



2024 ANNUAL WATER QUALITY REPORT
AMSTED RAIL FOUNDRY WASTE LANDFILL
KEOKUK, IOWA
PERMIT #56-SDP-89-91C

by Haley & Aldrich, Inc.
Dayton, Ohio

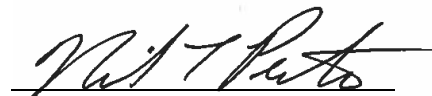
for Amsted Rail Company, Inc.
Keokuk, Iowa

File No. 129848-030
November 2024



CERTIFICATION PAGE

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.



Nick Leon Perrotta, P.E.

26 November 2024

Date

License Number: 22717

My license renewal date is: 31 December 2024

Pages or sheets covered by this seal: Entire Document





HALEY & ALDRICH, INC.
8899 Gander Creek Drive
Miamisburg, OH 45342
937.384.9940

26 November 2024
File No. 129848

Iowa Department of Natural Resources
502 East 9th Street
Des Moines, Iowa 50319-0034

Attention: Michael B. Leat
Land Quality Bureau

Subject: 2024 Annual Water Quality Report
Amsted Rail Foundry Waste Landfill
Keokuk, Iowa
Iowa Permit #56-SDP-15-89-91C

Dear Mr. Leat:

Haley & Aldrich, Inc. is submitting this *2024 Annual Water Quality Report* on behalf of Amsted Rail Company, Inc. for their Griffin Wheel Foundry Waste Landfill located in Keokuk, Iowa. Please contact me at 937.530.1412 if you have any questions or require additional information regarding this report.

Sincerely yours,
HALEY & ALDRICH, INC.

A handwritten signature in black ink that reads "Tom Vanage". The signature is written in a cursive, flowing style.

Thomas M. Vanage
Senior Project Manager

Enclosure

c: Amsted Rail Company, Inc.; Attn: Paul Sheppard

Executive Summary

This *Annual Water Quality Report (AWQR)* summarizes and evaluates groundwater and surface water quality data from the Amsted Rail Company, Inc. (Amsted) Griffin Wheel Foundry Waste Landfill (Landfill), located in Keokuk, Iowa (Site). Groundwater sampling activities were conducted on 29 April through 2 May and 9 through 12 September 2024.

The results of the statistical analyses for the groundwater samples were similar to those observed in previous years. The results indicate the following parameters exceeded the upper control limits in April/May and/or September 2024:

- ammonia nitrogen (MW-7, MW-26, and MW-27);
- boron (MW-7, MW-25, MW-26, and MW-27);
- field-measured conductivity (MW-7, MW-26, and SW-2);
- fluoride (MW-25);
- chloride (SW-2);
- iron (MW-7, MW-26, and MW-27);
- lithium (MW-7);
- manganese (MW-6, MW-7, MW-25 and MW-26);
- field-measured pH (SW-2);
- sodium (MW-26 and SW-2);
- strontium (MW-7, MW-26, and MW-27);
- sulfate (MW-7, MW-26, and MW-27);
- total organic halogens (SW-2); and
- field-measured temperature (MW-5, MW-6, MW-7, and MW-27).

Groundwater analytical sampling results from 2024 are generally consistent with previous sampling events. The parameters that were detected at concentrations greater than the Iowa Department of Natural Resources (IDNR) Action Levels were iron, lithium, manganese, sodium, and sulfate. Groundwater and surface water samples that were detected with concentrations greater than the appropriate action levels in April/May and/or September 2024 are as follows:

- Iron was detected at concentrations greater than the final Secondary Drinking Water Regulation (SDWR; 0.3 milligrams per liter [mg/L]) in groundwater samples collected from monitoring wells MW-7, MW-26, and MW-27.
- Sulfate was detected at concentrations greater than the final Secondary Drinking Water Regulation (SDWR; 250 mg/L) in groundwater samples collected from monitoring wells MW-7, MW-26, and MW-27.
- Manganese was detected at concentrations greater than the final Health Advisory Level (HAL; 0.3 mg/L) in groundwater samples collected from monitoring wells MW-7, and MW-26, and from surface water location SW-1.

- Sodium was detected at concentrations greater than the final HAL for sodium (20 mg/L) in groundwater samples collected from monitoring wells MW-5, MW-6, MW-7, MW-12, MW-16, MW-20, MW-21, MW-25, MW-26, and MW-27, and surface water samples collected from SW-1 and SW-2.
- Lithium was detected at concentrations greater than the IDNR Action Level (0.014 mg/L) in groundwater samples from monitoring wells MW-5, MW-7, MW-16, MW-20, MW-21, MW-25, MW-26, and MW-27.

A review of the groundwater concentration vs. time graphs indicates that the detected concentrations of parameters are generally similar to historical sampling results. Elevated concentrations of total organic halogens (MW-20, SW-1, SW-2), chloride (MW-20, and MW-25), and iron (MW-7) will continue to be monitored in future years of groundwater sampling to assess whether or not this was an isolated situation.

No actions or permit amendments are needed based on this year's sampling results.

The Landfill is in post-closure monitoring. The Closure Permit (#56-SDP-15-89-91C) was provided by IDNR on 27 September 2022. Therefore, post-closure activities at the Landfill will be performed in conformance with Iowa Code Chapter 455B.

As part of the closure permit, an Environmental Covenant was agreed upon and implemented that prohibits on-site groundwater to be used as a source of drinking water.

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List of Acronyms/Abbreviations

Amsted	Amsted Rail Company, Inc.
AWQR	Annual Water Quality Report
DUSR	Data Usability Summary Report
EPA	U.S. Environmental Protection Agency
GWQS	Groundwater Quality Standards
HAL	Health Advisory Level
Haley & Aldrich	Haley & Aldrich, Inc.
HMSP	Hydrologic Monitoring System Plan
IAC	Iowa Administrative Code
IDNR	Iowa Department of Natural Resources
Landfill	Griffin Wheel Foundry Waste Landfill
MCL	maximum contaminant level
MCLG	Maximum Contaminant Level Goal
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
ND	non-detect
NRL	Negligible Risk Level
QA/QC	quality assurance/quality control
Site	Amsted Foundry Waste Landfill in Keokuk, Iowa
SDWR	Secondary Drinking Water Regulation
TOX	total organic halogens
UCL	upper control limit

1. Introduction

Haley & Aldrich, Inc., (Haley & Aldrich) has prepared this *2024 Annual Water Quality Report (AWQR)* on behalf of Amsted Rail Company, Inc., (Amsted) to summarize and evaluate groundwater and surface water quality data from the Griffin Wheel Foundry Waste Landfill (Landfill), located in Keokuk, Iowa (Site). Groundwater sampling activities were conducted from 29 April through 2 May and 9 through 12 September 2024.

Clean closure activities for the disposal areas of the Landfill were completed from 2019 through early 2022. On 27 September 2022, Iowa Department of Natural Resources (IDNR) provided the Amsted Sanitary Disposal Project Closure Permit (#56-SDP-15-89-91C) for the Landfill. Post-Closure activities at the Landfill will be conducted in conformance with Iowa Code Chapter 455B. As special provision #7 of the Permit, hydraulic monitoring at the Site shall be performed in accordance with the Revised *Hydrologic Monitoring System Plan (HMSP)*; Haley & Aldrich, 2016) for a minimum duration of five years beginning on the issuance date of the permit (i.e., until 27 April 2027).

The groundwater monitoring activities presented in this report were performed in accordance with the amended HMSP.

1.1 SITE HISTORY

The Site has been used as a waste landfill for materials generated at the Amsted Foundry since the mid-1970s. Prior to that time, the Site was undeveloped. The Site receives various materials generated at the Amsted facility that are then reused either on or off Site. These materials generally fall into two categories: 1) spent foundry sand; and 2) slag that is commingled with refractory material. The slag is further processed into four sizes of aggregates (small, medium, large, and oversized).

The general geology of the Site is clayey silt or alluvium up to 10 feet below ground surface, underlain by a brown and gray sandy, silty clay unit up to 30 feet in thickness. The monitoring wells installed at the Site are either screened in the brown or gray, sandy, silty clay layer.

Surface water on the Landfill flows toward the east side of the Site into the upper reach of Soap Creek, which empties into the Mississippi River nearly 2 miles southeast of the Site. Shallow groundwater moves toward Soap Creek under a horizontal hydraulic gradient of approximately 0.03 foot per foot. The portions of the water table to the west, north, and east are located hydraulically upgradient of the Site. The portions of the water table near Soap Creek and southeast of the Site are generally hydraulically downgradient of the Site.

2. Groundwater Monitoring System

The monitoring system network comprises monitoring wells within the water table, the uppermost aquifer, and the surface water. The groundwater monitoring program is summarized below and in Table 1, Monitoring Program Summary and the groundwater monitoring schedule is summarized in Table 2. A Monitoring Point Location Map is included as Figure 1.

2.1 WATER TABLE MONITORING SYSTEM

The water table monitoring system comprises upgradient monitoring wells MW-12 and MW-20 and downgradient monitoring wells MW-5, MW-6, and MW-25. Although not part of the monitoring system network, monitoring wells MW-14 and MW-17 are retained to gather additional information pertaining to water table elevations. Figures 2 and 3 show the water table monitoring well locations.

2.2 UPPERMOST AQUIFER MONITORING SYSTEM

The uppermost aquifer monitoring system comprises upgradient monitoring wells MW-16 and MW-21 and downgradient monitoring wells MW-7, MW-26, and MW-27. Although not part of the monitoring system network, monitoring wells MW-2, MW-3, MW-11, MW-13, MW-15, MW-19, MW-23, and MW-24 are retained to gather additional information pertaining to water elevations within the uppermost aquifer monitoring system. Figures 4 and 5 show the uppermost aquifer monitoring well locations.

2.3 SURFACE WATER MONITORING SYSTEM

The surface water monitoring system comprises upgradient surface water monitoring location SW-1 and downgradient surface water monitoring location SW-2. Surface water locations SW-3 and SW-4 are no longer monitored, as approved by the IDNR in a letter dated 25 January 2017. Figure 1 shows the surface water and monitoring well locations.

2.4 MONITORING WELL CONDITION ASSESSMENT

During the September 2024 sampling event, the hinges on the guard pipe on monitoring wells MW-2, MW-5, MW-12 and MW-23 could not fully closed and need to be repaired. An air leak observed at the dedicated connection was encountered at monitoring well MW-16. The repairs will be completed and documented prior to the next sampling event scheduled for spring 2025.

Table 3, the Monitoring Well Maintenance and Performance Reevaluation Schedule, lists the completed and scheduled tasks performed in accordance with Iowa Administrative Code (IAC) 114.21(2)d. The monitoring well maintenance and performance summary is included in Table 4. Monitoring well depth measurements and in-situ permeability tests are performed once every five years; the last event was completed in April 2023.

2.5 ANALYTICAL PARAMETERS

Groundwater and surface water samples collected during the 2024 sampling events were analyzed for the parameters shown in Table 2, consistent with IAC Section 567, Chapter 115.26(4)e and (4)f and according to the special provisions of Permit No. 56-SDP-15-89-91C. The parameters sampled for and analyzed in April/May and September 2024 have been agreed upon by IDNR and will be monitored in future sampling events. Samples in monitoring wells for dissolved metals were field-filtered using an in-line, 0.45-micron filter.

Samples at surface water locations for dissolved metals were filtered at the laboratory. Completed Sampling Forms are included in Appendix A.

2.6 LABORATORY ANALYSIS

Appropriately prepared sample containers for each sampling event were provided by Eurofins Laboratories. Eurofins's laboratory located in Barberton, Ohio performed the analyses for the April/May and September sampling events. However, for the September sampling event, the analysis of total organic halogens (TOX) and carbon trap preparation were completed at Eurofins's Savannah, Georgia laboratory. Copies of the analytical laboratory reports and associated Data Usability Summary Reports (DUSRs) for the 2024 sampling events are provided in Appendix B.

The laboratory analyses were completed in accordance with the procedures and methods described in the U.S. Environmental Protection Agency's (EPA's) *Test Methods for Evaluating Solid Waste, SW-846, Physical/Chemical Methods* (February 2007 with updates). The quality assurance and quality control (QA/QC) procedures used to ensure the precision and accuracy of the sample analyses are provided in the Eurofins *Laboratories Quality Assurance Manual*, which is available upon request.

The information provided in the laboratory reports includes the completed chain of custody forms, investigative sample results, and the results for the associated QA/QC samples, method blanks, laboratory control spikes, laboratory duplicates, and matrix spike (MS) and matrix spike duplicates (MSDs) analyzed concurrently with the investigative samples. The reported results for the semiannual sampling events were validated with guidance from the *National Functional Guidelines for Inorganic Data Review* (EPA, November 2020). The laboratory analytical reports were evaluated for completeness, overall quality and usability, compliance with method-specific sample holding times, precision and accuracy, and potential sample cross-contamination.

As presented in the DUSRs, the laboratory reports were found to be complete and the reported results usable for Amsted's monitoring program. The September 2024 sample results for total organic halogens had a "J/UJ" qualifier. The September 2024 sample results for sodium had a "J-" for all samples because the relative percent difference between the MS and MSD results were not within the specified limits, as the relative percent difference was low. TOX had a "J" qualifier for samples MW-20-091124-1210 and 20760-091124-0001.

2.7 NOTABLE ISSUES

No notable issues were observed during the 2024 sampling events.

3. Groundwater Flow Conditions

3.1 HORIZONTAL GROUNDWATER FLOW

Static water levels were measured in April and August in the monitoring wells included in the network, as well as monitoring wells MW-2, MW-3, MW-11, MW-13, MW-14, MW-15, MW-17, MW-19, MW-23, and MW-24. Table 4 contains groundwater elevations for measured groundwater monitoring wells during the 2024 sampling events. Water table and upper aquifer water elevation maps (Figures 2 through 5) were prepared using the water level measurements from the 2024 sampling events. Horizontal groundwater flow was observed during these sampling events to flow to the east, northeast, and southeast toward Soap Creek, located on the east side of the Site.

3.2 VERTICAL HYDRAULIC GRADIENTS

Water levels measured in monitoring well clusters MW-5/MW-27, MW-6/MW-7, MW-17/MW-16, and MW-20/MW-19 during the 2024 sampling events were used to calculate vertical hydraulic gradients for the Site. The vertical hydraulic gradients were calculated by the following equation:

$$\frac{\Delta H}{\Delta L} = \frac{H_d - H_s}{L_s - L_d}$$

Where: Hd = the water elevation in the deep well
Hs = the water elevation in shallow well
Ls = the elevation of the middle of saturated zone of the shallow well screen
Ld = the elevation of the middle of saturated zone of the deep well screen

The average vertical hydraulic gradients were 0.07 foot per foot in well cluster MW-5/MW-27 and 0.13 foot per foot in well cluster MW-6/MW-7 (upward-directed flow in both well clusters). The average vertical hydraulic gradients were -0.39 foot per foot in well cluster MW-17/MW-16, and -0.37 foot per foot in well cluster MW-20/MW-19 (downward-directed flow in both well clusters) during 2024. The calculated vertical hydraulic gradients were consistent with previous results and are discussed below.

3.3 WATER LEVEL AND LOCATION EVALUATION

An evaluation was completed for the high and low water level elevations at each well, and the vertical and horizontal acceptability of each well location, as required by 567 IAC 115.21(2)a. The table below shows the elevations of the historical high and low water levels and the elevations of the top and bottom of the well screen in each well.

Table 3.3-1: Recorded High and Low Water Level Elevations 2018-2024

Monitoring Well	High Water Level	Low Water Level	Bottom and Top of Well Screen
MW-02	630.25	620.95	580.02 – 590.02
MW-03	650.25	632.90	599.27 – 609.27
MW-05	623.43	621.63	605.07 – 615.07
MW-06	621.68	618.52	604.30 – 614.30
MW-07	625.41	623.91	566.06 – 576.06
MW-11	628.55	623.83	583.42 – 593.42

Monitoring Well	High Water Level	Low Water Level	Bottom and Top of Well Screen
MW-12	629.03	624.03	613.27 – 623.27
MW-13	631.98	628.58	589.79 – 599.79
MW-14	644.23	640.68	623.37 – 633.37
MW-15	640.20	637.61	589.96 – 599.96
MW-16	626.68	624.99	594.13 – 604.13
MW-17	638.38	633.65	620.60 – 630.60
MW-19	626.24	623.62	580.93 – 590.93
MW-20	640.89	638.71	620.29 – 630.29
MW-21	644.31	641.09	594.07 – 604.07
MW-23	642.92	637.26	609.40 – 619.40
MW-24	631.79	628.60	598.24 – 608.24
MW-25	626.74	621.95	613.56 – 623.56
MW-26	624.35	622.92	583.29 – 588.29
MW-27	624.57	623.87	582.20 – 587.20

Note: All groundwater elevations in feet, National Geodetic Vertical Datum.

Water level elevations in the monitoring wells for the 2024 sampling events were located above the top of the well screen, except for MW-25 during the September sampling event, in which case the water level was measured with an elevation of 621.95 feet and the top of screen was 623.56 feet. Drought conditions were observed in Keokuk, Iowa prior to the September 2024 sampling event.¹ The monitoring wells are located within water-bearing units either upgradient or downgradient of the Landfill.

The groundwater flow underneath the Landfill during the 2024 sampling events has generally been from the southwest to the northeast. The groundwater flow for the entire Site is divided by Soap Creek. From a review of the vertical hydraulic gradients, the groundwater recharges at Soap Creek. The horizontal placement of monitoring wells is such that the spacing between downgradient monitoring wells has been maintained at less than the 600-foot maximum throughout the sampling events.

3.4 POTENTIAL GROUNDWATER MOUNDING

A potential for groundwater mounding exists if the surface elevations of the landfill increase to a significant height. The present surface elevation of the material staging areas has not increased to more than 20 feet above the ground surface where the upgradient wells are installed. The vertical component of the groundwater flow at the Site has consistently indicated downward flow at the upgradient well locations and upward flow at the downgradient well locations. It is believed that no groundwater mounding is occurring at the Site.

Construction activities of the sand and slag area, including removal of material and regrading to the base layer, along with exposure to rainfall, may have impacted the groundwater results. Now that a base layer is established and the Landfill is closed, native ground surface disturbance will decrease and future impacts to groundwater are not anticipated.

¹ National Weather Service National Oceanic and Atmospheric Administration (NOAA) website: <https://www.weather.gov/wrh/Climatwfo=divn>. Accessed 8 November 2024.

4. Analysis of Annual Monitoring Results

4.1 STATISTICAL ANALYSIS

Laboratory results were imported directly from the laboratory Excel file into the existing database with groundwater data from 2018 (field measurements were entered manually). The mean and standard deviation of each parameter for upgradient monitoring points in each monitoring network were calculated as required in 567 IAC 115.26(6). Analytical data from each sampling event was included in an Appendix C table and used in the mean and standard deviation calculations. The following formula was used to calculate the standard deviation:

$$s = \sqrt{\frac{\sum(X-M)^2}{n-1}}$$

Where: s = Sample Standard Deviation
X = Individual Data
M = Sample Mean
n = Number of Data Points in Set

Using the calculated mean and standard deviation for each analytical parameter, the upgradient control limit (the upgradient mean plus two standard deviations) for each parameter was calculated for each of the upgradient monitoring networks. The two standard deviations of the upgradient data were subtracted from the mean upgradient data to determine the lower control limit for pH. A summary of the calculated upper control limits (UCLs; or background levels) is included in Table 5.

4.2 CALCULATED CONTROL LIMITS AND ACTION LEVELS

A comparison was made to the calculated control limits for the upgradient sampling data to evaluate the status of the Site's water quality. A comparison was also made to the IDNR Action Levels established by IAC Chapter 133. IDNR Action Levels were established for specific chemical and exposure numbers, lifetime exposure, cancer risks, and drinking water exposure over a 70-year period. The following defines some of the various terms used in 567 IAC 133.2 (455B, 455E):

- IDNR Action Level – The IDNR Action Level for any contaminant is as follows: The EPA Health Advisory Level (HAL), if one exists; if there is no HAL, then the EPA Negligible Risk Level (NRL); if there is no HAL or NRL, then the EPA Maximum Contaminant Level (MCL), Secondary Drinking Water Regulation (SDWR), or Maximum Contaminant Level Goal (MCLG) is used. If there is no HAL, NRL, MCL, SDWR, or MCLG, an action level may be established by the IDNR based on current technical literature and recommended guidelines of the EPA and recognized experts on a case-by-case basis.
- HAL – A lifetime HAL for a contaminant is established by the EPA. Health advisories represent the concentration of a single contaminant, based on current toxicological information in drinking water, which is not expected to cause adverse health effects over a lifetime of exposure.
- NRL – The NRL for carcinogens is established by EPA. The NRL estimates the concentration of a contaminant that would cause an additional cancer case per million people exposed over a lifetime to the contaminant.
- MCL – The enforceable MCL was established by EPA pursuant to the Safe Drinking Water Act.

- **SDWR** – A SDWR exists for some contaminants that do not have HALs, NRLs, or MCLs. This number is usually based on the aesthetic qualities of the parameter and is generally not an enforceable limit. These were also established by EPA pursuant to the Safe Drinking Water Act.
- **MCLG** – A MCLG is a non-enforceable concentration of a drinking water contaminant that is protective of adverse human health effects and allows an adequate margin of safety.

When referring to the HAL, NRL, MCL, SDWR, and MCLG in the following analysis, the status of that standard is given in terms of final, draft, listed for regulation, proposed, or tentative form. The UCLs, the action levels, and the source of the action levels for each constituent are presented in Table 5 for each monitored aquifer.

4.3 WATER QUALITY ANALYTICAL RESULTS

Time versus concentration graphs for each analytical parameter are provided in Appendix C. Analytical data are also presented in tables where the mean and upgradient control limit is developed from the upgradient monitoring well concentrations. The upgradient control limits and the IDNR Action Levels (when within the scale of the graph) are shown on these graphs.

4.4 STATISTICAL TREND ANALYSIS

Statistical methods were used to evaluate groundwater trends. The analysis was completed for monitoring wells in the sampling program. Trend analysis was performed for data collected from 2018 through 2024. After the descriptive statistics had been summarized, the data was evaluated to check the viability of trends, including outlier presence, data censorship (percent of non-detects [NDs]), and determination of an adequate amount of data. A simple substitution method was utilized for ND datasets by substituting each ND value with the laboratory reporting limit. A formal two-tailed statistical trend evaluation (Mann-Kendall) with minimum 95 percent confidence level test (2.5 percent significance level at each tail) was performed for the monitoring wells. The following stepwise approach was utilized for the trend analysis:

1. **For dataset with less than 70 percent non-detects:** Constituents of concern maximum concentration values at each monitoring well were compared to the Groundwater Quality Standards (GWQS). If the maximum concentration of a constituent exceeded the GWQS, then trend analysis was completed using the Mann-Kendall test.
2. **For dataset with greater than 70 percent NDs:** Constituent concentrations were evaluated to determine if the constituent were detected during the sampling events conducted recently. If the detected most recent concentration of a constituent in a sample from the monitoring well exceeded the GWQS, then trend analysis using the Mann-Kendall test was performed.

The statistical evaluation was performed using ChemStat software (Version 6.3.0.0). Statistical analyses were performed on constituents that have at least six data points and either had detections or exceedances of state action levels.

Increasing trends were not observed in upgradient monitoring wells; however, increasing trends were observed in downgradient wells for iron (MW-26 and MW-27) and sulfate (MW-26). In 2023, an increasing trend was observed in upgradient monitoring well MW-16 for iron and in downgradient monitoring well MW-7 for sulfate, both of which are now stable by incorporating 2024 sampling results. The remaining constituents with concentrations above the Groundwater Protection Standard were either stable or decreasing. The statistical analysis results are summarized in Table 6 and the ChemStat output files for the statistical analysis is included in Appendix D.

5. Groundwater and Surface Water Quality Results

5.1 STATISTICAL RESULTS

As shown in Appendix C, similar to past sampling events, exceedances of the UCL exist in downgradient water table monitoring wells, downgradient uppermost aquifer monitoring wells, and in the downstream surface water sampling location. Constituents with no immediately preceding control limit exceedances are summarized in Table 7. A review of Appendix C indicates the following parameters exceeded upper control limits in April/May and/or September 2024:

- ammonia nitrogen (MW-7, MW-26, and MW-27);
- boron (MW-7, MW-25, MW-26, and MW-27);
- field-measured conductivity (MW-7, MW-26, and SW-2);
- fluoride (MW-25);
- chloride (SW-2);
- iron (MW-7, MW-26, and MW-27);
- lithium (MW-7);
- manganese (MW-6, MW-7, MW-25 and MW-26);
- field-measured pH (SW-2);
- sodium (MW-26 and SW-2);
- strontium (MW-7, MW-26, and MW-27);
- sulfate (MW-7, MW-26, and MW-27);
- total organic halogens (SW-2); and
- field-measured temperature (MW-5, MW-6, MW-7, and MW-27).

Table 7 depicts a summary of the ongoing and newly identified control limit exceedances by showing the most recent result of each exceeding constituent compared to the UCL and action level.

Surface water is not used as a source of drinking water. All businesses and residents in the area are supplied with drinking water from the City of Keokuk public water supply. The source for the City of Keokuk public water is the Mississippi River.

5.2 ANALYTICAL RESULTS

A summary of IDNR Action Level exceedances in 2024 for groundwater and surface water samples is shown in Table 9, Summary of Analytical Results. Groundwater sampling results from 2024 are generally consistent with previous sampling events. Table 10 presents a summary of historical IDNR Action Level exceedances and calculated control limit exceedances from 2018 through 2024. The parameters that were detected at concentrations greater than the IDNR Action Levels were the same as last year including iron, lithium, manganese, sodium, and sulfate.

Groundwater and surface water samples that were detected with concentrations greater than the appropriate action level in April/May and/or September 2024 are as follows:

- Iron was detected at concentrations greater than the final SDWR (0.3 milligrams per liter [mg/L]) in groundwater samples collected from monitoring wells MW-7, MW-26, and MW-27.
- Sulfate was detected at concentrations greater than the final SDWR (250 mg/L) in groundwater samples collected from monitoring wells MW-7, MW-26, and MW-27.
- Manganese was detected at concentrations greater than the final HAL (0.3 mg/L) in groundwater samples collected from monitoring wells MW-7 and MW-26, and from surface water location SW-1.
- Sodium was detected at concentrations greater than the final HAL for sodium (20 mg/L) in groundwater samples collected from monitoring wells MW-5, MW-6, MW-7, MW-12, MW-16, MW-20, MW-21, MW-25, MW-26, and MW-27, and surface water samples collected in from SW-1 and SW-2.
- Lithium was detected at concentrations greater than the IDNR Action Level (0.014 mg/L) in groundwater samples from monitoring wells MW-5, MW-7, MW-16, MW-20, MW-21, MW-25, MW-26, and MW-27.

A review of the groundwater concentration vs. time graphs included in Appendix C indicates that the detected concentrations of parameters are generally similar to historical sampling results. Elevated concentrations of total organic halogens (MW-20, SW-1, and SW-2), chloride (MW-20 and MW-25), and iron (MW-7) will continue to be monitored to assess whether or not this was an isolated situation.

6. Leachate and Gas Monitoring

The landfill has operated and was closed under IDNR permit #56-SDP-15-89P; Special Provision 4 states in part, that based on a completed and certified site risk assessment meeting the requirements outlined in Chapter 455B.305, Section 6 of the Iowa Code, the permit holder was conditionally exempted under the IDNR letter dated 5 September 1995 from providing and implementing a leachate control plan for the Phase I disposal area; therefore, leachate monitoring is not conducted at the Site. This facility will continue to store and process the same materials. Refer to Table 11.

The permit holder is not required to monitor or report Site gas concentrations, as the defined waste stream consists of inorganic foundry waste; therefore, no gas monitoring is required for this Site. Refer to Table 12. IDNR permit #56-SDP-15-89P has expired and the facility is currently operating under permit #56-SDP-15-89C.

7. Recommendations

Haley & Aldrich's review of hydrogeological conditions has indicated that the number of monitoring wells and their locations are adequate. We therefore recommend no changes to this component of the Groundwater Monitoring Plan. Per IDNR guidance, the "water table" and the "uppermost aquifer" are each monitored using two background wells and three downgradient wells in each unit. Water levels recorded at 20 of the Site's monitoring wells also provide valuable data used to document groundwater flow direction; there is no benefit to abandoning any of these wells at this time.

Moving forward, IDNR has issued a closure permit (56-SDP-15-89-91C); as such the monitoring wells will be monitored for five years beginning in 2022. If IDNR determines that all monitored parameters are exhibiting stable or declining concentrations, the permit will expire, and all groundwater monitoring wells shall be abandoned with appropriate documentation submitted to IDNR.

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TABLES

Monitoring Well	Formation	Current Monitoring Program*	Change for next sampling event	Control Limit Exceedances		Total # of Samples in each monitoring program since January 1, 2018		
				April 2024	August 2024	Routine	Supplemental	Remedial Action
MW-5	Water Table (Downgradient)	Routine	NC	No Exceedance	Temperature (field)	14	0	0
MW-6	Water Table (Downgradient)	Routine	NC	Manganese, Temperature (field)	Manganese	14	0	0
MW-7	Uppermost Aquifer (Downgradient)	Routine	NC	Ammonia, Boron, Lithium, Conductivity (field), Strontium, Sulfate, Temperature (field),	Ammonia, Boron, Conductivity (field), Iron, Manganese, Strontium, Sulfate, Temperature (field)	14	0	0
MW-12	Water Table (Upgradient)	Routine	NC	No Exceedance	No Exceedance	14	0	0
MW-16	Uppermost Aquifer (Upgradient)	Routine	NC	No Exceedance	No Exceedance	14	0	0
MW-20	Water Table (Upgradient)	Routine	NC	No Exceedance	No Exceedance	14	0	0
MW-21	Uppermost Aquifer (Upgradient)	Routine	NC	No Exceedance	No Exceedance	14	0	0
MW-25	Water Table (Downgradient)	Routine	NC	Boron, Fluoride	Boron, Fluoride, Manganese	14	0	0
MW-26	Uppermost Aquifer (Downgradient)	Routine	NC	Ammonia, Boron, Conductivity (field), Iron, Manganese, Sodium, Strontium, Sulfate	Ammonia, Boron, Conductivity (field), Iron, Manganese, Sodium, Strontium, Sulfate	14	0	0
MW-27	Uppermost Aquifer (Downgradient)	Routine	NC	Ammonia, Boron, Iron, Sulfate, Strontium, Temperature (field)	Ammonia, Boron, Iron, Sulfate, Strontium	14	0	0
SW-1	Surface Water (Upgradient)	Routine	NC	No Exceedance	No Exceedance	14	0	0
SW-2	Surface Water (Downgradient)	Routine	NC	Chloride, Sodium, pH (field)	Chloride, Conductivity (field), Sodium, Total Organic Halogens	14	0	0

Notes:
* In accordance with permit #56-SDP-15-89-91C.
NC: No Change

Monitoring Well	Recent Sampling Dates and Constituents														Upcoming Sampling Dates and Constituents	
	4/16/2018 - 4/18/2018	10/08/18 - 10/10/2018	4/13/2019 - 4/14/2019	10/01/19 - 10/02/2019	4/07/2020 - 4/09/2020	9/30/2020 - 10/02/2020	4/13/2021 - 4/15/2021	10/12/2021 - 10/14/2021	4/19/2022 - 4/20/22	9/27/2022 - 9/29/2022	4/18/2023- 4/19/2023	8/22/2023- 8/24/2023	4/29/2024- 5/2/24	9/9/2024- 9/12/2024	April 2025	October 2025
MW-5	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-6	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-7	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-12	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-16	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-20	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-21	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-25	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-26	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
MW-27	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
SW-1	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3
SW-2	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3	1, 3	1, 2, 3

Notes:

1. Semiannual Parameters: pH, Conductivity, Temperature, Dissolved Iron, Total Manganese, Ammonia Nitrogen, and Chemical Oxygen Demand (COD)
2. Annual Parameters: Total Organic Halogen, and Phenols
3. Supplemental Parameters: Boron, Lithium, Sodium, Strontium, Fluoride, and Sulfate

Compliance with:	Monitoring Calendar Years							
	2018	2019	2020	2021	2022	2023	2024	2025
567 IAC 115.21(2)"a" high and low water levels (annual)	Completed	Completed	Completed	Completed	Completed	Completed	Complete	Scheduled
567 IAC 115.21(2)"b" changes in the hydrologic setting and flow paths	Completed	Completed	Completed	Completed	Completed	Completed	Complete	Scheduled
567 IAC 115.21(2)"c" well depths	N/A	N/A	N/A	N/A	Completed	Completed ¹	N/A	N/A
567 IAC 115.21(2)"d" in-situ permeability tests (once every five years)	N/A	N/A	N/A	N/A	N/A	Completed ²	N/A	N/A

Notes:

1. Well depths were measured during the April 2023 event. Well depths will be measured every 5 years instead of once per year because dedicated pumps are installed in each sampling monitoring well.
2. In-situ permeability tests were completed by Haley & Aldrich in April 2023.

Well	Monitored Aquifer	Top of casing	Top of Screen	Screen Length	Total Depth		Date of Measurements		Maximum Depth Discrepancy (ft)	Baseline Permeability ¹ (cm/s/date)	Current Permeability ²	
							4/18/2024	8/22/2024			4/18/23-4/23/23	% Change
MW-2	Upper Most Aquifer	636.62	590.02	10	56.6	Groundwater Level (ft)	14.31	15.67	-0.02	<1.65E-05 4/21/2023	<1.65E-05	NA
						Groundwater Elevation (Ft MSL)	622.31	620.95				
						Measured Well Depth (ft)	56.62	NM				
						Submerged screen	Y	Y				
MW-3	Upper Most Aquifer	660.62	609.27	10	61.35	Groundwater Level (ft)	25.02	25.92	0.27	<1.65E-05 4/21/2023	<1.65E-05	NA
						Groundwater Elevation (Ft MSL)	635.6	634.7				
						Measured Well Depth (ft)	61.08	NM				
						Submerged screen	Y	Y				
MW-5	Water Table	625.07	615.07	10	20	Groundwater Level (ft)	1.28	3.44	-0.09	2.73E-05 4/20/2023	2.73E-05	NA
						Groundwater Elevation (Ft MSL)	623.79	621.63				
						Measured Well Depth (ft)	20.09	NM				
						Submerged screen	Y	Y				
MW-6	Water Table	627.76	614.30	10	23.46	Groundwater Level (ft)	6.48	9.24	1.51	2.93E-05 4/20/2023	2.93E-05	NA
						Groundwater Elevation (Ft MSL)	621.28	618.52				
						Measured Well Depth (ft)	21.95	NM				
						Submerged screen	Y	Y				
MW-7	Upper Most Aquifer	626.06	576.06	10	60	Groundwater Level (ft)	0.73	1.53	0	6.02E-04 4/21/2023	6.02E-04	NA
						Groundwater Elevation (Ft MSL)	625.33	624.53				
						Measured Well Depth (ft)	60.00	NM				
						Submerged screen	Y	Y				
MW-11	Upper Most Aquifer	636.22	593.42	10	52.8	Groundwater Level (ft)	8.75	11.92	1.15	2.80E-05 4/19/2023	2.80E-05	NA
						Groundwater Elevation (Ft MSL)	627.47	624.3				
						Measured Well Depth (ft)	51.65	NM				
						Submerged screen	Y	Y				
MW-12	Water Table	633.27	623.27	10	20	Groundwater Level (ft)	3.2	7.65	-0.12	1.65E-05 4/20/2023	1.65E-05	NA
						Groundwater Elevation (Ft MSL)	630.07	625.62				
						Measured Well Depth (ft)	20.12	NM				
						Submerged screen	Y	Y				
MW-13	Upper Most Aquifer	641.2	599.79	10	51.41	Groundwater Level (ft)	10.57	12.19	0.29	5.54E-05 4/19/2023	5.54E-05	NA
						Groundwater Elevation (Ft MSL)	630.63	629.01				
						Measured Well Depth (ft)	51.12	NM				
						Submerged screen	Y	Y				
MW-14	Water Table	648.67	633.37	10	25.3	Groundwater Level (ft)	5	7.51	0.05	9.58E-05 4/19/2023	9.58E-05	NA
						Groundwater Elevation (Ft MSL)	643.67	641.16				
						Measured Well Depth (ft)	25.25	NM				
						Submerged screen	Y	Y				
MW-15	Upper Most Aquifer	649.96	599.96	10	60	Groundwater Level (ft)	11.4	11.37	-1.19	<1.65E-05 4/19/2023	<1.65E-05	NA
						Groundwater Elevation (Ft MSL)	638.56	638.59				
						Measured Well Depth (ft)	61.19	NM				
						Submerged screen	Y	Y				
MW-16	Upper Most Aquifer	640.5	604.13	10	46.37	Groundwater Level (ft)	13.95	14.68	-0.51	<1.65E-05 4/21/2023-4/22/2023	<1.65E-05	NA
						Groundwater Elevation (Ft MSL)	626.55	625.82				
						Measured Well Depth (ft)	46.88	NM				
						Submerged screen	Y	Y				
MW-17	Water Table	640.7	630.60	10	20.1	Groundwater Level (ft)	2.31	6.01	-0.01	5.73E-05 4/22/2023	5.73E-05	NA
						Groundwater Elevation (Ft MSL)	638.39	634.69				
						Measured Well Depth (ft)	20.11	NM				
						Submerged screen	Y	Y				
MW-19	Upper Most Aquifer	650.43	590.93	10	69.5	Groundwater Level (ft)	24.43	25.74	1.32	4.57E-04 4/18/2023	4.57E-04	NA
						Groundwater Elevation (Ft MSL)	626	624.69				
						Measured Well Depth (ft)	68.18	NM				
						Submerged screen	Y	Y				
MW-20	Water Table	650.39	630.29	10	30.1	Groundwater Level (ft)	10.02	11.27	-0.06	1.45E-04 4/20/2023	1.45E-04	NA
						Groundwater Elevation (Ft MSL)	640.37	639.12				
						Measured Well Depth (ft)	30.16	NM				
						Submerged screen	Y	Y				
MW-21	Upper Most Aquifer	660.72	604.07	10	66.65	Groundwater Level (ft)	18.14	19.08	0.05	5.03E-05 4/21/2023	5.03E-05	NA
						Groundwater Elevation (Ft MSL)	642.58	641.64				
						Measured Well Depth (ft)	66.60	NM				
						Submerged screen	Y	Y				
MW-23	Upper Most Aquifer	659.75	609.40	10	50.35	Groundwater Level (ft)	19.14	21.18	-0.02	7.33E-04 4/22/2023	7.33E-04	NA
						Groundwater Elevation (Ft MSL)	640.61	638.57				
						Measured Well Depth (ft)	50.37	NM				
						Submerged screen	Y	Y				
MW-24	Upper Most Aquifer	639.99	608.24	10	41.75	Groundwater Level (ft)	8.39	11.34	0.05	2.22E-04 4/20/2023	2.22E-04	NA
						Groundwater Elevation (Ft MSL)	631.6	628.65				
						Measured Well Depth (ft)	41.70	NM				
						Submerged screen	Y	Y				
MW-25	Water Table	631.77	623.56	10	18.21	Groundwater Level (ft)	5.03	9.82	-0.55	1.07E-03 4/21/2023	1.07E-03	NA
						Groundwater Elevation (Ft MSL)	626.74	621.95				
						Measured Well Depth (ft)	18.76	NM				
						Submerged screen	Y	N				
MW-26	Upper Most Aquifer	631.03	588.29	5	47.74	Groundwater Level (ft)	6.68	7.44	-0.86	8.60E-05 4/21/2023	8.60E-05	NA
						Groundwater Elevation (Ft MSL)	624.35	623.59				
						Measured Well Depth (ft)	48.60	NM				
						Submerged screen	Y	Y				
MW-27	Upper Most Aquifer	624.57	587.20	5	42.37	Groundwater Level (ft)	Artesian	Artesian	0	Artesian well, could not slug test	NA	NA
						Groundwater Elevation (Ft MSL)	-	-				
						Measured Well Depth (ft)	42.37	NM				
						Submerged screen	Y	Y				
SW-1	Surface Water	NA	NA	NA	NA	Groundwater Level (ft)	Dry	Dry	NA	NA	NA	NA
						Groundwater Elevation (Ft MSL)	NA	NA				
						Measured Well Depth (ft)	NA	NA				
						Submerged screen	NA	NA				
SW-2	Surface Water	NA	NA	NA	NA	Groundwater Level (ft)	0.98	0.68	NA	NA	NA	NA
						Groundwater Elevation (Ft MSL)	NA	NA				
						Measured Well Depth (ft)	NA	NA				
						Submerged screen	NA	NA				
SW-3	Surface Water	NA	NA	NA	NA	Groundwater Level (ft)	0.22	NM	NA	NA	NA	NA
						Groundwater Elevation (Ft MSL)	NA	NA				
						Measured Well Depth (ft)	NA	NA				
						Submerged screen	NA	NA				
SW-4	Surface Water	NA	NA	NA	NA	Groundwater Level (ft)	Dry	NM	NA	NA	NA	NA
						Groundwater Elevation (Ft MSL)	NA	NA				
						Measured Well Depth (ft)	NA	NA				
						Submerged screen	NA	NA				

Notes:

¹ Permeability values were calculated by slug test data collected in April 2023.

² Current permeability values were calculated by slug test data collected in April 2023.

NM - Not Measured due to the presence of designated pumps in monitoring wells

NA - Not Applicable

Water Table Background/Control Limit (MW-12 and MW-20)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Semiannual							
pH	pH Units	28	28	8.084 and 5.631*	M+/-2SD	6.5/8.5	SDWR
Conductivity	mS/cm	28	28	1.27	M+/-2SD	NA	NA
Temperature	deg. C	28	28	22.32	M+/-2SD	NA	NA
Dissolved Iron	mg/L	28	4	0.14	M+/-2SD	0.3	SDWR
Total Managenese	mg/L	28	5	0.051	M+/-2SD	0.3	HAL
Ammonia Nitrogen	mg/L	28	4	0.53	M+/-2SD	30	IDNR AL
Chemical Oxygen Demand (COD)	mg/L	28	15	32.31	M+/-2SD	NA	NA
Annual Parameters							
Total Organic Halogens	mg/L	14	14	0.18	M+/-2SD	NA	NA
Phenols	mg/L	14	0	0.0253	M+/-2SD	NA	IDNR AL
Supplemental Parameters							
Boron	mg/L	28	3	0.139	M+/-2SD	6	HAL
Lithium	mg/L	28	18	0.06	M+/-2SD	0.014	IDNR AL
Sodium	mg/L	28	28	100.05	M+/-2SD	20	HAL
Strontium	mg/L	28	28	0.62	M+/-2SD	4	HAL
Fluoride	mg/L	28	28	0.6	M+/-2SD	4	MCL
Chloride	mg/L	28	28	62.25	M+/-2SD	250	SDWR
Sulfate	mg/L	28	28	60.56	M+/-2SD	250	HAL

Uppermost Aquifer Background/Control Limit (MW-16 and MW-21)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Semiannual							
pH	mg/L	28	28	8.32 and 5.11*	M+/-2SD	6.5/8.5	SDWR
Conductivity	mg/L	28	28	1.3	M+/-2SD	NA	NA
Temperature	deg. C	28	28	22.08	M+/-2SD	NA	NA
Dissolved Iron	mg/L	28	14	0.44	M+/-2SD	0.3	SDWR
Total Managenese	mg/L	28	28	0.35	M+/-2SD	0.3	HAL
Ammonia Nitrogen	mg/L	28	5	0.53	M+/-2SD	30	IDNR AL
Chemical Oxygen Demand (COD)	mg/L	28	13	36.5	M+/-2SD	NA	NA
Annual Parameters							
Total Organic Halogen	mg/L	14	7	0.063	M+/-2SD	NA	NA
Phenols	mg/L	14	0	0.0255	M+/-2SD	NA	IDNR AL
Supplemental Parameters							
Boron	mg/L	28	24	0.11	M+/-2SD	6	HAL
Lithium	mg/L	28	27	0.0798	M+/-2SD	0.014	IDNR AL
Sodium	mg/L	28	28	64	M+/-2SD	20	HAL
Strontium	mg/L	28	28	0.6	M+/-2SD	4	HAL
Fluoride	mg/L	28	28	0.51	M+/-2SD	4	MCL
Chloride	mg/L	28	28	5.62	M+/-2SD	250	SDWR
Sulfate	mg/L	28	28	92.89	M+/-2SD	250	HAL

Surface Water Background/Control Limit (SW-1)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Semiannual							
pH	mg/L	14	14	7.94 and 6.58*	M+/-2SD	6.5/8.5	SDWR
Conductivity	mg/L	14	14	0.67	M+/-2SD	NA	NA
Temperature	deg. C	14	14	26.54	M+/-2SD	NA	NA
Dissolved Iron	mg/L	14	9	3.02	M+/-2SD	0.3	SDWR
Total Managenese	mg/L	14	14	0.8	M+/-2SD	0.3	HAL
Ammonia Nitrogen	mg/L	14	11	5.07	M+/-2SD	30	IDNR AL
Chemical Oxygen Demand (COD)	mg/L	14	12	40.07	M+/-2SD	NA	NA
Annual Parameters							
Total Organic Halogen	mg/L	7	6	0.07	M+/-2SD	NA	NA
Phenols	mg/L	7	0	0.0261	M+/-2SD	NA	IDNR AL
Supplemental Parameters							
Boron	mg/L	14	14	0.42	M+/-2SD	6	HAL
Lithium	mg/L	14	1	0.07	M+/-2SD	0.014	IDNR AL
Sodium	mg/L	14	14	25.32	M+/-2SD	20	HAL
Strontium	mg/L	14	14	0.27	M+/-2SD	4	HAL
Fluoride	mg/L	14	14	1.18	M+/-2SD	4	MCL
Chloride	mg/L	14	14	29.13	M+/-2SD	250	SDWR
Sulfate	mg/L	14	14	62.82	M+/-2SD	250	HAL

Notes:

*Two control limits were established for pH, an upper and lower gradient control limit

1. AL: Action Level
2. HAL: EPA Health Advisory Level
3. IDNR AL: Iowa Department of Natural Resources Action Level
4. MCL: Maximum Contaminant Level
5. MCLG: EPA Maximum Contaminant Level Goal
6. mg/L: milligrams per liter
7. mS/cm: milliSiemens per centimeter
8. NRL: EPA Negligible Risk Level
9. SDWR: Secondary Drinking Water Regulation

TABLE 6
GROUNDWATER QUALITY ASSESSMENT PLAN TREND ANALYSIS
 2024 ANNUAL WATER QUALITY REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Well	Current SSL	Trend ¹
MW-5	Lithium	Stable
	Sodium	Stable
MW-6	Lithium	Stable
	Manganese	Stable
	Sodium	Stable
MW-7	Iron	Stable
	Lithium	Stable
	Manganese	Stable
	Sodium	Stable
	Sulfate	Stable
MW-12	Lithium	Stable
	Sodium	Decreasing
MW-16	Iron	Stable
	Lithium	Stable
	Manganese	Stable
	Sodium	Stable
MW-20	Lithium	Decreasing
	Sodium	Stable
MW-21	Lithium	Decreasing
	Manganese	Decreasing
	Sodium	Decreasing
MW-25	Lithium	Stable
	Flouride	Stable
	Sodium	Stable
MW-26	Iron	Increasing
	Lithium	Stable
	Manganese	Stable
	Sodium	Stable
	Sulfate	Increasing
MW-27	Iron	Increasing
	Lithium	Stable
	Sodium	Stable
	Sulfate	Stable
SW-1	Iron	Stable
	Manganese	Stable
	Sodium	Stable
SW-2	Iron	Stable
	Manganese	Stable
	Sodium	Decreasing

Notes:

SSL: Statistically Significant Level above groundwater protection standard

1: Two tailed trend analysis (Mann-Kendall) test performed at 95% confidence interval.

SUMMARY OF WELL/DETECTED CONSTITUENTS WITH NO IMMEDIATELY PRECEDING CONTROL LIMIT EXCEEDANCES

2024 ANNUAL WATER QUALITY REPORT

AMSTED - KEOKUK, IOWA

PERMIT NO. 56-SDP-15-89-91C

Well	Constituent*	Units	Most recent result		Control Limit
			April 2024	September 2024	
Water Table					
MW-5	Ammonia	mg/L	ND	ND	0.53
	Boron	mg/L	ND	ND	0.139
	Chemical Oxygen Demand	mg/L	ND	8.94	32.31
	Chloride	mg/L	3.26	3.74	62.25
	Fluoride	mg/L	0.383	0.464	0.6
	Iron	mg/L	ND	ND	0.14
	Lithium	mg/L	0.0259	0.02	0.06
	Manganese	mg/L	0.0124	0.0355	0.051
	Sodium	mg/L	42.4	43.6	100.5
	Strontium	mg/L	0.315	0.302	0.62
	Sulfate	mg/L	31.5	35.4	60.56
	Total Organic Halogens	mg/L	NA	ND	0.18
Total Phenols	mg/L	NA	ND	0.0253	
MW-6	Ammonia	mg/L	ND	ND	0.53
	Boron	mg/L	ND	ND	0.0139
	Chemical Oxygen Demand	mg/L	ND	7.4	32.31
	Chloride	mg/L	12.8	13.1	62.25
	Fluoride	mg/L	0.258	0.336	0.6
	Iron	mg/L	ND	ND	0.14
	Lithium	mg/L	ND	ND	0.06
	Sodium	mg/L	47.1	47.6	100.05
	Strontium	mg/L	0.38	0.351	0.62
	Sulfate	mg/L	9.59	12.9	60.56
	Total Organic Halogens	mg/L	NA	0.1	0.18
	Total Phenols	mg/L	NA	0.00477	0.0253
MW-25	Ammonia	mg/L	ND	ND	0.53
	Chemical Oxygen Demand	mg/L	14.8	13.5	32.31
	Chloride	mg/L	15.3	37.1	62.25
	Iron	mg/L	ND	ND	0.14
	Lithium	mg/L	0.0181	0.0369	0.06
	Manganese	mg/L	0.0183	-	0.051
	Sodium	mg/L	26.2	63.6	64
	Strontium	mg/L	0.387	0.507	0.62
	Sulfate	mg/L	47.4	59.2	60.56
	Total Organic Halogens	mg/L	NA	0.0559	0.18
	Total Phenols	mg/L	NA	ND	0.0253
	Uppermost Aquifer				
MW-7	Chemical Oxygen Demand	mg/L	ND	18.1	36.5
	Chloride	mg/L	1.2	1.44	5.62
	Fluoride	mg/L	0.275	0.331	0.51
	Lithium	mg/L	-	0.0734	0.0798
	Manganese	mg/L	0.114	-	0.35
	Sodium	mg/L	63.2	61.8	64
	Total Organic Halogens	mg/L	NA	0.0601	0.063
	Total Phenols	mg/L	NA	ND	0.0255
MW-26	Chloride	mg/L	2.7	2.88	5.62
	Fluoride	mg/L	0.158	0.209	0.51
	Lithium	mg/L	0.030	ND	0.0798
	Total Organic Halogens	mg/L	NA	0.027	0.063
	Total Phenols	mg/L	NA	ND	0.0255
MW-27	Total Phenols	mg/L	NA	ND	0.0255
	Chloride	mg/L	1.58	1.79	5.62
	Fluoride	mg/L	0.259	0.322	0.51
	Lithium	mg/L	0.0516	0.0438	0.0798
	Manganese	mg/L	0.146	0.141	0.35
	Sodium	mg/L	44.8	41.9	64
	Chemical Oxygen Demand	mg/L	7.36	7.11	36.5
	Total Organic Halogens	mg/L	NA	0.0525	0.063
Total Phenols	mg/L	NA	ND	0.0255	
Surface Water					
SW-2	Total Phenols	mg/L	NA	ND	0.0267
	Ammonia	mg/L	0.89	0.097	5.07
	Boron	mg/L	0.283	ND	0.42
	Chemical Oxygen Demand	mg/L	6.73	18.7	40.07
	Fluoride	mg/L	0.348	0.599	1.18
	Iron	mg/L	ND	ND	3.02
	Lithium	mg/L	ND	ND	0.07
	Manganese	mg/L	0.135	0.0427	0.8
	Strontium	mg/L	0.193	0.103	0.27
	Sulfate	mg/L	40.5	53.5	62.82

Notes:

1. "-": Exceeds background limit
2. NA: Not Analyzed in Spring
3. ND: Non-detect
4. *Field parameters (temperature, conductivity, and pH) are not included in this table due to variations from weather or equipment.

TABLE 8
SUMMARY OF ONGOING AND NEWLY IDENTIFIED CONTROL LIMIT EXCEEDANCES
 2024 ANNUAL WATER QUALITY REPORT
 GRIFFIN WHEEL - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Well	Constituent	Units	Most recent result		Background Standard (Upper Control Limit)	Action Level/ Statewide Standard
			April 2024	August 2024		
Downgradient Water Table						
MW-5	Temperature (field)	deg. C	NE	25.33	22.32	NA
MW-6	Manganese	mg/L	0.0712	0.185	0.051	0.3
	Temperature (field)	deg. C	23.3	NE	22.32	NA
MW-25	Boron	mg/L	0.155	0.243	0.139	6
	Fluoride	mg/L	4.54	1.95	0.6	4
	Manganese	mg/L	NE	0.102	0.051	0.3
Downgradient Uppermost Aquifer						
MW-7	Ammonia	mg/L	0.67	1	0.53	30
	Boron	mg/L	0.222	0.254	0.11	6
	Conductivity (Field)	mS/cm	2.72	2.59	1.3	NA
	Lithium	mg/L	0.0808	NE	0.0798	0.014
	Iron	mg/L	NE	9.6	0.44	0.3
	Manganese	mg/L	NE	1.78	0.35	0.3
	Strontium	mg/L	1.8	1.73	0.6	4
	Sulfate	mg/L	1300	1430	92.89	250
	Temperature (field)	deg. C	23.69	26.76	22.08	NA
MW-26	Ammonia	mg/L	1.11	1.11	0.53	30
	Boron	mg/L	0.202	0.222	0.254	6
	Conductivity (field)	mS/cm	2.97	2.9	1.3	NA
	Iron	mg/L	1.99	1.77	0.44	0.3
	Manganese	mg/L	3.02	2.54	0.35	0.3
	Sodium	mg/L	86.1	77.6	64	20
	Strontium	mg/L	1.94	1.73	0.6	4
	Sulfate	mg/L	1480	1520	92.89	250
MW-27	Ammonia	mg/L	1.36	1.34	0.53	30
	Boron	mg/L	0.163	0.177	0.11	6
	Iron	mg/L	2.38	2.52	0.44	0.3
	Strontium	mg/L	0.8	0.695	0.6	4
	Sulfate	mg/L	249	269	92.89	250
	Temperature (field)	deg. C	22.31	NE	22.08	NA
SW-2	Chloride	mg/L	34.5	44.2	29.13	250
	Conductivity (field)	mS/cm	NE	0.71	0.67	NA
	Total Organic Halogens	mg/L	NA	0.154	0.07	NA
	pH (field)	pH Units	8.21	NE	7.94/6.58	6.5/8.5
	Sodium	mg/L	31.6	25.4	25.32	20

Notes:

1. NE: No Exceedance
2. NA: Not Applicable, only analyzed in Fall
3. Red text indicates exceedance of action level/statewide standard.

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level Source	MW-05 04/18/2018 N WATER TABLE	MW-05 10/10/2018 N WATER TABLE	MW-05 04/13/2019 N WATER TABLE	MW-05 10/01/2019 N WATER TABLE	MW-05 04/09/2020 N WATER TABLE	MW-05 10/01/2020 N WATER TABLE	MW-05 04/14/2021 N WATER TABLE	MW-05 10/13/2021 N WATER TABLE	MW-05 04/20/2022 N WATER TABLE	MW-05 09/28/2022 N WATER TABLE	MW-05 11/01/2022 N WATER TABLE	MW-05 04/19/2023 N WATER TABLE	MW-05 08/24/2023 N WATER TABLE	
Field Parameters															
Temperature (Deg C)	-	-	8.47	15.76	10.37	18.81	10.79	15.83	13.56	17.12	9.12	15.57	12.50	13.41	20.68
Conductivity, Field (mS/cm)	-	-	0.673	0.778	0.735	0.741	0.757	1.15	0.707	0.579	0.781	0.886	0.711	0.693	0.772
pH, Field (pH units)	6.5-8.5	SDWR	6.48	6.36	6.66	6.90	6.79	6.36	5.19	6.81	3.68	6.47	7.26	6.98	6.66
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	ND (0.05)	ND (0.05)	ND (0.05)	0.0247 J	ND (0.1)	0.0238 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	-	ND (0.1)	ND (0.1)
Iron, Dissolved	0.3	SDWR	ND (0.025)	ND (0.025)	0.0463 R	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.052 J	ND (0.1)	-	ND (0.1)	0.104
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium, Total	0.014	IDNR AL	0.0301 J	0.0662	0.0255 J	0.0251 J	0.0182 J	0.0249 J	0.0175 J	0.0217 J	ND (0.05)	0.0216 J	-	0.0255 J	0.0221 J
Manganese, Total	0.3	HAL	0.0145	ND (0.08)	0.00777 J+	0.00788	0.0901	0.0648	0.0337	0.0449	0.0245	0.171	-	ND (0.005)	0.0196
Sodium, Total	20	HAL	42.9	57.1	26.9 J+	41.2	42.7	41.9	40.8	42.2	44.3	42.6	-	42.9	43.4
Strontium, Stable, Total	4	HAL	0.291 J-	0.282	0.292	0.288	0.31	0.265	0.267	0.251	0.295	0.276	-	0.3	0.296
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	0.0851 J	ND (0.1) J	ND (0.127)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2) J	ND (0.5)	-	ND (0.2)	ND (0.2)
Chemical Oxygen Demand (COD)	-	-	ND (20)	ND (20)	6.97 J	ND (10)	7.2 J	ND (25)	ND (10)	ND (25)	ND (10)	ND (25)	-	ND (10) J	ND (10)
Chloride	250	SDWR	3.98	4.26	3.96	4.11	3.79	3.93	3.85	4.03	3.76	3.71	-	3.62	3.69
Fluoride	4	MCL	0.409	0.443	0.435	0.508	0.462	0.502	0.463	0.517	0.456	0.461	-	0.446	0.471
Sulfate	250	SDWR	36.4	38.7	40.4	41	38.5	39	35.7	38.5	30.3	33.2	-	36.1	33.9
Total Organic Halogens	-	-	-	0.0161 J	-	0.042	-	0.0533	-	0.0445	-	-	-	-	ND (0.04)
Total Phenols	2	IDNR AL	-	ND (0.01)	-	ND (0.0196)	-	ND (0.0188)	-	ND (0.0184)	-	-	ND (0.02)	-	ND (0.01)

- Notes:**
- Results in **bold** were detected.
 - ND: Not detected above reporting limit
 J: Estimated result
 J+: Estimated result, biased high
 J-: Estimated result, biased low
 R: Rejected during validation
 - Results exceeding IDNR Action Levels are highlighted gray.
 - HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
 MCL: Maximum Contaminant Level (EPA, May 2009)
 SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
 IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
 - Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
 - Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level Source	MW-05 05/01/2024 N WATER TABLE	MW-05 09/11/2024 N WATER TABLE	MW-06 04/18/2018 N WATER TABLE	MW-06 10/10/2018 N WATER TABLE	MW-06 04/14/2019 N WATER TABLE	MW-06 10/02/2019 N WATER TABLE	MW-06 04/08/2020 N WATER TABLE	MW-06 09/30/2020 N WATER TABLE	MW-06 04/13/2021 N WATER TABLE	MW-06 10/14/2021 N WATER TABLE	MW-06 04/20/2022 N WATER TABLE	MW-06 09/27/2022 N WATER TABLE	MW-06 04/18/2023 N WATER TABLE	
Field Parameters															
Temperature (Deg C)	-	20.24	25.33	6.96	15.97	8.84	17.78	13.59	17.46	12.22	18.03	8.47	20.16	13.13	
Conductivity, Field (mS/cm)	-	0.618	0.671	0.704	0.836	0.776	0.803	0.75	1.28	0.732	0.759	0.739	0.682	0.725	
pH, Field (pH units)	6.5-8.5 SDWR	6.93	7.19	5.56	6.93	6.96	7.00	7.15	7.17	6.13	6.20	7.92	5.28	7.39	
Inorganic Compounds (mg/L)															
Boron, Total	6 HAL	ND (0.1)	ND (0.1)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Dissolved	0.3 SDWR	ND (0.1)	ND (0.1)	0.0186 J	ND (0.025)	0.221 R	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Total ⁵	0.3 SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014 IDNR AL	0.0259 J	0.02 J	0.0192 J	ND (0.05)	0.0196 J	0.0143 J	0.0104 J	0.013 J	0.00696 J	0.00978 J	ND (0.05)	0.0122 J	ND (0.05)	
Manganese, Total	0.3 HAL	0.0124	0.0355	0.124	0.549	0.0786	0.2	0.0909	0.436	0.0557	0.703	0.0729	0.253	0.0149	
Sodium, Total	20 HAL	42.4	43.6 J-	38.5	61.5	43.5 J+	41.5	42.2	44.8	41.4	45.9	39.9	43.2	42.5	
Strontium, Stable, Total	4 HAL	0.315	0.302	0.349 J-	0.365	0.362	0.393	0.394	0.355	0.328	0.355	0.33	0.357	0.377	
Other (mg/L)															
Ammonia (as N)	30 IDNR AL	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.1) J	ND (0.1)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2) J	ND (0.5)	ND (0.2)	
Chemical Oxygen Demand (COD)	-	ND (10)	8.94 J	5.09 J+	ND (20)	8.65 J	ND (10)	7.71 J	52.3 J+	ND (10)	42.8	ND (10)	ND (25)	ND (10) J	
Chloride	250 SDWR	3.26	3.74	13.6	14.1	14	14.4	13.1	14.5	13.9	11.1	13.1	12.2	13.9	
Fluoride	4 MCL	0.383	0.464	0.327	0.312	0.343	0.354	0.267	0.351	0.346	0.422	0.379	0.349	0.344	
Sulfate	250 SDWR	31.5	35.4	12.7	10.5	13	14.8	12.2	13.7	13.2	8.35	12.3	11	15.7	
Total Organic Halogens	-	-	0.143	-	0.036	-	0.0524 J	-	0.0528	-	0.0339 J	-	-	-	
Total Phenols	2 IDNR AL	-	ND (0.01)	-	ND (0.01)	-	ND (0.02)	-	ND (0.0204)	-	ND (0.0184)	-	ND (0.02)	-	

Notes:

- Results in **bold** were detected.
- ND: Not detected above reporting limit
 J: Estimated result
 J+: Estimated result, biased high
 J-: Estimated result, biased low
 R: Rejected during validation
- Results exceeding IDNR Action Levels are highlighted gray.
- HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
 MCL: Maximum Contaminant Level (EPA, May 2009)
 SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
 IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
- Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
- Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level Source	MW-06 08/23/2023 N WATER TABLE	MW-06 05/01/2024 N WATER TABLE	MW-06 09/12/2024 N WATER TABLE	MW-07 04/18/2018 N UPPER AQUIFER	MW-07 10/10/2018 N UPPER AQUIFER	MW-07 04/14/2019 N UPPER AQUIFER	MW-07 10/02/2019 N UPPER AQUIFER	MW-07 04/08/2020 N UPPER AQUIFER	MW-07 09/30/2020 N UPPER AQUIFER	MW-07 09/30/2020 FD UPPER AQUIFER	MW-07 04/13/2021 N UPPER AQUIFER	MW-07 04/13/2021 FD UPPER AQUIFER	MW-07 10/14/2021 N UPPER AQUIFER	
Field Parameters															
Temperature (Deg C)	-	28.77	23.3	17.44	8.40	15.40	10.06	18.12	12.52	15.55	-	12.66	-	15.14	
Conductivity, Field (mS/cm)	-	0.774	0.698	0.706	2.337	2.613	2.559	2.542	2.51	4.21	-	2.4	-	2.328	
pH, Field (pH units)	6.5-8.5 SDWR	7.25	6.89	7.36	6.52	5.06	6.74	6.80	6.81	7.17	-	6.24	-	6.53	
Inorganic Compounds (mg/L)															
Boron, Total	6 HAL	ND (0.1)	ND (0.1)	ND (0.1)	0.18	0.108	0.181	0.244	0.243	0.228	0.234	0.204	0.21	0.192	
Iron, Dissolved	0.3 SDWR	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.025)	0.297	0.213 R	0.204	7.93	0.801 J	0.223 J	8.8	8.84	9.64	
Iron, Total ⁵	0.3 SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014 IDNR AL	ND (0.05)	ND (0.05)	ND (0.05)	0.0872	0.116	0.0916	0.0776	0.0696	0.0784	0.0773	0.0671	0.0676	0.073	
Manganese, Total	0.3 HAL	0.575	0.0712	0.185	0.0844	2.33	0.0783	1.76	1.28	1.49	1.46	1.3	1.27	1.49	
Sodium, Total	20 HAL	44.7	47.1	47.6	64.4	79.1	69.4 J+	57.7	63.4	58.3	59.3	60.9	62.3	60.2	
Strontium, Stable, Total	4 HAL	0.386	0.38	0.351	1.85 J-	1.82	1.83	1.83	1.93	1.67	1.68	1.57	1.64	1.74	
Other (mg/L)															
Ammonia (as N)	30 IDNR AL	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	0.809 J	0.165 J+	1.07 J+	0.492	0.992	0.958	0.994	0.904	0.934	
Chemical Oxygen Demand (COD)	-	4.65 J	ND (10)	7.4 J	ND (20)	7.19 J	ND (10)	48.3	43.9 J+	27.2 J+	8.65 J	ND (10)	37.4		
Chloride	250 SDWR	13.4	12.8	13.1	1.37	1.49	1.48	1.38	1.38	1.46	1.41	1.44	1.41	1.47	
Fluoride	4 MCL	0.318	0.258	0.336	0.312	0.302	0.3	0.345	0.322	0.338	0.338	0.347	0.344	0.329	
Sulfate	250 SDWR	9.62	9.59	12.9	1250	1220	1250	1240	1320	1240	1270	1370	1390	1440	
Total Organic Halogens	-	0.0643	-	0.1	-	ND (0.03)	-	ND (0.01)	-	0.0779 J	0.0333 J	-	-	ND (0.04)	
Total Phenols	2 IDNR AL	ND (0.01)	-	0.00477 J	-	ND (0.01)	-	ND (0.0204)	-	ND (0.02)	ND (0.0204)	-	-	ND (0.0184)	

Notes:

- Results in **bold** were detected.
- ND: Not detected above reporting limit
 J: Estimated result
 J+: Estimated result, biased high
 J-: Estimated result, biased low
 R: Rejected during validation
- Results exceeding IDNR Action Levels are highlighted gray.
- HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
 MCL: Maximum Contaminant Level (EPA, May 2009)
 SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
 IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
- Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
- Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-07 04/20/2022 N UPPER AQUIFER	MW-07 09/27/2022 N UPPER AQUIFER	MW-07 04/18/2023 N UPPER AQUIFER	MW-07 08/23/2023 N UPPER AQUIFER	MW-07 05/01/2024 N UPPER AQUIFER	MW-07 09/11/2024 N UPPER AQUIFER	MW-12 04/17/2018 N WATER TABLE	MW-12 10/09/2018 N WATER TABLE	MW-12 04/14/2019 N WATER TABLE	MW-12 10/02/2019 N WATER TABLE	MW-12 04/08/2020 N WATER TABLE	MW-12 10/01/2020 N WATER TABLE	MW-12 04/15/2021 N WATER TABLE	
Field Parameters																
Temperature (Deg C)	-	-	10.46	15.19	15.4	28.99	23.69	26.76	10.60	15.86	7.72	17.42	12.10	15.15	10.52	
Conductivity, Field (mS/cm)	-	-	2.59	1.97	2.42	2.48	2.72	2.59	0.903	0.943	0.945	0.964	0.948	1.51	0.931	
pH, Field (pH units)	6.5-8.5	SDWR	7.33	5.08	7.23	7.15	6.89	7.15	6.46	6.84	6.55	6.75	6.76	6.07	6.54	
Inorganic Compounds (mg/L)																
Boron, Total	6	HAL	0.277	0.244	0.317	0.248	0.222	0.254	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Dissolved	0.3	SDWR	8.68	9.63	2.42	2.51	0.0522 J	9.6	0.0121 J	ND (0.025)	0.0629 R	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014	IDNR AL	0.0829	0.077	0.0573	0.0711	0.0808	0.0734	0.0193 J	ND (0.05)	0.0175 J	ND (0.05)	ND (0.05)	0.0128 J	0.00796 J	
Manganese, Total	0.3	HAL	1.46	1.58	0.0543	1.41	0.114	1.78	0.00344 J	ND (0.08)	ND (0.004)	ND (0.005)	0.00282 J	0.00643	ND (0.005)	
Sodium, Total	20	HAL	65.8	62.1	59.1	59.4	63.2	61.8 J-	34.2	34.6	34.9 J+	24.9	34.4	28.4	31.1	
Strontium, Stable, Total	4	HAL	1.79	1.78	1.81	1.8	1.8	1.73	0.513 J-	0.535	0.494	0.594	0.562	0.542	0.443	
Other (mg/L)																
Ammonia (as N)	30	IDNR AL	0.979 J	0.918	ND (0.2)	0.703	0.67	1	ND (0.1)	ND (0.1) J	ND (0.139)	ND (0.2)	ND (0.2)	ND (0.5)	0.147 J	
Chemical Oxygen Demand (COD)	-	-	ND (10)	ND (25)	ND (10) J	5.62 J	ND (10)	18.1	ND (20)	5.25 J	7.52 J	8.59 J	11.3	25.5 J+	ND (10)	
Chloride	250	SDWR	1.41	1.37	1.51 J+	1.34	1.2	1.44	5.26	6.92	5.77	5.58	6.08	6.31	6.73	
Fluoride	4	MCL	0.324	0.288	0.309	0.331	0.275	0.331	0.263	0.341	0.282	0.35	0.293	0.331	0.315	
Sulfate	250	SDWR	1340	1320	1330	1350	1300	1430	46.6	47.8	48.2	38.9	44	40.7	46.4	
Total Organic Halogens	-	-	-	-	-	ND (0.04)	-	0.0601	-	0.0231 J	-	0.021 J	-	0.0529	-	
Total Phenols	2	IDNR AL	-	ND (0.02)	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	ND (0.0196)	-	ND (0.0204)	-	

Notes:

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TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level Source	MW-12 10/14/2021 N WATER TABLE	MW-12 04/19/2022 N WATER TABLE	MW-12 09/28/2022 N WATER TABLE	MW-12 04/18/2023 N WATER TABLE	MW-12 08/24/2023 N WATER TABLE	MW-12 05/01/2024 N WATER TABLE	MW-12 05/01/2024 FD WATER TABLE	MW-12 09/12/2024 N WATER TABLE	MW-16 04/17/2018 N UPPER AQUIFER	MW-16 10/09/2018 N UPPER AQUIFER	MW-16 04/14/2019 N UPPER AQUIFER	MW-16 10/02/2019 N UPPER AQUIFER	MW-16 04/09/2020 N UPPER AQUIFER	
Field Parameters															
Temperature (Deg C)	-	-	10.78	15.68	14.33	20.95	14.64	-	18.66	7.99	13.71	9.80	16.81	10.59	
Conductivity, Field (mS/cm)	-	-	0.958	0.975	0.744	0.867	0.77	-	0.815	0.923	1.008	0.907	0.984	0.93	
pH, Field (pH units)	6.5-8.5	SDWR	-	5.56	6.32	7.22	6.71	-	7.10	6.42	6.23	6.72	6.87	6.90	
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Dissolved	0.3	SDWR	0.051 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014	IDNR AL	0.0102 J	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	
Manganese, Total	0.3	HAL	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Sodium, Total	20	HAL	27.4	32	24.3	30.8	23.9	28.2	29.1	25.5	47.2	64.7	53.1 J+	44.8	
Strontium, Stable, Total	4	HAL	0.557	0.474	0.492	0.49	0.513	0.502	0.499	0.502	0.523 J-	0.496	0.485	0.489	
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	ND (0.5)	ND (0.2) J	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.1) J	0.135	ND (0.2)	
Chemical Oxygen Demand (COD)	-	-	ND (25)	9 J	ND (25)	ND (10) J	ND (10)	ND (10)	ND (10)	ND (10)	4.03 J+	ND (20)	6.31 J	ND (10)	
Chloride	250	SDWR	7.4	6.65	7.94	8.24	9.04	9.69	9.54	11	2.98	3.39	4.3	3.45	
Fluoride	4	MCL	0.392	0.325	0.353	0.324	0.358	0.297	0.29	0.37	0.4	0.412	0.437	0.461	
Sulfate	250	SDWR	38.4	43.3	35.1	45.6	37	42.4	41.7	51.8	67.1	62.6	63	69.8	
Total Organic Halogens	-	-	0.0513	-	-	-	0.099	-	-	0.116	-	ND (0.03)	-	ND (0.01) J	
Total Phenols	2	IDNR AL	ND (0.02)	-	ND (0.02)	-	ND (0.01)	-	-	ND (0.01)	-	ND (0.01)	-	ND (0.02)	

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Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-16 10/01/2020 N UPPER AQUIFER	MW-16 04/15/2021 N UPPER AQUIFER	MW-16 10/14/2021 N UPPER AQUIFER	MW-16 04/19/2022 N UPPER AQUIFER	MW-16 09/28/2022 N UPPER AQUIFER	MW-16 04/18/2023 N UPPER AQUIFER	MW-16 08/24/2023 N UPPER AQUIFER	MW-16 05/02/2024 N UPPER AQUIFER	MW-16 09/12/2024 N UPPER AQUIFER	MW-20 04/17/2018 N WATER TABLE	MW-20 10/10/2018 N WATER TABLE	MW-20 04/14/2019 N WATER TABLE	MW-20 10/02/2019 N WATER TABLE	
Field Parameters																
Temperature (Deg C)	-	-	13.72	11.88	17.32	12.56	15.28	14.65	21.28	12.56	20.25	11.62	13.77	9.47	16.93	
Conductivity, Field (mS/cm)	-	-	1.55	0.947	0.928	0.992	1.13	0.819	0.963	0.861	0.867	0.806	0.924	0.927	0.91	
pH, Field (pH units)	6.5-8.5	SDWR	6.31	6.84	6.73	5.83	6.52	7.35	6.82	7.09	7.46	6.48	9.21	6.80	7.07	
Inorganic Compounds (mg/L)																
Boron, Total	6	HAL	0.079 J	0.066 J	0.0658 J	0.0785 J	0.0799 J	0.0764 J	0.0769 J	0.0663 J	0.0755 J	0.0201 J	ND (0.05)	ND (0.05)	0.0305 J	
Iron, Dissolved	0.3	SDWR	ND (0.1)	0.137	0.216	0.175	0.113	0.819	0.204	0.0938 J	0.1	0.0254	ND (0.025)	0.025 R	ND (0.1)	
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014	IDNR AL	0.0618	0.0512	0.063	0.0684 J+	0.058	0.0498 J	0.0556	0.0626	0.0515	0.0336 J	0.0566	0.0316 J	0.0295 J	
Manganese, Total	0.3	HAL	0.0742	0.0755	0.0735	0.126	0.181	0.0595	0.11	0.117	0.0616	ND (0.004)	ND (0.08)	ND (0.004)	ND (0.005)	
Sodium, Total	20	HAL	45.1	47.6	49.3	50.9	46.8	51.6	47.7	48	42.6	67.7	97.8	86.9 J+	67.6	
Strontium, Stable, Total	4	HAL	0.451	0.44	0.513	0.488	0.484	0.525	0.497	0.494	0.425	0.329 J-	0.338	0.336	0.354	
Other (mg/L)																
Ammonia (as N)	30	IDNR AL	ND (0.5)	ND (0.2)	ND (0.5)	ND (0.2) J	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.1)	ND (0.1) J	0.12	ND (0.2)	
Chemical Oxygen Demand (COD)	-	-	48.9 J+	ND (10)	25 J	ND (10)	ND (25)	ND (10) J	ND (10)	ND (10)	14.5	ND (20)	ND (20)	8.15 J	ND (10)	
Chloride	250	SDWR	3.65	4.37	3.94	4.34	3.36	4.44	4.22	4.36	4.13	27.9	34.1	29.7	40.5	
Fluoride	4	MCL	0.47	0.469	0.493	0.481	0.436	0.463	0.464	0.394	0.461	0.45	0.455	0.479	0.532	
Sulfate	250	SDWR	69.8	65.7	71.9	66.8	70.3	72.4	70	68.4	72.2	41.3	30.9	61.3	40	
Total Organic Halogens	-	-	0.0185 J	-	0.0269 J	-	-	-	ND (0.04)	-	0.0607	-	0.0158 J	-	0.0678 J	
Total Phenols	2	IDNR AL	ND (0.0196)	-	ND (0.0188)	-	ND (0.02)	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	ND (0.018)	

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Location Sample Date Sample Type Unit	IDNR Action Level Source	MW-20 04/09/2020 N WATER TABLE	MW-20 10/02/2020 N WATER TABLE	MW-20 04/15/2021 N WATER TABLE	MW-20 10/12/2021 N WATER TABLE	MW-20 10/12/2021 FD WATER TABLE	MW-20 04/20/2022 N WATER TABLE	MW-20 09/28/2022 N WATER TABLE	MW-20 04/19/2023 N WATER TABLE	MW-20 08/23/2023 N WATER TABLE	MW-20 08/23/2023 FD WATER TABLE	MW-20 04/30/2024 N WATER TABLE	MW-20 09/11/2024 N WATER TABLE	MW-20 09/11/2024 FD WATER TABLE	
Field Parameters															
Temperature (Deg C)	-	12.26	13.83	12.95	14.99	-	11.02	15.15	13.71	26.75	-	16.12	19.39	-	
Conductivity, Field (mS/cm)	-	0.939	1.41	0.895	0.672	-	0.889	1.04	0.802	0.802	-	0.806	0.849	-	
pH, Field (pH units)	6.5-8.5 SDWR	6.94	6.56	6.72	6.98	-	7.43	6.59	7.25	7.40	-	6.92	7.34	-	
Inorganic Compounds (mg/L)															
Boron, Total	6 HAL	ND (0.1)	0.0308 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Dissolved	0.3 SDWR	0.0705 J	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Iron, Total ⁵	0.3 SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014 IDNR AL	0.0291 J	0.0308 J	0.0195 J	0.0251 J	0.0252 J	ND (0.05)	0.0291 J	0.0293 J	0.0287 J	0.0296 J	0.0253 J	0.0253 J	0.0306 J	
Manganese, Total	0.3 HAL	0.00268 J	ND (0.005)	0.005	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Sodium, Total	20 HAL	82.6	66.2	73.7	66.9	65.6	77.4	71	76.2	66.7	69.2	77.1	67 J-	72 J-	
Strontium, Stable, Total	4 HAL	0.376	0.315	0.302	0.299	0.283	0.324	0.345	0.349	0.367	0.365	0.345	0.339	0.373	
Other (mg/L)															
Ammonia (as N)	30 IDNR AL	ND (0.2)	ND (0.5)	0.102 J	ND (0.5)	ND (0.5)	ND (0.2) J	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	
Chemical Oxygen Demand (COD)	-	9.25 J	38.9 J+	ND (10)	33.8	ND (25)	7.5 J	ND (25)	5.42 J	5.62 J	2.38 J	ND (10)	12.3	14.1	
Chloride	250 SDWR	34.3	43.7	42.9	45.5	45.4	40	44.9	46.7	48.3	48.1	53.5	58.3	58.1	
Fluoride	4 MCL	0.526	0.524	0.514	0.565	0.564	0.523	0.49	0.499	0.503	0.498	0.443	0.503	0.497	
Sulfate	250 SDWR	63.7	27.8	39.8	26.9	27.2	48.7	24.6	40	23.3	23.4	38.1	25.1	25.2	
Total Organic Halogens	-	-	0.0508	-	0.0588	0.0599	-	-	-	0.0183 J	0.0193 J	-	0.246 J	0.133 J	
Total Phenols	2 IDNR AL	-	ND (0.0196)	-	ND (0.0184)	ND (0.0192)	-	ND (0.02)	-	ND (0.01)	ND (0.01) J	-	ND (0.01)	ND (0.01)	

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Field Parameters															
Temperature (Deg C)	-	-	10.41	12.59	11.73	16.01	17.78	-	16.04	11.72	17.89	8.95	16.30	17.04	22.32
Conductivity, Field (mS/cm)	-	-	1.01	1.056	0.9	0.996	0.75	-	1.32	0.816	0.695	0.963	1.04	0.841	0.841
pH, Field (pH units)	6.5-8.5	SDWR	6.20	9.25	6.63	6.87	6.97	-	6.77	5.38	6.66	4.40	6.39	6.97	7.51
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	0.11	0.044 J	0.0567	0.0627 J	0.0375 J	0.0395 J	0.0622 J	0.051 J	ND (0.1)	0.0691 J	ND (0.1)	0.0919 J	0.0652 J
Iron, Dissolved	0.3	SDWR	ND (0.025)	0.0356	0.025 R	ND (0.1)	0.186	0.219	ND (0.1)	0.219	0.0768 J	0.246	ND (0.1)	0.0792 J	ND (0.1)
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium, Total	0.014	IDNR AL	0.0507	0.066	0.0442 J	0.0381 J	0.0409 J	0.0387 J	0.0362 J	0.0328 J	0.0401 J	ND (0.05)	0.035 J	0.0346 J	0.0352 J
Manganese, Total	0.3	HAL	0.553	0.0695 J	0.0676	0.0475	0.0436	0.0459	0.0486	0.0512	0.0217	0.079	0.0444	0.161	0.0216
Sodium, Total	20	HAL	63.9	63.2	62 J+	54.2	54.8	54.8	50.1	51.4	54.5	57.2	51.1	58	52.7
Strontium, Stable, Total	4	HAL	0.719 J-	0.449	0.463	0.441	0.477	0.494	0.41	0.406	0.44	0.464	0.421	0.556	0.458
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	0.267	ND (0.1) J	0.173	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)	ND (0.5)	0.0881 J	ND (0.5)	0.11 J	ND (0.2)
Chemical Oxygen Demand (COD)	-	-	ND (20)	ND (20)	ND (20)	ND (10)	6.68 J	11.3	36.3 J+	6.11 J	26.6	ND (10)	ND (25)	2.27 J	3.03 J
Chloride	250	SDWR	1.4	1.53	1.58	1.86	2.05	2.04	2.2	2.57	2.86	2.98	3.16	2.88	4.18
Fluoride	4	MCL	0.36	0.34	0.355	0.393	0.372	0.382	0.393	0.372	0.387	0.392	0.335	0.427	0.297
Sulfate	250	SDWR	45.9	31.9	20.7	29.1	19.7	20.3	23.5	18.5	19.7	18.2	17.9	32.3	14.9
Total Organic Halogens	-	-	-	ND (0.03)	-	ND (0.01)	-	-	0.0214 J	-	0.0348 J	-	-	-	ND (0.04)
Total Phenols	2	IDNR AL	-	ND (0.01)	-	ND (0.02)	-	-	ND (0.02)	-	ND (0.0192)	-	ND (0.02)	-	ND (0.01)

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TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-21 05/01/2024 N UPPER AQUIFER	MW-21 09/11/2024 N UPPER AQUIFER	MW-25 04/17/2018 N WATER TABLE	MW-25 04/17/2018 FD WATER TABLE	MW-25 10/09/2018 N WATER TABLE	MW-25 10/09/2018 FD WATER TABLE	MW-25 04/13/2019 N WATER TABLE	MW-25 04/13/2019 FD WATER TABLE	MW-25 10/01/2019 N WATER TABLE	MW-25 10/01/2019 FD WATER TABLE	MW-25 04/08/2020 N WATER TABLE	MW-25 10/01/2020 N WATER TABLE	MW-25 04/14/2021 N WATER TABLE
Field Parameters															
Temperature (Deg C)	-	-	15.35	18.6	11.28	-	16.38	-	9.79	-	18.34	-	14.27	15.86	10.75
Conductivity, Field (mS/cm)	-	-	0.769	0.784	1.036	-	1.156	-	0.929	-	1.037	-	0.96	1.8	0.749
pH, Field (pH units)	6.5-8.5	SDWR	6.72	7.20	5.79	-	7.90	-	6.59	-	6.97	-	6.97	6.32	5.36
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	ND (0.1)	ND (0.1)	0.134	0.143	0.167	0.17	0.163	ND (0.05)	0.234	0.235	0.188	0.278	0.165
Iron, Dissolved	0.3	SDWR	ND (0.1)	ND (0.1)	0.0161 J	ND (0.025)	ND (0.025)	ND (0.025)	0.972 R	1.01	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium, Total	0.014	IDNR AL	0.0389 J	0.0298 J	0.0427 J	0.039 J	0.0737	0.0657	0.0273 J	ND (0.05)	0.0442 J	0.0439 J	0.0358 J	0.0487 J	0.0134 J
Manganese, Total	0.3	HAL	0.0366	0.0215	0.012 J	0.0346 J	0.277 J	0.0556 J	0.0301	0.00171 J	0.0792	0.0585	0.0545	0.0241	0.0167
Sodium, Total	20	HAL	51.6	50 J-	51.7	51.5	85.4	94.1	42.3 J+	ND (1)	50	50.8	46.5	49.8	26.5
Strontium, Stable, Total	4	HAL	0.455	0.379	0.504 J-	0.52 J-	0.56	0.564	0.483	ND (0.05)	0.542	0.521	0.541	0.551	0.363
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	ND (0.2)	ND (0.2)	ND (0.1)	0.0604 J	ND (0.1) J	0.303 J	0.123	ND (0.1)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.5)	ND (0.2)
Chemical Oxygen Demand (COD)	-	-	ND (10)	17.5	4.17 J+	6.74 J+	ND (20)	ND (20)	6.5 J	ND (20)	5.63 J	ND (10)	12.3	ND (25)	10.7
Chloride	250	SDWR	4.77	5.62	12.5	12.8	14.5	14.8	6.5	ND (1)	10.4	10.4	11.6	18	9.36
Fluoride	4	MCL	0.313	0.351	2.53	2.44	1.77	1.73	2.53	ND (0.1)	2.01	1.99	2.01	2.09	3.8
Sulfate	250	SDWR	15.5	17.2	62.7	61.1	53.3	53	43.2	ND (1)	49.9	49.6	50	57.3	40.7
Total Organic Halogens	-	-	-	0.0346 J	-	-	0.0184 J	0.0166 J	-	-	0.0165	0.015	-	0.018 J	-
Total Phenols	2	IDNR AL	-	ND (0.01)	-	-	ND (0.01)	ND (0.01)	-	-	ND (0.018)	ND (0.02)	-	ND (0.018)	-

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Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-25 10/13/2021 N WATER TABLE	MW-25 04/19/2022 N WATER TABLE	MW-25 09/29/2022 N WATER TABLE	MW-25 04/19/2023 N WATER TABLE	MW-25 08/24/2023 N WATER TABLE	MW-25 04/29/2024 N WATER TABLE	MW-25 04/30/2024 N WATER TABLE	MW-25 09/10/2024 N WATER TABLE	MW-26 04/17/2018 N UPPER AQUIFER	MW-26 10/09/2018 N UPPER AQUIFER	MW-26 04/13/2019 N UPPER AQUIFER	MW-26 10/01/2019 N UPPER AQUIFER	MW-26 04/08/2020 N UPPER AQUIFER	
Field Parameters																
Temperature (Deg C)	-	-	17.05	11.50	14.68	14.4	22.86	15.54	15.57	21.56	13.75	15.12	11.89	18.05	14.50	
Conductivity, Field (mS/cm)	-	-	1.065	1.04	1.39	0.812	1.2	0.657	0.606	1.03	2.705	2.972	2.854	2.951	2.8	
pH, Field (pH units)	6.5-8.5	SDWR	6.79	7.13	6.07	7.22	6.82	7.01	7.04	7.20	6.29	7.70	6.55	6.71	6.63	
Inorganic Compounds (mg/L)																
Boron, Total	6	HAL	0.26	0.198	0.258	0.207	0.222	0.155	-	0.243	0.203	0.104	0.2	0.271	0.273	
Iron, Dissolved	0.3	SDWR	ND (0.1)	ND (0.1)	ND (0.1)	0.0711 J	ND (0.1)	-	ND (0.1)	ND (0.1)	0.0186 J	0.5	0.025 R	ND (0.1)	1.25	
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014	IDNR AL	0.0429 J	ND (0.05)	0.0427 J	0.037 J	0.044 J	0.0181 J	-	0.0369 J	0.0284 J	ND (0.05)	0.0325 J	0.0177 J	0.0143 J	
Manganese, Total	0.3	HAL	0.0297	0.0937	0.0223	0.00376 J	0.00912	0.0183	-	0.102	4	5.14	2.63	3.45	2.62	
Sodium, Total	20	HAL	53	61.9	59.5	49.8	61.1	26.2	-	63.6 J-	89.6	123	87 J+	82.5	85.7	
Strontium, Stable, Total	4	HAL	0.592	0.548	0.563	0.476	0.571	0.387	-	0.507	2.16 J-	2.03	1.92	2.1	2.18	
Other (mg/L)																
Ammonia (as N)	30	IDNR AL	ND (0.5)	ND (0.2) J	ND (0.5)	ND (0.2)	ND (0.2)	ND (0.2)	-	ND (0.2)	1.21	0.951 J	0.825	0.702 J+	0.921	
Chemical Oxygen Demand (COD)	-	-	35.6	ND (10)	ND (25)	5.42 J	ND (10)	14.8	-	13.5	5.4 J+	ND (20)	10.8 J	6.68 J	56	
Chloride	250	SDWR	22.5	28.1	31.5	22.1	34.4	15.3	-	37.1	2.87	3.06	2.87	3	2.91	
Fluoride	4	MCL	2.4	1.56	2.16	2.38	1.83	4.54	-	1.95	0.201	0.189	0.37	0.213	0.255	
Sulfate	250	SDWR	60.6	55.3	57.7	61.5	55.8	47.4	-	59.2	1390	1330	1420	1370	1430	
Total Organic Halogens	-	-	0.0444	-	-	-	0.0341 J	-	-	0.0559	-	ND (0.03)	-	ND (0.01) J	-	
Total Phenols	2	IDNR AL	ND (0.0196)	-	ND (0.02)	-	ND (0.01)	-	-	ND (0.01)	-	ND (0.01)	-	ND (0.0208)	-	

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Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-26 10/01/2020 N UPPER AQUIFER	MW-26 04/14/2021 N UPPER AQUIFER	MW-26 10/13/2021 N UPPER AQUIFER	MW-26 04/19/2022 N UPPER AQUIFER	MW-26 09/29/2022 N UPPER AQUIFER	MW-26 04/19/2023 N UPPER AQUIFER	MW-26 08/24/2023 N UPPER AQUIFER	MW-26 04/29/2024 N UPPER AQUIFER	MW-26 04/30/2024 N UPPER AQUIFER	MW-26 09/10/2024 N UPPER AQUIFER	MW-27 04/18/2018 N UPPER AQUIFER	MW-27 10/09/2018 N UPPER AQUIFER	MW-27 04/13/2019 N UPPER AQUIFER	
Field Parameters																
Temperature (Deg C)	-	-	15.41	14.15	16.94	11.70	13.56	15.15	23.42	16.5	18.82	20.98	10.28	15.38	11.98	
Conductivity, Field (mS/cm)	-	-	4.86	2.64	2.742	2.86	3.24	2.8	2.94	2.97	3.05	2.9	1.206	1.354	1.312	
pH, Field (pH units)	6.5-8.5	SDWR	6.21	4.99	6.41	7.04	5.92	6.89	6.55	6.65	6.70	7.02	6.45	7.61	6.55	
Inorganic Compounds (mg/L)																
Boron, Total	6	HAL	0.26	0.217	0.177	0.285	0.248	0.358	0.275	0.202	-	0.298	0.15	0.142	0.152	
Iron, Dissolved	0.3	SDWR	ND (0.1)	1.15	1.58	1.53	1.86	1.85	1.94	-	1.99	1.77	ND (0.025)	0.377	0.025 R	
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium, Total	0.014	IDNR AL	0.0287 J	0.012 J	0.0147 J	ND (0.05)	0.021 J	ND (0.05)	ND (0.05)	0.0301 J	-	ND (0.05)	0.0566	0.077	0.0584	
Manganese, Total	0.3	HAL	3.07	2.72	2.5	2.67	3.39	3.35	2.83	3.02	-	2.54	0.139	0.186	0.138	
Sodium, Total	20	HAL	81.1	81.5	74.7	81.3	81.3	86.7	83.1	86.1	-	77.6 J-	44.8	59.1	46.6 J+	
Strontium, Stable, Total	4	HAL	1.82	1.7	1.59	1.88	1.92	2.08	1.97	1.94	-	1.73	0.826 J-	0.787	0.826	
Other (mg/L)																
Ammonia (as N)	30	IDNR AL	1.18	0.818	0.93	1.03 J	1.32	1.26	1.19	1.11	-	1.11	1.49	1.52 J	1.54	
Chemical Oxygen Demand (COD)	-	-	37.2 J+	ND (10)	ND (25)	7.5 J	ND (25)	3.53 J	ND (10)	9.67 J	-	18.4	ND (20)	ND (20)	4.14 J	
Chloride	250	SDWR	2.9	2.94	3.04	3.04	2.8	2.84	2.85	2.7	-	2.88	1.56	1.81	1.61	
Fluoride	4	MCL	0.234	0.248	0.23	0.245	0.187	0.228	0.2	0.158	-	0.209	0.29	0.283	0.333	
Sulfate	250	SDWR	1410	1390	1600	1440	1450	1500	1500	1480	-	1520	263	263	266	
Total Organic Halogens	-	-	0.0724	-	0.0388 J	-	-	-	ND (0.04)	-	-	0.0272 J	-	0.0139 J	-	
Total Phenols	2	IDNR AL	ND (0.0184)	-	ND (0.0204)	-	ND (0.02)	-	ND (0.01)	-	-	ND (0.01)	-	ND (0.01)	-	

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Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-27 10/01/2019 N UPPER AQUIFER	MW-27 04/09/2020 N UPPER AQUIFER	MW-27 10/01/2020 N UPPER AQUIFER	MW-27 04/14/2021 N UPPER AQUIFER	MW-27 10/13/2021 N UPPER AQUIFER	MW-27 04/20/2022 N UPPER AQUIFER	MW-27 04/20/2022 FD UPPER AQUIFER	MW-27 09/28/2022 N UPPER AQUIFER	MW-27 09/28/2022 FD UPPER AQUIFER	MW-27 04/19/2023 N UPPER AQUIFER	MW-27 04/19/2023 FD UPPER AQUIFER	MW-27 08/24/2023 N UPPER AQUIFER	MW-27 05/01/2024 N UPPER AQUIFER
Field Parameters															
Temperature (Deg C)	-	-	16.39	11.73	14.31	13.26	15.20	11.21	-	13.82	-	14.05	-	19.37	22.31
Conductivity, Field (mS/cm)	-	-	1.299	1.3	2.11	1.24	0.951	1.32	-	1.46	-	1.18	-	1.33	1.05
pH, Field (pH units)	6.5-8.5	SDWR	6.81	6.55	6.28	5.24	6.66	3.62	-	6.38	-	6.98	-	6.59	6.81
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	0.172	0.152	0.177	0.144	0.117	0.153	0.159	0.168	0.159	0.183	0.183	0.165	0.163
Iron, Dissolved	0.3	SDWR	ND (0.1)	2.56	ND (0.1)	2.32	2.2	2.62	3.2	2.56	2.53	3.11	2.93	2.34	2.38
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium, Total	0.014	IDNR AL	0.0516	0.0466 J	0.0525	0.041 J	0.0391 J	ND (0.0556)	ND (0.0543)	0.0479 J	0.0411 J	0.0553	0.051	0.0447 J	0.0516
Manganese, Total	0.3	HAL	0.134	0.147	0.128	0.114	0.135	0.131	0.137	0.22	0.233	0.153	0.149	0.162	0.146
Sodium, Total	20	HAL	41.4	43.6	41.3	40.7	37.7	42.8	43.8	43.4	43.8	43.9	43.6	43.6	44.8
Strontium, Stable, Total	4	HAL	0.828	0.845	0.733	0.681	0.611	0.7	0.726	0.753	0.749	0.797	0.794	0.764	0.8
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	1.82	1.48	1.44	1.42	1.32	1.4 J	1.38 J	1.27	1.5	1.37	1.37	1.37	1.36
Chemical Oxygen Demand (COD)	-	-	ND (10)	7.2 J	30.5 J+	ND (10)	ND (25)	ND (10)	ND (10)	42.6	44.9	ND (10) J	ND (10) J	ND (10)	7.36 J
Chloride	250	SDWR	1.78	1.73	1.79	1.8	1.81	1.79	1.8	1.74	1.77	1.8	1.79	1.66	1.58
Fluoride	4	MCL	0.34	0.354	0.358	0.391	0.312	0.335	0.334	0.288	0.269	0.356	0.362	0.303	0.259
Sulfate	250	SDWR	268	264	275	264	270	275	262	261	261	257	260	254	249
Total Organic Halogens	-	-	ND (0.01) J	-	0.0175 J	-	ND (0.04)	-	-	-	-	-	-	0.0222 J	-
Total Phenols	2	IDNR AL	ND (0.0188)	-	ND (0.0184)	-	ND (0.0192)	-	-	ND (0.02)	ND (0.02)	-	-	ND (0.01)	-

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Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	MW-27 09/11/2024 N UPPER AQUIFER	SW-01 04/16/2018 N SURFACE WATER	SW-01 10/08/2018 N SURFACE WATER	SW-01 04/13/2019 N SURFACE WATER	SW-01 09/30/2019 N SURFACE WATER	SW-01 04/07/2020 N SURFACE WATER	SW-01 10/02/2020 N SURFACE WATER	SW-01 04/13/2021 N SURFACE WATER	SW-01 10/14/2021 N SURFACE WATER	SW-01 04/19/2022 N SURFACE WATER	SW-01 09/27/2022 N SURFACE WATER	SW-01 04/18/2023 N SURFACE WATER	SW-01 08/22/2023 N SURFACE WATER
Field Parameters															
Temperature (Deg C)	-	-	20.88	7.89	18.67	9.73	23.51	13.50	15.20	13.50	18.45	7.30	18.05	12.34	23.77
Conductivity, Field (mS/cm)	-	-	1.22	0.523	0.486	0.339	0.447	0.446	0.765	0.447	0.482	0.509	0.445	0.454	0.536
pH, Field (pH units)	6.5-8.5	SDWR	7.15	7.25	7.81	6.66	7.39	7.14	7.09	7.31	7.77	6.82	7.00	7.58	7.19
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	0.177	0.253	0.229	0.199	0.239	0.193	0.301	0.2	0.187	0.155	0.251	0.205	0.528
Iron, Dissolved	0.3	SDWR	2.52	0.21	0.379	1.35 J+	0.298	4.06	ND (0.1)	ND (0.1)	1.34	ND (0.1)	-	-	0.276
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	1.62	1.44	-
Lithium, Total	0.014	IDNR AL	0.0438 J	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Manganese, Total	0.3	HAL	0.141	0.375	0.184	0.51	0.275	0.817	0.533	0.254	0.245	0.34	0.572	0.497	0.71
Sodium, Total	20	HAL	41.9 J-	19.6	14.8 J	19.4	12.3	19.8	13.1	14.3	16.9	18.2	19.7	19.7	25.2
Strontium, Stable, Total	4	HAL	0.695	0.252	0.201	0.209	0.174	0.253	0.206	0.202	0.168	0.23	0.213	0.219	0.165
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	1.34	0.212	0.271 J	0.298 J+	2.78	0.281	0.483 J	0.17 J	ND (0.5)	0.147 J	0.399 J	0.212	7.68
Chemical Oxygen Demand (COD)	-	-	7.11 J	11.5 J	15.1 J	4.45 J	20.3	20.1	35.6 J+	14.3	42.8	11	ND (25)	2.58 J	5.07 J
Chloride	250	SDWR	1.79	13.7	7.22	18.5	10.8	14.5	8.78	10.7	18.6	13.3	21.8	15.1	26.1
Fluoride	4	MCL	0.322	0.636	0.374	0.988	0.569	0.944	1.14	0.742	0.842	0.566	0.901	0.82	0.887
Sulfate	250	SDWR	269	56.2	26.3	27	37	29.7	16.9	31.3	33.1	38	29.5	38.8	69.2
Total Organic Halogens	-	-	0.0525	-	ND (0.03)	-	0.0125 J	-	0.0385 J	-	0.0167 J	-	-	-	0.0208 J
Total Phenols	2	IDNR AL	ND (0.01)	-	ND (0.01)	-	ND (0.0204)	-	ND (0.0192)	-	ND (0.0196)	-	ND (0.02)	-	ND (0.01)

Notes:

- Results in **bold** were detected.
- ND: Not detected above reporting limit
J: Estimated result
J+: Estimated result, biased high
J-: Estimated result, biased low
R: Rejected during validation
- Results exceeding IDNR Action Levels are highlighted gray.
- HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
MCL: Maximum Contaminant Level (EPA, May 2009)
SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
- Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
- Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	SW-01 04/30/2024 N SURFACE WATER	SW-01 09/10/2024 N SURFACE WATER	SW-02 04/16/2018 N SURFACE WATER	SW-02 10/08/2018 N SURFACE WATER	SW-02 04/13/2019 N SURFACE WATER	SW-02 09/30/2019 N SURFACE WATER	SW-02 04/07/2020 N SURFACE WATER	SW-02 10/02/2020 N SURFACE WATER	SW-02 04/13/2021 N SURFACE WATER	SW-02 10/14/2021 N SURFACE WATER	SW-02 04/19/2022 N SURFACE WATER	SW-02 09/27/2022 N SURFACE WATER	SW-02 04/18/2023 N SURFACE WATER
Field Parameters															
Temperature (Deg C)	-	-	16.82	22	8.57	18.54	15.94	23.00	18.47	10.25	9.20	17.54	5.12	15.72	10.17
Conductivity, Field (mS/cm)	-	-	0.452	0.371	0.79	0.586	0.545	0.355	0.56	0.936	0.547	0.464	0.721	0.33	0.595
pH, Field (pH units)	6.5-8.5	SDWR	7.58	7.07	6.91	8.18	8.18	9.06	7.18	7.18	8.30	8.10	8.48	8.30	6.71
Inorganic Compounds (mg/L)															
Boron, Total	6	HAL	0.208	0.154	0.193	0.135	0.167	0.144	0.145	0.224	0.101	0.173	0.0828 J	0.127	0.116
Iron, Dissolved	0.3	SDWR	0.0828 J	ND (0.1)	0.0319	0.191	1.04 J+	ND (0.1)	1.14	0.0712 J	ND (0.1)	0.408	ND (0.1)	-	-
Iron, Total ⁵	0.3	SDWR	-	-	-	-	-	-	-	-	-	-	-	0.359	0.682
Lithium, Total	0.014	IDNR AL	ND (0.05)	ND (0.05)	0.0103 J	ND (0.05)	ND (0.05)	0.0103 J	ND (0.05)	0.00972 J	ND (0.05)	0.00794 J	ND (0.05)	ND (0.05)	ND (0.05)
Manganese, Total	0.3	HAL	0.308	0.228	0.506	0.188	0.35	0.091	0.417	0.292	0.0882	0.195	0.624	0.164	0.741
Sodium, Total	20	HAL	19.3	21 J-	71.2	40.6	47.9	24.4	41	35.6	33.9	33.7	44.1	36.4	39.3
Strontium, Stable, Total	4	HAL	0.233	0.138	0.254	0.237	0.258	0.169	0.217	0.203	0.13	0.177	0.255	0.156	0.251
Other (mg/L)															
Ammonia (as N)	30	IDNR AL	0.23	0.128 J	0.452	0.554 J	0.381 J+	0.323 J+	0.16 J	ND (0.5)	0.29	ND (0.5)	0.117 J	0.307 J	0.191 J
Chemical Oxygen Demand (COD)	-	-	ND (10)	19.6	14.4 J	14.1 J	16.2 J	11.8	36.5	47.3 J+	10.2	41	18	ND (25)	6.69 J
Chloride	250	SDWR	13.7	30.5	13.4 J+	31.8	61.7	27.7	50	47.2	42.1	46.4	60.5	47.6	48.4
Fluoride	4	MCL	0.57	0.823	0.505	0.326	0.507	0.382	0.806	0.484	0.332	0.404	0.371	0.416	0.494
Sulfate	250	SDWR	43.5	36.6	56.3	31.4	35.7	30.7	39.2	25.3	32	34.9	38.9	37.4	40
Total Organic Halogens	-	-	-	0.0657	-	0.0162 J	-	0.015	-	0.0669	-	0.0439	-	-	-
Total Phenols	2	IDNR AL	-	ND (0.01)	-	ND (0.01)	-	ND (0.0204)	-	ND (0.0188)	-	ND (0.018)	-	ND (0.02)	-

Notes:

- Results in **bold** were detected.
- ND: Not detected above reporting limit
 J: Estimated result
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 R: Rejected during validation
- Results exceeding IDNR Action Levels are highlighted gray.
- HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
 MCL: Maximum Contaminant Level (EPA, May 2009)
 SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
 IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
- Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
- Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

TABLE 9
SUMMARY OF ANALYTICAL RESULTS
 2024 ANNUAL GROUNDWATER MONITORING REPORT
 AMSTED - KEOKUK, IOWA
 PERMIT NO. 56-SDP-15-89-91C

Location Sample Date Sample Type Unit	IDNR Action Level	Action Level Source	SW-02 08/22/2023 N SURFACE WATER	SW-02 04/30/2024 N SURFACE WATER	SW-02 09/10/2024 N SURFACE WATER
Field Parameters					
Temperature (Deg C)	-	-	27.59	17.1	22.37
Conductivity, Field (mS/cm)	-	-	0.745	0.365	0.71
pH, Field (pH units)	6.5-8.5	SDWR	7.96	8.21	6.78
Inorganic Compounds (mg/L)					
Boron, Total	6	HAL	0.267	0.283	ND (0.1)
Iron, Dissolved	0.3	SDWR	ND (0.1)	ND (0.1)	ND (0.1)
Iron, Total ⁵	0.3	SDWR	-	-	-
Lithium, Total	0.014	IDNR AL	ND (0.05)	ND (0.05)	ND (0.05)
Manganese, Total	0.3	HAL	0.229	0.135	0.0427
Sodium, Total	20	HAL	35.2	31.6	25.4 J-
Strontium, Stable, Total	4	HAL	0.223	0.193	0.103
Other (mg/L)					
Ammonia (as N)	30	IDNR AL	0.134 J	0.89	0.097 J
Chemical Oxygen Demand (COD)	-	-	ND (10)	6.73 J	18.7
Chloride	250	SDWR	49.7	34.5	44.2
Fluoride	4	MCL	0.561	0.348	0.599
Sulfate	250	SDWR	30.6	40.5	53.5
Total Organic Halogens	-	-	0.0257 J	-	0.154
Total Phenols	2	IDNR AL	ND (0.01)	-	ND (0.01)

Notes:

1. Results in **bold** were detected.
2. ND: Not detected above reporting limit
 J: Estimated result
 J+: Estimated result, biased high
 J-: Estimated result, biased low
 R: Rejected during validation
3. Results exceeding IDNR Action Levels are highlighted gray.
4. HAL: Health Advisory Level (EPA 822-S-12-001; March 2018)
 MCL: Maximum Contaminant Level (EPA, May 2009)
 SDWR: Secondary Drinking Water Regulation (EPA 822-S-12-001; March 2018)
 IDNR AL: Statewide Standards for a Protected Groundwater Source (February 2017)
5. Surface water samples collected in September 2022/April 2023 were not lab filtered for iron analysis, results are reported as total.
6. Deg C = degrees Celsius; mg/L = milligrams per liter; mS/cm = milliSiemens per centimeter

Key: 1 = exceeds control limit; 2 = exceeds action level		S	F	S	F	S	F	S	F	S	F	S	F	S	F	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	
Well	Constituent	2018	2018	2019	2019	2020	2020	2021	2021	2022	2022	2023	2023	2024	2024	
MW-5	Manganese		1			1	1				1					
	Lithium	2	1&2	2	2	2	2	2	2		2	2	2	2	2	
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	Temperature														1	
	pH (Field)	2	2				2	1&2			1&2	2				
MW-6	Chemical Oxygen Demand						1		1							
	Conductivity (Field)						1									
	Lithium	2		2	2											
	Manganese	1&2	1	1&2	1&2	1	1	1	1	1	1		1	1	1	
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	Temperature													1	1	
MW-7	pH (Field)	1&2						2	2		1&2					
	Ammonia		1		1		1	1	1	1	1		1	1	1	
	Boron	1		1	1	1	1	1	1	1	1	1	1	1	1	
	Chemical Oxygen Demand					1	1		1							
	Conductivity (Field)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Temperature (Field)													1	1	1
	Iron					1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2		1&2
	Lithium	1&2	1&2	1&2	2	2	2	2	2	2	1&2	2	2	2	1&2	2
	Manganese		1&2		1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2		1&2		1&2
	pH (Field)		1&2									1&2				
	Sodium	2	1&2	1&2	2	2	2	2	2	2	1&2	2	2	2	2	2
	Strontium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Sulfate	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
Total Organic Halogens						1										
MW-12	Lithium	2		2												
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	pH (Field)	2					2			2	2					
MW-16	Lithium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	pH (Field)	2	2				2			2						
	Iron											2				
	Manganese	2														
MW-20	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	Lithium	2	2	2	2	2	2	2	2		2	2	2	2	2	
	pH (Field)	2	2													
MW-21	Lithium	2	2	2	2	2	2	2	2		2	2	2	2	2	
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2			
	pH (Field)	2	2					2			2	2				
	Manganese	2														
MW-25	Boron		1	1	1	1	1	1	1	1	1	1	1	1	1	
	Conductivity (Field)						1				1					
	Fluoride	1	1	1	1	1	1	1	1	1	1	1	1	1&2	1	
	pH (Field)	2					2	1&2			2					
	Temperature (Field)												1			
	Lithium	2	1&2	2	2	2	2		2		2	2	2	2	2	
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	Chemical Oxygen Demand								1							
	Sulfate	1							1			1				
Manganese		1		1	1				1						1	
MW-26	Ammonia	1		1	1	1	1	1	1	1	1	1	1	1	1	
	Boron	1		1	1	1	1	1	1	1	1	1	1			
	Chemical Oxygen Demand					1	1							1	1	
	Conductivity (Field)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Chloride													1	1	
	Temperature (Field)												1			
	Iron		1&2			1&2			1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
	Manganese	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
	Lithium	2		2	2	2	2		2		2			2		
	pH (Field)	2					2	1&2	2		2					
	Sodium	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
	Strontium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Sulfate	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
Total Organic Halogens						1					1					

Key: 1 = exceeds control limit; 2 = exceeds action level		S	F	S	F	S	F	S	F	S	F	S	F	S	F	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	
Well	Constituent	2018	2018	2019	2019	2020	2020	2021	2021	2022	2022	2023	2023	2024	2024	
MW-27	Ammonia	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Boron	1	1	1	1	1	1	1	1	1	1	1	1			
	Chemical Oxygen Demand										1					
	Conductivity (Field)		1	1	1	1	1				1	1		1		
	Temperature (Field)														1	
	Iron		2				1&2		1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
	Lithium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	pH (Field)	2					2	2			1&2		2			
	Strontium	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Sodium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Total Organic Halogens											1				
Sulfate	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1	1&2	
SW-1	Iron		2	2		2				2		2	2			
	Sodium												2			
	Manganese	2		2		2	2			2	2	2	2	2		
SW-2	Chemical Oxygen Demand						1		1							
	Chloride		1	1		1	1	1	1	1	1	1	1	1	1	
	Conductivity (Field)	1					1				1		1		1	
	Iron			2		2				2		2	2			
	Manganese	2		2		2				2		2				
	Temperature (Field)													1		
	pH (Field)		1	1	1&2				1	1	1	1		1	1	
	Sodium	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2	1&2
Total Organic Halogens							1		1							

If the control limit and action level are both exceeded, the box is highlighted in black.
Comments: (insert clarifications or notes as needed)

This worksheet:
1) Summarizes the historical extent of groundwater impacts,
2) Tracks GWQAP effectiveness, and
3) Potentially highlights sequential degradation of contaminants of concern.

Month	Maximum Head on Liner (ft)	Leachate Collected (gal)	Volume Utilized for Dust Control (gal)	Discharge to
Leachate management system is not applicable for this Site.				

TABLE 12

GAS MONITORING SUMMARY

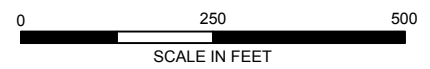
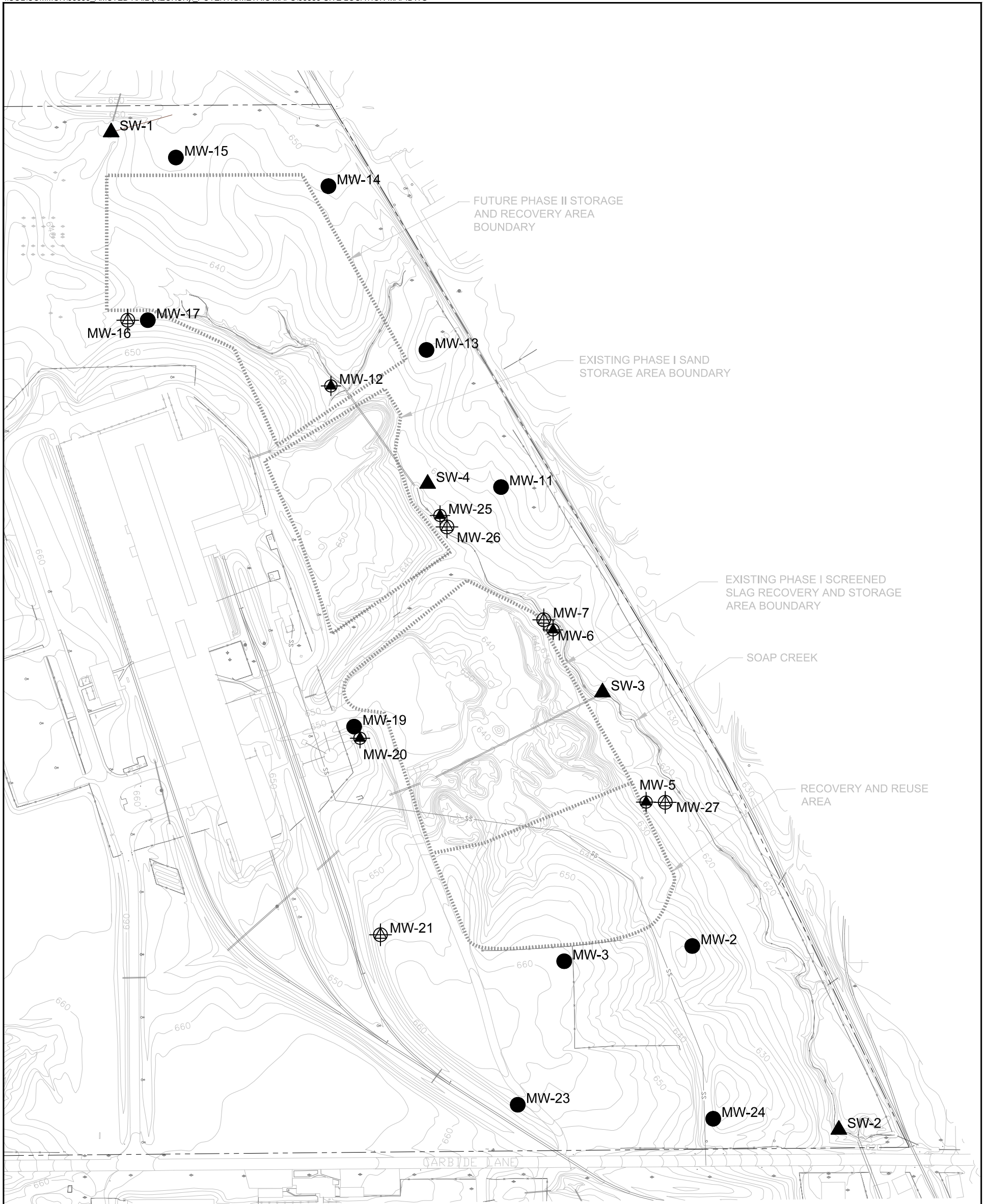
2024 ANNUAL WATER QUALITY REPORT

AMSTED - KEOKUK, IOWA

PERMIT NO. 56-SDP-15-89-91C

Monitoring Points			Methane Results (% LEL)
Name	Type	Description	Date
Gas monitoring is not applicable for this Site.			

FIGURES



LEGEND

- APPROXIMATE PROPERTY LINE
- - - EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- ▲ SW-1 SURFACE WATER MONITORING LOCATION
- MW-5 MONITORING WELL (FOR WATER LEVEL MONITORING ONLY)

- ⊕ MW-7 UPPERMOST AQUIFER MONITORING WELL
- ⊙ MW-5 WATER TABLE MONITORING WELL

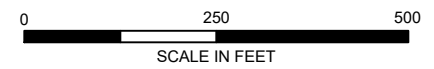
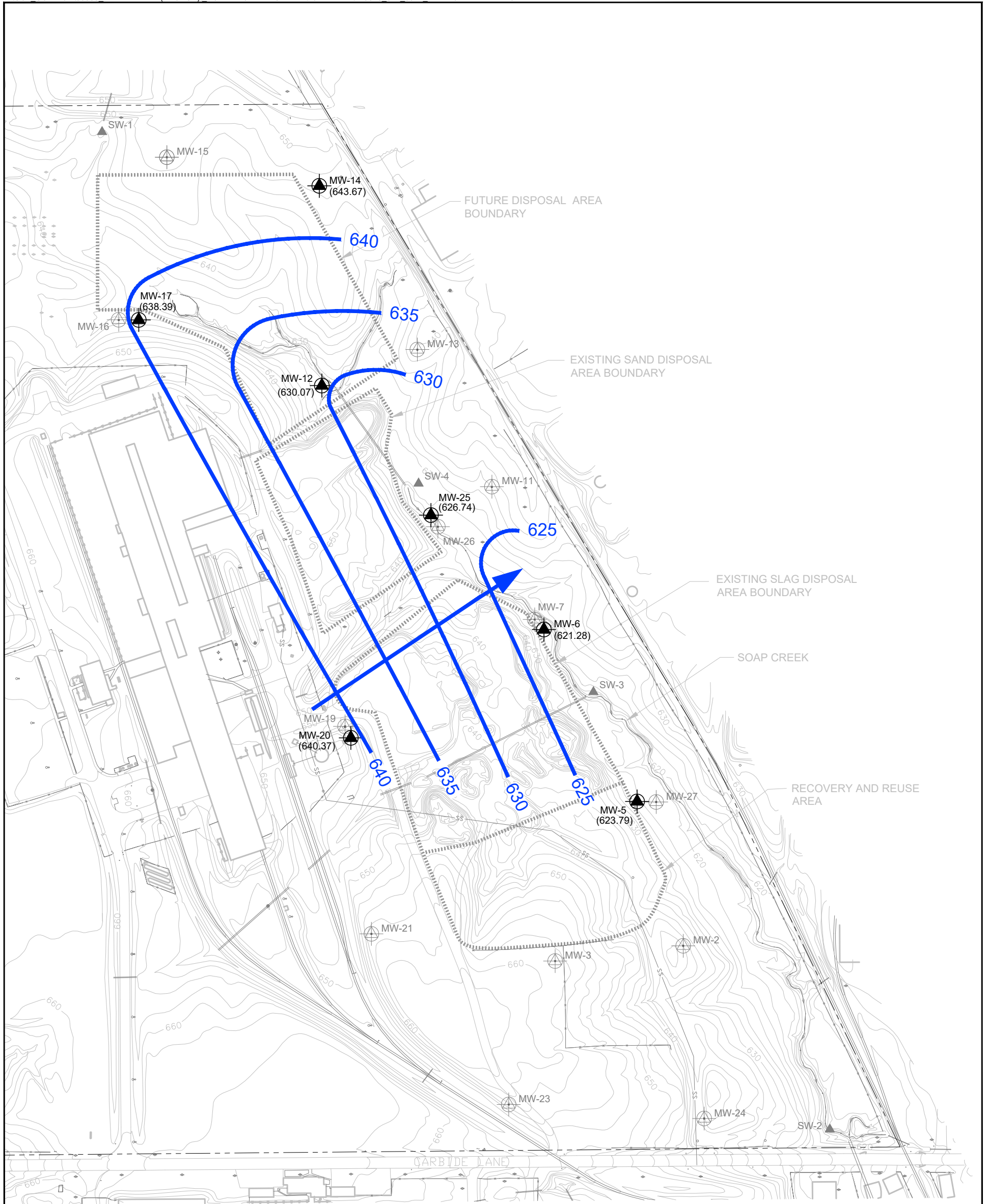


AMSTED RAIL COMPANY
KEOKUK, IOWA

MONITORING POINT LOCATION MAP

SCALE: AS SHOWN
JANUARY 2016

FIGURE 1



LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 620 POTENTIOMETRIC SURFACE CONTOUR (INTERVAL 5 FT)
- INFERRED SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION
- MW-5 WATER TABLE MONITORING WELL
- MW-23 UPPER MOST AQUIFER MONITORING WELL (NOT USED)
- (623.79) GROUNDWATER ELEVATION (MSL) (MEASURED 18 APRIL 2024)
- SW-2 SURFACE WATER MONITORING LOCATION

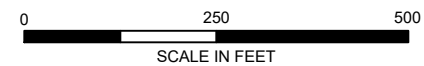
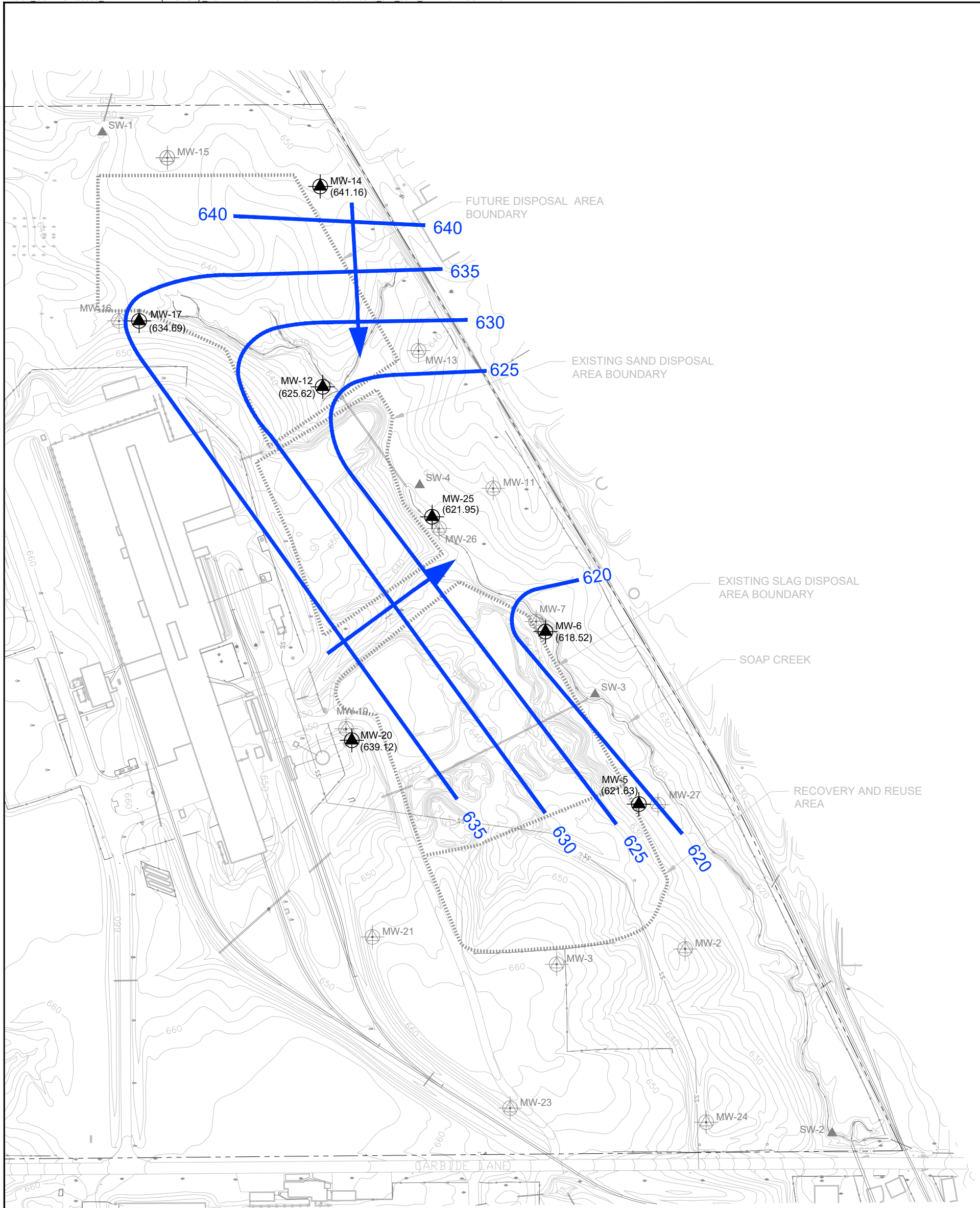


AMSTED RAIL COMPANY
 KEOKUK PLANT
 KEOKUK, IOWA

**WATER TABLE ELEVATIONS
 APRIL 2024**

SCALE: AS SHOWN
 OCTOBER 2024

FIGURE 2



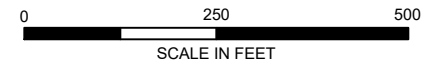
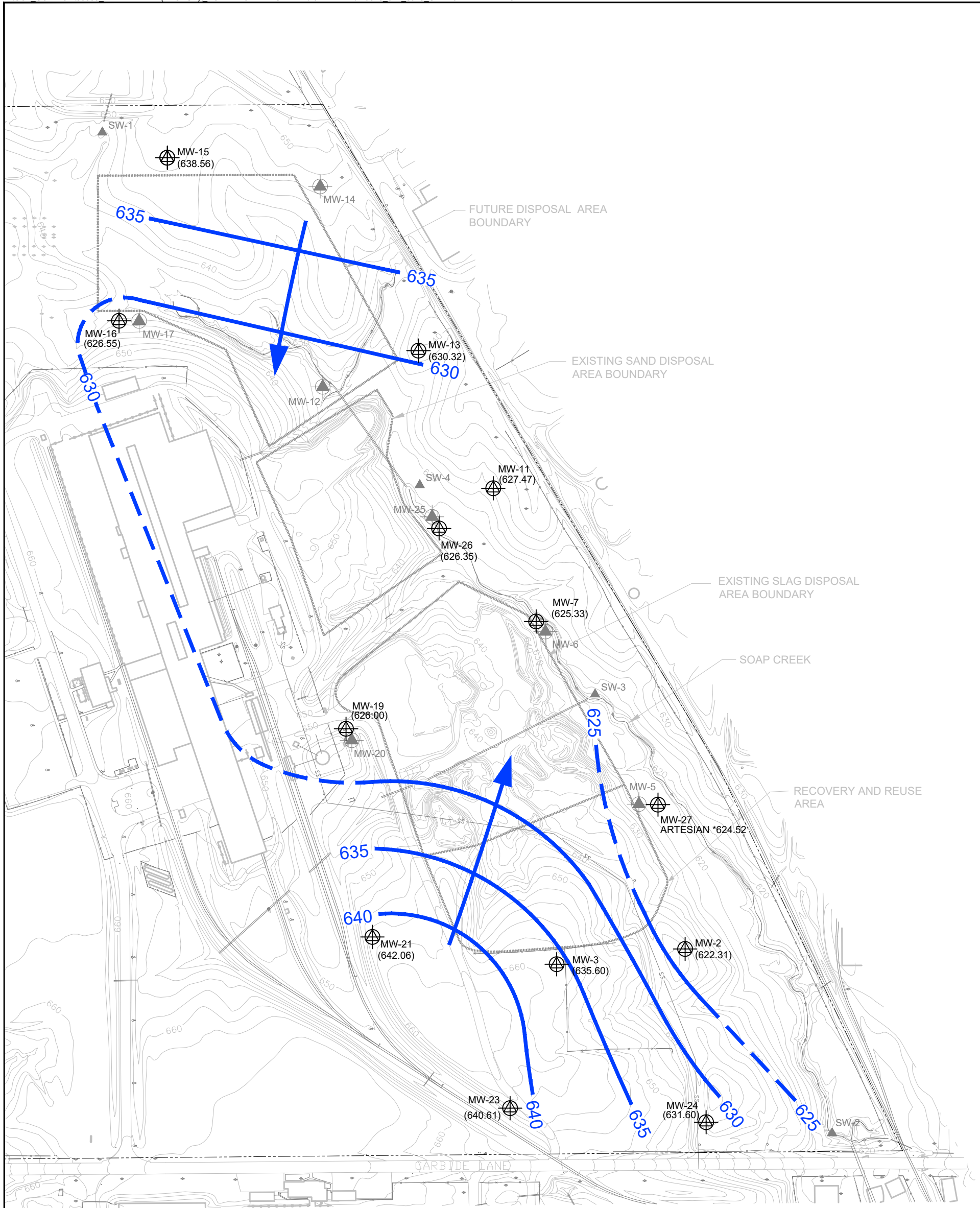
LEGEND

- APPROXIMATE PROPERTY LINE
- - - EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 625 POTENTIOMETRIC SURFACE CONTOUR (INTERVAL 5 FT)
- INFERRED SURFACE CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- MW-5 WATER TABLE MONITORING WELL
- MW-23 UPPER MOST AQUIFER MONITORING WELL (NOT USED)
- (621.63) GROUNDWATER ELEVATION (MSL) (MEASURED 22 AUGUST 2024)
- SW-2 SURFACE WATER MONITORING LOCATION

HALEY ALDRICH AMSTED RAIL COMPANY
 KEOKUK PLANT
 KEOKUK, IOWA

**WATER TABLE ELEVATIONS
 AUGUST 2024**

SCALE: AS SHOWN
 OCTOBER 2024



LEGEND

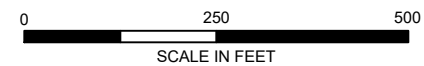
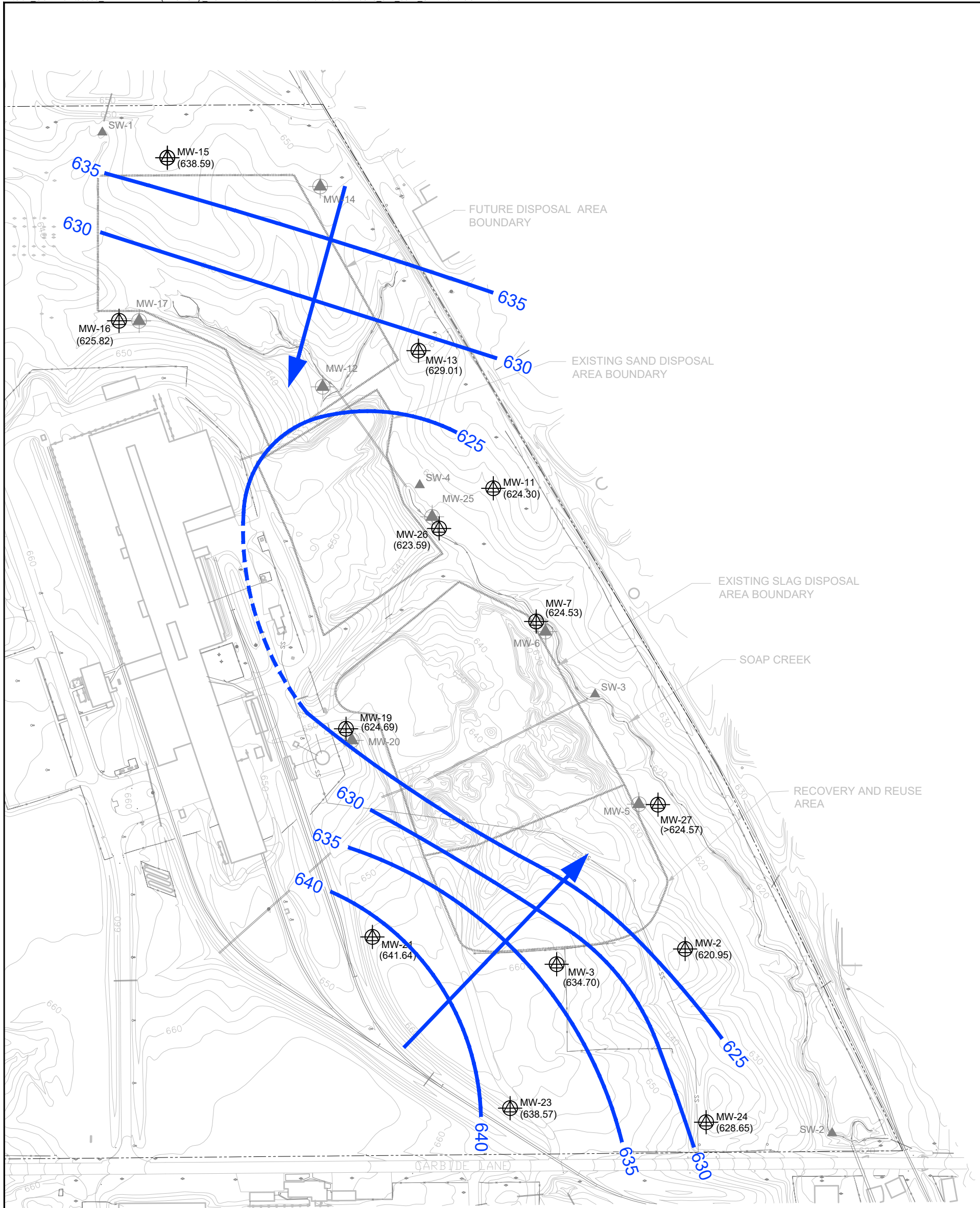
- APPROXIMATE PROPERTY LINE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 630 POTENTIOMETRIC SURFACE CONTOUR (INTERVAL 5 FT)
- INFERRED SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION
- MW-5 WATER TABLE MONITORING WELL
- MW-24 UPPER MOST AQUIFER MONITORING WELL
- (640.61) GROUNDWATER ELEVATION (MSL) (MEASURED 18 APRIL 2024)
- SW-2 SURFACE WATER MONITORING LOCATION

HALEY ALDRICH AMSTED RAIL COMPANY
 KEOKUK PLANT
 KEOKUK, IOWA

**UPPERMOST AQUIFER ELEVATIONS
 APRIL 2024**

SCALE: AS SHOWN
 OCTOBER 2024

FIGURE 4



LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 640 POTENTIOMETRIC SURFACE CONTOUR (INTERVAL 5 FT)
- INFERRED SURFACE CONTOUR
- GROUNDWATER FLOW DIRECTION
- MW-5 WATER TABLE MONITORING WELL
- MW-23 UPPER MOST AQUIFER MONITORING WELL
- (638.57) GROUNDWATER ELEVATION (MSL) (MEASURED 22 AUGUST 2024)
- SW-2 SURFACE WATER MONITORING LOCATION



AMSTED RAIL COMPANY
 KEOKUK PLANT
 KEOKUK, IOWA

**UPPERMOST AQUIFER ELEVATIONS
 AUGUST 2024**

SCALE: AS SHOWN
 OCTOBER 2024

APPENDIX A
IDNR Sampling Forms



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

							Final Reading
Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

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Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

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Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
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Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
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Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
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pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

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Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____



Groundwater Sampling Field Sheet

Disposal Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Top of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: Yes No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) Yes No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

Pump Interval Sampler
 Bailer Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

Submersible Peristaltic Bladder Inertial Lift Pump Other (specify): _____

Method (check one)

Low Flow No Purge Purge

Options (check one)

Dedicated Disposable Portable

Decontamination Method: _____

Field Analysis

Final Reading

Date/Time							
Depth to Water (ft)							
Volume Purged ()							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? Yes No Color? Yes No

Comments: _____

APPENDIX B
Analytical Laboratory Reports and Data Usability Summary
Reports

ANALYTICAL REPORT

PREPARED FOR

Attn: Thomas Vanage
Haley & Aldrich, Inc.
8899 Gander Creek Drive
Miamisburg, Ohio 45342-4418

Generated 5/13/2024 9:14:04 AM

JOB DESCRIPTION

Amsted - Keokuk, Iowa GW

JOB NUMBER

240-203649-1

Eurofins Cleveland

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Generated
5/13/2024 9:14:04 AM

Authorized for release by
Denise Heckler, Project Manager II
Denise.Heckler@et.eurofinsus.com
(330)966-9477



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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Haley & Aldrich, Inc.
Project: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Job ID: 240-203649-1

Eurofins Cleveland

Job Narrative 240-203649-1

Receipt

The samples were received on 5/1/2024 9:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.3°C.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CLE
6020B	Metals (ICP/MS)	SW846	EET CLE
350.1	Nitrogen, Ammonia	EPA	EET CLE
5220D-2011	Chemical Oxygen Demand	SM	EET CLE
9056A	Anions, Ion Chromatography	SW846	EET CLE
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET CLE
FILTRATION	Sample Filtration	None	EET CLE

Protocol References:

EPA = US Environmental Protection Agency

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-203649-1	MW-26-043024-1515	Water	04/30/24 15:15	05/01/24 09:00
240-203649-2	MW-25-043024-1400	Water	04/30/24 14:00	05/01/24 09:00
240-203649-3	SW-1-043024-1300	Water	04/30/24 13:00	05/01/24 09:00
240-203649-4	SW-2-043024-1140	Water	04/30/24 11:40	05/01/24 09:00
240-203649-5	MW-25-042924-1558	Water	04/29/24 15:58	05/01/24 09:00
240-203649-6	MW-26-042924-1710	Water	04/29/24 17:10	05/01/24 09:00

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Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-26-043024-1515

Lab Sample ID: 240-203649-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	1.99		0.100	0.0470	mg/L	1		6020B	Dissolved

Client Sample ID: MW-25-043024-1400

Lab Sample ID: 240-203649-2

No Detections.

