



Department of Energy

Washington, DC 20585

June 9, 2025

Via email: Quadri.Syed@epa.gov

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Subject: Transmittal of the Mound Site Annual Sitewide Groundwater Report

Dear Mr. Quadri and Mr. Glum:

Enclosed for your review is the draft Sitewide Groundwater Monitoring Report, Mound, Ohio, Site – Calendar Year 2024. Overall, data from both Phase I and Parcels 6, 7, and 8 support that trichloroethene concentrations are decreasing due to source removal. However, it has been noted the trichloroethene concentrations at one location (source well 0347) in Parcels 6, 7, and 8 exceeded the trigger level of 30 mg/L during the first and fourth quarter sampling events. The data from downgradient monitoring wells support that the remedial objective to protect the Buried Valley Aquifer for both Phase I and Parcels 6, 7, and 8 groundwater continues to be met.

Also enclosed are the responses to U.S. Environmental Protection Agency comments on the Calendar Year 2023 report. The Calendar Year 2023 report was prepared in May of 2024 and comments were received in late 2024. Therefore, many of the changes suggested in these comments were incorporated into this year's document.

Although the Federal Facilities Agreement does not provide a specific comment period, to allow for timely finalization of the document, DOE would appreciate receiving your comments 60 days following receipt of the document. After regulator comments are reviewed and incorporated, the final report will be available to the public on the LM Mound Public Website (<https://www.energy.gov/lm/mound-ohio-site>) under "Site Documents". If there are no comments, the enclosed report will be issued as the final report.

Please contact me at (636) 485-0036 or Tiffany.Drake@lm.doe.gov, if you have any questions.

Sincerely,

**TIFFANY
DRAKE**

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Tiffany Drake
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Sitewide Groundwater Monitoring Report Mound, Ohio, Site

Calendar Year 2024

June 2025



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_0	null hypothesis
H_a	alternative hypothesis
MCL	maximum contaminant level
µg/L	micrograms per liter
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 groundwater 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 2015a), hereafter called the Sitewide Operations and Maintenance Plan. It summarizes the data collected in 2024 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 2024. 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 for 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 (green) and Parcels 6, 7, and 8 (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.

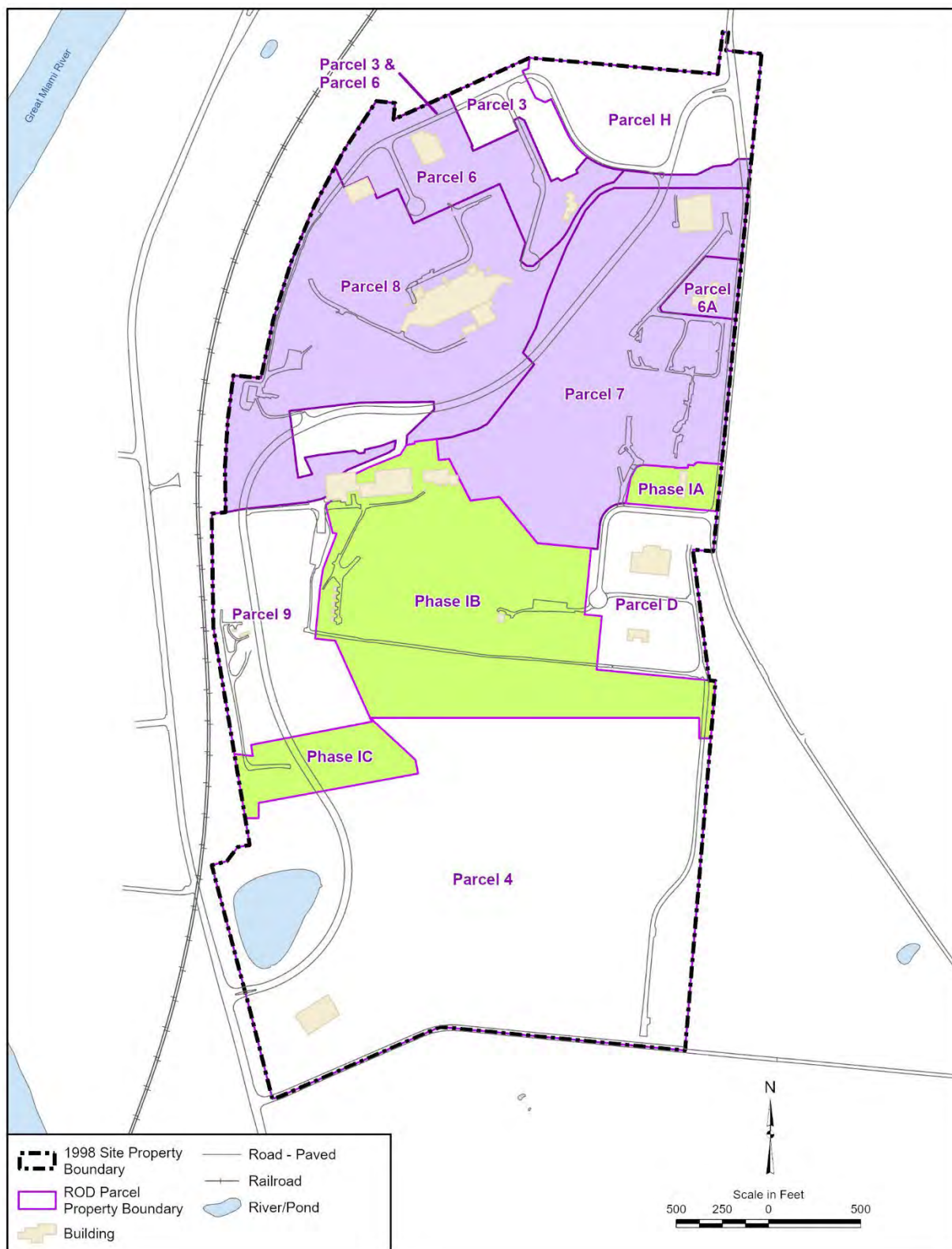


Figure 1. Locations of Phase I and Parcels 6, 7, and 8

The long-term Remedial Action Objective (RAO) for groundwater is to meet Safe Drinking Water Act maximum contaminant levels (MCLs) through MNA in both 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 along the steep hillsides or to the downgradient BVA.

Two monitoring wells on the eastern edge of the BVA indicate volatile organic compound (VOC) impact, primarily TCE, that exceeded the 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.

Three seeps associated with this area are along the Main Hill of the site. Two of the three seeps are within the site boundary, and the remaining seep is offsite to the north. Historically, these seeps 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 and 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.

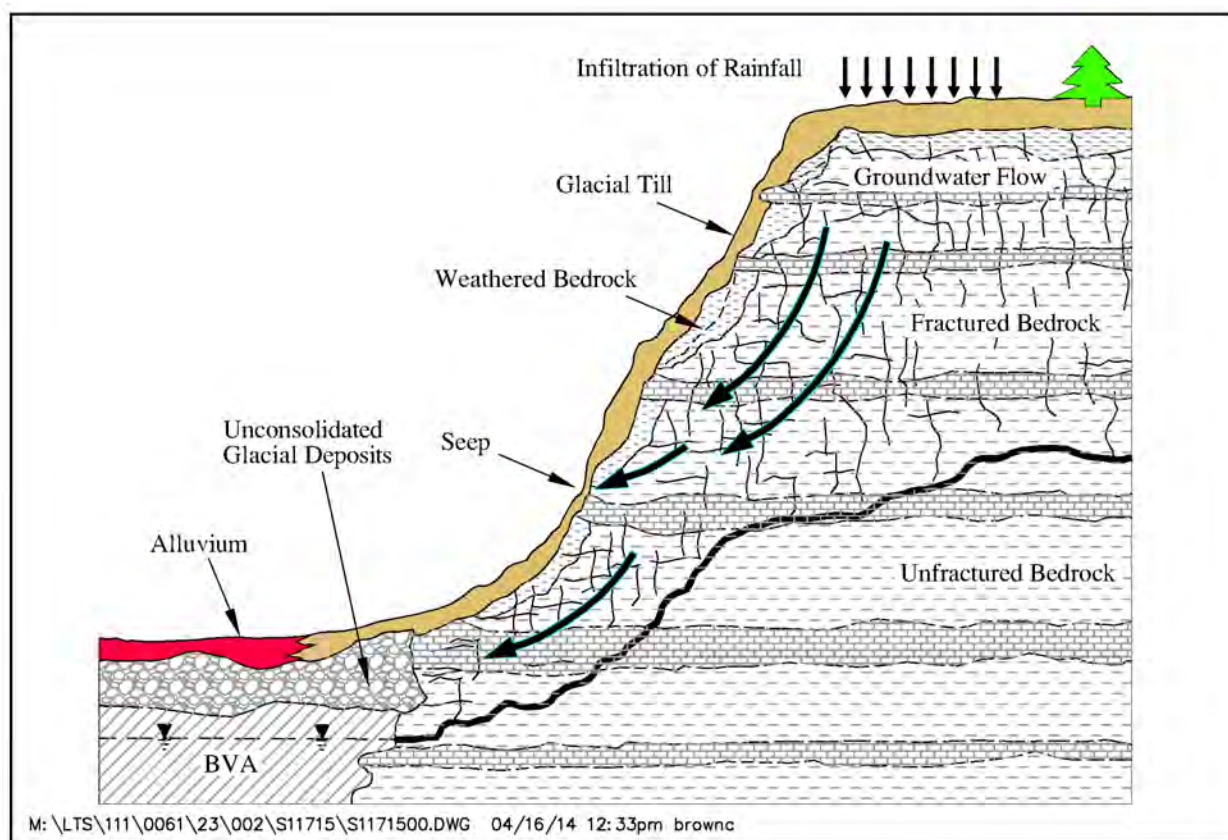


Figure 2. Generalized Cross Section Showing Flow from Bedrock to the BVA

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

Maps depicting the groundwater flow in Phase I and Parcels 6, 7, and 8 have been constructed using the average groundwater elevations measured during 2024 and represent the two flow regimes present at the site: (1) bedrock and (2) the unconsolidated materials of the tributary valley and the BVA. The average groundwater elevations are used because the groundwater levels show little variation across the site. Static water levels in the bedrock are relatively unchanged throughout the year. Water levels within the BVA are influenced by the stage of the Great Miami River, and any extreme high or low water levels are short term. The approximate

location of contact of the BVA with the bedrock is indicated in Figure 2. Groundwater originating from the upper areas of the Mound site flows within the bedrock, following the bedrock topography. This groundwater either discharges at seeps along the hillsides or enters the BVA along the contact with the weathered bedrock. Flow within the BVA is parallel to the bedrock contact.

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 upgradient 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.

Sampling at wells 0353, 0444, and 0445 was discontinued in 2020 because VOCs have not been detected. This change to the monitoring program was approved by both EPA and Ohio EPA after review of the *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site, Calendar Year 2020* (DOE 2021).

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 2024.

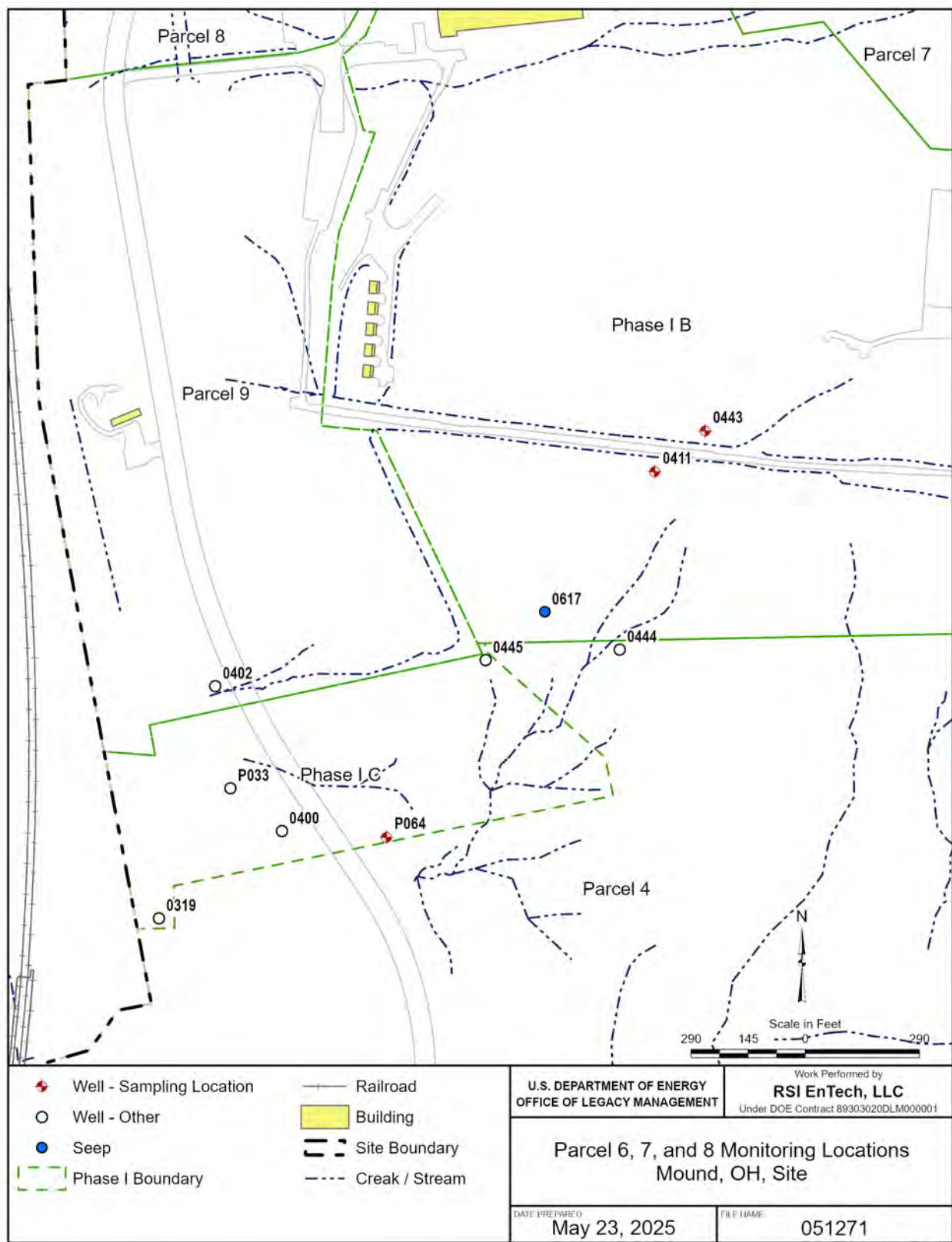
Table 1. Remedy MNA Monitoring for Phase I

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 Remedial Action Objectives

The RAOs include the following:

- Protect the BVA by verifying that the concentrations of TCE in the vicinity of well 0411, well 0443, and seep 0617 are decreasing and that TCE is not impacting the BVA
- Demonstrate the reduction of TCE to concentrations below the MCL in well 0411, well 0443, and seep 0617

2.1.3 Triggers

The contaminant data are evaluated against previous data collected at each location to determine whether concentrations are decreasing which supports that 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 2015a). The triggers and MCLs for each contaminant are summarized in Table 2.

Table 2. Trigger Levels and MCLs 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 that have very low concentrations of VOCs. 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 downgradient seeps to the north and south, and downgradient wells to the west. Water from seeps 0601, 0602, and 0605 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.

Tritium sampling in both groundwater wells and seeps was discontinued in 2020. EPA and Ohio EPA approved this change to the monitoring program after review of the *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site, Calendar Year 2020* (DOE 2021).

Sampling at seeps 0606 and 0607 was discontinued in 2024. This change to the monitoring program was approved by both EPA and Ohio EPA after review of the *Sitewide Groundwater Monitoring Report, Mound, Ohio, Site, Calendar Year 2023* (DOE 2024).

2.2.1 Monitoring Program

Under the MNA monitoring program for Parcels 6, 7, and 8, 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 (DOE 2015a).

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		

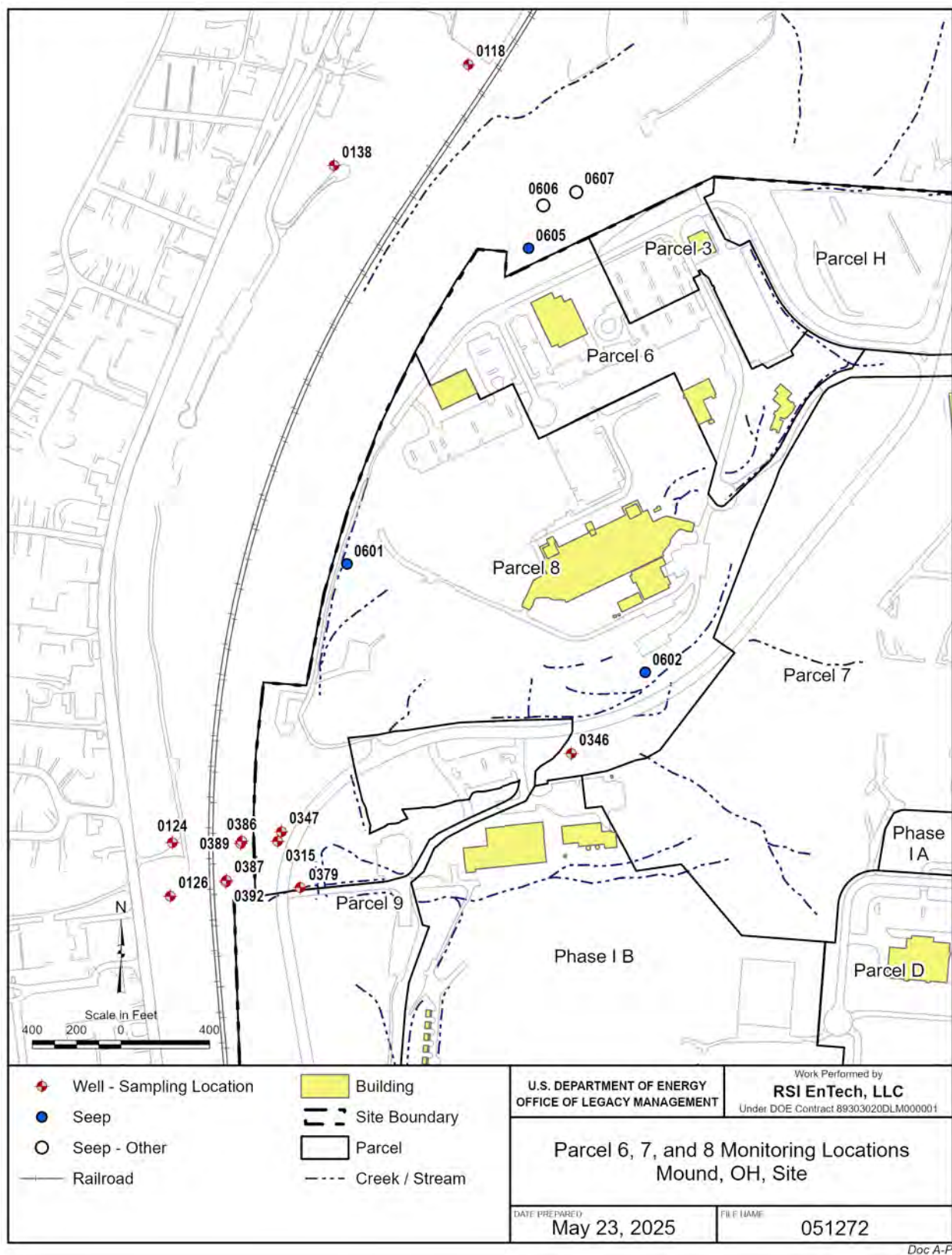


Figure 4. Parcels 6, 7, and 8 Remedy Monitoring Locations

2.2.2 Remedial Action Objectives

The RAOs include the following:

- Protect the downgradient BVA by verifying that TCE concentrations in the vicinity of wells 0315 and 0347 are decreasing and not impacting the BVA
- Monitor the reduction of TCE concentrations to determine whether 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 whether 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
- Monitor the reduction of tritium activity to determine whether levels fall below the MCL in the seeps and to verify the hypothesis that the removal of tritium sources will result in levels below the MCL over time

2.2.3 Trigger Levels

The contaminant data are evaluated against previous data collected at each location to determine whether downward trends are occurring which supports that MNA is adequately addressing groundwater impact. Trigger levels and response actions have been established for specific contaminants at specified locations as presented in the Sitewide Operations and Maintenance Plan (DOE 2015a). The trigger levels and MCLs for each contaminant are summarized in Table 4.

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

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

Abbreviation:

µg/L = micrograms per liter

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 RAOs 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 2015a), 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.

Sampling was performed as follows:

- All required locations in Phase I were sampled in 2024.
- All required locations in Parcels 6, 7, and 8 were sampled in 2024 with following exceptions:
 - Seep 0602, which was dry (no visible flow) during the second, third, and fourth quarter sampling events
 - Seep 0606, which was dry during the third and fourth quarter sampling events
 - Wells 0386, 0387, 0389, and 0392, which were not sampled during the third quarter sampling event because of delays with the property owner (Norfolk Southern Railroad) processing the access agreement
- Site-specific sampling methods were followed during these sampling events. These methods were approved by the Core Team and are integrated into the Sitewide Operations and Maintenance Plan.

2.5 Trend Analysis Methodology

Groundwater data from select locations are evaluated for long-term and short-term trends in contaminant concentrations to provide supporting evidence that contaminant concentrations are decreasing as a result of source removal (contaminated soil and buildings) 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 provides supporting evidence on the direction of changes over time. The computer program ProUCL (version 5.2.0), developed by Lockheed Martin and EPA and maintained by Neptune and Company, Inc., was used to perform trend analysis.

The Mann-Kendall test was performed; this test 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 2015b). Those results indicated that there are no seasonal trends in contaminant data collected from any of the monitoring locations.

Trends were not calculated at locations where more than 50% of the values in the datasets were less than the reporting limit of 1 µg/L and visual inspection of the time-series graphs indicates that concentrations of the target analyte are decreasing. The reporting limits required for the data are pointedly less than the trigger levels and MCLs; therefore, the graphical evaluation provides sufficient evidence that concentrations of an analyte have continued to decrease.

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 (which is included with ProUCL) to determine the linear rate of change in the concentrations to provide approximate time frames when concentrations may reach remediation goals (i.e., MCLs). The Theil-Sen test represents a nonparametric version of the ordinary least squares regression analysis and does not require normally distributed trend residuals. 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 2024 (Table 5) continue to show concentrations of TCE in source area wells 0411 and 0443 and seep 0617. Concentrations of TCE at wells 0411 and 0443 continue to exceed the MCL of 5 micrograms per liter (µg/L). 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. It was noted that PCE was reported in well P064 at a concentration of 1.2 µg/L for both sampling events. No detectable concentrations of cDCE were reported in well P064. No detectable concentrations of tDCE or VC were reported in any of the Phase I wells or seep.

Table 5. Summary of VOC Monitoring Results in Phase I for 2024

Well ID	Location	Parameter (µg/L)	First Semiannual Event	Second Semiannual Event
Source Area Wells and Seep				
0411	0411 Area	TCE	8.1	7.3
		cDCE	2.9	3.4
0443	0411 Area	TCE	10.4	7.4
		cDCE	0.82 (J)	ND (<1)
0617	Seep/ bedrock	TCE	1.3	2.2
		cDCE	0.35 (J)	0.57 (J)
Bedrock/BVA Monitoring Wells				
P064	BVA	TCE	ND (<1)	ND (<1)
		cDCE	ND (<1)	ND (<1)

Note:

Values in **bold** and in shaded cells exceed the MCL of 5 µg/L for TCE.

Abbreviations:

J = estimated value less than the reporting limit

ND = not detected above reporting limit

The data collected during 2024 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 very 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 shallow 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 over the past 5 years have been reported around 10 µg/L, and since 2022, the concentrations have been less than 10 µg/L. Concentrations of TCE in well 0443 and seep 0617 have fluctuated since monitoring of these locations started in 2002. Concentrations of TCE in well 0443 and seep 0617 over the past 5 years have typically been greater than the MCL with a few exceptions.

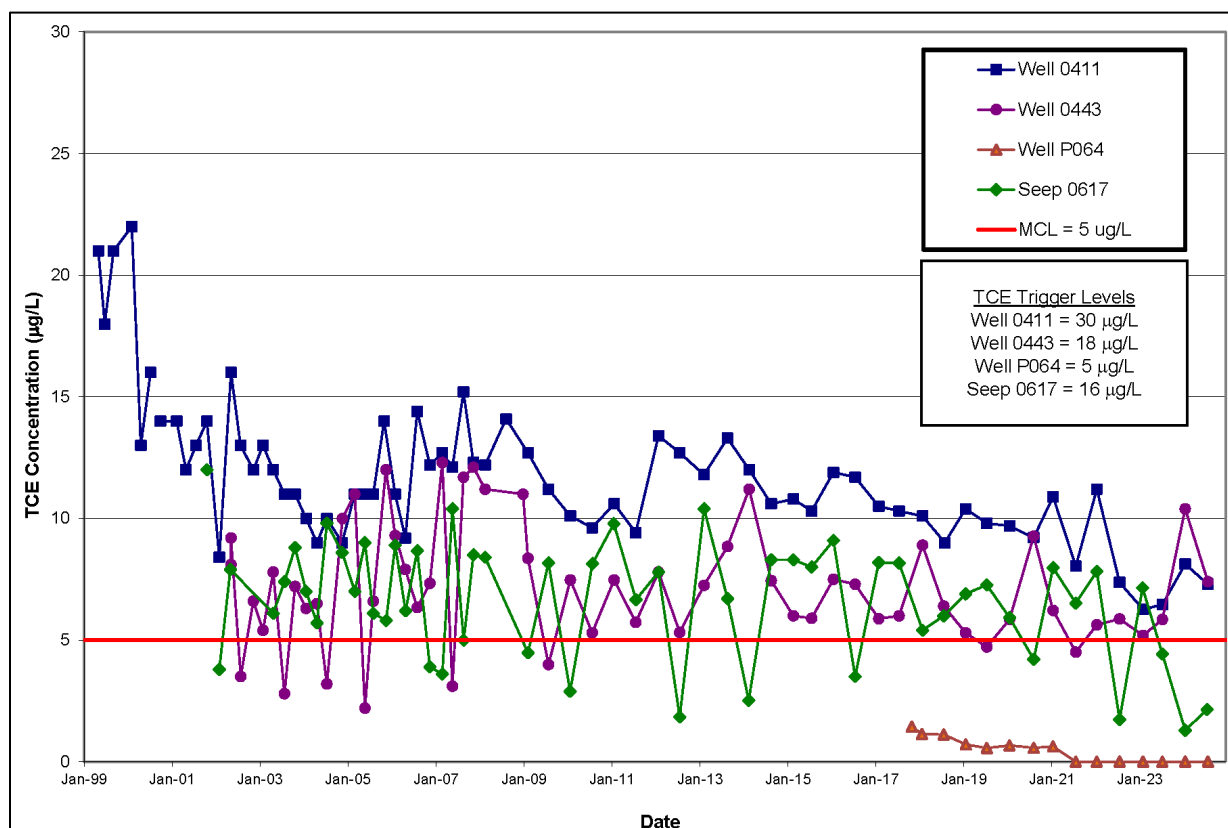


Figure 5. TCE Concentrations in Phase I, 1999–2024

The concentrations of cDCE in groundwater continue to remain very low (less than 5 µg/L). Well 0411 and seep 0617 most consistently exhibit concentrations greater than the reporting limit of 1 µg/L. Over the past few years, the concentrations in seep 0617 have been similar to concentrations in well 0411. The concentrations of cDCE in well 0443 have consistently been below the reporting limit. None of the locations had concentrations of cDCE that exceeded the MCL of 70 µg/L.

3.2 Trend Analysis

Trends were evaluated for the three wells and one seep that are monitored in Phase I. Trends were calculated for TCE data. Mann-Kendall trend analysis was performed using data collected since 1999 for well 0411, since 2002 for well 0443 and seep 0617, and since 2017 for well P064 to evaluate the overall (long-term) change in contaminant concentrations in Phase I groundwater. Short-term trend analysis was also performed using the last 4 years of data from each location to evaluate recent changes in contaminant concentrations. Trends were not calculated at locations where more than 50% of the values in the datasets were less than the reporting limits.

Long-term downward trends were indicated for TCE in wells 0411 and P064 and seep 0617 (Table 6). No upward trends were reported from any of these datasets. Summary reports produced from ProUCL providing details for each statistical evaluation for each monitoring location are contained in Appendix B.

Trend analysis using data from the last 4 years (2021–2024) indicated downward trends for TCE in seep 0617. No upward trends were reported for these datasets. Short-term trends were not evaluated for TCE in well P064 because more than 50% of the data were less than the reporting limit.

Table 6. Trend Analysis Results for TCE in Phase I

Location	Analyte	Trend	
		Long Term ^a	Short Term ^b
Well 0411	TCE	Down	None
Well 0443		None	None
Seep 0617		Down	Down
Well P064		Down	Not calculated ^c

Notes:

^a Long-term trends are based on data collected from 1999–2024 for well 0411, 2002–2024 for well 0443 and seep 0617, and 2017–2024 for well P064.

^b Short-term trends are based on data collected from 2021–2024.

^c Trends for some analytes were not calculated at locations where more than 50% of the values in the datasets were less than the reporting limits.

The Theil-Sen test was used to estimate the magnitude of the long-term downward trend in TCE concentrations in well 0411 and seep 0617 indicated by the Mann-Kendall analysis. The following is a summary of the evaluation of time frames to attain MCLs:

- For well 0411, the slope calculated for the Theil-Sen trend line suggests that the MCL may be reached by 2036. The estimated time frame from the 95% upper and lower confidence levels was estimated between 2028 and 2050. This is consistent with the time frames suggested by previous evaluations of the data trends.
- For seep 0617, the slope calculated for the Theil-Sen trend line suggests that the MCL may be reached by 2039. The estimated time frame from the 95% upper and lower confidence levels was estimated between 2028 and 2148. Results of the Theil-Sen test from previous years did not indicate a significant trend in the slopes of the data pairs; no estimation of when the MCL might be reached was calculated.

The remainder of the locations had concentrations of VOCs that were less than the MCLs or no trend was present; therefore, no time frames are estimated. The results of the Theil-Sen analyses using ProUCL for well 0411 and seep 0617 are included in Appendix B.

3.3 Groundwater Elevations

Maps of the groundwater elevations measured in the Phase I area during each of the 2024 sampling events are presented in Appendix C. These maps represent the two flow regimes at the site: (1) bedrock and (2) the unconsolidated materials of the BVA. The approximate location of contact of the BVA with the bedrock is indicated on the figures. Groundwater originating from the area of wells 0411 and 0443 flows southwest within the fractured and weathered bedrock, following the bedrock topography. This groundwater is predominantly contained within the drainage and discharged at either seep 0617 or 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 2024.

3.4 Summary and Recommendations

The data collected during 2024 continue to indicate that impact is localized in the bedrock groundwater near wells 0411 and 0443 and seep 0617. Monitoring results for 2024 show concentrations of TCE in source area wells 0411 and 0443 and seep 0617 continue to exceed the MCL of 5 µg/L, although concentrations remain low. No samples were above trigger levels. Concentrations of TCE and cDCE in well P064 at the edge of the BVA continue to remain below MCLs, indicating no impacts to the BVA. Evaluating the graphs of the contaminant data indicate that concentrations of TCE continue to decline in the bedrock groundwater, 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, 0602, 0605, and 0607 (Table 7). None of the seeps have TCE concentrations greater than the MCL of 5 µg/L or the trigger level of 150 µg/L for TCE (Table 4) in 2024. 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 2024. These concentrations were well below the trigger level of 75 µg/L. cDCE was periodically reported in seeps 0601, 0602, 0605, and 0607; none of the concentrations were above the MCL of 70 µg/L. Neither tDCE nor VC were measured in the seeps.

Table 7. Summary of VOC Results in the Main Hill Seeps for 2024

Location	Area	VOC Concentrations				
		VOC (µg/L)	Q1	Q2	Q3	Q4
0601	Onsite	PCE	10.8	9.0	4.6	0.91 (J)
		TCE	0.62 (J)	0.67 (J)	0.54 (J)	0.42 (J)
		cDCE	0.96 (J)	0.65 (J)	ND (<1)	ND (<1)
		tDCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0602	Onsite	PCE	ND (<1)	Dry	Dry	Dry
		TCE	3.3			
		cDCE	2.1			
		tDCE	ND (<1)			
		VC	ND (<1)			

Table 7. Summary of VOC Results in the Main Hill Seeps for 2024 (continued)

Location	Area	VOC Concentrations (µg/L)				
		VOC	Q1	Q2	Q3	Q4
0605	Offsite	PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	ND (<1)	0.54 (J)	0.43 (J)	ND (<1)
		cDCE	ND (<1)	ND (<1)	0.83 (J)	ND (<1)
		tDCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0606	Offsite	PCE	ND (<1)	ND (<1)	Dry	Dry
		TCE	ND (<1)	ND (<1)		
		cDCE	ND (<1)	ND (<1)		
		tDCE	ND (<1)	ND (<1)		
		VC	ND (<1)	ND (<1)		
0607	Offsite	PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	0.84 (J)	1.3	0.36 (J)	ND (<1)
		cDCE	1.7	0.66 (J)	ND (<1)	ND (<1)
		tDCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		VC	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** and in shaded cells 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 6) 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 that VOC concentrations have been less variable and decreasing. Data from seep 0602 indicate the highest and most variable concentrations of TCE; data show that although this seep is frequently dry (no observable flow), concentrations of TCE can be greater than the MCL. The remainder of the seeps have TCE concentrations below the MCL since 2018.

Seep 0601 is the only location where PCE is routinely reported. PCE concentrations in this seep (Figure 7) fluctuate but are generally decreasing over the past several years.

