RACER Trust

Groundwater Monitoring Plan (2025 Modification)

Pontiac North Campus, Pontiac Michigan

Initial Draft Submitted: August 29, 2024

Re-Draft Submittal: October 4, 2024

Final Submittal: February 6, 2026

Additional Re-Draft Per EPA Comments: May 12, 2026

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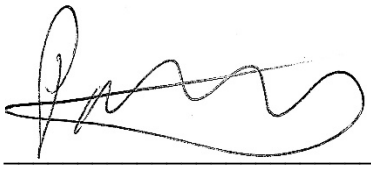

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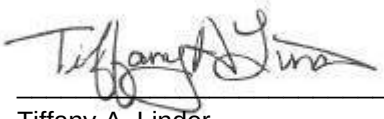

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Acronyms and Abbreviations

COC	Constituents of concern
DOD	Department of Defense
EI	Environmental Indicators
Fe	Iron
GMP	Groundwater Monitoring Plan
GSI	Groundwater Surface Water Interface
HDPE	High-density polyethylene
LCS	Laboratory control samples
LNAPL	Light non-aqueous phase liquid
M-K	Mann-Kendall
Mn	Manganese
MS/MSD	Matrix spike/matrix spike duplicate
NMFD	Northern Metal Fabrication Division
NTU	Nephelometric turbidity unit
PCB	Polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
pH	Potential of hydrogen
PNC	Pontiac North Campus
QA/QC	Quality assurance and quality control
RACER	Revitalizing Auto Communities Environmental Response
RCRA	Resource Conservation and Recovery Act
RHBDW	Residential health based drinking water criteria
SMFD	Southern Metal Fabrication Division
SOP	Standard operating procedure
SVOC	Semi-volatile organic compound
TCE	Trichloroethene
TDS	Total dissolved solids
TGI	Technical guidance instruction

USEPA	United States Environmental Protection Agency
USPS	United States Postal Service
VI	Vapor Intrusion
VIAP	Volatilization to indoor air pathway
VOC	Volatile organic compound

1 Introduction

On behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust, Arcadis of Michigan, LLC (Arcadis) has prepared this revised Groundwater Monitoring Plan (GMP) to support the Resource Conservation and Recovery Act (RCRA) Corrective Action at the RACER Pontiac North Campus (PNC) located in Pontiac, Michigan (Site; **Figure 1**). The 2025 Groundwater Monitoring Plan (2025 GMP) provides an outline of the continued groundwater monitoring activities proposed at the Site. The primary goal of groundwater monitoring is to evaluate stability of potential chemicals of concern (COCs) at the downgradient perimeter of the Site.

1.1 Background

The original GMP was presented as part of the Environmental Indicators (EI) CA 750 determination by ENVIRON in 2002 (ENVIRON 2002). Since 2002, the GMP has been officially modified twice:

- 2009 – Groundwater monitoring was reduced from semi-annual to annual sampling; proposed to implement the GMP for two more years and review; proposed to discontinue sampling of select wells; and proposed to discontinue semi-volatile organic compound (SVOC) analysis. The United States Environmental Protection Agency (USEPA) approved on November 23, 2009 (USEPA 2009). Following transfer of the Site to RACER Trust in March 2011, groundwater monitoring continued annually.
- 2018 – Modification in 2018 included changes to the list of sampled/gauged wells; proposed incorporation of the Montcalm seep area wells and incorporated 1,4-dioxane at select locations. USEPA approved modifications on September 17, 2018 (Arcadis 2018).

Groundwater samples have been collected from select monitoring wells either semi-annually or annually since 2002 to confirm that groundwater concentrations are stable and not migrating. Additional monitoring wells were added to the GMP over time as source areas were identified, and interim measures were implemented. By 2023, the GMP included the annual gauging of 96 monitoring wells and sample collection at 47 monitoring wells.

Based on a review of site analytical trends, along with an evaluation of ongoing exceedances, RACER Trust submitted a new request to modify the Site GMP on August 29, 2024. The modification included removal of some monitoring wells/analysis from the GMP and the addition of per-and polyfluoroalkyl substances (PFAS) monitoring. A second draft of the Site GMP was submitted on October 3, 2024, that addressed initial comments provided by USEPA. Additional comments, including the addition of select monitoring wells and/or analysis, were received from the USEPA on October 23, 2024. A response to comment was provided by RACER Trust to USEPA on October 29, 2024, confirming the addition of monitoring wells and analysis. An email sent from the USEPA to RACER Trust on October 30, 2024, stated the USEPA had no objection to RACER Trust proceeding with the following actions proposed in the October 29, 2024, email, specifically:

- RACER will implement the Revised GMP in 2024 including sampling the additional locations requested by the EPA in the October 23, 2024 email. Before conducting the sampling, please provide a list of the analyses that will be conducted on the quality assurance / quality control samples as requested in the EPA's Comment 1. Please ensure that the trip blank samples referenced in the EPA's Comment 2 are included in the sampling program. [This was completed and summarized in the final *2024 Annual Groundwater Monitoring Report* submitted to USEPA on November 18, 2025]
- RACER will revise the GMP document after reviewing the 2024 groundwater sampling results.
- RACER will sample the Fiero Parking Lot piezometers as a one-time sampling event as requested by the EPA. [This was completed and summarized in the Former Fiero Parking Lot Historical Summary Memorandum submitted to USEPA on January 2, 2026]

The results of the 2024 GMP are summarized in the final *2024 Annual Groundwater Monitoring Report* submitted to USEPA on November 18, 2025. The following wells and/or analyses were added to the 2024 sampling event at the request of USEPA:

Requested Well ID:	Requested Analysis:	Notes:
MWOS-05, MWM30-01, and MW-03-17	PFAS	None
MWOS-01, MWOS-02, MWOS-05, MWF12-02R, and MWW01-SEN03	Fe & Mn	TDS was also requested at MWW01-SEN03
TW-10-02, MWF12-01R, and MWF7-02	1,4-Dioxane	TW-10-02 was damaged and TW-10-01 was sampled in its place.
MWM2-22, MWM2-28, MWM16-30, MWM16-02, and MWM16-27	VOCs	MWM16-30 could not be located and is believed to be underneath large piles of debris.
MWOS-05 and TW-MD-06	PCBs	LNAPL was present in TW-MD-06. Well was not sampled.

1.2 Groundwater Stability Analysis

In 2023, Mann-Kendall (M-K) trend analysis was completed for all monitoring wells that were part of the 2018 GMP and met the following criteria:

- Had at least one COC exceedance of applicable criteria in the past 10 years
- Included a minimum of 7 data points necessary for statistical relevance
- For a given dataset, at least 50 percent of the datapoints were a detection to avoid skewing the results

For the 2018 GMP monitoring wells, the COCs that met criteria for M-K analysis included arsenic, copper, iron (Fe), dissolved Fe, lead, manganese (Mn), polychlorinated biphenyls (PCBs), trichloroethene (TCE), total dissolved solids (TDS), vanadium, vinyl chloride, and 1,4-dioxane. A summary of the historical groundwater analytical results since 2013, trend analysis, and M-K results are included in **Appendix A**. A total of 5,305 data sets were analyzed as part of the M-K analysis. A total of 19 monitoring wells qualified for statistical analysis and a total of 46 COC trends were evaluated. The remaining 28 monitoring wells did not meet the criteria used for the M-K analysis. A table summarizing the data sets that did not meet the M-K criteria is provided in **Appendix A**. The M-K analysis identified the following general trends:

- All wells north of the current United States Postal Service (USPS) parcel either did not meet the criteria for analysis or had no significant trend or a decreasing trend.
- For former Fiero, GMP wells either did not meet the criteria for analysis or had no significant trend or a decreasing trend. Note that VOC M-K analysis for Fiero monitoring wells is provided as part of the *2024 Fiero Temporary Groundwater Monitoring Plan Summary* (Arcadis 2025a).
- In the southern portion of PNC five wells exhibited statistically significant increasing trends for select metals (Fe and Mn) or TDS, and PCBs at TW-MD-06 (related to presence of LNAPL):
  - MW-03-17 – Fe (Interior to the Site)

- MWW10-03 - Mn
- TW-MD-02 - TDS
- TW-MD-05 - TDS
- TW-MD-06 - Fe and PCBs

In 2024, M-K trend analyses were completed on all monitoring wells and parameters included as part of the 2024 GMP utilizing the same M-K criteria outlined above. For monitoring wells with an applicable exceedance that did not meet the M-K criteria, a concentration vs. time trend graph was created when more than one sample result was available. M-K results and trend graphs from the 2024 monitoring are presented in **Appendix A.** Results of the trend analyses are summarized below.

- Northern Metal Fabrication Division
  - M-K trend results for monitoring well MWM16-37 in the northern portion of the Site displays no significant trend for VOCs.
  - Concentration trends for PFAS at monitoring well MWM30-01 show no significant trend.
- Fiero Properties
  - M-K trend results for monitoring well MWF7-02 located at the Former Fiero properties show no significant trend for 1,4-dioxane.
  - Concentration trends for PFAS at monitoring wells MWF16-25 and MWF16-26 appear to be decreasing. In monitoring well MWF12-02R, the trend for manganese (Mn) appears to be increasing, but remains below GSI criteria.
- Southern Metal Fabrication Division
  - M-K results for monitoring wells located in the southwest portion of the Site display increasing TDS trends. Manganese results display no significant trend or decreasing trends except for MWW01-SEN03, which shows an increasing trend. Iron (Fe) results display no significant trend or decreasing trends.
  - Concentration trends for PFOS results display no significant trend except for MW-03-17 and MWW10-03, which show increasing trends. PFOA results show no significant trend or decreasing trends. VOC results at interior monitoring well MWM2-22 show a decreasing trend for TCE and an increasing trend for VC.
- Offsite
  - M-K trend results for offsite monitoring wells MWOS-01, MWOS-02, and MWW1-06 display no significant trend for manganese.
  - Concentration trends for monitoring well MWOS-04 show a decreasing trend for manganese and for monitoring well MWOS-05 shows an increasing trend for manganese. Concentration trends for monitoring well MWOS-09R show an increasing PFOA trend.

1.3 2024 Annual Groundwater Sampling Summary

A detailed summary of the 2024 annual groundwater sampling activities and results is provided in the *2024 Annual Groundwater Monitoring Report* (Arcadis 2025b). Key results from the 2024 groundwater monitoring are below.

PFAS

PFAS was detected in 12 out of 15 monitoring wells, and the Montcalm seep vault. PFOS concentrations exceeded the GSI criteria (12 nanograms per liter [ng/L]) only at the following locations: MWW1-04, MW-01-17, MWW1-02, the seep vault, MW-03-17, MWW10-03.

VOCs

VOCs were detected in 1 out of 9 monitoring wells (MWM2-22). Concentrations in MWM2-22 did not exceed applicable GSI, VIAP, or Site-Specific Volatilization to Indoor Air Criteria.

1,4-Dioxane

1,4-dioxane was detected in all seven monitoring wells sampled in 2024, but did not exceed any applicable GSI, VIAP, or Site-Specific Volatilization to Indoor Air Criteria.

Metals

Iron and manganese were detected in 11 out of 12 monitoring wells, and the seep vault, sampled in 2024. Iron concentrations exceeded the Residential Health Based Drinking Water (RHBDW) criteria (2 milligrams per liter [mg/L]) at 8 monitoring wells and the seep vault. Concentrations detected ranged from 0.29 to 29 mg/L. Manganese concentrations exceeded GSI criteria (1.3 mg/L) and RHBDW criteria (0.86 mg/L) at 1 monitoring well. Concentrations ranged from 0.19 to 1.58 mg/L across the perimeter of the Site.

Total Dissolved Solids (TDS)

TDS was detected and exceeded GSI criteria (500 mg/L) in all 13 monitoring wells sampled in 2024. TDS concentrations ranged from 500 to 1,740 mg/L in property boundary and offsite monitoring wells. TDS was added to the Montcalm seep area groundwater monitoring program in 2018 to be used as an indicator of potential water quality changes due to the dewatering and re-injection associated with the Montcalm Street seep control system.

PCBs

PCBs were sampled at one monitoring well (MWOS-05) and were not detected.

2 Groundwater Monitoring Plan (2025 Modification)

The revisions to the 2025 GMP as presented below are based on the results of the 2024 sampling, which included the additional analysis requested by USEPA. The goal of the 2025 GMP is to continue to focus on monitoring of the downgradient perimeter wells and select onsite wells and assess ongoing Site groundwater stability. Monitoring wells located interior to the remainder of the Site (Northern Metal Fabrication Division [NMFD] and Southern Metal Fabrication Division [SMFD]) have generally shown no significant trend or decreasing concentration trends over time. Monitoring for VOCs at the former Fiero property will continue according to the separate Fiero Temporary Monitoring Plan (Arcadis 2025a).

Historical exceedances of drinking water criteria and/or vapor intrusion criteria are not relevant on-site given the current or planned deed restrictions for the various parcels that comprise the Site. Deed restrictions include or will include, among other provisions, that no drinking water wells may be installed or used on the property, and prior to any building or construction activities the building must either incorporate engineering controls to mitigate potential vapor intrusion (VI) or a VI evaluation must be completed. Further, a downgradient water well restriction ordinance (**Figure 1**) restricts the use of groundwater south of the former Fiero and SMFD boundary. Therefore, relevant exposure pathways for perimeter groundwater include Groundwater-Surface Water Interface Criteria (GSI) where the water table is suspected to be above the depth of sanitary and storm sewers (i.e., south of

SMFD), and off-site residential VI where VOCs are present in groundwater at the Site boundary (i.e., west-southwest of former Fiero Powerhouse). At the request of USEPA, groundwater analytical data from property boundary and offsite wells will be screened against residential and nonresidential drinking water criteria.

Based on results of the M-K analysis and the relevant exposure pathways, this GMP will focus on monitoring of VOCs, select metals (Fe and Mn), TDS, pH, and per- and polyfluoroalkyl substances (PFAS). Specifically:

- SMFD/Montcalm Seep Area - Monitor metals, TDS, 1,4-dioxane and PFAS at monitoring wells at the perimeter, off-site monitoring wells and upgradient monitoring well MW-43-14R.
- Former Fiero - Sentinel monitoring of PFAS, VOC and 1,4-dioxane impacts at the west, southwest and southern perimeter of the former Fiero properties.
    - VOC impacts associated with the former Fiero properties will continue to be evaluated under the Fiero Temporary Monitoring Plan as described in Appendix E of the *2024 Fiero Temporary Groundwater Monitoring Plan Summary* (Arcadis 2025a). The monitoring wells included in the 2025 Fiero Temporary Groundwater Monitoring Plan are shown on **Figure 2**.
- Former Plant 15 - Sampling of groundwater for VOCs where light non-aqueous phase liquid (LNAPL) has been observed in monitoring well MWM32-04 beginning in 2023.
- Additional gauging of perimeter LNAPL presence and thickness at select monitoring wells to verify LNAPL is stable and not migrating.

Data collected as part of the GMP will be evaluated after each event and reported annually. Changes to the GMP may be proposed as part of the Annual Groundwater Monitoring Report to be submitted by the second quarter of each following year.

2.1 Changes to 2024 GMP

Based on the results of 2024 groundwater monitoring, including the results of the additional sampling and analysis requested by the USEPA, the following changes are proposed to be carried forward in the GMP (2025 Modification):

- **VOCs:** MWM2-22 and MWM2-28 will be added to the GMP (2025 Modification) for upgradient monitoring. MWM16-02 will not be retained in the GMP (2025 Modification).
- **1,4-Dioxane:** TW-10-01 will not be retained in the GMP (2025 Modification).
- **Metals:** Monitoring wells MWOS-05 and MWF12-02R will be added to the GMP (2025 Modification) and samples analyzed for metals. MWW01-SEN03 will not be retained in the GMP (2025 Modification).
- **PCBs:** Samples from monitoring well MWOS-05 will no longer be analyzed for PCBs. No samples will be analyzed for PCBs as part of the GMP (2025 Modification) except for TW-MD-06 if LNAPL is not present in the monitoring well upon gauging.
- **PFAS:** MW-03-17 will continue to be monitored for PFAS to evaluate upgradient concentrations in the GMP (2025 Modification).
- **TDS:** Analysis for TDS will continue at property boundary and offsite locations currently included in the GMP (2025 Modification) for other analysis, including MWF12-02R, MWOS-01, MWOS-02, MWOS-04, MWW1-06, MW-01-17, MWW1-02, MWW1-04, MWW1-SEN03, SEEP VAULT, TW-MD-02, and TW-MD-05. Samples collected from MWOS-05 will not be analyzed for TDS.

3 Monitoring Plan Scope of Work

As noted above, the GMP (2025 Modification) will focus on the downgradient perimeter of the Site with select wells within the interior to monitor stability. The selected monitoring wells will act as a sentinel monitoring network to assess relevant exposure pathways for potential off-site receptors. The relevant exposure pathways include vapor intrusion to indoor air (VIAP) and GSI. In addition, analytical results for metals will be compared to residential health based drinking water (RHBDW) criteria and results from offsite and perimeter monitoring wells will be compared to residential and nonresidential drinking water criteria. To ensure exposure is not occurring via the drinking water pathway, off-site concentrations will be compared to drinking water criteria at or before groundwater reaches the downgradient edge of areas with groundwater use restrictions. Additional wells around the perimeter of the groundwater restriction area are being considered for installation in 2026 and will be summarized in a separate work plan.

The constituents of concern and gauging/sampling frequency for the proposed monitoring network are outlined on the revised groundwater sampling matrix included as **Table 1**. A comparison of the 2018 GMP sampling matrix and the revised GMP (2025 Modification) sampling matrix, including the basis for each revision, is provided as **Table 2**. Figures depicting the 2018 GMP sample locations (including historical data) compared to the 2025 GMP are provided in **Appendix B**.

3.1 Groundwater Elevation Gauging

Groundwater elevation monitoring will be completed as outlined in **Table 1** and shown on **Figure 3**. Site-wide groundwater elevation monitoring will be completed at 37 monitoring wells annually to collect data needed to assess horizontal gradient and apparent groundwater flow direction across the southern half of the Site. Monitoring wells will be gauged using an electronic water level meter accurate to 0.01-feet. All gauging events will be completed within 24 hours with exceptions only resulting from access or other issues.

3.2 LNAPL Monitoring

As discussed in Appendix A of the *Draft RCRA Corrective Action Summary Report* (Arcadis 2023), there are no compositional or mobility concerns associated with LNAPL present at PNC at this time. Groundwater will continue to be gauged for the presence of LNAPL at the perimeter of the main LNAPL areas to determine if migration is occurring as shown in **Figure 3**. In addition, LNAPL gauging will continue at TW-MD-06 and MWM32-04 and TW-MD-06 will be sampled for PCBs if LNAPL is not present in the well. Monitoring wells with LNAPL present will be gauged using an electronic interface probe accurate to 0.01-feet. All gauging events will be completed within 24 hours with exceptions only resulting from access or other issues.

3.3 Groundwater Sampling

Monitoring wells will be sampled as outlined in **Table 1** and shown in **Figure 4**. Groundwater sampling will be completed annually. Arcadis evaluated historical wells that are part of the GMP to evaluate seasonal trends. For COCs and monitoring wells with no specific statistical trends and representative number of events distributed first and second quarter vs. third and fourth quarter (MWW1-06, MWW5-01R, MWOS-01, MWW01-SEN03, MWW10-03), the average concentrations of inorganics tend to be higher in the third and fourth quarters, except for TDS (MWW5-01R), which is higher in the first and second quarter, likely due to salting during the winter months. VOCs are limited for GMP wells; however, select review of VOC trends at the former Fiero property suggest mixed

results for first and second quarter vs. third and fourth quarter sampling events, with some the same, some higher first and second, and some higher third and fourth. Wells with suitable data distribution for PFAS are not available (i.e., primarily sampled third quarter). Based on this result, RACER will continue to complete the annual groundwater sampling event during the third quarter starting in 2027.

Groundwater samples at the Site will be analyzed for VOCs, 1,4-dioxane, select metals (Fe and Mn), TDS, and PFAS. Groundwater samples will be collected in a manner consistent with the low-flow sampling techniques in the Arcadis technical guidance instruction (TGI) for low-flow sample collection, and consistent with USEPA Low-Stress (or Low-Flow) Purging and Sampling Procedure (USEPA 2017). Samples will be collected using a peristaltic pump or submersible pump, as appropriate, and submitted under chain of custody protocol to the analytical laboratory. An emphasis will be placed on collecting low-turbidity samples (less than 10 nephelometric turbidity units [NTUs]) for metals analysis. Field parameters, including dissolved oxygen, oxidation-reduction potential, pH, turbidity, and specific conductivity will be monitored for stability during sampling and recorded as a field data summary.

Sampling for PFAS can present unique challenges for field sampling protocols due to the potential for cross-contamination from materials such as Teflon tape, pump bladders, and water and oil resistant gear. While most of these materials will not present a large source of PFAS, they should be considered. Sampling for PFAS will be conducted in accordance with the Arcadis PFAS Sampling TGI to help ensure the chance of cross-contamination is minimized (**Appendix C**).

3.4 Additional PFAS Sampling Procedures

Due to the ubiquitous nature of PFAS and the potential for cross-contamination the following procedures will be applied to all monitoring locations proposed for PFAS sampling:

- Oil and water-resistant clothing such as Gore-Tex or other outdoor performance wear will not be worn. Sampling attire will include natural fabrics that have been well laundered. Rubber rain gear is acceptable for wet weather sampling.
- New, clean nitrile gloves will be used for each sampling location.
- Showering will be avoided on the day of sampling.
- Use of personal care products will be minimized to those that are medically necessary.
- Any food will be consumed away from the area of sampling. Hands will be washed before resuming sampling.
- All plastic sampling equipment will be high-density polyethylene (HDPE). This applies to passive sampling bags, pump bladders, tubing used for purging, and flow through cells. Sampling equipment will not contain any material that is Teflon coated or is noted to be organic resistant or non-stick.
- Reusable sampling equipment (e.g., flow through cells) will be rinsed with PFAS-free water between sampling locations.
- Appropriate size bottles will be provided by the laboratory.
- Equipment will be calibrated at the start of each day per the manufacturer's calibration procedures and calibration information will be recorded in the field daily log. An example of a field daily log form and groundwater sampling log has been provided in **Appendix D**. Manufacturer calibration procedures for the sampling equipment are provided in **Appendix E**.

3.5 Groundwater Analytical

Monitoring wells selected for sampling are shown on **Figure 4.** As presented in **Table 1**, groundwater samples will be submitted for one or more of the following analyses:

- *VOCs* – Samples will be collected annually and analyzed by USEPA Method SW8260C.
- *1,4*-Dioxane - Samples will be collected annually and analyzed by USEPA Method SW8260 SIM.
- *Fe and Mn* - Samples will be collected annually from select wells in areas of the Site identified with Fe or Mn exceedances of GSI in groundwater. Metals will be analyzed by USEPA Method E200.8. If turbidity below 10 NTU cannot be achieved during metals sampling, the sample will be field filtered and submitted for both dissolved and totals metals analysis, using USEPA Method E200.8.
- *TDS and pH (collected as a field parameter)* – Samples will be collected annually for select wells in areas of the Site identified with TDS exceedances of GSI in groundwater. TDS analysis will be analyzed by SM2540C. pH will be measured using a properly calibrated YSI Professional Plus multiparameter instrument. The multiparameter instrument will be calibrated on a daily basis using three calibration points for pH (4, 7, and 10).
- *PFAS* – Samples will be collected annually and analyzed for the Michigan 34 PFAS compounds using modified USEPA Method 537M with isotope dilution (DoD QSM 5.1).

4 Laboratory Methods and Quality Control

Merit Laboratories Inc. of East Lansing, Michigan will be the laboratory company supporting the environmental sample analyses for the VOC, 1,4-dioxane, metals and TDS analysis. Either ALS Group USA, Corp. (ALS) located in Holland, Michigan; Pace Analytical located in West Columbia, South Carolina, or another Pace Analytical location will be the laboratory company supporting the environmental sample analyses for PFAS.

4.1 Laboratory Analytical Methods

Groundwater samples will be analyzed for VOCs by USEPA Method 8260C, 1,4-dioxane by USEPA Method SW8260 SIM, select metals by USEPA Method E200.8, total dissolved solids by Method 2540C, and PFAS by modified USEPA Method 537M with isotope dilution (**Table 1**). Laboratory analysis limits (lower control limit and upper control limit) for VOCs are documented in the Merit Standard Operating Procedures (SOPs). Relevant laboratory SOPs and TGIs are summarized in **Table 3** and provided in **Appendix C**.

Table 3: Index of Standard Operating Procedures (SOP) and Technical Guidance Instructions (TGI)

Laboratory SOP	Total Dissolved Solids (TDS) (Also called: Total Filterable Residue) Standard Method #: 2540C
	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry Method SW-846 8260C/ EPA 624.1 (includes USEPA Method SW8260 SIM)
	Purge and Trap for Aqueous and High and Low Concentration Soil Samples Method 5030C/5035A
	Metals by Inductively Couples Plasma – Mass Spectrometry Methods 6020, 6020A, 200.8
	Microwave Assisted Acid Digestion of Liquid Samples and Extracts US EPA Method 3015A
	Determination of PFAS by LC MS MS (Isotope Dilution) QSM 5.3 Table B-15
	Groundwater and Soil Sampling Equipment Decontamination

Arcadis TGI	PFAS Field Sampling Guide
	Low Flow Groundwater Purging and Sampling Procedures for Monitoring Wells
	Manual Water Level and NAPL Monitoring
	Sample Chain of Custody
	Equipment and Reagent Blank Sample Collection for PFAS Analysis
	Investigation-Derived Waste Handling and Storage

4.2 Quality Assurance/Quality Control Procedures

Field Quality Assurance/Quality Control Procedures (QA/QC) samples will be collected during field sampling include:

- Equipment blank samples to determine the existence and magnitude of sample contamination resulting from ambient conditions or sampling procedures.
- Equipment blank samples will be collected at a frequency of one per day, following sampling equipment decontamination procedures. These samples will be collected by routing laboratory-provided deionized water through decontaminated sampling equipment. Equipment blank samples will be analyzed for PFAS to check procedural contamination and/or ambient conditions and/or sample container contamination at the Site that may cause sample contamination.
- Field duplicate samples will be collected at a minimum frequency of 1 per 10 samples. Field duplicate samples will be analyzed to assess the precision of the field sample collection procedures. One field duplicate will be collected and analyzed for each analyte group (VOCs, 1,4-dioxane, PFAS, metals, pH, and TDS).
- Sufficient sample volume will be provided to the laboratory (as necessary) for matrix spike and spike duplicate (MS/MSD) analyses. The data from MS/MSD analyses provides an indication of the precision and accuracy of the analytical method relative to the sample matrix. Samples for MS/MSD analysis will be designated at a minimum frequency of 1 per 20 or fewer samples and will be collected from randomly selected monitoring wells that are being analyzed for organic analyte groups.
- Trip blank samples to verify no outside contaminants will be collected at a frequency of one per sample cooler and analyzed for VOCs.

Samples will be collected and packed in the laboratory supplied containers and transported in accordance with the laboratory container, preservation, shipping, and packaging requirements.

Laboratory QA/QC requirements for the analysis of groundwater samples include analyzing method blanks, initial calibration verification standards, continuing calibration verification standards, MS/MSD samples, and laboratory Control Samples (LCS). The analysis frequency for these QA/QC samples is identified in the applicable laboratory SOP provided in **Appendix C**. The acceptance criteria for these QC checks will be consistent with the analytical methods and laboratory SOP. Laboratory reports for samples collected will consist of the following data deliverables:

1. Case Narrative:
    a. Date of issuance
    b. Project name and number
    c. Any deviations from intended analytical strategy
    d. Condition of samples "as received"
    e. Discussion of whether sample holding times were met

f. Discussion of technical problems or other observations that may have created analytical difficulties
g. Discussion of any laboratory quality control checks that failed to meet project criteria

2. Chemistry Data Package
   a. Dates of sample collection, receipt, preparation, and analysis
   b. Cross-reference of laboratory to project sample identification numbers
   c. Description of data qualifiers used
   d. Methods of sample preparation and analysis
   e. Sample results in tabular format
   f. Method blank data, surrogate data, LCS data, duplicate sample data, MS/MSD data,
   g. Fully executed chain-of-custody document

4.3 Data Review and Validation

Upon receipt of the final Level II data packages from the project laboratories a Tier II data review and validation will be completed. The data review will evaluate the final analytical results, holding time compliance, equipment blank sample data, field duplicate sample data, method blank data, LCS data, laboratory duplicate data, surrogate compound spike data, and MS/MSD sample data. Data will be reviewed in accordance with the USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-20-005, November 2020 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999 as appropriate), USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA 542-R-20-006, November 2020, and Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537, EPA 910-R-18-001, November 2018; and Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD Final General Data Validation Guidelines, November 2019.

5 Reporting

An annual report will be submitted following the sampling event and will provide a detailed narrative documenting any groundwater changes observed at the Site. The annual report will also propose changes to the GMP for future annual sampling events, as appropriate, based on the results of the sampling. The annual report will include the following:

- A table summarizing analytical data for the annual monitoring event
- A table summarizing groundwater elevations and measured LNAPL thickness (if LNAPL was present) since 2024 for the monitoring wells sampled in the annual event
- A table summarizing groundwater analytical data since 2013 for monitoring wells sampled in the annual event
- Figures summarizing COC criteria (GSI, Drinking Water, VIAP) exceedances for the annual event
- Figures summarizing groundwater elevation contours, and a discussion of current groundwater flow at the site and any potential changes to groundwater flow based on recent data
- Groundwater concentration trend graphs with M-K analysis completed for all parameters from all GMP monitoring wells that exceed criteria (or have in the past) and have at least seven samples available for analysis

- Low-flow groundwater sampling field logs and a summary of the field parameters recorded at each well during low-flow sampling
- Copies of the laboratory analytical reports for the year (including QA/QC results)
- Memo documenting data review and validation

6 References

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U.S. Environmental Protection Agency (USEPA; Region I). 1996. Low-Stress (or Low-Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells – Revision 4. July 30, 1996; Revised September 19, 2017.

USEPA. 2009. Semi-Annual Groundwater Monitoring Program Proposed Modifications Request Approval. RACER Pontiac North Campus. November 23, 2009.

Tables

Table 1
Groundwater Monitoring Plan (2025 Modification)
RACER Trust Pontiac North Campus

Well ID	Screen Interval (ft bgs)	Gauging	VOCs	1,4-Dioxane	Metals	PFAS	TDS	Primary Function
Offsite								
MWOS-01	4 - 14	A	A	A	A		A	Offsite sentinel monitoring
MWOS-02	6 - 16	A	A	A	A	A	A	Offsite sentinel monitoring
MWOS-04	3 - 13	A		A	A	A	A	Offsite sentinel monitoring
MWOS-05	2 - 12	A			A	A		Offsite sentinel monitoring
MWOS-09R	27.5 - 32.5	A				A		Offsite sentinel monitoring
MWOS-10	28.5 - 33.5	A				A		Offsite sentinel monitoring
MWW1-06	4 - 16	A			A	A	A	Offsite sentinel monitoring
Fiero Properties								
MW-02-17	25 - 30	A						Groundwater elevation
MWF7-02	18 - 28	A		A				Groundwater elevation
MWF8-01	18 - 28	A						Groundwater elevation
MWF12-01R	15 - 20	A		A				Groundwater elevation
MWF12-02R	18 - 23	A	A		A	A	A	Perimeter monitoring
MWF16-05	22 - 32	A						Groundwater elevation
MWF16-06	19 - 29	A						Groundwater elevation
MWF16-25	27 - 37	A				A		Perimeter monitoring
MWF16-26	27.5 - 37.5	A				A		Perimeter monitoring
PZF17-05	24 - 34	A						Groundwater elevation
Southern Metal Fabrication Division								
MW-01-17	3 - 8	A			A	A	A	Perimeter monitoring
MW-03-17	18 - 22	A				A		Upgradient monitoring / LNAPL Monitoring
MW-43-14R	25 - 30	A			A	A	A	Montcalm toe drain discharge monitoring / LNAPL Monitoring
MWM2-22	15 - 25	A	A					Upgradient monitoring / LNAPL Monitoring
MWM2-28	13 - 23	A	A					Upgradient monitoring / LNAPL Monitoring
MWW1-02	1 - 11	A			A	A	A	Perimeter monitoring / LNAPL Monitoring
MWW1-04	3 - 13	A			A	A	A	Perimeter monitoring
MWW01-SEN03	35.2 - 45.2	A					A	Upgradient monitoring / LNAPL Monitoring
MWW10-SEN01	14.5 - 19.5	A						Groundwater Elevation / LNAPL Monitoring
MWW10-SEN02	15 - 25	A						Groundwater Elevation / LNAPL Monitoring
MWW10-03	6 - 16	A				A		Perimeter monitoring / LNAPL Monitoring
MWW10-04	4 - 14	A						Groundwater Elevation / LNAPL Monitoring
SEEP VAULT	--				A	A	A	Perimeter monitoring
TW-10-01	25 - 30	A						Groundwater Elevation / LNAPL Monitoring
TW-MD-02	4.5 - 9.5	A			A		A	Perimeter monitoring / LNAPL Monitoring
TW-MD-05	6 - 11	A			A		A	Perimeter monitoring / LNAPL Monitoring
TW-MD-06*	5 - 15	A						Groundwater Elevation / LNAPL Monitoring - *will be sampled for PCBs if no LNAPL is present
Northern Metal Fabrication Division								
MWM16-37	25 - 35	A	A					Groundwater elevation
MWM30-01	24 - 34	A	A			A		Perimeter monitoring
MWM32-04	27 - 37	A						Groundwater Elevation / LNAPL Monitoring
MWM32-09	14 - 24	A	A			A		Perimeter monitoring

Notes:

A = Annual (Alternating 1Q and 3Q of each year)
ft bgs = feet below ground surface
Metals = manganese and iron
LNAPL = light non-aqueous phase liquid
TDS = total dissolved solids
PFAS = per- and polyfluoroalkyl substances
VOCs = volatile organic compounds

Table 2
Groundwater Monitoring Plan Comparison Matrix
Groundwater Monitoring Plan (2025 Modification)
RACER Trust Pontiac North Campus

ARCADIS

Well ID	2018 Gauging	Analysis - 2018 GMP					2025 Gauging	Analysis - 2025 GMP				Monitoring Program	Reason for Change
		VOCs	1,4-dioxane	Inorganics/ Metals[1]	PCBs	Geochemical per Montcalm Seep IMWP[2]		VOCs	1,4-dioxane	Inorganics/ Metals	PFAS		
OFFSITE													
MWOS-01	A	A	--	A - T/D Mn	--	--	A	A	A	A	--	2018 GMP / 2025 GMP	Monitoring well included as a sentinel well for monitoring potential groundwater impacts associated with the Fiero Properties.
MWOS-02	A	A	--	A - T/D Mn	--	--	A	A	A	A	A	2018 GMP / 2025 GMP	Monitoring well included as a sentinel well for monitoring potential groundwater impacts associated with the Fiero Properties.
MWOS-03	A	A	--	A - T/D V	A	--	--	--	--	--	--	2018 GMP	Monitoring well is considered redundant as nearby monitoring well MWW1-06 is included in the 2024 GMP.
MWOS-04	--	--	--	--	--	--	A	--	A	A	A	2025 GMP	Monitoring well included based on analytical results of surrounding monitoring wells.
MWOS-05	--	--	--	--	--	--	A	--	--	A	A	2025 GMP	Monitoring well included for off-site sentinel monitoring of metals (Mn & Fe) based on upgradient monitoring well results.
MWOS-06	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWOS-09R	--	--	--	--	--	--	A	--	--	--	A	2025 GMP	Monitoring well included for off-site sentinel monitoring of PFAS. VOCs will continue to be monitored under the Fiero Temporary Monitoring Plan.
MWOS-10	--	--	--	--	--	--	A	--	--	--	A	2025 GMP	Monitoring well included for off-site sentinel monitoring of PFAS. VOCs will continue to be monitored under the Fiero Temporary Monitoring Plan.
MWW1-06	A	--	--	--	--	--	A	--	--	A	A	2018 GMP / 2025 GMP	Monitoring well included for off-site sentinel monitoring of PFAS and inorganics/metals based on upgradient monitoring well results.
FIERO													
F-7													
MWF7-02	A	A	A	--	--	--	A	--	A	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Well will be sampled for 1,4-dioxane to understand remaining on-site concentrations. Well will be gauged for groundwater elevation contour map creation.
F-8													
MWF8-01	A	A	--	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Well will be gauged for groundwater elevation contour map creation.
F-12													
MWF12-01R	A	--	A	A - T/D Mn	--	--	A	--	A	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for groundwater elevation. Well will be sampled for 1,4-dioxane to monitor potential offsite migration. Well will be gauged for groundwater elevation contour map creation.
MWF12-02R	A	A	--	A - T Mn	--	--	A	A	--	A	A	2018 GMP / 2025 GMP	Well not included in the Fiero Temporary Monitoring Plan. Perimeter well monitored for potential impacts migrating off-site.
F-16													
MWF16-05	A	--	--	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Well will be gauged for groundwater elevation contour map creation.
MWF16-06	A	A	A	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Well will be gauged for groundwater elevation contour map creation.
MWF16-10	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well has been destroyed by current occupant. Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWF16-11	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well has been destroyed by current occupant. Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWF16-16	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs.
MWF16-23	A	A	A	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs.
MWF16-25	A	A	A	--	--	--	A	--	--	--	A	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Perimeter well monitored for potential impacts migrating off-site.

Table 2
Groundwater Monitoring Plan Comparison Matrix
Groundwater Monitoring Plan (2025 Modification)
RACER Trust Pontiac North Campus

ARCADIS

Well ID	2018 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals[1]	PCBs	Geochemical per Montcalm Seep IMWP[2]	2025 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals	PFAS	Monitoring Program	Reason for Change
MWF16-26	--	--	--	--	--	--	A	--	--	--	A	2025 GMP	Well not included in the Fiero Temporary Monitoring Plan. Perimeter well monitored for potential impacts migrating off-site.
MW-02-17	A	A	A	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs. Well will be gauged for groundwater elevation contour map creation.
MW-05-18	A	A	A	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan for VOCs.
FORMER FIERO PARKING LOT AREA													
PZF17-01	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
PZF17-02	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan.
PZF17-03	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
PZF17-04	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan.
PZF17-05	A	--	--	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well associated with the Fiero Properties and will continue to be monitored under the Fiero Temporary Monitoring Plan. Well will be gauged for groundwater elevation contour map creation.
DEMOLITION AREA													
W-1													
MWW01-SEN03	A	A	A	A	A	A	--	--	--	A	--	2018 GMP / 2025 GMP	Monitoring well is located interior to the Site and exhibits stable to decreasing stability trend. In addition, associated groundwater impacts are managed by DRCs.
MWW01-SEN04	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well is located interior to the Site and exhibits stable to decreasing stability trend. In addition, associated groundwater impacts are managed by DRCs.
MWW1-04	A	A	A	A - T Sb, V	A	A	A	--	--	A	A	2018 GMP / 2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site. Stability analysis shows a stable to decreasing trend for COCs analyzed for the 2018 GMP.
MW-40-99	A	A	A	--	A	--	--	--	--	--	--	2018 GMP	Monitoring well is located interior to the Site and associated groundwater impacts are managed by DRCs.
MW-01-17	A	A	A	--	--	--	A	--	--	A	A	2018 GMP / 2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site. On-site groundwater impacts are managed by DRCs.
TW-01-01	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
TW-01-02	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
TW-01-03	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MW-43-14R	A	--	--	--	--	--	A	--	--	A	A	2018 GMP / 2025 GMP	Monitoring well included for Montcalm toe drain discharge monitoring
W-5													
MWW5-01R	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well is located interior to the Site and associated groundwater impacts are managed by DRCs
W-8													
TW-03-01	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWW8-36	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWW8-65	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
RWW8-129	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
RWW8-133	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
TW-11-01	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.

Well ID	2018 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals[1]	PCBs	Geochemical per Montcalm Seep IMWP[2]	2025 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals	PFAS	Monitoring Program	Reason for Change
TW-11-02	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
TW-09-01	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well is located interior to the Site and exhibits and stable to decreasing stability trend. In addition, associated groundwater impacts are managed by DRCs.
TW-10-01	A	--	--	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution.
TW-10-02	A	--	A	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well is located interior to the Site and associated groundwater impacts are managed by DRCs.
TWW8-01	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
W-10													
MWW10-03	A	A	--	A - T Pb, Mn	A	--	A	--	--	--	A	2018 GMP / 2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site. Stability analysis shows an increasing trend for COCs analyzed during the 2018 GMP; however, impacts are managed by DRCs.
MWW10-04	--	--	--	--	--	--	A	--	--	--	--	2025 GMP	Monitoring well included for groundwater elevation contouring resolution.
MWW10-SEN01	A	--	--	--	--	--	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution.
MWW10-SEN02	A	A	--	A	A	A	A	--	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution. Monitoring well is located interior to the Site and groundwater impacts are managed by DRCs.
SB-25-14	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
RW-08-14	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
METAL FABRICATION DIVISION													
M-2													
MWM2-22	A	E	--	--	--	--	A	A	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution or groundwater impact delineation.
MWM2-28	A	E	--	--	--	--	A	A	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution or groundwater impact delineation.
MWM2-37	A	E	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
M-4													
MWM4-05	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWM4-06R	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
M-5													
MWM5-02	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
MWM5-03	A	--	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation.
M-16													
MWM16-02	A	A	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Groundwater impacts are managed by DRCs.
MWM16-30	A	A	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Groundwater impacts are managed by DRCs.
MWM16-31	A	A	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
MWM16-37	A	A	--	--	--	--	A	A	--	--	--	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution or groundwater impact delineation.
M-30													
MWM30-01	--	--	--	--	--	--	A	A	--	--	A	2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site.

Table 2
Groundwater Monitoring Plan Comparison Matrix
Groundwater Monitoring Plan (2025 Modification)
RACER Trust Pontiac North Campus

ARCADIS

Well ID	2018 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals[1]	PCBs	Geochemical per Montcalm Seep IMWP[2]	2025 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals	PFAS	Monitoring Program	Reason for Change
M-31/M-32													
MWM31-02	A	A	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Groundwater impacts are managed by DRCs.
MWM32-01	A	A	--	--	--	--	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Groundwater impacts are managed by DRCs.
MWM32-04	--	--	--	--	--	--	A	--	--	--	--	2025 GMP	Monitoring well included for LNAPL monitoring and groundwater elevation contouring resolution.
MWM32-09	--	--	--	--	--	--	A	A	--	--	A	2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts associated with the LNAPL observed at MWM32-04.
MONTCALM SEEP MONITORING													
INJ-01-17	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
INJ-02-18	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
MW-03-17	A	A	--	A	A	A	A	--	--	--	A	2018 GMP / 2025 GMP	Monitoring well included for groundwater elevation contouring resolution and groundwater impact characterization. Groundwater impacts are managed by DRCs.
MW-04-17	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
TW-MD-01	A	A	A	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
TW-MD-02	A	A	--	A	A	A	A	--	--	A	--	2018 GMP / 2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site. Stability analysis shows an increasing trend for COCs analyzed during the 2018 GMP; however, impacts are managed by DRCs.
TW-MD-03	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
TW-MD-04	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
TW-MD-05	A	A	--	A	A	A	A	--	--	A	--	2018 GMP / 2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site. Stability analysis shows an increasing trend for COCs analyzed during the 2018 GMP; however, impacts are managed by DRCs.
TW-MD-06	A	A	--	A	A	A	A	--	--		--	2018 GMP / 2025 GMP	Monitoring well included for LNAPL monitoring and groundwater elevation contouring resolution. Will be sampled for PCBs if no LNAPL is present in the well.
TW-MD-07	A	A	A	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Stability analysis shows a stable to decreasing trend and groundwater impacts are managed by DRCs.
MWW1-02	--	--	--	--	--	--	A	--	--	A	A	2025 GMP	Monitoring well included for perimeter monitoring of potential groundwater impacts migrating off-site.
MWW1-15	A	A	--	A	A	A	--	--	--	--	--	2018 GMP	Monitoring well not needed for groundwater elevation contouring resolution or groundwater impact delineation. Groundwater impacts are managed by DRCs.
Seep Vault	NA	See Notes[3]					A	--	--	A	A	2018 GMP / 2025 GMP	Seep Vault included for perimeter monitoring of potential groundwater impacts migrating off-site above applicable criteria.

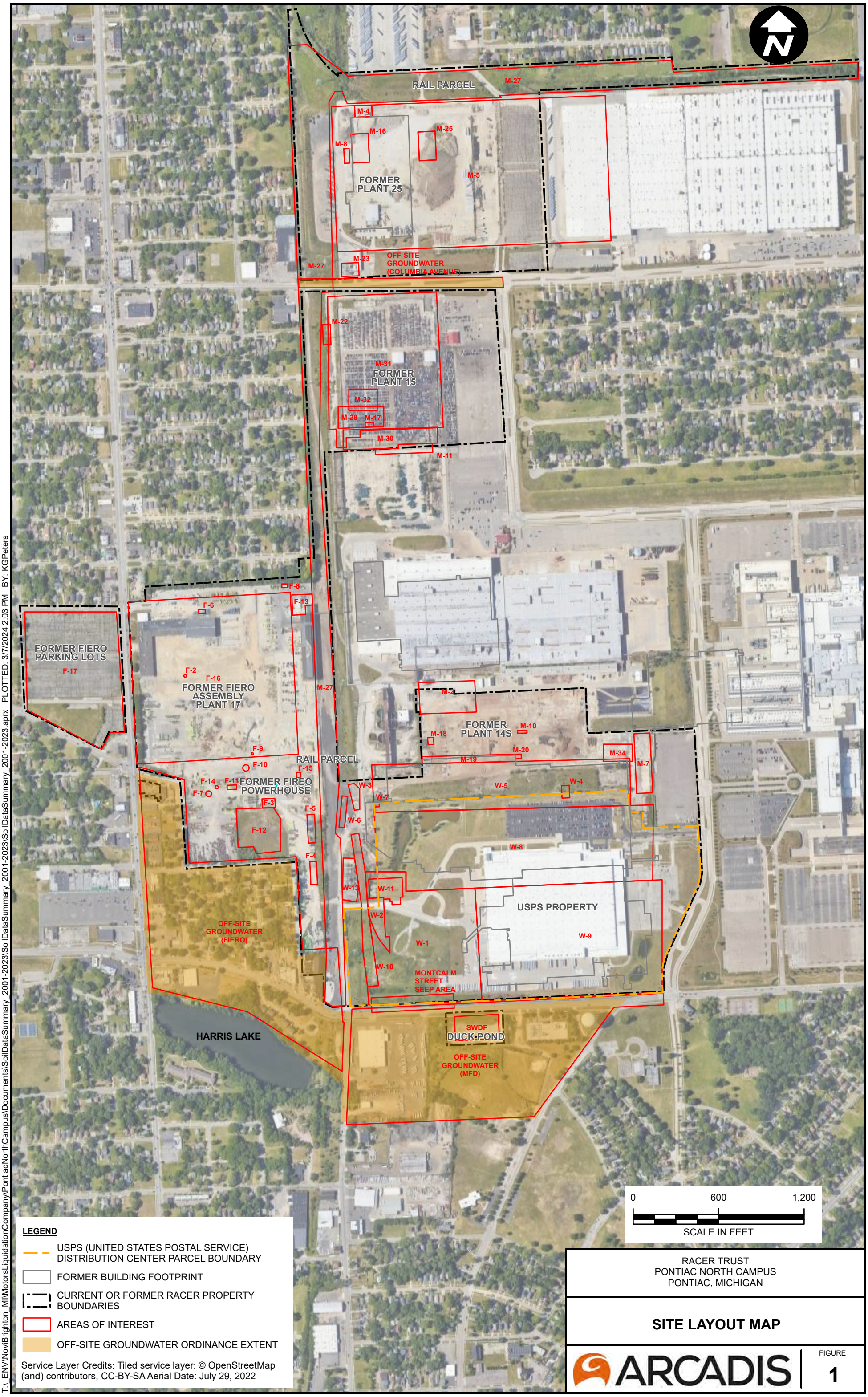
Table 2
Groundwater Monitoring Plan Comparison Matrix
Groundwater Monitoring Plan (2025 Modification)
RACER Trust Pontiac North Campus

Well ID	2018 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals[1]	PCBs	Geochemical per Montcalm Seep IMWP[2]	2025 Gauging	VOCs	1,4-dioxane	Inorganics/ Metals	PFAS	Monitoring Program	Reason for Change

Abbreviations
A - Annual
D - Dissolved
E - Added to GMP at request of EPA
GFL - Green for Life
GMP - Groundwater Monitoring Program
IMWP - Interim Measure Work Plan
Mn - Manganese
NA - Not Applicable
Pb - Lead
PCBs - Polychlorinated biphenyls
Sb - Antimony
T - Total
V - Vanadium
VOCs - Volatile organic compounds

Notes
1. Inorganics/Metals sampling includes antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc unless otherwise noted.
2. Geochemical sampling per the Montcalm Seep IMWP includes: calcium, iron, magnesium, alkalinity, hardness, dissolved and suspended solids.
3. Seep vault analysis includes VOC's, SVOC's, organochlorine pesticides, PCB's, asbestos, pH, alkalinity, total coliform, BOD, COD, total suspended solids, chloride, chlorine, fluoride, hardness, ammonia, oil & grease n-Hexane, total Kjeldahl nitrogen, nitrate, nitrite, total nitrogen, ortho phosphate, total phosphorus, conductivity, sulfate, sulfide, chromium VI, metals, total cyanide, sulfite, amenable cyanide, total dissolved solids, dissolved metals, and TOC

Figures



RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

SITE LAYOUT MAP

ARCADIS

FIGURE
1

CITY: NOVI, MI DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\NoviBrighton_MI\MotorsLiquidationCompany\PontiacNorthCampus\Documents\SoilDataSummary_2001-2023\SoilDataSummary_2001-2023.aprx PLOTTED: 3/7/2024 2:03 PM BY: KGPeters

CITY: NOVI DIV: ENV DB: TRY PIC: S.INSALACO PM: T. LINDER TM: L. NICKERSON TR: PROJECT NUMBER: 30267726.00005 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\NoviBrighton_MI\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2025\SiteInvestigation_2025.aprx PLOTTED: 3/5/2025 11:47 AM BY: AKENS

Service Layer Credits: Tiled service layer: © OpenStreetMap (and) contributors, CC-BY-SA
Google Earth Pro Aerial Dated March 19, 2021

MWF2
MWF8-01
PZF17-01
PZF17-02
PZF17-03
PZF17-04
PZF17-05
MWF16-17
MWF16-05
MWF16-12
MW-09-22
MWF16-18
MWF16-06
MWF16-20
MWF16-24
MWF16-26
TW-12-22
MWF16-19
MWF16-16
MWF16-22
MW-14-22
MW-13-22
MW-16-22
MW-15-22
MWF16-07
MWF16-15
MWF7-03
MW-11-22
MWF16-25
MWF16-23
MWF7-02
MWOS-08
MWOS-09R
UNKNOWN-01
MW-06-20
MWF15-01
SV-01-21
SV-02-21
MW-08-21
SV-06-21
SV-05-21
MWOS-10
MW-07-20
SV-04-21
SV-03-21
MW-05-18
SV-07-24
SV-08-24
MWF12-01R
MWF12-02R
MW-02-17

N

LEGEND

- EXISTING MONITORING WELL
- SOIL VAPOR MONITORING POINT
- SEMI-ANNUAL GAUGING ONLY
- SEMI-ANNUAL SAMPLING
- NOT INCLUDED IN 2025 FIERO MONITORING PLAN
- APPROXIMATE GROUNDWATER ORDINANCE EXTENT
- CURRENT OR FORMER RACER PROPERTY

0 200 400
SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

2025 TEMPORARY MONITORING PLAN LOCATIONS

ARCADIS

FIGURE
2

MWM4-05
MWM4-06R
MWM16-30
MWM5-02
MWM5-03
MWM16-02
MWM16-31
MWM16-37
MWM31-02
MWM32-01
MWM32-04
MWM32-09
MWM30-01
MWF8-01
PZF17-01
PZF17-02
PZF17-03
PZF17-04
PZF17-05
MWF16-10
MWF16-11
MWF16-05
MWF16-06
MWF16-26
MWF16-16
MWF16-25
MWF16-23
MWF7-02
MWOS-09R
MWOS-10
MW-05-18
MW-02-17
MWF12-01R
MWF12-02R
MWW10-04
MWW10-03
RW-08-14
MWOS-01
MWOS-02
MWW10-SEN01
MWW10-SEN02
SB-25-14
TW-01-01
TW-01-02
TW-01-03
MW-43-14R
TW-MD-02
MWW01-SEN03
MWW01-SEN04
MWW1-15
SEEP VAULT
MWW1-04
MW-01-17
MWOS-03
MWW1-06
MWOS-04
TW-MD-01
MW-40-99
TW-MD-03
TW-MD-04
TW-MD-05
TW-MD-06
TW-MD-07
MWW1-02
MWOS-06
MWOS-05
MWM2-22
MWM2-37
MWM2-28
INJ-01-17
MW-03-17
MW-04-17
MWW5-01R
INJ-02-18
TWW8-01
MWW8-65
TW-11-02
TW-11-01
TW-09-01
TW-03-01
MWW8-36
TW-10-01
TW-10-02
RWW8-129
RWW8-133

LEGEND

- EXISTING MONITORING LOCATION
- 2018 GMP LOCATION
- 2025 GMP ANNUAL GAUGING LOCATION
- LNAPL MONITORING LOCATION
- EXTENT OF LIF RESPONSES >25% BASED ON 2007 AND 2013-2014 MOBILITY STUDIES REPRESENTING CONSERVATIVE EXTENT OF RESIDUAL LNAPL
- CURRENT OR FORMER RACER PROPERTY

0 500 1,000

SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

2025 SITEWIDE GROUNDWATER GAUGING

ARCADIS

FIGURE 3

D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2025\MonitoringPlan_2025.aprx Layout: GroundwaterGauging_Sitewide_2025 PLOTTED: 4/1/2026 11:39 AM BY: TYarbrough

MWM4-05
MWM4-06R
MWM16-30
MWM5-02
MWM5-03
MWM16-02
MWM16-31
MWM16-37
MWM31-02
MWM32-01
MWM32-04
MWM32-09
MWM30-01
MWF8-01
PZF17-01
PZF17-02
PZF17-03
PZF17-04
PZF17-05
MWF16-10
MWF16-11
MWF16-17
MWF16-05
MW-09-22
MWF16-12
MWF16-18
TW-12-22
MW-16-22
MWF16-06
MWF16-26
MWF16-16
MWF16-07
MWF16-22
MWF16-15
MWF7-02
MW-11-22
MWF16-23
UNKNOWN-01
MWF16-25
MW-06-20
MWF15-01
MW-08-21
MW-07-20
MWOS-08
MW-05-18
MWOS-09R
MWOS-10
MWF12-01R
MW-02-17
RW-08-14
MWW10-04
MWF12-02R
MWW10-03
MWW8-36
RWW8-129
RWW8-133
TW-10-01
TW-10-02
INJ-01-17
MWW5-01R
TWW8-01
MWW8-65
MW-03-17
INJ-02-18
MW-04-17
TW-09-01
TW-03-01
TW-11-02
TW-11-01
MWM2-22
MWM2-37
MWM2-28
SB-25-14
MWW10-SEN01
TW-01-01
TW-01-03
TW-MD-02
TW-01-02
SEEP VAULT
MW-43-14R
MWW01-SEN03
TW-MD-03
MWW10-SEN02
TW-MD-04
TW-MD-01
TW-MD-05
MW-40-99
MWW01-SEN04
MW-01-17
TW-MD-06
MWW1-04
MWW1-15
MWW1-02
TW-MD-07
MWOS-01
MWOS-02
MWOS-03
MWW1-06
MWOS-04
MWOS-06
MWOS-05

0 500 1,000
SCALE IN FEET

LEGEND

- EXISTING MONITORING LOCATION
- 2018/2025 GMP LOCATION
- ANNUAL GROUNDWATER SAMPLING FOR 1,4-DIOXANE
- ANNUAL GROUNDWATER SAMPLING FOR VOCS
- ANNUAL GROUNDWATER SAMPLING FOR TDS
- ANNUAL GROUNDWATER SAMPLING FOR METALS
- ANNUAL GROUNDWATER SAMPLING FOR PFAS
- FIERO TGMP SAMPLING FOR VOCS
- CURRENT OR FORMER RACER PROPERTY

PFAS - PER- AND POLYFLUOROALKYL SUBSTANCES

TDS - TOTAL DISSOLVED SOLIDS

TGMP - TEMPORARY GROUNDWATER MONITORING PLAN

USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

VOCS - VOLATILE ORGANIC COMPOUNDS

NOTES:

1. VOC SAMPLES WILL BE ANALYZED USING USEPA METHOD SW8260B, SELECT METALS WILL BE ANALYZED USING USEPA METHOD 6020, TDS WILL BE ANALYZED BY SM2540C, PFAS WILL BE ANALYZED USING MODIFIED USEPA METHOD 537 WITH ISOTOPE DILUTION.

2. INORGANICS INCLUDES SELECT METALS (MANGANESE AND IRON) AND PH.

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

2025 SITEWIDE GROUNDWATER SAMPLING

ARCADIS

FIGURE
4

D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2025MonitoringPlan_2025.aprx Layout: GroundwaterSampling_Sitewide_2025 PLOTTED: 4/22/2026 5:13 PM BY: TYarbrough

Appendix A

Mann-Kendall Trend Analysis Summary and Historical Groundwater Data

Trend Analysis
RACER PNC
May 2024

STATISTICAL ANALYSIS METHODOLOGY

Arcadis conducted statistical analyses to assess whether constituent of concern (COC) concentrations have statistically significantly increasing or decreasing trends at 95 percent confidence. The Mann-Kendall (MK) trend test is a non-parametric test that determines these trends based on ranked data. As such, it is relatively insensitive to outlier values and non-detect concentrations (values less than reporting limits) and does not require the data to fit a specific model. The test has the flexibility to be modified to account for multiple observations per time period, multiple sampling locations, and seasonality (USEPA 2006, 2009).

The MK trend test is performed by listing the concentrations of the constituent of interest in temporal order and computing the differences between a given measurement and earlier measurements (Gilbert 1987; USEPA 2009). The MK test statistic (sum of trend [S]) is the difference between the number of strictly positive differences and the number of strictly negative differences. If S is positive, an increasing trend is indicated; if S is negative, a decreasing trend is indicated; and, if S is near zero, no trend is apparent. Trends with positive or negative S values are accepted as statistically significant for p-values less than or equal to 0.05 (95 percent confidence level). A minimum of four (preferably eight) sampling events per well is needed to run the MK trend test (USEPA, 2009). Where qualified values were used in computations, the concentrations were set equal to the reported value. Based on USEPA guidance (USEPA 2009) for MK analyses, non-detect values are set to a single value less than that of any detections, so that any pair of tied values or any pair of non-detects is given a score of 0 in the calculation of S.

To further consider the stability of COC concentrations, MK analyses with S values near zero were evaluated quantitatively using the coefficient of variation (CV) and qualitatively with visual inspection. The CV is a measure that can be used to assess relative stability. The CV is calculated as the standard deviation divided by the mean (average) concentration of a data set. In general, CV values greater than 1 indicate variability in concentrations over time while CV values less than 1 indicate that concentrations are stable.

Statistical analyses of COC concentration trends were evaluated using the MK method for monitoring well and constituent pairs that meet the following criteria:

1. At least 7 sampling results.
2. At least 50 percent of concentrations are detected measurements.
3. At least one criteria exceedance in concentration.

For non-Fiero data sets, an exceedance was considered if concentrations were greater than either the groundwater surface interface (GSI) or residential drinking water criteria. For Fiero data sets, criteria were considered based on the well location on-site. Since MWF16-06 and MWF7-02 are not within 100 feet of the property boundary, the NR Fiero SSVIAC <50k SOG criteria was used. All other Fiero data sets considered the Res Fiero SSVIAC BASE criteria.

TREND ANALYSES CONDUCTED

Based on data from February 2013 to September 2023, a total of 47 data sets qualified for statistical analysis according to the criteria above.

Among Fiero data sets, only trichloroethene at MWF16-23 qualified for statistical analysis. This well-constituent pair has no significant trend at the 95% confidence level. Considering the CV, p-value, and sign of the S-value, concentrations are stable to potentially decreasing. Fiero results are presented in Table A-1, and Figure A-1 presents a chart of trichloroethene concentrations over time at MWF16-23.

Among the non-Fiero data sets, six of the qualifying data sets have statistically significantly increasing trends. Statistically significant increasing trends include: iron at MW-03-17, manganese at MWW10-03, total dissolved solids at TW-MD-02 and TW-MD-05, and both iron and aroclor-1248 (PCB-1248) at TW-MD-06. Nine of the qualifying data sets have statistically significantly decreasing trends. Statistically significant decreasing trends include: iron at TW-MD-01, TW-MD-02, and TW-MD-05; manganese at TW-MD-01, TW-MD-04, and TW-MD-06; vinyl chloride at MWM16-37; aroclor-1248 (PCB-1248) at MWW01-SEN04; and vanadium at MWW1-04.

The additional qualifying data sets do not have statistically significant trends at the 95% confidence level. With the exception of lead and copper at MWW01-SEN04, each of the qualifying data sets with no statistically significant trend have CV values less than 1, indicating that concentrations are generally stable. Visual inspection confirms this conclusion, with the exceptions of concentrations of TDS at INJ-01-17; TDS and iron at INJ-02-18; and TDS at MW-03-17. In each of these instances, the concentration trend has changed direction over time, with a decreasing trend over the most recent two events. The relatively high CV values of copper (1.80), lead (2.83), and manganese at MWW01-SEN04 (0.97) are attributable to a substantial short-term (one sampling event) spike in concentrations at this location in October 2019. Non-Fiero results are presented in Table B-1, with corresponding charts in Figures B-1 through B-46.

REFERENCES

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley and Sons, Inc. New York.

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data and RCRA Facilities Unified Guidance. Office of Resource Conservation and Recovery. March.

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TABLE A-1
Summary Statistics and Trend Results
RACER PNC (Non-Fiero)
Pontiac, MI
May, 2024

Well ID	Analyte	Date Range	Figure	FOD	Detected Results Summary [1]					Mann-Kendall Test [2]		
					Range	Mean	Median	SD	CV	Result[4]	P-Value	S Value
INJ-01-17	Total dissolved solids (TDS)	10/18 - 09/23	A-1	7 / 7	562000 - 1970000	1210000	1260000	551000	0.46	NST	0.191	7
INJ-02-18	Total dissolved solids (TDS)	10/18 - 09/23	A-2	7 / 7	556000 - 1950000	1190000	1260000	543000	0.46	NST	0.191	7
INJ-02-18	Iron	10/18 - 09/23	A-3	7 / 7	2360 - 27500	16100	19600	9010	0.56	NST	0.500	-1
MW-03-17	Total dissolved solids (TDS)	10/18 - 09/23	A-4	7 / 7	532000 - 1920000	1050000	850000	563000	0.54	NST	0.191	7
MW-03-17	Iron	10/18 - 09/23	A-5	7 / 7	80 - 12300	4640	1720	5150	1.11	UP	0.005	17
MW-04-17	Total dissolved solids (TDS)	10/18 - 09/23	A-6	7 / 7	536000 - 1960000	1160000	1220000	524000	0.45	NST	0.191	7
MW-04-17	Iron	10/18 - 09/23	A-7	7 / 7	40 - 22300	11600	12400	7600	0.66	NST	0.281	5
MWM16-31	Vinyl chloride	10/17 - 09/23	A-8	5 / 7	1 - 3	2	2	0.71	0.36	NST	0.281	-5
MWM16-37	Vinyl chloride	09/16 - 09/23	A-9	9 / 9	1 - 9	3.1	2	2.4	0.77	DWN	0.017	-21
MWW01-SEN03	Copper	02/13 - 09/23	A-10	5 / 8	10 - 29	17.2	16	7.3	0.42	NST	0.317	-5
MWW01-SEN03	Manganese	02/13 - 09/23	A-11	8 / 8	130 - 477	283	269.5	127	0.45	NST	0.089	12
MWW01-SEN03	1,4-Dioxane	09/16 - 09/23	A-12	8 / 9	4 - 26	15.9	15.5	8.5	0.53	NST	0.209	-9
MWW01-SEN04	Arsenic	02/13 - 09/23	A-13	9 / 9	3.7 - 20	7	5.9	4.9	0.70	NST	0.460	2
MWW01-SEN04	Copper	02/13 - 09/23	A-14	4 / 8	1.7 - 174	47.1	6.25	84.7	1.80	NST	0.199	-8
MWW01-SEN04	Lead	02/13 - 09/23	A-15	9 / 9	3.9 - 1700	199	12	563	2.83	NST	0.209	9
MWW01-SEN04	Manganese	02/13 - 09/23	A-16	8 / 8	370 - 2520	751	431.5	730	0.97	NST	0.406	3
MWW01-SEN04	Aroclor-1248 (PCB-1248)	02/13 - 09/23	A-17	7 / 9	0.1 - 15	3.3	0.32	5.7	1.73	DWN	0.012	-22
MWW10-03	Manganese	12/13 - 09/23	A-18	11 / 11	30 - 11100	1170	120	3300	2.82	UP	0.006	33
MWW1-04	Aroclor-1248 (PCB-1248)	12/13 - 09/23	A-19	5 / 10	0.1 - 0.52	0.27	0.25	0.16	0.59	NST	0.078	-17
MWW1-04	Vanadium	12/13 - 09/23	A-20	9 / 10	6 - 45	16.6	13	11.8	0.71	DWN	0.019	-24
TW-09-01	Total dissolved solids (TDS)	10/18 - 09/23	A-21	7 / 7	686000 - 1460000	1020000	920000	279000	0.27	NST	0.500	-1
TW-09-01	Arsenic	02/13 - 09/23	A-22	8 / 8	16 - 48	26.8	22.5	11.1	0.41	NST	0.138	-10
TW-09-01	Iron	10/18 - 09/23	A-23	7 / 7	550 - 10100	4270	4710	3080	0.72	NST	0.068	11
TW-09-01	Manganese	02/13 - 09/23	A-24	8 / 8	133 - 1600	744	644	471	0.63	NST	0.274	-6
TW-MD-01	Total dissolved solids (TDS)	05/17 - 09/23	A-25	7 / 7	616000 - 1300000	871000	714000	282000	0.32	NST	0.281	5
TW-MD-01	Iron	05/17 - 09/23	A-26	7 / 7	970 - 10800	5360	7050	3970	0.74	DWN	0.035	-13
TW-MD-01	Manganese	07/14 - 09/23	A-27	11 / 11	404 - 1200	870	971	275	0.32	DWN	<0.001	-45
TW-MD-02	Total dissolved solids (TDS)	07/14 - 09/23	A-28	8 / 8	620000 - 1680000	978000	751000	407000	0.42	UP	0.003	22
TW-MD-02	Iron	05/17 - 09/23	A-29	8 / 8	9520 - 14400	12300	12250	1890	0.15	DWN	0.016	-18
TW-MD-02	Manganese	07/14 - 09/23	A-30	11 / 11	501 - 1900	1090	968	386	0.35	NST	0.069	-20
TW-MD-03	Total dissolved solids (TDS)	05/17 - 09/23	A-31	7 / 7	694000 - 1810000	1060000	840000	420000	0.40	NST	0.068	11
TW-MD-03	Iron	05/17 - 09/23	A-32	7 / 7	2030 - 18000	10000	8700	5140	0.51	NST	0.500	1
TW-MD-03	Manganese	07/14 - 09/23	A-33	10 / 10	288 - 1840	975	790	489	0.50	NST	0.466	2
TW-MD-04	Iron	04/17 - 09/22	A-34	7 / 7	10700 - 21900	13300	11700	3920	0.29	NST	0.443	2
TW-MD-04	Manganese	07/14 - 09/22	A-35	11 / 11	341 - 1300	613	560	322	0.53	DWN	0.036	-24
TW-MD-05	Total dissolved solids (TDS)	07/14 - 09/23	A-36	8 / 8	586000 - 1530000	848000	718000	335000	0.40	UP	0.016	18
TW-MD-05	Iron	04/17 - 09/23	A-37	8 / 8	8210 - 13900	11100	10950	1960	0.18	DWN	0.031	-16
TW-MD-05	Manganese	07/14 - 09/23	A-38	12 / 12	287 - 650	395	380	89.9	0.23	NST	0.108	-19
TW-MD-06	Total dissolved solids (TDS)	08/14 - 09/22	A-39	7 / 7	678000 - 1260000	954000	910000	215000	0.23	NST	0.386	-3
TW-MD-06	Iron	04/17 - 09/22	A-40	8 / 8	8200 - 24900	15500	14250	6610	0.43	NST	0.199	-8
TW-MD-06	Manganese	08/14 - 09/22	A-41	11 / 11	276 - 1600	871	738	487	0.56	DWN	0.001	-40
TW-MD-06	Iron (dissolved)	08/14 - 08/17	A-42	7 / 7	11000 - 21600	15400	13000	4590	0.30	UP	0.052	12
TW-MD-06	Aroclor-1248 (PCB-1248)	08/14 - 09/22	A-43	6 / 11	0.07 - 0.9	0.42	0.4	0.33	0.79	UP	0.020	26
TW-MD-07	Total dissolved solids (TDS)	05/17 - 09/23	A-44	7 / 7	958000 - 3040000	1570000	1220000	730000	0.46	NST	0.094	10
TW-MD-07	Iron	04/17 - 09/23	A-45	8 / 8	10000 - 34600	19200	17450	8030	0.42	NST	0.199	8
TW-MD-07	Manganese	07/14 - 09/23	A-46	12 / 12	134 - 547	324	317.5	136	0.42	NST	0.057	24

Abbreviations:

-- not applicable; statistically significant trend identified
CV = coefficient of variation (SD / mean)
FOD = frequency of detection (# detects / # samples)
mean = arithmetic mean
SD = standard deviation

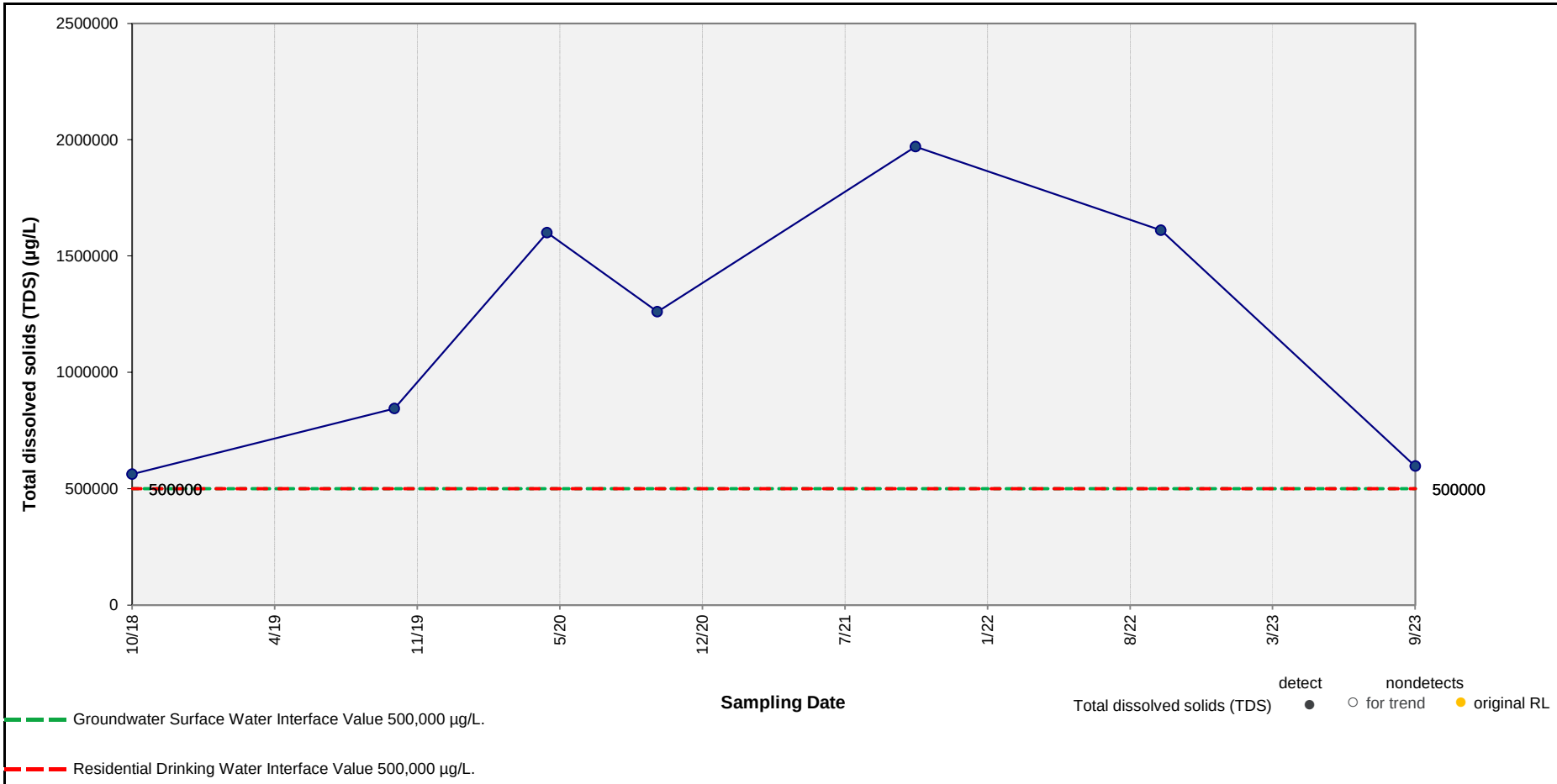
NST = no significant trend
DWN = downward trend
UP = upward trend

Notes:

1. All analytical results are in µg/L.
2. Trend results are presented when at least seven samples, one exceedance, and 50% detected values are available.
3. Non-detects were assigned a common value less than the minimum detected value, equal to half the minimum reporting limit (RL) in the dataset (USEPA, 2009). If half the minimum RL was greater than the minimum detected value, then half the minimum detect was assigned.
4. Statistically significant trend defined as having p-value ≤ 0.05, or 95% confidence.

Reference:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.



Results of Mann-Kendall Test for Trend: **No Significant Trend**

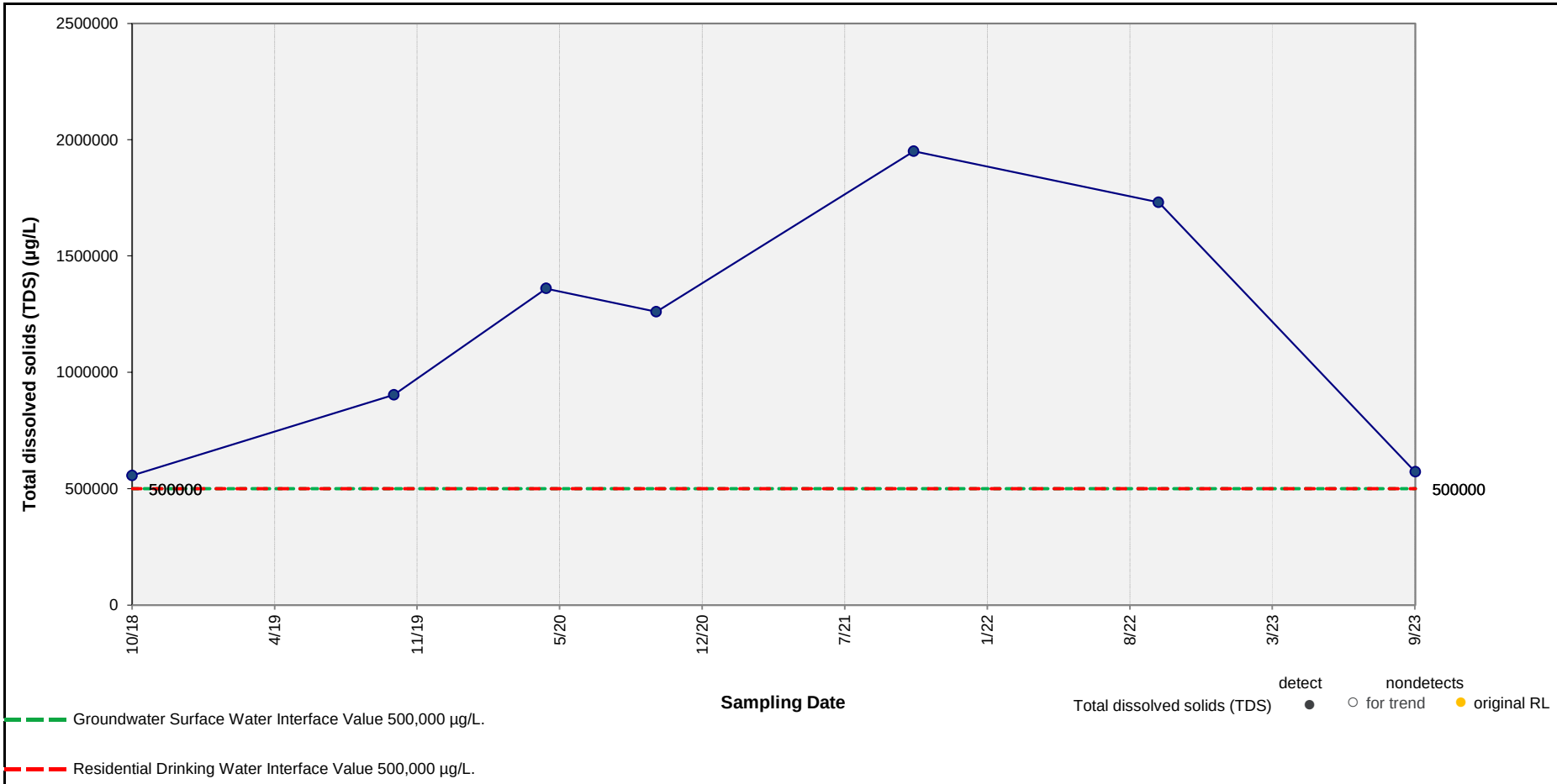
p value = 0.191 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well INJ-01-17

RACER PNC (Non-Fiero)

Figure A-1



Results of Mann-Kendall Test for Trend: **No Significant Trend**

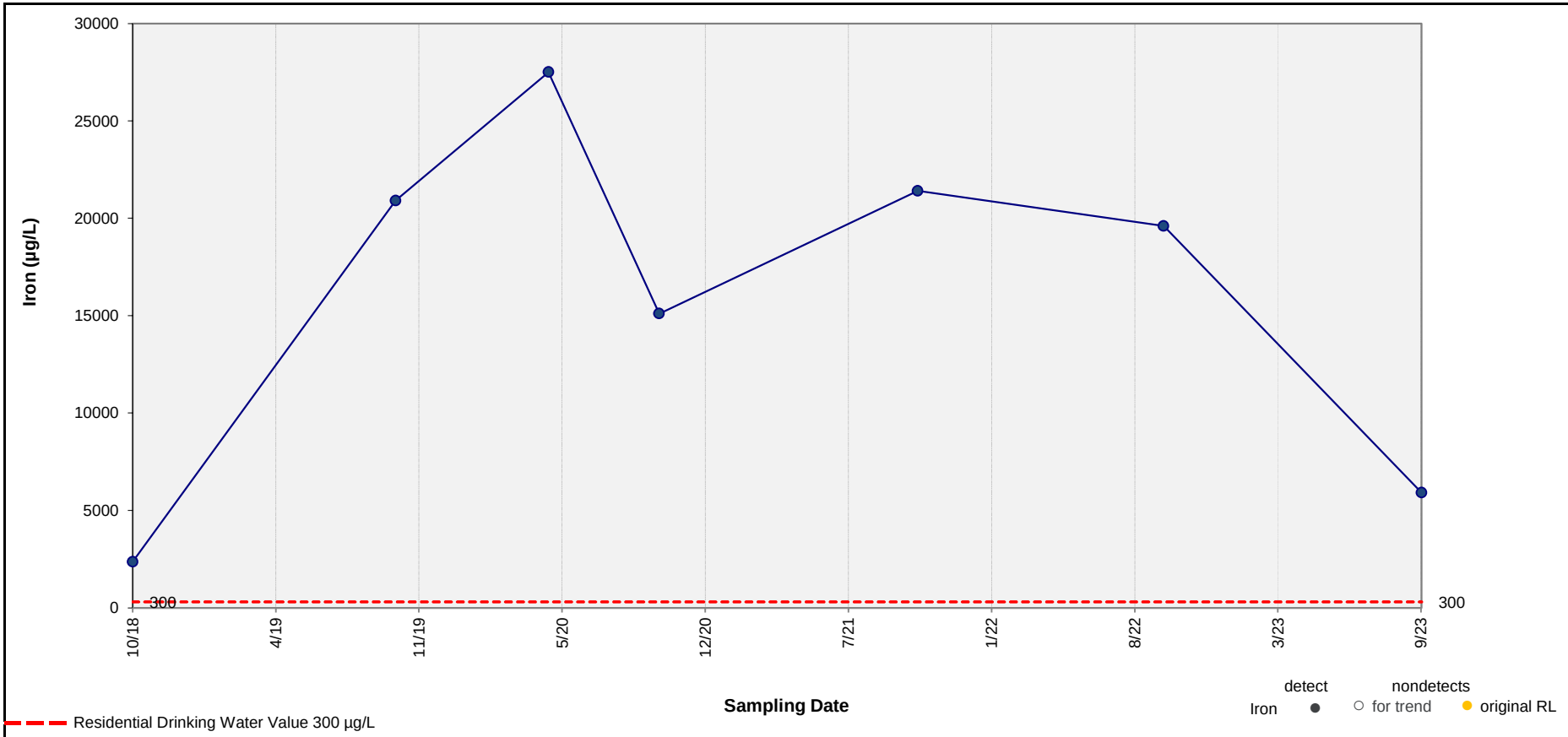
p value = 0.191 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well INJ-02-18

RACER PNC (Non-Fiero)

Figure A-2



Results of Mann-Kendall Test for Trend: **No Significant Trend**

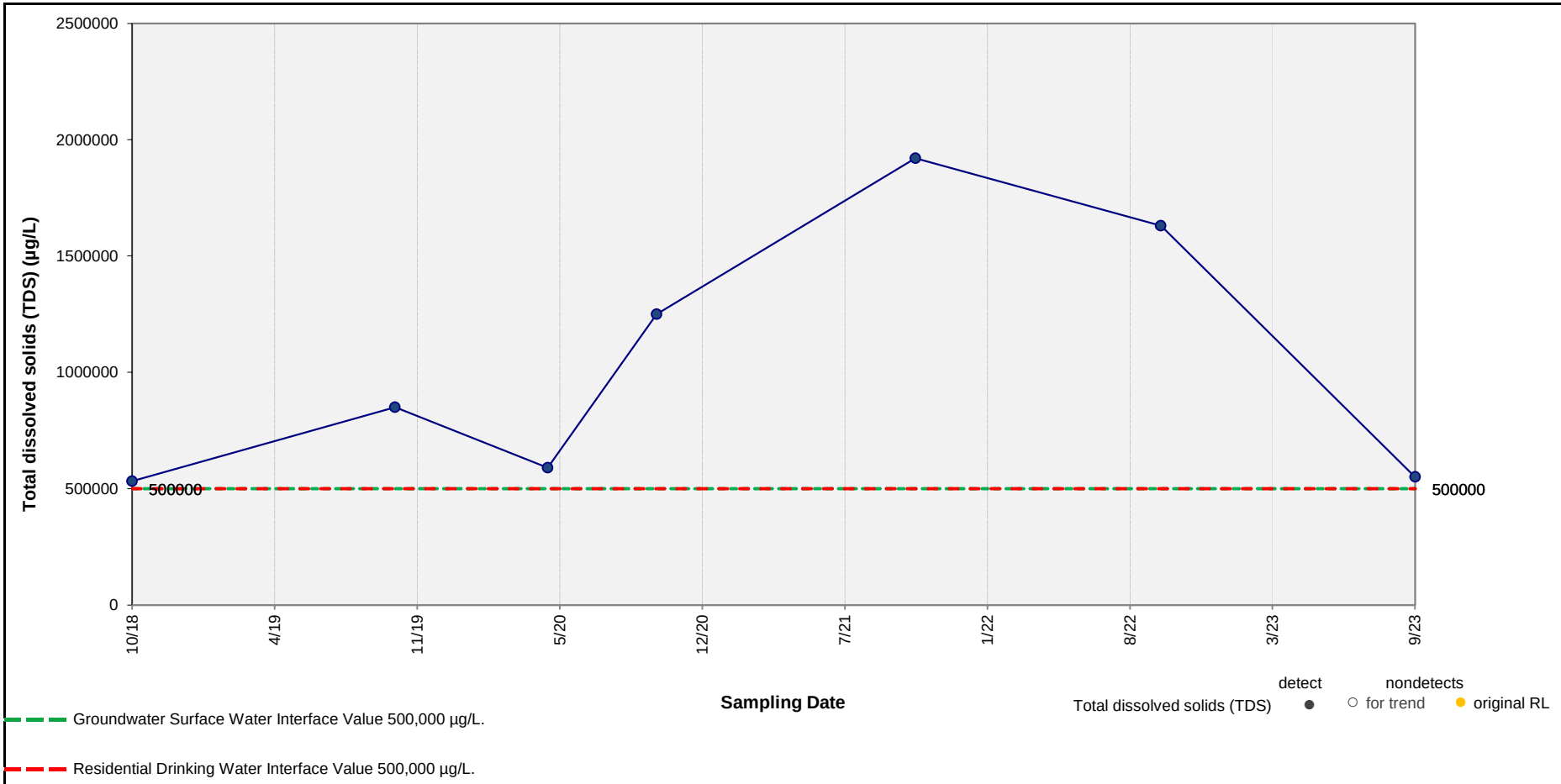
p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well INJ-02-18

RACER PNC (Non-Fiero)

Figure A-3



Results of Mann-Kendall Test for Trend: **No Significant Trend**

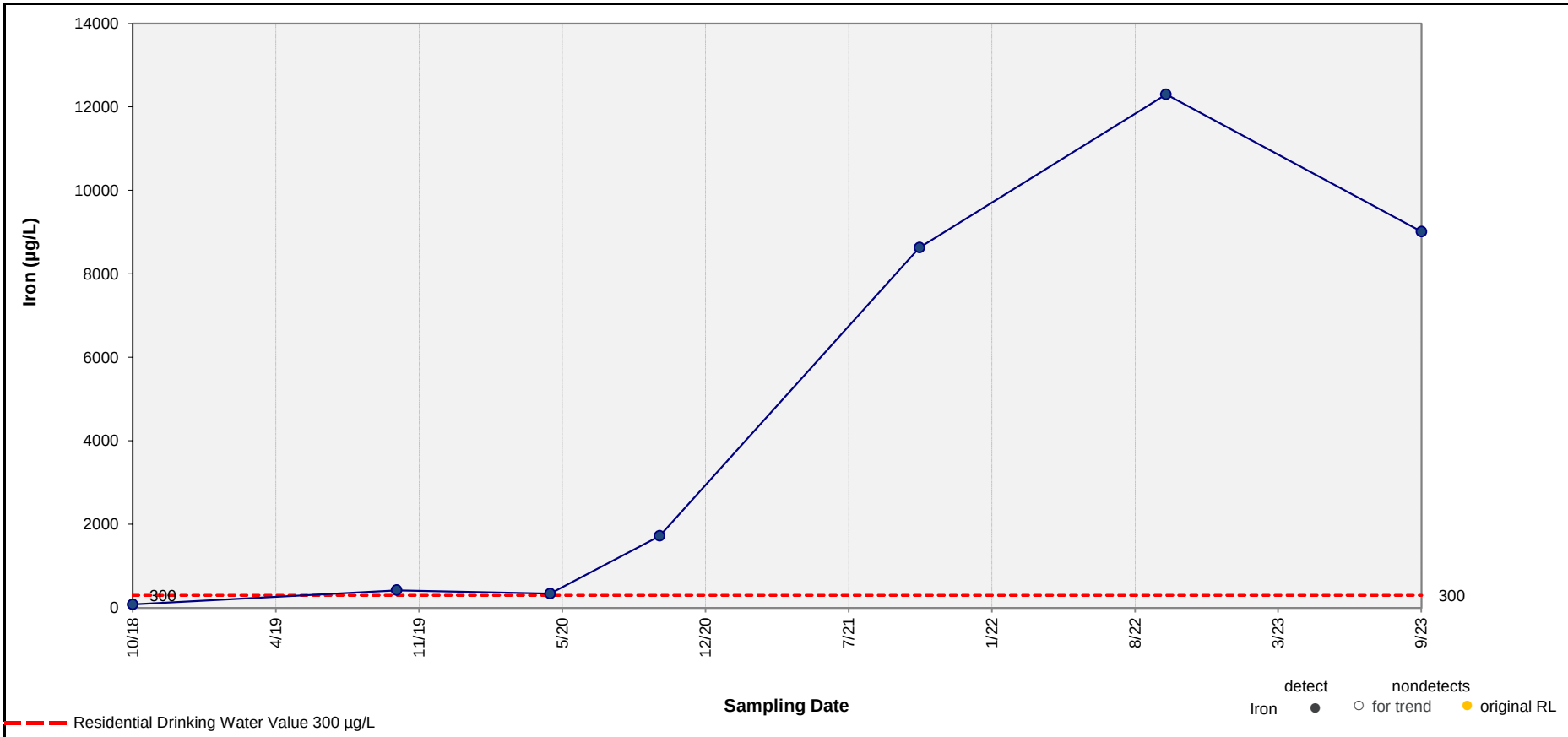
p value = 0.191 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well MW-03-17

RACER PNC (Non-Fiero)

Figure A-4



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

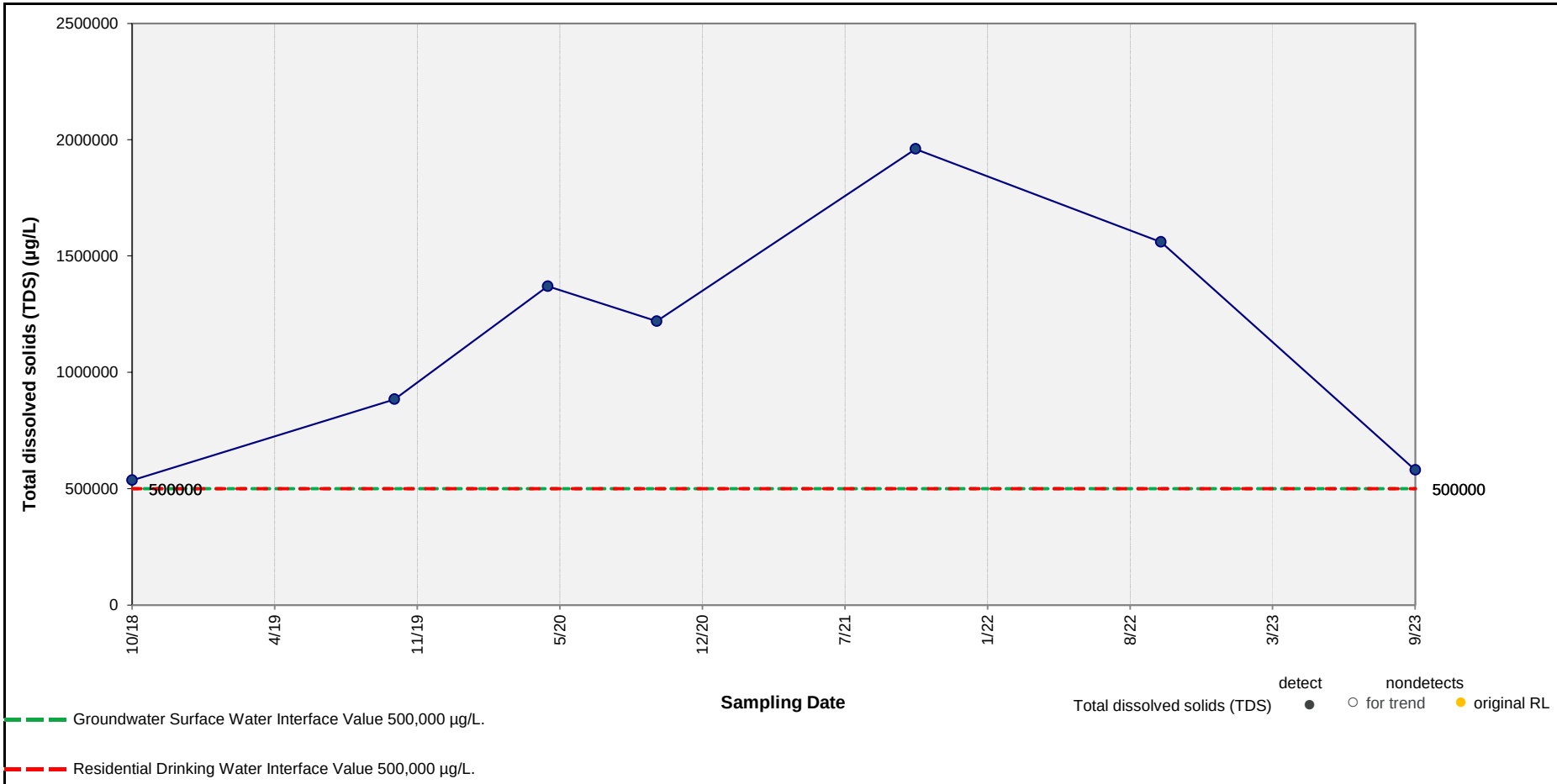
p value = 0.005 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well MW-03-17

RACER PNC (Non-Fiero)

Figure A-5



Results of Mann-Kendall Test for Trend: **No Significant Trend**

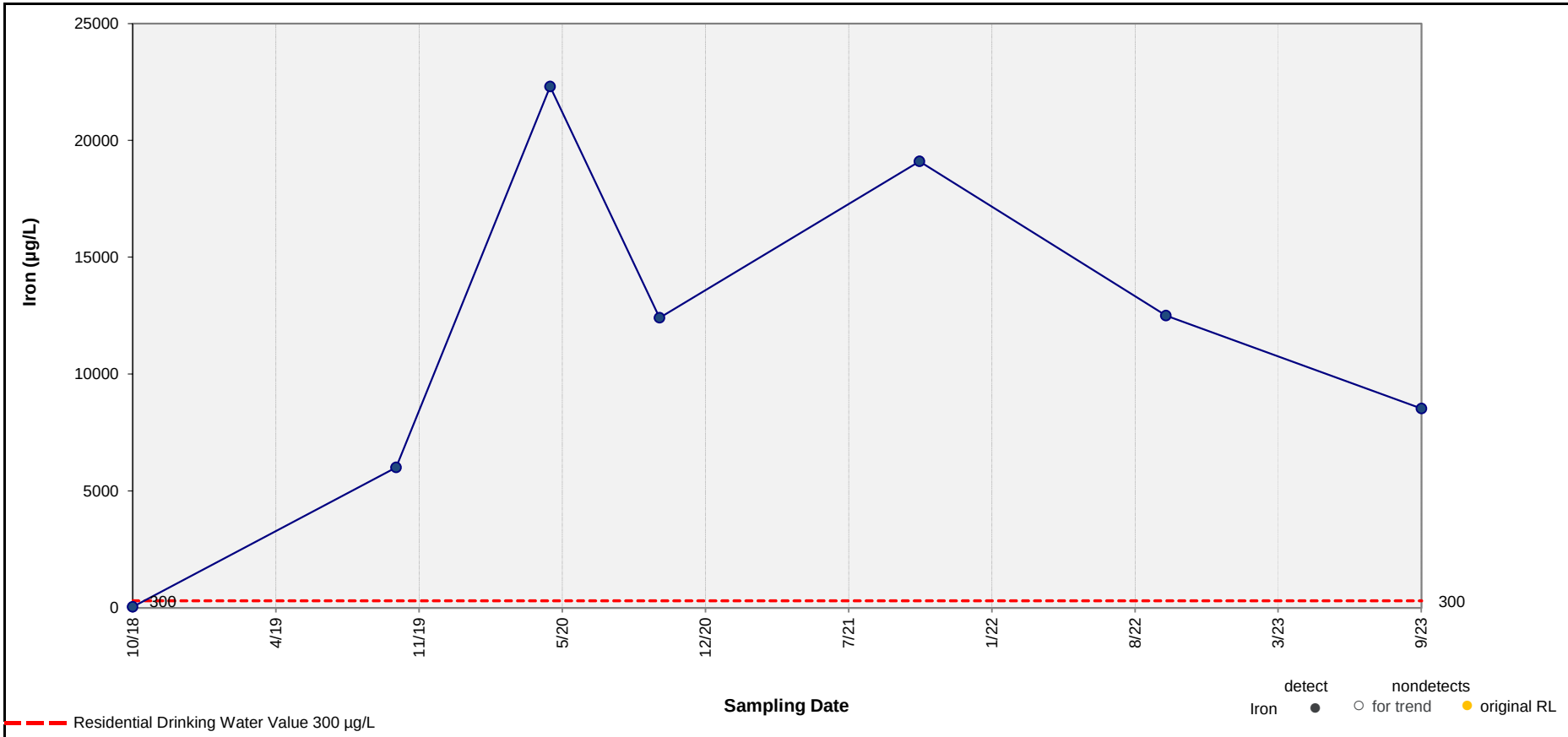
p value = 0.191 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well MW-04-17

RACER PNC (Non-Fiero)

Figure A-6



Results of Mann-Kendall Test for Trend: **No Significant Trend**

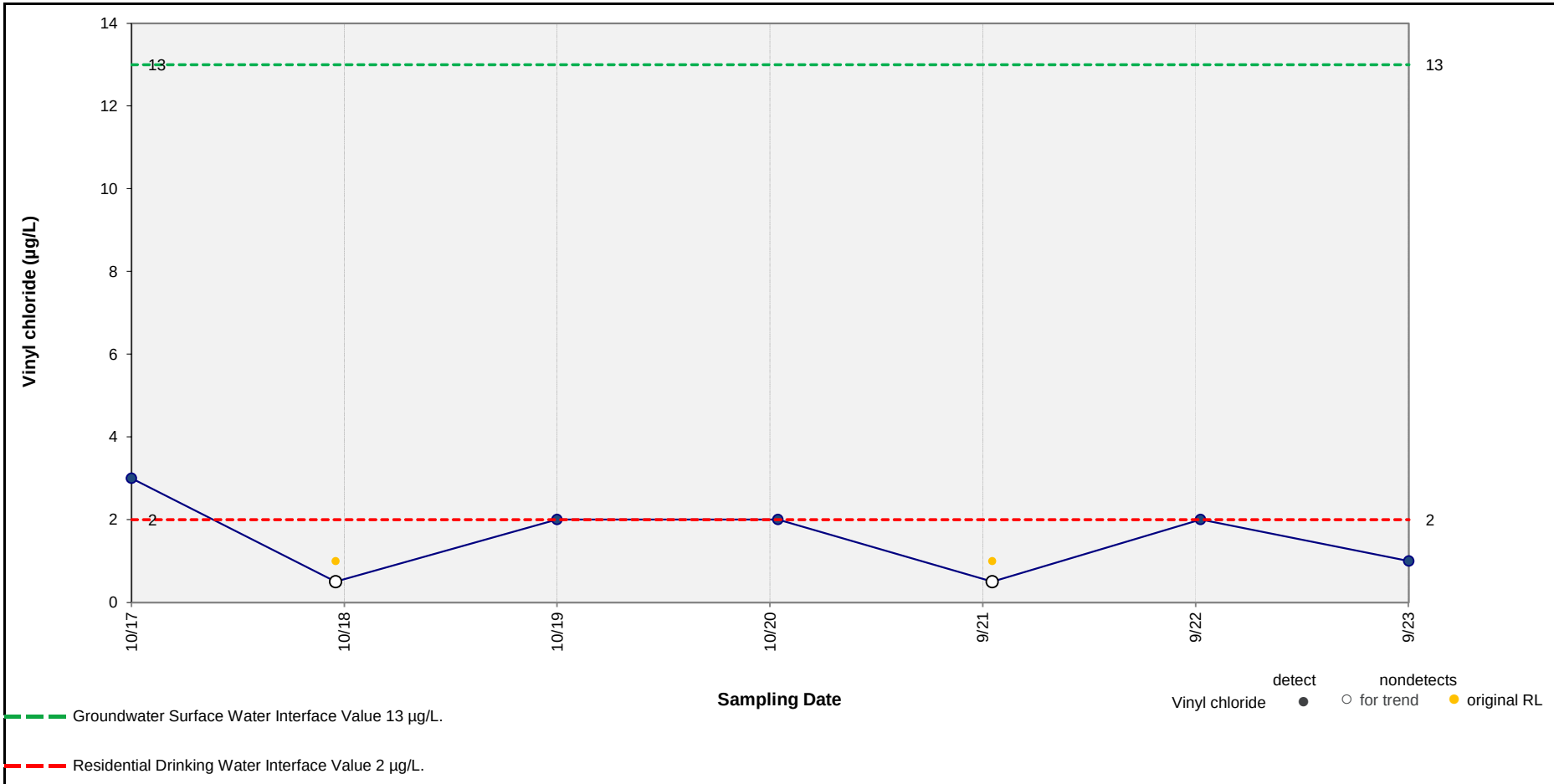
p value = 0.281 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well MW-04-17

RACER PNC (Non-Fiero)

Figure A-7



Results of Mann-Kendall Test for Trend: **No Significant Trend**

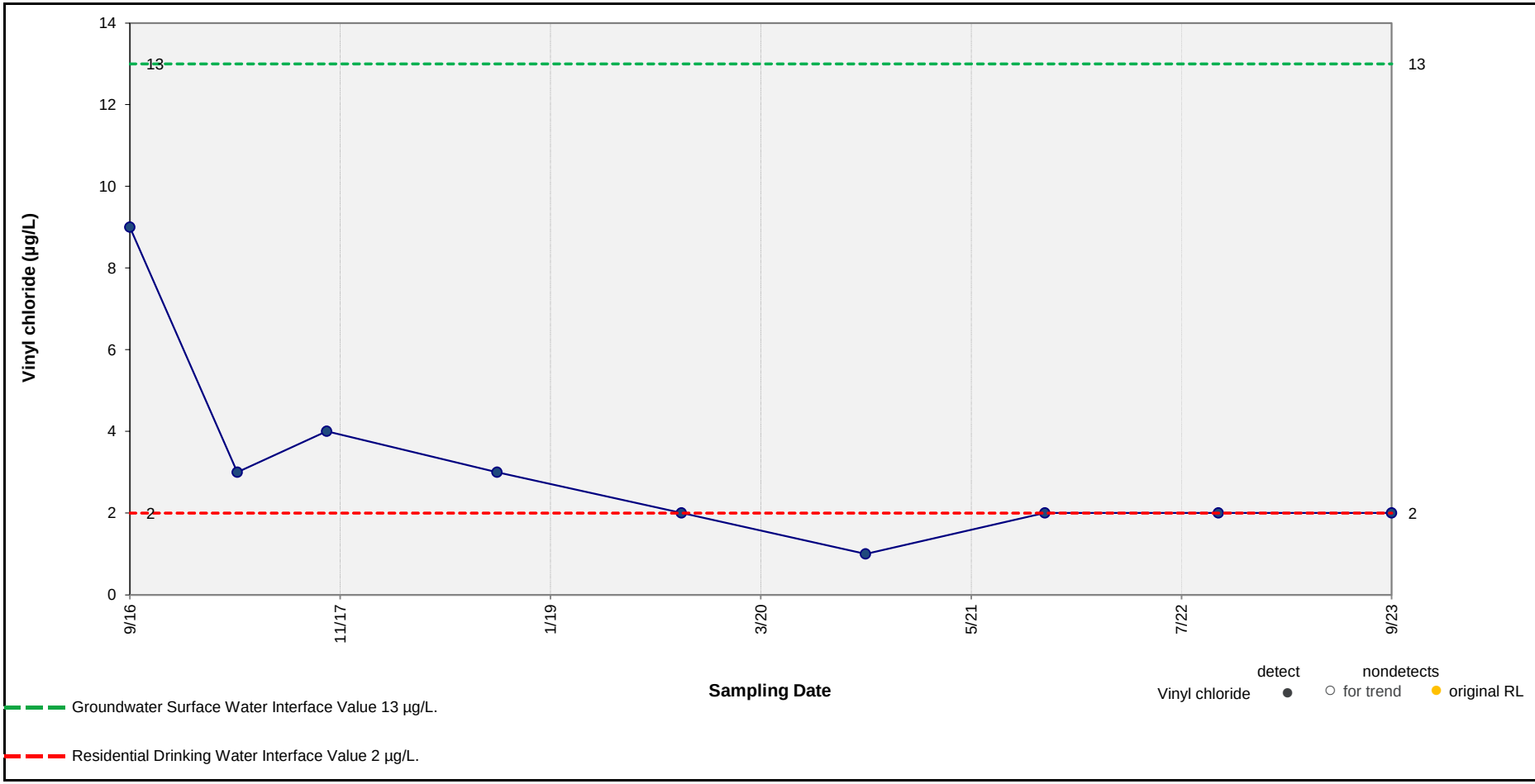
p value = 0.281 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Vinyl chloride in Well MWM16-31

RACER PNC (Non-Fiero)

Figure A-8



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

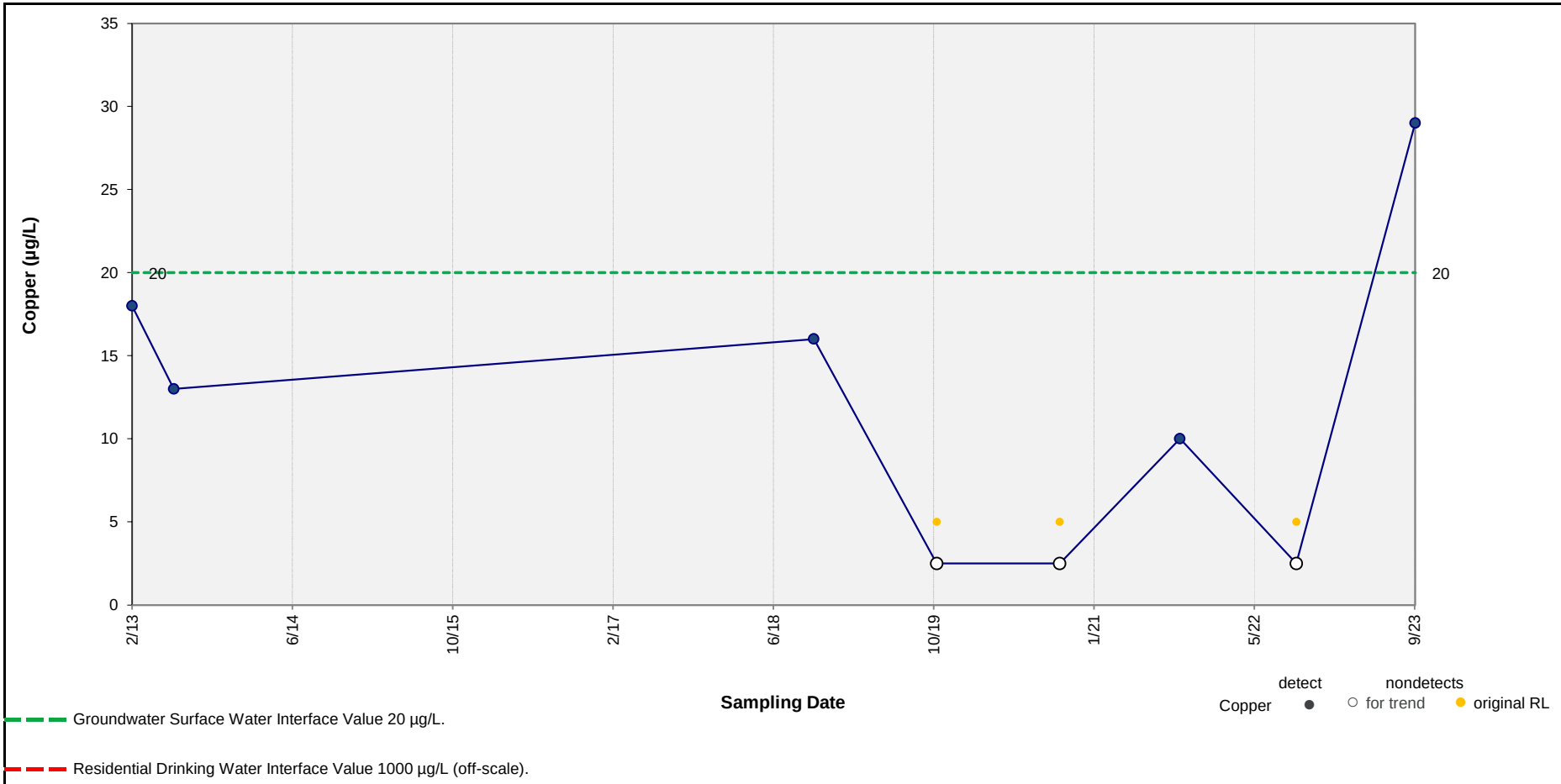
p value = 0.017 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Vinyl chloride in Well MWM16-37

RACER PNC (Non-Fiero)

Figure A-9



Results of Mann-Kendall Test for Trend: **No Significant Trend**

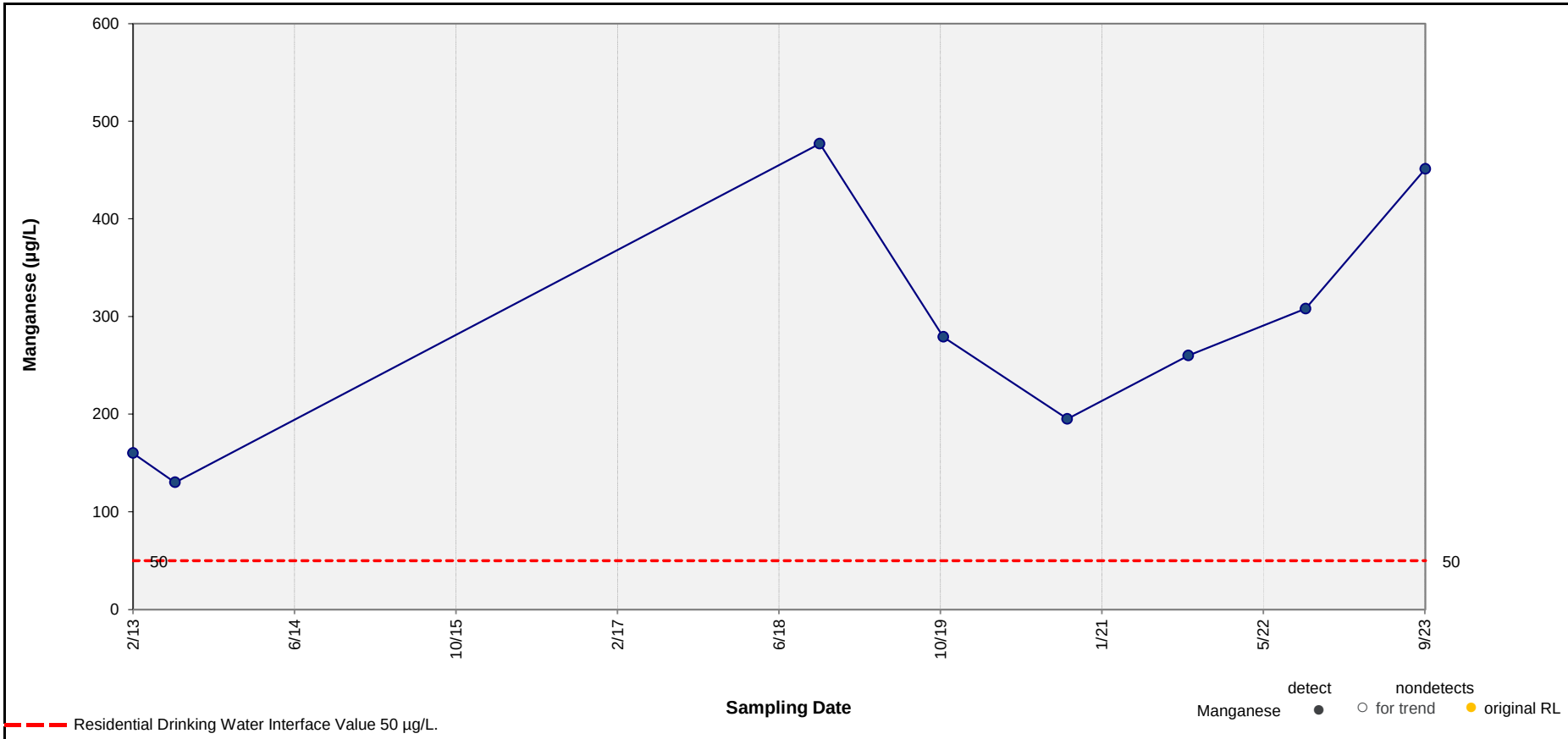
p value = 0.317 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Copper in Well MWW01-SEN03

RACER PNC (Non-Fiero)

Figure A-10



Results of Mann-Kendall Test for Trend: **No Significant Trend**

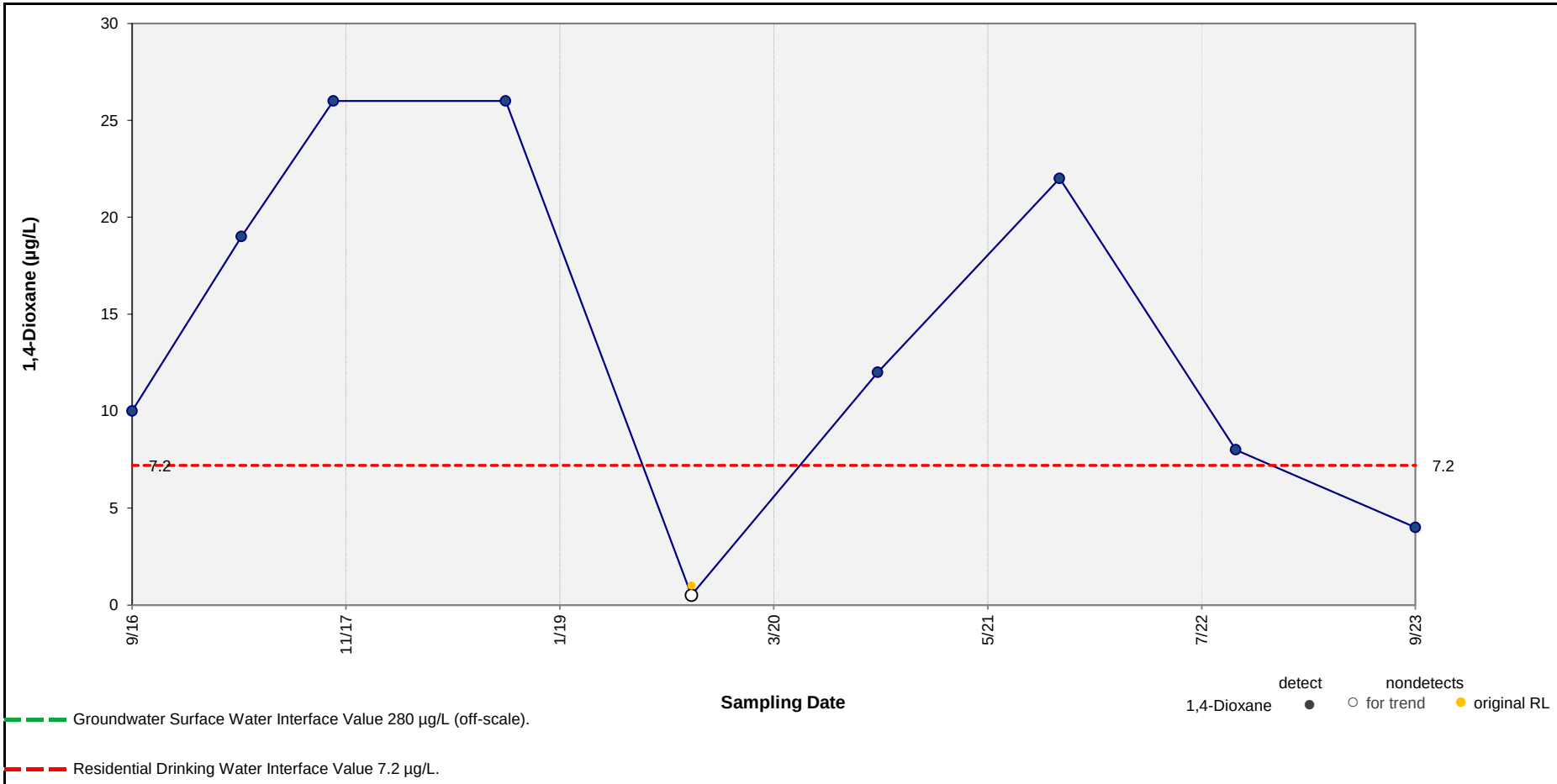
p value = 0.089 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW01-SEN03

RACER PNC (Non-Fiero)

Figure A-11



Results of Mann-Kendall Test for Trend: **No Significant Trend**

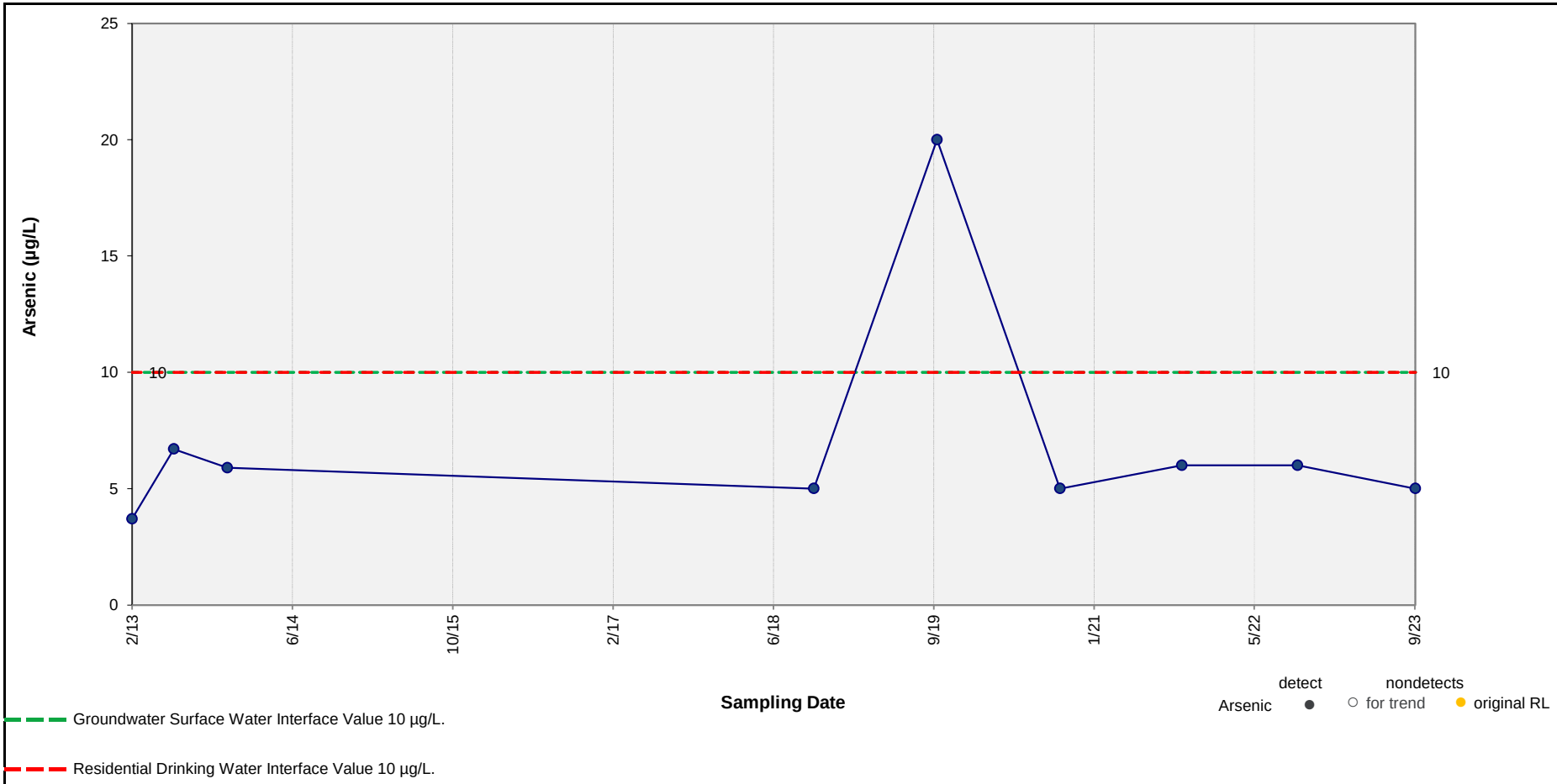
p value = 0.209 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well MWW01-SEN03

RACER PNC (Non-Fiero)

Figure A-12



Results of Mann-Kendall Test for Trend: **No Significant Trend**

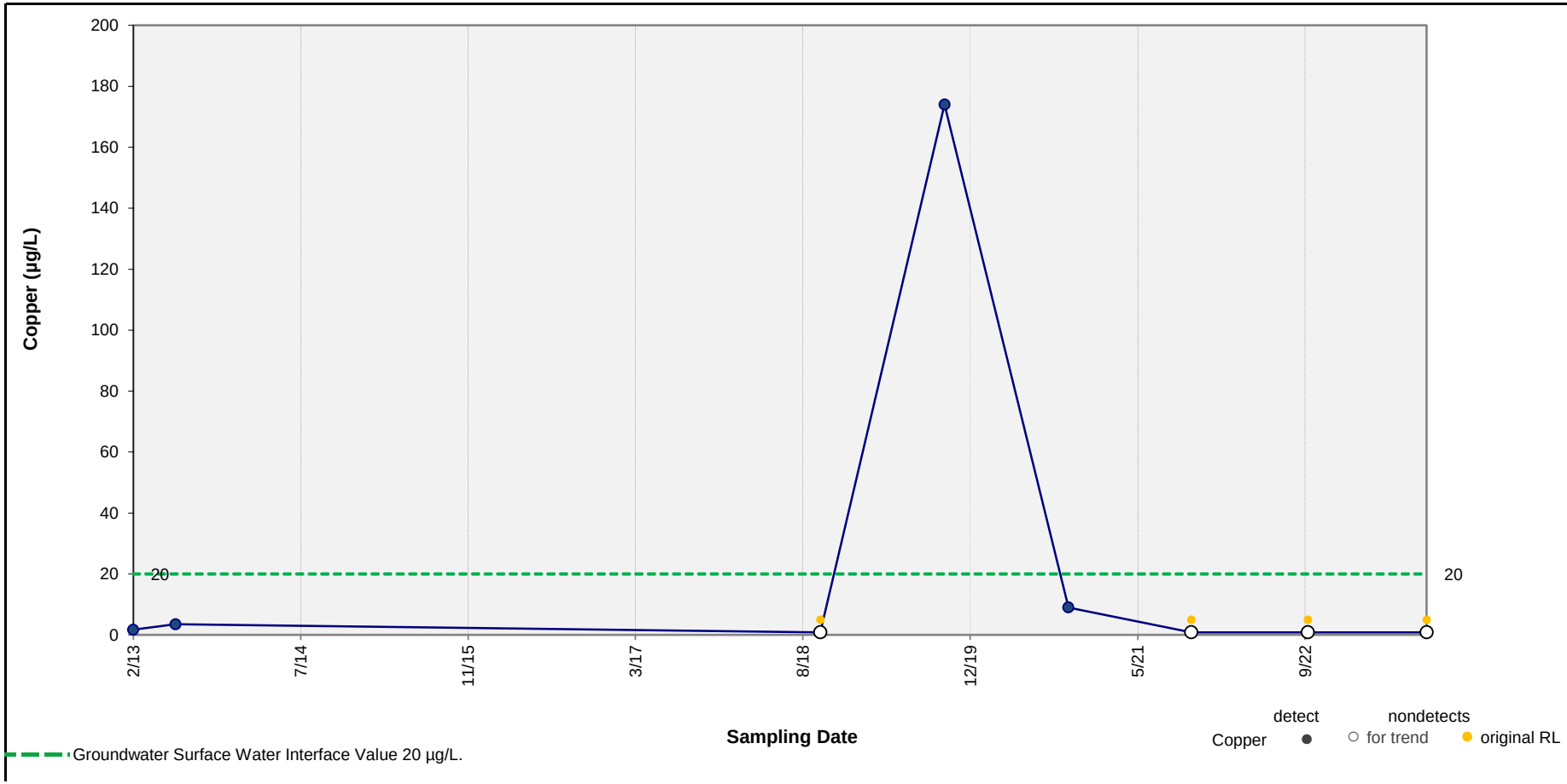
p value = 0.460 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Arsenic in Well MWW01-SEN04

RACER PNC (Non-Fiero)

Figure A-13



Results of Mann-Kendall Test for Trend: **No Significant Trend**

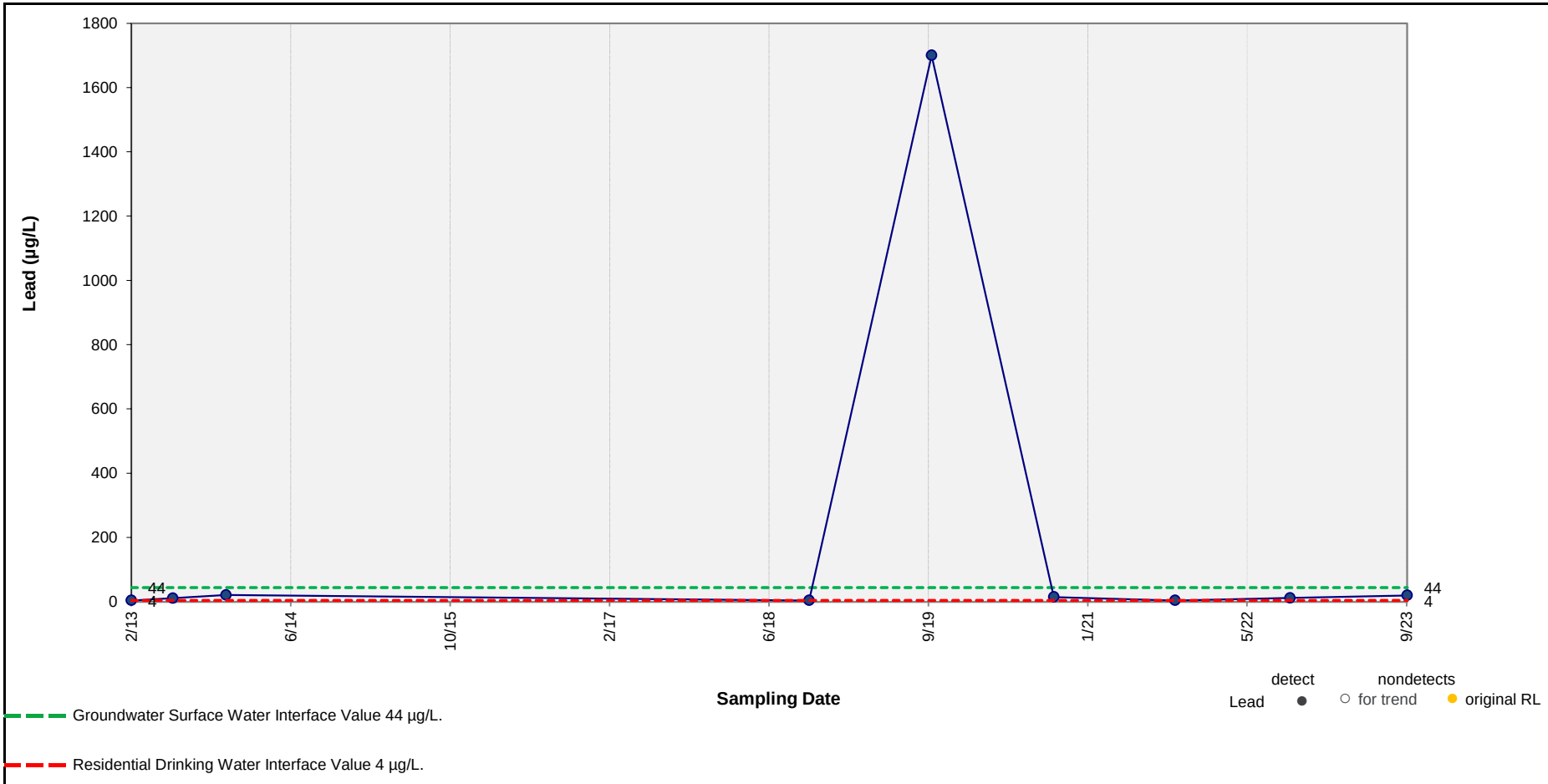
p value = 0.199 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Copper in Well MWW01-SEN04

RACER PNC (Non-Fiero)

Figure A-14



Results of Mann-Kendall Test for Trend: **No Significant Trend**

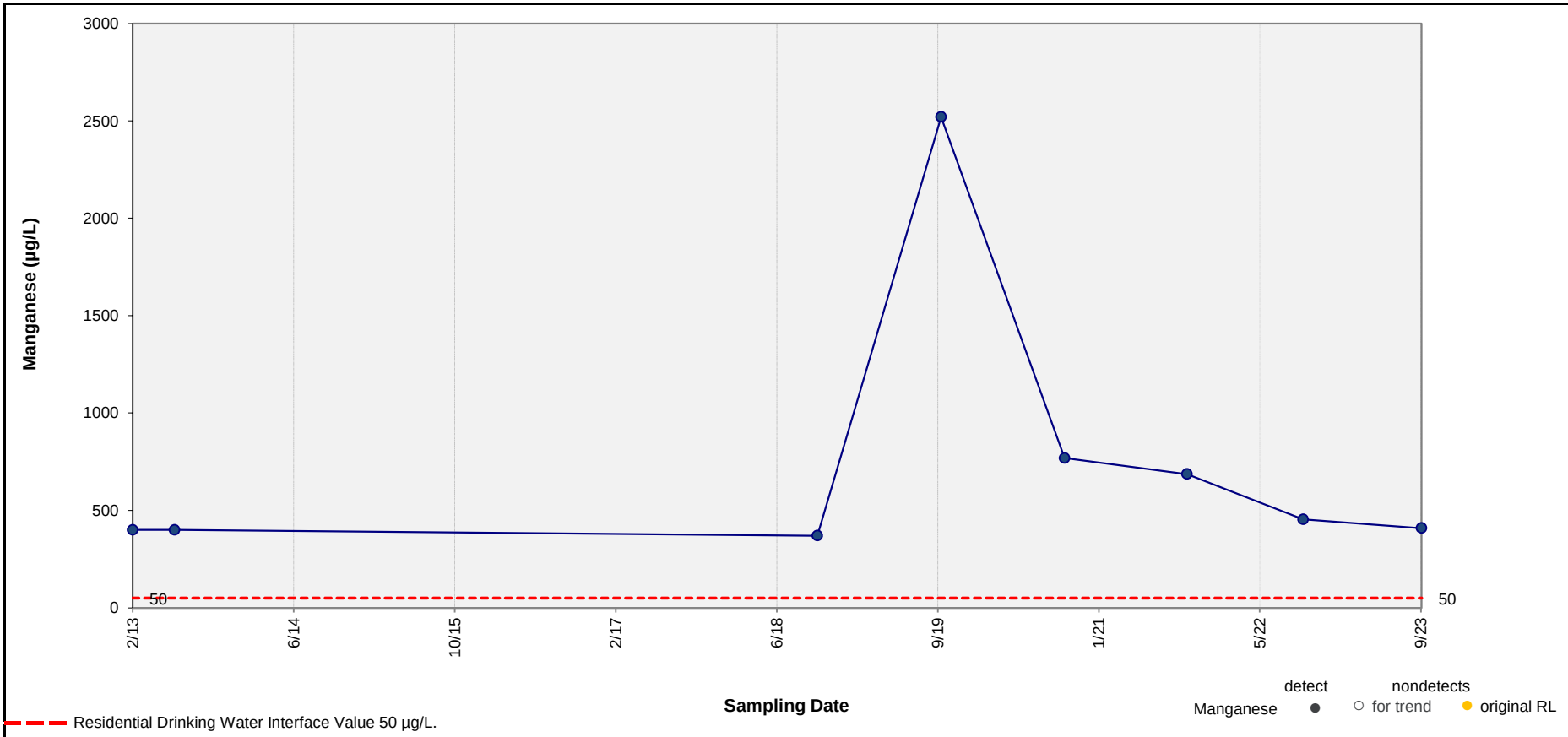
p value = 0.209 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Lead in Well MWW01-SEN04

RACER PNC (Non-Fiero)

Figure A-15



Results of Mann-Kendall Test for Trend: **No Significant Trend**

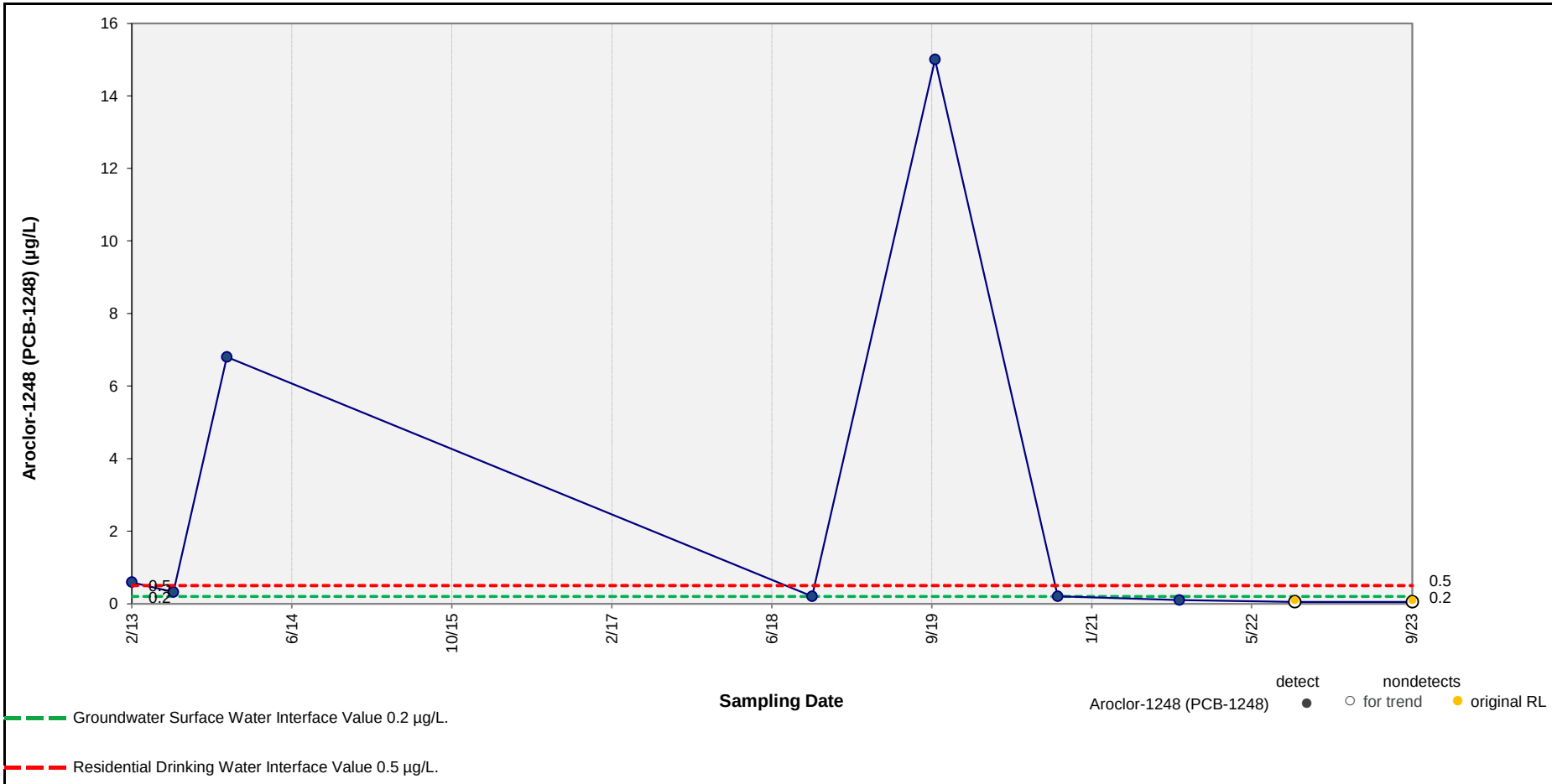
p value = 0.406 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW01-SEN04

RACER PNC (Non-Fiero)

Figure A-16



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

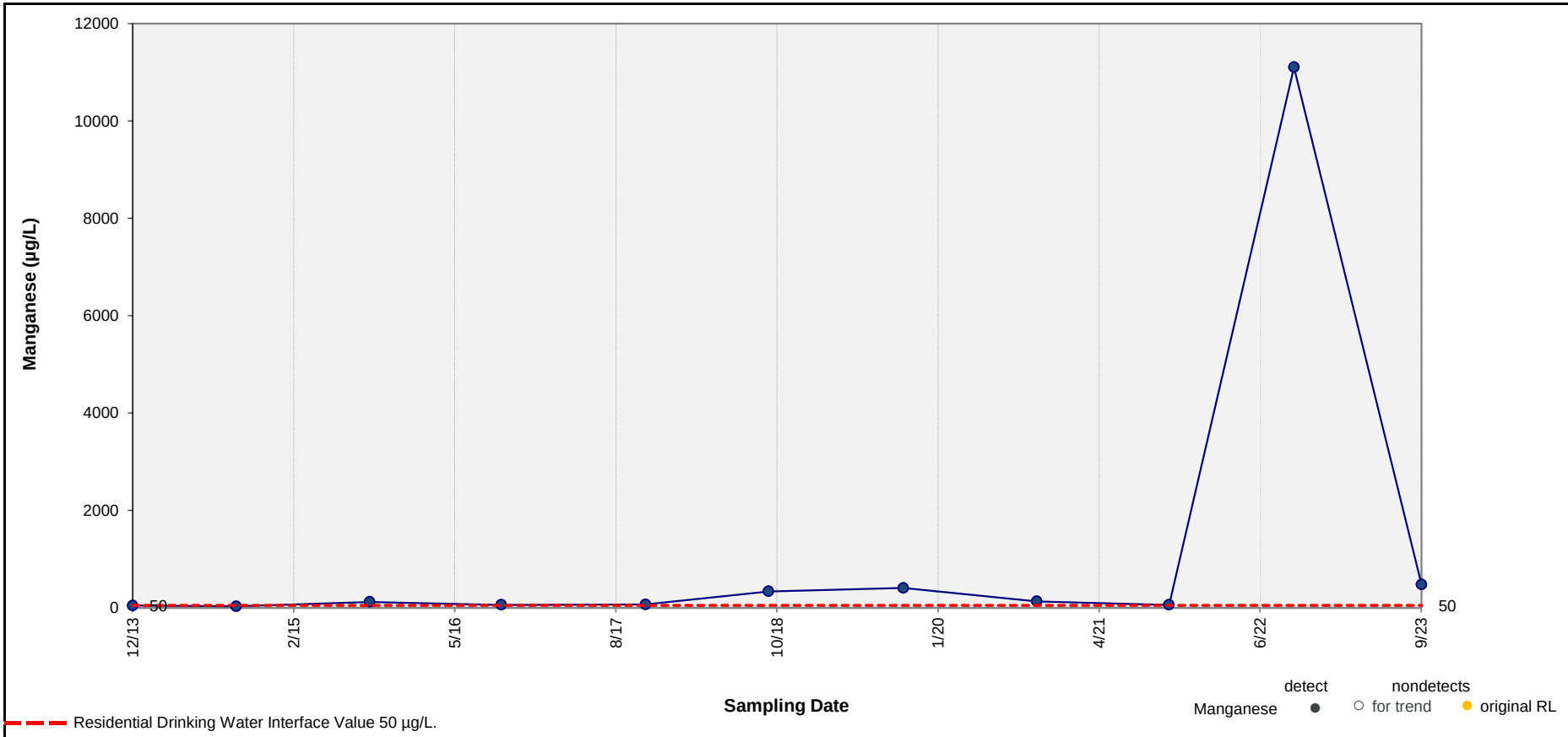
p value = 0.012 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Aroclor-1248 (PCB-1248) in Well MWW01-SEN04

RACER PNC (Non-Fiero)

Figure A-17



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

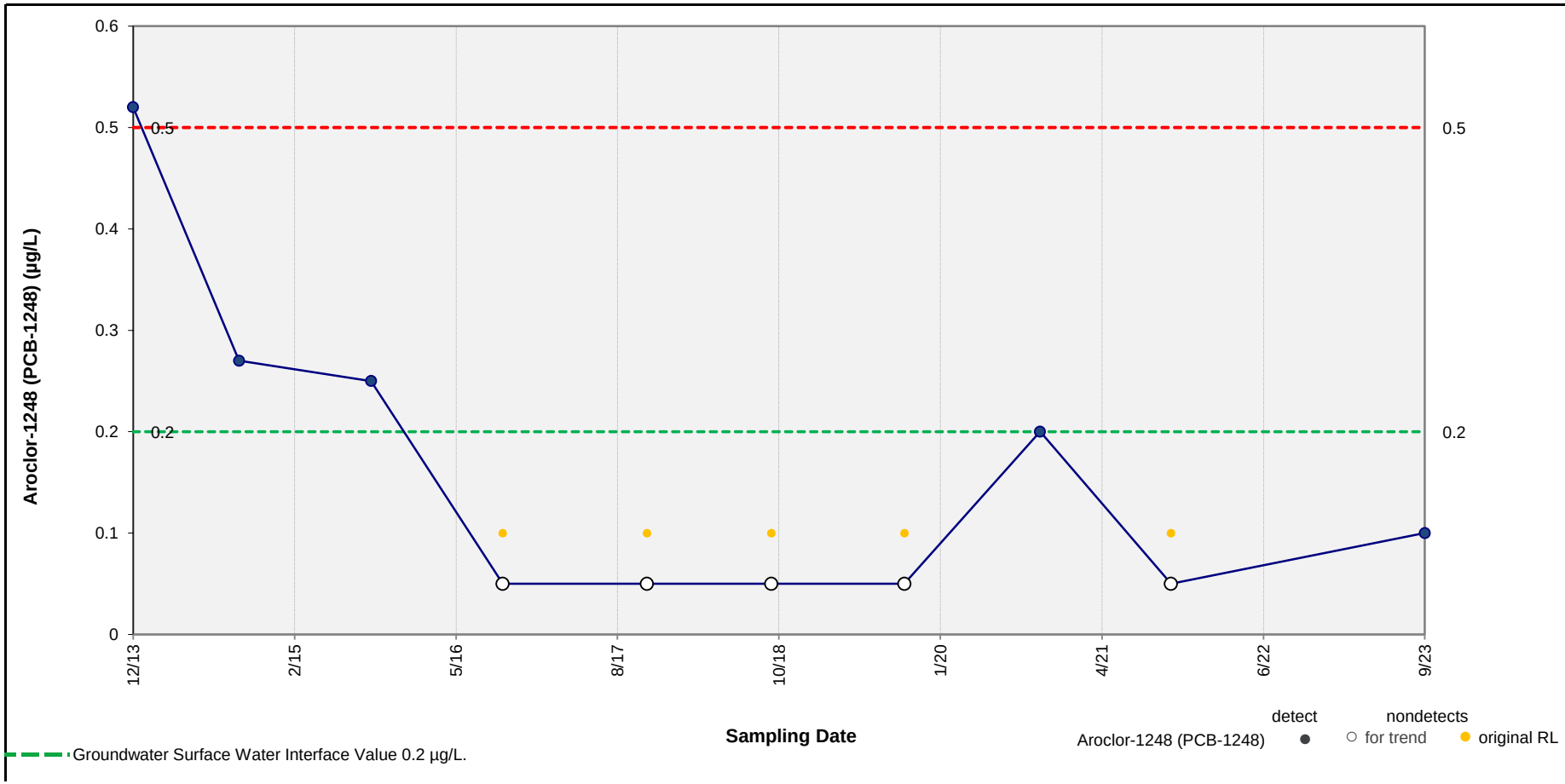
p value = 0.006 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW10-03

RACER PNC (Non-Fiero)

Figure A-18



Results of Mann-Kendall Test for Trend: **No Significant Trend**

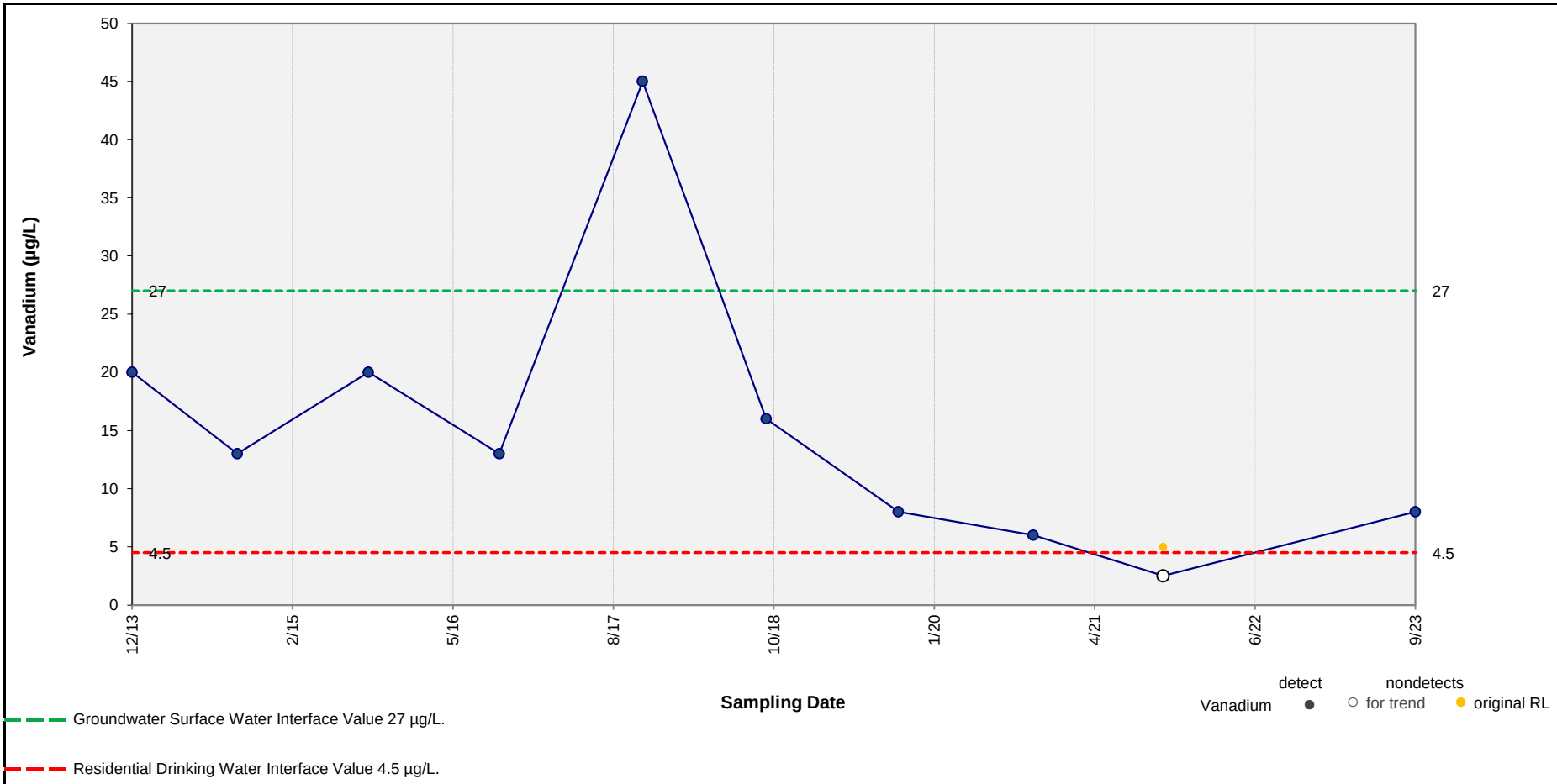
p value = 0.078 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Aroclor-1248 (PCB-1248) in Well MWW1-04

RACER PNC (Non-Fiero)

Figure A-19



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

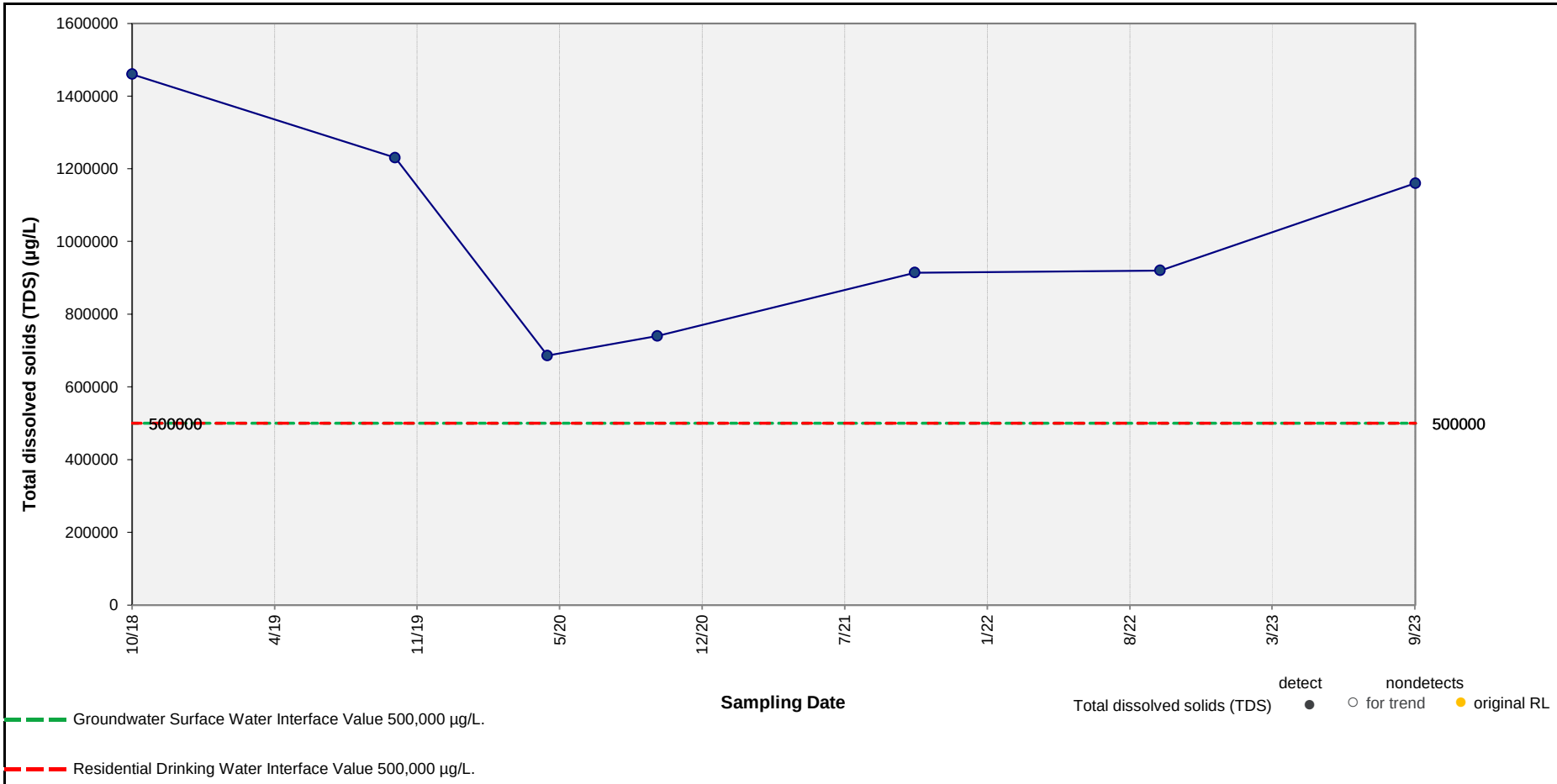
p value = 0.019 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Vanadium in Well MWW1-04

RACER PNC (Non-Fiero)

Figure A-20



Results of Mann-Kendall Test for Trend: **No Significant Trend**

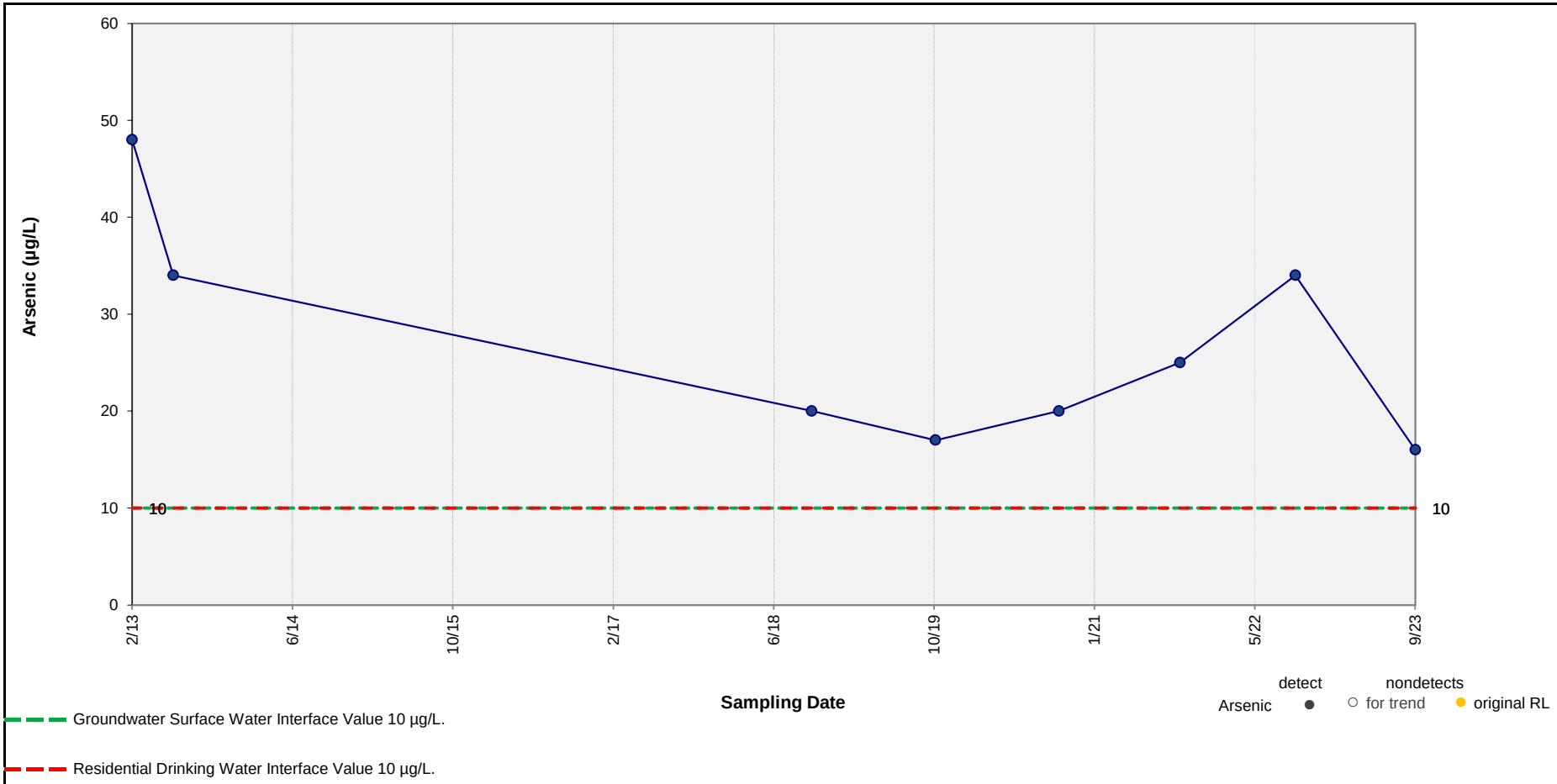
p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-09-01

RACER PNC (Non-Fiero)

Figure A-21



Results of Mann-Kendall Test for Trend: **No Significant Trend**

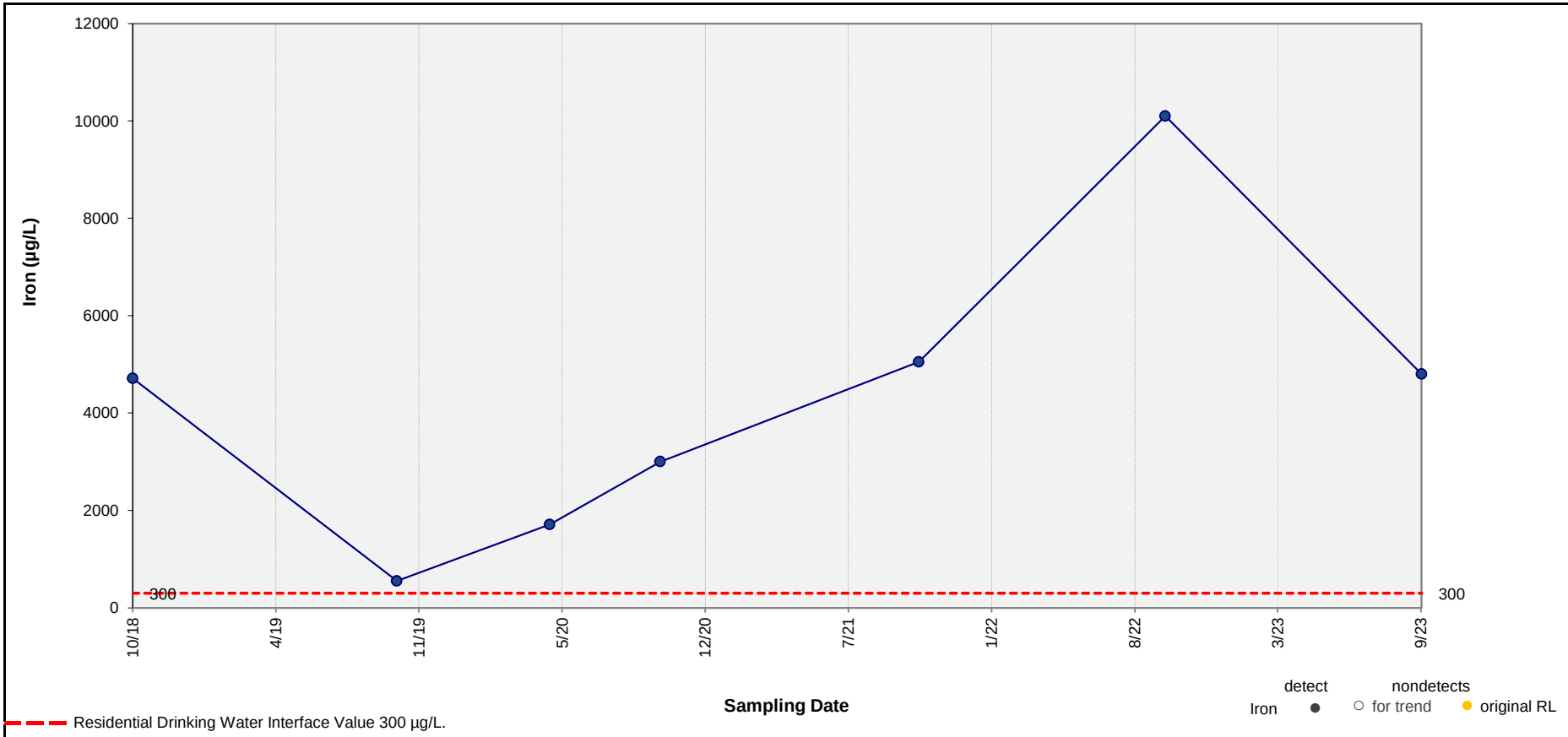
p value = 0.138 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Arsenic in Well TW-09-01

RACER PNC (Non-Fiero)

Figure A-22



Results of Mann-Kendall Test for Trend: **No Significant Trend**

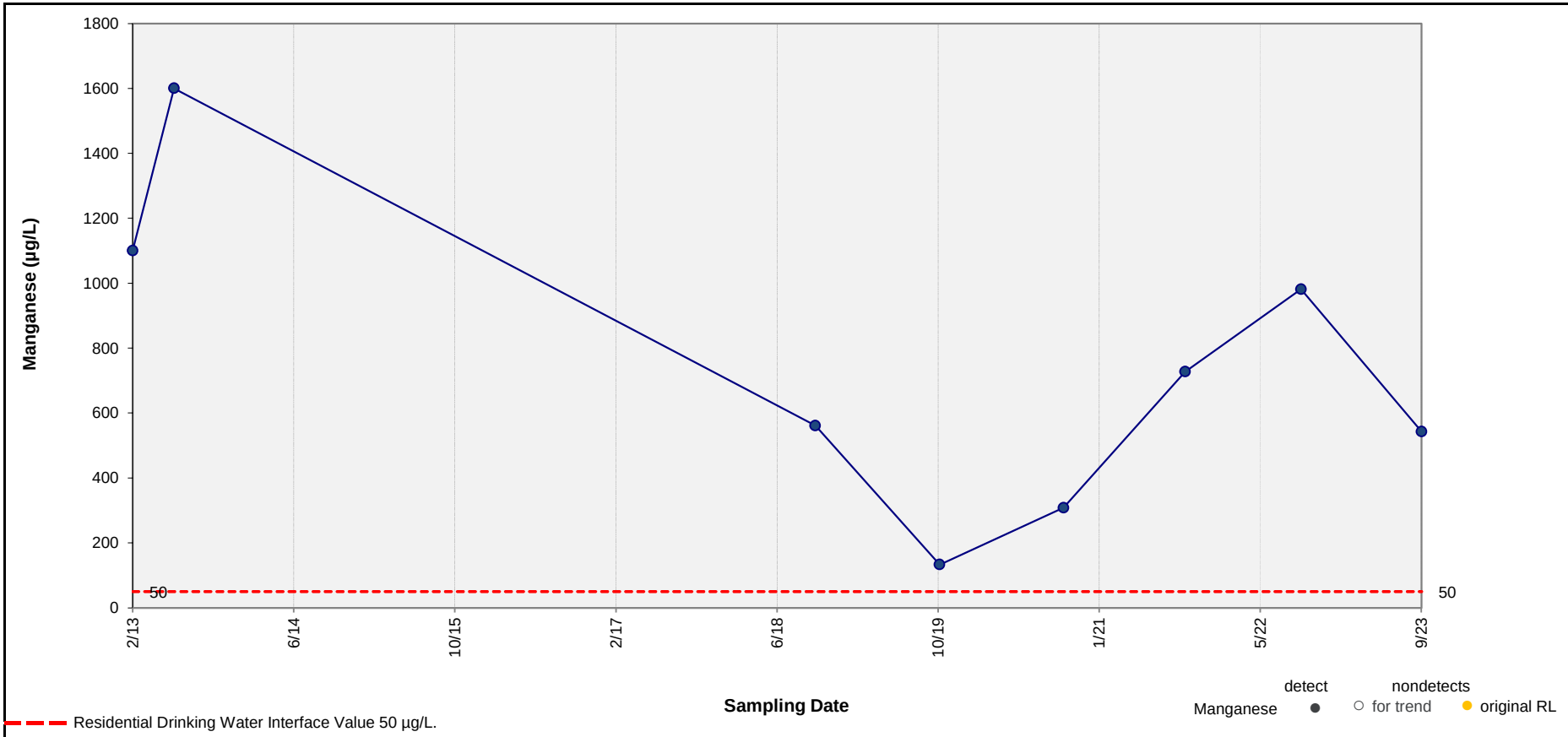
p value = 0.068 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-09-01

RACER PNC (Non-Fiero)

Figure A-23



Results of Mann-Kendall Test for Trend: **No Significant Trend**

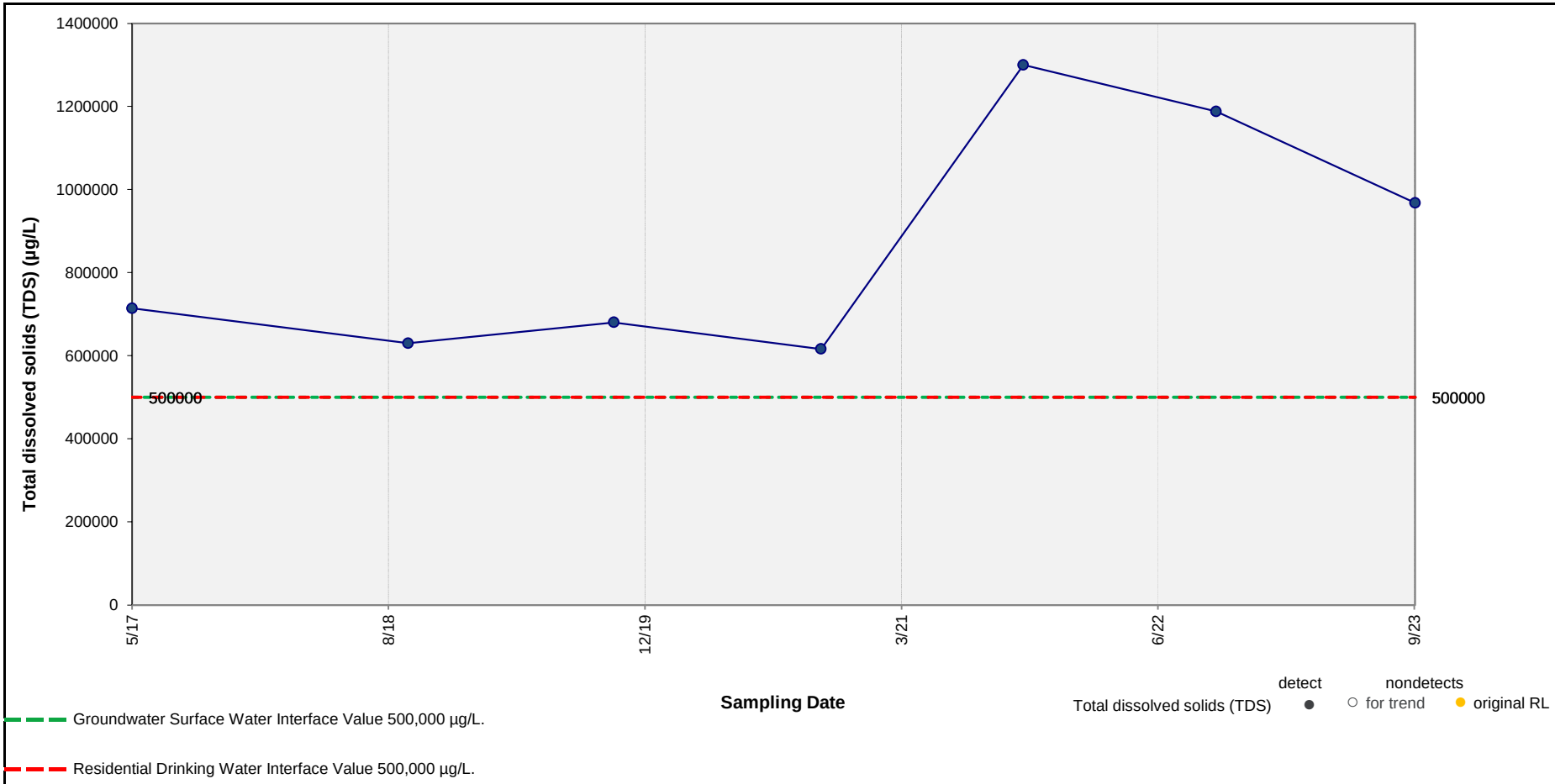
p value = 0.274 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-09-01

RACER PNC (Non-Fiero)

Figure A-24



Results of Mann-Kendall Test for Trend: **No Significant Trend**

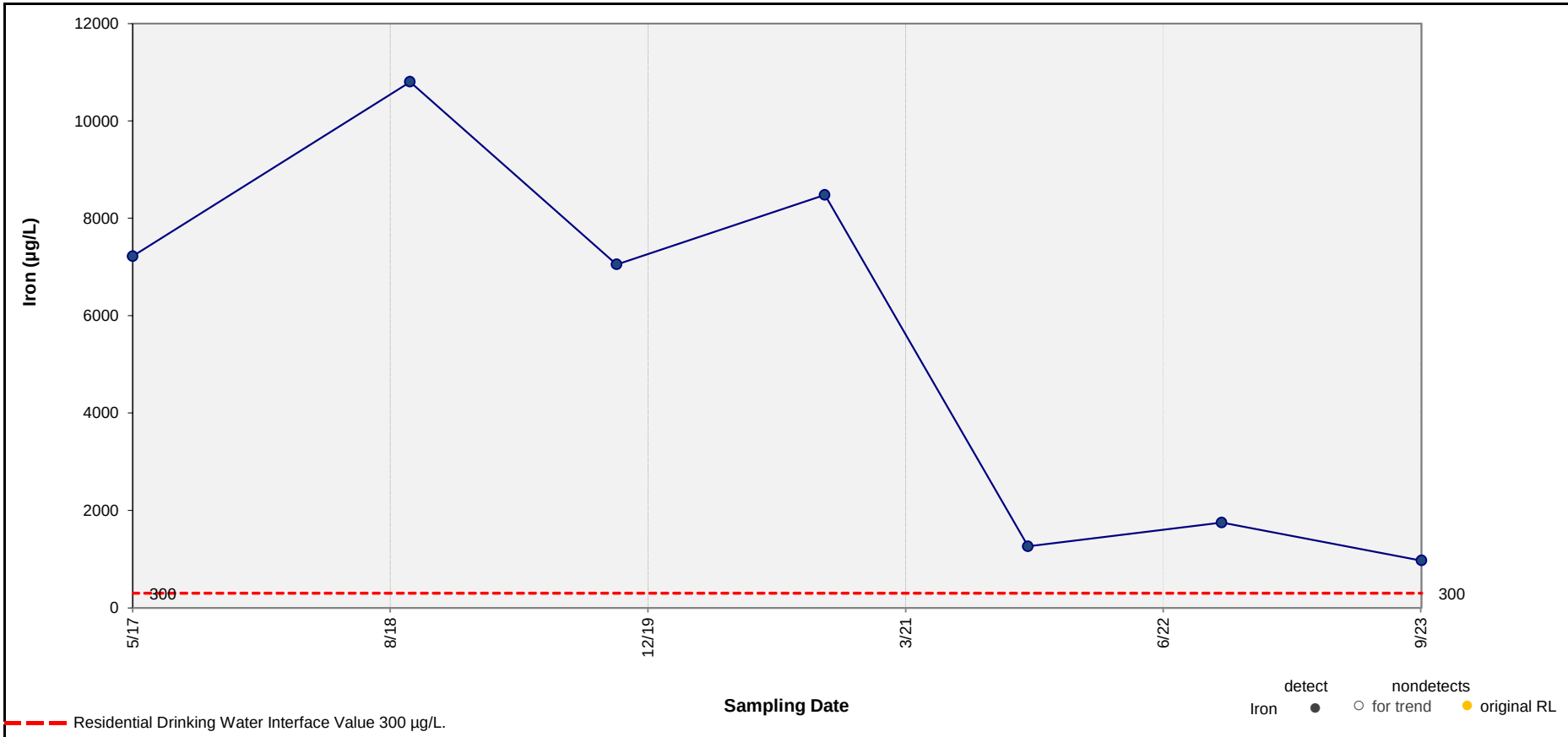
p value = 0.281 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-01

RACER PNC (Non-Fiero)