Client Sample ID: SW-1-043024-1300

Lab Sample ID: 240-203649-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.208		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Strontium	0.233		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.308		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	19.3		1.00	0.329	mg/L	1		6020B	Total Recoverable
Iron	0.0828	J	0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	0.230		0.200	0.0760	mg/L	1		350.1	Total/NA
Chloride	13.7		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.570		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	43.5		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: SW-2-043024-1140

Lab Sample ID: 240-203649-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.283		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Strontium	0.193		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.135		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	31.6		1.00	0.329	mg/L	1		6020B	Total Recoverable
Ammonia	0.890		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	6.73	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Chloride	34.5		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.348		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	40.5		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-25-042924-1558

Lab Sample ID: 240-203649-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.155		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0181	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.387		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0183		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	26.2		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	14.8		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Chloride	15.3		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	4.54		0.0500	0.0240	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-25-042924-1558 (Continued)

Lab Sample ID: 240-203649-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	47.4		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-26-042924-1710

Lab Sample ID: 240-203649-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.202		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0301	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	1.94		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	3.02		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	86.1		1.00	0.329	mg/L	1		6020B	Total Recoverable
Ammonia	1.11		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	9.67	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Chloride	2.70		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.158		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	1480		10.0	3.48	mg/L	10		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Client Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-26-043024-1515

Lab Sample ID: 240-203649-1

Date Collected: 04/30/24 15:15

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1.99		0.100	0.0470	mg/L		05/03/24 05:00	05/03/24 19:42	1

- 1
- 2
- 3
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Client Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-25-043024-1400

Lab Sample ID: 240-203649-2

Date Collected: 04/30/24 14:00

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/03/24 05:00	05/03/24 19:45	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: SW-1-043024-1300

Lab Sample ID: 240-203649-3

Date Collected: 04/30/24 13:00

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.208		0.100	0.0573	mg/L		05/02/24 14:00	05/03/24 15:54	1
Lithium	ND		0.0500	0.0172	mg/L		05/02/24 14:00	05/03/24 15:54	1
Strontium	0.233		0.0500	0.00927	mg/L		05/02/24 14:00	05/03/24 15:54	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.308		0.00500	0.00353	mg/L		05/02/24 14:00	05/03/24 17:36	1
Sodium	19.3		1.00	0.329	mg/L		05/02/24 14:00	05/03/24 17:36	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.0828	J	0.100	0.0470	mg/L		05/02/24 14:00	05/03/24 13:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	0.230		0.200	0.0760	mg/L			05/09/24 13:12	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	13.7		1.00	0.128	mg/L			05/03/24 02:43	1
Fluoride (SW846 9056A)	0.570		0.0500	0.0240	mg/L			05/03/24 02:43	1
Sulfate (SW846 9056A)	43.5		1.00	0.348	mg/L			05/03/24 02:43	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: SW-2-043024-1140

Lab Sample ID: 240-203649-4

Date Collected: 04/30/24 11:40

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.283		0.100	0.0573	mg/L		05/02/24 14:00	05/03/24 15:59	1
Lithium	ND		0.0500	0.0172	mg/L		05/02/24 14:00	05/03/24 15:59	1
Strontium	0.193		0.0500	0.00927	mg/L		05/02/24 14:00	05/03/24 15:59	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.135		0.00500	0.00353	mg/L		05/02/24 14:00	05/03/24 17:39	1
Sodium	31.6		1.00	0.329	mg/L		05/02/24 14:00	05/03/24 17:39	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/02/24 14:00	05/03/24 13:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	0.890		0.200	0.0760	mg/L			05/09/24 13:21	1
Chemical Oxygen Demand (SM 5220D-2011)	6.73	J	10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	34.5		1.00	0.128	mg/L			05/03/24 03:05	1
Fluoride (SW846 9056A)	0.348		0.0500	0.0240	mg/L			05/03/24 03:05	1
Sulfate (SW846 9056A)	40.5		1.00	0.348	mg/L			05/03/24 03:05	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-25-042924-1558

Lab Sample ID: 240-203649-5

Date Collected: 04/29/24 15:58

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.155		0.100	0.0573	mg/L		05/02/24 14:00	05/03/24 16:03	1
Lithium	0.0181	J	0.0500	0.0172	mg/L		05/02/24 14:00	05/03/24 16:03	1
Strontium	0.387		0.0500	0.00927	mg/L		05/02/24 14:00	05/03/24 16:03	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0183		0.00500	0.00353	mg/L		05/02/24 14:00	05/03/24 17:41	1
Sodium	26.2		1.00	0.329	mg/L		05/02/24 14:00	05/03/24 17:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/09/24 13:24	1
Chemical Oxygen Demand (SM 5220D-2011)	14.8		10.0	1.80	mg/L			05/06/24 10:01	1
Chloride (SW846 9056A)	15.3		1.00	0.128	mg/L			05/03/24 03:26	1
Fluoride (SW846 9056A)	4.54		0.0500	0.0240	mg/L			05/03/24 03:26	1
Sulfate (SW846 9056A)	47.4		1.00	0.348	mg/L			05/03/24 03:26	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-26-042924-1710

Lab Sample ID: 240-203649-6

Date Collected: 04/29/24 17:10

Matrix: Water

Date Received: 05/01/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.202		0.100	0.0573	mg/L		05/02/24 14:00	05/03/24 16:07	1
Lithium	0.0301	J	0.0500	0.0172	mg/L		05/02/24 14:00	05/03/24 16:07	1
Strontium	1.94		0.0500	0.00927	mg/L		05/02/24 14:00	05/03/24 16:07	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	3.02		0.00500	0.00353	mg/L		05/02/24 14:00	05/03/24 17:44	1
Sodium	86.1		1.00	0.329	mg/L		05/02/24 14:00	05/03/24 17:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	1.11		0.200	0.0760	mg/L			05/09/24 13:27	1
Chemical Oxygen Demand (SM 5220D-2011)	9.67	J	10.0	1.80	mg/L			05/06/24 10:01	1
Chloride (SW846 9056A)	2.70		1.00	0.128	mg/L			05/03/24 03:48	1
Fluoride (SW846 9056A)	0.158		0.0500	0.0240	mg/L			05/03/24 03:48	1
Sulfate (SW846 9056A)	1480		10.0	3.48	mg/L			05/03/24 04:10	10

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 240-611624/1-A
Matrix: Water
Analysis Batch: 611870

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Boron	ND		0.100	0.0573	mg/L		05/02/24 14:00	05/03/24 14:37	1
Lithium	ND		0.0500	0.0172	mg/L		05/02/24 14:00	05/03/24 14:37	1
Strontium	ND		0.0500	0.00927	mg/L		05/02/24 14:00	05/03/24 14:37	1

Lab Sample ID: LCS 240-611624/2-A
Matrix: Water
Analysis Batch: 611870

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	1.00	0.9246		mg/L		92	80 - 120
Strontium	1.00	0.9410		mg/L		94	80 - 120

Lab Sample ID: 240-203623-D-1-B MS
Matrix: Water
Analysis Batch: 611870

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	0.199		1.00	1.170		mg/L		97	75 - 125
Strontium	1.40		1.00	2.325		mg/L		93	75 - 125

Lab Sample ID: 240-203623-D-1-C MSD
Matrix: Water
Analysis Batch: 611870

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Lithium	0.199		1.00	1.168		mg/L		97	75 - 125	0	20
Strontium	1.40		1.00	2.329		mg/L		93	75 - 125	0	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-611612/1-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611612

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	ND		0.100	0.0470	mg/L		05/02/24 14:00	05/03/24 12:13	1

Lab Sample ID: LCS 240-611612/2-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611612

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

Eurofins Cleveland

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 190-34299-A-1-B MS
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 611612

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.735		5.00	5.893		mg/L		103	80 - 120

Lab Sample ID: 190-34299-A-1-C MSD
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 611612

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Iron	0.735		5.00	5.890		mg/L		103	80 - 120	0	20

Lab Sample ID: MB 240-611624/1-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		05/02/24 14:00	05/03/24 16:37	1
Sodium	ND		1.00	0.329	mg/L		05/02/24 14:00	05/03/24 16:37	1

Lab Sample ID: LCS 240-611624/3-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Manganese	0.500	0.4934		mg/L		99	80 - 120
Sodium	25.0	24.24		mg/L		97	80 - 120

Lab Sample ID: 240-203623-D-1-D MS
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Manganese	0.315		0.500	0.8058		mg/L		98	80 - 120
Sodium	214		25.0	237.6	4	mg/L		94	80 - 120

Lab Sample ID: 240-203623-D-1-E MSD
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 611624

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Manganese	0.315		0.500	0.7894		mg/L		95	80 - 120	2	20
Sodium	214		25.0	230.9	4	mg/L		67	80 - 120	3	20

Lab Sample ID: MB 240-611641/1-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611641

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/03/24 05:00	05/03/24 18:28	1

Eurofins Cleveland

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 240-611641/2-A
Matrix: Water
Analysis Batch: 611906

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611641

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	5.00	4.926		mg/L		99	80 - 120

Lab Sample ID: 240-203649-2 MS
Matrix: Water
Analysis Batch: 611906

Client Sample ID: MW-25-043024-1400
Prep Type: Dissolved
Prep Batch: 611641

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	ND		5.00	5.394		mg/L		108	80 - 120

Lab Sample ID: 240-203649-2 MSD
Matrix: Water
Analysis Batch: 611906

Client Sample ID: MW-25-043024-1400
Prep Type: Dissolved
Prep Batch: 611641

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	ND		5.00	5.337		mg/L		107	80 - 120	1	20

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 240-612531/14
Matrix: Water
Analysis Batch: 612531

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.200	0.0760	mg/L			05/09/24 13:06	1

Lab Sample ID: LCS 240-612531/15
Matrix: Water
Analysis Batch: 612531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia	3.83	3.803		mg/L		99	90 - 110

Lab Sample ID: 240-203649-3 MS
Matrix: Water
Analysis Batch: 612531

Client Sample ID: SW-1-043024-1300
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia	0.230		2.50	2.645		mg/L		97	90 - 110

Lab Sample ID: 240-203649-3 MSD
Matrix: Water
Analysis Batch: 612531

Client Sample ID: SW-1-043024-1300
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia	0.230		2.50	2.659		mg/L		97	90 - 110	1	20

Eurofins Cleveland

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method: 5220D-2011 - Chemical Oxygen Demand

Lab Sample ID: MB 240-611980/41
Matrix: Water
Analysis Batch: 611980

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			05/06/24 10:01	1

Lab Sample ID: LCS 240-611980/42
Matrix: Water
Analysis Batch: 611980

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	44.33		mg/L		108	90 - 110

Lab Sample ID: 240-203428-G-7 MS
Matrix: Water
Analysis Batch: 611980

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	6.66	J	50.0	53.07		mg/L		93	90 - 110

Lab Sample ID: 240-203428-G-7 MSD
Matrix: Water
Analysis Batch: 611980

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	6.66	J	50.0	51.87		mg/L		90	90 - 110	2	20

Lab Sample ID: MB 240-612256/9
Matrix: Water
Analysis Batch: 612256

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			05/08/24 08:54	1

Lab Sample ID: LCS 240-612256/10
Matrix: Water
Analysis Batch: 612256

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	38.13		mg/L		93	90 - 110

Lab Sample ID: 240-203592-B-1 MS
Matrix: Water
Analysis Batch: 612256

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	19.9		50.0	73.61		mg/L		107	90 - 110

Lab Sample ID: 240-203592-B-1 MSD
Matrix: Water
Analysis Batch: 612256

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	19.9		50.0	65.76		mg/L		92	90 - 110	11	20

Eurofins Cleveland

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 240-611677/3
Matrix: Water
Analysis Batch: 611677

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.128	mg/L			05/03/24 00:54	1
Fluoride	ND		0.0500	0.0240	mg/L			05/03/24 00:54	1
Sulfate	ND		1.00	0.348	mg/L			05/03/24 00:54	1

Lab Sample ID: LCS 240-611677/4
Matrix: Water
Analysis Batch: 611677

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	49.96		mg/L		100	90 - 110
Fluoride	2.50	2.595		mg/L		104	90 - 110
Sulfate	50.0	51.32		mg/L		103	90 - 110

Lab Sample ID: 240-203561-A-1 MS
Matrix: Water
Analysis Batch: 611677

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	51.5		50.0	106.4		mg/L		110	80 - 120
Fluoride	0.721	F1	2.50	3.747	F1	mg/L		121	80 - 120
Sulfate	89.5		50.0	144.4		mg/L		110	80 - 120

Lab Sample ID: 240-203561-A-1 MSD
Matrix: Water
Analysis Batch: 611677

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	51.5		50.0	106.2		mg/L		109	80 - 120	0	15
Fluoride	0.721	F1	2.50	3.748	F1	mg/L		121	80 - 120	0	15
Sulfate	89.5		50.0	144.2		mg/L		109	80 - 120	0	15

QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Metals

Filtration Batch: 611611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Dissolved	Water	FILTRATION	
240-203649-4	SW-2-043024-1140	Dissolved	Water	FILTRATION	

Prep Batch: 611612

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Dissolved	Water	3005A	611611
240-203649-4	SW-2-043024-1140	Dissolved	Water	3005A	611611
MB 240-611612/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-611612/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
190-34299-A-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
190-34299-A-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 611624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total Recoverable	Water	3005A	
240-203649-4	SW-2-043024-1140	Total Recoverable	Water	3005A	
240-203649-5	MW-25-042924-1558	Total Recoverable	Water	3005A	
240-203649-6	MW-26-042924-1710	Total Recoverable	Water	3005A	
MB 240-611624/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-611624/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCS 240-611624/3-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-203623-D-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
240-203623-D-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
240-203623-D-1-D MS	Matrix Spike	Total Recoverable	Water	3005A	
240-203623-D-1-E MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 611641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-1	MW-26-043024-1515	Dissolved	Water	3005A	
240-203649-2	MW-25-043024-1400	Dissolved	Water	3005A	
MB 240-611641/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-611641/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-203649-2 MS	MW-25-043024-1400	Dissolved	Water	3005A	
240-203649-2 MSD	MW-25-043024-1400	Dissolved	Water	3005A	

Analysis Batch: 611870

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total Recoverable	Water	6010D	611624
240-203649-4	SW-2-043024-1140	Total Recoverable	Water	6010D	611624
240-203649-5	MW-25-042924-1558	Total Recoverable	Water	6010D	611624
240-203649-6	MW-26-042924-1710	Total Recoverable	Water	6010D	611624
MB 240-611624/1-A	Method Blank	Total Recoverable	Water	6010D	611624
LCS 240-611624/2-A	Lab Control Sample	Total Recoverable	Water	6010D	611624
240-203623-D-1-B MS	Matrix Spike	Total Recoverable	Water	6010D	611624
240-203623-D-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010D	611624

Analysis Batch: 611906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-1	MW-26-043024-1515	Dissolved	Water	6020B	611641
240-203649-2	MW-25-043024-1400	Dissolved	Water	6020B	611641
240-203649-3	SW-1-043024-1300	Dissolved	Water	6020B	611612

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QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Metals (Continued)

Analysis Batch: 611906 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total Recoverable	Water	6020B	611624
240-203649-4	SW-2-043024-1140	Dissolved	Water	6020B	611612
240-203649-4	SW-2-043024-1140	Total Recoverable	Water	6020B	611624
240-203649-5	MW-25-042924-1558	Total Recoverable	Water	6020B	611624
240-203649-6	MW-26-042924-1710	Total Recoverable	Water	6020B	611624
MB 240-611612/1-A	Method Blank	Total Recoverable	Water	6020B	611612
MB 240-611624/1-A	Method Blank	Total Recoverable	Water	6020B	611624
MB 240-611641/1-A	Method Blank	Total Recoverable	Water	6020B	611641
LCS 240-611612/2-A	Lab Control Sample	Total Recoverable	Water	6020B	611612
LCS 240-611624/3-A	Lab Control Sample	Total Recoverable	Water	6020B	611624
LCS 240-611641/2-A	Lab Control Sample	Total Recoverable	Water	6020B	611641
190-34299-A-1-B MS	Matrix Spike	Total Recoverable	Water	6020B	611612
190-34299-A-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020B	611612
240-203623-D-1-D MS	Matrix Spike	Total Recoverable	Water	6020B	611624
240-203623-D-1-E MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020B	611624
240-203649-2 MS	MW-25-043024-1400	Dissolved	Water	6020B	611641
240-203649-2 MSD	MW-25-043024-1400	Dissolved	Water	6020B	611641

General Chemistry

Analysis Batch: 611677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total/NA	Water	9056A	
240-203649-4	SW-2-043024-1140	Total/NA	Water	9056A	
240-203649-5	MW-25-042924-1558	Total/NA	Water	9056A	
240-203649-6	MW-26-042924-1710	Total/NA	Water	9056A	
240-203649-6	MW-26-042924-1710	Total/NA	Water	9056A	
MB 240-611677/3	Method Blank	Total/NA	Water	9056A	
LCS 240-611677/4	Lab Control Sample	Total/NA	Water	9056A	
240-203561-A-1 MS	Matrix Spike	Total/NA	Water	9056A	
240-203561-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 611980

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-5	MW-25-042924-1558	Total/NA	Water	5220D-2011	
240-203649-6	MW-26-042924-1710	Total/NA	Water	5220D-2011	
MB 240-611980/41	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-611980/42	Lab Control Sample	Total/NA	Water	5220D-2011	
240-203428-G-7 MS	Matrix Spike	Total/NA	Water	5220D-2011	
240-203428-G-7 MSD	Matrix Spike Duplicate	Total/NA	Water	5220D-2011	

Analysis Batch: 612256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total/NA	Water	5220D-2011	
240-203649-4	SW-2-043024-1140	Total/NA	Water	5220D-2011	
MB 240-612256/9	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-612256/10	Lab Control Sample	Total/NA	Water	5220D-2011	
240-203592-B-1 MS	Matrix Spike	Total/NA	Water	5220D-2011	
240-203592-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5220D-2011	

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

General Chemistry

Analysis Batch: 612531

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203649-3	SW-1-043024-1300	Total/NA	Water	350.1	
240-203649-4	SW-2-043024-1140	Total/NA	Water	350.1	
240-203649-5	MW-25-042924-1558	Total/NA	Water	350.1	
240-203649-6	MW-26-042924-1710	Total/NA	Water	350.1	
MB 240-612531/14	Method Blank	Total/NA	Water	350.1	
LCS 240-612531/15	Lab Control Sample	Total/NA	Water	350.1	
240-203649-3 MS	SW-1-043024-1300	Total/NA	Water	350.1	
240-203649-3 MSD	SW-1-043024-1300	Total/NA	Water	350.1	

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-26-043024-1515

Lab Sample ID: 240-203649-1

Date Collected: 04/30/24 15:15

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			611641	BN	EET CLE	05/03/24 05:00
Dissolved	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 19:42

Client Sample ID: MW-25-043024-1400

Lab Sample ID: 240-203649-2

Date Collected: 04/30/24 14:00

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			611641	BN	EET CLE	05/03/24 05:00
Dissolved	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 19:45

Client Sample ID: SW-1-043024-1300

Lab Sample ID: 240-203649-3

Date Collected: 04/30/24 13:00

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6010D		1	611870	KLC	EET CLE	05/03/24 15:54
Dissolved	Filtration	FILTRATION			611611	BN	EET CLE	05/02/24 12:00
Dissolved	Prep	3005A			611612	BN	EET CLE	05/02/24 14:00
Dissolved	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 13:26
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 17:36
Total/NA	Analysis	350.1		1	612531	AJ	EET CLE	05/09/24 13:12
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	611677	JWW	EET CLE	05/03/24 02:43

Client Sample ID: SW-2-043024-1140

Lab Sample ID: 240-203649-4

Date Collected: 04/30/24 11:40

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6010D		1	611870	KLC	EET CLE	05/03/24 15:59
Dissolved	Filtration	FILTRATION			611611	BN	EET CLE	05/02/24 12:00
Dissolved	Prep	3005A			611612	BN	EET CLE	05/02/24 14:00
Dissolved	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 13:28
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 17:39
Total/NA	Analysis	350.1		1	612531	AJ	EET CLE	05/09/24 13:21
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	611677	JWW	EET CLE	05/03/24 03:05

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Client Sample ID: MW-25-042924-1558

Lab Sample ID: 240-203649-5

Date Collected: 04/29/24 15:58

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6010D		1	611870	KLC	EET CLE	05/03/24 16:03
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 17:41
Total/NA	Analysis	350.1		1	612531	AJ	EET CLE	05/09/24 13:24
Total/NA	Analysis	5220D-2011		1	611980	MS	EET CLE	05/06/24 10:01
Total/NA	Analysis	9056A		1	611677	JWW	EET CLE	05/03/24 03:26

Client Sample ID: MW-26-042924-1710

Lab Sample ID: 240-203649-6

Date Collected: 04/29/24 17:10

Matrix: Water

Date Received: 05/01/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6010D		1	611870	KLC	EET CLE	05/03/24 16:07
Total Recoverable	Prep	3005A			611624	BN	EET CLE	05/02/24 14:00
Total Recoverable	Analysis	6020B		1	611906	AJC	EET CLE	05/03/24 17:44
Total/NA	Analysis	350.1		1	612531	AJ	EET CLE	05/09/24 13:27
Total/NA	Analysis	5220D-2011		1	611980	MS	EET CLE	05/06/24 10:01
Total/NA	Analysis	9056A		1	611677	JWW	EET CLE	05/03/24 03:48
Total/NA	Analysis	9056A		10	611677	JWW	EET CLE	05/03/24 04:10

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203649-1

Laboratory: Eurofins Cleveland

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	421	06-01-25

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Eurofins Cleveland

180 S. Van Buren Avenue
Barberton, OH 44203
Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

3/1
3-3

Client Information		Sampler: Francis Reed		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-120136-41930.1		
Client Contact: Thomas Vanage		Phone: 614-288-8619		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: IOWA		Page: Page 1 of 2		
Company: Haley & Aldrich, Inc.		PWSID:		Analysis Requested					Job #: 129848-036	
Address: 8899 Gander Creek Drive		Due Date Requested:								
City: Miamisburg		TAT Requested (days): STD-TAT		Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No) 9056A_28D - Chloride, Fluoride, Sulfate 350.1, 5220D 6010D, 6020B 6020B - Iron - Field Filtered 6020B - Iron, Lab to filter		Total Number of containers		Preservation Codes: N - None S - H2SO4 D - HNO3		
State, Zip: OH, 45342-4418		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No						Other:		
Phone: 937-530-1412(Tel)		PO #: 0129848-034								
Email: TVanage@haleyaldrich.com		WO #:								
Project Name: Amsted - Keokuk, Iowa Spring 2024		Project #: 24024753								
Site:		SSOW#:								
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)		
								Preservation Code:		
MW-26-043024-1515		4/30/24		1515		G		Water		
MW-25-043024-1400		4/30/24		1400		G		Water		
SW-1-043024-1300		4/30/24		1300		G		Water		
SW-2-043024-1140		4/30/24		1140		G		Water		
MW-25-042924-1558		4/29/24		1558		G		Water		
MW-26-042924-1710		4/29/24		1710		G		Water		
								Water		
								Water		
								Water		
								Water		
								Water		
								Water		
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)					Special Instructions/QC Requirements:					
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:				
Relinquished by: Francis Reed		Date/Time: 04/30/24 16:30		Company: H&A		Received by: Brian Tala		Date/Time: 4-30-24 16:30		
Relinquished by: Brian Tala		Date/Time: 4-30-24 17:30		Company: H&A		Received by: Mary Bejda		Date/Time: 5-7-24 900		
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:						



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203649

Eurofins - Cleveland Sample Receipt Form/Narrative Login # Barberton Facility

Client Haley + Aldrich Site Name Cooler unpacked by Vany Dyer

Cooler Received on 5-1-24 Opened on 5-1-24 FedEx 1st Grd Exp UPS FAS Waypoint Chent Drop Off Eurofins Courier Other

Receipt After-hours Drop-off Date/Time Storage Location

Eurofins Cooler # ES Foam Box Chent Cooler Box Other Packing material used Bubble Wrap Foam Plastic Bag None Other

COOLANT Wet Ice Blue Ice Dry Ice Water None 1 Cooler temperature upon receipt IR GUN # 17 (CF 0+2 °C) Observed Cooler Temp 31 °C Corrected Cooler Temp 33 °C

- 2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1
Were the seals on the outside of the cooler(s) signed & dated?
Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?
Were tamper/custody seals intact and uncompromised?
3 Shippers' packing slip attached to the cooler(s)?
4 Did custody papers accompany the sample(s)?
5 Were the custody papers relinquished & signed in the appropriate place?
6 Was/were the person(s) who collected the samples clearly identified on the COC?
7 Did all bottles arrive in good condition (Unbroken)?
8 Could all bottle labels (ID/Date/Time) be reconciled with the COC?
9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)?
10 Were correct bottle(s) used for the test(s) indicated?
11 Sufficient quantity received to perform indicated analyses?
12 Are these work share samples and all listed on the COC?
13 Were all preserved sample(s) at the correct pH upon receipt?
14 Were VOAs on the COC?
15 Were air bubbles >6 mm in any VOA vials?
16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #
17 Was a LL Hg or Me Hg trip blank present?

Tests that are not checked for pH by Receiving VOAs Oil and Grease TOC

Contacted PM Date by via Verbal Voice Mail Other Concerning

18 CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by

SW-1 - 043024 - 1300
SW-2 - 043024 - 1140
MW-25 - 042924 - 1558
MW-26 - 042924 - 1740
have one Sulfuric Acid VOA

19 SAMPLE CONDITION Sample(s) were received after the recommended holding time had expired. Sample(s) were received in a broken container Sample(s) were received with bubble >6 mm in diameter (Notify PM)

20 SAMPLE PRESERVATION Sample(s) were further preserved in the laboratory Time preserved Preservative(s) added/Lot number(s) VOA Sample Preservation Date/Time VOAs Frozen



Temperature readings

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservation</u>	<u>Preservation</u>
			<u>pH</u>	<u>Temp</u>	<u>Added</u>	<u>Lot Number</u>
MW-26-043024-1515	240-203649-A 1	Plastic 500ml w/ Nitric - Dis.	<2			
MW 25-043024-1400	240 203649-A-2	Plastic 500ml - w/ Nitric - Dis	<2			
SW-1-043024-1300	240-203649 A-3	Voa Vial 40ml Amber - with Sulfuric Acid				
SW-1-043024 1300	240-203649 B-3	Plastic 60 mL - unpreserved				
SW-1-043024-1300	240-203649-C-3	Amber Glass 250ml - unpreserved				
SW 1-043024 1300	240 203649-D-3	Plastic 250ml - with Sulfuric Acid	<2			
SW-1-043024-1300	240-203649-E-3	Plastic 500 mL - unpreserved - dis				
SW-1-043024-1300	240-203649-F-3	Plastic 500ml - with Nitric Acid	<2			
SW-2-043024-1140	240-203649-A-4	Voa Vial 40ml Amber - with Sulfuric Acid				
SW-2-043024-1140	240-203649-B-4	Plastic 60 mL - unpreserved				
SW 2-043024-1140	240-203649-C-4	Amber Glass 250ml - unpreserved				
SW 2-043024-1140	240-203649-D-4	Plastic 250ml - with Sulfuric Acid	<2			
SW 2-043024-1140	240-203649-E-4	Plastic 500 mL - unpreserved - dis				
SW-2-043024-1140	240-203649-F-4	Plastic 500ml - with Nitric Acid	<2			
MW-25-042924-1558	240-203649-A-5	Voa Vial 40ml Amber - with Sulfuric Acid				
MW-25-042924-1558	240-203649-B-5	Plastic 60 mL - unpreserved				
MW-25-042924-1558	240-203649-C-5	Amber Glass 250ml - unpreserved				
MW 25-042924 1558	240-203649-D-5	Plastic 250ml with Sulfuric Acid	<2			
MW-25-042924-1558	240-203649-E-5	Plastic 500ml - with Nitric Acid	<2			
MW-25-042924 1558	240-203649-F-5	Plastic 250ml w/nitric - dis	<2			
MW-26-042924-1710	240-203649-A-6	Voa Vial 40ml Amber - with Sulfuric Acid				
MW-26-042924-1710	240-203649-B-6	Plastic 60 mL unpreserved				
MW-26-042924-1710	240-203649-C-6	Amber Glass 250ml unpreserved				
MW 26-042924-1710	240-203649-D-6	Plastic 250ml - with Sulfuric Acid	<2			
MW-26-042924-1710	240-203649-E-6	Plastic 500ml - with Nitric Acid	<2			
MW-26-042924-1710	240-203649-F-6	Plastic 250ml - w/nitric - dis	<2			

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Thomas Vanage
Haley & Aldrich, Inc.
8899 Gander Creek Drive
Miamisburg, Ohio 45342-4418

Generated 5/15/2024 7:16:23 AM

JOB DESCRIPTION

Amsted - Keokuk, Iowa GW

JOB NUMBER

240-203820-1

Eurofins Cleveland

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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5/15/2024 7:16:23 AM

Authorized for release by
Denise Heckler, Project Manager II
Denise.Heckler@et.eurofinsus.com
(330)966-9477



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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Haley & Aldrich, Inc.
Project: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Job ID: 240-203820-1

Eurofins Cleveland

Job Narrative 240-203820-1

Receipt

The samples were received on 5/3/2024 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.5°C, 2.1°C and 3.0°C.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CLE
6020B	Metals (ICP/MS)	SW846	EET CLE
350.1	Nitrogen, Ammonia	EPA	EET CLE
5220D-2011	Chemical Oxygen Demand	SM	EET CLE
9056A	Anions, Ion Chromatography	SW846	EET CLE
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET CLE

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-203820-1	MW-20-043024-1750	Water	04/30/24 17:50	05/03/24 09:45
240-203820-2	MW-21-050124-0900	Water	05/01/24 09:00	05/03/24 09:45
240-203820-3	MW-5-050124-1025	Water	05/01/24 10:25	05/03/24 09:45
240-203820-4	MW-27-050124-1135	Water	05/01/24 11:35	05/03/24 09:45
240-203820-5	MW-7-050124-1305	Water	05/01/24 13:05	05/03/24 09:45
240-203820-6	MW-6-050124-1520	Water	05/01/24 15:20	05/03/24 09:45
240-203820-7	20760-050124-0001	Water	05/01/24 00:00	05/03/24 09:45
240-203820-8	MW-12-050124-1640	Water	05/01/24 16:40	05/03/24 09:45
240-203820-9	MW-16-050224-0905	Water	05/02/24 09:05	05/03/24 09:45

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Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-20-043024-1750

Lab Sample ID: 240-203820-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0253	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.345		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	77.1		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	53.5		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.443		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	38.1		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-21-050124-0900

Lab Sample ID: 240-203820-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0389	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.455		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0366		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	51.6		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	4.77		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.313		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	15.5		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-5-050124-1025

Lab Sample ID: 240-203820-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0259	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.315		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0124		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	42.4		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	3.26		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.383		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	31.5		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-27-050124-1135

Lab Sample ID: 240-203820-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.163		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0516		0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.800		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.146		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	44.8		1.00	0.329	mg/L	1		6020B	Total Recoverable
Iron	2.38		0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	1.36		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	7.36	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-27-050124-1135 (Continued)

Lab Sample ID: 240-203820-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1.58		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.259		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	249		5.00	1.74	mg/L	5		9056A	Total/NA

Client Sample ID: MW-7-050124-1305

Lab Sample ID: 240-203820-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.222		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0808		0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	1.80		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.114		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	63.2		1.00	0.329	mg/L	1		6020B	Total Recoverable
Iron	0.0522	J	0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	0.670		0.200	0.0760	mg/L	1		350.1	Total/NA
Chloride	1.20		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.275		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	1300		10.0	3.48	mg/L	10		9056A	Total/NA

Client Sample ID: MW-6-050124-1520

Lab Sample ID: 240-203820-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.380		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0712		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	47.1		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	12.8		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.258		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	9.59		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: 20760-050124-0001

Lab Sample ID: 240-203820-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.499		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	29.1		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	9.54		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.290		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	41.7		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-12-050124-1640

Lab Sample ID: 240-203820-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.502		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	28.2		1.00	0.329	mg/L	1		6020B	Total Recoverable
Chloride	9.69		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.297		0.0500	0.0240	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-12-050124-1640 (Continued)

Lab Sample ID: 240-203820-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	42.4		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-16-050224-0905

Lab Sample ID: 240-203820-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.0663	J	0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0626		0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.494		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.117		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	48.0		1.00	0.329	mg/L	1		6020B	Total Recoverable
Iron	0.0938	J	0.100	0.0470	mg/L	1		6020B	Dissolved
Chloride	4.36		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.394		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	68.4		1.00	0.348	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-20-043024-1750

Lab Sample ID: 240-203820-1

Date Collected: 04/30/24 17:50

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:26	1
Lithium	0.0253	J	0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:26	1
Strontium	0.345		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:26	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:22	1
Sodium	77.1		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:22	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 11:40	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	53.5		1.00	0.128	mg/L			05/09/24 05:38	1
Fluoride (SW846 9056A)	0.443		0.0500	0.0240	mg/L			05/09/24 05:38	1
Sulfate (SW846 9056A)	38.1		1.00	0.348	mg/L			05/09/24 05:38	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-21-050124-0900

Lab Sample ID: 240-203820-2

Date Collected: 05/01/24 09:00

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:30	1
Lithium	0.0389	J	0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:30	1
Strontium	0.455		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:30	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0366		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:28	1
Sodium	51.6		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:28	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 11:43	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	4.77		1.00	0.128	mg/L			05/09/24 10:42	1
Fluoride (SW846 9056A)	0.313		0.0500	0.0240	mg/L			05/09/24 10:42	1
Sulfate (SW846 9056A)	15.5		1.00	0.348	mg/L			05/09/24 10:42	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-5-050124-1025

Lab Sample ID: 240-203820-3

Date Collected: 05/01/24 10:25

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:34	1
Lithium	0.0259	J	0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:34	1
Strontium	0.315		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:34	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0124		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:33	1
Sodium	42.4		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:33	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 11:46	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	3.26		1.00	0.128	mg/L			05/09/24 11:04	1
Fluoride (SW846 9056A)	0.383		0.0500	0.0240	mg/L			05/09/24 11:04	1
Sulfate (SW846 9056A)	31.5		1.00	0.348	mg/L			05/09/24 11:04	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-27-050124-1135

Lab Sample ID: 240-203820-4

Date Collected: 05/01/24 11:35

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.163		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:39	1
Lithium	0.0516		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:39	1
Strontium	0.800		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:39	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.146		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:38	1
Sodium	44.8		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:38	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.38		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	1.36		0.200	0.0760	mg/L			05/08/24 11:55	1
Chemical Oxygen Demand (SM 5220D-2011)	7.36	J	10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	1.58		1.00	0.128	mg/L			05/09/24 12:09	1
Fluoride (SW846 9056A)	0.259		0.0500	0.0240	mg/L			05/09/24 12:09	1
Sulfate (SW846 9056A)	249		5.00	1.74	mg/L			05/09/24 12:31	5

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-7-050124-1305

Lab Sample ID: 240-203820-5

Date Collected: 05/01/24 13:05

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.222		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 19:52	1
Lithium	0.0808		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 19:52	1
Strontium	1.80		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 19:52	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.114		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 19:53	1
Sodium	63.2		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 19:53	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.0522	J	0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	0.670		0.200	0.0760	mg/L			05/08/24 11:31	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	1.20		1.00	0.128	mg/L			05/09/24 08:32	1
Fluoride (SW846 9056A)	0.275		0.0500	0.0240	mg/L			05/09/24 08:32	1
Sulfate (SW846 9056A)	1300		10.0	3.48	mg/L			05/09/24 09:37	10

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-6-050124-1520

Lab Sample ID: 240-203820-6

Date Collected: 05/01/24 15:20

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:43	1
Lithium	ND		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:43	1
Strontium	0.380		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:43	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0712		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:48	1
Sodium	47.1		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:48	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 11:58	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	12.8		1.00	0.128	mg/L			05/09/24 12:53	1
Fluoride (SW846 9056A)	0.258		0.0500	0.0240	mg/L			05/09/24 12:53	1
Sulfate (SW846 9056A)	9.59		1.00	0.348	mg/L			05/09/24 12:53	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: 20760-050124-0001

Lab Sample ID: 240-203820-7

Date Collected: 05/01/24 00:00

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 20:47	1
Lithium	ND		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 20:47	1
Strontium	0.499		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 20:47	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:53	1
Sodium	29.1		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:53	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 20:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 12:01	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	9.54		1.00	0.128	mg/L			05/09/24 13:15	1
Fluoride (SW846 9056A)	0.290		0.0500	0.0240	mg/L			05/09/24 13:15	1
Sulfate (SW846 9056A)	41.7		1.00	0.348	mg/L			05/09/24 13:15	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-12-050124-1640

Lab Sample ID: 240-203820-8

Date Collected: 05/01/24 16:40

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 21:00	1
Lithium	ND		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 21:00	1
Strontium	0.502		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 21:00	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 20:58	1
Sodium	28.2		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 20:58	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 21:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 12:04	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/08/24 08:54	1
Chloride (SW846 9056A)	9.69		1.00	0.128	mg/L			05/09/24 13:36	1
Fluoride (SW846 9056A)	0.297		0.0500	0.0240	mg/L			05/09/24 13:36	1
Sulfate (SW846 9056A)	42.4		1.00	0.348	mg/L			05/09/24 13:36	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-16-050224-0905

Lab Sample ID: 240-203820-9

Date Collected: 05/02/24 09:05

Matrix: Water

Date Received: 05/03/24 09:45

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.0663	J	0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 21:04	1
Lithium	0.0626		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 21:04	1
Strontium	0.494		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 21:04	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.117		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 21:03	1
Sodium	48.0		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 21:03	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.0938	J	0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 21:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			05/08/24 12:07	1
Chemical Oxygen Demand (SM 5220D-2011)	ND		10.0	1.80	mg/L			05/14/24 13:40	1
Chloride (SW846 9056A)	4.36		1.00	0.128	mg/L			05/09/24 13:58	1
Fluoride (SW846 9056A)	0.394		0.0500	0.0240	mg/L			05/09/24 13:58	1
Sulfate (SW846 9056A)	68.4		1.00	0.348	mg/L			05/09/24 13:58	1

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 240-611976/1-A
Matrix: Water
Analysis Batch: 612168

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Boron	ND		0.100	0.0573	mg/L		05/06/24 14:00	05/07/24 19:44	1
Lithium	ND		0.0500	0.0172	mg/L		05/06/24 14:00	05/07/24 19:44	1
Strontium	ND		0.0500	0.00927	mg/L		05/06/24 14:00	05/07/24 19:44	1

Lab Sample ID: LCS 240-611976/2-A
Matrix: Water
Analysis Batch: 612168

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	1.00	0.8722		mg/L		87	80 - 120
Strontium	1.00	0.9037		mg/L		90	80 - 120

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612168

Client Sample ID: MW-7-050124-1305
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	0.0808		1.00	1.046		mg/L		96	75 - 125
Strontium	1.80		1.00	2.745		mg/L		94	75 - 125

Lab Sample ID: 240-203820-5 MSD
Matrix: Water
Analysis Batch: 612168

Client Sample ID: MW-7-050124-1305
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Lithium	0.0808		1.00	1.082		mg/L		100	75 - 125	3	20
Strontium	1.80		1.00	2.812		mg/L		101	75 - 125	2	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-611976/1-A
Matrix: Water
Analysis Batch: 612218

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	ND		0.100	0.0470	mg/L		05/06/24 14:00	05/07/24 19:49	1
Manganese	ND		0.00500	0.00353	mg/L		05/06/24 14:00	05/07/24 19:49	1
Sodium	ND		1.00	0.329	mg/L		05/06/24 14:00	05/07/24 19:49	1

Lab Sample ID: LCS 240-611976/3-A
Matrix: Water
Analysis Batch: 612218

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Manganese	0.500	0.4696		mg/L		94	80 - 120
Sodium	25.0	23.42		mg/L		94	80 - 120

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612218

Client Sample ID: MW-7-050124-1305
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Manganese	0.114		0.500	0.6106		mg/L		99	80 - 120	
Sodium	63.2		25.0	86.13		mg/L		92	80 - 120	

Lab Sample ID: 240-203820-5 MSD
Matrix: Water
Analysis Batch: 612218

Client Sample ID: MW-7-050124-1305
Prep Type: Total Recoverable
Prep Batch: 611976

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit
Manganese	0.114		0.500	0.5986		mg/L		97	80 - 120		2
Sodium	63.2		25.0	84.76		mg/L		86	80 - 120		2

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612218

Client Sample ID: MW-7-050124-1305
Prep Type: Dissolved
Prep Batch: 611976

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Iron	0.0522	J	5.00	4.920		mg/L		97	80 - 120	

Lab Sample ID: 240-203820-5 MSD
Matrix: Water
Analysis Batch: 612218

Client Sample ID: MW-7-050124-1305
Prep Type: Dissolved
Prep Batch: 611976

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit
Iron	0.0522	J	5.00	5.070		mg/L		100	80 - 120		3

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 240-612402/14
Matrix: Water
Analysis Batch: 612402

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Ammonia	ND		0.200	0.0760	mg/L			05/08/24 10:43	1

Lab Sample ID: LCS 240-612402/15
Matrix: Water
Analysis Batch: 612402

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec	
		Added	Result				Qualifier	Limits
Ammonia	3.83	3.616		mg/L		94	90 - 110	

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612402

Client Sample ID: MW-7-050124-1305
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Ammonia	0.670		2.50	2.988		mg/L		93	90 - 110	

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QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: 240-203820-5 MSD
 Matrix: Water
 Analysis Batch: 612402

Client Sample ID: MW-7-050124-1305
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia	0.670		2.50	2.984		mg/L		93	90 - 110	0	20

Method: 5220D-2011 - Chemical Oxygen Demand

Lab Sample ID: MB 240-612256/41
 Matrix: Water
 Analysis Batch: 612256

Client Sample ID: Method Blank
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			05/08/24 08:54	1

Lab Sample ID: LCS 240-612256/42
 Matrix: Water
 Analysis Batch: 612256

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	39.07		mg/L		95	90 - 110

Lab Sample ID: 240-203820-5 MS
 Matrix: Water
 Analysis Batch: 612256

Client Sample ID: MW-7-050124-1305
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	ND		50.0	45.35		mg/L		91	90 - 110

Lab Sample ID: 240-203820-5 MSD
 Matrix: Water
 Analysis Batch: 612256

Client Sample ID: MW-7-050124-1305
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	ND		50.0	48.80		mg/L		98	90 - 110	7	20

Lab Sample ID: MB 240-613017/9
 Matrix: Water
 Analysis Batch: 613017

Client Sample ID: Method Blank
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			05/14/24 13:40	1

Lab Sample ID: LCS 240-613017/10
 Matrix: Water
 Analysis Batch: 613017

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	39.09		mg/L		95	90 - 110

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method: 5220D-2011 - Chemical Oxygen Demand (Continued)

Lab Sample ID: 240-203618-F-1 MS
Matrix: Water
Analysis Batch: 613017

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	ND		50.0	47.10		mg/L		94	90 - 110

Lab Sample ID: 240-203618-F-1 MSD
Matrix: Water
Analysis Batch: 613017

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	ND		50.0	51.90		mg/L		104	90 - 110	10	20

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 240-612376/3
Matrix: Water
Analysis Batch: 612376

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.128	mg/L			05/08/24 19:08	1
Fluoride	ND		0.0500	0.0240	mg/L			05/08/24 19:08	1
Sulfate	ND		1.00	0.348	mg/L			05/08/24 19:08	1

Lab Sample ID: LCS 240-612376/4
Matrix: Water
Analysis Batch: 612376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	49.27		mg/L		99	90 - 110
Fluoride	2.50	2.594		mg/L		104	90 - 110
Sulfate	50.0	50.70		mg/L		101	90 - 110

Lab Sample ID: 240-203815-A-4 MS
Matrix: Water
Analysis Batch: 612376

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	0.447	J	50.0	54.68		mg/L		108	80 - 120
Fluoride	0.0803		2.50	2.850		mg/L		111	80 - 120
Sulfate	94.0		50.0	145.9		mg/L		104	80 - 120

Lab Sample ID: 240-203815-A-4 MSD
Matrix: Water
Analysis Batch: 612376

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	0.447	J	50.0	55.74		mg/L		111	80 - 120	2	15
Fluoride	0.0803		2.50	2.918		mg/L		114	80 - 120	2	15
Sulfate	94.0		50.0	147.1		mg/L		106	80 - 120	1	15

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QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 240-612381/3
Matrix: Water
Analysis Batch: 612381

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.128	mg/L			05/09/24 07:49	1
Fluoride	ND		0.0500	0.0240	mg/L			05/09/24 07:49	1
Sulfate	ND		1.00	0.348	mg/L			05/09/24 07:49	1

Lab Sample ID: LCS 240-612381/4
Matrix: Water
Analysis Batch: 612381

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	49.30		mg/L		99	90 - 110
Fluoride	2.50	2.604		mg/L		104	90 - 110
Sulfate	50.0	50.73		mg/L		101	90 - 110

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612381

Client Sample ID: MW-7-050124-1305
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	1.20		50.0	55.56		mg/L		109	80 - 120
Fluoride	0.275		2.50	2.984		mg/L		108	80 - 120

Lab Sample ID: 240-203820-5 MS
Matrix: Water
Analysis Batch: 612381

Client Sample ID: MW-7-050124-1305
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfate	1300		500	1763		mg/L		93	80 - 120

Lab Sample ID: 240-203820-5 MSD
Matrix: Water
Analysis Batch: 612381

Client Sample ID: MW-7-050124-1305
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Chloride	1.20		50.0	54.98		mg/L		108	80 - 120	1	15
Fluoride	0.275		2.50	2.942		mg/L		107	80 - 120	1	15

Lab Sample ID: 240-203820-5 MSD
Matrix: Water
Analysis Batch: 612381

Client Sample ID: MW-7-050124-1305
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Sulfate	1300		500	1773		mg/L		95	80 - 120	1	15

QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Metals

Prep Batch: 611976

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Dissolved	Water	3005A	
240-203820-1	MW-20-043024-1750	Total Recoverable	Water	3005A	
240-203820-2	MW-21-050124-0900	Dissolved	Water	3005A	
240-203820-2	MW-21-050124-0900	Total Recoverable	Water	3005A	
240-203820-3	MW-5-050124-1025	Dissolved	Water	3005A	
240-203820-3	MW-5-050124-1025	Total Recoverable	Water	3005A	
240-203820-4	MW-27-050124-1135	Dissolved	Water	3005A	
240-203820-4	MW-27-050124-1135	Total Recoverable	Water	3005A	
240-203820-5	MW-7-050124-1305	Dissolved	Water	3005A	
240-203820-5	MW-7-050124-1305	Total Recoverable	Water	3005A	
240-203820-6	MW-6-050124-1520	Dissolved	Water	3005A	
240-203820-6	MW-6-050124-1520	Total Recoverable	Water	3005A	
240-203820-7	20760-050124-0001	Dissolved	Water	3005A	
240-203820-7	20760-050124-0001	Total Recoverable	Water	3005A	
240-203820-8	MW-12-050124-1640	Dissolved	Water	3005A	
240-203820-8	MW-12-050124-1640	Total Recoverable	Water	3005A	
240-203820-9	MW-16-050224-0905	Dissolved	Water	3005A	
240-203820-9	MW-16-050224-0905	Total Recoverable	Water	3005A	
MB 240-611976/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-611976/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCS 240-611976/3-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-203820-5 MS	MW-7-050124-1305	Dissolved	Water	3005A	
240-203820-5 MS	MW-7-050124-1305	Total Recoverable	Water	3005A	
240-203820-5 MS	MW-7-050124-1305	Total Recoverable	Water	3005A	
240-203820-5 MSD	MW-7-050124-1305	Dissolved	Water	3005A	
240-203820-5 MSD	MW-7-050124-1305	Total Recoverable	Water	3005A	
240-203820-5 MSD	MW-7-050124-1305	Total Recoverable	Water	3005A	

Analysis Batch: 612168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Total Recoverable	Water	6010D	611976
240-203820-2	MW-21-050124-0900	Total Recoverable	Water	6010D	611976
240-203820-3	MW-5-050124-1025	Total Recoverable	Water	6010D	611976
240-203820-4	MW-27-050124-1135	Total Recoverable	Water	6010D	611976
240-203820-5	MW-7-050124-1305	Total Recoverable	Water	6010D	611976
240-203820-6	MW-6-050124-1520	Total Recoverable	Water	6010D	611976
240-203820-7	20760-050124-0001	Total Recoverable	Water	6010D	611976
240-203820-8	MW-12-050124-1640	Total Recoverable	Water	6010D	611976
240-203820-9	MW-16-050224-0905	Total Recoverable	Water	6010D	611976
MB 240-611976/1-A	Method Blank	Total Recoverable	Water	6010D	611976
LCS 240-611976/2-A	Lab Control Sample	Total Recoverable	Water	6010D	611976
240-203820-5 MS	MW-7-050124-1305	Total Recoverable	Water	6010D	611976
240-203820-5 MSD	MW-7-050124-1305	Total Recoverable	Water	6010D	611976

Analysis Batch: 612218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Dissolved	Water	6020B	611976
240-203820-1	MW-20-043024-1750	Total Recoverable	Water	6020B	611976
240-203820-2	MW-21-050124-0900	Dissolved	Water	6020B	611976
240-203820-2	MW-21-050124-0900	Total Recoverable	Water	6020B	611976
240-203820-3	MW-5-050124-1025	Dissolved	Water	6020B	611976

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QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Metals (Continued)

Analysis Batch: 612218 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-3	MW-5-050124-1025	Total Recoverable	Water	6020B	611976
240-203820-4	MW-27-050124-1135	Dissolved	Water	6020B	611976
240-203820-4	MW-27-050124-1135	Total Recoverable	Water	6020B	611976
240-203820-5	MW-7-050124-1305	Dissolved	Water	6020B	611976
240-203820-5	MW-7-050124-1305	Total Recoverable	Water	6020B	611976
240-203820-6	MW-6-050124-1520	Dissolved	Water	6020B	611976
240-203820-6	MW-6-050124-1520	Total Recoverable	Water	6020B	611976
240-203820-7	20760-050124-0001	Dissolved	Water	6020B	611976
240-203820-7	20760-050124-0001	Total Recoverable	Water	6020B	611976
240-203820-8	MW-12-050124-1640	Dissolved	Water	6020B	611976
240-203820-8	MW-12-050124-1640	Total Recoverable	Water	6020B	611976
240-203820-9	MW-16-050224-0905	Dissolved	Water	6020B	611976
240-203820-9	MW-16-050224-0905	Total Recoverable	Water	6020B	611976
MB 240-611976/1-A	Method Blank	Total Recoverable	Water	6020B	611976
LCS 240-611976/3-A	Lab Control Sample	Total Recoverable	Water	6020B	611976
240-203820-5 MS	MW-7-050124-1305	Dissolved	Water	6020B	611976
240-203820-5 MS	MW-7-050124-1305	Total Recoverable	Water	6020B	611976
240-203820-5 MSD	MW-7-050124-1305	Dissolved	Water	6020B	611976
240-203820-5 MSD	MW-7-050124-1305	Total Recoverable	Water	6020B	611976

General Chemistry

Analysis Batch: 612256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Total/NA	Water	5220D-2011	
240-203820-2	MW-21-050124-0900	Total/NA	Water	5220D-2011	
240-203820-3	MW-5-050124-1025	Total/NA	Water	5220D-2011	
240-203820-4	MW-27-050124-1135	Total/NA	Water	5220D-2011	
240-203820-5	MW-7-050124-1305	Total/NA	Water	5220D-2011	
240-203820-6	MW-6-050124-1520	Total/NA	Water	5220D-2011	
240-203820-7	20760-050124-0001	Total/NA	Water	5220D-2011	
240-203820-8	MW-12-050124-1640	Total/NA	Water	5220D-2011	
MB 240-612256/41	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-612256/42	Lab Control Sample	Total/NA	Water	5220D-2011	
240-203820-5 MS	MW-7-050124-1305	Total/NA	Water	5220D-2011	
240-203820-5 MSD	MW-7-050124-1305	Total/NA	Water	5220D-2011	

Analysis Batch: 612376

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Total/NA	Water	9056A	
MB 240-612376/3	Method Blank	Total/NA	Water	9056A	
LCS 240-612376/4	Lab Control Sample	Total/NA	Water	9056A	
240-203815-A-4 MS	Matrix Spike	Total/NA	Water	9056A	
240-203815-A-4 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 612381

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-2	MW-21-050124-0900	Total/NA	Water	9056A	
240-203820-3	MW-5-050124-1025	Total/NA	Water	9056A	
240-203820-4	MW-27-050124-1135	Total/NA	Water	9056A	
240-203820-4	MW-27-050124-1135	Total/NA	Water	9056A	

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QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

General Chemistry (Continued)

Analysis Batch: 612381 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-5	MW-7-050124-1305	Total/NA	Water	9056A	
240-203820-5	MW-7-050124-1305	Total/NA	Water	9056A	
240-203820-6	MW-6-050124-1520	Total/NA	Water	9056A	
240-203820-7	20760-050124-0001	Total/NA	Water	9056A	
240-203820-8	MW-12-050124-1640	Total/NA	Water	9056A	
240-203820-9	MW-16-050224-0905	Total/NA	Water	9056A	
MB 240-612381/3	Method Blank	Total/NA	Water	9056A	
LCS 240-612381/4	Lab Control Sample	Total/NA	Water	9056A	
240-203820-5 MS	MW-7-050124-1305	Total/NA	Water	9056A	
240-203820-5 MS	MW-7-050124-1305	Total/NA	Water	9056A	
240-203820-5 MSD	MW-7-050124-1305	Total/NA	Water	9056A	
240-203820-5 MSD	MW-7-050124-1305	Total/NA	Water	9056A	

Analysis Batch: 612402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-1	MW-20-043024-1750	Total/NA	Water	350.1	
240-203820-2	MW-21-050124-0900	Total/NA	Water	350.1	
240-203820-3	MW-5-050124-1025	Total/NA	Water	350.1	
240-203820-4	MW-27-050124-1135	Total/NA	Water	350.1	
240-203820-5	MW-7-050124-1305	Total/NA	Water	350.1	
240-203820-6	MW-6-050124-1520	Total/NA	Water	350.1	
240-203820-7	20760-050124-0001	Total/NA	Water	350.1	
240-203820-8	MW-12-050124-1640	Total/NA	Water	350.1	
240-203820-9	MW-16-050224-0905	Total/NA	Water	350.1	
MB 240-612402/14	Method Blank	Total/NA	Water	350.1	
LCS 240-612402/15	Lab Control Sample	Total/NA	Water	350.1	
240-203820-5 MS	MW-7-050124-1305	Total/NA	Water	350.1	
240-203820-5 MSD	MW-7-050124-1305	Total/NA	Water	350.1	

Analysis Batch: 613017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-203820-9	MW-16-050224-0905	Total/NA	Water	5220D-2011	
MB 240-613017/9	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-613017/10	Lab Control Sample	Total/NA	Water	5220D-2011	
240-203618-F-1 MS	Matrix Spike	Total/NA	Water	5220D-2011	
240-203618-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5220D-2011	

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-20-043024-1750

Lab Sample ID: 240-203820-1

Date Collected: 04/30/24 17:50

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:26
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:25
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:22
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:40
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612376	JWW	EET CLE	05/09/24 05:38

Client Sample ID: MW-21-050124-0900

Lab Sample ID: 240-203820-2

Date Collected: 05/01/24 09:00

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:30
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:30
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:28
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:43
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 10:42

Client Sample ID: MW-5-050124-1025

Lab Sample ID: 240-203820-3

Date Collected: 05/01/24 10:25

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:34
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:35
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:33
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:46
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 11:04

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: MW-27-050124-1135

Lab Sample ID: 240-203820-4

Date Collected: 05/01/24 11:35

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:39
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:40
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:38
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:55
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 12:09
Total/NA	Analysis	9056A		5	612381	MS	EET CLE	05/09/24 12:31

Client Sample ID: MW-7-050124-1305

Lab Sample ID: 240-203820-5

Date Collected: 05/01/24 13:05

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 19:52
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:05
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 19:53
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:31
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 08:32
Total/NA	Analysis	9056A		10	612381	MS	EET CLE	05/09/24 09:37

Client Sample ID: MW-6-050124-1520

Lab Sample ID: 240-203820-6

Date Collected: 05/01/24 15:20

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:43
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:50
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:48
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 11:58
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 12:53

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Client Sample ID: 20760-050124-0001

Lab Sample ID: 240-203820-7

Date Collected: 05/01/24 00:00

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 20:47
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:55
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:53
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 12:01
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 13:15

Client Sample ID: MW-12-050124-1640

Lab Sample ID: 240-203820-8

Date Collected: 05/01/24 16:40

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 21:00
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 21:00
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 20:58
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 12:04
Total/NA	Analysis	5220D-2011		1	612256	MS	EET CLE	05/08/24 08:54
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 13:36

Client Sample ID: MW-16-050224-0905

Lab Sample ID: 240-203820-9

Date Collected: 05/02/24 09:05

Matrix: Water

Date Received: 05/03/24 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6010D		1	612168	RKT	EET CLE	05/07/24 21:04
Dissolved	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Dissolved	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 21:05
Total Recoverable	Prep	3005A			611976	GK	EET CLE	05/06/24 14:00
Total Recoverable	Analysis	6020B		1	612218	AJC	EET CLE	05/07/24 21:03
Total/NA	Analysis	350.1		1	612402	AJ	EET CLE	05/08/24 12:07
Total/NA	Analysis	5220D-2011		1	613017	QUY8	EET CLE	05/14/24 13:40
Total/NA	Analysis	9056A		1	612381	MS	EET CLE	05/09/24 13:58

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-203820-1

Laboratory: Eurofins Cleveland

The accreditations/certifications listed below are applicable to this report.


Authority	Program	Identification Number	Expiration Date
Iowa	State	421	06-01-25

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

Eurofins Cleveland

180 S. Van Buren Avenue
 Barberton, OH 44203
 Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

Client Information		Sampler: <u>Francis Reed</u>		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-120136-41930.2											
Client Contact: Thomas Vanage		Phone: <u>614-288-8619</u>		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: <u>IA</u>		Page: Page 2 of 2											
Company: Haley & Aldrich, Inc.		PWSID:		Analysis Requested						Job #: <u>129848-036</u>									
Address: 8899 Gander Creek Drive		Due Date Requested:		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes or No)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Perform MS/MSD (Yes or No)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">9056A_28D - Chloride, Fluoride, Sulfate</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">350.1, 5220D</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6010D, 6020B</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6020B - Iron - Field Filtered</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6020B - Iron, Lab to filter</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Number of containers</td> </tr> </table>						Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056A_28D - Chloride, Fluoride, Sulfate	350.1, 5220D	6010D, 6020B	6020B - Iron - Field Filtered	6020B - Iron, Lab to filter	Total Number of containers	Preservation Codes: N - None S - H2SO4 D - HNO3	
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056A_28D - Chloride, Fluoride, Sulfate	350.1, 5220D							6010D, 6020B	6020B - Iron - Field Filtered	6020B - Iron, Lab to filter	Total Number of containers						
City: <u>Miamisburg</u>		TAT Requested (days): <u>STD TAT</u>								Other:									
State, Zip: <u>OH, 45342-4418</u>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No																	
Phone: <u>937-530-1412(Tel)</u>		PO #: <u>0129848-034</u>																	
Email: <u>TVanage@haleyaldrich.com</u>		WO #:																	
Project Name: <u>Amsted - Keokuk, Iowa Spring 2024</u>		Project #: <u>24024753</u>		 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">240-203820 Chain of Custody</p>						Special Instructions/Note:									
Site:		SSOW#:																	
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)		Preservation Code: N S D D N									
<u>MW-20-043024-1750</u>		<u>4/30/24</u>		<u>1750</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>MW-21-050124-0900</u>		<u>5/1/24</u>		<u>0900</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>MW-5-050124-1025</u>		<u>5/1/24</u>		<u>1025</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>MW-27-050124-1135</u>		<u>5/1/24</u>		<u>1135</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>MW-7-050124-1305</u>		<u>5/1/24</u>		<u>1305</u>		<u>G</u>		<u>Water</u>		<u>Y Y X X X X</u>									
<u>MW-6-050124-1520</u>		<u>5/1/24</u>		<u>1520</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>20760-050124-0001</u>		<u>5/1/24</u>		<u>-</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X Y</u>									
<u>MW-12-050124-1640</u>		<u>5/1/24</u>		<u>1640</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
<u>MW-16-050224-0905</u>		<u>5/2/24</u>		<u>0905</u>		<u>G</u>		<u>Water</u>		<u>Y N X X X X</u>									
								<u>Water</u>											
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)													
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months													
Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:													
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:													
Relinquished by: <u>Francis Reed</u>		Date/Time: <u>05/02/24 12:30</u>		Company: <u>H+A</u>		Received by: <u>Rachel Reed</u>		Date/Time: <u>05/3/24 9:45</u>		Company: <u>EEINC</u>									
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:									
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:															



Eurofins – Cleveland Sample Receipt Form/Narrative Login # : 203820
Barberton Facility

Client Haley & Alderich Site Name _____ Cooler unpacked by: Rachelle HA, det
Cooler Received on 5/3/24 Opened on 5/3/24
FedEx. 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other _____


Receipt After-hours _____ Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # EC Foam Box Chent Cooler Box Other _____
Packing material used Bubble Wrap Foam Plastic Bag None Other _____
COOLANT: Wet Ice Blue Ice Dry Ice Water None

1 Cooler temperature upon receipt _____ See Multiple Cooler Form
IR GUN # 17 (CF 102 °C) Observed Cooler Temp _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
-Were tamper/custody seals intact and uncompromised? Yes No NA

3 Shippers' packing slip attached to the cooler(s)? Yes No
4 Did custody papers accompany the sample(s)? Yes No
5 Were the custody papers relinquished & signed in the appropriate place? Yes No
6 Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7 Did all bottles arrive in good condition (Unbroken)? Yes No
8 Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)?
10 Were correct bottle(s) used for the test(s) indicated? Yes No
11 Sufficient quantity received to perform indicated analyses? Yes No
12 Are these work share samples and all listed on the COC? Yes No
If yes, Questions 13-17 have been checked at the originating laboratory

13 Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC439975
14 Were VOAs on the COC? Yes No
15 Were air bubbles >6 mm in any VOA vials? Yes No NA  ← Larger than this
16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
17 Was a LL Hg or Me Hg trip blank present? _____ Yes No

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other _____
Concerning _____

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by _____

19 SAMPLE CONDITION
Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container
Sample(s) _____ were received with bubble >6 mm in diameter (Notify PM)

20 SAMPLE PRESERVATION
Sample(s) _____ were further preserved in the laboratory
Time preserved _____ Preservative(s) added/Lot number(s) _____
VOA Sample Preservation Date/Time VOAs Frozen. _____

Login #: _____

Eurofins - Cleveland Sample Receipt Multiple Cooler Form				
Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
EC Client Box Other	IR GUN #: 17	2.8	30	Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____	1.9	2.1	Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____	1.3	1.5	Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
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EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None

See Temperature Excursion Form



Temperature readings

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservation</u>	<u>Preservation</u>
			<u>pH</u>	<u>Temp</u>	<u>Added</u>	<u>Lot Number</u>
MW-20-043024-1750	240 203820-A-1	Voa Vial 40mL Amber H2SO4				
MW-20-043024-1750	240-203820-B-1	Plastic 60 mL - unpreserved				
MW-20-043024-1750	240-203820-C-1	Plastic 250ml - with Sulfuric Acid				
MW-20-043024-1750	240-203820 D-1	Amber Glass 250ml - Sulfuric Acid				
MW-20-043024 1750	240-203820-E-1	Plastic 500ml with Nitric Acid				
MW-20-043024-1750	240-203820-F-1	Plastic 500ml - w/ Nitric - Dis.				
MW 21-050124-0900	240-203820-A-2	Voa Vial 40mL Amber - H2SO4				
MW-21-050124-0900	240-203820-B-2	Plastic 60 mL - unpreserved				
MW 21-050124-0900	240 203820-C-2	Plastic 250ml - with Sulfuric Acid				
MW-21-050124-0900	240-203820-D-2	Amber Glass 250ml Sulfuric Acid				
MW-21-050124-0900	240-203820 E-2	Plastic 500ml - with Nitric Acid				
MW-21-050124-0900	240-203820 F 2	Plastic 500ml - w/ Nitric - Dis				
MW-5-050124-1025	240-203820-A-3	Voa Vial 40mL Amber - H2SO4				
MW-5-050124-1025	240-203820-B 3	Plastic 60 mL - unpreserved				
MW 5-050124-1025	240-203820-C-3	Plastic 250ml with Sulfuric Acid				
MW-5-050124-1025	240-203820-D-3	Amber Glass 250ml - Sulfuric Acid				
MW 5-050124-1025	240-203820-E-3	Plastic 500ml - with Nitric Acid				
MW-5-050124-1025	240 203820-F-3	Plastic 500ml - w/ Nitric - Dis.				
MW 27-050124-1135	240-203820-A-4	Voa Vial 40mL Amber H2SO4				
MW-27-050124-1135	240-203820-B-4	Plastic 60 mL - unpreserved				
MW 27-050124-1135	240-203820-C-4	Plastic 250ml - with Sulfuric Acid				
MW 27-050124-1135	240-203820-D-4	Amber Glass 250ml - Sulfuric Acid				
MW 27-050124-1135	240-203820-E-4	Plastic 500ml - with Nitric Acid				
MW-27-050124-1135	240-203820-F-4	Plastic 500ml - w/ Nitric - Dis				
MW-7-050124 1305	240-203820-A-5	Voa Vial 40mL Amber - H2SO4				
MW-7-050124-1305	240-203820-A-5 MS	Voa Vial 40mL Amber - H2SO4				
MW-7-050124 1305	240-203820-A 5 MSD	Voa Vial 40mL Amber H2SO4				
MW-7-050124-1305	240-203820-B-5	Plastic 60 mL - unpreserved				
MW-7-050124 1305	240-203820-B 5 MS	Plastic 60 mL unpreserved				
MW-7-050124-1305	240-203820-B-5 MSD	Plastic 60 mL - unpreserved				
MW-7-050124-1305	240-203820-C-5	Plastic 250ml - with Sulfuric Acid				
MW-7-050124-1305	240-203820-C-5 MS	Plastic 250ml - with Sulfuric Acid				
MW 7-050124-1305	240-203820-C-5 MSD	Plastic 250ml - with Sulfuric Acid				



<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u> <u>pH</u>	<u>Temp</u>	<u>Preservation</u> <u>Added</u>	<u>Preservation</u> <u>Lot Number</u>
MW-7-050124-1305	240-203820-D-5	Amber Glass 250ml - Sulfuric Acid				
MW-7-050124-1305	240-203820-D-5 MS	Amber Glass 250ml - Sulfuric Acid				
MW-7-050124-1305	240-203820-D-5 MSD	Amber Glass 250ml - Sulfuric Acid				
MW-7-050124-1305	240-203820-E-5	Plastic 500ml - with Nitric Acid				
MW-7-050124 1305	240-203820-E-5 MS	Plastic 500ml - with Nitric Acid				
MW 7-050124-1305	240-203820-E-5 MSD	Plastic 500ml - with Nitric Acid				
MW-7-050124-1305	240-203820-F-5	Plastic 500ml - w/ Nitric - Dis.				
MW-7-050124-1305	240-203820 F-5 MS	Plastic 500ml - w/ Nitric - Dis.				
MW-7-050124-1305	240-203820-F-5 MSD	Plastic 500ml - w/ Nitric - Dis.				
MW-6-050124-1520	240-203820-A-6	Voa Vial 40mL Amber - H2SO4				
MW-6-050124-1520	240-203820-B-6	Plastic 60 mL - unpreserved				
MW-6-050124 1520	240-203820-C-6	Plastic 250ml - with Sulfuric Acid				
MW-6-050124-1520	240-203820-D-6	Amber Glass 250ml - Sulfuric Acid				
MW-6-050124-1520	240-203820-E-6	Plastic 500ml - with Nitric Acid				
MW-6-050124-1520	240-203820-F-6	Plastic 500ml - w/ Nitric - Dis				
20760-050124-0001	240-203820 A-7	Voa Vial 40mL Amber - H2SO4				
20760-050124-0001	240-203820 B 7	Plastic 60 mL - unpreserved				
20760-050124-0001	240-203820-C-7	Plastic 250ml with Sulfuric Acid				
20760-050124-0001	240-203820-D-7	Amber Glass 250ml - Sulfuric Acid				
20760-050124-0001	240-203820-E-7	Plastic 500ml with Nitric Acid				
20760-050124-0001	240 203820 F-7	Plastic 500ml - w/ Nitric - Dis				
MW-12-050124-1640	240-203820-A-8	Voa Vial 40mL Amber - H2SO4				
MW-12-050124-1640	240 203820 B 8	Plastic 60 mL - unpreserved				
MW-12-050124 1640	240-203820-C-8	Plastic 250ml - with Sulfuric Acid				
MW-12-050124 1640	240-203820 D-8	Amber Glass 250ml - Sulfuric Acid				
MW-12-050124 1640	240-203820-E-8	Plastic 500ml with Nitric Acid				
MW-12-050124-1640	240 203820 F-8	Plastic 500ml - w/ Nitric Dis.				
MW-16-050224-0905	240-203820-A-9	Voa Vial 40mL Amber - H2SO4				
MW 16-050224-0905	240 203820-B-9	Plastic 60 mL - unpreserved				
MW-16-050224-0905	240-203820-C-9	Plastic 250ml with Sulfuric Acid				
MW-16-050224-0905	240-203820 D-9	Amber Glass 250ml Sulfuric Acid				
MW-16-050224-0905	240-203820 E-9	Plastic 500ml with Nitric Acid				
MW-16-050224-0905	240-203820-F-9	Plastic 500ml - w/ Nitric - Dis				

ANALYTICAL REPORT

PREPARED FOR

Attn: Thomas Vanage
Haley & Aldrich, Inc.
8899 Gander Creek Drive
Miamisburg, Ohio 45342-4418

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JOB DESCRIPTION

Amsted - Keokuk, Iowa GW

JOB NUMBER

240-211103-1

Eurofins Cleveland

Job Notes

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Authorization



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Authorized for release by
Denise Heckler, Project Manager II
Denise.Heckler@et.eurofinsus.com
(330)966-9477



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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Qualifiers

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Haley & Aldrich, Inc.
Project: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Job ID: 240-211103-1

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Job Narrative 240-211103-1

Receipt

The samples were received on 9/12/2024 9:15 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 0.2°C, 0.8°C and 2.2°C.

Metals

Method 6010D - Total Recoverable: The continuing calibration verification (CCV) associated with batch 240-627425 recovered above the upper control limit for boron. The samples associated with this CCV were below the reporting limit for the affected analytes; therefore, the data have been reported. The associated samples are impacted: SW-2-091024-1410 (240-211103-1), MW-21-091124-1000 (240-211103-5), MW-20-091124-1210 (240-211103-6), MW-5-091124-1505 (240-211103-8) and 20760-091124-0001 (240-211103-9).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method 420.4_NP: The continuing calibration verification (CCV) associated with batch 240-627058 recovered above the upper control limit for Total Phenols. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: SW-2-091024-1410 (240-211103-1), SW-1-091024-1510 (240-211103-2), MW-25-091024-1645 (240-211103-3), MW-26-091024-1835 (240-211103-4), MW-21-091124-1000 (240-211103-5), MW-20-091124-1210 (240-211103-6), MW-27-091124-1407 (240-211103-7), MW-5-091124-1505 (240-211103-8), 20760-091124-0001 (240-211103-9) and MW-7-091124-1620 (240-211103-10).

Method 9020B: Breakthrough exceeded 10% for the following samples: MW-25-091024-1645 (240-211103-3), SW-2-091024-1410 (240-211103-1), MW-27-091124-1407 (240-211103-7), MW-5-091124-1505 (240-211103-8), 20760-091124-0001 (240-211103-9), MW-7-091124-1620 (240-211103-10), SW-1-091024-1510 (240-211103-2), MW-26-091024-1835 (240-211103-4), MW-21-091124-1000 (240-211103-5), MW-20-091124-1210 (240-211103-6), MW-5-091124-1505 (240-211103-8).

Method 9020B: Sample duplicate results are outside 20% RPD requirement. Reanalysis was performed with concurring results. The data has been reported: MW-5-091124-1505 (240-211103-8) and 20760-091124-0001 (240-211103-9)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CLE
6020B	Metals (ICP/MS)	SW846	EET CLE
350.1	Nitrogen, Ammonia	EPA	EET CLE
420.4	Phenolics, Total Recoverable	EPA	EET CLE
5220D-2011	Chemical Oxygen Demand	SM	EET CLE
9020B	Organic Halides, Total (TOX)	SW846	EET SAV
9056A	Anions, Ion Chromatography	SW846	EET CLE
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET CLE
Carbon Trap	Carbon Trap Preparation	EPA-17	EET SAV
FILTRATION	Sample Filtration	None	EET CLE

Protocol References:

EPA = US Environmental Protection Agency

EPA-17 = "Method 1650, Revision A, Adsorbable Organic Halides By Adsorption And Colormetric Titration," EPA, February 1992

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-211103-1	SW-2-091024-1410	Water	09/10/24 14:10	09/12/24 09:15
240-211103-2	SW-1-091024-1510	Water	09/10/24 15:10	09/12/24 09:15
240-211103-3	MW-25-091024-1645	Water	09/10/24 16:45	09/12/24 09:15
240-211103-4	MW-26-091024-1835	Water	09/10/24 18:35	09/12/24 09:15
240-211103-5	MW-21-091124-1000	Water	09/11/24 10:00	09/12/24 09:15
240-211103-6	MW-20-091124-1210	Water	09/11/24 12:10	09/12/24 09:15
240-211103-7	MW-27-091124-1407	Water	09/11/24 14:07	09/12/24 09:15
240-211103-8	MW-5-091124-1505	Water	09/11/24 15:05	09/12/24 09:15
240-211103-9	20760-091124-0001	Water	09/11/24 00:01	09/12/24 09:15
240-211103-10	MW-7-091124-1620	Water	09/11/24 16:20	09/12/24 09:15

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Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: SW-2-091024-1410

Lab Sample ID: 240-211103-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.103		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0427		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	25.4		1.00	0.882	mg/L	1		6020B	Total Recoverable
Ammonia	0.0970	J	0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	18.7		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	154		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	179		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	129		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	154		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	44.2		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.599		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	53.5		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: SW-1-091024-1510

Lab Sample ID: 240-211103-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.154		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Strontium	0.138		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.228		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	21.0		1.00	0.882	mg/L	1		6020B	Total Recoverable
Ammonia	0.128	J	0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	19.6		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	65.7		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	69.2		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	62.1		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	65.7		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	30.5		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.823		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	36.6		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-25-091024-1645

Lab Sample ID: 240-211103-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.243		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0369	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.507		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.102		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	63.6	F1	1.00	0.882	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	13.5	F1	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	55.9		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	60.6		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	51.2		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	55.9		40.0	14.0	ug/L	1		9020B	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-25-091024-1645 (Continued)

Lab Sample ID: 240-211103-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	37.1		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	1.95		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	59.2		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-26-091024-1835

Lab Sample ID: 240-211103-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.298		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Strontium	1.73		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	2.54		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	77.6		1.00	0.882	mg/L	1		6020B	Total Recoverable
Iron	1.77		0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	1.11		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	18.4		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	27.2	J	40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	39.6	J	40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	14.8	J	40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	27.2	J	40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	2.88		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.209		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	1520		10.0	3.48	mg/L	10		9056A	Total/NA

Client Sample ID: MW-21-091124-1000

Lab Sample ID: 240-211103-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0298	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.379		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0215		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	50.0		1.00	0.882	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	17.5		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	34.6	J	40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	41.8		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	27.4	J	40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	34.6	J	40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	5.62		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.351		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	17.2		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-20-091124-1210

Lab Sample ID: 240-211103-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0253	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.339		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	67.0		1.00	0.882	mg/L	1		6020B	Total Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Detection Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-20-091124-1210 (Continued)

Lab Sample ID: 240-211103-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chemical Oxygen Demand	12.3		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	246		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	232		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	261		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	246		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	58.3		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.503		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	25.1		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-27-091124-1407

Lab Sample ID: 240-211103-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.177		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0438	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.695		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.141		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	41.9		1.00	0.882	mg/L	1		6020B	Total Recoverable
Iron	2.52		0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	1.34		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	7.11	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	52.5		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	52.1		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	52.8		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	52.5		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	1.79		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.322		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	269		5.00	1.74	mg/L	5		9056A	Total/NA

Client Sample ID: MW-5-091124-1505

Lab Sample ID: 240-211103-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0200	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.302		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0355		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	43.6		1.00	0.882	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	8.94	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	143		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	164		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	122		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	143		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	3.74		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.464		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	35.4		1.00	0.348	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: 20760-091124-0001

Lab Sample ID: 240-211103-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	0.0306	J	0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.373		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	72.0		1.00	0.882	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	14.1		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	133		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	167		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	99.1		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	133		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	58.1		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.497		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	25.2		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-7-091124-1620

Lab Sample ID: 240-211103-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.254		0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0734		0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	1.73		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	1.78		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	61.8		1.00	0.882	mg/L	1		6020B	Total Recoverable
Iron	9.60		0.100	0.0470	mg/L	1		6020B	Dissolved
Ammonia	1.00		0.200	0.0760	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	18.1		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	60.1		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	55.0		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	65.2		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	60.1		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	1.44		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.331		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	1430		10.0	3.48	mg/L	10		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: SW-2-091024-1410

Lab Sample ID: 240-211103-1

Date Collected: 09/10/24 14:10

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	^+	0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 03:36	1
Lithium	ND		0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 03:36	1
Strontium	0.103		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 03:36	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0427		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:28	1
Sodium	25.4		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:28	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 16:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	0.0970	J	0.200	0.0760	mg/L			09/20/24 12:54	1
Phenolics, Total Recoverable (EPA 420.4)	ND	^+	0.0100	0.00300	mg/L			09/13/24 20:53	1
Chemical Oxygen Demand (SM 5220D-2011)	18.7		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	154		40.0	14.0	ug/L		09/19/24 08:40	09/20/24 07:03	1
TOX Result 1 (SW846 9020B)	179		40.0	14.0	ug/L		09/19/24 08:40	09/20/24 07:03	1
TOX Result 2 (SW846 9020B)	129		40.0	14.0	ug/L		09/19/24 08:40	09/20/24 07:03	1
TOX Dup (SW846 9020B)	154		40.0	14.0	ug/L		09/19/24 08:40	09/20/24 07:03	1
Chloride (SW846 9056A)	44.2		1.00	0.128	mg/L			09/15/24 03:21	1
Fluoride (SW846 9056A)	0.599		0.0500	0.0240	mg/L			09/15/24 03:21	1
Sulfate (SW846 9056A)	53.5		1.00	0.348	mg/L			09/15/24 03:21	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: SW-1-091024-1510

Lab Sample ID: 240-211103-2

Date Collected: 09/10/24 15:10

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.154		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 19:04	1
Lithium	ND		0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 03:40	1
Strontium	0.138		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 03:40	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.228		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:31	1
Sodium	21.0		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:31	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 16:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	0.128	J	0.200	0.0760	mg/L			09/20/24 12:57	1
Phenolics, Total Recoverable (EPA 420.4)	ND	^+	0.0100	0.00300	mg/L			09/13/24 20:56	1
Chemical Oxygen Demand (SM 5220D-2011)	19.6		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	65.7		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 15:05	1
TOX Result 1 (SW846 9020B)	69.2		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 15:05	1
TOX Result 2 (SW846 9020B)	62.1		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 15:05	1
TOX Dup (SW846 9020B)	65.7		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 15:05	1
Chloride (SW846 9056A)	30.5		1.00	0.128	mg/L			09/15/24 03:42	1
Fluoride (SW846 9056A)	0.823		0.0500	0.0240	mg/L			09/15/24 03:42	1
Sulfate (SW846 9056A)	36.6		1.00	0.348	mg/L			09/15/24 03:42	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-25-091024-1645

Lab Sample ID: 240-211103-3

Date Collected: 09/10/24 16:45

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.243		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 18:25	1
Lithium	0.0369	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 02:58	1
Strontium	0.507		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 02:58	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.102		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 20:56	1
Sodium	63.6	F1	1.00	0.882	mg/L		09/13/24 14:00	09/16/24 20:56	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 21:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/20/24 12:45	1
Phenolics, Total Recoverable (EPA 420.4)	ND	^+ F1	0.0100	0.00300	mg/L			09/13/24 20:59	1
Chemical Oxygen Demand (SM 5220D-2011)	13.5	F1	10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	55.9		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 13:55	1
TOX Result 1 (SW846 9020B)	60.6		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 13:55	1
TOX Result 2 (SW846 9020B)	51.2		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 13:55	1
TOX Dup (SW846 9020B)	55.9		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 13:55	1
Chloride (SW846 9056A)	37.1		1.00	0.128	mg/L			09/15/24 04:48	1
Fluoride (SW846 9056A)	1.95		0.0500	0.0240	mg/L			09/15/24 04:48	1
Sulfate (SW846 9056A)	59.2		1.00	0.348	mg/L			09/15/24 04:48	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-26-091024-1835

Lab Sample ID: 240-211103-4

Date Collected: 09/10/24 18:35

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.298		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 19:08	1
Lithium	ND		0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 03:44	1
Strontium	1.73		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 03:44	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	2.54		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:33	1
Sodium	77.6		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:33	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1.77		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 21:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	1.11		0.200	0.0760	mg/L			09/20/24 13:00	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:23	1
Chemical Oxygen Demand (SM 5220D-2011)	18.4		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	27.2	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 16:39	1
TOX Result 1 (SW846 9020B)	39.6	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 16:39	1
TOX Result 2 (SW846 9020B)	14.8	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 16:39	1
TOX Dup (SW846 9020B)	27.2	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 16:39	1
Chloride (SW846 9056A)	2.88		1.00	0.128	mg/L			09/15/24 06:58	1
Fluoride (SW846 9056A)	0.209		0.0500	0.0240	mg/L			09/15/24 06:58	1
Sulfate (SW846 9056A)	1520		10.0	3.48	mg/L			09/15/24 07:20	10

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-21-091124-1000

Lab Sample ID: 240-211103-5

Date Collected: 09/11/24 10:00

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	^+	0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 03:48	1
Lithium	0.0298	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 03:48	1
Strontium	0.379		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 03:48	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0215		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:43	1
Sodium	50.0		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:43	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 21:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/20/24 13:03	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:26	1
Chemical Oxygen Demand (SM 5220D-2011)	17.5		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	34.6	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 17:28	1
TOX Result 1 (SW846 9020B)	41.8		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 17:28	1
TOX Result 2 (SW846 9020B)	27.4	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 17:28	1
TOX Dup (SW846 9020B)	34.6	J	40.0	14.0	ug/L		09/19/24 08:40	09/19/24 17:28	1
Chloride (SW846 9056A)	5.62		1.00	0.128	mg/L			09/15/24 07:41	1
Fluoride (SW846 9056A)	0.351		0.0500	0.0240	mg/L			09/15/24 07:41	1
Sulfate (SW846 9056A)	17.2		1.00	0.348	mg/L			09/15/24 07:41	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-20-091124-1210

Lab Sample ID: 240-211103-6

Date Collected: 09/11/24 12:10

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	^+	0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 03:53	1
Lithium	0.0253	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 03:53	1
Strontium	0.339		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 03:53	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:48	1
Sodium	67.0		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:48	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 21:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/20/24 13:06	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:29	1
Chemical Oxygen Demand (SM 5220D-2011)	12.3		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	246		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 12:54	1
TOX Result 1 (SW846 9020B)	232		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 12:54	1
TOX Result 2 (SW846 9020B)	261		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 12:54	1
TOX Dup (SW846 9020B)	246		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 12:54	1
Chloride (SW846 9056A)	58.3		1.00	0.128	mg/L			09/15/24 09:08	1
Fluoride (SW846 9056A)	0.503		0.0500	0.0240	mg/L			09/15/24 09:08	1
Sulfate (SW846 9056A)	25.1		1.00	0.348	mg/L			09/15/24 09:08	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-27-091124-1407

Lab Sample ID: 240-211103-7

Date Collected: 09/11/24 14:07

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.177		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 19:12	1
Lithium	0.0438	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 04:05	1
Strontium	0.695		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 04:05	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.141		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:53	1
Sodium	41.9		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:53	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.52		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 21:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	1.34		0.200	0.0760	mg/L			09/20/24 13:15	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:33	1
Chemical Oxygen Demand (SM 5220D-2011)	7.11	J	10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	52.5		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 17:11	1
TOX Result 1 (SW846 9020B)	52.1		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 17:11	1
TOX Result 2 (SW846 9020B)	52.8		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 17:11	1
TOX Dup (SW846 9020B)	52.5		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 17:11	1
Chloride (SW846 9056A)	1.79		1.00	0.128	mg/L			09/15/24 09:52	1
Fluoride (SW846 9056A)	0.322		0.0500	0.0240	mg/L			09/15/24 09:52	1
Sulfate (SW846 9056A)	269		5.00	1.74	mg/L			09/15/24 10:13	5

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-5-091124-1505

Lab Sample ID: 240-211103-8

Date Collected: 09/11/24 15:05

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	^+	0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 04:10	1
Lithium	0.0200	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 04:10	1
Strontium	0.302		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 04:10	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0355		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 21:58	1
Sodium	43.6		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 21:58	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 22:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/20/24 13:18	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:36	1
Chemical Oxygen Demand (SM 5220D-2011)	8.94	J	10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	143		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 17:55	1
TOX Result 1 (SW846 9020B)	164		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 17:55	1
TOX Result 2 (SW846 9020B)	122		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 17:55	1
TOX Dup (SW846 9020B)	143		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 17:55	1
Chloride (SW846 9056A)	3.74		1.00	0.128	mg/L			09/15/24 10:35	1
Fluoride (SW846 9056A)	0.464		0.0500	0.0240	mg/L			09/15/24 10:35	1
Sulfate (SW846 9056A)	35.4		1.00	0.348	mg/L			09/15/24 10:35	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: 20760-091124-0001

Lab Sample ID: 240-211103-9

Date Collected: 09/11/24 00:01

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND	^+	0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 04:14	1
Lithium	0.0306	J	0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 04:14	1
Strontium	0.373		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 04:14	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 22:03	1
Sodium	72.0		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 22:03	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 22:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/20/24 13:21	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/13/24 21:39	1
Chemical Oxygen Demand (SM 5220D-2011)	14.1		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	133		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 18:38	1
TOX Result 1 (SW846 9020B)	167		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 18:38	1
TOX Result 2 (SW846 9020B)	99.1		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 18:38	1
TOX Dup (SW846 9020B)	133		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 18:38	1
Chloride (SW846 9056A)	58.1		1.00	0.128	mg/L			09/15/24 10:57	1
Fluoride (SW846 9056A)	0.497		0.0500	0.0240	mg/L			09/15/24 10:57	1
Sulfate (SW846 9056A)	25.2		1.00	0.348	mg/L			09/15/24 10:57	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-7-091124-1620

Lab Sample ID: 240-211103-10

Date Collected: 09/11/24 16:20

Matrix: Water

Date Received: 09/12/24 09:15

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.254		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 19:16	1
Lithium	0.0734		0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 04:18	1
Strontium	1.73		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 04:18	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	1.78		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 22:13	1
Sodium	61.8		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 22:13	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	9.60		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 22:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	1.00		0.200	0.0760	mg/L			09/20/24 13:24	1
Phenolics, Total Recoverable (EPA 420.4)	ND	F1	0.0100	0.00300	mg/L			09/13/24 21:43	1
Chemical Oxygen Demand (SM 5220D-2011)	18.1		10.0	1.80	mg/L			09/17/24 13:48	1
Halogens, Total Organic (SW846 9020B)	60.1		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 20:33	1
TOX Result 1 (SW846 9020B)	55.0		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 20:33	1
TOX Result 2 (SW846 9020B)	65.2		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 20:33	1
TOX Dup (SW846 9020B)	60.1		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 20:33	1
Chloride (SW846 9056A)	1.44		1.00	0.128	mg/L			09/15/24 11:40	1
Fluoride (SW846 9056A)	0.331		0.0500	0.0240	mg/L			09/15/24 11:40	1
Sulfate (SW846 9056A)	1430		10.0	3.48	mg/L			09/15/24 12:02	10

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 240-626958/1-A
Matrix: Water
Analysis Batch: 627425

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.0500	0.0172	mg/L		09/13/24 14:00	09/18/24 02:50	1
Strontium	ND		0.0500	0.00927	mg/L		09/13/24 14:00	09/18/24 02:50	1

Lab Sample ID: MB 240-626958/1-A
Matrix: Water
Analysis Batch: 627605

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		09/13/24 14:00	09/18/24 18:17	1

Lab Sample ID: LCS 240-626958/2-A
Matrix: Water
Analysis Batch: 627425

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	1.00	0.9483		mg/L		95	80 - 120
Strontium	1.00	0.8726		mg/L		87	80 - 120

Lab Sample ID: LCS 240-626958/2-A
Matrix: Water
Analysis Batch: 627605

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	1.00	1.054		mg/L		105	80 - 120

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627425

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	0.0369	J	1.00	1.011		mg/L		97	75 - 125
Strontium	0.507		1.00	1.409		mg/L		90	75 - 125

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627605

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.243		1.00	1.258		mg/L		102	75 - 125

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627425

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Lithium	0.0369	J	1.00	1.035		mg/L		100	75 - 125	2	20
Strontium	0.507		1.00	1.439		mg/L		93	75 - 125	2	20

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627605

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Boron	0.243		1.00	1.237		mg/L		99	75 - 125	2	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-626953/1-A
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 626953

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 14:54	1

Lab Sample ID: LCS 240-626953/2-A
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 626953

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	5.00	4.930		mg/L		99	80 - 120

Lab Sample ID: 240-211151-F-1-B MS
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 626953

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.267		5.00	5.525		mg/L		105	80 - 120

Lab Sample ID: 240-211151-F-1-C MSD
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 626953

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	0.267		5.00	5.357		mg/L		102	80 - 120	3	20

Lab Sample ID: MB 240-626958/1-A
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/13/24 14:00	09/16/24 20:52	1
Manganese	ND		0.00500	0.00353	mg/L		09/13/24 14:00	09/16/24 20:52	1
Sodium	ND		1.00	0.882	mg/L		09/13/24 14:00	09/16/24 20:52	1

Lab Sample ID: LCS 240-626958/3-A
Matrix: Water
Analysis Batch: 627233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	5.00	4.606		mg/L		92	80 - 120
Manganese	0.500	0.4392		mg/L		88	80 - 120
Sodium	25.0	21.75		mg/L		87	80 - 120

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627233

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Manganese	0.102		0.500	0.5427		mg/L		88	80 - 120	
Sodium	63.6	F1	25.0	79.33	F1	mg/L		63	80 - 120	

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627233

Client Sample ID: MW-25-091024-1645
Prep Type: Total Recoverable
Prep Batch: 626958

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits			
Manganese	0.102		0.500	0.5240		mg/L		84	80 - 120		4	20
Sodium	63.6	F1	25.0	78.45	F1	mg/L		60	80 - 120		1	20

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627233

Client Sample ID: MW-25-091024-1645
Prep Type: Dissolved
Prep Batch: 626958

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Iron	ND		5.00	5.035		mg/L		101	80 - 120	

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627233

Client Sample ID: MW-25-091024-1645
Prep Type: Dissolved
Prep Batch: 626958

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits			
Iron	ND		5.00	4.946		mg/L		99	80 - 120		2	20

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 240-627956/14
Matrix: Water
Analysis Batch: 627956

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Ammonia	ND		0.200	0.0760	mg/L			09/20/24 12:39	1

Lab Sample ID: LCS 240-627956/15
Matrix: Water
Analysis Batch: 627956

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec	
		Result	Qualifier				Limits	
Ammonia	8.50	8.021		mg/L		94	90 - 110	

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627956

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Ammonia	ND		2.50	2.505		mg/L		100	90 - 110	

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QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: 240-211103-3 MSD
 Matrix: Water
 Analysis Batch: 627956

Client Sample ID: MW-25-091024-1645
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia	ND		2.50	2.507		mg/L		100	90 - 110	0	20

Method: 420.4 - Phenolics, Total Recoverable

Lab Sample ID: MB 240-627058/17
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Method Blank
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.0100	0.00300	mg/L			09/13/24 18:36	1

Lab Sample ID: MB 240-627058/55
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Method Blank
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND	^+	0.0100	0.00300	mg/L			09/13/24 20:43	1

Lab Sample ID: LCS 240-627058/18
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	1.00	1.041		mg/L		104	90 - 110

Lab Sample ID: LCS 240-627058/56
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	1.00	1.020	^+	mg/L		102	90 - 110

Lab Sample ID: 240-211089-B-2 MS
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Matrix Spike
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	ND	F1 ^+	0.0500	0.07103	F1 ^+	mg/L		142	90 - 110

Lab Sample ID: 240-211089-B-2 MSD
 Matrix: Water
 Analysis Batch: 627058

Client Sample ID: Matrix Spike Duplicate
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenolics, Total Recoverable	ND	F1 ^+	0.0500	0.07323	F1 ^+	mg/L		146	90 - 110	3	20

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 420.4 - Phenolics, Total Recoverable (Continued)

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627058

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	ND	^+ F1	0.0500	0.07310	F1	mg/L		146	90 - 110

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627058

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenolics, Total Recoverable	ND	^+ F1	0.0500	0.06803	F1	mg/L		136	90 - 110	7	20

Lab Sample ID: 240-211103-10 MS
Matrix: Water
Analysis Batch: 627058

Client Sample ID: MW-7-091124-1620
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	ND	F1	0.0500	0.06869	F1	mg/L		137	90 - 110

Lab Sample ID: 240-211103-10 MSD
Matrix: Water
Analysis Batch: 627058

Client Sample ID: MW-7-091124-1620
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenolics, Total Recoverable	ND	F1	0.0500	0.07365	F1	mg/L		147	90 - 110	7	20

Method: 5220D-2011 - Chemical Oxygen Demand

Lab Sample ID: MB 240-627358/3
Matrix: Water
Analysis Batch: 627358

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			09/17/24 13:48	1

Lab Sample ID: LCS 240-627358/4
Matrix: Water
Analysis Batch: 627358

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	45.20		mg/L		110	90 - 110

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627358

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	13.5	F1	50.0	59.82		mg/L		93	90 - 110

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 5220D-2011 - Chemical Oxygen Demand (Continued)

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 627358

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	13.5	F1	50.0	60.74		mg/L		94	90 - 110	2	20

Method: 9020B - Organic Halides, Total (TOX)

Lab Sample ID: MB 680-856668/1-A
Matrix: Water
Analysis Batch: 856680

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 856668

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 12:50	1
TOX Result 1	ND		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 12:50	1
TOX Result 2	ND		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 12:50	1
TOX Dup	ND		40.0	14.0	ug/L		09/18/24 07:32	09/18/24 12:50	1

Lab Sample ID: LCS 680-856668/2-A
Matrix: Water
Analysis Batch: 856680

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 856668

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Halogens, Total Organic	400	395.6		ug/L		99	60 - 140
TOX Dup	400	395.6		ug/L		99	60 - 140

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 856680

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA
Prep Batch: 856668

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Halogens, Total Organic	55.9		400	443.9		ug/L		97	60 - 140
TOX Dup	55.9		400	443.9		ug/L		97	60 - 140

Lab Sample ID: 240-211103-3 MSD
Matrix: Water
Analysis Batch: 856680

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA
Prep Batch: 856668

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Halogens, Total Organic	55.9		400	450.7		ug/L		99	60 - 140	2	40
TOX Dup	55.9		400	450.7		ug/L		99	60 - 140	2	40

Lab Sample ID: MB 680-856693/1-A
Matrix: Water
Analysis Batch: 856758

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 856693

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/18/24 12:56	09/20/24 07:18	1
TOX Result 1	ND		40.0	14.0	ug/L		09/18/24 12:56	09/20/24 07:18	1
TOX Result 2	ND		40.0	14.0	ug/L		09/18/24 12:56	09/20/24 07:18	1
TOX Dup	ND		40.0	14.0	ug/L		09/18/24 12:56	09/20/24 07:18	1

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QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 9020B - Organic Halides, Total (TOX) (Continued)

Lab Sample ID: LCS 680-856693/2-A
Matrix: Water
Analysis Batch: 856758

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 856693

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	
							Limits	
Halogens, Total Organic	400	387.2		ug/L		97	60 - 140	
TOX Dup	400	387.2		ug/L		97	60 - 140	

Lab Sample ID: 680-255798-A-4-E MS
Matrix: Water
Analysis Batch: 856758

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 856693

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec	
									Limits	
Halogens, Total Organic	96.3		500	520.9		ug/L		85	60 - 140	
TOX Dup	96.3		500	520.9		ug/L		85	60 - 140	

Lab Sample ID: 680-255798-A-4-F MSD
Matrix: Water
Analysis Batch: 856758

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 856693

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits			
Halogens, Total Organic	96.3		500	528.1		ug/L		86	60 - 140	1	40	
TOX Dup	96.3		500	528.1		ug/L		86	60 - 140	1	40	

Lab Sample ID: MB 680-857061/1-A
Matrix: Water
Analysis Batch: 857067

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857061

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOX Result 1	ND		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 15:54	1
TOX Result 2	ND		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 15:54	1
TOX Dup	ND		40.0	14.0	ug/L		09/19/24 07:51	09/19/24 15:54	1

Lab Sample ID: LCS 680-857061/2-A
Matrix: Water
Analysis Batch: 857067

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857061

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	
							Limits	
Halogens, Total Organic	400	380.8		ug/L		95	60 - 140	
TOX Dup	400	380.8		ug/L		95	60 - 140	

Lab Sample ID: 680-255798-A-5-E MS
Matrix: Water
Analysis Batch: 857067

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 857061

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec	
									Limits	
Halogens, Total Organic	128		500	517.0		ug/L		78	60 - 140	
TOX Dup	128		500	517.0		ug/L		78	60 - 140	

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 9020B - Organic Halides, Total (TOX) (Continued)

Lab Sample ID: 680-255798-A-5-F MSD
Matrix: Water
Analysis Batch: 857067

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 857061

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Halogens, Total Organic	128		500	520.1		ug/L		78	60 - 140	1	40
TOX Dup	128		500	520.1		ug/L		78	60 - 140	1	40

Lab Sample ID: MB 680-857070/1-A
Matrix: Water
Analysis Batch: 857075

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857070

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 13:59	1
TOX Result 1	ND		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 13:59	1
TOX Result 2	ND		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 13:59	1
TOX Dup	ND		40.0	14.0	ug/L		09/19/24 08:40	09/19/24 13:59	1

Lab Sample ID: LCS 680-857070/2-A
Matrix: Water
Analysis Batch: 857075

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857070

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
		Added	Result				Qualifier
Halogens, Total Organic	400	403.6		ug/L		101	60 - 140
TOX Dup	400	403.6		ug/L		101	60 - 140

Lab Sample ID: 240-211103-2 MS
Matrix: Water
Analysis Batch: 857075

Client Sample ID: SW-1-091024-1510
Prep Type: Total/NA
Prep Batch: 857070

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec
	Result	Qualifier	Added	Result	Qualifier				Limits
Halogens, Total Organic	65.7		400	452.7		ug/L		97	60 - 140
TOX Dup	65.7		400	452.7		ug/L		97	60 - 140

Lab Sample ID: 240-211103-2 MSD
Matrix: Water
Analysis Batch: 857075

Client Sample ID: SW-1-091024-1510
Prep Type: Total/NA
Prep Batch: 857070

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Halogens, Total Organic	65.7		400	457.3		ug/L		98	60 - 140	1	40
TOX Dup	65.7		400	457.3		ug/L		98	60 - 140	1	40

Lab Sample ID: MB 680-857329/1-A
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857329

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Result 1	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Result 2	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Dup	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 9020B - Organic Halides, Total (TOX) (Continued)

Lab Sample ID: LCS 680-857329/2-A
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857329

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Halogens, Total Organic	400	394.8		ug/L		99	60 - 140
TOX Dup	400	394.8		ug/L		99	60 - 140

Lab Sample ID: 240-211306-C-1-C MS
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 857329

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Halogens, Total Organic	113		400	433.8		ug/L		80	60 - 140
TOX Dup	113		400	433.8		ug/L		80	60 - 140

Lab Sample ID: 240-211306-C-1-D MSD
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 857329

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Halogens, Total Organic	113		400	438.4		ug/L		81	60 - 140	1	40
TOX Dup	113		400	438.4		ug/L		81	60 - 140	1	40

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 240-627015/3
Matrix: Water
Analysis Batch: 627015

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.128	mg/L			09/14/24 20:06	1
Fluoride	ND		0.0500	0.0240	mg/L			09/14/24 20:06	1
Sulfate	ND		1.00	0.348	mg/L			09/14/24 20:06	1

Lab Sample ID: LCS 240-627015/4
Matrix: Water
Analysis Batch: 627015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	50.10		mg/L		100	90 - 110
Fluoride	2.50	2.654		mg/L		106	90 - 110
Sulfate	50.0	51.96		mg/L		104	90 - 110

Lab Sample ID: 240-211103-3 MS
Matrix: Water
Analysis Batch: 627015

Client Sample ID: MW-25-091024-1645
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	37.1		50.0	85.35		mg/L		97	80 - 120
Fluoride	1.95		2.50	4.488		mg/L		101	80 - 120
Sulfate	59.2		50.0	108.2		mg/L		98	80 - 120

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Method: 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-211103-3 MSD

Matrix: Water

Analysis Batch: 627015

Client Sample ID: MW-25-091024-1645

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	37.1		50.0	85.28		mg/L		96	80 - 120	0	15
Fluoride	1.95		2.50	4.479		mg/L		101	80 - 120	0	15
Sulfate	59.2		50.0	108.2		mg/L		98	80 - 120	0	15

QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Metals

Filtration Batch: 626951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Dissolved	Water	FILTRATION	
240-211103-2	SW-1-091024-1510	Dissolved	Water	FILTRATION	

Prep Batch: 626953

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Dissolved	Water	3005A	626951
240-211103-2	SW-1-091024-1510	Dissolved	Water	3005A	626951
MB 240-626953/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-626953/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-211151-F-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
240-211151-F-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 626958

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total Recoverable	Water	3005A	
240-211103-2	SW-1-091024-1510	Total Recoverable	Water	3005A	
240-211103-3	MW-25-091024-1645	Dissolved	Water	3005A	
240-211103-3	MW-25-091024-1645	Total Recoverable	Water	3005A	
240-211103-4	MW-26-091024-1835	Dissolved	Water	3005A	
240-211103-4	MW-26-091024-1835	Total Recoverable	Water	3005A	
240-211103-5	MW-21-091124-1000	Dissolved	Water	3005A	
240-211103-5	MW-21-091124-1000	Total Recoverable	Water	3005A	
240-211103-6	MW-20-091124-1210	Dissolved	Water	3005A	
240-211103-6	MW-20-091124-1210	Total Recoverable	Water	3005A	
240-211103-7	MW-27-091124-1407	Dissolved	Water	3005A	
240-211103-7	MW-27-091124-1407	Total Recoverable	Water	3005A	
240-211103-8	MW-5-091124-1505	Dissolved	Water	3005A	
240-211103-8	MW-5-091124-1505	Total Recoverable	Water	3005A	
240-211103-9	20760-091124-0001	Dissolved	Water	3005A	
240-211103-9	20760-091124-0001	Total Recoverable	Water	3005A	
240-211103-10	MW-7-091124-1620	Dissolved	Water	3005A	
240-211103-10	MW-7-091124-1620	Total Recoverable	Water	3005A	
MB 240-626958/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-626958/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCS 240-626958/3-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-211103-3 MS	MW-25-091024-1645	Dissolved	Water	3005A	
240-211103-3 MS	MW-25-091024-1645	Total Recoverable	Water	3005A	
240-211103-3 MS	MW-25-091024-1645	Total Recoverable	Water	3005A	
240-211103-3 MSD	MW-25-091024-1645	Dissolved	Water	3005A	
240-211103-3 MSD	MW-25-091024-1645	Total Recoverable	Water	3005A	
240-211103-3 MSD	MW-25-091024-1645	Total Recoverable	Water	3005A	

Analysis Batch: 627233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Dissolved	Water	6020B	626953
240-211103-1	SW-2-091024-1410	Total Recoverable	Water	6020B	626958
240-211103-2	SW-1-091024-1510	Dissolved	Water	6020B	626953
240-211103-2	SW-1-091024-1510	Total Recoverable	Water	6020B	626958
240-211103-3	MW-25-091024-1645	Dissolved	Water	6020B	626958
240-211103-3	MW-25-091024-1645	Total Recoverable	Water	6020B	626958
240-211103-4	MW-26-091024-1835	Dissolved	Water	6020B	626958

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Metals (Continued)

Analysis Batch: 627233 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-4	MW-26-091024-1835	Total Recoverable	Water	6020B	626958
240-211103-5	MW-21-091124-1000	Dissolved	Water	6020B	626958
240-211103-5	MW-21-091124-1000	Total Recoverable	Water	6020B	626958
240-211103-6	MW-20-091124-1210	Dissolved	Water	6020B	626958
240-211103-6	MW-20-091124-1210	Total Recoverable	Water	6020B	626958
240-211103-7	MW-27-091124-1407	Dissolved	Water	6020B	626958
240-211103-7	MW-27-091124-1407	Total Recoverable	Water	6020B	626958
240-211103-8	MW-5-091124-1505	Dissolved	Water	6020B	626958
240-211103-8	MW-5-091124-1505	Total Recoverable	Water	6020B	626958
240-211103-9	20760-091124-0001	Dissolved	Water	6020B	626958
240-211103-9	20760-091124-0001	Total Recoverable	Water	6020B	626958
240-211103-10	MW-7-091124-1620	Dissolved	Water	6020B	626958
240-211103-10	MW-7-091124-1620	Total Recoverable	Water	6020B	626958
MB 240-626953/1-A	Method Blank	Total Recoverable	Water	6020B	626953
MB 240-626958/1-A	Method Blank	Total Recoverable	Water	6020B	626958
LCS 240-626953/2-A	Lab Control Sample	Total Recoverable	Water	6020B	626953
LCS 240-626958/3-A	Lab Control Sample	Total Recoverable	Water	6020B	626958
240-211103-3 MS	MW-25-091024-1645	Dissolved	Water	6020B	626958
240-211103-3 MS	MW-25-091024-1645	Total Recoverable	Water	6020B	626958
240-211103-3 MSD	MW-25-091024-1645	Dissolved	Water	6020B	626958
240-211103-3 MSD	MW-25-091024-1645	Total Recoverable	Water	6020B	626958
240-211151-F-1-B MS	Matrix Spike	Total Recoverable	Water	6020B	626953
240-211151-F-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020B	626953

Analysis Batch: 627425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total Recoverable	Water	6010D	626958
240-211103-2	SW-1-091024-1510	Total Recoverable	Water	6010D	626958
240-211103-3	MW-25-091024-1645	Total Recoverable	Water	6010D	626958
240-211103-4	MW-26-091024-1835	Total Recoverable	Water	6010D	626958
240-211103-5	MW-21-091124-1000	Total Recoverable	Water	6010D	626958
240-211103-6	MW-20-091124-1210	Total Recoverable	Water	6010D	626958
240-211103-7	MW-27-091124-1407	Total Recoverable	Water	6010D	626958
240-211103-8	MW-5-091124-1505	Total Recoverable	Water	6010D	626958
240-211103-9	20760-091124-0001	Total Recoverable	Water	6010D	626958
240-211103-10	MW-7-091124-1620	Total Recoverable	Water	6010D	626958
MB 240-626958/1-A	Method Blank	Total Recoverable	Water	6010D	626958
LCS 240-626958/2-A	Lab Control Sample	Total Recoverable	Water	6010D	626958
240-211103-3 MS	MW-25-091024-1645	Total Recoverable	Water	6010D	626958
240-211103-3 MSD	MW-25-091024-1645	Total Recoverable	Water	6010D	626958

Analysis Batch: 627605

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-2	SW-1-091024-1510	Total Recoverable	Water	6010D	626958
240-211103-3	MW-25-091024-1645	Total Recoverable	Water	6010D	626958
240-211103-4	MW-26-091024-1835	Total Recoverable	Water	6010D	626958
240-211103-7	MW-27-091124-1407	Total Recoverable	Water	6010D	626958
240-211103-10	MW-7-091124-1620	Total Recoverable	Water	6010D	626958
MB 240-626958/1-A	Method Blank	Total Recoverable	Water	6010D	626958
LCS 240-626958/2-A	Lab Control Sample	Total Recoverable	Water	6010D	626958
240-211103-3 MS	MW-25-091024-1645	Total Recoverable	Water	6010D	626958

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Metals (Continued)

Analysis Batch: 627605 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-3 MSD	MW-25-091024-1645	Total Recoverable	Water	6010D	626958

General Chemistry

Analysis Batch: 627015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	9056A	
240-211103-2	SW-1-091024-1510	Total/NA	Water	9056A	
240-211103-3	MW-25-091024-1645	Total/NA	Water	9056A	
240-211103-4	MW-26-091024-1835	Total/NA	Water	9056A	
240-211103-4	MW-26-091024-1835	Total/NA	Water	9056A	
240-211103-5	MW-21-091124-1000	Total/NA	Water	9056A	
240-211103-6	MW-20-091124-1210	Total/NA	Water	9056A	
240-211103-7	MW-27-091124-1407	Total/NA	Water	9056A	
240-211103-7	MW-27-091124-1407	Total/NA	Water	9056A	
240-211103-8	MW-5-091124-1505	Total/NA	Water	9056A	
240-211103-9	20760-091124-0001	Total/NA	Water	9056A	
240-211103-10	MW-7-091124-1620	Total/NA	Water	9056A	
240-211103-10	MW-7-091124-1620	Total/NA	Water	9056A	
MB 240-627015/3	Method Blank	Total/NA	Water	9056A	
LCS 240-627015/4	Lab Control Sample	Total/NA	Water	9056A	
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	9056A	
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	9056A	

Analysis Batch: 627058

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	420.4	
240-211103-2	SW-1-091024-1510	Total/NA	Water	420.4	
240-211103-3	MW-25-091024-1645	Total/NA	Water	420.4	
240-211103-4	MW-26-091024-1835	Total/NA	Water	420.4	
240-211103-5	MW-21-091124-1000	Total/NA	Water	420.4	
240-211103-6	MW-20-091124-1210	Total/NA	Water	420.4	
240-211103-7	MW-27-091124-1407	Total/NA	Water	420.4	
240-211103-8	MW-5-091124-1505	Total/NA	Water	420.4	
240-211103-9	20760-091124-0001	Total/NA	Water	420.4	
240-211103-10	MW-7-091124-1620	Total/NA	Water	420.4	
MB 240-627058/17	Method Blank	Total/NA	Water	420.4	
MB 240-627058/55	Method Blank	Total/NA	Water	420.4	
LCS 240-627058/18	Lab Control Sample	Total/NA	Water	420.4	
LCS 240-627058/56	Lab Control Sample	Total/NA	Water	420.4	
240-211089-B-2 MS	Matrix Spike	Total/NA	Water	420.4	
240-211089-B-2 MSD	Matrix Spike Duplicate	Total/NA	Water	420.4	
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	420.4	
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	420.4	
240-211103-10 MS	MW-7-091124-1620	Total/NA	Water	420.4	
240-211103-10 MSD	MW-7-091124-1620	Total/NA	Water	420.4	

Analysis Batch: 627358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	5220D-2011	
240-211103-2	SW-1-091024-1510	Total/NA	Water	5220D-2011	

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

General Chemistry (Continued)

Analysis Batch: 627358 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-3	MW-25-091024-1645	Total/NA	Water	5220D-2011	
240-211103-4	MW-26-091024-1835	Total/NA	Water	5220D-2011	
240-211103-5	MW-21-091124-1000	Total/NA	Water	5220D-2011	
240-211103-6	MW-20-091124-1210	Total/NA	Water	5220D-2011	
240-211103-7	MW-27-091124-1407	Total/NA	Water	5220D-2011	
240-211103-8	MW-5-091124-1505	Total/NA	Water	5220D-2011	
240-211103-9	20760-091124-0001	Total/NA	Water	5220D-2011	
240-211103-10	MW-7-091124-1620	Total/NA	Water	5220D-2011	
MB 240-627358/3	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-627358/4	Lab Control Sample	Total/NA	Water	5220D-2011	
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	5220D-2011	
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	5220D-2011	

Analysis Batch: 627956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	350.1	
240-211103-2	SW-1-091024-1510	Total/NA	Water	350.1	
240-211103-3	MW-25-091024-1645	Total/NA	Water	350.1	
240-211103-4	MW-26-091024-1835	Total/NA	Water	350.1	
240-211103-5	MW-21-091124-1000	Total/NA	Water	350.1	
240-211103-6	MW-20-091124-1210	Total/NA	Water	350.1	
240-211103-7	MW-27-091124-1407	Total/NA	Water	350.1	
240-211103-8	MW-5-091124-1505	Total/NA	Water	350.1	
240-211103-9	20760-091124-0001	Total/NA	Water	350.1	
240-211103-10	MW-7-091124-1620	Total/NA	Water	350.1	
MB 240-627956/14	Method Blank	Total/NA	Water	350.1	
LCS 240-627956/15	Lab Control Sample	Total/NA	Water	350.1	
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	350.1	
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	350.1	

Prep Batch: 856668

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-3	MW-25-091024-1645	Total/NA	Water	Carbon Trap	
MB 680-856668/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-856668/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	Carbon Trap	
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	Carbon Trap	

Analysis Batch: 856680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-3	MW-25-091024-1645	Total/NA	Water	9020B	856668
MB 680-856668/1-A	Method Blank	Total/NA	Water	9020B	856668
LCS 680-856668/2-A	Lab Control Sample	Total/NA	Water	9020B	856668
240-211103-3 MS	MW-25-091024-1645	Total/NA	Water	9020B	856668
240-211103-3 MSD	MW-25-091024-1645	Total/NA	Water	9020B	856668

Prep Batch: 856693

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-856693/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-856693/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
680-255798-A-4-E MS	Matrix Spike	Total/NA	Water	Carbon Trap	

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

General Chemistry (Continued)

Prep Batch: 856693 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-255798-A-4-F MSD	Matrix Spike Duplicate	Total/NA	Water	Carbon Trap	

Analysis Batch: 856758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-856693/1-A	Method Blank	Total/NA	Water	9020B	856693
LCS 680-856693/2-A	Lab Control Sample	Total/NA	Water	9020B	856693
680-255798-A-4-E MS	Matrix Spike	Total/NA	Water	9020B	856693
680-255798-A-4-F MSD	Matrix Spike Duplicate	Total/NA	Water	9020B	856693

Prep Batch: 857061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-7	MW-27-091124-1407	Total/NA	Water	Carbon Trap	
240-211103-10	MW-7-091124-1620	Total/NA	Water	Carbon Trap	
MB 680-857061/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857061/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
680-255798-A-5-E MS	Matrix Spike	Total/NA	Water	Carbon Trap	
680-255798-A-5-F MSD	Matrix Spike Duplicate	Total/NA	Water	Carbon Trap	

Analysis Batch: 857067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-7	MW-27-091124-1407	Total/NA	Water	9020B	857061
240-211103-10	MW-7-091124-1620	Total/NA	Water	9020B	857061
MB 680-857061/1-A	Method Blank	Total/NA	Water	9020B	857061
LCS 680-857061/2-A	Lab Control Sample	Total/NA	Water	9020B	857061
680-255798-A-5-E MS	Matrix Spike	Total/NA	Water	9020B	857061
680-255798-A-5-F MSD	Matrix Spike Duplicate	Total/NA	Water	9020B	857061

Prep Batch: 857070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	Carbon Trap	
240-211103-2	SW-1-091024-1510	Total/NA	Water	Carbon Trap	
240-211103-4	MW-26-091024-1835	Total/NA	Water	Carbon Trap	
240-211103-5	MW-21-091124-1000	Total/NA	Water	Carbon Trap	
MB 680-857070/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857070/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
240-211103-2 MS	SW-1-091024-1510	Total/NA	Water	Carbon Trap	
240-211103-2 MSD	SW-1-091024-1510	Total/NA	Water	Carbon Trap	

Analysis Batch: 857075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-1	SW-2-091024-1410	Total/NA	Water	9020B	857070
240-211103-2	SW-1-091024-1510	Total/NA	Water	9020B	857070
240-211103-4	MW-26-091024-1835	Total/NA	Water	9020B	857070
240-211103-5	MW-21-091124-1000	Total/NA	Water	9020B	857070
MB 680-857070/1-A	Method Blank	Total/NA	Water	9020B	857070
LCS 680-857070/2-A	Lab Control Sample	Total/NA	Water	9020B	857070
240-211103-2 MS	SW-1-091024-1510	Total/NA	Water	9020B	857070
240-211103-2 MSD	SW-1-091024-1510	Total/NA	Water	9020B	857070

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

General Chemistry

Prep Batch: 857329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-6	MW-20-091124-1210	Total/NA	Water	Carbon Trap	
240-211103-8	MW-5-091124-1505	Total/NA	Water	Carbon Trap	
240-211103-9	20760-091124-0001	Total/NA	Water	Carbon Trap	
MB 680-857329/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857329/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
240-211306-C-1-C MS	Matrix Spike	Total/NA	Water	Carbon Trap	
240-211306-C-1-D MSD	Matrix Spike Duplicate	Total/NA	Water	Carbon Trap	

Analysis Batch: 857342

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211103-6	MW-20-091124-1210	Total/NA	Water	9020B	857329
240-211103-8	MW-5-091124-1505	Total/NA	Water	9020B	857329
240-211103-9	20760-091124-0001	Total/NA	Water	9020B	857329
MB 680-857329/1-A	Method Blank	Total/NA	Water	9020B	857329
LCS 680-857329/2-A	Lab Control Sample	Total/NA	Water	9020B	857329
240-211306-C-1-C MS	Matrix Spike	Total/NA	Water	9020B	857329
240-211306-C-1-D MSD	Matrix Spike Duplicate	Total/NA	Water	9020B	857329

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: SW-2-091024-1410

Lab Sample ID: 240-211103-1

Date Collected: 09/10/24 14:10

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 03:36
Dissolved	Filtration	FILTRATION			626951	BN	EET CLE	09/13/24 12:00
Dissolved	Prep	3005A			626953	BN	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 16:02
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:28
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 12:54
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 20:53
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857070	CLJ	EET SAV	09/19/24 08:40
Total/NA	Analysis	9020B		1	857075	CLJ	EET SAV	09/20/24 07:03
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 03:21

Client Sample ID: SW-1-091024-1510

Lab Sample ID: 240-211103-2

Date Collected: 09/10/24 15:10

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 03:40
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627605	RKT	EET CLE	09/18/24 19:04
Dissolved	Filtration	FILTRATION			626951	BN	EET CLE	09/13/24 12:00
Dissolved	Prep	3005A			626953	BN	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 16:05
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:31
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 12:57
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 20:56
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857070	CLJ	EET SAV	09/19/24 08:40
Total/NA	Analysis	9020B		1	857075	CLJ	EET SAV	09/19/24 15:05
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 03:42

Client Sample ID: MW-25-091024-1645

Lab Sample ID: 240-211103-3

Date Collected: 09/10/24 16:45

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 02:58
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627605	RKT	EET CLE	09/18/24 18:25

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-25-091024-1645

Lab Sample ID: 240-211103-3

Date Collected: 09/10/24 16:45

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:14
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 20:56
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 12:45
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 20:59
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			856668	CLJ	EET SAV	09/18/24 07:32
Total/NA	Analysis	9020B		1	856680	CLJ	EET SAV	09/18/24 13:55
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 04:48

Client Sample ID: MW-26-091024-1835

Lab Sample ID: 240-211103-4

Date Collected: 09/10/24 18:35

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 03:44
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627605	RKT	EET CLE	09/18/24 19:08
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:40
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:33
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:00
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:23
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857070	CLJ	EET SAV	09/19/24 08:40
Total/NA	Analysis	9020B		1	857075	CLJ	EET SAV	09/19/24 16:39
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 06:58
Total/NA	Analysis	9056A		10	627015	JMR	EET CLE	09/15/24 07:20

Client Sample ID: MW-21-091124-1000

Lab Sample ID: 240-211103-5

Date Collected: 09/11/24 10:00

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 03:48
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:45
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:43
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:03

Eurofins Cleveland

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-21-091124-1000

Lab Sample ID: 240-211103-5

Date Collected: 09/11/24 10:00

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:26
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857070	CLJ	EET SAV	09/19/24 08:40
Total/NA	Analysis	9020B		1	857075	CLJ	EET SAV	09/19/24 17:28
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 07:41

Client Sample ID: MW-20-091124-1210

Lab Sample ID: 240-211103-6

Date Collected: 09/11/24 12:10

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 03:53
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:51
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:48
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:06
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:29
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857329	CLJ	EET SAV	09/23/24 09:30
Total/NA	Analysis	9020B		1	857342	CLJ	EET SAV	09/23/24 12:54
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 09:08

Client Sample ID: MW-27-091124-1407

Lab Sample ID: 240-211103-7

Date Collected: 09/11/24 14:07

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 04:05
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627605	RKT	EET CLE	09/18/24 19:12
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:56
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:53
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:15
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:33
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857061	CLJ	EET SAV	09/19/24 07:51
Total/NA	Analysis	9020B		1	857067	CLJ	EET SAV	09/19/24 17:11
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 09:52
Total/NA	Analysis	9056A		5	627015	JMR	EET CLE	09/15/24 10:13

Eurofins Cleveland

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-5-091124-1505

Lab Sample ID: 240-211103-8

Date Collected: 09/11/24 15:05

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 04:10
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 22:01
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 21:58
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:18
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:36
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857329	CLJ	EET SAV	09/23/24 09:30
Total/NA	Analysis	9020B		1	857342	CLJ	EET SAV	09/23/24 17:55
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 10:35

Client Sample ID: 20760-091124-0001

Lab Sample ID: 240-211103-9

Date Collected: 09/11/24 00:01

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 04:14
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 22:10
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 22:03
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:21
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:39
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857329	CLJ	EET SAV	09/23/24 09:30
Total/NA	Analysis	9020B		1	857342	CLJ	EET SAV	09/23/24 18:38
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 10:57

Client Sample ID: MW-7-091124-1620

Lab Sample ID: 240-211103-10

Date Collected: 09/11/24 16:20

Matrix: Water

Date Received: 09/12/24 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627425	KLC	EET CLE	09/18/24 04:18
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6010D		1	627605	RKT	EET CLE	09/18/24 19:16
Dissolved	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Dissolved	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 22:15
Total Recoverable	Prep	3005A			626958	GK	EET CLE	09/13/24 14:00
Total Recoverable	Analysis	6020B		1	627233	AJC	EET CLE	09/16/24 22:13

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Client Sample ID: MW-7-091124-1620

Lab Sample ID: 240-211103-10

Date Collected: 09/11/24 16:20

Matrix: Water

Date Received: 09/12/24 09:15

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Analyst</u>	<u>Lab</u>	<u>Prepared or Analyzed</u>
Total/NA	Analysis	350.1		1	627956	AJ	EET CLE	09/20/24 13:24
Total/NA	Analysis	420.4		1	627058	JMR	EET CLE	09/13/24 21:43
Total/NA	Analysis	5220D-2011		1	627358	AAP	EET CLE	09/17/24 13:48
Total/NA	Prep	Carbon Trap			857061	CLJ	EET SAV	09/19/24 07:51
Total/NA	Analysis	9020B		1	857067	CLJ	EET SAV	09/19/24 20:33
Total/NA	Analysis	9056A		1	627015	JMR	EET CLE	09/15/24 11:40
Total/NA	Analysis	9056A		10	627015	JMR	EET CLE	09/15/24 12:02

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211103-1

Laboratory: Eurofins Cleveland

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	421	06-01-25

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.




Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-25
Arkansas (DW)	State	GA00006	06-30-25
Arkansas DEQ	State	88-00692	02-01-25
Florida	NELAP	E87052	06-30-25
Georgia	State	E87052	06-30-25
Georgia (DW)	State	803	06-30-25
Guam	State	24-05R	04-17-25
Hawaii	State	<cert No.>	06-30-25
Illinois	NELAP	200022	11-30-24
Iowa	State	353	07-01-25
Kentucky (UST)	State	108138	06-30-24 *
Louisiana (All)	NELAP	30690	06-30-25
Louisiana (DW)	State	LA009	12-31-24
Maine	State	GA00006	09-25-24
Maryland	State	250	12-31-24
Michigan	State	9925	06-30-24 *
Mississippi	State	<cert No.>	06-30-25
Nebraska	State	NE-OS-7-04	06-30-25
New Mexico	State	GA00006	06-30-25
North Carolina (DW)	State	13701	07-31-25
North Carolina (WW/SW)	State	269	12-31-24
Puerto Rico	State	GA00006	01-01-25
South Carolina	State	98001	06-30-24 *
Tennessee	State	TN02961	06-30-25
Texas	NELAP	T1047004185	11-30-24
Texas	TCEQ Water Supply	T104704185	06-30-24 *
USDA	US Federal Programs	P330-18-00313	04-04-27
Virginia	NELAP	460161	06-14-25
Wyoming	State	8TMS-L	06-30-25

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Cleveland

180 S. Van Buren Avenue
Barberton, OH 44203
Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

Client Information		Sampler: Francis Reed		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-124042-43261.1																				
Client Contact: Thomas Vanage		Phone: 614-288-8619		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: IA		Page: Page 1 of 1																				
Company: Haley & Aldrich, Inc.		PWSID:		Analysis Requested						Job #: 0129848-037																		
Address: 8899 Gander Creek Drive		Due Date Requested:		<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes or No)</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Number of Containers</div> </div> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 10%;">9056A_28D - Chloride, Fluoride, Sulfate</td> <td style="width: 10%;">360.1, 6220D</td> <td style="width: 10%;">420.4_MP - Phenolics, Total Recoverable</td> <td style="width: 10%;">6010D, 6020B</td> <td style="width: 10%;">6020B - Iron - Field Filtered</td> <td style="width: 10%;">9020B - Organic Halides, Total (TOX)</td> <td style="width: 10%;">6020B - Iron, Lab to filter</td> <td colspan="2" rowspan="2">  240-211103 COC </td> </tr> <tr> <td colspan="8"> Preservation Codes: N - None S - H2SO4 D - HNO3 </td> </tr> </table>						9056A_28D - Chloride, Fluoride, Sulfate	360.1, 6220D	420.4_MP - Phenolics, Total Recoverable	6010D, 6020B	6020B - Iron - Field Filtered	9020B - Organic Halides, Total (TOX)	6020B - Iron, Lab to filter	 240-211103 COC		Preservation Codes: N - None S - H2SO4 D - HNO3								Preservation Codes: N - None S - H2SO4 D - HNO3	
9056A_28D - Chloride, Fluoride, Sulfate	360.1, 6220D	420.4_MP - Phenolics, Total Recoverable	6010D, 6020B							6020B - Iron - Field Filtered	9020B - Organic Halides, Total (TOX)	6020B - Iron, Lab to filter	 240-211103 COC															
Preservation Codes: N - None S - H2SO4 D - HNO3																												
City: Miamisburg		TAT Requested (days): STD								Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Project #: 24024753		Other:														
State, Zip: OH, 45342-4418		PO #: 0129848-034																										
Phone: 937-530-1412(Tel)		WO #:								Project Name: Amsted - Keokuk, Iowa Fall 2024		SSOW#:		Special Instructions/Note:														
Email: TVanage@haleyaldrich.com		Sample Date																										
Project Name: Amsted - Keokuk, Iowa Fall 2024		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=water/soil, BT=Tissue, A=Air)		Preservation Code:																				
Site:																												
Sample Identification																												
SW -2- 091024 -1410		09/10/24 14:10		G Water		N S S D D S N		6																				
SW -1- 091024 -1510		09/10/24 15:10		G Water		N S S D D S N		6																				
MW -25- 091024 -1645		09/10/24 16:45		G Water		N S S D D S N		8 MS/MSD																				
MW -26- 091024 -1835		09/10/24 18:35		G Water		N S S D D S N		6																				
MW -21- 091124 -1000		09/11/24 10:00		G Water		N S S D D S N		6																				
MW -20- 091124 -1210		09/11/24 12:10		G Water		N S S D D S N		6																				
MW -27- 091124 -1407		09/11/24 14:07		G Water		N S S D D S N		6																				
MW -5- 091124 -1505		09/11/24 15:05		G Water		N S S D D S N		6																				
Z0760 -091124 -0001		09/11/24 00:01		G Water		N S S D D S N		6 Field Dup																				
MW -7- 091124 -1620		09/11/24 16:20		G Water		N S S D D S N		6																				
				Water																								
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months																						
Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:																						
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:																						
Relinquished by: Francis Reed		Date/Time: 09/11/24 18:30		Company: H+A		Received by: KATHARINE MARTIN		Date/Time: 9/12/24 9:15																				
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:																				
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:																				
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:																								

Eurofins - Cleveland Sample Receipt Form/Narrative Login # : _____
 Barberton Facility

Client Holey + Aldrich Site Name _____ Cooler unpacked by: CM
 Cooler Received on 9/12/24 Opened on 9/12/24

FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other _____
 Receipt After-hours Drop-off Date/Time _____ Storage Location _____

Eurofins Cooler # EC Foam Box Client Cooler Box Other _____
 Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
 COOLANT: Wet Ice Blue Ice Dry Ice Water None

1 Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN # ZZ (CF -0.1°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 2
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No NA
 -Were tamper/custody seals intact and uncompromised? Yes No NA

Tests that are not checked for pH by Receiving:
 VOAs
 Oil and Grease
 TOC

3 Shippers' packing slip attached to the cooler(s)? Yes No
 4 Did custody papers accompany the sample(s)? Yes No
 5 Were the custody papers relinquished & signed in the appropriate place? Yes No
 6 Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
 7 Did all bottles arrive in good condition (Unbroken)? Yes No
 8 Could all bottle labels (ID/Date/Time) be reconciled with the COC? Yes No
 9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)?
 10 Were correct bottle(s) used for the test(s) indicated? Yes No
 11 Sufficient quantity received to perform indicated analyses? Yes No
 12 Are these work share samples and all listed on the COC? Yes No
 If yes, Questions 13-17 have been checked at the originating laboratory
 13 Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC442471
 14 Were VOAs on the COC? Yes No
 15 Were air bubbles > 6 mm in any VOA vials? Yes No NA Larger than this
 16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No NA
 17 Was a LL Hg or Me Hg trip blank present? Yes No NA

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other _____
 Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by: _____

19. SAMPLE CONDITION
 Sample(s) _____ were received after the recommended holding time had expired
 Sample(s) _____ were received in a broken container
 Sample(s) _____ were received with bubble > 6 mm in diameter (Notify PM)

20. SAMPLE PRESERVATION
 Sample(s) _____ were further preserved in the laboratory
 Time preserved: _____ Preservative(s) added/Lot number(s): _____
 VOA Sample Preservation - Date/Time VOAs Frozen: _____

Login #: _____

Eurofins - Cleveland Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
EC Client Box Other	IR GUN #: <u>PF12</u>	<u>09</u>	<u>0.8</u>	<u>Wet Ice</u> Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: <u>22</u>	<u>0.3</u>	<u>0.2</u>	<u>Wet Ice</u> Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: <u>22</u>	<u>2.3</u>	<u>2.2</u>	<u>Wet Ice</u> Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None
EC Client Box Other	IR GUN #: _____			Wet Ice Blue Ice Dry Ice Water None

See Temperature Excursion Form

Eurofins Cleveland

180 S. Van Buren Avenue
 Barberton, OH 44203
 Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler:		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-190546.1			
Client Contact: Shipping/Receiving		Phone:		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: Iowa		Page: Page 1 of 2			
Company: Eurofins Environment Testing Southeast L				Accreditations Required (See note): State - Iowa				Job #: 240-211103-1			
Address: 5102 LaRoche Avenue,		Due Date Requested: 9/25/2024		Analysis Requested						Preservation Codes: -	
City: Savannah		TAT Requested (days):									
State, Zip: GA, 31404		PO #:									
Phone: 912-354-7858(Tel) 912-352-0165(Fax)		WO #:									
Email:		Project #: 24024753									
Project Name: Amsted - Keokuk, Iowa GW		SSOW#:		Other:							
Site:											
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/soil, BT=Tissue, A=Air)	Field Filtered (Sample Yes or No)	Perform MS/MSD (Yes or No)	9020B/Carbon_Trap Organic Halides, Total (TOX)	Total Number of Containers	Special Instructions/Note:	
				Preservation Code:							
SW-2-091024-1410 (240-211103-1)		9/10/24	14:10 Central	G	Water		X		1		
SW-1-091024-1510 (240-211103-2)		9/10/24	15:10 Central	G	Water		X		1		
MW-25-091024-1645 (240-211103-3)		9/10/24	16:45 Central	G	Water		X		1		
MW-25-091024-1645 (240-211103-3MS)		9/10/24	16:45 Central	G	Water		X		1		
MW-25-091024-1645 (240-211103-3MSD)		9/10/24	16:45 Central	G	Water		X		1		
MW-26-091024-1835 (240-211103-4)		9/10/24	18:35 Central	G	Water		X		1		
MW-21-091124-1000 (240-211103-5)		9/11/24	10:00 Central	G	Water		X		1		
MW-20-091124-1210 (240-211103-6)		9/11/24	12:10 Central	G	Water		X		1		
MW-27-091124-1407 (240-211103-7)		9/11/24	14:07 Central	G	Water		X		1		
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.</p>											
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months						
Deliverable Requested: I, II, III, IV, Other (specify)			Primary Deliverable Rank: 2		Special Instructions/QC Requirements:						
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:					
Relinquished by: JESSICA RIGDON		Date/Time: 9-12-24 1600		Company: EET/NC		Received by: [Signature]		Date/Time: 09/14/24 0845		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks: 2.9/2.9						



Eurofins Cleveland

180 S. Van Buren Avenue
 Barberton, OH 44203
 Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler:		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-190546.2			
Client Contact: Shipping/Receiving		Phone:		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: Iowa		Page: Page 2 of 2			
Company: Eurofins Environment Testing Southeast L				Accreditations Required (See note): State - Iowa				Job #: 240-211103-1			
Address: 5102 LaRoche Avenue, City: Savannah State, Zip: GA, 31404		Due Date Requested: 9/25/2024		Analysis Requested						Preservation Codes: -	
Phone: 912-354-7858(Tel) 912-352-0165(Fax)		TAT Requested (days):									
Email:		PO #:									
Project Name: Amsted - Keokuk, Iowa GW		Project #: 24024753									
Site:		SSOW#:		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		Total Number of Containers			
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oli, BT=Tissue, A=Air)	9020B/Carbon_Trap Organic Halides, Total (TOX)				Special Instructions/Note:	
				Preservation Code:							
MW-5-091124-1505 (240-211103-8)		9/11/24	15:05 Central	G	Water	X					
20760-091124-0001 (240-211103-9)		9/11/24	00:01 Central	G	Water	X					
MW-7-091124-1620 (240-211103-10)		9/11/24	16:20 Central	G	Water	X					
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.</p>											
Possible Hazard Identification					Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months						
Deliverable Requested: I, II, III, IV, Other (specify)			Primary Deliverable Rank: 2		Special Instructions/QC Requirements:						
Empty Kit Relinquished by:			Date:		Time:		Method of Shipment:				
Relinquished by: JESSICA RIGDON			Date/Time: 9-12-24 1600		Time: 0845		Received by: [Signature] Date/Time: 09/14/24 0845 Company:				
Relinquished by:			Date/Time:		Company:		Received by:		Date/Time: Company:		
Relinquished by:			Date/Time:		Company:		Received by:		Date/Time: Company:		
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks: 2.9/2.9						



Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 240-211103-1

Login Number: 211103

List Number: 2

Creator: Lincoln, Alyssa

List Source: Eurofins Savannah

List Creation: 09/14/24 11:10 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

PREPARED FOR

Attn: Thomas Vanage
Haley & Aldrich, Inc.
8899 Gander Creek Drive
Miamisburg, Ohio 45342-4418

Generated 9/26/2024 4:25:53 PM

JOB DESCRIPTION

Amsted - Keokuk, Iowa GW

JOB NUMBER

240-211306-1

Eurofins Cleveland

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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9/26/2024 4:25:53 PM

Authorized for release by
Denise Heckler, Project Manager II
Denise.Heckler@et.eurofinsus.com
(330)966-9477



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Definitions/Glossary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Haley & Aldrich, Inc.
Project: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Job ID: 240-211306-1

Eurofins Cleveland

Job Narrative 240-211306-1

Receipt

The samples were received on 9/16/2024 9:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.3°C.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method 9020B: Breakthrough exceeded 10% for the following samples: MW-6-091224-0800 (240-211306-1), MW-12-091224-0955 (240-211306-2) and MW-16-091224-1207 (240-211306-3).

