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November 27, 2024

Mr. Brian Rath
Land Quality Bureau
Iowa Department of Natural Resources
6200 Park Ave
Des Moines, IA 50321

Subject: **2024 Annual Water Quality Report**
Interstate Power and Light Company – Ottumwa Midland Landfill
Permit #90-SDP-8-92P

Dear Mr. Rath:

On behalf of Interstate Power and Light Company (IPL), Alliant Energy is providing the enclosed 2024 Annual Water Quality Report for the Ottumwa Midland Landfill, as required by Permit #90-SDP-8-92P and associated amendments.

Please call me at (515) 558-9704 or email me at jennycoughlin@alliantenergy.com with any questions regarding the enclosed report.

Sincerely,

Jenny Coughlin
Sr. Environmental Specialist
Alliant Energy Corporate Services, Inc.

Enclosures

Cc: IDNR Field Office #6
Rob Saunders – IPL
Meghan Blodgett, Thomas Karwoski – SCS Engineers

2024 Annual Water Quality Report

Interstate Power and Light Company
Ottumwa-Midland Landfill
Permit #90-SDP-8-92P

Alliant Energy
4902 North Biltmore Lane
Madison, Wisconsin 53718

SCS ENGINEERS

25224073.00 | November 27, 2024

2830 Dairy Drive
Madison, WI 53718
608-224-2830

CERTIFICATION

I, Thomas J. Karwoski, hereby certify that this report was prepared by me, or under my direct supervision, and that I am a qualified ground water scientist as defined in IAC SS 113.10(1)d.

Thomas J. Karwoski

Signature

November 27, 2024

Date

Pages or Sheets Covered by this Certification:

2024 Annual Water Quality Report, Interstate Power and Light Company
Ottumwa-Midland Landfill, Permit #90-SDP-8-92P

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EXECUTIVE SUMMARY

Period of Report Coverage

The period of coverage for this report is from November 2023 through October 2024. The report includes the April 2024 water level measurement event and the August 2024 groundwater sampling event conducted at the Ottumwa-Midland Landfill (OML, also referred to as Site). OML is a coal combustion residual (CCR) landfill located near Ottumwa, Iowa (**Figure 1**).

Report Priority

Comparison of the 2024 results to the Groundwater Protection Standards (GWPSs) indicated no new GWPS exceedances. GWPS exceedances in 2024 were:

- Shallow wells:
  - Cobalt above the Statewide Standard (SWS) at MW-108
  - Lithium above the GWPS at MW-1R, MW-15R, MW-100R, and MW-108
  - Manganese above the SWS at wells MW-15R and MW-108

- Mid-depth Pennsylvanian wells:
  - Lithium at MW-12, MW-13, MW-14, MW-16R, and MW-102P

Lithium concentrations at all sampled monitoring wells in August 2024 exceeded the GWPS (14 µg/L). August 2023 was the first sampling event in which lithium was included, background concentrations have not yet been calculated. However, the widespread nature of lithium GWPS exceedances and the fact that the highest detected lithium concentrations was at background Pennsylvanian well MW-102P indicate that elevated lithium concentrations occur naturally at the Site.

The two shallow wells with cobalt and manganese exceedances are screened within the Pennsylvanian shale. As shown on **Figures 3** and **5**, both are upgradient of the landfill. The cobalt and manganese GWPS exceedances at MW-15R and MW-108 may reflect natural variation within the shale and/or impacts related to the presence of coal and historic coal mining activities.

SCS Engineers (SCS) recommends that the current monitoring program be continued during 2025, with updates to the analytical parameter list as described in **Section 8.0**. A new monitoring well was installed to the south of TCB-1/2 in November 2024. Documentation of this well installation will be submitted under separate cover, and this well will be included in the 2025 monitoring events.

Site Status and Applicable Rules

The following summarizes the Site status and applicable rules associated with groundwater sampling at the OML site:

- **Landfill Status:** Active

- **Types of Wastes Accepted:** CCR

- **Applicable Iowa Administrative Code (IAC) Rules:** 567-103 current version, 567-115.26(6) (certain provisions), 567-115.21 (referenced for monitoring well maintenance and evaluation requirements, in place of the rescinded 567-110.9). The monitoring and reporting were also performed in accordance with the provisions of the variance to 567-103.1(2)f granted on July 20, 2017, and the conditions of the landfill permit renewal dated July 21, 2017.