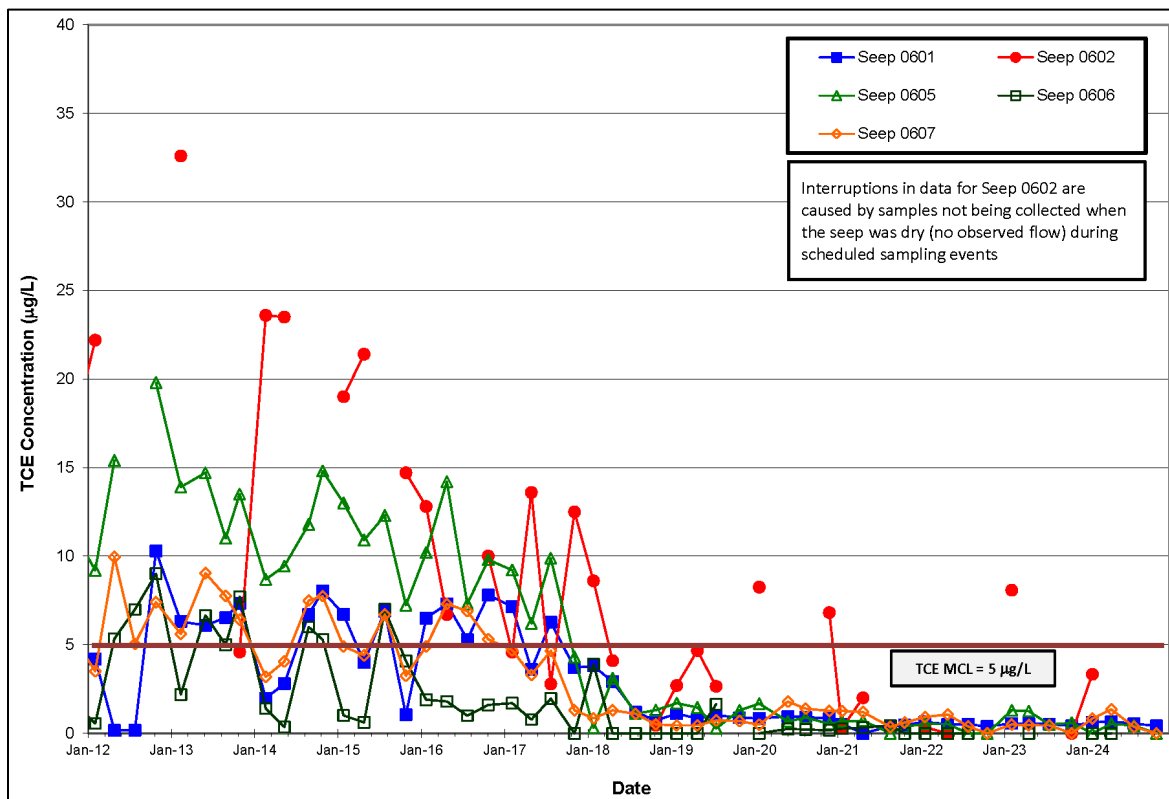


Figure 6. TCE Concentrations in Parcels 6, 7, and 8 Main Hill Seeps, 2012–2024

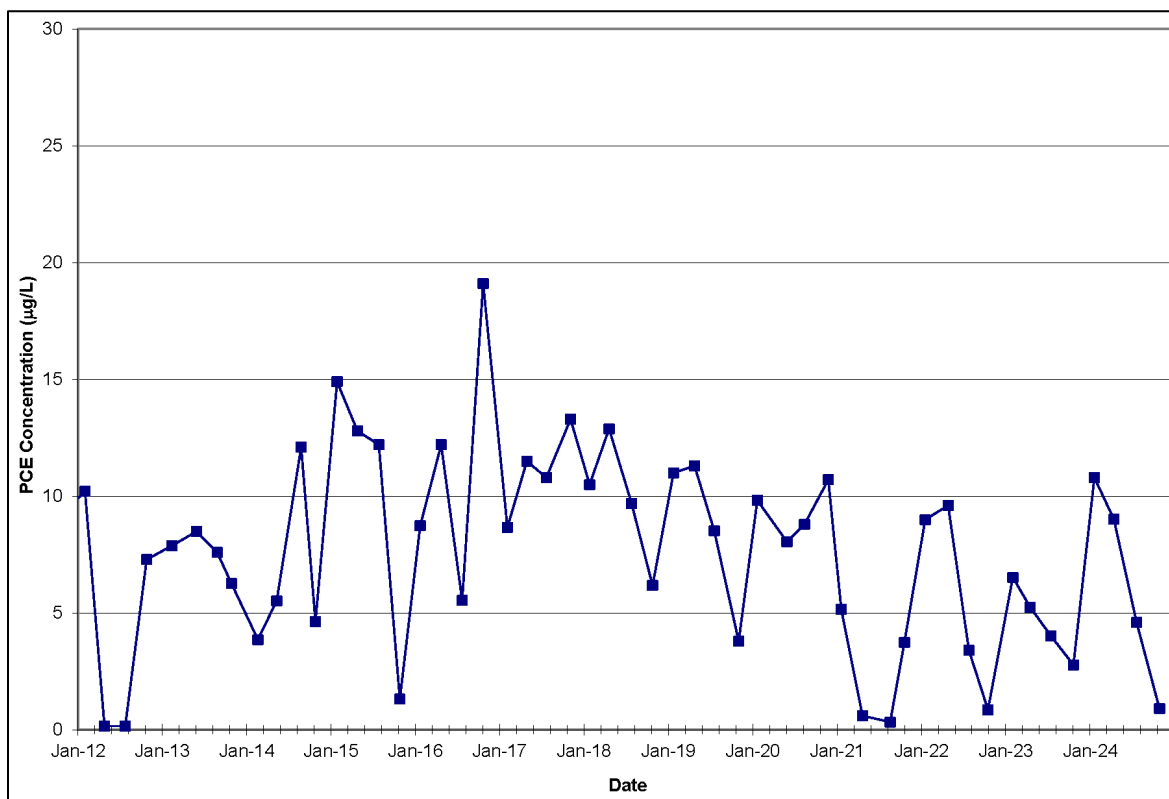


Figure 7. PCE Concentrations in Seep 0601 (Parcels 6, 7, and 8), 2012–2024

4.1.2 Groundwater

Monitoring results for 2024 (Table 8) continue to show the highest concentrations of TCE in well 0347 (source area well) where concentrations exceeded the MCL. The reported concentrations of TCE in this well were also greater than the trigger level of 30 µg/L (Table 4) during the first and fourth quarter sampling events. Concentrations of TCE were reported at or below the reporting limit of 1 µg/L in wells 0315, 0379, and 0386. 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, and 0379. These wells are where the tributary valley enters the BVA. 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 8. Summary of VOC Results in Parcels 6, 7, and 8 Groundwater for 2024

Location	Area	VOC Concentrations (µg/L)				
		VOC	Q1	Q2	Q3	Q4
Onsite Wells						
0315	Source area	PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	1.0	0.41 (J)	ND (<1)	0.50 (J)
0347		PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	31.5	13.7	ND (<1)	31.2
0346	Onsite	PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0379		PCE	0.37 (J)	ND (<1)	0.42 (J)	ND (<1)
		TCE	0.56 (J)	0.40 (J)	0.76 (J)	0.62 (J)
Downgradient Wells—Near (offsite)						
0386	BVA	PCE	ND (<1)	ND (<1)	NS	ND (<1)
		TCE	ND (<1)	0.40 (J)	NS	0.34 (J)
0387		PCE	ND (<1)	ND (<1)	NS	ND (<1)
		TCE (µ/L)	ND (<1)	ND (<1)	NS	ND (<1)
0389		PCE	ND (<1)	ND (<1)	NS	ND (<1)
		TCE	ND (<1)	ND (<1)	NS	ND (<1)
0392		PCE	ND (<1)	ND (<1)	NS	ND (<1)
		TCE	ND (<1)	ND (<1)	NS	ND (<1)
Downgradient Wells—Far (offsite)						
0118	BVA	PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0124		PCE	ND (<1)	0.34 (J)	ND (<1)	ND (<1)
		TCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0126		PCE	0.80 (J)	0.90 (J)	0.95 (J)	0.92 (J)
		TCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
0138		PCE	ND (<1)	ND (<1)	ND (<1)	ND (<1)
		TCE	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** and shaded cells exceed the MCL.

Abbreviations:

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

TCE data from the Main Hill area (Figure 8) indicate that the highest concentrations were measured in groundwater in well 0347; this well has consistently exceeded the MCL. Well 0347 is screened at the interface of the outwash with the underlying bedrock and is paired with well 0315, which is screened approximately 5 ft above well 0347 within the outwash. These wells were identified as source area wells for this monitoring program because they historically exhibited the highest TCE results. Well 0315 historically exhibited elevated concentrations of TCE; 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, with the exception of the result reported for the third quarter of 2022. The concentrations of TCE in the downgradient wells (0379, 0386, and 0389) 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.

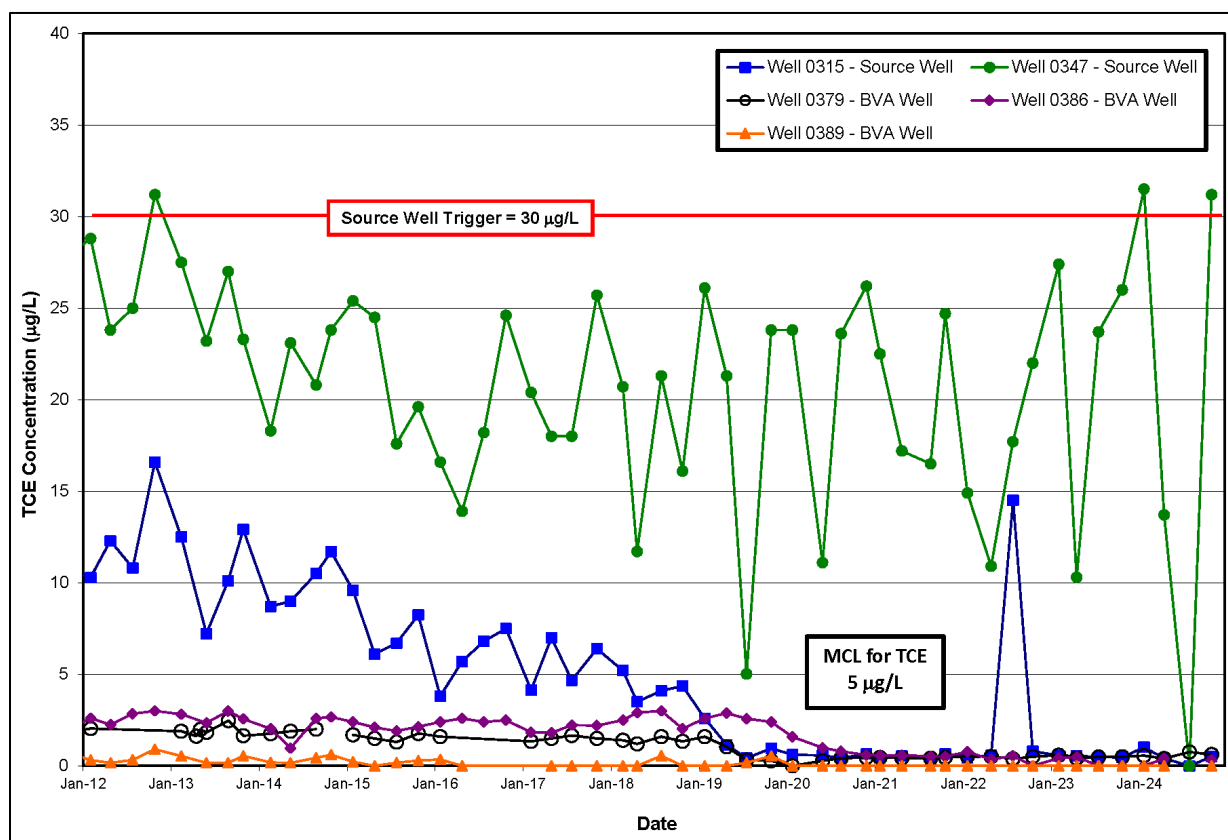


Figure 8. TCE Concentrations in Parcels 6, 7, and 8 Groundwater, 2012–2024

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 6) and well 0347 (Figure 8). Seep 0602 and 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 outwash or at seeps. Infiltrating surface water and precipitation contacts soils with residual amounts of TCE on the Main Hill resulting in TCE-impacted groundwater that discharges to seeps or into tributary valley (DOE 2017).

Data from wells within the tributary valley show that the deep wells screened directly above the bedrock (wells 0347, 0386, and 0387) have higher TCE concentrations than the shallower paired wells (wells 0315, 0389, and 0392). The shallower wells likely monitored TCE-impacted groundwater originating from the shallower sources associated with the Main Hill buildings and soil. Since the removal of these contaminated materials, the concentrations have decreased in response to the remediation of the Main Hill area. The deeper wells continue to monitor the TCE-impacted groundwater infiltrating through remaining TCE-impacted materials beneath the Main Hill that discharge through fractured bedrock to the deeper wells. It should be noted that 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 (source wells) were higher than those measured in the upgradient seeps.

4.2 Trend Analysis

Trends were evaluated for five seeps and four wells monitored under this program. Trends were calculated for TCE in all the seeps and select groundwater monitoring wells because it is the primary contaminant of interest. Wells 0315, 0347, and 0386 were selected because they have been the primary monitoring locations for VOC-impacted groundwater discharging from the bedrock into the BVA. Trends in PCE data were also calculated for seep 0601 because it is the only location where this contaminant is routinely reported and it is the primary monitoring location for this contaminant. Trend analysis is reported for data collected since 2012 to better evaluate the overall (long-term) change in contaminant concentrations after influences of surface water entering the subsurface through the tritium capture pits were reduced or eliminated. Short-term trend analysis was also performed using the last 4 years of data from each location to evaluate recent changes in contaminant concentrations. Trends were not calculated at locations where more than 50% of the values in the datasets were less than the reporting limit of 1 µg/L.

Long-term trend analysis of TCE data collected since 2012 indicates downward trends for all the seeps and wells 0315, 0347, and 0386 (Table 9). Concentrations of PCE in seep 0601 were evaluated for a trend, and no statistically significant trend was indicated. In previous years, the cDCE data from seeps 0602 and 0605 were evaluated for trends; however, trend evaluation was not performed this year because the concentrations of cDCE in these two seeps have remained low and indicated downward trends, also for the short-term trends more than 50% of the data were less than the reporting limit of 1 µg/L.

Table 9. Trend Analysis Results for VOCs in Parcels 6, 7, and 8

Location	Analyte	Trend	
		Long Term ^a	Short Term ^b
Seep 0601	TCE	Down	Not calculated ^c
Seep 0602		Down	None
Seep 0605		Down	Not calculated
Seep 0606		Down	Not calculated
Seep 0607		Down	Not calculated
Well 0315		Down	Not calculated
Well 0347		Down	None
Well 0386		Down	Not calculated
Seep 0601	PCE	None	None

Notes:

^a Long-term trends are based on data collected from 2012–2024.

^b Short-term trends are based on data collected from 2021–2024.

^c Trends for some analytes were not calculated at locations where more than 50% of the values in the datasets were less than the reporting limits.

Trend analysis using data from the last 4 years (2021–2024) indicated no statistically significant trends for TCE in seep 0602 or for well 0347 and no statistically significant trend for PCE in seep 0601. No upward trends were reported for these datasets. Short-term trends for TCE were not evaluated for seeps 0601, 0605, 0606, and 0607 or wells 0315 and 0386 or for cDCE for seeps 0602 and 0605 because more than 50% of the values in the datasets were less than the reporting limits.

The Theil-Sen test was used to estimate the magnitude of the long-term downward trends in TCE concentrations in well 0347 and seep 0602 indicated by the Mann-Kendall analysis. The following is a summary of the evaluation of time frames to attain MCLs:

- TCE data from well 0347 were evaluated using the Theil-Sen test, and the result indicated that there was insufficient evidence to identify a significant trend in the slopes of the data pairs.
- For seep 0602, the slope calculated for the Theil-Sen trend line underestimates the time frame that the MCL may be reached (estimated between 2018 and 2019). The underestimated time frame determined from the 95% upper and lower confidence levels is due to the concentrations of TCE periodically being below the MCL and the large fluctuations of TCE concentrations present in the data (Figure 7).
- PCE data from seep 0601 were evaluated using the Theil-Sen test, and the result indicated that there was insufficient evidence to identify a significant trend in the slopes of the data pairs.

The remainder of the locations had concentrations of VOCs that were less than the MCLs or no trend present; therefore, no time frames are estimated. The results of the Theil-Sen analyses using ProUCL for well 0347 and seeps 0601 and 0602 are included in Appendix B.

4.3 Groundwater Elevations

Maps showing the groundwater elevations measured in Parcels 6, 7, and 8 during 2024 groundwater sampling events are provided in Appendix C. It should be noted that a map was not prepared for the third quarter sampling because many of the wells were not sampled due to access issues with the railroad. These maps depict the two flow regimes present at the site: (1) bedrock and (2) the unconsolidated materials of the tributary valley and the BVA. The maps illustrate the flow of bedrock groundwater originating from the Main Hill area that follows 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 2024.

4.4 Summary and Recommendations

Data collected during 2024 continue to support the conceptual model 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 flows through the fractured bedrock and discharges into the BVA where these two media come into contact within the tributary valley.

The data collected from this monitoring program continue to indicate that VOC concentrations in groundwater originating from the Main Hill have generally decreased due to source removal (contaminated soil and building materials) that was completed in 2006. Three locations, seeps 0601 and 0602 and well 0347 exhibit elevated concentrations of VOCs greater than the MCLs. The concentrations of TCE in well 0347 were greater than the trigger level of 30 µg/L during the first and fourth quarter sampling events.

Evaluation of data from the past several years indicates that concentrations at well 0347 and seeps 0601 and 0602 have become more variable, fluctuating from values greater than MCLs and at times the trigger level to below the reporting limit. Statistical analysis does not indicate upward or downward trends in VOCs collected from 2020–2024 (short term) at these locations. The remainder of the locations have exhibited concentrations below the MCLs for the past 4 to 5 years, with many exhibiting concentrations below reporting limits. Statistical analysis of the data indicates long-term downward trends in all the seeps and several of the monitoring wells.

Evaluation of the 2024 data indicates that no changes to the current VOC monitoring program are warranted at this time. Efforts are being made to better understand the recent increased variability in TCE concentrations observed at well 0347.

5.0 Inspection of the Monitoring System

A routine maintenance program has been implemented 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 performed during each sampling or static water level measurement event. If any deficiencies requiring repairs or unusual observations are observed,

then they are documented in the field notes and reported to the project lead and will be included in the annual report.

No deficiencies were noted in 2024, and the wells and seep locations were reported in good condition. Routine mowing and vegetation control was performed throughout the year to allow for access.

6.0 Data Validation

All data collected were validated in accordance with procedures specified in the Sitewide Operations and Maintenance Plan (DOE 2015a). 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 2024 data, including data validation qualifiers, are summarized in Appendix D.

Nine Requisition Index Numbers (RINs) were established for the 2024 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. Table 10 lists the RINs associated with this report.

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 10. RINs for Mound Site Calendar Year 2024 Sampling

RIN	Area	Sampling Date	Notes
MND01-01.2401035	Parcels 6, 7, and 8	January 29–30, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0347. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.
MND01-01.2404036		April 22, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was not included. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.

Table 10. RINs for Mound Site Calendar Year 2024 Sampling (continued)

RIN	Area	Sampling Date	Notes
MND01-01.2404037		April 22, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0347. Duplicate results demonstrate acceptable overall precision. A trip blank was not submitted with these samples. They were shipped with request 2404036.
MND01-01.2407038		July 30 and August 8, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0347. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.
MND01-01.2407039	Parcels 6, 7, and 8 (continued)	August 5, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0347. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.
MND01-01.2410041		November 5, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0347. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.
MND01-01.2410042		November 5–6, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was not included. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.

Table 10. RINs for Mound Site Calendar Year 2024 Sampling (continued)

RIN	Area	Sampling Date	Notes
MND01-02.2401014	Phase I	January 29, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well P064. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.
MND01-02.2407015		July 30–August 6, 2024	All data are acceptable as qualified; no data were rejected. A field duplicate was collected from well 0411. Duplicate results demonstrate acceptable overall precision. Trip blanks were prepared and analyzed. No contaminants of interest were detected that would have an impact on the results in the primary samples.

Data Assessment Reports are prepared for each RIN and are presented in Appendix E. The assessment reports summarize the evaluation of the data quality indicators associated with the data. 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

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

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

Numerous quality control samples are collected in support of environmental monitoring activities. Samples are also provided to the laboratory for internal laboratory quality control evaluation specific to the samples' media (matrix spikes, matrix spike duplicates, and matrix duplicate samples). The following is a summary of the various quality control samples that are collected to support the environmental monitoring activities at the site (DOE 2015a):

- **Field duplicate:** One collected per 20 samples
- **Equipment blank:** One collected per 20 samples
- **Matrix spike/matrix spike duplicate:** One collected per 20 samples
- **Matrix duplicate:** One collected per 20 samples
- **Trip blank:** One collected per cooler containing VOC samples

As noted in Table 10, the data from the field duplicates demonstrated acceptable overall precision. Field duplicate results are included in the groundwater and seep data tables in Appendix D. Field duplicates are designated with the sample type code of D. Information related to the remainder of the quality control samples collected for each RIN are included in the Data Assessment Reports included in Appendix E.

7.0 References

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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 = feet

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 (M-K) 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 M-K 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 M-K test. Hence, the M-K test is a nonparametric (distribution-free) test.

Calculations to Determine Whether a Trend Exists

The M-K 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 M-K test will reject the H_0 and accept the H_a hypothesis.

The M-K 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, $x_1, x_2, \dots, x_n$, 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 M-K 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 : no monotonic trend exists
- H_α : 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 M-K test will falsely reject H_0 (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 M-K 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 M-K 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 M-K 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.

ProUCL Trending Results Abbreviations

Appx	approximate
LCL	lower confidence limit
M-K	Mann-Kendell test
M1	median slope lower confidence limit
M2	median slope upper confidence limit
mg/L	microgram per liter
n	number of values reported
OLS	ordinary least squares
<i>p</i> value	probability value
UCL	upper confidence limit

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.

Phase I ProUCL Trending Results

Well 0411 1999–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/26/2025 4:07:55 PM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	69
Number of values reported (n)	69
Minimum	6.26
Maximum	22
Mean	11.77
Geometric mean	11.42
Median	11.2
Standard deviation	3.039
Coefficient of variation	0.258
Mann-Kendall Test	
M-K test value (S)	-1107
Critical value (0.05)	-1.645
Standard deviation of S	192.9
Standardized value of S	-5.734
Approximate <i>p</i> value	4.9131E-9

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

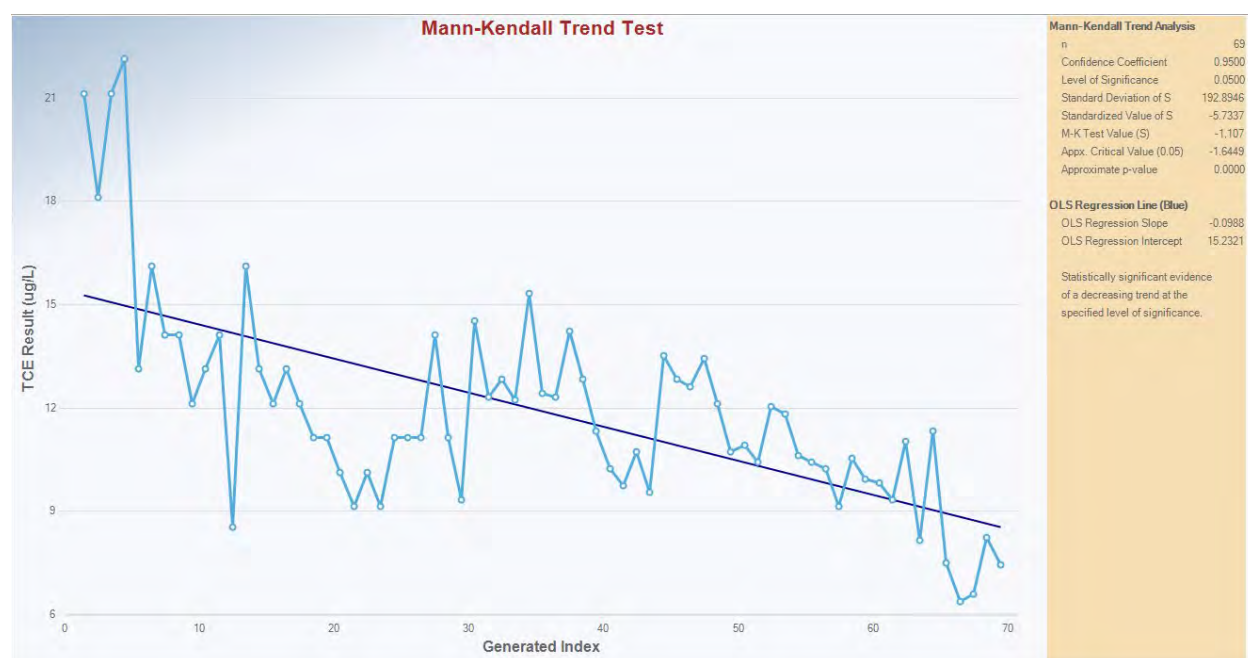


Figure B-1. Mann-Kendall Trend Test for Well 0411, 1999–2024 TCE Dataset

Well 0411 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 7:24:56 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	8
Number of values reported (n)	8
Minimum	6.26
Maximum	11.2
Mean	8.208
Geometric mean	8.034
Median	7.705
Standard deviation	1.874
Coefficient of variation	0.228
Mann-Kendall Test	
M-K test value (S)	-10
Tabulated <i>p</i> value	0.138
Standard deviation of S	8.083
Standardized value of S	-1.113
Approximate <i>p</i> value	0.133

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

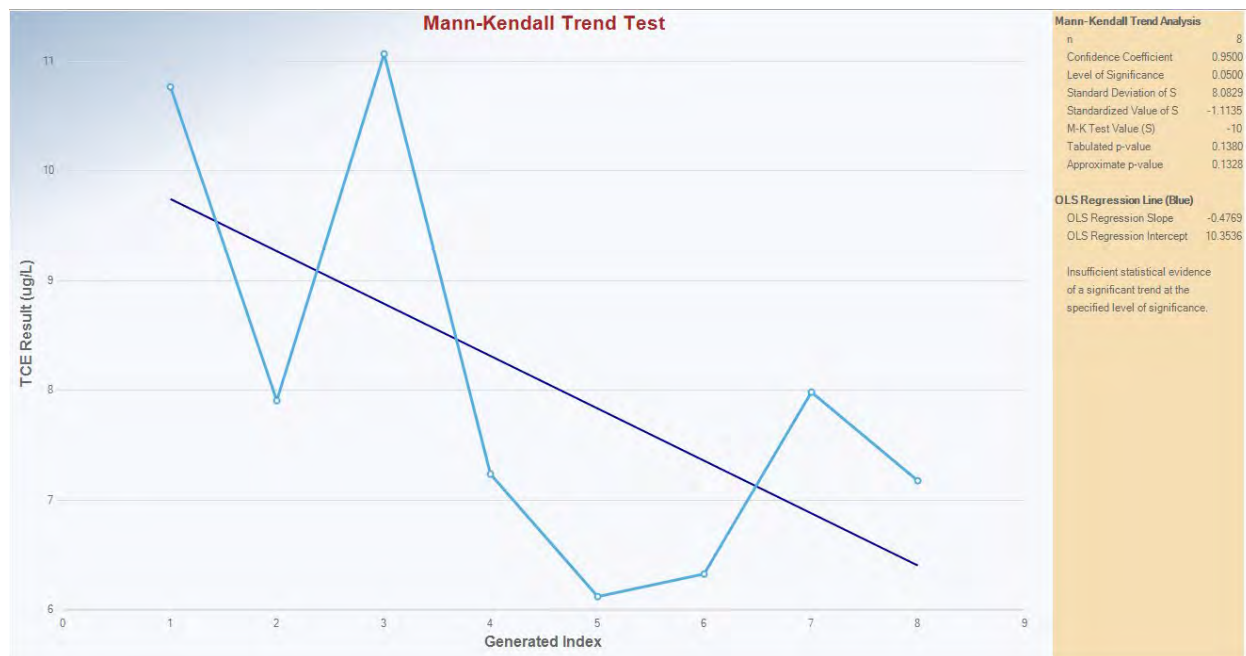


Figure B-2. Mann-Kendall Trend Test for Well 0411, 2021–2024 TCE Dataset

Well 0443 2002–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 6:55:03 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	57
Number of values reported (n)	57
Minimum	2.2
Maximum	14
Mean	7.282
Geometric mean	6.791
Median	6.6
Standard deviation	2.649
Coefficient of variation	0.364
Mann-Kendall Test	
MK test value (S)	-130
Critical value (0.05)	-1.645
Standard deviation of S	145.2
Standardized value of S	-0.888
Approximate p value	0.187

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

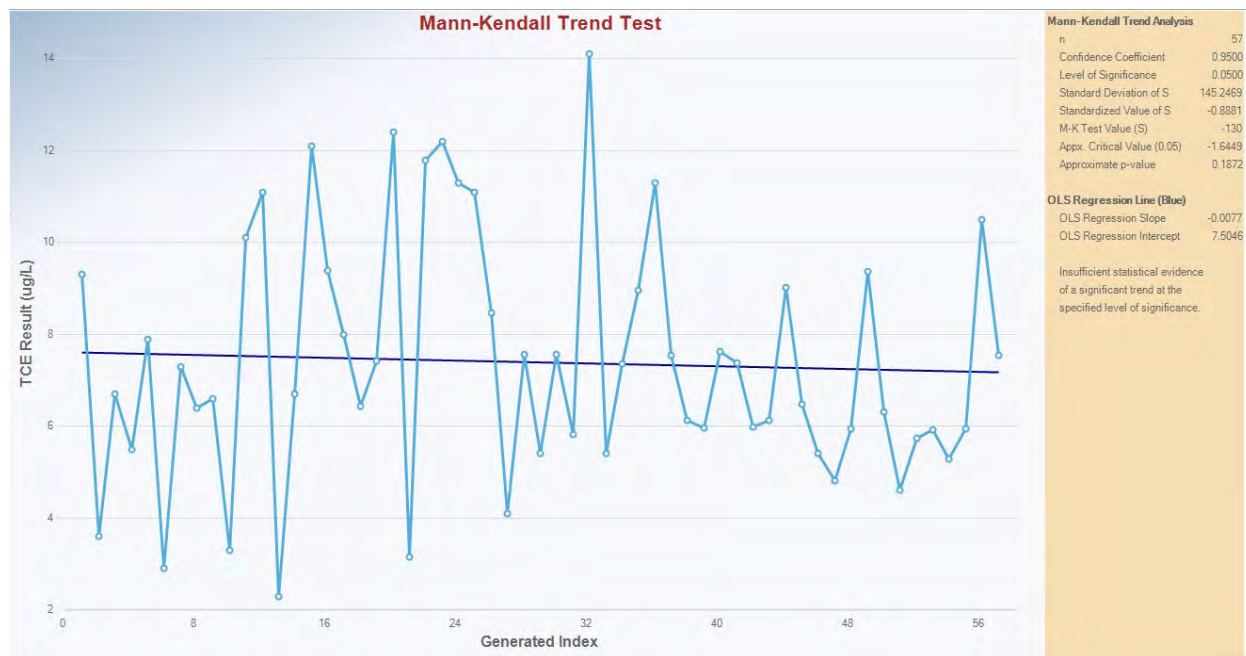


Figure B-3. Mann-Kendall Trend Test for Well 0443, 2002–2024 TCE Dataset

Well 0443 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 6:59:31 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	8
Number of values reported (n)	8
Minimum	4.5
Maximum	10.4
Mean	6.383
Geometric mean	6.191
Median	5.84
Standard deviation	1.829
Coefficient of variation	0.286
Mann-Kendall Test	
MK test value (S)	12
Tabulated <i>p</i> value	0.089
Standard deviation of S	8.083
Standardized value of S	1.361
Approximate <i>p</i> value	0.0868

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

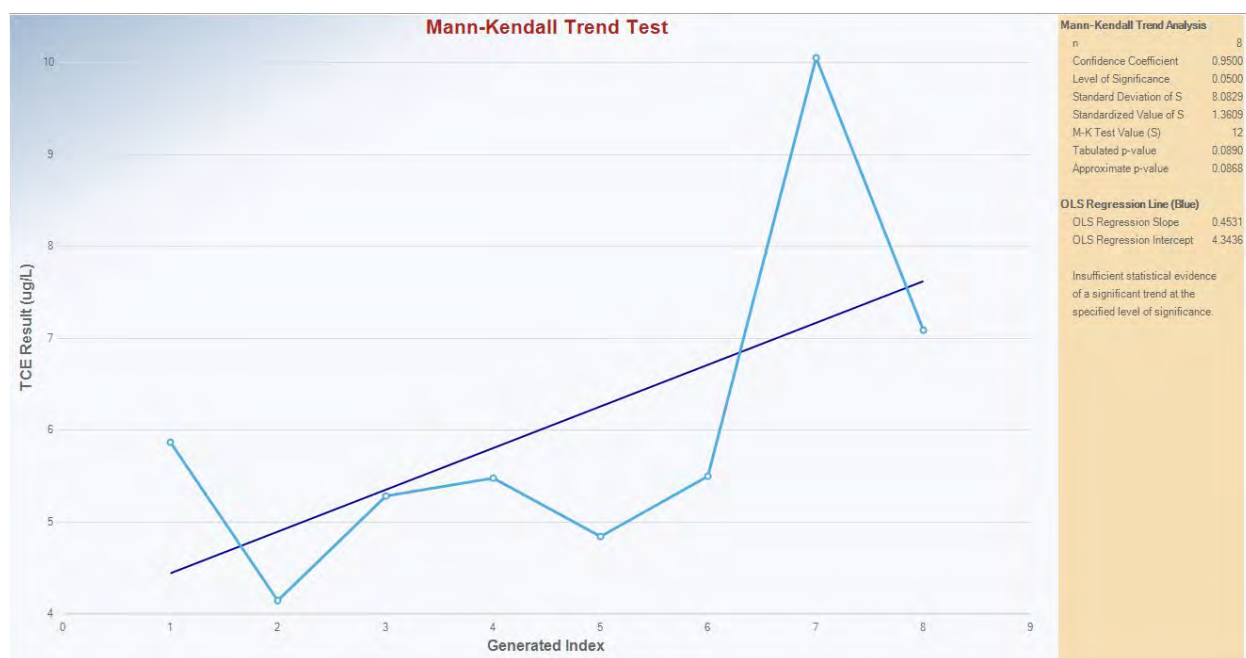


Figure B-4. Mann-Kendall Trend Test for Well 0443, 2021–2024 TCE Dataset

Seep 0617 2002–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/30/2025 8:45:04 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	54
Number of values reported (n)	54
Minimum	1.29
Maximum	10.4
Mean	6.56
Geometric mean	5.986
Median	7
Standard deviation	2.35
Coefficient of variation	0.358
Mann-Kendall Test	
M-K test value (S)	-279
Critical value (0.05)	-1.645
Standard deviation of S	134
Standardized value of S	-2.074
Approximate p value	0.019

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

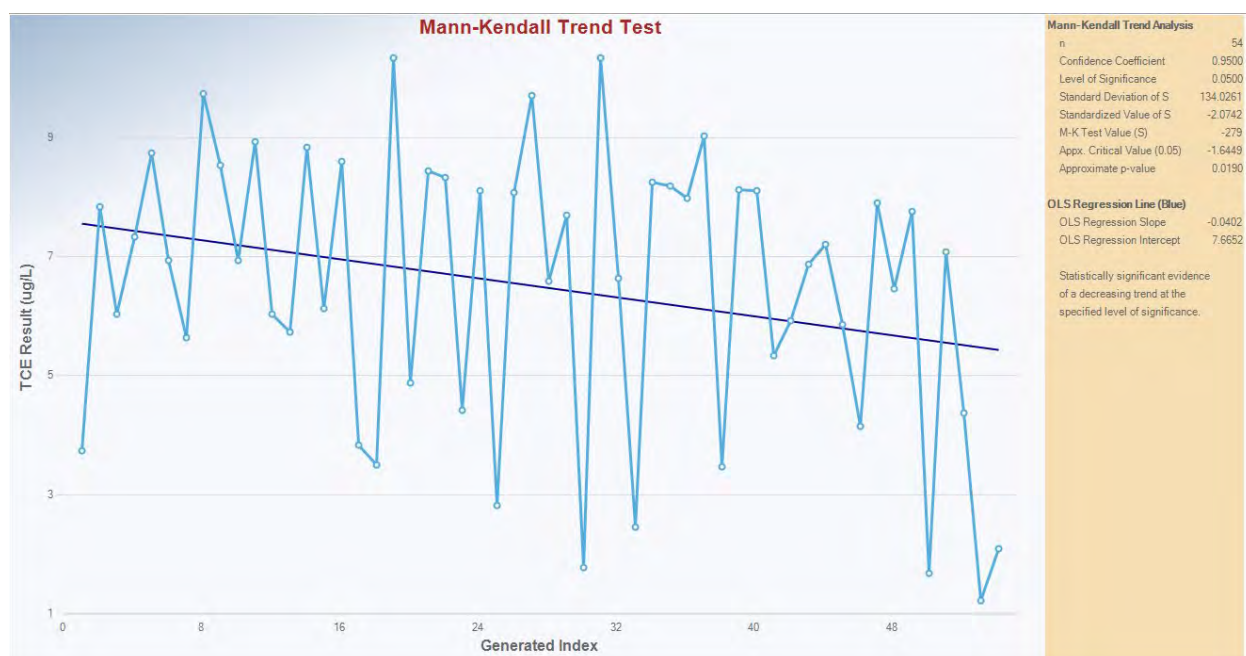


Figure B-5. Mann-Kendall Trend Test for Seep 0617, 2002–2024 TCE Dataset

Seep 0617 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 7:15:22 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	8
Number of values reported (n)	8
Minimum	1.29
Maximum	7.97
Mean	4.885
Geometric mean	3.974
Median	5.475
Standard deviation	2.841
Coefficient of variation	0.582
Mann-Kendall Test	
M-K test value (S)	-16
Tabulated <i>p</i> value	0.031
Standard deviation of S	8.083
Standardized value of S	-1.856
Approximate <i>p</i> value	0.0317

