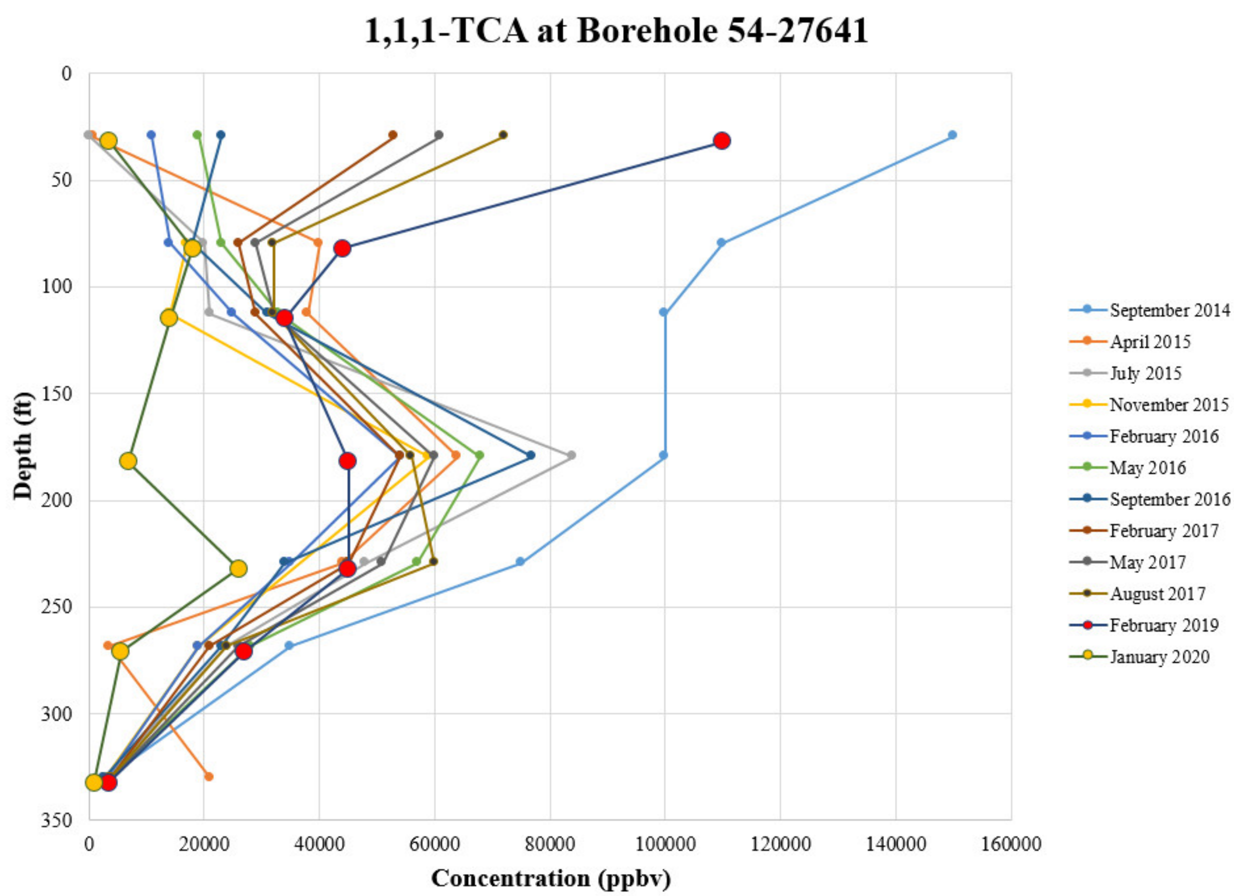

Figure D-3.0-3 TCA[1,1,1-] concentration versus depth and time for borehole 54-27641