Method 9020B: Sample duplicate results are outside 20% RPD requirement. Reanalysis was performed with concurring results. The data has been reported: MW-16-091224-1207 (240-211306-3)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Method Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET CLE
6020B	Metals (ICP/MS)	SW846	EET CLE
350.1	Nitrogen, Ammonia	EPA	EET CLE
420.4	Phenolics, Total Recoverable	EPA	EET CLE
5220D-2011	Chemical Oxygen Demand	SM	EET CLE
9020B	Organic Halides, Total (TOX)	SW846	EET SAV
9056A	Anions, Ion Chromatography	SW846	EET CLE
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET CLE
Carbon Trap	Carbon Trap Preparation	EPA-17	EET SAV

Protocol References:

EPA = US Environmental Protection Agency

EPA-17 = "Method 1650, Revision A, Adsorbable Organic Halides By Adsorption And Colormetric Titration," EPA, February 1992

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Sample Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
240-211306-1	MW-6-091224-0800	Water	09/12/24 08:00	09/16/24 09:00
240-211306-2	MW-12-091224-0955	Water	09/12/24 09:55	09/16/24 09:00
240-211306-3	MW-16-091224-1207	Water	09/12/24 12:07	09/16/24 09:00

- 1
- 2
- 3
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- 10
- 11
- 12
- 13
- 14

Detection Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-6-091224-0800

Lab Sample ID: 240-211306-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.351		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.185		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	47.6		1.00	0.882	mg/L	1		6020B	Total Recoverable
Phenolics, Total Recoverable	0.00477	J	0.0100	0.00300	mg/L	1		420.4	Total/NA
Chemical Oxygen Demand	7.40	J	10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	100		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	111		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	88.7		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	100		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	13.1		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.336		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	12.9		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-12-091224-0955

Lab Sample ID: 240-211306-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Strontium	0.502		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Sodium	25.5		1.00	0.882	mg/L	1		6020B	Total Recoverable
Chemical Oxygen Demand	11.1		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	116		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	106		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	126		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	116		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	11.0		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.370		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	51.8		1.00	0.348	mg/L	1		9056A	Total/NA

Client Sample ID: MW-16-091224-1207

Lab Sample ID: 240-211306-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.0755	J	0.100	0.0573	mg/L	1		6010D	Total Recoverable
Lithium	0.0515		0.0500	0.0172	mg/L	1		6010D	Total Recoverable
Strontium	0.425		0.0500	0.00927	mg/L	1		6010D	Total Recoverable
Manganese	0.0616		0.00500	0.00353	mg/L	1		6020B	Total Recoverable
Sodium	42.6		1.00	0.882	mg/L	1		6020B	Total Recoverable
Iron	0.100		0.100	0.0470	mg/L	1		6020B	Dissolved
Chemical Oxygen Demand	14.5		10.0	1.80	mg/L	1		5220D-2011	Total/NA
Halogens, Total Organic	60.7		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 1	78.0		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Result 2	43.4		40.0	14.0	ug/L	1		9020B	Total/NA
TOX Dup	60.7		40.0	14.0	ug/L	1		9020B	Total/NA
Chloride	4.13		1.00	0.128	mg/L	1		9056A	Total/NA
Fluoride	0.461		0.0500	0.0240	mg/L	1		9056A	Total/NA
Sulfate	72.2		1.00	0.348	mg/L	1		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-6-091224-0800

Lab Sample ID: 240-211306-1

Date Collected: 09/12/24 08:00

Matrix: Water

Date Received: 09/16/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		09/18/24 05:00	09/20/24 03:03	1
Lithium	ND		0.0500	0.0172	mg/L		09/18/24 05:00	09/20/24 03:03	1
Strontium	0.351		0.0500	0.00927	mg/L		09/18/24 05:00	09/20/24 03:03	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.185		0.00500	0.00353	mg/L		09/18/24 05:00	09/19/24 20:54	1
Sodium	47.6		1.00	0.882	mg/L		09/18/24 05:00	09/19/24 20:54	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/18/24 05:00	09/19/24 20:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/23/24 13:23	1
Phenolics, Total Recoverable (EPA 420.4)	0.00477	J	0.0100	0.00300	mg/L			09/25/24 16:31	1
Chemical Oxygen Demand (SM 5220D-2011)	7.40	J	10.0	1.80	mg/L			09/24/24 12:10	1
Halogens, Total Organic (SW846 9020B)	100		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 12:14	1
TOX Result 1 (SW846 9020B)	111		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 12:14	1
TOX Result 2 (SW846 9020B)	88.7		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 12:14	1
TOX Dup (SW846 9020B)	100		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 12:14	1
Chloride (SW846 9056A)	13.1		1.00	0.128	mg/L			09/25/24 05:24	1
Fluoride (SW846 9056A)	0.336		0.0500	0.0240	mg/L			09/25/24 05:24	1
Sulfate (SW846 9056A)	12.9		1.00	0.348	mg/L			09/25/24 05:24	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-12-091224-0955

Lab Sample ID: 240-211306-2

Date Collected: 09/12/24 09:55

Matrix: Water

Date Received: 09/16/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		09/18/24 05:00	09/20/24 03:07	1
Lithium	ND		0.0500	0.0172	mg/L		09/18/24 05:00	09/20/24 03:07	1
Strontium	0.502		0.0500	0.00927	mg/L		09/18/24 05:00	09/20/24 03:07	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.00500	0.00353	mg/L		09/18/24 05:00	09/19/24 20:59	1
Sodium	25.5		1.00	0.882	mg/L		09/18/24 05:00	09/19/24 20:59	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/18/24 05:00	09/19/24 21:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/23/24 13:26	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/25/24 15:03	1
Chemical Oxygen Demand (SM 5220D-2011)	11.1		10.0	1.80	mg/L			09/24/24 12:10	1
Halogens, Total Organic (SW846 9020B)	116		40.0	14.0	ug/L		09/24/24 10:42	09/25/24 08:32	1
TOX Result 1 (SW846 9020B)	106		40.0	14.0	ug/L		09/24/24 10:42	09/25/24 08:32	1
TOX Result 2 (SW846 9020B)	126		40.0	14.0	ug/L		09/24/24 10:42	09/25/24 08:32	1
TOX Dup (SW846 9020B)	116		40.0	14.0	ug/L		09/24/24 10:42	09/25/24 08:32	1
Chloride (SW846 9056A)	11.0		1.00	0.128	mg/L			09/25/24 05:45	1
Fluoride (SW846 9056A)	0.370		0.0500	0.0240	mg/L			09/25/24 05:45	1
Sulfate (SW846 9056A)	51.8		1.00	0.348	mg/L			09/25/24 05:45	1

Client Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-16-091224-1207

Lab Sample ID: 240-211306-3

Date Collected: 09/12/24 12:07

Matrix: Water

Date Received: 09/16/24 09:00

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.0755	J	0.100	0.0573	mg/L		09/18/24 05:00	09/20/24 03:11	1
Lithium	0.0515		0.0500	0.0172	mg/L		09/18/24 05:00	09/20/24 03:11	1
Strontium	0.425		0.0500	0.00927	mg/L		09/18/24 05:00	09/20/24 03:11	1

Method: SW846 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	0.0616		0.00500	0.00353	mg/L		09/18/24 05:00	09/19/24 21:09	1
Sodium	42.6		1.00	0.882	mg/L		09/18/24 05:00	09/19/24 21:09	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.100		0.100	0.0470	mg/L		09/18/24 05:00	09/19/24 21:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (EPA 350.1)	ND		0.200	0.0760	mg/L			09/23/24 13:29	1
Phenolics, Total Recoverable (EPA 420.4)	ND		0.0100	0.00300	mg/L			09/25/24 15:07	1
Chemical Oxygen Demand (SM 5220D-2011)	14.5		10.0	1.80	mg/L			09/24/24 12:10	1
Halogens, Total Organic (SW846 9020B)	60.7		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 13:33	1
TOX Result 1 (SW846 9020B)	78.0		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 13:33	1
TOX Result 2 (SW846 9020B)	43.4		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 13:33	1
TOX Dup (SW846 9020B)	60.7		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 13:33	1
Chloride (SW846 9056A)	4.13		1.00	0.128	mg/L			09/25/24 06:07	1
Fluoride (SW846 9056A)	0.461		0.0500	0.0240	mg/L			09/25/24 06:07	1
Sulfate (SW846 9056A)	72.2		1.00	0.348	mg/L			09/25/24 06:07	1

QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 240-627341/1-A
Matrix: Water
Analysis Batch: 627770

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.100	0.0573	mg/L		09/18/24 05:00	09/20/24 01:21	1
Lithium	ND		0.0500	0.0172	mg/L		09/18/24 05:00	09/20/24 01:21	1
Strontium	ND		0.0500	0.00927	mg/L		09/18/24 05:00	09/20/24 01:21	1

Lab Sample ID: LCS 240-627341/2-A
Matrix: Water
Analysis Batch: 627770

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	1.00	0.9867		mg/L		99	80 - 120
Lithium	1.00	0.9371		mg/L		94	80 - 120
Strontium	1.00	0.8924		mg/L		89	80 - 120

Lab Sample ID: 240-211176-C-1-B MS
Matrix: Water
Analysis Batch: 627770

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.179		1.00	1.197		mg/L		102	75 - 125
Lithium	ND		1.00	0.9864		mg/L		99	75 - 125
Strontium	0.153		1.00	1.062		mg/L		91	75 - 125

Lab Sample ID: 240-211176-C-1-C MSD
Matrix: Water
Analysis Batch: 627770

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Boron	0.179		1.00	1.083		mg/L		90	75 - 125	10	20
Lithium	ND		1.00	0.8881		mg/L		89	75 - 125	10	20
Strontium	0.153		1.00	0.9492		mg/L		80	75 - 125	11	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-627341/1-A
Matrix: Water
Analysis Batch: 627776

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.100	0.0470	mg/L		09/18/24 05:00	09/19/24 19:54	1
Manganese	ND		0.00500	0.00353	mg/L		09/18/24 05:00	09/19/24 19:54	1
Sodium	ND		1.00	0.882	mg/L		09/18/24 05:00	09/19/24 19:54	1

Lab Sample ID: LCS 240-627341/27-A
Matrix: Water
Analysis Batch: 627776

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	5.00	4.752		mg/L		95	80 - 120
Manganese	0.500	0.4647		mg/L		93	80 - 120
Sodium	25.0	24.78		mg/L		99	80 - 120

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: 240-211176-C-1-D MS
Matrix: Water
Analysis Batch: 627776

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Manganese	0.393	F1	0.500	0.8816		mg/L		98	80 - 120	
Sodium	24.5		25.0	49.54		mg/L		100	80 - 120	

Lab Sample ID: 240-211176-C-1-E MSD
Matrix: Water
Analysis Batch: 627776

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 627341

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit	
Manganese	0.393	F1	0.500	0.7859	F1	mg/L		79	80 - 120	11	20	
Sodium	24.5		25.0	44.76		mg/L		81	80 - 120	10	20	

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 240-628147/14
Matrix: Water
Analysis Batch: 628147

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Ammonia	ND		0.200	0.0760	mg/L			09/23/24 12:26	1

Lab Sample ID: LCS 240-628147/15
Matrix: Water
Analysis Batch: 628147

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec	
		Result	Qualifier				Limits	
Ammonia	8.50	8.023		mg/L		94	90 - 110	

Lab Sample ID: 240-211266-A-1 MS
Matrix: Water
Analysis Batch: 628147

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Ammonia	ND		2.50	2.488		mg/L		100	90 - 110	

Lab Sample ID: 240-211266-A-1 MSD
Matrix: Water
Analysis Batch: 628147

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit	
Ammonia	ND		2.50	2.521		mg/L		101	90 - 110	1	20	

Method: 420.4 - Phenolics, Total Recoverable

Lab Sample ID: MB 240-628470/17
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Phenolics, Total Recoverable	ND		0.0100	0.00300	mg/L			09/25/24 12:24	1

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 420.4 - Phenolics, Total Recoverable (Continued)

Lab Sample ID: MB 240-628470/55
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.0100	0.00300	mg/L			09/25/24 14:30	1

Lab Sample ID: LCS 240-628470/18
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	1.00	0.9947		mg/L		99	90 - 110

Lab Sample ID: LCS 240-628470/56
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	1.00	0.9109		mg/L		91	90 - 110

Lab Sample ID: LCS 240-628470/73
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	1.00	1.040		mg/L		104	90 - 110

Lab Sample ID: 240-211178-F-12 MS
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Phenolics, Total Recoverable	ND		0.0500	0.04610		mg/L		92	90 - 110

Lab Sample ID: 240-211178-F-12 MSD
Matrix: Water
Analysis Batch: 628470

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenolics, Total Recoverable	ND		0.0500	0.04698		mg/L		94	90 - 110	2	20

Method: 5220D-2011 - Chemical Oxygen Demand

Lab Sample ID: MB 240-628234/3
Matrix: Water
Analysis Batch: 628234

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		10.0	1.80	mg/L			09/24/24 12:10	1

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 5220D-2011 - Chemical Oxygen Demand (Continued)

Lab Sample ID: LCS 240-628234/4
Matrix: Water
Analysis Batch: 628234

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	41.2	43.41		mg/L		105	90 - 110

Lab Sample ID: 240-211301-A-1 MS
Matrix: Water
Analysis Batch: 628234

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	25.9	F1	50.0	69.57	F1	mg/L		87	90 - 110

Lab Sample ID: 240-211301-A-1 MSD
Matrix: Water
Analysis Batch: 628234

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	25.9	F1	50.0	71.42		mg/L		91	90 - 110	6	20

Method: 9020B - Organic Halides, Total (TOX)

Lab Sample ID: MB 680-857329/1-A
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857329

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Result 1	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Result 2	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1
TOX Dup	ND		40.0	14.0	ug/L		09/23/24 09:30	09/23/24 11:31	1

Lab Sample ID: LCS 680-857329/2-A
Matrix: Water
Analysis Batch: 857342

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857329

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Halogens, Total Organic	400	394.8		ug/L		99	60 - 140
TOX Dup	400	394.8		ug/L		99	60 - 140

Lab Sample ID: MB 680-857502/1-A
Matrix: Water
Analysis Batch: 857515

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857502

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 10:09	1
TOX Result 1	ND		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 10:09	1
TOX Result 2	ND		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 10:09	1
TOX Dup	ND		40.0	14.0	ug/L		09/24/24 06:59	09/24/24 10:09	1

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QC Sample Results

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 9020B - Organic Halides, Total (TOX) (Continued)

Lab Sample ID: LCS 680-857502/2-A
Matrix: Water
Analysis Batch: 857515

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857502

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	
							Limits	RPD
Halogens, Total Organic	400	389.2		ug/L		97	60 - 140	
TOX Dup	400	389.2		ug/L		97	60 - 140	

Lab Sample ID: LCSD 680-857502/14-A
Matrix: Water
Analysis Batch: 857515

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 857502

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD	Limit	
Halogens, Total Organic	400	388.2		ug/L		97	60 - 140	0	40	
TOX Dup	400	388.2		ug/L		97	60 - 140	0	40	

Lab Sample ID: 240-211306-1 MS
Matrix: Water
Analysis Batch: 857515

Client Sample ID: MW-6-091224-0800
Prep Type: Total/NA
Prep Batch: 857502

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec	
									Limits	RPD
Halogens, Total Organic	100		400	413.9		ug/L		78	60 - 140	
TOX Dup	100		400	413.9		ug/L		78	60 - 140	

Lab Sample ID: 240-211306-1 MSD
Matrix: Water
Analysis Batch: 857515

Client Sample ID: MW-6-091224-0800
Prep Type: Total/NA
Prep Batch: 857502

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
									Limits	RPD	Limit	
Halogens, Total Organic	100		400	415.8		ug/L		79	60 - 140	0	40	
TOX Dup	100		400	415.8		ug/L		79	60 - 140	0	40	

Lab Sample ID: MB 680-857607/1-A
Matrix: Water
Analysis Batch: 857609

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared		Analyzed		Dil Fac
							Time	Date	Time	Date	
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/24/24 10:42	09/24/24 13:32			1
TOX Result 1	ND		40.0	14.0	ug/L		09/24/24 10:42	09/24/24 13:32			1
TOX Result 2	ND		40.0	14.0	ug/L		09/24/24 10:42	09/24/24 13:32			1
TOX Dup	ND		40.0	14.0	ug/L		09/24/24 10:42	09/24/24 13:32			1

Lab Sample ID: LCS 680-857607/2-A
Matrix: Water
Analysis Batch: 857609

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857607

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	
							Limits	RPD
Halogens, Total Organic	400	418.0		ug/L		105	60 - 140	
TOX Dup	400	418.0		ug/L		105	60 - 140	

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 9020B - Organic Halides, Total (TOX) (Continued)

Lab Sample ID: 240-211306-2 MS
Matrix: Water
Analysis Batch: 857609

Client Sample ID: MW-12-091224-0955
Prep Type: Total/NA
Prep Batch: 857607

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Halogens, Total Organic	116		400	503.2		ug/L		97	60 - 140	
TOX Dup	116		400	503.2		ug/L		97	60 - 140	

Lab Sample ID: 240-211306-2 MSD
Matrix: Water
Analysis Batch: 857609

Client Sample ID: MW-12-091224-0955
Prep Type: Total/NA
Prep Batch: 857607

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit
Halogens, Total Organic	116		400	480.1		ug/L		91	60 - 140		5
TOX Dup	116		400	480.1		ug/L		91	60 - 140		5

Lab Sample ID: MB 680-857720/1-A
Matrix: Water
Analysis Batch: 857725

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 857720

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Halogens, Total Organic	ND		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 11:33	1
TOX Result 1	ND		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 11:33	1
TOX Result 2	ND		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 11:33	1
TOX Dup	ND		40.0	14.0	ug/L		09/25/24 06:45	09/25/24 11:33	1

Lab Sample ID: LCS 680-857720/2-A
Matrix: Water
Analysis Batch: 857725

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 857720

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec	
							Result	Qualifier
Halogens, Total Organic	400	358.0		ug/L		90	60 - 140	
TOX Dup	400	358.0		ug/L		90	60 - 140	

Lab Sample ID: 240-211306-3 MS
Matrix: Water
Analysis Batch: 857725

Client Sample ID: MW-16-091224-1207
Prep Type: Total/NA
Prep Batch: 857720

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec	
	Result	Qualifier	Added	Result	Qualifier				Limits	
Halogens, Total Organic	60.7		400	401.8		ug/L		85	60 - 140	
TOX Dup	60.7		400	401.8		ug/L		85	60 - 140	

Lab Sample ID: 240-211306-3 MSD
Matrix: Water
Analysis Batch: 857725

Client Sample ID: MW-16-091224-1207
Prep Type: Total/NA
Prep Batch: 857720

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec		RPD
	Result	Qualifier	Added	Result	Qualifier				Limits	RPD	Limit
Halogens, Total Organic	60.7		400	415.5		ug/L		89	60 - 140		3
TOX Dup	60.7		400	415.5		ug/L		89	60 - 140		3

QC Sample Results

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 240-628310/4
Matrix: Water
Analysis Batch: 628310

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.128	mg/L			09/25/24 02:52	1
Fluoride	ND		0.0500	0.0240	mg/L			09/25/24 02:52	1
Sulfate	ND		1.00	0.348	mg/L			09/25/24 02:52	1

Lab Sample ID: LCS 240-628310/5
Matrix: Water
Analysis Batch: 628310

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	50.58		mg/L		101	90 - 110
Fluoride	2.50	2.695		mg/L		108	90 - 110
Sulfate	50.0	52.70		mg/L		105	90 - 110

Lab Sample ID: 240-211084-B-5 MS
Matrix: Water
Analysis Batch: 628310

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	15.4		50.0	68.07		mg/L		105	80 - 120
Fluoride	0.331		2.50	3.159		mg/L		113	80 - 120
Sulfate	39.7		50.0	93.36		mg/L		107	80 - 120

Lab Sample ID: 240-211084-B-5 MSD
Matrix: Water
Analysis Batch: 628310

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	15.4		50.0	67.90		mg/L		105	80 - 120	0	15
Fluoride	0.331		2.50	3.150		mg/L		113	80 - 120	0	15
Sulfate	39.7		50.0	93.17		mg/L		107	80 - 120	0	15

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Metals

Prep Batch: 627341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Dissolved	Water	3005A	
240-211306-1	MW-6-091224-0800	Total Recoverable	Water	3005A	
240-211306-2	MW-12-091224-0955	Dissolved	Water	3005A	
240-211306-2	MW-12-091224-0955	Total Recoverable	Water	3005A	
240-211306-3	MW-16-091224-1207	Dissolved	Water	3005A	
240-211306-3	MW-16-091224-1207	Total Recoverable	Water	3005A	
MB 240-627341/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-627341/27-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCS 240-627341/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-211176-C-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
240-211176-C-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
240-211176-C-1-D MS	Matrix Spike	Total Recoverable	Water	3005A	
240-211176-C-1-E MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 627770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total Recoverable	Water	6010D	627341
240-211306-2	MW-12-091224-0955	Total Recoverable	Water	6010D	627341
240-211306-3	MW-16-091224-1207	Total Recoverable	Water	6010D	627341
MB 240-627341/1-A	Method Blank	Total Recoverable	Water	6010D	627341
LCS 240-627341/2-A	Lab Control Sample	Total Recoverable	Water	6010D	627341
240-211176-C-1-B MS	Matrix Spike	Total Recoverable	Water	6010D	627341
240-211176-C-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010D	627341

Analysis Batch: 627776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Dissolved	Water	6020B	627341
240-211306-1	MW-6-091224-0800	Total Recoverable	Water	6020B	627341
240-211306-2	MW-12-091224-0955	Dissolved	Water	6020B	627341
240-211306-2	MW-12-091224-0955	Total Recoverable	Water	6020B	627341
240-211306-3	MW-16-091224-1207	Dissolved	Water	6020B	627341
240-211306-3	MW-16-091224-1207	Total Recoverable	Water	6020B	627341
MB 240-627341/1-A	Method Blank	Total Recoverable	Water	6020B	627341
LCS 240-627341/27-A	Lab Control Sample	Total Recoverable	Water	6020B	627341
240-211176-C-1-D MS	Matrix Spike	Total Recoverable	Water	6020B	627341
240-211176-C-1-E MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020B	627341

General Chemistry

Analysis Batch: 628147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	350.1	
240-211306-2	MW-12-091224-0955	Total/NA	Water	350.1	
240-211306-3	MW-16-091224-1207	Total/NA	Water	350.1	
MB 240-628147/14	Method Blank	Total/NA	Water	350.1	
LCS 240-628147/15	Lab Control Sample	Total/NA	Water	350.1	
240-211266-A-1 MS	Matrix Spike	Total/NA	Water	350.1	
240-211266-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	350.1	

Eurofins Cleveland

QC Association Summary

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

General Chemistry

Analysis Batch: 628234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	5220D-2011	
240-211306-2	MW-12-091224-0955	Total/NA	Water	5220D-2011	
240-211306-3	MW-16-091224-1207	Total/NA	Water	5220D-2011	
MB 240-628234/3	Method Blank	Total/NA	Water	5220D-2011	
LCS 240-628234/4	Lab Control Sample	Total/NA	Water	5220D-2011	
240-211301-A-1 MS	Matrix Spike	Total/NA	Water	5220D-2011	
240-211301-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5220D-2011	

Analysis Batch: 628310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	9056A	
240-211306-2	MW-12-091224-0955	Total/NA	Water	9056A	
240-211306-3	MW-16-091224-1207	Total/NA	Water	9056A	
MB 240-628310/4	Method Blank	Total/NA	Water	9056A	
LCS 240-628310/5	Lab Control Sample	Total/NA	Water	9056A	
240-211084-B-5 MS	Matrix Spike	Total/NA	Water	9056A	
240-211084-B-5 MSD	Matrix Spike Duplicate	Total/NA	Water	9056A	

Analysis Batch: 628470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	420.4	
240-211306-2	MW-12-091224-0955	Total/NA	Water	420.4	
240-211306-3	MW-16-091224-1207	Total/NA	Water	420.4	
MB 240-628470/17	Method Blank	Total/NA	Water	420.4	
MB 240-628470/55	Method Blank	Total/NA	Water	420.4	
LCS 240-628470/18	Lab Control Sample	Total/NA	Water	420.4	
LCS 240-628470/56	Lab Control Sample	Total/NA	Water	420.4	
LCS 240-628470/73	Lab Control Sample	Total/NA	Water	420.4	
240-211178-F-12 MS	Matrix Spike	Total/NA	Water	420.4	
240-211178-F-12 MSD	Matrix Spike Duplicate	Total/NA	Water	420.4	

Prep Batch: 857329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-857329/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857329/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	

Analysis Batch: 857342

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-857329/1-A	Method Blank	Total/NA	Water	9020B	857329
LCS 680-857329/2-A	Lab Control Sample	Total/NA	Water	9020B	857329

Prep Batch: 857502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	Carbon Trap	
MB 680-857502/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857502/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
LCSD 680-857502/14-A	Lab Control Sample Dup	Total/NA	Water	Carbon Trap	
240-211306-1 MS	MW-6-091224-0800	Total/NA	Water	Carbon Trap	
240-211306-1 MSD	MW-6-091224-0800	Total/NA	Water	Carbon Trap	

QC Association Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

General Chemistry

Analysis Batch: 857515

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-1	MW-6-091224-0800	Total/NA	Water	9020B	857502
MB 680-857502/1-A	Method Blank	Total/NA	Water	9020B	857502
LCS 680-857502/2-A	Lab Control Sample	Total/NA	Water	9020B	857502
LCS D 680-857502/14-A	Lab Control Sample Dup	Total/NA	Water	9020B	857502
240-211306-1 MS	MW-6-091224-0800	Total/NA	Water	9020B	857502
240-211306-1 MSD	MW-6-091224-0800	Total/NA	Water	9020B	857502

Prep Batch: 857607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-2	MW-12-091224-0955	Total/NA	Water	Carbon Trap	
MB 680-857607/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857607/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
240-211306-2 MS	MW-12-091224-0955	Total/NA	Water	Carbon Trap	
240-211306-2 MSD	MW-12-091224-0955	Total/NA	Water	Carbon Trap	

Analysis Batch: 857609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-2	MW-12-091224-0955	Total/NA	Water	9020B	857607
MB 680-857607/1-A	Method Blank	Total/NA	Water	9020B	857607
LCS 680-857607/2-A	Lab Control Sample	Total/NA	Water	9020B	857607
240-211306-2 MS	MW-12-091224-0955	Total/NA	Water	9020B	857607
240-211306-2 MSD	MW-12-091224-0955	Total/NA	Water	9020B	857607

Prep Batch: 857720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-3	MW-16-091224-1207	Total/NA	Water	Carbon Trap	
MB 680-857720/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-857720/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
240-211306-3 MS	MW-16-091224-1207	Total/NA	Water	Carbon Trap	
240-211306-3 MSD	MW-16-091224-1207	Total/NA	Water	Carbon Trap	

Analysis Batch: 857725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-211306-3	MW-16-091224-1207	Total/NA	Water	9020B	857720
MB 680-857720/1-A	Method Blank	Total/NA	Water	9020B	857720
LCS 680-857720/2-A	Lab Control Sample	Total/NA	Water	9020B	857720
240-211306-3 MS	MW-16-091224-1207	Total/NA	Water	9020B	857720
240-211306-3 MSD	MW-16-091224-1207	Total/NA	Water	9020B	857720

Lab Chronicle

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-6-091224-0800

Lab Sample ID: 240-211306-1

Date Collected: 09/12/24 08:00

Matrix: Water

Date Received: 09/16/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6010D		1	627770	RKT	EET CLE	09/20/24 03:03
Dissolved	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Dissolved	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 20:57
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 20:54
Total/NA	Analysis	350.1		1	628147	AJ	EET CLE	09/23/24 13:23
Total/NA	Analysis	420.4		1	628470	JMR	EET CLE	09/25/24 16:31
Total/NA	Analysis	5220D-2011		1	628234	AAP	EET CLE	09/24/24 12:10
Total/NA	Prep	Carbon Trap			857502	CLJ	EET SAV	09/24/24 06:59
Total/NA	Analysis	9020B		1	857515	CLJ	EET SAV	09/24/24 12:14
Total/NA	Analysis	9056A		1	628310	JMR	EET CLE	09/25/24 05:24

Client Sample ID: MW-12-091224-0955

Lab Sample ID: 240-211306-2

Date Collected: 09/12/24 09:55

Matrix: Water

Date Received: 09/16/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6010D		1	627770	RKT	EET CLE	09/20/24 03:07
Dissolved	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Dissolved	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 21:02
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 20:59
Total/NA	Analysis	350.1		1	628147	AJ	EET CLE	09/23/24 13:26
Total/NA	Analysis	420.4		1	628470	JMR	EET CLE	09/25/24 15:03
Total/NA	Analysis	5220D-2011		1	628234	AAP	EET CLE	09/24/24 12:10
Total/NA	Prep	Carbon Trap			857607	CLJ	EET SAV	09/24/24 10:42
Total/NA	Analysis	9020B		1	857609	CLJ	EET SAV	09/25/24 08:32
Total/NA	Analysis	9056A		1	628310	JMR	EET CLE	09/25/24 05:45

Client Sample ID: MW-16-091224-1207

Lab Sample ID: 240-211306-3

Date Collected: 09/12/24 12:07

Matrix: Water

Date Received: 09/16/24 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6010D		1	627770	RKT	EET CLE	09/20/24 03:11
Dissolved	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Dissolved	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 21:12
Total Recoverable	Prep	3005A			627341	GK	EET CLE	09/18/24 05:00
Total Recoverable	Analysis	6020B		1	627776	AJC	EET CLE	09/19/24 21:09
Total/NA	Analysis	350.1		1	628147	AJ	EET CLE	09/23/24 13:29
Total/NA	Analysis	420.4		1	628470	JMR	EET CLE	09/25/24 15:07

Eurofins Cleveland

Lab Chronicle

Client: Haley & Aldrich, Inc.
Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Client Sample ID: MW-16-091224-1207

Lab Sample ID: 240-211306-3

Date Collected: 09/12/24 12:07

Matrix: Water

Date Received: 09/16/24 09:00

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Analyst</u>	<u>Lab</u>	<u>Prepared or Analyzed</u>
Total/NA	Analysis	5220D-2011		1	628234	AAP	EET CLE	09/24/24 12:10
Total/NA	Prep	Carbon Trap			857720	CLJ	EET SAV	09/25/24 06:45
Total/NA	Analysis	9020B		1	857725	CLJ	EET SAV	09/25/24 13:33
Total/NA	Analysis	9056A		1	628310	JMR	EET CLE	09/25/24 06:07

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



Accreditation/Certification Summary

Client: Haley & Aldrich, Inc.
 Project/Site: Amsted - Keokuk, Iowa GW

Job ID: 240-211306-1

Laboratory: Eurofins Cleveland

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	421	06-01-25

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-25
Arkansas (DW)	State	GA00006	06-30-25
Arkansas DEQ	State	88-00692	02-01-25
Florida	NELAP	E87052	06-30-25
Georgia	State	E87052	06-30-25
Georgia (DW)	State	803	06-30-25
Guam	State	24-05R	04-17-25
Hawaii	State	<cert No.>	06-30-25
Illinois	NELAP	200022	11-30-24
Iowa	State	353	07-01-25
Kentucky (UST)	State	108138	06-30-24 *
Louisiana (All)	NELAP	30690	06-30-25
Louisiana (DW)	State	LA009	12-31-24
Maine	State	GA00006	09-25-24
Maryland	State	250	12-31-24
Michigan	State	9925	06-30-24 *
Mississippi	State	<cert No.>	06-30-25
Nebraska	State	NE-OS-7-04	06-30-25
New Mexico	State	GA00006	06-30-25
North Carolina (DW)	State	13701	07-31-25
North Carolina (WW/SW)	State	269	12-31-24
Puerto Rico	State	GA00006	01-01-25
South Carolina	State	98001	06-30-24 *
Tennessee	State	TN02961	06-30-25
Texas	NELAP	T1047004185	11-30-24
Texas	TCEQ Water Supply	T104704185	06-30-24 *
USDA	US Federal Programs	P330-18-00313	04-04-27
Virginia	NELAP	460161	06-14-25
Wyoming	State	8TMS-L	06-30-25

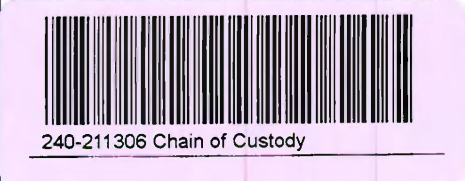
* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Cleveland

180 S. Van Buren Avenue
 Barberton, OH 44203
 Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

Client Information			Sampler: <u>Francis Reed</u>		Lab PM: Heckler, Denise D		Carrier Tracking No(s):		COC No: 240-124042-43261.1												
Client Contact: Thomas Vanage			Phone: <u>614-288-8619</u>		E-Mail: Denise.Heckler@et.eurofinsus.com		State of Origin: <u>IA</u>		Page: Page 1 of 1												
Company: Haley & Aldrich, Inc.			PWSID:		Analysis Requested						Job #: <u>0129848-037</u>										
Address: 8899 Gander Creek Drive			Due Date Requested:		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes/No)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">9056A_28D - Chloride, Fluoride, Sulfate</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">350.1, 5220D</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">420.4 NP - Phenolics, Total Recoverable</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6010D, 6020B</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6020B - Iron - Field Filtered</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">9020B - Organic Halides, Total (TOX)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">6020B - Iron, Lab to filler</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Total Number of Containers</td> </tr> </table>						Field Filtered Sample (Yes/No)	9056A_28D - Chloride, Fluoride, Sulfate	350.1, 5220D	420.4 NP - Phenolics, Total Recoverable	6010D, 6020B	6020B - Iron - Field Filtered	9020B - Organic Halides, Total (TOX)	6020B - Iron, Lab to filler	Total Number of Containers	Preservation Codes: N - None S - H2SO4 D - HNO3	
Field Filtered Sample (Yes/No)	9056A_28D - Chloride, Fluoride, Sulfate	350.1, 5220D	420.4 NP - Phenolics, Total Recoverable	6010D, 6020B							6020B - Iron - Field Filtered	9020B - Organic Halides, Total (TOX)	6020B - Iron, Lab to filler	Total Number of Containers							
City: Miamisburg			TAT Requested (days): <u>STD</u>								Other:										
State, Zip: OH, 45342-4418			Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No																		
Phone: 937-530-1412(Tel)			PO #: 0129848-034																		
Email: TVanage@haleyaldrich.com			WO #:																		
Project Name: Amsted - Keokuk, Iowa Fall 2024			Project #: 24024753																		
Site:			SSOW#:																		
Sample Identification			Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastewater, BT=Tissue, A=Air)						Special Instructions/Note:									
					Preservation Code:																
<u>MW-6-091224-0800</u>			<u>09/12/24</u>	<u>08:00</u>	<u>G</u>	<u>Water</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>									
<u>MW-12-091224-0955</u>			<u>09/12/24</u>	<u>09:55</u>	<u>G</u>	<u>Water</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>									
<u>MW-16-091224-1207</u>			<u>09/12/24</u>	<u>12:07</u>	<u>G</u>	<u>Water</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>									
						<u>Water</u>															
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						<u>Water</u>															
						<u>Water</u>															
						<u>Water</u>															
						<u>Water</u>															
						<u>Water</u>															
Possible Hazard Identification			<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)												
Deliverable Requested: I, II, III, IV, Other (specify)			Special Instructions/QC Requirements:						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months												
Empty Kit Relinquished by:			Date:	Time:	Method of Shipment:																
Relinquished by: <u>Francis Reed</u>			Date/Time: <u>09/12/24 16:50</u>	Company: <u>H+A</u>	Received by: <u>MALISSA LOAR</u>						Date/Time: <u>9-16-24 9:00</u>	Company:									
Relinquished by:			Date/Time:	Company:	Received by:						Date/Time:	Company:									
Relinquished by:			Date/Time:	Company:	Received by:						Date/Time:	Company:									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No			Custody Seal No.:						Cooler Temperature(s) °C and Other Remarks:												



Eurofins - Cleveland Sample Receipt Form/Narrative Login # : _____
 Barbercon Facility

Client Haley & ALDOCH Site Name _____
 Cooler Received on 9-16-24 Opened on 9-16-24
 FedEx: 1st Grd Exp UPS FAS Waypoint Client Drop Off Eurofins Courier Other _____
 Receipt After-hours Drop-off Date/Time _____ Storage Location _____

Cooler unpacked by:
MALISSA LOAR

Eurofins Cooler # 22 Foam Box Client Cooler Box Other _____
 Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
 COOLANT: Wet Ice Blue Ice Dry Ice Water None
 1 Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN # 22 (CF 0.1 °C) Observed Cooler Temp 24 °C Corrected Cooler Temp 23 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity YES No NO NA
 -Were the seals on the outside of the cooler(s) signed & dated? Yes NO No NO NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes NO No NO NA
 -Were tamper/custody seals intact and uncompromised? YES No NO NA
 3 Shippers' packing slip attached to the cooler(s)? YES No NO NA
 4 Did custody papers accompany the sample(s)? YES No NO NA
 5 Were the custody papers relinquished & signed in the appropriate place? YES No NO NA
 6 Was/were the person(s) who collected the samples clearly identified on the COC? YES No NO NA
 7 Did all bottles arrive in good condition (Unbroken)? YES No NO NA
 8 Could all bottle labels (ID/Date/Time) be reconciled with the COC? YES No NO NA
 9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)? YES No NO NA
 10 Were correct bottle(s) used for the test(s) indicated? YES No NO NA
 11 Sufficient quantity received to perform indicated analyses? YES No NO NA
 12 Are these work share samples and all listed on the COC? Yes NO No NO NA
 13 Were all preserved sample(s) at the correct pH upon receipt? YES No NO NA
 14 Were VOA's on the COC? YES No NO NA
 15 Were air bubbles >6 mm in any VOA vials? YES No NO NA
 16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes NO No NO NA
 17 Was a LL Hg or Me Hg trip blank present? Yes NO No NO NA

Tests that are not checked for pH by Receiving:
 VOAs
 Oil and Grease
 TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other _____
 Concerning _____

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES additional next page Samples processed by: _____

19. SAMPLE CONDITION
 Sample(s) _____ were received after the recommended holding time had expired
 Sample(s) _____ were received in a broken container
 Sample(s) _____ were received with bubble >6 mm in diameter (Notify PM)

20. SAMPLE PRESERVATION
 Sample(s) _____ were further preserved in the laboratory
 Time preserved: _____ Preservative(s) added/Lot number(s): _____
 VOA Sample Preservation - Date/Time VOAs Frozen: _____



Temperature readings

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u> <u>pH</u>	<u>Preservation</u> <u>Temp</u>	<u>Added</u>	<u>Preservation</u> <u>Lot Number</u>
MW-6-091224-0800	240-211306-A-1	Voa Vial 40ml Amber - with Sulfuric Acid				
MW-6-091224-0800	240-211306-B-1	Plastic 60 mL - unpreserved				
MW-6-091224-0800	240-211306-C-1	Amber Glass 250ml - Sulfuric Acid				
MW-6-091224-0800	240-211306-D-1	Plastic 250ml - with Sulfuric Acid	<2			
MW-6-091224-0800	240-211306-E-1	Plastic 500ml - with Nitric Acid	<2			
MW-6-091224-0800	240-211306-F-1	Plastic 500ml - w/ Nitric - Dis.	<2			
MW-12-091224-0955	240-211306-A-2	Voa Vial 40ml Amber - with Sulfuric Acid				
MW-12-091224-0955	240-211306-B-2	Plastic 60 mL - unpreserved				
MW-12-091224-0955	240-211306-C-2	Amber Glass 250ml - Sulfuric Acid				
MW-12-091224-0955	240-211306-D-2	Plastic 250ml - with Sulfuric Acid	<2			
MW-12-091224-0955	240-211306-E-2	Plastic 500ml - with Nitric Acid	<2			
MW-12-091224-0955	240-211306-F-2	Plastic 500ml - w/ Nitric - Dis.	<2			
MW-16-091224-1207	240-211306-A-3	Voa Vial 40ml Amber - with Sulfuric Acid				
MW-16-091224-1207	240-211306-B-3	Plastic 60 mL - unpreserved				
MW-16-091224-1207	240-211306-C-3	Amber Glass 250ml - Sulfuric Acid				
MW-16-091224-1207	240-211306-D-3	Plastic 250ml - with Sulfuric Acid	<2			
MW-16-091224-1207	240-211306-E-3	Plastic 500ml - with Nitric Acid	<2			
MW-16-091224-1207	240-211306-F-3	Plastic 500ml - w/ Nitric - Dis.	<2			

Eurofins Cleveland

180 S. Van Buren Avenue
 Barberton, OH 44203
 Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record



Environment Testing

Client Information (Sub Contract Lab)		Sampler:		Lab PM:		Carrier Tracking No(s):		COC No:			
Client Contact: Shipping/Receiving		Phone:		Heckler, Denise D		E-Mail: Denise.Heckler@et.eurofinsus.com		240-190707.1			
Company: Eurofins Environment Testing Southeast L		Accreditations Required (See note): State - Iowa		State of Origin: Iowa		Page: Page 1 of 1		Job #: 240-211306-1			
Address: 5102 LaRoche Avenue, City: Savannah State, Zip: GA, 31404		Due Date Requested: 9/30/2024		Analysis Requested						Preservation Codes: -	
Phone: 912-354-7858(Tel) 912-352-0165(Fax)		TAT Requested (days):								Other:	
Email:		PO #:									
Project Name: Amsted - Keokuk, Iowa GW		Project #: 24024753									
Site:		SSOW#:		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		Total Number of containers			
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	9020B/Carbon_Trap Organic Halides, Total (TOX)				Special Instructions/Note:	
MW-6-091224-0800 (240-211306-1)		9/12/24	08:00 Central	G	Water	X					
MW-12-091224-0955 (240-211306-2)		9/12/24	09:55 Central	G	Water	X					
MW-16-091224-1207 (240-211306-3)		9/12/24	12:07 Central	G	Water	X					
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.</p>											
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)			Primary Deliverable Rank: 2			Special Instructions/QC Requirements:					
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:					
Relinquished by: MALISSA LOAR		Date/Time: 9/16/24		Company:		Received by: <i>[Signature]</i>		Date/Time: 09/12/24 0958		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:			Cooler Temperature(s) °C and Other Remarks: 2.8/2.8						



Login Sample Receipt Checklist

Client: Haley & Aldrich, Inc.

Job Number: 240-211306-1

Login Number: 211306

List Number: 2

Creator: Lincoln, Alyssa

List Source: Eurofins Savannah

List Creation: 09/17/24 01:43 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Data Usability Summary Report

Project Name: Keokuk, Iowa Groundwater

Project Description: Groundwater Samples

Sample Date(s): 29 April through 02 May 2024

Analytical Laboratory: Eurofins Test America Laboratories, Inc. – Barberton, OH

Validation Performed by: Sean Fischer

Validation Reviewed by: Gabrielle Davis

Validation Date: 15 May 2024

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the analytical results for Sample Delivery Group(s) (SDGs) listed. This DUSR is organized into the following sections:

- 1. Sample Delivery Group Numbers 240-203649-1 and 240-203820-1**
 - 2. Explanations**
 - 3. Glossary**
 - 4. Abbreviations**
 - 5. Qualifiers**
- References**

This data validation and usability assessment was performed per the guidance and requirements established by the United States Environmental Protection Agency (USEPA) using the following reference materials:

- National Functional Guidelines (NFG) for Inorganic Data Review.
- The project-specific Work Plan (WP), herein referred to as the specified limits (see references section).

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and reporting limit (RL) are flagged J as estimated.

Sample data were qualified in accordance with the laboratory's standard operating procedures (SOPs). The results presented in each laboratory report were found to be compliant with the data quality objectives (DQOs) for the project and are therefore usable; any exceptions are noted in the following pages.

1. Sample Delivery Group Numbers 240-203649-1 and 240-203820-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number(s):

- 240-203649-1, dated 13 May 2024; and
- 240-203820-1, dated 15 May 2024.

Samples were collected, preserved, and shipped following standard chain of custody (COC) protocols.

Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals not used on the sample bottle(s).
- SDG 240-203649-1: Sample receipt form notes SW-1-043024-1300, SW-2-043024-1140, MW-25-042924-1558, and MW-26-042924-1710 have one sulfuric acid VOA. No other mention in the case narrative.
- Surface water samples sent in unpreserved bottles to the laboratory to be filtered for iron.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Date	Matrix	Methods
MW-26-043024-1515	N	240-203649-1	04/30/2024	WG	A
MW-25-043024-1400	N	240-203649-2	04/30/2024	WG	A
SW-1-043024-1300	N	240-203649-3	04/30/2024	WS	A, B, C, D, E
SW-2-043024-1140	N	240-203649-4	04/30/2024	WS	A, B, C, D, E
MW-25-042924-1558	N	240-203649-5	04/29/2024	WG	A, B, C, D, E
MW-26-042924-1710	N	240-203649-6	04/29/2024	WG	A, B, C, D, E
MW-20-043024-1750	N	240-203820-1	04/30/2024	WG	A, B, C, D, E
MW-21-050124-0900	N	240-203820-2	05/01/2024	WG	A, B, C, D, E
MW-5-050124-1025	N	240-203820-3	05/01/2024	WG	A, B, C, D, E
MW-27-050124-1135	N	240-203820-4	05/01/2024	WG	A, B, C, D, E
MW-7-050124-1305	N	240-203820-5	05/01/2024	WG	A, B, C, D, E
MW-6-050124-1520	N	240-203820-6	05/01/2024	WG	A, B, C, D, E
20760-050124-0001	FD	240-203820-7	05/01/2024	WG	A, B, C, D, E
MW-12-050124-1640	N	240-203820-8	05/01/2024	WG	A, B, C, D, E
MW-16-050224-0905	N	240-203820-9	05/02/2024	WG	A, B, C, D, E

Method Holding Times			
A.	SW6020B	Total Manganese & Sodium, Dissolved Iron	180 days (preserved)
B.	E350.1	Ammonia (as N)	28 days (preserved)
C.	SM5220D	Chemical Oxygen Demand (COD)	28 days (preserved)
D.	SW6010D	Total Boron, Lithium, and Strontium	180 days (preserved)
E.	SW9056A	Chloride, Fluoride, & Sulfate	28 days (preserved)

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All sample dilutions were reviewed and found to be justified. Only detected analytes were reported from a sample dilution analysis.

1.4 LABORATORY CONTROL SAMPLES

[Refer to Section E 1.3.](#) Compounds associated with the laboratory control samples (LCSs) analyses associated with client samples exhibited recoveries within the specified limits.

- For SDG 240-203649-1, methods SM5220D, SW6010D, and SW9056A are not supported by any precision quality control information.

1.5 MATRIX SPIKE SAMPLES

[Refer to Section E 1.4.](#) The sample(s) below were used for matrix spike/matrix spike duplicate (MS/MSD):

Lab Sample Number	Matrix Spike/Matrix Spike Duplicate Sample Client ID	Method(s)
240-203649-2 MS/MSD	MW-25-043024-1400	SW6020B
240-203649-3 MS/MSD	SW-1-043024-1300	E350.1
240-203820-5 MS/MSD	MW-7-050124-1305	E350.1, SM5220D, SW6010D, SW6020B, SW9056A

The MS/MSD recoveries and the relative percent difference (RPD) between the MS and MSD results were within the specified limits.

1.6 BLANK SAMPLE ANALYSIS

[Refer to Section E 1.5.](#) Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

[Refer to Section E 1.6.](#) No client samples were used for laboratory duplicate analysis.

The following sample(s) were used for field duplicate analysis. RPDs were all below 35 percent for water (or the absolute difference rule was satisfied if detects were less than 5 times the RL).

Primary Sample ID	Duplicate Sample ID	Method(s)
MW-12-050124-1640	20760-050124-0001	E350.1, SM5220D, SW6010D, SW6020B, SW9056A

1.8 PRECISION AND ACCURACY

[Refer to Section E 1.7.](#) Where required by the method, some measurement of analytical accuracy and precision was reported for each method with the site samples, with the following exceptions:

- No precision was reported for methods SM5220D, SW6010D, and SW9056A for SDG 240-203649-1.

1.9 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the DQOs for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

2. Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.3 Laboratory Control Samples
 - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
 - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
 - For inorganic methods, when a matrix spike recovery falls outside of the control limits and the sample result is less than four times the spike added, a post-digestion spike (PDS) is performed.
- E 1.5 Blank Sample Analysis
 - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
 - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
 - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
 - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The relative percent difference (RPD) or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
 - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
 - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent

recovery (%R) of certain spiked compounds. This can be assessed using LCS, blank spike (BS), MS, and/or surrogate recoveries.

3. Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
 - EB Equipment Blank Sample
 - FB Field Blank Sample
 - FD Field Duplicate Sample
 - N Primary Sample
 - TB Trip Blank Sample
- Units:
 - $\mu\text{g}/\text{kg}$ micrograms per kilogram
 - $\mu\text{g}/\text{L}$ micrograms per liter
 - $\mu\text{g}/\text{m}^3$ micrograms per cubic meter
 - mg/kg milligrams per kilogram
 - mg/L milligrams per liter
 - ppb v/v parts per billion volume/volume
 - pCi/L picocuries per liter
 - pg/g picograms per gram
 - pg/L picograms per liter
- Matrices:
 - AA Ambient Air
 - GS Soil Gas
 - GW/WG Groundwater
 - QW Water Quality
 - IA Indoor Air
 - SE Sediment
 - SO Soil
 - SSV Sub-slab Vapor
 - WQ Water Quality control matrix
 - WS Surface Water
- Table Footnotes:
 - NA Not applicable
 - ND Non-detect
 - NR Not reported
- Common Symbols:
 - % percent
 - < less than
 - \leq less than or equal to
 - > greater than
 - \geq greater than or equal to
 - = equal
 - $^{\circ}\text{C}$ degrees Celsius
 - \pm plus or minus
 - \sim approximately
 - x times (multiplier)

- Fractions:
 - N Normal (method cannot be filtered)
 - D Dissolved (filtered)
 - T Total (unfiltered)

4. Abbreviations

%D	Percent Difference	MDL	Laboratory Method Detection Limit
%R	Percent Recovery	MS/MSD	Matrix Spike/Matrix Spike Duplicate
%RSD	Percent Relative Standard Deviation	NA	not applicable
%v/v	Percent volume by volume	ND	Non-Detect
2s	2 sigma	NFG	National Functional Guidelines
4,4-DDT	4 4-dichlorodiphenyltrichloroethane	NH ₃	Ammonia
Abs Diff	Absolute Difference	NYSDEC	New York State Department of Environmental Conservation
amu	atomic mass unit	PAH	Polycyclic Aromatic Hydrocarbon
BPJ	Best Professional Judgement	PCB	Polychlorinated Biphenyl
BS	Blank Spike	PDS	Post-Digestion Spike
CCB	Continuing Calibration Blank	PEM	Performance Evaluation Mixture
CCV	Continuing Calibration Verification	PFAS	Per- and Polyfluoroalkyl Substances
CCVL	Continuing Calibration Verification Low	PFBA	Perfluorbutanoic Acid
COC	Chain of Custody	PFD	Perfluorodecalin
COM	Combined Isotope Calculation	PFOA	Perfluorooctanoic Acid
Cr (VI)	Hexavalent Chromium	PFOS	Perfluorooctane sulfonate
CRI	Collision Reaction Interface	PFPeA	Perfluoropentanoic Acid
DoD	Department of Defense	QAPP	Quality Assurance Project Plan
DQO	data quality objective	QC	Quality Control
DUSR	Data Usability Summary Report	QSM	Quality Systems Manual
EIS	Extraction Internal Standard	R ²	R-squared value
EMPC	Estimated Maximum Possible Concentration	Ra-226	Radium-226
FBK	Field Blank Contamination	Ra-228	Radium-228
FDP	Field Duplicate	RESC	Resolution Check Measure
GC	Gas Chromatograph	RL	Laboratory Reporting Limit
GC/MS	Gas Chromatography/Mass Spectrometry	RPD	Relative Percent Difference
GPC	Gel Permeation Chromatography	RRF	Relative Response Factor
H ₂	Hydrogen gas	RT	Retention Time
HCl	Hydrochloric Acid	SAP	Sampling Analysis Plan
ICAL	Initial Calibration	SDG	Sample Delivery Group
ICB	Initial Calibration Blank	SIM	Selected ion monitoring
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry	SOP	Standard Operating Procedure
ICV	Initial Calibration Verification	SPE	Solid-Phase Extraction
ICVL	Initial Calibration Verification Low	SVOC	Semi-Volatile Organic Compound
IPA	Isopropyl Alcohol	TCLP	Toxicity Characteristic Leaching Procedure
LC	Laboratory Control	TIC	Tentatively Identified Compound
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate	TKN	Total Kjeldahl Nitrogen
MBK	Method Blank Contamination	TPH	Total Petroleum Hydrocarbon
MDC	Minimum Detectable Concentration	TPU	Total Propagated Uncertainty
		USEPA	U.S. Environmental Protection Agency
		VOC	Volatile Organic Compound
		WP	Work Plan

5. Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
 - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or “ND”.
 - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
 - E The compound was quantitated above the calibration range.
 - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - J/UJ as listed in exception tables J applies to detected data and UJ applies to non-detected data as reported by the laboratory.
 - UJ The compound was not detected. The reported sample quantitation limit is approximate.
 - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
 - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
 - S Result is suspect. See DUSR for details.

References

1. Haley & Aldrich, Inc., 2016. Revised Hydrologic Monitoring System Plan. Amsted Foundry Materials Recovery and Reuse Area. Keokuk, Iowa. January.
2. United States Environmental Protection Agency, 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-542-R-20-006. November.

Data Usability Summary Report

Project Name: Keokuk, Iowa Groundwater

Project Description: Groundwater Samples

Sample Date(s): 10 through 12 September 2024

Analytical Laboratory: Eurofins Test America Laboratories, Inc. – Barberton, OH

Validation Performed by: Therese Rowland

Validation Reviewed by: Gabrielle Davis

Validation Date: 27 September 2024

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the analytical results for Sample Delivery Group(s) (SDG) listed. This DUSR is organized into the following sections:

- 1. Sample Delivery Group Numbers 240-211103-1 and 240-211306-1**
 - 2. Precision and Accuracy [for SDG(s) above]**
 - 3. Explanations**
 - 4. Glossary**
 - 5. Abbreviations**
 - 6. Qualifiers**
- References**

This data validation and usability assessment was performed per the guidance and requirements established by the United States Environmental Protection Agency (USEPA) using the following reference materials:

- National Functional Guidelines (NFG) for Inorganic Data Review.
- The project-specific Work Plan (WP), herein referred to as the specified limits (see references section).

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and reporting limit (RL) are flagged J as estimated.

Sample data were qualified in accordance with the laboratory's standard operating procedures (SOPs). The results presented in each laboratory report were found to be compliant with the data quality objectives (DQOs) for the project and are therefore usable; any exceptions are noted in the following pages.

1. Sample Delivery Group Numbers 240-211103-1 and 240-211306-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number(s):

- 240-211103-1, dated 24 September 2024; and
- 240-211306-1, dated 26 September 2024

Samples were collected, preserved, and shipped following standard chain of custody (COC) protocols.

Samples were also received appropriately, identified correctly, and analyzed according to the COC.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Date	Matrix	Methods
SW-2-091024-1410	N	240-211103-1	09/10/2024	WS	A, B, C, D, E, F, G
SW-1-091024-1510	N	240-211103-2	09/10/2024	WS	A, B, C, D, E, F, G
MW-25-091024-1645	N	240-211103-3	09/10/2024	WG	A, B, C, D, E, F, G
MW-26-091024-1835	N	240-211103-4	09/10/2024	WG	A, B, C, D, E, F, G
MW-21-091124-1000	N	240-211103-5	09/11/2024	WG	A, B, C, D, E, F, G
MW-20-091124-1210	N	240-211103-6	09/11/2024	WG	A, B, C, D, E, F, G
MW-27-091124-1407	N	240-211103-7	09/11/2024	WG	A, B, C, D, E, F, G
MW-5-091124-1505	N	240-211103-8	09/11/2024	WG	A, B, C, D, E, F, G
20760-091124-0001	FD	240-211103-9	09/11/2024	WG	A, B, C, D, E, F, G
MW-7-091124-1620	N	240-211103-10	09/11/2024	WG	A, B, C, D, E, F, G
MW-6-091224-0800	N	240-211306-1	09/12/2024	WG	A, B, C, D, E, F, G
MW-12-091224-0955	N	240-211306-2	09/12/2024	WG	A, B, C, D, E, F, G
MW-16-091224-1207	N	240-211306-3	09/12/2024	WG	A, B, C, D, E, F, G

Method Holding Times			
A.	E350.1	Ammonia (as N)	28 days (preserved)
B.	E420.4	Total Recoverable Phenols	28 days (preserved)
C.	SM5220D	Chemical Oxygen Demand (COD)	28 days (preserved)
D.	SW6010D	Total Boron, Lithium, & Strontium	180 days (preserved)
E.	SW6020B	Total Manganese & Sodium, Dissolved Iron	180 days (preserved)
F.	SW9020B	Total Organic Halides	28 days (preserved)
G.	SW9056A	Chloride, Fluoride, & Sulfate	28 days (preserved)

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All sample dilutions were reviewed and found to be justified. Only detected analytes were reported from a sample dilution analysis.

1.4 LABORATORY CONTROL SAMPLES

[Refer to Section E 1.3.](#) Compounds associated with the laboratory control samples (LCS) analyses associated with client samples exhibited recoveries within the specified limits.

- For SDG 240-211306-1, methods SW6010D, SW6020D, E350.1, E420.4, SM5220D, and SW9056A are not supported by any precision quality control information.

1.5 MATRIX SPIKE SAMPLES

[Refer to Section E 1.4.](#) The sample(s) below were used for matrix spike/matrix spike duplicate (MS/MSD):

Lab Sample Number	Matrix Spike/Matrix Spike Duplicate Sample Client ID	Method(s)
240-211103-3	MW-25-091024-1645	SW6010D, SW6020D, E350.1, E420.4, SM5220D, SW9020B, SW9056A
240-211103-10	MW-7-091124-1620	E420.4
240-211103-2	SW1-091024-1510	SW9020B
240-211306-1	MW-6-091224-0800	SW9020B
240-211306-2	MW-12-091224-0955	SW9020B
240-211306-3	MW-16-091224-1207	SW9020B

The MS/MSD recoveries and the relative percent difference (RPD) between the MS and MSD results were within the specified limits, with the following exceptions:

Sample Type	Method	Parent Sample	Analyte	%R/ RPD	Qualifier	Affected Samples
MS/MSD	SW6020B	MW-25-091024-1645	Sodium	63%/ 60%	J-	MW-21-091124-1000 20760-091124-0001 MW-20-091124-1210 MW-26-091024-1835 MW-7-091124-1620 SW-1-091024-1510 SW-2-091024-1410 MW-27-091124-1407 MW-5-091124-1505
MS/MSD	E420.4	MW-25-091024-1645	Phenolics, Total Recoverable	146%/ 136%	J+/ None	None, samples are ND

Sample Type	Method	Parent Sample	Analyte	%R/ RPD	Qualifier	Affected Samples
MS/MSD	E420.4	MW-7-091124-1645	Phenolics, Total Recoverable	137%/ 147%	J+/ None	None, samples are ND

1.6 BLANK SAMPLE ANALYSIS

[Refer to Section E 1.5.](#) Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

[Refer to Section E 1.6.](#) No client samples were used for laboratory duplicate analysis.

The following sample(s) were used for field duplicate analysis. RPDs were all below 35 percent for water (or the absolute difference rule was satisfied if detects were less than 5 times the RL). Any exceptions are noted below and qualified.

Primary Sample ID	Duplicate Sample ID	Method(s)
MW-20-091124-1210	20760-091124-0001	SW6010D, SW6020D, E350.1, E420.4, SM5220D, SW9020B, SW9056A

Field Duplicate RPD Calculations:

Method(s): SW9020				
Analyte (ug/L)	Primary Sample ID	Duplicate Sample ID	% RPD	Qualification
	MW-20-091124-1210	20760-091124-0001		
Total Organic Halides (2)	261	99.1	NA	J/UJ, Abs. Diff. > RL
Total Organic Halides (3)	246	133	NA	J/UJ, Abs. Diff. > RL
Total Organic Halides (TOX)	232	167	NA	J/UJ, Abs. Diff. > RL
Total Organic Halogens	246	133	NA	J/UJ, Abs. Diff. > RL

1.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the DQOs for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. The qualifiers applied to this dataset are summarized in the table below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
20760-091124-0001	Total Organic Halides (2)	99.1	99.1 J	Field Duplicate calculations
20760-091124-0001	Total Organic Halides (3)	133	133 J	Field Duplicate calculations

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
20760-091124-0001	Total Organic Halides (TOX)	167	167 J	Field Duplicate calculations
20760-091124-0001	Total Organic Halogens	133	133 J	Field Duplicate calculations
MW-20-091124-1210	Total Organic Halides (2)	261	261 J	Field Duplicate calculations
MW-20-091124-1210	Total Organic Halides (3)	246	246 J	Field Duplicate calculations
MW-20-091124-1210	Total Organic Halides (TOX)	232	232 J	Field Duplicate calculations
MW-20-091124-1210	Total Organic Halogens	246	246 J	Field Duplicate calculations
20760-091124-0001	Sodium	72	72 J-	MS/MSD %R low
MW-20-091124-1210	Sodium	67	67 J-	MS/MSD %R low
MW-21-091124-1000	Sodium	50	50 J-	MS/MSD %R low
MW-25-091024-1645	Sodium	63.6	63.6 J-	MS/MSD %R low
MW-26-091024-1835	Sodium	77.6	77.6 J-	MS/MSD %R low
MW-27-091124-1407	Sodium	41.9	41.9 J-	MS/MSD %R low
MW-5-091124-1505	Sodium	43.6	43.6 J-	MS/MSD %R low
MW-7-091124-1620	Sodium	61.8	61.8 J-	MS/MSD %R low
SW-1-091024-1510	Sodium	21	21 J-	MS/MSD %R low
SW-2-091024-1410	Sodium	25.4	25.4 J-	MS/MSD %R low

2. Precision and Accuracy [for SDG(s) above]

[Refer to Section E 1.7.](#) Where required by the method, some measurement of analytical accuracy and precision was reported for each method with the site samples, with the following exceptions:

- No precision was reported for methods SW6010D, SW6020D, E350.1, E420.4, SM5220D, and SW9056A for SDG 240-211306-1.

3. Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.3 Laboratory Control Samples
 - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
 - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
 - For inorganic methods, when a matrix spike recovery falls outside of the control limits and the sample result is less than four times the spike added, a post-digestion spike (PDS) is performed.
- E 1.5 Blank Sample Analysis
 - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
 - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The relative percent difference (RPD) or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
 - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
 - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%R) of certain spiked compounds. This can be assessed using LCS, blank spike (BS), MS, and/or surrogate recoveries.

4. Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
 - EB Equipment Blank Sample
 - FB Field Blank Sample
 - FD Field Duplicate Sample
 - N Primary Sample
 - TB Trip Blank Sample
- Units:
 - $\mu\text{g}/\text{kg}$ micrograms per kilogram
 - $\mu\text{g}/\text{L}$ micrograms per liter
 - $\mu\text{g}/\text{m}^3$ micrograms per cubic meter
 - mg/kg milligrams per kilogram
 - mg/L milligrams per liter
 - ppb v/v parts per billion volume/volume
 - pCi/L picocuries per liter
 - pg/g picograms per gram
 - pg/L picograms per liter
- Matrices:
 - AA Ambient Air
 - GS Soil Gas
 - GW/WG Groundwater
 - QW Water Quality
 - IA Indoor Air
 - SE Sediment
 - SO Soil
 - SSV Sub-slab Vapor
 - WQ Water Quality control matrix
 - WS Surface Water
- Table Footnotes:
 - NA Not applicable
 - ND Non-detect
 - NR Not reported
- Common Symbols:
 - % percent
 - < less than
 - \leq less than or equal to
 - > greater than
 - \geq greater than or equal to
 - = equal
 - $^{\circ}\text{C}$ degrees Celsius
 - \pm plus or minus
 - \sim approximately
 - x times (multiplier)

- Fractions:
 - N Normal (method cannot be filtered)
 - D Dissolved (filtered)
 - T Total (unfiltered)

5. Abbreviations

%D	Percent Difference	MDL	Laboratory Method Detection Limit
%R	Percent Recovery	MS/MSD	Matrix Spike/Matrix Spike Duplicate
%RSD	Percent Relative Standard Deviation	NA	not applicable
%v/v	Percent volume by volume	ND	Non-Detect
2s	2 sigma	NFG	National Functional Guidelines
4,4-DDT	4 4-dichlorodiphenyltrichloroethane	NH ₃	Ammonia
Abs Diff	Absolute Difference	NYSDEC	New York State Department of Environmental Conservation
amu	atomic mass unit	PAH	Polycyclic Aromatic Hydrocarbon
BPJ	Best Professional Judgement	PCB	Polychlorinated Biphenyl
BS	Blank Spike	PDS	Post-Digestion Spike
CCB	Continuing Calibration Blank	PEM	Performance Evaluation Mixture
CCV	Continuing Calibration Verification	PFAS	Per- and Polyfluoroalkyl Substances
CCVL	Continuing Calibration Verification Low	PFBA	Perfluorbutanoic Acid
COC	Chain of Custody	PFD	Perfluorodecalin
COM	Combined Isotope Calculation	PFOA	Perfluorooctanoic Acid
Cr (VI)	Hexavalent Chromium	PFOS	Perfluorooctane sulfonate
CRI	Collision Reaction Interface	PFPeA	Perfluoropentanoic Acid
DoD	Department of Defense	QAPP	Quality Assurance Project Plan
DQO	data quality objective	QC	Quality Control
DUSR	Data Usability Summary Report	QSM	Quality Systems Manual
EIS	Extraction Internal Standard	R ²	R-squared value
EMPC	Estimated Maximum Possible Concentration	Ra-226	Radium-226
FBK	Field Blank Contamination	Ra-228	Radium-228
FDP	Field Duplicate	RESC	Resolution Check Measure
GC	Gas Chromatograph	RL	Laboratory Reporting Limit
GC/MS	Gas Chromatography/Mass Spectrometry	RPD	Relative Percent Difference
GPC	Gel Permeation Chromatography	RRF	Relative Response Factor
H ₂	Hydrogen gas	RT	Retention Time
HCl	Hydrochloric Acid	SAP	Sampling Analysis Plan
ICAL	Initial Calibration	SDG	Sample Delivery Group
ICB	Initial Calibration Blank	SIM	Selected ion monitoring
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry	SOP	Standard Operating Procedure
ICV	Initial Calibration Verification	SPE	Solid-Phase Extraction
ICVL	Initial Calibration Verification Low	SVOC	Semi-Volatile Organic Compound
IPA	Isopropyl Alcohol	TCLP	Toxicity Characteristic Leaching Procedure
LC	Laboratory Control	TIC	Tentatively Identified Compound
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate	TKN	Total Kjeldahl Nitrogen
MBK	Method Blank Contamination	TPH	Total Petroleum Hydrocarbon
MDC	Minimum Detectable Concentration	TPU	Total Propagated Uncertainty
		USEPA	U.S. Environmental Protection Agency
		VOC	Volatile Organic Compound
		WP	Work Plan

6. Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
 - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or “ND”.
 - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
 - E The compound was quantitated above the calibration range.
 - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity, but the result may be biased high.
 - J- The result is an estimated quantity, but the result may be biased low.
 - J/UJ as listed in exception tables J applies to detected data and UJ applies to non-detected data as reported by the laboratory.
 - UJ The compound was not detected. The reported sample quantitation limit is approximate.
 - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
 - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
 - S Result is suspect. See DUSR for details.

References

1. Haley & Aldrich, Inc, 2016. Revised Hydrologic Monitoring System Plan. Amsted Foundry Materials Recovery and Reuse Area. Keokuk, Iowa. January 2016
2. United States Environmental Protection Agency, 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-542-R-20-006. November 2020.

APPENDIX C
Groundwater and Surface Water Quality Data Summaries,
including Time vs. Concentration Graphs

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Total Organic Halogens (mg/L)

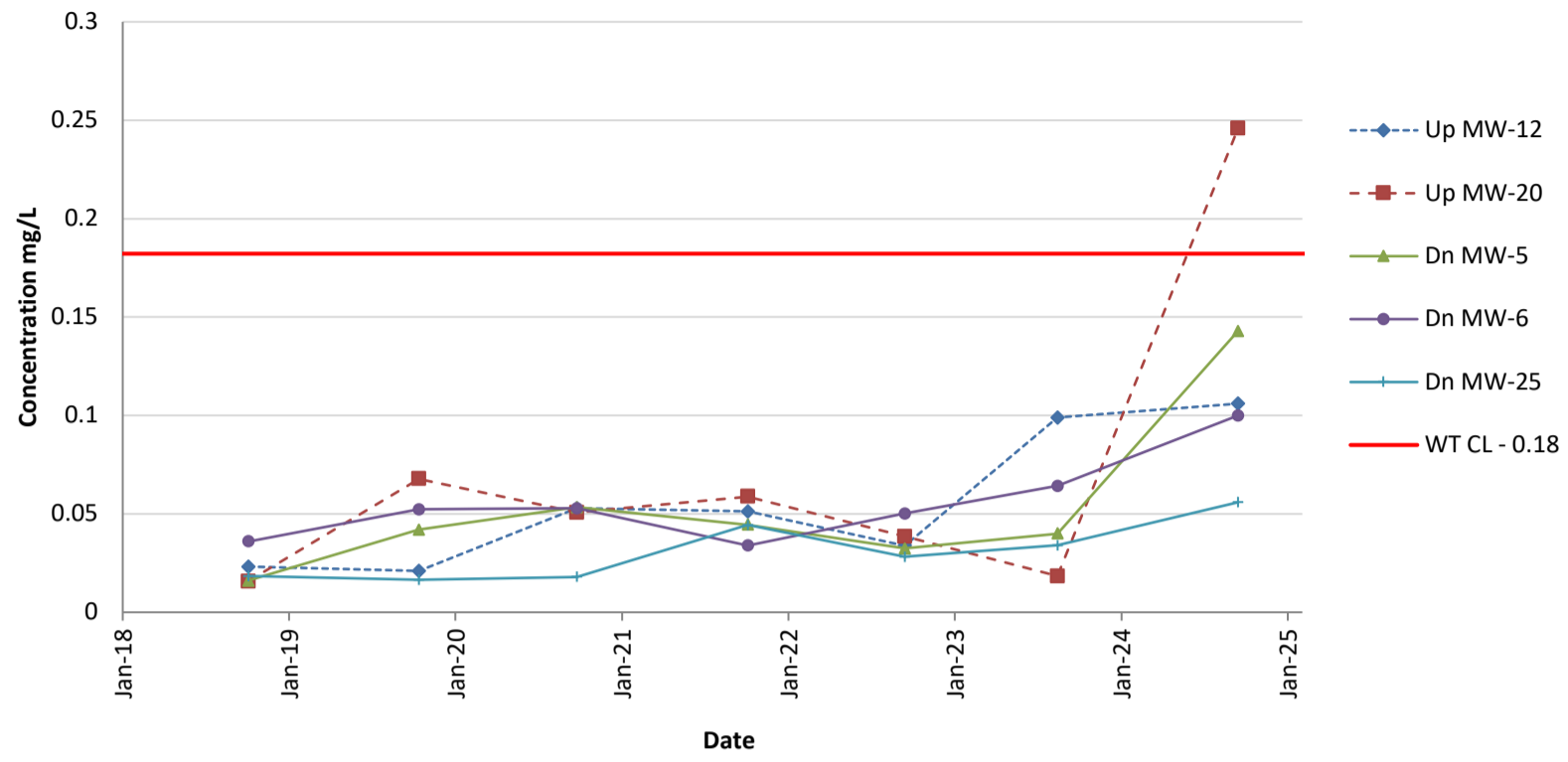
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18													
Oct-18	0.03	0.0231	0.0158	0.0161	0.036	0.0184	0.03	0.03	0.03	0.03	0.0139	0.03	0.0162
Apr-19													
Oct-19	0.01	0.021	0.0678	0.042	0.0524	0.0165	0.01	0.01	0.01	0.01	0.01	0.0125	0.015
Apr-20													
Oct-20	0.04	0.0529	0.0508	0.0533	0.0528	0.018	0.0185	0.0214	0.0779	0.0724	0.0175	0.0385	0.0635
Apr-21													
Oct-21	0.04	0.0513	0.0588	0.0445	0.0339	0.0444	0.0269	0.0348	0.04	0.0388	0.04	0.0167	0.0439
Apr-22													
Sep-22	0.02-0.06	0.0339	0.0385	0.0325	0.0502	0.0282	0.0182	0.06	0.0183	0.06	0.06	0.0212	0.0271
Apr-23													
Aug-23	0.04	0.099	0.0183	0.04	0.0643	0.0341	0.04	0.04	0.04	0.04	0.0222	0.0208	0.0257
Apr-24													
Sep-24	0.04	0.106	0.246	0.143	0.1	0.0559	0.0607	0.0346	0.0601	0.0272	0.0525	0.0657	0.154
		Mean	0.063				Mean	0.03			Mean	0.03	
		WT UCL	0.18				UA UCL	0.063			SW UCL	0.07	

Notes:

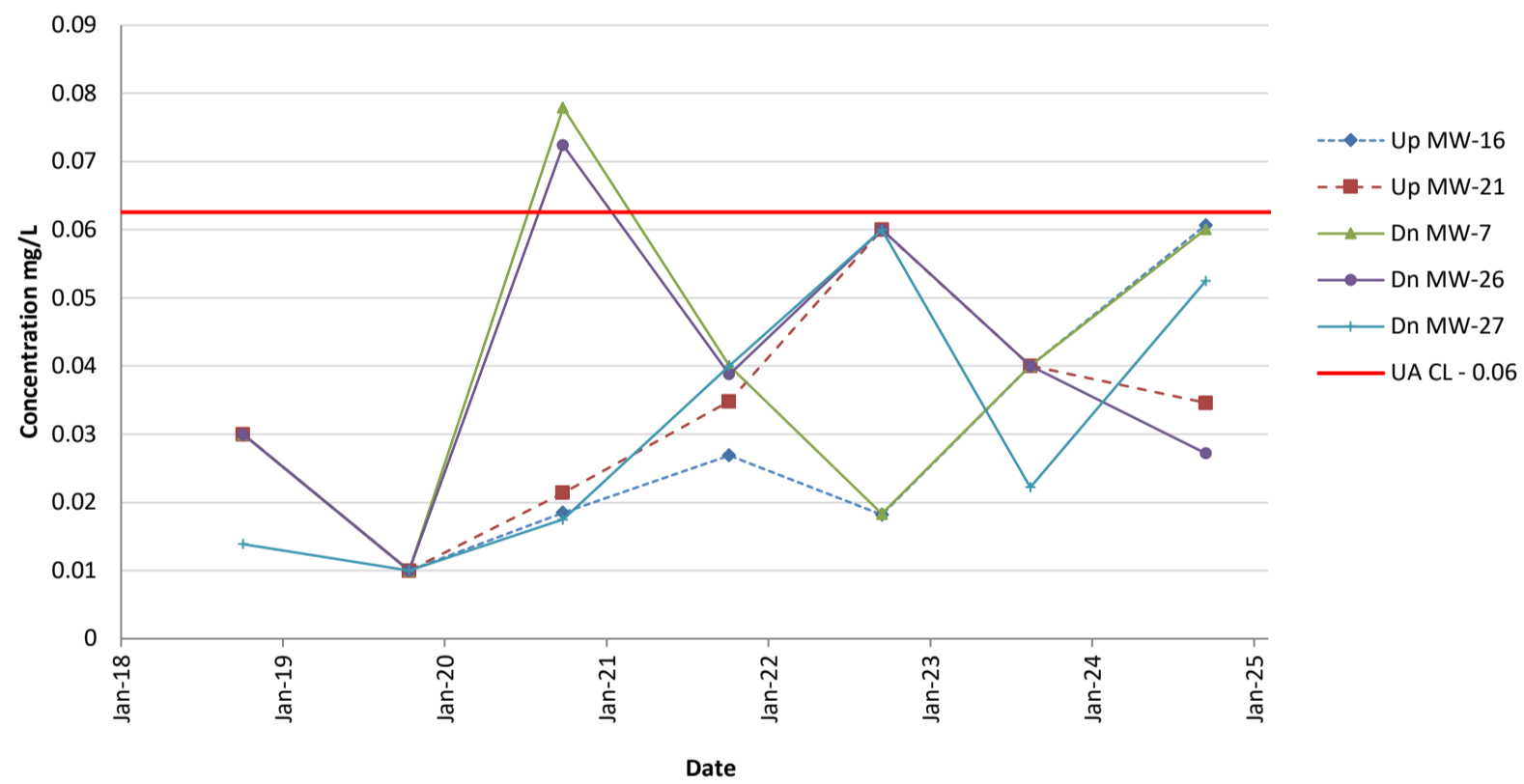
- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

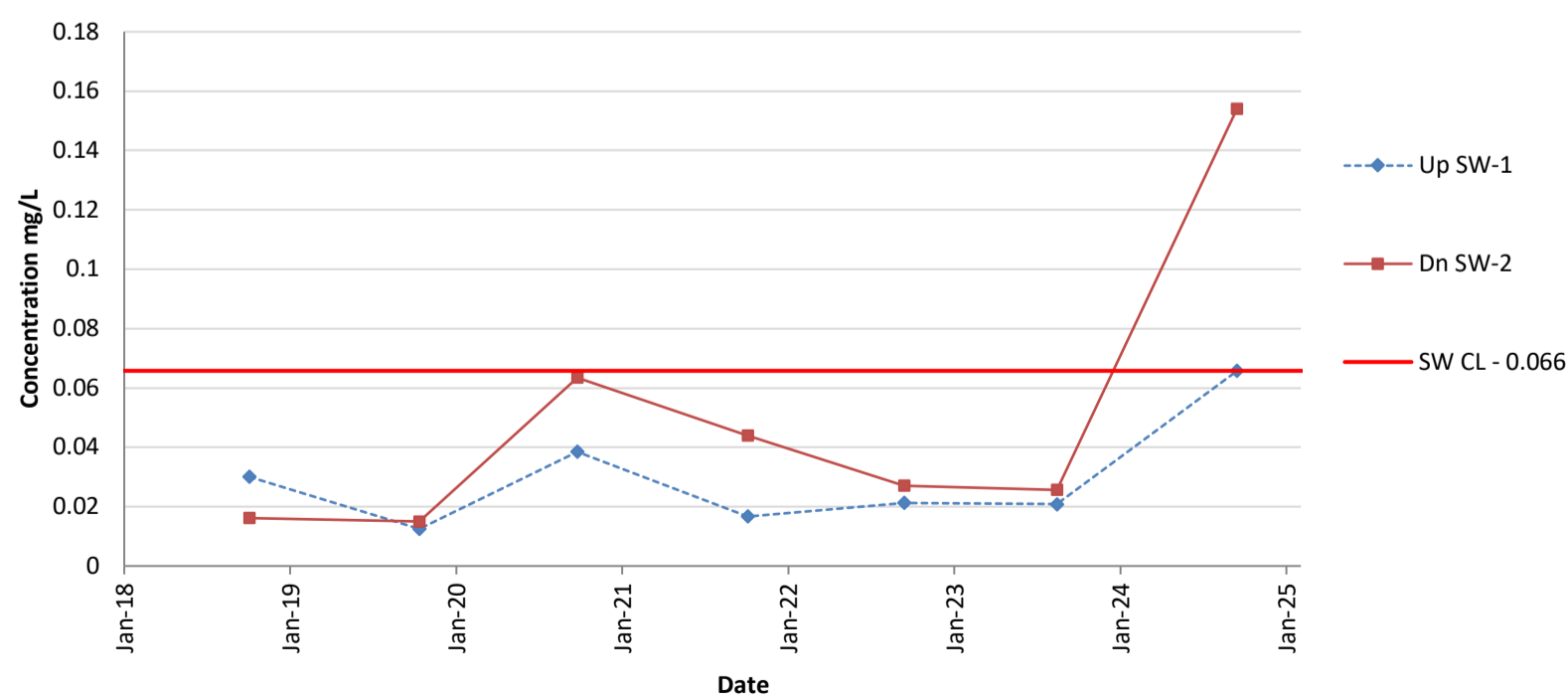
Amsted Landfill Water Quality Summary Water Table - Total Organic Halogens



Amsted Landfill Water Quality Summary Uppermost Aquifer - Total Organic Halogens



Amsted Landfill Water Quality Summary Surface Water - Total Organic Halogens



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

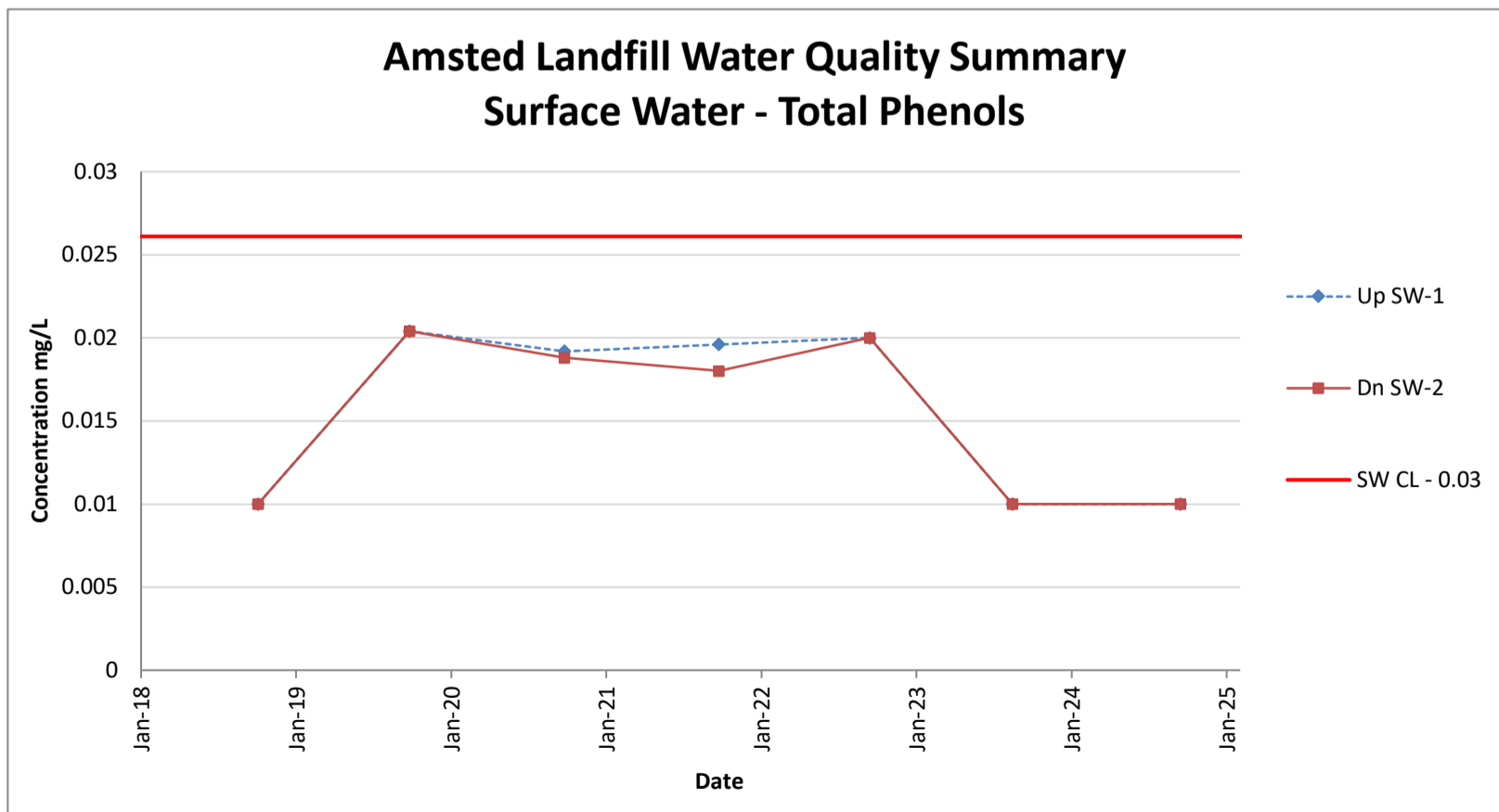
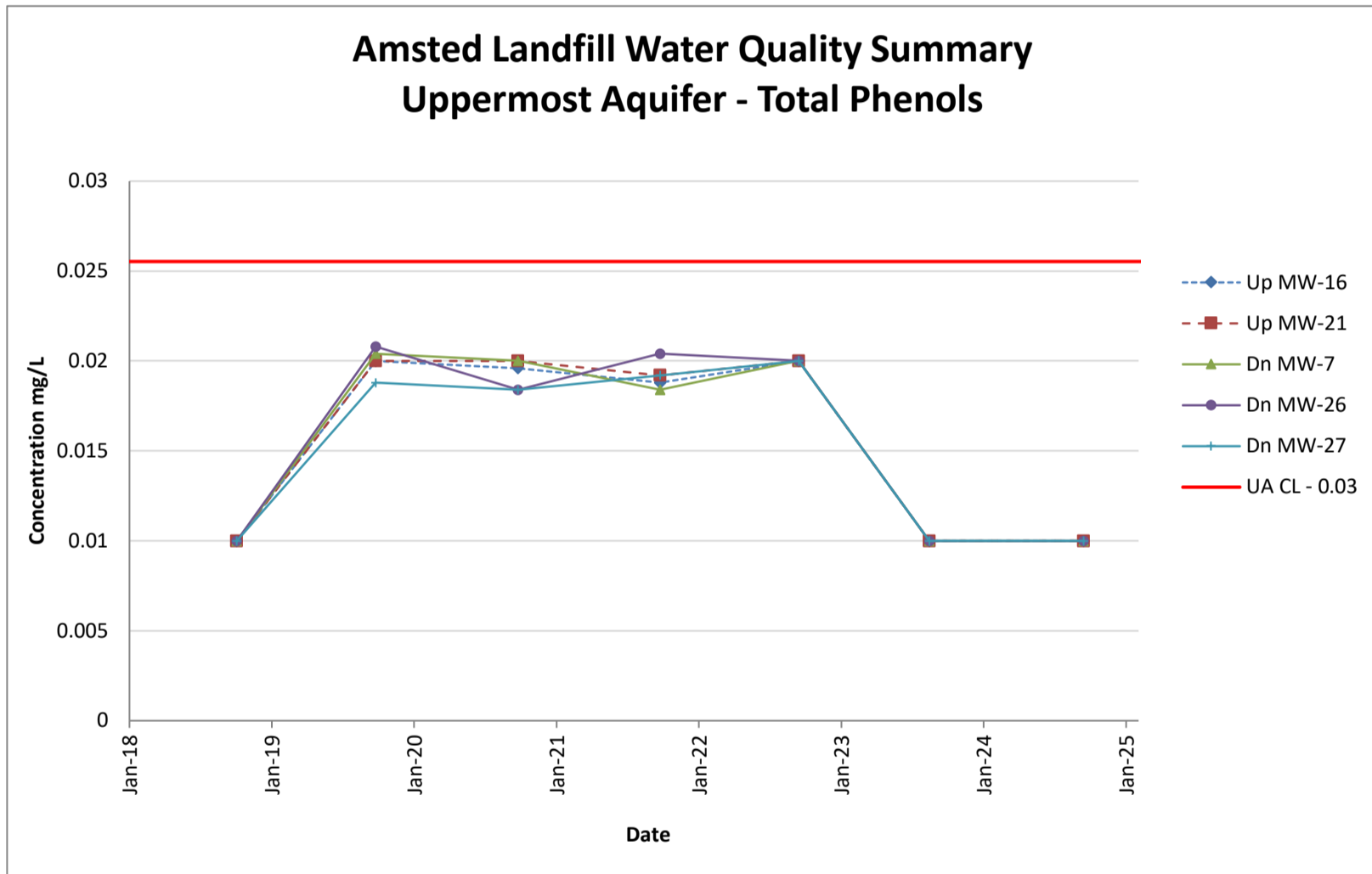
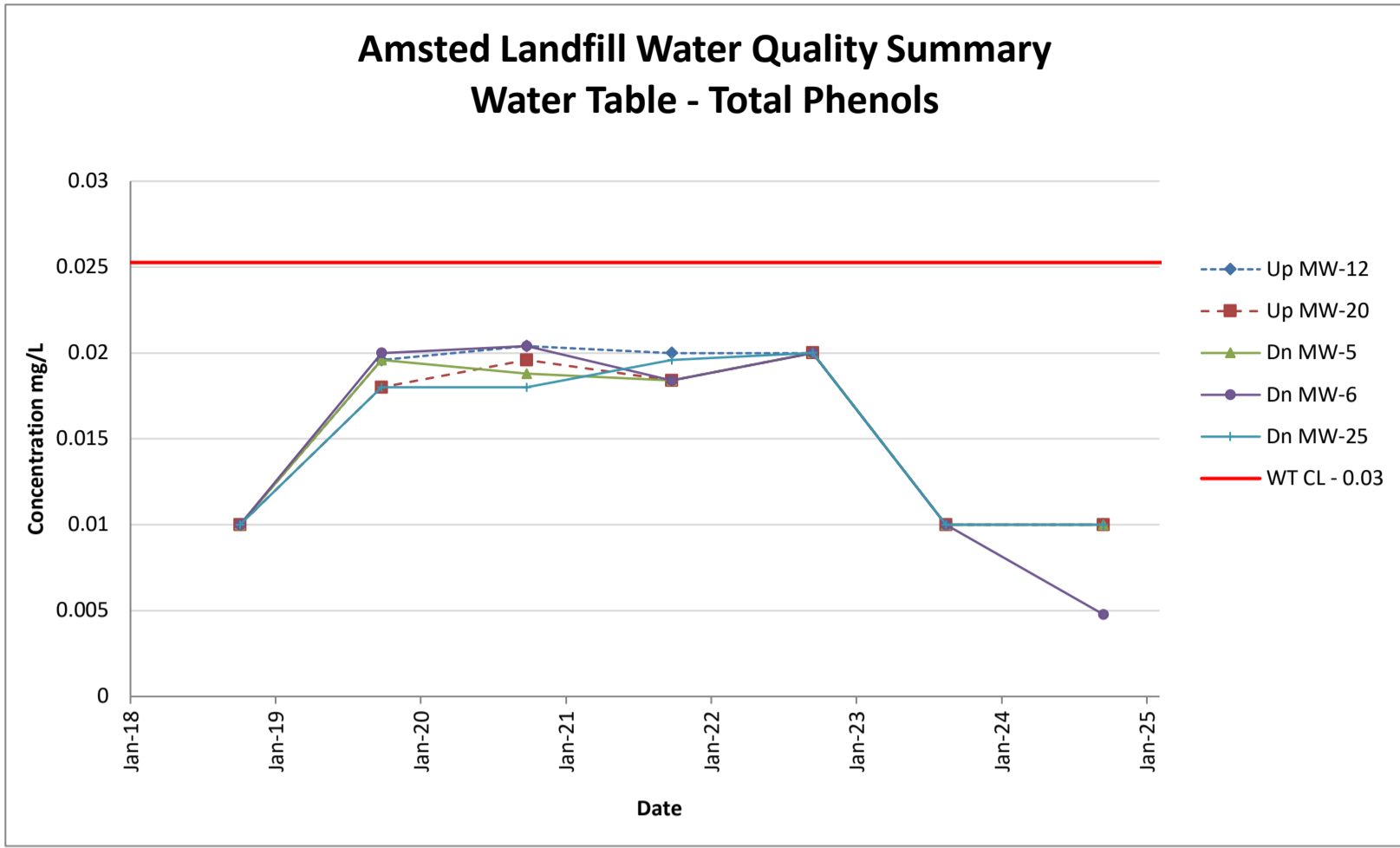
Total Phenols (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18													
Oct-18	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Apr-19													
Oct-19	0.0180-0.0216	0.0196	0.018	0.0196	0.02	0.018	0.02	0.02	0.0204	0.0208	0.0188	0.0204	0.0204
Apr-20													
Oct-20	0.018-0.0204	0.0204	0.0196	0.0188	0.0204	0.018	0.0196	0.02	0.02	0.0184	0.0184	0.0192	0.0188
Apr-21													
Oct-21	0.0180-0.0204	0.02	0.0184	0.0184	0.0184	0.0196	0.0188	0.0192	0.0184	0.0204	0.0192	0.0196	0.018
Apr-22													
Sep-22	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Apr-23													
Aug-23	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Apr-24													
Sep-24	0.01	0.01	0.01	0.01	0.00477	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
		Mean	0.02				Mean	0.02				Mean	0.02
		WT UCL	0.0253				UA UCL	0.0255				SW UCL	0.0261

Notes:

- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Ammonia (mg/L)

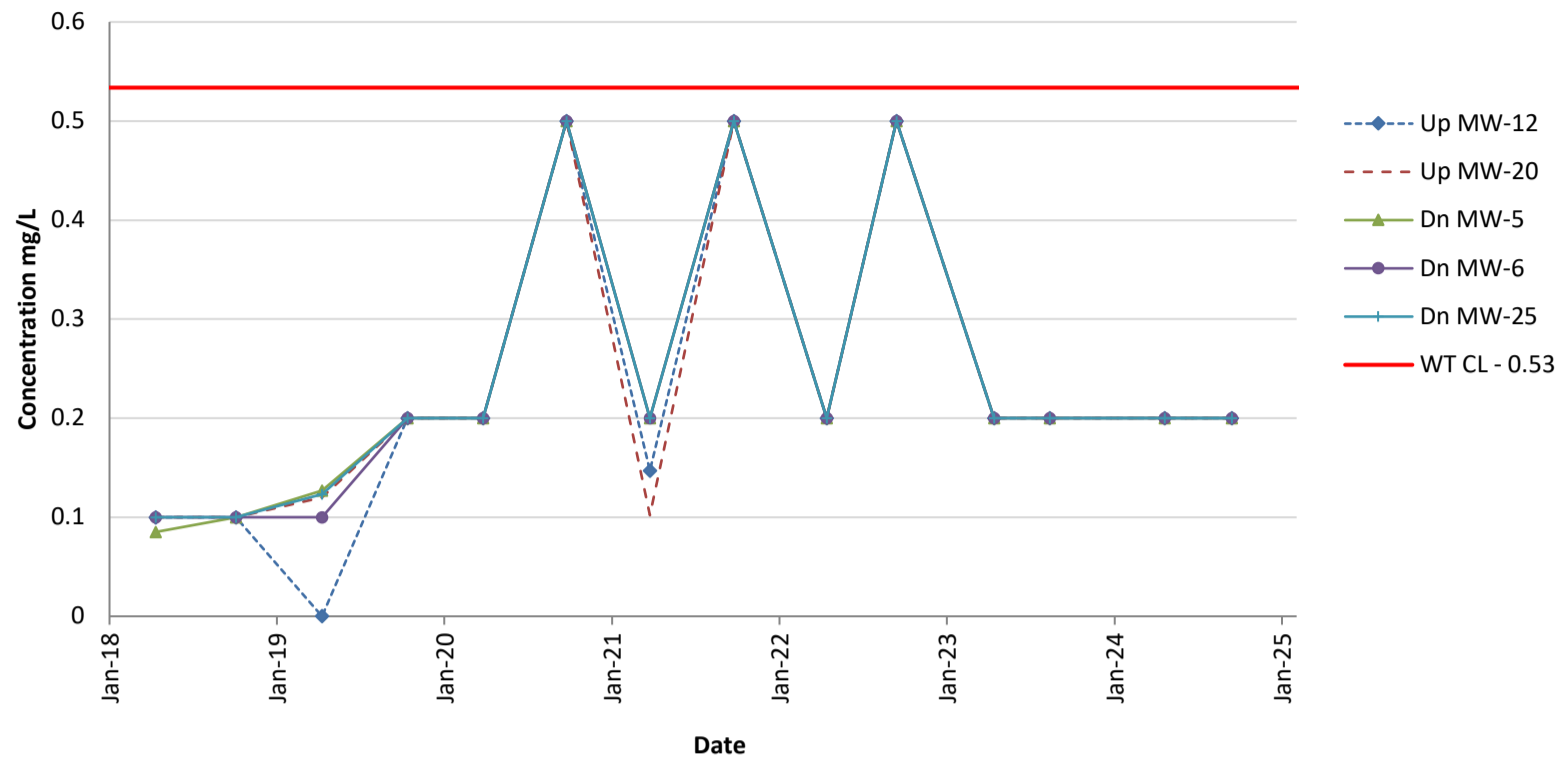
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.1	0.1	0.1	0.0851	0.1	0.1	0.1	0.267	0.1	1.21	1.49	0.212	0.452
Oct-18	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.809	0.951	1.52	0.271	0.554
Apr-19	0.1	0.139	0.12	0.127	0.1	0.123	0.135	0.173	0.165	0.825	1.54	0.298	0.381
Oct-19	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.07	0.702	1.82	2.78	0.323
Apr-20	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.492	0.921	1.48	0.281	0.16
Oct-20	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.992	1.18	1.44	0.483	0.5
Apr-21	0.2	0.147	0.102	0.2	0.2	0.2	0.2	0.2	0.994	0.818	1.42	0.17	0.29
Oct-21	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.934	0.93	1.32	0.5	0.5
Apr-22	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0881	0.979	1.03	1.4	0.147	0.117
Sep-22	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.918	1.32	1.27	0.399	0.307
Apr-23	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.11	0.2	1.26	1.37	0.212	0.191
Aug-23	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.703	1.19	1.37	7.68	0.134
Apr-24	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.67	1.11	1.36	0.23	0.89
Sep-24	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.00	1.11	1.34	0.128	0.097
		Mean	0.24			Mean	0.25			Mean	0.99		
		WT UCL	0.53			UA UCL	0.53			SW UCL	5.07		

Notes:

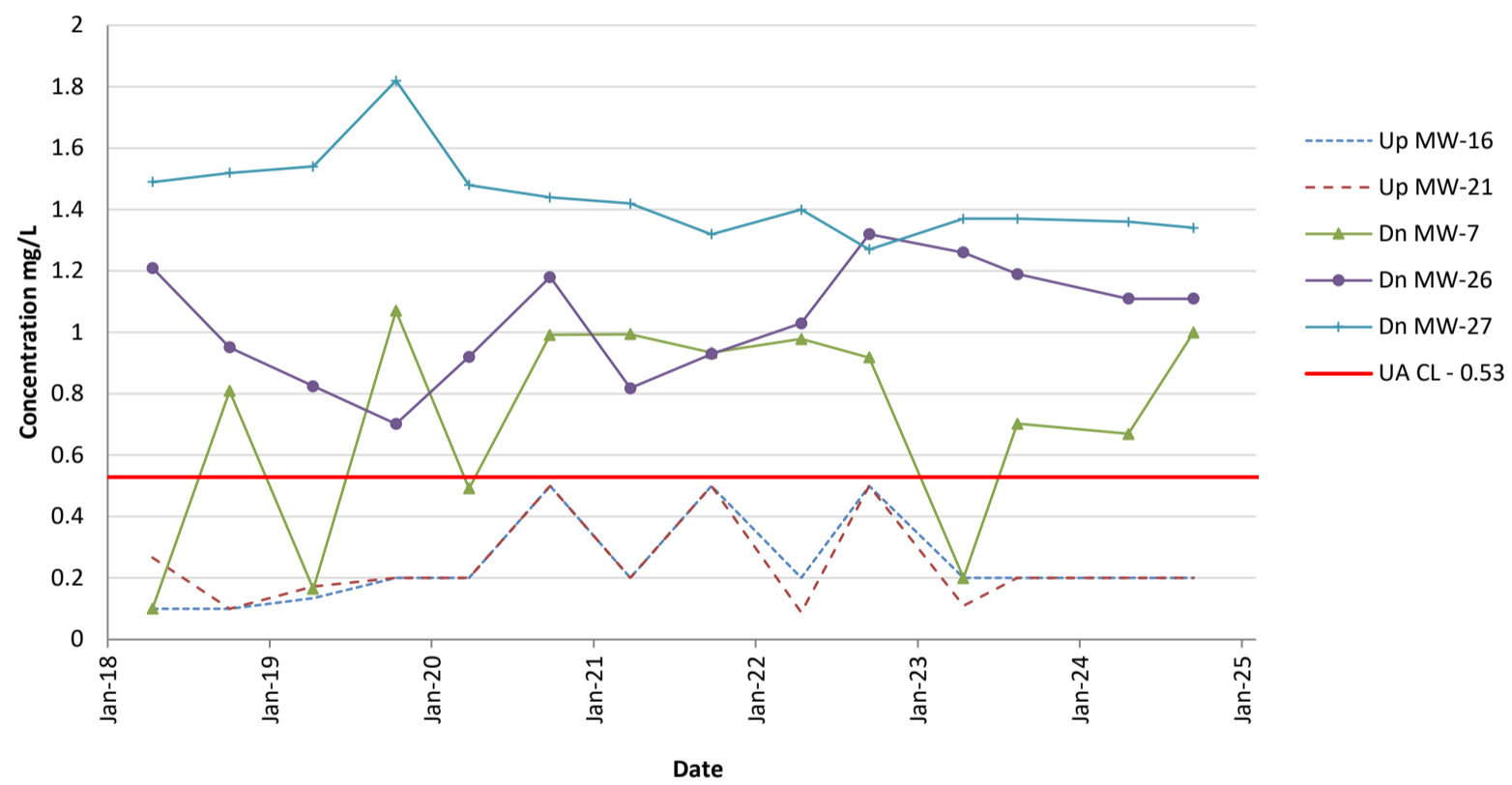
- CL = Control Limit
- NA = Not applicable
- NS = Not sampled due to insufficient amount of water
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table
- R = Rejected during validation

A **bolded** value indicates parameter present above method reporting limit.

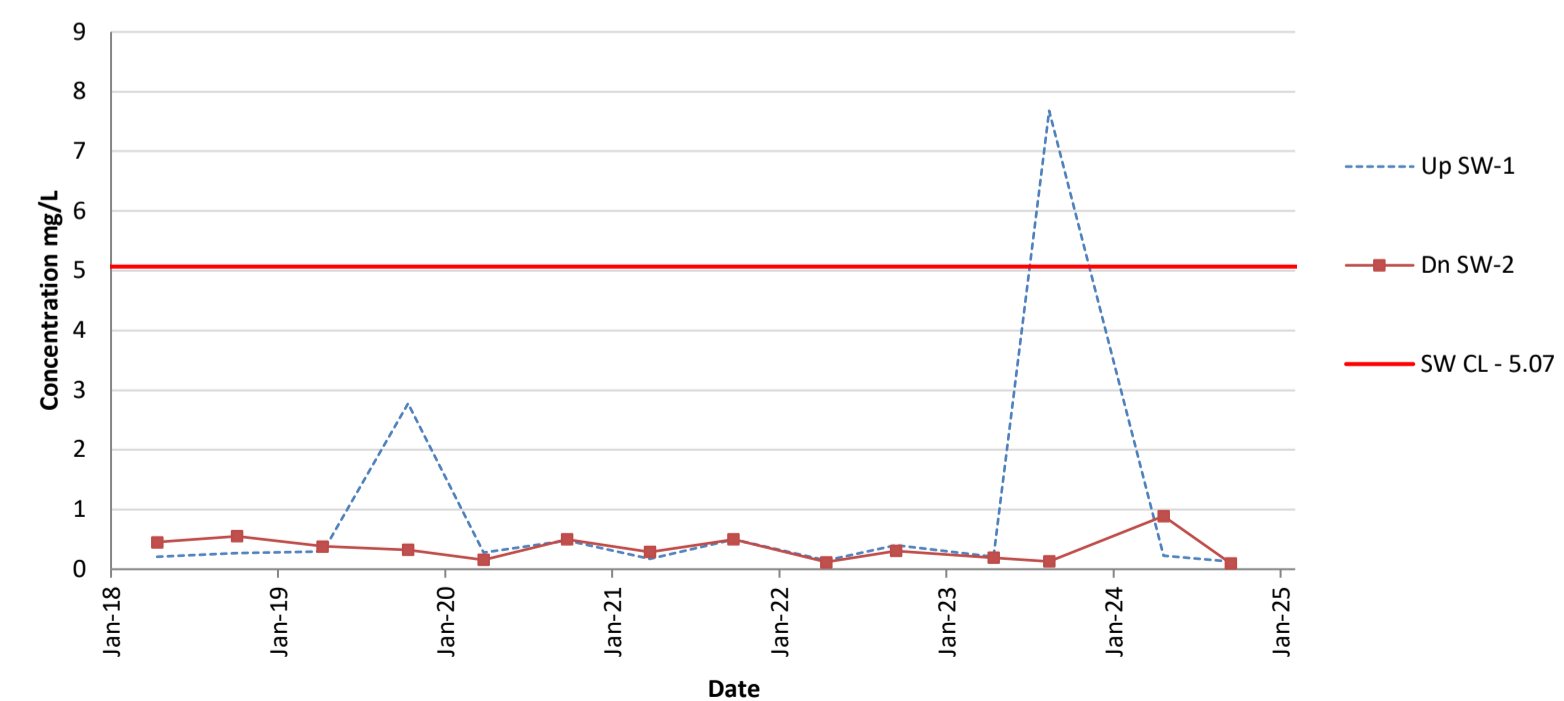
Amsted Landfill Water Quality Summary Water Table - Ammonia-Nitrogen



Amsted Landfill Water Quality Summary Uppermost Aquifer - Ammonia-Nitrogen



Amsted Landfill Water Quality Summary Surface Water - Ammonia-Nitrogen



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - GRIFFIN WHEEL AMSTED LANDFILL

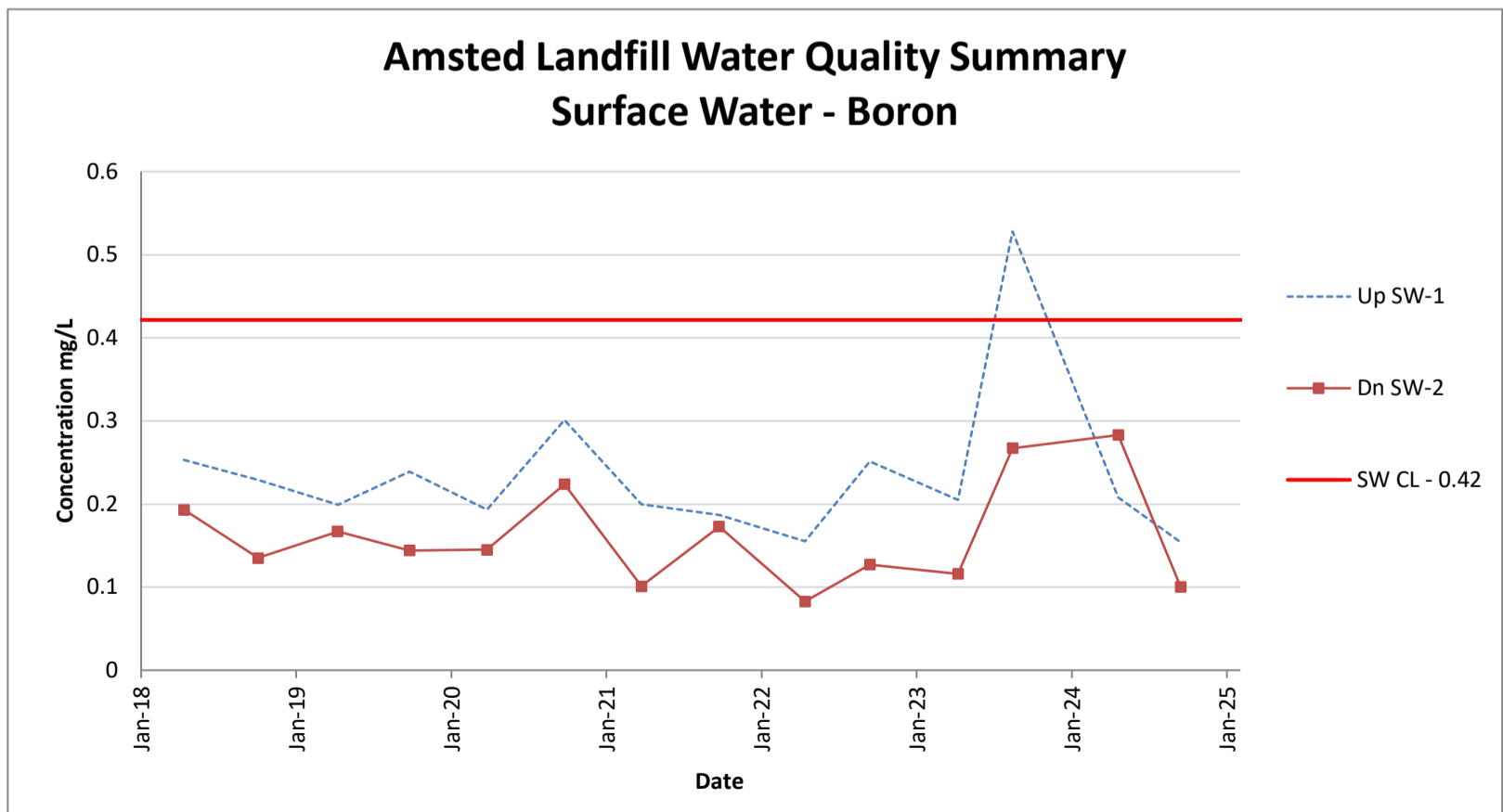
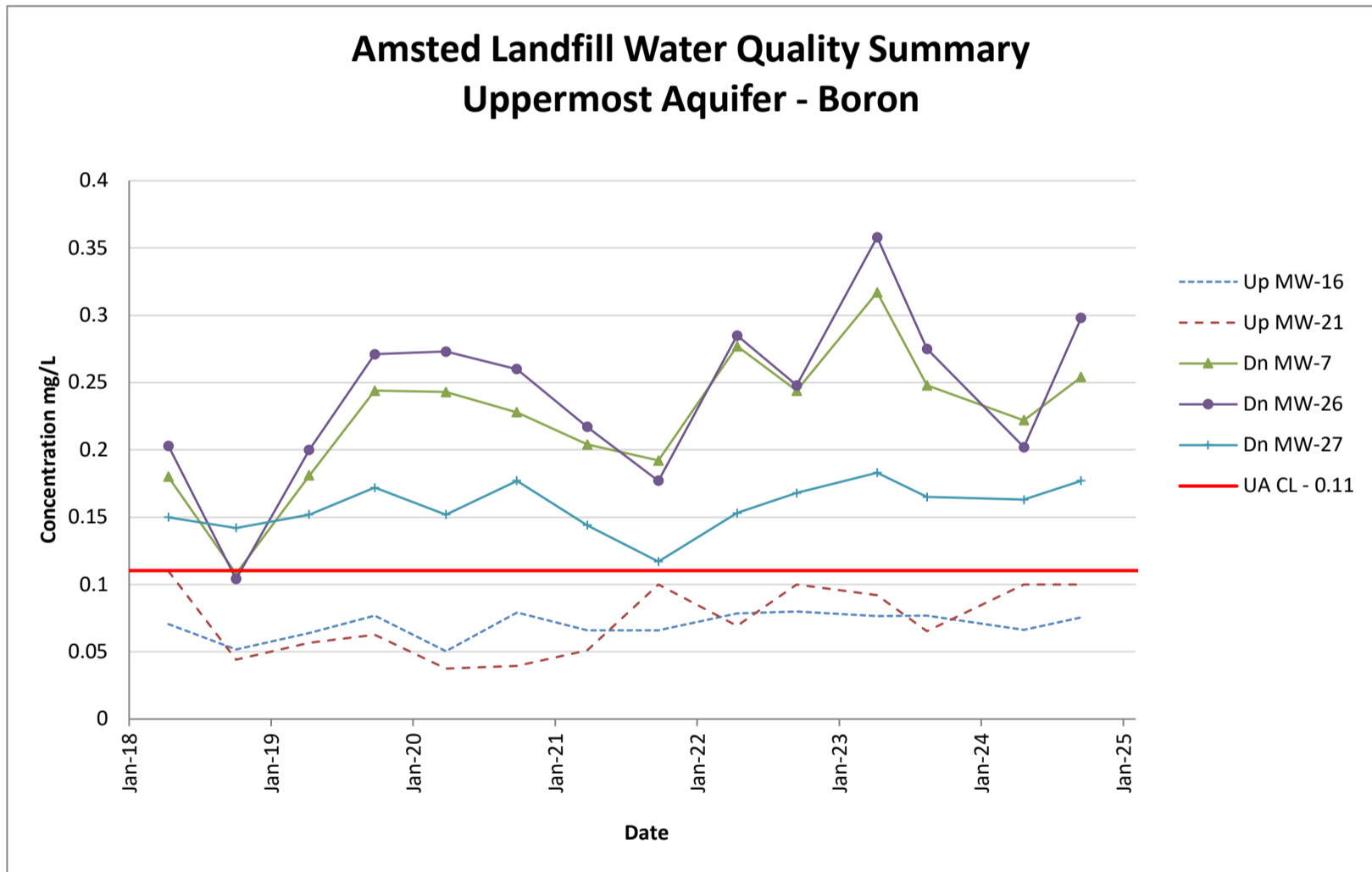
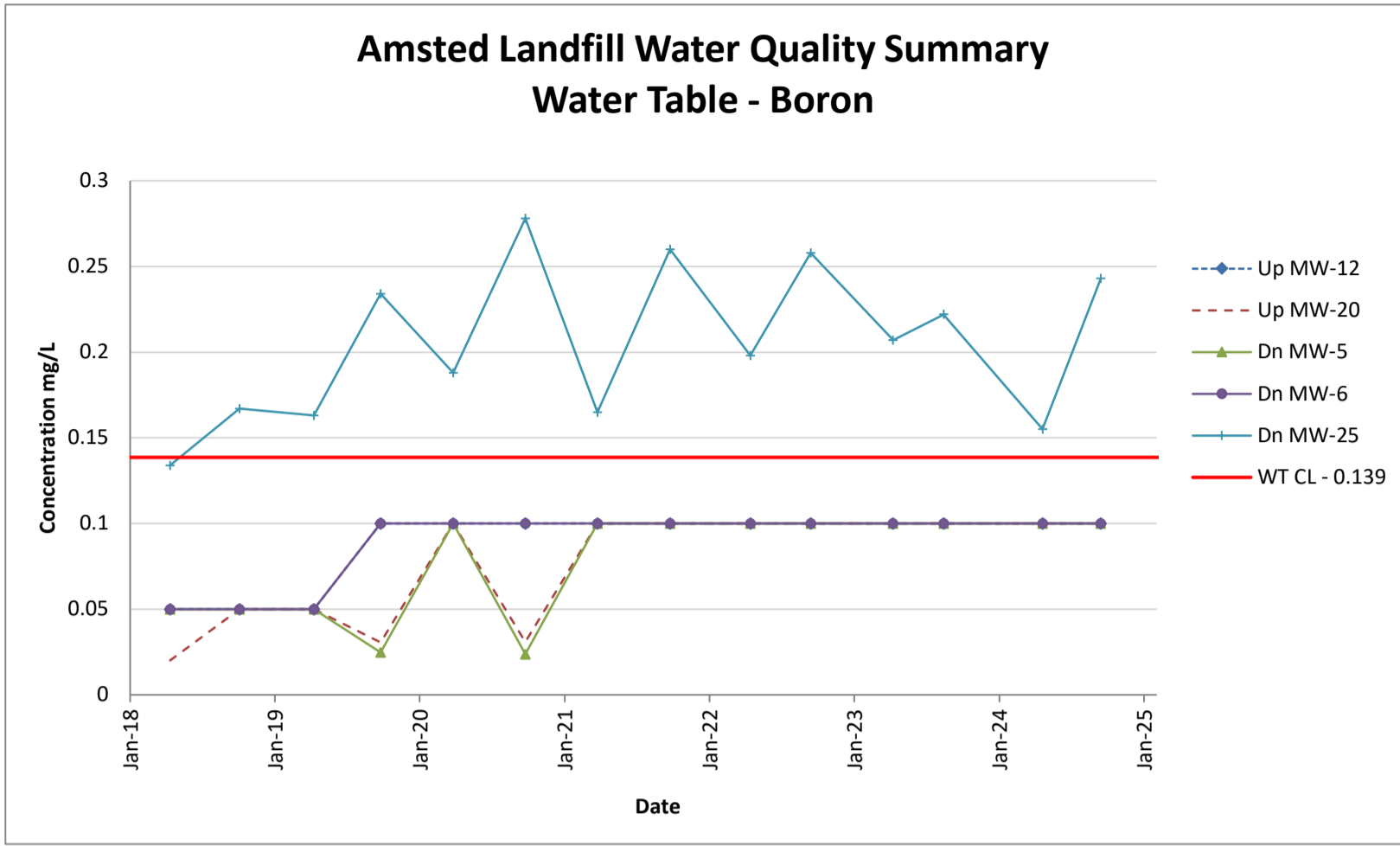
Boron (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.05	0.05	0.0201	0.05	0.05	0.134	0.0706	0.11	0.18	0.203	0.15	0.253	0.193
Oct-18	0.05	0.05	0.05	0.05	0.05	0.167	0.0516	0.044	0.108	0.104	0.142	0.229	0.135
Apr-19	0.05	0.05	0.05	0.05	0.05	0.163	0.0638	0.0567	0.181	0.2	0.152	0.199	0.167
Oct-19	0.1	0.1	0.0305	0.0247	0.1	0.234	0.0767	0.0627	0.244	0.271	0.172	0.239	0.144
Apr-20	0.1	0.1	0.1	0.1	0.1	0.188	0.0504	0.0375	0.243	0.273	0.152	0.193	0.145
Oct-20	0.1	0.1	0.0308	0.0238	0.1	0.278	0.079	0.0395	0.228	0.26	0.177	0.301	0.224
Apr-21	0.1	0.1	0.1	0.1	0.1	0.165	0.066	0.051	0.204	0.217	0.144	0.2	0.101
Oct-21	0.1	0.1	0.1	0.1	0.1	0.26	0.0658	0.1	0.192	0.177	0.117	0.187	0.173
Apr-22	0.1	0.1	0.1	0.1	0.1	0.198	0.0785	0.0691	0.277	0.285	0.153	0.155	0.0828
Sep-22	0.1	0.1	0.1	0.1	0.1	0.258	0.0799	0.1	0.244	0.248	0.168	0.251	0.127
Apr-23	0.1	0.1	0.1	0.1	0.1	0.207	0.0764	0.0919	0.317	0.358	0.183	0.205	0.116
Aug-23	0.1	0.1	0.1	0.1	0.1	0.222	0.0769	0.0652	0.248	0.275	0.165	0.528	0.267
Apr-24	0.1	0.1	0.1	0.1	0.1	0.155	0.0663	0.1	0.222	0.202	0.163	0.208	0.283
Sep-24	0.1	0.1	0.1	0.1	0.1	0.243	0.0755	0.1	0.254	0.298	0.177	0.154	0.1
		Mean	0.083				Mean	0.07				Mean	0.24
		WT UCL	0.139				UA UCL	0.11				SW UCL	0.42

Notes:

- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Chemical Oxygen Demand (mg/L)

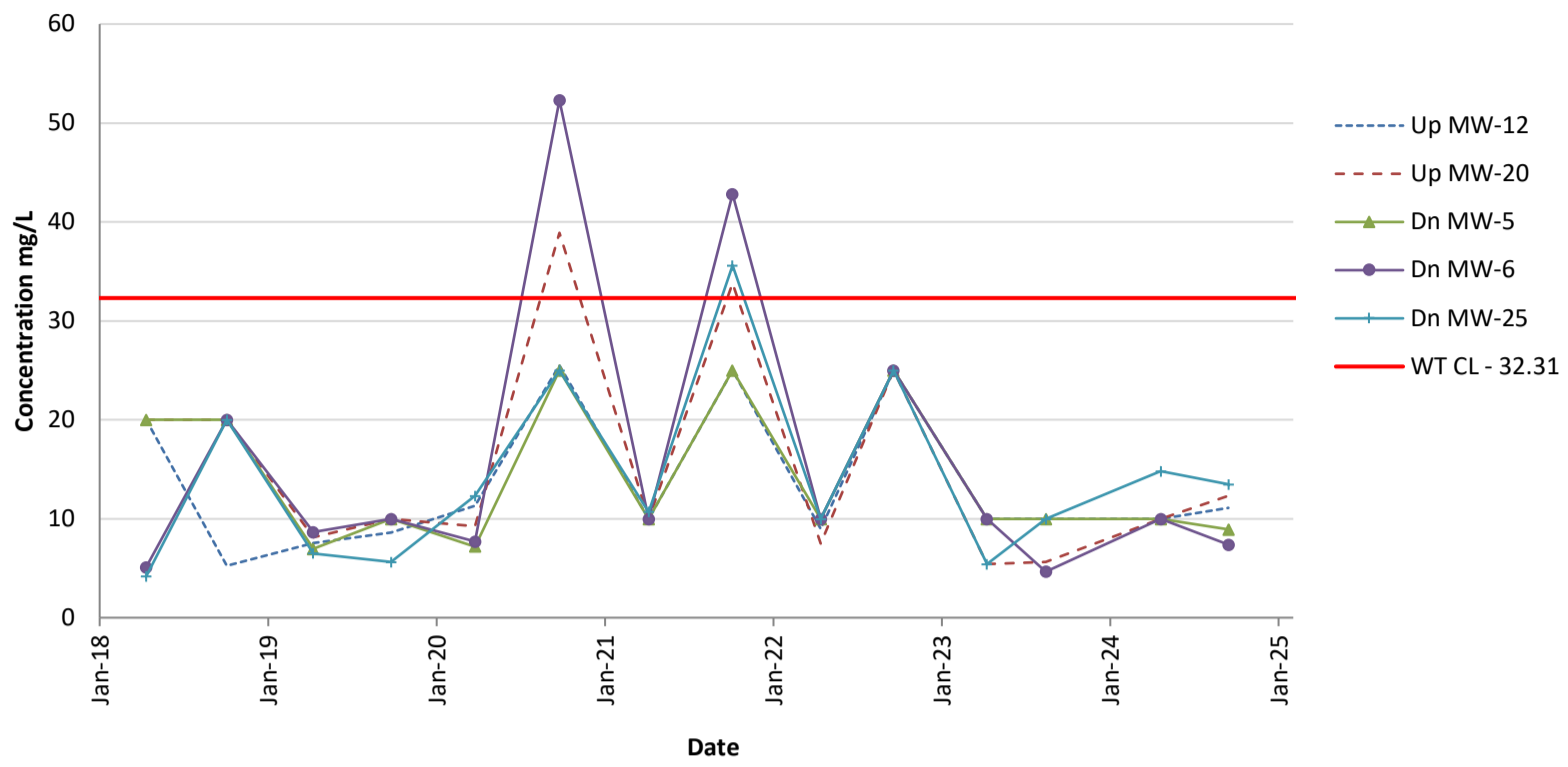
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	20	20	20	20	5.09	4.17	4.03	20	20	5.4	20	11.5	14.4
Oct-18	20	5.25	20	20	20	20	20	20	20	20	20	15.1	14.1
Apr-19	20	7.52	8.15	6.97	8.65	6.5	6.31	20	7.19	10.8	4.14	4.45	16.2
Oct-19	10	8.59	10	10	10	5.63	10	10	10	6.68	10	20.3	11.8
Apr-20	10	11.3	9.25	7.2	7.71	12.3	13.4	6.68	48.3	56	7.2	20.1	36.5
Oct-20	25	25.5	38.9	25	52.3	25	48.9	36.3	43.9	37.2	30.5	35.6	47.3
Apr-21	10	10	10	10	10	10.7	10	6.11	8.65	10	10	14.3	10.2
Oct-21	25	25	33.8	25	42.8	35.6	25	26.6	37.4	25	25	42.8	41
Apr-22	10	9	7.5	10	10	10	10	10	10	7.5	10	11	18
Sep-22	25	25	25	25	25	25	25	25	25	25	42.6	25	25
Apr-23	10	10	5.42	10	10	5.42	10	2.27	10	3.53	10	2.58	6.69
Aug-23	10	10	5.62	10	4.65	10	10	3.03	5.62	10	10	5.07	10
Apr-24	10	10	10	10	10	14.8	10	10	10	9.67	7.36	10	6.73
Sep-24	10	11.1	12.3	8.94	7.4	13.5	14.5	17.5	18.1	18.4	7.11	19.6	18.7
		Mean	14.44				Mean	15.4			Mean	16.96	
		WT UCL	32.31				UA UCL	36.5			SW UCL	40.07	

Notes:

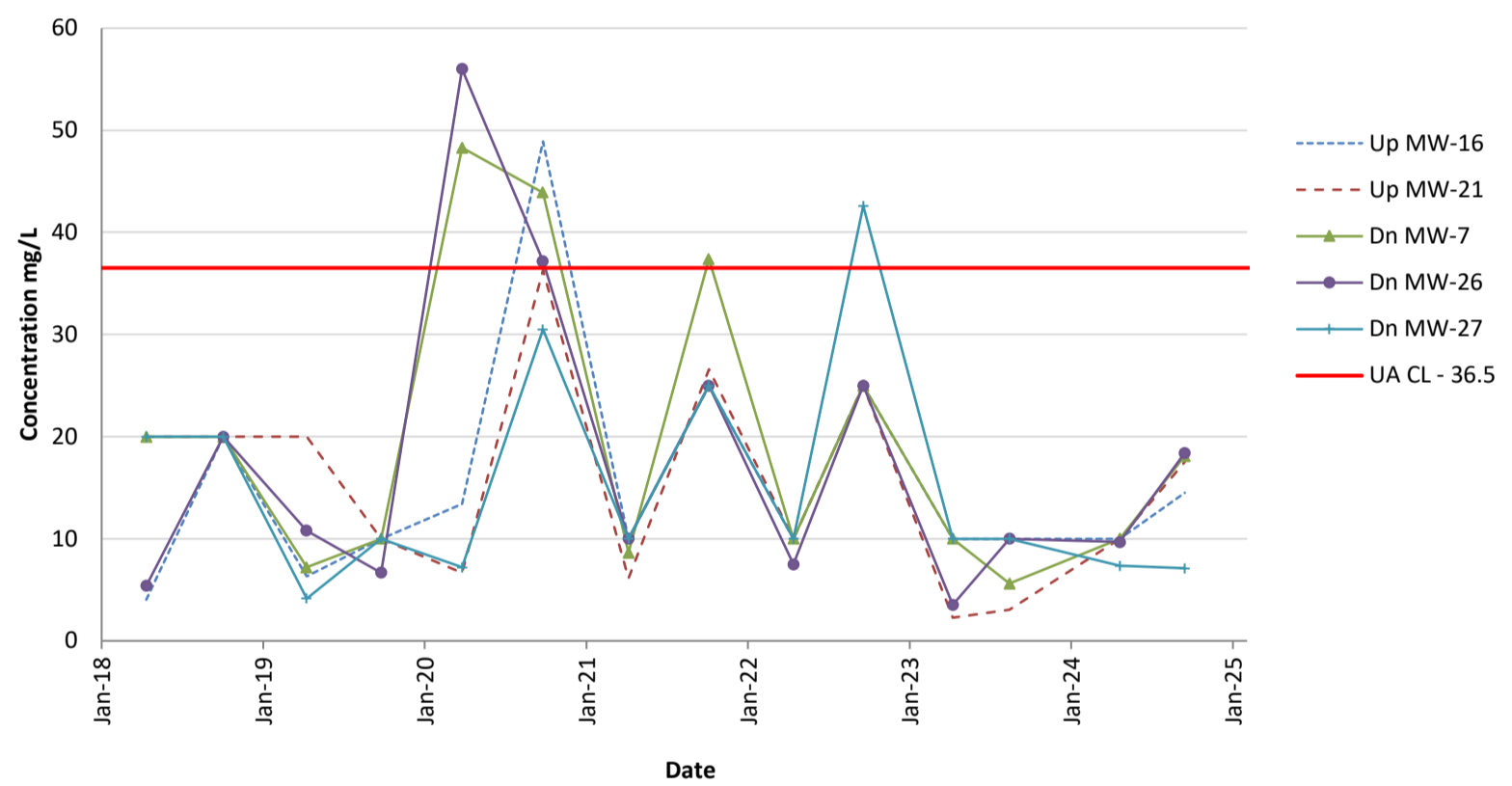
- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

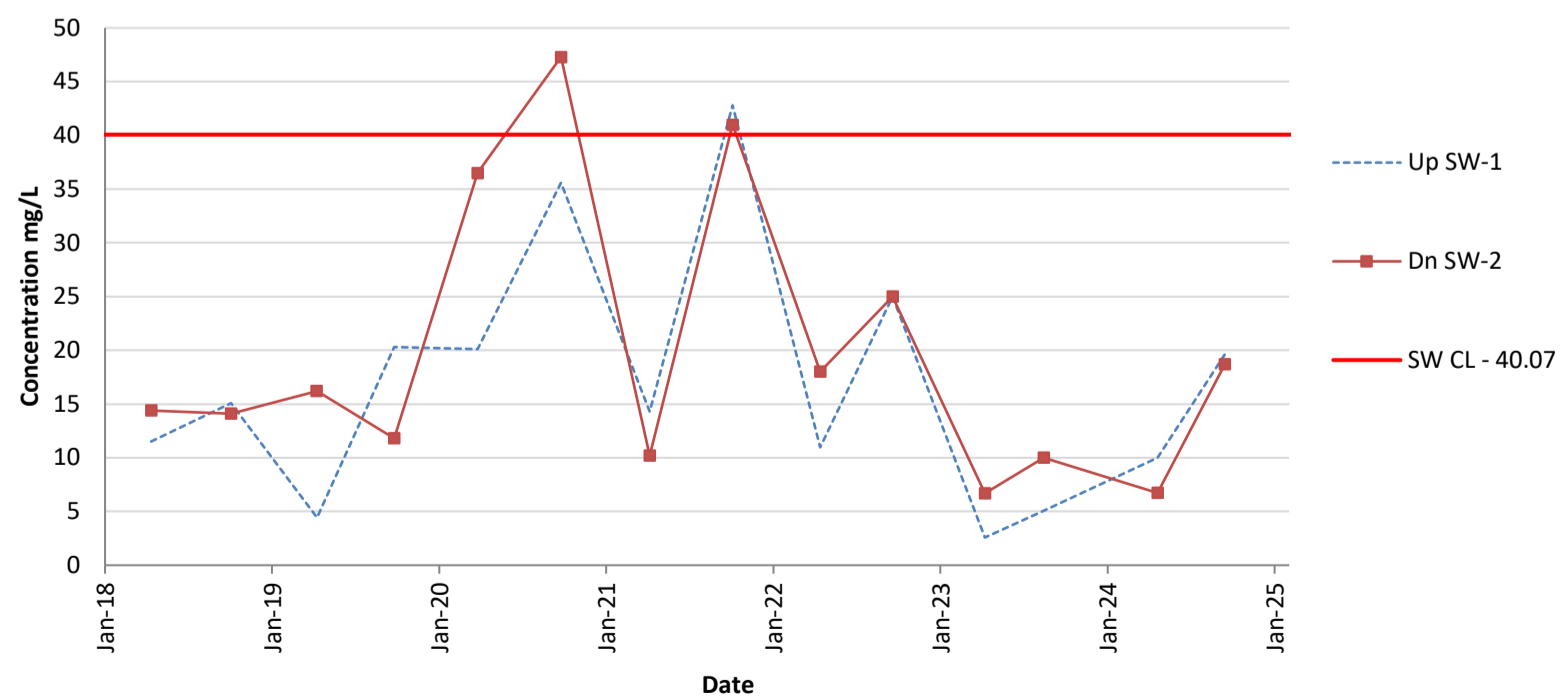
Amsted Landfill Water Quality Summary Water Table - Chemical Oxygen Demand



Amsted Landfill Water Quality Summary Uppermost Aquifer - Chemical Oxygen Demand



Amsted Landfill Water Quality Summary Surface Water - Chemical Oxygen Demand



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Chloride (mg/L)

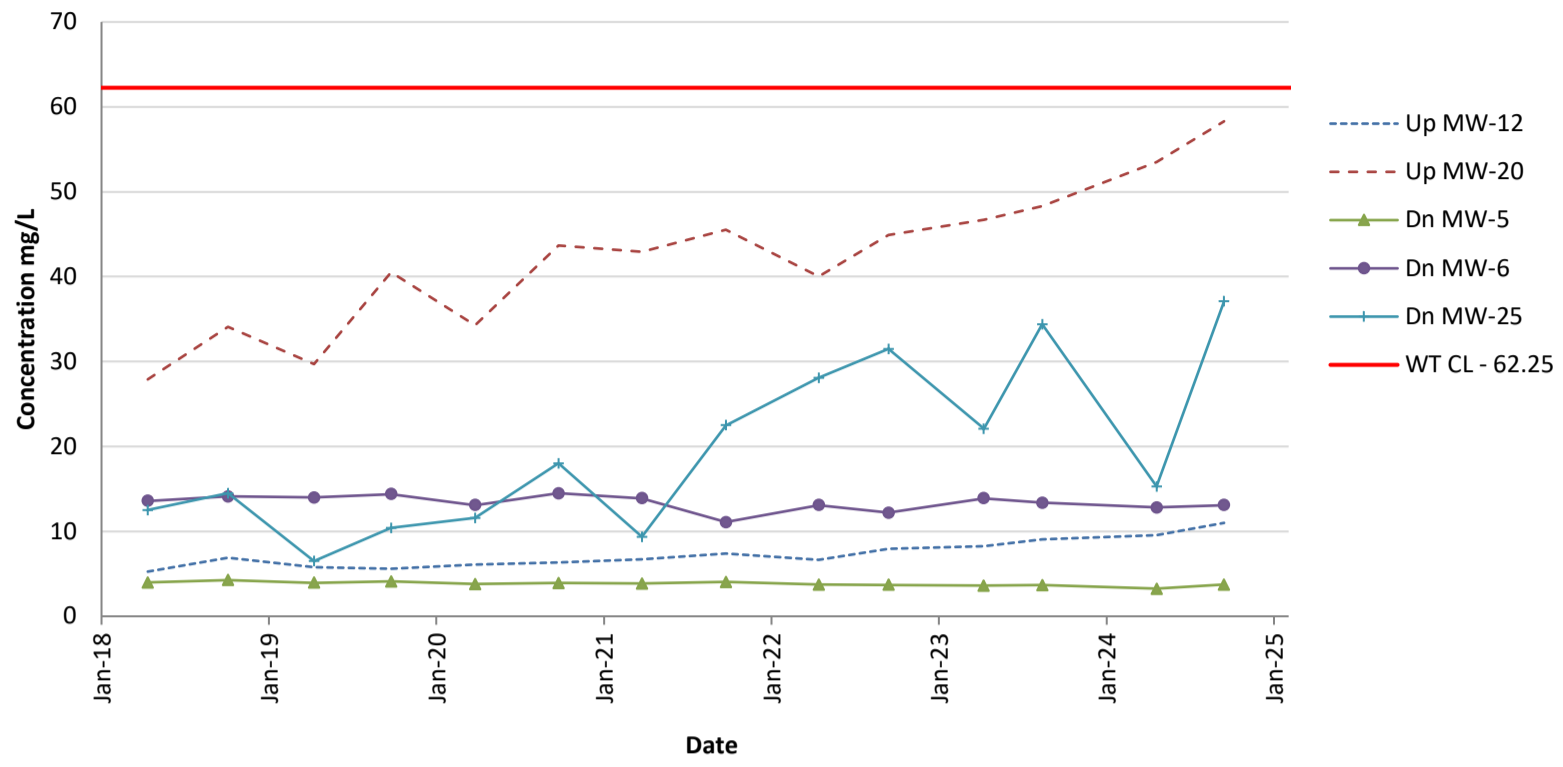
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	1.0-5.0	5.26	27.9	3.98	13.6	12.5	2.98	1.4	1.37	2.87	1.56	13.7	13.4
Oct-18	1.0	6.92	34.1	4.26	14.1	14.5	3.39	1.53	1.49	3.06	1.81	7.22	31.8
Apr-19	1.0-5.0	5.77	29.7	3.96	14	6.5	4.3	1.58	1.48	2.87	1.61	18.5	61.7
Oct-19	1.0	5.58	40.5	4.11	14.4	10.4	3.45	1.86	1.38	3	1.78	10.8	27.7
Apr-20	1.0	6.08	34.3	3.79	13.1	11.6	4.66	2.05	1.38	2.91	1.73	14.5	50
Oct-20	1.0	6.31	43.7	3.93	14.5	18	3.65	2.2	1.46	2.9	1.79	8.78	47.2
Apr-21	1.0	6.73	42.9	3.85	13.9	9.36	4.37	2.57	1.44	2.94	1.8	10.7	42.1
Oct-21	1.0	7.4	45.5	4.03	11.1	22.5	3.94	2.86	1.47	3.04	1.81	18.6	46.4
Apr-22	1.0	6.65	40	3.76	13.1	28.1	4.34	2.98	1.41	3.04	1.79	13.3	60.5
Sep-22	1.0	7.94	44.9	3.71	12.2	31.5	3.36	3.16	1.37	2.8	1.74	21.8	47.6
Apr-23	1.0	8.24	46.7	3.62	13.9	22.1	4.44	2.88	1.51	2.84	1.8	15.1	48.4
Aug-23	1.0	9.04	48.3	3.69	13.4	34.4	4.22	4.18	1.34	2.85	1.66	26.1	49.7
Apr-24	1.0	9.54	53.5	3.26	12.8	15.3	4.36	4.77	1.20	2.70	1.58	13.7	34.5
Sep-24	1.0	11.00	58.3	3.74	13.1	37.1	4.13	5.62	1.44	2.88	1.79	30.5	44.2
		Mean	24.74				Mean	3.4				Mean	15.95
		WT UCL	62.25				UA UCL	5.62				SW UCL	29.13

Notes:

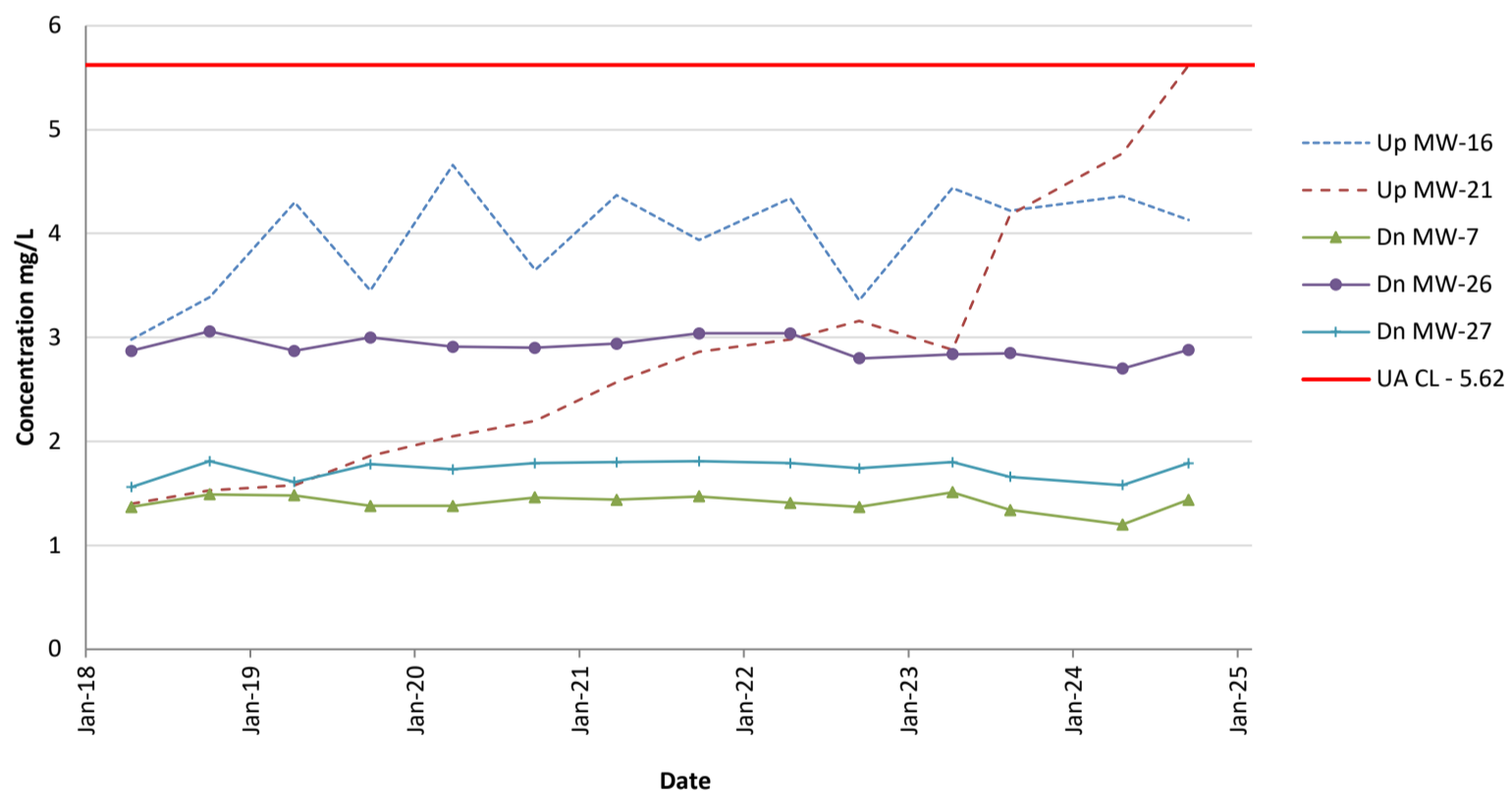
- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

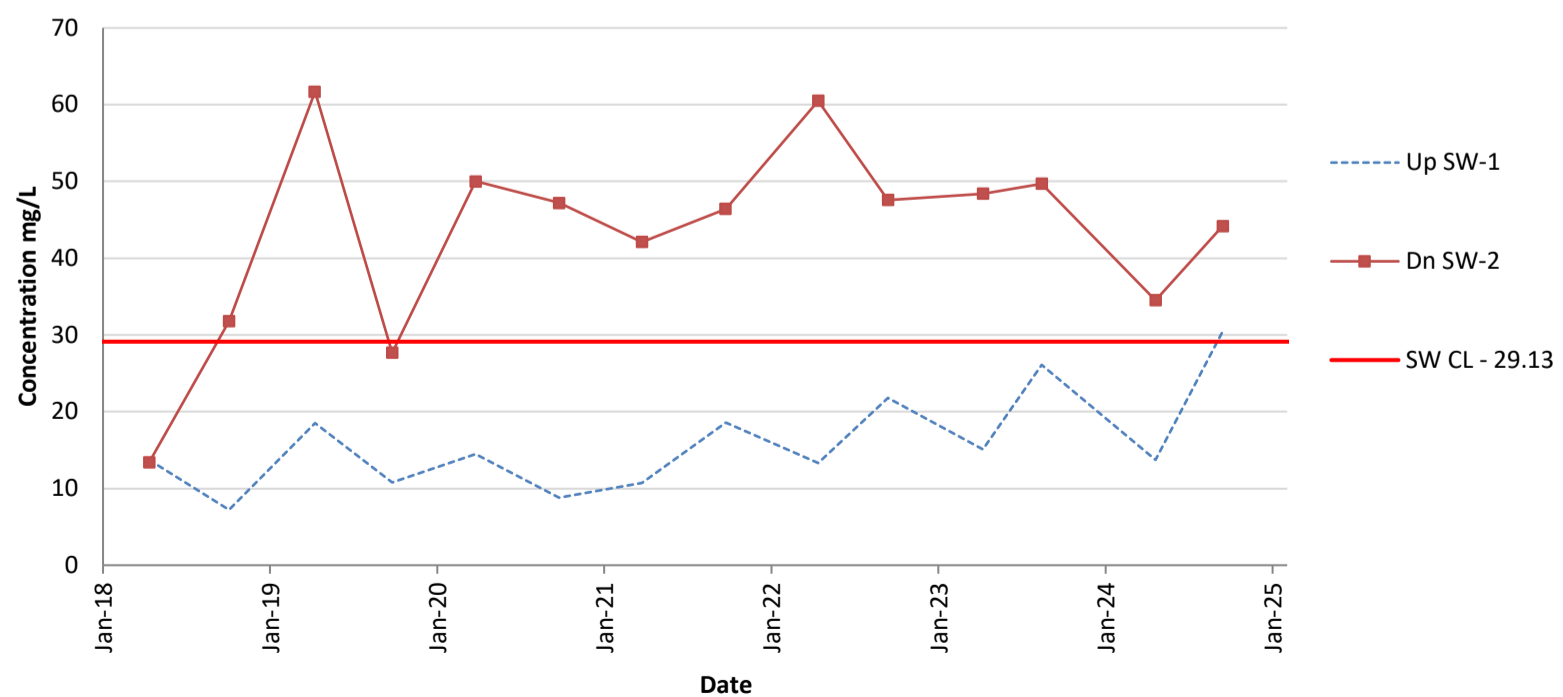
Amsted Landfill Water Quality Summary Water Table - Chloride



Amsted Landfill Water Quality Summary Uppermost Aquifer - Chloride



Amsted Landfill Water Quality Summary Surface Water - Chloride



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Conductivity, Field (mS/cm)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	NA	0.903	0.806	0.673	0.704	1.036	0.923	1.01	2.337	2.705	1.206	0.523	0.79
Oct-18	NA	0.943	0.924	0.778	0.836	1.156	1.008	1.056	2.613	2.972	1.354	0.486	0.586
Apr-19	NA	0.945	0.927	0.735	0.776	0.929	0.907	0.9	2.559	2.854	1.312	0.339	0.545
Oct-19	NA	0.964	0.91	0.741	0.803	1.037	0.984	0.996	2.542	2.951	1.299	0.447	0.355
Apr-20	NA	0.948	0.939	0.757	0.75	0.96	0.93	0.75	2.51	2.8	1.3	0.446	0.56
Oct-20	NA	1.51	1.41	1.15	1.28	1.8	1.55	1.32	4.21	4.86	2.11	0.765	0.936
Apr-21	NA	0.931	0.895	0.707	0.732	0.749	0.947	0.816	2.4	2.64	1.24	0.447	0.547
Oct-21	NA	0.759	0.672	0.579	0.759	1.065	0.928	0.695	2.328	2.742	0.951	0.482	0.464
Apr-22	NA	0.958	0.889	0.781	0.739	1.04	0.992	0.963	2.59	2.86	1.32	0.509	0.721
Sep-22	NA	0.975	1.04	0.886	0.682	1.39	1.13	1.04	1.97	3.24	1.46	0.445	0.33
Apr-23	NA	0.744	0.802	0.693	0.725	0.812	0.819	0.841	2.42	2.8	1.18	0.454	0.595
Aug-23	NA	0.867	0.802	0.772	0.774	1.2	0.963	0.841	2.48	2.94	1.33	0.536	0.745
Apr-24	NA	0.77	0.806	0.618	0.698	0.657	0.861	0.769	2.72	2.97	1.05	0.452	0.365
Sep-24	NA	0.815	0.849	0.671	0.706	1.03	0.867	0.784	2.59	2.90	1.22	0.371	0.71
		Mean	0.92				Mean	0.9				Mean	0.48
		WT UCL	1.27				UA UCL	1.30				SW UCL	0.67

Notes:

CL = Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

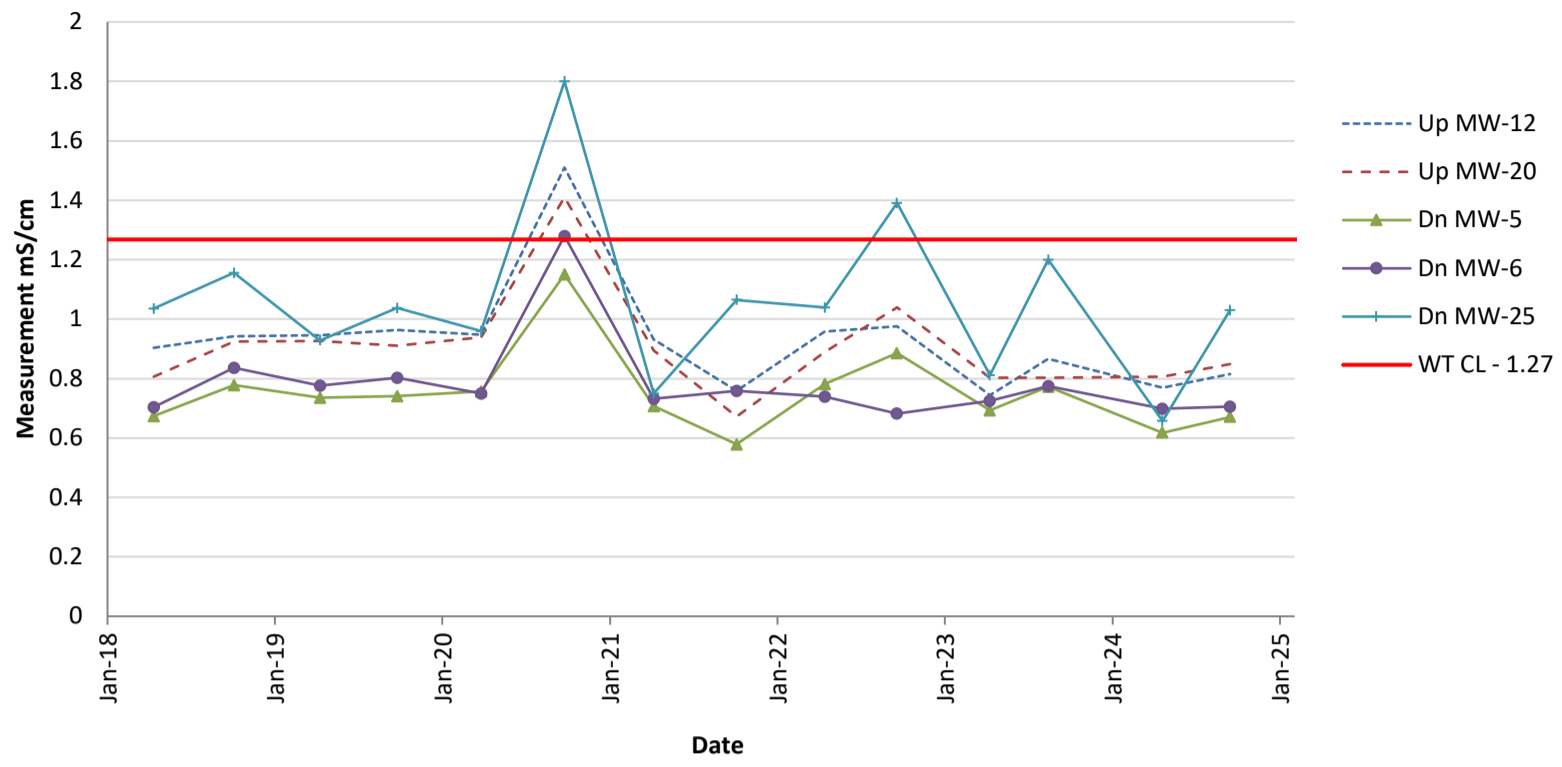
SW = Surface Water

UA = Uppermost Aquifer

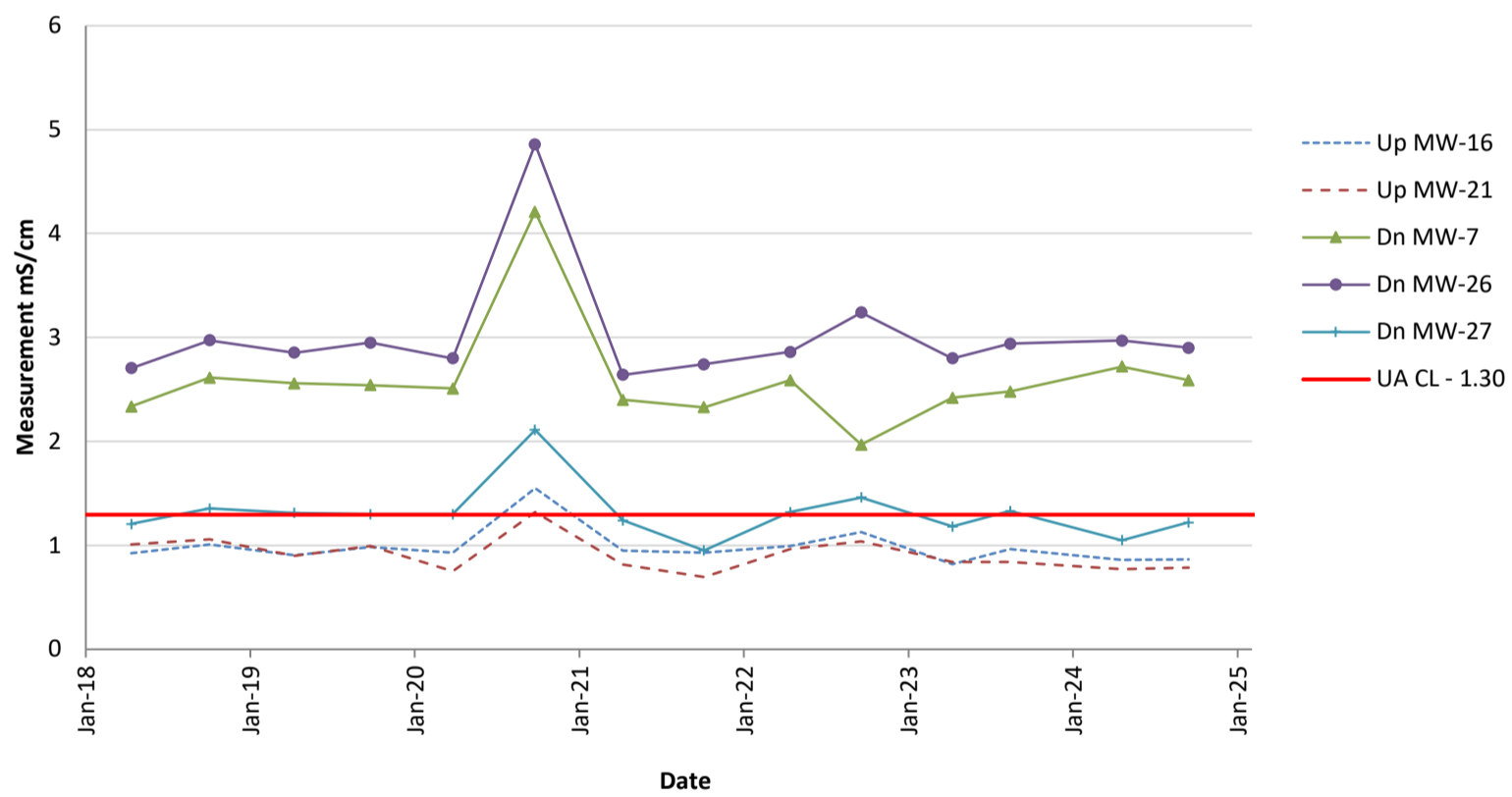
WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

