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August 7, 2024

Tiffany Drake, PE
Site Manager
US. Department of Energy – Office of Legacy Management
7295 Highway 94 South
St. Charles, MO 63304

Subject: Review of the Draft Sitewide Groundwater Monitoring Report for Calendar Year 2023
– Mound, Ohio Site, May 2024.

Dear Ms. Tiffany:

U.S. EPA has completed the review of the Draft Sitewide Groundwater Monitoring Report for Calendar Year 2023 – Mound, Ohio, May 2024 (the Report). In general, the Report provides a comprehensive evaluation of 2023 groundwater data; however, U.S EPA developed several comments intended to enhance the overall clarity and completeness of the Report. These recommendations are detailed in the enclosed comments.

Please do not hesitate to contact me at 312-886-5736 if you should have any questions.

Sincerely,

A large black rectangular box redacting the signature of Syed M. Quadri.

Syed M. Quadri, PMP
Remedial Project Manager

REVIEW OF THE DRAFT SITEWIDE GROUNDWATER MONITORING REPORT FOR CALENDAR YEAR 2023 – MOUND, OHIO SITE

MAY 2024

DOE MOUND PLANT

MIAMISBURG, OHIO

The following comments were prepared based on a review of the Draft Sitewide Groundwater Monitoring Report for Calendar Year 2023 – Mound, Ohio, May 2024 (the Report).

GENERAL COMMENTS

1. The Mann-Kendall (M-K) analyses presented in Appendix B do not include the trend graphs depicting the M-K results with the Ordinary Least Squares (OLS) regression line or the nonparametric Theil-Sen (T-S) line. Not only are these graphs helpful for visualizing the trend results but are especially important for drawing conclusions when the OLS residuals are not normal. As per ProUCL Version 5.2, Technical Guide: “It is suggested that the user assesses the normality of OLS residuals before drawing trend conclusions using a parametric test based upon the OLS slope estimate. When the assumptions are not met, one can use graphical displays and nonparametric trend tests, M-K and T-S tests, to determine potential trends in time series data set.” In this case, the normality of the OLS residuals is unknown. Therefore, please revise the Report to include the graphical display of the Mann-Kendall and Theil-Sen tests performed on the groundwater data.
2. Please note that the latest version of ProUCL (5.2) was released in June 2022 and should be used to perform trend analyses on the groundwater data going forward.

SPECIFIC COMMENTS

1. **Section 4.4, Summary and Recommendations, Page 26:** The third paragraph presents recommendations for discontinuing sampling at some monitoring well and seep locations; however, the rationale for the discontinuation of monitoring at wells 0118 and 0138 is unclear. While it is noted that TCE data from these wells have been below the Maximum Contaminant Level (MCL), they are identified as monitoring conditions downgradient of seeps which are also sampled. While the seeps provide data for evaluation (it is noted that only one seep is proposed for future sampling), this section does not clarify how seep data are considered fully representative of groundwater conditions because of the method of sample collection which may introduce a low bias to results given the potential for volatilization. Please revise Section 4.4 to clarify how the proposed discontinuation of

monitoring and the composition of the future monitoring program will define the extent of the trichloroethylene (TCE) plume in excess of the MCL.

2. **Figure 3, Phase I MNA Remedy Monitoring Locations, Page 6:** It is unclear why some historical monitoring locations discussed in the Report are not presented on Figure 3. For example, Section 2.1 (Phase I) lists the following wells where monitoring has been discontinued: P033, 0400, and 0402; however, groundwater elevation data were collected from these wells in 2023, as detailed in Table C-1 (Phase I Groundwater Elevations). For clarity, please revise Figure 3 to include these locations using different classes of symbology.
3. **Section 5, Inspection of the Monitoring System, Page 28:** The Report indicates that inspections are performed during each sampling event and, “No deficiencies were noted in 2023, and the wells and seep locations were reported in good condition.” However, field summaries or supporting documents are not provided to support these conclusions. It is recommended that field documentation be appended to the Report to document these findings.
4. **Figure 7, 2022 Average Groundwater Elevations in Phase I, Page 16, and Figure 11, 2022 Averages for Groundwater Elevations in Parcels 6, 7, and 8, Page 25:** The text in Section 3.3 states, “A map of the average groundwater elevations measured in the Phase I area during 2023 (Figure 7) represents the two flow regimes at the site: (1) bedrock and (2) the unconsolidated materials of the BVA.” It is noted that the use of an average of groundwater elevations from two separate sampling events does not allow for the assessment of changes in flow direction (e.g., seasonality). To represent variability most accurately in groundwater flow direction, please revise the Report to include separate contour maps for the semiannual Phase I sampling events and the quarterly Parcel 6, 7, and 8 sampling events, and use arrows to show groundwater flow direction.

Sitewide Groundwater Monitoring Report Mound, Ohio, Site

Calendar Year 2022

June 2023



U.S. DEPARTMENT OF
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Abbreviations

BVA	Buried Valley Aquifer
cDCE	<i>cis</i> -1,2-dichloroethene
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
H_α	alternative hypothesis
H_0	null hypothesis
MCL	maximum contaminant level
µg/L	micrograms per liter
MK	Mann-Kendall
MNA	monitored natural attenuation
Ohio EPA	Ohio Environmental Protection Agency
PCE	tetrachloroethene
RAO	Remedial Action Objective
RIN	Requisition Index Number
TCE	trichloroethene
tDCE	<i>trans</i> -1,2-dichloroethene
VC	vinyl chloride
VOC	volatile organic compound

1.0 Introduction

1.1 Purpose

This report was prepared in support of the selected remedies for Phase I and Parcels 6, 7, and 8 of the Mound, Ohio, Site as outlined in the *Operations and Maintenance Plan for the U.S. Department of Energy, Mound, Ohio, Site* (DOE 2015), hereafter called the Sitewide Operations and Maintenance Plan. It summarizes the data collected in 2022 and documents the progress of the monitored natural attenuation (MNA) remedies for both areas of the Mound site. All sampling and data analyses were performed in accordance with the Sitewide Operations and Maintenance Plan, unless noted otherwise.

This report includes data collected during the groundwater and seep sampling performed in 2022. Time-series plots were used to determine changes in data over time (increasing or decreasing) and interpret the effectiveness of the MNA remedy. Trend analysis was performed on data from selected wells using the nonparametric Mann-Kendall test to further support the observed increases or decreases in concentrations and possible estimates about when remediation goals may be reached.

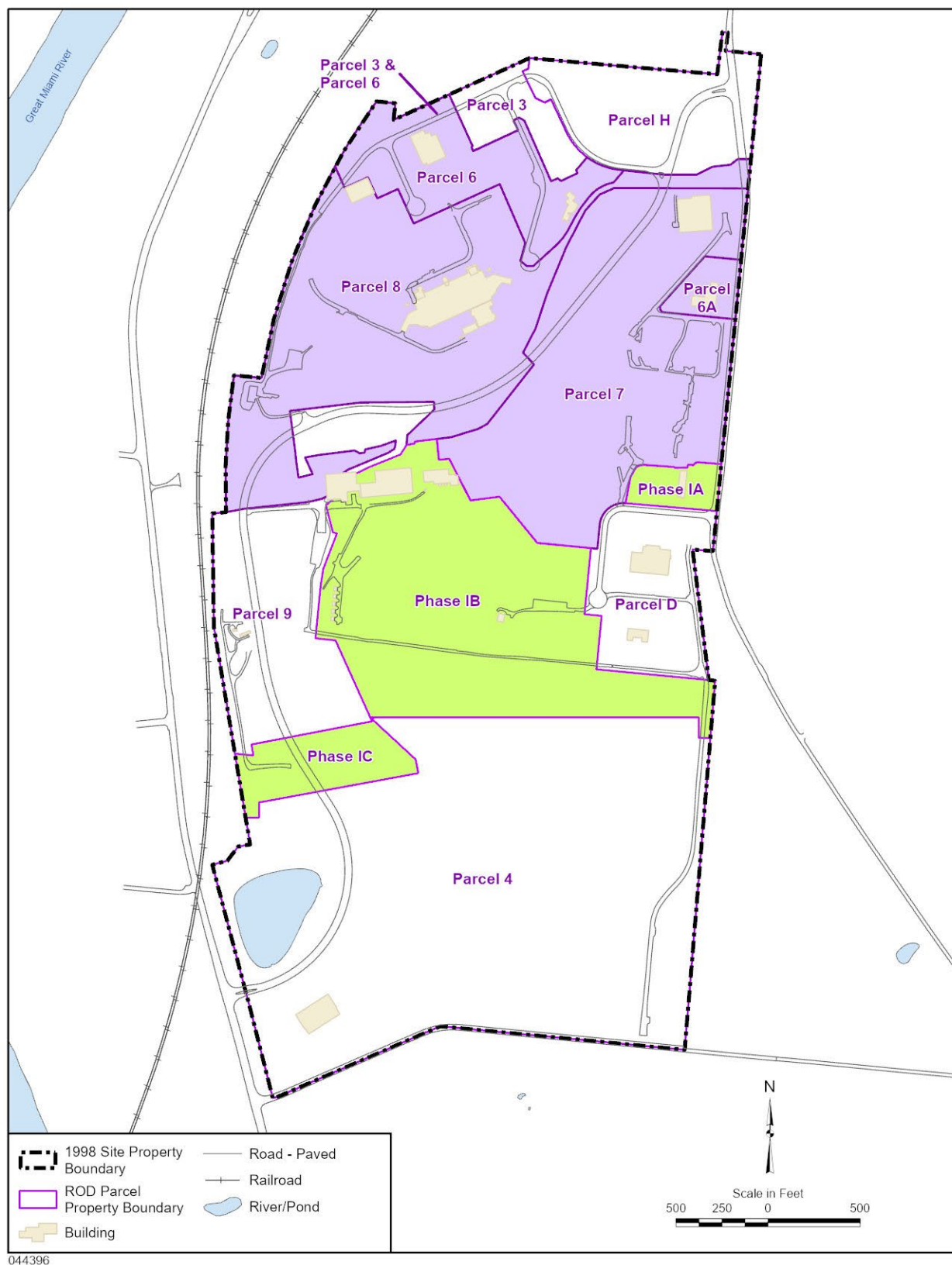
This report also documents operational changes that occurred during the reporting period, provides recommendations or changes to the current monitoring program, and identifies maintenance activities associated with the monitoring wells being sampled.

1.2 Project Description

The Mound site¹ is in Miamisburg, Ohio, approximately 10 miles southwest of Dayton. In 1995, the U.S. Department of Energy (DOE) Mound Plant, named after the Miamisburg Indian Mound adjacent to the site, included 120 buildings on 306 acres. The Great Miami River, west of the site, flows from northeast to southwest through Miamisburg and dominates the geography of the region surrounding the site. Figure 1 shows the locations of Phase I (in green) and Parcels 6, 7, and 8 (in purple).

DOE remediated the site to an industrial/commercial use standard consistent with the exposure assumptions provided in the *Mound 2000 Residual Risk Evaluation Methodology, Mound Plant* (DOE 1997) and endorsed by the U.S. Environmental Protection Agency (EPA) and Ohio Environmental Protection Agency (Ohio EPA). The remedies for groundwater at the site combine groundwater monitoring and institutional controls in the form of deed restrictions on future land and groundwater use. These combined remedies will prevent current and future workers, the public, and the environment from being exposed to contaminated groundwater at the site.

¹ The Mound site has also been called the Mound Laboratory, Mound Laboratories, the Mound Plant (EPA ID OH6890008984), the USDOE Mound Plant, the Mound Facility, the USDOE Mound Facility, the Miamisburg Environmental Management Project, and the Miamisburg Closure Project. The Office of Legacy Management uses Mound, Ohio, Site as the formal name of the site.



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Figure 1. Locations of Phase I and Parcels 6, 7, and 8

The long-term Remedial Action Objective (RAO) for groundwater is to meet Safe Drinking Water Act maximum contaminant levels (MCLs) through MNA in the Phase I and Parcels 6, 7, and 8 areas. Until these goals are achieved, the near-term RAO is to prohibit the extraction and use of groundwater underlying the premises unless prior written approval is obtained from EPA and Ohio EPA.

1.2.1 Phase I

Phase I is an approximately 52-acre area with three distinct sections. It lies on the southern border of the former production area of the site. This area contains monitoring wells that are screened in both the Great Miami Buried Valley Aquifer (BVA) and the upgradient bedrock aquifer system. MNA is being used as the remedy for a small, discrete section of the bedrock groundwater system contaminated with trichloroethene (TCE) to ensure that concentrations of TCE within the bedrock groundwater are decreasing to levels below the Safe Drinking Water Act MCL and do not impact the downgradient BVA.

1.2.2 Parcels 6, 7, and 8

Parcels 6, 7, and 8 occupy approximately 101 acres of the northern portion of the Mound site. The main production facilities were in an area called the Main Hill in Parcels 6 and 8. A tributary valley runs between these two parcels and Parcel 7; it contains a narrow tongue of glacial deposits that is hydraulically connected with the BVA. Groundwater within the fractured bedrock beneath the Main Hill area, and in topographic highs within Parcel 7, flows along horizontal bedding planes and fractures and ultimately discharges to naturally occurring seeps or to the downgradient BVA.

Two monitoring wells on the eastern edge of the BVA indicate volatile organic compound (VOC) impact, primarily TCE, that exceed MCLs of the Safe Drinking Water Act. MNA is the remedy for the VOCs in groundwater associated with the Main Hill. Sampling is being performed to assess the contaminant concentrations and verify that the BVA offsite and downgradient of these wells is not being adversely impacted.

Five seeps associated with this area are along the Main Hill of the site. Two of the five seeps are within the site boundary, and the remaining three are offsite to the north. Historically, these seeps have had elevated levels of tritium and VOCs. These seeps, and several downgradient wells, are being monitored to verify that source removal (buildings and soil) on the Main Hill result in decreasing concentrations over time.

1.3 Geology and Hydrology

The aquifer system at the Mound site consists of two distinct hydrogeologic environments: (1) groundwater flow through the Ordovician shale and limestone bedrock beneath the hills and (2) groundwater flow within the unconsolidated glacial deposits and alluvium associated with the BVA in the Great Miami River Valley. A thin tributary valley along the southern edge of the Main Hill divides the two main portions of the site and features a narrow tongue of glacial deposits that is hydraulically connected with the BVA.

The bedrock flow system is dominated by fracture flow and is not considered a highly productive aquifer. Groundwater flow in the bedrock typically mimics the topography, with groundwater discharging to the BVA or at seeps from the upper bedrock. The BVA is dominated by porous flow, with interbedded gravel deposits providing the major pathway for water movement. The unconsolidated deposits are Quaternary-age sediments that consist of both glacial and fluvial deposits. The BVA is a highly productive aquifer capable of yielding a significant quantity of water. It is designated a sole-source aquifer. Groundwater in the BVA flows south, following the downstream course of the Great Miami River. The general structure and flow characteristics for these two interconnected systems are depicted in Figure 2.

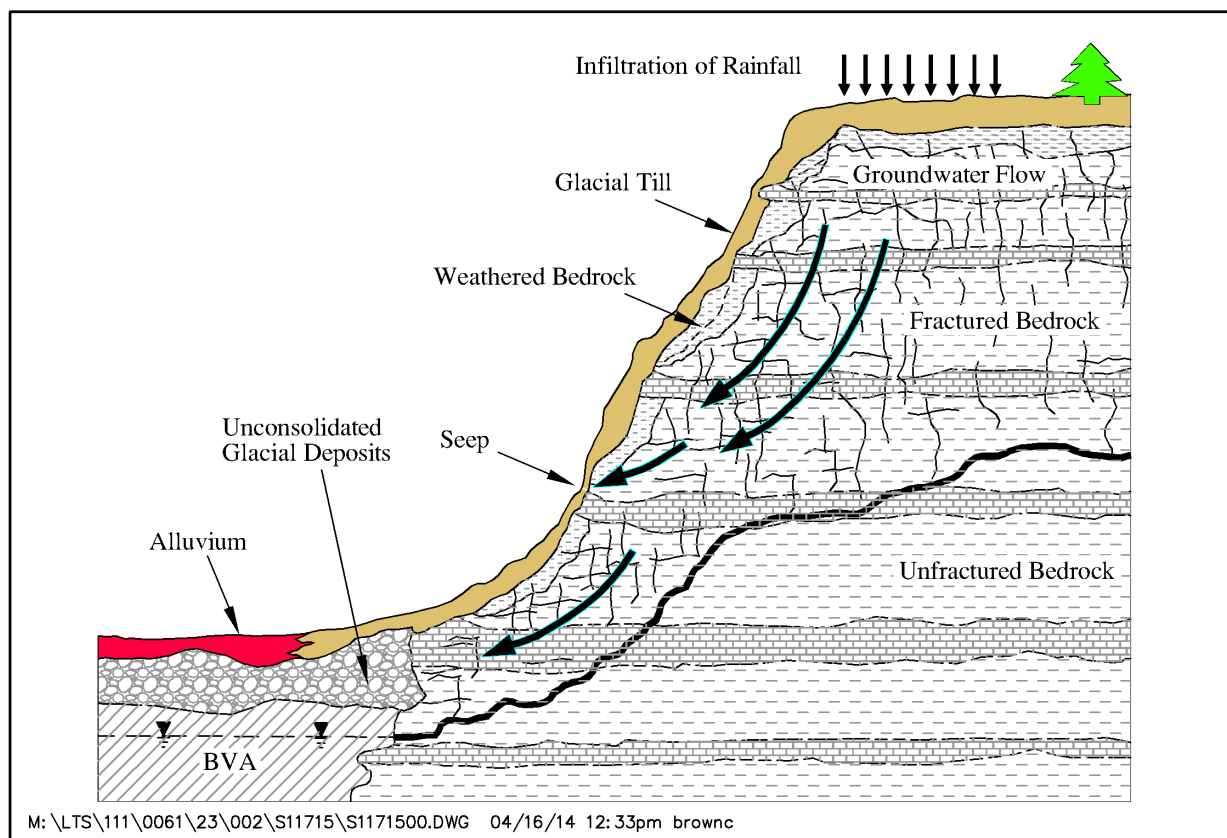


Figure 2. Generalized Cross Section Showing Flow from Bedrock to the BVA

For detailed descriptions of the geology, lithology, and groundwater flow regimes at the site and specific hydrogeologic information for each area, refer to hydrogeologic investigation reports and work plans prepared for the site (DOE 1992; DOE 1994a; DOE 1994b; DOE 1995; DOE 1999).

2.0 Monitoring Programs

2.1 Phase I

The Phase I groundwater monitoring program was established to verify that the BVA is not negatively affected by TCE-contaminated groundwater within the bedrock aquifer system. Groundwater in Phase I is monitored for TCE and its degradation products to verify that concentrations of TCE are decreasing by natural attenuation. The objective of this monitoring is to protect the BVA by verifying that the concentration of TCE near well 0411, well 0443, and seep 0617 is decreasing and to confirm that TCE is not adversely affecting the BVA.

Well P064 was added to the Phase I MNA remedy monitoring program starting in 2018 to monitor groundwater discharge from the bedrock to the BVA, and sampling at wells 0400, 0402, and P033 was discontinued. These changes to the monitoring program were approved by EPA and Ohio EPA during the August 17, 2017, Mound Core Team meeting. The Core Team consists of representatives from DOE, EPA, and Ohio EPA.

2.1.1 Monitoring Program

Under the Phase I MNA monitoring program, samples are collected semiannually from selected wells and one seep (Figure 3) and analyzed as outlined in Table 1. Sampling was performed in the first and third quarters of 2022.

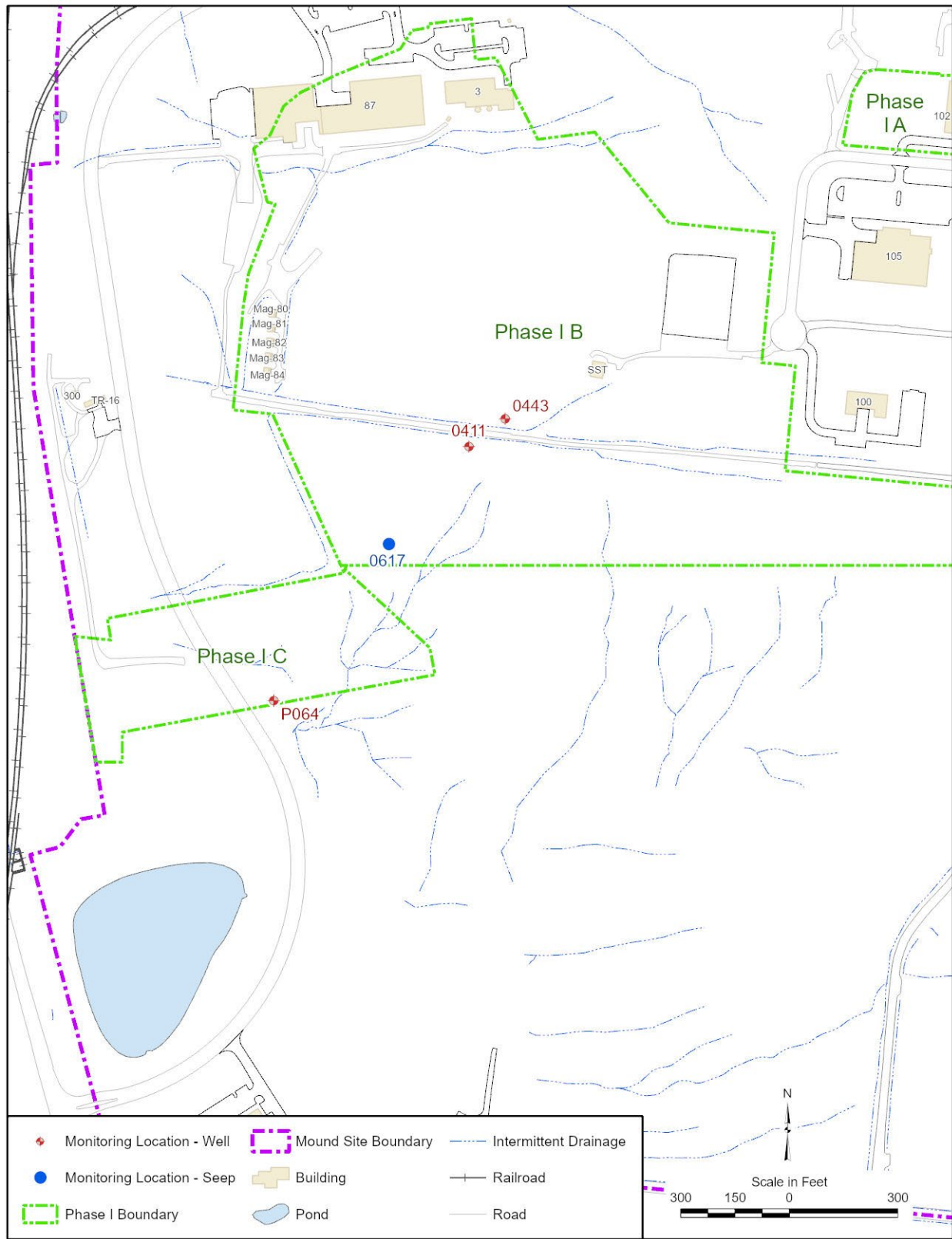
Table 1. Remedy MNA Monitoring for Phase I

Location	Area	Parameters
Well 0411	Well 0411 area	TCE cDCE VC
Well 0443		
Seep 0617	Bedrock monitoring	
Well P064	BVA monitoring	

Abbreviations:

cDCE = *cis*-1,2-dichloroethene

VC = vinyl chloride



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Figure 3. Phase I MNA Remedy Monitoring Locations

2.1.2 Triggers

The contaminant data are evaluated against previous data collected at each location to determine if MNA is adequately addressing groundwater impact and to monitor geochemical conditions in the aquifer. Trigger levels and response actions have been established for each contaminant as presented in the Sitewide Operations and Maintenance Plan (DOE 2015). The triggers and MCLs for each contaminant are summarized in Table 2.

Table 2. Trigger Levels for Phase I MNA Remedy

Location	TCE (µg/L)	cDCE (µg/L)	VC (µg/L)
Well 0411	30	70	2
Well 0443	18	70	2
Well P064	5	70	2
Seep 0617	16	70	2
MCL	5	70	2

Abbreviations:

cDCE = *cis*-1,2-dichloroethene

µg/L = micrograms per liter

VC = vinyl chloride

EPA and Ohio EPA must be notified if trigger levels are exceeded. After notification, the Core Team (EPA, Ohio EPA, and DOE) will determine an appropriate course of action.

2.2 Parcels 6, 7, and 8

Groundwater in Parcels 6, 7, and 8 is monitored for TCE and its degradation products to verify that the downgradient BVA is not affected and concentrations are decreasing. In addition, groundwater discharging from seeps is monitored for TCE and its degradation products to verify that source removal has resulted in decreasing concentrations over time.

The sampling program focuses on the following areas:

- **Well 0315/0347 Area:** Wells at the edge of the BVA on the southwestern corner of Parcel 8 that have elevated concentrations of VOCs. The program consists of wells that have TCE concentrations greater than the MCL and downgradient wells to the west. Wells 0315 and 0347 (source wells) and other selected downgradient BVA wells are monitored for VOCs—namely, tetrachloroethene (PCE), TCE, *cis*-1,2-dichloroethene (cDCE), *trans*-1,2-dichloroethene (tDCE), and vinyl chloride (VC).
- **Main Hill Seeps:** Seeps on the northern and southern sides of the Main Hill that have elevated concentrations of VOCs. The program consists of the downgradient seeps to the north and south, and downgradient wells to the west. Water from seeps 0601, 0602, 0605, 0606, and 0607 is collected and analyzed for VOCs. Select wells within the BVA that are downgradient of the bedrock groundwater discharge area of the Main Hill are also sampled to monitor VOCs.

2.2.1 Monitoring Program

Under the Parcels 6, 7, and 8 MNA monitoring program, samples are collected quarterly for VOCs in selected wells and seeps (Figure 4). Table 3 provides a summary of the monitoring locations as specified in the Sitewide Operations and Maintenance Plan.

Table 3. Monitoring for Parcels 6, 7, and 8

Monitoring Location	Area	Parameters
Well 0315	Source wells	PCE TCE cDCE tDCE VC
Well 0347		
Well 0118	Downgradient BVA monitoring	
Well 0124		
Well 0126		
Well 0138		
Well 0346		
Well 0379		
Well 0386		
Well 0387		
Well 0389		
Well 0392		
Seep 0601	Main Hill seeps	
Seep 0602		
Seep 0605		
Seep 0606		
Seep 0607		

2.2.2 Trigger Levels

The contaminant data are evaluated against previous data collected at each location to determine whether downward trends are occurring. Trigger levels and response actions have been established for specific contaminants at specified locations as presented in the Sitewide Operations and Maintenance Plan. The trigger levels and MCLs for each contaminant are summarized in Table 4.

Table 4. Trigger Levels for Parcels 6, 7, and 8 Monitoring Locations

Location	PCE	TCE	cDCE	tDCE	VC
Well 0315		30 µg/L			
Well 0347		30 µg/L			
Well 0124		5 µg/L			
Well 0126		5 µg/L			
Well 0386		5 µg/L			
Well 0387		5 µg/L			
Well 0389		5 µg/L			
Well 0392		5 µg/L			
Seep 0601	75 µg/L				
Seep 0605		150 µg/L			
MCL	5 µg/L	5 µg/L	70 µg/L	100 µg/L	2 µg/L

EPA and Ohio EPA must be notified if these trigger levels are exceeded. After notification, the Core Team (EPA, Ohio EPA, and DOE) will determine an appropriate course of action.

2.3 Monitoring Network

The monitoring well and seep locations sampled under these programs were selected to provide data of sufficient quality to meet the objectives of the groundwater remedies for Phase I and Parcels 6, 7, and 8. These wells were initially installed to support various site characterization activities and were designed and constructed to provide high-quality groundwater data. Appendix A contains construction information for each well used to support these remedies.

2.4 Deviations from the Sitewide Operations and Maintenance Plan

Sampling was performed as outlined in the Sitewide Operations and Maintenance Plan (DOE 2015), which compiles the sampling requirements outlined in previous regulator-approved plans for each area. Modifications to these monitoring programs (e.g., reduction in sampling frequency or discontinuation of monitoring locations) are also incorporated into the Sitewide Operations and Maintenance Plan (DOE 2015).

Sampling was performed as follows:

- All required locations in Phase I were sampled in 2022.
- All required locations in Parcels 6, 7, and 8 were sampled in 2022 with the exception of seep 0602, which was dry (no visible flow) during the third and fourth quarter sampling events and seep 0606, which was dry during the fourth quarter sampling event.
- Site-specific sampling methods for the site were followed during these sampling events. These methods were approved by the Core Team and are integrated into the Sitewide Operations and Maintenance Plan (DOE 2015).

2.5 Trend Analysis Methodology

Groundwater data from select locations are evaluated for trends in contaminant concentrations to provide supporting evidence that contaminant concentrations are decreasing as a result of source removal at the site. Both graphical and statistical evaluations are performed to provide evidence of continued decreases in concentrations. Graphs of data over time depict the range and changes in concentrations, identify outliers, and show relationships between monitoring locations. Statistical evaluation can provide supporting evidence on the direction of changes over time and whether they are significant, as well as estimate the magnitude of these changes. The computer program ProUCL (ProUCL, Version 5.1.002), developed by Lockheed Martin and EPA, was used to perform trend analysis. A Mann-Kendall test was performed, which is a nonparametric statistical procedure that is appropriate for analyzing trends in data over time.

There is no requirement that the data be normally distributed or that the trend, if present, be linear. The Mann-Kendall test can be used if values are missing or below the detection limit. The assumption of independence requires that the time between samples be sufficiently large so there is no correlation between measurements collected at different times. All locations were previously evaluated for seasonality as part of the annual review in 2014 (DOE 2015). Those results indicated that there are no seasonal trends in contaminant data collected from any of the monitoring locations.

The Mann-Kendall test determines whether to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_a), where:

- H_0 asserts there is no monotonic trend in the series.
- H_a asserts that a monotonic trend exists.

The initial assumption of the Mann-Kendall test is that H_0 is true and the data must be convincing beyond a reasonable doubt before H_0 is rejected and H_a is accepted.

Results of the trend analyses for each monitoring program are presented in Section 3.0 and Section 4.0. For those locations that exhibit downward trends and currently exceed the MCL, the data were additionally evaluated using the Theil-Sen test to determine the linear rate of change in the concentrations to provide an approximate time frame when concentrations may reach MCLs. A summary of the Mann-Kendall and Theil-Sen statistical approaches used for this report and the specified error rates and data assumptions are presented in Appendix B. Data analysis reports for each well and parameter are also included in Appendix B.

3.0 Phase I MNA Remedy

3.1 Monitoring Results

Monitoring results for 2022 (Table 5) continue to show concentrations of TCE in source area wells 0411 and 0443 and seep 0617. Concentrations of TCE at these locations continue to exceed the MCL of 5 micrograms per liter ($\mu\text{g/L}$) with the exception of the second semiannual sampling event in seep 0617. Low levels of cDCE, a TCE degradation product, were also reported in source area wells 0411 and 0443 and seep 0617. All VOC concentrations were below the applicable trigger levels (Table 2). Downgradient BVA monitoring well P064 had no detectable concentrations of TCE and cDCE. PCE was reported in well P064 during both semiannual events at concentrations of 0.74 $\mu\text{g/L}$ and 1.3 $\mu\text{g/L}$. No detectable concentrations of cDCE were reported in well P064. No detectable concentrations of tDCE or VC were reported in any of the wells or seep.

Table 5. Summary of VOC Monitoring Results in Phase I for 2022

Well ID	Location	Parameter	First Semiannual Event	Second Semiannual Event
Source Area Wells and Seep				
0411	0411 Area	TCE (μg/L)	11.2	7.4
		cDCE (μg/L)	0.89 (J)	0.92 (J)
0443	0411 Area	TCE (μg/L)	5.6	5.8
		cDCE (μg/L)	0.41 (J)	ND (<1)
0617	Seep/ Bedrock	TCE (μg/L)	7.8	1.7
		cDCE (μg/L)	2.2	0.69 (J)
Bedrock/BVA Monitoring Wells				
P064	BVA	TCE (μg/L)	ND (<1)	ND (<1)
		cDCE (μg/L)	ND (<1)	ND (<1)

Note:

Values in **bold** exceed the MCL of 5 $\mu\text{g/L}$ for TCE.

Abbreviations:

J = estimated value less than the reporting limit

ND = not detected above reporting limit

The data collected during 2022 continue to indicate that impact is localized in the bedrock groundwater near wells 0411 and 0443 and seep 0617. Data from downgradient BVA monitoring well P064 indicate that the concentrations of VOCs are low at the point where bedrock groundwater enters the BVA. Data from this monitoring program show that impacted groundwater moves through the fractured bedrock associated with the drainage extending from wells 0411 and 0443 through seep 0617 and discharges near well P064. This groundwater movement is consistent with the site conceptual model for groundwater where the bedrock flow system is dominated by fracture flow and typically mimics the topography, with groundwater discharging to the BVA or at seeps from the upper bedrock.

TCE concentrations in well 0411 (Figure 5) have decreased since monitoring began in 1999. Concentrations of TCE in this well have generally varied between 9 and 15 µg/L since 2002; however, in 2016, concentrations began to stabilize around 10 µg/L. Concentrations of TCE in well 0443 and seep 0617 have varied since monitoring of these locations started in 2002. Concentrations of TCE in well 0443 have been consistently greater than the MCL since 2010 with the exception of two sampling events in 2019 and 2021. The time-concentration plots for well 0443 and seep 0617 indicate that concentrations vary and are lower than those in well 0411.