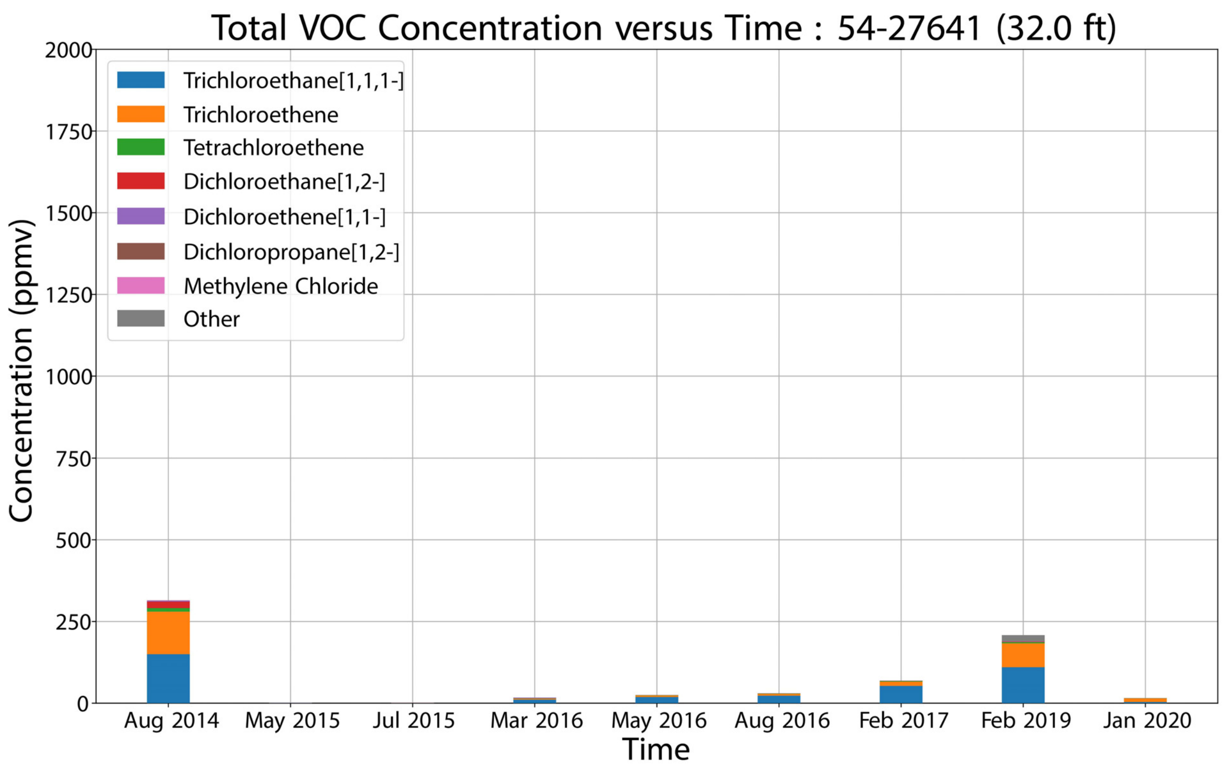

Figure D-3.0-4 Total VOC concentration through time at 32 ft bgs for borehole 54-27641