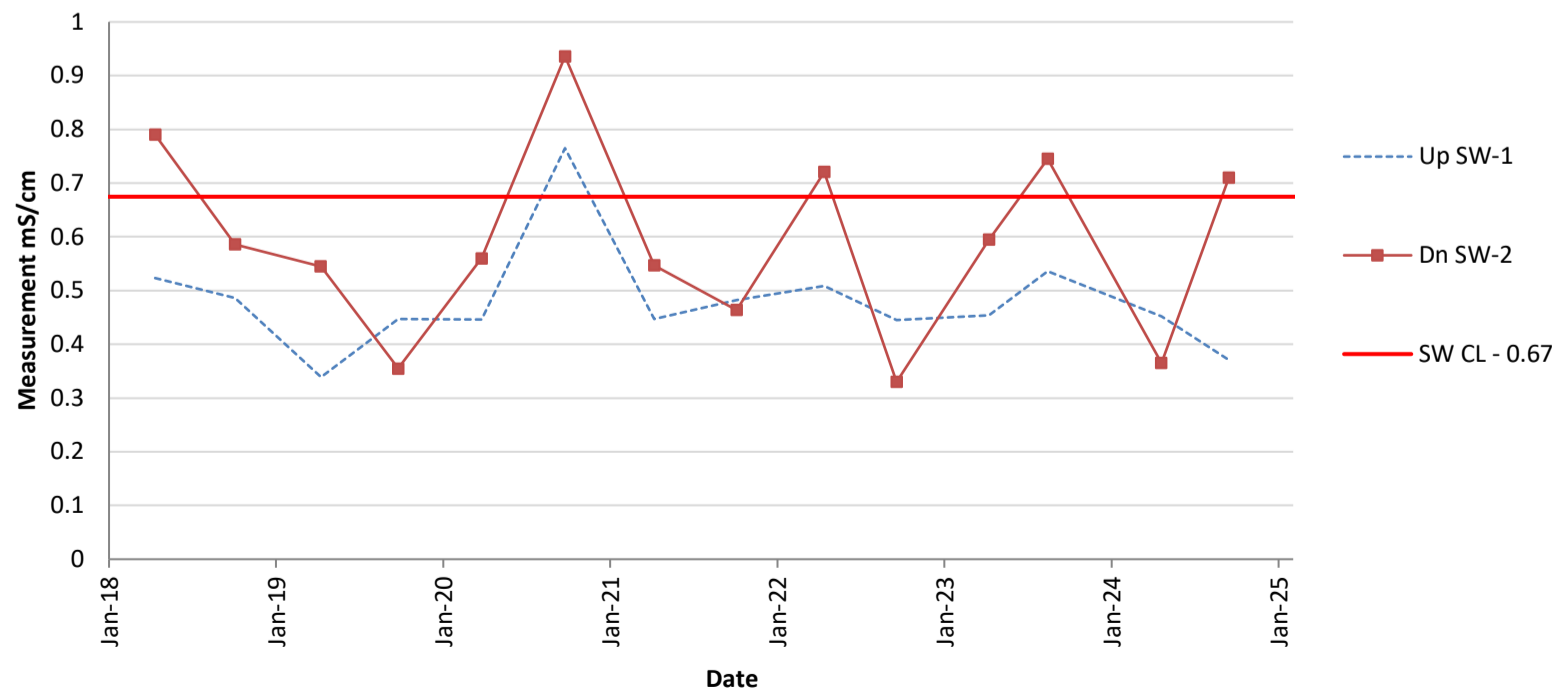
Amsted Landfill Water Quality Summary Water Table - Conductivity, Field



Amsted Landfill Water Quality Summary Uppermost Aquifer - Conductivity, Field



Amsted Landfill Water Quality Summary Surface Water - Conductivity, Field



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

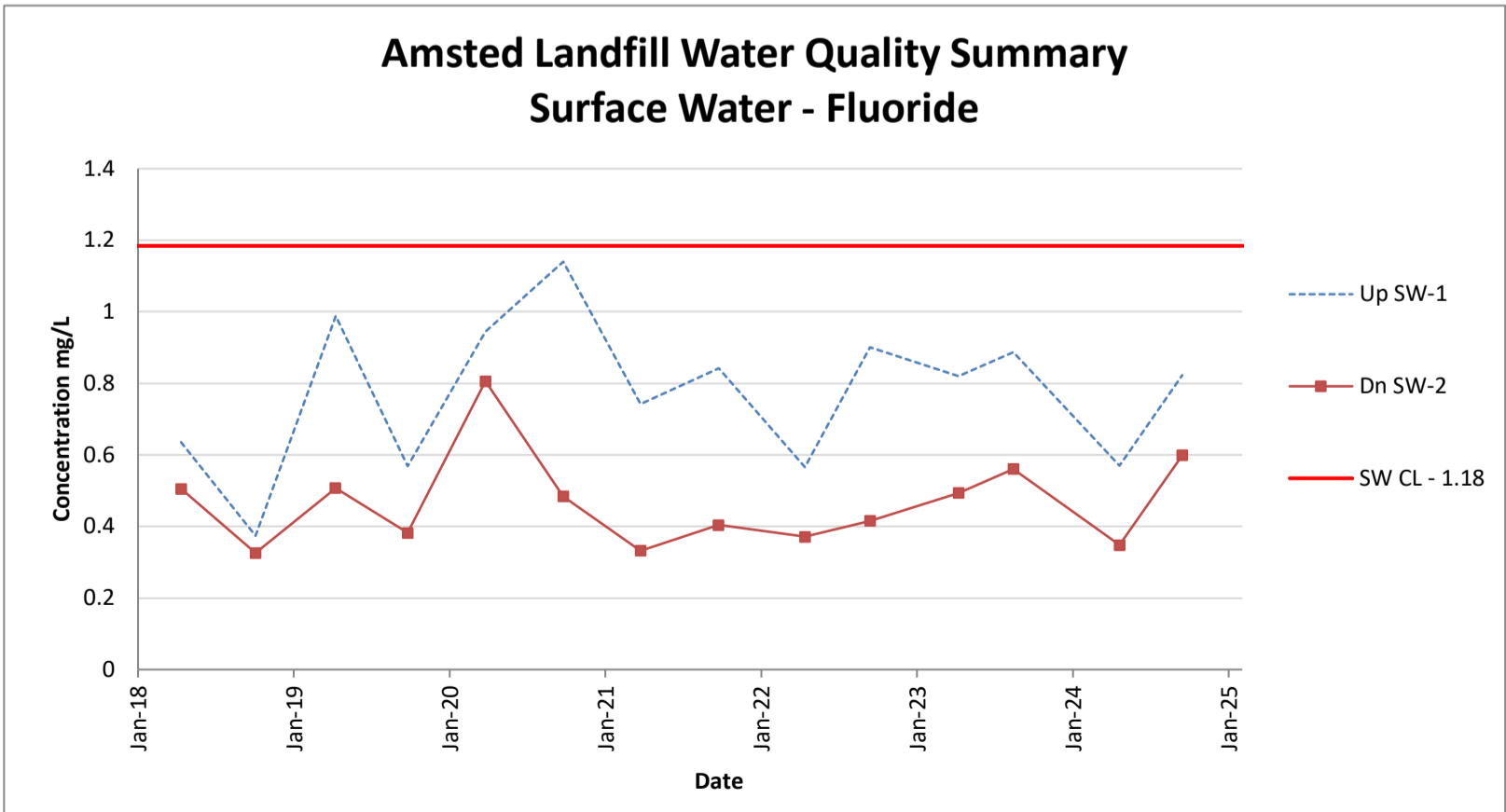
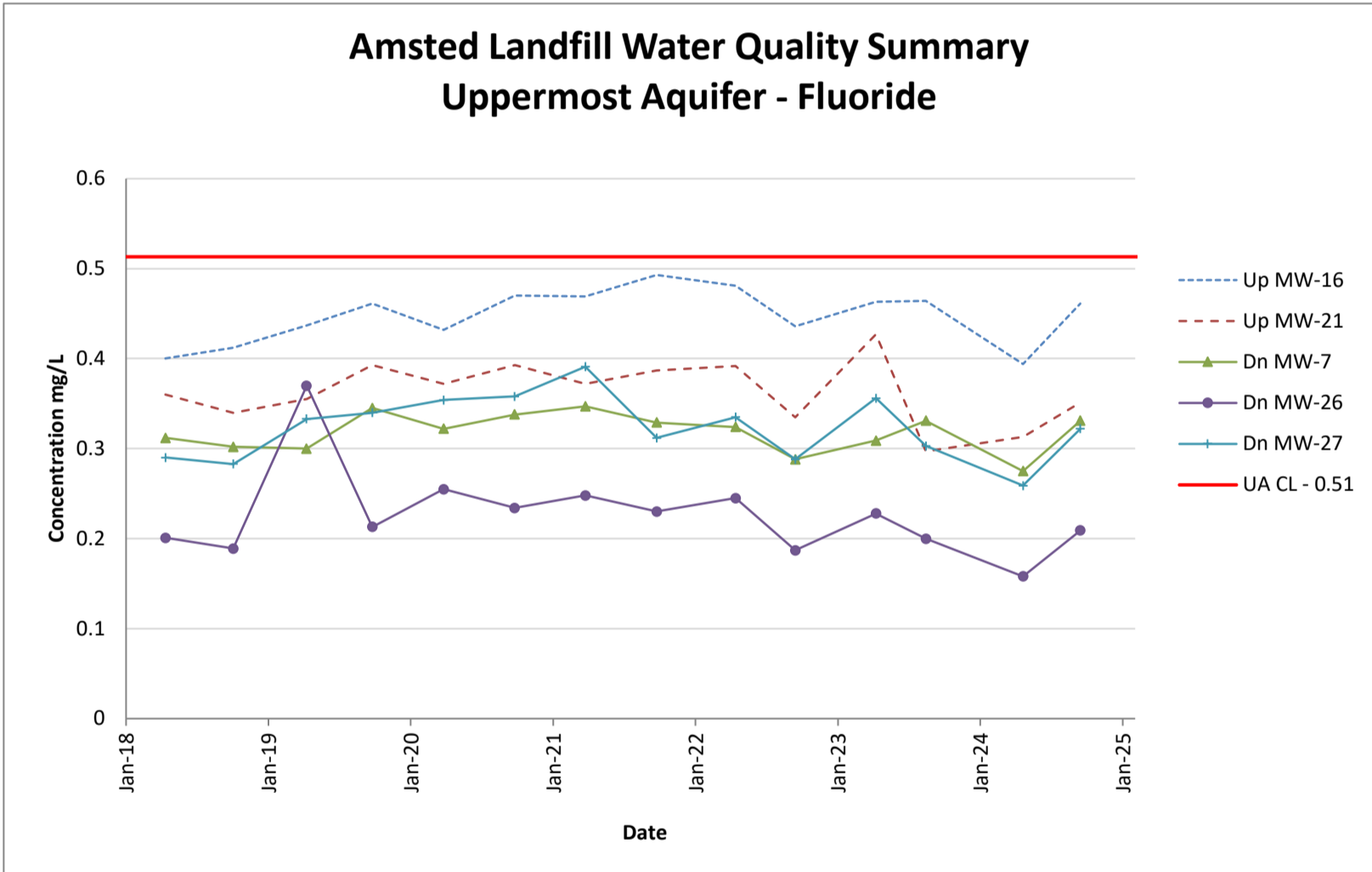
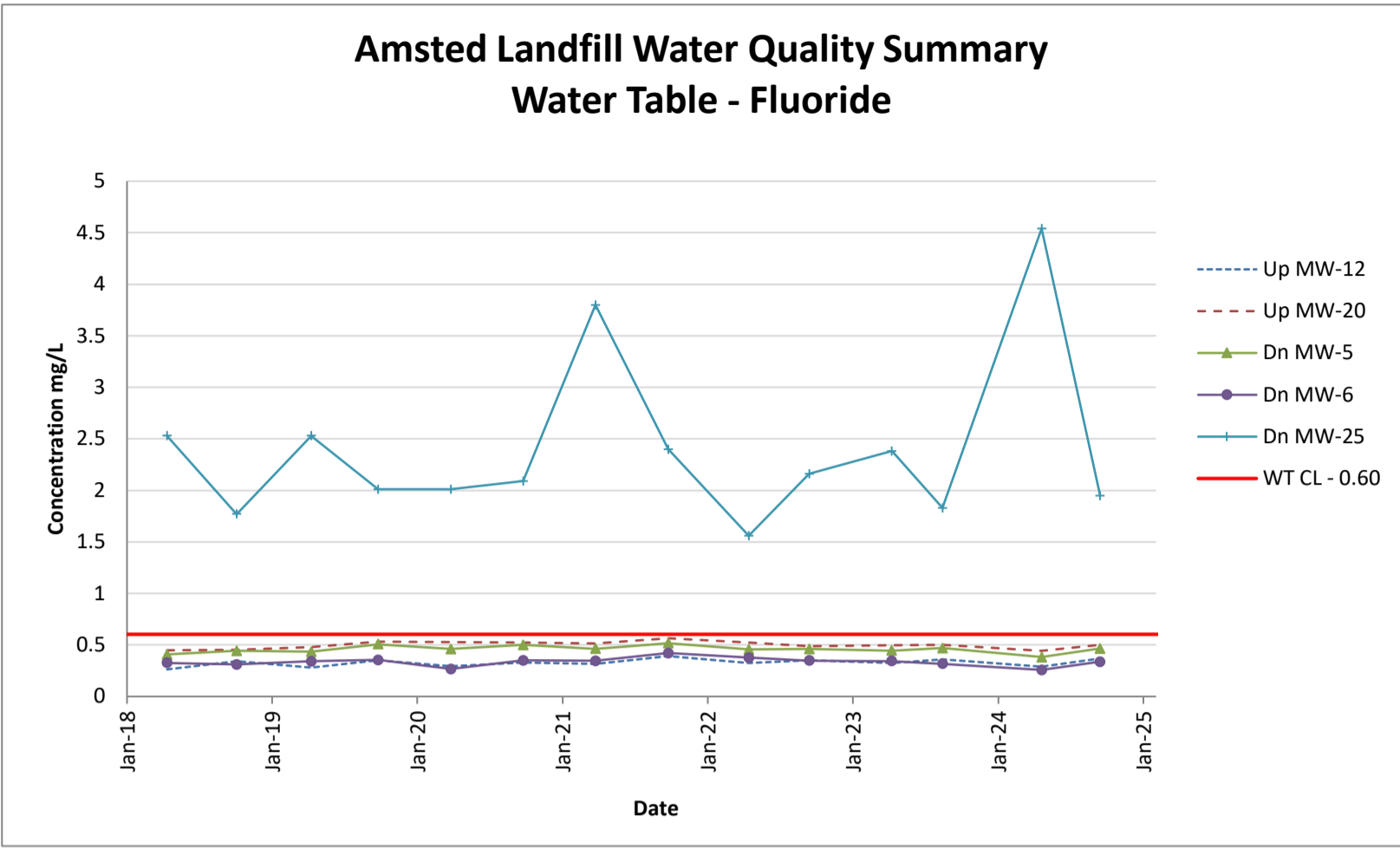
Fluoride (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.1	0.263	0.45	0.409	0.327	2.53	0.4	0.36	0.312	0.201	0.29	0.636	0.505
Oct-18	0.1	0.341	0.455	0.443	0.312	1.77	0.412	0.34	0.302	0.189	0.283	0.374	0.326
Apr-19	0.1	0.282	0.479	0.435	0.343	2.53	0.437	0.355	0.3	0.37	0.333	0.988	0.507
Oct-19	0.05	0.35	0.532	0.508	0.354	2.01	0.461	0.393	0.345	0.213	0.34	0.569	0.382
Apr-20	0.1	0.293	0.526	0.462	0.267	2.01	0.432	0.372	0.322	0.255	0.354	0.944	0.806
Oct-20	0.05	0.331	0.524	0.502	0.351	2.09	0.47	0.393	0.338	0.234	0.358	1.14	0.484
Apr-21	0.1	0.315	0.514	0.463	0.346	3.8	0.469	0.372	0.347	0.248	0.391	0.742	0.332
Oct-21	0.05	0.392	0.565	0.517	0.422	2.4	0.493	0.387	0.329	0.23	0.312	0.842	0.404
Apr-22	0.01	0.325	0.523	0.456	0.379	1.56	0.481	0.392	0.324	0.245	0.335	0.566	0.371
Sep-22	0.05	0.353	0.49	0.461	0.349	2.16	0.436	0.335	0.288	0.187	0.288	0.901	0.416
Apr-23	0.05	0.324	0.499	0.446	0.344	2.38	0.463	0.427	0.309	0.228	0.356	0.82	0.494
Aug-23	0.25	0.358	0.503	0.471	0.318	1.83	0.464	0.297	0.331	0.2	0.303	0.887	0.561
Apr-24	0.05	0.29	0.443	0.383	0.258	4.54	0.394	0.313	0.275	0.158	0.259	0.570	0.348
Sep-24	0.05	0.37	0.503	0.464	0.336	1.95	0.461	0.351	0.331	0.209	0.322	0.823	0.599
		Mean	0.41			Mean	0.4			Mean	0.77		
		WT UCL	0.60			UA UCL	0.51			SW UCL	1.18		

Notes:

- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Iron (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.025	0.0121	0.0254	0.025	0.0186	0.0161	0.025	0.025	0.025	0.0186	0.025	0.21	0.0319
Oct-18	0.025	0.025	0.025	0.025	0.025	0.025	0.0454	0.0356	0.297	0.5	0.377	0.379	0.191
Apr-19	0.025	R	R	R	R	R	R	R	R	R	R	1.35	1.04
Oct-19	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.204	0.1	0.1	0.298	0.1
Apr-20	0.1	0.1	0.0705	0.1	0.1	0.1	0.159	0.186	7.93	1.25	2.56	4.06	1.14
Oct-20	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.801	0.1	0.1	0.1	0.0712
Apr-21	0.1	0.1	0.1	0.1	0.1	0.1	0.137	0.219	8.8	1.15	2.32	0.1	0.1
Oct-21	0.1	0.051	0.1	0.1	0.1	0.1	0.216	0.0768	9.64	1.58	2.2	1.34	0.408
Apr-22	0.1	0.1	0.1	0.052	0.1	0.1	0.175	0.246	8.68	1.53	2.62	0.1	0.1
Sep-22	0.1	0.1	0.1	0.1	0.1	0.1	0.113	0.1	9.63	1.86	2.56	1.62	0.359
Apr-23	0.1	0.1	0.1	0.1	0.1	0.0711	0.819	0.0792	2.42	1.85	3.11	1.44	0.682
Aug-23	0.1	0.1	0.1	0.104	0.1	0.1	0.204	0.1	2.51	1.94	2.34	0.276	0.1
Apr-24	0.1	0.1	0.1	0.1	0.1	0.1	0.0938	0.1	0.0522	1.99	2.38	0.0828	0.1
Sep-24	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	9.6	1.77	2.52	0.1	0.1
		Mean	0.08			Mean	0.1			Mean	0.82		
		WT UCL	0.14			UA UCL	0.44			SW UCL	3.02		

Notes:

CL = Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

SW = Surface Water

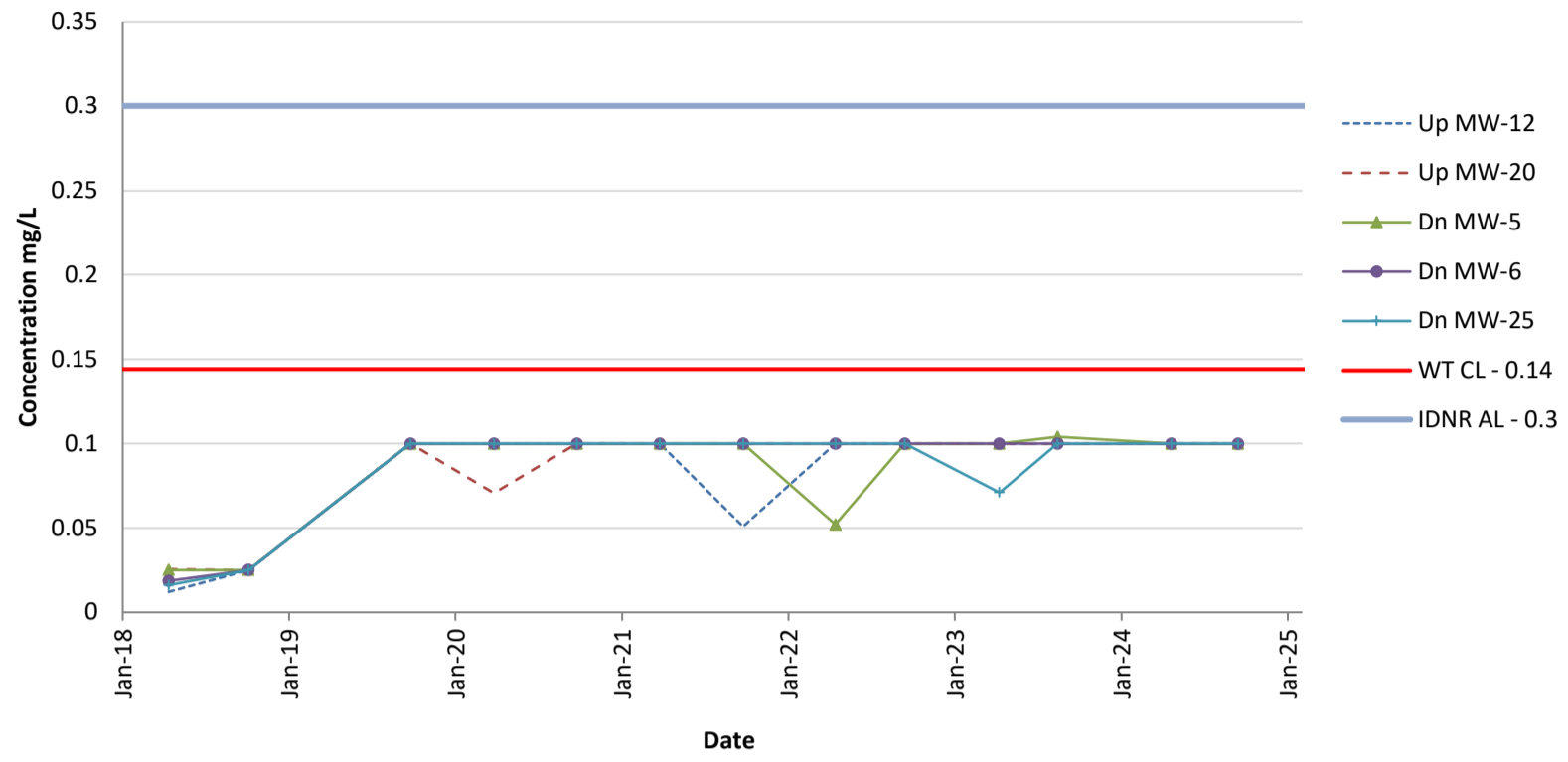
UA = Uppermost Aquifer

WT = Water Table

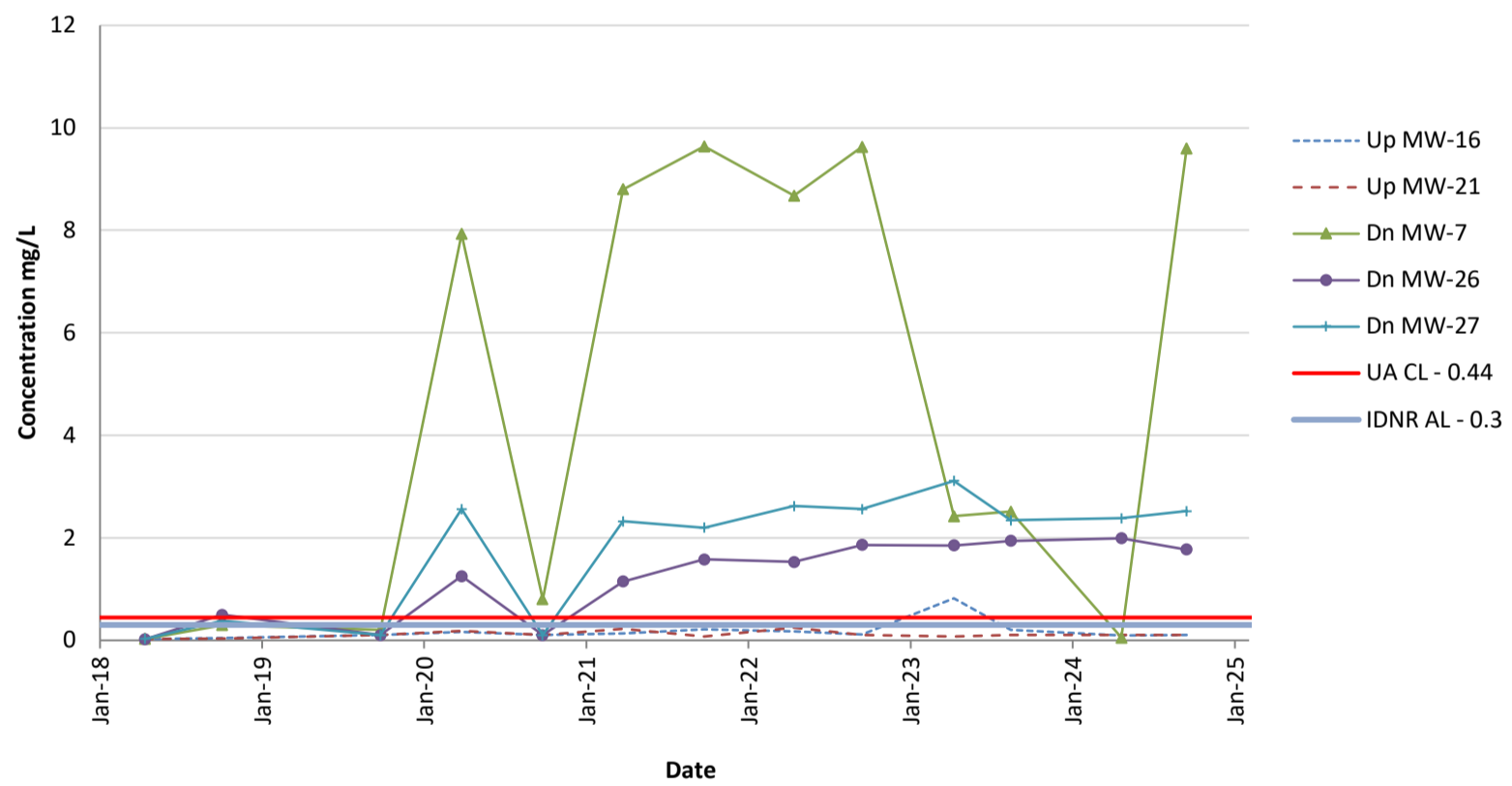
R = Rejected during validation

A **bolded** value indicates parameter present above method reporting limit.

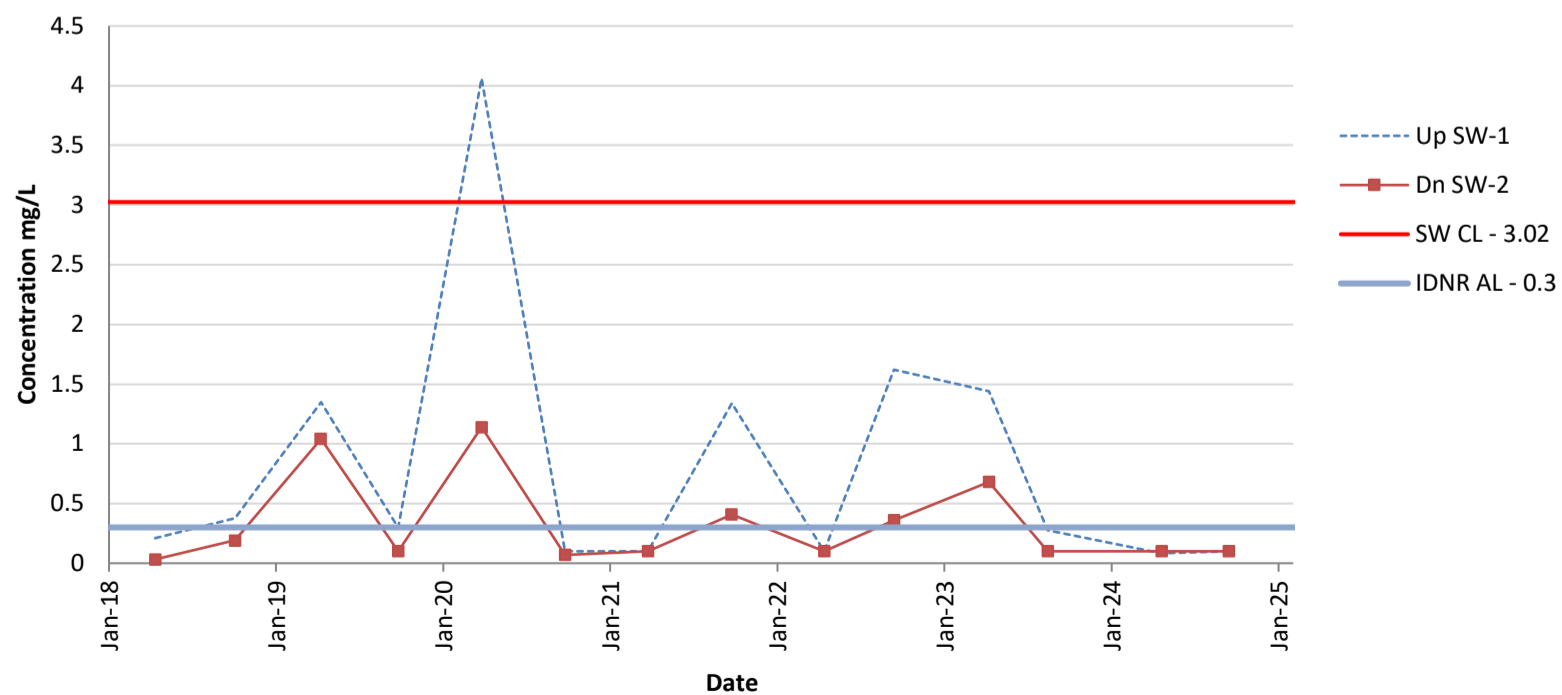
Amsted Landfill Water Quality Summary Water Table - Iron



Amsted Landfill Water Quality Summary Uppermost Aquifer - Iron



Amsted Landfill Water Quality Summary Surface Water - Iron



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Lithium (mg/L)

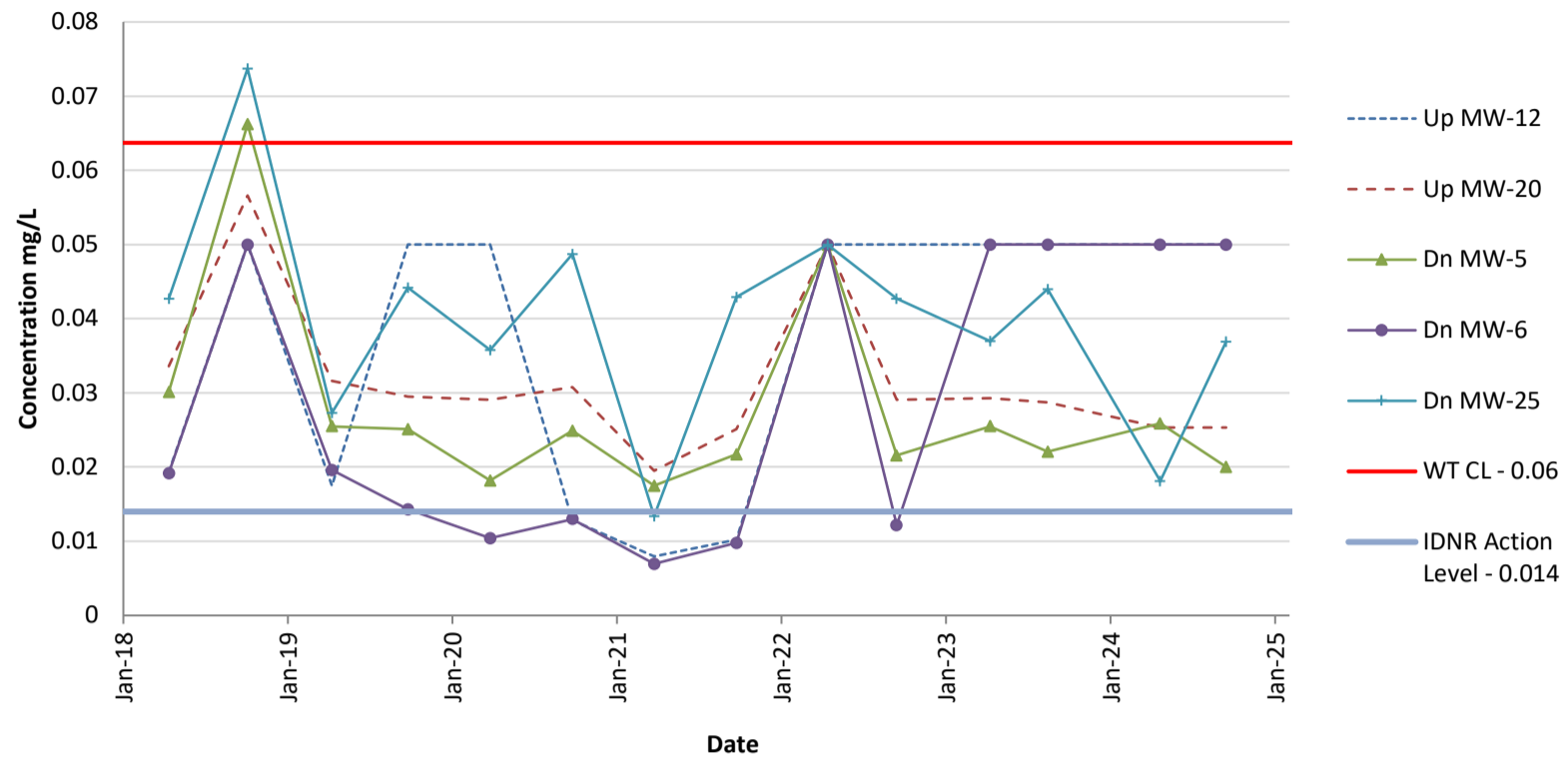
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.05	0.0193	0.0336	0.0301	0.0192	0.0427	0.0703	0.0507	0.0872	0.0284	0.0566	0.05	0.0103
Oct-18	0.05	0.05	0.0566	0.0662	0.05	0.0737	0.0893	0.066	0.116	0.05	0.077	0.0159	0.05
Apr-19	0.05	0.0175	0.0316	0.0255	0.0196	0.0273	0.0648	0.0442	0.0916	0.0325	0.0584	0.05	0.05
Oct-19	0.05	0.05	0.0295	0.0251	0.0143	0.0442	0.0617	0.0381	0.0776	0.0177	0.0516	0.05	0.0103
Apr-20	0.05	0.05	0.0291	0.0182	0.0104	0.0358	0.0543	0.0409	0.0696	0.0143	0.0466	0.05	0.05
Oct-20	0.05	0.0128	0.0308	0.0249	0.013	0.0487	0.0618	0.0362	0.0784	0.0287	0.0525	0.05	0.00972
Apr-21	0.05	0.00796	0.0195	0.0175	0.00696	0.0134	0.0512	0.0328	0.0671	0.012	0.041	0.05	0.05
Oct-21	0.05	0.0102	0.0251	0.0217	0.00978	0.0429	0.063	0.0401	0.073	0.0147	0.0391	0.05	0.00794
Apr-22	0.05	0.05	0.05	0.05	0.05	0.05	0.0684	0.05	0.0829	0.05	0.0556	0.05	0.05
Sep-22	0.05	0.05	0.0291	0.0216	0.0122	0.0427	0.058	0.035	0.077	0.021	0.0479	0.05	0.05
Apr-23	0.05	0.05	0.0293	0.0255	0.05	0.037	0.0498	0.0346	0.0573	0.05	0.0553	0.05	0.05
Aug-23	0.05	0.05	0.0287	0.0221	0.05	0.044	0.0556	0.0352	0.0711	0.05	0.0447	0.05	0.05
Apr-24	0.05	0.05	0.0253	0.0259	0.05	0.0181	0.0626	0.0389	0.0808	0.0301	0.0516	0.05	0.05
Sep-24	0.05	0.05	0.0253	0.02	0.05	0.0369	0.0515	0.0298	0.0734	0.05	0.0438	0.05	0.05
		Mean	0.03				Mean	0.05				Mean	0.05
		WT UCL	0.06				UA UCL	0.0798				SW UCL	0.07

Notes:

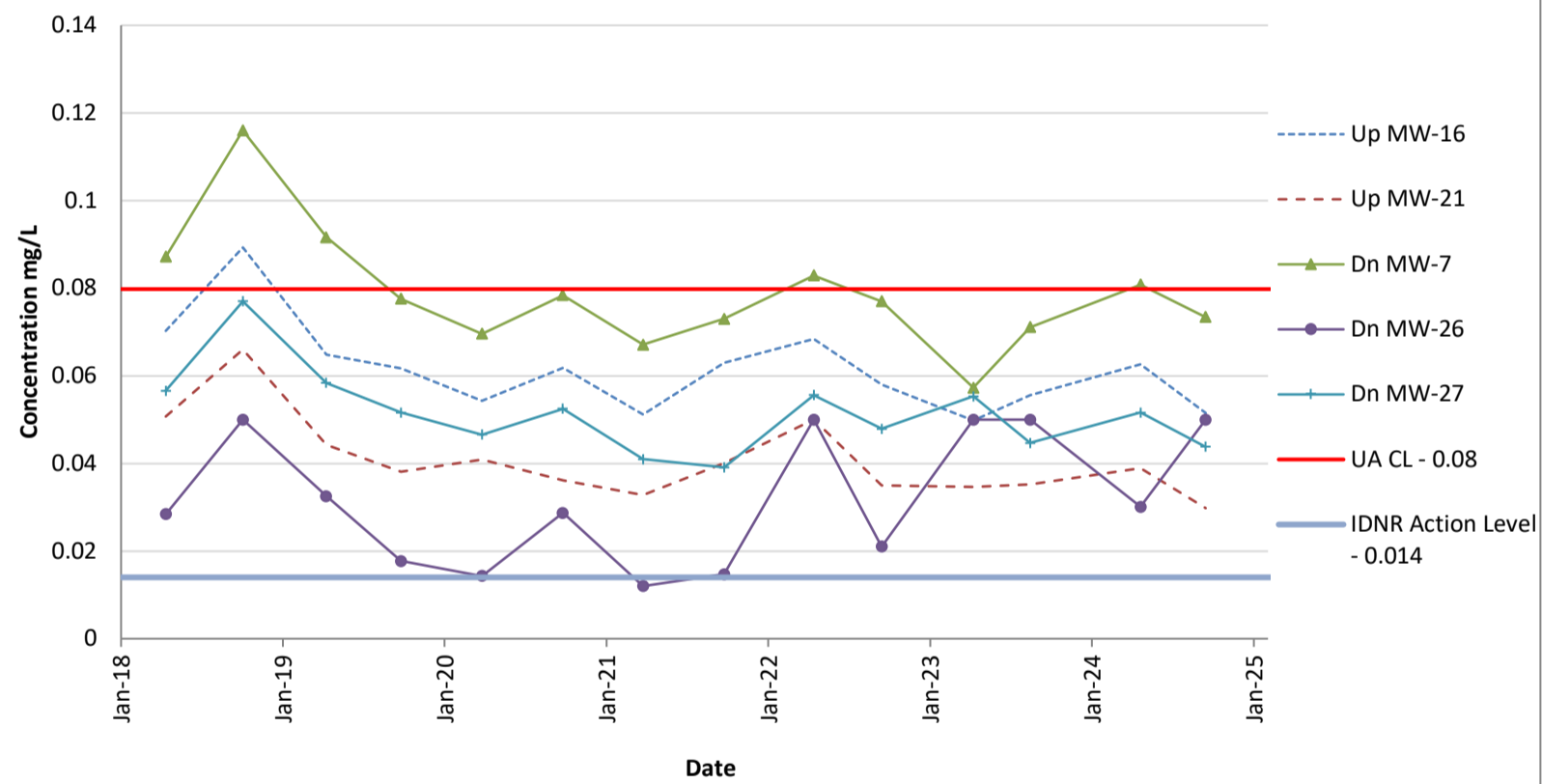
- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

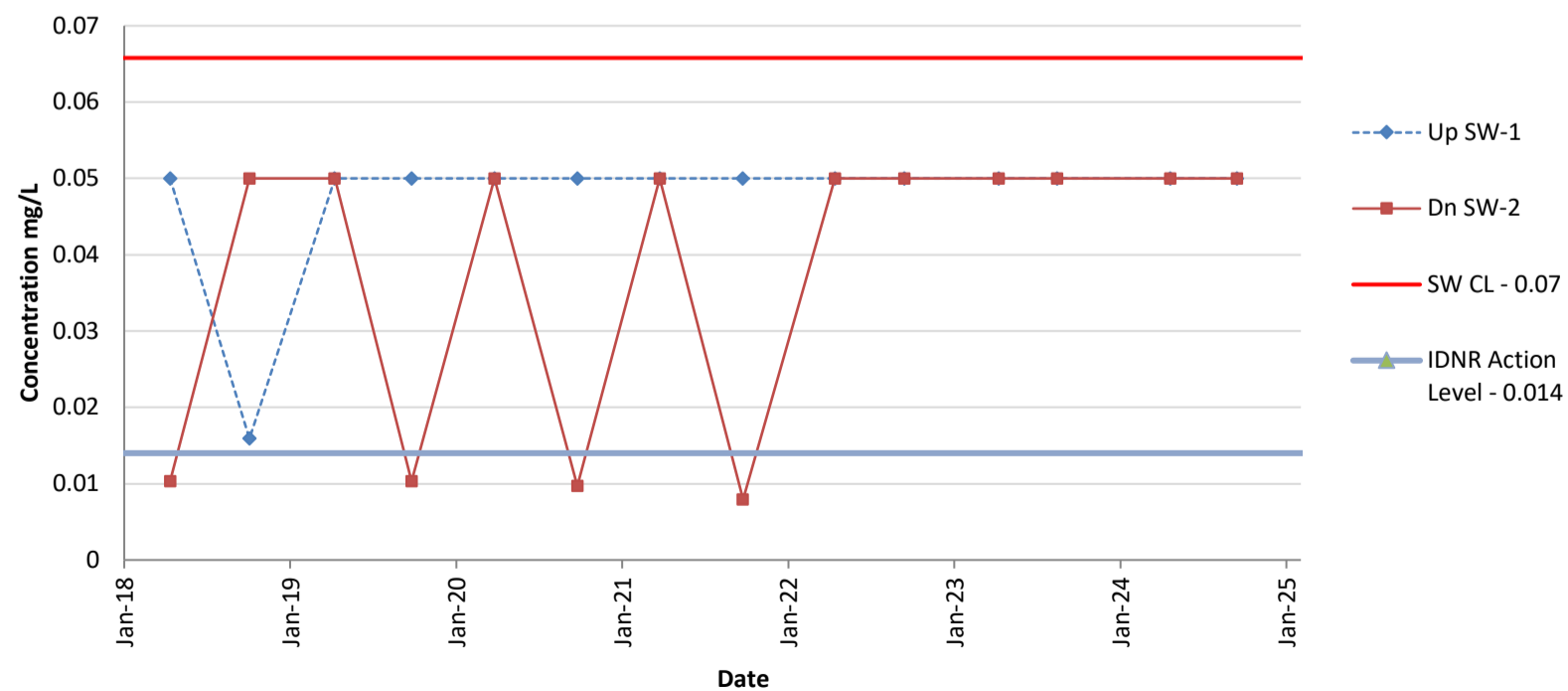
Amsted Landfill Water Quality Summary Water Table - Lithium



Amsted Landfill Water Quality Summary Uppermost Aquifer - Lithium



Amsted Landfill Water Quality Summary Surface Water - Lithium



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Manganese (mg/L)

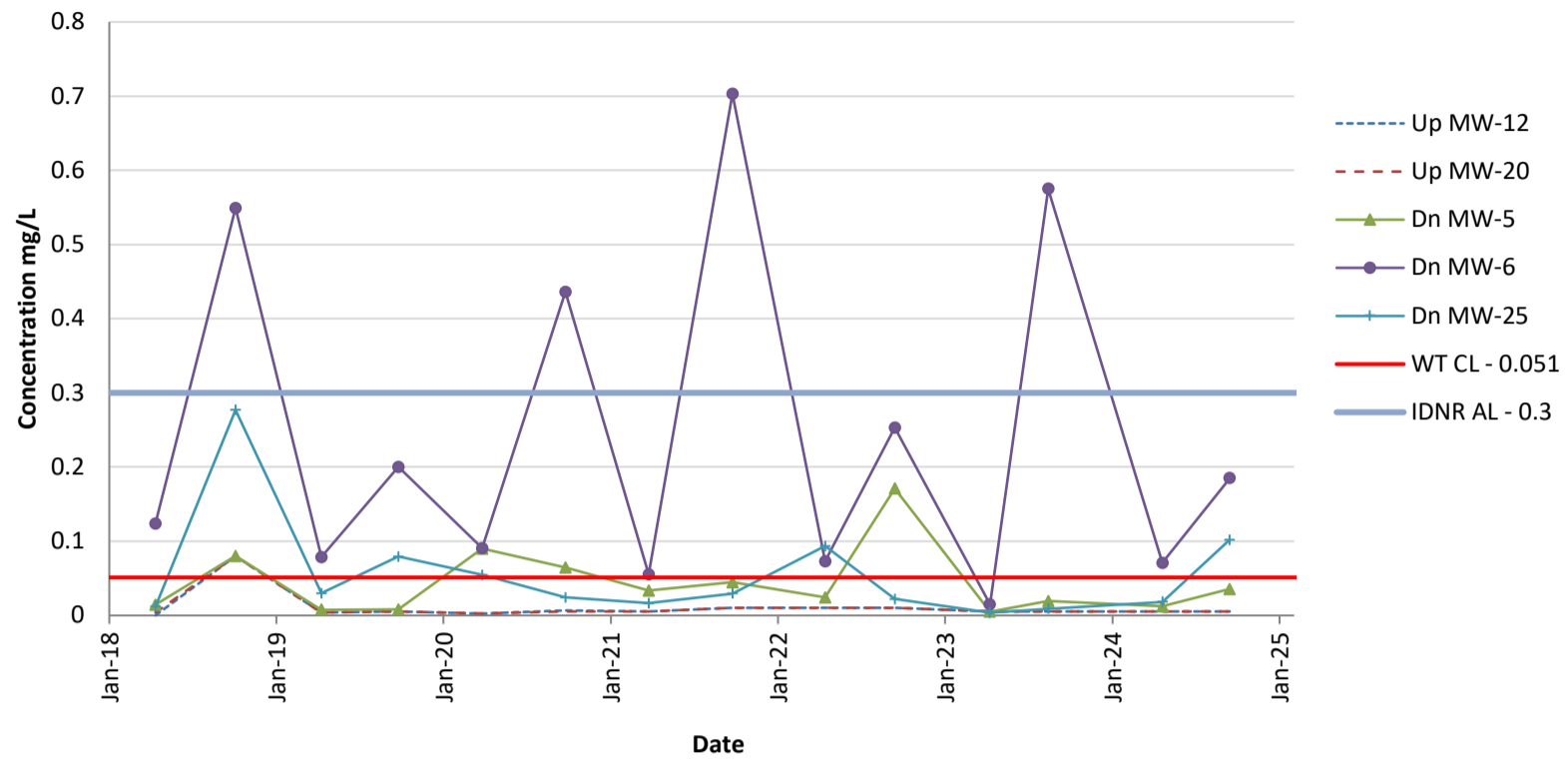
Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.004	0.00344	0.004	0.0145	0.124	0.012	0.477	0.553	0.0844	4	0.139	0.375	0.506
Oct-18	0.08	0.08	0.08	0.08	0.549	0.277	0.091	0.0695	2.33	5.14	0.186	0.184	0.188
Apr-19	0.004-0.0200	0.004	0.004	0.00777	0.0786	0.0301	0.0971	0.0676	0.0783	2.63	0.138	0.51	0.35
Oct-19	0.005	0.005	0.005	0.00788	0.2	0.0792	0.0723	0.0475	1.76	3.45	0.134	0.275	0.091
Apr-20	0.005	0.00282	0.00268	0.0901	0.0909	0.0545	0.0578	0.0436	1.28	2.62	0.147	0.817	0.417
Oct-20	0.005	0.00643	0.005	0.0648	0.436	0.0241	0.0742	0.0486	1.49	3.07	0.128	0.533	0.292
Apr-21	0.005	0.005	0.005	0.0337	0.0557	0.0167	0.0755	0.0512	1.3	2.72	0.114	0.254	0.0882
Oct-21	0.01	0.01	0.01	0.0449	0.703	0.0297	0.0735	0.0217	1.49	2.5	0.135	0.245	0.195
Apr-22	0.01	0.01	0.01	0.0245	0.0729	0.0937	0.126	0.079	1.46	2.67	0.131	0.34	0.624
Sep-22	0.01	0.01	0.01	0.171	0.253	0.0223	0.181	0.0444	1.58	3.39	0.22	0.572	0.164
Apr-23	0.005	0.005	0.005	0.005	0.0149	0.00376	0.0595	0.161	0.0543	3.35	0.153	0.497	0.741
Aug-23	0.005	0.005	0.005	0.0196	0.575	0.00912	0.11	0.0216	1.41	2.83	0.162	0.71	0.229
Apr-24	0.005	0.005	0.005	0.0124	0.0712	0.0183	0.117	0.0366	0.114	3.02	0.146	0.308	0.135
Sep-24	0.005	0.005	0.005	0.0355	0.185	0.102	0.0616	0.0215	1.78	2.54	0.141	0.228	0.0427
		Mean	0.011				Mean	0.11				Mean	0.42
		WT UCL	0.051				UA UCL	0.35				SW UCL	0.80

Notes:

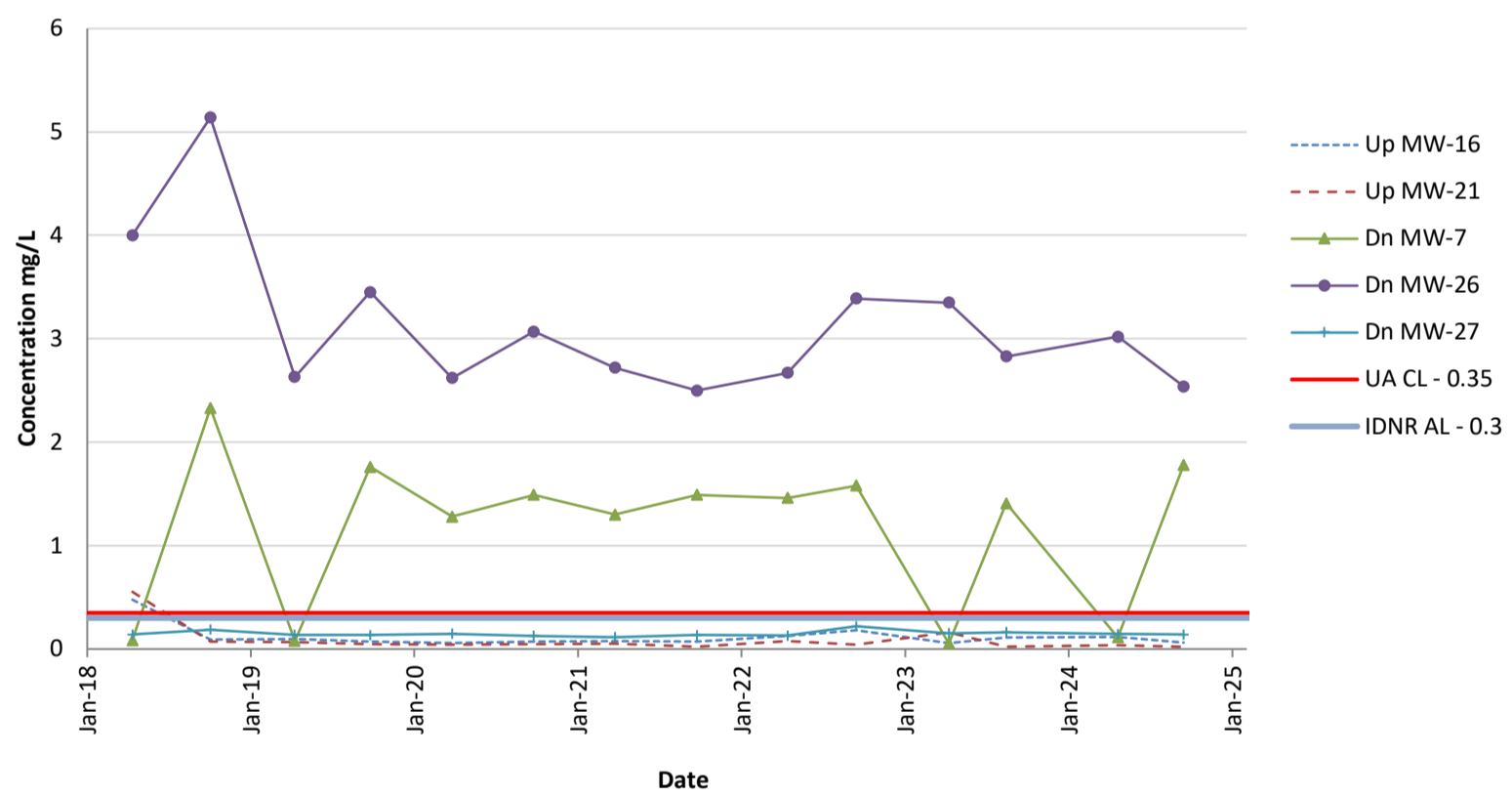
- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

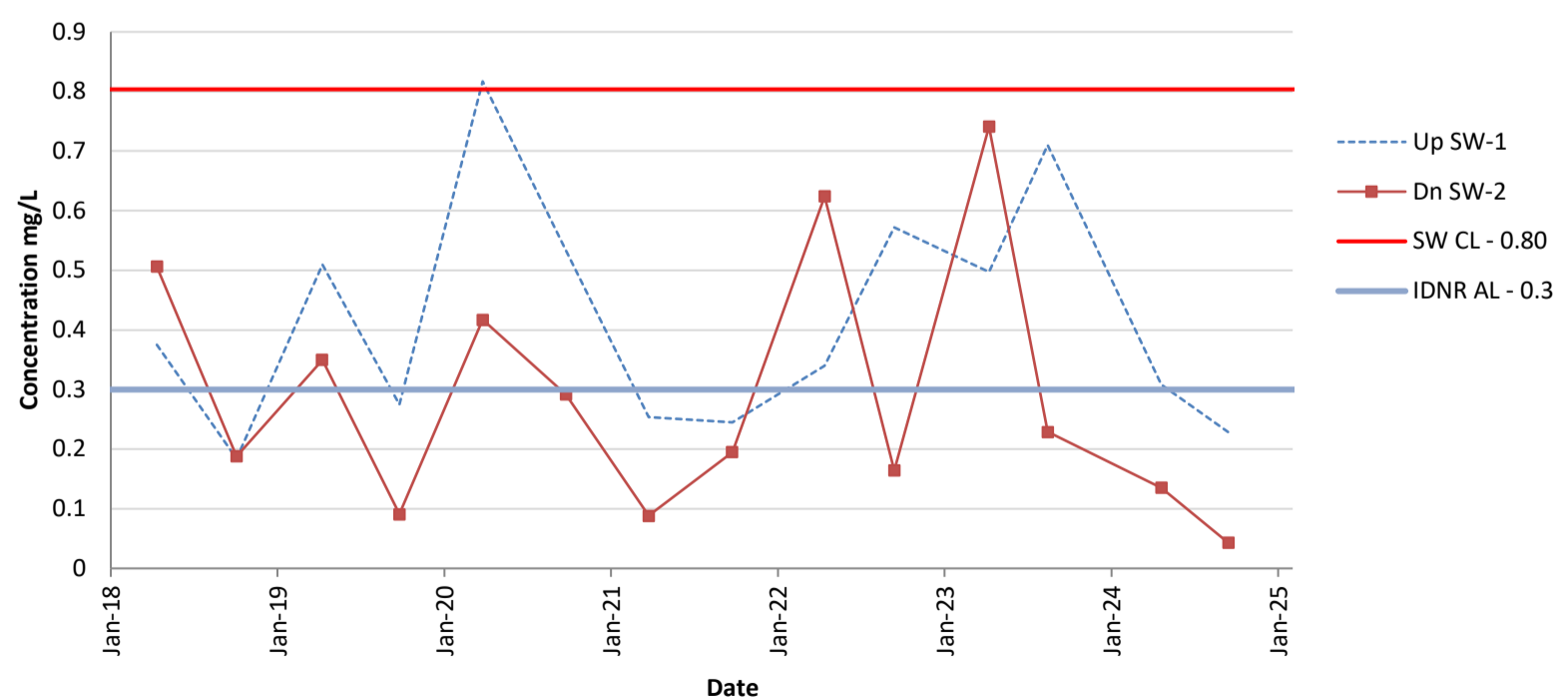
Amsted Landfill Water Quality Summary Water Table - Manganese



Amsted Landfill Water Quality Summary Uppermost Aquifer - Manganese



Amsted Landfill Water Quality Summary Surface Water - Manganese



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

pH, Field (pH Units)

Date	Quantitation	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
	Limit	MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	NA	6.46	6.48	6.48	5.56	5.79	6.42	6.2	6.52	6.29	6.45	7.25	6.91
Oct-18	NA	6.84	9.21	6.36	6.93	7.9	6.23	9.25	5.06	7.7	7.61	7.81	8.18
Apr-19	NA	6.55	6.8	6.66	6.96	6.59	6.72	6.63	6.74	6.55	6.55	6.66	8.18
Oct-19	NA	6.75	7.07	6.9	7	6.97	6.87	6.87	6.8	6.71	6.81	7.39	9.06
Apr-20	NA	6.76	6.94	6.79	7.15	6.97	6.9	6.97	6.81	6.63	6.55	7.14	7.18
Oct-20	NA	6.07	6.56	6.36	7.17	6.32	6.31	6.77	7.17	6.21	6.28	7.09	7.18
Apr-21	NA	6.54	6.72	5.19	6.13	5.36	6.84	5.38	6.24	4.99	5.24	7.31	8.3
Oct-21	NA	6.69	6.98	6.81	6.2	6.79	6.73	6.66	6.53	6.41	6.66	7.77	8.1
Apr-22	NA	5.56	7.43	3.68	7.92	7.13	5.83	4.4	7.33	7.04	3.62	6.82	8.48
Sep-22	NA	6.32	6.59	6.47	5.28	6.07	6.52	6.39	5.08	5.92	6.38	7	8.3
Apr-23	NA	7.22	7.25	6.98	7.39	7.22	7.35	6.97	7.23	6.89	6.98	7.58	6.71
Aug-23	NA	6.71	7.4	6.66	7.25	6.82	6.82	7.51	7.15	6.55	6.59	7.19	7.96
Apr-24	NA	6.76	6.92	6.93	6.89	7.01	7.09	6.72	6.89	6.65	6.81	7.58	8.21
Sep-24	NA	7.1	7.34	7.19	7.36	7.2	7.46	7.2	7.15	7.02	7.15	7.07	6.78
		Mean	6.858				Mean	6.71				Mean	7.26
		WT UCL	8.084				UA UCL	8.32				SW UCL	7.94
		WT LCL	5.631				UA LCL	5.11				SW LCL	6.58

Notes:

LCL = Lower Control Limit

UCL = Upper Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

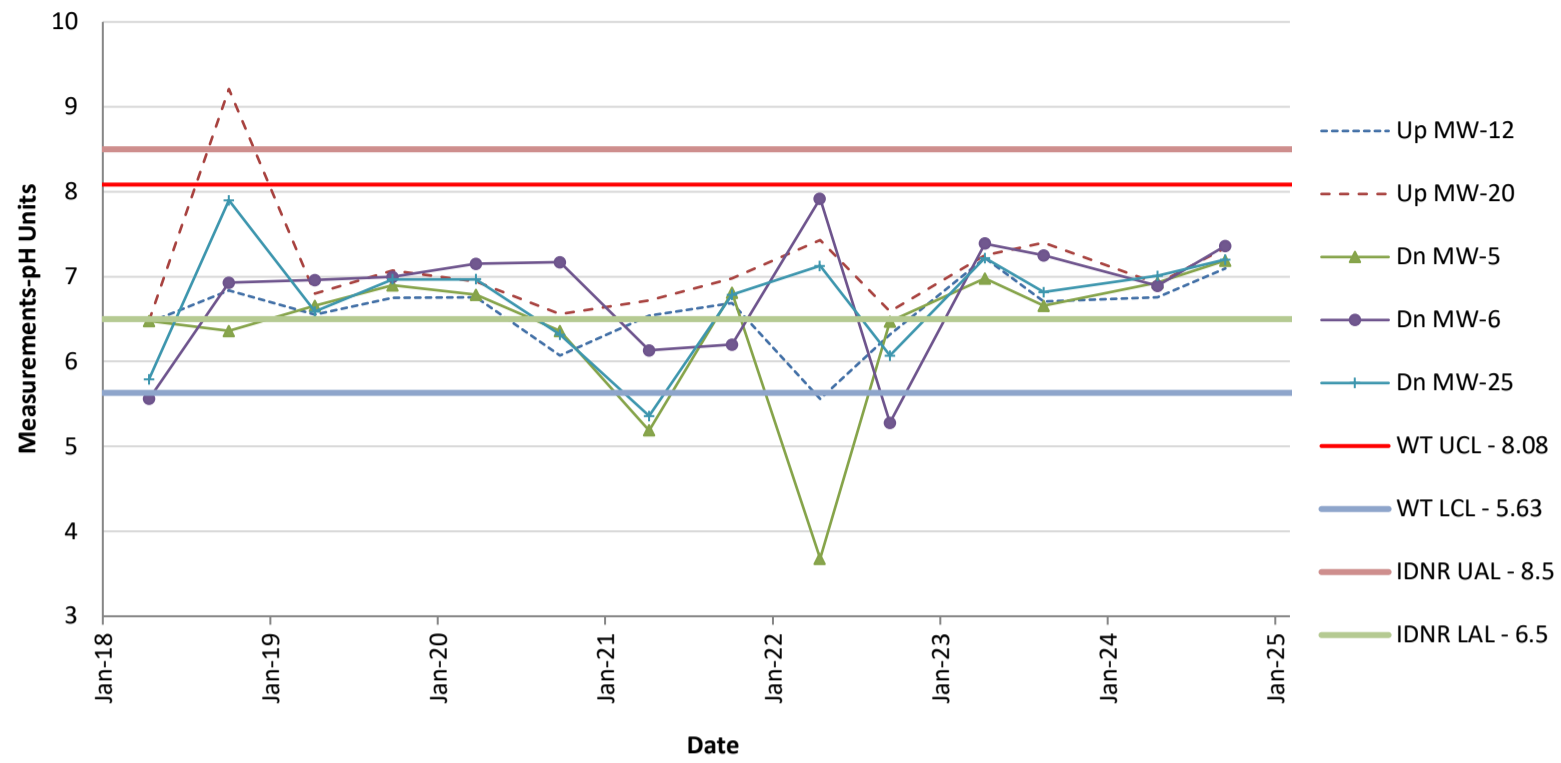
SW = Surface Water

UA = Uppermost Aquifer

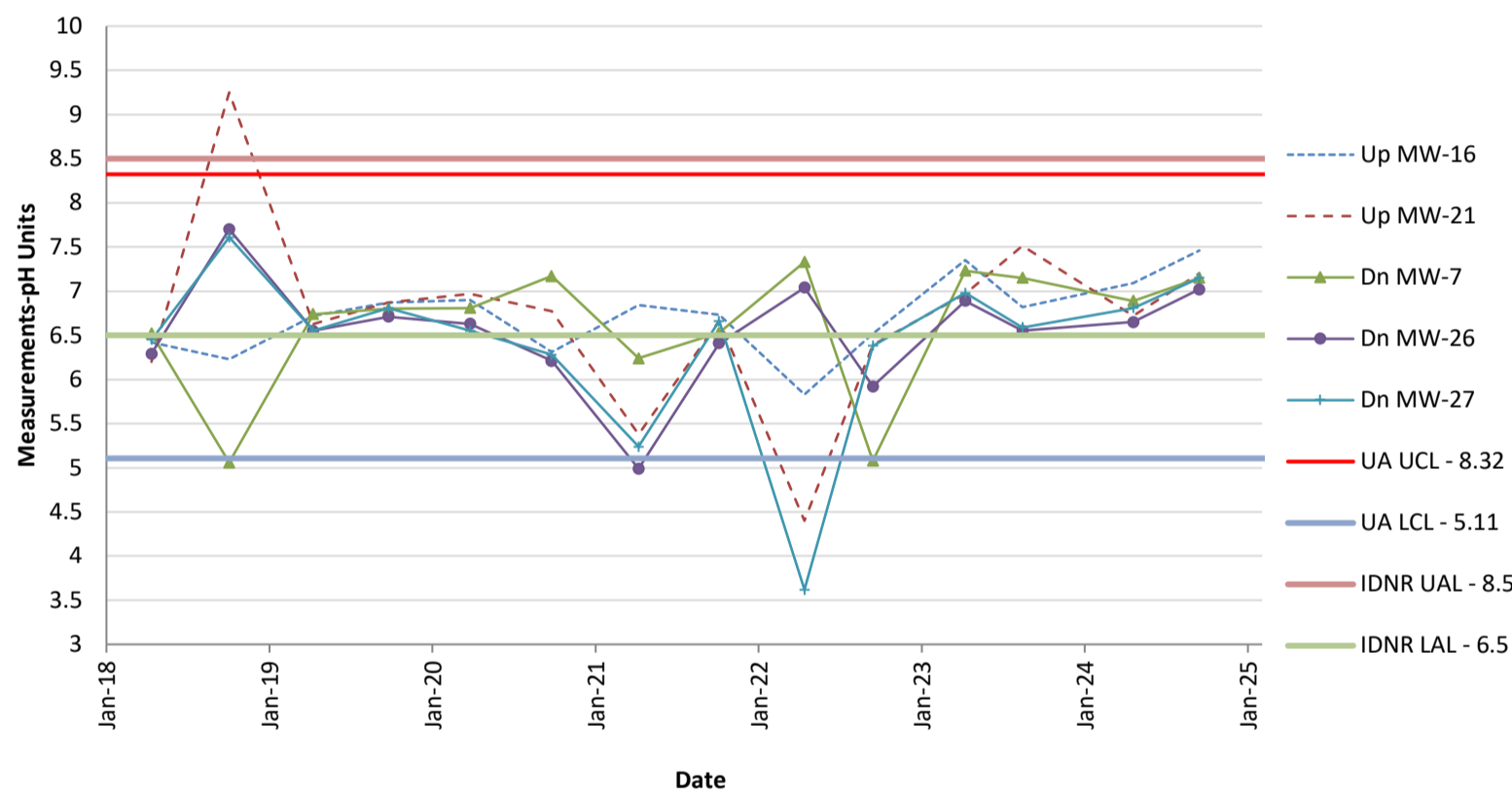
WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

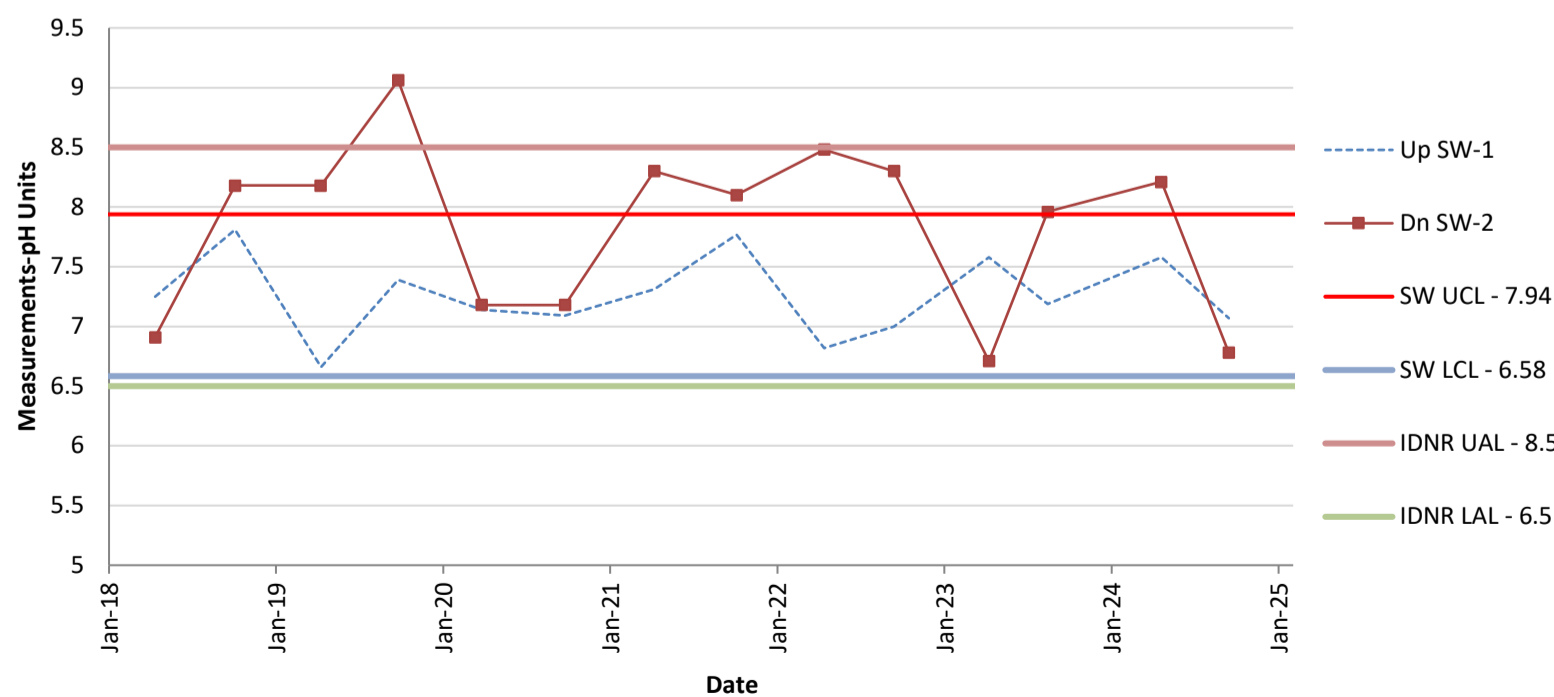
Amsted Landfill Water Quality Summary Water Table - pH, Field



Amsted Landfill Water Quality Summary Uppermost Aquifer - pH, Field



Amsted Landfill Water Quality Summary Surface Water - pH, Field



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Sodium (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	1.00	34.2	67.7	42.9	38.5	51.7	47.2	63.9	64.4	89.6	44.8	19.6	71.2
Oct-18	20	34.6	97.8	57.1	61.5	85.4	64.7	63.2	79.1	123	59.1	14.8	40.6
Apr-19	1.00	34.9	86.9	26.9	43.5	42.3	53.1	62	69.4	87	46.6	19.4	47.9
Oct-19	1.00	24.9	67.6	41.2	41.5	50	44.8	54.2	57.7	82.5	41.4	12.3	24.4
Apr-20	1.00	34.4	82.6	42.7	42.2	46.5	47.6	54.8	63.4	85.7	43.6	19.8	41
Oct-20	1.00	28.4	66.2	41.9	44.8	49.8	45.1	50.1	58.3	81.1	41.3	13.1	35.6
Apr-21	1.00	31.1	73.7	40.8	41.4	26.5	47.6	51.4	60.9	81.5	40.7	14.3	33.9
Oct-21	1.00	27.4	66.9	42.2	45.9	53	49.3	54.5	60.2	74.7	37.7	16.9	33.7
Apr-22	1.00	32	77.4	44.3	39.9	61.9	50.9	57.2	65.8	81.3	42.8	18.2	44.1
Sep-22	1.00	24.3	71	42.6	43.2	59.5	46.8	51.1	62.1	81.3	43.4	19.7	36.4
Apr-23	1.00	30.8	76.2	42.9	42.5	49.8	51.6	58	59.1	86.7	43.9	19.7	39.3
Aug-23	1.00	23.9	66.7	43.4	44.7	61.1	47.7	52.7	59.4	83.1	43.6	25.2	35.2
Apr-24	1.00	29.1	77.1	42.4	47.1	26.2	48	51.6	63.2	86.1	44.8	19.3	31.6
Sep-24	1.00	25.5	67	43.6	47.6	63.6	42.6	50	61.8	77.6	41.9	21	25.4
		Mean	52.154				Mean	52.20				Mean	18.35
		WT UCL	100.05				UA UCL	64.00				SW UCL	25.32

Notes:

CL = Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

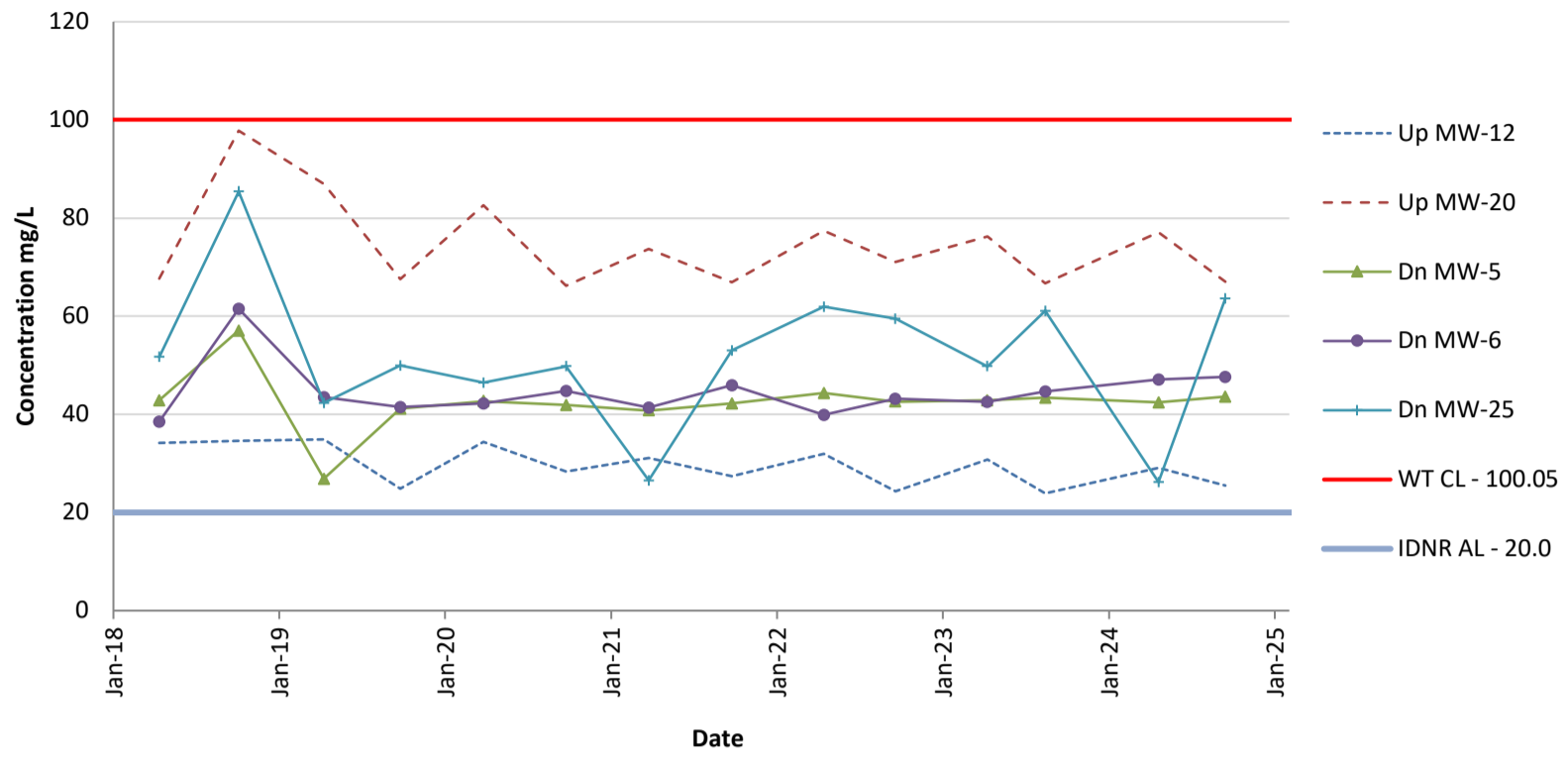
SW = Surface Water

UA = Uppermost Aquifer

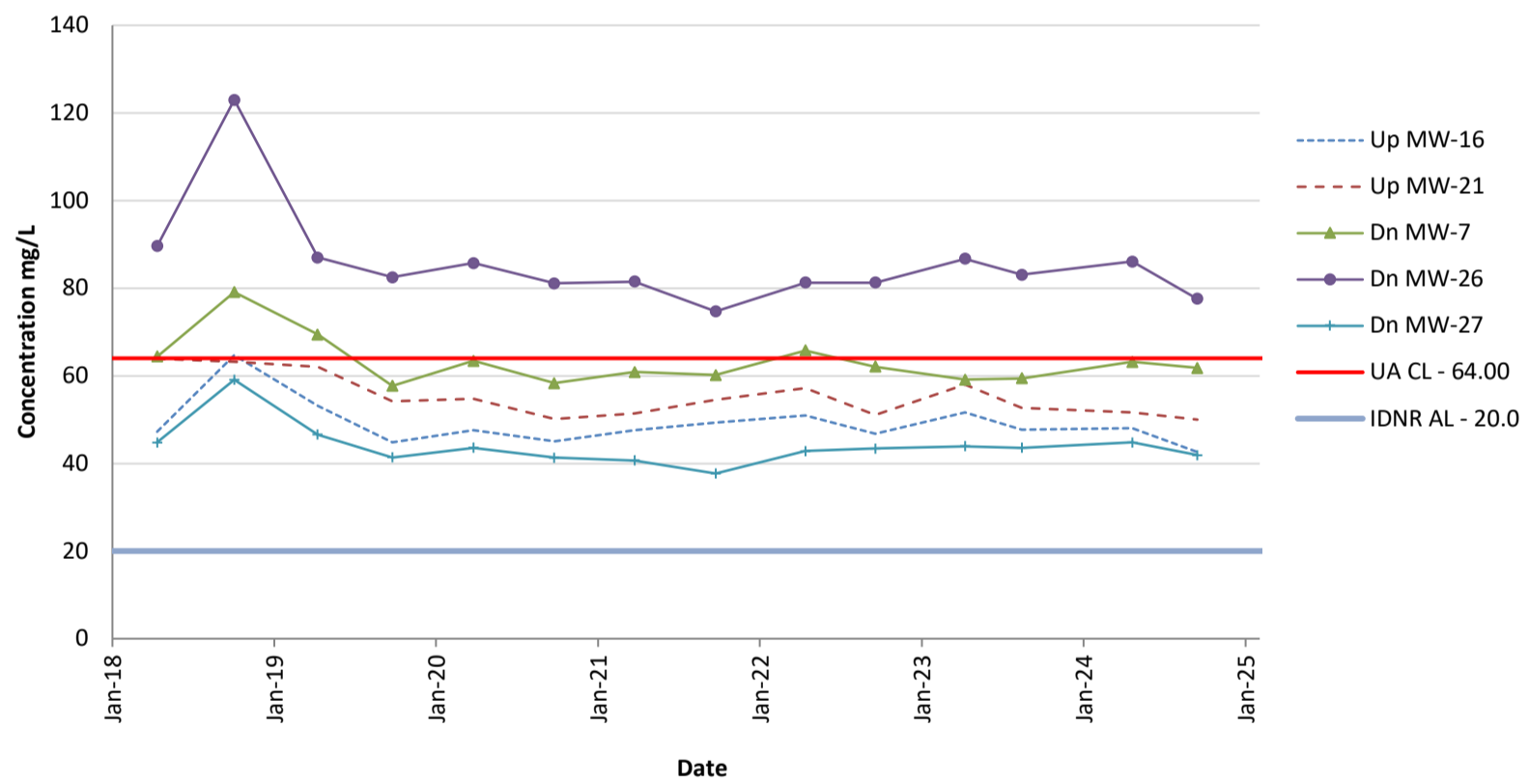
WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

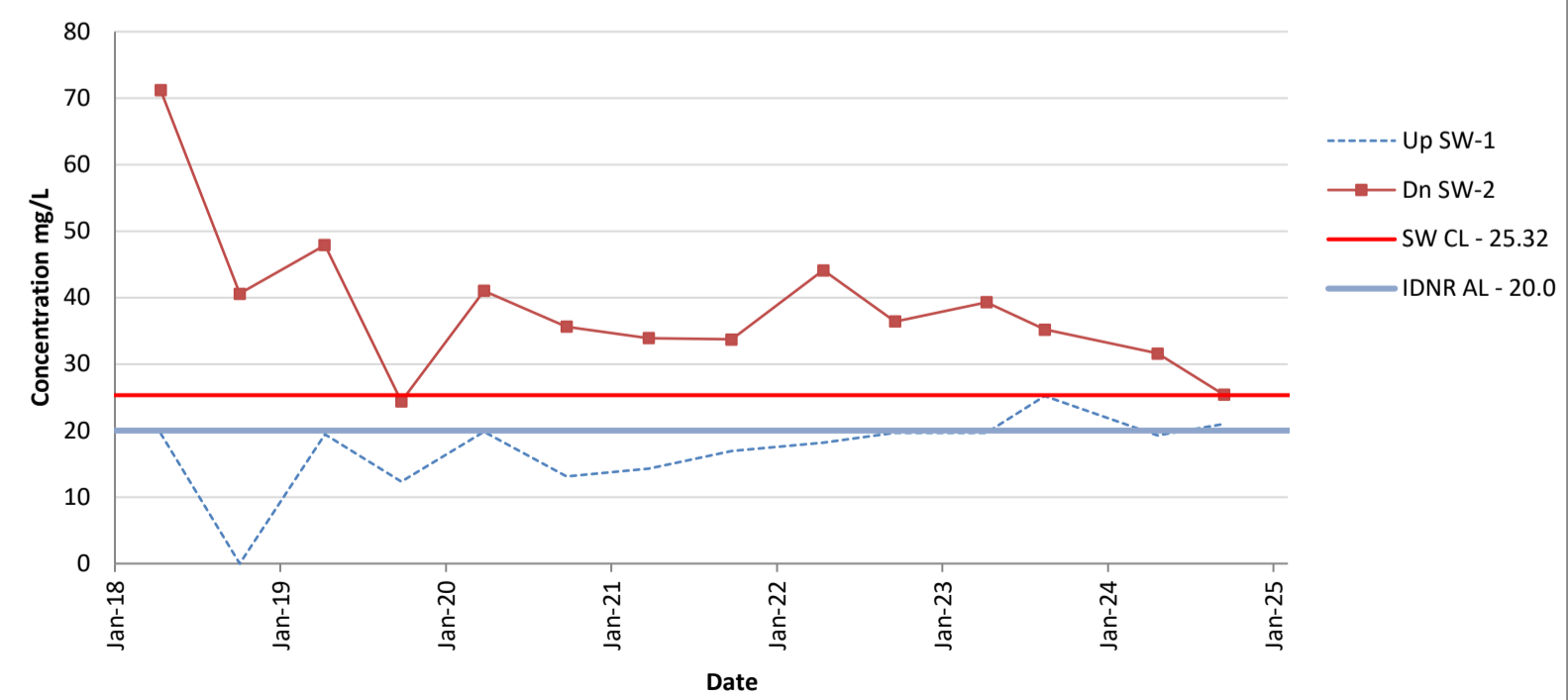
Amsted Landfill Water Quality Summary Water Table - Sodium



Amsted Landfill Water Quality Summary Uppermost Aquifer - Sodium



Amsted Landfill Water Quality Summary Surface Water - Sodium



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Strontium (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	0.05	0.513	0.329	0.291	0.349	0.504	0.523	0.719	1.85	2.16	0.826	0.252	0.254
Oct-18	0.05	0.535	0.338	0.282	0.365	0.56	0.496	0.449	1.82	2.03	0.787	0.201	0.237
Apr-19	0.05	0.494	0.336	0.292	0.362	0.483	0.485	0.463	1.83	1.92	0.826	0.209	0.258
Oct-19	0.05	0.594	0.354	0.288	0.393	0.542	0.489	0.441	1.83	2.1	0.828	0.174	0.169
Apr-20	0.05	0.562	0.376	0.31	0.394	0.541	0.498	0.477	1.93	2.18	0.845	0.253	0.217
Oct-20	0.05	0.542	0.315	0.265	0.355	0.551	0.451	0.41	1.67	1.82	0.733	0.206	0.203
Apr-21	0.05	0.443	0.302	0.267	0.328	0.363	0.440	0.406	1.57	1.7	0.681	0.202	0.13
Oct-21	0.05	0.557	0.299	0.251	0.355	0.592	0.513	0.44	1.74	1.59	0.611	0.168	0.177
Apr-22	0.05	0.474	0.324	0.295	0.330	0.548	0.488	0.464	1.79	1.88	0.700	0.23	0.255
Sep-22	0.05	0.492	0.345	0.276	0.357	0.563	0.484	0.421	1.78	1.92	0.753	0.213	0.156
Apr-23	0.05	0.490	0.349	0.300	0.377	0.476	0.525	0.556	1.81	2.08	0.797	0.219	0.251
Aug-23	0.05	0.513	0.367	0.296	0.386	0.571	0.497	0.458	1.80	1.97	0.764	0.165	0.223
Apr-24	0.05	0.502	0.345	0.315	0.380	0.387	0.494	0.455	1.80	1.94	0.800	0.233	0.193
Sep-24	0.05	0.502	0.339	0.302	0.351	0.507	0.425	0.379	1.73	1.73	0.695	0.138	0.103
		Mean	0.426			Mean	0.48			Mean	0.20		
		WT UCL	0.62			UA UCL	0.60			SW UCL	0.27		

Notes:

CL = Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

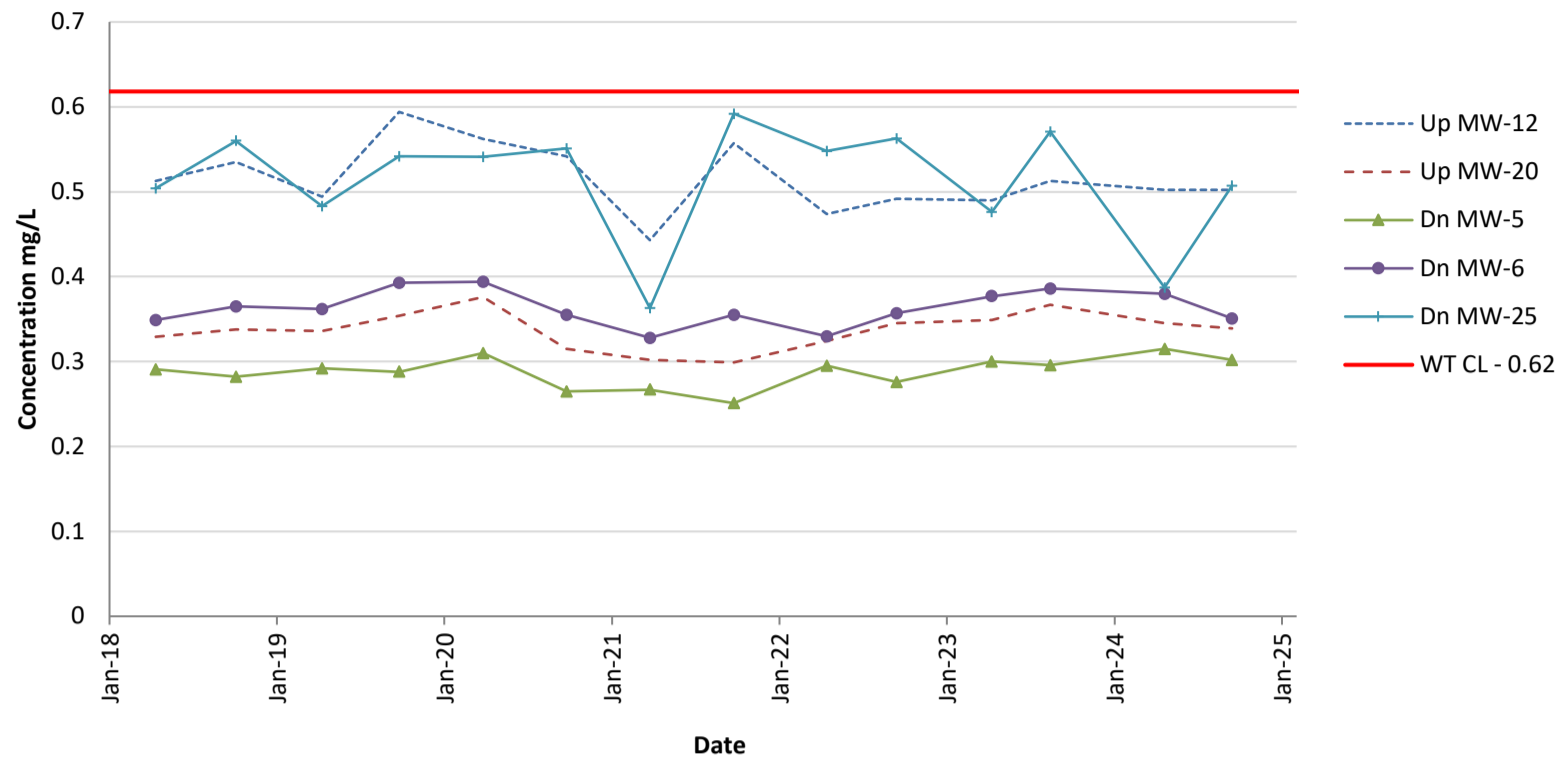
SW = Surface Water

UA = Uppermost Aquifer

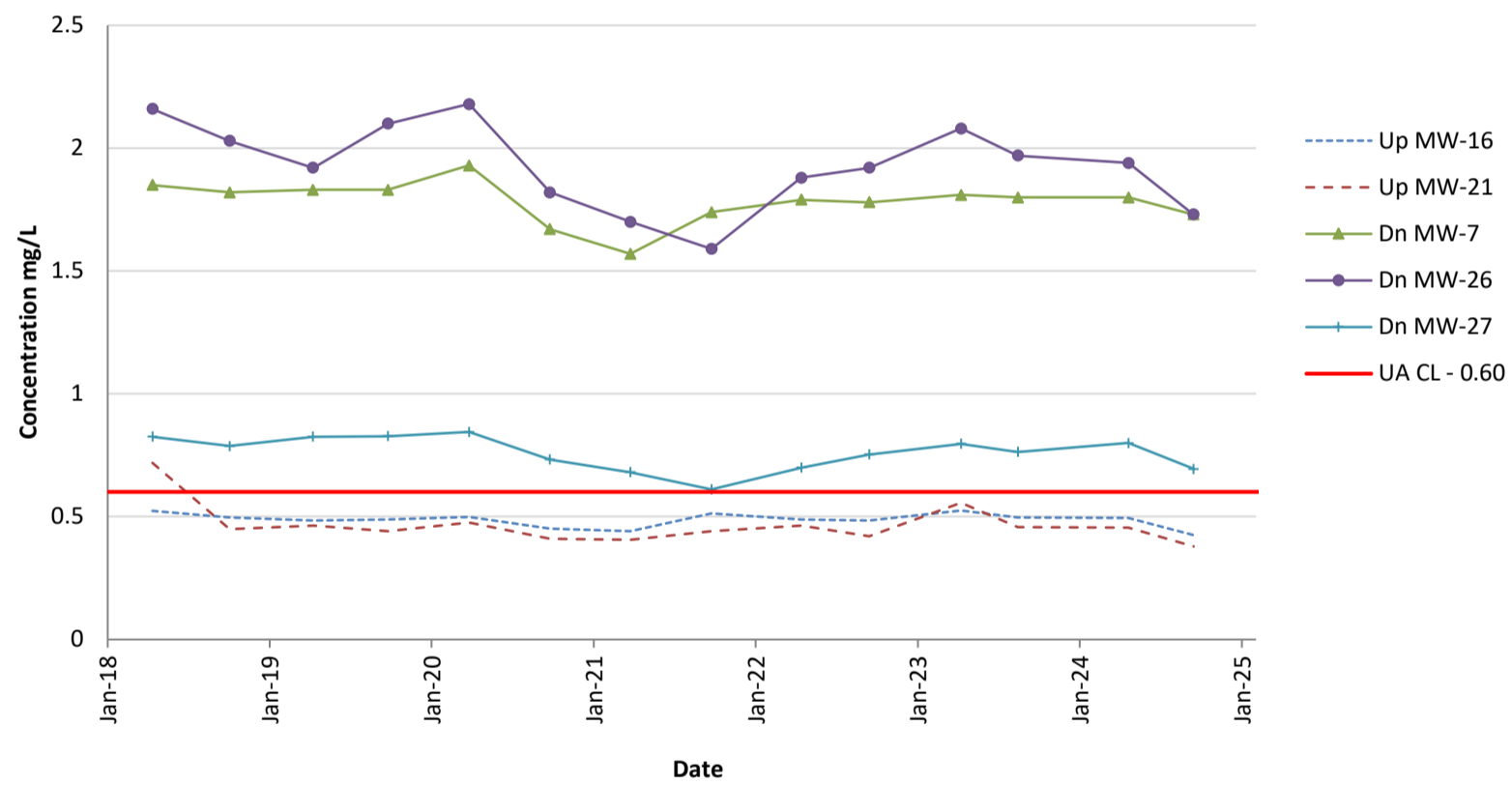
WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

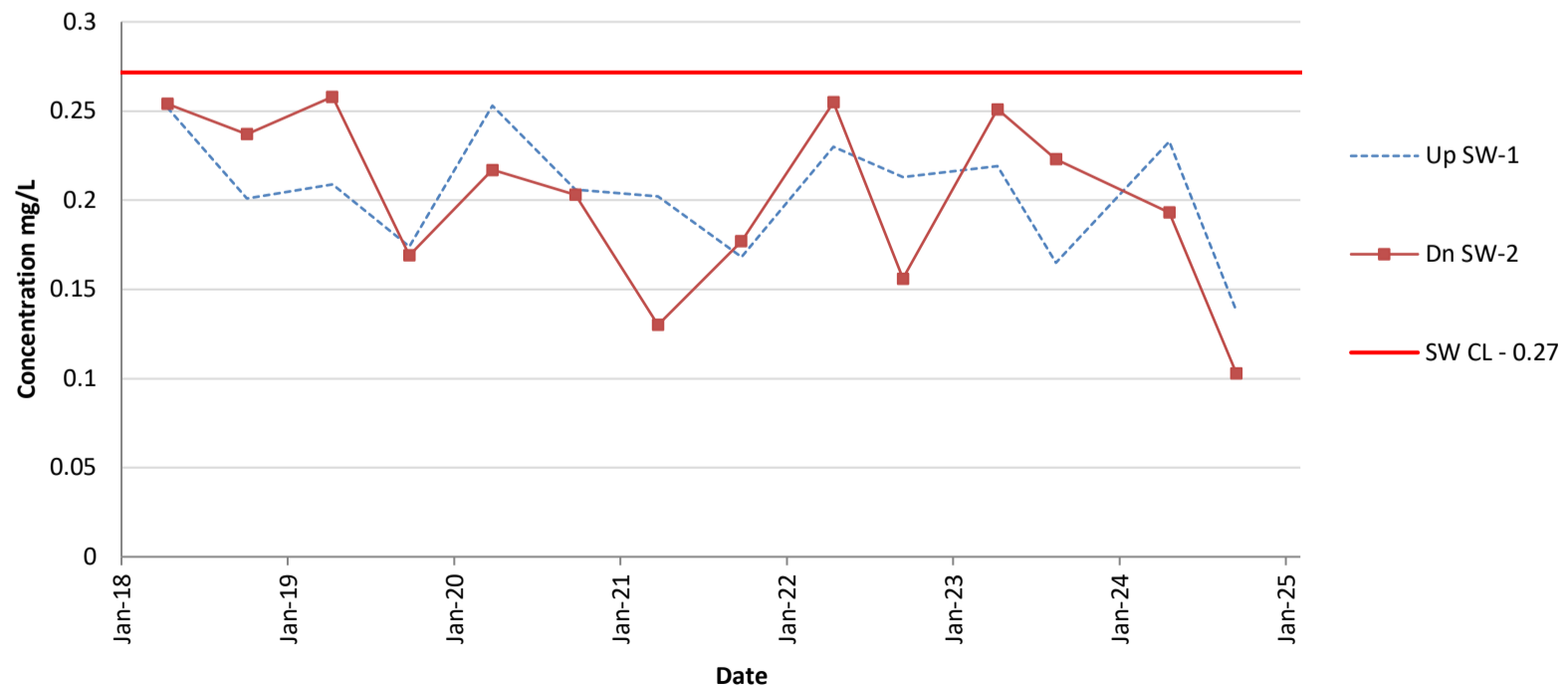
Amsted Landfill Water Quality Summary Water Table - Strontium



Amsted Landfill Water Quality Summary Uppermost Aquifer - Strontium



Amsted Landfill Water Quality Summary Surface Water - Strontium



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

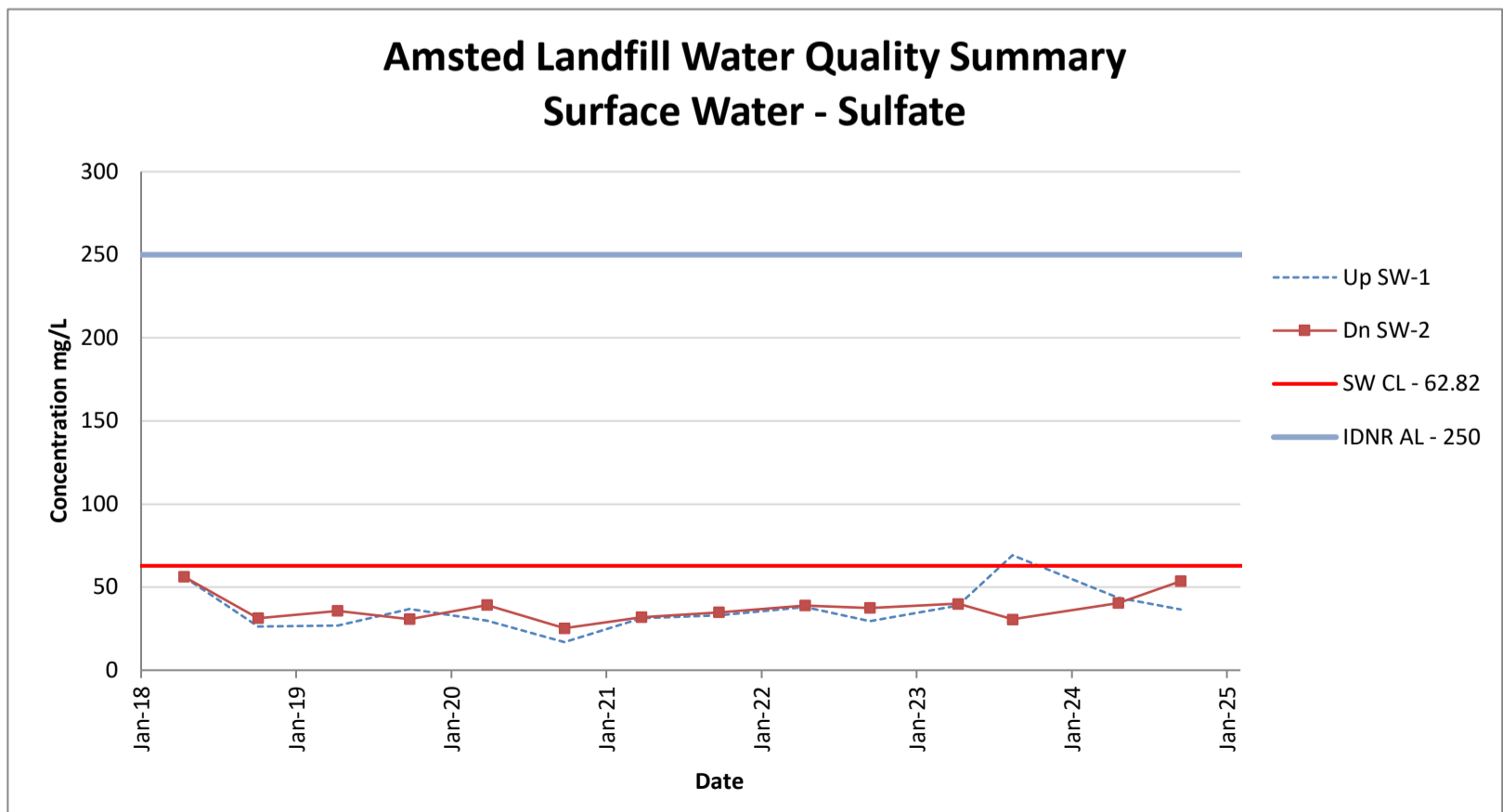
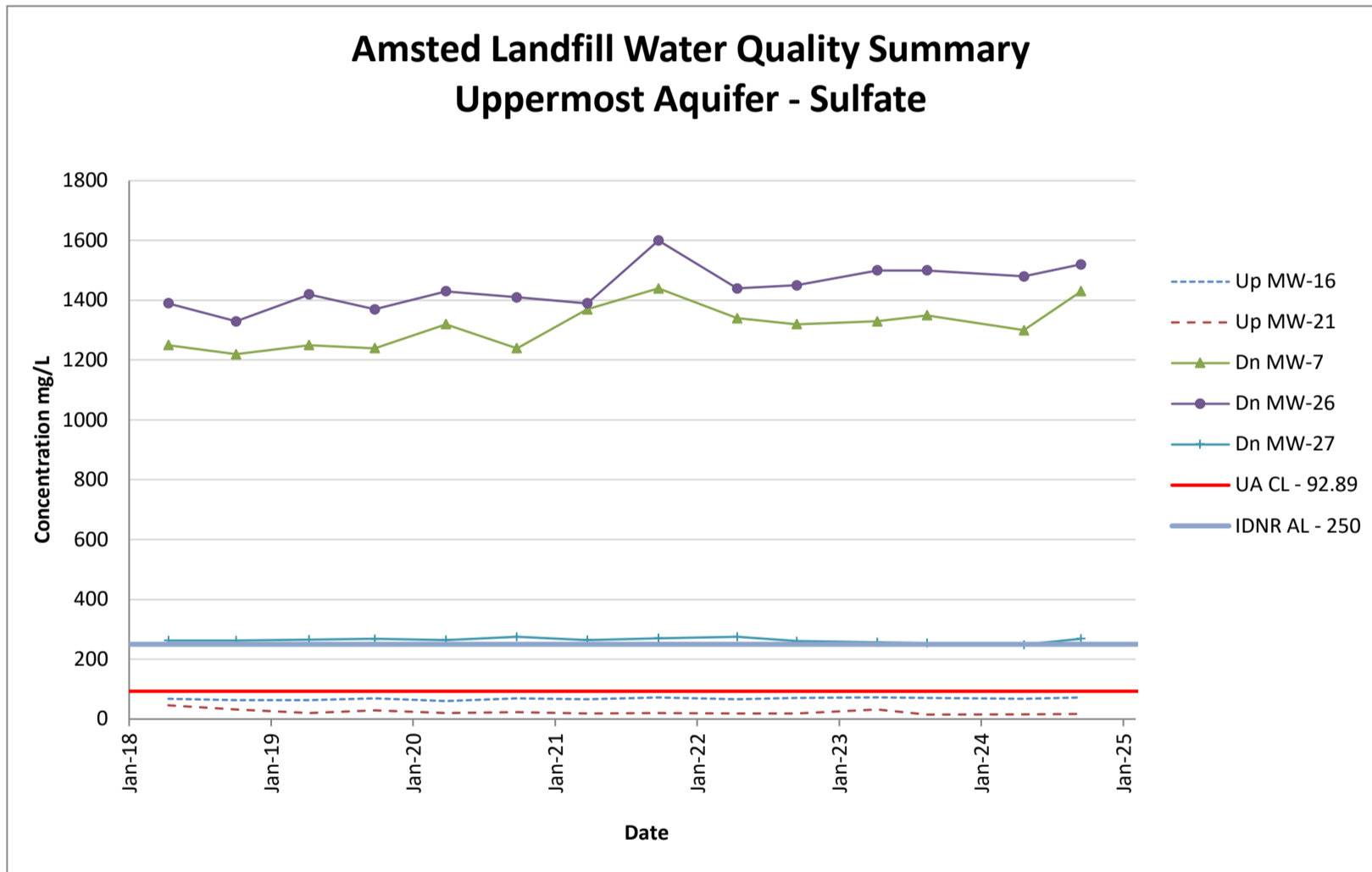
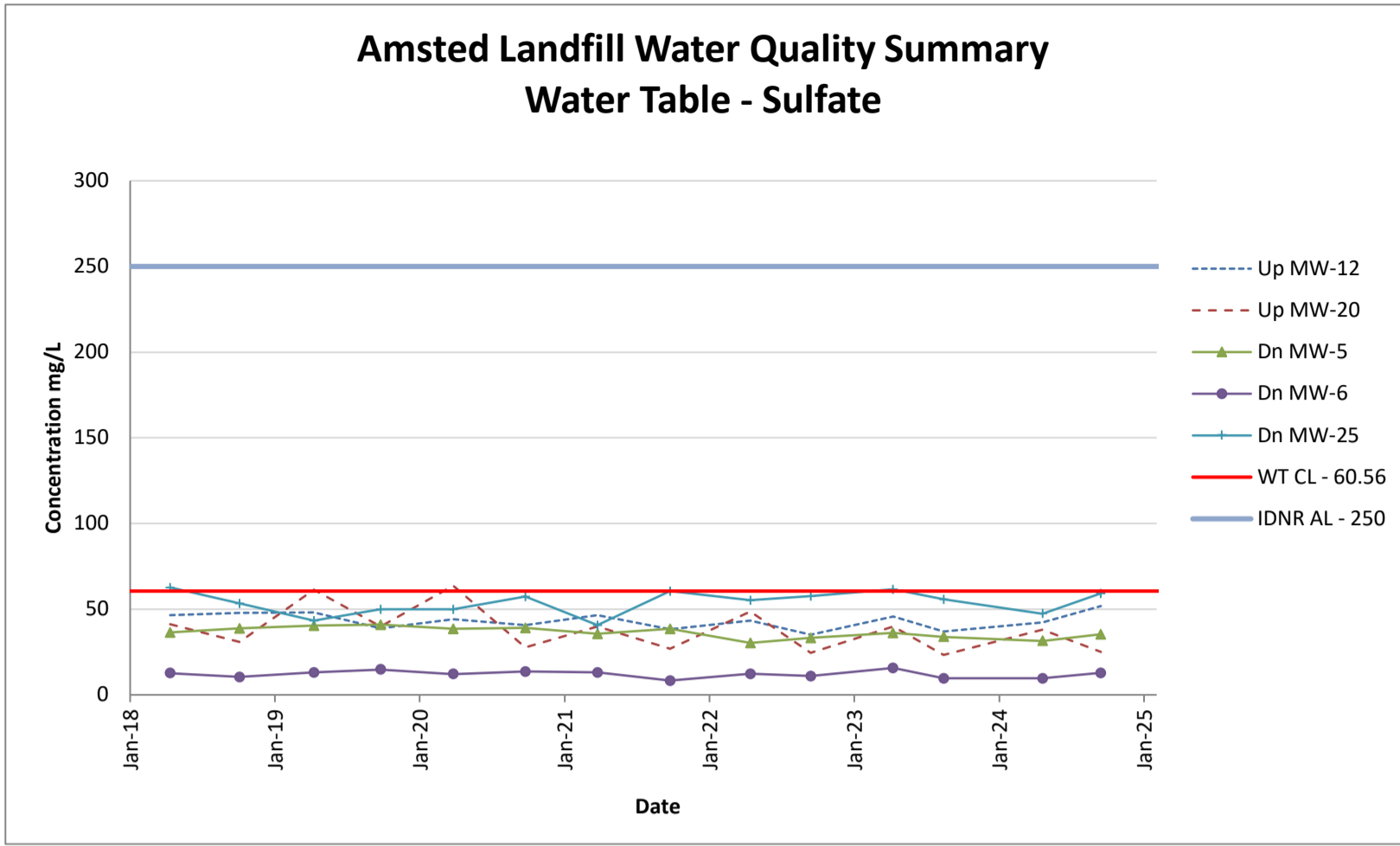
Sulfate (mg/L)

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	1.0-50	46.6	41.3	36.4	12.7	62.7	67.1	45.9	1250	1390	263	56.2	56.3
Oct-18	1.0-100	47.8	30.9	38.7	10.5	53.3	62.6	31.9	1220	1330	263	26.3	31.4
Apr-19	1.0-100	48.2	61.3	40.4	13	43.2	63	20.7	1,250	1,420	266	27	35.7
Oct-19	1.0-10.0	38.9	40	41	14.8	49.9	69.8	29.1	1,240	1,370	268	37	30.7
Apr-20	1.0-25.0	44	63.7	38.5	12.2	50	60.2	19.7	1320	1430	264	29.7	39.2
Oct-20	1.0-10.0	40.7	27.8	39	13.7	57.3	69.8	23.5	1240	1410	275	16.9	25.3
Apr-21	1.0-10.0	46.4	39.8	35.7	13.2	40.7	65.7	18.5	1370	1390	264	31.3	32
Oct-21	1.0-10.0	38.4	26.9	38.5	8.35	60.6	71.9	19.7	1440	1600	270	33.1	34.9
Apr-22	1.0-10.0	43.3	48.7	30.3	12.3	55.3	66.8	18.2	1340	1440	275	38	38.9
Sep-22	1.0-10.0	35.1	24.6	33.2	11	57.7	70.3	17.9	1320	1450	261	29.5	37.4
Apr-23	1.0-10.0	45.6	40	36.1	15.7	61.5	72.4	32.3	1330	1500	257	38.8	40
Aug-23	1.0-10.0	37	23.3	33.9	9.62	55.8	70	14.9	1350	1500	254	69.2	30.6
Apr-24	1.0-10.0	42.4	38.1	31.5	9.59	47.4	68.4	15.5	1300	1480	249	43.5	40.5
Sep-24	1.0-10.0	51.8	25.1	35.4	12.9	59.2	72.2	17.2	1430	1520	269	36.6	53.5
		Mean	40.632				Mean	45.54				Mean	36.65
		WT UCL	60.56				UA UCL	92.89				SW UCL	62.82

Notes:

- CL = Control Limit
- NA = Not applicable.
- NS = Not sampled due to insufficient amount of water.
- SW = Surface Water
- UA = Uppermost Aquifer
- WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

WATER QUALITY DATA - AMSTED FOUNDRY WASTE LANDFILL

Temperature, Degrees C

Date	Quantitation Limit	Water Table					Uppermost Aquifer					Surface Water	
		Upgradient		Downgradient			Upgradient		Downgradient			Upstream	Downstream
		MW-12	MW-20	MW-5	MW-6	MW-25	MW-16	MW-21	MW-7	MW-26	MW-27	SW-1	SW-2
Apr-18	NA	10.6	11.62	8.47	6.96	11.28	7.99	10.41	8.4	13.75	10.28	7.89	8.57
Oct-18	NA	15.86	13.77	15.76	15.97	16.38	13.71	12.59	15.4	15.12	15.38	18.67	18.54
Apr-19	NA	7.72	9.47	10.37	8.84	9.79	9.8	11.73	10.06	11.89	11.98	9.73	15.94
Oct-19	NA	17.42	16.93	18.81	17.78	18.34	16.81	16.01	18.12	18.05	16.39	23.51	23
Apr-20	NA	12.1	12.26	10.79	13.59	14.27	10.59	17.78	12.52	14.5	11.73	13.5	18.47
Oct-20	NA	15.15	13.83	15.83	17.46	15.86	13.72	16.04	15.55	15.41	14.31	15.2	10.25
Apr-21	NA	10.52	12.95	13.56	12.22	10.75	11.88	11.72	12.66	14.15	13.26	13.5	9.2
Oct-21	NA	15.41	14.99	17.12	18.03	17.05	17.32	17.89	15.14	16.94	15.2	18.45	17.54
Apr-22	NA	10.78	11.02	9.12	8.47	11.5	12.56	8.95	10.46	11.7	11.21	7.3	5.12
Sep-22	NA	15.68	15.15	15.57	20.16	14.68	15.28	16.3	15.19	13.56	13.82	18.05	15.72
Apr-23	NA	14.33	13.71	13.41	13.13	14.4	14.65	17.04	15.40	15.15	14.05	12.34	10.17
Aug-23	NA	20.95	26.75	20.68	28.77	22.86	21.28	22.32	28.99	23.42	19.37	23.77	27.59
Apr-24	NA	14.64	16.12	20.24	23.30	15.54	12.56	15.35	23.69	16.50	22.31	16.82	17.10
Sep-24	NA	18.66	19.39	25.33	17.44	21.56	20.25	18.6	26.76	20.98	20.88	22.00	22.37
		Mean	14.564				Mean	14.68			Mean	15.77	
		WT UCL	22.32				UA UCL	22.08			SW UCL	26.54	

Notes:

CL = Control Limit

NA = Not applicable.

NS = Not sampled due to insufficient amount of water.

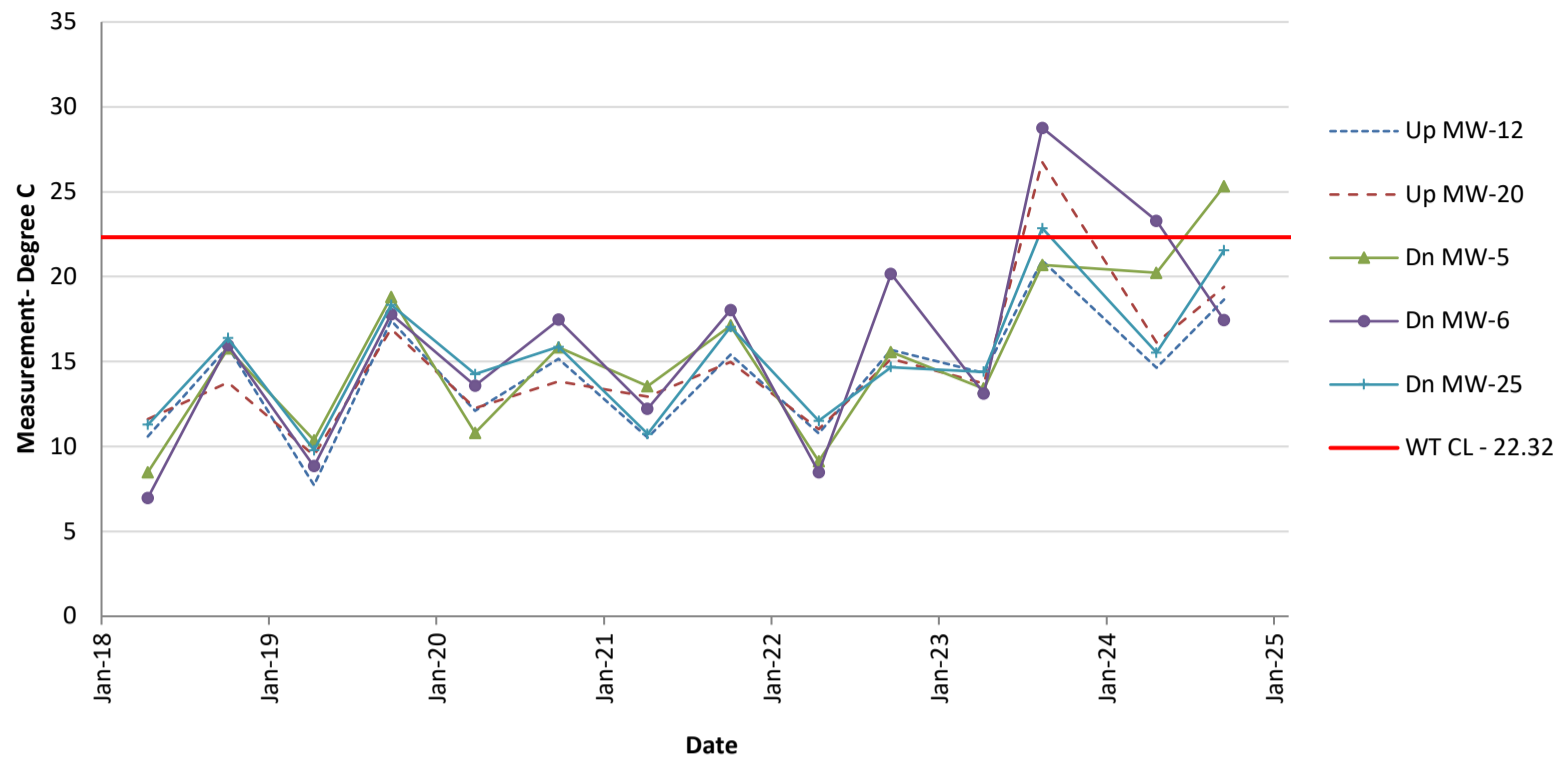
SW = Surface Water

UA = Uppermost Aquifer

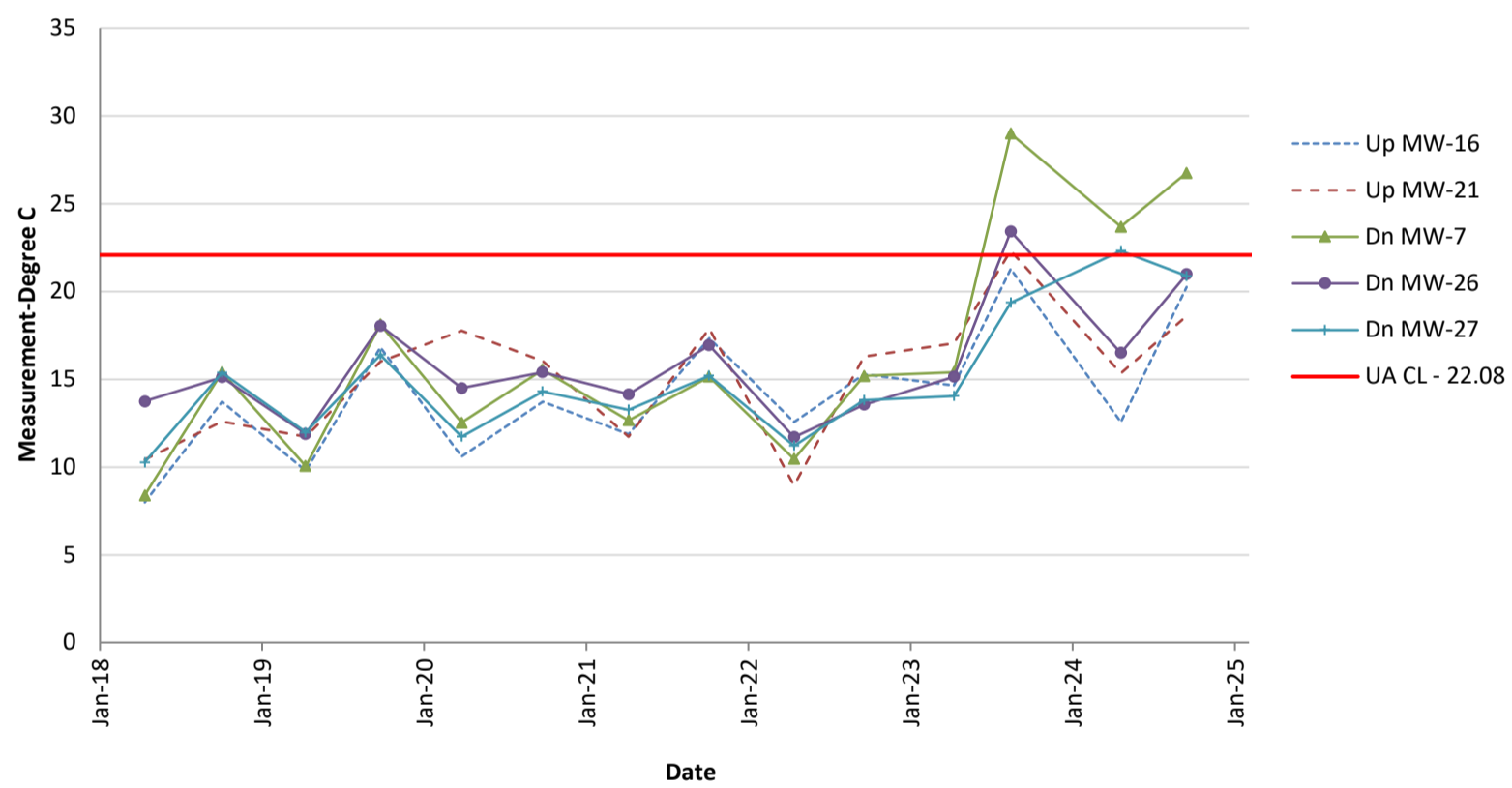
WT = Water Table

A **bolded** value indicates parameter present above method reporting limit.