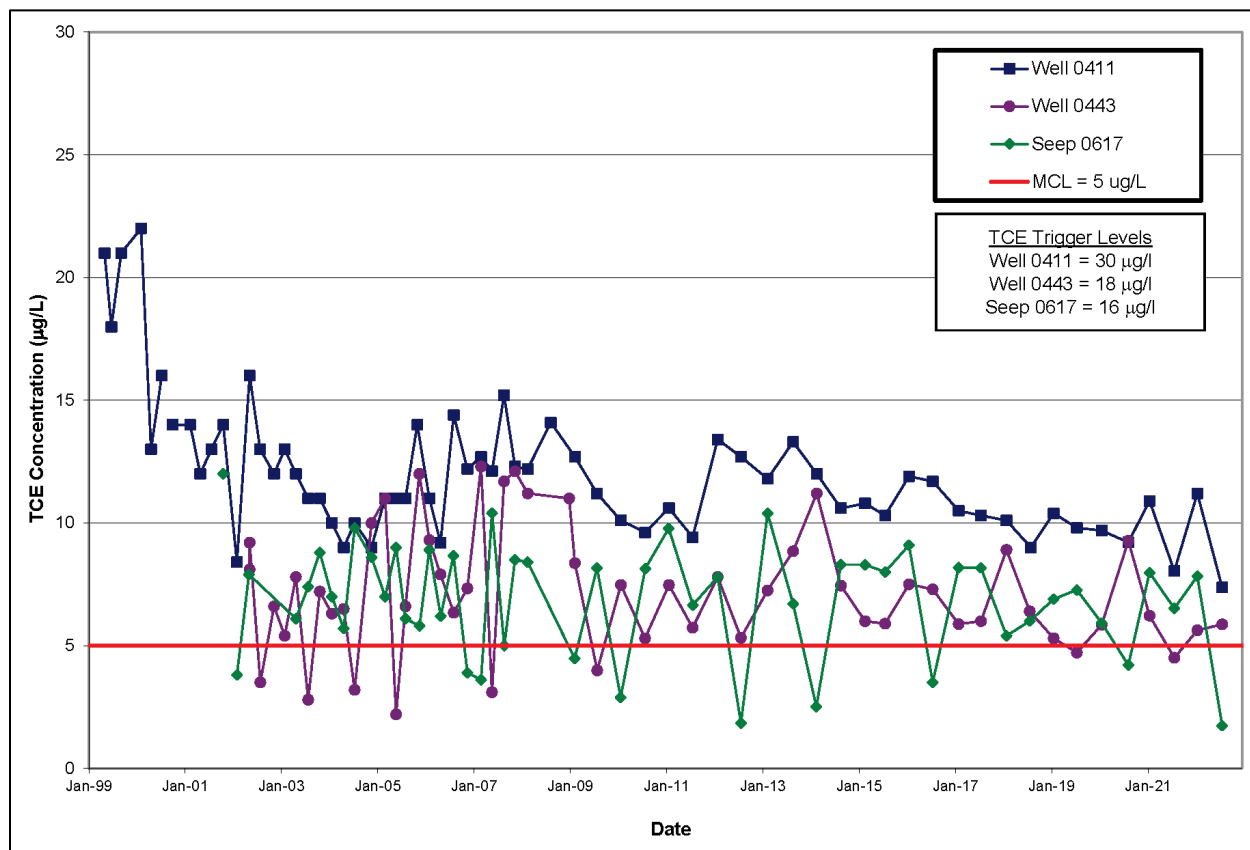


Figure 5. TCE Concentrations in Phase I, 1999–2022

The concentrations of cDCE in groundwater (Figure 6) continue to be varied. Concentrations greater than the reporting limit of 1 µg/L have mostly been found in well 0411 and seep 0617. Historically, concentrations of cDCE in well 0411 were generally greater than those measured in seep 0617; however, over the past few years, the concentrations in seep 0617 have been higher than or similar to concentrations in well 0411. Estimated detections lower than 1 µg/L have been reported in well 0443 since the second half of 2009. None of the locations had concentrations of cDCE that exceeded the MCL of 70 µg/L.

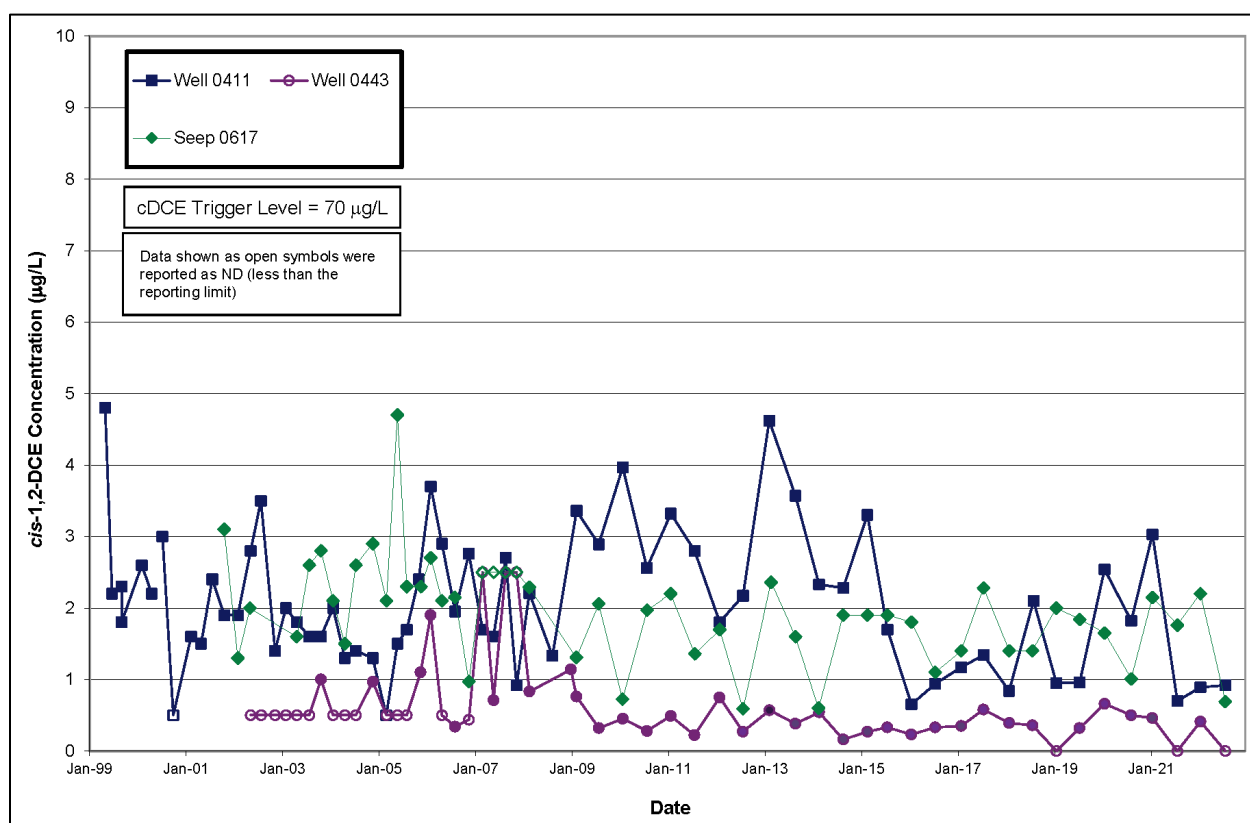


Figure 6. cDCE Concentrations in Phase I, 1999–2022

3.2 Trend Analysis

Mann-Kendall trend analysis was performed using data collected since 1999 for wells 0411 and 0443 and seep 0617. Downward trends were indicated for TCE in well 0411 and for cDCE in well 0443 and seep 0617 (Table 6). Trend analysis for well P064 was performed using data collected since its installation in 2017 and indicates a downward trend for TCE. Summary reports providing details for each statistical evaluation for each monitoring location are contained in Appendix B.

Table 6. Trend Analysis Results for TCE and cDCE in Phase I

Location	Analyte	Trend
Well 0411	TCE	Down
Well 0443		None
Seep 0617		None
Well P064		Down
Well 0411	cDCE	None
Well 0443		Down
Seep 0617		Down
Well P064		None

The Theil-Sen test was used to estimate the magnitude of the downward trend in TCE concentrations in well 0411 indicated by the Mann-Kendall analysis. The Theil-Sen test was used to estimate the magnitude of the slope data collected for the 1997–2022 time frame for well 0411. The slope calculated for the Theil-Sen trend line suggests that the MCL may be reached by 2038. This is consistent with the times suggested by extending a best fit linear or logarithmic trend line through the data; these methods estimated reaching the MCL by 2044 and 2041, respectively. The remainder of the locations were less than the MCL or no trend was present; therefore, no time frames are estimated.

Table 7 summarizes the results from each annual trend analysis performed since 2007 in Phase I for source area monitoring wells 0411 and 0443 and seep 0617, and for well P064 since 2019. Results show continued downward trends in TCE concentrations in well 0411 since the monitoring program was started. Results also show continued downward trends in TCE concentrations for well P064 since 2019. No trends in the data are observed in TCE concentrations in well 0443 and seep 0617. No trends in the cDCE data have been observed at well 0411 since 2016 or at well P064 since 2019. Downward trends in cDCE have been observed at both well 0443 and seep 0617 since 2014 and 2012, respectively.

Table 7. Summary of Annual Trend Analysis Results for Phase I

Location	Analyte	Year															
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Well 0411	TCE	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Well 0443		N	U	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Well P064														D	D	D	D
Seep 0617		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Well 0411	cDCE	---	N	N	N	N	N	N	U	U	N	N	N	N	N	N	N
Well 0443		---	U	N	N	N	N	N	D	D	D	D	D	D	D	D	D
Well P064														N	N	N	N
Seep 0617		---	N	N	N	N	D	D	D	D	D	D	D	D	D	D	D

Abbreviations:

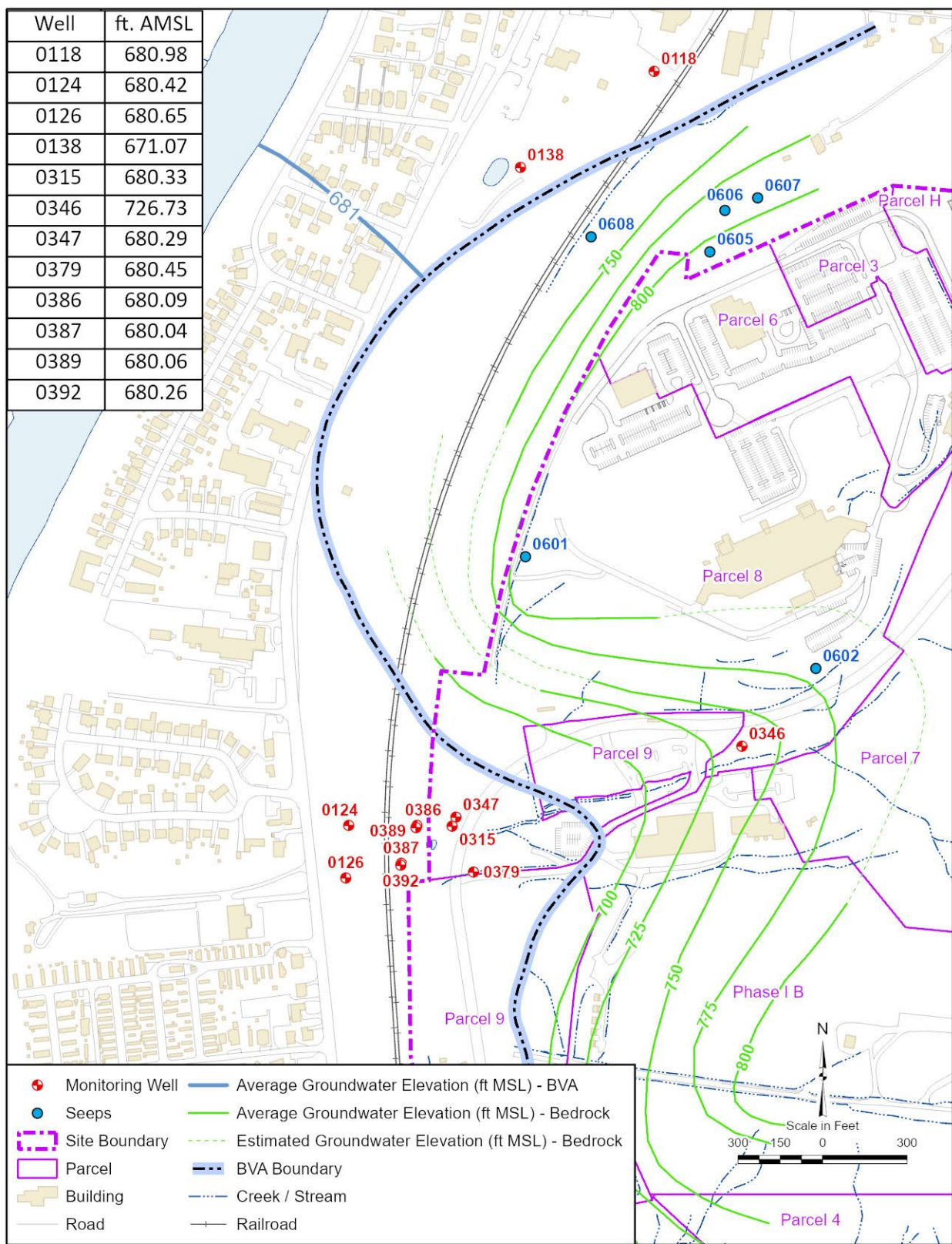
D = downward trend

N = no trend (either upward or downward)

U = upward trend

3.3 Groundwater Elevations

A map of the average groundwater elevations measured in the Phase I area during 2022 (Figure 7) represents the two flow regimes at the site: bedrock and the unconsolidated materials of the BVA. The approximate location of contact of the BVA with the bedrock is indicated in this figure. Groundwater originating from the area of wells 0411 and 0443 flows southwest within the bedrock, following the bedrock topography. This groundwater enters the BVA along this contact. Flow within the BVA is generally to the south-southeast (parallel to the bedrock contact). Appendix C presents a summary of the groundwater elevations measured in 2022.



044400

Abbreviation: ft. AMSL = feet above mean sea level

Figure 7. 2022 Average Groundwater Elevations in Phase I

3.4 Summary and Recommendations

The data collected during 2022 continue to indicate that impact is localized in the bedrock groundwater near wells 0411 and 0443 and seep 0617. Monitoring results for 2022 show concentrations of TCE in source area wells 0411 and 0443 and seep 0617 that continue to exceed the MCL of 5 µg/L. No samples were above trigger levels. Concentrations of TCE and cDCE in well P064 at the edge of the BVA continues to remain below MCLs, indicating no impacts to the BVA, and the absence of upward trends demonstrates that analyte concentrations are not statistically increasing. No changes to the monitoring program for Phase I are warranted at this time.

4.0 Parcels 6, 7, and 8 MNA Remedy

4.1 Monitoring Results

4.1.1 Seeps

Concentrations of TCE were reported in Main Hill seeps 0601, 0605, and 0607; none of the concentrations exceeded the MCL of 5 µg/L (Table 8) or the trigger level of 150 µg/L for TCE in seep 0605 (Table 4) in 2022. PCE continued to be measured in seep 0601 and the concentrations from the first and second quarter sampling events were above the MCL of 5 µg/L in 2022. These concentrations were well below the trigger level of 75 µg/L. A low concentration of PCE (less than the reporting limit of 1 µg/L) was reported in seep 0607 during the second quarter sampling event. cDCE was periodically reported in all of the seeps; none of the concentrations were above the MCL of 70 µg/L. No tDCE or VC were detected in the seeps.

Table 8. Summary of VOC Results in the Main Hill Seeps for 2022

Location	Area	VOC Concentrations				
		VOC	Q1	Q2	Q3	Q4
0601	Onsite	PCE (µg/L)	9.0	9.6	3.4	0.86 (J)
		TCE (µg/L)	0.64 (J)	0.51	0.50 (J)	0.39 (J)
		cDCE (µg/L)	0.34 (J)	ND (<1)	ND (<1)	0.86 (J)
		tDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0602	Onsite	PCE (µg/L)	ND (<1)	ND (<1)	DRY	DRY
		TCE (µg/L)	ND (<1)	ND (<1)		
		cDCE (µg/L)	ND (<1)	ND (<1)		
		tDCE (µg/L)	ND (<1)	ND (<1)		
		VC (µg/L)	ND (<1)	ND (<1)		
0605	Offsite	PCE (µg/L)	ND (< 1)	ND (< 1)	ND (< 1)	ND (<1)
		TCE (µg/L)	0.53 (J)	0.52 (J)	ND (< 1)	ND (<1)
		cDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	0.48 (J)
		tDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)

Table 8. Summary of VOC Results in the Main Hill Seeps for 2022 (continued)

Location	Area	VOC Concentrations				
		VOC	Q1	Q2	Q3	Q4
0606	Offsite	PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	DRY
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	
		cDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	
		tDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	
		VC (µg/L)	ND (<1)	ND (<1)	ND (<1)	
0607	Offsite	PCE (µg/L)	ND (<1)	0.36 (J)	ND (< 1)	ND (< 1)
		TCE (µg/L)	0.92 (J)	1.1	0.39 (J)	ND (<1)
		cDCE (µg/L)	0.78 (J)	0.67 (J)	ND (<1)	ND (<1)
		tDCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)

Notes:

PCE trigger level at seep 0601 = 75 µg/L.

TCE trigger level at the seeps = 150 µg/L.

Values in **bold** exceed the MCL.

DRY = no flow observed at the time of sampling

Abbreviations:

J = estimated value that is less than the reporting limit

ND = not detected

Q = quarter

A graph of TCE concentrations (Figure 8) measured in the seeps following the remediation of contaminated buildings and soil on the Main Hill (completed in mid-2006), completion of site improvements, and closure of the tritium capture pits on the Main Hill in 2011, shows VOC concentrations have been less variable and decreasing. Data from seep 0602 indicate the highest and most variable concentrations of TCE; data from the past few years show that concentrations of TCE greater than the MCL only periodically occurred in seep 0602, and the remainder of the seeps have TCE concentrations below the MCL.

Seep 0601 is the only location where PCE is routinely reported. PCE concentrations in this seep (Figure 9) are generally less than those measured before remediation on the Main Hill. Estimated PCE concentrations at less than 1 µg/L were reported in seeps 0605 and 0607 during 2022.

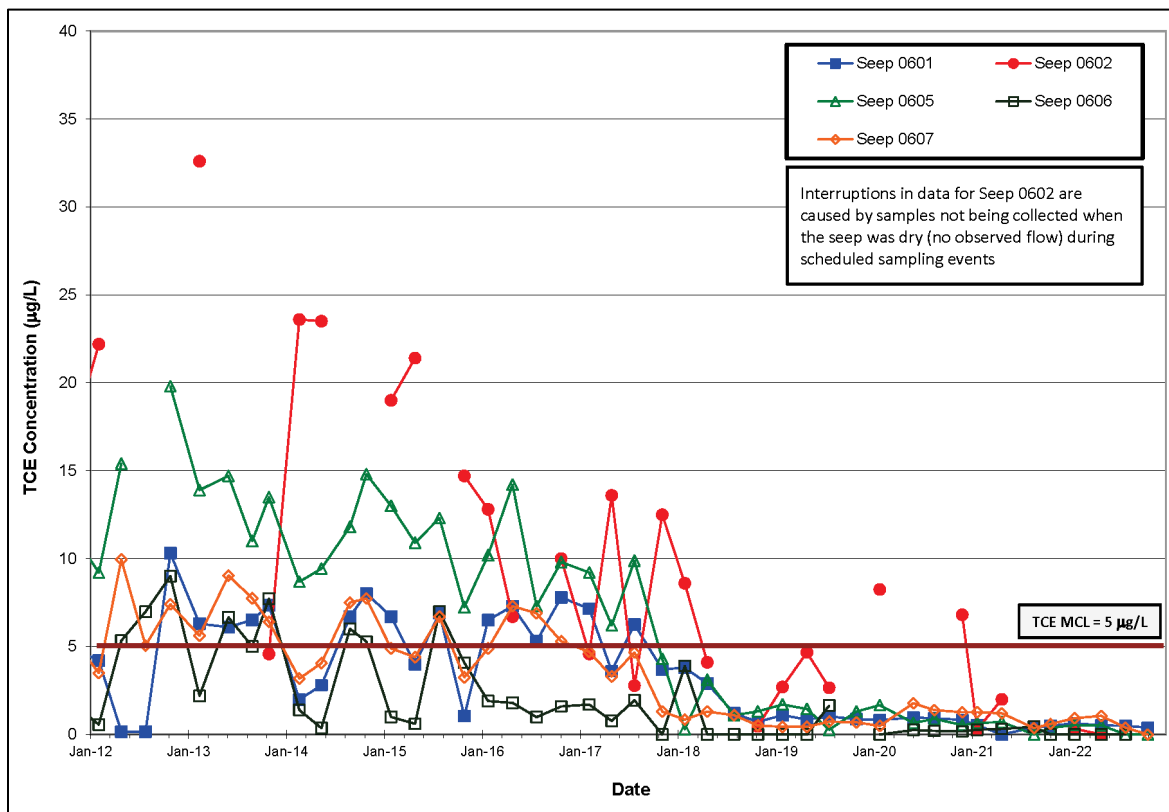


Figure 8. TCE Concentrations in Parcels 6, 7, and 8 Main Hill Seeps, 2012–2022

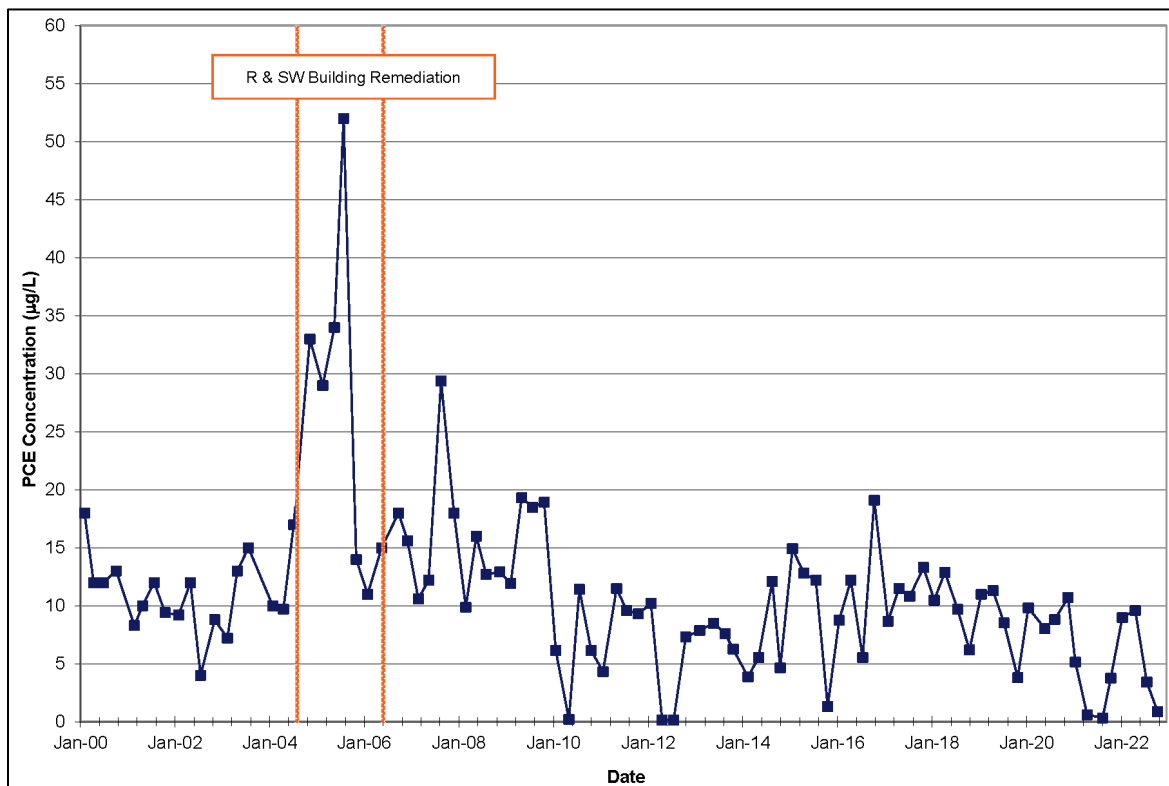


Figure 9. PCE Concentrations in Seep 0601 (Parcels 6, 7, and 8), 2000–2022

4.1.2 Groundwater

Monitoring results for 2022 (Table 9) continue to show TCE in wells 0315 and 0347 with estimated detections reported in wells 0124, 0315, 0379, and 0386; the highest concentrations are detected in well 0347 (source area well), where concentrations exceeded the MCL. The concentrations of TCE reported were below the trigger level of 30 µg/L established for source area wells 0315 and 0347 (Table 4). Wells 0315, 0379, and 0386 are within the tributary valley downgradient of well 0347 (Figure 4). There were no detectable concentrations of TCE measured in the remaining wells.

Estimated detections of PCE less than 1 µg/L were reported in wells 0124, 0126, 0379, 0386, 0387, and 0392. These wells are located where the tributary valley enters the BVA. No trigger levels for PCE have been set for these locations. There were no detectable concentrations of PCE measured in the remaining wells. No detectable concentrations of cDCE, tDCE, or VC were reported in any of the wells monitored as part of this program.

Table 9. Summary of VOC Results in Parcels 6, 7, and 8 Groundwater for 2022

Location	Area	VOC Concentrations				
		VOC	Q1	Q2	Q3	Q4
Onsite Wells						
0315	Source Area	PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	0.43 (J)	0.57 (J)	14.5	0.80 (J)
0347		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	14.9	10.9	17.7	22.0
0346	Onsite	PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0379		PCE (µg/L)	0.37 (J)	0.37 (J)	ND (<1)	0.46 (J)
		TCE (µg/L)	0.52 (J)	0.51 (J)	0.38 (J)	0.50 (J)
Downgradient Wells—Near (offsite)						
0386	BVA	PCE (µg/L)	ND (<1)	ND (<1)	0.36 (J)	ND (<1)
		TCE (µg/L)	0.77 (J)	0.35 (J)	0.54 (J)	ND (<1)
0387		PCE (µg/L)	0.42 (J)	ND (<1)	0.42 (J)	0.38 (J)
		TCE (µ/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0389		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0392		PCE (µg/L)	ND (<1)	ND (<1)	0.39 (J)	ND (<1)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
Downgradient Wells—Far (offsite)						
0118	BVA	PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0124		PCE (µg/L)	0.35 (J)	0.43 (J)	ND (<1)	0.42 (J)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0126		PCE (µg/L)	0.96 (J)	1.0	0.68 (J)	1.0
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0138		PCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE (µg/L)	ND (<1)	ND (<1)	ND (<1)	ND (<1)

Notes: TCE trigger level for wells 0315 and 0347 = 30 µg/L. TCE trigger level for other wells = 5 µg/L. Values in **bold** exceed the MCL.

Abbreviations: J = estimated value that is less than the reporting limit, ND = not detected, Q = quarter

TCE data from the Main Hill area indicate that the highest concentrations were measured in groundwater in well 0347; this well has consistently exceeded the MCL. An elevated concentration of 14.5 µg/L for TCE was reported in well 0315 during the third quarter sampling event. This well historically exhibited elevated concentrations of TCE, similar to those measured in well 0347; however, beginning in 2018, the TCE concentrations in well 0315 dropped below the MCL and were reported as estimated values (less than the 1 µg/L reporting limit) since 2019. Historically, concentrations of TCE were higher in the seeps than in the groundwater monitoring wells; however, starting in 2018, it was observed that the concentrations of TCE in wells 0315 and 0347 were higher than those measured in the upgradient seeps.

Figure 10 shows that TCE concentrations in well 0315 have consistently been lower than the MCL in the past 4 years and reported as estimated values (less than 1 µg/L), except for the third quarter 2022 sampling events. The concentrations of TCE in the downgradient wells have been below the MCL since 2000 and reported at or below 1 µg/L since 2016. The TCE concentrations in well 0347 have continued to be higher and have greater changes (increases and decreases) compared to those in well 0315. An overall decrease in TCE concentrations can be observed beginning at the same time. It is likely that surface water influences noted in previous reports (DOE 2014a; DOE 2014b) have been reduced or eliminated and that more recent data reflect TCE concentrations in groundwater not influenced by infiltration of surface water through the exposed tritium capture pits that were located on the Main Hill.

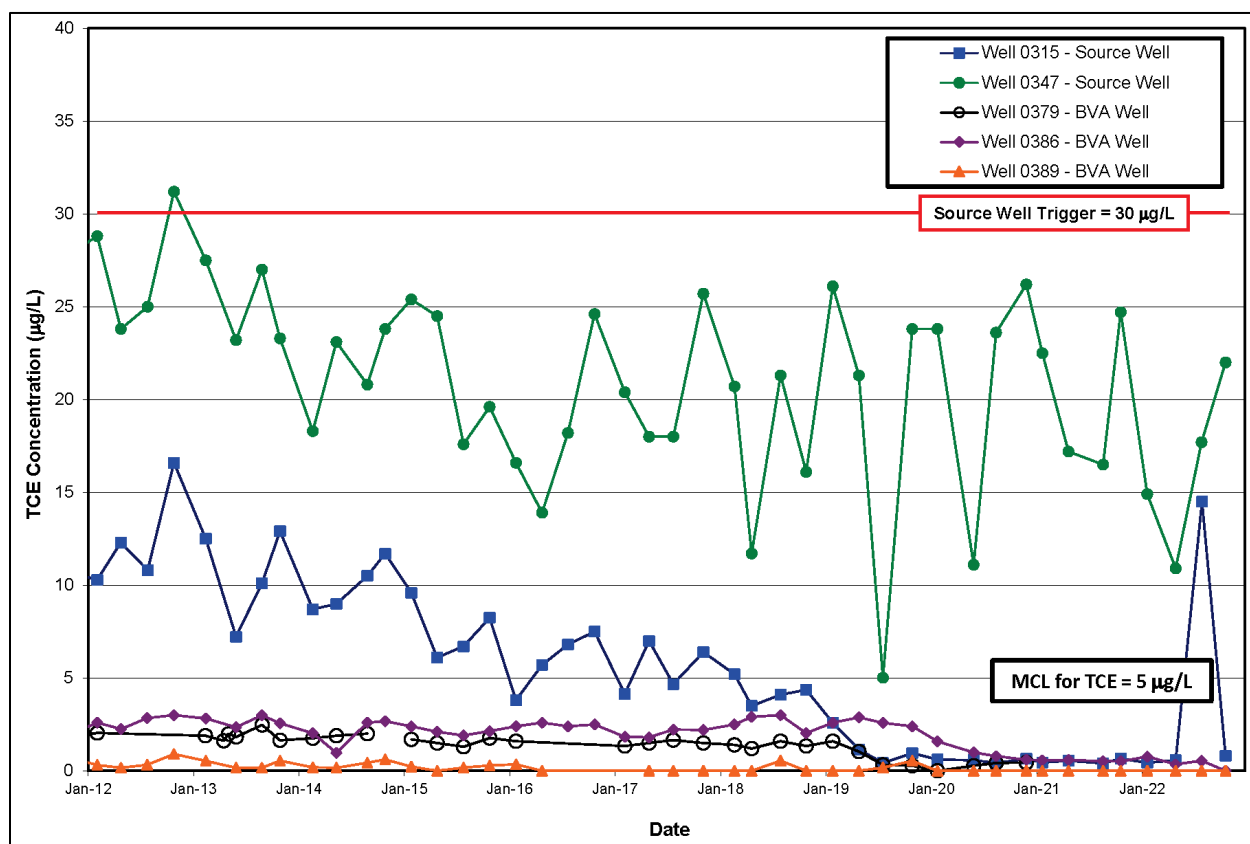


Figure 10. TCE Concentrations in Parcels 6, 7, and 8 Groundwater

Data collected over the past several years indicate variable concentrations of VOCs, primarily TCE, in the groundwater in Parcels 6, 7, and 8, as exhibited in the data from seep 0602 (Figure 8) and well 0347 (Figure 10). Seep 0602 and the downgradient well 0347 are in the tributary valley, which is along the southern edge of the Main Hill. As discussed in Section 1.3, the tributary valley is a narrow tongue of glacial deposits connected to the BVA that overlies the fractured bedrock at the site. Water infiltrating on the Main Hill moves through the fractured bedrock and ultimately discharges into the unconsolidated materials or seeps. This infiltrating surface water and precipitation contacts soils with residual amounts of TCE on the Main Hill resulting in TCE-impacted groundwater discharging to seeps or the tributary valley (DOE 2017). Annual average TCE concentrations from wells within the tributary valley show that the deep wells screened directly above the bedrock (wells 0347, 0386, and 0387) have the highest TCE concentrations and these wells monitor the TCE-impacted groundwater discharging from the Main Hill through fractured bedrock.

4.2 Trend Analysis

Trend analysis was performed on VOC data using the nonparametric Mann-Kendall test. Trend analysis is reported for data collected since 2012 to better evaluate more recent trends. This period was selected to represent data collected after influences of surface water entering the subsurface through the tritium capture pits were reduced or eliminated.

Trend analysis of TCE data collected since 2012 indicates downward trends for all the seeps and wells (Table 10). Concentrations of PCE in seep 0601 were evaluated for a trend, and a statistically significant downward trend was indicated. Data from seeps 0602 and 0605 were evaluated for trends in cDCE concentrations (Table 11), and downward trends were determined by the nonparameteric Mann-Kendall test for both seeps. The Theil-Sen test was used to estimate the magnitude of the slope data collected for the 2012–2022 time frame for well 0347. The slope calculated for the Theil-Sen trend line suggests that the MCL may be reached by 2042. This is consistent with the times suggested by extending a best fit linear or logarithmic trend line through the data; these methods estimated reaching the MCL by 2039 and 2041, respectively. Trend analysis was not performed on data from the remainder of the wells because results consistently showed nondetects or sporadic estimated detections. Summary reports providing details for each statistical evaluation for each monitoring location are in Appendix B.

Table 10. Trend Analysis Results for VOCs in Parcels 6, 7, and 8

Location	Trend
TCE	
Seep 0601	Down
Seep 0602	Down
Seep 0605	Down
Seep 0606	Down
Seep 0607	Down
Well 0315	Down
Well 0347	Down
Well 0386	Down
Well 0389	Down
PCE	
Seep 0601	Down
cDCE	
Seep 0602	Down
Seep 0605	Down

Table 11 summarizes the results from annual trend analyses of VOC data in Parcels 6, 7, and 8 since 2007. Results show that upward trends in TCE concentrations observed in seep 0601 (2007) and seep 0602 (from 2007 to 2012) had reverted to either no trends or downward trends starting in 2013. Since 2017, the seeps with the exception of 0601 and source well 0315 consistently exhibited downward trends. Seep 0601 downward trend started in 2020 and well 0347 downward trend started in 2018. Downward trends in PCE and cDCE in seeps 0601 and 0605, respectively, started in 2011, and a downward trend in cDCE in seep 0602 started in 2016. The downward trends for all of these locations are attributable to source removal and subsequent efforts in 2011 to reduce the impact of surface water entering the subsurface on the Main Hill (DOE 2014a; DOE 2014b).

Table 11. Summary of Trend Analysis Results for VOCs in Parcels 6, 7, and 8

Location	Analyte	Year															
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019 ^a	2020 ^a	2021 ^a	2022 ^a
Seep 0601	TCE	U	N	N	N	N	N	N	N	N	N	N	N	N	D	D	D
Seep 0602		U	U	U	U	U	U	N	N	N	N	D	D	D	D	D	D
Seep 0605		D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Seep 0606		---	---	---	N	N	N	N	N	N	N	D	D	D	D	D	D
Seep 0607		N	N	N	N	N	N	N	N	N	N	D	D	D	D	D	D
Well 0315		N	N	U	N	N	N	N	N	N	N	D	D	D	D	D	D
Well 0347		N	N	N	N	N	U	U	U	N	N	N	D	D	D	D	D
Well 0386		N	D	D	D	D	D	N	D	D	D	D	N	N	D	D	D
Well 0389		N	N	N	N	N	N	D	D	D	D	D	D	N	D	N	D
Seep 0601	PCE	---	---	N	N	D	D	D	D	D	D	D	D	D	N	N	D
Seep 0602	cDCE	---	---	---	---	N	N	N	N	N	D	D	D	D	D	D	D
Seep 0605		---	---	---	---	D	D	D	D	D	D	D	D	D	D	D	D

Notes:

Previous trending was performed using data starting from 2005.

^a Denotes trends using data starting from 2012.