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ACRONYMS/ABBREVIATIONS

CCR = Coal Combustion Residual
COC = Chain of Custody
EPA = Environmental Protection Agency
GWPS = Groundwater Protection Standard
IAC = Iowa Administrative Code
IDNR = Iowa Department of Natural Resources
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
MCL = EPA Maximum Contaminant Level
OML or Site = Ottumwa-Midland Landfill
QA/QC = Quality Assurance/Quality Control
RCRA = Resource Conservation and Recovery Act
SCS = SCS Engineers
SMCLs = Secondary Maximum Contaminant Levels
SWS = IDNR Statewide Standard for a protected groundwater source
SSI = Statistically Significant Increase above background
UPL = Upper Prediction Limits
U.S. EPA = U.S. Environmental Protection Agency

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1.0 SITE BACKGROUND

1.1 SITE HISTORY

The Ottumwa Midland Landfill (OML, also referred to as Site) is an active Coal Combustion Residual (CCR) landfill located near Ottumwa, Iowa (**Figure 1**). OML accepted waste during the 2023 to 2024 period covered by this report. The amount of CCR accepted during this period is provided in the Annual Facility Inspection Summary (**Appendix G**). A site plan is shown on **Figure 2**.

The southern portion of the landfill was developed in a former clay mine pit. Mining operations included the excavation of the unconsolidated clay material and approximately 40 feet of shale from the pit. Spoils from the mining operation, including both unconsolidated material and shale, were stockpiled to the east, west, and south of the existing CCR landfill. Collapsed underground coal mines appear to exist in the southeastern and northwestern portions of the property, outside the active filling area. More details regarding the Site geology can be obtained in the Hydrogeological Investigation Reports prepared by Montgomery Watson in May 1994 (Montgomery Watson, 1994) and by SCS in August 2013 (SCS, 2013).

Expansion construction began at the Site in March 2014, following the issuance of Amendment #6 to Permit #90-SDP-08-92P, issued February 28, 2014. The Phase 1 Liner Construction Documentation Report was approved by the Iowa Department of Natural Resources (IDNR) on January 12, 2016, and CCR disposal in Phase 1 of the expansion began in October 2016. Monitoring wells associated with Phase 1 of the landfill expansion were added to the groundwater sampling program in September 2015. The sampling program is summarized in **Table 1**. Additional parameters were included in the August 2023 and August 2024 monitoring events as outlined in communications with IDNR prior to the sampling event, including the Recommended Assessment Steps document submitted to IDNR on June 30, 2023.

1.2 SITE HYDROGEOLOGY

1.2.1 Geology

The Site geology consists of unconsolidated deposits of loess and till (generally silt and clay), which overlie the Pennsylvanian shale. The unconsolidated material and up to 40 feet of shale were removed from the original landfill area during historic clay mining operations at the Site. The base of the landfill is within the Pennsylvanian shale. Mississippian limestone and sandstone underlie the Pennsylvanian shale. Coal beds are present within the Pennsylvanian shale, and evidence of historical underground mining of these coal beds has been observed at the OML site. The Pennsylvanian shale is considered to be a confining unit, and the Mississippian limestone and sandstone unit is considered to be the uppermost aquifer in the area.

More detailed descriptions of the regional and local geology are provided by the Hydrogeological Investigation Reports prepared by Montgomery Watson in May 1994 (Montgomery Watson, 1994) and SCS in August 2013 (SCS, 2013).

1.2.2 Hydrogeology/Groundwater Flow Conditions

Groundwater and surface water levels were measured during April and August 2024, as shown in **Table 2**. The groundwater levels during the August event were measured prior to purging the wells for sampling. The groundwater and surface water elevation data are included in **Table 4A.** The April and August 2024 water level data were used to create water table and potentiometric surface maps (**Figure 3** through **Figure 6**). Flow directions were consistent with historical data.