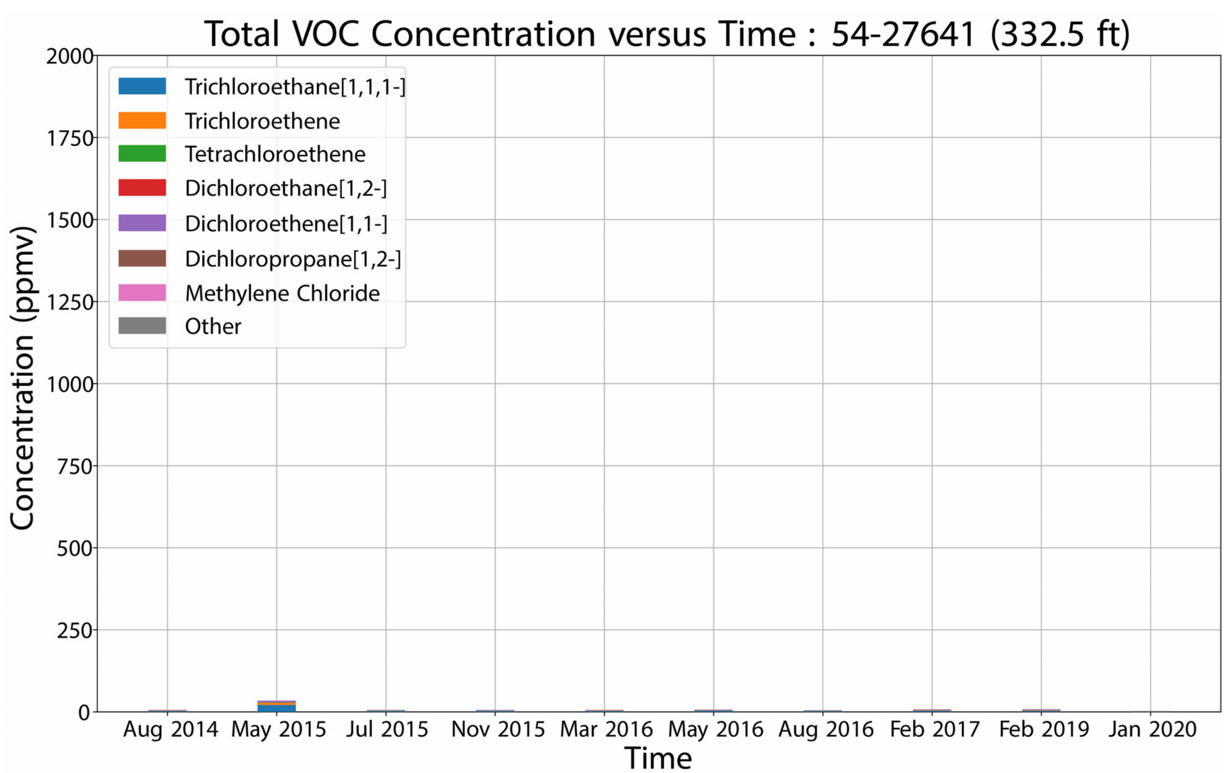

Figure D-3.0-5 Total VOC concentration through time at 332.5 ft bgs for borehole 54-27641