Abbreviations:

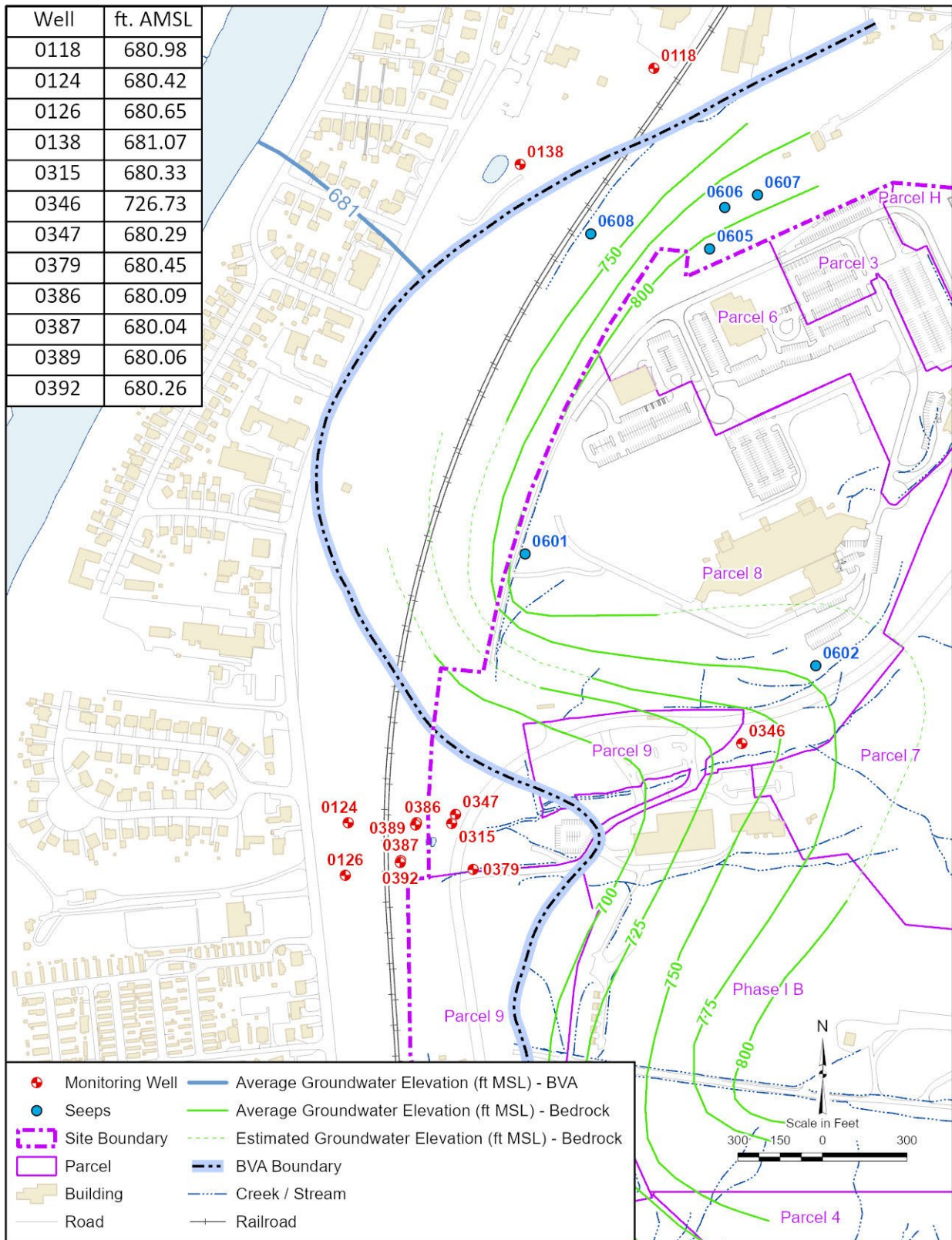
D = downward trend

N = no trend (either upward or downward)

U = upward trend

4.3 Groundwater Elevations

A map of the average groundwater elevations measured in Parcels 6, 7, and 8 during 2022 (Figure 11) represents the two flow regimes present at the site: bedrock and the unconsolidated materials of the tributary valley and BVA. The approximate location of contact of the BVA with the bedrock is indicated on this figure. Groundwater originating from the Main Hill area flows within the bedrock, following the bedrock topography. This groundwater enters the BVA along this contact, and flow within the BVA is parallel to the bedrock contact. Appendix C presents a summary of the groundwater elevations measured during 2022.



044400

Abbreviation: ft. AMSL = feet above mean sea level

Figure 11. 2022 Averages for Groundwater Elevations in Parcels 6, 7, and 8

4.4 Summary and Recommendations

PCE concentrations greater than the MCL continue to be measured in seep 0601 and TCE concentrations greater than the MCL continue to be measured in seep 0602 and in downgradient monitoring well 0347. The concentrations of VOCs continue to be variable at a few locations, although recent data (since 2012) indicate decreasing VOC concentrations at all the locations.

Overall, VOC concentrations in groundwater originating from the Main Hill are decreasing as a result of source removal (contaminated soil and building materials) that was completed in 2006. Statistical analysis of the data indicates downward trends in all the seeps and several of the monitoring wells.

It is recommended that sampling be discontinued at two seeps and six monitoring wells in Parcels 6, 7, and 8 based on historical data and hydrogeology of the Main Hill and tributary valley while maintaining the overall monitoring objectives of the MNA remedy. The sampling frequency in the remaining six wells and three seeps will remain quarterly to continue to monitor changes in PCE and TCE concentrations in groundwater originating from the Main Hill, to verify downward trends in VOC concentrations and continue to meet RAOs of the groundwater remedy. Figure 12 shows modifications to the monitoring network, which are included in this recommendation.

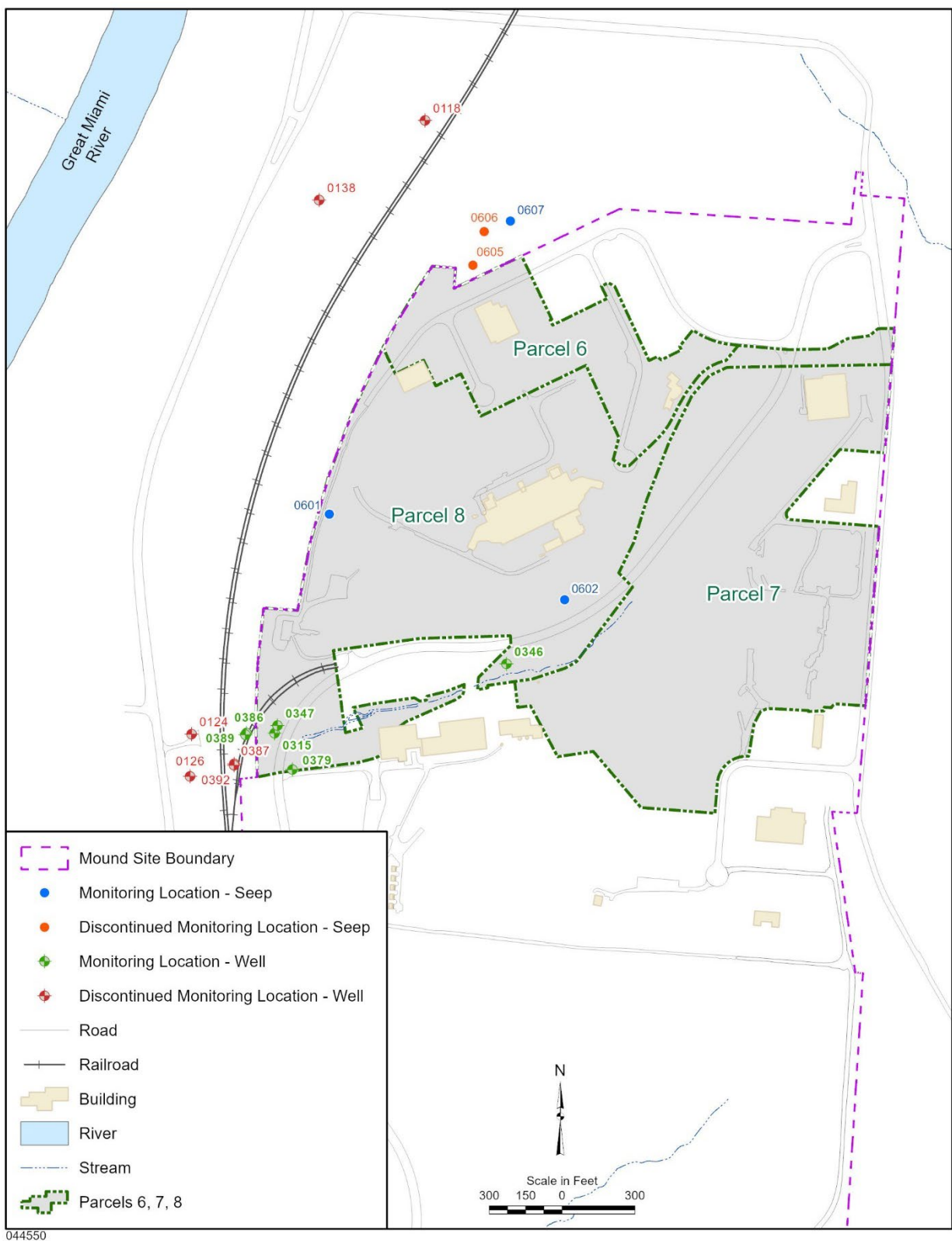


Figure 12. Modifications to the Parcels 6, 7, and 8 Monitoring Network

As discussed in Section 2.2, the Parcels 6, 7, and 8 MNA remedy and monitoring program was developed to address contamination in groundwater and seeps associated with the main production area referred to as the Main Hill. Groundwater in this area is contaminated with TCE (and to a limited extent its degradation products). Significant soil contamination was present beneath the main production facilities. Groundwater occurs within the fractured bedrock beneath the Main Hill and flows along horizontal bedding planes and fractures, and ultimately discharges to seeps or to the downgradient BVA. Groundwater is monitored in wells screened within the unconsolidated glacial materials along the western and southern portions of Parcels 6, 7, and 8 or is collected from seeps along the northern, western, and southern side of the Main Hill. Sampling is performed to ensure that the VOC concentrations in the groundwater decrease to levels below MCLs and to verify that the downgradient BVA is not affected. In addition, groundwater discharging from seeps is sampled for TCE and its degradation products to verify that source removal has resulted in decreasing concentrations over time.

The RAOs for Parcels 6, 7, and 8 (DOE 2015) include the following:

- Protect the downgradient BVA by verifying that TCE concentrations in the area of wells 0315 and 0347 are decreasing and not impacting the BVA
- Monitor the reduction of TCE concentrations to determine if they fall below the MCL in wells 0315 and 0347 and to verify the hypothesis that natural decomposition of TCE will result in concentrations below the MCL over time
- Monitor the reduction of TCE and PCE concentrations to determine if those parameters fall below the MCLs in seeps 0601, 0602, 0605, 0606, and 0607 and to verify the hypothesis that the removal of the TCE and PCE sources will result in concentrations below the MCL over time

4.4.1 Northern Part of Parcels 6, 7, and 8 – Offsite Wells and Seeps

Data from this monitoring program and data from Parcels 6, 7, and 8 monitoring wells and seeps collected since 1987 supports that impacted groundwater moves through the fractured bedrock of the Main Hill and discharges at seeps along the steep hillsides. Or, as observed in the southern portion of the Main Hill, groundwater can flow through the fractured bedrock into the BVA where these 2 media come into contact within the tributary valley. Groundwater in the fractured bedrock within the southern part of the Main Hill can discharge to seeps (0601 and 0602) or can continue to move within the bedrock ultimately entering the unconsolidated materials of the BVA below the ground surface. Movement of groundwater down off the Main Hill is preferential within the fractured bedrock and flow into the tributary valley was monitored using wells are located. Wells that are located near the interface between the fractured bedrock and the BVA provide better data to monitor potential impacts to the BVA. A detailed discussion of the hydrogeology of the area is provided in Section 1.3.

Evaluation of the monitoring program in the northern part of Parcels 6, 7, and 8 includes wells 0118 and 0138 that are located northwest of the Mound site and are downgradient of seeps 0605, 0606, and 0607, which are located along the steep escarpment on the northern side of the Main Hill. These wells were installed to monitor groundwater quality in the BVA downgradient of the Main Hill. Concentrations of VOCs in these wells have not been detected since they were installed in 1987. The three seeps (0605, 0606, and 0607) are monitored to verify that source removal on the Main Hill has resulted in decreasing concentrations over time. TCE

concentrations in the three seeps have been less than the MCL since 2019 and decreasing trends in TCE concentrations have been reported in all three locations since 2017.

The lack of detections of VOCs in the far downgradient wells (0118 and 0138) supports that along the northern portion of the Main Hill, VOC-impacted groundwater is primarily discharged at the seeps and has not entered the downgradient BVA. Because the concentrations of TCE in the seeps is low and monitoring data demonstrates decreasing trends in all of the seeps, it can be concluded that source removal has been beneficial in reducing VOC concentrations and there should be no new contribution of TCE to groundwater. Therefore, it is recommended that monitoring of VOCs in wells 0118 and 0138 be discontinued as part of this program; upgradient seeps 0605, 0606, and 0607 provide better data to evaluate the concentrations of VOCs remaining in bedrock groundwater.

Seep 0607 has been a primary discharge point for groundwater along the northern side of the Main Hill; this seep has exhibited the highest flow rates and TCE concentrations compared to nearby seeps 0605 and 0606. An overall decrease in VOCs to estimated values ($< 1 \mu\text{g/L}$) has been observed in seeps 0605, 0606, and 0607 (Figure 13). These seeps are located within 250 ft of each other and sampling could be reduced to one location. The remaining location would continue to provide adequate data to monitor bedrock groundwater quality, decreasing concentrations along the north side of the Main Hill and meet RAOs for the sampling program. Therefore, it is recommended that sampling of seeps 0605 and 0606 be discontinued, while seep 0607 continues to be sampled.

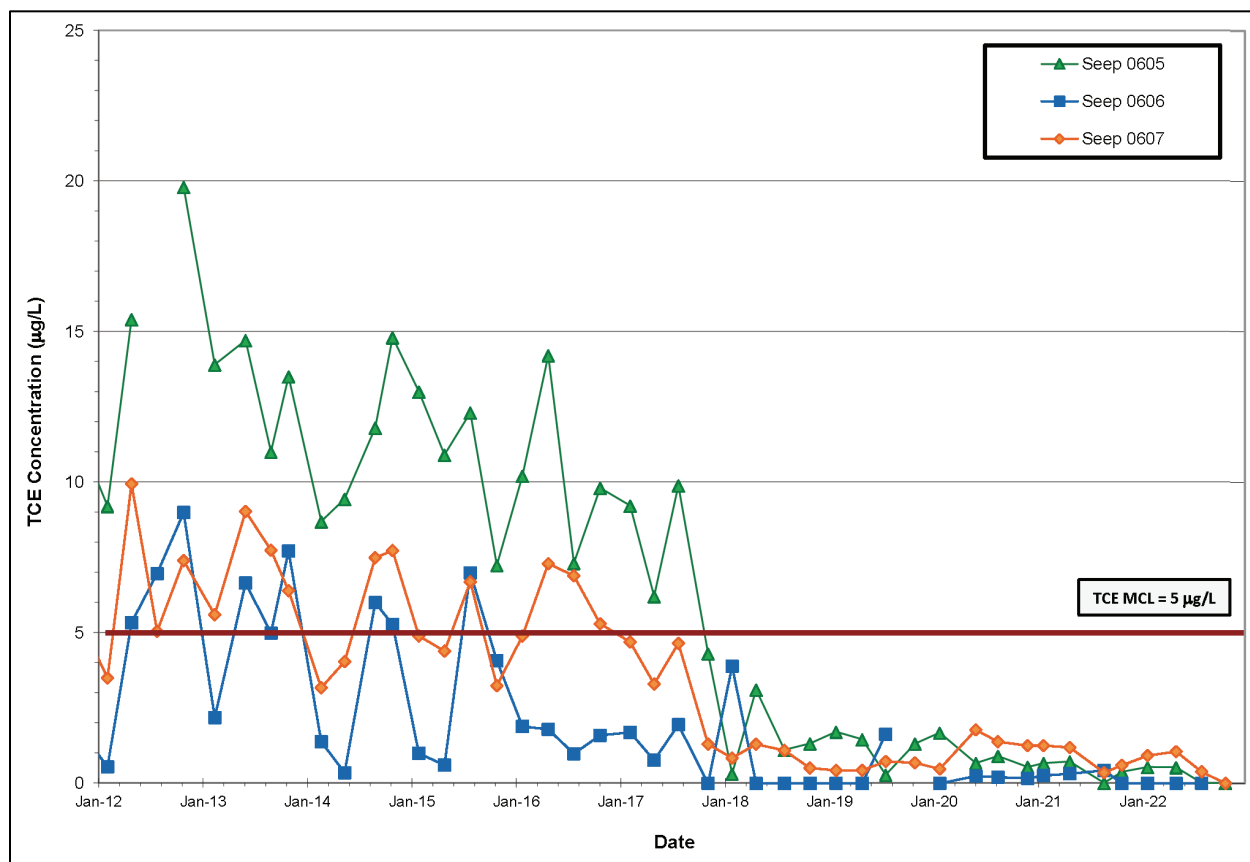


Figure 13. TCE Concentrations in Seeps 0605, 0606, and 0607

4.4.2 Western Part of Parcels 6, 7, and 8 – Offsite and Tributary Valley Wells

Evaluation of the monitoring program in the western part of Parcels 6, 7, and 8 focuses on six monitoring wells (0124, 0126, 0386, 0387, 0389, and 0392) that are west and downgradient of source wells 0315 and 0347 and seeps 0601 and 0602. These wells are located and screened in the tributary valley, which is along the southern edge of the Main Hill. The tributary valley is a narrow tongue of glacial deposits connected to the BVA that overlies the fractured bedrock at the site. Water infiltrating on the Main Hill moves through the fractured bedrock into the glacial deposits of the tributary valley to the south. The cross-section in Figure 14 depicts the bedrock topography beneath the tributary valley and the location and screened interval for these monitoring wells. These wells monitor TCE concentrations in groundwater that originates on the Main Hill and flows through the fractured bedrock and discharges into the unconsolidated materials of the tributary valley.

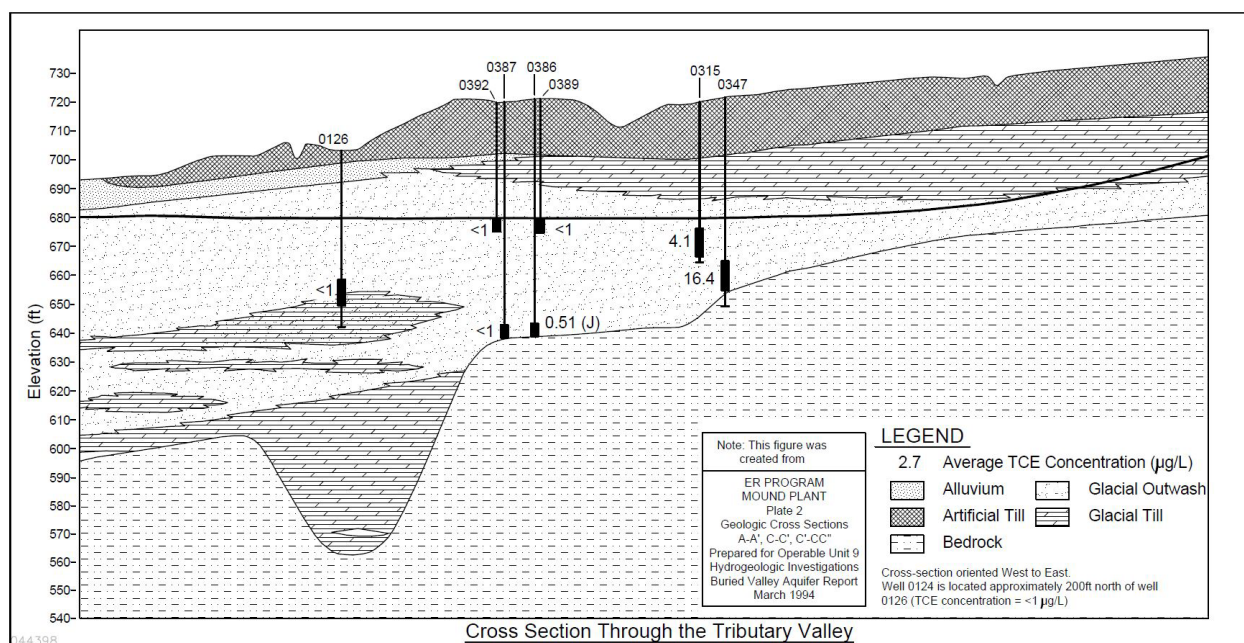


Figure 14. Cross-Section Through the Tributary Valley in Parcels 6, 7, and 8

Groundwater contamination in the tributary valley is monitored using three sets of nested wells—0315/0347, 0386/0389, and 0387/0392. Well 0315 was installed in 1989, and the remainder of the wells were installed in 1993. Wells 0315 and 0347 are designated as source wells as they have historically exhibited the highest concentrations of TCE and are considered to more directly monitor contaminated groundwater originating from the Main Hill. Wells 0386, 0387, 0389, and 0392 are downgradient of wells 0315 and 0347 and monitoring groundwater quality between the source wells and the BVA. Wells 0124 and 0126 monitoring groundwater quality within the BVA.

In recent years, the concentrations of TCE in well 0315, which is the shallower of the well pair, has decreased significantly. This decrease has also been observed in wells 0389 and 0392, which are the shallower of each of their respective well pairs. TCE concentrations posted on the cross section in Figure 14 show that the deep wells that are screened directly above the bedrock have

the highest TCE concentrations as compared to the shallower wells. These deeper wells more directly monitor the TCE-impacted groundwater flowing from the fractured bedrock into the unconsolidated materials of the tributary valley as presented in Figure 15.

Figure 15 is a graph of the TCE concentrations measured in wells 0386, 0387, 0389, and 0392 since 2012. Concentrations of TCE in the downgradient well pairs 0386/0389 and 0387/0392 are low; typically lower than those measured in wells 0315 and 0347 (refer to Figure 10). Starting in 2012, concentrations of TCE were reported as nondetect in well pair 0387/0392 while estimated detections of TCE continue to be reported in well pair 0386/0389. It is recommended that monitoring of VOCs in well pair 0387/0392 be discontinued as part of this program; upgradient wells 0315 and 0347 provide adequate data to evaluate the concentrations of VOCs remaining in bedrock groundwater and demonstrate decreasing concentrations of TCE in groundwater while well pair 0386/0392 provides data to show that the BVA remains unaffected and meets RAOs for the sampling program.

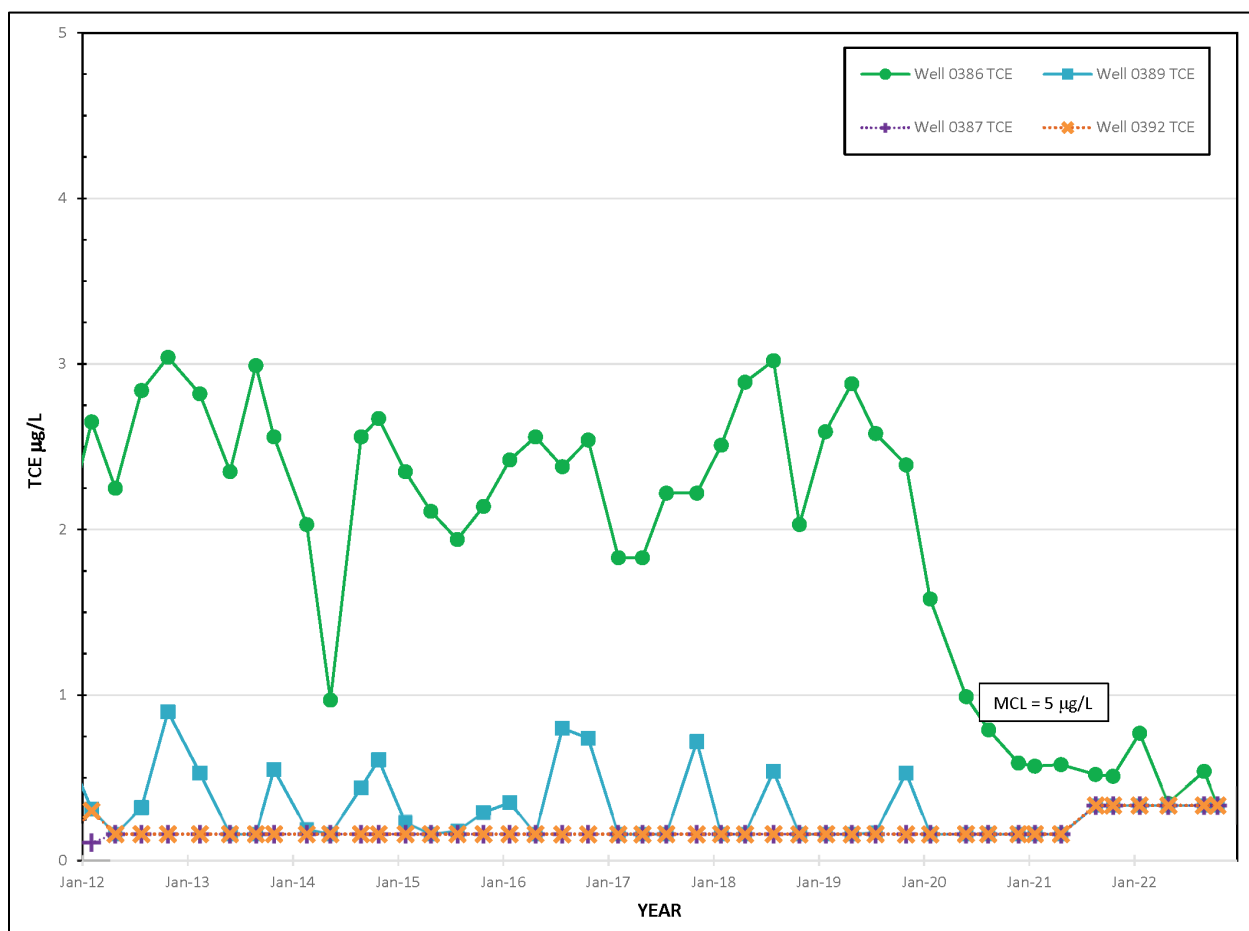


Figure 15. TCE in Wells 0386, 0387, 0389, and 0392 Since 2012

Wells 0124 and 0126 are downgradient of wells 0386, 0387, 0389, and 0392. These two wells are sampled to provide groundwater quality data farther downgradient from wells with known VOC impact in the tributary valley to ensure the BVA was not adversely impacted. Both wells are screened at similar elevations. Neither well historically had significant VOC detections—well 0126

sporadically had estimated detections ($< 1 \mu\text{g/L}$) of TCE and well 0124 has routinely had estimated detections of PCE since installation in 1987.

The lack of detections of VOCs in wells 0124 and 0126 supports that in the tributary valley, VOC-impacted groundwater is primarily discharged at seeps 0601 and 0602 or enters the unconsolidated materials of the tributary valley through the fractured bedrock as indicated by data from wells 0315, 0386, and 0387 and has not entered the downgradient BVA. Because the concentrations of TCE in the seeps is low and monitoring data demonstrates decreasing trends in all of the seeps, it can be concluded that source removal has been beneficial in reducing VOC concentrations and there should be no new contribution of TCE to groundwater. Therefore, it is recommended that monitoring of VOCs in wells 0124 and 0126 be discontinued as part of this program; upgradient seeps 0601 and 0602 and wells 0315 and 0347 provide adequate data to evaluate the concentrations of VOCs remaining in bedrock groundwater, demonstrate decreasing concentrations of TCE in groundwater, and meet RAOs for the sampling program.

5.0 Inspection of the Monitoring System

A routine maintenance program has been established for long-term groundwater monitoring locations at the site. This program includes periodic inspections that focus on the integrity of each well and the condition of the protective casing and surface pad, surrounding area, and access route. These inspections are usually performed during each sampling event. The wells and seep locations were in good condition in 2022.

6.0 Data Validation

All data collected were validated in accordance with procedures specified in the Sitewide Operations and Maintenance Plan (DOE 2015). This procedure also fulfills the requirements of applicable procedures in the *Mound Methods Compendium* (MD-80045). Data validation was documented in reports prepared for each data package. All 2022 data, including data validation qualifiers, are summarized in Appendix D.

Laboratory performance is assessed by a review and evaluation of the following quality indicators:

- Sample shipping and receiving practices
- Chain of custody
- Laboratory blanks
- Preparation blanks
- Laboratory replicates
- Serial dilutions
- Detection limits
- Peak integrations
- Matrix spikes and matrix spike duplicates
- Holding times
- Instrument calibrations
- Interference check samples
- Radiochemical uncertainty
- Laboratory control samples
- Sample dilutions
- Surrogate recoveries
- Confirmation analyses
- Electronic data

Nine Requisition Index Numbers (RINs) were established for the 2022 environmental sampling efforts at the site. An RIN is a set of samples that is relinquished to the laboratory using a chain-of-custody form. Data Assessment Reports are prepared for each RIN and are presented in Appendix E.

The laboratory prepares an analytical package for each RIN that includes a summary of results, a complete set of supporting analytical data for every analysis reported, and an electronic data deliverable that is used to upload analytical data into databases for validation and qualification before the data are released. Every RIN received from the laboratory is thoroughly reviewed and evaluated before the data package is finalized and released to the public. Table 12 lists the RINs associated with this report.

Table 12. RINs for Mound Site Calendar Year 2022 Sampling

RIN	Area	Sampling Date(s)
MND01-01.2201022	Parcels 6, 7, and 8	January 24–February 2, 2022
MND01-01.2201023		January 25–26, 2022
MND01-01.2205024		May 3–4, 2022
MND01-01.2205025		May 5, 2022
MND01-01.2207026		August 2–3, 2022
MND01-01.2210028		October 24–26, 2022
MND01-01.2210029		October 24, 2022
MND01-02.2201010	Phase I	January 24–25, 2022
MND01-02.2207011		August 2, 2022

The Data Assessment Reports also summarize and assess the sampling quality control for each sampling event. The following items are included:

- Sampling protocol
- Trip blanks
- Outliers
- Equipment blanks
- Field duplicates

7.0 References

- DOE (U.S. Department of Energy), 1992. *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Mound Plant, Miamisburg, Ohio*, April.
- DOE (U.S. Department of Energy), 1994a. *Operable Unit 9 Hydrogeologic Investigation: Bedrock Report, Mound Plant, Miamisburg, Ohio*, technical memorandum, January.
- DOE (U.S. Department of Energy), 1994b. *Operable Unit 9 Hydrogeologic Investigation: Buried Valley Aquifer Report, Mound Plant, Miamisburg, Ohio*, technical memorandum (revision 1), September.
- DOE (U.S. Department of Energy), 1995. *Operable Unit 1 Record of Decision, Mound Plant, Miamisburg, Ohio*, June.
- DOE (U.S. Department of Energy), 1997. *Mound 2000 Residual Risk Evaluation Methodology, Mound Plant*, January 6.
- DOE (U.S. Department of Energy), 1999. *Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach*, February.
- DOE (U.S. Department of Energy), 2014a. *Sitewide Groundwater Monitoring Report, Calendar Year 2012, Mound, Ohio*, LMS/MND/S10184, Office of Legacy Management, February.
- DOE (U.S. Department of Energy), 2014b. *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site, Calendar Year 2013*, LMS/MND/S11737, Office of Legacy Management, May.
- DOE (U.S. Department of Energy), 2015. *Operations and Maintenance Plan for the U.S. Department of Energy, Mound, Ohio, Site*, LMS/MND/S08406, Office of Legacy Management, January.
- DOE (U.S. Department of Energy), 2017. *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site, Calendar Year 2016*, LMS/MND/S15892, Office of Legacy Management, June.
- Mound Methods Compendium*, Issue 2, 2002, MD-80045, prepared by BWXT of Ohio Inc, January.

Appendix A

Well Construction Summary

Table A-1. Well Construction Summary

Location ID	Program	Northing	Easting	Ground Elevation (ft AMSL)	TOC Elevation (ft AMSL)	Well Depth (ft)	Top of Screen Elevation (ft AMSL)	Bottom of Screen Elevation (ft AMSL)	Screen Length (ft)	Well Material	Screened Formation
0118	Parcels 6, 7, 8	600464.95	1464737.80	705.36	704.86	40.1	674.73	664.73	10	4-inch SS	BVA
0124	Parcels 6, 7, 8	597789.14	1463654.10	704.18	705.12	55.9	659.18	649.18	10	4-inch SS	BVA
0126	Parcels 6, 7, 8	597603.58	1463643.30	704.61	705.54	54.8	660.78	650.78	10	4-inch SS	BVA
0138	Parcels 6, 7, 8	600123.50	1464264.42	698.59	708.04	40.2	667.59	657.59	10	4-inch SS	BVA
0315	Parcels 6, 7, 8	597786.28	1464020.40	722.57	723.99	54.8	679.17	669.17	10	4-inch SS	BVA
0346	Parcels 6, 7, 8	598070.11	1465048.90	743.50	742.97	45.5	702.50	697.50	5	4-inch SS	BVA
0347	Parcels 6, 7, 8	597819.31	1464034.10	723.76	725.20	68.4	666.76	656.76	10	4-inch SS	BVA
0379	Parcels 6, 7, 8	597624.41	1464095.90	715.24	716.11	40.9	685.24	675.24	10	4-inch SS	BVA
0386	Parcels 6, 7, 8	597789.23	1463896.00	725.16	724.79	86.6	648.16	638.16	10	4-inch SS	BVA
0387	Parcels 6, 7, 8	597654.63	1463839.50	721.26	720.89	81.6	644.26	639.26	5	4-inch SS	BVA
0389	Parcels 6, 7, 8	597781.29	1463891.90	724.96	724.65	51.7	682.96	672.96	10	4-inch SS	BVA
0392	Parcels 6, 7, 8	597648.77	1463838.30	721.18	720.84	44.7	681.18	676.18	5	4-inch SS	BVA
0411	Phase I	596808.81	1465077.10	834.83	836.57	39.7	806.89	796.89	10	2-inch SS	Bedrock
0443	Phase I	596886.22	1465177.11	856.89	858.78	39.6	829.20	819.20	10	2-inch PVC	Bedrock
P064	Phase I	596106.72	1464537.47	726.82	729.98	56.9	680.08	670.08	10	2-inch PVC	BVA
0601	Parcels 6, 7, 8	598743.22	1464280.80	817.52						Seep	Bedrock
0602	Parcels 6, 7, 8	598346.65	1465311.40	779.61						Seep	Bedrock
0605	Parcels 6, 7, 8	599824.63	1464935.40	817.70						Seep	Bedrock
0606	Parcels 6, 7, 8	599971.45	1464989.00	789.23						Seep	Bedrock
0607	Parcels 6, 7, 8	600015.30	1465105.70	797.00						Seep	Bedrock
0617	Phase I	596539.80	1464855.80	766.07						Seep	Bedrock

Abbreviations:

ft AMSL = feet above mean sea level

SS = stainless steel

TOC = top of casing

Appendix B

Mann-Kendall Trending Summaries

Mann-Kendall Test for Monotonic Trend

(from Battelle Memorial Institute 2018)

The purpose of the Mann-Kendall (MK) test (Mann 1945; Kendall 1975; Gilbert 1987) is to statistically assess if there is a monotonic upward or downward trend of the variable of interest over time. A monotonic upward trend means that the variable consistently increases through time, and a monotonic downward trend means that the variable consistently decreases, but the trend may or may not be linear.

Selected Statistical Testing Approach

The MK test can be used in place of a parametric linear regression analysis that is used to test if the slope of the estimated linear regression line is different from zero. The regression analysis requires that the residuals from the fitted regression line be normally distributed, an assumption not required by the MK test. Hence, the MK test is a nonparametric (distribution-free) test.

Calculations to Determine Whether a Trend Exists

The MK test is used to decide whether to reject the null hypothesis (H_0) that no monotonic trend exists in favor of the alternative hypothesis (H_a) that a monotonic trend exists.

One of three alternative hypotheses is chosen:

1. A monotonic downward trend exists.
2. Either a monotonic upward or monotonic downward trend exists.
3. A monotonic upward trend exists.

The data obtained over time must be convincing beyond a reasonable doubt before the MK test will reject the H_0 and accept the H_a hypothesis.