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

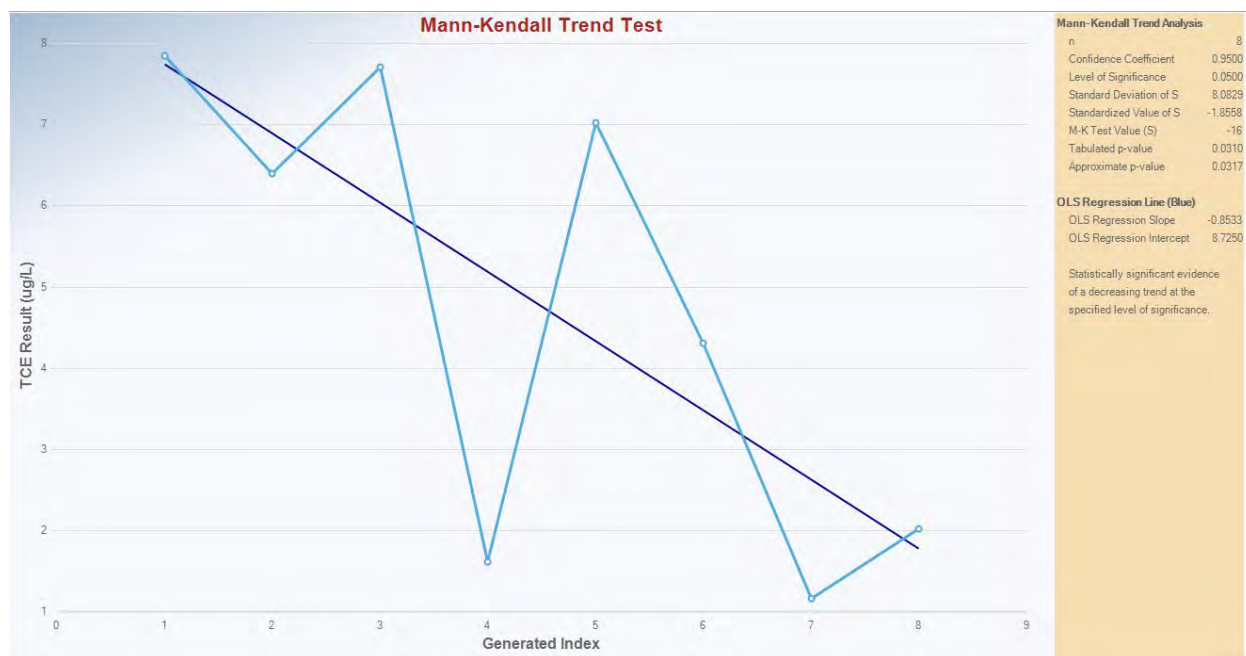


Figure B-6. Mann-Kendall Trend Test for Seep 0617, 2021–2024 TCE Dataset

Well P064 2017–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 7:21:35 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	15
Number of values reported (n)	15
Minimum	0.333
Maximum	1.44
Mean	0.611
Geometric mean	0.533
Median	0.56
Standard deviation	0.357
Coefficient of variation	0.584
Mann-Kendall Test	
M-K test value (S)	-76
Tabulated <i>p</i> value	0
Standard deviation of S	19.08
Standardized value of S	-3.931
Approximate <i>p</i> value	4.2285E-5

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

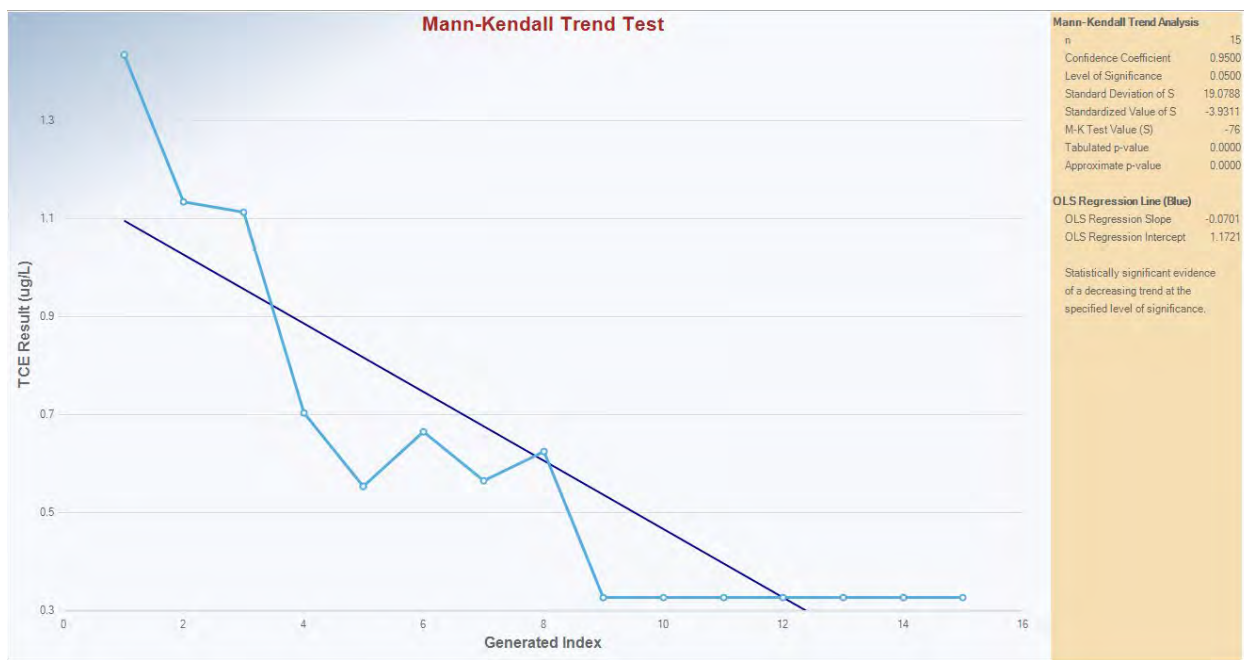


Figure B-7. Mann-Kendall Trend Test for Well P064, 2017–2024 TCE Dataset

Well 0411 1999–2024 Theil-Sen Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/30/2025 8:24:34 AM
From file	WorkSheet.xls
Full precision	OFF
Average replicates	Replicates at sampling events will be averaged
Confidence coefficient	0.95
TCE Result (µg/L)	
General Statistics	
Number of events	69
Number of values reported (n)	69
Number of values after averaging	69
Number of replicates	0
Minimum	6.26
Maximum	22
Mean	11.77
Geometric mean	11.42
Median	11.2
Standard deviation	3.039
Coefficient of variation	0.258
Mann-Kendall Statistics	
M-K test value (S)	-1107
Critical value (0.05)	-1.645
Standard deviation of S	192.9
Standardized value of S	-5.734
Approximate <i>p</i> value	4.9131E-9
Approximate inference for Theil-Sen Trend Test	
Number of slopes	2346
Theil-Sen slope	-6.157E-4
Theil-Sen intercept	35.46
M2'	1332
One-sided 95% upper limit of slope	-4.671E-4
95% LCL of slope (0.025)	-8.245E-4
95% UCL of slope (0.975)	-4.340E-4

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
1	36279	21	13.12	7.879
2	36332	18	13.09	4.912
3	36405	21	13.04	7.957
4	36557	22	12.95	9.05
5	36633	13	12.9	0.097
6	36714	16	12.85	3.147
7	36796	14	12.8	1.197
8	36931	14	12.72	1.28
9	37007	12	12.67	-0.673
10	37092	13	12.62	0.38
11	37182	14	12.56	1.435
12	37285	8.4	12.5	-4.102
13	37382	16	12.44	3.558
14	37461	13	12.39	0.607
15	37568	12	12.33	-0.327
16	37649	13	12.28	0.723
17	37733	12	12.23	-0.226
18	37827	11	12.17	-1.168
19	37916	11	12.11	-1.113
20	38008	10	12.06	-2.056
21	38098	9	12	-3.001
22	38180	10	11.95	-1.951
23	38308	9	11.87	-2.872
24	38411	11	11.81	-0.808
25	38496	11	11.76	-0.756
26	38566	11	11.71	-0.713
27	38657	14	11.66	2.343
28	38748	11	11.6	-0.601
29	38833	9.2	11.55	-2.348
30	38933	14.4	11.49	2.913
31	39038	12.2	11.42	0.778
32	39141	12.7	11.36	1.341
33	39225	12.1	11.31	0.793
34	39316	15.2	11.25	3.949
35	39399	12.3	11.2	1.1
36	39497	12.2	11.14	1.06
37	39671	14.1	11.03	3.067
38	39854	12.7	10.92	1.78
39	40023	11.2	10.82	0.384
40	40205	10.1	10.7	-0.604
41	40388	9.62	10.59	-0.971
42	40569	10.6	10.48	0.12
43	40749	9.42	10.37	-0.949
44	40938	13.4	10.25	3.148
45	41116	12.7	10.14	2.557
46	41319	12.5	10.02	2.482
47	41514	13.3	9.898	3.402
48	41694	12	9.787	2.213
49	41877	10.6	9.674	0.926

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
50	42031	10.8	9.58	1.22
51	42214	10.3	9.467	0.833
52	42394	11.9	9.356	2.544
53	42576	11.7	9.244	2.456
54	42772	10.5	9.123	1.377
55	42941	10.3	9.019	1.281
56	43130	10.1	8.903	1.197
57	43321	9.01	8.785	0.225
58	43500	10.4	8.675	1.725
59	43670	9.8	8.57	1.23
60	43859	9.69	8.454	1.236
61	44060	9.21	8.33	0.88
62	44222	10.9	8.231	2.669
63	44411	8.04	8.114	-0.0742
64	44586	11.2	8.006	3.194
65	44775	7.37	7.89	-0.52
66	44970	6.26	7.77	-1.51
67	45131	6.46	7.671	-1.211
68	45320	8.12	7.555	0.565
69	45510	7.31	7.438	-0.128

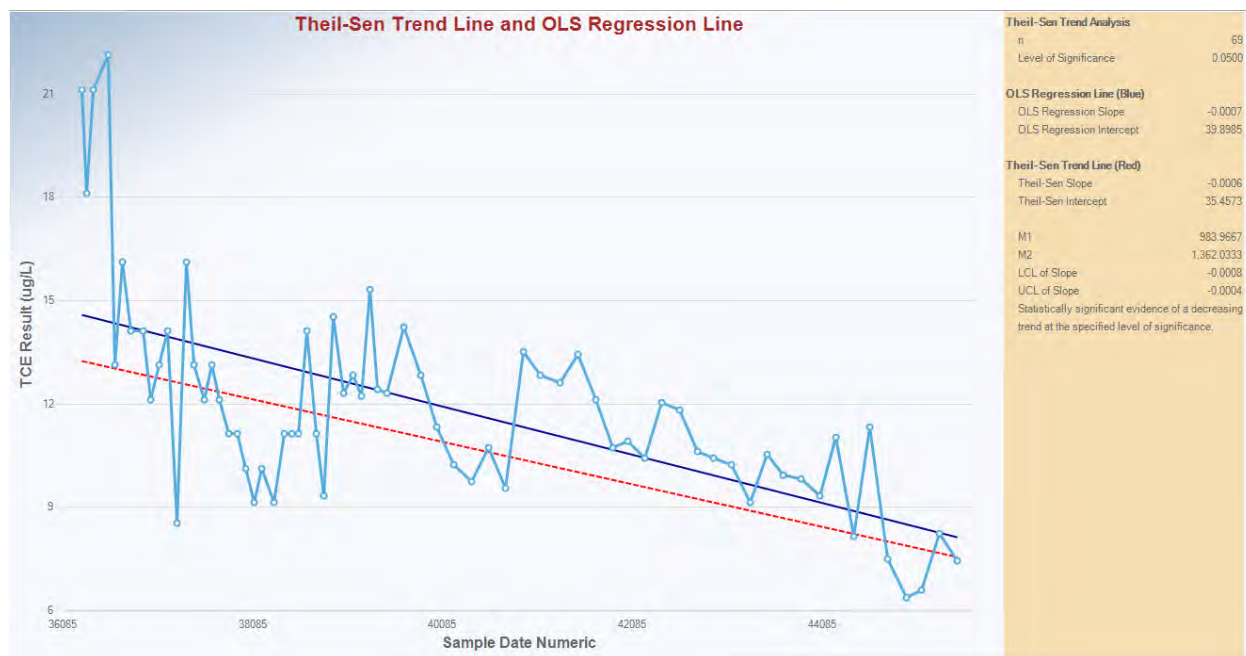


Figure B-8. Theil-Sen Trend Analysis for Well 0411, 1999–2024 TCE Dataset

Seep 0617 2002–2024 Theil-Sen Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/30/2025 8:57:38 AM
From file	WorkSheet.xls
Full precision	OFF
Average replicates	Replicates at sampling events will be averaged
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of events	54
Number of values reported (n)	54
Number of values after averaging	54
Number of replicates	0
Minimum	1.29
Maximum	10.4
Mean	6.56
Geometric mean	5.986
Median	7
Standard deviation	2.35
Coefficient of variation	0.358
Mann-Kendall Statistics	
M-K test value (S)	–279
Critical value (0.05)	–1.645
Standard deviation of S	134
Standardized value of S	–2.074
Approximate <i>p</i> value	0.019
Approximate inference for Theil-Sen Trend Test	
Number of slopes	1431
Theil-Sen slope	–2.340E-4
Theil-Sen intercept	16.51
M2'	825.7
One-sided 95% upper limit of slope	–6.413E-5
95% LCL of slope (0.025)	–5.024E-4
95% UCL of slope (0.975)	–2.012E-5

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
1	37286	3.8	7.789	-3.989
2	37377	7.9	7.768	0.132
3	37733	6.1	7.685	-1.585
4	37827	7.4	7.663	-0.263
5	37915	8.8	7.642	1.158
6	38008	7	7.62	-0.62
7	38098	5.7	7.599	-1.899
8	38180	9.8	7.58	2.22
9	38308	8.6	7.55	1.05
10	38413	7	7.526	-0.526
11	38496	9	7.506	1.494
12	38567	6.1	7.49	-1.39
13	38674	5.8	7.465	-1.665
14	38748	8.9	7.447	1.453
15	38834	6.2	7.427	-1.227
16	38932	8.67	7.404	1.266
17	39038	3.9	7.379	-3.479
18	39141	3.57	7.355	-3.785
19	39225	10.4	7.336	3.064
20	39318	4.95	7.314	-2.364
21	39400	8.5	7.295	1.205
22	39497	8.4	7.272	1.128
23	39853	4.48	7.189	-2.709
24	40023	8.17	7.149	1.021
25	40203	2.89	7.107	-4.217
26	40389	8.14	7.063	1.077
27	40568	9.78	7.021	2.759
28	40751	6.66	6.979	-0.319
29	40939	7.76	6.935	0.825
30	41116	1.84	6.893	-5.053
31	41316	10.4	6.846	3.554
32	41513	6.7	6.8	-0.1
33	41689	2.52	6.759	-4.239
34	41981	8.31	6.691	1.619
35	42033	8.26	6.679	1.581
36	42214	8.05	6.636	1.414
37	42394	9.09	6.594	2.496
38	42576	3.53	6.552	-3.022
39	42772	8.19	6.506	1.684
40	42941	8.17	6.466	1.704
41	43129	5.4	6.422	-1.022
42	43311	5.99	6.38	-0.39
43	43493	6.93	6.337	0.593
44	43669	7.27	6.296	0.974
45	43857	5.92	6.252	-0.332
46	44061	4.21	6.204	-1.994
47	44221	7.97	6.167	1.803
48	44411	6.52	6.122	0.398
49	44585	7.83	6.081	1.749

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
50	44775	1.74	6.037	-4.297
51	44966	7.15	5.992	1.158
52	45131	4.43	5.954	-1.524
53	45320	1.29	5.909	-4.619
54	45503	2.15	5.867	-3.717

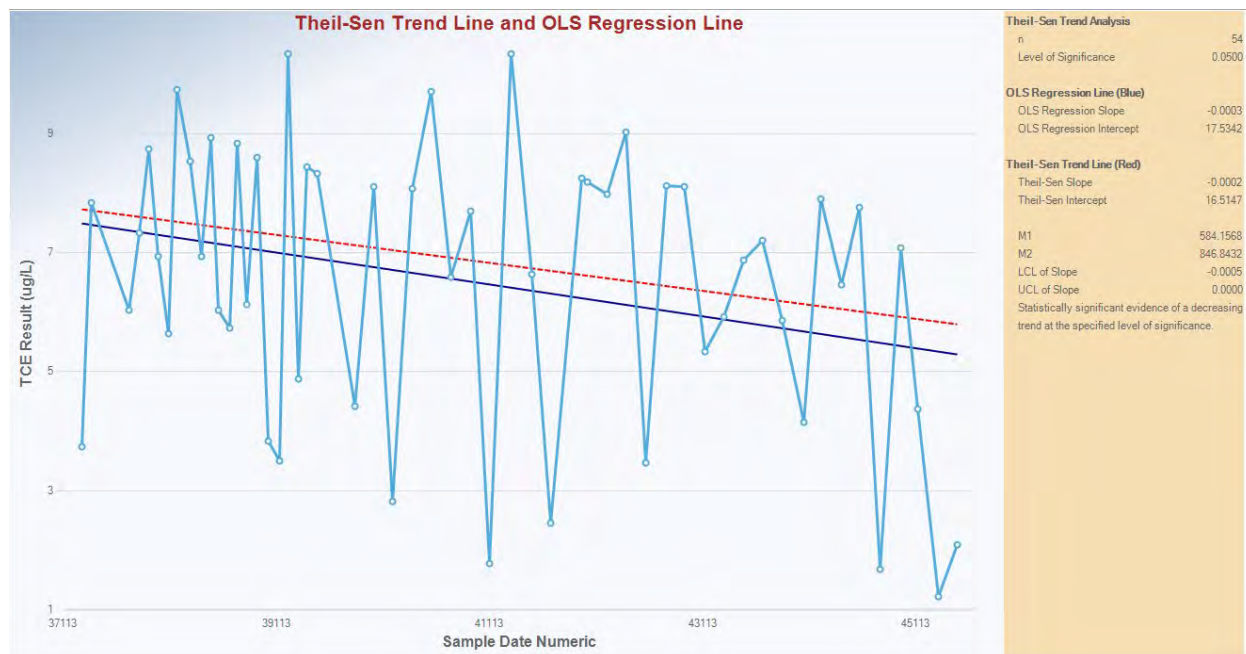


Figure B-9. Theil-Sen Trend Analysis for Seep 0617, 2002–2024 TCE Dataset

Parcels 6, 7, and 8 ProUCL Trending Results

Seep 0601 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:11:39 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	52
Number of values reported (n)	52
Minimum	0.16
Maximum	10.3
Mean	2.901
Geometric mean	1.532
Median	1.03
Standard deviation	2.9
Coefficient of variation	1
Mann-Kendall Statistics	
M-K test value (S)	-709
Critical value (0.05)	-1.645
Standard deviation of S	126.7
Standardized value of S	-5.588
Approximate p value	1.1471E-8

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

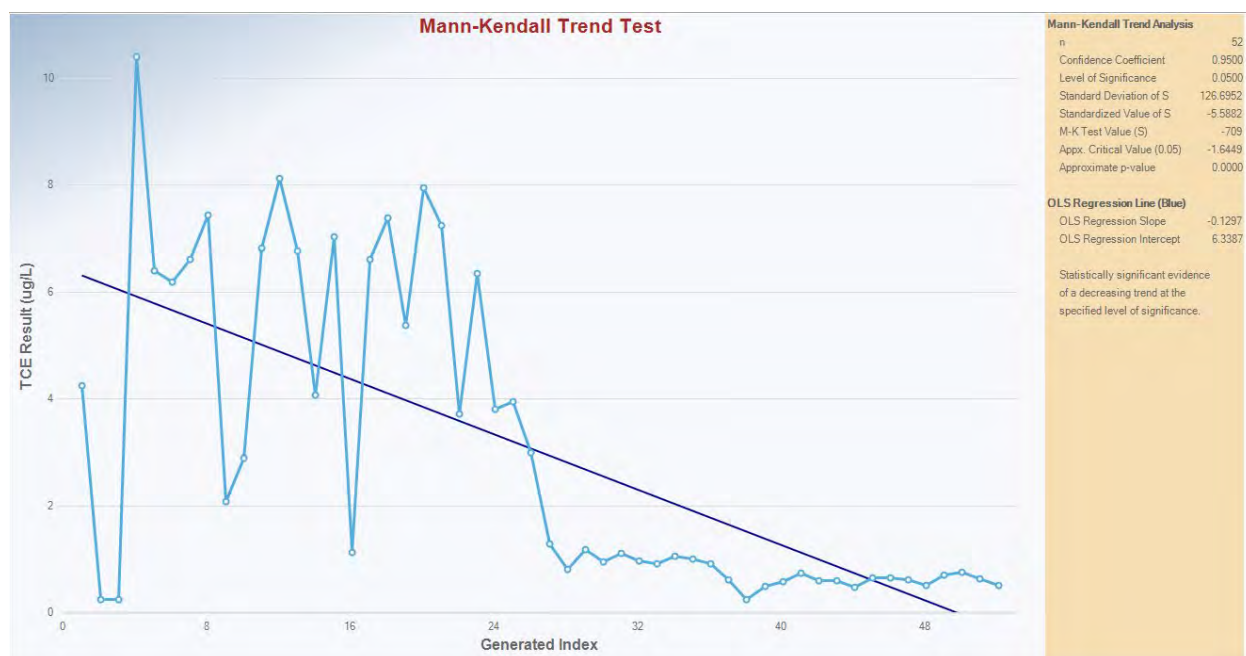


Figure B-10. Mann-Kendall Trend Test for Seep 0601, 2012–2024 TCE Dataset

Seep 0602 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:25:31 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	30
Number of values reported (n)	30
Minimum	0.29
Maximum	32.6
Mean	9.243
Geometric mean	4.835
Median	6.735
Standard deviation	8.624
Coefficient of variation	0.933
Mann-Kendall Statistics	
M-K test value (S)	-267
Critical value (0.05)	-1.645
Standard deviation of S	56.01
Standardized value of S	-4.749
Approximate <i>p</i> value	1.0209E-6

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

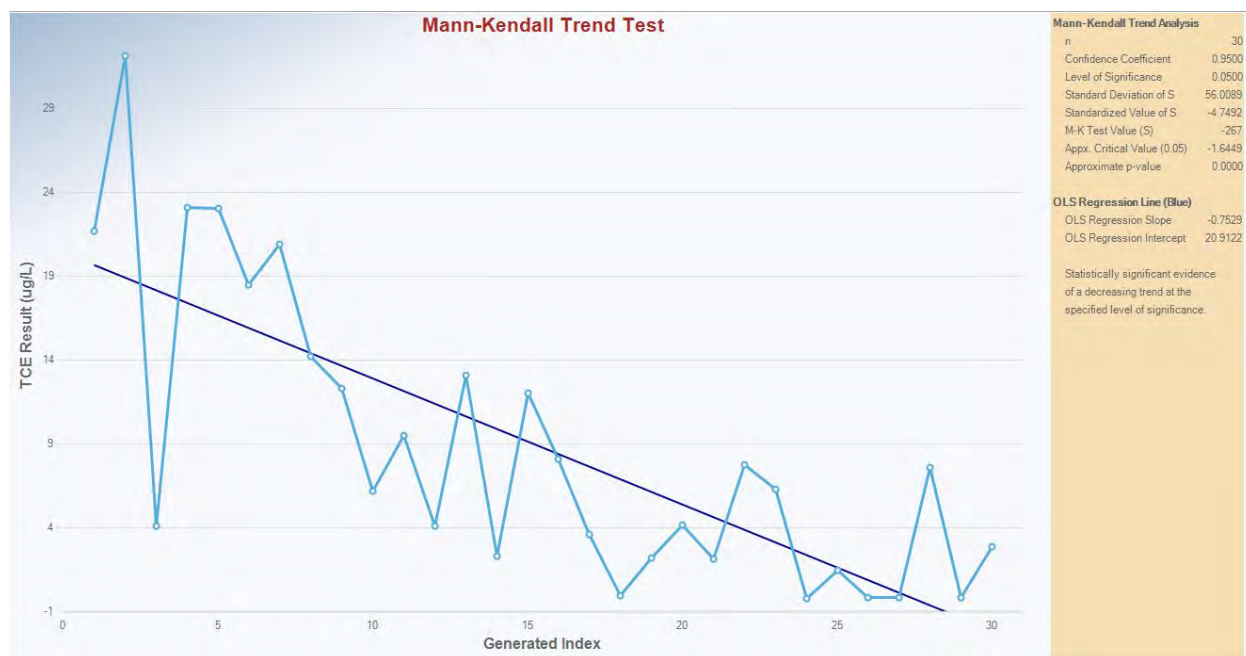


Figure B-11. Mann-Kendall Trend Test for Seep 0602, 2012–2024 TCE Dataset

Seep 0602 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:27:54 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	7
Number of values reported (n)	7
Minimum	0.29
Maximum	8.08
Mean	2.093
Geometric mean	0.921
Median	0.333
Standard deviation	2.885
Coefficient of variation	1.379
Mann-Kendall Statistics	
M-K test value (S)	8
Tabulated <i>p</i> value	0.119
Standard deviation of S	6.377
Standardized value of S	1.098
Approximate <i>p</i> value	0.136

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

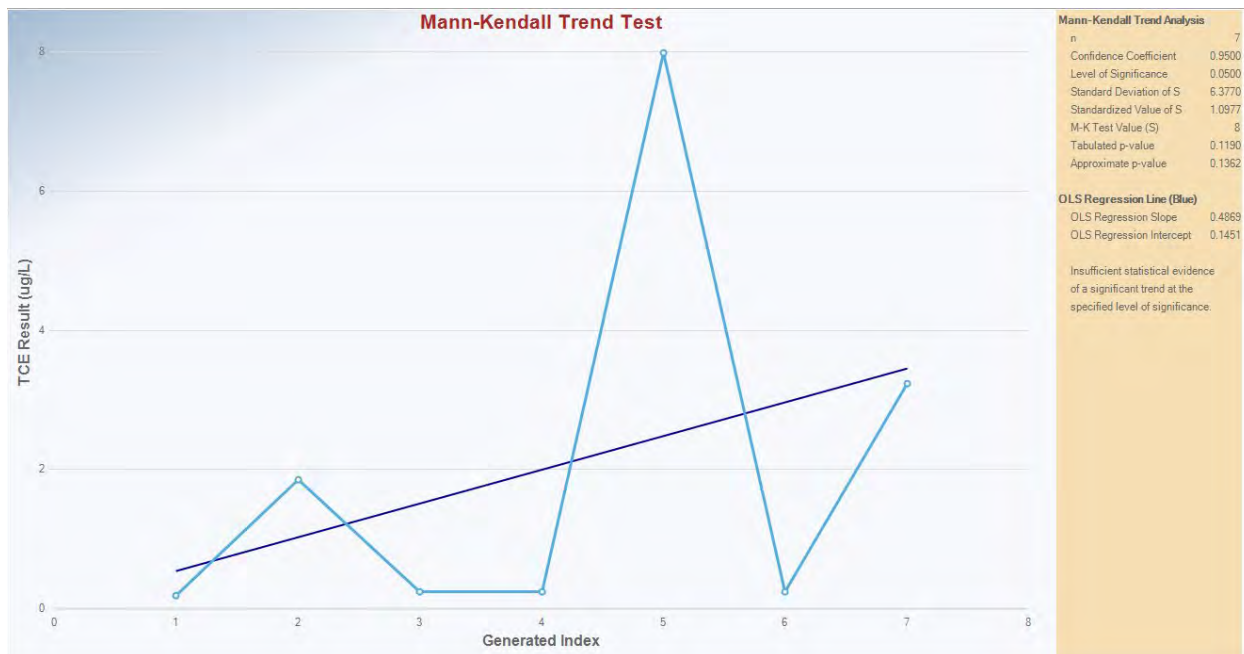


Figure B-12. Mann-Kendall Trend Test for Seep 0602, 2021–2024 TCE Dataset

Seep 0605 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:30:59 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	51
Number of values reported (n)	51
Minimum	0.27
Maximum	19.8
Mean	5.491
Geometric mean	2.325
Median	1.66
Standard deviation	5.704
Coefficient of variation	1.039
Mann-Kendall Statistics	
M-K test value (S)	-883
Critical value (0.05)	-1.645
Standard deviation of S	123
Standardized value of S	-7.168
Approximate <i>p</i> value	3.799E-13

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

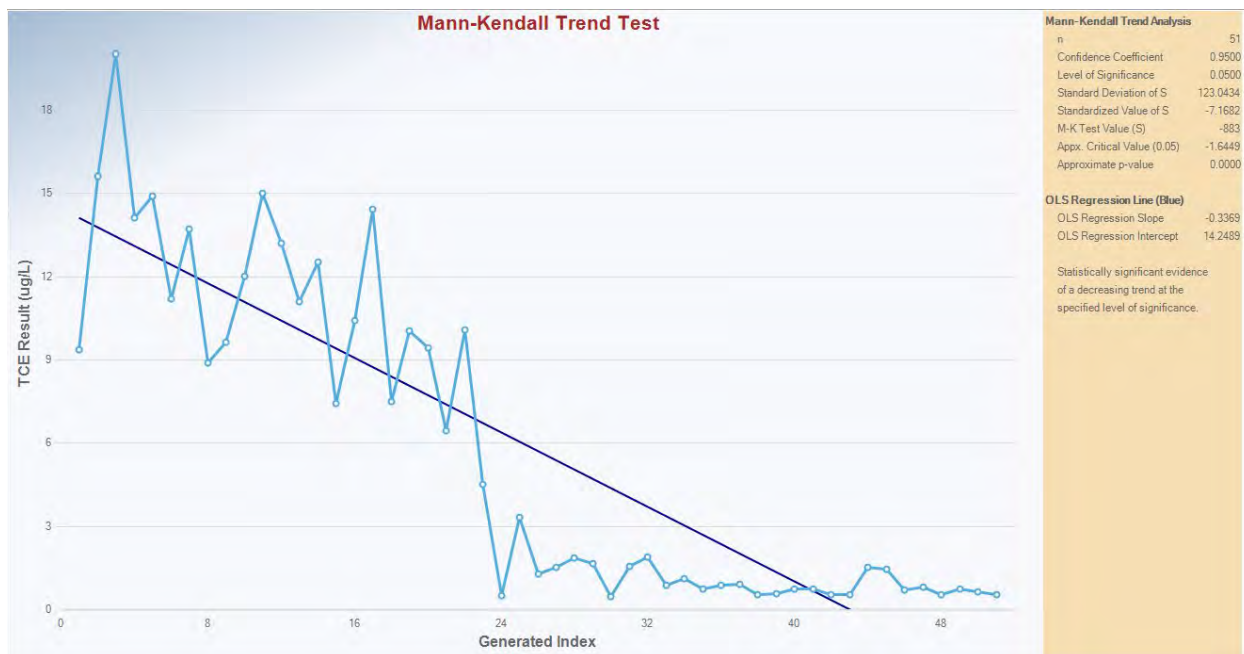


Figure B-13. Mann-Kendall Trend Test for Seep 0605, 2012–2024 TCE Dataset

Seep 0606 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:33:26 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of Significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	46
Number of values reported (n)	46
Minimum	0.16
Maximum	9.01
Mean	1.976
Geometric mean	0.841
Median	0.585
Standard deviation	2.509
Coefficient of variation	1.27
Mann-Kendall Statistics	
M-K test value (S)	-445
Critical value (0.05)	-1.645
Standard deviation of S	105.1
Standardized value of S	-4.225
Approximate <i>p</i> value	1.1954E-5

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

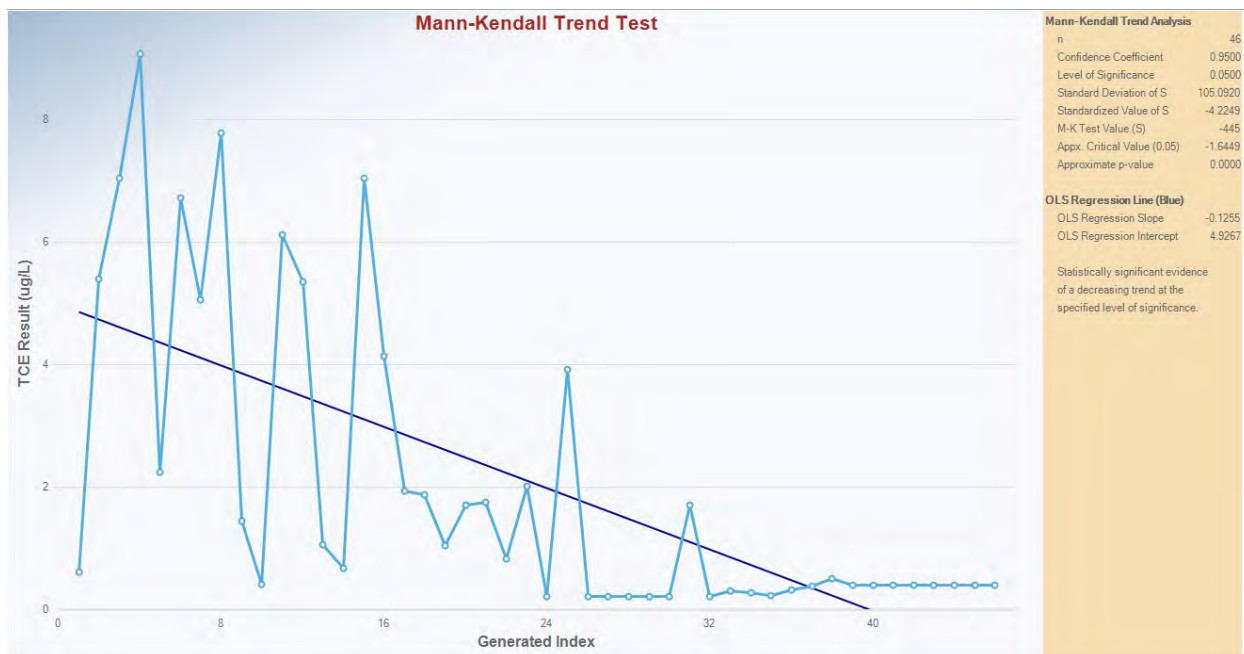


Figure B-14. Mann-Kendall Trend Test for Seep 0606, 2012–2024 TCE Dataset

Seep 0607 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:35:49 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	52
Number of values reported (n)	52
Minimum	0.333
Maximum	9.95
Mean	3.01
Geometric mean	1.732
Median	1.335
Standard deviation	2.826
Coefficient of variation	0.939
Mann-Kendall Statistics	
M-K test value (S)	-854
Critical value (0.05)	-1.645
Standard deviation of S	126.7
Standardized value of S	-6.732
Approximate <i>p</i> value	8.339E-12