As described below in **Section 3.0**, a biennial evaluation of water level conditions was included in the 2023 Annual Water Quality Report (AWQR). The next biennial evaluation will be completed in 2025.

2.0 SAMPLING STATUS SUMMARY

The IDNR requested that sampling data be summarized in a series of tables to consistently convey information related to groundwater monitoring at CCR landfills throughout Iowa. These tables are discussed within the text in appropriate sections as noted and included in the Tables section at the end of the text. **Table 1** provides an overview of the sampling status for the Site, including the monitoring points in the program, current monitoring program, comparative statistics findings, and the number of samples collected. **Figure 2** depicts the monitoring network for OML.

Field sheets from the August 2024 sampling event are included in **Appendix A.** Sampling completed in 2018 through 2024 and anticipated sampling for 2025 are summarized in **Table 2.** The laboratory analytical report for the August 2024 sampling event is included in **Appendix B.** Groundwater chemistry summary tables for sampling performed before 2020 are included in **Appendix C.** Summary tables of groundwater chemistry data for sampling performed since transitioning to unfiltered sampling in 2017 are included with the statistical analysis in **Appendix D.**

2024 was the second year in which parameters calcium, lithium, molybdenum, and total suspended solids (TSS) were included in the sampling program, as requested by IDNR. Because of the low number of samples for the parameters listed above, UPLs cannot be calculated at this time. UPL calculations for these parameters will be included in the report when a minimum of four samples have been collected at background wells. Additionally, field parameters dissolved oxygen (DO) and oxidation-reduction potential (ORP) are included in the tables of this AWQR for evaluation of the potential influences on groundwater chemistry due to reducing groundwater conditions. DO and ORP are required parameters to determine stability during low-flow sampling and have been included in AWQRs prior to 2023 on field sheets.

3.0 MONITORING WELL MAINTENANCE AND PERFORMANCE SUMMARY

Iowa Administrative Code (IAC) 567-115.21 was referenced for monitoring well maintenance and evaluation, in place of the rescinded 567-110.9. Each requirement is listed below in italics, followed by text describing how the requirement was addressed. **Table 3** provides the years in which each requirement was previously met and for which it is next scheduled.

a. *A biennial examination of high and low water levels accompanied by a discussion of the acceptability of well location (vertically and horizontally) and exposure of the screened interval to the atmosphere.*

An evaluation was included in the 2023 AWQR and concluded that the existing monitoring wells adequately characterize the groundwater quality and groundwater flow conditions at the site. The next biennial evaluation will be required in 2025.

b. *A biennial evaluation of water level conditions in the monitoring wells to ensure that the effects of waste disposal or well operation have not resulted in changes in the hydrologic setting and resultant flow paths.*

An evaluation was included in the 2023 AWQR. The next biennial evaluation will be required in 2025. Water levels in 2024 were generally consistent with historical data.

c. *Annual measurement of well depths to ensure that wells are physically intact and not filling with sediment.*

Well depths measured during April and August 2024 in all wells that do not contain dedicated pumps are summarized in **Table 4A**. The maximum discrepancy between the measured total depth and as-installed total depth was less than 1 foot in all wells except MW-9M, MW-107, MW-110P, MW-116M, MW-117, and MW-122P. The discrepancy at MW-9M was apparently due to a transcription error in the field. At all wells except MW-117, total depths measured in August 2024 were within 1 foot of the as-built depth, suggesting April 2024 measurements were anomalous in these wells. The discrepancies at MW-117 in April and August 2024 were 1.13 and 1.16 feet, respectively. Total depths at this well will continue to be monitored and compared to the as-built depth in 2025. The groundwater level at this well is within the open screen, and the well is functioning as intended to provide groundwater elevation data.

d. *Every five years conduct in-situ permeability tests on monitoring wells to compare test data with those collected originally to determine if well deterioration is occurring.*

A variance to IAC 567-110.9(2)(d) for in situ permeability tests every 5 years was granted by IDNR in a letter dated April 1, 1999. Although IAC 567-110 has been rescinded since the variance was granted, the same permeability test requirements are now in IAC 567-115.21(2), and our understanding is that the conditions of the variance still apply. The conditions of the variance state that, if a well cannot be sampled or purged because of plugging, the well will be replaced within 6 months of reporting this condition to IDNR in the annual report. The monitoring wells at this Site are performing adequately as noted above.