The MK test from pages 209–213 of Gilbert (1987) is conducted as follows:

- [1] List the data in the order in which they were collected over time, x_1, x_2, x_n , which denote the measurements obtained at times 1, 2, ..., n , respectively. The data are not necessarily (and need not be) collected at equally spaced time intervals, although equally spaced sampling over time is often preferred.
- [2] Determine the sign of all $n(n-1)/2$ possible differences $x_j - x_k$, where $j > k$. These differences are:

$$x_2 - x_1, x_3 - x_1, x_n - x_1, x_3 - x_2, x_4 - x_2, x_n - x_{n-2}, x_n - x_{n-1}$$

- [3] Let $\text{sgn}(x_j - x_k)$ be an indicator function that takes on the values 1, 0, or -1 according to the sign of $x_j - x_k$, that is:

$$\begin{aligned} \text{sgn}(x_j - x_k) &= 1 && \text{if } x_j - x_k > 0 \\ \text{sgn}(x_j - x_k) &= 0 && \text{if } x_j - x_k = 0, \end{aligned}$$

or if the sign of $x_j - x_k$ cannot be determined due to nondetects

$$\text{sgn}(x_j - x_k) = -1 \quad \text{if } x_j - x_k < 0$$

For example, if $x_j - x_k > 0$, then the observation at time j , denoted by x_j , is greater than the observation at time k , denoted by x_k .

- [4] Compute:

$$S = \sum_{k=1}^{n-1} \sum_{j=k+1}^n \text{sgn}(x_j - x_k)$$

which is the number of positive differences minus the number of negative differences. If S is a positive number, observations obtained later in time tend to be *larger* than observations made earlier. If S is a negative number, then observations made later in time tend to be *smaller* than observations made earlier.

- [5] If $n \leq 10$, follow the procedure described on page 209, Section 16.4.1, of Gilbert (1987) by looking up S in a table of probabilities on Table A18, page 272, of Gilbert (1987). If this probability is less than α (the probability of concluding a trend exists when there is none), then reject the null hypothesis and conclude the trend exists. If n cannot be found in the table of probabilities (which can happen if there are tied data values), the next value farther from zero in the table is used. For example, if $S = 12$ and there is no value for $S = 12$ in the table, it is handled the same as $S = 13$.

If $n > 10$, continue with steps 6 through 8 to determine whether a trend exists. This follows the procedure described on page 211, Section 16.4.2, of Gilbert (1987).

- [6] Compute the variance of S as follows:

$$\text{VAR}(S) = \frac{1}{18} \left[n(n-1)(2n+5) - \sum_{p=1}^g t_p(t_p-1)(2t_p+5) \right]$$

where g is the number of tied groups and t_p is the number of observations in the p th group. For example, in the sequence of measurements in time (23, 24, 29, 6, 29, 24, 24, 29, 23) we have $g = 3$ tied groups, for which $t_1 = 2$ for the tied value 23, $t_2 = 3$ for the tied value 24, and $t_3 = 3$ for the tied value 29.

[7] Compute the MK test statistic, Z_{MK} , as follows:

$$Z_{MK} = \frac{S-1}{\sqrt{VAR(S)}} \quad \text{if} \quad S > 0$$

$$Z_{MK} = 0 \quad \text{if} \quad S = 0$$

$$Z_{MK} = \frac{S+1}{\sqrt{VAR(S)}} \quad \text{if} \quad S < 0$$

A positive value of Z_{MK} indicates that the data tend to increase with time; a negative value of Z_{MK} indicates that the data tend to decrease with time.

[8] Finally, the hypothesis is tested. H_0 is rejected and H_α is accepted if $Z_{MK} \leq -Z_{1-\alpha}$ where:

- H_0 (null hypothesis): no monotonic trend exists
- H_α (alternative hypothesis): a downward monotonic trend exists

Alpha (α) is the Type I error rate, which is the user-specified small probability that can be tolerated that the MK test will falsely reject the null hypothesis (i.e., will conclude a trend exists when there is none).

$Z_{1-\alpha}$ is the $100(1 - \alpha)^{\text{th}}$ percentile of the standard normal distribution. For example, if $\alpha = 0.05$, then $Z_{1-\alpha} = 1.64485$. Values of $Z_{1-\alpha}$ are provided in many statistics books (for example, Table A1, page 254, of Gilbert [1987]) and statistical software packages.

The following parameters were used:

alpha (α)	0.05 (5%)
beta (β)	0.1 (10%)
standard deviation of residuals from trend line	3%

Assumptions

The following assumptions underlie the MK test:

1. When no trend is present, the measurements (observations or data) obtained over time are independent and identically distributed. The assumption of independence means that the observations are not serially correlated over time.
2. The observations obtained over time are representative of the true conditions at sampling times.
3. The sample collection, handling, and measurement methods provide unbiased and representative observations of the underlying populations over time.

The MK test does not require that the measurements or the residuals about a trend line be normally distributed or that the trend, if present, be linear.

The MK test can be computed if there are missing values (no measurements for some sampling times), but the performance of the test will be adversely affected. The assumption of independence requires that the time between samples be sufficiently long so that there is no correlation between measurements collected at different times.

References

Battelle Memorial Institute, 2014. Visual Sampling Plan (Version 7.0) User's Guide, prepared by Pacific Northwest National Laboratory for the U.S. Department of Energy under Contract DE-AC05-76RL01830, March.

Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*, Wiley & Sons, New York.

Kendall, M.G., 1975. *Rank Correlation Methods*, 4th ed., Charles Griffin, London.

Mann, H.B., 1945. "Non-parametric tests against trend," *Econometrica* 13:163–171.