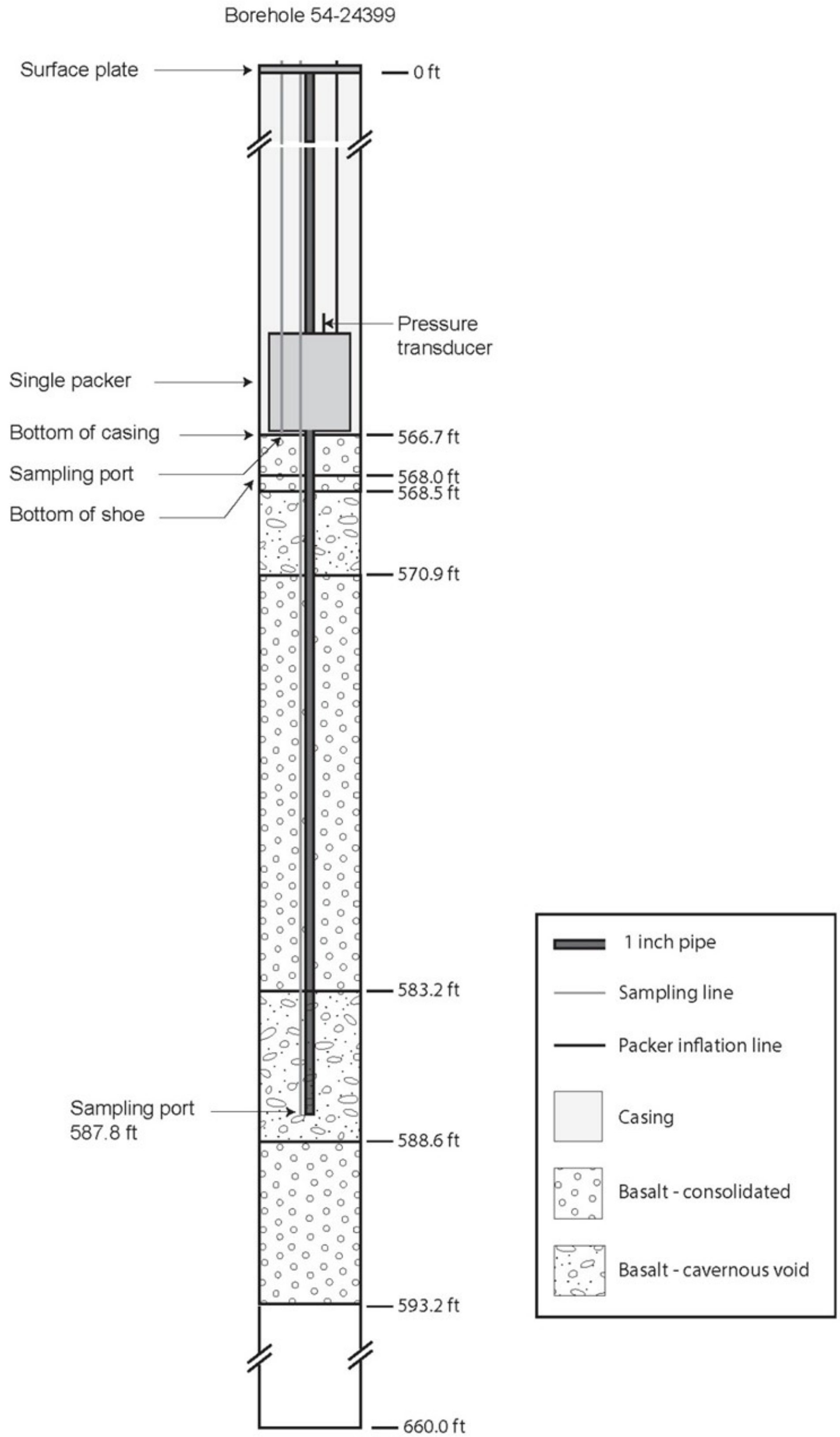

Figure D-4.0-1 Borehole 54-24399 completion schematic

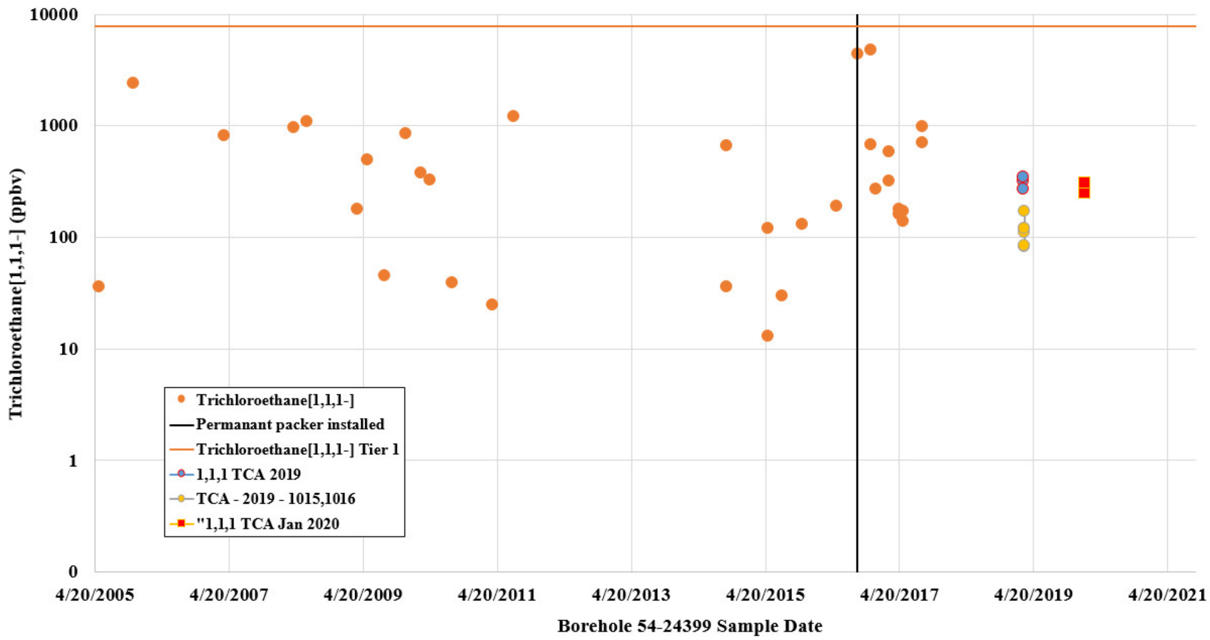

Figure D-4.0-2 TCA[1,1,1-] concentrations in borehole 54-24399

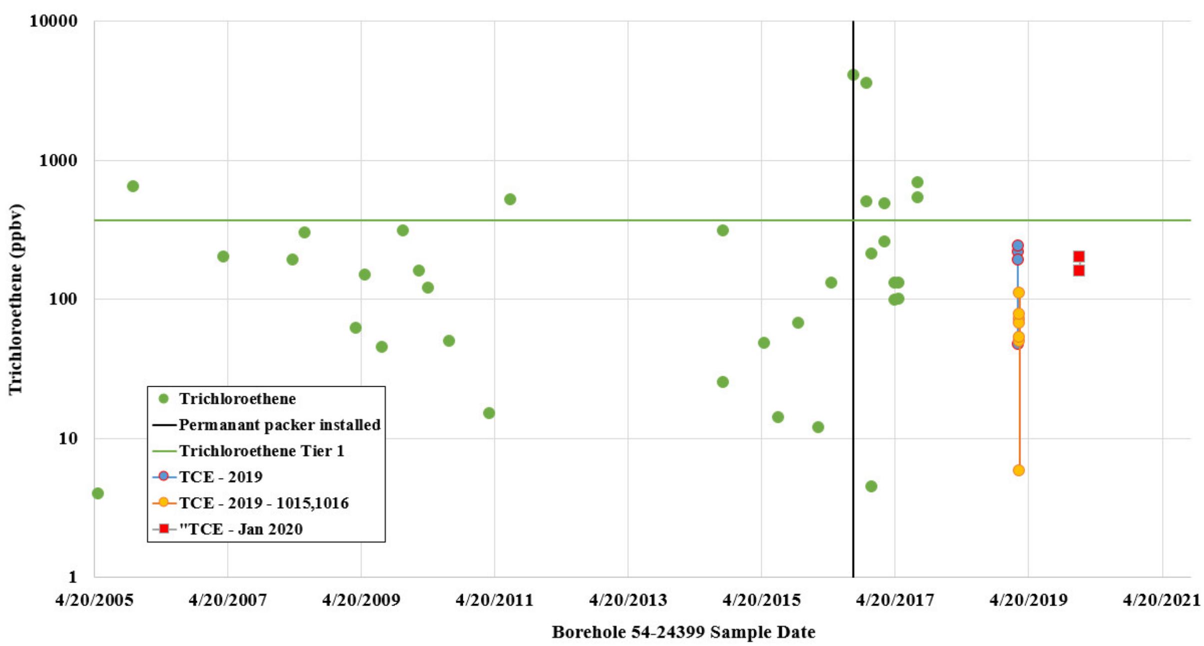

Figure D-4.0-3 TCE concentrations in borehole 54-24399

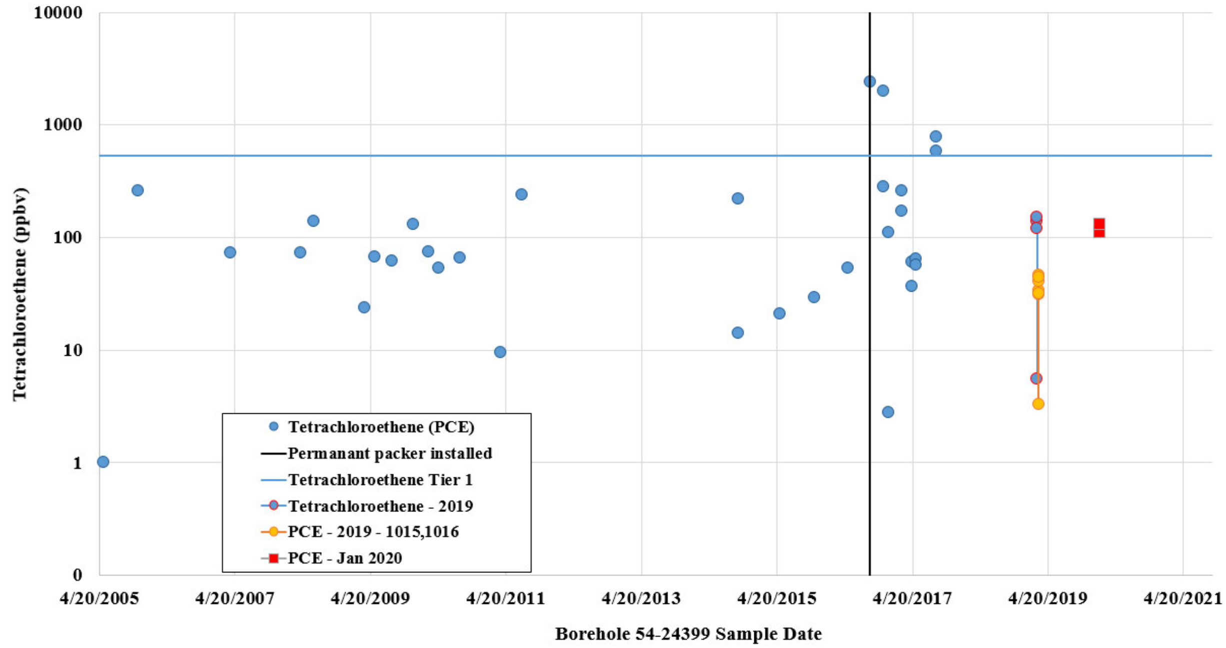