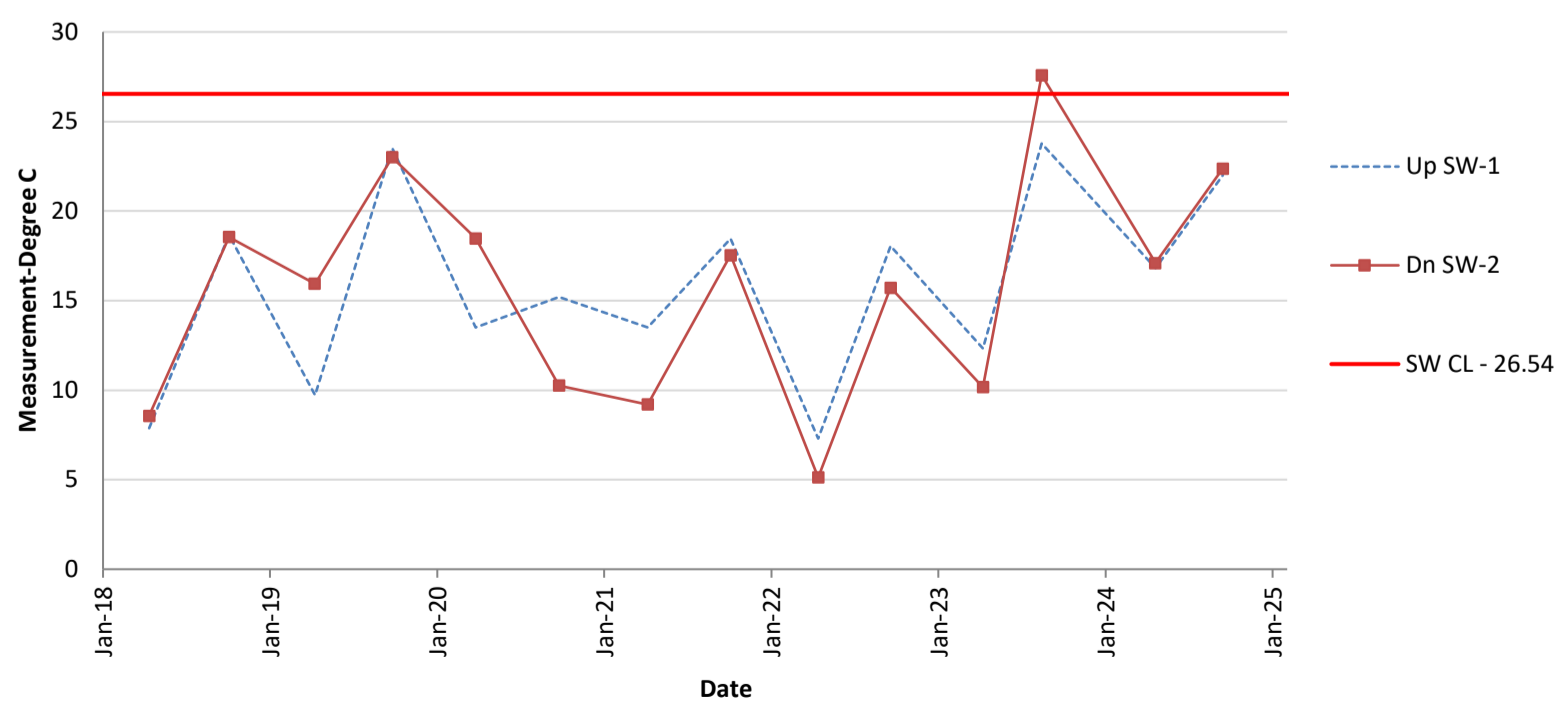
Amsted Landfill Water Quality Summary Water Table - Temperature



Amsted Landfill Water Quality Summary Uppermost Aquifer - Temperature



Amsted Landfill Water Quality Summary Surface Water - Temperature



Notes: Up = Upgradient, Dn = Downgradient, SW = Surface Water

APPENDIX D
ChemStat Output

Concentrations (ppb)

Parameter: Iron, Dissolved

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 154

Total Non-Detect: 82

Percent Non-Detects: 53.2468%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
------	-------	----	------	-------	----------

There are 14 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
------	-------	----	------	-------	----------

MW-05	13	11 (84.6154%)	4/18/2018	ND<25	ND<25
			10/10/2018	ND<25	ND<25
			10/1/2019	ND<100	ND<100
			4/9/2020	ND<100	ND<100
			10/1/2020	ND<100	ND<100
			4/14/2021	ND<100	ND<100
			10/13/2021	ND<100	ND<100
			4/20/2022	52	52
			9/28/2022	ND<100	ND<100
			4/19/2023	ND<100	ND<100
			8/24/2023	104	104
			5/1/2024	ND<100	ND<100
			9/11/2024	ND<100	ND<100
			10/1/1996	93	93
			2/1/1997	37	37
			4/1/1997	ND<30	ND<30
			7/1/1997	ND<30	ND<30
			10/1/1997	ND<30	ND<30
			4/1/1998	ND<30	ND<30
			10/1/1998	ND<30	ND<30
			7/1/1999	ND<30	ND<30
			10/1/1999	ND<30	ND<30
			6/1/2000	ND<100	ND<100
			10/1/2000	ND<30	ND<30
			5/1/2001	ND<30	ND<30
			10/1/2001	ND<30	ND<30
			4/1/2002	ND<30	ND<30
			10/1/2002	169	169
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	ND<30	ND<30
			4/5/2005	ND<30	ND<30
			10/5/2005	ND<30	ND<30
			4/6/2006	ND<30	ND<30
			10/7/2006	ND<30	ND<30
			4/7/2007	ND<30	ND<30
			10/7/2007	ND<100	ND<100
			4/1/2008	ND<30	ND<30
			10/1/2008	ND<30	ND<30
			5/1/2009	ND<30	ND<30
			10/1/2009	ND<30	ND<30
			5/10/2010	ND<100	ND<100
			10/10/2010	ND<100	ND<100
			4/11/2011	ND<100	ND<100
			10/11/2011	ND<100	ND<100
			4/12/2012	ND<100	ND<100

11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	ND<10	ND<10
4/21/2015	79.3	79.3
10/7/2015	ND<25	ND<25
4/20/2016	ND<25	ND<25
10/12/2016	ND<25	ND<25
4/19/2017	ND<125	ND<125
10/12/2017	ND<25	ND<25

MW-06	13	12 (92.3077%)	4/18/2018	18.6	18.6
			10/10/2018	ND<25	ND<25
			10/2/2019	ND<100	ND<100
			4/8/2020	ND<100	ND<100
			9/30/2020	ND<100	ND<100
			4/13/2021	ND<100	ND<100
			10/14/2021	ND<100	ND<100
			4/20/2022	ND<100	ND<100
			9/27/2022	ND<100	ND<100
			4/18/2023	ND<100	ND<100
			8/23/2023	ND<100	ND<100
			5/1/2024	ND<100	ND<100
			9/12/2024	ND<100	ND<100
			10/1/1996	10300	10300
			2/1/1997	9610	9610
			4/1/1997	8940	8940
			7/1/1997	8760	8760
			10/1/1997	8510	8510
			4/1/1998	37	37
			10/1/1998	ND<30	ND<30
			7/1/1999	ND<30	ND<30
			10/1/1999	ND<30	ND<30
			6/1/2000	ND<100	ND<100
			10/1/2000	ND<30	ND<30
			5/1/2001	31	31
			10/1/2001	ND<30	ND<30
			4/1/2002	33	33
			10/1/2002	46	46
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	ND<30	ND<30
			4/5/2005	ND<30	ND<30
			10/5/2005	ND<30	ND<30
			4/6/2006	ND<30	ND<30
			10/7/2006	ND<30	ND<30
			4/7/2007	ND<30	ND<30
			10/7/2007	ND<100	ND<100
			4/1/2008	ND<30	ND<30
			10/1/2008	ND<30	ND<30
			5/1/2009	ND<30	ND<30
			10/1/2009	ND<30	ND<30
			5/10/2010	ND<100	ND<100
			10/10/2010	ND<100	ND<100
			4/11/2011	ND<100	ND<100
			10/11/2011	ND<100	ND<100
			4/12/2012	ND<100	ND<100
			11/12/2012	ND<100	ND<100
			5/13/2013	ND<100	ND<100
			11/13/2013	ND<100	ND<100
			6/14/2014	ND<100	ND<100

10/14/2014	ND<10	ND<10
4/21/2015	ND<25	ND<25
10/7/2015	8660	8660
4/19/2016	ND<25	ND<25
10/12/2016	ND<25	ND<25
4/19/2017	ND<125	ND<125
10/12/2017	ND<25	ND<25

MW-07	13	1 (7.69231%)	4/18/2018	ND<25	ND<25
			10/10/2018	297	297
			10/2/2019	204	204
			4/8/2020	7930	7930
			9/30/2020	801	801
			4/13/2021	8800	8800
			10/14/2021	9640	9640
			4/20/2022	8680	8680
			9/27/2022	9630	9630
			4/18/2023	2420	2420
			8/23/2023	2510	2510
			5/1/2024	52.2	52.2
			9/11/2024	9600	9600
			10/1/1996	135	135
			2/1/1997	2190	2190
			4/1/1997	31	31
			7/1/1997	30	30
			10/1/1997	69	69
			4/1/1998	10100	10100
			10/1/1998	18700	18700
			7/1/1999	12700	12700
			10/1/1999	11900	11900
			6/1/2000	8900	8900
			10/1/2000	15900	15900
			5/1/2001	8190	8190
			10/1/2001	8630	8630
			4/1/2002	17000	17000
			10/1/2002	ND<16300	ND<16300
			4/3/2003	15600	15600
			10/3/2003	12500	12500
			4/4/2004	14900	14900
			10/4/2004	13600	13600
			4/5/2005	10600	10600
			10/5/2005	12700	12700
			4/6/2006	11600	11600
			10/7/2006	15000	15000
			4/7/2007	15300	15300
			10/7/2007	14400	14400
			4/1/2008	9780	9780
			10/1/2008	13100	13100
			5/1/2009	12200	12200
			10/1/2009	12700	12700
			5/10/2010	7650	7650
			10/10/2010	11100	11100
			4/11/2011	8990	8990
			10/11/2011	11800	11800
			4/12/2012	11990	11990
			11/12/2012	14200	14200
			5/13/2013	7740	7740
			11/13/2013	12600	12600
			6/14/2014	5250	5250
			10/14/2014	10900	10900
			4/21/2015	5480	5480
			10/7/2015	ND<25	ND<25
			4/19/2016	ND<25	ND<25

			10/12/2016	ND<25	ND<25
			4/19/2017	ND<125	ND<125
			10/12/2017	506	506
MW-12	13	11 (84.6154%)	4/17/2018	12.1	12.1
			10/9/2018	ND<25	ND<25
			10/2/2019	ND<100	ND<100
			4/8/2020	ND<100	ND<100
			10/1/2020	ND<100	ND<100
			4/15/2021	ND<100	ND<100
			10/14/2021	51	51
			4/19/2022	ND<100	ND<100
			9/28/2022	ND<100	ND<100
			4/18/2023	ND<100	ND<100
			8/24/2023	ND<100	ND<100
			5/1/2024	ND<100	ND<100
			9/12/2024	ND<100	ND<100
			10/1/1996	127	127
			2/1/1997	230	230
			4/1/1997	ND<30	ND<30
			7/1/1997	ND<30	ND<30
			10/1/1997	30	30
			4/1/1998	ND<30	ND<30
			10/1/1998	ND<30	ND<30
			7/1/1999	ND<30	ND<30
			10/1/1999	ND<30	ND<30
			6/1/2000	ND<100	ND<100
			10/1/2000	ND<30	ND<30
			5/1/2001	ND<30	ND<30
			10/1/2001	ND<30	ND<30
			4/1/2002	ND<30	ND<30
			10/1/2002	ND<30	ND<30
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	ND<30	ND<30
			4/5/2005	ND<30	ND<30
			10/5/2005	ND<30	ND<30
			4/6/2006	ND<30	ND<30
			10/7/2006	ND<30	ND<30
			4/7/2007	ND<30	ND<30
			10/7/2007	ND<100	ND<100
			4/1/2008	ND<30	ND<30
			10/1/2008	ND<30	ND<30
			5/1/2009	ND<30	ND<30
			10/1/2009	ND<30	ND<30
			5/10/2010	ND<100	ND<100
			10/10/2010	ND<100	ND<100
			4/11/2011	ND<100	ND<100
			10/11/2011	ND<100	ND<100
			4/12/2012	ND<100	ND<100
			11/12/2012	ND<100	ND<100
			5/13/2013	ND<100	ND<100
			11/13/2013	ND<100	ND<100
			6/14/2014	ND<100	ND<100
			10/14/2014	ND<10	ND<10
			4/22/2015	ND<25	ND<25
			10/8/2015	ND<25	ND<25
			4/20/2016	ND<25	ND<25
			10/11/2016	ND<25	ND<25
			4/18/2017	ND<125	ND<125
			10/10/2017	ND<25	ND<25

MW-16	13	3 (23.0769%)	4/17/2018	ND<25	ND<25
			10/9/2018	45.4	45.4
			10/2/2019	ND<100	ND<100
			4/9/2020	159	159
			10/1/2020	ND<100	ND<100
			4/15/2021	137	137
			10/14/2021	216	216
			4/19/2022	175	175
			9/28/2022	113	113
			4/18/2023	819	819
			8/24/2023	204	204
			5/2/2024	93.8	93.8
			9/12/2024	100	100
			10/1/1996	350	350
			2/1/1997	243	243
			4/1/1997	47	47
			7/1/1997	ND<30	ND<30
			10/1/1997	43	43
			4/1/1998	382	382
			10/1/1998	2510	2510
			7/1/1999	727	727
			10/1/1999	124	124
			6/1/2000	ND<100	ND<100
			10/1/2000	469	469
			5/1/2001	105	105
			10/1/2001	132	132
			4/1/2002	ND<30	ND<30
			10/1/2002	634	634
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	ND<30	ND<30
			4/5/2005	62	62
			10/5/2005	ND<30	ND<30
			4/6/2006	ND<30	ND<30
			10/7/2006	ND<30	ND<30
			4/7/2007	ND<30	ND<30
			10/7/2007	ND<100	ND<100
			4/1/2008	116	116
			10/1/2008	ND<30	ND<30
			5/1/2009	ND<30	ND<30
			10/1/2009	ND<30	ND<30
			5/10/2010	ND<100	ND<100
			10/10/2010	ND<100	ND<100
			4/11/2011	ND<100	ND<100
			10/11/2011	103	103
			4/12/2012	ND<100	ND<100
			11/12/2012	623	623
			5/13/2013	ND<100	ND<100
			11/13/2013	ND<100	ND<100
			6/14/2014	ND<100	ND<100
			10/14/2014	38.5	38.5
			4/22/2015	444	444
			10/8/2015	100	100
			4/20/2016	ND<25	ND<25
			10/11/2016	ND<25	ND<25
			4/18/2017	ND<125	ND<125
			10/10/2017	ND<25	ND<25

MW-20	13	11 (84.6154%)	4/17/2018	25.4	25.4
			10/10/2018	ND<25	ND<25
			10/2/2019	ND<100	ND<100
			4/9/2020	70.5	70.5

10/2/2020	ND<100	ND<100
4/15/2021	ND<100	ND<100
10/12/2021	ND<100	ND<100
4/20/2022	ND<100	ND<100
9/28/2022	ND<100	ND<100
4/19/2023	ND<100	ND<100
8/23/2023	ND<100	ND<100
4/30/2024	ND<100	ND<100
9/11/2024	ND<100	ND<100
10/1/1996	77	77
2/1/1997	235	235
4/1/1997	148	148
7/1/1997	48	48
10/1/1997	95	95
4/1/1998	40	40
10/1/1998	ND<30	ND<30
7/1/1999	ND<30	ND<30
10/1/1999	ND<30	ND<30
6/1/2000	ND<100	ND<100
10/1/2000	ND<30	ND<30
5/1/2001	ND<30	ND<30
10/1/2001	ND<30	ND<30
4/1/2002	ND<30	ND<30
10/1/2002	ND<30	ND<30
4/3/2003	ND<30	ND<30
10/3/2003	ND<30	ND<30
4/4/2004	ND<30	ND<30
10/4/2004	ND<30	ND<30
4/5/2005	ND<30	ND<30
10/5/2005	ND<30	ND<30
4/6/2006	ND<30	ND<30
10/7/2006	ND<30	ND<30
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	ND<30	ND<30
10/1/2008	ND<30	ND<30
5/1/2009	33	33
10/1/2009	37	37
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	ND<100	ND<100
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	ND<10	ND<10
4/22/2015	ND<25	ND<25
10/8/2015	7650	7650
10/8/2015	83.3	83.3
4/21/2016	ND<25	ND<25
10/12/2016	370	370
4/18/2017	ND<125	ND<125
10/12/2017	ND<25	ND<25

MW-21	13	7 (53.8462%)	4/17/2018	ND<25	ND<25
			10/10/2018	35.6	35.6
			10/1/2019	ND<100	ND<100
			4/7/2020	186	186
			9/30/2020	ND<100	ND<100
			4/14/2021	219	219
			10/12/2021	76.8	76.8

4/20/2022	246	246
9/29/2022	ND<100	ND<100
4/18/2023	79.2	79.2
8/23/2023	ND<100	ND<100
5/1/2024	ND<100	ND<100
9/11/2024	ND<100	ND<100
10/1/1996	141	141
2/1/1997	466	466
4/1/1997	ND<30	ND<30
7/1/1997	68	68
10/1/1997	ND<30	ND<30
4/1/1998	ND<30	ND<30
10/1/1998	ND<30	ND<30
7/1/1999	ND<30	ND<30
10/1/1999	ND<30	ND<30
6/1/2000	ND<100	ND<100
10/1/2000	ND<30	ND<30
5/1/2001	ND<30	ND<30
10/1/2001	ND<30	ND<30
4/1/2002	ND<30	ND<30
10/1/2002	ND<30	ND<30
4/3/2003	ND<30	ND<30
10/3/2003	ND<30	ND<30
4/4/2004	ND<30	ND<30
10/4/2004	ND<30	ND<30
4/5/2005	ND<30	ND<30
10/5/2005	ND<30	ND<30
4/6/2006	ND<30	ND<30
10/7/2006	ND<30	ND<30
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	49	49
10/1/2008	ND<30	ND<30
5/1/2009	ND<30	ND<30
10/1/2009	31	31
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	ND<100	ND<100
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	ND<10	ND<10
4/21/2015	ND<25	ND<25
10/6/2015	489	489
4/21/2016	ND<25	ND<25
10/11/2016	ND<25	ND<25
4/18/2017	ND<125	ND<125
10/12/2017	ND<25	ND<25

MW-25

13

11 (84.6154%)

4/17/2018	16.1	16.1
10/9/2018	ND<25	ND<25
10/1/2019	ND<100	ND<100
4/8/2020	ND<100	ND<100
10/1/2020	ND<100	ND<100
4/14/2021	ND<100	ND<100
10/13/2021	ND<100	ND<100
4/19/2022	ND<100	ND<100
9/29/2022	ND<100	ND<100
4/19/2023	71.1	71.1
8/24/2023	ND<100	ND<100

4/30/2024	ND<100	ND<100
9/10/2024	ND<100	ND<100
10/1/1996	125	125
2/1/1997	207	207
4/1/1997	41	41
7/1/1997	30	30
10/1/1997	30	30
4/1/1998	60	60
10/1/1998	ND<30	ND<30
7/1/1999	ND<30	ND<30
10/1/1999	50	50
6/1/2000	ND<100	ND<100
10/1/2000	ND<30	ND<30
5/1/2001	ND<30	ND<30
10/1/2001	ND<30	ND<30
4/1/2002	ND<30	ND<30
10/1/2002	ND<30	ND<30
4/3/2003	ND<30	ND<30
10/3/2003	ND<30	ND<30
4/4/2004	ND<30	ND<30
10/4/2004	ND<30	ND<30
4/5/2005	ND<30	ND<30
10/5/2005	ND<30	ND<30
4/6/2006	ND<30	ND<30
10/7/2006	ND<30	ND<30
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	ND<30	ND<30
10/1/2008	ND<30	ND<30
5/1/2009	ND<30	ND<30
10/1/2009	ND<30	ND<30
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	ND<100	ND<100
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	ND<10	ND<10
4/21/2015	ND<25	ND<25
10/6/2015	ND<25	ND<25
4/21/2016	ND<25	ND<25
10/11/2016	360	360
4/18/2017	ND<125	ND<125
10/10/2017	ND<25	ND<25

MW-26	13	2 (15.3846%)	4/17/2018	18.6	18.6
			10/9/2018	500	500
			10/1/2019	ND<100	ND<100
			4/8/2020	1250	1250
			10/1/2020	ND<100	ND<100
			4/14/2021	1150	1150
			10/13/2021	1580	1580
			4/19/2022	1530	1530
			9/29/2022	1860	1860
			4/19/2023	1850	1850
			8/24/2023	1940	1940
			4/30/2024	1990	1990
			9/10/2024	1770	1770
			10/1/1996	164	164
			2/1/1997	114	114

4/1/1997	ND<30	ND<30
7/1/1997	30	30
10/1/1997	31	31
4/1/1998	ND<30	ND<30
10/1/1998	ND<30	ND<30
7/1/1999	ND<30	ND<30
10/1/1999	ND<30	ND<30
6/1/2000	ND<100	ND<100
10/1/2000	ND<30	ND<30
5/1/2001	ND<30	ND<30
10/1/2001	80	80
4/1/2002	ND<30	ND<30
10/1/2002	ND<30	ND<30
4/3/2003	ND<30	ND<30
10/3/2003	ND<30	ND<30
4/4/2004	ND<30	ND<30
10/4/2004	35	35
4/5/2005	ND<30	ND<30
10/5/2005	ND<30	ND<30
4/6/2006	ND<30	ND<30
10/7/2006	42	42
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	40	40
10/1/2008	45	45
5/1/2009	144	144
10/1/2009	84	84
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	107	107
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	292	292
4/21/2015	1030	1030
10/6/2015	894	894
4/21/2016	ND<25	ND<25
4/18/2017	ND<125	ND<125
10/10/2017	87.8	87.8

MW-27	13	3 (23.0769%)	4/18/2018	ND<25	ND<25
			10/9/2018	377	377
			10/1/2019	ND<100	ND<100
			4/9/2020	2560	2560
			10/1/2020	ND<100	ND<100
			4/14/2021	2320	2320
			10/13/2021	2200	2200
			4/20/2022	2620	2620
			9/28/2022	2560	2560
			4/19/2023	3110	3110
			8/24/2023	2340	2340
			5/1/2024	2380	2380
			9/11/2024	2520	2520
			10/1/1996	1700	1700
			2/1/1997	1380	1380
			4/1/1997	728	728
			7/1/1997	176	176
			10/1/1997	1640	1640
			4/1/1998	ND<30	ND<30
			10/1/1998	35	35

7/1/1999	94	94
10/1/1999	ND<30	ND<30
6/1/2000	1000	1000
10/1/2000	47	47
5/1/2001	144	144
10/1/2001	1040	1040
4/1/2002	ND<30	ND<30
10/1/2002	307	307
4/3/2003	ND<30	ND<30
10/3/2003	409	409
4/4/2004	ND<30	ND<30
10/4/2004	564	564
4/5/2005	332	332
10/5/2005	286	286
4/6/2006	373	373
10/7/2006	695	695
4/7/2007	239	239
10/7/2007	118	118
4/1/2008	234	234
10/1/2008	494	494
5/1/2009	ND<30	ND<30
10/1/2009	587	587
5/10/2010	2500	2500
10/10/2010	2470	2470
4/11/2011	2570	2570
10/11/2011	2390	2390
4/12/2012	2570	2570
11/12/2012	2560	2560
5/13/2013	2500	2500
11/13/2013	2730	2730
6/14/2014	ND<400	ND<400
10/14/2014	165	165
4/21/2015	1900	1900
10/7/2015	39200	39200
4/20/2016	ND<25	ND<25
10/12/2016	ND<25	ND<25
4/19/2017	ND<125	ND<125
10/12/2017	60.5	60.5

SW-01	12	4 (33.3333%)	4/16/2018	210	210
			10/8/2018	379	379
			4/13/2019	1350	1350
			9/30/2019	298	298
			4/7/2020	4060	4060
			10/2/2020	ND<100	ND<100
			4/13/2021	ND<100	ND<100
			10/14/2021	1340	1340
			4/19/2022	ND<100	ND<100
			8/22/2023	276	276
			4/30/2024	82.8	82.8
			9/10/2024	ND<100	ND<100
			10/1/1996	100	100
			2/1/1997	69	69
			4/1/1997	123	123
			7/1/1997	70	70
			10/1/1997	80	80
			4/1/1998	417	417
			10/1/1998	81	81
			7/1/1999	ND<30	ND<30
			10/1/1999	241	241
			6/1/2000	ND<100	ND<100
			5/1/2001	35	35
			10/1/2001	ND<30	ND<30

4/1/2002	128	128
10/1/2002	ND<30	ND<30
4/3/2003	243	243
10/3/2003	510	510
4/4/2004	44	44
10/4/2004	124	124
4/5/2005	77	77
10/5/2005	66	66
4/6/2006	73	73
10/7/2006	49	49
4/7/2007	115	115
10/7/2007	ND<100	ND<100
4/1/2008	98	98
10/1/2008	157	157
5/1/2009	113	113
10/1/2009	144	144
5/10/2010	111	111
10/10/2010	ND<100	ND<100
4/11/2011	111	111
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	115	115
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	106	106
10/14/2014	86.1	86.1
4/20/2015	308	308
10/6/2015	157	157
4/21/2016	104	104
4/17/2017	315	315
10/9/2017	100	100

SW-02	12	6 (50%)	4/16/2018	31.9	31.9
			10/8/2018	191	191
			4/13/2019	1040	1040
			9/30/2019	ND<100	ND<100
			4/7/2020	1140	1140
			10/2/2020	71.2	71.2
			4/13/2021	ND<100	ND<100
			10/14/2021	408	408
			4/19/2022	ND<100	ND<100
			8/22/2023	ND<100	ND<100
			4/30/2024	ND<100	ND<100
			9/10/2024	ND<100	ND<100
			10/1/1996	57	57
			2/1/1997	77	77
			4/1/1997	ND<30	ND<30
			7/1/1997	34	34
			10/1/1997	32	32
			4/1/1998	140	140
			10/1/1998	ND<30	ND<30
			7/1/1999	ND<30	ND<30
			10/1/1999	53	53
			6/1/2000	ND<100	ND<100
			5/1/2001	33	33
			10/1/2001	48	48
			4/1/2002	ND<30	ND<30
			10/1/2002	ND<30	ND<30
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	ND<30	ND<30
			4/5/2005	ND<30	ND<30

10/5/2005	ND<30	ND<30
4/6/2006	41	41
10/7/2006	ND<30	ND<30
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	ND<30	ND<30
10/1/2008	72	72
5/1/2009	ND<30	ND<30
10/1/2009	ND<30	ND<30
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	ND<100	ND<100
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	98.6	98.6
4/20/2015	39.2	39.2
10/6/2015	204	204
4/21/2016	70.5	70.5
4/17/2017	ND<125	ND<125
10/9/2017	52.1	52.1

SW-03

0

0

10/1/1996	77	77
2/1/1997	202	202
4/1/1997	30	30
7/1/1997	37	37
10/1/1997	31	31
4/1/1998	237	237
10/1/1998	ND<30	ND<30
7/1/1999	ND<30	ND<30
10/1/1999	110	110
6/1/2000	ND<100	ND<100
5/1/2001	46	46
10/1/2001	ND<30	ND<30
4/1/2002	47	47
10/1/2002	ND<30	ND<30
4/3/2003	ND<30	ND<30
10/3/2003	39	39
4/4/2004	ND<30	ND<30
10/4/2004	31	31
4/5/2005	ND<30	ND<30
10/5/2005	ND<30	ND<30
4/6/2006	30	30
10/7/2006	ND<30	ND<30
4/7/2007	ND<30	ND<30
10/7/2007	ND<100	ND<100
4/1/2008	ND<30	ND<30
10/1/2008	78	78
5/1/2009	ND<30	ND<30
10/1/2009	158	158
5/10/2010	ND<100	ND<100
10/10/2010	ND<100	ND<100
4/11/2011	ND<100	ND<100
10/11/2011	ND<100	ND<100
4/12/2012	ND<100	ND<100
11/12/2012	ND<100	ND<100
5/13/2013	ND<100	ND<100
11/13/2013	ND<100	ND<100
6/14/2014	ND<100	ND<100
10/14/2014	122	122

			4/20/2015	64.2	64.2
			10/6/2015	158	158
			4/21/2016	88.2	88.2
SW-04	0	0	10/1/1996	99	99
			2/1/1997	73	73
			4/1/1997	66	66
			7/1/1997	72	72
			10/1/1997	46	46
			4/1/1998	307	307
			10/1/1998	228	228
			7/1/1999	ND<30	ND<30
			6/1/2000	ND<100	ND<100
			5/1/2001	45	45
			10/1/2001	65	65
			4/1/2002	139	139
			10/1/2002	30	30
			4/3/2003	ND<30	ND<30
			10/3/2003	ND<30	ND<30
			4/4/2004	ND<30	ND<30
			10/4/2004	38	38
			4/5/2005	64	64
			10/5/2005	36	36
			4/6/2006	34	34
			10/7/2006	ND<30	ND<30
			4/7/2007	42	42
			10/7/2007	ND<100	ND<100
			4/1/2008	ND<30	ND<30
			10/1/2008	147	147
			5/1/2009	57	57
			10/1/2009	41	41
			5/10/2010	ND<100	ND<100
			10/10/2010	ND<100	ND<100
			4/11/2011	202	202
			10/11/2011	ND<100	ND<100
			4/12/2012	202	202
			11/12/2012	129	129
			5/13/2013	ND<100	ND<100
			11/13/2013	ND<100	ND<100
			6/14/2014	ND<100	ND<100
			10/14/2014	122	122
			4/20/2015	93.9	93.9
			10/6/2015	212	212
			4/21/2016	119	119

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 13 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.00417197	0.0186361	0.521	None

Loc.	Date	Conc.	Outlier
MW-07	4/18/2018	ND<25	FALSE
	10/10/2018	297	FALSE
	10/2/2019	204	FALSE
	4/8/2020	7930	FALSE
	9/30/2020	801	FALSE
	4/13/2021	8800	FALSE
	10/14/2021	9640	FALSE
	4/20/2022	8680	FALSE
	9/27/2022	9630	FALSE
	4/18/2023	2420	FALSE
	8/23/2023	2510	FALSE
	5/1/2024	52.2	FALSE
	9/11/2024	9600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	25	9640	9615	0.5359	5152.68
2	52.2	9630	9577.8	0.3325	3184.62
3	204	9600	9396	0.2412	2266.32
4	297	8800	8503	0.1707	1451.46
5	801	8680	7879	0.1099	865.902
6	2420	7930	5510	0.0539	296.989
7	2510	2510	0		
8	7930	2420	-5510		
9	8680	801	-7879		
10	8800	297	-8503		
11	9600	204	-9396		
12	9630	52.2	-9577.8		
13	9640	25	-9615		

Sum of b values = 13218

Sample Standard Deviation = 4320.85

W Statistic = 0.779849

5% Critical value of 0.866 exceeds 0.779849
Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 exceeds 0.779849
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
297	ND<25	272	1	0
204	ND<25	179	2	0
7930	ND<25	7905	3	0
801	ND<25	776	4	0
8800	ND<25	8775	5	0
9640	ND<25	9615	6	0
8680	ND<25	8655	7	0
9630	ND<25	9605	8	0
2420	ND<25	2395	9	0
2510	ND<25	2485	10	0
52.2	ND<25	27.2	11	0
9600	ND<25	9575	12	0
204	297	-93	12	1
7930	297	7633	13	1
801	297	504	14	1
8800	297	8503	15	1
9640	297	9343	16	1
8680	297	8383	17	1
9630	297	9333	18	1
2420	297	2123	19	1
2510	297	2213	20	1
52.2	297	-244.8	20	2
9600	297	9303	21	2
7930	204	7726	22	2
801	204	597	23	2
8800	204	8596	24	2
9640	204	9436	25	2
8680	204	8476	26	2
9630	204	9426	27	2
2420	204	2216	28	2
2510	204	2306	29	2
52.2	204	-151.8	29	3
9600	204	9396	30	3
801	7930	-7129	30	4
8800	7930	870	31	4
9640	7930	1710	32	4
8680	7930	750	33	4
9630	7930	1700	34	4
2420	7930	-5510	34	5
2510	7930	-5420	34	6
52.2	7930	-7877.8	34	7
9600	7930	1670	35	7
8800	801	7999	36	7
9640	801	8839	37	7
8680	801	7879	38	7
9630	801	8829	39	7
2420	801	1619	40	7
2510	801	1709	41	7
52.2	801	-748.8	41	8

9600	801	8799	42	8
9640	8800	840	43	8
8680	8800	-120	43	9
9630	8800	830	44	9
2420	8800	-6380	44	10
2510	8800	-6290	44	11
52.2	8800	-8747.8	44	12
9600	8800	800	45	12
8680	9640	-960	45	13
9630	9640	-10	45	14
2420	9640	-7220	45	15
2510	9640	-7130	45	16
52.2	9640	-9587.8	45	17
9600	9640	-40	45	18
9630	8680	950	46	18
2420	8680	-6260	46	19
2510	8680	-6170	46	20
52.2	8680	-8627.8	46	21
9600	8680	920	47	21
2420	9630	-7210	47	22
2510	9630	-7120	47	23
52.2	9630	-9577.8	47	24
9600	9630	-30	47	25
2510	2420	90	48	25
52.2	2420	-2367.8	48	26
9600	2420	7180	49	26
52.2	2510	-2457.8	49	27
9600	2510	7090	50	27
9600	52.2	9547.8	51	27

S Statistic = 51 - 27 = 24

Tied Group	Value	Members
Time Period		Observations
4/18/2018		1
10/10/2018		1
10/2/2019		1
4/8/2020		1
9/30/2020		1
4/13/2021		1
10/14/2021		1
4/20/2022		1
9/27/2022		1
4/18/2023		1
8/23/2023		1
5/1/2024		1
9/11/2024		1
There are 0 time periods with multiple data		

- A = 0
- B = 0
- C = 0
- D = 0
- E = 0

F = 0

a = 4836

b = 15444

c = 312

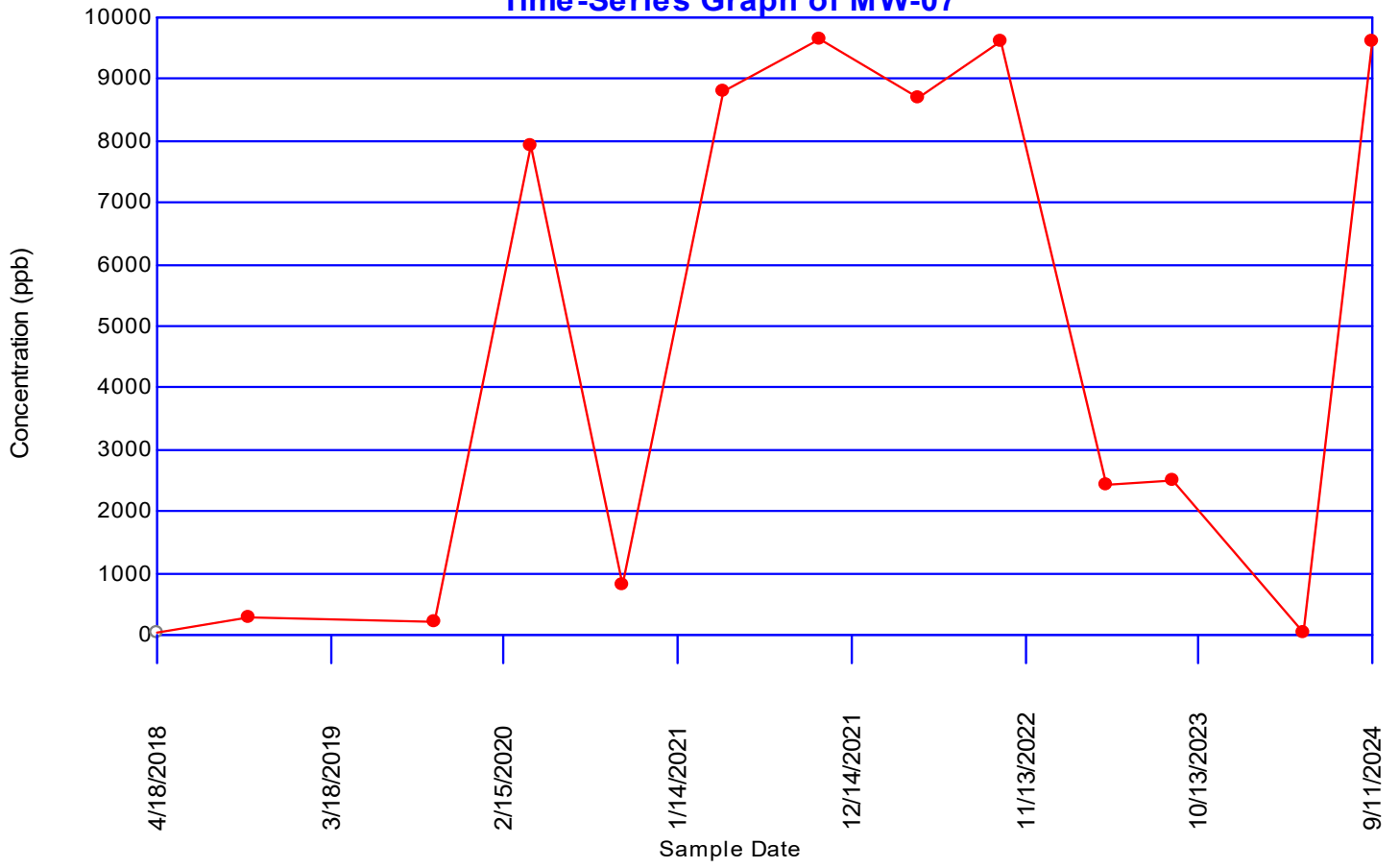
Group Variance = 268.667

Z-Score = 1.4032

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|1.4032| <= 1.97737 indicating no evidence of a trend

Iron, Dissolved Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 13 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.794984	0.360209	0.521	819
2	0.240328	0.384358	0.546	None

Loc.	Date	Conc.	Outlier
MW-16	4/17/2018	ND<25	FALSE
	10/9/2018	45.4	FALSE
	10/2/2019	ND<100	FALSE
	4/9/2020	159	FALSE
	10/1/2020	ND<100	FALSE
	4/15/2021	137	FALSE
	10/14/2021	216	FALSE
	4/19/2022	175	FALSE
	9/28/2022	113	FALSE
	4/18/2023	819	TRUE
	8/24/2023	204	FALSE
	5/2/2024	93.8	FALSE
	9/12/2024	100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	25	819	794	0.5359	425.505
2	45.4	216	170.6	0.3325	56.7245
3	93.8	204	110.2	0.2412	26.5802
4	100	175	75	0.1707	12.8025
5	100	159	59	0.1099	6.4841
6	100	137	37	0.0539	1.9943
7	113	113	0		
8	137	100	-37		
9	159	100	-59		
10	175	100	-75		
11	204	93.8	-110.2		
12	216	45.4	-170.6		
13	819	25	-794		

Sum of b values = 530.09

Sample Standard Deviation = 201.154

W Statistic = 0.57871

5% Critical value of 0.866 exceeds 0.57871

Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 exceeds 0.57871

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
45.4	ND<25	20.4	1	0
ND<100	ND<25	75	2	0
159	ND<25	134	3	0
ND<100	ND<25	75	4	0
137	ND<25	112	5	0
216	ND<25	191	6	0
175	ND<25	150	7	0
113	ND<25	88	8	0
819	ND<25	794	9	0
204	ND<25	179	10	0
93.8	ND<25	68.8	11	0
100	ND<25	75	12	0
ND<100	45.4	54.6	13	0
159	45.4	113.6	14	0
ND<100	45.4	54.6	15	0
137	45.4	91.6	16	0
216	45.4	170.6	17	0
175	45.4	129.6	18	0
113	45.4	67.6	19	0
819	45.4	773.6	20	0
204	45.4	158.6	21	0
93.8	45.4	48.4	22	0
100	45.4	54.6	23	0
159	ND<100	59	24	0
ND<100	ND<100	0	24	0
137	ND<100	37	25	0
216	ND<100	116	26	0
175	ND<100	75	27	0
113	ND<100	13	28	0
819	ND<100	719	29	0
204	ND<100	104	30	0
93.8	ND<100	-6.2	30	1
100	ND<100	0	30	1
ND<100	159	-59	30	2
137	159	-22	30	3
216	159	57	31	3
175	159	16	32	3
113	159	-46	32	4
819	159	660	33	4
204	159	45	34	4
93.8	159	-65.2	34	5
100	159	-59	34	6
137	ND<100	37	35	6
216	ND<100	116	36	6
175	ND<100	75	37	6
113	ND<100	13	38	6
819	ND<100	719	39	6
204	ND<100	104	40	6
93.8	ND<100	-6.2	40	7

100	ND<100	0	40	7
216	137	79	41	7
175	137	38	42	7
113	137	-24	42	8
819	137	682	43	8
204	137	67	44	8
93.8	137	-43.2	44	9
100	137	-37	44	10
175	216	-41	44	11
113	216	-103	44	12
819	216	603	45	12
204	216	-12	45	13
93.8	216	-122.2	45	14
100	216	-116	45	15
113	175	-62	45	16
819	175	644	46	16
204	175	29	47	16
93.8	175	-81.2	47	17
100	175	-75	47	18
819	113	706	48	18
204	113	91	49	18
93.8	113	-19.2	49	19
100	113	-13	49	20
204	819	-615	49	21
93.8	819	-725.2	49	22
100	819	-719	49	23
93.8	204	-110.2	49	24
100	204	-104	49	25
100	93.8	6.2	50	25

S Statistic = 50 - 25 = 25

Tied Group	Value	Members
1	100	3

Time Period	Observations
4/17/2018	1
10/9/2018	1
10/2/2019	1
4/9/2020	1
10/1/2020	1
4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/2/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 66
B = 0
C = 6
D = 0

E = 6

F = 0

a = 4836

b = 15444

c = 312

Group Variance = 265

Z-Score = 1.47431

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|1.47431| <= 1.97737 indicating no evidence of a trend

Iron, Dissolved Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 13 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.0687831	0.0423649	0.521	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	18.6	FALSE
	10/9/2018	500	FALSE
	10/1/2019	ND<100	FALSE
	4/8/2020	1250	FALSE
	10/1/2020	ND<100	FALSE
	4/14/2021	1150	FALSE
	10/13/2021	1580	FALSE
	4/19/2022	1530	FALSE
	9/29/2022	1860	FALSE
	4/19/2023	1850	FALSE
	8/24/2023	1940	FALSE
	4/30/2024	1990	FALSE
	9/10/2024	1770	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	18.6	1990	1971.4	0.5359	1056.47
2	100	1940	1840	0.3325	611.8
3	100	1860	1760	0.2412	424.512
4	500	1850	1350	0.1707	230.445
5	1150	1770	620	0.1099	68.138
6	1250	1580	330	0.0539	17.787
7	1530	1530	0		
8	1580	1250	-330		
9	1770	1150	-620		
10	1850	500	-1350		
11	1860	100	-1760		
12	1940	100	-1840		
13	1990	18.6	-1971.4		

Sum of b values = 2409.16

Sample Standard Deviation = 759.308

W Statistic = 0.838903

5% Critical value of 0.866 exceeds 0.838903
Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 is less than 0.838903
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
500	18.6	481.4	1	0
ND<100	18.6	81.4	2	0
1250	18.6	1231.4	3	0
ND<100	18.6	81.4	4	0
1150	18.6	1131.4	5	0
1580	18.6	1561.4	6	0
1530	18.6	1511.4	7	0
1860	18.6	1841.4	8	0
1850	18.6	1831.4	9	0
1940	18.6	1921.4	10	0
1990	18.6	1971.4	11	0
1770	18.6	1751.4	12	0
ND<100	500	-400	12	1
1250	500	750	13	1
ND<100	500	-400	13	2
1150	500	650	14	2
1580	500	1080	15	2
1530	500	1030	16	2
1860	500	1360	17	2
1850	500	1350	18	2
1940	500	1440	19	2
1990	500	1490	20	2
1770	500	1270	21	2
1250	ND<100	1150	22	2
ND<100	ND<100	0	22	2
1150	ND<100	1050	23	2
1580	ND<100	1480	24	2
1530	ND<100	1430	25	2
1860	ND<100	1760	26	2
1850	ND<100	1750	27	2
1940	ND<100	1840	28	2
1990	ND<100	1890	29	2
1770	ND<100	1670	30	2
ND<100	1250	-1150	30	3
1150	1250	-100	30	4
1580	1250	330	31	4
1530	1250	280	32	4
1860	1250	610	33	4
1850	1250	600	34	4
1940	1250	690	35	4
1990	1250	740	36	4
1770	1250	520	37	4
1150	ND<100	1050	38	4
1580	ND<100	1480	39	4
1530	ND<100	1430	40	4
1860	ND<100	1760	41	4
1850	ND<100	1750	42	4
1940	ND<100	1840	43	4
1990	ND<100	1890	44	4

1770	ND<100	1670	45	4
1580	1150	430	46	4
1530	1150	380	47	4
1860	1150	710	48	4
1850	1150	700	49	4
1940	1150	790	50	4
1990	1150	840	51	4
1770	1150	620	52	4
1530	1580	-50	52	5
1860	1580	280	53	5
1850	1580	270	54	5
1940	1580	360	55	5
1990	1580	410	56	5
1770	1580	190	57	5
1860	1530	330	58	5
1850	1530	320	59	5
1940	1530	410	60	5
1990	1530	460	61	5
1770	1530	240	62	5
1850	1860	-10	62	6
1940	1860	80	63	6
1990	1860	130	64	6
1770	1860	-90	64	7
1940	1850	90	65	7
1990	1850	140	66	7
1770	1850	-80	66	8
1990	1940	50	67	8
1770	1940	-170	67	9
1770	1990	-220	67	10

S Statistic = 67 - 10 = 57

Tied Group	Value	Members
1	100	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
10/1/2019	1
4/8/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 18
B = 0
C = 0
D = 0

E = 2

F = 0

a = 4836

b = 15444

c = 312

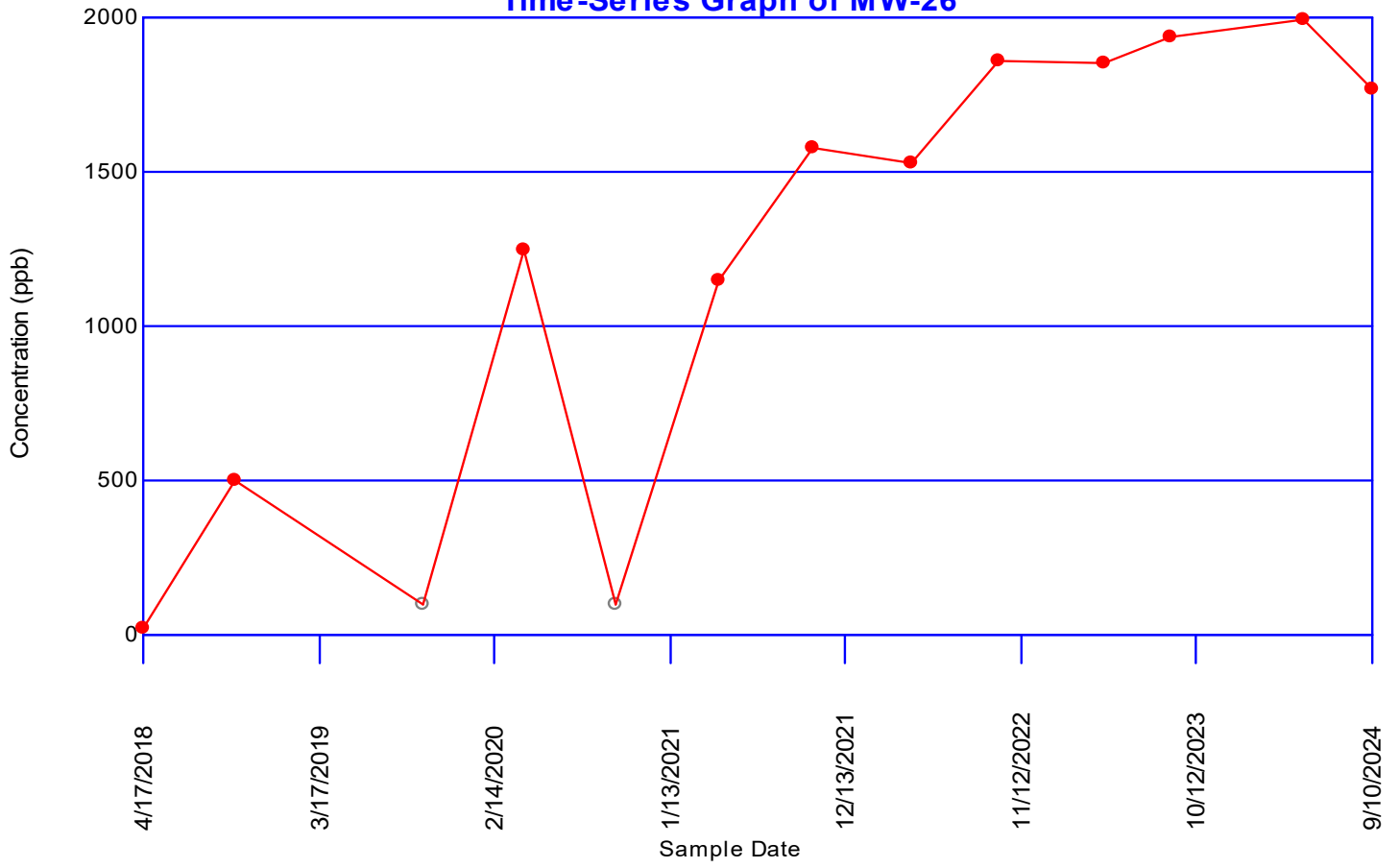
Group Variance = 267.667

Z-Score = 3.42287

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|3.42287| > 1.97737 indicating a trend

Iron, Dissolved Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 13 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.182724	0.0289017	0.521	None

Loc.	Date	Conc.	Outlier
MW-27	4/18/2018	ND<25	FALSE
	10/9/2018	377	FALSE
	10/1/2019	ND<100	FALSE
	4/9/2020	2560	FALSE
	10/1/2020	ND<100	FALSE
	4/14/2021	2320	FALSE
	10/13/2021	2200	FALSE
	4/20/2022	2620	FALSE
	9/28/2022	2560	FALSE
	4/19/2023	3110	FALSE
	8/24/2023	2340	FALSE
	5/1/2024	2380	FALSE
	9/11/2024	2520	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 13 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	25	3110	3085	0.5359	1653.25
2	100	2620	2520	0.3325	837.9
3	100	2560	2460	0.2412	593.352
4	377	2560	2183	0.1707	372.638
5	2200	2520	320	0.1099	35.168
6	2320	2380	60	0.0539	3.234
7	2340	2340	0		
8	2380	2320	-60		
9	2520	2200	-320		
10	2560	377	-2183		
11	2560	100	-2460		
12	2620	100	-2520		
13	3110	25	-3085		

Sum of b values = 3495.54

Sample Standard Deviation = 1157.34

W Statistic = 0.760192

5% Critical value of 0.866 exceeds 0.760192

Evidence of non-normality at 95% level of significance

1% Critical value of 0.814 exceeds 0.760192

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
377	ND<25	352	1	0
ND<100	ND<25	75	2	0
2560	ND<25	2535	3	0
ND<100	ND<25	75	4	0
2320	ND<25	2295	5	0
2200	ND<25	2175	6	0
2620	ND<25	2595	7	0
2560	ND<25	2535	8	0
3110	ND<25	3085	9	0
2340	ND<25	2315	10	0
2380	ND<25	2355	11	0
2520	ND<25	2495	12	0
ND<100	377	-277	12	1
2560	377	2183	13	1
ND<100	377	-277	13	2
2320	377	1943	14	2
2200	377	1823	15	2
2620	377	2243	16	2
2560	377	2183	17	2
3110	377	2733	18	2
2340	377	1963	19	2
2380	377	2003	20	2
2520	377	2143	21	2
2560	ND<100	2460	22	2
ND<100	ND<100	0	22	2
2320	ND<100	2220	23	2
2200	ND<100	2100	24	2
2620	ND<100	2520	25	2
2560	ND<100	2460	26	2
3110	ND<100	3010	27	2
2340	ND<100	2240	28	2
2380	ND<100	2280	29	2
2520	ND<100	2420	30	2
ND<100	2560	-2460	30	3
2320	2560	-240	30	4
2200	2560	-360	30	5
2620	2560	60	31	5
2560	2560	0	31	5
3110	2560	550	32	5
2340	2560	-220	32	6
2380	2560	-180	32	7
2520	2560	-40	32	8
2320	ND<100	2220	33	8
2200	ND<100	2100	34	8
2620	ND<100	2520	35	8
2560	ND<100	2460	36	8
3110	ND<100	3010	37	8
2340	ND<100	2240	38	8
2380	ND<100	2280	39	8

2520	ND<100	2420	40	8
2200	2320	-120	40	9
2620	2320	300	41	9
2560	2320	240	42	9
3110	2320	790	43	9
2340	2320	20	44	9
2380	2320	60	45	9
2520	2320	200	46	9
2620	2200	420	47	9
2560	2200	360	48	9
3110	2200	910	49	9
2340	2200	140	50	9
2380	2200	180	51	9
2520	2200	320	52	9
2560	2620	-60	52	10
3110	2620	490	53	10
2340	2620	-280	53	11
2380	2620	-240	53	12
2520	2620	-100	53	13
3110	2560	550	54	13
2340	2560	-220	54	14
2380	2560	-180	54	15
2520	2560	-40	54	16
2340	3110	-770	54	17
2380	3110	-730	54	18
2520	3110	-590	54	19
2380	2340	40	55	19
2520	2340	180	56	19
2520	2380	140	57	19

S Statistic = 57 - 19 = 38

Tied Group	Value	Members
1	100	2
2	2560	2

Time Period	Observations
4/18/2018	1
10/9/2018	1
10/1/2019	1
4/9/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 4836

b = 15444

c = 312

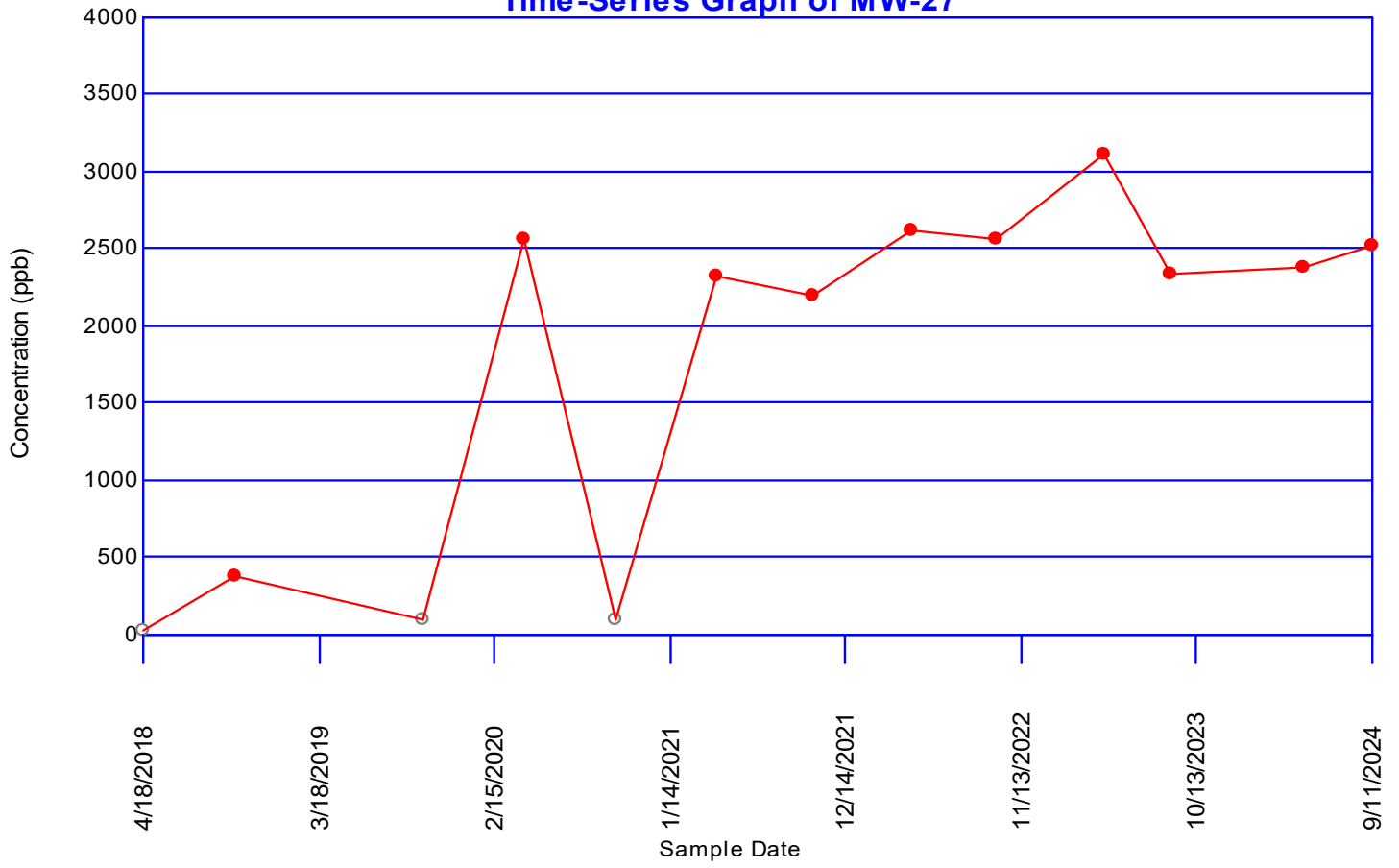
Group Variance = 266.667

Z-Score = 2.26578

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|2.26578| > 1.97737 indicating a trend

Iron, Dissolved Time-Series Graph of MW-27



Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 12 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.686869	0.0135732	0.546	4060
2	0.7768	0.0136812	0.576	1350
3	0.775	0.0580689	0.477	1340
4	0.290323	0.0799257	0.512	None

Loc.	Date	Conc.	Outlier
SW-01	4/16/2018	210	FALSE
	10/8/2018	379	FALSE
	4/13/2019	1350	TRUE
	9/30/2019	298	FALSE
	4/7/2020	4060	TRUE
	10/2/2020	ND<100	FALSE
	4/13/2021	ND<100	FALSE
	10/14/2021	1340	TRUE
	4/19/2022	ND<100	FALSE
	8/22/2023	276	FALSE
	4/30/2024	82.8	FALSE
	9/10/2024	ND<100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: SW-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 12 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	82.8	4060	3977.2	0.5475	2177.52
2	100	1350	1250	0.3325	415.625
3	100	1340	1240	0.2347	291.028
4	100	379	279	0.1586	44.2494
5	100	298	198	0.0922	18.2556
6	210	276	66	0.0303	1.9998
7	276	210	-66		
8	298	100	-198		
9	379	100	-279		
10	1340	100	-1240		
11	1350	100	-1250		
12	4060	82.8	-3977.2		

Sum of b values = 2948.67

Sample Standard Deviation = 1153.14

W Statistic = 0.594421

5% Critical value of 0.859 exceeds 0.594421

Evidence of non-normality at 95% level of significance

1% Critical value of 0.805 exceeds 0.594421

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
379	210	169	1	0
1350	210	1140	2	0
298	210	88	3	0
4060	210	3850	4	0
ND<100	210	-110	4	1
ND<100	210	-110	4	2
1340	210	1130	5	2
ND<100	210	-110	5	3
276	210	66	6	3
82.8	210	-127.2	6	4
ND<100	210	-110	6	5
1350	379	971	7	5
298	379	-81	7	6
4060	379	3681	8	6
ND<100	379	-279	8	7
ND<100	379	-279	8	8
1340	379	961	9	8
ND<100	379	-279	9	9
276	379	-103	9	10
82.8	379	-296.2	9	11
ND<100	379	-279	9	12
298	1350	-1052	9	13
4060	1350	2710	10	13
ND<100	1350	-1250	10	14
ND<100	1350	-1250	10	15
1340	1350	-10	10	16
ND<100	1350	-1250	10	17
276	1350	-1074	10	18
82.8	1350	-1267.2	10	19
ND<100	1350	-1250	10	20
4060	298	3762	11	20
ND<100	298	-198	11	21
ND<100	298	-198	11	22
1340	298	1042	12	22
ND<100	298	-198	12	23
276	298	-22	12	24
82.8	298	-215.2	12	25
ND<100	298	-198	12	26
ND<100	4060	-3960	12	27
ND<100	4060	-3960	12	28
1340	4060	-2720	12	29
ND<100	4060	-3960	12	30
276	4060	-3784	12	31
82.8	4060	-3977.2	12	32
ND<100	4060	-3960	12	33
ND<100	ND<100	0	12	33
1340	ND<100	1240	13	33
ND<100	ND<100	0	13	33

276	ND<100	176	14	33
82.8	ND<100	-17.2	14	34
ND<100	ND<100	0	14	34
1340	ND<100	1240	15	34
ND<100	ND<100	0	15	34
276	ND<100	176	16	34
82.8	ND<100	-17.2	16	35
ND<100	ND<100	0	16	35
ND<100	1340	-1240	16	36
276	1340	-1064	16	37
82.8	1340	-1257.2	16	38
ND<100	1340	-1240	16	39
276	ND<100	176	17	39
82.8	ND<100	-17.2	17	40
ND<100	ND<100	0	17	40
82.8	276	-193.2	17	41
ND<100	276	-176	17	42
ND<100	82.8	17.2	18	42

S Statistic = 18 - 42 = -24

Tied Group	Value	Members
1	100	4

Time Period	Observations
4/16/2018	1
10/8/2018	1
4/13/2019	1
9/30/2019	1
4/7/2020	1
10/2/2020	1
4/13/2021	1
10/14/2021	1
4/19/2022	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 156

B = 0

C = 24

D = 0

E = 12

F = 0

a = 3828

b = 11880

c = 264

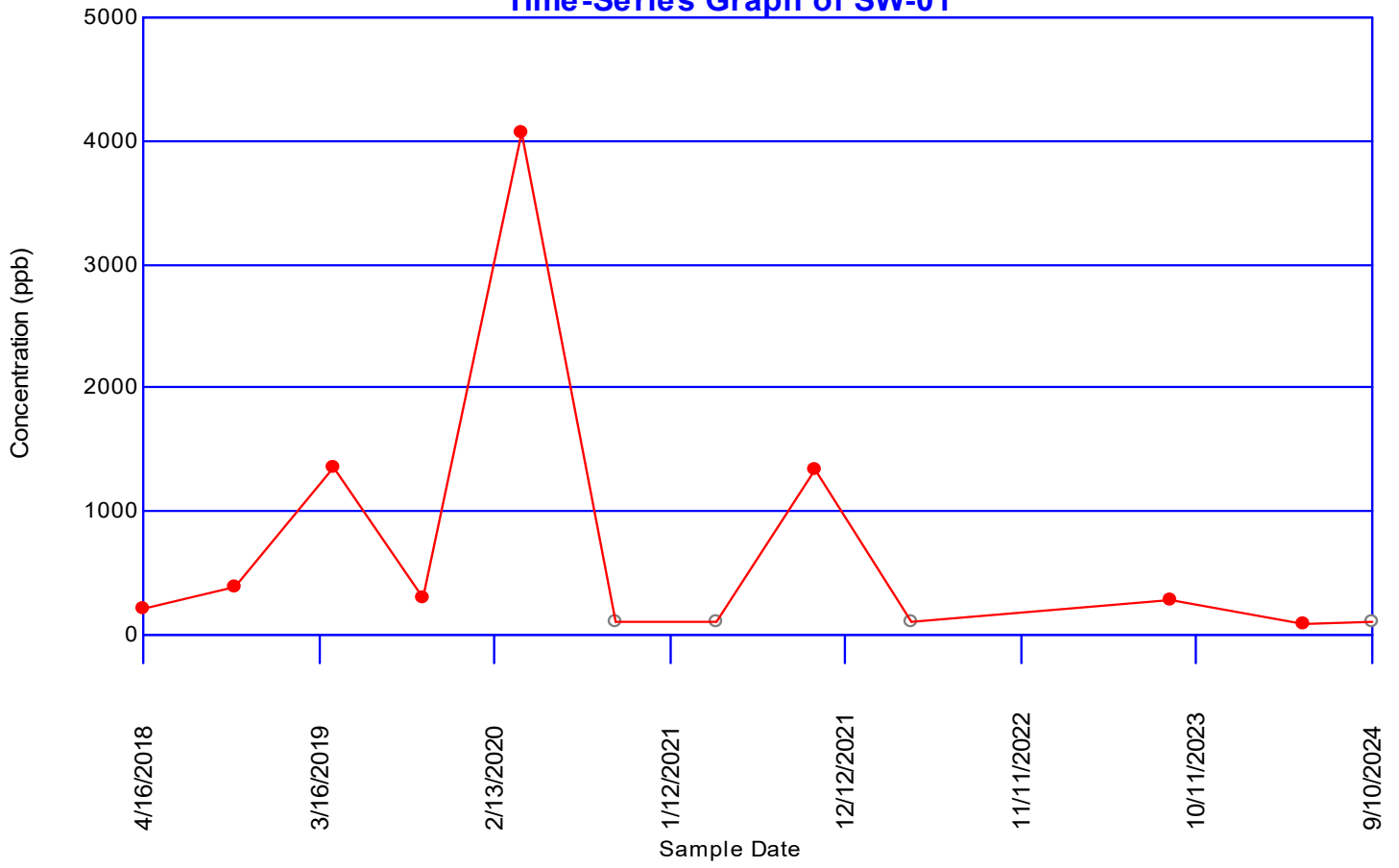
Group Variance = 204

Z-Score = -1.61032

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

|-1.61032| <= 1.97737 indicating no evidence of a trend

Iron, Dissolved Time-Series Graph of SW-01



Dixon's Test for Outliers

Parameter: Iron, Dissolved

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 12 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.68488	0.0675528	0.546	1140
2	0.876342	0.181069	0.576	1040
3	0.644299	0.247014	0.477	408
4	0.759599	0.577093	0.512	191
5	0	0.577093	0.554	31.9
6	0	1	0.507	71.2

A Divide-By-Zero error occurred in the calculations.

Additional Outliers May Exist.

Loc.	Date	Conc.	Outlier
SW-02	4/16/2018	31.9	TRUE
	10/8/2018	191	TRUE
	4/13/2019	1040	TRUE
	9/30/2019	ND<100	FALSE
	4/7/2020	1140	TRUE
	10/2/2020	71.2	TRUE
	4/13/2021	ND<100	FALSE
	10/14/2021	408	TRUE
	4/19/2022	ND<100	FALSE
	8/22/2023	ND<100	FALSE
	4/30/2024	ND<100	FALSE
	9/10/2024	ND<100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Iron, Dissolved

Location: SW-02

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 6 for 12 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	31.9	1140	1108.1	0.5475	606.685
2	71.2	1040	968.8	0.3325	322.126
3	100	408	308	0.2347	72.2876
4	100	191	91	0.1586	14.4326
5	100	100	0	0.0922	0
6	100	100	0	0.0303	0
7	100	100	0		
8	100	100	0		
9	191	100	-91		
10	408	100	-308		
11	1040	71.2	-968.8		
12	1140	31.9	-1108.1		

Sum of b values = 1015.53

Sample Standard Deviation = 386.101

W Statistic = 0.628915

5% Critical value of 0.859 exceeds 0.628915

Evidence of non-normality at 95% level of significance

1% Critical value of 0.805 exceeds 0.628915

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Iron, Dissolved

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
191	31.9	159.1	1	0
1040	31.9	1008.1	2	0
ND<100	31.9	68.1	3	0
1140	31.9	1108.1	4	0
71.2	31.9	39.3	5	0
ND<100	31.9	68.1	6	0
408	31.9	376.1	7	0
ND<100	31.9	68.1	8	0
ND<100	31.9	68.1	9	0
ND<100	31.9	68.1	10	0
ND<100	31.9	68.1	11	0
1040	191	849	12	0
ND<100	191	-91	12	1
1140	191	949	13	1
71.2	191	-119.8	13	2
ND<100	191	-91	13	3
408	191	217	14	3
ND<100	191	-91	14	4
ND<100	191	-91	14	5
ND<100	191	-91	14	6
ND<100	191	-91	14	7
ND<100	1040	-940	14	8
1140	1040	100	15	8
71.2	1040	-968.8	15	9
ND<100	1040	-940	15	10
408	1040	-632	15	11
ND<100	1040	-940	15	12
ND<100	1040	-940	15	13
ND<100	1040	-940	15	14
ND<100	1040	-940	15	15
1140	ND<100	1040	16	15
71.2	ND<100	-28.8	16	16
ND<100	ND<100	0	16	16
408	ND<100	308	17	16
ND<100	ND<100	0	17	16
ND<100	ND<100	0	17	16
ND<100	ND<100	0	17	16
ND<100	ND<100	0	17	16
71.2	1140	-1068.8	17	17
ND<100	1140	-1040	17	18
408	1140	-732	17	19
ND<100	1140	-1040	17	20
ND<100	1140	-1040	17	21
ND<100	1140	-1040	17	22
ND<100	1140	-1040	17	23
ND<100	71.2	28.8	18	23
408	71.2	336.8	19	23
ND<100	71.2	28.8	20	23

ND<100	71.2	28.8	21	23
ND<100	71.2	28.8	22	23
ND<100	71.2	28.8	23	23
408	ND<100	308	24	23
ND<100	ND<100	0	24	23
ND<100	ND<100	0	24	23
ND<100	ND<100	0	24	23
ND<100	ND<100	0	24	23
ND<100	408	-308	24	24
ND<100	408	-308	24	25
ND<100	408	-308	24	26
ND<100	408	-308	24	27
ND<100	ND<100	0	24	27
ND<100	ND<100	0	24	27
ND<100	ND<100	0	24	27
ND<100	ND<100	0	24	27
ND<100	ND<100	0	24	27
ND<100	ND<100	0	24	27

S Statistic = 24 - 27 = -3

Tied Group	Value	Members
1	100	6

Time Period	Observations
4/16/2018	1
10/8/2018	1
4/13/2019	1
9/30/2019	1
4/7/2020	1
10/2/2020	1
4/13/2021	1
10/14/2021	1
4/19/2022	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 510

B = 0

C = 120

D = 0

E = 30

F = 0

a = 3828

b = 11880

c = 264

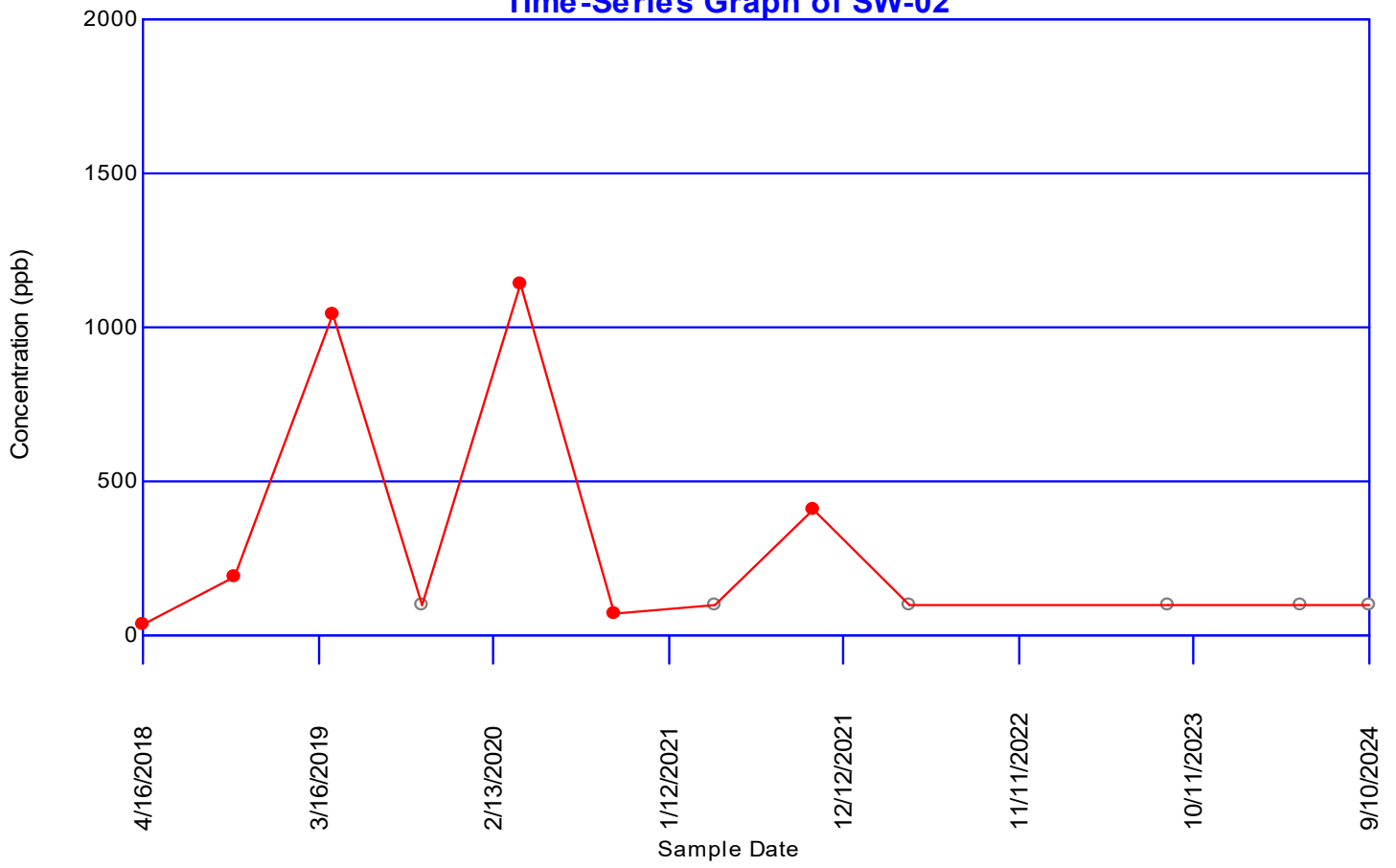
Group Variance = 184.333

Z-Score = -0.147309

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-0.147309| \leq 1.97737$ indicating no evidence of a trend

Iron, Dissolved Time-Series Graph of SW-02



Concentrations (ppb)

Parameter: Lithium, Total

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 49

Percent Non-Detects: 29.1667%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 12 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	14	1 (7.14286%)	4/18/2018	30.1	30.1
			10/10/2018	66.2	66.2
			4/13/2019	25.5	25.5
			10/1/2019	25.1	25.1
			4/9/2020	18.2	18.2
			10/1/2020	24.9	24.9
			4/14/2021	17.5	17.5
			10/13/2021	21.7	21.7
			4/20/2022	ND<50	ND<50
			9/28/2022	21.6	21.6
			4/19/2023	25.5	25.5
			8/24/2023	22.1	22.1
			5/1/2024	25.9	25.9
			9/11/2024	20	20
	10/12/2016	ND<50	ND<50		
	4/19/2017	24.7	24.7		
	10/12/2017	31	31		
MW-06	14	6 (42.8571%)	4/18/2018	19.2	19.2
			10/10/2018	ND<50	ND<50
			4/14/2019	19.6	19.6
			10/2/2019	14.3	14.3
			4/8/2020	10.4	10.4
			9/30/2020	13	13
			4/13/2021	6.96	6.96
			10/14/2021	9.78	9.78
			4/20/2022	ND<50	ND<50
			9/27/2022	12.2	12.2
			4/18/2023	ND<50	ND<50
			8/23/2023	ND<50	ND<50
			5/1/2024	ND<50	ND<50
			9/12/2024	ND<50	ND<50
	10/12/2016	ND<50	ND<50		
	4/19/2017	12.1	12.1		
	10/12/2017	16.7	16.7		
MW-07	14	0 (0%)	4/18/2018	87.2	87.2
			10/10/2018	116	116
			4/14/2019	91.6	91.6
			10/2/2019	77.6	77.6
			4/8/2020	69.6	69.6
			9/30/2020	78.4	78.4
			4/13/2021	67.1	67.1
			10/14/2021	73	73
			4/20/2022	82.9	82.9
			9/27/2022	77	77
			4/18/2023	57.3	57.3

			8/23/2023	71.1	71.1
			5/1/2024	80.8	80.8
			9/11/2024	73.4	73.4
			4/19/2017	75.1	75.1
			10/12/2017	92.6	92.6
MW-12	14	9 (64.2857%)	4/17/2018	19.3	19.3
			10/9/2018	ND<50	ND<50
			4/14/2019	17.5	17.5
			10/2/2019	ND<50	ND<50
			4/8/2020	ND<50	ND<50
			10/1/2020	12.8	12.8
			4/15/2021	7.96	7.96
			10/14/2021	10.2	10.2
			4/19/2022	ND<50	ND<50
			9/28/2022	ND<50	ND<50
			4/18/2023	ND<50	ND<50
			8/24/2023	ND<50	ND<50
			5/1/2024	ND<50	ND<50
			9/12/2024	ND<50	ND<50
			10/11/2016	ND<50	ND<50
			4/18/2017	13	13
			10/10/2017	12.5	12.5
MW-16	14	0 (0%)	4/17/2018	70.3	70.3
			10/9/2018	89.3	89.3
			4/14/2019	64.8	64.8
			10/2/2019	61.7	61.7
			4/9/2020	54.3	54.3
			10/1/2020	61.8	61.8
			4/15/2021	51.2	51.2
			10/14/2021	63	63
			4/19/2022	68.4	68.4
			9/28/2022	58	58
			4/18/2023	49.8	49.8
			8/24/2023	55.6	55.6
			5/2/2024	62.6	62.6
			9/12/2024	51.5	51.5
			4/18/2017	67.7	67.7
			10/10/2017	57.1	57.1
MW-20	14	1 (7.14286%)	4/17/2018	33.6	33.6
			10/10/2018	56.6	56.6
			4/14/2019	31.6	31.6
			10/2/2019	29.5	29.5
			4/9/2020	29.1	29.1
			10/2/2020	30.8	30.8
			4/15/2021	19.5	19.5
			10/12/2021	25.1	25.1
			4/20/2022	ND<50	ND<50
			9/28/2022	29.1	29.1
			4/19/2023	29.3	29.3
			8/23/2023	28.7	28.7
			4/30/2024	25.3	25.3
			9/11/2024	25.3	25.3
			10/12/2016	ND<50	ND<50
			4/18/2017	31.4	31.4
			10/12/2017	30.5	30.5
MW-21	14	1 (7.14286%)	4/17/2018	50.7	50.7
			10/10/2018	66	66
			4/13/2019	44.2	44.2
			10/1/2019	38.1	38.1

			4/7/2020	40.9	40.9
			9/30/2020	36.2	36.2
			4/14/2021	32.8	32.8
			10/12/2021	40.1	40.1
			4/20/2022	ND<50	ND<50
			9/29/2022	35	35
			4/18/2023	34.6	34.6
			8/23/2023	35.2	35.2
			5/1/2024	38.9	38.9
			9/11/2024	29.8	29.8
			4/18/2017	49.5	49.5
			10/12/2017	45.3	45.3
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MW-25	14	1 (7.14286%)	4/17/2018	42.7	42.7
			10/9/2018	73.7	73.7
			4/13/2019	27.3	27.3
			10/1/2019	44.2	44.2
			4/8/2020	35.8	35.8
			10/1/2020	48.7	48.7
			4/14/2021	13.4	13.4
			10/13/2021	42.9	42.9
			4/19/2022	ND<50	ND<50
			9/29/2022	42.7	42.7
			4/19/2023	37	37
			8/24/2023	44	44
			4/29/2024	18.1	18.1
			9/10/2024	36.9	36.9
			10/11/2016	52.8	52.8
			4/18/2017	40.2	40.2
			10/10/2017	32.8	32.8
<hr/>					
MW-26	14	5 (35.7143%)	4/17/2018	28.4	28.4
			10/9/2018	ND<50	ND<50
			4/13/2019	32.5	32.5
			10/1/2019	17.7	17.7
			4/8/2020	14.3	14.3
			10/1/2020	28.7	28.7
			4/14/2021	12	12
			10/13/2021	14.7	14.7
			4/19/2022	ND<50	ND<50
			9/29/2022	21	21
			4/19/2023	ND<50	ND<50
			8/24/2023	ND<50	ND<50
			4/29/2024	30.1	30.1
			9/10/2024	ND<50	ND<50
			4/18/2017	13	13
			10/10/2017	23.5	23.5
<hr/>					
MW-27	14	1 (7.14286%)	4/18/2018	56.6	56.6
			10/9/2018	77	77
			4/13/2019	58.4	58.4
			10/1/2019	51.6	51.6
			4/9/2020	46.6	46.6
			10/1/2020	52.5	52.5
			4/14/2021	41	41
			10/13/2021	39.1	39.1
			4/20/2022	ND<55.6	ND<55.6
			9/28/2022	47.9	47.9
			4/19/2023	55.3	55.3
			8/24/2023	44.7	44.7
			5/1/2024	51.6	51.6
			9/11/2024	43.8	43.8
			4/19/2017	53.5	53.5

			10/12/2017	52.1	52.1
SW-01	14	14 (100%)	4/16/2018	ND<50	ND<50
			10/8/2018	ND<50	ND<50
			4/13/2019	ND<50	ND<50
			9/30/2019	ND<50	ND<50
			4/7/2020	ND<50	ND<50
			10/2/2020	ND<50	ND<50
			4/13/2021	ND<50	ND<50
			10/14/2021	ND<50	ND<50
			4/19/2022	ND<50	ND<50
			9/27/2022	ND<50	ND<50
			4/18/2023	ND<50	ND<50
			8/22/2023	ND<50	ND<50
			4/30/2024	ND<50	ND<50
			9/10/2024	ND<50	ND<50
			10/10/2016	ND<50	ND<50
			4/17/2017	ND<50	ND<50
			10/9/2017	ND<50	ND<50

SW-02	14	10 (71.4286%)	4/16/2018	10.3	10.3
			10/8/2018	ND<50	ND<50
			4/13/2019	ND<50	ND<50
			9/30/2019	10.3	10.3
			4/7/2020	ND<50	ND<50
			10/2/2020	9.72	9.72
			4/13/2021	ND<50	ND<50
			10/14/2021	7.94	7.94
			4/19/2022	ND<50	ND<50
			9/27/2022	ND<50	ND<50
			4/18/2023	ND<50	ND<50
			8/22/2023	ND<50	ND<50
			4/30/2024	ND<50	ND<50
			9/10/2024	ND<50	ND<50
			10/10/2016	ND<50	ND<50
			4/17/2017	ND<50	ND<50
			10/9/2017	ND<50	ND<50

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.781385	0.198413	0.546	66.2
2	0.757862	0.198413	0.521	50
3	0.386555	0.297619	0.546	None

Loc.	Date	Conc.	Outlier
MW-05	4/18/2018	30.1	FALSE
	10/10/2018	66.2	TRUE
	4/13/2019	25.5	FALSE
	10/1/2019	25.1	FALSE
	4/9/2020	18.2	FALSE
	10/1/2020	24.9	FALSE
	4/14/2021	17.5	FALSE
	10/13/2021	21.7	FALSE
	4/20/2022	ND<50	TRUE
	9/28/2022	21.6	FALSE
	4/19/2023	25.5	FALSE
	8/24/2023	22.1	FALSE
	5/1/2024	25.9	FALSE
	9/11/2024	20	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-05

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	17.5	66.2	48.7	0.5251	25.5724
2	18.2	50	31.8	0.3318	10.5512
3	20	30.1	10.1	0.246	2.4846
4	21.6	25.9	4.3	0.1802	0.77486
5	21.7	25.5	3.8	0.124	0.4712
6	22.1	25.5	3.4	0.0727	0.24718
7	24.9	25.1	0.2	0.024	0.0048
8	25.1	24.9	-0.2		
9	25.5	22.1	-3.4		
10	25.5	21.7	-3.8		
11	25.9	21.6	-4.3		
12	30.1	20	-10.1		
13	50	18.2	-31.8		
14	66.2	17.5	-48.7		

Sum of b values = 40.1063

Sample Standard Deviation = 13.4963

W Statistic = 0.679284

5% Critical value of 0.874 exceeds 0.679284
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.679284
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
66.2	30.1	36.1	1	0
25.5	30.1	-4.6	1	1
25.1	30.1	-5	1	2
18.2	30.1	-11.9	1	3
24.9	30.1	-5.2	1	4
17.5	30.1	-12.6	1	5
21.7	30.1	-8.4	1	6
ND<50	30.1	19.9	2	6
21.6	30.1	-8.5	2	7
25.5	30.1	-4.6	2	8
22.1	30.1	-8	2	9
25.9	30.1	-4.2	2	10
20	30.1	-10.1	2	11
25.5	66.2	-40.7	2	12
25.1	66.2	-41.1	2	13
18.2	66.2	-48	2	14
24.9	66.2	-41.3	2	15
17.5	66.2	-48.7	2	16
21.7	66.2	-44.5	2	17
ND<50	66.2	-16.2	2	18
21.6	66.2	-44.6	2	19
25.5	66.2	-40.7	2	20
22.1	66.2	-44.1	2	21
25.9	66.2	-40.3	2	22
20	66.2	-46.2	2	23
25.1	25.5	-0.4	2	24
18.2	25.5	-7.3	2	25
24.9	25.5	-0.6	2	26
17.5	25.5	-8	2	27
21.7	25.5	-3.8	2	28
ND<50	25.5	24.5	3	28
21.6	25.5	-3.9	3	29
25.5	25.5	0	3	29
22.1	25.5	-3.4	3	30
25.9	25.5	0.4	4	30
20	25.5	-5.5	4	31
18.2	25.1	-6.9	4	32
24.9	25.1	-0.2	4	33
17.5	25.1	-7.6	4	34
21.7	25.1	-3.4	4	35
ND<50	25.1	24.9	5	35
21.6	25.1	-3.5	5	36
25.5	25.1	0.4	6	36
22.1	25.1	-3	6	37
25.9	25.1	0.8	7	37
20	25.1	-5.1	7	38
24.9	18.2	6.7	8	38
17.5	18.2	-0.7	8	39
21.7	18.2	3.5	9	39

ND<50	18.2	31.8	10	39
21.6	18.2	3.4	11	39
25.5	18.2	7.3	12	39
22.1	18.2	3.9	13	39
25.9	18.2	7.7	14	39
20	18.2	1.8	15	39
17.5	24.9	-7.4	15	40
21.7	24.9	-3.2	15	41
ND<50	24.9	25.1	16	41
21.6	24.9	-3.3	16	42
25.5	24.9	0.6	17	42
22.1	24.9	-2.8	17	43
25.9	24.9	1	18	43
20	24.9	-4.9	18	44
21.7	17.5	4.2	19	44
ND<50	17.5	32.5	20	44
21.6	17.5	4.1	21	44
25.5	17.5	8	22	44
22.1	17.5	4.6	23	44
25.9	17.5	8.4	24	44
20	17.5	2.5	25	44
ND<50	21.7	28.3	26	44
21.6	21.7	-0.1	26	45
25.5	21.7	3.8	27	45
22.1	21.7	0.4	28	45
25.9	21.7	4.2	29	45
20	21.7	-1.7	29	46
21.6	ND<50	-28.4	29	47
25.5	ND<50	-24.5	29	48
22.1	ND<50	-27.9	29	49
25.9	ND<50	-24.1	29	50
20	ND<50	-30	29	51
25.5	21.6	3.9	30	51
22.1	21.6	0.5	31	51
25.9	21.6	4.3	32	51
20	21.6	-1.6	32	52
22.1	25.5	-3.4	32	53
25.9	25.5	0.4	33	53
20	25.5	-5.5	33	54
25.9	22.1	3.8	34	54
20	22.1	-2.1	34	55
20	25.9	-5.9	34	56

S Statistic = 34 - 56 = -22

Tied Group	Value	Members
1	25.5	2

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/13/2019	1
10/1/2019	1
4/9/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

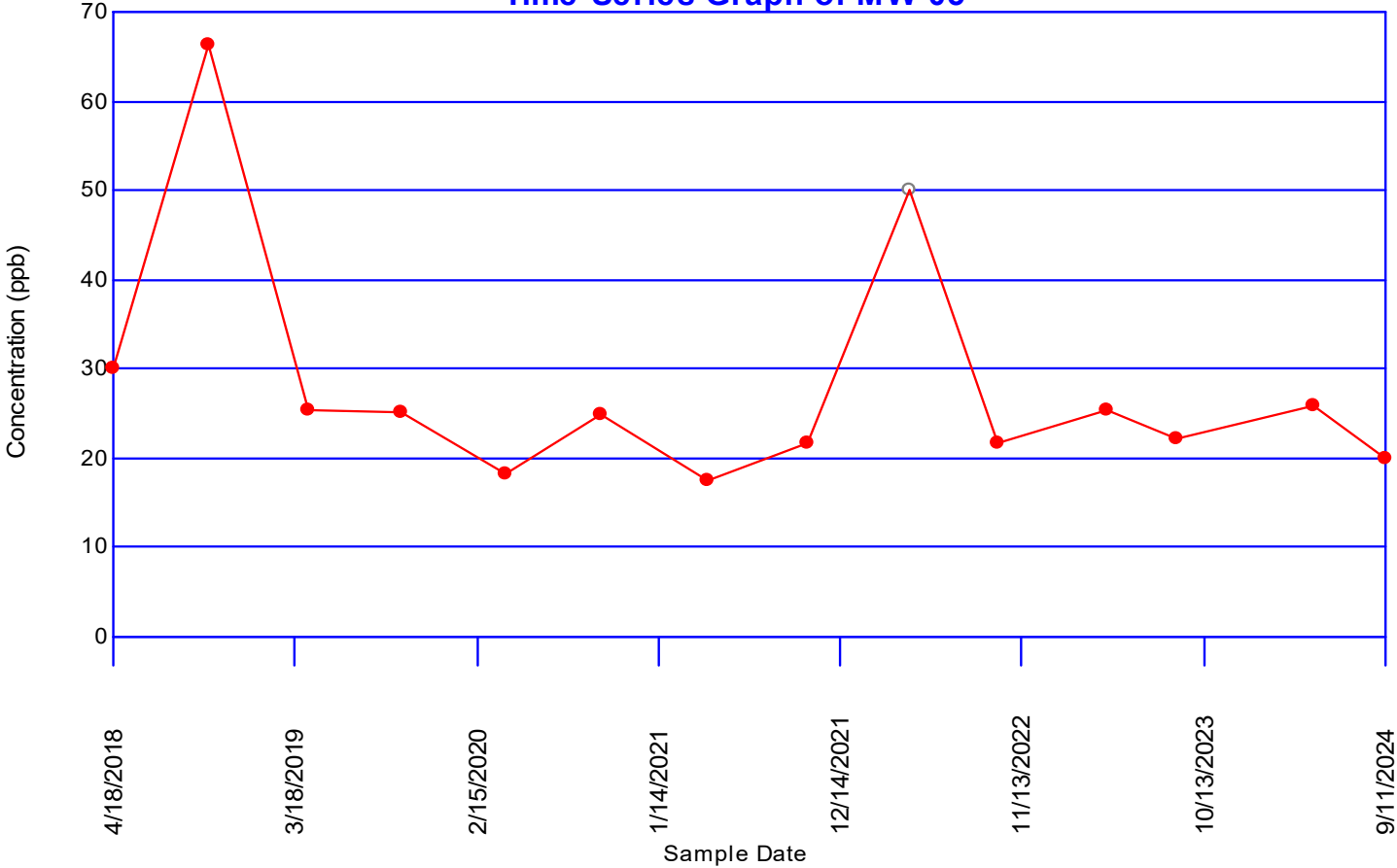
Group Variance = 332.667

Z-Score = -1.15137

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-1.15137| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-05



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0	0.0799257	0.546	None

Loc.	Date	Conc.	Outlier
MW-06	4/18/2018	19.2	FALSE
	10/10/2018	ND<50	FALSE
	4/14/2019	19.6	FALSE
	10/2/2019	14.3	FALSE
	4/8/2020	10.4	FALSE
	9/30/2020	13	FALSE
	4/13/2021	6.96	FALSE
	10/14/2021	9.78	FALSE
	4/20/2022	ND<50	FALSE
	9/27/2022	12.2	FALSE
	4/18/2023	ND<50	FALSE
	8/23/2023	ND<50	FALSE
	5/1/2024	ND<50	FALSE
	9/12/2024	ND<50	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	6.96	50	43.04	0.5251	22.6003
2	9.78	50	40.22	0.3318	13.345
3	10.4	50	39.6	0.246	9.7416
4	12.2	50	37.8	0.1802	6.81156
5	13	50	37	0.124	4.588
6	14.3	50	35.7	0.0727	2.59539
7	19.2	19.6	0.4	0.024	0.0096
8	19.6	19.2	-0.4		
9	50	14.3	-35.7		
10	50	13	-37		
11	50	12.2	-37.8		
12	50	10.4	-39.6		
13	50	9.78	-40.22		
14	50	6.96	-43.04		

Sum of b values = 59.6915

Sample Standard Deviation = 19.187

W Statistic = 0.744503

5% Critical value of 0.874 exceeds 0.744503
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.744503
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<50	19.2	30.8	1	0
19.6	19.2	0.4	2	0
14.3	19.2	-4.9	2	1
10.4	19.2	-8.8	2	2
13	19.2	-6.2	2	3
6.96	19.2	-12.24	2	4
9.78	19.2	-9.42	2	5
ND<50	19.2	30.8	3	5
12.2	19.2	-7	3	6
ND<50	19.2	30.8	4	6
ND<50	19.2	30.8	5	6
ND<50	19.2	30.8	6	6
ND<50	19.2	30.8	7	6
19.6	ND<50	-30.4	7	7
14.3	ND<50	-35.7	7	8
10.4	ND<50	-39.6	7	9
13	ND<50	-37	7	10
6.96	ND<50	-43.04	7	11
9.78	ND<50	-40.22	7	12
ND<50	ND<50	0	7	12
12.2	ND<50	-37.8	7	13
ND<50	ND<50	0	7	13
ND<50	ND<50	0	7	13
ND<50	ND<50	0	7	13
ND<50	ND<50	0	7	13
14.3	19.6	-5.3	7	14
10.4	19.6	-9.2	7	15
13	19.6	-6.6	7	16
6.96	19.6	-12.64	7	17
9.78	19.6	-9.82	7	18
ND<50	19.6	30.4	8	18
12.2	19.6	-7.4	8	19
ND<50	19.6	30.4	9	19
ND<50	19.6	30.4	10	19
ND<50	19.6	30.4	11	19
ND<50	19.6	30.4	12	19
10.4	14.3	-3.9	12	20
13	14.3	-1.3	12	21
6.96	14.3	-7.34	12	22
9.78	14.3	-4.52	12	23
ND<50	14.3	35.7	13	23
12.2	14.3	-2.1	13	24
ND<50	14.3	35.7	14	24
ND<50	14.3	35.7	15	24
ND<50	14.3	35.7	16	24
ND<50	14.3	35.7	17	24
13	10.4	2.6	18	24
6.96	10.4	-3.44	18	25
9.78	10.4	-0.62	18	26

ND<50	10.4	39.6	19	26
12.2	10.4	1.8	20	26
ND<50	10.4	39.6	21	26
ND<50	10.4	39.6	22	26
ND<50	10.4	39.6	23	26
ND<50	10.4	39.6	24	26
6.96	13	-6.04	24	27
9.78	13	-3.22	24	28
ND<50	13	37	25	28
12.2	13	-0.8	25	29
ND<50	13	37	26	29
ND<50	13	37	27	29
ND<50	13	37	28	29
ND<50	13	37	29	29
9.78	6.96	2.82	30	29
ND<50	6.96	43.04	31	29
12.2	6.96	5.24	32	29
ND<50	6.96	43.04	33	29
ND<50	6.96	43.04	34	29
ND<50	6.96	43.04	35	29
ND<50	6.96	43.04	36	29
ND<50	9.78	40.22	37	29
12.2	9.78	2.42	38	29
ND<50	9.78	40.22	39	29
ND<50	9.78	40.22	40	29
ND<50	9.78	40.22	41	29
ND<50	9.78	40.22	42	29
12.2	ND<50	-37.8	42	30
ND<50	ND<50	0	42	30
ND<50	ND<50	0	42	30
ND<50	ND<50	0	42	30
ND<50	ND<50	0	42	30
ND<50	12.2	37.8	43	30
ND<50	12.2	37.8	44	30
ND<50	12.2	37.8	45	30
ND<50	12.2	37.8	46	30
ND<50	ND<50	0	46	30
ND<50	ND<50	0	46	30
ND<50	ND<50	0	46	30
ND<50	ND<50	0	46	30
ND<50	ND<50	0	46	30
ND<50	ND<50	0	46	30

S Statistic = 46 - 30 = 16

Tied Group	Value	Members
1	50	6

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1
4/8/2020	1

9/30/2020	1
4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 510

B = 0

C = 120

D = 0

E = 30

F = 0

a = 6006

b = 19656

c = 364

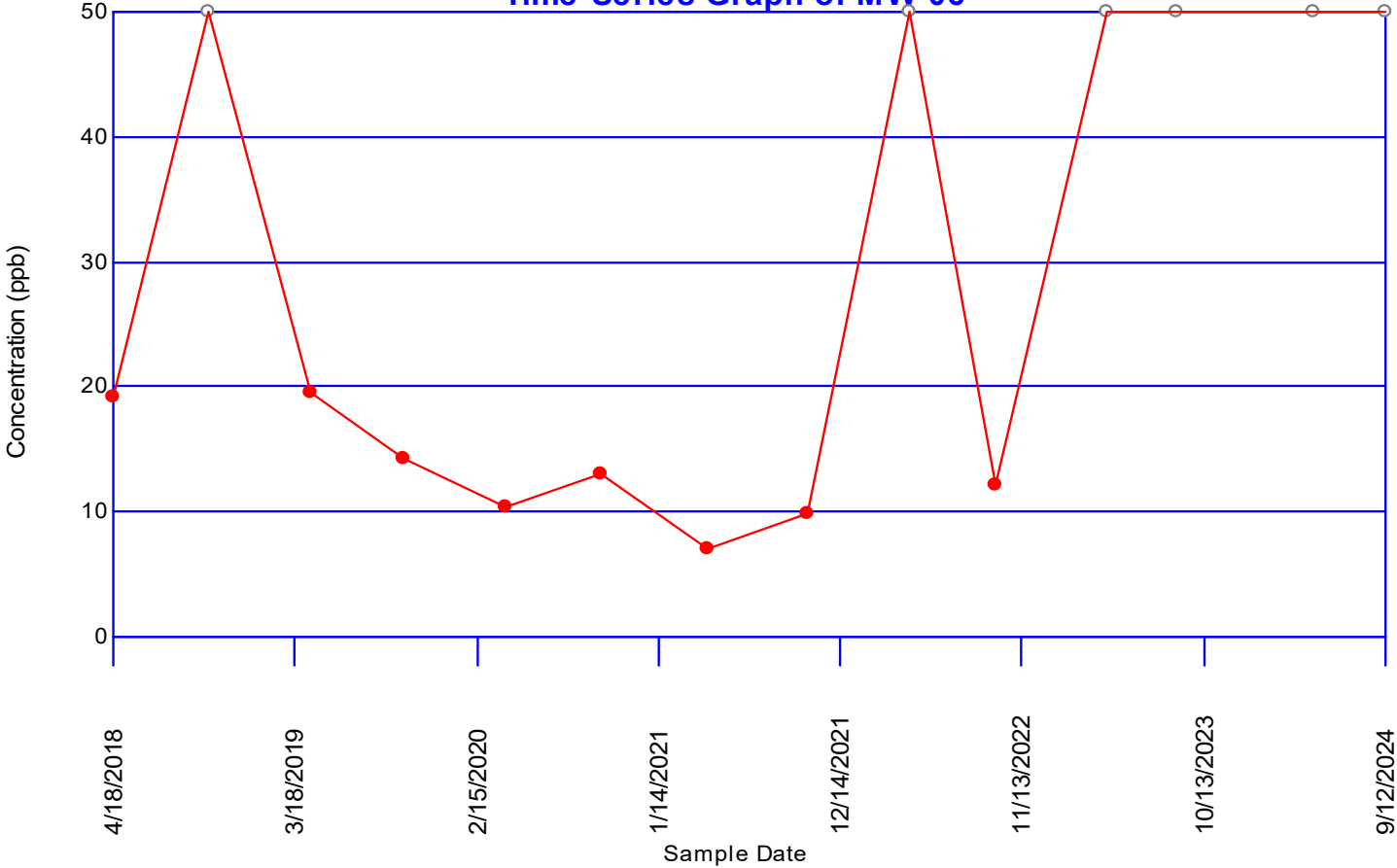
Group Variance = 305.333

Z-Score = 0.858429

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.858429| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-06



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.62069	0.411371	0.546	116
2	0.355102	0.411371	0.521	None

Loc.	Date	Conc.	Outlier
MW-07	4/18/2018	87.2	FALSE
	10/10/2018	116	TRUE
	4/14/2019	91.6	FALSE
	10/2/2019	77.6	FALSE
	4/8/2020	69.6	FALSE
	9/30/2020	78.4	FALSE
	4/13/2021	67.1	FALSE
	10/14/2021	73	FALSE
	4/20/2022	82.9	FALSE
	9/27/2022	77	FALSE
	4/18/2023	57.3	FALSE
	8/23/2023	71.1	FALSE
	5/1/2024	80.8	FALSE
	9/11/2024	73.4	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	57.3	116	58.7	0.5251	30.8234
2	67.1	91.6	24.5	0.3318	8.1291
3	69.6	87.2	17.6	0.246	4.3296
4	71.1	82.9	11.8	0.1802	2.12636
5	73	80.8	7.8	0.124	0.9672
6	73.4	78.4	5	0.0727	0.3635
7	77	77.6	0.6	0.024	0.0144
8	77.6	77	-0.6		
9	78.4	73.4	-5		
10	80.8	73	-7.8		
11	82.9	71.1	-11.8		
12	87.2	69.6	-17.6		
13	91.6	67.1	-24.5		
14	116	57.3	-58.7		

Sum of b values = 46.7535

Sample Standard Deviation = 13.7274

W Statistic = 0.892289

5% Critical value of 0.874 is less than 0.892289
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.892289
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
116	87.2	28.8	1	0
91.6	87.2	4.4	2	0
77.6	87.2	-9.6	2	1
69.6	87.2	-17.6	2	2
78.4	87.2	-8.8	2	3
67.1	87.2	-20.1	2	4
73	87.2	-14.2	2	5
82.9	87.2	-4.3	2	6
77	87.2	-10.2	2	7
57.3	87.2	-29.9	2	8
71.1	87.2	-16.1	2	9
80.8	87.2	-6.4	2	10
73.4	87.2	-13.8	2	11
91.6	116	-24.4	2	12
77.6	116	-38.4	2	13
69.6	116	-46.4	2	14
78.4	116	-37.6	2	15
67.1	116	-48.9	2	16
73	116	-43	2	17
82.9	116	-33.1	2	18
77	116	-39	2	19
57.3	116	-58.7	2	20
71.1	116	-44.9	2	21
80.8	116	-35.2	2	22
73.4	116	-42.6	2	23
77.6	91.6	-14	2	24
69.6	91.6	-22	2	25
78.4	91.6	-13.2	2	26
67.1	91.6	-24.5	2	27
73	91.6	-18.6	2	28
82.9	91.6	-8.7	2	29
77	91.6	-14.6	2	30
57.3	91.6	-34.3	2	31
71.1	91.6	-20.5	2	32
80.8	91.6	-10.8	2	33
73.4	91.6	-18.2	2	34
69.6	77.6	-8	2	35
78.4	77.6	0.8	3	35
67.1	77.6	-10.5	3	36
73	77.6	-4.6	3	37
82.9	77.6	5.3	4	37
77	77.6	-0.6	4	38
57.3	77.6	-20.3	4	39
71.1	77.6	-6.5	4	40
80.8	77.6	3.2	5	40
73.4	77.6	-4.2	5	41
78.4	69.6	8.8	6	41
67.1	69.6	-2.5	6	42
73	69.6	3.4	7	42

82.9	69.6	13.3	8	42
77	69.6	7.4	9	42
57.3	69.6	-12.3	9	43
71.1	69.6	1.5	10	43
80.8	69.6	11.2	11	43
73.4	69.6	3.8	12	43
67.1	78.4	-11.3	12	44
73	78.4	-5.4	12	45
82.9	78.4	4.5	13	45
77	78.4	-1.4	13	46
57.3	78.4	-21.1	13	47
71.1	78.4	-7.3	13	48
80.8	78.4	2.4	14	48
73.4	78.4	-5	14	49
73	67.1	5.9	15	49
82.9	67.1	15.8	16	49
77	67.1	9.9	17	49
57.3	67.1	-9.8	17	50
71.1	67.1	4	18	50
80.8	67.1	13.7	19	50
73.4	67.1	6.3	20	50
82.9	73	9.9	21	50
77	73	4	22	50
57.3	73	-15.7	22	51
71.1	73	-1.9	22	52
80.8	73	7.8	23	52
73.4	73	0.4	24	52
77	82.9	-5.9	24	53
57.3	82.9	-25.6	24	54
71.1	82.9	-11.8	24	55
80.8	82.9	-2.1	24	56
73.4	82.9	-9.5	24	57
57.3	77	-19.7	24	58
71.1	77	-5.9	24	59
80.8	77	3.8	25	59
73.4	77	-3.6	25	60
71.1	57.3	13.8	26	60
80.8	57.3	23.5	27	60
73.4	57.3	16.1	28	60
80.8	71.1	9.7	29	60
73.4	71.1	2.3	30	60
73.4	80.8	-7.4	30	61

S Statistic = 30 - 61 = -31

Tied Group	Value	Members
Time Period		Observations
4/18/2018		1
10/10/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
9/30/2020		1

4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

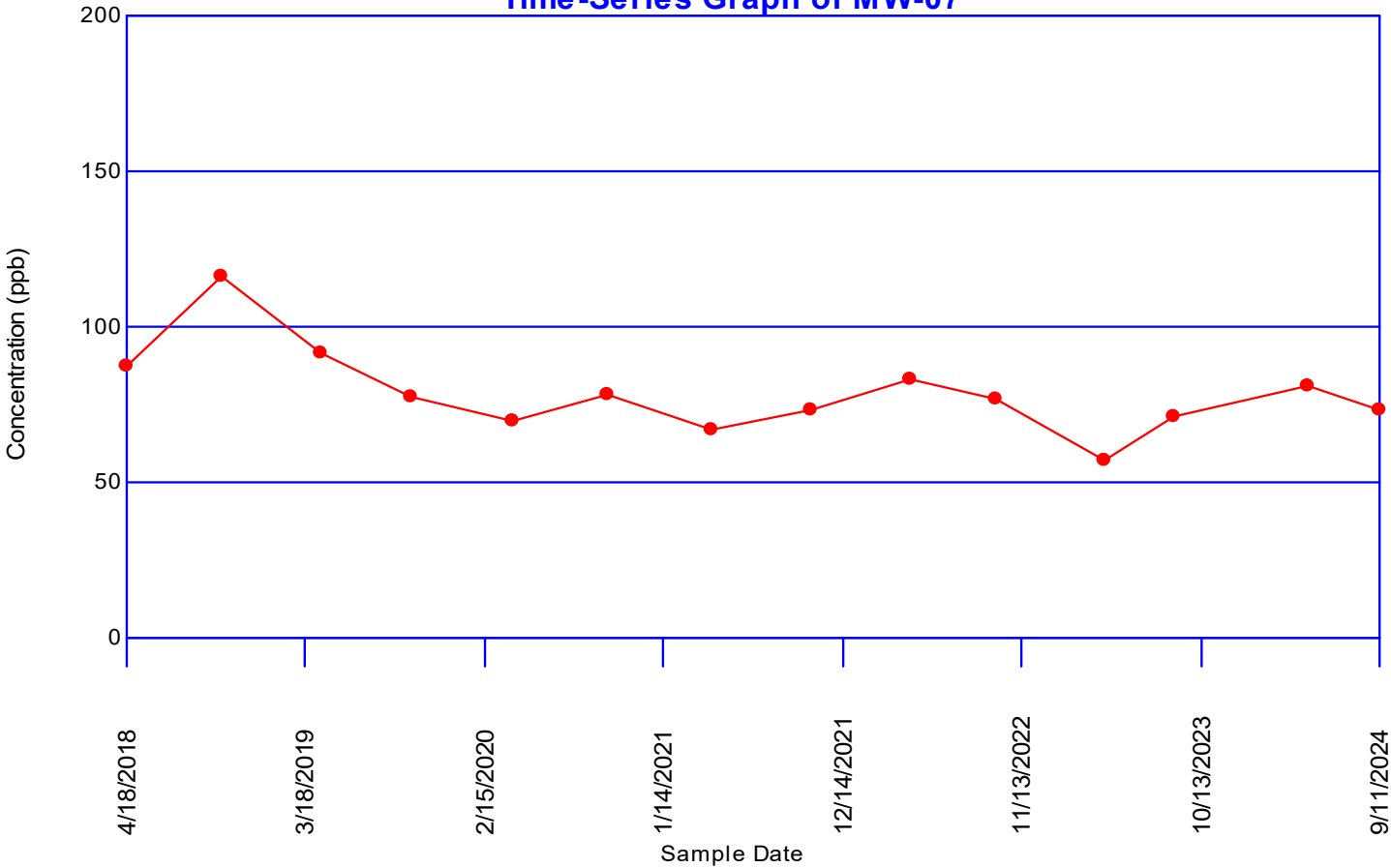
Group Variance = 333.667

Z-Score = -1.64235

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-1.64235| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0	0.115128	0.546	None

Loc.	Date	Conc.	Outlier
MW-12	4/17/2018	19.3	FALSE
	10/9/2018	ND<50	FALSE
	4/14/2019	17.5	FALSE
	10/2/2019	ND<50	FALSE
	4/8/2020	ND<50	FALSE
	10/1/2020	12.8	FALSE
	4/15/2021	7.96	FALSE
	10/14/2021	10.2	FALSE
	4/19/2022	ND<50	FALSE
	9/28/2022	ND<50	FALSE
	4/18/2023	ND<50	FALSE
	8/24/2023	ND<50	FALSE
	5/1/2024	ND<50	FALSE
	9/12/2024	ND<50	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-12

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	7.96	50	42.04	0.5251	22.0752
2	10.2	50	39.8	0.3318	13.2056
3	12.8	50	37.2	0.246	9.1512
4	17.5	50	32.5	0.1802	5.8565
5	19.3	50	30.7	0.124	3.8068
6	50	50	0	0.0727	0
7	50	50	0	0.024	0
8	50	50	0		
9	50	50	0		
10	50	19.3	-30.7		
11	50	17.5	-32.5		
12	50	12.8	-37.2		
13	50	10.2	-39.8		
14	50	7.96	-42.04		

Sum of b values = 54.0953

Sample Standard Deviation = 18.3172

W Statistic = 0.670904

5% Critical value of 0.874 exceeds 0.670904
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.670904
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<50	19.3	30.7	1	0
17.5	19.3	-1.8	1	1
ND<50	19.3	30.7	2	1
ND<50	19.3	30.7	3	1
12.8	19.3	-6.5	3	2
7.96	19.3	-11.34	3	3
10.2	19.3	-9.1	3	4
ND<50	19.3	30.7	4	4
ND<50	19.3	30.7	5	4
ND<50	19.3	30.7	6	4
ND<50	19.3	30.7	7	4
ND<50	19.3	30.7	8	4
ND<50	19.3	30.7	9	4
17.5	ND<50	-32.5	9	5
ND<50	ND<50	0	9	5
ND<50	ND<50	0	9	5
12.8	ND<50	-37.2	9	6
7.96	ND<50	-42.04	9	7
10.2	ND<50	-39.8	9	8
ND<50	ND<50	0	9	8
ND<50	ND<50	0	9	8
ND<50	ND<50	0	9	8
ND<50	ND<50	0	9	8
ND<50	ND<50	0	9	8
ND<50	ND<50	0	9	8
ND<50	17.5	32.5	10	8
ND<50	17.5	32.5	11	8
12.8	17.5	-4.7	11	9
7.96	17.5	-9.54	11	10
10.2	17.5	-7.3	11	11
ND<50	17.5	32.5	12	11
ND<50	17.5	32.5	13	11
ND<50	17.5	32.5	14	11
ND<50	17.5	32.5	15	11
ND<50	17.5	32.5	16	11
ND<50	17.5	32.5	17	11
ND<50	ND<50	0	17	11
12.8	ND<50	-37.2	17	12
7.96	ND<50	-42.04	17	13
10.2	ND<50	-39.8	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
ND<50	ND<50	0	17	14
12.8	ND<50	-37.2	17	15
7.96	ND<50	-42.04	17	16
10.2	ND<50	-39.8	17	17

ND<50	ND<50	0	17	17
ND<50	ND<50	0	17	17
ND<50	ND<50	0	17	17
ND<50	ND<50	0	17	17
ND<50	ND<50	0	17	17
ND<50	ND<50	0	17	17
7.96	12.8	-4.84	17	18
10.2	12.8	-2.6	17	19
ND<50	12.8	37.2	18	19
ND<50	12.8	37.2	19	19
ND<50	12.8	37.2	20	19
ND<50	12.8	37.2	21	19
ND<50	12.8	37.2	22	19
ND<50	12.8	37.2	23	19
10.2	7.96	2.24	24	19
ND<50	7.96	42.04	25	19
ND<50	7.96	42.04	26	19
ND<50	7.96	42.04	27	19
ND<50	7.96	42.04	28	19
ND<50	7.96	42.04	29	19
ND<50	7.96	42.04	30	19
ND<50	10.2	39.8	31	19
ND<50	10.2	39.8	32	19
ND<50	10.2	39.8	33	19
ND<50	10.2	39.8	34	19
ND<50	10.2	39.8	35	19
ND<50	10.2	39.8	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19
ND<50	ND<50	0	36	19

S Statistic = 36 - 19 = 17

Tied Group	Value	Members
1	50	9

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/14/2019	1
10/2/2019	1
4/8/2020	1

10/1/2020	1
4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 1656

B = 0

C = 504

D = 0

E = 72

F = 0

a = 6006

b = 19656

c = 364

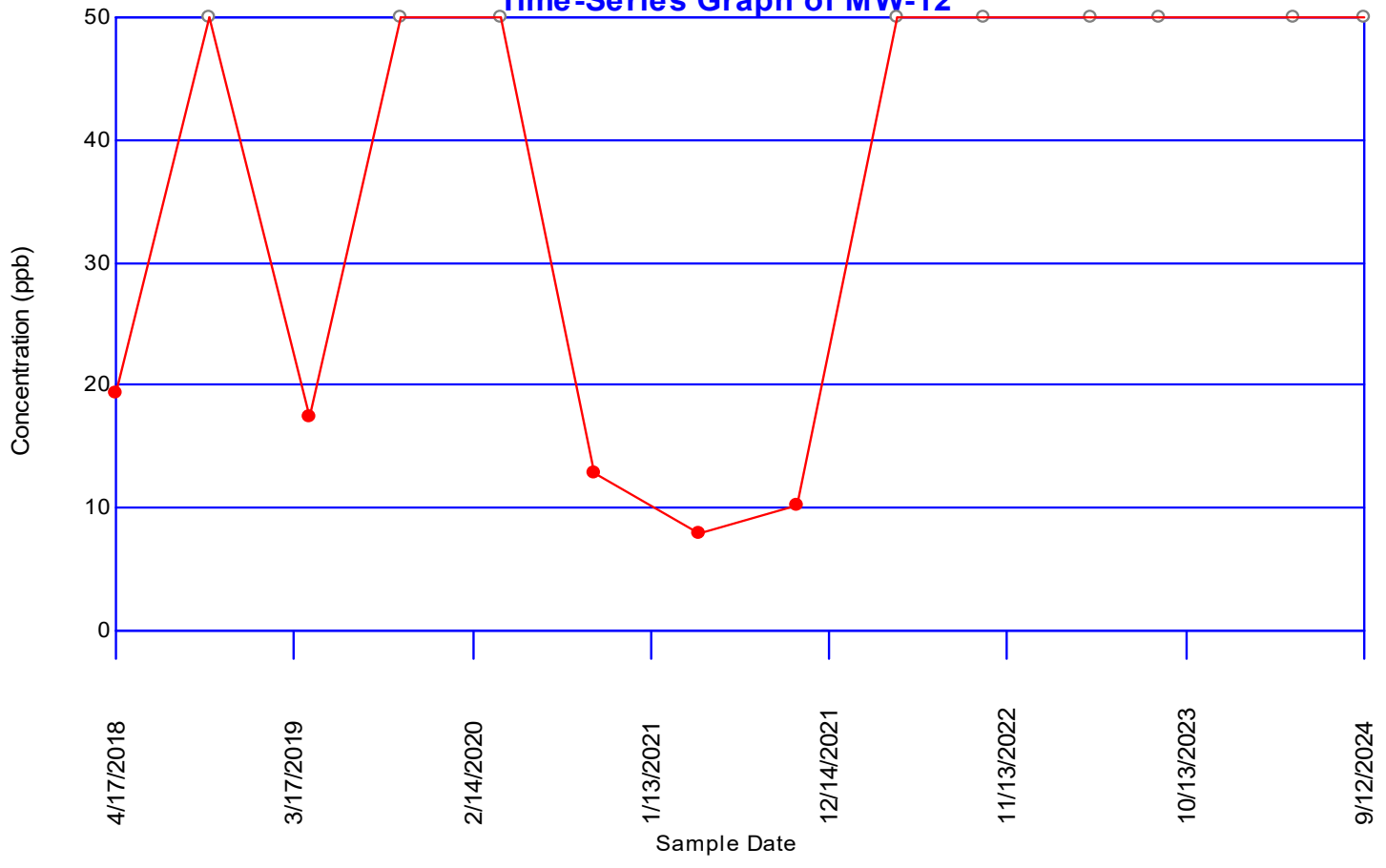
Group Variance = 241.667

Z-Score = 1.02923

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|1.02923| <= 1.97737 indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-12



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.55291	0.0913978	0.546	89.3
2	0.287958	0.0913978	0.521	None

Loc.	Date	Conc.	Outlier
MW-16	4/17/2018	70.3	FALSE
	10/9/2018	89.3	TRUE
	4/14/2019	64.8	FALSE
	10/2/2019	61.7	FALSE
	4/9/2020	54.3	FALSE
	10/1/2020	61.8	FALSE
	4/15/2021	51.2	FALSE
	10/14/2021	63	FALSE
	4/19/2022	68.4	FALSE
	9/28/2022	58	FALSE
	4/18/2023	49.8	FALSE
	8/24/2023	55.6	FALSE
	5/2/2024	62.6	FALSE
	9/12/2024	51.5	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	49.8	89.3	39.5	0.5251	20.7415
2	51.2	70.3	19.1	0.3318	6.33738
3	51.5	68.4	16.9	0.246	4.1574
4	54.3	64.8	10.5	0.1802	1.8921
5	55.6	63	7.4	0.124	0.9176
6	58	62.6	4.6	0.0727	0.33442
7	61.7	61.8	0.1	0.024	0.0024
8	61.8	61.7	-0.1		
9	62.6	58	-4.6		
10	63	55.6	-7.4		
11	64.8	54.3	-10.5		
12	68.4	51.5	-16.9		
13	70.3	51.2	-19.1		
14	89.3	49.8	-39.5		

Sum of b values = 34.3828

Sample Standard Deviation = 10.2061

W Statistic = 0.873014

5% Critical value of 0.874 exceeds 0.873014
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.873014
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
89.3	70.3	19	1	0
64.8	70.3	-5.5	1	1
61.7	70.3	-8.6	1	2
54.3	70.3	-16	1	3
61.8	70.3	-8.5	1	4
51.2	70.3	-19.1	1	5
63	70.3	-7.3	1	6
68.4	70.3	-1.9	1	7
58	70.3	-12.3	1	8
49.8	70.3	-20.5	1	9
55.6	70.3	-14.7	1	10
62.6	70.3	-7.7	1	11
51.5	70.3	-18.8	1	12
64.8	89.3	-24.5	1	13
61.7	89.3	-27.6	1	14
54.3	89.3	-35	1	15
61.8	89.3	-27.5	1	16
51.2	89.3	-38.1	1	17
63	89.3	-26.3	1	18
68.4	89.3	-20.9	1	19
58	89.3	-31.3	1	20
49.8	89.3	-39.5	1	21
55.6	89.3	-33.7	1	22
62.6	89.3	-26.7	1	23
51.5	89.3	-37.8	1	24
61.7	64.8	-3.1	1	25
54.3	64.8	-10.5	1	26
61.8	64.8	-3	1	27
51.2	64.8	-13.6	1	28
63	64.8	-1.8	1	29
68.4	64.8	3.6	2	29
58	64.8	-6.8	2	30
49.8	64.8	-15	2	31
55.6	64.8	-9.2	2	32
62.6	64.8	-2.2	2	33
51.5	64.8	-13.3	2	34
54.3	61.7	-7.4	2	35
61.8	61.7	0.1	3	35
51.2	61.7	-10.5	3	36
63	61.7	1.3	4	36
68.4	61.7	6.7	5	36
58	61.7	-3.7	5	37
49.8	61.7	-11.9	5	38
55.6	61.7	-6.1	5	39
62.6	61.7	0.9	6	39
51.5	61.7	-10.2	6	40
61.8	54.3	7.5	7	40
51.2	54.3	-3.1	7	41
63	54.3	8.7	8	41

68.4	54.3	14.1	9	41
58	54.3	3.7	10	41
49.8	54.3	-4.5	10	42
55.6	54.3	1.3	11	42
62.6	54.3	8.3	12	42
51.5	54.3	-2.8	12	43
51.2	61.8	-10.6	12	44
63	61.8	1.2	13	44
68.4	61.8	6.6	14	44
58	61.8	-3.8	14	45
49.8	61.8	-12	14	46
55.6	61.8	-6.2	14	47
62.6	61.8	0.8	15	47
51.5	61.8	-10.3	15	48
63	51.2	11.8	16	48
68.4	51.2	17.2	17	48
58	51.2	6.8	18	48
49.8	51.2	-1.4	18	49
55.6	51.2	4.4	19	49
62.6	51.2	11.4	20	49
51.5	51.2	0.3	21	49
68.4	63	5.4	22	49
58	63	-5	22	50
49.8	63	-13.2	22	51
55.6	63	-7.4	22	52
62.6	63	-0.4	22	53
51.5	63	-11.5	22	54
58	68.4	-10.4	22	55
49.8	68.4	-18.6	22	56
55.6	68.4	-12.8	22	57
62.6	68.4	-5.8	22	58
51.5	68.4	-16.9	22	59
49.8	58	-8.2	22	60
55.6	58	-2.4	22	61
62.6	58	4.6	23	61
51.5	58	-6.5	23	62
55.6	49.8	5.8	24	62
62.6	49.8	12.8	25	62
51.5	49.8	1.7	26	62
62.6	55.6	7	27	62
51.5	55.6	-4.1	27	63
51.5	62.6	-11.1	27	64

S Statistic = 27 - 64 = -37

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/9/2018		1
4/14/2019		1
10/2/2019		1
4/9/2020		1
10/1/2020		1

4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/2/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

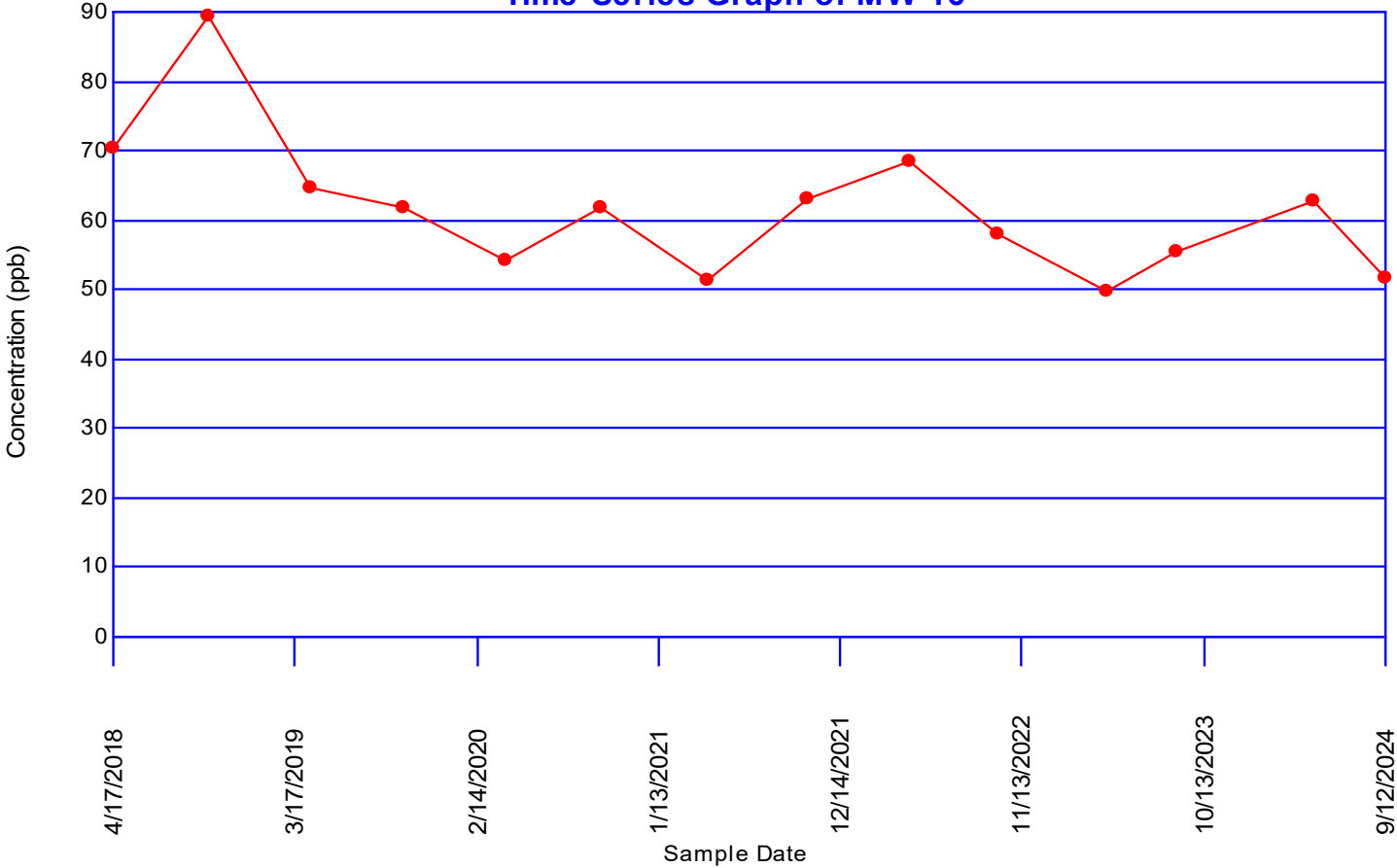
Group Variance = 333.667

Z-Score = -1.97082

Comparison Level at 1.0 - $(0.05 / 2)$ = 97.5% confidence level = 1.97737 (two-tailed)

$|-1.97082| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.509554	0.237624	0.546	None

Loc.	Date	Conc.	Outlier
MW-21	4/17/2018	50.7	FALSE
	10/10/2018	66	FALSE
	4/13/2019	44.2	FALSE
	10/1/2019	38.1	FALSE
	4/7/2020	40.9	FALSE
	9/30/2020	36.2	FALSE
	4/14/2021	32.8	FALSE
	10/12/2021	40.1	FALSE
	4/20/2022	ND<50	FALSE
	9/29/2022	35	FALSE
	4/18/2023	34.6	FALSE
	8/23/2023	35.2	FALSE
	5/1/2024	38.9	FALSE
	9/11/2024	29.8	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-21

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	29.8	66	36.2	0.5251	19.0086
2	32.8	50.7	17.9	0.3318	5.93922
3	34.6	50	15.4	0.246	3.7884
4	35	44.2	9.2	0.1802	1.65784
5	35.2	40.9	5.7	0.124	0.7068
6	36.2	40.1	3.9	0.0727	0.28353
7	38.1	38.9	0.8	0.024	0.0192
8	38.9	38.1	-0.8		
9	40.1	36.2	-3.9		
10	40.9	35.2	-5.7		
11	44.2	35	-9.2		
12	50	34.6	-15.4		
13	50.7	32.8	-17.9		
14	66	29.8	-36.2		

Sum of b values = 31.4036

Sample Standard Deviation = 9.40593

W Statistic = 0.857457

5% Critical value of 0.874 exceeds 0.857457
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.857457
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
66	50.7	15.3	1	0
44.2	50.7	-6.5	1	1
38.1	50.7	-12.6	1	2
40.9	50.7	-9.8	1	3
36.2	50.7	-14.5	1	4
32.8	50.7	-17.9	1	5
40.1	50.7	-10.6	1	6
ND<50	50.7	-0.7	1	7
35	50.7	-15.7	1	8
34.6	50.7	-16.1	1	9
35.2	50.7	-15.5	1	10
38.9	50.7	-11.8	1	11
29.8	50.7	-20.9	1	12
44.2	66	-21.8	1	13
38.1	66	-27.9	1	14
40.9	66	-25.1	1	15
36.2	66	-29.8	1	16
32.8	66	-33.2	1	17
40.1	66	-25.9	1	18
ND<50	66	-16	1	19
35	66	-31	1	20
34.6	66	-31.4	1	21
35.2	66	-30.8	1	22
38.9	66	-27.1	1	23
29.8	66	-36.2	1	24
38.1	44.2	-6.1	1	25
40.9	44.2	-3.3	1	26
36.2	44.2	-8	1	27
32.8	44.2	-11.4	1	28
40.1	44.2	-4.1	1	29
ND<50	44.2	5.8	2	29
35	44.2	-9.2	2	30
34.6	44.2	-9.6	2	31
35.2	44.2	-9	2	32
38.9	44.2	-5.3	2	33
29.8	44.2	-14.4	2	34
40.9	38.1	2.8	3	34
36.2	38.1	-1.9	3	35
32.8	38.1	-5.3	3	36
40.1	38.1	2	4	36
ND<50	38.1	11.9	5	36
35	38.1	-3.1	5	37
34.6	38.1	-3.5	5	38
35.2	38.1	-2.9	5	39
38.9	38.1	0.8	6	39
29.8	38.1	-8.3	6	40
36.2	40.9	-4.7	6	41
32.8	40.9	-8.1	6	42
40.1	40.9	-0.8	6	43

ND<50	40.9	9.1	7	43
35	40.9	-5.9	7	44
34.6	40.9	-6.3	7	45
35.2	40.9	-5.7	7	46
38.9	40.9	-2	7	47
29.8	40.9	-11.1	7	48
32.8	36.2	-3.4	7	49
40.1	36.2	3.9	8	49
ND<50	36.2	13.8	9	49
35	36.2	-1.2	9	50
34.6	36.2	-1.6	9	51
35.2	36.2	-1	9	52
38.9	36.2	2.7	10	52
29.8	36.2	-6.4	10	53
40.1	32.8	7.3	11	53
ND<50	32.8	17.2	12	53
35	32.8	2.2	13	53
34.6	32.8	1.8	14	53
35.2	32.8	2.4	15	53
38.9	32.8	6.1	16	53
29.8	32.8	-3	16	54
ND<50	40.1	9.9	17	54
35	40.1	-5.1	17	55
34.6	40.1	-5.5	17	56
35.2	40.1	-4.9	17	57
38.9	40.1	-1.2	17	58
29.8	40.1	-10.3	17	59
35	ND<50	-15	17	60
34.6	ND<50	-15.4	17	61
35.2	ND<50	-14.8	17	62
38.9	ND<50	-11.1	17	63
29.8	ND<50	-20.2	17	64
34.6	35	-0.4	17	65
35.2	35	0.2	18	65
38.9	35	3.9	19	65
29.8	35	-5.2	19	66
35.2	34.6	0.6	20	66
38.9	34.6	4.3	21	66
29.8	34.6	-4.8	21	67
38.9	35.2	3.7	22	67
29.8	35.2	-5.4	22	68
29.8	38.9	-9.1	22	69

S Statistic = 22 - 69 = -47

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/10/2018		1
4/13/2019		1
10/1/2019		1
4/7/2020		1
9/30/2020		1

4/14/2021	1
10/12/2021	1
4/20/2022	1
9/29/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

Group Variance = 333.667

Z-Score = -2.51826

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-2.51826| > 1.97737$ indicating a trend

Lithium, Total Time-Series Graph of MW-21



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.734824	0.411348	0.546	56.6
2	0.738956	0.411348	0.521	50
3	0.329412	0.479339	0.546	None

Loc.	Date	Conc.	Outlier
MW-20	4/17/2018	33.6	FALSE
	10/10/2018	56.6	TRUE
	4/14/2019	31.6	FALSE
	10/2/2019	29.5	FALSE
	4/9/2020	29.1	FALSE
	10/2/2020	30.8	FALSE
	4/15/2021	19.5	FALSE
	10/12/2021	25.1	FALSE
	4/20/2022	ND<50	TRUE
	9/28/2022	29.1	FALSE
	4/19/2023	29.3	FALSE
	8/23/2023	28.7	FALSE
	4/30/2024	25.3	FALSE
	9/11/2024	25.3	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-20

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	19.5	56.6	37.1	0.5251	19.4812
2	25.1	50	24.9	0.3318	8.26182
3	25.3	33.6	8.3	0.246	2.0418
4	25.3	31.6	6.3	0.1802	1.13526
5	28.7	30.8	2.1	0.124	0.2604
6	29.1	29.5	0.4	0.0727	0.02908
7	29.1	29.3	0.2	0.024	0.0048
8	29.3	29.1	-0.2		
9	29.5	29.1	-0.4		
10	30.8	28.7	-2.1		
11	31.6	25.3	-6.3		
12	33.6	25.3	-8.3		
13	50	25.1	-24.9		
14	56.6	19.5	-37.1		

Sum of b values = 31.2144

Sample Standard Deviation = 9.87134

W Statistic = 0.769154

5% Critical value of 0.874 exceeds 0.769154
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.769154
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
56.6	33.6	23	1	0
31.6	33.6	-2	1	1
29.5	33.6	-4.1	1	2
29.1	33.6	-4.5	1	3
30.8	33.6	-2.8	1	4
19.5	33.6	-14.1	1	5
25.1	33.6	-8.5	1	6
ND<50	33.6	16.4	2	6
29.1	33.6	-4.5	2	7
29.3	33.6	-4.3	2	8
28.7	33.6	-4.9	2	9
25.3	33.6	-8.3	2	10
25.3	33.6	-8.3	2	11
31.6	56.6	-25	2	12
29.5	56.6	-27.1	2	13
29.1	56.6	-27.5	2	14
30.8	56.6	-25.8	2	15
19.5	56.6	-37.1	2	16
25.1	56.6	-31.5	2	17
ND<50	56.6	-6.6	2	18
29.1	56.6	-27.5	2	19
29.3	56.6	-27.3	2	20
28.7	56.6	-27.9	2	21
25.3	56.6	-31.3	2	22
25.3	56.6	-31.3	2	23
29.5	31.6	-2.1	2	24
29.1	31.6	-2.5	2	25
30.8	31.6	-0.8	2	26
19.5	31.6	-12.1	2	27
25.1	31.6	-6.5	2	28
ND<50	31.6	18.4	3	28
29.1	31.6	-2.5	3	29
29.3	31.6	-2.3	3	30
28.7	31.6	-2.9	3	31
25.3	31.6	-6.3	3	32
25.3	31.6	-6.3	3	33
29.1	29.5	-0.4	3	34
30.8	29.5	1.3	4	34
19.5	29.5	-10	4	35
25.1	29.5	-4.4	4	36
ND<50	29.5	20.5	5	36
29.1	29.5	-0.4	5	37
29.3	29.5	-0.2	5	38
28.7	29.5	-0.8	5	39
25.3	29.5	-4.2	5	40
25.3	29.5	-4.2	5	41
30.8	29.1	1.7	6	41
19.5	29.1	-9.6	6	42
25.1	29.1	-4	6	43

ND<50	29.1	20.9	7	43
29.1	29.1	0	7	43
29.3	29.1	0.2	8	43
28.7	29.1	-0.4	8	44
25.3	29.1	-3.8	8	45
25.3	29.1	-3.8	8	46
19.5	30.8	-11.3	8	47
25.1	30.8	-5.7	8	48
ND<50	30.8	19.2	9	48
29.1	30.8	-1.7	9	49
29.3	30.8	-1.5	9	50
28.7	30.8	-2.1	9	51
25.3	30.8	-5.5	9	52
25.3	30.8	-5.5	9	53
25.1	19.5	5.6	10	53
ND<50	19.5	30.5	11	53
29.1	19.5	9.6	12	53
29.3	19.5	9.8	13	53
28.7	19.5	9.2	14	53
25.3	19.5	5.8	15	53
25.3	19.5	5.8	16	53
ND<50	25.1	24.9	17	53
29.1	25.1	4	18	53
29.3	25.1	4.2	19	53
28.7	25.1	3.6	20	53
25.3	25.1	0.2	21	53
25.3	25.1	0.2	22	53
29.1	ND<50	-20.9	22	54
29.3	ND<50	-20.7	22	55
28.7	ND<50	-21.3	22	56
25.3	ND<50	-24.7	22	57
25.3	ND<50	-24.7	22	58
29.3	29.1	0.2	23	58
28.7	29.1	-0.4	23	59
25.3	29.1	-3.8	23	60
25.3	29.1	-3.8	23	61
28.7	29.3	-0.6	23	62
25.3	29.3	-4	23	63
25.3	29.3	-4	23	64
25.3	28.7	-3.4	23	65
25.3	28.7	-3.4	23	66
25.3	25.3	0	23	66

S Statistic = 23 - 66 = -43

Tied Group	Value	Members
1	29.1	2
2	25.3	2

Time Period	Observations
4/17/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1

4/9/2020	1
10/2/2020	1
4/15/2021	1
10/12/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/23/2023	1
4/30/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

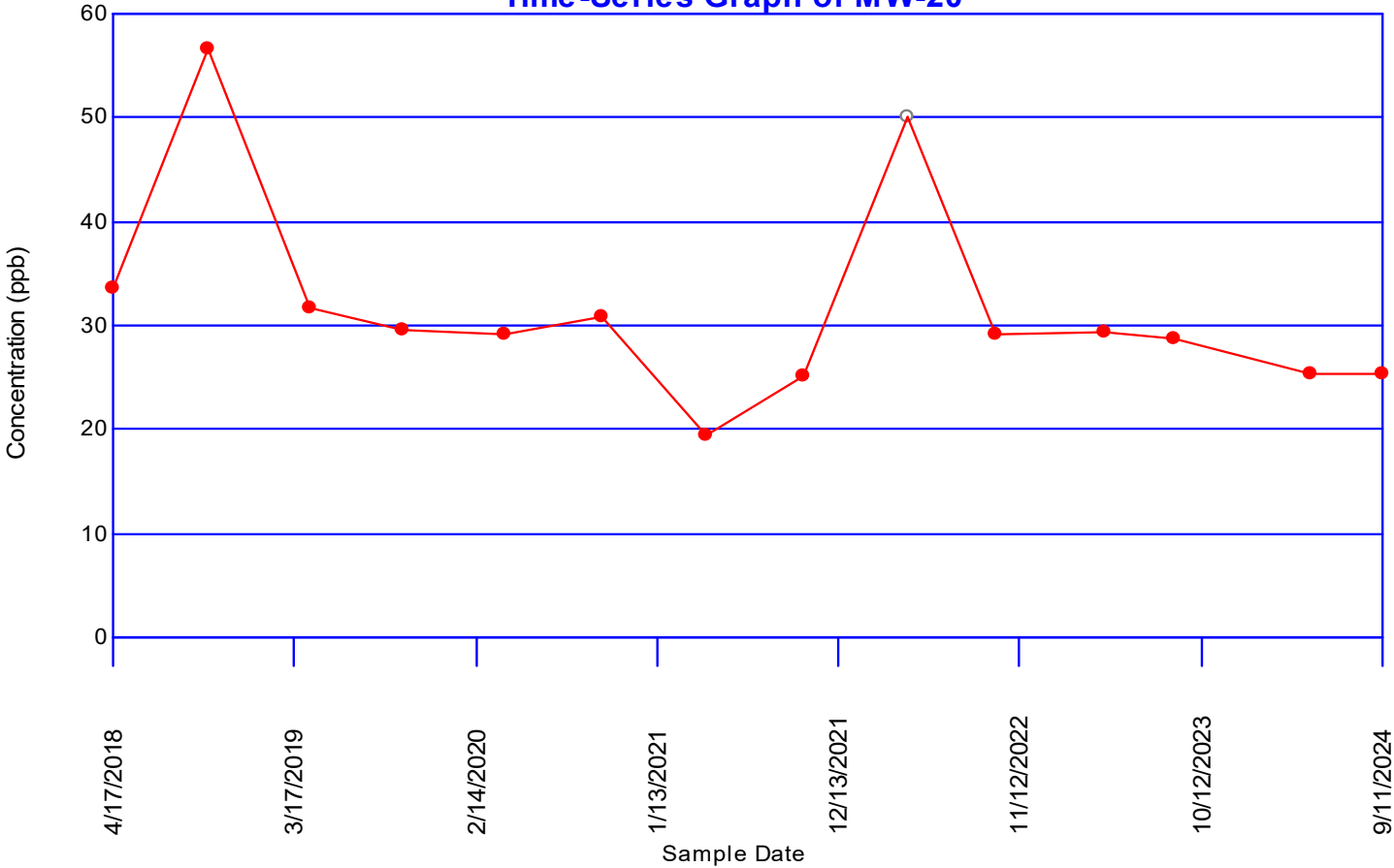
Group Variance = 331.667

Z-Score = -2.30621

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-2.30621| > 1.97737$ indicating a trend

Lithium, Total Time-Series Graph of MW-20



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.538793	0.393768	0.546	None

Loc.	Date	Conc.	Outlier
MW-25	4/17/2018	42.7	FALSE
	10/9/2018	73.7	FALSE
	4/13/2019	27.3	FALSE
	10/1/2019	44.2	FALSE
	4/8/2020	35.8	FALSE
	10/1/2020	48.7	FALSE
	4/14/2021	13.4	FALSE
	10/13/2021	42.9	FALSE
	4/19/2022	ND<50	FALSE
	9/29/2022	42.7	FALSE
	4/19/2023	37	FALSE
	8/24/2023	44	FALSE
	4/29/2024	18.1	FALSE
	9/10/2024	36.9	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-25

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	13.4	73.7	60.3	0.5251	31.6635
2	18.1	50	31.9	0.3318	10.5844
3	27.3	48.7	21.4	0.246	5.2644
4	35.8	44.2	8.4	0.1802	1.51368
5	36.9	44	7.1	0.124	0.8804
6	37	42.9	5.9	0.0727	0.42893
7	42.7	42.7	0	0.024	0
8	42.7	42.7	0		
9	42.9	37	-5.9		
10	44	36.9	-7.1		
11	44.2	35.8	-8.4		
12	48.7	27.3	-21.4		
13	50	18.1	-31.9		
14	73.7	13.4	-60.3		

Sum of b values = 50.3354

Sample Standard Deviation = 14.5503

W Statistic = 0.920578

5% Critical value of 0.874 is less than 0.920578
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.920578
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
73.7	42.7	31	1	0
27.3	42.7	-15.4	1	1
44.2	42.7	1.5	2	1
35.8	42.7	-6.9	2	2
48.7	42.7	6	3	2
13.4	42.7	-29.3	3	3
42.9	42.7	0.2	4	3
ND<50	42.7	7.3	5	3
42.7	42.7	0	5	3
37	42.7	-5.7	5	4
44	42.7	1.3	6	4
18.1	42.7	-24.6	6	5
36.9	42.7	-5.8	6	6
27.3	73.7	-46.4	6	7
44.2	73.7	-29.5	6	8
35.8	73.7	-37.9	6	9
48.7	73.7	-25	6	10
13.4	73.7	-60.3	6	11
42.9	73.7	-30.8	6	12
ND<50	73.7	-23.7	6	13
42.7	73.7	-31	6	14
37	73.7	-36.7	6	15
44	73.7	-29.7	6	16
18.1	73.7	-55.6	6	17
36.9	73.7	-36.8	6	18
44.2	27.3	16.9	7	18
35.8	27.3	8.5	8	18
48.7	27.3	21.4	9	18
13.4	27.3	-13.9	9	19
42.9	27.3	15.6	10	19
ND<50	27.3	22.7	11	19
42.7	27.3	15.4	12	19
37	27.3	9.7	13	19
44	27.3	16.7	14	19
18.1	27.3	-9.2	14	20
36.9	27.3	9.6	15	20
35.8	44.2	-8.4	15	21
48.7	44.2	4.5	16	21
13.4	44.2	-30.8	16	22
42.9	44.2	-1.3	16	23
ND<50	44.2	5.8	17	23
42.7	44.2	-1.5	17	24
37	44.2	-7.2	17	25
44	44.2	-0.2	17	26
18.1	44.2	-26.1	17	27
36.9	44.2	-7.3	17	28
48.7	35.8	12.9	18	28
13.4	35.8	-22.4	18	29
42.9	35.8	7.1	19	29

ND<50	35.8	14.2	20	29
42.7	35.8	6.9	21	29
37	35.8	1.2	22	29
44	35.8	8.2	23	29
18.1	35.8	-17.7	23	30
36.9	35.8	1.1	24	30
13.4	48.7	-35.3	24	31
42.9	48.7	-5.8	24	32
ND<50	48.7	1.3	25	32
42.7	48.7	-6	25	33
37	48.7	-11.7	25	34
44	48.7	-4.7	25	35
18.1	48.7	-30.6	25	36
36.9	48.7	-11.8	25	37
42.9	13.4	29.5	26	37
ND<50	13.4	36.6	27	37
42.7	13.4	29.3	28	37
37	13.4	23.6	29	37
44	13.4	30.6	30	37
18.1	13.4	4.7	31	37
36.9	13.4	23.5	32	37
ND<50	42.9	7.1	33	37
42.7	42.9	-0.2	33	38
37	42.9	-5.9	33	39
44	42.9	1.1	34	39
18.1	42.9	-24.8	34	40
36.9	42.9	-6	34	41
42.7	ND<50	-7.3	34	42
37	ND<50	-13	34	43
44	ND<50	-6	34	44
18.1	ND<50	-31.9	34	45
36.9	ND<50	-13.1	34	46
37	42.7	-5.7	34	47
44	42.7	1.3	35	47
18.1	42.7	-24.6	35	48
36.9	42.7	-5.8	35	49
44	37	7	36	49
18.1	37	-18.9	36	50
36.9	37	-0.1	36	51
18.1	44	-25.9	36	52
36.9	44	-7.1	36	53
36.9	18.1	18.8	37	53

S Statistic = 37 - 53 = -16

Tied Group	Value	Members
1	42.7	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1
4/8/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

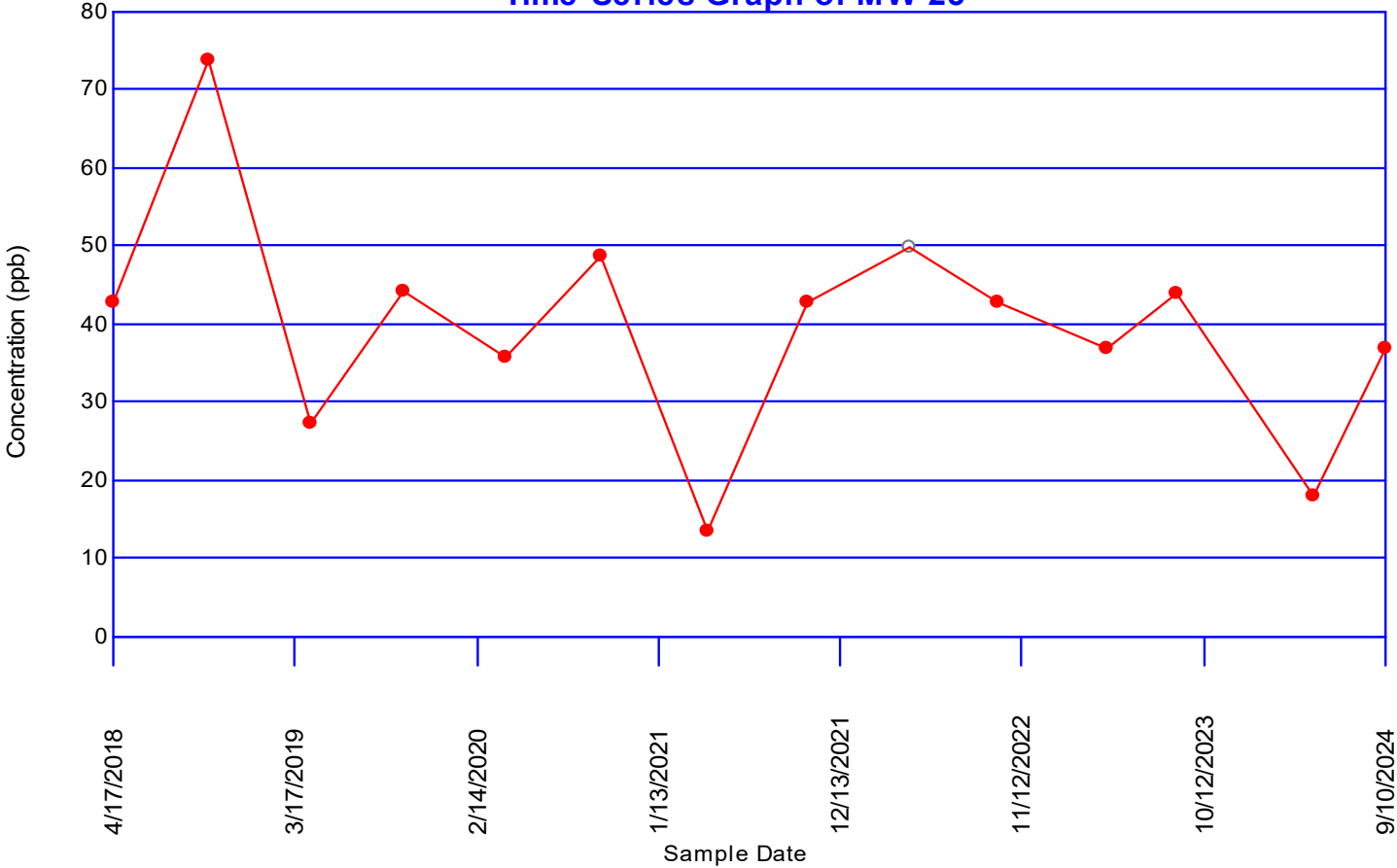
Group Variance = 332.667

Z-Score = -0.822407

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.822407| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-25



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0	0.0710526	0.546	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	28.4	FALSE
	10/9/2018	ND<50	FALSE
	4/13/2019	32.5	FALSE
	10/1/2019	17.7	FALSE
	4/8/2020	14.3	FALSE
	10/1/2020	28.7	FALSE
	4/14/2021	12	FALSE
	10/13/2021	14.7	FALSE
	4/19/2022	ND<50	FALSE
	9/29/2022	21	FALSE
	4/19/2023	ND<50	FALSE
	8/24/2023	ND<50	FALSE
	4/29/2024	30.1	FALSE
	9/10/2024	ND<50	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	12	50	38	0.5251	19.9538
2	14.3	50	35.7	0.3318	11.8453
3	14.7	50	35.3	0.246	8.6838
4	17.7	50	32.3	0.1802	5.82046
5	21	50	29	0.124	3.596
6	28.4	32.5	4.1	0.0727	0.29807
7	28.7	30.1	1.4	0.024	0.0336
8	30.1	28.7	-1.4		
9	32.5	28.4	-4.1		
10	50	21	-29		
11	50	17.7	-32.3		
12	50	14.7	-35.3		
13	50	14.3	-35.7		
14	50	12	-38		

Sum of b values = 50.231

Sample Standard Deviation = 15.1547

W Statistic = 0.845096

5% Critical value of 0.874 exceeds 0.845096
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.845096
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<50	28.4	21.6	1	0
32.5	28.4	4.1	2	0
17.7	28.4	-10.7	2	1
14.3	28.4	-14.1	2	2
28.7	28.4	0.3	3	2
12	28.4	-16.4	3	3
14.7	28.4	-13.7	3	4
ND<50	28.4	21.6	4	4
21	28.4	-7.4	4	5
ND<50	28.4	21.6	5	5
ND<50	28.4	21.6	6	5
30.1	28.4	1.7	7	5
ND<50	28.4	21.6	8	5
32.5	ND<50	-17.5	8	6
17.7	ND<50	-32.3	8	7
14.3	ND<50	-35.7	8	8
28.7	ND<50	-21.3	8	9
12	ND<50	-38	8	10
14.7	ND<50	-35.3	8	11
ND<50	ND<50	0	8	11
21	ND<50	-29	8	12
ND<50	ND<50	0	8	12
ND<50	ND<50	0	8	12
30.1	ND<50	-19.9	8	13
ND<50	ND<50	0	8	13
17.7	32.5	-14.8	8	14
14.3	32.5	-18.2	8	15
28.7	32.5	-3.8	8	16
12	32.5	-20.5	8	17
14.7	32.5	-17.8	8	18
ND<50	32.5	17.5	9	18
21	32.5	-11.5	9	19
ND<50	32.5	17.5	10	19
ND<50	32.5	17.5	11	19
30.1	32.5	-2.4	11	20
ND<50	32.5	17.5	12	20
14.3	17.7	-3.4	12	21
28.7	17.7	11	13	21
12	17.7	-5.7	13	22
14.7	17.7	-3	13	23
ND<50	17.7	32.3	14	23
21	17.7	3.3	15	23
ND<50	17.7	32.3	16	23
ND<50	17.7	32.3	17	23
30.1	17.7	12.4	18	23
ND<50	17.7	32.3	19	23
28.7	14.3	14.4	20	23
12	14.3	-2.3	20	24
14.7	14.3	0.4	21	24

ND<50	14.3	35.7	22	24
21	14.3	6.7	23	24
ND<50	14.3	35.7	24	24
ND<50	14.3	35.7	25	24
30.1	14.3	15.8	26	24
ND<50	14.3	35.7	27	24
12	28.7	-16.7	27	25
14.7	28.7	-14	27	26
ND<50	28.7	21.3	28	26
21	28.7	-7.7	28	27
ND<50	28.7	21.3	29	27
ND<50	28.7	21.3	30	27
30.1	28.7	1.4	31	27
ND<50	28.7	21.3	32	27
14.7	12	2.7	33	27
ND<50	12	38	34	27
21	12	9	35	27
ND<50	12	38	36	27
ND<50	12	38	37	27
30.1	12	18.1	38	27
ND<50	12	38	39	27
ND<50	14.7	35.3	40	27
21	14.7	6.3	41	27
ND<50	14.7	35.3	42	27
ND<50	14.7	35.3	43	27
30.1	14.7	15.4	44	27
ND<50	14.7	35.3	45	27
21	ND<50	-29	45	28
ND<50	ND<50	0	45	28
ND<50	ND<50	0	45	28
30.1	ND<50	-19.9	45	29
ND<50	ND<50	0	45	29
ND<50	21	29	46	29
ND<50	21	29	47	29
30.1	21	9.1	48	29
ND<50	21	29	49	29
ND<50	ND<50	0	49	29
30.1	ND<50	-19.9	49	30
ND<50	ND<50	0	49	30
30.1	ND<50	-19.9	49	31
ND<50	ND<50	0	49	31
ND<50	30.1	19.9	50	31

S Statistic = 50 - 31 = 19

Tied Group	Value	Members
1	50	5

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1
4/8/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 300

B = 0

C = 60

D = 0

E = 20

F = 0

a = 6006

b = 19656

c = 364

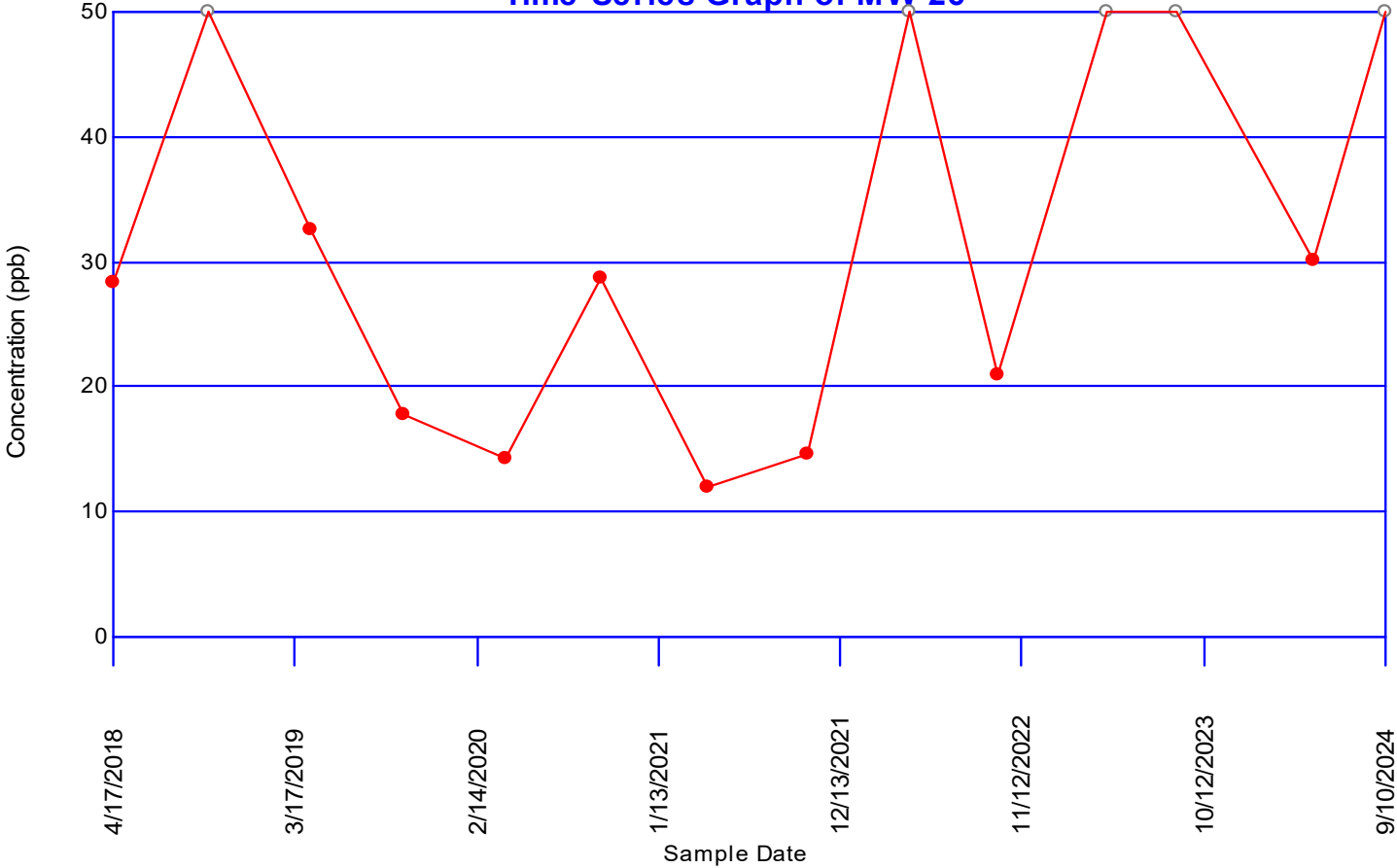
Group Variance = 317

Z-Score = 1.01098

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|1.01098| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Lithium, Total