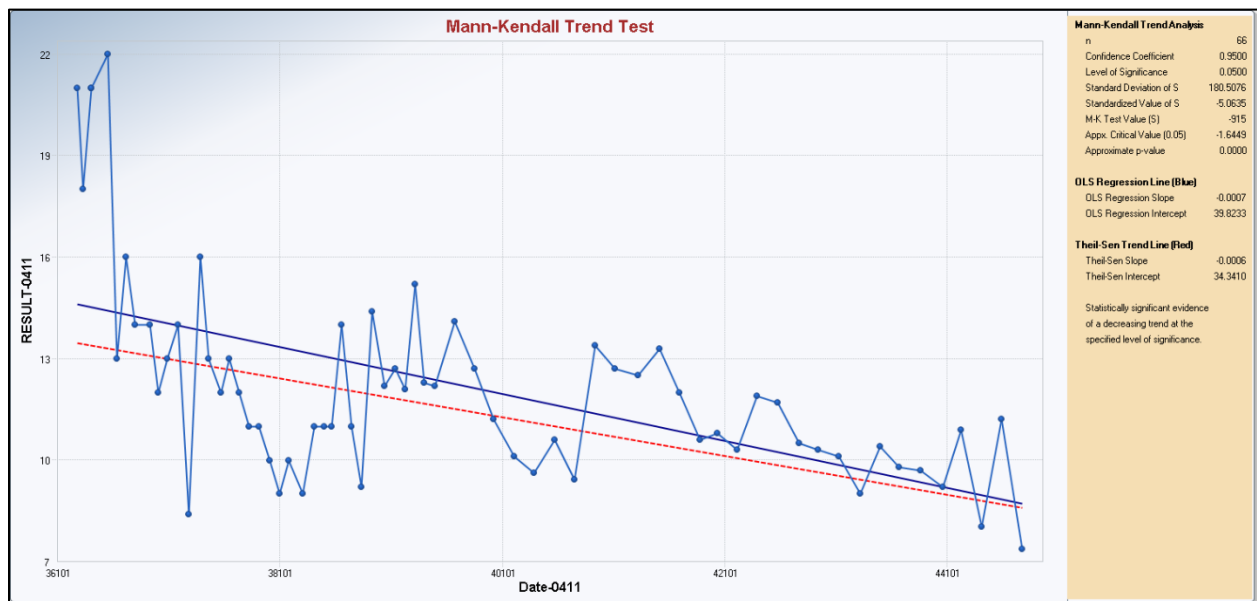


Figure B-1. Well 0411 Trend Analysis of TCE Concentrations

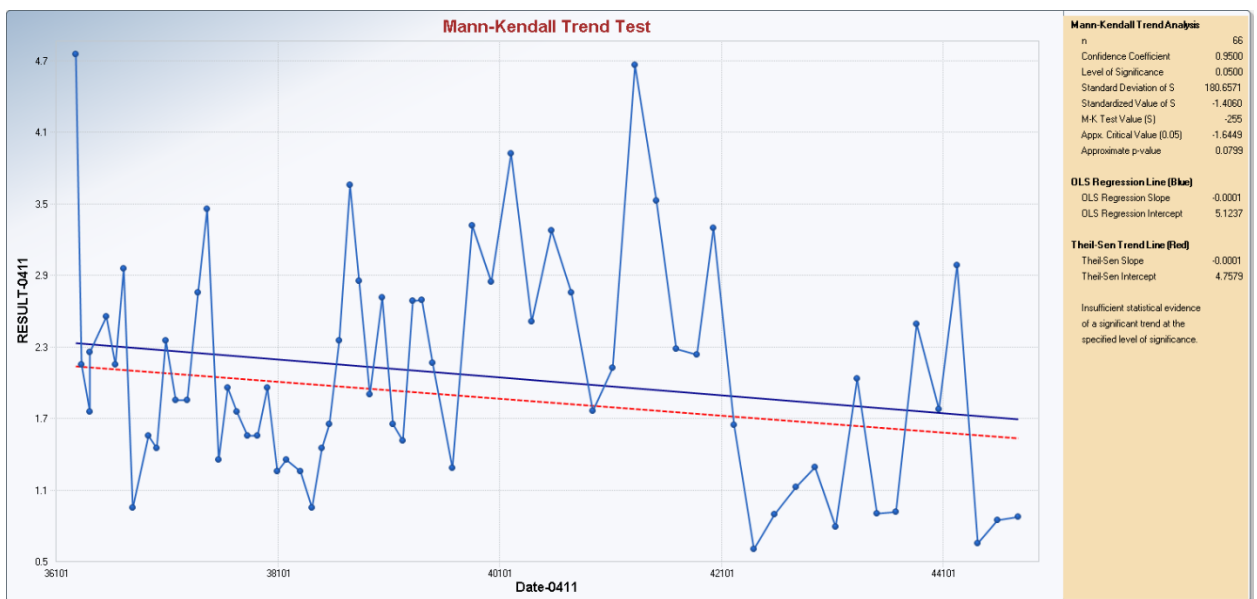


Figure B-2. Well 0411 Trend Analysis of cDCE Concentrations

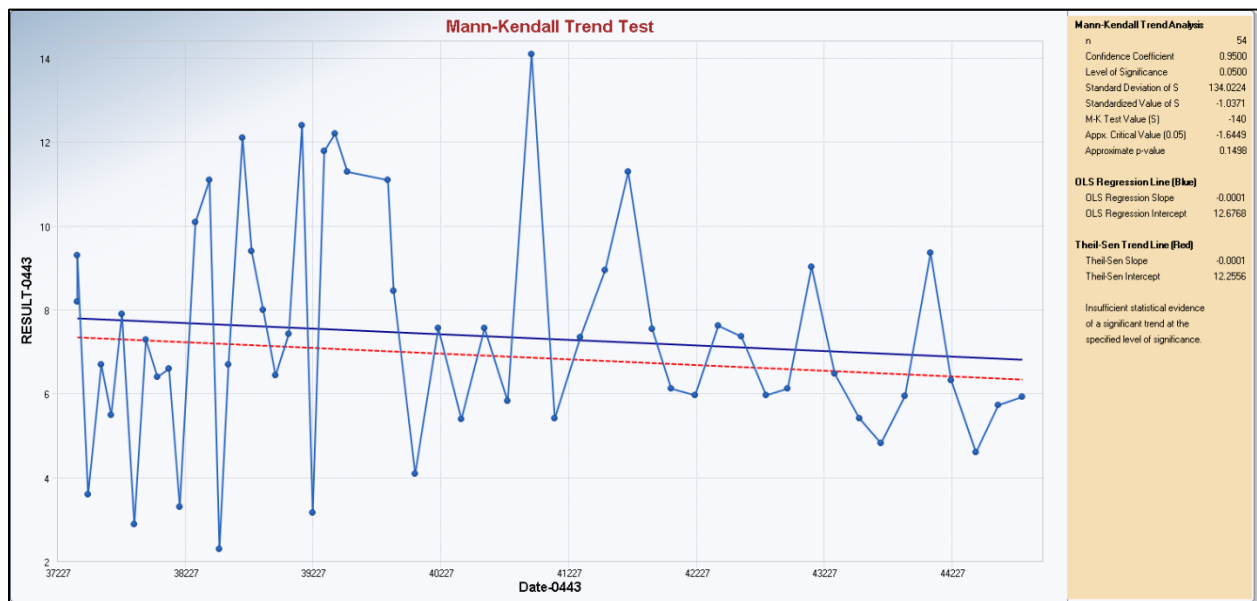


Figure B-3. Well 0443 Trend Analysis of TCE Concentrations

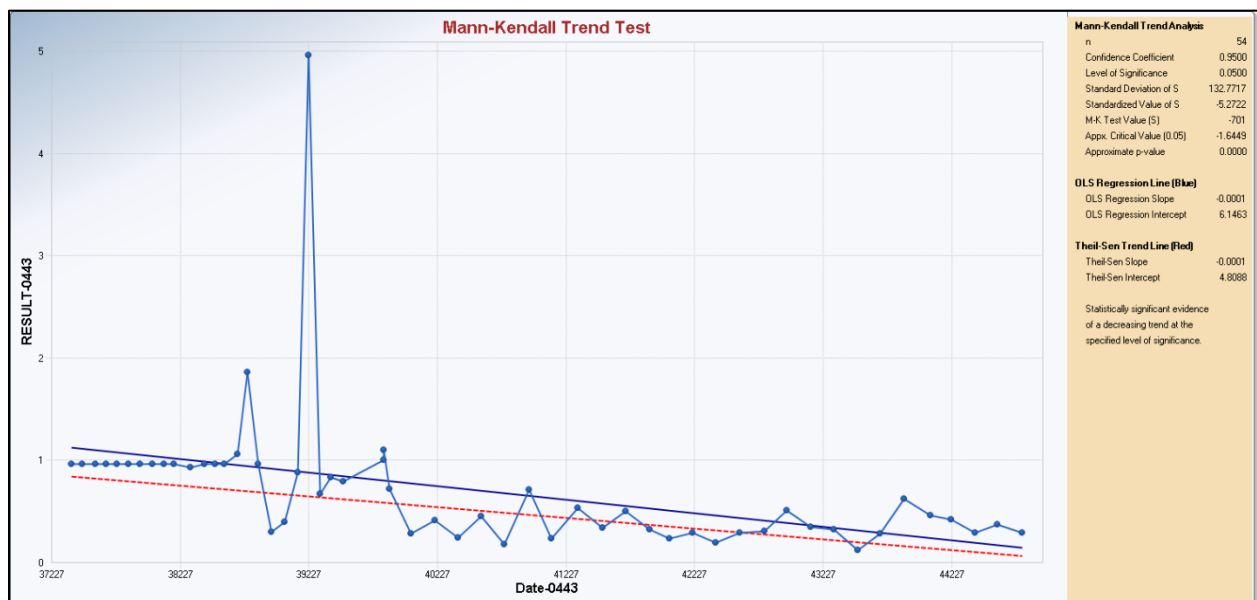


Figure B-4. Well 0443 Trend Analysis of cDCE Concentrations

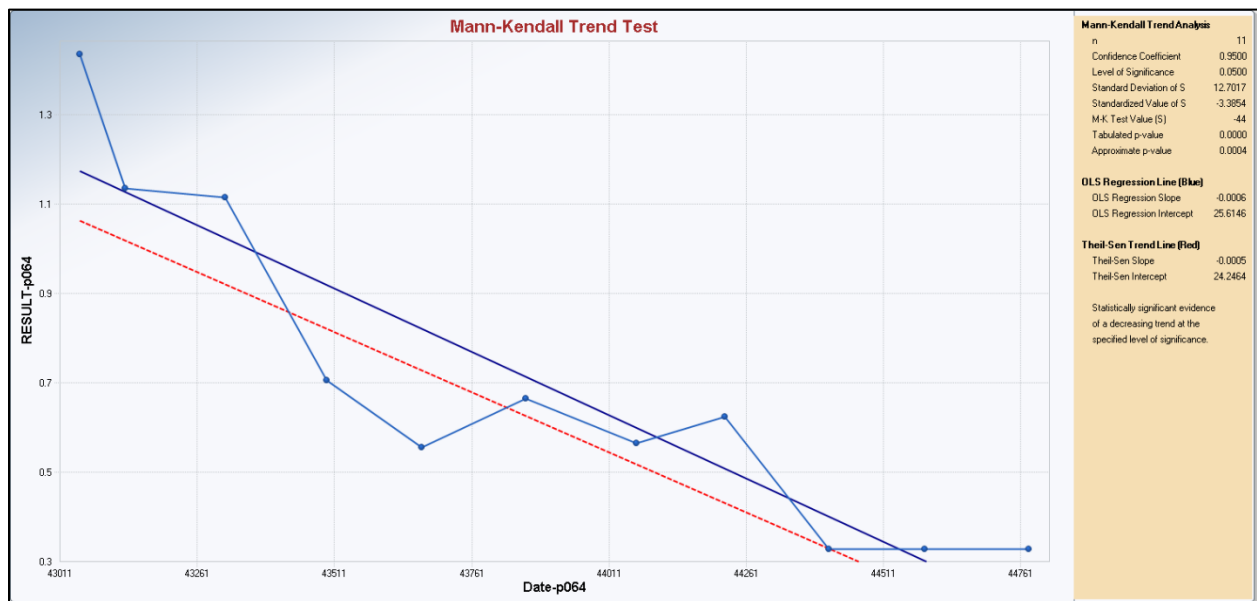


Figure B-5. Well P064 Trend Analysis of TCE Concentrations

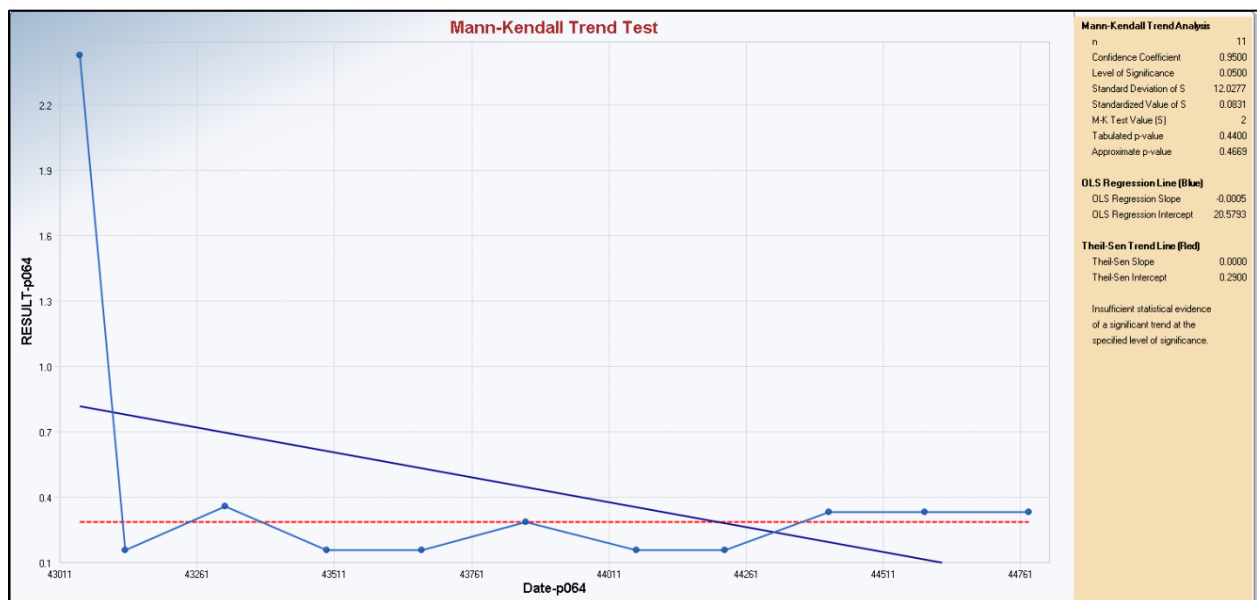


Figure B-6. Well P064 Trend Analysis of cDCE Concentrations

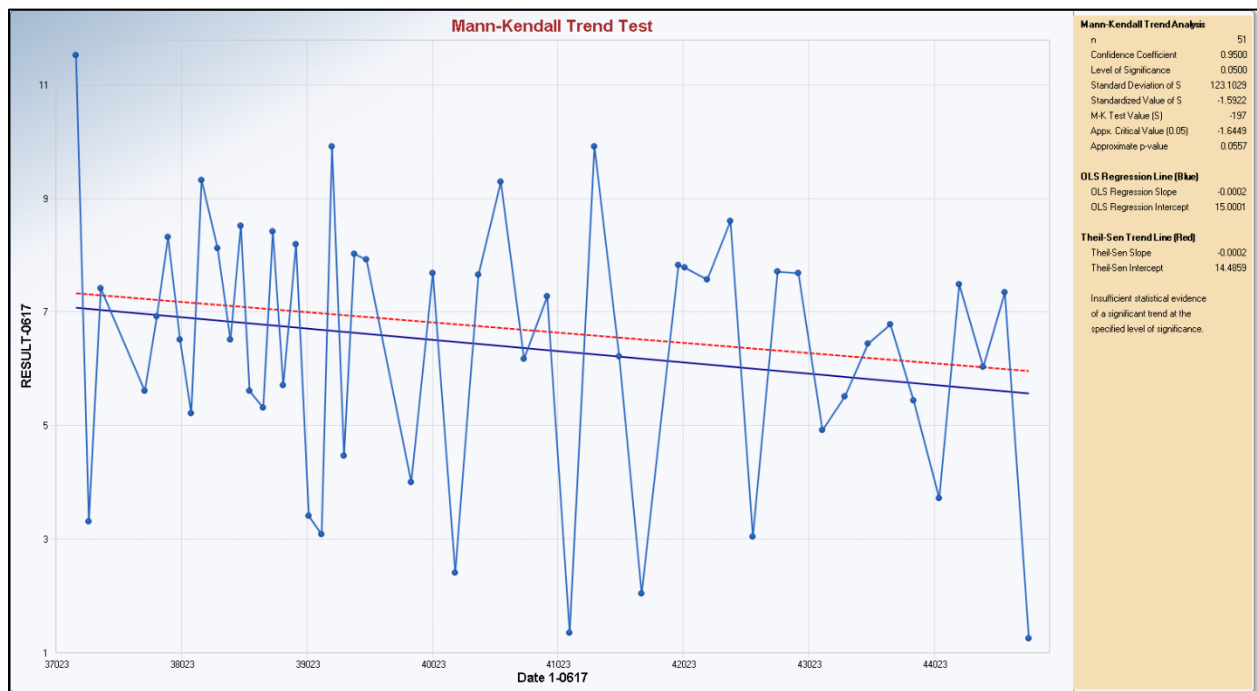


Figure B-7. Seep 0617 Trend Analysis of TCE Concentrations

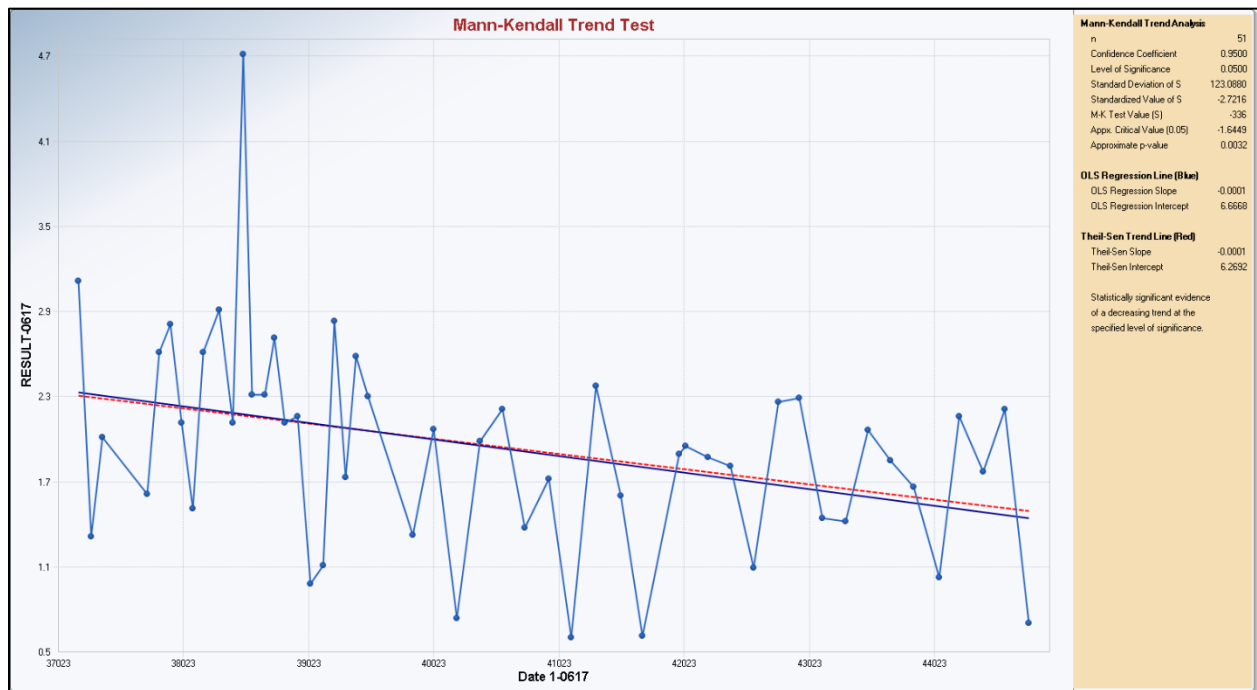


Figure B-8. Seep 0617 Trend Analysis of cDCE Concentrations

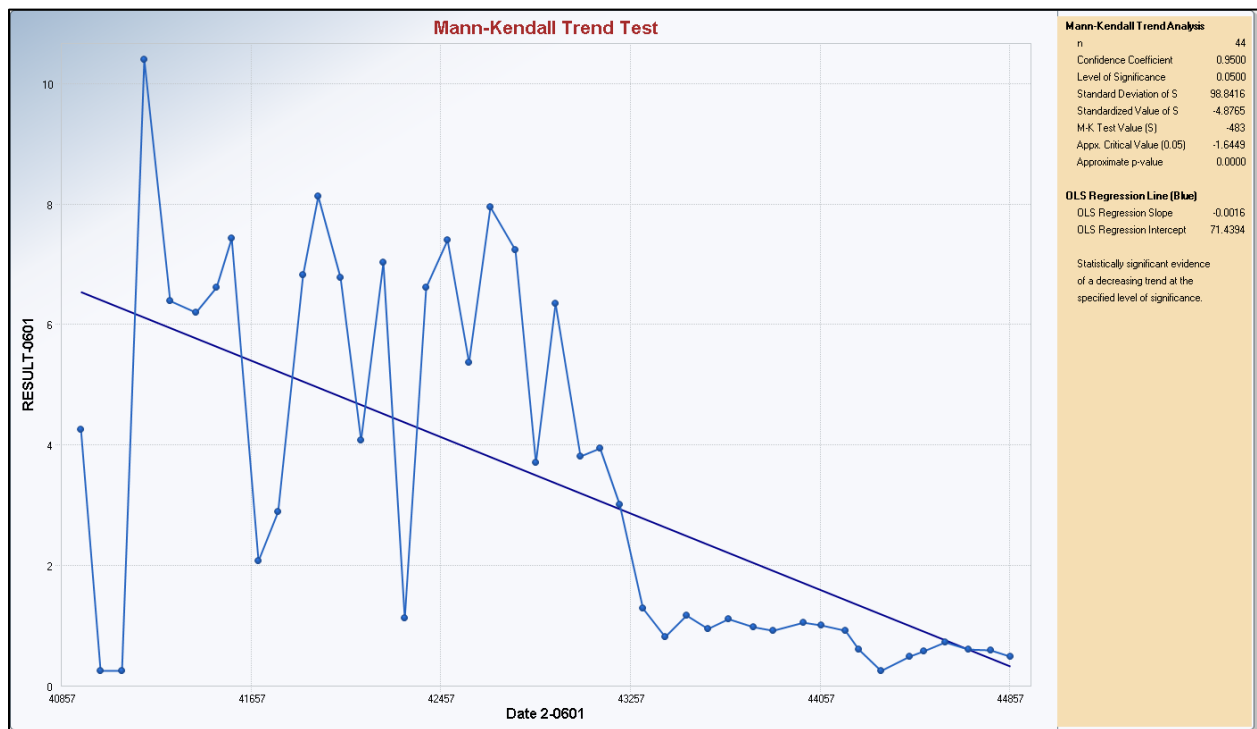


Figure B-9. Seep 0601 Trend Analysis of TCE Concentrations

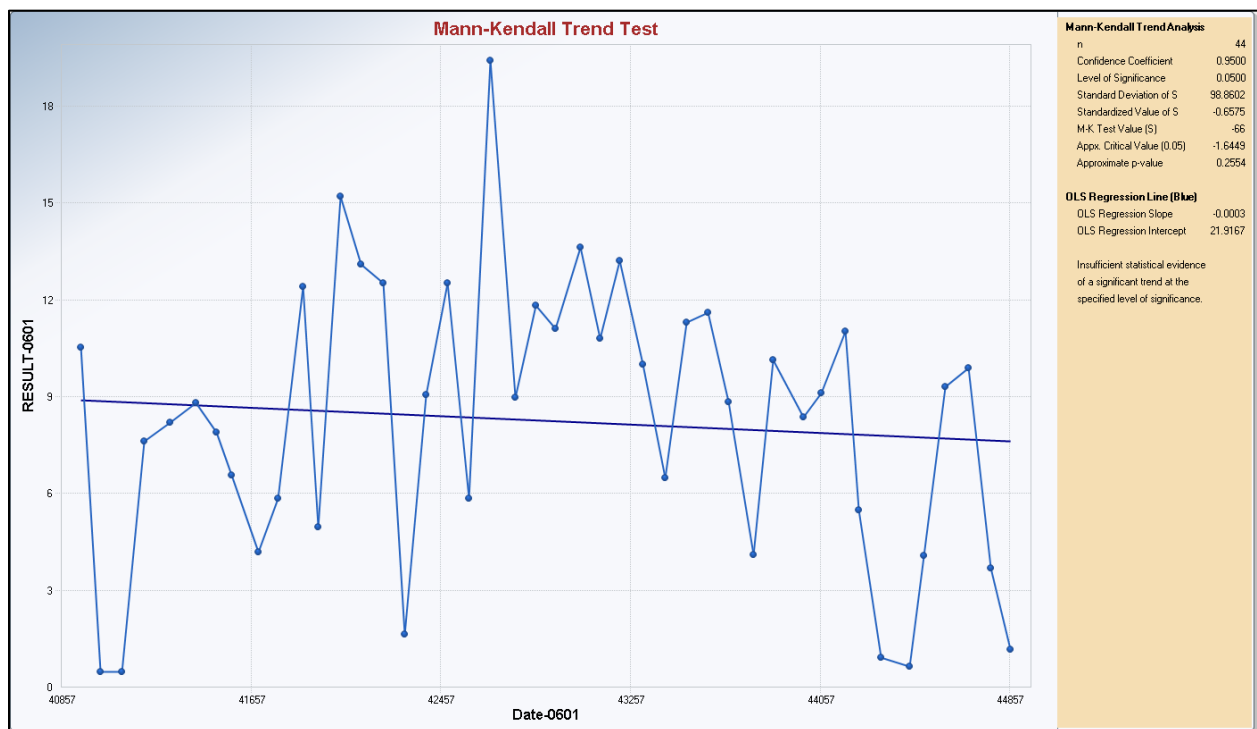


Figure B-10. Seep 0601 Trend Analysis of cDCE Concentrations

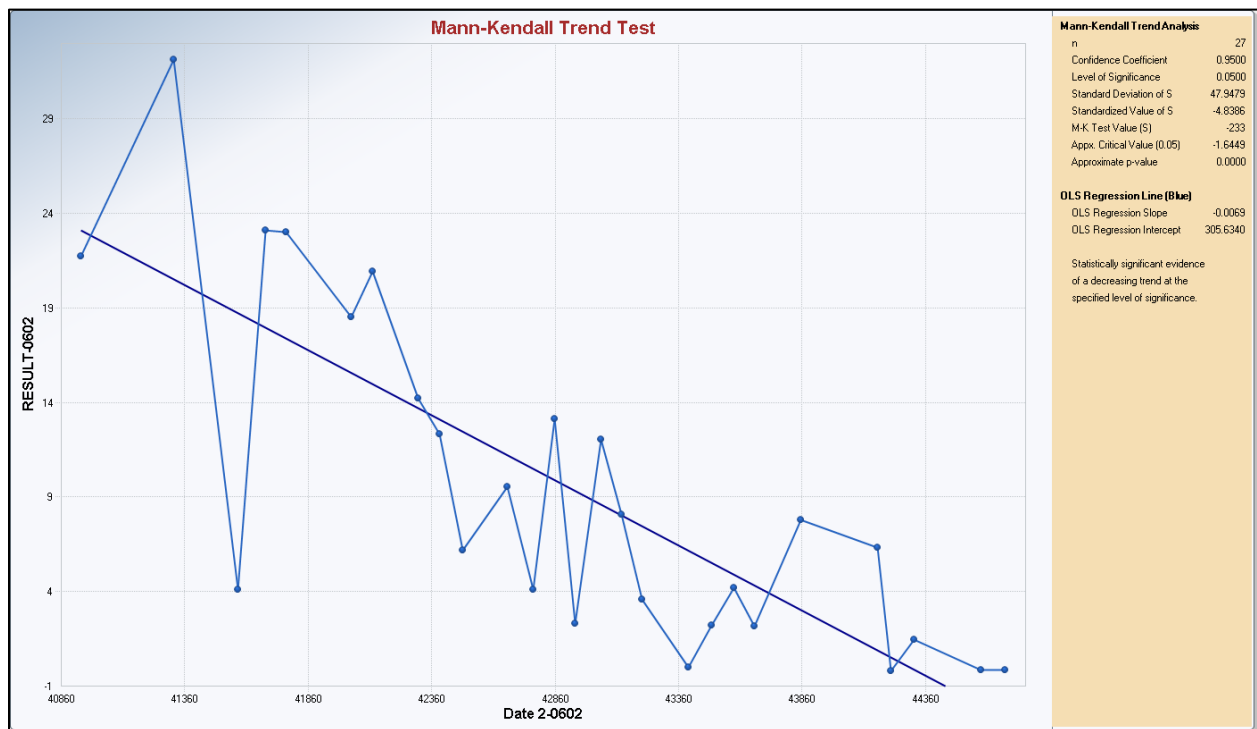


Figure B-11. Seep 0602 Trend Analysis of TCE Concentrations

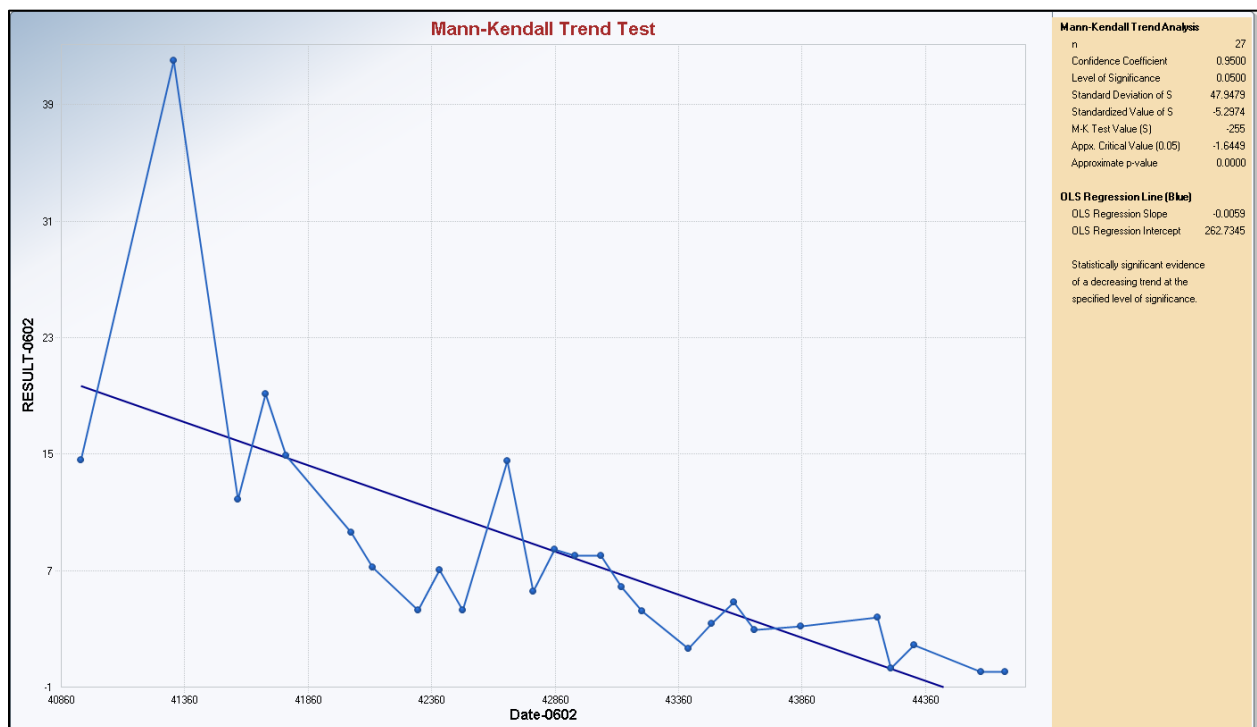


Figure B-12. Seep 0602 Trend Analysis of cDCE Concentrations

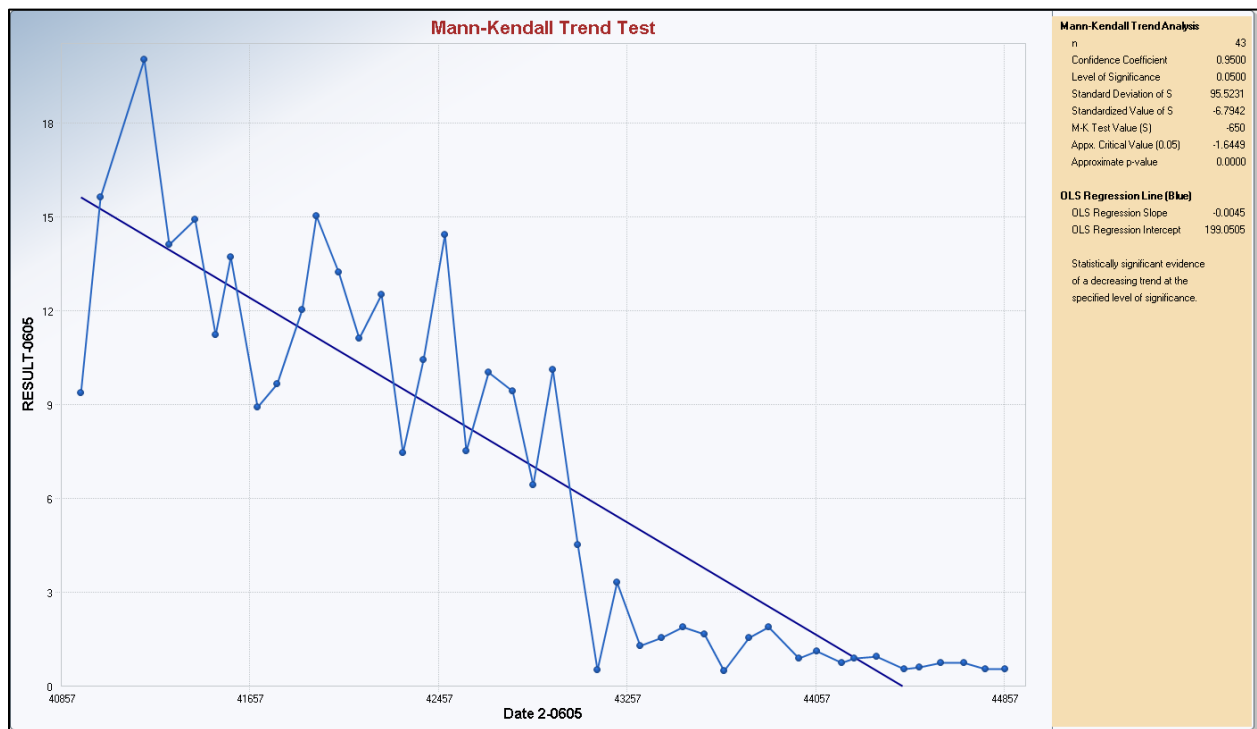


Figure B-13. Seep 0605 Trend Analysis of TCE Concentrations

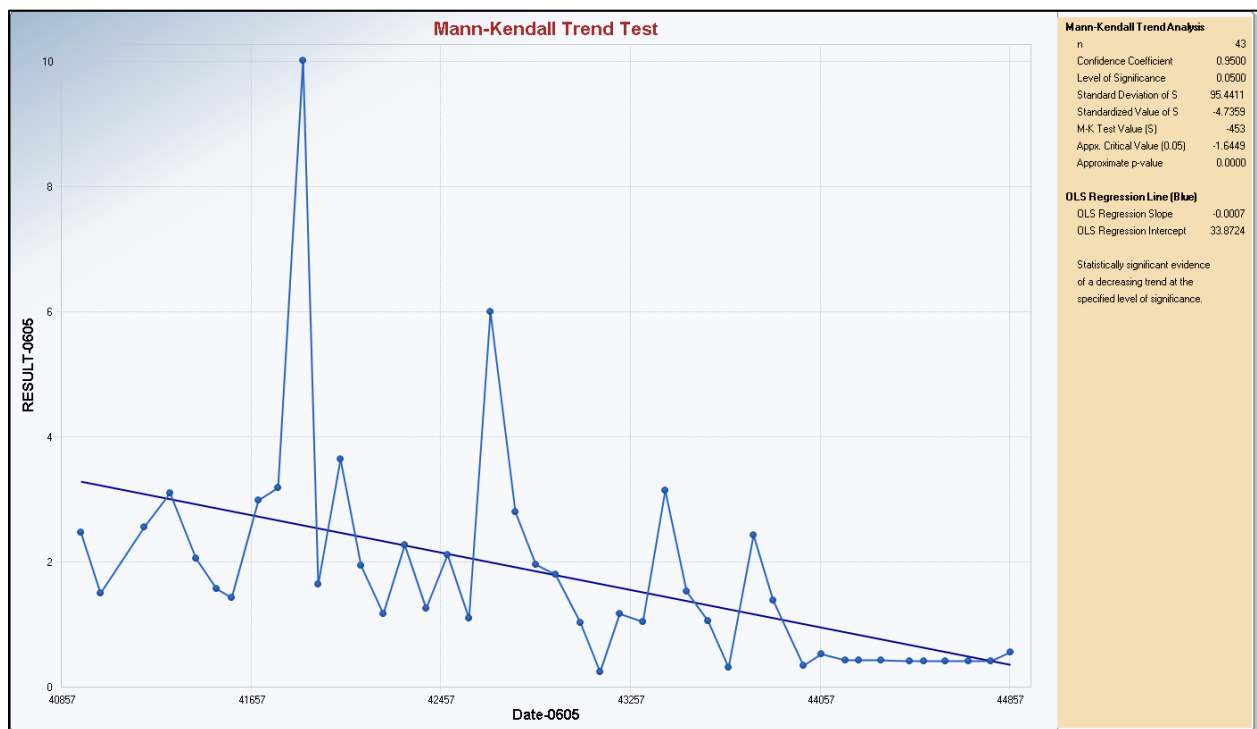


Figure B-14. Seep 0605 Trend Analysis of cDCE Concentrations

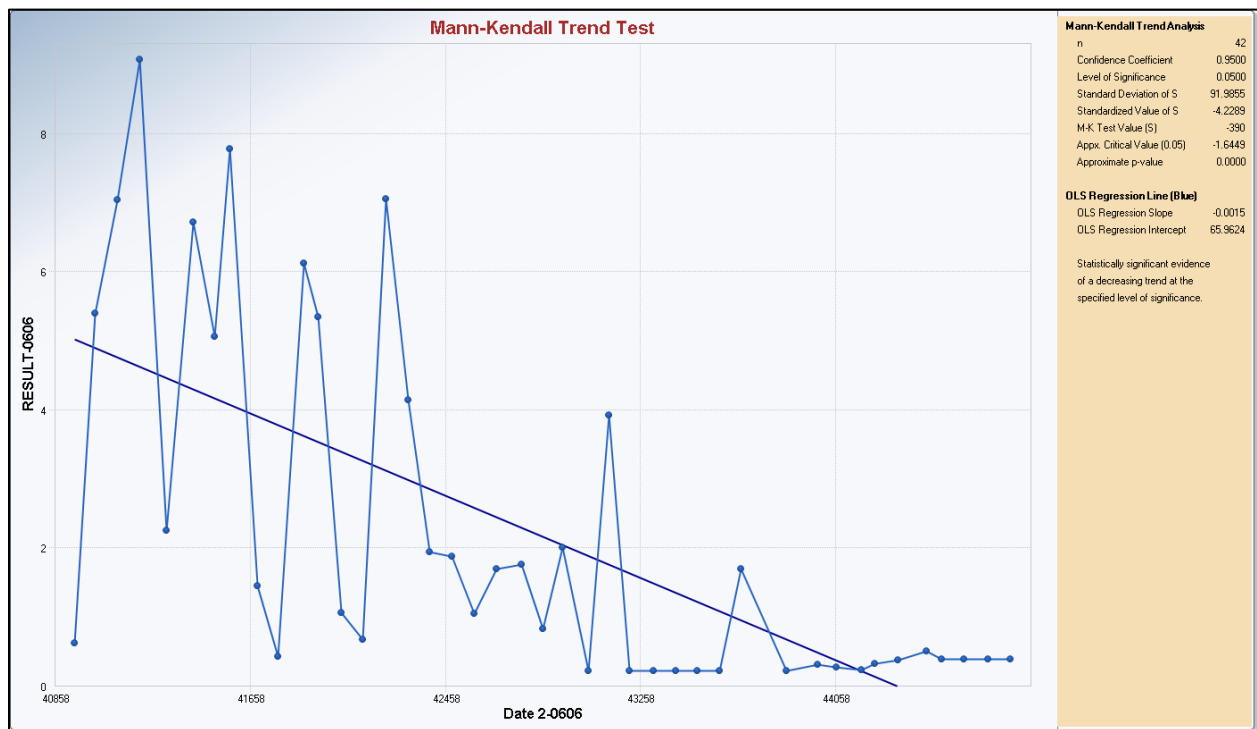


Figure B-15. Seep 0606 Trend Analysis of TCE Concentrations

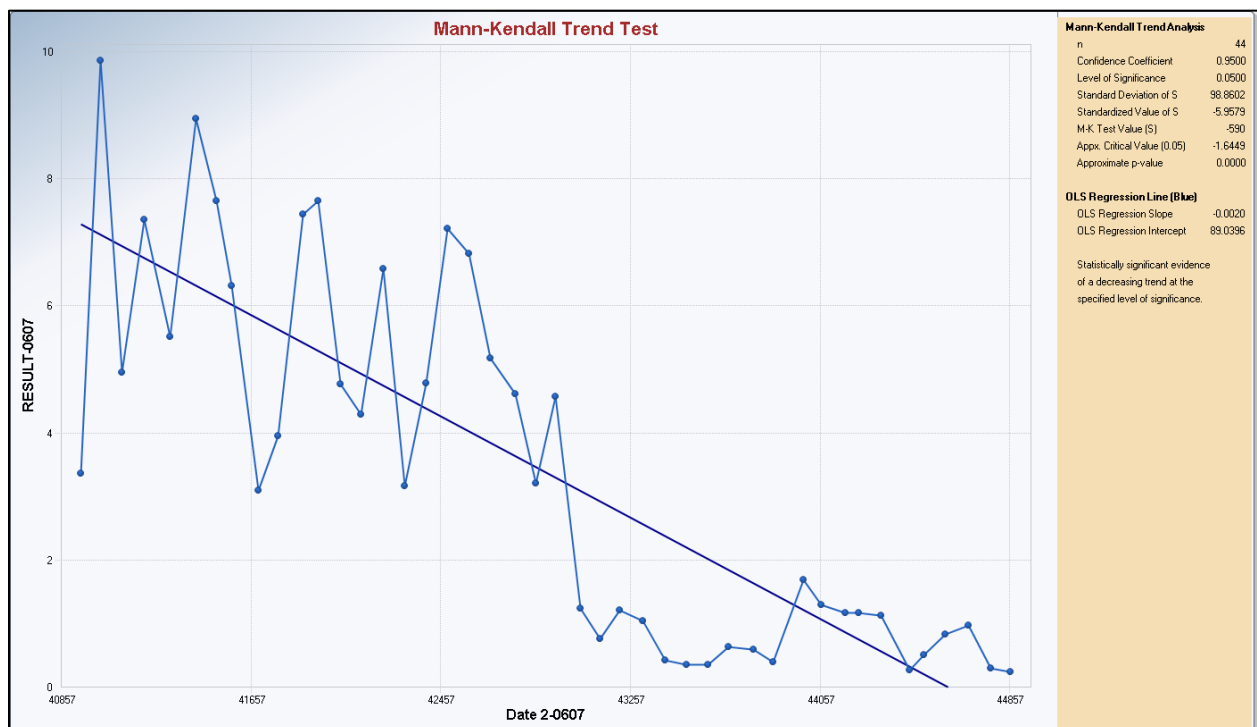


Figure B-16. Seep 0607 Trend Analysis of TCE Concentrations

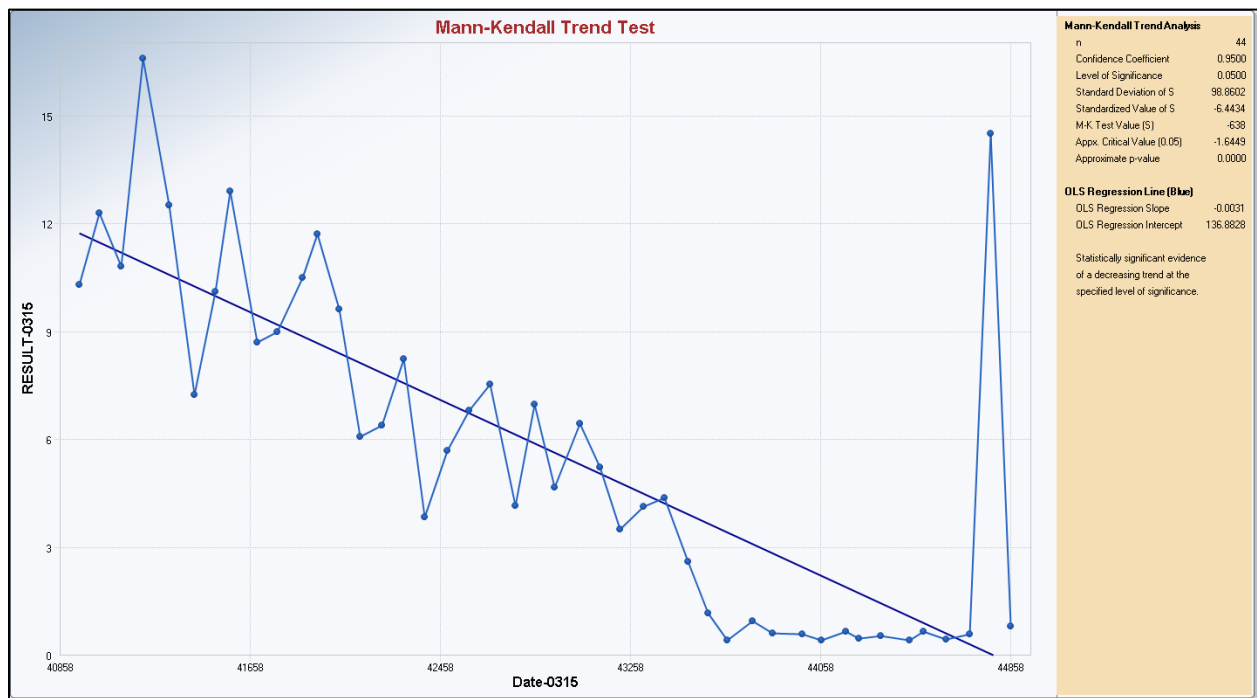


Figure B-17. Well 0315 Trend Analysis of TCE Concentrations

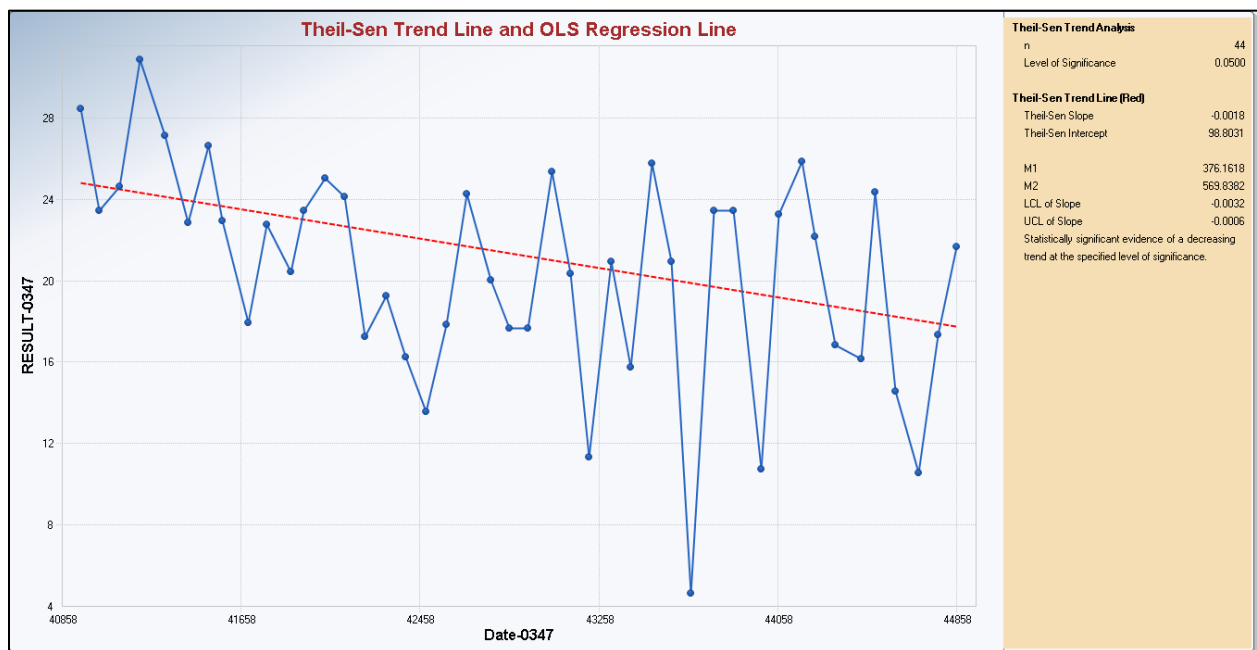


Figure B-18. Well 0347 Trend Analysis of TCE Concentrations with Theil-Sen Slope

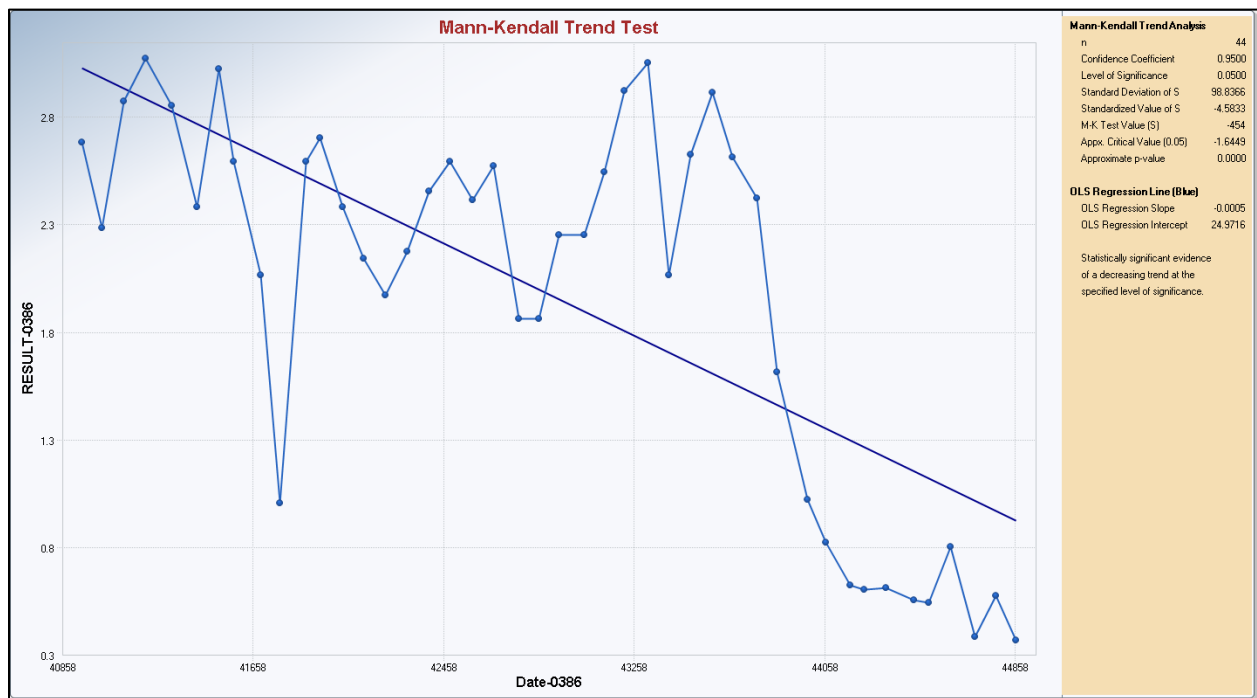


Figure B-19. Well 0386 Trend Analysis of TCE Concentrations

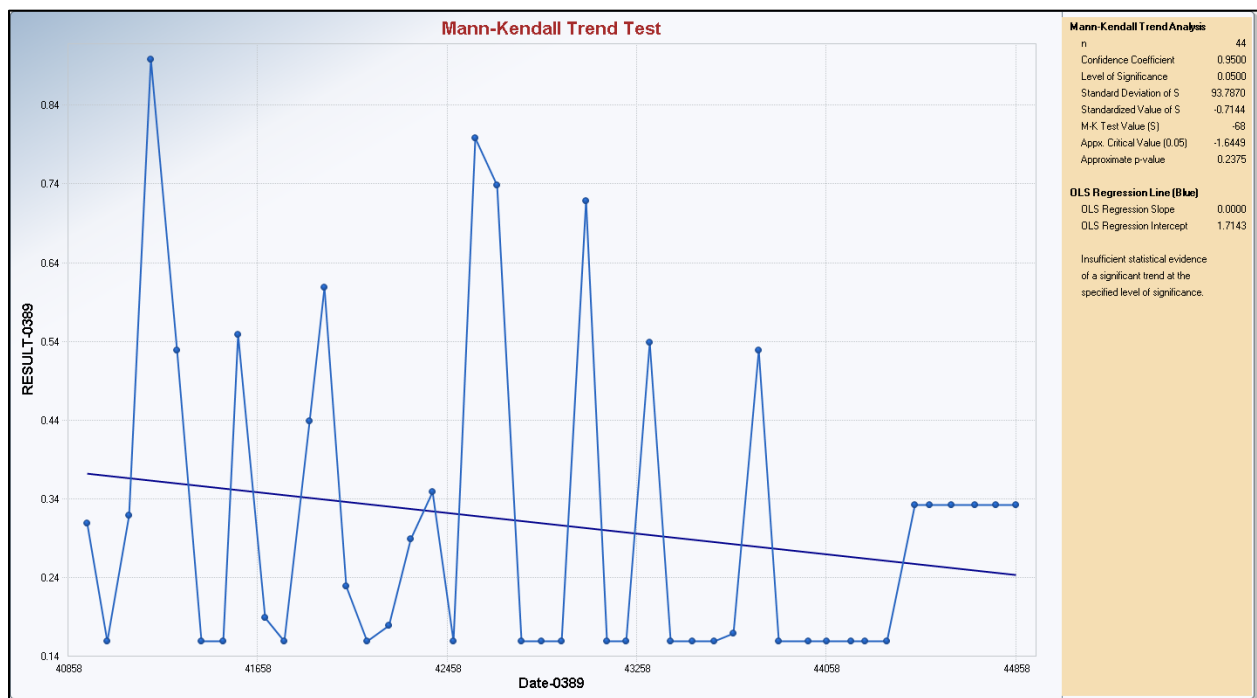


Figure B-20. Well 0389 Trend Analysis of TCE Concentrations

Appendix C

2022 Groundwater Elevations

Table C-1. Phase I Groundwater Elevations

Well	Date/Time	Top of Casing Elevation (ft AMSL)	Depth from Top of Casing (ft)	Groundwater Elevation (ft AMSL)
0400	01/11/2022 00:00	705.11	22.38	682.73
	02/15/2022 00:00		24.01	681.1
	03/15/2022 00:00		20.67	684.44
	04/14/2022 00:00		23.45	681.66
	05/16/2022 00:00		23.76	681.35
	06/16/2022 00:00		23.51	681.6
	07/12/2022 00:00		25.14	679.97
	08/16/2022 00:00		26.07	679.04
	09/14/2022 00:00		26.31	678.8
	10/18/2022 00:00		27.16	677.95
	11/15/2022 00:00		27.26	677.85
	12/13/2022 00:00		27.39	677.72
0402	01/11/2022 00:00	704.02	21.27	682.75
	01/31/2022 10:53		23.22	680.8
	02/15/2022 00:00		28.82	675.2
	03/15/2022 00:00		19.65	684.37
	04/14/2022 00:00		22.19	681.83
	04/25/2022 10:50		22	682.02
	05/16/2022 00:00		22.59	681.43
	06/16/2022 00:00		22.31	681.71
	07/12/2022 00:00		23.97	680.05
	07/28/2022 10:43		24.11	679.91
	08/16/2022 00:00		24.9	679.12
	09/14/2022 00:00		25.14	678.88
	10/18/2022 00:00		25.9	678.12
	10/31/2022 10:41		26.07	677.95
	11/15/2022 00:00		26.05	677.97
	12/13/2022 00:00		26.18	677.84
0411	01/25/2022 12:46	836.57	18.4941	818.0759
	08/02/2022 10:55		27.72	808.85
0443	01/25/2022 09:58	858.78	32.69	826.09
	08/02/2022 10:20		28.9	829.88

Table C-1. Phase I Groundwater Elevations (continued)

Well	Date/Time	Top of Casing Elevation (ft AMSL)	Depth from Top of Casing (ft)	Groundwater Elevation (ft AMSL)
P033	01/11/2022 00:00	705.83	23.13	682.7
	02/15/2022 00:00		24.74	681.09
	03/15/2022 00:00		21.48	684.35
	04/14/2022 00:00		24.1	681.73
	05/16/2022 00:00		24.46	681.37
	06/16/2022 00:00			705.83
	07/12/2022 00:00		25.87	679.96
	08/16/2022 00:00		26.81	679.02
	09/14/2022 00:00		27.05	678.78
	10/18/2022 00:00		27.83	678
	11/15/2022 00:00		27.97	677.86
	12/13/2022 00:00		28.11	677.72
P064	01/11/2022 00:00	729.98	47.45	682.53
	01/25/2022 13:36		48.87	681.11
	02/15/2022 00:00		49.07	680.91
	03/15/2022 00:00		45.64	684.34
	04/14/2022 00:00		48.45	681.53
	05/16/2022 00:00		48.65	681.33
	06/16/2022 00:00		48.6	681.38
	07/12/2022 00:00		50.02	679.96
	08/02/2022 12:48		50.65	679.33
	08/16/2022 00:00		51.15	678.83
	09/14/2022 00:00		51.41	678.57
	10/18/2022 00:00		52.23	677.75
	11/15/2022 00:00		52.31	677.67
	12/13/2022 00:00		52.44	677.54

Abbreviation:

ft AMSL = feet above mean sea level

Table C-2. Parcels 6, 7, and 8 Groundwater Elevations

Well	Date/Time	Top of Casing Elevation (ft AMSL)	Depth from Top of Casing (ft)	Groundwater Elevation (ft AMSL)
0118	01/24/2022 10:21	704.86	22.76	682.1
	05/04/2022 09:56		22.46	682.4
	09/07/2022 12:45		24.73	680.13
	10/24/2022 10:14		25.57	679.29
0124	01/24/2022 13:05	705.12	23.33	681.79
	05/04/2022 11:56		23.42	681.7
	08/02/2022 13:19		25.2	679.92
	10/24/2022 11:14		26.84	678.28
0126	01/11/2022 00:00	705.54	22.7	682.84
	01/24/2022 12:39		23.87	681.67
	02/15/2022 00:00		24.13	681.41
	03/15/2022 00:00		21.31	684.23
	04/14/2022 00:00		23.59	681.95
	05/04/2022 10:50		23.89	681.65
	05/16/2022 00:00		23.73	681.81
	06/16/2022 00:00		23.59	681.95
	07/12/2022 00:00		25.24	680.3
	08/02/2022 12:48		25.61	679.93
	08/16/2022 00:00		25.15	680.39
	09/14/2022 00:00		26.43	679.11
	10/18/2022 00:00		27.06	678.48
	10/24/2022 10:46		27.28	678.26
	11/15/2022 00:00		27.3	678.24
	12/13/2022 00:00		27.37	678.17
0138	01/24/2022 12:04	697.76	25.93	671.83
	05/04/2022 10:22		24.66	673.1
	08/02/2022 12:17		27.38	670.38
	10/24/2022 13:46		28.78	668.98
0315	01/25/2022 12:00	723.99	42.4	681.59
	05/05/2022 09:41		42.35	681.64
	08/03/2022 11:07		44.11	679.88
	10/24/2022 10:00		45.78	678.21
0346	01/25/2022 10:33	742.97	16.7	726.27
	05/04/2022 12:25		13.75	729.22
	08/02/2022 10:19		16.16	726.81
	10/24/2022 13:08		18.36	724.61
0347	01/25/2022 12:24	725.2	43.75	681.45
	05/05/2022 10:13		43.57	681.63
	08/03/2022 10:25		45.32	679.88
	10/24/2022 10:34		47	678.2

Table C-2. Parcels 6, 7, and 8 Groundwater Elevations (continued)

Well	Date/Time	Top of Casing Elevation (ft AMSL)	Depth from Top of Casing (ft)	Groundwater Elevation (ft AMSL)
0379	01/11/2022 00:00	716.11	33.26	682.85
	01/25/2022 09:50		34.6	681.51
	01/27/2022 12:42		34.81	681.3
	02/15/2022 00:00		34.76	681.35
	03/15/2022 00:00		31.8	684.31
	04/14/2022 00:00		34.2	681.91
	05/03/2022 10:44		34.39	681.72
	05/04/2022 12:53		34.46	681.65
	05/16/2022 00:00		34.31	681.8
	06/16/2022 00:00		34.11	682
	07/12/2022 00:00		35.81	680.3
	07/26/2022 09:36		35.88	680.23
	08/02/2022 11:33		36.2	679.91
	08/16/2022 00:00		36.74	679.37
	09/14/2022 00:00		37.02	679.09
	10/18/2022 00:00		37.8	678.31
	10/27/2022 10:06		38.63	677.48
	10/31/2022 12:28		38.58	677.53
	11/15/2022 00:00		37.88	678.23
	12/13/2022 00:00		38	678.11
0386	01/26/2022 10:30	724.79	43.42	681.37
	05/05/2022 11:37		43.15	681.64
	09/07/2022 11:09		45.64	679.15
	10/24/2022 12:00		46.58	678.21
0387	01/26/2022 13:07	720.89	39.58	681.31
	05/05/2022 12:27		39.3	681.59
	09/07/2022 10:46		41.78	679.11
	10/24/2022 12:58		42.73	678.16
0389	01/26/2022 12:05	724.65	43.35	681.3
	05/05/2022 11:59		43.05	681.6
	09/07/2022 11:30		45.51	679.14
	10/24/2022 12:26		46.45	678.2
0392	01/26/2022 12:35	720.84	39.15	681.69
	05/05/2022 13:03		39.15	681.69
	09/07/2022 10:26		41.61	679.23
	10/24/2022 13:20		42.43	678.41

Abbreviation:

ft AMSL = feet above mean sea level

Appendix D

2022 Groundwater and Seep Data Tables

Table D-1. Phase I Groundwater Data

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0411	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.89	0.333	J		ug/L	F
0411	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.92	0.333	J		ug/L	D
0411	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.92	0.333	J		ug/L	F
0411	Dissolved Oxygen	1/25/2022 12:00 AM	2.9				mg/L	F
0411	Dissolved Oxygen	8/2/2022 12:00 AM	1.16				mg/L	F
0411	Oxidation Reduction Potential	1/25/2022 12:00 AM	238.2				mV	F
0411	Oxidation Reduction Potential	8/2/2022 12:00 AM	291.7				mV	F
0411	pH	1/25/2022 12:00 AM	7.17				s.u.	F
0411	pH	8/2/2022 12:00 AM	4.49				s.u.	F
0411	Temperature	1/25/2022 12:00 AM	9.9				C	F
0411	Temperature	8/2/2022 12:00 AM	13.4				C	F
0411	Tetrachloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0411	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	D
0411	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0411	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0411	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0411	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	D
0411	Trichloroethene	1/25/2022 12:00 AM	11.2	0.333			ug/L	F
0411	Trichloroethene	8/2/2022 12:00 AM	7.37	0.333			ug/L	F
0411	Trichloroethene	8/2/2022 12:00 AM	7.38	0.333			ug/L	D
0411	Turbidity	1/25/2022 12:00 AM	48.3				NTU	F
0411	Turbidity	8/2/2022 12:00 AM	16.7				NTU	F
0411	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0411	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	D
0411	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.41	0.333	J		ug/L	F
0443	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	Dissolved Oxygen	1/25/2022 12:00 AM	2.36				mg/L	F
0443	Dissolved Oxygen	8/2/2022 12:00 AM	8.58				mg/L	F