Figure A-25



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

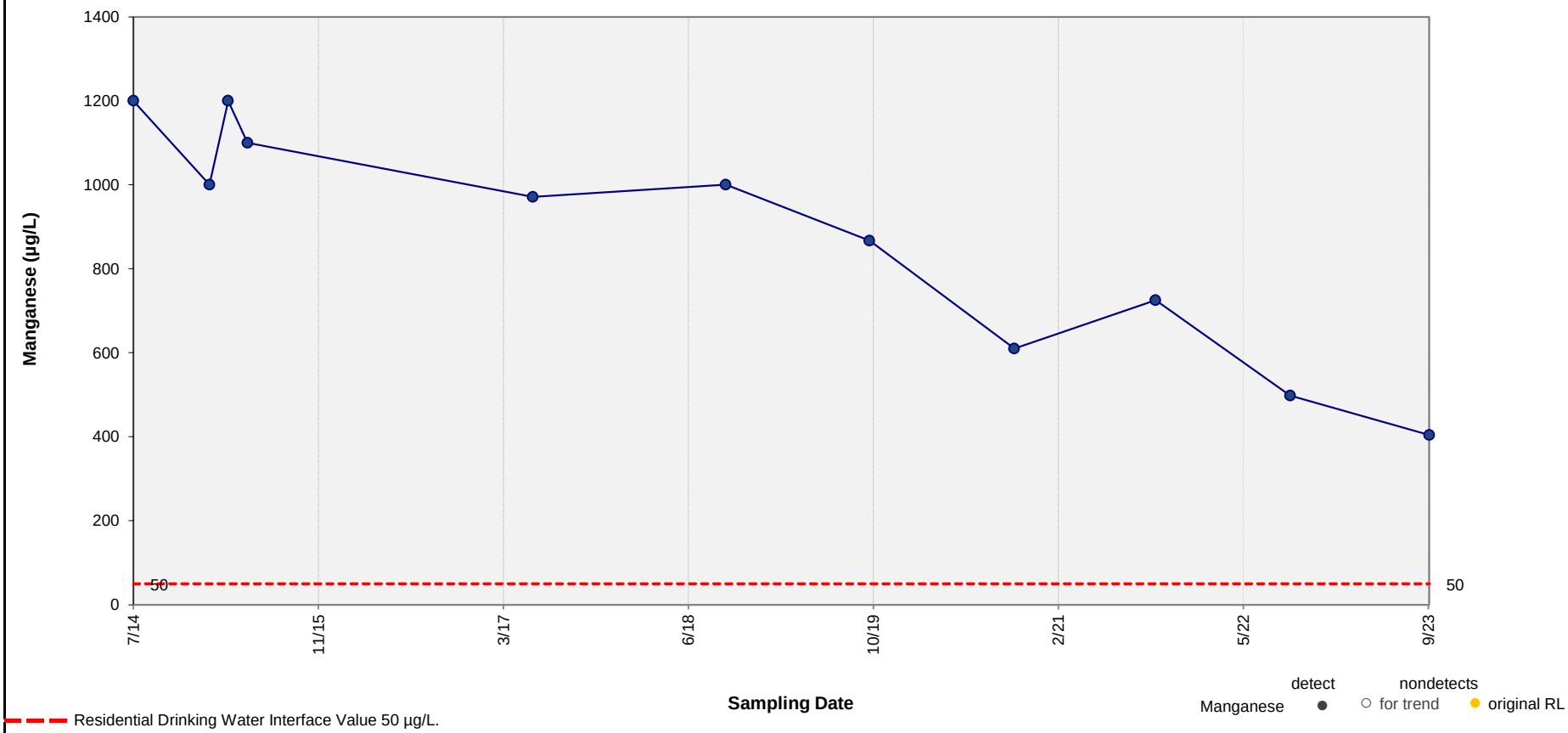
p value = 0.035 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-01

RACER PNC (Non-Fiero)

Figure A-26



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

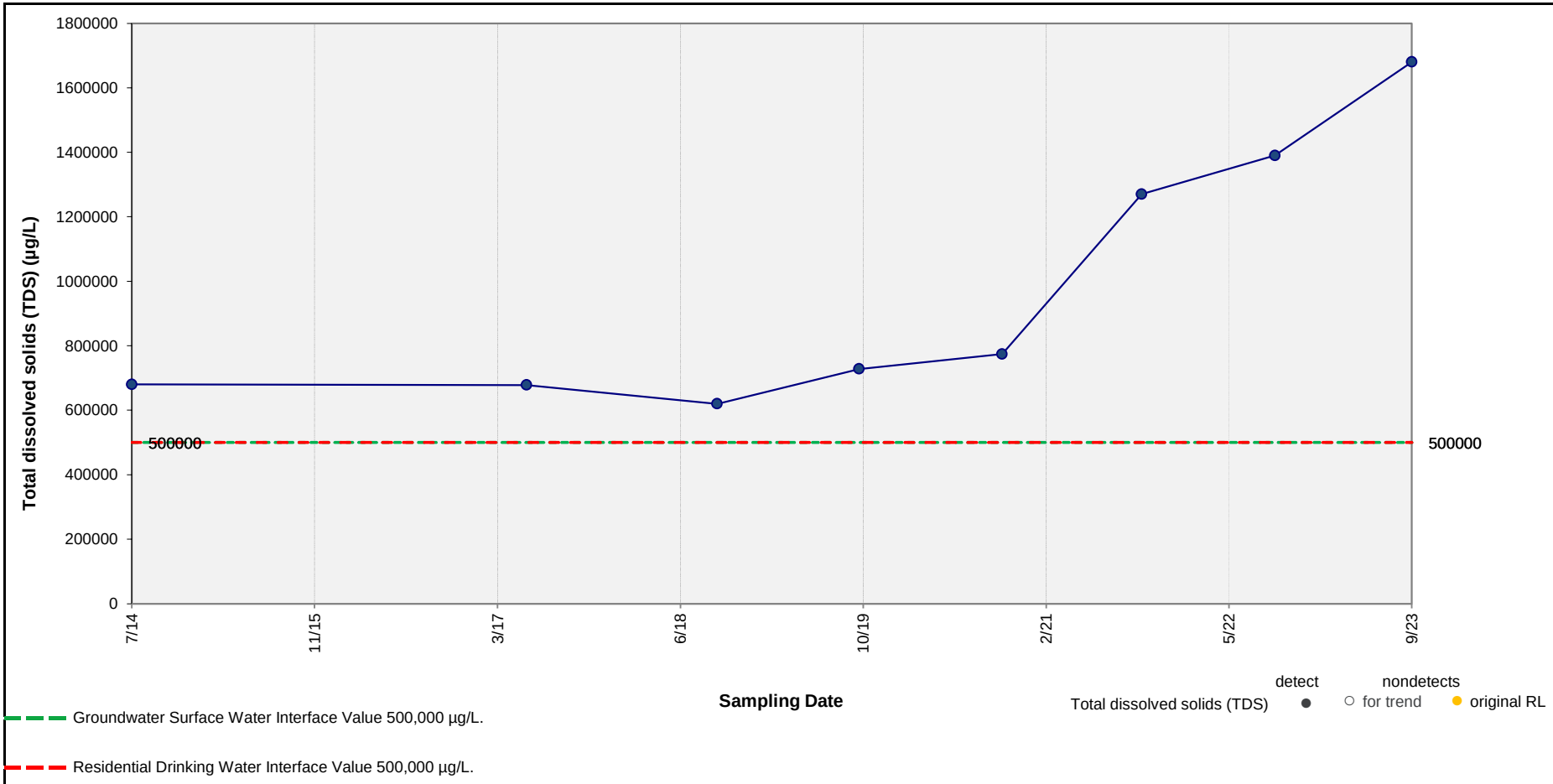
p value = <0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-01

RACER PNC (Non-Fiero)

Figure A-27



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

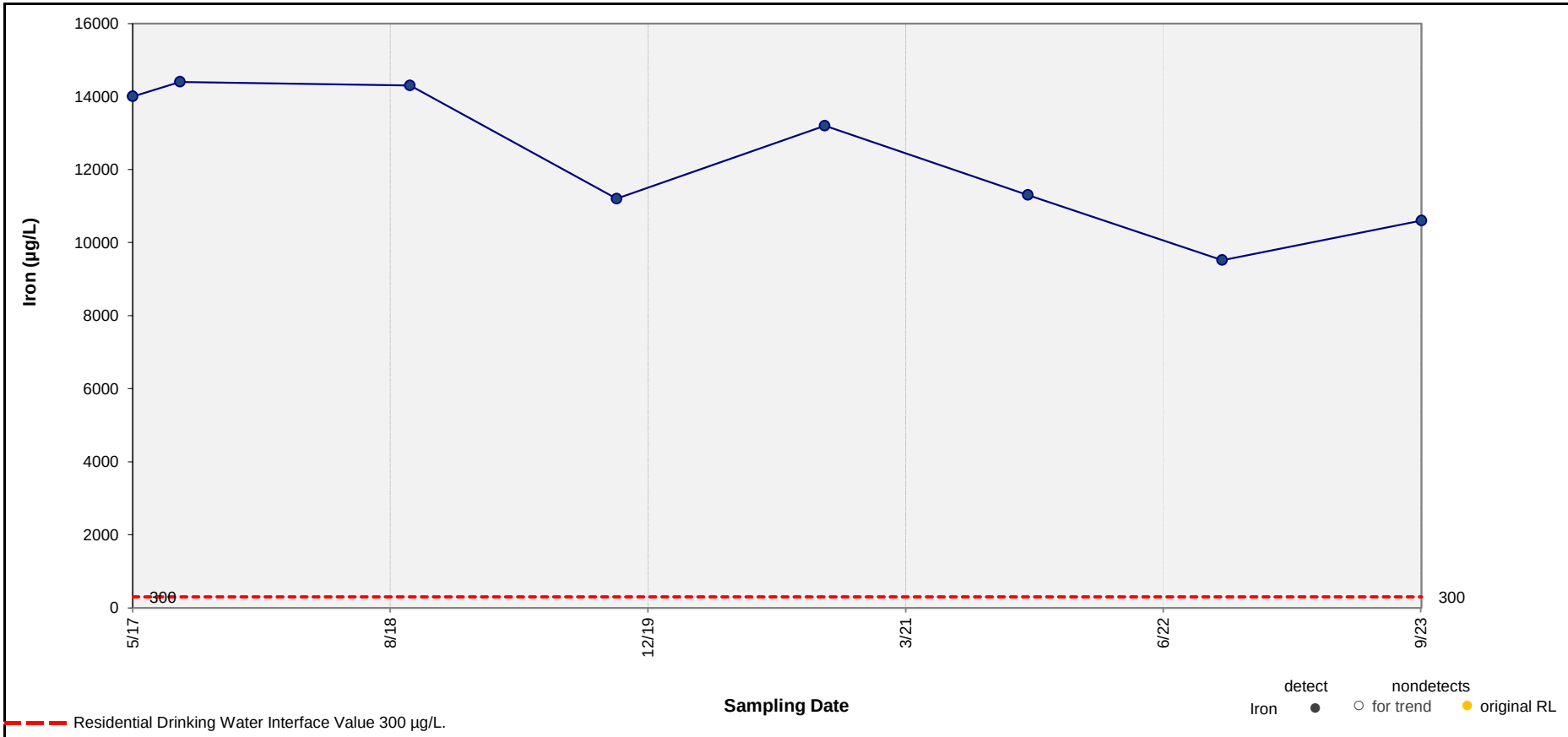
p value = 0.003 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-02

RACER PNC (Non-Fiero)

Figure A-28



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

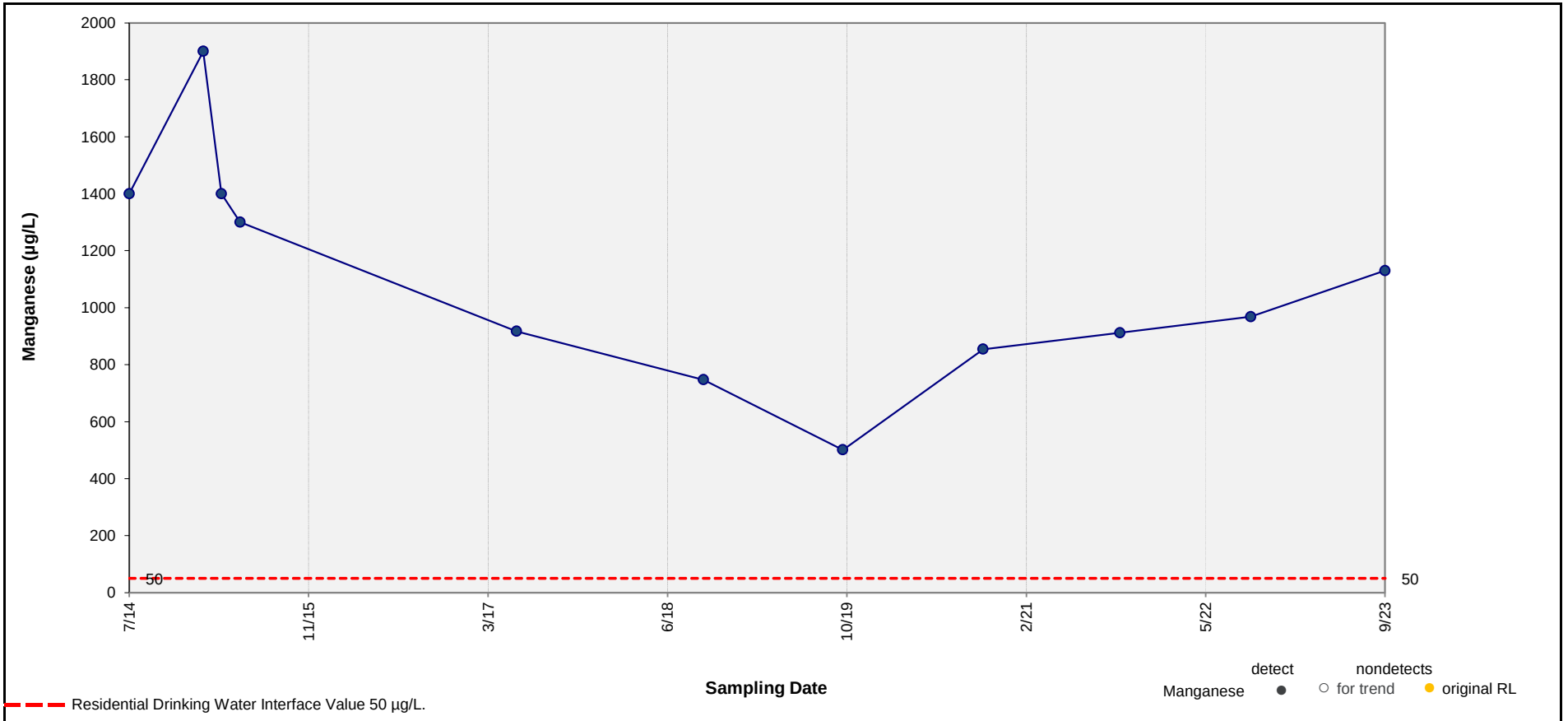
p value = 0.016 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-02

RACER PNC (Non-Fiero)

Figure A-29



Results of Mann-Kendall Test for Trend: **No Significant Trend**

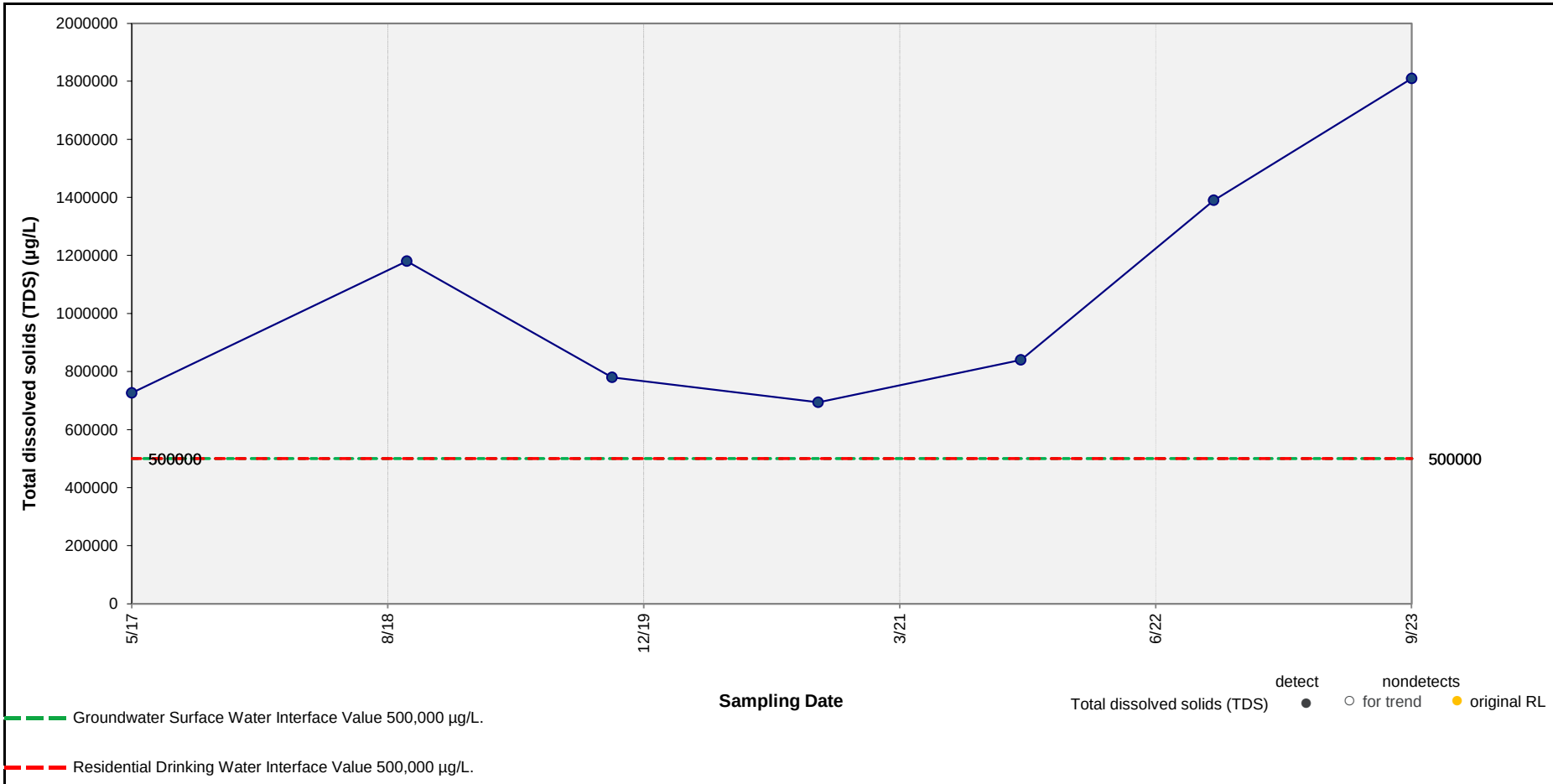
p value = 0.069 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-02

RACER PNC (Non-Fiero)

Figure A-30



Results of Mann-Kendall Test for Trend: **No Significant Trend**

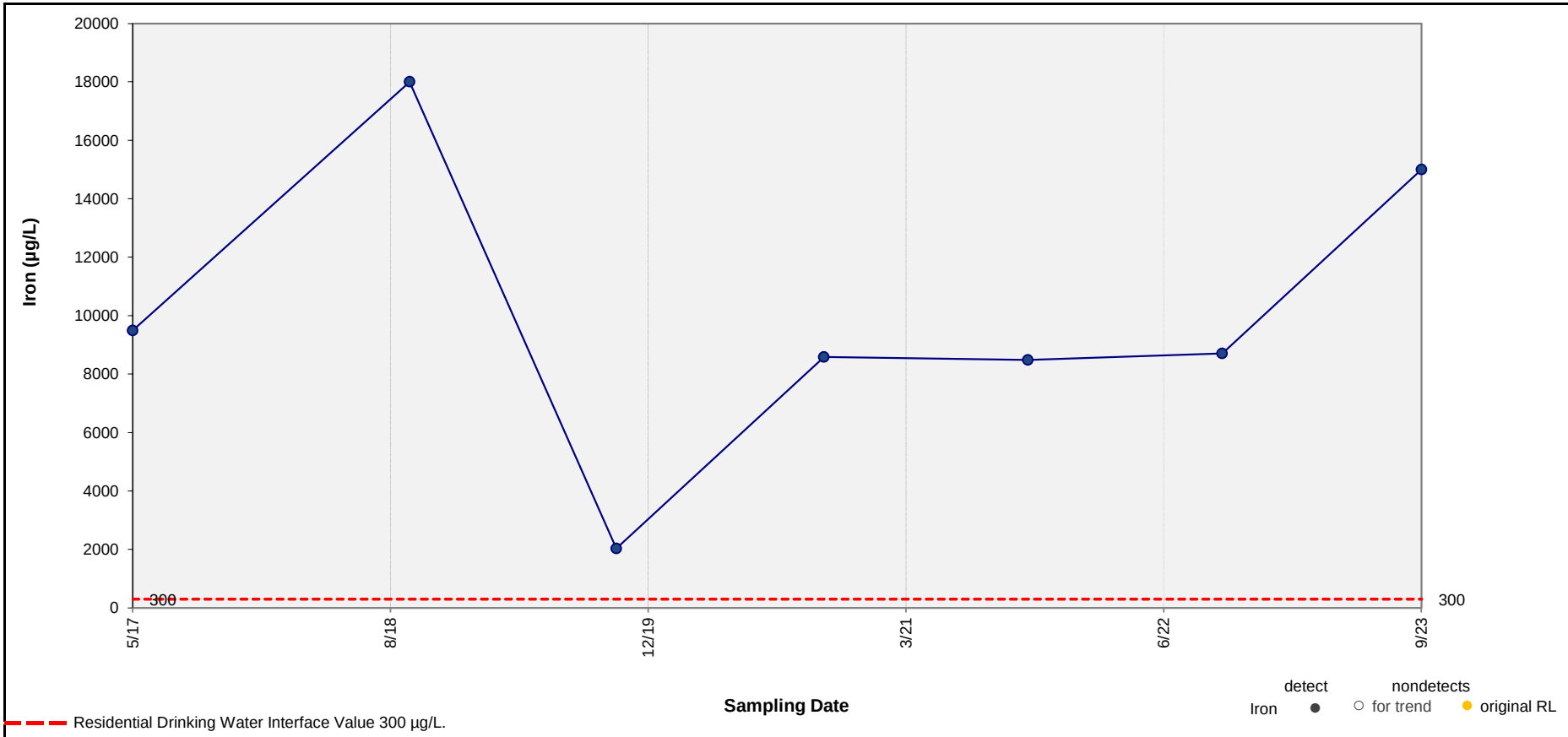
p value = 0.068 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-03

RACER PNC (Non-Fiero)

Figure A-31



Results of Mann-Kendall Test for Trend: **No Significant Trend**

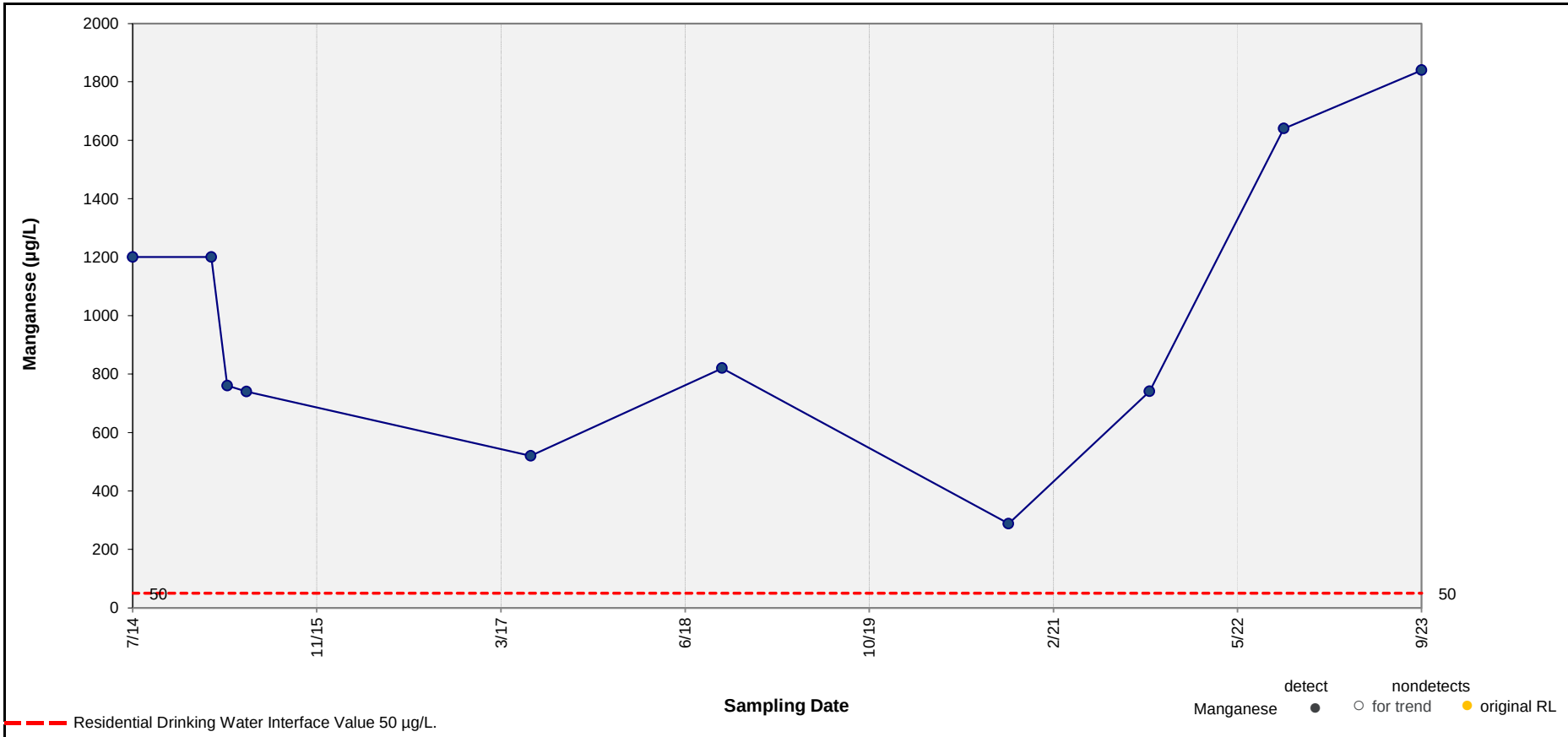
p value = 0.500 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-03

RACER PNC (Non-Fiero)

Figure A-32



Results of Mann-Kendall Test for Trend: **No Significant Trend**

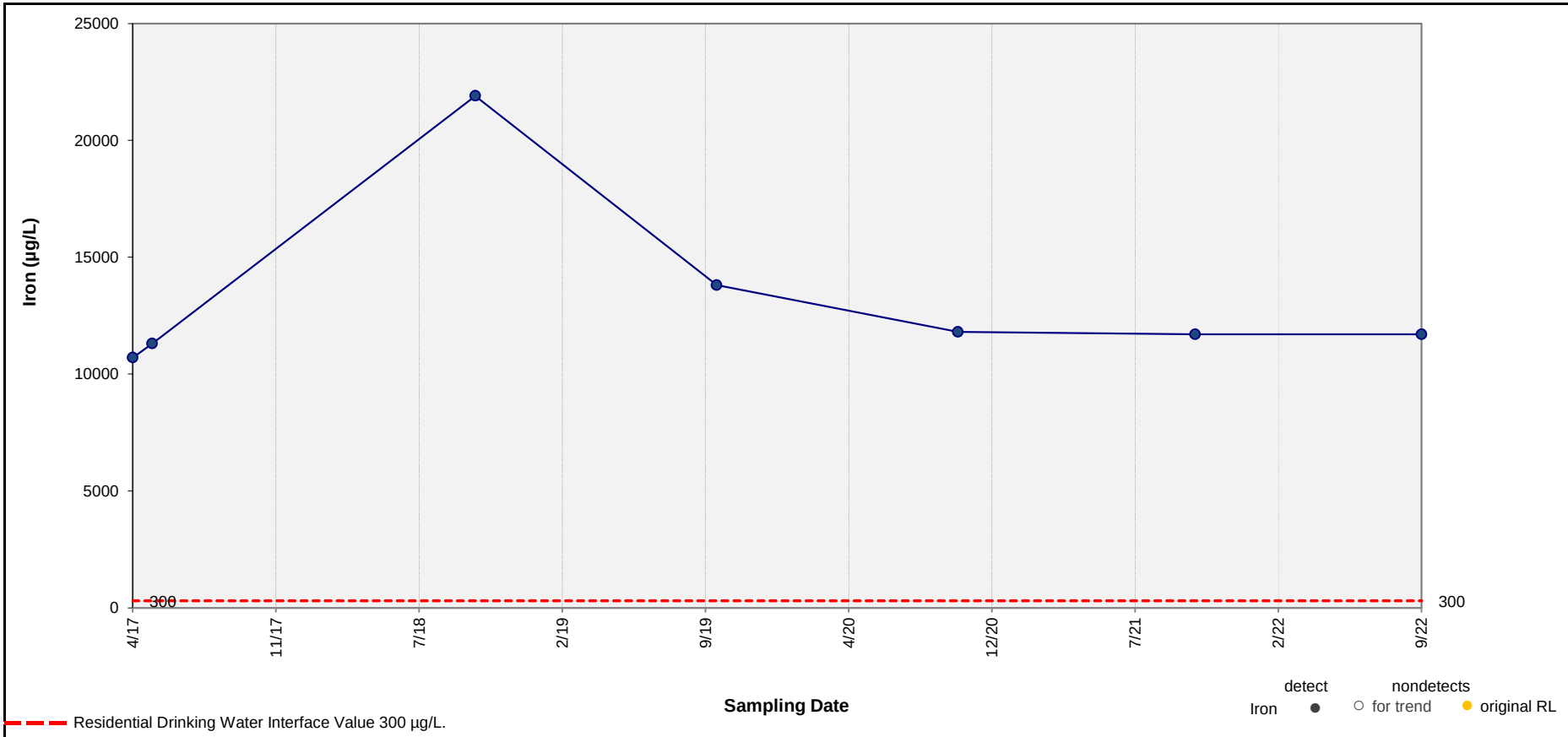
p value = 0.466 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-03

RACER PNC (Non-Fiero)

Figure A-33



Results of Mann-Kendall Test for Trend: **No Significant Trend**

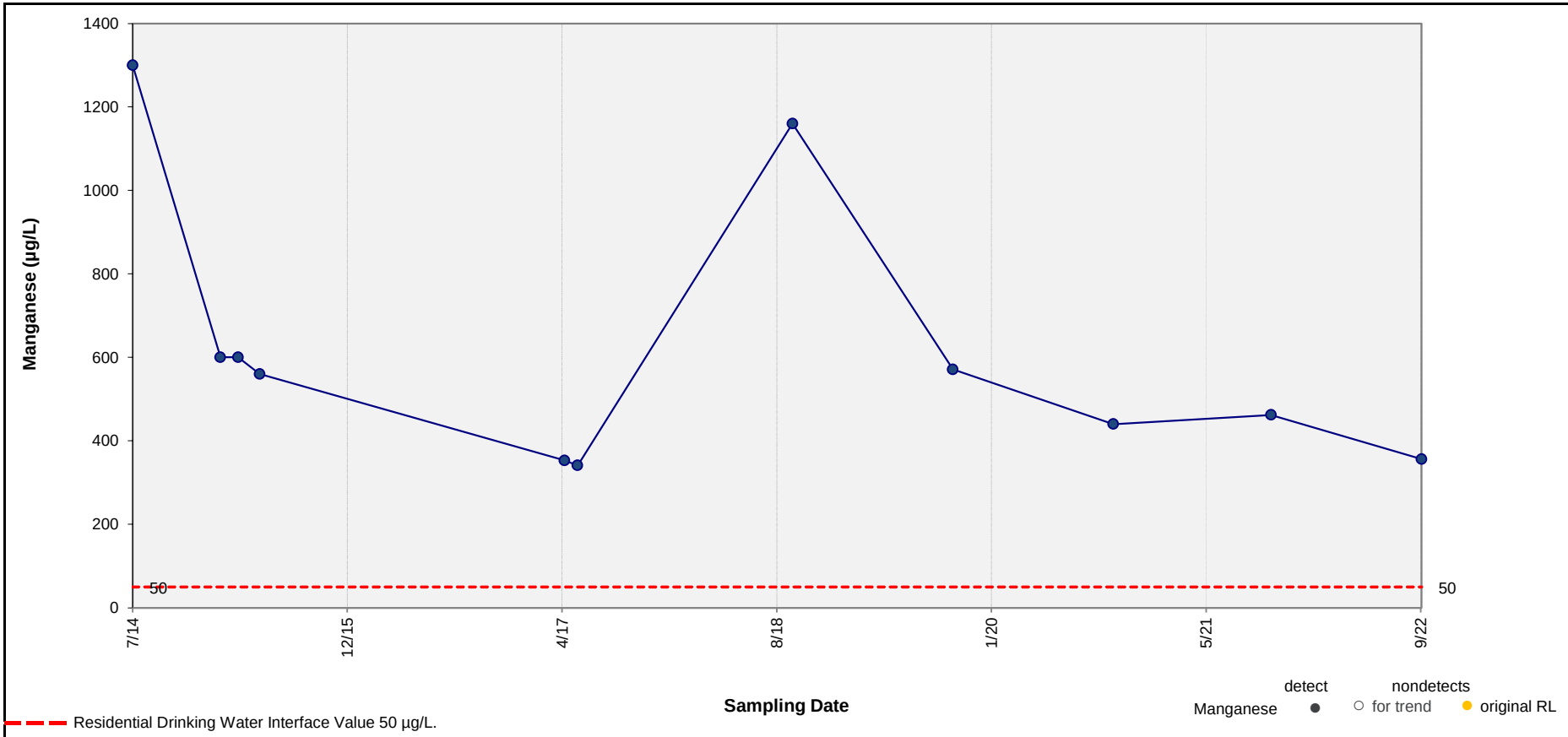
p value = 0.443 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-04

RACER PNC (Non-Fiero)

Figure A-34



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

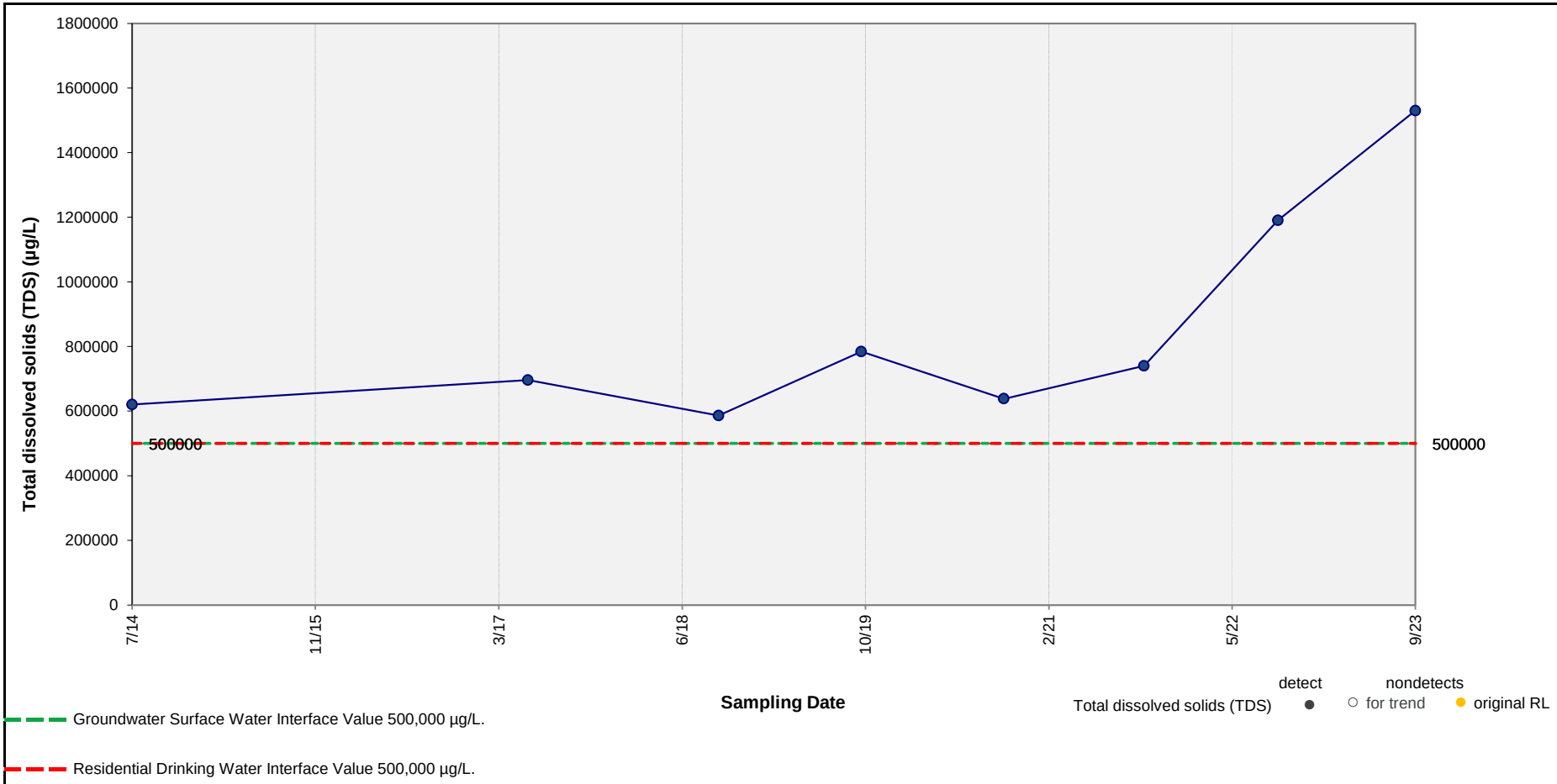
p value = 0.036 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-04

RACER PNC (Non-Fiero)

Figure A-35



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

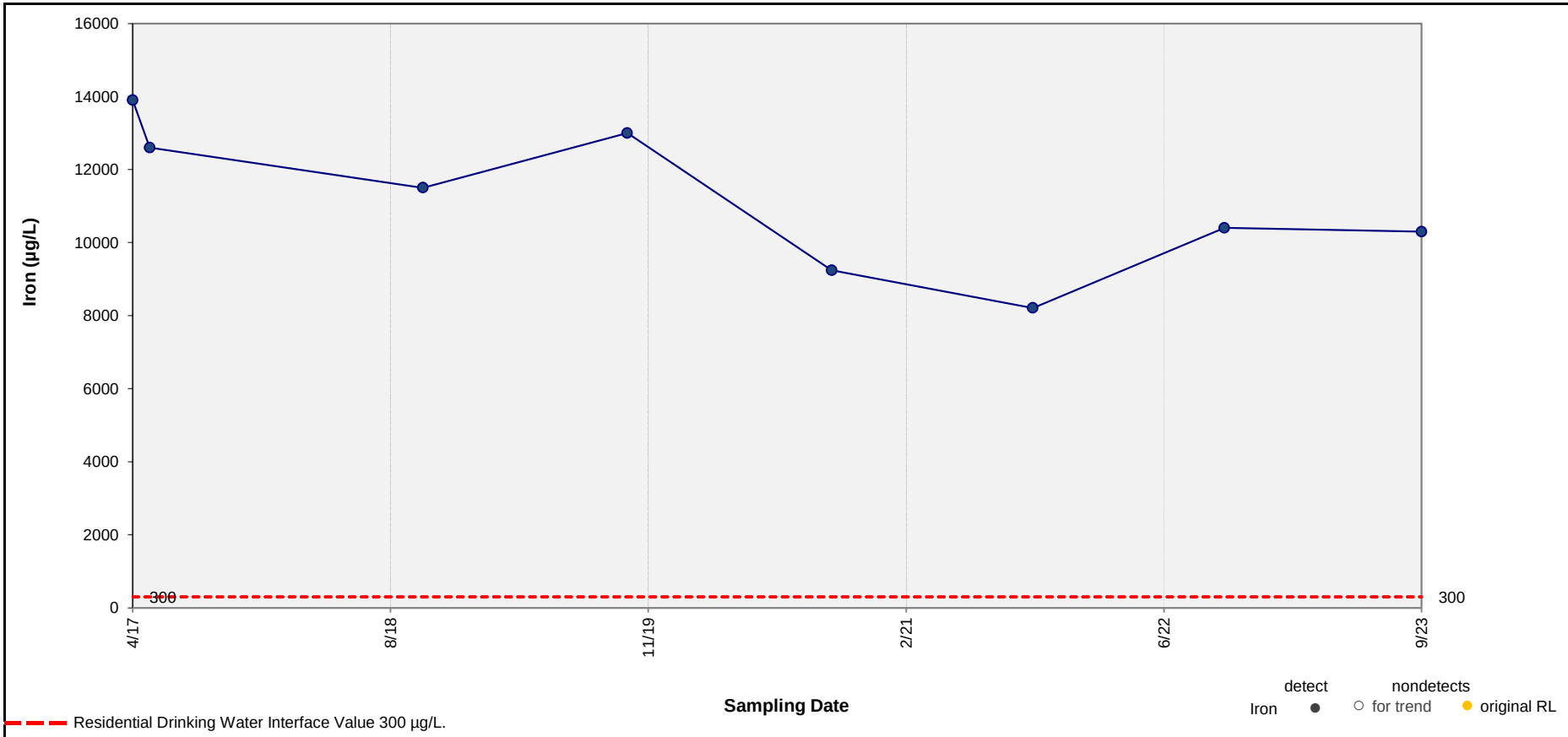
p value = 0.016 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-05

RACER PNC (Non-Fiero)

Figure A-36



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

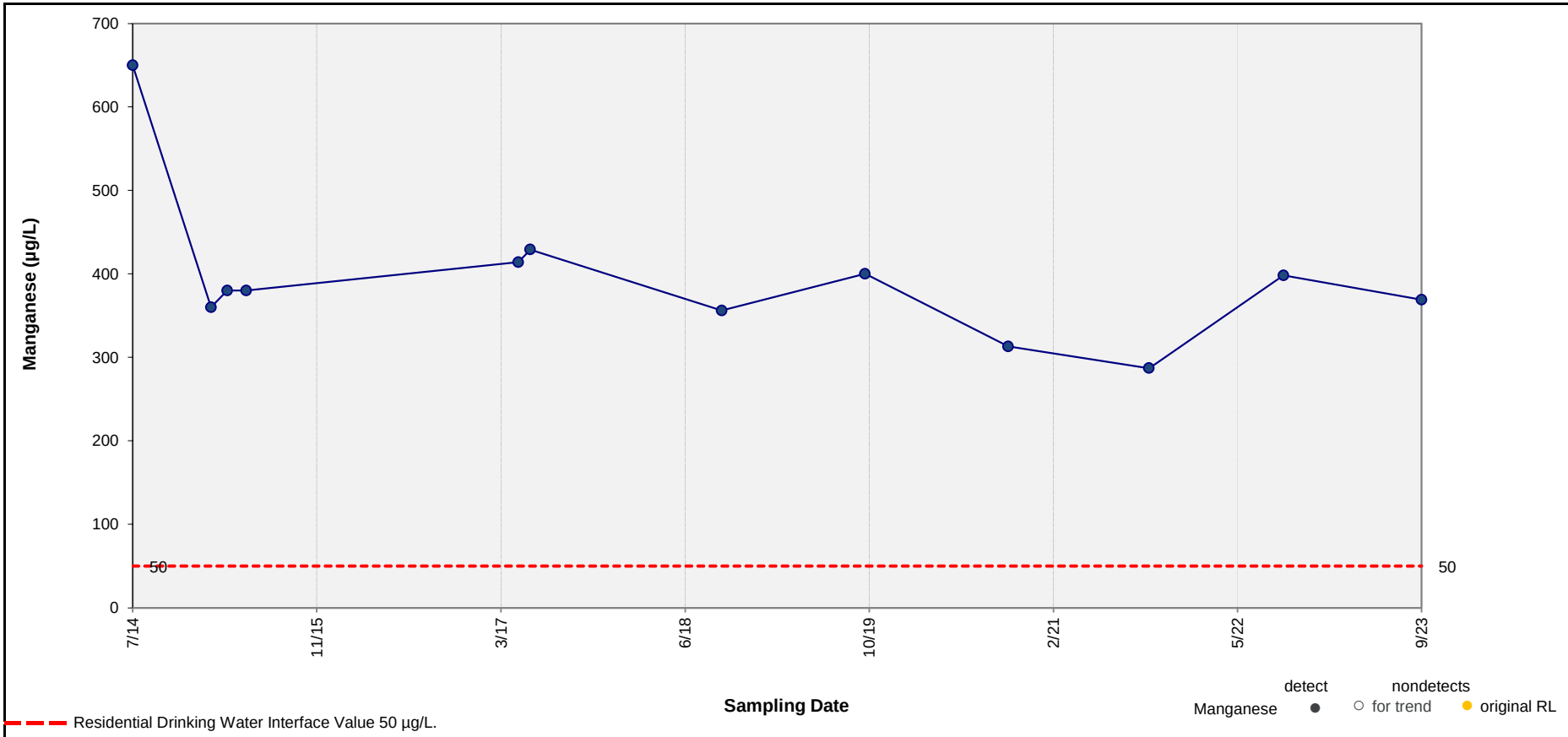
p value = 0.031 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-05

RACER PNC (Non-Fiero)

Figure A-37



Results of Mann-Kendall Test for Trend: **No Significant Trend**

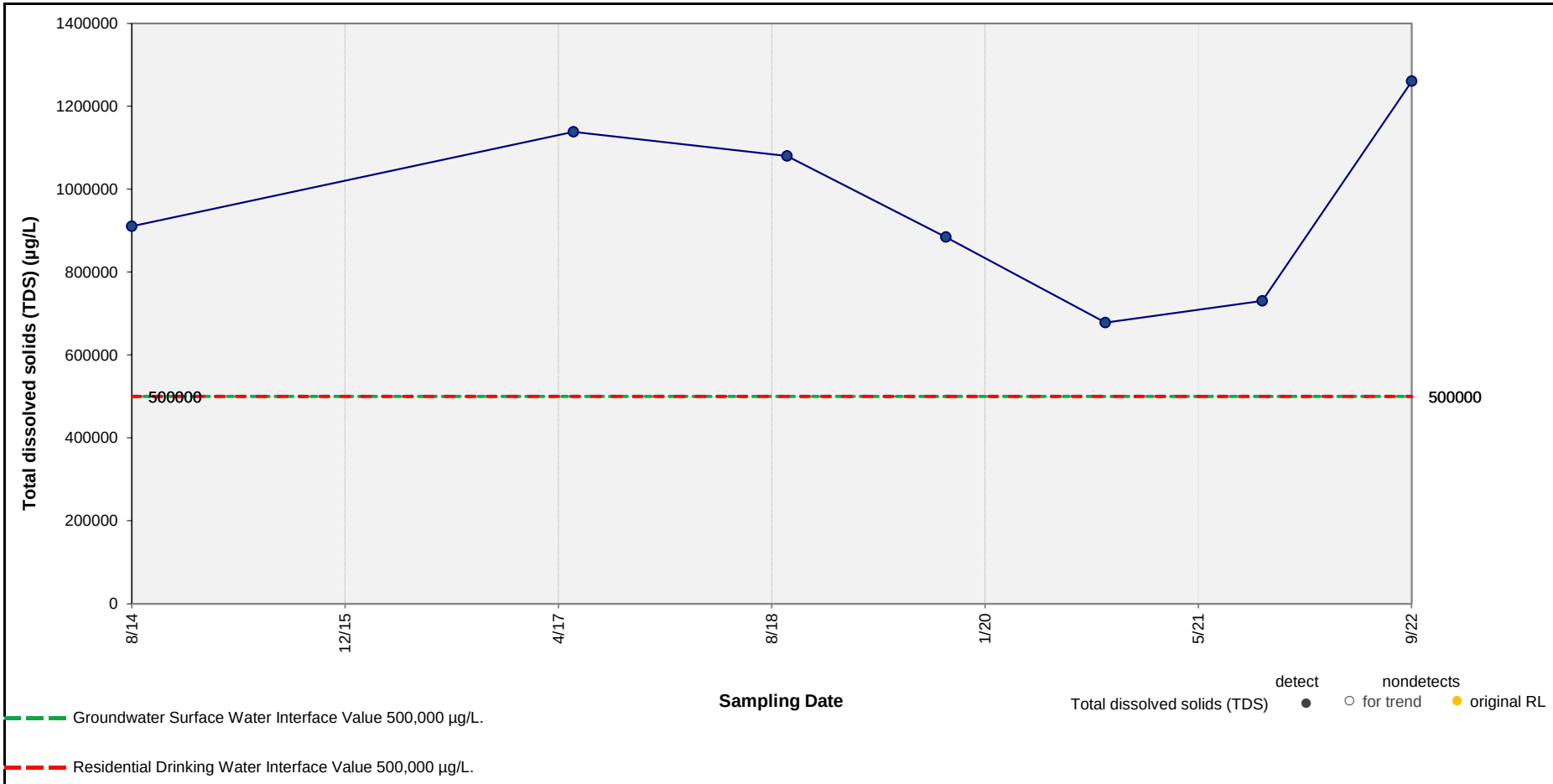
p value = 0.108 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-05

RACER PNC (Non-Fiero)

Figure A-38



Results of Mann-Kendall Test for Trend: **No Significant Trend**

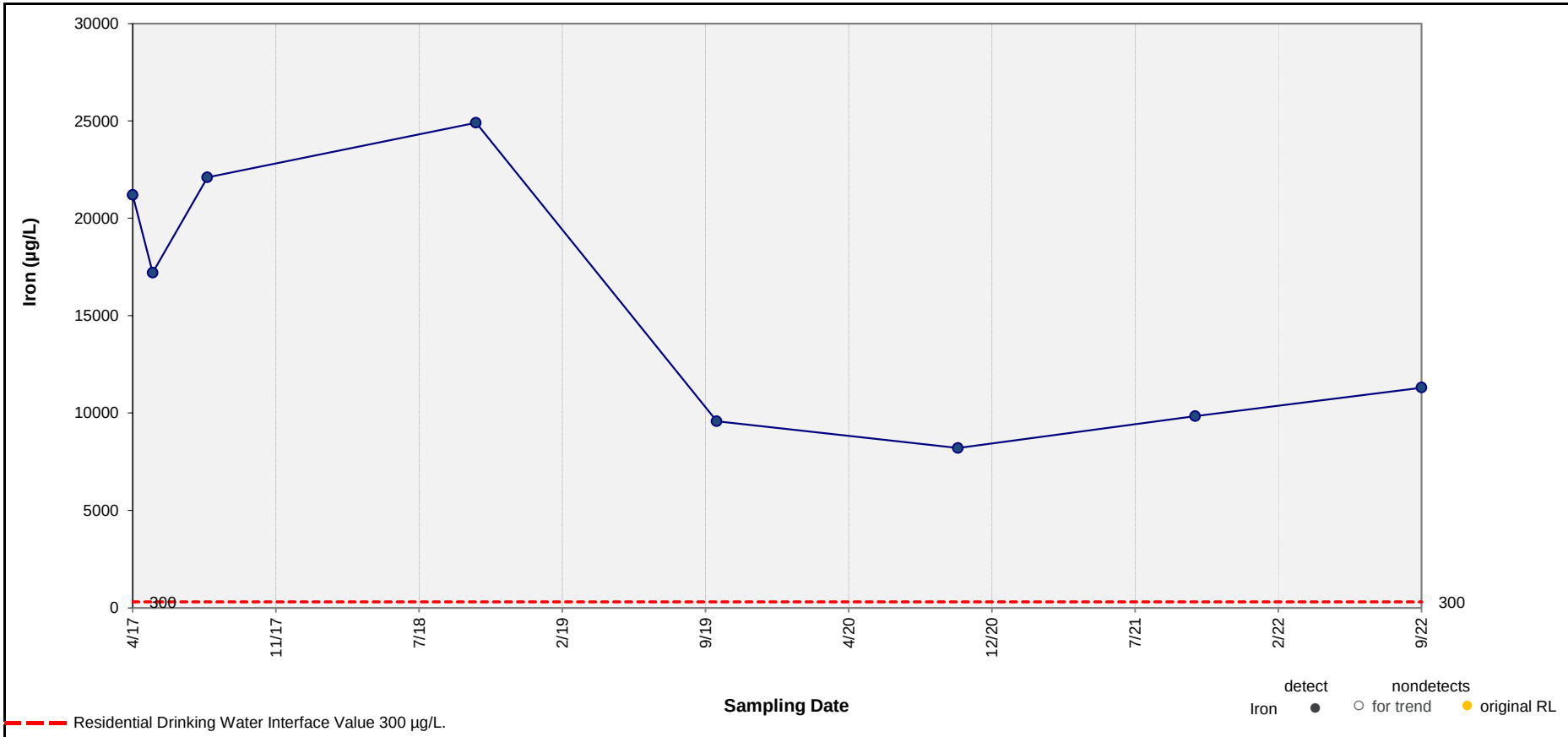
p value = 0.386 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-06

RACER PNC (Non-Fiero)

Figure A-39



Results of Mann-Kendall Test for Trend: **No Significant Trend**

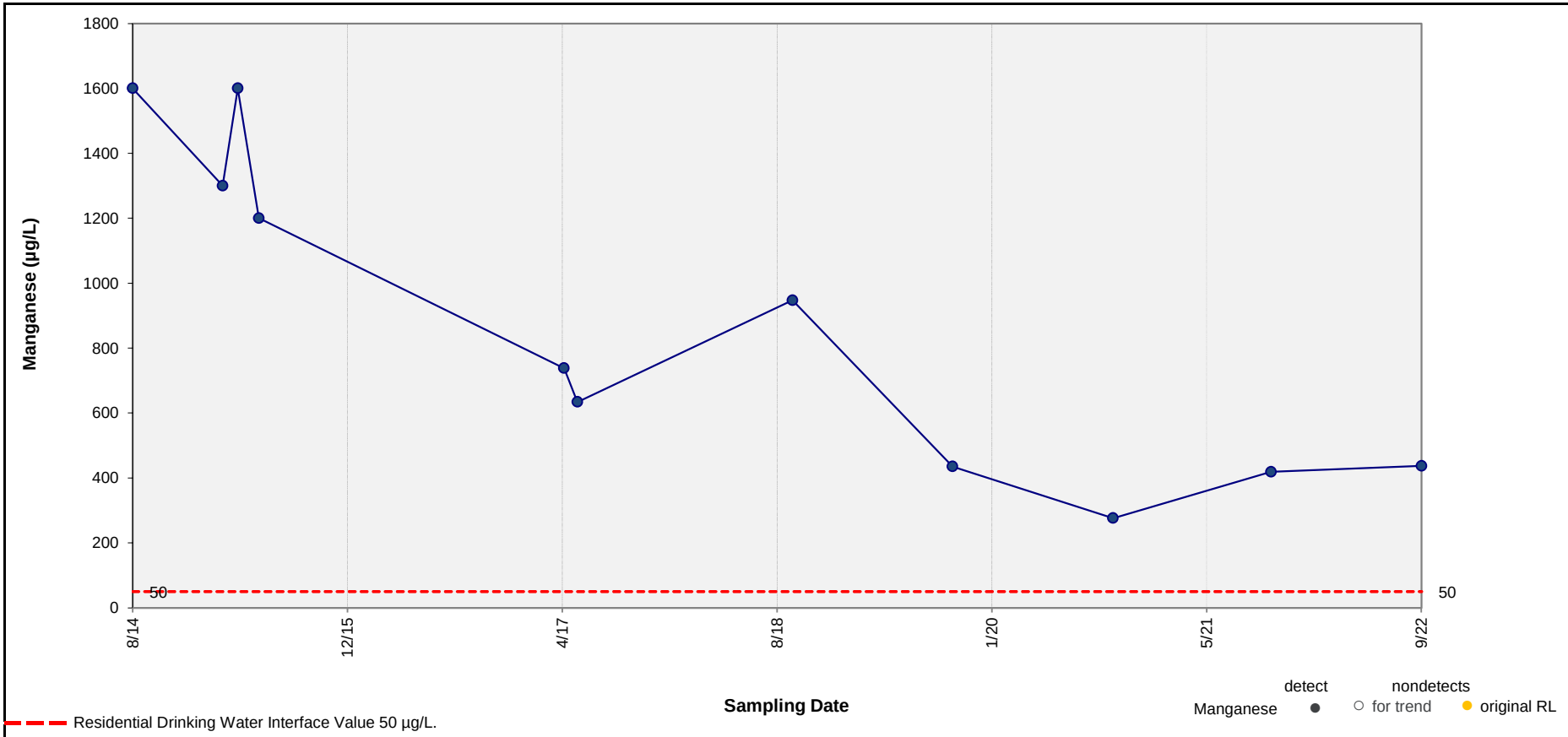
p value = 0.199 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-06

RACER PNC (Non-Fiero)

Figure A-40



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

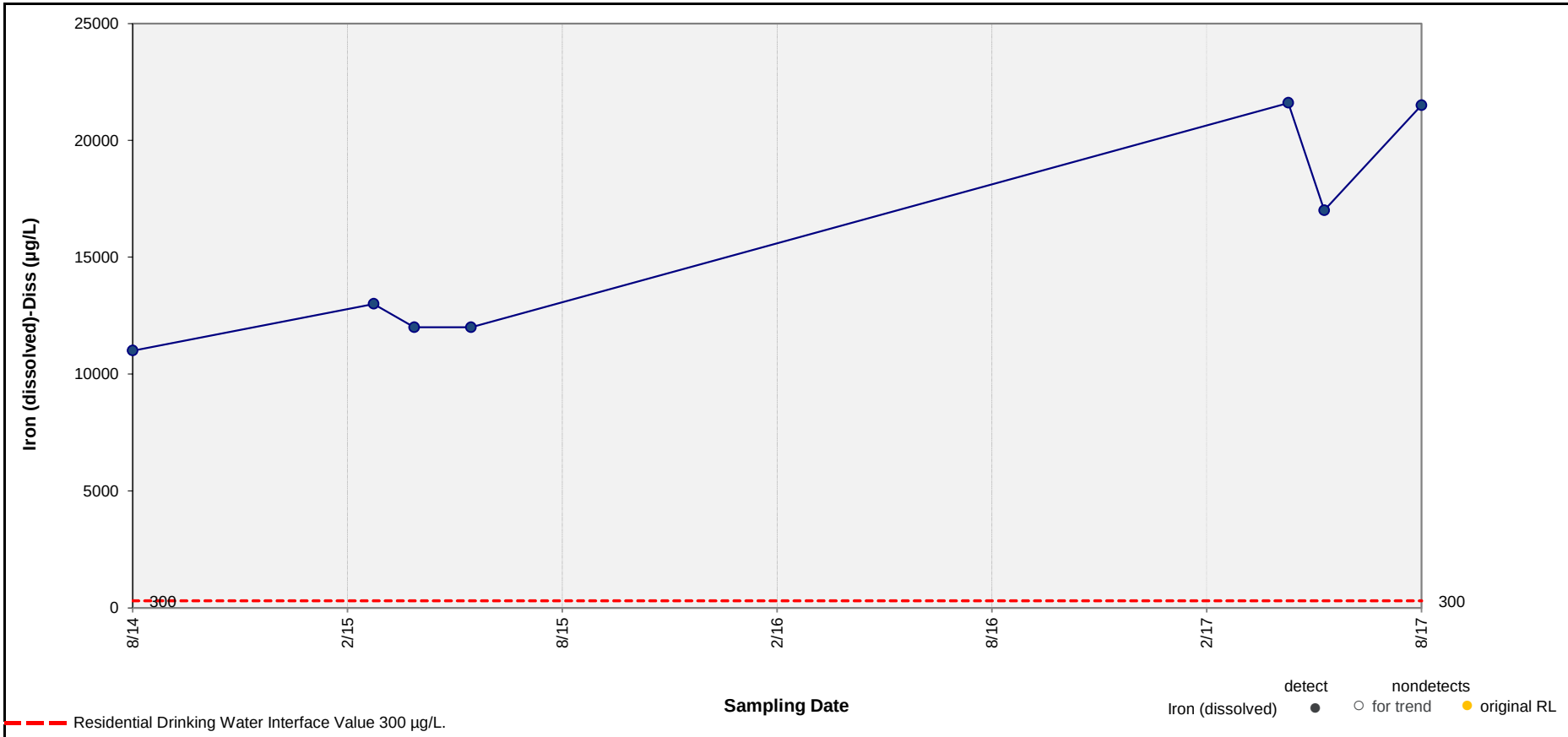
p value = 0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-06

RACER PNC (Non-Fiero)

Figure A-41



Results of Mann-Kendall Test for Trend: **No Significant Trend**

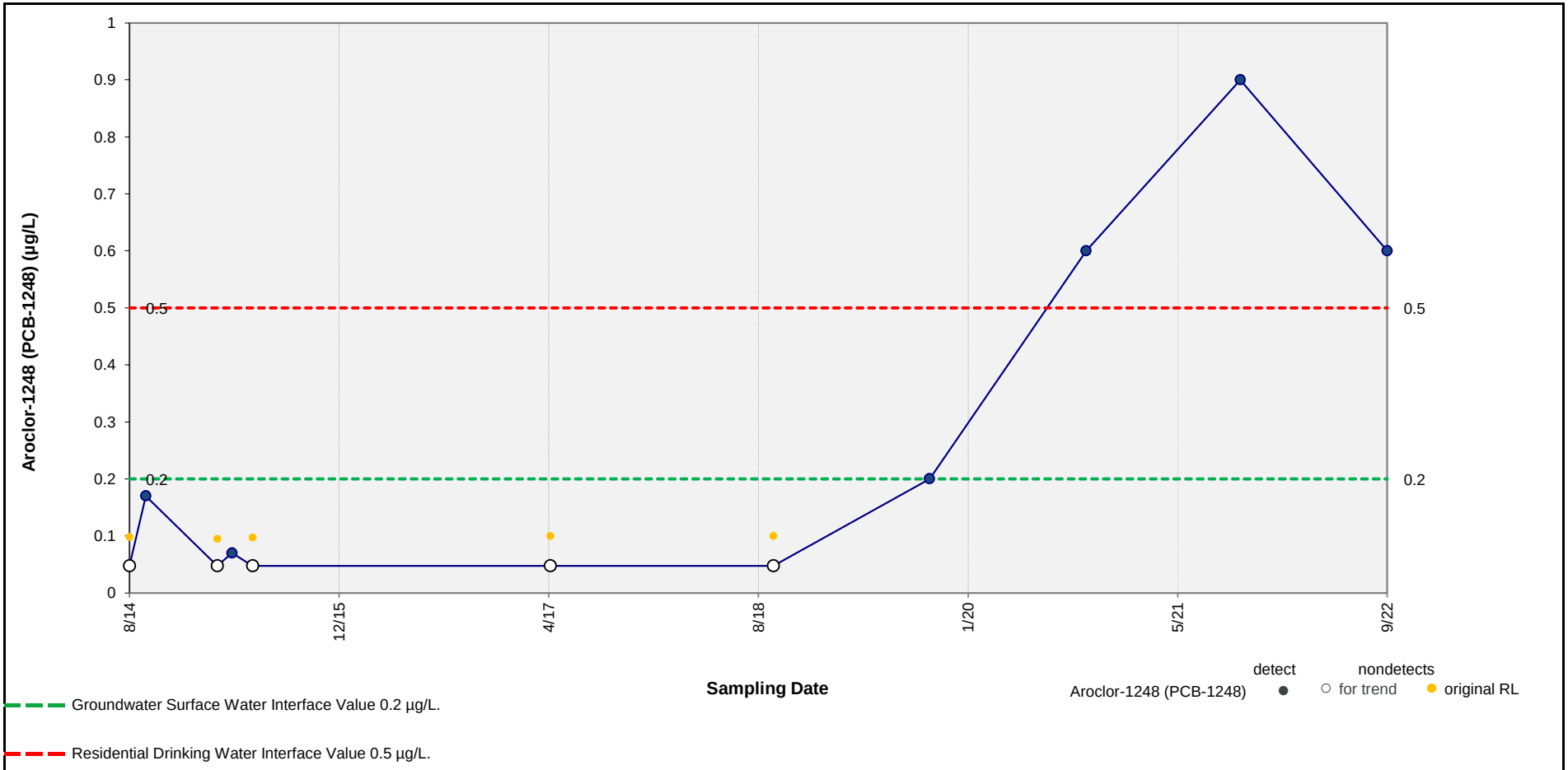
p value = 0.052 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron (dissolved) in Well TW-MD-06

RACER PNC (Non-Fiero)

Figure A-42



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

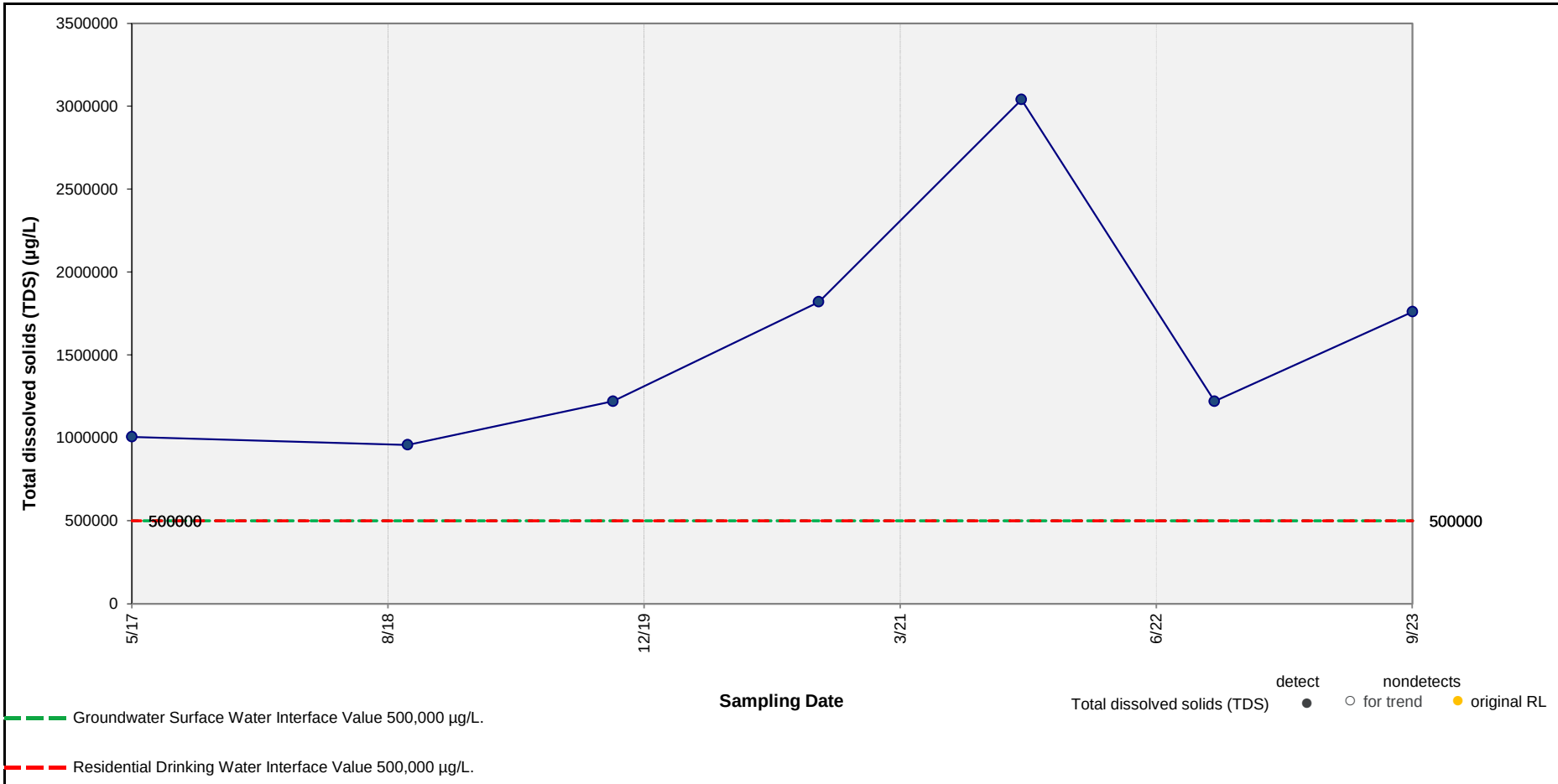
p value = 0.020 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Aroclor-1248 (PCB-1248) in Well TW-MD-06

RACER PNC (Non-Fiero)

Figure A-43



Results of Mann-Kendall Test for Trend: **No Significant Trend**

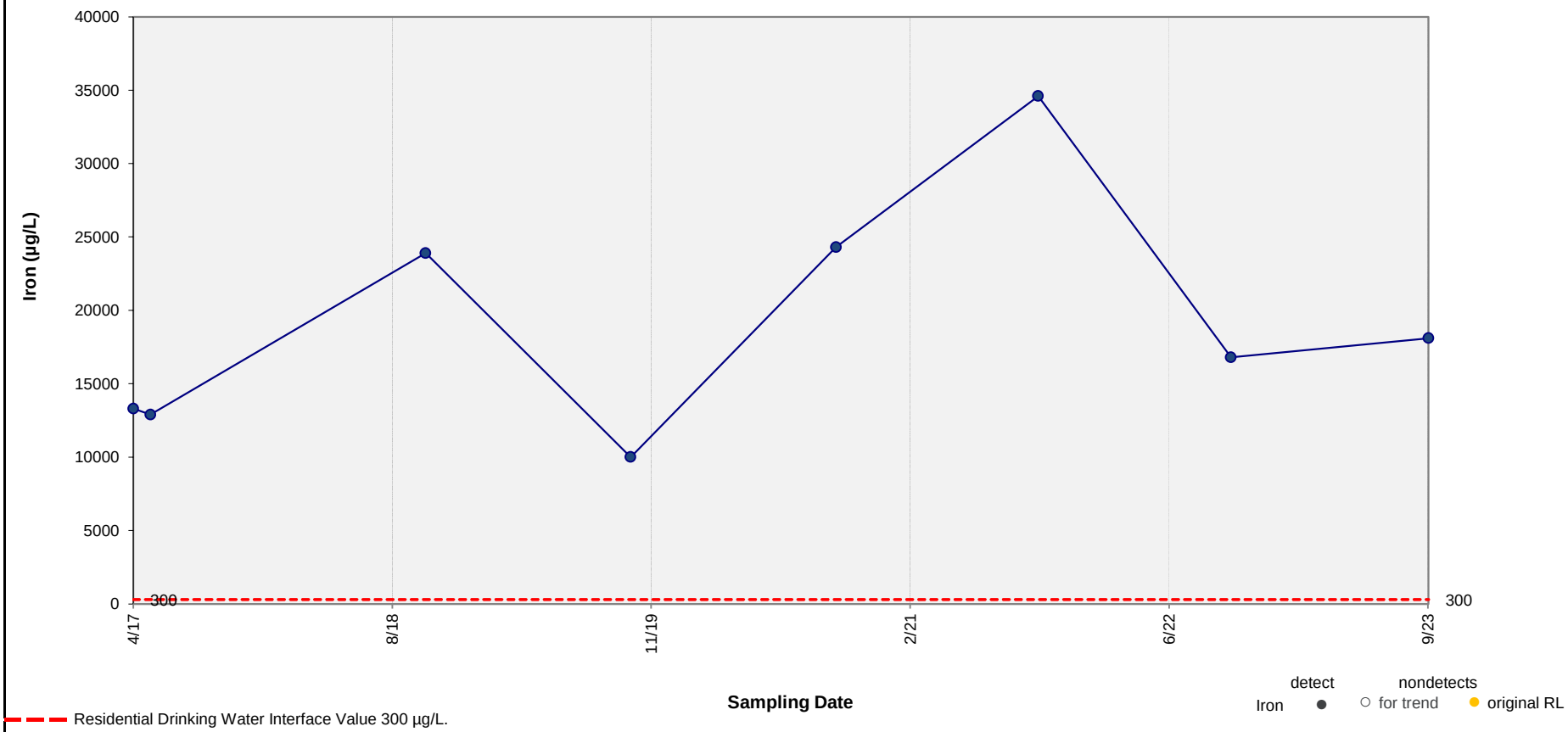
p value = 0.094 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-07

RACER PNC (Non-Fiero)

Figure A-44



Results of Mann-Kendall Test for Trend: **No Significant Trend**

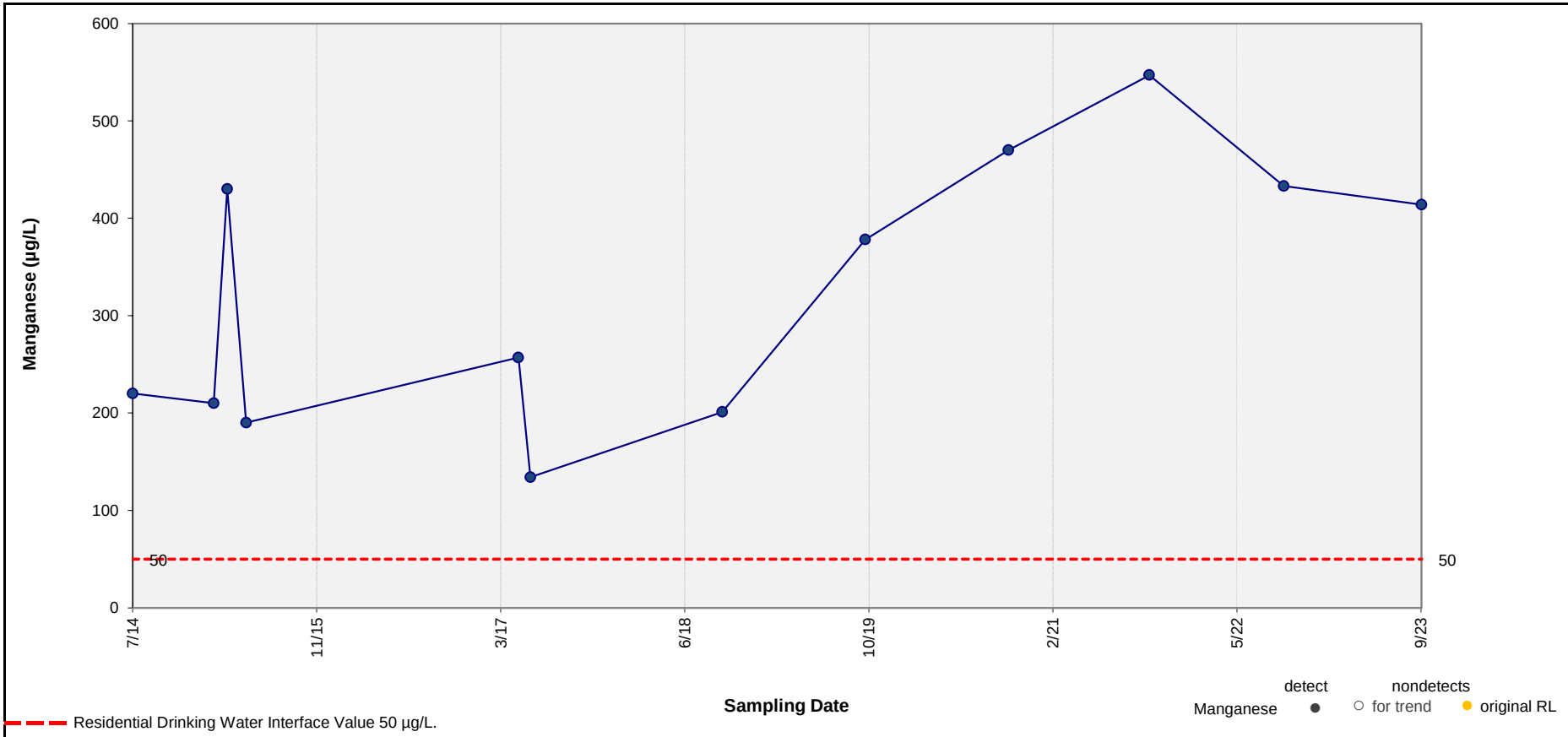
p value = 0.199 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-07

RACER PNC (Non-Fiero)

Figure A-45



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.057 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-07

RACER PNC (Non-Fiero)

Figure A-46

TABLE A-2
Summary Statistics and Trend Results
RACER PNC (Fiero)
Pontiac, MI
May, 2024

Well ID	Analyte	Date Range	Figure	FOD	Detected Results Summary [1]					Mann-Kendall Test [2]		
					Range	Mean	Median	SD	CV	Result[4]	P-Value	S Value
MWF16-23	Trichloroethene	10/17 - 11/23	A-1	19 / 19	9 - 23	17.3	17	3.4	0.20	NST	0.078	-41

Abbreviations:

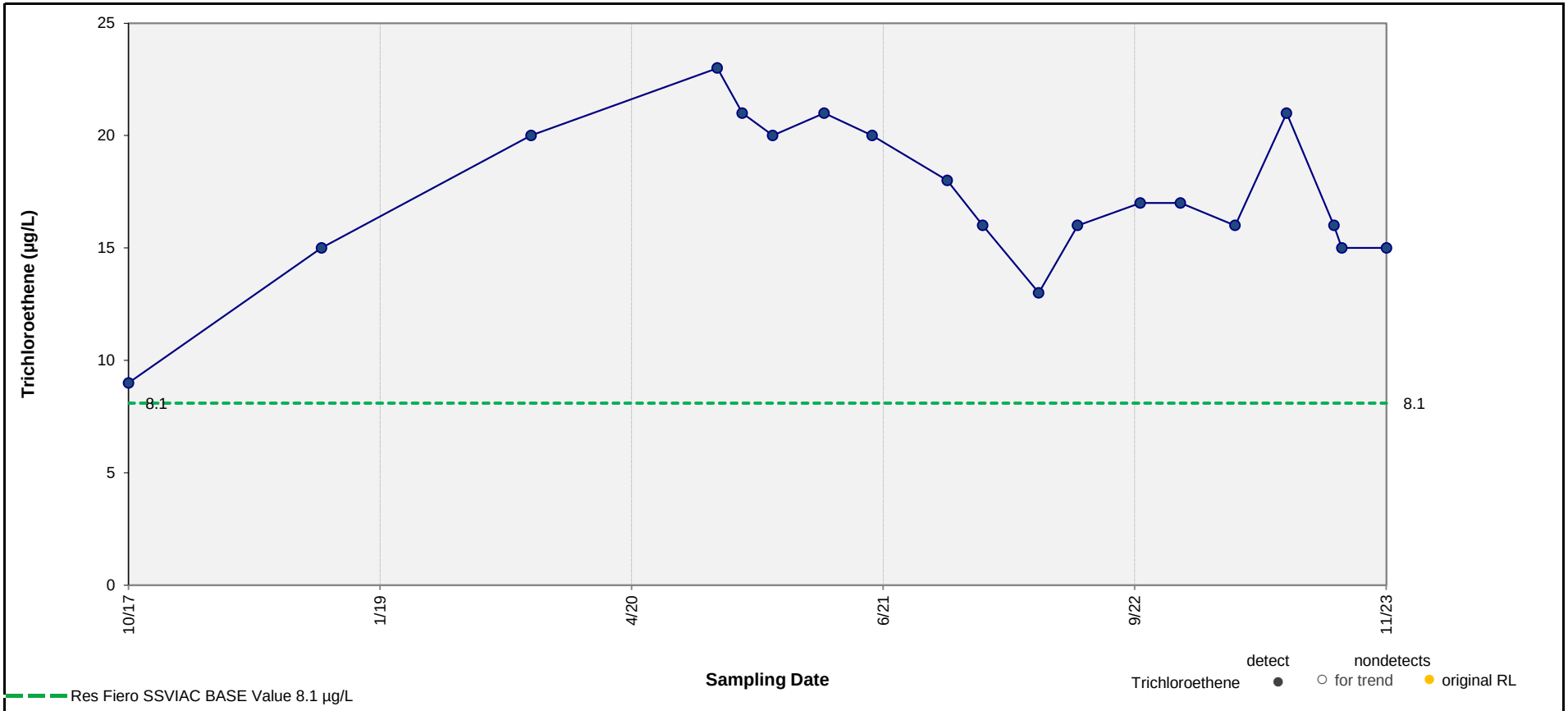
CV = coefficient of variation (SD / mean)
FOD = frequency of detection (# detects / # samples)
mean = arithmetic mean
SD = standard deviation
NST = no significant trend
DWN = downward trend
UP = upward trend

Notes:

1. All analytical results are in µg/L.
2. Trend results are presented when at least seven samples, one exceedance, and 50% detected values are available.
3. Non-detects were assigned a common value less than the minimum detected value, equal to half the minimum reporting limit (RL) in the dataset (USEPA, 2009). If half the minimum RL was greater than the minimum detected value, then half the minimum detect was assigned.
4. Statistically significant trend defined as having p-value ≤ 0.05, or 95% confidence.

Reference:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.078 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Trichloroethene in Well MWF16-23

RACER PNC (Fiero)

Figure A-1

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
INJ-01-17	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-01-17	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
INJ-01-17	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
INJ-01-17	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
INJ-01-17	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
INJ-01-17	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	1,4-Dioxane	FALSE	TRUE	FALSE	No
INJ-01-17	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
INJ-01-17	2-Hexanone	FALSE	FALSE	FALSE	No
INJ-01-17	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
INJ-01-17	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
INJ-01-17	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
INJ-01-17	Acetone	FALSE	FALSE	FALSE	No
INJ-01-17	Acrylonitrile	FALSE	FALSE	FALSE	No
INJ-01-17	Antimony	FALSE	FALSE	FALSE	No
INJ-01-17	Antimony (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
INJ-01-17	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
INJ-01-17	Arsenic	FALSE	TRUE	FALSE	No
INJ-01-17	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Barium	FALSE	TRUE	FALSE	No
INJ-01-17	Barium (dissolved)	FALSE	TRUE	FALSE	No
INJ-01-17	Benzene	FALSE	FALSE	FALSE	No
INJ-01-17	Beryllium	FALSE	FALSE	FALSE	No
INJ-01-17	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Bromobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Bromodichloromethane	FALSE	FALSE	FALSE	No
INJ-01-17	Bromoform	FALSE	FALSE	FALSE	No
INJ-01-17	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
INJ-01-17	Cadmium	FALSE	FALSE	FALSE	No
INJ-01-17	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Carbon disulfide	FALSE	FALSE	FALSE	No
INJ-01-17	Carbon tetrachloride	FALSE	FALSE	FALSE	No
INJ-01-17	Chlorobenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Chloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
INJ-01-17	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
INJ-01-17	Chromium	FALSE	FALSE	FALSE	No
INJ-01-17	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-01-17	Cobalt	FALSE	FALSE	FALSE	No
INJ-01-17	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Copper	FALSE	FALSE	FALSE	No
INJ-01-17	Copper (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Dibromochloromethane	FALSE	FALSE	FALSE	No
INJ-01-17	Dibromomethane	FALSE	FALSE	FALSE	No
INJ-01-17	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
INJ-01-17	Ethyl ether	FALSE	FALSE	FALSE	No
INJ-01-17	Ethylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Hexachloroethane	FALSE	FALSE	FALSE	No
INJ-01-17	Iron	FALSE	TRUE	TRUE	No
INJ-01-17	Iron (dissolved)	FALSE	TRUE	TRUE	No
INJ-01-17	Isopropyl benzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
INJ-01-17	Lead	FALSE	FALSE	FALSE	No
INJ-01-17	Lead (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Magnesium	FALSE	TRUE	FALSE	No
INJ-01-17	Magnesium (dissolved)	FALSE	TRUE	FALSE	No
INJ-01-17	Manganese	FALSE	TRUE	TRUE	No
INJ-01-17	Manganese (dissolved)	FALSE	TRUE	TRUE	No
INJ-01-17	Mercury	FALSE	FALSE	FALSE	No
INJ-01-17	Mercury (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
INJ-01-17	Methylene chloride	FALSE	FALSE	FALSE	No
INJ-01-17	Naphthalene	FALSE	FALSE	FALSE	No
INJ-01-17	N-Butylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Nickel	FALSE	FALSE	FALSE	No
INJ-01-17	Nickel (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	N-Propylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Phenanthrene	FALSE	FALSE	FALSE	No
INJ-01-17	Selenium	FALSE	FALSE	FALSE	No
INJ-01-17	Selenium (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Silver	FALSE	FALSE	FALSE	No
INJ-01-17	Silver (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Styrene	FALSE	FALSE	FALSE	No
INJ-01-17	tert-Butylbenzene	FALSE	FALSE	FALSE	No
INJ-01-17	Tetrachloroethene	FALSE	FALSE	FALSE	No
INJ-01-17	Tetrahydrofuran	FALSE	FALSE	FALSE	No
INJ-01-17	Thallium	FALSE	FALSE	FALSE	No
INJ-01-17	Thallium (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Toluene	FALSE	FALSE	FALSE	No
INJ-01-17	Total PCBs	FALSE	FALSE	FALSE	No
INJ-01-17	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-01-17	Trichloroethene	FALSE	FALSE	FALSE	No
INJ-01-17	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
INJ-01-17	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
INJ-01-17	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
INJ-01-17	Vanadium	FALSE	FALSE	FALSE	No
INJ-01-17	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
INJ-01-17	Vinyl chloride	FALSE	FALSE	FALSE	No
INJ-01-17	Xylene (Total)	FALSE	FALSE	FALSE	No
INJ-01-17	Zinc	FALSE	TRUE	FALSE	No
INJ-01-17	Zinc (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-02-18	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
INJ-02-18	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
INJ-02-18	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
INJ-02-18	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
INJ-02-18	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	1,4-Dioxane	FALSE	FALSE	FALSE	No
INJ-02-18	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
INJ-02-18	2-Hexanone	FALSE	FALSE	FALSE	No
INJ-02-18	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
INJ-02-18	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
INJ-02-18	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
INJ-02-18	Acetone	FALSE	FALSE	FALSE	No
INJ-02-18	Acrylonitrile	FALSE	FALSE	FALSE	No
INJ-02-18	Antimony	FALSE	FALSE	FALSE	No
INJ-02-18	Antimony (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
INJ-02-18	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
INJ-02-18	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
INJ-02-18	Arsenic	FALSE	TRUE	FALSE	No
INJ-02-18	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
INJ-02-18	Barium	FALSE	TRUE	FALSE	No
INJ-02-18	Barium (dissolved)	FALSE	TRUE	FALSE	No
INJ-02-18	Benzene	FALSE	FALSE	FALSE	No
INJ-02-18	Beryllium	FALSE	FALSE	FALSE	No
INJ-02-18	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Bromobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Bromodichloromethane	FALSE	FALSE	FALSE	No
INJ-02-18	Bromoform	FALSE	FALSE	FALSE	No
INJ-02-18	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
INJ-02-18	Cadmium	FALSE	FALSE	FALSE	No
INJ-02-18	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Carbon disulfide	FALSE	FALSE	FALSE	No
INJ-02-18	Carbon tetrachloride	FALSE	FALSE	FALSE	No
INJ-02-18	Chlorobenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Chloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
INJ-02-18	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
INJ-02-18	Chromium	FALSE	FALSE	FALSE	No
INJ-02-18	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-02-18	Cobalt	FALSE	FALSE	FALSE	No
INJ-02-18	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Copper	FALSE	FALSE	TRUE	No
INJ-02-18	Copper (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Dibromochloromethane	FALSE	FALSE	FALSE	No
INJ-02-18	Dibromomethane	FALSE	FALSE	FALSE	No
INJ-02-18	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
INJ-02-18	Ethyl ether	FALSE	FALSE	FALSE	No
INJ-02-18	Ethylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Hexachloroethane	FALSE	FALSE	FALSE	No
INJ-02-18	Iron (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Isopropyl benzene	FALSE	FALSE	FALSE	No
INJ-02-18	Lead	FALSE	FALSE	FALSE	No
INJ-02-18	Lead (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Magnesium	FALSE	TRUE	FALSE	No
INJ-02-18	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Manganese	FALSE	TRUE	TRUE	No
INJ-02-18	Manganese (dissolved)	FALSE	TRUE	TRUE	No
INJ-02-18	Mercury	FALSE	FALSE	FALSE	No
INJ-02-18	Mercury (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
INJ-02-18	Methylene chloride	FALSE	FALSE	FALSE	No
INJ-02-18	Naphthalene	FALSE	FALSE	FALSE	No
INJ-02-18	N-Butylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Nickel	FALSE	FALSE	FALSE	No
INJ-02-18	Nickel (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	N-Propylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Phenanthrene	FALSE	FALSE	FALSE	No
INJ-02-18	Selenium	FALSE	FALSE	FALSE	No
INJ-02-18	Selenium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Silver	FALSE	FALSE	FALSE	No
INJ-02-18	Silver (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Styrene	FALSE	FALSE	FALSE	No
INJ-02-18	tert-Butylbenzene	FALSE	FALSE	FALSE	No
INJ-02-18	Tetrachloroethene	FALSE	FALSE	FALSE	No
INJ-02-18	Tetrahydrofuran	FALSE	FALSE	FALSE	No
INJ-02-18	Thallium	FALSE	FALSE	FALSE	No
INJ-02-18	Thallium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Toluene	FALSE	FALSE	FALSE	No
INJ-02-18	Total PCBs	FALSE	FALSE	FALSE	No
INJ-02-18	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
INJ-02-18	Trichloroethene	FALSE	FALSE	FALSE	No
INJ-02-18	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
INJ-02-18	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
INJ-02-18	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
INJ-02-18	Vanadium	FALSE	FALSE	FALSE	No
INJ-02-18	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
INJ-02-18	Vinyl chloride	FALSE	FALSE	FALSE	No
INJ-02-18	Xylene (Total)	FALSE	FALSE	FALSE	No
INJ-02-18	Zinc	FALSE	FALSE	FALSE	No
INJ-02-18	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-01-17	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MW-01-17	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MW-01-17	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MW-01-17	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MW-01-17	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MW-01-17	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-01-17	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MW-01-17	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-01-17	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MW-01-17	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MW-01-17	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-01-17	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MW-01-17	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MW-01-17	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-01-17	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-01-17	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-01-17	1,4-Dioxane	TRUE	FALSE	TRUE	No
MW-01-17	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MW-01-17	2-Hexanone	TRUE	FALSE	FALSE	No
MW-01-17	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-01-17	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-01-17	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MW-01-17	Acetone	TRUE	FALSE	FALSE	No
MW-01-17	Acrylonitrile	FALSE	FALSE	FALSE	No
MW-01-17	Antimony	FALSE	FALSE	FALSE	No
MW-01-17	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MW-01-17	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MW-01-17	Arsenic	FALSE	FALSE	FALSE	No
MW-01-17	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Barium	FALSE	FALSE	FALSE	No
MW-01-17	Barium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Benzene	TRUE	FALSE	FALSE	No
MW-01-17	Beryllium	FALSE	FALSE	FALSE	No
MW-01-17	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Bromobenzene	FALSE	FALSE	FALSE	No
MW-01-17	Bromodichloromethane	TRUE	FALSE	FALSE	No
MW-01-17	Bromoform	TRUE	FALSE	FALSE	No
MW-01-17	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MW-01-17	Cadmium	FALSE	FALSE	FALSE	No
MW-01-17	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Carbon disulfide	TRUE	FALSE	FALSE	No
MW-01-17	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW-01-17	Chlorobenzene	TRUE	FALSE	FALSE	No
MW-01-17	Chloroethane	TRUE	FALSE	FALSE	No
MW-01-17	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW-01-17	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW-01-17	Chromium	FALSE	FALSE	FALSE	No
MW-01-17	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-01-17	Cobalt	FALSE	FALSE	FALSE	No
MW-01-17	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Copper	FALSE	FALSE	FALSE	No
MW-01-17	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Dibromochloromethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-01-17	Dibromomethane	FALSE	FALSE	FALSE	No
MW-01-17	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MW-01-17	Ethyl ether	FALSE	FALSE	FALSE	No
MW-01-17	Ethylbenzene	TRUE	FALSE	FALSE	No
MW-01-17	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-01-17	Iron	FALSE	FALSE	FALSE	No
MW-01-17	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW-01-17	Lead	FALSE	FALSE	FALSE	No
MW-01-17	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Magnesium	FALSE	FALSE	FALSE	No
MW-01-17	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Manganese	FALSE	FALSE	FALSE	No
MW-01-17	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Mercury	FALSE	FALSE	FALSE	No
MW-01-17	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW-01-17	Methylene chloride	TRUE	FALSE	FALSE	No
MW-01-17	Naphthalene	FALSE	FALSE	FALSE	No
MW-01-17	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-01-17	Nickel	FALSE	FALSE	FALSE	No
MW-01-17	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-01-17	Phenanthrene	FALSE	FALSE	FALSE	No
MW-01-17	Selenium	FALSE	FALSE	FALSE	No
MW-01-17	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Silver	FALSE	FALSE	FALSE	No
MW-01-17	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Styrene	TRUE	FALSE	FALSE	No
MW-01-17	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-01-17	Tetrachloroethene	TRUE	FALSE	FALSE	No
MW-01-17	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-01-17	Thallium	FALSE	FALSE	FALSE	No
MW-01-17	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Toluene	TRUE	FALSE	FALSE	No
MW-01-17	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MW-01-17	Total PCBs	FALSE	FALSE	FALSE	No
MW-01-17	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-01-17	Trichloroethene	TRUE	FALSE	FALSE	No
MW-01-17	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW-01-17	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW-01-17	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW-01-17	Vanadium	FALSE	FALSE	FALSE	No
MW-01-17	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MW-01-17	Vinyl chloride	TRUE	FALSE	FALSE	No
MW-01-17	Xylene (Total)	FALSE	FALSE	FALSE	No
MW-01-17	Zinc	FALSE	FALSE	FALSE	No
MW-01-17	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MW-02-17	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-02-17	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MW-02-17	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MW-02-17	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MW-02-17	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MW-02-17	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MW-02-17	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MW-02-17	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-02-17	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MW-02-17	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MW-02-17	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MW-02-17	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-02-17	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MW-02-17	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MW-02-17	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-02-17	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-02-17	1,4-Dioxane	TRUE	TRUE	FALSE	No
MW-02-17	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-02-17	2-Hexanone	TRUE	FALSE	FALSE	No
MW-02-17	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-02-17	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-02-17	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MW-02-17	Acetone	TRUE	FALSE	FALSE	No
MW-02-17	Acrylonitrile	FALSE	FALSE	FALSE	No
MW-02-17	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MW-02-17	Antimony	FALSE	FALSE	FALSE	No
MW-02-17	Arsenic	FALSE	FALSE	FALSE	No
MW-02-17	Barium	FALSE	FALSE	FALSE	No
MW-02-17	Benzene	TRUE	FALSE	FALSE	No
MW-02-17	Beryllium	FALSE	FALSE	FALSE	No
MW-02-17	Bromobenzene	FALSE	FALSE	FALSE	No
MW-02-17	Bromodichloromethane	TRUE	FALSE	FALSE	No
MW-02-17	Bromoform	TRUE	FALSE	FALSE	No
MW-02-17	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MW-02-17	Cadmium	FALSE	FALSE	FALSE	No
MW-02-17	Calcium	FALSE	FALSE	FALSE	No
MW-02-17	Carbon disulfide	TRUE	FALSE	FALSE	No
MW-02-17	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW-02-17	Chlorobenzene	TRUE	FALSE	FALSE	No
MW-02-17	Chlorobromomethane	FALSE	FALSE	FALSE	No
MW-02-17	Chloroethane	TRUE	FALSE	FALSE	No
MW-02-17	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW-02-17	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW-02-17	Chromium	FALSE	FALSE	FALSE	No
MW-02-17	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-02-17	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MW-02-17	Cobalt	FALSE	FALSE	FALSE	No
MW-02-17	Copper	FALSE	FALSE	FALSE	No
MW-02-17	Cyclohexane	TRUE	FALSE	FALSE	No
MW-02-17	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MW-02-17	Dibromochloromethane	TRUE	FALSE	FALSE	No
MW-02-17	Dibromomethane	FALSE	FALSE	FALSE	No
MW-02-17	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MW-02-17	Ethyl ether	FALSE	FALSE	FALSE	No
MW-02-17	Ethylbenzene	TRUE	FALSE	FALSE	No
MW-02-17	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-02-17	Iodomethane	FALSE	FALSE	FALSE	No
MW-02-17	Iron	FALSE	FALSE	FALSE	No
MW-02-17	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-02-17	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW-02-17	Lead	FALSE	FALSE	FALSE	No
MW-02-17	m&p-Xylene	TRUE	FALSE	FALSE	No
MW-02-17	Magnesium	FALSE	FALSE	FALSE	No
MW-02-17	Manganese	FALSE	FALSE	FALSE	No
MW-02-17	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-02-17	Mercury	FALSE	FALSE	FALSE	No
MW-02-17	Methyl acetate	TRUE	FALSE	FALSE	No
MW-02-17	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MW-02-17	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW-02-17	Methylene chloride	TRUE	FALSE	FALSE	No
MW-02-17	Naphthalene	FALSE	FALSE	FALSE	No
MW-02-17	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	Nickel	FALSE	FALSE	FALSE	No
MW-02-17	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	o-Xylene	TRUE	FALSE	FALSE	No
MW-02-17	Selenium	FALSE	FALSE	FALSE	No
MW-02-17	Silver	FALSE	FALSE	FALSE	No
MW-02-17	Styrene	TRUE	FALSE	FALSE	No
MW-02-17	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-02-17	Tetrachloroethene	TRUE	TRUE	FALSE	No
MW-02-17	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-02-17	Thallium	FALSE	FALSE	FALSE	No
MW-02-17	Toluene	TRUE	FALSE	FALSE	No
MW-02-17	Total Xylenes	FALSE	FALSE	FALSE	No
MW-02-17	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-02-17	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MW-02-17	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-02-17	Trichloroethene	TRUE	TRUE	FALSE	No
MW-02-17	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW-02-17	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW-02-17	Vanadium	FALSE	FALSE	FALSE	No
MW-02-17	Vinyl chloride	TRUE	FALSE	FALSE	No
MW-02-17	Zinc	FALSE	FALSE	FALSE	No
MW-03-17	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MW-03-17	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-03-17	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MW-03-17	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MW-03-17	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MW-03-17	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MW-03-17	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-03-17	1,4-Dioxane	FALSE	FALSE	FALSE	No
MW-03-17	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MW-03-17	2-Hexanone	FALSE	FALSE	FALSE	No
MW-03-17	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-03-17	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-03-17	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MW-03-17	Acetone	FALSE	FALSE	FALSE	No
MW-03-17	Acrylonitrile	FALSE	FALSE	FALSE	No
MW-03-17	Antimony	FALSE	FALSE	FALSE	No
MW-03-17	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MW-03-17	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MW-03-17	Arsenic	FALSE	TRUE	TRUE	No
MW-03-17	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Barium	FALSE	TRUE	FALSE	No
MW-03-17	Barium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Benzene	FALSE	FALSE	FALSE	No
MW-03-17	Beryllium	FALSE	FALSE	FALSE	No
MW-03-17	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Bromobenzene	FALSE	FALSE	FALSE	No
MW-03-17	Bromodichloromethane	FALSE	FALSE	FALSE	No
MW-03-17	Bromoform	FALSE	FALSE	FALSE	No
MW-03-17	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MW-03-17	Cadmium	FALSE	FALSE	FALSE	No
MW-03-17	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Carbon disulfide	FALSE	FALSE	FALSE	No
MW-03-17	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MW-03-17	Chlorobenzene	FALSE	FALSE	FALSE	No
MW-03-17	Chloroethane	FALSE	FALSE	FALSE	No
MW-03-17	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MW-03-17	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MW-03-17	Chromium	FALSE	FALSE	FALSE	No
MW-03-17	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MW-03-17	Cobalt	FALSE	FALSE	FALSE	No
MW-03-17	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Copper	FALSE	FALSE	FALSE	No
MW-03-17	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Dibromochloromethane	FALSE	FALSE	FALSE	No
MW-03-17	Dibromomethane	FALSE	FALSE	FALSE	No
MW-03-17	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-03-17	Ethyl ether	FALSE	FALSE	FALSE	No
MW-03-17	Ethylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-03-17	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Isopropyl benzene	FALSE	FALSE	FALSE	No
MW-03-17	Lead	FALSE	FALSE	FALSE	No
MW-03-17	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Magnesium	FALSE	TRUE	FALSE	No
MW-03-17	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Manganese	FALSE	TRUE	TRUE	No
MW-03-17	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Mercury	FALSE	FALSE	FALSE	No
MW-03-17	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MW-03-17	Methylene chloride	FALSE	FALSE	FALSE	No
MW-03-17	Naphthalene	FALSE	FALSE	FALSE	No
MW-03-17	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	Nickel	FALSE	FALSE	FALSE	No
MW-03-17	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	Phenanthrene	FALSE	FALSE	FALSE	No
MW-03-17	Selenium	FALSE	FALSE	FALSE	No
MW-03-17	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Silver	FALSE	FALSE	FALSE	No
MW-03-17	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Styrene	FALSE	FALSE	FALSE	No
MW-03-17	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-03-17	Tetrachloroethene	FALSE	FALSE	FALSE	No
MW-03-17	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-03-17	Thallium	FALSE	FALSE	FALSE	No
MW-03-17	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Toluene	FALSE	FALSE	FALSE	No
MW-03-17	Total PCBs	FALSE	FALSE	FALSE	No
MW-03-17	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MW-03-17	Trichloroethene	FALSE	FALSE	FALSE	No
MW-03-17	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW-03-17	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MW-03-17	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MW-03-17	Vanadium	FALSE	FALSE	FALSE	No
MW-03-17	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MW-03-17	Vinyl chloride	FALSE	FALSE	FALSE	No
MW-03-17	Xylene (Total)	FALSE	FALSE	FALSE	No
MW-03-17	Zinc	FALSE	FALSE	FALSE	No
MW-03-17	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MW-04-17	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-04-17	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MW-04-17	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MW-04-17	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MW-04-17	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MW-04-17	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MW-04-17	1,4-Dioxane	FALSE	FALSE	FALSE	No
MW-04-17	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MW-04-17	2-Hexanone	FALSE	FALSE	FALSE	No
MW-04-17	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-04-17	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-04-17	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MW-04-17	Acetone	FALSE	FALSE	FALSE	No
MW-04-17	Acrylonitrile	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-04-17	Antimony	FALSE	FALSE	FALSE	No
MW-04-17	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MW-04-17	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MW-04-17	Arsenic	FALSE	TRUE	TRUE	No
MW-04-17	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Barium	FALSE	TRUE	FALSE	No
MW-04-17	Barium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Benzene	FALSE	FALSE	FALSE	No
MW-04-17	Beryllium	FALSE	FALSE	FALSE	No
MW-04-17	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Bromobenzene	FALSE	FALSE	FALSE	No
MW-04-17	Bromodichloromethane	FALSE	FALSE	FALSE	No
MW-04-17	Bromoform	FALSE	FALSE	FALSE	No
MW-04-17	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MW-04-17	Cadmium	FALSE	FALSE	FALSE	No
MW-04-17	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Carbon disulfide	FALSE	FALSE	FALSE	No
MW-04-17	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MW-04-17	Chlorobenzene	FALSE	FALSE	FALSE	No
MW-04-17	Chloroethane	FALSE	FALSE	FALSE	No
MW-04-17	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MW-04-17	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MW-04-17	Chromium	FALSE	FALSE	FALSE	No
MW-04-17	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MW-04-17	Cobalt	FALSE	FALSE	FALSE	No
MW-04-17	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Copper	FALSE	FALSE	FALSE	No
MW-04-17	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Dibromochloromethane	FALSE	FALSE	FALSE	No
MW-04-17	Dibromomethane	FALSE	FALSE	FALSE	No
MW-04-17	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MW-04-17	Ethyl ether	FALSE	FALSE	FALSE	No
MW-04-17	Ethylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-04-17	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Isopropyl benzene	FALSE	FALSE	FALSE	No
MW-04-17	Lead	FALSE	FALSE	FALSE	No
MW-04-17	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Magnesium	FALSE	TRUE	FALSE	No
MW-04-17	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Manganese	FALSE	TRUE	TRUE	No
MW-04-17	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Mercury	FALSE	FALSE	FALSE	No
MW-04-17	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MW-04-17	Methylene chloride	FALSE	FALSE	FALSE	No
MW-04-17	Naphthalene	FALSE	FALSE	FALSE	No
MW-04-17	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	Nickel	FALSE	FALSE	FALSE	No
MW-04-17	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	Phenanthrene	FALSE	FALSE	FALSE	No
MW-04-17	Selenium	FALSE	FALSE	FALSE	No
MW-04-17	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Silver	FALSE	FALSE	FALSE	No
MW-04-17	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Styrene	FALSE	FALSE	FALSE	No
MW-04-17	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-04-17	Tetrachloroethene	FALSE	FALSE	FALSE	No
MW-04-17	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-04-17	Thallium	FALSE	FALSE	FALSE	No
MW-04-17	Thallium (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-04-17	Toluene	FALSE	FALSE	FALSE	No
MW-04-17	Total PCBs	FALSE	FALSE	FALSE	No
MW-04-17	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MW-04-17	Trichloroethene	FALSE	FALSE	FALSE	No
MW-04-17	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW-04-17	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MW-04-17	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MW-04-17	Vanadium	FALSE	FALSE	FALSE	No
MW-04-17	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MW-04-17	Vinyl chloride	FALSE	FALSE	FALSE	No
MW-04-17	Xylene (Total)	FALSE	FALSE	FALSE	No
MW-04-17	Zinc	FALSE	FALSE	FALSE	No
MW-04-17	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MW-05-18	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-05-18	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MW-05-18	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MW-05-18	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MW-05-18	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MW-05-18	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MW-05-18	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MW-05-18	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-05-18	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MW-05-18	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MW-05-18	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MW-05-18	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-05-18	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MW-05-18	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MW-05-18	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-05-18	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-05-18	1,4-Dioxane	TRUE	TRUE	FALSE	No
MW-05-18	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MW-05-18	2-Hexanone	TRUE	FALSE	FALSE	No
MW-05-18	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-05-18	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-05-18	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MW-05-18	Acetone	TRUE	FALSE	FALSE	No
MW-05-18	Acrylonitrile	FALSE	FALSE	FALSE	No
MW-05-18	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MW-05-18	Antimony	FALSE	FALSE	FALSE	No
MW-05-18	Arsenic	FALSE	FALSE	FALSE	No
MW-05-18	Barium	FALSE	FALSE	FALSE	No
MW-05-18	Benzene	TRUE	FALSE	FALSE	No
MW-05-18	Beryllium	FALSE	FALSE	FALSE	No
MW-05-18	Bromobenzene	FALSE	FALSE	FALSE	No
MW-05-18	Bromodichloromethane	TRUE	FALSE	FALSE	No
MW-05-18	Bromoform	TRUE	FALSE	FALSE	No
MW-05-18	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MW-05-18	Cadmium	FALSE	FALSE	FALSE	No
MW-05-18	Calcium	FALSE	FALSE	FALSE	No
MW-05-18	Carbon disulfide	TRUE	FALSE	FALSE	No
MW-05-18	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW-05-18	Chlorobenzene	TRUE	FALSE	FALSE	No
MW-05-18	Chlorobromomethane	FALSE	FALSE	FALSE	No
MW-05-18	Chloroethane	TRUE	FALSE	FALSE	No
MW-05-18	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW-05-18	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW-05-18	Chromium	FALSE	FALSE	FALSE	No
MW-05-18	cis-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MW-05-18	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MW-05-18	Cobalt	FALSE	FALSE	FALSE	No
MW-05-18	Copper	FALSE	FALSE	FALSE	No
MW-05-18	Cyclohexane	TRUE	FALSE	FALSE	No
MW-05-18	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MW-05-18	Dibromochloromethane	TRUE	FALSE	FALSE	No
MW-05-18	Dibromomethane	FALSE	FALSE	FALSE	No
MW-05-18	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No

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RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-05-18	Ethyl ether	FALSE	FALSE	FALSE	No
MW-05-18	Ethylbenzene	TRUE	FALSE	FALSE	No
MW-05-18	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-05-18	Iodomethane	FALSE	FALSE	FALSE	No
MW-05-18	Iron	FALSE	FALSE	FALSE	No
MW-05-18	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-05-18	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW-05-18	Lead	FALSE	FALSE	FALSE	No
MW-05-18	m&p-Xylene	TRUE	FALSE	FALSE	No
MW-05-18	Magnesium	FALSE	FALSE	FALSE	No
MW-05-18	Manganese	FALSE	FALSE	FALSE	No
MW-05-18	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-05-18	Mercury	FALSE	FALSE	FALSE	No
MW-05-18	Methyl acetate	TRUE	FALSE	FALSE	No
MW-05-18	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MW-05-18	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW-05-18	Methylene chloride	TRUE	FALSE	FALSE	No
MW-05-18	Naphthalene	FALSE	FALSE	FALSE	No
MW-05-18	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	Nickel	FALSE	FALSE	FALSE	No
MW-05-18	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	o-Xylene	TRUE	FALSE	FALSE	No
MW-05-18	Selenium	FALSE	FALSE	FALSE	No
MW-05-18	Silver	FALSE	FALSE	FALSE	No
MW-05-18	Styrene	TRUE	FALSE	FALSE	No
MW-05-18	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-05-18	Tetrachloroethene	TRUE	FALSE	FALSE	No
MW-05-18	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-05-18	Thallium	FALSE	FALSE	FALSE	No
MW-05-18	Toluene	TRUE	FALSE	FALSE	No
MW-05-18	Total Xylenes	FALSE	FALSE	FALSE	No
MW-05-18	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-05-18	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MW-05-18	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MW-05-18	Trichloroethene	TRUE	FALSE	FALSE	No
MW-05-18	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW-05-18	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW-05-18	Vanadium	FALSE	FALSE	FALSE	No
MW-05-18	Vinyl chloride	TRUE	FALSE	FALSE	No
MW-05-18	Zinc	FALSE	FALSE	FALSE	No
MW-40-99	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW-40-99	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MW-40-99	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MW-40-99	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MW-40-99	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MW-40-99	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MW-40-99	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW-40-99	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MW-40-99	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-40-99	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MW-40-99	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MW-40-99	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-40-99	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MW-40-99	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MW-40-99	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MW-40-99	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-40-99	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MW-40-99	1,4-Dioxane	TRUE	FALSE	TRUE	No
MW-40-99	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MW-40-99	2-Hexanone	TRUE	FALSE	FALSE	No
MW-40-99	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MW-40-99	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MW-40-99	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MW-40-99	Acetone	TRUE	FALSE	FALSE	No
MW-40-99	Acrylonitrile	FALSE	FALSE	FALSE	No
MW-40-99	Antimony	FALSE	FALSE	FALSE	No
MW-40-99	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
MW-40-99	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No

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Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-40-99	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
MW-40-99	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
MW-40-99	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
MW-40-99	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
MW-40-99	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
MW-40-99	Arsenic	FALSE	FALSE	FALSE	No
MW-40-99	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Barium	FALSE	FALSE	FALSE	No
MW-40-99	Barium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Benzene	TRUE	FALSE	FALSE	No
MW-40-99	Beryllium	FALSE	FALSE	FALSE	No
MW-40-99	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Bromobenzene	FALSE	FALSE	FALSE	No
MW-40-99	Bromodichloromethane	TRUE	FALSE	FALSE	No
MW-40-99	Bromoform	TRUE	FALSE	FALSE	No
MW-40-99	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MW-40-99	Cadmium	FALSE	FALSE	FALSE	No
MW-40-99	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Carbon disulfide	TRUE	FALSE	FALSE	No
MW-40-99	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW-40-99	Chlorobenzene	TRUE	FALSE	FALSE	No
MW-40-99	Chloroethane	TRUE	FALSE	FALSE	No
MW-40-99	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW-40-99	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW-40-99	Chromium	FALSE	FALSE	FALSE	No
MW-40-99	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-40-99	Cobalt	FALSE	FALSE	FALSE	No
MW-40-99	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Copper	FALSE	FALSE	FALSE	No
MW-40-99	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Dibromochloromethane	TRUE	FALSE	FALSE	No
MW-40-99	Dibromomethane	FALSE	FALSE	FALSE	No
MW-40-99	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MW-40-99	Ethyl ether	FALSE	FALSE	FALSE	No
MW-40-99	Ethylbenzene	TRUE	FALSE	FALSE	No
MW-40-99	Hexachloroethane	FALSE	FALSE	FALSE	No
MW-40-99	Iron	FALSE	FALSE	FALSE	No
MW-40-99	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW-40-99	Lead	FALSE	FALSE	FALSE	No
MW-40-99	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Magnesium	FALSE	FALSE	FALSE	No
MW-40-99	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Manganese	FALSE	FALSE	FALSE	No
MW-40-99	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Mercury	FALSE	FALSE	FALSE	No
MW-40-99	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW-40-99	Methylene chloride	TRUE	FALSE	FALSE	No
MW-40-99	Naphthalene	FALSE	FALSE	FALSE	No
MW-40-99	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW-40-99	Nickel	FALSE	FALSE	FALSE	No
MW-40-99	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW-40-99	Phenanthrene	FALSE	FALSE	FALSE	No
MW-40-99	Selenium	FALSE	FALSE	FALSE	No
MW-40-99	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Silver	FALSE	FALSE	FALSE	No
MW-40-99	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Styrene	TRUE	FALSE	FALSE	No
MW-40-99	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW-40-99	Tetrachloroethene	TRUE	FALSE	FALSE	No
MW-40-99	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW-40-99	Thallium	FALSE	FALSE	FALSE	No
MW-40-99	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Toluene	TRUE	FALSE	FALSE	No
MW-40-99	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MW-40-99	Total PCBs	TRUE	FALSE	FALSE	No