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.614458	0.268571	0.546	77
2	0.16092	0.268571	0.521	None

Loc.	Date	Conc.	Outlier
MW-27	4/18/2018	56.6	FALSE
	10/9/2018	77	TRUE
	4/13/2019	58.4	FALSE
	10/1/2019	51.6	FALSE
	4/9/2020	46.6	FALSE
	10/1/2020	52.5	FALSE
	4/14/2021	41	FALSE
	10/13/2021	39.1	FALSE
	4/20/2022	ND<55.6	FALSE
	9/28/2022	47.9	FALSE
	4/19/2023	55.3	FALSE
	8/24/2023	44.7	FALSE
	5/1/2024	51.6	FALSE
	9/11/2024	43.8	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lithium, Total

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	39.1	77	37.9	0.5251	19.9013
2	41	58.4	17.4	0.3318	5.77332
3	43.8	56.6	12.8	0.246	3.1488
4	44.7	55.6	10.9	0.1802	1.96418
5	46.6	55.3	8.7	0.124	1.0788
6	47.9	52.5	4.6	0.0727	0.33442
7	51.6	51.6	0	0.024	0
8	51.6	51.6	0		
9	52.5	47.9	-4.6		
10	55.3	46.6	-8.7		
11	55.6	44.7	-10.9		
12	56.6	43.8	-12.8		
13	58.4	41	-17.4		
14	77	39.1	-37.9		

Sum of b values = 32.2008

Sample Standard Deviation = 9.45685

W Statistic = 0.891862

5% Critical value of 0.874 is less than 0.891862

Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.891862

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Lithium, Total

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
77	56.6	20.4	1	0
58.4	56.6	1.8	2	0
51.6	56.6	-5	2	1
46.6	56.6	-10	2	2
52.5	56.6	-4.1	2	3
41	56.6	-15.6	2	4
39.1	56.6	-17.5	2	5
ND<55.6	56.6	-1	2	6
47.9	56.6	-8.7	2	7
55.3	56.6	-1.3	2	8
44.7	56.6	-11.9	2	9
51.6	56.6	-5	2	10
43.8	56.6	-12.8	2	11
58.4	77	-18.6	2	12
51.6	77	-25.4	2	13
46.6	77	-30.4	2	14
52.5	77	-24.5	2	15
41	77	-36	2	16
39.1	77	-37.9	2	17
ND<55.6	77	-21.4	2	18
47.9	77	-29.1	2	19
55.3	77	-21.7	2	20
44.7	77	-32.3	2	21
51.6	77	-25.4	2	22
43.8	77	-33.2	2	23
51.6	58.4	-6.8	2	24
46.6	58.4	-11.8	2	25
52.5	58.4	-5.9	2	26
41	58.4	-17.4	2	27
39.1	58.4	-19.3	2	28
ND<55.6	58.4	-2.8	2	29
47.9	58.4	-10.5	2	30
55.3	58.4	-3.1	2	31
44.7	58.4	-13.7	2	32
51.6	58.4	-6.8	2	33
43.8	58.4	-14.6	2	34
46.6	51.6	-5	2	35
52.5	51.6	0.9	3	35
41	51.6	-10.6	3	36
39.1	51.6	-12.5	3	37
ND<55.6	51.6	4	4	37
47.9	51.6	-3.7	4	38
55.3	51.6	3.7	5	38
44.7	51.6	-6.9	5	39
51.6	51.6	0	5	39
43.8	51.6	-7.8	5	40
52.5	46.6	5.9	6	40
41	46.6	-5.6	6	41
39.1	46.6	-7.5	6	42

ND<55.6	46.6	9	7	42
47.9	46.6	1.3	8	42
55.3	46.6	8.7	9	42
44.7	46.6	-1.9	9	43
51.6	46.6	5	10	43
43.8	46.6	-2.8	10	44
41	52.5	-11.5	10	45
39.1	52.5	-13.4	10	46
ND<55.6	52.5	3.1	11	46
47.9	52.5	-4.6	11	47
55.3	52.5	2.8	12	47
44.7	52.5	-7.8	12	48
51.6	52.5	-0.9	12	49
43.8	52.5	-8.7	12	50
39.1	41	-1.9	12	51
ND<55.6	41	14.6	13	51
47.9	41	6.9	14	51
55.3	41	14.3	15	51
44.7	41	3.7	16	51
51.6	41	10.6	17	51
43.8	41	2.8	18	51
ND<55.6	39.1	16.5	19	51
47.9	39.1	8.8	20	51
55.3	39.1	16.2	21	51
44.7	39.1	5.6	22	51
51.6	39.1	12.5	23	51
43.8	39.1	4.7	24	51
47.9	ND<55.6	-7.7	24	52
55.3	ND<55.6	-0.3	24	53
44.7	ND<55.6	-10.9	24	54
51.6	ND<55.6	-4	24	55
43.8	ND<55.6	-11.8	24	56
55.3	47.9	7.4	25	56
44.7	47.9	-3.2	25	57
51.6	47.9	3.7	26	57
43.8	47.9	-4.1	26	58
44.7	55.3	-10.6	26	59
51.6	55.3	-3.7	26	60
43.8	55.3	-11.5	26	61
51.6	44.7	6.9	27	61
43.8	44.7	-0.9	27	62
43.8	51.6	-7.8	27	63

S Statistic = 27 - 63 = -36

Tied Group	Value	Members
1	51.6	2

Time Period	Observations
4/18/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1
4/9/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

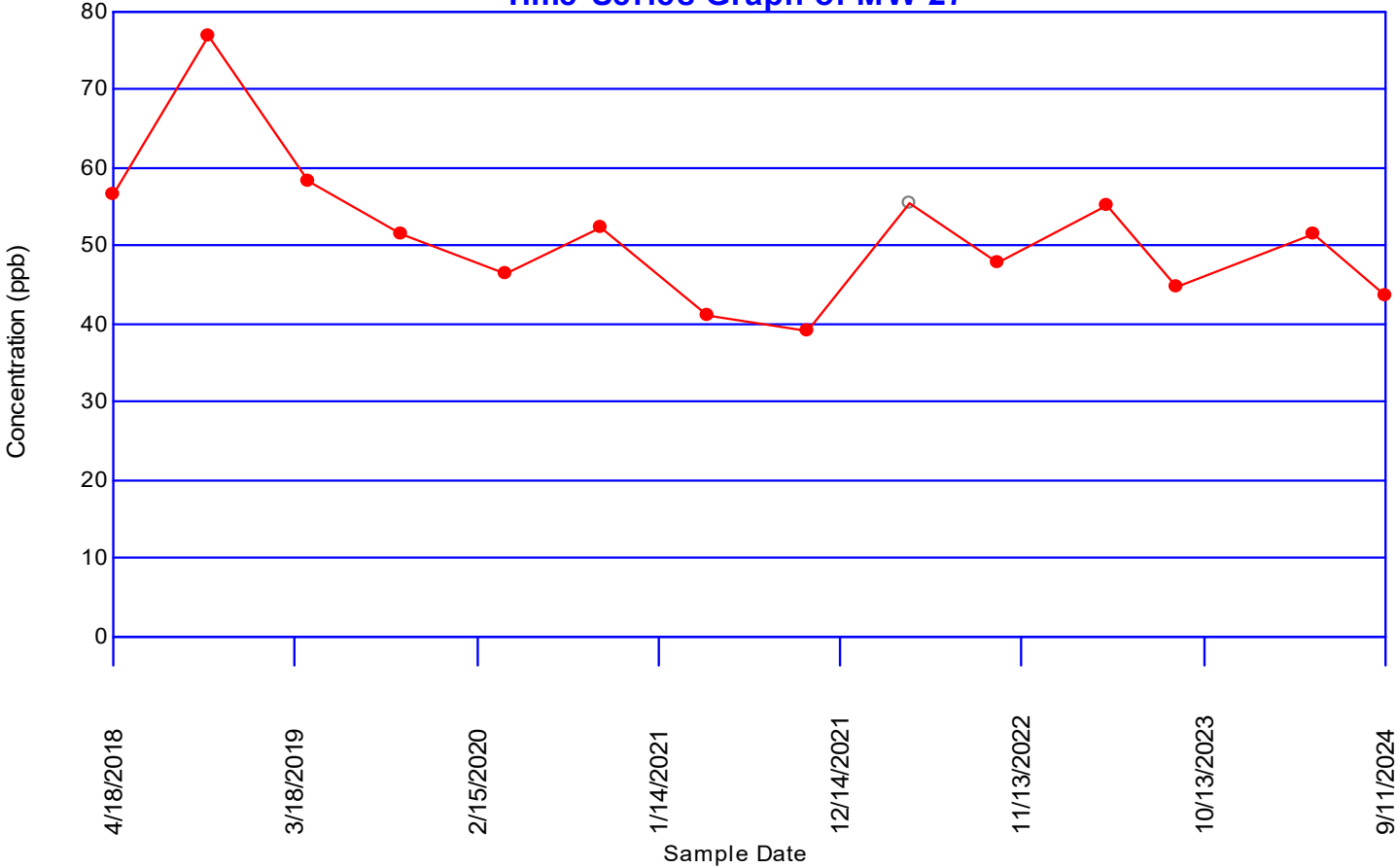
Group Variance = 332.667

Z-Score = -1.91895

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-1.91895| \leq 1.97737$ indicating no evidence of a trend

Lithium, Total Time-Series Graph of MW-27



Concentrations (ppb)

Parameter: Manganese, Total

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 25

Percent Non-Detects: 14.881%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 14 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	14	2 (14.2857%)	4/18/2018	14.5	14.5
			10/10/2018	ND<80	ND<80
			4/13/2019	7.77	7.77
			10/1/2019	7.88	7.88
			4/9/2020	90.1	90.1
			10/1/2020	64.8	64.8
			4/14/2021	33.7	33.7
			10/13/2021	44.9	44.9
			4/20/2022	24.5	24.5
			9/28/2022	171	171
			4/19/2023	ND<5	ND<5
			8/24/2023	19.6	19.6
			5/1/2024	12.4	12.4
			9/11/2024	35.5	35.5
10/7/2015	107	107			
4/20/2016	ND<4	ND<4			
10/12/2016	6.95	6.95			
4/19/2017	ND<4	ND<4			
10/12/2017	8.14	8.14			

MW-06	14	0 (0%)	4/18/2018	124	124
			10/10/2018	549	549
			4/14/2019	78.6	78.6
			10/2/2019	200	200
			4/8/2020	90.9	90.9
			9/30/2020	436	436
			4/13/2021	55.7	55.7
			10/14/2021	703	703
			4/20/2022	72.9	72.9
			9/27/2022	253	253
			4/18/2023	14.9	14.9
			8/23/2023	575	575
			5/1/2024	71.2	71.2
			9/12/2024	185	185
10/7/2015	220	220			
4/19/2016	ND<4	ND<4			
10/12/2016	6560	6560			
4/19/2017	192	192			
10/12/2017	2020	2020			

MW-07	14	0 (0%)	4/18/2018	84.4	84.4
			10/10/2018	2330	2330
			4/14/2019	78.3	78.3
			10/2/2019	1760	1760
			4/8/2020	1280	1280
			9/30/2020	1490	1490
			4/13/2021	1300	1300

			10/14/2021	1490	1490
			4/20/2022	1460	1460
			9/27/2022	1580	1580
			4/18/2023	54.3	54.3
			8/23/2023	1410	1410
			5/1/2024	114	114
			9/11/2024	1780	1780
			10/7/2015	2040	2040
			4/19/2016	245	245
			10/12/2016	724	724
			4/19/2017	132	132
			10/12/2017	1820	1820
<hr/>					
MW-12	14	11 (78.5714%)	4/17/2018	3.44	3.44
			10/9/2018	ND<80	ND<80
			4/14/2019	ND<4	ND<4
			10/2/2019	ND<5	ND<5
			4/8/2020	2.82	2.82
			10/1/2020	6.43	6.43
			4/15/2021	ND<5	ND<5
			10/14/2021	ND<10	ND<10
			4/19/2022	ND<10	ND<10
			9/28/2022	ND<10	ND<10
			4/18/2023	ND<5	ND<5
			8/24/2023	ND<5	ND<5
			5/1/2024	ND<5	ND<5
			9/12/2024	ND<5	ND<5
			10/8/2015	24.8	24.8
			4/20/2016	ND<4	ND<4
			10/11/2016	ND<4	ND<4
			4/18/2017	ND<4	ND<4
			10/10/2017	ND<4	ND<4
<hr/>					
MW-16	14	0 (0%)	4/17/2018	477	477
			10/9/2018	91	91
			4/14/2019	97.1	97.1
			10/2/2019	72.3	72.3
			4/9/2020	57.8	57.8
			10/1/2020	74.2	74.2
			4/15/2021	75.5	75.5
			10/14/2021	73.5	73.5
			4/19/2022	126	126
			9/28/2022	181	181
			4/18/2023	59.5	59.5
			8/24/2023	110	110
			5/2/2024	117	117
			9/12/2024	61.6	61.6
			10/8/2015	376	376
			4/20/2016	467	467
			10/11/2016	77	77
			4/18/2017	212	212
			10/10/2017	82.7	82.7
<hr/>					
MW-20	14	12 (85.7143%)	4/17/2018	ND<4	ND<4
			10/10/2018	ND<80	ND<80
			4/14/2019	ND<4	ND<4
			10/2/2019	ND<5	ND<5
			4/9/2020	2.68	2.68
			10/2/2020	ND<5	ND<5
			4/15/2021	5	5
			10/12/2021	ND<10	ND<10
			4/20/2022	ND<10	ND<10
			9/28/2022	ND<10	ND<10

			4/19/2023	ND<5	ND<5
			8/23/2023	ND<5	ND<5
			4/30/2024	ND<5	ND<5
			9/11/2024	ND<5	ND<5
			10/8/2015	61.8	61.8
			4/21/2016	ND<4	ND<4
			10/12/2016	ND<4	ND<4
			4/18/2017	ND<4	ND<4
			10/12/2017	ND<4	ND<4
MW-21	14	0 (0%)	4/17/2018	553	553
			10/10/2018	69.5	69.5
			4/13/2019	67.6	67.6
			10/1/2019	47.5	47.5
			4/7/2020	43.6	43.6
			9/30/2020	48.6	48.6
			4/14/2021	51.2	51.2
			10/12/2021	21.7	21.7
			4/20/2022	79	79
			9/29/2022	44.4	44.4
			4/18/2023	161	161
			8/23/2023	21.6	21.6
			5/1/2024	36.6	36.6
			9/11/2024	21.5	21.5
			10/6/2015	331	331
			4/21/2016	657	657
			10/11/2016	752	752
			4/18/2017	766	766
			10/12/2017	116	116
MW-25	14	0 (0%)	4/17/2018	12	12
			10/9/2018	277	277
			4/13/2019	30.1	30.1
			10/1/2019	79.2	79.2
			4/8/2020	54.5	54.5
			10/1/2020	24.1	24.1
			4/14/2021	16.7	16.7
			10/13/2021	29.7	29.7
			4/19/2022	93.7	93.7
			9/29/2022	22.3	22.3
			4/19/2023	3.76	3.76
			8/24/2023	9.12	9.12
			4/29/2024	18.3	18.3
			9/10/2024	102	102
			10/6/2015	146	146
			4/21/2016	13.6	13.6
			10/11/2016	4.9	4.9
			4/18/2017	ND<4	ND<4
			10/10/2017	9.37	9.37
MW-26	14	0 (0%)	4/17/2018	4000	4000
			10/9/2018	5140	5140
			4/13/2019	2630	2630
			10/1/2019	3450	3450
			4/8/2020	2620	2620
			10/1/2020	3070	3070
			4/14/2021	2720	2720
			10/13/2021	2500	2500
			4/19/2022	2670	2670
			9/29/2022	3390	3390
			4/19/2023	3350	3350
			8/24/2023	2830	2830
			4/29/2024	3020	3020

			9/10/2024	2540	2540
			10/6/2015	5180	5180
			4/21/2016	5440	5440
			10/11/2016	4470	4470
			4/18/2017	4440	4440
			10/10/2017	3230	3230
MW-27	14	0 (0%)	4/18/2018	139	139
			10/9/2018	186	186
			4/13/2019	138	138
			10/1/2019	134	134
			4/9/2020	147	147
			10/1/2020	128	128
			4/14/2021	114	114
			10/13/2021	135	135
			4/20/2022	131	131
			9/28/2022	220	220
			4/19/2023	153	153
			8/24/2023	162	162
			5/1/2024	146	146
			9/11/2024	141	141
			10/7/2015	149	149
			4/20/2016	241	241
			10/12/2016	200	200
			4/19/2017	189	189
			10/12/2017	129	129
SW-01	14	0 (0%)	4/16/2018	375	375
			10/8/2018	184	184
			4/13/2019	510	510
			9/30/2019	275	275
			4/7/2020	817	817
			10/2/2020	533	533
			4/13/2021	254	254
			10/14/2021	245	245
			4/19/2022	340	340
			9/27/2022	572	572
			4/18/2023	497	497
			8/22/2023	710	710
			4/30/2024	308	308
			9/10/2024	228	228
			4/21/2016	831	831
			10/10/2016	849	849
			4/17/2017	437	437
			10/9/2017	311	311
SW-02	14	0 (0%)	4/16/2018	506	506
			10/8/2018	188	188
			4/13/2019	350	350
			9/30/2019	91	91
			4/7/2020	417	417
			10/2/2020	292	292
			4/13/2021	88.2	88.2
			10/14/2021	195	195
			4/19/2022	624	624
			9/27/2022	164	164
			4/18/2023	741	741
			8/22/2023	229	229
			4/30/2024	135	135
			9/10/2024	42.7	42.7
			4/21/2016	774	774
			10/10/2016	318	318
			4/17/2017	344	344

			10/9/2017	382	382
SW-03	0	0	4/21/2016	761	761
SW-04	0	0	4/21/2016	718	718

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Manganese, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.243748	0.105411	0.546	None

Loc.	Date	Conc.	Outlier
MW-06	4/18/2018	124	FALSE
	10/10/2018	549	FALSE
	4/14/2019	78.6	FALSE
	10/2/2019	200	FALSE
	4/8/2020	90.9	FALSE
	9/30/2020	436	FALSE
	4/13/2021	55.7	FALSE
	10/14/2021	703	FALSE
	4/20/2022	72.9	FALSE
	9/27/2022	253	FALSE
	4/18/2023	14.9	FALSE
	8/23/2023	575	FALSE
	5/1/2024	71.2	FALSE
	9/12/2024	185	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: MW-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	14.9	703	688.1	0.5251	361.321
2	55.7	575	519.3	0.3318	172.304
3	71.2	549	477.8	0.246	117.539
4	72.9	436	363.1	0.1802	65.4306
5	78.6	253	174.4	0.124	21.6256
6	90.9	200	109.1	0.0727	7.93157
7	124	185	61	0.024	1.464
8	185	124	-61		
9	200	90.9	-109.1		
10	253	78.6	-174.4		
11	436	72.9	-363.1		
12	549	71.2	-477.8		
13	575	55.7	-519.3		
14	703	14.9	-688.1		

Sum of b values = 747.616

Sample Standard Deviation = 226.665

W Statistic = 0.836844

5% Critical value of 0.874 exceeds 0.836844
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.836844
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
549	124	425	1	0
78.6	124	-45.4	1	1
200	124	76	2	1
90.9	124	-33.1	2	2
436	124	312	3	2
55.7	124	-68.3	3	3
703	124	579	4	3
72.9	124	-51.1	4	4
253	124	129	5	4
14.9	124	-109.1	5	5
575	124	451	6	5
71.2	124	-52.8	6	6
185	124	61	7	6
78.6	549	-470.4	7	7
200	549	-349	7	8
90.9	549	-458.1	7	9
436	549	-113	7	10
55.7	549	-493.3	7	11
703	549	154	8	11
72.9	549	-476.1	8	12
253	549	-296	8	13
14.9	549	-534.1	8	14
575	549	26	9	14
71.2	549	-477.8	9	15
185	549	-364	9	16
200	78.6	121.4	10	16
90.9	78.6	12.3	11	16
436	78.6	357.4	12	16
55.7	78.6	-22.9	12	17
703	78.6	624.4	13	17
72.9	78.6	-5.7	13	18
253	78.6	174.4	14	18
14.9	78.6	-63.7	14	19
575	78.6	496.4	15	19
71.2	78.6	-7.4	15	20
185	78.6	106.4	16	20
90.9	200	-109.1	16	21
436	200	236	17	21
55.7	200	-144.3	17	22
703	200	503	18	22
72.9	200	-127.1	18	23
253	200	53	19	23
14.9	200	-185.1	19	24
575	200	375	20	24
71.2	200	-128.8	20	25
185	200	-15	20	26
436	90.9	345.1	21	26
55.7	90.9	-35.2	21	27
703	90.9	612.1	22	27

72.9	90.9	-18	22	28
253	90.9	162.1	23	28
14.9	90.9	-76	23	29
575	90.9	484.1	24	29
71.2	90.9	-19.7	24	30
185	90.9	94.1	25	30
55.7	436	-380.3	25	31
703	436	267	26	31
72.9	436	-363.1	26	32
253	436	-183	26	33
14.9	436	-421.1	26	34
575	436	139	27	34
71.2	436	-364.8	27	35
185	436	-251	27	36
703	55.7	647.3	28	36
72.9	55.7	17.2	29	36
253	55.7	197.3	30	36
14.9	55.7	-40.8	30	37
575	55.7	519.3	31	37
71.2	55.7	15.5	32	37
185	55.7	129.3	33	37
72.9	703	-630.1	33	38
253	703	-450	33	39
14.9	703	-688.1	33	40
575	703	-128	33	41
71.2	703	-631.8	33	42
185	703	-518	33	43
253	72.9	180.1	34	43
14.9	72.9	-58	34	44
575	72.9	502.1	35	44
71.2	72.9	-1.7	35	45
185	72.9	112.1	36	45
14.9	253	-238.1	36	46
575	253	322	37	46
71.2	253	-181.8	37	47
185	253	-68	37	48
575	14.9	560.1	38	48
71.2	14.9	56.3	39	48
185	14.9	170.1	40	48
71.2	575	-503.8	40	49
185	575	-390	40	50
185	71.2	113.8	41	50

S Statistic = 41 - 50 = -9

Tied Group	Value	Members
Time Period		Observations
4/18/2018		1
10/10/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
9/30/2020		1

4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

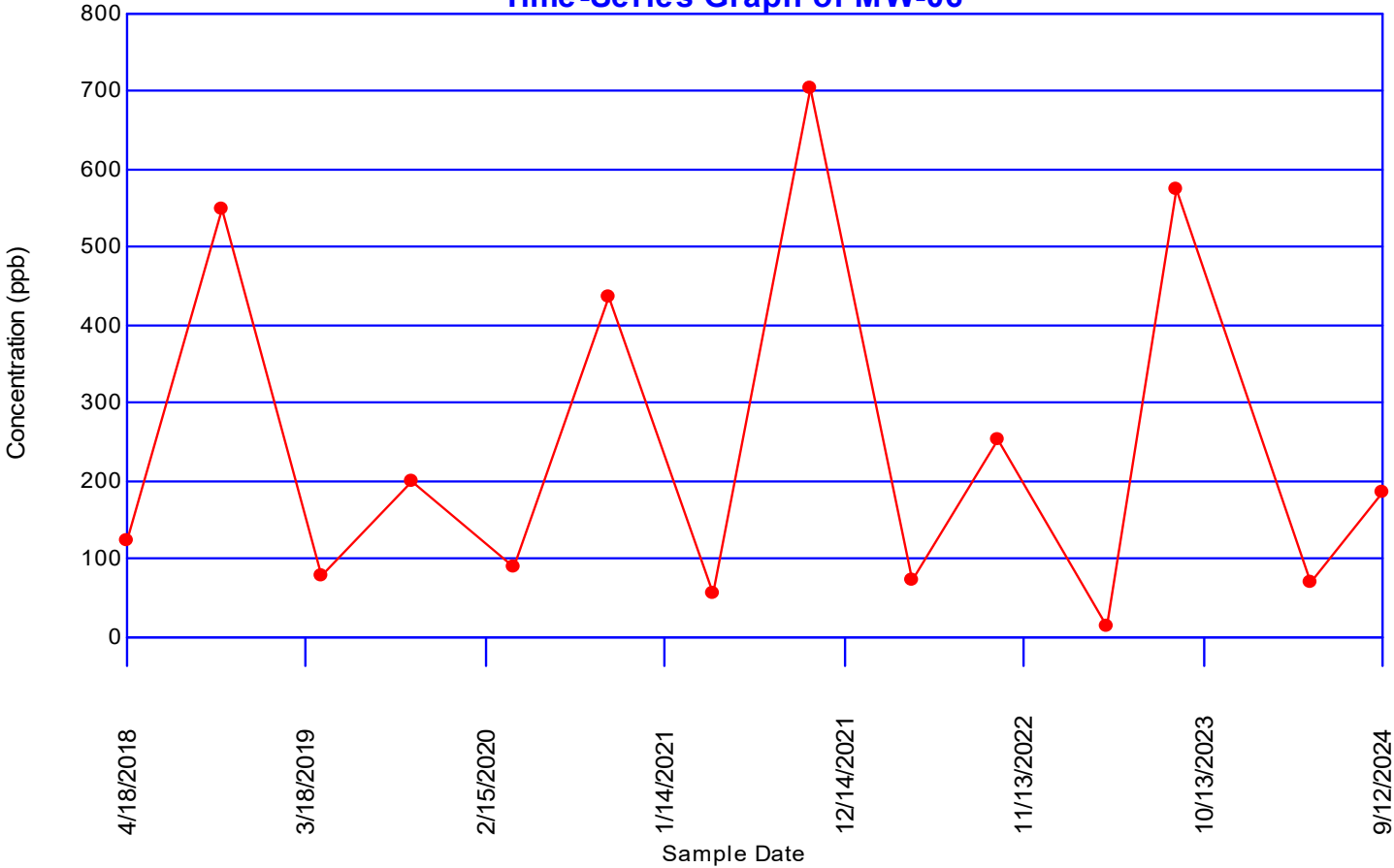
Group Variance = 333.667

Z-Score = -0.437959

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.437959| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of MW-06



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.25383	0.0176467	0.546	None

Loc.	Date	Conc.	Outlier
MW-07	4/18/2018	84.4	FALSE
	10/10/2018	2330	FALSE
	4/14/2019	78.3	FALSE
	10/2/2019	1760	FALSE
	4/8/2020	1280	FALSE
	9/30/2020	1490	FALSE
	4/13/2021	1300	FALSE
	10/14/2021	1490	FALSE
	4/20/2022	1460	FALSE
	9/27/2022	1580	FALSE
	4/18/2023	54.3	FALSE
	8/23/2023	1410	FALSE
	5/1/2024	114	FALSE
	9/11/2024	1780	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	54.3	2330	2275.7	0.5251	1194.97
2	78.3	1780	1701.7	0.3318	564.624
3	84.4	1760	1675.6	0.246	412.198
4	114	1580	1466	0.1802	264.173
5	1280	1490	210	0.124	26.04
6	1300	1490	190	0.0727	13.813
7	1410	1460	50	0.024	1.2
8	1460	1410	-50		
9	1490	1300	-190		
10	1490	1280	-210		
11	1580	114	-1466		
12	1760	84.4	-1675.6		
13	1780	78.3	-1701.7		
14	2330	54.3	-2275.7		

Sum of b values = 2477.02

Sample Standard Deviation = 751.287

W Statistic = 0.836187

5% Critical value of 0.874 exceeds 0.836187
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.836187
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
2330	84.4	2245.6	1	0
78.3	84.4	-6.1	1	1
1760	84.4	1675.6	2	1
1280	84.4	1195.6	3	1
1490	84.4	1405.6	4	1
1300	84.4	1215.6	5	1
1490	84.4	1405.6	6	1
1460	84.4	1375.6	7	1
1580	84.4	1495.6	8	1
54.3	84.4	-30.1	8	2
1410	84.4	1325.6	9	2
114	84.4	29.6	10	2
1780	84.4	1695.6	11	2
78.3	2330	-2251.7	11	3
1760	2330	-570	11	4
1280	2330	-1050	11	5
1490	2330	-840	11	6
1300	2330	-1030	11	7
1490	2330	-840	11	8
1460	2330	-870	11	9
1580	2330	-750	11	10
54.3	2330	-2275.7	11	11
1410	2330	-920	11	12
114	2330	-2216	11	13
1780	2330	-550	11	14
1760	78.3	1681.7	12	14
1280	78.3	1201.7	13	14
1490	78.3	1411.7	14	14
1300	78.3	1221.7	15	14
1490	78.3	1411.7	16	14
1460	78.3	1381.7	17	14
1580	78.3	1501.7	18	14
54.3	78.3	-24	18	15
1410	78.3	1331.7	19	15
114	78.3	35.7	20	15
1780	78.3	1701.7	21	15
1280	1760	-480	21	16
1490	1760	-270	21	17
1300	1760	-460	21	18
1490	1760	-270	21	19
1460	1760	-300	21	20
1580	1760	-180	21	21
54.3	1760	-1705.7	21	22
1410	1760	-350	21	23
114	1760	-1646	21	24
1780	1760	20	22	24
1490	1280	210	23	24
1300	1280	20	24	24
1490	1280	210	25	24

1460	1280	180	26	24
1580	1280	300	27	24
54.3	1280	-1225.7	27	25
1410	1280	130	28	25
114	1280	-1166	28	26
1780	1280	500	29	26
1300	1490	-190	29	27
1490	1490	0	29	27
1460	1490	-30	29	28
1580	1490	90	30	28
54.3	1490	-1435.7	30	29
1410	1490	-80	30	30
114	1490	-1376	30	31
1780	1490	290	31	31
1490	1300	190	32	31
1460	1300	160	33	31
1580	1300	280	34	31
54.3	1300	-1245.7	34	32
1410	1300	110	35	32
114	1300	-1186	35	33
1780	1300	480	36	33
1460	1490	-30	36	34
1580	1490	90	37	34
54.3	1490	-1435.7	37	35
1410	1490	-80	37	36
114	1490	-1376	37	37
1780	1490	290	38	37
1580	1460	120	39	37
54.3	1460	-1405.7	39	38
1410	1460	-50	39	39
114	1460	-1346	39	40
1780	1460	320	40	40
54.3	1580	-1525.7	40	41
1410	1580	-170	40	42
114	1580	-1466	40	43
1780	1580	200	41	43
1410	54.3	1355.7	42	43
114	54.3	59.7	43	43
1780	54.3	1725.7	44	43
114	1410	-1296	44	44
1780	1410	370	45	44
1780	114	1666	46	44

S Statistic = 46 - 44 = 2

Tied Group	Value	Members
1	1490	2

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1
4/8/2020	1

9/30/2020	1
4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

Group Variance = 332.667

Z-Score = 0.0548271

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.0548271| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.844969	0.0557185	0.546	477
2	0.526749	0.0557185	0.521	181
3	0.240602	0.0641892	0.546	None

Loc.	Date	Conc.	Outlier
MW-16	4/17/2018	477	TRUE
	10/9/2018	91	FALSE
	4/14/2019	97.1	FALSE
	10/2/2019	72.3	FALSE
	4/9/2020	57.8	FALSE
	10/1/2020	74.2	FALSE
	4/15/2021	75.5	FALSE
	10/14/2021	73.5	FALSE
	4/19/2022	126	FALSE
	9/28/2022	181	TRUE
	4/18/2023	59.5	FALSE
	8/24/2023	110	FALSE
	5/2/2024	117	FALSE
	9/12/2024	61.6	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	57.8	477	419.2	0.5251	220.122
2	59.5	181	121.5	0.3318	40.3137
3	61.6	126	64.4	0.246	15.8424
4	72.3	117	44.7	0.1802	8.05494
5	73.5	110	36.5	0.124	4.526
6	74.2	97.1	22.9	0.0727	1.66483
7	75.5	91	15.5	0.024	0.372
8	91	75.5	-15.5		
9	97.1	74.2	-22.9		
10	110	73.5	-36.5		
11	117	72.3	-44.7		
12	126	61.6	-64.4		
13	181	59.5	-121.5		
14	477	57.8	-419.2		

Sum of b values = 290.896

Sample Standard Deviation = 108.178

W Statistic = 0.556228

5% Critical value of 0.874 exceeds 0.556228
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.556228
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
91	477	-386	0	1
97.1	477	-379.9	0	2
72.3	477	-404.7	0	3
57.8	477	-419.2	0	4
74.2	477	-402.8	0	5
75.5	477	-401.5	0	6
73.5	477	-403.5	0	7
126	477	-351	0	8
181	477	-296	0	9
59.5	477	-417.5	0	10
110	477	-367	0	11
117	477	-360	0	12
61.6	477	-415.4	0	13
97.1	91	6.1	1	13
72.3	91	-18.7	1	14
57.8	91	-33.2	1	15
74.2	91	-16.8	1	16
75.5	91	-15.5	1	17
73.5	91	-17.5	1	18
126	91	35	2	18
181	91	90	3	18
59.5	91	-31.5	3	19
110	91	19	4	19
117	91	26	5	19
61.6	91	-29.4	5	20
72.3	97.1	-24.8	5	21
57.8	97.1	-39.3	5	22
74.2	97.1	-22.9	5	23
75.5	97.1	-21.6	5	24
73.5	97.1	-23.6	5	25
126	97.1	28.9	6	25
181	97.1	83.9	7	25
59.5	97.1	-37.6	7	26
110	97.1	12.9	8	26
117	97.1	19.9	9	26
61.6	97.1	-35.5	9	27
57.8	72.3	-14.5	9	28
74.2	72.3	1.9	10	28
75.5	72.3	3.2	11	28
73.5	72.3	1.2	12	28
126	72.3	53.7	13	28
181	72.3	108.7	14	28
59.5	72.3	-12.8	14	29
110	72.3	37.7	15	29
117	72.3	44.7	16	29
61.6	72.3	-10.7	16	30
74.2	57.8	16.4	17	30
75.5	57.8	17.7	18	30
73.5	57.8	15.7	19	30

126	57.8	68.2	20	30
181	57.8	123.2	21	30
59.5	57.8	1.7	22	30
110	57.8	52.2	23	30
117	57.8	59.2	24	30
61.6	57.8	3.8	25	30
75.5	74.2	1.3	26	30
73.5	74.2	-0.7	26	31
126	74.2	51.8	27	31
181	74.2	106.8	28	31
59.5	74.2	-14.7	28	32
110	74.2	35.8	29	32
117	74.2	42.8	30	32
61.6	74.2	-12.6	30	33
73.5	75.5	-2	30	34
126	75.5	50.5	31	34
181	75.5	105.5	32	34
59.5	75.5	-16	32	35
110	75.5	34.5	33	35
117	75.5	41.5	34	35
61.6	75.5	-13.9	34	36
126	73.5	52.5	35	36
181	73.5	107.5	36	36
59.5	73.5	-14	36	37
110	73.5	36.5	37	37
117	73.5	43.5	38	37
61.6	73.5	-11.9	38	38
181	126	55	39	38
59.5	126	-66.5	39	39
110	126	-16	39	40
117	126	-9	39	41
61.6	126	-64.4	39	42
59.5	181	-121.5	39	43
110	181	-71	39	44
117	181	-64	39	45
61.6	181	-119.4	39	46
110	59.5	50.5	40	46
117	59.5	57.5	41	46
61.6	59.5	2.1	42	46
117	110	7	43	46
61.6	110	-48.4	43	47
61.6	117	-55.4	43	48

S Statistic = 43 - 48 = -5

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/9/2018		1
4/14/2019		1
10/2/2019		1
4/9/2020		1
10/1/2020		1

4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/2/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

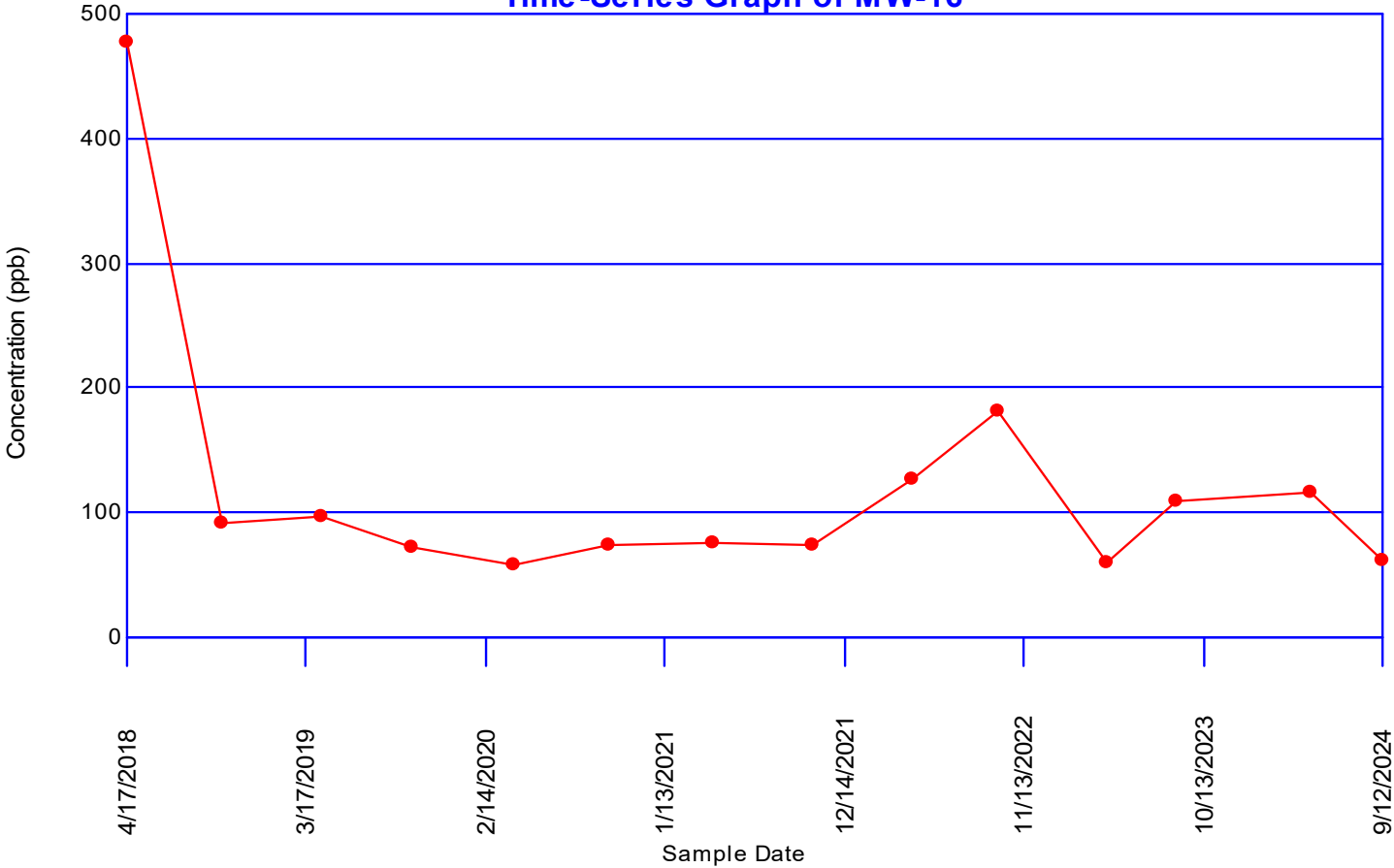
Group Variance = 333.667

Z-Score = -0.21898

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.21898| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.892151	0.00347826	0.546	553
2	0.656385	0.00347826	0.521	161
3	0.198606	0.00416667	0.546	None

Loc.	Date	Conc.	Outlier
MW-21	4/17/2018	553	TRUE
	10/10/2018	69.5	FALSE
	4/13/2019	67.6	FALSE
	10/1/2019	47.5	FALSE
	4/7/2020	43.6	FALSE
	9/30/2020	48.6	FALSE
	4/14/2021	51.2	FALSE
	10/12/2021	21.7	FALSE
	4/20/2022	79	FALSE
	9/29/2022	44.4	FALSE
	4/18/2023	161	TRUE
	8/23/2023	21.6	FALSE
	5/1/2024	36.6	FALSE
	9/11/2024	21.5	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: MW-21

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	21.5	553	531.5	0.5251	279.091
2	21.6	161	139.4	0.3318	46.2529
3	21.7	79	57.3	0.246	14.0958
4	36.6	69.5	32.9	0.1802	5.92858
5	43.6	67.6	24	0.124	2.976
6	44.4	51.2	6.8	0.0727	0.49436
7	47.5	48.6	1.1	0.024	0.0264
8	48.6	47.5	-1.1		
9	51.2	44.4	-6.8		
10	67.6	43.6	-24		
11	69.5	36.6	-32.9		
12	79	21.7	-57.3		
13	161	21.6	-139.4		
14	553	21.5	-531.5		

Sum of b values = 348.865

Sample Standard Deviation = 137.727

W Statistic = 0.493549

5% Critical value of 0.874 exceeds 0.493549
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.493549
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
69.5	553	-483.5	0	1
67.6	553	-485.4	0	2
47.5	553	-505.5	0	3
43.6	553	-509.4	0	4
48.6	553	-504.4	0	5
51.2	553	-501.8	0	6
21.7	553	-531.3	0	7
79	553	-474	0	8
44.4	553	-508.6	0	9
161	553	-392	0	10
21.6	553	-531.4	0	11
36.6	553	-516.4	0	12
21.5	553	-531.5	0	13
67.6	69.5	-1.9	0	14
47.5	69.5	-22	0	15
43.6	69.5	-25.9	0	16
48.6	69.5	-20.9	0	17
51.2	69.5	-18.3	0	18
21.7	69.5	-47.8	0	19
79	69.5	9.5	1	19
44.4	69.5	-25.1	1	20
161	69.5	91.5	2	20
21.6	69.5	-47.9	2	21
36.6	69.5	-32.9	2	22
21.5	69.5	-48	2	23
47.5	67.6	-20.1	2	24
43.6	67.6	-24	2	25
48.6	67.6	-19	2	26
51.2	67.6	-16.4	2	27
21.7	67.6	-45.9	2	28
79	67.6	11.4	3	28
44.4	67.6	-23.2	3	29
161	67.6	93.4	4	29
21.6	67.6	-46	4	30
36.6	67.6	-31	4	31
21.5	67.6	-46.1	4	32
43.6	47.5	-3.9	4	33
48.6	47.5	1.1	5	33
51.2	47.5	3.7	6	33
21.7	47.5	-25.8	6	34
79	47.5	31.5	7	34
44.4	47.5	-3.1	7	35
161	47.5	113.5	8	35
21.6	47.5	-25.9	8	36
36.6	47.5	-10.9	8	37
21.5	47.5	-26	8	38
48.6	43.6	5	9	38
51.2	43.6	7.6	10	38
21.7	43.6	-21.9	10	39

79	43.6	35.4	11	39
44.4	43.6	0.8	12	39
161	43.6	117.4	13	39
21.6	43.6	-22	13	40
36.6	43.6	-7	13	41
21.5	43.6	-22.1	13	42
51.2	48.6	2.6	14	42
21.7	48.6	-26.9	14	43
79	48.6	30.4	15	43
44.4	48.6	-4.2	15	44
161	48.6	112.4	16	44
21.6	48.6	-27	16	45
36.6	48.6	-12	16	46
21.5	48.6	-27.1	16	47
21.7	51.2	-29.5	16	48
79	51.2	27.8	17	48
44.4	51.2	-6.8	17	49
161	51.2	109.8	18	49
21.6	51.2	-29.6	18	50
36.6	51.2	-14.6	18	51
21.5	51.2	-29.7	18	52
79	21.7	57.3	19	52
44.4	21.7	22.7	20	52
161	21.7	139.3	21	52
21.6	21.7	-0.1	21	53
36.6	21.7	14.9	22	53
21.5	21.7	-0.2	22	54
44.4	79	-34.6	22	55
161	79	82	23	55
21.6	79	-57.4	23	56
36.6	79	-42.4	23	57
21.5	79	-57.5	23	58
161	44.4	116.6	24	58
21.6	44.4	-22.8	24	59
36.6	44.4	-7.8	24	60
21.5	44.4	-22.9	24	61
21.6	161	-139.4	24	62
36.6	161	-124.4	24	63
21.5	161	-139.5	24	64
36.6	21.6	15	25	64
21.5	21.6	-0.1	25	65
21.5	36.6	-15.1	25	66

S Statistic = 25 - 66 = -41

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/10/2018		1
4/13/2019		1
10/1/2019		1
4/7/2020		1
9/30/2020		1

4/14/2021	1
10/12/2021	1
4/20/2022	1
9/29/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

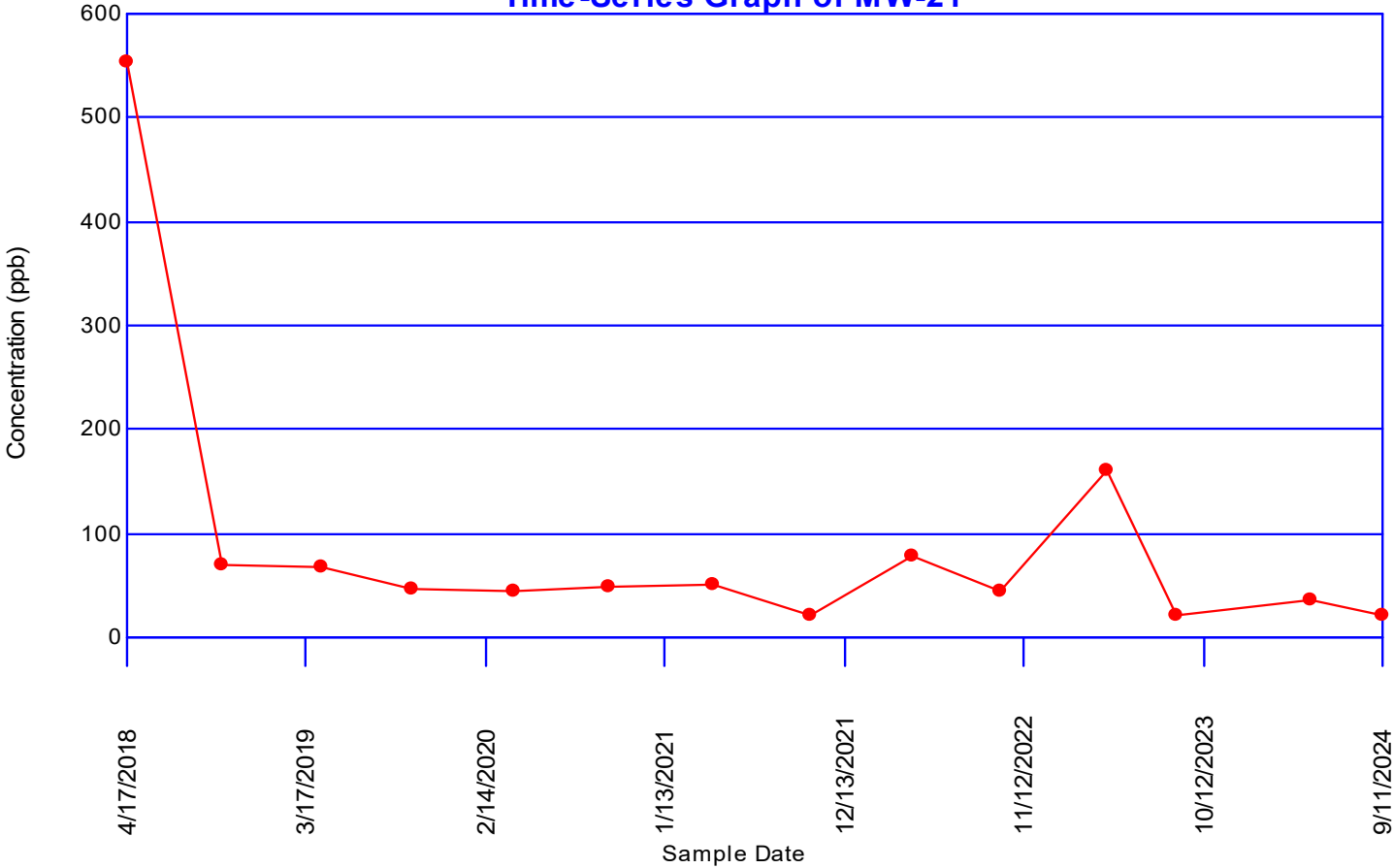
Group Variance = 333.667

Z-Score = -2.1898

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-2.1898| > 1.97737$ indicating a trend

Manganese, Total Time-Series Graph of MW-21



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.670635	0.126316	0.546	5140
2	0.417808	0.126316	0.521	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	4000	FALSE
	10/9/2018	5140	TRUE
	4/13/2019	2630	FALSE
	10/1/2019	3450	FALSE
	4/8/2020	2620	FALSE
	10/1/2020	3070	FALSE
	4/14/2021	2720	FALSE
	10/13/2021	2500	FALSE
	4/19/2022	2670	FALSE
	9/29/2022	3390	FALSE
	4/19/2023	3350	FALSE
	8/24/2023	2830	FALSE
	4/29/2024	3020	FALSE
	9/10/2024	2540	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2500	5140	2640	0.5251	1386.26
2	2540	4000	1460	0.3318	484.428
3	2620	3450	830	0.246	204.18
4	2630	3390	760	0.1802	136.952
5	2670	3350	680	0.124	84.32
6	2720	3070	350	0.0727	25.445
7	2830	3020	190	0.024	4.56
8	3020	2830	-190		
9	3070	2720	-350		
10	3350	2670	-680		
11	3390	2630	-760		
12	3450	2620	-830		
13	4000	2540	-1460		
14	5140	2500	-2640		

Sum of b values = 2326.15

Sample Standard Deviation = 720.845

W Statistic = 0.801027

5% Critical value of 0.874 exceeds 0.801027

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.801027

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
5140	4000	1140	1	0
2630	4000	-1370	1	1
3450	4000	-550	1	2
2620	4000	-1380	1	3
3070	4000	-930	1	4
2720	4000	-1280	1	5
2500	4000	-1500	1	6
2670	4000	-1330	1	7
3390	4000	-610	1	8
3350	4000	-650	1	9
2830	4000	-1170	1	10
3020	4000	-980	1	11
2540	4000	-1460	1	12
2630	5140	-2510	1	13
3450	5140	-1690	1	14
2620	5140	-2520	1	15
3070	5140	-2070	1	16
2720	5140	-2420	1	17
2500	5140	-2640	1	18
2670	5140	-2470	1	19
3390	5140	-1750	1	20
3350	5140	-1790	1	21
2830	5140	-2310	1	22
3020	5140	-2120	1	23
2540	5140	-2600	1	24
3450	2630	820	2	24
2620	2630	-10	2	25
3070	2630	440	3	25
2720	2630	90	4	25
2500	2630	-130	4	26
2670	2630	40	5	26
3390	2630	760	6	26
3350	2630	720	7	26
2830	2630	200	8	26
3020	2630	390	9	26
2540	2630	-90	9	27
2620	3450	-830	9	28
3070	3450	-380	9	29
2720	3450	-730	9	30
2500	3450	-950	9	31
2670	3450	-780	9	32
3390	3450	-60	9	33
3350	3450	-100	9	34
2830	3450	-620	9	35
3020	3450	-430	9	36
2540	3450	-910	9	37
3070	2620	450	10	37
2720	2620	100	11	37
2500	2620	-120	11	38

2670	2620	50	12	38
3390	2620	770	13	38
3350	2620	730	14	38
2830	2620	210	15	38
3020	2620	400	16	38
2540	2620	-80	16	39
2720	3070	-350	16	40
2500	3070	-570	16	41
2670	3070	-400	16	42
3390	3070	320	17	42
3350	3070	280	18	42
2830	3070	-240	18	43
3020	3070	-50	18	44
2540	3070	-530	18	45
2500	2720	-220	18	46
2670	2720	-50	18	47
3390	2720	670	19	47
3350	2720	630	20	47
2830	2720	110	21	47
3020	2720	300	22	47
2540	2720	-180	22	48
2670	2500	170	23	48
3390	2500	890	24	48
3350	2500	850	25	48
2830	2500	330	26	48
3020	2500	520	27	48
2540	2500	40	28	48
3390	2670	720	29	48
3350	2670	680	30	48
2830	2670	160	31	48
3020	2670	350	32	48
2540	2670	-130	32	49
3350	3390	-40	32	50
2830	3390	-560	32	51
3020	3390	-370	32	52
2540	3390	-850	32	53
2830	3350	-520	32	54
3020	3350	-330	32	55
2540	3350	-810	32	56
3020	2830	190	33	56
2540	2830	-290	33	57
2540	3020	-480	33	58

S Statistic = 33 - 58 = -25

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/9/2018		1
4/13/2019		1
10/1/2019		1
4/8/2020		1
10/1/2020		1

4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

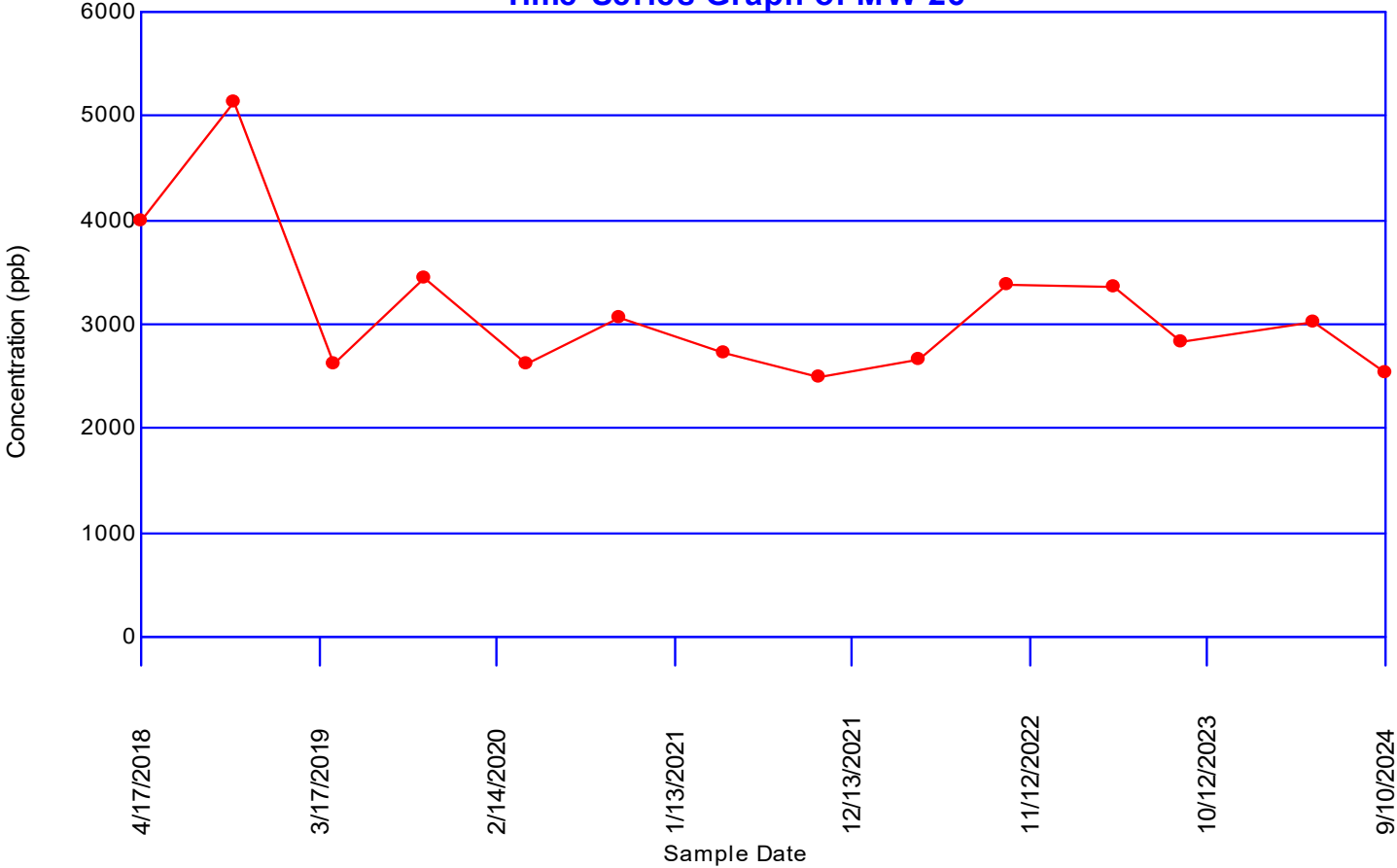
Group Variance = 333.667

Z-Score = -1.31388

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-1.31388| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.428322	0.157216	0.546	None

Loc.	Date	Conc.	Outlier
SW-01	4/16/2018	375	FALSE
	10/8/2018	184	FALSE
	4/13/2019	510	FALSE
	9/30/2019	275	FALSE
	4/7/2020	817	FALSE
	10/2/2020	533	FALSE
	4/13/2021	254	FALSE
	10/14/2021	245	FALSE
	4/19/2022	340	FALSE
	9/27/2022	572	FALSE
	4/18/2023	497	FALSE
	8/22/2023	710	FALSE
	4/30/2024	308	FALSE
	9/10/2024	228	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: SW-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	184	817	633	0.5251	332.388
2	228	710	482	0.3318	159.928
3	245	572	327	0.246	80.442
4	254	533	279	0.1802	50.2758
5	275	510	235	0.124	29.14
6	308	497	189	0.0727	13.7403
7	340	375	35	0.024	0.84
8	375	340	-35		
9	497	308	-189		
10	510	275	-235		
11	533	254	-279		
12	572	245	-327		
13	710	228	-482		
14	817	184	-633		

Sum of b values = 666.754

Sample Standard Deviation = 193.007

W Statistic = 0.917997

5% Critical value of 0.874 is less than 0.917997

Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.917997

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
184	375	-191	0	1
510	375	135	1	1
275	375	-100	1	2
817	375	442	2	2
533	375	158	3	2
254	375	-121	3	3
245	375	-130	3	4
340	375	-35	3	5
572	375	197	4	5
497	375	122	5	5
710	375	335	6	5
308	375	-67	6	6
228	375	-147	6	7
510	184	326	7	7
275	184	91	8	7
817	184	633	9	7
533	184	349	10	7
254	184	70	11	7
245	184	61	12	7
340	184	156	13	7
572	184	388	14	7
497	184	313	15	7
710	184	526	16	7
308	184	124	17	7
228	184	44	18	7
275	510	-235	18	8
817	510	307	19	8
533	510	23	20	8
254	510	-256	20	9
245	510	-265	20	10
340	510	-170	20	11
572	510	62	21	11
497	510	-13	21	12
710	510	200	22	12
308	510	-202	22	13
228	510	-282	22	14
817	275	542	23	14
533	275	258	24	14
254	275	-21	24	15
245	275	-30	24	16
340	275	65	25	16
572	275	297	26	16
497	275	222	27	16
710	275	435	28	16
308	275	33	29	16
228	275	-47	29	17
533	817	-284	29	18
254	817	-563	29	19
245	817	-572	29	20

340	817	-477	29	21
572	817	-245	29	22
497	817	-320	29	23
710	817	-107	29	24
308	817	-509	29	25
228	817	-589	29	26
254	533	-279	29	27
245	533	-288	29	28
340	533	-193	29	29
572	533	39	30	29
497	533	-36	30	30
710	533	177	31	30
308	533	-225	31	31
228	533	-305	31	32
245	254	-9	31	33
340	254	86	32	33
572	254	318	33	33
497	254	243	34	33
710	254	456	35	33
308	254	54	36	33
228	254	-26	36	34
340	245	95	37	34
572	245	327	38	34
497	245	252	39	34
710	245	465	40	34
308	245	63	41	34
228	245	-17	41	35
572	340	232	42	35
497	340	157	43	35
710	340	370	44	35
308	340	-32	44	36
228	340	-112	44	37
497	572	-75	44	38
710	572	138	45	38
308	572	-264	45	39
228	572	-344	45	40
710	497	213	46	40
308	497	-189	46	41
228	497	-269	46	42
308	710	-402	46	43
228	710	-482	46	44
228	308	-80	46	45

S Statistic = 46 - 45 = 1

Tied Group	Value	Members
Time Period		Observations
4/16/2018		1
10/8/2018		1
4/13/2019		1
9/30/2019		1
4/7/2020		1
10/2/2020		1

4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

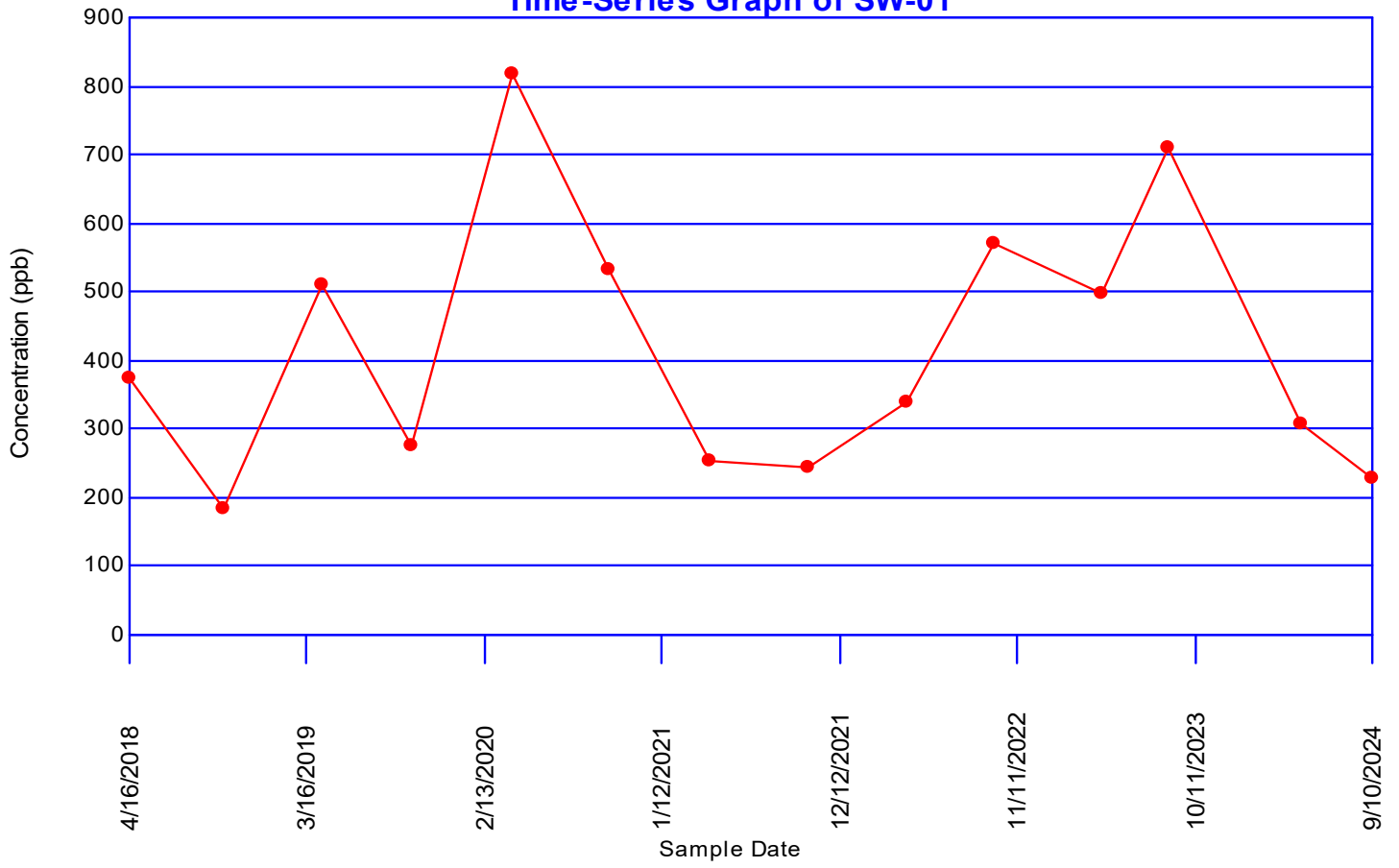
Group Variance = 333.667

Z-Score = 0

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of SW-01



Dixon's Test for Outliers

Parameter: Manganese, Total

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.361538	0.104252	0.546	None

Loc.	Date	Conc.	Outlier
SW-02	4/16/2018	506	FALSE
	10/8/2018	188	FALSE
	4/13/2019	350	FALSE
	9/30/2019	91	FALSE
	4/7/2020	417	FALSE
	10/2/2020	292	FALSE
	4/13/2021	88.2	FALSE
	10/14/2021	195	FALSE
	4/19/2022	624	FALSE
	9/27/2022	164	FALSE
	4/18/2023	741	FALSE
	8/22/2023	229	FALSE
	4/30/2024	135	FALSE
	9/10/2024	42.7	FALSE

Shapiro-Wilks Test of Normality

Parameter: Manganese, Total

Location: SW-02

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	42.7	741	698.3	0.5251	366.677
2	88.2	624	535.8	0.3318	177.778
3	91	506	415	0.246	102.09
4	135	417	282	0.1802	50.8164
5	164	350	186	0.124	23.064
6	188	292	104	0.0727	7.5608
7	195	229	34	0.024	0.816
8	229	195	-34		
9	292	188	-104		
10	350	164	-186		
11	417	135	-282		
12	506	91	-415		
13	624	88.2	-535.8		
14	741	42.7	-698.3		

Sum of b values = 728.803

Sample Standard Deviation = 212.291

W Statistic = 0.906595

5% Critical value of 0.874 is less than 0.906595
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.906595
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Manganese, Total

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
188	506	-318	0	1
350	506	-156	0	2
91	506	-415	0	3
417	506	-89	0	4
292	506	-214	0	5
88.2	506	-417.8	0	6
195	506	-311	0	7
624	506	118	1	7
164	506	-342	1	8
741	506	235	2	8
229	506	-277	2	9
135	506	-371	2	10
42.7	506	-463.3	2	11
350	188	162	3	11
91	188	-97	3	12
417	188	229	4	12
292	188	104	5	12
88.2	188	-99.8	5	13
195	188	7	6	13
624	188	436	7	13
164	188	-24	7	14
741	188	553	8	14
229	188	41	9	14
135	188	-53	9	15
42.7	188	-145.3	9	16
91	350	-259	9	17
417	350	67	10	17
292	350	-58	10	18
88.2	350	-261.8	10	19
195	350	-155	10	20
624	350	274	11	20
164	350	-186	11	21
741	350	391	12	21
229	350	-121	12	22
135	350	-215	12	23
42.7	350	-307.3	12	24
417	91	326	13	24
292	91	201	14	24
88.2	91	-2.8	14	25
195	91	104	15	25
624	91	533	16	25
164	91	73	17	25
741	91	650	18	25
229	91	138	19	25
135	91	44	20	25
42.7	91	-48.3	20	26
292	417	-125	20	27
88.2	417	-328.8	20	28
195	417	-222	20	29

624	417	207	21	29
164	417	-253	21	30
741	417	324	22	30
229	417	-188	22	31
135	417	-282	22	32
42.7	417	-374.3	22	33
88.2	292	-203.8	22	34
195	292	-97	22	35
624	292	332	23	35
164	292	-128	23	36
741	292	449	24	36
229	292	-63	24	37
135	292	-157	24	38
42.7	292	-249.3	24	39
195	88.2	106.8	25	39
624	88.2	535.8	26	39
164	88.2	75.8	27	39
741	88.2	652.8	28	39
229	88.2	140.8	29	39
135	88.2	46.8	30	39
42.7	88.2	-45.5	30	40
624	195	429	31	40
164	195	-31	31	41
741	195	546	32	41
229	195	34	33	41
135	195	-60	33	42
42.7	195	-152.3	33	43
164	624	-460	33	44
741	624	117	34	44
229	624	-395	34	45
135	624	-489	34	46
42.7	624	-581.3	34	47
741	164	577	35	47
229	164	65	36	47
135	164	-29	36	48
42.7	164	-121.3	36	49
229	741	-512	36	50
135	741	-606	36	51
42.7	741	-698.3	36	52
135	229	-94	36	53
42.7	229	-186.3	36	54
42.7	135	-92.3	36	55

S Statistic = 36 - 55 = -19

Tied Group	Value	Members
Time Period		Observations
4/16/2018		1
10/8/2018		1
4/13/2019		1
9/30/2019		1
4/7/2020		1
10/2/2020		1

4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

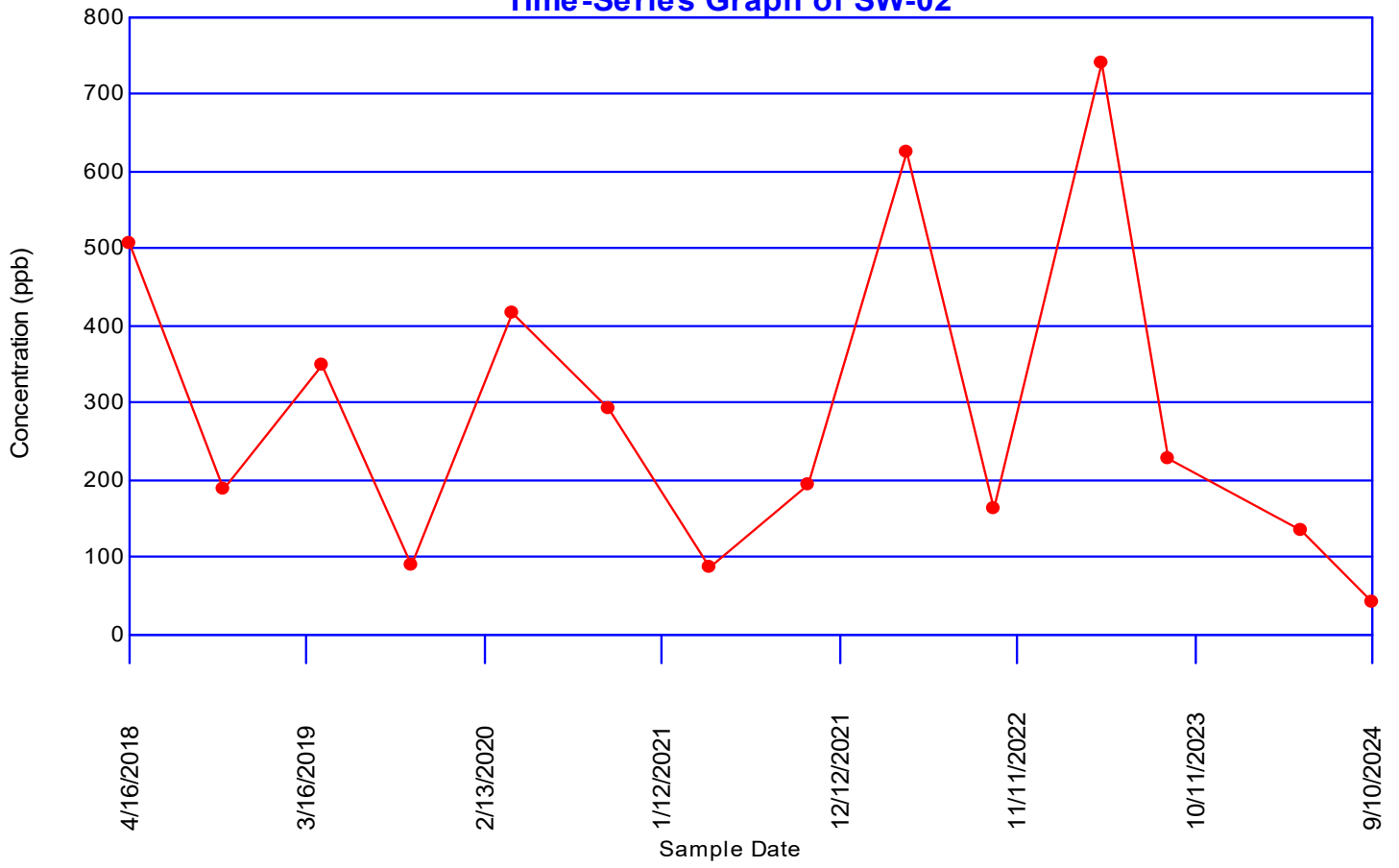
Group Variance = 333.667

Z-Score = -0.985408

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.985408| \leq 1.97737$ indicating no evidence of a trend

Manganese, Total Time-Series Graph of SW-02



Concentrations (ppb)

Parameter: Sodium, Total

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 0

Percent Non-Detects: 0%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 12 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	14	0 (0%)	4/18/2018	42900	42900
			10/10/2018	57100	57100
			4/13/2019	26900	26900
			10/1/2019	41200	41200
			4/9/2020	42700	42700
			10/1/2020	41900	41900
			4/14/2021	40800	40800
			10/13/2021	42200	42200
			4/20/2022	44300	44300
			9/28/2022	42600	42600
			4/19/2023	42900	42900
			8/24/2023	43400	43400
			5/1/2024	42400	42400
			9/11/2024	43600	43600
4/20/2016	48300	48300			
10/12/2016	42000	42000			
4/19/2017	45500	45500			
10/12/2017	39500	39500			

MW-06	14	0 (0%)	4/18/2018	38500	38500
			10/10/2018	61500	61500
			4/14/2019	43500	43500
			10/2/2019	41500	41500
			4/8/2020	42200	42200
			9/30/2020	44800	44800
			4/13/2021	41400	41400
			10/14/2021	45900	45900
			4/20/2022	39900	39900
			9/27/2022	43200	43200
			4/18/2023	42500	42500
			8/23/2023	44700	44700
			5/1/2024	47100	47100
			9/12/2024	47600	47600
4/19/2016	47100	47100			
10/12/2016	45300	45300			
4/19/2017	40900	40900			
10/12/2017	45900	45900			

MW-07	14	0 (0%)	4/18/2018	64400	64400
			10/10/2018	79100	79100
			4/14/2019	69400	69400
			10/2/2019	57700	57700
			4/8/2020	63400	63400
			9/30/2020	58300	58300
			4/13/2021	60900	60900
			10/14/2021	60200	60200
4/20/2022	65800	65800			

			9/27/2022	62100	62100
			4/18/2023	59100	59100
			8/23/2023	59400	59400
			5/1/2024	63200	63200
			9/11/2024	61800	61800
			4/19/2017	66000	66000
			10/12/2017	59700	59700
MW-12	14	0 (0%)	4/17/2018	34200	34200
			10/9/2018	34600	34600
			4/14/2019	34900	34900
			10/2/2019	24900	24900
			4/8/2020	34400	34400
			10/1/2020	28400	28400
			4/15/2021	31100	31100
			10/14/2021	27400	27400
			4/19/2022	32000	32000
			9/28/2022	24300	24300
			4/18/2023	30800	30800
			8/24/2023	23900	23900
			5/1/2024	28200	28200
			9/12/2024	25500	25500
			4/20/2016	40300	40300
			10/11/2016	28900	28900
			4/18/2017	37500	37500
			10/10/2017	22200	22200
MW-16	14	0 (0%)	4/17/2018	47200	47200
			10/9/2018	64700	64700
			4/14/2019	53100	53100
			10/2/2019	44800	44800
			4/9/2020	47600	47600
			10/1/2020	45100	45100
			4/15/2021	47600	47600
			10/14/2021	49300	49300
			4/19/2022	50900	50900
			9/28/2022	46800	46800
			4/18/2023	51600	51600
			8/24/2023	47700	47700
			5/2/2024	48000	48000
			9/12/2024	42600	42600
			4/18/2017	47200	47200
			10/10/2017	41900	41900
MW-20	14	0 (0%)	4/17/2018	67700	67700
			10/10/2018	97800	97800
			4/14/2019	86900	86900
			10/2/2019	67600	67600
			4/9/2020	82600	82600
			10/2/2020	66200	66200
			4/15/2021	73700	73700
			10/12/2021	66900	66900
			4/20/2022	77400	77400
			9/28/2022	71000	71000
			4/19/2023	76200	76200
			8/23/2023	66700	66700
			4/30/2024	77100	77100
			9/11/2024	67000	67000
			4/21/2016	85700	85700
			10/12/2016	62800	62800
			4/18/2017	75000	75000
			10/12/2017	54600	54600

MW-21	14	0 (0%)	4/17/2018	63900	63900
			10/10/2018	63200	63200
			4/13/2019	62000	62000
			10/1/2019	54200	54200
			4/7/2020	54800	54800
			9/30/2020	50100	50100
			4/14/2021	51400	51400
			10/12/2021	54500	54500
			4/20/2022	57200	57200
			9/29/2022	51100	51100
			4/18/2023	58000	58000
			8/23/2023	52700	52700
			5/1/2024	51600	51600
			9/11/2024	50000	50000
			4/18/2017	65800	65800
10/12/2017	66400	66400			
<hr/>					
MW-25	14	0 (0%)	4/17/2018	51700	51700
			10/9/2018	85400	85400
			4/13/2019	42300	42300
			10/1/2019	50000	50000
			4/8/2020	46500	46500
			10/1/2020	49800	49800
			4/14/2021	26500	26500
			10/13/2021	53000	53000
			4/19/2022	61900	61900
			9/29/2022	59500	59500
			4/19/2023	49800	49800
			8/24/2023	61100	61100
			4/29/2024	26200	26200
			9/10/2024	63600	63600
			4/21/2016	63600	63600
10/11/2016	67200	67200			
4/18/2017	54800	54800			
10/10/2017	43200	43200			
<hr/>					
MW-26	14	0 (0%)	4/17/2018	89600	89600
			10/9/2018	123000	123000
			4/13/2019	87000	87000
			10/1/2019	82500	82500
			4/8/2020	85700	85700
			10/1/2020	81100	81100
			4/14/2021	81500	81500
			10/13/2021	74700	74700
			4/19/2022	81300	81300
			9/29/2022	81300	81300
			4/19/2023	86700	86700
			8/24/2023	83100	83100
			4/29/2024	86100	86100
			9/10/2024	77600	77600
			4/18/2017	84400	84400
10/10/2017	82100	82100			
<hr/>					
MW-27	14	0 (0%)	4/18/2018	44800	44800
			10/9/2018	59100	59100
			4/13/2019	46600	46600
			10/1/2019	41400	41400
			4/9/2020	43600	43600
			10/1/2020	41300	41300
			4/14/2021	40700	40700
			10/13/2021	37700	37700
			4/20/2022	42800	42800
			9/28/2022	43400	43400

			4/19/2023	43900	43900
			8/24/2023	43600	43600
			5/1/2024	44800	44800
			9/11/2024	41900	41900
			4/19/2017	42300	42300
			10/12/2017	39200	39200
SW-01	14	0 (0%)	4/16/2018	19600	19600
			10/8/2018	14800	14800
			4/13/2019	19400	19400
			9/30/2019	12300	12300
			4/7/2020	19800	19800
			10/2/2020	13100	13100
			4/13/2021	14300	14300
			10/14/2021	16900	16900
			4/19/2022	18200	18200
			9/27/2022	19700	19700
			4/18/2023	19700	19700
			8/22/2023	25200	25200
			4/30/2024	19300	19300
			9/10/2024	21000	21000
			4/21/2016	26700	26700
			10/10/2016	20000	20000
			4/17/2017	17500	17500
			10/9/2017	21800	21800
SW-02	14	0 (0%)	4/16/2018	71200	71200
			10/8/2018	40600	40600
			4/13/2019	47900	47900
			9/30/2019	24400	24400
			4/7/2020	41000	41000
			10/2/2020	35600	35600
			4/13/2021	33900	33900
			10/14/2021	33700	33700
			4/19/2022	44100	44100
			9/27/2022	36400	36400
			4/18/2023	39300	39300
			8/22/2023	35200	35200
			4/30/2024	31600	31600
			9/10/2024	25400	25400
			4/21/2016	50300	50300
			10/10/2016	24600	24600
			4/17/2017	35700	35700
			10/9/2017	38700	38700

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.849057	0.856287	0.546	57100
2	0.257143	0.856287	0.521	26900
3	0.290323	0.392857	0.546	None

Loc.	Date	Conc.	Outlier
MW-05	4/18/2018	42900	FALSE
	10/10/2018	57100	TRUE
	4/13/2019	26900	TRUE
	10/1/2019	41200	FALSE
	4/9/2020	42700	FALSE
	10/1/2020	41900	FALSE
	4/14/2021	40800	FALSE
	10/13/2021	42200	FALSE
	4/20/2022	44300	FALSE
	9/28/2022	42600	FALSE
	4/19/2023	42900	FALSE
	8/24/2023	43400	FALSE
	5/1/2024	42400	FALSE
	9/11/2024	43600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-05

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	26900	57100	30200	0.5251	15858
2	40800	44300	3500	0.3318	1161.3
3	41200	43600	2400	0.246	590.4
4	41900	43400	1500	0.1802	270.3
5	42200	42900	700	0.124	86.8
6	42400	42900	500	0.0727	36.35
7	42600	42700	100	0.024	2.4
8	42700	42600	-100		
9	42900	42400	-500		
10	42900	42200	-700		
11	43400	41900	-1500		
12	43600	41200	-2400		
13	44300	40800	-3500		
14	57100	26900	-30200		

Sum of b values = 18005.6

Sample Standard Deviation = 5994.8

W Statistic = 0.693938

5% Critical value of 0.874 exceeds 0.693938

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.693938

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
57100	42900	14200	1	0
26900	42900	-16000	1	1
41200	42900	-1700	1	2
42700	42900	-200	1	3
41900	42900	-1000	1	4
40800	42900	-2100	1	5
42200	42900	-700	1	6
44300	42900	1400	2	6
42600	42900	-300	2	7
42900	42900	0	2	7
43400	42900	500	3	7
42400	42900	-500	3	8
43600	42900	700	4	8
26900	57100	-30200	4	9
41200	57100	-15900	4	10
42700	57100	-14400	4	11
41900	57100	-15200	4	12
40800	57100	-16300	4	13
42200	57100	-14900	4	14
44300	57100	-12800	4	15
42600	57100	-14500	4	16
42900	57100	-14200	4	17
43400	57100	-13700	4	18
42400	57100	-14700	4	19
43600	57100	-13500	4	20
41200	26900	14300	5	20
42700	26900	15800	6	20
41900	26900	15000	7	20
40800	26900	13900	8	20
42200	26900	15300	9	20
44300	26900	17400	10	20
42600	26900	15700	11	20
42900	26900	16000	12	20
43400	26900	16500	13	20
42400	26900	15500	14	20
43600	26900	16700	15	20
42700	41200	1500	16	20
41900	41200	700	17	20
40800	41200	-400	17	21
42200	41200	1000	18	21
44300	41200	3100	19	21
42600	41200	1400	20	21
42900	41200	1700	21	21
43400	41200	2200	22	21
42400	41200	1200	23	21
43600	41200	2400	24	21
41900	42700	-800	24	22
40800	42700	-1900	24	23
42200	42700	-500	24	24

44300	42700	1600	25	24
42600	42700	-100	25	25
42900	42700	200	26	25
43400	42700	700	27	25
42400	42700	-300	27	26
43600	42700	900	28	26
40800	41900	-1100	28	27
42200	41900	300	29	27
44300	41900	2400	30	27
42600	41900	700	31	27
42900	41900	1000	32	27
43400	41900	1500	33	27
42400	41900	500	34	27
43600	41900	1700	35	27
42200	40800	1400	36	27
44300	40800	3500	37	27
42600	40800	1800	38	27
42900	40800	2100	39	27
43400	40800	2600	40	27
42400	40800	1600	41	27
43600	40800	2800	42	27
44300	42200	2100	43	27
42600	42200	400	44	27
42900	42200	700	45	27
43400	42200	1200	46	27
42400	42200	200	47	27
43600	42200	1400	48	27
42600	44300	-1700	48	28
42900	44300	-1400	48	29
43400	44300	-900	48	30
42400	44300	-1900	48	31
43600	44300	-700	48	32
42900	42600	300	49	32
43400	42600	800	50	32
42400	42600	-200	50	33
43600	42600	1000	51	33
43400	42900	500	52	33
42400	42900	-500	52	34
43600	42900	700	53	34
42400	43400	-1000	53	35
43600	43400	200	54	35
43600	42400	1200	55	35

S Statistic = 55 - 35 = 20

Tied Group	Value	Members
1	42900	2

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/13/2019	1
10/1/2019	1
4/9/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

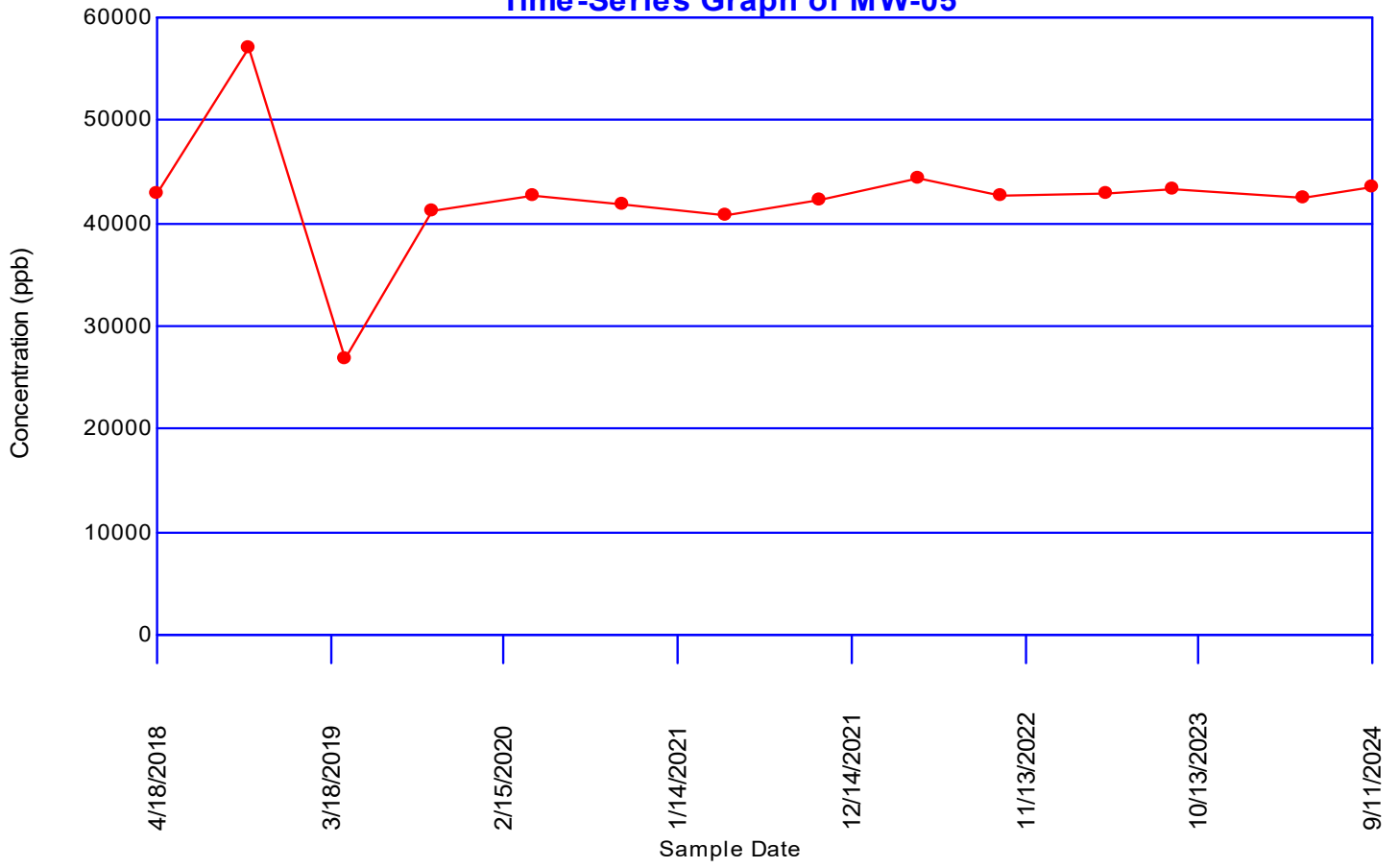
Group Variance = 332.667

Z-Score = 1.04172

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|1.04172| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-05



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.716418	0.337209	0.546	61500
2	0.220779	0.337209	0.521	None

Loc.	Date	Conc.	Outlier
MW-06	4/18/2018	38500	FALSE
	10/10/2018	61500	TRUE
	4/14/2019	43500	FALSE
	10/2/2019	41500	FALSE
	4/8/2020	42200	FALSE
	9/30/2020	44800	FALSE
	4/13/2021	41400	FALSE
	10/14/2021	45900	FALSE
	4/20/2022	39900	FALSE
	9/27/2022	43200	FALSE
	4/18/2023	42500	FALSE
	8/23/2023	44700	FALSE
	5/1/2024	47100	FALSE
	9/12/2024	47600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	38500	61500	23000	0.5251	12077.3
2	39900	47600	7700	0.3318	2554.86
3	41400	47100	5700	0.246	1402.2
4	41500	45900	4400	0.1802	792.88
5	42200	44800	2600	0.124	322.4
6	42500	44700	2200	0.0727	159.94
7	43200	43500	300	0.024	7.2
8	43500	43200	-300		
9	44700	42500	-2200		
10	44800	42200	-2600		
11	45900	41500	-4400		
12	47100	41400	-5700		
13	47600	39900	-7700		
14	61500	38500	-23000		

Sum of b values = 17316.8

Sample Standard Deviation = 5512.85

W Statistic = 0.758995

5% Critical value of 0.874 exceeds 0.758995

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.758995

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
61500	38500	23000	1	0
43500	38500	5000	2	0
41500	38500	3000	3	0
42200	38500	3700	4	0
44800	38500	6300	5	0
41400	38500	2900	6	0
45900	38500	7400	7	0
39900	38500	1400	8	0
43200	38500	4700	9	0
42500	38500	4000	10	0
44700	38500	6200	11	0
47100	38500	8600	12	0
47600	38500	9100	13	0
43500	61500	-18000	13	1
41500	61500	-20000	13	2
42200	61500	-19300	13	3
44800	61500	-16700	13	4
41400	61500	-20100	13	5
45900	61500	-15600	13	6
39900	61500	-21600	13	7
43200	61500	-18300	13	8
42500	61500	-19000	13	9
44700	61500	-16800	13	10
47100	61500	-14400	13	11
47600	61500	-13900	13	12
41500	43500	-2000	13	13
42200	43500	-1300	13	14
44800	43500	1300	14	14
41400	43500	-2100	14	15
45900	43500	2400	15	15
39900	43500	-3600	15	16
43200	43500	-300	15	17
42500	43500	-1000	15	18
44700	43500	1200	16	18
47100	43500	3600	17	18
47600	43500	4100	18	18
42200	41500	700	19	18
44800	41500	3300	20	18
41400	41500	-100	20	19
45900	41500	4400	21	19
39900	41500	-1600	21	20
43200	41500	1700	22	20
42500	41500	1000	23	20
44700	41500	3200	24	20
47100	41500	5600	25	20
47600	41500	6100	26	20
44800	42200	2600	27	20
41400	42200	-800	27	21
45900	42200	3700	28	21

39900	42200	-2300	28	22
43200	42200	1000	29	22
42500	42200	300	30	22
44700	42200	2500	31	22
47100	42200	4900	32	22
47600	42200	5400	33	22
41400	44800	-3400	33	23
45900	44800	1100	34	23
39900	44800	-4900	34	24
43200	44800	-1600	34	25
42500	44800	-2300	34	26
44700	44800	-100	34	27
47100	44800	2300	35	27
47600	44800	2800	36	27
45900	41400	4500	37	27
39900	41400	-1500	37	28
43200	41400	1800	38	28
42500	41400	1100	39	28
44700	41400	3300	40	28
47100	41400	5700	41	28
47600	41400	6200	42	28
39900	45900	-6000	42	29
43200	45900	-2700	42	30
42500	45900	-3400	42	31
44700	45900	-1200	42	32
47100	45900	1200	43	32
47600	45900	1700	44	32
43200	39900	3300	45	32
42500	39900	2600	46	32
44700	39900	4800	47	32
47100	39900	7200	48	32
47600	39900	7700	49	32
42500	43200	-700	49	33
44700	43200	1500	50	33
47100	43200	3900	51	33
47600	43200	4400	52	33
44700	42500	2200	53	33
47100	42500	4600	54	33
47600	42500	5100	55	33
47100	44700	2400	56	33
47600	44700	2900	57	33
47600	47100	500	58	33

S Statistic = 58 - 33 = 25

Tied Group	Value	Members
Time Period		Observations
4/18/2018		1
10/10/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
9/30/2020		1

4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

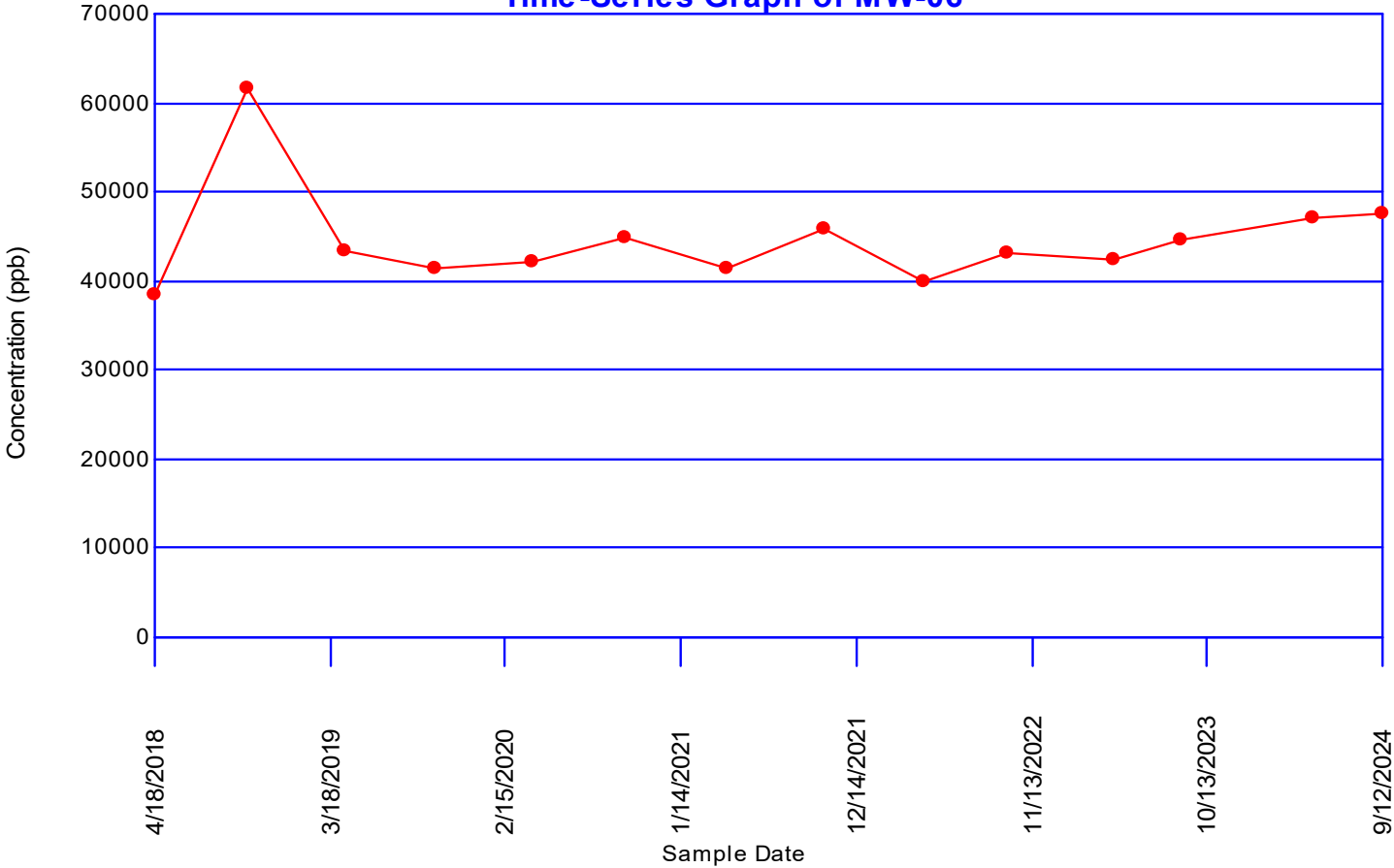
Group Variance = 333.667

Z-Score = 1.31388

Comparison Level at 1.0 - $(0.05 / 2)$ = 97.5% confidence level = 1.97737 (two-tailed)

|1.31388| <= 1.97737 indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-06



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.665	0.17284	0.546	79100
2	0.45045	0.17284	0.521	None

Loc.	Date	Conc.	Outlier
MW-07	4/18/2018	64400	FALSE
	10/10/2018	79100	TRUE
	4/14/2019	69400	FALSE
	10/2/2019	57700	FALSE
	4/8/2020	63400	FALSE
	9/30/2020	58300	FALSE
	4/13/2021	60900	FALSE
	10/14/2021	60200	FALSE
	4/20/2022	65800	FALSE
	9/27/2022	62100	FALSE
	4/18/2023	59100	FALSE
	8/23/2023	59400	FALSE
	5/1/2024	63200	FALSE
	9/11/2024	61800	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	57700	79100	21400	0.5251	11237.1
2	58300	69400	11100	0.3318	3682.98
3	59100	65800	6700	0.246	1648.2
4	59400	64400	5000	0.1802	901
5	60200	63400	3200	0.124	396.8
6	60900	63200	2300	0.0727	167.21
7	61800	62100	300	0.024	7.2
8	62100	61800	-300		
9	63200	60900	-2300		
10	63400	60200	-3200		
11	64400	59400	-5000		
12	65800	59100	-6700		
13	69400	58300	-11100		
14	79100	57700	-21400		

Sum of b values = 18040.5

Sample Standard Deviation = 5564.03

W Statistic = 0.808678

5% Critical value of 0.874 exceeds 0.808678
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.808678
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
79100	64400	14700	1	0
69400	64400	5000	2	0
57700	64400	-6700	2	1
63400	64400	-1000	2	2
58300	64400	-6100	2	3
60900	64400	-3500	2	4
60200	64400	-4200	2	5
65800	64400	1400	3	5
62100	64400	-2300	3	6
59100	64400	-5300	3	7
59400	64400	-5000	3	8
63200	64400	-1200	3	9
61800	64400	-2600	3	10
69400	79100	-9700	3	11
57700	79100	-21400	3	12
63400	79100	-15700	3	13
58300	79100	-20800	3	14
60900	79100	-18200	3	15
60200	79100	-18900	3	16
65800	79100	-13300	3	17
62100	79100	-17000	3	18
59100	79100	-20000	3	19
59400	79100	-19700	3	20
63200	79100	-15900	3	21
61800	79100	-17300	3	22
57700	69400	-11700	3	23
63400	69400	-6000	3	24
58300	69400	-11100	3	25
60900	69400	-8500	3	26
60200	69400	-9200	3	27
65800	69400	-3600	3	28
62100	69400	-7300	3	29
59100	69400	-10300	3	30
59400	69400	-10000	3	31
63200	69400	-6200	3	32
61800	69400	-7600	3	33
63400	57700	5700	4	33
58300	57700	600	5	33
60900	57700	3200	6	33
60200	57700	2500	7	33
65800	57700	8100	8	33
62100	57700	4400	9	33
59100	57700	1400	10	33
59400	57700	1700	11	33
63200	57700	5500	12	33
61800	57700	4100	13	33
58300	63400	-5100	13	34
60900	63400	-2500	13	35
60200	63400	-3200	13	36

65800	63400	2400	14	36
62100	63400	-1300	14	37
59100	63400	-4300	14	38
59400	63400	-4000	14	39
63200	63400	-200	14	40
61800	63400	-1600	14	41
60900	58300	2600	15	41
60200	58300	1900	16	41
65800	58300	7500	17	41
62100	58300	3800	18	41
59100	58300	800	19	41
59400	58300	1100	20	41
63200	58300	4900	21	41
61800	58300	3500	22	41
60200	60900	-700	22	42
65800	60900	4900	23	42
62100	60900	1200	24	42
59100	60900	-1800	24	43
59400	60900	-1500	24	44
63200	60900	2300	25	44
61800	60900	900	26	44
65800	60200	5600	27	44
62100	60200	1900	28	44
59100	60200	-1100	28	45
59400	60200	-800	28	46
63200	60200	3000	29	46
61800	60200	1600	30	46
62100	65800	-3700	30	47
59100	65800	-6700	30	48
59400	65800	-6400	30	49
63200	65800	-2600	30	50
61800	65800	-4000	30	51
59100	62100	-3000	30	52
59400	62100	-2700	30	53
63200	62100	1100	31	53
61800	62100	-300	31	54
59400	59100	300	32	54
63200	59100	4100	33	54
61800	59100	2700	34	54
63200	59400	3800	35	54
61800	59400	2400	36	54
61800	63200	-1400	36	55

S Statistic = 36 - 55 = -19

Tied Group	Value	Members
Time Period		Observations
4/18/2018		1
10/10/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
9/30/2020		1

4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

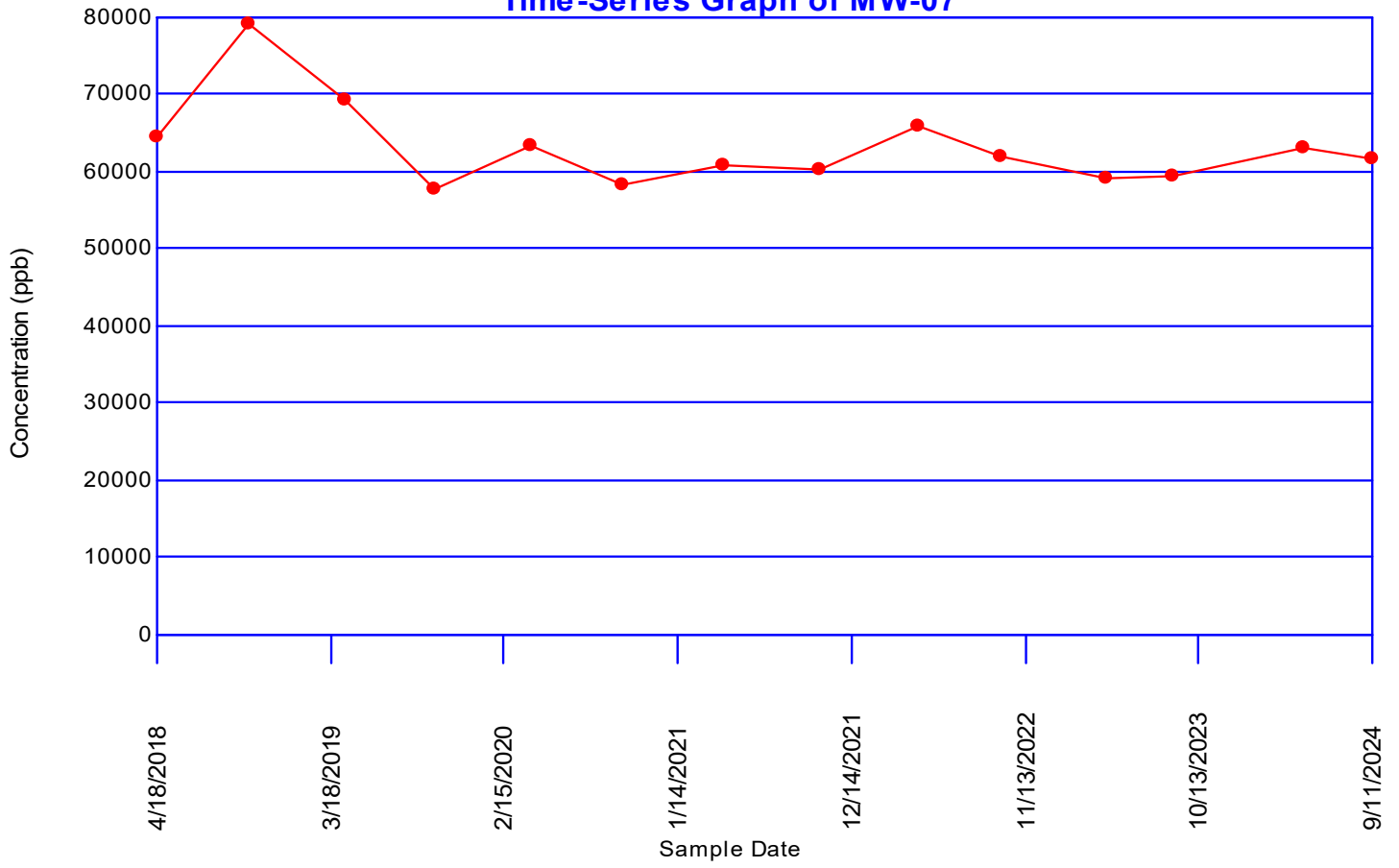
Group Variance = 333.667

Z-Score = -0.985408

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.985408| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.05	0.0952381	0.546	None

Loc.	Date	Conc.	Outlier
MW-12	4/17/2018	34200	FALSE
	10/9/2018	34600	FALSE
	4/14/2019	34900	FALSE
	10/2/2019	24900	FALSE
	4/8/2020	34400	FALSE
	10/1/2020	28400	FALSE
	4/15/2021	31100	FALSE
	10/14/2021	27400	FALSE
	4/19/2022	32000	FALSE
	9/28/2022	24300	FALSE
	4/18/2023	30800	FALSE
	8/24/2023	23900	FALSE
	5/1/2024	28200	FALSE
	9/12/2024	25500	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-12

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	23900	34900	11000	0.5251	5776.1
2	24300	34600	10300	0.3318	3417.54
3	24900	34400	9500	0.246	2337
4	25500	34200	8700	0.1802	1567.74
5	27400	32000	4600	0.124	570.4
6	28200	31100	2900	0.0727	210.83
7	28400	30800	2400	0.024	57.6
8	30800	28400	-2400		
9	31100	28200	-2900		
10	32000	27400	-4600		
11	34200	25500	-8700		
12	34400	24900	-9500		
13	34600	24300	-10300		
14	34900	23900	-11000		

Sum of b values = 13937.2

Sample Standard Deviation = 4061.61

W Statistic = 0.905756

5% Critical value of 0.874 is less than 0.905756
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.905756
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
34600	34200	400	1	0
34900	34200	700	2	0
24900	34200	-9300	2	1
34400	34200	200	3	1
28400	34200	-5800	3	2
31100	34200	-3100	3	3
27400	34200	-6800	3	4
32000	34200	-2200	3	5
24300	34200	-9900	3	6
30800	34200	-3400	3	7
23900	34200	-10300	3	8
28200	34200	-6000	3	9
25500	34200	-8700	3	10
34900	34600	300	4	10
24900	34600	-9700	4	11
34400	34600	-200	4	12
28400	34600	-6200	4	13
31100	34600	-3500	4	14
27400	34600	-7200	4	15
32000	34600	-2600	4	16
24300	34600	-10300	4	17
30800	34600	-3800	4	18
23900	34600	-10700	4	19
28200	34600	-6400	4	20
25500	34600	-9100	4	21
24900	34900	-10000	4	22
34400	34900	-500	4	23
28400	34900	-6500	4	24
31100	34900	-3800	4	25
27400	34900	-7500	4	26
32000	34900	-2900	4	27
24300	34900	-10600	4	28
30800	34900	-4100	4	29
23900	34900	-11000	4	30
28200	34900	-6700	4	31
25500	34900	-9400	4	32
34400	24900	9500	5	32
28400	24900	3500	6	32
31100	24900	6200	7	32
27400	24900	2500	8	32
32000	24900	7100	9	32
24300	24900	-600	9	33
30800	24900	5900	10	33
23900	24900	-1000	10	34
28200	24900	3300	11	34
25500	24900	600	12	34
28400	34400	-6000	12	35
31100	34400	-3300	12	36
27400	34400	-7000	12	37

32000	34400	-2400	12	38
24300	34400	-10100	12	39
30800	34400	-3600	12	40
23900	34400	-10500	12	41
28200	34400	-6200	12	42
25500	34400	-8900	12	43
31100	28400	2700	13	43
27400	28400	-1000	13	44
32000	28400	3600	14	44
24300	28400	-4100	14	45
30800	28400	2400	15	45
23900	28400	-4500	15	46
28200	28400	-200	15	47
25500	28400	-2900	15	48
27400	31100	-3700	15	49
32000	31100	900	16	49
24300	31100	-6800	16	50
30800	31100	-300	16	51
23900	31100	-7200	16	52
28200	31100	-2900	16	53
25500	31100	-5600	16	54
32000	27400	4600	17	54
24300	27400	-3100	17	55
30800	27400	3400	18	55
23900	27400	-3500	18	56
28200	27400	800	19	56
25500	27400	-1900	19	57
24300	32000	-7700	19	58
30800	32000	-1200	19	59
23900	32000	-8100	19	60
28200	32000	-3800	19	61
25500	32000	-6500	19	62
30800	24300	6500	20	62
23900	24300	-400	20	63
28200	24300	3900	21	63
25500	24300	1200	22	63
23900	30800	-6900	22	64
28200	30800	-2600	22	65
25500	30800	-5300	22	66
28200	23900	4300	23	66
25500	23900	1600	24	66
25500	28200	-2700	24	67

S Statistic = 24 - 67 = -43

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/9/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
10/1/2020		1

4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

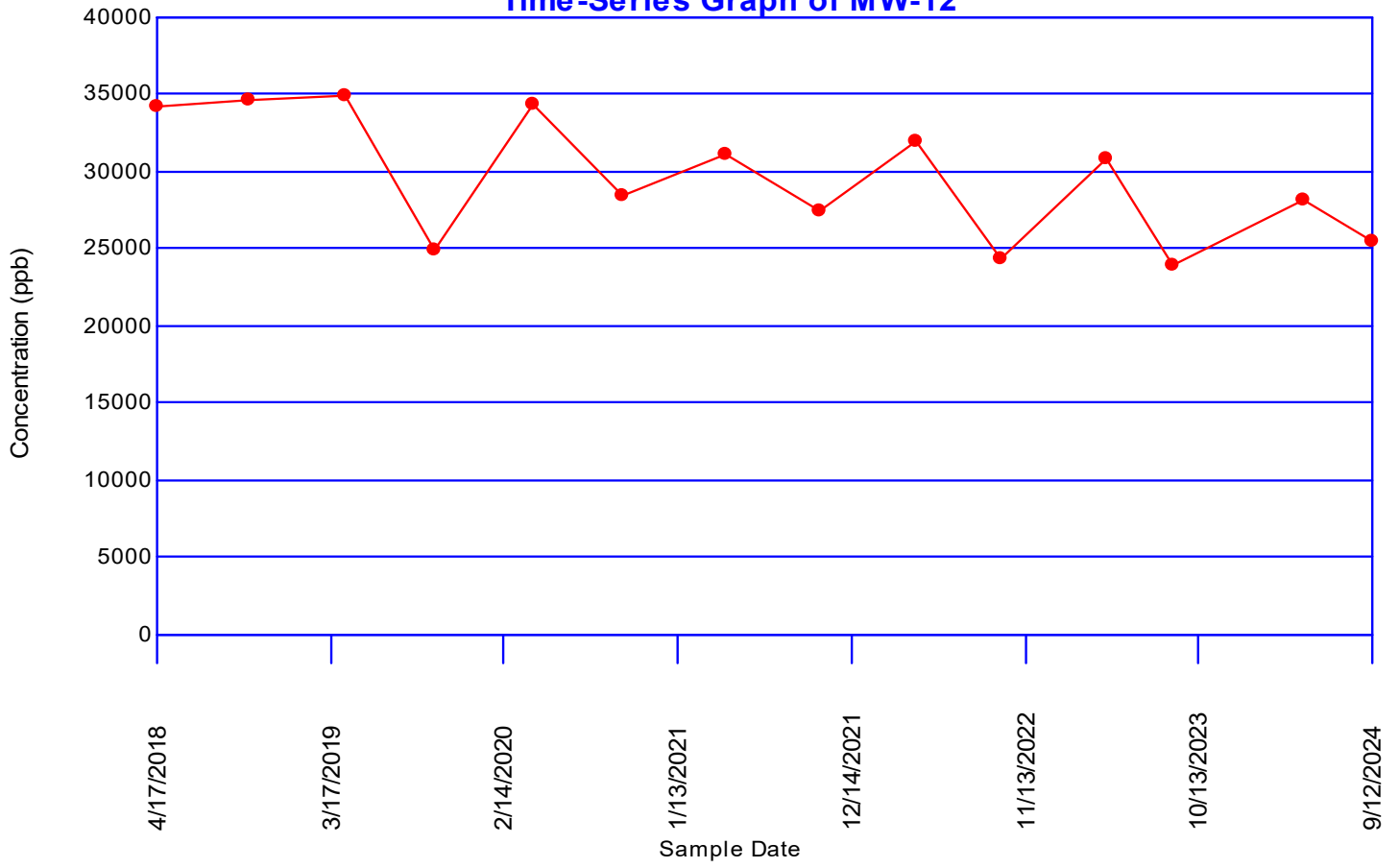
Group Variance = 333.667

Z-Score = -2.29929

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-2.29929| > 1.97737$ indicating a trend

Sodium, Total Time-Series Graph of MW-12



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.668367	0.277778	0.546	64700
2	0.26506	0.277778	0.521	None

Loc.	Date	Conc.	Outlier
MW-16	4/17/2018	47200	FALSE
	10/9/2018	64700	TRUE
	4/14/2019	53100	FALSE
	10/2/2019	44800	FALSE
	4/9/2020	47600	FALSE
	10/1/2020	45100	FALSE
	4/15/2021	47600	FALSE
	10/14/2021	49300	FALSE
	4/19/2022	50900	FALSE
	9/28/2022	46800	FALSE
	4/18/2023	51600	FALSE
	8/24/2023	47700	FALSE
	5/2/2024	48000	FALSE
	9/12/2024	42600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	42600	64700	22100	0.5251	11604.7
2	44800	53100	8300	0.3318	2753.94
3	45100	51600	6500	0.246	1599
4	46800	50900	4100	0.1802	738.82
5	47200	49300	2100	0.124	260.4
6	47600	48000	400	0.0727	29.08
7	47600	47700	100	0.024	2.4
8	47700	47600	-100		
9	48000	47600	-400		
10	49300	47200	-2100		
11	50900	46800	-4100		
12	51600	45100	-6500		
13	53100	44800	-8300		
14	64700	42600	-22100		

Sum of b values = 16988.4

Sample Standard Deviation = 5278.32

W Statistic = 0.796834

5% Critical value of 0.874 exceeds 0.796834
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.796834
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
64700	47200	17500	1	0
53100	47200	5900	2	0
44800	47200	-2400	2	1
47600	47200	400	3	1
45100	47200	-2100	3	2
47600	47200	400	4	2
49300	47200	2100	5	2
50900	47200	3700	6	2
46800	47200	-400	6	3
51600	47200	4400	7	3
47700	47200	500	8	3
48000	47200	800	9	3
42600	47200	-4600	9	4
53100	64700	-11600	9	5
44800	64700	-19900	9	6
47600	64700	-17100	9	7
45100	64700	-19600	9	8
47600	64700	-17100	9	9
49300	64700	-15400	9	10
50900	64700	-13800	9	11
46800	64700	-17900	9	12
51600	64700	-13100	9	13
47700	64700	-17000	9	14
48000	64700	-16700	9	15
42600	64700	-22100	9	16
44800	53100	-8300	9	17
47600	53100	-5500	9	18
45100	53100	-8000	9	19
47600	53100	-5500	9	20
49300	53100	-3800	9	21
50900	53100	-2200	9	22
46800	53100	-6300	9	23
51600	53100	-1500	9	24
47700	53100	-5400	9	25
48000	53100	-5100	9	26
42600	53100	-10500	9	27
47600	44800	2800	10	27
45100	44800	300	11	27
47600	44800	2800	12	27
49300	44800	4500	13	27
50900	44800	6100	14	27
46800	44800	2000	15	27
51600	44800	6800	16	27
47700	44800	2900	17	27
48000	44800	3200	18	27
42600	44800	-2200	18	28
45100	47600	-2500	18	29
47600	47600	0	18	29
49300	47600	1700	19	29

50900	47600	3300	20	29
46800	47600	-800	20	30
51600	47600	4000	21	30
47700	47600	100	22	30
48000	47600	400	23	30
42600	47600	-5000	23	31
47600	45100	2500	24	31
49300	45100	4200	25	31
50900	45100	5800	26	31
46800	45100	1700	27	31
51600	45100	6500	28	31
47700	45100	2600	29	31
48000	45100	2900	30	31
42600	45100	-2500	30	32
49300	47600	1700	31	32
50900	47600	3300	32	32
46800	47600	-800	32	33
51600	47600	4000	33	33
47700	47600	100	34	33
48000	47600	400	35	33
42600	47600	-5000	35	34
50900	49300	1600	36	34
46800	49300	-2500	36	35
51600	49300	2300	37	35
47700	49300	-1600	37	36
48000	49300	-1300	37	37
42600	49300	-6700	37	38
46800	50900	-4100	37	39
51600	50900	700	38	39
47700	50900	-3200	38	40
48000	50900	-2900	38	41
42600	50900	-8300	38	42
51600	46800	4800	39	42
47700	46800	900	40	42
48000	46800	1200	41	42
42600	46800	-4200	41	43
47700	51600	-3900	41	44
48000	51600	-3600	41	45
42600	51600	-9000	41	46
48000	47700	300	42	46
42600	47700	-5100	42	47
42600	48000	-5400	42	48

S Statistic = 42 - 48 = -6

Tied Group	Value	Members
1	47600	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/14/2019	1
10/2/2019	1
4/9/2020	1

10/1/2020	1
4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/2/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

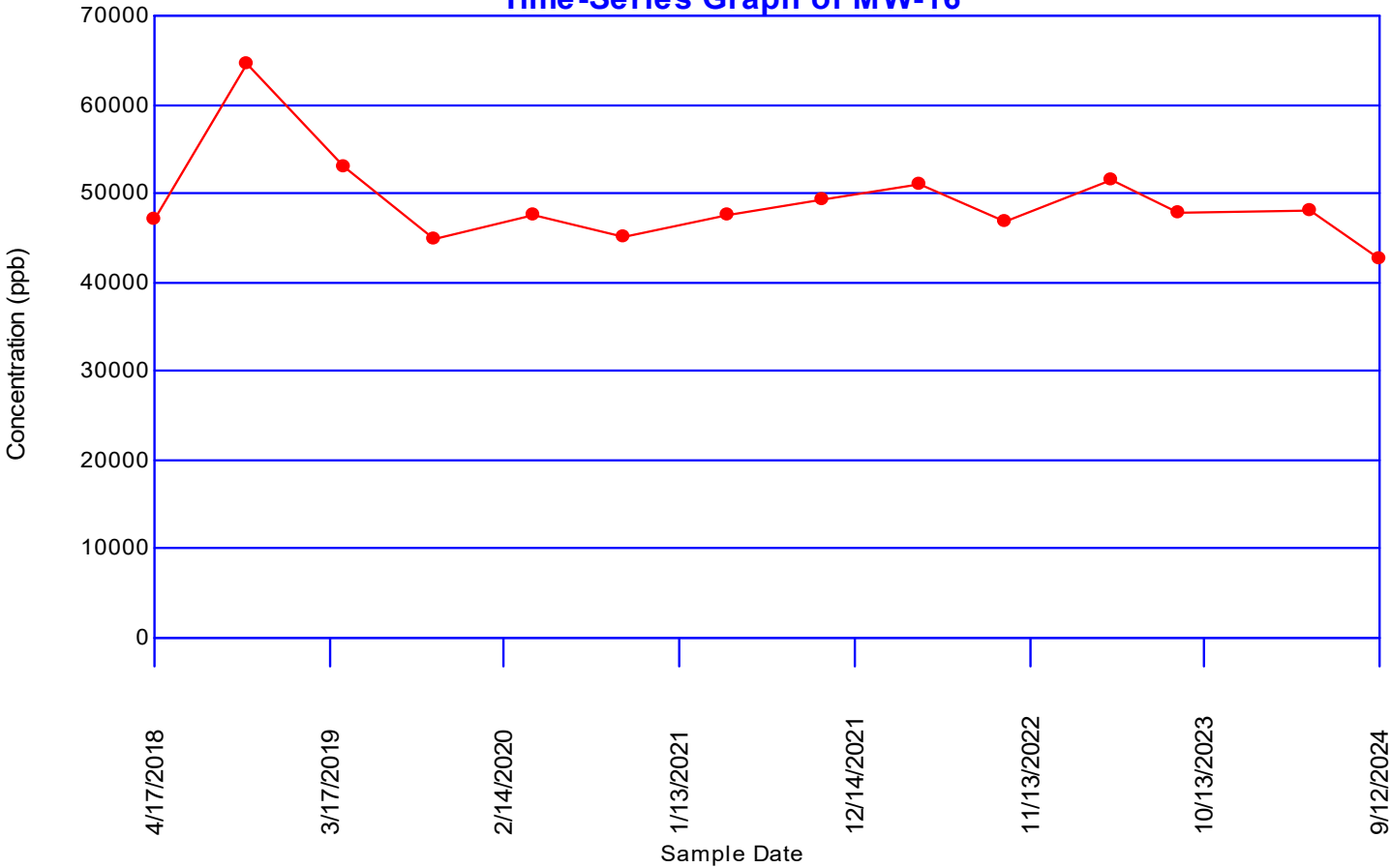
Group Variance = 332.667

Z-Score = -0.274136

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.274136| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.491909	0.0426829	0.546	None

Loc.	Date	Conc.	Outlier
MW-20	4/17/2018	67700	FALSE
	10/10/2018	97800	FALSE
	4/14/2019	86900	FALSE
	10/2/2019	67600	FALSE
	4/9/2020	82600	FALSE
	10/2/2020	66200	FALSE
	4/15/2021	73700	FALSE
	10/12/2021	66900	FALSE
	4/20/2022	77400	FALSE
	9/28/2022	71000	FALSE
	4/19/2023	76200	FALSE
	8/23/2023	66700	FALSE
	4/30/2024	77100	FALSE
	9/11/2024	67000	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-20

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	66200	97800	31600	0.5251	16593.2
2	66700	86900	20200	0.3318	6702.36
3	66900	82600	15700	0.246	3862.2
4	67000	77400	10400	0.1802	1874.08
5	67600	77100	9500	0.124	1178
6	67700	76200	8500	0.0727	617.95
7	71000	73700	2700	0.024	64.8
8	73700	71000	-2700		
9	76200	67700	-8500		
10	77100	67600	-9500		
11	77400	67000	-10400		
12	82600	66900	-15700		
13	86900	66700	-20200		
14	97800	66200	-31600		

Sum of b values = 30892.6

Sample Standard Deviation = 9325.6

W Statistic = 0.844132

5% Critical value of 0.874 exceeds 0.844132
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.844132
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
97800	67700	30100	1	0
86900	67700	19200	2	0
67600	67700	-100	2	1
82600	67700	14900	3	1
66200	67700	-1500	3	2
73700	67700	6000	4	2
66900	67700	-800	4	3
77400	67700	9700	5	3
71000	67700	3300	6	3
76200	67700	8500	7	3
66700	67700	-1000	7	4
77100	67700	9400	8	4
67000	67700	-700	8	5
86900	97800	-10900	8	6
67600	97800	-30200	8	7
82600	97800	-15200	8	8
66200	97800	-31600	8	9
73700	97800	-24100	8	10
66900	97800	-30900	8	11
77400	97800	-20400	8	12
71000	97800	-26800	8	13
76200	97800	-21600	8	14
66700	97800	-31100	8	15
77100	97800	-20700	8	16
67000	97800	-30800	8	17
67600	86900	-19300	8	18
82600	86900	-4300	8	19
66200	86900	-20700	8	20
73700	86900	-13200	8	21
66900	86900	-20000	8	22
77400	86900	-9500	8	23
71000	86900	-15900	8	24
76200	86900	-10700	8	25
66700	86900	-20200	8	26
77100	86900	-9800	8	27
67000	86900	-19900	8	28
82600	67600	15000	9	28
66200	67600	-1400	9	29
73700	67600	6100	10	29
66900	67600	-700	10	30
77400	67600	9800	11	30
71000	67600	3400	12	30
76200	67600	8600	13	30
66700	67600	-900	13	31
77100	67600	9500	14	31
67000	67600	-600	14	32
66200	82600	-16400	14	33
73700	82600	-8900	14	34
66900	82600	-15700	14	35

77400	82600	-5200	14	36
71000	82600	-11600	14	37
76200	82600	-6400	14	38
66700	82600	-15900	14	39
77100	82600	-5500	14	40
67000	82600	-15600	14	41
73700	66200	7500	15	41
66900	66200	700	16	41
77400	66200	11200	17	41
71000	66200	4800	18	41
76200	66200	10000	19	41
66700	66200	500	20	41
77100	66200	10900	21	41
67000	66200	800	22	41
66900	73700	-6800	22	42
77400	73700	3700	23	42
71000	73700	-2700	23	43
76200	73700	2500	24	43
66700	73700	-7000	24	44
77100	73700	3400	25	44
67000	73700	-6700	25	45
77400	66900	10500	26	45
71000	66900	4100	27	45
76200	66900	9300	28	45
66700	66900	-200	28	46
77100	66900	10200	29	46
67000	66900	100	30	46
71000	77400	-6400	30	47
76200	77400	-1200	30	48
66700	77400	-10700	30	49
77100	77400	-300	30	50
67000	77400	-10400	30	51
76200	71000	5200	31	51
66700	71000	-4300	31	52
77100	71000	6100	32	52
67000	71000	-4000	32	53
66700	76200	-9500	32	54
77100	76200	900	33	54
67000	76200	-9200	33	55
77100	66700	10400	34	55
67000	66700	300	35	55
67000	77100	-10100	35	56

S Statistic = 35 - 56 = -21

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/10/2018		1
4/14/2019		1
10/2/2019		1
4/9/2020		1
10/2/2020		1

4/15/2021	1
10/12/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/23/2023	1
4/30/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

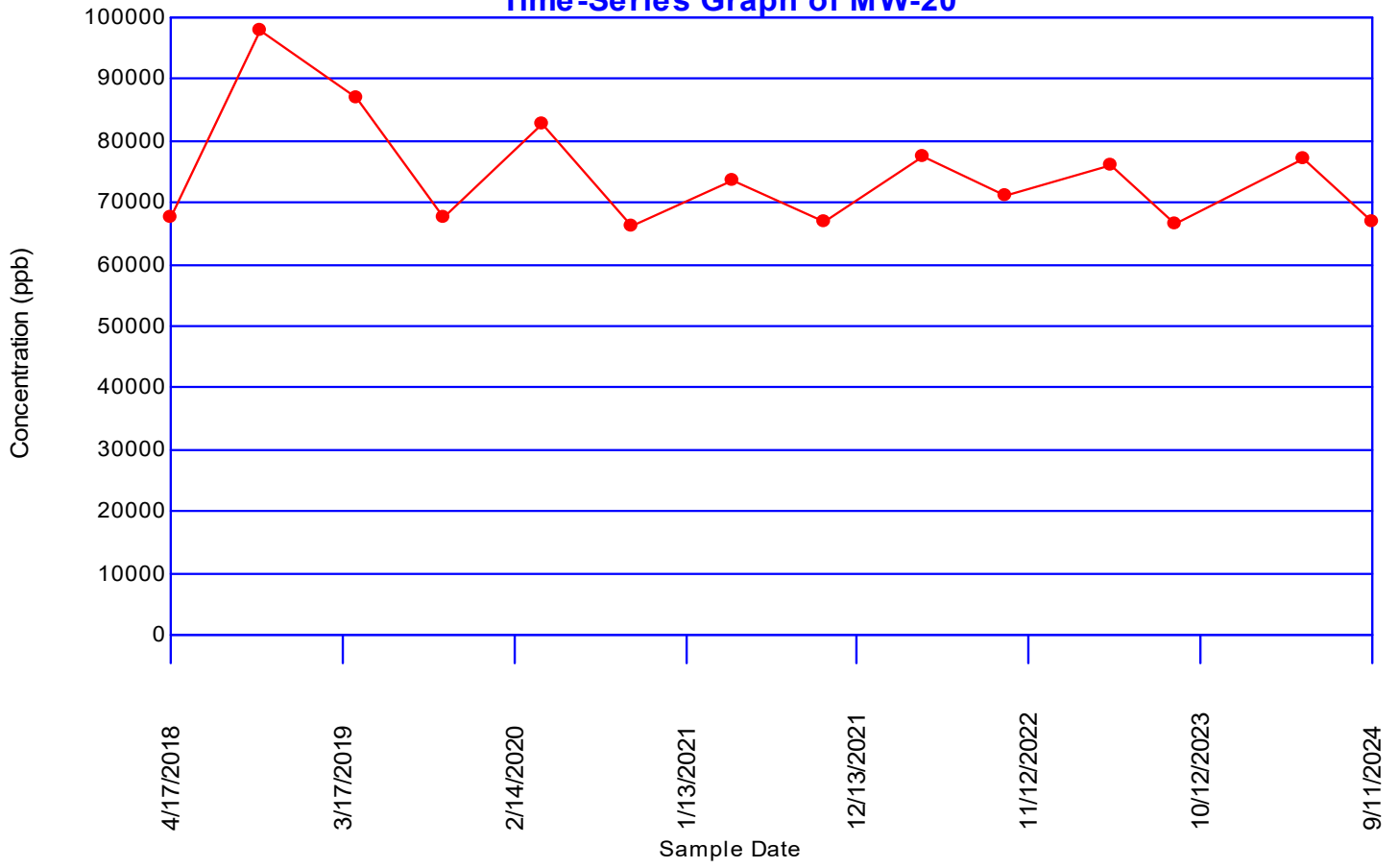
Group Variance = 333.667

Z-Score = -1.0949

Comparison Level at 1.0 - $(0.05 / 2)$ = 97.5% confidence level = 1.97737 (two-tailed)

$|-1.0949| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-20



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.148438	0.0916667	0.546	None

Loc.	Date	Conc.	Outlier
MW-21	4/17/2018	63900	FALSE
	10/10/2018	63200	FALSE
	4/13/2019	62000	FALSE
	10/1/2019	54200	FALSE
	4/7/2020	54800	FALSE
	9/30/2020	50100	FALSE
	4/14/2021	51400	FALSE
	10/12/2021	54500	FALSE
	4/20/2022	57200	FALSE
	9/29/2022	51100	FALSE
	4/18/2023	58000	FALSE
	8/23/2023	52700	FALSE
	5/1/2024	51600	FALSE
	9/11/2024	50000	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-21

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	50000	63900	13900	0.5251	7298.89
2	50100	63200	13100	0.3318	4346.58
3	51100	62000	10900	0.246	2681.4
4	51400	58000	6600	0.1802	1189.32
5	51600	57200	5600	0.124	694.4
6	52700	54800	2100	0.0727	152.67
7	54200	54500	300	0.024	7.2
8	54500	54200	-300		
9	54800	52700	-2100		
10	57200	51600	-5600		
11	58000	51400	-6600		
12	62000	51100	-10900		
13	63200	50100	-13100		
14	63900	50000	-13900		

Sum of b values = 16370.5

Sample Standard Deviation = 4825.19

W Statistic = 0.88542

5% Critical value of 0.874 is less than 0.88542
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.88542
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
63200	63900	-700	0	1
62000	63900	-1900	0	2
54200	63900	-9700	0	3
54800	63900	-9100	0	4
50100	63900	-13800	0	5
51400	63900	-12500	0	6
54500	63900	-9400	0	7
57200	63900	-6700	0	8
51100	63900	-12800	0	9
58000	63900	-5900	0	10
52700	63900	-11200	0	11
51600	63900	-12300	0	12
50000	63900	-13900	0	13
62000	63200	-1200	0	14
54200	63200	-9000	0	15
54800	63200	-8400	0	16
50100	63200	-13100	0	17
51400	63200	-11800	0	18
54500	63200	-8700	0	19
57200	63200	-6000	0	20
51100	63200	-12100	0	21
58000	63200	-5200	0	22
52700	63200	-10500	0	23
51600	63200	-11600	0	24
50000	63200	-13200	0	25
54200	62000	-7800	0	26
54800	62000	-7200	0	27
50100	62000	-11900	0	28
51400	62000	-10600	0	29
54500	62000	-7500	0	30
57200	62000	-4800	0	31
51100	62000	-10900	0	32
58000	62000	-4000	0	33
52700	62000	-9300	0	34
51600	62000	-10400	0	35
50000	62000	-12000	0	36
54800	54200	600	1	36
50100	54200	-4100	1	37
51400	54200	-2800	1	38
54500	54200	300	2	38
57200	54200	3000	3	38
51100	54200	-3100	3	39
58000	54200	3800	4	39
52700	54200	-1500	4	40
51600	54200	-2600	4	41
50000	54200	-4200	4	42
50100	54800	-4700	4	43
51400	54800	-3400	4	44
54500	54800	-300	4	45

57200	54800	2400	5	45
51100	54800	-3700	5	46
58000	54800	3200	6	46
52700	54800	-2100	6	47
51600	54800	-3200	6	48
50000	54800	-4800	6	49
51400	50100	1300	7	49
54500	50100	4400	8	49
57200	50100	7100	9	49
51100	50100	1000	10	49
58000	50100	7900	11	49
52700	50100	2600	12	49
51600	50100	1500	13	49
50000	50100	-100	13	50
54500	51400	3100	14	50
57200	51400	5800	15	50
51100	51400	-300	15	51
58000	51400	6600	16	51
52700	51400	1300	17	51
51600	51400	200	18	51
50000	51400	-1400	18	52
57200	54500	2700	19	52
51100	54500	-3400	19	53
58000	54500	3500	20	53
52700	54500	-1800	20	54
51600	54500	-2900	20	55
50000	54500	-4500	20	56
51100	57200	-6100	20	57
58000	57200	800	21	57
52700	57200	-4500	21	58
51600	57200	-5600	21	59
50000	57200	-7200	21	60
58000	51100	6900	22	60
52700	51100	1600	23	60
51600	51100	500	24	60
50000	51100	-1100	24	61
52700	58000	-5300	24	62
51600	58000	-6400	24	63
50000	58000	-8000	24	64
51600	52700	-1100	24	65
50000	52700	-2700	24	66
50000	51600	-1600	24	67

S Statistic = 24 - 67 = -43

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/10/2018		1
4/13/2019		1
10/1/2019		1
4/7/2020		1
9/30/2020		1

4/14/2021	1
10/12/2021	1
4/20/2022	1
9/29/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

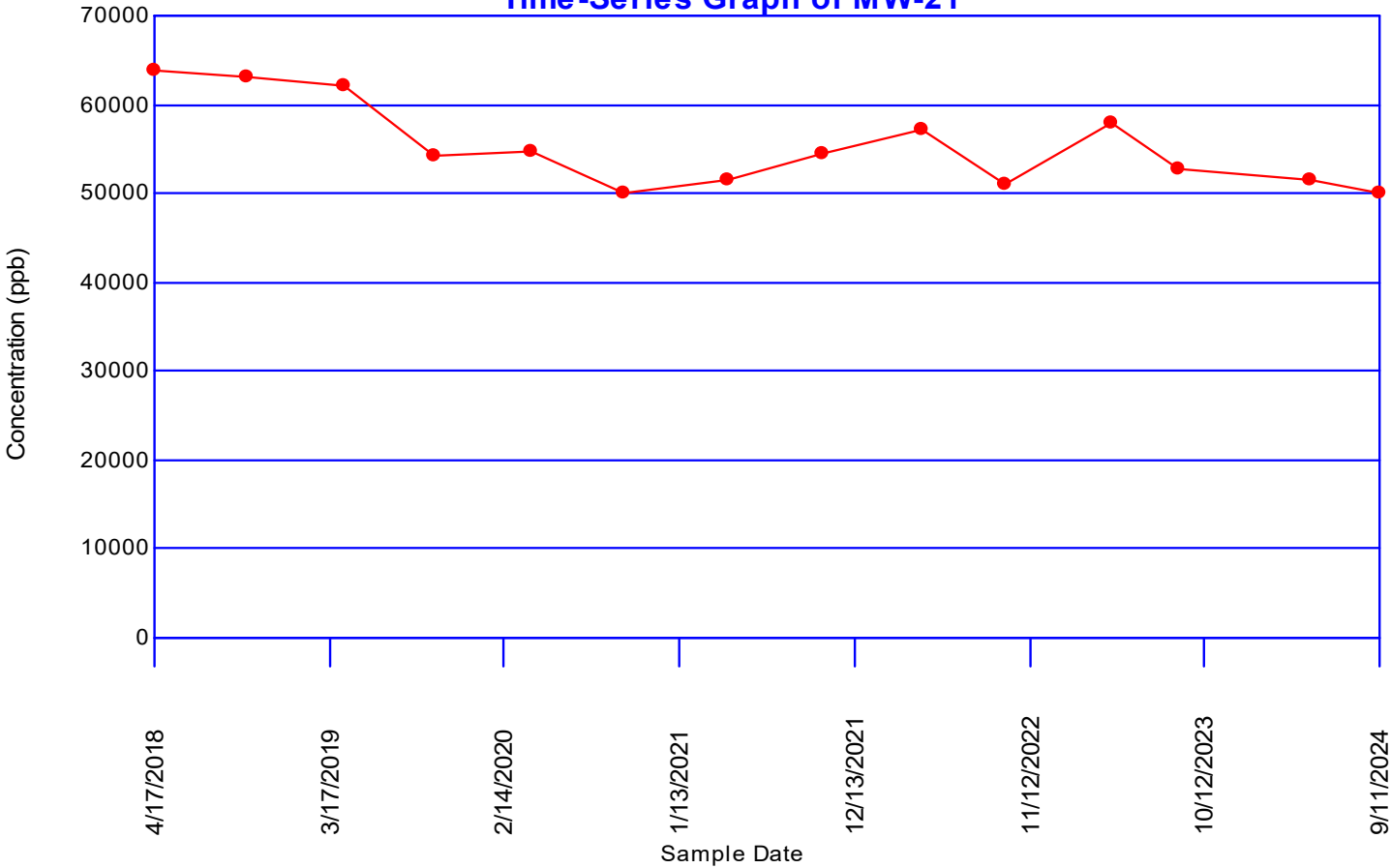
Group Variance = 333.667

Z-Score = -2.29929

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-2.29929| > 1.97737$ indicating a trend

Sodium, Total Time-Series Graph of MW-21



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.545244	0.45098	0.546	None

Loc.	Date	Conc.	Outlier
MW-25	4/17/2018	51700	FALSE
	10/9/2018	85400	FALSE
	4/13/2019	42300	FALSE
	10/1/2019	50000	FALSE
	4/8/2020	46500	FALSE
	10/1/2020	49800	FALSE
	4/14/2021	26500	FALSE
	10/13/2021	53000	FALSE
	4/19/2022	61900	FALSE
	9/29/2022	59500	FALSE
	4/19/2023	49800	FALSE
	8/24/2023	61100	FALSE
	4/29/2024	26200	FALSE
	9/10/2024	63600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-25

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	26200	85400	59200	0.5251	31085.9
2	26500	63600	37100	0.3318	12309.8
3	42300	61900	19600	0.246	4821.6
4	46500	61100	14600	0.1802	2630.92
5	49800	59500	9700	0.124	1202.8
6	49800	53000	3200	0.0727	232.64
7	50000	51700	1700	0.024	40.8
8	51700	50000	-1700		
9	53000	49800	-3200		
10	59500	49800	-9700		
11	61100	46500	-14600		
12	61900	42300	-19600		
13	63600	26500	-37100		
14	85400	26200	-59200		

Sum of b values = 52324.5

Sample Standard Deviation = 15043.9

W Statistic = 0.930559

5% Critical value of 0.874 is less than 0.930559
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.930559
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
85400	51700	33700	1	0
42300	51700	-9400	1	1
50000	51700	-1700	1	2
46500	51700	-5200	1	3
49800	51700	-1900	1	4
26500	51700	-25200	1	5
53000	51700	1300	2	5
61900	51700	10200	3	5
59500	51700	7800	4	5
49800	51700	-1900	4	6
61100	51700	9400	5	6
26200	51700	-25500	5	7
63600	51700	11900	6	7
42300	85400	-43100	6	8
50000	85400	-35400	6	9
46500	85400	-38900	6	10
49800	85400	-35600	6	11
26500	85400	-58900	6	12
53000	85400	-32400	6	13
61900	85400	-23500	6	14
59500	85400	-25900	6	15
49800	85400	-35600	6	16
61100	85400	-24300	6	17
26200	85400	-59200	6	18
63600	85400	-21800	6	19
50000	42300	7700	7	19
46500	42300	4200	8	19
49800	42300	7500	9	19
26500	42300	-15800	9	20
53000	42300	10700	10	20
61900	42300	19600	11	20
59500	42300	17200	12	20
49800	42300	7500	13	20
61100	42300	18800	14	20
26200	42300	-16100	14	21
63600	42300	21300	15	21
46500	50000	-3500	15	22
49800	50000	-200	15	23
26500	50000	-23500	15	24
53000	50000	3000	16	24
61900	50000	11900	17	24
59500	50000	9500	18	24
49800	50000	-200	18	25
61100	50000	11100	19	25
26200	50000	-23800	19	26
63600	50000	13600	20	26
49800	46500	3300	21	26
26500	46500	-20000	21	27
53000	46500	6500	22	27

61900	46500	15400	23	27
59500	46500	13000	24	27
49800	46500	3300	25	27
61100	46500	14600	26	27
26200	46500	-20300	26	28
63600	46500	17100	27	28
26500	49800	-23300	27	29
53000	49800	3200	28	29
61900	49800	12100	29	29
59500	49800	9700	30	29
49800	49800	0	30	29
61100	49800	11300	31	29
26200	49800	-23600	31	30
63600	49800	13800	32	30
53000	26500	26500	33	30
61900	26500	35400	34	30
59500	26500	33000	35	30
49800	26500	23300	36	30
61100	26500	34600	37	30
26200	26500	-300	37	31
63600	26500	37100	38	31
61900	53000	8900	39	31
59500	53000	6500	40	31
49800	53000	-3200	40	32
61100	53000	8100	41	32
26200	53000	-26800	41	33
63600	53000	10600	42	33
59500	61900	-2400	42	34
49800	61900	-12100	42	35
61100	61900	-800	42	36
26200	61900	-35700	42	37
63600	61900	1700	43	37
49800	59500	-9700	43	38
61100	59500	1600	44	38
26200	59500	-33300	44	39
63600	59500	4100	45	39
61100	49800	11300	46	39
26200	49800	-23600	46	40
63600	49800	13800	47	40
26200	61100	-34900	47	41
63600	61100	2500	48	41
63600	26200	37400	49	41