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

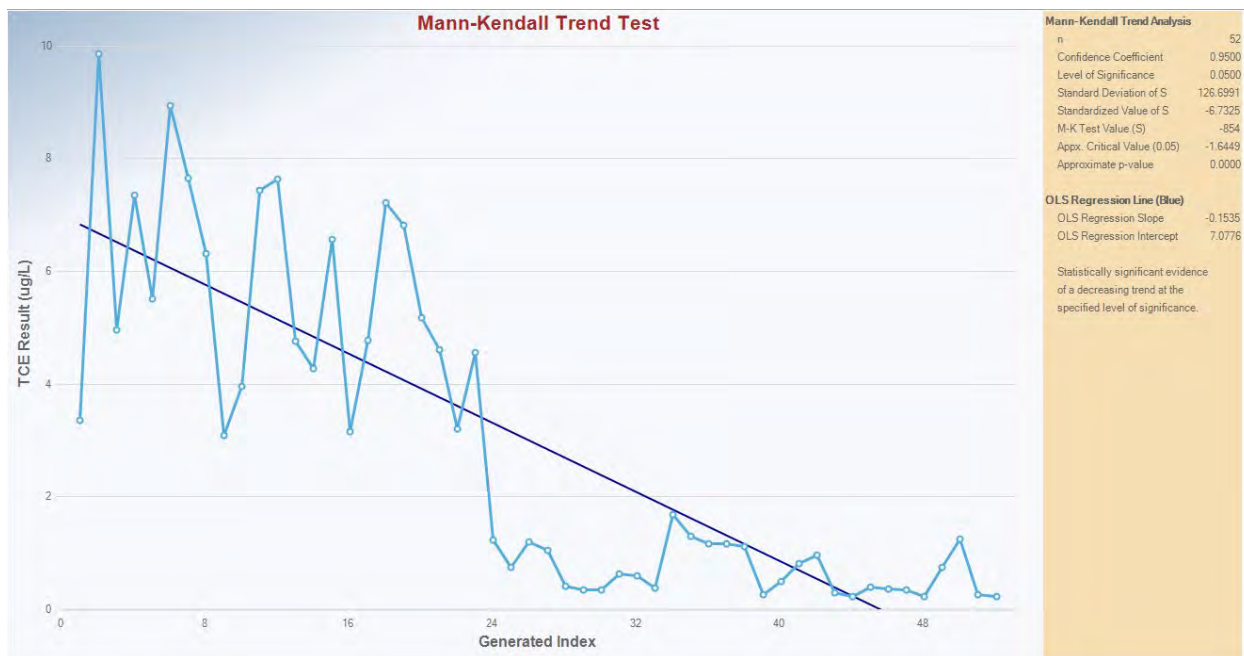


Figure B-15. Mann-Kendall Trend Test for Seep 0607, 2012–2024 TCE Dataset

Well 0315 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:38:33 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	52
Number of values reported (n)	52
Minimum	0.333
Maximum	16.6
Mean	4.927
Geometric mean	2.466
Median	4.13
Standard deviation	4.614
Coefficient of variation	0.936
Mann-Kendall Statistics	
M-K test value (S)	–920
Critical value (0.05)	–1.645
Standard deviation of S	126.7
Standardized value of S	–7.252
Approximate <i>p</i> value	2.048E-13

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

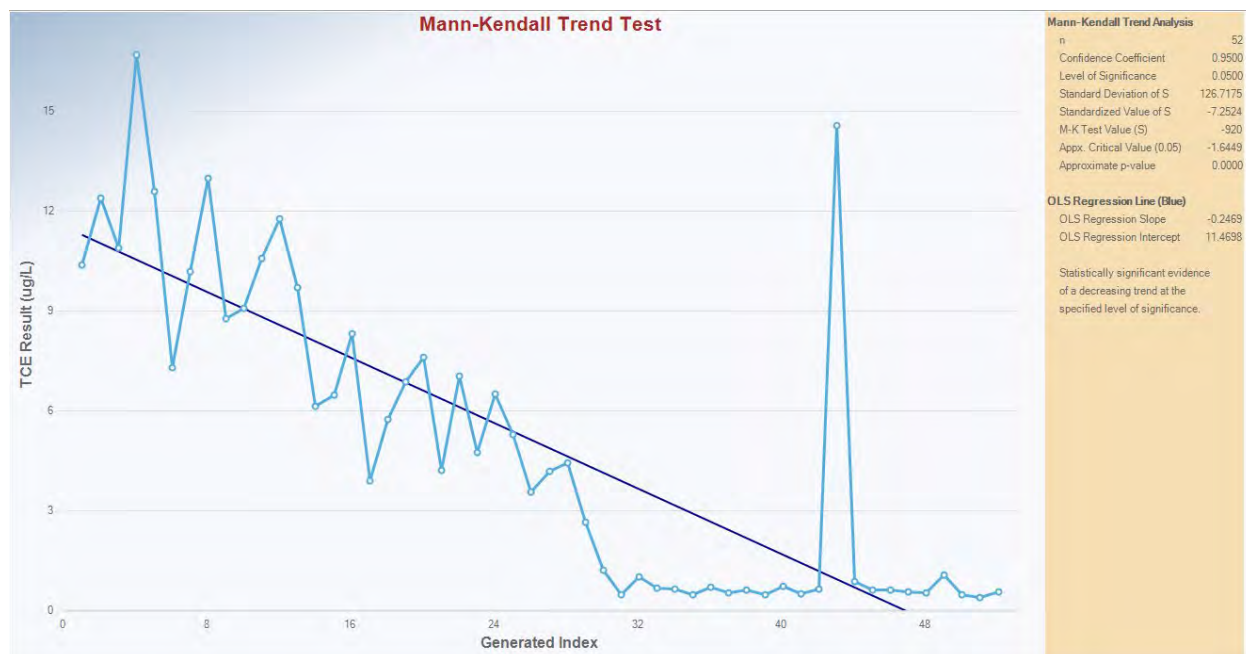


Figure B-16. Mann-Kendall Trend Test for Well 0315, 2012–2024 TCE Dataset

Well 0347 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:43:08 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	52
Number of values reported (n)	52
Minimum	0.333
Maximum	31.5
Mean	20.76
Geometric mean	18.65
Median	22.25
Standard deviation	6.408
Coefficient of variation	0.309
Mann-Kendall Statistics	
M-K test value (S)	-237
Critical value (0.05)	-1.645
Standard deviation of S	126.7
Standardized value of S	-1.863
Approximate <i>p</i> value	0.0312

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

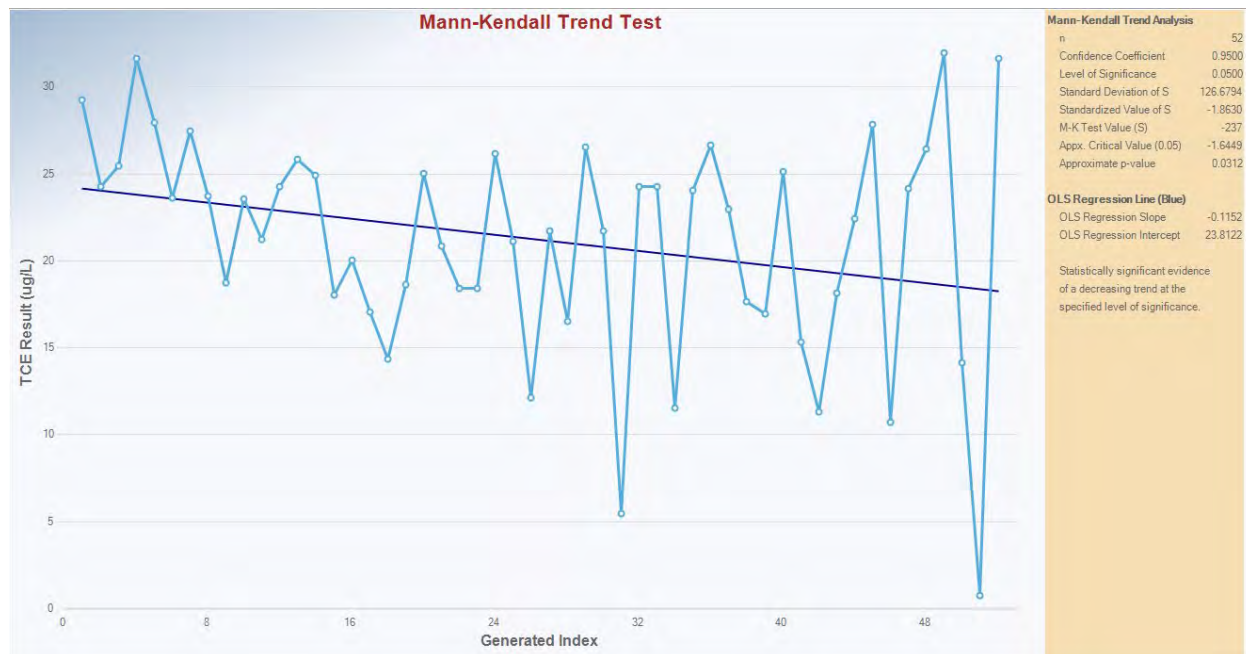


Figure B-17. Mann-Kendall Trend Test for Well 0347, 2012–2024 TCE Dataset

Well 0347 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:45:22 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	16
Number of values reported (n)	16
Minimum	0.333
Maximum	31.5
Mean	19.41
Geometric mean	15.16
Median	19.85
Standard deviation	8.341
Coefficient of variation	0.43
Mann-Kendall Statistics	
M-K test value (S)	12
Tabulated <i>p</i> value	0.313
Standard deviation of S	22.21
Standardized value of S	0.495
Approximate <i>p</i> value	0.31

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

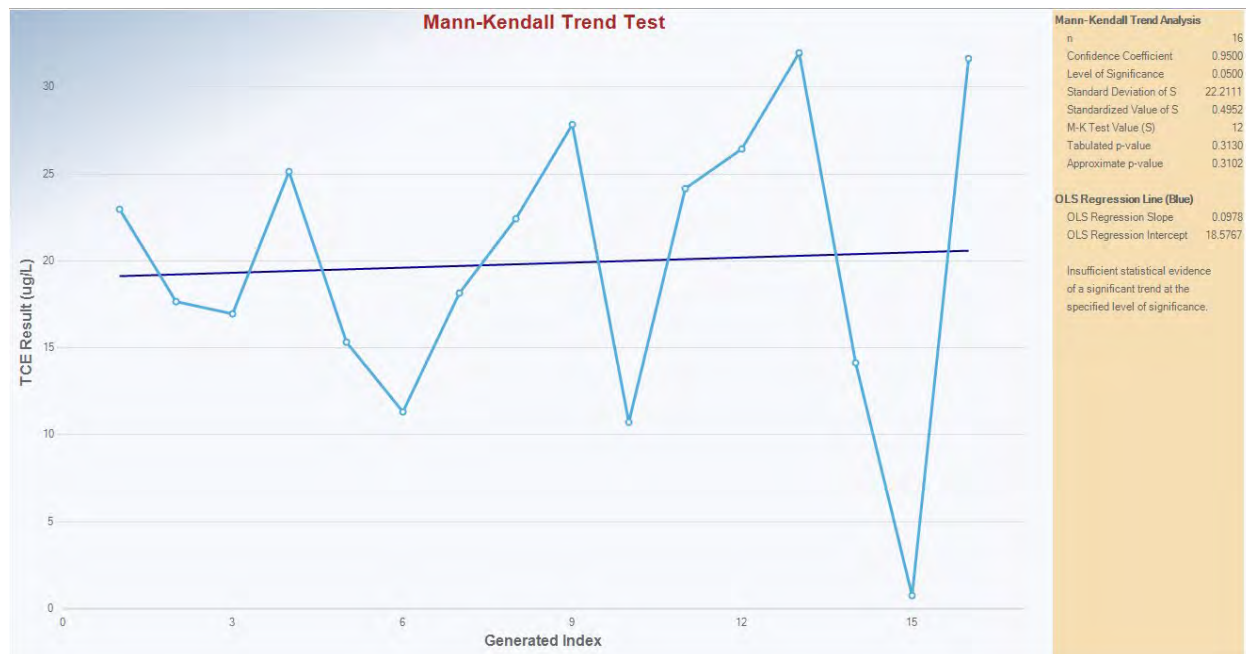


Figure B-18. Mann-Kendall Trend Test for Well 0347, 2021–2024 TCE Dataset

Well 0386 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:48:21 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	51
Number of values reported (n)	51
Minimum	0.333
Maximum	3.04
Mean	1.724
Geometric mean	1.34
Median	2.11
Standard deviation	0.979
Coefficient of variation	0.568
Mann-Kendall Statistics	
M-K test value (S)	-748
Critical value (0.05)	-1.645
Standard deviation of S	123.1
Standardized value of S	-6.071
Approximate <i>p</i> value	6.373E-10

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

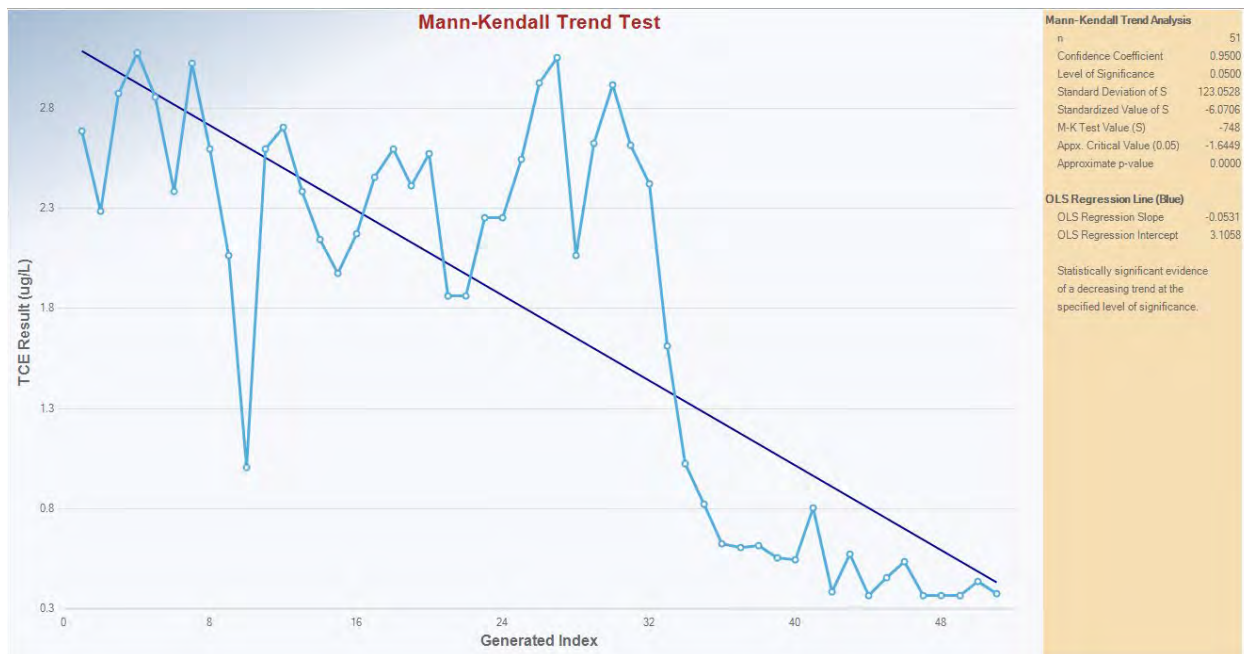


Figure B-19. Mann-Kendall Trend Test for Well 0386, 2012–2024 TCE Dataset

Seep 0601 PCE 2012–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:51:55 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
PCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	52
Number of values reported (n)	52
Minimum	0.16
Maximum	19.1
Mean	7.557
Geometric mean	5.407
Median	8.27
Standard deviation	4.262
Coefficient of variation	0.564
Mann-Kendall Statistics	
M-K TEST VALUE (S)	-191
Critical VALUE (0.05)	-1.645
Standard DEVIATION of S	126.7
Standardized VALUE of S	-1.499
Approximate <i>p</i> value	0.0669

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

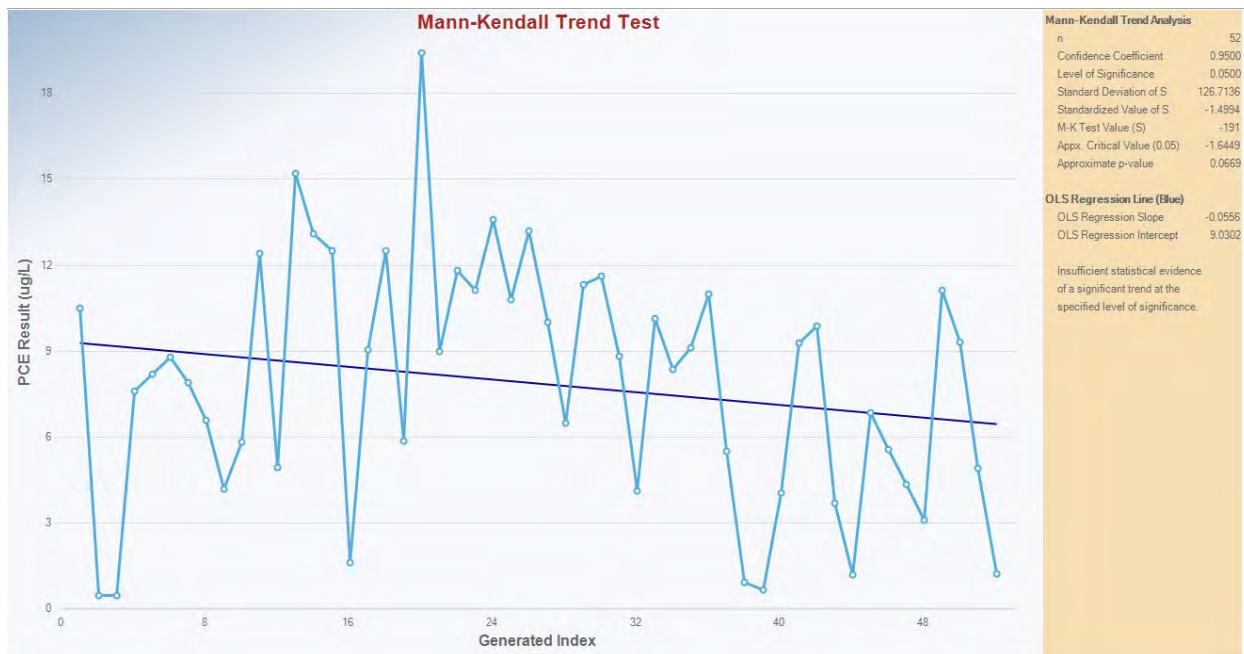


Figure B-19. Mann-Kendall Trend Test for Seep 0601, 2012–2024 PCE Dataset

Seep 0601 PCE 2021–2024 Mann-Kendall Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/27/2025 8:54:05 AM
From file	WorkSheet.xls
Full precision	OFF
Confidence coefficient	0.95
Level of significance	0.05
PCE Result (µg/L)	
General Statistics	
Number of reported events not used	0
Number of generated events	16
Number of values reported (n)	16
Minimum	0.333
Maximum	10.8
Mean	4.783
Geometric mean	3.244
Median	4.305
Standard deviation	3.4
Coefficient of variation	0.711
Mann-Kendall Statistics	
M-K test value (S)	16
Tabulated <i>p</i> value	0.253
Standard deviation of S	22.21
Standardized value of S	0.675
Approximate <i>p</i> value	0.25

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

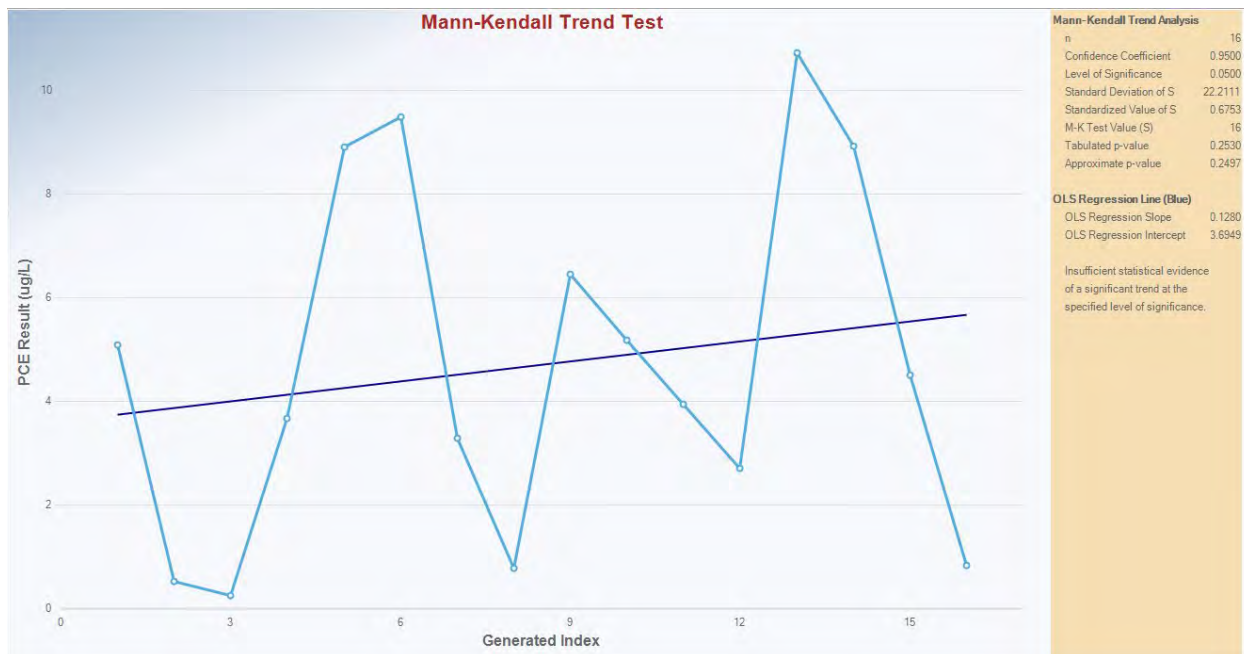


Figure B-20. Mann-Kendall Trend Test for Seep 0601, 2021–2024 PCE Dataset

Well 0347 2012–2024 Theil-Sen Trend Test Analysis	
User-Selected Options	
Date/time of Computation	ProUCL 5.2 3/30/2025 9:01:47 AM
From file	WorkSheet.xls
Full precision	OFF
Average replicates	Replicates at sampling events will be averaged
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of events	52
Number of values reported (n)	52
Number of values after averaging	52
Number of replicates	0
Minimum	0.333
Maximum	31.5
Mean	20.76
Geometric mean	18.65
Median	22.25
Standard deviation	6.408
Coefficient of variation	0.309
Mann-Kendall Statistics	
M-K test value (S)	-237
Critical value (0.05)	-1.645
Standard deviation of S	126.7
Standardized value of S	-1.863
Approximate <i>p</i> value	0.0312
Approximate Inference for Theil-Sen Trend Test	
Number of slopes	1326
Theil-Sen slope	-0.00117
Theil-Sen intercept	72.87
M1	538.9
M2	787.1
95% LCL of slope (0.025)	-0.00264
95% UCL of slope (0.975)	4.1268E-5

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
1	40940	28.8	24.97	3.831
2	41022	23.8	24.87	-1.073
3	41115	25	24.76	0.235
4	41206	31.2	24.66	6.542
5	41317	27.5	24.53	2.972
6	41422	23.2	24.41	-1.205
7	41512	27	24.3	2.7
8	41575	23.3	24.23	-0.926
9	41689	18.3	24.09	-5.793
10	41771	23.1	24	-0.897
11	41879	20.8	23.87	-3.071

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
12	41939	23.8	23.8	-3.736E-4
13	42032	25.4	23.69	1.708
14	42121	24.5	23.59	0.913
15	42212	17.6	23.48	-5.881
16	42305	19.6	23.37	-3.772
17	42394	16.6	23.27	-6.668
18	42486	13.9	23.16	-9.26
19	42578	18.2	23.05	-4.853
20	42669	24.6	22.95	1.654
21	42773	20.4	22.82	-2.425
22	42856	18	22.73	-4.727
23	42941	18	22.63	-4.628
24	43046	25.7	22.51	3.195
25	43132	20.7	22.4	-1.704
26	43214	11.7	22.31	-10.61
27	43314	21.3	22.19	-0.891
28	43402	16.1	22.09	-5.989
29	43496	26.1	21.98	4.121
30	43584	21.3	21.88	-0.576
31	43668	5.01	21.78	-16.77
32	43774	23.8	21.65	2.147
33	43858	23.8	21.55	2.245
34	43983	11.1	21.41	-10.31
35	44061	23.6	21.32	2.283
36	44165	26.2	21.2	5.004
37	44222	22.5	21.13	1.371
38	44313	17.2	21.02	-3.823
39	44433	16.5	20.88	-4.382
40	44494	24.7	20.81	3.889
41	44586	14.9	20.7	-5.803
42	44686	10.9	20.59	-9.686
43	44776	17.7	20.48	-2.781
44	44858	22	20.38	1.615
45	44966	27.4	20.26	7.141
46	45040	10.3	20.17	-9.872
47	45132	23.7	20.06	3.636
48	45230	26	19.95	6.05
49	45320	31.5	19.84	11.66
50	45404	13.7	19.75	-6.046
51	45509	0.333	19.62	-19.29
52	45601	31.2	19.52	11.68

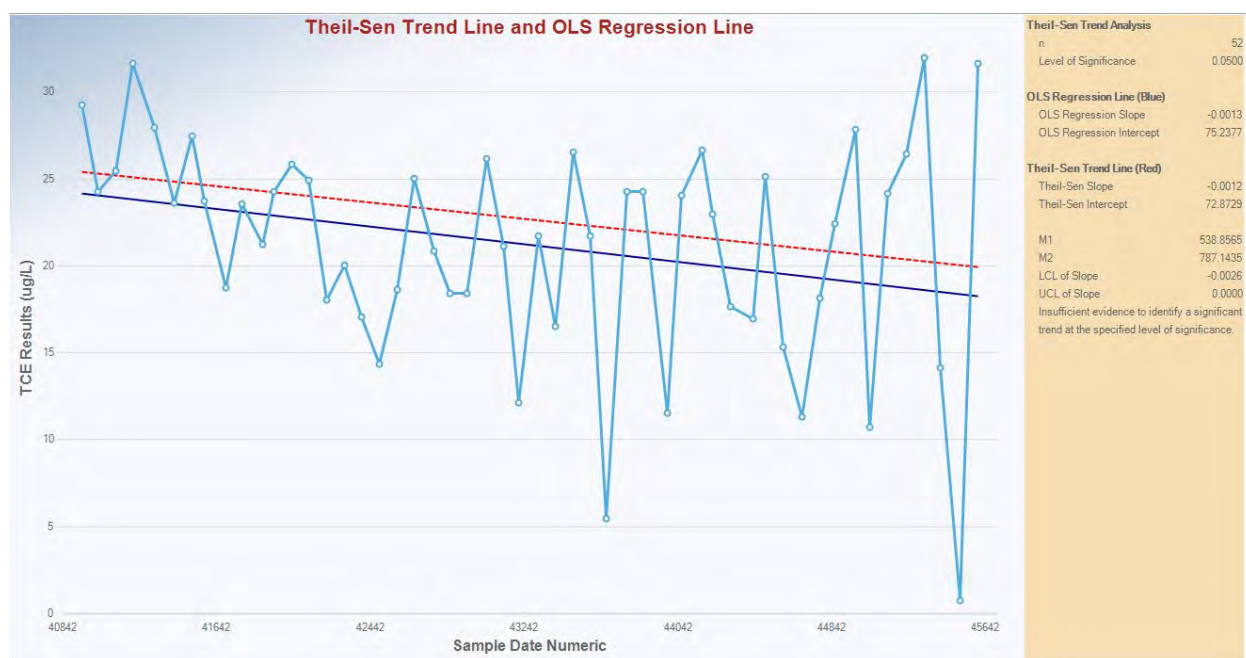


Figure B-21. Theil-Sen Trend Analysis for Well 0347, 2012–2024 TCE Dataset

Seep 0602 2012–2024 Theil-Sen Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 3/30/2025 9:06:59 AM
From file	WorkSheet.xls
Full precision	OFF
Average replicates	Replicates at sampling events will be averaged
Confidence coefficient	0.95
Level of significance	0.05
TCE Result (µg/L)	
General Statistics	
Number of events	30
Number of values reported (n)	30
Number of values after averaging	30
Number of replicates	0
Minimum	0.29
Maximum	32.6
Mean	9.243
Geometric mean	4.835
Median	6.735
Standard deviation	8.624
Coefficient of variation	0.933
Mann-Kendall Statistics	
M-K test value (S)	-267
Critical value (0.05)	-1.645
Standard deviation of S	56.01
Standardized Value of S	-4.749
Approximate <i>p</i> value	1.0209E-6
Approximate Inference for Theil-Sen Trend Test	
Number of slopes	435
Theil-Sen slope	-0.00565
Theil-Sen intercept	250.1
M2'	263.6
One-sided 95% upper limit of slope	-0.00372
95% LCL of slope (0.025)	-0.00764
95% UCL of slope (0.975)	-0.00319

Note:

Statistically significant evidence of a decreasing trend at the specified level of significance.

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
1	40939	22.2	18.87	3.33
2	41316	32.6	16.74	15.86
3	41575	4.58	15.28	-10.7
4	41689	23.6	14.63	8.966
5	41771	23.5	14.17	9.329
6	42033	19	12.69	6.309
7	42121	21.4	12.19	9.206
8	42305	14.7	11.15	3.545
9	42394	12.8	10.65	2.148
10	42485	6.66	10.14	-3.478
11	42667	10	9.11	0.89

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
12	42772	4.58	8.517	-3.937
13	42857	13.6	8.037	5.563
14	42941	2.78	7.562	-4.782
15	43046	12.5	6.969	5.531
16	43129	8.56	6.501	2.059
17	43213	4.06	6.026	-1.966
18	43402	0.46	4.959	-4.499
19	43493	2.68	4.445	-1.765
20	43584	4.67	3.931	0.739
21	43669	2.65	3.451	-0.801
22	43857	8.25	2.389	5.861
23	44165	6.81	0.649	6.161
24	44221	0.29	0.333	-0.0429
25	44315	1.95	-0.198	2.148
26	44594	0.333	-1.774	2.107
27	44684	0.333	-2.282	2.615
28	44966	8.08	-3.875	11.95
29	45229	0.333	-5.36	5.693
30	45320	3.33	-5.874	9.204

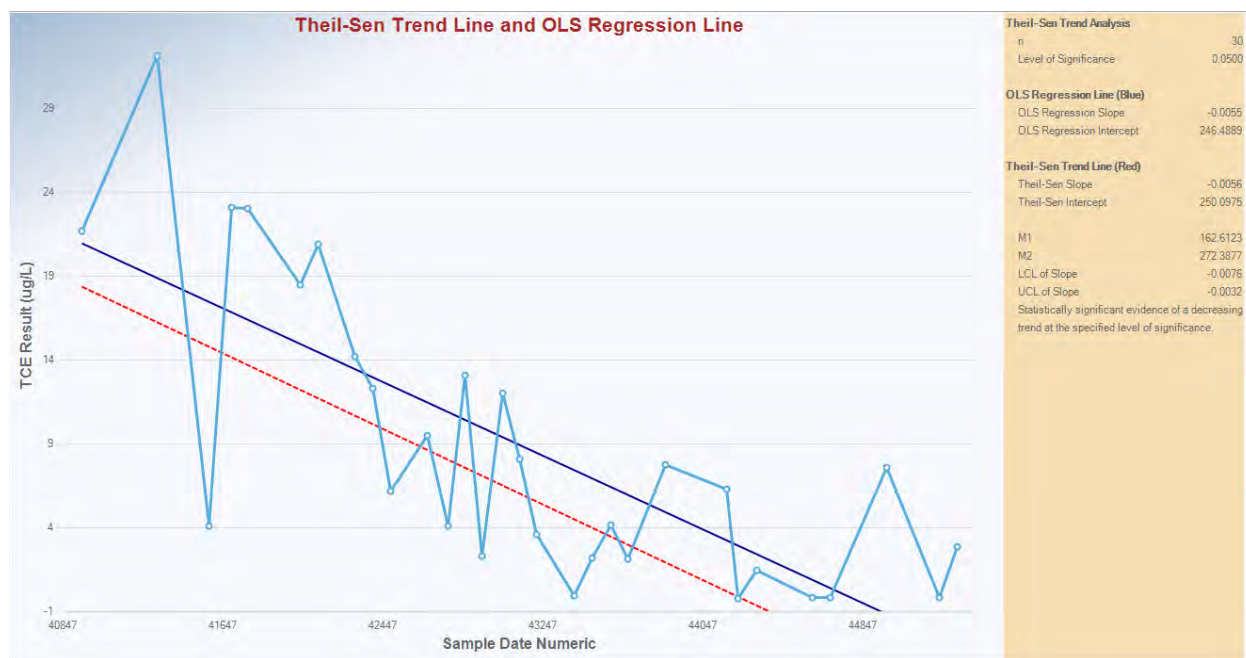


Figure B-22. Theil-Sen Trend Analysis for Seep 0602, 2012–2024 TCE Dataset

Seep 0601 PCE Results Theil-Sen Trend Test Analysis	
User-Selected Options	
Date/time of computation	ProUCL 5.2 4/2/2025 6:33:44 AM
From file	WorkSheet.xls
Full precision	OFF
Average replicates	Replicates at sampling events will be averaged
Confidence coefficient	0.95
Level of significance	0.05
PCE Result (µg/L)	
General Statistics	
Number of events	52
Number of values reported (n)	52
Number of values after averaging	52
Number of replicates	0
Minimum	0.16
Maximum	19.1
Mean	7.557
Geometric mean	5.407
Median	8.27
Standard deviation	4.262
Coefficient of variation	0.564
Mann-Kendall Statistics	
M-K test value (S)	-191
Critical value (0.05)	-1.645
Standard deviation of S	126.7
Standardized value of S	-1.499
Approximate <i>p</i> value	0.0669
Approximate Inference for Theil-Sen Trend Test	
Number of slopes	1326
Theil-Sen slope	-8.169E-4
Theil-Sen intercept	43.61
M1	538.8
M2	787.2
95% LCL of slope (0.025)	-0.00172
95% UCL of slope (0.975)	1.5525E-4

Note:

Insufficient evidence to identify a significant trend at the specified level of significance.