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Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW-40-99	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW-40-99	Trichloroethene	TRUE	FALSE	FALSE	No
MW-40-99	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW-40-99	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW-40-99	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW-40-99	Vanadium	FALSE	FALSE	FALSE	No
MW-40-99	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MW-40-99	Vinyl chloride	TRUE	FALSE	FALSE	No
MW-40-99	Xylene (Total)	FALSE	FALSE	FALSE	No
MW-40-99	Zinc	FALSE	FALSE	FALSE	No
MW-40-99	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWF12-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-01	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF12-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF12-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF12-01	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF12-01	1,1-Dichloroethene	TRUE	TRUE	FALSE	No
MWF12-01	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF12-01	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF12-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF12-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF12-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF12-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-01	1,4-Dioxane	FALSE	TRUE	FALSE	No
MWF12-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF12-01	2-Hexanone	TRUE	FALSE	FALSE	No
MWF12-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF12-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF12-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF12-01	Acetone	TRUE	FALSE	FALSE	No
MWF12-01	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF12-01	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF12-01	Antimony	FALSE	FALSE	FALSE	No
MWF12-01	Arsenic	FALSE	FALSE	FALSE	No
MWF12-01	Barium	FALSE	FALSE	FALSE	No
MWF12-01	Benzene	TRUE	FALSE	FALSE	No
MWF12-01	Beryllium	FALSE	FALSE	FALSE	No
MWF12-01	Bromobenzene	FALSE	FALSE	FALSE	No
MWF12-01	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF12-01	Bromoform	TRUE	FALSE	FALSE	No
MWF12-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF12-01	Cadmium	FALSE	FALSE	FALSE	No
MWF12-01	Calcium	FALSE	FALSE	FALSE	No
MWF12-01	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF12-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF12-01	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF12-01	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF12-01	Chloroethane	TRUE	FALSE	FALSE	No
MWF12-01	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWF12-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF12-01	Chromium	FALSE	FALSE	FALSE	No
MWF12-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF12-01	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF12-01	Cobalt	FALSE	FALSE	FALSE	No
MWF12-01	Copper	FALSE	FALSE	FALSE	No
MWF12-01	Cyclohexane	TRUE	FALSE	FALSE	No
MWF12-01	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF12-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF12-01	Dibromomethane	FALSE	FALSE	FALSE	No
MWF12-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF12-01	Ethyl ether	FALSE	FALSE	FALSE	No
MWF12-01	Ethylbenzene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF12-01	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF12-01	Iodomethane	FALSE	FALSE	FALSE	No
MWF12-01	Iron	FALSE	FALSE	FALSE	No
MWF12-01	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF12-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF12-01	Lead	FALSE	FALSE	FALSE	No
MWF12-01	m&p-Xylene	FALSE	FALSE	FALSE	No
MWF12-01	Magnesium	FALSE	FALSE	FALSE	No
MWF12-01	Manganese	FALSE	TRUE	FALSE	No
MWF12-01	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF12-01	Mercury	FALSE	FALSE	FALSE	No
MWF12-01	Methyl acetate	TRUE	FALSE	FALSE	No
MWF12-01	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF12-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF12-01	Methylene chloride	TRUE	FALSE	FALSE	No
MWF12-01	Naphthalene	FALSE	FALSE	FALSE	No
MWF12-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	Nickel	FALSE	FALSE	FALSE	No
MWF12-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	o-Xylene	FALSE	FALSE	FALSE	No
MWF12-01	Selenium	FALSE	FALSE	FALSE	No
MWF12-01	Silver	FALSE	FALSE	FALSE	No
MWF12-01	Styrene	TRUE	FALSE	FALSE	No
MWF12-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWF12-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF12-01	Thallium	FALSE	FALSE	FALSE	No
MWF12-01	Toluene	TRUE	FALSE	FALSE	No
MWF12-01	Total Xylenes	FALSE	FALSE	FALSE	No
MWF12-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF12-01	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF12-01	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF12-01	Trichloroethene	TRUE	FALSE	FALSE	No
MWF12-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF12-01	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF12-01	Vanadium	FALSE	FALSE	FALSE	No
MWF12-01	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF12-01	Zinc	FALSE	FALSE	FALSE	No
MWF12-01R	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	1,1,1-Trichloroethane	FALSE	TRUE	FALSE	No
MWF12-01R	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	1,1-Dichloroethane	FALSE	TRUE	FALSE	No
MWF12-01R	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF12-01R	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWF12-01R	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWF12-01R	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWF12-01R	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	1,4-Dioxane	FALSE	TRUE	FALSE	No
MWF12-01R	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWF12-01R	2-Hexanone	FALSE	FALSE	FALSE	No
MWF12-01R	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF12-01R	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF12-01R	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWF12-01R	Acetone	FALSE	FALSE	FALSE	No
MWF12-01R	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF12-01R	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF12-01R	Antimony	FALSE	FALSE	FALSE	No
MWF12-01R	Arsenic	FALSE	FALSE	FALSE	No
MWF12-01R	Barium	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF12-01R	Benzene	FALSE	FALSE	FALSE	No
MWF12-01R	Beryllium	FALSE	FALSE	FALSE	No
MWF12-01R	Bromobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWF12-01R	Bromoform	FALSE	FALSE	FALSE	No
MWF12-01R	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWF12-01R	Cadmium	FALSE	FALSE	FALSE	No
MWF12-01R	Calcium	FALSE	FALSE	FALSE	No
MWF12-01R	Carbon disulfide	FALSE	FALSE	FALSE	No
MWF12-01R	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWF12-01R	Chlorobenzene	FALSE	FALSE	FALSE	No
MWF12-01R	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF12-01R	Chloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWF12-01R	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWF12-01R	Chromium	FALSE	FALSE	FALSE	No
MWF12-01R	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-01R	cis-1,3-Dichloropropene	FALSE	FALSE	FALSE	No
MWF12-01R	Cobalt	FALSE	FALSE	FALSE	No
MWF12-01R	Copper	FALSE	FALSE	FALSE	No
MWF12-01R	Cyclohexane	FALSE	FALSE	FALSE	No
MWF12-01R	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF12-01R	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWF12-01R	Dibromomethane	FALSE	FALSE	FALSE	No
MWF12-01R	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWF12-01R	Ethyl ether	FALSE	FALSE	FALSE	No
MWF12-01R	Ethylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF12-01R	Iodomethane	FALSE	FALSE	FALSE	No
MWF12-01R	Iron	FALSE	FALSE	FALSE	No
MWF12-01R	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF12-01R	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWF12-01R	Lead	FALSE	FALSE	FALSE	No
MWF12-01R	m&p-Xylene	FALSE	FALSE	FALSE	No
MWF12-01R	Magnesium	FALSE	FALSE	FALSE	No
MWF12-01R	Manganese	FALSE	TRUE	FALSE	No
MWF12-01R	Manganese (dissolved)	FALSE	TRUE	FALSE	No
MWF12-01R	Mercury	FALSE	FALSE	FALSE	No
MWF12-01R	Methyl acetate	FALSE	FALSE	FALSE	No
MWF12-01R	Methyl cyclohexane	FALSE	FALSE	FALSE	No
MWF12-01R	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWF12-01R	Methylene chloride	FALSE	FALSE	FALSE	No
MWF12-01R	Naphthalene	FALSE	FALSE	FALSE	No
MWF12-01R	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	Nickel	FALSE	FALSE	FALSE	No
MWF12-01R	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	o-Xylene	FALSE	FALSE	FALSE	No
MWF12-01R	Selenium	FALSE	FALSE	FALSE	No
MWF12-01R	Silver	FALSE	FALSE	FALSE	No
MWF12-01R	Styrene	FALSE	FALSE	FALSE	No
MWF12-01R	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-01R	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWF12-01R	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF12-01R	Thallium	FALSE	FALSE	FALSE	No
MWF12-01R	Toluene	FALSE	FALSE	FALSE	No
MWF12-01R	Total Xylenes	FALSE	FALSE	FALSE	No
MWF12-01R	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-01R	trans-1,3-Dichloropropene	FALSE	FALSE	FALSE	No
MWF12-01R	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF12-01R	Trichloroethene	FALSE	FALSE	FALSE	No
MWF12-01R	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWF12-01R	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWF12-01R	Vanadium	FALSE	FALSE	FALSE	No
MWF12-01R	Vinyl chloride	FALSE	FALSE	FALSE	No
MWF12-01R	Zinc	FALSE	FALSE	FALSE	No
MWF12-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-02	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF12-02	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF12-02	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF12-02	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF12-02	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWF12-02	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF12-02	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF12-02	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF12-02	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-02	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF12-02	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF12-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-02	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF12-02	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWF12-02	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF12-02	2-Hexanone	TRUE	FALSE	FALSE	No
MWF12-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF12-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF12-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF12-02	Acetone	TRUE	FALSE	FALSE	No
MWF12-02	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF12-02	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF12-02	Antimony	FALSE	FALSE	FALSE	No
MWF12-02	Arsenic	FALSE	FALSE	FALSE	No
MWF12-02	Barium	FALSE	FALSE	FALSE	No
MWF12-02	Benzene	TRUE	FALSE	FALSE	No
MWF12-02	Beryllium	FALSE	FALSE	FALSE	No
MWF12-02	Bromobenzene	FALSE	FALSE	FALSE	No
MWF12-02	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF12-02	Bromoform	TRUE	FALSE	FALSE	No
MWF12-02	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF12-02	Cadmium	FALSE	FALSE	FALSE	No
MWF12-02	Calcium	FALSE	FALSE	FALSE	No
MWF12-02	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF12-02	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF12-02	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF12-02	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF12-02	Chloroethane	TRUE	FALSE	FALSE	No
MWF12-02	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWF12-02	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF12-02	Chromium	FALSE	FALSE	FALSE	No
MWF12-02	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF12-02	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF12-02	Cobalt	FALSE	FALSE	FALSE	No
MWF12-02	Copper	FALSE	FALSE	FALSE	No
MWF12-02	Cyclohexane	TRUE	FALSE	FALSE	No
MWF12-02	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF12-02	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF12-02	Dibromomethane	FALSE	FALSE	FALSE	No
MWF12-02	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF12-02	Ethyl ether	FALSE	FALSE	FALSE	No
MWF12-02	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF12-02	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF12-02	Iodomethane	FALSE	FALSE	FALSE	No
MWF12-02	Iron	FALSE	FALSE	FALSE	No
MWF12-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF12-02	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF12-02	Lead	FALSE	FALSE	FALSE	No
MWF12-02	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF12-02	Magnesium	FALSE	FALSE	FALSE	No
MWF12-02	Manganese	FALSE	TRUE	FALSE	No
MWF12-02	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF12-02	Mercury	FALSE	FALSE	FALSE	No
MWF12-02	Methyl acetate	TRUE	FALSE	FALSE	No
MWF12-02	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF12-02	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF12-02	Methylene chloride	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF12-02	Naphthalene	FALSE	FALSE	FALSE	No
MWF12-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	Nickel	FALSE	FALSE	FALSE	No
MWF12-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	o-Xylene	TRUE	FALSE	FALSE	No
MWF12-02	Selenium	FALSE	FALSE	FALSE	No
MWF12-02	Silver	FALSE	FALSE	FALSE	No
MWF12-02	Styrene	TRUE	FALSE	FALSE	No
MWF12-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-02	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWF12-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF12-02	Thallium	FALSE	FALSE	FALSE	No
MWF12-02	Toluene	TRUE	FALSE	FALSE	No
MWF12-02	Total Xylenes	FALSE	FALSE	FALSE	No
MWF12-02	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF12-02	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF12-02	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF12-02	Trichloroethene	TRUE	FALSE	FALSE	No
MWF12-02	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF12-02	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF12-02	Vanadium	FALSE	FALSE	FALSE	No
MWF12-02	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF12-02	Zinc	FALSE	FALSE	FALSE	No
MWF12-02R	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF12-02R	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWF12-02R	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWF12-02R	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWF12-02R	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWF12-02R	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWF12-02R	2-Hexanone	FALSE	FALSE	FALSE	No
MWF12-02R	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF12-02R	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF12-02R	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWF12-02R	Acetone	FALSE	FALSE	FALSE	No
MWF12-02R	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF12-02R	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF12-02R	Antimony	FALSE	FALSE	FALSE	No
MWF12-02R	Arsenic	FALSE	FALSE	FALSE	No
MWF12-02R	Barium	FALSE	TRUE	FALSE	No
MWF12-02R	Benzene	FALSE	FALSE	FALSE	No
MWF12-02R	Beryllium	FALSE	FALSE	FALSE	No
MWF12-02R	Bromobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWF12-02R	Bromoform	FALSE	FALSE	FALSE	No
MWF12-02R	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWF12-02R	Cadmium	FALSE	FALSE	FALSE	No
MWF12-02R	Calcium	FALSE	FALSE	FALSE	No
MWF12-02R	Carbon disulfide	FALSE	FALSE	FALSE	No
MWF12-02R	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWF12-02R	Chlorobenzene	FALSE	FALSE	FALSE	No
MWF12-02R	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF12-02R	Chloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWF12-02R	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF12-02R	Chromium	FALSE	FALSE	FALSE	No
MWF12-02R	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-02R	cis-1,3-Dichloropropene	FALSE	FALSE	FALSE	No
MWF12-02R	Cobalt	FALSE	FALSE	FALSE	No
MWF12-02R	Copper	FALSE	FALSE	FALSE	No
MWF12-02R	Cyclohexane	FALSE	FALSE	FALSE	No
MWF12-02R	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF12-02R	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWF12-02R	Dibromomethane	FALSE	FALSE	FALSE	No
MWF12-02R	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWF12-02R	Ethyl ether	FALSE	FALSE	FALSE	No
MWF12-02R	Ethylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF12-02R	Iodomethane	FALSE	FALSE	FALSE	No
MWF12-02R	Iron	FALSE	FALSE	FALSE	No
MWF12-02R	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF12-02R	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWF12-02R	Lead	FALSE	FALSE	FALSE	No
MWF12-02R	m&p-Xylene	FALSE	FALSE	FALSE	No
MWF12-02R	Magnesium	FALSE	FALSE	FALSE	No
MWF12-02R	Manganese	FALSE	TRUE	FALSE	No
MWF12-02R	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF12-02R	Mercury	FALSE	FALSE	FALSE	No
MWF12-02R	Methyl acetate	FALSE	FALSE	FALSE	No
MWF12-02R	Methyl cyclohexane	FALSE	FALSE	FALSE	No
MWF12-02R	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWF12-02R	Methylene chloride	FALSE	FALSE	FALSE	No
MWF12-02R	Naphthalene	FALSE	FALSE	FALSE	No
MWF12-02R	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	Nickel	FALSE	FALSE	FALSE	No
MWF12-02R	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	o-Xylene	FALSE	FALSE	FALSE	No
MWF12-02R	Selenium	FALSE	FALSE	FALSE	No
MWF12-02R	Silver	FALSE	FALSE	FALSE	No
MWF12-02R	Styrene	FALSE	FALSE	FALSE	No
MWF12-02R	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF12-02R	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWF12-02R	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF12-02R	Thallium	FALSE	FALSE	FALSE	No
MWF12-02R	Toluene	FALSE	FALSE	FALSE	No
MWF12-02R	Total Xylenes	FALSE	FALSE	FALSE	No
MWF12-02R	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWF12-02R	trans-1,3-Dichloropropene	FALSE	FALSE	FALSE	No
MWF12-02R	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF12-02R	Trichloroethene	FALSE	FALSE	FALSE	No
MWF12-02R	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWF12-02R	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWF12-02R	Vanadium	FALSE	FALSE	FALSE	No
MWF12-02R	Vinyl chloride	FALSE	FALSE	FALSE	No
MWF12-02R	Zinc	FALSE	FALSE	FALSE	No
MWF16-06	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF16-06	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF16-06	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF16-06	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF16-06	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF16-06	1,1-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-06	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF16-06	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF16-06	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-06	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF16-06	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF16-06	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-06	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF16-06	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF16-06	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-06	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF16-06	1,4-Dioxane	TRUE	TRUE	FALSE	No
MWF16-06	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF16-06	2-Hexanone	TRUE	FALSE	FALSE	No
MWF16-06	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF16-06	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF16-06	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF16-06	Acetone	TRUE	FALSE	FALSE	No
MWF16-06	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF16-06	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF16-06	Antimony	FALSE	FALSE	FALSE	No
MWF16-06	Arsenic	FALSE	FALSE	FALSE	No
MWF16-06	Barium	FALSE	FALSE	FALSE	No
MWF16-06	Benzene	TRUE	FALSE	FALSE	No
MWF16-06	Beryllium	FALSE	FALSE	FALSE	No
MWF16-06	Bromobenzene	FALSE	FALSE	FALSE	No
MWF16-06	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF16-06	Bromoform	TRUE	FALSE	FALSE	No
MWF16-06	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF16-06	Cadmium	FALSE	FALSE	FALSE	No
MWF16-06	Calcium	FALSE	FALSE	FALSE	No
MWF16-06	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF16-06	Carbon tetrachloride	TRUE	TRUE	FALSE	No
MWF16-06	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF16-06	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF16-06	Chloroethane	TRUE	FALSE	FALSE	No
MWF16-06	Chloroform (Trichloromethane)	TRUE	TRUE	FALSE	No
MWF16-06	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF16-06	Chromium	FALSE	FALSE	FALSE	No
MWF16-06	cis-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-06	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-06	Cobalt	FALSE	FALSE	FALSE	No
MWF16-06	Copper	FALSE	FALSE	FALSE	No
MWF16-06	Cyclohexane	TRUE	FALSE	FALSE	No
MWF16-06	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF16-06	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF16-06	Dibromomethane	FALSE	FALSE	FALSE	No
MWF16-06	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF16-06	Ethyl ether	FALSE	FALSE	FALSE	No
MWF16-06	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF16-06	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF16-06	Iodomethane	FALSE	FALSE	FALSE	No
MWF16-06	Iron	FALSE	TRUE	FALSE	No
MWF16-06	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF16-06	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF16-06	Lead	FALSE	FALSE	FALSE	No
MWF16-06	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF16-06	Magnesium	FALSE	FALSE	FALSE	No
MWF16-06	Manganese	FALSE	FALSE	FALSE	No
MWF16-06	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF16-06	Mercury	FALSE	FALSE	FALSE	No
MWF16-06	Methyl acetate	TRUE	FALSE	FALSE	No
MWF16-06	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF16-06	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF16-06	Methylene chloride	TRUE	FALSE	FALSE	No
MWF16-06	Naphthalene	FALSE	FALSE	FALSE	No
MWF16-06	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	Nickel	FALSE	FALSE	FALSE	No
MWF16-06	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	o-Xylene	TRUE	FALSE	FALSE	No
MWF16-06	Selenium	FALSE	FALSE	FALSE	No
MWF16-06	Silver	FALSE	FALSE	FALSE	No
MWF16-06	Styrene	TRUE	FALSE	FALSE	No
MWF16-06	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-06	Tetrachloroethene	TRUE	TRUE	FALSE	No
MWF16-06	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF16-06	Thallium	FALSE	FALSE	FALSE	No
MWF16-06	Toluene	TRUE	FALSE	FALSE	No
MWF16-06	Total Xylenes	FALSE	FALSE	FALSE	No
MWF16-06	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF16-06	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-06	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF16-06	Trichloroethene	TRUE	TRUE	FALSE	No
MWF16-06	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF16-06	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF16-06	Vanadium	FALSE	FALSE	FALSE	No
MWF16-06	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF16-06	Zinc	FALSE	FALSE	FALSE	No
MWF16-23	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF16-23	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF16-23	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF16-23	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF16-23	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF16-23	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWF16-23	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF16-23	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF16-23	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-23	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF16-23	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF16-23	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-23	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF16-23	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF16-23	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-23	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-23	1,4-Dioxane	TRUE	FALSE	FALSE	No
MWF16-23	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF16-23	2-Hexanone	TRUE	FALSE	FALSE	No
MWF16-23	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF16-23	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF16-23	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF16-23	Acetone	TRUE	FALSE	FALSE	No
MWF16-23	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF16-23	Alkalinity, total (as CaCO3)	FALSE	TRUE	FALSE	No
MWF16-23	Antimony	FALSE	FALSE	FALSE	No
MWF16-23	Arsenic	FALSE	FALSE	FALSE	No
MWF16-23	Barium	FALSE	FALSE	FALSE	No
MWF16-23	Benzene	TRUE	FALSE	FALSE	No
MWF16-23	Beryllium	FALSE	FALSE	FALSE	No
MWF16-23	Bromobenzene	FALSE	FALSE	FALSE	No
MWF16-23	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF16-23	Bromoform	TRUE	FALSE	FALSE	No
MWF16-23	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF16-23	Cadmium	FALSE	FALSE	FALSE	No
MWF16-23	Calcium	FALSE	TRUE	FALSE	No
MWF16-23	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF16-23	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF16-23	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF16-23	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF16-23	Chloroethane	TRUE	FALSE	FALSE	No
MWF16-23	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWF16-23	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF16-23	Chromium	FALSE	FALSE	FALSE	No
MWF16-23	cis-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-23	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-23	Cobalt	FALSE	FALSE	FALSE	No
MWF16-23	Copper	FALSE	FALSE	FALSE	No
MWF16-23	Cyclohexane	TRUE	FALSE	FALSE	No
MWF16-23	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF16-23	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF16-23	Dibromomethane	FALSE	FALSE	FALSE	No
MWF16-23	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF16-23	Ethyl ether	FALSE	FALSE	FALSE	No
MWF16-23	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF16-23	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF16-23	Iodomethane	FALSE	FALSE	FALSE	No
MWF16-23	Iron	FALSE	TRUE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF16-23	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF16-23	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF16-23	Lead	FALSE	FALSE	FALSE	No
MWF16-23	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF16-23	Magnesium	FALSE	TRUE	FALSE	No
MWF16-23	Manganese	FALSE	FALSE	FALSE	No
MWF16-23	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF16-23	Mercury	FALSE	FALSE	FALSE	No
MWF16-23	Methyl acetate	TRUE	FALSE	FALSE	No
MWF16-23	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF16-23	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF16-23	Methylene chloride	TRUE	FALSE	FALSE	No
MWF16-23	Naphthalene	FALSE	FALSE	FALSE	No
MWF16-23	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	Nickel	FALSE	FALSE	FALSE	No
MWF16-23	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	o-Xylene	TRUE	FALSE	FALSE	No
MWF16-23	Selenium	FALSE	FALSE	FALSE	No
MWF16-23	Silver	FALSE	FALSE	FALSE	No
MWF16-23	Styrene	TRUE	FALSE	FALSE	No
MWF16-23	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-23	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWF16-23	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF16-23	Thallium	FALSE	FALSE	FALSE	No
MWF16-23	Toluene	TRUE	FALSE	FALSE	No
MWF16-23	Total Xylenes	FALSE	FALSE	FALSE	No
MWF16-23	trans-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-23	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-23	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF16-23	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF16-23	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF16-23	Vanadium	FALSE	FALSE	FALSE	No
MWF16-23	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF16-23	Zinc	FALSE	FALSE	FALSE	No
MWF16-25	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF16-25	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF16-25	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF16-25	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF16-25	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF16-25	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWF16-25	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF16-25	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF16-25	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-25	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF16-25	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF16-25	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-25	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF16-25	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF16-25	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-25	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF16-25	1,4-Dioxane	TRUE	FALSE	FALSE	No
MWF16-25	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF16-25	2-Hexanone	TRUE	FALSE	FALSE	No
MWF16-25	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF16-25	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF16-25	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF16-25	Acetone	TRUE	FALSE	FALSE	No
MWF16-25	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF16-25	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF16-25	Antimony	FALSE	FALSE	FALSE	No
MWF16-25	Arsenic	FALSE	FALSE	FALSE	No
MWF16-25	Barium	FALSE	FALSE	FALSE	No
MWF16-25	Benzene	TRUE	FALSE	FALSE	No
MWF16-25	Beryllium	FALSE	FALSE	FALSE	No
MWF16-25	Bromobenzene	FALSE	FALSE	FALSE	No
MWF16-25	Bromodichloromethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF16-25	Bromoform	TRUE	FALSE	FALSE	No
MWF16-25	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF16-25	Cadmium	FALSE	FALSE	FALSE	No
MWF16-25	Calcium	FALSE	FALSE	FALSE	No
MWF16-25	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF16-25	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF16-25	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF16-25	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF16-25	Chloroethane	TRUE	FALSE	FALSE	No
MWF16-25	Chloroform (Trichloromethane)	TRUE	TRUE	FALSE	No
MWF16-25	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF16-25	Chromium	FALSE	FALSE	FALSE	No
MWF16-25	cis-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-25	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-25	Cobalt	FALSE	FALSE	FALSE	No
MWF16-25	Copper	FALSE	FALSE	FALSE	No
MWF16-25	Cyclohexane	TRUE	FALSE	FALSE	No
MWF16-25	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF16-25	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF16-25	Dibromomethane	FALSE	FALSE	FALSE	No
MWF16-25	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF16-25	Ethyl ether	FALSE	FALSE	FALSE	No
MWF16-25	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF16-25	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF16-25	Iodomethane	FALSE	FALSE	FALSE	No
MWF16-25	Iron	FALSE	FALSE	FALSE	No
MWF16-25	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF16-25	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF16-25	Lead	FALSE	FALSE	FALSE	No
MWF16-25	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF16-25	Magnesium	FALSE	FALSE	FALSE	No
MWF16-25	Manganese	FALSE	FALSE	FALSE	No
MWF16-25	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF16-25	Mercury	FALSE	FALSE	FALSE	No
MWF16-25	Methyl acetate	TRUE	FALSE	FALSE	No
MWF16-25	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF16-25	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF16-25	Methylene chloride	TRUE	FALSE	FALSE	No
MWF16-25	Naphthalene	FALSE	FALSE	FALSE	No
MWF16-25	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	Nickel	FALSE	FALSE	FALSE	No
MWF16-25	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	o-Xylene	TRUE	FALSE	FALSE	No
MWF16-25	Selenium	FALSE	FALSE	FALSE	No
MWF16-25	Silver	FALSE	FALSE	FALSE	No
MWF16-25	Styrene	TRUE	FALSE	FALSE	No
MWF16-25	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF16-25	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWF16-25	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF16-25	Thallium	FALSE	FALSE	FALSE	No
MWF16-25	Toluene	TRUE	FALSE	FALSE	No
MWF16-25	Total Xylenes	FALSE	FALSE	FALSE	No
MWF16-25	trans-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF16-25	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF16-25	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF16-25	Trichloroethene	TRUE	FALSE	FALSE	No
MWF16-25	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF16-25	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF16-25	Vanadium	FALSE	FALSE	FALSE	No
MWF16-25	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF16-25	Zinc	FALSE	FALSE	FALSE	No
MWF7-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF7-02	1,1,1-Trichloroethane	TRUE	TRUE	FALSE	No
MWF7-02	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF7-02	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF7-02	1,1-Dichloroethane	TRUE	TRUE	FALSE	No
MWF7-02	1,1-Dichloroethene	TRUE	TRUE	FALSE	No
MWF7-02	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF7-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF7-02	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF7-02	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF7-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF7-02	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF7-02	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF7-02	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF7-02	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF7-02	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF7-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF7-02	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF7-02	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF7-02	1,4-Dioxane	TRUE	TRUE	FALSE	No
MWF7-02	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF7-02	2-Hexanone	TRUE	FALSE	FALSE	No
MWF7-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF7-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF7-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF7-02	Acetone	TRUE	FALSE	FALSE	No
MWF7-02	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF7-02	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF7-02	Antimony	FALSE	FALSE	FALSE	No
MWF7-02	Arsenic	FALSE	FALSE	FALSE	No
MWF7-02	Barium	FALSE	FALSE	FALSE	No
MWF7-02	Benzene	TRUE	FALSE	FALSE	No
MWF7-02	Beryllium	FALSE	FALSE	FALSE	No
MWF7-02	Bromobenzene	FALSE	FALSE	FALSE	No
MWF7-02	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF7-02	Bromoform	TRUE	FALSE	FALSE	No
MWF7-02	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF7-02	Cadmium	FALSE	FALSE	FALSE	No
MWF7-02	Calcium	FALSE	FALSE	FALSE	No
MWF7-02	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF7-02	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF7-02	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF7-02	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF7-02	Chloroethane	TRUE	FALSE	FALSE	No
MWF7-02	Chloroform (Trichloromethane)	TRUE	TRUE	FALSE	No
MWF7-02	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF7-02	Chromium	FALSE	FALSE	FALSE	No
MWF7-02	cis-1,2-Dichloroethene	TRUE	TRUE	FALSE	No
MWF7-02	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF7-02	Cobalt	FALSE	FALSE	FALSE	No
MWF7-02	Copper	FALSE	FALSE	FALSE	No
MWF7-02	Cyclohexane	TRUE	FALSE	FALSE	No
MWF7-02	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF7-02	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF7-02	Dibromomethane	FALSE	FALSE	FALSE	No
MWF7-02	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF7-02	Ethyl ether	FALSE	FALSE	FALSE	No
MWF7-02	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF7-02	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF7-02	Iodomethane	FALSE	FALSE	FALSE	No
MWF7-02	Iron	FALSE	FALSE	FALSE	No
MWF7-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF7-02	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF7-02	Lead	FALSE	FALSE	FALSE	No
MWF7-02	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF7-02	Magnesium	FALSE	FALSE	FALSE	No
MWF7-02	Manganese	FALSE	FALSE	FALSE	No
MWF7-02	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF7-02	Mercury	FALSE	FALSE	FALSE	No
MWF7-02	Methyl acetate	TRUE	FALSE	FALSE	No
MWF7-02	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF7-02	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF7-02	Methylene chloride	TRUE	FALSE	FALSE	No
MWF7-02	Naphthalene	FALSE	FALSE	FALSE	No
MWF7-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF7-02	Nickel	FALSE	FALSE	FALSE	No
MWF7-02	N-Propylbenzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF7-02	o-Xylene	TRUE	FALSE	FALSE	No
MWF7-02	Selenium	FALSE	FALSE	FALSE	No
MWF7-02	Silver	FALSE	FALSE	FALSE	No
MWF7-02	Styrene	TRUE	FALSE	FALSE	No
MWF7-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF7-02	Tetrachloroethene	TRUE	TRUE	FALSE	No
MWF7-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF7-02	Thallium	FALSE	FALSE	FALSE	No
MWF7-02	Toluene	TRUE	FALSE	FALSE	No
MWF7-02	Total Xylenes	FALSE	FALSE	FALSE	No
MWF7-02	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF7-02	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF7-02	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF7-02	Trichloroethene	TRUE	TRUE	FALSE	No
MWF7-02	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF7-02	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF7-02	Vanadium	FALSE	FALSE	FALSE	No
MWF7-02	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF7-02	Zinc	FALSE	FALSE	FALSE	No
MWF8-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWF8-01	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWF8-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWF8-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWF8-01	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWF8-01	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWF8-01	1,2,3-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWF8-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWF8-01	1,2,3-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWF8-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWF8-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWF8-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF8-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWF8-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWF8-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF8-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWF8-01	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWF8-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWF8-01	2-Hexanone	TRUE	FALSE	FALSE	No
MWF8-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWF8-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWF8-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWF8-01	Acetone	TRUE	FALSE	FALSE	No
MWF8-01	Acrylonitrile	FALSE	FALSE	FALSE	No
MWF8-01	Alkalinity, total (as CaCO3)	FALSE	FALSE	FALSE	No
MWF8-01	Antimony	FALSE	FALSE	FALSE	No
MWF8-01	Arsenic	FALSE	FALSE	FALSE	No
MWF8-01	Barium	FALSE	FALSE	FALSE	No
MWF8-01	Benzene	TRUE	FALSE	FALSE	No
MWF8-01	Beryllium	FALSE	FALSE	FALSE	No
MWF8-01	Bromobenzene	FALSE	FALSE	FALSE	No
MWF8-01	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWF8-01	Bromoform	TRUE	FALSE	FALSE	No
MWF8-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWF8-01	Cadmium	FALSE	FALSE	FALSE	No
MWF8-01	Calcium	FALSE	FALSE	FALSE	No
MWF8-01	Carbon disulfide	TRUE	FALSE	FALSE	No
MWF8-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWF8-01	Chlorobenzene	TRUE	FALSE	FALSE	No
MWF8-01	Chlorobromomethane	FALSE	FALSE	FALSE	No
MWF8-01	Chloroethane	TRUE	FALSE	FALSE	No
MWF8-01	Chloroform (Trichloromethane)	TRUE	TRUE	FALSE	No
MWF8-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWF8-01	Chromium	FALSE	FALSE	FALSE	No
MWF8-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF8-01	cis-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF8-01	Cobalt	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWF8-01	Copper	FALSE	FALSE	FALSE	No
MWF8-01	Cyclohexane	TRUE	FALSE	FALSE	No
MWF8-01	Cymene (p-Isopropyltoluene)	FALSE	FALSE	FALSE	No
MWF8-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWF8-01	Dibromomethane	FALSE	FALSE	FALSE	No
MWF8-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWF8-01	Ethyl ether	FALSE	FALSE	FALSE	No
MWF8-01	Ethylbenzene	TRUE	FALSE	FALSE	No
MWF8-01	Hexachloroethane	FALSE	FALSE	FALSE	No
MWF8-01	Iodomethane	FALSE	FALSE	FALSE	No
MWF8-01	Iron	FALSE	FALSE	FALSE	No
MWF8-01	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWF8-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWF8-01	Lead	FALSE	FALSE	FALSE	No
MWF8-01	m&p-Xylene	TRUE	FALSE	FALSE	No
MWF8-01	Magnesium	FALSE	FALSE	FALSE	No
MWF8-01	Manganese	FALSE	FALSE	FALSE	No
MWF8-01	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWF8-01	Mercury	FALSE	FALSE	FALSE	No
MWF8-01	Methyl acetate	TRUE	FALSE	FALSE	No
MWF8-01	Methyl cyclohexane	TRUE	FALSE	FALSE	No
MWF8-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWF8-01	Methylene chloride	TRUE	FALSE	FALSE	No
MWF8-01	Naphthalene	FALSE	FALSE	FALSE	No
MWF8-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	Nickel	FALSE	FALSE	FALSE	No
MWF8-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	o-Xylene	TRUE	FALSE	FALSE	No
MWF8-01	Selenium	FALSE	FALSE	FALSE	No
MWF8-01	Silver	FALSE	FALSE	FALSE	No
MWF8-01	Styrene	TRUE	FALSE	FALSE	No
MWF8-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWF8-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWF8-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWF8-01	Thallium	FALSE	FALSE	FALSE	No
MWF8-01	Toluene	TRUE	FALSE	FALSE	No
MWF8-01	Total Xylenes	FALSE	FALSE	FALSE	No
MWF8-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWF8-01	trans-1,3-Dichloropropene	TRUE	FALSE	FALSE	No
MWF8-01	trans-1,4-Dichloro-2-butene	FALSE	FALSE	FALSE	No
MWF8-01	Trichloroethene	TRUE	FALSE	FALSE	No
MWF8-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWF8-01	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWF8-01	Vanadium	FALSE	FALSE	FALSE	No
MWF8-01	Vinyl chloride	TRUE	FALSE	FALSE	No
MWF8-01	Zinc	FALSE	FALSE	FALSE	No
MWM16-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM16-02	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-02	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWM16-02	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-02	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-02	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM16-02	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-02	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWM16-02	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWM16-02	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-02	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-02	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWM16-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-02	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-02	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-02	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM16-02	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWM16-02	2-Hexanone	TRUE	FALSE	FALSE	No
MWM16-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM16-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM16-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-02	Acetone	TRUE	FALSE	FALSE	No
MWM16-02	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM16-02	Antimony	FALSE	FALSE	FALSE	No
MWM16-02	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM16-02	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM16-02	Arsenic	FALSE	FALSE	FALSE	No
MWM16-02	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Barium	FALSE	FALSE	FALSE	No
MWM16-02	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Benzene	TRUE	FALSE	FALSE	No
MWM16-02	Beryllium	FALSE	FALSE	FALSE	No
MWM16-02	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Bromobenzene	FALSE	FALSE	FALSE	No
MWM16-02	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWM16-02	Bromoform	TRUE	FALSE	FALSE	No
MWM16-02	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWM16-02	Cadmium	FALSE	FALSE	FALSE	No
MWM16-02	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Carbon disulfide	TRUE	FALSE	FALSE	No
MWM16-02	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWM16-02	Chlorobenzene	TRUE	FALSE	FALSE	No
MWM16-02	Chloroethane	TRUE	FALSE	FALSE	No
MWM16-02	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWM16-02	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWM16-02	Chromium	FALSE	FALSE	FALSE	No
MWM16-02	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-02	Cobalt	FALSE	FALSE	FALSE	No
MWM16-02	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Copper	FALSE	FALSE	FALSE	No
MWM16-02	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWM16-02	Dibromomethane	FALSE	FALSE	FALSE	No
MWM16-02	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWM16-02	Ethyl ether	FALSE	FALSE	FALSE	No
MWM16-02	Ethylbenzene	TRUE	FALSE	FALSE	No
MWM16-02	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM16-02	Iron	FALSE	FALSE	FALSE	No
MWM16-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWM16-02	Lead	FALSE	FALSE	FALSE	No
MWM16-02	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Magnesium	FALSE	FALSE	FALSE	No
MWM16-02	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Manganese	FALSE	FALSE	FALSE	No
MWM16-02	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Mercury	FALSE	FALSE	FALSE	No
MWM16-02	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWM16-02	Methylene chloride	TRUE	FALSE	FALSE	No
MWM16-02	Naphthalene	FALSE	FALSE	FALSE	No
MWM16-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-02	Nickel	FALSE	FALSE	FALSE	No
MWM16-02	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM16-02	Phenanthrene	FALSE	FALSE	FALSE	No
MWM16-02	Selenium	FALSE	FALSE	FALSE	No
MWM16-02	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Silver	FALSE	FALSE	FALSE	No
MWM16-02	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Styrene	TRUE	FALSE	FALSE	No
MWM16-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-02	Tetrachloroethene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM16-02	Thallium	FALSE	FALSE	FALSE	No
MWM16-02	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Toluene	TRUE	FALSE	FALSE	No
MWM16-02	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM16-02	Total PCBs	FALSE	FALSE	FALSE	No
MWM16-02	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-02	Trichloroethene	TRUE	FALSE	FALSE	No
MWM16-02	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM16-02	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWM16-02	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM16-02	Vanadium	FALSE	FALSE	FALSE	No
MWM16-02	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-02	Vinyl chloride	TRUE	FALSE	FALSE	No
MWM16-02	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM16-02	Zinc	FALSE	FALSE	FALSE	No
MWM16-02	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM16-30	1,1,1-Trichloroethane	FALSE	TRUE	FALSE	No
MWM16-30	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM16-30	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWM16-30	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWM16-30	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWM16-30	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM16-30	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWM16-30	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWM16-30	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWM16-30	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWM16-30	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM16-30	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM16-30	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWM16-30	2-Hexanone	FALSE	FALSE	FALSE	No
MWM16-30	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM16-30	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM16-30	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWM16-30	Acetone	FALSE	FALSE	FALSE	No
MWM16-30	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM16-30	Antimony	FALSE	FALSE	FALSE	No
MWM16-30	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM16-30	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM16-30	Arsenic	FALSE	FALSE	FALSE	No
MWM16-30	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Barium	FALSE	FALSE	FALSE	No
MWM16-30	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Benzene	FALSE	FALSE	FALSE	No
MWM16-30	Beryllium	FALSE	FALSE	FALSE	No
MWM16-30	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Bromobenzene	FALSE	FALSE	FALSE	No
MWM16-30	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWM16-30	Bromoform	FALSE	FALSE	FALSE	No
MWM16-30	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWM16-30	Cadmium	FALSE	FALSE	FALSE	No
MWM16-30	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Carbon disulfide	FALSE	FALSE	FALSE	No
MWM16-30	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWM16-30	Chlorobenzene	FALSE	FALSE	FALSE	No
MWM16-30	Chloroethane	FALSE	FALSE	FALSE	No
MWM16-30	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-30	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWM16-30	Chromium	FALSE	FALSE	FALSE	No
MWM16-30	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWM16-30	Cobalt	FALSE	FALSE	FALSE	No
MWM16-30	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Copper	FALSE	FALSE	FALSE	No
MWM16-30	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWM16-30	Dibromomethane	FALSE	FALSE	FALSE	No
MWM16-30	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWM16-30	Ethyl ether	FALSE	FALSE	FALSE	No
MWM16-30	Ethylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM16-30	Iron	FALSE	FALSE	FALSE	No
MWM16-30	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWM16-30	Lead	FALSE	FALSE	FALSE	No
MWM16-30	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Magnesium	FALSE	FALSE	FALSE	No
MWM16-30	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Manganese	FALSE	FALSE	FALSE	No
MWM16-30	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Mercury	FALSE	FALSE	FALSE	No
MWM16-30	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWM16-30	Methylene chloride	FALSE	FALSE	FALSE	No
MWM16-30	Naphthalene	FALSE	FALSE	FALSE	No
MWM16-30	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	Nickel	FALSE	FALSE	FALSE	No
MWM16-30	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	Phenanthrene	FALSE	FALSE	FALSE	No
MWM16-30	Selenium	FALSE	FALSE	FALSE	No
MWM16-30	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Silver	FALSE	FALSE	FALSE	No
MWM16-30	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Styrene	FALSE	FALSE	FALSE	No
MWM16-30	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-30	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWM16-30	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM16-30	Thallium	FALSE	FALSE	FALSE	No
MWM16-30	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Toluene	FALSE	FALSE	FALSE	No
MWM16-30	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM16-30	Total PCBs	FALSE	FALSE	FALSE	No
MWM16-30	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWM16-30	Trichloroethene	FALSE	TRUE	TRUE	No
MWM16-30	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM16-30	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWM16-30	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM16-30	Vanadium	FALSE	FALSE	FALSE	No
MWM16-30	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-30	Vinyl chloride	FALSE	FALSE	FALSE	No
MWM16-30	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM16-30	Zinc	FALSE	FALSE	FALSE	No
MWM16-30	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM16-31	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-31	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWM16-31	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-31	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-31	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-31	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM16-31	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-31	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-31	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWM16-31	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWM16-31	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-31	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-31	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWM16-31	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-31	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-31	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-31	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM16-31	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWM16-31	2-Hexanone	TRUE	FALSE	FALSE	No
MWM16-31	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM16-31	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM16-31	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWM16-31	Acetone	TRUE	FALSE	FALSE	No
MWM16-31	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM16-31	Antimony	FALSE	FALSE	FALSE	No
MWM16-31	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM16-31	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM16-31	Arsenic	FALSE	FALSE	FALSE	No
MWM16-31	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Barium	FALSE	FALSE	FALSE	No
MWM16-31	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Benzene	TRUE	FALSE	FALSE	No
MWM16-31	Beryllium	FALSE	FALSE	FALSE	No
MWM16-31	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Bromobenzene	FALSE	FALSE	FALSE	No
MWM16-31	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWM16-31	Bromoform	TRUE	FALSE	FALSE	No
MWM16-31	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWM16-31	Cadmium	FALSE	FALSE	FALSE	No
MWM16-31	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Carbon disulfide	TRUE	FALSE	FALSE	No
MWM16-31	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWM16-31	Chlorobenzene	TRUE	FALSE	FALSE	No
MWM16-31	Chloroethane	TRUE	FALSE	FALSE	No
MWM16-31	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWM16-31	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWM16-31	Chromium	FALSE	FALSE	FALSE	No
MWM16-31	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-31	Cobalt	FALSE	FALSE	FALSE	No
MWM16-31	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Copper	FALSE	FALSE	FALSE	No
MWM16-31	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWM16-31	Dibromomethane	FALSE	FALSE	FALSE	No
MWM16-31	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWM16-31	Ethyl ether	FALSE	FALSE	FALSE	No
MWM16-31	Ethylbenzene	TRUE	FALSE	FALSE	No
MWM16-31	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM16-31	Iron	FALSE	FALSE	FALSE	No
MWM16-31	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWM16-31	Lead	FALSE	FALSE	FALSE	No
MWM16-31	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Magnesium	FALSE	FALSE	FALSE	No
MWM16-31	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Manganese	FALSE	FALSE	FALSE	No
MWM16-31	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Mercury	FALSE	FALSE	FALSE	No
MWM16-31	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWM16-31	Methylene chloride	TRUE	FALSE	FALSE	No
MWM16-31	Naphthalene	FALSE	FALSE	FALSE	No
MWM16-31	N-Butylbenzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-31	Nickel	FALSE	FALSE	FALSE	No
MWM16-31	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM16-31	Phenanthrene	FALSE	FALSE	FALSE	No
MWM16-31	Selenium	FALSE	FALSE	FALSE	No
MWM16-31	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Silver	FALSE	FALSE	FALSE	No
MWM16-31	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Styrene	TRUE	FALSE	FALSE	No
MWM16-31	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-31	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWM16-31	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM16-31	Thallium	FALSE	FALSE	FALSE	No
MWM16-31	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Toluene	TRUE	FALSE	FALSE	No
MWM16-31	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM16-31	Total PCBs	FALSE	FALSE	FALSE	No
MWM16-31	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-31	Trichloroethene	TRUE	FALSE	FALSE	No
MWM16-31	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM16-31	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWM16-31	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM16-31	Vanadium	FALSE	FALSE	FALSE	No
MWM16-31	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-31	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM16-31	Zinc	FALSE	FALSE	FALSE	No
MWM16-31	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM16-37	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-37	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWM16-37	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWM16-37	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-37	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-37	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM16-37	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-37	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-37	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWM16-37	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWM16-37	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-37	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWM16-37	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWM16-37	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM16-37	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-37	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM16-37	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM16-37	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWM16-37	2-Hexanone	TRUE	FALSE	FALSE	No
MWM16-37	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM16-37	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM16-37	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWM16-37	Acetone	TRUE	FALSE	FALSE	No
MWM16-37	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM16-37	Antimony	FALSE	FALSE	FALSE	No
MWM16-37	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM16-37	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM16-37	Arsenic	FALSE	FALSE	FALSE	No
MWM16-37	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Barium	FALSE	FALSE	FALSE	No
MWM16-37	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Benzene	TRUE	FALSE	FALSE	No
MWM16-37	Beryllium	FALSE	FALSE	FALSE	No
MWM16-37	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Bromobenzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM16-37	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWM16-37	Bromoform	TRUE	FALSE	FALSE	No
MWM16-37	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWM16-37	Cadmium	FALSE	FALSE	FALSE	No
MWM16-37	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Carbon disulfide	TRUE	FALSE	FALSE	No
MWM16-37	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWM16-37	Chlorobenzene	TRUE	FALSE	FALSE	No
MWM16-37	Chloroethane	TRUE	FALSE	FALSE	No
MWM16-37	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWM16-37	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWM16-37	Chromium	FALSE	FALSE	FALSE	No
MWM16-37	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-37	Cobalt	FALSE	FALSE	FALSE	No
MWM16-37	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Copper	FALSE	FALSE	FALSE	No
MWM16-37	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWM16-37	Dibromomethane	FALSE	FALSE	FALSE	No
MWM16-37	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWM16-37	Ethyl ether	FALSE	FALSE	FALSE	No
MWM16-37	Ethylbenzene	TRUE	FALSE	FALSE	No
MWM16-37	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM16-37	Iron	FALSE	FALSE	FALSE	No
MWM16-37	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWM16-37	Lead	FALSE	FALSE	FALSE	No
MWM16-37	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Magnesium	FALSE	FALSE	FALSE	No
MWM16-37	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Manganese	FALSE	FALSE	FALSE	No
MWM16-37	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Mercury	FALSE	FALSE	FALSE	No
MWM16-37	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWM16-37	Methylene chloride	TRUE	FALSE	FALSE	No
MWM16-37	Naphthalene	FALSE	FALSE	FALSE	No
MWM16-37	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-37	Nickel	FALSE	FALSE	FALSE	No
MWM16-37	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM16-37	Phenanthrene	FALSE	FALSE	FALSE	No
MWM16-37	Selenium	FALSE	FALSE	FALSE	No
MWM16-37	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Silver	FALSE	FALSE	FALSE	No
MWM16-37	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Styrene	TRUE	FALSE	FALSE	No
MWM16-37	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM16-37	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWM16-37	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM16-37	Thallium	FALSE	FALSE	FALSE	No
MWM16-37	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Toluene	TRUE	FALSE	FALSE	No
MWM16-37	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM16-37	Total PCBs	FALSE	FALSE	FALSE	No
MWM16-37	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM16-37	Trichloroethene	TRUE	FALSE	FALSE	No
MWM16-37	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM16-37	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWM16-37	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWM16-37	Vanadium	FALSE	FALSE	FALSE	No
MWM16-37	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM16-37	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM16-37	Zinc	FALSE	FALSE	FALSE	No
MWM16-37	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM2-22	1,1,1-Trichloroethane	FALSE	TRUE	FALSE	No
MWM2-22	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM2-22	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWM2-22	1,1-Dichloroethane	FALSE	TRUE	FALSE	No
MWM2-22	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWM2-22	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM2-22	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWM2-22	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWM2-22	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWM2-22	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWM2-22	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-22	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM2-22	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWM2-22	2-Hexanone	FALSE	FALSE	FALSE	No
MWM2-22	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM2-22	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM2-22	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWM2-22	Acetone	FALSE	FALSE	FALSE	No
MWM2-22	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM2-22	Antimony	FALSE	FALSE	FALSE	No
MWM2-22	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM2-22	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM2-22	Arsenic	FALSE	FALSE	FALSE	No
MWM2-22	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Barium	FALSE	FALSE	FALSE	No
MWM2-22	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Benzene	FALSE	FALSE	FALSE	No
MWM2-22	Beryllium	FALSE	FALSE	FALSE	No
MWM2-22	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Bromobenzene	FALSE	FALSE	FALSE	No
MWM2-22	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWM2-22	Bromoform	FALSE	FALSE	FALSE	No
MWM2-22	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWM2-22	Cadmium	FALSE	FALSE	FALSE	No
MWM2-22	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Carbon disulfide	FALSE	FALSE	FALSE	No
MWM2-22	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWM2-22	Chlorobenzene	FALSE	FALSE	FALSE	No
MWM2-22	Chloroethane	FALSE	FALSE	FALSE	No
MWM2-22	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWM2-22	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWM2-22	Chromium	FALSE	FALSE	FALSE	No
MWM2-22	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	cis-1,2-Dichloroethene	FALSE	TRUE	FALSE	No
MWM2-22	Cobalt	FALSE	FALSE	FALSE	No
MWM2-22	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Copper	FALSE	FALSE	FALSE	No
MWM2-22	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWM2-22	Dibromomethane	FALSE	FALSE	FALSE	No
MWM2-22	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWM2-22	Ethyl ether	FALSE	FALSE	FALSE	No
MWM2-22	Ethylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM2-22	Iron	FALSE	FALSE	FALSE	No
MWM2-22	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWM2-22	Lead	FALSE	FALSE	FALSE	No
MWM2-22	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Magnesium	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM2-22	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Manganese	FALSE	FALSE	FALSE	No
MWM2-22	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Mercury	FALSE	FALSE	FALSE	No
MWM2-22	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWM2-22	Methylene chloride	FALSE	FALSE	FALSE	No
MWM2-22	Naphthalene	FALSE	FALSE	FALSE	No
MWM2-22	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	Nickel	FALSE	FALSE	FALSE	No
MWM2-22	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	Phenanthrene	FALSE	FALSE	FALSE	No
MWM2-22	Selenium	FALSE	FALSE	FALSE	No
MWM2-22	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Silver	FALSE	FALSE	FALSE	No
MWM2-22	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Styrene	FALSE	FALSE	FALSE	No
MWM2-22	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM2-22	Tetrachloroethene	FALSE	TRUE	TRUE	No
MWM2-22	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM2-22	Thallium	FALSE	FALSE	FALSE	No
MWM2-22	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Toluene	FALSE	FALSE	FALSE	No
MWM2-22	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM2-22	Total PCBs	FALSE	FALSE	FALSE	No
MWM2-22	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWM2-22	Trichloroethene	FALSE	TRUE	TRUE	No
MWM2-22	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM2-22	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWM2-22	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM2-22	Vanadium	FALSE	FALSE	FALSE	No
MWM2-22	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-22	Vinyl chloride	FALSE	TRUE	TRUE	No
MWM2-22	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM2-22	Zinc	FALSE	FALSE	FALSE	No
MWM2-22	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWM2-28	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM2-28	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWM2-28	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWM2-28	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWM2-28	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWM2-28	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWM2-28	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM2-28	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWM2-28	2-Hexanone	FALSE	FALSE	FALSE	No
MWM2-28	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM2-28	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM2-28	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWM2-28	Acetone	FALSE	FALSE	FALSE	No
MWM2-28	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM2-28	Antimony	FALSE	FALSE	FALSE	No
MWM2-28	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM2-28	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM2-28	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM2-28	Arsenic	FALSE	FALSE	FALSE	No
MWM2-28	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Barium	FALSE	FALSE	FALSE	No
MWM2-28	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Benzene	FALSE	FALSE	FALSE	No
MWM2-28	Beryllium	FALSE	FALSE	FALSE	No
MWM2-28	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Bromobenzene	FALSE	FALSE	FALSE	No
MWM2-28	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWM2-28	Bromoform	FALSE	FALSE	FALSE	No
MWM2-28	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWM2-28	Cadmium	FALSE	FALSE	FALSE	No
MWM2-28	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Carbon disulfide	FALSE	FALSE	FALSE	No
MWM2-28	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWM2-28	Chlorobenzene	FALSE	FALSE	FALSE	No
MWM2-28	Chloroethane	FALSE	FALSE	FALSE	No
MWM2-28	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWM2-28	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWM2-28	Chromium	FALSE	FALSE	FALSE	No
MWM2-28	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWM2-28	Cobalt	FALSE	FALSE	FALSE	No
MWM2-28	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Copper	FALSE	FALSE	FALSE	No
MWM2-28	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWM2-28	Dibromomethane	FALSE	FALSE	FALSE	No
MWM2-28	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWM2-28	Ethyl ether	FALSE	FALSE	FALSE	No
MWM2-28	Ethylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM2-28	Iron	FALSE	FALSE	FALSE	No
MWM2-28	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWM2-28	Lead	FALSE	FALSE	FALSE	No
MWM2-28	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Magnesium	FALSE	FALSE	FALSE	No
MWM2-28	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Manganese	FALSE	FALSE	FALSE	No
MWM2-28	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Mercury	FALSE	FALSE	FALSE	No
MWM2-28	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWM2-28	Methylene chloride	FALSE	FALSE	FALSE	No
MWM2-28	Naphthalene	FALSE	FALSE	FALSE	No
MWM2-28	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	Nickel	FALSE	FALSE	FALSE	No
MWM2-28	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	Phenanthrene	FALSE	FALSE	FALSE	No
MWM2-28	Selenium	FALSE	FALSE	FALSE	No
MWM2-28	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Silver	FALSE	FALSE	FALSE	No
MWM2-28	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Styrene	FALSE	FALSE	FALSE	No
MWM2-28	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM2-28	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWM2-28	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM2-28	Thallium	FALSE	FALSE	FALSE	No
MWM2-28	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Toluene	FALSE	FALSE	FALSE	No
MWM2-28	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM2-28	Total PCBs	FALSE	FALSE	FALSE	No
MWM2-28	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWM2-28	Trichloroethene	FALSE	FALSE	FALSE	No
MWM2-28	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM2-28	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWM2-28	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM2-28	Vanadium	FALSE	FALSE	FALSE	No
MWM2-28	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM2-28	Vinyl chloride	FALSE	FALSE	FALSE	No
MWM2-28	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM2-28	Zinc	FALSE	FALSE	FALSE	No
MWM2-28	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM31-02	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWM31-02	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWM31-02	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWM31-02	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWM31-02	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWM31-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM31-02	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWM31-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM31-02	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWM31-02	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWM31-02	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM31-02	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWM31-02	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWM31-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM31-02	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM31-02	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM31-02	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM31-02	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWM31-02	2-Hexanone	TRUE	FALSE	FALSE	No
MWM31-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWM31-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM31-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWM31-02	Acetone	TRUE	FALSE	FALSE	No
MWM31-02	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM31-02	Antimony	FALSE	FALSE	FALSE	No
MWM31-02	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM31-02	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM31-02	Arsenic	FALSE	FALSE	FALSE	No
MWM31-02	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Barium	FALSE	FALSE	FALSE	No
MWM31-02	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Benzene	TRUE	FALSE	FALSE	No
MWM31-02	Beryllium	FALSE	FALSE	FALSE	No
MWM31-02	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Bromobenzene	FALSE	FALSE	FALSE	No
MWM31-02	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWM31-02	Bromoform	TRUE	FALSE	FALSE	No
MWM31-02	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWM31-02	Cadmium	FALSE	FALSE	FALSE	No
MWM31-02	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Carbon disulfide	TRUE	FALSE	FALSE	No
MWM31-02	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWM31-02	Chlorobenzene	TRUE	FALSE	FALSE	No
MWM31-02	Chloroethane	TRUE	FALSE	FALSE	No
MWM31-02	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWM31-02	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWM31-02	Chromium	FALSE	FALSE	FALSE	No
MWM31-02	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM31-02	Cobalt	FALSE	FALSE	FALSE	No
MWM31-02	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Copper	FALSE	FALSE	FALSE	No
MWM31-02	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Dibromochloromethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM31-02	Dibromomethane	FALSE	FALSE	FALSE	No
MWM31-02	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWM31-02	Ethyl ether	FALSE	FALSE	FALSE	No
MWM31-02	Ethylbenzene	TRUE	FALSE	FALSE	No
MWM31-02	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM31-02	Iron	FALSE	FALSE	FALSE	No
MWM31-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWM31-02	Lead	FALSE	FALSE	FALSE	No
MWM31-02	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Magnesium	FALSE	FALSE	FALSE	No
MWM31-02	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Manganese	FALSE	FALSE	FALSE	No
MWM31-02	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Mercury	FALSE	FALSE	FALSE	No
MWM31-02	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWM31-02	Methylene chloride	TRUE	FALSE	FALSE	No
MWM31-02	Naphthalene	FALSE	FALSE	FALSE	No
MWM31-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM31-02	Nickel	FALSE	FALSE	FALSE	No
MWM31-02	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM31-02	Phenanthrene	FALSE	FALSE	FALSE	No
MWM31-02	Selenium	FALSE	FALSE	FALSE	No
MWM31-02	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Silver	FALSE	FALSE	FALSE	No
MWM31-02	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Styrene	TRUE	FALSE	FALSE	No
MWM31-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM31-02	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWM31-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM31-02	Thallium	FALSE	FALSE	FALSE	No
MWM31-02	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Toluene	TRUE	FALSE	FALSE	No
MWM31-02	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM31-02	Total PCBs	FALSE	FALSE	FALSE	No
MWM31-02	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM31-02	Trichloroethene	TRUE	FALSE	FALSE	No
MWM31-02	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM31-02	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWM31-02	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM31-02	Vanadium	FALSE	FALSE	FALSE	No
MWM31-02	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM31-02	Vinyl chloride	TRUE	FALSE	FALSE	No
MWM31-02	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM31-02	Zinc	FALSE	FALSE	FALSE	No
MWM31-02	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWM32-01	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWM32-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWM32-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWM32-01	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWM32-01	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWM32-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWM32-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWM32-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM32-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWM32-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWM32-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM32-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWM32-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWM32-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWM32-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM32-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWM32-01	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWM32-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWM32-01	2-Hexanone	TRUE	FALSE	FALSE	No
MWM32-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM32-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWM32-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWM32-01	Acetone	TRUE	FALSE	FALSE	No
MWM32-01	Acrylonitrile	FALSE	FALSE	FALSE	No
MWM32-01	Antimony	FALSE	FALSE	FALSE	No
MWM32-01	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWM32-01	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWM32-01	Arsenic	FALSE	FALSE	FALSE	No
MWM32-01	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Barium	FALSE	FALSE	FALSE	No
MWM32-01	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Benzene	TRUE	FALSE	FALSE	No
MWM32-01	Beryllium	FALSE	FALSE	FALSE	No
MWM32-01	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Bromobenzene	FALSE	FALSE	FALSE	No
MWM32-01	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWM32-01	Bromoform	TRUE	FALSE	FALSE	No
MWM32-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWM32-01	Cadmium	FALSE	FALSE	FALSE	No
MWM32-01	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Carbon disulfide	TRUE	FALSE	FALSE	No
MWM32-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWM32-01	Chlorobenzene	TRUE	FALSE	FALSE	No
MWM32-01	Chloroethane	TRUE	FALSE	FALSE	No
MWM32-01	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWM32-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWM32-01	Chromium	FALSE	FALSE	FALSE	No
MWM32-01	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM32-01	Cobalt	FALSE	FALSE	FALSE	No
MWM32-01	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Copper	FALSE	FALSE	FALSE	No
MWM32-01	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWM32-01	Dibromomethane	FALSE	FALSE	FALSE	No
MWM32-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWM32-01	Ethyl ether	FALSE	FALSE	FALSE	No
MWM32-01	Ethylbenzene	TRUE	FALSE	FALSE	No
MWM32-01	Hexachloroethane	FALSE	FALSE	FALSE	No
MWM32-01	Iron	FALSE	FALSE	FALSE	No
MWM32-01	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWM32-01	Lead	FALSE	FALSE	FALSE	No
MWM32-01	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Magnesium	FALSE	FALSE	FALSE	No
MWM32-01	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Manganese	FALSE	FALSE	FALSE	No
MWM32-01	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Mercury	FALSE	FALSE	FALSE	No
MWM32-01	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWM32-01	Methylene chloride	TRUE	FALSE	FALSE	No
MWM32-01	Naphthalene	FALSE	FALSE	FALSE	No
MWM32-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWM32-01	Nickel	FALSE	FALSE	FALSE	No
MWM32-01	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWM32-01	Phenanthrene	FALSE	FALSE	FALSE	No
MWM32-01	Selenium	FALSE	FALSE	FALSE	No
MWM32-01	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Silver	FALSE	FALSE	FALSE	No
MWM32-01	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Styrene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWM32-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWM32-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWM32-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWM32-01	Thallium	FALSE	FALSE	FALSE	No
MWM32-01	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Toluene	TRUE	FALSE	FALSE	No
MWM32-01	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWM32-01	Total PCBs	FALSE	FALSE	FALSE	No
MWM32-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWM32-01	Trichloroethene	TRUE	FALSE	FALSE	No
MWM32-01	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWM32-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWM32-01	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWM32-01	Vanadium	FALSE	FALSE	FALSE	No
MWM32-01	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWM32-01	Vinyl chloride	TRUE	FALSE	FALSE	No
MWM32-01	Xylene (Total)	FALSE	FALSE	FALSE	No
MWM32-01	Zinc	FALSE	FALSE	FALSE	No
MWM32-01	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-01	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWOS-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWOS-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWOS-01	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWOS-01	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWOS-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWOS-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWOS-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWOS-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWOS-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWOS-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWOS-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWOS-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWOS-01	1,4-Dioxane	FALSE	TRUE	FALSE	No
MWOS-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWOS-01	2-Hexanone	TRUE	FALSE	FALSE	No
MWOS-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWOS-01	Acetone	TRUE	FALSE	FALSE	No
MWOS-01	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-01	Antimony	FALSE	FALSE	FALSE	No
MWOS-01	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-01	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-01	Arsenic	FALSE	FALSE	FALSE	No
MWOS-01	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Barium	FALSE	FALSE	FALSE	No
MWOS-01	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Benzene	TRUE	FALSE	FALSE	No
MWOS-01	Beryllium	FALSE	FALSE	FALSE	No
MWOS-01	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-01	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWOS-01	Bromoform	TRUE	FALSE	FALSE	No
MWOS-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWOS-01	Cadmium	FALSE	FALSE	FALSE	No
MWOS-01	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Carbon disulfide	TRUE	FALSE	FALSE	No
MWOS-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWOS-01	Chlorobenzene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-01	Chloroethane	TRUE	FALSE	FALSE	No
MWOS-01	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWOS-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWOS-01	Chromium	FALSE	FALSE	FALSE	No
MWOS-01	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWOS-01	Cobalt	FALSE	FALSE	FALSE	No
MWOS-01	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Copper	FALSE	FALSE	FALSE	No
MWOS-01	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWOS-01	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWOS-01	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-01	Ethylbenzene	TRUE	FALSE	FALSE	No
MWOS-01	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-01	Iron	FALSE	FALSE	FALSE	No
MWOS-01	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWOS-01	Lead	FALSE	FALSE	FALSE	No
MWOS-01	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Magnesium	FALSE	FALSE	FALSE	No
MWOS-01	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Manganese	FALSE	TRUE	TRUE	No
MWOS-01	Manganese (dissolved)	FALSE	TRUE	TRUE	No
MWOS-01	Mercury	FALSE	FALSE	FALSE	No
MWOS-01	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWOS-01	Methylene chloride	TRUE	FALSE	FALSE	No
MWOS-01	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-01	Nickel	FALSE	FALSE	FALSE	No
MWOS-01	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-01	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-01	Selenium	FALSE	FALSE	FALSE	No
MWOS-01	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Silver	FALSE	FALSE	FALSE	No
MWOS-01	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Styrene	TRUE	FALSE	FALSE	No
MWOS-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWOS-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-01	Thallium	FALSE	FALSE	FALSE	No
MWOS-01	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Toluene	TRUE	FALSE	FALSE	No
MWOS-01	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-01	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWOS-01	Trichloroethene	TRUE	FALSE	FALSE	No
MWOS-01	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWOS-01	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-01	Vanadium	FALSE	FALSE	FALSE	No
MWOS-01	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-01	Vinyl chloride	TRUE	FALSE	FALSE	No
MWOS-01	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-01	Zinc	FALSE	FALSE	FALSE	No
MWOS-01	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-02	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-02	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-02	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-02	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-02	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWOS-02	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-02	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-02	Acetone	FALSE	FALSE	FALSE	No
MWOS-02	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-02	Antimony	FALSE	FALSE	FALSE	No
MWOS-02	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-02	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-02	Arsenic	FALSE	FALSE	FALSE	No
MWOS-02	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Barium	FALSE	FALSE	FALSE	No
MWOS-02	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Benzene	FALSE	FALSE	FALSE	No
MWOS-02	Beryllium	FALSE	FALSE	FALSE	No
MWOS-02	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-02	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-02	Bromoform	FALSE	FALSE	FALSE	No
MWOS-02	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-02	Cadmium	FALSE	FALSE	FALSE	No
MWOS-02	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-02	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-02	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-02	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-02	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-02	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-02	Chromium	FALSE	FALSE	FALSE	No
MWOS-02	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-02	Cobalt	FALSE	FALSE	FALSE	No
MWOS-02	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Copper	FALSE	FALSE	FALSE	No
MWOS-02	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-02	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-02	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-02	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-02	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-02	Iron	FALSE	FALSE	FALSE	No
MWOS-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-02	Lead	FALSE	FALSE	FALSE	No
MWOS-02	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Magnesium	FALSE	FALSE	FALSE	No
MWOS-02	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Manganese	FALSE	TRUE	TRUE	No
MWOS-02	Manganese (dissolved)	FALSE	TRUE	TRUE	No
MWOS-02	Mercury	FALSE	FALSE	FALSE	No
MWOS-02	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-02	Methylene chloride	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-02	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	Nickel	FALSE	FALSE	FALSE	No
MWOS-02	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-02	Selenium	FALSE	FALSE	FALSE	No
MWOS-02	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Silver	FALSE	FALSE	FALSE	No
MWOS-02	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Styrene	FALSE	FALSE	FALSE	No
MWOS-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-02	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-02	Thallium	FALSE	FALSE	FALSE	No
MWOS-02	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Toluene	FALSE	FALSE	FALSE	No
MWOS-02	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-02	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-02	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-02	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-02	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-02	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-02	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-02	Vanadium	FALSE	FALSE	FALSE	No
MWOS-02	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-02	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-02	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-02	Zinc	FALSE	FALSE	FALSE	No
MWOS-02	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-03	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-03	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWOS-03	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-03	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-03	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-03	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-03	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWOS-03	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-03	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-03	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-03	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-03	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-03	Acetone	FALSE	FALSE	FALSE	No
MWOS-03	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-03	Antimony	FALSE	FALSE	FALSE	No
MWOS-03	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-03	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-03	Arsenic	FALSE	FALSE	FALSE	No
MWOS-03	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Barium	FALSE	FALSE	FALSE	No
MWOS-03	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Benzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-03	Beryllium	FALSE	FALSE	FALSE	No
MWOS-03	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-03	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-03	Bromoform	FALSE	FALSE	FALSE	No
MWOS-03	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-03	Cadmium	FALSE	FALSE	FALSE	No
MWOS-03	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-03	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-03	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-03	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-03	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-03	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-03	Chromium	FALSE	FALSE	FALSE	No
MWOS-03	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-03	Cobalt	FALSE	FALSE	FALSE	No
MWOS-03	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Copper	FALSE	FALSE	FALSE	No
MWOS-03	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-03	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-03	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-03	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-03	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-03	Iron	FALSE	FALSE	FALSE	No
MWOS-03	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-03	Lead	FALSE	FALSE	FALSE	No
MWOS-03	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Magnesium	FALSE	FALSE	FALSE	No
MWOS-03	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Manganese	FALSE	FALSE	FALSE	No
MWOS-03	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Mercury	FALSE	FALSE	FALSE	No
MWOS-03	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-03	Methylene chloride	FALSE	FALSE	FALSE	No
MWOS-03	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-03	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	Nickel	FALSE	FALSE	FALSE	No
MWOS-03	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-03	Selenium	FALSE	FALSE	FALSE	No
MWOS-03	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Silver	FALSE	FALSE	FALSE	No
MWOS-03	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Styrene	FALSE	FALSE	FALSE	No
MWOS-03	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-03	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-03	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-03	Thallium	FALSE	FALSE	FALSE	No
MWOS-03	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Toluene	FALSE	FALSE	FALSE	No
MWOS-03	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-03	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-03	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-03	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-03	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-03	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-03	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-03	Vanadium	FALSE	FALSE	FALSE	No
MWOS-03	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-03	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-03	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-03	Zinc	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-03	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-04	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-04	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWOS-04	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-04	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-04	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-04	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-04	1,4-Dioxane	FALSE	TRUE	TRUE	No
MWOS-04	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-04	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-04	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-04	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-04	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-04	Acetone	FALSE	FALSE	FALSE	No
MWOS-04	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-04	Antimony	FALSE	FALSE	FALSE	No
MWOS-04	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-04	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-04	Arsenic	FALSE	TRUE	FALSE	No
MWOS-04	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Barium	FALSE	TRUE	FALSE	No
MWOS-04	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Benzene	FALSE	FALSE	FALSE	No
MWOS-04	Beryllium	FALSE	FALSE	FALSE	No
MWOS-04	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-04	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-04	Bromoform	FALSE	FALSE	FALSE	No
MWOS-04	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-04	Cadmium	FALSE	FALSE	FALSE	No
MWOS-04	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-04	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-04	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-04	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-04	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-04	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-04	Chromium	FALSE	FALSE	FALSE	No
MWOS-04	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-04	Cobalt	FALSE	FALSE	FALSE	No
MWOS-04	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Copper	FALSE	FALSE	FALSE	No
MWOS-04	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-04	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-04	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-04	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-04	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-04	Iron	FALSE	FALSE	FALSE	No
MWOS-04	Iron (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-04	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-04	Lead	FALSE	FALSE	FALSE	No
MWOS-04	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Magnesium	FALSE	FALSE	FALSE	No
MWOS-04	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Manganese	FALSE	TRUE	TRUE	No
MWOS-04	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Mercury	FALSE	FALSE	FALSE	No
MWOS-04	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-04	Methylene chloride	FALSE	FALSE	FALSE	No
MWOS-04	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-04	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	Nickel	FALSE	FALSE	FALSE	No
MWOS-04	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-04	Selenium	FALSE	FALSE	FALSE	No
MWOS-04	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Silver	FALSE	FALSE	FALSE	No
MWOS-04	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Styrene	FALSE	FALSE	FALSE	No
MWOS-04	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-04	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-04	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-04	Thallium	FALSE	FALSE	FALSE	No
MWOS-04	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Toluene	FALSE	FALSE	FALSE	No
MWOS-04	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-04	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-04	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-04	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-04	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-04	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-04	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-04	Vanadium	FALSE	FALSE	FALSE	No
MWOS-04	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-04	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-04	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-04	Zinc	FALSE	FALSE	FALSE	No
MWOS-04	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-05	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-05	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWOS-05	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-05	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-05	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-05	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-05	1,4-Dioxane	FALSE	TRUE	TRUE	No
MWOS-05	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-05	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-05	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-05	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-05	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-05	Acetone	FALSE	FALSE	FALSE	No
MWOS-05	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-05	Antimony	FALSE	FALSE	FALSE	No
MWOS-05	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-05	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-05	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-05	Arsenic	FALSE	TRUE	TRUE	No
MWOS-05	Arsenic (dissolved)	FALSE	TRUE	TRUE	No
MWOS-05	Barium	FALSE	TRUE	FALSE	No
MWOS-05	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Benzene	FALSE	FALSE	FALSE	No
MWOS-05	Beryllium	FALSE	FALSE	FALSE	No
MWOS-05	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-05	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-05	Bromoform	FALSE	FALSE	FALSE	No
MWOS-05	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-05	Cadmium	FALSE	FALSE	FALSE	No
MWOS-05	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-05	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-05	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-05	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-05	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-05	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-05	Chromium	FALSE	FALSE	FALSE	No
MWOS-05	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-05	Cobalt	FALSE	FALSE	FALSE	No
MWOS-05	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Copper	FALSE	FALSE	FALSE	No
MWOS-05	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-05	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-05	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-05	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-05	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-05	Iron	FALSE	FALSE	FALSE	No
MWOS-05	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-05	Lead	FALSE	FALSE	FALSE	No
MWOS-05	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Magnesium	FALSE	FALSE	FALSE	No
MWOS-05	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Manganese	FALSE	TRUE	TRUE	No
MWOS-05	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Mercury	FALSE	FALSE	FALSE	No
MWOS-05	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-05	Methylene chloride	FALSE	FALSE	FALSE	No
MWOS-05	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-05	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	Nickel	FALSE	FALSE	FALSE	No
MWOS-05	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-05	Selenium	FALSE	TRUE	FALSE	No
MWOS-05	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Silver	FALSE	FALSE	FALSE	No
MWOS-05	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Styrene	FALSE	FALSE	FALSE	No
MWOS-05	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-05	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-05	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-05	Thallium	FALSE	FALSE	FALSE	No
MWOS-05	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Toluene	FALSE	FALSE	FALSE	No
MWOS-05	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-05	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-05	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-05	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-05	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-05	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-05	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-05	Vanadium	FALSE	FALSE	FALSE	No
MWOS-05	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-05	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-05	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-05	Zinc	FALSE	FALSE	FALSE	No
MWOS-05	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-06	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-06	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWOS-06	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-06	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-06	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-06	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-06	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWOS-06	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-06	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-06	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-06	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-06	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-06	Acetone	FALSE	FALSE	FALSE	No
MWOS-06	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-06	Antimony	FALSE	FALSE	FALSE	No
MWOS-06	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-06	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-06	Arsenic	FALSE	TRUE	FALSE	No
MWOS-06	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Barium	FALSE	TRUE	FALSE	No
MWOS-06	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Benzene	FALSE	FALSE	FALSE	No
MWOS-06	Beryllium	FALSE	FALSE	FALSE	No
MWOS-06	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-06	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-06	Bromoform	FALSE	FALSE	FALSE	No
MWOS-06	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-06	Cadmium	FALSE	FALSE	FALSE	No
MWOS-06	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-06	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-06	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-06	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-06	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-06	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-06	Chromium	FALSE	FALSE	FALSE	No
MWOS-06	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-06	Cobalt	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-06	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Copper	FALSE	FALSE	FALSE	No
MWOS-06	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-06	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-06	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-06	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-06	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-06	Iron	FALSE	FALSE	FALSE	No
MWOS-06	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-06	Lead	FALSE	FALSE	FALSE	No
MWOS-06	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Magnesium	FALSE	FALSE	FALSE	No
MWOS-06	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Manganese	FALSE	TRUE	TRUE	No
MWOS-06	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Mercury	FALSE	FALSE	FALSE	No
MWOS-06	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-06	Methylene chloride	FALSE	FALSE	FALSE	No
MWOS-06	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-06	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	Nickel	FALSE	FALSE	FALSE	No
MWOS-06	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-06	Selenium	FALSE	FALSE	FALSE	No
MWOS-06	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Silver	FALSE	FALSE	FALSE	No
MWOS-06	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Styrene	FALSE	FALSE	FALSE	No
MWOS-06	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-06	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-06	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-06	Thallium	FALSE	FALSE	FALSE	No
MWOS-06	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Toluene	FALSE	FALSE	FALSE	No
MWOS-06	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-06	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-06	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-06	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-06	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-06	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-06	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-06	Vanadium	FALSE	FALSE	FALSE	No
MWOS-06	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-06	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-06	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-06	Zinc	FALSE	TRUE	FALSE	No
MWOS-06	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-07	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWOS-07	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-07	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWOS-07	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWOS-07	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-07	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWOS-07	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWOS-07	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWOS-07	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-07	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWOS-07	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWOS-07	2-Hexanone	FALSE	FALSE	FALSE	No
MWOS-07	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWOS-07	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWOS-07	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWOS-07	Acetone	FALSE	FALSE	FALSE	No
MWOS-07	Acrylonitrile	FALSE	FALSE	FALSE	No
MWOS-07	Antimony	FALSE	FALSE	FALSE	No
MWOS-07	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWOS-07	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWOS-07	Arsenic	FALSE	TRUE	FALSE	No
MWOS-07	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Barium	FALSE	TRUE	FALSE	No
MWOS-07	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Benzene	FALSE	FALSE	FALSE	No
MWOS-07	Beryllium	FALSE	FALSE	FALSE	No
MWOS-07	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Bromobenzene	FALSE	FALSE	FALSE	No
MWOS-07	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWOS-07	Bromoform	FALSE	FALSE	FALSE	No
MWOS-07	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWOS-07	Cadmium	FALSE	FALSE	FALSE	No
MWOS-07	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Carbon disulfide	FALSE	FALSE	FALSE	No
MWOS-07	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWOS-07	Chlorobenzene	FALSE	FALSE	FALSE	No
MWOS-07	Chloroethane	FALSE	FALSE	FALSE	No
MWOS-07	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWOS-07	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWOS-07	Chromium	FALSE	FALSE	FALSE	No
MWOS-07	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-07	Cobalt	FALSE	FALSE	FALSE	No
MWOS-07	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Copper	FALSE	FALSE	FALSE	No
MWOS-07	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWOS-07	Dibromomethane	FALSE	FALSE	FALSE	No
MWOS-07	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWOS-07	Ethyl ether	FALSE	FALSE	FALSE	No
MWOS-07	Ethylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	Hexachloroethane	FALSE	FALSE	FALSE	No
MWOS-07	Iron	FALSE	FALSE	FALSE	No
MWOS-07	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWOS-07	Lead	FALSE	FALSE	FALSE	No
MWOS-07	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Magnesium	FALSE	FALSE	FALSE	No
MWOS-07	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Manganese	FALSE	TRUE	TRUE	No
MWOS-07	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Mercury	FALSE	FALSE	FALSE	No
MWOS-07	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWOS-07	Methylene chloride	FALSE	FALSE	FALSE	No
MWOS-07	Naphthalene	FALSE	FALSE	FALSE	No
MWOS-07	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	Nickel	FALSE	TRUE	FALSE	No
MWOS-07	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	Phenanthrene	FALSE	FALSE	FALSE	No
MWOS-07	Selenium	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWOS-07	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Silver	FALSE	FALSE	FALSE	No
MWOS-07	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Styrene	FALSE	FALSE	FALSE	No
MWOS-07	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWOS-07	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWOS-07	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWOS-07	Thallium	FALSE	FALSE	FALSE	No
MWOS-07	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Toluene	FALSE	FALSE	FALSE	No
MWOS-07	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWOS-07	Total PCBs	FALSE	FALSE	FALSE	No
MWOS-07	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWOS-07	Trichloroethene	FALSE	FALSE	FALSE	No
MWOS-07	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWOS-07	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWOS-07	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWOS-07	Vanadium	FALSE	FALSE	FALSE	No
MWOS-07	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWOS-07	Vinyl chloride	FALSE	FALSE	FALSE	No
MWOS-07	Xylene (Total)	FALSE	FALSE	FALSE	No
MWOS-07	Zinc	FALSE	TRUE	FALSE	No
MWOS-07	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWW01-SEN0	2-Hexanone	TRUE	FALSE	FALSE	No
MWW01-SEN0	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW01-SEN0	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW01-SEN0	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Acetone	TRUE	FALSE	FALSE	No
MWW01-SEN0	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW01-SEN0	Antimony	TRUE	FALSE	FALSE	No
MWW01-SEN0	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Arsenic	TRUE	TRUE	FALSE	No
MWW01-SEN0	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
MWW01-SEN0	Barium	TRUE	TRUE	FALSE	No
MWW01-SEN0	Barium (dissolved)	FALSE	TRUE	FALSE	No
MWW01-SEN0	Benzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Beryllium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Bromobenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	Bromoform	TRUE	FALSE	FALSE	No
MWW01-SEN0	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cadmium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cadmium (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW01-SEN0	Carbon disulfide	TRUE	FALSE	FALSE	No
MW01-SEN0	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW01-SEN0	Chlorobenzene	TRUE	FALSE	FALSE	No
MW01-SEN0	Chloroethane	TRUE	FALSE	FALSE	No
MW01-SEN0	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW01-SEN0	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW01-SEN0	Chromium	TRUE	TRUE	FALSE	No
MW01-SEN0	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW01-SEN0	Cobalt	TRUE	FALSE	FALSE	No
MW01-SEN0	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Dibromochloromethane	TRUE	FALSE	FALSE	No
MW01-SEN0	Dibromomethane	FALSE	FALSE	FALSE	No
MW01-SEN0	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MW01-SEN0	Ethyl ether	FALSE	FALSE	FALSE	No
MW01-SEN0	Ethylbenzene	TRUE	FALSE	FALSE	No
MW01-SEN0	Hexachloroethane	FALSE	FALSE	FALSE	No
MW01-SEN0	Iron	FALSE	TRUE	TRUE	No
MW01-SEN0	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW01-SEN0	Lead	TRUE	FALSE	TRUE	No
MW01-SEN0	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Magnesium	FALSE	TRUE	FALSE	No
MW01-SEN0	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Manganese (dissolved)	FALSE	TRUE	TRUE	No
MW01-SEN0	Mercury	TRUE	FALSE	TRUE	No
MW01-SEN0	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW01-SEN0	Methylene chloride	TRUE	FALSE	FALSE	No
MW01-SEN0	Naphthalene	FALSE	FALSE	FALSE	No
MW01-SEN0	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW01-SEN0	Nickel	TRUE	TRUE	FALSE	No
MW01-SEN0	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW01-SEN0	Phenanthrene	FALSE	FALSE	FALSE	No
MW01-SEN0	Selenium	TRUE	FALSE	FALSE	No
MW01-SEN0	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Silver	TRUE	FALSE	FALSE	No
MW01-SEN0	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Styrene	TRUE	FALSE	FALSE	No
MW01-SEN0	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW01-SEN0	Tetrachloroethene	TRUE	FALSE	FALSE	No
MW01-SEN0	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW01-SEN0	Thallium	TRUE	FALSE	FALSE	No
MW01-SEN0	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Toluene	TRUE	FALSE	FALSE	No
MW01-SEN0	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MW01-SEN0	Total PCBs	FALSE	FALSE	FALSE	No
MW01-SEN0	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW01-SEN0	Trichloroethene	TRUE	FALSE	FALSE	No
MW01-SEN0	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW01-SEN0	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW01-SEN0	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW01-SEN0	Vanadium	TRUE	FALSE	TRUE	No
MW01-SEN0	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	Vinyl chloride	TRUE	FALSE	FALSE	No
MW01-SEN0	Xylene (Total)	FALSE	FALSE	FALSE	No
MW01-SEN0	Zinc	TRUE	TRUE	FALSE	No
MW01-SEN0	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MW01-SEN0	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MW01-SEN0	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MW01-SEN0	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MW01-SEN0	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MW01-SEN0	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MW01-SEN0	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MW01-SEN0	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MW01-SEN0	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MW01-SEN0	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW01-SEN0	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWW01-SEN0	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWW01-SEN0	2-Hexanone	TRUE	FALSE	FALSE	No
MWW01-SEN0	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW01-SEN0	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW01-SEN0	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Acetone	TRUE	FALSE	FALSE	No
MWW01-SEN0	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW01-SEN0	Antimony	TRUE	FALSE	FALSE	No
MWW01-SEN0	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Barium	TRUE	TRUE	FALSE	No
MWW01-SEN0	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Benzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Beryllium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Bromobenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	Bromoform	TRUE	FALSE	FALSE	No
MWW01-SEN0	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cadmium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Carbon disulfide	TRUE	FALSE	FALSE	No
MWW01-SEN0	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWW01-SEN0	Chlorobenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Chloroethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Chromium	TRUE	FALSE	TRUE	No
MWW01-SEN0	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cobalt	TRUE	FALSE	FALSE	No
MWW01-SEN0	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWW01-SEN0	Dibromomethane	FALSE	FALSE	FALSE	No
MWW01-SEN0	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Ethyl ether	FALSE	FALSE	FALSE	No
MWW01-SEN0	Ethylbenzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW01-SEN0	Iron	FALSE	TRUE	TRUE	No
MWW01-SEN0	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Magnesium	FALSE	TRUE	FALSE	No
MWW01-SEN0	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Mercury	TRUE	FALSE	TRUE	No
MWW01-SEN0	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Methylene chloride	TRUE	FALSE	FALSE	No
MWW01-SEN0	Naphthalene	FALSE	FALSE	FALSE	No
MWW01-SEN0	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Nickel	TRUE	FALSE	TRUE	No
MWW01-SEN0	Nickel (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW01-SEN0	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Phenanthrene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Selenium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Silver	TRUE	FALSE	FALSE	No
MWW01-SEN0	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Styrene	TRUE	FALSE	FALSE	No
MWW01-SEN0	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW01-SEN0	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWW01-SEN0	Thallium	TRUE	FALSE	FALSE	No
MWW01-SEN0	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Toluene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MWW01-SEN0	Total PCBs	FALSE	TRUE	TRUE	No
MWW01-SEN0	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Trichloroethene	TRUE	FALSE	FALSE	No
MWW01-SEN0	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWW01-SEN0	Vanadium	TRUE	FALSE	TRUE	No
MWW01-SEN0	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Vinyl chloride	TRUE	FALSE	FALSE	No
MWW01-SEN0	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW01-SEN0	Zinc	TRUE	FALSE	FALSE	No
MWW01-SEN0	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW10-03	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWW10-03	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWW10-03	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWW10-03	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWW10-03	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWW10-03	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW10-03	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-03	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW10-03	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWW10-03	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWW10-03	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-03	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWW10-03	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWW10-03	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW10-03	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-03	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-03	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWW10-03	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWW10-03	2-Hexanone	TRUE	FALSE	FALSE	No
MWW10-03	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW10-03	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW10-03	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWW10-03	Acetone	TRUE	FALSE	FALSE	No
MWW10-03	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW10-03	Antimony	FALSE	FALSE	FALSE	No
MWW10-03	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
MWW10-03	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
MWW10-03	Arsenic	FALSE	TRUE	FALSE	No
MWW10-03	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Barium	FALSE	TRUE	FALSE	No
MWW10-03	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Benzene	TRUE	FALSE	FALSE	No
MWW10-03	Beryllium	FALSE	FALSE	FALSE	No
MWW10-03	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Bromobenzene	FALSE	FALSE	FALSE	No
MWW10-03	Bromodichloromethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW10-03	Bromoform	TRUE	FALSE	FALSE	No
MWW10-03	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWW10-03	Cadmium	FALSE	FALSE	FALSE	No
MWW10-03	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Carbon disulfide	TRUE	FALSE	FALSE	No
MWW10-03	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWW10-03	Chlorobenzene	TRUE	FALSE	FALSE	No
MWW10-03	Chloroethane	TRUE	FALSE	FALSE	No
MWW10-03	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWW10-03	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWW10-03	Chromium	FALSE	FALSE	FALSE	No
MWW10-03	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW10-03	Cobalt	FALSE	FALSE	FALSE	No
MWW10-03	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Copper	FALSE	FALSE	FALSE	No
MWW10-03	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWW10-03	Dibromomethane	FALSE	FALSE	FALSE	No
MWW10-03	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWW10-03	Ethyl ether	FALSE	FALSE	FALSE	No
MWW10-03	Ethylbenzene	TRUE	FALSE	FALSE	No
MWW10-03	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW10-03	Iron	FALSE	FALSE	FALSE	No
MWW10-03	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWW10-03	Lead	TRUE	FALSE	TRUE	No
MWW10-03	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Magnesium	FALSE	FALSE	FALSE	No
MWW10-03	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Manganese (dissolved)	FALSE	TRUE	TRUE	No
MWW10-03	Mercury	FALSE	FALSE	FALSE	No
MWW10-03	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWW10-03	Methylene chloride	TRUE	FALSE	FALSE	No
MWW10-03	Naphthalene	FALSE	FALSE	FALSE	No
MWW10-03	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW10-03	Nickel	FALSE	FALSE	FALSE	No
MWW10-03	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW10-03	Phenanthrene	FALSE	FALSE	FALSE	No
MWW10-03	Selenium	FALSE	FALSE	FALSE	No
MWW10-03	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Silver	FALSE	FALSE	FALSE	No
MWW10-03	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Styrene	TRUE	FALSE	FALSE	No
MWW10-03	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW10-03	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWW10-03	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWW10-03	Thallium	FALSE	FALSE	FALSE	No
MWW10-03	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Toluene	TRUE	FALSE	FALSE	No
MWW10-03	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
MWW10-03	Total PCBs	TRUE	FALSE	FALSE	No
MWW10-03	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW10-03	Trichloroethene	TRUE	FALSE	FALSE	No
MWW10-03	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW10-03	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWW10-03	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWW10-03	Vanadium	FALSE	FALSE	FALSE	No
MWW10-03	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-03	Vinyl chloride	TRUE	FALSE	FALSE	No
MWW10-03	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW10-03	Zinc	FALSE	FALSE	FALSE	No
MWW10-03	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW1-04	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWW1-04	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWW1-04	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW1-04	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWW1-04	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWW1-04	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW1-04	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWW1-04	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW1-04	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWW1-04	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWW1-04	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW1-04	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWW1-04	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWW1-04	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW1-04	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW1-04	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW1-04	1,4-Dioxane	TRUE	FALSE	FALSE	No
MWW1-04	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWW1-04	2-Hexanone	TRUE	FALSE	FALSE	No
MWW1-04	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW1-04	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW1-04	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWW1-04	Acetone	TRUE	FALSE	FALSE	No
MWW1-04	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW1-04	Antimony	TRUE	FALSE	FALSE	No
MWW1-04	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
MWW1-04	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
MWW1-04	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
MWW1-04	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
MWW1-04	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
MWW1-04	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
MWW1-04	Arsenic	FALSE	FALSE	FALSE	No
MWW1-04	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Barium	FALSE	FALSE	FALSE	No
MWW1-04	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Benzene	TRUE	FALSE	FALSE	No
MWW1-04	Beryllium	FALSE	FALSE	FALSE	No
MWW1-04	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Bromobenzene	FALSE	FALSE	FALSE	No
MWW1-04	Bromodichloromethane	TRUE	FALSE	FALSE	No
MWW1-04	Bromoform	TRUE	FALSE	FALSE	No
MWW1-04	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MWW1-04	Cadmium	FALSE	FALSE	FALSE	No
MWW1-04	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Carbon disulfide	TRUE	FALSE	FALSE	No
MWW1-04	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MWW1-04	Chlorobenzene	TRUE	FALSE	FALSE	No
MWW1-04	Chloroethane	TRUE	FALSE	FALSE	No
MWW1-04	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MWW1-04	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MWW1-04	Chromium	FALSE	FALSE	FALSE	No
MWW1-04	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW1-04	Cobalt	FALSE	FALSE	FALSE	No
MWW1-04	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Copper	FALSE	FALSE	FALSE	No
MWW1-04	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Dibromochloromethane	TRUE	FALSE	FALSE	No
MWW1-04	Dibromomethane	FALSE	FALSE	FALSE	No
MWW1-04	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MWW1-04	Ethyl ether	FALSE	FALSE	FALSE	No
MWW1-04	Ethylbenzene	TRUE	FALSE	FALSE	No
MWW1-04	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW1-04	Iron	FALSE	TRUE	TRUE	No
MWW1-04	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Isopropyl benzene	TRUE	FALSE	FALSE	No
MWW1-04	Lead	FALSE	FALSE	FALSE	No
MWW1-04	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Magnesium	FALSE	TRUE	FALSE	No
MWW1-04	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Manganese	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW1-04	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Mercury	FALSE	FALSE	FALSE	No
MWW1-04	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MWW1-04	Methylene chloride	TRUE	FALSE	FALSE	No
MWW1-04	Naphthalene	FALSE	TRUE	FALSE	No
MWW1-04	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW1-04	Nickel	FALSE	FALSE	FALSE	No
MWW1-04	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW1-04	Phenanthrene	FALSE	FALSE	FALSE	No
MWW1-04	Selenium	FALSE	FALSE	FALSE	No
MWW1-04	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Silver	FALSE	FALSE	FALSE	No
MWW1-04	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Styrene	TRUE	FALSE	FALSE	No
MWW1-04	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW1-04	Tetrachloroethene	TRUE	FALSE	FALSE	No
MWW1-04	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWW1-04	Thallium	FALSE	FALSE	FALSE	No
MWW1-04	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Toluene	TRUE	FALSE	FALSE	No
MWW1-04	Total dissolved solids (TDS)	FALSE	TRUE	FALSE	No
MWW1-04	Total PCBs	TRUE	TRUE	FALSE	No
MWW1-04	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MWW1-04	Trichloroethene	TRUE	FALSE	FALSE	No
MWW1-04	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW1-04	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MWW1-04	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MWW1-04	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-04	Vinyl chloride	TRUE	FALSE	FALSE	No
MWW1-04	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW1-04	Zinc	FALSE	FALSE	FALSE	No
MWW1-04	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW10-SEN0	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW10-SEN0	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW10-SEN0	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW10-SEN0	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW10-SEN0	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
MWW10-SEN0	1,4-Dioxane	FALSE	TRUE	TRUE	No
MWW10-SEN0	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
MWW10-SEN0	2-Hexanone	TRUE	FALSE	FALSE	No
MWW10-SEN0	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW10-SEN0	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW10-SEN0	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
MWW10-SEN0	Acetone	TRUE	FALSE	FALSE	No
MWW10-SEN0	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW10-SEN0	Antimony	FALSE	FALSE	FALSE	No
MWW10-SEN0	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Arsenic	FALSE	TRUE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MW10-SEN0	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Barium	FALSE	TRUE	FALSE	No
MW10-SEN0	Barium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Benzene	TRUE	FALSE	FALSE	No
MW10-SEN0	Beryllium	FALSE	FALSE	FALSE	No
MW10-SEN0	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Bromobenzene	FALSE	FALSE	FALSE	No
MW10-SEN0	Bromodichloromethane	TRUE	FALSE	FALSE	No
MW10-SEN0	Bromoform	TRUE	FALSE	FALSE	No
MW10-SEN0	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
MW10-SEN0	Cadmium	FALSE	FALSE	FALSE	No
MW10-SEN0	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Carbon disulfide	TRUE	FALSE	FALSE	No
MW10-SEN0	Carbon tetrachloride	TRUE	FALSE	FALSE	No
MW10-SEN0	Chlorobenzene	TRUE	FALSE	FALSE	No
MW10-SEN0	Chloroethane	TRUE	FALSE	FALSE	No
MW10-SEN0	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
MW10-SEN0	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
MW10-SEN0	Chromium	FALSE	TRUE	FALSE	No
MW10-SEN0	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW10-SEN0	Cobalt	FALSE	TRUE	FALSE	No
MW10-SEN0	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Copper	FALSE	TRUE	TRUE	No
MW10-SEN0	Copper (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Dibromochloromethane	TRUE	FALSE	FALSE	No
MW10-SEN0	Dibromomethane	FALSE	FALSE	FALSE	No
MW10-SEN0	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
MW10-SEN0	Ethyl ether	FALSE	FALSE	FALSE	No
MW10-SEN0	Ethylbenzene	TRUE	FALSE	FALSE	No
MW10-SEN0	Hexachloroethane	FALSE	FALSE	FALSE	No
MW10-SEN0	Iron	FALSE	TRUE	TRUE	No
MW10-SEN0	Iron (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Isopropyl benzene	TRUE	FALSE	FALSE	No
MW10-SEN0	Lead	FALSE	TRUE	TRUE	No
MW10-SEN0	Lead (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Magnesium	FALSE	TRUE	FALSE	No
MW10-SEN0	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Manganese	FALSE	TRUE	TRUE	No
MW10-SEN0	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Mercury	FALSE	FALSE	TRUE	No
MW10-SEN0	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
MW10-SEN0	Methylene chloride	TRUE	FALSE	FALSE	No
MW10-SEN0	Naphthalene	FALSE	FALSE	FALSE	No
MW10-SEN0	N-Butylbenzene	FALSE	FALSE	FALSE	No
MW10-SEN0	Nickel	FALSE	TRUE	TRUE	No
MW10-SEN0	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	N-Propylbenzene	FALSE	FALSE	FALSE	No
MW10-SEN0	Phenanthrene	FALSE	FALSE	FALSE	No
MW10-SEN0	Selenium	FALSE	FALSE	FALSE	No
MW10-SEN0	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Silver	FALSE	FALSE	FALSE	No
MW10-SEN0	Silver (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Styrene	TRUE	FALSE	FALSE	No
MW10-SEN0	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MW10-SEN0	Tetrachloroethene	TRUE	FALSE	FALSE	No
MW10-SEN0	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MW10-SEN0	Thallium	FALSE	FALSE	FALSE	No
MW10-SEN0	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MW10-SEN0	Toluene	TRUE	FALSE	FALSE	No
MW10-SEN0	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MW10-SEN0	Total PCBs	FALSE	FALSE	FALSE	No
MW10-SEN0	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
MW10-SEN0	Trichloroethene	TRUE	FALSE	FALSE	No
MW10-SEN0	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MW10-SEN0	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
MW10-SEN0	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
MW10-SEN0	Vanadium	FALSE	TRUE	TRUE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW10-SEN0	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Vinyl chloride	TRUE	FALSE	FALSE	No
MWW10-SEN0	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW10-SEN0	Zinc	FALSE	TRUE	FALSE	No
MWW10-SEN0	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWW1-15	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW1-15	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWW1-15	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWW1-15	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWW1-15	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWW1-15	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW1-15	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWW1-15	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWW1-15	2-Hexanone	FALSE	FALSE	FALSE	No
MWW1-15	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW1-15	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW1-15	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWW1-15	Acetone	FALSE	FALSE	FALSE	No
MWW1-15	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW1-15	Antimony	FALSE	FALSE	FALSE	No
MWW1-15	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWW1-15	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWW1-15	Arsenic	FALSE	TRUE	FALSE	No
MWW1-15	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Barium	FALSE	TRUE	FALSE	No
MWW1-15	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Benzene	FALSE	FALSE	FALSE	No
MWW1-15	Beryllium	FALSE	FALSE	FALSE	No
MWW1-15	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Bromobenzene	FALSE	FALSE	FALSE	No
MWW1-15	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWW1-15	Bromoform	FALSE	FALSE	FALSE	No
MWW1-15	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWW1-15	Cadmium	FALSE	FALSE	FALSE	No
MWW1-15	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Carbon disulfide	FALSE	FALSE	FALSE	No
MWW1-15	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWW1-15	Chlorobenzene	FALSE	FALSE	FALSE	No
MWW1-15	Chloroethane	FALSE	FALSE	FALSE	No
MWW1-15	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWW1-15	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWW1-15	Chromium	FALSE	FALSE	FALSE	No
MWW1-15	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW1-15	Cobalt	FALSE	FALSE	FALSE	No
MWW1-15	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Copper	FALSE	FALSE	FALSE	No
MWW1-15	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWW1-15	Dibromomethane	FALSE	FALSE	FALSE	No
MWW1-15	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWW1-15	Ethyl ether	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW1-15	Ethylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW1-15	Iron	FALSE	TRUE	TRUE	No
MWW1-15	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWW1-15	Lead	FALSE	FALSE	FALSE	No
MWW1-15	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Magnesium	FALSE	TRUE	FALSE	No
MWW1-15	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Manganese	FALSE	TRUE	TRUE	No
MWW1-15	Manganese (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Mercury	FALSE	FALSE	FALSE	No
MWW1-15	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWW1-15	Methylene chloride	FALSE	FALSE	FALSE	No
MWW1-15	Naphthalene	FALSE	FALSE	FALSE	No
MWW1-15	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	Nickel	FALSE	FALSE	FALSE	No
MWW1-15	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	Phenanthrene	FALSE	FALSE	FALSE	No
MWW1-15	Selenium	FALSE	FALSE	FALSE	No
MWW1-15	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Silver	FALSE	FALSE	FALSE	No
MWW1-15	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Styrene	FALSE	FALSE	FALSE	No
MWW1-15	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW1-15	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWW1-15	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWW1-15	Thallium	FALSE	FALSE	FALSE	No
MWW1-15	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Toluene	FALSE	FALSE	FALSE	No
MWW1-15	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MWW1-15	Total PCBs	FALSE	FALSE	FALSE	No
MWW1-15	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW1-15	Trichloroethene	FALSE	FALSE	FALSE	No
MWW1-15	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW1-15	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWW1-15	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWW1-15	Vanadium	FALSE	FALSE	FALSE	No
MWW1-15	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW1-15	Vinyl chloride	FALSE	FALSE	FALSE	No
MWW1-15	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW1-15	Zinc	FALSE	FALSE	FALSE	No
MWW1-15	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW5-01	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWW5-01	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWW5-01	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWW5-01	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWW5-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01	1,4-Dioxane	FALSE	TRUE	TRUE	No
MWW5-01	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWW5-01	2-Hexanone	FALSE	FALSE	FALSE	No
MWW5-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW5-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW5-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWW5-01	Acetone	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW5-01	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW5-01	Antimony	FALSE	FALSE	FALSE	No
MWW5-01	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWW5-01	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWW5-01	Arsenic	FALSE	TRUE	TRUE	No
MWW5-01	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Barium	FALSE	TRUE	FALSE	No
MWW5-01	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Benzene	FALSE	FALSE	FALSE	No
MWW5-01	Beryllium	FALSE	FALSE	FALSE	No
MWW5-01	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Bromobenzene	FALSE	FALSE	FALSE	No
MWW5-01	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWW5-01	Bromoform	FALSE	FALSE	FALSE	No
MWW5-01	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWW5-01	Cadmium	FALSE	TRUE	FALSE	No
MWW5-01	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Carbon disulfide	FALSE	FALSE	FALSE	No
MWW5-01	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWW5-01	Chlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01	Chloroethane	FALSE	TRUE	FALSE	No
MWW5-01	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWW5-01	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
MWW5-01	Chromium	FALSE	FALSE	FALSE	No
MWW5-01	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01	Cobalt	FALSE	TRUE	FALSE	No
MWW5-01	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Copper	FALSE	TRUE	TRUE	No
MWW5-01	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWW5-01	Dibromomethane	FALSE	FALSE	FALSE	No
MWW5-01	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWW5-01	Ethyl ether	FALSE	FALSE	FALSE	No
MWW5-01	Ethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW5-01	Iron	FALSE	TRUE	TRUE	No
MWW5-01	Iron (dissolved)	FALSE	TRUE	FALSE	No
MWW5-01	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWW5-01	Lead	FALSE	TRUE	TRUE	No
MWW5-01	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Magnesium	FALSE	TRUE	FALSE	No
MWW5-01	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Manganese	FALSE	TRUE	TRUE	No
MWW5-01	Manganese (dissolved)	FALSE	TRUE	FALSE	No
MWW5-01	Mercury	FALSE	FALSE	FALSE	No
MWW5-01	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWW5-01	Methylene chloride	FALSE	FALSE	FALSE	No
MWW5-01	Naphthalene	FALSE	FALSE	FALSE	No
MWW5-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	Nickel	FALSE	TRUE	FALSE	No
MWW5-01	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	Phenanthrene	FALSE	FALSE	FALSE	No
MWW5-01	Selenium	FALSE	FALSE	FALSE	No
MWW5-01	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Silver	FALSE	FALSE	FALSE	No
MWW5-01	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Styrene	FALSE	FALSE	FALSE	No
MWW5-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW5-01	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWW5-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW5-01	Thallium	FALSE	FALSE	FALSE	No
MWW5-01	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Toluene	FALSE	FALSE	FALSE	No
MWW5-01	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MWW5-01	Total PCBs	FALSE	FALSE	FALSE	No
MWW5-01	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01	Trichloroethene	FALSE	FALSE	FALSE	No
MWW5-01	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW5-01	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWW5-01	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWW5-01	Vanadium	FALSE	TRUE	TRUE	No
MWW5-01	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01	Vinyl chloride	FALSE	FALSE	FALSE	No
MWW5-01	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW5-01	Zinc	FALSE	TRUE	FALSE	No
MWW5-01	Zinc (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01R	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
MWW5-01R	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
MWW5-01R	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
MWW5-01R	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
MWW5-01R	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	1,4-Dioxane	FALSE	FALSE	FALSE	No
MWW5-01R	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
MWW5-01R	2-Hexanone	FALSE	FALSE	FALSE	No
MWW5-01R	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
MWW5-01R	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
MWW5-01R	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
MWW5-01R	Acetone	FALSE	FALSE	FALSE	No
MWW5-01R	Acrylonitrile	FALSE	FALSE	FALSE	No
MWW5-01R	Antimony	FALSE	FALSE	FALSE	No
MWW5-01R	Antimony (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
MWW5-01R	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
MWW5-01R	Arsenic	FALSE	TRUE	TRUE	No
MWW5-01R	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Barium	FALSE	TRUE	FALSE	No
MWW5-01R	Barium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Benzene	FALSE	FALSE	FALSE	No
MWW5-01R	Beryllium	FALSE	FALSE	FALSE	No
MWW5-01R	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Bromobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Bromodichloromethane	FALSE	FALSE	FALSE	No
MWW5-01R	Bromoform	FALSE	FALSE	FALSE	No
MWW5-01R	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
MWW5-01R	Cadmium	FALSE	FALSE	FALSE	No
MWW5-01R	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Carbon disulfide	FALSE	FALSE	FALSE	No
MWW5-01R	Carbon tetrachloride	FALSE	FALSE	FALSE	No
MWW5-01R	Chlorobenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Chloroethane	FALSE	TRUE	FALSE	No
MWW5-01R	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
MWW5-01R	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
MWW5-01R	Chromium	FALSE	FALSE	FALSE	No
MWW5-01R	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01R	Cobalt	FALSE	FALSE	FALSE	No
MWW5-01R	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Copper	FALSE	FALSE	FALSE	No
MWW5-01R	Copper (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Dibromochloromethane	FALSE	FALSE	FALSE	No
MWW5-01R	Dibromomethane	FALSE	FALSE	FALSE	No
MWW5-01R	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
MWW5-01R	Ethyl ether	FALSE	FALSE	FALSE	No
MWW5-01R	Ethylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Hexachloroethane	FALSE	FALSE	FALSE	No
MWW5-01R	Iron	FALSE	TRUE	TRUE	No
MWW5-01R	Iron (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Isopropyl benzene	FALSE	FALSE	FALSE	No
MWW5-01R	Lead	FALSE	FALSE	FALSE	No
MWW5-01R	Lead (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Magnesium	FALSE	TRUE	FALSE	No
MWW5-01R	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Manganese	FALSE	FALSE	FALSE	No
MWW5-01R	Manganese (dissolved)	FALSE	TRUE	TRUE	No
MWW5-01R	Mercury	FALSE	FALSE	FALSE	No
MWW5-01R	Mercury (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
MWW5-01R	Methylene chloride	FALSE	FALSE	FALSE	No
MWW5-01R	Naphthalene	FALSE	FALSE	FALSE	No
MWW5-01R	N-Butylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Nickel	FALSE	TRUE	FALSE	No
MWW5-01R	Nickel (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	N-Propylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Phenanthrene	FALSE	FALSE	FALSE	No
MWW5-01R	Selenium	FALSE	FALSE	FALSE	No
MWW5-01R	Selenium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Silver	FALSE	FALSE	FALSE	No
MWW5-01R	Silver (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Styrene	FALSE	FALSE	FALSE	No
MWW5-01R	tert-Butylbenzene	FALSE	FALSE	FALSE	No
MWW5-01R	Tetrachloroethene	FALSE	FALSE	FALSE	No
MWW5-01R	Tetrahydrofuran	FALSE	FALSE	FALSE	No
MWW5-01R	Thallium	FALSE	FALSE	FALSE	No
MWW5-01R	Thallium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Toluene	FALSE	FALSE	FALSE	No
MWW5-01R	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
MWW5-01R	Total PCBs	FALSE	FALSE	FALSE	No
MWW5-01R	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
MWW5-01R	Trichloroethene	FALSE	FALSE	FALSE	No
MWW5-01R	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
MWW5-01R	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
MWW5-01R	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
MWW5-01R	Vanadium	FALSE	FALSE	FALSE	No
MWW5-01R	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
MWW5-01R	Vinyl chloride	FALSE	FALSE	FALSE	No
MWW5-01R	Xylene (Total)	FALSE	FALSE	FALSE	No
MWW5-01R	Zinc	FALSE	FALSE	FALSE	No
MWW5-01R	Zinc (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
SWDF-1	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
SWDF-1	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
SWDF-1	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
SWDF-1	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
SWDF-1	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
SWDF-1	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
SWDF-1	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
SWDF-1	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
SWDF-1	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,2-Dichloroethane	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
SWDF-1	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
SWDF-1	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
SWDF-1	1,4-Dioxane	FALSE	TRUE	FALSE	No
SWDF-1	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
SWDF-1	2-Hexanone	FALSE	FALSE	FALSE	No
SWDF-1	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
SWDF-1	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
SWDF-1	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
SWDF-1	Acetone	FALSE	FALSE	FALSE	No
SWDF-1	Acrylonitrile	FALSE	FALSE	FALSE	No
SWDF-1	Antimony	FALSE	FALSE	FALSE	No
SWDF-1	Antimony (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
SWDF-1	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
SWDF-1	Arsenic	FALSE	TRUE	TRUE	No
SWDF-1	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
SWDF-1	Barium	FALSE	TRUE	FALSE	No
SWDF-1	Barium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Benzene	FALSE	FALSE	FALSE	No
SWDF-1	Beryllium	FALSE	FALSE	FALSE	No
SWDF-1	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Bromobenzene	FALSE	FALSE	FALSE	No
SWDF-1	Bromodichloromethane	FALSE	FALSE	FALSE	No
SWDF-1	Bromoform	FALSE	FALSE	FALSE	No
SWDF-1	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
SWDF-1	Cadmium	FALSE	FALSE	FALSE	No
SWDF-1	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Carbon disulfide	FALSE	FALSE	FALSE	No
SWDF-1	Carbon tetrachloride	FALSE	FALSE	FALSE	No
SWDF-1	Chlorobenzene	FALSE	FALSE	FALSE	No
SWDF-1	Chloroethane	FALSE	FALSE	FALSE	No
SWDF-1	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
SWDF-1	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
SWDF-1	Chromium	FALSE	FALSE	FALSE	No
SWDF-1	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
SWDF-1	Cobalt	FALSE	FALSE	FALSE	No
SWDF-1	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Copper	FALSE	FALSE	FALSE	No
SWDF-1	Copper (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Dibromochloromethane	FALSE	FALSE	FALSE	No
SWDF-1	Dibromomethane	FALSE	FALSE	FALSE	No
SWDF-1	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
SWDF-1	Ethyl ether	FALSE	FALSE	FALSE	No
SWDF-1	Ethylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	Hexachloroethane	FALSE	FALSE	FALSE	No
SWDF-1	Iron	FALSE	FALSE	FALSE	No
SWDF-1	Iron (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Isopropyl benzene	FALSE	FALSE	FALSE	No
SWDF-1	Lead	FALSE	FALSE	FALSE	No
SWDF-1	Lead (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Magnesium	FALSE	FALSE	FALSE	No
SWDF-1	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Manganese	FALSE	TRUE	TRUE	No
SWDF-1	Manganese (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Mercury	FALSE	FALSE	FALSE	No
SWDF-1	Mercury (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
SWDF-1	Methylene chloride	FALSE	FALSE	FALSE	No
SWDF-1	Naphthalene	FALSE	FALSE	FALSE	No
SWDF-1	N-Butylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	Nickel	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
SWDF-1	Nickel (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	N-Propylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	Phenanthrene	FALSE	FALSE	FALSE	No
SWDF-1	Selenium	FALSE	TRUE	TRUE	No
SWDF-1	Selenium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Silver	FALSE	FALSE	FALSE	No
SWDF-1	Silver (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Styrene	FALSE	FALSE	FALSE	No
SWDF-1	tert-Butylbenzene	FALSE	FALSE	FALSE	No
SWDF-1	Tetrachloroethene	FALSE	FALSE	FALSE	No
SWDF-1	Tetrahydrofuran	FALSE	FALSE	FALSE	No
SWDF-1	Thallium	FALSE	FALSE	FALSE	No
SWDF-1	Thallium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Toluene	FALSE	FALSE	FALSE	No
SWDF-1	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
SWDF-1	Total PCBs	FALSE	FALSE	FALSE	No
SWDF-1	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
SWDF-1	Trichloroethene	FALSE	FALSE	FALSE	No
SWDF-1	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
SWDF-1	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
SWDF-1	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
SWDF-1	Vanadium	FALSE	FALSE	FALSE	No
SWDF-1	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
SWDF-1	Vinyl chloride	FALSE	FALSE	FALSE	No
SWDF-1	Xylene (Total)	FALSE	FALSE	FALSE	No
SWDF-1	Zinc	FALSE	FALSE	FALSE	No
SWDF-1	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-09-01	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-09-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-09-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-09-01	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-09-01	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-09-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-09-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-09-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-09-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-09-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-09-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-09-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-09-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-09-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-09-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-09-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-09-01	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-09-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-09-01	2-Hexanone	TRUE	FALSE	FALSE	No
TW-09-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-09-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-09-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-09-01	Acetone	TRUE	FALSE	FALSE	No
TW-09-01	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-09-01	Antimony	TRUE	FALSE	FALSE	No
TW-09-01	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-09-01	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-09-01	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Barium	TRUE	TRUE	FALSE	No
TW-09-01	Barium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Benzene	TRUE	FALSE	FALSE	No
TW-09-01	Beryllium	TRUE	FALSE	FALSE	No
TW-09-01	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Bromobenzene	FALSE	FALSE	FALSE	No
TW-09-01	Bromodichloromethane	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-09-01	Bromoform	TRUE	FALSE	FALSE	No
TW-09-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-09-01	Cadmium	TRUE	FALSE	FALSE	No
TW-09-01	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-09-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-09-01	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-09-01	Chloroethane	TRUE	FALSE	FALSE	No
TW-09-01	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-09-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-09-01	Chromium	TRUE	FALSE	FALSE	No
TW-09-01	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-09-01	Cobalt	TRUE	FALSE	FALSE	No
TW-09-01	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Copper	TRUE	FALSE	FALSE	No
TW-09-01	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-09-01	Dibromomethane	FALSE	FALSE	FALSE	No
TW-09-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-09-01	Ethyl ether	FALSE	FALSE	FALSE	No
TW-09-01	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-09-01	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-09-01	Iron (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-09-01	Lead	TRUE	FALSE	FALSE	No
TW-09-01	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Magnesium	FALSE	TRUE	FALSE	No
TW-09-01	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Manganese (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Mercury	TRUE	FALSE	FALSE	No
TW-09-01	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-09-01	Methylene chloride	TRUE	FALSE	FALSE	No
TW-09-01	Naphthalene	FALSE	FALSE	FALSE	No
TW-09-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-09-01	Nickel	TRUE	FALSE	FALSE	No
TW-09-01	Nickel (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-09-01	Phenanthrene	FALSE	TRUE	TRUE	No
TW-09-01	Selenium	TRUE	FALSE	FALSE	No
TW-09-01	Selenium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Silver	TRUE	FALSE	FALSE	No
TW-09-01	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Styrene	TRUE	FALSE	FALSE	No
TW-09-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-09-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
TW-09-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-09-01	Thallium	TRUE	FALSE	FALSE	No
TW-09-01	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Toluene	TRUE	FALSE	FALSE	No
TW-09-01	Total PCBs	FALSE	FALSE	FALSE	No
TW-09-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-09-01	Trichloroethene	TRUE	FALSE	FALSE	No
TW-09-01	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-09-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
TW-09-01	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
TW-09-01	Vanadium	TRUE	FALSE	FALSE	No
TW-09-01	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
TW-09-01	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-09-01	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-09-01	Zinc	TRUE	FALSE	FALSE	No
TW-09-01	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-10-02	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
TW-10-02	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-10-02	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
TW-10-02	1,1-Dichloroethane	FALSE	TRUE	FALSE	No
TW-10-02	1,1-Dichloroethene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-10-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-10-02	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
TW-10-02	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
TW-10-02	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
TW-10-02	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
TW-10-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-10-02	1,4-Dioxane	FALSE	TRUE	TRUE	No
TW-10-02	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	TRUE	FALSE	No
TW-10-02	2-Hexanone	FALSE	FALSE	FALSE	No
TW-10-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-10-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-10-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	TRUE	FALSE	No
TW-10-02	Acetone	FALSE	TRUE	FALSE	No
TW-10-02	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-10-02	Antimony	FALSE	FALSE	FALSE	No
TW-10-02	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1016 (PCB-1016)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1221 (PCB-1221)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1232 (PCB-1232)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1242 (PCB-1242)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1248 (PCB-1248)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1254 (PCB-1254)	FALSE	FALSE	FALSE	No
TW-10-02	Aroclor-1260 (PCB-1260)	FALSE	FALSE	FALSE	No
TW-10-02	Arsenic	FALSE	TRUE	TRUE	No
TW-10-02	Arsenic (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Barium	FALSE	TRUE	FALSE	No
TW-10-02	Barium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Benzene	FALSE	TRUE	FALSE	No
TW-10-02	Beryllium	FALSE	TRUE	FALSE	No
TW-10-02	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Bromobenzene	FALSE	FALSE	FALSE	No
TW-10-02	Bromodichloromethane	FALSE	FALSE	FALSE	No
TW-10-02	Bromoform	FALSE	FALSE	FALSE	No
TW-10-02	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
TW-10-02	Cadmium	FALSE	FALSE	FALSE	No
TW-10-02	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Carbon disulfide	FALSE	TRUE	FALSE	No
TW-10-02	Carbon tetrachloride	FALSE	FALSE	FALSE	No
TW-10-02	Chlorobenzene	FALSE	FALSE	FALSE	No
TW-10-02	Chloroethane	FALSE	TRUE	FALSE	No
TW-10-02	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
TW-10-02	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
TW-10-02	Chromium	FALSE	TRUE	FALSE	No
TW-10-02	Chromium Total (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	cis-1,2-Dichloroethene	FALSE	TRUE	FALSE	No
TW-10-02	Cobalt	FALSE	TRUE	FALSE	No
TW-10-02	Cobalt (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Copper	FALSE	TRUE	FALSE	No
TW-10-02	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Dibromochloromethane	FALSE	FALSE	FALSE	No
TW-10-02	Dibromomethane	FALSE	FALSE	FALSE	No
TW-10-02	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
TW-10-02	Ethyl ether	FALSE	FALSE	FALSE	No
TW-10-02	Ethylbenzene	FALSE	TRUE	FALSE	No
TW-10-02	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-10-02	Iron	FALSE	FALSE	FALSE	No
TW-10-02	Iron (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Isopropyl benzene	FALSE	TRUE	FALSE	No
TW-10-02	Lead	FALSE	TRUE	FALSE	No
TW-10-02	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Magnesium	FALSE	FALSE	FALSE	No
TW-10-02	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Manganese	FALSE	TRUE	TRUE	No
TW-10-02	Manganese (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-10-02	Mercury	FALSE	FALSE	FALSE	No
TW-10-02	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
TW-10-02	Methylene chloride	FALSE	FALSE	FALSE	No
TW-10-02	Naphthalene	FALSE	TRUE	FALSE	No
TW-10-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-10-02	Nickel	FALSE	TRUE	FALSE	No
TW-10-02	Nickel (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-10-02	Phenanthrene	FALSE	FALSE	TRUE	No
TW-10-02	Selenium	FALSE	TRUE	FALSE	No
TW-10-02	Selenium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Silver	FALSE	FALSE	FALSE	No
TW-10-02	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Styrene	FALSE	FALSE	FALSE	No
TW-10-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-10-02	Tetrachloroethene	FALSE	FALSE	FALSE	No
TW-10-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-10-02	Thallium	FALSE	FALSE	FALSE	No
TW-10-02	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Toluene	FALSE	TRUE	FALSE	No
TW-10-02	Total dissolved solids (TDS)	FALSE	FALSE	FALSE	No
TW-10-02	Total PCBs	FALSE	FALSE	FALSE	No
TW-10-02	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
TW-10-02	Trichloroethene	FALSE	TRUE	FALSE	No
TW-10-02	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-10-02	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
TW-10-02	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
TW-10-02	Vanadium	FALSE	TRUE	FALSE	No
TW-10-02	Vanadium (dissolved)	FALSE	FALSE	FALSE	No
TW-10-02	Vinyl chloride	FALSE	FALSE	FALSE	No
TW-10-02	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-10-02	Zinc	FALSE	TRUE	FALSE	No
TW-10-02	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-01	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-01	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-01	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-01	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-01	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-MD-01	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-MD-01	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-01	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-MD-01	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-01	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-01	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-01	1,4-Dioxane	TRUE	FALSE	FALSE	No
TW-MD-01	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-MD-01	2-Hexanone	TRUE	FALSE	FALSE	No
TW-MD-01	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-01	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-01	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-MD-01	Acetone	TRUE	FALSE	FALSE	No
TW-MD-01	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-01	Antimony	TRUE	FALSE	FALSE	No
TW-MD-01	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-01	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-01	Arsenic	TRUE	TRUE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-01	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Barium	TRUE	TRUE	FALSE	No
TW-MD-01	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Benzene	TRUE	FALSE	FALSE	No
TW-MD-01	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-01	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-01	Bromodichloromethane	TRUE	FALSE	FALSE	No
TW-MD-01	Bromoform	TRUE	FALSE	FALSE	No
TW-MD-01	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-MD-01	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-01	Cadmium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-MD-01	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-MD-01	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-01	Chloroethane	TRUE	FALSE	FALSE	No
TW-MD-01	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-MD-01	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-MD-01	Chromium	TRUE	FALSE	FALSE	No
TW-MD-01	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-01	Cobalt	TRUE	FALSE	FALSE	No
TW-MD-01	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Copper	TRUE	FALSE	FALSE	No
TW-MD-01	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-MD-01	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-01	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-MD-01	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-01	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-MD-01	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-01	Iron (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-01	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-MD-01	Lead	TRUE	FALSE	FALSE	No
TW-MD-01	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Magnesium	TRUE	TRUE	FALSE	No
TW-MD-01	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-01	Mercury	TRUE	FALSE	FALSE	No
TW-MD-01	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-MD-01	Methylene chloride	TRUE	FALSE	FALSE	No
TW-MD-01	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-01	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-01	Nickel	TRUE	TRUE	FALSE	No
TW-MD-01	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-01	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-01	Selenium	TRUE	FALSE	FALSE	No
TW-MD-01	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Silver	TRUE	FALSE	TRUE	No
TW-MD-01	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Styrene	TRUE	FALSE	FALSE	No
TW-MD-01	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-01	Tetrachloroethene	TRUE	FALSE	FALSE	No
TW-MD-01	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-01	Thallium	TRUE	FALSE	FALSE	No
TW-MD-01	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-01	Toluene	TRUE	FALSE	FALSE	No
TW-MD-01	Total PCBs	FALSE	FALSE	FALSE	No
TW-MD-01	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-01	Trichloroethene	TRUE	FALSE	FALSE	No
TW-MD-01	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-01	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
TW-MD-01	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
TW-MD-01	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-01	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-01	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-MD-01	Xylene (Total)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-01	Zinc	TRUE	FALSE	FALSE	No
TW-MD-01	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-02	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-02	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-02	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-02	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-02	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-MD-02	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-MD-02	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-02	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-MD-02	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-02	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-02	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-02	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-MD-02	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-MD-02	2-Hexanone	TRUE	FALSE	FALSE	No
TW-MD-02	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-02	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-02	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-MD-02	Acetone	TRUE	FALSE	FALSE	No
TW-MD-02	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-02	Antimony	TRUE	FALSE	FALSE	No
TW-MD-02	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-02	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-02	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-02	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Barium	TRUE	TRUE	FALSE	No
TW-MD-02	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Benzene	TRUE	FALSE	FALSE	No
TW-MD-02	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-02	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-02	Bromodichloromethane	TRUE	FALSE	FALSE	No
TW-MD-02	Bromoform	TRUE	FALSE	FALSE	No
TW-MD-02	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-MD-02	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-02	Cadmium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-MD-02	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-MD-02	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-02	Chloroethane	TRUE	FALSE	FALSE	No
TW-MD-02	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-MD-02	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-MD-02	Chromium	TRUE	FALSE	FALSE	No
TW-MD-02	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-02	Cobalt	TRUE	FALSE	FALSE	No
TW-MD-02	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Copper	TRUE	FALSE	FALSE	No
TW-MD-02	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-MD-02	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-02	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-MD-02	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-02	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-MD-02	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-02	Iron (dissolved)	FALSE	TRUE	TRUE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-02	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-MD-02	Lead	TRUE	FALSE	FALSE	No
TW-MD-02	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Magnesium	TRUE	TRUE	FALSE	No
TW-MD-02	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-02	Mercury	TRUE	FALSE	FALSE	No
TW-MD-02	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-MD-02	Methylene chloride	TRUE	FALSE	FALSE	No
TW-MD-02	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-02	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-02	Nickel	TRUE	TRUE	FALSE	No
TW-MD-02	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-02	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-02	Selenium	TRUE	FALSE	FALSE	No
TW-MD-02	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Silver	TRUE	FALSE	FALSE	No
TW-MD-02	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Styrene	TRUE	FALSE	FALSE	No
TW-MD-02	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-02	Tetrachloroethene	TRUE	FALSE	FALSE	No
TW-MD-02	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-02	Thallium	TRUE	FALSE	FALSE	No
TW-MD-02	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-02	Toluene	TRUE	FALSE	FALSE	No
TW-MD-02	Total PCBs	FALSE	FALSE	FALSE	No
TW-MD-02	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-02	Trichloroethene	TRUE	FALSE	FALSE	No
TW-MD-02	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-02	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
TW-MD-02	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
TW-MD-02	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-02	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-02	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-MD-02	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-02	Zinc	TRUE	FALSE	FALSE	No
TW-MD-02	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-03	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-03	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-03	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-03	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-03	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-MD-03	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-MD-03	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-03	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-MD-03	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-03	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-03	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-03	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-MD-03	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-MD-03	2-Hexanone	TRUE	FALSE	FALSE	No
TW-MD-03	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-03	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-03	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-MD-03	Acetone	TRUE	FALSE	FALSE	No
TW-MD-03	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-03	Antimony	TRUE	FALSE	FALSE	No
TW-MD-03	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-03	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-03	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-03	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-03	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-03	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-03	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-03	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-03	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	Barium	TRUE	TRUE	FALSE	No
TW-MD-03	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	Benzene	TRUE	FALSE	FALSE	No
TW-MD-03	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-03	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-03	Bromodichloromethane	TRUE	FALSE	FALSE	No
TW-MD-03	Bromoform	TRUE	FALSE	FALSE	No
TW-MD-03	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-MD-03	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-03	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-MD-03	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-MD-03	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-03	Chloroethane	TRUE	FALSE	FALSE	No
TW-MD-03	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-MD-03	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-MD-03	Chromium	TRUE	FALSE	FALSE	No
TW-MD-03	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-03	Cobalt	TRUE	FALSE	FALSE	No
TW-MD-03	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	Copper	TRUE	FALSE	FALSE	No
TW-MD-03	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-MD-03	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-03	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-MD-03	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-03	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-MD-03	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-03	Iron (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-03	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-MD-03	Lead	TRUE	FALSE	FALSE	No
TW-MD-03	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Magnesium	TRUE	TRUE	FALSE	No
TW-MD-03	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-03	Mercury	TRUE	FALSE	TRUE	No
TW-MD-03	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-MD-03	Methylene chloride	TRUE	FALSE	FALSE	No
TW-MD-03	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-03	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-03	Nickel	TRUE	FALSE	FALSE	No
TW-MD-03	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-03	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-03	Selenium	TRUE	FALSE	FALSE	No
TW-MD-03	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	Silver	TRUE	FALSE	FALSE	No
TW-MD-03	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Styrene	TRUE	FALSE	FALSE	No
TW-MD-03	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-03	Tetrachloroethene	TRUE	FALSE	FALSE	No
TW-MD-03	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-03	Thallium	TRUE	FALSE	FALSE	No
TW-MD-03	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-03	Toluene	TRUE	FALSE	FALSE	No
TW-MD-03	Total PCBs	FALSE	FALSE	FALSE	No
TW-MD-03	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-03	Trichloroethene	TRUE	FALSE	FALSE	No
TW-MD-03	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-03	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-03	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
TW-MD-03	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-03	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-03	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-MD-03	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-03	Zinc	TRUE	FALSE	FALSE	No
TW-MD-03	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-04	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-04	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
TW-MD-04	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
TW-MD-04	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
TW-MD-04	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-MD-04	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
TW-MD-04	2-Hexanone	FALSE	FALSE	FALSE	No
TW-MD-04	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-04	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-04	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
TW-MD-04	Acetone	FALSE	FALSE	FALSE	No
TW-MD-04	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-04	Antimony	TRUE	FALSE	FALSE	No
TW-MD-04	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-04	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-04	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-04	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Barium	TRUE	TRUE	FALSE	No
TW-MD-04	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Benzene	FALSE	FALSE	FALSE	No
TW-MD-04	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-04	Beryllium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Bromodichloromethane	FALSE	FALSE	FALSE	No
TW-MD-04	Bromoform	FALSE	FALSE	FALSE	No
TW-MD-04	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
TW-MD-04	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-04	Cadmium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Carbon disulfide	FALSE	FALSE	FALSE	No
TW-MD-04	Carbon tetrachloride	FALSE	FALSE	FALSE	No
TW-MD-04	Chlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Chloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
TW-MD-04	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
TW-MD-04	Chromium	TRUE	FALSE	FALSE	No
TW-MD-04	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-04	Cobalt	TRUE	TRUE	FALSE	No
TW-MD-04	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Copper	TRUE	FALSE	FALSE	No
TW-MD-04	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Dibromochloromethane	FALSE	FALSE	FALSE	No
TW-MD-04	Dibromomethane	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-04	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
TW-MD-04	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-04	Ethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-04	Iron (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-04	Isopropyl benzene	FALSE	FALSE	FALSE	No
TW-MD-04	Lead	TRUE	FALSE	FALSE	No
TW-MD-04	Lead (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Magnesium	FALSE	TRUE	FALSE	No
TW-MD-04	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-04	Mercury	TRUE	FALSE	FALSE	No
TW-MD-04	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
TW-MD-04	Methylene chloride	FALSE	FALSE	FALSE	No
TW-MD-04	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-04	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Nickel	TRUE	FALSE	FALSE	No
TW-MD-04	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-04	Selenium	TRUE	FALSE	FALSE	No
TW-MD-04	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Silver	TRUE	FALSE	FALSE	No
TW-MD-04	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Styrene	FALSE	FALSE	FALSE	No
TW-MD-04	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-04	Tetrachloroethene	FALSE	FALSE	FALSE	No
TW-MD-04	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-04	Thallium	TRUE	FALSE	FALSE	No
TW-MD-04	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-04	Toluene	FALSE	FALSE	FALSE	No
TW-MD-04	Total dissolved solids (TDS)	FALSE	TRUE	TRUE	No
TW-MD-04	Total PCBs	FALSE	FALSE	FALSE	No
TW-MD-04	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-04	Trichloroethene	FALSE	FALSE	FALSE	No
TW-MD-04	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-04	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
TW-MD-04	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
TW-MD-04	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-04	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-04	Vinyl chloride	FALSE	FALSE	FALSE	No
TW-MD-04	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-04	Zinc	TRUE	FALSE	FALSE	No
TW-MD-04	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-05	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-05	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-05	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-05	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-05	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-MD-05	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-MD-05	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-05	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-MD-05	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-05	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-05	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-05	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-MD-05	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-MD-05	2-Hexanone	TRUE	FALSE	FALSE	No
TW-MD-05	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-05	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-05	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-MD-05	Acetone	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-05	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-05	Antimony	TRUE	FALSE	FALSE	No
TW-MD-05	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-05	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-05	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-05	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	Barium	TRUE	TRUE	FALSE	No
TW-MD-05	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	Benzene	TRUE	FALSE	FALSE	No
TW-MD-05	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-05	Beryllium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-05	Bromodichloromethane	TRUE	FALSE	FALSE	No
TW-MD-05	Bromoform	TRUE	FALSE	FALSE	No
TW-MD-05	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-MD-05	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-05	Cadmium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-MD-05	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-MD-05	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-05	Chloroethane	TRUE	FALSE	FALSE	No
TW-MD-05	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-MD-05	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-MD-05	Chromium	TRUE	FALSE	FALSE	No
TW-MD-05	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-05	Cobalt	TRUE	FALSE	FALSE	No
TW-MD-05	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	Copper	TRUE	FALSE	FALSE	No
TW-MD-05	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-MD-05	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-05	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-MD-05	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-05	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-MD-05	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-05	Iron (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-05	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-MD-05	Lead	TRUE	FALSE	FALSE	No
TW-MD-05	Lead (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Magnesium	TRUE	TRUE	FALSE	No
TW-MD-05	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-05	Mercury	TRUE	FALSE	TRUE	No
TW-MD-05	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-MD-05	Methylene chloride	TRUE	FALSE	FALSE	No
TW-MD-05	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-05	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-05	Nickel	TRUE	FALSE	FALSE	No
TW-MD-05	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-05	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-05	Selenium	TRUE	FALSE	FALSE	No
TW-MD-05	Selenium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Silver	TRUE	FALSE	FALSE	No
TW-MD-05	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-05	Styrene	TRUE	FALSE	FALSE	No
TW-MD-05	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-05	Tetrachloroethene	TRUE	FALSE	FALSE	No
TW-MD-05	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-05	Thallium	TRUE	FALSE	FALSE	No
TW-MD-05	Thallium (dissolved)	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-05	Toluene	TRUE	FALSE	FALSE	No
TW-MD-05	Total PCBs	TRUE	FALSE	FALSE	No
TW-MD-05	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-05	Trichloroethene	TRUE	FALSE	FALSE	No
TW-MD-05	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-05	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
TW-MD-05	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
TW-MD-05	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-05	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-05	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-MD-05	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-05	Zinc	TRUE	FALSE	FALSE	No
TW-MD-05	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-06	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,1,1-Trichloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,1,2,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,1,2-Trichloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,1-Dichloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,1-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-06	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-06	1,2,4-Trichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,2-Dibromo-3-chloropropane (DBCP)	FALSE	FALSE	FALSE	No
TW-MD-06	1,2-Dibromoethane (Ethylene dibromide)	FALSE	FALSE	FALSE	No
TW-MD-06	1,2-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,2-Dichloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	1,2-Dichloropropane	FALSE	FALSE	FALSE	No
TW-MD-06	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,3-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,4-Dichlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	1,4-Dioxane	FALSE	FALSE	FALSE	No
TW-MD-06	2-Butanone (Methyl ethyl ketone) (MEK)	FALSE	FALSE	FALSE	No
TW-MD-06	2-Hexanone	FALSE	FALSE	FALSE	No
TW-MD-06	2-Methylnaphthalene	FALSE	FALSE	FALSE	No
TW-MD-06	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-06	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	FALSE	FALSE	FALSE	No
TW-MD-06	Acetone	FALSE	FALSE	FALSE	No
TW-MD-06	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-06	Antimony	TRUE	FALSE	FALSE	No
TW-MD-06	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-06	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-06	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-06	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-06	Aroclor-1242 (PCB-1242)	TRUE	FALSE	TRUE	No
TW-MD-06	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-06	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-06	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-06	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Barium	TRUE	TRUE	FALSE	No
TW-MD-06	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Benzene	FALSE	FALSE	FALSE	No
TW-MD-06	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-06	Beryllium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Bromodichloromethane	FALSE	FALSE	FALSE	No
TW-MD-06	Bromoform	FALSE	FALSE	FALSE	No
TW-MD-06	Bromomethane (Methyl bromide)	FALSE	FALSE	FALSE	No
TW-MD-06	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-06	Cadmium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Carbon disulfide	FALSE	FALSE	FALSE	No
TW-MD-06	Carbon tetrachloride	FALSE	FALSE	FALSE	No
TW-MD-06	Chlorobenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Chloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	Chloroform (Trichloromethane)	FALSE	FALSE	FALSE	No
TW-MD-06	Chloromethane (Methyl chloride)	FALSE	FALSE	FALSE	No
TW-MD-06	Chromium	TRUE	FALSE	FALSE	No
TW-MD-06	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	cis-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-06	Cobalt	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-06	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Copper	TRUE	FALSE	FALSE	No
TW-MD-06	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-06	Dibromochloromethane	FALSE	FALSE	FALSE	No
TW-MD-06	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-06	Dichlorodifluoromethane (CFC-12)	FALSE	FALSE	FALSE	No
TW-MD-06	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-06	Ethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-06	Isopropyl benzene	FALSE	FALSE	FALSE	No
TW-MD-06	Lead	TRUE	FALSE	FALSE	No
TW-MD-06	Lead (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Magnesium	FALSE	TRUE	FALSE	No
TW-MD-06	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-06	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-06	Mercury	TRUE	FALSE	FALSE	No
TW-MD-06	Mercury (dissolved)	FALSE	FALSE	TRUE	No
TW-MD-06	Methyl tert butyl ether (MTBE)	FALSE	FALSE	FALSE	No
TW-MD-06	Methylene chloride	FALSE	FALSE	FALSE	No
TW-MD-06	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-06	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Nickel	TRUE	FALSE	FALSE	No
TW-MD-06	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-06	Selenium	TRUE	FALSE	FALSE	No
TW-MD-06	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Silver	TRUE	FALSE	FALSE	No
TW-MD-06	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-06	Styrene	FALSE	FALSE	FALSE	No
TW-MD-06	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-06	Tetrachloroethene	FALSE	FALSE	FALSE	No
TW-MD-06	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-06	Thallium	TRUE	FALSE	FALSE	No
TW-MD-06	Thallium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Toluene	FALSE	FALSE	FALSE	No
TW-MD-06	Total PCBs	FALSE	TRUE	TRUE	No
TW-MD-06	trans-1,2-Dichloroethene	FALSE	FALSE	FALSE	No
TW-MD-06	Trichloroethene	FALSE	FALSE	FALSE	No
TW-MD-06	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-06	Trichlorofluoromethane (CFC-11)	FALSE	FALSE	FALSE	No
TW-MD-06	Trifluorotrichloroethane (Freon 113)	FALSE	FALSE	FALSE	No
TW-MD-06	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-06	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-06	Vinyl chloride	FALSE	FALSE	FALSE	No
TW-MD-06	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-06	Zinc	TRUE	FALSE	FALSE	No
TW-MD-06	Zinc (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	1,1,1,2-Tetrachloroethane	FALSE	FALSE	FALSE	No
TW-MD-07	1,1,1-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	1,1,2,2-Tetrachloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	1,1,2-Trichloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	1,1-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	1,1-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-07	1,2,3-Trichloropropane	FALSE	FALSE	FALSE	No
TW-MD-07	1,2,4-Trichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-07	1,2,4-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-07	1,2-Dibromo-3-chloropropane (DBCP)	TRUE	FALSE	FALSE	No
TW-MD-07	1,2-Dibromoethane (Ethylene dibromide)	TRUE	FALSE	FALSE	No
TW-MD-07	1,2-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-07	1,2-Dichloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	1,2-Dichloropropane	TRUE	FALSE	FALSE	No
TW-MD-07	1,3,5-Trimethylbenzene	FALSE	FALSE	FALSE	No
TW-MD-07	1,3-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-07	1,4-Dichlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-07	1,4-Dioxane	FALSE	TRUE	FALSE	No
TW-MD-07	2-Butanone (Methyl ethyl ketone) (MEK)	TRUE	FALSE	FALSE	No
TW-MD-07	2-Hexanone	TRUE	FALSE	FALSE	No
TW-MD-07	2-Methylnaphthalene	FALSE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-07	2-Phenylbutane (sec-Butylbenzene)	FALSE	FALSE	FALSE	No
TW-MD-07	4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	TRUE	FALSE	FALSE	No
TW-MD-07	Acetone	TRUE	FALSE	FALSE	No
TW-MD-07	Acrylonitrile	FALSE	FALSE	FALSE	No
TW-MD-07	Antimony	TRUE	FALSE	FALSE	No
TW-MD-07	Antimony (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Aroclor-1016 (PCB-1016)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1221 (PCB-1221)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1232 (PCB-1232)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1242 (PCB-1242)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1248 (PCB-1248)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1254 (PCB-1254)	TRUE	FALSE	FALSE	No
TW-MD-07	Aroclor-1260 (PCB-1260)	TRUE	FALSE	FALSE	No
TW-MD-07	Arsenic	TRUE	TRUE	FALSE	No
TW-MD-07	Arsenic (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Barium	TRUE	TRUE	FALSE	No
TW-MD-07	Barium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Benzene	TRUE	FALSE	FALSE	No
TW-MD-07	Beryllium	TRUE	FALSE	FALSE	No
TW-MD-07	Beryllium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Bromobenzene	FALSE	FALSE	FALSE	No
TW-MD-07	Bromodichloromethane	TRUE	FALSE	FALSE	No
TW-MD-07	Bromoform	TRUE	FALSE	FALSE	No
TW-MD-07	Bromomethane (Methyl bromide)	TRUE	FALSE	FALSE	No
TW-MD-07	Cadmium	TRUE	FALSE	FALSE	No
TW-MD-07	Cadmium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Carbon disulfide	TRUE	FALSE	FALSE	No
TW-MD-07	Carbon tetrachloride	TRUE	FALSE	FALSE	No
TW-MD-07	Chlorobenzene	TRUE	FALSE	FALSE	No
TW-MD-07	Chloroethane	TRUE	FALSE	FALSE	No
TW-MD-07	Chloroform (Trichloromethane)	TRUE	FALSE	FALSE	No
TW-MD-07	Chloromethane (Methyl chloride)	TRUE	FALSE	FALSE	No
TW-MD-07	Chromium	TRUE	FALSE	FALSE	No
TW-MD-07	Chromium Total (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	cis-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-07	Cobalt	TRUE	FALSE	FALSE	No
TW-MD-07	Cobalt (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Copper	TRUE	FALSE	FALSE	No
TW-MD-07	Copper (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Dibromochloromethane	TRUE	FALSE	FALSE	No
TW-MD-07	Dibromomethane	FALSE	FALSE	FALSE	No
TW-MD-07	Dichlorodifluoromethane (CFC-12)	TRUE	FALSE	FALSE	No
TW-MD-07	Ethyl ether	FALSE	FALSE	FALSE	No
TW-MD-07	Ethylbenzene	TRUE	FALSE	FALSE	No
TW-MD-07	Hexachloroethane	FALSE	FALSE	FALSE	No
TW-MD-07	Iron (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-07	Isopropyl benzene	TRUE	FALSE	FALSE	No
TW-MD-07	Lead	TRUE	FALSE	FALSE	No
TW-MD-07	Lead (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Magnesium	TRUE	TRUE	FALSE	No
TW-MD-07	Magnesium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Manganese (dissolved)	FALSE	TRUE	TRUE	No
TW-MD-07	Mercury	TRUE	FALSE	TRUE	No
TW-MD-07	Mercury (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Methyl tert butyl ether (MTBE)	TRUE	FALSE	FALSE	No
TW-MD-07	Methylene chloride	TRUE	FALSE	FALSE	No
TW-MD-07	Naphthalene	FALSE	FALSE	FALSE	No
TW-MD-07	N-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-07	Nickel	TRUE	FALSE	FALSE	No
TW-MD-07	Nickel (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	N-Propylbenzene	FALSE	FALSE	FALSE	No
TW-MD-07	Phenanthrene	FALSE	FALSE	FALSE	No
TW-MD-07	Selenium	TRUE	FALSE	FALSE	No
TW-MD-07	Selenium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Silver	TRUE	FALSE	FALSE	No
TW-MD-07	Silver (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Styrene	TRUE	FALSE	FALSE	No
TW-MD-07	tert-Butylbenzene	FALSE	FALSE	FALSE	No
TW-MD-07	Tetrachloroethene	TRUE	FALSE	FALSE	No

Table A-3
Summary of Constituents that Did Not Meet Mann-Kendall Criteria
RACER PNC (Fiero and Non-Fiero)

Well ID	Chemical Name	7 Sample Points?	50% Detections?	1 Exceedance?	Mann-Kendall Criteria Met?
TW-MD-07	Tetrahydrofuran	FALSE	FALSE	FALSE	No
TW-MD-07	Thallium	TRUE	FALSE	FALSE	No
TW-MD-07	Thallium (dissolved)	FALSE	FALSE	FALSE	No
TW-MD-07	Toluene	TRUE	FALSE	FALSE	No
TW-MD-07	Total PCBs	TRUE	FALSE	FALSE	No
TW-MD-07	trans-1,2-Dichloroethene	TRUE	FALSE	FALSE	No
TW-MD-07	Trichloroethene	TRUE	FALSE	FALSE	No
TW-MD-07	Trichloroethene (SIM)	FALSE	FALSE	FALSE	No
TW-MD-07	Trichlorofluoromethane (CFC-11)	TRUE	FALSE	FALSE	No
TW-MD-07	Trifluorotrichloroethane (Freon 113)	TRUE	FALSE	FALSE	No
TW-MD-07	Vanadium	TRUE	FALSE	FALSE	No
TW-MD-07	Vanadium (dissolved)	FALSE	TRUE	FALSE	No
TW-MD-07	Vinyl chloride	TRUE	FALSE	FALSE	No
TW-MD-07	Xylene (Total)	FALSE	FALSE	FALSE	No
TW-MD-07	Zinc	TRUE	FALSE	FALSE	No
TW-MD-07	Zinc (dissolved)	FALSE	FALSE	FALSE	No

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SPO PARKING

FORMER BUILDING 25

SPO

FORMER BUILDING 15

FORMER PLANT 12

BUILDING 14

FORMER FIERO PARKING LOT

FORMER FIERO PLANT 17

FORMER POWER HOUSE

GM WWTP

FORMER BUILDING 14S (PLANTS 5 AND 23)

GM POWERTRAIN

USPS REGIONAL DISTRIBUTION CENTER (LEASED PROPERTY)

STORMWATER DETENTION FACILITY

HARRIS LAKE

PERRY PARK

OAKLAND PARK

MWM16-30 MWM16-02 MWM16-31 MWM16-37 MWM31-02 MWM32-01 MWF8-01 MWF16-06 MWF16-25 MWF16-23 MWF7-02 MW-05-18 MW-02-17 MWF12-01R MWF12-02R MWW10-03 MWM2-22 MWM2-28 MW-03-17 INJ-01-17 MW-03-17 MWW5-01R INJ-02-18 MW-04-17 TW-09-01 TW-10-02 MWW10-SEN02 MWW01-SEN03 MWW01-SEN04 TW-MD-05 TW-MD-04 TW-MD-06 TW-MD-03 TW-MD-07 MWW1-15 MW-40-99 TW-MD-02 MWW1-04 MW-01-17 TW-MD-01 MWOS-01 MWOS-02 MWOS-03

MWW10-03
Mn = Increasing Trend

MW-03-17
TDS = No Significant Trend
Iron = Increasing Trend

TW-MD-02
TDS = Increasing Trend
Iron = Decreasing Trend
Mn = No Significant Trend

TW-MD-05
TDS = Increasing Trend
Iron = Decreasing Trend
Mn = No Significant Trend

TW-MD-06
TDS = No Significant Trend
Iron = No Significant Trend
Mn = Decreasing Trend
Diss. Iron = Increasing Trend
PCB-1248 = Increasing Trend

LEGEND

- EXISTING MONITORING WELL
- INJECTION WELL
- USPS DISTRIBUTION CENTER PROPERTY BOUNDARY
- CURRENT OR FORMER RACER PROPERTY
- LOCATION PART OF GMP - DID NOT MEET CRITERIA FOR TREND ANALYSIS
- INCREASING TREND
- DECREASING OR NO SIGNIFICANT TREND

GM – GENERAL MOTORS CORPORATION
SPO – SERVICE PARTS OPERATION
USPS – UNITED STATES POSTAL SERVICE
WWTP – WASTEWATER TREATMENT PLANT
GMP - GROUNDWATER MONITORING PLAN
TDS - TOTAL DISSOLVED SOLIDS
GSI - GROUNDWATER SURFACE WATER INTERFACE
RES - RESIDENTIAL
NR - NONRESIDENTIAL
SSVIAC - SITE-SPECIFIC VOLATILIZATION TO INDOOR AIR CRITERIA
SOG - SLAB ON GRADE
BASE - BASEMENT
<50K - LESS THAN 50,000 SQUARE FEET

NOTES:

1. ALL BOUNDARIES ARE APPROXIMATE

2. MANN-KENDALL TREND ANALYSIS CONDUCTED FOR GMP WELLS WITH AT LEAST 7 DATA POINTS, 50% DETECTION, AND AT LEAST 1 APPLICABLE CRITERIA EXCEEDANCE IN THE PAST 10 YEARS (2013-2023)

3. CRITERIA COMPARISONS
   - NONFIERO = GSI AND RDW
   - FIERO = NR SSVIAC <50K SOG FOR WELLS GREATER THAN 100 FEET FROM PROPERTY BOUNDARY
   - FIERO = RES SSVIAC BASE FOR WELLS WITHIN 100 FT OF PROPERTY BOUNDARY

4. RESULTS POSTED FOR THE FOLLOWING CONSTITUENTS THAT MET MANN KENDALL ANALYSIS:

- TDS
- IRON
- MANGANESE
- ARSENIC
- COPPER
- LEAD
- VANADIUM
- VINYL CHLORIDE
- 1,4-DIOXANE
- TRICHLOROETHENE
- AROCLOR-1248 (PCB-1248)

0 300 600
SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

MANN-KENDALL TREND ANALYSIS SUMMARY - GROUNDWATER

ARCADIS

FIGURE 1

CITY: NOVI, MI DIV: ENV DB: TRY PIC: J. BARRETT PM: T. LINDER TM: L. CRISP TR: PROJECT NUMBER: 30214041 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\Former_Fiero_Property\SiteInvestigation_2023\MonitoringPlan_2024\MonitoringPlan_2024.aprx PLOTTED: 7/11/2024 6:50 PM BY: TYarbrough

Location ID: / Date Collected:	Units	Groundwater Surface Water Interface Criteria	Non-Residential Drinking Water Criteria	Non-Residential Health Based Drinking Water Value	Non- Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Residential Drinking Water Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	MW-40-99 12/3/2013	MWF12-01 12/4/2013	MWF1R 12/4/2013	MWF7-01 12/4/2013	MWM16-21 12/5/2013	MWW10-03 12/5/2013	MWW10-03 DUPLICATE 12/5/2013	MWW1-04 12/4/2013
Pesticides/PCBs[1]															
Aroclor-1016 (PCB-1016)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Aroclor-1221 (PCB-1221)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Aroclor-1232 (PCB-1232)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Aroclor-1242 (PCB-1242)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Aroclor-1248 (PCB-1248)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	**0.00052**
Aroclor-1254 (PCB-1254)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Aroclor-1260 (PCB-1260)	mg/L	0.0002 (M); 2.6E-5	0.0005 (A)	--	0.045 (S)	0.0005 (A)	0.045 (S)	NA	NA	NA	NA	NA	< 0.000098	< 0.00011	< 0.000095
Volatile Organics															
1,1,1-Trichloroethane	mg/L	0.089	0.2 (A)	--	1300 (S)	0.2 (A)	660	< 0.0010	0.026	< 0.0010	0.0073	< 0.0010	< 0.0010	< 0.0010	NA
1,1,2,2-Tetrachloroethane	mg/L	0.078 (X)	0.035	--	77	0.0085	12	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,1,2-Trichloroethane	mg/L	0.33 (X)	0.005 (A)	--	110	0.005 (A)	17	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,1-Dichloroethane	mg/L	0.74	2.5	--	2300	0.88	1000	< 0.0010	0.0041	< 0.0010	0.0019	< 0.0010	< 0.0010	< 0.0010	NA
1,1-Dichloroethene	mg/L	0.13	0.007 (A)	--	1.3	0.007 (A)	0.2	< 0.0010	0.0014	< 0.0010	0.00041 J	< 0.0010	< 0.0010	< 0.0010	NA
1,2,4-Trichlorobenzene	mg/L	0.099 (X)	0.07 (A)	--	300 (S)	0.07 (A)	300 (S)	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010 J	< 0.0010 J	NA
1,2-Dibromo-3-chloropropane (DBCP)	mg/L	--	0.0002 (A)	--	1.2 (S)	0.0002 (A)	0.22	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010 J	< 0.0010 J	NA
1,2-Dibromoethane (Ethylene dibromide)	mg/L	0.0057 (X)	0.00005 (A)	--	15	0.00005 (A)	2.4	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,2-Dichlorobenzene	mg/L	0.013	0.6 (A)	--	160 (S)	0.6 (A)	160 (S)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,2-Dichloroethane	mg/L	0.36 (X)	0.005 (A)	--	59	0.005 (A)	9.6	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,2-Dichloropropane	mg/L	0.23 (X)	0.005 (A)	--	36	0.005 (A)	16	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,3-Dichlorobenzene	mg/L	0.028	0.019	--	41	0.0066	18	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
1,4-Dichlorobenzene	mg/L	0.017	0.075 (A)	--	74 (S)	0.075 (A)	16	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
2-Butanone (Methyl ethyl ketone) (MEK)	mg/L	2.2	38	--	240000 (S)	13	240000 (S)	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	NA
2-Hexanone	mg/L	--	2.9	--	8700	1	4200	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/L	--	5.2	--	20000 (S)	1.8	20000 (S)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA
Acetone	mg/L	1.7	2.1	--	1000000 (D,S)	0.73	1000000 (D,S)	< 0.025 B	0.0024 J	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	NA
Benzene	mg/L	0.2 (X)	0.005 (A)	--	35	0.005 (A)	5.6	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Bromodichloromethane	mg/L	--	0.08 (A,W)	--	37	0.08 (A,W)	4.8	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Bromoform	mg/L	--	0.08 (A,W)	--	3100 (S)	0.08 (A,W)	470	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010 J	< 0.0010	NA
Bromomethane (Methyl bromide)	mg/L	0.035	0.029	--	9	0.01	4	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	NA
Carbon disulfide	mg/L	--	2.3	--	550	0.8	250	0.00026 J	0.0025 J	< 0.0050	0.00025 J	< 0.0050	< 0.0050	< 0.0050	NA
Carbon tetrachloride	mg/L	0.045 (X)	0.005 (A)	--	2.4	0.005 (A)	0.37	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Chlorobenzene	mg/L	0.025	0.1 (A)	--	470 (S)	0.1 (A)	210	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Chloroethane	mg/L	1.1 (X)	1.7	--	5700 (S)	0.43	5700 (S)	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	< 0.0010 J	NA
Chloroform (Trichloromethane)	mg/L	0.35	0.08 (A,W)	--	180	0.08 (A,W)	28	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Chloromethane (Methyl chloride)	mg/L	--	1.1	--	45	0.26	8.6	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
cis-1,2-Dichloroethene	mg/L	0.62	0.07 (A)	--	210	0.07 (A)	93	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
cis-1,3-Dichloropropene	mg/L	--	--	--	--	--	--	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Cyclohexane	mg/L	--	--	--	--	--	--	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Dibromochloromethane	mg/L	--	0.08 (A,W)	--	110	0.08 (A,W)	14	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Dichlorodifluoromethane (CFC-12)	mg/L	--	4.8	--	300 (S)	1.7	220	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Ethylbenzene	mg/L	0.018	0.074 (E)	0.7	170 (S)	0.074 (E)	110	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Isopropyl benzene	mg/L	0.028	2.3	--	56 (S)	0.8	56 (S)	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	NA
Methyl acetate	mg/L	--	--	--	--	--	--	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA
Methyl cyclohexane	mg/L	--	--	--	--	--	--	0.00018 J	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Methyl tert butyl ether (MTBE)	mg/L	7.1 (X)	0.04 (E)	0.69	47000 (S)	0.04 (E)	47000 (S)	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050 J	< 0.0050 J	NA
Methylene chloride	mg/L	1.5 (X)	0.005 (A)	--	1400	0.005 (A)	220	< 0.0050	< 0.0050 J	< 0.0050	< 0.0050 J	< 0.0050	< 0.0050	< 0.0050	NA
Styrene	mg/L	0.08 (X)	0.1 (A)	--	310 (S)	0.1 (A)	170	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Tetrachloroethene	mg/L	0.06 (X)	0.005 (A)	--	170	0.005 (A)	25	< 0.0010	< 0.0010	< 0.0010	0.00074 J	< 0.0010	< 0.0010	< 0.0010	NA
Toluene	mg/L	0.27	0.79 (E)	1.0	530 (S)	0.79 (E)	530 (S)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
trans-1,2-Dichloroethene	mg/L	1.5 (X)	0.1 (A)	--	200	0.1 (A)	85	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
trans-1,3-Dichloropropene	mg/L	--	--	--	--	--	--	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010 J	< 0.0010 J	NA
Trichloroethene	mg/L	0.2 (X)	0.005 (A)	--	4.9	0.005 (A)	2.2	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Trichlorofluoromethane (CFC-11)	mg/L	--	7.3	--	1100 (S)	2.6	1100 (S)	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010	< 0.0010	NA
Trifluorotrichloroethane (Freon 113)	mg/L	0.032	170 (S)	--	170 (S)	170 (S)	170 (S)	< 0.0010	< 0.0010	< 0.0010	< 0.0010 J	< 0.0010	< 0.0010	< 0.0010	NA
Vinyl chloride	mg/L	0.013 (X)	0.002 (A)	--	13	0.002 (A)	1.1	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Xylene (total)	mg/L	0.041	0.28 (E)	10	190 (S)	0.28 (E)	190 (S)	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	NA

Location ID: Date Collected:	Units	Groundwater Surface Water Interface Criteria	Non-Residential Drinking Water Criteria	Non-Residential Health Based Drinking Water Value	Non- Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Residential Drinking Water Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	MW-40-99 12/3/2013	MWF12-01 12/4/2013	MWF1R 12/4/2013	MWF7-01 12/4/2013	MWM16-21 12/5/2013	MWW10-03 12/5/2013	MWW10-03 DUPLICATE 12/5/2013	MWW1-04 12/4/2013
Inorganics															
Antimony	mg/L	0.13 (X)	0.006 (A)	--	NLV	0.006 (A)	NLV	NA	NA	NA	NA	NA	NA	NA	< 0.0031 B
Lead[2]	mg/L	0.0 (G,X)	0.004 (L)	--	NLV	0.004 (L)	NLV	NA	NA	NA	NA	NA	< 0.0010	< 0.0010	NA
Manganese[2]	mg/L	0.0 (G,X)	0.05 (E)	2.5	NLV	0.05 (E)	NLV	NA	**5.2**	NA	NA	NA	0.047	**0.062**	NA
Vanadium	mg/L	0.027	0.062	--	NLV	0.0045	NLV	NA	NA	NA	NA	NA	NA	NA	0.02
Field Parameters															
pH	pH units	--	--	--	--	--	--	7.15	7.51	7.66	7.64	7.77	6.83	6.83	9.78
Turbidity	NTU	--	--	--	--	--	--	5.75	5.63	2.51	3.44	4.87	2.3	2.3	5.31

Location ID: Sample Depth(): Date Collected:	Groundwater Surface Water Interface	Non-Residential Drinking Water	Non-Residential Health Based Drinking Water Value	Non-Res GW Volatilization to Indoor Air Inhalation	Residential Drinking Water	Res GW Volatilization to Indoor Air Inhalation	Units	MW-40-99 09/18/14	MWF1R 09/19/14	MWF7-01 09/19/14	MWF7-01 DUPLICATE 09/19/14	MWF12-01 09/19/14	MWM16-21 09/19/14	MWW1-04 09/23/14	MWW1-04 DUPLICATE 09/23/14	MWW10-03 09/18/14
PCBs																
Aroclor-1016	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	<0.000098	<0.0001	<0.000095
Aroclor-1221	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	<0.000098	<0.0001	<0.000095
Aroclor-1232	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	<0.000098	<0.0001	<0.000095
Aroclor-1242	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	<0.000098	<0.0001	<0.000095
Aroclor-1248	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	*0.00027*	<0.0001	<0.000095
Aroclor-1254	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	0.000078 J	<0.0001	<0.000095
Aroclor-1260	0.0002	0.0005	- -	0.045	0.0005	0.045	mg/L	NA	NA	NA	NA	NA	NA	<0.000098	<0.0001	<0.000095
Volatile Organics																
Acetone	1.7	2.1	- -	1,000,000	0.73	1,000,000	mg/L	0.031	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	<0.025
Benzene	0.2	0.005	- -	35	0.005	5.6	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Bromodichloromethane	- -	0.08	- -	37	0.08	4.8	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Bromoform	- -	0.08	- -	3,100	0.08	470	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Bromomethane	0.035	0.029	- -	9	0.01	4	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
2-Butanone	2.2	38	- -	240,000	13	240,000	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA	<0.025
Carbon Disulfide	- -	2.3	- -	550	0.8	250	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
Carbon Tetrachloride	0.045	0.005	- -	2.4	0.005	0.37	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
CFC-11	- -	7.3	- -	1,100	2.6	1,100	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
CFC-12	- -	4.8	- -	300	1.7	220	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Chlorobenzene	0.025	0.1	- -	470	0.1	210	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Chlorodibromomethane	- -	0.08	- -	110	0.08	14	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Chloroethane	1.1	1.7	- -	5,700	0.43	5,700	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Chloroform	0.35	0.08	- -	180	0.08	28	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Chloromethane	- -	1.1	- -	45	0.26	8.6	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Cyclohexane	- -	- -	- -	- -	- -	- -	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,2-Dibromo-3-chloropropane	- -	0.0002	- -	1.2	0.0002	0.22	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,2-Dibromoethane	0.0057	0.00005	- -	15	0.00005	2.4	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,2-Dichlorobenzene	0.013	0.6	- -	160	0.6	160	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,3-Dichlorobenzene	0.028	0.019	- -	41	0.0066	18	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,4-Dichlorobenzene	0.017	0.075	- -	74	0.075	16	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,1-Dichloroethane	0.74	2.5	- -	2,300	0.88	1,000	mg/L	<0.001	0.00028 J	0.0049 J	0.0072 J	0.0046	<0.001	NA	NA	<0.001
1,2-Dichloroethane	0.36	0.005	- -	59	0.005	9.6	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,1-Dichloroethene	0.13	0.007	- -	1.3	0.007	0.2	mg/L	<0.001	<0.001	0.0013	0.0017	0.0022	<0.001	NA	NA	<0.001
cis-1,2-Dichloroethene	0.62	0.07	- -	210	0.07	93	mg/L	<0.001	<0.001	0.00045 J	0.00081 J	0.0002 J	<0.001	NA	NA	<0.001
trans-1,2-Dichloroethene	1.5	0.1	- -	200	0.1	85	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Dichloromethane	1.5	0.005	- -	1,400	0.005	220	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
1,2-Dichloropropane	0.23	0.005	- -	36	0.005	16	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
cis-1,3-Dichloropropene	0.009	- -	- -	- -	- -	- -	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Ethylbenzene	0.018	0.074	0.7	170	0.074	110	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Isopropylbenzene	0.028	2.3	- -	56	0.8	56	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
Methyl acetate	- -	- -	- -	- -	- -	- -	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	<0.01
Methyl N-Butyl Ketone	- -	2.9	- -	8,700	1	4,200	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05
Methylcyclohexane	- -	- -	- -	- -	- -	- -	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
4-Methyl-2-pentanone	- -	5.2	- -	20,000	1.8	20,000	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05
Methyl tert-butyl ether	7.1	0.04	0.69	47,000	0.04	47,000	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
Styrene	0.08	0.1	- -	310	0.1	170	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,1,2,2-Tetrachloroethane	0.078	0.035	- -	77	0.0085	12	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Tetrachloroethene	0.06	0.005	- -	170	0.005	25	mg/L	<0.001	<0.001	0.00091 J	0.00099 J	<0.001	<0.001	NA	NA	<0.001
Toluene	0.27	0.79	1	530	0.79	530	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,2,4-Trichlorobenzene	0.099	0.07	- -	300	0.07	300	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
1,1,1-Trichloroethane	0.089	0.2	- -	1,300	0.2	660	mg/L	<0.001	<0.001	0.014	0.014	0.025	<0.001	NA	NA	<0.001
1,1,2-Trichloroethane	0.33	0.005	- -	110	0.005	17	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Trichloroethene	0.2	0.005	- -	4.9	0.005	2.2	mg/L	<0.001	<0.001	0.00016 J	0.0002 J	<0.001	<0.001	NA	NA	<0.001
1,1,2-trichloro-1,2,2-trifluoroethane	0.032	170	- -	170	170	170	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001
Vinyl Chloride	0.013	0.002	- -	13	0.002	1.1	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.00034 J	NA	NA	<0.001
Total Xylenes	0.041	0.28	10	190	0.28	190	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	<0.002

Location ID: Sample Depth(): Date Collected:	Groundwater Surface Water Interface	Non-Residential Drinking Water	Non-Residential Health Based Drinking Water Value	Non-Res GW Volatilization to Indoor Air Inhalation	Residential Drinking Water	Res GW Volatilization to Indoor Air Inhalation	Units	MW-40-99 09/18/14	MWF1R 09/19/14	MWF7-01 09/19/14	MWF7-01 DUPLICATE 09/19/14	MWF12-01 09/19/14	MWM16-21 09/19/14	MWW1-04 09/23/14	MWW1-04 DUPLICATE 09/23/14	MWW10-03 09/18/14
Inorganics																
Antimony	0.13	0.006	- -	- -	0.006	- -	mg/L	NA	NA	NA	NA	NA	NA	0.003	0.0031	NA
Lead	- -	0.004	- -	- -	0.004	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	<0.001 B
Manganese	- -	0.05	2.5	- -	0.05	- -	mg/L	NA	NA	NA	NA	**2.4**	NA	NA	NA	0.03
Vanadium	0.027	0.062	- -	- -	0.0045	- -	mg/L	NA	NA	NA	NA	NA	NA	0.013	0.014	NA
Field Parameters																
pH	pH units	--	--	--	--	--	--	7.25	7.22	7.08	7.08	7.10	7.10	11.84	11.84	7.11
Turbidity	NTU	--	--	--	--	--	--	11.90	1.53	2.85	2.85	1.51	7.08	3.50	3.50	1.01

Location ID: / Date Collected: / Units		Groundwater Surface Water Interface	Non-Residential Drinking Water	Non-Residential Health Based Drinking Water Value	Non-Res GW Volatilization to Indoor Air Inhalation	Residential Drinking Water	Res GW Volatilization to Indoor Air Inhalation	MW-40-99 09/22/15	MWF1R 09/22/15	MWF7-01 09/22/15	MWF12-01 09/22/15	MWM16-21 09/22/15	MWW1-04 09/23/15	MWW10-03 09/23/15
Field Parameters														
pH	pH units	- -	- -	- -	- -	- -	- -	7.50	7.07	7.13	7.47 [7.47]	7.58	9.77	7.30
Turbidity	NTU	- -	- -	- -	- -	- -	- -	5.80	3.21	1.43	2.12 [2.12]	3.50	4.02	3.81
PCBs														
Aroclor-1016	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Aroclor-1221	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Aroclor-1232	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Aroclor-1242	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Aroclor-1248	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.00025	0.000095 U
Aroclor-1254	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Aroclor-1260	mg/L	0.0002	0.0005	- -	0.045	0.0005	0.045	NA	NA	NA	NA	NA	0.000095 U	0.000095 U
Volatile Organics														
Acetone	mg/L	1.7	2.1	- -	1,000,000	0.73	1,000,000	0.025 U	0.025 U	0.036 U	0.025 U [0.025 U]	0.025 U	NA	0.025 U
Benzene	mg/L	0.2	0.005	- -	35	0.005	5.6	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Bromodichloromethane	mg/L	- -	0.08	- -	37	0.08	4.8	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Bromoform	mg/L	- -	0.08	- -	3,100	0.08	470	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Bromomethane	mg/L	0.035	0.029	- -	9	0.01	4	0.001 UJ	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
2-Butanone	mg/L	2.2	38	- -	240,000	13	240,000	0.025 U	0.025 U	0.036 U	0.025 U [0.025 U]	0.025 U	NA	0.025 U
Carbon Disulfide	mg/L	- -	2.3	- -	550	0.8	250	0.005 U	0.005 U	0.0072 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U
Carbon Tetrachloride	mg/L	0.045	0.005	- -	2.4	0.005	0.37	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
CFC-11	mg/L	- -	7.3	- -	1,100	2.6	1,100	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
CFC-12	mg/L	- -	4.8	- -	300	1.7	220	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Chlorobenzene	mg/L	0.025	0.1	- -	470	0.1	210	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Chlorodibromomethane	mg/L	- -	0.08	- -	110	0.08	14	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Chloroethane	mg/L	1.1	1.7	- -	5,700	0.43	5,700	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 UJ]	0.001 U	NA	0.001 UJ
Chloroform	mg/L	0.35	0.08	- -	180	0.08	28	0.001 U	0.001 U	0.00068 J	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Chloromethane	mg/L	- -	1.1	- -	45	0.26	8.6	0.001 UJ	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Cyclohexane	mg/L	- -	- -	- -	- -	- -	- -	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,2-Dibromo-3-chloropropane	mg/L	- -	0.0002	- -	1.2	0.0002	0.22	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,2-Dibromoethane	mg/L	0.0057	0.00005	- -	15	0.00005	2.4	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,2-Dichlorobenzene	mg/L	0.013	0.6	- -	160	0.6	160	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,3-Dichlorobenzene	mg/L	0.028	0.019	- -	41	0.0066	18	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,4-Dichlorobenzene	mg/L	0.017	0.075	- -	74	0.075	16	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,1-Dichloroethane	mg/L	0.74	2.5	- -	2,300	0.88	1,000	0.001 U	0.00061 J	0.012	0.0039 [0.0041]	0.001 U	NA	0.001 U
1,2-Dichloroethane	mg/L	0.36	0.005	- -	59	0.005	9.6	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,1-Dichloroethene	mg/L	0.13	0.007	- -	1.3	0.007	0.2	0.001 U	0.001 U	0.0038	0.0012 [0.0012]	0.001 U	NA	0.001 U
cis-1,2-Dichloroethene	mg/L	0.62	0.07	- -	210	0.07	93	0.001 U	0.001 U	0.0019	0.001 U [0.001 U]	0.001 U	NA	0.001 U
trans-1,2-Dichloroethene	mg/L	1.5	0.1	- -	200	0.1	85	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Dichloromethane	mg/L	1.5	0.005	- -	1,400	0.005	220	0.005 U	0.005 U	0.0072 UB	0.005 U [0.005 U]	0.005 U	NA	0.005 U
1,2-Dichloropropane	mg/L	0.23	0.005	- -	36	0.005	16	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
cis-1,3-Dichloropropene	mg/L	- -	- -	- -	- -	- -	- -	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
trans-1,3-Dichloropropene	mg/L	- -	- -	- -	- -	- -	- -	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Ethylbenzene	mg/L	0.018	0.074	0.7	170	0.074	110	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Isopropylbenzene	mg/L	0.028	2.3	- -	56	0.8	56	0.005 U	0.005 U	0.0072 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U
Methyl acetate	mg/L	- -	- -	- -	- -	- -	- -	0.01 U	0.01 U	0.014 U	0.01 U [0.01 U]	0.01 U	NA	0.01 U
Methyl N-Butyl Ketone	mg/L	- -	2.9	- -	8,700	1	4,200	0.05 U	0.05 U	0.072 U	0.05 U [0.05 U]	0.05 U	NA	0.05 U
Methylcyclohexane	mg/L	- -	- -	- -	- -	- -	- -	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
4-Methyl-2-pentanone	mg/L	- -	5.2	- -	20,000	1.8	20,000	0.05 U	0.05 U	0.072 U	0.05 U [0.05 U]	0.05 U	NA	0.05 U
Methyl tert-butyl ether	mg/L	7.1	0.04	0.69	47,000	0.04	47,000	0.005 U	0.005 U	0.0072 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U
Styrene	mg/L	0.08	0.1	- -	310	0.1	170	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,1,2,2-Tetrachloroethane	mg/L	0.078	0.035	- -	77	0.0085	12	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Tetrachloroethene	mg/L	0.06	0.005	- -	170	0.005	25	0.001 U	0.001 U	0.0024	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Toluene	mg/L	0.27	0.79	1	530	0.79	530	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,2,4-Trichlorobenzene	mg/L	0.099	0.07	- -	300	0.07	300	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,1,1-Trichloroethane	mg/L	0.089	0.2	- -	1,300	0.2	660	0.001 U	0.00067 J	0.035	0.022 [0.018]	0.001 U	NA	0.001 U
1,1,2-Trichloroethane	mg/L	0.33	0.005	- -	110	0.005	17	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Trichloroethene	mg/L	0.2	0.005	- -	4.9	0.005	2.2	0.001 U	0.001 U	0.00066 J	0.001 U [0.001 U]	0.001 U	NA	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	mg/L	0.032	170	- -	170	170	170	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Vinyl Chloride	mg/L	0.013	0.002	- -	13	0.002	1.1	0.001 U	0.001 U	0.0014 U	0.001 U [0.001 U]	0.0011	NA	0.001 U
Total Xylenes	mg/L	0.041	0.28	10	190	0.28	190	0.002 U	0.002 U	0.0029 U	0.002 U [0.002 U]	0.002 U	NA	0.002 U

Location ID: / Date Collected:		Groundwater Surface Water	Non-Residential	Non-Residential Health Based Drinking Water	Non-Res GW Volatilization to	Residential Drinking	Res GW Volatilization to	MW-40-99 09/22/15	MWF1R 09/22/15	MWF7-01 09/22/15	MWF12-01 09/22/15	MWM16-21 09/22/15	MWW1-04 09/23/15	MWW10-03 09/23/15
Inorganics														
Antimony	mg/L	0.13	0.006	- -	- -	0.006	- -	NA	NA	NA	NA	NA	0.0032	NA
Lead	mg/L	- -	0.004	- -	- -	0.004	- -	NA	NA	NA	NA	NA	NA	0.001 U
Manganese	mg/L	- -	0.05	2.5	- -	0.05	- -	NA	NA	NA	**2.8 [2.6]**	NA	NA	**0.12**
Vanadium	mg/L	0.027	0.062	- -	- -	0.0045	- -	NA	NA	NA	NA	NA	0.02	NA

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Residential Drinking Water Yellow HL	Non-Residential Drinking Water Orange HL	Non-Residential Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MW-40-99 09/20/16 MW40-99_092016	MWF1R 09/20/16 MWF1R_092016	MWF7-01 09/22/16 MWF7-01_092216	MWF8-01 09/21/16 MWF8-01_092116	MWF12-01 09/21/16 MWF12-01_092116
Field Parameters												
pH	pH units	- -	- -	- -	- -	- -	- -	7.00	7.03	7.16	6.99	7.19
Turbidity	NTU	- -	- -	- -	- -	- -	- -	5.10	3.62	2.97	3.59	3.41
PCBs												
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	- -	- -	NA	NA	NA	NA	NA
Volatile Organics												
1,2,3-Trimethylbenzene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
2-Methylnaphthalene	ug/L	19	260	750	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
Acrylonitrile	ug/L	2	2.6	11	- -	- -	- -	2 U	2 U	2 U	2 U	2 U [2 U]
Hexachloroethane	ug/L	6.7	7.3	21	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
Iodomethane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
m&p-Xylene	ug/L	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U	2 U [2 U]
Tetrahydrofuran	ug/L	11,000	95	270	- -	- -	- -	90 U	90 U	90 U	90 U	90 U [90 U]
trans-1,4-Dichloro-2-butene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Acetone	ug/L	1,700	730	2,100	- -	*1,000,000,000*	1,000,000,000	50 U	50 U	50 U	50 U	50 U [50 U]
Benzene	ug/L	200	5	5	- -	*5,600*	35,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromobenzene	ug/L	- -	18	50	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Bromodichloromethane	ug/L	- -	80	80	- -	*4,800*	37,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromoform	ug/L	- -	80	80	- -	*470,000*	3,100,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromomethane	ug/L	35	10	29	- -	*4,000*	9,000	5 U	5 U	5 U	5 U	5 U [5 U]
2-Butanone	ug/L	2,200	13,000	38,000	- -	*240,000,000*	240,000,000	25 U	25 U	25 U	25 U	25 U [25 U]
n-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
sec-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
tert-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Carbon Disulfide	ug/L	- -	800	2,300	- -	*250,000*	550,000	5 U	5 U	5 U	5 U	5 U [5 U]
Carbon Tetrachloride	ug/L	45	5	5	- -	*370*	2,400	1 U	1 U	1 U	1 U	1 U [1 U]
CFC-11	ug/L	- -	2,600	7,300	- -	*1,100,000*	1,100,000	1 U	1 U	1 U	1 U	1 U [1 U]
CFC-12	ug/L	- -	1,700	4,800	- -	*220,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chlorobenzene	ug/L	25	100	100	- -	*210,000*	470,000	1 U	1 U	1 U	1 U	1 U [1 U]
Chlorobromomethane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Chlorodibromomethane	ug/L	- -	80	80	- -	*14,000*	110,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chloroethane	ug/L	1,100	430	1,700	- -	*5,700,000*	5,700,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chloroform	ug/L	350	80	80	- -	*28,000*	180,000	1 U	1 U	1 U	1 U	1 U [1 U]
Chloromethane	ug/L	- -	260	1,100	- -	*8,600*	45,000	5 U	5 U	5 U	5 U	5 U [5 U]
Cymene	ug/L	- -	- -	- -	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	*220*	1,200	5 U	5 U	5 U	5 U	5 U [5 U]
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	*2,400*	15,000	1 U	1 U	1 U	1 U	1 U [1 U]
Dibromomethane	ug/L	- -	80	230	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
1,2-Dichlorobenzene	ug/L	13	600	600	- -	*160,000*	160,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	*18,000*	41,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,4-Dichlorobenzene	ug/L	17	75	75	- -	*16,000*	74,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1-Dichloroethane	ug/L	740	880	2,500	- -	*1,000,000*	2,300,000	1 U	1 U	2	1 U	3 [4]
1,2-Dichloroethane	ug/L	360	5	5	- -	*9,600*	59,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1-Dichloroethene	ug/L	130	7	7	- -	*200*	1,300	1 U	1 U	1 U	1 U	1 U [1]
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	*93,000*	210,000	1 U	1 U	1 U	1 U	1 U [1 U]
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	*85,000*	200,000	1 U	1 U	1 U	1 U	1 U [1 U]
Dichloromethane	ug/L	1,500	5	5	- -	*220,000*	1,400,000	5 U	5 U	5 U	5 U	5 U [5 U]

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Residential Drinking Water Yellow HL	Non-Residential Drinking Water Orange HL	Non-Residential Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MW-40-99 09/20/16 MW40-99_092016	MWF1R 09/20/16 MWF1R_092016	MWF7-01 09/22/16 MWF7-01_092216	MWF8-01 09/21/16 MWF8-01_092116	MWF12-01 09/21/16 MWF12-01_092116
1,2-Dichloropropane	ug/L	230	5	5	- -	*16,000*	36,000	1 U	1 U	1 U	1 U	1 U [1 U]
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Diethyl Ether	ug/L	- -	10	10	- -	- -	- -	10 U	10 U	10 U	10 U	10 U [10 U]
Ethylbenzene	ug/L	18	74	74	**700**	*110,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]
Isopropylbenzene	ug/L	28	800	2,300	- -	*56,000*	56,000	5 U	5 U	5 U	5 U	5 U [5 U]
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	*4,200,000*	8,700,000	50 U	50 U	50 U	50 U	50 U [50 U]
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	*20,000,000*	20,000,000	50 U	50 U	50 U	50 U	50 U [50 U]
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	*47,000,000*	47,000,000	5 U	5 U	5 U	5 U	5 U [5 U]
Naphthalene	ug/L	11	520	1,500	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
n-Propylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Styrene	ug/L	80	100	100	- -	*170,000*	310,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1,1,2-Tetrachloroethane	ug/L	- -	77	320	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	*12,000*	77,000	1 U	1 U	1 U	1 U	1 U [1 U]
Tetrachloroethene	ug/L	60	5	5	- -	*25,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]
Toluene	ug/L	270	790	790	**1,000**	*530,000*	530,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,2,3-Trichlorobenzene	ug/L	- -	- -	- -	- -	- -	- -	5 U	5 U	5 U	5 U	5 U [5 U]
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	*300,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]
1,1,1-Trichloroethane	ug/L	89	200	200	- -	*660,000*	1,300,000	1 U	1 U	9	1 U	16 [17]
1,1,2-Trichloroethane	ug/L	330	5	5	- -	*17,000*	110,000	1 U	1 U	1 U	1 U	1 U [1 U]
Trichloroethene	ug/L	200	5	5	- -	*2,200*	4,900	1 U	1 U	1 U	1 U	1 U [1 U]
1,2,3-Trichloropropane	ug/L	- -	42	120	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
1,2,4-Trimethylbenzene	ug/L	17	63	63	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
1,3,5-Trimethylbenzene	ug/L	45	72	72	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Vinyl Chloride	ug/L	13	2	2	- -	*1,100*	13,000	1 U	1 U	1 U	1 U	1 U [1 U]
o-Xylene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Inorganics												
Antimony	mg/L	0.13	0.006	0.006	- -	- -	- -	NA	NA	NA	NA	NA
Lead	mg/L	- -	0.004	0.004	- -	- -	- -	NA	NA	NA	NA	NA
Manganese	mg/L	- -	0.05	0.05	**2.5**	- -	- -	NA	NA	NA	NA	2.25 **[5.29]**
Vanadium	mg/L	0.027	0.0045	0.062	- -	- -	- -	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Residential Drinking Water Yellow HL	Non-Residential Drinking Water Orange HL	Non-Residential Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWF12-02 09/21/16 MWF12-02_092116	MWM16-21 09/20/16 MW16-21_092016	MWM16-37 09/20/16 MW16-37_092016	MWW1-04 09/21/16 MWW1-04_092116	MWW10-03 09/21/16 MWW10-03_092116
Field Parameters												
pH	pH units	- -	- -	- -	- -	- -	- -	7.52	7.21	7.06	11.69	7.15
Turbidity	NTU	- -	- -	- -	- -	- -	- -	3.79	3.33	3.90	2.69	5.12
PCBs												
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 [0.1]	0.1 U
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	0.1 U [0.1 U]	0.1 U
Total PCBs	ug/L	0.2	0.5	0.5	- -	- -	- -	NA	NA	NA	0.1 [0.1]	0.1 U
Volatile Organics												
1,2,3-Trimethylbenzene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
2-Methylnaphthalene	ug/L	19	260	750	- -	- -	- -	5 U	5 U	5 U	NA	5 U
Acrylonitrile	ug/L	2	2.6	11	- -	- -	- -	2 U	2 U	2 U	NA	2 U
Hexachloroethane	ug/L	6.7	7.3	21	- -	- -	- -	5 U	5 U	5 U	NA	5 U
Iodomethane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	NA	2 U
Tetrahydrofuran	ug/L	11,000	95	270	- -	- -	- -	90 U	90 U	90 U	NA	90 U
trans-1,4-Dichloro-2-butene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Acetone	ug/L	1,700	730	2,100	- -	*1,000,000,000*	1,000,000,000	50 U	50 U	50 U	NA	50 U
Benzene	ug/L	200	5	5	- -	*5,600*	35,000	1 U	1 U	1 U	NA	1 U
Bromobenzene	ug/L	- -	18	50	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	*4,800*	37,000	1 U	1 U	1 U	NA	1 U
Bromoform	ug/L	- -	80	80	- -	*470,000*	3,100,000	1 U	1 U	1 U	NA	1 U
Bromomethane	ug/L	35	10	29	- -	*4,000*	9,000	5 U	5 U	5 U	NA	5 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	*240,000,000*	240,000,000	25 U	25 U	25 U	NA	25 U
n-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	NA	1 U
sec-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	NA	1 U
tert-Butylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	*250,000*	550,000	5 U	5 U	5 U	NA	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	*370*	2,400	1 U	1 U	1 U	NA	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	*1,100,000*	1,100,000	1 U	1 U	1 U	NA	1 U
CFC-12	ug/L	- -	1,700	4,800	- -	*220,000*	300,000	5 U	5 U	5 U	NA	5 U
Chlorobenzene	ug/L	25	100	100	- -	*210,000*	470,000	1 U	1 U	1 U	NA	1 U
Chlorobromomethane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	*14,000*	110,000	5 U	5 U	5 U	NA	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	*5,700,000*	5,700,000	5 U	5 U	5 U	NA	5 U
Chloroform	ug/L	350	80	80	- -	*28,000*	180,000	1 U	1 U	1 U	NA	1 U
Chloromethane	ug/L	- -	260	1,100	- -	*8,600*	45,000	5 U	5 U	5 U	NA	5 U
Cymene	ug/L	- -	- -	- -	- -	- -	- -	5 U	5 U	5 U	NA	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	*220*	1,200	5 U	5 U	5 U	NA	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	*2,400*	15,000	1 U	1 U	1 U	NA	1 U
Dibromomethane	ug/L	- -	80	230	- -	- -	- -	5 U	5 U	5 U	NA	5 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	*160,000*	160,000	1 U	1 U	1 U	NA	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	*18,000*	41,000	1 U	1 U	1 U	NA	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	*16,000*	74,000	1 U	1 U	1 U	NA	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	*1,000,000*	2,300,000	2	1 U	1 U	NA	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	*9,600*	59,000	1 U	1 U	1 U	NA	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	*200*	1,300	1 U	1 U	1 U	NA	1 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	*93,000*	210,000	1 U	1 U	1 U	NA	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	*85,000*	200,000	1 U	1 U	1 U	NA	1 U
Dichloromethane	ug/L	1,500	5	5	- -	*220,000*	1,400,000	5 U	5 U	5 U	NA	5 U

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Residential Drinking Water Yellow HL	Non-Residential Drinking Water Orange HL	Non-Residential Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWF12-02 09/21/16 MWF12-02_092116	MWM16-21 09/20/16 MW16-21_092016	MWM16-37 09/20/16 MW16-37_092016	MWW1-04 09/21/16 MWW1-04_092116	MWW10-03 09/21/16 MWW10-03_092116
1,2-Dichloropropane	ug/L	230	5	5	- -	*16,000*	36,000	1 U	1 U	1 U	NA	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Diethyl Ether	ug/L	- -	10	10	- -	- -	- -	10 U	10 U	10 U	NA	10 U
Ethylbenzene	ug/L	18	74	74	**700**	*110,000*	170,000	1 U	1 U	1 U	NA	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	*56,000*	56,000	5 U	5 U	5 U	NA	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	*4,200,000*	8,700,000	50 U	50 U	50 U	NA	50 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	*20,000,000*	20,000,000	50 U	50 U	50 U	NA	50 U
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	*47,000,000*	47,000,000	5 U	5 U	5 U	NA	5 U
Naphthalene	ug/L	11	520	1,500	- -	- -	- -	5 U	5 U	5 U	NA	5 U
n-Propylbenzene	ug/L	- -	80	230	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Styrene	ug/L	80	100	100	- -	*170,000*	310,000	1 U	1 U	1 U	NA	1 U
1,1,1,2-Tetrachloroethane	ug/L	- -	77	320	- -	- -	- -	1 U	1 U	1 U	NA	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	*12,000*	77,000	1 U	1 U	1 U	NA	1 U
Tetrachloroethene	ug/L	60	5	5	- -	*25,000*	170,000	1 U	1 U	1 U	NA	1 U
Toluene	ug/L	270	790	790	**1,000**	*530,000*	530,000	1 U	1 U	1 U	NA	1 U
1,2,3-Trichlorobenzene	ug/L	- -	- -	- -	- -	- -	- -	5 U	5 U	5 U	NA	5 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	*300,000*	300,000	5 U	5 U	5 U	NA	5 U
1,1,1-Trichloroethane	ug/L	89	200	200	- -	*660,000*	1,300,000	4	1 U	1 U	NA	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	*17,000*	110,000	1 U	1 U	1 U	NA	1 U
Trichloroethene	ug/L	200	5	5	- -	*2,200*	4,900	1 U	1 U	1 U	NA	1 U
1,2,3-Trichloropropane	ug/L	- -	42	120	- -	- -	- -	1 U	1 U	1 U	NA	1 U
1,2,4-Trimethylbenzene	ug/L	17	63	63	- -	- -	- -	1 U	1 U	1 U	NA	1 U
1,3,5-Trimethylbenzene	ug/L	45	72	72	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Vinyl Chloride	ug/L	13	2	2	- -	*1,100*	13,000	1 U	3	9	NA	1 U
o-Xylene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	NA	1 U
Inorganics												
Antimony	mg/L	0.13	0.006	0.006	- -	- -	- -	NA	NA	NA	0.005 U [0.005 U]	NA
Lead	mg/L	- -	0.004	0.004	- -	- -	- -	NA	NA	NA	NA	0.003 U
Manganese	mg/L	- -	0.05	0.05	**2.5**	- -	- -	**3.91**	NA	NA	NA	0.060
Vanadium	mg/L	0.027	0.0045	0.062	- -	- -	- -	NA	NA	NA	0.013 [0.013]	NA

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MW-40-99 10/26/17 MW-40-99_GW-102617	MWF1R 10/23/17 MWF1R_GW-102317	MWF7-01 10/24/17 MWF7-01_GW-102417	MWF8-01 10/26/17 MWF8-01_GW-102617	MWF12-01 10/24/17 MWF12-01_GW-102417
Field Parameters												
pH	pH units	- -	- -	- -	- -	- -	- -	7.15	7.08	7.17	7.08	7.04
Turbidity	NTU	- -	- -	- -	- -	- -	- -	10.7	3.67	0.63	1.41	7.0
PCBs												
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	*45*	45	0.1 U	NA	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	- -	- -	0.1 U	NA	NA	NA	NA
Volatile Organics												
1,1,1-Trichloroethane	ug/L	89	200	200	- -	*660,000*	1,300,000	1 U	1 U	18	1 U	8 [10]
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	*12,000*	77,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	*170,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1,2-Trichloroethane	ug/L	330	5	5	- -	*17,000*	110,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,1-Dichloroethane	ug/L	740	880	2,500	- -	*1,000,000*	2,300,000	1 U	1 U	3	1 U	2 [2]
1,1-Dichloroethene	ug/L	130	7	7	- -	*200*	1,300	1 U	1 U	1	1 U	1 U [1 U]
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	*300,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	*220*	1,200	5 U	5 U	5 U	5 U	5 U [5 U]
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	*2,400*	15,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,2-Dichlorobenzene	ug/L	13	600	600	- -	*160,000*	160,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,2-Dichloroethane	ug/L	360	5	5	- -	*9,600*	59,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,2-Dichloropropane	ug/L	230	5	5	- -	*16,000*	36,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	*18,000*	41,000	1 U	1 U	1 U	1 U	1 U [1 U]
1,4-Dichlorobenzene	ug/L	17	75	75	- -	*16,000*	74,000	1 U	1 U	1 U	1 U	1 U [1 U]
2-Butanone	ug/L	2,200	13,000	38,000	- -	*240,000,000*	240,000,000	25 U	25 U	25 U	25 U	25 U [25 U]
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	*20,000,000*	20,000,000	50 U	50 U	50 U	50 U	50 U [50 U]
Acetone	ug/L	1,700	730	2,100	- -	*1,000,000,000*	1,000,000,000	50 U	50 U	50 U	50 U	50 U [50 U]
Benzene	ug/L	200	5	5	- -	*5,600*	35,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromodichloromethane	ug/L	- -	80	80	- -	*4,800*	37,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromoform	ug/L	- -	80	80	- -	*470,000*	3,100,000	1 U	1 U	1 U	1 U	1 U [1 U]
Bromomethane	ug/L	35	10	29	- -	*4,000*	9,000	5 U	5 U	5 U	5 U	5 U [5 U]
Carbon Disulfide	ug/L	- -	800	2,300	- -	*250,000*	550,000	5 U	5 U	5 U	5 U	5 U [5 U]
Carbon Tetrachloride	ug/L	45	5	5	- -	*370*	2,400	1 U	1 U	1 U	1 U	1 U [1 U]
CFC-11	ug/L	- -	2,600	7,300	- -	*1,100,000*	1,100,000	1 U	1 U	1 U	1 U	1 U [1 U]
CFC-12	ug/L	- -	1,700	4,800	- -	*220,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chlorobenzene	ug/L	25	100	100	- -	*210,000*	470,000	1 U	1 U	1 U	1 U	1 U [1 U]
Chlorodibromomethane	ug/L	- -	80	80	- -	*14,000*	110,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chloroethane	ug/L	1,100	430	1,700	- -	*5,700,000*	5,700,000	5 U	5 U	5 U	5 U	5 U [5 U]
Chloroform	ug/L	350	80	80	- -	*28,000*	180,000	1 U	1 U	1 U	1	1 U [1 U]
Chloromethane	ug/L	- -	260	1,100	- -	*8,600*	45,000	5 U	5 U	5 U	5 U	5 U [5 U]
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	*93,000*	210,000	1 U	1 U	1 U	1 U	1 U [1 U]
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Cyclohexane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Ethylbenzene	ug/L	18	74	74	**700**	*110,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]
Isopropylbenzene	ug/L	28	800	2,300	- -	*56,000*	56,000	1 U	1 U	1 U	1 U	1 U [1 U]
m&p-Xylene	ug/L	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U	2 U [2 U]
Methyl acetate	ug/L	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U	10 U [10 U]
Methylene chloride	ug/L	1,500	5	5	- -	*220,000*	1,400,000	5 U	5 U	5 U	5 U	5 U [5 U]
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	*4,200,000*	8,700,000	50 U	50 U	50 U	50 U	50 U [50 U]

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MW-40-99 10/26/17 MW-40-99_GW-102617	MWF1R 10/23/17 MWF1R_GW-102317	MWF7-01 10/24/17 MWF7-01_GW-102417	MWF8-01 10/26/17 MWF8-01_GW-102617	MWF12-01 10/24/17 MWF12-01_GW-102417
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	*47,000,000*	47,000,000	5 U	5 U	5 U	5 U	5 U [5 U]
Methylcyclohexane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
o-Xylene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Styrene	ug/L	80	100	100	- -	*170,000*	310,000	1 U	1 U	1 U	1 U	1 U [1 U]
Tetrachloroethene	ug/L	60	5	5	- -	*25,000*	170,000	1 U	1 U	1	1 U	1 U [1 U]
Toluene	ug/L	270	790	790	**1,000**	*530,000*	530,000	1 U	1 U	1 U	1 U	1 U [1 U]
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	*85,000*	200,000	1 U	1 U	1 U	1 U	1 U [1 U]
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]
Trichloroethene	ug/L	200	5	5	- -	*2,200*	4,900	1 U	1 U	1 U	1 U	1 U [1 U]
Vinyl Chloride	ug/L	13	2	2	- -	*1,100*	13,000	1 U	1 U	1 U	1 U	1 U [1 U]
Inorganics												
Antimony	mg/L	0.13	0.006	0.006	- -	- -	- -	NA	NA	NA	NA	NA
Lead	mg/L	0.014	0.004	0.004	- -	- -	- -	NA	NA	NA	NA	NA
Manganese	mg/L	1.3	0.05	0.05	**2.5**	- -	- -	NA	NA	NA	NA	**17.8**
Vanadium	mg/L	0.027	0.0045	0.062	- -	- -	- -	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-02 10/24/17 MWF12-02_GW-102417	MWM16-02 10/23/17 MWM16-02_GW-102317	MWM16-29 10/25/17 MWM16-29_GW-102517	MWM16-30 10/23/17 MWM16-30_GW-102317	MWM16-31 10/23/17 MWM16-31_GW-102317
Field Parameters													
pH	pH units	- -	- -	- -	- -	- -	- -	6.79	7.19	7.07	7.46	6.44	7.01
Turbidity	NTU	- -	- -	- -	- -	- -	- -	3.77	1.37	15.2	1.28	1.49	1.99
PCBs													
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	NA	NA
Total PCBs	ug/L	0.2	0.5	0.5	- -	- -	- -	NA	NA	NA	NA	NA	NA
Volatile Organics													
1,1,1-Trichloroethane	ug/L	89	200	200	- -	*660,000*	1,300,000	NA	1	1 U	1 U	10	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	*12,000*	77,000	NA	1 U	1 U	1 U	1 U	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	*170,000*	170,000	NA	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	*17,000*	110,000	NA	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	*1,000,000*	2,300,000	NA	2	1 U	1 U	1 U	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	*200*	1,300	NA	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	*300,000*	300,000	NA	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	*220*	1,200	NA	5 U	5 U	5 U	5 U	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	*2,400*	15,000	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	*160,000*	160,000	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	*9,600*	59,000	NA	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	*16,000*	36,000	NA	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	*18,000*	41,000	NA	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	*16,000*	74,000	NA	1 U	1 U	1 U	1 U	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	*240,000,000*	240,000,000	NA	25 U	25 U	25 U	25 U	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	*20,000,000*	20,000,000	NA	50 U	50 U	50 U	50 U	50 U
Acetone	ug/L	1,700	730	2,100	- -	*1,000,000,000*	1,000,000,000	NA	50 U	50 U	50 U	50 U	50 U
Benzene	ug/L	200	5	5	- -	*5,600*	35,000	NA	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	*4,800*	37,000	NA	1 U	1 U	1 U	1 U	1 U
Bromoform	ug/L	- -	80	80	- -	*470,000*	3,100,000	NA	1 U	1 U	1 U	1 U	1 U
Bromomethane	ug/L	35	10	29	- -	*4,000*	9,000	NA	5 U	5 U	5 U	5 U	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	*250,000*	550,000	NA	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	*370*	2,400	NA	1 U	1 U	1 U	1 U	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	*1,100,000*	1,100,000	NA	1 U	1 U	1 U	1 U	1 U
CFC-12	ug/L	- -	1,700	4,800	- -	*220,000*	300,000	NA	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	ug/L	25	100	100	- -	*210,000*	470,000	NA	1 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	*14,000*	110,000	NA	5 U	5 U	5 U	5 U	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	*5,700,000*	5,700,000	NA	5 U	5 U	5 U	5 U	5 U
Chloroform	ug/L	350	80	80	- -	*28,000*	180,000	NA	1 U	1 U	1 U	1 U	1 U
Chloromethane	ug/L	- -	260	1,100	- -	*8,600*	45,000	NA	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	*93,000*	210,000	NA	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	NA	1 U	1 U	1 U	1 U	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	- -	- -	NA	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	ug/L	18	74	74	**700**	*110,000*	170,000	NA	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	*56,000*	56,000	NA	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	- -	- -	NA	2 U	2 U	2 U	2 U	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	- -	- -	NA	10 U	10 U	10 U	10 U	10 U
Methylene chloride	ug/L	1,500	5	5	- -	*220,000*	1,400,000	NA	5 U	5 U	5 U	5 U	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	*4,200,000*	8,700,000	NA	50 U	50 U	50 U	50 U	50 U

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-02 10/24/17 MWF12-02_GW-102417	MWM16-02 10/23/17 MWM16-02_GW-102317	MWM16-29 10/25/17 MWM16-29_GW-102517	MWM16-30 10/23/17 MWM16-30_GW-102317	MWM16-31 10/23/17 MWM16-31_GW-102317
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	*47,000,000*	47,000,000	NA	5 U	5 U	5 U	5 U	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	- -	- -	NA	1 U	1 U	1 U	1 U	1 U
o-Xylene	ug/L	- -	- -	- -	- -	- -	- -	NA	1 U	1 U	1 U	1 U	1 U
Styrene	ug/L	80	100	100	- -	*170,000*	310,000	NA	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	ug/L	60	5	5	- -	*25,000*	170,000	NA	1 U	1 U	1 U	1 U	1 U
Toluene	ug/L	270	790	790	**1,000**	*530,000*	530,000	NA	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	*85,000*	200,000	NA	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	NA	1 U	1 U	1 U	1 U	1 U
Trichloroethene	ug/L	200	5	5	- -	*2,200*	4,900	NA	1 U	1 U	1 U	15	1 U
Vinyl Chloride	ug/L	13	2	2	- -	*1,100*	13,000	NA	1 U	1 U	1 U	1 U	3
Inorganics													
Antimony	mg/L	0.13	0.006	0.006	- -	- -	- -	NA	NA	NA	NA	NA	NA
Lead	mg/L	0.014	0.004	0.004	- -	- -	- -	NA	NA	NA	NA	NA	NA
Manganese	mg/L	1.3	0.05	0.05	**2.5**	- -	- -	**3.32 [3.12]**	0.808	NA	NA	NA	NA
Vanadium	mg/L	0.027	0.0045	0.062	- -	- -	- -	NA	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWM16-36 10/23/17 MWM16-36_GW-102317	MWM16-37 10/23/17 MWM16-37_GW-102317	MWM31-02 10/24/17 MWM31-02_GW-102417	MWM32-01 10/23/17 MWM32-01_GW-102317	MWW1-04 10/25/17 MWW1-04_GW-102517	MWW10-03 10/26/17 MWW10-03_GW-102617
Field Parameters													
pH	pH units	- -	- -	- -	- -	- -	- -	8.31	7.06	7.03	6.90	11.15	7.12
Turbidity	NTU	- -	- -	- -	- -	- -	- -	5.68	2.91	1.33	7.49	1.54	0.87
PCBs													
Aroclor-1016	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Aroclor-1221	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Aroclor-1232	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Aroclor-1242	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1	0.1 U
Aroclor-1248	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Aroclor-1254	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Aroclor-1260	ug/L	0.2	0.5	0.5	- -	*45*	45	NA	NA	NA	NA	0.1 U	0.1 U
Total PCBs	ug/L	0.2	0.5	0.5	- -	- -	- -	NA	NA	NA	NA	0.1	0.1 U
Volatile Organics													
1,1,1-Trichloroethane	ug/L	89	200	200	- -	*660,000*	1,300,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2,2-Tetrachloroethane	ug/L	78	8.5	35	- -	*12,000*	77,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2-trichloro-1,2,2-trifluoroethane	ug/L	32	170,000	170,000	- -	*170,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,1,2-Trichloroethane	ug/L	330	5	5	- -	*17,000*	110,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,1-Dichloroethane	ug/L	740	880	2,500	- -	*1,000,000*	2,300,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,1-Dichloroethene	ug/L	130	7	7	- -	*200*	1,300	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,2,4-Trichlorobenzene	ug/L	99	70	70	- -	*300,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
1,2-Dibromo-3-chloropropane	ug/L	- -	0.2	0.2	- -	*220*	1,200	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
1,2-Dibromoethane	ug/L	5.7	0.05	0.05	- -	*2,400*	15,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichlorobenzene	ug/L	13	600	600	- -	*160,000*	160,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichloroethane	ug/L	360	5	5	- -	*9,600*	59,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,2-Dichloropropane	ug/L	230	5	5	- -	*16,000*	36,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,3-Dichlorobenzene	ug/L	28	6.6	19	- -	*18,000*	41,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
1,4-Dichlorobenzene	ug/L	17	75	75	- -	*16,000*	74,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
2-Butanone	ug/L	2,200	13,000	38,000	- -	*240,000,000*	240,000,000	25 U	25 U	25 U	25 U	25 U [25 U]	25 U
4-Methyl-2-pentanone	ug/L	- -	1,800	5,200	- -	*20,000,000*	20,000,000	50 U	50 U	50 U	50 U	50 U [50 U]	50 U
Acetone	ug/L	1,700	730	2,100	- -	*1,000,000,000*	1,000,000,000	50 U	50 U	50 U	50 U	50 U [50 U]	50 U
Benzene	ug/L	200	5	5	- -	*5,600*	35,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Bromodichloromethane	ug/L	- -	80	80	- -	*4,800*	37,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Bromoform	ug/L	- -	80	80	- -	*470,000*	3,100,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Bromomethane	ug/L	35	10	29	- -	*4,000*	9,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Carbon Disulfide	ug/L	- -	800	2,300	- -	*250,000*	550,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Carbon Tetrachloride	ug/L	45	5	5	- -	*370*	2,400	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
CFC-11	ug/L	- -	2,600	7,300	- -	*1,100,000*	1,100,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
CFC-12	ug/L	- -	1,700	4,800	- -	*220,000*	300,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Chlorobenzene	ug/L	25	100	100	- -	*210,000*	470,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Chlorodibromomethane	ug/L	- -	80	80	- -	*14,000*	110,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Chloroethane	ug/L	1,100	430	1,700	- -	*5,700,000*	5,700,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Chloroform	ug/L	350	80	80	- -	*28,000*	180,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Chloromethane	ug/L	- -	260	1,100	- -	*8,600*	45,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
cis-1,2-Dichloroethene	ug/L	620	70	70	- -	*93,000*	210,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
cis-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Cyclohexane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Ethylbenzene	ug/L	18	74	74	**700**	*110,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Isopropylbenzene	ug/L	28	800	2,300	- -	*56,000*	56,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
m&p-Xylene	ug/L	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U	2 U [2 U]	2 U
Methyl acetate	ug/L	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U	10 U [10 U]	10 U
Methylene chloride	ug/L	1,500	5	5	- -	*220,000*	1,400,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Methyl N-Butyl Ketone	ug/L	- -	1,000	2,900	- -	*4,200,000*	8,700,000	50 U	50 U	50 U	50 U	50 U [50 U]	50 U

Location ID: Date Collected: Sample Name:	Units	Groundwater Surface Water Interface Shaded	Res Drinking Water Yellow HL	Non-Res Drinking Water Orange HL	Non-Res Health Based Drinking Water Value Bold	Res GW Volatilization to Indoor Air Inhalation Italics	Non-Res GW Volatilization to Indoor Air Inhalation Red Type	MWM16-36 10/23/17 MWM16-36_GW-102317	MWM16-37 10/23/17 MWM16-37_GW-102317	MWM31-02 10/24/17 MWM31-02_GW-102417	MWM32-01 10/23/17 MWM32-01_GW-102317	MWW1-04 10/25/17 MWW1-04_GW-102517	MWW10-03 10/26/17 MWW10-03_GW-102617
Methyl tert-butyl ether	ug/L	7,100	40	40	**690**	*47,000,000*	47,000,000	5 U	5 U	5 U	5 U	5 U [5 U]	5 U
Methylcyclohexane	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
o-Xylene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Styrene	ug/L	80	100	100	- -	*170,000*	310,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Tetrachloroethene	ug/L	60	5	5	- -	*25,000*	170,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Toluene	ug/L	270	790	790	**1,000**	*530,000*	530,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
trans-1,2-Dichloroethene	ug/L	1,500	100	100	- -	*85,000*	200,000	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
trans-1,3-Dichloropropene	ug/L	- -	- -	- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Trichloroethene	ug/L	200	5	5	- -	*2,200*	4,900	1 U	1 U	1 U	1 U	1 U [1 U]	1 U
Vinyl Chloride	ug/L	13	2	2	- -	*1,100*	13,000	1 U	4	1 U	1 U	1 U [1 U]	1 U
Inorganics													
Antimony	mg/L	0.13	0.006	0.006	- -	- -	- -	NA	NA	NA	NA	0.005	NA
Lead	mg/L	0.014	0.004	0.004	- -	- -	- -	NA	NA	NA	NA	NA	0.003 U
Manganese	mg/L	1.3	0.05	0.05	**2.5**	- -	- -	NA	NA	NA	NA	NA	0.067
Vanadium	mg/L	0.027	0.0045	0.062	- -	- -	- -	NA	NA	NA	NA	0.045	NA

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	INJ-01-17 10/02/18 INJ-01-17_GW-100218	INJ-02-18 10/02/18 INJ-02-18_GW-100218	MW-01-17 01/15/18 MW-01-17_GW-011518	MW-01-17 10/03/18 MW-01-17_GW-100318	MW-02-17 01/15/18 MW-02-17_GW-011518	MW-02-17 10/02/18 MW-02-17_GW-100218	MW-03-17 10/02/18 MW-03-17_GW-100218	MW-04-17 10/02/18 MW-04-17_GW-100218	MW-05-18 10/01/18 MW-05-18_GW-100118
Field Parameters																
pH	- -	- -	- -	- -	- -	- -	SU	7.06	7.12		7.35		6.73	7.02	7.07	6.81
Turbidity	- -	- -	- -	- -	- -	- -	NTU	1.43	1.43		2.78		5.84	8.46	2.45	5.23
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1221	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1232	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1242	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1248	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1254	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Aroclor-1260	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Total PCBs	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	NA	NA	NA	0.0001 U	0.0001 U	NA
Volatile Organics																
m&p-Xylene	- -	- -	- -	**- -**	- -	- -	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U [0.002 U]
Acetone	0.73	2.1	1.7	**- -**	*1,000,000*	1,000,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U [0.05 U]
Benzene	0.005	0.005	0.2	**- -**	*5.6*	35	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Bromodichloromethane	0.08	0.08	- -	**- -**	*4.8*	37	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Bromoform	0.08	0.08	- -	**- -**	*470*	3,100	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Bromomethane	0.01	0.029	0.005	**- -**	*4*	9	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
2-Butanone	13	38	2.2	**- -**	*240,000*	240,000	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U [0.025 U]
Carbon Disulfide	0.8	2.3	- -	**- -**	*250*	550	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Carbon Tetrachloride	0.005	0.005	0.038	**- -**	*0.37*	2.4	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
CFC-11	2.6	7.3	- -	**- -**	*1,100*	1,100	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
CFC-12	1.7	4.8	- -	**- -**	*220*	300	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Chlorobenzene	0.1	0.1	0.025	**- -**	*210*	470	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Chlorodibromomethane	0.08	0.08	- -	**- -**	*14*	110	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Chloroethane	0.43	1.7	1.1	**- -**	*5,700*	5,700	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Chloroform	0.08	0.08	0.35	**- -**	*28*	180	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Chloromethane	0.26	1.1	- -	**- -**	*8.6*	45	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Cyclohexane	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	**- -**	*0.22*	1.2	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
1,2-Dibromoethane	0.00005	0.00005	0.0057	**- -**	*2.4*	15	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,2-Dichlorobenzene	0.6	0.6	0.013	**- -**	*160*	160	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,3-Dichlorobenzene	0.0066	0.019	0.028	**- -**	*18*	41	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,4-Dichlorobenzene	0.075	0.075	0.017	**- -**	*16*	74	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,1-Dichloroethane	0.88	2.5	0.74	**- -**	*1,000*	2,300	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.002	0.001 U	0.001 U	0.004 [0.004]
1,2-Dichloroethane	0.005	0.005	0.36	**- -**	*9.6*	59	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,1-Dichloroethene	0.007	0.007	0.13	**- -**	*0.2*	1.3	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
cis-1,2-Dichloroethene	0.07	0.07	0.62	**- -**	*93*	210	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.006 [0.006]
trans-1,2-Dichloroethene	0.1	0.1	1.5	**- -**	*85*	200	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Dichloromethane	0.005	0.005	1.5	**- -**	*220*	1,400	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
1,2-Dichloropropane	0.005	0.005	0.23	**- -**	*16*	36	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
cis-1,3-Dichloropropene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
trans-1,3-Dichloropropene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Ethylbenzene	0.074	0.074	0.018	**0.7**	*110*	170	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Isopropylbenzene	0.8	2.3	0.028	**- -**	*56*	56	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Methyl acetate	- -	- -	- -	**- -**	- -	- -	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U [0.01 U]
Methyl N-Butyl Ketone	1	2.9	- -	**- -**	*4,200*	8,700	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U [0.05 U]
Methylcyclohexane	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
4-Methyl-2-pentanone	1.8	5.2	- -	**- -**	*20,000*	20,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U [0.05 U]
Methyl tert-butyl ether	0.04	0.04	7.1	**0.69**	*47,000*	47,000	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
Styrene	0.1	0.1	0.08	**- -**	*170*	310	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	**- -**	*12*	77	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Tetrachloroethene	0.005	0.005	0.06	**- -**	*25*	170	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.011	0.006	0.001 U	0.001 U	0.001 U [0.001 U]
Toluene	0.79	0.79	0.27	**1**	*530*	530	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
1,2,4-Trichlorobenzene	0.07	0.07	0.099	**- -**	*300*	300	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U [0.005 U]
1,1,1-Trichloroethane	0.2	0.2	0.089	**- -**	*660*	1,300	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.008	0.006	0.001 U	0.001 U	0.004 [0.004]
1,1,2-Trichloroethane	0.005	0.005	0.33	**- -**	*17*	110	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Trichloroethene	0.005	0.005	0.2	**- -**	*2.2*	4.9	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.002	0.001 U	0.001 U	0.001 U [0.001 U]
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	**- -**	*170*	170	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Vinyl Chloride	0.002	0.002	0.013	**- -**	*1.1*	13	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
o-Xylene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U [0.001 U]
Total Xylenes	- -	- -	- -	**10**	*190*	190	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U [0.002 U]

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	INJ-01-17 10/02/18 INJ-01-17_GW-100218	INJ-02-18 10/02/18 INJ-02-18_GW-100218	MW-01-17 01/15/18 MW-01-17_GW-011518	MW-01-17 10/03/18 MW-01-17_GW-100318	MW-02-17 01/15/18 MW-02-17_GW-011518	MW-02-17 10/02/18 MW-02-17_GW-100218	MW-03-17 10/02/18 MW-03-17_GW-100218	MW-04-17 10/02/18 MW-04-17_GW-100218	MW-05-18 10/01/18 MW-05-18_GW-100118
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	mg/L	NA	NA	0.003 U	0.001 U	0.019	0.021	NA	NA	0.002 [0.002]
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Arsenic	0.01	0.01	0.01	- -	- -	- -	mg/L	0.002 U	0.007	NA	NA	NA	NA	0.002 U	0.002 U	NA
Barium	2	2	0.67	- -	- -	- -	mg/L	0.048	0.163	NA	NA	NA	NA	0.047	0.06	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	mg/L	0.001 U	0.001 U	NA	NA	NA	NA	0.001 U	0.001 U	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	mg/L	0.0005 U	0.0005 U	NA	NA	NA	NA	0.0005 U	0.0005 U	NA
Calcium	- -	- -	- -	- -	- -	- -	mg/L	92	99.4	NA	NA	NA	NA	85.2	87	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Copper	1	1	0.013	**4**	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Iron	0.3	0.3	- -	**5.6**	- -	- -	mg/L	0.36	2.36	NA	NA	NA	NA	0.08	0.04	NA
Lead	0.004	0.004	0.014	- -	- -	- -	mg/L	0.003 U	0.003 U	NA	NA	NA	NA	0.003 U	0.003 U	NA
Magnesium	400	1,100	- -	- -	- -	- -	mg/L	20.1	23.7	NA	NA	NA	NA	16.9	18.6	NA
Manganese	0.05	0.05	1.3	**2.5**	- -	- -	mg/L	0.402	0.386	NA	NA	NA	NA	0.562	0.487	NA
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	mg/L	0.0002 U	0.0002 U	NA	NA	NA	NA	0.0002 U	0.0002 U	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	mg/L	0.005 U	0.03	NA	NA	NA	NA	0.006	0.005 U	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	mg/L	0.0005 U	0.0005 U	NA	NA	NA	NA	0.0005 U	0.0005 U	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	mg/L	0.002 U	0.002 U	NA	NA	NA	NA	0.002 U	0.002 U	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Zinc	2.4	5	0.17	- -	- -	- -	mg/L	0.005 U	0.005 U	NA	NA	NA	NA	0.005 U	0.005 U	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	mg/L	238	368	NA	NA	NA	NA	250	240	NA
Hardness	- -	- -	- -	- -	- -	- -	mg/L	244	246	NA	NA	NA	NA	199	221	NA
Total Dissolved Solids	500	500	500	- -	- -	- -	mg/L	562	556	NA	NA	NA	NA	532	536	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	mg/L	3 U	4	NA	NA	NA	NA	3 U	3 U	NA

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MW-40-99 01/15/18 MW-40-99_GW-011518	MW-40-99 10/03/18 MW-40-99_GW-100318	MWF7-02 10/04/18 MWF7-02_GW-100418	MWF8-01 10/04/18 MWF8-01_GW-100418	MWF12-01 01/16/18 MWF12-01_GW-011618	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-01 10/03/18 MWF12-01_GW-100318	MWF12-02 01/16/18 MWF12-02_GW-011618	MWF12-02 10/03/18 MWF12-02_GW-100318
Field Parameters																
pH	- -	- -	- -	- -	- -	- -	SU		7.12	5.91	5.56			6.92		7.10
Turbidity	- -	- -	- -	- -	- -	- -	NTU		9.87	0.57	2.54			6.47		1.27
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Total PCBs	0.0005	0.0005	0.0002	**- -**	*0.045*	0.045	mg/L	NA	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Volatile Organics																
m&p-Xylene	- -	- -	- -	**- -**	- -	- -	mg/L	0.002 U	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	NA	NA	0.002 U [0.002 U]	0.002 U
Acetone	0.73	2.1	1.7	**- -**	*1,000,000*	1,000,000	mg/L	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	NA	NA	0.05 U [0.05 U]	0.05 U
Benzene	0.005	0.005	0.2	**- -**	*5.6*	35	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Bromodichloromethane	0.08	0.08	- -	**- -**	*4.8*	37	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Bromoform	0.08	0.08	- -	**- -**	*470*	3,100	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Bromomethane	0.01	0.029	0.005	**- -**	*4*	9	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
2-Butanone	13	38	2.2	**- -**	*240,000*	240,000	mg/L	0.025 U	0.025 U	0.025 U [0.025 U]	0.025 U	0.025 U	NA	NA	0.025 U [0.025 U]	0.025 U
Carbon Disulfide	0.8	2.3	- -	**- -**	*250*	550	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	**- -**	*0.37*	2.4	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
CFC-11	2.6	7.3	- -	**- -**	*1,100*	1,100	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
CFC-12	1.7	4.8	- -	**- -**	*220*	300	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Chlorobenzene	0.1	0.1	0.025	**- -**	*210*	470	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Chlorodibromomethane	0.08	0.08	- -	**- -**	*14*	110	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Chloroethane	0.43	1.7	1.1	**- -**	*5,700*	5,700	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Chloroform	0.08	0.08	0.35	**- -**	*28*	180	mg/L	0.001 U	0.001 U	0.001 [0.001 U]	0.002	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Chloromethane	0.26	1.1	- -	**- -**	*8.6*	45	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Cyclohexane	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	**- -**	*0.22*	1.2	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	**- -**	*2.4*	15	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	**- -**	*160*	160	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	**- -**	*18*	41	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	**- -**	*16*	74	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	**- -**	*1,000*	2,300	mg/L	0.001 U	0.001 U	0.048 [0.048]	0.001 U	0.003	NA	NA	0.002 [0.002]	0.002
1,2-Dichloroethane	0.005	0.005	0.36	**- -**	*9.6*	59	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	**- -**	*0.2*	1.3	mg/L	0.001 U	0.001 U	0.011 [0.011]	0.001 U	0.001	NA	NA	0.001 U [0.001 U]	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	**- -**	*93*	210	mg/L	0.001 U	0.001 U	0.003 [0.003]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	**- -**	*85*	200	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Dichloromethane	0.005	0.005	1.5	**- -**	*220*	1,400	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	**- -**	*16*	36	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Ethylbenzene	0.074	0.074	0.018	**0.7**	*110*	170	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Isopropylbenzene	0.8	2.3	0.028	**- -**	*56*	56	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Methyl acetate	- -	- -	- -	**- -**	- -	- -	mg/L	0.01 U	0.01 U	0.01 U [0.01 U]	0.01 U	0.01 U	NA	NA	0.01 U [0.01 U]	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	**- -**	*4,200*	8,700	mg/L	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	NA	NA	0.05 U [0.05 U]	0.05 U
Methylcyclohexane	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	**- -**	*20,000*	20,000	mg/L	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	NA	NA	0.05 U [0.05 U]	0.05 U
Methyl tert-butyl ether	0.04	0.04	7.1	**0.69**	*47,000*	47,000	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
Styrene	0.1	0.1	0.08	**- -**	*170*	310	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	**- -**	*12*	77	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Tetrachloroethene	0.005	0.005	0.06	**- -**	*25*	170	mg/L	0.001 U	0.001 U	0.034 [0.033]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Toluene	0.79	0.79	0.27	**1**	*530*	530	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	**- -**	*300*	300	mg/L	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	NA	NA	0.005 U [0.005 U]	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	**- -**	*660*	1,300	mg/L	0.001 U	0.001 U	0.073 [0.073]	0.001 U	0.025	NA	NA	0.001 [0.001]	0.001
1,1,2-Trichloroethane	0.005	0.005	0.33	**- -**	*17*	110	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Trichloroethene	0.005	0.005	0.2	**- -**	*2.2*	4.9	mg/L	0.001 U	0.001 U	0.003 [0.003]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	**- -**	*170*	170	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Vinyl Chloride	0.002	0.002	0.013	**- -**	*1.1*	13	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
o-Xylene	- -	- -	- -	**- -**	- -	- -	mg/L	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	NA	NA	0.001 U [0.001 U]	0.001 U
Total Xylenes	- -	- -	- -	**10**	*190*	190	mg/L	0.002 U	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	NA	NA	0.002 U [0.002 U]	0.002 U

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MW-40-99 01/15/18 MW-40-99_GW-011518	MW-40-99 10/03/18 MW-40-99_GW-100318	MWF7-02 10/04/18 MWF7-02_GW-100418	MWF8-01 10/04/18 MWF8-01_GW-100418	MWF12-01 01/16/18 MWF12-01_GW-011618	MWF12-01 01/17/18 MWF12-01_GW-011718	MWF12-01 10/03/18 MWF12-01_GW-100318	MWF12-02 01/16/18 MWF12-02_GW-011618	MWF12-02 10/03/18 MWF12-02_GW-100318
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	mg/L	0.003 U	0.001 U	0.5 Y [0.5 Y]	NA	0.005	NA	0.005	0.004 [0.004]	NA
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.01	0.01	0.01	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2	2	0.67	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1	1	0.013	**4**	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	0.3	0.3	- -	**5.6**	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.004	0.004	0.014	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	400	1,100	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	0.05	0.05	1.3	**2.5**	- -	- -	mg/L	NA	NA	NA	NA	NA	**3.32 [3.12]**	NA	NA	0.292
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2.4	5	0.17	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	500	500	500	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWF16-06 10/04/18 MWF16-06_GW-100418	MWF16-23 10/01/18 MWF16-23_GW-100118	MWF16-25 10/01/18 MWF16-25_GW-100118	MWM16-02 10/02/18 MWM-16-02_GW-100218	MWM16-31 10/02/18 MWM16-31_GW-100218	MWM16-37 10/02/18 MWM16-37_GW-100218	MWM31-02 10/02/18 MWM31-02_GW-100218	MWM32-01 10/02/18 MWM32-01_GW-100218	MWOS-01 10/01/18 MWOS-01_GW-100118
Field Parameters																
pH	- -	- -	- -	- -	- -	- -	SU	6.44	6.91	7.02	6.79	7.04	7.12	7.03	6.92	6.97
Turbidity	- -	- -	- -	- -	- -	- -	NTU	1.86	10.2	8.89	9.90	4.55	4.63	1.65	1.18	7.87
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organics																
m&p-Xylene	- -	- -	- -	- -	- -	- -	mg/L	0.01 UY	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	mg/L	0.25 UY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	mg/L	0.13 UY	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	mg/L	0.014 Y	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	mg/L	0.038 Y	0.001 U	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	mg/L	0.047 Y	0.009	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	mg/L	0.009 Y	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	mg/L	0.012 Y	0.019	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	mg/L	0.005 UY	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.074	0.074	0.018	**0.7**	*110*	170	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	mg/L	0.05 UY	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	mg/L	0.25 UY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	mg/L	0.25 UY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether	0.04	0.04	7.1	**0.69**	*47,000*	47,000	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	mg/L	0.07 Y	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.79	0.79	0.27	**1**	*530*	530	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	mg/L	0.03 UY	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	mg/L	0.163 Y	0.009	0.003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	mg/L	0.012 Y	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.001 U	0.001 U	0.001 U
o-Xylene	- -	- -	- -	- -	- -	- -	mg/L	0.005 UY	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes	- -	- -	- -	**10**	*190*	190	mg/L	0.01 UY	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWF16-06 10/04/18 MWF16-06_GW-100418	MWF16-23 10/01/18 MWF16-23_GW-100118	MWF16-25 10/01/18 MWF16-25_GW-100118	MWM16-02 10/02/18 MWM-16-02_GW-100218	MWM16-31 10/02/18 MWM16-31_GW-100218	MWM16-37 10/02/18 MWM16-37_GW-100218	MWM31-02 10/02/18 MWM31-02_GW-100218	MWM32-01 10/02/18 MWM32-01_GW-100218	MWOS-01 10/01/18 MWOS-01_GW-100118
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	mg/L	0.015	0.004	0.007	NA	NA	NA	NA	0.001 U	NA
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.01	0.01	0.01	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2	2	0.67	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1	1	0.013	**4**	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	0.3	0.3	- -	**5.6**	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.004	0.004	0.014	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	400	1,100	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	0.05	0.05	1.3	**2.5**	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2.4	5	0.17	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	500	500	500	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWW1-04 01/16/18 MWW1-04_GW-011618	MWW1-04 10/04/18 MWW1-04_GW-100418	MWW1-15 10/03/18 MWW1-15_GW-100318	MWW01-SEN03 10/05/18 MWW01-SEN03-GW-100518	MWW01-SEN04 10/03/18 MWW01-SEN04_GW-100318	MWW5-01 10/01/18 MWW5-01_GW-100118	MWW10-03 10/02/18 MWW10-03_GW-100218	MWW10-SEN02 10/05/18 MWW10-SEN02-GW-100518
Field Parameters															
pH	- -	- -	- -	- -	- -	- -	SU		11.46	7.43	7.57	6.92	6.86	6.94	6.75
Turbidity	- -	- -	- -	- -	- -	- -	NTU		3.80	5.10	141	13.2	4.29	0.51	NA
PCBs															
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0002 [0.0001]	0.0001 U	0.0001 U	NA
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	NA
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	NA	0.0001 [0.0001 U]	0.0001 U	0.0001 U	0.0002 [0.0001]	0.0001 U	0.0001 U	NA
Volatile Organics															
m&p-Xylene	- -	- -	- -	- -	- -	- -	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	mg/L	0.025 U	0.025 U [0.025 U]	0.025 U	0.025 U	0.025 U [0.025 U]	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.021	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.074	0.074	0.018	**0.7**	*110*	170	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	mg/L	0.01 U	0.01 U [0.01 U]	0.01 U	0.01 U	0.01 U [0.01 U]	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether	0.04	0.04	7.1	**0.69**	*47,000*	47,000	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Toluene	0.79	0.79	0.27	**1**	*530*	530	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
o-Xylene	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U
Total Xylenes	- -	- -	- -	**10**	*190*	190	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWW1-04 01/16/18 MWW1-04_GW-011618	MWW1-04 10/04/18 MWW1-04_GW-100418	MWW1-15 10/03/18 MWW1-15_GW-100318	MWW01-SEN03 10/05/18 MWW01-SEN03-GW-100518	MWW01-SEN04 10/03/18 MWW01-SEN04_GW-100318	MWW5-01 10/01/18 MWW5-01_GW-100118	MWW10-03 10/02/18 MWW10-03_GW-100218	MWW10-SEN02 10/05/18 MWW10-SEN02-GW-100518
Volatile Organics-SIM															
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	mg/L	0.003 U	0.001 U [0.001 U]	NA	0.026	NA	NA	NA	NA
Inorganics															
Antimony	0.006	0.006	0.13	- -	- -	- -	mg/L	NA	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U
Arsenic	0.01	0.01	0.01	- -	- -	- -	mg/L	NA	NA	0.002	0.008	0.005 [0.005]	0.004	NA	0.007
Barium	2	2	0.67	- -	- -	- -	mg/L	NA	NA	0.139	0.17	0.129 [0.128]	0.087	NA	0.141
Beryllium	0.004	0.004	0.0067	- -	- -	- -	mg/L	NA	NA	0.001 U	0.001 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U
Cadmium	0.005	0.005	0.0025	- -	- -	- -	mg/L	NA	NA	0.0005 U	0.001	0.0005 U [0.0005 U]	0.0005 U	NA	0.0005 U
Calcium	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	62	80.1	86.4	194	NA	190
Chromium	0.1	0.1	0.011	- -	- -	- -	mg/L	NA	NA	0.005 U	0.029	0.005 U [0.005 U]	0.005 U	NA	0.053
Cobalt	0.04	0.1	0.1	- -	- -	- -	mg/L	NA	NA	0.005 U	0.006	0.005 U [0.005 U]	0.005 U	NA	0.011
Copper	1	1	0.013	**4**	- -	- -	mg/L	NA	NA	0.005 U	0.016	0.005 U [0.005 U]	0.005 U	NA	0.054
Iron	0.3	0.3	- -	**5.6**	- -	- -	mg/L	NA	NA	**9.07**	**21.1**	**14.5**	2.18	NA	**21.2**
Lead	0.004	0.004	0.014	- -	- -	- -	mg/L	NA	NA	0.003 U	0.011	0.004 [0.003]	0.003 U	0.003 U	0.012
Magnesium	400	1,100	- -	- -	- -	- -	mg/L	NA	NA	28.6	16.2	27.6	28.2	NA	42.2
Manganese	0.05	0.05	1.3	**2.5**	- -	- -	mg/L	NA	NA	0.236	0.477	0.37 [0.369]	0.52	0.338	0.563
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	mg/L	NA	NA	0.0002 U	0.0002 U	0.0002 U [0.0002 U]	0.0002 U	NA	0.0002 U
Nickel	0.1	0.1	0.073	- -	- -	- -	mg/L	NA	NA	0.005 U	0.023	0.005 U [0.005 U]	0.005 U	NA	0.128
Selenium	0.05	0.05	0.005	- -	- -	- -	mg/L	NA	NA	0.005 U	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U
Silver	0.034	0.098	0.0002	- -	- -	- -	mg/L	NA	NA	0.0005 U	0.0005 U	0.0005 U [0.0005 U]	0.0005 U	NA	0.0005 U
Thallium	0.002	0.002	0.0037	- -	- -	- -	mg/L	NA	NA	0.002 U	0.002 U	0.002 U [0.002 U]	0.002 U	NA	0.002 U
Vanadium	0.0045	0.062	0.027	- -	- -	- -	mg/L	NA	0.016 [0.015]	0.005 U	0.007	0.005 U [0.005 U]	0.005 U	NA	0.021
Zinc	2.4	5	0.17	- -	- -	- -	mg/L	NA	NA	0.005 U	0.027	0.005 U [0.005 U]	0.005 U	NA	0.051
Miscellaneous															
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	528	754	498	558	NA	686
Hardness	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	155	137	218	512	NA	NA
Total Dissolved Solids	500	500	500	- -	- -	- -	mg/L	NA	NA	794	1,110	580	810	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	9	249	27	3 U	NA	4,940

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWW10-SEN02 11/29/18 MWW10-SEN02_112918	TW-09-01 10/01/18 TW-09-01_GW-100118	TW-10-02 10/01/18	TW-MD-01 10/03/18 TW-MD-01_GW-100318	TW-MD-02 10/03/18 TW-MD-02_GW-100318	TW-MD-03 10/03/18 TW-MD-03_GW-100318	TW-MD-04 10/03/18 TW-MD-04_GW-100318	TW-MD-05 10/03/18 TW-MD-05_GW-100318	TW-MD-06 10/04/18 TW-MD-06_GW-100418	TW-MD-07 10/04/18 TW-MD-07_GW-100418
Field Parameters																	
pH	- -	- -	- -	- -	- -	- -	SU	6.55	7.08	6.48	6.90	6.90	7.01	6.69	6.85	6.81	6.61
Turbidity	- -	- -	- -	- -	- -	- -	NTU	30.1	7.12	4.89	7.79	6.26	3.06	2.35	8.92	8.20	3.40
PCBs																	
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	mg/L	0.0001 U	0.0001 U	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Volatile Organics																	
m&p-Xylene	- -	- -	- -	- -	- -	- -	mg/L	NA	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	mg/L	NA	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	mg/L	NA	0.025 U	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.074	0.074	0.018	**0.7**	*110*	170	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	mg/L	NA	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	mg/L	NA	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	mg/L	NA	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether	0.04	0.04	7.1	**0.69**	*47,000*	47,000	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.79	0.79	0.27	**1**	*530*	530	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
o-Xylene	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes	- -	- -	- -	**10**	*190*	190	mg/L	NA	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	Units	MWW10-SEN02 11/29/18 MWW10-SEN02_112918	TW-09-01 10/01/18 TW-09-01_GW-100118	TW-10-02 10/01/18	TW-MD-01 10/03/18 TW-MD-01_GW-100318	TW-MD-02 10/03/18 TW-MD-02_GW-100318	TW-MD-03 10/03/18 TW-MD-03_GW-100318	TW-MD-04 10/03/18 TW-MD-04_GW-100318	TW-MD-05 10/03/18 TW-MD-05_GW-100318	TW-MD-06 10/04/18 TW-MD-06_GW-100418	TW-MD-07 10/04/18 TW-MD-07_GW-100418
Volatile Organics-SIM																	
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	mg/L	NA	NA	0.045	0.001 U	NA	NA	NA	NA	NA	NA
Inorganics																	
Antimony	0.006	0.006	0.13	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	- -	- -	- -	mg/L	NA	0.02	NA	0.002 U	0.008	0.005	0.002	0.004	0.01	0.002 U
Barium	2	2	0.67	- -	- -	- -	mg/L	NA	0.539	NA	0.126	0.163	0.309	0.341	0.095	0.18	0.206
Beryllium	0.004	0.004	0.0067	- -	- -	- -	mg/L	NA	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	- -	- -	- -	mg/L	NA	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Calcium	- -	- -	- -	- -	- -	- -	mg/L	NA	265	NA	125	101	109	166	47.2	152	148
Chromium	0.1	0.1	0.011	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.009	0.005 U	0.005 U	0.005 U
Copper	1	1	0.013	**4**	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Iron	0.3	0.3	- -	**5.6**	- -	- -	mg/L	NA	4.71	NA	**10.8**	**14.3**	**18**	**21.9**	**11.5**	**24.9**	**23.9**
Lead	0.004	0.004	0.014	- -	- -	- -	mg/L	NA	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Magnesium	400	1,100	- -	- -	- -	- -	mg/L	NA	36.6	NA	30.1	22.4	28.6	43.7	21.9	43	43.9
Manganese	0.05	0.05	1.3	**2.5**	- -	- -	mg/L	NA	0.561	NA	1	0.747	0.82	1.16	0.356	0.947	0.201
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	mg/L	NA	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Selenium	0.05	0.05	0.005	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	- -	- -	- -	mg/L	NA	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	- -	- -	- -	mg/L	NA	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	2.4	5	0.17	- -	- -	- -	mg/L	NA	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.009	0.005 U
Miscellaneous																	
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	mg/L	NA	770	NA	504	524	460	422	456	434	494
Hardness	- -	- -	- -	- -	- -	- -	mg/L	NA	675	NA	314	253	294	390	113	390	365
Total Dissolved Solids	500	500	500	- -	- -	- -	mg/L	1,910 X	1,460	NA	630	620	1,180	1,700	586	1,080	958
Total Suspended Solids	- -	- -	- -	- -	- -	- -	mg/L	4,940	11	NA	12	14	28	37	20	46	43

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	INJ-01-17 10/08/19 INJ-01-17_GW-100819	INJ-02-18 10/08/19 INJ-02-18_GW-100819	MW-01-17 10/08/19 MW-01-17_GW-100819	MW-02-17 10/07/19 MW-02-17_GW-100719	MW-03-17 10/09/19 MW-03-17_GW-100919	MW-04-17 10/08/19 MW-04-17_GW-100819	MW-05-18 10/07/19 MW-05-18_GW-100719	MW-40-99 10/09/19 MW-40-99_GW-100919
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	SU	7.09	7.47	7.34	7.09	7.08	7.12	7.12	7.02
Turbidity	- -	- -	- -	- -	- -	- -	- -	NTU	7.91	120	0.49	1.20	0.02	0.02	0.02	8.98
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U [0.0001 U]	0.0001 U	NA	NA	NA	0.0001 U	NA	NA
Volatile Organics																
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	12,000	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	0.014	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	- -	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	- -	mg/L	0.025 U [0.025 U]	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	- -	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	- -	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	0.54	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	- -	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	6.7	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	0.0076	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	0.16	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	- -	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	0.052	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	0.12	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	0.067	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.002	0.001 U	0.001 U	0.009	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	0.17	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	0.048	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.013	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	0.65	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	3.9	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	**0.7**	*110*	170	0.045	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	mg/L	0.01 U [0.01 U]	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	- -	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	- -	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	**0.69**	*47,000*	47,000	4	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	0.096	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.01	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	**1**	*530*	530	23	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	0.095	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	8.6	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.007	0.001 U	0.001 U	0.008	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	0.0061	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.004	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	0.00096 (M)	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	**10**	*190*	190	1.2	mg/L	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	INJ-01-17 10/08/19 INJ-01-17_GW-100819	INJ-02-18 10/08/19 INJ-02-18_GW-100819	MW-01-17 10/08/19 MW-01-17_GW-100819	MW-02-17 10/07/19 MW-02-17_GW-100719	MW-03-17 10/09/19 MW-03-17_GW-100919	MW-04-17 10/08/19 MW-04-17_GW-100819	MW-05-18 10/07/19 MW-05-18_GW-100719	MW-40-99 10/09/19 MW-40-99_GW-100919
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	- -	mg/L	NA	NA	0.001 U	0.029	NA	NA	0.004	0.011
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Arsenic	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	0.003 [0.003]	NA	NA	NA	0.002 U	0.007	NA	NA
Barium	2	2	0.67	- -	- -	- -	- -	mg/L	0.168 [0.17]	NA	NA	NA	0.112	0.179	NA	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	0.001 U [0.001 U]	NA	NA	NA	0.001 U	0.001 U	NA	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	0.0005 U [0.0005 U]	NA	NA	NA	0.0005 U	0.0005 U	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	mg/L	81.1 [84.6]	85.6	NA	NA	90.0	84.1	NA	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Copper*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Iron*	0.3 (E)	0.3 (E)	- -	**5.6**	- -	- -	- -	mg/L	5.40 [5.40]	**20.9**	NA	NA	0.42	**6.00**	NA	NA
Lead	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	0.003 U [0.003 U]	NA	NA	NA	0.003 U	0.003 U	NA	NA
Magnesium	400	1,100	- -	- -	- -	- -	- -	mg/L	24.1 [24.6]	25.8	NA	NA	24.0	24.7	NA	NA
Manganese*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	0.324 [0.331]	NA	NA	NA	0.840	0.597	NA	NA
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	0.0002 U [0.0002 U]	NA	NA	NA	0.0002 U	0.0002 U	NA	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	0.0005 U [0.0005 U]	NA	NA	NA	0.0005 U	0.0005 U	NA	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	0.002 U [0.002 U]	NA	NA	NA	0.002 U	0.002 U	NA	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	0.005 U [0.005 U]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Zinc	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	0.007 [0.008]	NA	NA	NA	0.005 U	0.005 U	NA	NA
Inorganics-Filtered																
Antimony (dissolved)	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	0.002 Uf	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	- -	- -	- -	- -	mg/L	NA	0.140 f	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	0.001 Uf	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	0.0005 Uf	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	0.003 Uf	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	0.356 f	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	0.0002 Uf	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	0.0005 Uf	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	0.002 Uf	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	0.005 Uf	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	mg/L	394 [404]	392	NA	NA	388	398	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	mg/L	227 [231]	222	NA	NA	247	230	NA	NA
Total Dissolved Solids	500 (E)	500 (E)	500	- -	- -	- -	- -	mg/L	844 [844]	903	NA	NA	850	884	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	- -	mg/L	14 [14]	52	NA	NA	3 U	12	NA	NA

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MW-40-99 10/11/19 MW-40-99_GW-101119	MWF7-02 10/07/19 MWF7-02_GW-100719	MWF8-01 10/07/19 MWF8-01_GW-100719	MWF12-02 10/07/19 MWF12-02_GW-100719	MWF16-06 10/07/19 MWF16-06_GW-100719	MWF16-23 10/07/19 MWF16-23_GW-100719	MWF16-25 10/07/19 MWF16-25_GW-100719	MWM16-02 10/10/19 MWM16-02_GW-101019
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	SU	7.01	7.12	6.90	7.27	7.65	7.04	7.22	7.11
Turbidity	- -	- -	- -	- -	- -	- -	- -	NTU	8.64	1.60	0.02	3.60	4.22	2.73	1.45	4.50
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	NA	NA	NA	NA	NA	NA	NA
Volatile Organics																
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	12,000	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	0.014	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	- -	mg/L	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.013	0.001 U	0.001	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	0.54	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	6.7	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	0.0076	mg/L	NA	0.001 U	0.001 U	0.001 U	0.034	0.001 U	0.005	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	0.16	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	0.052	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	0.12	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	0.067	mg/L	NA	0.038	0.001 U	0.002	0.067	0.006	0.004	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	0.17	mg/L	NA	0.01	0.001 U	0.001 U	0.012	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	0.048	mg/L	NA	0.003	0.001 U	0.001 U	0.017	0.021	0.008	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	0.65	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	3.9	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	**0.7**	*110*	170	0.045	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	- -	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	- -	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	**0.69**	*47,000*	47,000	4	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	0.096	mg/L	NA	0.054	0.001 U	0.001 U	0.076	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	**1**	*530*	530	23	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	0.095	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	8.6	mg/L	NA	0.06	0.001 U	0.001	0.164	0.009	0.004	0.001
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	0.0061	mg/L	NA	0.003	0.001 U	0.001 U	0.012	0.02	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	0.00096 (M)	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	**10**	*190*	190	1.2	mg/L	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MW-40-99 10/11/19 MW-40-99_GW-101119	MWF7-02 10/07/19 MWF7-02_GW-100719	MWF8-01 10/07/19 MWF8-01_GW-100719	MWF12-02 10/07/19 MWF12-02_GW-100719	MWF16-06 10/07/19 MWF16-06_GW-100719	MWF16-23 10/07/19 MWF16-23_GW-100719	MWF16-25 10/07/19 MWF16-25_GW-100719	MWM16-02 10/10/19 MWM16-02_GW-101019
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	- -	mg/L	NA	0.300 Y	NA	NA	0.029	0.001 U	0.004	NA
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron*	0.3 (E)	0.3 (E)	- -	**5.6**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	400	1,100	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	0.330	NA	NA	NA	NA
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics-Filtered																
Antimony (dissolved)	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	500 (E)	500 (E)	500	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWM16-30 10/10/19 MWM16-30_GW-101019	MWM16-31 10/10/19 MWM16-31_GW-101019	MWM16-37 10/10/19 MWM16-37_GW-101019	MWM31-02 10/10/19 MWM31-02_GW-101019	MWM32-01 10/10/19 MWM32-01_GW-101019	MWOS-01 10/07/19 MWOS-01_GW-100719	MWOS-05 10/10/19 MWOS-05_GW-101019	MWW1-04 10/07/19 MWW1-04_GW-100719
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	SU	6.86	7.27	7.17	6.94	6.76	7.08	6.85	11.31
Turbidity	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.02	7.22	6.81	7.61	102	1.05	4.11
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0002
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.0002
Volatile Organics																
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	12,000	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	0.014	mg/L	0.001 U	0.001 [0.001]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	- -	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	- -	mg/L	0.025 U	0.025 U [0.025 U]	0.025 U	0.025 U	0.025 U	0.025 U	NA	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	- -	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	- -	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	0.54	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	- -	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	6.7	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	0.0076	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	0.16	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	- -	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	0.052	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	0.12	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	0.067	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	0.17	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	0.048	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	0.65	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	3.9	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	**0.7**	*110*	170	0.045	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	mg/L	0.01 U	0.01 U [0.01 U]	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	- -	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	- -	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	**0.69**	*47,000*	47,000	4	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	0.096	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	**1**	*530*	530	23	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	0.095	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	8.6	mg/L	0.006	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	0.0061	mg/L	0.017	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	0.00096 (M)	mg/L	0.001 U	0.002 [0.002]	0.002	0.001 U	0.001 U	0.001 U	NA	0.001 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	**10**	*190*	190	1.2	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWM16-30 10/10/19 MWM16-30_GW-101019	MWM16-31 10/10/19 MWM16-31_GW-101019	MWM16-37 10/10/19 MWM16-37_GW-101019	MWM31-02 10/10/19 MWM31-02_GW-101019	MWM32-01 10/10/19 MWM32-01_GW-101019	MWOS-01 10/07/19 MWOS-01_GW-100719	MWOS-05 10/10/19 MWOS-05_GW-101019	MWW1-04 10/07/19 MWW1-04_GW-100719
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.001 U
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.005 U
Arsenic	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	0.005	NA
Barium	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron*	0.3 (E)	0.3 (E)	- -	**5.6**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	400	1,100	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.008
Zinc	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics-Filtered																
Antimony (dissolved)	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	0.005	NA
Barium (dissolved)	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	500 (E)	500 (E)	500	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Total Suspended Solids	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWW1-15 10/08/19 MWW1-15_GW-100819	MWW01-SEN03 10/10/19 MWW01-SEN03_GW-10101	MWW01-SEN04 10/09/19 MWW01-SEN04_GW-10091	MWW5-01 10/09/19 MWW5-01_GW-100919	MWW10-03 10/10/19 MWW10-03_GW-101019	MWW10-SEN02 10/08/19 MWW10-SEN02_GW-10081	SUMP 10/10/19 SUMP_GW-101019	TW-09-01 10/09/19 TW-09-01_GW-100919
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	SU	7.70	7.08	6.97	7.16	6.68	6.96	6.89	7.47
Turbidity	- -	- -	- -	- -	- -	- -	- -	NTU	2.97	185	174	9.09	2.40	7.22	19.5	0.02
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.015 Y	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.002 UY	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	0.0001 U	0.0001 U	0.015 Y	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Volatile Organics																
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	12,000	mg/L	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	0.014	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	- -	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	- -	mg/L	0.025 U	0.025 U	0.025 U	NA	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	- -	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	- -	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	0.54	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	- -	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	6.7	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	0.0076	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	0.16	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	- -	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	0.052	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	0.12	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	0.067	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	0.17	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	0.048	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	0.65	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	3.9	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	**0.7**	*110*	170	0.045	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	mg/L	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	- -	mg/L	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	- -	mg/L	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	**0.69**	*47,000*	47,000	4	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	0.096	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	**1**	*530*	530	23	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	0.095	mg/L	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	8.6	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	0.0061	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	0.00096 (M)	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	**10**	*190*	190	1.2	mg/L	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: Date Collected: Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWW1-15 10/08/19 MWW1-15_GW-100819	MWW01-SEN03 10/10/19 MWW01-SEN03_GW-101019	MWW01-SEN04 10/09/19 MWW01-SEN04_GW-100919	MWW5-01 10/09/19 MWW5-01_GW-100919	MWW10-03 10/10/19 MWW10-03_GW-101019	MWW10-SEN02 10/08/19 MWW10-SEN02_GW-100819	SUMP 10/10/19 SUMP_GW-101019	TW-09-01 10/09/19 TW-09-01_GW-100919
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	- -	mg/L	NA	0.001 U	NA	NA	NA	0.009	NA	NA
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.005	0.005 U	NA	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	0.002	0.002	0.020	0.014	NA	0.009	0.004	0.017
Barium	2	2	0.67	- -	- -	- -	- -	mg/L	0.116	0.083	0.424	0.190	NA	0.137	0.184	0.186
Beryllium	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	0.001 U	0.001 U	0.002	0.001 U	NA	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	0.0005 U	0.0005 U	0.0010	0.0012	NA	0.0005 U	0.0005 U	0.0005 U
Calcium	- -	- -	- -	- -	- -	- -	- -	mg/L	53.3	147	290	226	NA	180	83.2	101
Chromium	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.190	0.005 U	NA	0.096	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.013	0.012	NA	0.008	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	0.005 U	0.005 U	0.174	0.078	NA	0.058	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	- -	**5.6**	- -	- -	- -	mg/L	5.04	1.02	**100**	**15.0**	NA	**20.6**	**9.61**	0.55
Lead	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	0.003 U	0.003 U	1.70	0.007	0.011	0.009	0.003 U	0.003 U
Magnesium	400	1,100	- -	- -	- -	- -	- -	mg/L	29.0	25.4	39.4	30.6	NA	38.6	25.3	12.1
Manganese*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	0.207	0.279	**2.52**	**4.27**	0.408	0.294	0.360	0.133
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	0.0002 U	0.0002 U	0.0004	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.111	0.014	NA	0.105	0.005 U	0.005
Selenium	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.062	0.014	NA	0.022	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	0.005 U	0.005 U	0.191	0.140	NA	0.057	0.005 U	0.005 U
Inorganics-Filtered																
Antimony (dissolved)	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	mg/L	416	416	386	436	NA	696	408	520
Hardness	- -	- -	- -	- -	- -	- -	- -	mg/L	147	405	278	594	NA	262	226	261
Total Dissolved Solids	500 (E)	500 (E)	500	- -	- -	- -	- -	mg/L	724	704	1,000	926	NA	1,280	868	1,230
Total Suspended Solids	- -	- -	- -	- -	- -	- -	- -	mg/L	4	3 U	2,140	NA	NA	602	22	3 U

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	TW-10-02 10/09/19 TW-10-02_GW-100919	TW-MD-01 10/08/19 TW-MD-01_GW-100819	TW-MD-02 10/08/19 TW-MD-02_GW-100819	TW-MD-03 10/08/19 TW-MD-03_GW-100819	TW-MD-04 10/09/19 TW-MD-04_GW-100919	TW-MD-05 10/09/19 TW-MD-05_GW-100919	TW-MD-06 10/09/19 TW-MD-06_GW-100919	TW-MD-07 10/09/19 TW-MD-07_GW-100919
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	SU	6.60	7.14	7.25	7.33	7.12	7.25	7.16	7.06
Turbidity	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.41	1.01	47.1	2.76	1.21	4.02	2.96
PCBs																
Aroclor-1016	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0002	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	- -	*0.045*	0.045	- -	mg/L	NA	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0002	0.0001 U
Volatile Organics																
Acetone	0.73	2.1	1.7	- -	*1,000,000*	1,000,000	12,000	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	- -	*5.6*	35	0.014	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	- -	- -	*4.8*	37	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	- -	- -	*470*	3,100	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	- -	*4*	9	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	- -	*240,000*	240,000	- -	mg/L	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	- -	- -	*250*	550	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	- -	*0.37*	2.4	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	- -	- -	*1,100*	1,100	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	- -	- -	*220*	300	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	- -	*210*	470	0.54	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	- -	- -	*14*	110	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	- -	*5,700*	5,700	6.7	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	- -	*28*	180	0.0076	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	- -	- -	*8.6*	45	0.16	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	- -	- -	*0.22*	1.2	- -	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	- -	*2.4*	15	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	- -	*160*	160	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	- -	*18*	41	0.052	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	- -	*16*	74	0.12	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	- -	*1,000*	2,300	0.067	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	- -	*9.6*	59	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	- -	*0.2*	1.3	0.17	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	- -	*93*	210	0.048	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	- -	*85*	200	0.65	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	- -	*220*	1,400	3.9	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	- -	*16*	36	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	**0.7**	*110*	170	0.045	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	- -	*56*	56	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	- -	- -	*4,200*	8,700	- -	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	- -	- -	*20,000*	20,000	- -	mg/L	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	**0.69**	*47,000*	47,000	4	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	- -	*170*	310	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	- -	*12*	77	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	- -	*25*	170	0.096	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	**1**	*530*	530	23	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	- -	*300*	300	0.095	mg/L	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	- -	*660*	1,300	8.6	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	- -	*17*	110	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	- -	*2.2*	4.9	0.0061	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	- -	*170*	170	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	- -	*1.1*	13	0.00096 (M)	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	**10**	*190*	190	1.2	mg/L	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

Location ID: / Date Collected: / Sample Name:	MDEQ 2013 UPDATED Res DW	MDEQ 2013 UPDATED Non-Res DW	MDEQ 2013 UPDATED GSWI	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	TW-10-02 10/09/19 TW-10-02_GW-100919	TW-MD-01 10/08/19 TW-MD-01_GW-100819	TW-MD-02 10/08/19 TW-MD-02_GW-100819	TW-MD-03 10/08/19 TW-MD-03_GW-100819	TW-MD-04 10/09/19 TW-MD-04_GW-100919	TW-MD-05 10/09/19 TW-MD-05_GW-100919	TW-MD-06 10/09/19 TW-MD-06_GW-100919	TW-MD-07 10/09/19 TW-MD-07_GW-100919
Volatile Organics-SIM																
1,4-Dioxane	0.0072	0.35	0.28	- -	- -	- -	- -	mg/L	0.09 [0.12]	0.006	NA	NA	NA	NA	NA	0.001 U
Inorganics																
Antimony	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	0.002	0.006	NA	0.006	0.005	0.007	0.004
Barium	2	2	0.67	- -	- -	- -	- -	mg/L	NA	0.110	0.193	NA	0.136	0.104	0.117	0.135
Beryllium	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	0.0005 U	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Calcium	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	103	90.6	61.9	75.5	58.4	89.8	86.5
Chromium	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	- -	**5.6**	- -	- -	- -	mg/L	NA	**7.05**	**11.2**	2.03	**13.8**	**13.0**	**9.57**	**10.0**
Lead	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U
Magnesium	400	1,100	- -	- -	- -	- -	- -	mg/L	NA	25.1	20.2	20.0	20.7	26.5	27.3	20.4
Manganese*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	0.867	0.501	NA	0.571	0.400	0.435	0.378
Mercury	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	0.0002 U	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Selenium	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	0.0007	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	0.005 U	0.008	NA	0.005 U	0.005 U	0.005 U	0.005 U
Inorganics-Filtered																
Antimony (dissolved)	0.006	0.006	0.13	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	- -	- -	- -	- -	mg/L	NA	NA	NA	0.004 f	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	- -	- -	- -	- -	mg/L	NA	NA	NA	0.126 f	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	- -	- -	- -	- -	mg/L	NA	NA	NA	0.001 Uf	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	- -	- -	- -	- -	mg/L	NA	NA	NA	0.0005 Uf	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	**4**	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	- -	- -	- -	- -	mg/L	NA	NA	NA	0.003 Uf	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	**2.5**	- -	- -	- -	mg/L	NA	NA	NA	0.250 f	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	- -	*0.056*	0.056	- -	mg/L	NA	NA	NA	0.0002 Uf	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	- -	- -	- -	- -	mg/L	NA	NA	NA	0.010 f	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	- -	- -	- -	- -	mg/L	NA	NA	NA	0.0005 Uf	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	- -	- -	- -	- -	mg/L	NA	NA	NA	0.002 Uf	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	- -	- -	- -	- -	mg/L	NA	NA	NA	0.005 Uf	NA	NA	NA	NA
Miscellaneous																
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	470	410	400	372	372	384	410
Hardness	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	271	219	185	201	156	248	225
Total Dissolved Solids	500 (E)	500 (E)	500	- -	- -	- -	- -	mg/L	NA	680	728	780	792	784	884	1,220
Total Suspended Solids	- -	- -	- -	- -	- -	- -	- -	mg/L	NA	16	22	40	30	28	21	21

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 10/14/20 INJ-01-17_GW10142020	INJ-02-18 10/14/20 INJ-02-18_GW-10142020	MW-01-17 10/15/20 MW-01-17_GW-10152020	MW-03-17 10/13/20 MW-03-17_GW-10132020	MW-04-17 10/13/20 MW-04-17_GW-10132020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.18	7.31	8.27	7.14	7.25
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	216	2.88	5.78	2.46	3.11
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

See Notes on last page.