Table D-1. Phase I Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0443	Oxidation Reduction Potential	1/25/2022 12:00 AM	124.3				mV	F
0443	Oxidation Reduction Potential	8/2/2022 12:00 AM	880.9				mV	F
0443	pH	1/25/2022 12:00 AM	6.98				s.u.	F
0443	pH	8/2/2022 12:00 AM	7.75				s.u.	F
0443	Temperature	1/25/2022 12:00 AM	10.9				C	F
0443	Temperature	8/2/2022 12:00 AM	16.4				C	F
0443	Tetrachloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	Trichloroethene	1/25/2022 12:00 AM	5.63	0.333			ug/L	F
0443	Trichloroethene	8/2/2022 12:00 AM	5.83	0.333			ug/L	F
0443	Turbidity	1/25/2022 12:00 AM	9.9				NTU	F
0443	Turbidity	8/2/2022 12:00 AM	8.53				NTU	F
0443	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0443	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
P064	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	Dissolved Oxygen	1/25/2022 12:00 AM	3.12				mg/L	F
P064	Dissolved Oxygen	8/2/2022 12:00 AM	7.62				mg/L	F
P064	Oxidation Reduction Potential	1/25/2022 12:00 AM	252.7				mV	F
P064	Oxidation Reduction Potential	8/2/2022 12:00 AM	217.2				mV	F
P064	pH	1/25/2022 12:00 AM	6.99				s.u.	F
P064	pH	8/2/2022 12:00 AM	5.69				s.u.	F
P064	Temperature	1/25/2022 12:00 AM	11.7				C	F
P064	Temperature	8/2/2022 12:00 AM	14.6				C	F
P064	Tetrachloroethene	1/25/2022 12:00 AM	1.29	0.333			ug/L	F

Table D-1. Phase I Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
P064	Tetrachloroethene	1/25/2022 12:00 AM	1.33	0.333			ug/L	D
P064	Tetrachloroethene	8/2/2022 12:00 AM	0.74	0.333	J		ug/L	F
P064	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
P064	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	Trichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
P064	Trichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	Turbidity	1/25/2022 12:00 AM	3.53				NTU	F
P064	Turbidity	8/2/2022 12:00 AM	85.5				NTU	F
P064	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
P064	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
P064	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F

Abbreviations:

C = Celsius

D = analyte determined in diluted sample

F = low-flow sampling method used

J = estimated value

µg/L = micrograms per liter

mg/L = milligrams per liter

mV = millivolts

NTU = nephelometric turbidity unit

s.u. = standard unit

U = analytical result below detection limit

Table D-2. Parcels 6, 7, and 8 Groundwater Data

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0118	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	cis-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Dissolved Oxygen	1/24/2022 12:00 AM	7.19				mg/L	F
0118	Dissolved Oxygen	5/4/2022 12:00 AM	10.27				mg/L	F
0118	Dissolved Oxygen	9/7/2022 12:00 AM	6.31				mg/L	F
0118	Dissolved Oxygen	10/24/2022 12:00 AM	5.45				mg/L	F
0118	Oxidation Reduction Potential	1/24/2022 12:00 AM	145.6				mV	F
0118	Oxidation Reduction Potential	5/4/2022 12:00 AM	226.7				mV	F
0118	Oxidation Reduction Potential	9/7/2022 12:00 AM	281.4				mV	F
0118	Oxidation Reduction Potential	10/24/2022 12:00 AM	391.9				mV	F
0118	pH	1/24/2022 12:00 AM	7.18				s.u.	F
0118	pH	5/4/2022 12:00 AM	7.23				s.u.	F
0118	pH	9/7/2022 12:00 AM	6.73				s.u.	F
0118	pH	10/24/2022 12:00 AM	6.36				s.u.	F
0118	Temperature	1/24/2022 12:00 AM	13.6				C	F
0118	Temperature	5/4/2022 12:00 AM	13.8				C	F
0118	Temperature	9/7/2022 12:00 AM	14.8				C	F
0118	Temperature	10/24/2022 12:00 AM	14.4				C	F
0118	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Tetrachloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Tetrachloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	trans-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Trichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0118	Trichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Trichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Turbidity	1/24/2022 12:00 AM	22.7				NTU	F
0118	Turbidity	5/4/2022 12:00 AM	14.3				NTU	F
0118	Turbidity	9/7/2022 12:00 AM	19				NTU	F
0118	Turbidity	10/24/2022 12:00 AM	32.3				NTU	F
0118	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Vinyl chloride	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0118	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Dissolved Oxygen	1/24/2022 12:00 AM	7.84				mg/L	F
0124	Dissolved Oxygen	5/4/2022 12:00 AM	7.47				mg/L	F
0124	Dissolved Oxygen	8/2/2022 12:00 AM	2.82				mg/L	F
0124	Dissolved Oxygen	10/24/2022 12:00 AM	1.22				mg/L	F
0124	Oxidation Reduction Potential	1/24/2022 12:00 AM	247.6				mV	F
0124	Oxidation Reduction Potential	5/4/2022 12:00 AM	277.3				mV	F
0124	Oxidation Reduction Potential	8/2/2022 12:00 AM	296.1				mV	F
0124	Oxidation Reduction Potential	10/24/2022 12:00 AM	337				mV	F
0124	pH	1/24/2022 12:00 AM	6.94				s.u.	F
0124	pH	5/4/2022 12:00 AM	7.05				s.u.	F
0124	pH	8/2/2022 12:00 AM	6.45				s.u.	F
0124	pH	10/24/2022 12:00 AM	6.44				s.u.	F
0124	Temperature	1/24/2022 12:00 AM	12.9				C	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0124	Temperature	5/4/2022 12:00 AM	13.2				C	F
0124	Temperature	8/2/2022 12:00 AM	15.2				C	F
0124	Temperature	10/24/2022 12:00 AM	14.3				C	F
0124	Tetrachloroethene	1/24/2022 12:00 AM	0.35	0.333	J		ug/L	F
0124	Tetrachloroethene	5/4/2022 12:00 AM	0.43	0.333	J		ug/L	F
0124	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Tetrachloroethene	10/24/2022 12:00 AM	0.42	0.333	J		ug/L	F
0124	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Trichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Trichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Turbidity	1/24/2022 12:00 AM	2.89				NTU	F
0124	Turbidity	5/4/2022 12:00 AM	2.06				NTU	F
0124	Turbidity	8/2/2022 12:00 AM	7.01				NTU	F
0124	Turbidity	10/24/2022 12:00 AM	12.2				NTU	F
0124	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0124	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Dissolved Oxygen	1/24/2022 12:00 AM	2				mg/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0126	Dissolved Oxygen	5/4/2022 12:00 AM	2.09				mg/L	F
0126	Dissolved Oxygen	8/2/2022 12:00 AM	0.56				mg/L	F
0126	Dissolved Oxygen	10/24/2022 12:00 AM	0.52				mg/L	F
0126	Oxidation Reduction Potential	1/24/2022 12:00 AM	243.4				mV	F
0126	Oxidation Reduction Potential	5/4/2022 12:00 AM	245.4				mV	F
0126	Oxidation Reduction Potential	8/2/2022 12:00 AM	300.4				mV	F
0126	Oxidation Reduction Potential	10/24/2022 12:00 AM	363.6				mV	F
0126	pH	1/24/2022 12:00 AM	6.94				s.u.	F
0126	pH	5/4/2022 12:00 AM	7.07				s.u.	F
0126	pH	8/2/2022 12:00 AM	6.55				s.u.	F
0126	pH	10/24/2022 12:00 AM	6.39				s.u.	F
0126	Temperature	1/24/2022 12:00 AM	12.7				C	F
0126	Temperature	5/4/2022 12:00 AM	13.4				C	F
0126	Temperature	8/2/2022 12:00 AM	15.5				C	F
0126	Temperature	10/24/2022 12:00 AM	14.1				C	F
0126	Tetrachloroethene	1/24/2022 12:00 AM	0.96	0.333	J		ug/L	F
0126	Tetrachloroethene	5/4/2022 12:00 AM	1.03	0.333			ug/L	F
0126	Tetrachloroethene	8/2/2022 12:00 AM	0.68	0.333	J		ug/L	F
0126	Tetrachloroethene	10/24/2022 12:00 AM	1.01	0.333			ug/L	F
0126	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Trichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Trichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Turbidity	1/24/2022 12:00 AM	1.5				NTU	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0126	Turbidity	5/4/2022 12:00 AM	1.47				NTU	F
0126	Turbidity	8/2/2022 12:00 AM	9.58				NTU	F
0126	Turbidity	10/24/2022 12:00 AM	1.38				NTU	F
0126	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0126	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Dissolved Oxygen	1/24/2022 12:00 AM	5.19				mg/L	F
0138	Dissolved Oxygen	5/4/2022 12:00 AM	5.08				mg/L	F
0138	Dissolved Oxygen	8/2/2022 12:00 AM	2.84				mg/L	F
0138	Dissolved Oxygen	10/24/2022 12:00 AM	4.2				mg/L	F
0138	Oxidation Reduction Potential	1/24/2022 12:00 AM	224.9				mV	F
0138	Oxidation Reduction Potential	5/4/2022 12:00 AM	237				mV	F
0138	Oxidation Reduction Potential	8/2/2022 12:00 AM	267.8				mV	F
0138	Oxidation Reduction Potential	10/24/2022 12:00 AM	318.7				mV	F
0138	pH	1/24/2022 12:00 AM	7.17				s.u.	F
0138	pH	5/4/2022 12:00 AM	7.3				s.u.	F
0138	pH	8/2/2022 12:00 AM	6.65				s.u.	F
0138	pH	10/24/2022 12:00 AM	6.67				s.u.	F
0138	Temperature	1/24/2022 12:00 AM	11.8				C	F
0138	Temperature	5/4/2022 12:00 AM	12.6				C	F
0138	Temperature	8/2/2022 12:00 AM	16.2				C	F
0138	Temperature	10/24/2022 12:00 AM	15				C	F
0138	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0138	Tetrachloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Trichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Trichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Turbidity	1/24/2022 12:00 AM	47.6				NTU	F
0138	Turbidity	5/4/2022 12:00 AM	6.43				NTU	F
0138	Turbidity	8/2/2022 12:00 AM	11.1				NTU	F
0138	Turbidity	10/24/2022 12:00 AM	19				NTU	F
0138	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0138	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Dissolved Oxygen	1/25/2022 12:00 AM	2.26				mg/L	F
0346	Dissolved Oxygen	5/4/2022 12:00 AM	4.82				mg/L	F
0346	Dissolved Oxygen	8/2/2022 12:00 AM	0.28				mg/L	F
0346	Dissolved Oxygen	10/24/2022 12:00 AM	0.25				mg/L	F
0346	Oxidation Reduction Potential	1/25/2022 12:00 AM	179.1				mV	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0346	Oxidation Reduction Potential	5/4/2022 12:00 AM	280.3				mV	F
0346	Oxidation Reduction Potential	8/2/2022 12:00 AM	250.4				mV	F
0346	Oxidation Reduction Potential	10/24/2022 12:00 AM	-46				mV	F
0346	pH	1/25/2022 12:00 AM	7.2				s.u.	F
0346	pH	5/4/2022 12:00 AM	7.5				s.u.	F
0346	pH	8/2/2022 12:00 AM	6.46				s.u.	F
0346	pH	10/24/2022 12:00 AM	6.69				s.u.	F
0346	Temperature	1/25/2022 12:00 AM	13.1				C	F
0346	Temperature	5/4/2022 12:00 AM	13				C	F
0346	Temperature	8/2/2022 12:00 AM	15.6				C	F
0346	Temperature	10/24/2022 12:00 AM	14.7				C	F
0346	Tetrachloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Tetrachloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Trichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Trichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Turbidity	1/25/2022 12:00 AM	27.5				NTU	F
0346	Turbidity	5/4/2022 12:00 AM	11.7				NTU	F
0346	Turbidity	8/2/2022 12:00 AM	9.89				NTU	F
0346	Turbidity	10/24/2022 12:00 AM	17.4				NTU	F
0346	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0346	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0346	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	cis-1,2-Dichloroethene	8/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Dissolved Oxygen	1/25/2022 12:00 AM	0.4				mg/L	F
0347	Dissolved Oxygen	5/5/2022 12:00 AM	3.74				mg/L	F
0347	Dissolved Oxygen	8/3/2022 12:00 AM	0.22				mg/L	F
0347	Dissolved Oxygen	10/24/2022 12:00 AM	7.83				mg/L	F
0347	Oxidation Reduction Potential	1/25/2022 12:00 AM	-25.5				mV	F
0347	Oxidation Reduction Potential	5/5/2022 12:00 AM	-62.1				mV	F
0347	Oxidation Reduction Potential	8/3/2022 12:00 AM	-49.5				mV	F
0347	Oxidation Reduction Potential	10/24/2022 12:00 AM	-37.1				mV	F
0347	pH	1/25/2022 12:00 AM	6.85				s.u.	F
0347	pH	5/5/2022 12:00 AM	6.98				s.u.	F
0347	pH	8/3/2022 12:00 AM	6.18				s.u.	F
0347	pH	10/24/2022 12:00 AM	6.85				s.u.	F
0347	Temperature	1/25/2022 12:00 AM	13.1				C	F
0347	Temperature	5/5/2022 12:00 AM	13.7				C	F
0347	Temperature	8/3/2022 12:00 AM	16				C	F
0347	Temperature	10/24/2022 12:00 AM	14.4				C	F
0347	Tetrachloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	Tetrachloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	D

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0347	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Tetrachloroethene	8/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	trans-1,2-Dichloroethene	8/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Trichloroethene	1/25/2022 12:00 AM	14.9	0.333			ug/L	F
0347	Trichloroethene	1/25/2022 12:00 AM	14.8	0.333			ug/L	D
0347	Trichloroethene	5/5/2022 12:00 AM	10.9	0.333			ug/L	F
0347	Trichloroethene	5/5/2022 12:00 AM	9.95	0.333			ug/L	D
0347	Trichloroethene	8/3/2022 12:00 AM	17.7	0.333			ug/L	F
0347	Trichloroethene	10/24/2022 12:00 AM	22	0.333			ug/L	F
0347	Turbidity	1/25/2022 12:00 AM	22.4				NTU	F
0347	Turbidity	5/5/2022 12:00 AM	13.9				NTU	F
0347	Turbidity	8/3/2022 12:00 AM	21.7				NTU	F
0347	Turbidity	10/24/2022 12:00 AM	8.54				NTU	F
0347	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	D
0347	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Vinyl chloride	8/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0347	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	1/27/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	cis-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	7/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	D
0379	cis-1,2-Dichloroethene	10/27/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Dissolved Oxygen	1/25/2022 12:00 AM	3.03				mg/L	F
0379	Dissolved Oxygen	1/27/2022 12:00 AM	1				mg/L	F
0379	Dissolved Oxygen	5/3/2022 12:00 AM	5.43				mg/L	F
0379	Dissolved Oxygen	5/4/2022 12:00 AM	5.58				mg/L	F
0379	Dissolved Oxygen	7/26/2022 12:00 AM	3.41				mg/L	F
0379	Dissolved Oxygen	8/2/2022 12:00 AM	0.55				mg/L	F
0379	Dissolved Oxygen	10/24/2022 12:00 AM	0.72				mg/L	F
0379	Dissolved Oxygen	10/27/2022 12:00 AM	1.74				mg/L	F
0379	Oxidation Reduction Potential	1/25/2022 12:00 AM	41.3				mV	F
0379	Oxidation Reduction Potential	1/27/2022 12:00 AM	11.1				mV	F
0379	Oxidation Reduction Potential	5/3/2022 12:00 AM	12.8				mV	F
0379	Oxidation Reduction Potential	5/4/2022 12:00 AM	175.2				mV	F
0379	Oxidation Reduction Potential	7/26/2022 12:00 AM	613.6				mV	F
0379	Oxidation Reduction Potential	8/2/2022 12:00 AM	162.2				mV	F
0379	Oxidation Reduction Potential	10/24/2022 12:00 AM	286.6				mV	F
0379	Oxidation Reduction Potential	10/27/2022 12:00 AM	357.2				mV	F
0379	pH	1/25/2022 12:00 AM	6.99				s.u.	F
0379	pH	1/27/2022 12:00 AM	7.03				s.u.	F
0379	pH	5/3/2022 12:00 AM	7.28				s.u.	F
0379	pH	5/4/2022 12:00 AM	7.26				s.u.	F
0379	pH	7/26/2022 12:00 AM	6.79				s.u.	F
0379	pH	8/2/2022 12:00 AM	6.63				s.u.	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	pH	10/24/2022 12:00 AM	6.7				s.u.	F
0379	pH	10/27/2022 12:00 AM	6.58				s.u.	F
0379	Temperature	1/25/2022 12:00 AM	12.7				C	F
0379	Temperature	1/27/2022 12:00 AM	12.3				C	F
0379	Temperature	5/3/2022 12:00 AM	14.6				C	F
0379	Temperature	5/4/2022 12:00 AM	14.3				C	F
0379	Temperature	7/26/2022 12:00 AM	15.1				C	F
0379	Temperature	8/2/2022 12:00 AM	17.6				C	F
0379	Temperature	10/24/2022 12:00 AM	16.3				C	F
0379	Temperature	10/27/2022 12:00 AM	14.1				C	F
0379	Tetrachloroethene	1/25/2022 12:00 AM	0.37	0.333	J		ug/L	F
0379	Tetrachloroethene	1/27/2022 12:00 AM	0.37	0.333	J		ug/L	F
0379	Tetrachloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Tetrachloroethene	5/4/2022 12:00 AM	0.37	0.333	J		ug/L	F
0379	Tetrachloroethene	7/26/2022 12:00 AM	0.38	0.333	J		ug/L	F
0379	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Tetrachloroethene	10/24/2022 12:00 AM	0.37	0.333	J		ug/L	D
0379	Tetrachloroethene	10/27/2022 12:00 AM	0.46	0.333	J		ug/L	F
0379	trans-1,2-Dichloroethene	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	1/27/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	7/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	D
0379	trans-1,2-Dichloroethene	10/27/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	Trichloroethene	1/25/2022 12:00 AM	0.53	0.333	J		ug/L	F
0379	Trichloroethene	1/27/2022 12:00 AM	0.52	0.333	J		ug/L	F
0379	Trichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Trichloroethene	5/4/2022 12:00 AM	0.51	0.333	J		ug/L	F
0379	Trichloroethene	7/26/2022 12:00 AM	0.47	0.333	J		ug/L	F
0379	Trichloroethene	8/2/2022 12:00 AM	0.38	0.333	J		ug/L	F
0379	Trichloroethene	10/24/2022 12:00 AM	0.5	0.333	J		ug/L	F
0379	Trichloroethene	10/24/2022 12:00 AM	0.34	0.333	J		ug/L	D
0379	Trichloroethene	10/27/2022 12:00 AM	0.53	0.333	J		ug/L	F
0379	Turbidity	1/25/2022 12:00 AM	22.4				NTU	F
0379	Turbidity	1/27/2022 12:00 AM	49.5				NTU	F
0379	Turbidity	5/3/2022 12:00 AM	26.5				NTU	F
0379	Turbidity	5/4/2022 12:00 AM	33.8				NTU	F
0379	Turbidity	7/26/2022 12:00 AM	31.6				NTU	F
0379	Turbidity	8/2/2022 12:00 AM	29.5				NTU	F
0379	Turbidity	10/24/2022 12:00 AM	58.9				NTU	F
0379	Turbidity	10/27/2022 12:00 AM	17.9				NTU	F
0379	Vinyl chloride	1/25/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	1/27/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	5/4/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	7/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0379	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	D
0379	Vinyl chloride	10/27/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	cis-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0386	cis-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Dissolved Oxygen	1/26/2022 12:00 AM	1.78				mg/L	F
0386	Dissolved Oxygen	5/5/2022 12:00 AM	2.9				mg/L	F
0386	Dissolved Oxygen	9/7/2022 12:00 AM	1.12				mg/L	F
0386	Dissolved Oxygen	10/24/2022 12:00 AM	4.25				mg/L	F
0386	Oxidation Reduction Potential	1/26/2022 12:00 AM	254.9				mV	F
0386	Oxidation Reduction Potential	5/5/2022 12:00 AM	184.9				mV	F
0386	Oxidation Reduction Potential	9/7/2022 12:00 AM	341				mV	F
0386	Oxidation Reduction Potential	10/24/2022 12:00 AM	172.4				mV	F
0386	pH	1/26/2022 12:00 AM	6.7				s.u.	F
0386	pH	5/5/2022 12:00 AM	6.99				s.u.	F
0386	pH	9/7/2022 12:00 AM	6.46				s.u.	F
0386	pH	10/24/2022 12:00 AM	6.57				s.u.	F
0386	Temperature	1/26/2022 12:00 AM	11.1				C	F
0386	Temperature	5/5/2022 12:00 AM	12.6				C	F
0386	Temperature	9/7/2022 12:00 AM	13.9				C	F
0386	Temperature	10/24/2022 12:00 AM	12.8				C	F
0386	Tetrachloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Tetrachloroethene	9/7/2022 12:00 AM	0.36	0.333	J		ug/L	F
0386	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	trans-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	trans-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Trichloroethene	1/26/2022 12:00 AM	0.77	0.333	J		ug/L	F
0386	Trichloroethene	5/5/2022 12:00 AM	0.35	0.333	J		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0386	Trichloroethene	9/7/2022 12:00 AM	0.54	0.333	J		ug/L	F
0386	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Turbidity	1/26/2022 12:00 AM	13.8				NTU	F
0386	Turbidity	5/5/2022 12:00 AM	9.87				NTU	F
0386	Turbidity	9/7/2022 12:00 AM	5.28				NTU	F
0386	Turbidity	10/24/2022 12:00 AM	3.09				NTU	F
0386	Vinyl chloride	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Vinyl chloride	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0386	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	cis-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	cis-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Dissolved Oxygen	1/26/2022 12:00 AM	0.59				mg/L	F
0387	Dissolved Oxygen	5/5/2022 12:00 AM	7.22				mg/L	F
0387	Dissolved Oxygen	9/7/2022 12:00 AM	0.24				mg/L	F
0387	Dissolved Oxygen	10/24/2022 12:00 AM	2.76				mg/L	F
0387	Oxidation Reduction Potential	1/26/2022 12:00 AM	258.2				mV	F
0387	Oxidation Reduction Potential	5/5/2022 12:00 AM	213.1				mV	F
0387	Oxidation Reduction Potential	9/7/2022 12:00 AM	364.1				mV	F
0387	Oxidation Reduction Potential	10/24/2022 12:00 AM	196.3				mV	F
0387	pH	1/26/2022 12:00 AM	6.85				s.u.	F
0387	pH	5/5/2022 12:00 AM	7.08				s.u.	F
0387	pH	9/7/2022 12:00 AM	6.46				s.u.	F
0387	pH	10/24/2022 12:00 AM	6.03				s.u.	F
0387	Temperature	1/26/2022 12:00 AM	11.9				C	F
0387	Temperature	5/5/2022 12:00 AM	13.2				C	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0387	Temperature	9/7/2022 12:00 AM	13.5				C	F
0387	Temperature	10/24/2022 12:00 AM	13.3				C	F
0387	Tetrachloroethene	1/26/2022 12:00 AM	0.42	0.333	J		ug/L	F
0387	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Tetrachloroethene	9/7/2022 12:00 AM	0.42	0.333	J		ug/L	F
0387	Tetrachloroethene	10/24/2022 12:00 AM	0.38	0.333	J		ug/L	F
0387	trans-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	trans-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Trichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Trichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Trichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Turbidity	1/26/2022 12:00 AM	2.98				NTU	F
0387	Turbidity	5/5/2022 12:00 AM	9.23				NTU	F
0387	Turbidity	9/7/2022 12:00 AM	4.06				NTU	F
0387	Turbidity	10/24/2022 12:00 AM	1.69				NTU	F
0387	Vinyl chloride	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Vinyl chloride	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0387	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	cis-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	cis-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Dissolved Oxygen	1/26/2022 12:00 AM	3.24				mg/L	F
0389	Dissolved Oxygen	5/5/2022 12:00 AM	3.32				mg/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0389	Dissolved Oxygen	9/7/2022 12:00 AM	0.94				mg/L	F
0389	Dissolved Oxygen	10/24/2022 12:00 AM	2.11				mg/L	F
0389	Oxidation Reduction Potential	1/26/2022 12:00 AM	239.1				mV	F
0389	Oxidation Reduction Potential	5/5/2022 12:00 AM	213.5				mV	F
0389	Oxidation Reduction Potential	9/7/2022 12:00 AM	314.6				mV	F
0389	Oxidation Reduction Potential	10/24/2022 12:00 AM	136.6				mV	F
0389	pH	1/26/2022 12:00 AM	6.83				s.u.	F
0389	pH	5/5/2022 12:00 AM	7				s.u.	F
0389	pH	9/7/2022 12:00 AM	6.61				s.u.	F
0389	pH	10/24/2022 12:00 AM	7.12				s.u.	F
0389	Temperature	1/26/2022 12:00 AM	10.5				C	F
0389	Temperature	5/5/2022 12:00 AM	12.9				C	F
0389	Temperature	9/7/2022 12:00 AM	15.5				C	F
0389	Temperature	10/24/2022 12:00 AM	13.6				C	F
0389	Tetrachloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Tetrachloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	trans-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	trans-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Trichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Trichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Trichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Turbidity	1/26/2022 12:00 AM	15.1				NTU	F
0389	Turbidity	5/5/2022 12:00 AM	5.48				NTU	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0389	Turbidity	9/7/2022 12:00 AM	9.97				NTU	F
0389	Turbidity	10/24/2022 12:00 AM	7.49				NTU	F
0389	Vinyl chloride	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Vinyl chloride	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0389	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	cis-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	cis-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	cis-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	cis-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Dissolved Oxygen	1/26/2022 12:00 AM	4.45				mg/L	F
0392	Dissolved Oxygen	5/5/2022 12:00 AM	4.17				mg/L	F
0392	Dissolved Oxygen	9/7/2022 12:00 AM	1.79				mg/L	F
0392	Dissolved Oxygen	10/24/2022 12:00 AM	2				mg/L	F
0392	Oxidation Reduction Potential	1/26/2022 12:00 AM	256.8				mV	F
0392	Oxidation Reduction Potential	5/5/2022 12:00 AM	228.5				mV	F
0392	Oxidation Reduction Potential	9/7/2022 12:00 AM	389.8				mV	F
0392	Oxidation Reduction Potential	10/24/2022 12:00 AM	215.5				mV	F
0392	pH	1/26/2022 12:00 AM	6.8				s.u.	F
0392	pH	5/5/2022 12:00 AM	6.96				s.u.	F
0392	pH	9/7/2022 12:00 AM	6.31				s.u.	F
0392	pH	10/24/2022 12:00 AM	5.41				s.u.	F
0392	Temperature	1/26/2022 12:00 AM	10.2				C	F
0392	Temperature	5/5/2022 12:00 AM	13.6				C	F
0392	Temperature	9/7/2022 12:00 AM	14.8				C	F
0392	Temperature	10/24/2022 12:00 AM	15.9				C	F
0392	Tetrachloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Tetrachloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-2. Parcels 6, 7, and 8 Groundwater Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0392	Tetrachloroethene	9/7/2022 12:00 AM	0.39	0.333	J		ug/L	F
0392	Tetrachloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	trans-1,2-Dichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	trans-1,2-Dichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	trans-1,2-Dichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	trans-1,2-Dichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Trichloroethene	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Trichloroethene	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Trichloroethene	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Trichloroethene	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Turbidity	1/26/2022 12:00 AM	7.55				NTU	F
0392	Turbidity	5/5/2022 12:00 AM	1.65				NTU	F
0392	Turbidity	9/7/2022 12:00 AM	12.2				NTU	F
0392	Turbidity	10/24/2022 12:00 AM	6.11				NTU	F
0392	Vinyl chloride	1/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Vinyl chloride	5/5/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Vinyl chloride	9/7/2022 12:00 AM	0.333	0.333	U		ug/L	F
0392	Vinyl chloride	10/24/2022 12:00 AM	0.333	0.333	U		ug/L	F

Abbreviations:

C = Celsius

D = analyte determined in diluted sample

F = low-flow sampling method used

J = estimated value

µg/L = micrograms per liter

mg/L = milligrams per liter

mV = millivolts

NTU = nephelometric turbidity unit

s.u. = standard unit

U = analytical result below detection limit

Table D-3. Seep Data

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0601	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.34	0.333	J		ug/L	F
0601	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	cis-1,2-Dichloroethene	10/26/2022 12:00 AM	0.86	0.333	J		ug/L	F
0601	Dissolved Oxygen	1/24/2022 12:00 AM	5.81				mg/L	F
0601	Dissolved Oxygen	5/3/2022 12:00 AM	3.82				mg/L	F
0601	Dissolved Oxygen	8/2/2022 12:00 AM	4.57				mg/L	F
0601	Dissolved Oxygen	10/26/2022 12:00 AM	9.3				mg/L	F
0601	Oxidation Reduction Potential	1/24/2022 12:00 AM	123.6				mV	F
0601	Oxidation Reduction Potential	5/3/2022 12:00 AM	236.5				mV	F
0601	Oxidation Reduction Potential	8/2/2022 12:00 AM	90.6				mV	F
0601	Oxidation Reduction Potential	10/26/2022 12:00 AM	323.9				mV	F
0601	pH	1/24/2022 12:00 AM	7.17				s.u.	F
0601	pH	5/3/2022 12:00 AM	7.12				s.u.	F
0601	pH	8/2/2022 12:00 AM	7.14				s.u.	F
0601	pH	10/26/2022 12:00 AM	7.64				s.u.	F
0601	Temperature	1/24/2022 12:00 AM	12				C	F
0601	Temperature	5/3/2022 12:00 AM	12.6				C	F
0601	Temperature	8/2/2022 12:00 AM	16				C	F
0601	Temperature	10/26/2022 12:00 AM	13.8				C	F
0601	Tetrachloroethene	1/24/2022 12:00 AM	8.98	0.333			ug/L	F
0601	Tetrachloroethene	5/3/2022 12:00 AM	9.57	0.333			ug/L	F
0601	Tetrachloroethene	8/2/2022 12:00 AM	3.37	0.333			ug/L	F
0601	Tetrachloroethene	10/26/2022 12:00 AM	0.86	0.333	J		ug/L	F
0601	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	trans-1,2-Dichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	Trichloroethene	1/24/2022 12:00 AM	0.64	0.333	J		ug/L	F
0601	Trichloroethene	5/3/2022 12:00 AM	0.51	0.333	J		ug/L	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0601	Trichloroethene	8/2/2022 12:00 AM	0.5	0.333	J		ug/L	F
0601	Trichloroethene	10/26/2022 12:00 AM	0.39	0.333	J		ug/L	F
0601	Turbidity	1/24/2022 12:00 AM	32.9				NTU	F
0601	Turbidity	5/3/2022 12:00 AM	171				NTU	F
0601	Turbidity	8/2/2022 12:00 AM	999				NTU	F
0601	Turbidity	10/26/2022 12:00 AM	653				NTU	F
0601	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0601	Vinyl chloride	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	cis-1,2-Dichloroethene	2/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Dissolved Oxygen	2/2/2022 12:00 AM	14.48				mg/L	F
0602	Dissolved Oxygen	5/3/2022 12:00 AM	6.52				mg/L	F
0602	Oxidation Reduction Potential	2/2/2022 12:00 AM	73.3				mV	F
0602	Oxidation Reduction Potential	5/3/2022 12:00 AM	213.9				mV	F
0602	pH	2/2/2022 12:00 AM	8.17				s.u.	F
0602	pH	5/3/2022 12:00 AM	7.31				s.u.	F
0602	Temperature	2/2/2022 12:00 AM	4.7				C	F
0602	Temperature	5/3/2022 12:00 AM	15.3				C	F
0602	Tetrachloroethene	2/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Tetrachloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	trans-1,2-Dichloroethene	2/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Trichloroethene	2/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Trichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Turbidity	2/2/2022 12:00 AM	266				NTU	F
0602	Turbidity	5/3/2022 12:00 AM	388				NTU	F
0602	Vinyl chloride	2/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0602	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0605	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	cis-1,2-Dichloroethene	10/26/2022 12:00 AM	0.48	0.333	J		ug/L	F
0605	Dissolved Oxygen	1/24/2022 12:00 AM	9.02				mg/L	F
0605	Dissolved Oxygen	5/3/2022 12:00 AM	7.56				mg/L	F
0605	Dissolved Oxygen	8/2/2022 12:00 AM	2.25				mg/L	F
0605	Dissolved Oxygen	10/26/2022 12:00 AM	8.25				mg/L	F
0605	Oxidation Reduction Potential	1/24/2022 12:00 AM	233.2				mV	F
0605	Oxidation Reduction Potential	5/3/2022 12:00 AM	241.2				mV	F
0605	Oxidation Reduction Potential	8/2/2022 12:00 AM	-137.9				mV	F
0605	Oxidation Reduction Potential	10/26/2022 12:00 AM	229.6				mV	F
0605	pH	1/24/2022 12:00 AM	7.42				s.u.	F
0605	pH	5/3/2022 12:00 AM	7.33				s.u.	F
0605	pH	8/2/2022 12:00 AM	7.39				s.u.	F
0605	pH	10/26/2022 12:00 AM	7.67				s.u.	F
0605	Temperature	1/24/2022 12:00 AM	12.2				C	F
0605	Temperature	5/3/2022 12:00 AM	12				C	F
0605	Temperature	8/2/2022 12:00 AM	18.9				C	F
0605	Temperature	10/26/2022 12:00 AM	12.8				C	F
0605	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Tetrachloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Tetrachloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	trans-1,2-Dichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Trichloroethene	1/24/2022 12:00 AM	0.53	0.333	J		ug/L	F
0605	Trichloroethene	5/3/2022 12:00 AM	0.52	0.333	J		ug/L	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0605	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Trichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Turbidity	1/24/2022 12:00 AM	41.8				NTU	F
0605	Turbidity	5/3/2022 12:00 AM	96.7				NTU	F
0605	Turbidity	8/2/2022 12:00 AM	999				NTU	F
0605	Turbidity	10/26/2022 12:00 AM	999				NTU	F
0605	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0605	Vinyl chloride	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Dissolved Oxygen	1/24/2022 12:00 AM	12.25				mg/L	F
0606	Dissolved Oxygen	5/3/2022 12:00 AM	8.78				mg/L	F
0606	Dissolved Oxygen	8/2/2022 12:00 AM	5.95				mg/L	F
0606	Oxidation Reduction Potential	1/24/2022 12:00 AM	203.9				mV	F
0606	Oxidation Reduction Potential	5/3/2022 12:00 AM	238.6				mV	F
0606	Oxidation Reduction Potential	8/2/2022 12:00 AM	104.8				mV	F
0606	pH	1/24/2022 12:00 AM	7.73				s.u.	F
0606	pH	5/3/2022 12:00 AM	7.59				s.u.	F
0606	pH	8/2/2022 12:00 AM	7.79				s.u.	F
0606	Temperature	1/24/2022 12:00 AM	1.7				C	F
0606	Temperature	5/3/2022 12:00 AM	12.5				C	F
0606	Temperature	8/2/2022 12:00 AM	20.8				C	F
0606	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Tetrachloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0606	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Trichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Trichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Trichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Turbidity	1/24/2022 12:00 AM	999				NTU	F
0606	Turbidity	5/3/2022 12:00 AM	999				NTU	F
0606	Turbidity	8/2/2022 12:00 AM	999				NTU	F
0606	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0606	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	0.78	0.333	J		ug/L	F
0607	cis-1,2-Dichloroethene	5/3/2022 12:00 AM	0.67	0.333	J		ug/L	F
0607	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	cis-1,2-Dichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Dissolved Oxygen	1/24/2022 12:00 AM	7.66				mg/L	F
0607	Dissolved Oxygen	5/3/2022 12:00 AM	7.89				mg/L	F
0607	Dissolved Oxygen	8/2/2022 12:00 AM	9.35				mg/L	F
0607	Dissolved Oxygen	10/26/2022 12:00 AM	5.8				mg/L	F
0607	Oxidation Reduction Potential	1/24/2022 12:00 AM	1.6				mV	F
0607	Oxidation Reduction Potential	5/3/2022 12:00 AM	207.6				mV	F
0607	Oxidation Reduction Potential	8/2/2022 12:00 AM	227.2				mV	F
0607	Oxidation Reduction Potential	10/26/2022 12:00 AM	51.3				mV	F
0607	pH	1/24/2022 12:00 AM	7.65				s.u.	F
0607	pH	5/3/2022 12:00 AM	7.83				s.u.	F
0607	pH	8/2/2022 12:00 AM	7.35				s.u.	F
0607	pH	10/26/2022 12:00 AM	7.53				s.u.	F
0607	Temperature	1/24/2022 12:00 AM	3.9				C	F
0607	Temperature	5/3/2022 12:00 AM	12.5				C	F
0607	Temperature	8/2/2022 12:00 AM	15				C	F
0607	Temperature	10/26/2022 12:00 AM	14.5				C	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0607	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Tetrachloroethene	5/3/2022 12:00 AM	0.36	0.333	J		ug/L	F
0607	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Tetrachloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	trans-1,2-Dichloroethene	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	trans-1,2-Dichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Trichloroethene	1/24/2022 12:00 AM	0.92	0.333	J		ug/L	F
0607	Trichloroethene	5/3/2022 12:00 AM	1.06	0.333			ug/L	F
0607	Trichloroethene	8/2/2022 12:00 AM	0.39	0.333	J		ug/L	F
0607	Trichloroethene	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Turbidity	1/24/2022 12:00 AM	999				NTU	F
0607	Turbidity	5/3/2022 12:00 AM	632				NTU	F
0607	Turbidity	8/2/2022 12:00 AM	53.7				NTU	F
0607	Turbidity	10/26/2022 12:00 AM	999				NTU	F
0607	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Vinyl chloride	5/3/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0607	Vinyl chloride	10/26/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	cis-1,2-Dichloroethene	1/24/2022 12:00 AM	2.2	0.333			ug/L	F
0617	cis-1,2-Dichloroethene	8/2/2022 12:00 AM	0.69	0.333	J		ug/L	F
0617	Dissolved Oxygen	1/24/2022 12:00 AM	10.41				mg/L	F
0617	Dissolved Oxygen	8/2/2022 12:00 AM	3.21				mg/L	F
0617	Oxidation Reduction Potential	1/24/2022 12:00 AM	125.9				mV	F
0617	Oxidation Reduction Potential	8/2/2022 12:00 AM	42.5				mV	F
0617	pH	1/24/2022 12:00 AM	7.15				s.u.	F
0617	pH	8/2/2022 12:00 AM	7.08				s.u.	F
0617	Temperature	1/24/2022 12:00 AM	9.2				C	F
0617	Temperature	8/2/2022 12:00 AM	19.1				C	F

Table D-3. Seep Data (continued)

Location	Analyte	Sample Date	Value	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0617	Tetrachloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	Tetrachloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	trans-1,2-Dichloroethene	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	trans-1,2-Dichloroethene	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	Trichloroethene	1/24/2022 12:00 AM	7.83	0.333			ug/L	F
0617	Trichloroethene	8/2/2022 12:00 AM	1.74	0.333			ug/L	F
0617	Turbidity	1/24/2022 12:00 AM	53.2				NTU	F
0617	Turbidity	8/2/2022 12:00 AM	999				NTU	F
0617	Vinyl chloride	1/24/2022 12:00 AM	0.333	0.333	U		ug/L	F
0617	Vinyl chloride	8/2/2022 12:00 AM	0.333	0.333	U		ug/L	F

Abbreviations:

C = Celsius

F = low-flow sampling method used

J = estimated value

µg/L = micrograms per liter

mg/L = milligrams per liter

mV = millivolts

NTU = nephelometric turbidity unit

s.u. = standard unit

U = analytical result below detection limit

Appendix E

Data Assessment Reports

Data Review and Validation Report

General Information

Task Code:	MND01-01.2201022
Sample Event:	January 24 and February 2, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	568513 and 569313
Analysis:	Organics
Validator:	Samantha Tigar
Review Date:	May 10, 2022

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2201022-003	0126	Acetone	U	Less than 10 times the trip blank
MND01-01.2201022-014	0602	Acetone	U	Less than 10 times the trip blank
MND01-01.2201022-015	0605	Acetone	U	Less than 10 times the trip blank
MND01-01.2201022-016	0606	Acetone	U	Less than 10 times the trip blank

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2201022-017	0607	Acetone	U	Less than 10 times the trip blank
MND01-01.2201022-014	0602	Methylene chloride	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on January 26 and February 3, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 2 °C and 6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations of instruments VOA4 and VOA9 were performed on January 20, 2022, and December 17, 2021, respectively, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Some compound calibrations using average response factors had relative standard deviations greater than 15 percent. No other calibration criteria were exceeded for these compounds so no qualification is necessary. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and

continuing calibration verification checks were made at the required frequency. The CCVs for several analytes were out of the acceptance criteria. All associated sample results were less than the MDL or were qualified as not detected during validation, so no further qualification was necessary. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on March 14, 2022, which included corrected sample collection times. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Two trip blanks were submitted with these samples. Acetone, 2-butanone, and methylene chloride were detected in the trip blanks. Associated results greater than the MDL and less than 5 times the trip blank concentration (10 times for common laboratory contaminants) were qualified with a U flag as not detected.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

The acetone result for location 0607 was qualified during validation as not detected. The remaining results in question are all non-detects at location 0602 where the MDLs for the analytes were greater than in the past. None of the results were identified as outliers and the laboratory data from this event are acceptable as qualified.