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
1	40939	10.2	10.17	0.0322
2	41024	0.16	10.1	-9.938
3	41114	0.16	10.02	-9.865
4	41207	7.29	9.949	-2.659
5	41316	7.88	9.86	-1.98
6	41424	8.49	9.772	-1.282
7	41513	7.59	9.699	-2.109
8	41575	6.26	9.648	-3.388
9	41689	3.86	9.555	-5.695
10	41771	5.53	9.488	-3.958
11	41877	12.1	9.401	2.699

Theil-Sen Trend Test Estimates and Residuals				
No.	Events	Values	Estimates	Residuals
12	41939	4.64	9.351	-4.711
13	42033	14.9	9.274	5.626
14	42121	12.8	9.202	3.598
15	42214	12.2	9.126	3.074
16	42305	1.31	9.052	-7.742
17	42394	8.73	8.979	-0.249
18	42485	12.2	8.905	3.295
19	42576	5.54	8.83	-3.29
20	42667	19.1	8.756	10.34
21	42772	8.67	8.67	-3.014E-4
22	42857	11.5	8.601	2.899
23	42941	10.8	8.532	2.268
24	43046	13.3	8.446	4.854
25	43129	10.5	8.379	2.121
26	43213	12.9	8.31	4.59
27	43311	9.69	8.23	1.46
28	43402	6.18	8.156	-1.976
29	43493	11	8.081	2.919
30	43584	11.3	8.007	3.293
31	43669	8.52	7.938	0.582
32	43775	3.79	7.851	-4.061
33	43857	9.82	7.784	2.036
34	43985	8.05	7.679	0.371
35	44061	8.8	7.617	1.183
36	44165	10.7	7.532	3.168
37	44221	5.17	7.487	-2.317
38	44315	0.6	7.41	-6.81
39	44433	0.333	7.313	-6.98
40	44495	3.75	7.263	-3.513
41	44585	8.98	7.189	1.791
42	44684	9.57	7.108	2.462
43	44775	3.37	7.034	-3.664
44	44860	0.86	6.965	-6.105
45	44966	6.53	6.878	-0.348
46	45041	5.25	6.817	-1.567
47	45131	4.02	6.743	-2.723
48	45229	2.78	6.663	-3.883
49	45320	10.8	6.589	4.211
50	45404	9.01	6.52	2.49
51	45503	4.59	6.439	-1.849
52	45602	0.91	6.358	-5.448

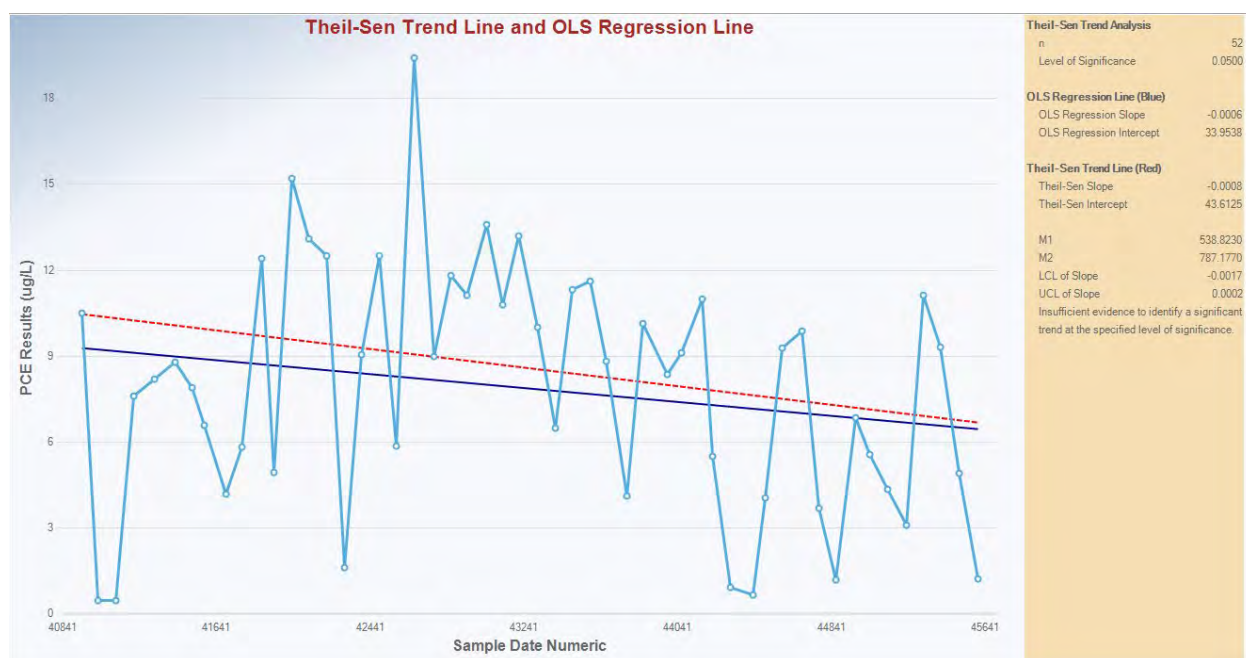


Figure B-22. Theil-Sen Trend Analysis for Seep 0601, 2012–2024 PCE Dataset

Appendix C

2024 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)
0319	01/16/2024 00:00	701.42	22.22	679.20
	02/15/2024 00:00		20.71	680.71
	03/13/2024 00:00		19.89	681.53
	04/18/2024 00:00		17.98	683.44
	05/20/2024 00:00		20.74	680.68
	06/13/2024 00:00		21.52	679.90
	07/11/2024 00:00		22.56	678.86
	08/08/2024 00:00		22.50	678.92
	09/05/2024 00:00		23.34	678.08
	10/07/2024 00:00		22.97	678.45
	11/12/2024 00:00		23.19	678.23
	12/09/2024 00:00		22.70	678.72
0400	01/16/2024 00:00	705.11	25.97	679.14
	02/15/2024 00:00		24.32	680.79
	03/13/2024 00:00		23.59	681.52
	04/18/2024 00:00		21.43	683.68
	05/20/2024 00:00		24.39	680.72
	06/13/2024 00:00		25.18	679.93
	07/11/2024 00:00		26.25	678.86
	08/08/2024 00:00		26.18	678.93
	09/05/2024 00:00		27.00	678.11
	10/07/2024 00:00		26.63	678.48
	11/12/2024 00:00		26.87	678.24
	12/09/2024 00:00		26.41	678.70
0402	01/16/2024 00:00	704.02	24.74	679.28
	01/31/2024 12:49		22.62	681.40
	02/15/2024 00:00		23.16	680.86
	03/13/2024 00:00		22.42	681.60
	04/18/2024 00:00		20.35	683.67
	04/24/2024 12:49		21.53	682.49
	05/20/2024 00:00		23.24	680.78
	06/13/2024 00:00		23.99	680.03
	07/11/2024 00:00		25.13	678.89
	07/29/2024 13:34		25.25	678.77
	08/08/2024 00:00		24.98	679.04
	09/05/2024 00:00		25.82	678.20
	10/07/2024 00:00		25.43	678.59
	10/30/2024 12:40		25.84	678.18
	11/12/2024 00:00		25.72	678.30
	12/09/2024 00:00		25.22	678.80

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)
0411	01/29/2024 10:30	836.57	21.93	814.64
	08/06/2024 10:37		28.78	807.79
0443	01/29/2024 11:51	858.78	31.76	827.02
	08/06/2024 10:13		37.06	821.72
P033	01/16/2024 00:00	705.83	26.63	679.20
	02/15/2024 00:00		25.03	680.80
	03/13/2024 00:00		24.31	681.52
	04/18/2024 00:00		22.19	683.64
	05/20/2024 00:00		25.14	680.69
	06/13/2024 00:00		25.87	679.96
	07/11/2024 00:00		27.03	678.80
	08/08/2024 00:00		26.90	678.93
	09/05/2024 00:00		27.73	678.10
	10/07/2024 00:00		27.39	678.44
	11/12/2024 00:00		27.63	678.20
	12/09/2024 00:00		27.13	678.70
P064	01/16/2024 00:00	729.98	51.11	678.87
	01/29/2024 12:53		49.30	680.68
	02/15/2024 00:00		49.40	680.58
	03/13/2024 00:00		48.65	681.33
	04/18/2024 00:00		46.40	683.58
	05/20/2024 00:00		49.50	680.48
	06/13/2024 00:00		50.27	679.71
	07/11/2024 00:00		51.40	678.58
	08/08/2024 00:00		51.26	678.72
	09/05/2024 00:00		52.10	677.88
	10/07/2024 00:00		51.77	678.21
	11/12/2024 00:00		52.06	677.92
	12/09/2024 00:00		51.50	678.48

Abbreviations:

ft = feet

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	01/29/2024 10:15	704.86	22.23	682.63
	04/22/2024 11:57		21.58	683.28
	11/05/2024 09:41		25.48	679.38
0124	01/29/2024 12:55	705.12	23.90	681.22
	04/22/2024 13:32		22.23	682.89
	08/05/2024 12:26		25.80	679.32
	11/05/2024 12:00		26.73	678.39
0126	01/16/2024 00:00	705.54	25.99	679.55
	01/29/2024 12:31		24.29	681.25
	02/15/2024 00:00		24.47	681.07
	03/13/2024 00:00		23.69	681.85
	04/18/2024 00:00		21.89	683.65
	04/22/2024 13:03		22.65	682.89
	05/20/2024 00:00		24.48	681.06
	06/13/2024 00:00		25.21	680.33
	07/11/2024 00:00		26.40	679.14
	08/05/2024 12:04		26.30	679.24
	08/08/2024 00:00		26.24	679.30
	09/05/2024 00:00		27.12	678.42
	10/07/2024 00:00		26.72	678.82
	11/05/2024 10:51		27.16	678.38
	11/12/2024 00:00		26.94	678.60
	12/09/2024 00:00		26.47	679.07
0138	01/29/2024 11:06	708.04	25.24	682.80
	04/22/2024 12:30		24.28	683.76
	08/05/2024 09:55		27.85	680.19
	11/05/2024 10:18		25.65	682.39
0315	01/30/2024 10:18	723.99	42.60	681.39
	04/22/2024 11:00		41.10	682.89
	08/05/2024 10:36		44.70	679.29
	11/05/2024 09:44		45.59	678.40
0346	01/29/2024 13:25	742.97	18.47	724.50
	04/22/2024 14:15		16.38	726.59
	08/05/2024 10:53		18.52	724.45
	11/05/2024 12:26		18.80	724.17
0347	01/29/2024 14:00	725.20	44.05	681.15
	04/22/2024 10:16		42.30	682.90
	08/05/2024 09:50		45.91	679.29
	11/05/2024 10:16		46.82	678.38
0379	01/16/2024 00:00	716.11	36.55	679.56
	01/30/2024 09:42		34.68	681.43

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)
	02/05/2024 12:55		35.19	680.92
	02/15/2024 00:00		35.03	681.08
	03/13/2024 00:00		34.26	681.85
	04/18/2024 00:00		32.41	683.70
	04/22/2024 13:57		34.00	682.11
	04/23/2024 13:21		33.35	682.76
	05/20/2024 00:00		34.96	681.15
	06/13/2024 00:00		35.77	680.34
	07/11/2024 00:00		36.95	679.16
	08/01/2024 10:40		37.07	679.04
	08/08/2024 00:00		36.83	679.28
	09/05/2024 00:00		37.68	678.43
	10/07/2024 00:00		37.30	678.81
	10/30/2024 10:24		37.66	678.45
	11/12/2024 00:00		37.49	678.62
	12/09/2024 00:00		37.08	679.03
0386	01/30/2024 11:28	724.79	43.28	681.51
	04/22/2024 12:25		41.90	682.89
	11/05/2024 10:44		46.40	678.39
0387	01/30/2024 12:40	720.89	39.41	681.48
	04/22/2024 13:31		38.04	682.85
	11/05/2024 12:27		42.55	678.34
0389	01/30/2024 12:03	724.65	43.19	681.46
	04/22/2024 12:57		41.75	682.90
	11/05/2024 11:53		46.28	678.37
0392	01/30/2024 13:10	720.84	39.24	681.60
	04/22/2024 14:07		37.85	682.99
	11/05/2024 12:53		42.35	678.49

Abbreviations:

ft = feet

ft AMSL = feet above mean sea level

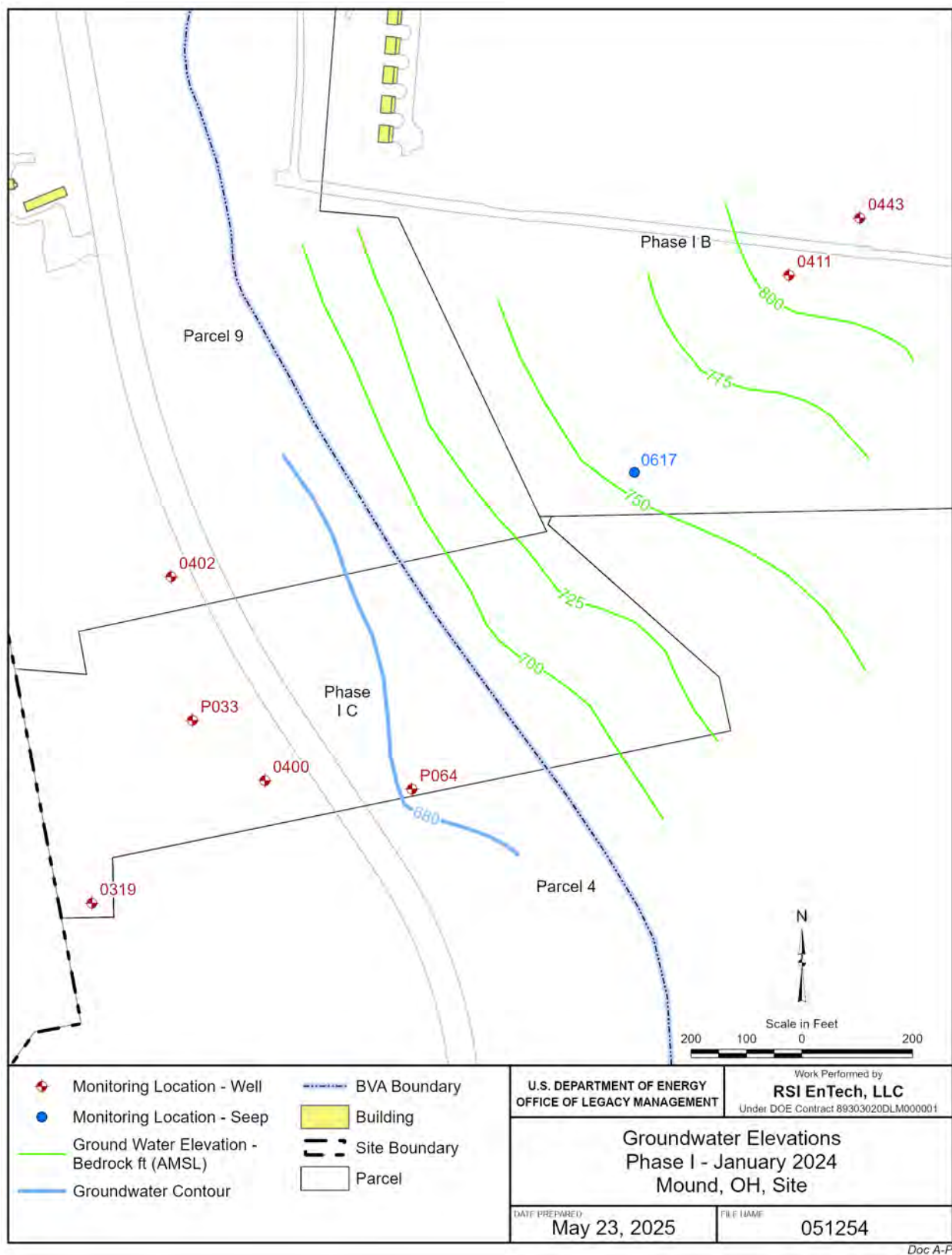


Figure C-1. Groundwater Elevations in Phase I, January 2024

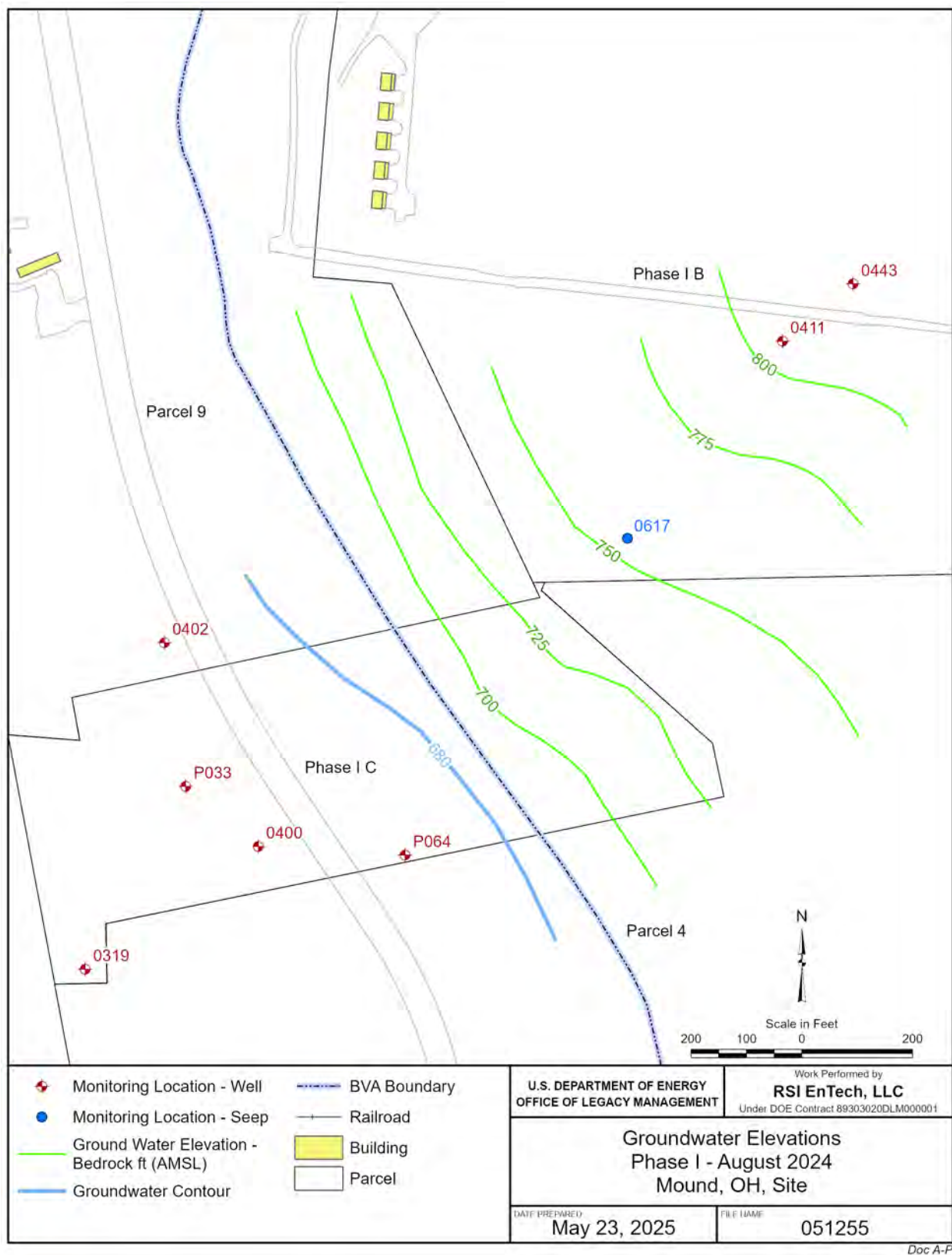


Figure C-2. Groundwater Elevations in Phase I, August 2024

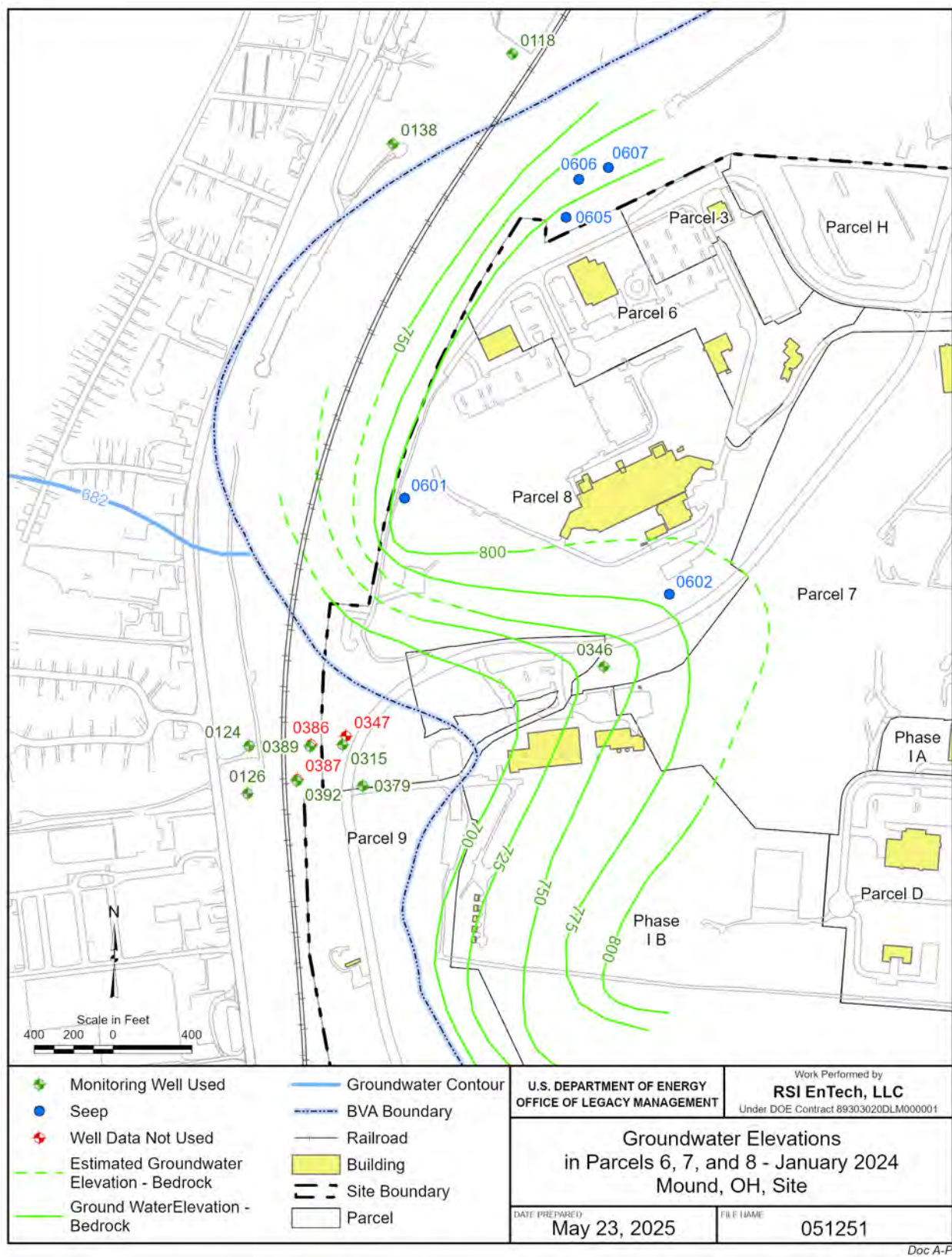


Figure C-3. Groundwater Elevations in Parcels 6, 7, and 8; January 2024

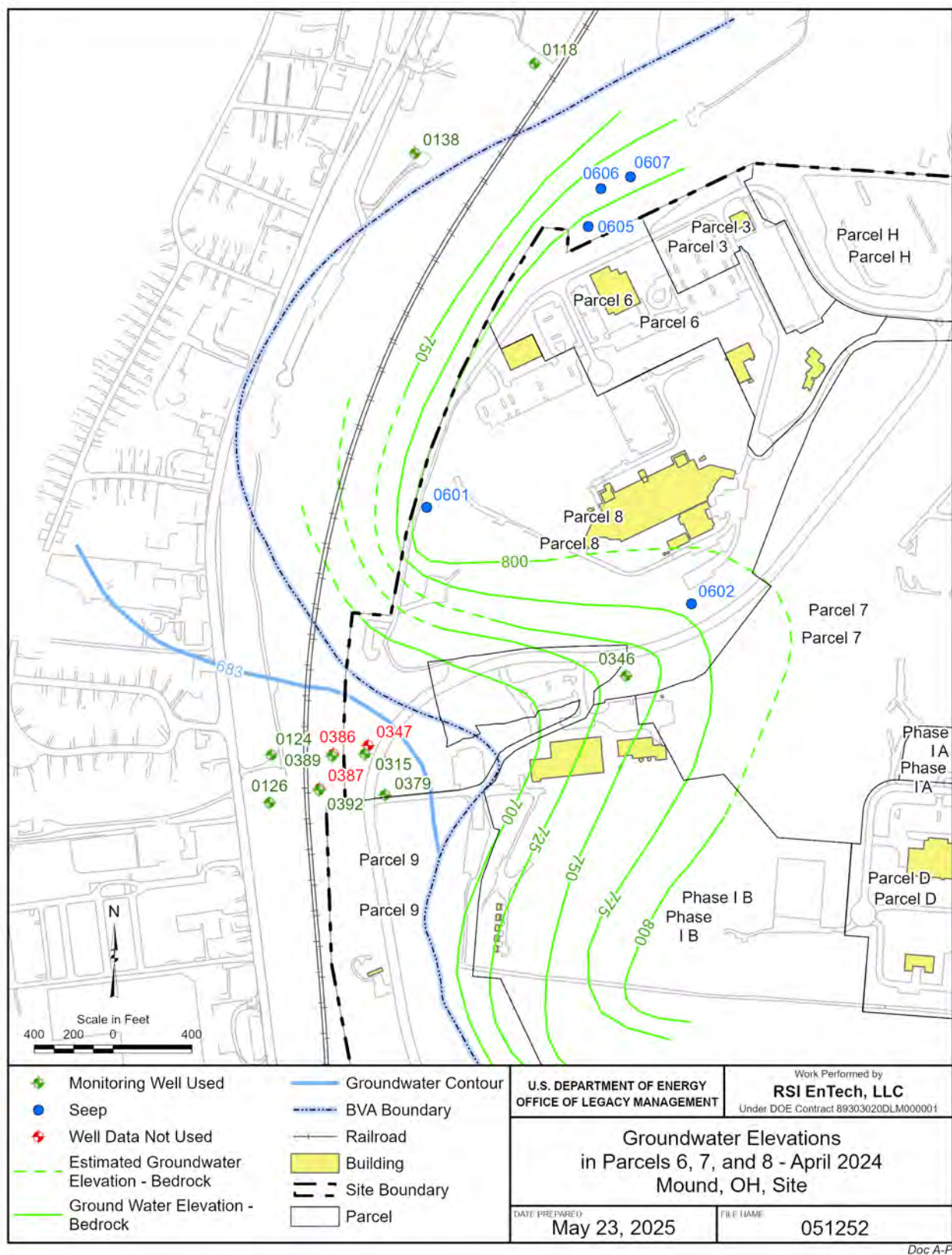
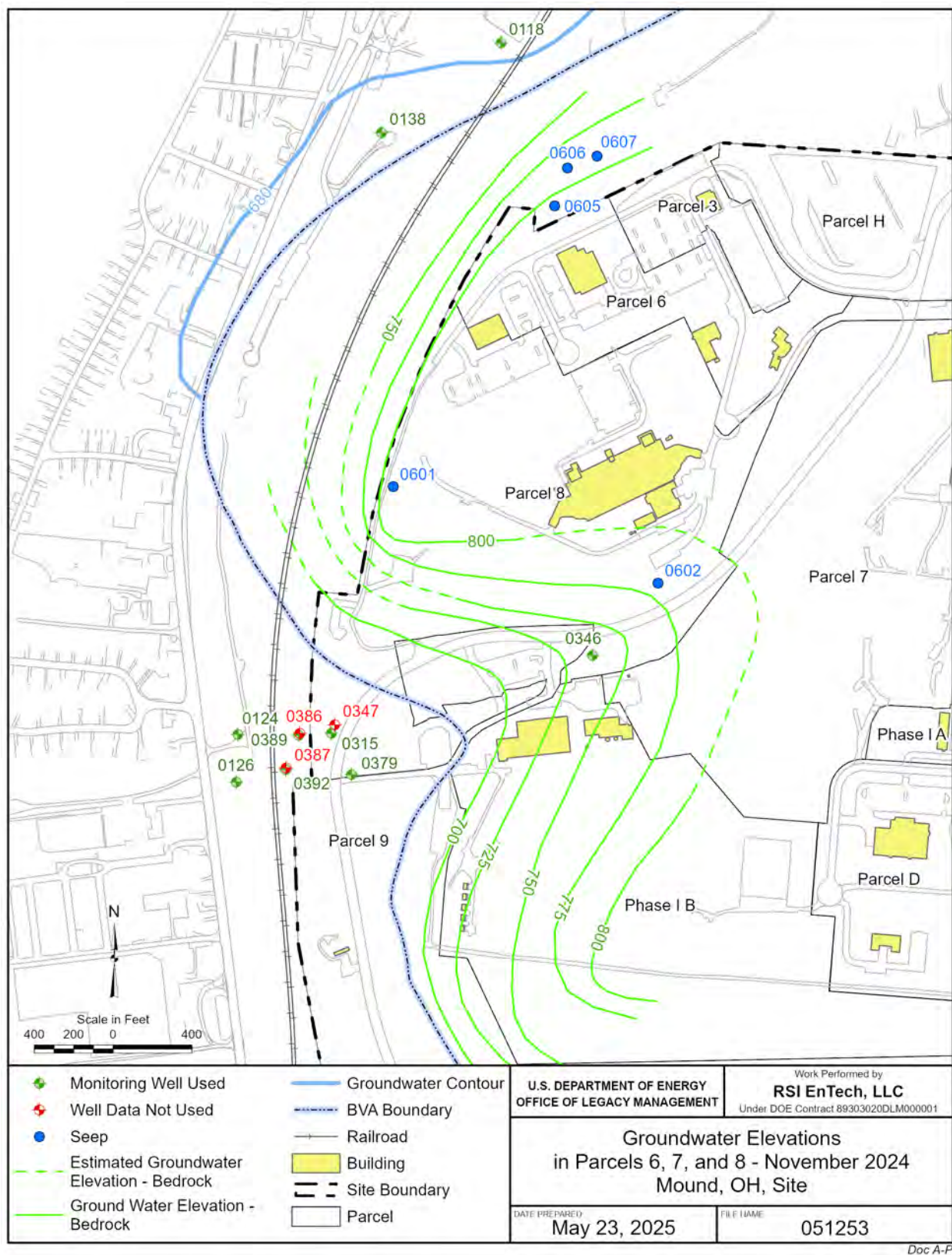


Figure C-4. Groundwater Elevations in Parcels 6, 7, and 8; April 2024



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Figure C-5. Groundwater Elevations in Parcels 6, 7, and 8; November 2024

Appendix D

2024 Groundwater and Seep Data Tables

Table D-1. Phase I Groundwater Data

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0411	<i>cis</i> -1,2-Dichloroethene	1/29/2024	2.9	0.333			µg/L	F
0411	<i>cis</i> -1,2-Dichloroethene	8/6/2024	3.14	0.333			µg/L	D
0411	<i>cis</i> -1,2-Dichloroethene	8/6/2024	3.35	0.333			µg/L	F
0411	Dissolved oxygen	1/29/2024	0.88				mg/L	F
0411	Dissolved oxygen	8/6/2024	1.08				mg/L	F
0411	Oxidation-reduction potential	1/29/2024	159.3				mV	F
0411	Oxidation-reduction potential	8/6/2024	106.5				mV	F
0411	pH	1/29/2024	6.91				s.u.	F
0411	pH	8/6/2024	6.89				s.u.	F
0411	Specific conductance	1/29/2024	1338				µmhos/cm	F
0411	Specific conductance	8/6/2024	1566				µmhos/cm	F
0411	Temperature	1/29/2024	10.7				C	F
0411	Temperature	8/6/2024	18.2				C	F
0411	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0411	Tetrachloroethene	8/6/2024	0.333	0.333	U		µg/L	D
0411	Tetrachloroethene	8/6/2024	0.333	0.333	U		µg/L	F
0411	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0411	<i>trans</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µ/L	D
0411	<i>trans</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µg/L	F
0411	Trichloroethene	1/29/2024	8.12	0.333			µg/L	F
0411	Trichloroethene	8/6/2024	6.91	0.333			µg/L	D
0411	Trichloroethene	8/6/2024	7.31	0.333			µg/L	F
0411	Turbidity	1/29/2024	4.15				NTU	F
0411	Turbidity	8/6/2024	3.78				NTU	F
0411	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0411	Vinyl chloride	8/6/2024	0.333	0.333	U		µg/L	D
0411	Vinyl chloride	8/6/2024	0.333	0.333	U		µg/L	F
0443	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.82	0.333	J		µg/L	F
0443	<i>cis</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µg/L	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0443	Dissolved oxygen	1/29/2024	8.51				mg/L	F
0443	Dissolved oxygen	8/6/2024	6.1				mg/L	F
0443	Oxidation-reduction potential	1/29/2024	164.1				mV	F
0443	Oxidation-reduction potential	8/6/2024	193.9				mV	F
0443	pH	1/29/2024	7				s.u.	F
0443	pH	8/6/2024	6.9				s.u.	F
0443	Specific conductance	1/29/2024	1119				µmhos/cm	F
0443	Specific conductance	8/6/2024	1561				µmhos/cm	F
0443	Temperature	1/29/2024	10.4				C	F
0443	Temperature	8/6/2024	18.6				C	F
0443	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0443	Tetrachloroethene	8/6/2024	0.333	0.333	U		µg/L	F
0443	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0443	<i>trans</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µg/L	F
0443	Trichloroethene	1/29/2024	10.4	0.333			µg/L	F
0443	Trichloroethene	8/6/2024	7.44	0.333			µg/L	F
0443	Turbidity	1/29/2024	3.7				NTU	F
0443	Turbidity	8/6/2024	14				NTU	F
0443	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0443	Vinyl chloride	8/6/2024	0.333	0.333	U		µg/L	F
P064	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	D
P064	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
P064	<i>cis</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µg/L	F
P064	Dissolved oxygen	1/29/2024	4.21				mg/L	F
P064	Dissolved oxygen	8/6/2024	1.4				mg/L	F
P064	Oxidation-reduction potential	1/29/2024	132.7				mV	F
P064	Oxidation-reduction potential	8/6/2024	155.6				mV	F
P064	pH	1/29/2024	6.86				s.u.	F
P064	pH	8/6/2024	6.83				s.u.	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
P064	Specific conductance	1/29/2024	1517				µmhos/cm	F
P064	Specific conductance	8/6/2024	1600				µmhos/cm	F
P064	Temperature	1/29/2024	12.1				C	F
P064	Temperature	8/6/2024	16.7				C	F
P064	Tetrachloroethene	1/29/2024	1.15	0.333			µg/L	F
P064	Tetrachloroethene	1/29/2024	1.19	0.333			µg/L	D
P064	Tetrachloroethene	8/6/2024	1.28	0.333			µg/L	F
P064	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
P064	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	D
P064	<i>trans</i> -1,2-Dichloroethene	8/6/2024	0.333	0.333	U		µg/L	F
P064	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
P064	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	D
P064	Trichloroethene	8/6/2024	0.333	0.333	U		µg/L	F
P064	Turbidity	1/29/2024	2.48				NTU	F
P064	Turbidity	8/6/2024	6.73				NTU	F
P064	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
P064	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	D
P064	Vinyl chloride	8/6/2024	0.333	0.333	U		µg/L	F

Abbreviations:

C = Celsius

D = analyte determined in diluted sample

F = low-flow sampling method used

J = estimated value

mg/L = milligrams per liter

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

mV = millivolts

NTU = nephelometric turbidity units

s.u. = standard unit

U = analytical result below detection limit

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0118	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0118	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0118	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0118	Dissolved oxygen	1/29/2024	5.88				mg/L	F
0118	Dissolved oxygen	4/22/2024	4.85				mg/L	F
0118	Dissolved oxygen	11/5/2024	5.06				mg/L	F
0118	Oxidation-reduction potential	1/29/2024	120.2				mV	F
0118	Oxidation-reduction potential	4/22/2024	173.9				mV	F
0118	Oxidation-reduction potential	11/5/2024	226.4				mV	F
0118	pH	1/29/2024	6.95				s.u.	F
0118	pH	4/22/2024	6.94				s.u.	F
0118	pH	11/5/2024	6.98				s.u.	F
0118	Specific conductance	1/29/2024	1104				µmhos/cm	F
0118	Specific conductance	4/22/2024	1109				µmhos/cm	F
0118	Specific conductance	11/5/2024	1893				µmhos/cm	F
0118	Temperature	1/29/2024	15.8				C	F
0118	Temperature	4/22/2024	15.6				C	F
0118	Temperature	11/5/2024	15.7				C	F
0118	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0118	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0118	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0118	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0118	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0118	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0118	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0118	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0118	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0118	Turbidity	1/29/2024	28.3				NTU	F
0118	Turbidity	4/22/2024	32.7				NTU	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0118	Turbidity	11/5/2024	12				NTU	F
0118	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0118	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0118	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0124	cis-1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0124	cis-1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0124	cis-1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0124	cis-1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0124	Dissolved oxygen	1/29/2024	0.1				mg/L	F
0124	Dissolved oxygen	4/22/2024	0.23				mg/L	F
0124	Dissolved oxygen	8/5/2024	2.21				mg/L	F
0124	Dissolved oxygen	11/5/2024	2.95				mg/L	F
0124	Oxidation-reduction potential	1/29/2024	114.4				mV	F
0124	Oxidation-reduction potential	4/22/2024	160.5				mV	F
0124	Oxidation-reduction potential	8/5/2024	121.5				mV	F
0124	Oxidation-reduction potential	11/5/2024	254.9				mV	F
0124	pH	1/29/2024	6.75				s.u.	F
0124	pH	4/22/2024	6.68				s.u.	F
0124	pH	8/5/2024	6.77				s.u.	F
0124	pH	11/5/2024	6.75				s.u.	F
0124	Specific conductance	1/29/2024	1186				µmhos/cm	F
0124	Specific conductance	4/22/2024	1170				µmhos/cm	F
0124	Specific conductance	8/5/2024	1431				µmhos/cm	F
0124	Specific conductance	11/5/2024	1764				µmhos/cm	F
0124	Temperature	1/29/2024	15.4				C	F
0124	Temperature	4/22/2024	15.1				C	F
0124	Temperature	8/5/2024	16.2				C	F
0124	Temperature	11/5/2024	15.6				C	F
0124	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0124	Tetrachloroethene	4/22/2024	0.34	0.333	J		µg/L	F
0124	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0124	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0124	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0124	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0124	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0124	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0124	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0124	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0124	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0124	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0124	Turbidity	1/29/2024	5.53				NTU	F
0124	Turbidity	4/22/2024	6.37				NTU	F
0124	Turbidity	8/5/2024	14.4				NTU	F
0124	Turbidity	11/5/2024	2.05				NTU	F
0124	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0124	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0124	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0124	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0126	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0126	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0126	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0126	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0126	Dissolved oxygen	1/29/2024	0.47				mg/L	F
0126	Dissolved oxygen	4/22/2024	0.1				mg/L	F
0126	Dissolved oxygen	8/5/2024	0.95				mg/L	F
0126	Dissolved oxygen	11/5/2024	0.26				mg/L	F
0126	Oxidation-reduction potential	1/29/2024	119.3				mV	F
0126	Oxidation-reduction potential	4/22/2024	166.5				mV	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0126	Oxidation-reduction potential	8/5/2024	181				mV	F
0126	Oxidation-reduction potential	11/5/2024	187.7				mV	F
0126	pH	1/29/2024	6.73				s.u.	F
0126	pH	4/22/2024	6.65				s.u.	F
0126	pH	8/5/2024	6.75				s.u.	F
0126	pH	11/5/2024	6.75				s.u.	F
0126	Specific conductance	1/29/2024	1228				µmhos/cm	F
0126	Specific conductance	4/22/2024	1270				µmhos/cm	F
0126	Specific conductance	8/5/2024	1495				µmhos/cm	F
0126	Specific conductance	11/5/2024	1789				µmhos/cm	F
0126	Temperature	1/29/2024	15.6				C	F
0126	Temperature	4/22/2024	15.2				C	F
0126	Temperature	8/5/2024	16.1				C	F
0126	Temperature	11/5/2024	15.4				C	F
0126	Tetrachloroethene	1/29/2024	0.8	0.333	J		µg/L	F
0126	Tetrachloroethene	4/22/2024	0.9	0.333	J		µg/L	F
0126	Tetrachloroethene	8/5/2024	0.95	0.333	J		µg/L	F
0126	Tetrachloroethene	11/5/2024	0.92	0.333	J		µg/L	F
0126	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0126	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0126	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0126	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0126	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0126	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0126	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0126	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0126	Turbidity	1/29/2024	23.8				NTU	F
0126	Turbidity	4/22/2024	10.4				NTU	F
0126	Turbidity	8/5/2024	6.51				NTU	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0126	Turbidity	11/5/2024	1.77				NTU	F
0126	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0126	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0126	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0126	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0138	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0138	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0138	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0138	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0138	Dissolved oxygen	1/29/2024	5.37				mg/L	F
0138	Dissolved oxygen	4/22/2024	3.4				mg/L	F
0138	Dissolved oxygen	8/5/2024	4.08				mg/L	F
0138	Dissolved oxygen	11/5/2024	2.8				mg/L	F
0138	Oxidation-reduction potential	1/29/2024	65.9				mV	F
0138	Oxidation-reduction potential	4/22/2024	159				mV	F
0138	Oxidation-reduction potential	8/5/2024	180.5				mV	F
0138	Oxidation-reduction potential	11/5/2024	120.8				mV	F
0138	pH	1/29/2024	6.41				s.u.	F
0138	pH	4/22/2024	6.85				s.u.	F
0138	pH	8/5/2024	6.93				s.u.	F
0138	pH	11/5/2024	6.92				s.u.	F
0138	Specific conductance	1/29/2024	1187				µmhos/cm	F
0138	Specific conductance	4/22/2024	1168				µmhos/cm	F
0138	Specific conductance	8/5/2024	1410				µmhos/cm	F
0138	Specific conductance	11/5/2024	1878				µmhos/cm	F
0138	Temperature	1/29/2024	15.5				C	F
0138	Temperature	4/22/2024	14.5				C	F
0138	Temperature	8/5/2024	16.5				C	F
0138	Temperature	11/5/2024	14.9				C	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0138	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0138	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0138	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0138	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0138	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0138	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0138	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0138	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0138	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0138	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0138	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0138	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0138	Turbidity	1/29/2024	32.8				NTU	F
0138	Turbidity	4/22/2024	24.7				NTU	F
0138	Turbidity	8/5/2024	10.2				NTU	F
0138	Turbidity	11/5/2024	23				NTU	F
0138	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0138	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0138	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0138	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0315	<i>cis</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0315	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0315	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0315	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0315	Dissolved oxygen	1/30/2024	1.32				mg/L	F
0315	Dissolved oxygen	4/22/2024	1.04				mg/L	F
0315	Dissolved oxygen	8/5/2024	0.38				mg/L	F
0315	Dissolved oxygen	11/5/2024	2.46				mg/L	F
0315	Oxidation-reduction potential	1/30/2024	21.7				mV	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0315	Oxidation-reduction potential	4/22/2024	132.4				mV	F
0315	Oxidation-reduction potential	8/5/2024	146				mV	F
0315	Oxidation-reduction potential	11/5/2024	153.6				mV	F
0315	pH	1/30/2024	6.86				s.u.	F
0315	pH	4/22/2024	6.94				s.u.	F
0315	pH	8/5/2024	7.1				s.u.	F
0315	pH	11/5/2024	6.93				s.u.	F
0315	Specific conductance	1/30/2024	1570				µmhos/cm	F
0315	Specific conductance	4/22/2024	1621				µmhos/cm	F
0315	Specific conductance	8/5/2024	1678				µmhos/cm	F
0315	Specific conductance	11/5/2024	1635				µmhos/cm	F
0315	Temperature	1/30/2024	15.3				C	F
0315	Temperature	4/22/2024	14.5				C	F
0315	Temperature	8/5/2024	16.6				C	F
0315	Temperature	11/5/2024	15				C	F
0315	Tetrachloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0315	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0315	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0315	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0315	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0315	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0315	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0315	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0315	Trichloroethene	1/30/2024	1.01	0.333			µg/L	F
0315	Trichloroethene	4/22/2024	0.41	0.333	J		µg/L	F
0315	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0315	Trichloroethene	11/5/2024	0.5	0.333	J		µg/L	F
0315	Turbidity	1/30/2024	210				NTU	F
0315	Turbidity	4/22/2024	66				NTU	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0315	Turbidity	8/5/2024	117				NTU	F
0315	Turbidity	11/5/2024	147				NTU	F
0315	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0315	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0315	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0315	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0346	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0346	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0346	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0346	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0346	Dissolved oxygen	1/29/2024	8.56				mg/L	F
0346	Dissolved oxygen	4/22/2024	8.39				mg/L	F
0346	Dissolved oxygen	8/5/2024	4.65				mg/L	F
0346	Dissolved oxygen	11/5/2024	0.4				mg/L	F
0346	Oxidation-reduction potential	1/29/2024	141.3				mV	F
0346	Oxidation-reduction potential	4/22/2024	272.6				mV	F
0346	Oxidation-reduction potential	8/5/2024	50.2				mV	F
0346	Oxidation-reduction potential	11/5/2024	-63				mV	F
0346	pH	1/29/2024	7.37				s.u.	F
0346	pH	4/22/2024	7.11				s.u.	F
0346	pH	8/5/2024	7.12				s.u.	F
0346	pH	11/5/2024	6.79				s.u.	F
0346	Specific conductance	1/29/2024	516				µmhos/cm	F
0346	Specific conductance	4/22/2024	636				µmhos/cm	F
0346	Specific conductance	8/5/2024	741				µmhos/cm	F
0346	Specific conductance	11/5/2024	1707				µmhos/cm	F
0346	Temperature	1/29/2024	15				C	F
0346	Temperature	4/22/2024	13.7				C	F
0346	Temperature	8/5/2024	16.2				C	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0346	Temperature	11/5/2024	15.3				C	F
0346	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0346	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0346	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0346	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0346	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0346	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0346	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0346	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0346	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0346	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0346	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0346	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0346	Turbidity	1/29/2024	9.78				NTU	F
0346	Turbidity	4/22/2024	5.92				NTU	F
0346	Turbidity	8/5/2024	18.3				NTU	F
0346	Turbidity	11/5/2024	18.4				NTU	F
0346	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0346	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0346	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0346	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0347	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0347	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	D
0347	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	D
0347	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0347	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	D
0347	<i>cis</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0347	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0347	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	D

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0347	Dissolved oxygen	1/29/2024	0.82				mg/L	F
0347	Dissolved oxygen	4/22/2024	0.39				mg/L	F
0347	Dissolved oxygen	8/5/2024	0.21				mg/L	F
0347	Dissolved oxygen	11/5/2024	7.83				mg/L	F
0347	Oxidation-reduction potential	1/29/2024	-27.7				mV	F
0347	Oxidation-reduction potential	4/22/2024	-32.3				mV	F
0347	Oxidation-reduction potential	8/5/2024	-49.7				mV	F
0347	Oxidation-reduction potential	11/5/2024	-42.1				mV	F
0347	pH	1/29/2024	6.79				s.u.	F
0347	pH	4/22/2024	6.85				s.u.	F
0347	pH	8/5/2024	6.67				s.u.	F
0347	pH	11/5/2024	6.49				s.u.	F
0347	Specific conductance	1/29/2024	1508				µmhos/cm	F
0347	Specific conductance	4/22/2024	1723				µmhos/cm	F
0347	Specific conductance	8/5/2024	1905				µmhos/cm	F
0347	Specific conductance	11/5/2024	1850				µmhos/cm	F
0347	Temperature	1/29/2024	14.5				C	F
0347	Temperature	4/22/2024	14.1				C	F
0347	Temperature	8/5/2024	15.8				C	F
0347	Temperature	11/5/2024	15				C	F
0347	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0347	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	D
0347	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0347	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	D
0347	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0347	Tetrachloroethene	8/5/2024	0.333	0.333	U		µg/L	D
0347	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	D
0347	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0347	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	D

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0347	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0347	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	D
0347	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0347	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0347	<i>trans</i> -1,2-Dichloroethene	8/5/2024	0.333	0.333	U		µg/L	D
0347	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0347	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	D
0347	Trichloroethene	1/29/2024	30.4	0.333			µg/L	D
0347	Trichloroethene	1/29/2024	31.5	0.333			µg/L	F
0347	Trichloroethene	4/22/2024	13.9	0.333			µg/L	D
0347	Trichloroethene	4/22/2024	13.7	0.333			µg/L	F
0347	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	F
0347	Trichloroethene	8/5/2024	0.333	0.333	U		µg/L	D
0347	Trichloroethene	11/5/2024	31.2	0.333			µg/L	F
0347	Trichloroethene	11/5/2024	30.5	0.333			µg/L	D
0347	Turbidity	1/29/2024	9.22				NTU	F
0347	Turbidity	4/22/2024	10.87				NTU	F
0347	Turbidity	8/5/2024	10.3				NTU	F
0347	Turbidity	11/5/2024	9.88				NTU	F
0347	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	D
0347	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0347	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0347	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	D
0347	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	D
0347	Vinyl chloride	8/5/2024	0.333	0.333	U		µg/L	F
0347	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0347	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	D
0379	<i>cis</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0379	<i>cis</i> -1,2-Dichloroethene	2/5/2024	0.333	0.333	U		µg/L	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	cis-1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0379	cis-1,2-Dichloroethene	4/23/2024	0.333	0.333	U		µg/L	F
0379	cis-1,2-Dichloroethene	8/1/2024	0.333	0.333	U		µg/L	F
0379	cis-1,2-Dichloroethene	10/30/2024	0.333	0.333	U		µg/L	F
0379	Dissolved oxygen	1/30/2024	0.6				mg/L	F
0379	Dissolved oxygen	2/5/2024	0.42				mg/L	F
0379	Dissolved oxygen	4/22/2024	1.55				mg/L	F
0379	Dissolved oxygen	4/23/2024	1.08				mg/L	F
0379	Dissolved oxygen	8/1/2024	1.15				mg/L	F
0379	Dissolved oxygen	10/30/2024	3.4				mg/L	F
0379	Oxidation-reduction potential	1/30/2024	21.8				mV	F
0379	Oxidation-reduction potential	2/5/2024	-3.4				mV	F
0379	Oxidation-reduction potential	4/22/2024	49.2				mV	F
0379	Oxidation-reduction potential	4/23/2024	25				mV	F
0379	Oxidation-reduction potential	8/1/2024	-3.7				mV	F
0379	Oxidation-reduction potential	10/30/2024	7.6				mV	F
0379	pH	1/30/2024	6.9				s.u.	F
0379	pH	2/5/2024	6.88				s.u.	F
0379	pH	4/22/2024	6.85				s.u.	F
0379	pH	4/23/2024	6.84				s.u.	F
0379	pH	8/1/2024	6.91				s.u.	F
0379	pH	10/30/2024	6.89				s.u.	F
0379	Specific conductance	1/30/2024	1727				µmhos/cm	F
0379	Specific conductance	2/5/2024	2002				µmhos/cm	F
0379	Specific conductance	4/22/2024	1499				µmhos/cm	F
0379	Specific conductance	4/23/2024	1500				µmhos/cm	F
0379	Specific conductance	8/1/2024	2018				µmhos/cm	F
0379	Specific conductance	10/30/2024	2149				µmhos/cm	F
0379	Temperature	1/30/2024	15.2				C	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	Temperature	2/5/2024	16.4				C	F
0379	Temperature	4/22/2024	16.6				C	F
0379	Temperature	4/23/2024	16.2				C	F
0379	Temperature	8/1/2024	18.8				C	F
0379	Temperature	10/30/2024	16.9				C	F
0379	Tetrachloroethene	1/30/2024	0.37	0.333	J		µg/L	F
0379	Tetrachloroethene	2/5/2024	0.35	0.333	J		µg/L	F
0379	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0379	Tetrachloroethene	4/23/2024	0.333	0.333	U		µg/L	F
0379	Tetrachloroethene	8/1/2024	0.42	0.333	J		µg/L	F
0379	Tetrachloroethene	10/30/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	2/5/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	4/23/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	8/1/2024	0.333	0.333	U		µg/L	F
0379	<i>trans</i> -1,2-Dichloroethene	10/30/2024	0.333	0.333	U		µg/L	F
0379	Trichloroethene	1/30/2024	0.56	0.333	J		µg/L	F
0379	Trichloroethene	2/5/2024	0.58	0.333	J		µg/L	F
0379	Trichloroethene	4/22/2024	0.4	0.333	J		µg/L	F
0379	Trichloroethene	4/23/2024	0.39	0.333	J		µg/L	F
0379	Trichloroethene	8/1/2024	0.76	0.333	J		µg/L	F
0379	Trichloroethene	10/30/2024	0.62	0.333	J		µg/L	F
0379	Turbidity	1/30/2024	30.5				NTU	F
0379	Turbidity	2/5/2024	20.3				NTU	F
0379	Turbidity	4/22/2024	7.63				NTU	F
0379	Turbidity	4/23/2024	7.45				NTU	F
0379	Turbidity	8/1/2024	10.2				NTU	F
0379	Turbidity	10/30/2024	22.5				NTU	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0379	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0379	Vinyl chloride	2/5/2024	0.333	0.333	U		µg/L	F
0379	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0379	Vinyl chloride	4/23/2024	0.333	0.333	U		µg/L	F
0379	Vinyl chloride	8/1/2024	0.333	0.333	U		µg/L	F
0379	Vinyl chloride	10/30/2024	0.333	0.333	U		µg/L	F
0386	<i>cis</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0386	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0386	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0386	Dissolved oxygen	1/30/2024	1.96				mg/L	F
0386	Dissolved oxygen	4/22/2024	5.65				mg/L	F
0386	Dissolved oxygen	11/5/2024	2.07				mg/L	F
0386	Oxidation-reduction potential	1/30/2024	133.7				mV	F
0386	Oxidation-reduction potential	4/22/2024	138				mV	F
0386	Oxidation-reduction potential	11/5/2024	262.5				mV	F
0386	pH	1/30/2024	6.63				s.u.	F
0386	pH	4/22/2024	6.63				s.u.	F
0386	pH	11/5/2024	6.7				s.u.	F
0386	Specific conductance	1/30/2024	1293				µmhos/cm	F
0386	Specific conductance	4/22/2024	1396				µmhos/cm	F
0386	Specific conductance	11/5/2024	1410				µmhos/cm	F
0386	Temperature	1/30/2024	13.8				C	F
0386	Temperature	4/22/2024	13				C	F
0386	Temperature	11/5/2024	13.4				C	F
0386	Tetrachloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0386	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0386	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0386	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0386	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0386	trans-1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0386	Trichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0386	Trichloroethene	4/22/2024	0.4	0.333	J		µg/L	F
0386	Trichloroethene	11/5/2024	0.34	0.333	J		µg/L	F
0386	Turbidity	1/30/2024	9.62				NTU	F
0386	Turbidity	4/22/2024	1.88				NTU	F
0386	Turbidity	11/5/2024	1.47				NTU	F
0386	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0386	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0386	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0387	cis-1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0387	cis-1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0387	cis-1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0387	Dissolved oxygen	1/30/2024	2.39				mg/L	F
0387	Dissolved oxygen	4/22/2024	0.38				mg/L	F
0387	Dissolved oxygen	11/5/2024	1.18				mg/L	F
0387	Oxidation-reduction potential	1/30/2024	131.3				mV	F
0387	Oxidation-reduction potential	4/22/2024	198				mV	F
0387	Oxidation-reduction potential	11/5/2024	326.6				mV	F
0387	pH	1/30/2024	6.71				s.u.	F
0387	pH	4/22/2024	6.79				s.u.	F
0387	pH	11/5/2024	6.79				s.u.	F
0387	Specific conductance	1/30/2024	1459				µmhos/cm	F
0387	Specific conductance	4/22/2024	1360				µmhos/cm	F
0387	Specific conductance	11/5/2024	1346				µmhos/cm	F
0387	Temperature	1/30/2024	13.1				C	F
0387	Temperature	4/22/2024	13.1				C	F
0387	Temperature	11/5/2024	13.8				C	F
0387	Tetrachloroethene	1/30/2024	0.333	0.333	U		µg/L	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0387	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0387	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0387	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0387	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0387	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0387	Trichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0387	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0387	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0387	Turbidity	1/30/2024	2.81				NTU	F
0387	Turbidity	4/22/2024	0.69				NTU	F
0387	Turbidity	11/5/2024	0.97				NTU	F
0387	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0387	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0387	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0389	<i>cis</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0389	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0389	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0389	Dissolved oxygen	1/30/2024	3.05				mg/L	F
0389	Dissolved oxygen	4/22/2024	5.94				mg/L	F
0389	Dissolved oxygen	11/5/2024	1.09				mg/L	F
0389	Oxidation-reduction potential	1/30/2024	105.7				mV	F
0389	Oxidation-reduction potential	4/22/2024	174.5				mV	F
0389	Oxidation-reduction potential	11/5/2024	301.3				mV	F
0389	pH	1/30/2024	6.68				s.u.	F
0389	pH	4/22/2024	6.71				s.u.	F
0389	pH	11/5/2024	6.81				s.u.	F
0389	Specific conductance	1/30/2024	1138				µmhos/cm	F
0389	Specific conductance	4/22/2024	1273				µmhos/cm	F
0389	Specific conductance	11/5/2024	1251				µmhos/cm	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0389	Temperature	1/30/2024	13.5				C	F
0389	Temperature	4/22/2024	13.5				C	F
0389	Temperature	11/5/2024	13.5				C	F
0389	Tetrachloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0389	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0389	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0389	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0389	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0389	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0389	Trichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0389	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0389	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0389	Turbidity	1/30/2024	5.36				NTU	F
0389	Turbidity	4/22/2024	5.6				NTU	F
0389	Turbidity	11/5/2024	6.23				NTU	F
0389	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0389	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0389	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F
0392	<i>cis</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0392	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0392	<i>cis</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0392	Dissolved oxygen	1/30/2024	2.61				mg/L	F
0392	Dissolved oxygen	4/22/2024	4.04				mg/L	F
0392	Dissolved oxygen	11/5/2024	0.9				mg/L	F
0392	Oxidation-reduction potential	1/30/2024	141.6				mV	F
0392	Oxidation-reduction potential	4/22/2024	222.5				mV	F
0392	Oxidation-reduction potential	11/5/2024	43.3				mV	F
0392	pH	1/30/2024	6.64				s.u.	F
0392	pH	4/22/2024	6.72				s.u.	F

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

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0392	pH	11/5/2024	6.69				s.u.	F
0392	Specific conductance	1/30/2024	1226				µmhos/cm	F
0392	Specific conductance	4/22/2024	1272				µmhos/cm	F
0392	Specific conductance	11/5/2024	1232				µmhos/cm	F
0392	Temperature	1/30/2024	12.5				C	F
0392	Temperature	4/22/2024	13.7				C	F
0392	Temperature	11/5/2024	15.6				C	F
0392	Tetrachloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0392	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0392	Tetrachloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0392	<i>trans</i> -1,2-Dichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0392	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0392	<i>trans</i> -1,2-Dichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0392	Trichloroethene	1/30/2024	0.333	0.333	U		µg/L	F
0392	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0392	Trichloroethene	11/5/2024	0.333	0.333	U		µg/L	F
0392	Turbidity	1/30/2024	2.41				NTU	F
0392	Turbidity	4/22/2024	0.71				NTU	F
0392	Turbidity	11/5/2024	5.12				NTU	F
0392	Vinyl chloride	1/30/2024	0.333	0.333	U		µg/L	F
0392	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0392	Vinyl chloride	11/5/2024	0.333	0.333	U	J	µg/L	F

Abbreviations:

C = Celsius

D = analyte determined in diluted sample

F = low-flow sampling method used

J = estimated value

mg/L = milligrams per liter

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

mV = millivolts

NTU = nephelometric turbidity units

s.u. = standard unit

U = analytical result below detection limit

Table D-3. Phase I Seep Data

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0617	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.35	0.333	J		µg/L	F
0617	<i>cis</i> -1,2-Dichloroethene	7/30/2024	0.57	0.333	J		µg/L	F
0617	Dissolved oxygen	1/29/2024	8.07				mg/L	F
0617	Dissolved oxygen	7/30/2024	4.41				mg/L	F
0617	Oxidation-reduction potential	1/29/2024	148.2				mV	F
0617	Oxidation-reduction potential	7/30/2024	-32				mV	F
0617	pH	1/29/2024	7.39				s.u.	F
0617	pH	7/30/2024	6.98				s.u.	F
0617	Specific conductance	1/29/2024	600				µmhos/cm	F
0617	Specific conductance	7/30/2024	1437				µmhos/cm	F
0617	Temperature	1/29/2024	7.7				C	F
0617	Temperature	7/30/2024	21.7				C	F
0617	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0617	Tetrachloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0617	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0617	<i>trans</i> -1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0617	Trichloroethene	1/29/2024	1.29	0.333			µg/L	F
0617	Trichloroethene	7/30/2024	2.15	0.333			µg/L	F
0617	Turbidity	1/29/2024	43.8				NTU	F
0617	Turbidity	7/30/2024	265				NTU	F
0617	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0617	Vinyl chloride	7/30/2024	0.333	0.333	U		µg/L	F

Abbreviations:

C = Celsius

F = low-flow sampling method used

J = estimated value

mg/L = milligrams per liter

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

mV = millivolts

NTU = nephelometric turbidity units

s.u. = standard unit

U = analytical result below detection limit

Table D-4. Parcels 6, 7, and 8 Seep Data

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0601	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.96	0.333	J		µg/L	F
0601	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.65	0.333	J		µg/L	F
0601	<i>cis</i> -1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0601	<i>cis</i> -1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0601	Dissolved oxygen	1/29/2024	2.48				mg/L	F
0601	Dissolved oxygen	4/22/2024	6.39				mg/L	F
0601	Dissolved oxygen	7/30/2024	5.22				mg/L	F
0601	Dissolved oxygen	11/6/2024	2.74				mg/L	F
0601	Oxidation-reduction potential	1/29/2024	161.1				mV	F
0601	Oxidation-reduction potential	4/22/2024	133				mV	F
0601	Oxidation-reduction potential	7/30/2024	126.5				mV	F
0601	Oxidation-reduction potential	11/6/2024	6.2				mV	F
0601	pH	1/29/2024	7.02				s.u.	F
0601	pH	4/22/2024	6.91				s.u.	F
0601	pH	7/30/2024	7.17				s.u.	F
0601	pH	11/6/2024	7.21				s.u.	F
0601	Specific conductance	1/29/2024	1140				µmhos/cm	F
0601	Specific conductance	4/22/2024	1280				µmhos/cm	F
0601	Specific conductance	7/30/2024	1134				µmhos/cm	F
0601	Specific conductance	11/6/2024	803				µmhos/cm	F
0601	Temperature	1/29/2024	13.6				C	F
0601	Temperature	4/22/2024	13.8				C	F
0601	Temperature	7/30/2024	15.6				C	F
0601	Temperature	11/6/2024	17.9				C	F
0601	Tetrachloroethene	1/29/2024	10.8	0.333			µg/L	F
0601	Tetrachloroethene	4/22/2024	9.01	0.333			µg/L	F
0601	Tetrachloroethene	7/30/2024	4.59	0.333			µg/L	F
0601	Tetrachloroethene	11/6/2024	0.91	0.333	J		µg/L	F
0601	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F

Table D-4. Parcels 6, 7, and 8 Seep Data (continued)

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0601	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0601	<i>trans</i> -1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0601	<i>trans</i> -1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0601	Trichloroethene	1/29/2024	0.62	0.333	J		µg/L	F
0601	Trichloroethene	4/22/2024	0.67	0.333	J		µg/L	F
0601	Trichloroethene	7/30/2024	0.54	0.333	J		µg/L	F
0601	Trichloroethene	11/6/2024	0.42	0.333	J		µg/L	F
0601	Turbidity	1/29/2024	3.16				NTU	F
0601	Turbidity	4/22/2024	455				NTU	F
0601	Turbidity	7/30/2024	20				NTU	F
0601	Turbidity	11/6/2024	999				NTU	F
0601	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0601	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0601	Vinyl chloride	7/30/2024	0.333	0.333	U		µg/L	F
0601	Vinyl chloride	11/6/2024	0.333	0.333	U	J	µg/L	F
0602	<i>cis</i> -1,2-Dichloroethene	1/29/2024	2.13	0.333			µg/L	F
0602	Dissolved oxygen	1/29/2024	7.91				mg/L	F
0602	Oxidation-reduction potential	1/29/2024	221.2				mV	F
0602	pH	1/29/2024	7.07				s.u.	F
0602	Specific conductance	1/29/2024	985				µmhos/cm	F
0602	Temperature	1/29/2024	8.6				C	F
0602	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0602	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0602	Trichloroethene	1/29/2024	3.33	0.333			µg/L	F
0602	Turbidity	1/29/2024	9.56				NTU	F
0602	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0605	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0605	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0605	<i>cis</i> -1,2-Dichloroethene	7/30/2024	0.83	0.333	J		µg/L	F

Table D-4. Parcels 6, 7, and 8 Seep Data (continued)

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0605	<i>cis</i> -1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0605	Dissolved oxygen	1/29/2024	6.66				mg/L	F
0605	Dissolved oxygen	4/22/2024	8.71				mg/L	F
0605	Dissolved oxygen	7/30/2024	2.91				mg/L	F
0605	Dissolved oxygen	11/6/2024	3.83				mg/L	F
0605	Oxidation-reduction potential	1/29/2024	188.8				mV	F
0605	Oxidation-reduction potential	4/22/2024	216.6				mV	F
0605	Oxidation-reduction potential	7/30/2024	-90.7				mV	F
0605	Oxidation-reduction potential	11/6/2024	242.9				mV	F
0605	pH	1/29/2024	7.24				s.u.	F
0605	pH	4/22/2024	6.95				s.u.	F
0605	pH	7/30/2024	6.97				s.u.	F
0605	pH	11/6/2024	7.24				s.u.	F
0605	Specific conductance	1/29/2024	25				µmhos/cm	F
0605	Specific conductance	4/22/2024	1513				µmhos/cm	F
0605	Specific conductance	7/30/2024	1296				µmhos/cm	F
0605	Specific conductance	11/6/2024	2082				µmhos/cm	F
0605	Temperature	1/29/2024	13				C	F
0605	Temperature	4/22/2024	13.5				C	F
0605	Temperature	7/30/2024	17.1				C	F
0605	Temperature	11/6/2024	16.5				C	F
0605	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0605	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0605	Tetrachloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0605	Tetrachloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0605	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0605	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0605	<i>trans</i> -1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0605	<i>trans</i> -1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F

Table D-4. Parcels 6, 7, and 8 Seep Data (continued)

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0605	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0605	Trichloroethene	4/22/2024	0.54	0.333	J		µg/L	F
0605	Trichloroethene	7/30/2024	0.43	0.333	J		µg/L	F
0605	Trichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0605	Turbidity	1/29/2024	22.6				NTU	F
0605	Turbidity	4/22/2024	37.9				NTU	F
0605	Turbidity	7/30/2024	650				NTU	F
0605	Turbidity	11/6/2024	999				NTU	F
0605	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0605	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0605	Vinyl chloride	7/30/2024	0.333	0.333	U		µg/L	F
0605	Vinyl chloride	11/6/2024	0.333	0.333	U	J	µg/L	F
0606	<i>cis</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0606	<i>cis</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0606	Dissolved oxygen	1/29/2024	9.69				mg/L	F
0606	Dissolved oxygen	4/22/2024	6.91				mg/L	F
0606	Oxidation-reduction potential	1/29/2024	181.9				mV	F
0606	Oxidation-reduction potential	4/22/2024	28.1				mV	F
0606	pH	1/29/2024	7.56				s.u.	F
0606	pH	4/22/2024	7.3				s.u.	F
0606	Specific conductance	1/29/2024	544				µmhos/cm	F
0606	Specific conductance	4/22/2024	1315				µmhos/cm	F
0606	Temperature	1/29/2024	5.8				C	F
0606	Temperature	4/22/2024	11.5				C	F
0606	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0606	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0606	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0606	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0606	Trichloroethene	1/29/2024	0.333	0.333	U		µg/L	F

Table D-4. Parcels 6, 7, and 8 Seep Data (continued)

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0606	Trichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0606	Turbidity	1/29/2024	14.1				NTU	F
0606	Turbidity	4/22/2024	999				NTU	F
0606	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0606	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0607	cis-1,2-Dichloroethene	1/29/2024	1.74	0.333			µg/L	F
0607	cis-1,2-Dichloroethene	4/22/2024	0.66	0.333	J		µg/L	F
0607	cis-1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0607	cis-1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0607	Dissolved oxygen	1/29/2024	7.2				mg/L	F
0607	Dissolved oxygen	4/22/2024	8.23				mg/L	F
0607	Dissolved oxygen	7/30/2024	8.18				mg/L	F
0607	Dissolved oxygen	11/6/2024	7.9				mg/L	F
0607	Oxidation-reduction potential	1/29/2024	196.2				mV	F
0607	Oxidation-reduction potential	4/22/2024	90.8				mV	F
0607	Oxidation-reduction potential	7/30/2024	134.4				mV	F
0607	Oxidation-reduction potential	11/6/2024	294.3				mV	F
0607	pH	1/29/2024	7.34				s.u.	F
0607	pH	4/22/2024	7.4				s.u.	F
0607	pH	7/30/2024	6.54				s.u.	F
0607	pH	11/6/2024	6.83				s.u.	F
0607	Specific conductance	1/29/2024	1610				µmhos/cm	F
0607	Specific conductance	4/22/2024	1960				µmhos/cm	F
0607	Specific conductance	11/6/2024	1590				µmhos/cm	F
0607	Temperature	1/29/2024	9.5				C	F
0607	Temperature	4/22/2024	11.2				C	F
0607	Temperature	7/30/2024	15.6				C	F
0607	Temperature	11/6/2024	18.2				C	F
0607	Tetrachloroethene	1/29/2024	0.333	0.333	U		µg/L	F

Table D-4. Parcels 6, 7, and 8 Seep Data (continued)

Location	Analyte	Sample Date	Result	Detection Limit	Lab Qualifiers	Validation Qualifiers	Units	Sample Type
0607	Tetrachloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0607	Tetrachloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0607	Tetrachloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0607	<i>trans</i> -1,2-Dichloroethene	1/29/2024	0.333	0.333	U		µg/L	F
0607	<i>trans</i> -1,2-Dichloroethene	4/22/2024	0.333	0.333	U		µg/L	F
0607	<i>trans</i> -1,2-Dichloroethene	7/30/2024	0.333	0.333	U		µg/L	F
0607	<i>trans</i> -1,2-Dichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0607	Trichloroethene	1/29/2024	0.84	0.333	J		µg/L	F
0607	Trichloroethene	4/22/2024	1.34	0.333			µg/L	F
0607	Trichloroethene	7/30/2024	0.36	0.333	J		µg/L	F
0607	Trichloroethene	11/6/2024	0.333	0.333	U		µg/L	F
0607	Turbidity	1/29/2024	24.2				NTU	F
0607	Turbidity	4/22/2024	482				NTU	F
0607	Turbidity	7/30/2024	30				NTU	F
0607	Turbidity	11/6/2024	125				NTU	F
0607	Vinyl chloride	1/29/2024	0.333	0.333	U		µg/L	F
0607	Vinyl chloride	4/22/2024	0.333	0.333	U		µg/L	F
0607	Vinyl chloride	7/30/2024	0.333	0.333	U		µg/L	F
0607	Vinyl chloride	11/6/2024	0.333	0.333	U	J	µg/L	F

Abbreviations:

C = Celsius

F = low-flow sampling method used

J = estimated value

mg/L = milligrams per liter

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

mV = millivolts

NTU = nephelometric turbidity units

s.u. = standard unit

U = analytical result below detection limit

Appendix E

Data Assessment Reports



Data Review and Validation Report

General Information

Task Code: MND01-01.2401035
Sample Event: January 29 and 30, 2024
Site(s): Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 653544
Analysis: Organics
Validator: Samantha Tigar
Review Date: March 25, 2024

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
MND01-01.2401035-001	0118	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-002	0124	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-003	0126	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-004	0138	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-005	0315	Methylene chloride	U	Less than 10 times the trip blank

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2401035-007	0347	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-008	0379	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-009	0386	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-010	0387	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-012	0392	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-016	0606	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-017	0607	Methylene chloride	U	Less than 10 times the trip blank
MND01-01.2401035-018	0347	Methylene chloride	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 20 water samples on January 31, 2024, 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 shipment was received intact with the temperature inside the iced cooler at 1°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 January 17, 2024 (VOA4), using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. All compound calibrations using average response factors had relative standard deviations less than 15 percent (except acetone which was only detected in the trip blanks.) 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. Some target compounds had percent drift values greater than 20 percent. There were no sample results greater than the MDL associated with these calibration verification compounds, so no qualification is 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

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All samples are spiked with surrogate compounds prior to sample preparation. Surrogate recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries may also be influenced by the success in recoveries of the internal standards. All surrogate recoveries were within the acceptance ranges. The recovery of the internal standards added to the samples is monitored to measure the purging efficiency. Internal standard recoveries were stable and within acceptance ranges.

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 18, 2024. 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. 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, except turbidity at location 0315. No filtration was required for these volatile samples.

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.

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 outliers in the laboratory results were identified for this Task. The laboratory data from this event are acceptable as qualified. Potential anomalies in the field parameters were examined for patterns of repeated high or low bias, which suggest a systematic error due to instrument malfunction. No such patterns were found and all field data from this event are acceptable.