ARCADIS

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 10/14/20 INJ-01-17_GW10142020	INJ-02-18 10/14/20 INJ-02-18_GW-10142020	MW-01-17 10/15/20 MW-01-17_GW-10152020	MW-03-17 10/13/20 MW-03-17_GW-10132020	MW-04-17 10/13/20 MW-04-17_GW-10132020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	5	NA	8	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	2	NA	11	6
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	265	NA	179	249
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	97,300	NA	102,000	106,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	**15,100**	NA	1,720	**12,400**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	NA	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	27,900	NA	28,300	29,600
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	393	NA	1,330	451
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	NA	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	< 5 U	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	218	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	103,000	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	2,870	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	29,300	NA	NA	NA	NA
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	368	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	416,000	412,000	NA	416,000	428,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	302,000	280,000	NA	282,000	273,000
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	1,260,000	1,260,000	NA	1,250,000	1,220,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	78,000	34,000	NA	18,000	26,000

See Notes on last page.

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Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-40-99 10/15/20 MW-40-99_GW-10152020	MWM16-02 10/15/20 MWM16-02_GW-10152020	MWM16-30 10/15/20 MWM16-30_GW-10152020	MWM16-31 10/16/20 MWM16-31_GW-10162020	MWM16-37 10/16/20 MWM16-37_GW-10162020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.38 [7.38]	7.04	6.83	7.28	7.29 [7.29]
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	30.8 [30.8]	2.38	0.02	0.02	2.48 [2.48]
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U [< 0.1 U]	NA	NA	NA	NA [NA]
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U [< 25 U]
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U	< 10 U [< 10 U]
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U [< 1 U]	< 1 U	6	< 1 U	< 1 U [< 1 U]
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U [< 1 U]	< 1 U	*14*	< 1 U	< 1 U [< 1 U]
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	2	1 [1]
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]

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Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-40-99 10/15/20 MW-40-99_GW-10152020	MWM16-02 10/15/20 MWM16-02_GW-10152020	MWM16-30 10/15/20 MWM16-30_GW-10152020	MWM16-31 10/16/20 MWM16-31_GW-10162020	MWM16-37 10/16/20 MWM16-37_GW-10162020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	6 [9]	NA	NA	NA	NA [NA]
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA [NA]

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Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM31-02 10/16/20 MWM31-02_GW-10162020	MWM32-01 10/16/20 MWM32-01_GW-10162020	MWOS-01 10/16/20 MWOS-01_GW-10162020	MWOS-02 10/16/20 MWOS-02_GW-10162020	MWOS-03 10/16/20 MWOS-03_GW-10162020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.03	6.71	7.17	7.18	6.74
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	3.48	23.5	10	9.73
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	NA	NA	NA	NA	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	NA	NA
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	NA	NA
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	NA	NA
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	NA	NA
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	NA	NA
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	NA	NA
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	NA	NA
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	NA	NA
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	NA	NA

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Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM31-02 10/16/20 MWM31-02_GW-10162020	MWM32-01 10/16/20 MWM32-01_GW-10162020	MWOS-01 10/16/20 MWOS-01_GW-10162020	MWOS-02 10/16/20 MWOS-02_GW-10162020	MWOS-03 10/16/20 MWOS-03_GW-10162020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	703	1,210	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 5 U
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	683	298	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	< 5 U
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA

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Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW01-SEN03 10/15/20 MWW01-SEN03_GW-10152020	MWW01-SEN04 10/13/20 MWW01-SEN04_GW-10132020	MWW10-03 10/14/20 MWW10-03_GW-10142020	MWW1-04 10/16/20 MWW1-04_GW-10162020	MWW10-SEN02 10/16/20 MWW10-SEN02_GW-10162020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.22	7.11	7.03 [7.03]	11.55	6.99
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	5.86	8.23	9.8 [9.8]	6.59	5.3
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	0.2	< 0.1 U [< 0.1 U]	0.2	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	0.2	< 0.1 U [< 0.1 U]	0.2	NA
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U [< 25 U]	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 2 UX	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U [< 10 U]	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U

See Notes on last page.

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Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW01-SEN03 10/15/20 MWW01-SEN03_GW-10152020	MWW01-SEN04 10/13/20 MWW01-SEN04_GW-10132020	MWW10-03 10/14/20 MWW10-03_GW-10142020	MWW1-04 10/16/20 MWW1-04_GW-10162020	MWW10-SEN02 10/16/20 MWW10-SEN02_GW-10162020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	12	NA	NA [NA]	< 1 U	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	4	5	9 [7]	NA	< 2 U
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	96	202	132 [132]	NA	69
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 0.1 U [< 0.1 U]	NA	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U [< 0.5 U]	NA	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	38,600	128,000	NA [NA]	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	NA	9
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	NA	< 5 U
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	9	< 5 U [< 5 U]	NA	< 5 U
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	**9,430**	**20,300**	NA [NA]	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	15	< 3 U [< 3 U]	NA	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	12,900	38,400	NA [NA]	NA	NA
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	195	769	132 [114]	NA	< 5 U
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	< 0.2 U [< 0.2 U]	NA	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	NA	12
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	NA	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U [< 0.5 U]	NA	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U [< 2 U]	NA	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	6	< 5 U
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	NA	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA [NA]	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA [NA]	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	496,000	356,000	NA [NA]	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	101,000	340,000	NA [NA]	NA	NA
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	846,000	1,360,000	NA [NA]	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	26,000	42,000	NA [NA]	NA	NA

See Notes on last page.

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Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW1-15 10/15/20 MWW1-15_GW-10152020	TW-09-01 10/15/20 TW-09-01_GW-10152020	TW-10-02 10/13/20 TW-10-02_GW-10132020	TW-MD-01 10/15/20 TW-MD-01_GW-10152020	TW-MD-02 10/15/20 TW-MD-02_GW-10152020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.65	7.34	6.72	6.93	7.06
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	9.63	8.09	2.9	0.39	7.27
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	NA	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	NA	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	NA	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	NA	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	NA	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	NA	< 2 U	< 2 U

See Notes on last page.

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Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW1-15 10/15/20 MWW1-15_GW-10152020	TW-09-01 10/15/20 TW-09-01_GW-10152020	TW-10-02 10/13/20 TW-10-02_GW-10132020	TW-MD-01 10/15/20 TW-MD-01_GW-10152020	TW-MD-02 10/15/20 TW-MD-02_GW-10152020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	30	< 1 U	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	2	20	NA	2	5
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	143	370	NA	83	199
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	53,500	112,000	NA	108,000	88,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	**6,910**	3,000	NA	**8,480**	**13,200**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	NA	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	27,400	20,700	NA	31,400	18,900
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	216	308	NA	610	854
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	NA	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	7	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	514,000	456,000	NA	424,000	500,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	143,000	303,000	NA	293,000	235,000
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	654,000	740,000	NA	616,000	774,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	15,000	10,000	NA	18,000	29,000

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Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-03 10/14/20 TW-MD-03_GW-10142020	TW-MD-04 10/14/20 TW-MD-04_GW-10142020	TW-MD-05 10/14/20 TW-MD-05_GW-10142020	TW-MD-06 10/14/20 TW-MD-06_GW-10142020	TW-MD-07 10/14/20 TW-MD-07_GW-10142020
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	SU	7.11	6.99	7.17	7.40	6.92
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.98	0.02	7.44	3.59	0.02
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	0.6	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	0.6	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	NA	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

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Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Residential GVIIC	Non-Residential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-03 10/14/20 TW-MD-03_GW-10142020	TW-MD-04 10/14/20 TW-MD-04_GW-10142020	TW-MD-05 10/14/20 TW-MD-05_GW-10142020	TW-MD-06 10/14/20 TW-MD-06_GW-10142020	TW-MD-07 10/14/20 TW-MD-07_GW-10142020
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA	2
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	3	3	5	7	3
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	142	120	97	101	246
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	58,000	63,300	50,800	66,500	134,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Copper*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Iron*	300 (E)	300 (E)	- -	**5,600**	- -	- -	- -	- -	ug/L	**8,580**	**11,800**	**9,240**	**8,200**	**24,300**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	15,300	17,200	23,000	22,300	30,200
Manganese*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	288	440	313	276	470
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Zinc	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000 (E)	1,000 (E)	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Zinc (dissolved)	2,400	5,000 (E)	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	424,000	424,000	402,000	390,000	388,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	159,000	168,000	135,000	194,000	369,000
Total dissolved solids (TDS)	500,000 (E)	500,000 (E)	500,000	- -	- -	- -	- -	- -	ug/L	694,000	658,000	638,000	678,000	1,820,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	22,000	26,000	24,000	18,000	48,000

See Notes on last page.

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	Units	MW-02-17 10/13/20 MW-02-17_GW-10132020	MW-05-18 10/13/20 MW-05-18_GW-10132020	MWF12-01R 10/13/20 MWF12-01R_GW-10132020	MWF12-02 10/13/20 MWF12-02_GW-10132020	MWF16-06 10/15/20 MWF16-06_GW-10152020
Field Parameters																
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	SU	7.19	7.06	7.03	7.11 [7.11]	7.41
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.58	0.02	0.02	0.08 [0.08]	0.02
Volatile Organics																
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 Ur
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	ug/L	< 25 U	< 25 U	NA	< 25 U [< 25 U]	< 25 Ur
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	*13 r*
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	*34 r*
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	ug/L	< 1 U	7	NA	2 [2]	*210 Yr*
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	4 r
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	23 r
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	ug/L	< 1 U	12	NA	< 1 U [< 1 U]	*82 r*
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	2 r
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Ethylbenzene*	74 (E)	74 (E)	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	NA	< 10 U [< 10 U]	< 10 Ur
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 Ur
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 Ur
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	ug/L	3	< 1 U	NA	< 1 U [< 1 U]	127 r
Toluene*	790 (E)	790 (E)	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 Ur
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	ug/L	6	7	NA	< 1 U [< 1 U]	170 Yr
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	ug/L	2	< 1 U	NA	< 1 U [< 1 U]	*24 r*
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U [< 2 U]	< 2 Ur
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 Ur
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	ug/L	< 2 U	< 2 U	NA	< 2 U [< 2 U]	< 2 Ur
Volatile Organics-SIM																
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	ug/L	30	3	107	NA [NA]	20
Inorganics																
Manganese	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	190	868 [1,000]	NA
Inorganics-Filtered																
Manganese (dissolved)	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	194	NA [NA]	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface	Non-Residential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	Units	MWF16-23 10/15/20 MWF16-23_GW-10152020	MWF16-25 10/15/20 MWF16-25_GW-10152020	MWF7-02 10/13/20 MWF7-02_GW-10132020	MWF8-01 10/15/20 MWF8-01_GW-10152020
Field Parameters															
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	SU	6.96	7.11	7.01	6.83
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	NTU	9.76	4.66	0.02	0.02
Volatile Organics															
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	ug/L	< 1 U	1	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	ug/L	1	6	1	2
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	ug/L	6	4	24	< 1 U
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	ug/L	< 1 U	< 1 U	15	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	ug/L	10	9	3	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	ug/L	1	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	ug/L	< 1 U	< 1 U	70	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	ug/L	10	4	77	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	ug/L	< 1 U	< 1 U	1	< 1 U
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	ug/L	*21*	< 1 U	3	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
Volatile Organics-SIM															
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	ug/L	1	< 1 U	530 Y	NA
Inorganics															
Manganese	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Inorganics-Filtered															
Manganese (dissolved)	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 10/14/21 INJ-01-17_GW-10142021	INJ-02-18 10/14/21 INJ-02-18_GW-10142021	MW-01-17 10/15/21 MW-01-17_GW-10152021	MW-03-17 10/14/21 MW-03-17_GW-10142021	MW-04-17 10/14/21 MW-04-17_GW-10142021
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.0	7.14	7.62	7.04	6.98
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	1.66	22.5	2.08	0.02	2.39
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 10/14/21 INJ-01-17_GW-10142021	INJ-02-18 10/14/21 INJ-02-18_GW-10142021	MW-01-17 10/15/21 MW-01-17_GW-10152021	MW-03-17 10/14/21 MW-03-17_GW-10142021	MW-04-17 10/14/21 MW-04-17_GW-10142021
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	2	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	4	4	NA	18	8
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	278	270	NA	394	297
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	142,000	143 ,000	NA	146,000	144,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	40	NA	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	**19,700**	**21,400**	NA	**8,630**	**19,100**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	NA	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	33,900	33,900	NA	34,700	34,400
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	640	623	NA	1,000	698
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	NA	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U	< 5 U
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	18	< 5 U	NA	< 5 U	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	3	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	268	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	650	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	396,000	392,000	NA	412,000	402,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	380,000	365,000	NA	435,000	370,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	1,970,000	1,950,000	NA	1,920,000	1,960,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	41,000	40,000	NA	17,000	40,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-40-99 10/15/21 MW-40-99_GW-10152021	MW-40-99 10/15/21 DUP-04_GW-10152021	MWM16-02 10/12/21 MWM16-02_101221	MWM16-30 10/12/21 MWM16-30_101221	MWM16-31 10/12/21 MWM16-31_101221
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.04		7.12	6.90	7.22
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	45.8		2.28	1.75	2.59
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	NA	NA	NA
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	6	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	*12*	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-40-99 10/15/21 MW-40-99_GW-10152021	MW-40-99 10/15/21 DUP-04_GW-10152021	MWM16-02 10/12/21 MWM16-02_101221	MWM16-30 10/12/21 MWM16-30_101221	MWM16-31 10/12/21 MWM16-31_101221
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	1 [1]	1	NA	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-37 10/13/21 MWM16-37_GW-10132021	MWM2-23 10/13/21 MWM2-23_GW-10132021	MWM2-28 10/13/21 MWM2-28_101321	MWM31-02 10/13/21 MWM31-02_101321	MWM32-01 10/13/21 MWM32-01_GW-10132021
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.26	6.88	7.33	7.16	6.97
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	3.67	0.80	1.26	1.78	3.95
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U [< 25 U]	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U [< 1 U]	18 [28]	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U [< 1 U]	5 [9]	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U [< 10 U]	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U [< 1 U]	27 [39]	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U [< 1 U]	2 [2]	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U [< 1 U]	5 [7]	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	2 [2]	*3 [5]*	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U [< 2 U]	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U [< 2 U]	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-37 10/13/21 MWM16-37_GW-10132021	MWM2-23 10/13/21 MWM2-23_GW-10132021	MWM2-28 10/13/21 MWM2-28_101321	MWM31-02 10/13/21 MWM31-02_101321	MWM32-01 10/13/21 MWM32-01_GW-10132021
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA [NA]	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWOS-01 10/12/21 MWOS-01_101221	MWOS-02 10/12/21 MWOS-02_101221	MWOS-03 10/13/21 MWOS-03_101321	MWW01-SEN03 10/12/21 MWW01-SEN03_GW-10122021	MWW01-SEN04 10/15/21 MWW01-SEN04_GW-10152021
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.03	7.17	6.73	7.23	7.18
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	14.3	4.18	1.39	17.7	40
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	0.1
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	NA	NA	< 0.1 U	< 0.1 U	0.1
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	NA	NA	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	NA	NA	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	NA	NA	2	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	NA	NA	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	NA	NA	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	1	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	NA	NA	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	NA	NA	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	NA	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	NA	NA	< 2 U	< 2 U

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWOS-01 10/12/21 MWOS-01_101221	MWOS-02 10/12/21 MWOS-02_101221	MWOS-03 10/13/21 MWOS-03_101321	MWW01-SEN03 10/12/21 MWW01-SEN03_GW-10122021	MWW01-SEN04 10/15/21 MWW01-SEN04_GW-10152021
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	22	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	5	6
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	111	164
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	45,900	100,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	8	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	< 5 U
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	10	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	**11,400**	**17,000**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 3 U	4
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	15,300	28,800
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	78	530	NA	260	686
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	0.3	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	8	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	< 5 U	< 5 U	< 5 U
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	7	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	4	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	101	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 1 U	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 0.5 U	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 3 U	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	67	337	NA	271	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	< 0.2 U	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 0.5 U	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 2 U	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	< 5 U	< 5 U	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	< 5 U	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	454,000	424,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	128,000	246
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	1,010,000	1,320,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	42,000	35,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW10-03 10/15/21 MWW10-03_GW-10152021	MWW10-03 10/15/21 DUP-03_GW-10152021	MWW1-04 10/13/21 MWW1-04_GW-10132021	MWW10-SEN02 10/12/2021 and 10/15/2021 MWW10-SEN02_GW-10122021	MWW1-15 10/15/21 MWW1-15_10152021
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.99		9.61	6.90	7.57
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	14		1.80	1.97	12.50
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U [< 1 U]		< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U [< 1 U]		< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 5 U [< 5 U]	< 5 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U [< 10 U]		< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]		< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U [< 1 U]		< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW10-03 10/15/21 MWW10-03_GW-10152021	MWW10-03 10/15/21 DUP-03_GW-10152021	MWW1-04 10/13/21 MWW1-04_GW-10132021	MWW10-SEN02 10/12/2021 and 10/15/2021 MWW10-SEN02_GW-10122021	MWW1-15 10/15/21 MWW1-15_10152021
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA [NA]	NA	< 1 U	NA	NA
Inorganics														
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 2 U	3
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	73	209
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	56,000	129,000	102,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	6	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 5 U	< 5 U
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	30	100	**11,200**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U [< 3 U]	< 3 U	NA	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	2,170	35,300	47,700
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	61 [59]	59	NA	< 5 U	305
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	0.4	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	9	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	< 5 U	< 5 U	< 5 U
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	< 5 U	< 5 U
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA [NA]	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	90,000	678,000	430,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	145,000	389,000	250,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	328,000	934,000	1,110,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA [NA]	NA	< 3,000 U	108,000	24,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-09-01 10/15/21 TW-09-01_GW-10152021	TW-10-02 12/14/21 TW-10-02_GW-121421	TW-MD-01 10/14/21 TW-MD-01_GW-10142021	TW-MD-02 10/14/21 TW-MD-02_GW-10142021	TW-MD-03 10/14/21 TW-MD-03_GW-10142021
Field Parameters														
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.09	6.61	6.64	6.95	7.05
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	2.20	2.62	0.02	3.02	3.45
PCBs														
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	NA	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics														
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	NA	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	NA	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	NA	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	NA	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	NA	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	NA	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-09-01 10/15/21 TW-09-01_GW-10152021	TW-10-02 12/14/21 TW-10-02_GW-121421	TW-MD-01 10/14/21 TW-MD-01_GW-10142021	TW-MD-02 10/14/21 TW-MD-02_GW-10142021	TW-MD-03 10/14/21 TW-MD-03_GW-10142021
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	93	< 1 U	NA	NA
Inorganics										NA				
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	25	NA	< 2 U	5	< 2 U
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	510	NA	127	231	141
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	149,000	NA	160,000	198,000	115,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	5,050	NA	1,260	**11,300**	**8,480**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	NA	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	30,600	NA	34,700	40,400	27,600
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	727	NA	725	912	741
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	NA	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	12	10	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	< 5 U	< 5 U	< 5 U
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	8	7	6
Inorganics-Filtered														
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	400,000	NA	430,000	428,000	474,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	364,000	NA	438,000	547,000	308,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	914,000	NA	1,300,000	1,270,000	840,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	13,000	NA	< 3,000 U	21,000	19,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-04 10/14/21 TW-MD-04_GW-10142021	TW-MD-05 10/14/21 TW-MD-05_GW-10142021	TW-MD-06 10/14/21 TW-MD-06_GW-10142021	TW-MD-07 10/14/21 TW-MD-07_GW-10142021
Field Parameters													
pH	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.15	7.31	7.12	6.86
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.02	0.02	6.13
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	0.9	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	- -	- -	ug/L	< 0.1 U	< 0.1 U	0.9	< 0.1 U
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-04 10/14/21 TW-MD-04_GW-10142021	TW-MD-05 10/14/21 TW-MD-05_GW-10142021	TW-MD-06 10/14/21 TW-MD-06_GW-10142021	TW-MD-07 10/14/21 TW-MD-07_GW-10142021
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	2
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	4	5	7	< 2 U
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	138	86	118	365
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	85,300	46,800	76,900	176,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Copper*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	**11,700**	**8,210**	**9,840**	**34,600**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	22,300	20,100	24,500	32,700
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	462	287	419	547
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Zinc	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	5
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1000	1000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	512,000	466,000	396,000	286,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	229,000	123,000	216,000	468,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	788,000	740,000	730,000	3,040,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	25,000	17,000	20,000	59,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	Units	MW-02-17 10/19/21 MW-02-17_GW-10192021	MW-05-18 10/18/21 MW-05-18_GW-10182021	MWF12-01R 10/18/21 MWF12-01R_GW-10182021	MWF16-06 10/18/21 MWF16-06_GW-10182021
Field Parameters															
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	SU	7.20	7.16	6.97	7.78
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	NTU	4.76	5.76	4.78	9.02
Volatile Organics															
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	ug/L	< 25 U	< 25 U	< 25 U [< 25 U]	< 25 U
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	*10*
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	*18*
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	ug/L	1	6	5 [5]	19
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	4
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	ug/L	< 1 U	10	< 1 U [< 1 U]	4
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U [< 10 U]	< 10 U
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	ug/L	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	ug/L	5	< 1 U	< 1 U [< 1 U]	56
Toluene*	790 (E)	790 (E)	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	ug/L	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	ug/L	2	4	40 [41]	106
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	ug/L	7	< 1 U	< 1 U [< 1 U]	5
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	ug/L	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U
Volatile Organics-SIM															
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	ug/L	5	2	83 [86]	5
Inorganics															
Manganese	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	150 [142]	NA
Inorganics-Filtered															
Manganese (dissolved)	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	140 [142]	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	MWF16-23 10/13/21 MWF16-23_GW-10132021	MWF16-25 10/13/21 MWF16-25_101321	MWF7-02 10/18/21 MWF7-02_GW-10182021	MWF8-01 10/18/21 MWF8-01_GW-10182021
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	6.88	7.22	7.15	7.06
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.43	3.79	5.58	4.02
Volatile Organics														
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	< 1 U	3	< 1 U	1
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	4	5	29	< 1 U
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	< 1 U	< 1 U	11	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	3	22	3	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	< 1 U	2	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74 (E)	74 (E)	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	< 1 U	< 1 U	< 5 U	< 5 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40 (E)	40 (E)	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	< 1 U	< 1 U	84	< 1 U
Toluene*	790 (E)	790 (E)	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	11	3	95	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	< 1 U	< 1 U	1	< 1 U
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	*18*	< 1 U	4	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280 (E)	280 (E)	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	< 2 U	< 2 U	< 2 U	< 2 U
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	2	3	141	NA
Inorganics														
Manganese	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	NA	NA	NA	NA
Inorganics-Filtered														
Manganese (dissolved)	50 (E)	50 (E)	1,300	**2,500**	- -	- -	- -	- -	- -	- -	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 09/26/22 INJ-01-17_GW-092622	INJ-02-18 09/26/22 INJ-02-18_GW-092622	MW-01-17 09/26/22 MW-01-17_GW-092622	MW-03-17 09/26/22 MW-03-17_GW-092622
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.13	7.14	7.84	7.02
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	50.30	0.02	0.45	0.67
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U	< 0.1 U	NA	< 0.1 U
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	INJ-01-17 09/26/22 INJ-01-17_GW-092622	INJ-02-18 09/26/22 INJ-02-18_GW-092622	MW-01-17 09/26/22 MW-01-17_GW-092622	MW-03-17 09/26/22 MW-03-17_GW-092622
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	4	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	5	7	NA	22
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	281	259	NA	283
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	126,000	125,000	NA	122,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	13	NA	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	**21,600**	**19,600**	NA	**12,300**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	NA	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	33,100	31,300	NA	30,700
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	576	540	NA	707
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	NA	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	NA	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	5	5	NA	< 5 U
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	350,000	350,000	NA	346,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	309,000	308,000	NA	298,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	1,610,000	1,730,000	NA	1,630,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	43,000	38,000	NA	18,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-04-17 09/26/22 MW-04-17_GW-092622	MW-40-99 09/27/22 MW-40-99_GW-092722	MWM16-02 09/28/22 MWM16-02_GW-092822	MWM16-30 09/29/22 MWM16-30_GW-092922
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.03	7.01	7.04	6.83
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	2.81	2.40	0.02	0.02
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U [< 25 U]	< 25 U	< 25 U [< 25 U]
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U [< 10 U]	< 10 U	< 10 U [< 10 U]
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	6 [6]
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	*11 [12]*
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U [< 2 U]
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U [< 2 U]

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-04-17 09/26/22 MW-04-17_GW-092622	MW-40-99 09/27/22 MW-40-99_GW-092722	MWM16-02 09/28/22 MWM16-02_GW-092822	MWM16-30 09/29/22 MWM16-30_GW-092922
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	6 [6]	NA	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	13	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	245	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	118,000	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	**12,500**	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	30,000	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	564	NA	NA	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	5	NA	NA	NA
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	346,000	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	295,000	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	1,560,000	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	28,000	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-31 09/28/22 MWM16-31_GW-092822	MWM16-37 09/29/22 MWM16-37_GW-092922	MWM2-22 09/28/22 MWM2-22_GW-092822	MWM2-28 09/28/22 MWM2-28_GW-092822
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.10	7.15	6.84	7.23
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.70	0.95	0.49	0.02
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	NA	NA	NA
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U [< 25 U]	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U [< 1 U]	27	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U [< 1 U]	14	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U [< 10 U]	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U [< 1 U]	42	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U [< 1 U]	5	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U [< 1 U]	*15*	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	2	2 *[3]*	*18*	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-31 09/28/22 MWM16-31_GW-092822	MWM16-37 09/29/22 MWM16-37_GW-092922	MWM2-22 09/28/22 MWM2-22_GW-092822	MWM2-28 09/28/22 MWM2-28_GW-092822
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM31-02 09/29/22 MWM31-02_GW-092922	MWM32-01 09/29/22 MWM32-01_GW-092922	MWOS-01 10/03/22 MWOS-01_GW-100322	MWOS-02 09/30/22 MWOS-02_GW-093022
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.18	6.78	6.98	7.01
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.98	3.75	1.46
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	NA	NA	NA
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM31-02 09/29/22 MWM31-02_GW-092922	MWM32-01 09/29/22 MWM32-01_GW-092922	MWOS-01 10/03/22 MWOS-01_GW-100322	MWOS-02 09/30/22 MWOS-02_GW-093022
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	424	380
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	293	315
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWOS-03 10/03/22 MWOS-03_GW-100322	MWW1-04 09/29/22 MWW1-04_GW-092922	MWW01-SEN03 09/28/22 MWW01-SEN03_GW-092822	MWW01-SEN04 09/28/22 MWW01-SEN04_GW-092822
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.45	10.84	7.11	7.11
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	1.67	1.53	1.68	1.16
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	0.2	< 0.1 U	0.1
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U	0.2	< 0.1 U	0.1
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	1	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWOS-03 10/03/22 MWOS-03_GW-100322	MWW1-04 09/29/22 MWW1-04_GW-092922	MWW01-SEN03 09/28/22 MWW01-SEN03_GW-092822	MWW01-SEN04 09/28/22 MWW01-SEN04_GW-092822
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	< 1 U	8	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	5	6
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	115	155
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	71,500	48,600	115,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	6	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	30	**17,300**	**11,300**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	< 3 U	12
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	900	13,500	35,900
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	308	454
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	5	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	7	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	5	< 5 U
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	120,000	306,000	304,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	183,000	124,000	305,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	416,000	1,230,000	1,060,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 3,000 U	38,000	25,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW10-03 09/27/22 MWW10-03_GW-092722	MWW1-15 09/26/22 MWW1-15_GW-092622	MWW5-01R 09/28/22 MWW5-01R_GW-092822	TW-09-01 09/28/22 TW-09-01_GW-092822
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.70	7.35	6.96	6.99
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	131.00	1.09	0.02	5.74
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U [< 5 U]	< 5 U	43	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWW10-03 09/27/22 MWW10-03_GW-092722	MWW1-15 09/26/22 MWW1-15_GW-092622	MWW5-01R 09/28/22 MWW5-01R_GW-092822	TW-09-01 09/28/22 TW-09-01_GW-092822
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	4	28	34
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	248	129	387
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	136,000	187,000	122,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	**12,100**	**10,000**	**10,100**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	95 [28]	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	50,800	31,000	29,700
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	**11,000 [4,450]**	368	634	981
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	6	8
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U [< 3 U]	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	84 [77]	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	482,000	508,000	414,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	355,000	488,000	318,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	1,250,000	1,100,000	920,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	26,000	33,000	31,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-10-02 09/27/22 TW-10-02_GW-092722	TW-MD-01 09/26/22 TW-MD-01_GW-092622	TW-MD-02 09/27/22 TW-MD-02_GW-092722	TW-MD-03 09/27/22 TW-MD-03_GW-092722
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.57	6.91	6.87	6.93
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.02	1.89	0.39
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	NA	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	NA	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	NA	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	NA	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	NA	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	NA	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	NA	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	NA	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	NA	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	NA	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	NA	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	NA	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	NA	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	NA	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	NA	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	NA	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	NA	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	NA	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	NA	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	NA	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	NA	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	NA	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	NA	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	NA	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	NA	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	NA	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	NA	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	NA	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	NA	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	NA	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	NA	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	NA	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	NA	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	NA	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	NA	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	NA	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	NA	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	NA	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	NA	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	NA	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	NA	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	NA	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	NA	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	NA	< 2 U	< 2 U	< 2 U

Location ID: / Date Collected: / Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-10-02 09/27/22 TW-10-02_GW-092722	TW-MD-01 09/26/22 TW-MD-01_GW-092622	TW-MD-02 09/27/22 TW-MD-02_GW-092722	TW-MD-03 09/27/22 TW-MD-03_GW-092722
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	29	2	NA	NA
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	2	8	4
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	92	228	106
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	113,000	128,000	128,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	1,750	**9,520**	**8,700**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	28,800	24,200	25,800
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	498	968	1,640
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	10	12	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	9	5	7
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	416,000	344,000	338,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	287,000	302,000	332,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	1,188,000	1,390,000	1,390,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	3,000	18,000	17,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-04 09/27/22 TW-MD-04_GW-092722	TW-MD-05 09/27/22 TW-MD-05_GW-092722	TW-MD-06 09/27/22 TW-MD-06_GW-092722	TW-MD-07 09/27/22 TW-MD-07_GW-092722
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.20	7.22	7.16	6.98
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	0.02	0.02	0.02
PCBs													
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	0.6	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U	< 0.1 U	0.6	< 0.1 U
Volatile Organics													
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	- -	- -	*2,000*	8,100	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	170,000	170,000	*2,700*	26,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
o-Xylene	NA	NA	NA	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-MD-04 09/27/22 TW-MD-04_GW-092722	TW-MD-05 09/27/22 TW-MD-05_GW-092722	TW-MD-06 09/27/22 TW-MD-06_GW-092722	TW-MD-07 09/27/22 TW-MD-07_GW-092722
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	1
Inorganics													
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	6	6	8	3
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	130	124	198	188
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	84,400	60,600	107,000	118,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	< 5 U	9	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	**11,700**	**10,400**	**11,300**	**16,800**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	< 3 U	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	19,500	18,700	34,500	32,500
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	356	398	437	433
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	5	< 5 U	< 5 U	< 5 U
Inorganics-Filtered													
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	318,000	264,000	308,000	318,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	212,000	138,000	268,000	309,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	1,300,000	1,190,000	1,260,000	1,220,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	26,000	22,000	20,000	22,000

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	Units	MW-02-17 09/22/22 MW-02-17_GW-092222	MW-05-18 09/20/22 MW-05-18_GW-092022	MWF12-01R 09/22/22 MWF12-01R_GW-092222
Field Parameters														
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	SU	7.10	7.37	6.90
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.34	2.42	0.27
Volatile Organics														
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	ug/L	< 50 U	< 50 U	< 50 U
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	ug/L	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	ug/L	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	ug/L	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	ug/L	< 5 U	< 5 U	< 5 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	ug/L	< 25 U	< 25 U	< 25 U
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	ug/L	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	ug/L	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	ug/L	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	ug/L	< 5 U	< 5 U	< 5 U
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	ug/L	< 1 U	< 1 U	< 1 U
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	ug/L	< 5 U	< 5 U	< 5 U
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	ug/L	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	ug/L	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	ug/L	< 5 U	< 5 U	< 5 U
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	ug/L	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	ug/L	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	ug/L	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	ug/L	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	ug/L	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	ug/L	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	ug/L	2	5	5
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	ug/L	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	ug/L	< 1 U	< 1 U	1
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	ug/L	< 1 U	11	< 1 U
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	ug/L	< 1 U	< 1 U	< 1 U
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	ug/L	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	ug/L	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U
Ethylbenzene*	74	74	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	ug/L	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	ug/L	< 1 U	< 1 U	< 1 U
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	ug/L	< 50 U	< 50 U	< 50 U
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	ug/L	< 50 U	< 50 U	< 50 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	ug/L	< 5 U	< 5 U	< 5 U
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	ug/L	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	ug/L	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	ug/L	8	< 1 U	< 1 U
Toluene*	790	790	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	ug/L	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	ug/L	< 5 U	< 5 U	< 5 U
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	ug/L	6	7	47
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	ug/L	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	ug/L	2	1	< 1 U
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	ug/L	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	ug/L	< 1 U	< 1 U	< 1 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	ug/L	< 2 U	< 2 U	< 2 U
Volatile Organics-SIM														
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	ug/L	5	< 1 U	40
Inorganics														
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	801
Inorganics-Filtered														
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	698

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	MWF12-02R 09/21/22 MWF12-02R_GW-092122	MWF16-06 09/22/22 MWF16-06_GW-092222	MWF16-23 09/20/22 MWF16-23_GW-092022
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	6.98	7.52	7.25
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1.09	0.02	2.45
Volatile Organics													
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	< 25 U [< 25 U]	< 25 U	< 25 U [< 25 U]
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	< 1 U [< 1 U]	*9*	< 1 U [< 1 U]
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	< 1 U [< 1 U]	*15*	< 1 U [< 1 U]
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	< 1 U [< 1 U]	1	< 1 U [< 1 U]
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	< 1 U [< 1 U]	*95*	7 [7]
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	< 1 U [< 1 U]	2	< 1 U [< 1 U]
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	< 1 U [< 1 U]	10	< 1 U [< 1 U]
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	< 1 U [< 1 U]	29	12 [12]
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	< 1 U [< 1 U]	< 1 U	2 [2]
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Ethylbenzene*	74	74	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 10 U [< 10 U]	< 10 U	< 10 U [< 10 U]
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	< 50 U [< 50 U]	< 50 U	< 50 U [< 50 U]
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	< 1 U [< 1 U]	63	< 1 U [< 1 U]
Toluene*	790	790	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	< 5 U [< 5 U]	< 5 U	< 5 U [< 5 U]
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	< 1 U [< 1 U]	135	13 [13]
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	< 1 U [< 1 U]	*9*	*17 [18]*
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 2 U [< 2 U]	< 2 U	< 2 U [< 2 U]
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U [< 1 U]	< 1 U	< 1 U [< 1 U]
Total Xylenes*	280	280	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	< 2 U [< 2 U]	< 2 U	< 2 U [< 2 U]
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	NA	8	2 [1]
Inorganics													
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	256 [252]	NA	NA
Inorganics-Filtered													
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	NA	NA	NA

Location ID: Date Collected: Sample Name:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE	MWF16-25 09/23/22 MWF16-25_GW092322	MWF7-02 09/20/22 MWF7-02_GW-092022	MWF8-01 09/22/22 MWF8-01_GW-092222
Field Parameters													
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	7.24	7.47	6.80
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	6.20	0.89	0.47
Volatile Organics													
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	< 50 U	< 50 U	< 50 U [< 50 U]
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	< 1 U	< 1 U	< 1 U [< 1 U]
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	< 1 U	< 1 U	< 1 U [< 1 U]
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	< 1 U	< 1 U	< 1 U [< 1 U]
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	< 5 U	< 5 U	< 5 U [< 5 U]
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	< 25 U	< 25 U	< 25 U [< 25 U]
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	< 5 U	< 5 U	< 5 U [< 5 U]
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	< 1 U	< 1 U	< 1 U [< 1 U]
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	< 1 U	< 1 U	< 1 U [< 1 U]
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	< 5 U	< 5 U	< 5 U [< 5 U]
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	< 1 U	< 1 U	< 1 U [< 1 U]
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	< 5 U	< 5 U	< 5 U [< 5 U]
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	< 5 U	< 5 U	< 5 U [< 5 U]
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	3	1	1 [< 1 U]
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	< 5 U	< 5 U	< 5 U [< 5 U]
Cyclohexane	- -	- -	- -	- -	*2,600*	*1,400*	53,000	24,000	55,000	36,000	< 1 U	< 1 U	< 1 U [< 1 U]
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	< 5 U	< 5 U	< 5 U [< 5 U]
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	< 1 U	< 1 U	< 1 U [< 1 U]
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	< 1 U	< 1 U	< 1 U [< 1 U]
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	< 1 U	< 1 U	< 1 U [< 1 U]
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	< 1 U	< 1 U	< 1 U [< 1 U]
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	4	12	< 1 U [< 1 U]
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	< 1 U	1	< 1 U [< 1 U]
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	< 1 U	15	< 1 U [< 1 U]
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	38	2	< 1 U [< 1 U]
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	3	< 1 U	< 1 U [< 1 U]
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	< 5 U	< 5 U	< 5 U [< 5 U]
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	< 1 U	< 1 U	< 1 U [< 1 U]
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U [< 1 U]
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U [< 1 U]
Ethylbenzene*	74	74	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	< 1 U	< 1 U	< 1 U [< 1 U]
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	< 1 U	< 1 U	< 1 U [< 1 U]
Methyl acetate	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 10 U	< 10 U	< 10 U [< 10 U]
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	< 50 U	< 50 U	< 50 U [< 50 U]
Methyl cyclohexane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U [< 1 U]
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	< 50 U	< 50 U	< 50 U [< 50 U]
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	< 5 U	< 5 U	< 5 U [< 5 U]
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	< 1 U	< 1 U	< 1 U [< 1 U]
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	< 1 U	< 1 U	< 1 U [< 1 U]
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	< 1 U	115	< 1 U [< 1 U]
Toluene*	790	790	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	< 1 U	< 1 U	< 1 U [< 1 U]
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	< 5 U	< 5 U	< 5 U [< 5 U]
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	3	115	< 1 U [< 1 U]
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	< 1 U	1	< 1 U [< 1 U]
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	< 1 U	5	< 1 U [< 1 U]
Trifluorotrichloroethane (Freon 113)	170,000	170,000	32	- -	*7,100*	*3,600*	140,000	58,000	170,000	88,000	< 1 U	< 1 U	< 1 U [< 1 U]
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	< 1 U	< 1 U	< 1 U [< 1 U]
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 2 U	< 2 U	< 2 U [< 2 U]
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	< 1 U	< 1 U	< 1 U [< 1 U]
Total Xylenes*	280	280	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	< 2 U	< 2 U	< 2 U [< 2 U]
Volatile Organics-SIM													
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	< 1 U	201 E	NA
Inorganics													
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	NA	NA	NA
Inorganics-Filtered													
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	- -	- -	NA	NA	NA

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-01-17 09/18/23	INJ-01-17 09/21/23	INJ-02-18 09/25/23	MW-03-17 09/21/23	MW-04-17 09/21/23	MW-40-99 09/19/23	MWM16-02 09/14/23	MWM16-30 09/14/23
Field Parameters																	
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.81	7.59	6.99	7.42	7.40	7.31	7.15	6.88
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	5.78	8.38	0.33	6.12	9.32	6.33	2.30	0.11
PCBs																	
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	NA	NA
Volatile Organics																	
1,1,1,2-Tetrachloroethane	77	320	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	5
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2,3-Trichlorobenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2,3-Trichloropropane	42	120	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2,3-Trimethylbenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2,4-Trimethylbenzene	63	63	17	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,3,5-Trimethylbenzene	72	72	45	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U [< 25 U]	< 25 U	< 25 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
2-Methylnaphthalene	260	750	19	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
2-Phenylbutane (sec-Butylbenzene)	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U
Acrylonitrile	2.6	11	2	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromobenzene	18	50	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Chlorobromomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Cymene (p-Isopropyltoluene)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Dibromomethane	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Ethyl ether	10	10	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U [< 10 U]	< 10 U	< 10 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Hexachloroethane	7.3	21	6.7	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Iodomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MW-01-17 09/18/23	INJ-01-17 09/21/23	INJ-02-18 09/25/23	MW-03-17 09/21/23	MW-04-17 09/21/23	MW-40-99 09/19/23	MWM16-02 09/14/23	MWM16-30 09/14/23
Methyl tert butyl ether (MBTE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
Naphthalene	520	1500	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U
N-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
N-Propylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
tert-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Tetrahydrofuran	95	270	11,000						ug/L	< 90 U	< 90 U	< 90 U	< 90 U	< 90 U	< 90 U [< 90 U]	< 90 U	< 90 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
trans-1,4-Dichloro-2-butene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	*10*
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 UJ	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U
Volatile Organics-SIM																	
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	6	< 1 U	NA	< 1 U	< 1 UB	< 2 UB [< 2 UB]	NA	NA
Inorganics																	
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	10	9	54	18	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	112	84	104	105	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	80,600	65,800	74,100	73,200	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	**15,100**	**5,910**	**9,010**	**8,520**	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	< 3 U	< 3 U	< 3 U	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	19,600	16,600	17,200	18,700	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	379	290	423	419	NA	NA	NA
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U	< 2 U	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	NA	NA	NA
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	30	9	8	< 5 U	NA	NA	NA
Inorganics-Filtered																	
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																	
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	256,000	322,000	304,000	258,000	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	290,000	210,000	254,000	258,000	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	596,000	572,000	550,000	580,000	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	73,200	13,000	13,100	77,600	NA	NA	NA

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-31 09/14/23	MWM16-37 09/14/23	MWM2-22 09/25/23	MWM2-28 09/25/23	MWM31-02 09/19/23	MWM32-01 09/14/23	MWOS-01 09/13/23	MWOS-02 09/13/23
Field Parameters																	
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	7.18	7.27	6.89	7.11	7.10	7.09	7.02	7.18
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	1.79	9.71	0.02	0.02	4.41	3.82	8.95	9.43
PCBs																	
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organics																	
1,1,1,2-Tetrachloroethane	77	320	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U [< 1 U]	16 [16]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trichlorobenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,3-Trichloropropane	42	120	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trimethylbenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,4-Trimethylbenzene	63	63	17	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3,5-Trimethylbenzene	72	72	45	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U [< 25 U]	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
2-Methylnaphthalene	260	750	19	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Phenylbutane (sec-Butylbenzene)	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U [< 50 U]	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acrylonitrile	2.6	11	2	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromobenzene	18	50	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobromomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U [< 1 U]	14 [14]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cymene (p-Isopropyltoluene)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromomethane	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Ethyl ether	10	10	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U [< 10 U]	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachloroethane	7.3	21	6.7	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Iodomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWM16-31 09/14/23	MWM16-37 09/14/23	MWM2-22 09/25/23	MWM2-28 09/25/23	MWM31-02 09/19/23	MWM32-01 09/14/23	MWOS-01 09/13/23	MWOS-02 09/13/23
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	520	1500	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U [< 5 U]	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
N-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
N-Propylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U [< 1 U]	8 [9]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrahydrofuran	95	270	11,000						ug/L	< 90 U	< 90 U [< 90 U]	< 90 U [< 90 U]	< 90 U	< 90 U	< 90 U	< 90 U	< 90 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U [< 2 U]	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,4-Dichloro-2-butene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U [< 1 U]	8 [9]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	1	2 [2]	*12 [12]*	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Volatile Organics-SIM																	
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																	
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	144	311
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics-Filtered																	
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	110	307
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																	
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	MWOS-03 09/13/23	MWW01-SEN03 09/21/23	MWW01-SEN04 09/18/23	MWW10-03 09/15/23	MWW1-04 09/15/23	MWW1-15 09/18/23	MWW5-01R 09/21/23	TW-09-01 09/25/23
Field Parameters																	
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.62	7.30	7.30	6.96	10.38	7.35	6.92	7.17
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	5.54	9.88	5.40	0.02	6.99	6.39	3.54	0.02
PCBs																	
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	0.1	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U [< 0.1 U]	*0.1*	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics																	
1,1,1,2-Tetrachloroethane	77	320	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trichlorobenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2,3-Trichloropropane	42	120	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trimethylbenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2,4-Trimethylbenzene	63	63	17	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,3,5-Trimethylbenzene	72	72	45	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	< 25 U	< 25 U	< 25 U	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
2-Methylnaphthalene	260	750	19	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
2-Phenylbutane (sec-Butylbenzene)	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	< 50 U	< 50 U	< 50 U	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U
Acrylonitrile	2.6	11	2	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromobenzene	18	50	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobromomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	11	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Cymene (p-Isopropyltoluene)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Dibromomethane	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Ethyl ether	10	10	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	< 10 U	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U	< 10 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Hexachloroethane	7.3	21	6.7	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Iodomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U

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Methyl tert butyl ether (MBTE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	520	1500	11	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	< 5 U [< 5 U]	7	< 5 U	< 5 U	< 5 U
N-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
N-Propylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
tert-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Tetrahydrofuran	95	270	11,000						ug/L	< 90 U	< 90 U	< 90 U	< 90 U [< 90 U]	< 90 U	< 90 U	< 90 U	< 90 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	< 2 U	< 2 U	< 2 U	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,4-Dichloro-2-butene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	< 1 U	< 1 U	< 1 U	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U
Volatile Organics-SIM																	
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	NA	4	NA	NA	< 1 U	NA	NA	NA
Inorganics																	
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	NA	< 5 U	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	5	5	NA	NA	4	45	16
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	182	215	NA	NA	241	123	236
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	NA	NA	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	NA	NA	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	78,700	135,000	NA	56,800	116,000	150,000	165,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	29	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	**22,400**	**11,400**	NA	560	**13,400**	**13,400**	4,800
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	20	< 3 U [< 3 U]	NA	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	40,600	42,600	NA	1,470	35,800	32,900	27,000
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	451	409	480 J [245 J]	NA	354	825	543
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	< 0.2 U	NA	NA	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	NA	NA	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	NA	NA	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	< 5 U	NA	8	< 5 U	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	11	< 5 U	NA	NA	< 5 U	< 5 U	< 5 U
Inorganics-Filtered																	
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	< 5 U	NA	NA	NA	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous																	
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	316,000	346,000	NA	64,000	346,000	588,000	622,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	340,000	514,000	NA	160,000	444,000	514,000	529,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	1,570,000	1,670,000	NA	340,000	1,490,000	942,000	1,160,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	49,200	23,600	NA	15,400	27,800	31,200	12,600

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP	Units	TW-10-02 09/18/23	TW-MD-01 09/19/23	TW-MD-02 09/19/23	TW-MD-03 09/19/23	TW-MD-05 09/20/23	TW-MD-07 09/19/23
Field Parameters															
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	SU	6.51	6.90	7.04	6.99	7.36	6.90
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	NTU	6.91	0.65	1.24	2.33	3.05	8.83
PCBs															
Aroclor-1016 (PCB-1016)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1221 (PCB-1221)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1232 (PCB-1232)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1242 (PCB-1242)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1248 (PCB-1248)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1254 (PCB-1254)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Aroclor-1260 (PCB-1260)	0.5	0.5	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Total PCBs	0.5	0.5	0.2	- -	45	45	*0.031*	0.97	ug/L	NA	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
Volatile Organics															
1,1,1,2-Tetrachloroethane	77	320	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	200	200	89	- -	660,000	1,300,000	*14,000*	19,000	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	12,000	77,000	*71*	170	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	17,000	110,000	*14*	20	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	1,000,000	2,300,000	*130*	300	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	7	7	130	- -	200	1,300	*330*	480	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trichlorobenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,3-Trichloropropane	42	120	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trimethylbenzene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	300,000	300,000	*110*	160	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,4-Trimethylbenzene	63	63	17	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	220	1,200	*0.00045*	0.021	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	2,400	15,000	*3.8*	8.9	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	160,000	160,000	*11,000*	16,000	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	9,600	59,000	*41*	97	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	5	5	230	- -	16,000	36,000	*74*	110	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3,5-Trimethylbenzene	72	72	45	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	18,000	41,000	*75*	110	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	16,000	74,000	*170*	400	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	240,000,000	240,000,000	*4,300,000*	4,300,000	ug/L	NA	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
2-Hexanone	1,000	2,900	- -	- -	4,200,000	8,700,000	*20,000*	29,000	ug/L	NA	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
2-Methylnaphthalene	260	750	19	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Phenylbutane (sec-Butylbenzene)	80	230	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	20,000,000	20,000,000	*330,000*	330,000	ug/L	NA	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	730	2,100	1,700	- -	1,000,000,000	1,000,000,000	*40,000,000*	40,000,000	ug/L	NA	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acrylonitrile	2.6	11	2	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Benzene	5	5	200	- -	5,600	35,000	*28*	66	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromobenzene	18	50	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	4,800	37,000	*34*	73	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	470,000	3,100,000	*2,700*	6,200	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	4,000	9,000	*55*	80	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon disulfide	800	2,300	- -	- -	250,000	550,000	*2,100*	3,100	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	370	2,400	*7.7*	18	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	100	100	25	- -	210,000	470,000	*940*	1,400	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobromomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloroethane	430	1,700	1,100	- -	5,700,000	5,700,000	*15,000*	22,000	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	28,000	180,000	*14*	32	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	8,600	45,000	*380*	560	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
cis-1,2-Dichloroethene	70	70	620	- -	93,000	210,000	*95*	140	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cymene (p-Isopropyltoluene)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane	80	80	- -	- -	14,000	110,000	*23*	130	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromomethane	80	230	- -	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	220,000	300,000	*49*	410	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Ethyl ether	10	10	- -	- -	- -	- -	- -	- -	ug/L	NA	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Ethylbenzene*	74	74	18	**700**	110,000	170,000	*74*	170	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachloroethane	7.3	21	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Iodomethane	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2,300	28	- -	56,000	56,000	*15*	36	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

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Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	47,000,000	47,000,000	*7,400*	17,000	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	5	5	1,500	- -	220,000	1,400,000	*8,400*	12,000	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	520	1500	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
N-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
N-Propylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Styrene	100	100	80	- -	170,000	310,000	*960*	2,300	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Butylbenzene	80	230	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	25,000	170,000	*130*	130	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrahydrofuran	95	270	11,000						ug/L	NA	< 90 U	< 90 U	< 90 U	< 90 U	< 90 U
Toluene*	790	790	270	**1,000**	530,000	530,000	*41,000*	59,000	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	190,000	190,000	*2,000*	3,000	ug/L	NA	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
trans-1,2-Dichloroethene	100	100	1,500	- -	85,000	200,000	*390*	580	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,4-Dichloro-2-butene	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	2,200	4,900	*10*	10	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	1,100,000	1,100,000	*190*	560	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	1,100	13,000	*2.1*	18	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Volatile Organics-SIM															
1,4-Dioxane	7.2	350	280	- -	- -	- -	*56,000*	130,000	ug/L	25	< 1 UB	NA	NA	NA	2
Inorganics															
Antimony	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Arsenic	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	2	9	3	5	3
Barium	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	90	207	136	179	191
Beryllium	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cadmium	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Calcium	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	149,000	132,000	163,000	70,600	131,000
Chromium	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Cobalt	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Copper*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Iron*	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	970	**10,600**	**15,000**	**10,300**	**18,100**
Lead	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U
Magnesium	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	37,000	32,200	39,900	27,500	32,900
Manganese*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	404	1,130	1,840	369	414
Mercury	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
Nickel	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	8	8	< 5 U	< 5 U	< 5 U
Selenium	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Silver	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Thallium	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Vanadium	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Zinc*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	8	< 5 U	< 5 U	< 5 U	< 5 U
Inorganics-Filtered															
Antimony (dissolved)	6	6	130	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	10	10	10	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2,000	2,000	670	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	4	4	6.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	5	5	2.5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Calcium (dissolved)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Chromium Total (dissolved)	100	100	11	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	40	100	100	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1,000	1,000	13	**4,000**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Iron (dissolved)	300	300	- -	**5,600**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Lead (dissolved)	4	4	14	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Magnesium (dissolved)	400,000	1,100,000	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	50	50	1,300	**2,500**	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	2	2	0.0013	- -	56	56	*2.5*	3.7	ug/L	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	100	100	73	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	50	50	5	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Silver (dissolved)	34	98	0.2	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	2	2	3.7	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	4.5	62	27	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Zinc (dissolved)*	2,400	5,000	170	- -	- -	- -	- -	- -	ug/L	NA	NA	NA	NA	NA	NA
Miscellaneous															
Alkalinity, total (as CaCO3)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	416,000	322,000	374,000	300,000	356,000
Hardness	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	529,000	456,000	566,000	288,000	488,000
Total dissolved solids (TDS)	500,000	500,000	500,000	- -	- -	- -	- -	- -	ug/L	NA	968,000	1,680,000	1,810,000	1,530,000	1,760,000
Total suspended solids (TSS)	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	< 3,000 U	23,800	32,000	162,800	30,100

Location ID: / Date Collected:	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Res Fiero SSVIAC SOG	Res Fiero SSVIAC BASE	NR Fiero SSVIAC <50k SOG	NR Fiero SSVIAC <50k BASE	NR Fiero SSVIAC >50k SOG	NR Fiero SSVIAC >50k BASE		MW-02-17 09/12/23	MW-05-18 09/12/23	MWF12-01R 09/12/23	MWF12-02R 09/12/23	MWF16-06 09/15/23	MWF16-23 09/12/23	MWF16-25 09/12/23	MWF7-02 09/12/23	MWF8-01 09/15/23
Field Parameters																				
pH*	6.5-8.5	6.5-8.5	6.5-9.0	- -	- -	- -	- -	- -	- -	- -	SU	7.11	7.10	6.79	7.22	7.88	7.05	7.11	7.19	6.99
Turbidity	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	NTU	0.02	4.22	0.02	6.02	0.26	8.60	5.45	4.59	1.73
Volatile Organics																				
1,1,1,2-Tetrachloroethane	77	320	- -	- -	*180*	*93*	5,700	2,400	8,500	3,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	200	200	89	- -	*22,000*	*11,000*	210,000	92,000	310,000	140,000	ug/L	3	5	NA	< 1 U [< 1 U]	90	8	3	72	< 1 U
1,1,2,2-Tetrachloroethane	8.5	35	78	- -	*130*	*66*	4,100	1,800	6,200	2,600	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	5	5	330	- -	*21*	*11*	410	180	620	280	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	880	2,500	740	- -	*160*	*88*	5,300	2,400	8,000	3,600	ug/L	2	4	NA	< 1 U [< 1 U]	8	3	3	20	< 1 U
1,1-Dichloroethene	7	7	130	- -	*410*	*220*	8,300	3,800	13,000	5,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	2	< 1 U	< 1 U	7	< 1 U
1,2,3-Trichlorobenzene	- -	- -	- -	- -	*4,100*	*2,100*	18,000	18,000	18,000	18,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,3-Trichloropropane	42	120	- -	- -	*91*	*47*	1,800	790	2,700	1,200	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trimethylbenzene	- -	- -	- -	- -	*2,000*	*1,100*	41,000	18,000	61,000	27,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,4-Trichlorobenzene	70	70	99	- -	*270*	*130*	5,100	2,200	7,700	3,300	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,4-Trimethylbenzene	63	63	17	- -	*1,100*	*590*	22,000	9,900	34,000	15,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	- -	- -	*0.00045*	*0.00045*	0.042	0.029	0.061	0.042	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene dibromide)	0.05	0.05	5.7	- -	*8*	*4*	250	110	370	160	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichlorobenzene	600	600	13	- -	*19,000*	*9,900*	160,000	160,000	160,000	160,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	5	5	360	- -	*50*	*27*	1,600	750	2,500	1,100	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	5	5	230	- -	*100*	*56*	2,100	950	3,200	1,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3,5-Trimethylbenzene	72	72	45	- -	*800*	*420*	16,000	7000	24,000	10,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	6.6	19	28	- -	*130*	*70*	2,700	1,200	4,000	1,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	75	75	17	- -	*310*	*160*	9,800	4,300	15,000	6,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Butanone (Methyl ethyl ketone) (MEK)	13,000	38,000	2,200	- -	*4,000,000*	*2,200,000*	59,000,000	27,000,000	88,000,000	40,000,000	ug/L	< 25 U	< 25 U	NA	< 25 U [< 25 U]	< 25 U	< 25 U	< 25 U	< 25 U	< 25 U
2-Hexanone	1,000	2,900	- -	- -	*24,000*	*12,000*	490,000	220,000	740,000	320,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
2-Methylnaphthalene	260	750	19	- -	*3,500*	*1,800*	25,000	25,000	25,000	25,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Phenylbutane (sec-Butylbenzene)	80	230	- -	- -	*9,200*	*4,300*	18,000	18,000	18,000	18,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	1,800	5,200	- -	- -	*1,600,000*	*810,000*	19,000,000	9,500,000	19,000,000	14,000,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	730	2,100	1,700	- -	*32,000,000*	*18,000,000*	240,000,000	110,000,000	360,000,000	160,000,000	ug/L	< 50 U	< 50 U	NA	< 50 U [< 50 U]	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acrylonitrile	2.6	11	2	- -	*120*	*67*	4,100	1,900	6,200	2,900	ug/L	< 2 U	< 2 U	NA	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Benzene	5	5	200	- -	*34*	*18*	1,100	510	1,700	760	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromobenzene	18	50	- -	- -	*3,300*	*1,700*	66,000	29,000	99,000	43,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	80	80	- -	- -	*60*	*31*	1,700	760	2,600	1,100	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	80	80	- -	- -	*6,400*	*3,200*	200,000	83,000	300,000	120,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane (Methyl bromide)	10	29	5	- -	*59*	*33*	1,200	580	1,900	860	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon disulfide	800	2,300	- -	- -	*2,200*	*1,200*	46,000	22,000	70,000	33,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride	5	5	38	- -	*14*	*7.2*	440	190	650	290	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	*8*	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	100	100	25	- -	*1,300*	*720*	27,000	12,000	41,000	18,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobromomethane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloroethane	430	1,700	1,100	- -	*15,000*	*8,600*	320,000	150,000	490,000	230,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chloroform (Trichloromethane)	80	80	350	- -	*19*	*10*	610	270	910	410	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	7	< 1 U	2	< 1 U	< 1 U
Chloromethane (Methyl chloride)	260	1,100	- -	- -	*340*	*200*	7,400	3,500	11,000	5,300	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
cis-1,2-Dichloroethene	70	70	620	- -	*110*	*62*	2,300	1,100	3,500	1,600	ug/L	1	8	NA	< 1 U [< 1 U]	2	2	44	2	< 1 U
cis-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cymene (p-Isopropyltoluene)	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane	80	80	- -	- -	*58*	*29*	4,400	1,800	6,600	2,800	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromomethane	80	230	- -	- -	*450*	*230*	9,000	3,900	13,000	5,900	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (CFC-12)	1,700	4,800	- -	- -	*71*	*38*	1,400	640	2,100	960	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Ethyl ether	10	10	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 10 U	< 10 U	NA	< 10 U [< 10 U]	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Ethylbenzene*	74	74	18	**700**	*110*	*60*	3,600	1,600	5,400	2,400	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachloroethane	7.3	21	6.7	- -	*130*	*64*	3,900	1,600	5,900	2,500	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Iodomethane	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropyl benzene	800	2300	28	- -	*26*	*13*	810	360	1,200	540	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
m&p-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 2 U	< 2 U	NA	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Methyl tert butyl ether (MTBE)*	40	40	7,100	**690**	*10,000*	*5,300*	320,000	150,000	490,000	220,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	5	5	1,500	- -	*9,100*	*5,000*	190,000	88,000	280,000	130,000	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Naphthalene	520	1500	11	- -	*190*	*100*	6,200	2,700	9,300	4,100	ug/L	< 5 U	< 5 U	NA	< 5 U [< 5 U]	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
N-Butylbenzene	80	230	- -	- -	*2,000*	*1,100*	12,000	12,000	12,000	12,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
N-Propylbenzene	80	230	- -	- -	*10,000*	*5,400*	52,000	31,000	52,000	46,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
o-Xylene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Styrene	100	100	80	- -	*1,400*	*740*	45,000	20,000	67,000	30,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tert-Butylbenzene	80	230	- -	- -	*3*	*1.8*	67	29	100	44	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	5	5	60	- -	*250*	*130*	3,400	1,500	5,000	2,200	ug/L	7	< 1 U	NA	< 1 U [< 1 U]	36	< 1 U	< 1 U	89	< 1 U
Tetrahydrofuran	95	270	11000	- -	*1,300,000*	*690,000*	27,000,000	12,000,000	41,000,000	19,000,000	ug/L	< 90 U	< 90 U	NA	< 90 U [< 90 U]	< 90 U	< 90 U	< 90 U	< 90 U	< 90 U
Toluene*	790	790	270	**1,000**	*56,000*	*30,000*	530,000	250,000	530,000	380,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Total Xylenes*	280	280	49	**10,000**	*3,000*	*1,600*	60,000	27,000	91,000	41,000	ug/L	< 2 U	< 2 U	NA	< 2 U [< 2 U]	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
trans-1,2-Dichloroethene	100	100	1,500	- -	*480*	*260*	9,800	4,500	15,000	6,700	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	1	4	< 1 U	< 1 U
trans-1,3-Dichloropropene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,4-Dichloro-2-butene	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	5	5	200	- -	*15*	*8.1*	210	93	310	140	ug/L	4	1	NA	< 1 U [< 1 U]	4	*15*	< 1 U	4	< 1 U
Trichlorofluoromethane (CFC-11)	2,600	7,300	- -	- -	*300*	*160*	6,000	2,700	9,000	4,000	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	2	2	13	- -	*2.2*	*1.2*	260	120	390	180	ug/L	< 1 U	< 1 U	NA	< 1 U [< 1 U]	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Volatile Organics-SIM																				
1,4-Dioxane	7.2	350	280	- -	*43,000*	*22,000*	1,500,000	670,000	2,300,000	1,000,000	ug/L	< 1 UB	< 1 UB	21	< 2 UB [< 1 UB]	< 2 UB	< 1 UB	< 1 UB	240	NA
Inorganics																				
Manganese*	50	50	1,300	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	174	439 [441]	NA	NA	NA	NA	NA
Inorganics - Filtered																				
Manganese* (dissolved)	50	50	1,300	- -	- -	- -	- -	- -	- -	- -	ug/L	NA	NA	156	NA	NA	NA	NA	NA	NA

Appendix A – 2024 Trend Analysis
RACER PNC
April 2025

STATISTICAL ANALYSIS METHODOLOGY

Arcadis conducted statistical analyses to assess whether constituent of concern (COC) concentrations have statistically significantly increasing or decreasing trends at 95 percent confidence. The Mann-Kendall (MK) trend test is a non-parametric test that determines these trends based on ranked data. As such, it is relatively insensitive to outlier values and non-detect concentrations (values less than reporting limits) and does not require the data to fit a specific model. The test has the flexibility to be modified to account for multiple observations per time period, multiple sampling locations, and seasonality (USEPA 2006, 2009).

The MK trend test is performed by listing the concentrations of the constituent of interest in temporal order and computing the differences between a given measurement and earlier measurements (Gilbert 1987; USEPA 2009). The MK test statistic (sum of trend [S]) is the difference between the number of strictly positive differences and the number of strictly negative differences. If S is positive, an increasing trend is indicated; if S is negative, a decreasing trend is indicated; and, if S is near zero, no trend is apparent. Trends with positive or negative S values are accepted as statistically significant for p-values less than or equal to 0.05 (95 percent confidence level). A minimum of four (preferably eight) sampling events per well is needed to run the MK trend test (USEPA, 2009). Where qualified values were used in computations, the concentrations were set equal to the reported value. Based on USEPA guidance (USEPA 2009) for MK analyses, non-detect values are set to a single value less than that of any detections, so that any pair of tied values or any pair of non-detects is given a score of 0 in the calculation of S.

To further consider the stability of COC concentrations, MK analyses with S values near zero were evaluated quantitatively using the coefficient of variation (CV) and qualitatively with visual inspection. The CV is a measure that can be used to assess relative stability. The CV is calculated as the standard deviation divided by the mean (average) concentration of a data set. In general, CV values greater than 1 indicate variability in concentrations over time while CV values less than 1 indicate that concentrations are stable.

Wells from the Groundwater Monitoring Plan (GMP) were considered for analysis. Statistical analyses of COC concentration trends were evaluated using the MK method for monitoring well and constituent pairs that meet the following criteria:

1. At least 7 sampling results.
2. At least 50 percent of concentrations are detected measurements.
3. At least one criteria exceedance in concentration.

An exceedance was considered if concentrations were greater than either the groundwater surface water interface (GSWI) value, nonresidential drinking water criteria, or other criteria on a well-basis (e.g., VIAP or SSVIAC criteria values as applicable). Corresponding screening criteria are displayed on qualifying trend graphs of COC concentrations over time for each well.

TREND ANALYSES CONDUCTED

Based on data from January 2002 to November 2024, a total of 15 data sets qualified for statistical analysis according to the criteria above. Trend results are presented in Table A-1, with corresponding charts in Figures A-1 through B-15.

Among Fiero data sets, 1,4-dioxane at MWF7-02 qualified for statistical analysis, which indicated no statistically significant trend. Considering the CV, p-value, and sign of the S-value, concentrations for this COC are stable to potentially decreasing. The last four sampling results (since October 2021) measure below the corresponding GSWI and nonresidential drinking water criteria (280 and 350 µg/L, respectively).

Among the non-Fiero data sets, four of the qualifying data sets have statistically significantly increasing trends, all of which are within the southern metal fabrication division. Statistically significant increasing trends include total dissolved solids (TDS) MWW01-SEN03, TW-MD-02, TW-MD-05, as well as manganese at MWW01-SEN03.

Four of the qualifying non-Fiero data sets have statistically significantly decreasing trends, all of which are within the southern metal fabrication division. Statistically significant decreasing trends include iron and manganese at TW-MD-02 and TW-MD-05.

The additional non-Fiero qualifying data sets do not have statistically significant trends at the 95% confidence level. Each of the qualifying data sets with no statistically significant trend have CV values less than 1, indicating that concentrations are generally stable. Visual inspection confirms this conclusion, with the exceptions of concentrations of iron at MWW01-SEN03 (potentially increasing concentrations since 2019), manganese at MWW1-02 (historically decreasing concentrations, with a step-increase in concentrations in 2008, which remained elevated during sampling in 2013 and 2024), and vinyl chloride at MWM16-37 (potentially decreasing concentrations since 2016).

REFERENCES

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley and Sons, Inc. New York.

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data and RCRA Facilities Unified Guidance. Office of Resource Conservation and Recovery. March.

TABLE A-1
2024 Mann-Kendall Analysis
RACER PNC
Pontiac, MI
April, 2025

Well ID	Analyte	Date Range	Figure	FOD	Detected Results Summary [1]					Mann-Kendall Test [2]			
					Range	Mean	Median	SD	CV	Result[4]	MK Result Note	P-Value	S Value
Fiero Properties													
MWF7-02	1,4-Dioxane	09/16 - 11/24	A-1	10 / 10	141 - 540	329	270	163	0.50	NST	--	0.078	-17
Offsite													
MWOS-01	Manganese	01/05 - 11/24	A-2	7 / 7	0.078 - 0.7	0.28	0.199	0.22	0.79	NST	5a	0.386	3
MWOS-02	Manganese	01/05 - 11/24	A-3	7 / 7	0.31 - 1.2	0.53	0.438	0.31	0.58	NST	5a	0.191	-7
MWW1-06	Manganese	05/03 - 11/24	A-4	12 / 14	0.1 - 0.53	0.27	0.2805	0.13	0.48	NST	--	0.435	-4
Southern Metal Fabrication Division													
MWW01-SEN03	Total dissolved solids (TDS)	10/18 - 11/24	A-5	7 / 7	704 - 1570	1130	1110	307	0.27	UP	5a	0.035	13
MWW01-SEN03	Iron	10/18 - 11/24	A-6	7 / 7	1 - 22.4	14.8	17.3	7.8	0.53	NST	5a	0.119	9
MWW01-SEN03	Manganese	02/13 - 11/24	A-7	9 / 9	0.13 - 0.55	0.31	0.279	0.15	0.48	UP	--	0.022	20
MWW1-02	Manganese	01/02 - 11/24	A-8	17 / 17	0.19 - 1.3	0.55	0.448	0.3	0.55	NST	--	0.268	-16
TW-MD-02	Total dissolved solids (TDS)	07/14 - 11/24	A-9	9 / 9	620 - 1680	1050	774	437	0.42	UP	--	0.001	28
TW-MD-02	Iron	05/17 - 11/24	A-10	9 / 9	5.5 - 14.4	11.6	11.3	2.9	0.25	DWN	--	0.003	-26
TW-MD-02	Manganese	07/14 - 11/24	A-11	12 / 12	0.5 - 1.9	1.1	0.9425	0.4	0.36	DWN	--	0.027	-29
TW-MD-05	Total dissolved solids (TDS)	07/14 - 11/24	A-12	9 / 9	586 - 1740	947	740	432	0.46	UP	--	0.003	26
TW-MD-05	Iron	04/17 - 11/24	A-13	9 / 9	7.5 - 13.9	10.7	10.4	2.2	0.21	DWN	--	0.006	-24
TW-MD-05	Manganese	07/14 - 11/24	A-14	13 / 13	0.29 - 0.65	0.39	0.38	0.089	0.23	DWN	--	0.044	-29
Northern Metal Fabrication Division													
MWM16-37	Vinyl chloride	12/04 - 11/24	A-15	10 / 12	1 - 9	3.1	2.35	2.2	0.71	NST	--	0.053	-24

Abbreviations:

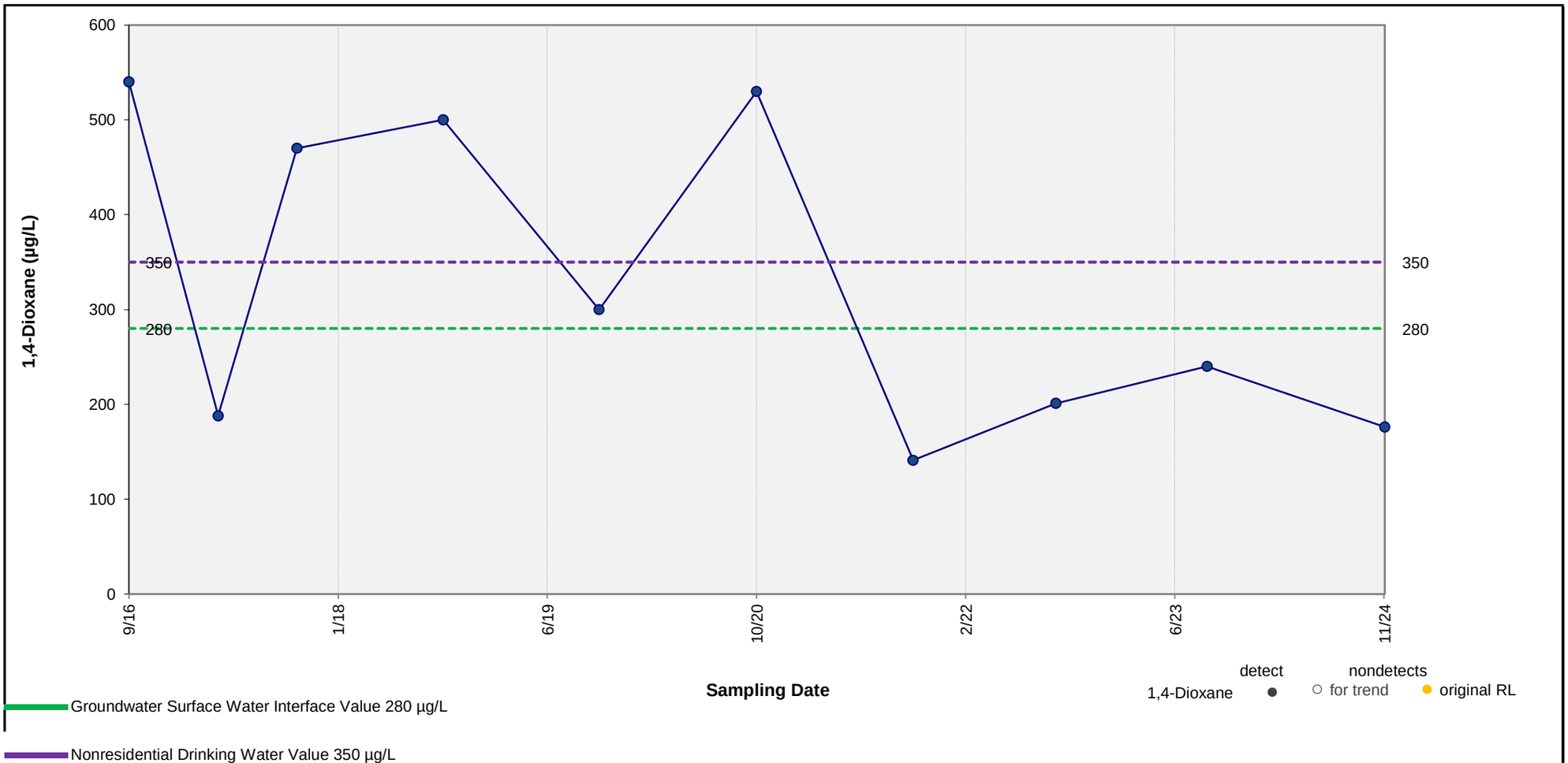
-- = not applicable
CV = coefficient of variation (SD / mean)
FOD = frequency of detection (# detects / # samples)
mean = arithmetic mean
SD = standard deviation
NST = no significant trend
DWN = downward trend
UP = upward trend
MK = Mann-Kendall

Notes:

1. TDS, iron, and maganese analytical results are in mg/L; vinyl chloride and 1,4-dioxane analytical results are in µg/L.
2. Trend results are presented when at least seven samples,and 50% detected values, and at least one criteria exceedance are available.
3. Non-detects were assigned a common value less than the minimum detected value, equal to half the minimum reporting limit (RL) in the dataset (USEPA, 2009). If half the minimum RL was greater than the minimum detected value, then half the minimum detect was assigned.
4. Statistically significant trend defined as having p-value ≤ 0.05, or 95% confidence.
5a. MK Trend results for datasets with fewer than 8 samples may not be reliable and should be treated with caution.

Reference:

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. Unified Guidance. EPA/530/R-09/007, 2009.



Results of Mann-Kendall Test for Trend: **No Significant Trend**

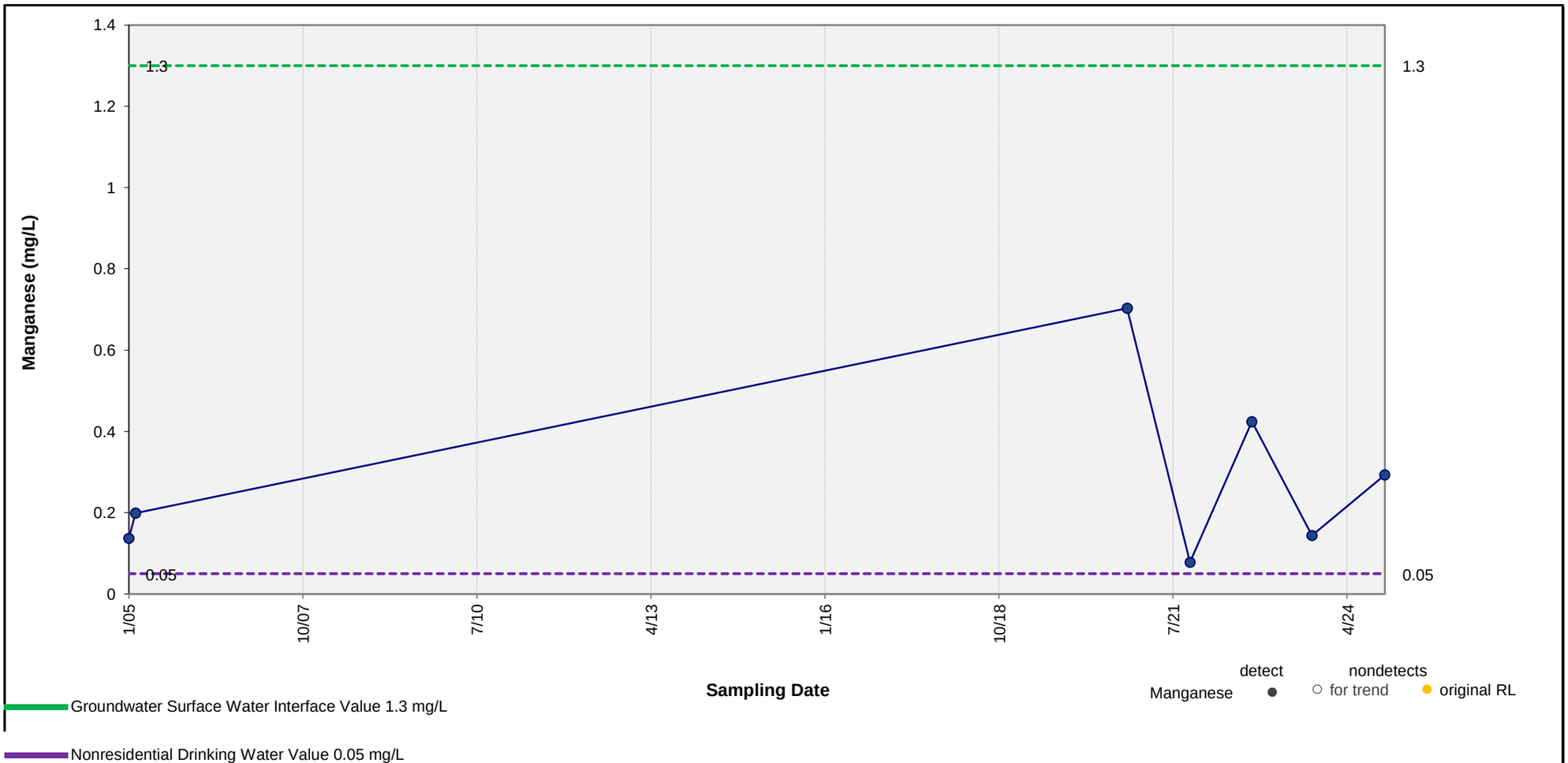
p value = 0.078 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – 1,4-Dioxane in Well MWF7-02

RACER PNC

Figure A-1



Results of Mann-Kendall Test for Trend: **No Significant Trend**

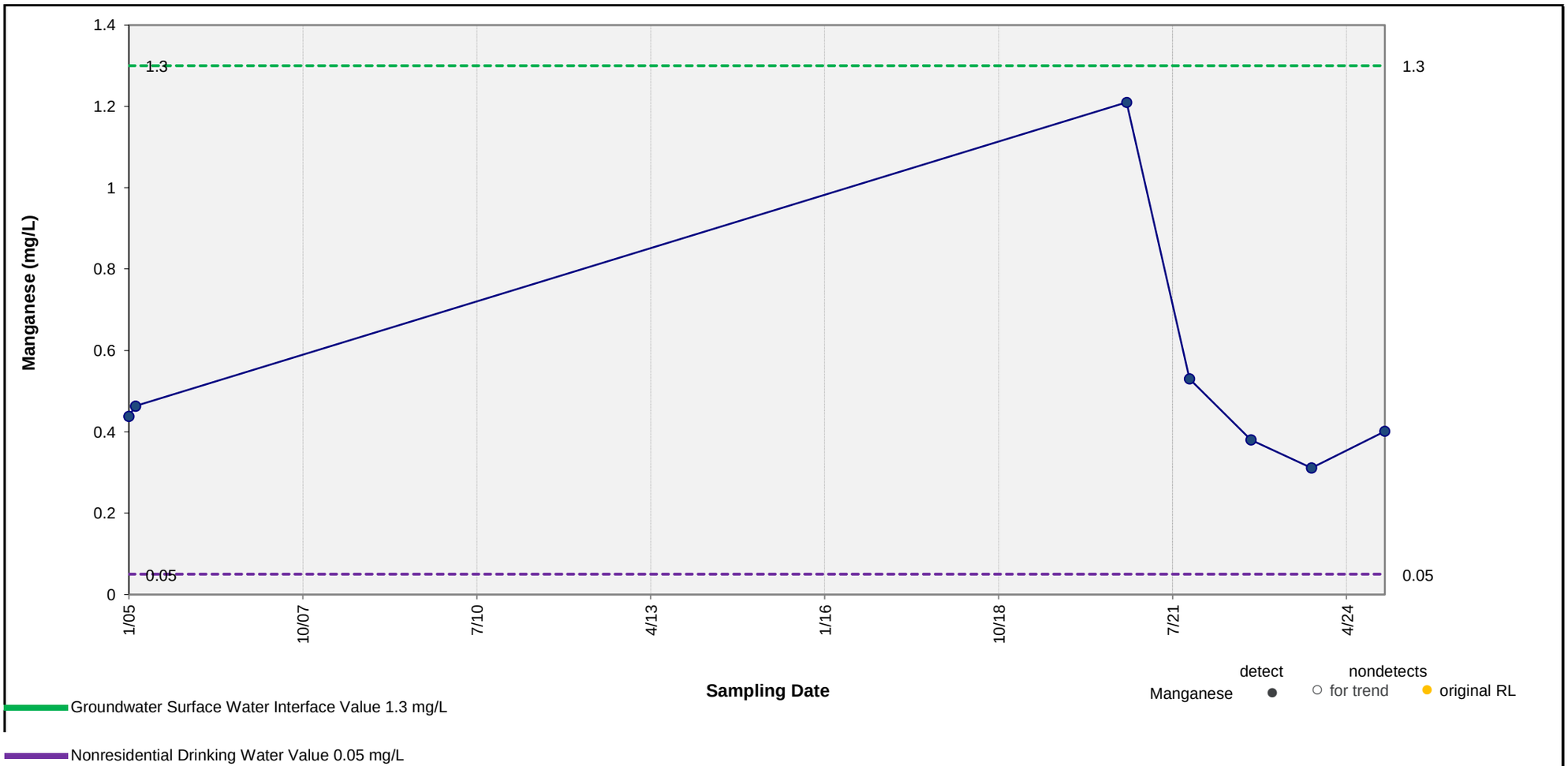
p value = 0.386 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWOS-01

RACER PNC

Figure A-2



Results of Mann-Kendall Test for Trend: **No Significant Trend**

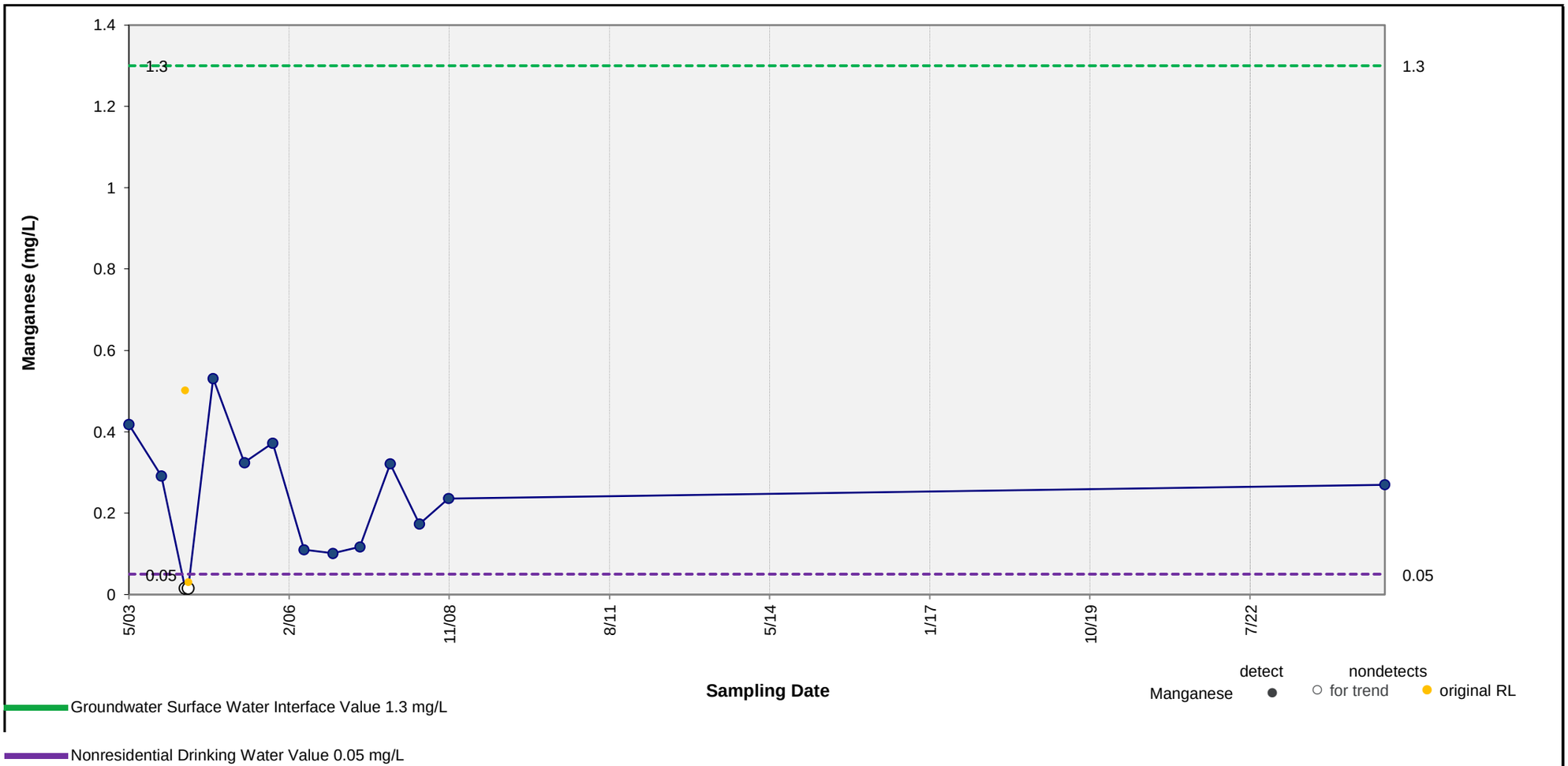
p value = 0.191 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWOS-02

RACER PNC

Figure A-3



Results of Mann-Kendall Test for Trend: **No Significant Trend**

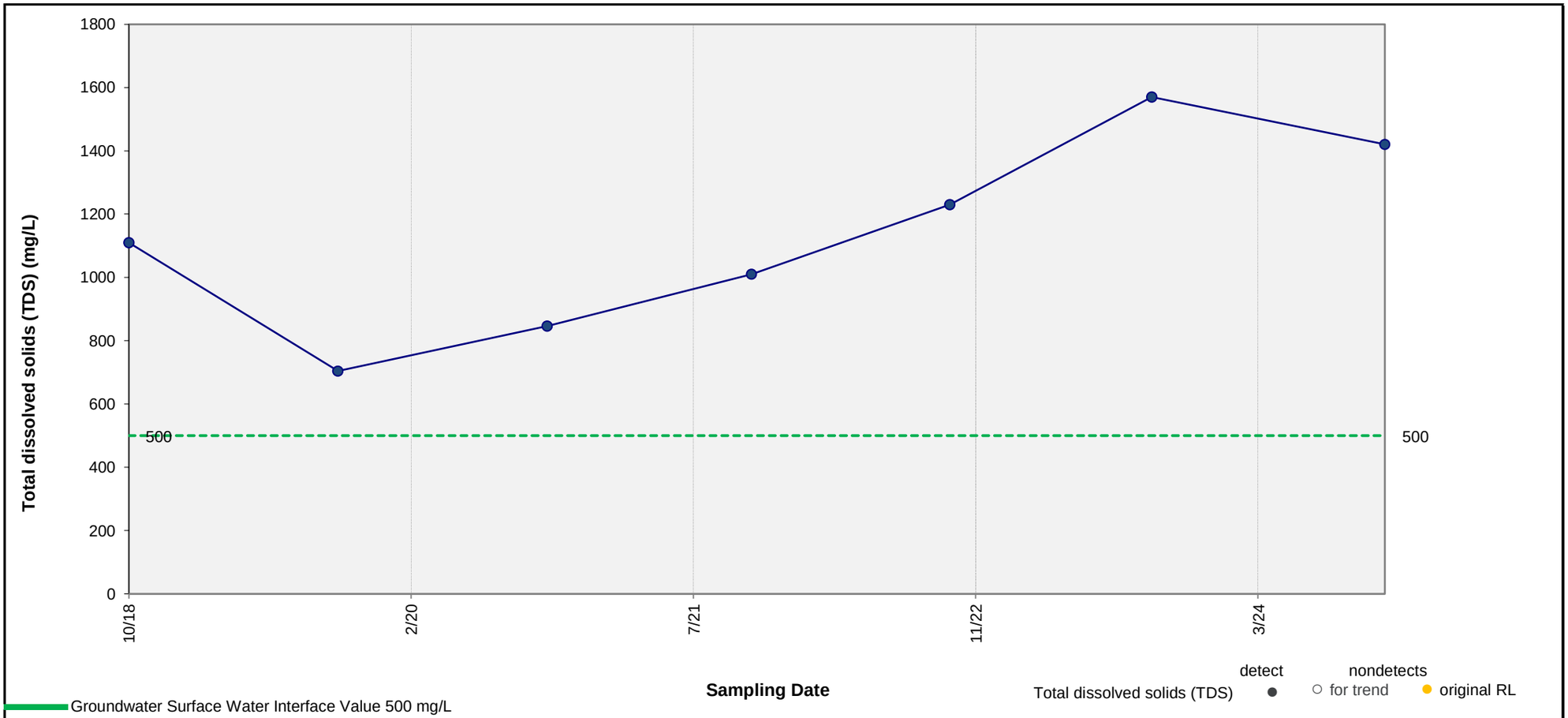
p value = 0.435 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW1-06

RACER PNC

Figure A-4



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

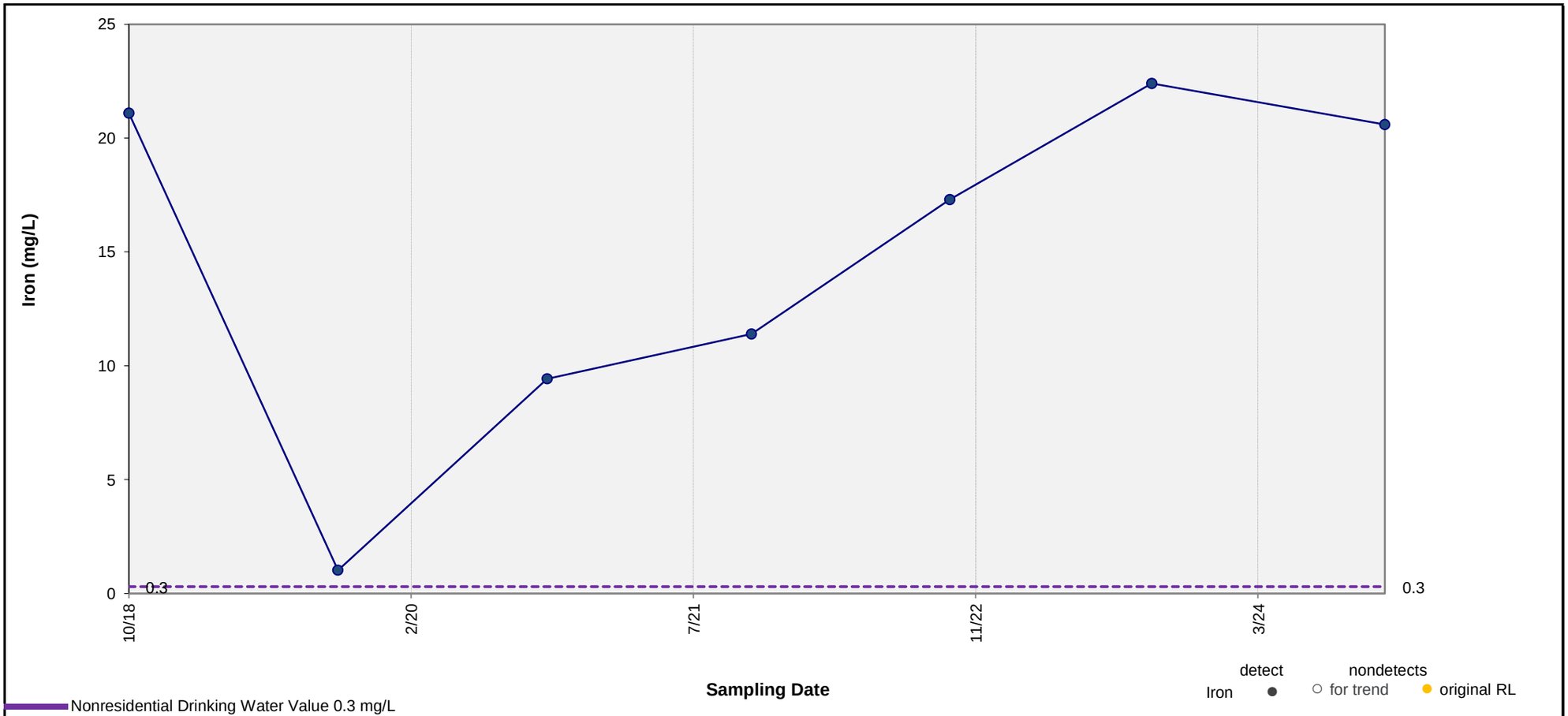
p value = 0.035 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well MWW01-SEN03

RACER PNC

Figure A-5



Results of Mann-Kendall Test for Trend: **No Significant Trend**

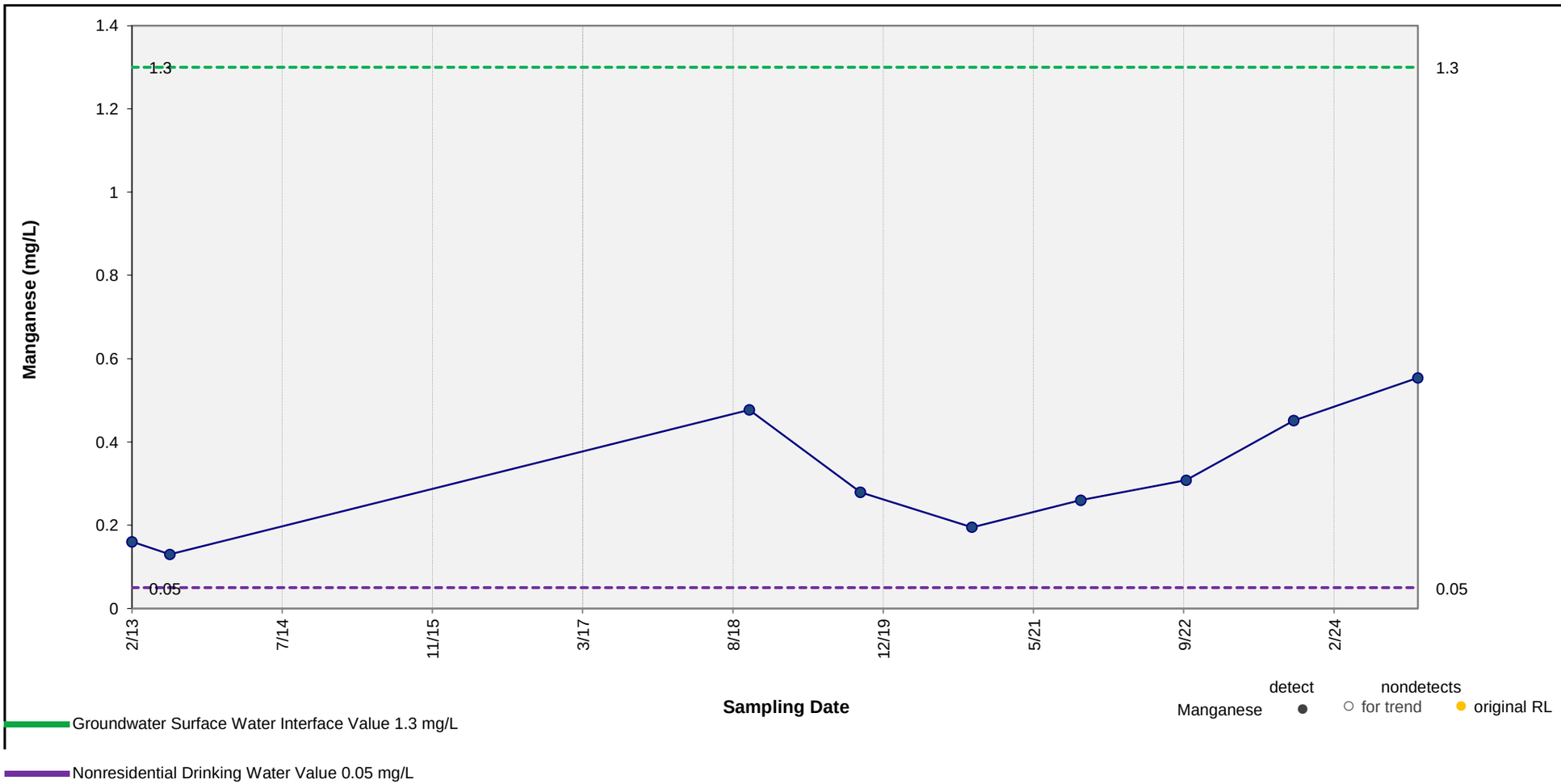
p value = 0.119 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well MWW01-SEN03

RACER PNC

Figure A-6



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

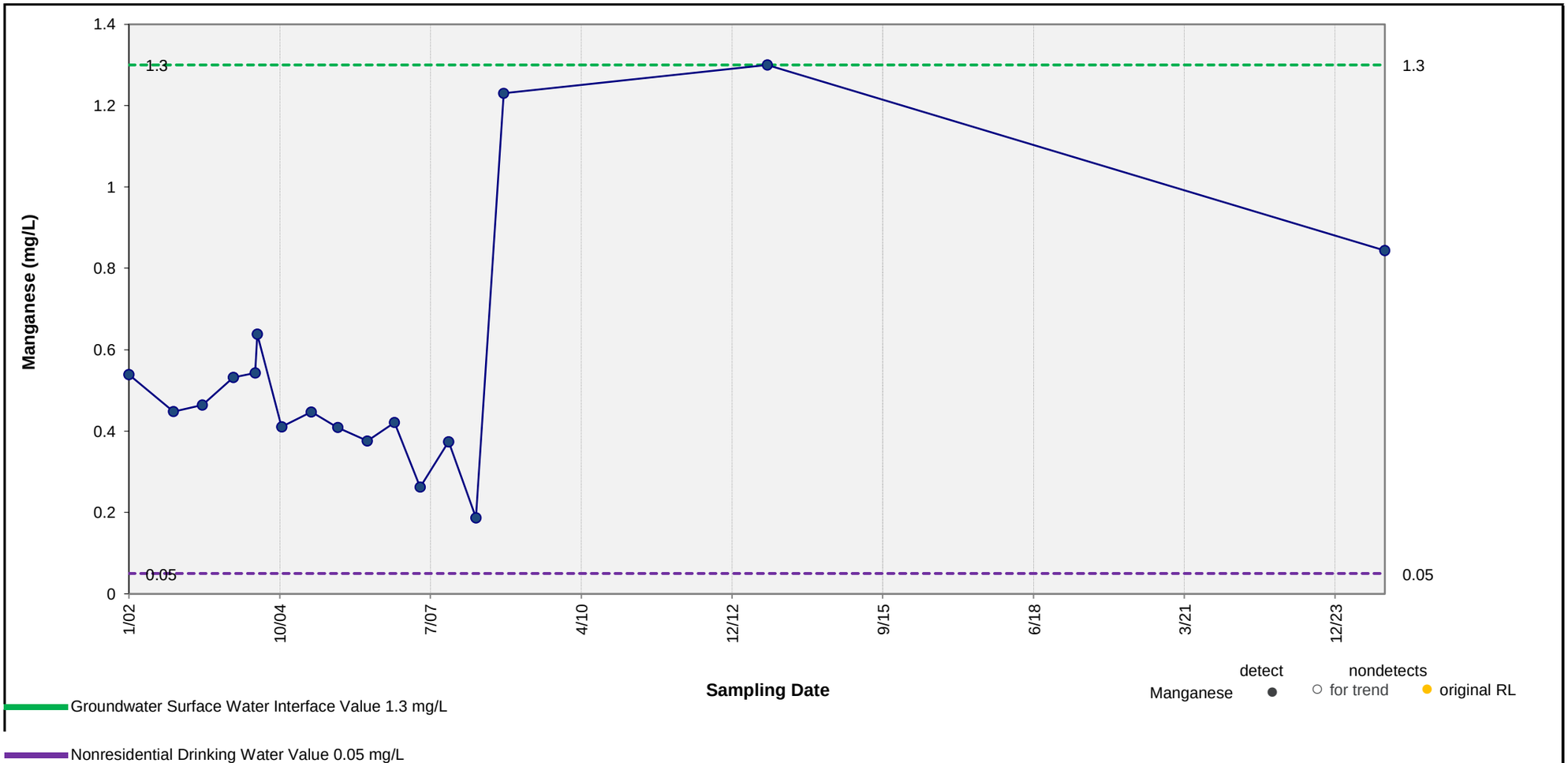
p value = 0.022 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW01-SEN03

RACER PNC

Figure A-7



Results of Mann-Kendall Test for Trend: **No Significant Trend**

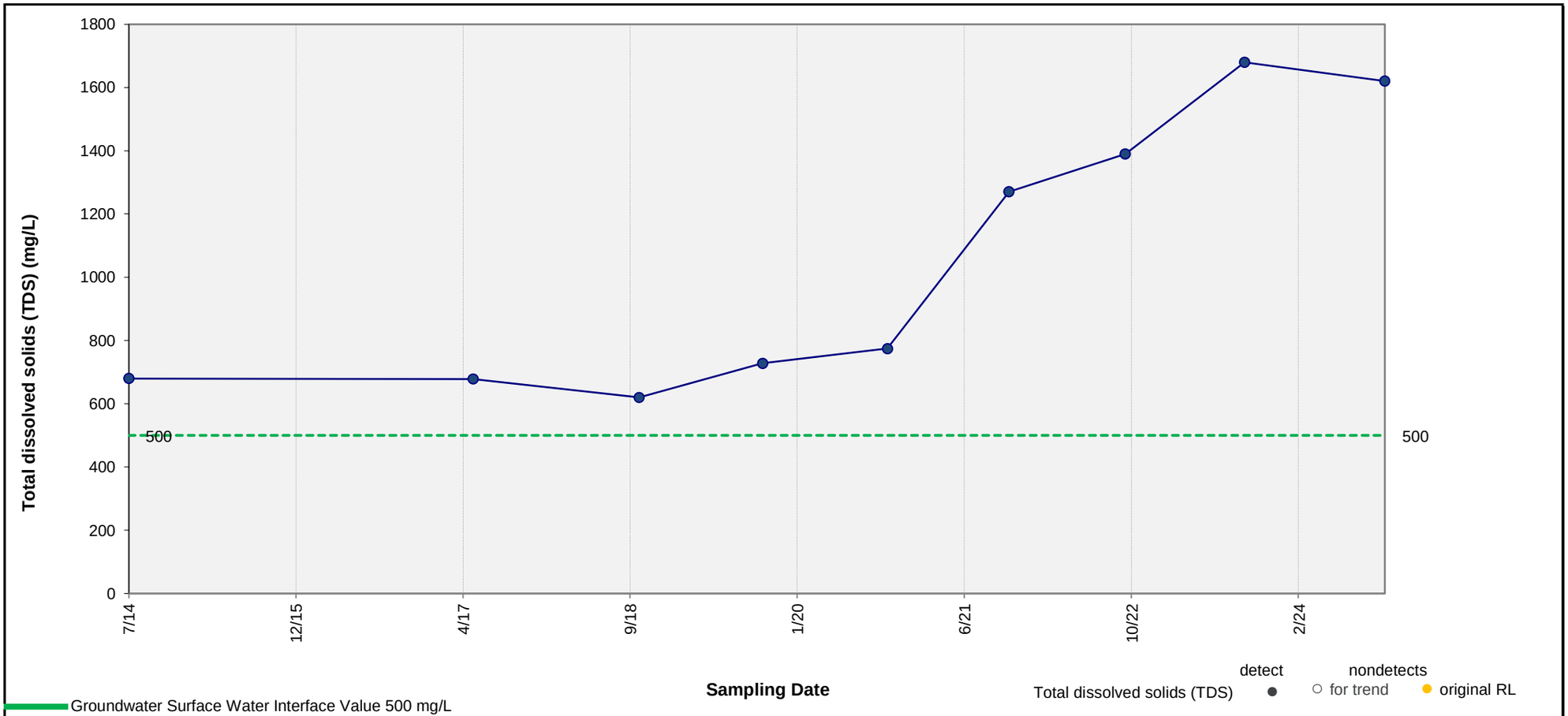
p value = 0.268 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well MWW1-02

RACER PNC

Figure A-8



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

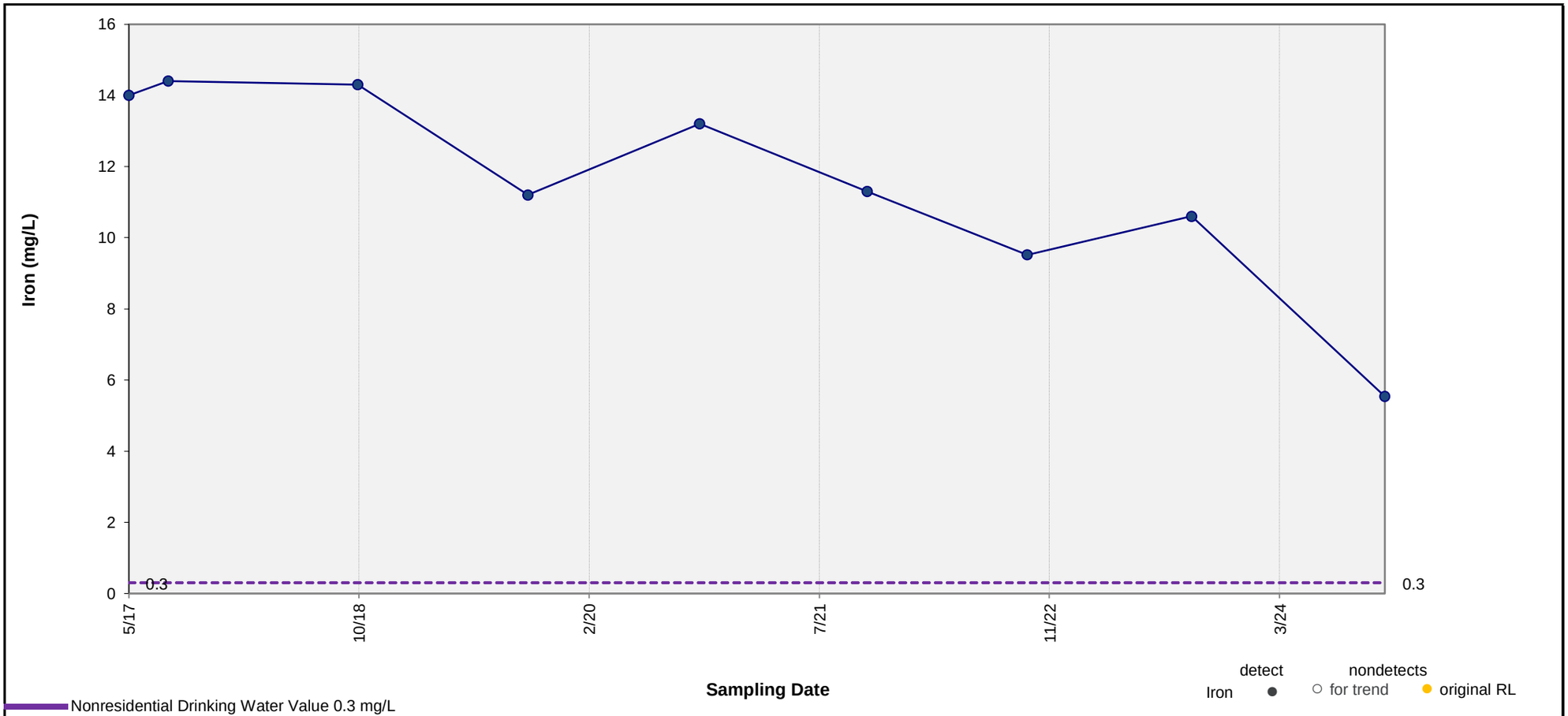
p value = 0.001 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-02

RACER PNC

Figure A-9



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

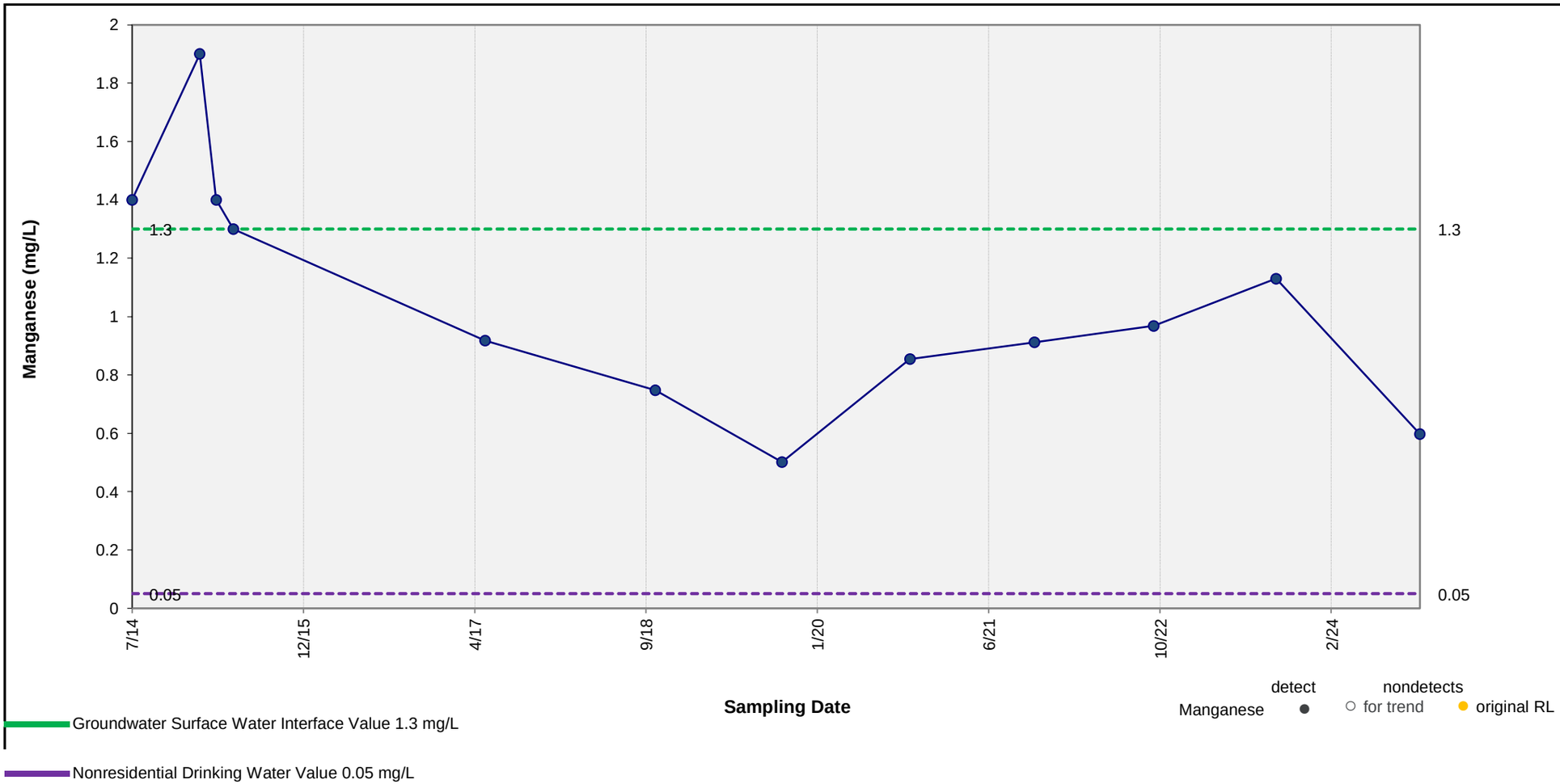
p value = 0.003 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-02

RACER PNC

Figure A-10



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

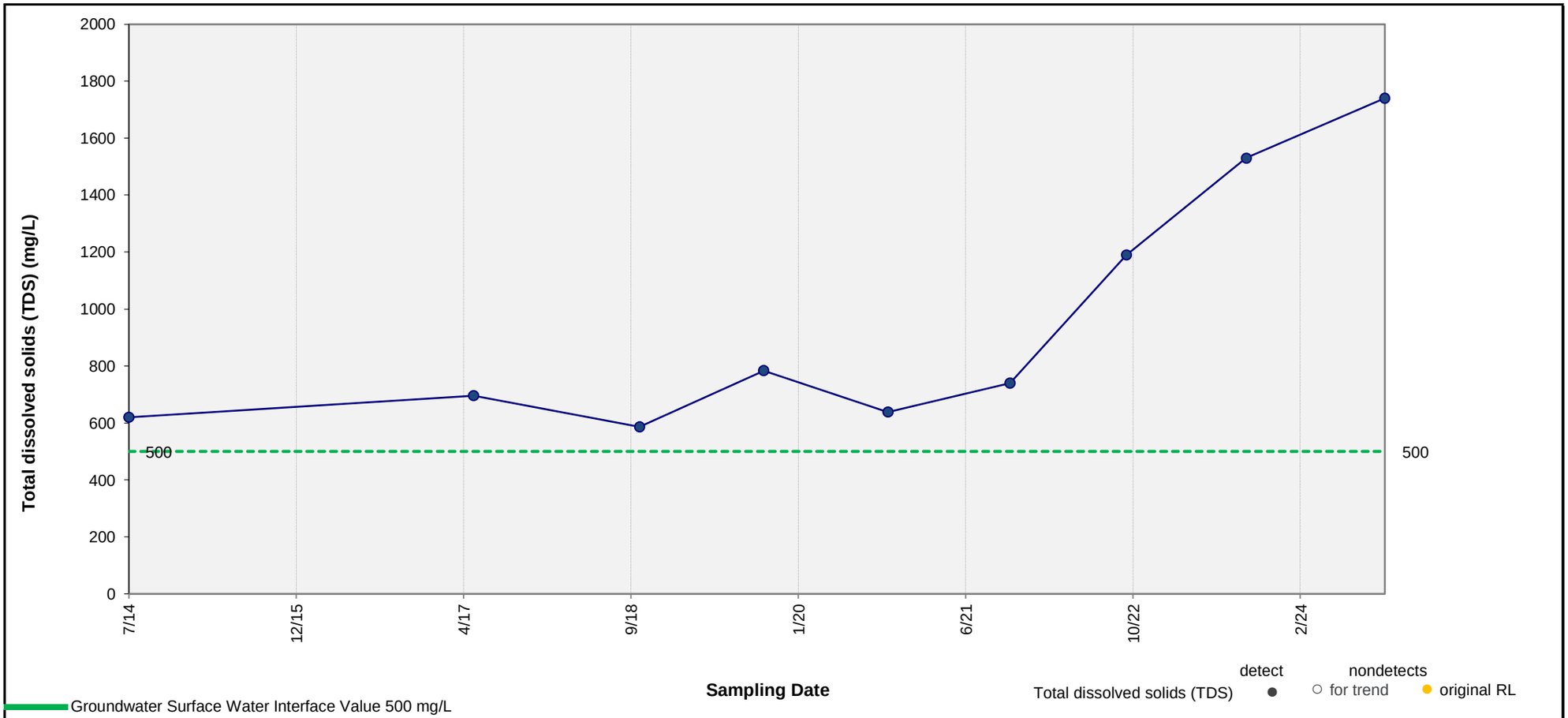
p value = 0.027 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-02

RACER PNC

Figure A-11



Results of Mann-Kendall Test for Trend: **INCREASING TREND**

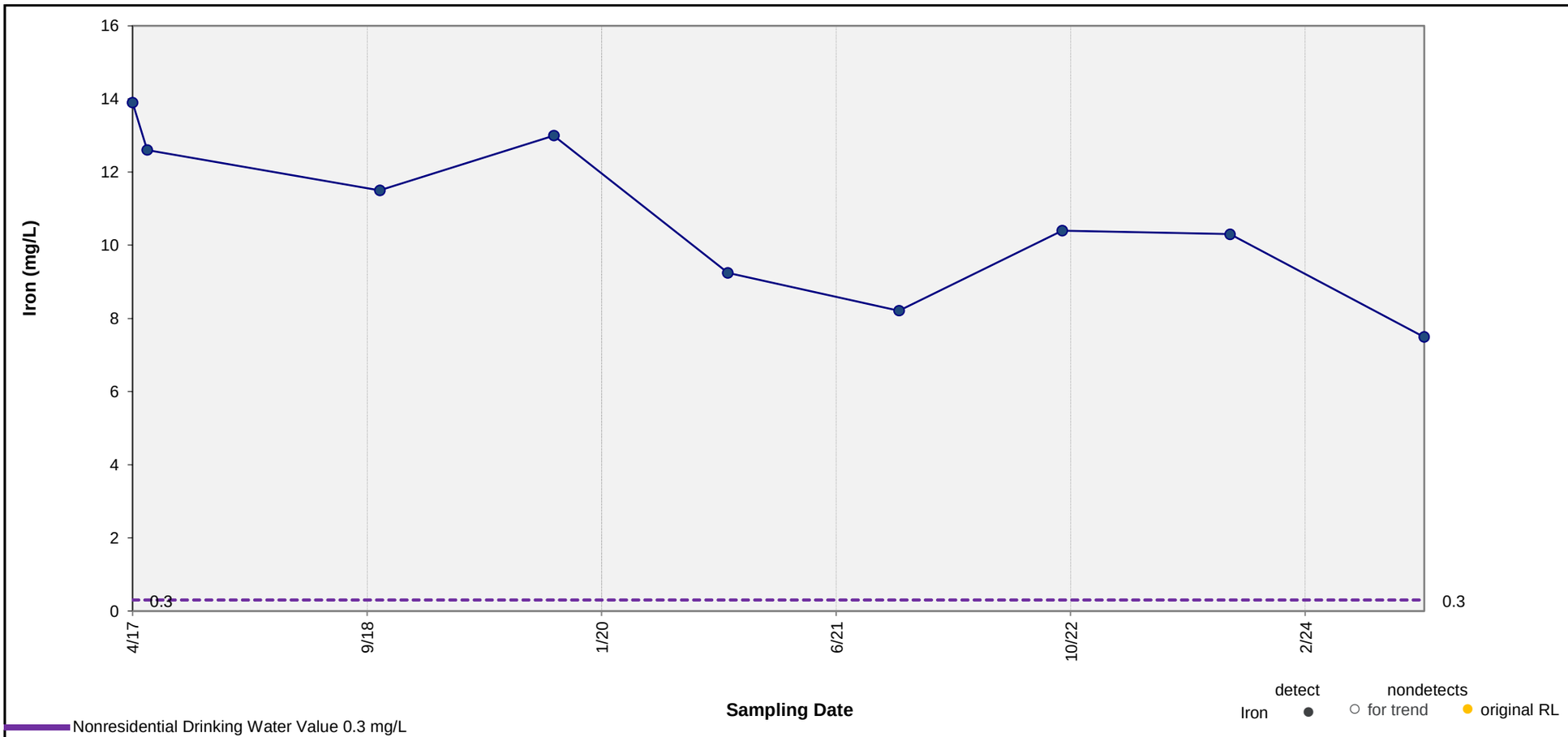
p value = 0.003 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Total dissolved solids (TDS) in Well TW-MD-05

RACER PNC

Figure A-12



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

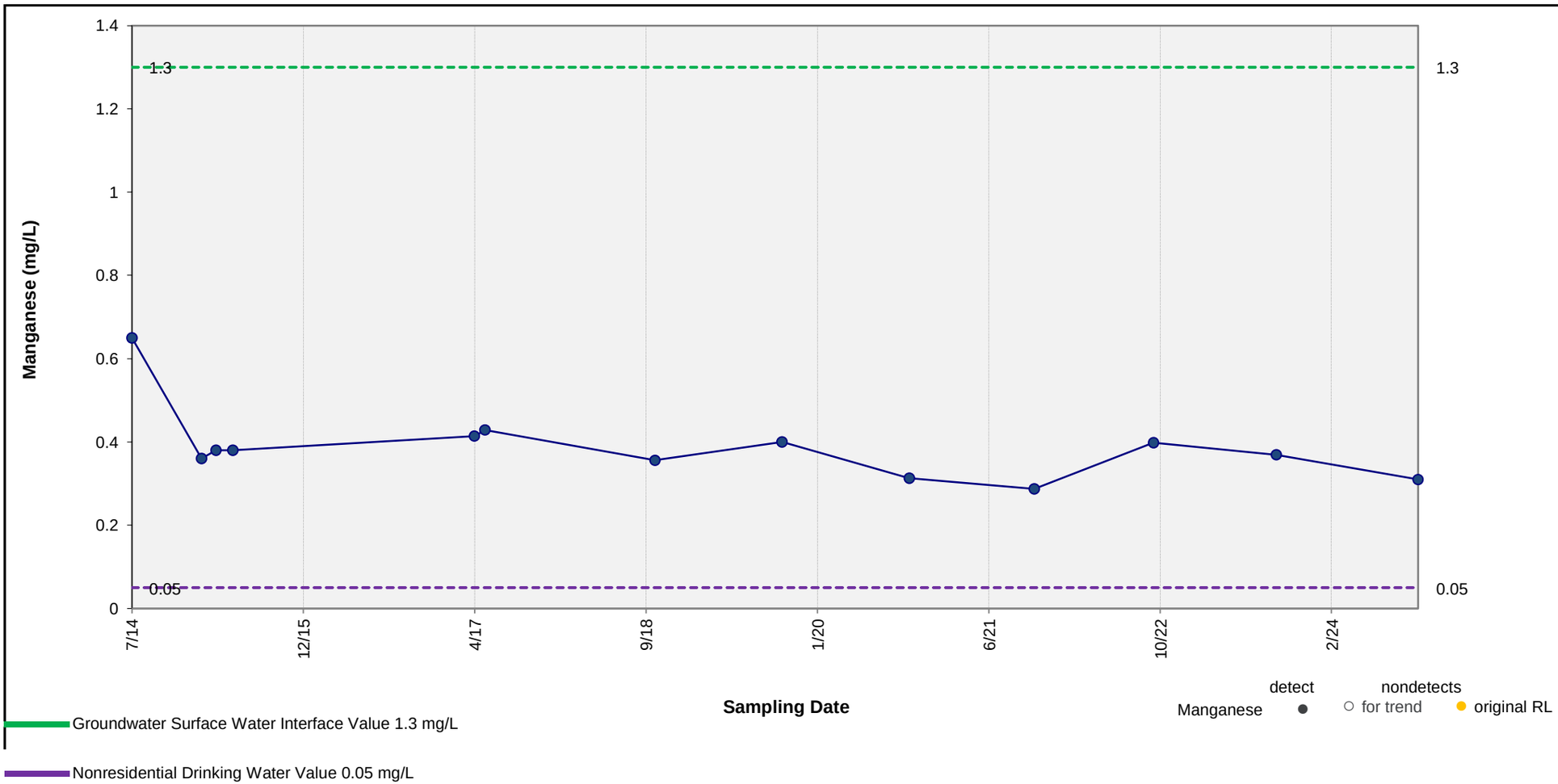
p value = 0.006 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Iron in Well TW-MD-05

RACER PNC

Figure A-13



Results of Mann-Kendall Test for Trend: **DECREASING TREND**

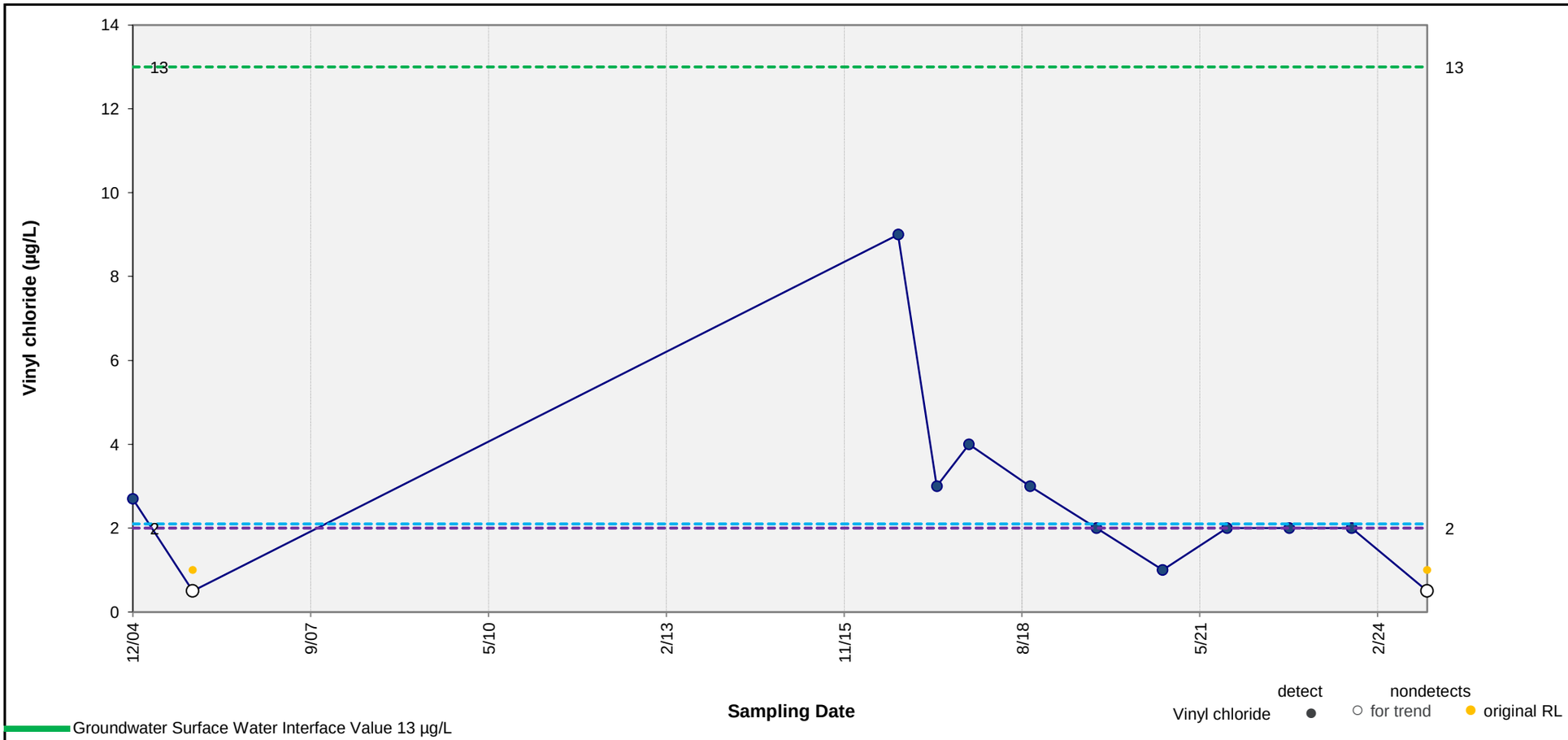
p value = 0.044 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS

Concentration vs. Time Plot – Manganese in Well TW-MD-05

RACER PNC

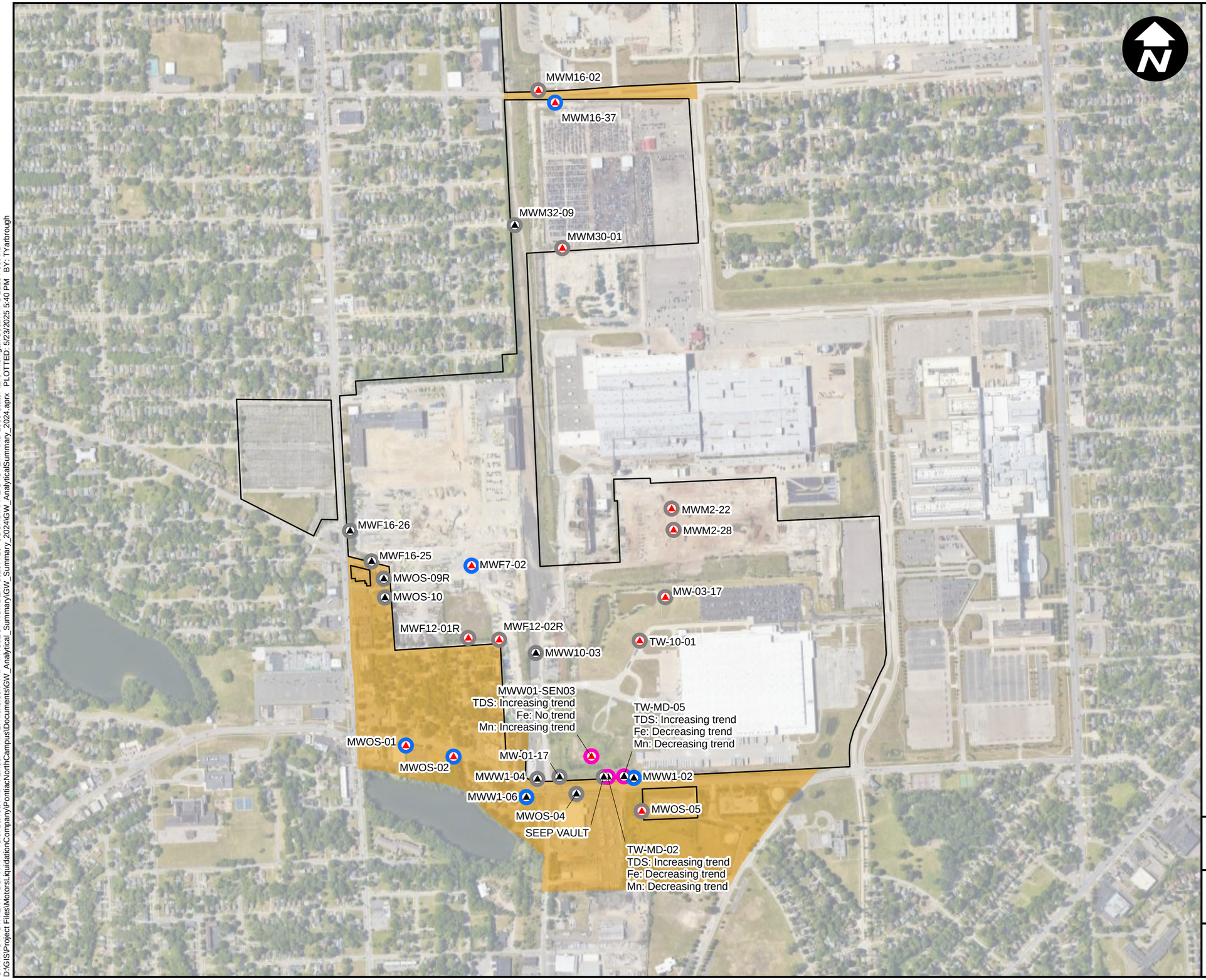
Figure A-14



Results of Mann-Kendall Test for Trend: **No Significant Trend**

p value = 0.053 Note: p value < 0.05 indicates a statistically significant trend (95% confidence level).

ARCADIS	RACER PNC **Concentration vs. Time Plot – Vinyl chloride in Well MWM16-37** RACER PNC	**Figure A-15**



LEGEND

- DRAFT GMP MONITORING WELL
- MONITORING WELL ADDED FOR SAMPLING OF ONE ANALYTE OR MORE, PER USEPA REQUEST
- DOES NOT MEET CRITERIA FOR TREND ANALYSIS
- INCREASING TREND OBSERVED
- DECREASING OR NO SIGNIFICANT TREND OBSERVED
- OFF-SITE GROUNDWATER ORDINANCE EXTENT
- CURRENT OR FORMER RACER PROPERTY

NOTES:

1. MANN-KENDALL TREND ANALYSIS CONDUCTED WHEN AT LEAST SEVEN SAMPLES, 50% DETECTED VALUES, AND AT LEAST ONE CRITERIA EXCEEDANCE ARE AVAILABLE. SIGNIFICANCE OF TRENDS EVALUATED AT 95% CONFIDENCE.