Figure D-4.0-4 Tetrachloroethene concentrations in borehole 54-24399

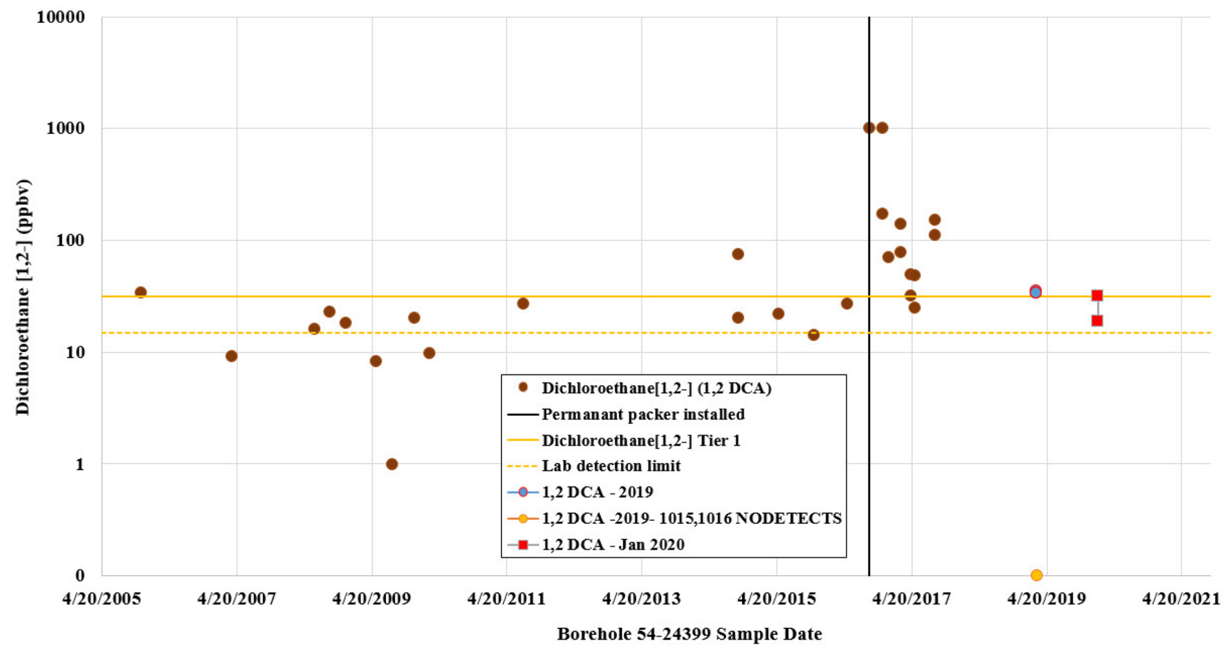

Figure D-4.0-5 DCA[1.2-] concentrations in borehole 54-24399

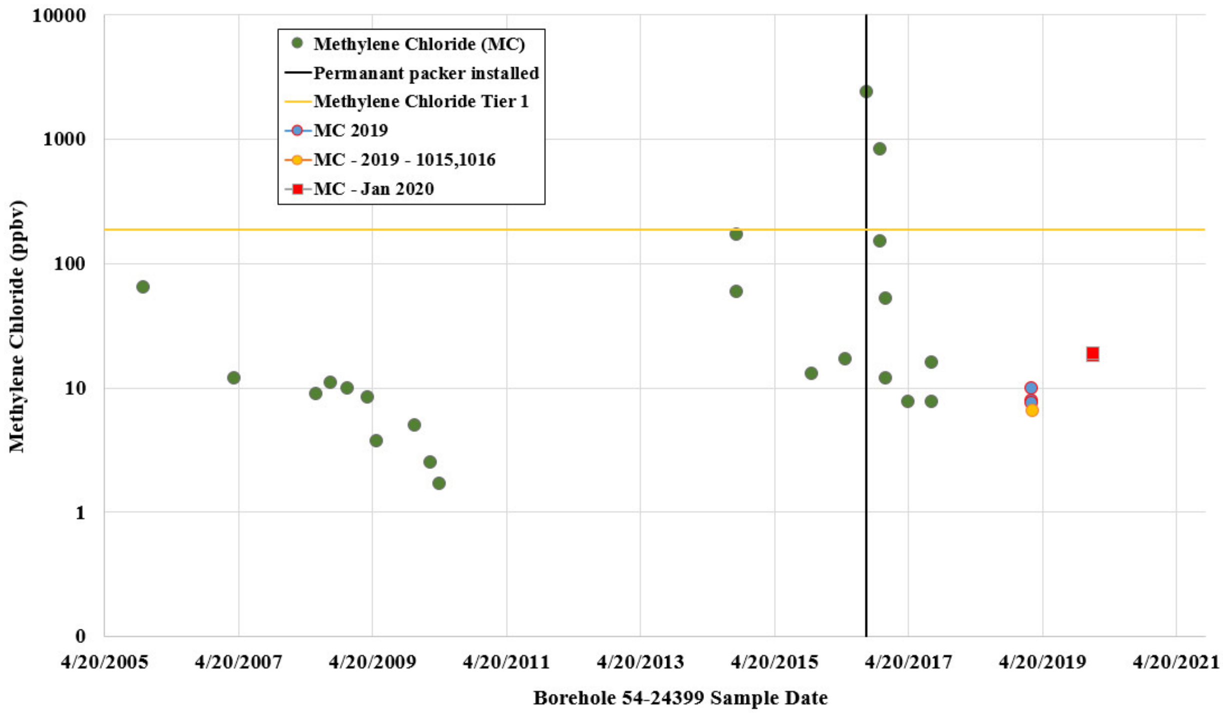

Figure D-4.0-6 Methylene chloride concentrations in borehole 54-24399

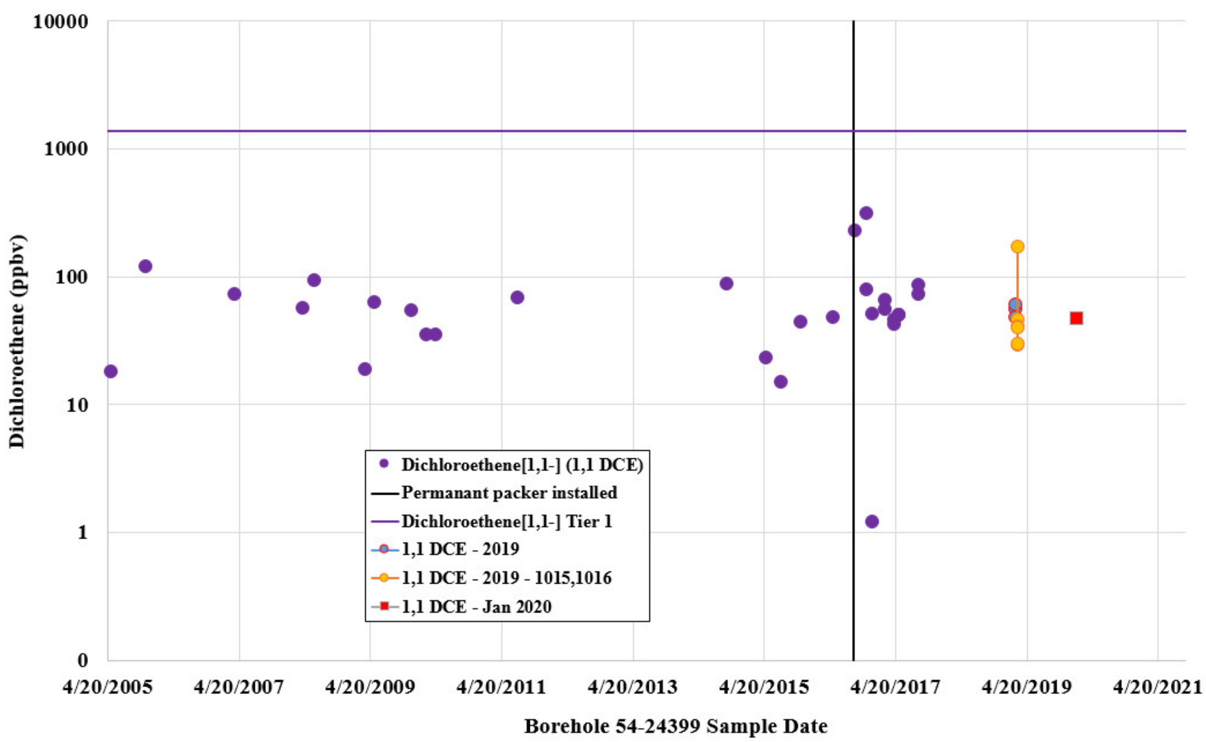

Figure D-4.0-7 DCE[1,1-] concentrations in borehole 54-24399