Report Prepared By: **SAMANTHA**
TIGAR (Affiliate)

Digitally signed by SAMANTHA
TIGAR (Affiliate)
Date: 2024.03.26 13:22:32
-06'00'

Samantha Tigar
Data Validator

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2401035 **Lab Code:** GEN **Validator:** Samantha Tigar **Validation Date:** 03-25-2024

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

Samples: 20

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 20 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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25-Mar-2024

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

Task Code: MND01-01.2401035

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2401035-001	0118	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-008	0379	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-014	0602	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-016	0606	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2401035-020	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: MND01-01.2401035

Lab Code: GEN

25-Mar-2024

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2401035-019	0999	SW-846 8260	Acetone	24.8	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2401035-001	0118	1.74	1	U	
MND01-01.2401035-002	0124	1.74	1	U	
MND01-01.2401035-003	0126	1.74	1	U	
MND01-01.2401035-004	0138	1.74	1	U	
MND01-01.2401035-006	0346	1.74	1	U	
MND01-01.2401035-007	0347	1.74	1	U	
MND01-01.2401035-013	0601	1.74	1	U	
MND01-01.2401035-014	0602	1.74	1	U	
MND01-01.2401035-015	0605	1.74	1	U	
MND01-01.2401035-016	0606	1.74	1	U	
MND01-01.2401035-017	0607	1.74	1	U	
MND01-01.2401035-018	0347	1.74	1	U	

Validation Report: Field Blanks

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25-Mar-2024

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

Task Code: MND01-01.2401035

Lab Code: GEN

TB	MND01-01.2401035-019	0999	SW-846 8260	Methylene chloride	0.770	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2401035-001	0118	0.590	1	J	U
MND01-01.2401035-002	0124	0.700	1	J	U
MND01-01.2401035-003	0126	0.560	1	J	U
MND01-01.2401035-004	0138	0.560	1	J	U
MND01-01.2401035-006	0346	0.500	1	U	
MND01-01.2401035-007	0347	0.540	1	J	U
MND01-01.2401035-013	0601	0.500	1	U	
MND01-01.2401035-014	0602	0.500	1	U	
MND01-01.2401035-015	0605	0.500	1	U	
MND01-01.2401035-016	0606	0.590	1	J	U
MND01-01.2401035-017	0607	0.590	1	J	U
MND01-01.2401035-018	0347	0.560	1	J	U

Validation Report: Field Blanks

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

Task Code: MND01-01.2401035

Lab Code: GEN

25-Mar-2024

TB	MND01-01.2401035-020	0999	SW-846 8260	Acetone	21.8	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2401035-005	0315	1.74	1	U	
MND01-01.2401035-008	0379	1.74	1	U	
MND01-01.2401035-009	0386	1.74	1	U	
MND01-01.2401035-010	0387	1.74	1	U	
MND01-01.2401035-011	0389	1.74	1	U	

Validation Report: Field Blanks

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

Task Code: MND01-01.2401035

Lab Code: GEN

25-Mar-2024

TB	MND01-01.2401035-020	0999	SW-846 8260	Methylene chloride	0.630	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2401035-005	0315	0.670	1	J	U
MND01-01.2401035-008	0379	0.550	1	J	U
MND01-01.2401035-009	0386	0.660	1	J	U
MND01-01.2401035-010	0387	0.550	1	J	U
MND01-01.2401035-011	0389	0.500	1	U	

Validation Report: Field Duplicates

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25-Mar-2024

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

Task Code: MND01-01.2401035

Lab Code: GEN

Duplicate: MND01-01.2401035-018					Sample: MND01-01.2401035-007 0347						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Trichloroethene	30.4			1	31.5			1	3.6		ug/L
Carbon tetrachloride	0.900	J		1	0.880	J		1			ug/L
Chloroform	0.530	J		1	0.560	J		1			ug/L
Methylene chloride	0.560	J		1	0.540	J		1			ug/L
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

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

Validation Report: Field Duplicates

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25-Mar-2024

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2401035 **Lab Code:** GEN

Duplicate: MND01-01.2401035-018					Sample: MND01-01.2401035-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
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
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

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

Validation Report: Field Duplicates

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25-Mar-2024

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2401035 **Lab Code:** GEN

Duplicate: MND01-01.2401035-018					Sample: MND01-01.2401035-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert	Dilution	RPD	RER	Units
Carbon Disulfide	1.67	U		1	1.67	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
Chloroethane	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
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

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

Validation Report: Field Duplicates

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25-Mar-2024

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

Task Code: MND01-01.2401035

Lab Code: GEN

Duplicate: MND01-01.2401035-018					Sample: MND01-01.2401035-007 0347						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Toluene	0.333	U		1	0.333	U		1			ug/L
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
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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25-Mar-2024

Task Code: MND01-01.2401035

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: MND01-01.2404036
Sample Event: April 22, 2024
Site(s): Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 664618
Analysis: Organics
Validator: Samantha Tigar
Review Date: September 30, 2024

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
All	All	1,1,1,2-Tetrachloroethane	J	Calibration RSD > 15%
All	All	1,2-Dibromo-3-chloropropane	J	Calibration RSD > 15%
All	All	cis-1,3-Dichloropropene	J	Calibration RSD > 15%

Sample ID	Location	Analyte	Flag	Reason
All	All	Methylene chloride	U	Less than 5 times the method blank
All	All	Styrene	J	Calibration RSD > 15%

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 11 water samples on April 25, 2024, accompanied by a Chain of Custody (COC) form. The FedEx tracking information was included on the Sample Receipt and Review Form. The COC forms were checked to confirm that all 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 shipment was received intact with the temperature inside the iced coolers between 1-3 °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 five 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 4, 2024, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. If compound calibrations using average response factors had relative standard deviations greater than 15%, associated results were qualified with J as estimated. If compound calibrations using linear or higher order regression calibrations had correlation

coefficient values less than 0.99, associated results were qualified with J as estimated. Initial and continuing calibration verification checks were made at the required frequency. Some target compounds had percent drift values greater than 20%. None of the associated sample results were greater than the MDL, so no 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

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All samples are spiked with surrogate compounds prior to sample preparation. Surrogate recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries may also be influenced by the success in recoveries of the internal standards. All surrogate recoveries were within the acceptance ranges. The recovery of the internal standards added to the samples is monitored to measure the purging efficiency. Internal standard recoveries were stable and within acceptance ranges.

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 five 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 four times the spike concentration. All reported matrix spike recoveries met acceptance criteria.

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 five times the PQL should be less than 20% (or less than the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. All reported replicate results met acceptance 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 dichlorodifluoromethane and 1,2-dibromo-3-chloropropane. The 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 May 23, 2024. 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 methylene chloride 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.

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 laboratory results were identified as outside of the historical range. All data is acceptable as qualified.

Report Prepared By: **SAMANTHA
TIGAR (Affiliate)**

Digitally signed by SAMANTHA
TIGAR (Affiliate)
Date: 2024.09.30 16:40:53 -06'00'

Samantha Tigar
Data Validator

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2404036 **Lab Code:** GEN **Validator:** Samantha Tigar **Validation Date:** 09-30-2024

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 was 1 field blank associated with this task.

Validation Report: Detection Limits

Page 1 of 2

30-Sep-2024

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

Task Code: MND01-
01.2404036

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2404036-001	0118	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-008	0379	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-016	0606	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404036-019	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 2

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

Task Code: MND01-01.2404036

Lab Code: GEN

30-Sep-2024

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2404036-019	0999	SW-846 8260	Acetone	7.41	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2404036-001	0118	1.74	1	U	
MND01-01.2404036-002	0124	1.74	1	U	
MND01-01.2404036-003	0126	1.74	1	U	
MND01-01.2404036-004	0138	1.74	1	U	
MND01-01.2404036-006	0346	1.74	1	U	
MND01-01.2404036-008	0379	1.74	1	U	
MND01-01.2404036-013	0601	1.74	1	U	
MND01-01.2404036-015	0605	1.74	1	U	
MND01-01.2404036-016	0606	1.74	1	U	
MND01-01.2404036-017	0607	1.74	1	U	

Validation Report: Field Blanks

Page 2 of 2

30-Sep-2024

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

Task Code: MND01-01.2404036

Lab Code: GEN

TB	MND01-01.2404036-019	0999	SW-846 8260	Methylene chloride	0.900	BJ
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2404036-001	0118	0.950	1	BJ	U
MND01-01.2404036-002	0124	0.800	1	BJ	U
MND01-01.2404036-003	0126	0.740	1	BJ	U
MND01-01.2404036-004	0138	0.800	1	BJ	U
MND01-01.2404036-006	0346	0.710	1	BJ	U
MND01-01.2404036-008	0379	0.890	1	BJ	U
MND01-01.2404036-013	0601	0.830	1	BJ	U
MND01-01.2404036-015	0605	0.950	1	BJ	U
MND01-01.2404036-016	0606	0.910	1	BJ	U
MND01-01.2404036-017	0607	0.860	1	BJ	U

Organics Data Validation Summary

Page 1 of 1

30-SEP-2024

Task Code: MND01-01.2404036

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 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 was 1 method blank result above the MDL.

Noncompliance Report: LCS/LCSD Performance

Page 1 of 1

30-Sep-2024

Task Code: MND01-01.2404036

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
	04-26-2024	SW-846 8260	1,2-Dibromo-3-chloropropane	141		58	130			
	04-26-2024	SW-846 8260	Chlorodibromomethane	132		70	130			
	04-26-2024	SW-846 8260	Dichlorodifluoromethane	164		58	151			

Noncompliance Report: Method Blanks

Page 1 of 1

30-Sep-2024

Task Code: MND01-01.2404036

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

Lab Code: GEN

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	04-26-2024	SW-846 8260	Methylene chloride	0.720	J	



Data Review and Validation Report

General Information

Task Code:	MND01-01.2404037
Sample Event:	April 22, 2024
Site(s):	Mound, Ohio: LTS&M (Parcel 6-7-8)
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	664617
Analysis:	Organics
Validator:	Amy Maurer
Review Date:	July 30, 2024

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	Qualifier	Reason
All	All	1,1,1,2-Tetrachloroethane	J	Calibration RSD > 15%
All	All	1,2-Dibromo-3-chloropropane	J	Calibration RSD > 15%; %Drift >20%; MS recovery above limit

Sample ID	Location	Analyte	Qualifier	Reason
All	All	Bromodichloro-methane	J	%Drift >20%
All	All	cis-1,3-Dichloropropene	J	Calibration RSD > 15%
All	All	Dichlorodifluoro-methane	J	%Drift >20%; MS recovery above limit
All	All	Methylene chloride	U	<5x concentration of MB
All	All	Naphthalene	J	%Drift >20%
All	All	Styrene	J	Calibration RSD > 15%
All	All	Trichlorofluoro-methane	J	%Drift >20%

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received seven water samples on April 25, 2024, accompanied by a Chain of Custody (COC) form. The FedEx tracking information was included on the Sample Receipt and Review Form. The COC forms were checked to confirm that all 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 shipment was received intact with the temperature inside the iced coolers between 1-3 °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 five 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 26, 2024, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. If compound calibrations using average response factors had relative standard deviations greater than 15%, associated results were qualified with J as estimated. If compound calibrations using linear or higher order regression calibrations had correlation coefficient values less than 0.99, associated results were qualified with J as estimated. Initial and continuing calibration verification checks were made at the required frequency. Some target compounds had percent drift values greater than 20%. If not previously qualified, the associated sample results were qualified with J as estimated. 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

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All samples are spiked with surrogate compounds prior to sample preparation. Surrogate recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries may also be influenced by the success in recoveries of the internal standards. All surrogate recoveries were within the acceptance ranges. The recovery of the internal standards added to the samples is monitored to measure the purging efficiency. Internal standard recoveries were stable and within acceptance ranges.

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 five times the blank concentration are qualified with a U flag as not detected. Methylene chloride was detected in the method blank above the MDL. The associated results were qualified with U 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 four times the spike concentration. All reported matrix spike recoveries met acceptance criteria.

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 five times the PQL should be less

than 20% (or less than the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. All reported replicate results met acceptance 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, with the following exceptions: The recoveries for dichlorodifluoromethane and 1,2-dibromo-3-chloropropane were above the acceptance range. The associated results were previously qualified.

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 May 23, 2024. 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

No trip blanks were submitted with these samples.

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 five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0347. All reported duplicate results met the acceptance criteria.

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 laboratory results were identified as outside of the historical range. One field result was identified as outside of the historical range (see Data Validation Outliers Reports on following page). Upon further review, including statistical evaluation at the 95% confidence level using ProUCL, it was determined that the value was not a true outlier.

No further issues with the data were identified. All data is acceptable as qualified.

Report Prepared By: **AMY MAURER (Affiliate)** Digitally signed by AMY MAURER (Affiliate)
Date: 2024.08.01 09:20:48 -06'00'

Amy Maurer
Data Validator

Data Validation Outliers Report - Field Parameters Only Report Date: 07/30/2024

Comparison to Historical Data Since: 7/30/2013 12:00:00 AM Fraction: Any

Task: MND01-01.2404037

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Dissolved Oxygen	0389	FI	mg/L	N	5.94		> HistMAX	0.42	5.28	43	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Task Code: MND01-01.2404037 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 07-30-2024

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

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

Chain of Custody

Present: <u>OK</u> Signed: <u>OK</u> Dated: <u>OK</u>

Sample

Integrity: <u>OK</u> Preservation <u>OK</u> Temperature: <u>OK</u>
--

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 Duplicates:	There was 1 duplicate evaluated.

Validation Report: Detection Limits

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

Task Code: MND01-01.2404037

Lab Code: GEN

30-Jul-2024

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2404037-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2404037-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Duplicates

Page 1 of 4

30-Jul-2024

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

Task Code: MND01-01.2404037

Lab Code: GEN

Duplicate: MND01-01.2404037-018					Sample: MND01-01.2404037-007 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	1.67	U		1	1.67	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

30-Jul-2024

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

Task Code: MND01-01.2404037

Lab Code: GEN

Duplicate: MND01-01.2404037-018					Sample: MND01-01.2404037-007 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	0.650	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

Page 3 of 4

30-Jul-2024

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

Task Code: MND01-01.2404037

Lab Code: GEN

Duplicate: MND01-01.2404037-018					Sample: MND01-01.2404037-007 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	0.770	BJ		1	0.750	BJ		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

Page 4 of 4

30-Jul-2024

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

Task Code: MND01-01.2404037

Lab Code: GEN

Duplicate: MND01-01.2404037-018					Sample: MND01-01.2404037-007 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	13.9			1	13.7			1	1.4		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

01-Aug-2024

Task Code: MND01-01.2404037

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 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 was 1 method blank result above the MDL.

Noncompliance Report: LCS/LCSD Performance

Page 1 of 1

01-Aug-2024

Task Code: MND01-01.2404037

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
	04-26-2024	SW-846 8260	1,2-Dibromo-3-chloropropane	141		58	130			
	04-26-2024	SW-846 8260	Chlorodibromomethane	132		70	130			
	04-26-2024	SW-846 8260	Dichlorodifluoromethane	164		58	151			

Noncompliance Report: Method Blanks

Page 1 of 1

01-Aug-2024

Task Code: MND01-01.2404037

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

Lab Code: GEN

Method Blank ID	Date Analyzed	Method	Analyte	Result	Lab Qualifiers	Comment
	04-26-2024	SW-846 8260	Methylene chloride	0.720	J	



Data Review and Validation Report

General Information

Task Code: MND01-01.2407038
Sample Event: July 30 and August 5, 2024
Site(s): Mound LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 678407 and 679483
Analysis: Organics
Validator: Amy Maurer
Review Date: December 16, 2024

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0), which is available at <https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S15870.pdf>. 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 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 Organic Compounds (VOAs)	VOA-A-007	SW-846 5030B	SW846 8260D

Data Qualifier Summary

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

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2407038-015	0605	Acetone	U	Less than 10x TB concentration

Sample Shipping/Receiving

GEL Laboratories, in Charleston, South Carolina, received a total of nine water samples on July 31, 2024 and August 6, 2024. Chain of Custody (COC) forms accompanied the sample shipment. The COC forms were checked to confirm that all 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. FedEx shipping information was included with the receiving documentation.

Preservation and Holding Times

The sample shipments were received with the temperatures inside the iced coolers between 4 °C and 6 °C, which comply with requirements. All sample containers were received in-tact 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 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 five times the MDL. Results that are less than the MDL are qualified with U as not detected.

The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and were in compliance with contractual requirements, with the exception of MDLs for carbon disulfide, which were elevated but still acceptable for this task.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument can produce acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification (ICV) 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. ICV and CCV standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations, ICVs, and CCVs were performed correctly in accordance with the cited methods.

Method SW-846 8260D, Volatile Organic Compounds

Initial calibrations were performed on July 26, 2024 on instrument “VOA5” and August 2, 2024 on instrument “VOA2” using up to nine calibration standards, dependent upon analyte. Calibrations using average response factors must have relative standard deviations (RSDs) of less than 15%. The reported RSDs for several target analytes were greater than 15% but less than 40%. All associated sample detects were qualified with J as estimated. Associated non-detects were qualified with J if any other calibration criteria had been exceeded for that compound. All calibrations using linear regressions had correlation coefficient values greater than 0.99 and intercepts less than three times the MDL. ICV and CCV checks were made at the required frequency. The absolute value of the percent drift (%D) for target compounds must be less than 20%. Several target compounds had reported %D that failed to meet acceptance criteria. In cases where the %D was positive and greater than 20%, associated detects were qualified with J as estimated. In cases where the %D was negative and the absolute value was between 20%-40%, associated detects were qualified with J as estimated, and non-detects were qualified with J if any other calibration criteria had failed for that compound. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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 were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with U as not detected when the sample result is greater than the MDL but less than five times the blank concentration (and less than ten times the blank concentration for common laboratory contaminants). All method and calibration blanks met the acceptance criteria.

VOA Internal Standard and Surrogate Recoveries

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All VOA samples are spiked with surrogate compounds prior to sample preparation, and the recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries must fall within limits determined by the laboratory. All reported surrogate recoveries met the laboratory-established acceptance criteria. The recovery of internal standards (ISs) added to the samples is monitored ensure that instrument sensitivity and response are stable and acceptable during each analysis. The IS area counts must not vary by more than a factor of two from the average obtained from the calibration standards, and the retention times of the ISs must not vary by more than ± 30 seconds from that of the associated calibration standard. All reported IS recoveries met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration

of the unspiked sample is greater than four times the spike. For VOAs, the matrix spike percent recovery (%R) must fall within 70%-130%, and MSD relative percent differences (RPDs) must fall below 30%. Several MS/MSD results failed to meet acceptance criteria. However, the samples used for the MS/MSDs with %R outside of the acceptance range were not from this task. Therefore, no qualifications were necessary based on this finding. All other reported MS/MSD results met the acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. Laboratory MSD results may be assessed in lieu of a designated replicate sample if a replicate sample was not analyzed. The relative percent difference (RPD) for results that are greater than five times the PQL should be less than 20% (or less than the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. All reported replicate results met the acceptance criteria.

Laboratory Control Sample

Laboratory control samples (LCSs) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. For VOAs, the LCS %R must fall between 70%-130%. All reported LCS results met the acceptance criteria.

Compound Identification

The provided mass spectral data were reviewed for each reported organic compound to verify that analytes were identified correctly.

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 RPD for duplicate results that are greater than five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from location 0347 (although part of the same sampling event, the parent and duplicate can be found under a separate task number: MND01-01.2407039. Parent sample ID: MND01-01.2407039-007. Field duplicate sample ID: MND01-01.2407039-018. All reported duplicate results met acceptance criteria, with the exception of the results for chloromethane. The associated results were qualified with J as estimated.

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. Sample results that were greater than the MDL but less than ten

times the trip blank results for these common laboratory contaminants were qualified with U as not detected.

Completeness

Results were reported for all analytes requested in the correct units 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

An EDD file arrived on September 3, 2024. 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 were 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 Measurements

All groundwater locations were sampled in accordance with Mound Micropurge criteria. No field instrument calibrations, daily operational checks, or safety meeting forms were included in the field EDD for review.

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 of a historical range. Potential outliers are identified by generating the Data Validation Outliers Report (see following pages) from data in the environmental database: The data from this task are compared to historical values from within a selected date range, and data points that fall below the historical minimum or above the historical maximum are included in the report as potential outliers. 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.

It was noted that one laboratory result and seven field results were outside of the historical data range assessed. Upon thorough review of the raw data, field EDD (including field notes), historic data trends, and evaluation by ProUCL at the 95% confidence levels, the following outliers were established:

- The specific conductance results at locations 0124 and 0126 were anomalously high. Thorough review of the field data did not indicate any errors, indicating that these outliers should be considered true extreme values.
- The specific conductance result at location 0607 was anomalously low. The field notes and sample collection logs were reviewed in detail, and it was noted that the raw value recorded for the specific conductance was 0.0178 mS/cm. The field samplers from this

sampling event were consulted regarding the recorded value and confirmed it to have been accurately recorded. The result should be considered a true extreme value.

- The pH result at location 0607 was anomalously low. Thorough review of the field data did not indicate any errors, indicating that this outlier should be considered a true extreme value.

All results are acceptable as qualified.

Report Prepared By: **AMY MAURER**
(Affiliate)

Amy Maurer
Data Validator

Digitally signed by AMY MAURER
(Affiliate)
Date: 2024.12.18 07:05:18 -07'00'

Data Validation Outliers Report - No Field Parameters Report Date: 12/06/2024

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2407038

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Chloroform	0605	LB	ug/L	N	0.700	J	> HistMAX	0.16	0.53	18	No

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only Report Date: 12/06/2024

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2407038

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Turbidity	0124	FI	NTU	N	14.4		> HistMAX	0.47	12.2	18	No
Specific Conductance	0124	FI	umhos/cm	N	1431		> HistMAX	1142	1310	18	Yes
Temperature	0124	FI	C	N	16.2		> HistMAX	12.7	15.5	18	No
Specific Conductance	0126	FI	umhos/cm	N	1495		> HistMAX	1228	1410	18	Yes
Temperature	0346	FI	C	N	16.2		> HistMAX	13	15.6	18	No
Specific Conductance	0607	FI	umhos/cm	N	017.8		< HistMIN	374	2060	16	Yes
pH	0607	FI	s.u.	N	6.54		< HistMIN	7.22	7.83	17	Yes

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2407038 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 12-16-2024

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

Samples: 9

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 9 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

Page 1 of 2

16-Dec-2024

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

Task Code: MND01-
01.2407038

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2407038-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-006	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-013	0601	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-015	0605	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-017	0607	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-019	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407038-020	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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16-Dec-2024

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

Task Code: MND01-
01.2407038

Lab Code: GEN

Validation Report: Field Blanks

Page 1 of 4

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

Task Code: MND01-01.2407038

Lab Code: GEN

16-Dec-2024

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2407038-019	0999	SW-846.8260	2-Butanone	2.86	U

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2407038-002	0129	1.67	1	U	
MND01-01.2407038-003	0126	1.67	1	U	
MND01-01.2407038-004	0138	1.67	1	U	
MND01-01.2407038-006	0346	1.67	1	U	

Validation Report: Field Blanks

Page 2 of 4

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

Task Code: MND01-01.2407038

Lab Code: GEN

16-Dec-2024

TB	MND01-01.2407038-019	0999	SW-846 8260	Acetone	6.40	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2407038-002	0124	1.74	1	U	
MND01-01.2407038-003	0126	1.74	1	U	
MND01-01.2407038-004	0130	1.74	1	U	
MND01-01.2407038-006	0346	1.74	1	U	

Validation Report: Field Blanks

Page 3 of 4

16-Dec-2024

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

Task Code: MND01-01.2407038

Lab Code: GEN

TB	MND01-01.2407038-020	0999	SW-846 8260	2-Butanone	3.88	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2407038-013	0601	1.67	1	U	
MND01-01.2407038-015	0605	1.67	1	U	
MND01-01.2407038-017	0607	1.67	1	U	

Validation Report: Field Blanks

Page 4 of 4

16-Dec-2024

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

Task Code: MND01-01.2407038

Lab Code: GEN

TB	MND01-01.2407038-020	0999	SW-846 8260	Acetone	6.37	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2407038-013	0601	1.74	1	U	
MND01-01.2407038-015	0605	3.22	1	J	U
MND01-01.2407038-017	0607	1.74	1	U	

Organics Data Validation Summary

Page 1 of 1

16-Dec-2024

Task Code: MND01-01.2407038

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: MND01-01.2407039
Sample Event: August 5, 2024
Site(s): Mound LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 679480
Analysis: Organics
Validator: Amy Maurer
Review Date: December 16, 2024

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0), which is available at <https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S15870.pdf>. 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 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 Organic Compounds (VOAs)	VOA-A-007	SW-846 5030B	SW846 8260D

Data Qualifier Summary

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

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-01.2407039-005	0315	2-Butanone	U	Less than 10x TB concentration
MND01-01.2407039-018	0347	Acetone	U	Less than 10x TB concentration
MND01-01.2407039-007	0347	Acetone	U	Less than 10x TB concentration
MND01-01.2407039-005	0315	Acetone	U	Less than 10x TB concentration
MND01-01.2407039-018	0347	Chloromethane	J	Field duplicate RPD above limit
MND01-01.2407039-007	0347	Chloromethane	J	Field duplicate RPD above limit

Sample Shipping/Receiving

GEL Laboratories, in Charleston, South Carolina, received three water samples on August 6, 2024. A Chain of Custody (COC) form accompanied the sample shipment. The COC was checked to confirm that all samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. FedEx shipping information was included with the receiving documentation.

Preservation and Holding Times

The sample shipment was received with the temperature inside the iced cooler at 6 °C, which complies with requirements. All sample containers were received in-tact 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 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 five times the MDL. Results that are less than the MDL are qualified with U as not detected.

The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and were in compliance with contractual requirements, with the exception of MDLs for carbon disulfide, which were elevated but still acceptable for this task.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument can produce acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification (ICV) 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. ICV and CCV standards must be prepared from independent

sources to ensure the validity of the calibration. All laboratory instrument calibrations, ICVs, and CCVs were performed correctly in accordance with the cited methods.

Method SW-846 8260D, Volatile Organic Compounds

Initial calibrations were performed on August 2, 2024 on instrument “VOA4” using up to nine calibration standards, dependent upon analyte. Calibrations using average response factors must have relative standard deviations (RSDs) of less than 15%. The RSDs for all target analytes were less than 15%. All calibrations using linear regressions had correlation coefficient values greater than 0.99 and intercepts less than three times the MDL. ICV and CCV checks were made at the required frequency. The absolute value of the percent drift (%D) for target compounds must be less than 20%. Several target compounds had reported %D that failed to meet acceptance criteria. In cases where the %D was positive and greater than 20%, any associated detects were qualified with J as estimated. In cases where the %D was negative and the absolute value was between 20%-40%, any associated detects were qualified with J as estimated, and any non-detects were qualified with J if any other calibration criteria had failed for that compound. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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 were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with U as not detected when the sample result is greater than the MDL but less than five times the blank concentration (and less than ten times the blank concentration for common laboratory contaminants). All method and calibration blanks met the acceptance criteria.

VOA Internal Standard and Surrogate Recoveries

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All VOA samples are spiked with surrogate compounds prior to sample preparation, and the recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries must fall within limits determined by the laboratory. All reported surrogate recoveries met the laboratory-established acceptance criteria. The recovery of internal standards (ISs) added to the samples is monitored ensure that instrument sensitivity and response are stable and acceptable during each analysis. The IS area counts must not vary by more than a factor of two from the average obtained from the calibration standards, and the retention times of the ISs must not vary by more than ± 30 seconds from that of the associated calibration standard. All reported IS recoveries met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration

of the unspiked sample is greater than four times the spike. For VOAs, the matrix spike percent recovery (%R) must fall within 70%-130%, and MSD relative percent differences (RPDs) must fall below 30%. The reported %R for trichloroethylene in the MS and MSD was >130%. Any associated sample detects were qualified with J as estimated. Reported MS results for all other analytes met the acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. Laboratory MSD results may be assessed in lieu of a designated replicate sample if a replicate sample was not analyzed. The relative percent difference (RPD) for results that are greater than five times the PQL should be less than 20% (or less than the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. All reported replicate results met the acceptance criteria.

Laboratory Control Sample

Laboratory control samples (LCSs) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. For VOAs, the LCS %R must fall between 70%-130%. All reported LCS results met the acceptance criteria.

Compound Identification

The provided mass spectral data were reviewed for each reported organic compound to verify that analytes were identified correctly.

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 RPD for duplicate results that are greater than five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from location 0347. All reported duplicate results met acceptance criteria, with the exception of the results for chloromethane. The associated sample results were qualified with J as estimated.

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. Although from the same sampling event, the trip blank associated with these samples was assigned to task MND01-01.2407038 (sample ID MND01-01.2407038-019). Acetone and 2-butanone were detected in the trip blank at concentrations above the MDLs: 6.40 mg/L acetone and 2.86 mg/L

2-butanone. Sample results that were greater than the MDL but less than ten times the trip blank results for these common laboratory contaminants were qualified with U as not detected.

Completeness

Results were reported for all analytes requested in the correct units 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

An EDD file arrived on August 30, 2024. 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 were 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 Measurements

All groundwater locations were sampled in accordance with Mound Micropurge criteria. No field instrument calibrations, daily operational checks, or safety meeting forms were included in the field EDD for review. It was noted by the field samplers that the water quality readings were not equilibrating after 10 sets of field measurements at location 0315, at which point samples were collected.

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 of a historical range. Potential outliers are identified by generating the Data Validation Outliers Report (see following pages) from data in the environmental database: The data from this task are compared to historical values from within a selected date range, and data points that fall below the historical minimum or above the historical maximum are included in the report as potential outliers. 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.

It was noted that seven laboratory results and one field result were outside of the historical data range assessed. Upon thorough review of the raw data, field EDD (including field notes and sample collection logs), historic data trends, and evaluation by ProUCL at the 95% confidence levels, the following outliers were established:

- The acetone results from locations 0315 and 0347 were anomalously high. It was determined that these reported concentrations must be qualified with U as not detected due to the presence of acetone in the trip blank. Non-detect results are consistent with historical results.

- The 2-butanone result from location 0315 was anomalously high. It was determined that this reported concentration must be qualified with U as not detected due to the presence of 2-butanone in the trip blank. A non-detect result is consistent with historical data.
- The naphthalene results from locations 0315 and 0347 were anomalously high. Thorough review of the raw data did not indicate any potential errors contributing to these results, indicating that these outliers should be considered true extreme values. Both results were qualified by the laboratory with J as estimated values due to the results being greater than the MDL but less than the reporting detection limit (RDL).
- The chloromethane result from location 0347 was anomalously high. The parent sample and duplicate sample collected from this location failed to meet acceptance criteria for chloromethane, resulting in this result being qualified with J as estimated. Thorough review of the raw data did not indicate any potential laboratory errors contributing to this result, indicating that this outlier should be considered a true extreme value.

All laboratory results are acceptable as qualified.

Report Prepared By: AMY MAURER (Affiliate) Digitally signed by AMY MAURER (Affiliate)
Date: 2024.12.17 09:34:41 -07'00'

Amy Maurer
Data Validator

Data Validation Outliers Report - No Field Parameters Report Date: 12/16/2024

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2407039

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Acetone	0315	LB	ug/L	N	19.9		> HistMAX	0.5	2.56	23	Yes
2-Butanone	0315	LB	ug/L	N	4.50	J	> HistMAX	0.5	1.67	23	Yes
Trichloroethene	0315	LB	ug/L	N	0.333	U	< HistMIN	0.35	14.5	23	No
Naphthalene	0315	LB	ug/L	N	0.750	J	> HistMAX	0.16	0.55	23	Yes
Acetone	0347	LB	ug/L	N	22.5		> HistMAX	0.5	19.1	30	Yes
Chloromethane	0347	LB	ug/L	N	13.7		> HistMAX	0.16	0.333	30	Yes
Naphthalene	0347	LB	ug/L	N	0.640	J	> HistMAX	0.16	0.62	30	Yes

FRACTION: D = Dissolved N = NA T = Total

Data Validation Outliers Report - Field Parameters Only Report Date: 12/16/2024

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2407039

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Dissolved Oxygen	0347	FI	mg/L	N	0.21		< HistMIN	0.22	8.3	18	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2407039 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 12-16-2024

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

Samples: 3

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 3 detection limits above the contract required limits.
Field Duplicates:	There was 1 duplicate evaluated.

Validation Report: Detection Limits

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16-Déc-2024

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

Task Code: MND01-
01 2407039

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2407039-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407039-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2407039-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Duplicates

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16-Dec-2024

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2407039 **Lab Code:** GEN

Duplicate: MND01-01.2407039-018					Sample: MND01-01.2407039-007 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	1.67	U		1	1.67	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
16-Dec-2024

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2407039 **Lab Code:** GEN

Duplicate: MND01-01.2407039-018					Sample: MND01-01.2407039-007 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	19.1			1	22.5			1	16.3		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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16-Dec-2024

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2407039 **Lab Code:** GEN

Duplicate: MND01-01.2407039-018					Sample: MND01-01.2407039-007 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	13.7			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	0.620	U		1	0.640	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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16-Dec-2024

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

Task Code: MND01-01.2407039

Lab Code: GEN

Duplicate: MND01-01.2407039-018					Sample: MND01-01.2407039-007 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	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

Organics Data Validation Summary

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16-Dec-2024

Task Code: MND01-01.2407039

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: There were 2 MS/MSD results outside the laboratory acceptance limits.

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

Noncompliance Report: MS/MSD Performance

Page 1 of 1

16-Dec-2024

Task Code: MND01-01.2407039

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
	08-12-2024	SW-846 8260	Trichloroethene	151		61	130			%R > upper limit
	08-12-2024	SW-846 8260	Trichloroethene		145	61	130	4	20	%R > upper limit



Data Review and Validation Report

General Information

Task Code: MND01-01.2410041
Sample Event: November 5, 2024
Site(s): Mound LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 694078
Analysis: Organics
Validator: Amy Maurer
Review Date: March 31, 2025

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0), which is available at <https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S15870.pdf>. 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. 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 Organic Compounds (VOAs)	VOA-A-007	SW-846 5030B	SW846 8260D

Data Qualifier Summary

Results were qualified as listed in *Table 2*. Explanations for each qualifier applied are found in the sections below. For qualifier definitions, refer to the *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0).

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Qualifier	Reason
MND01-01.2410041-005	315	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-005	315	Acetone	U	Less than 10x TB concentration
MND01-01.2410041-005	315	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-007	347	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-007	347	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-009	386	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-009	386	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-010	387	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-010	387	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-011	389	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-011	389	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-012	392	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-012	392	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-018	347	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-018	347	Methylene chloride	U	Less than 10x TB concentration
MND01-01.2410041-018	347	Vinyl chloride	J	CCV %R above acceptance range
MND01-01.2410041-019	999	1,2-Dibromo-3-chloropropane	J	CCV %R below acceptance range; MS %R below acceptance range
MND01-01.2410041-019	999	Vinyl chloride	J	CCV %R above acceptance range

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received eight water samples on November, 6, 2024, accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all samples were listed with sample collection dates and times and that signatures and dates were present, indicating sample relinquishment and receipt. The COC form was complete with no errors or omissions. The receiving documentation included FedEx tracking information.

Preservation and Holding Times

The sample shipments were received intact. Upon receipt, the temperatures inside the iced coolers were 1-5 °C, which comply with temperature requirements. All samples were analyzed within the applicable holding times. All samples were received in the correct container types and were preserved correctly for the requested analyses.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all 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 five times the MDL. Results that are less than the MDL are qualified with U as not detected.

The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and were in compliance with contractual requirements, with the exception of MDLs for carbon disulfide, which were elevated but still acceptable for this task.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument can produce acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification (ICV) 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. ICV and CCV standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations, ICVs, and CCVs were performed correctly in accordance with the cited methods.

Method SW-846 8260D, Volatile Organic Compounds

Initial calibrations were performed on October 28, 2024 on instrument "VOA6" using up to nine calibration standards, dependent upon analyte. All calibrations using average response factors had RSDs of less than 15%. All calibrations using linear regressions had correlation coefficient values greater than 0.99 and intercepts less than three times the MDL. ICV and CCV checks were made at the required frequency. All ICV and CCV results fell within 80%-120% of the true values with the following exceptions: vinyl chloride and 1,2-dibromo-3-chloropropane. Associated sample results were qualified with J as estimated. The absolute value of the %D between the initial and continuing calibration response factors for all target compounds was less than 20%, with the following exceptions: vinyl chloride, 2-butanone, bromoform, and 1,2-dibromo-3-chloropropane. If the %D was positive and greater than 20%, the associated sample detects were qualified with J as estimated. If the %D was negative and the absolute value was greater than 20% but less than 40%, the associated sample detects were qualified with J as estimated, and non-detects were qualified with J if any other calibration criteria had failed for that compound. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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. In cases where a blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than five times the blank concentration (or less than ten times the blank concentration for common laboratory contaminants) are qualified with U as not detected. In cases where the absolute value of a negative blank concentration exceeds the MDL, associated sample results less than five times the blank concentration are qualified with a J flag as estimated values. All reported blank concentrations were below the associated MDLs.