2. TREND RESULTS SUMMARIZED IN APPENDIX D.

ABBREVIATIONS:

FE IRON
MN MANGANESE
TDS TOTAL DISSOLVED SOLIDS

0 700 1,400
SCALE IN FEET

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

SUMMARY OF TRENDS IN GROUNDWATER - 2024

ARCADIS

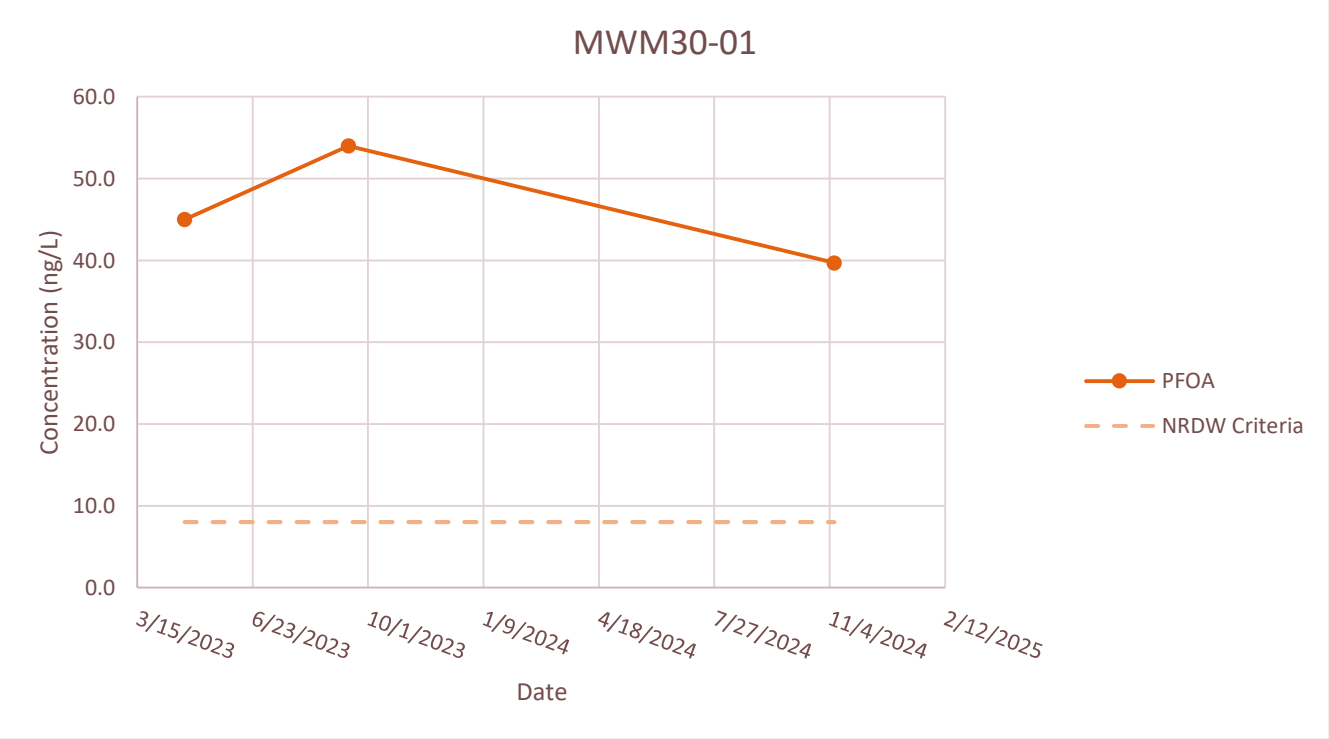
APPENDIX
A

CITY: NOVI DIV: ENV DB: TRY PIC: J. Barrett PM: T. Linder TM: L. Nickerson TR: PROJECT NUMBER: 30267726 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\GW_Analytical_Summary\GW_Summary_2024\GW_AnalyticalSummary_2024.aprx PLOTTED: 5/23/2025 5:40 PM BY: TYarbrough

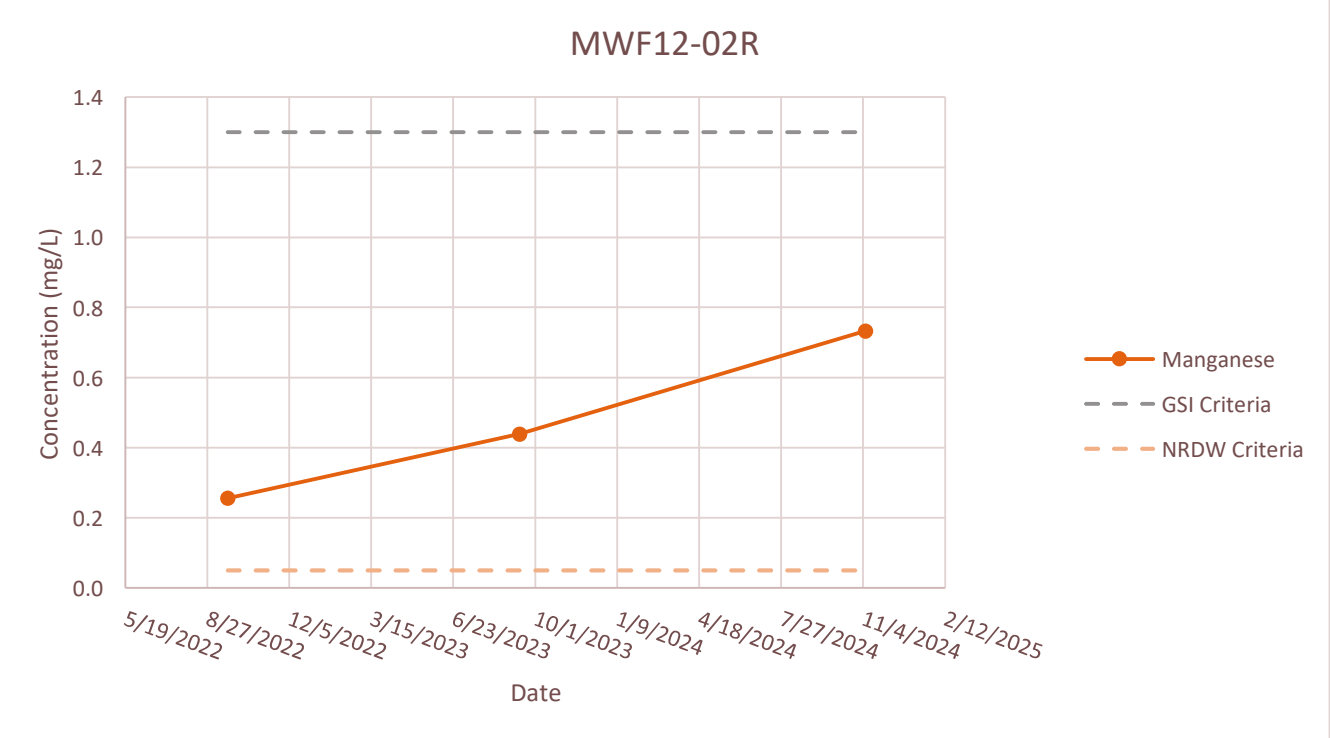
Appendix A

2024 Groundwater Trend Graphs

Northern Metal Fabrication Division

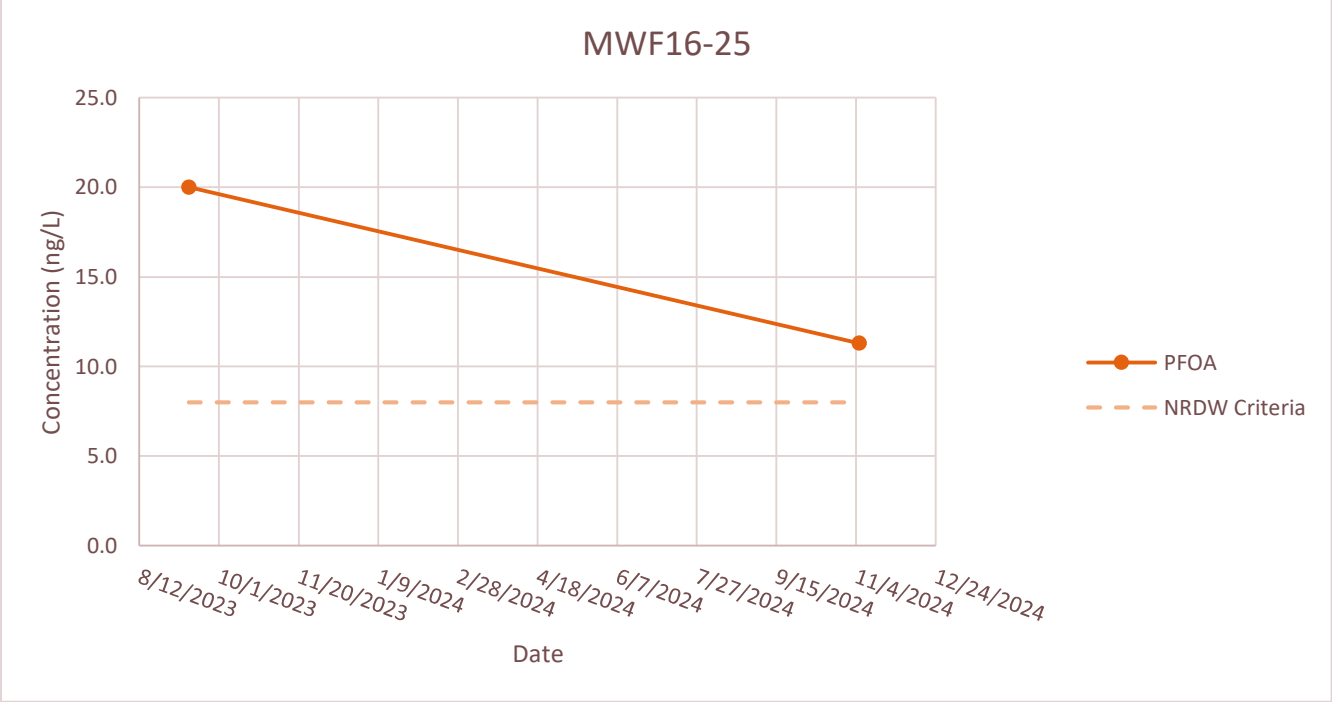


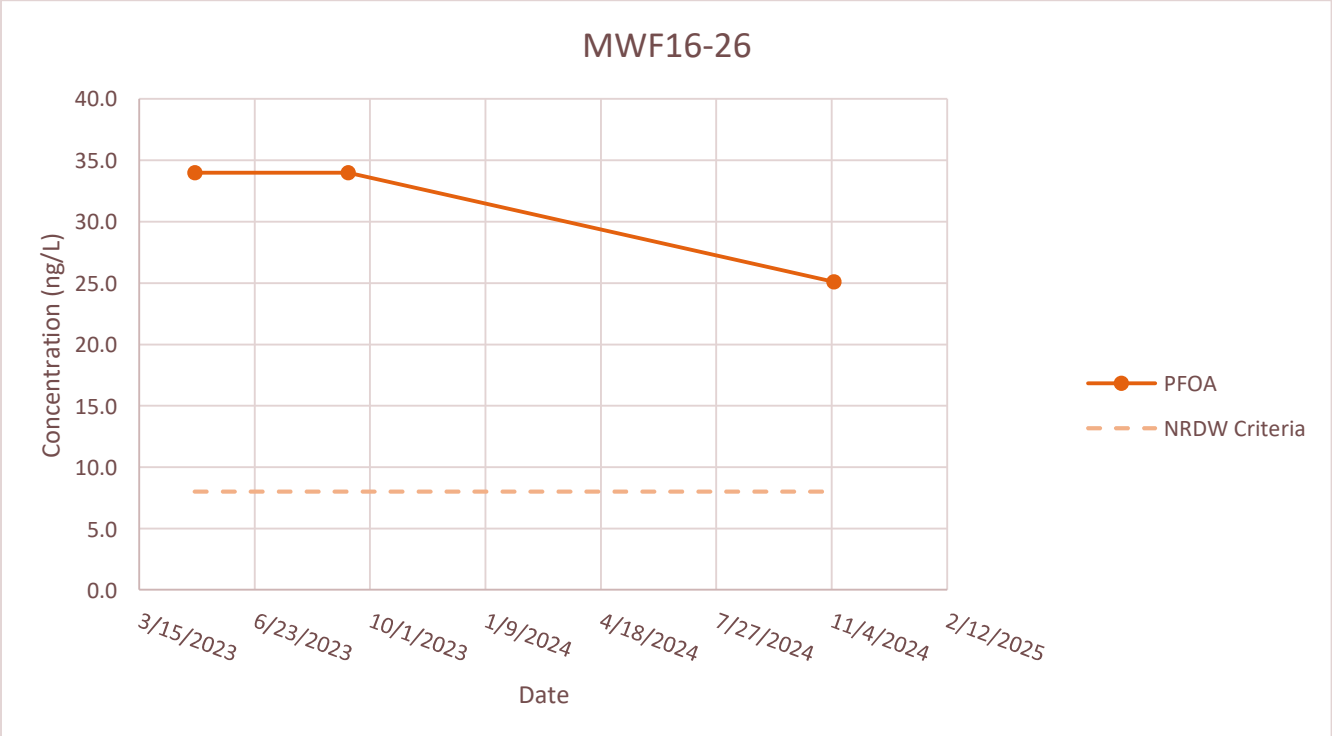
Fiero Properties



Appendix A

2024 Groundwater Trend Graphs

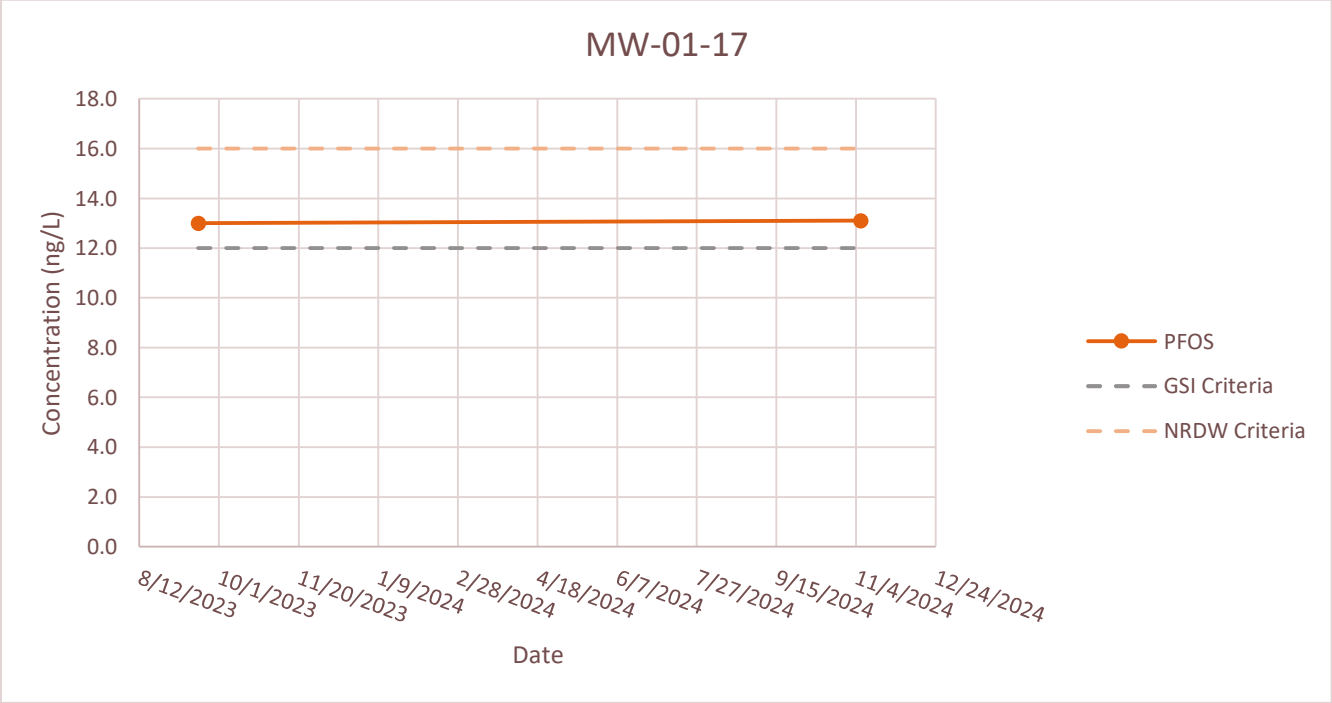


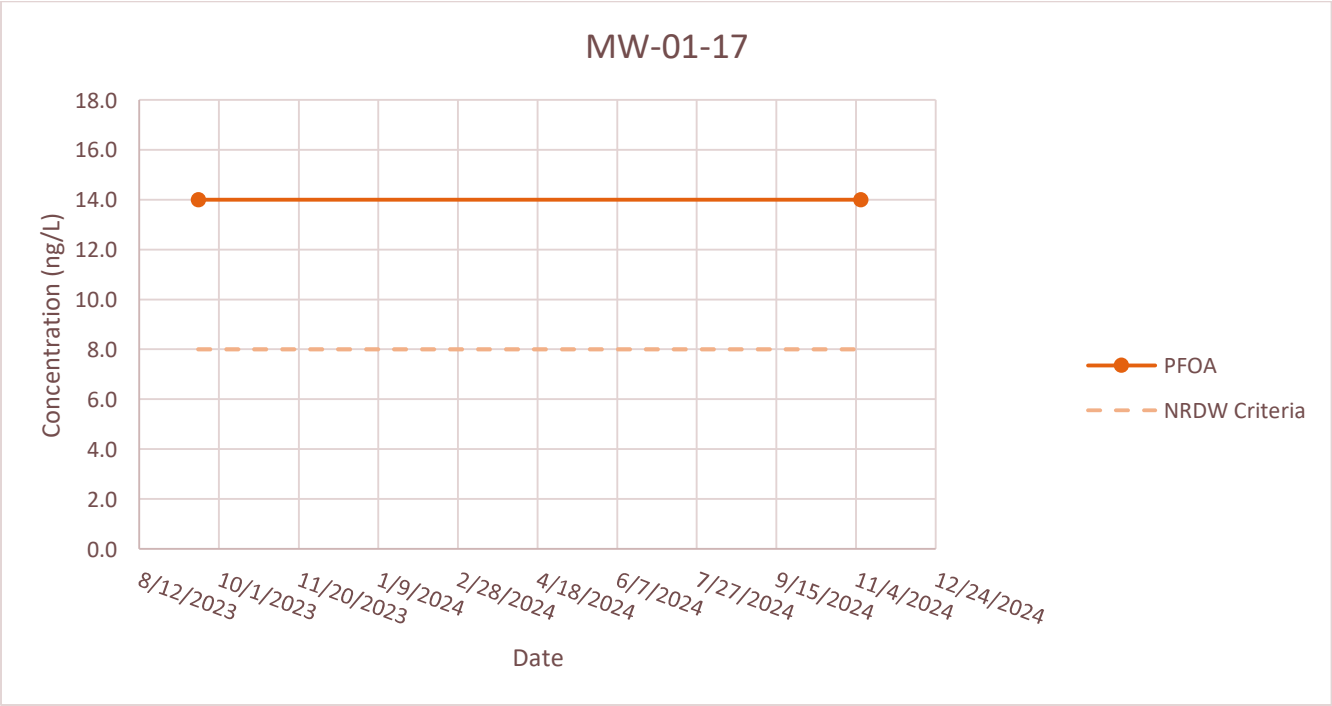


Appendix A

2024 Groundwater Trend Graphs

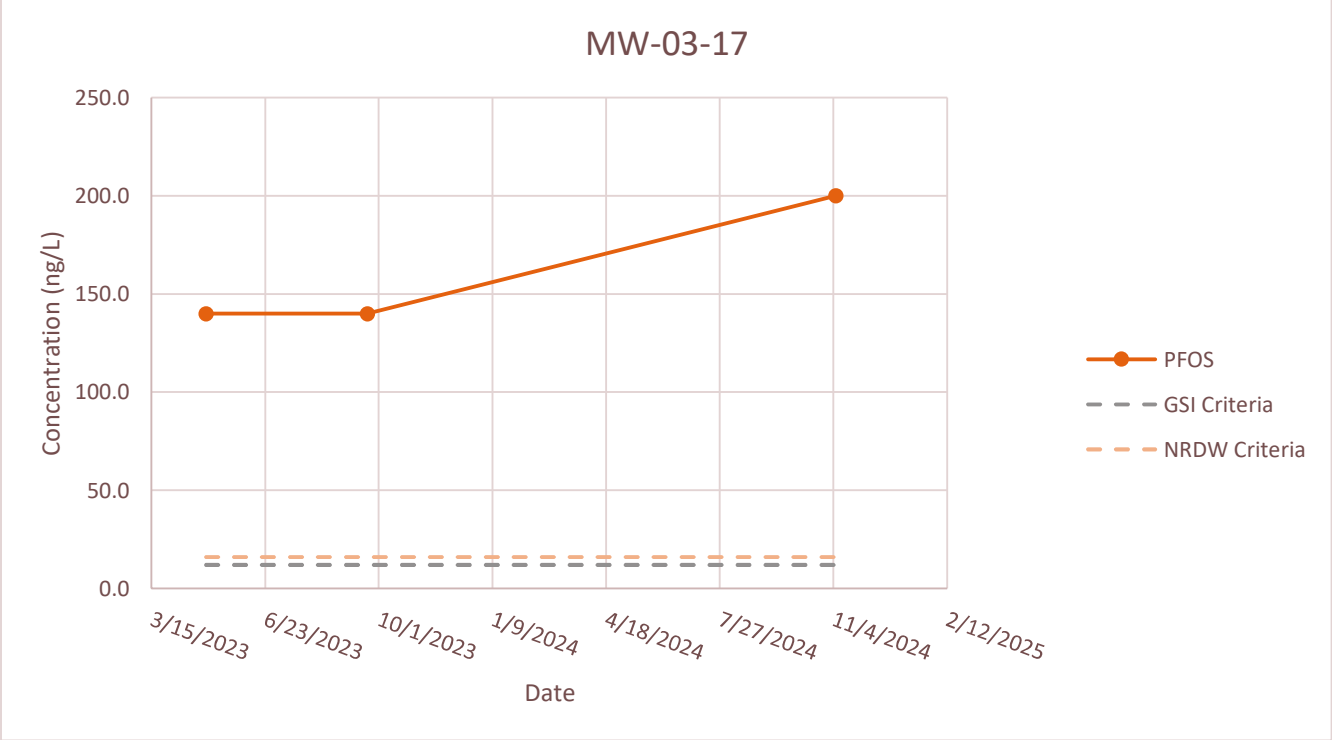
Southern Metal Fabrication Division

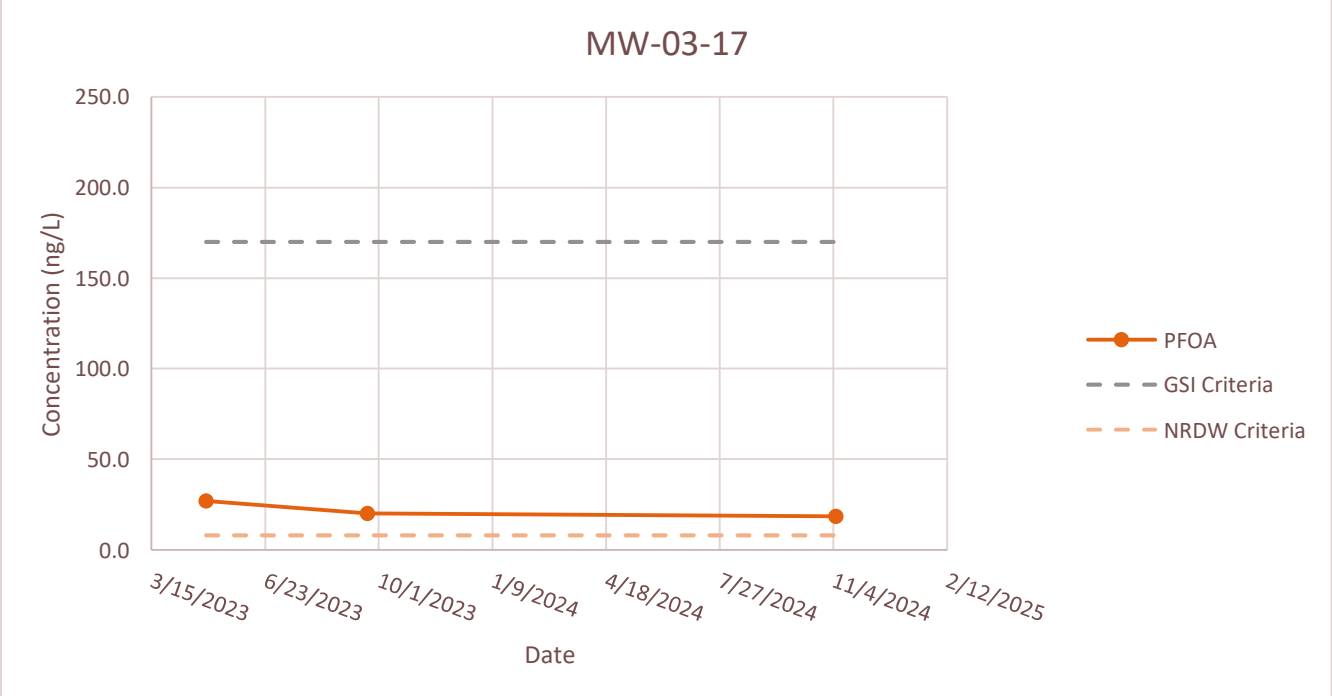




Appendix A

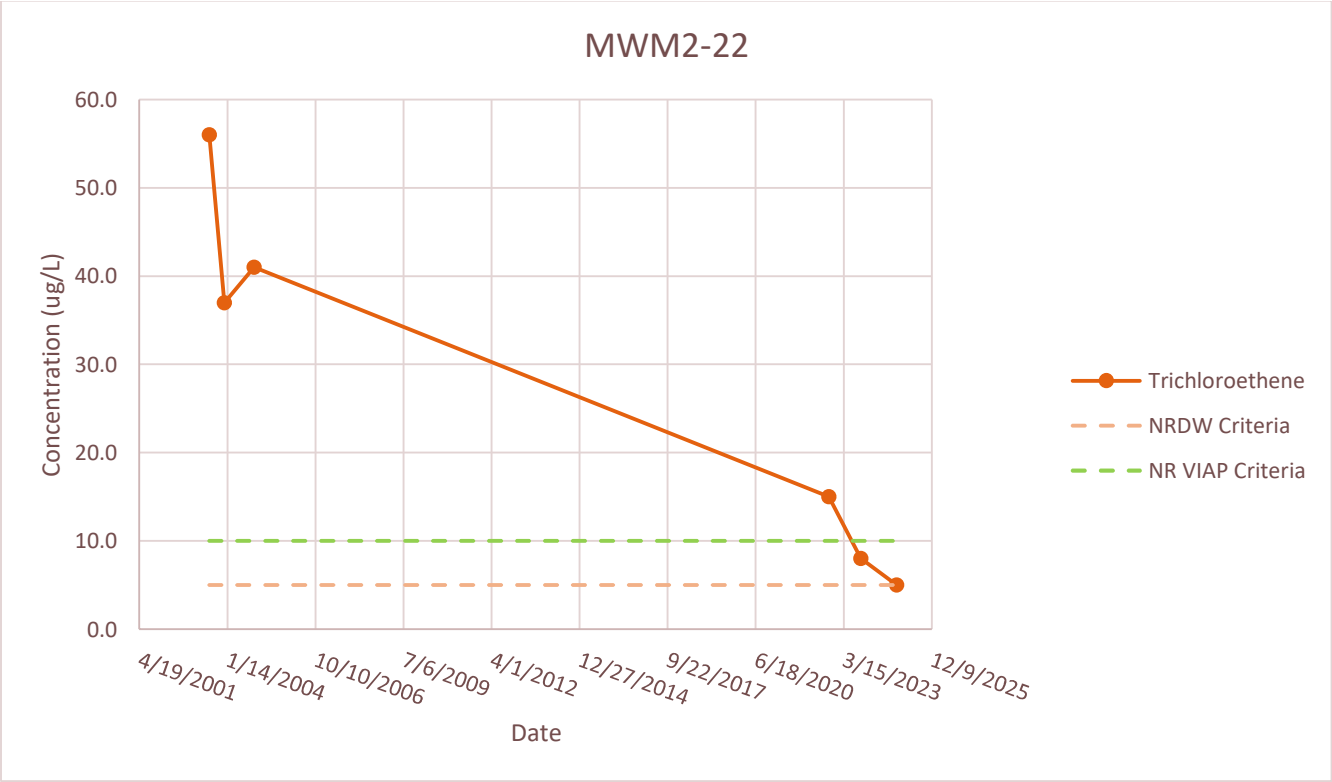
2024 Groundwater Trend Graphs

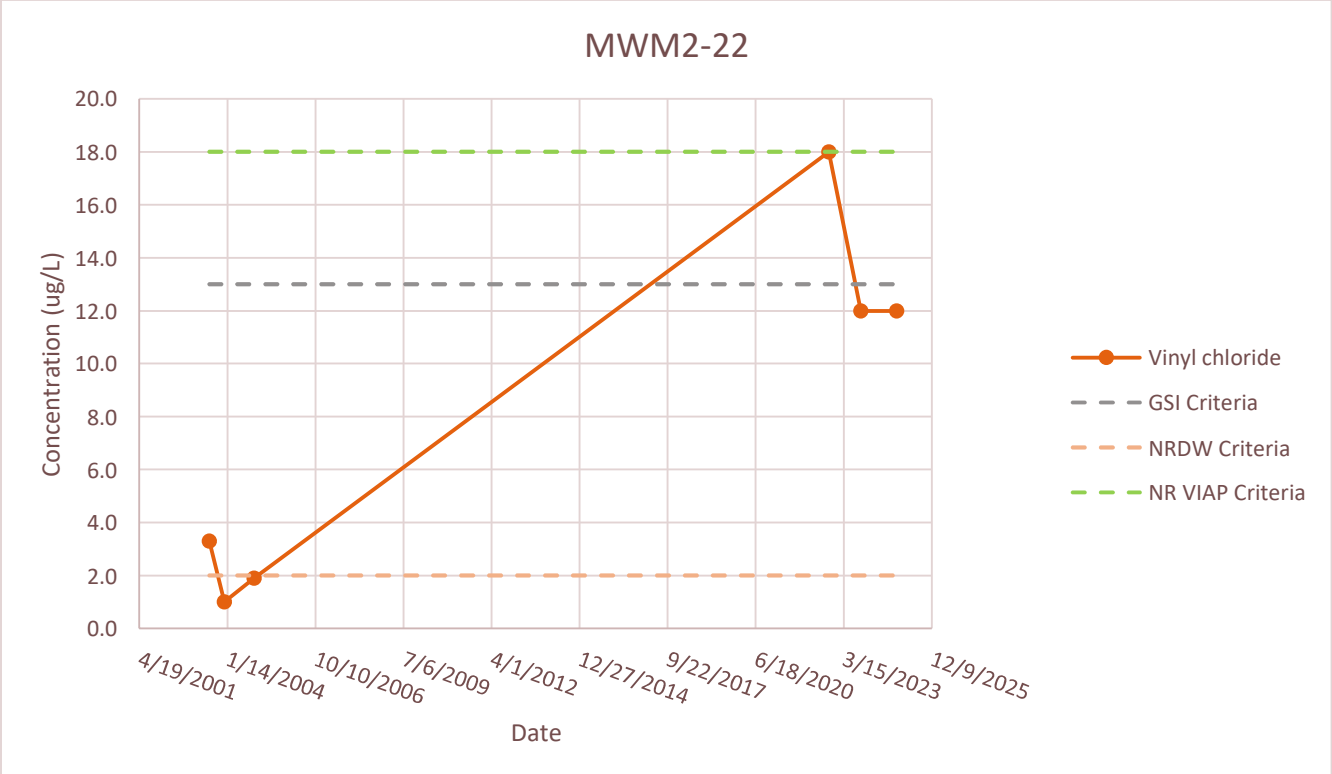




Appendix A

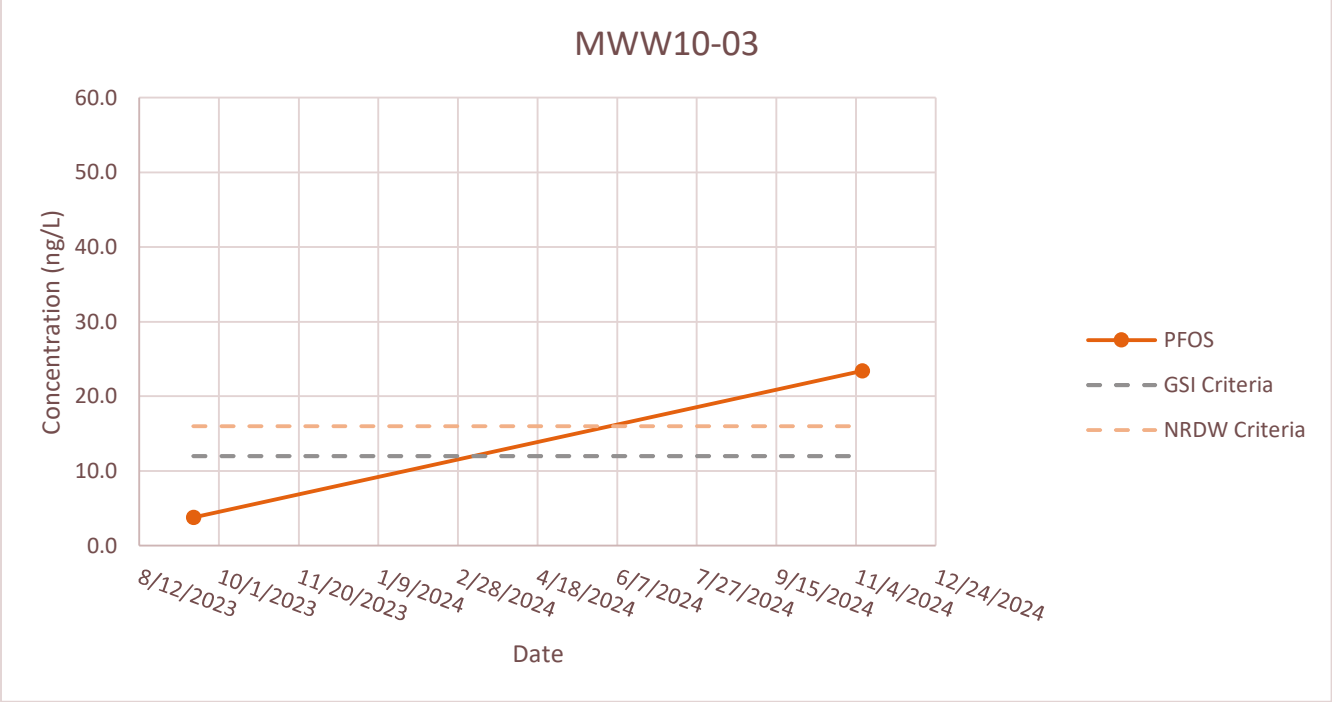
2024 Groundwater Trend Graphs

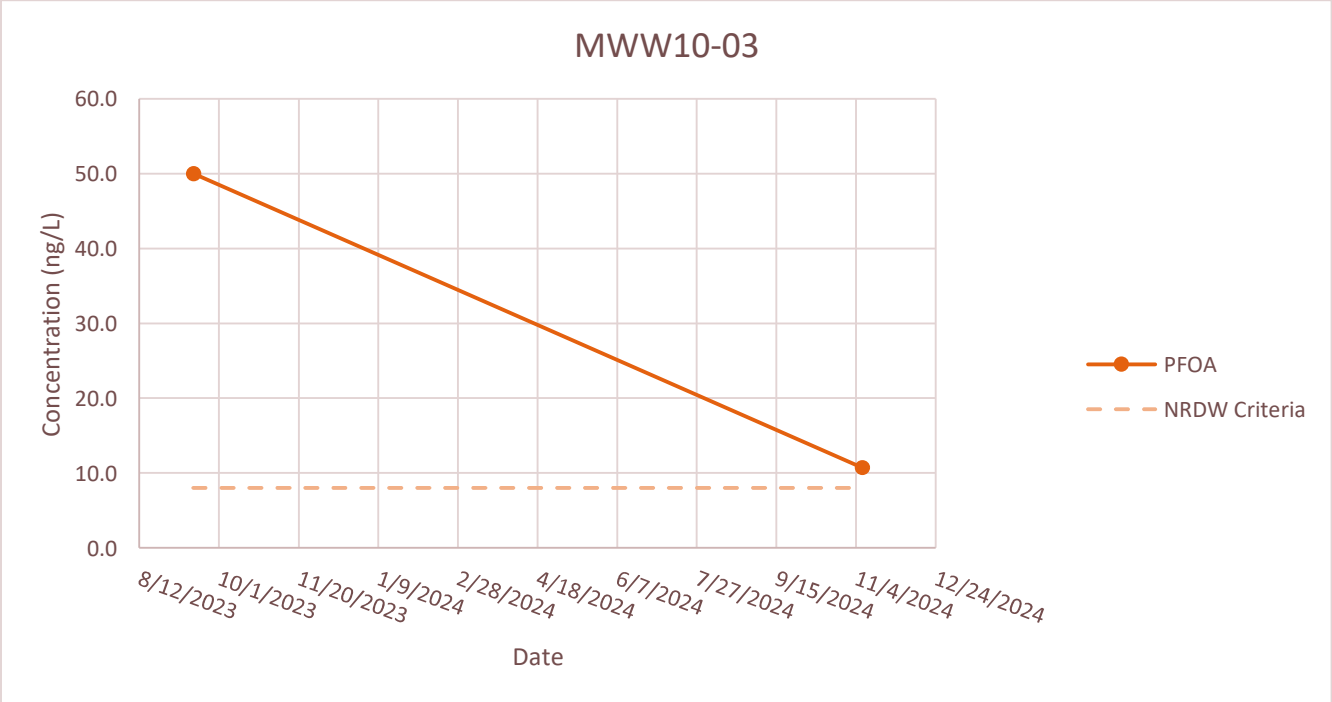




Appendix A

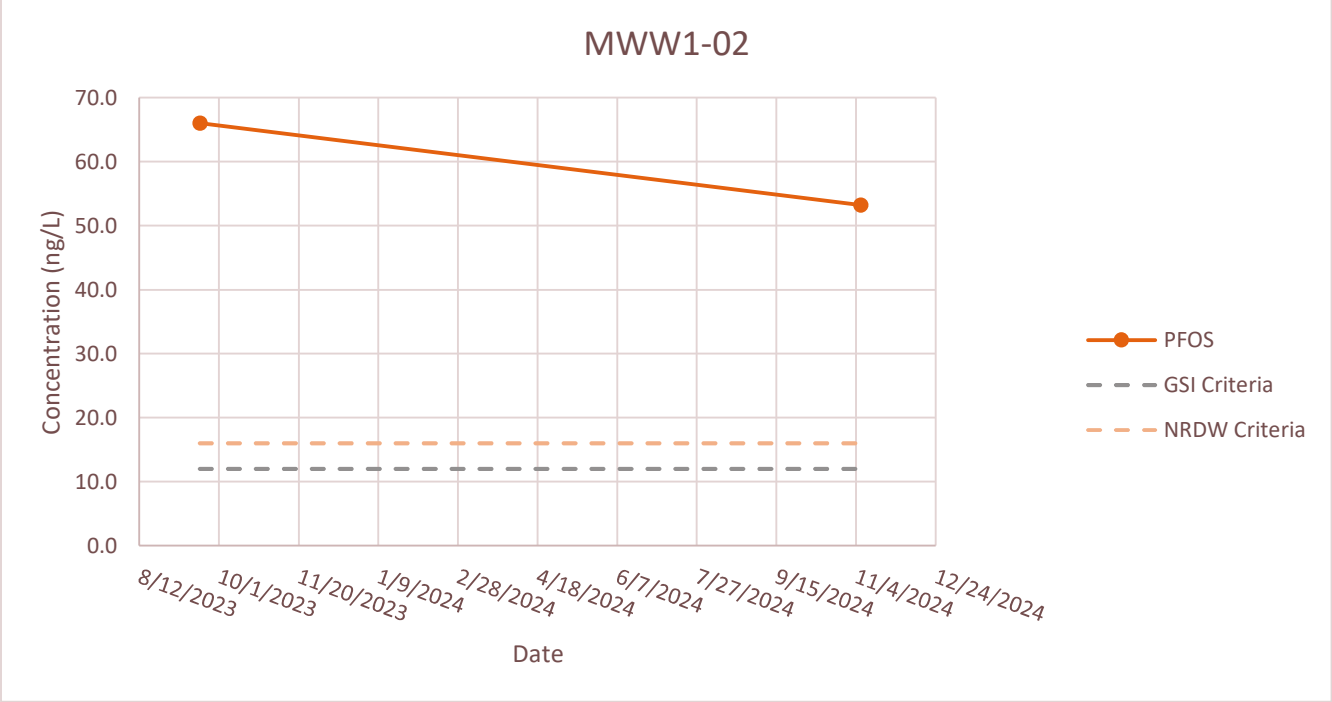
2024 Groundwater Trend Graphs

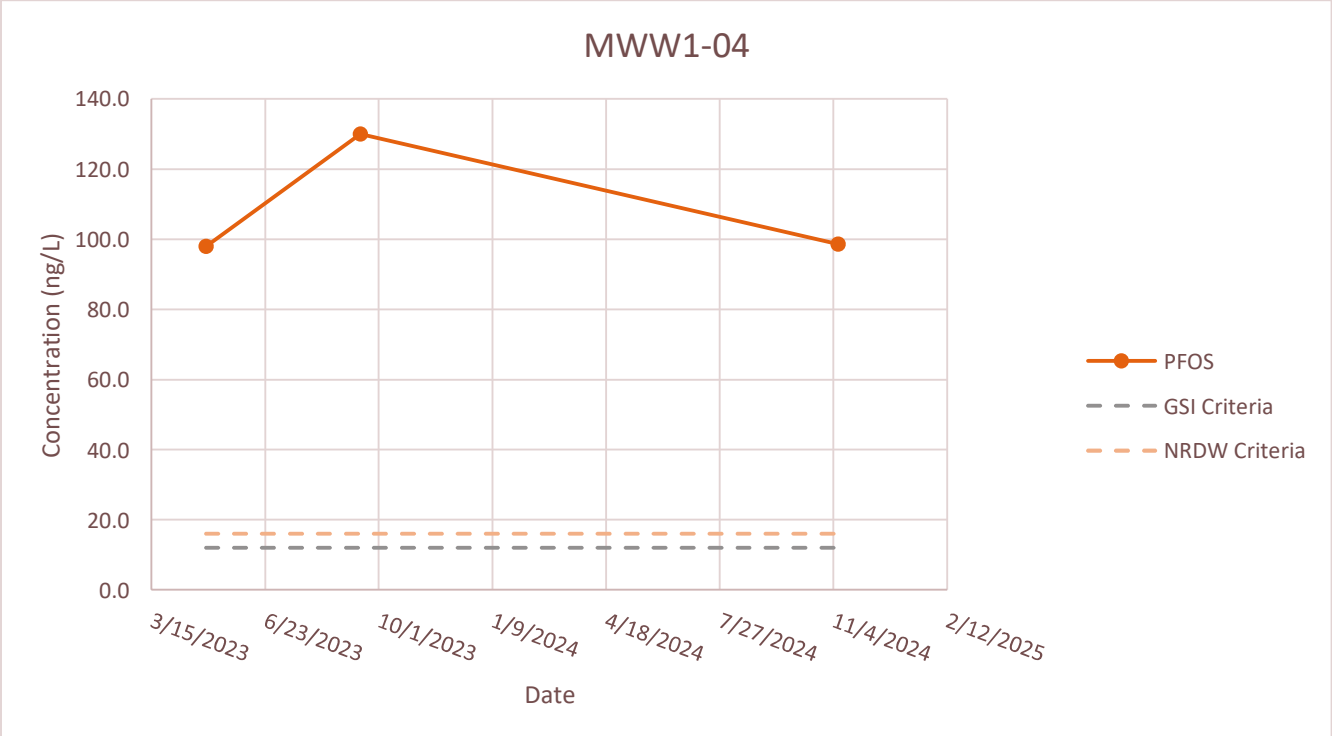




Appendix A

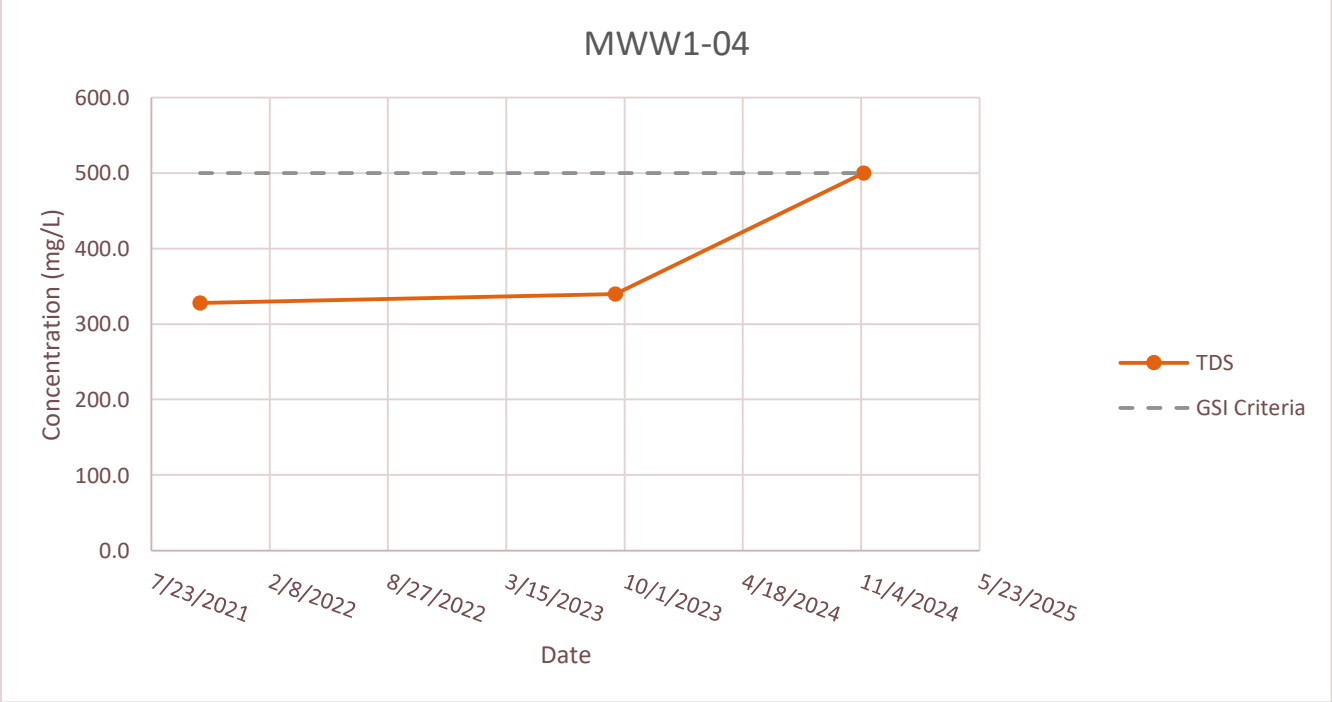
2024 Groundwater Trend Graphs

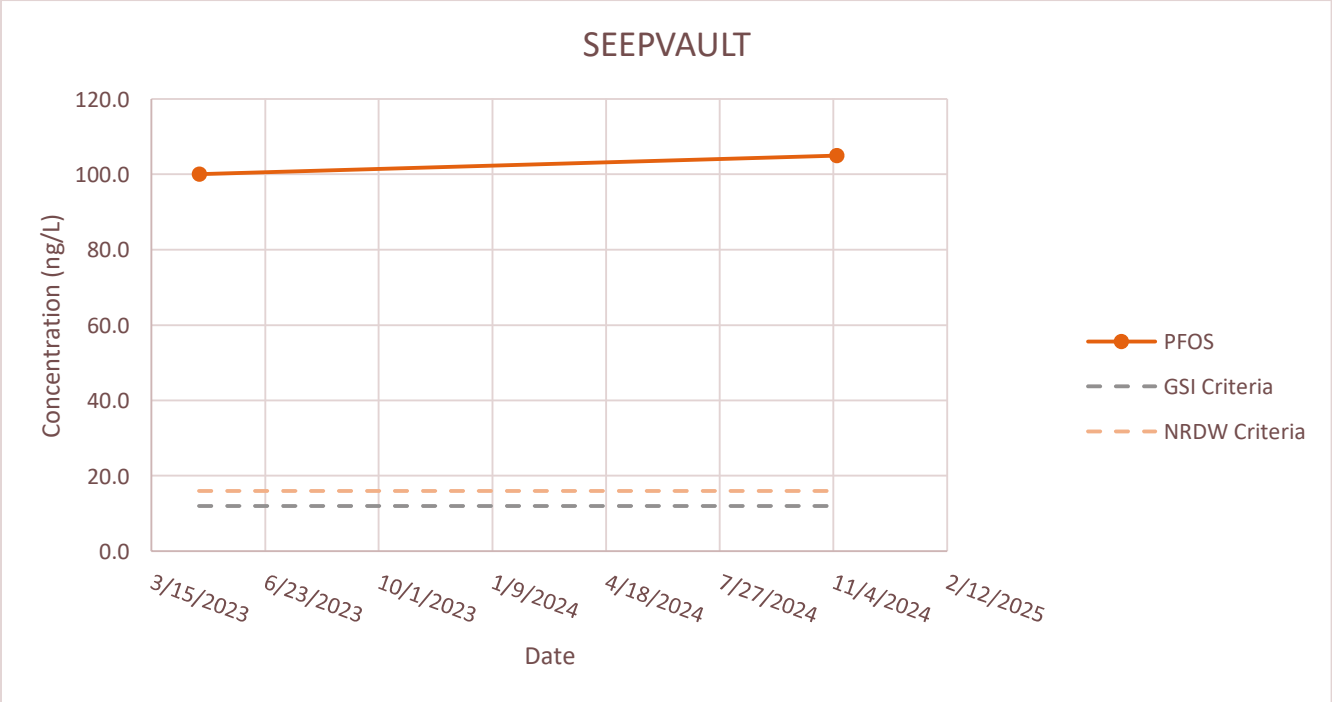




Appendix A

2024 Groundwater Trend Graphs

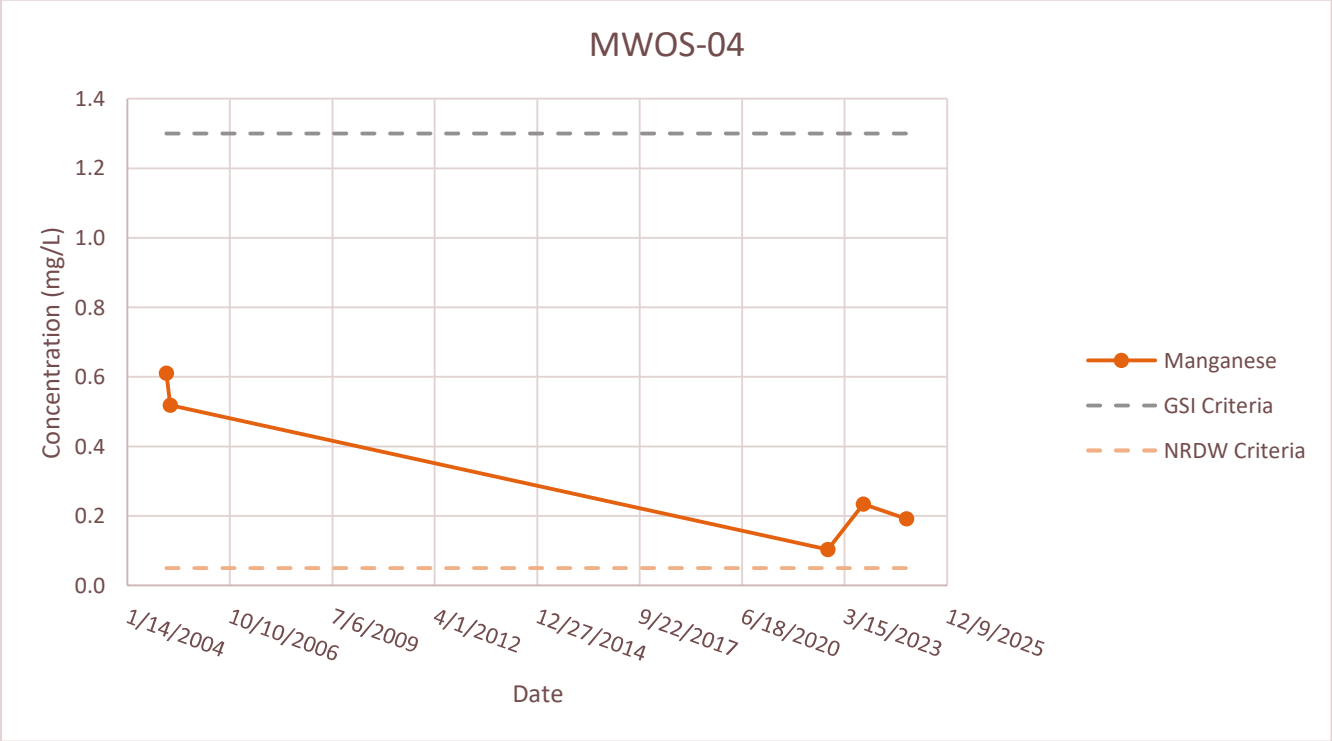


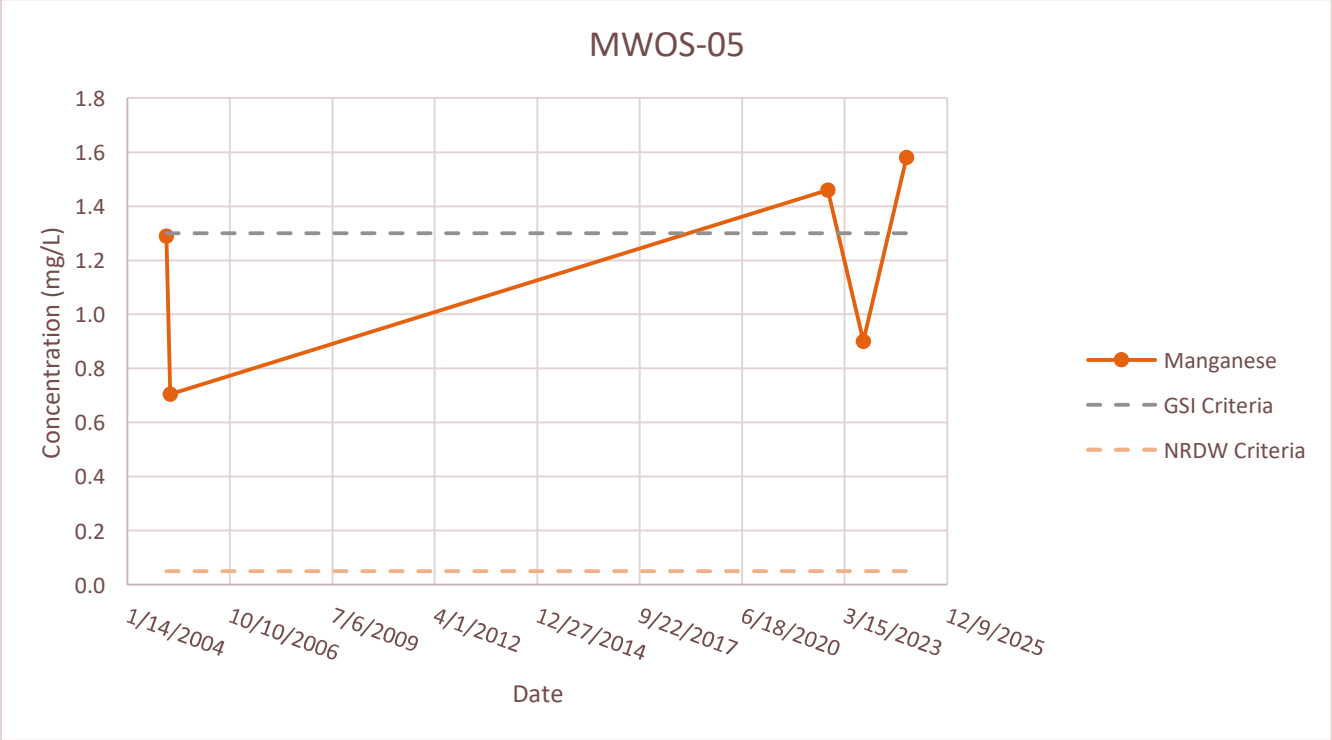


Appendix A

2024 Groundwater Trend Graphs

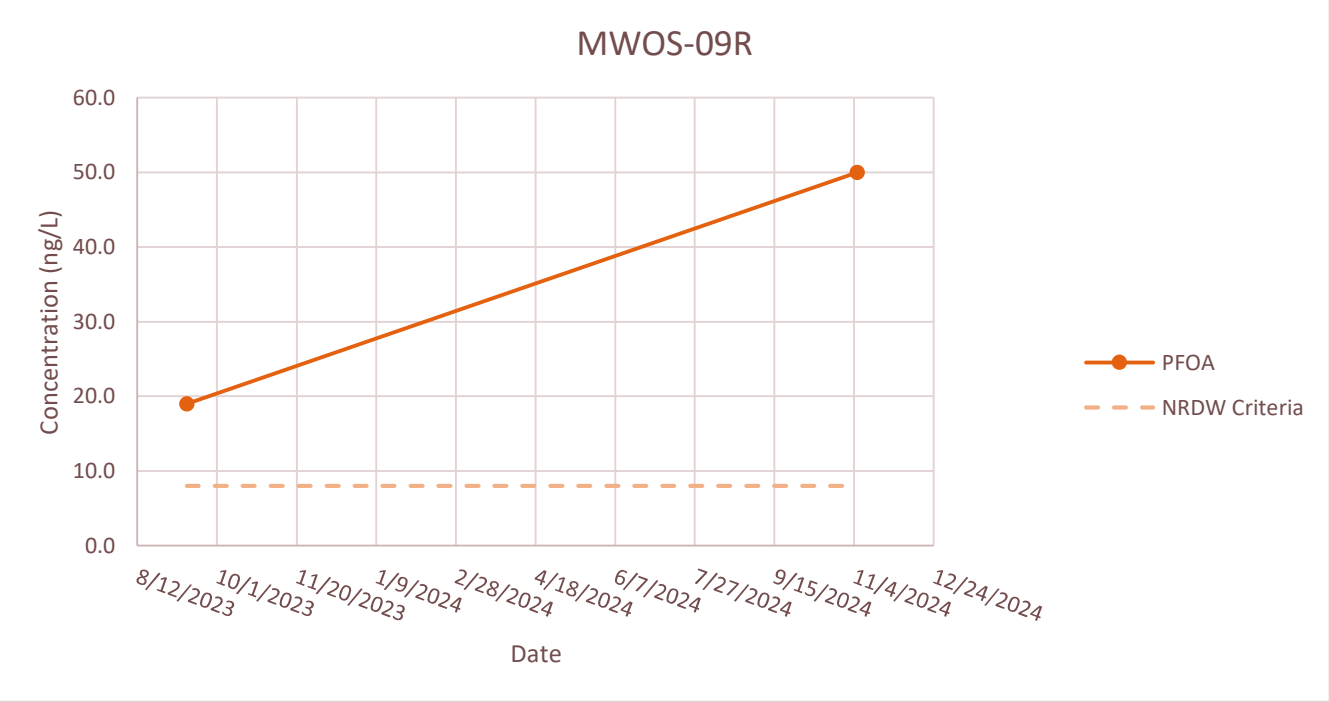
Offsite





Appendix A

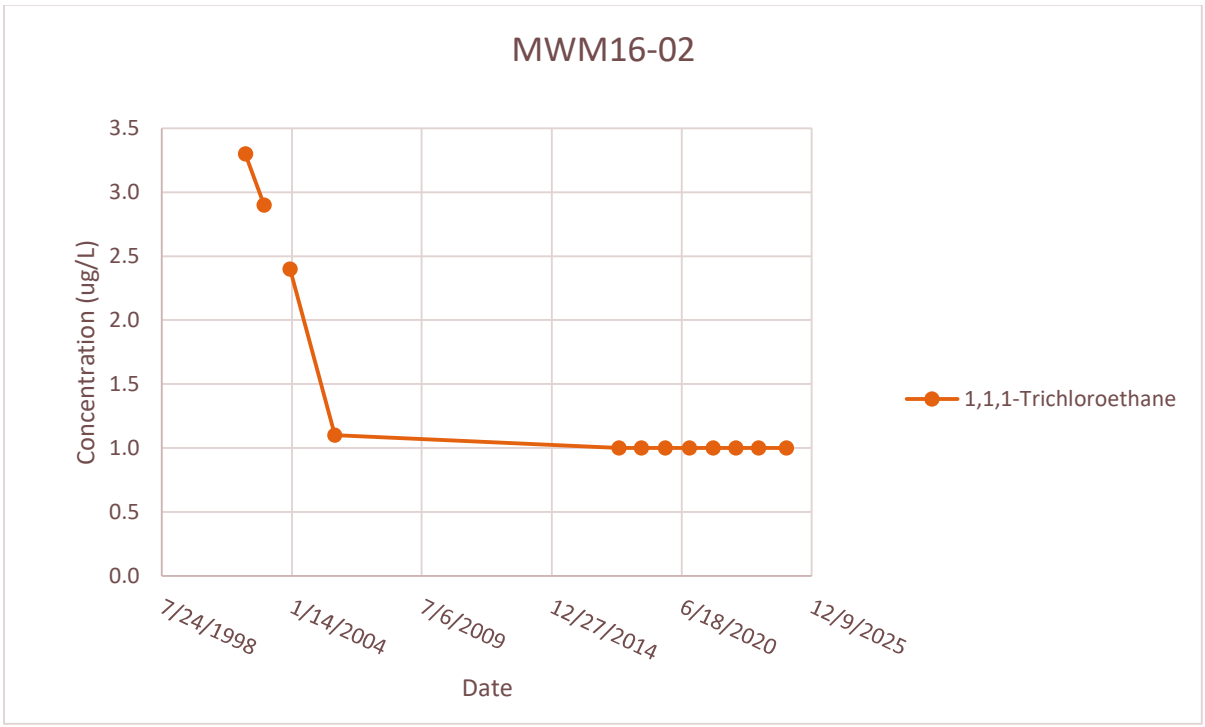
2024 Groundwater Trend Graphs

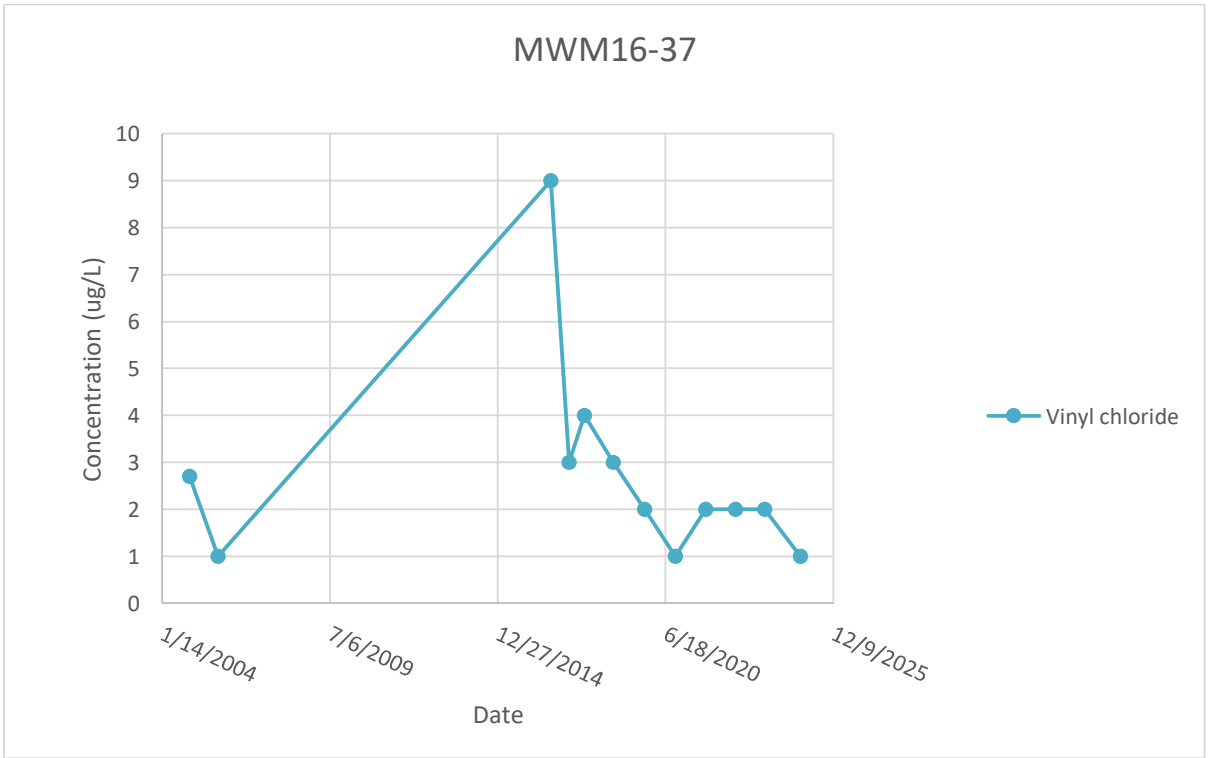


Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

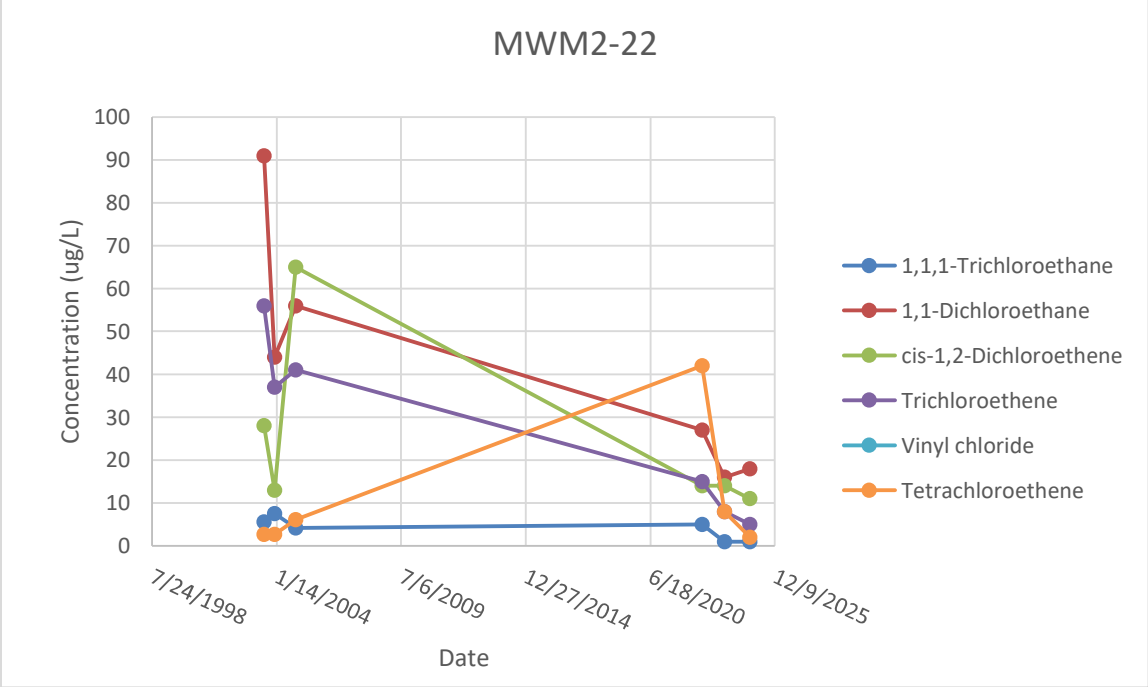
VOCs

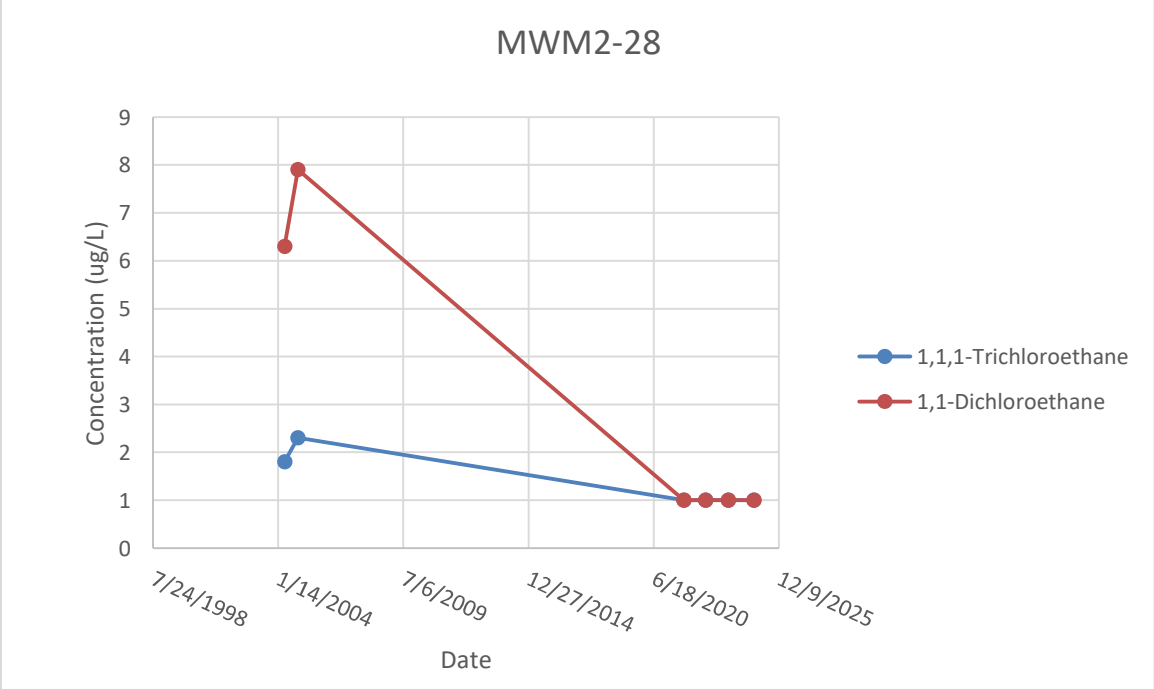




Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

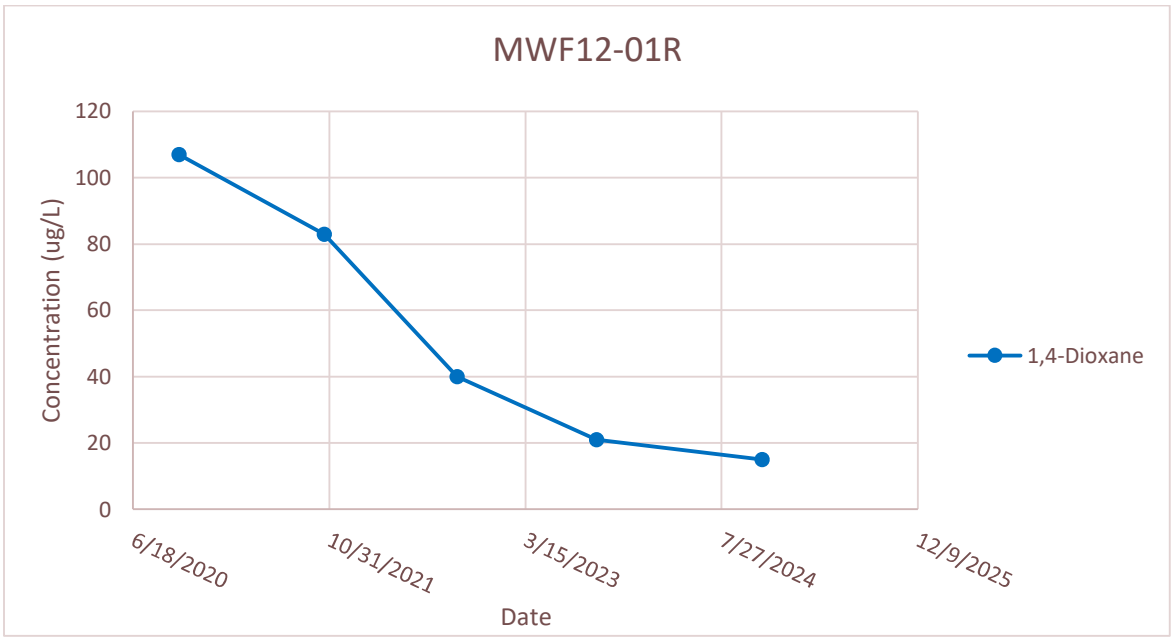


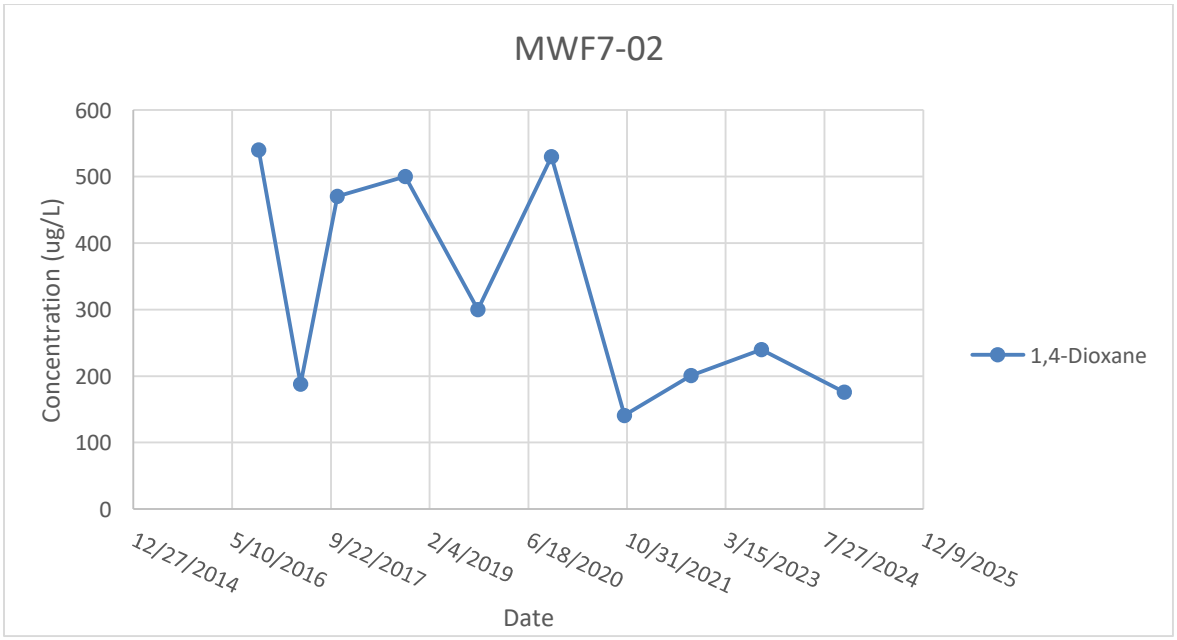


Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

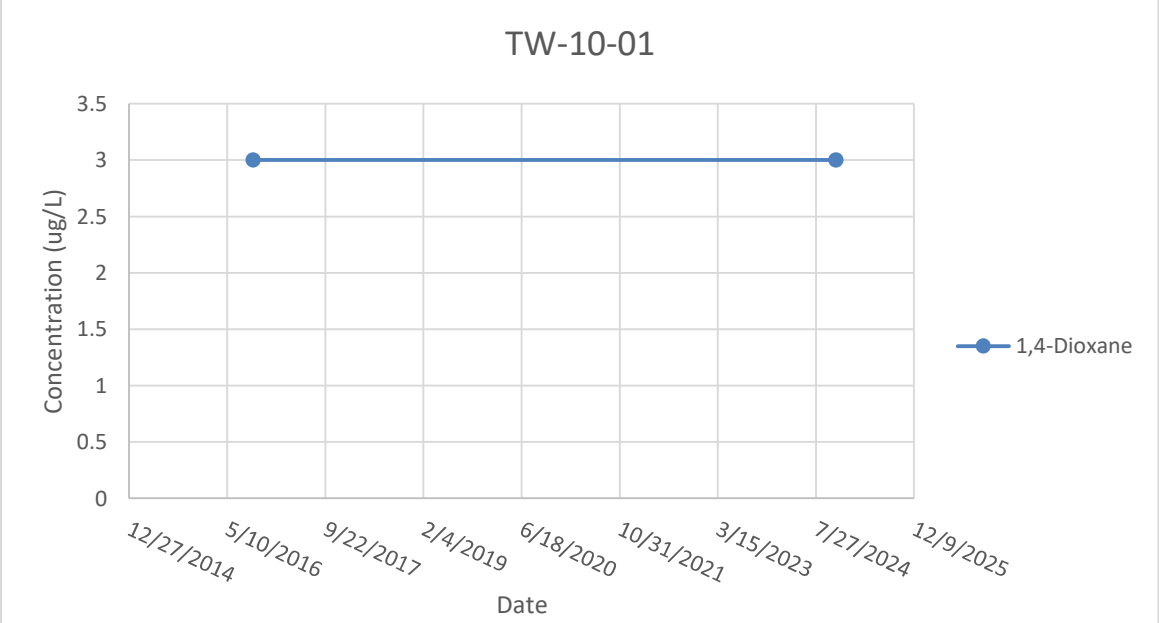
1,4-Dioxane



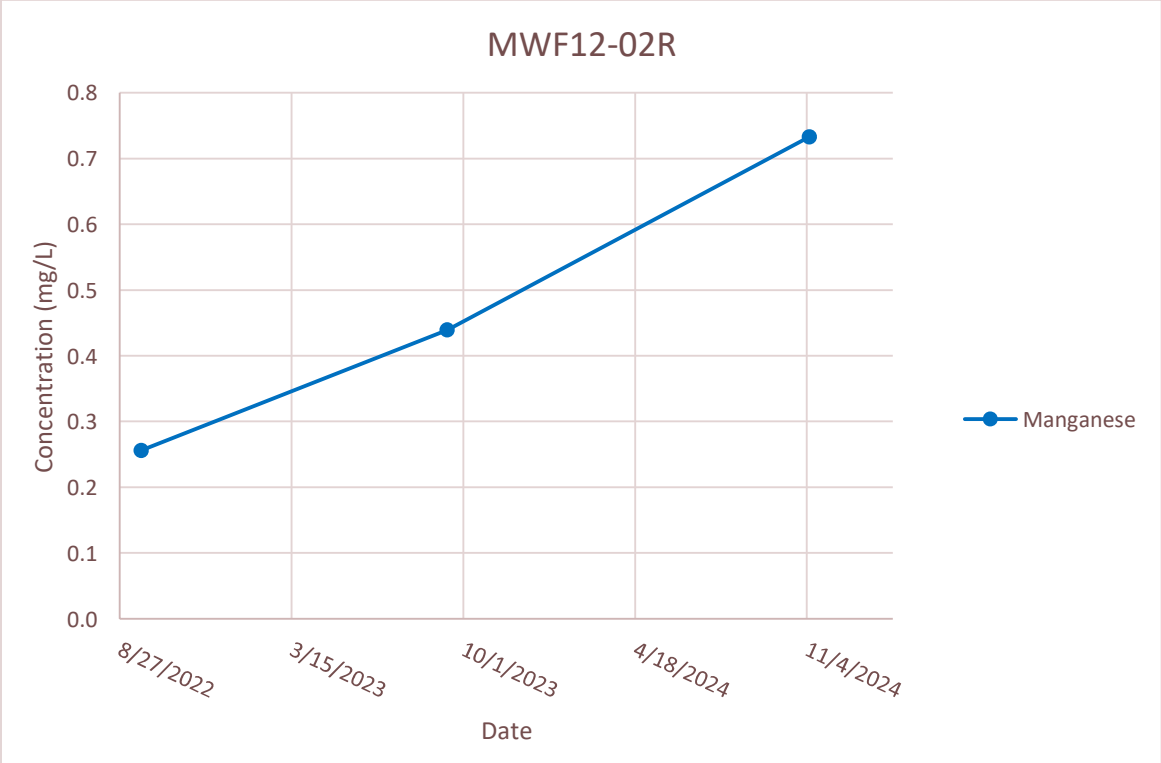


Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

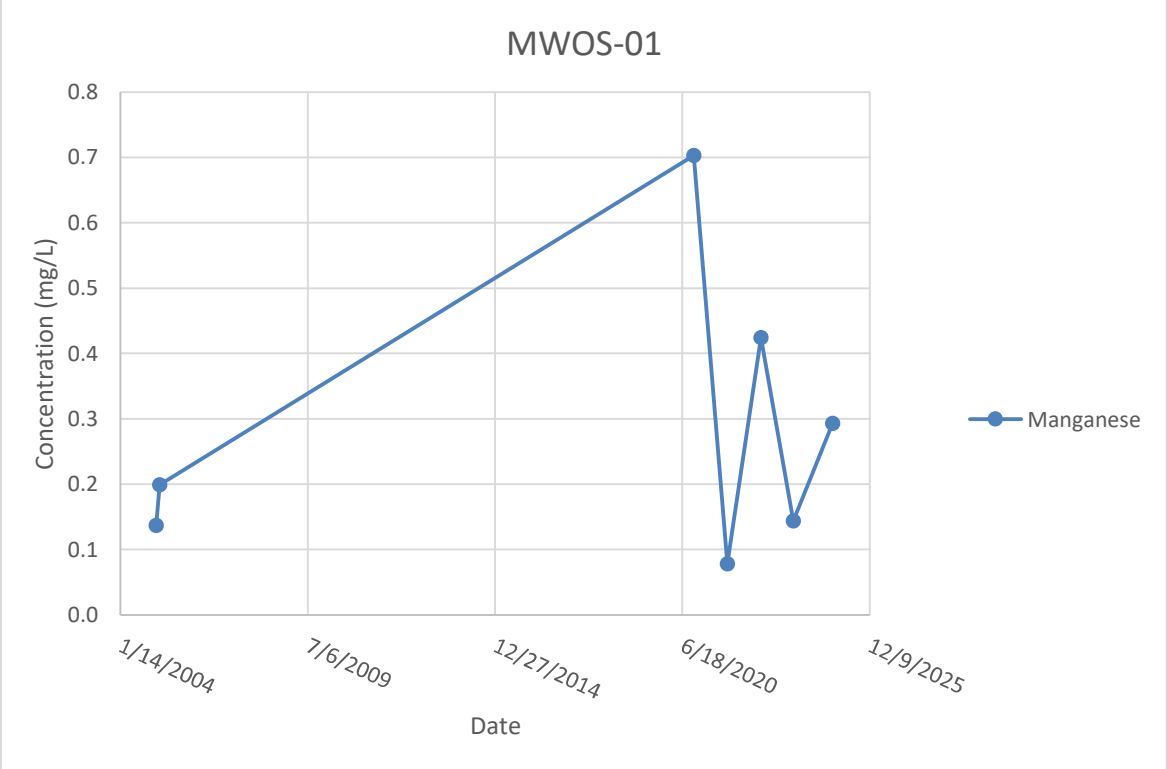


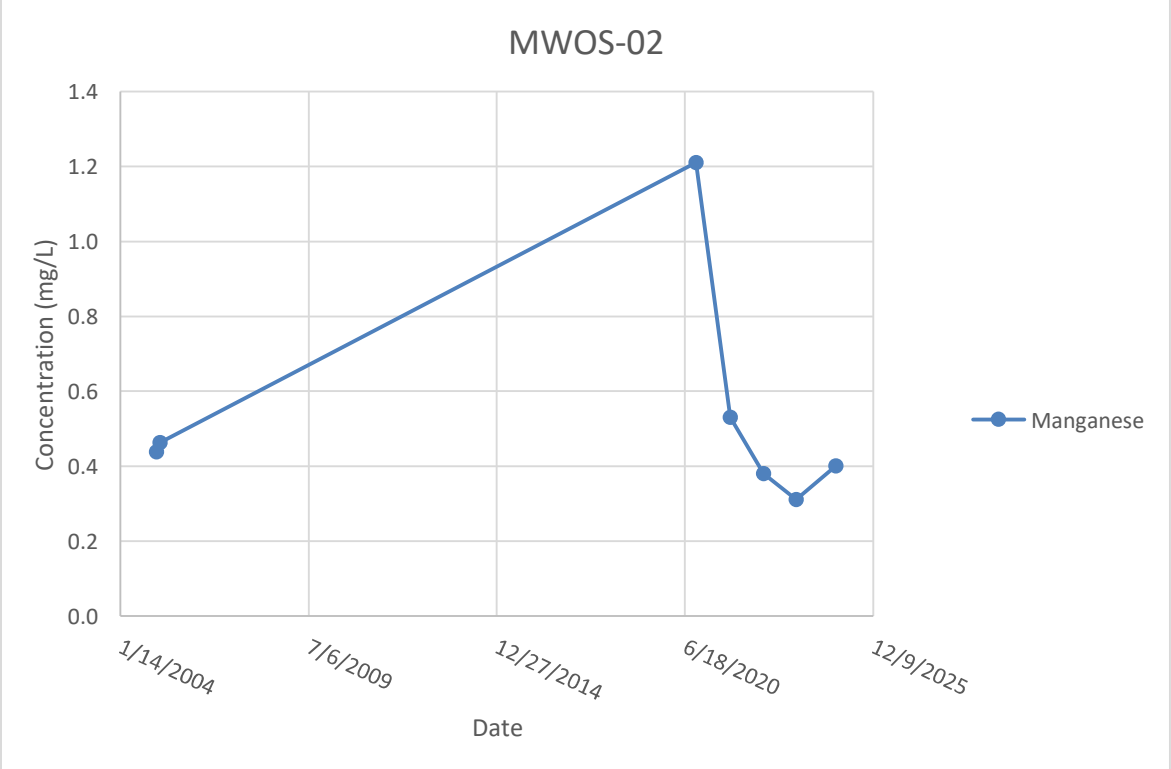
Metals



Appendix A

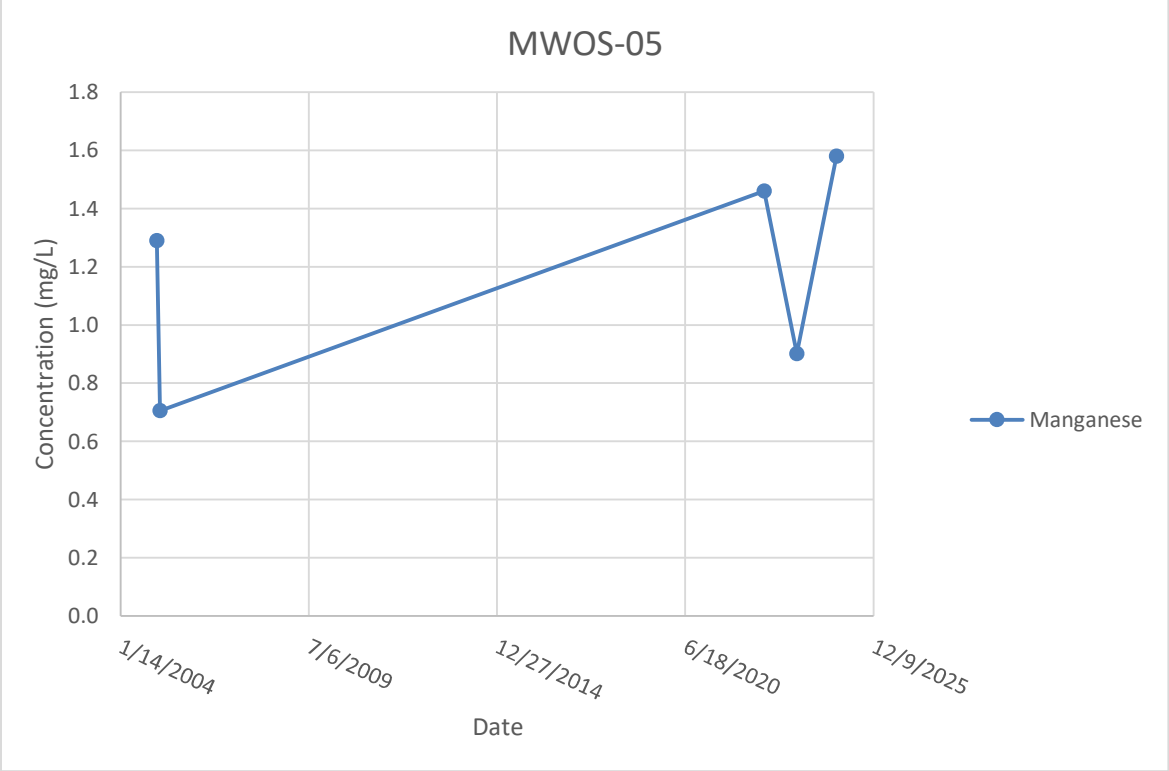
USEPA Additional Sampling Requested Trend Graphs - 2024

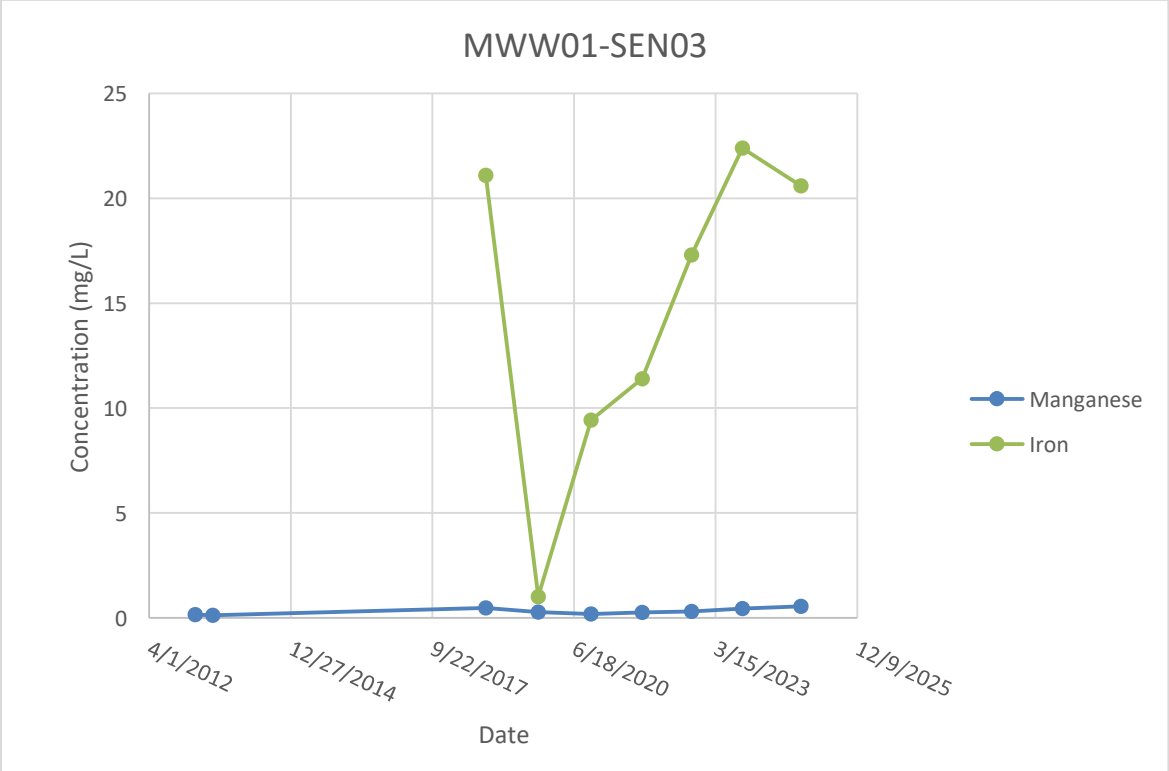




Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

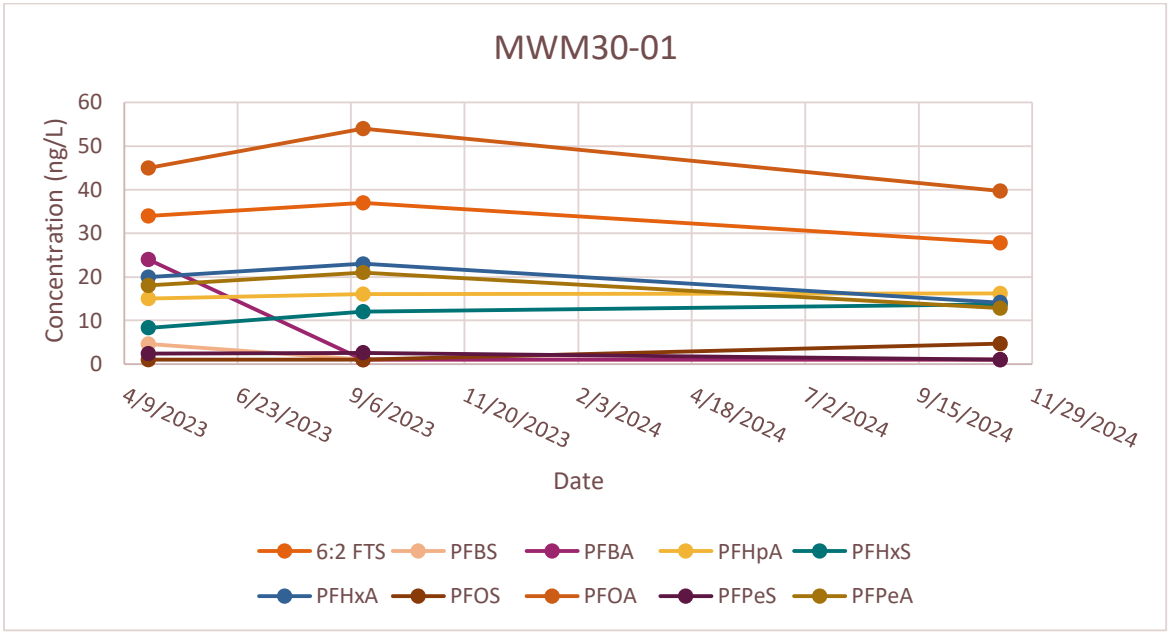


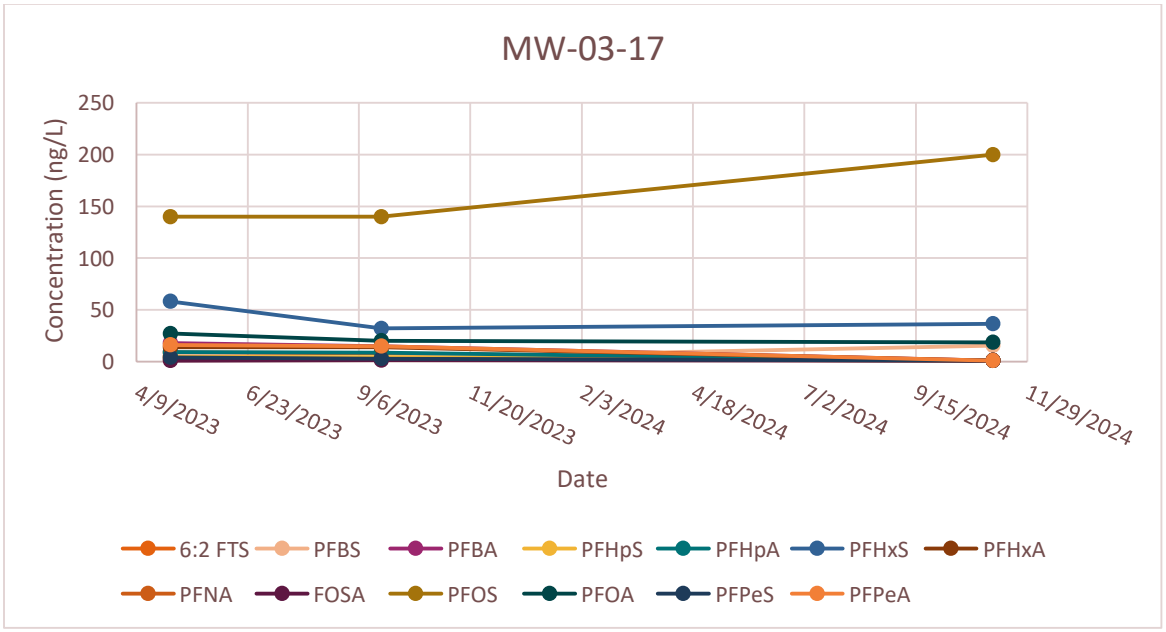


Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024

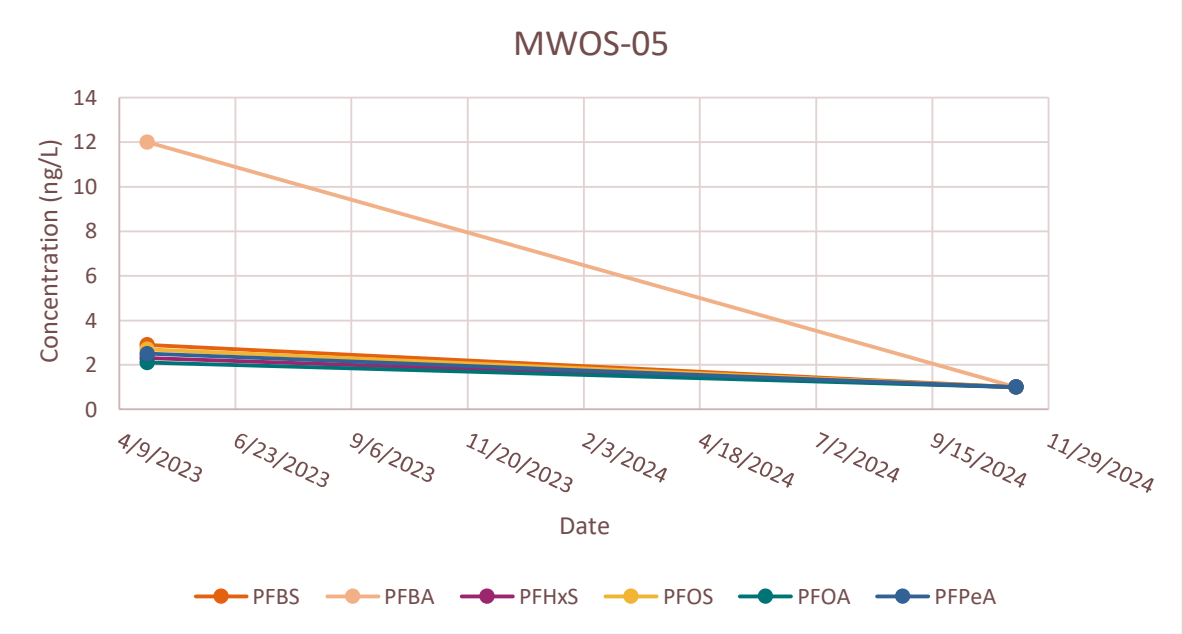
PFAS



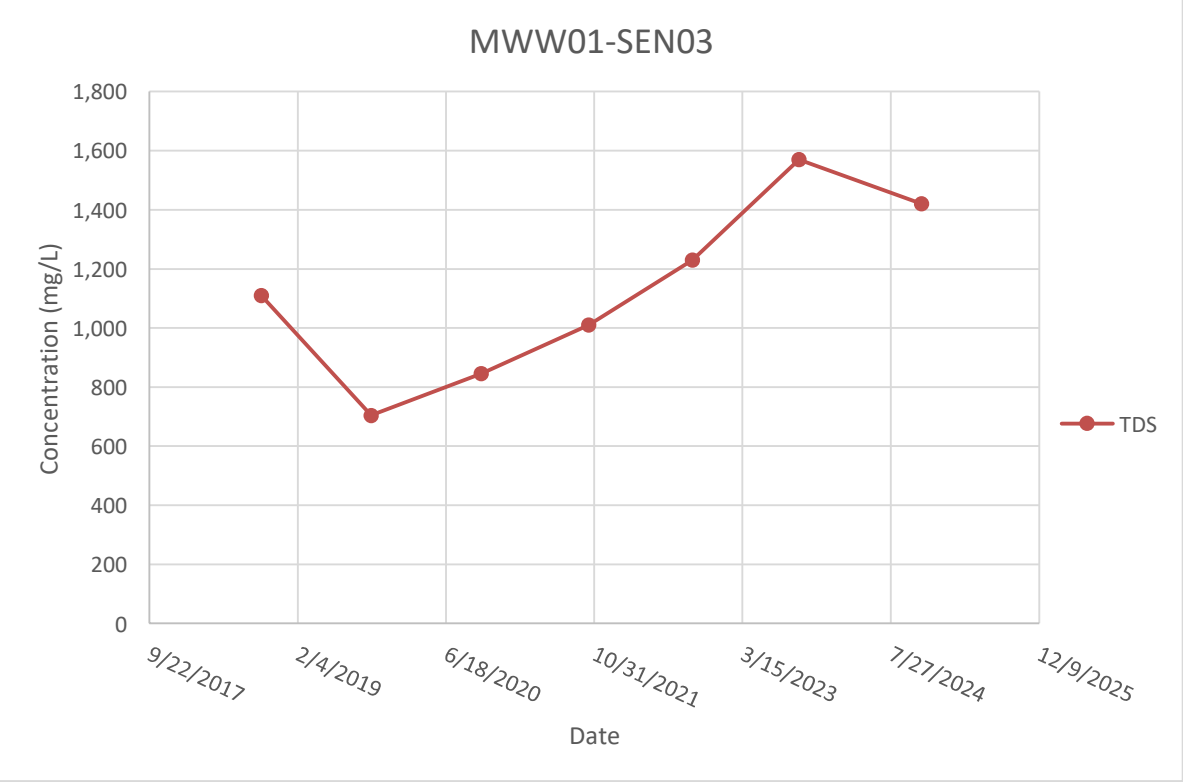


Appendix A

USEPA Additional Sampling Requested Trend Graphs - 2024



TDS



Appendix B

Groundwater Monitoring Plan Comparison Figures

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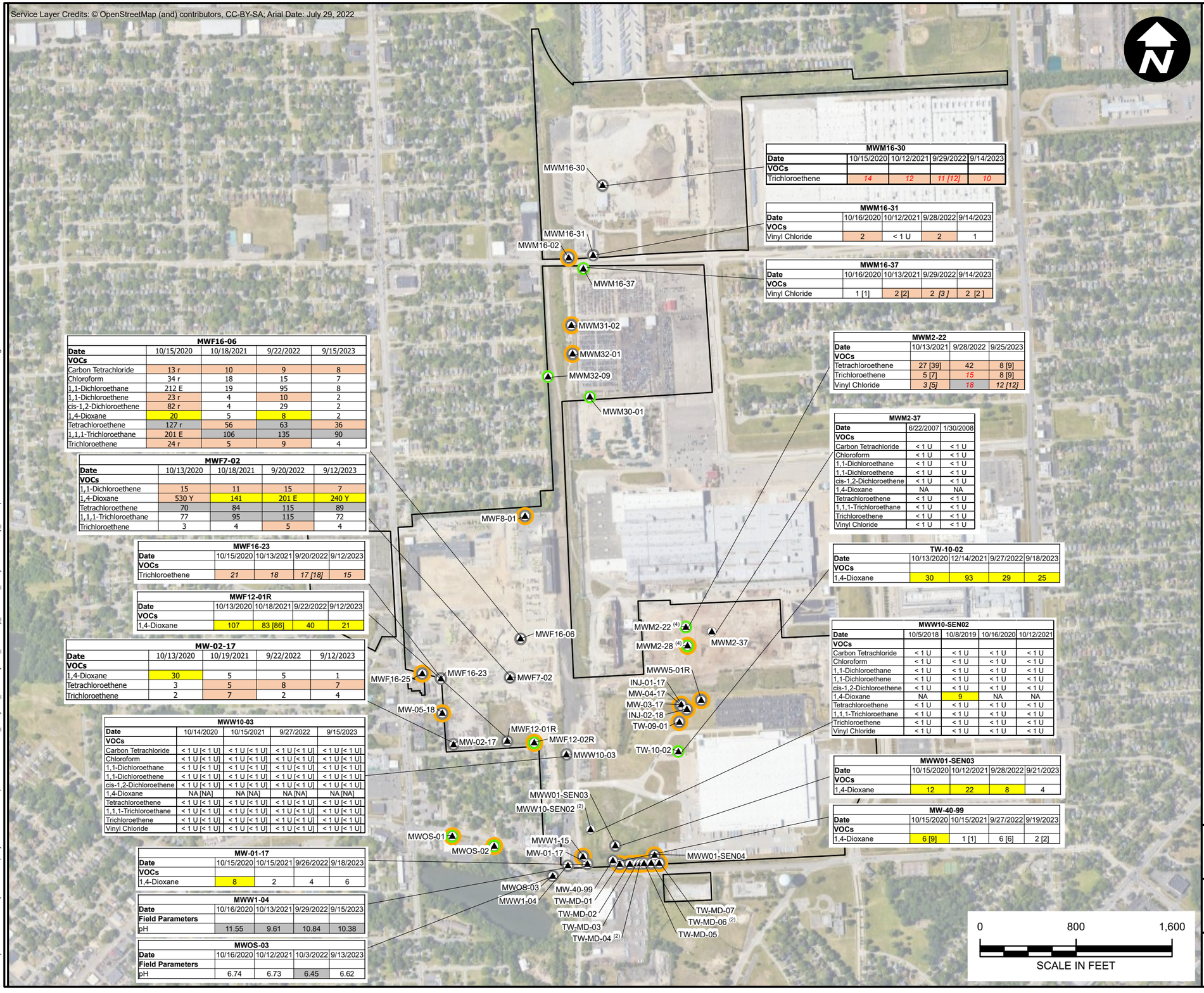


MWM16-30

Date	10/15/2020	10/12/2021	9/29/2022	9/14/2023
VOCs				
Trichloroethene	*14*	*12*	*11 [12]*	*10*

MWM16-31

Date	10/16/2020	10/12/2021	9/28/2022	9/14/2023
VOCs				
Vinyl Chloride	2	< 1 U	2	1

MWM16-37

Date	10/16/2020	10/13/2021	9/29/2022	9/14/2023
VOCs				
Vinyl Chloride	1 [1]	2 [2]	2 *[3]*	2 [2]

MWF16-06

Date	10/15/2020	10/18/2021	9/22/2022	9/15/2023
VOCs				
Carbon Tetrachloride	13 r	10	9	8
Chloroform	34 r	18	15	7
1,1-Dichloroethane	212 E	19	95	8
1,1-Dichloroethene	23 r	4	10	2
cis-1,2-Dichloroethene	82 r	4	29	2
1,4-Dioxane	20	5	8	2
Tetrachloroethene	127 r	56	63	36
1,1,1-Trichloroethane	201 E	106	135	90
Trichloroethene	24 r	5	9	4

MWF7-02

Date	10/13/2020	10/18/2021	9/20/2022	9/12/2023
VOCs				
1,1-Dichloroethene	15	11	15	7
1,4-Dioxane	530 Y	141	201 E	240 Y
Tetrachloroethene	70	84	115	89
1,1,1-Trichloroethane	77	95	115	72
Trichloroethene	3	4	5	4

MWF16-23

Date	10/15/2020	10/13/2021	9/20/2022	9/12/2023
VOCs				
Trichloroethene	*21*	*18*	*17 [18]*	*15*

MWF12-01R

Date	10/13/2020	10/18/2021	9/22/2022	9/12/2023
VOCs				
1,4-Dioxane	107	83 [86]	40	21

MW-02-17

Date	10/13/2020	10/19/2021	9/22/2022	9/12/2023
VOCs				
1,4-Dioxane	30	5	5	1
Tetrachloroethene	3	5	8	7
Trichloroethene	2	7	2	4

MWW10-03

Date	10/14/2020	10/15/2021	9/27/2022	9/15/2023
VOCs				
Carbon Tetrachloride	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
Chloroform	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
1,1-Dichloroethane	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
1,1-Dichloroethene	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
cis-1,2-Dichloroethene	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
1,4-Dioxane	NA [NA]	NA [NA]	NA [NA]	NA [NA]
Tetrachloroethene	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
1,1,1-Trichloroethane	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
Trichloroethene	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]
Vinyl Chloride	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]	< 1 U [< 1 U]

MW-01-17

Date	10/15/2020	10/15/2021	9/26/2022	9/18/2023
VOCs				
1,4-Dioxane	8	2	4	6

MWW1-04

Date	10/16/2020	10/13/2021	9/29/2022	9/15/2023
Field Parameters				
pH	11.55	9.61	10.84	10.38

MWOS-03

Date	10/16/2020	10/12/2021	10/3/2022	9/13/2023
Field Parameters				
pH	6.74	6.73	6.45	6.62

MWM2-22

Date	10/13/2021	9/28/2022	9/25/2023
VOCs			
Tetrachloroethene	27 [39]	42	8 [9]
Trichloroethene	5 [7]	*15*	8 [9]
Vinyl Chloride	*3 [5]*	*18*	*12 [12]*

MWM2-37

Date	6/22/2007	1/30/2008
VOCs		
Carbon Tetrachloride	< 1 U	< 1 U
Chloroform	< 1 U	< 1 U
1,1-Dichloroethane	< 1 U	< 1 U
1,1-Dichloroethene	< 1 U	< 1 U
cis-1,2-Dichloroethene	< 1 U	< 1 U
1,4-Dioxane	NA	NA
Tetrachloroethene	< 1 U	< 1 U
1,1,1-Trichloroethane	< 1 U	< 1 U
Trichloroethene	< 1 U	< 1 U
Vinyl Chloride	< 1 U	< 1 U

TW-10-02

Date	10/13/2020	12/14/2021	9/27/2022	9/18/2023
VOCs				
1,4-Dioxane	30	93	29	25

MWW10-SEN02

Date	10/5/2018	10/8/2019	10/16/2020	10/12/2021
VOCs				
Carbon Tetrachloride	< 1 U	< 1 U	< 1 U	< 1 U
Chloroform	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dioxane	NA	9	NA	NA
Tetrachloroethene	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl Chloride	< 1 U	< 1 U	< 1 U	< 1 U

MWW01-SEN03

Date	10/15/2020	10/12/2021	9/28/2022	9/21/2023
VOCs				
1,4-Dioxane	12	22	8	4

MW-40-99

Date	10/15/2020	10/15/2021	9/27/2022	9/19/2023
VOCs				
1,4-Dioxane	6 [9]	1 [1]	6 [6]	2 [2]

0 800 1,600

SCALE IN FEET

LEGEND

- EXISTING MONITORING WELL
- PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- LOCATION PREVIOUSLY SAMPLED THAT WAS REMOVED FROM THE PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- NO EXCEEDANCES OF CRITERIA FROM SAMPLING EVENTS BETWEEN 2020-2023
- CURRENT OR FORMER RACER PROPERTY

NOTE: WELLS LOCATED AT FIERO PROPERTIES MAY BE INCLUDED IN THE FIERO TEMPORARY MONITORING PROGRAM AND ARE NOT REFLECTED ON THIS FIGURE.

	Units	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Residential Volatilization to Indoor Air Pathway Screening Levels	Nonresidential Volatilization to Indoor Air Pathway Screening Levels	Residential Fiero SSVIAC Slab On Grade*	Residential Fiero SSVIAC Basement*
Field Paramters								
ph	SU	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	- -	- -	- -	- -
VOCs								
Carbon Tetrachloride	ug/L	5	5	38	*7.7*	18	14	7.2
Chloroform	ug/L	80	80	350	*14*	32	19	10
1,1-Dichloroethane	ug/L	880	2,500	740	*130*	300	160	88
1,1-Dichloroethene	ug/L	7	7	130	*330*	480	410	220
cis-1,2-Dichloroethene	ug/L	70	70	620	*95*	140	110	62
1,4-Dioxane	ug/L	7.2	350	280	*56,000*	130,000	43,000	22,000
Tetrachloroethene	ug/L	5	5	60	*130*	130	250	130
1,1,1-Trichloroethane	ug/L	200	200	89	*14,000*	19,000	22,000	11,000
Trichloroethene	ug/L	5	5	200	*10*	10	15	8.1
Vinyl Chloride	ug/L	2	2	13	*2.1*	18	2.2	1.2

* ONLY APPLIES TO WELLS ON FORMER FIERO PROPERTY

E CRITERION IS THE AESTHETIC DRINKING WATER VALUE, AS REQUIRED BY SECTION 20120A(5) OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED (NREPA)

SSVIAC SITE SPECIFIC VOLATILIZATION TO INDOOR AIR CRITERIA

< NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT.

SU STANDARD UNIT

[ ] DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.

VOC VOLATILE ORGANIC COMPOUND

E CONCENTRATIONS EXCEEDS CALIBRATION RANGE

Y ELEVATED REPORTING LIMIT DUE TO HIGH TARGET CONCENTRATIONS

U COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE R COMPOUND QUANTITATION LIMIT.

r ANALYTE REPORTED FROM BEST RESULTS FROM MULTIPLE RUNS. MULTIPLE RUNS COMPLETED DUE TO ELEVATED CONCENTRATIONS AND DILUTION IS REQUIRED.

NOTES:

1. ALL CONCENTRATIONS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).

2. IN 2023 TW-MD-04 WAS UNABLE TO BE SAMPLED DUE TO WELL CASING DAMAGE, TW-MD-06 WAS UNABLE TO BE SAMPLED DUE TO THE PRESENCE OF LNAPL, AND MWW10-SEN02 WAS UNABLE TO BE SAMPLED DUE TO INSUFFICENT WATER IN THE MONITORING WELL.

3. MONITORING WELLS SHOWN ARE INCLUDED IN THE CURRENT GROUNDWATER MONITORING PLAN FOR THE SITE.

4. MWM2-22 AND MWM2-28 ARE CURRENTLY INCORPORATED INTO THE GROUNDWATER MONITORING PLAN AND WERE SAMPLED IN 2023 BASED ON USEPA REQUEST.

5. DATABOXES PRESENTED ON THIS FIGURE INCLUDE ONLY THOSE PARAMETERS WHERE REGULATORY EXCEEDANCES OF PROMULGATED CRITERIA EXISTS ANYTIME FROM 2020-2023. MWW10-03, MWW10-SEN02, AND MWM2-37 DATA PRESENTED ON FIGURE TO SUPPORT THE ELIMINATION OF SAMPLING FOR VOCS.

6. PH RDW AND NRDW CRITERIA REPRESENT AESTHETIC DRINKING WATER VALUES AS REQUIRED BY SECTION 20120A(5) OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED (NREPA).

7. MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) DEVELOPED SITE-SPECIFIC VOLATILIZATION TO INDOOR AIR CRITERIA (SSVIAC) FOR THE FORMER FIERO ASSEMBLY, APRIL 21, 2020.

8. OTHER CRITERIA LISTED ARE FROM THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) CLEAN UP CRITERIA REQUIREMENTS TABLE 1: GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL, PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS, OCTOBER 12, 2023.

9. SAMPLES WERE ANALYZED BY EPA METHOD SW5030C/SW8260C AND SW8260B-SIM.

10. MWM2-37 WAS LAST SAMPLED IN 2008. CLIENT REQUESTED WELL TO BE SAMPLED IN 2021 FOR VOCS. WELL WAS ATTEMPTED TO BE SAMPLED BUT WELL WAS DAMAGED.

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

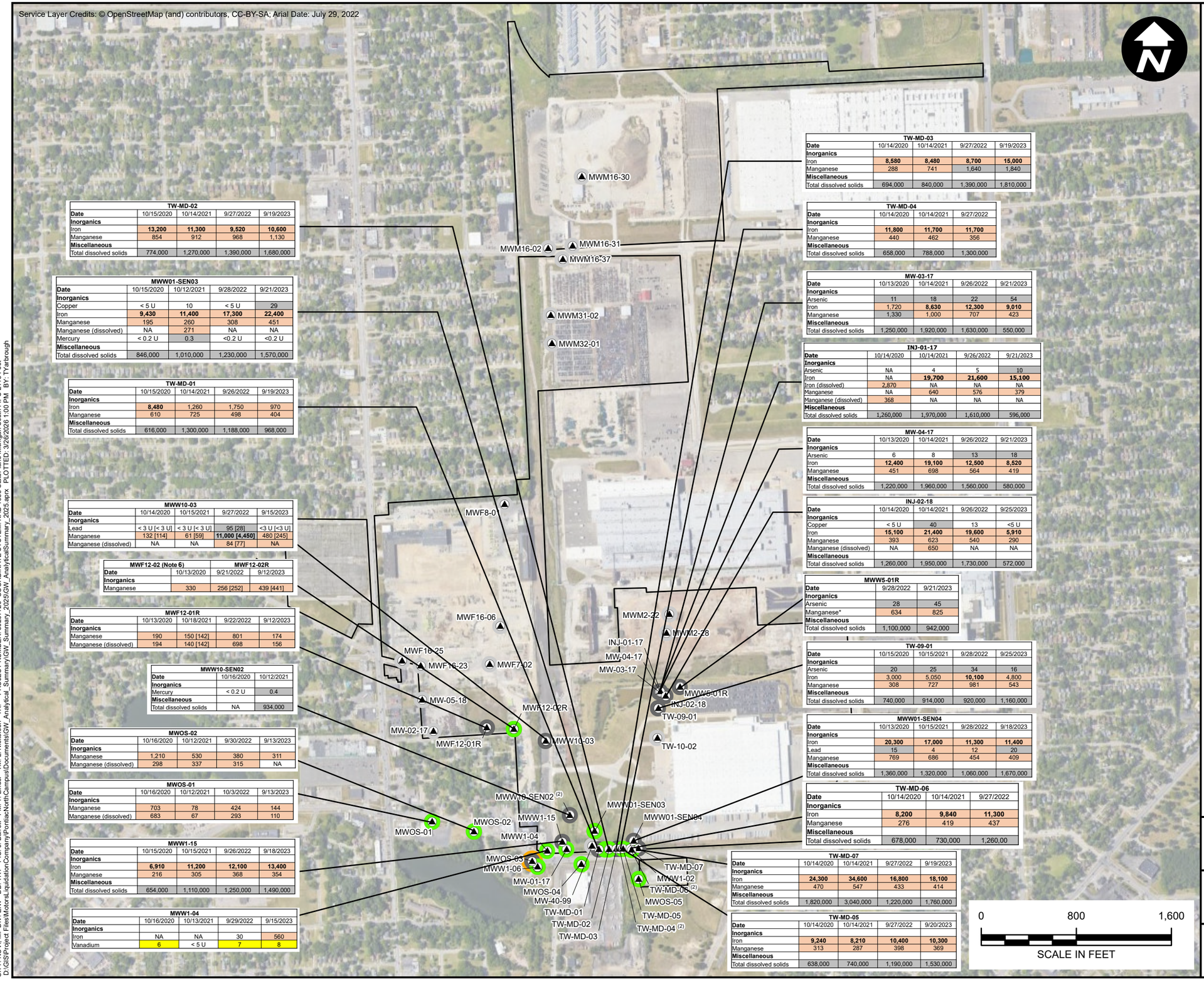
GROUNDWATER ANALYTICAL SUMMARY VOCs - 2025

ARCADIS

FIGURE
3A

CITY: NOVI, MI DIV: ENV DB: TRY PIC: J. Barrett PM: T. Linder TM: L. Nickerson TR: PROJECT NUMBER: 30267726 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\GW_Analytical_Summary\GW_Summary_2025\GW_AnalyticalSummary_2025.aprx PLOTTED: 9/24/2025 1:39 PM BY: TYarbrough

Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA; Arial Date: July 29, 2022



TW-MD-02

Date	10/15/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**13,200**	**11,300**	**9,520**	**10,600**
Manganese	854	912	968	1,130
Miscellaneous				
Total dissolved solids	774,000	1,270,000	1,390,000	1,680,000

MWW01-SEN03

Date	10/15/2020	10/12/2021	9/28/2022	9/21/2023
Inorganics				
Copper	< 5 U	10	< 5 U	29
Iron	**9,430**	**11,400**	**17,300**	**22,400**
Manganese	195	260	308	451
Manganese (dissolved)	NA	271	NA	NA
Mercury	< 0.2 U	0.3	<0.2 U	<0.2 U
Miscellaneous				
Total dissolved solids	846,000	1,010,000	1,230,000	1,570,000

TW-MD-01

Date	10/15/2020	10/14/2021	9/26/2022	9/19/2023
Inorganics				
Iron	**8,480**	1,260	1,750	970
Manganese	610	725	498	404
Miscellaneous				
Total dissolved solids	616,000	1,300,000	1,188,000	968,000

MWW10-03

Date	10/14/2020	10/15/2021	9/27/2022	9/15/2023
Inorganics				
Lead	< 3 U [< 3 U]	< 3 U [< 3 U]	95 [28]	<3 U [<3 U]
Manganese	132 [114]	61 [59]	**11,000 [4,450]**	480 [245]
Manganese (dissolved)	NA	NA	84 [77]	NA

MWF12-02 (Note 6)

Date	10/13/2020	9/21/2022	9/12/2023
Inorganics			
Manganese	330	256 [252]	439 [441]

MWF12-02R

MWF12-01R

Date	10/13/2020	10/18/2021	9/22/2022	9/12/2023
Inorganics				
Manganese	190	150 [142]	801	174
Manganese (dissolved)	194	140 [142]	698	156

MWW10-SEN02

Date	10/16/2020	10/12/2021
Inorganics		
Mercury	< 0.2 U	0.4
Miscellaneous		
Total dissolved solids	NA	934,000

MWOS-02

Date	10/16/2020	10/12/2021	9/30/2022	9/13/2023
Inorganics				
Manganese	1,210	530	380	311
Manganese (dissolved)	298	337	315	NA

MWOS-01

Date	10/16/2020	10/12/2021	10/3/2022	9/13/2023
Inorganics				
Manganese	703	78	424	144
Manganese (dissolved)	683	67	293	110

MWW1-15

Date	10/15/2020	10/15/2021	9/26/2022	9/18/2023
Inorganics				
Iron	**6,910**	**11,200**	**12,100**	**13,400**
Manganese	216	305	368	354
Miscellaneous				
Total dissolved solids	654,000	1,110,000	1,250,000	1,490,000

MWW1-04

Date	10/16/2020	10/13/2021	9/29/2022	9/15/2023
Inorganics				
Iron	NA	NA	30	560
Vanadium	6	< 5 U	7	8

TW-MD-03

Date	10/14/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**8,580**	**8,480**	**8,700**	**15,000**
Manganese	288	741	1,640	1,840
Miscellaneous				
Total dissolved solids	694,000	840,000	1,390,000	1,810,000

TW-MD-04

Date	10/14/2020	10/14/2021	9/27/2022
Inorganics			
Iron	**11,800**	**11,700**	**11,700**
Manganese	440	462	356
Miscellaneous			
Total dissolved solids	658,000	788,000	1,300,000

MW-03-17

Date	10/13/2020	10/14/2021	9/26/2022	9/21/2023
Inorganics				
Arsenic	11	18	22	54
Iron	1,720	**8,630**	**12,300**	**9,010**
Manganese	1,330	1,000	707	423
Miscellaneous				
Total dissolved solids	1,250,000	1,920,000	1,630,000	550,000

INJ-01-17

Date	10/14/2020	10/14/2021	9/26/2022	9/21/2023
Inorganics				
Arsenic	NA	4	5	10
Iron	NA	**19,700**	**21,600**	**15,100**
Iron (dissolved)	2,870	NA	NA	NA
Manganese	NA	640	576	379
Manganese (dissolved)	368	NA	NA	NA
Miscellaneous				
Total dissolved solids	1,260,000	1,970,000	1,610,000	596,000

MW-04-17

Date	10/13/2020	10/14/2021	9/26/2022	9/21/2023
Inorganics				
Arsenic	6	8	13	18
Iron	**12,400**	**19,100**	**12,500**	**8,520**
Manganese	451	698	564	419
Miscellaneous				
Total dissolved solids	1,220,000	1,960,000	1,560,000	580,000

INJ-02-18

Date	10/14/2020	10/14/2021	9/26/2022	9/25/2023
Inorganics				
Copper	< 5 U	40	13	<5 U
Iron	**15,100**	**21,400**	**19,600**	**5,910**
Manganese	393	623	540	290
Manganese (dissolved)	NA	650	NA	NA
Miscellaneous				
Total dissolved solids	1,260,000	1,950,000	1,730,000	572,000

MWW5-01R

Date	9/28/2022	9/21/2023
Inorganics		
Arsenic	28	45
Manganese*	634	825
Miscellaneous		
Total dissolved solids	1,100,000	942,000

TW-09-01

Date	10/15/2020	10/15/2021	9/28/2022	9/25/2023
Inorganics				
Arsenic	20	25	34	16
Iron	3,000	5,050	**10,100**	4,800
Manganese	308	727	981	543
Miscellaneous				
Total dissolved solids	740,000	914,000	920,000	1,160,000

MWW01-SEN04

Date	10/13/2020	10/15/2021	9/28/2022	9/18/2023
Inorganics				
Iron	**20,300**	**17,000**	**11,300**	**11,400**
Lead	15	4	12	20
Manganese	769	686	454	409
Miscellaneous				
Total dissolved solids	1,360,000	1,320,000	1,060,000	1,670,000

TW-MD-06

Date	10/14/2020	10/14/2021	9/27/2022
Inorganics			
Iron	**8,200**	**9,840**	**11,300**
Manganese	276	419	437
Miscellaneous			
Total dissolved solids	678,000	730,000	1,260,00

TW-MD-07

Date	10/14/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**24,300**	**34,600**	**16,800**	**18,100**
Manganese	470	547	433	414
Miscellaneous				
Total dissolved solids	1,820,000	3,040,000	1,220,000	1,760,000

TW-MD-05

Date	10/14/2020	10/14/2021	9/27/2022	9/20/2023
Inorganics				
Iron	**9,240**	**8,210**	**10,400**	**10,300**
Manganese	313	287	398	369
Miscellaneous				
Total dissolved solids	638,000	740,000	1,190,000	1,530,000

0 800 1,600

SCALE IN FEET

LEGEND

- EXISTING MONITORING WELL
- PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- LOCATION PREVIOUSLY SAMPLED THAT WAS REMOVED FROM THE PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- NOT ANALYZED FOR INORGANICS OR TOTAL DISSOLVED SOLIDS
- NO EXCEEDANCES OF CRITERIA FROM SAMPLING EVENTS BETWEEN 2020-2023
- CURRENT OR FORMER RACER PROPERTY

NOTE: WELLS LOCATED AT FIERO PROPERTIES MAY BE INCLUDED IN THE FIERO TEMPORARY MONITORING PROGRAM AND ARE NOT REFLECTED ON THIS FIGURE.

	Units	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential GVIIC	Nonresidential GVIIC	Residential VIAP	Nonresidential VIAP
Inorganics									
Arsenic	ug/L	10	10	10	- -	--	--	- -	- -
Copper	ug/L	1,000	1,000	13	**4,000**	--	--	- -	- -
Iron	ug/L	300	300	- -	**5,600**	--	--	- -	- -
Iron (dissolved)	ug/L	300	300	- -	**5,600**	--	--	- -	- -
Lead	ug/L	4	4	14	- -	--	--	- -	- -
Manganese	ug/L	50	50	1,300	**2,500**	--	--	- -	- -
Manganese (dissolved)	ug/L	50	50	1,300	**2,500**	--	--	- -	- -
Mercury	ug/L	2	2	0.0013	- -	56	56	2.5	3.7
Vanadium	ug/L	4.5	62	27	- -	--	--	- -	- -
Miscellaneous									
Total dissolved solids (TDS)	ug/L	500,000	500,000	500,000	- -	--	--	- -	- -

< NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT.

[ ] DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.

NA NOT ANALYZED

VOC VOLATILE ORGANIC COMPOUND

U COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE R COMPOUND QUANTITATION LIMIT.

NOTES:

1. ALL CONCENTRATIONS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).

2. IN 2023 TW-MD-04 WAS UNABLE TO BE SAMPLED DUE TO WELL CASING DAMAGE, TW-MD-06 WAS UNABLE TO BE SAMPLED DUE TO THE PRESENCE OF LNAPL, AND MWW10-SEN02 WAS UNABLE TO BE SAMPLED DUE TO INSUFFICENT WATER IN THE MONITORING WELL.

3. MONITORING WELLS SHOWN ARE INCLUDED IN THE CURRENT GROUNDWATER MONITORING PLAN FOR THE SITE.

4. DATABOXES PRESENTED ON THIS FIGURE INCLUDE ONLY THOSE PARAMETERS WHERE REGULATORY EXCEEDANCES OF PROMULGATED CRITERIA EXISTS ANYTIME FROM 2020-2023.

5. CRITERIA LISTED ARE FROM THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) CLEAN UP CRITERIA REQUIREMENTS TABLE 1: GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL, PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS, OCTOBER 12, 2023.

6. OTHER CRITERIA LISTED ARE FROM RESIDENTIAL AND NONRESIDENTIAL VOLATILIZATION TO INDOOR AIR PATHWAY SCREENING LEVELS (GROUNDWATER NOT IN CONTACT) ARE FROM THE DEQ GUIDANCE DOCUMENT FOR THE VAPOR INTRUSION PATHWAY, APPENDIX C - TABLES 1 AND 2, MARCH 2021.

7. OTHER CRITERIA LISTED ARE FROM GROUNDWATER SURFACE WATER INTERFACE CRITERIA LISTED FOR COPPER, LEAD, MANGANESE, AND ZINC ARE CALCULATED BASED ON A HARDNESS OF 150 MG/L-CACO3 FOR SOUTHERN LOWER PENINSULA PROTECTED AS A DRINKING WATER SOURCE.

8. SAMPLES WERE ANALYZED BY EPA METHOD E200.8, E245.1, 2180WMS, 2180DIS, AND SM2540C.

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

GROUNDWATER ANALYTICAL SUMMARY INORGANICS AND TOTAL DISSOLVED SOLIDS 2025

ARCADIS

FIGURE
3B

CITY: NOVI, MI DIV: ENV DB: TRY PIC: J. Barrett PM: T. Linder TM: L. Nickerson TR: PROJECT NUMBER: 30267726 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
D:\GIS\Project Files\Motors Liquidation Company\Pontiac\North Campus\Documents\GW_Analytical_Summary\GW_Summary_2025\GW_AnalyticalSummary_2025.aprx PLOTTED: 3/26/2026 1:00 PM BY: Tarbrough

LEGEND

- EXISTING MONITORING WELL
- LOCATION PREVIOUSLY SAMPLED THAT WAS REMOVED FROM THE PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- NOT ANALYZED FOR PCB's
- NO EXCEEDANCES OF CRITERIA FROM SAMPLING EVENTS BETWEEN 2020-2023
- CURRENT OR FORMER RACER PROPERTY

NOTE: WELLS LOCATED AT FIERO PROPERTIES MAY BE INCLUDED IN THE FIERO TEMPORARY MONITORING PROGRAM AND ARE NOT REFLECTED ON THIS FIGURE.

	Units	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Residential Volatilization to Indoor Air Pathway Screening Levels	Nonresidential Volatilization to Indoor Air Pathway Screening Levels
PCBs								
Total PCBs	ug/L	0.5	0.5	0.2	45	45	*0.031*	0.97

< NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT.

U COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE R COMPOUND QUANTITATION LIMIT.

PCB POLYCHLORINATED BIPHENYLS

NOTES:

1. ALL CONCENTRATIONS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L).

2. IN 2023 TW-MD-04 WAS UNABLE TO BE SAMPLED DUE TO WELL CASING DAMAGE, AND TW-MD-06 WAS UNABLE TO BE SAMPLED DUE TO THE PRESENCE OF LNAPL AND MWW10-SEN02 WAS UNABLE TO BE SAMPLED DUE TO INSUFFICIENT WATER ON THE MONITORING WELL.

3. MONITORING WELLS SHOWN ARE INCLUDED IN THE CURRENT GROUNDWATER MONITORING PLAN FOR THE SITE.

4. DATABOXES PRESENTED ON THIS FIGURE INCLUDE ONLY THOSE PARAMETERS WHERE REGULATORY EXCEEDANCES OF PROMULGATED CRITERIA EXISTS ANYTIME FROM 2020-2023. MWW10-SEN02 DATA PRESENTED ON FIGURE TO SUPPORT THE ELIMINATION OF SAMPLING FOR VOCS.

5. OTHER CRITERIA LISTED ARE FROM THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) CLEAN UP CRITERIA REQUIREMENTS TABLE 1: GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL, PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS, OCTOBER 12, 2023.

6. OTHER CRITERIA LISTED ARE FROM RESIDENTIAL AND NONRESIDENTIAL VOLATILIZATION TO INDOOR AIR PATHWAY SCREENING LEVELS (GROUNDWATER NOT IN CONTACT) ARE FROM THE DEQ GUIDANCE DOCUMENT FOR THE VAPOR INTRUSION PATHWAY, APPENDIX C - TABLES 1 AND 2, MARCH 2021.

7. SAMPLES WERE ANALYZED BY EPA METHOD SW8082A.

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

GROUNDWATER ANALYTICAL SUMMARY POLYCHLORINATED BIPHENYLS (PCBs) 2025

ARCADIS

FIGURE
3C

CITY: NOVI MI DIV: ENV DB: TRY PIC: J. Barrett PM: T. Linder TM: L. Crisp TR: PROJECT NUMBER: 30167840 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet
D:\GIS\Project Files\Motors Liquidation Company\Pontiac North Campus\Documents\GW_Analytical_Summary\GW_Summary_2023\GW_Summary_2023_Pro.aprx PLOTTED: 5/31/2025 2:26 PM BY: TYarbrough

Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA; Arial Date: July 29, 2022

MWM16-31				
Date	10/16/2020	10/12/2021	9/28/2022	9/14/2023
VOCs				
Vinyl Chloride	2	< 1 U	2	1

MWM16-37				
Date	10/16/2020	10/13/2021	9/29/2022	9/14/2023
VOCs				
Vinyl Chloride	1 [1]	2 [2]	*2 [3]*	2 [2]

MWF12-02 (Note 8)		MWF12-02R	
Date	10/13/2020	9/21/2022	9/12/2023
Inorganics			
Manganese	330	256 [252]	439 [441]

MWF12-01R				
Date	10/13/2020	10/18/2021	9/22/2022	9/12/2023
VOCs				
1,4-Dioxane	107	83 [86]	40	21
Inorganics				
Manganese	190	150 [142]	801	174
Manganese (dissolved)	194	140 [142]	698	156

MWF16-23				
Date	10/15/2020	10/13/2021	9/20/2022	9/12/2023
VOCs				
Trichloroethene	*21*	*18*	*17 [18]*	*15*

MW-02-17				
Date	10/13/2020	10/19/2021	9/22/2022	9/12/2023
VOCs				
1,4-Dioxane	30	5	5	1
Tetrachloroethene	3	5	8	7
Trichloroethene	2	7	2	4

MWW1-15				
Date	10/15/2020	10/15/2021	9/26/2022	9/18/2023
Inorganics				
Iron	**6,910**	**11,200**	**12,100**	**13,400**
Manganese	216	305	368	354
Miscellaneous				
Total dissolved solids (TDS)	654,000	1,110,000	1,250,000	1,490,000

MW-01-17				
Date	10/15/2020	10/15/2021	9/26/2022	9/18/2023
VOCs				
1,4-Dioxane	8	2	4	6

MWW1-04				
Date	10/16/2020	10/13/2021	9/29/2022	9/15/2023
Field Parameters				
pH	11.55	9.61	10.84	10.38
PCBs				
Total PCBs	*0.2*	< 0.1 U	*0.2*	*0.1*
Inorganics				
Iron	NA	NA	30	560
Vanadium	6	< 5 U	7	8

MWOS-01				
Date	10/16/2020	10/12/2021	10/3/2022	9/13/2023
Inorganics				
Manganese	703	78	424	144
Manganese (dissolved)	683	67	293	110

MWOS-02				
Date	10/16/2020	10/12/2021	9/30/2022	9/13/2023
Inorganics				
Manganese	1,210	530	380	311
Manganese (dissolved)	298	337	315	NA

MWOS-03				
Date	10/16/2020	10/12/2021	10/3/2022	9/13/2023
Field Parameters				
pH	6.74	6.73	6.45	6.62

MW-40-99				
Date	10/15/2020	10/15/2021	9/27/2022	9/19/2023
1,4-Dioxane	6 [9]	1 [1]	6 [6]	2 [2]

TW-MD-01				
Date	10/15/2020	10/14/2021	9/26/2022	9/19/2023
Inorganics				
Iron	**8,480**	1,260	1,750	970
Manganese	610	725	498	404
Miscellaneous				
Total dissolved solids	616,000	1,300,000	1,188,000	968,000

TW-MD-02				
Date	10/15/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**13,200**	**11,300**	**9,520**	**10,600**
Manganese	854	912	968	1,130
Miscellaneous				
Total dissolved solids	774,000	1,270,000	1,390,000	1,680,000

TW-MD-03				
Date	10/14/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**8,580**	**8,480**	**8,700**	**15,000**
Manganese	288	741	1,640	1,840
Miscellaneous				
Total dissolved solids	694,000	840,000	1,390,000	1,810,000

TW-MD-04			
Date	10/14/2020	10/14/2021	9/27/2022
Inorganics			
Iron	**11,800**	**11,700**	**11,700**
Manganese	440	462	356
Miscellaneous			
Total dissolved solids	658,000	788,000	1,300,000

TW-MD-05				
Date	10/14/2020	10/14/2021	9/27/2022	9/20/2023
Inorganics				
Iron	**9,240**	**8,210**	**10,400**	**10,300**
Manganese	313	287	398	369
Miscellaneous				
Total dissolved solids	638,000	740,000	1,190,000	1,530,000

TW-MD-07				
Date	10/14/2020	10/14/2021	9/27/2022	9/19/2023
Inorganics				
Iron	**24,300**	**34,600**	**16,800**	**18,100**
Manganese	470	547	433	414
Miscellaneous				
Total dissolved solids	1,820,000	3,040,000	1,220,000	1,760,000

TW-MD-06			
Date	10/14/2020	10/14/2021	9/27/2022
PCBs			
Total PCBs	*0.6*	*0.9*	*0.6*
Inorganics			
Iron	**8,200**	**9,840**	**11,300**
Manganese	276	419	437
Miscellaneous			
Total dissolved solids	678,000	730,000	1,260,000

MWM16-30
MWM16-02
MWM16-31
MWM16-37
MWM31-02
MWM32-01
MWM32-09
MWM30-01
MWF8-01
MWF16-06
MWF16-25
MWF16-23
MWF7-02
MW-05-18
MWF12-01R
MWF12-02R
MW-02-17
MWW10-03
MWW01-SEN03
MWW10-SEN02 (2)
MWOS-01
MWOS-02
MWW1-04
MWOS-03
MWW1-06
MWW1-15
MW-01-17
MWOS-04
MW-40-99
TW-MD-01
TW-MD-02
TW-MD-03
MWM2-37
MWM2-22
MWM2-28
INJ-02-18
INJ-01-17
MW-04-17
MW-03-17
TW-09-01
TW-10-02
MWW5-01R
MWW01-SEN04
TW-MD-07
MWW1-02
TW-MD-06 (2)
MWOS-05
TW-MD-05
TW-MD-04 (2)

0 800 1,600
SCALE IN FEET

LEGEND

- EXISTING MONITORING WELL
- LOCATION PREVIOUSLY SAMPLED THAT WAS REMOVED FROM THE PROPOSED 2025 GROUNDWATER MONITORING PLAN
- PROPOSED 2025 GROUNDWATER MONITORING PROGRAM
- NO EXCEEDANCES OF CRITERIA FROM SAMPLING EVENTS BETWEEN 2020-2023
- CURRENT OR FORMER RACER PROPERTY

NOTE: WELLS LOCATED AT FIERO PROPERTIES MAY BE INCLUDED IN THE FIERO TEMPORARY MONITORING PROGRAM AND ARE NOT REFLECTED ON THIS FIGURE.

	Units	Residential Drinking Water	Nonresidential Drinking Water	Groundwater Surface Water Interface	Nonresidential Health Based Drinking Water Value	Residential Volatilization to Indoor Air Pathway Screening Levels	Nonresidential Volatilization to Indoor Air Pathway Screening Levels	Residential Fiero SSVIAC Slab On Grade*	Residential Fiero SSVIAC Basement*
Field Paramters									
pH	SU	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	--
VOCs									
1,4-Dioxane	ug/L	7.2	350	280	--	*56,000*	130,000	43,000	22,000
Tetrachloroethene	ug/L	5	5	60	--	*130*	130	250	130
Trichloroethene	ug/L	5	5	200	--	*10*	10	15	8.1
Vinyl Chloride	ug/L	2	2	13	--	*2.1*	18	2.2	1.2
Inorganics									
Manganese	ug/L	50	50	1,300	**2,500**	--	--	--	--
Manganese (dissolved)	ug/L	50	50	1,300	**2,500**	--	--	--	--
Vanadium	ug/L	4.5	62	27	--	--	--	--	--
Iron	ug/L	300	300	--	**5,600**	--	--	--	--
PCBs									
Total PCBs	ug/L	0.5	0.5	0.2	--	--	--	--	--
Miscellaneous									
Total dissolved solids (TDS)	ug/L	500,000	500,000	500,000	--	--	--	--	--

* ONLY APPLIES TO WELLS ON FORMER FIERO PROPERTY

E CRITERION IS THE AESTHETIC DRINKING WATER VALUE, AS REQUIRED BY SECTION 20120A(5) OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED (NREPA)

SSVIAC	SITE SPECIFIC VOLATILIZATION TO INDOOR AIR CRITERIA
<	NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT.
SU	STANDARD UNIT
[ ]	DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
NA	NOT ANALYZED
VOC	VOLATILE ORGANIC COMPOUND
U	COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE R COMPOUND QUANTITATION LIMIT.

NOTES:

1. ALL CONCENTRATIONS ARE PRESENTED IN MICROGRAMS PER LITER (µg/L) EXCEPT FOR pH, WHICH IS PRESENTED IN STANDARD UNITS (SU).

2. IN 2023 TW-MD-04 WAS UNABLE TO BE SAMPLED DUE TO WELL CASING DAMAGE. TW-MD-06 WAS UNABLE TO BE SAMPLED DUE TO THE PRESENCE OF LNAPL, AND MWW10-SEN02 WAS UNABLE TO BE SAMPLED DUE TO INSUFFICIENT WATER IN THE MONITORING WELL.

3. MONITORING WELLS SHOWN ARE INCLUDED IN THE CURRENT GROUNDWATER MONITORING PLAN FOR THE SITE.

4. DATABOXES PRESENTED ON THIS FIGURE INCLUDE ONLY THOSE PARAMETERS WHERE REGULATORY EXCEEDANCES OF PROMULGATED CRITERIA EXISTS ANYTIME FROM 2020-2023.

5. pH RDW AND NRDW CRITERIA REPRESENT AESTHETIC DRINKING WATER VALUES AS REQUIRED BY SECTION 20120A(5) OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED (NREPA).

6. MICHIGAN DEPARTMENT OF ENV1RONMENT, GREAT LAKES, AND ENERGY (EGLE) DEVELOPED SITE-SPECIFIC VOLATILIZATION TO INDOOR AIR CRITERIA (SSVIAC) FOR THE FORMER FIERO ASSEMBLY, APRIL 21, 2020.

7. OTHER CRITERIA LISTED ARE FROM THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE) CLEAN UP CRITERIA REQUIREMENTS TABLE 1: GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL, PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS, OCTOBER 12, 2023.

8. OTHER CRITERIA LISTED ARE FROM RESIDENTIAL AND NONRESIDENTIAL VOLATILIZATION TO INDOOR AIR PATHWAY SCREENING LEVELS (GROUNDWATER NOT IN CONTACT) ARE FROM THE DEQ GUIDANCE DOCUMENT FOR THE VAPOR INTRUSION PATHWAY, APPENDIX C - TABLES 1 AND 2, MARCH 2021.

9. OTHER CRITERIA LISTED ARE FROM GROUNDWATER SURFACE WATER INTERFACE CRITERIA LISTED FOR COPPER, LEAD, MANGANESE, AND ZINC ARE CALCULATED BASED ON A HARDNESS OF 150 MG/L-CACO3 FOR SOUTHERN LOWER PENINSULA PROTECTED AS A DRINKING WATER SOURCE.

10. SAMPLES WERE ANALYZED BY EPA METHOD SW5030C/SW8260C, SW8260B-SIM, E200.8, E245.1, 2180WMS, 2180DIS, SM2540C, AND SW8082A.

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GROUNDWATER ANALYTICAL SUMMARY PROPERTY BOUNDARIES AND SELECTED OFFSITE WELLS 2025

ARCADIS

FIGURE 4

CITY: NOVI MI DIV: ENV DB: TRY PIC: J. Barrett PM: T. Linder TM: L. Nickerson TR: PROJECT NUMBER: 30267726 COORDINATE SYSTEM: NAD D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\GW_Analytical_Summary\GW_Summary_2025\GW_AnalyticalSummary_2025.aprx PLOTTED: 3/26/2026 1:00 PM BY: TFarbrough

Appendix C

Relevant Laboratory SOPs and Arcadis TGIs

1.0 Scope And Application

This standard operating procedure (SOP) describes the laboratory procedure for the determination of Per- and Polyfluoroalkyl Substances (PFAS) by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) with Isotope Dilution Quantification in aqueous and solid matrices.

The requirements outlined in this SOP conform to those presented in Table B-15 of the Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories. Table B-15 requirements are included in Appendix H for reference. Additional appendices are included for state and/or program specific method criteria, which supersede and/or supplement the method criteria prescribed in this SOP

1.1 Target Analyte List and Limits of Quantitation (LOQ)

The target analytes and the normal LOQ that can be achieved with this procedure are provided in Appendix A.

LOQ are established in accordance with Pace policy and SOPs for method validation and for the determination of detection limits (DL) and quantitation limits (LOQ). DL and LOQ are routinely verified and updated when needed. The current LOQ for each target analyte that can be determined by this SOP as of the effective date of this SOP is provided in Appendix A.

The reporting limit (RL) is the value to which analytes are reported as detected or not detected in the final report. When the RL is less than the lower limit of quantitation (LLOQ), all detects and non-detects at the RL are qualitative. The LLOQ is the lowest point of the calibration curve used for each target analyte.

DL, LOQ, and RL are always adjusted to account for actual amounts used and for dilution.

2.0 Summary of Method

NOTE: Refer to appendices for state and/or program specific method criteria, which supersede and/or supplement the method criteria prescribed in this SOP.

2.1 **PFAS Isotope Dilution method (aqueous; ID-AQ)** - A 250-mL water sample is fortified with surrogates (SUR; also referred to as extracted internal standards [EIS] or isotope dilution standards [IDS]) and passed through a stacked Polymeric Weak Anion Exchange (WAX)/Graphitized Carbon (GCB) SPE/filtration cartridge (Phenomenex Strata-PFAS (WAX/GCB), or equivalent) to extract the method analytes and SUR. The compounds are eluted from the SPE cartridge with 4-mL of methanol and 4-mL of ammonia-methanol (0.6%), with a separate final cartridge rinse of 2-mL of clean MeOH. With the final cartridge rinse, the extract volume is approximately 10 mL. Sample extracts are concentrated in a heated water bath under nitrogen to final volume of either 5mL or 2mL, depending on project objectives. A 10 µL aliquot of the concentrated extract is injected on an LC equipped with a C18 column that is coupled to an MS/MS detector. The analytes are separated and identified by comparing the acquired mass spectra and retention times to the reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the internal standard isotope dilution technique.

2.2 **PFAS Isotope Dilution method (solid; ID-Solid)** - Approximately 1g of solid sample is spiked with SUR/EIS/IDS and mixed with 4mL of methanol and 4mL of ammonia-methanol (0.6%). The spiked sample with extraction solvent is then shaken on an orbital shaker, followed by sonication and centrifugation. The extract is filtered by SPE (Strata-GCB or equivalent), with a tube rinse of 2-mL of clean MeOH. The extract volume following the filtration step is approximately 10 mL. Sample extracts are concentrated in a heated water bath under nitrogen to final volume of either 5mL or 2mL, depending on project objectives. A 10 µL aliquot of the concentrated extract is injected on an LC equipped with a C18 column that is coupled to an MS/MS detector. The analytes are separated and identified by comparing the acquired mass spectra and retention times to the reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the internal standard isotope dilution technique. See Appendix B for specific procedures for preparing and analyzing solid samples by ID-Solid.

2.3 **PFAS Isotope Dilution method (Aqueous Serial Dilution; ID-SD)** - Samples of known high PFAS concentrations, such as AFFF pure product formulations, can be prepared by serial dilution instead of SPE, with documented project approval. The sample serial dilutions will be prepared in 96% MeOH: 4% water. SUR will be spiked into the diluted sample (not the original sample collected) in the preparation vial. Any target analytes found to be ND in any samples shall be spiked at the LOQ level (post-spike) in those samples at the dilution reported and analyzed again. Recovery for the post-spiked analytes must fall within 70-130% of the expected value; if these criteria are not met, the post-spike analysis will be repeated at successively higher dilutions until recovery is acceptable. The spiking concentration will be used to calculate the project specific LOQ for each analyte. 10-µL of the prepared dilution aliquot is injected on an LC equipped with a C18 column that is coupled to an MS/MS detector. The analytes are separated and identified by comparing the acquired mass spectra and retention times to the reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the internal standard isotope dilution technique. See Appendix E for specific procedures for preparing and analyzing serial dilution samples by ID-SD.

3.0 Interferences

3.1 Non-volumetric glassware can be solvent rinsed or heated in a muffle furnace at 400°C for 2-hours. Volumetric glassware should be solvent rinsed and can be heated in an oven at a temperature below 120°C. Store clean glassware inverted or capped. Do not cover with aluminum foil since PFAS may potentially be transferred from the aluminum foil to the glassware.

NOTE: PFAS standards, extracts and samples should not come into contact with any glass containers or pipettes as these analytes can potentially adsorb to glass surfaces. PFAS analyte, internal standards (IS) and surrogate standards (SUR) commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in HDPE or polypropylene containers.

3.2 Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample containers and caps, and other sample processing equipment that lead to discrete artifacts and/or elevated baselines in the chromatograms. Method analytes may also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, SPE sample transfer lines, etc. Supplies and equipment are demonstrated to be free from interference (no analyte detected > ½ LOQ) by evaluation of routine method blanks (MB). Subtracting blank values from sample results is not permitted.

3.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the water. Humic and/or fulvic material can be co-extracted during SPE and high levels can cause

enhancement and/or suppression in the electrospray ionization source or low recoveries on the SPE sorbent.

3.4 SPE cartridges/tubes can be a source of interferences. The analysis of field and laboratory reagent blanks can provide important information regarding the presence or absence of such interferences. Brands and sorbent lots of SPE devices should be tested to ensure that contamination does not prevent analyte identification and quantitation.

4.0 Definitions

Refer to the Laboratory Quality Manual [QAMP ME0012K] for a glossary of common lab terms and definitions.

4.1 **Collisionally Activated Dissociation (CAD)** – The process of converting the precursor ion's translational energy into internal energy by collisions with neutral gas molecules to bring about dissociation into product ions.

4.2 **Surrogate/Extracted Internal Standard/Isotope Dilution Standard (SUR/EIS/IDS)** – A pure chemical which chemically resembles method analytes and is extremely unlikely to be found in any sample. This chemical is added to a sample aliquot (field and QC) in known amount(s) before the extraction and analysis processes. The purpose of the SUR is to monitor method performance from extraction to final chromatographic measurement. For the ID methods, the SUR is used as an isotope dilution standard for measuring the relative response and quantification of other method analytes.

4.3 **Field Duplicates (FD1 and FD2)** – Two separate samples collected at the same time and place under identical circumstances and treated exactly the same throughout field and laboratory procedures. Analyses of FD1 and FD2 give a measure of the precision associated with sample collection, preservation, and storage, as well as laboratory procedures.

4.4 **Precursor Ion** – The precursor ion is typically the deprotonated molecule ([M-H]-) of the method analyte. In MS/MS, the precursor ion is the mass selected and fragmented by collisionally activated dissociation to produce distinctive product ions of smaller m/z.

4.5 **Product Ion** – A product ion is one of the fragment ions produced in MS/MS by collisionally activated dissociation of the precursor ion.

4.6 **Non-conformance Memo (NCM)** - A form used to document a non-conforming event. An analyst must document a non-conformance memo when a non-conforming event occurs. A non-conforming event may include the reporting of analytical data outside of method or SOP criteria, or when there is a deviation from a written policy or procedure. Information in an NCM may be used by project managers to flag data in the report narrative, or by the quality department to track trends and initiate corrective actions, where applicable. Additional information on the NCM policy and procedure is located in the Nonconformance and Corrective Action SOP [QA SOP ME0012BO].

4.7 **Minimum Reporting Level (MRL) [WI DNR Compliance]** - The minimum concentration that can be reported as a quantitated value for a method analyte in a sample following analysis. This defined concentration can be no lower than the concentration of the lowest calibration standard for that analyte and can only be used if acceptable QC criteria for this standard are met. Synonymous with Limit of Quantitation (LOQ).

5.0 Health And Safety

The toxicity or carcinogenicity of each chemical material used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable.

The laboratory maintains documentation of hazard assessments and OSHA regulations regarding the safe handling of the chemicals specified in each method. Safety data sheets for all hazardous chemicals are available to all personnel. Employees must abide by the health, safety and environmental (HSE) policies and procedures specified in this SOP and in the Pace Chemical Hygiene / Safety Manual.

Personal protective equipment (PPE) such as safety glasses, gloves, and a laboratory coat must be worn in designated areas and while handling samples and chemical materials to protect against physical contact with samples that contain potentially hazardous chemicals and exposure to chemical materials used in the procedure.

Concentrated corrosives present additional hazards and are damaging to skin and mucus membranes. Use these acids in a fume hood whenever possible with additional PPE designed for handing these materials. If eye or skin contact occurs, flush with large volumes of water. When working with acids, always add acid to water to prevent violent reactions. Any processes that emit large volumes of solvents (evaporation/concentration processes) must be in a hood or apparatus that prevents employee exposure.

Contact your supervisor or local HSE coordinator with questions or concerns regarding safety protocol or safe handling procedures for this procedure.

6.0 Sample Collection, Preservation, Holding Time, And Storage

Samples should be collected in accordance with a sampling plan and procedures appropriate to achieve the regulatory, scientific, and data quality objectives for the project.

The laboratory performs samples collection for samples to be analyzed by this SOP in accordance with the *Field Services* SOP [FS SOP ME001BS]. Refer to this SOP for these instructions.

The laboratory will provide containers for the collection of samples upon client request for analytical services. Bottle kits are prepared in accordance with the *Sample Container Shipping* SOP [AD SOP ME001DS].

Requirements for container type, preservation, and field quality control (QC) for the common list of test methods offered by Pace are listed in the *Pace-WCOL Analytical Methods List* [ME002BS].

General Requirements

Matrix	Routine Container	Min. Sample Amount[1]	Preservation	Holding Time
Aqueous	250 mL HDPE bottle fitted with polyethylene screw-cap lid	250 mL	**Thermal:** ≤ 10°C[2] **Chemical:** None	**Collection to Prep:** 28 days **Prep to Analysis:** 28 days
Solid	4 oz. HDPE bottle fitted with polyethylene screw-cap lid	10 g	**Thermal:** ≤ 10°C **Chemical:** None	**Collection to Prep:** 28 days **Prep to Analysis:** 28 days

[1]*Minimum amount needed for each discrete analysis.*
[2]*For Wisconsin compliance, samples must be received at above their freezing point to 6°C*

Field / Matrix QC

Trip Blank	MS/MSD	Field Duplicate

Analysis of TB required only if sample contains analyte concentrations at or above the LoQ.[1]	Analysis of an MS is required in each extraction batch. Assessment of method precision can be accomplished by analysis of a FD; however, infrequent occurrence of method analytes might hinder this assessment. If the occurrence of method analytes in the samples is infrequent, or if historical trends are unavailable, an MSD must be analyzed. Extraction batches that contain MSD will not require the extraction of an FD.	Within each extraction batch a minimum of one FD or MSD must be analyzed. If method analytes are not routinely observed in field samples, an MSD should be analyzed rather than an FD.

[1] Lab analyzes all TB, regardless of sample concentration.

Thermal preservation is checked and recorded on receipt in the laboratory in accordance with the *Sample Receiving* SOP [AD SOP ME0013H]. Chemical preservation is checked and recorded at time of receipt or prior to sample preparation.

After receipt, samples are stored at 4±2°C until sample preparation. Prepared samples (extracts, digestates, distillates, other) are stored at room temperature until sample analysis.

NOTE: Wisconsin compliance sample extracts will be stored at 0-6°C until sample analysis.

After analysis, unless otherwise specified in the analytical services contract, samples are retained for 30 days from date of final report and then disposed of in accordance with Federal, State, and Local regulations.

7.0 Equipment And Supplies

7.1 Equipment

NOTE: Refer to the Major Operational Equipment List [QA Control Log ME001PM] for specific details regarding the equipment and data processing software utilized during this procedure.

NOTE: Due to the possibility of adsorption of analytes onto glass, HDPE containers are used for all standard, sample and extraction preparations. Any time a new lot of SPE cartridges/tubes, solvents, cryovials, or autosampler vials are used, it must be demonstrated that a MB is reasonably free of contamination and that the criteria in Section 11.4.1 are met.

7.1.1 **Analytical Balance** – Capable of weighing to the nearest 0.0001 g

7.1.2 **Point of Use water preparation system –** Millipore Direct-Q 8 UV

7.1.3 **Solid Phase Extraction (SPE) Apparatus**

7.1.3.1 Stacked SPE/filtration cartridges: Strata PFAS(WAX/GCB), 500mg/50mg/6mL, Phenomenex part# CS0-9208, or equivalent

7.1.3.2 25mg GCB pass-through filtration cartridges (for solid extract clean-up): Strata GCB 25mg/1mL Cartridge, Phenomenex part# 8B-S528-CAJ

7.1.3.3 Vacuum Extraction Manifold – VisiPrep 24-port SPE manifold, Millipore-Sigma part# 57265, or equivalent. Care must be taken with automated SPE systems to ensure the PTFE commonly used in these systems does not contribute to unacceptable analyte concentrations in the MB.

7.1.3.4 Disposable liners for Visiprep Manifold – Millipor-Sigma part# 57059 / Restek part# 28310-VM, or equivalent.

7.1.3.5 SPE reservoirs – 60 mL and 12 mL polypropylene, Phenomenex part# AH0-7189 and AH0-7003, or equivalent.

7.1.3.6 SPE adapter caps – Phenomenex Part# AH0-7191 (Adapter cap for 1, 3, 6mL SPE tubes)

7.1.3.7 Vacuum tubing – 1/4" ID, 5/8" OD, 3/16" wall; Fisher Scientific part# 14-176-6B or equivalent

7.1.4 **Vacuum Pump** – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges. Millipore model# WP6111560, 115V, 60Hz, 3.5A.

7.1.5 **Liquid Chromatography (LC)/Tandem Mass Spectrometer (MS/MS) with Data System**

7.1.5.1 LC System – Agilent Model 1260, with Degasser (G4225A), Binary Pump (G1312B), Autosampler (G1329B), Thermostat (G1330B), Column Compartment (G1316A).
Shimadzu Model LC-30AD, with Communication Bus Module (CBM-20A), Column Oven (CTO-30A), Degassing Unit (DGU-20A5R), Autosampler (SIL-20AC XR).

NOTE: PFAS can build up in the PTFE solvent transfer lines and PTFE solvent frits. To prevent long delays in purging high levels of PFAS from the LC solvent lines, PEEK tubing and stainless-steel frits are used.

7.1.5.2 Tandem Mass Spectrometer (MS/MS) – Sciex 4500 or 5500 MS/MS, in negative ion electrospray ionization (ESI) mode. A minimum of 10 scans across the chromatographic peak is required to ensure adequate precision.

7.1.5.3 Analytical Column – Phenomenex Gemini® 3µm C18 110Å LC column 50 x3mm, (part# 00B-4439-Y0). Any column that provides adequate resolution, peak shape, capacity, accuracy, and precision may be used.

7.1.5.4 Mixing/Delay Column – Phenomenex Luna 5µm C18 100Å LC column 30 x 3mm (part# 00A-4252-Y0) or equivalent.

7.1.5.5 Guard cartridge – SecurityGuard Cartridges: Gemini C18, 2-3mm ID, 10/pk; Part# AJ0-7596/AJ0-7597; Phenomenex Part# KJ0-4282 (SecurityGuard Guard Cartridge Kit)

7.1.6 **Extract Concentration System** – Extracts are concentrated by evaporation with nitrogen using a water bath set to 55-60 °C (TurboVap LV, Biotage Inc, or equivalent).

7.1.7 **Vortex Mixer** - Bibby Scientific/Stuart Vortex Mixer, Model SA8, or equivalent.

7.1.8 **Orbital shaker table** - VWR Model 3500 Standard Shaker, 120V, or equivalent

7.1.9 **Centrifuge** - VWR Clinical 200, Hettich Rotanta 460, or equivalent

7.1.10 **Sonicator** - VWR Model 97043-976, or equivalent

7.1.11 **Kimwipes –** Fisher Scientific part # 06-666A, or equivalent

7.2 Supplies

7.2.1 **Extract/Standard storage containers** – 15-mL, 8-mL, or 4-mL narrow-mouth HDPE container - Thermo Scientific item# 2002-9050, 2002-9025, 2002-9125; 2.0-mL screw-top polypropylene

cryogenic vials – Grainger item# 6EMV1;1.5-mL snap-cap polypropylene microcentrifuge tubes - Fisher item# 05-408-129; or equivalent.

7.2.2 **Centrifuge Tubes** – 15-mL conical polypropylene tubes with or without (MoldPro) polypropylene screw caps for preparing and storing extract solutions and for collection of eluents (VWR catalogue# 10026-076 or equivalent; MoldPro, Inc. item# MP-100, 17x100mm sample tubes or equivalent - alternate extract collection tubes). 500-mL conical polypropylene bottles with polypropylene screw caps for centrifuging aqueous samples containing high solids content (Fisher catalogue# 07-200-621 or equivalent).

7.2.3 **Autosampler Vials** – Polypropylene vials (Agilent part# 5188-2788) with polypropylene caps (Agilent part# 5182-0542), or equivalent.

NOTE: Polypropylene vials and caps are necessary to prevent contamination of the sample from PTFE coated septa. However, polypropylene caps do not reseal, so evaporation occurs after injection. Thus, multiple injections from the same vial are not advisable.

7.2.4 **Micropipettes** – Range of volumes (see section 8 for volumes needed)

7.2.5 **Plastic Pipettes** – Polypropylene or polyethylene disposable pipettes, Fisher Cat# 13-711-7M or equivalent.

7.2.6 **Ottawa Sand** - for solid QC preparation (VWR catalog #: EM-SX0075-3 or equivalent)

8.0 Reagents And Standards

NOTE: Reagent grade or better chemicals should be used. Unless otherwise indicated, it is intended that ACS reagents be used, where such specifications are available. Other grades may be used, provided it is first determined that the reagent is of sufficiently high purity to permit its use without lessening the quality of the analysis.

8.1 Reagents

8.1.1 **Reagent Water** – Optima LC/MS water, Fisher part# W6-4 or equivalent.

8.1.1.1 The reagent water should not contain any measurable quantities of any method analytes or interfering compounds greater than 1/2 the LOQ for each analyte of interest.

8.1.2 **Methanol (MeOH, CH3OH, CAS#: 67-56-1)** – HPLC grade, demonstrated to be free of analytes and interferences (Fisher part# A452-4 or equivalent).

8.1.3 **Ammonium Acetate (NH4C2H3O2, CAS#: 631-61-8)** – LC/MS grade (Fisher part# A114-50 or equivalent).

8.1.4 **20 mM Ammonium Acetate** – To prepare 1 L, add 1.54 g ammonium acetate to 1L of reagent water (0.77g into 0.5L reagent water). This solution is prone to volatility losses and should be replaced at least every 96 hours.

8.1.5 **Ammonium Hydroxide (NH4OH, CAS#: 1336-21-6)** – ACS Plus grade (Fisher part# A669C-212 or equivalent)

8.1.6 **Ammonia-Methanol (Amm-MeOH, 0.6%)** – In a 1000 mL graduated cylinder, add 20 mL NH4OH (Ammonium Hydroxide) and fill to volume with methanol (980 mL reagent MeOH). Invert to mix.

8.1.7 **Ammonium Acetate/Acetic Acid buffer (25mM, pH 4)** – In a 2000 mL volumetric flask, add 2.32 mL acetic acid and 0.80 g ammonium acetate then fill to volume with reagent water (1997.68 mL reagent water). Invert to mix.

8.1.8 **Nitrogen** – Nitrogen aids in aerosol generation of the ESI liquid spray and is used as collision gas in some MS/MS instruments. The nitrogen used should meet or exceed instrument manufacturer's specifications.

8.2 Standards

NOTE: When a compound purity is assayed to be 96% or greater (standards purchased from Wellington are >98%), the weight can be used without correction to calculate the concentration of the stock standard. PFAS analyte, IS, and SUR standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in HDPE containers. Solution concentrations listed in this section were used to develop this method and are included as an example. Alternate concentrations may be used as necessary depending on instrument sensitivity and the calibration range used. Standards for sample fortification generally should be prepared in the smallest volume that can be accurately measured to minimize the addition of excess organic solvent to aqueous samples.

NOTE: The final compositions for all standards in section 8.2 contain 96:4% (v/v) methanol/water. The solutions are stored at 2-6°C in HDPE containers, except for the solutions in 8.2.8, 8.2.11, and 8.2.16.2, which are routinely stored at room temperature.

8.2.1 **Surrogate (SUR) Stock Standard Solutions –** The SUR standard stocks are obtained from Wellington Labs (catalog #s: M2PFHxDA, M2-4:2FTS, M2-6:2FTS, M2-8:2FTS, M8FOSA-I, d-N-EtFOSA-M, d-N-MeFOSA-M, d5-N-EtFOSAA-M, d3-N-MeFOSAA-M and MPFAC-C-ES). SUR stock standard solutions are stable for at least 12 months when stored at 2-6°C.

8.2.2 **SUR 50X Mix** - Dilute the stock standards with methanol/water in accordance with the table below:

SUR 50X Mix Preparation (Aqueous)				
Standard Name	**Conc. of Stock Std. (µg/mL)**	**Aliquoted Volume (µL)**	**Dilution Volume (mL)**	**Final Conc. (µg/mL)**
Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-$^{13}C_2$] hexane sulfonate (13C2-4:2FTS)	50	1000	10	5.0
Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-$^{13}C_2$] octane sulfonate (13C2-6:2FTS)	50	1000	10	5.0
Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-$^{13}C_2$] decane sulfonate (13C2-8:2FTS)	50	1000	10	5.0
Perfluoro-1-[$^{13}C_8$] octanesulfonamide (13C8-PFOSA)	50	200	10	1.0

N-ethyl-d5-perfluoro-1-octanesulfonamide (d5-EtFOSA)	50	200	10	1.0
N-methyl-d3-perfluoro-1-octanesulfonamide (d3-MeFOSA)	50	200	10	1.0
N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid (d5-EtFOSAA)	50	1000	10	5.0
N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid (d3-MeFOSAA)	50	1000	10	5.0
2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-$^{13}C_3$-propanoic acid (13C3-GenX)	50	1000	10	5.0
2-(N-methyl-d3-perfluoro-1-octanesulfonamido) ethan-4-ol (d7-MeFOSE)	50	200	10	1.0
2-(N-ethyl-d5-perfluoro-1-octanesulfonamido) ethan-4-ol (d9-EtFOSE)	50	200	10	1.0
Perfluoro-n-[1,2-$^{13}C_2$] hexadecanoic acid (13C2-PFHxDA)	50	200	10	1.0

8.2.3 **100 ppb SUR Mix** - Combine the SUR 50X mix and Wellington Labs standard part# MPFAC-C-ES and dilute with methanol/water in accordance with the table below:

100 ppb SUR Mix Preparation (Aqueous)				
Standard Name	**Conc. of Stock Std. (µg/mL)**	**Aliquoted Volume (µL)**	**Dilution Volume (mL)**	**Final Conc. (µg/mL)**
SUR 50X Mix	1	2200	22	0.10
MPFAC-C-ES Stock	2	1100	22	0.10

NOTE: The complete list of compounds included in the ID (Aqueous and Solid) 100 ppb SUR Mix is found under Table 5.

8.2.4 **Analyte Primary Dilution Standards (PDS)** – Analyte standards are purchased from Wellington Labs as ampoulized solutions. The PDS standards are stable for at least 12 months when stored at 2-6°C.

8.2.4.1 PFHxS, PFOS and other sulfonic acids are not available as the acid form, but rather as their corresponding salts, such as Na+ and K+. These salts are acceptable for use as stock standards as long as the weight is corrected for the salt content according to the equation below.

$$Mass_{acid} = Measured\ Mass_{salt} \times \frac{MW_{acid}}{MW_{salt}}$$

Where:
MW_{acid} = the molecular weight of PFAA
MW_{salt} = the molecular weight of purchased salt

8.2.5 **10X Stock Analyte PDS** – Contains all target analytes at 0.2 ug/mL, except GenX which is present at 0.4 ug/mL (GenX is present in PFAC-30PAR; additional spike of individual stock standard is added to give double concentration). Prepare as outlined below:

8.2.5.1 2 mL of the primary lot of PFAC-30PAR standard mix, 40 uL of MeFOSA, EtFOSA, 10:2 FTS, MeFOSE, EtFOSE, GenX, PFDOS, PFHxDA, and PFODA primary standards, are diluted to 10 mL with methanol and reagent water, for a final composition of 96%MeOH.

8.2.6 **100X Analyte PDS** - Contains all target analytes at 20 ng/mL, except GenX which is present at 40 ng/mL. Prepare as outlined below:

8.2.6.1 1 mL of Stock (10X) Analyte PDS is diluted to 10 mL with 9 mL of 96% MeOH

8.2.7 **1000X Analyte PDS** - Contains all target analytes at 2.0 ng/mL, except GenX which is present at at 4.0 ng/mL. Prepare as outlined below:

8.2.7.1 1 mL of 100X Analyte PDS is diluted to 10 mL with 9 mL of 96% MeOH

8.2.8 **Initial Calibration Standards (ICAL)** – According to the table below, prepare calibration standards at the following nominal concentrations in pg/mL (ng/L): 50, 100, 200, 500, 1000, 2000, 5000, 10000, 15000 and 20000, except for GenX which will be at double these concentrations. The ICAL standards are stable for at least three months when stored at room temperature, or 12 months when stored at 2-6°C. See Table 5 for a list of analytes and exact concentrations.

ICAL Preparation (Aqueous)							
ICAL Level	**PFAS Conc. (pg/mL)**	**SUR Conc. (pg/mL)**	**PFAS PDS 10X (mL)**	**PFAS PDS 100X (mL)**	**PFAS PDS 1000X (mL)**	**100 ppb SUR (mL)**	**Final Volume (mL)**
1	50	2000	-	-	0.125	0.1	5
2	100	2000	-	-	0.250	0.1	5
3	200	2000	-	-	0.500	0.1	5
4	500	2000	-	0.125	-	0.1	5
5	1000	2000	-	0.250	-	0.1	5
6	2000	2000	-	0.500	-	0.1	5
7	5000	2000	0.125	-	-	0.1	5
8	10000	2000	0.25	-	-	0.1	5
9	15000	2000	0.375	-	-	0.1	5
10	20000	2000	0.50	-	-	0.1	5

NOTE: ICAL preparation procedures are subject to change without notice

8.2.9 **10X ICV PDS mix** – Second source standard containing required target analytes at 0.2 ug/mL or 200ppb, except those compounds not contained in the PFAC-24PAR stock mix, which are present at a nominal concentration of 1.0 ug/mL or 1000ppb. Prepare as outlined below:

8.2.9.1 Dilute PFAC-24PAR standard mix (secondary source/preparation) and 40uL each of GenX, ADONA, 9Cl-PF3ONS, and 11Cl-PF3OUDS secondary standards are diluted to 2mL with methanol and water, for a final solvent composition of 96:4% MeOH:water. The PFAC-24PAR standard includes all analytes listed in Table 5 except the following: GenX, ADONA, 9Cl-PF3ONS, 11Cl-PF3OUDS, 10:2FTS, MeFOSA, EtFOSA, MeFOSE, EtFOSE, PFDOS, PFHxDA, and PFODA.

8.2.10 **100X ICV Mix** - Second source standard containing required target analytes at 0.02 ug/mL or 20ppb. Prepare as outlined below:

8.2.10.1 Dilute 0.5 mL of the 10X ICV PDS mix to 5mL using 96:4% MeOH:water.

8.2.11 **ICV Sample Solution (500ppt)** – Prepare according to the table below. Note: secondary standards for the following compounds are not included in the ICV sample: 10:2 FTS, MeFOSA, EtFOSA, MeFOSE, EtFOSE, PFDOS, PFHxDA, PFODA

ICV Preparation (Aqueous)				
Standard Name	**Conc. of Stock Std. (pg/mL)**	**Aliquoted Volume (µL)**	**Dilution Volume (mL)**	**Final Conc. (pg/mL)**
PFAS ICV 100X Mix	20000	25	1.0	500
Full List SUR mix, 100ppb	100000	20	1.0	2000

8.2.12 **Isomer check** – For target compounds which have multiple chromatographic peaks due to branched and linear isomers, but for which quantitative standards are not available, a qualitative check is analyzed with each calibration event to demonstrate the peak shape and retention time of the branched isomers. See sections 10.5, 10.6 for integration information.

8.2.12.1 **Isomer Check 50X Mix** – 20 µL each of TPFOA, br-MeFOSAA, and br-EtFOSAA standards (Wellington Laboratories item #s T-PFOA, br-MeFOSAA, and br-EtFOSAA) are diluted to 1 mL with 900 µL of MeOH and 40 µL of reagent water. Final solvent composition is 96:4% MeOH:water. This solution is used to create the actual isomer check standard to be analyzed with each ICAL. Note: branched/linear isomer mixes of MeFOSAA and EtFOSAA are now present in the analyte PDS solutions, so these compounds will be calibrated with branched and linear isomers summed, but will also continue to be present in the Isomer Check mix.

8.2.12.2 **Isomer Check Standard** - 10 µL of the Isomer Check 50X Mix plus 20 µL of the 100 ppb SUR are diluted to 1 mL with 96% MeOH. The concentrations of the isomer components should be approximately 10000 ppt. This sample will be analyzed with each calibration event to demonstrate peak shape and retention time of the additional branched isomers of the included compounds.

8.2.12.3 As more qualitative standards containing mixes of branched and linear isomers become commercially available, the lab will add those newly available compounds/standards to the isomer check mix and analyze them in the manner described in Sec. 8.2.12.

8.3 Instrument Blank (IBLK) – The instrument blank is prepared by spiking 942 µL of MeOH and 38 µL of Water with 20 µL of SUR 100ppb; cap and vortex to mix, then aliquot into auto-sampler vial.

8.4 Method Blank (MB) – For 5mL FV extracts, spike 250 mL reagent water with 100 µL of the 100ppb SUR Mix. Mix well, extract as normal alongside client samples. For 2mL FV extracts, spike 250 mL reagent water with 40 µL of the 100ppb SUR Mix. Mix well, extract as normal alongside client samples.

9.0 Procedure

9.1. Equipment Preparation

9.1.1 Support Equipment

9.1.1.1 Refrigerator units are maintained and verified as required by the Quality Assurance Management Plan [QAMP ME0012K].

9.1.1.2 The balance is verified at the beginning of each analytical day using a certified weight set. Refer to the Equipment and Instrumentation SOP [QA SOP ME002JT] for balance verification procedures and acceptance criteria.

9.1.1.3 Bottletop dispensers, pipettes, and thermometers are maintained and verified as required by the Equipment and Instrumentation SOP [QA SOP ME002JT].

9.1.2 Instrument

9.1.2.1 Example Chromatographic Conditions

Step	Total Time (min)	Flow Rate (uL/min)	A: 20mM Ammonium Acetate (%)	B: Methanol (%)
0	0.00	1200	95.0	5.0
1	0.10	1200	45.0	55.0
2	4.50	1200	1.0	99.0
3	6.00	1200	1.0	99.0
4	6.10	1200	95.0	5.0
5	8.10	1200	95.0	5.0

9.1.2.2 Example Mass Spectrometric Conditions

Parameter	Setting or Value
Syringe Size	100 µL
Injection Volume	10 µL
Draw Speed	50.0 µL/min
Eject Speed	50.0 µL/min
Needle Level	3.0 mm
Column Oven Temperature	40°C
MRM Scan Window	60 sec
Curtain Gas (CUR)	30.0
Collision Gas (CAD)	9
Ion Spray Voltage (IS)	-4500.0 V
Temperature (TEM)	450.0°C
Ion Source Gas 1 (GS1)	40.0

Ion Source Gas 2 (GS2)	60.0

9.2. Initial Calibration

9.2.1 Mass Calibration – calibrate the mass scale of the MS with the calibration compounds and procedures prescribed by the manufacturer. Mass calibration/mass tune will be performed any time major maintenance is performed on the MS, or following any catastrophic instrument failure (power loss, etc.)

9.2.2 Mass Calibration verification – a mass calibration verification will be analyzed following mass calibration/mass tune, prior to initial calibration (ICAL). A prepared standard containing PFAS targets will be injected using the normal LC parameters for analysis but set up to perform a product ion (MS2) scan for the quantitation product ions of PFOA (m/z 369) and PFOS (m/z 80). If these target product ions are detected at the expected RT, the mass calibration has been verified.

9.2.3 Prepare a set of at least five ICAL standards (six ICAL standards for quadratic regressions) as described in Section 8. The lowest concentration ICAL standard must be at or below the LOQ, which may depend on system sensitivity. It is recommended that at least four of the ICAL standards are at a concentration greater than or equal to the LOQ.

9.2.4 The LC/MS/MS system is calibrated using the IS technique. A calibration curve for each of the analytes is generated by average response factor (AVG RF) or linear regression. Linear regression curves may be concentration weighted, if necessary. Linear or quadratic calibration regressions are not expected to be set through zero.

9.2.4.1 The linear regression curve is expressed as below:

$y = ax + b$

Where a is the slope and b is the y-intercept. When forced through 0, b=0.

$y = AS/ASUR$ $x = CS/CSUR$

AS is peak response of target analyte in calibration standards
ASUR is peak response of surrogate standard (SUR) in calibration standards
CS is concentration of target analyte in calibration standards
CSUR is concentration of surrogate standard (SUR) in calibration standards

9.2.5 Calibration Sequence

9.2.5.1 Calibration standards must be analyzed in sequence from lowest to highest concentration to minimize the chance that carryover from a higher concentration standard will boost the area of a lower concentration standard.

9.2.6 ICAL Evaluation

9.2.6.1 Acceptance Criteria – When quantitated using the ICAL curve, each calibration level for each analyte must calculate to be within 70-130% of its true value (±30% RE). For calibration curves produced using average response factors, the percent relative standard deviation (%RSD) of the RFs for all analytes must be <20%. Linear or non-linear regressions must have $r^2 \geq 0.99$ ($r \geq 0.995$) for each analyte. Weighting (typically 1/x or 1/x2) is allowed for linear and non-linear regressions. If these criteria cannot be met, the analyst will have difficulty

meeting ongoing QC criteria. It is recommended that corrective action is taken to reanalyze the ICAL standards, restrict the range of calibration, or select an alternate method of calibration.

9.2.6.1.1 Calibration Point Dropping – If more than the minimum number of standards are analyzed and levels are excluded from the calibration, only the lowest or highest standards may be excluded, except as noted here. The removal of calibration levels from the interior of the curve is allowed only when there is sound technical reason for doing so and when the level is removed for all analytes; for example, when it can be proven that the wrong standard was analyzed for the calibration level or there is obvious evidence that the instrument malfunctioned during injection of the standard. **The removal of any calibration level from the interior of the curve must be approved by the department supervisor/manager. Management approval and the rationale for the level removal must be documented and kept with the technical record.**

9.2.6.1.2 Calibration Point Replacement – replacing a calibration standard may sometimes be needed to correct for a technical problem that occurred during analysis such as power failure, incomplete injection of the standard or similar situation. Replacement of one standard, when analyzed within 24 hours of original analysis time and replacing all analytes in the original standard, is permitted. **The replacement of the standard must be approved by the department supervisor/manager; approval and the reason for replacement must be documented and kept with the technical record.**

9.2.6.1.3 For Wisconsin compliance analysis, re-quantitated concentrations for all target compounds at all concentration levels must be within the range 70-130% of their actual concentrations, except for the lowest calibration concentration level, which must be within the range of 50-150% of actual concentrations.

9.2.6.1.4 Calibration results for labeled Surrogate and Internal Standard compounds will be evaluated by comparing the area response of each level to the ICAL midpoint level (L5 – 1000ppt). Any ICAL points for which SUR or IS responses fall outside of 50-200% of the midpoint ICAL shall be removed. If any more than two ICAL points fail these criteria, the system should be inspected, and maintenance should be performed if needed. A new ICAL will then be analyzed following any maintenance.

NOTE: When acquiring MS/MS data, LC operating conditions must be carefully reproduced for each analysis to provide reproducible retention times. If this is not done, the correct ions will not be monitored at the appropriate times. As a precautionary measure, the chromatographic peaks in each window must not elute too close to the edge of the segment time window.

9.2.7 Calibration Locking – After all ICAL and ICV acceptance criteria are met, the calibration is considered “locked” and no further changes may be made until the next calibration event. In the AIM2 data processing software, the primary review (L1) analyst will set the “Sample State” for all files of the calibration event to “Locked” state. When files are in “Locked” state, no permanent changes can be made to the samples. The calibration design or fit must never be changed during routine data processing of any analytical sequence associated with the calibration; the only exception is when a problem with the original calibration curve is found. In that case, the problem must be handled as a quality incident. If the investigation of the incident indicates that the calibration is invalid, then all data associated with the calibration must be reprocessed under the corrected calibration.

9.2.8 Relative Error

9.2.8.1 Each calibration level for each analyte must calculate to be within 70-130% of its true value (±30% RE); except for Wisconsin compliance – see section 9.2.6.1.3.

9.2.9 Initial Calibration Verification (ICV)

9.2.9.1 As part of the IDOC, each time a new Analyte PDS is prepared, and once after each ICAL, analyze an ICV sample from a second source (different from the source of the ICAL standards). If a second vendor is not available, then a different lot of the standard from the same vendor should be used. The ICV should be prepared and analyzed just like a CCV. Acceptance criteria for the ICV are identical to the CCVs; the calculated amount for each analyte must be ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, correct the problem and rerun the ICV. If the problem persists, repeat the ICAL. Samples are not to be analyzed until the ICAL has been verified by acceptable ICV accuracy. The lab will add additional target analytes to the ICV mix as second source standards become commercially available.

9.2.10 Continuing Calibration Verification/Instrument Sensitivity Check (CCV/ISC)

9.2.10.1 CCV Standards are analyzed at the beginning of each analysis batch, after every 10 samples, and at the end of the analysis batch. In this context, a “sample” is considered to be a field sample. MBs, CCVs, LCSs, MSs, FDs, TBs and MSDs are not counted as samples. In the event that 10 field samples and various non-field sample QC (BLKs, MBs, CCVs, LCSs, MSs, FDs, TBs and MSDs) are injected between a set of CCVs, the maximum injections between CCVs is limited to 20. Inject an aliquot of the appropriate concentration ICAL standard and analyze with the same conditions used during the initial calibration.

9.2.10.1.1 The daily Instrument Sensitivity Check (ISC; DOD required) will be used as the daily opening CCV and will be analyzed at a concentration at or below the LoQ using prepared ICAL standards.

9.2.10.1.2 The prepared mid-level ICAL solution will be analyzed for subsequent bracketing and closing CCVs.

9.2.10.1.3 Calculate the concentration of each analyte and surrogate in the CCV. The calculated amount for each analyte must be within ± 30% of the true value. The area response for each surrogate compound must be within ±50% of the area of the corresponding compound in the ICAL midpoint, or the ISC on days that an ICAL is not analyzed. If these conditions do not exist, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any field or QC samples that have been analyzed since the last acceptable calibration verification should be reanalyzed after adequate calibration has been restored, with the following exception: if the CCV fails because the calculated concentration is greater than 130% for a particular method analyte, and the associated field sample extracts show no detection for that method analyte, non-detects may be reported with appropriate narrative, without the need for re-analysis.

9.2.10.1.3.1 For Wisconsin and other non-DoD compliance samples, the calculated amount for each analyte must be within ± 30% of the true value except for the ISC, for which the calculated amount of each analyte must be within ± 50% of the true value.

9.2.10.1.4 Remedial Action – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration and verification of sensitivity by analyzing a CCV at or below the LOQ.

9.2.10.1.4.1 Remedial Actions taken to correct for ICAL, ICV, and CCV acceptance criteria exceptions must be documented and must be traceable to the ICAL/ICV/CCV for which the corrective action was performed. The instrument maintenance log entry for the remedial action must include some reference to the failing result (batch, ID, file number, etc) for which the remedial action is being taken.

9.2.10.1.5 If reanalysis cannot be performed, the data must be qualified. An NCM must be generated which describes the reason that reanalysis is not being performed.

9.3. Sample Preparation (Aqueous)

Some of the PFAS adsorb to surfaces, including polypropylene and HDPE. Therefore, aqueous sample containers must be rinsed with the elution solvent. The container rinse is passed through the cartridge to elute the method analytes and is then collected.

NOTE: The SPE cartridges, reservoirs, and sample containers described in this section are designed as single use items and should be discarded after use. They may not be refurbished for reuse in subsequent analyses.

9.3.1 Inspect samples; determine if sample centrifugation is warranted for each sample. Samples containing settled or suspended solids may require centrifugation in order to be fully loaded through the SPE sorbent; see Appendix C for more guidance in the Aqueous Sample Centrifugation Protocol. If centrifugation is warranted, follow the PFAS centrifuge procedure in Appendix C of this SOP.

9.3.1.1 Leachate samples and most samples from landfill-impacted sites will be prepared at an up-front (pre-extraction) dilution of 10X (25mL aliquot of sample into final volume of 250mL, using verified pipette).

9.3.2 Weigh the full sample container and document in LIMS3 prep batch. Initial volume for samples requiring centrifugation should be recorded after the centrifugation procedure has been completed.

9.3.3 Spike the sample containers with 100 µL of the 100 ppb SUR Mix. Invert the sample to mix.

9.3.4 Spike the LCS/LCSD, MS, and either FD or MSD appropriately according to the corresponding section under Quality Control and Method Performance (Section 11)

9.3.5 Clean SPE adapter caps by thoroughly rinsing with MeOH and allow to dry before using them to connect the cartridges/reservoirs.

9.3.6 Insert a disposable liner gently into the center of the flow valve. NOTE: tip of liner may catch and bend/break the liner. If that happens, try again with a new liner.

9.3.7 Attach the SPE extraction cartridges (Strata PFAS [WAX/GCB]) to the converter caps and the reservoirs. Place the cartridge setups in the active SPE manifold ports.

9.3.8 Wet the rim of the manifold body with DI water to form a proper seal with the manifold top.

9.3.9 Place the top on the SPE manifold, start the vacuum pump, and ensure the vacuum is approximately 5-10in. Hg.

9.3.10 Condition each SPE cartridge in individual steps with the following solvents. Solvent volumes used for conditioning step 1 should be used to rinse down the inside of the SPE reservoirs, to remove any potential contamination from the inside of the reservoirs. After adding the conditioning solvent to the reservoir/cartridge setup and before passing the solvent through the SPE sorbent for each conditioning step: in a *dropwise fashion*, the analyst must allow the conditioning solvent to soak the sorbent for 2 minutes, ensuring both sorbent beds (WAX and GCB) are fully soaked **(do not allow sorbent to go dry during conditioning).**

9.3.10.1 Conditioning step 1: 4mL Ammonia-MeOH (0.6%) + 4mL MeOH

9.3.10.2 Conditioning step 2: 4mL Ammonium acetate/acetic acid buffer

If the SPE cartridge goes dry during any step of the conditioning process, restart conditioning with first step (Amm-MeOH+MeOH).

9.3.11 Add the entire water sample to the SPE tube/reservoir **(do not allow sorbent to go dry during sample loading).**

9.3.11.1 Samples containing settled or suspended solids may require centrifugation in order to be fully loaded through the SPE sorbent; see Appendix C for the Aqueous Sample Centrifugation Protocol.

9.3.12 Adjust the pressure/SPE flow control valves to load the sample at approximately 10-15mL/min; this rate equates to loading time of 17-25 mins for a 250mL sample.

9.3.12.1 If the sample takes longer than 30 minutes to load through the SPE sorbent due to clogging, even after centrifugation, stop and continue with 9.3.13. A nonconformance memo must be used to document this.

9.3.13 Once the entire sample has passed through the SPE cartridge, wash the cartridge by passing 4 mL of the Ammonium Acetate/Acetic Acid buffer through the sorbent at a rate similar to the sample loading rate in 9.3.11

9.3.14 Use the vacuum to dry cartridges under high vacuum (≤20in. Hg) for ~5mins. Record drying start and end times.

9.3.15 Release the vacuum, remove the top from the SPE manifold and wet the rim of the manifold. Place the rack with the eluent collection tubes in the manifold and replace the top, ensuring that the active SPE ports are set in the corresponding collection tubes and a proper seal is formed. Turn the pump back on and ensure the pressure is approximately 5-10in. Hg.

9.3.16 Add 4mL MeOH to each empty sample container, then cap and shake each bottle to ensure all interior surfaces get rinsed. Transfer rinsate to the SPE, using a pipette to swirl MeOH along the insides of the reservoir to rinse.

9.3.17 Rinse each empty sample container a second time with 4mL Ammonia-MeOH (0.6 %). Transfer to the SPE, again using a pipette to swirl the Ammonia-MeOH solution along the inside of the reservoir to rinse.

9.3.18 Allow the eluent to soak the sorbent bed for 2 minutes before elution, as in 9.3.10. Collect the total eluent in the previously positioned collection tubes. Adjust the pressure/SPE flow control valves to elute in a ***slow*** dropwise fashion. Close each flow control valve just after the eluent level drops below the top frit of the cartridge – do not fully dry cartridges at this step.