3.1 WELL MAINTENANCE RECOMMENDATIONS

No well maintenance activities are recommended based on observations during the 2024 sampling events.

One new monitoring well was installed downgradient of temporary contact water basin TCB-1/2 in November 2024. Documentation of the well installation will be submitted under separate cover, and this well will be added to the monitoring program in 2025.

4.0 QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Data validation quality assurance/quality control (QA/QC) procedures are performed on analytical results for laboratory quality control samples, and a quality assurance assessment of the data is conducted as the data are generated. The QA/QC review procedure provides documentation of the accuracy and precision of the analytical data and confirms that the analyses are sufficiently sensitive to detect constituents at levels below regulatory standards, where such standards exist. QA/QC data validation includes review of sample handling, analytical sensitivity, blanks, accuracy, and precision. The QA/QC and data validation procedures and findings are discussed in more detail below.

4.1 SAMPLE COLLECTION AND HANDLING

Groundwater samples are collected using dedicated low-flow pumps. Samples are not field filtered. A water level measurement tape is the only down-hole equipment used in multiple wells and is decontaminated between wells. All samples are placed on ice after collection and are transported to the laboratory in sealed coolers under Chain of Custody (COC).

Sample receipt forms were reviewed and checked to verify that samples were received in good condition and within the acceptable temperature range. COC records for each sampling event were reviewed and confirmed that information was complete.

Monitoring well MW-17 and leachate headwell LP-1 were not sampled in August 2024 because they were dry during the sampling event. Surface water monitoring points SW-1, SW-2, SW-4, and SW-5, and groundwater underdrain monitoring point GU-2 were not sampled in August 2024 because they were either dry or insufficient water was present for sample collection.

4.2 ANALYTICAL SENSITIVITY AND BLANKS

Laboratory QA/QC procedures and post-analysis data validation assist in producing data of acceptable quality and reliability. Eurofins - Cedar Falls is a certified laboratory in Iowa and performed QA/QC procedures, including analyzing laboratory method blanks in association with samples collected for the project to check for contributions to the analytical results possibly attributable to laboratory-based contamination. A field blank was submitted with the groundwater samples to assess whether cross-contamination occurred during sample handling and transport. No detections were reported for the August 2024 field blank sample. No detections were reported in the method blanks.

4.3 ACCURACY

Laboratory analytical accuracy can be assessed by evaluating the constituent recoveries from the following laboratory QA/QC samples: laboratory control sample (LCS), LCS duplicate (LCSD), matrix spike (MS), and MS duplicate (MSD). LCS/LCSD samples assess the accuracy of analytical procedures by checking the ability to recover constituents added to clean aqueous matrices. MS/MSD samples check the ability to recover constituents added to the sample matrix. Because the QC samples are run by the laboratory on a per-batch basis and a batch may include other projects, the MS/MSD results run with the batch are included in the laboratory report only if the sample used for the MS/MSD originated in the OML project.

For the analysis of the August 2024 samples, LCS, MS, and MSD results reported in the analytical laboratory report were within applicable control limits. Control limits did not apply to some parameters due to analyte concentrations present in the original sample.

4.4 DATA QUALITY SUMMARY

Based on the above QA/QC procedures and the field sampling standard operating procedures, the samples collected during this reporting period are considered to be representative of Site conditions at the locations and times they were obtained. Based on the QA/QC review, no samples were rejected as unusable due to QC failures or other issues identified during the data review.

5.0 COMPARISON TO STANDARDS

5.1 STATISTICAL ANALYSIS

Statistical analysis is completed for the Site on an annual basis. The 2024 Annual Statistical Summary Report is included in **Appendix D**, including a summary table of data used for the statistical analysis of each parameter. **Table 5** provides the background and Groundwater Protection Standard (GWPS) summary for the Site.