VOA Internal Standard and Surrogate Recoveries

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All VOA samples are spiked with surrogate compounds prior to sample preparation, and the recoveries are used

to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries must fall within limits determined by the laboratory. All reported surrogate recoveries met the laboratory-established acceptance criteria. The recovery of internal standards (ISs) added to the samples is monitored ensure that instrument sensitivity and response are stable and acceptable during each analysis. The IS area counts must not vary by more than a factor of two from the average obtained from the calibration standards, and the retention times of the ISs must not vary by more than ± 30 seconds from that of the associated calibration standard. All reported IS recoveries met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. For VOAs, the matrix spike %R must fall within 70%-130%, and MSD relative percent differences (RPDs) must fall below 30%. The following analytes had MS %R values outside of the acceptance range: dichlorodifluoromethane and 1,2-dibromo-3-chloropropane. For those less than the lower acceptance limit but greater than 10%, associated sample detects and non-detects were qualified with J as estimated. For those greater than the upper acceptance limit, associated sample detects were qualified with J as estimated. All reported MS/MSD RPDs met acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate (LR) analyses are used to determine laboratory precision for each sample matrix. The RPD for results that are greater than five times the PQL should be less than 20% (less than 30% or the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. For this task, the laboratory used the MS/MSD in lieu of a designated LR sample, which is acceptable.

Laboratory Control Sample

Laboratory control samples (LCSs) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. For VOAs, LCS %R must meet method-specific criteria or, if criteria are not reported, must fall between 70%-130%. All reported LCS results met the acceptance criteria, with the exception of some VOAs. However, the analytes that failed to meet LCS acceptance criteria were not detected in any associated task samples. Therefore, no qualifications were necessary based upon these findings. Reported LCS results for all other analytes met the acceptance criteria.

VOA Compound Identification

The provided mass spectral data were reviewed for each reported organic compound to verify that analytes were identified correctly. If any compounds were reported with results above the MDL but failed to meet mass spectral compound identification criteria, they were qualified with U as not detected.

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 RPD for duplicate results that are greater than five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 0347. All reported duplicate results met acceptance criteria.

Trip Blank

Trip blanks are 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 methylene chloride were detected in trip blanks. Associated sample results that were greater than the MDL but less than ten times the trip blank results for these common laboratory contaminants were qualified with U as not detected.

Completeness

Results were reported for all analytes requested in the correct units 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

An EDD file arrived on December 5, 2024. 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 were 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 Measurements

Groundwater locations were sampled using the Mound Micropurge criteria in accordance with the *Environmental Monitoring Procedures for the Fernald Preserve and Mound, Ohio, Sites*, which is available at [https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S05277 EM Procedures FER.pdf](https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S05277_EM_Procedures_FER.pdf). The field EDD did not contain pre-trip calibration data, nor daily operational check data for review. The recorded field data, including specific conductance, dissolved oxygen, pH, and depth to water, were reviewed. Purge stability criteria were met at all sampled locations.

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 of a historical range. Potential outliers are identified by generating the Data Validation Outliers Report (see following pages) from data in the environmental database: The data from this task

are compared to historical values from within a selected date range, and data points that fall below the historical minimum or above the historical maximum are included in the report as potential outliers. 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.

It was noted that one field result was outside of the historical data range assessed. Upon thorough review of the raw data and historic data trends, it was determined that the anomalous value is not a true outlier.

All data for this task are acceptable as qualified.

Report Prepared By: AMY MAURER (Affiliate) Digitally signed by AMY MAURER (Affiliate)
Date: 2025.04.01 09:01:23 -06'00'

Amy Maurer
Data Validator

Data Validation Outliers Report - Field Parameters Only Report Date: 03/31/2025

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2410041

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Dissolved Oxygen	0392	FI	mg/L	N	0.90		< HistMIN	1.17	6.87	19	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2410041 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 03-31-2025

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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31-Mar-2025

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

Task Code: MND01-
01.2410041

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2410041-005	0315	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-018	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-007	0347	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-009	0386	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-010	0387	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-011	0389	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-012	0392	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410041-019	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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31-Mar-2025

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

Task Code: MND01-
01.2410041

Lab Code: GEN

Validation Report: Field Duplicates

Page 1 of 4
31-Mar-2025

Project: LTS&M (Parcel 6-7-8) **Task Code:** MND01-01.2410041 **Lab Code:** GEN

Duplicate: MND01-01.2410041-018					Sample: MND01-01.2410041-007 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	1.67	U		1	1.67	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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31-Mar-2025

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

Task Code: MND01-01.2410041

Lab Code: GEN

Duplicate: MND01-01.2410041-018					Sample: MND01-01.2410041-007 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	0.440	U		1	0.460	J		1	4.4		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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31-Mar-2025

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

Task Code: MND01-01.2410041

Lab Code: GEN

Duplicate: MND01-01.2410041-018					Sample: MND01-01.2410041-007 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	0.980	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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31-Mar-2025

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

Task Code: MND01-01.2410041

Lab Code: GEN

Duplicate: MND01-01.2410041-018					Sample: MND01-01.2410041-007 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	30.5			1	31.2			1	2.3		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: Field Blanks

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31-Mar-2025

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

Task Code: MND01-01.2410041

Lab Code: GEN

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01.2410041-019	0999	SW-846 8260	Acetone	88.9	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2410041-005	0315	3.29	1	J	U
MND01-01.2410041-007	0347	1.74	1	U	
MND01-01.2410041-009	0386	1.74	1	U	
MND01-01.2410041-010	0387	1.74	1	U	
MND01-01.2410041-011	0389	1.74	1	U	
MND01-01.2410041-012	0392	1.74	1	U	
MND01-01.2410041-018	0347	1.74	1	U	

Validation Report: Field Blanks

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31-Mar-2025

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

Task Code: MND01-01.2410041

Lab Code: GEN

TB	MND01-01.2410041-019	0999	SW-846 8260	Methylene chloride	1.10	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01.2410041-005	0315	0.500	1	U	
MND01-01.2410041-007	0347	0.500	1	U	
MND01-01.2410041-009	0366	0.500	1	U	
MND01-01.2410041-010	0387	0.500	1	U	
MND01-01.2410041-011	0389	0.500	1	U	
MND01-01.2410041-012	0392	0.500	1	U	
MND01-01.2410041-018	0347	0.580	1	J	U

Organics Data Validation Summary

Page 1 of 1

01-Apr-2025

Task Code: MND01-01.2410041

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: MND01-01.2410042
Sample Event: November 5-6, 2024
Site(s): Mound LTS&M (Parcel 6-7-8)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 694079 and 694269
Analysis: Organics
Validator: Amy Maurer
Review Date: April 1, 2025

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0), which is available at <https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S15870.pdf>. 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. 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 Organic Compounds (VOAs)	VOA-A-007	SW-846 5030B	SW846 8260D

Data Qualifier Summary

Results were qualified as listed in *Table 2*. Explanations for each qualifier applied are found in the sections below. For qualifier definitions, refer to the *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0).

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Qualifier	Reason
MND01-01.2410042-001	118	Acetone	J	ICAL RSD >15%
MND01-01.2410042-001	118	Bromomethane	J	MS %R below acceptance range
MND01-01.2410042-001	118	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-001	118	Chloroethane	J	MS %R below acceptance range
MND01-01.2410042-001	118	Chloromethane	J	MS %R below acceptance range
MND01-01.2410042-001	118	Dichlorodifluoromethane	J	MS %R below acceptance range
MND01-01.2410042-001	118	Naphthalene	J	ICAL RSD >15%
MND01-01.2410042-001	118	tert-Butylbenzene	J	ICAL RSD >15%
MND01-01.2410042-001	118	Trichlorofluoromethane	J	MS %R below acceptance range
MND01-01.2410042-001	118	Vinyl chloride	J	MS %R below acceptance range
MND01-01.2410042-002	124	Acetone	J	ICAL RSD >15%
MND01-01.2410042-002	124	Bromomethane	J	MS %R below acceptance range
MND01-01.2410042-002	124	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-002	124	Chloroethane	J	MS %R below acceptance range
MND01-01.2410042-002	124	Chloromethane	J	MS %R below acceptance range
MND01-01.2410042-002	124	Dichlorodifluoromethane	J	MS %R below acceptance range
MND01-01.2410042-002	124	Naphthalene	J	ICAL RSD >15%
MND01-01.2410042-002	124	tert-Butylbenzene	J	ICAL RSD >15%
MND01-01.2410042-002	124	Trichlorofluoromethane	J	MS %R below acceptance range
MND01-01.2410042-002	124	Vinyl chloride	J	MS %R below acceptance range
MND01-01.2410042-003	126	Acetone	J	ICAL RSD >15%
MND01-01.2410042-003	126	Bromomethane	J	MS %R below acceptance range
MND01-01.2410042-003	126	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-003	126	Chloroethane	J	MS %R below acceptance range
MND01-01.2410042-003	126	Chloromethane	J	MS %R below acceptance range
MND01-01.2410042-003	126	Dichlorodifluoromethane	J	MS %R below acceptance range
MND01-01.2410042-003	126	Naphthalene	J	ICAL RSD >15%
MND01-01.2410042-003	126	tert-Butylbenzene	J	ICAL RSD >15%
MND01-01.2410042-003	126	Trichlorofluoromethane	J	MS %R below acceptance range
MND01-01.2410042-003	126	Vinyl chloride	J	MS %R below acceptance range
MND01-01.2410042-004	138	Acetone	J	ICAL RSD >15%
MND01-01.2410042-004	138	Bromomethane	J	MS %R below acceptance range
MND01-01.2410042-004	138	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-004	138	Chloroethane	J	MS %R below acceptance range
MND01-01.2410042-004	138	Chloromethane	J	MS %R below acceptance range
MND01-01.2410042-004	138	Dichlorodifluoromethane	J	MS %R below acceptance range
MND01-01.2410042-004	138	Naphthalene	J	ICAL RSD >15%
MND01-01.2410042-004	138	tert-Butylbenzene	J	ICAL RSD >15%
MND01-01.2410042-004	138	Trichlorofluoromethane	J	MS %R below acceptance range
MND01-01.2410042-004	138	Vinyl chloride	J	MS %R below acceptance range
MND01-01.2410042-006	346	Acetone	J	ICAL RSD >15%
MND01-01.2410042-006	346	Bromomethane	J	MS %R below acceptance range
MND01-01.2410042-006	346	Chlorodibromomethane	J	ICAL RSD >15%

Sample ID	Location	Analyte	Qualifier	Reason
MND01-01.2410042-006	346	Chloroethane	J	MS %R below acceptance range
MND01-01.2410042-006	346	Chloromethane	J	MS %R below acceptance range
MND01-01.2410042-006	346	Dichlorodifluoromethane	J	MS %R below acceptance range
MND01-01.2410042-006	346	Naphthalene	J	ICAL RSD >15%
MND01-01.2410042-006	346	tert-Butylbenzene	J	ICAL RSD >15%
MND01-01.2410042-006	346	Trichlorofluoromethane	J	MS %R below acceptance range
MND01-01.2410042-006	346	Vinyl chloride	J	MS %R below acceptance range
MND01-01.2410042-013	601	1,2-Dibromo-3-chloropropane	J	ICAL RSD >15%
MND01-01.2410042-013	601	Acetone	U	Less than 10x TB concentration
MND01-01.2410042-013	601	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-013	601	Dichlorodifluoromethane	J	ICAL RSD >15%
MND01-01.2410042-013	601	Hexachlorobutadiene	J	MS %R below acceptance range
MND01-01.2410042-013	601	Vinyl chloride	J	ICAL RSD >15%
MND01-01.2410042-015	605	1,2-Dibromo-3-chloropropane	J	ICAL RSD >15%
MND01-01.2410042-015	605	Acetone	U	Less than 10x TB concentration
MND01-01.2410042-015	605	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-015	605	Dichlorodifluoromethane	J	ICAL RSD >15%
MND01-01.2410042-015	605	Hexachlorobutadiene	J	MS %R below acceptance range
MND01-01.2410042-015	605	Vinyl chloride	J	ICAL RSD >15%
MND01-01.2410042-017	607	1,2-Dibromo-3-chloropropane	J	ICAL RSD >15%
MND01-01.2410042-017	607	Acetone	J	ICAL RSD >15%
MND01-01.2410042-017	607	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-017	607	Dichlorodifluoromethane	J	ICAL RSD >15%
MND01-01.2410042-017	607	Hexachlorobutadiene	J	MS %R below acceptance range
MND01-01.2410042-017	607	Vinyl chloride	J	ICAL RSD >15%
MND01-01.2410042-020	999	1,2-Dibromo-3-chloropropane	J	ICAL RSD >15%
MND01-01.2410042-020	999	Acetone	J	ICAL RSD >15%
MND01-01.2410042-020	999	Chlorodibromomethane	J	ICAL RSD >15%
MND01-01.2410042-020	999	Dichlorodifluoromethane	J	ICAL RSD >15%
MND01-01.2410042-020	999	Hexachlorobutadiene	J	MS %R below acceptance range
MND01-01.2410042-020	999	Vinyl chloride	J	ICAL RSD >15%

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received a total of nine water samples on November, 6, 2024 and November 7, 2024, accompanied by Chain of Custody (COC) forms. The COC forms were checked to confirm that all 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. The receiving documentation included FedEx tracking information.

Preservation and Holding Times

The sample shipments were received intact. Upon receipt, the temperatures inside the iced coolers were 1-5 °C, which comply with temperature requirements. All samples were analyzed within the

applicable holding times. All samples were received in the correct container types and were preserved correctly for the requested analyses.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all 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 five times the MDL. Results that are less than the MDL are qualified with U as not detected.

The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and were in compliance with contractual requirements, with the exception of MDLs for carbon disulfide, which were elevated but still acceptable for this task.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument can produce acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification (ICV) 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. ICV and CCV standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations, ICVs, and CCVs were performed correctly in accordance with the cited methods.

Method SW-846 8260D, Volatile Organic Compounds

Initial calibrations were performed on October 19, 2024 on instrument "VOA4," and on October 28, 2024 on instrument "VOA1" using up to nine calibration standards, dependent upon analyte. All calibrations using average response factors had RSDs of less than 15%, with the following exceptions: acetone, dibromochloromethane, tert-butylbenzene, and naphthalene on VOA4, and dichlorodifluoromethane, acetone, vinyl acetate, dibromochloromethane, and 1,2-dibromo-3-chloropropane on VOA1. All associated sample results were qualified with J as estimated. All calibrations using linear regressions had correlation coefficient values greater than 0.99 and intercepts less than three times the MDL. ICV and CCV checks were made at the required frequency. All ICV results for target analytes fell within 80%-120% of the true values. The absolute value of the %D between the initial and continuing calibration response factors for all target compounds was less than 20%, with the following exceptions: chloromethane, vinyl chloride, bromomethane, chloroethane, trichlorofluoromethane, acetone, hexachlorobutadiene, 1,2,3-trichlorobenzene, and trichlorotrifluoroethane on VOA4, and chloromethane, trichlorofluoromethane, acetone, methylene chloride, and 1,2-dichloroethane on VOA1. If the %D was positive and greater than 20%, the associated sample detects were qualified with J as estimated. If the %D was negative and the absolute value was greater than 20% but less than 40%, the associated sample detects were qualified with J as estimated, and non-detects were qualified with J if any other calibration criteria had failed for that compound. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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. In cases where a blank concentration exceeds the MDL, associated sample results that are greater than the MDL but less than five times the blank concentration (or less than ten times the blank concentration for common laboratory contaminants) are qualified with U as not detected. In cases where the absolute value of a negative blank concentration exceeds the MDL, associated sample results less than five times the blank concentration are qualified with a J flag as estimated values. All reported blank concentrations were below the associated MDLs.

VOA Internal Standard and Surrogate Recoveries

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All VOA samples are spiked with surrogate compounds prior to sample preparation, and the recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries must fall within limits determined by the laboratory. All reported surrogate recoveries met the laboratory-established acceptance criteria. The recovery of internal standards (ISs) added to the samples is monitored ensure that instrument sensitivity and response are stable and acceptable during each analysis. The IS area counts must not vary by more than a factor of two from the average obtained from the calibration standards, and the retention times of the ISs must not vary by more than ± 30 seconds from that of the associated calibration standard. All reported IS recoveries met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than four times the spike. For VOAs, the matrix spike %R must fall within 70%-130%, and MSD relative percent differences (RPDs) must fall below 30%. The following analytes had MS %R values outside of the acceptance range: dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane, and trichlorofluoromethane on VOA4, and hexachlorobutadiene on VOA1. For those less than the lower acceptance limit but greater than 10%, associated sample detects and non-detects were qualified with J as estimated. For those greater than the upper acceptance limit, associated sample detects were qualified with J as estimated. All reported MS/MSD RPDs met acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate (LR) analyses are used to determine laboratory precision for each sample matrix. The RPD for results that are greater than five times the PQL should be less than 20% (less than 30% or the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. For this task, the laboratory used the MS/MSD in lieu of a designated LR sample, which is acceptable.

Laboratory Control Sample

Laboratory control samples (LCSs) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. For VOAs, LCS %R must meet

method-specific criteria or, if criteria are not reported, must fall between 70%-130%. All reported LCS results met acceptance criteria.

VOA Compound Identification

The provided mass spectral data were reviewed for each reported organic compound to verify that analytes were identified correctly. If any compounds are reported with results above the MDL but fail to meet mass spectral compound identification criteria, they are qualified with U as not detected. All compound identifications were acceptable.

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 RPD for duplicate results that are greater than five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. No duplicate samples were collected for this task.

Trip Blank

Trip blanks are 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 sample results that were greater than the MDL but less than ten times the trip blank results for this common laboratory contaminant were qualified with U as not detected.

Completeness

Results were reported for all analytes requested in the correct units 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

An EDD file arrived on December 17, 2024. 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 were 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 Measurements

All locations were sampled in accordance with the *Environmental Monitoring Procedures for the Fernald Preserve and Mound, Ohio, Sites*, which is available at [https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S05277 EM Procedures FER.pdf](https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S05277_EM_Procedures_FER.pdf). Groundwater locations were sampled using the Mound Micropurge criteria. The field EDD did not contain pre-trip calibration data, nor daily operational check data for

review. The recorded field data, including specific conductance, dissolved oxygen, pH, and depth to water, were reviewed. Purge stability criteria were met at all sampled groundwater locations.

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 of a historical range. Potential outliers are identified by generating the Data Validation Outliers Report (see following pages) from data in the environmental database: The data from this task are compared to historical values from within a selected date range, and data points that fall below the historical minimum or above the historical maximum are included in the report as potential outliers. 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.

It was noted that eight field results were outside of the historical data range assessed. Upon thorough review of the raw data and historic data trends, it was determined that the following are true outliers:

- Specific conductance results from locations 0118, 0124, 0126, and 0138 were outliers greater than historic maxima over the time period assessed. Detailed review of the field EDD and field notes did not reveal any errors. During the purges at these locations, the specific conductance values were within $\pm 10\%$ across all sets of field measurements collected at each location, indicating that these results were accurately recorded. It should be noted that specific conductance results were greater than historic maxima during the time period assessed at all five locations sampled on November 5, 2024 for this task (see table on following pages). This may indicate an instrument error. However, no calibration data nor daily calibration check data was provided in the field EDD for review.

All data for this task are acceptable as qualified.

Report Prepared By: _____

AMY MAURER (Affiliate)

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(Affiliate)
Date: 2025.04.01 14:01:53 -06'00'

Amy Maurer
Data Validator

Data Validation Outliers Report - Field Parameters Only
Report Date: 03/31/2025

Comparison to Historical Data Since: 1/1/2020 12:00:00 AM Fraction: Any

Task: MND01-01.2410042

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Specific Conductance	0118	FI	umhos/cm	N	1893		> HistMAX	1000	1160	20	Yes
Specific Conductance	0124	FI	umhos/cm	N	1764		> HistMAX	1142	1431	20	Yes
Specific Conductance	0126	FI	umhos/cm	N	1789		> HistMAX	1228	1495	20	Yes
Specific Conductance	0138	FI	umhos/cm	N	1878		> HistMAX	1090	1426	19	Yes
Specific Conductance	0346	FI	umhos/cm	N	1707		> HistMAX	480	1660	20	No
Oxidation Reduction Potential	0346	FI	mV	N	-63.0		< HistMIN	-46.6	354.6	20	No
Oxidation Reduction Potential	0601	FI	mV	N	6.2		< HistMIN	22.2	323.9	20	No
Temperature	0601	FI	C	N	17.9		> HistMAX	10.5	16	20	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-01.2410042 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 04-01-2025

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

Samples: 9

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 9 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

01-Apr-2025

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

Task Code: MND01-
01.2410042

Lab Code: GEN

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-01.2410042-001	0118	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-002	0124	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-003	0126	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-004	0138	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-005	0346	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-013	0801	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-015	0805	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-017	0807	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-01.2410042-020	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

01-Apr-2025

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

Task Code: MND01-
01.2410042

Lab Code: GEN

Validation Report: Field Blanks

Page 1 of 1

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

Task Code: MND01-01 2410042

Lab Code: GEN

01-Apr-2025

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-01,2410042-020	0999	SW-846 8260	Acetone	95.9	

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-01,2410042-013	0901	4.00	1	✓	U
MND01-01,2410042-015	0905	3.97	1	✓	U
MND01-01,2410042-017	0907	1.74	1	U	

Organics Data Validation Summary

Page 1 of 1

01-Apr-2025

Task Code: MND01-01.2410042

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: MND01-02.2401014
Sample Event: January 29, 2024
Site(s): Mound, Ohio: LTS&M (Phase 1)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 653542
Analysis: Organics
Validator: Samantha Tigar
Review Date: March 26, 2024

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
MND01-02.2401014-001	0411	Methylene chloride	U	Less than 10 times the trip blank
MND01-02.2401014-002	0443	Methylene chloride	U	Less than 10 times the trip blank
MND01-02.2401014-003	0617	Methylene chloride	U	Less than 10 times the trip blank
MND01-02.2401014-001	0411	Methylene chloride	U	Less than 10 times the trip blank

Sample ID	Location	Analyte	Flag	Reason
MND01-02.2401014-006	P064	Methylene chloride	U	Less than 10 times the trip blank
MND01-02.2401014-007	P064	Methylene chloride	U	Less than 10 times the trip blank

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received six water samples on January 31, 2024, 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 1°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 for instrument VOA6 were performed on January 17, 2024, using nine calibration standards. Calibration curves are established using linear regression, quadratic regression, or the average response factor approach. All 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 except acetone and methylene chloride. These compounds were detected in the trip blanks and all associated sample results were already qualified. Initial and continuing

calibration verification checks were made at the required frequency. Several compound CCVs were out of the acceptance criteria. All associated sample results were less than the MDL, so no 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

The EDD file arrived on February 28, 2024. 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, 2-butanone, and methylene chloride 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.

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 P064. The duplicate results met the criteria for all analytes, demonstrating acceptable overall precision.

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 outliers were identified for this Task. The laboratory data from this event are acceptable as qualified.

SAMANTHA
TIGAR (Affiliate)

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TIGAR (Affiliate)
Date: 2024.03.26 15:39:59 -06'00'

Report Prepared By:

Samantha Tigar
Data Validator

General Data Validation Report

Page 1 of 1

Task Code: MND01-02.2401014 **Lab Code:** GEN **Validator:** Samantha Tigar **Validation Date:** 03-26-2024

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: Detection Limits

Page 1 of 2

Project: LTS&M (Phase I)

Task Code: MND01-
02.2401014

Lab Code: GEN

26-Mar-2024

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-02.2401014-001	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2401014-002	0443	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2401014-003	0617	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2401014-004	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2401014-007	P064	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2401014-006	P064	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L

Validation Report: Field Blanks

Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

26-Mar-2024

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-02.2401014-004	0999	SW-846 8260	2-Butanone	2.15	J

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2401014-001	0411	1.67	1	U	
MND01-02.2401014-002	0443	1.67	1	U	
MND01-02.2401014-003	0617	1.67	1	U	
MND01-02.2401014-006	P064	1.67	1	U	
MND01-02.2401014-007	P064	1.67	1	U	

Validation Report: Field Blanks

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Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

26-Mar-2024

TB	MND01-02.2401014-004	0999	SW-846 8260	Acetone	20.9	
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2401014-001	0411	1.74	1	U	
MND01-02.2401014-002	0443	1.74	1	U	
MND01-02.2401014-003	0617	1.74	1	U	
MND01-02.2401014-006	P064	1.74	1	U	
MND01-02.2401014-007	P064	1.74	1	U	

Validation Report: Field Blanks

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Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

26-Mar-2024

TB	MND01-02.2401014-004	0999	SW-846 8260	Methylene chloride	1.16	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2401014-001	0411	0.800	1	J	U
MND01-02.2401014-002	0443	0.790	1	J	U
MND01-02.2401014-003	0617	0.770	1	J	U
MND01-02.2401014-006	P064	0.780	1	J	U
MND01-02.2401014-007	P064	1.03	1	J	U

Validation Report: Field Duplicates

Page 1 of 4
26-Mar-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

Duplicate: MND01-02.2401014-007					Sample: MND01-02.2401014-006 P064						
Analyte	Result	Qualifiers	Uncert.	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Tetrachloroethene	1.19			1	1.15			1			ug/L
Methylene chloride	1.03	J		1	0.780	J		1			ug/L
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

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

Validation Report: Field Duplicates

Page 2 of 4
26-Mar-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

Duplicate: MND01-02.2401014-007					Sample: MND01-02.2401014-006 P064						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert	Dilution	RPD	RER	Units
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
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

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

Validation Report: Field Duplicates

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26-Mar-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

Duplicate: MND01-02.2401014-007					Sample: MND01-02.2401014-006 P064						
Analyte	Result	Qualifiers	Uncert	Dilution	Result	Qualifiers	Uncert.	Dilution	RPD	RER	Units
Chlorobenzene	0.333	U		1	0.333	U		1			ug/L
Chlorodibromomethane	0.333	U		1	0.333	U		1			ug/L
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
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
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

26-Mar-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2401014

Lab Code: GEN

Duplicate: MND01-02.2401014-007					Sample: MND01-02.2401014-006 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

Organics Data Validation Summary

Page 1 of 1

26-Mar-2024

Task Code: MND01-02.2401014

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: All method blanks were below the MDL.



Data Review and Validation Report

General Information

Task Code: MND01-02.2407015
Sample Event: July 30 and August 6, 2024
Site(s): Mound LTS&M (Phase I)
Laboratory: GEL Laboratories, Charleston, South Carolina
Work Order No.: 678405 and 679596
Analysis: Organics
Validator: Amy Maurer
Review Date: December 16, 2024

This validation was performed according to *Environmental Data Validation Procedure* (LMS/PRO/S15870-2.0), which is available at <https://documentmanagement.share.lm.doe.gov/ControlledDocuments/Controlled%20Documents/S15870.pdf>. 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 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 Organic Compounds (VOAs)	VOA-A-007	SW-846 5030B	SW846 8260D

Data Qualifier Summary

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

Table 2. Data Qualifiers

Sample ID	Location	Analyte	Flag	Reason
MND01-02.2407015-003	617	Acetone	U	Less than 10x TB concentration

Sample Shipping/Receiving

GEL Laboratories, in Charleston, South Carolina, received a total of seven water samples on July 31, 2024 and August 7, 2024. Chain of Custody (COC) forms accompanied the sample shipment. The COC forms were checked to confirm that all 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. FedEx shipping information was included with the receiving documentation.

Preservation and Holding Times

The sample shipments were received with the temperatures inside the iced coolers between 1 °C and 6 °C, which comply with requirements. All sample containers were received in-tact 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 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 five times the MDL. Results that are less than the MDL are qualified with U as not detected.

The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and were in compliance with contractual requirements, with the exception of MDLs for carbon disulfide, which were elevated but still acceptable for this task.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument can produce acceptable qualitative and quantitative data for the analytes of interest. Initial calibration verification (ICV) 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. ICV and CCV standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations, ICVs, and CCVs were performed correctly in accordance with the cited methods.

Method SW-846 8260D, Volatile Organic Compounds

Initial calibrations were performed on July 26, 2024 on instrument “VOA5” and August 2, 2024 on instrument “VOA2” using up to nine calibration standards, dependent upon analyte. Calibrations using average response factors must have relative standard deviations (RSDs) of less than 15%. The reported RSDs for several target analytes were greater than 15% but less than 40%. All associated sample detects were qualified with J as estimated. Associated non-detects were qualified with J if any other calibration criteria had been exceeded for that compound. All calibrations using linear regressions had correlation coefficient values greater than 0.99 and intercepts less than three times the MDL. ICV and CCV checks were made at the required frequency. The absolute value of the percent drift (%D) for target compounds must be less than 20%. Several target compounds had reported %D that failed to meet acceptance criteria. In cases where the %D was positive and greater than 20%, associated detects were qualified with J as estimated. In cases where the %D was negative and the absolute value was between 20%-40%, associated detects were qualified with J as estimated, and non-detects were qualified with J if any other calibration criteria had failed for that compound. The mass spectrometer calibration and resolution were checked at the beginning of each analytical run in accordance with the procedure.

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 were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with U as not detected when the sample result is greater than the MDL but less than five times the blank concentration (and less than ten times the blank concentration for common laboratory contaminants). All method and calibration blanks met the acceptance criteria.

VOA Internal Standard and Surrogate Recoveries

Laboratory performance for individual samples is evaluated by means of surrogate spikes. All VOA samples are spiked with surrogate compounds prior to sample preparation, and the recoveries are used to monitor factors such as interference and high concentrations of analytes. Surrogate recoveries must fall within limits determined by the laboratory. All reported surrogate recoveries met the laboratory-established acceptance criteria. The recovery of internal standards (ISs) added to the samples is monitored ensure that instrument sensitivity and response are stable and acceptable during each analysis. The IS area counts must not vary by more than a factor of two from the average obtained from the calibration standards, and the retention times of the ISs must not vary by more than ± 30 seconds from that of the associated calibration standard. All reported IS recoveries met the acceptance criteria.

Matrix Spike Analysis

Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration

of the unspiked sample is greater than four times the spike. For VOAs, the matrix spike percent recovery (%R) must fall within 70%-130%, and MSD relative percent differences (RPDs) must fall below 30%. Several MS/MSD results failed to meet acceptance criteria. However, the samples used for the MS/MSDs with %R outside of the acceptance range were not from this task. Therefore, no qualifications were necessary based on this finding. All other reported MS/MSD results met the acceptance criteria.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. Laboratory MSD results may be assessed in lieu of a designated replicate sample if a replicate sample was not analyzed. The relative percent difference (RPD) for results that are greater than five times the PQL should be less than 20% (or less than the laboratory-derived control limits for organics). For results that are less than five times the PQL, the range should be no greater than the PQL. All reported replicate results met the acceptance criteria.

Laboratory Control Sample

Laboratory control samples (LCSs) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. For VOAs, the LCS %R must fall between 70%-130%. All reported LCS results met the acceptance criteria.

Compound Identification

The provided mass spectral data were reviewed for each reported organic compound to verify that analytes were identified correctly.

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 RPD for duplicate results that are greater than five times the PQL should be less than 20%. For results that are less than five times the PQL, the range should be no greater than the PQL. Duplicate samples were collected from location 0411. All reported duplicate results met acceptance criteria.

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. Sample results that were greater than the MDL but less than ten times the trip blank results for these common laboratory contaminants were qualified with U as not detected.

Completeness

Results were reported for all analytes requested in the correct units 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

An EDD file arrived on September 4, 2024. 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 were 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 Measurements

All groundwater locations were sampled in accordance with Mound Micropurge criteria. No field instrument calibrations, daily operational checks, or safety meeting forms were included in the field EDD for review. Depth to water was not recorded for location P064 because the water level was located below the top of the pump.

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 of a historical range. Potential outliers are identified by generating the Data Validation Outliers Report (see following page) from data in the environmental database: The data from this task are compared to historical values from within a selected date range, and data points that fall below the historical minimum or above the historical maximum are included in the report as potential outliers. 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.

It was noted that two field results and no laboratory results were outside of the historical data range assessed. Upon thorough review of the raw data, field EDD (including field notes), historic data trends, and evaluation by ProUCL at the 95% confidence levels, it was determined that no results are true outliers.

Report Prepared By: AMY MAURER
(Affiliate)  Digitally signed by AMY MAURER
(Affiliate)
Date: 2024.12.17 11:23:53 -07'00'

Amy Maurer
Data Validator

Data Validation Outliers Report - Field Parameters Only **Report Date: 12/16/2024**

Comparison to Historical Data Since: 1/1/2000 12:00:00 AM Fraction: Any

Task: MND01-02.2407015

Analyte	Location	Analysis Location	Units	Fraction	Result	Lab Qualifier(s)	Type	HistMIN	HistMAX	HistSetSize	Outlier?
Specific Conductance	P064	FI	umhos/cm	N	1600		> HistMAX	1170	1517	14	No
Temperature	P064	FI	C	N	16.7		> HistMAX	11.5	15.2	14	No

FRACTION: D = Dissolved N = NA T = Total

General Data Validation Report

Page 1 of 1

Task Code: MND01-02,2407015 **Lab Code:** GEN **Validator:** Amy Maurer **Validation Date:** 12-16-2024

Project: LTS&M (Phase I)

Samples: 7

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

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

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: Detection Limits

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Project: LTS&M (Phase I)

Task Code: MND01-
02.2407015

Lab Code: GEN

16-Dec-2024

Sample ID	Location	Method Analyte Group	Method	Analyte	Result	Qualifiers	MDL/MDC	Required MDL/MDC	Units
MND01-02.2407015-007	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-001	0411	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-002	0443	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-003	0617	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-004	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-008	0999	VOA-A-007, VOAs	SW-846 8260	Carbon Disulfide	1.67	U	1.67	1	ug/L
MND01-02.2407015-006	P064	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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Project: LTS&M (Phase I)

Task Code: MND01-
02.2407015

Lab Code: GEN

16-Dec-2024

Validation Report: Field Blanks

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16-Dec-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2407015

Lab Code: GEN

Blank Type	Sample Code	Location	Method	Analyte	Result	Lab Qualifiers
TB	MND01-02.2407015-004	0999	SW-846 8260	2-Butanone	1.89	U

Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2407015-001	0411	1.67	1	U	
MND01-02.2407015-002	0443	1.67	1	U	
MND01-02.2407015-006	P064	1.67	1	U	
MND01-02.2407015-007	0411	1.67	1	U	

Validation Report: Field Blanks

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16-Dec-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2407015

Lab Code: GEN

TB	MND01-02.2407015-004	0999	SW-846 8260	Acetone	4.33	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2407015-001	0411	1.74	1	U	
MND01-02.2407015-002	0443	1.74	1	U	
MND01-02.2407015-006	P064	1.74	1	U	
MND01-02.2407015-007	0411	1.74	1	U	

Validation Report: Field Blanks

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16-Dec-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2407015

Lab Code: GEN

TB	MND01-02.2407015-008	0999	SW-846 8260	2-Butanone	4.08	J
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Associated Samples:

Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier
MND01-02.2407015-008	061P	1.67	1	U	

Validation Report: Field Blanks

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Project: LTS&M (Phase I)

Task Code: MND01-02.2407015

Lab Code: GEN

16-Dec-2024

TB	MND01-02.2407015-008	0999	SW-846 8260	Acetone	6.85															
Associated Samples: <table><tr><th>Sample Code</th><th>Location</th><th>Result</th><th>Dilution</th><th>Lab Qualifiers</th><th>Validation Qualifier</th><th></th></tr><tr><td>MND01-02.2407015-008</td><td>061P</td><td>2.53</td><td>1</td><td>J</td><td>U</td><td></td></tr></table>							Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier		MND01-02.2407015-008	061P	2.53	1	J	U	
Sample Code	Location	Result	Dilution	Lab Qualifiers	Validation Qualifier															
MND01-02.2407015-008	061P	2.53	1	J	U															

Validation Report: Field Duplicates

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16-Dec-2024

Project: LTS&M (Phase I)

Task Code: MND01-02.2407015

Lab Code: GEN

Duplicate: MND01-02.2407015-007					Sample: MND01-02.2407015-001 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	1.67	U		1	1.67	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

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Duplicate: MND01-02.2407015-007					Sample: MND01-02.2407015-001 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	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

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Duplicate: MND01-02.2407015-007					Sample: MND01-02.2407015-001 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	3.14			1	3.35			1	6.5		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

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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	6.91			1	7.31			1	5.6		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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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.