9.3.19 Add 2mL MeOH to each cartridge, allowing the rinse solvent to soak the sorbent bed for 2 mins before eluting from the cartridge, as in 9.3.10.

NOTE: This soak may be visually different than previous soak steps in this protocol, as the entire volume of MeOH may fit in the body of the sorbent beds – there may not be any visible MeOH volume sitting on top of the sorbent bed.

9.3.20 Collect the entirety of the MeOH rinsate into the eluent collection tubes in a slow dropwise fashion, allowing the cartridges to fully dry. Release vacuum and remove collection tubes to a rack when elution is complete.

9.3.21 Weigh the empty container and document the weight in LIMS3 prep batch.

9.3.22 The difference between the weights from 9.3.2 and 9.3.21 is the sample volume (assuming 1g/mL density). Sample volumes will be rounded to the nearest 1.0 mL for use in calculations.

9.3.23 Using clean MeOH and individual Kimwipes, clean enough nozzles on the TurboVap LV concentrator to accommodate the number of sample extracts being concentrated. Make sure any nozzles not in use are firmly capped.

9.3.24 Concentrate extracts to an approximate volume of 4.0 mL (1.5mL if targeted final volume is 2 mL) using the TurboVap LV under a gentle stream of nitrogen in a heated water bath (55–60 °C). Set Nitrogen flow at a level which creates a vortex in the extract tube but does not cause splash-out; suggested starting flow rate is 1.5L/min.

9.3.25 Create a final volume (FV) reference tube: using a verified pipette, place a 5 mL or 2 mL aliquot of 96% MeOH into a clean extract tube – reference aliquot volume will depend on the targeted FV for the particular analysis selected

9.3.26 Once the sample extract has been concentrated to approximately 4.0 mL (1.5 mL if targeted final volume is 2 mL), remove elution tube from the TurboVap and allow to cool to room temperature.

9.3.27 Once cooled, reconstitute the extract following the appropriate row in the table below. After adding the water aliquot, use a transfer pipet and the reference tube created in 9.3.25 to bring the extract to the appropriate FV with clean reagent MeOH. Mix reconstituted extract to ensure homogeneity. Final reconstituted extract solvent composition is 96% MeOH: 4% water.

Extract targeted FV (mL)	Water (µL)
5	200
2	80

9.3.28 Transfer the reconstituted extracts to either 8mL HDPE Nalgene bottles or 2 mL cryovials, depending on extract FV, for storage at room temperature until instrumental analysis. Ensure caps are fully sealed on all extract storage bottles.

NOTE: For Wisconsin compliance samples, sample extracts must be stored at 0-6°C

9.3.29 Manifold cleanup – open flow control valves all the way and use the methanol squirt bottle to thoroughly rinse all flow control valves on the vacuum manifold top. Turn the manifold top on the side and rinse lures with methanol and flip the side and rinse the other side with methanol as well. Repeat the aforementioned steps with 0.6% ammonium methanol followed by methanol. If samples with high levels of contamination are processed, or if there is a concern that carryover contamination could impact samples yet to be prepared, Isopropyl Alcohol may be used to clean the manifold and flow control valves before the first methanol rinse.

9.3.30 For samples that show analyte detections above the range of the ICAL, sample dilutions will need to be prepared. See Appendix F for dilution preparation scheme.

9.3.30.1 Samples requiring analyses prepared at post-extraction dilutions of 50X or greater will be refortified with EIS to enable proper quantitation. Samples diluted in this manner are no longer technically quantitated using isotope dilution quantitation. All analyses prepared at post-extraction dilutions of 20X, 10X, or 5X will not be refortified with EIS and will thus maintain isotope dilution quantitation.

9.4. Analysis

9.4.1 Column Flush – Each day of analysis, the column must be thoroughly flushed with 100% MeOH for at least 30 minutes to clear any accumulated impurities and interferents from the sample pathway and equilibrate the system. It is also good practice to open the purge valve on the pumps for the first ~1min of flush time. The column should then be equilibrated to the analysis starting conditions by flushing for approximately 15 mins with 50:50 Ammonium Acetate: MeOH and finally approximately 15 mins with 95:5 Ammonium acetate: MeOH. Ensure that pressure is stable.

9.4.2 Analytical Sequence – Following the daily column flush, two to three (2-3) high ICAL standard (L9 or L10) injections and one blank injection will be made in order to prime the system before analyzing opening QC and client samples. Following these opening injections, Instrument Sensitivity Check (ISC) samples will be analyzed as the opening CCV (9.2.10). When a passing ISC sample(s) has been evaluated, an instrument blank will be analyzed to demonstrate the absence of system contamination. After system contamination is determined to be acceptable (no target analyte concentrations >1/2 LOQ), samples may be analyzed. After every tenth field sample analyzed in a sequence, a CCV will be analyzed (9.2.10), as well as at the end of the sequence. Each bracketing CCV should be followed by a CCB/IBLK sample injection. If system contamination is detected (any target analyte concentration >1/2 LOQ) in a CCB/IBLK following a bracketing CCV, and a Wisconsin compliance sample in the associated analysis window (prior to next CCV) shows a concurrent target analyte detection, that sample will be reanalyzed with an acceptable CCB. If the sample cannot be reanalyzed for some reason, the data for the CCB-detected compound(s) in the affected sample will be qualified with an NCM.

10.0 Data Analysis And Calculations

10.1 Qualitative Identification

10.1.1 Manual Integration

10.1.2.1 Manual changes to automated integration is called manual integration. Manual integration is sometimes necessary to correct inaccurate automated integrations but must never be used to meet QC criteria or to substitute for proper instrument maintenance and/or method set-up. To assure that all manual integrations are performed consistently and are ethically justified,

all manual integrations must be performed, reviewed, and recorded in accordance with corporate SOP ENV-SOP-CORQ-0006, Manual Integration.

10.2 Calculations

See the Laboratory Quality Assurance Manual [QAMP ME0012K] for equations for common calculations.

NOTE: The surrogate standard/Extracted Internal Standard (SUR/EIS) is used for quantitation in the PFAS ID methods.

10.2.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations using MS/MS. Concentrations are calculated by measuring the product ions (Q3 Mass) listed in Table 4. Other ions may be selected at the discretion of the analyst.

10.2.2 Calculate analyte and surrogate concentrations using the multipoint calibration established in Section 9.2. Do not use daily calibration verification data to quantitate analytes in samples. Final analyte concentrations are adjusted to reflect the actual sample volume determined in Section 9.

Sample concentration for aqueous samples:

$$\text{Concentration (ng/L)} = (\text{Cs})(\text{DF})$$

Where:

DF = dilution factor
Cs – see below

From the equation in section 10.3.2, Cs is calculated as follows:

$$Cs = \left(\frac{As}{Asur} - b\right) \cdot \left(\frac{Csur}{a}\right)$$

Where:

As is peak response of target analyte in the sample
Asur is peak response of internal standard in the sample (SUR for isotope dilution methods)
Cs is concentration of target analyte in the sample
Csur is concentration of internal standard in the sample (SUR for isotope dilution methods)
a is the slope from the ICAL linear regression
b is the y-intercept from the ICAL linear regression

10.2.3 Results for target analytes must be quantified from the most recent ICAL analyzed on the same instrument. During both primary (L1) and secondary (L2) review, analysts must review the ICAL Form 6 RF report (ICAL summary) to ensure that the most recent ICAL analyzed on the same instrument was utilized for the quantitation of all samples.

10.3 Prior to reporting the data, the chromatogram must be reviewed by a trained analyst for any incorrect peak identification or poor integration.

10.4 Dilution - When the concentrations of target analytes on-column exceed the highest concentration of initial calibration standard, dilution analyses are required. An appropriate dilution should be in the upper half of the calibration range, or close to the CCV. The diluted extract must maintain the same methanol/water ratio as the original extract. If a dilution greater than 20X of the extract is required,

fortification of the SUR/EIS in the diluted extract is necessary. Samples requiring >20-fold diluted analyses post-extraction will be refortified with SUR/EIS to enable proper quantitation. Samples diluted in this manner are no longer technically quantitated using isotope dilution quantitation. Refer to Appendix F for dilution preparation information.

10.5 PFHxS, PFOS, MeFOSAA and EtFOSAA have multiple chromatographic peaks using the LC conditions in Table 4 due to the linear and branched isomers of these compounds. The areas of all the linear and branched isomer peaks observed in the ICAL standards for each of these analytes must be integrated together and summed. The concentrations are reported as a total for each of these analytes. Purchased standards contain both linear and branched isomers; therefore, individual ICALs for the linear and branched isomers will not be possible. PFOA also has multiple chromatographic peaks using the LC conditions in Table 4 due to linear and branched isomers of this compound. However, a quantitative standard containing both linear and branched isomers is not currently available, so ICAL standards will not show multiple peaks for PFOA. A technical (qualitative) standard is analyzed with each calibration event to identify where the branched isomer peak elutes, relative to the linear isomer peak. In client samples, the areas of the linear and branched isomer peaks observed must be integrated together and summed. The concentration of PFOA in client samples will be reported as a sum total of branched and linear isomers. As more standards (quantitative or qualitative) containing both branched and linear isomers for other target analytes become available, these will be used in the same way as for PFHxS/PFOS/MeFOSAA/EtFOSAA or PFOA. Following the same procedure, any target analyte for which a standard has been purchased and analyzed will be integrated and reported as a sum total of branched and linear isomers.

10.5.1 MeFOSAA and EtFOSAA standards containing branched and linear isomers are also present in the Isomer Check solutions.

10.6 Integration - Sample integration is performed automatically by quantitation software and reviewed by the analyst for any incorrect analyte identification or poor integration. A peak is considered a positive detection if the primary (quantitation) ion transition peak shows a signal-to-noise ratio (S/N) of at least 10.0:1 and is defined by at least 10 MS scans (data points) across the baseline of the peak. For analytes with a secondary (confirmation) ion transition, the primary and secondary ion transitions must elute at nominally the same retention time (±2 seconds). Further, the secondary transition must show S/N of at least 3.0:1.

10.6.1 For Wisconsin compliance and other analyses not regulated by the DoD, quantitation ion transition peaks are considered positive detections if the S/N is at least 3.0:1

10.6.2 Retention Time (RT) acceptance – RT of each analyte, SUR, and IS must fall within 0.4 minutes (±0.2 mins) of the corresponding RTs from the ICAL midpoint, or the daily ISC on days when ICAL is not performed. Analytes with matched (labeled analogue) SUR compounds must elute within 0.1 mins of the associated SUR.

10.7 Calculations must utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty), typically two, and not more than three significant figures.

10.8 Calculate the % recovery for the LCS using the following equation:

$$\%\ \text{Recovery} = \frac{\text{Concentration (or amount)found}}{\text{Concentration (or amount) spiked}} \times 100$$

10.9 Calculate the MS % recovery for each analyte using the equation:

$$\%\ \text{Recovery} = \frac{Xs - X}{t} \times 100$$

Where:
Xs = measured concentration in the spiked sample
X = measured concentration in the unspiked sample
t = spike concentration

10.10 Calculate the relative percent difference (RPD) for duplicate measurements (FD1 and FD2 or MS and MSD) using the equation:

$$\text{RPD} = \frac{|X2 - X1|}{\frac{X2 + X1}{2}} \times 100$$

Where:
X1 = FD1 or MS result
X2 = FD2 or MSD result

10.11 Calculate the percent relative standard deviation (%RSD) for calibration curves produced using average response factor using the equation:

$$\%\ \text{RSD} = \frac{SD}{AVG} \times 100$$

Where:
SD = the standard deviation of the curve
AVG = the average response factor for the curve (y = AVG*x)

10.12 Calculate the relative error (RE) using the equation:

$$\%RE = \frac{x_2 - x_1}{x_1} \text{ x } 100$$

Where:
X1 = true value of the calibration standard
X2 = measured concentration of the calibration standard

11.0 Quality Control And Method Performance

11.1 Quality Control

The following QC samples are prepared and analyzed with each batch of samples.

QC Item	Frequency
Method Blank (MB)	1 per batch
Laboratory Control Sample (LCS)	1 per batch
Laboratory Control Sample Duplicate (LCSD)	As needed
Matrix Spike (MS)	1 per batch
Matrix Spike Duplicate (MSD)	1 per batch or as needed
Sample Duplicate	1 per batch or as needed

11.2 Instrument QC

The following Instrument QC checks are performed.

QC Item	Frequency
Initial Calibration (ICAL)	Following major instrument maintenance, when new ICAL standards are prepared, and as needed to account for instrumental drift
Instrument Blank (IBLK)	After calibration, daily prior to sample analysis, after each CCV
Initial Calibration Verification (ICV)	After calibration.
Continuing Calibration Verification (CCV)	At the beginning of each batch, after every 10 samples, and at end of each batch
Instrument Sensitivity Check (ISC)	Daily opening CCV(s)

11.3 Instrument Blank (IBLK) – One instrument blank (IBLK) is analyzed immediately following the highest ICAL standard analyzed, on a daily basis prior to sample analysis, and following each bracketing CCV in a sequence, to check for carryover and instrument contamination. The concentration of each analyte must be ≤ 1/2 the LOQ. If the instrument blank does not pass this requirement after the highest ICAL standard, the calibration must be performed using a lower concentration for the highest standard until the acceptance criteria is met.

11.3.1 If any target analyte is detected in both a Wisconsin compliance sample and the IBLK/CCB immediately preceding (following bracketing CCV), an NCM will be generated to document the potential bias. See 9.4.2.

11.4 Method Blank (MB) – One method blank (MB) must be processed with each extraction batch. If more than 20 samples are included in a batch, analyze an MB for every 20 samples. The MB is to contain all reagents specific to the method that is carried through the entire analytical procedure, including preparation and analysis.

11.4.1 The MB must not contain any analyte of interest at or above 1/2 of the LOQ or project specific-requirements. (Note: see appendices for state or program specific requirements). If the MB contains an analyte of interest at or above 1/2 of the LOQ, then the MB and associated samples must be reanalyzed. If the MB contamination is confirmed, the entire batch must be re-prepared and reanalyzed. Reanalysis or re-extraction is not required if the samples are not impacted. Samples are not impacted when:

11.4.1.1 The MB detection is not present in the sample.

11.4.1.2 The sample concentration is ≥10x the concentration of the detection in the MB.

11.4.1.3 For any MB not associated with DOD-compliance samples OR Wisconsin-compliance samples, contamination must only be **≤LOQ** for each analyte. Other project-specific requirements may be used as well.

11.4.2 The MB must have acceptable surrogate recoveries. If surrogate recoveries are not acceptable, sample analysis should stop immediately. Corrective action should be taken. The MB should be reanalyzed if the analyst feels that the failure could be attributed to instrument problems. If the analyst feels that the failure is due to a poor extraction, the entire batch associated with the MB must be re-extracted.

11.4.2.1 If a MB recovers above the acceptance limits for a SUR/EIS compound and is ND for the associated target compound in the MB AND associated samples show acceptable recovery for the same SUR/EIS compound, the MB is acceptable and sample data may be reported as is. If a sample associated with a MB showing a high-failing result for a SUR/EIS compound also shows recovery above the acceptance range but is ND for associated target compound(s), the data may be reported for that sample.

11.5 Laboratory Control Sample (LCS) – An LCS is required with each extraction batch. The spiked concentration of the LCS will be at a low concentration of the calibration curve. See DoD acceptance criteria for LCS targets in Table 6. If the LCS results do not meet the criteria listed in Table 6 for method analytes, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch. For target analytes not included in the DoD Limits for batch control table (Appendix C of QSM 5.3), in-house limits of 70-150% recovery will be used as acceptance criteria.

11.5.1 The LCS for ID-AQ is prepared by spiking 250 mL of reagent water with 200 µL of the 100X PDS mix (20 ppb) for a concentration of 16 ppt (GenX at 32 ppt). The LCS is also spiked with 100 µL of Full List 100 ppb SUR mix and extracted as normal alongside client samples.

11.5.2 For Wisconsin compliance and other non-DoD compliance samples, acceptance limits will be 50-150% recovery for all target compounds.

11.6 Surrogates (SUR/EIS/IDS) – The surrogate standard (SUR, also referred to as extracted internal standard [EIS] or isotope dilution standard [IDS]) is fortified into all samples, MBs, LCSs, MSs, MSDs prior to extraction. It is also included in the ICAL standards. SUR/EIS indicate extraction efficiency in sample prep and are used to quantitate target analytes in all samples.

11.6.1 The analyst must monitor the peak areas of the SUR in all injections during each analysis day. The SUR responses (peak areas) in any chromatographic run must not deviate by more than 50% from the area measured in the ICAL midpoint (L5) standard during initial calibration or in the daily opening CCV on days a calibration is not performed. When the SUR/EIS/IDS recovery from a sample, blank, or CCV is not within this range check the following: calculations to locate possible errors, standard solutions for degradation or contamination, and instrument performance. Correct the problem and inject a second preparation of that sample extract (or blank or CCV) prepared in a new capped autosampler vial. Loss due to evaporation has been observed when using polypropylene caps which can cause high SUR response.

11.6.2 For Wisconsin and other non-DoD compliance analysis, all SUR/EIS/IDS compounds must recover within the range 25-150% in extracted samples, except 13C8-PFOSA, d3-MeFOSA, d5-EtFOSA, d7-MeFOSE, and d9-EtFOSE, which must recover within the range 10-150% in extracted samples. Recovery will be based on area counts as described above. For all instrument QC (CCV, ICV, ICB, CCB, IBLK) used for Wisconsin compliance, SUR/EIS/IDS compounds must recover within the range 50-150% in each injection.

11.6.3 If extract reanalysis meets the surrogate recovery acceptance criteria, report only the data for the reanalyzed extract.

11.6.4 If the extract reanalysis fails the 50-150% acceptance criteria (or 10/25-150% for non-DoD compliance), the analyst should check the calibration by injecting the last ICAL standard that passed. If the ICAL standard fails the criteria of 9.2.6, maintenance and/or recalibration is in order. If the ICAL standard is acceptable, extraction of the sample should be repeated provided the sample is still within the holding time. If the re-extracted sample also fails the recovery acceptance criteria, an NCM will be generated describing that the results are suspect due to surrogate recovery. Alternatively, a new sample can be collected and re-analyzed.

11.7 Ion Ratios – In detections of analytes for which two ion transitions (quantitation and confirmation) are measured, the area ratio between the confirmation and quantitation transitions shall be monitored and documented. The ion ratio for all detected analytes in each injection should be within 50-150% of the average ion ratio for the same analyte in the ICAL. On days ICAL is not performed, the ion ratio should be within 50-150% of the initial CCV standard. Targets detected and identified with ion ratios that fail these acceptance criteria will be flagged in the quantitation report, but not disqualified.

11.8 Matrix Spike (MS) – Analysis of an MS is required in each extraction batch. Assessment of method precision can be accomplished by analysis of a duplicate collected in the field; however, infrequent occurrence of method analytes might hinder this assessment. If the occurrence of method analytes in the samples is infrequent, or if historical trends are unavailable, a matrix spike duplicate (MSD) must be prepared, extracted, and analyzed. Extraction batches that contain MSD will not require the extraction of an FD.

11.8.1 Within each extraction batch, a minimum of one sample is spiked as an MS for every 20 samples analyzed. Client samples are spiked in the same manner as the LCS. 250mL of sample is spiked with 200 µL of 100X PDS mix (20 ppb) plus 100 µL of Full List 100 ppb SUR mix and extracted as normal alongside other client samples.

11.8.1.1 Analyte recoveries may exhibit matrix effect. For matrix spike samples, recoveries should range between 70-150%. If the % recovery falls outside of the acceptable range, corrective action must occur. The initial corrective action will be to check all calculations. If the calculations are correct, check the recovery of that analyte in the LCS. If the recovery of the analyte in the LCS is within limits, then matrix interference has been demonstrated and the laboratory operation may proceed. Analytical reports will show qualifier flags in such cases.

11.8.1.2 If the recovery for any analyte is outside the acceptance criteria for the matrix spike and the LCS, the laboratory is out of control and corrective action will be taken. Corrective action may include re-preparation and reanalysis of the batch. An NCM will be generated to document the corrective action taken.

11.9 Field Duplicate (FD) or Matrix Spike Duplicate (MSD) – Within each extraction batch (not to exceed 20 Field Samples), a minimum of one FD or MSD must be analyzed. If method analytes are not routinely observed in field samples, an MSD should be analyzed rather than an FD. See Appendix G for MS/MSD, MS/FD sample selection guidance.

11.9.1 Relative Percent Differences (RPDs) – FDs should have RPDs that are ≤30% between the original sample and the FD. If the RPD of any analyte falls outside the acceptance criteria, and the laboratory performance for that analyte is shown to be in control in the LCS, the recovery is judged to be matrix biased.

11.9.2 RPDs for MS/MSDs should be ≤30%. If the RPD falls outside of the acceptable range, corrective action must occur. The initial corrective action will be to check all calculations. If the calculations are correct, check the recovery of that analyte in the LCS. If the recovery of the analyte in the LCS is within limits, then matrix interference has been demonstrated and the laboratory operation may proceed. Analytical reports will show qualifier flags in such cases.

11.9.3 Every effort is made to ensure that an MS/MSD or an FD is included in every batch. In the event that there is insufficient sample to analyze an MS/MSD pair or if no FD is available, a duplicate LCS (laboratory control sample duplicate (LCSD)) is included in the batch. The MS/MSD must be analyzed at the same dilution as the most concentrated reportable analysis of the parent sample (the un-spiked sample See Appendix G for MS/MSD, MS/FD sample selection guidance.

11.10 Trip Blank (TB) – The purpose of the TB is to ensure that PFAS measured in the samples were not inadvertently introduced into the sample during sample collection/handling. Analysis of the TB is required only if a sample contains a method analyte or analytes at or above the LOQ; by lab protocol, TB samples are prepared and analyzed when received, prior to any knowledge of associated sample contamination. The TB is processed, extracted and analyzed in exactly the same manner as the samples. If an analyte found in the sample is present in the TB at a concentration greater than 1/2 the LOQ, then all samples collected with that TB are invalid and must be recollected and reanalyzed.

11.11 Reagent Water Contamination Testing – in-house generated reagent water demonstrated to be reasonably free of PFAS compounds, will be used for QC samples (MB/LCS/LCSD) in extraction batches and also sent to clients for use as trip blanks (TB), field blanks (FB), and equipment blanks (EB). Tested reagent water may also be sent to client sampling sites for other uses. Reagent water used for these purposes will be tested by the lab to confirm the absence of PFAS compounds prior to shipping to clients or being used in the lab. Carboys routinely will be filled with reagent water from the in-house Milli-Q water filtration system in order to create in-house “lots” of water; a sample bottle will be prepared each time carboys are filled and tested as a MB (contamination check) and LCS (spike recovery check) using the ID-AQ method. The test samples will be logged into the LIMS system by the PFAS supervisor or a member of QA when a set of carboys are filled to create a new in-house lot. The physical test samples shall be created by sampling approximately equal amounts of water from each filled carboy, which together constitute the “lot” of water. These test samples will be treated exactly the same as all other client and QC samples, taken through the entire extraction and analysis process. Should there be any recovery issues or any PFAS contamination detected in the reagent water collected in a particular lot, the water in that lot will not be used further for PFAS QC or field use. The lot may be tested again to confirm the recovery issue and/or the presence of contamination. If long-term outage of the in-house reagent water system occurs, reagent water may be purchased from an approved vendor; when new lots

of reagent water are received from the vendor, one sample from one of the bottles of the new lot will be tested in the same manner as described above. Reagent water lots and testing results will be recorded in document ME0047N-01: PFAS Free Reagent Water Milli Q System Water Testing; naming convention for in-house generated water lots will follow the convention of PFAS-YY-###, in which "YY" is the last two digits of the current year and "###" is a three digit number indicating the sequential lot number (ex: PFAS-21-005 is the 5th lot generated in 2021).

11.12 Method Performance

11.12.1 Method Validation

11.12.1.1 Detection Limits

Detection limits (DL) and limits of quantitation (LOQ) are established at initial method setup and verified on an on-going basis thereafter. Refer to Pace ENV corporate SOP ENV-SOP-CORQ-0011 Method Validation and Instrument Verification and to the *Method Validation* SOP [QA Policy ME003BF] for these procedures.

11.12.1.2 The MDL spike samples were prepared by spiking 250 mL of reagent water with 50 µL of 1000X PDS mix (2ppb), for a concentration of 0.4 ng/L (ppt; 50 ppt on column), plus 100 µL of Full List 100ppb SUR mix and extracted as normal. Final extract was concentrated/reconstituted to a final volume of 2 mL. An equal number of MB (see section 11.4) were extracted and analyzed with MDL samples.

11.12.1.3 MRL samples for Wisconsin compliance analysis will be spiked at twice the target analyte concentration of the MDL spiked samples.

11.12.1.4 Routine, on-going MDLv samples will be prepared by spiking 250 mL of reagent water with 25 µL of 100X PDS mix (20ppb), for a concentration of 2 ng/L (ppt; 100 ppt on column), plus 100 uL of Full List 100ppb SUR mix and extracted as normal. Final extract will be concentrated/reconstituted to a final volume of 5 mL. These samples will be prepared and analyzed at least twice per quarter.

11.12.1.5 For non-standard, non-regulatory analytes, an MDL study should be performed, and calibration curve generated before analyzing any samples, unless lesser requirements are previously agreed to with the client.

11.13 Analyst Qualifications and Training

Employees that perform any step of this procedure must have a completed Read and Acknowledgment Statement for this version of the SOP in their training record. In addition, prior to unsupervised (independent) work on any client sample, analysts that prepare or analyze samples must have successful initial demonstration of capability (IDOC) and must successfully demonstrate on-going proficiency on an annual basis. Successful means the initial and on-going DOC met criteria, documentation of the DOC is complete, and the DOC record is in the employee's training file. Refer to the *Demonstration of Capability* SOP [QA SOP ME001F2] for more information.

12.0 Data Review and Corrective Action

12.1 Data Review

Pace's data review process includes a series of checks performed at different stages of the analytical process by different people to ensure that SOPs were followed, the analytical record is complete and

properly documented, proper corrective actions were taken for QC failure and other nonconformance(s), and that test results are reported with proper qualification.

The review steps and checks that occur as employees complete tasks and review their own work is called primary review.

All data and results are also reviewed by an experienced peer or supervisor. Secondary review is performed to verify SOPs were followed, that calibration, instrument performance, and QC criteria were met and/or proper corrective actions were taken, qualitative ID and quantitative measurement is accurate, all manual integrations are justified and documented in accordance with the Pace ENV's SOP for manual integration, calculations are correct, the analytical record is complete and traceable, and that results are properly qualified.

A third-level review, called a completeness check, is performed by reporting or project management staff to verify the data report is not missing information and project specifications were met.

Refer to the *Data Review* SOP [QA SOP ME003LP] for specific instructions and requirements for each step of the data review process.

12.2 Corrective Action

Corrective action is expected any time QC or sample results are not within acceptance criteria. If corrective action is not taken or was not successful, the decision/outcome must be documented in the analytical record. The primary analyst has primary responsibility for taking corrective action when QA/QC criteria are not met. Secondary data reviewers must verify that appropriate action was taken and/or that results reported with QC failure are properly qualified.

Corrective action is also required when carryover is suspected and when results are over range. Samples analyzed after a high concentration sample must be checked for carryover and reanalyzed if carryover is suspected. Carryover is usually indicated by low concentration detections of the analyte in successive samples analyzed after the high concentration sample.

Sample results at concentrations above the upper limit of quantitation must be diluted and reanalyzed. The result in the diluted samples should be within the upper half of the calibration range. Results less than the mid-range of the calibration (L5) indicate the sample was over diluted and analysis should be repeated with a lower level of dilution. If dilution is not performed, any result reported above the upper range is considered a qualitative measurement and must be qualified as an estimated value.

13.0 Pollution Prevention And Waste Management

Pace proactively seeks ways to minimize waste generated during our work processes. Some examples of pollution prevention include but are not limited to: reduced solvent extraction, solvent capture, use of reusable cycletainers for solvent management, and real-time purchasing.

The EPA requires that laboratory waste management practice to be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner in accordance with Pace's Chemical Hygiene Plan / Safety Manual.

14.0 Modifications

14.1 A modification is a change to a reference test method made by the laboratory. For example, changes in stoichiometry, technology, quantitation ions, reagent or solvent volumes, reducing digestion or extraction times, instrument runtimes, etc. are all examples of modifications. Refer to Pace ENV corporate SOP

ENV-SOP-CORQ-0011 *Method Validation and Instrument Verification* for the conditions under which the procedures in test method SOPs may be modified and for the procedure and document requirements.

14.1.1 The analyst is permitted to modify LC columns, LC conditions, internal standards or surrogate standards, and MS and MS/MS conditions. Each time such method modifications are made, the analyst must repeat the procedures of the IDOC. **Modifications to LC conditions should still produce conditions such that co-elution of the method analytes is minimized to reduce the probability of suppression/enhancement effects.**

15.0 Responsibilities

Pace ENV employees that perform any part this procedure in their work activities must have a signed Read and Acknowledgement Statement in their training file for this version of the SOP. The employee is responsible for following the procedures in this SOP and handling temporary departures from this SOP in accordance with Pace's policy for temporary departure.

Pace supervisors/managers are responsible for training employees on the procedures in this SOP and monitoring the implementation of this SOP in their work area.

16.0 Attachments

16.1 Appendix A: Tables

16.1.1 Table 1 – Target Analyte List

16.1.2 Table 2 – Reporting Limits (LOQ)

16.1.3 Table 3 – Labeled Standard Associations

16.1.4 Table 4 – Instrument Conditions

16.1.5 Table 5 – Calibration Levels

16.1.6 Table 6 – DoD Batch Control Limits

16.2 Appendix B – PFAS ID – Solid Matrix

16.3 Appendix C – Aqueous Sample Centrifugation Protocol

16.4 Appendix D – PFAS by TCLP/SPLP

16.5 Appendix E - Aqueous Serial Dilution

16.6 Appendix F – Extract Dilution Preparations

16.7 Appendix G – MS/MSD, MS/FD Sample Selection Guide

16.8 Appendix H – Chemical Derivation of Ion Transitions

16.9 Appendix I – DoD/DOE QSM Requirements

17.0 References

NOTE: Where references exclude a date or edition, the latest edition of the referenced document adopted/recognized by the laboratory's accreditation bodies applies. Refer to the Quality Assurance Management Plan [QAMP ME0012K] for details.

17.1 *Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography* / Tandem Mass Spectrometry (LC/MS/MS), USEPA, Method 537.1, Version 1.0, November 2018.

17.2 *Department of Defense Department of Energy Consolidated Quality Systems Manual (QSM)* for Environmental Laboratories

17.3 Water Quality – Determination of Perfluorooctanesulfonate (PFOS) and Perfluorooctanoate (PFOA) – Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry, ISO 25101:2009 €.

17.4 Solvent-Extractable Nonvolatile Compounds by High-Performance Liquid Chromatography/Thermospray/Mass Spectrometry (HPLC/TS/MS) or Ultraviolet (UV) detection, USEPA, SW846, Method 9321B, Revision 2, February 2007.

17.5 Knepper, T.P. (2003) Analysis and Fate of Surfactants in the Aquatic Environment. Amsterdam, The Netherlands; Elsevier Science B.V.

17.6 Knepper, T.P. (2012) Polyfluorinated Chemicals and Transformation Products. Berlin, Germany: Springer-Verlag Berlin Heidelberg.

17.7 Rapid Commun Mass Spectrom 2007;21 (23): 3803-14.

17.8 *Wisconsin Department of Natural Resources Notice of Final Guidance and Certification, Wisonsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Expectations*. Wisconsin DNR. Version 12.16.2019.

18.0 Revision History

Revision #	Section Modified	Modification	Reason for Modification
v04	Appendix C	Removed Chip Method	Created separate SWI
	Appendix D	Removed Bottle Rinsate Method	Created separate SWI

APPENDIX A: TABLES

TABLE 1 – TARGET ANALYTE LIST

Analyte Name	Analyte Acronym	CAS Number	Method 537.1	ID (Aqueous)	DAI	ID (Solid)
1H,1H,2H,2H-perfluorohexane sulfonic acid	4:2 FTS	757124-72-4*	No	Yes	No	Yes
1H,1H,2H,2H-perfluorooctane sulfonic acid	6:2 FTS	27619-97-2	No	Yes	No	Yes
1H,1H,2H,2H-perfluorodecane sulfonic acid	8:2 FTS	39108-34-4	No	Yes	No	Yes
1H,1H,2H,2H-perfluorododecane sulfonic acid	10:2FTS	120226-60-0*	No	Yes	No	Yes
N-ethylperfluoro-1-octanesulfonamidoacetic acid	EtFOSAA	2991-50-6	Yes	Yes	No	Yes
N-methylperfluoro-1-octanesulfonamidoacetic acid	MeFOSAA	2355-31-9	Yes	Yes	No	Yes
Perfluoro-1-butanesulfonic acid	PFBS	375-73-5*	Yes	Yes	Yes	Yes
Perfluoro-n-butanoic acid	PFBA	375-22-4	No	Yes	Yes	Yes
Perfluoro-1-decanesulfonic acid	PFDS	335-77-3*	No	Yes	No	Yes
Perfluoro-n-decanoic acid	PFDA	335-76-2	Yes	Yes	Yes	Yes
Perfluoro-n-dodecanoic acid	PFDoA	307-55-1	Yes	Yes	No	Yes
Perfluoro-1-heptanesulfonic acid	PFHpS	375-92-8*	Yes	Yes	No	Yes
Perfluoro-n-heptanoic acid	PFHpA	375-85-9	Yes	Yes	Yes	Yes
Perfluoro-1-hexanesulfonic acid	PFHxS	355-46-4*	Yes	Yes	Yes	Yes
Perfluoro-n-hexanoic acid	PFHxA	307-24-4	Yes	Yes	Yes	Yes
Perfluoro-1-nonanesulfonic acid	PFNS	68259-12-1*	Yes	Yes	No	Yes
Perfluoro-n-nonanoic acid	PFNA	375-95-1	Yes	Yes	Yes	Yes
Perfluorooctanesulfonic acid	PFOS	1763-23-1*	Yes	Yes	Yes	Yes
Perfluoro-1-octanesulfonamide	PFOSA	754-91-6	No	Yes	No	Yes
Perfluoro-n-octanoic acid	PFOA	335-67-1	No	Yes	Yes	Yes
Perfluoro-n-pentanoic acid	PFPeA	2706-90-3	Yes	Yes	Yes	Yes
Perfluoro-1-pentansulfonic acid	PFPeS	2706-91-4*	Yes	Yes	No	Yes
Perfluoro-n-tetradecanoic acid	PFTeDA	376-06-7	Yes	Yes	No	Yes

TABLE 1 – TARGET ANALYTE LIST (CONT'D)

Analyte Name	Analyte Acronym	CAS Number	Method 537.1	ID (Aqueous)	DAI	ID (Solid)
Perfluoro-n-tridecanoic acid	PFTrDA	72629-94-8	Yes	Yes	No	Yes
Perfluoro-n-undecanoic acid	PFUdA	2058-94-8	Yes	Yes	No	Yes
N-methylperfluoro-1-octanesulfonamide	MeFOSA	31506-32-8	No	Yes	No	Yes
N-ethylperfluoro-1-octanesulfonamide	EtFOSA	4151-50-2	No	Yes	No	Yes
Hexafluoropropylene oxide dimer acid	GenX	13252-13-6	Yes	Yes	No	Yes
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	Yes	Yes	No	Yes
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1*	Yes	Yes	No	Yes
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUDS	763051-92-9*	Yes	Yes	No	Yes
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	MeFOSE	24448-09-7	No	Yes	No	Yes
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	EtFOSE	1691-99-2	No	Yes	No	Yes
Perfluoro-1-dodecanesulfonic acid	PFDOS	79780-39-5*	No	Yes^	No	Yes^
Perfluoro-n-hexadecanoic acid	PFHxDA	67905-19-5	No	Yes^	No	Yes^
Perfluoro-n-octadecanoic acid	PFODA	16517-11-6	No	Yes^	No	Yes^

* CAS Numbers are for the acid and not the salt.
^ Compounds for Wisconsin compliance analysis
NOTE: Methods 537.1 and DAI are addressed in SOPs ME002I6 and ME002I7 respectively.

TABLE 2A – REPORTING LIMITS (LOQ) – PFAS ISOTOPE DILUTION – AQUEOUS MATRIX

NOTE: Reporting Limits are subject to change. Current limits are available in LIMs

Analyte Acronym	Analyte Name	CAS Number	Spiked Conc[1] (ng/L)	DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
EtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid	2991-50-6	0.4	1	4	8
8:2 FTS	1H,1H,2H,2H-perfluorodecane sulfonic acid	39108-34-4	0.383	1	4	8
4:2 FTS	1H,1H,2H,2H-perfluorohexane sulfonic acid	757124-72-4[2]	0.374	1	4	8
6:2 FTS	1H,1H,2H,2H-perfluorooctane sulfonic acid	27619-97-2	0.379	1	4	8
MeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid	2355-31-9	0.4	1	4	8
PFBS	Perfluoro-1-butanesulfonic acid	375-73-5[2]	0.354	0.5	2	4
PFBA	Perfluoro-n-butanoic acid	375-22-4	0.4	0.5	2	4
PFDS	Perfluoro-1-decanesulfonic acid	335-77-3[2]	0.386	0.5	2	4
PFDA	Perfluoro-n-decanoic acid	335-76-2	0.4	0.5	2	4
PFDoA	Perfluoro-n-dodecanoic acid	307-55-1	0.4	0.5	2	4
PFHpS	Perfluoro-1-heptanesulfonic acid	375-92-8[2]	0.381	0.5	2	4
PFHpA	Perfluoro-n-heptanoic acid	375-85-9	0.4	0.5	2	4
PFHxS	Perfluoro-1-hexanesulfonic acid	355-46-4[2]	0.364	0.5	2	4
PFHxA	Perfluoro-n-hexanoic acid	307-24-4	0.4	0.5	2	4
PFNS	Perfluoro-1-nonanesulfonic acid	68259-12-1[2]	0.384	0.75	2	4
PFNA	Perfluoro-n-nonanoic acid	375-95-1	0.4	0.5	2	4
PFOS	Perfluorooctanesulfonic acid	1763-23-1[2]	0.371	0.5	2	4
PFOSA	Perfluoro-1-octanesulfonamide	754-91-6	0.4	0.75	2	4

TABLE 2A – REPORTING LIMITS (LOQ) – PFAS ISOTOPE DILUTION – AQUEOUS MATRIX CONT'D
NOTE: Reporting Limits are subject to change. Current limits are available in LIMs

Analyte Acronym	Analyte Name	CAS Number	Spiked Conc[1] (ng/L)	DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
PFOA	Perfluoro-n-octanoic acid	335-67-1	0.4	0.5	2	4
PFPeA	Perfluoro-n-pentanoic acid	2706-90-3	0.4	0.5	2	4
PFPeS	Perfluoro-1-pentansulfonic acid	2706-91-4[2]	0.375	0.5	2	4
PFTeDA	Perfluoro-n-tetradecanoic acid	376-06-7	0.4	0.5	2	4
PFTrDA	Perfluoro-n-tridecanoic acid	72629-94-8	0.4	0.5	2	4
PFUdA	Perfluoro-n-undecanoic acid	2058-94-8	0.4	0.5	2	4
MeFOSA	N-methylperfluoro-1-octanesulfonamide	31506-32-8	0.4	2	8	16
EtFOSA	N-ethylperfluoro-1-octanesulfonamide	4151-50-2	0.4	1.5	4	8
10:2FTS	1H,1H,2H,2H-perfluorododecane sulfonic acid	120226-60-0[2]	0.386	1	4	8
GenX	Hexafluoropropylene oxide dimer acid	13252-13-6	0.8	1	4	8
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4	0.377	1	4	8
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	756426-58-1[2]	0.373	1	4	8
11Cl-PF3OUDS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9[2]	0.377	1	4	8
MeFOSE	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	24448-09-7	0.4	1	4	8
EtFOSE	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	1691-99-2	0.4	1	4	8
PFDOS	Perfluoro-1-dodecanesulfonic acid	79780-39-5[2]	0.387	1	4	8
PFHxDA	Perfluoro-n-hexadecanoic acid	67905-19-5	0.4	1	4	8
PFODA	Perfluoro-n-octadecanoic acid	16517-11-6	0.4	1	4	8

[1]Spiking concentration used to determine DL.
[2]CAS Numbers are for the acid and not the salt.

TABLE 2B – REPORTING LIMITS (LOQ) – PFAS ISOTOPE DILUTION – SOLID MATRIX
NOTE: Reporting Limits are subject to change. Current limits are available in LIMs

Analyte Acronym	Analyte Name	CAS Number	Spiked Conc[1] (µg/kg)	DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
EtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid	2991-50-6	0.1	0.25	1	2
8:2 FTS	Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate]	39108-34-4	0.096	0.25	1	2
4:2 FTS	Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate]	757124-72-4[2]	0.093	0.4	1	2
6:2 FTS	Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate]	27619-97-2	0.095	0.25	1	2
MeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid	2355-31-9	0.1	0.25	1	2
PFBS	Perfluoro-1-butanesulfonic acid	375-73-5	0.088	0.13	0.5	1
PFBA	Perfluoro-n-butanoic acid	375-22-4	0.1	0.13	0.5	1
PFDS	Perfluoro-1-decanesulfonic acid	335-77-3	0.096	0.13	0.5	1
PFDA	Perfluoro-n-decanoic acid	335-76-2	0.1	0.13	0.5	1
PFDoA	Perfluoro-n-dodecanoic acid	307-55-1	0.1	0.13	0.5	1
PFHpS	Perfluoro-1-heptanesulfonic acid	375-92-8	0.095	0.13	0.5	1
PFHpA	Perfluoro-n-heptanoic acid	375-85-9	0.1	0.13	0.5	1
PFHxS	Perfluoro-1-hexanesulfonic acid	355-46-4	0.091	0.13	0.5	1
PFHxA	Perfluoro-n-hexanoic acid	307-24-4	0.1	0.13	0.5	1
PFNS	Perfluoro-1-nonanesulfonic acid	68259-12-1	0.096	0.2	0.5	1
PFNA	Perfluoro-n-nonanoic acid	375-95-1	0.1	0.13	0.5	1
PFOS	Perfluorooctanesulfonic acid	1763-23-1	0.093	0.13	0.5	1
PFOSA	Perfluoro-1-octanesulfonamide	754-91-6	0.1	0.13	0.5	1

TABLE 2B – REPORTING LIMITS (LOQ) – PFAS ISOTOPE DILUTION – SOLID MATRIX CONT'D
NOTE: Reporting Limits are subject to change. Current limits are available in LIMs

Analyte Acronym	Analyte Name	CAS Number	Spiked Conc[1] (µg/kg)	DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
PFOA	Perfluoro-n-octanoic acid	335-67-1	0.1	0.13	0.5	1
PFPeA	Perfluoro-n-pentanoic acid	2706-90-3	0.1	0.13	0.5	1
PFPeS	Perfluoro-1-pentanesulfonic acid	2706-91-4	0.094	0.13	0.5	1
PFTeDA	Perfluoro-n-tetradecanoic acid	376-06-7	0.1	0.13	0.5	1
PFTrDA	Perfluoro-n-tridecanoic acid	72629-94-8	0.1	0.13	0.5	1
PFUdA	Perfluoro-n-undecanoic acid	2058-94-8	0.1	0.13	0.5	1
MeFOSA	N-methylperfluoro-1-octanesulfonamide	31506-32-8	0.1	0.25	1	2
EtFOSA	N-ethylperfluoro-1-octanesulfonamide	4151-50-2	0.1	0.4	1	2
10:2FTS	1H,1H,2H,2H-perfluorododecane sulfonate	120226-60-0[2]	0.096	0.25	1	2
GenX	Tetrafluoro-2-(heptafluoropropoxy) propanoic acid	13252-13-6	0.2	0.5	2	4
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4	0.094	0.25	1	2
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	756426-58-1	0.093	0.25	1	2
11Cl-PF3OUDS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9	0.094	0.25	1	2
MeFOSE	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	24448-09-7	0.1	0.25	1	2
EtFOSE	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	1691-99-2	0.1	0.25	1	2
PFDOS	Perfluoro-1-dodecanesulfonic acid	79780-39-5[2]	0.097	0.13	0.5	1
PFHxDA	Perfluoro-n-hexadecanoic acid	67905-19-5	0.1	0.25	1	2
PFODA	Perfluoro-n-octadecanoic acid	16517-11-6	0.1	0.13	0.5	1

[1]Spiking concentration used to determine DL.
[2]CAS Numbers are for the acid and not the salt.

TABLE 3 – LABELED STANDARD ASSOCIATIONS – PFAS ISOTOPE DILUTION – AQUEOUS AND SOLID MATRIX

Target Analyte	Associated Labeled Standard
4:2 FTS	13C2_4:2FTS_2
6:2 FTS	13C2_6:2FTS_2
8:2 FTS	13C2_8:2FTS_2
10:2FTS	13C2_8:2 FTS_2
EtFOSAA	d5-EtFOSAA
MeFOSAA	d3-MeFoSAA
PFBS	13C3_PFBS
PFBA	13C4_PFBA
PFDS	13C8_PFOS
PFDA	13C6_PFDA
PFDoA	13C2_PFDoA
PFHpS	13C3_PFHxS
PFHpA	13C4_PFHpA
PFHxS	13C3_PFHxS
PFHxA	13C5_PFHxA
PFNS	13C8_PFOS
PFNA	13C9_PFNA
PFOS	13C8_PFOS
PFOSA	13C8_PFOSA
PFOA	13C8_PFOA
PFPeA	13C5_PFPeA
PFPeS	13C3_PFBS
PFTeDA	13C2_PFTeDA
PFTrDA	13C2_PFDoA
PFUdA	13C7_PFUdA
MeFOSA	d3-MeFOSA
EtFOSA	d5-EtFOSA
GenX	13C3-GenX
ADONA	13C3_PFHxS
9Cl-PF3ONS	13C8_PFOS
11Cl-PF3OUDS	13C8_PFOS
MeFOSE	d7-MeFOSE
EtFOSE	d9-EtFOSE
PFDOS	13C8_PFOS
PFHxDA	13C2-PFHxDA
PFODA	13C2-PFHxDA

NOTE: For method ID-AQ and ID-Solid, the labeled quantitation standards are contained in the SUR solution.

TABLE 4: ID INSTRUMENT CONDITIONS – AQUEOUS AND SOLID MATRIX

LC Program

Step	Total Time (min)	Flow Rate (uL/min)	A: 20mM Ammonium Acetate (%)	B: Methanol (%)
0	0.00	1200	95.0	5.0
1	0.10	1200	45.0	55.0
2	4.50	1200	1.0	99.0
3	6.00	1200	1.0	99.0
4	6.10	1200	95.0	5.0
5	8.10	1200	95.0	5.0

Built-in Diverter Valve Program

Step	Total Time (min)	Position
1	0.0	Waste
2	1.0	MS
3	5.8	Waste

Instrument Parameters

Parameter	Setting or Value
Syringe Size	100 µL
Injection Volume	10 µL
Draw Speed	50.0 µL/min
Eject Speed	50.0 µL/min
Needle Level	3.0 mm
Column Oven Temperature	40°C
MRM Scan Window	30 sec
Curtain Gas (CUR)	30.0
Collision Gas (CAD)	9
Ion Spray Voltage (IS)	-4500.0 V
Temperature (TEM)	450.0°C
Ion Source Gas 1 (GS1)	40.0
Ion Source Gas 2 (GS2)	60.0

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MS/MS Conditions*

ID	Q1 Mass (Da)	Q3 Mass (Da)	Time (min)	DP (volts)	EP (volts)	CE (volts)	CXP (volts)
4:2 FTS	327	307	2.42	-20	-4	-28	-8
4:2 FTS_2	327	81	2.42	-20	-4	-50	-8
6:2 FTS	427	407	3.23	-20	-4	-32	-8
6:2 FTS_2	427	81	3.23	-20	-4	-72	-8
8:2 FTS	527	507	4.02	-20	-4	-40	-8
8:2 FTS_2	527	81	4.02	-20	-4	-82	-8
9Cl-PF3ONS	531	351	3.88	-75	-10	-38	-10
10:2 FTS	627	607	4.66	-20	-8	-45	-8
10:2 FTS_2	627	80	4.66	-20	-8	-92	-8
11Cl-PF3OUDS	631	451	4.52	-90	-10	-41	-13
ADONA	377	251	2.95	-47	-8	-18	-8
ADONA_2	377	85	2.95	-47	-8	-68	-8
EtFOSA	526	169	4.71	-50	-10	-37	-8
EtFOSA_2	526	219	4.71	-50	-10	-37	-8
EtFOSE	630	59	4.65	-39	-4	-58	-8
GenX	285	119	2.58	-51	-10	-38	-8
GenX_2	285	185	2.58	-51	-10	-28	-8
MeFOSA	512	169	4.52	-50	-10	-37	-8
MeFOSA_2	512	219	4.52	-50	-10	-37	-8
MeFOSE	616	59	4.49	-50	-10	-58	-8
N-EtFOSAA	584	419	4.36	-50	-10	-28	-8
N-EtFOSAA_2	584	526	4.36	-50	-10	-28	-8
N-MeFOSAA	570	419	4.20	-50	-10	-28	-8
N-MeFOSAA_2	570	483	4.20	-50	-10	-22	-8
PFBA	212.9	168.9	1.71	-10	-8	-12	-8
PFBS	298.9	80	2.15	-20	-4	-56	-5.5
PFBS_2	298.9	99	2.15	-20	-4	-46	-9
PFDA	513	469	4.03	-10	-8	-17	-8
PFDA_2	513	169	4.03	-10	-8	-27	-8
PFDoA	613	569	4.66	-10	-8	-18	-8
PFDoA_2	613	169	4.66	-10	-8	-30	-8
PFDOS	699	80	4.65	-150	-10	-125	-7
PFDOS_2	699	99	4.65	-150	-10	-120	-10
PFDS	599	80	4.34	-20	-7	-118	-5.5
PFDS_2	599	99	4.34	-20	-7	-95	-9
PFHpA	363	319	2.85	-10	-8	-14	-8
PFHpA_2	363	169	2.85	-10	-8	-25	-8
PFHpS	449	80	3.27	-20	-4	-80	-5.5
PFHpS_2	449	99	3.27	-20	-4	-70	-9
PFHxA	313	269	2.46	-10	-8	-14	-8
PFHxA_2	313	119	2.46	-10	-8	-25	-8
PFHxDA	813	769	5.31	-123	-13	-22	-19

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*MS/MS Conditions**
Continued

ID	Q1 Mass (Da)	Q3 Mass (Da)	Time (min)	DP (volts)	EP (volts)	CE (volts)	CXP (volts)
PFHxDA_2	813	269	5.31	-123	-6.5	-37	-22
PFHxS	399	80	2.87	-20	-4	-74	-5.5
PFHxS_2	399	99	2.87	-20	-4	-60	-9
PFNA	463	419	3.66	-10	-8	-16	-8
PFNA_2	463	169	3.66	-10	-8	-26	-8
PFNS	549	80	4.02	-20	-5.5	-115	-5.5
PFNS_2	549	99	4.02	-20	-5.5	-92	-5.5
PFOA	413	369	3.26	-10	-8	-14	-8
PFOA_2	413	169	3.26	-10	-8	-26	-8
PFODA	913	869	5.70	-120	-9	-25	-15
PFODA_2	913	319	5.70	-120	-9	-42	-15
PFOS	499	80	3.66	-20	-4	-95	-5.5
PFOS_2	499	99	3.66	-20	-4	-87	-9
PFOSA	498	78	4.02	-20	-4	-85	-8
PFPeA	262.9	218.9	2.09	-10	-8	-13	-8
PFPeS	349	80	2.50	-20	-4	-70	-5.5
PFPeS_2	349	99	2.50	-20	-4	-60	-9
PFTeDA	713	669	5.15	-10	-4	-22	-8
PFTeDA_2	713	169	5.15	-10	-4	-38	-8
PFTrDA	663	619	4.92	-10	-4	-20	-8
PFTrDA_2	663	169	4.92	-10	-4	-36	-8
PFUdA	563	519	4.36	-10	-8	-18	-8
PFUdA_2	563	169	4.36	-10	-8	-28	-8
13C2-PFDA	515	470	4.03	-10	-8	-17	-8
13C2-PFDoA	615	570	4.66	-10	-4	-18	-8
13C2-PFHxA	315	270	2.46	-10	-8	-14	-8
13C2-PFHxDA	815	770	5.31	-107	-10	-24	-16
13C2-PFOA	415	370	3.26	-10	-8	-14	-8
13C2-PFTeDA	715	670	5.15	-10	-4	-22	-8
13C3-GenX	287	185	2.58	-55	-10	-24	-10
13C3-PFBA	216	172	1.71	-10	-8	-12	-8
13C3_PFBS	302	80	2.15	-20	-4	-56	-5.5
13C3_PFHxS	402	80	2.87	-20	-4	-74	-5.5
13C4_PFBA	217	172	1.71	-10	-8	-12	-8
13C4_PFHpA	367	322	2.85	-10	-8	-14	-8
13C4_PFOS	503	80	3.66	-20	-4	-95	-5.5
13C5_PFHxA	318	273	2.46	-10	-8	-14	-8
13C5_PFPeA	267.9	223	2.09	-10	-8	-13	-8
13C6_PFDA	519	474	4.03	-10	-8	-16	-8
13C7_PFUdA	570	525	4.36	-10	-8	-18	-8

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*MS/MS Conditions** *Continued*

ID	Q1 Mass (Da)	Q3 Mass (Da)	Time (min)	DP (volts)	EP (volts)	CE (volts)	CXP (volts)
13C8_PFOA	421	376	3.26	-10	-8	-14	-8
13C8_PFOS	507	80	3.66	-20	-4	-95	-5.5
13C8_PFOSA	506	78	4.02	-20	-4	-85	-8
13C9_PFNA	472	427	3.66	-10	-8	-16	-8
d3-MeFOSA	515	169	4.52	-50	-10	-37	-8
d3-MeFOSAA	573	419	4.20	-50	-10	-28	-8
d5-EtFOSA	531	169	4.71	-50	-10	-37	-8
d5-EtFOSAA	589	419	4.36	-50	-10	-28	-8
d7-MeFOSE	623	59	4.49	-50	-5.5	-58	-5.5
d9-EtFOSE	639	59	4.65	-60	-4	-60	-8
M2-4:2 FTS	329	309	2.42	-20	-4	-28	-8
13C2-4:2 FTS_2	329	81	2.42	-20	-4	-28	-8
M2-6:2FTS	429	409	3.23	-20	-4	-32	-8
13C2-6:2FTS_2	429	81	3.23	-20	-4	-32	-8
M2-8:2FTS	529	509	4.02	-20	-4	-40	-8
13C2-8:2FTS_2	529	81	4.02	-20	-4	-82	-8

*Some MS/MS conditions may need to be re-optimized for individual instruments

NOTE: See Appendix I for the chemical derivation of the ion transitions.

TABLE 5: CALIBRATION LEVELS (ng/L) – ID ICAL – AQUEOUS AND SOLID MATRIX

Analyte	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10
	PFAS Full List Native PDS Mix, 1000X			PFAS Full List Native PDS Mix, 100X			PFAS Full List Native PDS Mix, 10X			
PFBA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFPeA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFBS	44	88	177	442	884	1768	4420	8840	13260	17680
PFHxA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFPeS	47	94	188	469	938	1876	4690	9380	14070	18760
PFHpA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFHxS	46	91	182	455	910	1820	4550	9100	13650	18200
PFOA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFHpS	48	95	190	476	952	1904	4760	9520	14280	19040
PFNA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFOS	46	93	186	464	928	1856	4640	9280	13920	18560
PFDA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFNS	48	96	192	480	960	1920	4800	9600	14400	19200
4:2FTS	47	93	187	467	934	1868	4670	9340	14010	18680
6:2FTS	47	95	190	474	948	1896	4740	9480	14220	18960
8:2 FTS	48	96	192	479	958	1916	4790	9580	14370	19160
PFOSA	50	100	200	500	1000	2000	5000	10000	15000	20000

TABLE 5: CALIBRATION LEVELS (ng/L) – ID ICAL – AQUEOUS AND SOLID MATRIX CONT'D

Analyte	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10
	PFAS Full List Native PDS Mix, 1000X			PFAS Full List Native PDS Mix, 100X			PFAS Full List Native PDS Mix, 10X			
MeFOSA	50	100	200	500	1000	2000	5000	10000	15000	20000
EtFOSA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFUDA	50	100	200	500	1000	2000	5000	10000	15000	20000
MeFOSAA	50	100	200	500	1000	2000	5000	10000	15000	20000
EtFOSAA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFDS	48	96	193	482	964	1928	4820	9640	14460	19280
PFDoA	50	100	200	500	1000	2000	5000	10000	15000	20000
10:2FTS	48	96	193	482	964	1928	4820	9640	14460	19280
PFTrDA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFTeDA	50	100	200	500	1000	2000	5000	10000	15000	20000
GenX	100	200	400	1000	2000	4000	10000	20000	30000	40000
ADONA	47	94	188	471	942	1884	4710	9420	14130	18840
9Cl-PF3ONS	47	93	186	466	932	1864	4660	9320	13980	18640
11Cl-PF3OUDS	47	94	188	471	942	1884	4710	9420	14130	18840
MeFOSE	50	100	200	500	1000	2000	5000	10000	15000	20000
EtFOSE	50	100	200	500	1000	2000	5000	10000	15000	20000
PFDOS	48	97	194	484	968	1936	4840	9680	14520	19360
PFHxDA	50	100	200	500	1000	2000	5000	10000	15000	20000
PFODA	50	100	200	500	1000	2000	5000	10000	15000	20000
Surrogates (SUR)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

NOTE: See Table 1 for method specific target analytes.

NOTE: *The ID (Aqueous and Solid) SUR includes the following compounds:*

- Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-13C2] hexane sulfonate (M2-4:2FTS or 13C2-4:2FTS)
- Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-13C2] octane sulfonate (M2-6:2FTS or 13C2-6:2FTS)
- Sodium 1H, 1H, 2H, 2H-perfluoro-[1,2-13C2] decane sulfonate (M2-8:2FTS or 13C2-8:2FTS)
- Perfluoro-1-[13C8] octanesulfonamide (M8FOSA-I or 13C8FOSA)
- N-ethyl-d5-perfluoro-1-octanesulfonamide (d-N-EtFOSA-M)

- N-methyl-d3-perfluoro-1-octanesulfonamide (d-N-MeFOSA-M)
- N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid (d5-N-EtFOSAA)
- N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid (d3-N-MeFOSAA)
- Perfluoro-n-[13C4]butanoic acid (MPFBA or 13C4PFBA)
- Perfluoro-n-[13C5]pentanoic acid (M5PFPeA or 13C5PFPeA)
- Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid (M5PFHxA or 13C5PFHxA)
- Perfluoro-n-[1,2,3,4-13C4]heptanoic acid (M4PFHpA or 13C4PFHpA)
- Perfluoro-n-[13C8]octanoic acid (M8PFOA or 13C8PFOA)
- Perfluoro-n-[13C9]nonanoic acid (M9PFNA or 13C9PFNA)
- Perfluoro-n-[1,2,3,4,5,6-13C5]decanoicanoic acid (M6PFDA or 13C6PFDA)
- Sodium perfluoro-1-[2,3,4-13C3]butanesulfonate (M3PFBS or 13C3PFBS)
- Sodium perfluoro-1-[1,2,3-13C3]hexanesulfonate (M3PFHxS or 13C3PFHxS)
- Sodium perfluoro-1-[13C8]octanesulfonate (M8PFOS or 13C8PFOS)
- Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid (M7PFUdA or 13C7PFUdA)
- Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA or 13C2PFDoA)
- Perfluoro-n-[1,2-13C2]tetradecanoic acid (M2PFTeDA or 13C2PFTeDA)
- Tetrafluoro-2-(heptafluoropropoxy)-13C3 propanoic acid (13C3-GenX)
- 2-(N-methyl-d3-perfluoro-1-octanesulfonamido) ethan-4-ol (d7-MeFOSE)
- 2-(N-ethyl-d5-perfluoro-1-octanesulfonamido) ethan-4-ol (d9-EtFOSE)
- Perfluoro-n-[1,2-$^{13}C_2$] hexadecanoic acid (13C2-PFHxDA)

TABLE 6A: DOD BATCH CONTROL LIMITS – AQUEOUS MATRIX*

The limits outlined in this table shall be used when reporting data for DoD/DOE projects

CAS	Analyte Acronym	Lower Control Limit (%REC)	Upper Control Limit (%REC)
2991-50-6	EtFOSAA	61	135
39108-34-4	8:2 FTS	67	138
757124-72-4	4:2 FTS	63	143
27619-97-2	6:2 FTS	64	140
2355-31-9	MeFOSAA	65	136
375-73-5	PFBS	72	130
375-22-4	PFBA	73	129
335-77-3	PFDS	53	142
335-76-2	PFDA	71	129
307-55-1	PFDoA	72	134
375-92-8	PFHpS	69	134
375-85-9	PFHpA	72	130
355-46-4	PFHxS	68	131
307-24-4	PFHxA	72	129
68259-12-1	PFNS	69	127
375-95-1	PFNA	69	130
1763-23-1	PFOS	65	140
754-91-6	PFOSA	67	137
335-67-1	PFOA	71	133
2706-90-3	PFPeA	72	129
2706-91-4	PFPeS	71	127
376-06-7	PFTeDA	71	132
72629-94-8	PFTrDA	65	144
2058-94-8	PFUdA	69	133
31506-32-8	MeFOSA	68	141
4151-50-2	EtFOSA	70	150
120226-60-0	10:2FTS	70	150
13252-13-6	GenX	70	150
919005-14-4	ADONA	70	150
756426-58-1	9Cl-PF3ONS	70	150
763051-92-9	11Cl-PF3OUDS	70	150
24448-09-7	MeFOSE	70	150
1691-99-2	EtFOSE	70	150

***For Wisconsin compliance analysis, LCS recovery limits for all compounds are 60-135% when spiked at mid-range or high-range concentrations; 50-150% when spiked at low-range concentration.**

TABLE 6B: DOD BATCH CONTROL LIMITS – SOLID MATRIX*

The limits outlined in this table shall be used when reporting data for DoD/DOE projects

CAS	Analyte Acronym	Lower Control Limit (%REC)	Upper Control Limit (%REC)
2991-50-6	EtFOSAA	61	139
39108-34-4	8:2 FTS	65	137
757124-72-4	4:2 FTS	62	145
27619-97-2	6:2 FTS	64	140
2355-31-9	MeFOSAA	63	144
375-73-5	PFBS	72	128
375-22-4	PFBA	71	135
335-77-3	PFDS	59	134
335-76-2	PFDA	69	133
307-55-1	PFDoA	69	135
375-92-8	PFHpS	70	132
375-85-9	PFHpA	71	131
355-46-4	PFHxS	67	130
307-24-4	PFHxA	70	132
68259-12-1	PFNS	69	125
375-95-1	PFNA	72	129
1763-23-1	PFOS	68	136
754-91-6	PFOSA	67	137
335-67-1	PFOA	69	133
2706-90-3	PFPeA	69	132
2706-91-4	PFPeS	73	123
376-06-7	PFTeDA	69	133
72629-94-8	PFTrDA	66	139
2058-94-8	PFUdA	64	136
31506-32-8	MeFOSA	70	150
4151-50-2	EtFOSA	70	150
120226-60-0	10:2FTS	70	150
13252-13-6	GenX	70	150
919005-14-4	ADONA	70	150
756426-58-1	9Cl-PF3ONS	70	150
763051-92-9	11Cl-PF3OUDS	70	150
24448-09-7	MeFOSE	70	150
1691-99-2	EtFOSE	70	150

***For Wisconsin compliance analysis, LCS recovery limits for all compounds are 60-135% when spiked at mid-range or high-range concentrations; 50-150% when spiked at low-range concentration.**

APPENDIX B. PFAS ID – SOLID MATRIX

1. Standard Preparation

NOTE: Refer to the main body of this SOP for information regarding reagents and standards not listed here, specifically section 8.2 through 8.3

1.1 Solid Spiking Standard (SSS) – For ID-Solid, a separate solution of target analytes will be prepared and used to spike all QC samples (LCS, MS/MSD) used for 3M-TSM regulated analyses prior to extraction. The nominal concentration of all target analytes will be 500 ng/mL, except GenX which will be 1000 ng/mL. The SSS is stable for 12 months when stored at 2-6°C and contains 96% MeOH:4% Water. Prepare according to the table below:

ID Solid Spiking Standard (SSS)

Component	Conc. of Stock Std.	Aliquot volume	Dilution Volume	Final Conc.
	ng/mL	µL	mL	ng/mL
PFAC-30PAR	1000	2000	4	500
MeFOSA	50000	40	4	500
EtFOSA	50000	40	4	500
10:2 FTS	48200	40	4	482
GenX	50000	40	4	500
MeFOSE	50000	40	4	500
EtFOSE	50000	40	4	500
PFDOS	50000	40	4	484
PFHxDA	50000	40	4	500
PFODA	50000	40	4	500

1.2 Method Blank (MB) – Weigh 1.0g of Ottawa sand into a pre-tared 15mL Falcon tube and spike with 100µL of 100ppb SUR mix. Extract as normal alongside client samples.

1.3 Continuing Calibration Verification/Instrument Sensitivity Check (CCV/ISC) – See Section 9.2.10 in the main body of this SOP.

1.4 Laboratory Control Sample (LCS) – The LCS is prepared by spiking approximately 1g of Ottawa sand with 100 µL of 100X PDS (20 ng/mL) for a concentration of 2 µg/kg (2000 pg/g; 2000 ng/kg; 2 ng/g). The LCS is also spiked with 100 µL of Full List SUR mix (100 ppb) and extracted as normal alongside client samples.

1.5 Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Client samples are spiked in the same manner as an LCS. 1g of sample is spiked with 100 µL of 100X PDS (20 ng/mL) for a concentration of 2 µg/kg, plus 100µL of Full List SUR mix (100ppb) and extracted as normal alongside other client samples.

1.6 Method Detection Limit (MDL) – MDL sample preparation and analysis will be performed over three separate days. Each MDL sample will be extracted with an equal number of MB samples. The MDL is prepared by spiking approximately 1g of Ottawa sand with 50 µL of 100X PDS mix for a concentration of 1000 pg/g (1000 ng/kg; 1 µg/kg), plus 100µL of Full List SUR mix (100ppb) and extracted as normal. An equal number of MB (see section 1.16 above) will be extracted and analyzed with MDL samples.

1.7 Initial (and Continuing) Demonstration of Capability (IDOC/CDOC) – The IDOC/CDOC is prepared by spiking approximately 1g of Ottawa sand with 100 µL 100X PDS plus 100µL of Full List SUR mix (100ppb) and extracted as normal. IDOC/CDOC sample final concentration equals 2µg/kg. Four replicates should be prepared and analyzed.

1.8 Ammonia-Methanol (Amm-MeOH, 0.6%) – In a 1000 mL graduated cylinder, add 20 mL NH4OH (Ammonium Hydroxide) and fill to volume with methanol (980 mL reagent MeOH). Invert to mix.

2. Sample Preparation

2.1 Allow samples time to come to room temperature.

2.2 Homogenize sample with a tongue depressor and/or vigorously shake sample container to ensure sample homogeneity.

2.3 Weigh approximately 1.0 g of sample into a pre-labeled, pre-tared 15 mL Falcon tube, record sample weight.

2.4 Spike sample aliquot with 100 µL 100ppb SUR mix; spike QC samples appropriately with PDS

2.5 Add 4 mL MeOH and 4 mL 0.6% Amm-MeOH to sample tube and cap tightly.

2.6 Place sample tubes on orbital shaker table for 30-35mins, on level 9.

2.7 Place samples in a tray and place the tray in a sonic bath at room temperature, sonicate for 30-35mins.

2.8 Remove rack from sonic bath and dry individual sample tubes before placing in a centrifuge and centrifuge at 3000RPM for 5 mins.

2.9 If centrifugation of sample does not fully separate solids from the extraction fluids, the resultant supernatant can be decanted from original sample tube into a clean centrifuge tube by pouring or using a plastic pipette. Decanting the supernatant from poorly separated extracts may help speed up the filtration process.

2.10 Place 25mg GCB pass-through cartridges, with pre-labeled reservoirs attached, into individual active luer ports in the vacuum manifold top.

2.11 Wet rim of manifold body and place manifold top on manifold body. Start the vacuum pump and ensure that a proper seal is formed between the manifold top and body, and vacuum is at a proper level (approximately 5-10 in. Hg).

2.12 Condition the GCB cartridges by passing 3mL MeOH in a slow drop-wise fashion through the tube, allowing the conditioning solvent to fully soak the sorbent for 2 mins before passing through the cartridge. Discard eluent. Do not dry GCB cartridges; if a cartridge goes dry, restart the conditioning step.

2.13 Release vacuum and remove manifold top. Place a rack containing clean, labelled 15mL Falcon tubes in the manifold body and replace the top. Ensure that the correct luer is inserted into the corresponding falcon tube in the manifold body.

2.14 Start vacuum and ensure proper seal and vacuum are achieved.

2.15 Load decanted extracts into corresponding labelled reservoirs and begin passing the extracts through the GCB cartridges in a drop-wise fashion; collect in the previously positioned clean, labelled 15mL Falcon tubes.

2.16 When the entire extract has eluted through the tube, close the stopcock to keep the tube from drying before/during the following step.

2.17 Rinse each tube with 2mL of clean MeOH, allowing the rinse solvent to fully soak the sorbent for 2 mins before passing through the cartridge (as in 2.12 above), and collect the rinsate in a slow drop-wise fashion.

2.18 Release vacuum, remove manifold top from body, and remove collection tubes. Cap tubes and invert to mix.

2.19 Concentrate extracts to an approximate volume of 4.0 mL (1.5mL if targeted final volume is 2 mL) using the TurboVap LV under a gentle stream of nitrogen in a heated water bath (55–60 °C). Set Nitrogen flow at a level which creates a vortex in the extract tube, but does not cause splash-out; suggested starting flow rate is 1.5L/min

2.20 Create a final volume (FV) reference tube: using a verified pipette, place a 5 mL or 2 mL aliquot of 96% MeOH into a clean extract tube – reference aliquot volume will depend on the targeted FV for the particular analysis selected

2.21 Once the sample extract has been concentrated to approximately 4.0 mL (1.5mL if targeted final volume is 2 mL), remove elution tube from the TurboVap and allow to cool to room temperature.

2.22 Once cooled, reconstitute the extract following the appropriate row in the table below. After adding the water aliquot, use a transfer pipet and the reference tube created in 2.20 to bring the extract to the appropriate FV with clean reagent MeOH. Vortex reconstituted extract to ensure homogeneity. Final reconstituted extract solvent composition is 96% MeOH: 4% water.

Extract targeted FV (mL)	Water (µL)
5	200
2	80

2.23 Transfer the reconstituted extracts to either 2 mL cryovials or 8mL HDPE Nalgene bottles, depending on extract FV, for storage at room temperature until instrumental analysis. Avoid transferring any remaining settled solids in the reconstituted extracts. Ensure caps are fully sealed on all extract storage bottles.

2.24 Manifold cleanup – see section 9.3.29 in main body of SOP

2.25 For samples that show analyte detections above the range of the ICAL, sample dilutions will need to be prepared. See Appendix G for dilution preparation scheme

2.25.1 Samples requiring analyses prepared at post-extraction dilutions of 50X or greater will be refortified with EIS to enable proper quantitation. Samples diluted in this manner are no longer technically quantitated using isotope dilution quantitation. All analyses prepared at post-extraction dilutions of 20X, 10X, or 5X will not be refortified with EIS and will thus maintain isotope dilution quantitation

APPENDIX C: AQUEOUS SAMPLE CENTRIFUGATION PROTOCOL

Preliminary considerations – The DoD QSM5.3, Table B-15, states that "[aqueous] samples with >1% solids may require centrifugation prior to SPE extraction." Additionally, the Wisconsin Department of Natural Resources (WDNR) guidance document, titled "Wisconsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Expectations," states "add the EIS [Extracted Internal Standard] before any extraction, centrifuging, filtering or phase separation takes place…Samples should only be centrifuged when the suspended solids content appears visually high enough, by chemist inspection, that it would cause the SPE cartridge to clog…It is expected that the solid phase remains in the container when rinsing the container walls with the polar elution solvent. Rinsing the container walls would therefore also include rinsing of the solids. If removing the solvent disrupts the solid phase significantly, the container can be centrifuged again before removing the solvent for use during the elution step of the SPE procedure…When the sample has significant solids, the laboratory should account for the weight or volume displaced by the solids in the initial sample volume determination…One or more rinses of polar solvent can be used for quantitative transfers. Rinse the sample bottle and cap with elution solvent, pour the solvent from each rinse through the SPE cartridge during the elution step, and collect the filtrate for analysis. Bring to a quantitative final volume with the final injection solvent and vortex well." Whether or not an individual sample will require centrifugation for proper preparation will be determined and documented by the preparation analyst.

Procedure:

1.1 Inspect the sample and consider the necessity of centrifuging. Consider any visible indications of particulate matter including settled solids collected on the bottom of the container, cloudiness and/or dark color of the sample, suspended solids within the sample, increased viscosity, etc. If uncertain, seek a second opinion from another analyst, supervisor, or operations director.

1.2 If, in the judgement of the preparation analyst, a sample requires centrifugation the analyst will contemporaneously make a note on the prep batch log indicating this fact.

1.3 Spike samples requiring centrifugation in the same manner and with the same standard volume as samples which will not be centrifuged.

1.4 Label a 500mL conical centrifuge bottle with the sample ID for each sample that will be centrifuged. Set them in an appropriate rack with the caps removed.

1.5 Vigorously shake the spiked sample and then quickly pour into the labeled centrifuge bottle. Try to ensure that the original sample bottle is devoid of any solid material. Be careful to avoid spilling sample during the transfer process. Tightly cap each centrifuge bottle after transfers are complete.

1.6 Transfer capped centrifuge bottles to centrifuge, ensuring that the centrifuge carousel is symmetrically balanced. Close top and centrifuge at 3000 RPM for 6 minutes.

1.7 Remove centrifuge bottles and decant the centrifuged liquid off of the condensed solids, back into the original sample bottle. Try to avoid transferring any of the condensed solids from the centrifuge

bottle back to the original sample bottle, while maximizing the amount of liquid decanted off of the solid portion.

1.8 Weigh the full, decanted original sample bottle and document in the LIMS prep batch.

1.9 Extract the decanted sample as normal alongside un-centrifuged samples, up to the bottle rinse and elution steps.

1.10 When the SPE cartridges have been dried, rinse the original sample bottle as normal. Additionally, add 4mL of Methanol (MeOH) to each centrifuge bottle to rinse the inside of the centrifuge bottles as well as the cap. If the condensed solids become re-suspended while rinsing the centrifuge bottles, re-centrifugation may be required. Using a transfer pipet or mechanical pipet, transfer the MeOH rinse from the centrifuge bottle into the SPE cartridge and elute with the original sample bottle rinse into a 15mL conical centrifuge tube.

Note: If <u>any</u> samples in a prep batch have been centrifuged, all sample extracts in the batch should be eluted into 15mL conical centrifuge tubes, as the standard centrifuge tubes typically used to collect the eluent are shorter than the 15mL conical tubes. This may cause loss of extract during elution due to the tips of the male luers on the underside of the manifold not actually being located within the top of the shorter (standard) centrifuge tubes during elution.

1.11 Add an additional volume of MeOH to the elution of all batch QC samples (MB/LCS/LCSD) to match the volume used for elution for any centrifuged sample in the prep batch. Typically, this will mean that 4mL of clean MeOH will be added directly to the SPE reservoir and eluted with the normal bottle rinses.

Batch QC and client samples with additional container rinse volume should be filtered as normal.

1.12 After elution, all sample extracts (client and QC) shall be concentrated and reconstituted following the protocols in sections 9.3.22 through 9.3.27 in the main body of this SOP. Determine initial sample volume using the weights measured in 2.8 and the protocols in sections 9.3.20 and 9.3.21 in the main body of this SOP.

1.13 Generate a Non-Conformance Memo (NCM) noting which samples in the prep batch included centrifugation in the extraction process and any additional observations and/or deficiencies that were noted during the centrifugation process.

APPENDIX D: PFAS by TCLP/SPLP

SUMMARY

Clients may submit samples (solid or aqueous) for PFAS by TCLP or SPLP analyses. For solid samples, the TCLP and SPLP procedures are used to simulate the leaching of environmental contaminants over extended periods of time from a solid material into the environment. A subsample of the client's solid sample is weighed out and combined with a leaching solution and mechanically tumbled for a set period of time. Each leachate prep method (TCLP or SPLP) employs a unique leaching solution dictated by the TCLP and SPLP parent methods. After the sample has been tumbled/leached by the Extractions department, the leachate is filtered by the Inorganic Metals department and delivered to the PFAS sample holding area. The PFAS department is notified by email when the leachate solutions are ready for PFAS prep. Aqueous samples are not tumbled in the way that solid samples are prepared, but are simply filtered by the same method in the Inorganic Metals department. The filtered leachate solutions are prepared by the PFAS prep analysts using the ID-AQ SPE prep method, at a 1:10 dilution (1 part leachate solution, 9 parts reagent water).

PROCEDURE

Prep:

1. Samples requested for PFAS by SPLP/TCLP analysis will batched and leached by the normal SPLP/TCLP procedures used by the Extractions department (EXT). EXT will be the initial responsible party for samples analyzed for PFAS by SPLP/TCLP.
2. When the leaching process is complete, EXT will collect approximately 250mL (at minimum 100mL) of the leachate solutions in clean HDPE containers provided by the PFAS department.
3. After collecting the leachate solution, EXT will deliver the collected leachates to the Inorganic Metals department (IM) and verbally notify an IM prep team member. EXT will typically also send an email to the PFAS group to notify that the leaching process is complete.
4. An IM analyst will filter at least 100mL of each leachate solution using a Flipmate apparatus, using normal protocols for Flipmate filtration.
5. After filtering the leachates, the IM analyst will deliver the filtrates to the PFAS sample holding area (INM walk-in cooler) and send an email to the PFAS group to notify that the filtrates are ready for PFAS SPE prep.
6. Samples to be analyzed for PFAS by TCLP/SPLP will appear on a separate PFAS prep worklist (widget), the title of which will contain "SPLP" or "TCLP" (three separate lists so far, depending on leaching method and program area). PFAS analysts will select from these lists the samples to be extracted.
7. Using a verified variable pipet, transfer 25mL of filtrate solution to a pre-labeled HDPE PFAS sample bottle. Using pre-tested reagent water, fill the sample bottle to approximately 250mL. Each TCLP/SPLP filtrate sample will be prepared at a 10X dilution, using 25mL of the leachate filtrate, brought to a final volume of ~250mL using reagent water. Initial volume will be recorded as 25mL for all samples. As a result, LOQs for PFAS by TCLP/SPLP will be 10X higher than normal ID-AQ LOQs.
8. Following the instructions in step 7, use the leachate blank solution (typically has sample ID XX00000-038) to prepare two bottles for use as batch QC. Volume for the leachate blank and LCS will be recorded as 25mL, matching all samples.
9. Label and fill a clean 250mL HDPE bottle with ~250mL of pre-tested reagent water for use as a typical PFAS MB sample. Volume for the PFAS MB will be recorded as 250mL.

10. After preparing the diluted filtrate, filtrate batch QC, and PFAS MB bottles, follow the normal extraction steps for ID-AQ analysis. Each sample will be spiked with EIS standard as normal. The filtrate LCS will be spiked with target analytes according to the ID-AQ protocol for LCS target spiking.
11. Leachate batch QC (MB/LCS) should be documented in LIMS3 as a leachate blank (LEB) and as an LCS; the reagent water blank should be documented as the MB.

Analysis:

12. After PFAS SPE prep has been completed, the instrumental analyst will analyze the extracts by the full list ID-AQ method, as normal.
13. Before processing ***solid*** SPLP/TCLP samples in the AIM data processing software, the “Matrix” field in the Sample Editor app must be changed to “Aqueous”.
14. After processing, reviewing, and generating reports for the data, import the data into LIMS4. Before performing final calculations on the imported sample data in LIMS4, the values in the “InitialVolume” and “InitialWeight” columns must be made to match. For all but the PFAS MB, this will mean copying the 25 from “InitialWeight” to “InitialVolume;” for the PFAS MB, this will mean copying the 250 from “InitialVolume” to “InitialWeight.”
15. Once the changes in step 14 have been affected, calculate final results, then L1 and upload.

APPENDIX E. AQUEOUS SERIAL DILUTION

1 Standard Preparation

1.1 IS, SUR, and ICV standard solutions prepared for ID-AQ are used for samples analyzed by serial dilution instead of SPE. See Section 8 in the main body of the SOP for more information on preparation and contents of these solutions.

1.2 Dilutions of individual analyte stock standards are used for fortifying post-spike samples. Typically, these diluted stocks are prepared by a two-step serial dilution for a nominal concentration of 5ppb (some analytes have different concentrations due to differing stock concentrations). These diluted stocks are prepared by diluting 10uL of stock solution with 950uL of MeOH and 40uL of reagent water (FV=1mL), then further diluting 10uL of this initial 100X solution with 990uL of 96% MeOH, for a final dilution of 10,000X. The 10,000X DIL stock solution will typically be used for fortifying post-spike samples.

1.3 ICALs, ICAL standards, and instrument QC (CCVs, IBLKs) are the same as for ID-AQ and all acceptance criteria used for ID-AQ applies.

1.4 Samples analyzed by serial dilution do not require an LCS or MB to be prepared alongside the samples, as no extraction is performed. Daily IBLKs take the place of MBs.

2 Sample Preparation – Samples of known high PFAS concentrations can be prepared by serial dilution instead of SPE, with documented project approval.

2.1 All solutions prepared for instrumental analysis in this section and Section 3 shall have a solvent composition of 96:4% MeOH:water.

2.2 An initial dilution of the sample is made up with no IS or SUR added, to be used as the base dilution for successive serial dilutions. This initial dilution is typically prepared at 100X.

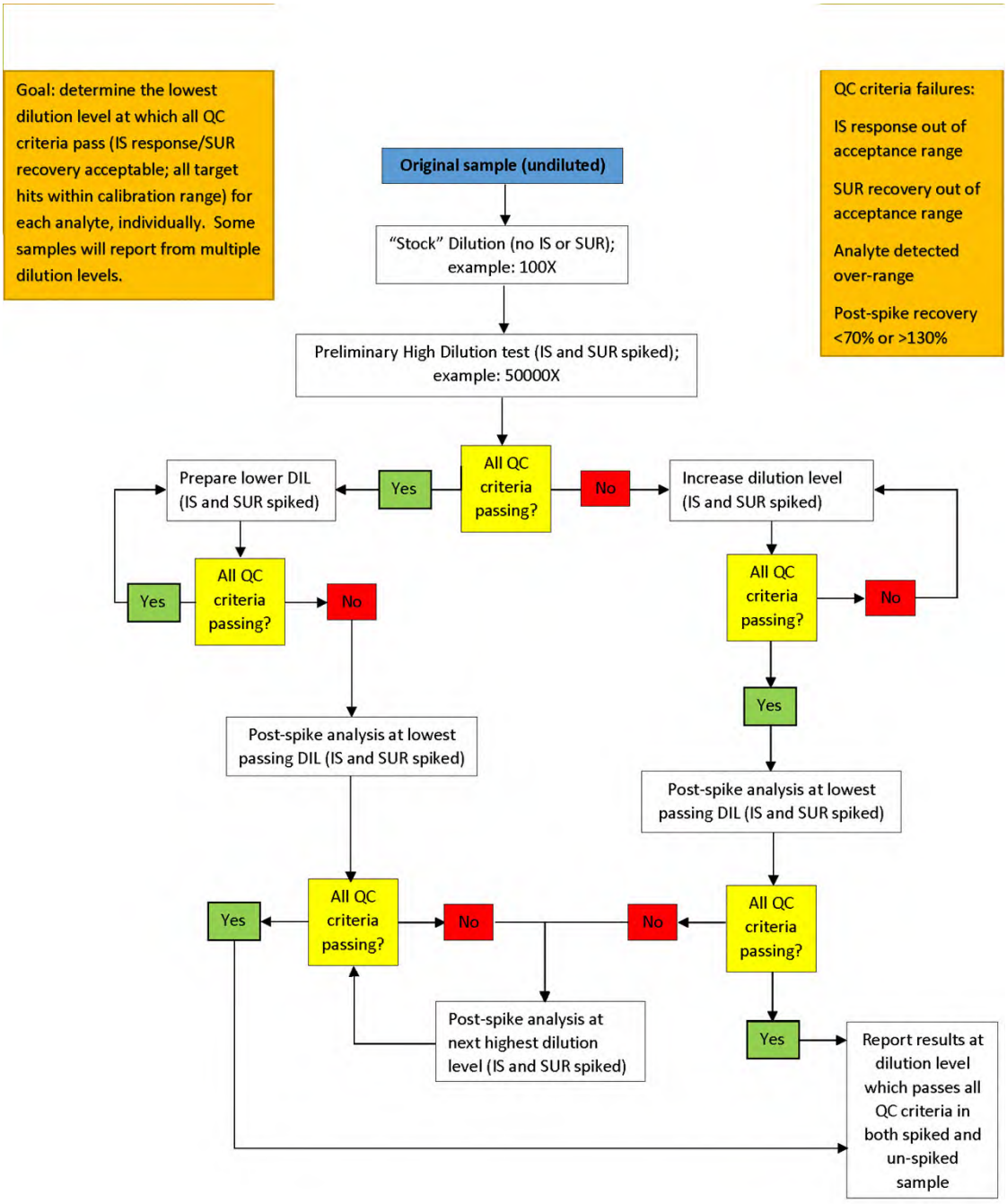
2.3 Using the initial sample dilution, prepare a high dilution (e.g. 50,000X) and analyze it to determine the approximate concentration of target analytes in the samples. Use the information obtained from this analysis to determine the next serial dilution to be prepared. Be sure to include IS and SUR standards at the appropriate concentration in each analyzed serial dilution. IS/SUR compounds should typically be present at a concentration of 1000pg/mL (1ppb).

2.4 Prepare successively lower dilutions of each serial dilution sample until all target analytes fail for over-range detection, IS response being out of acceptance, and/or SUR recovery being out of acceptance. Use the Non-Extracted Method PFAS Serial Dilution Prep Log and Post-spike Log (ME002DR) to record dilution and post-spike preparations. Be sure to include IS and SUR standards at the appropriate concentration in each analyzed serial dilution. No serial dilution samples will be analyzed at a dilution below 25X, in order to maintain proper solvent composition in the analyzed sample.

NOTE: Each target analyte should be evaluated individually in each serial dilution preparation. Associated IS/SUR compounds must pass acceptance criteria for an individual analyte to be reported. If the associated SUR and/or IS for one compound fails in a dilution sample, but *any* others pass, further dilution analysis will be necessary. Once a dilution level is reached in which all targets fail for one of the above-stated reasons, analysis will begin on the post-spiked samples.

2.5 For each target analyte, determine the dilution level at which the sample fails for one of the reasons stated in Section 2.4. The corresponding post-spike sample should be prepared at the next highest dilution level; in other words, determine the lowest dilution level at which a target analyte and its corresponding IS/SUR pass and prepare post-spike samples beginning at that dilution level.

Serial Dilution Decision Tree



3 **Post-spike sample preparation –** Post-spike samples must be prepared for all serial dilution samples which are ND for any target analyte at the reported dilution level. Non-detected target analytes will be individually spiked into post-spike dilution preparations at an expected on-column concentration equal to the stated LOQ in order to validate the stated LOQ in the sample matrix. If an analyte is detected in

a reportable dilution, no post-spiking of that analyte is required; the LOQ will equal the stated LOQ times the dilution factor of the reported analysis.

3.1 Post-spike samples must be prepared at the same dilution level as the reported sample results, and spiked at a concentration equivalent to the LOQ in the diluted sample. Post-spike analysis shall be prepared and evaluated for EACH non-detected analyte in EACH sample.

3.2 Calculate the appropriate amount of 10000X DIL stock solution necessary for the post-spike preparation by using the following equation:

$$\text{Spike Volume (mL)} = \frac{\text{LOQ(pg/mL)} * \text{final volume(mL)}}{\text{DIL stock(pg/mL)}}$$

3.3 Calculate the appropriate amount of 20ppb SUR and 20ppb IS necessary for the post-spike preparation by using the following equation:

$$\text{Spike Volume (mL)} = \frac{\text{1000(pg/mL)} * \text{final volume(mL)}}{\text{20000(pg/mL)}}$$

3.4 Prepare post-spikes at the reported dilution level for all ND analytes and record all post-spike preparation information using ME002DR. Use this logbook to ensure final volumes are correct and that all post-spike samples have solvent concentrations of 96% MeOH.

3.4.1 The analyte post-spiked into the dilution preparation must recover within 70-130% in order to be acceptable/reportable. All other QC criteria must be met as well (IS, SUR passing; opening/closing CCVs passing; acceptable IBLK).

3.4.2 Only the target analyte(s) being spiked and its corresponding IS/SUR must pass for each individual post-spike sample to be acceptable.

3.4.3 If a spiked analyte does not meet the 70-130% recovery limit, re-prepare the post-spike sample at successively higher dilutions using the steps above until recovery is within acceptance limits and corresponding IS/SUR compounds pass.

3.5 When a post-spike sample passes recovery and other QC criteria for the specific analyte(s) spiked, post-spiking analysis is complete for that sample/analyte combination.

3.6 The dilution reported for any individual analyte shall be the same dilution at which the post-spike sample passes for that analyte. If the initial post-spike sample fails when prepared at the expected reportable sample dilution, the LOQ has not been validated for this dilution level. Therefore, the reported dilution for that analyte/sample will be elevated to match the lowest passing dilution level of the post-spike analysis.

Report analyte results from the lowest dilution level which passes for all sample and post-spike QC criteria. The LOQ for ND analytes will equal the stated LOQ times the reported dilution factor.

APPENDIX F. EXTRACT DILUTION PREPARATIONS

Pace Analytical	Document Name: Extraction Dilution Preparations	Document Revised: 3/21/2022 Page 1 of 1
	Document No.: ME003.IZ-04	Issuing Authority: Pace ENV – Local Quality - WCOL

Extract Dilution Preparations

DILUTION	1X	5X	10X	20X	50X	100X	200X
537.1 DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	20	10	5
IS (µL)	0	40	45	47.5	49	49.5	49.75
96% MeOH (µL)	0	760	855	902.5	931	940.5	945.25
TOTAL (µL)	75	1000	1000	1000	1000	1000	1000
REFORTIFIED ID-AQ/ID-SOLID DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	20	10	5
ES-100ppb (µL)	0	16	18	19	19.6	19.8	19.9
MeOH (µL)	0	753	847	894	922	931	936
WATER (µL)	0	31	35	37	38.4	38.8	39
TOTAL (µL)	75	1000	1000	1000	1000	999.6	999.9
UNFORTIFIED ID-AQ/ID-SOLID DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	20	10	5
ES-100ppb (µL)	0	0	0	0	0	0	0
MeOH (µL)	0	768	864	912	941	950	955
WATER (µL)	0	32	36	38	39	40	40
TOTAL (µL)	75	1000	1000	1000	1000	1000	1000
In-vial 50X ID Screen							
In-vial 50X ID Screen		240µL 96%MeOH	+	5µL SUR 100ppb	+	5µL sample extract	
DAI DILUTION PREP							
SAMPLE (µL)	500	100	50	25	10	5	
ES (µL)	25	25	25	25	25	25	
MeOH (µL)	475	475	475	475	475	475	
Water (µL)	0	400	450	475	490	495	
TOTAL (µL)	1000	1000	1000	1000	1000	1000	
533 DILUTION PREP							
EXTRACT (µL)	950	200	100	50	20	10	5
IS (µL)	50	40	45	47.5	49	49.5	49.75
ES (µL)	0	40	45	47.5	49	49.5	49.75
80% MeOH (µL)	0	720	810	855	882	891	895.5
TOTAL (µL)	1000	1000	1000	1000	1000	1000	1000

NOTE: Serial dilution will be performed for dilutions higher than 200X.

APPENDIX G. MS/MSD, MS/FD SAMPLE SELECTION PROTOCOL

Background: EPA 537.1 and DOD QSM 5.3, Table B-15 both require that a matrix spike (MS) sample and a matrix spike duplicate (MSD) or field duplicate (FD) be prepped with every prep batch. Further, this SOP states that "every effort is made to ensure that an MS/MSD or an FD is included in every batch." Therefore, all aqueous prep batches must include an MS/MSD or MS/FD pair, if possible. Prep analysts will select samples to be used for this purpose following a hierarchy of preference. See below:

*****Any kind of blank (FB,TB,EB,RB,etc.) or samples designated as "DUP" by the client will not be used for MS/MSD/FD analysis.*****

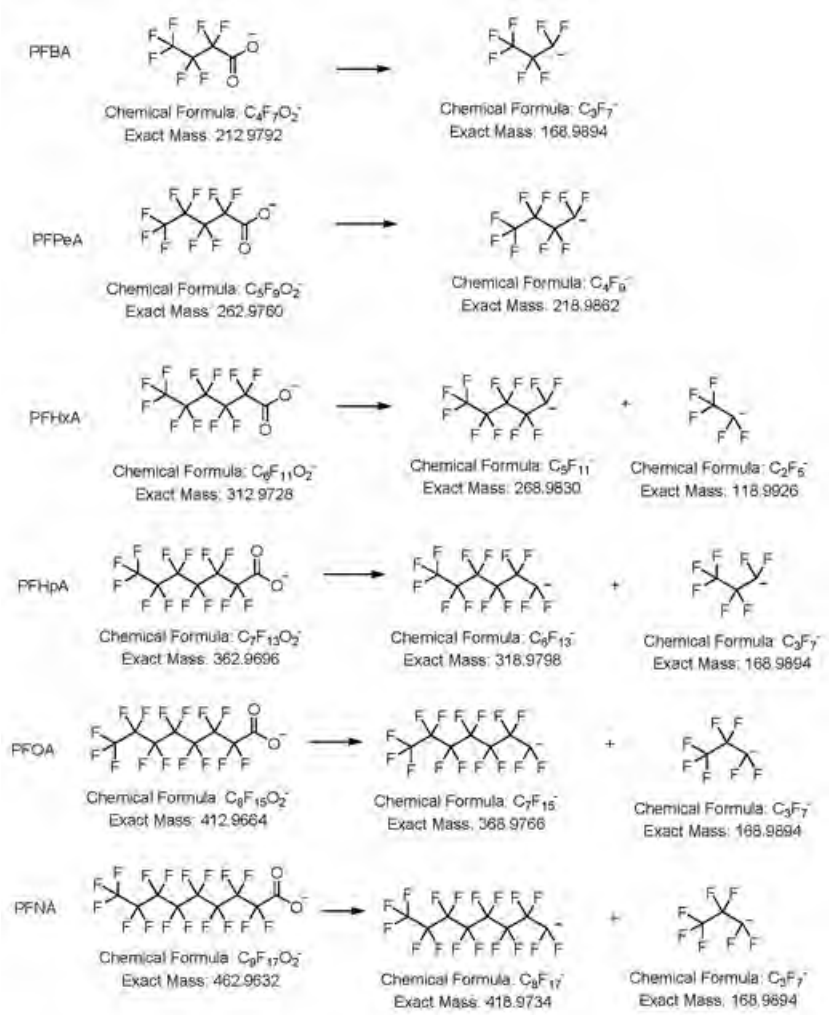
1. First preference is to use client-designated samples as MS/MSD samples. This designation should show up on the prep widget, under comments. It is possible that SR will miss adding this comment to the sample, but this designation will be present in the COC from the client, on the right side of the COC under "Remarks/Cooler ID." When a client designates a sample to be used for MS/MSD analysis, they will typically provide us with more than 2 bottles (often 4, sometimes as many as 6).

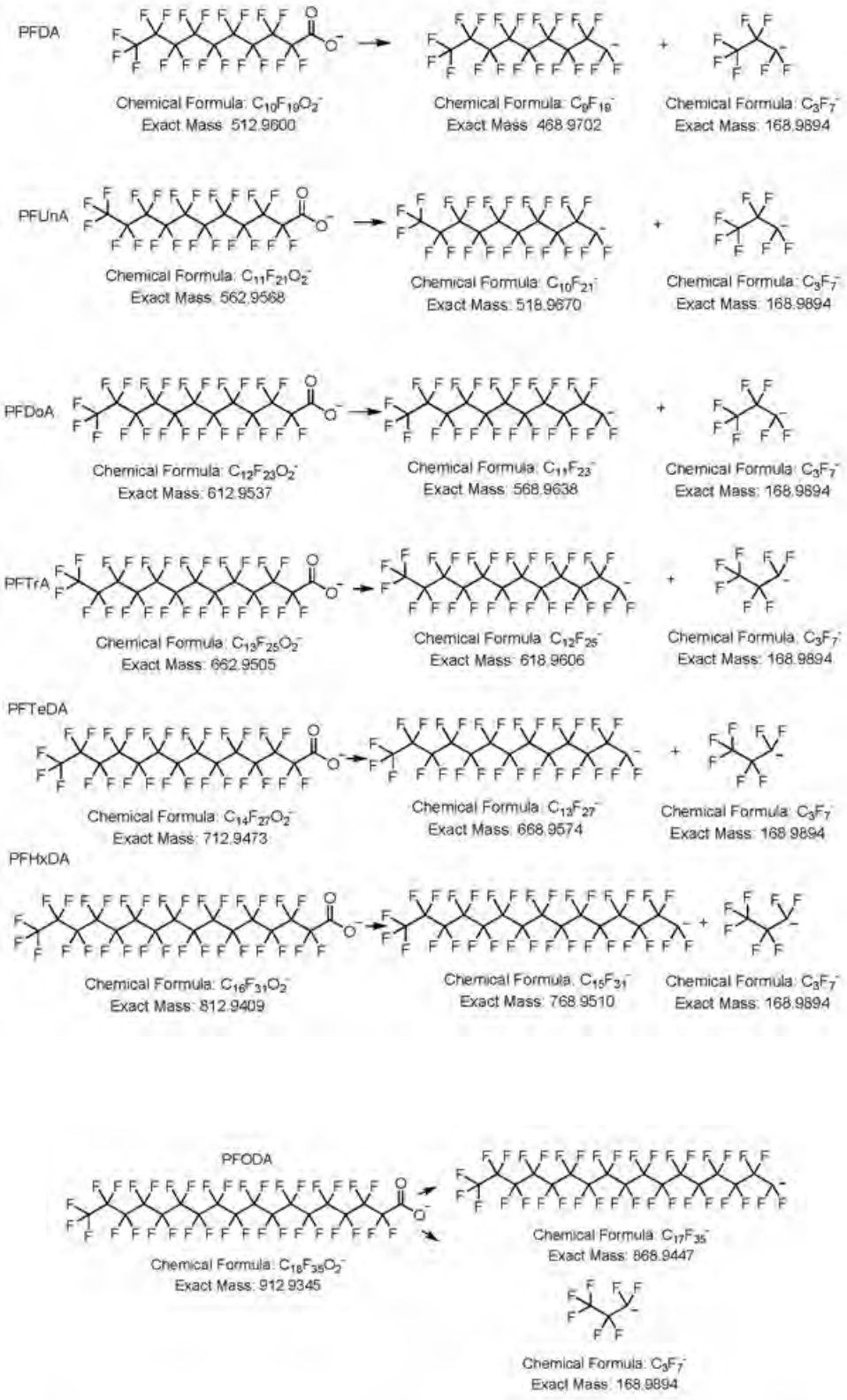
2. Lacking a client-designated MS/MSD sample, the next preference is to use any sample received with more than 2 bottles provided. If an analyst selects a set of samples for prep in which none of the samples are client-designated for MS/MSD, the analyst should check for any samples in the set that were received with 3 or more bottles. If there is a sample with 3 or more bottles, pull 3 of them and use one for the parent sample and spike the other two for analysis as MS/MSD samples.

3. Lacking any samples received with 3 or more bottles, the prep analyst must use two different samples to fulfill the MS/FD pair requirement. Find two samples out of the set of samples selected for prep which were received with 2 bottles, and pull both bottles for each sample. Pick one sample (pair of bottles) to be used for parent/MS prep and the other sample (pair of bottles) to be used for parent/FD. The sample selected for parent/MS will have one bottle spiked with targets and one prepped as normal, with no added spiking. The bottle which is spiked should be identified in the LIMS3 PB as MS (select parent sample in PB, click the MS/MSD button, then select the MSD sample and click the minus sign button to remove the MSD, leaving just the parent and MS). The sample selected for parent/FD will have both bottles prepped following normal procedures, but will have one of the two designated as DUP in the PB in LIMS3 (select parent sample in PB then click the "DUP" button to generate a DUP instance of the sample).

4. If all samples in a particular prep batch were all received in just one bottle, analysis of an MS/MSD or MS/FD pair will not be possible. In this case, the prep analyst will prep an LCS/LCSD pair and NCM all the samples in the PB for "MS/MSD – Insufficient volume – Ran LCS/LCSD". This should be a rare occurrence, as prep analysts will attempt to adjust batching to ensure that every PB contains an MS/MSD or MS/FD.

APPENDIX H. CHEMICAL DERIVATION OF ION TRANSITIONS




PFDA
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Exact Mass: 512.9600
Chemical Formula: $C_8F_{19}^-$
Exact Mass: 468.9702
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFUnA
Chemical Formula: $C_{11}F_{21}O_2^-$
Exact Mass: 562.9568
Chemical Formula: $C_{10}F_{21}^-$
Exact Mass: 518.9670
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFDoA
Chemical Formula: $C_{12}F_{23}O_2^-$
Exact Mass: 612.9537
Chemical Formula: $C_{11}F_{23}^-$
Exact Mass: 568.9638
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFTrA
Chemical Formula: $C_{13}F_{25}O_2^-$
Exact Mass: 662.9505
Chemical Formula: $C_{12}F_{25}^-$
Exact Mass: 618.9606
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFTeDA
Chemical Formula: $C_{14}F_{27}O_2^-$
Exact Mass: 712.9473
Chemical Formula: $C_{13}F_{27}^-$
Exact Mass: 668.9574
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFHxDA
Chemical Formula: $C_{16}F_{31}O_2^-$
Exact Mass: 812.9409
Chemical Formula: $C_{15}F_{31}^-$
Exact Mass: 768.9510
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
PFODA
Chemical Formula: $C_{18}F_{35}O_2^-$
Exact Mass: 912.9345
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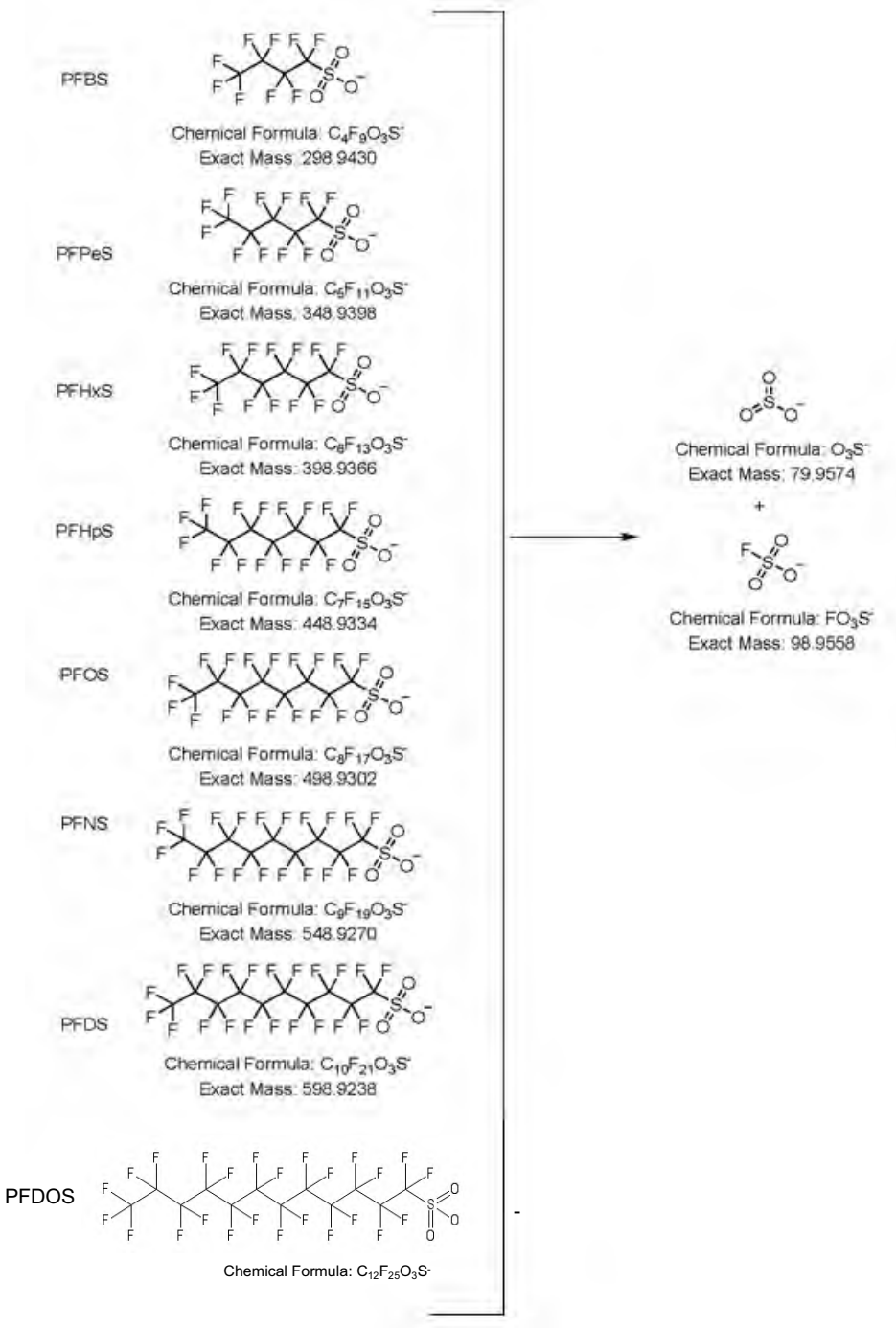
Exact Mass: 868.9447
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894


PFBS
Chemical Formula: $C_4F_9O_3S^-$
Exact Mass: 298.9430
PFPeS
Chemical Formula: $C_5F_{11}O_3S^-$
Exact Mass: 348.9398
PFHxS
Chemical Formula: $C_6F_{13}O_3S^-$
Exact Mass: 398.9366
PFHpS
Chemical Formula: $C_7F_{15}O_3S^-$
Exact Mass: 448.9334
PFOS
Chemical Formula: $C_8F_{17}O_3S^-$
Exact Mass: 498.9302
PFNS
Chemical Formula: $C_9F_{19}O_3S^-$
Exact Mass: 548.9270
PFDS
Chemical Formula: $C_{10}F_{21}O_3S^-$
Exact Mass: 598.9238
PFDOS
Chemical Formula: $C_{12}F_{25}O_3S^-$
Chemical Formula: O_3S^-
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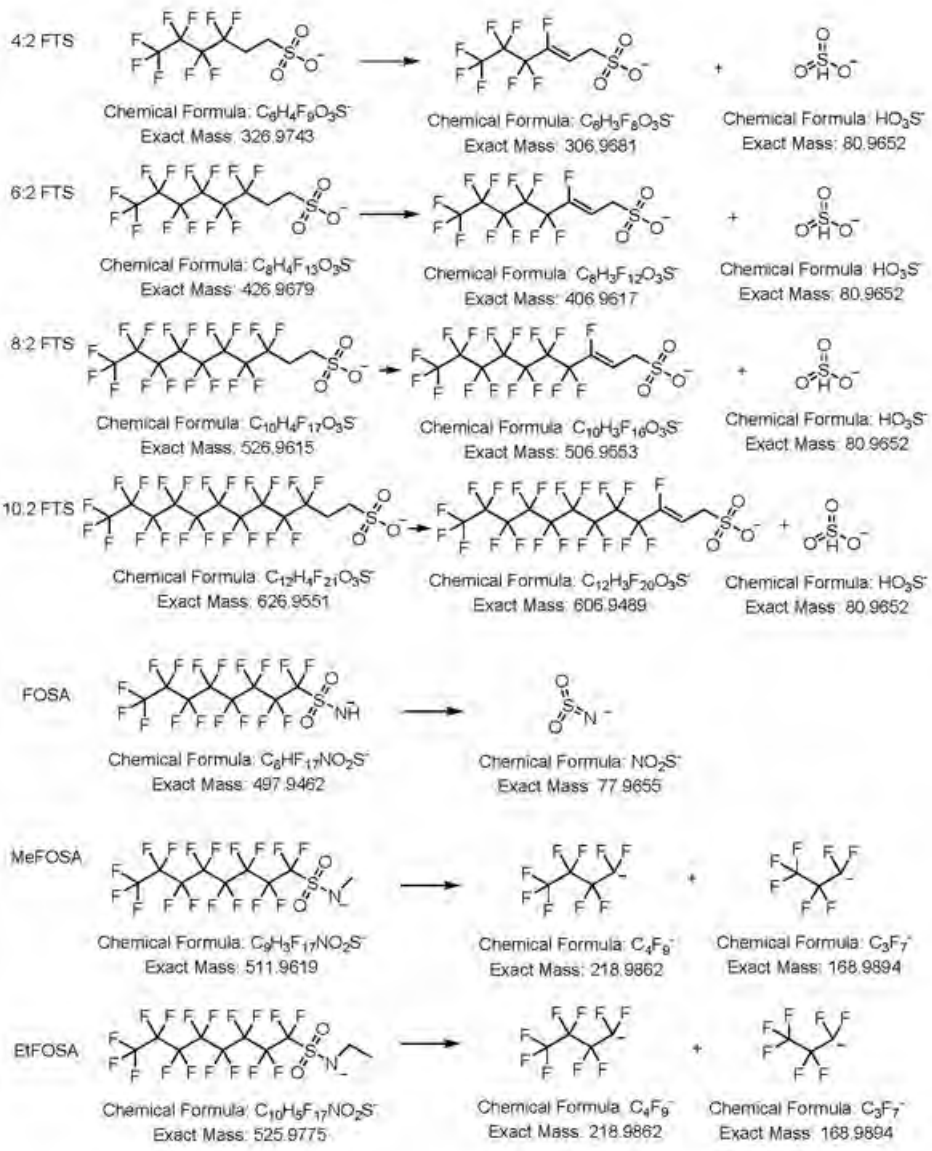
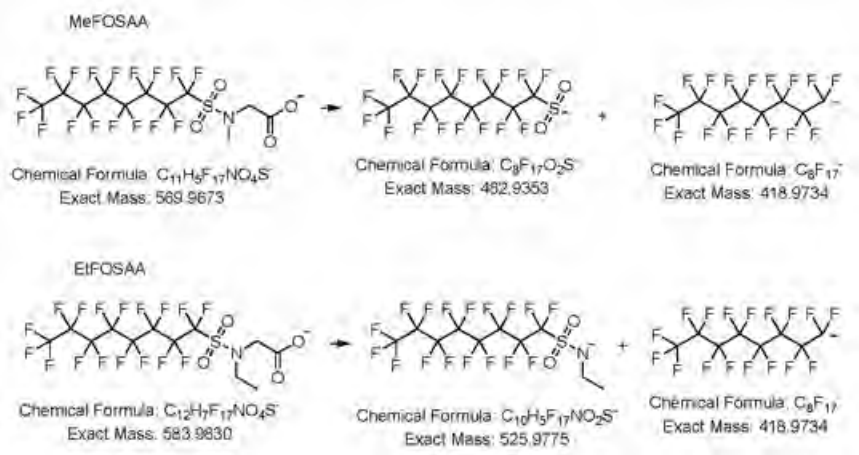
Exact Mass: 98.9558


4:2 FTS
Chemical Formula: $C_6H_4F_9O_3S^-$
Exact Mass: 326.9743
Chemical Formula: $C_6H_3F_8O_3S^-$
Exact Mass: 306.9681
Chemical Formula: HO_3S^-
Exact Mass: 80.9652
6:2 FTS
Chemical Formula: $C_8H_4F_{13}O_3S^-$
Exact Mass: 426.9679
Chemical Formula: $C_8H_3F_{12}O_3S^-$
Exact Mass: 406.9617
Chemical Formula: HO_3S^-
Exact Mass: 80.9652
8:2 FTS
Chemical Formula: $C_{10}H_4F_{17}O_3S^-$
Exact Mass: 526.9615
Chemical Formula: $C_{10}H_3F_{16}O_3S^-$
Exact Mass: 506.9553
Chemical Formula: HO_3S^-
Exact Mass: 80.9652
10:2 FTS
Chemical Formula: $C_{12}H_4F_{21}O_3S^-$
Exact Mass: 626.9551
Chemical Formula: $C_{12}H_3F_{20}O_3S^-$
Exact Mass: 606.9489
Chemical Formula: HO_3S^-
Exact Mass: 80.9652
FOSA
Chemical Formula: $C_8HF_{17}NO_2S^-$
Exact Mass: 497.9462
Chemical Formula: NO_2S^-
Exact Mass: 77.9655
MeFOSA
Chemical Formula: $C_9H_3F_{17}NO_2S^-$
Exact Mass: 511.9619
Chemical Formula: $C_4F_9^-$
Exact Mass: 218.9862
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894
EtFOSA
Chemical Formula: $C_{10}H_5F_{17}NO_2S^-$
Exact Mass: 525.9775
Chemical Formula: $C_4F_9^-$
Exact Mass: 218.9862
Chemical Formula: $C_3F_7^-$
Exact Mass: 168.9894


MeFOSAA
Chemical Formula: $C_{11}H_5F_{17}NO_4S^-$
Exact Mass: 569.9673
Chemical Formula: $C_8F_{17}O_2S^-$
Exact Mass: 482.9353
Chemical Formula: $C_8F_{17}^-$
Exact Mass: 418.9734
EtFOSAA
Chemical Formula: $C_{12}H_7F_{17}NO_4S^-$
Exact Mass: 583.9830
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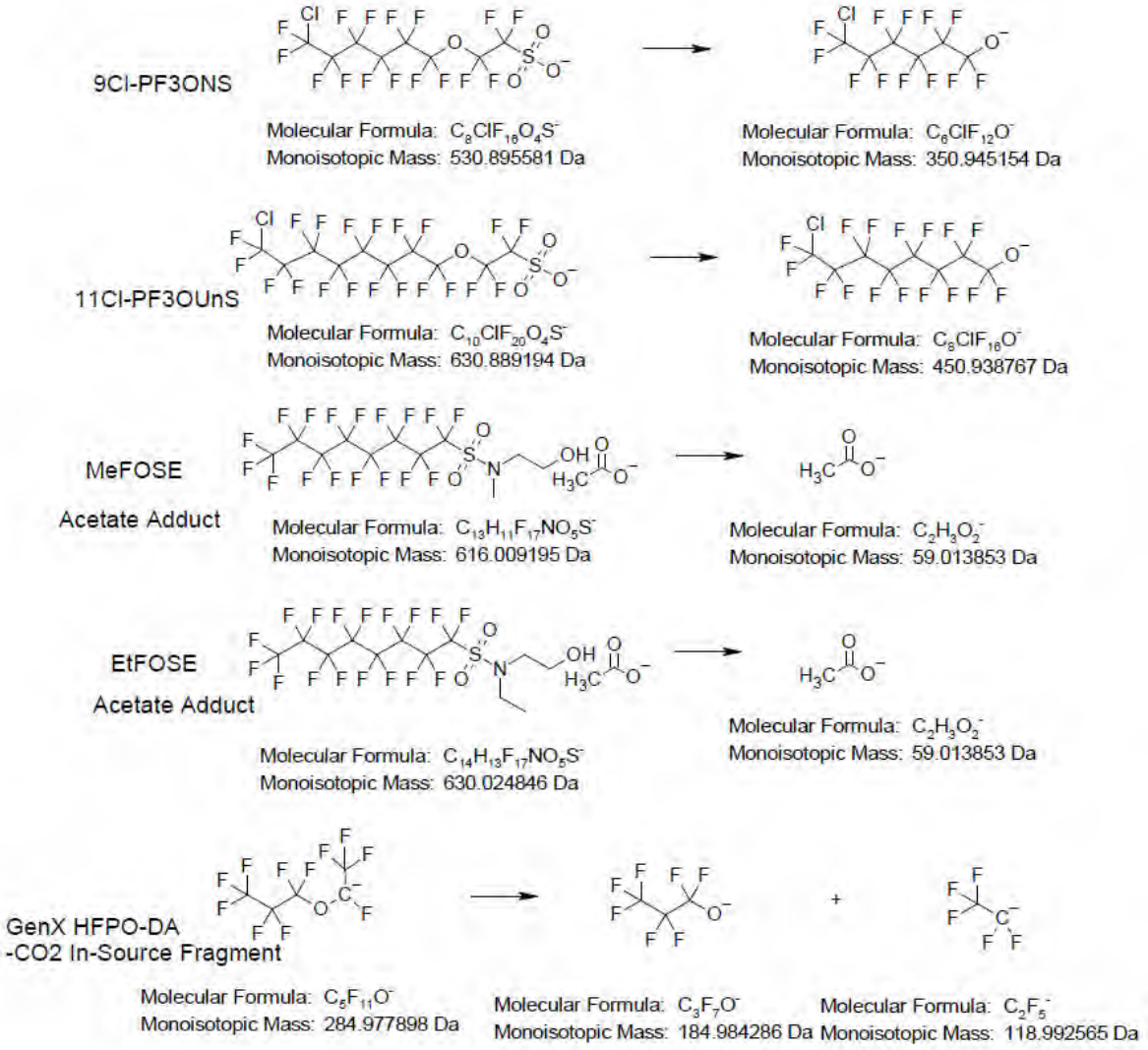
Exact Mass: 418.9734


9Cl-PF3ONS
Molecular Formula: C8ClF16O4S-
Monoisotopic Mass: 530.895581 Da
Molecular Formula: C6ClF12O-
Monoisotopic Mass: 350.945154 Da
11Cl-PF3OUnS
Molecular Formula: C10ClF20O4S-
Monoisotopic Mass: 630.889194 Da
Molecular Formula: C8ClF16O-
Monoisotopic Mass: 450.938767 Da
MeFOSE
Acetate Adduct
Molecular Formula: C13H11F17NO5S-
Monoisotopic Mass: 616.009195 Da
Molecular Formula: C2H3O2-
Monoisotopic Mass: 59.013853 Da
EtFOSE
Acetate Adduct
Molecular Formula: C14H13F17NO5S-
Monoisotopic Mass: 630.024846 Da
Molecular Formula: C2H3O2-
Monoisotopic Mass: 59.013853 Da
GenX HFPO-DA
-CO2 In-Source Fragment
Molecular Formula: C5F11O-
Monoisotopic Mass: 284.977898 Da
Molecular Formula: C3F7O-
Monoisotopic Mass: 184.984286 Da
Molecular Formula: C2F5-
Monoisotopic Mass: 118.992565 Da

APPENDIX I: DOD/DOE QSM REQUIREMENTS

Sections found in this appendix replace and/or supplement the existing sections of the SOP. These requirements must be met when analyzing samples for the Department of Defense, as stipulated in the DOD Quality System Manual.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Aqueous Sample Preparation	Each sample and associated batch QC samples.	Solid Phase Extraction (SPE) must be used unless samples are known to contain high PFAS concentrations (e.g., Aqueous Film Forming Foam (AFFF) formulations). Inline SPE is acceptable. Entire sample plus bottle rinsate must be extracted using SPE. Known high PFAS concentration samples require serial dilution be performed in duplicate. Documented project approval is needed for samples prepared by serial dilution as opposed to SPE.	NA.	NA.	Samples with > 1% solids may require centrifugation prior to SPE extraction. Pre-screening of separate aliquots of aqueous samples is recommended.
Solid Sample Preparation	Each sample and associated batch QC samples.	Entire sample received by the laboratory must be homogenized prior to subsampling.	NA.	NA.	NA.
Biota Sample Preparation	Each sample and associated batch QC samples.	Sample prepared as defined by the project (e.g., whole fish versus filleted fish).	NA.	NA.	NA.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
AFFF and AFFF Mixture Samples Preparation	Each sample and associated batch QC samples.	Each field sample must be prepared in duplicate (equivalent to matrix duplicate). Serial dilutions must be performed to achieve the lowest LOQ possible for each analyte.	NA.	NA.	Adsorption onto bottle is negligible compared to sample concentration so subsampling is allowed. Multiple dilutions will most likely have to be reported in order to achieve the lowest LOQ possible for each analyte.
Sample Cleanup Procedure	Each sample and associated batch QC samples. Not applicable to AFFF and AFFF Mixture Samples.	ENVI-Carb™ or equivalent must be used on each sample and batch QC sample.	NA.	Flagging is not appropriate.	Cleanup should reduce bias from matrix interferences.
Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis. Mass calibration is verified after each mass calibration, prior to initial calibration (ICAL).	Calibrate the mass scale of the MS with calibration compounds and procedures described by the manufacturer. Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for every acquisition in an analytical run. Mass calibration must be verified to be ±0.5 amu of the true value, by acquiring a full scan continuum mass spectrum of a PFAS stock standard.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Flagging is not appropriate.	Problem must be corrected. No samples may be analyzed under a failing mass calibration. The mass calibration is updated on an as-needed basis (e.g., QC failures, ion masses fall outside of the ±0.5 amu of the true value, major instrument maintenance is performed, or the instrument is moved).

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Mass Spectral Acquisition Rate	Each analyte, Extracted Internal Standard (EIS) Analyte.	A minimum of 10 spectra scans are acquired across each chromatographic peak.	NA.	Flagging is not appropriate.	NA.
Calibration, Calibration Verification, and Spiking Standards	All analytes.	Standards containing both branched and linear isomers must be used when commercially available. PFAS method analytes may consist of both branched and linear isomers, but quantitative standards that contain the linear and branched isomers do not exist for all method analytes. For PFAS that do not have a quantitative branched and linear standard, identify the branched isomers by analyzing a qualitative standard that includes both linear and branched isomers and determine retention times, transitions and transition ion ratios. Quantitate samples by integrating the total response (i.e., accounting for peaks that are identified as linear and branched isomers) and relying on the initial calibration that uses the linear isomer quantitative standard.	NA.	Flagging is not appropriate.	Standards containing both branched and linear isomers are to be used during method validation and when reestablishing retention times, to ensure the total response is quantitated for that analyte. Technical grade standards cannot be used for quantitative analysis.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Sample PFAS Identification	All analytes detected in a sample.	The chemical derivation of the ion transitions must be documented. A minimum of two ion transitions (Precursor → quant ion and precursor → confirmation ion) and the ion transitions ratio per analyte are required for confirmation. Exception is made for analytes where two transitions do not exist (PFBA and PFPeA). Documentation of the primary and confirmation transitions and the ion ratio is required. In-house acceptance criteria for evaluation of ion ratios must be used and must not exceed 50-150%. Signal to Noise Ratio (S/N) must be ≥ 10 for all ions used for quantification and must be ≥ 3 for all ions used for confirmation. Quant ion and confirmation ion must be present and must maximize simultaneously (±2 seconds).	NA.	PFAS identified with ion ratios that fail acceptance criteria must be flagged. Any quantitation ion peak that does not meet the maximization criteria shall be included in the summed integration and the resulting data flagged as "estimated, biased high".	For example: Ion Ratio = (quant ion abundance/ confirm ion abundance) Calculate the average ratio (A) and standard deviation (SD) using the ICAL standards. An acceptance range of ratio could be within A ±3SD for confirmation of detection.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Ion Transitions (Precursor-> Product)	Every field sample, standard, blank, and QC sample.	In order to avoid biasing results high due to known interferences for some transitions, the following transitions must be used for the quantification of the following analytes: PFOA: 413 → 369 PFOS: 499 → 80 PFHxS: 399 → 80 PFBS: 299 → 80 4:2 FTS: 327 → 307 6:2 FTS: 427 → 407 8:2 FTS: 527 → 507 NEtFOSAA: 584 → 419 NMeFOSAA: 570 → 419 If these transitions are not used, the reason must be technically justified and documented (e.g., alternate transition was used due to observed interferences).	NA.	Flagging is not appropriate	NA.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Initial Calibration (ICAL)	At instrument set-up and after ICV or CCV failure, prior to sample analysis.	The isotopically labeled analog of an analyte (Extracted Internal Standard Analyte) must be used for quantitation if commercially available (Isotope Dilution Quantitation). Commercial PFAS standards available as salts are acceptable providing the measured mass is corrected to the neutral acid concentration. Results shall be reported as the neutral acid with appropriate CAS number. If a labeled analog is not commercially available, the Extracted Internal Standard Analyte with the closest retention time or chemical similarity to the analyte must be used for quantitation. (Internal Standard Quantitation) Analytes must be within 70-130% of their true value for each calibration standard. *(continued next page)*	Correct problem, then repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until ICAL has passed. External Calibration is not allowed for any analyte. Calibration can be linear (minimum of 5 standards) or quadratic (minimum of 6 standards); weighting is allowed.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Initial Calibration (ICAL) *(Continued)*		ICAL must meet one of the two options below: Option 1: The RSD of the RFs for all analytes must be ≤ 20%. Option 2: Linear or non-linear calibrations must have $r^2 \geq 0.99$ for each analyte.			
Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Calculated for each analyte and EIS.
Retention Time (RT) window width	Every field sample, standard, blank, and QC sample.	RT of each analyte and EIS analyte must fall within 0.4 minutes of the predicted retention times from the daily calibration verification or, on days when ICAL is performed, from the midpoint standard of the ICAL. Analytes must elute within 0.1 minutes of the associated EIS. This criterion applies only to analyte and labeled analog pairs.	Correct problem and reanalyze samples.	NA.	Calculated for each analyte and EIS.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Instrument Sensitivity Check (ISC)	Prior to analysis and at least once every 12 hours.	Analyte concentrations must be at LOQ; concentrations must be within ±30% of their true values.	Correct problem, rerun ISC. If problem persists repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until ISC has met acceptance criteria. ISC can serve as the initial daily CCV.
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	Analyte concentrations must be within ±30% of their true value.	Correct problem, rerun ICV. If problem persists repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified.
Continuing Calibration Verification (CCV)	Prior to sample analysis, after every 10 field samples, and at the end of the analytical sequence.	Concentration of analytes must range from the LOQ to the mid-level calibration concentration. Analyte concentrations must be within ±30% of their true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable calibration verification.	Results may not be reported without valid CCVs. Instrument Sensitivity Check (ISC) can serve as a bracketing CCV.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Instrument Blanks	Immediately following the highest standard analyzed and daily prior to sample analysis.	Concentration of each analyte must be ≤ ½ the LOQ. Instrument Blank must contain EIS to enable quantitation of contamination.	If acceptance criteria are not met after the highest calibration standard, calibration must be performed using a lower concentration for the highest standard until acceptance criteria is met. If sample concentrations exceed the highest allowed standard and the sample(s) following exceed this acceptance criteria (>1/2 LOQ), they must be reanalyzed.	Flagging is only appropriate in cases when the sample cannot be reanalyzed and when there is no more sample left.	No samples shall be analyzed until instrument blank has met acceptance criteria. Note: Successful analysis following the highest standard analyzed determines the highest concentration that carryover does not occur. When the highest standard analyzed is not part of the calibration curve, it cannot be used to extend out the calibration range, it is used only to document a higher concentration at which carryover still does not occur.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Extracted Internal Standard (EIS) Analytes	Every field sample, standard, blank, and QC sample.	Added to solid sample prior to extraction. Added to aqueous samples, into the original container, prior to extraction. For aqueous samples prepared by serial dilution instead of SPE, added to final dilution of samples prior to analysis. Extracted Internal Standard Analyte recoveries must be within 50% to 150% of ICAL midpoint standard area or area measured in the initial CCV on days when an ICAL is not performed.	Correct problem. If required, re-extract and reanalyze associated field and QC samples. If recoveries are acceptable for QC samples, but not field samples, the field samples must be re-extracted and analyzed (greater dilution may be needed). Samples may be re-extracted and analyzed outside of hold times, as necessary for corrective action associated with QC failure.	Apply Q-flag and discuss in the Case Narrative only if reanalysis confirms failures in exactly the same manner.	Failing analytes shall be thoroughly documented in the Case Narrative. EIS should be 96% (or greater) purity. When the impurity consists of the unlabeled analyte, the EIS can result in a background artifact in every sample, standard and blank, if the EIS is fortified at excessive concentrations.
Method Blank (MB)	One per preparatory batch.	No analytes detected >½ LOQ or > 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater.	Correct problem. If required, re-extract and reanalyze MB and all QC samples and field samples processed with the contaminated blank. Samples may be re-extracted and analyzed outside of hold times, as necessary for corrective action associated with QC failure. Examine the project-specific requirements. Contact the client as to additional measures to be taken.	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid MB. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Laboratory Control Sample (LCS)	One per preparatory batch.	Blank spiked with all analytes at a concentration ≥ LOQ and ≤ the mid-level calibration concentration. A laboratory must use the DoD/DOE QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re-extract and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available. Samples may be re-extracted and analyzed outside of hold times, as necessary for corrective action associated with QC failure. Examine the project-specific requirements. Contact the client as to additional measures to be taken.	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch. Not required for aqueous samples prepared by serial dilution instead of SPE.	Sample spiked with all analytes at a concentration ≥ LOQ and ≤ the mid-level calibration concentration. A laboratory must use the DoD/DOE QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative.	For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference (i.e., matrix effect or analytical error).

Table B-15. Per- and Polyfluoroalkyl Substances (PFAS) Using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) With Isotope Dilution or Internal Standard Quantification in Matrices Other Than Drinking Water

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	For MSD: One per preparatory batch. For MD: Each aqueous sample prepared by serial dilution instead of SPE.	For MSD: Sample spiked with all analytes at a concentration ≥ LOQ and ≤ the mid-level calibration concentration. A laboratory must use the DoD/DOE QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. RPD ≤ 30% (between MS and MSD or sample and MD).	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative.	The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is ≥ LOQ. The MD is a second aliquot of the field sample that has been prepared by serial dilution.
Post Spike Sample	Only applies to aqueous samples prepared by serial dilution instead of SPE that have reported value of < LOQ for analyte(s).	Spike all analytes reported as < LOQ into the dilution that the result for that analyte is reported from. The spike must be at the LOQ concentration to be reported for this sample as < LOQ. When analyte concentrations are calculated as < LOQ, the post spike for that analyte must recover within 70–130% of its true value.	When analyte concentrations are calculated as < LOQ, and the spike recovery does not meet the acceptance criteria, the sample, sample duplicate, and post spike sample must be reanalyzed at consecutively higher dilutions until the criteria is met.	Flagging is not appropriate.	When analyte concentrations are calculated as < LOQ, results may not be reported without acceptable post spike recoveries.

MERIT LABORATORIES, INC.

STANDARD OPERATING PROCEDURE

TOTAL DISSOLVED SOLIDS (TDS) (ALSO CALLED: TOTAL FILTERABLE RESIDUE)
STANDARD METHOD #: 2540C

APPROVALS:

Barbara Ball

03/07/2024

QA Officer — Date

Maya Mushahwar

03/07/2024

Technical Director — Date

Number	**Description of Change**	**Date**
001-005	Previous changes were not documented	
006	Updated to comply with DoD QSM and ISO 17025 standards.	5/27/11
007	2013 Internal Audit Findings	6/04/14
008	2018 Internal Audit Findings	01/09/19
009	DOD Audit Corrective Action	10/02/2020
010	2020 Internal Audit revisions	02/12/2021
011	Emergency SOP Amendment Form	03/08/2023
012	2023 Internal Audit revisions	03/07/2023
013		
014		
015		
016		

1.0 SCOPE AND APPLICATION

This SOP determines filterable residue Total Dissolved Solids (TDS) in drinking, surface, and saline waters and domestic and industrial wastes. The reporting limit is 50 mg/l for TDS. TDS is analyzed by Standard Method 2540C.

2.0 SUMMARY OF METHOD

An aliquot of sample is taken from a well-shaken sample and filtered through a filter into a StableWeigh bag. The sample is evaporated in the oven overnight without boiling. Once all the free liquid is evaporated, the oven temperature is increased to 180^{o} C oven and dried overnight or to a constant weight. The weight of solids in the dish represents the TDS.

3.0 INTERFERENCES

Poor shaking or stirring can lead to incorrect results.

Improper drying of the solids (not to constant weight) will give higher results than the true value.

Highly mineralized waters containing significant concentrations of calcium, magnesium, chloride, and/or sulfate can be hygroscopic and will require prolonged drying, desiccation, and rapid weighing.

Samples containing high concentrations of bicarbonate will require careful and possibly prolonged drying at 180 ^{o}C to ensure that all the bicarbonate is converted to carbonate.

Too much residue in the evaporating dish will crust over and entrap water that will not be driven off during drying. Total residue must be limited to about 200 mg.

4.0 APPARATUS AND MATERIALS

Un-weighed glass fiber filters.

Vacuum filtering apparatus compatible with 47 mm glass fiber filters.

25 and 50 mL large mouth pipettes.

StableWeigh Vessels

Oven, 103 ^{o}C ± 2 ^{o}C.

Oven, 180 ^{o}C ± 2 ^{o}C.

Magnetic stir bar

Magnetic stir plate

Beakers

Thermometer.

Desiccators.

Analytical Balance, capable of weighing to 0.1 mg.

Vacuum pump.

Tweezers.

Tongs

Heat Resistant Gloves

StableWeigh Vessel Holder (oven and scale)

Static Removal Device

5.0 REAGENTS

Deionized (DI) Water.
Laboratory Control Sample (LCS)

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

The sample is usually a composite sample collected in a plastic or glass liter bottle with no preservation other than refrigeration at $4 \pm 2^{o}C$. The holding time is 7 days from sample collection.

7.0 PROCEDURE

1. Record the date and time when samples are put in oven, as well as your initials as the analyst on the bench sheet (Figure 1, F:\data\Benchsheets\Solids\Total Dissolved Solids\TDS.2023.xls) and in the appropriate batch for TDS. A batch is defined as 20 samples of the same or similar matrix.

2. Record the StableWeigh bag on the TDS bench sheet. Using tweezers, place the filter in the filter holder with the wrinkled side up.

3. Place the StableWeigh bag inside the StableWeigh Filling Station. Place the filter assembly on each station.

4. Turn on the vacuum and filter 50 ml of DI water through the filter until all of the water is drawn through. This is the Blank.

5. Record the 50 ml volume on the bench sheet(s) for the Blank.

6. Record the Merit number on the bench sheet. Vigorously shake each sample and quickly pipette the sample from the bottle into a graduated cylinder or pipette the required sample volume. Typically, 50 ml of sample for TDS less than 2000 mg/l. When using this method, pipette the sample in to filter apparatus from the graduated cylinder or pipette.

    i. If sample requires more mixing, shake the sample violently and quickly pipette about 150 ml to 250 ml into a plastic cup or beaker.

    ii. Place a Teflon-covered, magnetic stirring bar in the beaker and place the beaker on top of a magnetic stirrer. Stir for 1 minute or more.

    iii. Using a 25 ml serological pipette with a wide opening, remove 25.0 ml of well mixed sample from halfway into the cup and halfway between the mixing vortex and the side of the cup. Then drain the pipette onto and through the filter.

    iv. Repeat pipetting until 50 ml has been filtered. 25 ml or less can be used if you know there are a lot of dissolved solids in the sample (from historical testing or conductivity information). For brine samples, use 1 to 10 mls.

7. Record the volume you filtered on the bench sheet.

8. Place the StableWeigh bag in oven and dry it at 103 ^{o}C overnight or until all free liquids are evaporated. Then dry the dish in a 180 ^{o}C oven overnight or to a constant weight.

9. Remove the StableWeigh bag from the oven and cool it to room temperature in a Desiccator. Carefully weigh it on an analytical balance to 0.1 mg. StableWeigh bags must be read immediately after removing from oven and being placed in dessicator.

10. Record the weight on the bench sheet.

11. For constant weigh check, check the dryness of the sample by drying it for another 30 minutes. Then reweigh. The sample is dried to a constant weight if the two weights differ by no more than four percent or 0.5 mg, whichever is less.

12. Record the weight on the bench sheet.

13. Be sure to perform the quality control (QC) analyses summarized in Section 8.0.

14. Repeat Steps 6 through 13 for each sample.

15. Calculate TDS as follows:

$$TotalDissolvedSolids = \left(\frac{A - B}{volumeofsample} \right) x1000000$$

- Where A = final weight of sample & StableWeigh bag
- B = original weight of dish

16. Calculate Relative Percent Difference:

$$RPD = \frac{(S - D)}{\left[\frac{S + D}{2} \right]} \times 100$$

- Where: S = Initial sample result
- D = Duplicate sample result

8.0 QUALITY CONTROL

All of the QC items employed and evaluated are provided in Table 1. In addition, the table indicates the frequency of each QC item along with appropriate courses of corrective action. The analyst will follow SOP #QA-007 and complete the appropriate review form upon completion of the analysis.

9.0 METHOD PERFORMANCE

This method is evaluated by testing a LCS and duplicate samples.

10.0 EQUIPMENT MAINTENANCE AND TROUBLESHOOTING

All equipment must be maintained and calibrated according to manufacturer's procedures. When equipment is not performing as required, the instrument must not be used until it is recalibrated or replaced.

Computer software and firmware can be found on Merit's network at F:\data\MERIT\EQUIPMENT\Instrument-Software Version List.200818.xls.

11.0 SAFETY

Eye protection and gloves must be worn while performing TDS analyses. Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples. The air system throughout the laboratory area is on a 100 percent fresh air exchange system. This system exchanges 100 percent the air in the laboratory area with air from

outside six times per hour and 30 times per hour when the emergency purge button is hit. A reference file of material safety data sheets (MSDSs) is available to all personnel.

12.0 WASTE DISPOSAL AND POLLUTION PREVENTION

All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations. Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

13.0 DEFINITIONS

Filterable residue: solids capable of passing through a glass fiber filter and dried to constant weight at 180 ^{o}C

Sample Batch: samples of the same or similar matrix; a sample batch consists of 20 samples or less

Method Blank: an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Laboratory Duplicate: aliquots of sample taken from the same container under the same laboratory conditions and processed and analyzed under the same conditions but independently.

Laboratory Control Spike: Milli-Q water (for water) and Organic-Free Soil (for soil) is spiked with the target analytes and carried through the complete sample preparation and analytical procedure. The control spike is used to document the ability to generate acceptable precision and bias, to verify the analytical system's performance, and to document method accuracy for each matrix.

14.0 REFERENCES

Standard Methods for Examination of Water and Wastewater, Twentieth Edition, Method 2540C, *Total Dissolved Solids Dried at 180^{o}C.*

Department of Defense, Quality Systems Manual for Environmental Laboratories (DoD QSM), DoD Environmental Data Quality Workgroup, Department of Navy, Lead Service, Version 5.4, 2021

Table 1: Quality Control Items, Frequency, and Corrective Action

QC Sample	**Frequency**	**Acceptable Limits**	**Corrective Action**	**Follow up Corrective Action**
Blank	1/20 samples	-20 to +20 mg/l	Redry and Reweigh	Reset the entire set of samples with new filters
Laboratory Control Sample	1/20 samples	Within Supplier's Limits	Redry and Reweigh	Reset the entire set of samples with new filters
Sample Duplicate	1/20 Samples	± 10 % RPD	Reset sample duplicates	Footnote non-homogeneity
Constant Weight Verification	1/20 samples	4 % or 0.5 mg whichever is less	Dry longer and reweigh.	Dry longer and reweigh.
Minimum Mass Requirement	Every Sample	Limits ≥2.5mg	Flag client results	N/A

Total Dissolved Solids
TDS: Standard Methodd 2540C

Date Started:	Date Finished:	Date Reviewed:
Time Started:	Time Finished:	Reviewed by:
Analyst:	Temperature:	Batch ID:
Time in Oven: 0 Days 0 Hour 0 Minutes	Balance ID:	Oven/Therm ID:

Analyst Fields

Merit #	Bag #	Sample Volume (mL)	Bag Wt. (g)	Bag + Dry Sample Wt. (g)	Reweigh Bag + Dry Sample Wt. (g)	TDS (mg-L)	Dilution Factor	Reporting Limit (mg-L)
Blank	**#VALUE!**	50	#VALUE!			#VALUE!	2.00	50
LCS	**#VALUE!**	25	#VALUE!			#VALUE!	4.00	100
DUP 1-S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
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S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!
S	**#VALUE!**		#VALUE!			#VALUE!	#DIV/0!	#DIV/0!

LCS	Merit ID	Result	
Found Value	LCS	#VALUE!	
Actual Value	n/a	100	
	Recovery	#VALUE!	%

DUPLICATE	Merit ID	Result	
Parent		#N/A	
Duplicate	DUP 1-S	#VALUE!	
	RPD	#N/A	%

LCS Information	Value
Lot #	
Target Value (mg-L)	100
LCL (% / mg-L)	90 / 90
UCL (% / mg-L)	110 / 110

If applicable	
Oven Change Time	
Oven/Therm ID:	
New Oven Temp	

IRL-F34

Effective Date:
08/18/2023

Prepared by
Merit Laboratories, Inc.

Figure 1: Total Dissolved Solids Bench Sheet

STANDARD OPERATING PROCEDURE

MICROWAVE ASSISTED ACID DIGESTION OF LIQUID SAMPLES AND EXTRACTS US EPA METHOD 3015A

APPROVALS:

Barbara Ball

02/12/2024

QA Officer Date

Maya Mushahwar

02/12/2024

Technical Director Date

Number	Description of Change	Date
001-007	Previous changes were not documented	
008	Updated to comply with DoD QSM and ISO 17025 standards.	6/3/11
009	Emergency SOP Amendment Form updates	02/09/16
010	Updated to comply with DoD QSM 5.0 standards.	03/10/16
011	Updated to comply with DoD QSM 5.1 standards.	01/15/18
012	DOD Audit Corrective Action	10/01/2020
013	2020 Internal Audit revisions	02/08/2021
014	2023 Internal Audit revisions	02/12/2024
015		
016		
017		
018		

1.0 SCOPE AND APPLICATION

This digestion procedure is used for the preparation of aqueous samples, mobility-procedure extracts, and wastes that contain suspended solids for analysis, by inductively coupled plasma mass spectrometry (ICP-MS). The procedure is a hot acid leach for determining available metals. The method referenced with in this SOP is SW-846 Method 3015A.

Samples prepared by using nitric acid digestion are analyzed by ICP-MS for the following metals:

Metal (Symbol)	CAS#:
Aluminum (Al)	7429-90-5
Antimony (Sb)	7440-36-0
Arsenic (As)	7440-38-2
Barium (Ba)	7440-39-3
*Boron (B)	7440-42-8
Beryllium (Be)	7440-41-7
Cadmium (Cd)	7440-43-9
Calcium (Ca)	7440-70-2
Chromium (Cr)	7440-47-3
Cobalt (Co)	7440-48-4
Copper (Cu)	7440-50-8
Iron (Fe)	7439-89-6
Lead (Pb)	7439-92-1
*Lithium (Li)	7439-93-2
Magnesium (Mg)	7439-95-4
Manganese (Mn)	7439-96-5
Molybdenum (Mo)	7439-95-4
Nickel (Ni)	7440-02-0
Potassium (K)	7440-09-7
Selenium (Se)	7782-49-2
Silver (Ag)	7440-22-4
Sodium (Na)	7440-23-5
*Strontium (Sr)	7440-24-6
Thallium (Tl)	7440-28-0
*Tin (Sn)	7440-31-5
*Titanium (Ti)	7440-32-6
Vanadium (V)	7440-62-2
Zinc (Zn)	7440-66-6

* Not approved for DoD work

2.0 SUMMARY OF METHOD

A representative 0.5 to 25 g/ml aqueous sample is digested in 1 ml of concentrated nitric acid and 1 mL of hydrochloric acid in a polypropylene digestion vessel heated using microwave heating and brought to a final volume of 50 ml. After the digestion process, the sample is cooled, and then filtered, centrifuged, or allowed to settle prior to analysis.

3.0 INTERFERENCES

Addition of nitric acid to samples that contain organics, such as TCLP extracts, could result in a violent reaction and splattering (loss) of the sample, leading to loss of analytes and/or sample, which must be

avoided. A smaller sample size can be used but the final water volume must be adjusted to approximately 10 ml prior to the heating stage.

4.0 APPARATUS AND MATERIALS

Microwave Digestion System CEM–Model MDS – 81D and MARSX-Model # 907600:

- The MDS-81D consists of a microwave drying system with an operator selectable power output of 0-600 watts in 1% increments, a microwave cavity with a variable speed exhaust fan, a programmable microprocessor based digital computer, Teflon® coated cavity, exhaust tubing and standard screen rotating turntable, rotated at 6 rpm to insure uniform microwave heating.

- The MARSX consists of a microwave drying system with an operator selectable power output of 0-1200 watts in, a microwave cavity with a variable speed exhaust fan, a programmable microprocessor based digital computer, Teflon® coated cavity, exhaust tubing and standard rotating turntable, and self calibration features.

- Microwave Digestion System Specifications:

MDS-81D		MARSX	
Power	600 Watts	Power	1200 Watts
Pressure	0 – 200 psi	Pressure	0 – 200 psi
Temperature	0 – 200°C	Temperature	0 – 200°C
Capacity	26 samples	Capacity	50 samples

Analytical balances, 510g capacity, minimum accuracy ± 0.001g and 250g capacity, minimum accuracy ±0.0001g.

Glass-fiber filter paper, 0.45 µm, or syringe filters.

Digital bottle top dispenser capable of dispensing volumes of 0-5 ml in 0.02 ml increments.

Disposable polypropylene vessels, 50 ml, compatible with centrifuge.

Plastic containers to support minimum of 200 ml.

Disposable Pasteur pipettes.

Eppendorf automatic pipette with disposable combitips ranging from 2.50 ml to 50 ml capable of pipetting volumes ranging from 50 µl to 5,000 µl.

Centrifuge (IEC Centra GP8).

5.0 REAGENTS

Trace metal grade chemicals are used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, if applicable.

Deionized (DI) Water (Type I) is used which meets the specifications of the ASTM standard criteria.

Concentrated nitric acid, HNO_3, Trace Metal Grade. Acid purity is monitored by analysis of the laboratory reagent blank.

Hydrochloric acid, HCl, Trace Metal Grade. Acid purity is monitored by analysis of the laboratory reagent blank.

Standards added to digestion:

- Spiking Solutions
  - Spiking solutions are prepared according to the Standard Prep Log (Figure 1). The formula, date source solutions, lot numbers, expiration date of stock standards, expiration date standard made, expiration and unique ID of any working standards used.
  - All standards are NIST traceable.
  - Multi-element standard solution **WS1** (Figure 1), contains 10 µg/ml (ppm) each of Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Li, Mo, Mn, Ni, Se, Sr, Sn, Ag, Tl, Ti, V, and Zn. The spiking solution is made by diluting the WS1, 2 to 1 (5 µg/ml). The 5 µg/ml spiking solution is added to the QC samples accordingly, 0.5 ml is added to MS/MSD samples and 0.5 ml is added to the laboratory control sample (LCS), using the Eppendorf automatic pipette.
  - Multi-element standard solution High Purity Mineral (**HM)** (Figure 1) contains 100 µg/ml each of Ca, K, Mg, and Na. From this solution, 1.0 ml is added to the QC samples (*i.e.* MS/MSD samples), and 0.50 ml to the laboratory control sample (LCS), by weighing the amounts (1.0 g, 0.50 g) on the scale.
- Internal Standards (After digestion):
  - Lithium 6, 1000 µg/ml stock solution.
  - Scandium, 1000 µg/ml stock solution.
  - Yttrium, 1000 µg/ml stock solution.

- Rhodium, 1000 µg/ml stock solution.
- Rhenium, 1000 µg/ml stock solution.
- Internal Standard working solution (**IS-WS**): From the above stock solutions, 2.5 g of each is transferred to a 1000 ml plastic bottle, along with 10 ml of concentrated HNO_3 and brought to a final volume of 1000 ml (by weight). The concentration in the bottle will be 2.5 µg/ml. This represents the internal standards working solution from which 1 ml will be added to all samples (*i.e.* standards, samples, QC samples, blanks, etc.) prior to the analysis by the ICP/MS.

NOTE: The stock solutions are NIST traceable and provided with a certificate of analyses and MSDS sheets by the manufacturer.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

Water samples are collected in HNO_3 pre-preserved plastic containers and are acidified to pH of <2. (Approximately 125 ml volume). Holding times for metals are 6 months from the date of sampling, with the exception of Mercury, which is not covered by this SOP.

7.0 PROCEDURE

1. The Microwave Accelerated Reaction Systems are equipped with a temperature feedback control system. Microwaves are calibrated once a year according to the manufacturer's operation manual.

2. All digestion vessels are disposable and are used only once, which allows for better sample control and prevents cross contamination.

CAUTION: - Toxic nitrogen oxide fumes may evolve; therefore all work must be performed in a properly operating ventilation system.

- *Loss of sample through splattering inside the microwave system must be avoided. Physical observation is sufficient to determine if this is the case, therefore the batch of samples needs to be inspected at the end of the digestion cycle. If splattering has occurred, the samples are to be discarded, and a new batch is to be prepared.*

3. Digestion using industrial Microwave.

- A 0.25 to 25 ml/grams aliquot of a well shaken sample is transferred into the digestion vessel; sample volume is determined by sample matrix and sample history. The vessel is labeled with the sample number, which is also recorded on the digestion log (Figure 2).

- With every batch of 20 analytical samples measure a volume of reagent water equal to the sample volume as described at above into a vessel labeled LRB. This represents the Laboratory Reagent Blank (LRB), which is carried through the entire digestion procedure, the same as an analytical sample.

- With every batch of samples measure a volume of reagent water equal to the sample volume as described at above into a vessel labeled LCS. This represents the Laboratory Control Sample (LCS), which is carried through the entire digestion procedure, the same as an analytical sample.

- For every 10 samples measure, in a similar manner, an amount equal to the parent sample of the sample designated for Matrix Spike (MS) and Matrix Spike duplicate (MSD) or duplicate (Dup).

- For analysis of all metals except Ca, Mg, K and Na, add 0.5 ml of the QC Spiking Solution to the QC samples (LCS, MS/MSD). For Ca, Mg, K and Na, add 0.5 ml of the HM solution to the LCS, and 1.0 ml of the HM solution to the MS/MSD samples. The spike concentration and the Lot # of the stock solution used is recorded in the digestion log (Figure 2).

- Add 1 $\pm$ 0.1 ml of concentrated nitric acid and 0.5 ml hydrochloric acid to each vessel, by using the bottle top dispensers in the fume hood.

CAUTION: Addition of nitric acid to the non-aqueous (solvents) samples needs to be performed slowly, dropwise if possible in order to control the potential reaction. When the reaction has subsided, swirl the vessel lightly, dilute the sample to approximately 10 mL, and go to the next step.

- Loosely cap the vessel and place into the carousel.
- Samples are slowly ramped in the microwave to 95 ± 5 degrees Celsius over the course of a few minutes and maintained at this temperature for 30 minutes.

- After the temperature program is completed, leave the vessels 5-10 minutes in the microwave, to cool down, and then move them into the hood.

- When the vessels have cooled to near room temperature, determine if the microwave vessels and caps are intact. If the sample vessel look compromised (i.e. cap is not on, sides of the

vessel are wet), then the sample is considered compromised and the sample must be re-digested.

- Add 1 ml of the Internal Standard working solution, using an Eppendorf automatic pipettor, and dilute to the 50 ml mark with DI Water into a calibrated digestion vessel (per lot). PE NexION 1000 adds the internal standard to each sample as it is introduced into instrument.

- If the digested sample contains particulate matter, which has the potential to clog the nebulizer, the sample needs to be centrifuged, allowed to settle, or filtered.

    - Settling: allow the sample to stand until the supernatant is clear. Allowing a sample to stand overnight will usually accomplish this; however this can frequently be accomplished in a few hours. If it does not, centrifuge or filter the sample.

    - Centrifugation: centrifugation at 4500 rpm for 3 minutes is usually sufficient to clear the supernatant.

    - Filtering: the filtering apparatus (flask and funnel) must be thoroughly rinsed with a 10% v/v nitric acid solution and copious amounts of DI Water. Filter the sample through a 0.45 μm filter paper and transfer the liquid to a new vessel. Glass fiber filters are acceptable for all metals except Zn and Ba, for which membrane filters are required, due to the presence of these elements in the glass fiber filters. Syringe filters may be used.

4. Calculations:

Dilution factor (DF:

$$DF = \frac{Final\ Volume\ (50)}{Sample\ amount}$$

Relative Percent Difference: $$RPD = \frac{(S - D)}{\left[\frac{S + D}{2}\right]} \times 100$$

Where: S = Initial sample result
D = Duplicate sample result

Spike Recovery Percent Recovery: $$\frac{SSR - SR}{SA} \times 100$$

Where: SSR = Spike sample result
SR = Sample (unspiked) result
SA = Spike added

% Difference (%D)

Used for serial dilution test in metals.

$$\%D = \left| \frac{X_1 - X_2}{X_1} \right| \times 100\%$$

where: %D = percent difference
X_1 = Initial concentration
X_2 = Duplicate concentration

- Record pertinent information onto the digestion log (Figure 2). The following information must be included: Date, start time, end time, analyst initials, method reference, sample IDs, sample weight or volume, MS/MSD/LCS spiking concentration and lot #, acid lot #, dilution factor, final volume and any pertinent remarks.

8.0 QUALITY CONTROL

All of the quality control items employed and evaluated are provided in Table 1 and 2. In addition, the table indicates the frequency of each QC item along with appropriate courses of corrective action. A dilution test is performed once per every 20 samples. The dilution test is performed by taking 10 mls of a parent sample after digestion and adding 0.8 mls acid and 0.8 mls internal standard and bringing to a final volume of 50 mls with DI water. The dilution test is used to identify matrix interference and is not applicable if the measured concentration is less than 100 times the MDL for each measured analyte.

The analyst will follow SOP #QA-007 and complete the appropriate review form upon completion of the analysis.

9.0 METHOD PERFORMANCE

The precision and accuracy of the method will depend upon the overall performance of the sample preparation and analysis.

10.0 EQUIPMENT MAINTENANCE AND TROUBLESHOOTING

Each instrument is assigned a maintenance logbook. All maintenance performed on the instrument must be recorded. Additionally, any modifications to the instrument settings shall be noted in the specific instrument logbook. Maintenance procedures provided in the equipment manual shall be followed.

Computer software and firmware can be found on Merit's network at F:\data\MERIT\EQUIPMENT\Instrument-Software Version List.200818.xls.

11.0 SAFETY

Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples. The air system throughout the laboratory area is on a 100% fresh

air exchange system, this system exchanges 100% the air in the laboratory area with air from outside 4 times per hour and 6 times per hour when the emergency purge button is hit. A reference file of material safety data sheets (MSDSs) is available to all personnel.

Specific attention be paid (but not limited) to:

- Nitric acid is a corrosive, not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition, and can react with metals to release flammable hydrogen gas.

- Many metal salts are extremely toxic if inhaled or swallowed. Extreme care must be taken to ensure that samples and standards are handled properly and that all exhaust gases are properly vented. Wash hands thoroughly after handling.

- The acidification of samples containing reactive materials may result in the release of toxic gases, such as cyanides or sulfides. For this reason, the acidification and digestion of samples should be performed in an approved fume hood.

12.0 WASTE DISPOSAL

All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations. Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

Samples.

- All digested samples are neutralized with baking soda and diluted before being disposed of with the normal laboratory wastewater.

- As a "small generator" of metals, Merit Laboratories has been approved for this type of disposal from the local government.

Acid bottles.

- Acid bottles are rinsed out and neutralized with baking soda before being disposed of with the normal laboratory waste.

13.0 DEFINITIONS

Sample Batch: samples of the same or similar matrix; for metals a sample batch consists of 20 samples or less.

Method Blank (Laboratory Reagent Blank) (LRB): an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Laboratory Control Sample (LCS) (also known as Laboratory Fortified Blank, Spiked Blank, or QC Check Sample): a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes carried through the complete sample prep and analytical procedure. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system.

Matrix Spike (MS) (also known as Spiked Sample or Fortified Sample): a sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (MSD) (also known as Spiked Sample or Fortified Sample Duplicate): a second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

Laboratory Duplicate: aliquots of sample taken from the same container under the same laboratory conditions and processed and analyzed under the same conditions but independently.

Dilution Test: a digested sample is diluted five-fold and analyzed to determine if matrix interference is present.

14.0 REFERENCES

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TABLE 1 Quality Control Items, Frequency and Corrective Action

QA Items	**Frequency**	**Acceptance Criteria**	**Corrective Action**
Laboratory Reagent Blank (Method Blank)	One per sample batch	<RL/dilution	Remove contamination and re-digest sample set
Laboratory Control Sample	One per sample batch	85%-115%	Re-digest the sample set
Matrix Spike	One per every 10 samples	75%-125%	Analyze by Method of Standard Additions (MSA)
Matrix Spike Duplicate	One per ever 10 samples	75%-125% RPD <20%	Analyze by Method of Standard Additions (MSA)
Matrix Duplicate	One per every 10 samples	RPD <20%	Re-digest the sample set and QC.
Dilution Test	One per sample batch	0-10% Not required for 200.8	If concentration analyzed >100 x MDL, flag data for possible matrix interference.

TABLE 2 Quality Control Items, Frequency and Corrective Action for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Linear Dynamic Range (LDR) or High-level Check Standard	At initial set-up and checked every 6 months with a high standard at the upper limit of the range.	Within ±10% of true value.	Dilute samples within the calibration range, or re-establish/verify the LDR.	Flagging is not appropriate.	Data cannot be reported above the calibration range without an established/passing high-level check standard.
Tuning	Prior to ICAL.	Mass calibration ≤ 0.1 amu from the true value; Resolution < 0.9 amu full width at 10% peak height.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Initial Calibration (ICAL) for All Analytes	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, r2 ≥ 0.99.	Correct problem, then repeat ICAL.	Flagging is not appropriate.	Minimum one high standard and a calibration blank. No samples shall be analyzed until ICAL has passed.
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes, within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.
Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since the last acceptable CCV. Alternately, recalibrate if	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable CCV.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

			necessary; then reanalyze all associated samples since the last acceptable CCV.		
Low-level Calibration Check Standard (LLCCV)	Daily.	All reported analytes within ± 20% of the true value.	Correct problem and repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed without a valid low-level calibration check standard (LLCCV). LLCCV should be less than or equal to the LOQ. If the concentration of the lowest calibration standard os less than or equal to the LOQ, the lowest standard may be re-quantified against the calibration curve as LLCCV. Otherwise, a separate standard must be analyzed as the LLCCV prior to the analysis of any samples.
Internal Standards (IS)	Every field sample, standard and QC sample.	IS intensity in the samples within 30-120% of intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Reanalyze sample at 5- fold dilutions until criteria is met. For failed QC samples, correct problem, and rerun all associated failed field samples.	Flagging is not appropriate.	Samples suffering from matrix effect should be diluted until criteria are met, or an alternate IS should be selected.
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10th the amount measured in any sample.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch	Results may not be reported without a valid method blank. Non-detects associated with positive blank infractions may be reported. Samples results > 10X the LOQ associated with negative blanks

					may be reported. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Initial and Continuing Calibration Blank (ICB/CCB)	Immediately after the ICV and immediately after every CCV.	The absolute values of all analytes must be < ½ LOQ or 1/10th the amount measured in any sample.	ICB: Correct problem and repeat ICV/ICB analysis. If that fails, rerun ICAL. All samples following the last acceptable Calibration Blank must be reanalyzed. CCBs may not be re-analyzed without re-analysis of the associated samples and CCV(s).	Flagging is not appropriate.	Results may not be reported without a valid calibration blank. Non-detects associated with positive blank infractions may be reported. Sample results > 10X the LOQ associated with negative blanks may be reported. For CCB, failures due to carryover may not require an ICAL.
Interference Check Solutions (ICS) (also called Spectral Interference Checks)	After ICAL and prior to sample analysis.	ICS-A: Absolute value of concentration for all nonspiked project analytes <1/2 LOQ (unless they are a verified trace impurity from one of the spiked analytes) ICS-AB: Within ± 20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples.	If corrective action fails, apply Q-flag to all results for specific analyte(s) in all samples associated with the failed ICS.	All analytes must be within the LDR. ICS-AB is not needed if instrument can read negative responses.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all reported analytes. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in	For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of

		analyte(s) are not listed, use in-house LCS limits if project limits are not specified.		the case narrative.	difference, i.e., matrix effect or analytical error.
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Dilution Test	One per preparatory batch if MS or MSD fails.	Five-fold dilution must agree within ± 10% of the original measurement.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	Only applicable for samples with concentrations > 50 X LOQ (prior to dilution). Use along with MS/MSD or PDS data to confirm matrix effects.
Post Digestion Spike (PDS) Addition	One per preparatory batch if MS or MSD fails (using the same sample as used for the MS/MSD if possible).	Recovery within 80-120%.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	Criteria apply for samples with concentrations < 50 X LOQ prior to dilution.
Method of Standard Additions (MSA)	When dilution or post digestion spike fails and if the required by project.	NA.	NA.	NA.	Document use of MSA in the case narrative.

DoD Appendix C LCS Limits
Method 6020 Solid Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
7429-90-5	Aluminum	78	124
7440-36-0	Antimony	72	124
7440-38-2	Arsenic	82	118
7440-39-3	Barium	86	116
7440-41-7	Beryllium	80	120
7440-42-8	Boron	74	128
7440-43-9	Cadmium	84	116
7440-70-2	Calcium	86	118
7440-47-3	Chromium	83	119
7440-48-4	Cobalt	84	115
7440-50-8	Copper	84	119
7439-89-6	Iron	81	124
7439-92-1	Lead	84	118
7439-93-2	Lithium	75	120
7439-95-4	Magnesium	80	123
7439-96-5	Manganese	85	116
7439-97-6	Mercury	74	126
7439-98-7	Molybdenum	83	114
7440-02-0	Nickel	84	119
7440-09-7	Potassium	85	119
7782-49-2	Selenium	80	119
7440-22-4	Silver	83	118
7440-23-5	Sodium	79	125
7440-24-6	Strontium	75	129
7440-28-0	Thallium	83	118
7440-29-1	Thorium	81	116
7440-29-1	Tin	82	121
7440-32-6	Titanium	83	117
7440-61-1	Uranium	83	120
7440-62-2	Vanadium	82	116
7440-66-6	Zinc	82	119

Method 6020 Water Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
7429-90-5	Aluminum	84	117
7440-36-0	Antimony	85	117
7440-38-2	Arsenic	84	116
7440-39-3	Barium	86	114
7440-41-7	Beryllium	83	121
7440-42-8	Boron	73	130
7440-43-9	Cadmium	87	115
7440-70-2	Calcium	87	118
7440-47-3	Chromium	85	116
7440-48-4	Cobalt	86	115
7440-50-8	Copper	85	118
7439-89-6	Iron	87	118
7439-92-1	Lead	88	115
7439-93-2	Lithium	78	126
7439-95-4	Magnesium	83	118
7439-96-5	Manganese	87	115
7439-97-6	Mercury	70	124
7439-98-7	Molybdenum	83	115
7440-02-0	Nickel	85	117
7440-09-7	Potassium	87	115
7782-49-2	Selenium	80	120
7440-22-4	Silver	85	116
7440-23-5	Sodium	85	117
7440-24-6	Strontium	82	118
7440-28-0	Thallium	82	116
7440-29-1	Thorium	87	121
7440-29-1	Tin	86	115
7440-32-6	Titanium	83	115
7440-33-7	Tungsten	85	122
7440-61-1	Uranium	87	120
7440-62-2	Vanadium	86	115
7440-66-6	Zinc	83	119

FIGURE 1: STANDARD PREP LOG

Standard Preparation PE

Inorganic Stock Solution IV-28 (100 ppm) + CGSN1-1 (1000 ppm)

I. Working Stock Solution 1 (WS1)

10 mls IV-28 + 1 ml CGSN1-1 + 2 mls HNO_3;
Bring to a final volume of 100 mls = 10 ppm

II. Working Stock Solution 2 (WS2)

1ml of WS1 to a final volume of 100 mls = 0.100 ppm

III. Spiking Solution

50 mls of WS1 to a final volume of 100 mls = 5.0ppm

IV. STANDARDS

Standards	Volume Working Stock Solution	Internal Standard 5.0 ppm	HNO_3	Final Volume
0.20 ppm	2.00 mls WS1	2 mls	2 mls	100 mls
0.10 ppm	1.00 ml WS1	2 mls	2 mls	100 mls
0.05 ppm	0.50 ml WS1	2 mls	2 mls	100 mls
0.02 ppm	20.0 mls WS2	2 mls	2 mls	100 mls
0.005 ppm	5.00 mls WS2	2 mls	2 mls	100 mls
0.002 ppm	2.00 mls WS2	2 mls	2 mls	100 mls
0.001 ppm	1.00 mls WS2	2 mls	2 mls	100 mls
0.0005 ppm	0.50 mls WS2	2 mls	2 mls	100 mls
0.0002 ppm	0.20 mls WS2	2 mls	2 mls	100 mls
0.0001 ppm	0.10 mls WS2	2 mls	2 mls	100 mls
0.00 ppm	0.00 mls	2 mls	2 mls	100 mls

ICP/MS MINERALS PREP LOG

Date	IS ID	Exp. Date	Analyst

Standards **ppm**	**Volume of Working Stock**	**Source and Lot # of Working Stock (100ppm)**	**Internal Standard 5.0 ppm**	**HNO_3**	Final Volume
0.0	**0.0**		**2 mls**	**2 mls**	**100 mls**
0.50	**0.5**		**2 mls**	**2 mls**	**100 mls**
1.0	**1.0**		**2 mls**	**2 mls**	**100 mls**
2.0	**2.0**		**2 mls**	**2 mls**	**100 mls**
5.0	**5.0**		**2 mls**	**2 mls**	**100 mls**
10.0	**10.0**		**2 mls**	**2 mls**	**100 mls**
ICV – 5.0	**5.0**		**2 mls**	**2 mls**	**100 mls**

FIGURE 2: METALS DIGESTION LOG

Metals Digestion 3015A \ 3050B

DATE _____ PREP BATCH MTD-_____

TIME START _____ TIME FINISH _____ ANALYST _____

Pipet Calibration:

Pipet #	Test #	Pipet Volume Setting mL	Wt. of water from pipet, g	Criteria	Pipet #	Test #	Pipet Volume Setting mL	Wt. of water from pipet, g	Criteria
2	1			Bias: Mean ± 2% of nominal value Precision: RSD ≤1% of nominal value	3	1			Bias: Mean ± 2% of nominal value Precision: RSD ≤1% of nominal value
	2					2			
	3					3			

SAMPLE#	BTL ID	SAMPLE AMOUNT GRAMS (g)	FINAL VOLUME (ml)	REMARKS	% TOTAL SOLIDS	DILUTION FACTOR
LCS -	----	50	**50**		—	1
LRB-	----	50	**50**		—	1

NOTES: *1) Spike values (unless otherwise stated):*
QC: LCS = 0.05 ppm = 50 mls / 0.50 mls of 5ppm Spiking SolutionSamples: Water = 0.05 ppm = 50 mls / 0.50 mls of 5ppm Spiking Solution
Soil = 0.10 ppm = 50 mls / 1.0 mls of 5ppm Spiking Solution

Spiking Solution – Date Prepared: _____

2) Spike values for minerals (Ca-Mg-K-Na)
QC: LCS = 1.0 ppm = 50 mls / 0.50 mls HM Stock Solution
Samples (Water or Soil)= 2.0 ppm = 50 mls / 1.0 mls HM Stock Solution

High Purity Stock Solution (HM)- Lot # _____

3) HNO_3 Lot # _____ *4) Centrifuge Tube Lot #* _____

5) Balance ID: _____ *Reviewed by* _____ *On* _____

STANDARD OPERATING PROCEDURE

METALS BY INDUCTIVELY COUPLED PLASMA - MASS SPECTROMETRY METHODS 6020, 6020A, 200.8

APPROVALS:

Barbara Ball

06/27/2024

QA Officer Date

Maya Mushaly

06/27/2024

Technical Director Date

Number	Description of Change	Date
001	Updated to comply with DoD QSM and ISO 17025 standards.	6/3/11
002	Emergency SOP Amendment Form updates	02/09/16
003	Updated to comply with DoD QSM 5.0 standards.	03/10/16
004	Updated to comply with DoD QSM 5.1 standards.	01/15/18
005	Emergency SOP Amendment Form updates	02/13/19
006	DOD Audit Corrective Action	10/01/2020
007	2020 Internal Audit revisions	02/08/2021
008	2023 Internal Audit revisions	03/12/2024
009	NY NELAP Assessment revisions	06/27/2024
010		
011		
012		

1.0 SCOPE AND APPLICATION

Inductively coupled plasma-mass spectrometry (ICP-MS) is applicable for the determination of sub-µg/L concentrations of a large number of elements in water samples and in waste extracts or digestions. When dissolved constituents are required, samples are filtered through 0.45 µm membrane filters and acid-preserved prior to analysis. No digestion is needed prior to analysis for dissolved elements in water samples. Acid digestion prior to filtration and analysis is performed for groundwater, aqueous samples, industrial wastes, soils, sludges, sediments, and other solid wastes for which total (acid-leachable) elements are needed. Acid digestion is also needed prior to analysis to dissolve elements in water samples with turbidity >1 NTU. This SOP follows the guidelines of the EPA Methods 200.8, 6020, and 6020A. The metals that are determined by using this SOP are listed in Table 1 with associated reporting limits (RL) and quantitation limits (QL) and which methods can be used for each element.

If this SOP is followed to determine any analyte not listed in Table 1, it is the responsibility of the analyst to demonstrate the accuracy and precision of the method as well as method detection limit (MDL) and multi-point calibration. The analyst is always required to monitor potential sources of interferences and take appropriate action to ensure data of known quality. Use of this SOP is restricted to analysts who are knowledgeable in the recognition and in the correction of spectral, chemical and physical interferences in ICP-MS.

2.0 SUMMARY OF METHOD

Prior to analysis, samples which require total ("acid-leachable") values are digested using appropriate sample digestion procedures (Document #'s MET-003 and MET-001). This SOP describes the measurement of ions produced by radio-frequency inductively coupled plasma. Analyte species originating in a liquid are nebulized and the resulting aerosol transported by argon gas into the plasma torch. The ions produced are entrained in the plasma gas and introduced, by means of an interface, into a mass spectrometer. The ions produced in the plasma are sorted according to their mass-to-charge ratios, and quantified with a channel electron multiplier. Potential interference from isobaric elements and polyatomic ions are corrected for by the use of elemental interference equations based on natural isotope abundance. Interference corrections include compensation for background ions contributed by the plasma gas, reagents, and constituents of the sample matrix. Instrument drift and matrix induced signal suppressions and enhancements are compensated for by the use of internal standardization.

3.0 INTERFERENCES

There are three fundamentally different sources of interference in ICP-MS: spectroscopic interferences, physical interferences, and memory interferences.

♦ **Spectroscopic Interferences** are interferences caused by the presence of compounds or elements entering the mass spectrometer which have the same nominal mass-to-charge (m/z ratio of the analyte elements). They can be isobaric elemental and isobaric molecular interferences (polyatomic, refractory oxide, and doubly charged ions).

- Isobaric elemental interferences in ICP-MS are caused by isotopes of different elements forming atomic ions with the same nominal mass-to-charge ratio (m/z) as the analyte element. These are managed by the selection of an alternate isotope for analysis or by the use of elemental interference equations. These equations use the naturally occurring isotope ratios of most elements to estimate and allow for the subtraction of isobaric interferences. An example of an elemental isobaric interference is ^{40}Ar on ^{40}Ca. In this case, the use of ^{43}Ca or ^{44}Ca is recommended. The appropriate elemental interference equations are incorporated in the methods (or parameter) used for calibration and data acquisition.

- Isobaric molecular and doubly-charged ion interferences in ICP-MS are caused by ions consisting of more than one atom or charge, respectively. Most isobaric interferences that affect ICP-MS determinations have been identified. Examples include $ArCl^+$ ions on the ^{75}As signal and MoO^+ ions on the cadmium isotopes. While the approach used to correct for molecular isobaric interferences is demonstrated below using the natural isotope abundance, the most precise coefficients for an instrument is determined from the ratio of the net isotope signals observed for a standard solution at a concentration providing suitable (<1%) counting statistics.