Digitally signed by Samantha M. Tigar

Date: 2022.06.27 12:26:56 -06'00'

Report Prepared By: _____

Samantha Tigar
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 05/09/2022

Comparison to Historical Data Since: 1/1/2012 12:00:00 AM Fraction: Any

Task: MND01-01.2201022

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Ethylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Styrene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
cis-1,3-Dichloropropene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
trans-1,3-dichloropropene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
n-Propylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
n-Butylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
4-Chlorotoluene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,4-Dichlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,2-Dibromoethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
1,2-Dichloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
4-Methyl-2-Pentanone	0602	LB	ug/L	N	1.67	U	> HistMAX	0.5	0.5	25	No
1,3,5-Trimethylbenzene	0602	LB	ug/L	N	0.500	U	> HistMAX	0.1	0.16	25	No
Bromobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Chlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,2,4-Trichlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
Chlorodibromomethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Tetrachloroethene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Total Xylenes	0602	LB	ug/L	N	1.00	U	> HistMAX	0.16	0.2	25	No
sec-Butylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,3-Dichloropropane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
cis-1,2-Dichloroethene	0602	LB	ug/L	N	0.333	U	< HistMIN	0.58	42.3	25	No

Data Validation Outliers Report - No Field Parameters Report Date: 05/09/2022

Comparison to Historical Data Since: 1/1/2012 12:00:00 AM Fraction: Any

Task: MND01-01.2201022

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
1,3-Dichlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Carbon tetrachloride	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,1-Dichloropropene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
2-Hexanone	0602	LB	ug/L	N	1.67	U	> HistMAX	0.5	0.5	25	No
2,2-Dichloropropane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
1,1,1,2-Tetrachloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Chloroform	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Benzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,1,1-Trichloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Bromomethane	0602	LB	ug/L	N	0.337	U	> HistMAX	0.16	0.2	25	No
Chloromethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Dibromomethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
Bromochloromethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Chloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
Vinyl chloride	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Carbon Disulfide	0602	LB	ug/L	N	1.67	U	> HistMAX	0.25	0.5	25	No
Bromoform	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
Bromodichloromethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
1,1-Dichloroethene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Trichlorofluoromethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
Dichlorodifluoromethane	0602	LB	ug/L	N	0.355	U	> HistMAX	0.16	0.25	25	No
1,1,2-Trichloro-1,2,2-trifluoroethane	0602	LB	ug/L	N	2.98	U	> HistMAX	0.5	1.5	25	No

Data Validation Outliers Report - No Field Parameters
Report Date: 05/09/2022

Comparison to Historical Data Since: 1/1/2012 12:00:00 AM

Fraction: Any

Task: MND01-01.2201022

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
1,2-Dichloropropane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
1,1,2-Trichloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
1,1,2,2-Tetrachloroethane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.15	0.16	25	No
1,2,3-Trichlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.2	25	No
Hexachlorobutadiene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
Naphthalene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
2-Chlorotoluene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,2-Dichlorobenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
1,2,4-Trimethylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
1,2-Dibromo-3-chloropropane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.25	25	No
1,2,3-Trichloropropane	0602	LB	ug/L	N	0.333	U	> HistMAX	0.16	0.2	25	No
tert-Butylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
Isopropylbenzene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.16	25	No
p-Isopropyltoluene	0602	LB	ug/L	N	0.333	U	> HistMAX	0.1	0.2	25	No
Acetone	0607	LB	ug/L	N	7.09		> HistMAX	0.5	2.88	42	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2201022 **Lab Code:** GEN **Validator:** Samantha Tigar **Validation Date:** 05-09-2022

Project: LTS&M (Parcel 6-7-8)

Samples: 11

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 11 detection limits above the contract required limits.
Field Blanks:	There were 2 field blanks associated with this task.

Validation Report: Detection Limits

Page 1 of 2

09-May-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2201022

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2201022-001	0118	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-014	0602	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-016	0606	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-021	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201022-022	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Blanks

Page 1 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201022

Lab Code: GEN

09-May-2022

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2201022-021	0999	SW-846 8260	2-Butanone	1.81	J

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201022-001	0118	1.67	1	U	
MND01-01.2201022-002	0124	1.67	1	U	
MND01-01.2201022-003	0126	1.67	1	U	
MND01-01.2201022-004	0138	1.67	1	U	
MND01-01.2201022-013	0601	1.67	1	U	
MND01-01.2201022-015	0605	1.67	1	U	
MND01-01.2201022-016	0606	1.67	1	U	
MND01-01.2201022-017	0607	1.67	1	U	

Validation Report: Field Blanks

Page 2 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201022

Lab Code: GEN

09-May-2022

TB	MND01-01.2201022-021	0999	SW-846 8260	Acetone	9.19	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201022-001	0118	1.74	1	U	
MND01-01.2201022-002	0124	1.74	1	U	
MND01-01.2201022-003	0126	2.55	1	J	U
MND01-01.2201022-004	0138	1.74	1	U	
MND01-01.2201022-013	0601	1.74	1	U	
MND01-01.2201022-015	0605	2.24	1	J	U
MND01-01.2201022-016	0606	3.46	1	J	U
MND01-01.2201022-017	0607	7.09	1		U

Validation Report: Field Blanks

Page 3 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201022

Lab Code: GEN

09-May-2022

TB	MND01-01.2201022-022	0999	SW-846 8260	Acetone	4.57	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201022-014	0602	7.93	1		U

Validation Report: Field Blanks

Page 4 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201022

Lab Code: GEN

09-May-2022

TB	MND01-01.2201022-022	0999	SW-846 8260	Methylene chloride	0.840	BJ
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201022-014	0602	0.740	1	BJ	U

Organics Data Validation Summary

Page 1 of 1

09-May-2022

Task Code: MND01-01.2201022

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: All LCS/LCSD results were within the laboratory acceptance limits.

MS/MSD Performance: All MS/MSD results were within the laboratory acceptance limits.

Method Blank Performance: All method blanks were below the MDL.

Data Review and Validation Report

General Information

Task Code:	MND01-01.2201023
Sample Event:	January 25 and 26, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	568508 and 568653
Analysis:	Organics
Validator:	Samantha Tigar
Review Date:	June 27, 2022

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2201023-012	0392	Acetone	U	Less than 10 times the method blank
MND01-01.2201023-020	0999	Acetone	U	Less than 10 times the method blank
MND01-01.2201023-009	0386	Methylene chloride	U	Less than 10 times the method blank
MND01-01.2201023-010	0387	Methylene chloride	U	Less than 10 times the method blank

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2201023-011	0389	Methylene chloride	U	Less than 10 times the method blank
MND01-01.2201023-012	0392	Methylene chloride	U	Less than 10 times the method blank
MND01-01.2201023-020	0999	Methylene chloride	U	Less than 10 times the method blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on January 26 and 27, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations of instruments VOA4 and VOA9 were performed on January 20, 2022, and December 17, 2021, respectively, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Some compound calibrations using average response factors had relative standard deviations slightly greater than 15 percent. No other calibration criteria were exceeded for these compounds so no qualification is necessary. Linear or higher order regression calibrations had correlation

coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. The CCVs for several analytes were out of the acceptance criteria. All associated sample results were less than the MDL, so no further qualification was necessary. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration (10 times for common laboratory contaminants) are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes evaluated except dichlorodifluoromethane. All associated sample results were less than the MDL so no qualification was required.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated except bromoform. All associated sample results were less than the MDL so no qualification was required.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on March 14, 2022, which included corrected sample collection times. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Two trip blanks were submitted with these samples. Acetone and methylene chloride were detected in the trip blanks. The associated samples were previously qualified.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Four results at location 0315 were identified as outliers. The report was reviewed in detail and no errors were identified. The laboratory data from this event are acceptable as qualified.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0347. The duplicate results met

the criteria for all analytes, demonstrating acceptable overall precision.

Report Prepared By: Digitally signed by Samantha M. Tigar
Date: 2022.07.14 16:11:07 -06'00'

Samantha Tigar
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 05/09/2022

Comparison to Historical Data Since: 1/1/2012 12:00:00 AM Fraction: Any

Task: MND01-01.2201023

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
1,2,4-Trichlorobenzene	0315	LB	ug/L	N	0.360	J	> HistMAX	0.16	0.333	45	Yes
1,2,3-Trichlorobenzene	0315	LB	ug/L	N	0.500	J	> HistMAX	0.1	0.333	45	Yes
Hexachlorobutadiene	0315	LB	ug/L	N	0.400	J	> HistMAX	0.16	0.333	45	Yes
Naphthalene	0315	LB	ug/L	N	0.550	J	> HistMAX	0.16	0.333	45	Yes
Tetrachloroethene	0387	LB	ug/L	N	0.420	J	> HistMAX	0.16	0.35	40	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2201023 **Lab Code:** GEN **Validator:** Samantha Tigar **Validation Date:** 06-27-2022

Project: LTS&M (Parcel 6-7-8)

Samples: 11

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 11 detection limits above the contract required limits.
Field Blanks:	There were 2 field blanks associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Detection Limits

Page 1 of 2

27-Jun-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2201023-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-008	0379	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2201023-020	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

27-Jun-2022

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2201023-019	0999	SW-846 8260	Acetone	8.21	B

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201023-005	0315	1.74	1	U	
MND01-01.2201023-006	0346	1.74	1	U	
MND01-01.2201023-007	0347	1.74	1	U	
MND01-01.2201023-008	0379	1.74	1	U	
MND01-01.2201023-018	0347	1.74	1	U	

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

27-Jun-2022

TB	MND01-01.2201023-020	0999	SW-846 8260	Acetone	5.46	B
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201023-009	0386	1.74	1	U	
MND01-01.2201023-010	0387	1.74	1	U	
MND01-01.2201023-011	0389	1.74	1	U	
MND01-01.2201023-012	0392	1.92	1	BJ	U

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

27-Jun-2022

TB	MND01-01.2201023-020	0999	SW-846 8260	Methylene chloride	0.660	BJ
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2201023-009	0386	0.620	1	BJ	U
MND01-01.2201023-010	0387	0.620	1	BJ	U
MND01-01.2201023-011	0389	0.620	1	BJ	U
MND01-01.2201023-012	0392	0.560	1	BJ	U

Validation Report: Field Duplicates

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27-Jun-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

Duplicate: MND01-01.2201023-018					Sample: MND01-01.2201023-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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27-Jun-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

Duplicate: MND01-01.2201023-018					Sample: MND01-01.2201023-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	1.74	U		1	1.74	U		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.600	J		1	0.600	J		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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27-Jun-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

Duplicate: MND01-01.2201023-018					Sample: MND01-01.2201023-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.380	J		1	0.380	J		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	0.333	U		1	0.333	U		1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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27-Jun-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2201023

Lab Code: GEN

Duplicate: MND01-01.2201023-018					Sample: MND01-01.2201023-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	14.8			1	14.9			1	0.7		ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Organics Data Validation Summary

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27-Jun-2022

Task Code: MND01-01.2201023

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: There was 1 LCS/LCSD result outside the laboratory acceptance limits.

MS/MSD Performance: There was 1 MS/MSD result outside the laboratory acceptance limits.

Method Blank Performance: There were 3 method blank results above the MDL.

Noncompliance Report: LCS/LCSD Performance

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27-Jun-2022

Task Code: MND01-01.2201023

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	LCS Recovery	LCSD recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	01-31-2022	SW-846 8260	Bromoform	145		69	130			

Noncompliance Report: MS/MSD Performance

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27-Jun-2022

Task Code: MND01-01.2201023

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	MS Recovery	MSD Recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	01-31-2022	SW-846 8260	Dichlorodifluoromethane		160	42	155	5	20	

Noncompliance Report: Method Blanks

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27-Jun-2022

Task Code: MND01-01.2201023

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	01-31-2022	SW-846 8260	Acetone	2.02	J	
	01-31-2022	SW-846 8260	Methylene chloride	0.740	J	
	01-31-2022	SW-846 8260	Naphthalene	0.340	J	

Data Review and Validation Report

General Information

Task Code:	MND01-01.2205024
Sample Event:	May 3 and 4, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	578846
Analysis:	Organics
Validator:	Daniel Ohlson
Review Date:	July 14, 2022

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2205024-014	0602	Acetone	U	Less than 10 times the trip blank
MND01-01.2205024-016	0606	Acetone	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 13 water samples on May 5, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations were performed on April 19, 2022, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. All target compound calibrations using average response factors had relative standard deviations less than 15 percent. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. The CCVs for all analytes were within the acceptance criteria. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on June 16, 2022, which included corrected sample locations. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Two trip blanks were submitted with these samples. Acetone and 2-butanone were detected in the trip blanks. Associated results greater than the MDL and less than 5 times the trip blank concentration (10 times for common laboratory contaminants) were qualified with a U flag as not detected.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results were identified as outliers. The report was reviewed in detail and no errors were identified. The laboratory data from this event are acceptable as qualified.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. No field duplicates were collected for this task.

Report Prepared By: **Daniel T. Ohlson**
Digitally signed by Daniel T. Ohlson
Date: 2022.07.14 10:19:59 -06'00'
Daniel Ohlson
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 07/14/2022

Comparison to Historical Data Since: 7/14/2011 12:00:00 AM Fraction: Any

Task: MND01-01.2205024

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Toluene-d8	0118	LB	ug/L	N	55.4		> HistMAX	45.4	53.2	15	No
Toluene-d8	0124	LB	ug/L	N	55.5		> HistMAX	44.5	54.4	15	No
1,2-Dichloroethane-d4	0126	LB	ug/L	N	56.9		> HistMAX	47.8	56.8	15	No
Toluene-d8	0126	LB	ug/L	N	56.3		> HistMAX	45.3	54	15	No
Toluene-d8	0138	LB	ug/L	N	56.3		> HistMAX	43.9	52.7	15	No
1,2-Dichloroethane-d4	0346	LB	ug/L	N	57.1		> HistMAX	46.6	56.1	15	No
Toluene-d8	0346	LB	ug/L	N	54.8		> HistMAX	46.4	52.2	15	No
Toluene-d8	0379	LB	ug/L	N	56.9		> HistMAX	45.3	52.8	33	No
1,2-Dichloroethane-d4	0601	LB	ug/L	N	57.6		> HistMAX	43.6	56	16	No
Toluene-d8	0601	LB	ug/L	N	56.4		> HistMAX	45.8	53.4	16	No
Toluene-d8	0602	LB	ug/L	N	56.1		> HistMAX	47	52.5	9	No
Toluene-d8	0605	LB	ug/L	N	56.9		> HistMAX	45.1	53	16	No
1,2-Dichloroethane-d4	0606	LB	ug/L	N	58.6		> HistMAX	42.7	55.3	15	No
Toluene-d8	0606	LB	ug/L	N	57.2		> HistMAX	45.8	53.8	15	No
Tetrachloroethene	0607	LB	ug/L	N	0.360	J	> HistMAX	0.16	0.333	45	No
1,2-Dichloroethane-d4	0607	LB	ug/L	N	59.0		> HistMAX	45.6	56	16	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2205024 **Lab Code:** GEN **Validator:** Daniel Ohlson **Validation Date:** 07-14-2022

Project: LTS&M (Parcel 6-7-8)

Samples: 13

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 13 detection limits above the contract required limits.
Field Blanks:	There were 2 field blanks associated with this task.
Field Duplicates:	There are no duplicates associated with this task.

Validation Report: Detection Limits

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14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2205024

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2205024-001	0118	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-008	0379	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-014	0602	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-016	0606	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-021	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205024-022	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Blanks

Page 1 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205024

Lab Code: GEN

14-Jul-2022

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2205024-021	0999	SW-846 8260	2-Butanone	2.64	J

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Page 2 of 4

14-Jul-2022

Validation Qualifier

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205024

Lab Code: GEN

14-Jul-2022

TB	MND01-01.2205024-022	0999	SW-846 8260	2-Butanone	2.90	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Validation Report: Field Blanks

Page 4 of 4

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205024

Lab Code: GEN

14-Jul-2022

TB

MND01-01.2205024-022

0999

SW-846 8260

Acetone

35.1

Associated Samples:

Sample Code

Location

Result

Dilution

Lab Qualifiers

Validation Qualifier

Organics Data Validation Summary

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14-Jul-2022

Task Code: MND01-01.2205024

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: All LCS/LCSD results were within the laboratory acceptance limits.

MS/MSD Performance: All MS/MSD results were within the laboratory acceptance limits.

Method Blank Performance: All method blanks were below the MDL.

Data Review and Validation Report

General Information

Task Code:	MND01-01.2205025
Sample Event:	May 5, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	579077
Analysis:	Organics
Validator:	Daniel Ohlson
Review Date:	July 14, 2022

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

No analytical results required qualification.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received eight water samples on May 6, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 2 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations were performed on March 7, 2022, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. All target compound calibrations using average response factors had relative standard deviations less than 15 percent. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. The CCVs for all analytes were within the acceptance criteria. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and

during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated. All associated sample results were less than the MDL so no qualification was required.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on June 17, 2022, which included corrected location codes. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. One trip blank was submitted with these samples. Acetone was detected in the trip blank. Associated results greater than the MDL and less than 5 times the trip blank

concentration (10 times for common laboratory contaminants) were qualified with a U flag as not detected. No acetone results were greater than the MDL, so no qualification was necessary.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No results were identified as outliers. The laboratory data from this event are acceptable as qualified.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0347. The duplicate results met the criteria for all analytes, demonstrating acceptable overall precision.

Report Prepared By: Daniel T. Ohlson Digitally signed by Daniel T. Ohlson
Date: 2022.07.14 13:15:24 -06'00'

Daniel Ohlson
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 07/14/2022

Comparison to Historical Data Since: 7/14/2011 12:00:00 AM Fraction: Any

Task: MND01-01.2205025

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Toluene-d8	0315	LB	ug/L	N	53.8		> HistMAX	44.8	53.3	17	No
Toluene-d8	0386	LB	ug/L	N	53.9		> HistMAX	44.2	51.7	16	No
Trichloroethene	0386	LB	ug/L	N	0.350	J	< HistMIN	0.51	3.04	44	No
1,2-Dichloroethane-d4	0389	LB	ug/L	N	56.4		> HistMAX	44.1	56.3	15	No
Toluene-d8	0389	LB	ug/L	N	54.8		> HistMAX	44.8	52.7	15	No
Toluene-d8	0392	LB	ug/L	N	53.6		> HistMAX	44.7	53.4	15	No
Toluene-d8	0347	LB	ug/L	N	54.3		> HistMAX	45.9	54	26	No
Carbon tetrachloride	0347	LB	ug/L	N	0.430	J	< HistMIN	0.5	3.33	61	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2205025 **Lab Code:** GEN **Validator:** Daniel Ohlson **Validation Date:** 07-14-2022

Project: LTS&M (Parcel 6-7-8)

Samples: 8

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 8 detection limits above the contract required limits.
Field Blanks:	There was 1 field blank associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Detection Limits

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14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2205025

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2205025-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2205025-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205025

Lab Code: GEN

14-Jul-2022

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2205025-019	0999	SW-846 8260	Acetone	18.4	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Validation Report: Field Duplicates

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14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205025

Lab Code: GEN

Duplicate: MND01-01.2205025-018					Sample: MND01-01.2205025-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 2 of 4

14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205025

Lab Code: GEN

Duplicate: MND01-01.2205025-018					Sample: MND01-01.2205025-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	1.74	U		1	1.74	U		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.430	J		1	0.500	J		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205025

Lab Code: GEN

Duplicate: MND01-01.2205025-018					Sample: MND01-01.2205025-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.333	U		1	0.333	U		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	0.333	U		1	0.333	U		1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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14-Jul-2022

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2205025

Lab Code: GEN

Duplicate: MND01-01.2205025-018					Sample: MND01-01.2205025-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	9.95			1	10.9			1	9.1		ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Organics Data Validation Summary

Page 1 of 1

14-Jul-2022

Task Code: MND01-01.2205025

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: All LCS/LCSD results were within the laboratory acceptance limits.

MS/MSD Performance: All MS/MSD results were within the laboratory acceptance limits.

Method Blank Performance: All method blanks were below the MDL.

Data Review and Validation Report

General Information

Task Code:	MND01-01.2207026
Sample Event:	August 2 and 3, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	588421
Analysis:	Organics
Validator:	Sophia Alires
Review Date:	January 18, 2023

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2 and Table 3. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2207026-005	0315	1,2,3-Trichlorobenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	1,2,4-Trichlorobenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	1,2,4-Trimethylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	1,2-Dichlorobenzene	J	Matrix spike recovery precision

Sample ID	Location	Analyte	Flag	Reason
All	Various	1,2-Dichlorobenzene	J	Continuing calibration verification
MND01-01.2207026-005	0315	1,3,5-Trimethylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	1,3-Dichlorobenzene	J	Matrix spike recovery precision
All	Various	1,3-Dichlorobenzene	J	Continuing calibration verification
MND01-01.2207026-005	0315	1,4-Dichlorobenzene	J	Matrix spike recovery precision
All	Various	1,4-Dichlorobenzene	J	Continuing calibration verification
MND01-01.2207026-005	0315	2-Chlorotoluene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	4-Chlorotoluene	J	Matrix spike recovery precision
All	Various	4-Chlorotoluene	J	Continuing calibration verification
MND01-01.2207026-005	0315	4-Isopropyltoluene	J	Matrix spike recovery precision
MND01-01.2207026-007	0347	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-008	0379	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-013	0601	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-017	0607	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-019	0999	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-020	0999	Acetone	U	Less than 5 times the method blank
MND01-01.2207026-005	0315	Bromobenzene	J	Matrix spike recovery precision
All	Various	Bromobenzene	J	Continuing calibration verification
MND01-01.2207026-005	0315	Ethylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	Hexachlorobutadiene	J	Matrix spike recovery
MND01-01.2207026-005	0315	Isopropylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	n-Butylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	n-Propylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	sec-Butylbenzene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	Styrene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	tert-Butylbenzene	J	Matrix spike recovery precision
All	Various	tert-Butylbenzene	J	Continuing calibration verification
MND01-01.2207026-005	0315	Tetrachloroethene	J	Matrix spike recovery precision
MND01-01.2207026-005	0315	Trichloroethene	J	Matrix spike recovery
MND01-01.2207026-018	0315	Trichloroethene	J	Field duplicate result
MND01-01.2207026-005	0315	Xylenes (total)	J	Matrix spike recovery precision

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 14 water samples on August 4, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions except the following. The sample MND01-01.2207026-016 was listed with a collection date of August 22, however, the mistake was isolated to the COC.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 5 °C, which complies with requirements. All samples were received in the correct container types and

had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The reported MDLs were slightly greater than requested for the analyte carbon disulfide but are acceptable for this task. The remaining organic compounds MDLs met the detection limit requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibration of instrument VOA2 was performed on July 22, 2022, using 9 calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. One compound calibration, using average response factors, had a relative standard deviation greater than 15 percent. No other calibration criteria were exceeded for this compound, so no qualification was necessary. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99, in accordance with the requirements. Initial and continuing calibration verification checks were made at the required frequency. Several analytes had continuing calibration recoveries out of the acceptance range. Analytes that recovered below the criteria were qualified with a J flag if additional quality control results were not within the acceptance criteria. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run, in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the

MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recovery for the compounds hexachlorobutadiene and trichloroethene recovered below the acceptance criteria. Additionally, the MS/MSD agreement for several analytes were greater than the acceptance range. The associated compounds were qualified with a J flag, as estimated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria, except as stated in the matrix spike assessment.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated except 4-Methyl-2-pentanone, chloromethane, and vinyl chloride. These compounds were not detected in samples above the MDL, so no qualification was necessary.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

A revised EDD file arrived on October 5, 2022. The revision included corrected sample collection times, which were originally entered incorrectly upon laboratory receipt. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and

has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0315. The duplicate results met the criteria for all analytes except the compound trichloroethene. The replicate agreement greatly exceeded acceptance criteria, and the samples results were qualified with a J flag (if not previously).

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Two trip blanks were submitted with these samples. Acetone and methylene chloride were detected in the trip blanks. Associated results greater than the MDL and less than 5 times the trip blank concentration (10 times for common laboratory contaminants) are qualified with a U flag as not detected. The associated samples were previously qualified, so no additional qualification was necessary.

Field Measurements

The pre-sampling purge criteria were met for all wells except the following. The turbidity requirement could not be met at location 0315. Additionally, the specific conductance measurements for locations 0605 and 0607 were found to be erroneous. These results were not accepted and were qualified with an R flag (as rejected). The results imply that the instrument probe was not fully submerged in the sample and were nonrepresentative measurements.

Table 3. Field Measurement Data Qualifiers

Location	Analyte	Result	Flag	Reason
0605	Specific conductance	1.55 µmhos/cm	R	Erroneous value; Not representative
0607	Specific conductance	24 µmhos/cm	R	Erroneous value; Not representative

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Two laboratory result from this sampling event were identified as potentially anomalous. The results for trichloroethene were the field duplicate results of location 0315. The result above the historical range was identified as an outlier. Additionally, there was statistically significant

evidence of a decreasing concentration for this analyte, so this result was closely reviewed. The results were qualified with a J flag during validation and the data are acceptable as qualified.

The field measurements were also surveyed for statistical outliers. Two specific conductance measurements were identified as anomalous. The results are acceptable as qualified.

Report Prepared By: Sophia R. Alires Digitally signed by Sophia R. Alires
Date: 2023.01.24 15:17:49 -07'00'

Sophia Alires
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 01/18/2023

Comparison to Historical Data Since: 1/1/2015 12:00:00 AM Fraction: Any

Task: MND01-01.2207026

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Trichloroethene	0315	LB	ug/L	N	14.5		> HistMAX	0.35	9.62	36	YES
Trichloroethene	0315	LB	ug/L	N	0.350	J	< HistMIN	0.39	14.5	36	No

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only Report Date: 01/18/2023

Comparison to Historical Data Since: 1/1/2015 12:00:00 AM Fraction: Any

Task: MND01-01.2207026

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
pH	0138	FI	s.u.	N	6.65		< HistMIN	6.67	7.36	31	No
pH	0346	FI	s.u.	N	6.46		< HistMIN	6.69	8.01	32	No
pH	0347	FI	s.u.	N	6.18		< HistMIN	6.32	7.15	31	No
Specific Conductance	0605	FI	umhos/cm	N	1.55		< HistMIN	1070	2850	30	YES; Rejected
Specific Conductance	0607	FI	umhos/cm	N	24		< HistMIN	374	2460	30	YES; Rejected
Temperature	0138	FI	C	N	16.2		> HistMAX	11.47	16.1	31	No
Temperature	0346	FI	C	N	15.6		> HistMAX	12.2	15.3	32	No
Temperature	0605	FI	C	N	18.9		> HistMAX	6.5	18.6	31	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2207026 Lab Code: GEN Validator: Sophia Alires Validation Date: 01-18-2023

Project: LTS&M (Parcel 6-7-8)

Samples: 14

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 14 detection limits above the contract required limits.
Field Blanks:	There were 2 field blanks associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Detection Limits

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18-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2207026

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2207026-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-018	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-008	0379	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-016	0606	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2207026-020	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Detection Limits

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18-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2207026

Lab Code: GEN

Validation Report: Field Duplicates

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18-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2207026

Lab Code: GEN

Analyte	Duplicate: MND01-01.2207026-018				Sample: MND01-01.2207026-005 0315				RPD	RER	Units
	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution			
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 2 of 4
18-Jan-2023

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2207026 **Lab Code:** GEN

Duplicate: MND01-01.2207026-018					Sample: MND01-01.2207026-005 0315						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	1.74	U		1	1.74	U		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.333	U		1	0.340	J		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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18-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2207026

Lab Code: GEN

Duplicate: MND01-01.2207026-018					Sample: MND01-01.2207026-005 0315						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.333	U		1	0.333	U		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	0.333	U		1	0.333	U		1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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18-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2207026

Lab Code: GEN

Duplicate: MND01-01.2207026-018					Sample: MND01-01.2207026-005 0315						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	0.350	J		1	14.5			1			ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Organics Data Validation Summary

Page 1 of 1

18-Jan-2023

Task Code: MND01-01.2207026

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: 3 LCS/LCSD results were outside the laboratory acceptance limits.

MS/MSD Performance: 25 MS/MSD results were outside the laboratory acceptance limits.

Method Blank Performance: 2 analytes were above the MDL.