Groundwater samples collected in 2024 were unfiltered, in accordance with the variance to 567-103.1(2)f granted on July 20, 2017, and the conditions of the landfill permit renewal dated July 21, 2017. The 2024 sampling event was the eighth round of unfiltered samples collected at the Site, and 2024 was the fifth reporting period during which the statistical approach described below was applied at the Site.

The selected statistical analysis method uses a prediction interval approach as recommended for detection monitoring in the March 2009 U.S. Environmental Protection Agency (U.S. EPA) Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (Unified Guidance).

Interwell testing was selected for the prediction interval evaluation, with monitoring well MW-1/1R used as the background well for the shallow unit and MW-102P used as the background well for the mid-depth Pennsylvanian unit. Monitoring results from the downgradient wells were compared to the UPLs to evaluate whether a Statistically Significant Increase (SSI) over background has occurred. UPL calculations were completed in 2024 using the eight rounds of unfiltered sample results for metals and a longer data record for anions that are not typically affected by filtration (e.g., chloride, sulfate).

Detection of an SSI at a compliance well indicates that the groundwater quality is different than the background groundwater quality, but does not necessarily indicate an impact to public health or the environment.

To evaluate potential health impacts, the monitoring results were compared to health-based GWPS values. The GWPS values were set at the drinking water MCL if one exists; otherwise, the Iowa Statewide Standard (SWS) for protected groundwater was used. If the UPL established based on background monitoring was higher than the MCL or SWS, then the GWPS was set at the UPL. Secondary Maximum Contaminant Levels (SMCLs) were not used to establish GWPS values because SMCLs are not health-based standards, but they are shown in **Table 5** for comparison with the UPL and GWPS values.

5.2 2024 RESULTS

Table 6 is a summary of monitoring points/detected constituents from the 2024 sampling event that did not exceed a UPL. **Table 7** provides a summary of ongoing and newly identified SSIs and compares these concentrations to the GWPS values.

Table 8 provides a visualization of the historic SSIs and regulatory standard exceedances since 2017, the first year during which unfiltered samples were collected at the Site. **Table 8** does not identify SSIs prior to 2020, as this was the first year UPLs were calculated.

August 2024 is the eighth event completed since transitioning to unfiltered sampling. Trend analyses for wells and parameters with regulatory standard exceedances were performed. **Table 10** provides a summary of the wells, parameters and trends that were performed. The Trends report can be found in **Appendix E**.

5.3 STANDARDS HISTORY

The standards for 2020 through 2024 are summarized in **Table 9**. Graphs of standards history were not prepared because this is only the 5th year that UPL calculations have been completed since the transition to unfiltered sampling and the change in statistical method. Graphs will be added in future AWQRs.

6.0 SUMMARY OF FINDINGS FOR GROUNDWATER

This was the fifth year that the new statistical approach using UPLs was implemented; results have only been compared to the UPLs calculated for the current year. The UPL exceedances noted for 2024 were generally similar to the UPL exceedances in 2023 and to results flagged as being above background using the previous method (mean plus two standard deviations).

Comparison of the 2024 results to the GWPSs indicated no new GWPS exceedances. GWPS exceedances in 2024 were:

- Shallow wells:
  - Cobalt above the SWS at MW-108
  - Lithium above the GWPS at MW-1R, MW-15R, MW-100R, and MW-108
  - Manganese above the SWS at wells MW-15R and MW-108

- Mid-depth Pennsylvanian wells:
  - Lithium at MW-12, MW-13, MW-14, MW-16R, and MW-102P

Lithium concentrations at all sampled monitoring wells in August 2024 exceeded the GWPS (14 µg/L). August 2023 was the first sampling event in which lithium was included, background concentrations have not yet been calculated. However, the widespread nature of lithium GWPS exceedances and the fact that the highest detected lithium concentrations was at background Pennsylvanian well MW-102P indicate that elevated lithium concentrations occur naturally at the Site.