  - Example for As is as follows: Because the ^{35}Cl natural abundance of 75.77% is 3.13 times the ^{37}Cl abundance of 24.23%, the chloride correction for arsenic is calculated (approximately) as follows (where the $^{38}Ar^{37}Cl^+$ contribution at m/z 75 is a negligible 0.06% of the $^{40}Ar^{35}Cl^+$ signal): Corrected arsenic signal (using natural isotopes abundance for coefficient approximations) = (m/z 75 signal) - (3.13) (m/z 77 signal) + (2.73) (m/z 82 signal), (where the final term adjusts for any selenium contribution at 77 m/z).

    NOTE: Arsenic values can be biased high by this type of equation when the net signal at m/z 82 is caused by ions other than $^{82}Se^+$ (e.g., $^{81}BrH^+$ from bromine wastes[6]).

- Example for Cd is as follows: corrected cadmium signal (using natural isotopes abundance for coefficient approximations) = (m/z 114 signal) - (0.027) (m/z 118 signal) - (1.63) (m/z 108 signal), (where last 2 terms adjust for any tin or MoO^+ contributions at m/z 114).

  NOTE: Cadmium values are biased low by this type of equation when $^{92}ZrO^+$ ions contribute at m/z 108, but use of m/z 111 for Cd is even subject to direct ($^{94}ZrOH^+$) and indirect ($^{90}ZrO^+$) additive interferences when Zr is present.

  NOTE: Since there is a certain degree of uncertainty as to which equation is better to use, and in what cases, it is up to the analyst to determine how the interference is corrected, upon the evaluation of data. It is suggested that the <u>elemental</u> isobaric interference equations be <u>included</u> in all methods (parameters) from the beginning, but potential <u>polyatomic</u> species (masses) that could interfere be <u>only monitored</u> (except for $^{40}Ar^{35}Cl^+$ on As). When species monitored indicate that an isobaric molecular interference is present, the equations can be adjusted to correct for such interference and data be reprocessed to produce an interference free summary report. Generally, an interference is easy to spot when multiple isotopes of an element show different results. Since the interference is additive, the use of the isotope with the lowest result is suggested for data reporting, providing that all other QC criteria are met (See Table 6a & 6b for summary of QC requirements).

- Abundance sensitivity is a property defining the degree to which the wings of a mass peak contribute to adjacent masses. Wing overlap interference can occur when a small ion peak is being measured adjacent to a large one. The potential for these interferences must be recognized, and the spectrometer resolution adjusted to minimize them. Although this type of interference is uncommon, it is not easily corrected, and samples exhibiting a significant problem of this type could require matrix separation, or analysis using another verified and documented isotope.

♦ **Physical Interferences** are associated with the physical processes, which govern the transport of sample into the plasma, sample conversion process within the plasma and the transmission of ions through the plasma-mass spectrometer interface. These interferences can result in differences between instrument responses for the samples and calibration standards. Physical interferences can

occur in the transfer of solution to the nebulizer (e.g. viscosity effects), at the point of aerosol formation and transport to the plasma (e.g. surface tension effects), during the atomization and ionization process within the plasma itself, or during the transfer of ions through the interface and mass spectrometer (space charge effects). To minimize some of these effects, acid composition and concentration must be matched for all standards, blanks, and samples. Total solid levels below 0.2% (2,000 mg/L) have been currently recommended to minimize solid deposition. Internal standardization is effectively used to compensate for many physical interference effects. Internal standards must ideally display similar analytical behavior to the elements being determined. Generally, an internal standard must be no more than 50 amu removed from the analyte. Recommended internal standards include ^{6}Li, ^{45}Sc, ^{89}Y, ^{103}Rh, ^{115}In, ^{159}Tb, ^{169}Ho, ^{185}Re, and ^{209}Bi.

- **Memory Interferences** result when elements in a previous sample contribute to signals measured in a subsequent sample. Memory effects can result from the deposition of sample on various components of the sample introduction system, including sample and peristaltic pump tubing, spray chamber, torch, and interface cones. The site(s) where deposition can occur is dependent on the sample and needs to be minimized through the use of a rinse blank between samples. Routine maintenance (cleaning and/or replacement) of sample introduction components is necessary for long-term minimization of memory effects. The possibility of memory interferences within an analytical run must be recognized and suitable rinse times must be used to reduce them. Memory effects are evaluated by using a minimum of three replicate integrations for data acquisition. High relative standard deviation (%RSD) of the three replicates caused by a consecutive drop in signal intensity is indicative of carryover from the previous sample. If memory interference is suspected, the sample must be reanalyzed after analysis of a blank indicates that the carryover has been eliminated.

4.0 APPARATUS AND MATERIALS

Inductively coupled plasma-mass spectrometers:

- **Perkin Elmer (PE) NexION 350X**
- **Perkin Elmer (PE) NexION 1000**

Argon gas supply: liquid argon cylinders

Analytical balance, 510 g capacity, minimum accuracy ± 0.001 g.

Digital bottle top dispenser capable of dispensing volumes of 0-5 ml in 0.02 ml increments.

Eppendorf automatic pipette with disposable combitips ranging from 2.50 ml to 50 ml capable of pipetting volumes ranging from 50 µl to 5,000 µl.

Note: dispensers are calibrated quarterly according to SOP # GEN-001.

Disposable Pasteur pipettes.

Polypropylene vessels, 50 mL.

Plastic cups to support minimum of 200 ml.

Plastic bottles.

5.0 REAGENTS & STANDARDS

Nitric Acid (HNO_3), concentrated, Trace Metal Grade. Acids used in the preparation of standards and for sample processing must be of high purity. Trace metal grade (also known as re-distilled) acids are recommended because of the high sensitivity of ICP-MS. Nitric acid at 2% (v/v) or less in the solution to be analyzed is required for ICP-MS, in order to minimize damage to the interface.

Hydrochloric Acid (HCl), concentrated, Trace Metal Grade. Several polyatomic ion interferences result when HCl is used. However, its use is recommended to maintain stability in solutions containing high concentrations of antimony and silver. When used, corrections for the chloride polyatomic ion interference must be applied to all data.

Reagent water (Deionized water): All references to reagent water in the method refer to ASTM Type I water (ASTM D1193), unless otherwise specified.

Internal Standard stock solutions:

- Lithium 6, 1000 μg/ml stock solution.
- Scandium, 1000 μg/ml stock solution.
- Yttrium, 1000 μg/ml stock solution.
- Rhodium, 1000 μg/ml stock solution.
- Rhenium, 1000 μg/ml stock solution.
- Internal Standard Working Solution (IS-WS): From the above stock solution, 2.5 ml of each is transferred to a 1000 ml plastic bottle, along with 10 ml of concentrated HNO_3 and brought to a final volume of 1000 ml (by weight), which corresponds to 2.5 μg/ml. This represents the internal standard working solution from which 1 ml (for a 50 ml final volume) must be added to all calibration standards and blanks. This provides a 0.05 ppm of internal standard concentration in all calibration standards, similar to analytical samples. Internal standard mixture can also be purchased.

Note: The stock solutions are NIST traceable, and provided with a certificate of analyses and MSDS sheets by the vendor. See Appendix 1 for blank page of standard preparation log book page.

Multi-element standard stock solution from three of four different vendors:

- Inorganic Venture (IV), 100 mg/L each of Ag, Al, B, Ba, As, Be, Cd, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Sr, Sn, Ti, Tl, V, and Zn. This solution is used for the preparation of standards.

- High Purity Standards (HM), 100 µg/ml each of Ca, Mg, K, and Na. This solution is used for the preparation of the calibration standards and for the minerals standard.

- SPEX Industries (S), 100 µg/ml each of Al, Sb, As, Ba, Be, B, Cd, Ca Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Se, Si, Ag, Na, Sr, Sn, Ti, Tl, V, and Zn. This solution is used for the preparation of the initial calibration verification (ICV) standards.

Note: The stock solutions are NIST traceable, and provided with a certificate of analyses and MSDS sheets by the vendor. See Appendix 1 for Standard Prep Log and Appendix 2 for ICV prep log.

Multi-element calibration standard solutions are prepared by diluting the stock standard solutions to levels in the linear range for the instrument in a solvent consisting of 2% (v/v) HNO_3 in reagent water. The calibration standard solutions must contain a suitable concentration of an appropriate internal standard for each analyte. The calibration standards are kept in plastic bottles and prepared every two weeks or more frequent if needed. They must be verified using a quality control standard (ICV). Table 2 (metals) and Table 3 (minerals) are used as guidance, when preparing standards.

Blanks: Three types of blanks are required for the analysis. The calibration blank (std-0.00) is used in establishing the calibration curve. The Laboratory Reagent Blank (LRB) also known as method blank is used to monitor possible contamination resulting from the sample preparation procedure. The rinse blank (also called optional rinse or autosampler wash) is used to flush the system between all samples and standards.

- The calibration blank (std-0.00), the initial calibration blank (ICB), and the continuing calibration blank (CCB) consists of the same concentration(s) of the same acid(s) used to prepare the calibration standards, along with the appropriate concentration of internal standard. The preparation of these blanks can be found in the standards prep-log. The calibration blank is used in the calibration process, the ICB is used to check the instrument before analyzing samples, and the CCB is used to verify the instrument in the middle and end of analytical runs.

- The Laboratory Reagent Blank (LRB) also known as method blank must be carried through the complete preparation procedure and contain the same volumes of reagents as the sample solutions.

- The rinse blank consists of 2% HNO_3 (v/v) in reagent water. Prepare a sufficient quantity to flush the system between all standards, quality control samples, and analytical samples. Rinse blank is prepared by adding 20 ml of concentrated HNO_3 to 1000 ml of DI water in a large plastic container.

The interference check solution (ICS) is prepared to contain known concentrations of interfering elements that demonstrate the magnitude of interferences and provide an adequate test of any corrections. Chloride in the ICS provides a means to evaluate software corrections for chloride-related interference such as $^{35}Cl^{16}O^{+}$ on $^{51}V^{+}$ and $^{40}Ar^{35}Cl^{+}$ on $^{75}As^{+}$. Iron is used to demonstrate adequate resolution of the spectrometer for the determination of manganese. Molybdenum serves to indicate oxide effects on cadmium isotopes. The other components are present to evaluate the ability of the measurement system to correct for various molecular isobaric interferences. The ICS is used to verify that the interference levels are corrected by the data system within quality control limits.

- Interference check stock solution A, containing 1000 µg/ml each of Al, Ca, Fe, Mg, Na, P, K, and S, 2000 µg/ml of C, 10000 µg/ml of Cl, and 20.0 µg/ml each of Mo and Ti. The ICS-A solution is prepared by weighing 10.0 g of the stock solution in a plastic cup, addition of 2 ml IS-WS, 2 ml HNO_3, and dilution to 100 g on the scale with reagent water.

- Interference check stock solution AB, containing 2.0 µg/ml each of As, Cd, Cr, Co, Cu, Mn, Ni, Ag, and Zn. The ICS-AB solution is prepared by weighing 1.00 g of the stock solution in a plastic cup, addition of 2 ml IS-WS, 2 ml HNO_3, and dilution to 100 g on the scale with reagent water.

- The final concentration of the elements in ICS-A and ICS-AB is listed in Table 4. These solutions are prepared fresh every 2 weeks or as needed.

The initial calibration verification solution (ICV) is used to verify the calibration before samples are analyzed. The ICV must be prepared in the same acid matrix as the calibration standards. This solution must be an independent standard near the midpoint of the linear range at a concentration other than that used for instrument calibration. An independent standard (known as a second source) is defined as a standard from a source different from those used in the standards for instrument calibration.

Mass spectrometer tuning solution. A solution containing elements representing all of the mass regions of interest must be prepared to verify that the resolution and mass calibration of the instrument are within the required specifications (see Number 5, Section 7.0). This solution is also used to verify that the instrument has reached thermal stability (See See Number 4, Section 7.0).

- Tuning solution for PE ICP-MS: 10µg/ml each of Li 7, Be 9, Mg 25, Co 59, In 115, Tl 205, and Pb 208.

Working standards and solutions are prepared every two weeks according to recipes in the standards prep log. The logbook is available in the metals lab. Concentrations of the LCS can be found on the laboratory bench sheet.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

All samples are collected in appropriate plastic or glass containers.

- Water samples are collected in HNO_3 pre-preserved plastic containers (approximately 125 ml volume), and are acidified to pH of <2.
- Soil samples are collected without preservation, usually in glass containers with Teflon lined caps. Non-aqueous samples must be refrigerated at 4 ±2 C° upon receipt.

Holding times for metals are 6 months from the date of sampling to analysis. For TCLP samples the holding time is 6 months from sampling to TCLP extraction then 6 months from TCLP extraction to analysis.

7.0 PROCEDURE

1. Solubilization and digestion procedures are presented in the Sample Preparation Document #'s (MET-003 and/or MET-001). A sample digestion log sheet is found in Figure 1.

2. Initiate appropriate operating configuration of the instrument's computer according to the instrument manufacturer's instructions.

3. Set up the instrument with the proper operating parameters according to the instrument manufacturer's instructions.

4. Operating conditions: The analyst must follow the instructions provided by the instrument manufacturer. Allow at least 30 minutes for the instrument to equilibrate before analyzing any samples. The thermal stability must be verified by analyzing a tuning solution described in Section 5.0.

5. For all analysis tune instrument according to following parameters.

    - The tuning must include beryllium, magnesium, cobalt, indium, and lead. Conduct mass calibration and resolution checks in the mass regions of interest.

- The mass calibration and resolution parameters are required criteria that must be met prior to any samples being analyzed. If the mass calibration differs more than 0.1 amu from the true value, then the mass calibration must be adjusted to the correct value.

- The resolution must be verified to be within 0.6-0.9 amu full width at 5 percent peak height.

Note: A peak height of 5 percent is used instead of 10 percent because 5 percent is the tighter restriction and this SOP is written to meet the requirements of methods 200.8, 6020, and 6020A.

- Perform tune after machine is warmed up and every 12 hours following.

Note: Precautions must be taken to protect the channel electron multiplier from high ion currents. The channel electron multiplier suffers from fatigue after being exposed to high ion currents. This fatigue can last from several seconds to hours depending on the extent of exposure. During this time period, response factors are constantly changing, which invalidates the calibration curve, causes instability, and invalidates sample analyses.

6. The instrument is calibrated daily and re-calibrated as needed. Calibrate the instrument for the analytes of interest (recommended isotopes for the elements in Table 1 are provided in Table 5a and Table 5b), using the calibration blank and at least three non-zero calibration standards according to the instrument manufacturer's procedure. A multi-point calibration curve is analyzed and evaluated. For the calibration curve to be acceptable, a correlation coefficient of greater than or equal to 0.998 must be achieved. If the required correlation coefficient is not achieved then the extreme upper and lower calibration points may be removed from the multi-point curve as long as three non-zero points remain such that the linear range is narrowed and the non-linear upper and/or lower portions are removed. If narrowing the linear range does not improve the correlation coefficient to 0.998, then replace the calibration standards and re-calibrate the instrument. The reporting limit (RL) must be greater than or equal to the lowest calibration point or the concentration of low level initial calibration verification (LLICV), whichever is lower.

The principle of calculation for the linear curve fit and the coefficient of determination (COD) is found in SW 846 method 8000C Sections 11.5.2.1 through 11.5.2.3. ICP-MS manufacturer software is preprogrammed for this calculation.

The multi point calibration is verified with a mid level ICV standard with control limits of 90%-110% and a low-level ICV with limits of 70%-130% (80%-120% for DoD projects). Table 2 and Table 3 (Section 5.0) provide information to what calibration standards are used. (More information on limits and corrective actions can be found in Section 8 and Table 6a & 6b). Flush the system with the rinse blank (Section 5.0) between

each standard solution. The instrument must be set to use the mean of at least three integrations for both calculation of calibration points and the calculation of sample concentrations.

7. All masses that affect data quality must be monitored to determine potential effects from matrix components on the analyte peaks. Preferred isotopes are referenced in Tables 5a and 5b.

8. Immediately after the calibration has been established, the calibration must be verified and documented for every analyte by the analysis of the initial calibration verification solution (ICV, Section 5.0) using a second source standard. When measurements exceed ± 10% of the true value, the analyses must be terminated, the problem corrected, the instrument re-calibrated, and the new calibration verified. During the course of an analytical run, the instrument may require re-calibration to correct for instrument drift. A re-calibration must then be followed immediately by a new analysis of an ICV, LLICV, and initial calibration blank (ICB) before any further samples are analyzed. Corrective actions for specific situations are found in Section 8 and summarized in Table 6a & 6b.

9. A low-level initial calibration verification (LLICV) must be analyzed after every calibration to verify the linearity near the lower end of the calibration curve. The LLICV is made from the same source as the calibration standards at a concentration comparable to the reporting limits of elements being reported. When the LLICV measurements exceed ± 30% (± 20% for DoD projects) of the true value, the analyses must be terminated, the problem corrected, the instrument re-calibrated, and the new calibration verified. (limits and corrective action information can be found in Section 8.0 and is summarized in Table 6a & 6b).

10. Flush the system with the rinse blank solution (Section 5.0) until the signal levels return to the method's levels of quantitation (usually about 30 seconds) before the analysis of each sample. Nebulize each sample until a steady-state signal is achieved (usually about 30 seconds) prior to collecting data. Analyze the calibration verification solution (CCV), and the continuing calibration blank (CCB) at a frequency of at least once every 10 analytical samples (limits and corrective action information can be found in Section 8.0 and is summarized in Table 6a & 6b).

11. Dilute and reanalyze samples that are more concentrated than the linear range (LR) (Section 8.0) for an analyte or measure an alternate less-abundant isotope. The linearity at the alternate mass must be confirmed by appropriate calibration (Numbers 6 through 8, Section 7.0).

12. Interference Check Solutions (ICS) are run to verify the magnitude of elemental and molecular-ion isobaric interferences. This is performed every 12 hours. This is done by analyzing interference

check solutions A and AB. (Concentration of elements in solution found in Table 4, other reagent information is in Section 5.0)

Corrective Action: The ICS needs to be within 65-135% (± 20%, of true value, for DoD projects). If the ICS fails, re-evaluate the equations used for the corrections, make the necessary adjustments, recalibrate the instrument and re-analyze the samples associated with the failed ICS. See Table 6a &6b for ICS summary and Section 8.0 for more information.

Note: Precipitation from solution AB can occur with some elements, specifically silver. Rinse the instrument 5 –10 minutes before analyzing any other samples to help improve performance.

13. Calculations: the quantitative values are reported in appropriate units, such as milligrams per liter (mg/L) for aqueous samples and milligrams per kilogram (mg/kg) for solid samples.

- The appropriate dilution factor (DF) on water samples resulted from sample preparation (see Document # MET-003) is entered in the data system for each sample at the time of programming the sequence to be analyzed. If additional dilutions are performed, the appropriate corrections must be applied to the dilution factor, using the following equation

  C *x* DF = SC
  Where, C = digest concentration
  DF = Dilution Factor
  SC = Sample Concentration

  The ICP/MS software carries out this calculation for the analyst.

- Generally, for solid samples, DF includes the correction necessary for the determination of a dry weight result. If this is not the case or if a dry weight result is requested at a later time, calculate results for solids on a dry-weight basis as follows:

(1) A separate determination of percent solids must be performed.

(2) A new DF is calculated, based on the original wet weight of the sample (from the preparation log) and the percent total solids. The sequence is updated with the new DF, data reprocessed, and a new quantitation report is generated by the data system.

(3) Manual calculation of the dry weight concentration (DWC) by the formula:

$$DWC(mg/kg) = \frac{CxV}{WxS}$$

Where, C = Digest Concentration (mg/L).
V = Final volume in liters after sample preparation.
W = Weight in kg of wet sample.
S = (% Total Solids)/100.

♦ Calculations performed by the data system include appropriate interference corrections, internal standard normalization, and the summation of signals (for example 206, 207 and 208 m/z for lead) to compensate for any differences in the abundances of these isotopes between samples and standards.

Note: The instrument must be set to use the mean of at least three integrations for both calculation of calibration points and the calculation of sample concentrations.

♦ Hardness by Calculation

The preferred method for calculating Hardness Standard Method 2340B. Hardness is calculated from the Calcium and Magnesium results from this procedure using the following equation:

CaCo3/L = 2.497 [Ca] + 4.118[Mg]
Where:
CaCO3 is the total hardness by calculation
Ca is the total Calcium by 6020A in mg/L
Mg is the total Magnesium by 6020A in mg/L

Relative Percent Difference:

$$RPD = \frac{(S-D)}{\left[\frac{S+D}{2}\right]} \times 100$$

Where: S = Initial sample result
D = Duplicate sample result

Spike Recovery Percent Recovery:

$$\frac{SSR-SR}{SA} \times 100$$

Where: SSR = Spike sample result
SR = Sample (unspiked) result
SA = Spike added

% Difference (%D)
Used for serial dilution test in metals.

$$\%D = \left|\frac{X_1 - X_2}{X_1}\right| \times 100\%$$

where: %D = percent difference
X_1 = Initial concentration
X_2 = Duplicate concentration

8.0 QUALITY CONTROL

All quality control data must be maintained and be available for easy reference or inspection.

Demonstration of Performance.

- The demonstration of performance is used to demonstrate instrument performance and has two parts. The first is initial demonstration of performance this is done by performing method detection limit (MDL) studies, linear range studies, and precision and accuracy studies prior to the analysis of samples. The second is continual demonstration of performance is done by annual MDLs and linear range studies. MDL studies are performed by following SOP #060004 (Determination of Method Detection Limit). Analyst performance is demonstrated by analysis of proficiency test and blind samples multiple times per year.

- Linear calibration ranges: Linear calibration ranges are primarily detector limited. The upper limit of the linear calibration range must be established by determining the signal responses from a minimum of five different concentration standards. Care must be taken to avoid potential damage to the detector during this process. The linear calibration range, which is used for the analysis of samples, must be judged by the analyst from the resulting data. The upper LR is defined as the maximum concentration for which the measured concentration is within ±10% of the true value. Determined sample analyte concentrations that are greater than the upper LR limit must be diluted and reanalyzed. The LR must be verified whenever, in the judgment of the analyst, a change in analytical performance caused by either a change in instrument hardware or operating conditions would dictate they be re-determined. See Section 7.6 for curve specific criteria.

To obtain analyte data of known quality, it is necessary to measure more than the analytes of interest in order to apply corrections or to determine whether interference corrections are necessary. If an interference source is present, and cannot be corrected, the sample elements impacted must be flagged. The ICS is used to verify the correction equations used by the instrument. Requirements are found in Section 8.0 and Table 4 and preparation information is in Section 5.0.

The intensities of all internal standards must be monitored for every analysis. When the intensity of any internal standard falls outside the control limits as compared with the first calibration standard (Calibration Blank or std-0.00), the following procedure is followed. Check for instrument drift, instrument drift is characterized by internal standards outside control limits for QC samples (Section 8.0), recalibrate instrument

and reanalyze samples. If matrix interference is suspected, the sample must be diluted at least fivefold (1+4) and reanalyzed with the addition of appropriate amounts of internal standards. This procedure must be repeated until the internal standard intensities fall within the prescribed window. (Summary of control limits and corrective actions can be found in Table 6a & 6b)

- The intensity levels of the internal standards for the ICV/ICB/LLICV, CCV/CCB, LCS/LRB must also be within the specified acceptance limits (refer to Section 8.0 for limits and Section 7.0, Numbers 6-12 for procedure information). If they are not within limits, terminate the analysis, correct the problem, recalibrate, verify the new calibration, and reanalyze the affected samples.

Check the instrument calibration by analyzing appropriate quality control solutions as follows (Summarized in Table 6a & 6b):

- Initial Calibration must include a blank and minimum of three non-zero points. A correlation coefficient of 0.998 must be achieved. Section 7.0 for calibration procedure.

- Immediately after instrument calibration check instrument calibration by analyzing the ICV described in Section 5.0. ICV limits are 90%-110%. The ICB has to be less than the lower limit of quantitation for every target element. The lower limit of the calibration must be checked by analyzing the low-level initial calibration verification (LLICV) with acceptance limits of 70%-130% (± 20% for DoD projects). Summary of limits and corrective actions are found in Table 6a & 6b, the procedure for this is found in Section 7.0, Numbers 6 through 9.

- When running samples verify calibration at a frequency of every 10 analytical samples with the CCV standard with limits of 90-110% and the continuing calibration blank (CCB) with acceptance criteria of less than the lower limit of quantitation for every target element. These solutions must also be analyzed for each analyte at the beginning of the analysis and after the last sample. If this is not the case, the reason for the out-of-control condition must be found and corrected, and affected samples must be reanalyzed. See Table 6a &6b for summary of acceptance criteria and corrective actions, the procedure for this information for this is found in Section 7.0, Number 10.

- Corrective action for out of compliance ICV, LLICV, and CCV, is to terminate the analysis, correct the problem, and recalibrate the instrument. Control limits and corrective actions are found in Section 8.0 and summarized in Table 6a & 6b.

Laboratory Reagent blank (LRB) also known as Method blank. Method blank (LRB) must be carried throughout the entire sample preparation and analytical process. The LRB is prepared by using a volume or

weight of reagent water at the volume or weight specified in the preparation method and then carried through the appropriate analytical process. The LRB has to be below the RL divided by the dilution factor for each target analyte. If the LRB does not contain target analytes at a level that interferes with the project specific requirements, then the LRB is acceptable. Control limits and corrective actions are summarized in Table 6a & 6b.

A Laboratory Control Sample (LCS) must be analyzed for each analyte using the same sample preparations, analytical methods, and QA/QC procedures employed for the test samples. One LCS must be prepared and analyzed for each sample batch at a frequency of one LCS for a least every 20 samples or every 10 samples for drinking waters. The recovery limits for the LCS are 85-115% of the true value (stated in the preparation log). If the LCS is outside of the control limits the entire sample batch must be re-digested and re-analyzed. Control limits and corrective actions are summarized in Table 6a & 6b. (In method 200.8, the LCS is referred to as the Laboratory Fortified Blank, LFB).

Analyze one matrix spike (MS) sample for every 10 analytical water samples or every 20 analytical soil samples. For majority of the elements, the aqueous samples are spiked at levels similar to the LCS (0.05 ppm in the analysis solution). For solid samples, a concentration of 0.10 mg/kg is added pre-digestion. The acceptable limits for performance are summarized in Section 8.10 and Table 6a & 6b.

- Calculate the percent recovery of each analyte, corrected for background concentrations measured in the unfortified (original) sample. Percent recovery must be calculated in units appropriate to the matrix, using the following equation:

$$R = \frac{C_s - C}{S} x100$$

where: R = percent recovery.
C_s = spiked sample concentration.
C = sample background concentration.
S = concentration equivalent of analyte added to fortify the sample.

Analyze one matrix duplicate (Dp) sample for every 10 water samples or every 20 soil samples. In some cases, a matrix spike duplicate (MSD) is used instead of the matrix duplicate, especially if the analytes in the sample are of low concentration. A control limit of 20% RPD must not be exceeded for analyte values greater than 100 times the MDL. If this limit is exceeded and laboratory performance for that analyte is shown to be in control (ICV/ICB, CCV/CCB, and LCS/LRB within the limits), the problem encountered is judged to be matrix related. The data user must be informed that the result for that analyte is suspect due to the heterogeneous nature of the sample. If the performance of the laboratory is not in control (ICV/ICB, CCV/CCB, and LCS/LRB outside the limits), the reason for the out-of-control situation must be found and

corrected, and any samples analyzed during the out-of-control condition for that analyte must be reanalyzed. Control limits and corrective actions are summarized in Table 6a & 6b.

The relative percent difference (RPD) between duplicate determinations must be calculated as follows:

$$RPD = \frac{\left|D_1 - D_2\right|}{\frac{D_1 + D_2}{2}} x100$$

where: RPD = relative percent difference.
D_1 = first sample value.
D_2 = second sample value (duplicate).

The Quality Control requirements and limits vary slightly, based upon the method referenced in the analytical report (i.e. 6020A vs. 200.8). For both methods, the calibration is verified by the analysis of ICV/ICB and CCV/CCB. Recalibration is required when either one falls outside the limits. The performance of the method is evaluated by the analysis of the LCS/LRB pair for every batch of 20 samples, and MS/MSD/Dp for every 10 water samples and 20 soil samples. The acceptable limits for performance are summarized in Table 6a & 6b and the procedures can be found in Section 7.0, Numbers 6-12.

- Requirements for all methods:
  - When the recovery for ICV/CCV falls outside ±10% terminate the analysis and recalibrate the instrument. The samples from the last CCV that was within limits are to be re-analyzed, after recalibration of the instrument.
  - The MS is represented by a spiked sample, before digestion, and a Post-Digestion Spike, if the recovery of the regular spike fails to meet QC criteria. An analyte spike added to a portion of a prepared sample, or its dilution, must be recovered to within 75 to 125 percent of the known value. The spike addition must be based on the indigenous concentration of each element of interest in the sample. If the spike is not recovered within the specified limits, the sample is spiked and re-analyzed according to the electronic ICP/MS standards preparation log. The same recovery limits apply to the spiked dilution.
  - The MSD is represented by a spiked duplicate sample, before digestion, and a Post-Digestion Spike, if the recovery of the regular duplicate spike fails to meet QC criteria. The evaluation of the MSD is similar to the evaluation of the duplicate analysis described in Section 8.0.
  - When the intensity of any internal standard in the sample to falls outside 60-125% (200.8) or 30-120% (6020A) of the intensity of that internal standard in the initial calibration standard (Calibration Blank or std-0.00), follow the procedure described in Section 8.0. The intensity

levels of the internal standards for the ICV/LLICV/ICB and CCV/CCB must agree within ± 20 percent of the intensity level of the initial calibration standard (Calibration Blank or std-0.00). If they do not agree, terminate the analysis, correct the problem, recalibrate, verify the new calibration, and reanalyze the affected samples.

- Method 6020/6020A specific requirements:
  - Dilution Test: If the analyte concentration is within the linear dynamic range of the instrument and sufficiently high (minimally, a factor of at least 100 x MDL), an analysis of a fivefold (1+4) dilution must agree within ± 10% of the original determination. If not, an interference effect must be suspected, and the results flagged. One dilution test must be included with every batch of twenty samples.
  - Verify the magnitude of elemental and molecular-ion isobaric interferences and the adequacy of any corrections at the beginning of an analytical run or once every 12 hours, whichever is more frequent. This is done by analyzing the interference check solutions ICS-A and ICS-AB. The recovery of the elements of interest in ICS-AB (listed in Table 4 at a concentration of 0.02 ppm) must be between 70-135% (± 20% for DoD projects) (see Section 7.0, Number 12 for procedure information and Table 6a & 6b for a summary).
  - The LLICV is used to verify the linearity of the low end of the calibration curve. The LLICV must be analyzed after every new calibration with the measurements not exceeding ± 30% (± 20% for DoD projects) of the true value. If the LLICV is outside of these limits the run must be stopped and the instrument recalibrated and the new calibration verified (see Section 7.0, Number 9 for procedure information and Table 6a & 6b for a summary).

The analyst will follow SOP #QA-007 and complete the appropriate review form upon completion of the analysis.

9.0 METHOD PERFORMANCE

The precision and accuracy of the method depends upon the overall performance of the sample preparation and analysis. Performance Evaluation samples are analyzed periodically in order to prove the performance of the method. In an EPA multi-laboratory study, laboratories applied the ICP-MS technique to both aqueous and solid samples. The results are listed at the end of methods 200.8, 6020 and 6020A.

10.0 EQUIPMENT MAINTENANCE AND TROUBLESHOOTING

All equipment shall be maintained and calibrated according to manufacturer's procedures. When equipment is not performing as required, the instrument shall not be used until it is recalibrated or replaced.

Computer software and firmware can be found on Merit's network at F:\data\MERIT\EQUIPMENT\Instrument-Software Version List.200818.xls.

11.0 SAFETY

Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples. The air system throughout the laboratory area is on a 100% fresh air exchange system, this system exchanges 100% the air in the laboratory area with air from outside 4 times per hour and 6 times per hour when the emergency purge button is hit. A reference file of material safety data sheets (MSDSs) is available to all personnel.

Specific attention be paid (but not limited) to:

- Nitric acid is a corrosive, not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition, and can react with metals to release flammable hydrogen gas.

- Hydrochloric acid is corrosive, extreme heat or contact with metals can release flammable hydrogen gas, stable under ordinary conditions of use and storage, and incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates, cyanides, sulfides, sulfites, and formaldehyde.

- Many metal salts are extremely toxic if inhaled or swallowed. Extreme care must be taken to ensure that samples and standards are handled properly and that all exhaust gases are properly vented. Wash hands thoroughly after handling.

- The acidification of samples containing reactive materials may result in the release of toxic gases, such as cyanides or sulfides. For this reason, the acidification and digestion of samples should be performed in an approved fume hood.

12.0 WASTE DISPOSAL

All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations. Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

Samples.

- All digested samples are neutralized with baking soda and diluted before being disposed of with the normal laboratory wastewater.

- As a "small generator" of metals, Merit Laboratories has been approved for this type of disposal from the local government.

Acid bottles.

- Acid bottles are rinsed out and neutralized with baking soda before being disposed of with the normal laboratory waste.

13.0 DEFINITIONS

Sample Batch: samples of the same or similar matrix; for this method, a sample batch consists of 20 samples or less.

Method Blank: also referred to as a Laboratory Reagent Blank. an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system.

Matrix Spike (spiked sample or fortified sample): a sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): a second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

Laboratory Duplicate: aliquots of sample taken from the same container under the same laboratory conditions and processed and analyzed under the same conditions but independently.

Internal Standard: a known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.

Method Detection Limit (MDL): the method detection limit is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. It is determined from analysis of a sample in a given matrix containing the analyte. An acceptable MDL standard check must produce a signal at least three times the instrument's noise level. Also, a MDL check injection must be made after each major instrument repair or changing of instruments (prior to sample analysis) to determine the performance sensitivity of the analysis.

Calibration Standards: a series of known standard solutions used for calibration of the instrument within the measurable linear range. Calibration standards shall contain, in correct proportion, all reagents required by the method. A minimum of 4 calibration points are used for calibration. Acceptance of the calibration requires a correlation coefficient of 0.997 or better. No samples shall be analyzed without acceptable calibration.

Initial Calibration Verification (ICV): the initial calibration verification standard (different lot # or manufacturer from the initial calibration standard) shall verify the initial calibration curve. The initial calibration verification standard involves the analysis of all target analytes each time the initial calibration is performed.

Continuing Calibration Verification Standard (CCV): a standard solution that is used to check the validity of a calibration curve on a daily basis. It also provides information on satisfactory maintenance and adjustment of the instrument during sample analysis.

Initial calibration blank (ICB): a reagent blank solution, which is analyzed immediately following the ICV. The ICB is analyzed to check for drifts in calibration or possible analyte carry-over.

Continuing Calibration Blank (CCB): a reagent blank solution, which is analyzed immediately following the CCV. The CCB is analyzed to check for drifts in calibration or possible analyte carry-over.

14.0 REFERENCES

Method 200.8, Revision 5.4, 1998.

SW-846, Method 6020A Revision 1, 2007.

SW-846, Method 8000C Revision 3, 2003.

Department of Defense, Quality Systems Manual for Environmental Laboratories (DoD QSM), DoD Environmental Data Quality Workgroup, Department of Navy, Lead Service, Version 5.4, 2021

Table 1. List of elements analyzed.

Element	**Symbol**	**CAS#**	**Reporting Limits**		**Method Reference**			DoD Reportable	Quantitaion limit * ug/L	Laboratory performance based
			mg/L	**mg/kg**	**6020**	**200.8**	**6020A**			
Aluminum	Al	7429-90-5	0.05	0.5	X	X	X	X	0.5	
Antimony	Sb	7440-36-0	0.002	0.3	X	X	X	X	2.0	
Arsenic	As	7440-38-2	0.001	0.1	X	X	X	X	0.5	
Barium	Ba	7440-39-3	0.01	1.0	X	X	X	X	0.5	
Beryllium	Be	7440-39-3	0.001	0.50	X	X	X	X	0.5	
Boron	B	7440-42-8	0.01	1.0						X
Cadmium	Cd	7440-43-9	0.0005	0.2	X	X	X	X	0.5	
Calcium	Ca	7440-70-2	0.05	10.0	X		X	X	200	
Chromium	Cr	7440-47-3	0.005	2.0	X	X	X	X	0.5	
Cobalt	Co	7440-48-4	0.01	0.5	X	X	X	X	0.5	
Copper	Cu	7440-50-8	0.004	1.0	X	X	X	X	0.5	
Iron	Fe	7439-89-6	0.1	1.0	X		X	X	2.0	
Lead	Pb	7439-92-1	0.003	1.0	X	X	X	X	0.5	
Lithium	Li	7439-93-2	0.01	1.0						X
Magnesium	Mg	7439-95-4	1.0	4.0	X		X	X	200	
Manganese	Mn	7439-96-5	0.02	1.0	X	X	X	X	2.0	
Molybdenum	Mo	7439-98-7	0.005	0.50		X		X	2.0	
Nickel	Ni	7440-02-0	0.005	1.0	X	X	X	X	0.5	
Potassium	K	7440-09-7	1.0	5.0	X		X	X	200	
Selenium	Se	7782-49-2	0.005	0.2	X	X	X	X	0.5	
Silver	Ag	7440-22-4	0.0002	0.1	X	X	X	X	0.5	
Sodium	Na	7440-23-5	0.05	10.0	X		X	X	200	
Strontium	Sr	7440-24-6	0.005	0.50					1.0	X
Tin	Sn	7440-31-5	0.02	1.0						X
Titanium	Ti	7440-32-6	0.005	1.0					0.5	X
Thallium	Tl	7440-28-0	0.001	0.50	X	X	X	X	0.5	
Vanadium	V	7440-62-2	0.004	1.0	X	X	X	X	0.5	
Zinc	Zn	7440-66-6	0.01	1.0	X	X	X	X	2.0	
* Quantitation limit for individual samples is affected by sample dilutions										

Table 2.

Standard Preparation PE

Inorganic Stock Solution IV-28 (100 ppm) + CGSN1-1 (1000 ppm)

I. Working Stock Solution 1 (WS1)

10 mls IV-28 + 1 ml CGSN1-1 + 2 mls HNO_3 + 1 ml HCl;
Bring to a final volume of 100 mls = 10 ppm

II. Working Stock Solution 2 (WS2)

1ml of WS1 to a final volume of 100 mls = 0.100 ppm

III. Spiking Solution

50 mls of WS1 to a final volume of 100 mls = 5.0ppm

IV. STANDARDS

Standards	Volume Working Stock Solution	Internal Standard 5.0 ppm	HNO_3	HCl	Final Volume
0.20 ppm	2.00 mls WS1	2 mls	2 mls	1 ml	100 mls
0.10 ppm	1.00 ml WS1	2 mls	2 mls	1 ml	100 mls
0.05 ppm	0.50 ml WS1	2 mls	2 mls	1 ml	100 mls
0.02 ppm	20.0 mls WS2	2 mls	2 mls	1 ml	100 mls
0.005 ppm	5.00 mls WS2	2 mls	2 mls	1 ml	100 mls
0.002 ppm	2.00 mls WS2	2 mls	2 mls	1 ml	100 mls
0.001 ppm	1.00 mls WS2	2 mls	2 mls	1 ml	100 mls
0.0005 ppm	0.50 mls WS2	2 mls	2 mls	1 ml	100 mls
0.0002 ppm	0.20 mls WS2	2 mls	2 mls	1 ml	100 mls
0.0001 ppm	0.10 mls WS2	2 mls	2 mls	1 ml	100 mls
0.00 ppm	0.00 mls	2 mls	2 mls	1 ml	100 mls

Table 3. Standard preparation for Ca, Mg, K, Na (minerals).

Standards ppm	Volume of Working Stock	Source and Lot # of Working Stock (100ppm)	Internal Standard 5.0 ppm	HNO_3	HCl	Final Volume
0.0	0.0	High Purity (HM) –	2 ml	2 ml	1 ml	100 ml
0.20	0.2	High Purity (HM) –	2 ml	2 ml	1 ml	100 ml
0.50	0.5	High Purity (HM) -	2 ml	2 ml	1 ml	100 ml
1.0	1.0	High Purity (HM) -	2 ml	2 ml	1 ml	100 ml
2.0	2.0	High Purity (HM) -	2 ml	2 ml	1 ml	100 ml
5.0	5.0	High Purity (HM) -	2 ml	2 ml	1 ml	100 ml
10.0	10.0	High Purity (HM) -	2 ml	2 ml	1 ml	100 ml
ICV- 5.0	5.0	Spex –	2 ml	2 ml	1 ml	100 ml

Table 4. ICS Components and Concentration.

Solution Component	ICS-A (ppm)	ICS-AB (ppm)
Al	100.0	100.0
Ca	100.0	100.0
Fe	100.0	100.0
Mg	100.0	100.0
Na	100.0	100.0
P	100.0	100.0
K	100.0	100.0
S	100.0	100.0
C	200.0	200.0
Cl	1000.0	1000.0
Mo	2.0	2.0
Ti	2.0	2.0
As	0.0	0.020
Cd	0.0	0.020
Cr	0.0	0.020
Co	0.0	0.020
Cu	0.0	0.020
Mn	0.0	0.020
Ni	0.0	0.020
Ag	0.0	0.020
Zn	0.0	0.020

Table 5a. Recommended analytical isotopes (underlined) and additional masses to be monitored.

Mass	Element	I.S. Used	Elemental Correction	Potential interferences
19	K	Sc, Rh		
23	Na	Sc, Rh		
24	Mg	Sc, Rh		
43	Ca	Sc, Rh		
44	Ca	Sc, Rh	$(-0.0271)(^{88}C)$	Sr^{++}

Notes:
- † Recommended for PE instrument.
- ‡ Recommended for HP instrument.
- C = Counts at specified mass.
- When the concentration of Na in the samples is high, the ionization of Sc is suppressed leading to positive bias of the results, therefore Rh must be used as the internal standard, even if more than 50 amu removed from the element of interest.

Table 5b. Recommended analytical isotopes (underlined) and additional masses to be monitored.

Mass	Element	I.S. Used	Elemental Correction	Potential interferences
6	Li	**I.S.**	-(0.0813)(^{7}C)	
7	Li	^{6}Li, Sc		
9	Be	^{6}Li, Sc		
10	B	^{6}Li, Sc		
11	B	^{6}Li, Sc		
27	Al	^{6}Li, Sc		
45	Sc	**I.S.**		CO_2H^+
47	Ti	^{6}Li, Sc		
49	Ti	^{6}Li, Sc		
51	V	^{6}Li, Sc	-(3.127)(^{53}C)+(0.352)(^{52}C)	$^{35}ClO^+$, $^{34}SOH^+$
52†	Cr	Sc, Y, Rh		ArC^+, ArO^+, $^{35}ClHO^+$
53‡	Cr	Sc, Y, Rh		$^{37}ClHO^+$
54†	Fe	Sc, Y, Rh	-(0.0284)(^{52}C)	
55	Mn	Sc, Y, Rh		$ArNH^+$
56	Fe	Sc, Y, Rh		
57‡	Fe	Sc, Y, Rh		
58†	Ni	Sc, Y, Rh		
59	Co	Sc, Y, Rh		
60	Ni	Sc, Y, Rh		
62	Ni	Sc, Y, Rh		TiO
63†	Cu	Sc, Y, Rh		$^{31}PO_2^+$, $^{40}ArNa^+$, TiO
65‡	Cu	Sc, Y, Rh		TiO
66	Zn	Sc, Y, Rh		TiO
68	Zn	Sc, Y, Rh		
75	As	Y, Rh	-(3.132)(^{77}C)+(2.736)(^{83}C)	$^{40}Ar^{35}Cl^+$
76	$^{40}Ar^{36}Ar^+$	Y, Rh		$^{40}Ar^{37}Cl^+$
77	Se	Y, Rh		
78†	Se	Y, Rh	-(0.1869)(^{76}C)‡	$^{40}Ar^{38}Ar^+$
82‡	Se	Y, Rh		$^{81}BrH^+$
83	Kr	Y, Rh		
88	Sr	Y, Rh		
89	Y	**I.S.**		
90	Zr	Y, Rh		
95	Mo	Y, Rh		$^{79}BrO^+$
98	Mo	Y, Rh	-(0.146)(^{99}C)	$^{79}BrHO^+$
99	Ru	Y, Rh		
103	Rh	**I.S.**		
105	Pd	Rh		
106	Pd, Cd	Rh		ZrO,
107	Ag	Rh		ZrO
108	MoO	Rh		ZrO, MoO
109	Ag	Rh		ZrO, MoO
111	Cd	Rh		ZrO, MoO
112	Cd	Rh	-(0.040)(^{118}C)	ZrO, MoO
114	Cd	Rh	-(0.0269)(^{118}C)	MoO
118	Sn	Rh		
119	Sn	Rh		
120	Sn	Rh	-(0.0127)(^{125}C)	
121	Sb	Rh	-(0.124)(^{125}C)	$^{40}Ar^{81}Br^+$
123	Sb	Rh		
125	Te	Rh		
137	Ba	Rh		
138	Ba	Rh	-(8.91E-04)(^{139}C)-(2.82E-04)(^{140}C)	
139	La	Rh		
140	Ce	Rh		
185	Re	**I.S.**		
203	Tl	Re		
205	Tl	Re		
206	Pb	Re		
207	Pb	Re		
208	Pb	Re	+(1.0)(^{206}C)+(1.0)($^{2.07}$C)	

Notes:
- † Recommended for the PE instrument.
-

Table 6a. Summary of Quality Control Items, Frequency, and Corrective Action.*

QC Item	Frequency	Acceptance Criteria	Corrective Action
Tuning	After warm-up Every 12 hours	Manufacturer specifications	Check operating parameters, clean cones, replace malfunctioning components if necessary. Reevaluate the tuning.
Calibration Curve	Once a day and as necessary	R ≥ 0.998 The lowest non-zero calibration point must be at or below reporting limit	Remove allowed points keeping minimum of 3 non-zero points, replace calibration standards if needed and recalibrate instrument.
ICV	After every calibration	90-110%	Verify that method parameters are valid, check calibration tables, replace calibration standards if necessary, and recalibrate the instrument.
ICB	After every ICV	Less than the lower limit of quantitation for every target element.	Prepare fresh calibration blank and/or increase the rinse time between analyses; reanalyze ICB; if within limits, continue the run; if still outside limits, determine the source of the problem, make the necessary corrections, and start from the beginning with a new calibration.
LLICV	After initial calibration	70-130% Not required for 200.8	Verify that method parameters are valid, check calibration tables, replace calibration standards if necessary, prepare a fresh calibration blank, and recalibrate the instrument.
CCV	After Every 10 sample or less	90-110%	Recalibrate the instrument. Follow method specific requirements (6020, 6020A or 200.8) as to what data prior to the CCV can be used.
CCB	After Every 10 sample or less	Less than the lower limit of quantitation for every target element.	Prepare fresh calibration blank; reanalyze CCB; if within limits, continue the run; if still outside limits, eliminate the source of the contamination, clean the sample introduction system if necessary, and recalibrate the instrument. Reanalyze all samples from the last good CCB.
LCS	Every batch of 20 samples or less	85-115%	Re-digest the entire sample batch and reanalyze.
LRB (MB)	Every batch of 20 samples or less	<RL/Dilution factor	Re-digest the entire sample batch and reanalyze.
Dp	Every 10 water samples or every 20 soil samples	0-20%	If all other QC acceptable continue the run; sample result must be flagged; otherwise recalibrate instrument and reanalyze samples.
MS	Every 10 water samples or every 20 soil samples, prior to digestion	75-125%	The sample is spiked and re-analyzed according to the electronic ICP/MS Standards Prep Log
MSD†	Every 10 water samples or every 20 soil samples, prior to digestion	0-20%	Same as for duplicate.
Dil‡	Once with every batch of 20 samples or less	0-10% Not required for 200.8	If concentration analyzed >100 x MDL, flag data for possible matrix interference.
ICS-A‡	Every 12 hours	<RL for water samples Not required for 200.8	Reevaluate the equations used for corrections, make the necessary adjustments, and recalibrate the instrument. Re-analyze samples associated with the failed ICS.
ICS-AB‡	Every 12 hours	65-135% Not required for 200.8	Reevaluate the equations used for corrections, make the necessary adjustments, and recalibrate the instrument. Re-analyze samples associated with the failed ICS.
IS Samples	With every sample	60-125% (200.8) 30-120% (6020A)	Verify matrix interference by ruling out instrument drift by unacceptable IS recoveries in standards. Dilute 4+1 and reanalyze. Repeat until inside control limits.
IS QC Samples	With every QC Sample	80-120% for ICV/ICB and CCV/CCB	For CCV/CCB's recalibrate the instrument and reanalyze the affected samples.

NOTE:
- *This is a summery table for more information see Sections 8.4 to 8.10
- RL = Reporting Limit.
- Dil = Dilution Test.
- † MSD optional instead of duplicate sample.
- ‡ When Method 6020 & 6020A referenced in the analytical report.
- IS = Internal Standard

Table 6b. Quality Control Items, Frequency, and Corrective Actions for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Linear Dynamic Range (LDR) or High-level Check Standard	At initial set-up and checked every 6 months with a high standard at the upper limit of the range.	Within ±10% of true value.	Dilute samples within the calibration range, or re-establish/verify the LDR.	Flagging is not appropriate.	Data cannot be reported above the calibration range without an established/passing high-level check standard.
Tuning	Prior to ICAL.	Mass calibration ≤ 0.1 amu from the true value; Resolution < 0.9 amu full width at 10% peak height.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Initial Calibration (ICAL) for All Analytes	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, r2 ≥ 0.99.	Correct problem, then repeat ICAL.	Flagging is not appropriate.	Minimum one high standard and a calibration blank. No samples shall be analyzed until ICAL has passed.
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes, within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.
Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable CCV.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

Table 6b. Quality Control Items, Frequency, and Corrective Actions for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Low-level Calibration Check Standard (Low Level ICV)	Daily.	All reported analytes within ± 20% of the true value.	Correct problem and repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Internal Standards (IS)	Every field sample, standard and QC sample.	IS intensity in the samples within 30-120% of intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Reanalyze sample at 5- fold dilutions until criteria is met. For failed QC samples, correct problem, and rerun all associated failed field samples.	Flagging is not appropriate.	Samples suffering from matrix effect should be diluted until criteria are met, or an alternate IS should be selected.
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct problem. If required, reprep and reanalyze method blank and all samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch	Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Initial and Continuing Calibration Blank (ICB/CCB)	Before beginning a sample run, after every 10 field samples, and at end of the analysis sequence.	No analytes detected > LOD.	Correct problem and repeat ICAL. All samples following the last acceptable calibration blank must be reanalyzed.	Flagging is not appropriate.	Results may not be reported without a valid calibration blank. For CCB, failures due to carryover may not require an ICAL.

Table 6b. Quality Control Items, Frequency, and Corrective Actions for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Interference Check Solutions (ICS) (also called Spectral Interference Checks)	After ICAL and prior to sample analysis.	ICS-A: Absolute value of concentration for all nonspiked project analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within ± 20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples.	If corrective action fails, apply Q-flag to all results for specific analyte(s) in all samples associated with the failed ICS.	All analytes must be within the LDR. ICS-AB is not needed if instrument can read negative responses.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all reported analytes. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	The data shall be evaluated to determine the source of difference.

Table 6b. Quality Control Items, Frequency, and Corrective Actions for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
		sample and MD).			
Dilution Test	One per preparatory batch if MS or MSD fails.	Five-fold dilution must agree within ± 10% of the original measurement.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	Only applicable for samples with concentrations > 50 X LOQ (prior to dilution). Use along with MS/MSD or PDS data to confirm matrix effects.
Post Digestion Spike (PDS) Addition	One per preparatory batch if MS or MSD fails (using the same sample as used for the MS/MSD if possible).	Recovery within 80-120%.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J flag if acceptance criteria are not met and explain in the case narrative.	Criteria apply for samples with concentrations < 50 X LOQ prior to dilution.
Method of Standard Additions (MSA)	When dilution or post digestion spike fails and if the required by project.	NA.	NA.	NA.	Document use of MSA in the case narrative.

DoD Appendix C LCS Limits
Method 6020 Solid Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
7429-90-5	Aluminum	78	124
7440-36-0	Antimony	72	124
7440-38-2	Arsenic	82	118
7440-39-3	Barium	86	116
7440-41-7	Beryllium	80	120
7440-42-8	Boron	74	128
7440-43-9	Cadmium	84	116
7440-70-2	Calcium	86	118
7440-47-3	Chromium	83	119
7440-48-4	Cobalt	84	115
7440-50-8	Copper	84	119
7439-89-6	Iron	81	124
7439-92-1	Lead	84	118
7439-93-2	Lithium	75	120
7439-95-4	Magnesium	80	123
7439-96-5	Manganese	85	116
7439-97-6	Mercury	74	126
7439-98-7	Molybdenum	83	114
7440-02-0	Nickel	84	119
7440-09-7	Potassium	85	119
7782-49-2	Selenium	80	119
7440-22-4	Silver	83	118
7440-23-5	Sodium	79	125
7440-24-6	Strontium	75	129
7440-28-0	Thallium	83	118
7440-29-1	Thorium	81	116
7440-29-1	Tin	82	121
7440-32-6	Titanium	83	117
7440-61-1	Uranium	83	120

7440-62-2	Vanadium	82	116
7440-66-6	Zinc	82	119

Method 6020 Water Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
7429-90-5	Aluminum	84	117
7440-36-0	Antimony	85	117
7440-38-2	Arsenic	84	116
7440-39-3	Barium	86	114
7440-41-7	Beryllium	83	121
7440-42-8	Boron	73	130
7440-43-9	Cadmium	87	115
7440-70-2	Calcium	87	118
7440-47-3	Chromium	85	116
7440-48-4	Cobalt	86	115
7440-50-8	Copper	85	118
7439-89-6	Iron	87	118
7439-92-1	Lead	88	115
7439-93-2	Lithium	78	126
7439-95-4	Magnesium	83	118
7439-96-5	Manganese	87	115
7439-97-6	Mercury	70	124
7439-98-7	Molybdenum	83	115
7440-02-0	Nickel	85	117
7440-09-7	Potassium	87	115
7782-49-2	Selenium	80	120
7440-22-4	Silver	85	116
7440-23-5	Sodium	85	117
7440-24-6	Strontium	82	118
7440-28-0	Thallium	82	116
7440-29-1	Thorium	87	121

7440-29-1	Tin	86	115
7440-32-6	Titanium	83	115
7440-33-7	Tungsten	85	122
7440-61-1	Uranium	87	120
7440-62-2	Vanadium	86	115
7440-66-6	Zinc	83	119

Metals Digestion 3015A \ 3050B

DATE _____ PREP BATCH MTD-_____

TIME START _____ TIME FINISH _____ ANALYST _____

Pipet Calibration:

Pipet #	Test #	Pipet Volume Setting mL	Wt. of water from pipet, g	Criteria	Pipet #	Test #	Pipet Volume Setting mL	Wt. of water from pipet, g	Criteria
2	1			Bias: Mean ± 2% of nominal value Precision: RSD ≤1% of nominal value	3	1			Bias: Mean ± 2% of nominal value Precision: RSD ≤1% of nominal value
	2					2			
	3					3			

SAMPLE#	BTL ID	SAMPLE AMOUNT GRAMS (g)	FINAL VOLUME (ml)	REMARKS	% TOTAL SOLIDS	DILUTION FACTOR
LCS -	----	50	50		—	1
LRB-	----	50	50		—	1

NOTES: *1) Spike values (unless otherwise stated):*
LCS = 0.05 ppm = 50 mls / 0.50 mls of 5ppm Spiking Solution
Samples: Water = 0.05 ppm = 50 mls / 0.50 mls of 5ppm Spiking Solution
Soil = 0.10 ppm = 50 mls / 1.0 mls of 5ppm Spiking Solution
Spiking Solution – Date Prepared: _____

2) Spike values for minerals (Ca-Mg-K-Na)
LCS = 1.0 ppm = 50 mls / 0.50 mls HM Stock Solution
Samples (Water or Soil) = 2.0 ppm = 50 mls / 1.0 mls HM Stock Solution
High Purity Stock Solution (HM)- Lot # _____

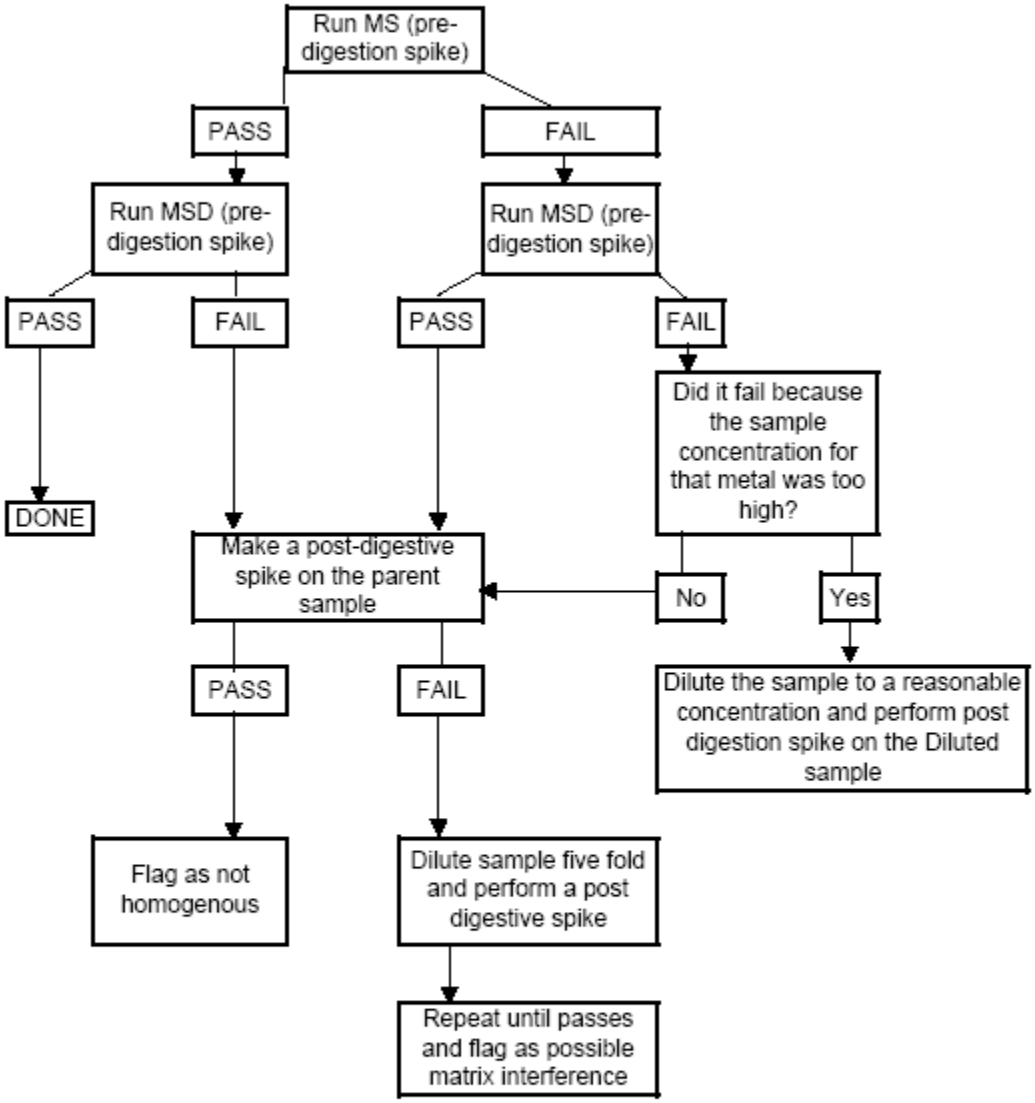
3) HNO3 Lot # _____ *4) Centrifuge Tube Lot # _____*

5) Balance ID: _____ *6) HCl Lot # _____* *Reviewed by _____ On _____*

MET-F18 Effective Date 6/28/2023 Prepared by Merit Laboratories, Inc.

FIGURE 1: METALS BENCHSHEET

FIGURE 2 MS/MSD CORRECTIVE ACTION FLOW CHART



STANDARD OPERATING PROCEDURE

PURGE AND TRAP FOR AQUEOUS AND HIGH AND LOW CONCENTRATION SOIL SAMPLES
METHOD 5030C/5035A

APPROVALS:

Barbara Ball

03/22/2024

QA Officer Date

Maya Mushaly

03/22/2024

Technical Director Date

Number	Description of Change	Date
001-005	Previous changes were not documented	
006	Updated to comply with DoD QSM and ISO 17025 standards.	6/3/11
007	Updated SOP for Method 5035A high and low level soil prep	6/14/12
008	Updated SOP for Method 5030C	9/03/13
009	Updated to comply with DoD QSM 5.0 standards.	04/01/16
010	Updated to comply with DoD QSM 5.1 standards.	01/16/18
011	DOD Audit Corrective Action	09/29/2020
012	2020 Internal Audit revisions	02/16/2021
013	2023 Internal Audit revisions	03/22/2024
014		
015		
016		

1.0 SCOPE AND APPLICATION

This SOP describes a purge-and-trap procedure for the analysis of volatile organic compounds (VOCs) in aqueous samples and water miscible liquid samples. It also describes the analysis of low and high concentration soil and waste sample extracts prepared in Method 5035A. The method is applicable to Gas Chromotography/Mass Spectrometry (GC/MS) Method 8260B. Method 5030C can be used for most volatile organic compounds that have boiling points below 200°C and are insoluble or slightly soluble in water. Volatile water-soluble compounds can be included in this analytical technique; however, quantitation limits (by GC or GC/MS) are approximately ten times higher because of poor purging efficiency. The method is also limited to compounds that elute as sharp peaks from a GC column packed with graphitized carbon lightly coated with a carbowax or a coated capillary column. Such compounds include low molecular weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers, and sulfides. Water samples can be analyzed directly for volatile organic compounds by purge-and-trap extraction and gas chromatography. Higher concentrations of these analytes in water can be determined by direct injection of the sample into the chromatographic system or by dilution of the sample prior to the purge-and-trap process. This method is restricted to use by or under the supervision of trained analysts. Each analyst must demonstrate the ability to generate acceptable results with this method. This SOP is not for use with samples that come into the lab for OHIO VAP work.

2.0 SUMMARY OF METHOD

Aqueous Samples: An inert gas is bubbled through a portion of the aqueous sample at ambient temperature, and the volatile components are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the volatile components are adsorbed. After purging is completed, the sorbent column is heated and backflushed with inert gas to desorb the components onto a gas chromatographic column. High Concentration Extracts from Method 5035A: An aliquot of the extract prepared in Method 5035A is combined with organic free reagent water in the purging chamber. It is then analyzed by purge-and-trap GC or GC/MS. Low Concentration Soils: An aliquot of the soil is combined with organic free reagent water in the purging chamber. It is then analyzed by purge-and–trap GC or GC/MS. Air samples in Tedlar Bags: A volume of air is extracted from the Tedlar Bag using a gas tight syringe and is introduced to a vial of reagent water. An inert gas is bubbled through a portion of the aqueous sample at ambient temperature. The vapor is swept through a sorbent column where the volatile components are adsorbed. After purging is completed, the sorbent column is heated and backflushed with inert gas to desorb the components onto a gas chromatographic column.

3.0 INTERFERENCES

Impurities in the purge gas, and from organic compounds out-gassing from the plumbing ahead of the trap, account for the majority of contamination problems. The analytical system must be demonstrated to be free

from contamination under the conditions of the analysis by running laboratory reagent blanks. The use of non-polytetrafluoroethylene (non-PTFE) plastic coating, non-PTFE thread sealant, or flow controllers with rubber components in the purging device must be avoided, since such materials out-gas organic compounds which will be concentrated in the trap during the purge operation. These compounds will result in interferences or false positives in the determinative step.

Samples can be contaminated by diffusion of volatile organics (particularly methylene chloride and fluorocarbons) through the septum seal of the sample vial during shipment and storage. A trip blank prepared from organic-free reagent water and carried through sampling and handling protocols serves as a check on such contamination.

Contamination by carryover can occur whenever high-concentration and low-concentration samples are analyzed sequentially. Whenever an unusually concentrated sample is analyzed, it must be followed by an analysis of organic-free reagent water to check for cross-contamination. The trap and other parts of the system are subject to contamination. Therefore, frequent bake-out and purging of the entire system may be required.

The laboratory where volatiles analysis is performed must be completely free of solvents. Special precautions must be taken to determine methylene chloride. The analytical and sample storage areas must be isolated from all atmospheric sources of methylene chloride. Otherwise random background levels will result. Since methylene chloride will permeate through PTFE tubing, all GC carrier gas lines and purge gas plumbing must be constructed of stainless steel or copper tubing. Laboratory workers' clothing previously exposed to methylene chloride fumes during common liquid/liquid extraction procedures can contribute to sample contamination. The presence of other organic solvents in the laboratory where volatile organics are analyzed will also lead to random background levels and the same precautions must be taken.

4.0 APPARATUS AND MATERIALS

Microsyringes - 10-µL, 25-µL, 50-µL, 100-µL, 250-µL, and 500-µL.

Gas tight 5ml syringes.

Vials – 40-mL, for GC autosampler (Archon).

Magnetic stir bars.

Scale capable of displaying weight to the nearest hundredth of a gram.

Purge-and-trap device. The purge-and-trap device consists of three separate pieces of equipment: the sample purger, the trap, and the desorber.

- The Vocarb3000 trap by Supelco is used. It is preconditioned at 270°C for 60 minutes upon installment as suggested by supplier.

Gas Chromatograph.

Mass Spectrometer.

pH paper.

Chlorine Strips

Class A Volumetric Flasks (10, 50 & 100 ml)

Disposal Pipettes

Graduated Pipettes

5.0 REAGENTS

Organic-free reagent water - All references to water in this method refer to organic-free reagent water.

Purge and Trap grade methanol.

Sodium Bisulfate.

Hydrochloric Acid (HCl)

See SOP ORL-007 for specifications on internal and surrogate standards.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

Aqueous Samples

- Samples must be stored in capped bottles, with minimum headspace, at (4 ± 2)°C in an area free of solvent fumes.

- All samples must be analyzed within 14 days of collection. Samples not analyzed within this period must be noted and data are considered minimum values. The pH of the samples is checked with pH strips after the sample has been prepared for the autosampler. If the pH is greater than 2 as determined by the pH strip the fact is noted. If the sample with pH > 2 is not analyzed within seven days of the collection date then it is noted on the report that the sample was not properly preserved. The pH is recorded on the volatile sample prep log (Figure 1).

Soil Samples

- High concentration soil samples collected and preserved in the field.

- The following steps apply to the preparation of vials used in the collection of high concentration soil samples to be preserved in the field with methanol and analyzed by the aqueous purge-and-trap equipment.

- Add 10 mL of methanol to each vial. Seal the vial with the screw-cap and septum seal. Affix a label to each vial. This eliminates the need to label the vials in the field and assures that the tare weight of the vial includes the label. (The weight of any markings added to the label in the field is negligible). Weigh the prepared vial to the nearest 0.01g, record the tare weight, and write it on the label.

- (10 ± 0.5)g of sample are weighed out and added to the vial in the field.

- Upon arrival to the lab, samples are stored at (4 ±2)°C.

♦ High concentration soil samples collected without a preservative.

- When high concentration soil samples are collected without the use of a preservative, an EnCore sample container/sampler is employed.

  - The EnCore sampler has not been thoroughly evaluated by the EPA as a sample storage device. Preliminary results indicate that storage in the EnCore device may be appropriate for up to 48 hours, and so samples collected this way must be preserved in methanol within 48 hours of the sampling time. This preservation is documented in the High Level Extraction Sheet (Figure 3).

- Weigh out (10 ±0.5)g of soil sample into a 40-mL vial and add 10-mL of Methanol.

- Sonicate for twenty minutes.

- Sample extracts are transferred to 4 ml vials and stored at (4 ± 2)°C.

- Frozen samples are not acceptable for all OHIO VAP samples.

♦ Low concentration soil samples collected and preserved in the field.

- The following steps apply to the preparation of vials used in the collection of low concentration soil samples to be preserved in the field with sodium bisulfate and reagent water and analyzed by the aqueous purge-and-trap equipment described in this SOP. Note: The sampling and preservation techniques required for low concentration analysis vary widely by state and regulating agency. The end-use of the data must be considered before selecting a sampling and preservation technique and may include procedures not in this SOP.

- Add 5 mL of reagent water and a magnetic stir bar to each vial as well as 0.2g of sodium bisulfate for every 1g of sample to be collected. Seal the vial with the screw-cap and septum seal. Affix a label to each vial. This eliminates the need to label the vials in the field and assures that the tare weight of the vial includes the label. (The weight of any markings added to the label in the field is negligible). Weigh the prepared vial to the nearest 0.01g, record the tare weight, and write it on the label, and Low Level Extraction Log (Figure 2).

- (1-5 ± 0.5)g of sample are weighed out and added to the vial in the field.

- Upon arrival to the lab, samples are stored at (4 ±2)°C.

♦ Low concentration soil samples collected without a preservative.

- When low concentration soil samples are collected without the use of a preservative, an EnCore sample container/sampler or an empty 40 ml vial is employed.

  ▪ The EnCore sampler has not been thoroughly evaluated by the EPA as a sample storage device. Preliminary results indicate that storage in the EnCore device may be appropriate for up to 48 hours, and so samples collected this way must be preserved with sodium bisulfate within 48 hours of the sampling time. This preservation is documented in the Low Level Extraction Log (Figure 2).

- Weigh out (1-5 ±0.5)g of soil sample into a 40-mL vial and add 5ml of reagent water and 0.2g of sodium bisulfate for every 1g of sample. Alternatively, weigh out (1-5 ±0.5)g of soil sample into a 40-mL vial and freeze (-7°C) for up to 14 days.

- The preserved samples are stored at (4 ± 2)°C.

- Bulk sample collection using USEPA Method 5030C can be used for approved sites/QAPPs.

7.0 PROCEDURE

1. The purge-and-trap technique for aqueous samples is found in Number 2 and method for analysis of solvent extracts from the High Concentration Method in Method 5035A is found in Number 3. The gas chromatographic determinative steps are found in SOP ORL-007. The method is also applicable to the analysis of gasoline, using SOP ORL-010.

2. This section provides guidance on the analysis of aqueous samples and samples that are water miscible, by purge-and-trap analysis.

   ♦ Initial calibration. Calibrate system in accordance with Method 8260C.

- If necessary or for project specific purposes, screen samples prior to purge-and-trap analysis to provide guidance on whether sample dilution is necessary and may prevent contamination of the purge-and-trap system. Screen the sample by GC/MS.

- Sample introduction and purging.
  - Assemble the purge-and-trap device. The operating conditions for the GC and GC/MS are given in method SOP ORL-007, ORL-009 and SOP ORL-010.
  - A daily check standard containing surrogates, internal standards and 20ug/l bromoform must be analyzed prior to the analysis of the daily check standard. If levels of chloromethane or bromomethane exceed 0.5ug/l, then the trap may be too contaminated with salts or tightly bound contamination for analysis to continue. The trap must be replaced and the system recalibrated. This can be achieved in the same run as the BFB.
  - GC or GC/MS calibration verification criteria must be met (SOP ORL-007 and SOP ORL-010) before analyzing samples.
  - Adjust the purge gas flow rate to provide the best response for chloromethane and bromoform, if these compounds are analytes. Excessive flow rate reduces chloromethane response, whereas insufficient flow reduces bromoform response.
  - Use autosampler to take a 5-mL aliquot of the sample. Care must be taken to remove any bubbles from the syringe. This process of taking an aliquot destroys the validity of the liquid sample for future analysis. Re-analysis must be done with duplicate VOA.
  - The autosampler adds 5.0 µL of surrogate and internal spiking solution. Matrix spike is added if applicable as described in SOP ORL-007 and SOP ORL-010.
  - Inject the aliquot into a purging vessel.
  - Purge for 11.0 minutes at room temperature in the sparge tube.

- Sample desorption.
  - Non-cryogenic interface - After the recommended purge (see above), place the purge-and-trap system in the desorb mode and preheat the trap to 190 °C without a flow of carrier gas passing through the trap. Start the flow of the carrier gas, begin the GC temperature program, and start GC data acquisition.

- Trap Reconditioning.
    - After desorbing the sample, recondition the trap by baking it at 210 °C for 7 minutes.

3. This section provides guidance on the analysis of solvent extracts from High Concentration Samples prepared by Method 5035A.

    - The GC or GC/MS system must be set up as in specific determinative method (SOP ORL-007 and SOP ORL-010).
    - Measure out a 100µL aliquot of the methanol phase of the sample.
    - The autosampler adds 5.0 µL of surrogate and internal spiking solution. Matrix spike is added if applicable as described in SOP ORL-007 and SOP ORL-010.
    - Purge for 11.0 minutes at room temperature in the 40ml vial.
    - Desorb the sample and recondition the trap.
    - If 1,4-Dioxane, heated purge is used.

4. This section provides guidance on the analysis of Low Concentration Samples prepared by Method 5035.

    - The GC or GC/MS system must be set up as in specific determinative method (SOP ORL-007 and SOP ORL-010).
    - Internal standards, surrogates and matrix spikes (if applicable) must be added automatically by the autosampler or manually by puncturing the septum using a small gauge needle.
    - Prior to purging the sample is preheated to 40°C for 1.5 minute while being agitated by the magnetic stir bar.
    - Purge for 11.0 minutes at 40°C while being agitated by the magnetic stir bar in the 40ml vial.
    - Desorb the sample and recondition the trap.

5. Tedlar Bag Air Analysis

    - The GC or GC/MS system must be set up as in specific determinative method (SOP ORL-007 and SOP ORL-010).
    - To a 40 ml VOA bottle add 5 ml reagent water.

- Take a gas tight syringe with a needle fixed to the tip. Draw in a small volume of DI water into the syringe. This will provide a bubbling effect to show air is being drawn in from the bag.
- Insert the needle of the syringe through the septa of the Tedlar Bag and with draw 5 cc into the syringe.
- Surrogates and internal standards are added by autosampler.
- Purge for 11.0 minutes at room temperature in the 40ml vial.
- Desorb the sample and recondition the trap.

6. Sample analysis. The samples prepared by this method will be analyzed according to SOP ORL-007 and SOP ORL-010.

8.0 QUALITY CONTROL

Refer to method SOP ORL-007 and SOP ORL-010 for specific quality control procedures. Quality control items employed and evaluated are provided in Table 1 and Table 2. In addition, the table indicates the frequency of each QC item along with appropriate courses of corrective action. The analyst will follow SOP # QA-007 and complete the appropriate review form upon completion of the analysis.

9.0 METHOD PERFORMANCE

Refer to the determinative methods for performance data.

10.0 EQUIPMENT MAINTENANCE AND TROUBLESHOOTING

Each instrument is assigned a maintenance logbook. All maintenance performed on the instrument must be recorded. Additionally, any modifications to the instrument settings shall be noted in the specific instrument logbook. Maintenance procedures provided in the equipment manual shall be followed. Maintenance may include, cleaning the MS source, clipping/replacing the column, or replacing the calibration standard.

Computer software and firmware can be found on Merit's network at F:\data\MERIT\EQUIPMENT\Instrument-Software Version List.200818.xls.

11.0 SAFETY

Eye protection and gloves must be worn while performing Volatile analyses. Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The air system throughout the laboratory area is on a 100% fresh air exchange system, this system exchanges 100% the air in the laboratory area with air from outside 6 times per hour and 30 times per hour when the emergency purge button is hit. A reference file of material safety data sheets (MSDSs) is available to all personnel.

Specific attention be paid (but not limited) to:

- Hydrochloric acid is corrosive, extreme heat or contact with metals can release flammable hydrogen gas, stable under ordinary conditions of use and storage, and incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates, cyanides, sulfides, sulfites, and formaldehyde.

- Methanol may react violently with acids, acid chlorides, acid anhydrides, oxidizing agents, reducing agents and alkali metals. Protect from moisture. Highly flammable.

12.0 WASTE DISPOSAL AND POLLUTION PREVENTION

All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations. Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

13.0 DEFINITIONS

An analytical batch is defined as a group of samples (not to exceed 20 samples) analyzed per sequential run. Depending on client or program requirements, an analytical batch may or may not include matrix spikes as part of the 20 samples.

Method Blank (MB): an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Laboratory Control Sample (LCS) (also known as Laboratory Fortified Blank, Spiked Blank, or QC Check Sample): a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-

laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system.

Matrix Spike (also known as Spiked Sample or Fortified Sample): a sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (also known as Spiked Sample or Fortified Sample Duplicate): A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

14.0 REFERENCES

Bellar, T., "Measurement of Volatile Organic Compounds in Soils Using Modified Purge-and-Trap and Capillary Gas Chromatography/Mass Spectrometry", U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, OH, November, 1991.

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USEPA, SW-846, 1996, REVISION 0; METHOD 5000.

USEPA, SW-846, 1996, REVISION 2; METHOD 5030B.

USEPA, SW-846, 2003, REVISION 3; METHOD 5030C.

USEPA, SW-846, 2002, REVISION 1; METHOD 5035A.

USEPA, SW-846, 1996, REVISION 2; METHOD 8000B.

USEPA, SW-846, 1996, REVISION 2; METHOD 8260B.

USEPA, SW-846, 2006, REVISION 3; METHOD 8260C.

Table 1 Quality Control Items, Frequency, and Corrective Action

QC Item	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration	Prior to all analytical runs	Method-based	Examine the entire analytical system; some or all of the following: clean MS source, re-tune, clip/replace column, replace calibration standards, re-calibrate.
BFB	12-hour	Method-based	Re-attempt injection; clean MS source, re-tune; failure requires the re-analysis of all associated analytical runs.
SPCC/CCC	12-hour	Method-based	Re-attempt injection; some or all of the following: clean MS source, re-tune, clip/replace column, replace calibration standards, re-calibrate; failure requires the re-analysis of all associated analytical runs.
LCS and MS	20 samples	Lab-based	A failed LCS must be re-extracted and re-analyzed. A failed MS requires no action provided that the LCS is acceptable. If additional sample exists, the samples associated with a failed LCS must be re-extracted and re-analyzed.
Duplicate or MSD	20 samples	n/a	Relative Percent Differences (RPDs) are computed and included in the QC report
Method Blank	20 samples	n/a	Method blank contamination is flagged on the analytical report for any identified target compound. Blanks indicative of contaminated analytical system (typically the purge-and-trap system) must result in a thorough cleansing of the affected system and sample/blank re-analysis.
Internal Standard	All samples	Method-based	Adverse matrix effects on areas/recoveries are demonstrated either by screening the extract of re-analyzing the sample within a 12-hour QC batch. The resulting analytical report is flagged appropriately. A negative bias unrelated to matrix effects indicates the need to: clean the MS source, re-tune, and re-calibrate
Surrogate Standard	All samples	Lab-based	Adverse matrix effects on areas/recoveries are demonstrated either by screening the extract of re-analyzing the sample within a 12-hour QC batch. The resulting analytical report is flagged appropriately. If additional sample exists, the sample must be re-extracted prior to re-analysis if a matrix effect cannot be demonstrated.
Target Compound	All samples	Method-based	Target compounds beyond the calibration range are diluted and re-analyzed and/or flagged as estimated on the analytical report.

Table 2: Quality Control Items, Frequency, and Corrective Action for DoD Projects					
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Flagging Criteria**	**Comments**
Tune Check	Prior to ICAL and prior To each 12-hour period of sample analysis	Specific ion abundance criteria of BFB or DFTPP from method.	Retune instrument and verify.	Flagging criteria is not appropriate.	No samples shall be analyzed without a valid tune.
Performance Check (Method 8270 only)	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol shall be present at their normal responses and shall not exceed a tailing factor of 2.	Correct problem, then repeat performance checks.	Flagging is not appropriate.	No sample shall be analyzed until performance check is within criteria. The DDT breakdown and Benzidine/Pentachlorophenol tailing factors are considered overall system checks to evaluate injector port inertness and column performance and are required regardless of the reported analyte list.
Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up and after ICV or CCV failure, prior to sample analysis.	Each analyte must meet one of the three options below: Option 1. RSD for each analyte ≤ 15%;. Option 2: linear least squares regression $r^2 \geq 0.99$; Option 3:non-linear least squares regression (quadratic) for each analyte: $r^2 \geq 0.99$.	Correct problem then repeat ICAL.	Flagging criteria is not appropriate.	Minimum 5 levels for linear and 6 levels for quadratic. No samples shall be analyzed until ICAL has passed. If the specific version of a method requires additional evaluation (e.g., RFs or low calibration standard analysis and recovery criteria) these additional requirements must also be met.
Retention time window position establishment and surrogate	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Calculated for each analyte and surrogate.
Evaluation of relative retention times (RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	NA	After maintenance is performed which may affect retention times, RRTs may be updated based on the daily CCV. RRTs shall be compared with the most recently updated RRTs.

Table 2: Quality Control Items, Frequency, and Corrective Action for DoD Projects					
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Flagging Criteria**	**Comments**
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source prior to sample analysis	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.
Continuing calibration verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since the last acceptable CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. If the specific version of a method requires additional evaluation (e.g, average RFs) these additional requirements must also be met.
Internal standards (IS)	Every field sample, standard, and QC sample.	Retention time ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	If corrective action fails in field samples, data must be qualified and explained in the case narrative. Apply Q-flag to analytes associated with the non-compliant IS. Flagging criteria is not appropriate for failed standards.	NA
Method blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater. Common contaminants, must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all QC samples and field samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

Table 2: Quality Control Items, Frequency, and Corrective Action for DoD Projects					
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Flagging Criteria**	**Comments**
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all surrogates and all analytes to be reported. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Must contain all surrogates and all analytes to be reported. For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.
Matrix spike duplicate (MSD) or Matrix duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	MSD: Must contain all surrogates and all analytes to be reported. The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Surrogate spike	All field and QC samples.	QC acceptance criteria specified by project, if available; otherwise use QSM Appendix C limits or in-house LCS limits if analyte(s) are not listed..	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present,	Apply Q-flag to all associated analytes if acceptance criteria are not met and explain in the case narrative.	Alternative surrogates are recommended when there is obvious chromatographic interference.

Table 2: Quality Control Items, Frequency, and Corrective Action for DoD Projects					
QC Check	**Minimum Frequency**	**Acceptance Criteria**	**Corrective Action**	**Flagging Criteria**	**Comments**
			reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative..		

DoD Appendix C LCS Limits
Method 8260 Solid Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
630-20-6	1,1,1,2-Tetrachloroethane	78	125
71-55-6	1,1,1-Trichloroethane	73	130
79-34-5	1,1,2,2-Tetrachloroethane	70	124
79-00-5	1,1,2-Trichloroethane	78	121
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane [Freon-113]	66	136
75-34-3	1,1-Dichloroethane	76	125
75-35-4	1,1-Dichloroethene	70	131
563-58-6	1,1-Dichloropropene	76	125
87-61-6	1,2,3-Trichlorobenzene	66	130
96-18-4	1,2,3-Trichloropropane	73	125
526-73-8	1,2,3-Trimethlybenzene	82	118
120-82-1	1,2,4-Trichlorobenzene	67	129
95-63-6	1,2,4-Trimethylbenzene	75	123
96-12-8	1,2-Dibromo-3-chloropropane	61	132
106-93-4	1,2-Dibromoethane	78	122
95-50-1	1,2-Dichlorobenzene	78	121
107-06-2	1,2-Dichloroethane	73	128
17060-07-0	1,2-Dichloroethane-d4	71	136
540-59-0	1,2-Dichloroethene	78	122
78-87-5	1,2-Dichloropropane	76	123
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	64	132
108-70-3	1,3,5-Trichlorobenzene	71	128
108-67-8	1,3,5-Trimethylbenzene	73	124
541-73-1	1,3-Dichlorobenzene	77	121
142-28-9	1,3-Dichloropropane	77	121
542-75-6	1,3-Dichloropropene	77	126
106-46-7	1,4-Dichlorobenzene	75	120
105-05-5	1,4-Diethylbenzene	79	114
123-91-1	1,4-Dioxane	55	138
544-10-5	1-Chlorohexane	71	130
594-20-7	2,2-Dichloropropane	67	133
78-93-3	2-Butanone (MEK)	51	148

126-99-8	2-Chloro-1,3-butadiene	65	133
110-75-8	2-Chloroethyl vinyl ether	43	149
95-49-8	Chlorotoluene	75	122
591-78-6	2-Hexanone	53	145
79-46-9	2-Nitropropane	47	150
67-63-0	2-Propanol [Isopropyl alcohol]	60	140
460-00-4	4-Bromofluorobenzene	79	119
106-43-4	4-Chlorotoluene	72	124
108-10-1	4-Methyl-2-pentanone [MIBK]	65	135
67-64-1	Acetone	36	164
75-05-8	Acetonitrile	54	143
107-02-8	Acrolein [Propenal]	47	155
107-13-1	Acrylonitrile	65	134
107-05-1	Allyl chloride	68	135
71-43-2	Benzene	77	121
100-44-7	Benzyl chloride	64	120
108-86-1	Bromobenzene	78	121
74-97-5	Bromochloromethane	78	125
75-27-4	Bromodichloromethane	75	127
75-25-2	Bromoform	67	132
74-83-9	Bromomethane	53	143
75-15-0	Carbon disulfide	63	132
56-23-5	Carbon tetrachloride	70	135
108-90-7	Chlorobenzene	79	120
124-48-1	Chlorodibromomethane	74	126
75-00-3	Chloroethane	59	139
67-66-3	Chloroform	78	123
74-87-3	Chloromethane	50	136
156-59-2	cis-1,2-Dichloroethene	77	123
10061-01-5	cis-1,3-Dichloropropene	74	126
1476-11-5	cis-1,4-Dichloro-2-butene	69	143
110-82-7	Cyclohexane	67	131
108-94-1	Cyclohexanone	30	156
1868-53-7	Dibromofluoromethane	78	119
74-95-3	Dibromomethane	78	125
75-71-8	Dichlorodifluoromethane [Freon-12]	29	149

75-43-4	Dichlorofluoromethane	47	155
60-29-7	Diethyl ether	71	129
108-20-3	Diisopropyl ether	69	127
64-17-5	Ethanol	45	159
141-78-6	Ethyl acetate	52	139
97-63-2	Ethyl methacrylate	69	129
637-92-3	Ethyl tert-butyl ether	72	126
100-41-4	Ethylbenzene	76	122
462-06-6	Fluorobenzene	81	114
142-82-5	Heptane	49	138
87-68-3	Hexachlorobutadiene	61	135
67-72-1	Hexachloroethane	72	133
110-54-3	Hexane	45	142
74-88-4	Iodomethane	71	131
78-83-1	Isobutyl alcohol	60	135
108-21-4	Isopropyl acetate [Acetic acid]	58	131
98-82-8	Isopropylbenzene	68	134
179601-23-1	m/p-Xylene [3/4-Xylene]	77	124
126-98-7	Methacrylonitrile	66	132
79-20-9	Methyl acetate	53	144
80-62-6	Methyl methacrylate	63	134
1634-04-4	Methyl tert-butyl ether [MTBE]	73	125
108-87-2	Methylcyclohexane	66	133
75-09-2	Methylene chloride	70	128
123-86-4	n-Butyl acetate	62	128
71-36-3	n-Butyl alcohol	55	131
104-51-8	n-Butylbenzene	70	128
103-65-1	n-Propylbenzene	73	125
91-20-3	Naphthalene	62	129
95-47-6	o-Xylene	77	123
99-87-6	p-Isopropyltoluene [p-Cymene]	73	127
76-01-7	Pentachloroethane	69	135
107-12-0	Propionitrile [Ethyl cyanide]	68	134
135-98-8	sec-Butylbenzene	73	126
100-42-5	Styrene	76	124
994-05-8	tert-Amyl methyl ether [TAME]	73	126

75-65-0	tert-Butyl alcohol	68	133
98-06-6	tert-Butylbenzene	73	125
127-18-4	Tertachloroethene	73	128
109-99-9	Tetrahydrofuran	61	135
108-88-3	Toluene	77	121
2037-26-5	Toluene-d8	85	116
156-60-5	trans-1,2-Dichloroethene	74	125
10061-02-6	trans-1,3-Dichloropropene	71	130
110-57-6	trans-1,4-Dichloro-2-butene	62	136
79-01-6	Trichloroethene	77	123
75-69-4	Trichlorofluoromethane [Freon-11]	62	140
108-05-4	Vinyl acetate	50	151
75-01-4	Vinyl chloride	56	135
1330-20-7	Xylene [total]	78	124

DoD Appendix C LCS Limits
Method 8260 Water Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
630-20-6	1,1,1,2-Tetrachloroethane	78	124
71-55-6	1,1,1-Trichloroethane	74	131
79-34-5	1,1,2,2-Tetrachloroethane	71	121
79-00-5	1,1,2-Trichloroethane	80	119
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane [Freon-113]	70	136
75-34-3	1,1-Dichloroethane	77	125
75-35-4	1,1-Dichloroethene	71	131
563-58-6	1,1-Dichloropropene	79	125
87-61-6	1,2,3-Trichlorobenzene	69	129
96-18-4	1,2,3-Trichloropropane	73	122
526-73-8	1,2,3-Trimethlybenzene	82	120
120-82-1	1,2,4-Trichlorobenzene	69	130
95-63-6	1,2,4-Trimethylbenzene	76	124
96-12-8	1,2-Dibromo-3-chloropropane	62	128
106-93-4	1,2-Dibromoethane	77	121
95-50-1	1,2-Dichlorobenzene	80	119
107-06-2	1,2-Dichloroethane	73	128

17060-07-0	1,2-Dichloroethane-d4	81	118
540-59-0	1,2-Dichloroethene	79	121
78-87-5	1,2-Dichloropropane	78	122
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	70	136
108-70-3	1,3,5-Trichlorobenzene	75	130
108-67-8	1,3,5-Trimethylbenzene	75	124
106-99-0	1,3-Butadiene	43	158
541-73-1	1,3-Dichlorobenzene	80	119
142-28-9	1,3-Dichloropropane	80	119
542-75-6	1,3-Dichloropropene	77	123
106-46-7	1,4-Dichlorobenzene	79	118
105-05-5	1,4-Diethylbenzene	79	118
123-91-1	1,4-Dioxane	59	139
544-10-5	1-Chlorohexane	76	124
540-84-1	2,2,4-Trimethylpentane [Isooctane]	58	132
594-20-7	2,2-Dichloropropane	60	139
75-85-4	2-Butanol	66	120
78-93-3	2-Butanone (MEK)	56	143
126-99-8	2-Chloro-1,3-butadiene	65	135
110-75-8	2-Chloroethyl vinyl ether	51	139
95-49-8	Chlorotoluene	79	122
591-78-6	2-Hexanone	57	139
91-57-6	2-Methylnaphthalene	17	142
79-46-9	2-Nitropropane	49	136
67-63-0	2-Propanol [Isopropyl alcohol]	56	142
624-95-3	3,3-Dimethyl-1-butanol	49	133
460-00-4	4-Bromofluorobenzene	85	114
106-43-4	4-Chlorotoluene	78	122
108-10-1	4-Methyl-2-pentanone [MIBK]	67	130
67-64-1	Acetone	39	160
75-05-8	Acetonitrile	50	142
107-02-8	Acrolein [Propenal]	39	155
107-13-1	Acrylonitrile	63	135
107-05-1	Allyl chloride	68	130
71-43-2	Benzene	79	120
100-44-7	Benzyl chloride	42	138

108-86-1	Bromobenzene	80	120
74-97-5	Bromochloromethane	78	123
75-27-4	Bromodichloromethane	79	125
75-25-2	Bromoform	66	130
74-83-9	Bromomethane	53	141
75-15-0	Carbon disulfide	64	133
56-23-5	Carbon tetrachloride	72	136
108-90-7	Chlorobenzene	82	118
124-48-1	Chlorodibromomethane	74	126
75-45-6	Chlorodifluoromethane	40	129
75-00-3	Chloroethane	60	138
67-66-3	Chloroform	79	124
74-87-3	Chloromethane	50	139
156-59-2	cis-1,2-Dichloroethene	78	123
10061-01-5	cis-1,3-Dichloropropene	75	124
1476-11-5	cis-1,4-Dichloro-2-butene	57	146
110-82-7	Cyclohexane	71	130
1868-53-7	Dibromofluoromethane	80	119
74-95-3	Dibromomethane	79	123
75-71-8	Dichlorodifluoromethane [Freon-12]	32	152
75-43-4	Dichlorofluoromethane	72	131
60-29-7	Diethyl ether	68	129
108-20-3	Diisopropyl ether	67	128
64-17-5	Ethanol	48	151
141-78-6	Ethyl acetate	55	138
97-63-2	Ethyl methacrylate	72	126
637-92-3	Ethyl tert-butyl ether	70	127
100-41-4	Ethylbenzene	79	121
462-06-6	Fluorobenzene	80	116
142-82-5	Heptane	49	140
87-68-3	Hexachlorobutadiene	66	134
67-72-1	Hexachloroethane	72	134
110-54-3	Hexane	48	143
74-88-4	Iodomethane	69	131
78-83-1	Isobutyl alcohol	63	133
108-21-4	Isopropyl acetate [Acetic acid]	63	133

98-82-8	Isopropylbenzene	72	131
179601-23-1	m/p-Xylene [3/4-Xylene]	80	121
126-98-7	Methacrylonitrile	63	133
79-20-9	Methyl acetate	56	136
80-62-6	Methyl methacrylate	67	128
1634-04-4	Methyl tert-butyl ether [MTBE]	71	124
108-87-2	Methylcyclohexane	72	132
75-09-2	Methylene chloride	74	124
123-86-4	n-Butyl acetate	69	125
71-36-3	n-Butyl alcohol	59	131
104-51-8	n-Butylbenzene	75	128
109-60-4	n-Propyl acetate	76	126
103-65-1	n-Propylbenzene	76	126
91-20-3	Naphthalene	61	128
95-47-6	o-Xylene	78	122
99-87-6	p-Isopropyltoluene [p-Cymene]	77	127
76-01-7	Pentachloroethane	69	133
109-66-0	Pentane	16	134
107-12-0	Propionitrile [Ethyl cyanide]	64	136
135-98-8	sec-Butylbenzene	77	126
100-42-5	Styrene	78	123
994-05-8	tert-Amyl methyl ether [TAME]	68	128
75-65-0	tert-Butyl alcohol	68	129
762-75-4	tert-Butyl formate	65	132
98-06-6	tert-Butylbenzene	78	124
127-18-4	Tertachloroethene	74	129
109-99-9	Tetrahydrofuran	57	133
108-88-3	Toluene	80	121
2037-26-5	Toluene-d8	89	112
156-60-5	trans-1,2-Dichloroethene	75	124
10061-02-6	trans-1,3-Dichloropropene	73	127
110-57-6	trans-1,4-Dichloro-2-butene	43	140
79-01-6	Trichloroethene	79	123
75-69-4	Trichlorofluoromethane [Freon-11]	65	141
108-05-4	Vinyl acetate	54	146
75-01-4	Vinyl chloride	58	137

1330-20-7	Xylene [total]	79	121

Figure 1: Volatiles Sample Preparation

VOLATILES — Date: _____
Sample Prep — Analyst: _____
Batch QC ID#: _____

#	Merit #	Matrix	Surrogate ID	Vol. (ul)	Spike ID	Vol. (ul)	Time Start / End	PH	Chlorine Check*	Notes
	BFB									
	SPCC									
	LCS									
	LCSD									
	BLK									
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										

Reviewed by: _____
Date: _____

* Applicable only for Methods 524.2 & 624

Figure 2: Method 5035A Low Level Extraction Sheet

Method 5035A (Low Level)
Extraction Sheet

Analyst: _____
Date: _____
Batch QC ID#: _____

Merit Number	Tare wt (g)	Vial wt (g)	Sample wt.(g)	Time Start / End	Notes

Figure 3: Method 5035A (high Level) Extraction Example Sheet

Methanol Extraction Benchsheet

Page 1 of 1

Batch ID: METH240319-1 Run Date/Time: 03/19/2024 12:31 Analyst: ACK

Sample ID	Tare Wt (g)	Final Wt (g)	Sample Wt (g)	Methanol Vol (ml)	Lot #
S59924.01	033.103	39.341	6.238	10	EG359-US
S59924.02	033.395	39.623	6.228	10	EG359-US
S59943.01	032.417	52.517	20.100	20	EG359-US
S59943.02	033.387	55.575	22.188	22	EG359-US
S59943.03	032.546	50.104	17.558	17	EG359-US
S59943.04	033.472	49.300	15.828	15	EG359-US
S59943.05	033.346	51.118	17.772	17	EG359-US
S59949.01	032.819	45.141	12.322	12	EG359-US
S59949.02	032.764	42.951	10.187	10	EG359-US
S59949.03	032.752	44.908	12.156	12	EG359-US
S59949.04	032.763	45.553	12.790	12	EG359-US
S59949.05	032.904	46.152	13.248	13	EG359-US
S59949.06	032.615	44.963	12.348	12	EG359-US
S59949.07	032.477	55.640	23.163	23	EG359-US
S59949.08	032.480	44.621	12.141	12	EG359-US
S59954.01	37.77	49.208	11.438	11	EG359-US
S59954.02	37.46	47.665	10.205	10	EG359-US

STANDARD OPERATING PROCEDURE

VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
METHOD SW-846 8260C/ EPA 624.1

APPROVALS:

Barbara Ball

03/22/2024

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03/22/2024

Technical Director Date

Number	Description of Change	Date
001-011	Previous revisions not documented	
0012	Updated to comply with DoD QSM and ISO 17025 standards.	6/9/11
013	Updated to method 8260C	9/4/13
014	Updated to comply with DoD QSM 5.0 standards.	04/01/16
015	Updated to comply with DoD QSM 5.1 standards.	01/17/18
016	NY NELAC Audit Finding	03/13/19
017	DOD Audit Corrective Action	09/29/2020
018	2020 Internal Audit revisions	02/16/2021
019	NY NELAC Audit Finding	05/25/2022
020	Emergency SOP Amendment Form	03/08/2023
021	2023 Internal Audit revisions	03/22/2024
022		

1.0 SCOPE AND APPLICATION

This SOP is used to determine volatile organic compounds (VOC) in a variety of matrices, regardless of water content, including various air sampling trapping media, ground and surface water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oily wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils, and sediments. See Table 1 for a list of compounds (along with their characteristic ions) that have been evaluated.

There are various techniques by which these compounds may be introduced into the GC/MS system. Purge-and-trap, by SW-846 Methods 5030C (aqueous samples) and 5035A (solid, waste, and oil samples), are the most commonly used technique for volatile organic analytes. SW-846 Method 5000 provides general information on the selection of other introduction methods.

The practical quantitation limit (PQL) for an individual compound is instrument dependent and also dependent on the choice of the sample preparation/introduction method. Using standard quadrapole instrumentation and the purge-and-trap technique, limits should be approximately 50 μg/kg (wet weight) for solid samples and 1 μg/L for ground water. When lower reportable detection limits (RDLs) are required, the mass spectrometer (MS) can be set to selective ion monitoring (SIM) to achieve limits approximately 20 times lower then obtainable using the full scan method. Regardless of the sample matrix, PQLs will be proportionately higher for sample extracts and samples that require dilution or when a reduced sample size is used to avoid saturation of the detector.

Method Detection Limits (MDL) and Practical Quantitation Limits (PQL) are available in Merit's LIMs system.

This SOP is restricted to use by, or under the supervision of, analysts experienced in the use of gas chromatograph/mass spectrometers, and skilled in the interpretation of mass spectra and their use as a quantitative tool.

This SOP is not for use with samples that come into the lab for OHIO VAP work.

2.0 SUMMARY OF THE METHOD

VOC are introduced into the gas chromatograph by the purge-and-trap method or by other methods. The analytes are introduced directly to a wide-bore capillary column. The column is temperature-programmed to separate the analytes, which are then detected with a mass spectrometer interfaced to the gas chromatograph.

Analytes eluted from the capillary column are introduced into the mass spectrometer via a jet separator or a direct connection. Identification of target analytes is accomplished by comparing their mass spectra

with the electron impact spectra of authentic standards. Quantitation is accomplished by comparing the response of a major (quantitation) ion relative to an internal standard using a five point (or more) calibration curve.

The method includes specific calibration and quality control steps that supersede the general requirements provided in SW-846 Method 8000.

3.0 INTERFERENCES

Major contaminant sources are volatile materials in the laboratory and impurities in the inert purging gas and in the sorbent trap. The use of non-polytetrafluoroethylene (PTFE) thread sealants, plastic tubing, or flow controllers with rubber components should be avoided, since such materials out-gas organic compounds will be concentrated in the trap during the purge operation.

Cross-contamination may occur when any sample is analyzed immediately after a sample containing high concentrations of volatile organic compounds. After the analysis of a sample containing high concentrations of volatile organic compounds, one or more blanks should be analyzed to allow the system to be cleaned as well as to demonstrate the ultimate absence of cross-contamination. Alternatively, if the sample immediately following the high concentration sample does not contain the volatile organic compounds present in the high level sample, freedom from contamination has been established.

4.0 APPARATUS AND MATERIALS

Gas chromatograph/mass spectrometer system

- Gas chromatograph - An analytical system complete with a temperature programmable gas chromatograph suitable for splitless injection and all required accessories, including syringes, analytical columns, and gases. The capillary column should be directly coupled to the source.
- 20 m × 0.18 mm ID capillary column coated with DB-624 (J&W Scientific), Rt_x-502.2 (RESTEK), or VOCOL (Supelco), 1-µm film thickness, or equivalent.
- Mass spectrometer capable of scanning from 35 to 260 amu every 2 sec or less, using 70 volts (nominal) electron energy in the electron impact ionization mode. The mass spectrometer must be capable of producing a mass spectrum for 4-bromofluorobenzene (BFB) which meets the criteria in Table 4.
- GC/MS interface - The capillary column is interfaced through a direct connection to the GC/MS system.

- Data system - A computer system is interfaced to the mass spectrometer. Hewlett-Packard Chemstation software (with environmental data analysis) is used to acquire and process GC/MS data.

Purge-and-trap device.

Microsyringes - 10 to 500-µL.

Balance - Analytical, capable of weighing 0.001 g, and top-loading, capable of weighing 0.1 g.

Glass bottles - 40-mL, with PTFE-lined screw-caps.

pH paper.

5.0 REAGENTS

Reagent grade organic chemicals shall be used in all tests. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without introducing adverse interferences.

Organic-free reagent water - All references to water in this method refer to organic-free reagent water.

Stock standard solutions.

- Certified stock standard solutions are purchased when available for the bulk of desired analytes. They are typically available at concentrations of 1000 to 2000 mg/L.
- Supplemental compounds added to calibration mixes are generally prepared gravimetrically from neat standard references (in order to create a high-concentration stock solution).
- Stock standard solutions are stored in bottles with PTFE-lined screw-caps. They are refrigerated and protected from light, as recommended by the standard manufacturer.
- Stock standard solutions are replaced prior to expiration, or sooner if comparison with quality control check samples indicate a problem.

Internal standard solutions - The internal standards used are pentafluorobenzene, 1,4-difluorobenzene, chlorobenzene-d_5, and 1,4-dichlorobenzene-d_4 (see Table 2). Internal standards are used at a working concentration of 50 mg/L and are added to samples, spikes, blanks, and calibration standards at a uniform concentration of 50 µg/L (i.e. 10µL per 5000µL purge volume). For SIM (selective ion monitoring) analysis, internal standards of 1-4-Dioxane-d8, 1,2-Dibromoethane-D4, and 1,2-Dibromo-3-chloropropane-C3 is used, but with concentrations at 50 ppb for 1,4-Dioxane and 1,2-Dibromoethane-D4, and 1,2-Dibromo-3-chloropropane-C3 for 0.4 ppb (µg/L).

Calibration standards - A minimum of five calibration standards are prepared at different concentrations. The lowest calibration standard corresponds to a sample concentration at or below the standard reporting limit. The remaining standards should represent the working range of the GC/MS system. Each standard should contain each analyte for quantitation by this method. For DoD projects, each standard shall contain all target compounds.

Surrogate standards - The surrogates used are toluene-d_8, 4-bromofluorobenzene, and 1,2-dichloroethane-d_4. Surrogate standards are used at a working concentration of 50 mg/L and are added to samples, spikes, blanks, and calibration standards at a uniform concentration of 50 µg/L, or less. For SIM (selective ion monitoring) analysis, surrogate standards are the same, but with concentrations at 0.4 ppb (µg/L).

Matrix spike (MS), matrix spike duplicate (MSD) and laboratory control standards (LCS) - Matrix spiking solutions are prepared using the same standards as those used for the calibration. For DoD projects, matrix spiking solutions shall contain all target compounds.

- Matrix spiking mixes for individual analytes are created at 100 mg/L and spiked into samples at 50 µg/L (*i.e.* 2.50µL per 5000µL purge volume).
- For SIM (selective ion monitoring) analysis, compounds of interest are spiked at concentrations of 0.1 ppb (µg/L).
- For 1-Dioxane, compounds of interest are spiked at concentrations of 50 ppb (µg/L).

Methanol, CH_3OH - Pesticide quality or equivalent, demonstrated to be free of analytes. Store apart from other solvents.

6.0 SAMPLE HANDLING AND PRESERVATION

Unanalyzed samples are refrigerated at 4 ± 2 degrees Celsius in sealed vials or containers.

Aqueous samples are preserved to a pH <2with HCl and/or $Na_2S_2O_3$ (unless unpreserved requested) and collected in a 40 ml. Preserved samples must be analyzed within 14 days from sample collection; unpreserved samples must be analyzed within 7 days from sample collection.

Soil samples collected Encore™ Samplers must be preserved within 48 hours and analyzed within 14 days. Soil samples collected in glass jars shall be kept refrigerated and analyzed within 14 days from sample collection. For additional information on sample collection, handling and preservation for soil samples see SOP #ORL-005.

7.0 PROCEDURE

Sample introduction.

- Direct injection - This method of introduction is used only rarely, generally when the compounds of interest exhibit poor purging efficiency. Quantitation in this case, if required, is generally subject to external standard calibration procedures (*cf*. Method 8000).
- Purge-and-trap - This is generally used for sample introduction for both soil and water samples. All samples, standards, spikes, and blanks are introduced into the GC/MS system in an identical manner (see Merit SOP# ORL-005).

GC/MS operating conditions - see Table 3 for routine operating conditions for VOC analysis.

- For SIM, the MS is put into the SIM mode. Based on compounds of interest, the time windows are set within the run (i.e. for internal standards, surrogate standards, compounds). For each time window, corresponding to a compound, a minimum of 3 ions are chosen for qualitative analysis. One ion (primary ion), generally the most abundant ion is used for quantitative analysis.

Initial calibration.

- Each GC/MS system must be hardware-tuned to meet the criteria in Table 4 for 4-bromofluorobenzene. Analysis does not begin until these criteria are met.
    - In the absence of any other manipulations, evaluate the mass spectrum of the peak apex or the scan immediately preceding or following from the total ion chromatogram for the BFB peak. This is the default approach used.
    - If the above evaluation is adversely affected by ion peak asymmetry, average the three highest intensity scans of the peak or average the mass spectrum ranging from the 10% initial peak intensity to the tailing 10% peak intensity level from the total ion chromatogram for the BFB peak.
    - If the above evaluation is adversely affected by background contamination, perform a background subtraction with a spectrum within 20 scans of the BFB peak which does not represent a target compound. Use of this procedure may be indicative of failing MS performance. The MS source should be cleaned and re-tuned.
    - The BFB mass intensity criteria in Table 4 are used as tuning acceptance criteria.

- All subsequent standards, samples, MS/MSDs, and blanks associated with a BFB analysis must use the identical mass spectrometer instrument conditions, Exception: for SIM, tune is run using full scan acquisition and subsequent samples are acquired using SIM.

♦ Purge and analyze each calibration standard (containing internal standards) and tabulate the area of the primary characteristic ion against concentration for each target analyte (as indicated in Table 1). A set of at least five calibration standards is necessary. The purge volume must be the same for all standards and sample extracts. Figure 1 shows a chromatogram of a midpoint calibration standard.

♦ Calculate response factors (*RF*s) for each target analyte relative to one of the internal standards as follows: $RF = A_s C_i / A_i C_s$. Here, A_s and A_i are the areas of the standard compound and corresponding internal standard, respectively. Likewise, C_s and C_i are the respective concentrations (in any consistent set of units) of the standard compound and corresponding internal standard.

♦ Response Factor Criteria

- It is recommended that a minimum response factor for the most common target analytes as noted in Table 2b, be demonstrated for each individual calibration level as a means to ensure that these compounds are behaving as expected. In addition, meeting the minimum response factor criteria for the lowest calibration level is important in demonstrating the desired sensitivity. Due to the large number of compounds that may be analyzed, some compounds will fail to meet this criteria. In particular, poor performers such as ketones and 1,2-dibromo-3-chloropropane are likely to fail this criteria but have been demonstrated to perform adequately overall.

- If the minimum response factors are not met, the system must be evaluated, and corrective action must be taken before sample analysis begins. Possible problems include standard mixture degradation, contamination in the purge-and-trap system, excessively high or low purge flow rates, and active sites in the column or chromatographic system. Replacing the calibration standards, clipping and/or replacing the column will likely solve this problem.

♦ Evaluation of retention times - The relative retention time (RRT) of each target analyte in each calibration standard should agree within 0.06 RRT units. This is accomplished by setting the retention time extraction windows in the Chemstation software.

- Linearity of target analytes - If the %RSD of any target analytes is 20% or less, then the relative response factor may be assumed to be constant over the calibration range, and the average relative response factor may be used for quantitation.
    - Refer to SW-846 Method 8000 if a least-squares regression is used to determine a linear or quadratic fit to the calibration data. Quadratic polynomials are generally fit through the origin in order to prevent the symptomatic aphysical prediction of high concentrations at very low responses. The coefficient of determination for any regression fit should be ≥0.99. In addition, 6 calibration data points are required for a calibration fit with 3 free parameters, while 5 are required for a calibration fit with 1 or 2 free parameters.
    - When the RSD exceeds 20%, the plotting and visual inspection of a calibration curve can be a useful diagnostic tool. The inspection may indicate analytical problems, including errors in standard preparation, the presence of active sites in the chromatographic system, analytes that exhibit poor chromatographic behavior, *etc*.
    - The method of linear regression analysis has the potential for a significant bias to the lower portion of a calibration curve, while the relative percent difference and the quadratic methods of calibration do not have this potential bias. When calculating the calibration curves using the linear regression model, a minimum quantitation check on the viability of the lowest calibration point should be performed by re-fitting the response from the low concentration calibration standard back into the curve. The recalculated concentration of the low calibration point should be within 30% of the standard's true concentration. Other recovery criteria may be applicable depending on the project's data quality objectives. For analytes which do not meet the minimum quantitation calibration re-fitting criteria reporting those analytes as estimated when the concentration is at or near the lowest calibration point may be appropriate.
    - The initial calibration curve should be verified immediately after performing the standard analyses using a second source standard at a concentration near the midpoint of the calibration range. The acceptance limits are 70-130% or project specific. Analytes that fail this criteria are considered estimated values.
    - The quality of the calibration fit for any particular compound is communicated to the data user via the Quality Control report for a given batch of samples. The calibration summary report includes: the concentration and RF for each standard in the calibration curve, the type of calibration fit, the calibration fit parameters (*i.e*. average RF or

regression coefficients), and the appropriate calibration quality metric (*i.e*. %RSD or COD).

- GC/MS calibration verification - Calibration verification consists of three steps that are performed at the beginning of each 12-hour analytical shift.
- Prior to the analysis of samples or calibration standards, purge the BFB standard into the GC/MS system. The resultant mass spectrum for BFB must meet the criteria given in Table 4 before sample analysis begins. These must be *injected* within 12 hours of the injection time for the BFB.
- The initial calibration for each compound of interest should be verified once every 12 hours prior to sample analysis, using the introduction technique and conditions used for samples. This is accomplished by analyzing a calibration standard at a concentration near the midpoint concentration for the calibration range of the GC/MS (50 µg/L; this represents 2.50 µL of the 100 mg/L calibration standard solution in a 5mL purge volume). A concentration of 0.1µg/L is analyzed for SIM procedures. The results from the calibration standard analysis must meet the verification acceptance criteria provided below. In addition the internal standards should be within 10s of those in the midpoint calibration standard and the responses should be 50-200% of those in the midpoint calibration standard.
- A method blank is run every 20 samples to ensure that the total system (preparation glassware, introduction device, transfer lines, and the GC/MS system itself) is free of contaminants. A method blank/wash sample is also run after calibration check/spike samples and prior to analytical samples in order to eliminate carryover contamination from the purge-and-trap system.
- Calibration Verification
  - A calibration verification must be made during every 12-hour analytical shift.
  - Each of the most common target analytes in the calibration verification standard should meet the minimum response factors as noted in Table 2b. This is the same check that is applied during the initial calibration and exceptions are noted above.
  - If the minimum response factors are not met, the system must be evaluated, and corrective action must be taken before sample analysis begins.
  - All target compounds of interest must be evaluated using a 20% variability criterion. If the percent drift for a compound is less than or equal to 20%, then the initial calibration for that compound is assumed to be valid. Due to the large numbers of compounds that may be analyzed by this method, some compounds will fail to meet the criteria. If the criterion is not met for more than 20% of the compounds included in the initial

calibration, then corrective action must be taken prior to the analysis of samples. In cases where compounds fail, they may still be reported as non-detects if it can be demonstrated that there was adequate sensitivity to detect the compound at the applicable quantitation limit. For situations when a failed compound is present, the concentration is an estimated value. Drift is defined as the normalized deviation of the measured from the spike value of a target component: $\%D = \left|C - C_{spike}\right| / C_{spike}$.

- Problems similar to those listed under initial calibration could affect the calibration verification. If the problem cannot be corrected by other measures, a new initial calibration must be generated. The calibration verification criteria must be met before sample analysis begins.

GC/MS analysis of samples.

- Samples are screened at a diluted state via GC/MS whenever possible prior to analysis within a 12-hour QC batch. This can identify potentially low surrogate recoveries, high target compound concentrations, non-target matrix interferences. This will minimize contamination of the GC/MS system from unexpectedly high concentrations of organic compounds.
- Samples are introduced into the GC/MS system by loading the 40ml zero headspace vial onto the autosampler which draws 5ml of sample and adds internal standards and surrogate standards to achieve a 5ug/L concentration.

  For SIM analysis, internal and surrogate standards are spiked at 0.4μg/L, except 1,4-Dioxane which is spiked at 50 μg/L.
- If the concentration for any quantitation ion exceeds the initial calibration range of the GC/MS system, the sample extract should be diluted and reanalyzed. In any event, a result based on an extrapolation of calibration curve beyond the working range is flagged on the analytical report.
- The Extracted Ion Current Profile (EICP) area for all of the internal standards in all spikes, blanks, and samples is monitored relative to the most recent calibration verification standard. Changes by more than a factor of two (*i.e.* 50% to 200%) can indicate adverse matrix effects (in the case of an isolated sample) or degrading MS performance (in the case of a systematic low bias). A single-sample matrix effect is documented either via screening or re-analysis and is noted on the analytical report (see Table 5a and 5b). Similarly, the retention times for all of the internal standards in all spikes, blanks, and samples is monitored relative to the most recent calibration verification standard. The change in retention time for any internal standard by more

than 30 seconds of the most recent calibration verification standard is indicative of the same potential problems listed above and should be flagged/corrected as appropriate.

Qualitative analysis.

- The qualitative identification of compounds determined by this method is based on retention time and on comparison of the sample mass spectrum, after background correction, with characteristic ions in a reference mass spectrum. The reference mass spectrum must be generated by the laboratory using the conditions of this method. The characteristic ions from the reference mass spectrum are given in Figures 1a and 1b. Compounds are identified when the following criteria are met.
    - Initial selection of a target compound peak is performed by the Chemstation data system search routine. The search is based on the presence of a target chromatographic peak containing ions specific for the target compound at a compound specific retention time.
    - The RRT of the sample component is within ± 0.06 RRT units of the RRT of the standard component. This is accomplished using retention time extraction windows within the Chemstation data system.
    - The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum. (Example: For an ion with an abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can range between 20% and 80%.)
    - Structural isomers that produce very similar mass spectra are identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.
    - Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (*i.e.*, a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra is important.
    - Examination of extracted ion current profiles of appropriate ions can aid in the selection of spectra and in qualitative identification of compounds. When analytes coelute (*i.e.*, only one chromatographic peak is apparent), the identification criteria may be met, but

each analyte spectrum will contain extraneous ions contributed by the coeluting compound.

- In the two previous cases, analyst expertise as well as knowledge of site history may be important in accepting/rejecting the identification of a compound. In the event of continued uncertainty, the analyst should preferentially make a conservative judgment and accept an identified hit, allowing the potential for a false positive.

♦ For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. Guidelines for tentative identification are:

- Relative intensities of major ions in the reference spectrum (ions > 10% of the most abundant ion) should be present in the sample spectrum.
- The relative intensities of the major ions should agree within ± 20%.
- Molecular ions present in the reference spectrum should be present in the sample spectrum.
- Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.
- Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. Data system library reduction programs can sometimes create these discrepancies.

Quantitative analysis.

♦ Once a compound has been identified, the quantitation of that compound will be based on the integrated abundance of the primary characteristic ion from the EICP.

♦ The curve fit applied in the initial calibration is the same as that used to compute the concentration of a target analyte in a sample. All curve fits are evaluated by the data system and are of the form: $A_s/A_i = k_0 + k_1[C_s/C_i] + k_2[C_s/C_i]^2$. Here A_s and A_i are the areas of the target and internal standard, C_s and C_i are the concentrations of the target and internal standard, and k_i is the i^{th}-order regression coefficient. Note that for a mean RF fit to the calibration data, $k_1 \equiv$ <RF>, while k_0, $k_2 \equiv 0$.

- The concentration of any non-target analytes identified in the sample may be estimated by assuming a mean RF of 1 and by using the tentatively identified compound (TIC) areas for the nearest internal standard and target compound. The resulting concentration should be reported indicating: (1) that the value is an estimate, and (2) which internal standard was used to determine concentration. Use the nearest internal standard free of interferences.
- Structural isomers that produce very similar mass spectra should be quantitated as individual isomers if they have sufficiently different GC retention times. Otherwise, structural isomers are quantitated as isomeric pairs (such as p- and m-xylene).

8.0 QUALITY CONTROL

All of the quality control items employed and evaluated are provided in Table 5a and 5b. In addition, the table indicates the frequency of each QC item along with appropriate courses of corrective action. Control limits for surrogates and internal standards are listed in Table 6. The analyst will follow SOP # QA-007 and complete the appropriate review form upon completion of the analysis.

9.0 METHOD PERFORMANCE

The precision and accuracy of the method depends upon the overall performance of the sample preparation and analysis. Laboratory specific performance data is provided for Merit's LIMs system. Each sample batch contains a method blank, laboratory control sample and matrix spike samples. Performance Evaluation samples are analyzed periodically in order to prove the performance of the method.

10.0 EQUIPMENT MAINTENANCE AND TROUBLESHOOTING

Each instrument is assigned a maintenance logbook. All maintenance performed on the instrument must be recorded. Additionally, any modifications to the instrument settings shall be noted in the specific instrument logbook. Maintenance procedures provided in the equipment manual shall be followed. Maintenance may include, cleaning the MS source, clipping/replacing the column, or replacing the calibration standard.

Computer software and firmware can be found on Merit's network at F:\data\MERIT\EQUIPMENT\Instrument-Software Version List.200818.xls.

11.0 SAFETY

Eye protection and gloves must be worn while performing the analyses. Every laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples. The air system throughout the laboratory area is on a 100% fresh air exchange system,

this system exchanges 100% the air in the laboratory area with air from outside 6 times per hour and 30 times per hour when the emergency purge button is hit.

A reference file of material safety data sheets (MSDSs) is available to all personnel. Specific attention shall be paid (but not limited) to:

a. Methanol may react violently with acids, acid chlorides, acid anhydrides, oxidizing agents, reducing agents and alkali metals. Protect from moisture. Highly flammable.
b. Hydrochloric acid is corrosive. Extreme heat or contact with metals can release flammable hydrogen gas, stable under ordinary conditions of use and storage, and incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates, cyanides, sulfides, sulfites, and formaldehyde.

12.0 WASTE DISPOSAL AND POLLUTION PREVENTION

All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations. Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

13.0 DEFINITIONS

4-Bromofluorobenzene (BFB), is used to verify that the GC/MS is properly tuned and ready for calibration and sample analyses. BFB is directly injected at 25-50 ng and precedes all other analyses. A twelve hour analysis time window is used before another BFB injection is required.

An Initial Calibration Verification standard (ICV) is analyzed before the analysis of samples as a check on the calibration curve. The ICV shall be of a second source, meaning a separate vendor and/or lot # shall be used to prepare this standard. A second source is needed to validate the integrity and concentration of the standards used for calibration.

An Initial Calibration Blank (ICB) is also analyzed before samples to confirm that the deionized water (DI H2O) used for standards, blanks, and dilutions are free from contamination. An ICB for soil samples also includes organic free sand and/or methanol used for standard and QC preparation, as well as sample dilutions and volume adjustments; the control sand and methanol must also be documented as free from contamination.

A Calibration Check Verification standard (CCV) is analyzed at the beginning of each sequence (following the BFB injection) shift and every 12 hour shift thereafter. A CCV is made up from the same standards used

for calibration and is used to ensure that the calibration and retention times are stable.

An analytical batch is defined as a group of samples (not to exceed 20 samples) analyzed per sequential run. Depending on client or program requirements, an analytical batch may or may not include matrix spikes as part of the 20 samples.

Internal standards (ISTD) are added to each sample, blank, spike, and check standard. The ISTDs used are Fluorobenzene, Chlorobenzene-d_5, and 1,4-Dichlorobenzene-d_4. The ISTD is used for internal calibration as a reference peak and to check purging efficiency.

Surrogate standards (SSTD) are also added to each sample, blank, spike, and check standard. The SSTDs used are Toluene-d_4, 4-Bromofluorobenzene, 1,2-Dichloroethane-d_4, and Dibromofluoromethane. The SSTD is used as matrix interference and as a method control check.

Method Blank (MB): An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

A Continuing Calibration Blank (CCB) is analyzed every 12 hour shift after the MB has been analyzed and before sample reanalyzes to ensure the system is still free from contamination.

Instrument blanks are analyzed whenever instrument contamination is a suspected possibility. The purpose of an IB is to prevent carry over from a standard, spike, or contaminated sample into another sample or blank. The acceptance criteria for an IB is the same as for a MB or CCB (for example: if an IB contains detections above acceptance criteria and a MB and/or sample following the IB exhibit the same contamination above acceptance criteria, then the instrument shall be considered contaminated). The samples and/or MBs shall be reanalyzed after the instrument is confirmed free from contamination.

Laboratory Control Spike (LCS): Milli-Q water (for water) and Organic-Free Soil (for soil) is spiked with all target compounds and carried through the complete sample preparation and analytical procedure. The control spike is used to document the ability of an analyst to generate acceptable precision and bias to verify the analytical system performance, and to document method accuracy for each matrix.

Matrix Spike (MS): An aliquot of sample spiked with all target compounds. The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

Matrix Spike Duplicate (MSD): Intra-laboratory split samples spiked with all target compounds. The spiking occurs prior to sample preparation and analysis. They are used to document the precision and bias of a method in a given sample matrix.

14.0 REFERENCES

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National Environmental Laboratory Accreditation Conference (NELAC), 2003. *Standards, Chapters 1–6,* EPA/600/R-04/003.

EPA Method 624.1, December 2016

Table 1. Summary of Retention Times and Characteristic Ions for Volatile Organics

Compound List Report Ravnica

Method : F:\GCMS.DAT\RAVNICA.SN\METHODS\WR201119.M
Title : Volatile Organics, SW-846 # 8260B
Last Update : Thu Nov 19 18:19:17 2020
Response via : Initial Calibration
Total Cpnds : 88

PK#		Compound Name	QIon	Exp_RT	Rel_RT	Cal	#Qual	A/H	ID
1	I	PENTAFLUOROBENZENE (I)	168	4.04	1.000	A	2	A	B
2	S	1,2-DICHLOROETHANE-D4 (S)	65	4.19	1.039	A	2	A	B
3		1,1,2-Trichloro-1,2,2-trifluor	101	2.63	0.651	A	2	A	B
4		Diethyl ether (*)	74	2.41	0.596	A	2	A	B
5		Acetone (*)	43	2.66	0.660	A	2	A	B
6		Methyl iodide (iodomethane) (*	142	2.70	0.669	A	2	A	B
7		Carbon disulfide (*)	76	2.76	0.684	A	2	A	B
8		Methyl Acetate	43	2.91	0.721	A	2	A	B
9		tert-Methyl butyl ether (MTBE)	73	3.17	0.784	A	3	A	B
10		Acrylonitrile (*)	53	3.15	0.780	A	2	A	B
11		2-Butanone (MEK) (*)	43	3.77	0.935	A	2	A	B
12		Dichlorodifluoromethane	85	1.26	0.311	QO	2	A	B
13		Chloromethane (SPCC)	50	1.34	0.332	A	2	A	B
14		Vinyl Chloride (CCC)	62	1.47	0.365	A	2	A	B
15		Bromomethane	94	1.75	0.432	A	2	A	B
16		Chloroethane	64	1.85	0.458	A	3	A	B
17		Acrolein	56	2.52	0.623	A	2	A	B
18		Trichlorofluoromethane	101	2.17	0.538	A	3	A	B
19		1,1-Dichloroethene (CCC/MS)	61	2.58	0.639	A	3	A	B
20		Methylene Chloride	84	2.97	0.736	A	3	A	B
21		trans-1,2-Dichloroethene	61	3.16	0.782	A	3	A	B
22		Hexane	57	3.33	0.825	A	2	A	B
23		Vinyl Acetate	43	3.32	0.823	A	2	A	B
24		1,1-Dichloroethane (SPCC)	63	3.42	0.848	A	2	A	B
25		cis-1,2-Dichloroethene	96	3.76	0.932	A	2	A	B
26		2,2-Dichloropropane	77	3.76	0.932	A	2	A	B
27		Tetrahydrofuran	42	3.92	0.970	A	2	A	B
28		Chloroform (CCC)	83	3.94	0.975	A	2	A	B
29		Bromochloromethane	130	3.90	0.965	A	3	A	B
30		1,1,1-Trichloroethane	97	4.04	1.000	A	2	A	B
31		1,1-Dichloropropene	75	4.11	1.018	A	2	A	B
32		Cyclohexane	42	4.06	1.005	A	3	A	B
33	I	1,4-DIFLUOROBENZENE (I)	114	4.40	1.000	A	2	A	B
34	S	TOLUENE-D8 (S)	98	5.11	1.160	A	2	A	B
35		4-Methyl-2-pentanone (MIBK) (*	58	5.04	1.145	A	3	A	B
36		2-Hexanone (*)	58	5.43	1.232	A	3	A	B
37		2-chloroethylvinyl ether	63	4.90	1.113	A	2	A	B
38		Carbon Tetrachloride	117	4.12	0.936	A	2	A	B
39		Benzene (MS)	78	4.22	0.958	A	2	A	B
40		1,2-Dichloroethane	62	4.23	0.961	A	3	A	B
41	M	Trichloroethene (MS)	95	4.53	1.030	A	3	A	B
42		1,2-Dichloropropane (CCC)	63	4.64	1.055	A	2	A	B
43		Bromodichloromethane	83	4.77	1.083	A	3	A	B
44		Methyl Cyclohexane	55	4.63	1.051	A	3	A	B
45		Dibromomethane	174	4.71	1.069	A	3	A	B
46		cis-1,3-Dichloropropene	75	4.98	1.131	A	2	A	B
47	M	Toluene (CCC/MS)	91	5.14	1.167	A	2	A	B
48		trans-1,3-Dichloropropene	75	5.23	1.188	A	2	A	B

49		1,1,2-Trichloroethane	83	5.32	1.208	A	3	A	B
50		Tetrachloroethene	166	5.39	1.225	A	2	A	B
51	I	CHLOROBENZENE-D5 (I)	82	5.78	1.000	A	2	A	B
52	S	4-BROMOFLUOROBENZENE (S)	174	6.33	1.095	A	2	A	B
53		1,3-Dichloropropane	76	5.40	0.935	A	2	A	B
54		trans-1,4-Dichloro-2-butene	53	6.41	1.109	QO	3	A	B
55		Dibromochloromethane	129	5.51	0.954	A	2	A	B
56		1,2-Dibromoethane	107	5.57	0.965	A	2	A	B
57	M	Chlorobenzene (SPCC/MS)	112	5.79	1.003	A	2	A	B
58		1,1,1,2-Tetrachloroethane	131	5.83	1.009	A	3	A	B
59		Ethylbenzene (CCC)	91	5.84	1.010	A	2	A	B
60		p,m-Xylene	106	5.89	1.019	A	2	A	B
61		o-Xylene	91	6.08	1.052	A	2	A	B
62		Styrene	104	6.08	1.053	A	2	A	B
63		Isopropylbenzene	105	6.24	1.081	A	2	A	B
64		Bromoform (SPCC)	173	6.18	1.070	A	2	A	B
65		1,1,2,2-Tetrachloroethane (SPC	83	6.38	1.104	A	3	A	B
66		1,2,3-Trichloropropane	110	6.41	1.110	A	3	A	B
67		n-Propylbenzene	91	6.44	1.114	A	2	A	B
68		Bromobenzene	156	6.41	1.109	A	2	A	B
69		1,3,5-Trimethylbenzene	120	6.52	1.128	A	2	A	B
70		2-Chlorotoluene	91	6.49	1.123	A	2	A	B
71		4-Chlorotoluene	126	6.54	1.132	A	2	A	B
72		tert-Butylbenzene	91	6.67	1.155	A	2	A	B
73		1,2,4-Trimethylbenzene	120	6.70	1.160	A	2	A	B
74	I	1,4-DICHLOROBENZENE-D4 (I)	152	6.88	1.000	A	2	A	B
75		sec-Butylbenzene	105	6.78	0.986	A	2	A	B
76		p-Isopropyltoluene	119	6.84	0.995	A	2	A	B
77		1,3-Dichlorobenzene	146	6.85	0.995	A	2	A	B
78		1,4-Dichlorobenzene	146	6.89	1.002	A	2	A	B
79		1,2-Dichlorobenzene	146	7.07	1.028	A	2	A	B
80		1,2,3-Trimethylbenzene	105	6.90	1.004	A	2	A	B
81		n-Butylbenzene	91	7.04	1.024	A	2	A	B
82		Hexachloroethane	201	7.19	1.046	A	2	A	B
83		1,2-Dibromo-3-Chloropropane	157	7.44	1.082	A	3	A	B
84		1,2,4-Trichlorobenzene	182	7.84	1.140	A	3	A	B
85		Hexachlorobutadiene	225	7.92	1.151	A	3	A	B
86		1,2,3-Trichlorobenzene	180	8.09	1.176	A	3	A	B
87		Naphthalene	128	7.97	1.159	A	3	A	B
88		2-Methylnaphthalene	142	8.52	1.239	A	2	A	B

Cal A = Average L = Linear LO = Linear w/origin Q = Quad QO = Quad w/origin
#Qual = number of qualifiers
A/H = Area or Height
ID R = R.T. B = R.T. & Q Q = Qvalue L = Largest A = All

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: For DoD projects, all target compounds will be included in the matrix spike and matrix spike duplicate

Table 2. Summary of Applicable Performance Compounds - Volatile Organics Analysis

COMPOUND	ISD	SSD
PENTAFLUOROBENZENE	✔	
1,2-DICHLOROETHANE-D4		✔
1,4-DIFLUOROBENZENE	✔	
TOLUENE-D8		✔
CHLOROBENZENE-D5	✔	
4-BROMOFLUOROBENZENE-		✔
1,4-DICHLOROBENZENE-D4	✔	

: For DoD projects, all target compounds will be included in the matrix spike and matrix spike duplicate

Key

ISD: Internal Standard Compound

SSD: Surrogate Standard Compound

Table 2b. Recommended Minimum Relative Response Factor Criteria For Initial And Continuing Calibration Verification.

Volatile Compounds	Minimum Response Factor (RF)[a]
Dichlorodifluoromethane	0.100
Chloromethane	0.100
Vinyl chloride	0.100
Bromomethane	0.100
Chloroethane	0.100
Trichlorofluoromethane	0.100
1,1-Dichloroethene	0.100
1,1,2-Trichloro-1,2,2-trifluoroethane	0.100
Acetone	0.100
Carbon disulfide	0.100
Methyl Acetate	0.100
Methylene chloride	0.100
trans-1,2-Dichloroethene	0.100
cis-1,2-Dichloroethene	0.100
Methyl tert-Butyl Ether	0.100
1,1-Dichloroethane	0.200
2-Butanone	0.100
Chloroform	0.200
1,1,1-Trichloroethane	0.100
Cyclohexane	0.100
Carbon tetrachloride	0.100
Benzene	0.500
1,2-Dichloroethane	0.100
Trichloroethene	0.200
Methylcyclohexane	0.100
1,2-Dichloropropane	0.100
Bromodichloromethane	0.200
cis-1,3-Dichloropropene	0.200
trans-1,3-Dichloropropene	0.100
4-Methyl-2-pentanone	0.100
Toluene	0.400
1,1,2-Trichloroethane	0.100
Tetrachloroethene	0.200
2-Hexanone	0.100
Dibromochloromethane	0.100
1,2-Dibromoethane	0.100
Chlorobenzene	0.500

Volatile Compounds	Minimum Response Factor (RF)[a]
Ethylbenzene	0.100
meta-/para-Xylene	0.100
ortho-Xylene	0.300
Styrene	0.300
Bromoform	0.100
Isopropylbenzene	0.100
1,1,2,2-Tetrachloroethane	0.300
1,3-Dichlorobenzene	0.600
1,4-Dichlorobenzene	0.500
1,2-Dichlorobenzene	0.400
1,2-Dibromo-3-chloropropane	0.050
1,2,4-Trichlorobenzene	0.200

[a] The Project-specific response factors obtained may be affected by the quantitation ion selected and when using possible alternate ions the actual response factors may be lower than those listed.

Table 3. GC/MS Operating Conditions - Volatile Organics Analysis

Operating Parameter	**Volatiles Analysis**
Chromatographic Column	DB 624, *L* = 20 *m*, *ID* = 0.18 *mm*
Carrier Gas	Helium (He)
Temperature Program	T_0 = 30°C, hold 2.0 *min* dT/dt_1 = 32°C/*min* T_1 = 195°C dT/dt_2 = 30°C/*min* T_2 = 235°C
Injector Temperature	150°C
Detector Temperature	300°C
Purge Volume	5 *mL*
Mass Scanning Range	35 *m/z* - 260 *m/z*
Mass Scanning Rate	2.0 *Hz*

Note: the above is subject to change based on GC and/or sample conditions.

Table 4. BFB Tune Evaluation Criteria

Target *m/z*	**Relative *m/z***	**LCL (%)**	**UCL (%)**
50	95	8	40
75	95	30	66
95	95	100	100
96	95	5.0	9.0
173	174	0	2.0
174	95	50	120
175	174	4.0	9.0
176	174	93	101
177	176	5.0	9.0

Abundance criteria are for a quadrupole mass spectrometer. Alternative tuning criteria from other published EPA reference methods may be used, provided method performance is not adversely affected. Alternative tuning criteria specified by an instrument manufacturer may also be used for another type of mass spectrometer, or for an alternative carrier gas, provided method performance is not adversely affected.

Table 5a. Quality Control Items, Frequency, and Corrective Action

QC Item	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration	Prior to all analytical runs	Method-based	Examine the entire analytical system; some or all of the following: clean MS source, re-tune, clip/replace column, replace calibration standards, re-calibrate.
BFB	12-hour	Table 4	Re-attempt injection; clean MS source, re-tune; failure requires the re-analysis of all associated analytical runs.
Calibration Verification	12-hour	Table 2b	Re-attempt injection; some or all of the following: clean MS source, re-tune, clip/replace column, replace calibration standards, re-calibrate; failure requires the re-analysis of all associated analytical runs.
LCS and MS	20 samples	Laboratory in-house Control Limits with no more than 4 Marginal Exceedances	A failed LCS should be re-analyzed. A failed MS requires no action provided that the LCS is acceptable. If additional sample exists, the samples associated with a failed LCS should be re-analyzed or QC data qualified.
Duplicate or MSD	20 samples	n/a	Relative Percent Differences (RPDs) are computed and included in the QC report
Method Blank	20 samples	<RL	Method blank contamination is flagged on the analytical report for any identified target compound. Blanks indicative of contaminated analytical system (typically the purge-and-trap system) should result in a thorough cleansing of the affected system and sample/blank re-analysis.
Internal Standard	All samples	Section 7.5.5	Adverse matrix effects on areas/recoveries are demonstrated either by screening the extract of re-analyzing the sample within a 12-hour QC batch.

QC Item	Frequency	Acceptance Criteria	Corrective Action
			The resulting analytical report is flagged appropriately. A negative bias unrelated to matrix effects indicates the need to: clean the MS source, re-tune, and re-calibrate
Surrogate Standard	All samples	Table 6	Adverse matrix effects on areas/recoveries are demonstrated either by screening the extract of re-analyzing the sample within a 12-hour QC batch. The resulting analytical report is flagged appropriately. If additional sample exists, the sample should be re-extracted prior to re-analysis if a matrix effect cannot be demonstrated.
Target Compound	All samples	Method-based	Target compounds beyond the calibration range are diluted and re-analyzed and/or flagged as estimated on the analytical report.

Table 5b. Quality Control Items, Frequency, and Corrective Action for DoD Projects

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of BFB or DFTPP from method.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up and after ICV or CCV failure, prior to sample analysis.	Each analyte must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.	Flagging is not appropriate.	Minimum 5 levels for linear and 6 levels for quadratic. No samples shall be analyzed until ICAL has passed. If the specific version of a method requires additional evaluation (e.g., RFs or low calibration standard analysis and recovery criteria) these additional requirements must also be met.
Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Calculated for each analyte and surrogate.
Evaluation of Relative Retention Times (RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	NA.	After maintenance is performed which may affect retention times, RRTs may be updated based on the daily CCV. RRTs shall be compared with the most recently updated RRTs.
Initial	Once after	All reported	Correct problem.	Flagging is not	No samples shall be analyzed

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Calibration Verification (ICV)	each ICAL, analysis of a second source prior to sample analysis	analytes within ± 20% of true value.	Rerun ICV. If that fails, repeat ICAL.	appropriate.	until calibration has been verified with a second source.
Continuing calibration verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since the last acceptable CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. If the specific version of a method requires additional evaluation (e.g, average RFs) these additional requirements must also be met.
Internal standards (IS)	Every field sample, standard, and QC sample.	Retention time ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is	If corrective action fails in field samples, data must be qualified and explained in the case narrative. Apply Q-flag	NA

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
		On days when ICAL is not performed, the daily initial CCV can be used.	mandatory.	to analytes associated with the non-compliant IS. Flagging criteria is not appropriate for failed standards.	
Method blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater. Common contaminants, must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all QC samples and field samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory	Must contain all surrogates and all analytes to be reported. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
				batch.	
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Must contain all surrogates and all analytes to be reported. For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.
Matrix spike duplicate (MSD) or Matrix duplicate (MD)	One per preparatory batch.	A laboratory must use the QSM Appendix C Limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	MSD: Must contain all surrogates and all analytes to be reported. The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Surrogate spike	All field and QC samples.	QC acceptance criteria specified by project, if available; otherwise use QSM Appendix C limits or in-house LCS limits if analyte(s) are not listed..	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious	Apply Q-flag to all associated analytes if acceptance criteria are not met and explain in the case narrative.	Alternative surrogates are recommended when there is obvious chromatographic interference.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
			chromatographic interference with surrogate is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative.		

DoD Appendix C LCS Limits
Method 8260 Solid Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
630-20-6	1,1,1,2-Tetrachloroethane	78	125
71-55-6	1,1,1-Trichloroethane	73	130
79-34-5	1,1,2,2-Tetrachloroethane	70	124
79-00-5	1,1,2-Trichloroethane	78	121
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane [Freon-113]	66	136
75-34-3	1,1-Dichloroethane	76	125
75-35-4	1,1-Dichloroethene	70	131
563-58-6	1,1-Dichloropropene	76	125
87-61-6	1,2,3-Trichlorobenzene	66	130
96-18-4	1,2,3-Trichloropropane	73	125
526-73-8	1,2,3-Trimethlybenzene	82	118
120-82-1	1,2,4-Trichlorobenzene	67	129
95-63-6	1,2,4-Trimethylbenzene	75	123
96-12-8	1,2-Dibromo-3-chloropropane	61	132
106-93-4	1,2-Dibromoethane	78	122
95-50-1	1,2-Dichlorobenzene	78	121
107-06-2	1,2-Dichloroethane	73	128
17060-07-0	1,2-Dichloroethane-d4	71	136
540-59-0	1,2-Dichloroethene	78	122
78-87-5	1,2-Dichloropropane	76	123
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	64	132
108-70-3	1,3,5-Trichlorobenzene	71	128
108-67-8	1,3,5-Trimethylbenzene	73	124
541-73-1	1,3-Dichlorobenzene	77	121
142-28-9	1,3-Dichloropropane	77	121
542-75-6	1,3-Dichloropropene	77	126
106-46-7	1,4-Dichlorobenzene	75	120
105-05-5	1,4-Diethylbenzene	79	114

123-91-1	1,4-Dioxane	55	138
544-10-5	1-Chlorohexane	71	130
594-20-7	2,2-Dichloropropane	67	133
78-93-3	2-Butanone (MEK)	51	148
126-99-8	2-Chloro-1,3-butadiene	65	133
110-75-8	2-Chloroethyl vinyl ether	43	149
95-49-8	Chlorotoluene	75	122
591-78-6	2-Hexanone	53	145
79-46-9	2-Nitropropane	47	150
67-63-0	2-Propanol [Isopropyl alcohol]	60	140
460-00-4	4-Bromofluorobenzene	79	119
106-43-4	4-Chlorotoluene	72	124
108-10-1	4-Methyl-2-pentanone [MIBK]	65	135
67-64-1	Acetone	36	164
75-05-8	Acetonitrile	54	143
107-02-8	Acrolein [Propenal]	47	155
107-13-1	Acrylonitrile	65	134
107-05-1	Allyl chloride	68	135
71-43-2	Benzene	77	121
100-44-7	Benzyl chloride	64	120
108-86-1	Bromobenzene	78	121
74-97-5	Bromochloromethane	78	125
75-27-4	Bromodichloromethane	75	127
75-25-2	Bromoform	67	132
74-83-9	Bromomethane	53	143
75-15-0	Carbon disulfide	63	132
56-23-5	Carbon tetrachloride	70	135
108-90-7	Chlorobenzene	79	120
124-48-1	Chlorodibromomethane	74	126
75-00-3	Chloroethane	59	139
67-66-3	Chloroform	78	123
74-87-3	Chloromethane	50	136
156-59-2	cis-1,2-Dichloroethene	77	123

10061-01-5	cis-1,3-Dichloropropene	74	126
1476-11-5	cis-1,4-Dichloro-2-butene	69	143
110-82-7	Cyclohexane	67	131
108-94-1	Cyclohexanone	30	156
1868-53-7	Dibromofluoromethane	78	119
74-95-3	Dibromomethane	78	125
75-71-8	Dichlorodifluoromethane [Freon-12]	29	149
75-43-4	Dichlorofluoromethane	47	155
60-29-7	Diethyl ether	71	129
108-20-3	Diisopropyl ether	69	127
64-17-5	Ethanol	45	159
141-78-6	Ethyl acetate	52	139
97-63-2	Ethyl methacrylate	69	129
637-92-3	Ethyl tert-butyl ether	72	126
100-41-4	Ethylbenzene	76	122
462-06-6	Fluorobenzene	81	114
142-82-5	Heptane	49	138
87-68-3	Hexachlorobutadiene	61	135
67-72-1	Hexachloroethane	72	133
110-54-3	Hexane	45	142
74-88-4	Iodomethane	71	131
78-83-1	Isobutyl alcohol	60	135
108-21-4	Isopropyl acetate [Acetic acid]	58	131
98-82-8	Isopropylbenzene	68	134
179601-23-1	m/p-Xylene [3/4-Xylene]	77	124
126-98-7	Methacrylonitrile	66	132
79-20-9	Methyl acetate	53	144
80-62-6	Methyl methacrylate	63	134
1634-04-4	Methyl tert-butyl ether [MTBE]	73	125
108-87-2	Methylcyclohexane	66	133
75-09-2	Methylene chloride	70	128
123-86-4	n-Butyl acetate	62	128
71-36-3	n-Butyl alcohol	55	131

104-51-8	n-Butylbenzene	70	128
103-65-1	n-Propylbenzene	73	125
91-20-3	Naphthalene	62	129
95-47-6	o-Xylene	77	123
99-87-6	p-Isopropyltoluene [p-Cymene]	73	127
76-01-7	Pentachloroethane	69	135
107-12-0	Propionitrile [Ethyl cyanide]	68	134
135-98-8	sec-Butylbenzene	73	126
100-42-5	Styrene	76	124
994-05-8	tert-Amyl methyl ether [TAME]	73	126
75-65-0	tert-Butyl alcohol	68	133
98-06-6	tert-Butylbenzene	73	125
127-18-4	Tertachloroethene	73	128
109-99-9	Tetrahydrofuran	61	135
108-88-3	Toluene	77	121
2037-26-5	Toluene-d8	85	116
156-60-5	trans-1,2-Dichloroethene	74	125
10061-02-6	trans-1,3-Dichloropropene	71	130
110-57-6	trans-1,4-Dichloro-2-butene	62	136
79-01-6	Trichloroethene	77	123
75-69-4	Trichlorofluoromethane [Freon-11]	62	140
108-05-4	Vinyl acetate	50	151
75-01-4	Vinyl chloride	56	135
1330-20-7	Xylene [total]	78	124

DoD Appendix C LCS Limits
Method 8260 Water Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
630-20-6	1,1,1,2-Tetrachloroethane	78	124
71-55-6	1,1,1-Trichloroethane	74	131
79-34-5	1,1,2,2-Tetrachloroethane	71	121
79-00-5	1,1,2-Trichloroethane	80	119
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane	70	136

	[Freon-113]		
75-34-3	1,1-Dichloroethane	77	125
75-35-4	1,1-Dichloroethene	71	131
563-58-6	1,1-Dichloropropene	79	125
87-61-6	1,2,3-Trichlorobenzene	69	129
96-18-4	1,2,3-Trichloropropane	73	122
526-73-8	1,2,3-Trimethlybenzene	82	120
120-82-1	1,2,4-Trichlorobenzene	69	130
95-63-6	1,2,4-Trimethylbenzene	76	124
96-12-8	1,2-Dibromo-3-chloropropane	62	128
106-93-4	1,2-Dibromoethane	77	121
95-50-1	1,2-Dichlorobenzene	80	119
107-06-2	1,2-Dichloroethane	73	128
17060-07-0	1,2-Dichloroethane-d4	81	118
540-59-0	1,2-Dichloroethene	79	121
78-87-5	1,2-Dichloropropane	78	122
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	70	136
108-70-3	1,3,5-Trichlorobenzene	75	130
108-67-8	1,3,5-Trimethylbenzene	75	124
106-99-0	1,3-Butadiene	43	158
541-73-1	1,3-Dichlorobenzene	80	119
142-28-9	1,3-Dichloropropane	80	119
542-75-6	1,3-Dichloropropene	77	123
106-46-7	1,4-Dichlorobenzene	79	118
105-05-5	1,4-Diethylbenzene	79	118
123-91-1	1,4-Dioxane	59	139
544-10-5	1-Chlorohexane	76	124
540-84-1	2,2,4-Trimethylpentane [Isooctane]	58	132
594-20-7	2,2-Dichloropropane	60	139
75-85-4	2-Butanol	66	120
78-93-3	2-Butanone (MEK)	56	143
126-99-8	2-Chloro-1,3-butadiene	65	135

110-75-8	2-Chloroethyl vinyl ether	51	139
95-49-8	Chlorotoluene	79	122
591-78-6	2-Hexanone	57	139
91-57-6	2-Methylnaphthalene	17	142
79-46-9	2-Nitropropane	49	136
67-63-0	2-Propanol [Isopropyl alcohol]	56	142
624-95-3	3,3-Dimethyl-1-butanol	49	133
460-00-4	4-Bromofluorobenzene	85	114
106-43-4	4-Chlorotoluene	78	122
108-10-1	4-Methyl-2-pentanone [MIBK]	67	130
67-64-1	Acetone	39	160
75-05-8	Acetonitrile	50	142
107-02-8	Acrolein [Propenal]	39	155
107-13-1	Acrylonitrile	63	135
107-05-1	Allyl chloride	68	130
71-43-2	Benzene	79	120
100-44-7	Benzyl chloride	42	138
108-86-1	Bromobenzene	80	120
74-97-5	Bromochloromethane	78	123
75-27-4	Bromodichloromethane	79	125
75-25-2	Bromoform	66	130
74-83-9	Bromomethane	53	141
75-15-0	Carbon disulfide	64	133
56-23-5	Carbon tetrachloride	72	136
108-90-7	Chlorobenzene	82	118
124-48-1	Chlorodibromomethane	74	126
75-45-6	Chlorodifluoromethane	40	129
75-00-3	Chloroethane	60	138
67-66-3	Chloroform	79	124
74-87-3	Chloromethane	50	139
156-59-2	cis-1,2-Dichloroethene	78	123
10061-01-5	cis-1,3-Dichloropropene	75	124
1476-11-5	cis-1,4-Dichloro-2-butene	57	146

110-82-7	Cyclohexane	71	130
1868-53-7	Dibromofluoromethane	80	119
74-95-3	Dibromomethane	79	123
75-71-8	Dichlorodifluoromethane [Freon-12]	32	152
75-43-4	Dichlorofluoromethane	72	131
60-29-7	Diethyl ether	68	129
108-20-3	Diisopropyl ether	67	128
64-17-5	Ethanol	48	151
141-78-6	Ethyl acetate	55	138
97-63-2	Ethyl methacrylate	72	126
637-92-3	Ethyl tert-butyl ether	70	127
100-41-4	Ethylbenzene	79	121
462-06-6	Fluorobenzene	80	116
142-82-5	Heptane	49	140
87-68-3	Hexachlorobutadiene	66	134
67-72-1	Hexachloroethane	72	134
110-54-3	Hexane	48	143
74-88-4	Iodomethane	69	131
78-83-1	Isobutyl alcohol	63	133
108-21-4	Isopropyl acetate [Acetic acid]	63	133
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126-98-7	Methacrylonitrile	63	133
79-20-9	Methyl acetate	56	136
80-62-6	Methyl methacrylate	67	128
1634-04-4	Methyl tert-butyl ether [MTBE]	71	124
108-87-2	Methylcyclohexane	72	132
75-09-2	Methylene chloride	74	124
123-86-4	n-Butyl acetate	69	125
71-36-3	n-Butyl alcohol	59	131
104-51-8	n-Butylbenzene	75	128
109-60-4	n-Propyl acetate	76	126
103-65-1	n-Propylbenzene	76	126

91-20-3	Naphthalene	61	128
95-47-6	o-Xylene	78	122
99-87-6	p-Isopropyltoluene [p-Cymene]	77	127
76-01-7	Pentachloroethane	69	133
109-66-0	Pentane	16	134
107-12-0	Propionitrile [Ethyl cyanide]	64	136
135-98-8	sec-Butylbenzene	77	126
100-42-5	Styrene	78	123
994-05-8	tert-Amyl methyl ether [TAME]	68	128
75-65-0	tert-Butyl alcohol	68	129
762-75-4	tert-Butyl formate	65	132
98-06-6	tert-Butylbenzene	78	124
127-18-4	Tertachloroethene	74	129
109-99-9	Tetrahydrofuran	57	133
108-88-3	Toluene	80	121
2037-26-5	Toluene-d8	89	112
156-60-5	trans-1,2-Dichloroethene	75	124
10061-02-6	trans-1,3-Dichloropropene	73	127
110-57-6	trans-1,4-Dichloro-2-butene	43	140
79-01-6	Trichloroethene	79	123
75-69-4	Trichlorofluoromethane [Freon-11]	65	141
108-05-4	Vinyl acetate	54	146
75-01-4	Vinyl chloride	58	137
1330-20-7	Xylene [total]	79	121

LCS Limits
EPA 624.1 Water Matrix

CAS ID	ANALYTE	LOWER CONTROL LIMIT (LCL)	UPPER CONTROL LIMIT (UCL)
71-55-6	1,1,1-Trichloroethane	70	130
79-34-5	1,1,2,2-Tetrachloroethane	60	140
79-00-5	1,1,2-Trichloroethane	70	130
75-34-3	1,1-Dichloroethane	70	130
75-35-4	1,1-Dichloroethene	50	150
95-50-1	1,2-Dichlorobenzene	65	135
107-06-2	1,2-Dichloroethane	70	130
78-87-5	1,2-Dichloropropane	35	165
541-73-1	1,3-Dichlorobenzene	70	130
106-46-7	1,4-Dichlorobenzene	65	135
110-75-8	2-Chloroethyl vinyl ether	0	225
107-02-8	Acrolein [Propenal]	60	140
107-13-1	Acrylonitrile	60	140
71-43-2	Benzene	65	135
75-27-4	Bromodichloromethane	65	135
75-25-2	Bromoform	70	130
74-83-9	Bromomethane	15	185
56-23-5	Carbon tetrachloride	70	130
108-90-7	Chlorobenzene	65	135
124-48-1	Chlorodibromomethane	70	135
75-00-3	Chloroethane	40	160
67-66-3	Chloroform	70	135
74-87-3	Chloromethane	0	205
10061-01-5	cis-1,3-Dichloropropene	25	175
100-41-4	Ethylbenzene	60	140
75-09-2	Methylene chloride	60	140
127-18-4	Tetrachloroethene	70	130
108-88-3	Toluene	70	130
156-60-5	trans-1,2-Dichloroethene	70	130

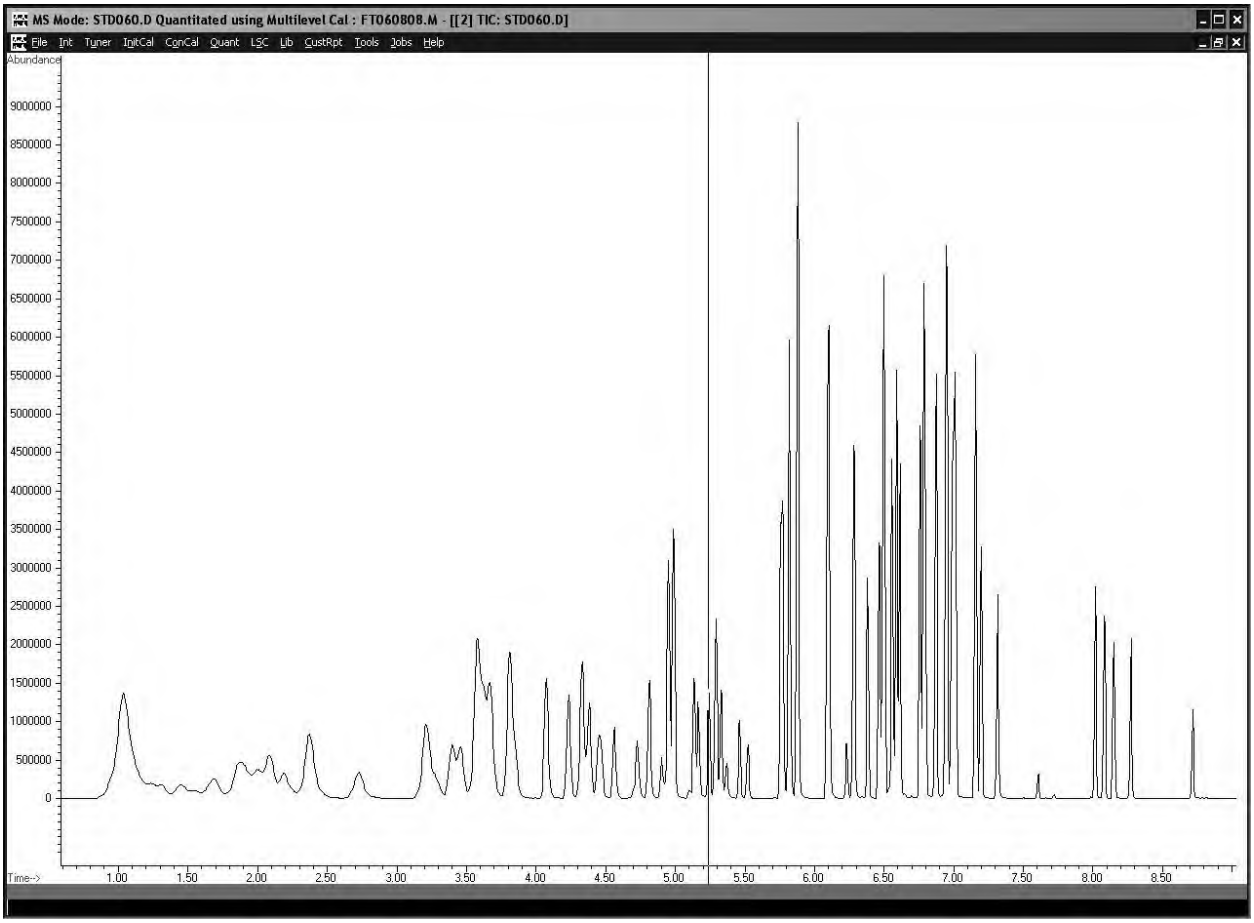
10061-02-6	trans-1,3-Dichloropropene	50	150
79-01-6	Trichloroethene	65	135
75-69-4	Trichlorofluoromethane [Freon-11]	50	150
75-01-4	Vinyl chloride	5	195

Table 6. Summary of Control Limits: Surrogate and Internal Standard Compounds Percent Recovery†

COMPOUND	Water Matrix		Solid Matrix	
	LCL (%)	UCL (%)	LCL (%)	UCL (%)
1.2-DICHLOROETHANE-D4	72.0	125.0	71.0	124.0
TOLUENE-D8	89.0	112.0	83.0	120.0
4-BROMOFLUOROBENZENE	80.0	124.0	81.0	124.0
Pentafluorobenzene	50.0	200.0	50.0	200.0
1,4-Difluorobenzene	50.0	200.0	50.0	200.0
Chlorobenzene-D5	50.0	200.0	50.0	200.0
1,4-Dichlorobenzene-D4	50.0	200.0	50.0	200.0

†: Results based on recovery data from 2020.

Figure 1. Example Total Ion Chromatogram for a Midpoint VOA Calibration Standard†



†: Data file Std060.D (60 μg/L). GC/MS acquisition parameters are given by Table 4.

TGI - Equipment and Reagent Blank Sample Collection for PFAS Analysis

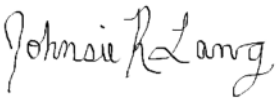
Rev: 2

Rev Date: February 21, 2022

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
--	0	October 2, 2018	All	TGI – Equipment and Reagent Blank Sample Collection for PFAS Analysis	Erika Houtz
Outdated template	1	December 10, 2021	All	Updated to current TGI format. Also updated sections to match the most recent TGI for PFAS Field Sampling Guidance (Arcadis 2021)	Kevin Engle
Template Updates	2	February 21, 2022	All	Additional template updates	Kevin Engle, Johnsie Lang

Approval Signatures

Prepared by:		2/21/2022
	Kevin Engle, PG (WY)	Date
Reviewed by:		2/21/2022
	Johnsie Lang, PhD (Subject Matter Expert)	Date

1. Introduction

This document is intended to provide guidance to field staff collected equipment blanks for Per- and Polyfluoroalkyl Substances (PFAS). The content in this document describes the intended use, scope and application, personnel qualifications, equipment, cautions, health and safety considerations, procedures, waste management, data recording and management, and quality assurance of PFAS sampling.

2. Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3. Scope and Application

Equipment and reagent blanks will be collected in the field during sampling activities and submitted for laboratory analysis. These samples are primarily intended to verify that sampling and decontamination practices are effectively preventing cross-contamination caused by reusable sample equipment or other per- and polyfluoroalkyl substances (PFAS)-containing materials.

The intent of this Technical Guidance Instruction (TGI) is to provide instructions for collection of equipment and reagent blanks. More detailed instructions related to general PFAS sampling considerations is provided in the Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance (Arcadis 2021).

4. Personnel Qualifications

Equipment and reagent samples will be collected by persons who have been trained in proper sampling procedures under the guidance of an experienced field geologist, engineer, or technician. Blank sampling should be completed with a two-person sampling team.

5. Equipment List

The following equipment and materials must be available for equipment and reagent blank sampling:

- Site plan which specifies frequency/quantity of blank sampling;
- Relevant work plan (e.g., PQAPP);
- Site Safety and Health Plan (SSHP);
- Appropriate health and safety equipment, as specified in the SSHP;
- Laboratory-provided "PFAS-free" water;
- Nitrile gloves;
- Dedicated plastic sheeting (preferably low-density polyethylene) or other clean surface to prevent sample contact with the ground;
- Pail or bucket with closable lid for excess rinse water;
- Garbage bags;
- Appropriate sample containers and labels;
    - Labeled high density polypropylene (HDPE) sample bottles: see the Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance (Arcadis 2021) for PFAS-specific considerations;
    - Ziploc®-style bags to hold ice and samples;
    - Packing and shipping materials;
    - Chain-of-Custody (COC) Forms; see the Sample Chain of Custody Standard Operating Procedure (SOP) for reference (Arcadis 2017a);
    - Appropriate transport containers (coolers) with ice and appropriate labeling; no blue ice is to be used.
- Decontamination:
    - Equipment cleaning materials: see the Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance (Arcadis 2021) or the Groundwater and Soil Sampling Equipment Decontamination TGI (Arcadis 2017b) as applicable;
    - An organic solvent such as isopropanol, methanol, or acetone should be used to decontaminate reusable equipment if it can be brought to the site safely. While strongly recommended, the use of solvents may be excluded for project-specific health and safety concerns. Refer to Section 7.1.1 for more details.
    - Drum labels as required for investigation-derived waste handling: see the Investigation-Derived Waste Handling and Storage TGI for details (Arcadis 2017c);

- Field Notes:
  - Pens, pencils, and/or fine point Sharpies® for writing;
  - Appropriate field forms;
  - Clipboards, field binders, field notebook, and field note pages that are not waterproof.

6. Cautions

In general, sampling techniques used for PFAS sample collection are consistent with conventional sampling techniques used in the environmental industry, but special consideration is made regarding PFAS-containing materials and cross-contamination potential. The most important consideration during PFAS-related sampling is to prevent contact between sample media and suspect PFAS sources. During collection of equipment and reagent blanks, the sampled media (i.e., PFAS-free water) should not contact anything but the sample container. New nitrile gloves should be donned after handling of any non-dedicated sampling equipment; contact with contaminated surfaces; and whenever judged necessary by field personnel. When in doubt change your gloves. More detailed instructions related to general PFAS sampling considerations is provided in the TGI - Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance (Arcadis 2021).

7. Health and Safety Considerations

Field activities associated with equipment and reagent blank sampling will be performed in accordance with the SSHP, a copy of which will be present on site during such activities. Additional health and safety considerations can be found in TGI for PFAS Field Sampling Guidance (Arcadis 2021).

8. Procedure

The specific procedure for equipment and reagent blank sampling was developed after careful review and consideration of project data quality objectives. Procedures for equipment blank sampling and reagent blank sampling are further described in this section. Note: the laboratory has to analyze the entire sample bottle for aqueous solutions of PFASs. When collecting each blank, fill two sample bottles and instruct the lab to hold one of them in reserve. If an unacceptable detection occurs in a blank, the second bottle of sample may be analyzed.

For additional sampling considerations, reference the TGI for PFAS Field Sampling Guidance (Arcadis 2021).

8.1 Blank Sampling

8.1.1 Decontamination

Prior to collecting blank samples, the applicable piece of equipment should be properly decontaminated following these steps:

- Hand Tools and Sampling Devices (including hand augers and bladder pumps)
  1. Don new pair of nitrile gloves prior to decontamination
  2. Remove o-rings and bladder (applies only to bladder pump)

3. Scrub using a plastic brush and a non-phosphate soap free of volatile organic compounds (VOCs) (e.g., Liquinox, Alconox);
4. Double-rinse in deionized or distilled water;
5. Rinse once with the site-approved organic rinsing solvent (e.g., isopropanol, methanol, acetone);
6. Rinse once with PFAS-free water;
7. Collect all rinsate in a sealed pail for disposal;
8. Allowed time to air dry prior to re-use.
9. Insert new o-rings and bladder (applies only to bladder pump)

While strongly recommended, the use of solvents may be excluded for project-specific health and safety concerns. If solvents are prohibited, then additional procedures should be evaluated by the project team. Contingencies could include the use of dedicated sampling equipment at each sampling location or amending laboratory procedures to mitigate the increased risk of cross-contamination.

The following decontamination procedure could be utilized when organic solvent use is not possible:

1. Don new pair of nitrile gloves prior to decontamination
2. Remove o-rings and bladder (applies only to bladder pump)
3. Scrub using a plastic brush and a non-phosphate soap free of VOCs (e.g., Liquinox, Alconox);
4. Single-rinse in deionized or distilled water;
5. Scrub using a plastic brush and a non-phosphate soap free of VOCs (e.g., Liquinox, Alconox);
6. Rinse twice with deionized water and once with PFAS-free water;
7. Collect all rinsate in a sealed pail for disposal;
8. Allowed time to air dry prior to re-use.
9. Insert new o-rings and bladder (applies only to bladder pump)

- Drilling Rods
  - Drive casings and other drilling equipment will be steam cleaned or replaced with new equipment between boreholes.
  - The drilling equipment will be cleaned in an area designated by the supervising engineer or geologist that is located outside of the work zone.

After verifying the piece of equipment is properly decontaminated, and after determining an equipment blank is warranted per the sampling quality assurance / quality control (QA/QC) plan, follow the specific procedures for the relevant type of equipment found in the following sections.

8.1.2 Drilling Equipment (Hand Auger or Cutting Shoe/Drill Rod)

Two field personnel should participate in the collection of the equipment blank. One person (“Field Personnel #1”) should hold the sampling bottle and collect the sample, and the second person (“Field Personnel #2”) should pour the rinse water.

The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep bottle lid on until immediately prior to sample collection.
2. Lay down dedicated plastic sheeting or other clean surface to prevent sample contact with the ground.
3. Place the sealable bucket or pail on top of plastic sheeting.

4. Don a new pair of nitrile gloves prior to blank collection (Field Personnel #1 and #2). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.
5. Open the sample container and position the piece of clean, decontaminated sample equipment (i.e., hand auger or drilling rod/cutting shoe) above the container (Field Personnel #1). Keep the sample cap in the hand of the sampler (Field Personnel #1) until it is replaced on the bottle.
    a. The bucket of the hand auger can be removed from the rods/handle and held manually.
    b. The drillers should assist the field staff with removing the cutting shoe from the drill string and positioning it for sampling.
6. Slowly pour laboratory-provided "PFAS-free" water over any surface of the decontaminated sampling device that previously contacted sampled material (Field Personnel #2).
    a. Pour water through the inside of the hand auger bucket while manually rotating the bucket so that "PFAS-free" water contacts all sides of the sampling device. Collect runoff in the sample container (Field Personnel #1), making sure that any excess "PFAS-free" water is contained in the sealable bucket or pail.
    b. Pour water through the inside of cutting shoe while drilling contractor holds and manually rotates the shoe so that "PFAS-free" water contacts all sides of the shoe (Field Personnel #2). Collect runoff in the sample container, making sure that any excess "PFAS-free" water is contained in the sealable bucket or pail.
7. After collecting the necessary sample volume, place cap back on the sample bottle (Field Personnel #1). The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
8. Collect the second bottle with the same procedure (Steps 5 to 7), if collecting a backup.
9. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.
10. Add sample to the laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
11. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
12. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.3 Reusable Sediment Sampling Equipment (Stainless-Steel Hand Tools, Petite Ponar Grab Sampler)

Two field personnel should participate in the collection of the equipment blank. One person ("Field Personnel #1") should hold the sampling bottle and collect the sample, and the second person ("Field Personnel #2") should pour the rinse water.

The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep bottle lid on until immediately prior to sample collection.
2. Lay down dedicated plastic sheeting or other clean surface to prevent sample contact with the ground.
3. Place sealable bucket or pail on top of plastic sheeting.
4. Don new pair of nitrile gloves prior to blank collection (both field personnel). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.

5. Open sample container and position the clean, decontaminated piece of sample equipment (i.e., hand tool, grab sampler) above the container (Field Personnel #1). Keep the sample cap in the hand of the sampler (Field Personnel #1) until it is replaced on the bottle.
6. Slowly pour the laboratory-provided "PFAS-free" water over any surface of the sampling device that contacted sampled material (Field Personnel #2).
    a. Pour water over front and back of all decontaminated hand tools such as spoons, spatulas, and trowels so that "PFAS-free" water touches all sides of the sampling device. Collect runoff in the sample container, making sure that any excess "PFAS-free" water is contained in the sealable bucket or pail (Field Personnel #1).
    b. Pour water through inside of the decontaminated Petite Ponar Grab Sampler while rotating the sampler (or the "PFAS-free" water container) so that "PFAS-free" water contacts all interior sides of the sampler (Field Personnel #2). Collect runoff in the sample container, making sure that any excess "PFAS-free" water is contained in the sealable bucket or pail.
7. After collecting the necessary sample volume, place cap back on the sample bottle (Field Personnel #1). The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
8. Collect the second bottle with the same procedure (Steps 5 to 7), if collecting a backup.
9. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.
10. Add the sample to the laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
11. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
12. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.4 Disposable Sediment Sampling Equipment (Lexan TM Liner Sleeve)

Two field personnel should participate in the collection of the equipment blank. One person ("Field Personnel #1") should hold the sampling bottle and collect the sample, and the second person ("Field Personnel #2") should pour the rinse water.

The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep the bottle lid on until immediately prior to sample collection.
2. Lay down dedicated plastic sheeting or other clean surface to prevent sample contact with the ground.
3. Place sealable bucket or pail on top of plastic sheeting.
4. Don new pair of nitrile gloves prior to blank collection (both field personnel). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.
5. Open sample container and position a clean, new, and unused section of LexanTM liner above the container (Field Personnel #1). Keep the sample cap in the hand of the sampler (Field Personnel #1) until it is replaced on the bottle.
6. Slowly pour laboratory-provided "PFAS-free" water over any surface of the sampling device that contacted sampled material (Field Personnel #2).

   a. Pour water through inside of Lexan TM liner while rotating the liner so that “PFAS-free” water contacts all interior sides of the liner. Collect runoff in the sample container, making sure that any excess “PFAS-free” water is contained in the sealable bucket or pail.
7. After collecting the necessary sample volume, place cap back on the sample bottle (Field Personnel #1). The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
8. Collect the second bottle with the same procedure (Steps 5 to 7), if collecting a backup.
9. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.
10. Add sample to the laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
11. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
12. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.5 Reusable Water Sampling Equipment (Peristaltic Pump, Bladder Pump, Stainless-Steel Bailer)

8.1.5.1 Peristaltic Pump

Two field personnel should participate in the collection of the equipment blank. One person (“Field Personnel #1”) should hold the sampling bottle and collect the sample, and the second person (“Field Personnel #2”) should set up the pump and pour/ transfer the blank water.

The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep bottle lid on until immediately prior to sample collection.
2. Lay down dedicated plastic sheeting other clean surface to prevent sample contact with the ground.
3. Don new pair of nitrile gloved prior to blank collection (both field personnel). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.
4. Pour laboratory-supplied “PFAS-free” water into a clean HDPE sample bottle (Field Personnel #2).
5. Insert new HDPE tubing into the HDPE bottle containing “PFAS-free” water and connect tubing to peristaltic pump (with new silicone tubing) (Field Personnel #2).
6. Open sample container, keeping the sample cap in the hand of the sampler until it is replaced on the bottle (Field Personnel #1).
7. Turn the peristaltic pump on and slowly pump the “PFAS-free” water into the labeled sample container (Field Personnel #2).
8. After collecting the necessary sample volume, place cap back on the sample bottle (Field Personnel #1). The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
9. Collect the second bottle with the same procedure (Steps 6 to 8), if collecting a backup.
10. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.