Noncompliance Report: LCS/LCSD Performance

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18-Jan-2023

Task Code:

Project:

Lab Code:

Sample ID	Date Analyzed	Method	Analyte	LCS Recovery	LCSD recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	08-08-2022	SW-846 8260	4-Methyl-2-Pentanone	127		65	126			OK, Sample concentration < MDL
	08-09-2022	SW-846 8260	Chloromethane	140		60	139			OK, Sample concentration < MDL
	08-09-2022	SW-846 8260	Vinyl chloride	150		67	134			OK, Sample concentration < MDL

Noncompliance Report: Method Blanks

Page 1 of 1

18-Jan-2023

Task Code:

Project:

Lab Code:

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	08-08-2022	SW-846 8260	Acetone	1.90	J	*
	08-08-2022	SW-846 8260	Methylene chloride	0.600	J	OK, Sample concentration < MDL

Noncompliance Report: MS/MSD Performance

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18-Jan-2023

Task Code: MND01-01.2207026

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	MS Recovery	MSD Recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
MND01-01.2207026-005PS	08/08/2022	SW846 8260D	Hexachlorobutadiene	43		50	139			
	08/08/2022	SW846 8260D	Trichloroethylene	54		66	126			
MND01-01.2207026-005PSD	08/08/2022	SW846 8260D	Xylenes (total)		96	52	132	26	20	
	08/08/2022	SW846 8260D	Chloromethane		145	45	142	6	20	OK, Sample concentration <MDL
	08/08/2022	SW846 8260D	Vinyl chloride		149	58	139	7	20	OK, Sample concentration <MDL
	08/08/2022	SW846 8260D	Tetrachloroethylene		89	64	129	22	20	
	08/08/2022	SW846 8260D	Ethylbenzene		101	65	124	24	20	
	08/08/2022	SW846 8260D	Styrene		97	60	131	22	20	
	08/08/2022	SW846 8260D	Isopropylbenzene		84	56	132	32	20	
	08/08/2022	SW846 8260D	Bromobenzene		89	62	125	22	20	
	08/08/2022	SW846 8260D	n-Propylbenzene		90	49	129	35	20	
	08/08/2022	SW846 8260D	1,3,5-Trimethylbenzene		90	53	129	35	20	
	08/08/2022	SW846 8260D	2-Chlorotoluene		89	56	131	31	20	
	08/08/2022	SW846 8260D	4-Chlorotoluene		80	52	126	30	20	
	08/08/2022	SW846 8260D	tert-Butylbenzene		78	52	134	36	20	
	08/08/2022	SW846 8260D	1,2,4-Trimethylbenzene		83	53	129	33	20	
	08/08/2022	SW846 8260D	sec-Butylbenzene		81	45	132	40	20	
	08/08/2022	SW846 8260D	4-Isopropyltoluene		78	50	124	43	20	
	08/08/2022	SW846 8260D	1,3-Dichlorobenzene		82	56	127	28	20	
	08/08/2022	SW846 8260D	1,4-Dichlorobenzene		81	51	125	27	20	
	08/08/2022	SW846 8260D	n-Butylbenzene		79	46	139	44	20	
	08/08/2022	SW846 8260D	Hexachlorobutadiene		71	50	139	50	20	
	08/08/2022	SW846 8260D	1,2,3-Trichlorobenzene		82	50	132	25	20	
	08/08/2022	SW846 8260D	1,2,4-Trichlorobenzene		75	48	134	25	20	
	08/08/2022	SW846 8260D	1,2-Dichlorobenzene		83	60	128	25	20	

Data Review and Validation Report

General Information

Task Code:	MND01-01.2210028
Sample Event:	October 24 and 26, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	598274 and 598388
Analysis:	Organics
Validator:	Daniel Ohlson
Review Date:	January 19, 2023

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2210028-004	0138	Specific Conductance	R	Unacceptable outlier, low
MND01-01.2210028-013	0601	Acetone	U	Less than 10 times the trip blank
MND01-01.2210028-015	0605	Acetone	U	Less than 10 times the trip blank
MND01-01.2210028-001	0118	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2210028-002	0124	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-003	0126	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-004	0138	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-006	0346	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-008	0379	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-018	0379	1,2-Dibromo-3-chloropropane	J	Initial Calibration Response Factor
MND01-01.2210028-001	0118	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-002	0124	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-003	0126	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-004	0138	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-006	0346	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-008	0379	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-018	0379	Chloromethane	J	Initial Calibration Response Factor
MND01-01.2210028-013	0601	Dichlorodifluoromethane	J	Initial Calibration Response Factor
MND01-01.2210028-015	0605	Dichlorodifluoromethane	J	Initial Calibration Response Factor
MND01-01.2210028-017	0607	Dichlorodifluoromethane	J	Initial Calibration Response Factor
MND01-01.2210028-021	0999	Dichlorodifluoromethane	J	Initial Calibration Response Factor

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received eleven water samples on October 26 and 27, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 4 °C and 6 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration

is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations of instruments “VOA1” and “VOA9” were performed on August 28, 2022, and September 18, 2022, respectively, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Calibrations using average response factors had relative standard deviations slightly greater than 15 percent for 1,2-dibromo-3-chloropropane and chloromethane in instrument “VOA9” and dichlorodifluoromethane and dibromochloromethane in instrument “VOA1”. With the exception of dibromochloromethane, these compounds were also out of acceptance criteria in the CCV and were qualified with a J flag as estimated values. No other calibration criteria were exceeded for dibromochloromethane so no qualification is necessary. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. The CCVs for several analytes were out of the acceptance criteria. All associated sample results were less than the MDL, so no further qualification was necessary. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes evaluated except bromochloromethane and vinyl chloride. All associated sample results were less than the MDL so no qualification was required.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated except vinyl chloride. All associated sample results were less than the MDL so no qualification was required.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on November 12, 2022. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. One trip blank was submitted with these samples. Acetone and toluene were detected in the trip blank. Associated results greater than the MDL and less than 5 times the trip blank concentration (10 times for common laboratory contaminants) were qualified with a U flag as not detected.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

The result for 2-butanone at location 0601 was identified as an outlier. The report was reviewed in detail and no errors were identified. The laboratory data from this event are acceptable as qualified.

Several field measurements were identified as outliers. The specific conductance measurements at location 0138 were significantly lower than the historical range and were rejected and qualified with an R flag. No other field measurements were flagged, and the data are acceptable as qualified.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0379. The duplicate results met the criteria for all analytes, demonstrating acceptable overall precision.

Report Prepared By: **Daniel T. Ohlson** Digitally signed by Daniel T. Ohlson
Date: 2023.01.19 16:04:18 -07'00'

Daniel Ohlson
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 01/18/2023

Comparison to Historical Data Since: 1/18/2012 12:00:00 AM Fraction: Any

Task: MND01-01.2210028

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Chloromethane	0118	LB	ug/L	N	0.380	J	> HistMAX	0.16	0.333	43	No
Acetone	0601	LB	ug/L	N	5.63	B	> HistMAX	0.5	5.52	46	No
2-Butanone	0601	LB	ug/L	N	2.51	J	> HistMAX	0.5	1.67	46	Yes
Trichloroethene	0607	LB	ug/L	N	0.333	U	< HistMIN	0.36	9.95	45	No

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only Report Date: 01/18/2023

Comparison to Historical Data Since: 1/18/2012 12:00:00 AM Fraction: Any

Task: MND01-01.2210028

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Oxidation Reduction Potential	0118	FI	mV	N	391.9		> HistMAX	-42.7	281.4	43	Yes
pH	0118	FI	s.u.	N	6.36		< HistMIN	6.65	7.58	43	Yes
Specific Conductance	0138	FI	umhos/cm	N	026		< HistMIN	1090	1387	43	Yes, rejected
Specific Conductance	0601	FI	umhos/cm	N	2020		> HistMAX	710	1744	43	Yes
Oxidation Reduction Potential	0601	FI	mV	N	323.9		> HistMAX	-31	265	43	Yes

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2210028 **Lab Code:** GEN **Validator:** Daniel Ohlson **Validation Date:** 01-18-2023

Project: LTS&M (Parcel 6-7-8)

Samples: 13

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 11 detection limits above the contract required limits.
Field Blanks:	There was 1 field blank associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

19-Jan-2023

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2210028-021	0999	SW-846 8260	Acetone	8.28	B

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Validation Report: Field Blanks

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Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

19-Jan-2023

TB	MND01-01.2210028-021	0999	SW-846 8260	Toluene	0.340	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Validation Report: Field Duplicates

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19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

Duplicate: MND01-01.2210028-018					Sample: MND01-01.2210028-008 0379						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

Duplicate: MND01-01.2210028-018					Sample: MND01-01.2210028-008 0379						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	1.74	U		1	1.74	U		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.600	J		1	0.670	J		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

Duplicate: MND01-01.2210028-018					Sample: MND01-01.2210028-008 0379						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.333	U		1	0.333	U		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	0.370	J		1	0.333	U		1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210028

Lab Code: GEN

Duplicate: MND01-01.2210028-018					Sample: MND01-01.2210028-008 0379						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	0.340	J		1	0.500	J		1			ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Organics Data Validation Summary

Page 1 of 1
19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery:	All surrogate recoveries were within the laboratory acceptance limits.
LCS/LCSD Performance:	There was 1 LCS/LCSD result outside the laboratory acceptance limits.
MS/MSD Performance:	There were 5 MS/MSD results outside the laboratory acceptance limits.
Method Blank Performance:	All method blanks were below the MDL.

Noncompliance Report: LCS/LCSD Performance

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19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	LCS Recovery	LCSD recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	10-28-2022	SW-846 8260	Vinyl chloride	152		67	134			Ok, not detected in sample

Noncompliance Report: MS/MSD Performance

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19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	MS Recovery	MSD Recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	10-28-2022	SW-846 8260	Bromochloromethane	66		72	131			Ok, not detected in sample
	10-28-2022	SW-846 8260	Bromochloromethane		69	72	131	4	20	Ok, not detected in sample
	10-28-2022	SW-846 8260	Chlorodibromomethane		67	68	142	2	20	Ok, not detected in sample
	10-28-2022	SW-846 8260	Vinyl chloride	151		58	139			Ok, not detected in sample
	10-28-2022	SW-846 8260	Vinyl chloride		140	58	139	8	20	Ok, not detected in sample

Data Review and Validation Report

General Information

Task Code:	MND01-01.2210029
Sample Event:	October 24, 2022
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	598276
Analysis:	Organics
Validator:	Sophia Alires
Review Date:	January 19, 2023

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2210029-005	0315	Dichlorodifluoromethane	J	Initial calibration verification
MND01-01.2210029-007	0347	Dichlorodifluoromethane	J	Initial calibration verification
MND01-01.2210029-009	0386	Dichlorodifluoromethane	J	Initial calibration verification
MND01-01.2210029-010	0387	Dichlorodifluoromethane	J	Initial calibration verification

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2210029-011	0389	Dichlorodifluoromethane	J	Initial calibration verification
MND01-01.2210029-012	0392	Dichlorodifluoromethane	J	Initial calibration verification
MND01-01.2210029-019	0999	Dichlorodifluoromethane	J	Initial calibration verification

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 7 water samples on October 26, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present – indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The reported MDLs were slightly greater than requested for the analyte carbon disulfide but are acceptable for this task. The remaining organic compounds MDLs met the detection limit requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibration of instrument VOA9 was performed on September 18, 2022, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. The calibrations, using average response factors, had relative standard deviations greater than 15 percent for two compounds. No other calibration criteria were exceeded for these compounds, so no qualification was necessary. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99,

in accordance with the requirements. Initial and continuing calibration verification checks were made at the required frequency. The analyte dichlorodifluoromethane recovered outside of the acceptance range for the initial calibration verification standard. This compound was qualified with a J flag for all affected samples, as estimated. Several analytes recovered above the upper acceptance limit in the continuing calibration verification. These analytes were not detected at concentrations greater than the MDL, so no further qualification was necessary.

The mass spectrometer calibration and resolution were checked at the beginning of each analytical run, in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The post-digestion spikes were assessed on samples of a different task. The matrix was not assumed identical, and no qualification was applied regarding these recoveries.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The post-digestion spike was assessed in duplicate on a sample associated with a different task. The precision between these duplicates was assessed in-lieu of a laboratory replicate. The duplicate results met acceptance criteria, indicating satisfactory precision.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated except vinyl chloride, which recovered above the acceptance range. This compound was not

detected in samples above the MDL, so no qualification was necessary. This LCS was shared with the task MND01-01.2210028 (see attached task validation worksheets for details).

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on November 21, 2022. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. No field duplicates were collected during this sampling event.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. One trip blank was submitted with these samples. Acetone, 2-butanone, and toluene were detected in the trip blank. Associated results greater than the MDL and less than 5 times the trip blank concentration (10 times for common laboratory contaminants) are qualified with a U flag as not detected. These contaminants were not detected above the MDL in any samples, so no qualification was necessary.

Field Measurements

The pre-sampling purge criteria were met for all wells except the following. The pH stability criterion was not met at location 0386 prior to sample collection.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an

evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

None of the laboratory results from this sampling event were identified as anomalous. The results are acceptable as qualified.

Three field measurements were identified as anomalous values for the specified locations. The data was reviewed in detail with no errors noted. The pH readings for locations 0387 and 0392 appeared to have stabilized and no trends were found in the data recorded with this instrumentation. The dissolved oxygen readings for location 0315 had met the stability criterion but was notably decreasing over time. There remains potential for this result to have a high bias.

Report Prepared By: **Sophia R. Alires** Digitally signed by Sophia R. Alires
Date: 2023.01.19 16:10:40 -07'00'

Sophia Alires
Data Validator

Data Validation Outliers Report - No Field Parameters **Report Date: 01/19/2023**

Comparison to Historical Data Since: 1/1/2015 12:00:00 AM Fraction: Any

Task: MND01-01.2210029

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Trichloroethene	0386	LB	ug/L	N	0.333	U	< HistMIN	0.35	3.02	32	No

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only **Report Date: 01/19/2023**

Comparison to Historical Data Since: 1/1/2015 12:00:00 AM Fraction: Any

Task: MND01-01.2210029

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Dissolved Oxygen	0315	FI	mg/L	N	4.57		> HistMAX	0.11	3.69	31	YES
pH	0387	FI	s.u.	N	6.03		< HistMIN	6.46	7.4	31	YES
pH	0392	FI	s.u.	N	5.41		< HistMIN	6.28	7.16	31	YES

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2210029 **Lab Code:** GEN **Validator:** Sophia Aires **Validation Date:** 01-19-2023

Project: LTS&M (Parcel 6-7-8)

Samples: 7

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 7 detection limits above the contract required limits.
Field Blanks:	There was 1 field blank associated with this task.
Field Duplicates:	There are no duplicates associated with this task.

Validation Report: Detection Limits

Page 1 of 2

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2210029

Lab Code: GEN

19-Jan-2023

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2210029-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2210029-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Detection Limits

Page 2 of 2

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-
01.2210029

Lab Code: GEN

19-Jan-2023

Validation Report: Field Blanks

Page 1 of 3

19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210029

Lab Code: GEN

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2210029-019	0999	SW-846 8260	2-Butanone	3.50	J

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2210029-005	0315	1.67	1	U	
MND01-01.2210029-007	0347	1.67	1	U	
MND01-01.2210029-009	0386	1.67	1	U	
MND01-01.2210029-010	0387	1.67	1	U	
MND01-01.2210029-011	0389	1.67	1	U	
MND01-01.2210029-012	0392	1.67	1	U	

Validation Report: Field Blanks

Page 2 of 3

19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210029

Lab Code: GEN

TB	MND01-01.2210029-019	0999	SW-846 8260	Acetone	41.4	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2210029-005	0315	1.74	1	U	
MND01-01.2210029-007	0347	1.74	1	U	
MND01-01.2210029-009	0386	1.74	1	U	
MND01-01.2210029-010	0387	1.74	1	U	
MND01-01.2210029-011	0389	1.74	1	U	
MND01-01.2210029-012	0392	1.74	1	U	

Validation Report: Field Blanks

Page 3 of 3

19-Jan-2023

Project: LTS&M (Parcel 6-7-8)

Task Code: MND01-01.2210029

Lab Code: GEN

TB	MND01-01.2210029-019	0999	SW-846 8260	Toluene	0.380	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2210029-005	0315	0.333	1	U	
MND01-01.2210029-007	0347	0.333	1	U	
MND01-01.2210029-009	0386	0.333	1	U	
MND01-01.2210029-010	0387	0.333	1	U	
MND01-01.2210029-011	0389	0.333	1	U	
MND01-01.2210029-012	0392	0.333	1	U	

Organics Data Validation Summary

Page 1 of 1

19-Jan-2023

Task Code: MND01-01.2210029

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: There was 1 LCS/LCSD result outside the laboratory acceptance limits.

Method Blank Performance: All method blanks were below the MDL.

Organics Data Validation Summary

Page 1 of 1

19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: There was 1 LCS/LCSD result outside the laboratory acceptance limits.

MS/MSD Performance: There were 5 MS/MSD results outside the laboratory acceptance limits.

Method Blank Performance: All method blanks were below the MDL.

Noncompliance Report: LCS/LCSD Performance

Page 1 of 1

19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	LCS Recovery	LCSD recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	10-28-2022	SW-846 8260	Vinyl chloride	152		67	134			OK, Sample concentration < MDL

Noncompliance Report: MS/MSD Performance

Page 1 of 1

19-Jan-2023

Task Code: MND01-01.2210028

Project: LTS&M (Parcel 6-7-8)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	MS Recovery	MSD Recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	10-28-2022	SW-846 8260	Bromochloromethane	66		72	131			MS/MSD Precision assessment applicable only (Laboratory replicate evaluation)
	10-28-2022	SW-846 8260	Bromochloromethane		69	72	131	4	20	
	10-28-2022	SW-846 8260	Chlorodibromomethane		67	68	142	2	20	
	10-28-2022	SW-846 8260	Vinyl chloride	151		58	139			
	10-28-2022	SW-846 8260	Vinyl chloride		140	58	139	8	20	



Data Review and Validation Report

General Information

Task Code: MND01-02.2201010
Sample Event: January 24-25, 2022
Site(s): Mound, Ohio: LTS&M (Phase I)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 568523
Analysis: Organics
Validator: Sophia Alires
Review Date: April 18, 2022

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 1. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 1. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-02.2201010-003	0617	Acetone	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 7 water samples on January 26, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 2 °C which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL.

The reported MDLs for the organic analytes met the detection limits requirements, with the exception of carbon disulfide.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations of instrument VOA4 was performed on January 20 and 21, 2022, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Calibrations using average response factors had relative standard deviations of less than 15 percent. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All associated target compound percent drift values were less than 20 percent with a few exceptions. All associated sample results were less than the MDL so no qualification was

required. The mass spectrometer calibration and resolution was checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. The matrix spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference (RPD) for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. The replicate results met these criteria.

Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All control sample results were within the acceptance criteria.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on February 22, 2022. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. Two trip blanks were associated with these samples. Two trip blanks were submitted with these samples. Table 2 summarizes the detected compounds. Associated sample results that are less than 5 times the trip blank concentration (and less than 10 times the blank concentration for common laboratory contaminants) are qualified with a U flag as not detected. Acetone was detected in the sample from location 0617.

Table 2. Trip Blanks

Sample ID	Date	Detects
MND01-02.2201010-004	01/25/2022	Acetone = 9.37
MND01-02.2201010-004	01/25/2022	2-Butanone = 1.67
MND01-02.2201010-005	01/24/2022	Acetone = 9.98
MND01-02.2201010-005	01/24/2022	2-Butanone = 2.01

Field Duplicate

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. A duplicate sample was collected from location P064. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results less than 5 times the PQL, the range should be no greater than the PQL. All duplicate results met these criteria, demonstrating acceptable precision.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by

the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

None of the laboratory results from this sampling event were identified as outliers. The laboratory data was reviewed in detail and no errors were identified; the data for this task are acceptable as qualified.

**Sophia R.
Alires**



Digitally signed by Sophia
R. Alires
Date: 2022.04.18 14:42:37
-06'00'

Report Prepared By: _____

Sophia Alires
Data Validator

Data Validation Outliers Report - No Field Parameters **Report Date: 04/18/2022**

Comparison to Historical Data Since: 1/1/2010 12:00:00 AM Fraction: Any

Task: MND01-02.2201010

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Tetrachloroethene	P064	LB	ug/L	N	1.33		> HistMAX	0.67	1.29	17	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-02.2201010 Lab Code: GEN Validator: Sophia Aires Validation Date: 04-18-2022

Project: LTS&M (Phase I)

Samples: 7

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 7 detection limits above the contract required limits.
Field Blanks:	There were 2 field blanks associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Field Duplicates

Page 1 of 4
18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

Analyte	Duplicate: MND01-02.2201010-007				Sample: MND01-02.2201010-006 P064				RPD	RER	Units
	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution			
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 2 of 4

18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

Duplicate: MND01-02.2201010-007					Sample: MND01-02.2201010-006 P064						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	1.74	U		1	1.74	U		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.333	U		1	0.333	U		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 3 of 4

18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

Duplicate: MND01-02.2201010-007					Sample: MND01-02.2201010-006 P064						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.333	U		1	0.333	U		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	1.33			1	1.29			1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 4 of 4

18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

Duplicate: MND01-02.2201010-007					Sample: MND01-02.2201010-006 P064						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	0.333	U		1	0.333	U		1			ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Detection Limits

Page 1 of 1

18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010 Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-02.2201010-001	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-002	0443	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-003	0617	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-004	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-005	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-007	P064	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2201010-006	P064	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Organics Data Validation Summary

Page 1 of 1

18-Apr-2022

Task Code: MND01-02.2201010

Project: LTS&M (Phase I)

Lab Code: GEN

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

LCS/LCSD Performance: All LCS/LCSD results were within the laboratory acceptance limits.

MS/MSD Performance: All MS/MSD results were within the laboratory acceptance limits.

Method Blank Performance: There was 1 method blank result above the MDL.

Noncompliance Report: Method Blanks

Page 1 of 1

18-Apr-2022

Task Code: MND01-02.2201010

Project: LTS&M (Phase I)

Lab Code: GEN

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	01-28-2022	SW-846 8260	Acetone	2.16	J	

Validation Report: Field Blanks

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18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-02.2201010-004	0999	SW-846 8260	2-Butanone	1.67	J

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2201010-001	0411	1.67	1	U	
MND01-02.2201010-002	0443	1.67	1	U	
MND01-02.2201010-006	P064	1.67	1	U	
MND01-02.2201010-007	P064	1.67	1	U	

Validation Report: Field Blanks

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18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

TB	MND01-02.2201010-004	0999	SW-846 8260	Acetone	9.73	B
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2201010-001	0411	1.74	1	U	
MND01-02.2201010-002	0443	1.74	1	U	
MND01-02.2201010-006	P064	1.74	1	U	
MND01-02.2201010-007	P064	1.74	1	U	

Validation Report: Field Blanks

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18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

TB	MND01-02.2201010-005	0999	SW-846 8260	2-Butanone	2.01	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2201010-003	0617	1.67	1	U	

Validation Report: Field Blanks

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18-Apr-2022

Project: LTS&M (Phase I)

Task Code: MND01-02.2201010

Lab Code: GEN

TB	MND01-02.2201010-005	0999	SW-846 8260	Acetone	9.98	B
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2201010-003	0617	2.01	1	BJ	U

Data Review and Validation Report

General Information

Task Code:	MND01-02.2207011
Sample Event:	August 2, 2022
Site(s):	Mound, Ohio: LTS&M (Phase 1)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	588427
Analysis:	Organics
Validator:	Daniel Ohlson
Review Date:	January 18, 2023

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see attached Data Validation Worksheets). The comparability, completeness, and sensitivity of the data are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Volatile Organics, VOA	VOA-A-007	SW-846 5030B	SW-846 8260D

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to the attached validation worksheets and the sections below for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-02.2207011-001	411	Acetone	U	Less than 10 times the trip blank
MND01-02.2207011-007	411	Acetone	U	Less than 10 times the trip blank
MND01-02.2207011-004	999	1,2-Dibromo-3-chloropropane	J	CCV Drift %
MND01-02.2207011-006	P064	1,2-Dibromo-3-chloropropane	J	CCV Drift %

Sample ID	Location	Analyte	Flag	Reason
MND01-02.2207011-004	999	1,2-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-006	P064	1,2-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-004	999	1,3-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-006	P064	1,3-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-004	999	1,4-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-006	P064	1,4-Dichlorobenzene	J	CCV Drift %
MND01-02.2207011-004	999	4-Chlorotoluene	J	CCV Drift %
MND01-02.2207011-006	P064	4-Chlorotoluene	J	CCV Drift %
MND01-02.2207011-004	999	Bromobenzene	J	CCV Drift %
MND01-02.2207011-006	P064	Bromobenzene	J	CCV Drift %
MND01-02.2207011-004	999	Chlorobenzene	J	CCV Drift %
MND01-02.2207011-006	P064	Chlorobenzene	J	CCV Drift %
MND01-02.2207011-001	411	Chloroethane	J	CCV Drift %
MND01-02.2207011-002	443	Chloroethane	J	CCV Drift %
MND01-02.2207011-003	617	Chloroethane	J	CCV Drift %
MND01-02.2207011-007	411	Chloroethane	J	CCV Drift %
MND01-02.2207011-001	411	Dichlorodifluoromethane	J	CCV Drift %
MND01-02.2207011-002	443	Dichlorodifluoromethane	J	CCV Drift %
MND01-02.2207011-003	617	Dichlorodifluoromethane	J	CCV Drift %
MND01-02.2207011-007	411	Dichlorodifluoromethane	J	CCV Drift %
MND01-02.2207011-004	999	tert-Butylbenzene	J	CCV Drift %
MND01-02.2207011-006	P064	tert-Butylbenzene	J	CCV Drift %
MND01-02.2207011-001	411	Trichlorofluoromethane	J	CCV Drift %
MND01-02.2207011-002	443	Trichlorofluoromethane	J	CCV Drift %
MND01-02.2207011-003	617	Trichlorofluoromethane	J	CCV Drift %
MND01-02.2207011-007	411	Trichlorofluoromethane	J	CCV Drift %

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received six water samples on August 4, 2022, accompanied by a Chain of Custody (COC) form. The air waybill numbers were listed on the Sample Receipt and Review Form. The COC forms were checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC forms were complete with no errors or omissions.

Preservation and Holding Times

The sample shipments were received intact with the temperatures inside the iced coolers at 5°C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all organics analytes as required. The MDL, as defined in Title 40 *Code of Federal Regulations* Section 136, is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured and is defined as 5 times the MDL. The carbon disulfide MDLs were slightly greater than requested but are acceptable for this task. The remaining reported MDLs for the organics met the detection limits requirements.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibration verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method SW-846 8260D Volatile Organics, VOA

Initial calibrations were performed July 22, 2022, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. Calibration for carbon disulfide, using average response factors, had a relative standard deviation slightly greater than 15 percent. No other calibration criteria were exceeded for this compound so no qualification is necessary. Linear or higher order regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. The CCVs for several analytes were out of the acceptance criteria. Affected sample results were qualified with a J flag as estimated values. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

Volatiles Internal Standards and Surrogates

The volatile internal standard recoveries and surrogate recoveries were within the acceptance ranges for all samples.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where the blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than 5 times the blank concentration are qualified with a U flag as not detected.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) analysis is

used to assess the performance of the method by measuring the effects of interferences caused by the sample matrix and reflects the bias of the method for the particular matrix in question. Matrix spike data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike concentration. A post-digestion spike and duplicate (PS/PSD) were run on a sample from a different task. No sample results were qualified for failed matrix spike recoveries.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than 5 times the PQL, the range should be no greater than the PQL. A post-digestion matrix spike (PSD) was ran as a laboratory replicate. This PSD was performed on a sample from a different task. No sample results were qualified for failed relative percent differences in the PSD.

Laboratory Control Sample

Laboratory control samples (LCS) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The LCS recoveries met the acceptance criteria for all analytes evaluated except 4-methyl-2-pentanone, chloromethane, and vinyl chloride. All associated sample results were less than the MDL so no qualification was required.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers. The analytical report included the MDL and PQL for all analytes and all required supporting documentation.

Electronic Data Deliverable (EDD) File

The EDD file arrived on September 1, 2022. The EDD was examined to verify that the file was complete and in compliance with requirements. The contents of the file were compared to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

Trip Blank

Trip blanks were prepared and analyzed to document contamination attributable to shipping and field handling procedures. This type of blank is useful in documenting contamination of volatile organic samples. One trip blank was submitted with these samples. Acetone was detected in the trip blanks. Associated results greater than the MDL and less than 10 times the trip blank concentration were qualified with a U flag as not detected.

Field Measurements

The pre-sampling purge criteria were met for all wells.

Outliers Report

Potential outliers are results that lie outside the historical range, possibly due to transcription errors, data calculation errors, or measurement system problems. However, outliers can also represent true values outside the historical range. Potential outliers are identified by generating the Data Validation Outliers Report from data in the environmental database. The new data are compared to historical values and data that fall outside the historical data range are listed on the report along with the historical minimum and maximum values. The potential outliers are further reviewed and may be subject to statistical evaluation using the ProUCL application developed by the EPA (<https://www.epa.gov/land-research/proucl-software>). The review also includes an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

No lab results were identified as outliers. The report was reviewed in detail and no errors were identified. The laboratory data from this event are acceptable as qualified.

Three field measurements were identified as potential outliers. Close inspection of the field EDD did not identify errors. The field data from this event are acceptable as qualified.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0411. The duplicate results met the criteria for all analytes, demonstrating acceptable overall precision.

Report Prepared By: **Daniel T. Ohlson** Digitally signed by Daniel T. Ohlson
Date: 2023.01.18 10:04:11 -07'00'

Daniel Ohlson
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 01/17/2023

Comparison to Historical Data Since: 1/17/2012 12:00:00 AM Fraction: Any

Task: MND01-02.2207011

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Trichloroethene	0411	LB	ug/L	N	7.37		< HistMIN	7.38	13.4	30	No

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only Report Date: 01/17/2023

Comparison to Historical Data Since: 1/17/2012 12:00:00 AM Fraction: Any

Task: MND01-02.2207011

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Oxidation Reduction Potential	0411	FI	mV	N	291.7		> HistMAX	-36.5	240.4	21	No
pH	0411	FI	s.u.	N	4.49		< HistMIN	5.67	7.3	21	Yes
Oxidation Reduction Potential	0443	FI	mV	N	880.9		> HistMAX	-89.5	279.4	21	Yes
Dissolved Oxygen	P064	FI	mg/L	N	7.62		> HistMAX	0.81	5.27	10	No
pH	P064	FI	s.u.	N	5.69		< HistMIN	6.68	7.3	10	Yes

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-02.2207011 **Lab Code:** GEN **Validator:** Daniel Ohlson **Validation Date:** 01-17-2023

Project: LTS&M (Phase I)

Samples: 6

Analysis Type: ☐ General Chemistry ☐ Metals ☒ Organics ☐ Radiochemistry

Chain of Custody

Sample

Present: OK Signed: OK Dated: OK

Integrity: OK Preservation OK Temperature: OK

Check

Summary

Holding Times:	All analyses were completed within the applicable holding times.
Detection Limits:	There were 6 detection limits above the contract required limits.
Field Blanks:	There was 1 field blank associated with this task.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Field Blanks

Page 1 of 1

Project: LTS&M (Phase I)

Task Code: MND01-02.2207011

Lab Code: GEN

17-Jan-2023

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-02.2207011-004	0999	SW-846 8260	Acetone	10.4	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
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Validation Report: Field Duplicates

Page 1 of 4
17-Jan-2023

Project: LTS&M (Phase I)

Task Code: MND01-02.2207011

Lab Code: GEN

Duplicate: MND01-02.2207011-007					Sample: MND01-02.2207011-001 0411						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,1,1,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,1-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2,2-Tetrachloroethane	0.333	U		1	0.333	U		1			ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	2.98	U		1	2.98	U		1			ug/L
1,1,2-Trichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
1,1-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,3-Trichloropropane	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2,4-Trimethylbenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromo-3-chloropropane	0.333	U		1	0.333	U		1			ug/L
1,2-Dibromoethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloroethane	0.333	U		1	0.333	U		1			ug/L
1,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,3,5-Trimethylbenzene	0.500	U		1	0.500	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

Page 2 of 4

17-Jan-2023

Project: LTS&M (Phase I)

Task Code: MND01-02.2207011

Lab Code: GEN

Duplicate: MND01-02.2207011-007					Sample: MND01-02.2207011-001 0411						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
1,3-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
1,3-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
1,4-Dichlorobenzene	0.333	U		1	0.333	U		1			ug/L
2,2-Dichloropropane	0.333	U		1	0.333	U		1			ug/L
2-Butanone	1.67	U		1	1.67	U		1			ug/L
2-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
2-Hexanone	1.67	U		1	1.67	U		1			ug/L
4-Chlorotoluene	0.333	U		1	0.333	U		1			ug/L
4-Methyl-2-Pentanone	1.67	U		1	1.67	U		1			ug/L
Acetone	2.01	BJ		1	2.04	BJ		1			ug/L
Benzene	0.333	U		1	0.333	U		1			ug/L
Bromobenzene	0.333	U		1	0.333	U		1			ug/L
Bromochloromethane	0.333	U		1	0.333	U		1			ug/L
Bromodichloromethane	0.333	U		1	0.333	U		1			ug/L
Bromoform	0.333	U		1	0.333	U		1			ug/L
Bromomethane	0.337	U		1	0.337	U		1			ug/L
Carbon Disulfide	1.67	U		1	1.67	U		1			ug/L
Carbon tetrachloride	0.333	U		1	0.333	U		1			ug/L
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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17-Jan-2023

Project: LTS&M (Phase I)

Task Code: MND01-02.2207011

Lab Code: GEN

Duplicate: MND01-02.2207011-007					Sample: MND01-02.2207011-001 0411						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chloroethane	0.333	U		1	0.333	U		1			ug/L
Chloroform	0.333	U		1	0.333	U		1			ug/L
Chloromethane	0.333	U		1	0.333	U		1			ug/L
cis-1,2-Dichloroethene	0.920	J		1	0.920	J		1			ug/L
cis-1,3-Dichloropropene	0.333	U		1	0.333	U		1			ug/L
Dibromomethane	0.333	U		1	0.333	U		1			ug/L
Dichlorodifluoromethane	0.355	U		1	0.355	U		1			ug/L
Ethylbenzene	0.333	U		1	0.333	U		1			ug/L
Hexachlorobutadiene	0.333	U		1	0.333	U		1			ug/L
Isopropylbenzene	0.333	U		1	0.333	U		1			ug/L
Methylene chloride	0.500	U		1	0.500	U		1			ug/L
n-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
n-Propylbenzene	0.333	U		1	0.333	U		1			ug/L
Naphthalene	0.333	U		1	0.333	U		1			ug/L
p-Isopropyltoluene	0.333	U		1	0.333	U		1			ug/L
sec-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Styrene	0.333	U		1	0.333	U		1			ug/L
tert-Butylbenzene	0.333	U		1	0.333	U		1			ug/L
Tetrachloroethene	0.333	U		1	0.333	U		1			ug/L
Toluene	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Field Duplicates

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17-Jan-2023

Project: LTS&M (Phase I)

Task Code: MND01-02.2207011

Lab Code: GEN

Duplicate: MND01-02.2207011-007					Sample: MND01-02.2207011-001 0411						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Total Xylenes	1.00	U		1	1.00	U		1			ug/L
trans-1,2-Dichloroethene	0.333	U		1	0.333	U		1			ug/L
trans-1,3-dichloropropene	0.333	U		1	0.333	U		1			ug/L
Trichloroethene	7.38			1	7.37			1	0.1		ug/L
Trichlorofluoromethane	0.333	U		1	0.333	U		1			ug/L
Vinyl chloride	0.333	U		1	0.333	U		1			ug/L

QC Checks: RPD: Relative Percent Difference RER: Relative Error Ratio

Validation Report: Detection Limits

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17-Jan-2023

Project: LTS&M (Phase I)

Task Code: MND01-
02.2207011

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-02.2207011-001	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2207011-007	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2207011-002	0443	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2207011-003	0617	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2207011-004	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2207011-006	P064	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Organics Data Validation Summary

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17-Jan-2023

Task Code: MND01-02.2207011

Project: LTS&M (Phase I)

Lab Code: GEN

Surrogate Recovery:	All surrogate recoveries were within the laboratory acceptance limits.
LCS/LCSD Performance:	There were 3 LCS/LCSD results outside the laboratory acceptance limits.
MS/MSD Performance:	All MS/MSD results were within the laboratory acceptance limits.
Method Blank Performance:	There were 2 method blank results above the MDL.

Noncompliance Report: LCS/LCSD Performance

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18-Jan-2023

Task Code: MND01-02.2207011

Project: LTS&M (Phase I)

Lab Code: GEN

Sample ID	Date Analyzed	Method	Analyte	LCS Recovery	LCSD recovery	Lower Limit	Upper Limit	RPD	RPD Limit	Comment
	08-08-2022	SW-846 8260	4-Methyl-2-Pentanone	127		65	126			Ok-not detected in sample
	08-09-2022	SW-846 8260	Chloromethane	140		60	139			Ok-not detected in sample
	08-09-2022	SW-846 8260	Vinyl chloride	150		67	134			Ok-not detected in sample

Noncompliance Report: Method Blanks

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18-Jan-2023

Task Code: MND01-02.2207011

Project: LTS&M (Phase I)

Lab Code: GEN

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	08-08-2022	SW-846 8260	Acetone	1.90	J	
	08-08-2022	SW-846 8260	Methylene chloride	0.600	J	