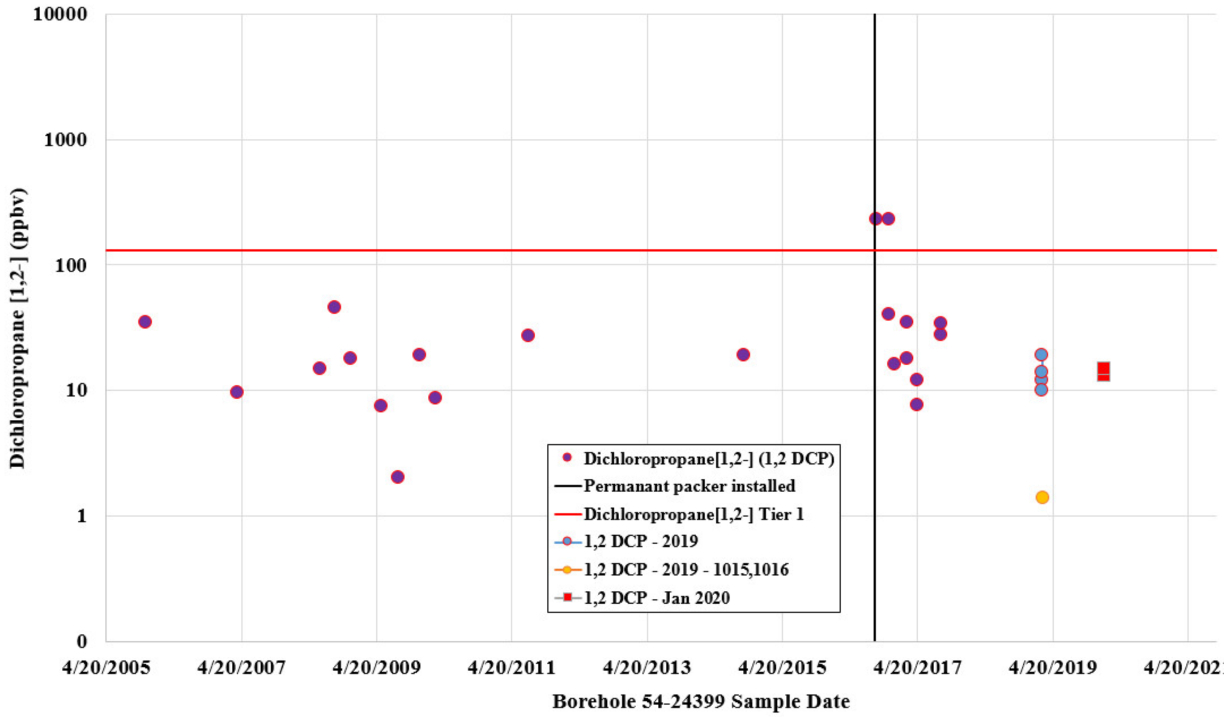

Figure D-4.0.8 DCP[1,2-] concentrations in borehole 54-24399

Table D-1.0-1
Sentry Boreholes at MDA L

Sentry Borehole	East, West, or Deep	Deepest Port (ft)	Possible Increased Leakage Detected
54-02089	East	86	Yes (all depths)
54-24238	East	84	Yes (all depths)
54-24240	West	153	Yes (28 ft)
54-24241	East	193	No
54-24399	Deep	587.7	No
54-27641	West	332.5	No
54-27642	East	338	Yes (30 ft)

Appendix E

Analytical Suites and Results and Analytical Reports
(on CD included with this document)

E-1.0 INTRODUCTION

This appendix summarizes detected volatile organic compound concentrations and tritium activities for vapor-phase monitoring during the two rounds of calendar year 2019 sampling at Material Disposal Area L.

Data qualifiers used in these tables are defined in Appendix A of this periodic monitoring report.

Notes:

1. The abbreviation ppbv is for parts per billion by volume (i.e., volume of gaseous pollutant per 109 volumes of ambient air).
2. The abbreviation $\mu g/m^3$ is for micrograms of gaseous pollutant per cubic meter of ambient air.