11. Add the sample to the laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
12. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
13. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.5.1 Bladder Pump

1. Two field personnel should participate in the collection of the equipment blank. One person ("Field Personnel #1") should hold the sampling bottle and collect the sample, and the second person ("Field Personnel #2") should set up the pump and pour/ transfer the blank water.
2. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.
3. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep the bottle lid on until immediately prior to sample collection.
4. Lay down dedicated plastic sheeting or other clean surface to prevent sample contact with the ground.
5. Don new pair of nitrile gloved prior to blank collection (both field personnel). Do not use gloved hands to handle papers, pens, clothes, equipment, etc., before collecting samples.
6. Pour laboratory-supplied "PFAS-free" water into an approved container (to avoid PFAS cross-contamination) large enough to submerge the bladder pump.
7. After properly decontaminating the bladder pump and replacing the bladder, attach a new section of HDPE tubing to the bladder pump, long enough to hold and direct flow into the labeled sample container. Submerge the bladder pump into the approved container of "PFAS-free" water (Field Personnel #2).
8. Open sample container, keeping the sample cap in the hand of the sampler until it is replaced on the bottle (Field Personnel #1).
9. Turn the bladder pump on and slowly pump the "PFAS-free" water into the labeled sample container (Field Personnel #2).
10. After collecting the necessary sample volume, place cap back on the sample bottle. The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
11. Collect the second bottle with the same procedure (Steps 6 to 8), if collecting a backup.
12. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.
13. Add sample to laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
14. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
15. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.5.2 Stainless-Steel Bailer

Two field personnel should participate in the collection of the equipment blank. One person ("Field Personnel #1") should hold the sampling bottle and collect the sample, and the second person ("Field Personnel #2") should pour the rinse water.

The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFASs, after the sampling equipment has been appropriately decontaminated.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep bottle lid on until immediately prior to sample collection.
2. Lay down dedicated plastic sheeting or other clean surface to prevent sample contact with the ground.
3. Place sealable bucket or pail on top of plastic sheeting.
4. Don new pair of nitrile gloves prior to blank collection (both field personnel). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.
5. Open sample container (Field Personnel #1) and position the bailer above the container (Field Personnel #2). Keep the sample cap in the hand of the sampler (Field Personnel #1) until it is replaced on the bottle.
6. Fill the stainless-steel bailer with enough laboratory-provided “PFAS-free” water to collect the necessary sample volume (Field Personnel #2).
7. Slowly pour laboratory-provided “PFAS-free” water from the stainless-steel bailer into the sample container (Field Personnel #2).
8. After collecting the necessary sample volume, place cap back on the sample bottle. The bottle should be filled approximately full, but some headspace in the bottle is acceptable.
9. Collect the second bottle with the same procedure (Steps 5 to 8), if collecting a backup.
10. Place filled sample bottles in sealed Ziploc® bags, record any label information that was not pre-filled out, if necessary (e.g., sample time). Record the label information and time of sampling in the field notes and sampling forms.
11. Fill out the laboratory COC and check against the labels on the Equipment Blank sample bottle(s) progressively after each Equipment Blank is collected. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
12. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in a separate cooler from any other types of samples.
13. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

8.1.6 Field Reagent Blank Sampling

Two field personnel should participate in the collection of the reagent blank. One person (“Field Personnel #1”) should hold the sampling bottle and collect the sample, and the second person (“Field Personnel #2”) should pour the blank water.

This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

1. Label the laboratory-provided HDPE bottles with applicable information (e.g., sample ID, date, time, analysis required). Keep the bottle lid on until immediately prior to sample collection.
2. Don new pair of nitrile gloves prior to blank collection (both field personnel). Do not use gloved hands to handle other objects (e.g., papers, pens, clothes, equipment) before collecting samples.
3. Open sample container, keeping the sample cap in the hand of the sampler (Field Personnel #1) until it is replaced on the bottle (Field Personnel #1).
4. Slowly pour laboratory-provided “PFAS-free” water from the laboratory-provided container into the sample container (“Field Personnel #2”).
5. After collecting the necessary sample volume, place cap back on the sample bottle. The bottle should be filled approximately full, but some headspace in the bottle is acceptable.

6. Collect the second bottle with the same procedure (Steps 3 to 5) if collecting a backup.
7. Record any label information that was not pre-filled out, if necessary (e.g., sample time), and place filled sample bottles in sealed Ziploc® bags. Record the label information and time of sampling in the field notes.
8. Add sample to the laboratory COC. Double check that the sample labels and COC agree. Note on the COC that one bottle should be held in reserve, if a backup bottle is collected.
9. Place sealed Ziploc® bag into the sample cooler. Store PFAS samples in separate cooler from any other types of samples.
10. Place dedicated plastic sheeting and nitrile gloves in plastic bags. These bags will be transferred into appropriately labeled waste containers for appropriate disposal.

9. Waste Management

Excess water generated during equipment and reagent blank collection procedures will be collected and contained on site in appropriate containers, (see the Investigation-Derived Waste Handling and Storage TGI for details [Arcadis 2017c]). All investigation-derived waste (IDW) generated will be placed in Department of Transportation approved containers, sealed, and labeled. Containerized IDW will be stored on site until it is profiled and subsequently transported to an approved facility for disposal or recycling. Waste manifests for all IDW suspected to have come into contact with PFAS should clearly note the presence of PFAS. Additional IDW sampling and management details will be provided in the site-specific Work Plan (QAPP addendum) and will be consistent with applicable client policies and requirements. Disposable personal protective equipment (e.g., gloves, disposable clothing, disposable equipment) will be placed in plastic bags. These bags will be transferred into appropriately labeled containers for appropriate disposal.

10. Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

If digital data collection isn't possible, waterproof field books should be avoided for field notes. Instead, field notes on loose paper on Masonite, plastic, or aluminum clip boards is preferred. Please note that newer Rite in the Rain® notebooks are approved for PFAS sampling. Other requirements for field notes include:

- Pens, pencils, and fine point Sharpies® may be used.
- Keep field notes and writing implements away from samples and sampling materials.
- Do not write on sampling bottle labels unless the sample bottle covers are tightly closed.
- Complete sampling logs in their entirety.

- Make sure COC forms are properly completed. Verify that the analysis method requested is US EPA Method 537.1 for potable water and includes the appropriate analytes desired for analysis.

11. Quality Assurance

Refer to quality control requirements for the project to ensure that appropriate QA/QC samples are collected. When collecting QA/QC samples, the same guidelines apply as when collecting regular samples – specifically:

- **Duplicate samples of each equipment blank and reagent blank should be collected and submitted to the laboratory with instructions to hold for analysis. The purpose of this sample is to provide analytical back-up in case there are any issues with the original blank sample.**
- Samples should be collected in laboratory-supplied HDPE bottles;
- Bottle caps must remain in the hand of the sampler until replaced on the bottle;
- Labels must be completed after the caps have been placed back on each bottle; and,

Samples must be stored in appropriate transport containers (coolers) with ice (Ziploc®-type bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

12. References

Arcadis. 2021. TGI – Poly- and Perfluorinated Alkyl Substances (PFAS) Field Sampling Guidance. Rev. 9. October 22.

Arcadis. 2017a. SOP – Sample Chain of Custody, Rev. #1. May 23.

Arcadis. 2017b. TGI – Groundwater and Soil Sampling Equipment Decontamination, Rev. #0. February 23.

Arcadis. 2017c. TGI – Investigation-Derived Waste Handling and Storage, Rev. #0. February 23.

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TGI – Groundwater and Soil Sampling Equipment Decontamination

Rev: 3

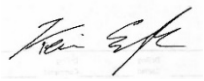
Rev Date: August 30, 2023

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
	0	February 23, 2017	All	Conversion from SOP to TGI	Cassandra McCloud / Pete Frederick
	1	May 8, 2020	4, 5	Added note regarding use of Liquinox and 1,4-Dioxane	Marc Killingstad
	2	June 14, 2022	All	Conversion to new TGI format and minor edits.	Kevin Engle / Marc Killingstad
	3	August 30, 2023	All	Annual review completed by SME. Updated Rev 1.	Marc Killingstad

Approval Signatures

Prepared by: 8/30/2023



Name (Preparer) Date

Reviewed by: 8/30/2023

Marc Killingstad (Subject Matter Expert) Date

1 Introduction

This document is intended to provide guidance to staff performing decontamination procedures at project sites. The content in this document describes the intended use, scope and application, personnel qualifications, equipment, cautions, health and safety considerations, procedures, waste management, data recording and management, and quality assurance of decontamination procedures.

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

Decontamination is performed on sampling equipment prior to sample collection to ensure that the sampling equipment that contacts a sample, or monitoring equipment that is brought into contact with environmental media to be sampled, is free from analytes of interest and/or constituents that could interfere with laboratory analysis for analytes of interest. Sampling equipment must be appropriately cleaned prior to use for sampling or coming into contact with environmental media to be sampled and following completion of the sampling event prior to shipment or storage. The effectiveness of the decontamination procedure should be verified by collecting and analyzing equipment blank samples.

The sampling equipment cleaning procedures described herein includes pre-field, in the field, and post- field cleaning of sampling equipment which may be conducted at an established equipment decontamination area (EDA) on site, as appropriate and necessary. Sampling equipment that may require decontamination at a given site include soil sampling tools; groundwater, sediment, and surface-water sampling devices; water testing instruments; down-hole instruments; and other activity-specific sampling equipment. Non-disposable equipment will be cleaned before collecting each sample, between each sample collected, and prior to placing sampling equipment in protective cases, or containers for transport. Cleaning procedures for sampling equipment should be monitored by collecting equipment blank samples as required in project work plans, field sampling plans, quality assurance project plans (QAPP), or other pertinent project documents. Dedicated and/or single-use (i.e., not to be re-used) sampling equipment will not require decontamination.

4 Personnel Qualifications

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour hazardous waste operations and emergency response (HAZWOPER) training and/or Occupational Safety and Health Administration (OSHA) HAZWOPER site supervisor training. Arcadis personnel will also have current training as specified in the Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project HASP and other documents will identify other training requirements or access control requirements.

5 Equipment List

The equipment required for equipment decontamination is presented below. Note that certain contaminants may require specific materials be used that are not captured in this list. Always review project and contaminant specific TGIs or work plans to ensure proper equipment is utilized. Note for per- and polyfluoroalkyl substances (PFAS) see *TGI – Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide*.

- Health and safety equipment, including appropriate personal protective equipment (PPE), as required in the site HASP
- Deionized water that meets the analytical criteria for deionized water with no detectable constituents above the reporting limits for the methods to be used and analytes being analyzed for. Deionized water is used for inorganics, and organic-free water for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, etc.
- Non-phosphate detergent such as Alconox® or, if sampling for phosphorus or phosphorus- containing compounds, Liquinox (or equivalent). NOTE: Liquinox has shown to provide false positives for 1,4-Dioxane and should not be used at sites where that may be a constituent of concern (COC).
- Tap water
- Rinsate collection plastic containers

- Department of Transportation (DOT)-approved waste shipping container(s), as specified in the work plan, field sampling plan, or regulatory requirements if decontamination waste is to be shipped for disposal
- Brushes
- Large heavy-duty garbage bags
- Spray bottles
- (Optional) – Isopropyl alcohol (free of ketones) or methanol. These can be wipes or diluted with water (usually 1part isopropyl/methanol to 10 parts water) if a spray is needed.
- Airtight, sealable plastic baggies, such as Ziploc®-type
- Plastic sheeting

6 Cautions

Rinse equipment thoroughly and allow the equipment to dry before re-use or storage to prevent introducing solvent into sample medium. If manual drying of equipment is required, use clean lint-free material to wipe the equipment dry. Ensure all rinse materials do not adversely affect sample collection efficiency or analytical results.

Store decontaminated equipment in a clean, dry environment. Do not store near combustion engine exhausts. Properly containerize equipment to ensure cross-contamination doesn't happen from other uncontaminated surfaces or equipment.

If equipment is damaged to the extent that decontamination is uncertain due to cracks, gouges, crevices, or dents, the equipment should not be used and should be discarded or submitted for repair prior to use for sample collection.

A proper shipping determination regarding hazardous materials will be performed by a DOT-trained individual for cleaning materials shipped by Arcadis.

Caution should be exercised to avoid contact with the pump casing and water in the container while the pump is running (do not use metal drums or garbage cans) to avoid electric shock.

7 Health and Safety Considerations

Review the safety data sheets (SDS) for the cleaning agents and materials used in decontamination. If solvent is used during decontamination, use appropriate PPE and work in a well-ventilated area and stand upwind while applying solvent to equipment. Apply solvent in a manner that minimizes potential for exposure to workers and bystanders. Follow health and safety procedures outlined in the HASP.

8 Procedure

A designated area will be established to clean sampling equipment in the field prior to and following sample collection. Equipment cleaning areas will be set up within or adjacent to the specific work area, but not at a location that expose equipment to contamination (i.e., exposed to combustion engine exhaust). Detergent solutions will be prepared in clean containers for use in equipment decontamination. Decontaminated equipment

will be handled by workers wearing clean gloves, properly changed to prevent cross-contamination. The procedures detailed in this section provide an overview of common decontamination techniques. Additional steps may be required based on the type of contaminant present or client/site requirements.

Cleaning Sampling Equipment

1. Wash the equipment/pump with potable water.
2. Wash with detergent solution (Alconox®, Liquinox® or equivalent) to remove all visible particulate matter and any residual oils or grease. NOTE: Liquinox® has shown to provide false positives for 1,4-Dioxane and will not be used at sites where that may be a COC.
3. If equipment is very dirty, precleaning gross debris with a brush and tap water may be necessary.
4. If non-aqueous phase liquids are present, the use of isopropyl alcohol (free of ketones) or methanol is recommended. Cloth wipes or diluted solution can be used to remove the non-aqueous phase liquids that are hard to remove with detergent solution in step 2. Consult with project manager if non-aqueous phase liquids are present onsite and design an appropriate decontamination procedure that includes step 4.
5. Rinse with deionized water.

Decontaminating Submersible Pumps

Submersible pumps may be used during well development, groundwater sampling, or other investigative activities. The pumps must be cleaned and flushed before and between uses. This cleaning process will consist of an external detergent solution wash and tap water rinse, a flush of detergent solution through the pump, followed by a flush of potable water through the pump. Flushing will be accomplished by using an appropriate container filled with detergent solution and another container filled with potable water. The pump will be be flushed with deionized water as the last step prior to use. The pump will run long enough to effectively flush the pump housing and hose (unless new, disposable hose is used). Disconnect the pump from the power source before handling. The pump and hose will be placed on or in clean polyethylene sheeting to avoid contact with the ground surface.

9 Waste Management

Equipment decontamination rinsate will be managed in conjunction with all other waste produced during the field sampling effort. Waste management procedures are outlined in the work plan or Waste Management Plan (WMP).

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff

are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

Equipment cleaning and decontamination will be noted during project documentation. Information will include the type of equipment cleaned, the decontamination location, specific procedures utilized, solvents and/or cleaning agents used, source of water, and deviations or omissions from this TGI.

Unusual field conditions should be noted if there is potential to impact the efficacy of the decontamination or subsequent sample collection.

An inventory of the solvents brought on site and used and removed from the site will be maintained in the project documentation. Records will be maintained for solvents used in decontamination, including lot number and expiration date.

Containers with decontamination fluids will be labeled.

11 Quality Assurance

Equipment blanks should be collected to verify that the decontamination procedures are effective in minimizing potential for cross contamination. The equipment blank is prepared by pouring deionized water (or organic-free water, for organic analyses) over the clean and dry tools and collecting the water into appropriate sample containers. Equipment blanks should be analyzed for the same set of parameters that are performed on the field samples collected with the equipment that was cleaned as specified in the sampling and analysis plan. Equipment blanks are collected per equipment set, which represents all the tools needed to collect a specific sample.

12 References

USEPA Region 9 - Field Sampling Guidance #1230, Sampling Equipment Decontamination.

USEPA Region 1 - Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.

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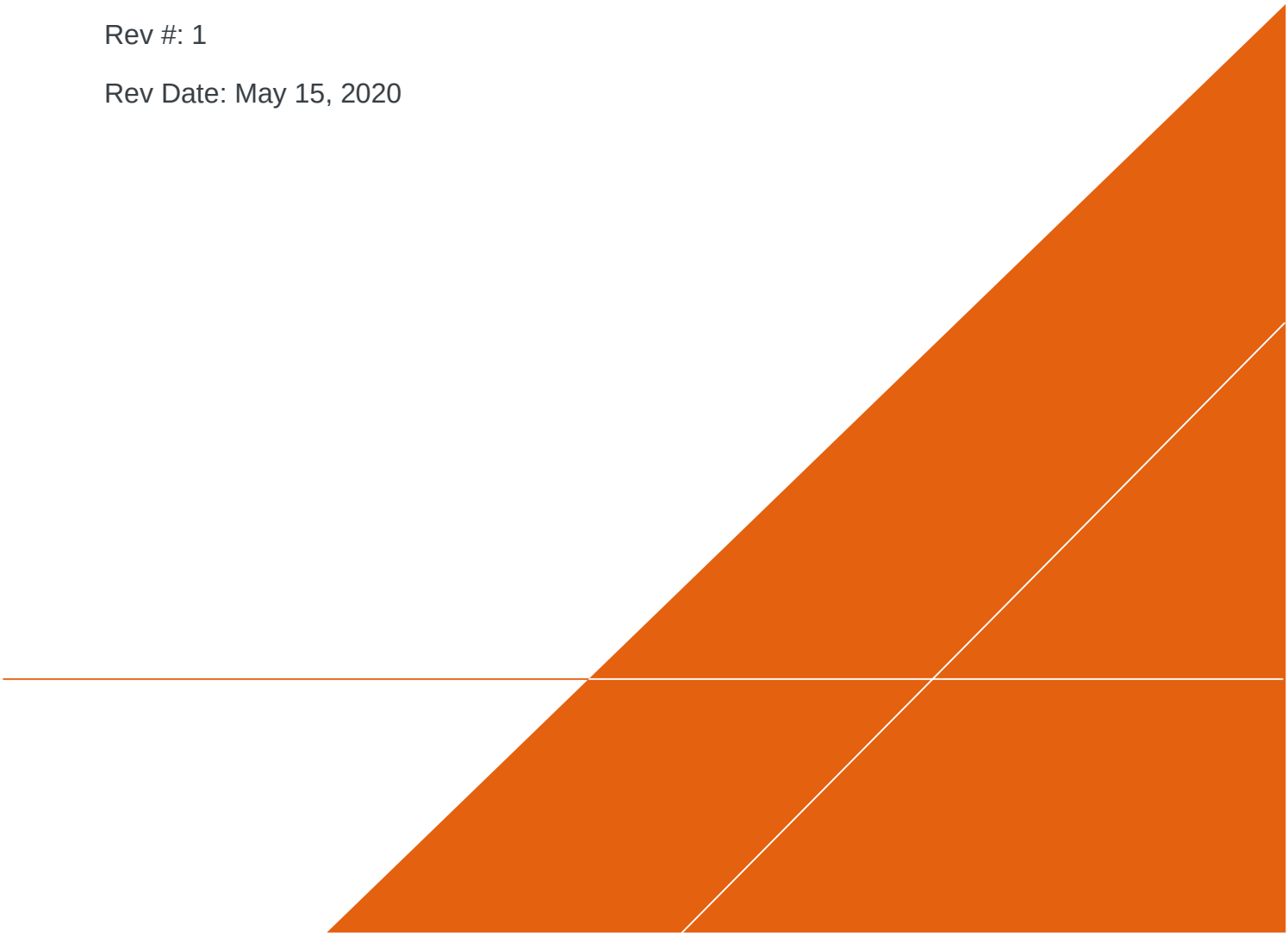
ARCADIS Design & Consultancy for natural and built assets

TGI - INVESTIGATION-DERIVED WASTE HANDLING AND STORAGE

Rev #: 1

Rev Date: May 15, 2020



VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	February 23, 2017	ALL	Conversion from SOP to TGI	Ryan Mattson / Peter Frederick
1	May 15, 2020	ALL	Updated to reflect regulatory changes	

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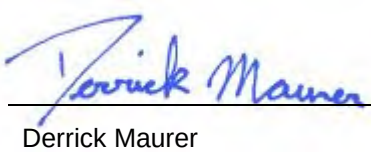
APPROVAL SIGNATURES

Prepared by:		02/23/2017
	Derrick Maurer	Date:
Technical Expert Reviewed by:		05/15/2020
	Ryan Mattson (Technical Expert)	Date:

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

The objective of this Technical Guidance Instruction (TGI) is to describe the procedures to manage investigation-derived wastes (IDW), both hazardous and nonhazardous, generated during site activities, which may include, but are not limited to: drilling, trenching/excavation, construction, demolition, monitoring well sampling, soil sampling, decontamination and remediation. For the purposes of this TGI, IDW is considered to be discarded materials which are defined as solid waste by United States Environmental Protection Agency (EPA) standard 40 CFR § 261.2 (which may include liquids, solids, or sludges). IDW may include soil, groundwater, drilling fluids, decontamination liquids, as well as contaminated personal protective equipment (PPE), sorbent materials, construction and demolition debris, and disposable sampling materials. Hazardous or uncharacterized IDW will be collected and staged at the point of generation. Quantities small enough to be containerized in 55-gallon drums will be taken to a designated temporary onsite storage area (discussed in further detail under Drum Storage) pending characterization and disposal. IDW materials will be characterized using process knowledge and appropriate laboratory analyses to determine the waste classification and evaluate proper safe handling and disposal methods.

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This TGI describes the necessary equipment, field procedures, materials, regulatory references, and documentation procedures necessary for proper handling and storage of IDW up to the time it is properly transported from the project site and disposed. The procedures included in this TGI for handling and temporary storage of IDW are based on the EPA's guidance document *Guide to Management of Investigation Derived Wastes* (USEPA, 1992). IDW is assumed to be contaminated with the site constituents of concern (COCs) until analytical evidence indicates otherwise. IDW will be managed to ensure the protection of human health and the environment and will comply with all applicable or relevant and appropriate requirements (ARAR). Although not comprehensive, the following laws and regulations on Hazardous Waste Management should be considered as potential ARAR. It is the Arcadis Certified Project Manager (CPM) and/or designated Technical Expert to determine which laws and regulations, at all levels of government, are applicable to each project site and activity falling under this TGI.

Federal Laws and Regulations

- Resource Conservation and Recovery Act (RCRA) 42 USC § 6901-6987.
- Federal Hazardous Waste Regulations 40 CFR § 260-265

Department of Transportation (DOT) Hazardous Materials Transportation 49 CFR

Occupational Safety and Health Administration (OSHA) Regulations 29 CFR

State Laws and Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

Regional, County, Municipal, and Local Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

Initial Storage

Pending characterization, IDW will be temporarily stored appropriately within each area of contamination (AOC). Under RCRA, "storage" is defined as the "holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (40 CFR § 260.10). The onsite waste staging area will be in a secure and controlled area. Uncharacterized wastes are considered potentially hazardous wastes and must be stored in DOT approved packaging. Liquid wastes must be stored in DOT approved closed head drums or other approved containers (e.g., portable tank containers) that are compatible with the type of material stored therein. Solid materials must be stored in DOT approved open head drums where practicable. Larger quantities of solid IDW can be containerized in bulk containers (such as in a roll-off box). Soil from large excavation projects may be managed in stockpiles with within the AOC and does not need to be containerized until exiting the AOC.

Characterization

Waste characterization can either be based on generator knowledge, such as using historical process knowledge and safety data sheets (SDS), or can be based upon characterization sampling analytical results. IDW typically is not characterized using SDS as it is a mixture of aged chemicals and environmental media. Historical process knowledge should be used to determine if the IDW is a listed hazardous waste (40 CFR § 261.31-33). If the IDW is not a listed hazardous waste, waste

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characterization can be completed by laboratory analysis of representative samples of the IDW. The laboratory used for waste characterization analysis must have the appropriate state and federal accreditations and may be required to be pre-approved by the Client. IDW will be classified as RCRA hazardous or non-regulated under RCRA based on the waste characterization determination.

If IDW is characterized as RCRA hazardous waste, RCRA and DOT requirements must be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR § 262 and 49 CFR § 171-178. Waste material classified as RCRA nonhazardous may be handled and disposed of as nonhazardous waste in accordance with applicable federal, state, and local regulations.

Storage Time Limitations

Containerized hazardous wastes can be temporarily stored for a maximum of 90 calendar days from the accumulation start date for a large quantity generator or a maximum of 180 calendar days from the accumulation start date for a small quantity generator. Wastes classified as nonhazardous may be handled and disposed of as nonhazardous waste and are not subject to storage time limitations.

This is TGI may be modified by the CPM and/or Technical Expert for a specific project or client program, as required, dependent upon client requirements, site conditions, equipment limitations, or limitations imposed by the procedure. The resulting procedure employed to execute the work will be documented in the project work plans or reports. If changes to the sampling procedures are required due to unanticipated field conditions, the changes will be discussed with the CPM and/or Technical Expert as soon as practicable, and if approved to be performed, be documented.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current regulatory- and Arcadis-required health and safety training including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), as needed. Personnel handling and packaging hazardous waste and performing hazardous waste characterizations must have RCRA hazardous waste management training per 40 CFR § 264.16. Additional state-specific hazardous waste management training is required in certain states (i.e., California).

Although not common practice, in certain situations Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator. Arcadis personnel who sign waste profiles and/or waste manifests will have both current RCRA hazardous waste management training per 40 CFR § 264.16 and current DOT hazardous materials transportation training per 49 CFR § 172.704. Arcadis field personnel will also comply with client-specific training. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project health and safety plan (HASP) and other documents will identify other training requirements or access control requirements.

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4 EQUIPMENT LIST

The Following Materials, as required, will be available for IDW handling and Storage:

- Appropriate personal protective equipment as specified in the Site Health and Safety Plan (HASP)
- DOT approved containers
- Hammer
- Leather gloves
- Drum dolly
- Appropriate drum labels (outdoor waterproof self-adhesive)
- Portable tank container
- Appropriate labeling, packing, chain-of-custody forms, and shipping materials as determined by the CPM and/or Technical Expert.
- Indelible ink and/or permanent marking pens
- Plastic sheeting
- Appropriate sample containers, labels, and forms
- Stainless-steel bucket auger
- Stainless steel spatula or knife
- Stainless steel hand spade
- Stainless steel scoop
- Digital camera
- Field logbook

5 CAUTIONS

Filled drums can be very heavy, become unbalanced, or spill its contents. Therefore, use appropriate moving techniques and equipment for safe handling. Similar media (e.g. soils with other soils; or liquids with other liquids) will be stored in the same drums to aid in sample analysis and disposal. Drum lids must be secured to prevent rainwater from entering the drums and leakage during movement. Drums containing solid material may not contain any free liquids. Waste containers stored for extended periods of time may be subject to deterioration. Drum Over Packs may be used as secondary containment. All drums must be visually inspected for condition to ensure that they are in good condition without visible evidence of rusting, holes, breakage, etc., to prevent potential leakage and facilitate subsequent disposal. All drum lids must be verified as having a properly functioning secured lid prior to use.

6 HEALTH AND SAFETY CONSIDERATIONS

As determined by the site's known and suspected hazards, appropriate PPE must be worn by all field personnel within the designated work area. Exposure air monitoring may be required during certain field activities as required in the Site Health and Safety Plan. If soil excavation in areas with potentially hazardous contaminants is possible, contingency plans will be developed to address the potential for encountering gross contamination or non-aqueous phase liquids. All excavation activities shall be in compliance with OSHA standard 29 CFR 1926.651 Excavations, and any other applicable regulations.

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Arcadis field personnel and subcontractors will be trained in and perform their work in compliance with all applicable federal, state, and local health and safety regulations as well as Arcadis' HASP and applicable Client health and safety requirements.

7 PROCEDURE

Specific waste temporary storage and handling procedures to be used are dependent upon the type of generated waste, including type of media (e.g. soils or free liquids) and constituents of concern. For this reason, IDW can be stored in a secure location onsite in separate 55-gallon storage drums, where solids can be stockpiled onsite (if nonhazardous) and purge water may be stored in portable tank containers. Waste materials such as broken sample bottles or equipment containers and wrappings will be stored in 55-gallon drums unless they were not in contact with sample media.

Management of IDW

Minimization of IDW should be considered by the project team during all phases of the project. Site managers may want to consider techniques such as replacing solvent based cleaners with aqueous-based cleaners for decontamination of equipment, reuse of equipment (where it can be properly decontaminated), limitation of traffic between exclusion and support zones, and drilling methods and sampling techniques that minimize the generation of waste. Alternative drilling and subsurface sampling methods may include the use of small diameter boreholes, as well as borehole testing methods such as a core penetrometer or direct push technique instead of coring.

Drum Storage

Drums containing hazardous waste will be stored in accordance with the requirements of 40 CFR 265 Subpart I (for containers) and 265 Subpart DD (for containment buildings). All 55-gallon drums will be stored at a secure, centralized onsite location that is readily accessible for vehicular pick-up. Drums confirmed as, or assumed to contain hazardous waste will be stored over an impervious surface provided with secondary spill containment. The storage location will, for drums containing liquid, have a containment system that can contain at least the larger of 10% of the aggregate volume of staged materials or 100% of the volume of the largest container. Drums will be closed during storage and be in good condition in accordance with the Guide to Management of Investigation-Derived Wastes (USEPA, 1992).

Hazardous Waste Determination

Waste material must be characterized to determine if it meets any of the federal definitions of hazardous waste as required by 40 CFR § 262.11. If the waste does not meet any of the federal definitions, it must then be established if any state-specific or local-specific hazardous waste criteria exist/apply.

Generator Status

Once hazardous waste determination has been made, the generator status will be determined. Large quantity generators (LQG) are generators who generate more than 1,000 kilograms of hazardous waste in a calendar month. Small quantity generators (SQG) of hazardous waste are generators who generate greater than 100 kilograms but less than 1,000 kilograms of hazardous waste in a calendar month. Very small quantity generators (VSQG) are generators who generate less than 100 kilograms of hazardous

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waste per month. Please note that a generator status may change from month to month and that a notice of this change is usually required by the generator's state agency.

Accumulation Time for Hazardous Waste

A LQG may accumulate hazardous waste on site for 90 calendar days or less without a permit and without having interim status, provided that such accumulation is in compliance with requirements in 40 CFR § 262.17. A SQG may accumulate hazardous waste on site for 180 calendar days or less without a permit or without having interim status, subject to the requirements of 40 CFR § 262.16. VSQG requirements are found in 40 CFR § 262.14. NOTE: The federal VSQG and SQG provisions may not be recognized by some states (e.g., California and Rhode Island). State-specific and local-specific regulations must be reviewed and understood prior to the generation of hazardous waste.

Satellite Accumulation of Hazardous Waste Satellite accumulation (SAA) will mean the accumulation of as much as fifty-five (55) gallons of hazardous waste, or the accumulation of as much as one quart of acutely hazardous waste, in containers at or near any point of generation where the waste initially accumulates, which is under the control of the operator of the process generating the waste, without a permit or interim status and without complying with the requirements of 40 CFR § 262.15 and without any storage time limit, provided that the generator complies with 40 CFR § 262.15.

Once more than 55 gallons of hazardous waste accumulates in SAA, the generator has three days to move this waste into storage.

Storage recommendations for hazardous waste include:

- Ignitable or reactive hazardous wastes must be >50 feet from the property line per 40 CFR § 265.176 (LQG generators only).
- Hazardous waste should be stored on a concrete slab (asphalt is acceptable if there are no free liquids in the waste).
- Drainage must be directed away from the accumulation area.
- Area must be properly vented.
- Area must be secure.

Drum/Container Labeling

Drums will be labeled on both the side and lid of the drum using a permanent marking pen. Old drum labels must be removed to the extent possible, descriptions crossed out should any information remain, and new labels affixed on top of the old labels. Other containers used to store various types of waste (e.g., polyethylene tanks, roll-off boxes, end-dump trailers, etc.) will be labeled with an appropriate "Waste Container" or "Testing in Progress" label pending characterization. Drums and containers will be labeled as follows:

- Appropriate waste characterization label (Pending Analysis, Hazardous, or Nonhazardous)
- Waste generator's name (e.g., client name)
- Project Name
- Name and telephone number of Arcadis project manager
- Composition of contents (e.g., used oil, acetone 40%, toluene 60%)
- Media (e.g., solid, liquid)
- Accumulation start date

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- Drum number of total drums as reconciled with the Drum Inventory maintained in the field log book.

IDW containers will remain closed except when adding or removing waste. Immediately upon beginning to place waste into the drum/container, a “Waste Container” or “Pending Analysis” label will be filled out to include the information specified above, and affixed to the container. Once the contents of the container are identified as either non-hazardous or hazardous, the following additional labels will be applied.

- Containers with waste determined to be non-hazardous will be labeled with a green and white "Nonhazardous Waste" label over the "Waste Container" label.
- Containers with waste determined to be hazardous will be stored in an onsite storage area and will be labeled with the "Hazardous Waste" label and affixed over the "Waste Container" label.

The ACCUMULATION DATE for the hazardous waste is the date the waste is first placed in the container and is the same date as the date on the "Waste Container" label. DOT hazardous class labels must be applied to all hazardous waste containers for shipment offsite to an approved disposal or recycling facility. In addition, a DOT proper shipping name will be included on the hazardous waste label. The transporter should be equipped with the appropriate DOT placards. However, placarding or offering placards to the initial transporter is the responsibility of the generator per 40 CFR § 262.33.

Inspections and Documentation

All IDW will be documented as generated on a Drum Inventory Log maintained in the field log book. The Drum Inventory will record the generation date, type, quantity, matrix and origin (e.g., Boring-1, Test Pit 3, etc.) of materials in every drum, as well as a unique identification number for each drum. The drum inventory will be used during drum pickup to assist with labeling of drums. The drum storage area and any other areas of temporarily staged waste, such as soil/debris piles, will be inspected weekly. The weekly inspections will be recorded in the field notebook or on a Weekly Inspection Log. Digital photographs will be taken upon the initial generation and drumming/staging of waste, and final labeling after characterization to document compliance with labeling and storage protocols, and condition of the container. Evidence of damage, tampering or other discrepancy should be documented photographically.

Emergency Response and Notifications

Specific procedures for responding to site emergencies will be detailed in the HASP. If the generator is designated as a LQG, a Contingency Plan will need to be prepared to include emergency response and notification procedures per 40 CFR § 265 Subpart D. In the event of a fire, explosion, or other release which could threaten human health outside of the site or when Client or Arcadis has knowledge of a spill that has reached surface water, Client or Arcadis must immediately notify the National Response Center (800-424-8802) in accordance with 40 CFR § 262.265. Other notifications to state and/or other local regulatory agencies may also be necessary.

Drilling Soil Cuttings and Muds

Soil cuttings are solid to semi-solid soils generated during trenching activities, subsurface soil sampling, or installation of monitoring wells. Depending on the drilling method, drilling fluids known as "muds" may be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Soil cuttings will be labeled and stored in 55-gallon drums with bolt-sealed lids.

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Excavated Solids

Excavated solids may include, but are not limited to: soil, fill, and construction and demolition debris. Prior to permitted treatment or offsite disposal, potentially hazardous excavated solids may be temporarily stockpiled onsite as long as the stockpile remains in the same AOC from where it was excavated. Potentially hazardous excavated solids removed from the AOC must be immediately containerized in labeled drums or closable top roll-offs lined with 9-mil polyvinyl chloride (PVC) sheeting and are subject to LQG storage time limits. Nonhazardous excavated solids can be stockpiled either inside or outside of the AOC, do not have to be containerized and are not subject to hazardous waste regulations. Potentially hazardous excavated solids must not be mixed with nonhazardous excavated solids. All classes of excavated solid stockpiles should be maintained in a secure area onsite. At a minimum, the floor of the stockpile area will be covered with a 20-mil high density polyethylene liner that is supported by a foundation or at least a 60-mil high density polyethylene liner that is not supported by a foundation. The excavated material will not contain free liquids. The owner/operator will provide controls for windblown dispersion, run-on control, and precipitation runoff. The run-on control system will prevent flow onto the active portion of the pile during peak discharge from at least a 25-year storm and the run-off management system will collect and control at least the water volume resulting from a 24-hour, 25-year storm (USEPA, 1992). Additionally, the stockpile area will be inspected on a weekly basis and after storm events. Individual states may require that the stockpile be inspected/certified by a licensed professional engineer. Stockpiled material will be covered with a 6-mil polyvinyl chloride (PVC) liner or sprayed dust control product. The stockpile cover will be secured in place with appropriate material (concrete blocks, weights, etc.) to prevent the movement of the cover.

Decontamination Solutions

Decontamination solutions are generated during the decontamination of personal protective equipment and sampling equipment. Decontamination solutions may range from detergents, organic solvents and acids used to decontaminate small field sampling equipment to steam cleaning rinsate used to wash heavy field equipment. These solutions are to be labeled and stored in closed head drums compatible with the decontamination solution. Decontamination procedures, including personnel and field sampling equipment, must comply with applicable Arcadis procedural documents.

Disposable Equipment

Disposable equipment includes personal protective equipment (e.g., tyvek coveralls, gloves, booties and APR cartridges) and disposable sampling equipment such as trowels or disposable bailers. If the media sampled exhibits hazardous characteristics per results of waste characterization sampling, contaminated disposable equipment will also be disposed of as a hazardous waste. If compatible with the original IDW waste stream (i.e., the IDW is a solid and the disposal equipment is a solid), the disposable equipment can be combined with the IDW. If these materials are not compatible (i.e., the IDW is a liquid and the disposal equipment is a solid), the disposable equipment will be stored onsite in separate labeled 55-gallon drums. Uncontaminated or decontaminated disposable equipment can be considered nonhazardous waste.

Purge Water

Purge water includes groundwater generated during well development, groundwater sampling, or aquifer testing. The volume of groundwater generated will dictate the appropriate storage procedure. Monitoring

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well development and groundwater sampling may generate three well volumes of groundwater or more. This volume will be stored in labeled 55-gallon drums. Aquifer tests may generate significantly greater volumes of groundwater depending on the well yield and the duration of the test. Therefore, large-volume portable polyethylene tanks will be considered for temporary storage pending groundwater-waste characterization.

Purged Water Storage Tank Decontamination and Removal

The following procedures will be used for inspection, cleaning, and offsite removal of storage tanks used for temporary storage of purge water. These procedures are intended to be used for rented portable tanks such as Baker Tanks or Rain for Rent containers. Storage tanks will be made of inert plastic materials. The major steps for preparing a rented tank for return to a vendor include characterizing the purge water, disposing of the purge water, decontaminating the tank, final tank inspection, and mobilization. Decontamination and inspection procedures are described in further detail below.

- Tank Cleaning: Most vendors require that tanks be free of any visible sediment and water before returning, a professional cleaning service may be required. Each specific vendor should be consulted concerning specific requirements for returning tanks.
- Tank Inspection: After emptying the tank, purged water storage tanks should be inspected for debris, chemical staining, and physical damage. The vendors require that tanks be returned in the original condition (i.e., free of sediment, staining and no physical damage).

8 WASTE MANAGEMENT

Soil/Solids Characterization

Waste characterization will be conducted in accordance with waste hauler, waste handling facility, and local/state/federal requirements. In general, RCRA hazardous wastes are those solid wastes determined by a Toxicity Characteristic Leaching Procedure (TCLP) test or to contain levels of certain toxic metals, pesticides, or other organic chemicals above specific applicable regulatory agency thresholds. If the one or more of 40 toxic compounds listed in Table I of 40 CFR § 261.24 are detected in the sample at levels above the maximum unregulated concentrations, the waste must be characterized as a toxic hazardous waste. Wastes can also be considered “listed” hazardous waste depending on site-specific processes.

Composite soil samples will be collected at a frequency of one sample per 250 cubic yard basis for stockpiled soil or one per 55-gallon drum per different waste stream for containerized. A four-point composite sample will be collected per 250 cubic yards of stockpiled material and for each drum waste stream. Sample and composite frequencies may be adjusted in accordance with the waste handling facility’s requirements and may be reduced for large volumes of waste with consistent properties. Waste characterization samples will be considered valid for consistent waste streams for a period of 1 year. Waste characterization samples may be analyzed for the TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls (PCBs), as well as reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional sampling. Please note that state- or local-specific regulations may require a different or additional sampling approaches.

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Wastewater Characterization

Waste characterization will be conducted in accordance with the requirements of the waste hauler, waste handling facility, and local/state/federal governments. In general, purge water should be analyzed by methods appropriate for the known contaminants, if any, that have been historically detected in the monitoring wells. Samples will be collected and analyzed in accordance with the requirements of the waste disposal facility. Wastewater characterization samples may be analyzed for TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls, as well as corrosivity (pH), reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional sampling. Please note that state- and/or local-specific regulations may require different or additional sampling approaches.

Sample Handling and Shipping

All samples will be appropriately labeled, packed, and shipped, and the chain-of-custody will be filled out in accordance with current Arcadis sample chain of custody, handling, packing, and shipping procedures and guidance instructions.

It should be noted that additional training is required for packaging and shipping of hazardous and/or dangerous materials. Please refer to the current Arcadis training requirements related to handling and shipping of samples, shipping determinations, and hazardous materials.

Preparing Waste Shipment Documentation (Hazardous and Nonhazardous)

Waste profiles will be prepared by the Arcadis CPM and forwarded, along with laboratory analytical data to the Client for approval/signature. The Client will then return the profile to Arcadis who will then forward to the waste removal contractor for preparation of a manifest. The manifest will be reviewed by Arcadis prior to forwarding to the Client for approval. Upon approval of the manifest, the Client will return the original signed manifest directly to the waste contractor or to the Arcadis CPM for forwarding to the waste contractor. Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator.

Final drum labeling and pickup will be supervised by an Arcadis representative who is trained and experienced with applicable waste labeling procedures. The Arcadis representative will have a copy of the drum inventory maintained in the field book and will reconcile the drum inventory with the profile numbers on the labels and on the manifest. Different profile numbers will be generated for different matrices or materials in the drums. For example, the profile number for drill cuttings will be different than the profile number for purge water. When there are multiple profiles it is critical that the proper label, with the profile number appropriate to a specific material be affixed to the proper drums. A copy of the Arcadis drum inventory will be provided to the waste transporter during drum pickup and to the facility receiving the waste.

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9 DATA RECORDING AND MANAGEMENT

Waste characterization sample handling, packing, and shipping procedures will be documented in accordance with relevant Arcadis procedures and guidance instructions as well as applicable client and/or project requirements, such as a Quality Assurance Project Plan or Sampling and Analysis Plan. Copies of the chain-of-custody forms will be maintained in the project file. Arcadis should photograph or maintain a copy of any hazardous waste manifest signed on behalf of Client in the corresponding office DOT record file.

10 QUALITY ASSURANCE

The CPM or APM will review all field documentation once per week for errors or omissions as compared to applicable project requirements including but not limited to: the proposal/scope of work, QAPP, SAP, HASP, etc. Deficiencies will be noted, tracked, and resolved. Upon correction, they will be noted for project documentation.

11 REFERENCES

United States Environmental Protection Agency (USEPA). 1992. Guide to Management of Investigation-Derived Wastes. Office of Remedial and Emergency Response. Hazardous Site Control Division. January 1992.

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ARCADIS Design & Consultancy for natural and built assets

TGI – Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells

Rev: 3

Rev Date: April 5, 2023

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
	0	October 12, 2018	All	Updated and re-written as TGI with new branding and content	Marc Killingstad
	1	May 8, 2020	Pages 5, 10-11	Added clarification/details for equipment requirements and procedure steps based on USEPA guidance	Marc Killingstad
	2	April 5, 2022	All	Updated to new branding template and minor edits	Marc Killingstad
	3	April 5, 2023	All	Annual review completed by SME. Document version number and document date updated.	Marc Killingstad

Approval Signatures

Prepared by:	Xuan Xu	4/5/2023
	Xuan Xu (Preparer)	Date
Reviewed by:		4/5/2023
	Marc Killingstad (Subject Matter Expert)	Date

1 Introduction

Groundwater samples are collected from monitoring wells to evaluate groundwater quality. The protocol presented in this Technical Guidance Instruction (TGI) describes the procedures to purge monitoring wells and collect groundwater samples using the low flow purging/sampling methodology. This protocol has been developed in accordance with the United States Environmental Protection Agency (USEPA) Region I *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (EQASOP-GW4; September 19, 2017).

2 Intended Use and Responsibilities

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It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

Both filtered and unfiltered groundwater samples may be collected using this low-flow sampling method. Filtered samples will be obtained using a 0.45-micron disposable filter. Project teams will evaluate the last time the monitoring wells were developed and determine if additional development might be necessary. Water samples will not be taken immediately following well development. Sufficient time will be allowed for the groundwater flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well

construction materials. This lag time will depend on site conditions and methods of installation but often exceeds one week.

4 Personnel Qualifications

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations,such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as identified in the site-specific Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. The HASP will also identify any access control requirements.

Prior to mobilizing to the field, the groundwater sampling team will review and be thoroughly familiar withrelevant site-specific documents including but not limited to the task-specific work plan or field implementation plan (FIP)/field sampling plan, Quality Assurance Project Plan (QAPP), HASP, historical information, and other relevant site documents.

Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and TGIs and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. Additionally, the groundwater sampling team will review and be thoroughly familiar with documentation provided by equipment manufacturers and become familiar with the operation of (i.e., hands-on experience) all equipment that will be used in the field prior to mobilization.

5 Equipment List

Specific to this activity, the following materials (or equivalent) will be used:

- Site-specific HASP and health and safety documents identified in the HASP
- Field Implementation Plan (FIP) that includes site map, well construction records, sampling plan (sample analyses, sample volume required, and sample holding time), and prior groundwater sampling records (if available)
- Field notebook and/or smart device (phone or tablet)
- Low-flow sampling field forms (**Attachment A**)
- Appropriate personal protective equipment (PPE) (e.g., latex or nitrile gloves, safety glasses, etc.)as specified in the HASP
- Well keys and other tools to remove manhole covers (manual torque wrench with 9/16” socket and flat head screwdriver typical)
- Photoionization detector (PID) or Flame ionization detector (FID) (as appropriate, depending onsite-specific constituents of concern)
- Electronic water-level indicator (e.g., Solinist Model 101) or oil/water interface probe with 0.01- foot accuracy (oil/water as appropriate, note that sampling will not be performed when sheen orlight non-aqueous phase liquid [LNAPL] is present)
- Down-hole multi-parameter water-quality sonde (temperature/pH/specific conductivity/oxidationreduction [ORP]/turbidity/dissolved oxygen) meter coupled with flow-through-cell for measurements, for example:

  - YSI 6-Series Multi-Parameter Instrument
  - Horiba U-22 Multi-Parameter Instrument.
  - Hydrolab Series 3 or Series 4a Multiprobe and Display.

  NOTE: *Transparent, small volume flow-through-cells (e.g., 250 milliliters or less) are preferred as they allow for easy detection of air bubbles and sediment buildup in the cell, which can interfere with the monitoring instrument probes. A small volume cell also allows for quick turnover of water in the cell between measurements of the indicator field parameters. It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through-cell.*

- Plastic sheeting (e.g., Weatherall Visqueen) to protect all down-hole sampling equipment from contact with potential sources of contamination.
- Decontamination equipment
  - Non-phosphate laboratory soap (Alconox or equivalent), brushes, and clean buckets, and/or clean wash tubs—new buckets or tubs will be purchased if it cannot be determined if the present items are clean
  - Distilled or de-ionized water for equipment decontamination
- Indelible ink pen
- 150-foot measuring tape (or sufficient length for the maximum site depth requirement)
- Sampling pump, which may consist of one or more of the following:
  - Submersible pump (e.g., Grundfos Redi-Flo 2)
  - Peristaltic pump (e.g., ISCO Model 150)
  - Bladder pump (e.g., Marschalk System 1, QED Micropurge, Geotech)
- Appropriate controller and power source for pump:
  - Submersible and peristaltic pumps require electric power from either a generator or a deep cell battery
  - Submersible pumps such as Grundfos require a pump controller to run the pump
  - Bladder pumps require a pump controller and a gas source (e.g., air compressor or compressed N_2 or CO_2 gas cylinders)
- Teflon® tubing or Teflon®-lined polyethylene tubing of an appropriate size for the pump being used
  - For peristaltic pumps, dedicated Tygon® tubing (or other type as specified by the manufacturer) will be used through the pump apparatus
  - Teflon® will not be used when sampling for per- and polyfluoroalkyl substances (PFAS)
- Graduated cylinder and stopwatch or other device to measure time to determine pumping rate
- Appropriate water sample containers (supplied by the laboratory)
- Appropriate blanks (trip blank supplied by the laboratory)
- Sample labels and Chain-of-Custody forms (COC)
- 0.45-micron disposable filters (if field filtering is required)

- A supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020) may be required for specific projects and will be specified in the project FIP/ work plan and the kick-off notes.
    - If used, in-line 'T' and valve allows for collection of water for turbidity measurements before the pump discharge enters the flow-through cell

NOTE: *The maintenance requirements for the above equipment generally involve decontamination or periodic cleaning, battery charging, and proper storage, as specified by the manufacturer. For operational difficulties, the equipment will be serviced by a qualified technician.*

6 Cautions

Different USEPA regions and/or state regulatory agencies may stipulate deviations from this document. Itis the responsibility of the Project Team (Project Manager and Technical Lead) to be fully aware of the requirements from the applicable regulatory framework.

Weather

- If heavy precipitation occurs, and no cover over the sampling area and monitoring well can be erected, sampling may be discontinued until adequate cover is provided. Rainwater could compromise groundwater samples.
- Avoid extreme weather situations. Be aware that thermal currents and vertical mixing of cold and warm water inside the well casing could create a convection cell within the well and compromise data collection (e.g., biological mechanisms).
    - Direct sunlight and hot ambient temperatures may cause the groundwater in the tubing orflow-through-cell to heat up and de-gas. This may result in the loss of volatile organic compounds (VOCs) and dissolved gases. Shade the equipment from direct sunlight, keep the tubing as short as possible and avoid the hottest times of the day.
    - Sampling during freezing conditions may adversely impact the data quality objectives. USEPA recommends low-flow sampling be conducted at air temperatures above 32°F (0°C) or taking special precautions to prevent groundwater from freezing in the equipment.

Cross-Contamination

- To mitigate potential cross-contamination, groundwater samples are to be collected in a pre- determined order from least impacted to impacted based on previous analytical data. If no analytical data are available, collect samples in order of up-gradient, then furthest down-gradient tosource area locations.
- Note that permanent markers could introduce volatile constituents into the samples*; therefore, indelible ink is recommended* to be used for labels on sample containers or sample coolers.
- When using a gasoline generator, this power source will be set-up at least 30 feet downwind from the well to avoid exhaust fumes to contaminate samples.

Pumps

- Preferred methods of extracting groundwater are adjustable rate, submersible pumps - such as centrifugal pumps or bladder pumps – constructed of stainless steel or polytetrafluoroethylene (PTFE, i.e., Teflon®). However, *PTFE will not be used when sampling for per- and polyfluoroalkyl substances (PFAS). PTFE could contain PFAS*.

- When using a bladder pump for collecting VOCs and dissolved gases, “best practice” is to set-up the pump to deliver sufficient water to fill a 40 mL VOC vial.
- The use of peristaltic pumps will be based on the type of data to be collected. *Because the use a peristaltic pump can result in de-gassing of VOC and / or dissolved gases from groundwater, a different type of pump will be considered if these compounds are of concern.*
- *Manual or motor driven inertial pumping devices are not recommended because they cause greater disturbance during purging and pumping than regular pumps and are less easily controlled. This could cause a higher degree of data variability.*

Tubing

- When sampling for VOCs, SVOCs, pesticides, PCBs and inorganics, use of PTFE (Teflon®) or PTFE-lined tubing is preferred. However, PTFE tubing will not be used when sampling for PFAS.
- PVC, polypropylene or polyethelene tubing may be used when sampling for metals or other inorganics.
- Tubing with inside diameters of 1/4 or 3/8 inch is recommended because this will help ensure tubing remains water filled when operating at very low pumping rates.

General Precautions

- Store and/or stage empty and full sample containers and coolers out of direct sunlight.
- It may be necessary to field filter the groundwater for some parameters (e.g., metals) during collection, depending on preservation, analytical method, and project quality objectives. The task-kick-off notes and the FIP/work plan will list the samples that require field filtering.
- Be careful not to overtighten lids with Teflon® liners or septa (e.g., 40 mL vials). Over-tightening can cause the glass to shatter or impair the integrity of the Teflon® seal.

7 Health and Safety Considerations

The HASP will be followed, as appropriate, to ensure the safety of field personnel.

Appropriate personal protective equipment (PPE) will be always worn in line with the task and the site-specific HASP.

Review all site-specific and procedural hazards as they are provided in the HASP, and review Job Safety Analysis (JSA) documents in the field each day prior to beginning work.

Access to wells may expose field personnel to hazardous materials such as contaminated groundwater or non-aqueous phase liquid (NAPL) (e.g., oil). Other potential hazards include pressurized wells, stinging insects that may inhabit well heads, other biologic hazards (e.g. ticks in long grass/weeds around well head), and potentially the use of sharp cutting tools (scissors, knife)—open well caps slowly and keep face and body away to allow to vent any built-up pressure; only use non-toxic peppermint oil spray for stinging insect nests; review client-specific health and safety requirements, which may preclude the use of fixed/folding-blade knives, and use appropriate hand protection.

Generators and cord and plug equipment will employ an overcurrent protection device such as an integrated ground fault circuit interrupter (GFCI) cord. Grundfos pump controllers will not run properly with a GFCI, so the power source will be equipped with other overcurrent protection means.

Overtightening of lids with Teflon® liners can cause the glass to shatter and create a risk for hand injuries.

8 Procedure

Field personnel will set up and perform low-flow sampling in accordance with the following procedures.

1. Review FIP and groundwater sampling records from previous sampling events (if available) prior to mobilization to estimate the optimum pumping rate and anticipated drawdown for each well to perform sampling as efficiently as possible (i.e., reach a stabilized pumping condition).
2. Calibrate field instruments according to manufacturer procedures for calibration and record calibration procedure and results in field log.
3. All equipment will either be new or decontaminated in accordance with appropriate guidance document *(TGI – Groundwater and Soil Sampling Equipment Decontamination)* prior to use.
4. Visually inspect the well to ensure that it is undamaged, properly labeled and secured
   a. Damage or other conditions that may affect the integrity of the well will be recorded in the Field Activity Daily Log and brought to the attention of the designated Field Manager and/or Project Manager
   b. Record well construction and conditions on the Low-Flow Sampling Field Form **(Attachment A)**.
5. Place clean plastic sheeting on the ground near the well to keep monitoring and sampling equipment off the surface unless the equipment is elevated above the ground (e.g., on a table).
6. Open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. If appropriate or required for site-specific conditions, insert the photoionization detector (PID) probe approximately 4 to 6 inches into the casing or the well headspace and cover it with a gloved hand. Record the PID reading in the field log. Perform air monitoring in the breathing zone according to the HASP and/or JSA.
7. Measure and record the initial depth to groundwater prior to placing the pumps.
8. Prepare and install the pump in the well.

   NOTE: *Groundwater will be purged from the wells using an appropriate pump. If the depth to water is below the sampling range of a peristaltic pump (approximately 25 feet below ground surface), a submersible or bladder pump will be used, provided that the well is constructed with a casing diameter of at least two (2) inches (the minimum well diameter capable of accommodating such pumps). For smaller diameter wells, where the depth to water is below the sampling range of a peristaltic pump, alternative sampling methods (i.e., bailing or small diameter bladder pumps) will be used to purge and sample the groundwater. Bladder pumps are preferred over peristaltic and submersible pumps to prevent volatilization if sampling of VOCs and/or dissolved gasses is required. Purge water will be collected and containerized according to the direction of the project team.*

   a. For submersible and non-dedicated bladder pumps, decontaminate the pump according to site decontamination procedures. Non-dedicated bladder pumps will require a new bladder and attachment of an air-line, sample discharge line, and safety cable prior to placement in the well. Attach the air-line tubing to the air-port on the top of the bladder pump. Attach the sample discharge tubing to the water port on the top of the bladder pump. Take care not to reverse the air and discharge tubing lines during bladder pump setup, as this could result in bladder failure or rupture. Attach and secure a safety cable to the eyebolt on the top of pump (if present, depending on pump model used). Slowly lower the pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Avoid twisting

and tangling of safety cable, tubing, and electrical lines while lowering the pump into the well; twisted and tangled lines could result in the pump becoming stuck in the well casing. Also, make sure to keep tubing and lines from touching the ground or other surfaces while introducing them into the well, as this could lead to unintended contamination.

b. If using a bladder pump, connect the air-line to the pump controller output port. The pump controller will be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose. Tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Teflon® tape may be used on the threads of the cylinder to provide a tighter seal. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow. Turn on the pump controller power (if an on/off switch is present) and verify that all batteries are charged and fully functioning before starting the pump.

c. If a peristaltic pump is being used, slowly lower the sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. The pump intake or sampling tube must be kept at least two (2) feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

d. If using an in-line 'T' and valve, install between pump discharge water line and the bottom inlet port of the flow-through cell. Attach a short piece of tubing to the outlet. This set-up will be used to collect samples for turbidity readings.

9. Connect the pump discharge water line to the bottom inlet port on the flow-through cell connected to the multi-parameter water-quality sonde and make sure to record equipment/instrument identification (manufacturer and model number).

10. Before starting the pump, ensure that the water level inside the well has stabilized (i.e., measure the water level multiple times after deploying the pump in the well).

11. Start pumping the well at 200 to 500 milliliters (mL) per minute (or at lower site-specific rate if specified) and adjust the pumping rate to cause little or no water level drawdown in the well (less than 0.3 feet below the initial static depth to water measurement): the water level should stabilize, however, this is not always possible.

12. If the well diameter is of sufficient size, measure the water level every 3 to 5 minutes (or as appropriate, lower flow rates may require longer time between readings) during pumping.

13. Maintain a steady flow rate to the extent practicable and do not break pump suction or cause entrainment of air in the sample.

14. Record pumping rate adjustments and depths to water.

    If necessary, reduce pumping rates to the minimum capabilities of the pump to avoid pumping the well dry and/or to stabilize indicator parameters; if the recharge rate of the well is very low, use alternative purging techniques, which will vary based on the well construction and screen position.

    For wells screened across the water table, the well may be pumped dry, and sampling can commence as soon as the volume in the well has recovered sufficiently to permit collection of samples.

    For wells screened entirely below the water table, the well can be pumped until a stabilized level (which may be greater than the maximum displacement goal of 0.3 feet) is maintained and monitoring for stabilization of field indicator parameters can commence; if a lower stabilization level cannot be

maintained, the well may be pumped until the drawdown is at a level slightly higher than top of the well screen.

15. After water levels have stabilized and a sufficient volume has been purged (see note below), continue pumping and begin monitoring field indicator parameters using a multi-parameter water-quality sonde coupled with a flow-through-cell.

    NOTE: *The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.*

16. Use the flow to measure all indicator field parameters, except for turbidity, every 3 to 5 minutes (or after each volume of the flow-through cell has been purged or other appropriate interval); turbidity samples will be collected before the flow-through-cell using the T-valve and a clean container such as a glass beaker.

17. Record field indicator parameters on the groundwater sampling log.

18. The well is considered stabilized and ready for sample collection when three consecutive readings are within the following limits:

    - **Turbidity** within ± 10% for values greater than 5 nephelometric turbidity units [NTUs] or if three turbidity values are less than 5 NTUs, consider the values stabilized
    - **Dissolved Oxygen (DO)** within ± 10% for values greater than 0.5 mg/L or if three DO values are less than 0.5 mg/L, consider the values stabilized
    - **Specific Conductance** within ± 3%
    - **Temperature** within ± 3%
    - **pH** within ± 0.1 unit
    - **Oxidation/Reduction Potential (ORP)** within ±10 millivolts (mV)

    NOTE: *Alternate stabilization goals may exist in different geographic regions, consult the site- specific FIP/work plan for stabilization criteria).*

    NOTE: *While achieving turbidity levels less than 5 NTU and a stable drawdown of less than 0.3 feet is desirable, sample collection may still take place provided the indicator field parameter criteria in this procedure are met.*

19. If the parameters have stabilized but turbidity remains relatively high (e.g., greater than 50 NTUs), the pump flow rate may be decreased to a minimum rate of 100 mL/min to reduce turbidity levels as low as possible. If groundwater turbidity has been minimized (i.e., consecutive readings within ± 10%) and the values for all other parameters have stabilized, the well may be sampled; however, consult specifications in the FIP/work plan and/or the project technical lead prior to sampling.

20. If after one (1) hour of purging indicator field parameters have not stabilized, consult specifications in the FIP/work plan and/or the project technical lead prior to sampling.

    In general, three potential options are available if stabilization criteria are not met:

    a. Continue purging until stabilization is achieved.

    b. Discontinue purging, do not collect any samples, and record in field logbook/on the sampling form that stabilization could not be achieved (documentation must describe attempts to achieve stabilization).

c. Discontinue purging, collect samples, and provide full explanation of attempts to achieve stabilization. There is a risk that the analytical data obtained under these conditions, particularly metals and hydrophobic organic analytes, may reflect a sampling bias and, as a result, the data may not meet the data quality objectives of the sampling event.

NOTE: *DO is extremely susceptible to various external influences (including temperature or the presence of bubbles on the DO meter); therefore, great care will be taken to minimize the agitation or other disturbance of water within the flow-through cell while collecting these measurements. If air bubbles are present on the DO probe or in the discharge tubing, remove them before taking a measurement. If DO values are not within acceptable range for the temperature of groundwater, again check for and remove air bubbles on the probe before re-measuring. The table below may be used as a general guide for DO values under various temperatures; however, understand that the table corresponds to freshwater solubility and groundwater contaminants may affect oxygen solubility. If DO value is 0.00 or less, then the meter will be serviced and re-calibrated. If DO values are above possible results, then the meter will be serviced and re-calibrated.*

NOTE: *During extreme weather conditions, stabilization of field indicator parameters may be difficult to attain. Modifications to the sampling procedures to alleviate these conditions (e.g., measuring the water temperature in the well adjacent to the pump intake) will be documented in the field logbook/on the sampling form.*

NOTE: *If other field conditions are suspected of preventing stabilization of certain parameters, detailed observations will be documented in the field logbook/on the sampling form.*

Oxygen Solubility in Fresh Water

Temperature (degrees C)	Dissolved Oxygen (mg/L)
0	14.6
1	14.19
2	13.81
3	13.44
4	13.09
5	12.75
6	12.43
7	12.12
8	11.83
9	11.55
10	11.27
11	11.01
12	10.76
13	10.52
14	10.29
15	10.07
16	9.85
17	9.65
18	9.45
19	9.26
20	9.07
21	8.9
22	8.72
23	8.56
24	8.4
25	8.24
26	8.09
27	7.95
28	7.81
29	7.67
30	7.54
31	7.41
32	7.28
33	7.16
34	7.05
35	6.93

Reference: Vesilind, P.A., Introduction to Environmental Engineering, PWS Publishing Company, Boston, 468 pages (1996)

21. Complete the sample label(s) and cover the label(s) with clear packing tape to secure the label onto the container.
22. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container.
    a. If a flow-through analytical cell is being used to measure field parameters, the flow-through cell will be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection.
    b. Under no circumstances will analytical samples be collected from the discharge of the flow- through cell.
    c. If an in-line ‘T’ and valve are used, the valve needs to be removed as well.

d. Samples will be collected in the following order: VOCs, total organic carbon (TOC), semi- volatile organic compounds (SVOCs), metals and cyanide, and others (or other order as defined in the site-specific FIP/work plan).
e. When the container is full, tightly screw on the cap.

23. If sampling for total and filtered metals and/or polychlorinated biphenyls (PCBs), a filtered and unfiltered sample will be collected.
    a. Install an in-line, disposable 0.45-micron particle filter on the discharge tubing after the appropriate unfiltered groundwater sample has been collected.
    b. Continue to run the pump until an initial volume of "flush" water has been run through the filter in accordance with the manufacturer's directions (generally 100 to 300 mL).
    c. Collect the filtered groundwater sample by diverting flow out of the filter into the appropriately labeled sample container.
    d. When the container is full, tightly screw on the cap.
24. Secure with packing material and store the samples on ice in an insulated transport container provided by the laboratory and include a temperature blank in each container to be shipped.
25. Record on the Low-Flow Sampling Field Form (and bound field logbook) the time at which sampling procedures were completed, any pertinent observations of the sample (e.g., physical appearance and the presence or lack of odors or sheens), and the values of the stabilized field indicator parameters as measured during the final reading during purging **(see Attachment A)**.
26. Turn off the pump and air compressor or close the gas cylinder valve if using a bladder pump setup.
27. Slowly remove the pump, tubing, lines, and safety cable from the well.
    a. If using dedicated tubing, do not allow the tubing or lines to touch the ground or any other surfaces which could contaminate them.
    b. If using dedicated tubing, it will be folded - without pinching it - to a length that will allow the well to be capped and also facilitate retrieval of the tubing during later sampling events.
    c. Use a length of rope or string to tie the tubing to the well cap.
    d. Alternatively, if tubing and safety line are to be saved and reused for sampling the well at a later date, coil the tubing neatly and placed in a clean plastic bag that is clearly labeled with the well ID ensuring the bag is tightly sealed before placing it in storage.
28. Secure the well and properly dispose of personal protective equipment (PPE) and disposable equipment.
29. Complete the procedures for packaging, shipping, and handling with the associated Chain-of- Custody.
30. Complete decontamination for flow-through analytical cell and submersible or bladder pump, as appropriate *(TGI – Groundwater and Soil Sampling Equipment Decontamination).*
31. At the end of each day of the sampling event, perform calibration check of field instruments and record procedure and results in field log.

9 Waste Management

Materials generated during groundwater sampling activities, including disposable equipment and excess purge water, will be stored on site in appropriately labeled containers and disposed of properly. Waste will be managed in accordance with the *TGI – Investigation-Derived Waste Handling and Storage*, the procedures identified in the

FIP or QAPP as well as state-, federal- or client-specific requirements. Be certain that waste containers are properly labeled and documented in the field logbook.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

Management of the original documents from the field will be completed in accordance with the site- specific QAPP.

In general, forms (e.g., Low-Flow Sampling Field Forms), logs/notes (including daily field and calibration logs), digital records, and Chain-of-Custody records will be maintained by the field team lead.

Field logs and Chain-of-Custody records will be transmitted to the Arcadis Project Manager and/or Task Manager, as appropriate, at the end of each day unless otherwise directed. Electronic data files will be sent to the project team and uploaded to the electronic project folder daily.

Records generated as a result of this TGI will be controlled and maintained in the project record files in accordance with project requirements.

11 Quality Assurance

Quality assurance procedures shall be conducted in accordance with the Arcadis Quality Management System or the site-specific QAPP.

Unless described otherwise in the project-specific FIP/work plan, QAPP, or Sampling and Analysis Plan, quality assurance/quality control samples will be collected as follows:

- One duplicate for every 10 samples
- One laboratory matrix/matrix spike sample for every 20 samples
- In addition to the quality control samples to be collected in accordance with this TGI, the following quality control procedures will be observed in the field:
- Collect samples from monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information if available
- Equipment blanks will include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well)
- Collect equipment blanks after wells with higher concentrations (if known) have been sampled

- Operate all monitoring instrumentation in accordance with manufacturer's instructions and calibration procedures—calibrate instruments at the beginning of each day, verify the calibration at the end of each day, and record all calibration activities in the field notebook
- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well following the procedure for equipment decontamination

12 References

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U.S. Geological Survey (USGS). 1977. *National Handbook of Recommended Methods for Water-Data Acquisition: USGS Office of Water Data Coordination*. Reston, Virginia.

13 Attachments

Attachment A – Low Flow Sampling Field Form

Attachment A

Low-Flow Sampling Field Form

GROUNDWATER SAMPLING FORM

Project No. _____ Well ID _____ Date _____

Project Name/Location _____ Weather _____

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) _____ Total Depth (ft-bmp) _____ Water Column (ft) _____ Gallons in Well _____

MP Elevation _____ Pump Intake (ft-bmp) _____ Purge Method: _____ Sample Method _____

Pump On/Off _____ Centrifugal _____ Submersible _____ Other _____

Sample Time: _____ Volume Purged _____

Purge Start _____ Gallons Purged _____ Sample ID _____ Sampled by _____

Purge End _____ Replicate/Code No. _____

Time	Minutes Elapsed	Rate (gpm)/(mL/min) 200mL/min +	Depth to Water (ft) -0.3	Gallons Purged	pH ± 0.1	Cond. (µMhos)/(mS/cm) ± 3%	Turbidity (NTU) ± 10%	DO (mg/L) ± 10%	Temp. (°C)/(°F) ± 3%	Redox (mV) ± 10mV	Appearance	
											Color	Odor
Stabilization Calculations (±)												
Stabilization Criteria					**± 0.1 s.u.**	**±3%**	**± 10% or within 1 NTU (1)**	**± 10%**	**±3%**	**±10 mV**		

(1) **Turbidity** < 50 NTU and ±10% or within 1 NTU of a previous reading when <10 NTU

Constituents Sampled	Container	Number	Preservative

Comments _____

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	*1.5" = 0.09*	*2.5" = 0.26*	*3.5" = 0.50*	*6" = 1.47*
	1.25" = 0.06	*2" = 0.16*	*3" = 0.37*	*4" = 0.65*	

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

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TGI - Manual Water-Level and NAPL Monitoring

Rev: 5

Rev Date: March 8, 2024

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
0	0	October 11, 2018	All	Updated and re-written as TGI	Marc Killingstad Everett H. Fortner III
1	1	May 8, 2020	All	Updated and added NAPL gauging	Marc Killingstad Everett H. Fortner III Andy Pennington
2	2	April 5, 2022	All	Formatting and Revisions	Martha Wulftange
3	3	December 22, 2022	11	Data Management	Martha Wulftange
4	4	March 1, 2023	All	Annual review completed by SME. Document Revision Number and Document Date Updated.	Everett H. Fortner III
5	4	March 8, 2028	All	Annual review completed by SME. Document Revision Number and Document Date Updated.	Everett H. Fortner III

Approval Signatures

Prepared by:

3/8/2024

Everett H. Fortner III, PG (Preparer) | Date

Reviewed by:

3/8/2024

Marc Killingstad, PE (Subject Matter Expert) | Date

1 Introduction

This TGI describes the equipment, field procedures, materials, and documentation procedures to measure and record water-levels using an electronic water-level probe or an oil-water level indicator. This TGI also describes procedures for measuring in-well thicknesses of non-aqueous phase liquid (NAPL), both light and/or dense (LNAPLs and DNAPLs, respectively).

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

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This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

The objective of this Technical Guidance Instruction (TGI) is to describe procedures to measure and record water-levels (groundwater and surface-water) using manual water-level meters. Water levels may be measured using an electronic water-level probe or an oil-water level indicator from established reference points (e.g., top of casing). Reference points must be surveyed to evaluate fluid level elevations relative to a vertical datum (e.g., North America Vertical Datum of 1988 [NAVD88] relative to sea level). This TGI also describes procedures for measuring in well thickness of NAPL and DNAPLs.

Surface water-levels can be measured from stilling wells or fixed points (bridges, walls, etc.) and measuring from an established point of reference using a water-level meter. In some cases, surface water water-levels may be determined from a graduated stream gauge, attached to a pole located in open water with known elevation, without the use of a water-level meter.

The use of pressure transducers or other automated devices for the collection of groundwater elevation data will be subject of *TGI – Water-Level Monitoring using Pressure Transducers and TGI – Water-Level Measurements using Sonic Meters.*

4 Personnel Qualifications

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as specified in the Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and TGIs and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The HASP and other documents will identify other training requirements or access control requirements.

5 Equipment List

The following field equipment is suggested for water-level measurements:

- Site-specific Health and Safety Plan (HASP).
- Appropriate personal protective equipment (PPE) as specified in the HASP.
- Electronic water-level indicator graduated in 0.01 ft. increments.
- Electronic oil-water (interface) level indicator graduated in 0.01 ft. increments, if necessary.
- Non-phosphate laboratory soap (Alconox or equivalent), brushes, clean buckets or clean wash tubs.
- Distilled or de-ionized (required for some sites) water for equipment decontamination.
- Photoionization detector (PID) and/or organic vapor analyzer (optional).
- 150-foot measuring tape (or sufficient length for the maximum site depth requirement) – if required for total depth measurements of deeper wells.
- Solvent (methanol/acetone/isopropyl alcohol) rinse – optional.
- Spray bottle for solvent - optional
- Plastic drop cloth (e.g. Weatherall Visqueen) to place beneath the buckets or tubs to reduce potential for contamination of the tape or probe.
- Tools and/or keys required for opening wells.
- Well construction summary table and/or well construction logs.
- Summary table of previous water-level measurements.
- Field notebook and/or smart device (phone or tablet) or appropriate field forms (see Attachment 1).
- Indelible ink pen

6 Cautions

Electronic water-level indicators and oil-water interface probes may sometimes produce false-positive readings. For example, if the inside casing surface of the well or stilling tube has condensation above the water level, then an electronic water-level probe may produce a signal by contacting the sidewall of the well, rather than the true water-level surface. For accuracy, the electronic water-level probe and/or interface probe should be raised and lowered several times at the approximate depth where the instrument produces a tone indicating a fluid interface to verify consistent, repeatable results (three or more times). Additionally, some wells may be constructed with a sump. If local/regional groundwater levels have declined such that the water-level is below the base of the well screen, a sump may still contain water and provide an erroneous measurement. Therefore, possessing and comparing measurements with a well construction summary table or well construction log is recommended for proper reporting.

If the presence of a NAPL is known or suspected within specific wells, do not use an electronic water- level indicator. Use an oil-water interface probe instead. If NAPL presents ignition or explosion hazards, an intrinsically safe oil-water interface probe is required to be used with grounding and following the manufacturer's instructions.

If the NAPL is known to be very viscous or problematic to gauge, the data quality will require additional consideration prior to measuring. Staff will consider the data quality objectives for the gauging activity – e.g., if quantifying NAPL thickness is necessary, or if assessing the presence/absence is sufficient.

Alternate NAPL measurement methods (such as using drop pipes or temporary coatings for down-well equipment) may be considered.

When measuring total well depths with an electronic water-level indicator, the measurement must have a correction factor applied for post processing or completed at the time of measurement that is equal to the length of the probe beneath the circuit closing electrodes (if applicable to the instrument). This is necessary because the tape distance markings are referenced to the electrode, rather than the end of the probe. Some newer instruments do not have an offset electrode and this correction factor is needed. In addition, total depth measurements are difficult with wells that have large water columns due to buoyancy issues. In addition, the total depth measurement will include notes that indicate a soft or hard bottom if recognized during the measurement.

Ensure that the type of electronic water-level indicator is compatible with the depth and diameter of the wells to be measured. Some smaller piezometers or larger diameter well stilling tubes will accommodate only smaller diameter probes.

7 Health and Safety Considerations

The HASP will be followed, as appropriate, to ensure the safety of field personnel. Access to wells may expose field personnel to hazardous materials such as contaminated groundwater or oil. Other potential hazards include pressurized wells, stinging insects that may inhabit well heads, other biologic hazards (e.g. ticks in long grass/weeds around well head), and potentially the use of sharp cutting tools (scissors, knife). Appropriate personal protective equipment (PPE) will be worn during these activities. Only use non-toxic peppermint oil spray for stinging insect nests. Open well caps slowly and keep face and body away to allow to vent any built-up pressure. Field personnel will thoroughly review client-specific health and safety requirements, which may preclude the use of fixed/folding-blade knives.

Obtaining measurements from active pumping wells requires knowledge of the construction and design, as the indicator probe and tape can become intertwined within down-well equipment (such as pump impellers) causing a serious health and safety hazard and equipment damage. Ensure that stilling wells have a perforated end and capped bottom to inhibit tape from extending into the downhole pump depth. If a stilling tube is not present or the still tube construction is not known, determine a conservative "not to exceed" measurement depth based on the top of pump depth with an added safety factor. If all information is not known, a water-level will not be taken from the pumping well until clarification on depths are available.

8 Procedure

Calibration procedures and groundwater level measurement procedures for electronic water-level indicators and oil-water indicators are described in the sections below. Calibration documentation can berequested from the rental or manufacturer.

Calibration Procedures

If the indicator requires length and markings verification is required by project data quality plan or other reasons, then the following steps may be used:

- Measure the lengths between each increment marker on the indicator with a measuring tape. The appropriate length of indicator measuring tape, suitable to cover the depth range for the wells of interest, will be checked for accuracy.
- If the indicator measuring tape is inaccurate, the probe will require to be sent back to the manufacturer or rental company. If a replacement can't immediately be available, then an offset can be measured to correct the measurements.
- If multiple water-level indicators and/or oil-water interface probes are being used for an event, calibration of the multiple devices will be required by measuring a water-level at a single well contemporaneously with all indicators to be used and calculated correction factors provided for data processing (typical corrections are small and range from 0.01 to 0.03 foot).
- Equipment calibration will be recorded in the field logbook and/or smart device.

Water-Level Measurement Procedures

The general procedures to be followed for the collection of fluid level measurements and well depths from the monitoring wells are as follows:

- Check that the water-level/oil-water level indicator battery is functional, before mobilization and prior to each work day (e.g., turn power on and check that meter sounds when probe is lowered into a bucket of water – note that water-level meters will not work with low-electrical-conductivity liquids such as distilled water).
- Record instrument make, model, serial number, and (if present) Arcadis ID number in the field form or electronic field form.
- Don disposable nitrile gloves. Decontaminate the water-level/oil-water indicator, any attached tape and the spool with laboratory-grade soap and distilled water (see Initial Decontamination Procedures below). The spool requires caution with cleaning as it is not water-proof and can be damaged during cleaning.

- The top of the monitoring well will be cleaned with a clean rag to prevent loose particulate matter from falling into the well.
- Perform a well inspection (note that a well inspection form may be required to be filled out along with a photo to document the conditions).
- Place clean plastic sheeting on the ground next to the well.
- Unlock and/or open the monitoring well cover while standing upwind from the well (note that some wells may be under pressure and precaution should be taken with opening well caps – see Section 6).
- Measure the volatile organics present in the monitoring well head space with a PID and record the PID reading (if applicable and requirement for the site).
- Allow the water-level in the well to equilibrate with atmospheric pressure for a few minutes (check previous field forms or field books for equilibration time, if noted).
- Locate the measuring reference point that correlates to the survey point on the well casing. If one is not found, make a reference point by notching the highest and/or north point on the inner casing (or outer if an inner casing is not present) or mark with a permanent mark. All downhole measurements will be taken from the reference point. Document any changes or new reference point addition.
- Measure to the nearest 0.01 foot and record the height of the inner well casing and outer protective casing to ground level (note that some well pads are raised and are not at true ground surface).
- Lower the indicator probe into the center of the well until contact with the water surface is indicated by either an audible alarm or light. The sensitivity of the probe may need adjustment if the alarm or light is not strong signal. Use and install a tape guide (available from some manufacturers) to help with accuracy and provide protection with damaging the measurement tape. If a tape guide is not available, make sure that the tape does rub on the inner or outer casing which could fray and damage the tape.
- If an oil-water interface probe is being used to measure depth and thickness of NAPL, lower the interface probe into the center of the well until a contact with the NAPL surface is indicated by either audible alarm or light. The sensitivity of the probe may need adjustment if the alarm or light is not strong signal. To gauge the water level in a well which contains LNAPL (LNAPL-water interface), advance the interface probe past the LNAPL-water interface until the probe produces a solid audible alarm indicating water. While slowly retrieving the probe upward, the equipment will produce a different tone when the LNAPL-water interface is reached (typically this is a multiple alarm sound or flashing light). This level should represent the depth to water. The depth indicating the bottom of the water column and top of DNAPL layer, if any, is indicated by the multiple alarm signal or flashing light emitted by the interface probe.
- Hold the tape at the measuring point and repeat the measurement two more times.
- Read and record measurement to the nearest 0.01 foot. Check the measurement with previous measurements, if available, and note any anomalies/discrepancies; if significant, contact the project staff.

- Measure and record total depth of well (see Total Depth Measurement Procedures below); note that measurement of total depth is not always performed at wells containing LNAPL or DNAPL, in order to reduce decontamination of the instrument and reduce potential exposure to NAPL.
- Record all measurements (with date and time collected to the nearest minute) and note any inconsistencies/anomalies and relevant observations in the field notebook and/or smart device or appropriate field forms.
- Follow decontamination procedure outlined below before measuring subsequent wells (see
- Decontamina*tion after Water Level and Total Depth Measurements* below).
- Replace cap and lock the well when all activities are completed.

Total Depth Measurement Procedures

- Weighted tape or electronic water-level indicator can be used to measure the total well depth.
- Follow initial procedures noted above in Water-Level Measurements above.
- Lower indicator probe (or tape) until weighted end is resting on the bottom of the well. Raise indicator slowly until there is no slack in the tape. Gently estimate the bottom of the well by slowly raising and lowering the indicator: great care should be taken to avoid damaging the sensor on the probe. The operator may find it easier to allow the weight to touch bottom and then detect the 'tug' on the tape while lifting the weight off the well bottom.
- Because of tape buoyancy and weight effects encountered in deep wells with long water columns, it may be difficult to determine when the probe is in contact the bottom of the well and sediment in the bottom of the well can also make it difficult to determine total depth. Care must be taken in these situations to ensure accurate measurements.
- If total depth measurements are to be collected during low-flow sampling events, the measurement will be made only after low-flow sampling has been completed or at least 12 hours prior to initiating sample collection from the well, in order to minimize: 1) mixing of the stagnant water at the top of the well column with potential formation water underneath; and/or 2) agitation and subsequent entrainment of possible sediment collected at the well bottom).
- Read and record measurement to the nearest 0.1 foot. Please refer to the note regarding total depth measurements described in Section 5 Cautions above.
- Follow decontamination procedure outlined below before gauging the next well (see Decontaminationafter *Water Level, NAPL Level, and Total Depth Measurements* below).

Initial Decontamination

- Note that there may be project specific decontamination procedure documents that will be followed in lieu of the below procedures.
- Set up a decontamination station consisting of three clean buckets (e.g., 5-gallon buckets). The buckets should not be used to containerize purge water; they will be used for decontamination purposes only.
- Fill the first bucket with one gallon of distilled water (use deionized water if metals are a contaminant at the site) and add non-phosphate laboratory-grade soap. Fill the second bucket

with distilled water (use deionized water if metals are a contaminant at the site) and leave the third bucket empty. Place the drop cloth underneath.

- Unwind the entire tape from the spool into a bucket with non-phosphate laboratory-grade soap and distilled water; Brush the tape carefully to remove dirt and possible contamination, using a brush dedicated to the wash bucket.
- Carefully brush all dirt of the spool and wipe down with a soapy cloth or paper towel.
- Transfer the tape into the second bucket containing rinse water. Carefully brush the tape using a second brush, dedicated to the rinse bucket. Lift the tape out of the bucket and allow rinse water to drip off the tape.
- Transfer the tape to the third bucket. Wind the tape onto the spool while wiping excess water off the tape using a paper towel.

Decontamination after Water Level, NAPL Level, and Total Depth Measurements

- Set up a decontamination station consisting of three clean buckets, fill according to the initial decon procedure.
- Unwind the only the length of tape used for gauging from the spool into a bucket with laboratory-grade soap and distilled water. Brush the tape carefully to remove dirt and possible contamination, using a brush dedicated to the wash bucket.
- Continue as described above.
- Extra care should be taken to clean the probe after a total depth measurement. All sediment or dirt needs to be removed during decontamination.
- If an oil-water interface probe is used to gauge NAPL, a solvent may be necessary to remove all NAPL residue. After decontaminations steps above, use a spray bottle filled with chosen solvent (ex. isopropyl alcohol) and spray across all surfaces of the tape. Use paper towels to wipe off solvent and/or residue. This step may be repeated if necessary.

Notes:

- Collect equipment blanks if required by the work plan (minimum 1 per 20 samples or 1 per sampling event).
- Prepare new wash solution and rinse water when necessary (e.g., every 10 to 20 wells). The spent wash and rinse solution should be discharged according to site practices.
- The decontamination station may be expanded by adding extra rinse and/or detergent stations (i.e., solvent wash station) to the set up. The addition of more stations depends on the requirements of the work plan or the site-specific Field Sampling and Quality Assurance Plan and outlined in the project field plan or kick-off meeting.
- Small crates or washtubs are a possible substitute for the buckets. In any case, it is recommended to use containers with a lid.

9 Waste Management

Decontamination fluids, PPE, and other disposable equipment will be properly stored on site in labeledcontainers and disposed of properly. Be certain that waste containers are properly labeled and documented in the field log book. Review *TGI – Investigation Derived Waste Handling and Storage*, foradditional information and state- or client-specific requirements.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

Field personnel will complete all applicable field forms for each test (see attached forms and FieldNow® available forms). Forms will include recommended data file naming protocol per the field implementation plan. Data that has been collected must be transmitted at the end of the day (notes/forms/data file). The files must be transmitted to the appropriate project directory (via direct transfer or email to data manager). Work completed that day and any relevant observations noted during the daily activities as well as copies of the data mentioned above should be summarized and provided in an email. The appropriate team member will review the data for accuracy and provide feedback. Field equipment calibration, decontamination activities, and waste management activities will be recorded in the field notebook, appropriate field form, or daily log.

Refer to the Quality Procedure Data Management, QP 4.09, for additional information on data management.

11 Quality Assurance

Suggested quality control measures are below; project teams may implement some or all of these at their discretion and based on project data quality needs.

- As described in the detailed procedure, the electronic water-level meter and/or oil-water interfaceprobe can be calibrated prior to use versus an engineer's rule to ensure accurate length demarcations on the tape or cable. The results will be recorded.
- Measurements will be completed three times, with the final measurement recorded.
- Fluid interface measurements will be verified by gently raising and lowering the instrument through each interface to confirm repeatable results.
- Field notes will be reviewed by the project team once the field data has been delivered.

12 References

Cunningham, W.L., and Schalk, C.W., comps., 2011. *Groundwater technical procedures of the U.S. Geological Survey: U.S. Geological Survey Techniques and Methods 1–A1, 151 pp.*

U.S. Environmental Protection Agency, 2013. *SESD Operating Procedure, Groundwater level and Well Depth Measurement.* January 29.

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TGI – Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide

Rev: 12

Rev Date: September 20, 2023

Version Control

Revision No.	Date Issued	Page No.	Description	Reviewed By
0	April 27, 2017	All	Initial Release	Erica Kalve Erika Houtz Sue Tauro
1	June 19, 2018	1 through 4 and 17	Updated Information on Sampling Materials	Erica Kalve Erika Houtz
2	October 15, 2018	6 to 16	Minor updates on laboratory elements, updates to decontamination procedures, and clarification on equipment and reagent blank collection	Erika Houtz Erica Kalve
3	December 17, 2018	4, 6, 17	Removed Sharpies from acceptable field writing implements; Changed language in Section 3.2 and Section 10.5 to provide stricter guidance for DoD projects.	Erika Houtz, Erica Kalve
4	March 26, 2019	4,5	Removed Citranox from acceptable Decon solutions in Table 1a, added all fluoropolymer containing materials to prohibited items in Table 1b. Made a correction that Liquinox contains trace levels of 1,4 Dioxane, not Alconox.	Erika Houtz
5	October 16, 2020	14	Added Air Force preference to sample surface water at surface for Air Force investigations.	Erika Houtz
6	March 23, 2021	4, 5, 7, 12, 13, 14, 15, 16, 17	Made clarifications that fine/ultra-fine point Sharpies are allowed. Referenced 2018 MDEQ sampling guidance. Made updates to 'After Sample Collection' in Section 7.	Kevin Engle

7	April 18, 2021	All	Changed title from Poly- and Perfluoroalkyl Substances to **"Per- and Polyfluoroalkyl Substances"** and changed PFASs to PFAS.	Rosario Varrella, Erika Houtz
8	May 4, 2021	12, 13, 15, 16	Clarified that sample containers should have an HDPE lined screw cap and that LDPE plastic sheeting should be used.	Kevin Engle, Erika Houtz
9	October 20, 2021	Note that numbers have shifted one page forward relative to prior versions. 5, 7, 9-12, 15, 16, 18-25.	Specific acceptable sunscreen and insect repellent brands were added to Table 1. Clarified language regarding footwear and H&S trainings. Laboratories section and Section 10.5 was updated to reflect new laboratory names and an updated version of the QSM. Sections 5 and 6 were updated to provide clearer language on health and safety protocols for sunscreen, insect repellent, and rain events. Added language to specify decontamination of reusable equipment prior to initial use in Section 7.1. Section 8 on Waste Management was updated to state that waste storage and disposal should be determined in the site specific workplan. Section 9 was updated to include Rite in the Rain® notebooks as approved for PFAS sampling. Changed the term "sample port" to "sample location" when describing where to place plastic sheeting. Section 10.1 was updated to indicate an equipment blank can be collected for unvetted hazard controls that contact a sample. References were updated to include the newer version of the DoD QSM, MDEQ Sampling Guidance, and	Kevin Engle, Erika Houtz

			California State Water Board PFAS Sampling Guidance.	
10	January 26, 2022	Various, Section 7	TGI formatted to comply with new QMS TGI template and Arcadis brand compliance. Indicated to avoid use of anti-fog spray on safety glasses due to possible presence of PFAS.	Rosario Varrella, Kevin Engle
11	January 13, 2023	Various	TGI updated to include specific information found in the June 2022 ITRC Guidance document. Updates reflecting current state of the practice analytical procedures. Table 1a and Table 1b updates	Kevin Engle, Joey Matzke, Lauren March
12	September 20, 2023	Various	Decontamination procedure in Section 8.1 has been updated to remove solvent rinse. Procedure is now: Scrub with alconox, rinse with DI/distilled water, rinse with “PFAS-free” water, repeat. Updated “Shipping” section 8.4, allowing for Saturday delivery with laboratory approval. Made various minor corrections and clarifications related to specific brand names	Alexander Hamilton, Johnsie Lang

Approval Signatures

Prepared by:		9/20/2023
	Alexander Hamilton, PG Geologist (Preparer)	Date
Reviewed by:		9/20/2023
	Johnsie Lang, PhD (Subject Matter Expert)	Date

1 Introduction

This document is intended to provide guidance to field staff sampling for Per- and Polyfluoroalkyl Substances (PFAS). The content in this document describes the intended use, scope and application, personnel qualifications, equipment, cautions, health and safety considerations, procedures, waste management, data recording and management, and quality assurance of PFAS sampling.

2 Intended Use and Responsibilities

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3 Scope and Application

The purpose of this Technical Guidance Instructions (TGI) is to provide guidance on field sampling to be used for **Per- and Polyfluoroalkyl Substances** (PFAS). This protocol was adapted from various sources including Arcadis Australia, Transport Canada, and the U.S Army Corp of Engineers (USACE) Omaha. In general, sampling techniques used for PFAS site characterization are consistent with conventional sampling techniques used in the environmental industry, but special consideration is made regarding PFAS-containing materials and cross-contamination potential. **Table 1a** provides a summary of materials that have been approved for site investigation; this list is expected to grow longer as industry experience increases. **Table 1b** provides a summary of field equipment and materials that have available testing information and/or industry knowledge regarding

PFAS cross-contamination potential, and it is recommended that these materials be prohibited for sample collection; for materials that are suspected of containing PFAS and/or to retain PFAS, these recommendations are considered preliminary and subject to change. Further discussion of approved and prohibited materials is found throughout this document. In general, prohibited materials include but are not limited to peolytetrafluoroethylene (PFTE), waterproof coatings containing PFAS, fluorinated ethylene-propylene (FEP), ethylene tetrafluoroethylene (ETFE), low density polyethylene (LDPE), polyvinylidene fluoride (PVDF) [ITRC 2022].

Table 1a: Summary of Acceptable Sampling Equipment and Materials for PFAS Site Investigations

Sampling Materials	Additional Considerations	References
Water Sampling Materials		
High density polyethylene (HDPE) or silicone tubing materials	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
HDPE HydraSleeves™	LDPE HydraSleeves™ are not recommended	USACE 2016; MassDEP 2017
Drilling and Soil Sampling Materials		
PFAS-free drilling fluids	--	DER 2016
PFAS-free makeup water	Confirm PFAS-free water source via laboratory analysis prior to investigation	--
Acetate liners	For use in soil sampling	USACE 2016
Sample Containers and Storage		
HDPE sample containers with HDPE lined lids for soil and water samples	Laboratory should provide; whole bottle analysis of aqueous samples combined with a solvent rinse of bottle is recommended	DER 2016, MassDEP 2017
Ice contained in plastic (polyethylene) bags (double bagged)	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Field Documentation		
Ball point pens	--	MassDEP 2017
Standard paper and paper labels	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Fine/Ultra-Fine point Sharpies®	Larger point Sharpies® should be avoided.	MDEQ 2018
Decontamination		

Sampling Materials	Additional Considerations	References
Water-only decontamination	Confirm PFAS-free water source via laboratory analysis prior to investigation	DER 2016
Alconox® or Liquinox® followed by deionized water or PFAS-free water rinse	Liquinox® known to contain trace levels of 1,4-dioxane	NHDES 2016; USACE 2016; MassDEP 2017
Sun and Biological Protection		
OFF Deep Woods, Sawyer Permethrin, Insect Shield® Permethrin	Apply >10 m away from sampling area	MDEQ 2018
Banana Boat, Coppertone, Neutrogena, Meijer, and L'Oreal Sunscreens	Apply >10 m away from sampling area	MDEQ 2018

Note: This list is considered preliminary and additional materials may be added as additional information becomes available. Project teams are expected to follow a methodical evaluation process of materials to be used and confirm acceptance prior to implementation of field activities.

Table 1b: Summary of Sampling Equipment and Materials Not Recommended for PFAS Site Investigations.

Sampling Materials	Known PFAS-Containing Materials	Suspected PFAS-Containing Materials	Materials with Potential to Retain PFAS	References
Water Sampling Materials				
Teflon®, PTFE-containing or other fluoropolymer coated or containing field equipment (e.g., tubing, bailers, liners, tape, plumbing paste, pump parts)	x			DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Passive diffusion bags			x	MassDEP 2017
LDPE HydraSleeves ™			x	USACE 2016; MassDEP 2017
Water particle filters			x	MassDEP 2017
Drilling and Soil Sampling Materials				
Aluminium foil			x	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Drilling fluid containing PFAS	x	x		DER 2016
Coated bentonite		x		Radford et al 2023
Pipe thread compounds and tape			x	ITRC 2022

Sampling Materials	Known PFAS-Containing Materials	Suspected PFAS-Containing Materials	Materials with Potential to Retain PFAS	References
Sample Containers and Storage				
Glass sample containers with lined lids			x	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
LDPE containers and lined lids			x	USACE 2016
Teflon® or PTFE- lined lids on containers (e.g., sample containers, rinsate water storage containers)	x			DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Reusable chemical or gel ice packs (e.g., BlueIce®)		x		DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Field Documentation				
Self-sticking notes and similar office products (e.g., 3M Post-it-notes)		x		DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Waterproof paper, notebooks, and labels	x			DER 2016, MassDEP 2017
Markers		x		NHDES 2016
Decontamination				
[Some] detergents and decontamination solutions (e.g., Decon 90® Decontamination Solution)	x	x		DER 2016; NHDES 2016; MassDEP 2017

Note: For materials that are suspected of containing PFAS, or have the potential to retain PFAS, project specific considerations may provide adequate justification for use during the field event. For example, further evaluation may be conducted in the form of pre-field equipment blank sample analysis.

Given the extremely low detection limits associated with PFAS analysis and the many potential sources of trace levels of PFAS, field personnel are advised to err on the side of caution by strictly following these protocols, frequently replacing nitrile gloves, and rinsing field equipment to help mitigate the potential for false detections of PFAS. A summary of other specific items related to field sampling for PFAS are discussed in the sections below.

This TGI applies to all Arcadis and subcontractor personnel involved in field sampling for PFAS.

4 Personnel Qualifications

4.1 Sampling Personnel

Field personnel must have current health and safety training, including 40-hour HAZWOPER training, up to date 8-hour refresher, site supervisor training, and site-specific training, as needed. In addition, field personnel will be versed in the other relevant SOPs (e.g., low flow sampling) and will possess the skills and experience necessary to successfully complete the desired field work. The site Health and Safety Plan (HASP) and other documents will identify any other training requirements such as site-specific safety training or access control requirements.

4.2 Laboratories

These laboratories are example laboratories that could be used to analyze environmental media for PFAS, pending project approval:

- United States: Pace, SGS, Vista, ALS, and Eurofins
- Canada: AXYS-SGS and Bureau Veritas

Other laboratories may be used if they are appropriately accredited for PFAS analysis according to any project requirements. It is recommended that a laboratory is Environmental Laboratory Accreditation Program (ELAP)-accredited for PFAS analysis in accordance with the Department of Defense (DoD) Quality Systems Manual (QSM) 5.3 Table B-15 or any subsequent updates. **For all data collection efforts at DoD sites, PFAS data must be obtained using a method that is DoD ELAP-accredited under QSM 5.3 or later.**

5 Equipment List

The following equipment and materials must be available for sampling:

- Site plan of sampling locations, relevant work plan (or equivalent), and this TGI;
- Appropriate health and safety equipment, as specified in the site HASP;
- Dedicated plastic sheeting (preferably high-density polyethylene [HDPE]) or other clean surface to prevent sample contact with the ground;
- Conductivity/temperature/pH meter;
- Dissolved oxygen meter, oxidation reduction potential meter, and turbidity meter;
- Depth to water meter;
- If using low-flow groundwater sampling techniques, peristaltic pump (groundwater sampling)/bladder pump (with PFAS free bladder/ HDPE bladder), flow through cell, and accompanying HDPE and silicone tubing;
- Hydrasleeves™, if using Hydrasleeves™ for groundwater sampling;
- Metal trowel for soil samples; specialized soil/sediment sampling equipment as required;
- Brushes for scrubbing sampling equipment;

- Pens, pencils, and/or fine/ultra-fine point Sharpies® for writing;
- Clipboards, field binders, and field note pages that are not waterproof;
- Labeled sample bottles:
    - There are various laboratory and analytical methods in place at the time of this TGI revision (Revision 11). Only use certified PFAS free materials provided by the laboratory for sample collection.
- If high concentrations of PFAS related to class B firefighting foams are expected, bring additional small vials to conduct field-based shaker tests for foaming;
- Ziploc® bags to hold ice and samples;
- Bottles containing “PFAS-free” water used for reagent blanks;
- Labeled, thoroughly decontaminated coolers for samples with ice; Blue ice is not permitted;
- Deionized or distilled water for initial decontamination rinsing;
- “PFAS-free” water provided by the laboratory for final decontamination rinsing;
- Alconox or Liquinox®;
- Packing and shipping materials;
- Groundwater and/or Sampling Log; and
- Chain-of-Custody (COC) Forms.

6 Cautions

6.1 Food Packaging

Some food packaging may be treated with PFAS-containing chemicals to prevent permeation of oil and water in the food outside of the packaging. To avoid potential food packaging-related PFAS contact:

- Do not bring any food outside of the field vehicles onsite and eat snacks and meals offsite.
- Wash hands after eating.
- Remove any field garments or outer layers prior to eating. Do not put them back on until done eating and hands are washed.

6.2 Field Gear

6.2.1 Clothing

Many types of clothing are treated with PFAS for stain and water resistance, in particular outdoor performance wear. To avoid potential clothing-related PFAS contact:

- Do not wear any outdoor performance wear that is water or stain resistant, or appears to be. Err on the side of caution.
- Wear pre-laundered (multiple washings, i.e., 6+) clothing that is not stain resistant or waterproof (unless made from the materials listed in Section 5.3.1).
- Natural fabrics such as cotton are preferred. Synthetic fabrics may also be acceptable if there is no indication on the label that the fabric is water and stain resistant.
- Most importantly, avoid contacting your clothing with sampling equipment, bottles, and samples.

6.2.2 Personal Protective Equipment

Safety Footwear

Some safety footwear has been treated to provide a degree of waterproofing and increased durability and may represent a source of trace PFAS. If at all possible, safety footwear without waterproofing should be worn; footwear that provides adequate safety from physical hazards is required and takes precedence over potential PFAS concerns. To avoid any PFAS cross contamination to samples from footwear:

- Do not contact your footwear with equipment, bottles, or samples in any way.
- Do not allow gloves used for sampling to come in contact with safety footwear.

Nitrile Gloves

Wear disposable nitrile gloves at all times. Don a new pair of nitrile gloves **before** the following activities at each sample location:

- Decontamination of re-usable sampling equipment;
- Contact with sample bottles or “PFAS-free” water bottles;
- Insertion of anything into the sample ports (e.g., HDPE tubing); and
- Handling of any quality assurance/quality control (QA/QC) samples including field blanks and equipment blanks.

Don a new pair of nitrile gloves **after** the following activities:

- Handling of any non-dedicated sampling equipment;
- Contact with contaminated surfaces; or
- When judged necessary by field personnel.

6.3 Personal Hygiene

- Shower at night.
- Do not use personal care products after showering such as lotions, makeup, and perfumes, UNLESS medically necessary.

- Use sunscreen and insect repellent as necessary for health and safety, i.e., if sampling is to occur outdoors in direct sunlight and/or if insect hazards may be present. Specific products that are acceptable for PFAS sampling are listed in Table 1 and in Section 6.1. Apply sunscreen and insect repellant prior to initiating field sampling. If sunscreen and/or repellant need to be reapplied, ensure a safe distance away from the sampling locations and equipment (i.e., more than 10 meters (m) away). Wash hands after application and don new gloves following hand washing.

6.4 Visitors

Visitors to the site are asked to remain at least 10 meters from sampling areas.

7 Health and Safety Considerations

7.1 Biological and Environmental Hazard Controls

7.1.1 Sunscreens and Insect Repellents

When site conditions warrant, insect repellent and sunscreen should be applied. Some insect repellents and sunscreen have been approved for PFAS sampling by individual states. According to Michigan Department of Environmental Quality (MDEQ; now known as Michigan Department of Environment, Great Lakes, and Energy [EGLE]), the products below are allowable (MDEQ 2018). Note that California State Water Quality Control Board's PFAS sampling guidance refers to MDEQ/EGLE's allowable list of sunscreens and insect repellents (California State Water Quality Control Board 2020).

Insect Repellents

- OFF Deep Woods
- Sawyer Permethrin

Sunscreen

- Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30
- Meijer Sunscreen Lotion Broad Spectrum SPF 30
- Neutrogena Ultra-Sheer Dry-Touch Sunscreen Broad Spectrum SPF 30
- Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30
- Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30
- Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30
- Banana Boat Sport Performance Sunscreen Stick SPF 50
- Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50
- Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30
- Coppertone Sunscreen Stick Kids SPF 55
- L'Oréal Silky Sheer Face Lotion 50+
- Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50
- Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70
- Neutrogena Beach Defense Water + Sun Barrier Lotion SPF 70

- Neutrogena Beach Defense Water + Sun Barrier Spray Broad Spectrum SPF 30
- Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+

Please plan for sampling events and purchase these products ahead of time. For any sunscreens and bug sprays, including those listed above, always follow these instructions for application:

- Insect repellents and sunscreen should be applied away from the work area prior to initiating sampling.
- When re-applying, stay at least 10 m away from the sampling locations and equipment.
- Wash hands after application and don new nitrile gloves.

7.1.2 Rain Event

Special care should be taken when rain is falling at the project site:

- Field sampling during extreme rainfall should be avoided if possible. If sampling needs to take place during a rain event (or other extreme weather condition), ensure the rain gear or other safety clothing is appropriate. For example, rain gear made from the following materials is allowable: polyurethane, PVC, wax coated fabrics, rubber/neoprene, uncoated Tyvek® (MDEQ 2018).
- If project timelines are tight, consider the use of a gazebo tent that can be erected over the top of the monitoring well to provide shelter from the rain. The canopy material is possibly a PFAS-treated surface and should be managed as such; therefore, wear gloves when moving the tent, change them immediately after moving the tent, and avoid further contact with the tent until all sampling activities have been finished and the team is ready to move on to the next site.

7.1.3 Other H&S Considerations

- ***If an unapproved or potentially suspect hazard control is needed for health and safety, apply or keep that control away from the samples, document its use in field notes, and, if it does contact a sample, take an equipment blank with that material.***
- The ability to safely access the surface water sampling locations must be verified before sampling.
- Field activities must be performed in accordance with the site HASP, a copy of which will be present onsite during such activities.
- Safety hazards associated with sampling surface water include fast-moving water, deep water, and steep slopes close to sampling sites. Use extreme caution when approaching sampling sites
- If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting.
- Use caution when removing well caps as well may be under pressure, cap can dislodge forcefully and cause injury.
- Avoid the use of anti-fog sprays on glasses, which may contain PFAS. It's recommended to instead purchase pre-treated anti-fog safety glasses.

8 Procedure

8.1 Field Equipment Cleaning

Reusable field sampling equipment will require cleaning before initial use and between uses. For groundwater sampling, between uses, decontaminate the flow-through cell and any non-dedicated equipment (i.e., interface probe of depth to water meter) that comes into contact with well water. Trowels and other materials used to sample soil samples will also require decontamination, although dedicated, single use equipment such as liners should be used where possible.

After donning a new pair of nitrile gloves:

- Rinse sampling equipment with Alconox or Liquinox® cleaning solution; Scrub equipment with a plastic brush if needed;
- Rinse with distilled water or deionized water;
- Rinse with “PFAS-free” water
- Repeat this entire process, scrubbing equipment a second time, rinsing with distilled or deionized water, then rinsing again with “PFAS-free” water (i.e., two scrubbings and four water rinsings total).
- Collect all rinsate in a sealed pail for disposal. Do not reuse decontamination solutions between sampling locations.

8.2 Borehole/Monitoring Well Development

If a drill rig is being used to drill for soil cores or to install monitoring wells, wear clean nitrile gloves before collecting each continuous soil sample. Additional requirements include the following:

- Verify in writing with the manufacturer that single-use liners used to collect each sample are made of a material that does not contain PFAS;
- Collect soil samples in laboratory-supplied HDPE bottles.
- Store the sample bottles in coolers and keep at a temperature of 0 to 6ºC until transported to the laboratory.

8.2.1 Well Condition Survey/ Water Level Monitoring

Using equipment that has been thoroughly decontaminated according to the procedures in Section 7.1, conduct the well condition surveys and water level monitoring:

- Conduct monitoring well inspections and record water levels.
- Use an interface probe to evaluate presence/absence of non-aqueous phase liquid (NAPL).
- Measure the depth to water from the top of the polyvinyl chloride (PVC) riser and the total depth of the well.
- Record information in the field notes.

8.2.2 Monitoring Well Development and Purging

Follow these requirements for monitoring well development and purging:

- Do not use Teflon™ tubing for purging or sample collection. HDPE tubing is acceptable.
- Do not re-use materials between wells. Upon completion of use, remove all disposable materials (such as HDPE and/or silicone tubing) and place in heavy duty garbage bags for disposal.
- During development of the well, create sufficient energy to agitate the water column and create flow reversals in the well screen, filter pack and formation to loosen fine-grained materials and draw them into the well. The pumping or bailing action should then draw all drilling fluids and fine-grained material out of the borehole and adjacent formation and then out of the well. Review the Arcadis Monitoring Well Development guidance (Arcadis 2010) for more detailed information.
- Follow the low-flow purge and sampling techniques per the U.S. Protection Agency's (EPA's) guidance document titled *Low Stress (Low Flow) purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells* (2010) and ASTM's standard titled *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations* (2002). Also available for review is the Arcadis Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells (Arcadis 2011).
- To purge the well, if using HDPE tubing and a peristaltic pump, insert the end of the tubing to the approximate depth of the midpoint of the screened section of the monitoring wells. Measure the length of HDPE tubing to be inserted into each monitoring well and pre-cut it to approximate lengths (such as the previously measured arm span of a field technician) to avoid contact with any materials other than the monitoring well and peristaltic pump. Flow rates should be as low as can be reasonably achieved. Collect and appropriately dispose of purge water.
- Silicone tubing should direct the purge water through a flow-through cell for field parameter measurements of pH, conductivity, temperature, dissolved oxygen, and turbidity. Calibrate the instrument in the field prior to use.
- Record field parameters in intervals (generally of 3-minute duration) to ensure purge water has cycled through the flow-through cell. Sample the wells after field parameter measurements indicate stabilization, which allows collection of representative formation water (generally acceptable standards are three consecutive pH readings to within ±0.1 units, and three consecutive conductivity, temperature and dissolved oxygen measurements to within 3%). Turbidity must be monitored, but does not need to be used as a stabilization indicator of purge completion. Record field parameter measurements at each well. Drawdown should be monitored throughout the purge. Prior to collecting sample, disconnect tubing from flow-through cell and collect sample directly from tubing coming out of the monitoring well.
- If wells are suspected to be dewatering throughout the purge (i.e., reduced flow rate/difficulty pumping water or bubbles begin to come through the flow through cell), turn off the pump and allow the water level to recover for ½ hour, followed by sample collection. Document these activities in the field notes.

8.3 Sample Collection

Different laboratories may supply sample collection bottles of varying sizes depending on the type of media to be sampled. This section focuses on the collection of only soil, groundwater, surface water, and sediment. Different media may not follow these procedures. For example, AFFF concentrate should be sampled in accordance with DoD AFFF01 (DoD 2021).

8.3.1 Sample Containers

- Collect samples in HDPE bottles fitted with a HDPE lined (no Teflon™) screw cap.
- Complete bottle labels after the caps have been placed back on each bottle.
- Do not use glass bottles due to potential loss of analyte through adsorption. This is particularly important for aqueous samples.
- Review with analytical lab the sample size, sample container, etc. depending upon the type of PFAS analysis that is being requested.

8.3.2 Soil Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Trowels or drilling equipment that will come into contact with a sample should be decontaminated prior to sample collection, preferably with methanol/isopropanol/acetone;
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Collect soil samples using a clean stainless-steel trowel or with single-use PFAS-free liners;
- Place soil samples in HDPE bottles supplied by the laboratory.
- Note the time on the sample label.
- Collect any necessary duplicates/co-located samples and matrix spikes – verify with laboratory whether they need to be collected in separate sample bottles.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.

- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place soil sample bottles in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. Do not use blue ice.

8.3.3 Groundwater Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPEbottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.
- Measure depth to water and field parameters. Turbidity and the physical appearance of the purged water should be noted on the Groundwater Sampling Log.

During Sample Collection

- Start groundwater sample collection upon stabilization of field parameters.
- If low-flow groundwater sampling techniques are being used, disconnect the silicone tubing from the flow-through cell, enabling collection of groundwater samples without passing through the cell.
- Hydrasleeves are also considered acceptable for sampling of PFAS in groundwater – consult the project manager to determine which technique should be used. In general, low flow sampling is preferable.
- Collect groundwater samples (to the neck of the bottle, some headspace is acceptable) from the dedicated sampling ports at the center of the well screen. While collecting the sample, make sure the bottle cap remains in the other hand of the sampler, until replaced on the bottle.
- To mitigate cross contamination, collect groundwater samples in a pre-determined order from least impacted to greater impacted based on previous analytical data or knowledge about past activities at the site. If no analytical data are available, samples are to be collected in the following order:
    1. First sample the upgradient well(s).
    2. Next, sample the well located furthest downgradient of the interpreted or known source.
    3. The remaining wells should be progressively sampled in order from downgradient to upgradient, such that the wells closest to the interpreted or known source are sampled last.

- NOTE: If high concentrations of PFAS related to class B firefighting foams are expected in a groundwater sample, conduct a Shaker test by collecting and shaking a small portion of the sample (~10 to 25 mL) on site in a small disposable vial. If foaming is noted within the sample, document the foaming when samples are submitted for analysis; the 'shaker test' vial can then be disposed. This shaker test provides information about how each of the samples should be handled analytically.
- After collecting the sample, tightly screw on the polypropylene cap (snug, but not too tight). This will minimize leaking or cross contamination of the sample.
- Note the time on the sample label.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.
- Do not rinse PFAS sample bottles during sampling. Do not filter samples.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes and COC. Note ‘shake test’ results if appropriate.
- Place groundwater samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

  Treat all disposable sampling materials as single use and dispose of them appropriately after sampling at each monitoring well.

8.3.4 Surface Water Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Avoid sampling the surface, in general.
- However, for Air Force investigations, collect samples from the water surface.
- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.
- Collect surface water samples directly into laboratory-supplied bottles; wide-mouth bottles may be preferable to narrow mouth bottles for ease of surface water collection.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.
- Note the time on the sample bottle.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and TDS at each location **after** both surface water and sediment sampling.

8.3.5 Sediment Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.
- Collect sediment samples either manually using a stainless-steel trowel or using a petite ponar grab sampler, depending on field conditions at each sampling location during sampling program.
- Collect sediment samples from the upper 10 cm of sediment.
- For a sample to be acceptable overlying, low turbidity water must be present.
- Decant the overlying water and use a stainless-steel trowel to collect only the upper 5 centimeters (cm) of sediment.
- Collect sediment samples directly into laboratory-supplied bottles that are suitable in both material and size.
- Do not overfill the sample bottle.
- Make sure that the sample does not contain vegetation, that the sediment is undisturbed, and that the sampler shows no signs of winnowing or leaking.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.
- Note the time on the sample label.
- Collect any necessary duplicates and matrix spikes.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and total dissolved solids (TDS) at each location **after** both surface water and sediment sampling is completed.

8.4 Shipping

- If samples cannot be shipped the same day as collected, arrange an appropriate means of keeping the samples cool overnight and maintain the temperature between 0 and 10°C for the first 48 hours after collection, and then between 0 and 6°C thereafter.

- Store samples in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Complete the appropriate procedures for COC, handling, packing, and shipping.
- Fill out and check COC Forms against the labels on the sample bottles progressively after each sample is collected.
- Place all disposable sampling materials (such as plastic sheeting, and health and safety equipment) in appropriate containers.
- Ship samples via courier service with priority overnight delivery. Tracking numbers for all shipments should be provided and recorded after they have been sent out to ensure their timely delivery.
- Confirm with the laboratory before shipping samples via Fed Ex for Saturday delivery.

9 Waste Management

All rinsate should be collected in a sealed pail for disposal. Drill cuttings and purge water will be managed as specified in the Field Sampling Plan (FSP) or Work Plan, and according to state and/or federal requirements. PPE and decontaminated fluids will be contained separately and staged at the sampling location. Containers must be labeled at the time of collection. Labels will include date, location(s), site name, city, state, and description of matrix contained (e.g., soil, groundwater, PPE). General guidelines for investigation derived waste (IDW) handling and storage are set forth in a separate IDW guidance document (Arcadis 2009).

Typical waste characterization procedures include collection of a composite sample of the drill cutting material and a composite sample of the purge water for laboratory analysis. Samples are typically analyzed for disposal toxicity characteristic leaching procedure (TCLP) analysis for metals and VOCs. For PFAS, a simple leach test with neutral pH water may be more indicative of actual risk. Additionally, generators of waste are required to include analysis of other constituents that are reasonably believed to be present including (in this case) PFAS.

Waste storage and final waste disposition should be determined in the site specific workplan.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

If digital data collection isn't possible, waterproof field books should be avoided for field notes. Instead, field notes on loose paper on Masonite, plastic, or aluminum clip boards is preferred. Please note that newer Rite in the Rain® notebooks are approved for PFAS sampling. Other requirements for field notes include:

- Pens, pencils, and fine/ultra-fine point Sharpies® may be used.
- Keep field notes and writing implements away from samples and sampling materials.
- One person should conduct sampling while another records field notes.
- Do not write on sampling bottles unless they are closed.

10.1 Other Project Documentation

- Complete groundwater and/or soil sampling logs.
- Make sure COC Forms are properly completed. Verify which PFAS analytes and methods (e.g., just PFOS/PFOA, some or all of the /1633 lists, etc.) are required for analysis and note on the COC.

11 Quality Assurance

Refer to quality control requirements for the project to ensure that appropriate quality assurance and quality control (QA/QC) samples are collected. When collecting QA/QC samples, the same guidelines apply as when collecting regular samples – specifically that:

- Samples should be collected in laboratory-supplied HDPE bottles;
- Bottle caps must remain in the hand of the sampler until replaced on the bottle;
- Labels must be completed after the caps have been placed back on each bottle; and
- Samples must be stored in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

11.1 Equipment Blanks (if relevant)

QA/QC sampling typically includes daily collection of equipment blanks using the laboratory-supplied “PFAS-free” water. For peristaltic pump tubing, laboratory supplied “PFAS-free” water should be poured into a clean HDPE sample bottle and then pumped through new HDPE tubing using the peristaltic pump (with new silicone tubing). The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated. Note that an equipment blank can also be collected if an unapproved or potentially suspect hazard control is needed for health and safety and it contacts a sample, i.e., that material would be exposed to PFAS free water then the water would be collected in a separate sample container.

11.2 Field Duplicates

QA/QC sampling typically includes the collection of one field duplicate for every 10 or 20 samples collected. Each duplicate sample will be collected immediately after the initial sample of which it is a duplicate into a separate laboratory-provided sample bottle. Do not indicate to the laboratory which sample the duplicate replicates, i.e., it should be given a blind reference on the COC and sample name such as “Duplicate-01”.

11.3 Field Reagent Blanks

QA/QC sampling for PFAS typically includes the submission of one laboratory supplied field reagent blank per day. The field reagent blank sample is brought to the site in a laboratory-supplied sample bottle. Field staff transfer the laboratory-supplied reagent blank to an empty sample bottle. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel and should be placed in the same cooler as the other PFAS samples.

11.4 Matrix Spikes (optional in some cases)

QA/QC sampling includes submitting samples to be used as a matrix spike and matrix spike duplicate (MS/MSD) if the project requires it. If separate sample bottles are required, additional samples will be collected immediately after the initial sample of which it is a duplicate into separate laboratory-supplied sample bottles.

11.5 Laboratory Analytical QA/QC

- Arcadis recommends that any request for PFAS analysis in groundwater or soil should be conducted by an ELAP-accredited method compliant with QSM 5.3 Table B-15. Requirements laid out in Table B-15 strictly govern acceptable laboratory data quality for PFAS analysis in environmental samples. **For all data collection efforts at DoD sites, PFAS data must be obtained using a method that is DoD ELAP-accredited under QSM 5.3 or later.**
- Laboratory QA/QC should consist of one laboratory blank and one laboratory control sample (or blank spike) per batch of samples, and additional QA/QCs as indicated by the laboratory QA/QC procedures.
- Isotope dilution must be used for quantification with isotope-labeled spiked standards (extracted internal standards EIS), as available, according to the guidelines of QSM 5.3 Table B-15. See EPA method 1633 and DoD QSM 5.4 Table B-24 for quantification requirements by isotope dilution with EIS standards. The USEPA has two drinking water methods (USEPA Method 537.1 and USEPA Method 533).
- For drinking water, groundwater, and surface water samples, laboratories must extract the entire sample and include a solvent rinse of the bottle for analysis. Aqueous samples should generally not be sub-sampled prior to analysis, unless they are high concentration and require serial dilution (US DoD 2017).
- Soil samples should be analyzed in their entirety or thoroughly homogenized before extraction and analysis.
- As part of the internal QA/QC of laboratory results, relative percent difference (RPD) should be calculated between samples and corresponding field or laboratory duplicates. The laboratory quality assurance portion of the laboratory certificates should be reviewed to verify that all calculations/recoveries were within acceptable limits as established by the laboratory method and guidelines in Table B-15 of QSM 5.3 or later (USDoD 2019).

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TGI – Sample Chain of Custody

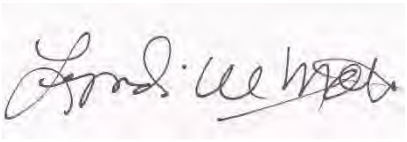
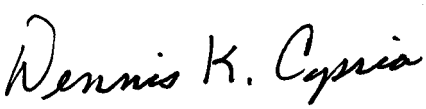
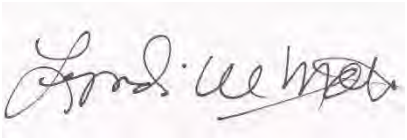
Rev: 3

Rev Date: March 28, 2022

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
	0	April 19, 2017	All	Re-write to COC only	Richard Murphy
	1	May 23, 2017	4,7,9	Add: Guidance on use of previous version of TGI. Add: Info on COCs for multiple shipping containers Modify: Move letter i. to letter m. and change to “when appropriate”	Peter Frederick
	2	April 29, 2020	4, 11	Remove obsolete link	Lyndi Mott
	3	December 28, 2022	All	Updated Arcadis format Added to 6c. Collection time between COC and container must match. Added to 6o. Add name of overnight courier when relinquishing samples. Updated reference documents and added internet links.	Lyndi Mott

Approval Signatures

Prepared by:		3/28/2022
	Lyndi Mott (Preparer)	Date
Reviewed by:		3/28/2022
	Dennis Capria (Chain of Custody Reviewer)	Date
Reviewed by:		12/22/2021
	Lyndi Mott (Subject Matter Expert)	Date

1 Introduction

This Technical Guidance Instruction (TGI) provides the procedure for Arcadis field personnel for required documentation during the collection of environmental field samples and transfer of custody to a laboratory. It provides direction for completion of the Chain of Custody form that must accompany collected field samples for analysis by a laboratory.

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

This TGI describes the general Chain of Custody (COC) procedures and guidance instructions for samples collected from project sites that are relinquished from Arcadis' possession.

COC is defined as the maintenance of an unbroken record of possession of an item from the time of its collection through some analytical or testing procedure. COC is typically documented by a written record of the collection, possession, and handling of samples collected from a project location. Each sample will be tracked by a documented record that efficiently documents the individuals who were responsible for the sample during each successive transfer of that sample to various recipients beyond Arcadis' possession. This information can be used to legally establish the integrity of the samples and therefore the analytical results derived from the samples. This

information can be used in addition to other records and documentation regarding the samples, such as field forms, field logs, and photographs.

A sample is considered under custody if:

- It is in your possession; or
- It is in your view, after being in your possession; or
- It was in your possession and then you then locked it up to prevent tampering; or
- It is in a designated secure area.

Continued use of previous version of TGI:

Although not recommended, Arcadis program-, project-, and client-teams may be able to use the previous version of this TGI provided that it meets all of the quality expectations of Arcadis and client and meets applicable regulatory requirements. It is up to the program, project, and/or client-team leader to determine whether it is appropriate to adopt the current TGI or to continue using the previous version.

However, all new work not associated with the previous version of this TGI must be performed with the current version of the TGI.

When adopting this new TGI, users of the previous versions must be aware that specific handling, packing, and shipping procedures and guidance has been removed and that those should be addressed within program or project plans (e.g., Quality Assurance Project Plans (QAPP), Work Plans, Sampling and Analysis Plans (SAPs), etc.) or in a more detailed TGI specific to that sampling activity, whether related to media, constituent/analyte, client, state, etc.

In addition, adopting this new TGI will require users to refer to the Arcadis Department of Transportation (DOT) Safety Program for procedures and guidance on the determination and handling, packing, and shipping of samples that are or may be considered hazardous materials.

4 Personnel Qualifications

Arcadis personnel performing work under the purview of this TGI will have received appropriate training and have field experience regarding the collection of samples from project locations. Arcadis personnel will have all other applicable and appropriate training relevant to the sampling work and project site.

5 Equipment List

The following list provides materials that may be required for each COC. Project reporting and documentation requirements must be reviewed with the CPM prior to execution of work. Additional materials, tools, equipment, etc. may be required, and project staff are required to verify with the CPM and/or Technical Expert what specific equipment is required to complete the COC.

- Indelible ink pen (preferably either black or blue ink);
- COC form **(Appendix A)** from either Arcadis, laboratory receiving and analyzing the samples, or other applicable and appropriate entity for the work performed;
- When appropriate, such as for litigation or expert testimony work, custody seals or tape.

6 Cautions

One way in which the law tries to ensure the integrity of evidence is by requiring proof of the chain of custody by the party who is seeking to introduce a particular piece of evidence.

A proper chain of custody requires three types of affirmations: (1) affirmation that a sample is what it purports to be (for example, soil collected from a specified location and depth); (2) affirmation of continuous possession by each individual who has had possession of the sample from the time it is collected until the time it is analyzed or held by a laboratory; and (3) affirmation by each person who has had possession that sample remained in substantially the same condition and not contaminated or affected by outside influences from the moment one person took possession until the moment that person released the evidence into the custody of another (for example, affirmation that the sample was stored in a secure location where no one but the person in custody had access to it).

Proving chain of custody is necessary to "lay a foundation" for the samples in question, by showing the absence of alteration, substitution, or change of condition.

Ensure that appropriate sample containers with applicable preservatives, coolers, and packing material are planned for and provided at the site at the time of sample collection.

Understand the offsite transfer requirements of the samples for the facility at which samples are collected.

If overnight courier service is required schedule pick-up or know where the drop-off service center is located and the hours of operation.

An Arcadis employee appropriately trained at the correct level of internal hazardous materials/DOT)shipping must complete an Arcadis shipping determination to address applicable DOT and International Air Transport Association (IATA) shipping requirements. Review the applicable Arcadis procedures and guidance instructions for sample packaging, and labeling. Prior to using air transportation, confirm air shipment is acceptable under DOT and IATA regulations.

The person relinquishing possession of the samples or other member of the project team should contact the final recipient of the samples to confirm receipt and review any special provisions on the COC or questions that they may have.

7 Health and Safety Considerations

Follow the health and safety procedures outlined in the project/site Health and Safety Plan (HASP) as well as other applicable H&S requirements, such as:

- Arcadis Hazardous Material/DOT handling, packaging, and shipping training
- Project site-specific H&S training
- Client-specific H&S training
- Constituent-specific H&S training
- Media-specific H&S training

8 Procedure

Collected samples must be uniquely identified, and properly documented, containerized, labeled with unique identifier, possessed in a secure manner during remainder of sampling event, packaged, and shipped to recipient laboratory.

Sample Identification

The method of sample identification depends on the type of measurement or analyses performed. In some cases, in-situ measurements of existing conditions and/or sample location must be made during sample collection.

These data will be recorded directly on field forms, logbooks, or other project record data sheets used to permanently retain this information for the project file. Examples of location identification information includes: latitude/longitudinal measurements, compass directions, well number, building number, floor number, room name, or proximity to a site feature unique to the site. Examples of in-situ measurements are pH, temperature, conductivity, flow measurement, or physical condition of the media being sampled. Physical samples collected are identified by a unique identifying number or code on a sample tag or label. These physical samples are removed from the sample location and transported to a laboratory for analyses.

In some cases, before samples are placed into individual containers and labeled as individual samples, samples may be separated into portions depending upon the analytical methods and required duplicate or triplicate analyses to be performed.

When completing a COC for samples, personnel must complete the following:

1. Written COCs must be completed with indelible ink (preferably either black or blue colored ink).
2. Written COCs must be completed using legible printed writing, and not cursive writing.
3. All entry fields on the COC form must be completed. If information is not applicable for a specific entry field, personnel will either put “N/A” or use a strike-out line or dash like “----------“ to indicate no applicable information is needed for that field.
4. Use of quotation marks or lines/down arrows to represent repetitive/duplicative text in similar fields.
5. Regardless of the type or specific COC form, the following pertinent information must be provided on the COC form:
    a. Arcadis project number
    b. Arcadis project name
    c. Project location, including street address, city, state, building number, providing as much detail as appropriate
    d. Recipient laboratory contact and sample receiving shipping location information
    e. Entities’/persons’ contact information for who will be receiving analytical results
    f. Name of sampler, i.e., person collecting sample and relinquishing possession of samples to the next entity in the chain of custody
    g. Date of sample collection
    h. If appropriate for the sample media, contaminant/constituent of concern, or analytical method, document time of sample collection using standard military time
    i. Sample analytical method(s)

j. Turnaround time required for analyses and/or reporting

k. Instructions to laboratory regarding handling, timing, analyses, etc. as applicable and appropriate.

l. Printed name and signature of the individual person who collected the samples and relinquishing possession of the samples

m. If appropriate or when documentation of the specific sample collection method will influence how the laboratory handles, prepares, or analyzes the samples, document the sample collection methodology used for collecting the samples (e.g., ASTM D5755)

6. The following additional specific information will be entered on the COC form, regardless of what type of COC is being used:

a. Unique Sample Identifier – The sample identifier (ID) must be unique to the individual sample it is applied to. The information in which the sample ID conveys is determined by the CPM, Technical Expert, and/or other project team members in advance of sample collection so that sample identification is consistently applied for the project. The sample nomenclature may be dictated by a specific client, program, or project database and require unique identification for each sample collected for the project. Consult with the CPM and/or Technical Expert for additional information regarding sample identification.

The sample ID could convey specific information regarding the sample to aid personnel in recognizing what the sample represents, or they may be arbitrary so as to facilitate the anonymity of the sample location, media, constituent of concern, project site, etc.

Examples of unique identifiers include:

1. Well locations, grid points, or soil boring identification numbers (e.g., MW-3, X-20, SB-30). When the depth interval is included, the complete sample ID would be “SB-30 (0.5-1.0) where the depth interval is in feet. Please note it is very important that the use of hyphens in sample names and depth units (i.e., feet or inches) remain consistent for all samples entered on the chain of custody form. DO NOT use the apostrophe or quotes in the sample ID.

2. Sample names may also use the abbreviations “FB,” “TB,” “FD” and “DUP” as prefixes or suffixes to indicate that the sample is a field blank, trip blank, or field duplicate, respectively.

b. List the date of sample collection. All indicated dates must be formatted using either mm/dd/yy (e.g., 03/07/09) or mm/dd/yyyy (e.g., 03/07/2009).

c. List the local time that the sample was collected. The time value should be presented using military format. For example, 3:15 P.M. should be entered as 15:15. The time listed on the COC form must match the sample collection time on the sample container(s).

d. Samples should be indicated to be either “Grab” or “Composite”. Grab samples are collected from only one unique location at one specific point in time.

e. Composite samples are a group of individual samples that are combined for analysis in their totality. Composite samples need to be documented if they are either collected from a number of different locations over a broader area to be representative of the entire area being sampled, or if they are representative of a single location over an extended period of time.

f. If used, preservatives for the individual sample will be noted.

g. The requested analytical method(s) that the samples are being analyzed for must be indicated. As much detail, as necessary, should be presented to allow the analytical laboratory to properly analyze the samples. For example, polychlorinated biphenyl (PCB) analyses may be represented by entering "EPA Method 8082 – PCBs" or "EPA PLM 600-R93-116." In cases where multiple analytical methods and/or analytical parameters are required for an individual sample, each method should be indicated for the sample (e.g., EPA 8082/8260/8270 or EPA PLM/400-point count).

h. If there are project-specific sample analytes to be reported, they should be specifically listed for each individual sample (e.g., 40 CFR 264 Appendix IX).

i. The total number of containers for each analytical method requested should be documented. This information may be included under the parameter or as a total for the sample.

j. When necessary, note which samples should be used for site specific matrix spikes in the Remarks or Comments field.

k. Indicate special project-specific requirements pertinent to the handling, shipping, or analyses. These requirements may be on a per sample basis such as "extract and hold sample until notified," or may be used to inform the laboratory of special reporting requirements for the entire sample delivery group (SDG).

l. Indicate turnaround time (TAT) required for samples on COC. If individual samples have differing TATs, the different TATs for each sample or groups of samples must be clearly indicated.

m. Provide contact name and phone number in the event that problems are encountered when samples are received at the laboratory. The person relinquishing possession of the samples or other member of the project team should contact the final recipient of the samples to confirm receipt and review any special provisions on the COC or questions that they may have.

n. If available, attach the Laboratory Task Order or Work Authorization forms.

o. The "Relinquished By" field must contain the signature of the Arcadis person who relinquished custody of the samples to the next entity in the chain of custody, which may be another person, the shipping courier, or the analytical laboratory. If a courier, enter the shipping courier in the "Received by" such as FedEx. The date/time relinquished should be when the person signs the COC and seals the cooler or shipping container for pick-up by the shipping courier.

p. Dates and times must be indicated using the following format:

   1) Date: either mm/dd/yy e.g., 01/01/17 OR mm/dd/yyyy e.g., 01/01/2017

   2) Time: use military format, e.g., 9:30 a.m. is 0930 and 9:30 p.m. is 2130

q. The "Received By" section is signed by sample courier or laboratory representative who received the samples from the sampler. The laboratory will sign upon laboratory receipt from the overnight courier service.

7. When more than one page of the COC form is required to complete the total number of samples, use as many sheets as necessary to accurately and clearly, document the samples and information. Some COCs may have a standard first page/cover page, and subsequent pages may not contain all the detailed fields as

the first page/cover page. Ensure that any subsequent pages convey all of the necessary and pertinent information for each individual sample as required in this procedure document.

8. Pages of the COC must retain a page count of the total number of pages; e.g., Page 1 of 3, Page 2 of 3, Page 3 of 3.
9. Upon completing the COC forms, forward the original signed COC with the sample package. Ensure that the original COC form is secured with the sample package so that it remains with the physical samples for the duration of transport and handling to its final destination and ensure that the COC form will not be become damaged or rendered unreadable due to sample breakage/leakage if stored inside the sample shipping container or outside influences if COC is stored in an outside plastic pouch to the container.
10. If you've collected enough samples that would require more than one container to ship them all to the same laboratory or location, then each separate/individual container that contains any number of samples must have a separate COC representing only those samples contained within that specific container. For example, if you have 3 total shipping containers for all of your samples, you must have a total of 3 separate, individual COCs for each of the 3 containers representing only those samples in their representative container. Thus, every container holding samples must have its own, individual COC.
11. If electronic chain of custody (eCOC) forms are utilized, ensure that the requirements of this procedure and guidance instructions are followed to the extent possible. Verify that proper signature and COC procedures are maintained with the CPM and/or Technical Expert when using eCOC.

9 Waste Management

Not Applicable.

10 Data Recording and Management

The original signed COC shall be submitted with the samples. Copies of COC records will be transmitted to the CPM or designee at the end of each day unless otherwise directed by the CPM. The sampling team leader retains copies of the chain of custody forms for filing in the project file. Record retention shall be in accordance with client- and project-specific requirements and Arcadis policies, the most stringent will apply.

The option to use the Electronic Chain of Custody (eCOC) form in conjunction with the appropriate sample application(s) may be available through the FieldNow® program but is currently limited to a select list of approved analytical laboratories. Use of the eCOC application is intended to reduce common transcription errors both by field staff and laboratory staff on a conventional handwritten paper COC. Once the eCOC form is completed and approved on the field tablet by field staff, a PDF version of the form is automatically emailed to each assigned team member. In addition, a dedicated or mobile printer is recommended for printing a hard copy of the completed eCOC to be included in each sample cooler to meet laboratory requirements.

11 Quality Assurance

COC forms will be legibly completed in accordance with this procedure and guidance instruction document, as well as other applicable and appropriate project documents such as SAP, Quality QAPP, Work Plan, or other project guidance documents.

COC records will be reviewed by the CPM or their appropriate designee for completeness and accuracy to the applicable requirements. Non-conformances will be noted and corrected in a timely manner on the copies retained by Arcadis as well as contacting the ultimate receiving entity for correction to the originally signed COC in their possession.

12 References

Arcadis Transportation Safety Program requirements, procedures, and guidance instructions.

EPA Samplers' Guide – Contract Laboratory Program Guidance for Field Samplers, EPA document EPA-540-R014-013 October 2014 https://www.epa.gov/sites/default/files/2015-03/documents/samplers_guide.pdf.

EPA Region III – Sample Submission Procedures for the Office of Analytical Services and Quality Assurance (OASQA) Laboratory Branch revision 14.0 October 18, 2018, https://www.epa.gov/sites/default/files/2018-12/documents/sample-submission-procedures-rev14.pdf.

EPA Region IV Science and Ecosystem Support Division Operating Procedure for Sample and Evidence Management May 25, 2016, https://www.epa.gov/sites/default/files/2015-06/documents/Sample-and-Evidence-Management.pdf.

Attachment A

Chain of Custody and Laboratory Analysis Request Form

ARCADIS

ID#

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ____ of ____

Lab Work Order #

Send Results to:

Contact & Company Name: | Telephone:

Address: | Fax:

City State Zip | E-mail Address:

Project Name/Location (City, State): | Project #:

Sampler's Printed Name: | Sampler's Signature

SAMPLE ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (✓)	# of Containers	Container Information	PARAMETER ANALYSIS & METHOD							REMARKS

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Containment Information Key
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

Special Instructions/Comments

☐ Special QA/QC Instructions (✓)

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Last Name:	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name:	Printed Name:	Printed Name:	Printed Name
☐ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt	Firm:	Firm:	Firm:	Firm:
Shipping Tracking #:	Condition/Cooler Temp:_____	Date/Time:	Date/Time:	Date/Time:	Date/Time:

SOP – Sample Chain of Custody Rev1_May 23, 2017

Arcadis U.S., Inc.
630 Plaza Drive, Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
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www.arcadis.com

Appendix D

Arcadis Standard Field Forms

Daily Log

Project Name : RACER Pontiac North Campus 2023
Project Number :
Purpose :
PPE :
Equipment:

Weather(°F) :
Prepared By:

Date	Time	Description of Activities

Signature:

Waste Management:

Drums On Site

Date	Are there any waste drums on site?	Number of Drums upon Arrival	Size of Drums	Type of Drums	Condition of Drums	Waste Drummed Today?	Number of drums Created	Size of drums	Condition of Drums	General Waste Comments

Other Photos

Equipment and Calibration Information:

Supplier:
Rental Number:
Bump Checked:

Model:
Calibrated:
Calibration Passed:

Water Quality Meter SN:

Date	Time	Calibrated Fluid and Value	Lot #	Expiration Date	Initial Reading	Final Reading

Calibration Documents

Equipment and Calibration Information:

Supplier:
Rental Number:
Bump Checked:

Model:
Calibrated:
Calibration Passed:

Turbidity Meter SN:

Date	Time	Calibrated Fluid and Value	Lot #	Expiration Date	Reading

Groundwater Sampling Form

ARCADIS

Project Number	**Well ID**		**Date**
Project Name/Location	RACER Pontiac North Campus 2023	**Weather(°F)**	
Measuring Pt. Description	**MP Elevation**	**Casing Diameter (in)**	**Well Casing Material**
Static Water Level (ft-bmp)	**Total Depth (ft-bmp)**	**Water Column (ft)**	**Gallons in Well**
Purge Start	**Pump Intake (ft-bmp)**	**Purge Method**	**Purge Equipment**
Purge End	**Volumes Purged**	**Sample ID**	**Sampled by**
Sample Time	**Gallons Purged**	**Replicate/ Code No.**	**Sample Type**

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallon Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot — 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location: _____ Well Locked at Arrival: _____

Condition of Well: _____ Well Locked at Departure: _____

Well Completion: _____ Key Number To Well: _____

_____

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = milliv

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL BOLD OUTLINED AREAS are for LAB USE ONLY

Company:	Billing Information:
Address:	
Report To:	Email To:
Copy To:	Site Collection Info/Address:
Customer Project Name/Number:	State: County/City: Time Zone Collected: / [ ]PT [ ]MT [ ]CT [ ]ET

Phone: Email:	Site/Facility ID #:	Compliance Monitoring? [ ] Yes [ ] No
Collected By (print):	Purchase Order # : Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required:	Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: (Expedite Charges Apply) [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day	Field Filtered (if applicable): [ ] Yes [ ] No Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)

Container Preservative Type **

Analyses

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Project Manager:

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours) : Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: __oC
Cooler 1 Therm Corr. Factor: ___oC
Cooler 1 Corrected Temp: _____oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY

Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

Appendix E

Equipment Manufacturer Calibration Procedures

Conductivity

The conductivity calibration should be verified every day the instrument is used. However, the conductivity sensor is very stable and may hold its calibration for several weeks.

CALIBRATION TIPS

1. It is not necessary to calibrate conductivity, specific conductance and salinity. Calibrating one of these parameters will simultaneously calibrate the others. YSI recommends calibrating specific conductance (temperature compensated conductivity) for greatest ease and accuracy.
2. Ensure the conductivity sensor is clean and dry before performing a specific conductance calibration.
3. Always use fresh, traceable conductivity calibration solution when calibrating the conductivity sensor.
    a. The shelf life of conductivity solution is one month after being opened. This is due to potential changes in the value of the solution caused by evaporation which can occur after opening the bottle. Be sure to write the open date on the bottle so you know that you are using good calibration solution.
    b. Never calibrate with a conductivity solution that is less than 1.0 mS/cm. You are setting the slope on a linear device so a good strong conductivity signal will give you the best performance. Use 1.0 mS/cm for fresh water, 10 mS/cm for brackish to estuarine water and 50 mS/cm for salt water. 1.0 mS (millisiemens) = 1000 uS (microsiemens).
4. Pre-rinse the cal cup and sensors with a small amount of calibration standard or rinse standard and discard.
5. When calibrating the conductivity sensor, the calibration solution must cover the top vent holes of the conductivity sensor. If using a Quatro cable, the top vent hole is located on the side of the combination conductivity/temperature sensor. If using a different cable, the conductivity sensor is integral to the cable and the sensor has two vent holes located close to the cable. Ensure the entire conductivity sensor is submerged in the solution or the instrument will read approximately half the expected value.
6. After placing the sensor into the solution, gently move the sensor up and down to remove any air bubbles that may be trapped in the conductivity sensor.
7. If calibrating Specific Conductance, enter the value of the conductivity solution as it is listed for 25°C. Make sure you are entering the correct units. 1 mS = 1,000 uS.
8. If you receive a warning message stating that the calibration is questionable, do <u>not</u> continue with the calibration. Instead, select 'No' and investigate what is causing the questionable results. If you accept a questionable calibration, your conductivity readings (and your DO mg/L readings) will be erroneous. Typical causes for this error message include: incorrect entries (entering 1000 uS/cm instead of 1.0 mS/cm), not using enough solution to cover the vent holes, air bubbles trapped in the sensor, calibrating in conductivity instead of specific conductance, dirty conductivity electrodes, and/or bad calibration solution.
9. After accepting a good calibration, navigate to the GLP file and check the conductivity cell constant for the calibration. For highest accuracy, the cell constant should be 5.0 +/- 0.5. However, the acceptable range is 5 +/- 1.0. A cell constant outside of this range indicates that a questionable calibration was accepted.

TROUBLESHOOTING TIPS

If you get an error message during calibration, be sure that you are:

1. Entering the correct calibration value (1 mS/cm = 1000 uS/cm).
2. Calibrating in Specific Conductance mode.
3. Using enough solution to cover the vent holes on the sensor.
4. Dislodging any air bubbles that could be trapped in the sensor.
5. Using a fresh, traceable conductivity calibration solution.

If you are following the above recommendations and still receiving an error message, check the conductivity sensor to make sure it is clean. A clean conductivity sensor should read less than 3 uS/cm in dry air. If your sensor is dry and giving you a reading higher than 3 uS/cm in air, it should be cleaned.

The conductivity calibration generates its cell constant value after calibration. The ideal cell constant is 5.0 +/-0.5 but 5.0 +/- 1.0 is acceptable. Any significant jump or change in this number from one calibration to the next usually indicates a problem with the calibration and/or sensor. If you are sure that your calibration standard is good and your calibration process is correct, then your sensor may need to be cleaned.

Cleaning the Conductivity Sensor

The openings that allow sample access to the conductivity electrodes should be cleaned regularly. The small cleaning brush included in the Maintenance Kit is intended for this purpose. Dip the brush in clean water and insert it into each hole 10 to 12 times. In the event that deposits have formed on the electrodes, it may be necessary to use a mild detergent (laboratory grade soap or bathroom foaming tile cleaner) with the brush. Rinse thoroughly with clean water, then check the response and accuracy of the conductivity sensor with calibration solution.

Quatro Cables

Quatro cables have a replaceable combination conductivity/temperature sensor (p/n 5560). All other Pro Plus cables have integral conductivity sensors. If using a Quatro cable and your conductivity sensor is not calibrating or is reading > 3 uS/cm in dry air after being cleaned, remove the conductivity/temperature sensor from the cable. The Pro Plus should read < 3 uS/cm for conductivity (not specific conductance) without a conductivity sensor installed. If the instrument is reading > 3 uS/cm without a sensor installed, the conductivity/temperature port on the cable may be contaminated. Refer to the Cleaning the Sensor Port section of this document for information on how to clean the port.

If the conductivity measurement continues to read more than 3 uS/cm without a conductivity/temperature sensor installed, there may be a problem with the cable and/or instrument. In this case, contact your local YSI Representative or a YSI Authorized Service Center.

Other Pro Plus Cables

If your conductivity sensor is not calibrating or is reading > 3 uS/cm in dry air after performing a sensor cleaning, contact your local YSI Representative or a YSI Authorized Service Center.

pH

The pH calibration should be verified every day the instrument is used. However, a new pH sensor may be capable of holding its calibration for several days.

CALIBRATION TIPS

1. If using a pH sensor in a 6051010 or Quatro cable, calibrate the sensor in port 1 prior to calibrating the sensor in port 2. The sensor in port 2 uses the reference of the sensor installed in port 1. Therefore, it is important to verify that the port 1 sensor is working properly before calibrating the port 2 sensor. See pH Troubleshooting Tips for additional info.
2. The pH sensor can be calibrated with up to six calibration points.
3. Calibration can be accomplished in any buffer order.
4. pH 7 buffer should be used regardless of how many calibration points you use; however, it does not have to be the first point.
5. In most cases, a two-point calibration is all that is required (4 and 7 or 7 and 10). You can bracket the expected in-situ pH values. Use a three-point calibration with 4, 7 and 10 if the in-situ pH values are unknown or if you expect the in-situ values to be on both sides of the pH scale.
6. Rinse the sensors and cal cup with a small amount of pH buffer. Fill the cup so that the pH sensor tip and the temperature sensor are submerged in buffer.
7. If necessary, highlight the Calibration Value and enter the pH value of the buffer solution. Note: The Pro Plus has auto buffer recognition which can be set to USA (4, 7, 10) or NIST (4.01, 6.86, 9.18) buffer values in the pH Sensor Setup menu.
8. Record the pH millivolts for each calibration point. The acceptable mV outputs for each buffer are shown below.

   pH 7 mV value = 0 mV +/- 50 mV

   pH 4 mV value = +165 to +180 from 7 buffer mV value

   pH 10 mV value = -165 to -180 from 7 buffer mV value

   - A value of +50 or -50 mVs in buffer 7 does not indicate a bad sensor.
   - The mV span between pH 4 and 7 and 7 and 10 mV values should be ≈ 165 to 180 mV. 177 is the ideal distance. The slope can be 55 to 60 mV per pH unit with an ideal of 59 mV per pH unit.
   - If the mV span between pH 4 and 7 or 7 and 10 drops below 160, clean the sensor and try to recalibrate.
9. Wait for the pH to stabilize in the each buffer and then press enter to accept each calibration point.
10. Rinse the sensor and cal cup with a small amount of the next buffer between calibration points.
11. After pressing enter to accept your last calibration point, press cal (Cal) to complete the calibration. Otherwise you will continue calibrating up to 6 calibration points.
12. If you receive a warning message stating that the calibration is questionable, do not continue with the calibration. Instead, select 'No' and investigate what is causing the questionable results. If you accept a questionable calibration, your pH readings will be erroneous. Typical causes for this error message include: incorrect Sensor/Port setup in the instrument, a dirty sensor or bad buffer solution.
13. After accepting a good calibration, navigate to the GLP file and check the pH Slope and Slope % of ideal. A good slope should be between 55 and 60 mVs while the ideal is 59 mV. If the slope drops below 53, the sensor should be reconditioned and recalibrated.

TROUBLESHOOTING TIPS

Typical working life for pH sensors is approximately 12-24 months depending on usage, storage and maintenance. Proper storage and maintenance generally extends the sensor's working life.

Clean and recondition the sensor if a slow response in the field has been reported or if it takes more than 90 seconds to stabilize in pH buffer.

If you get an error message during a pH calibration, check the following:

1. Ensure the pH buffers are good and not expired
2. Ensure that the pH sensor is installed in the correct port of the cable and the correct ISE is enabled in the Sensor Setup menu.
    a. If using a pH or pH/ORP combo sensor in a 6051020 cable, ensure the sensor is installed in port 1.
    b. If using a pH or pH/ORP combo sensor in a 60510, 6051020 or 6051030 cable, pH should be enabled in ISE1 of the instrument's Sensor Setup menu.
    c. If using a pH sensor in a 6051010 or Quatro cable, check to see if the pH sensor is installed in port 1 or port 2. If the pH sensor is installed in port 1, enable pH in ISE1 of the Sensor Setup menu. If the pH sensor is installed in port 2, enable pH in ISE2 of the Sensor Setup menu. Note: It is not recommended to use a pH/ORP combo sensor in 6051010 or Quatro cables. If using a pH/ORP combo sensor in a 6051010 or Quatro cable, ORP will not be measured or reported.
3. If using a 6051010 or Quatro cable, you must have a sensor installed in port 1 for port 2 to operate. Additionally, ensure that the sensor installed in port 1 is in good working order. In 6051010 and Quatro cables, the sensors installed in port 1 and port 2 use the reference from the sensor installed in port 1 only. Therefore, if the sensor installed in port 1 is not working properly, the readings from the sensor installed in port 2 will be erroneous. For greatest ease, install a pH sensor in port 1 of both 6051010 and Quatro cables and your other ISE sensor in port 2.
4. If you continue to get error messages during calibration, clean and recondition the sensor.

Cleaning and Reconditioning the pH, ORP or pH/ORP Sensor

If the pH or pH/ORP sensor has been allowed to dry out or has been stored in distilled or deionized water for an extended period of time, soak the sensor in buffer 4 overnight to try and restore functionality.

Cleaning is required whenever deposits or contaminants appear on the glass and/or platinum surfaces or when the sensor's response slows. The cleaning can be chemical and/or mechanical.

Removing the sensor from the cable may make cleaning easier. Initially, moisten a soft clean cloth, lens cleaning tissue or cotton swab to remove all foreign material from the glass bulb and/or platinum button. Then use a moistened cotton swab to carefully remove any material that may be blocking the reference electrode junction of the sensor. ***CAUTION***: When using a cotton swab, be careful NOT to wedge the swab between the guard and the glass sensor. If necessary, remove cotton from the swab tip, so that the cotton can reach all parts of the sensor tip without stress. You can also use a pipe cleaner for this cleaning if more convenient.

If good pH and/or ORP response is not restored, perform the following additional procedure:

1. Soak the sensor for 10-15 minutes in clean water containing a few drops of commercial dishwashing liquid.
2. GENTLY clean the glass bulb and platinum button by rubbing with a cotton swab soaked in the cleaning solution.
3. Rinse the sensor in clean water, wipe with a cotton swab moistened with clean water, and then re-rinse with clean water.

If good pH and/or ORP response is still not restored, perform the following additional procedure:

1. Soak the sensor for 30-60 minutes in one molar (1 M) hydrochloric acid (HCl). This reagent can be purchased from most lab supply distributors. Be sure to follow the safety instructions included with the acid.

2. Rinse the sensor in clean water, wipe with a cotton swab moistened with clean water (not DI water), and then re-rinse with clean water. To be certain that all traces of the acid are removed from the sensor crevices, soak the sensor in clean tap water for about an hour with occasional stirring.

If biological contamination of the reference junction is suspected or if good response is not restored by the above procedures, perform the following additional cleaning step:

CAUTION: Do not mix the acid from the previous step with the chlorine bleach in the following step. A toxic gaseous product can form from the reaction between the acid and the chlorine bleach. Be certain to copiously rinse the sink and drain system of acid after its disposal and before the disposal of chlorine bleach.

1. Soak the sensor for approximately 1 hour in a 1:1 dilution of commercially available chlorine bleach.
2. Rinse the sensor with clean water and then soak for at least 1 hour in clean tap water with occasional stirring to remove residual bleach from the junction. (If possible, soak the sensor for a period of time longer than 1 hour in order to be certain that all traces of chlorine bleach are removed.) Then re-rinse the sensor with clean water and retest.

Prior to reinstalling the sensor, dry the port and sensor connector with compressed air. If you suspect port contamination, follow the instructions in the Cleaning a Sensor Port section of this document before reinstalling the sensor.

If your pH sensor is still not calibrating after performing a sensor cleaning, contact your local YSI Representative or a YSI Authorized Service Center.

ORP

The ORP calibration should be verified every day the instrument is used. However, a new ORP sensor may be capable of holding its calibration for several days.

CALIBRATION TIPS

1. If using a pH/ORP combination sensor, calibrate pH first to ensure it is working.
2. If using an ORP sensor in a 6051010 or Quatro cable, calibrate the sensor in port 1 prior to calibrating the sensor in port 2. The sensor in port 2 uses the reference of the sensor installed in port 1. Therefore, it is important to verify that the port 1 sensor is working properly before calibrating the port 2 sensor. See ORP Troubleshooting Tips for additional info.
3. Rinse the sensors and cal cup with a small amount of ORP calibration solution. Fill the cup so that the ORP sensor tip and the temperature sensor are submerged in solution.
4. Enter the calibration value per the temperature reading. The value of ORP calibration solution is greatly affected by temperature. The ORP solution should include a chart of solution values per temperature. If not, contact the supplier of the ORP solution to obtain this information. The Pro Series ORP sensors use a Ag/AgCl 3.5 M KCl reference. Be sure the value you enter is for this type of reference. If using the YSI Zobell calibration solution, the Pro Plus will automatically determine the calibration value.
5. Wait for the readings to stabilize and then press enter to accept the calibration.
6. If you receive a warning message stating that the calibration is questionable, do not continue with the calibration. Instead, select 'No' and investigate what is causing the questionable results. If you accept a questionable calibration, your ORP readings will be erroneous. Typical causes for this error message include: incorrect Sensor/Port setup in the instrument, a dirty sensor or bad calibration solution.

TROUBLESHOOTING TIPS

Typical working life for ORP sensors is approximately 12-24 months depending on usage, storage and maintenance. Proper storage and maintenance generally extends the sensor's working life.

Clean and recondition the sensor if the sensor exhibits a slow response in Zobell solution, i.e. it takes more than 90 seconds to stabilize when placed in Zobell.

If you get error messages during an ORP calibration, check the following:

1. Ensure the ORP calibration solution is good and not expired.
2. Ensure that the ORP sensor is installed in the correct port of the cable and the correct ISE is enabled in the Sensor Setup menu.
    a. If using an ORP or pH/ORP combo sensor in a 6051020 cable, ensure the sensor is installed in port 1.
    b. If using an ORP sensor in a 60510, 6051020 or 6051030 cable, ORP should be enabled in ISE1 of the instrument's Sensor Setup menu.
    c. If using a pH/ORP combo sensor in a 60510, 6051020 or 6051030 cable, ORP should be enabled in ISE2 of the instrument's Sensor Setup menu.
    d. If using an ORP sensor in a 6051010 or Quatro cable, check to see if the ORP sensor is installed in port 1 or port 2. If the ORP sensor is installed in port 1, enable ORP in ISE1 of the Sensor Setup menu. If the ORP sensor is installed in port 2, enable ORP in ISE2 of the Sensor Setup menu.
5. If using a pH/ORP combo sensor in a 6051010 or Quatro cable, ORP will not be measured or reported.
6. If using a 6051010 or Quatro cable, you must have a sensor installed in port 1 for port 2 to operate. Additionally, ensure that the sensor installed in port 1 is calibrated and in good working order. In 6051010 and Quatro cables, the sensors installed in port 1 and port 2 use the reference from the sensor installed in

port 1 only. Therefore, if the sensor installed in port 1 is not working properly, the readings from the sensor installed in port 2 will be erroneous.

7. If you continue to get error messages during calibration, clean and recondition the sensor per the instructions in the pH Troubleshooting section of this document. If you suspect port contamination, follow the instructions in the Cleaning a Sensor Port section before reinstalling the sensor.
8. If you continue to have problems, you can check the offset of the ORP sensor by performing a factory reset to the ORP sensor. After resetting the sensor, compare the ORP mV readings in Zobell solution to the calibration value. The difference between values should be less than 100 mVs. If the difference is 80 mVs or higher, consider replacing the sensor as it is nearing the end of its life span.

Dissolved Oxygen

The dissolved oxygen sensor should be calibrated every day the instrument is used. It is not necessary to calibrate in both % and mg/L or ppm. Calibrating in % will simultaneously calibrate mg/L and ppm and vice versa.

CALIBRATION TIPS

1. The Pro Plus can be calibrated in air-saturated water, water-saturated air or against a Winkler Titration. You can perform a 1 or 2 point DO calibration. A 2 point calibration includes 1 point in a zero oxygen environment and the 2nd point at full saturation.
2. For both ease of use and accuracy, YSI recommends that you perform a 1 point calibration in water-saturated air.
3. Make sure that there is a good membrane with fresh electrolyte (O2 probe solution) installed on the DO sensor. The membrane should be clean and free of wrinkles. There should not be any air bubbles present under the membrane. Membranes should be changed regularly and generally last 2-8 weeks depending on use and storage.
4. To perform a 1 point calibration in water-saturated air, place the sensor in a 100% humid environment. This can be accomplished several ways:
    a. For the 60520 and 6052030 cables, moisten the sponge in the gray calibration sleeve with a *small* amount of clean water and place it over the sensor guard.
    b. For the 6051020 and Quatro cables, place a small amount of water in the calibration/storage cup and place it over the sensors. When screwing the calibration cup onto the sensor bulkhead, only engage one or two threads. Do <u>not</u> screw the calibration cup completely onto the sensor bulkhead. The goal is to have air exchange between inside and outside the calibration cup.

    The sponge and calibration sleeve/cup should be clean since bacterial growth may consume oxygen and interfere with the calibration. Be sure the sensor is in air, not water, and that there are not any water droplets on the membrane or temperature sensor.
5. After entering the % calibration mode, wait approximately 5 to 15 minutes for the storage container to become completely saturated and, if using a polarographic sensor, to allow the sensor to stabilize.
6. Salinity affects the ability of water to hold oxygen and is used by the instrument to calculate DO mg/L (ppm). The Salinity value displayed near the top of the DO calibration screen is either the salinity correction value entered in the Sensor menu or the Salinity value as measured by the conductivity sensor in use. If you are using a conductivity sensor, ensure that it is calibrated and reading correctly in order to obtain accurate DO mg/L (ppm) measurements. If you are not using a conductivity sensor, the Salinity correction value should be the salinity of the water you <u>will</u> be testing. Highlight Salinity and press enter to modify this setting if necessary. The salinity of fresh water is typically 0-0.5 ppt and seawater is typically 35 ppt.
7. After accepting the calibration, navigate to the GLP menu and record the DO sensor's value (sensor current in uA). The acceptable sensor currents when calibration is performed at 25°C, in a 100% saturated air environment at 760 mmHg are:

    1.25 mil PE membrane (yellow membrane): Average 6.15 uA (min. 4.31 uA, max. 8.00 uA)
    2.0 mil PE membrane (blue membrane): Average 3.38 uA (min. 2.37 uA, max. 4.40 uA)
    1 mil Teflon membrane: Average 16.29 uA (min. 11.40 uA, max. 21.18 uA)
8. If you receive a warning message stating that the calibration is questionable, do <u>not</u> continue with the calibration. Instead, select 'No' and investigate what is causing the questionable results. If you accept a questionable calibration, your DO readings will be erroneous. Typical causes of a calibration error message include: incorrect sensor, membrane or port setup in the instrument, incorrect barometric pressure information, a bad membrane or a sensor that needs reconditioned.

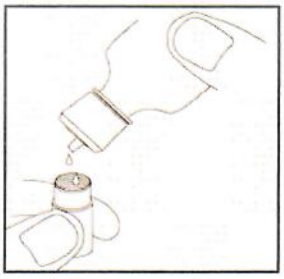
TROUBLESHOOTING TIPS

1. Ensure that the correct sensor type and membrane type are enabled in the Sensor Setup Menu. Galvanic sensors have a gray probe body and Polarographic sensors have a black probe body.
2. If using a 6051020 cable, ensure that the DO sensor is installed in port 2. If using a Quatro cable, ensure that the DO sensor is installed in the port labeled DO.
3. Ensure the Pro Plus barometer is reading accurately. The DO % Saturation calibration uses the instrument's barometric pressure reading for the DO % calibration. If the barometer is not reading accurately, the calibration will be erroneous. The barometer should be reading *true* barometric pressure. If you suspect the barometer reading is incorrect, calibrate the barometer and then recalibrate the DO sensor. Laboratory barometer readings are usually "true" (uncorrected) values of air pressure and can be used "as is" for barometer calibration. Weather service readings are usually not "true", i.e., they are corrected to sea level, and therefore cannot be used until they are "uncorrected". An approximate formula for this "uncorrection" is: True BP in mmHg = Corrected BP in mmHg – [2.5 * (Local Altitude in ft. above sea level/100)]
4. Install a new membrane with fresh electrolyte onto the DO sensor. Ensure you are using the correct electrolyte solution. Polarographic sensors use electrolyte that is in a white labeled bottle (KCl/Na_2SO_4). Galvanic sensors use electrolyte that is in a blue labeled bottle (NaCl).
5. Recondition the DO sensor and then install a new membrane.
6. If you suspect port contamination, remove the sensor and follow the instructions in the Cleaning a Sensor Port section.
7. If you continue to have trouble calibrating the DO sensor, contact your local YSI Representative or a YSI Authorized Service Center.

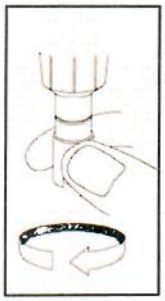
Membrane Cap Installation

The DO membrane and electrolyte solution (O2 solution) should be changed once every 2-8 weeks depending on use and storage. In addition, the membrane and electrolyte solution should be changed if (a) bubbles are visible under the membrane; (b) significant deposits of dried electrolyte are visible on the membrane; or (c) if the sensor shows unstable readings or other sensor-related symptoms. To install a new membrane cap follow these instructions:

1. Remove the sensor guard or cal cup to access the sensor tip.
2. Unscrew and remove any old membrane cap by holding the sensor when unscrewing the membrane cap. Discard the used membrane cap.
3. Thoroughly rinse the sensor tip with distilled or DI water.



4. Fill a new membrane cap with the appropriate electrolyte solution that has been prepared according to the directions on the bottle. Polarographic sensors use electrolyte that is in a white labeled bottle (KCl/Na_2SO_4). Galvanic sensors use electrolyte that is in a blue labeled bottle (NaCl). Be very careful not to touch the membrane surface during this process. Lightly tap the side of the membrane cap to release air bubbles that may be trapped.



5. Thread the membrane cap onto the sensor. It is normal for a small amount of electrolyte to overflow.

Installing and Uninstalling Sensors

GENERAL PRECAUTIONS

It is important that the entire sensor connector and cable connector be dry when installing, removing or replacing sensors. This will prevent water from entering the port. Once a sensor is removed, examine the connector inside the port. If any moisture is present, use compressed air to completely dry the connector or place directly in front of a steady flow of fresh air. If you suspect port contamination, follow the port cleaning procedures listed under Cleaning a Sensor Port.

Remove sensors upside down (facing the ground) to help prevent water from entering the port upon removal.

The instrument utilizes o-rings as seals to prevent water from entering the sensor ports. When the sensors are removed, the o-rings that provide the seal should be carefully inspected for contamination (e.g. debris, grit, etc.) and cleaned if necessary.

If no dirt or damage to the o-rings is evident, wipe the o-rings with a lint free cloth or lens cloth to remove the old o-ring grease. Then, lightly apply new o-ring grease (provided in the maintenance kit) to the o-rings without removing them from their groove. If there is any indication of damage, the o-ring should be replaced with an identical o-ring. At the time of o-ring replacement, the entire o-ring assembly should be cleaned.

Do not over-grease the o-rings. The purpose of the o-ring grease it to keep the o-ring in good condition. Excess grease may collect grit particles that can compromise the seal. Excess grease can also cause the waterproofing capabilities of the o-ring to diminish, potentially causing leaks. If excess grease is present, remove it using a lens cloth or lint-free cloth.

To remove the o-rings:
Use a small, flat-bladed screwdriver or similar blunt-tipped tool to remove the o-ring from its groove. Do not use a sharp object to remove the o-rings. Using a sharp object could damage the o-ring groove which would allow water to enter the port resulting in permanent damage to the port and sensor. Check the o-ring and the groove for any excess grease or contamination. If contamination is evident, clean the o-ring and nearby plastic parts with lens cleaning tissue or equivalent lint-free cloth. Alcohol can be used to clean the plastic parts, but use only water and mild detergent on the o-ring itself. Using alcohol on o-rings may cause a loss of elasticity and may promote cracking. Also, inspect the o-rings for nicks and imperfections.

Before re-installing the o-rings, make sure to use a clean workspace, clean hands, and avoid contact with anything that may leave fibers on the o-ring or grooves. Even a very small amount of contamination (hair, grit, etc.) may cause a leak.

To re-install the o-rings:
Place a small amount of o-ring grease between your thumb and index finger. Draw the o-ring through the grease while pressing the fingers together to place a very light covering of grease to the o-ring. Place the o-ring into its groove making sure that it does not twist or roll. Do no excessively stretch the o-ring during installation.

Use your grease-coated finger to once again lightly go over the mating surface of the o-ring.

Do not over-grease the o-rings. The excess grease may collect grit particles that can compromise the seal. Excess grease can also cause the waterproofing capabilities of the o-ring to diminish, potentially causing leaks. If excess grease is present, remove it using a lens cloth or lint-free cloth.

UNINSTALLING DO, PH, ORP, PH/ORP AND ISE SENSORS

First, ensure that the entire sensor and cable bulkhead are clean and dry. Remove sensors upside down (facing the ground) to help prevent water from entering the port upon removal.

Simply unscrew the sensor from the cable by holding the sensor port end of the cable (bulkhead) in one hand and the sensor in the other hand. Twist the sensor counter-clockwise to unscrew the sensor from the port.

INSTALLING DO, PH, ORP, PH/ORP AND ISE SENSORS

First, ensure both the sensor connector and sensor port on the cable are clean and dry. If any moisture is present, use compressed air to completely dry the connector or place directly in front of a steady flow of fresh air. If you suspect port contamination, follow the port cleaning procedures listed under Cleaning a Sensor Port.

To connect the sensor, grasp the sensor with one hand and the sensor port end of the cable (bulkhead) in the other. Push the sensor into the connector on the cable until it is properly seated and only one o-ring is visible. Failure to properly seat the sensor may result in damage. Twist the sensor clockwise to engage threads and finger tighten. Do not use a tool. This connection is waterproof. Please refer to the sensor installation sheet that is included with each sensor for detailed instructions.

UNINSTALLING A CONDUCTIVITY/TEMPERATURE SENSOR IN A QUATRO CABLE

First, ensure that the entire sensor and cable bulkhead are clean and dry. Remove sensors upside down (facing the ground) to help prevent water from entering the port upon removal.

Remove the conductivity/temperature sensor using the installation tool to loosen the stainless steel retaining nut. Insert the tool into one of the holes in the stainless steel retaining nut. Next, use the installation tool to turn the stainless steel retaining nut counter-clockwise to loosen. Do not allow the sensor to be turned with the tool. Turning the sensor with the tool will likely damage the sensor connector. Once the stainless steel retaining nut has been completely loosened from the bulkhead, remove the sensor from the bulkhead by pulling the sensor straight out of the port.

INSTALLING A CONDUCTIVITY/TEMPERATURE SENSOR IN A QUATRO CABLE

First, ensure both the sensor connector and sensor port on the cable are clean and dry. If any moisture is present, use compressed air to completely dry the connector or place directly in front of a steady flow of fresh air. If you suspect port contamination, follow the port cleaning procedures listed under Cleaning a Sensor Port.

1. Align the connectors of the sensor and the port. With connectors aligned, push the sensor in towards the bulkhead until you feel the sensor seat in its port. You will experience some resistance as you push the sensor inward, this is normal
2. Once you feel the sensor seat into the port, gently rotate the stainless steel sensor nut clockwise with your fingers, do not use the tool.
3. The nut must be screwed in by hand. If the nut is difficult to turn, STOP, as this may indicate cross threading. If you feel resistance or cross threading at any point, unscrew the nut and try again until you are able to screw the nut down completely without feeling any resistance. Damage to your cable/sensor may occur if you force the parts together.
4. Once completely installed, the nut will seat flat against the bulkhead. At this point, use the installation tool that was included with the sensor to turn the nut an additional ¼ to ½ turn. Do not over tighten.
5. Please refer to the sensor installation sheet that is included with the conductivity/temperature sensor for detailed instructions.

Cleaning a Sensor Port

If you suspect port contamination, you can clean the port on the cable by filling the port with Isopropyl Alcohol for 30 seconds and then dumping it out. Next, allow the port to air dry completely or blow it out with compressed air. Installing a sensor into a port that is not completely dry is likely to cause erratic and erroneous readings.

If the connector is corroded, contact your local YSI Representative or a YSI Authorized Service Center.

Verifying Sensor Accuracy and Calibration

Sensor accuracy and calibration can be verified by immersing a sensor into calibration solution or YSI Confidence Solution®. Compare the readings on the Pro Plus display to the value of the solution. If the readings have drifted more than the accuracy specification of the sensor, perform a calibration before taking field measurements.

YSI Confidence Solution can be used to check the accuracy and calibration of the conductivity, pH and ORP sensors. However, to maintain the highest accuracy of the instrument, it should not be used to perform a calibration.

Resetting a Sensor to Factory Default

Occasionally, it may be necessary to reset the instrument to its factory calibration default values. To reset the calibration values, press the Cal key (Cal), highlight **Restore Default Cal** and press enter. Highlight the parameter you wish to reset to default and press enter. Next, you will be asked to confirm the operation. Highlight **Yes** and press enter to confirm.

Use the ▲ or ▼ keys to set user number from 0-99. Use the **READ** or **SAVE** button to set the user number and exit to the ID menu.

3.2.2 Calibrate

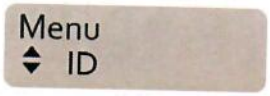
From the main menu, use the ▲ or ▼ keys select the Calibrate function, then press **READ** to enter that submenu.

The Standard vials must be thoroughly cleaned before each measurement, using a lint-free cloth.

Guided Cal.

The complete calibration procedure, as outlined below, should be performed by the user according to required quality and maintenance programs.

1. Gather the four (4) calibration sample vials with formula standards of <0.10 (i.e. 0.02), 20.0, 100, 800 NTU (or stabilized primary standards in the same concentrations).
   - Ensure each vial is cleaned with a soft cloth.
2. Hold **MENU** button for 3 seconds until the main menu is displayed.



3. Scroll through the menu using the ▲ or ▼ keys until "Calibrate" is displayed.
4. Press the **READ** button to enter into the calibration menu.
5. Select "Guided Cal" and follow the scrolling prompts on the screen.
   - Before placing each vial into the sample chamber, gently invert the vial to ensure a homogeneous mix.
6. Once done calibrating to the four standards, the instrument will return to the calibration menu.
7. Press the **ESC** key twice to navigate to the ready-to-sample screen.

Free Cal.

Free Calibration allows for a single calibration point. For many users, this single point calibration will be sufficient for routine work.

1. Follow steps 1-3 from "Guided Cal" above.
2. Select "Free Cal"
3. On the "Cal. Auto" screen, there will be a value displayed from the previous calibration. Place one of the calibration standards into the sample chamber.

4. Press READ button and wait for result.

5. If necessary use ▲ or ▼ keys to change the displayed value for this standard to match its label, press and hold **SAVE** for 3 seconds.
   - "Saving" will be displayed.

6. After the value is saved, the display returns to the "Calibrate" menu.

7. Recalibrate against the same standard for better accuracy, or perform the "Guided Cal" routine.

NOTE 1: If an error message displays, check the standards and repeat the previous steps.

NOTE 2: After the calibration, perform standard readings for verification, and if needed repeat the calibration procedure.

Section 3: System Operation

Turn the ET WLM on with the ON/SENSITIVITY switch. If the buzzer makes a loud signal and a red light is visible, the battery is adequate for normal operation.

Lower the probe down the well to the water surface. The light and buzzer will activate. At this point, adjust the probe dial by rotating it counter-clockwise until the light and buzzer turn off.

With the probe still in contact with the water, adjust the probe sensitivity dial clockwise until the light and buzzer barely activate. In this setting, the probe will detect the water level and avoid false triggering.

Water level measurements can now be taken from the top of the casing or any reference point.

The ET WLM should be stored with the ON/SENSITIVITY switch in the OFF position. To turn the unit off, rotate the switch fully counter-clockwise until the switch clicks. If the ET WLM is not used and is stored for longer than three (3) months, remove the battery to prevent battery leakage, which can cause internal damage.

To avoid damage to the tape and strain relief, do not over tighten the reel with the probe in storage position.

This unit is not rated for use with hydrocarbons or flammable liquids. If measuring depth to fluid of wells containing hydrocarbons, use Geotech's line of interface probe products.

Operation of Optional Draw Down Control

1. Lower the probe to desired depth of maximum allowable draw down with the unit in standard ET WLM mode (switch at "Right") – see Figure 1-3.

2. Move the mode switch to the "Left ", for Draw Down mode.

3. Connect the ET WLM to a controller; such as the Geotech GeoControl Pro or Geo Controller, which is equipped with a Draw Down feature, as shown in Figure 1-3.

4. Operate your controller in accordance with the controller's operation manual. The ET WLM will stop the controller when the water level dips below it. It will allow the controller to re-start when the water level rises and makes contact with the probe

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