S Statistic = 49 - 41 = 8

Tied Group	Value	Members
1	49800	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1
4/8/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

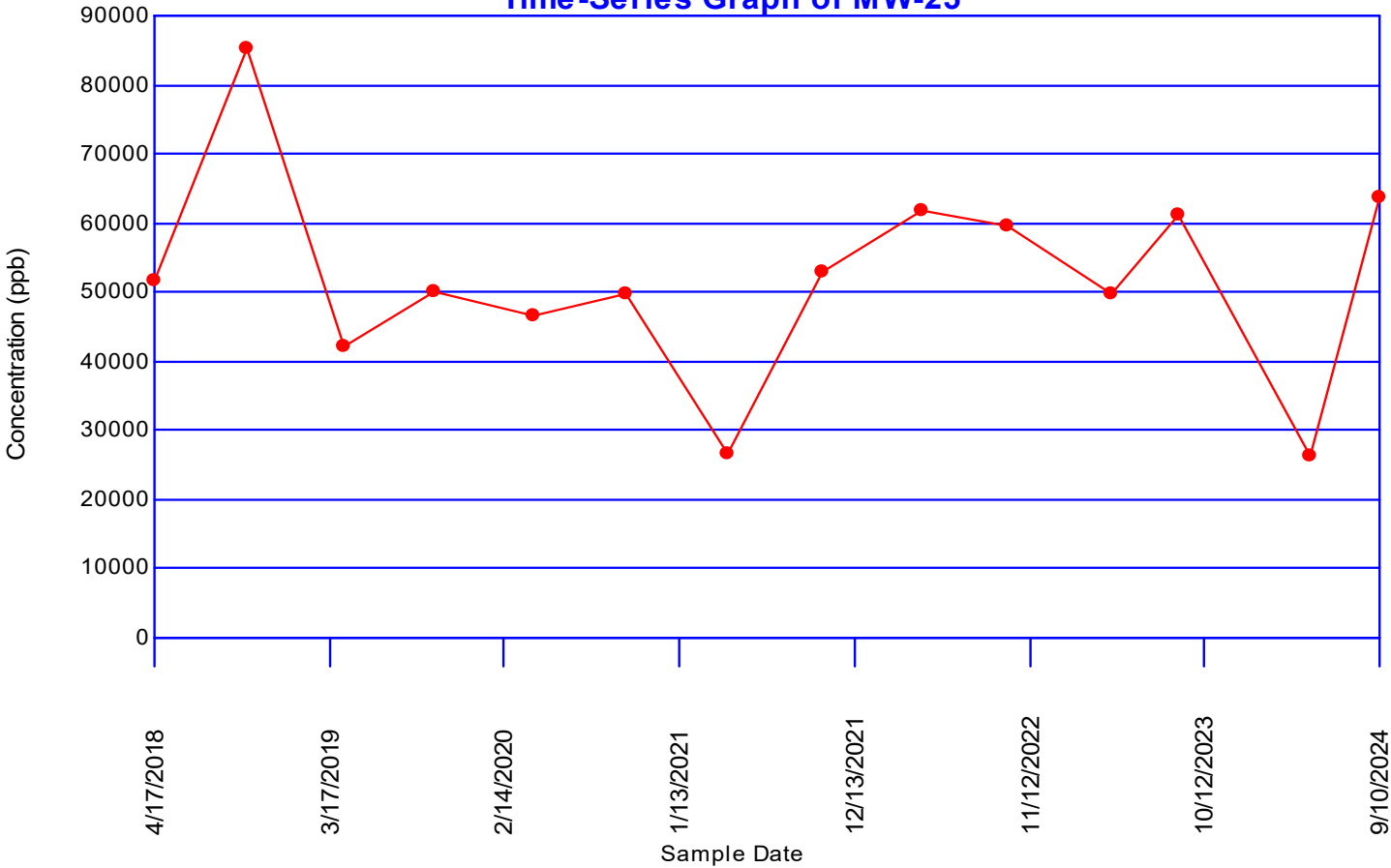
Group Variance = 332.667

Z-Score = 0.38379

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.38379| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-25



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.859189	0.520325	0.546	123000
2	0.241667	0.520325	0.521	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	89600	FALSE
	10/9/2018	123000	TRUE
	4/13/2019	87000	FALSE
	10/1/2019	82500	FALSE
	4/8/2020	85700	FALSE
	10/1/2020	81100	FALSE
	4/14/2021	81500	FALSE
	10/13/2021	74700	FALSE
	4/19/2022	81300	FALSE
	9/29/2022	81300	FALSE
	4/19/2023	86700	FALSE
	8/24/2023	83100	FALSE
	4/29/2024	86100	FALSE
	9/10/2024	77600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	74700	123000	48300	0.5251	25362.3
2	77600	89600	12000	0.3318	3981.6
3	81100	87000	5900	0.246	1451.4
4	81300	86700	5400	0.1802	973.08
5	81300	86100	4800	0.124	595.2
6	81500	85700	4200	0.0727	305.34
7	82500	83100	600	0.024	14.4
8	83100	82500	-600		
9	85700	81500	-4200		
10	86100	81300	-4800		
11	86700	81300	-5400		
12	87000	81100	-5900		
13	89600	77600	-12000		
14	123000	74700	-48300		

Sum of b values = 32683.4

Sample Standard Deviation = 11402.9

W Statistic = 0.631945

5% Critical value of 0.874 exceeds 0.631945
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.631945
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
123000	89600	33400	1	0
87000	89600	-2600	1	1
82500	89600	-7100	1	2
85700	89600	-3900	1	3
81100	89600	-8500	1	4
81500	89600	-8100	1	5
74700	89600	-14900	1	6
81300	89600	-8300	1	7
81300	89600	-8300	1	8
86700	89600	-2900	1	9
83100	89600	-6500	1	10
86100	89600	-3500	1	11
77600	89600	-12000	1	12
87000	123000	-36000	1	13
82500	123000	-40500	1	14
85700	123000	-37300	1	15
81100	123000	-41900	1	16
81500	123000	-41500	1	17
74700	123000	-48300	1	18
81300	123000	-41700	1	19
81300	123000	-41700	1	20
86700	123000	-36300	1	21
83100	123000	-39900	1	22
86100	123000	-36900	1	23
77600	123000	-45400	1	24
82500	87000	-4500	1	25
85700	87000	-1300	1	26
81100	87000	-5900	1	27
81500	87000	-5500	1	28
74700	87000	-12300	1	29
81300	87000	-5700	1	30
81300	87000	-5700	1	31
86700	87000	-300	1	32
83100	87000	-3900	1	33
86100	87000	-900	1	34
77600	87000	-9400	1	35
85700	82500	3200	2	35
81100	82500	-1400	2	36
81500	82500	-1000	2	37
74700	82500	-7800	2	38
81300	82500	-1200	2	39
81300	82500	-1200	2	40
86700	82500	4200	3	40
83100	82500	600	4	40
86100	82500	3600	5	40
77600	82500	-4900	5	41
81100	85700	-4600	5	42
81500	85700	-4200	5	43
74700	85700	-11000	5	44

81300	85700	-4400	5	45
81300	85700	-4400	5	46
86700	85700	1000	6	46
83100	85700	-2600	6	47
86100	85700	400	7	47
77600	85700	-8100	7	48
81500	81100	400	8	48
74700	81100	-6400	8	49
81300	81100	200	9	49
81300	81100	200	10	49
86700	81100	5600	11	49
83100	81100	2000	12	49
86100	81100	5000	13	49
77600	81100	-3500	13	50
74700	81500	-6800	13	51
81300	81500	-200	13	52
81300	81500	-200	13	53
86700	81500	5200	14	53
83100	81500	1600	15	53
86100	81500	4600	16	53
77600	81500	-3900	16	54
81300	74700	6600	17	54
81300	74700	6600	18	54
86700	74700	12000	19	54
83100	74700	8400	20	54
86100	74700	11400	21	54
77600	74700	2900	22	54
81300	81300	0	22	54
86700	81300	5400	23	54
83100	81300	1800	24	54
86100	81300	4800	25	54
77600	81300	-3700	25	55
86700	81300	5400	26	55
83100	81300	1800	27	55
86100	81300	4800	28	55
77600	81300	-3700	28	56
83100	86700	-3600	28	57
86100	86700	-600	28	58
77600	86700	-9100	28	59
86100	83100	3000	29	59
77600	83100	-5500	29	60
77600	86100	-8500	29	61

S Statistic = 29 - 61 = -32

Tied Group	Value	Members
1	81300	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1
4/8/2020	1

10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

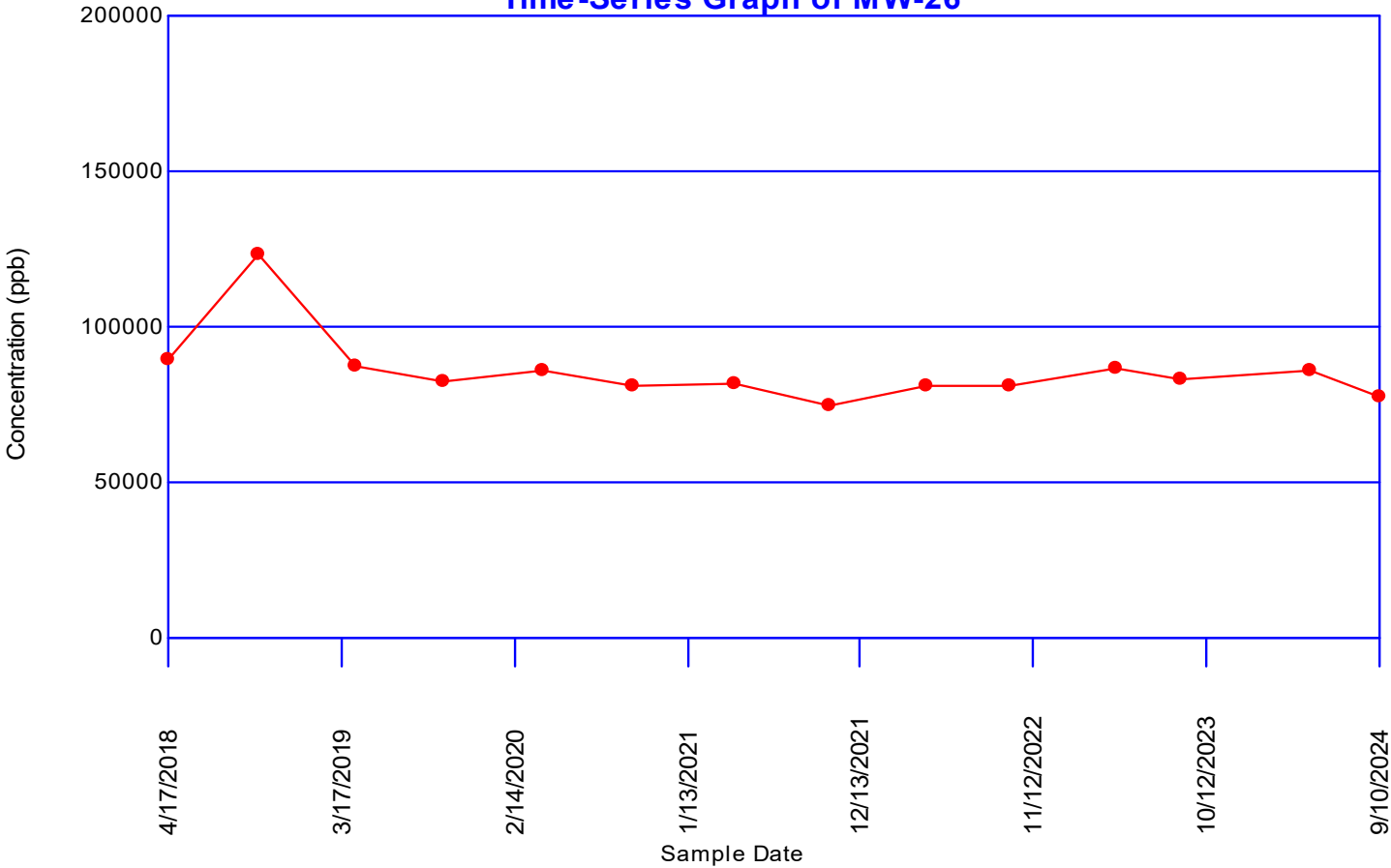
Group Variance = 332.667

Z-Score = -1.69964

Comparison Level at 1.0 - $(0.05 / 2)$ = 97.5% confidence level = 1.97737 (two-tailed)

$|-1.69964| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.803371	0.507042	0.546	59100
2	0.305085	0.507042	0.521	None

Loc.	Date	Conc.	Outlier
MW-27	4/18/2018	44800	FALSE
	10/9/2018	59100	TRUE
	4/13/2019	46600	FALSE
	10/1/2019	41400	FALSE
	4/9/2020	43600	FALSE
	10/1/2020	41300	FALSE
	4/14/2021	40700	FALSE
	10/13/2021	37700	FALSE
	4/20/2022	42800	FALSE
	9/28/2022	43400	FALSE
	4/19/2023	43900	FALSE
	8/24/2023	43600	FALSE
	5/1/2024	44800	FALSE
	9/11/2024	41900	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	37700	59100	21400	0.5251	11237.1
2	40700	46600	5900	0.3318	1957.62
3	41300	44800	3500	0.246	861
4	41400	44800	3400	0.1802	612.68
5	41900	43900	2000	0.124	248
6	42800	43600	800	0.0727	58.16
7	43400	43600	200	0.024	4.8
8	43600	43400	-200		
9	43600	42800	-800		
10	43900	41900	-2000		
11	44800	41400	-3400		
12	44800	41300	-3500		
13	46600	40700	-5900		
14	59100	37700	-21400		

Sum of b values = 14979.4

Sample Standard Deviation = 4861.22

W Statistic = 0.730391

5% Critical value of 0.874 exceeds 0.730391

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.730391

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
59100	44800	14300	1	0
46600	44800	1800	2	0
41400	44800	-3400	2	1
43600	44800	-1200	2	2
41300	44800	-3500	2	3
40700	44800	-4100	2	4
37700	44800	-7100	2	5
42800	44800	-2000	2	6
43400	44800	-1400	2	7
43900	44800	-900	2	8
43600	44800	-1200	2	9
44800	44800	0	2	9
41900	44800	-2900	2	10
46600	59100	-12500	2	11
41400	59100	-17700	2	12
43600	59100	-15500	2	13
41300	59100	-17800	2	14
40700	59100	-18400	2	15
37700	59100	-21400	2	16
42800	59100	-16300	2	17
43400	59100	-15700	2	18
43900	59100	-15200	2	19
43600	59100	-15500	2	20
44800	59100	-14300	2	21
41900	59100	-17200	2	22
41400	46600	-5200	2	23
43600	46600	-3000	2	24
41300	46600	-5300	2	25
40700	46600	-5900	2	26
37700	46600	-8900	2	27
42800	46600	-3800	2	28
43400	46600	-3200	2	29
43900	46600	-2700	2	30
43600	46600	-3000	2	31
44800	46600	-1800	2	32
41900	46600	-4700	2	33
43600	41400	2200	3	33
41300	41400	-100	3	34
40700	41400	-700	3	35
37700	41400	-3700	3	36
42800	41400	1400	4	36
43400	41400	2000	5	36
43900	41400	2500	6	36
43600	41400	2200	7	36
44800	41400	3400	8	36
41900	41400	500	9	36
41300	43600	-2300	9	37
40700	43600	-2900	9	38
37700	43600	-5900	9	39

42800	43600	-800	9	40
43400	43600	-200	9	41
43900	43600	300	10	41
43600	43600	0	10	41
44800	43600	1200	11	41
41900	43600	-1700	11	42
40700	41300	-600	11	43
37700	41300	-3600	11	44
42800	41300	1500	12	44
43400	41300	2100	13	44
43900	41300	2600	14	44
43600	41300	2300	15	44
44800	41300	3500	16	44
41900	41300	600	17	44
37700	40700	-3000	17	45
42800	40700	2100	18	45
43400	40700	2700	19	45
43900	40700	3200	20	45
43600	40700	2900	21	45
44800	40700	4100	22	45
41900	40700	1200	23	45
42800	37700	5100	24	45
43400	37700	5700	25	45
43900	37700	6200	26	45
43600	37700	5900	27	45
44800	37700	7100	28	45
41900	37700	4200	29	45
43400	42800	600	30	45
43900	42800	1100	31	45
43600	42800	800	32	45
44800	42800	2000	33	45
41900	42800	-900	33	46
43900	43400	500	34	46
43600	43400	200	35	46
44800	43400	1400	36	46
41900	43400	-1500	36	47
43600	43900	-300	36	48
44800	43900	900	37	48
41900	43900	-2000	37	49
44800	43600	1200	38	49
41900	43600	-1700	38	50
41900	44800	-2900	38	51

S Statistic = 38 - 51 = -13

Tied Group	Value	Members
1	44800	2
2	43600	2

Time Period	Observations
4/18/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/9/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

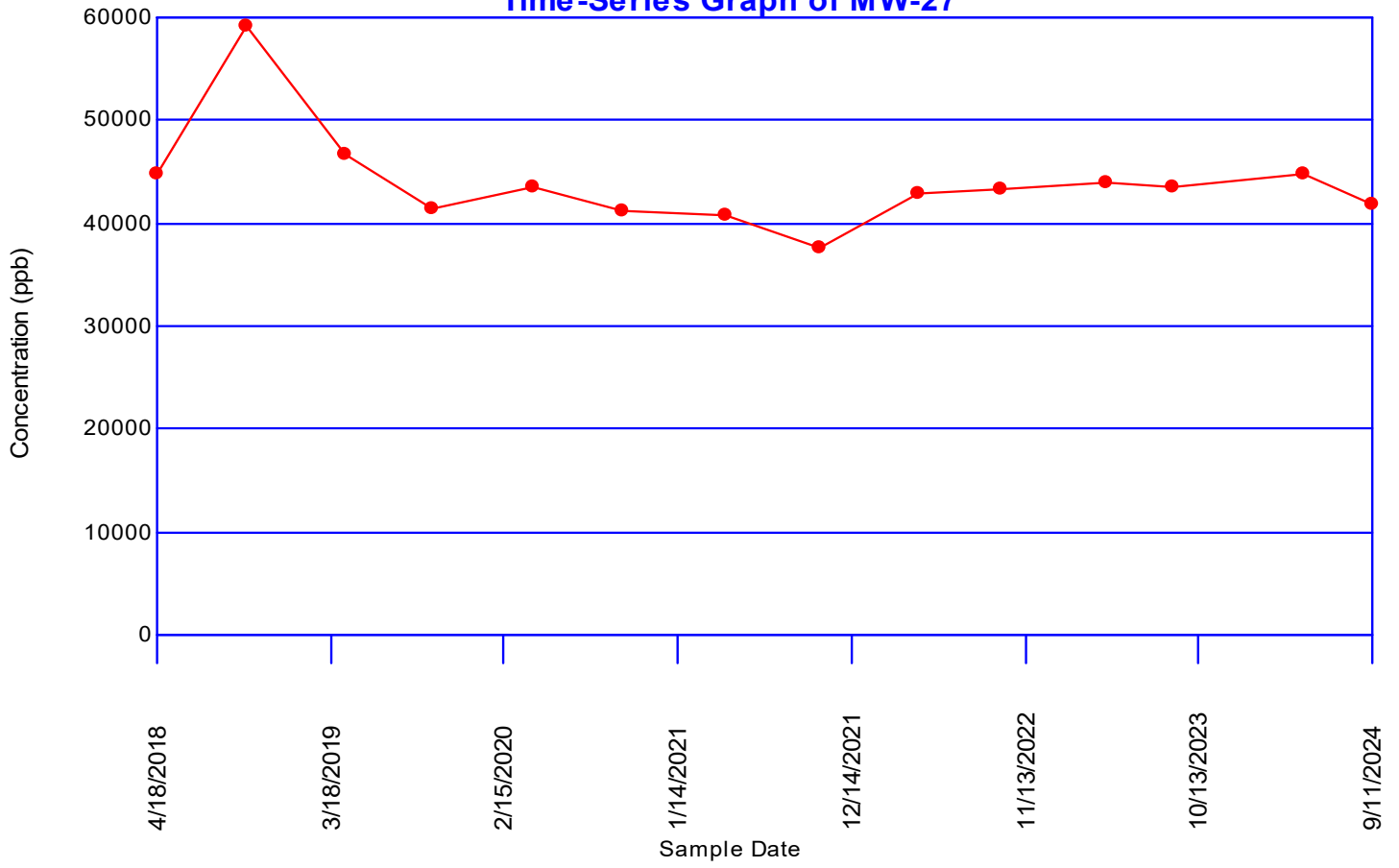
Group Variance = 331.667

Z-Score = -0.658916

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.658916| \leq 1.97737$ indicating no evidence of a trend

Sodium, Total Time-Series Graph of MW-27



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.495413	0.266667	0.546	None

Loc.	Date	Conc.	Outlier
SW-01	4/16/2018	19600	FALSE
	10/8/2018	14800	FALSE
	4/13/2019	19400	FALSE
	9/30/2019	12300	FALSE
	4/7/2020	19800	FALSE
	10/2/2020	13100	FALSE
	4/13/2021	14300	FALSE
	10/14/2021	16900	FALSE
	4/19/2022	18200	FALSE
	9/27/2022	19700	FALSE
	4/18/2023	19700	FALSE
	8/22/2023	25200	FALSE
	4/30/2024	19300	FALSE
	9/10/2024	21000	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: SW-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	12300	25200	12900	0.5251	6773.79
2	13100	21000	7900	0.3318	2621.22
3	14300	19800	5500	0.246	1353
4	14800	19700	4900	0.1802	882.98
5	16900	19700	2800	0.124	347.2
6	18200	19600	1400	0.0727	101.78
7	19300	19400	100	0.024	2.4
8	19400	19300	-100		
9	19600	18200	-1400		
10	19700	16900	-2800		
11	19700	14800	-4900		
12	19800	14300	-5500		
13	21000	13100	-7900		
14	25200	12300	-12900		

Sum of b values = 12082.4

Sample Standard Deviation = 3482.14

W Statistic = 0.92612

5% Critical value of 0.874 is less than 0.92612
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.92612
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
14800	19600	-4800	0	1
19400	19600	-200	0	2
12300	19600	-7300	0	3
19800	19600	200	1	3
13100	19600	-6500	1	4
14300	19600	-5300	1	5
16900	19600	-2700	1	6
18200	19600	-1400	1	7
19700	19600	100	2	7
19700	19600	100	3	7
25200	19600	5600	4	7
19300	19600	-300	4	8
21000	19600	1400	5	8
19400	14800	4600	6	8
12300	14800	-2500	6	9
19800	14800	5000	7	9
13100	14800	-1700	7	10
14300	14800	-500	7	11
16900	14800	2100	8	11
18200	14800	3400	9	11
19700	14800	4900	10	11
19700	14800	4900	11	11
25200	14800	10400	12	11
19300	14800	4500	13	11
21000	14800	6200	14	11
12300	19400	-7100	14	12
19800	19400	400	15	12
13100	19400	-6300	15	13
14300	19400	-5100	15	14
16900	19400	-2500	15	15
18200	19400	-1200	15	16
19700	19400	300	16	16
19700	19400	300	17	16
25200	19400	5800	18	16
19300	19400	-100	18	17
21000	19400	1600	19	17
19800	12300	7500	20	17
13100	12300	800	21	17
14300	12300	2000	22	17
16900	12300	4600	23	17
18200	12300	5900	24	17
19700	12300	7400	25	17
19700	12300	7400	26	17
25200	12300	12900	27	17
19300	12300	7000	28	17
21000	12300	8700	29	17
13100	19800	-6700	29	18
14300	19800	-5500	29	19
16900	19800	-2900	29	20

18200	19800	-1600	29	21
19700	19800	-100	29	22
19700	19800	-100	29	23
25200	19800	5400	30	23
19300	19800	-500	30	24
21000	19800	1200	31	24
14300	13100	1200	32	24
16900	13100	3800	33	24
18200	13100	5100	34	24
19700	13100	6600	35	24
19700	13100	6600	36	24
25200	13100	12100	37	24
19300	13100	6200	38	24
21000	13100	7900	39	24
16900	14300	2600	40	24
18200	14300	3900	41	24
19700	14300	5400	42	24
19700	14300	5400	43	24
25200	14300	10900	44	24
19300	14300	5000	45	24
21000	14300	6700	46	24
18200	16900	1300	47	24
19700	16900	2800	48	24
19700	16900	2800	49	24
25200	16900	8300	50	24
19300	16900	2400	51	24
21000	16900	4100	52	24
19700	18200	1500	53	24
19700	18200	1500	54	24
25200	18200	7000	55	24
19300	18200	1100	56	24
21000	18200	2800	57	24
19700	19700	0	57	24
25200	19700	5500	58	24
19300	19700	-400	58	25
21000	19700	1300	59	25
25200	19700	5500	60	25
19300	19700	-400	60	26
21000	19700	1300	61	26
19300	25200	-5900	61	27
21000	25200	-4200	61	28
21000	19300	1700	62	28

S Statistic = 62 - 28 = 34

Tied Group	Value	Members
1	19700	2

Time Period	Observations
4/16/2018	1
10/8/2018	1
4/13/2019	1
9/30/2019	1
4/7/2020	1

10/2/2020	1
4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 18

B = 0

C = 0

D = 0

E = 2

F = 0

a = 6006

b = 19656

c = 364

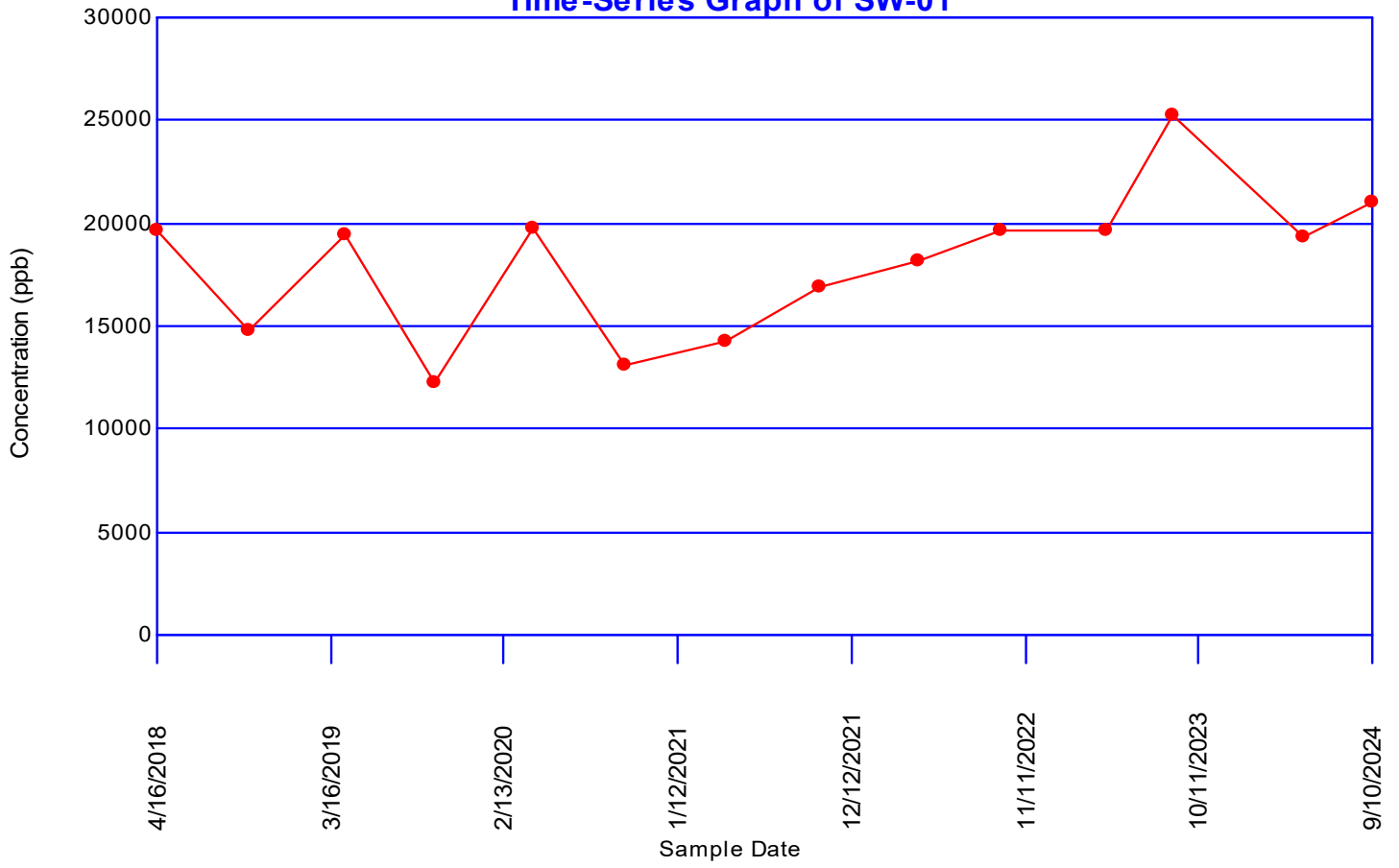
Group Variance = 332.667

Z-Score = 1.80929

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|1.80929| <= 1.97737 indicating no evidence of a trend

Sodium, Total Time-Series Graph of SW-01



Dixon's Test for Outliers

Parameter: Sodium, Total

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.684343	0.365482	0.546	71200
2	0.306667	0.365482	0.521	None

Loc.	Date	Conc.	Outlier
SW-02	4/16/2018	71200	TRUE
	10/8/2018	40600	FALSE
	4/13/2019	47900	FALSE
	9/30/2019	24400	FALSE
	4/7/2020	41000	FALSE
	10/2/2020	35600	FALSE
	4/13/2021	33900	FALSE
	10/14/2021	33700	FALSE
	4/19/2022	44100	FALSE
	9/27/2022	36400	FALSE
	4/18/2023	39300	FALSE
	8/22/2023	35200	FALSE
	4/30/2024	31600	FALSE
	9/10/2024	25400	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sodium, Total

Location: SW-02

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	24400	71200	46800	0.5251	24574.7
2	25400	47900	22500	0.3318	7465.5
3	31600	44100	12500	0.246	3075
4	33700	41000	7300	0.1802	1315.46
5	33900	40600	6700	0.124	830.8
6	35200	39300	4100	0.0727	298.07
7	35600	36400	800	0.024	19.2
8	36400	35600	-800		
9	39300	35200	-4100		
10	40600	33900	-6700		
11	41000	33700	-7300		
12	44100	31600	-12500		
13	47900	25400	-22500		
14	71200	24400	-46800		

Sum of b values = 37578.7

Sample Standard Deviation = 11388.7

W Statistic = 0.837516

5% Critical value of 0.874 exceeds 0.837516
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.837516
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sodium, Total

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
40600	71200	-30600	0	1
47900	71200	-23300	0	2
24400	71200	-46800	0	3
41000	71200	-30200	0	4
35600	71200	-35600	0	5
33900	71200	-37300	0	6
33700	71200	-37500	0	7
44100	71200	-27100	0	8
36400	71200	-34800	0	9
39300	71200	-31900	0	10
35200	71200	-36000	0	11
31600	71200	-39600	0	12
25400	71200	-45800	0	13
47900	40600	7300	1	13
24400	40600	-16200	1	14
41000	40600	400	2	14
35600	40600	-5000	2	15
33900	40600	-6700	2	16
33700	40600	-6900	2	17
44100	40600	3500	3	17
36400	40600	-4200	3	18
39300	40600	-1300	3	19
35200	40600	-5400	3	20
31600	40600	-9000	3	21
25400	40600	-15200	3	22
24400	47900	-23500	3	23
41000	47900	-6900	3	24
35600	47900	-12300	3	25
33900	47900	-14000	3	26
33700	47900	-14200	3	27
44100	47900	-3800	3	28
36400	47900	-11500	3	29
39300	47900	-8600	3	30
35200	47900	-12700	3	31
31600	47900	-16300	3	32
25400	47900	-22500	3	33
41000	24400	16600	4	33
35600	24400	11200	5	33
33900	24400	9500	6	33
33700	24400	9300	7	33
44100	24400	19700	8	33
36400	24400	12000	9	33
39300	24400	14900	10	33
35200	24400	10800	11	33
31600	24400	7200	12	33
25400	24400	1000	13	33
35600	41000	-5400	13	34
33900	41000	-7100	13	35
33700	41000	-7300	13	36

44100	41000	3100	14	36
36400	41000	-4600	14	37
39300	41000	-1700	14	38
35200	41000	-5800	14	39
31600	41000	-9400	14	40
25400	41000	-15600	14	41
33900	35600	-1700	14	42
33700	35600	-1900	14	43
44100	35600	8500	15	43
36400	35600	800	16	43
39300	35600	3700	17	43
35200	35600	-400	17	44
31600	35600	-4000	17	45
25400	35600	-10200	17	46
33700	33900	-200	17	47
44100	33900	10200	18	47
36400	33900	2500	19	47
39300	33900	5400	20	47
35200	33900	1300	21	47
31600	33900	-2300	21	48
25400	33900	-8500	21	49
44100	33700	10400	22	49
36400	33700	2700	23	49
39300	33700	5600	24	49
35200	33700	1500	25	49
31600	33700	-2100	25	50
25400	33700	-8300	25	51
36400	44100	-7700	25	52
39300	44100	-4800	25	53
35200	44100	-8900	25	54
31600	44100	-12500	25	55
25400	44100	-18700	25	56
39300	36400	2900	26	56
35200	36400	-1200	26	57
31600	36400	-4800	26	58
25400	36400	-11000	26	59
35200	39300	-4100	26	60
31600	39300	-7700	26	61
25400	39300	-13900	26	62
31600	35200	-3600	26	63
25400	35200	-9800	26	64
25400	31600	-6200	26	65

S Statistic = 26 - 65 = -39

Tied Group	Value	Members
Time Period		Observations
4/16/2018		1
10/8/2018		1
4/13/2019		1
9/30/2019		1
4/7/2020		1
10/2/2020		1

4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

Group Variance = 333.667

Z-Score = -2.08031

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

$|-2.08031| > 1.97737$ indicating a trend

Sodium, Total Time-Series Graph of SW-02



Concentrations (ppb)

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 0

Percent Non-Detects: 0%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 12 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	14	0 (0%)	4/18/2018	36400	36400
			10/10/2018	38700	38700
			4/13/2019	40400	40400
			10/1/2019	41000	41000
			4/9/2020	38500	38500
			10/1/2020	39000	39000
			4/14/2021	35700	35700
			10/13/2021	38500	38500
			4/20/2022	30300	30300
			9/28/2022	33200	33200
			4/19/2023	36100	36100
			8/24/2023	33900	33900
			5/1/2024	31500	31500
			9/11/2024	35400	35400
4/20/2016	53400	53400			
10/12/2016	46900	46900			
4/19/2017	42300	42300			
10/12/2017	39300	39300			

MW-06	14	0 (0%)	4/18/2018	12700	12700
			10/10/2018	10500	10500
			4/14/2019	13000	13000
			10/2/2019	14800	14800
			4/8/2020	12200	12200
			9/30/2020	13700	13700
			4/13/2021	13200	13200
			10/14/2021	8350	8350
			4/20/2022	12300	12300
			9/27/2022	11000	11000
			4/18/2023	15700	15700
			8/23/2023	9620	9620
			5/1/2024	9590	9590
			9/12/2024	12900	12900
4/19/2016	14100	14100			
10/12/2016	10100	10100			
4/19/2017	14500	14500			
10/12/2017	12500	12500			

MW-07	14	0 (0%)	4/18/2018	1.25e+006	1.25e+006
			10/10/2018	1.22e+006	1.22e+006
			4/14/2019	1.25e+006	1.25e+006
			10/2/2019	1.24e+006	1.24e+006
			4/8/2020	1.32e+006	1.32e+006
			9/30/2020	1.24e+006	1.24e+006
			4/13/2021	1.37e+006	1.37e+006
			10/14/2021	1.44e+006	1.44e+006
			4/20/2022	1.34e+006	1.34e+006

			9/27/2022	1.32e+006	1.32e+006
			4/18/2023	1.33e+006	1.33e+006
			8/23/2023	1.35e+006	1.35e+006
			5/1/2024	1.3e+006	1.3e+006
			9/11/2024	1.43e+006	1.43e+006
			4/19/2017	1.46e+006	1.46e+006
			10/12/2017	1.2e+006	1.2e+006
MW-12	14	0 (0%)	4/17/2018	46600	46600
			10/9/2018	47800	47800
			4/14/2019	48200	48200
			10/2/2019	38900	38900
			4/8/2020	44000	44000
			10/1/2020	40700	40700
			4/15/2021	46400	46400
			10/14/2021	38400	38400
			4/19/2022	43300	43300
			9/28/2022	35100	35100
			4/18/2023	45600	45600
			8/24/2023	37000	37000
			5/1/2024	42400	42400
			9/12/2024	51800	51800
			4/20/2016	71900	71900
			10/11/2016	55600	55600
			4/18/2017	59900	59900
			10/10/2017	42800	42800
MW-16	14	0 (0%)	4/17/2018	67100	67100
			10/9/2018	62600	62600
			4/14/2019	63000	63000
			10/2/2019	69800	69800
			4/9/2020	60200	60200
			10/1/2020	69800	69800
			4/15/2021	65700	65700
			10/14/2021	71900	71900
			4/19/2022	66800	66800
			9/28/2022	70300	70300
			4/18/2023	72400	72400
			8/24/2023	70000	70000
			5/2/2024	68400	68400
			9/12/2024	72200	72200
			4/18/2017	78300	78300
			10/10/2017	72900	72900
MW-20	14	0 (0%)	4/17/2018	41300	41300
			10/10/2018	30900	30900
			4/14/2019	61300	61300
			10/2/2019	40000	40000
			4/9/2020	63700	63700
			10/2/2020	27800	27800
			4/15/2021	39800	39800
			10/12/2021	26900	26900
			4/20/2022	48700	48700
			9/28/2022	24600	24600
			4/19/2023	40000	40000
			8/23/2023	23300	23300
			4/30/2024	38100	38100
			9/11/2024	25100	25100
			4/21/2016	56600	56600
			10/12/2016	32100	32100
			4/18/2017	37100	37100
			10/12/2017	22900	22900

MW-21	14	0 (0%)	4/17/2018	45900	45900
			10/10/2018	31900	31900
			4/13/2019	20700	20700
			10/1/2019	29100	29100
			4/7/2020	19700	19700
			9/30/2020	23500	23500
			4/14/2021	18500	18500
			10/12/2021	19700	19700
			4/20/2022	18200	18200
			9/29/2022	17900	17900
			4/18/2023	32300	32300
			8/23/2023	14900	14900
			5/1/2024	15500	15500
			9/11/2024	17200	17200
			4/18/2017	52200	52200
10/12/2017	63000	63000			
MW-25	14	0 (0%)	4/17/2018	62700	62700
			10/9/2018	53300	53300
			4/13/2019	43200	43200
			10/1/2019	49900	49900
			4/8/2020	50000	50000
			10/1/2020	57300	57300
			4/14/2021	40700	40700
			10/13/2021	60600	60600
			4/19/2022	55300	55300
			9/29/2022	57700	57700
			4/19/2023	61500	61500
			8/24/2023	55800	55800
			4/29/2024	47400	47400
			9/10/2024	59200	59200
			4/21/2016	48900	48900
10/11/2016	80500	80500			
4/18/2017	58900	58900			
10/10/2017	54600	54600			
MW-26	14	0 (0%)	4/17/2018	1.39e+006	1.39e+006
			10/9/2018	1.33e+006	1.33e+006
			4/13/2019	1.42e+006	1.42e+006
			10/1/2019	1.37e+006	1.37e+006
			4/8/2020	1.43e+006	1.43e+006
			10/1/2020	1.41e+006	1.41e+006
			4/14/2021	1.39e+006	1.39e+006
			10/13/2021	1.6e+006	1.6e+006
			4/19/2022	1.44e+006	1.44e+006
			9/29/2022	1.45e+006	1.45e+006
			4/19/2023	1.5e+006	1.5e+006
			8/24/2023	1.5e+006	1.5e+006
			4/29/2024	1.48e+006	1.48e+006
			9/10/2024	1.52e+006	1.52e+006
			4/18/2017	1.54e+006	1.54e+006
10/10/2017	1.46e+006	1.46e+006			
MW-27	14	0 (0%)	4/18/2018	263000	263000
			10/9/2018	263000	263000
			4/13/2019	266000	266000
			10/1/2019	268000	268000
			4/9/2020	264000	264000
			10/1/2020	275000	275000
			4/14/2021	264000	264000
			10/13/2021	270000	270000
			4/20/2022	275000	275000
			9/28/2022	261000	261000

			4/19/2023	257000	257000
			8/24/2023	254000	254000
			5/1/2024	249000	249000
			9/11/2024	269000	269000
			4/19/2017	309000	309000
			10/12/2017	248000	248000
SW-01	14	0 (0%)	4/16/2018	56200	56200
			10/8/2018	26300	26300
			4/13/2019	27000	27000
			9/30/2019	37000	37000
			4/7/2020	29700	29700
			10/2/2020	16900	16900
			4/13/2021	31300	31300
			10/14/2021	33100	33100
			4/19/2022	38000	38000
			9/27/2022	29500	29500
			4/18/2023	38800	38800
			8/22/2023	69200	69200
			4/30/2024	43500	43500
			9/10/2024	36600	36600
			4/21/2016	63800	63800
			10/10/2016	16400	16400
			4/17/2017	41300	41300
			10/9/2017	69500	69500
SW-02	14	0 (0%)	4/16/2018	56300	56300
			10/8/2018	31400	31400
			4/13/2019	35700	35700
			9/30/2019	30700	30700
			4/7/2020	39200	39200
			10/2/2020	25300	25300
			4/13/2021	32000	32000
			10/14/2021	34900	34900
			4/19/2022	38900	38900
			9/27/2022	37400	37400
			4/18/2023	40000	40000
			8/22/2023	30600	30600
			4/30/2024	40500	40500
			9/10/2024	53500	53500
			4/21/2016	39900	39900
			10/10/2016	26300	26300
			4/17/2017	38100	38100
			10/9/2017	77900	77900

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Sulfate

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.298507	0.259843	0.546	None

Loc.	Date	Conc.	Outlier
MW-12	4/17/2018	46600	FALSE
	10/9/2018	47800	FALSE
	4/14/2019	48200	FALSE
	10/2/2019	38900	FALSE
	4/8/2020	44000	FALSE
	10/1/2020	40700	FALSE
	4/15/2021	46400	FALSE
	10/14/2021	38400	FALSE
	4/19/2022	43300	FALSE
	9/28/2022	35100	FALSE
	4/18/2023	45600	FALSE
	8/24/2023	37000	FALSE
	5/1/2024	42400	FALSE
	9/12/2024	51800	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Location: MW-12

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	35100	51800	16700	0.5251	8769.17
2	37000	48200	11200	0.3318	3716.16
3	38400	47800	9400	0.246	2312.4
4	38900	46600	7700	0.1802	1387.54
5	40700	46400	5700	0.124	706.8
6	42400	45600	3200	0.0727	232.64
7	43300	44000	700	0.024	16.8
8	44000	43300	-700		
9	45600	42400	-3200		
10	46400	40700	-5700		
11	46600	38900	-7700		
12	47800	38400	-9400		
13	48200	37000	-11200		
14	51800	35100	-16700		

Sum of b values = 17141.5

Sample Standard Deviation = 4809.13

W Statistic = 0.977288

5% Critical value of 0.874 is less than 0.977288

Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.977288

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
47800	46600	1200	1	0
48200	46600	1600	2	0
38900	46600	-7700	2	1
44000	46600	-2600	2	2
40700	46600	-5900	2	3
46400	46600	-200	2	4
38400	46600	-8200	2	5
43300	46600	-3300	2	6
35100	46600	-11500	2	7
45600	46600	-1000	2	8
37000	46600	-9600	2	9
42400	46600	-4200	2	10
51800	46600	5200	3	10
48200	47800	400	4	10
38900	47800	-8900	4	11
44000	47800	-3800	4	12
40700	47800	-7100	4	13
46400	47800	-1400	4	14
38400	47800	-9400	4	15
43300	47800	-4500	4	16
35100	47800	-12700	4	17
45600	47800	-2200	4	18
37000	47800	-10800	4	19
42400	47800	-5400	4	20
51800	47800	4000	5	20
38900	48200	-9300	5	21
44000	48200	-4200	5	22
40700	48200	-7500	5	23
46400	48200	-1800	5	24
38400	48200	-9800	5	25
43300	48200	-4900	5	26
35100	48200	-13100	5	27
45600	48200	-2600	5	28
37000	48200	-11200	5	29
42400	48200	-5800	5	30
51800	48200	3600	6	30
44000	38900	5100	7	30
40700	38900	1800	8	30
46400	38900	7500	9	30
38400	38900	-500	9	31
43300	38900	4400	10	31
35100	38900	-3800	10	32
45600	38900	6700	11	32
37000	38900	-1900	11	33
42400	38900	3500	12	33
51800	38900	12900	13	33
40700	44000	-3300	13	34
46400	44000	2400	14	34
38400	44000	-5600	14	35

43300	44000	-700	14	36
35100	44000	-8900	14	37
45600	44000	1600	15	37
37000	44000	-7000	15	38
42400	44000	-1600	15	39
51800	44000	7800	16	39
46400	40700	5700	17	39
38400	40700	-2300	17	40
43300	40700	2600	18	40
35100	40700	-5600	18	41
45600	40700	4900	19	41
37000	40700	-3700	19	42
42400	40700	1700	20	42
51800	40700	11100	21	42
38400	46400	-8000	21	43
43300	46400	-3100	21	44
35100	46400	-11300	21	45
45600	46400	-800	21	46
37000	46400	-9400	21	47
42400	46400	-4000	21	48
51800	46400	5400	22	48
43300	38400	4900	23	48
35100	38400	-3300	23	49
45600	38400	7200	24	49
37000	38400	-1400	24	50
42400	38400	4000	25	50
51800	38400	13400	26	50
35100	43300	-8200	26	51
45600	43300	2300	27	51
37000	43300	-6300	27	52
42400	43300	-900	27	53
51800	43300	8500	28	53
45600	35100	10500	29	53
37000	35100	1900	30	53
42400	35100	7300	31	53
51800	35100	16700	32	53
37000	45600	-8600	32	54
42400	45600	-3200	32	55
51800	45600	6200	33	55
42400	37000	5400	34	55
51800	37000	14800	35	55
51800	42400	9400	36	55

S Statistic = 36 - 55 = -19

Tied Group	Value	Members
Time Period		Observations
4/17/2018		1
10/9/2018		1
4/14/2019		1
10/2/2019		1
4/8/2020		1
10/1/2020		1

4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

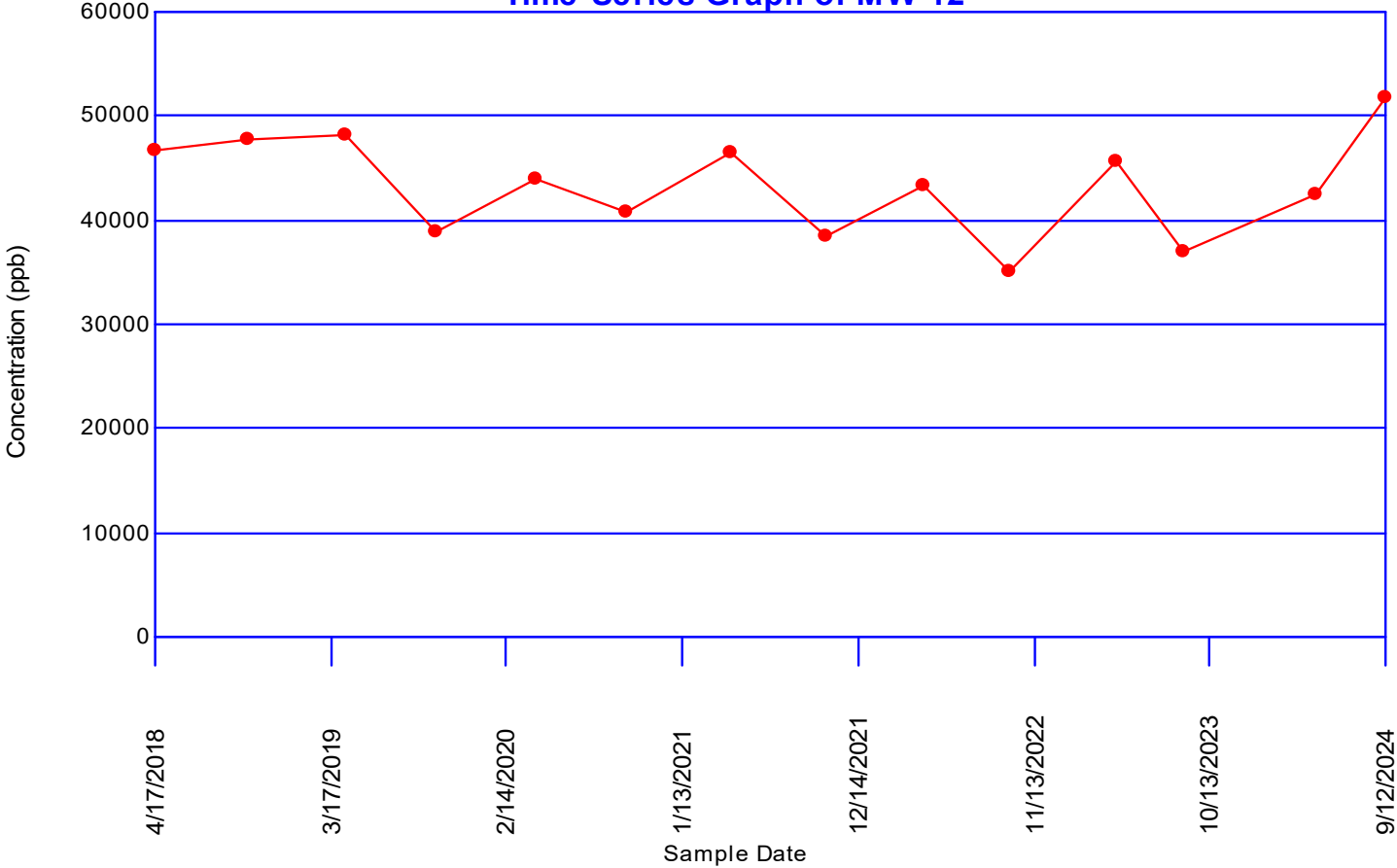
Group Variance = 333.667

Z-Score = -0.985408

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.985408| \leq 1.97737$ indicating no evidence of a trend

Sulfate Time-Series Graph of MW-12



Dixon's Test for Outliers

Parameter: Sulfate

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.47619	0.352941	0.546	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	1.39e+006	FALSE
	10/9/2018	1.33e+006	FALSE
	4/13/2019	1.42e+006	FALSE
	10/1/2019	1.37e+006	FALSE
	4/8/2020	1.43e+006	FALSE
	10/1/2020	1.41e+006	FALSE
	4/14/2021	1.39e+006	FALSE
	10/13/2021	1.6e+006	FALSE
	4/19/2022	1.44e+006	FALSE
	9/29/2022	1.45e+006	FALSE
	4/19/2023	1.5e+006	FALSE
	8/24/2023	1.5e+006	FALSE
	4/29/2024	1.48e+006	FALSE
	9/10/2024	1.52e+006	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	1.33e+006	1.6e+006	270000	0.5251	141777
2	1.37e+006	1.52e+006	150000	0.3318	49770
3	1.39e+006	1.5e+006	110000	0.246	27060
4	1.39e+006	1.5e+006	110000	0.1802	19822
5	1.41e+006	1.48e+006	70000	0.124	8680
6	1.42e+006	1.45e+006	30000	0.0727	2181
7	1.43e+006	1.44e+006	10000	0.024	240
8	1.44e+006	1.43e+006	-10000		
9	1.45e+006	1.42e+006	-30000		
10	1.48e+006	1.41e+006	-70000		
11	1.5e+006	1.39e+006	-110000		
12	1.5e+006	1.39e+006	-110000		
13	1.52e+006	1.37e+006	-150000		
14	1.6e+006	1.33e+006	-270000		

Sum of b values = 249530

Sample Standard Deviation = 70137.2

W Statistic = 0.973655

5% Critical value of 0.874 is less than 0.973655
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.973655
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
1.33e+006	1.39e+006	-60000	0	1
1.42e+006	1.39e+006	30000	1	1
1.37e+006	1.39e+006	-20000	1	2
1.43e+006	1.39e+006	40000	2	2
1.41e+006	1.39e+006	20000	3	2
1.39e+006	1.39e+006	0	3	2
1.6e+006	1.39e+006	210000	4	2
1.44e+006	1.39e+006	50000	5	2
1.45e+006	1.39e+006	60000	6	2
1.5e+006	1.39e+006	110000	7	2
1.5e+006	1.39e+006	110000	8	2
1.48e+006	1.39e+006	90000	9	2
1.52e+006	1.39e+006	130000	10	2
1.42e+006	1.33e+006	90000	11	2
1.37e+006	1.33e+006	40000	12	2
1.43e+006	1.33e+006	100000	13	2
1.41e+006	1.33e+006	80000	14	2
1.39e+006	1.33e+006	60000	15	2
1.6e+006	1.33e+006	270000	16	2
1.44e+006	1.33e+006	110000	17	2
1.45e+006	1.33e+006	120000	18	2
1.5e+006	1.33e+006	170000	19	2
1.5e+006	1.33e+006	170000	20	2
1.48e+006	1.33e+006	150000	21	2
1.52e+006	1.33e+006	190000	22	2
1.37e+006	1.42e+006	-50000	22	3
1.43e+006	1.42e+006	10000	23	3
1.41e+006	1.42e+006	-10000	23	4
1.39e+006	1.42e+006	-30000	23	5
1.6e+006	1.42e+006	180000	24	5
1.44e+006	1.42e+006	20000	25	5
1.45e+006	1.42e+006	30000	26	5
1.5e+006	1.42e+006	80000	27	5
1.5e+006	1.42e+006	80000	28	5
1.48e+006	1.42e+006	60000	29	5
1.52e+006	1.42e+006	100000	30	5
1.43e+006	1.37e+006	60000	31	5
1.41e+006	1.37e+006	40000	32	5
1.39e+006	1.37e+006	20000	33	5
1.6e+006	1.37e+006	230000	34	5
1.44e+006	1.37e+006	70000	35	5
1.45e+006	1.37e+006	80000	36	5
1.5e+006	1.37e+006	130000	37	5
1.5e+006	1.37e+006	130000	38	5
1.48e+006	1.37e+006	110000	39	5
1.52e+006	1.37e+006	150000	40	5
1.41e+006	1.43e+006	-20000	40	6
1.39e+006	1.43e+006	-40000	40	7
1.6e+006	1.43e+006	170000	41	7

1.44e+006	1.43e+006	10000	42	7
1.45e+006	1.43e+006	20000	43	7
1.5e+006	1.43e+006	70000	44	7
1.5e+006	1.43e+006	70000	45	7
1.48e+006	1.43e+006	50000	46	7
1.52e+006	1.43e+006	90000	47	7
1.39e+006	1.41e+006	-20000	47	8
1.6e+006	1.41e+006	190000	48	8
1.44e+006	1.41e+006	30000	49	8
1.45e+006	1.41e+006	40000	50	8
1.5e+006	1.41e+006	90000	51	8
1.5e+006	1.41e+006	90000	52	8
1.48e+006	1.41e+006	70000	53	8
1.52e+006	1.41e+006	110000	54	8
1.6e+006	1.39e+006	210000	55	8
1.44e+006	1.39e+006	50000	56	8
1.45e+006	1.39e+006	60000	57	8
1.5e+006	1.39e+006	110000	58	8
1.5e+006	1.39e+006	110000	59	8
1.48e+006	1.39e+006	90000	60	8
1.52e+006	1.39e+006	130000	61	8
1.44e+006	1.6e+006	-160000	61	9
1.45e+006	1.6e+006	-150000	61	10
1.5e+006	1.6e+006	-100000	61	11
1.5e+006	1.6e+006	-100000	61	12
1.48e+006	1.6e+006	-120000	61	13
1.52e+006	1.6e+006	-80000	61	14
1.45e+006	1.44e+006	10000	62	14
1.5e+006	1.44e+006	60000	63	14
1.5e+006	1.44e+006	60000	64	14
1.48e+006	1.44e+006	40000	65	14
1.52e+006	1.44e+006	80000	66	14
1.5e+006	1.45e+006	50000	67	14
1.5e+006	1.45e+006	50000	68	14
1.48e+006	1.45e+006	30000	69	14
1.52e+006	1.45e+006	70000	70	14
1.5e+006	1.5e+006	0	70	14
1.48e+006	1.5e+006	-20000	70	15
1.52e+006	1.5e+006	20000	71	15
1.48e+006	1.5e+006	-20000	71	16
1.52e+006	1.5e+006	20000	72	16
1.52e+006	1.48e+006	40000	73	16

S Statistic = 73 - 16 = 57

Tied Group	Value	Members
1	1.39e+006	2
2	1.5e+006	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/8/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

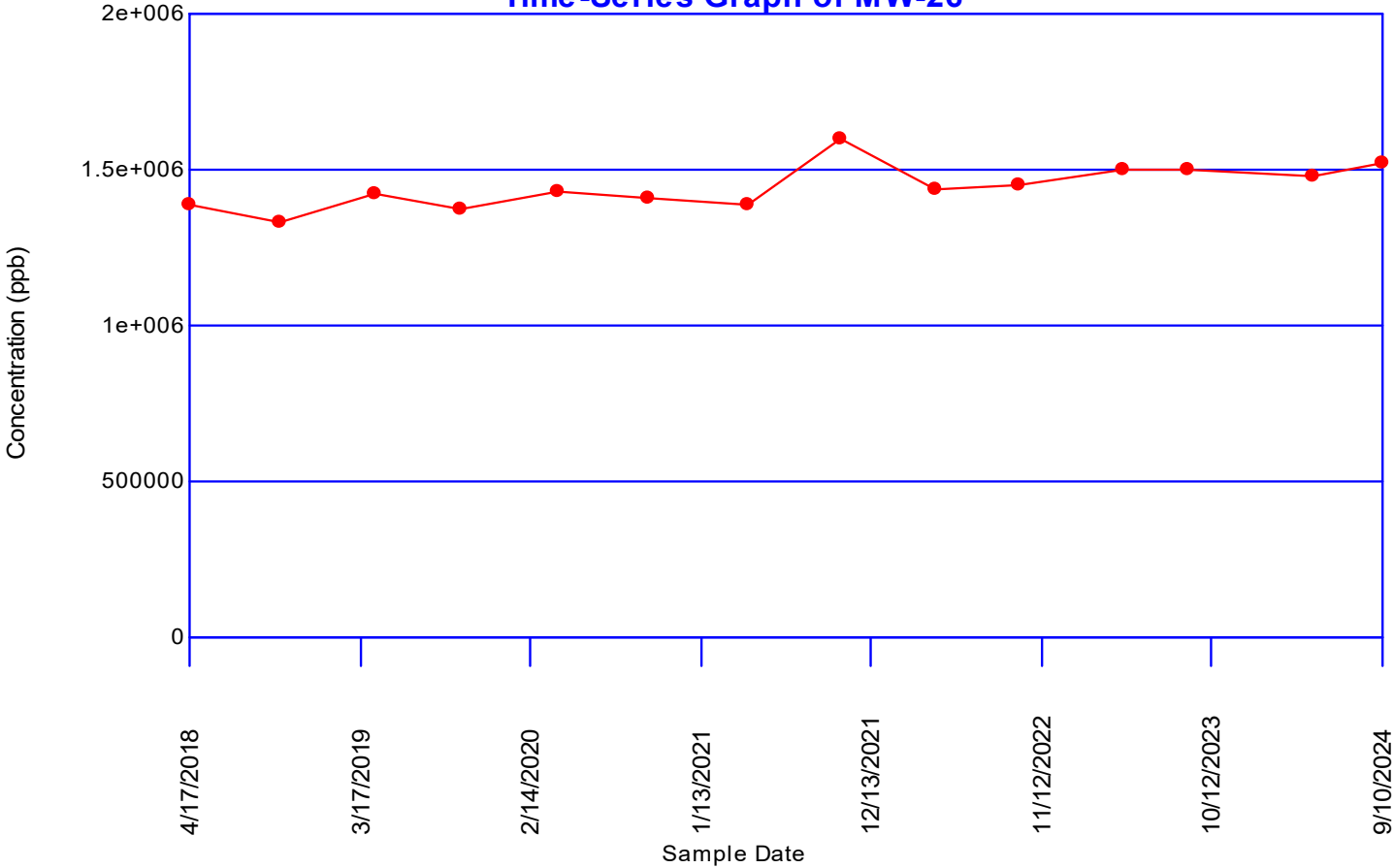
Group Variance = 331.667

Z-Score = 3.07494

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|3.07494| > 1.97737 indicating a trend

Sulfate Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Sulfate

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.277778	0.380952	0.546	None

Loc.	Date	Conc.	Outlier
MW-27	4/18/2018	263000	FALSE
	10/9/2018	263000	FALSE
	4/13/2019	266000	FALSE
	10/1/2019	268000	FALSE
	4/9/2020	264000	FALSE
	10/1/2020	275000	FALSE
	4/14/2021	264000	FALSE
	10/13/2021	270000	FALSE
	4/20/2022	275000	FALSE
	9/28/2022	261000	FALSE
	4/19/2023	257000	FALSE
	8/24/2023	254000	FALSE
	5/1/2024	249000	FALSE
	9/11/2024	269000	FALSE

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	249000	275000	26000	0.5251	13652.6
2	254000	275000	21000	0.3318	6967.8
3	257000	270000	13000	0.246	3198
4	261000	269000	8000	0.1802	1441.6
5	263000	268000	5000	0.124	620
6	263000	266000	3000	0.0727	218.1
7	264000	264000	0	0.024	0
8	264000	264000	0		
9	266000	263000	-3000		
10	268000	263000	-5000		
11	269000	261000	-8000		
12	270000	257000	-13000		
13	275000	254000	-21000		
14	275000	249000	-26000		

Sum of b values = 26098.1

Sample Standard Deviation = 7378.32

W Statistic = 0.962409

5% Critical value of 0.874 is less than 0.962409
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.962409
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Sulfate

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
263000	263000	0	0	0
266000	263000	3000	1	0
268000	263000	5000	2	0
264000	263000	1000	3	0
275000	263000	12000	4	0
264000	263000	1000	5	0
270000	263000	7000	6	0
275000	263000	12000	7	0
261000	263000	-2000	7	1
257000	263000	-6000	7	2
254000	263000	-9000	7	3
249000	263000	-14000	7	4
269000	263000	6000	8	4
266000	263000	3000	9	4
268000	263000	5000	10	4
264000	263000	1000	11	4
275000	263000	12000	12	4
264000	263000	1000	13	4
270000	263000	7000	14	4
275000	263000	12000	15	4
261000	263000	-2000	15	5
257000	263000	-6000	15	6
254000	263000	-9000	15	7
249000	263000	-14000	15	8
269000	263000	6000	16	8
268000	266000	2000	17	8
264000	266000	-2000	17	9
275000	266000	9000	18	9
264000	266000	-2000	18	10
270000	266000	4000	19	10
275000	266000	9000	20	10
261000	266000	-5000	20	11
257000	266000	-9000	20	12
254000	266000	-12000	20	13
249000	266000	-17000	20	14
269000	266000	3000	21	14
264000	268000	-4000	21	15
275000	268000	7000	22	15
264000	268000	-4000	22	16
270000	268000	2000	23	16
275000	268000	7000	24	16
261000	268000	-7000	24	17
257000	268000	-11000	24	18
254000	268000	-14000	24	19
249000	268000	-19000	24	20
269000	268000	1000	25	20
275000	264000	11000	26	20
264000	264000	0	26	20
270000	264000	6000	27	20

275000	264000	11000	28	20
261000	264000	-3000	28	21
257000	264000	-7000	28	22
254000	264000	-10000	28	23
249000	264000	-15000	28	24
269000	264000	5000	29	24
264000	275000	-11000	29	25
270000	275000	-5000	29	26
275000	275000	0	29	26
261000	275000	-14000	29	27
257000	275000	-18000	29	28
254000	275000	-21000	29	29
249000	275000	-26000	29	30
269000	275000	-6000	29	31
270000	264000	6000	30	31
275000	264000	11000	31	31
261000	264000	-3000	31	32
257000	264000	-7000	31	33
254000	264000	-10000	31	34
249000	264000	-15000	31	35
269000	264000	5000	32	35
275000	270000	5000	33	35
261000	270000	-9000	33	36
257000	270000	-13000	33	37
254000	270000	-16000	33	38
249000	270000	-21000	33	39
269000	270000	-1000	33	40
261000	275000	-14000	33	41
257000	275000	-18000	33	42
254000	275000	-21000	33	43
249000	275000	-26000	33	44
269000	275000	-6000	33	45
257000	261000	-4000	33	46
254000	261000	-7000	33	47
249000	261000	-12000	33	48
269000	261000	8000	34	48
254000	257000	-3000	34	49
249000	257000	-8000	34	50
269000	257000	12000	35	50
249000	254000	-5000	35	51
269000	254000	15000	36	51
269000	249000	20000	37	51

S Statistic = 37 - 51 = -14

Tied Group	Value	Members
1	263000	2
2	264000	2
3	275000	2

Time Period	Observations
4/18/2018	1
10/9/2018	1
4/13/2019	1

10/1/2019	1
4/9/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 54

B = 0

C = 0

D = 0

E = 6

F = 0

a = 6006

b = 19656

c = 364

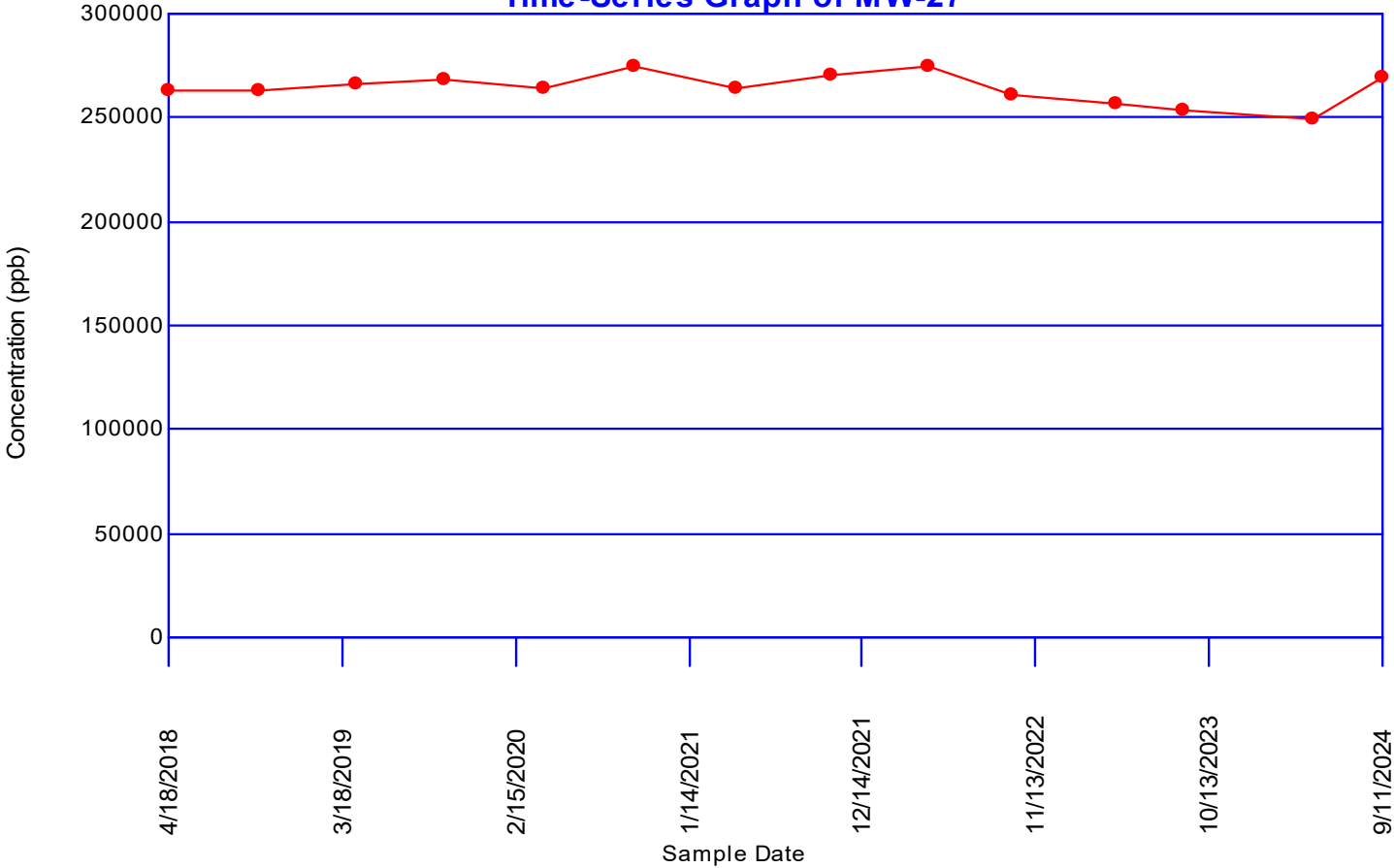
Group Variance = 330.667

Z-Score = -0.714905

Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)

| -0.714905 | ≤ 1.97737 indicating no evidence of a trend

Sulfate Time-Series Graph of MW-27



Concentrations (ppb)

Parameter: Chemical Oxygen Demand (COD)

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 76

Percent Non-Detects: 45.2381%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 14 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-05	14	11 (78.5714%)	4/18/2018	ND<20000	ND<20000
			10/10/2018	ND<20000	ND<20000
			4/13/2019	6970	6970
			10/1/2019	ND<10000	ND<10000
			4/9/2020	7200	7200
			10/1/2020	ND<25000	ND<25000
			4/14/2021	ND<10000	ND<10000
			10/13/2021	ND<25000	ND<25000
			4/20/2022	ND<10000	ND<10000
			9/28/2022	ND<25000	ND<25000
			4/19/2023	ND<10000	ND<10000
			8/24/2023	ND<10000	ND<10000
			5/1/2024	ND<10000	ND<10000
			9/11/2024	8940	8940
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	ND<10000	ND<10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	ND<10000	ND<10000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	ND<10000	ND<10000
			4/3/2003	ND<10000	ND<10000
			10/3/2003	ND<10000	ND<10000
			4/4/2004	ND<10000	ND<10000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	ND<10000	ND<10000
			10/5/2005	ND<10000	ND<10000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	ND<10000	ND<10000
			10/1/2008	11000	11000
			5/1/2009	ND<10000	ND<10000
			10/1/2009	ND<10000	ND<10000
			5/10/2010	ND<10000	ND<10000
			10/10/2010	ND<10000	ND<10000
			4/11/2011	ND<10000	ND<10000
			10/11/2011	ND<10000	ND<10000

4/12/2012	ND<10000	ND<10000
11/12/2012	13000	13000
5/13/2013	ND<10000	ND<10000
11/13/2013	ND<10000	ND<10000
6/14/2014	19000	19000
10/14/2014	ND<5000	ND<5000
4/21/2015	32300	32300
10/7/2015	ND<20000	ND<20000
4/20/2016	ND<20000	ND<20000
10/12/2016	ND<20000	ND<20000
4/19/2017	ND<20000	ND<20000
10/12/2017	ND<20000	ND<20000

MW-06	14	7 (50%)	4/18/2018	5090	5090
			10/10/2018	ND<20000	ND<20000
			4/14/2019	8650	8650
			10/2/2019	ND<10000	ND<10000
			4/8/2020	7710	7710
			9/30/2020	52300	52300
			4/13/2021	ND<10000	ND<10000
			10/14/2021	42800	42800
			4/20/2022	ND<10000	ND<10000
			9/27/2022	ND<25000	ND<25000
			4/18/2023	ND<10000	ND<10000
			8/23/2023	4650	4650
			5/1/2024	ND<10000	ND<10000
			9/12/2024	7400	7400
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	ND<10000	ND<10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	ND<10000	ND<10000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	ND<10000	ND<10000
			4/3/2003	ND<10000	ND<10000
			10/3/2003	ND<10000	ND<10000
			4/4/2004	ND<10000	ND<10000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	11000	11000
			10/5/2005	ND<10000	ND<10000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	ND<10000	ND<10000
			10/1/2008	17000	17000
			5/1/2009	ND<10000	ND<10000
			10/1/2009	ND<10000	ND<10000
			5/10/2010	ND<10000	ND<10000
			10/10/2010	ND<10000	ND<10000
			4/11/2011	ND<10000	ND<10000
			10/11/2011	ND<10000	ND<10000
			4/12/2012	25000	25000
			11/12/2012	17000	17000
			5/13/2013	ND<10000	ND<10000

11/13/2013	15000	15000
6/14/2014	23000	23000
10/14/2014	15100	15100
4/21/2015	26600	26600
10/7/2015	ND<20000	ND<20000
4/19/2016	ND<20000	ND<20000
10/12/2016	ND<20000	ND<20000
4/19/2017	ND<20000	ND<20000
10/12/2017	5190	5190

MW-07	14	7 (50%)	4/18/2018	ND<20000	ND<20000
			10/10/2018	ND<20000	ND<20000
			4/14/2019	7190	7190
			10/2/2019	ND<10000	ND<10000
			4/8/2020	48300	48300
			9/30/2020	43900	43900
			4/13/2021	8650	8650
			10/14/2021	37400	37400
			4/20/2022	ND<10000	ND<10000
			9/27/2022	ND<25000	ND<25000
			4/18/2023	ND<10000	ND<10000
			8/23/2023	5620	5620
			5/1/2024	ND<10000	ND<10000
			9/11/2024	18100	18100
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	ND<10000	ND<10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	ND<10000	ND<10000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	ND<10000	ND<10000
			4/3/2003	ND<10000	ND<10000
			10/3/2003	12000	12000
			4/4/2004	13000	13000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	13000	13000
			10/5/2005	ND<10000	ND<10000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	10000	10000
			10/1/2008	22000	22000
			5/1/2009	ND<10000	ND<10000
			10/1/2009	14000	14000
			5/10/2010	ND<10000	ND<10000
			10/10/2010	ND<10000	ND<10000
			4/11/2011	ND<10000	ND<10000
			10/11/2011	12000	12000
			4/12/2012	14000	14000
			11/12/2012	ND<10000	ND<10000
			5/13/2013	ND<10000	ND<10000
			11/13/2013	ND<10000	ND<10000
			6/14/2014	36000	36000
			10/14/2014	ND<5000	ND<5000

4/21/2015	32700	32700
10/7/2015	ND<20000	ND<20000
4/19/2016	ND<20000	ND<20000
10/12/2016	ND<20000	ND<20000
4/19/2017	ND<20000	ND<20000
10/12/2017	ND<20000	ND<20000

MW-12	14	7 (50%)	4/17/2018	ND<20000	ND<20000
			10/9/2018	5250	5250
			4/14/2019	7520	7520
			10/2/2019	8590	8590
			4/8/2020	11300	11300
			10/1/2020	25500	25500
			4/15/2021	ND<10000	ND<10000
			10/14/2021	ND<25000	ND<25000
			4/19/2022	9000	9000
			9/28/2022	ND<25000	ND<25000
			4/18/2023	ND<10000	ND<10000
			8/24/2023	ND<10000	ND<10000
			5/1/2024	ND<10000	ND<10000
			9/12/2024	11100	11100
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	10000	10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	11000	11000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	10000	10000
			4/3/2003	ND<10000	ND<10000
			10/3/2003	ND<10000	ND<10000
			4/4/2004	ND<10000	ND<10000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	10000	10000
			10/5/2005	14000	14000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	ND<10000	ND<10000
			10/1/2008	17000	17000
			5/1/2009	ND<10000	ND<10000
			10/1/2009	ND<10000	ND<10000
			5/10/2010	ND<10000	ND<10000
			10/10/2010	ND<10000	ND<10000
			4/11/2011	ND<10000	ND<10000
			10/11/2011	12000	12000
			4/12/2012	15000	15000
			11/12/2012	16000	16000
			5/13/2013	10000	10000
			11/13/2013	ND<10000	ND<10000
			6/14/2014	11000	11000
			10/14/2014	6630	6630
			4/22/2015	28600	28600
			10/8/2015	ND<20000	ND<20000
			4/20/2016	ND<20000	ND<20000

			10/11/2016	ND<20000	ND<20000
			4/18/2017	ND<20000	ND<20000
			10/10/2017	8600	8600
MW-16	14	9 (64.2857%)	4/17/2018	4030	4030
			10/9/2018	ND<20000	ND<20000
			4/14/2019	6310	6310
			10/2/2019	ND<10000	ND<10000
			4/9/2020	13400	13400
			10/1/2020	48900	48900
			4/15/2021	ND<10000	ND<10000
			10/14/2021	ND<25000	ND<25000
			4/19/2022	ND<10000	ND<10000
			9/28/2022	ND<25000	ND<25000
			4/18/2023	ND<10000	ND<10000
			8/24/2023	ND<10000	ND<10000
			5/2/2024	ND<10000	ND<10000
			9/12/2024	14500	14500
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	ND<10000	ND<10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	ND<10000	ND<10000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	ND<10000	ND<10000
			4/3/2003	12000	12000
			10/3/2003	ND<10000	ND<10000
			4/4/2004	ND<10000	ND<10000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	ND<10000	ND<10000
			10/5/2005	ND<10000	ND<10000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	ND<10000	ND<10000
			10/1/2008	ND<10000	ND<10000
			5/1/2009	ND<10000	ND<10000
			10/1/2009	16000	16000
			5/10/2010	ND<10000	ND<10000
			10/10/2010	ND<10000	ND<10000
			4/11/2011	ND<10000	ND<10000
			10/11/2011	ND<10000	ND<10000
			4/12/2012	33000	33000
			11/12/2012	ND<10000	ND<10000
			5/13/2013	17000	17000
			11/13/2013	15000	15000
			6/14/2014	ND<10000	ND<10000
			10/14/2014	ND<5000	ND<5000
			4/22/2015	32000	32000
			10/8/2015	ND<20000	ND<20000
			4/20/2016	ND<20000	ND<20000
			10/11/2016	ND<20000	ND<20000
			4/18/2017	ND<20000	ND<20000
			10/10/2017	ND<20000	ND<20000

MW-20	14	6 (42.8571%)	4/17/2018	ND<20000	ND<20000
			10/10/2018	ND<20000	ND<20000
			4/14/2019	8150	8150
			10/2/2019	ND<10000	ND<10000
			4/9/2020	9250	9250
			10/2/2020	38900	38900
			4/15/2021	ND<10000	ND<10000
			10/12/2021	33800	33800
			4/20/2022	7500	7500
			9/28/2022	ND<25000	ND<25000
			4/19/2023	5420	5420
			8/23/2023	5620	5620
			4/30/2024	ND<10000	ND<10000
			9/11/2024	12300	12300
			10/1/1996	ND<10000	ND<10000
			2/1/1997	ND<10000	ND<10000
			4/1/1997	ND<10000	ND<10000
			7/1/1997	ND<10000	ND<10000
			10/1/1997	ND<10000	ND<10000
			4/1/1998	ND<10000	ND<10000
			10/1/1998	ND<10000	ND<10000
			7/1/1999	ND<10000	ND<10000
			10/1/1999	ND<10000	ND<10000
			6/1/2000	ND<5000	ND<5000
			10/1/2000	ND<10000	ND<10000
			5/1/2001	ND<10000	ND<10000
			10/1/2001	ND<10000	ND<10000
			4/1/2002	ND<10000	ND<10000
			10/1/2002	ND<10000	ND<10000
			4/3/2003	16000	16000
			10/3/2003	ND<10000	ND<10000
			4/4/2004	12000	12000
			10/3/2004	ND<10000	ND<10000
			4/5/2005	14000	14000
			10/5/2005	ND<10000	ND<10000
			4/6/2006	ND<10000	ND<10000
			10/7/2006	ND<10000	ND<10000
			4/7/2007	ND<10000	ND<10000
			10/7/2007	ND<10000	ND<10000
			4/1/2008	ND<10000	ND<10000
10/1/2008	12000	12000			
5/1/2009	ND<10000	ND<10000			
10/1/2009	10000	10000			
5/10/2010	ND<10000	ND<10000			
10/10/2010	ND<10000	ND<10000			
4/11/2011	ND<10000	ND<10000			
10/11/2011	ND<10000	ND<10000			
4/12/2012	25000	25000			
11/12/2012	ND<10000	ND<10000			
5/13/2013	ND<10000	ND<10000			
11/13/2013	12000	12000			
6/14/2014	24000	24000			
10/14/2014	ND<5000	ND<5000			
4/22/2015	28100	28100			
10/8/2015	ND<20000	ND<20000			
4/21/2016	ND<20000	ND<20000			
10/12/2016	ND<20000	ND<20000			
4/18/2017	ND<20000	ND<20000			
10/12/2017	ND<20000	ND<20000			

MW-21	14	7 (50%)	4/17/2018	ND<20000	ND<20000
			10/10/2018	ND<20000	ND<20000

4/13/2019	ND<20000	ND<20000
10/1/2019	ND<10000	ND<10000
4/7/2020	6680	6680
9/30/2020	36300	36300
4/14/2021	6110	6110
10/12/2021	26600	26600
4/20/2022	ND<10000	ND<10000
9/29/2022	ND<25000	ND<25000
4/18/2023	2270	2270
8/23/2023	3030	3030
5/1/2024	ND<10000	ND<10000
9/11/2024	17500	17500
10/1/1996	ND<10000	ND<10000
2/1/1997	ND<10000	ND<10000
4/1/1997	ND<10000	ND<10000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	ND<10000	ND<10000
10/1/1998	ND<10000	ND<10000
7/1/1999	ND<10000	ND<10000
10/1/1999	ND<10000	ND<10000
6/1/2000	ND<5000	ND<5000
10/1/2000	ND<10000	ND<10000
5/1/2001	ND<10000	ND<10000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	ND<10000	ND<10000
10/3/2003	ND<10000	ND<10000
4/4/2004	12000	12000
10/3/2004	ND<10000	ND<10000
4/5/2005	ND<10000	ND<10000
10/5/2005	ND<10000	ND<10000
4/6/2006	ND<10000	ND<10000
10/7/2006	ND<10000	ND<10000
4/7/2007	ND<10000	ND<10000
10/7/2007	ND<10000	ND<10000
4/1/2008	ND<10000	ND<10000
10/1/2008	ND<10000	ND<10000
5/1/2009	ND<10000	ND<10000
10/1/2009	ND<10000	ND<10000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	ND<10000	ND<10000
4/12/2012	17000	17000
11/12/2012	ND<10000	ND<10000
5/13/2013	ND<10000	ND<10000
11/13/2013	ND<10000	ND<10000
6/14/2014	15000	15000
10/14/2014	ND<5000	ND<5000
4/21/2015	20000	20000
10/6/2015	ND<20000	ND<20000
4/21/2016	ND<20000	ND<20000
10/11/2016	ND<20000	ND<20000
4/18/2017	ND<20000	ND<20000
10/12/2017	ND<20000	ND<20000

MW-25	14	5 (35.7143%)	4/17/2018	4170	4170
			10/9/2018	ND<20000	ND<20000
			4/13/2019	6500	6500
			10/1/2019	5630	5630
			4/8/2020	12300	12300

10/1/2020	ND<25000	ND<25000
4/14/2021	10700	10700
10/13/2021	35600	35600
4/19/2022	ND<10000	ND<10000
9/29/2022	ND<25000	ND<25000
4/19/2023	5420	5420
8/24/2023	ND<10000	ND<10000
4/29/2024	14800	14800
9/10/2024	13500	13500
10/1/1996	ND<10000	ND<10000
2/1/1997	ND<10000	ND<10000
4/1/1997	ND<10000	ND<10000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	ND<10000	ND<10000
10/1/1998	ND<10000	ND<10000
7/1/1999	ND<10000	ND<10000
10/1/1999	ND<10000	ND<10000
6/1/2000	ND<5000	ND<5000
10/1/2000	ND<10000	ND<10000
5/1/2001	ND<10000	ND<10000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	ND<10000	ND<10000
10/3/2003	ND<10000	ND<10000
4/4/2004	ND<10000	ND<10000
10/3/2004	ND<10000	ND<10000
4/5/2005	10000	10000
10/5/2005	10000	10000
4/6/2006	ND<10000	ND<10000
10/7/2006	11000	11000
4/7/2007	ND<10000	ND<10000
10/7/2007	ND<10000	ND<10000
4/1/2008	12000	12000
10/1/2008	17000	17000
5/1/2009	ND<10000	ND<10000
10/1/2009	ND<10000	ND<10000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	ND<10000	ND<10000
4/12/2012	29000	29000
11/12/2012	11000	11000
5/13/2013	ND<10000	ND<10000
11/13/2013	ND<10000	ND<10000
6/14/2014	23000	23000
10/14/2014	8650	8650
4/21/2015	28700	28700
10/6/2015	ND<20000	ND<20000
4/21/2016	ND<20000	ND<20000
10/11/2016	ND<20000	ND<20000
4/18/2017	ND<20000	ND<20000
10/10/2017	4110	4110

MW-26	14	5 (35.7143%)	4/17/2018	5400	5400
			10/9/2018	ND<20000	ND<20000
			4/13/2019	10800	10800
			10/1/2019	6680	6680
			4/8/2020	56000	56000
			10/1/2020	37200	37200
			4/14/2021	ND<10000	ND<10000
			10/13/2021	ND<25000	ND<25000

4/19/2022	7500	7500
9/29/2022	ND<25000	ND<25000
4/19/2023	3530	3530
8/24/2023	ND<10000	ND<10000
4/29/2024	9670	9670
9/10/2024	18400	18400
10/1/1996	26000	26000
2/1/1997	21000	21000
4/1/1997	13000	13000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	ND<10000	ND<10000
10/1/1998	ND<10000	ND<10000
7/1/1999	ND<10000	ND<10000
10/1/1999	ND<10000	ND<10000
6/1/2000	ND<5000	ND<5000
10/1/2000	ND<10000	ND<10000
5/1/2001	ND<10000	ND<10000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	ND<10000	ND<10000
10/3/2003	ND<10000	ND<10000
4/4/2004	11000	11000
10/3/2004	ND<10000	ND<10000
4/5/2005	16000	16000
10/5/2005	ND<10000	ND<10000
4/6/2006	ND<10000	ND<10000
10/7/2006	ND<10000	ND<10000
4/7/2007	ND<10000	ND<10000
10/7/2007	ND<10000	ND<10000
4/1/2008	ND<10000	ND<10000
10/1/2008	15000	15000
5/1/2009	ND<10000	ND<10000
10/1/2009	15000	15000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	ND<10000	ND<10000
4/12/2012	19000	19000
11/12/2012	ND<10000	ND<10000
5/13/2013	ND<10000	ND<10000
11/13/2013	ND<10000	ND<10000
6/14/2014	10000	10000
10/14/2014	ND<5000	ND<5000
4/21/2015	27000	27000
10/6/2015	ND<20000	ND<20000
4/21/2016	ND<20000	ND<20000
10/11/2016	ND<20000	ND<20000
4/18/2017	ND<20000	ND<20000
10/10/2017	ND<20000	ND<20000

MW-27

14

8 (57.1429%)

4/18/2018	ND<20000	ND<20000
10/9/2018	ND<20000	ND<20000
4/13/2019	4140	4140
10/1/2019	ND<10000	ND<10000
4/9/2020	7200	7200
10/1/2020	30500	30500
4/14/2021	ND<10000	ND<10000
10/13/2021	ND<25000	ND<25000
4/20/2022	ND<10000	ND<10000
9/28/2022	42600	42600
4/19/2023	ND<10000	ND<10000

8/24/2023	ND<10000	ND<10000
5/1/2024	7360	7360
9/11/2024	7110	7110
10/1/1996	22000	22000
2/1/1997	ND<10000	ND<10000
4/1/1997	ND<10000	ND<10000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	ND<10000	ND<10000
10/1/1998	ND<10000	ND<10000
7/1/1999	ND<10000	ND<10000
10/1/1999	ND<10000	ND<10000
6/1/2000	ND<5000	ND<5000
10/1/2000	ND<10000	ND<10000
5/1/2001	ND<10000	ND<10000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	ND<10000	ND<10000
10/3/2003	ND<10000	ND<10000
4/4/2004	ND<10000	ND<10000
10/3/2004	ND<10000	ND<10000
4/5/2005	10000	10000
10/5/2005	ND<10000	ND<10000
4/6/2006	ND<10000	ND<10000
10/7/2006	ND<10000	ND<10000
4/7/2007	ND<10000	ND<10000
10/7/2007	ND<10000	ND<10000
4/1/2008	ND<10000	ND<10000
10/1/2008	19000	19000
5/1/2009	ND<10000	ND<10000
10/1/2009	ND<10000	ND<10000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	19000	19000
4/12/2012	29000	29000
11/12/2012	12000	12000
5/13/2013	ND<10000	ND<10000
11/13/2013	10000	10000
6/14/2014	25000	25000
10/14/2014	ND<5000	ND<5000
4/21/2015	50800	50800
10/7/2015	ND<20000	ND<20000
4/20/2016	ND<20000	ND<20000
10/12/2016	ND<20000	ND<20000
4/19/2017	ND<20000	ND<20000
10/12/2017	ND<20000	ND<20000

SW-01	14	2 (14.2857%)	4/16/2018	11500	11500
			10/8/2018	15100	15100
			4/13/2019	4450	4450
			9/30/2019	20300	20300
			4/7/2020	20100	20100
			10/2/2020	35600	35600
			4/13/2021	14300	14300
			10/14/2021	42800	42800
			4/19/2022	11000	11000
			9/27/2022	ND<25000	ND<25000
			4/18/2023	2580	2580
			8/22/2023	5070	5070
			4/30/2024	ND<10000	ND<10000
			9/10/2024	19600	19600

10/1/1996	ND<10000	ND<10000
2/1/1997	ND<10000	ND<10000
4/1/1997	12000	12000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	1.53e+006	1.53e+006
10/1/1998	44000	44000
7/1/1999	ND<10000	ND<10000
10/1/1999	37000	37000
6/1/2000	ND<5000	ND<5000
10/1/2000	20000	20000
5/1/2001	29000	29000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	14000	14000
4/3/2003	32000	32000
10/3/2003	ND<10000	ND<10000
4/4/2004	54000	54000
10/3/2004	39000	39000
4/5/2005	ND<10000	ND<10000
10/5/2005	ND<10000	ND<10000
4/6/2006	ND<10000	ND<10000
10/7/2006	ND<10000	ND<10000
4/7/2007	44000	44000
10/7/2007	ND<10000	ND<10000
4/1/2008	63000	63000
10/1/2008	12000	12000
5/1/2009	ND<10000	ND<10000
10/1/2009	12000	12000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	ND<10000	ND<10000
4/12/2012	33000	33000
11/12/2012	ND<10000	ND<10000
5/13/2013	15000	15000
11/13/2013	ND<10000	ND<10000
6/14/2014	15000	15000
10/14/2014	ND<8150	ND<8150
4/20/2015	26600	26600
10/6/2015	ND<20000	ND<20000
4/21/2016	ND<20000	ND<20000
10/10/2016	ND<20000	ND<20000
4/17/2017	24100	24100
10/9/2017	29700	29700

SW-02

14

2 (14.2857%)

4/16/2018	14400	14400
10/8/2018	14100	14100
4/13/2019	16200	16200
9/30/2019	11800	11800
4/7/2020	36500	36500
10/2/2020	47300	47300
4/13/2021	10200	10200
10/14/2021	41000	41000
4/19/2022	18000	18000
9/27/2022	ND<25000	ND<25000
4/18/2023	6690	6690
8/22/2023	ND<10000	ND<10000
4/30/2024	6730	6730
9/10/2024	18700	18700
10/1/1996	ND<10000	ND<10000
2/1/1997	20000	20000
4/1/1997	13000	13000

7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	15000	15000
10/1/1998	44000	44000
7/1/1999	ND<10000	ND<10000
10/1/1999	12000	12000
6/1/2000	14000	14000
10/1/2000	13000	13000
5/1/2001	22000	22000
10/1/2001	ND<10000	ND<10000
4/1/2002	16000	16000
10/1/2002	15000	15000
4/3/2003	32000	32000
10/3/2003	ND<10000	ND<10000
4/4/2004	28000	28000
10/3/2004	66000	66000
4/5/2005	ND<10000	ND<10000
10/5/2005	ND<10000	ND<10000
4/6/2006	13000	13000
10/7/2006	ND<10000	ND<10000
4/7/2007	ND<10000	ND<10000
10/7/2007	ND<10000	ND<10000
4/1/2008	51000	51000
10/1/2008	21000	21000
5/1/2009	14000	14000
10/1/2009	17000	17000
5/10/2010	13000	13000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	22000	22000
4/12/2012	35000	35000
11/12/2012	ND<10000	ND<10000
5/13/2013	25000	25000
11/13/2013	15000	15000
6/14/2014	15000	15000
10/14/2014	15200	15200
4/20/2015	38200	38200
10/6/2015	ND<20000	ND<20000
4/21/2016	22200	22200
10/10/2016	ND<20000	ND<20000
4/17/2017	23000	23000
10/9/2017	23900	23900

SW-03

0

0

10/1/1996	ND<10000	ND<10000
2/1/1997	26000	26000
4/1/1997	23000	23000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	ND<10000	ND<10000
10/1/1998	29000	29000
7/1/1999	ND<10000	ND<10000
10/1/1999	22000	22000
6/1/2000	18000	18000
10/1/2000	15000	15000
5/1/2001	18000	18000
10/1/2001	ND<10000	ND<10000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	29000	29000
10/3/2003	17000	17000
4/4/2004	32000	32000
10/3/2004	35000	35000
4/5/2005	32000	32000

10/5/2005	17000	17000
4/6/2006	11000	11000
10/7/2006	ND<10000	ND<10000
4/7/2007	12000	12000
10/7/2007	ND<10000	ND<10000
4/1/2008	63000	63000
10/1/2008	17000	17000
5/1/2009	ND<10000	ND<10000
10/1/2009	18000	18000
5/10/2010	13000	13000
10/10/2010	16000	16000
4/11/2011	ND<10000	ND<10000
10/11/2011	25000	25000
4/12/2012	34000	34000
11/12/2012	17000	17000
5/13/2013	19000	19000
11/13/2013	13000	13000
6/14/2014	13000	13000
10/14/2014	10500	10500
4/20/2015	33800	33800
10/6/2015	ND<20000	ND<20000
4/21/2016	23500	23500

SW-04

0

0

10/1/1996	ND<10000	ND<10000
2/1/1997	15000	15000
4/1/1997	12000	12000
7/1/1997	ND<10000	ND<10000
10/1/1997	ND<10000	ND<10000
4/1/1998	19000	19000
10/1/1998	27000	27000
7/1/1999	ND<10000	ND<10000
6/1/2000	8100	8100
10/1/2000	12000	12000
5/1/2001	19000	19000
10/1/2001	14000	14000
4/1/2002	ND<10000	ND<10000
10/1/2002	ND<10000	ND<10000
4/3/2003	30000	30000
10/3/2003	ND<10000	ND<10000
4/4/2004	64000	64000
10/3/2004	17000	17000
4/5/2005	ND<10000	ND<10000
10/5/2005	ND<10000	ND<10000
4/6/2006	11000	11000
10/7/2006	ND<10000	ND<10000
4/7/2007	21000	21000
10/7/2007	ND<10000	ND<10000
4/1/2008	77000	77000
10/1/2008	20000	20000
5/1/2009	ND<10000	ND<10000
10/1/2009	14000	14000
5/10/2010	ND<10000	ND<10000
10/10/2010	ND<10000	ND<10000
4/11/2011	ND<10000	ND<10000
10/11/2011	22000	22000
4/12/2012	52000	52000
11/12/2012	17000	17000
5/13/2013	38000	38000
11/13/2013	12000	12000
6/14/2014	15000	15000
10/14/2014	7840	7840
4/20/2015	29900	29900
10/6/2015	ND<20000	ND<20000

Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.608018	0.135135	0.546	52300
2	0.604614	0.135135	0.521	42800
3	0.75339	0.179153	0.546	25000
4	0.670691	0.514019	0.576	20000
5	0	0.082243	0.477	None

Loc.	Date	Conc.	Outlier
MW-06	4/18/2018	5090	FALSE
	10/10/2018	ND<20000	TRUE
	4/14/2019	8650	FALSE
	10/2/2019	ND<10000	FALSE
	4/8/2020	7710	FALSE
	9/30/2020	52300	TRUE
	4/13/2021	ND<10000	FALSE
	10/14/2021	42800	TRUE
	4/20/2022	ND<10000	FALSE
	9/27/2022	ND<25000	TRUE
	4/18/2023	ND<10000	FALSE
	8/23/2023	4650	FALSE
	5/1/2024	ND<10000	FALSE
	9/12/2024	7400	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	4650	52300	47650	0.5251	25021
2	5090	42800	37710	0.3318	12512.2
3	7400	25000	17600	0.246	4329.6
4	7710	20000	12290	0.1802	2214.66
5	8650	10000	1350	0.124	167.4
6	10000	10000	0	0.0727	0
7	10000	10000	0	0.024	0
8	10000	10000	0		
9	10000	10000	0		
10	10000	8650	-1350		
11	20000	7710	-12290		
12	25000	7400	-17600		
13	42800	5090	-37710		
14	52300	4650	-47650		

Sum of b values = 44244.9

Sample Standard Deviation = 14564.1

W Statistic = 0.709927

5% Critical value of 0.874 exceeds 0.709927

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.709927

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	5090	14910	1	0
8650	5090	3560	2	0
ND<10000	5090	4910	3	0
7710	5090	2620	4	0
52300	5090	47210	5	0
ND<10000	5090	4910	6	0
42800	5090	37710	7	0
ND<10000	5090	4910	8	0
ND<25000	5090	19910	9	0
ND<10000	5090	4910	10	0
4650	5090	-440	10	1
ND<10000	5090	4910	11	1
7400	5090	2310	12	1
8650	ND<20000	-11350	12	2
ND<10000	ND<20000	-10000	12	3
7710	ND<20000	-12290	12	4
52300	ND<20000	32300	13	4
ND<10000	ND<20000	-10000	13	5
42800	ND<20000	22800	14	5
ND<10000	ND<20000	-10000	14	6
ND<25000	ND<20000	5000	15	6
ND<10000	ND<20000	-10000	15	7
4650	ND<20000	-15350	15	8
ND<10000	ND<20000	-10000	15	9
7400	ND<20000	-12600	15	10
ND<10000	8650	1350	16	10
7710	8650	-940	16	11
52300	8650	43650	17	11
ND<10000	8650	1350	18	11
42800	8650	34150	19	11
ND<10000	8650	1350	20	11
ND<25000	8650	16350	21	11
ND<10000	8650	1350	22	11
4650	8650	-4000	22	12
ND<10000	8650	1350	23	12
7400	8650	-1250	23	13
7710	ND<10000	-2290	23	14
52300	ND<10000	42300	24	14
ND<10000	ND<10000	0	24	14
42800	ND<10000	32800	25	14
ND<10000	ND<10000	0	25	14
ND<25000	ND<10000	15000	26	14
ND<10000	ND<10000	0	26	14
4650	ND<10000	-5350	26	15
ND<10000	ND<10000	0	26	15
7400	ND<10000	-2600	26	16
52300	7710	44590	27	16
ND<10000	7710	2290	28	16
42800	7710	35090	29	16

ND<10000	7710	2290	30	16
ND<25000	7710	17290	31	16
ND<10000	7710	2290	32	16
4650	7710	-3060	32	17
ND<10000	7710	2290	33	17
7400	7710	-310	33	18
ND<10000	52300	-42300	33	19
42800	52300	-9500	33	20
ND<10000	52300	-42300	33	21
ND<25000	52300	-27300	33	22
ND<10000	52300	-42300	33	23
4650	52300	-47650	33	24
ND<10000	52300	-42300	33	25
7400	52300	-44900	33	26
42800	ND<10000	32800	34	26
ND<10000	ND<10000	0	34	26
ND<25000	ND<10000	15000	35	26
ND<10000	ND<10000	0	35	26
4650	ND<10000	-5350	35	27
ND<10000	ND<10000	0	35	27
7400	ND<10000	-2600	35	28
ND<10000	42800	-32800	35	29
ND<25000	42800	-17800	35	30
ND<10000	42800	-32800	35	31
4650	42800	-38150	35	32
ND<10000	42800	-32800	35	33
7400	42800	-35400	35	34
ND<25000	ND<10000	15000	36	34
ND<10000	ND<10000	0	36	34
4650	ND<10000	-5350	36	35
ND<10000	ND<10000	0	36	35
7400	ND<10000	-2600	36	36
ND<10000	ND<25000	-15000	36	37
4650	ND<25000	-20350	36	38
ND<10000	ND<25000	-15000	36	39
7400	ND<25000	-17600	36	40
4650	ND<10000	-5350	36	41
ND<10000	ND<10000	0	36	41
7400	ND<10000	-2600	36	42
ND<10000	4650	5350	37	42
7400	4650	2750	38	42
7400	ND<10000	-2600	38	43

S Statistic = 38 - 43 = -5

Tied Group	Value	Members
1	10000	5

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1
4/8/2020	1

9/30/2020	1
4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 300

B = 0

C = 60

D = 0

E = 20

F = 0

a = 6006

b = 19656

c = 364

Group Variance = 317

Z-Score = -0.224662

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.224662| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-06



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.274905	0.095343	0.546	None

Loc.	Date	Conc.	Outlier
MW-07	4/18/2018	ND<20000	FALSE
	10/10/2018	ND<20000	FALSE
	4/14/2019	7190	FALSE
	10/2/2019	ND<10000	FALSE
	4/8/2020	48300	FALSE
	9/30/2020	43900	FALSE
	4/13/2021	8650	FALSE
	10/14/2021	37400	FALSE
	4/20/2022	ND<10000	FALSE
	9/27/2022	ND<25000	FALSE
	4/18/2023	ND<10000	FALSE
	8/23/2023	5620	FALSE
	5/1/2024	ND<10000	FALSE
	9/11/2024	18100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	5620	48300	42680	0.5251	22411.3
2	7190	43900	36710	0.3318	12180.4
3	8650	37400	28750	0.246	7072.5
4	10000	25000	15000	0.1802	2703
5	10000	20000	10000	0.124	1240
6	10000	20000	10000	0.0727	727
7	10000	18100	8100	0.024	194.4
8	18100	10000	-8100		
9	20000	10000	-10000		
10	20000	10000	-10000		
11	25000	10000	-15000		
12	37400	8650	-28750		
13	43900	7190	-36710		
14	48300	5620	-42680		

Sum of b values = 46528.5

Sample Standard Deviation = 14144.1

W Statistic = 0.83242

5% Critical value of 0.874 exceeds 0.83242

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.83242

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	ND<20000	0	0	0
7190	ND<20000	-12810	0	1
ND<10000	ND<20000	-10000	0	2
48300	ND<20000	28300	1	2
43900	ND<20000	23900	2	2
8650	ND<20000	-11350	2	3
37400	ND<20000	17400	3	3
ND<10000	ND<20000	-10000	3	4
ND<25000	ND<20000	5000	4	4
ND<10000	ND<20000	-10000	4	5
5620	ND<20000	-14380	4	6
ND<10000	ND<20000	-10000	4	7
18100	ND<20000	-1900	4	8
7190	ND<20000	-12810	4	9
ND<10000	ND<20000	-10000	4	10
48300	ND<20000	28300	5	10
43900	ND<20000	23900	6	10
8650	ND<20000	-11350	6	11
37400	ND<20000	17400	7	11
ND<10000	ND<20000	-10000	7	12
ND<25000	ND<20000	5000	8	12
ND<10000	ND<20000	-10000	8	13
5620	ND<20000	-14380	8	14
ND<10000	ND<20000	-10000	8	15
18100	ND<20000	-1900	8	16
ND<10000	7190	2810	9	16
48300	7190	41110	10	16
43900	7190	36710	11	16
8650	7190	1460	12	16
37400	7190	30210	13	16
ND<10000	7190	2810	14	16
ND<25000	7190	17810	15	16
ND<10000	7190	2810	16	16
5620	7190	-1570	16	17
ND<10000	7190	2810	17	17
18100	7190	10910	18	17
48300	ND<10000	38300	19	17
43900	ND<10000	33900	20	17
8650	ND<10000	-1350	20	18
37400	ND<10000	27400	21	18
ND<10000	ND<10000	0	21	18
ND<25000	ND<10000	15000	22	18
ND<10000	ND<10000	0	22	18
5620	ND<10000	-4380	22	19
ND<10000	ND<10000	0	22	19
18100	ND<10000	8100	23	19
43900	48300	-4400	23	20
8650	48300	-39650	23	21
37400	48300	-10900	23	22

ND<10000	48300	-38300	23	23
ND<25000	48300	-23300	23	24
ND<10000	48300	-38300	23	25
5620	48300	-42680	23	26
ND<10000	48300	-38300	23	27
18100	48300	-30200	23	28
8650	43900	-35250	23	29
37400	43900	-6500	23	30
ND<10000	43900	-33900	23	31
ND<25000	43900	-18900	23	32
ND<10000	43900	-33900	23	33
5620	43900	-38280	23	34
ND<10000	43900	-33900	23	35
18100	43900	-25800	23	36
37400	8650	28750	24	36
ND<10000	8650	1350	25	36
ND<25000	8650	16350	26	36
ND<10000	8650	1350	27	36
5620	8650	-3030	27	37
ND<10000	8650	1350	28	37
18100	8650	9450	29	37
ND<10000	37400	-27400	29	38
ND<25000	37400	-12400	29	39
ND<10000	37400	-27400	29	40
5620	37400	-31780	29	41
ND<10000	37400	-27400	29	42
18100	37400	-19300	29	43
ND<25000	ND<10000	15000	30	43
ND<10000	ND<10000	0	30	43
5620	ND<10000	-4380	30	44
ND<10000	ND<10000	0	30	44
18100	ND<10000	8100	31	44
ND<10000	ND<25000	-15000	31	45
5620	ND<25000	-19380	31	46
ND<10000	ND<25000	-15000	31	47
18100	ND<25000	-6900	31	48
5620	ND<10000	-4380	31	49
ND<10000	ND<10000	0	31	49
18100	ND<10000	8100	32	49
ND<10000	5620	4380	33	49
18100	5620	12480	34	49
18100	ND<10000	8100	35	49

S Statistic = 35 - 49 = -14

Tied Group	Value	Members
1	20000	2
2	10000	4

Time Period	Observations
4/18/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1

4/8/2020	1
9/30/2020	1
4/13/2021	1
10/14/2021	1
4/20/2022	1
9/27/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 174

B = 0

C = 24

D = 0

E = 14

F = 0

a = 6006

b = 19656

c = 364

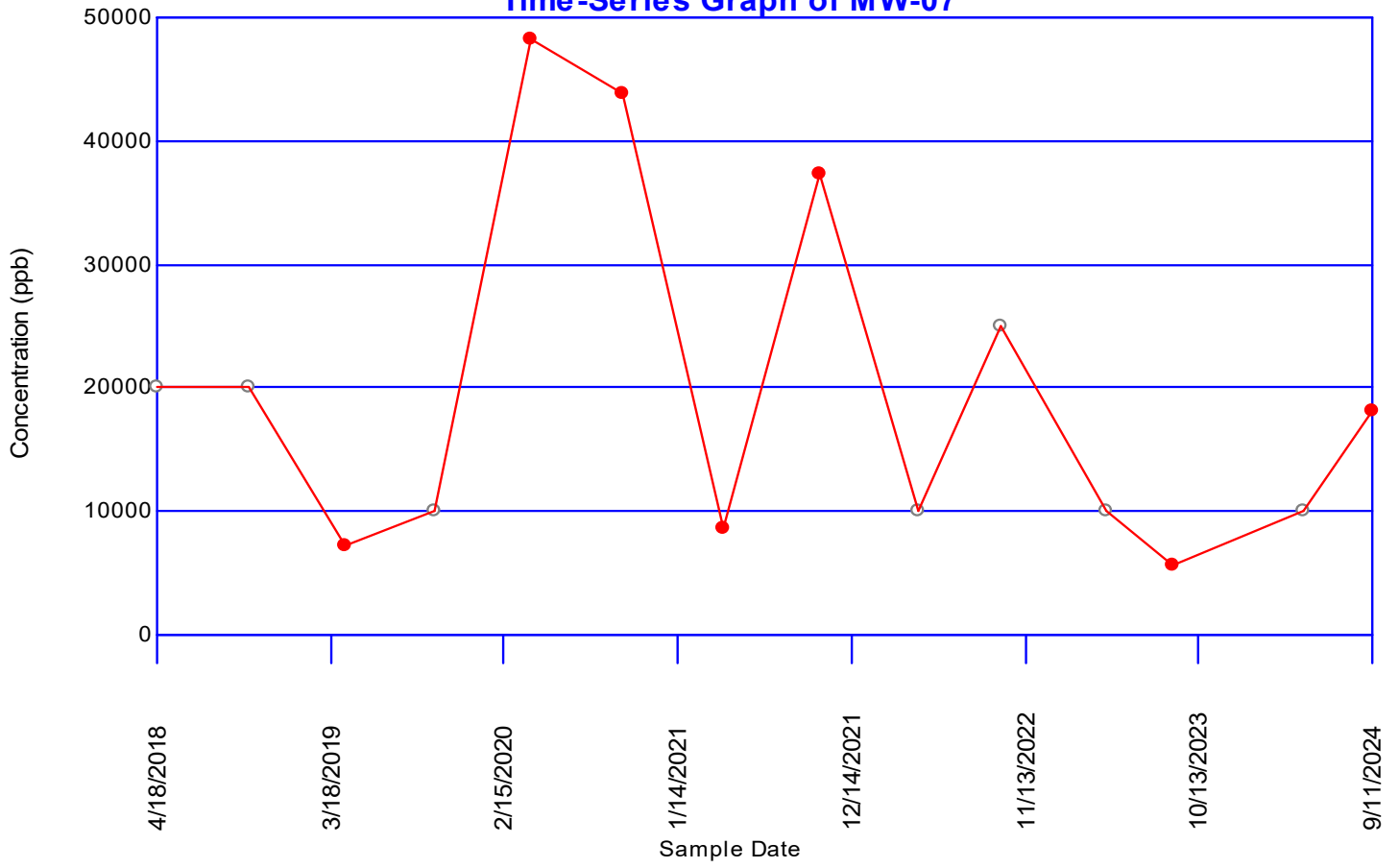
Group Variance = 324

Z-Score = -0.722222

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.722222| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.0295683	0.169114	0.546	None

Loc.	Date	Conc.	Outlier
MW-12	4/17/2018	ND<20000	FALSE
	10/9/2018	5250	FALSE
	4/14/2019	7520	FALSE
	10/2/2019	8590	FALSE
	4/8/2020	11300	FALSE
	10/1/2020	25500	FALSE
	4/15/2021	ND<10000	FALSE
	10/14/2021	ND<25000	FALSE
	4/19/2022	9000	FALSE
	9/28/2022	ND<25000	FALSE
	4/18/2023	ND<10000	FALSE
	8/24/2023	ND<10000	FALSE
	5/1/2024	ND<10000	FALSE
	9/12/2024	11100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-12

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	5250	25500	20250	0.5251	10633.3
2	7520	25000	17480	0.3318	5799.86
3	8590	25000	16410	0.246	4036.86
4	9000	20000	11000	0.1802	1982.2
5	10000	11300	1300	0.124	161.2
6	10000	11100	1100	0.0727	79.97
7	10000	10000	0	0.024	0
8	10000	10000	0		
9	11100	10000	-1100		
10	11300	10000	-1300		
11	20000	9000	-11000		
12	25000	8590	-16410		
13	25000	7520	-17480		
14	25500	5250	-20250		

Sum of b values = 22693.4

Sample Standard Deviation = 7117.11

W Statistic = 0.782073

5% Critical value of 0.874 exceeds 0.782073

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.782073

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
5250	ND<20000	-14750	0	1
7520	ND<20000	-12480	0	2
8590	ND<20000	-11410	0	3
11300	ND<20000	-8700	0	4
25500	ND<20000	5500	1	4
ND<10000	ND<20000	-10000	1	5
ND<25000	ND<20000	5000	2	5
9000	ND<20000	-11000	2	6
ND<25000	ND<20000	5000	3	6
ND<10000	ND<20000	-10000	3	7
ND<10000	ND<20000	-10000	3	8
ND<10000	ND<20000	-10000	3	9
11100	ND<20000	-8900	3	10
7520	5250	2270	4	10
8590	5250	3340	5	10
11300	5250	6050	6	10
25500	5250	20250	7	10
ND<10000	5250	4750	8	10
ND<25000	5250	19750	9	10
9000	5250	3750	10	10
ND<25000	5250	19750	11	10
ND<10000	5250	4750	12	10
ND<10000	5250	4750	13	10
ND<10000	5250	4750	14	10
11100	5250	5850	15	10
8590	7520	1070	16	10
11300	7520	3780	17	10
25500	7520	17980	18	10
ND<10000	7520	2480	19	10
ND<25000	7520	17480	20	10
9000	7520	1480	21	10
ND<25000	7520	17480	22	10
ND<10000	7520	2480	23	10
ND<10000	7520	2480	24	10
ND<10000	7520	2480	25	10
11100	7520	3580	26	10
11300	8590	2710	27	10
25500	8590	16910	28	10
ND<10000	8590	1410	29	10
ND<25000	8590	16410	30	10
9000	8590	410	31	10
ND<25000	8590	16410	32	10
ND<10000	8590	1410	33	10
ND<10000	8590	1410	34	10
ND<10000	8590	1410	35	10
11100	8590	2510	36	10
25500	11300	14200	37	10
ND<10000	11300	-1300	37	11
ND<25000	11300	13700	38	11

9000	11300	-2300	38	12
ND<25000	11300	13700	39	12
ND<10000	11300	-1300	39	13
ND<10000	11300	-1300	39	14
ND<10000	11300	-1300	39	15
11100	11300	-200	39	16
ND<10000	25500	-15500	39	17
ND<25000	25500	-500	39	18
9000	25500	-16500	39	19
ND<25000	25500	-500	39	20
ND<10000	25500	-15500	39	21
ND<10000	25500	-15500	39	22
ND<10000	25500	-15500	39	23
11100	25500	-14400	39	24
ND<25000	ND<10000	15000	40	24
9000	ND<10000	-1000	40	25
ND<25000	ND<10000	15000	41	25
ND<10000	ND<10000	0	41	25
ND<10000	ND<10000	0	41	25
ND<10000	ND<10000	0	41	25
11100	ND<10000	1100	42	25
9000	ND<25000	-16000	42	26
ND<25000	ND<25000	0	42	26
ND<10000	ND<25000	-15000	42	27
ND<10000	ND<25000	-15000	42	28
ND<10000	ND<25000	-15000	42	29
11100	ND<25000	-13900	42	30
ND<25000	9000	16000	43	30
ND<10000	9000	1000	44	30
ND<10000	9000	1000	45	30
ND<10000	9000	1000	46	30
11100	9000	2100	47	30
ND<10000	ND<25000	-15000	47	31
ND<10000	ND<25000	-15000	47	32
ND<10000	ND<25000	-15000	47	33
11100	ND<25000	-13900	47	34
ND<10000	ND<10000	0	47	34
ND<10000	ND<10000	0	47	34
11100	ND<10000	1100	48	34
ND<10000	ND<10000	0	48	34
11100	ND<10000	1100	49	34
11100	ND<10000	1100	50	34

S Statistic = 50 - 34 = 16

Tied Group	Value	Members
1	10000	4
2	25000	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/14/2019	1
10/2/2019	1

4/8/2020	1
10/1/2020	1
4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/1/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 174

B = 0

C = 24

D = 0

E = 14

F = 0

a = 6006

b = 19656

c = 364

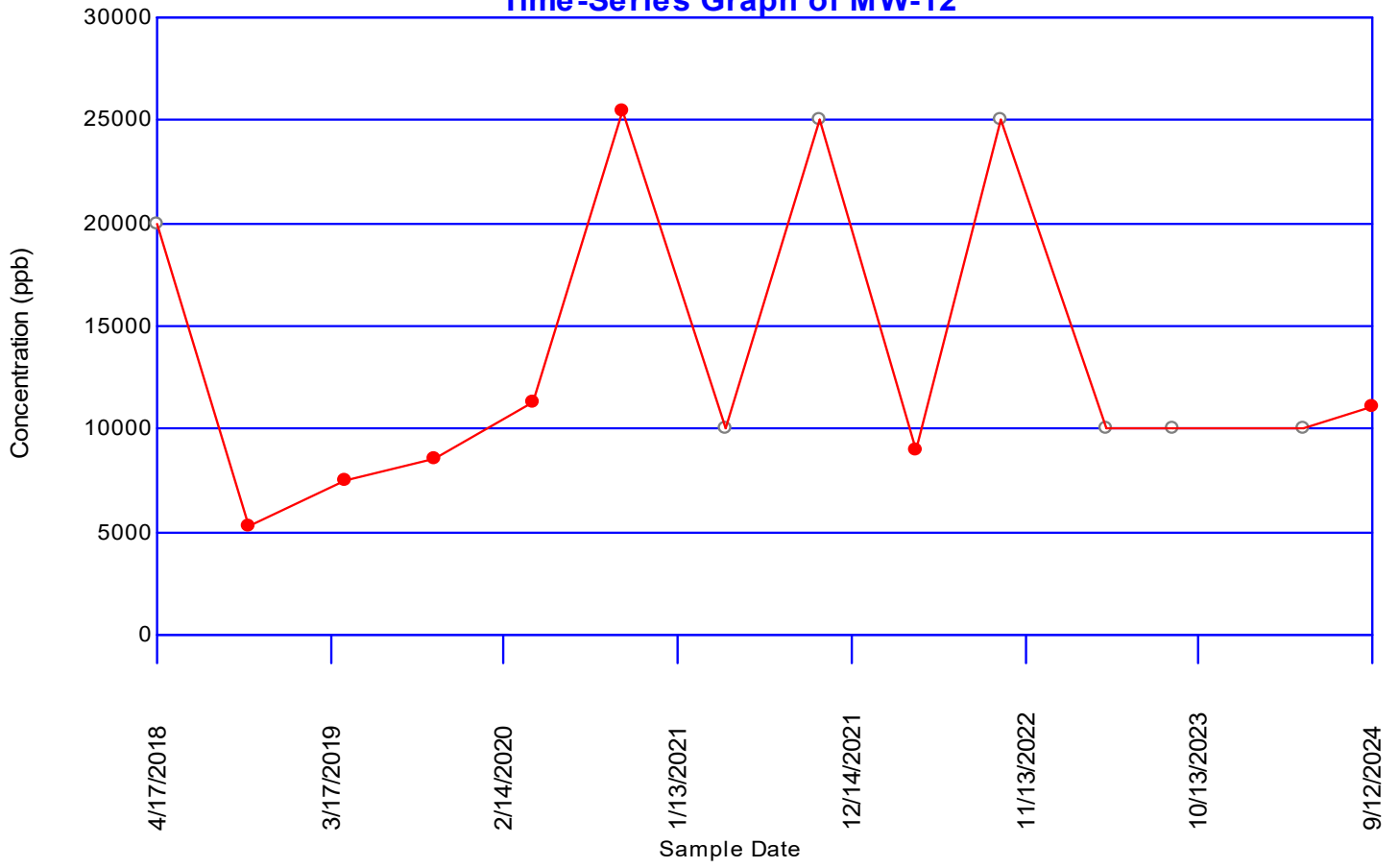
Group Variance = 324

Z-Score = 0.833333

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.833333| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-12



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.614396	0.284692	0.546	48900
2	0.267523	0.284692	0.521	None

Loc.	Date	Conc.	Outlier
MW-16	4/17/2018	4030	FALSE
	10/9/2018	ND<20000	FALSE
	4/14/2019	6310	FALSE
	10/2/2019	ND<10000	FALSE
	4/9/2020	13400	FALSE
	10/1/2020	48900	TRUE
	4/15/2021	ND<10000	FALSE
	10/14/2021	ND<25000	FALSE
	4/19/2022	ND<10000	FALSE
	9/28/2022	ND<25000	FALSE
	4/18/2023	ND<10000	FALSE
	8/24/2023	ND<10000	FALSE
	5/2/2024	ND<10000	FALSE
	9/12/2024	14500	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	4030	48900	44870	0.5251	23561.2
2	6310	25000	18690	0.3318	6201.34
3	10000	25000	15000	0.246	3690
4	10000	20000	10000	0.1802	1802
5	10000	14500	4500	0.124	558
6	10000	13400	3400	0.0727	247.18
7	10000	10000	0	0.024	0
8	10000	10000	0		
9	13400	10000	-3400		
10	14500	10000	-4500		
11	20000	10000	-10000		
12	25000	10000	-15000		
13	25000	6310	-18690		
14	48900	4030	-44870		

Sum of b values = 36059.8

Sample Standard Deviation = 11500

W Statistic = 0.756328

5% Critical value of 0.874 exceeds 0.756328

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.756328

Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	4030	15970	1	0
6310	4030	2280	2	0
ND<10000	4030	5970	3	0
13400	4030	9370	4	0
48900	4030	44870	5	0
ND<10000	4030	5970	6	0
ND<25000	4030	20970	7	0
ND<10000	4030	5970	8	0
ND<25000	4030	20970	9	0
ND<10000	4030	5970	10	0
ND<10000	4030	5970	11	0
ND<10000	4030	5970	12	0
14500	4030	10470	13	0
6310	ND<20000	-13690	13	1
ND<10000	ND<20000	-10000	13	2
13400	ND<20000	-6600	13	3
48900	ND<20000	28900	14	3
ND<10000	ND<20000	-10000	14	4
ND<25000	ND<20000	5000	15	4
ND<10000	ND<20000	-10000	15	5
ND<25000	ND<20000	5000	16	5
ND<10000	ND<20000	-10000	16	6
ND<10000	ND<20000	-10000	16	7
ND<10000	ND<20000	-10000	16	8
14500	ND<20000	-5500	16	9
ND<10000	6310	3690	17	9
13400	6310	7090	18	9
48900	6310	42590	19	9
ND<10000	6310	3690	20	9
ND<25000	6310	18690	21	9
ND<10000	6310	3690	22	9
ND<25000	6310	18690	23	9
ND<10000	6310	3690	24	9
ND<10000	6310	3690	25	9
ND<10000	6310	3690	26	9
14500	6310	8190	27	9
13400	ND<10000	3400	28	9
48900	ND<10000	38900	29	9
ND<10000	ND<10000	0	29	9
ND<25000	ND<10000	15000	30	9
ND<10000	ND<10000	0	30	9
ND<25000	ND<10000	15000	31	9
ND<10000	ND<10000	0	31	9
ND<10000	ND<10000	0	31	9
ND<10000	ND<10000	0	31	9
14500	ND<10000	4500	32	9
48900	13400	35500	33	9
ND<10000	13400	-3400	33	10
ND<25000	13400	11600	34	10

ND<10000	13400	-3400	34	11
ND<25000	13400	11600	35	11
ND<10000	13400	-3400	35	12
ND<10000	13400	-3400	35	13
ND<10000	13400	-3400	35	14
14500	13400	1100	36	14
ND<10000	48900	-38900	36	15
ND<25000	48900	-23900	36	16
ND<10000	48900	-38900	36	17
ND<25000	48900	-23900	36	18
ND<10000	48900	-38900	36	19
ND<10000	48900	-38900	36	20
ND<10000	48900	-38900	36	21
14500	48900	-34400	36	22
ND<25000	ND<10000	15000	37	22
ND<10000	ND<10000	0	37	22
ND<25000	ND<10000	15000	38	22
ND<10000	ND<10000	0	38	22
ND<10000	ND<10000	0	38	22
ND<10000	ND<10000	0	38	22
14500	ND<10000	4500	39	22
ND<10000	ND<25000	-15000	39	23
ND<25000	ND<25000	0	39	23
ND<10000	ND<25000	-15000	39	24
ND<10000	ND<25000	-15000	39	25
ND<10000	ND<25000	-15000	39	26
14500	ND<25000	-10500	39	27
ND<25000	ND<10000	15000	40	27
ND<10000	ND<10000	0	40	27
ND<10000	ND<10000	0	40	27
ND<10000	ND<10000	0	40	27
14500	ND<10000	4500	41	27
ND<10000	ND<25000	-15000	41	28
ND<10000	ND<25000	-15000	41	29
ND<10000	ND<25000	-15000	41	30
14500	ND<25000	-10500	41	31
ND<10000	ND<10000	0	41	31
ND<10000	ND<10000	0	41	31
14500	ND<10000	4500	42	31
ND<10000	ND<10000	0	42	31
14500	ND<10000	4500	43	31
14500	ND<10000	4500	44	31

S Statistic = 44 - 31 = 13

Tied Group	Value	Members
1	10000	6
2	25000	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/14/2019	1
10/2/2019	1

4/9/2020	1
10/1/2020	1
4/15/2021	1
10/14/2021	1
4/19/2022	1
9/28/2022	1
4/18/2023	1
8/24/2023	1
5/2/2024	1
9/12/2024	1

There are 0 time periods with multiple data

A = 528

B = 0

C = 120

D = 0

E = 32

F = 0

a = 6006

b = 19656

c = 364

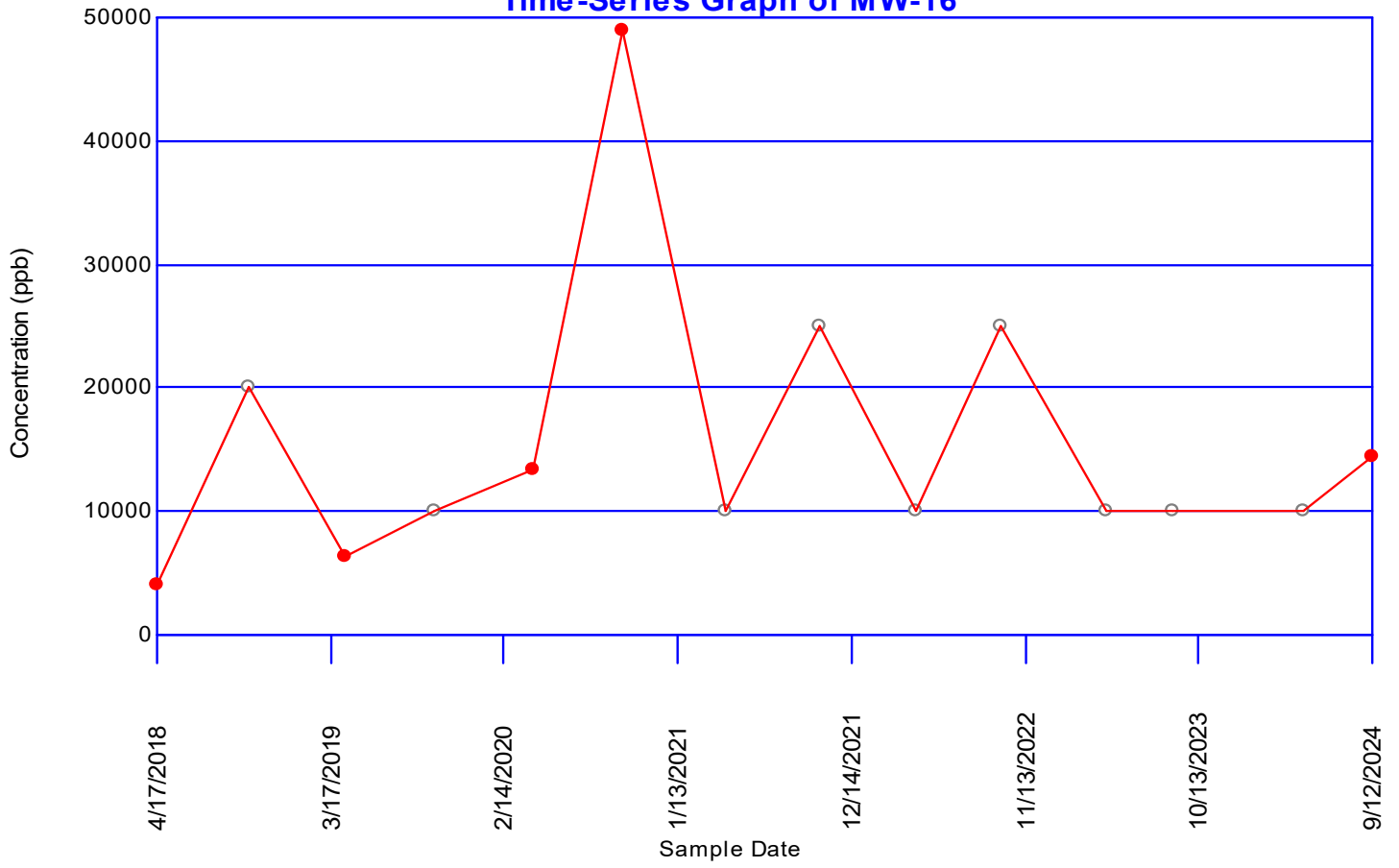
Group Variance = 304.333

Z-Score = 0.68787

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.68787| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.442675	0.106231	0.546	None

Loc.	Date	Conc.	Outlier
MW-20	4/17/2018	ND<20000	FALSE
	10/10/2018	ND<20000	FALSE
	4/14/2019	8150	FALSE
	10/2/2019	ND<10000	FALSE
	4/9/2020	9250	FALSE
	10/2/2020	38900	FALSE
	4/15/2021	ND<10000	FALSE
	10/12/2021	33800	FALSE
	4/20/2022	7500	FALSE
	9/28/2022	ND<25000	FALSE
	4/19/2023	5420	FALSE
	8/23/2023	5620	FALSE
	4/30/2024	ND<10000	FALSE
	9/11/2024	12300	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-20

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	5420	38900	33480	0.5251	17580.3
2	5620	33800	28180	0.3318	9350.12
3	7500	25000	17500	0.246	4305
4	8150	20000	11850	0.1802	2135.37
5	9250	20000	10750	0.124	1333
6	10000	12300	2300	0.0727	167.21
7	10000	10000	0	0.024	0
8	10000	10000	0		
9	12300	10000	-2300		
10	20000	9250	-10750		
11	20000	8150	-11850		
12	25000	7500	-17500		
13	33800	5620	-28180		
14	38900	5420	-33480		

Sum of b values = 34871.1

Sample Standard Deviation = 10635.3

W Statistic = 0.82697

5% Critical value of 0.874 exceeds 0.82697

Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.82697

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	ND<20000	0	0	0
8150	ND<20000	-11850	0	1
ND<10000	ND<20000	-10000	0	2
9250	ND<20000	-10750	0	3
38900	ND<20000	18900	1	3
ND<10000	ND<20000	-10000	1	4
33800	ND<20000	13800	2	4
7500	ND<20000	-12500	2	5
ND<25000	ND<20000	5000	3	5
5420	ND<20000	-14580	3	6
5620	ND<20000	-14380	3	7
ND<10000	ND<20000	-10000	3	8
12300	ND<20000	-7700	3	9
8150	ND<20000	-11850	3	10
ND<10000	ND<20000	-10000	3	11
9250	ND<20000	-10750	3	12
38900	ND<20000	18900	4	12
ND<10000	ND<20000	-10000	4	13
33800	ND<20000	13800	5	13
7500	ND<20000	-12500	5	14
ND<25000	ND<20000	5000	6	14
5420	ND<20000	-14580	6	15
5620	ND<20000	-14380	6	16
ND<10000	ND<20000	-10000	6	17
12300	ND<20000	-7700	6	18
ND<10000	8150	1850	7	18
9250	8150	1100	8	18
38900	8150	30750	9	18
ND<10000	8150	1850	10	18
33800	8150	25650	11	18
7500	8150	-650	11	19
ND<25000	8150	16850	12	19
5420	8150	-2730	12	20
5620	8150	-2530	12	21
ND<10000	8150	1850	13	21
12300	8150	4150	14	21
9250	ND<10000	-750	14	22
38900	ND<10000	28900	15	22
ND<10000	ND<10000	0	15	22
33800	ND<10000	23800	16	22
7500	ND<10000	-2500	16	23
ND<25000	ND<10000	15000	17	23
5420	ND<10000	-4580	17	24
5620	ND<10000	-4380	17	25
ND<10000	ND<10000	0	17	25
12300	ND<10000	2300	18	25
38900	9250	29650	19	25
ND<10000	9250	750	20	25
33800	9250	24550	21	25

7500	9250	-1750	21	26
ND<25000	9250	15750	22	26
5420	9250	-3830	22	27
5620	9250	-3630	22	28
ND<10000	9250	750	23	28
12300	9250	3050	24	28
ND<10000	38900	-28900	24	29
33800	38900	-5100	24	30
7500	38900	-31400	24	31
ND<25000	38900	-13900	24	32
5420	38900	-33480	24	33
5620	38900	-33280	24	34
ND<10000	38900	-28900	24	35
12300	38900	-26600	24	36
33800	ND<10000	23800	25	36
7500	ND<10000	-2500	25	37
ND<25000	ND<10000	15000	26	37
5420	ND<10000	-4580	26	38
5620	ND<10000	-4380	26	39
ND<10000	ND<10000	0	26	39
12300	ND<10000	2300	27	39
7500	33800	-26300	27	40
ND<25000	33800	-8800	27	41
5420	33800	-28380	27	42
5620	33800	-28180	27	43
ND<10000	33800	-23800	27	44
12300	33800	-21500	27	45
ND<25000	7500	17500	28	45
5420	7500	-2080	28	46
5620	7500	-1880	28	47
ND<10000	7500	2500	29	47
12300	7500	4800	30	47
5420	ND<25000	-19580	30	48
5620	ND<25000	-19380	30	49
ND<10000	ND<25000	-15000	30	50
12300	ND<25000	-12700	30	51
5620	5420	200	31	51
ND<10000	5420	4580	32	51
12300	5420	6880	33	51
ND<10000	5620	4380	34	51
12300	5620	6680	35	51
12300	ND<10000	2300	36	51

S Statistic = 36 - 51 = -15

Tied Group	Value	Members
1	20000	2
2	10000	3

Time Period	Observations
4/17/2018	1
10/10/2018	1
4/14/2019	1
10/2/2019	1

4/9/2020	1
10/2/2020	1
4/15/2021	1
10/12/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/23/2023	1
4/30/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 84

B = 0

C = 6

D = 0

E = 8

F = 0

a = 6006

b = 19656

c = 364

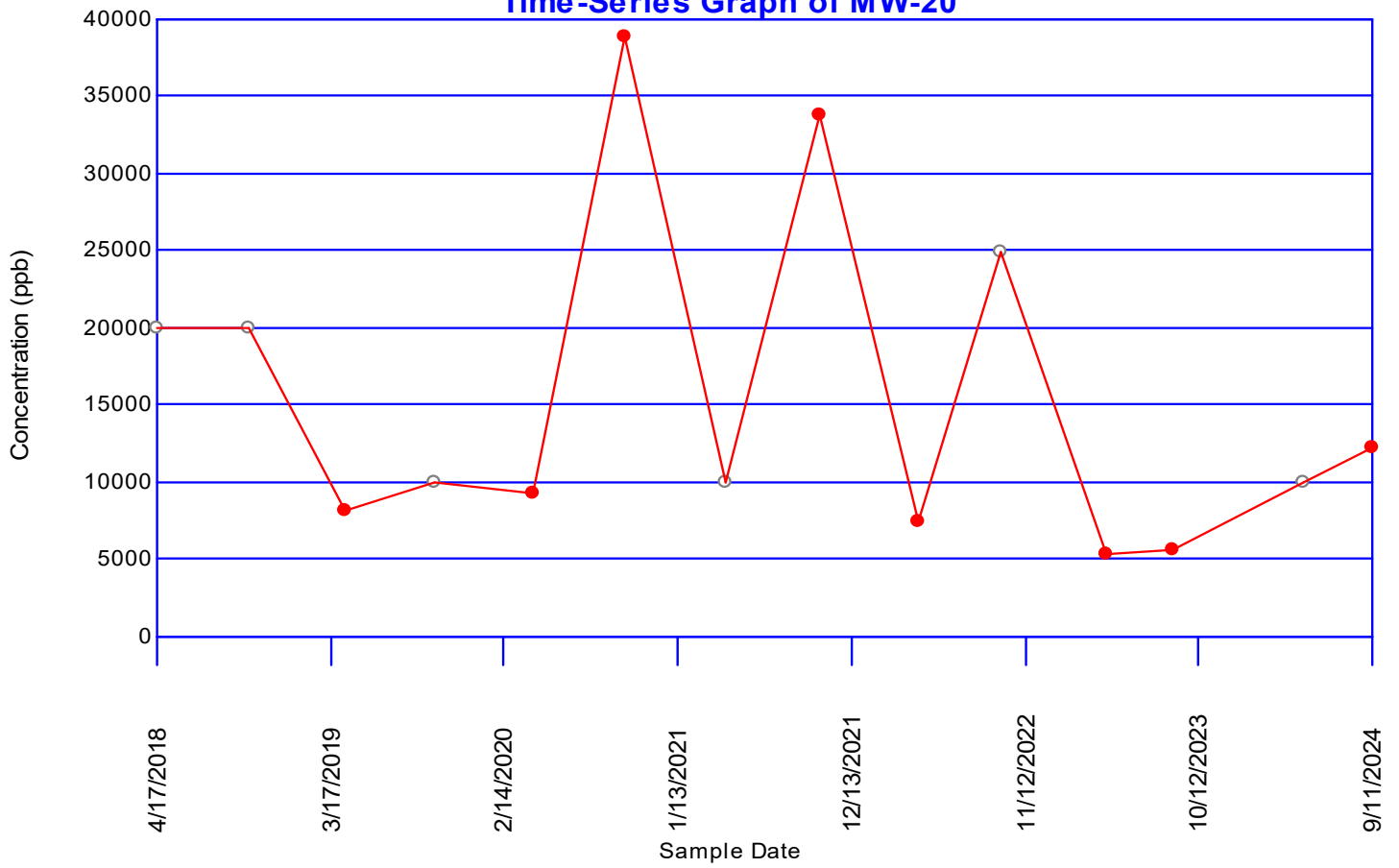
Group Variance = 329

Z-Score = -0.771845

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.771845| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-20



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.374296	0.16894	0.546	None

Loc.	Date	Conc.	Outlier
MW-21	4/17/2018	ND<20000	FALSE
	10/10/2018	ND<20000	FALSE
	4/13/2019	ND<20000	FALSE
	10/1/2019	ND<10000	FALSE
	4/7/2020	6680	FALSE
	9/30/2020	36300	FALSE
	4/14/2021	6110	FALSE
	10/12/2021	26600	FALSE
	4/20/2022	ND<10000	FALSE
	9/29/2022	ND<25000	FALSE
	4/18/2023	2270	FALSE
	8/23/2023	3030	FALSE
	5/1/2024	ND<10000	FALSE
	9/11/2024	17500	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-21

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2270	36300	34030	0.5251	17869.2
2	3030	26600	23570	0.3318	7820.53
3	6110	25000	18890	0.246	4646.94
4	6680	20000	13320	0.1802	2400.26
5	10000	20000	10000	0.124	1240
6	10000	20000	10000	0.0727	727
7	10000	17500	7500	0.024	180
8	17500	10000	-7500		
9	20000	10000	-10000		
10	20000	10000	-10000		
11	20000	6680	-13320		
12	25000	6110	-18890		
13	26600	3030	-23570		
14	36300	2270	-34030		

Sum of b values = 34883.9

Sample Standard Deviation = 9989.3

W Statistic = 0.938073

5% Critical value of 0.874 is less than 0.938073

Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.938073

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	ND<20000	0	0	0
ND<20000	ND<20000	0	0	0
ND<10000	ND<20000	-10000	0	1
6680	ND<20000	-13320	0	2
36300	ND<20000	16300	1	2
6110	ND<20000	-13890	1	3
26600	ND<20000	6600	2	3
ND<10000	ND<20000	-10000	2	4
ND<25000	ND<20000	5000	3	4
2270	ND<20000	-17730	3	5
3030	ND<20000	-16970	3	6
ND<10000	ND<20000	-10000	3	7
17500	ND<20000	-2500	3	8
ND<20000	ND<20000	0	3	8
ND<10000	ND<20000	-10000	3	9
6680	ND<20000	-13320	3	10
36300	ND<20000	16300	4	10
6110	ND<20000	-13890	4	11
26600	ND<20000	6600	5	11
ND<10000	ND<20000	-10000	5	12
ND<25000	ND<20000	5000	6	12
2270	ND<20000	-17730	6	13
3030	ND<20000	-16970	6	14
ND<10000	ND<20000	-10000	6	15
17500	ND<20000	-2500	6	16
ND<10000	ND<20000	-10000	6	17
6680	ND<20000	-13320	6	18
36300	ND<20000	16300	7	18
6110	ND<20000	-13890	7	19
26600	ND<20000	6600	8	19
ND<10000	ND<20000	-10000	8	20
ND<25000	ND<20000	5000	9	20
2270	ND<20000	-17730	9	21
3030	ND<20000	-16970	9	22
ND<10000	ND<20000	-10000	9	23
17500	ND<20000	-2500	9	24
6680	ND<10000	-3320	9	25
36300	ND<10000	26300	10	25
6110	ND<10000	-3890	10	26
26600	ND<10000	16600	11	26
ND<10000	ND<10000	0	11	26
ND<25000	ND<10000	15000	12	26
2270	ND<10000	-7730	12	27
3030	ND<10000	-6970	12	28
ND<10000	ND<10000	0	12	28
17500	ND<10000	7500	13	28
36300	6680	29620	14	28
6110	6680	-570	14	29
26600	6680	19920	15	29

ND<10000	6680	3320	16	29
ND<25000	6680	18320	17	29
2270	6680	-4410	17	30
3030	6680	-3650	17	31
ND<10000	6680	3320	18	31
17500	6680	10820	19	31
6110	36300	-30190	19	32
26600	36300	-9700	19	33
ND<10000	36300	-26300	19	34
ND<25000	36300	-11300	19	35
2270	36300	-34030	19	36
3030	36300	-33270	19	37
ND<10000	36300	-26300	19	38
17500	36300	-18800	19	39
26600	6110	20490	20	39
ND<10000	6110	3890	21	39
ND<25000	6110	18890	22	39
2270	6110	-3840	22	40
3030	6110	-3080	22	41
ND<10000	6110	3890	23	41
17500	6110	11390	24	41
ND<10000	26600	-16600	24	42
ND<25000	26600	-1600	24	43
2270	26600	-24330	24	44
3030	26600	-23570	24	45
ND<10000	26600	-16600	24	46
17500	26600	-9100	24	47
ND<25000	ND<10000	15000	25	47
2270	ND<10000	-7730	25	48
3030	ND<10000	-6970	25	49
ND<10000	ND<10000	0	25	49
17500	ND<10000	7500	26	49
2270	ND<25000	-22730	26	50
3030	ND<25000	-21970	26	51
ND<10000	ND<25000	-15000	26	52
17500	ND<25000	-7500	26	53
3030	2270	760	27	53
ND<10000	2270	7730	28	53
17500	2270	15230	29	53
ND<10000	3030	6970	30	53
17500	3030	14470	31	53
17500	ND<10000	7500	32	53

S Statistic = 32 - 53 = -21

Tied Group	Value	Members
1	20000	3
2	10000	3

Time Period	Observations
4/17/2018	1
10/10/2018	1
4/13/2019	1
10/1/2019	1

4/7/2020	1
9/30/2020	1
4/14/2021	1
10/12/2021	1
4/20/2022	1
9/29/2022	1
4/18/2023	1
8/23/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 132

B = 0

C = 12

D = 0

E = 12

F = 0

a = 6006

b = 19656

c = 364

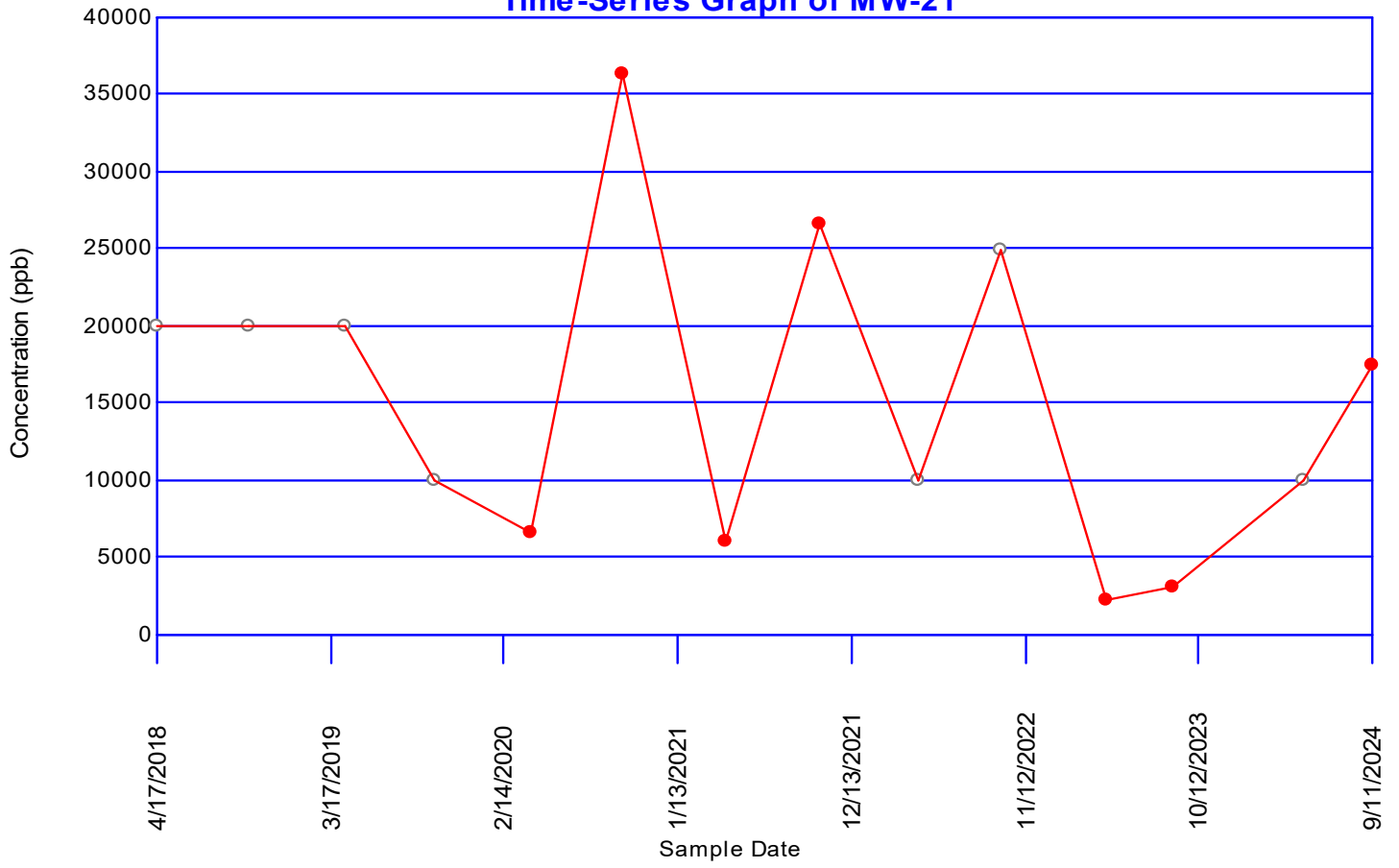
Group Variance = 326.333

Z-Score = -1.10713

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-1.10713| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-21



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.353687	0.0700912	0.546	None

Loc.	Date	Conc.	Outlier
MW-25	4/17/2018	4170	FALSE
	10/9/2018	ND<20000	FALSE
	4/13/2019	6500	FALSE
	10/1/2019	5630	FALSE
	4/8/2020	12300	FALSE
	10/1/2020	ND<25000	FALSE
	4/14/2021	10700	FALSE
	10/13/2021	35600	FALSE
	4/19/2022	ND<10000	FALSE
	9/29/2022	ND<25000	FALSE
	4/19/2023	5420	FALSE
	8/24/2023	ND<10000	FALSE
	4/29/2024	14800	FALSE
	9/10/2024	13500	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-25

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	4170	35600	31430	0.5251	16503.9
2	5420	25000	19580	0.3318	6496.64
3	5630	25000	19370	0.246	4765.02
4	6500	20000	13500	0.1802	2432.7
5	10000	14800	4800	0.124	595.2
6	10000	13500	3500	0.0727	254.45
7	10700	12300	1600	0.024	38.4
8	12300	10700	-1600		
9	13500	10000	-3500		
10	14800	10000	-4800		
11	20000	6500	-13500		
12	25000	5630	-19370		
13	25000	5420	-19580		
14	35600	4170	-31430		

Sum of b values = 31086.3

Sample Standard Deviation = 9145.37

W Statistic = 0.888776

5% Critical value of 0.874 is less than 0.888776
Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.888776
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	4170	15830	1	0
6500	4170	2330	2	0
5630	4170	1460	3	0
12300	4170	8130	4	0
ND<25000	4170	20830	5	0
10700	4170	6530	6	0
35600	4170	31430	7	0
ND<10000	4170	5830	8	0
ND<25000	4170	20830	9	0
5420	4170	1250	10	0
ND<10000	4170	5830	11	0
14800	4170	10630	12	0
13500	4170	9330	13	0
6500	ND<20000	-13500	13	1
5630	ND<20000	-14370	13	2
12300	ND<20000	-7700	13	3
ND<25000	ND<20000	5000	14	3
10700	ND<20000	-9300	14	4
35600	ND<20000	15600	15	4
ND<10000	ND<20000	-10000	15	5
ND<25000	ND<20000	5000	16	5
5420	ND<20000	-14580	16	6
ND<10000	ND<20000	-10000	16	7
14800	ND<20000	-5200	16	8
13500	ND<20000	-6500	16	9
5630	6500	-870	16	10
12300	6500	5800	17	10
ND<25000	6500	18500	18	10
10700	6500	4200	19	10
35600	6500	29100	20	10
ND<10000	6500	3500	21	10
ND<25000	6500	18500	22	10
5420	6500	-1080	22	11
ND<10000	6500	3500	23	11
14800	6500	8300	24	11
13500	6500	7000	25	11
12300	5630	6670	26	11
ND<25000	5630	19370	27	11
10700	5630	5070	28	11
35600	5630	29970	29	11
ND<10000	5630	4370	30	11
ND<25000	5630	19370	31	11
5420	5630	-210	31	12
ND<10000	5630	4370	32	12
14800	5630	9170	33	12
13500	5630	7870	34	12
ND<25000	12300	12700	35	12
10700	12300	-1600	35	13
35600	12300	23300	36	13

ND<10000	12300	-2300	36	14
ND<25000	12300	12700	37	14
5420	12300	-6880	37	15
ND<10000	12300	-2300	37	16
14800	12300	2500	38	16
13500	12300	1200	39	16
10700	ND<25000	-14300	39	17
35600	ND<25000	10600	40	17
ND<10000	ND<25000	-15000	40	18
ND<25000	ND<25000	0	40	18
5420	ND<25000	-19580	40	19
ND<10000	ND<25000	-15000	40	20
14800	ND<25000	-10200	40	21
13500	ND<25000	-11500	40	22
35600	10700	24900	41	22
ND<10000	10700	-700	41	23
ND<25000	10700	14300	42	23
5420	10700	-5280	42	24
ND<10000	10700	-700	42	25
14800	10700	4100	43	25
13500	10700	2800	44	25
ND<10000	35600	-25600	44	26
ND<25000	35600	-10600	44	27
5420	35600	-30180	44	28
ND<10000	35600	-25600	44	29
14800	35600	-20800	44	30
13500	35600	-22100	44	31
ND<25000	ND<10000	15000	45	31
5420	ND<10000	-4580	45	32
ND<10000	ND<10000	0	45	32
14800	ND<10000	4800	46	32
13500	ND<10000	3500	47	32
5420	ND<25000	-19580	47	33
ND<10000	ND<25000	-15000	47	34
14800	ND<25000	-10200	47	35
13500	ND<25000	-11500	47	36
ND<10000	5420	4580	48	36
14800	5420	9380	49	36
13500	5420	8080	50	36
14800	ND<10000	4800	51	36
13500	ND<10000	3500	52	36
13500	14800	-1300	52	37

S Statistic = 52 - 37 = 15

Tied Group	Value	Members
1	25000	2
2	10000	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/8/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

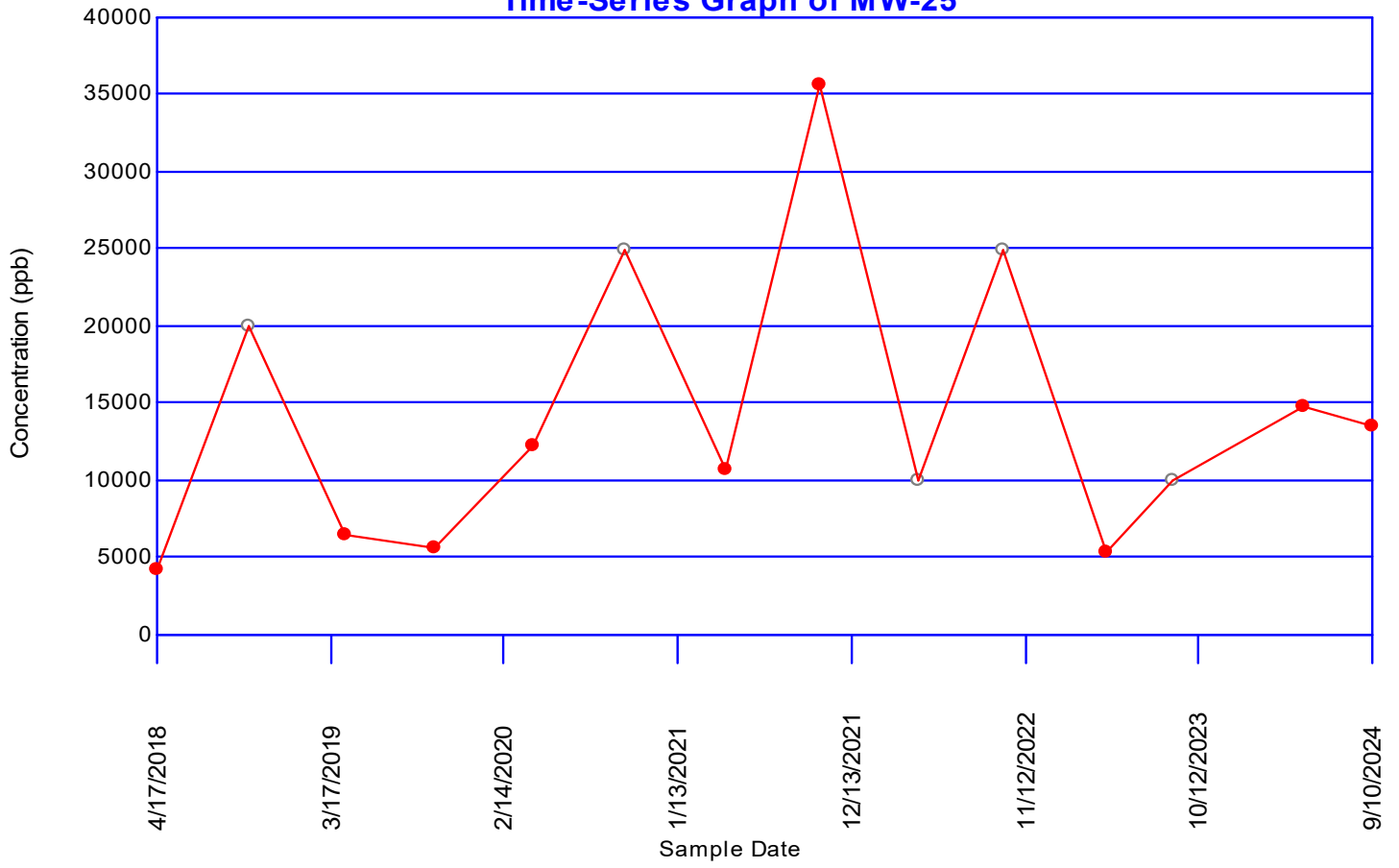
Group Variance = 331.667

Z-Score = 0.768736

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|0.768736| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-25



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.628548	0.146716	0.546	56000
2	0.383648	0.146716	0.521	None

Loc.	Date	Conc.	Outlier
MW-26	4/17/2018	5400	FALSE
	10/9/2018	ND<20000	FALSE
	4/13/2019	10800	FALSE
	10/1/2019	6680	FALSE
	4/8/2020	56000	TRUE
	10/1/2020	37200	FALSE
	4/14/2021	ND<10000	FALSE
	10/13/2021	ND<25000	FALSE
	4/19/2022	7500	FALSE
	9/29/2022	ND<25000	FALSE
	4/19/2023	3530	FALSE
	8/24/2023	ND<10000	FALSE
	4/29/2024	9670	FALSE
	9/10/2024	18400	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	3530	56000	52470	0.5251	27552
2	5400	37200	31800	0.3318	10551.2
3	6680	25000	18320	0.246	4506.72
4	7500	25000	17500	0.1802	3153.5
5	9670	20000	10330	0.124	1280.92
6	10000	18400	8400	0.0727	610.68
7	10000	10800	800	0.024	19.2
8	10800	10000	-800		
9	18400	10000	-8400		
10	20000	9670	-10330		
11	25000	7500	-17500		
12	25000	6680	-18320		
13	37200	5400	-31800		
14	56000	3530	-52470		

Sum of b values = 47674.3

Sample Standard Deviation = 14589.9

W Statistic = 0.821336

5% Critical value of 0.874 exceeds 0.821336
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.821336
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	5400	14600	1	0
10800	5400	5400	2	0
6680	5400	1280	3	0
56000	5400	50600	4	0
37200	5400	31800	5	0
ND<10000	5400	4600	6	0
ND<25000	5400	19600	7	0
7500	5400	2100	8	0
ND<25000	5400	19600	9	0
3530	5400	-1870	9	1
ND<10000	5400	4600	10	1
9670	5400	4270	11	1
18400	5400	13000	12	1
10800	ND<20000	-9200	12	2
6680	ND<20000	-13320	12	3
56000	ND<20000	36000	13	3
37200	ND<20000	17200	14	3
ND<10000	ND<20000	-10000	14	4
ND<25000	ND<20000	5000	15	4
7500	ND<20000	-12500	15	5
ND<25000	ND<20000	5000	16	5
3530	ND<20000	-16470	16	6
ND<10000	ND<20000	-10000	16	7
9670	ND<20000	-10330	16	8
18400	ND<20000	-1600	16	9
6680	10800	-4120	16	10
56000	10800	45200	17	10
37200	10800	26400	18	10
ND<10000	10800	-800	18	11
ND<25000	10800	14200	19	11
7500	10800	-3300	19	12
ND<25000	10800	14200	20	12
3530	10800	-7270	20	13
ND<10000	10800	-800	20	14
9670	10800	-1130	20	15
18400	10800	7600	21	15
56000	6680	49320	22	15
37200	6680	30520	23	15
ND<10000	6680	3320	24	15
ND<25000	6680	18320	25	15
7500	6680	820	26	15
ND<25000	6680	18320	27	15
3530	6680	-3150	27	16
ND<10000	6680	3320	28	16
9670	6680	2990	29	16
18400	6680	11720	30	16
37200	56000	-18800	30	17
ND<10000	56000	-46000	30	18
ND<25000	56000	-31000	30	19

7500	56000	-48500	30	20
ND<25000	56000	-31000	30	21
3530	56000	-52470	30	22
ND<10000	56000	-46000	30	23
9670	56000	-46330	30	24
18400	56000	-37600	30	25
ND<10000	37200	-27200	30	26
ND<25000	37200	-12200	30	27
7500	37200	-29700	30	28
ND<25000	37200	-12200	30	29
3530	37200	-33670	30	30
ND<10000	37200	-27200	30	31
9670	37200	-27530	30	32
18400	37200	-18800	30	33
ND<25000	ND<10000	15000	31	33
7500	ND<10000	-2500	31	34
ND<25000	ND<10000	15000	32	34
3530	ND<10000	-6470	32	35
ND<10000	ND<10000	0	32	35
9670	ND<10000	-330	32	36
18400	ND<10000	8400	33	36
7500	ND<25000	-17500	33	37
ND<25000	ND<25000	0	33	37
3530	ND<25000	-21470	33	38
ND<10000	ND<25000	-15000	33	39
9670	ND<25000	-15330	33	40
18400	ND<25000	-6600	33	41
ND<25000	7500	17500	34	41
3530	7500	-3970	34	42
ND<10000	7500	2500	35	42
9670	7500	2170	36	42
18400	7500	10900	37	42
3530	ND<25000	-21470	37	43
ND<10000	ND<25000	-15000	37	44
9670	ND<25000	-15330	37	45
18400	ND<25000	-6600	37	46
ND<10000	3530	6470	38	46
9670	3530	6140	39	46
18400	3530	14870	40	46
9670	ND<10000	-330	40	47
18400	ND<10000	8400	41	47
18400	9670	8730	42	47

S Statistic = 42 - 47 = -5

Tied Group	Value	Members
1	10000	2
2	25000	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/8/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

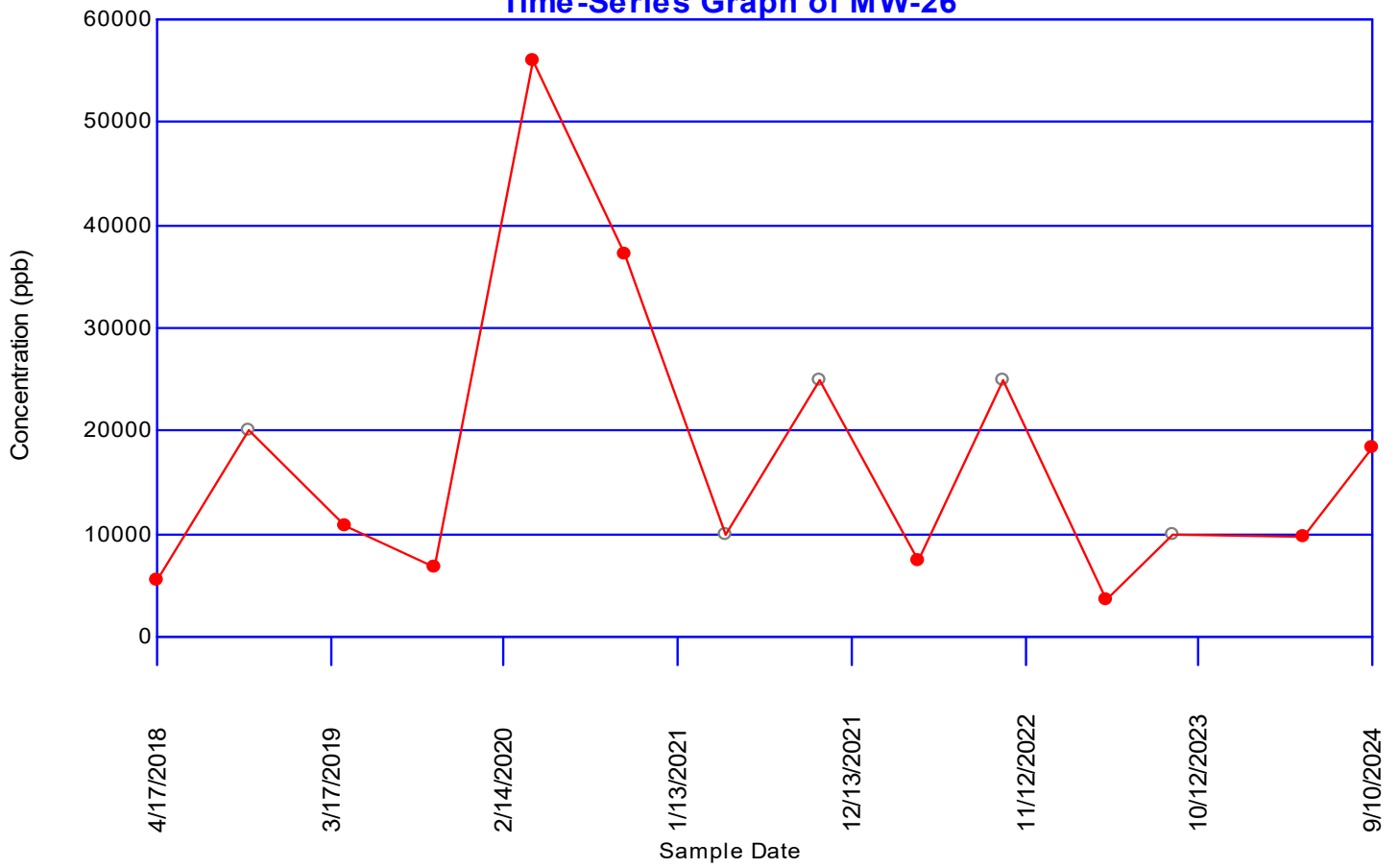
Group Variance = 331.667

Z-Score = -0.219639

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.219639| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.497175	0.146692	0.546	None

Loc.	Date	Conc.	Outlier
MW-27	4/18/2018	ND<20000	FALSE
	10/9/2018	ND<20000	FALSE
	4/13/2019	4140	FALSE
	10/1/2019	ND<10000	FALSE
	4/9/2020	7200	FALSE
	10/1/2020	30500	FALSE
	4/14/2021	ND<10000	FALSE
	10/13/2021	ND<25000	FALSE
	4/20/2022	ND<10000	FALSE
	9/28/2022	42600	FALSE
	4/19/2023	ND<10000	FALSE
	8/24/2023	ND<10000	FALSE
	5/1/2024	7360	FALSE
	9/11/2024	7110	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	4140	42600	38460	0.5251	20195.3
2	7110	30500	23390	0.3318	7760.8
3	7200	25000	17800	0.246	4378.8
4	7360	20000	12640	0.1802	2277.73
5	10000	20000	10000	0.124	1240
6	10000	10000	0	0.0727	0
7	10000	10000	0	0.024	0
8	10000	10000	0		
9	10000	10000	0		
10	20000	10000	-10000		
11	20000	7360	-12640		
12	25000	7200	-17800		
13	30500	7110	-23390		
14	42600	4140	-38460		

Sum of b values = 35852.7

Sample Standard Deviation = 11008.1

W Statistic = 0.815971

5% Critical value of 0.874 exceeds 0.815971
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.815971
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<20000	ND<20000	0	0	0
4140	ND<20000	-15860	0	1
ND<10000	ND<20000	-10000	0	2
7200	ND<20000	-12800	0	3
30500	ND<20000	10500	1	3
ND<10000	ND<20000	-10000	1	4
ND<25000	ND<20000	5000	2	4
ND<10000	ND<20000	-10000	2	5
42600	ND<20000	22600	3	5
ND<10000	ND<20000	-10000	3	6
ND<10000	ND<20000	-10000	3	7
7360	ND<20000	-12640	3	8
7110	ND<20000	-12890	3	9
4140	ND<20000	-15860	3	10
ND<10000	ND<20000	-10000	3	11
7200	ND<20000	-12800	3	12
30500	ND<20000	10500	4	12
ND<10000	ND<20000	-10000	4	13
ND<25000	ND<20000	5000	5	13
ND<10000	ND<20000	-10000	5	14
42600	ND<20000	22600	6	14
ND<10000	ND<20000	-10000	6	15
ND<10000	ND<20000	-10000	6	16
7360	ND<20000	-12640	6	17
7110	ND<20000	-12890	6	18
ND<10000	4140	5860	7	18
7200	4140	3060	8	18
30500	4140	26360	9	18
ND<10000	4140	5860	10	18
ND<25000	4140	20860	11	18
ND<10000	4140	5860	12	18
42600	4140	38460	13	18
ND<10000	4140	5860	14	18
ND<10000	4140	5860	15	18
7360	4140	3220	16	18
7110	4140	2970	17	18
7200	ND<10000	-2800	17	19
30500	ND<10000	20500	18	19
ND<10000	ND<10000	0	18	19
ND<25000	ND<10000	15000	19	19
ND<10000	ND<10000	0	19	19
42600	ND<10000	32600	20	19
ND<10000	ND<10000	0	20	19
ND<10000	ND<10000	0	20	19
7360	ND<10000	-2640	20	20
7110	ND<10000	-2890	20	21
30500	7200	23300	21	21
ND<10000	7200	2800	22	21
ND<25000	7200	17800	23	21

ND<10000	7200	2800	24	21
42600	7200	35400	25	21
ND<10000	7200	2800	26	21
ND<10000	7200	2800	27	21
7360	7200	160	28	21
7110	7200	-90	28	22
ND<10000	30500	-20500	28	23
ND<25000	30500	-5500	28	24
ND<10000	30500	-20500	28	25
42600	30500	12100	29	25
ND<10000	30500	-20500	29	26
ND<10000	30500	-20500	29	27
7360	30500	-23140	29	28
7110	30500	-23390	29	29
ND<25000	ND<10000	15000	30	29
ND<10000	ND<10000	0	30	29
42600	ND<10000	32600	31	29
ND<10000	ND<10000	0	31	29
ND<10000	ND<10000	0	31	29
7360	ND<10000	-2640	31	30
7110	ND<10000	-2890	31	31
ND<10000	ND<25000	-15000	31	32
42600	ND<25000	17600	32	32
ND<10000	ND<25000	-15000	32	33
ND<10000	ND<25000	-15000	32	34
7360	ND<25000	-17640	32	35
7110	ND<25000	-17890	32	36
42600	ND<10000	32600	33	36
ND<10000	ND<10000	0	33	36
ND<10000	ND<10000	0	33	36
7360	ND<10000	-2640	33	37
7110	ND<10000	-2890	33	38
ND<10000	42600	-32600	33	39
ND<10000	42600	-32600	33	40
7360	42600	-35240	33	41
7110	42600	-35490	33	42
ND<10000	ND<10000	0	33	42
7360	ND<10000	-2640	33	43
7110	ND<10000	-2890	33	44
7360	ND<10000	-2640	33	45
7110	ND<10000	-2890	33	46
7110	7360	-250	33	47

S Statistic = 33 - 47 = -14

Tied Group	Value	Members
1	20000	2
2	10000	5

Time Period	Observations
4/18/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/9/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/20/2022	1
9/28/2022	1
4/19/2023	1
8/24/2023	1
5/1/2024	1
9/11/2024	1

There are 0 time periods with multiple data

A = 318

B = 0

C = 60

D = 0

E = 22

F = 0

a = 6006

b = 19656

c = 364

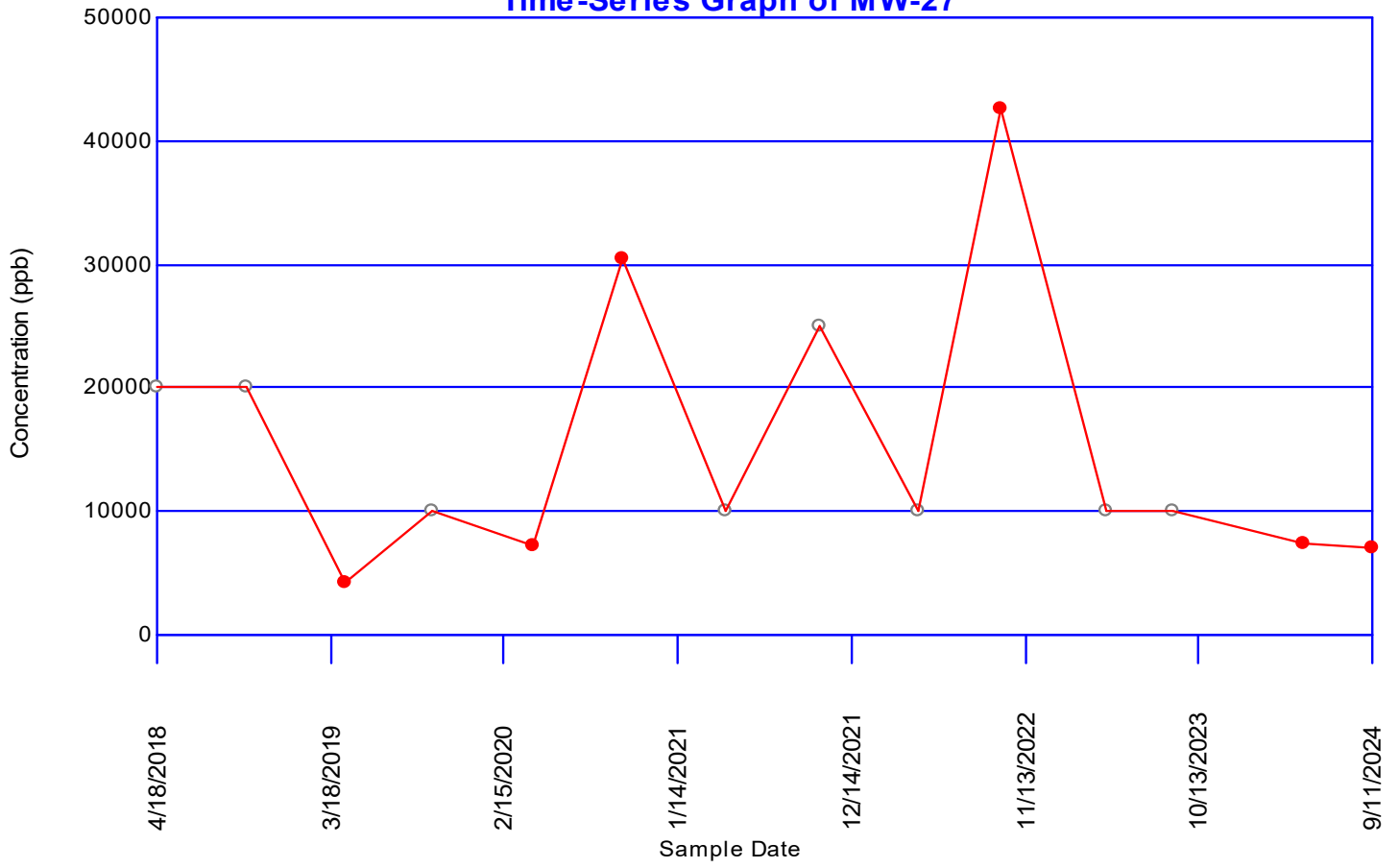
Group Variance = 316

Z-Score = -0.731307

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.731307| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of MW-27



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.471773	0.111062	0.546	None

Loc.	Date	Conc.	Outlier
SW-01	4/16/2018	11500	FALSE
	10/8/2018	15100	FALSE
	4/13/2019	4450	FALSE
	9/30/2019	20300	FALSE
	4/7/2020	20100	FALSE
	10/2/2020	35600	FALSE
	4/13/2021	14300	FALSE
	10/14/2021	42800	FALSE
	4/19/2022	11000	FALSE
	9/27/2022	ND<25000	FALSE
	4/18/2023	2580	FALSE
	8/22/2023	5070	FALSE
	4/30/2024	ND<10000	FALSE
	9/10/2024	19600	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: SW-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2580	42800	40220	0.5251	21119.5
2	4450	35600	31150	0.3318	10335.6
3	5070	25000	19930	0.246	4902.78
4	10000	20300	10300	0.1802	1856.06
5	11000	20100	9100	0.124	1128.4
6	11500	19600	8100	0.0727	588.87
7	14300	15100	800	0.024	19.2
8	15100	14300	-800		
9	19600	11500	-8100		
10	20100	11000	-9100		
11	20300	10000	-10300		
12	25000	5070	-19930		
13	35600	4450	-31150		
14	42800	2580	-40220		

Sum of b values = 39950.4

Sample Standard Deviation = 11558.4

W Statistic = 0.918979

5% Critical value of 0.874 is less than 0.918979

Data is normally distributed at 95% level of significance

1% Critical value of 0.825 is less than 0.918979

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
15100	11500	3600	1	0
4450	11500	-7050	1	1
20300	11500	8800	2	1
20100	11500	8600	3	1
35600	11500	24100	4	1
14300	11500	2800	5	1
42800	11500	31300	6	1
11000	11500	-500	6	2
ND<25000	11500	13500	7	2
2580	11500	-8920	7	3
5070	11500	-6430	7	4
ND<10000	11500	-1500	7	5
19600	11500	8100	8	5
4450	15100	-10650	8	6
20300	15100	5200	9	6
20100	15100	5000	10	6
35600	15100	20500	11	6
14300	15100	-800	11	7
42800	15100	27700	12	7
11000	15100	-4100	12	8
ND<25000	15100	9900	13	8
2580	15100	-12520	13	9
5070	15100	-10030	13	10
ND<10000	15100	-5100	13	11
19600	15100	4500	14	11
20300	4450	15850	15	11
20100	4450	15650	16	11
35600	4450	31150	17	11
14300	4450	9850	18	11
42800	4450	38350	19	11
11000	4450	6550	20	11
ND<25000	4450	20550	21	11
2580	4450	-1870	21	12
5070	4450	620	22	12
ND<10000	4450	5550	23	12
19600	4450	15150	24	12
20100	20300	-200	24	13
35600	20300	15300	25	13
14300	20300	-6000	25	14
42800	20300	22500	26	14
11000	20300	-9300	26	15
ND<25000	20300	4700	27	15
2580	20300	-17720	27	16
5070	20300	-15230	27	17
ND<10000	20300	-10300	27	18
19600	20300	-700	27	19
35600	20100	15500	28	19
14300	20100	-5800	28	20
42800	20100	22700	29	20

11000	20100	-9100	29	21
ND<25000	20100	4900	30	21
2580	20100	-17520	30	22
5070	20100	-15030	30	23
ND<10000	20100	-10100	30	24
19600	20100	-500	30	25
14300	35600	-21300	30	26
42800	35600	7200	31	26
11000	35600	-24600	31	27
ND<25000	35600	-10600	31	28
2580	35600	-33020	31	29
5070	35600	-30530	31	30
ND<10000	35600	-25600	31	31
19600	35600	-16000	31	32
42800	14300	28500	32	32
11000	14300	-3300	32	33
ND<25000	14300	10700	33	33
2580	14300	-11720	33	34
5070	14300	-9230	33	35
ND<10000	14300	-4300	33	36
19600	14300	5300	34	36
11000	42800	-31800	34	37
ND<25000	42800	-17800	34	38
2580	42800	-40220	34	39
5070	42800	-37730	34	40
ND<10000	42800	-32800	34	41
19600	42800	-23200	34	42
ND<25000	11000	14000	35	42
2580	11000	-8420	35	43
5070	11000	-5930	35	44
ND<10000	11000	-1000	35	45
19600	11000	8600	36	45
2580	ND<25000	-22420	36	46
5070	ND<25000	-19930	36	47
ND<10000	ND<25000	-15000	36	48
19600	ND<25000	-5400	36	49
5070	2580	2490	37	49
ND<10000	2580	7420	38	49
19600	2580	17020	39	49
ND<10000	5070	4930	40	49
19600	5070	14530	41	49
19600	ND<10000	9600	42	49

S Statistic = 42 - 49 = -7

Tied Group	Value	Members
Time Period		Observations
4/16/2018		1
10/8/2018		1
4/13/2019		1
9/30/2019		1
4/7/2020		1
10/2/2020		1

4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

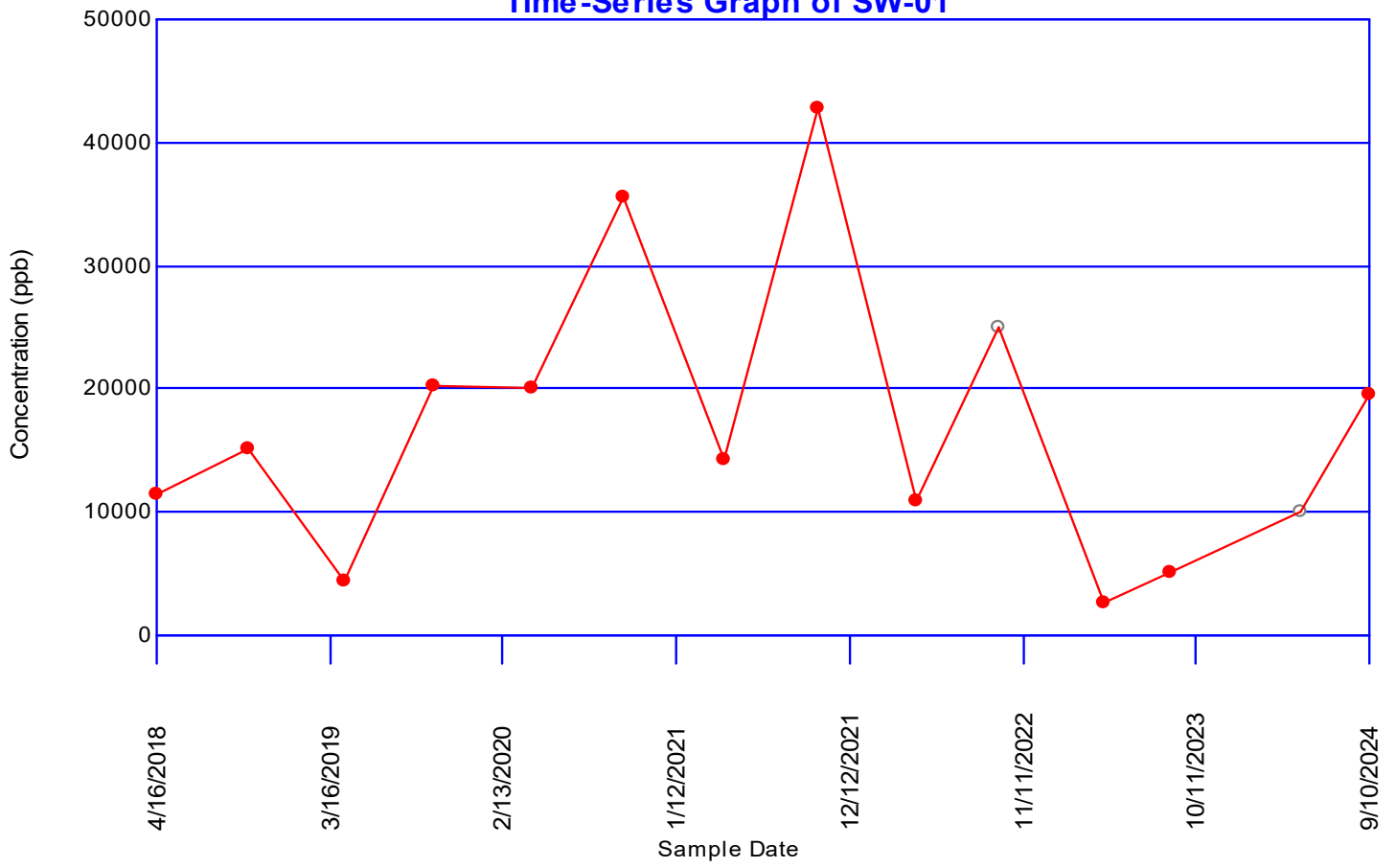
Group Variance = 333.667

Z-Score = -0.328469

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.328469| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of SW-01



Dixon's Test for Outliers

Parameter: Chemical Oxygen Demand (COD)

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.289544	0.111037	0.546	None

Loc.	Date	Conc.	Outlier
SW-02	4/16/2018	14400	FALSE
	10/8/2018	14100	FALSE
	4/13/2019	16200	FALSE
	9/30/2019	11800	FALSE
	4/7/2020	36500	FALSE
	10/2/2020	47300	FALSE
	4/13/2021	10200	FALSE
	10/14/2021	41000	FALSE
	4/19/2022	18000	FALSE
	9/27/2022	ND<25000	FALSE
	4/18/2023	6690	FALSE
	8/22/2023	ND<10000	FALSE
	4/30/2024	6730	FALSE
	9/10/2024	18700	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chemical Oxygen Demand (COD)

Location: SW-02

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	6690	47300	40610	0.5251	21324.3
2	6730	41000	34270	0.3318	11370.8
3	10000	36500	26500	0.246	6519
4	10200	25000	14800	0.1802	2666.96
5	11800	18700	6900	0.124	855.6
6	14100	18000	3900	0.0727	283.53
7	14400	16200	1800	0.024	43.2
8	16200	14400	-1800		
9	18000	14100	-3900		
10	18700	11800	-6900		
11	25000	10200	-14800		
12	36500	10000	-26500		
13	41000	6730	-34270		
14	47300	6690	-40610		

Sum of b values = 43063.4

Sample Standard Deviation = 12966.1

W Statistic = 0.848506

5% Critical value of 0.874 exceeds 0.848506
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 is less than 0.848506
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Chemical Oxygen Demand (COD)

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
14100	14400	-300	0	1
16200	14400	1800	1	1
11800	14400	-2600	1	2
36500	14400	22100	2	2
47300	14400	32900	3	2
10200	14400	-4200	3	3
41000	14400	26600	4	3
18000	14400	3600	5	3
ND<25000	14400	10600	6	3
6690	14400	-7710	6	4
ND<10000	14400	-4400	6	5
6730	14400	-7670	6	6
18700	14400	4300	7	6
16200	14100	2100	8	6
11800	14100	-2300	8	7
36500	14100	22400	9	7
47300	14100	33200	10	7
10200	14100	-3900	10	8
41000	14100	26900	11	8
18000	14100	3900	12	8
ND<25000	14100	10900	13	8
6690	14100	-7410	13	9
ND<10000	14100	-4100	13	10
6730	14100	-7370	13	11
18700	14100	4600	14	11
11800	16200	-4400	14	12
36500	16200	20300	15	12
47300	16200	31100	16	12
10200	16200	-6000	16	13
41000	16200	24800	17	13
18000	16200	1800	18	13
ND<25000	16200	8800	19	13
6690	16200	-9510	19	14
ND<10000	16200	-6200	19	15
6730	16200	-9470	19	16
18700	16200	2500	20	16
36500	11800	24700	21	16
47300	11800	35500	22	16
10200	11800	-1600	22	17
41000	11800	29200	23	17
18000	11800	6200	24	17
ND<25000	11800	13200	25	17
6690	11800	-5110	25	18
ND<10000	11800	-1800	25	19
6730	11800	-5070	25	20
18700	11800	6900	26	20
47300	36500	10800	27	20
10200	36500	-26300	27	21
41000	36500	4500	28	21

18000	36500	-18500	28	22
ND<25000	36500	-11500	28	23
6690	36500	-29810	28	24
ND<10000	36500	-26500	28	25
6730	36500	-29770	28	26
18700	36500	-17800	28	27
10200	47300	-37100	28	28
41000	47300	-6300	28	29
18000	47300	-29300	28	30
ND<25000	47300	-22300	28	31
6690	47300	-40610	28	32
ND<10000	47300	-37300	28	33
6730	47300	-40570	28	34
18700	47300	-28600	28	35
41000	10200	30800	29	35
18000	10200	7800	30	35
ND<25000	10200	14800	31	35
6690	10200	-3510	31	36
ND<10000	10200	-200	31	37
6730	10200	-3470	31	38
18700	10200	8500	32	38
18000	41000	-23000	32	39
ND<25000	41000	-16000	32	40
6690	41000	-34310	32	41
ND<10000	41000	-31000	32	42
6730	41000	-34270	32	43
18700	41000	-22300	32	44
ND<25000	18000	7000	33	44
6690	18000	-11310	33	45
ND<10000	18000	-8000	33	46
6730	18000	-11270	33	47
18700	18000	700	34	47
6690	ND<25000	-18310	34	48
ND<10000	ND<25000	-15000	34	49
6730	ND<25000	-18270	34	50
18700	ND<25000	-6300	34	51
ND<10000	6690	3310	35	51
6730	6690	40	36	51
18700	6690	12010	37	51
6730	ND<10000	-3270	37	52
18700	ND<10000	8700	38	52
18700	6730	11970	39	52

S Statistic = 39 - 52 = -13

Tied Group	Value	Members
Time Period		Observations
4/16/2018		1
10/8/2018		1
4/13/2019		1
9/30/2019		1
4/7/2020		1
10/2/2020		1

4/13/2021	1
10/14/2021	1
4/19/2022	1
9/27/2022	1
4/18/2023	1
8/22/2023	1
4/30/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 6006

b = 19656

c = 364

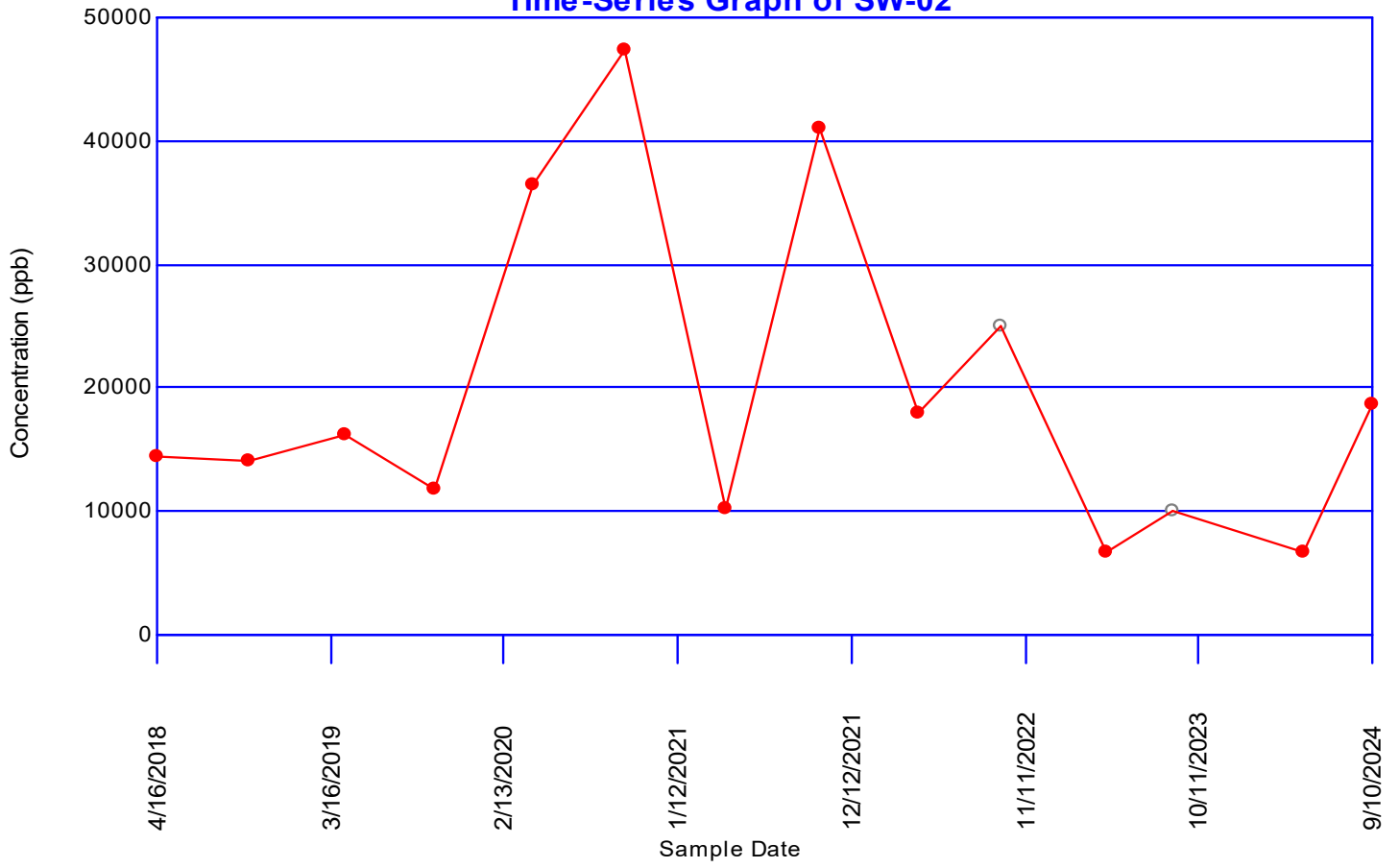
Group Variance = 333.667

Z-Score = -0.656939

Comparison Level at 1.0 - $(0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

$|-0.656939| \leq 1.97737$ indicating no evidence of a trend

Chemical Oxygen Demand (COD) Time-Series Graph of SW-02



Concentrations (ppb)

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 168

Total Non-Detect: 0

Percent Non-Detects: 0%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 14 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	14	0 (0%)	4/18/2018	409	409
			10/10/2018	443	443
			4/13/2019	435	435
			10/1/2019	508	508
			4/9/2020	462	462
			10/1/2020	502	502
			4/14/2021	463	463
			10/13/2021	517	517
			4/20/2022	456	456
			9/28/2022	461	461
			4/19/2023	446	446
			8/24/2023	471	471
			5/1/2024	383	383
			9/11/2024	464	464
			11/12/2012	400	400
			5/13/2013	600	600
			11/13/2013	400	400
			6/14/2014	400	400
			10/14/2014	522	522
			4/21/2015	403	403
			10/7/2015	514	514
			4/20/2016	466	466
			10/12/2016	461	461
4/19/2017	421	421			
10/12/2017	506	506			

MW-06	14	0 (0%)	4/18/2018	327	327
			10/10/2018	312	312
			4/14/2019	343	343
			10/2/2019	354	354
			4/8/2020	267	267
			9/30/2020	351	351
			4/13/2021	346	346
			10/14/2021	422	422
			4/20/2022	379	379
			9/27/2022	349	349
			4/18/2023	344	344
			8/23/2023	318	318
			5/1/2024	258	258
			9/12/2024	336	336
			11/12/2012	500	500
			5/13/2013	600	600
			11/13/2013	400	400
			6/14/2014	300	300
			10/14/2014	390	390
			4/21/2015	334	334
			10/7/2015	476	476

			4/19/2016	419	419
			10/12/2016	395	395
			4/19/2017	276	276
			10/12/2017	299	299
MW-07	14	0 (0%)	4/18/2018	312	312
			10/10/2018	302	302
			4/14/2019	300	300
			10/2/2019	345	345
			4/8/2020	322	322
			9/30/2020	338	338
			4/13/2021	347	347
			10/14/2021	329	329
			4/20/2022	324	324
			9/27/2022	288	288
			4/18/2023	309	309
			8/23/2023	331	331
			5/1/2024	275	275
			9/11/2024	331	331
			11/12/2012	500	500
			5/13/2013	400	400
			11/13/2013	300	300
			6/14/2014	200	200
			10/14/2014	335	335
			4/21/2015	221	221
			10/7/2015	411	411
			4/19/2017	173	173
			10/12/2017	2110	2110
MW-12	14	0 (0%)	4/17/2018	263	263
			10/9/2018	341	341
			4/14/2019	282	282
			10/2/2019	350	350
			4/8/2020	293	293
			10/1/2020	331	331
			4/15/2021	315	315
			10/14/2021	392	392
			4/19/2022	325	325
			9/28/2022	353	353
			4/18/2023	324	324
			8/24/2023	358	358
			5/1/2024	297	297
			9/12/2024	370	370
			11/12/2012	300	300
			5/13/2013	500	500
			11/13/2013	200	200
			6/14/2014	300	300
			10/14/2014	746	746
			4/22/2015	264	264
			10/8/2015	348	348
			4/20/2016	394	394
			10/11/2016	323	323
			4/18/2017	279	279
			10/10/2017	400	400
MW-16	14	0 (0%)	4/17/2018	400	400
			10/9/2018	412	412
			4/14/2019	437	437
			10/2/2019	461	461
			4/9/2020	432	432
			10/1/2020	470	470
			4/15/2021	469	469
			10/14/2021	493	493

			4/19/2022	481	481
			9/28/2022	436	436
			4/18/2023	463	463
			8/24/2023	464	464
			5/2/2024	394	394
			9/12/2024	461	461
			11/12/2012	400	400
			5/13/2013	600	600
			11/13/2013	300	300
			6/14/2014	300	300
			10/14/2014	492	492
			4/22/2015	529	529
			10/8/2015	428	428
			4/18/2017	399	399
			10/10/2017	550	550
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MW-20	14	0 (0%)	4/17/2018	450	450
			10/10/2018	455	455
			4/14/2019	479	479
			10/2/2019	532	532
			4/9/2020	526	526
			10/2/2020	524	524
			4/15/2021	514	514
			10/12/2021	565	565
			4/20/2022	523	523
			9/28/2022	490	490
			4/19/2023	499	499
			8/23/2023	503	503
			4/30/2024	443	443
			9/11/2024	503	503
			11/12/2012	400	400
			5/13/2013	700	700
			11/13/2013	400	400
			6/14/2014	400	400
			10/14/2014	544	544
			4/22/2015	609	609
			10/8/2015	484	484
			4/21/2016	631	631
			10/12/2016	520	520
			4/18/2017	497	497
			10/12/2017	537	537
<hr/>					
MW-21	14	0 (0%)	4/17/2018	360	360
			10/10/2018	340	340
			4/13/2019	355	355
			10/1/2019	393	393
			4/7/2020	372	372
			9/30/2020	393	393
			4/14/2021	372	372
			10/12/2021	387	387
			4/20/2022	392	392
			9/29/2022	335	335
			4/18/2023	427	427
			8/23/2023	297	297
			5/1/2024	313	313
			9/11/2024	351	351
			11/12/2012	400	400
			5/13/2013	600	600
			11/13/2013	400	400
			6/14/2014	300	300
			10/14/2014	479	479
			4/21/2015	707	707
			10/6/2015	838	838

			4/18/2017	296	296
			10/12/2017	524	524
MW-25	14	0 (0%)	4/17/2018	2530	2530
			10/9/2018	1770	1770
			4/13/2019	2530	2530
			10/1/2019	2010	2010
			4/8/2020	2010	2010
			10/1/2020	2090	2090
			4/14/2021	3800	3800
			10/13/2021	2400	2400
			4/19/2022	1560	1560
			9/29/2022	2160	2160
			4/19/2023	2380	2380
			8/24/2023	1830	1830
			4/29/2024	4540	4540
			9/10/2024	1950	1950
			11/12/2012	1100	1100
			5/13/2013	2800	2800
			11/13/2013	1400	1400
			6/14/2014	3100	3100
			10/14/2014	1700	1700
			4/21/2015	868	868
			10/6/2015	2130	2130
			4/21/2016	1840	1840
			10/11/2016	1420	1420
			4/18/2017	1680	1680
			10/10/2017	2160	2160
MW-26	14	0 (0%)	4/17/2018	201	201
			10/9/2018	189	189
			4/13/2019	370	370
			10/1/2019	213	213
			4/8/2020	255	255
			10/1/2020	234	234
			4/14/2021	248	248
			10/13/2021	230	230
			4/19/2022	245	245
			9/29/2022	187	187
			4/19/2023	228	228
			8/24/2023	200	200
			4/29/2024	158	158
			9/10/2024	209	209
			11/12/2012	200	200
			5/13/2013	1100	1100
			11/13/2013	200	200
			6/14/2014	600	600
			10/14/2014	713	713
			4/21/2015	124	124
			10/6/2015	732	732
			4/18/2017	155	155
			10/10/2017	2890	2890
MW-27	14	0 (0%)	4/18/2018	290	290
			10/9/2018	283	283
			4/13/2019	333	333
			10/1/2019	340	340
			4/9/2020	354	354
			10/1/2020	358	358
			4/14/2021	391	391
			10/13/2021	312	312
			4/20/2022	335	335
			9/28/2022	288	288

			4/19/2023	356	356
			8/24/2023	303	303
			5/1/2024	259	259
			9/11/2024	322	322
			11/12/2012	300	300
			5/13/2013	600	600
			11/13/2013	200	200
			6/14/2014	200	200
			10/14/2014	347	347
			4/21/2015	275	275
			10/7/2015	332	332
			4/19/2017	191	191
			10/12/2017	489	489
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SW-01	14	0 (0%)	4/16/2018	636	636
			10/8/2018	374	374
			4/13/2019	988	988
			9/30/2019	569	569
			4/7/2020	944	944
			10/2/2020	1140	1140
			4/13/2021	742	742
			10/14/2021	842	842
			4/19/2022	566	566
			9/27/2022	901	901
			4/18/2023	820	820
			8/22/2023	887	887
			4/30/2024	570	570
			9/10/2024	823	823
			11/12/2012	800	800
			5/13/2013	800	800
			11/13/2013	700	700
			6/14/2014	700	700
			10/14/2014	771	771
			4/20/2015	987	987
			10/6/2015	1080	1080
			4/21/2016	689	689
			10/10/2016	1190	1190
			4/17/2017	749	749
			10/9/2017	864	864
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SW-02	14	0 (0%)	4/16/2018	505	505
			10/8/2018	326	326
			4/13/2019	507	507
			9/30/2019	382	382
			4/7/2020	806	806
			10/2/2020	484	484
			4/13/2021	332	332
			10/14/2021	404	404
			4/19/2022	371	371
			9/27/2022	416	416
			4/18/2023	494	494
			8/22/2023	561	561
			4/30/2024	348	348
			9/10/2024	599	599
			11/12/2012	700	700
			5/13/2013	500	500
			11/13/2013	600	600
			6/14/2014	600	600
			10/14/2014	809	809
			4/20/2015	694	694
			10/6/2015	1330	1330
			4/21/2016	491	491
			10/10/2016	404	404

			4/17/2017	450	450
			10/9/2017	887	887
SW-03	0	0	11/12/2012	800	800
			5/13/2013	600	600
			11/13/2013	700	700
			6/14/2014	700	700
			10/14/2014	846	846
			4/20/2015	820	820
			10/6/2015	1080	1080
SW-04	0	0	11/12/2012	800	800
			5/13/2013	600	600
			11/13/2013	700	700
			6/14/2014	700	700
			10/14/2014	836	836
			4/20/2015	843	843
			10/6/2015	1060	1060

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Fluoride

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 14 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.741697	0.278351	0.546	4540
2	0.625616	0.278351	0.521	3800
3	0.171053	0.278351	0.546	None

Loc.	Date	Conc.	Outlier
MW-25	4/17/2018	2530	FALSE
	10/9/2018	1770	FALSE
	4/13/2019	2530	FALSE
	10/1/2019	2010	FALSE
	4/8/2020	2010	FALSE
	10/1/2020	2090	FALSE
	4/14/2021	3800	TRUE
	10/13/2021	2400	FALSE
	4/19/2022	1560	FALSE
	9/29/2022	2160	FALSE
	4/19/2023	2380	FALSE
	8/24/2023	1830	FALSE
	4/29/2024	4540	TRUE
	9/10/2024	1950	FALSE

Shapiro-Wilks Test of Normality

Parameter: Fluoride

Location: MW-25

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 7 for 14 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	1560	4540	2980	0.5251	1564.8
2	1770	3800	2030	0.3318	673.554
3	1830	2530	700	0.246	172.2
4	1950	2530	580	0.1802	104.516
5	2010	2400	390	0.124	48.36
6	2010	2380	370	0.0727	26.899
7	2090	2160	70	0.024	1.68
8	2160	2090	-70		
9	2380	2010	-370		
10	2400	2010	-390		
11	2530	1950	-580		
12	2530	1830	-700		
13	3800	1770	-2030		
14	4540	1560	-2980		

Sum of b values = 2592.01

Sample Standard Deviation = 816.252

W Statistic = 0.775675

5% Critical value of 0.874 exceeds 0.775675
Evidence of non-normality at 95% level of significance

1% Critical value of 0.825 exceeds 0.775675
Evidence of non-normality at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Fluoride

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
1770	2530	-760	0	1
2530	2530	0	0	1
2010	2530	-520	0	2
2010	2530	-520	0	3
2090	2530	-440	0	4
3800	2530	1270	1	4
2400	2530	-130	1	5
1560	2530	-970	1	6
2160	2530	-370	1	7
2380	2530	-150	1	8
1830	2530	-700	1	9
4540	2530	2010	2	9
1950	2530	-580	2	10
2530	1770	760	3	10
2010	1770	240	4	10
2010	1770	240	5	10
2090	1770	320	6	10
3800	1770	2030	7	10
2400	1770	630	8	10
1560	1770	-210	8	11
2160	1770	390	9	11
2380	1770	610	10	11
1830	1770	60	11	11
4540	1770	2770	12	11
1950	1770	180	13	11
2010	2530	-520	13	12
2010	2530	-520	13	13
2090	2530	-440	13	14
3800	2530	1270	14	14
2400	2530	-130	14	15
1560	2530	-970	14	16
2160	2530	-370	14	17
2380	2530	-150	14	18
1830	2530	-700	14	19
4540	2530	2010	15	19
1950	2530	-580	15	20
2010	2010	0	15	20
2090	2010	80	16	20
3800	2010	1790	17	20
2400	2010	390	18	20
1560	2010	-450	18	21
2160	2010	150	19	21
2380	2010	370	20	21
1830	2010	-180	20	22
4540	2010	2530	21	22
1950	2010	-60	21	23
2090	2010	80	22	23
3800	2010	1790	23	23
2400	2010	390	24	23

1560	2010	-450	24	24
2160	2010	150	25	24
2380	2010	370	26	24
1830	2010	-180	26	25
4540	2010	2530	27	25
1950	2010	-60	27	26
3800	2090	1710	28	26
2400	2090	310	29	26
1560	2090	-530	29	27
2160	2090	70	30	27
2380	2090	290	31	27
1830	2090	-260	31	28
4540	2090	2450	32	28
1950	2090	-140	32	29
2400	3800	-1400	32	30
1560	3800	-2240	32	31
2160	3800	-1640	32	32
2380	3800	-1420	32	33
1830	3800	-1970	32	34
4540	3800	740	33	34
1950	3800	-1850	33	35
1560	2400	-840	33	36
2160	2400	-240	33	37
2380	2400	-20	33	38
1830	2400	-570	33	39
4540	2400	2140	34	39
1950	2400	-450	34	40
2160	1560	600	35	40
2380	1560	820	36	40
1830	1560	270	37	40
4540	1560	2980	38	40
1950	1560	390	39	40
2380	2160	220	40	40
1830	2160	-330	40	41
4540	2160	2380	41	41
1950	2160	-210	41	42
1830	2380	-550	41	43
4540	2380	2160	42	43
1950	2380	-430	42	44
4540	1830	2710	43	44
1950	1830	120	44	44
1950	4540	-2590	44	45

S Statistic = 44 - 45 = -1

Tied Group	Value	Members
1	2530	2
2	2010	2

Time Period	Observations
4/17/2018	1
10/9/2018	1
4/13/2019	1
10/1/2019	1

4/8/2020	1
10/1/2020	1
4/14/2021	1
10/13/2021	1
4/19/2022	1
9/29/2022	1
4/19/2023	1
8/24/2023	1
4/29/2024	1
9/10/2024	1

There are 0 time periods with multiple data

A = 36

B = 0

C = 0

D = 0

E = 4

F = 0

a = 6006

b = 19656

c = 364

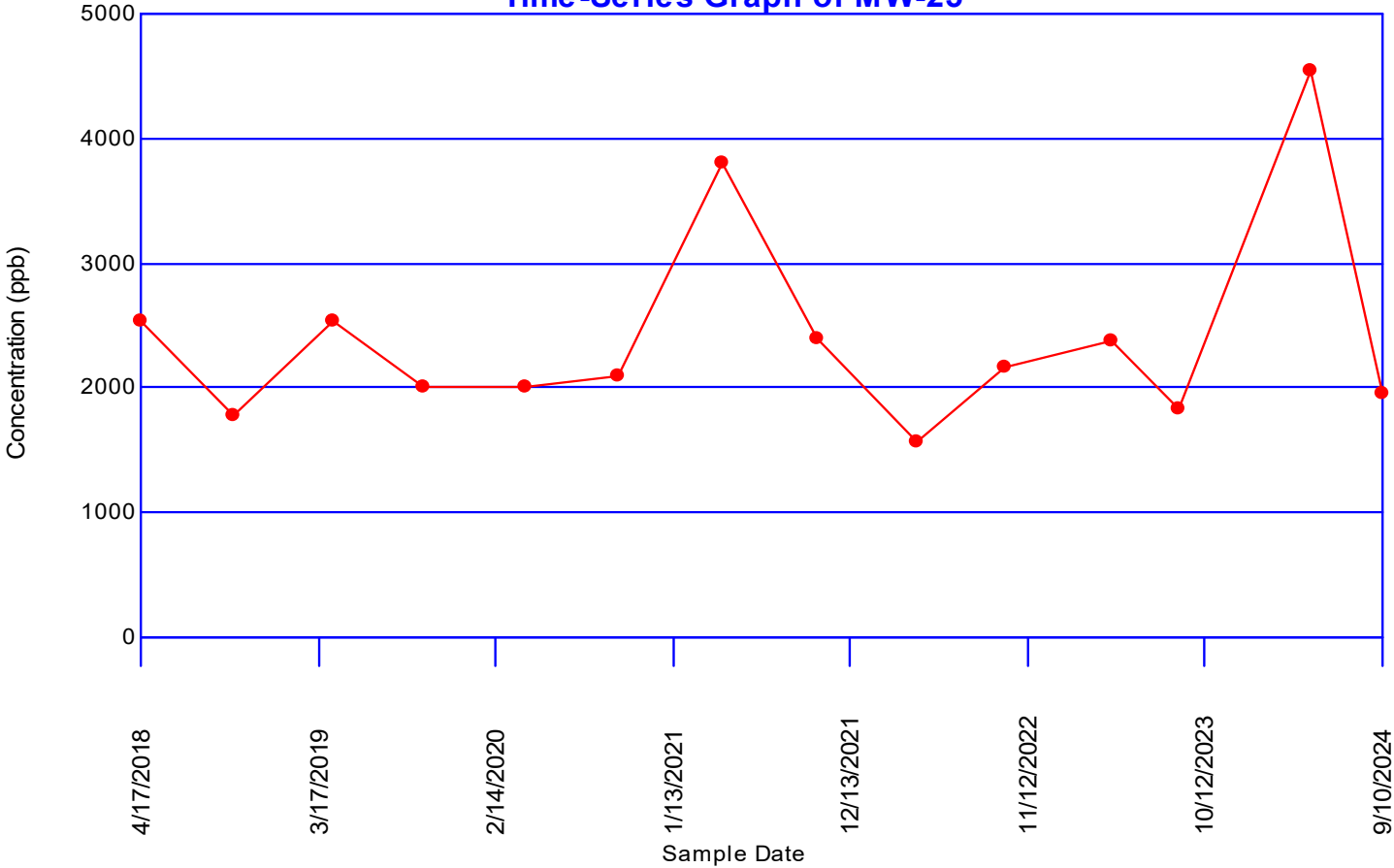
Group Variance = 331.667

Z-Score = 0

Comparison Level at $1.0 - (0.05 / 2) = 97.5\%$ confidence level = 1.97737 (two-tailed)

|0| <= 1.97737 indicating no evidence of a trend

Fluoride Time-Series Graph of MW-25



Concentrations (ppb)

Parameter: Total Organic Halogens

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 72

Total Non-Detect: 17

Percent Non-Detects: 23.6111%

Total Background Measurements: 0

There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original
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There are 14 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
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MW-05	6	1 (16.6667%)	10/10/2018	16.1	16.1
			10/1/2019	42	42
			10/1/2020	53.3	53.3
			10/13/2021	44.5	44.5
			8/24/2023	ND<40	ND<40
			9/11/2024	143	143
			10/1/1996	ND<20	ND<20
			10/1/1997	20	20
			10/1/1998	20	20
			10/1/1999	40	40
			10/1/2000	30	30
			10/1/2001	42	42
			10/1/2002	ND<10	ND<10
			10/3/2003	46	46
			10/3/2004	37	37
			10/5/2005	31	31
			10/7/2006	73	73
			10/7/2007	41	41
			10/1/2008	63	63
			10/1/2009	38	38
10/10/2010	97	97			
10/11/2011	36	36			
11/12/2012	23	23			
11/13/2013	22	22			
10/14/2014	46.3	46.3			
4/21/2015	65.7	65.7			
10/7/2015	45.7	45.7			
10/12/2016	51.4	51.4			
10/12/2017	25.8	25.8			

MW-06	6	0 (0%)	10/10/2018	36	36
			10/2/2019	52.4	52.4
			9/30/2020	52.8	52.8
			10/14/2021	33.9	33.9
			8/23/2023	64.3	64.3
			9/12/2024	100	100
			10/1/1996	ND<10	ND<10
			10/1/1997	ND<10	ND<10
			10/1/1998	40	40
			10/1/1999	70	70
			10/1/2000	20	20
			10/1/2001	59	59
			10/1/2002	50	50
			10/3/2003	67	67
			10/3/2004	73	73
			10/5/2005	176	176
			10/7/2006	105	105

10/7/2007	31	31
10/1/2008	27	27
10/1/2009	72	72
10/10/2010	81	81
10/11/2011	52	52
11/12/2012	47	47
11/13/2013	40	40
10/14/2014	53.2	53.2
4/21/2015	96.3	96.3
10/7/2015	98.9	98.9
10/12/2016	84.4	84.4
10/12/2017	33.8	33.8

MW-07	6	4 (66.6667%)	10/10/2018	ND<30	ND<30
			10/2/2019	ND<10	ND<10
			9/30/2020	77.9	77.9
			10/14/2021	ND<40	ND<40
			8/23/2023	ND<40	ND<40
			9/11/2024	60.1	60.1
			10/1/1996	ND<120	ND<120
			10/1/1997	70	70
			10/1/1998	ND<10	ND<10
			10/1/1999	ND<10	ND<10
			10/1/2000	ND<10	ND<10
			10/1/2001	11	11
			10/1/2002	ND<10	ND<10
			10/3/2003	ND<10	ND<10
			10/3/2004	ND<10	ND<10
			10/5/2005	11	11
			10/7/2006	52	52
			10/7/2007	ND<10	ND<10
			10/1/2008	ND<10	ND<10
			10/1/2009	ND<10	ND<10
			10/10/2010	25	25
			10/11/2011	10	10
			11/12/2012	ND<10	ND<10
			11/13/2013	ND<10	ND<10
			10/14/2014	ND<15	ND<15
			4/21/2015	38.3	38.3
			10/7/2015	ND<30	ND<30
			10/12/2016	ND<30	ND<30
			10/12/2017	ND<30	ND<30

MW-12	6	0 (0%)	10/9/2018	23.1	23.1
			10/2/2019	21	21
			10/1/2020	52.9	52.9
			10/14/2021	51.3	51.3
			8/24/2023	99	99
			9/12/2024	116	116
			10/1/1996	ND<40	ND<40
			10/1/1997	20	20
			10/1/1998	20	20
			10/1/1999	20	20
			10/1/2000	900	900
			10/1/2001	34	34
			10/1/2002	41	41
			10/3/2003	50	50
			10/3/2004	23	23
			10/5/2005	56	56
			10/7/2006	21	21
			10/7/2007	39	39
			10/1/2008	32	32
			10/1/2009	29	29

			10/10/2010	43	43
			10/11/2011	34	34
			11/12/2012	36	36
			11/13/2013	21	21
			10/14/2014	40.7	40.7
			4/22/2015	48.4	48.4
			10/8/2015	39.4	39.4
			10/11/2016	ND<30	ND<30
			10/10/2017	20.2	20.2
MW-16	6	3 (50%)	10/9/2018	ND<30	ND<30
			10/2/2019	ND<10	ND<10
			10/1/2020	18.5	18.5
			10/14/2021	26.9	26.9
			8/24/2023	ND<40	ND<40
			9/12/2024	60.7	60.7
			10/1/1996	ND<10	ND<10
			10/1/1997	ND<10	ND<10
			10/1/1998	ND<10	ND<10
			10/1/1999	ND<10	ND<10
			10/1/2000	ND<10	ND<10
			10/1/2001	ND<10	ND<10
			10/1/2002	15	15
			10/3/2003	13	13
			10/3/2004	ND<10	ND<10
			10/5/2005	ND<10	ND<10
			10/7/2006	25	25
			10/7/2007	ND<10	ND<10
			10/1/2008	ND<10	ND<10
			10/1/2009	ND<10	ND<10
			10/10/2010	ND<10	ND<10
			10/11/2011	ND<10	ND<10
			11/12/2012	10	10
			11/13/2013	ND<10	ND<10
			10/14/2014	ND<15	ND<15
			4/22/2015	ND<30	ND<30
			10/8/2015	ND<30	ND<30
			10/11/2016	ND<30	ND<30
			10/10/2017	ND<30	ND<30
MW-20	6	0 (0%)	10/10/2018	15.8	15.8
			10/2/2019	67.8	67.8
			10/2/2020	50.8	50.8
			10/12/2021	58.8	58.8
			8/23/2023	18.3	18.3
			9/11/2024	246	246
			10/1/1996	ND<40	ND<40
			10/1/1997	20	20
			10/1/1998	10	10
			10/1/1999	20	20
			10/1/2000	400	400
			10/1/2001	16	16
			10/1/2002	ND<10	ND<10
			10/3/2003	ND<10	ND<10
			10/3/2004	19	19
			10/5/2005	ND<10	ND<10
			10/7/2006	60	60
			10/7/2007	13	13
			10/1/2008	ND<10	ND<10
			10/1/2009	14	14
			10/10/2010	26	26
			10/11/2011	29	29
			11/12/2012	23	23

			11/13/2013	14	14
			10/14/2014	37.8	37.8
			4/22/2015	ND<30	ND<30
			10/8/2015	ND<30	ND<30
			10/12/2016	ND<30	ND<30
			10/12/2017	35.9	35.9
MW-21	6	3 (50%)	10/10/2018	ND<30	ND<30
			10/1/2019	ND<10	ND<10
			9/30/2020	21.4	21.4
			10/12/2021	34.8	34.8
			8/23/2023	ND<40	ND<40
			9/11/2024	34.6	34.6
			10/1/1996	ND<10	ND<10
			10/1/1997	ND<10	ND<10
			10/1/1998	ND<10	ND<10
			10/1/1999	ND<10	ND<10
			10/1/2000	ND<10	ND<10
			10/1/2001	12	12
			10/1/2002	62	62
			10/3/2003	ND<10	ND<10
			10/3/2004	ND<10	ND<10
			10/5/2005	15	15
			10/7/2006	17	17
			10/7/2007	ND<10	ND<10
			10/1/2008	ND<10	ND<10
			10/1/2009	14	14
			10/10/2010	ND<10	ND<10
			10/11/2011	12	12
			11/12/2012	17	17
			11/13/2013	ND<10	ND<10
			10/14/2014	ND<15	ND<15
			4/21/2015	ND<30	ND<30
			10/6/2015	ND<30	ND<30
			10/11/2016	ND<30	ND<30
			10/12/2017	ND<30	ND<30
MW-25	6	0 (0%)	10/9/2018	18.4	18.4
			10/1/2019	16.5	16.5
			10/1/2020	18	18
			10/13/2021	44.4	44.4
			8/24/2023	34.1	34.1
			9/10/2024	55.9	55.9
			10/1/1996	ND<50	ND<50
			10/1/1997	40	40
			10/1/1998	40	40
			10/1/1999	30	30
			10/1/2000	30	30
			10/1/2001	62	62
			10/1/2002	119	119
			10/3/2003	48	48
			10/3/2004	28	28
			10/5/2005	53	53
			10/7/2006	64	64
			10/7/2007	42	42
			10/1/2008	39	39
			10/1/2009	51	51
			10/10/2010	32	32
			10/11/2011	35	35
			11/12/2012	44	44
			11/13/2013	35	35
			10/14/2014	19.3	19.3
			4/21/2015	45.4	45.4

			10/6/2015	35.2	35.2
			10/11/2016	ND<30	ND<30
			10/10/2017	18.8	18.8
MW-26	6	3 (50%)	10/9/2018	ND<30	ND<30
			10/1/2019	ND<10	ND<10
			10/1/2020	72.4	72.4
			10/13/2021	38.8	38.8
			8/24/2023	ND<40	ND<40
			9/10/2024	27.2	27.2
			10/1/1996	ND<10	ND<10
			10/1/1997	ND<10	ND<10
			10/1/1998	ND<10	ND<10
			10/1/1999	ND<10	ND<10
			10/1/2000	ND<10	ND<10
			10/1/2001	20	20
			10/1/2002	14	14
			10/3/2003	11	11
			10/3/2004	73	73
			10/5/2005	110	110
			10/7/2006	78	78
			10/7/2007	ND<10	ND<10
			10/1/2008	ND<10	ND<10
			10/1/2009	15	15
			10/10/2010	17	17
			10/11/2011	ND<10	ND<10
			11/12/2012	29	29
			11/13/2013	ND<10	ND<10
			10/14/2014	ND<15	ND<15
			4/21/2015	ND<30	ND<30
			10/6/2015	ND<30	ND<30
			10/11/2016	ND<30	ND<30
			10/10/2017	ND<30	ND<30
MW-27	6	2 (33.3333%)	10/9/2018	13.9	13.9
			10/1/2019	ND<10	ND<10
			10/1/2020	17.5	17.5
			10/13/2021	ND<40	ND<40
			8/24/2023	22.2	22.2
			9/11/2024	52.5	52.5
			10/1/1996	ND<10	ND<10
			10/1/1997	ND<10	ND<10
			10/1/1998	ND<10	ND<10
			10/1/1999	ND<10	ND<10
			10/1/2000	ND<10	ND<10
			10/1/2001	ND<10	ND<10
			10/1/2002	15	15
			10/3/2003	10	10
			10/3/2004	ND<10	ND<10
			10/5/2005	ND<10	ND<10
			10/7/2006	47	47
			10/7/2007	ND<10	ND<10
			10/1/2008	ND<10	ND<10
			10/1/2009	ND<10	ND<10
			10/10/2010	ND<10	ND<10
			10/11/2011	ND<10	ND<10
			11/12/2012	ND<10	ND<10
			11/13/2013	ND<10	ND<10
			10/14/2014	ND<15	ND<15
			4/21/2015	ND<30	ND<30
			10/7/2015	ND<30	ND<30
			10/12/2016	ND<30	ND<30
			10/12/2017	ND<30	ND<30

SW-01	6	1 (16.6667%)	10/8/2018	ND<30	ND<30
			9/30/2019	12.5	12.5
			10/2/2020	38.5	38.5
			10/14/2021	16.7	16.7
			8/22/2023	20.8	20.8
			9/10/2024	65.7	65.7
			10/1/1996	ND<350	ND<350
			10/1/1997	330	330
			10/1/1998	80	80
			10/1/1999	140	140
			10/1/2000	70	70
			10/1/2001	240	240
			10/1/2002	123	123
			10/3/2003	66	66
			10/3/2004	75	75
			10/5/2005	260	260
			10/7/2006	118	118
			10/7/2007	135	135
			10/1/2008	115	115
			10/1/2009	176	176
			10/10/2010	385	385
			10/11/2011	182	182
			11/12/2012	217	217
			11/13/2013	169	169
			10/14/2014	272	272
			4/20/2015	220	220
10/6/2015	226	226			
10/10/2016	ND<30	ND<30			
10/9/2017	44.4	44.4			
SW-02	6	0 (0%)	10/8/2018	16.2	16.2
			9/30/2019	15	15
			10/2/2020	66.9	66.9
			10/14/2021	43.9	43.9
			8/22/2023	25.7	25.7
			9/10/2024	154	154
			10/1/1996	ND<90	ND<90
			10/1/1997	110	110
			10/1/1998	30	30
			10/1/1999	80	80
			10/1/2000	50	50
			10/1/2001	115	115
			10/1/2002	163	163
			10/3/2003	41	41
			10/3/2004	46	46
			10/5/2005	131	131
			10/7/2006	81	81
			10/7/2007	69	69
			10/1/2008	64	64
			10/1/2009	65	65
			10/10/2010	210	210
			10/11/2011	81	81
			11/12/2012	204	204
			11/13/2013	93	93
			10/14/2014	109	109
			4/20/2015	70.3	70.3
10/6/2015	98.6	98.6			
10/10/2016	ND<30	ND<30			
10/9/2017	53.4	53.4			
SW-03	0	0	10/1/1996	ND<110	ND<110
			10/1/1997	140	140

10/1/1998	50	50
10/1/1999	ND<100	ND<100
10/1/2000	70	70
10/1/2001	141	141
10/1/2002	148	148
10/3/2003	69	69
10/3/2004	48	48
10/5/2005	119	119
10/7/2006	87	87
10/7/2007	91	91
10/1/2008	96	96
10/1/2009	91	91
10/10/2010	290	290
10/11/2011	98	98
11/12/2012	164	164
11/13/2013	196	196
10/14/2014	122	122
4/20/2015	176	176
10/6/2015	116	116

SW-04 0 0

10/1/1996	ND<110	ND<110
10/1/1997	240	240
10/1/1998	60	60
10/1/2000	40	40
10/1/2001	177	177
10/1/2002	142	142
10/3/2003	32	32
10/3/2004	65	65
10/5/2005	230	230
10/7/2006	71	71
10/7/2007	109	109
10/1/2008	139	139
10/1/2009	143	143
10/10/2010	317	317
10/11/2011	119	119
11/12/2012	207	207
11/13/2013	203	203
10/14/2014	263	263
4/20/2015	224	224
10/6/2015	132	132

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original
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Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...
5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.706856	0.188337	0.56	143
2	0.236559	0.642473	0.642	16.1
3	0.661654	0.150376	0.765	None

Loc.	Date	Conc.	Outlier
MW-05	10/10/2018	16.1	TRUE
	10/1/2019	42	FALSE
	10/1/2020	53.3	FALSE
	10/13/2021	44.5	FALSE
	8/24/2023	ND<40	FALSE
	9/11/2024	143	TRUE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-05

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	16.1	143	126.9	0.6431	81.6094
2	40	53.3	13.3	0.2806	3.73198
3	42	44.5	2.5	0.0875	0.21875
4	44.5	42	-2.5		
5	53.3	40	-13.3		
6	143	16.1	-126.9		

Sum of b values = 85.5601

Sample Standard Deviation = 44.1614

W Statistic = 0.750736

5% Critical value of 0.788 exceeds 0.750736
Evidence of non-normality at 95% level of significance

1% Critical value of 0.713 is less than 0.750736
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-05

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
42	16.1	25.9	1	0
53.3	16.1	37.2	2	0
44.5	16.1	28.4	3	0
ND<40	16.1	23.9	4	0
143	16.1	126.9	5	0
53.3	42	11.3	6	0
44.5	42	2.5	7	0
ND<40	42	-2	7	1
143	42	101	8	1
44.5	53.3	-8.8	8	2
ND<40	53.3	-13.3	8	3
143	53.3	89.7	9	3
ND<40	44.5	-4.5	9	4
143	44.5	98.5	10	4
143	ND<40	103	11	4

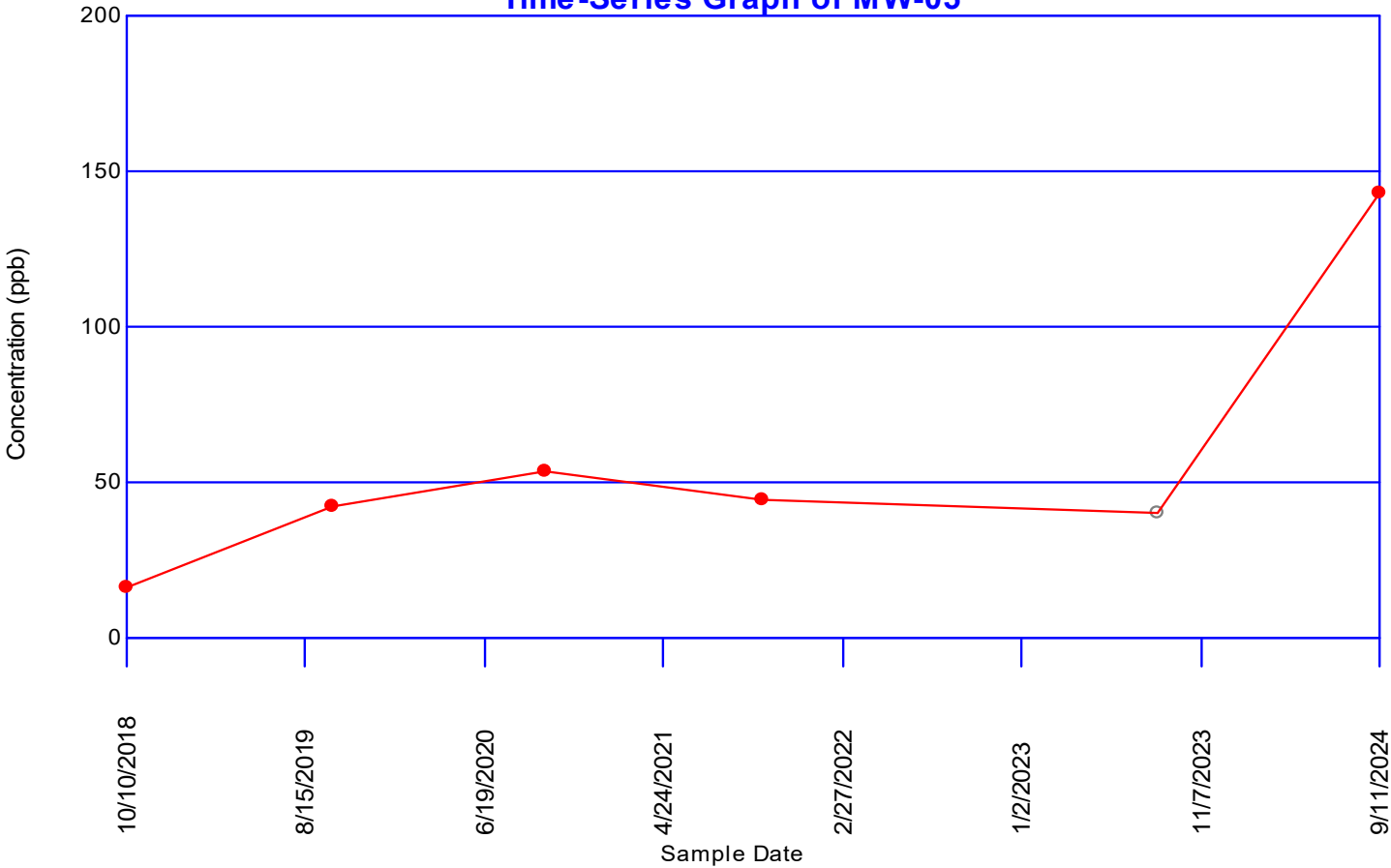
S Statistic = 11 - 4 = 7

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |7|$ is 0.272

0.272 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-05



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...
5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.540091	0.03177	0.56	None

Loc.	Date	Conc.	Outlier
MW-06	10/10/2018	36	FALSE
	10/2/2019	52.4	FALSE
	9/30/2020	52.8	FALSE
	10/14/2021	33.9	FALSE
	8/23/2023	64.3	FALSE
	9/12/2024	100	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	33.9	100	66.1	0.6431	42.5089
2	36	64.3	28.3	0.2806	7.94098
3	52.4	52.8	0.4	0.0875	0.035
4	52.8	52.4	-0.4		
5	64.3	36	-28.3		
6	100	33.9	-66.1		

Sum of b values = 50.4849

Sample Standard Deviation = 24.1436

W Statistic = 0.874476

5% Critical value of 0.788 is less than 0.874476

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.874476

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-06

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
52.4	36	16.4	1	0
52.8	36	16.8	2	0
33.9	36	-2.1	2	1
64.3	36	28.3	3	1
100	36	64	4	1
52.8	52.4	0.4	5	1
33.9	52.4	-18.5	5	2
64.3	52.4	11.9	6	2
100	52.4	47.6	7	2
33.9	52.8	-18.9	7	3
64.3	52.8	11.5	8	3
100	52.8	47.2	9	3
64.3	33.9	30.4	10	3
100	33.9	66.1	11	3
100	64.3	35.7	12	3

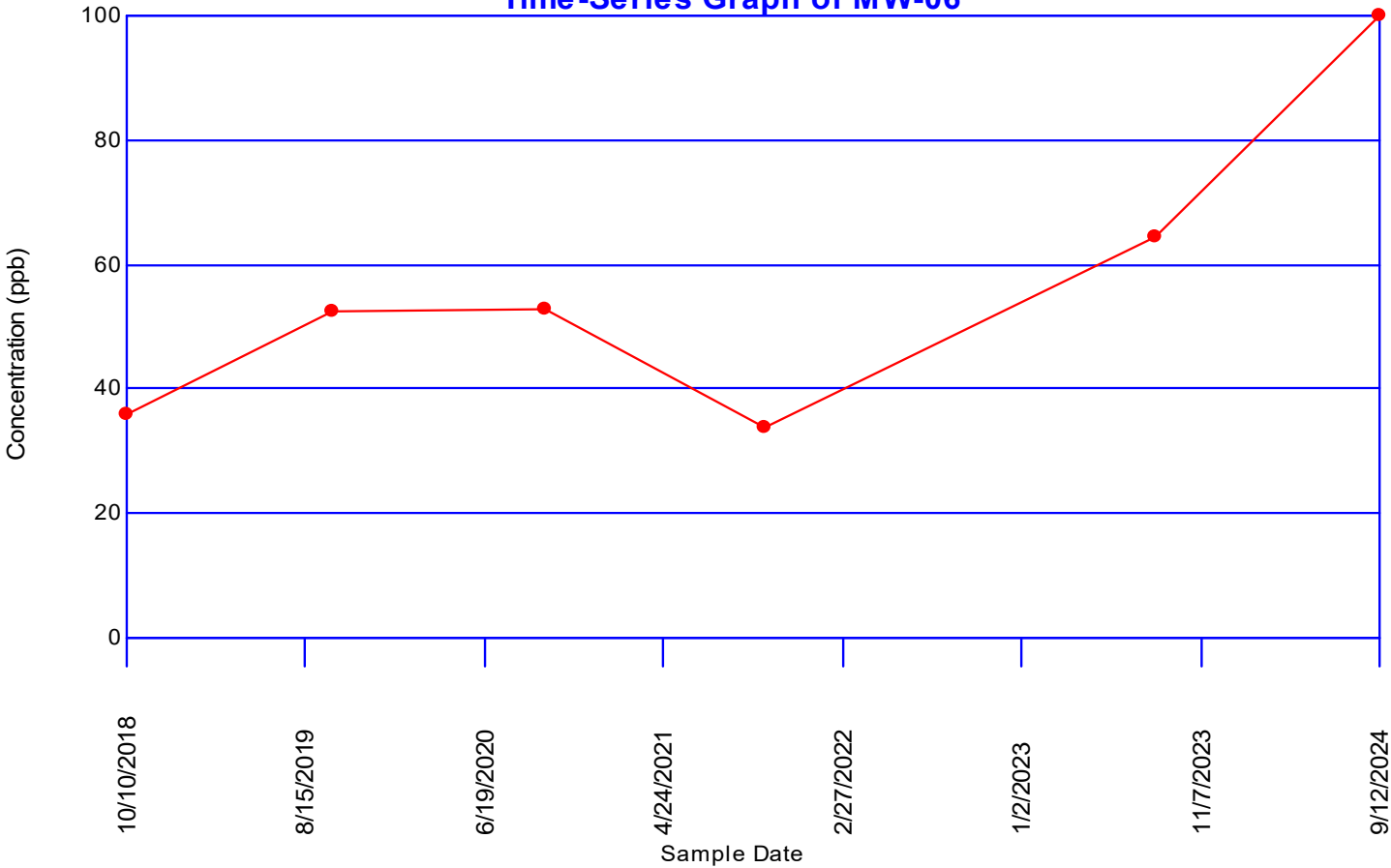
S Statistic = 12 - 3 = 9

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |9|$ is 0.136

0.136 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-06



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.26215	0.294551	0.56	None

Loc.	Date	Conc.	Outlier
MW-07	10/10/2018	ND<30	FALSE
	10/2/2019	ND<10	FALSE
	9/30/2020	77.9	FALSE
	10/14/2021	ND<40	FALSE
	8/23/2023	ND<40	FALSE
	9/11/2024	60.1	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	77.9	67.9	0.6431	43.6665
2	30	60.1	30.1	0.2806	8.44606
3	40	40	0	0.0875	0
4	40	40	0		
5	60.1	30	-30.1		
6	77.9	10	-67.9		

Sum of b values = 52.1126

Sample Standard Deviation = 23.6069

W Statistic = 0.974626

5% Critical value of 0.788 is less than 0.974626

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.974626

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-07

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	ND<30	-20	0	1
77.9	ND<30	47.9	1	1
ND<40	ND<30	10	2	1
ND<40	ND<30	10	3	1
60.1	ND<30	30.1	4	1
77.9	ND<10	67.9	5	1
ND<40	ND<10	30	6	1
ND<40	ND<10	30	7	1
60.1	ND<10	50.1	8	1
ND<40	77.9	-37.9	8	2
ND<40	77.9	-37.9	8	3
60.1	77.9	-17.8	8	4
ND<40	ND<40	0	8	4
60.1	ND<40	20.1	9	4
60.1	ND<40	20.1	10	4

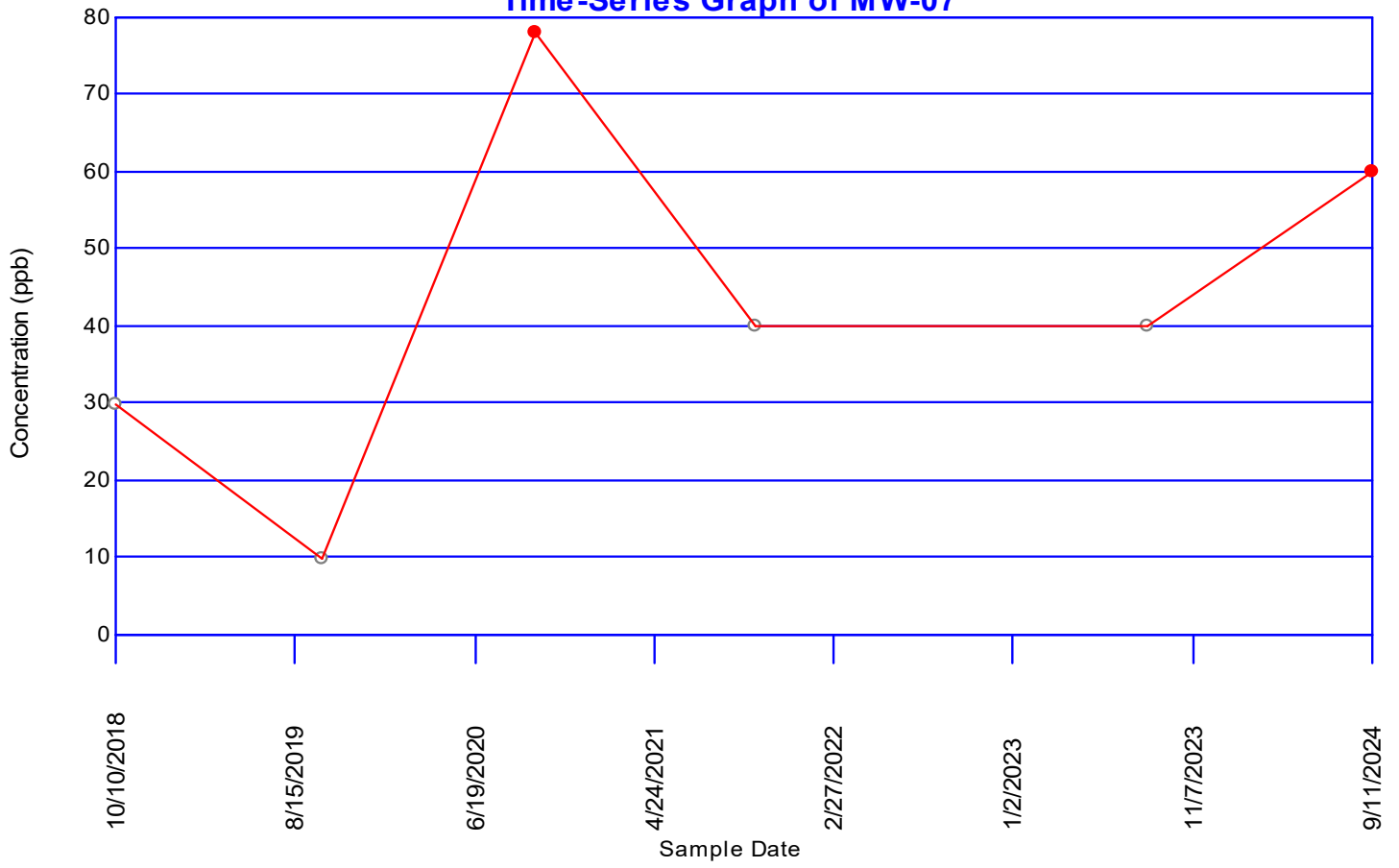
S Statistic = 10 - 4 = 6

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |6|$ is 0.371

0.371 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-07



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.178947	0.0221053	0.56	None

Loc.	Date	Conc.	Outlier
MW-12	10/9/2018	23.1	FALSE
	10/2/2019	21	FALSE
	10/1/2020	52.9	FALSE
	10/14/2021	51.3	FALSE
	8/24/2023	99	FALSE
	9/12/2024	116	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-12

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	21	116	95	0.6431	61.0945
2	23.1	99	75.9	0.2806	21.2975
3	51.3	52.9	1.6	0.0875	0.14
4	52.9	51.3	-1.6		
5	99	23.1	-75.9		
6	116	21	-95		

Sum of b values = 82.532

Sample Standard Deviation = 39.1507

W Statistic = 0.888783

5% Critical value of 0.788 is less than 0.888783

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.888783

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-12

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
21	23.1	-2.1	0	1
52.9	23.1	29.8	1	1
51.3	23.1	28.2	2	1
99	23.1	75.9	3	1
116	23.1	92.9	4	1
52.9	21	31.9	5	1
51.3	21	30.3	6	1
99	21	78	7	1
116	21	95	8	1
51.3	52.9	-1.6	8	2
99	52.9	46.1	9	2
116	52.9	63.1	10	2
99	51.3	47.7	11	2
116	51.3	64.7	12	2
116	99	17	13	2

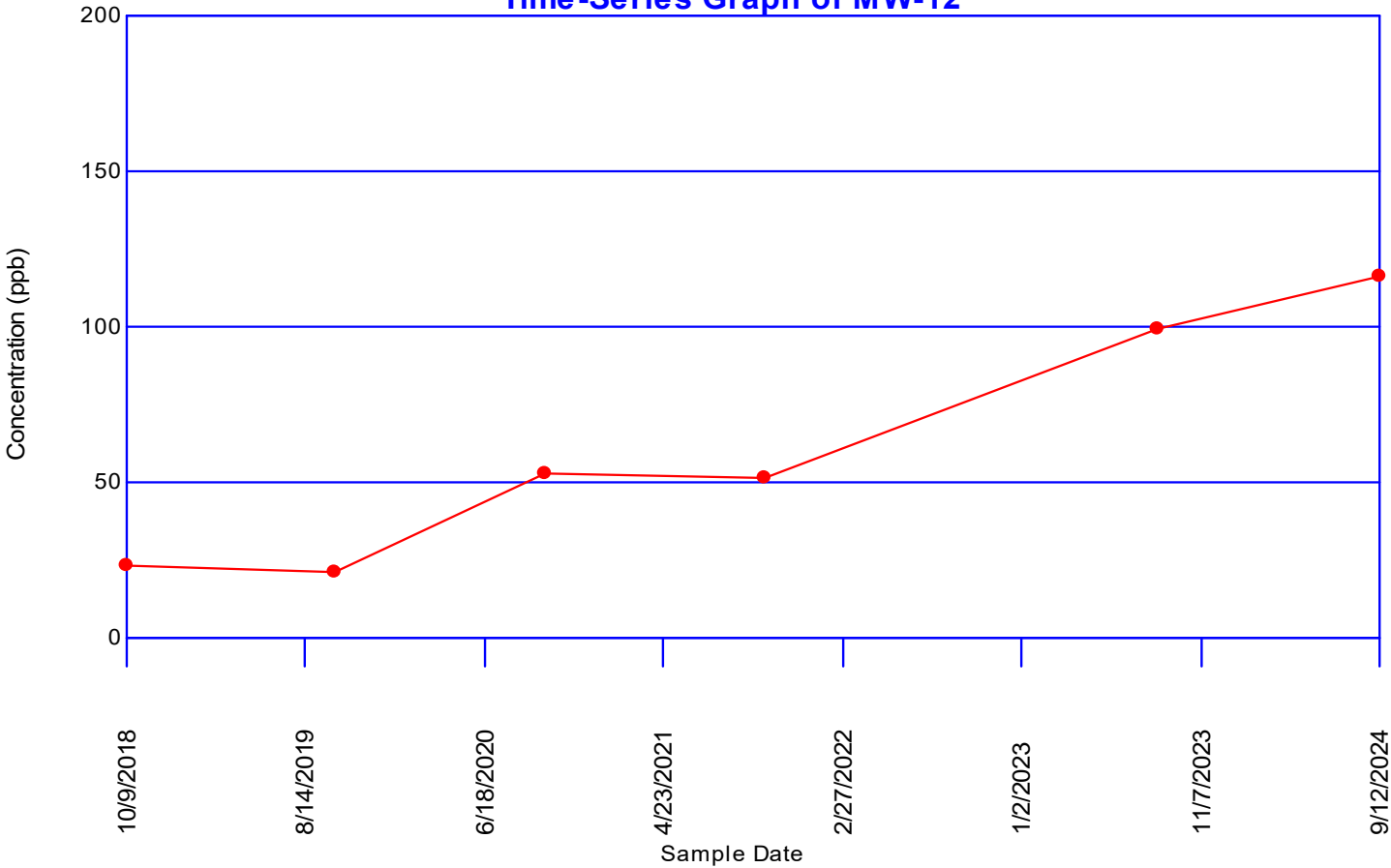
S Statistic = 13 - 2 = 11

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |11|$ is 0.056

0.056 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-12



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...
5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.408284	0.167653	0.56	None

Loc.	Date	Conc.	Outlier
MW-16	10/9/2018	ND<30	FALSE
	10/2/2019	ND<10	FALSE
	10/1/2020	18.5	FALSE
	10/14/2021	26.9	FALSE
	8/24/2023	ND<40	FALSE
	9/12/2024	60.7	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-16

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	60.7	50.7	0.6431	32.6052
2	18.5	40	21.5	0.2806	6.0329
3	26.9	30	3.1	0.0875	0.27125
4	30	26.9	-3.1		
5	40	18.5	-21.5		
6	60.7	10	-50.7		

Sum of b values = 38.9093

Sample Standard Deviation = 17.766

W Statistic = 0.959311

5% Critical value of 0.788 is less than 0.959311

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.959311

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-16

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	ND<30	-20	0	1
18.5	ND<30	-11.5	0	2
26.9	ND<30	-3.1	0	3
ND<40	ND<30	10	1	3
60.7	ND<30	30.7	2	3
18.5	ND<10	8.5	3	3
26.9	ND<10	16.9	4	3
ND<40	ND<10	30	5	3
60.7	ND<10	50.7	6	3
26.9	18.5	8.4	7	3
ND<40	18.5	21.5	8	3
60.7	18.5	42.2	9	3
ND<40	26.9	13.1	10	3
60.7	26.9	33.8	11	3
60.7	ND<40	20.7	12	3

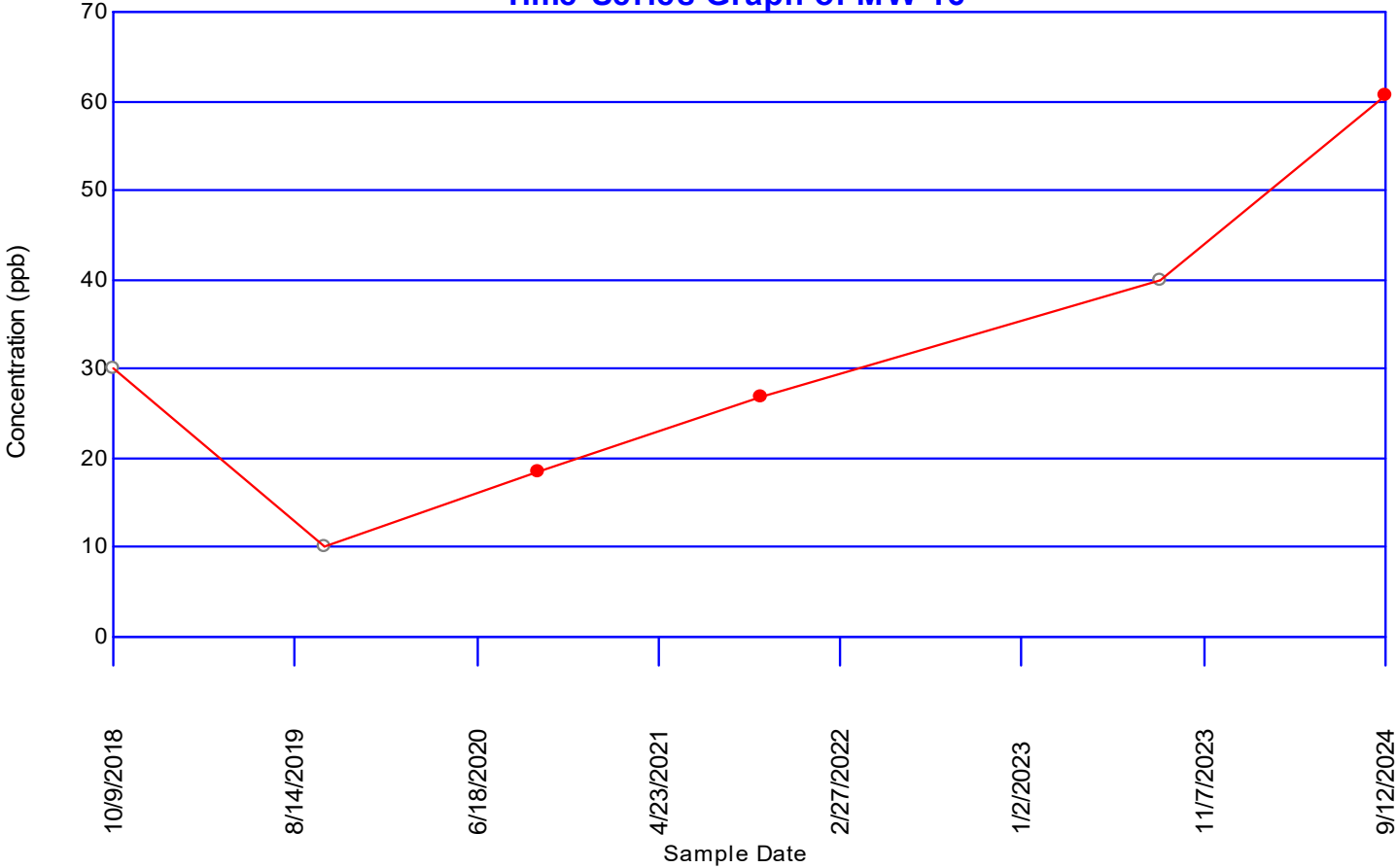
S Statistic = 12 - 3 = 9

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |9|$ is 0.136

0.136 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-16



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.774109	0.0108601	0.56	246
2	0.173077	0.0480769	0.642	None

Loc.	Date	Conc.	Outlier
MW-20	10/10/2018	15.8	FALSE
	10/2/2019	67.8	FALSE
	10/2/2020	50.8	FALSE
	10/12/2021	58.8	FALSE
	8/23/2023	18.3	FALSE
	9/11/2024	246	TRUE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-20

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	15.8	246	230.2	0.6431	148.042
2	18.3	67.8	49.5	0.2806	13.8897
3	50.8	58.8	8	0.0875	0.7
4	58.8	50.8	-8		
5	67.8	18.3	-49.5		
6	246	15.8	-230.2		

Sum of b values = 162.631

Sample Standard Deviation = 85.85

W Statistic = 0.717725

5% Critical value of 0.788 exceeds 0.717725
Evidence of non-normality at 95% level of significance

1% Critical value of 0.713 is less than 0.717725
Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-20

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
67.8	15.8	52	1	0
50.8	15.8	35	2	0
58.8	15.8	43	3	0
18.3	15.8	2.5	4	0
246	15.8	230.2	5	0
50.8	67.8	-17	5	1
58.8	67.8	-9	5	2
18.3	67.8	-49.5	5	3
246	67.8	178.2	6	3
58.8	50.8	8	7	3
18.3	50.8	-32.5	7	4
246	50.8	195.2	8	4
18.3	58.8	-40.5	8	5
246	58.8	187.2	9	5
246	18.3	227.7	10	5

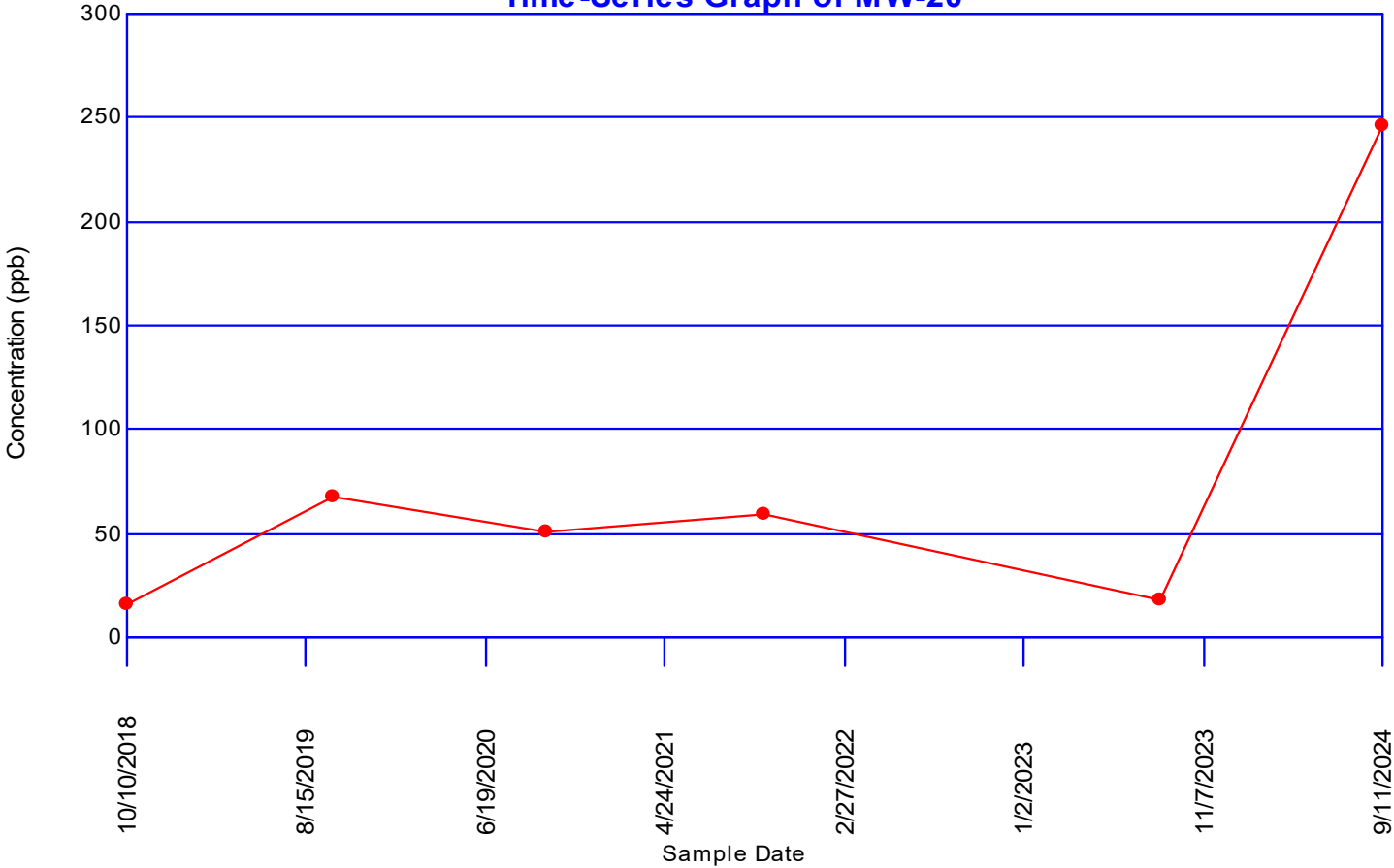
S Statistic = 10 - 5 = 5

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |5|$ is 0.47

0.47 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-20



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.173333	0.38	0.56	None

Loc.	Date	Conc.	Outlier
MW-21	10/10/2018	ND<30	FALSE
	10/1/2019	ND<10	FALSE
	9/30/2020	21.4	FALSE
	10/12/2021	34.8	FALSE
	8/23/2023	ND<40	FALSE
	9/11/2024	34.6	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-21

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	40	30	0.6431	19.293
2	21.4	34.8	13.4	0.2806	3.76004
3	30	34.6	4.6	0.0875	0.4025
4	34.6	30	-4.6		
5	34.8	21.4	-13.4		
6	40	10	-30		

Sum of b values = 23.4555

Sample Standard Deviation = 10.9914

W Statistic = 0.910784

5% Critical value of 0.788 is less than 0.910784

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.910784

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-21

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	ND<30	-20	0	1
21.4	ND<30	-8.6	0	2
34.8	ND<30	4.8	1	2
ND<40	ND<30	10	2	2
34.6	ND<30	4.6	3	2
21.4	ND<10	11.4	4	2
34.8	ND<10	24.8	5	2
ND<40	ND<10	30	6	2
34.6	ND<10	24.6	7	2
34.8	21.4	13.4	8	2
ND<40	21.4	18.6	9	2
34.6	21.4	13.2	10	2
ND<40	34.8	5.2	11	2
34.6	34.8	-0.2	11	3
34.6	ND<40	-5.4	11	4

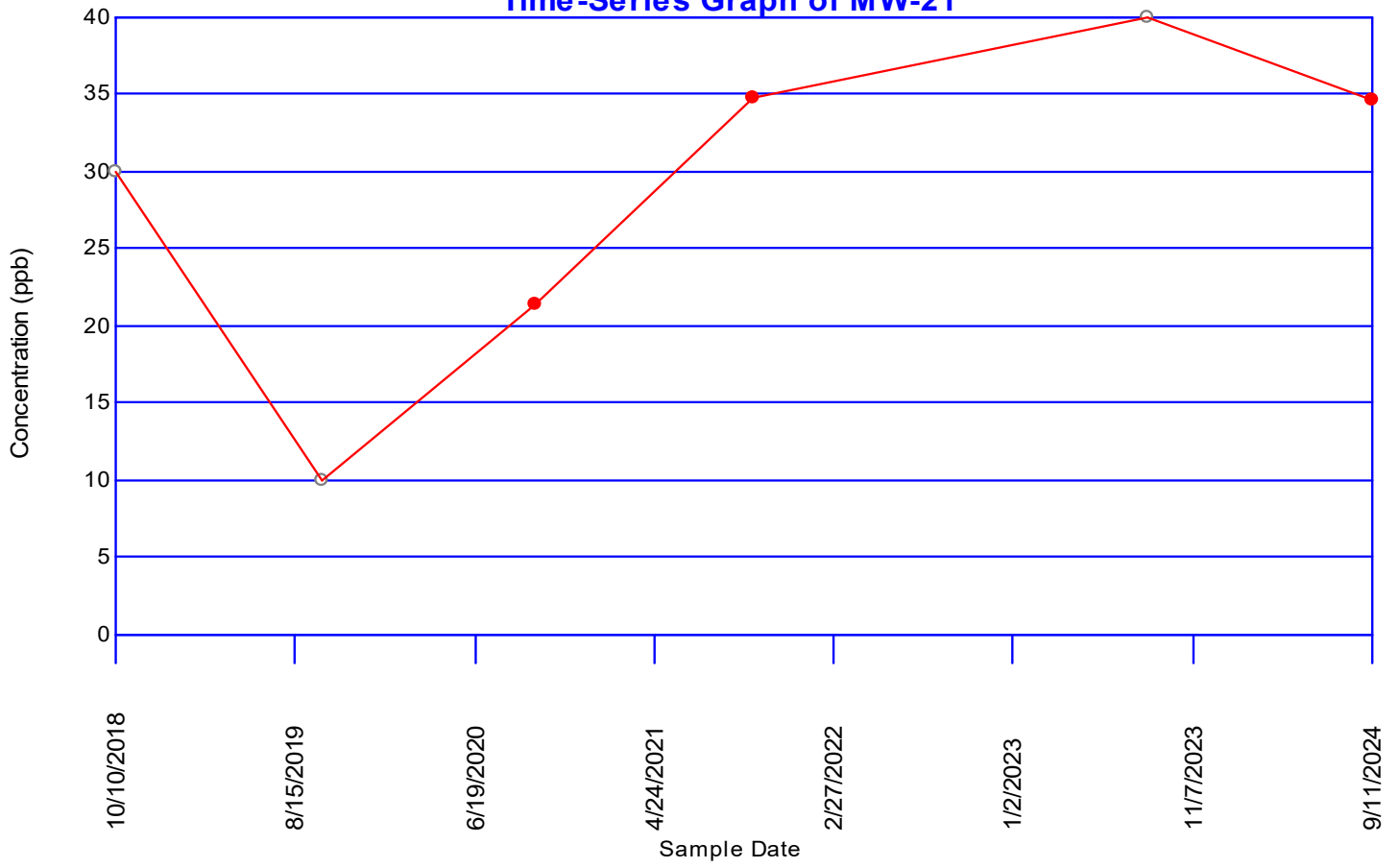
S Statistic = 11 - 4 = 7

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |7|$ is 0.272

0.272 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-21



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.291878	0.0380711	0.56	None

Loc.	Date	Conc.	Outlier
MW-25	10/9/2018	18.4	FALSE
	10/1/2019	16.5	FALSE
	10/1/2020	18	FALSE
	10/13/2021	44.4	FALSE
	8/24/2023	34.1	FALSE
	9/10/2024	55.9	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-25

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	16.5	55.9	39.4	0.6431	25.3381
2	18	44.4	26.4	0.2806	7.40784
3	18.4	34.1	15.7	0.0875	1.37375
4	34.1	18.4	-15.7		
5	44.4	18	-26.4		
6	55.9	16.5	-39.4		

Sum of b values = 34.1197

Sample Standard Deviation = 16.4129

W Statistic = 0.864317

5% Critical value of 0.788 is less than 0.864317

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.864317

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-25

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
16.5	18.4	-1.9	0	1
18	18.4	-0.4	0	2
44.4	18.4	26	1	2
34.1	18.4	15.7	2	2
55.9	18.4	37.5	3	2
18	16.5	1.5	4	2
44.4	16.5	27.9	5	2
34.1	16.5	17.6	6	2
55.9	16.5	39.4	7	2
44.4	18	26.4	8	2
34.1	18	16.1	9	2
55.9	18	37.9	10	2
34.1	44.4	-10.3	10	3
55.9	44.4	11.5	11	3
55.9	34.1	21.8	12	3

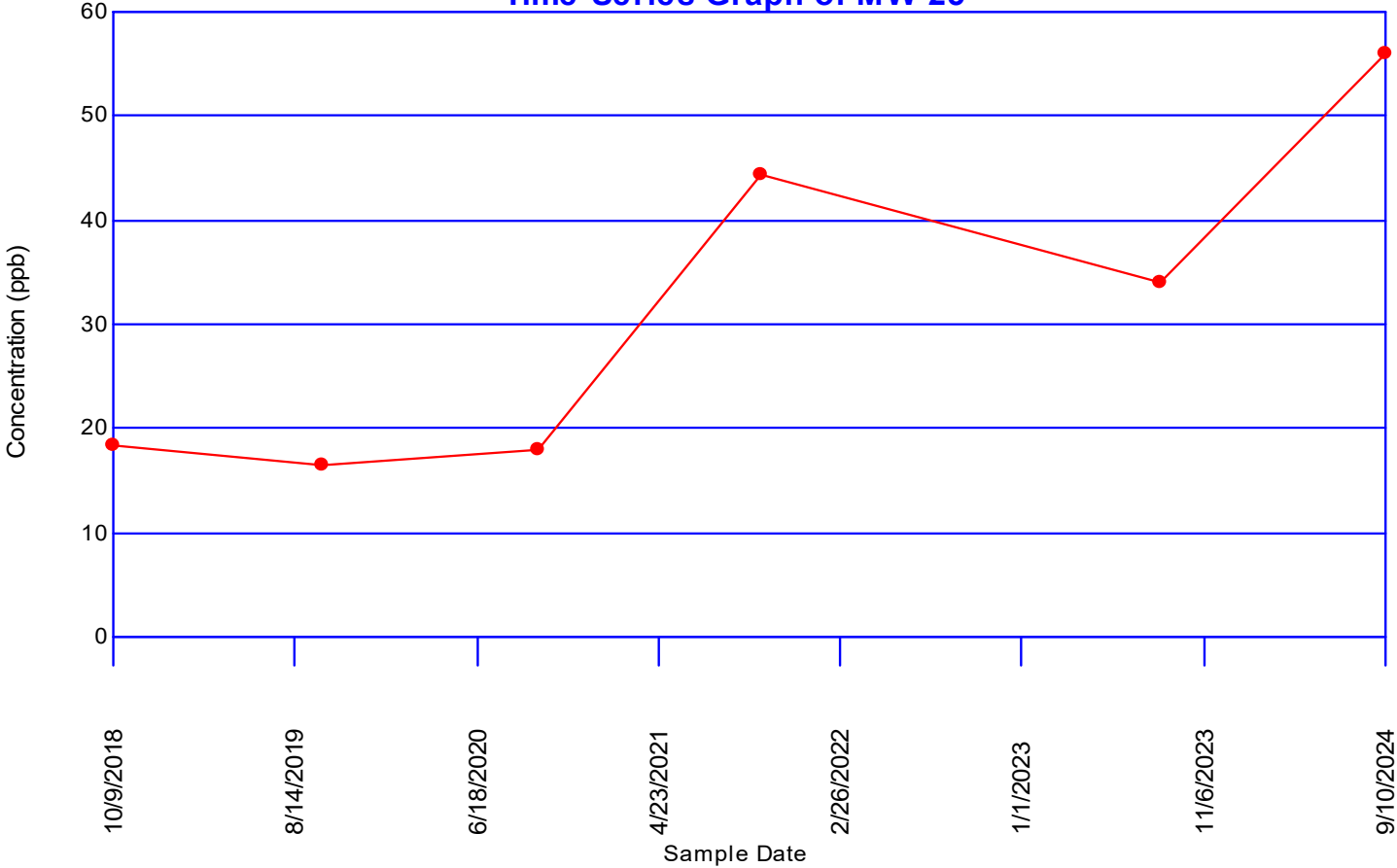
S Statistic = 12 - 3 = 9

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |9|$ is 0.136

0.136 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-25



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.519231	0.275641	0.56	None

Loc.	Date	Conc.	Outlier
------	------	-------	---------

MW-26	10/9/2018	ND<30	FALSE
	10/1/2019	ND<10	FALSE
	10/1/2020	72.4	FALSE
	10/13/2021	38.8	FALSE
	8/24/2023	ND<40	FALSE
	9/10/2024	27.2	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-26

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	72.4	62.4	0.6431	40.1294
2	27.2	40	12.8	0.2806	3.59168
3	30	38.8	8.8	0.0875	0.77
4	38.8	30	-8.8		
5	40	27.2	-12.8		
6	72.4	10	-62.4		

Sum of b values = 44.4911

Sample Standard Deviation = 20.675

W Statistic = 0.926158

5% Critical value of 0.788 is less than 0.926158

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.926158

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-26

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	ND<30	-20	0	1
72.4	ND<30	42.4	1	1
38.8	ND<30	8.8	2	1
ND<40	ND<30	10	3	1
27.2	ND<30	-2.8	3	2
72.4	ND<10	62.4	4	2
38.8	ND<10	28.8	5	2
ND<40	ND<10	30	6	2
27.2	ND<10	17.2	7	2
38.8	72.4	-33.6	7	3
ND<40	72.4	-32.4	7	4
27.2	72.4	-45.2	7	5
ND<40	38.8	1.2	8	5
27.2	38.8	-11.6	8	6
27.2	ND<40	-12.8	8	7

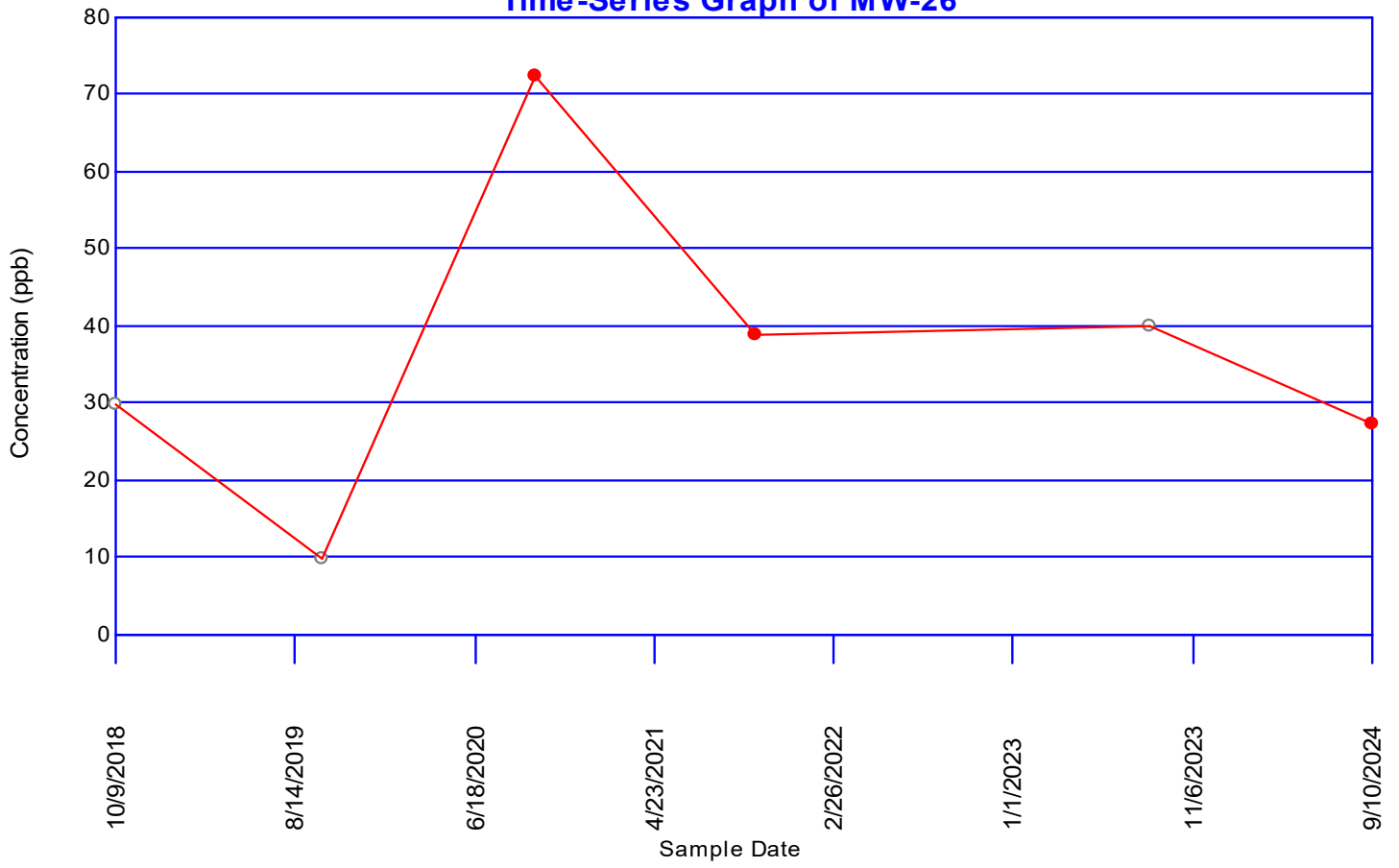
S Statistic = 8 - 7 = 1

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |1|$ is 1

1 ≥ 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-26



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.294118	0.0917647	0.56	None

Loc.	Date	Conc.	Outlier
MW-27	10/9/2018	13.9	FALSE
	10/1/2019	ND<10	FALSE
	10/1/2020	17.5	FALSE
	10/13/2021	ND<40	FALSE
	8/24/2023	22.2	FALSE
	9/11/2024	52.5	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: MW-27

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	10	52.5	42.5	0.6431	27.3318
2	13.9	40	26.1	0.2806	7.32366
3	17.5	22.2	4.7	0.0875	0.41125
4	22.2	17.5	-4.7		
5	40	13.9	-26.1		
6	52.5	10	-42.5		

Sum of b values = 35.0667

Sample Standard Deviation = 16.6574

W Statistic = 0.886346

5% Critical value of 0.788 is less than 0.886346

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.886346

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: MW-27

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
ND<10	13.9	-3.9	0	1
17.5	13.9	3.6	1	1
ND<40	13.9	26.1	2	1
22.2	13.9	8.3	3	1
52.5	13.9	38.6	4	1
17.5	ND<10	7.5	5	1
ND<40	ND<10	30	6	1
22.2	ND<10	12.2	7	1
52.5	ND<10	42.5	8	1
ND<40	17.5	22.5	9	1
22.2	17.5	4.7	10	1
52.5	17.5	35	11	1
22.2	ND<40	-17.8	11	2
52.5	ND<40	12.5	12	2
52.5	22.2	30.3	13	2

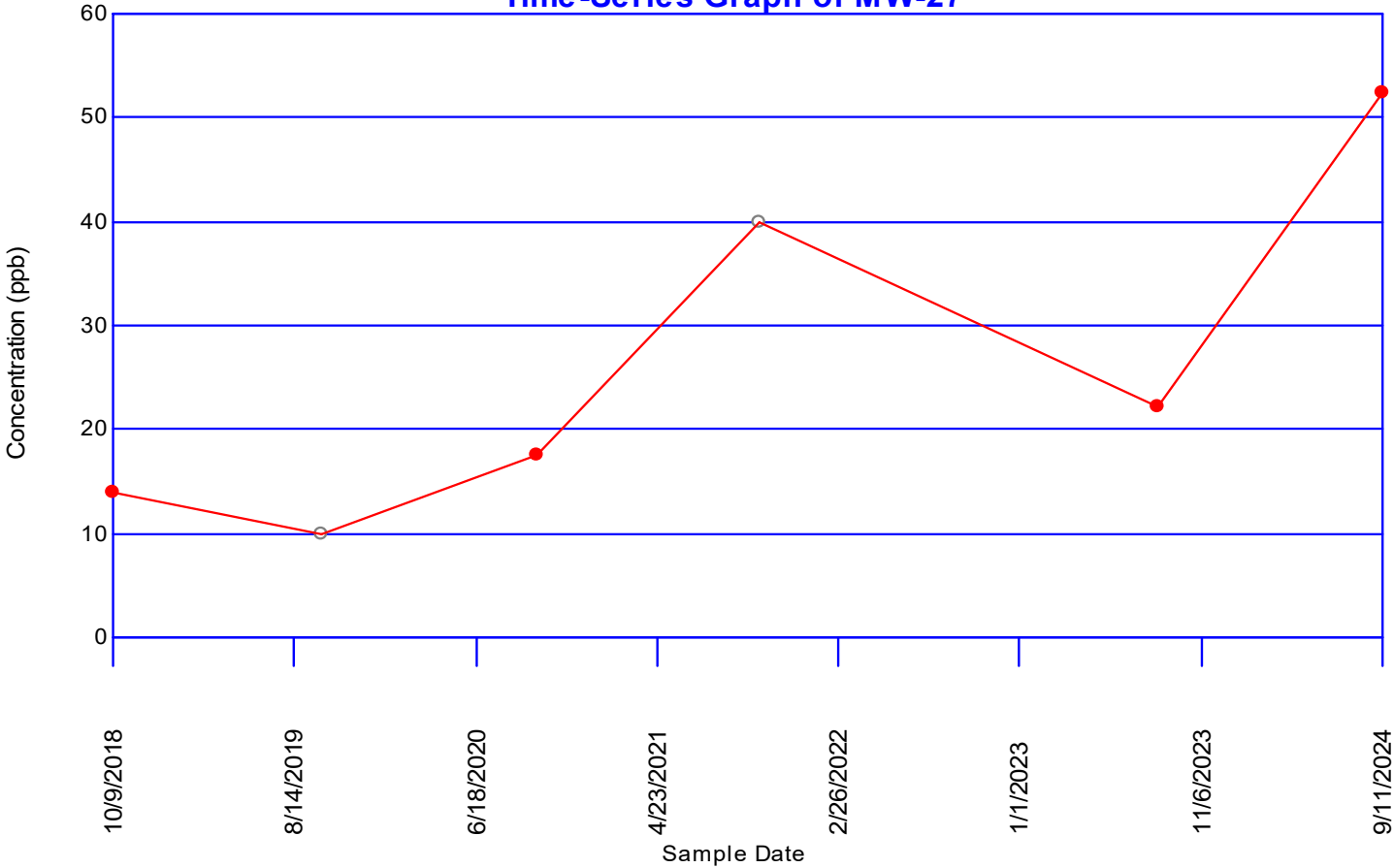
S Statistic = 13 - 2 = 11

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |11|$ is 0.056

0.056 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of MW-27



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.511278	0.0789474	0.56	None

Loc.	Date	Conc.	Outlier
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SW-01	10/8/2018	ND<30	FALSE
	9/30/2019	12.5	FALSE
	10/2/2020	38.5	FALSE
	10/14/2021	16.7	FALSE
	8/22/2023	20.8	FALSE
	9/10/2024	65.7	FALSE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: SW-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	12.5	65.7	53.2	0.6431	34.2129
2	16.7	38.5	21.8	0.2806	6.11708
3	20.8	30	9.2	0.0875	0.805
4	30	20.8	-9.2		
5	38.5	16.7	-21.8		
6	65.7	12.5	-53.2		

Sum of b values = 41.135

Sample Standard Deviation = 19.5529

W Statistic = 0.885178

5% Critical value of 0.788 is less than 0.885178

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.885178

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: SW-01

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
12.5	ND<30	-17.5	0	1
38.5	ND<30	8.5	1	1
16.7	ND<30	-13.3	1	2
20.8	ND<30	-9.2	1	3
65.7	ND<30	35.7	2	3
38.5	12.5	26	3	3
16.7	12.5	4.2	4	3
20.8	12.5	8.3	5	3
65.7	12.5	53.2	6	3
16.7	38.5	-21.8	6	4
20.8	38.5	-17.7	6	5
65.7	38.5	27.2	7	5
20.8	16.7	4.1	8	5
65.7	16.7	49	9	5
65.7	20.8	44.9	10	5

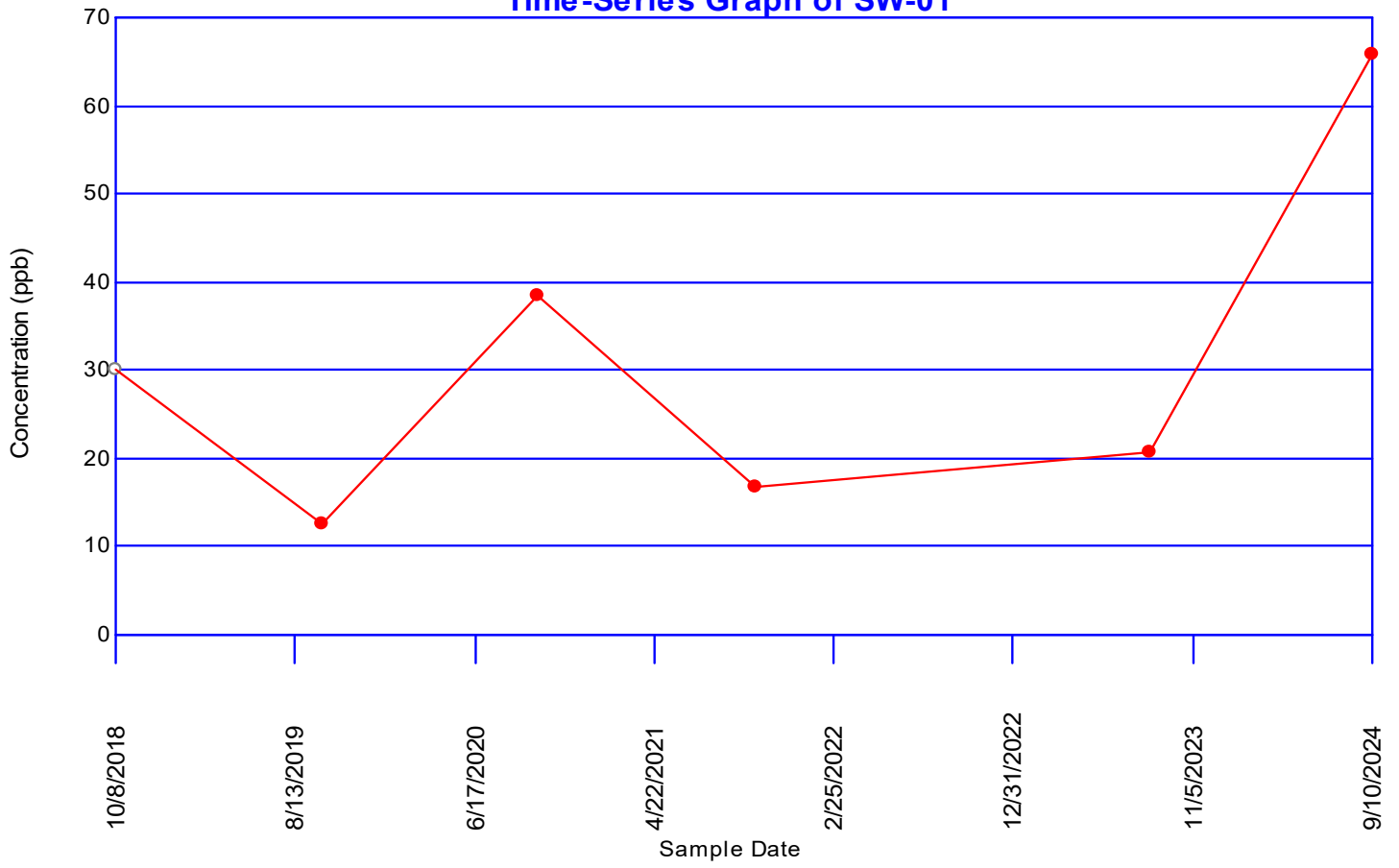
S Statistic = 10 - 5 = 5

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |5|$ is 0.47

0.47 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of SW-01



Dixon's Test for Outliers

Parameter: Total Organic Halogens

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

For 6 Measurements...

5% Level of Significance

Iteration	Highest	Lowest	Critical	Outlier
1	0.626619	0.00863309	0.56	154
2	0.44316	0.0231214	0.642	None

Loc.	Date	Conc.	Outlier
SW-02	10/8/2018	16.2	FALSE
	9/30/2019	15	FALSE
	10/2/2020	66.9	FALSE
	10/14/2021	43.9	FALSE
	8/22/2023	25.7	FALSE
	9/10/2024	154	TRUE

Shapiro-Wilks Test of Normality

Parameter: Total Organic Halogens

Location: SW-02

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 3 for 6 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	15	154	139	0.6431	89.3909
2	16.2	66.9	50.7	0.2806	14.2264
3	25.7	43.9	18.2	0.0875	1.5925
4	43.9	25.7	-18.2		
5	66.9	16.2	-50.7		
6	154	15	-139		

Sum of b values = 105.21

Sample Standard Deviation = 52.9495

W Statistic = 0.78962

5% Critical value of 0.788 is less than 0.78962

Data is normally distributed at 95% level of significance

1% Critical value of 0.713 is less than 0.78962

Data is normally distributed at 99% level of significance

Mann-Kendall Trend Analysis

Parameter: Total Organic Halogens

Location: SW-02

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
15	16.2	-1.2	0	1
66.9	16.2	50.7	1	1
43.9	16.2	27.7	2	1
25.7	16.2	9.5	3	1
154	16.2	137.8	4	1
66.9	15	51.9	5	1
43.9	15	28.9	6	1
25.7	15	10.7	7	1
154	15	139	8	1
43.9	66.9	-23	8	2
25.7	66.9	-41.2	8	3
154	66.9	87.1	9	3
25.7	43.9	-18.2	9	4
154	43.9	110.1	10	4
154	25.7	128.3	11	4

S Statistic = 11 - 4 = 7

Comparing at $1.0 - (0.05 / 2) = 97.5\%$ confidence level (two-tailed)

Probability of obtaining $S \geq |7|$ is 0.272

0.272 \geq 0.025 indicating no evidence of a trend

Total Organic Halogens Time-Series Graph of SW-02