MW-17 was not sampled in August 2022, August 2023, or August 2024 because it was dry during each sampling event, but the results for the August 2021 event indicated that concentrations of cobalt and manganese exceeded the SWS. MW-17 was installed in an unconventional manner, in a trench adjacent to the sedimentation basin rather than installed in a boring like a typical monitoring well. Based on this unusual construction MW-17 may not be providing representative or useful data in the context of groundwater monitoring at the Site.

The two shallow wells with cobalt and manganese exceedances are screened within the Pennsylvanian shale. As shown on **Figures 3** and **5**, both are upgradient of the landfill. The cobalt and manganese GWPS exceedances at MW-15R and MW-108 may reflect natural variation within the shale and/or impacts related to the presence of coal and historic coal mining activities.

TSS was added to the monitoring program in 2023. Measured TSS was at or below 5 mg/L in all monitoring well samples except MW-14 (6 mg/L). Dedicated low flow pumps are used at the Site to minimize sample turbidity at monitoring wells to the extent practicable.

Calcium, lithium, and molybdenum were added to the monitoring program in 2023. Calcium, lithium, and molybdenum were all detected at multiple wells in August 2024. There is no applicable GWPS for calcium. Lithium concentrations are discussed above, and all detected molybdenum concentrations were below the applicable GWPS.

7.0 ADDITIONAL REPORTING

7.1 ANNUAL INSPECTION AND LEACHATE CONTROL SYSTEM PERFORMANCE EVALUATION

The 2024 Annual Facility Inspection Summary and Leachate Control System Performance Evaluation is included in **Appendix G.**

7.2 OTHER MONITORING POINTS

7.2.1 Surface Water Monitoring

Surface water monitoring points SW-1R, SW-2R, SW-4, and SW-5 were dry during the August 2024 sampling event (**Table 4A**). SW-3 was sampled in August 2024. Analytical results for SW-3 were consistent with historical results and are included in **Table 11.**

7.2.2 Leachate Collection System

A sample was voluntarily collected from the leachate storage lagoon during the August 2024 sampling event. The leachate storage lagoon is located on the south side of 130th Street. The Phase 1 and 2 Temporary Contact Water Basin (TCB-1/2) was also sampled in August 2024.

Results for the 2024 leachate samples were consistent with historical results and are included in **Table 11**. Historic analytical results for leachate sample results are included in **Appendix C** and **Appendix F.**

7.2.3 Underdrain System

Samples were collected at the active landfill underdrain system (GU-EX), and the Phase 1 Expansion underdrain system (GU-1 [Temporary]).

Results for the 2024 underdrain system were consistent with historical results and are included in **Table 11**. Historic analytical results for leachate sample results are included in **Appendix C** and **Appendix F.**

Re-routing of the underdrain system discharge is currently in the design phase. Updates on this work will be provided to IDNR under separate cover.

8.0 RECEPTOR SURVEY

As requested by IDNR, an updated receptor survey was completed in 2024. SCS contacted Wapello County to request assistance with searching relevant records for water supply sources near OML. Mr. Travis Baily of the Wapello County Engineers Office responded and stated that most of Wapello County is on Rural Water, and searches of the GeoSAM and Private Well Tracking System databases would yield the best information about potentially-active private water supply sources in the area. Mr. Baily performed a search of the GeoSAM and PWTS databases and provided the results to SCS. The only PWTS record generated by this search is associated with a monitoring well at OML. GeoSAM search results for wells apparently located within one mile of OML are summarized in **Appendix H**.

9.0 RECOMMENDATIONS

SCS recommends that the current monitoring program be continued during 2025, with the inclusion of calcium, lithium, molybdenum, and TSS. In addition, the new well installed to the south of TCB-1/2 in November 2024 will be included in 2025 monitoring.

10.0 REFERENCES

Montgomery Watson, 1994, Hydrogeological Investigation Report and Hydrologic Monitoring System Plan, Ottumwa-Midland Commercial Landfill, Ottumwa, IA, May 1994.

SCS Engineers, 2013, Proposed Landfill Expansion Soil and Hydrologic Investigation Report, Ottumwa Midland Landfill, Ottumwa, IA, September 2013.

U.S. Geological Survey, 1983, Water Resources Investigations Open File Report 82-1014, Hydrology of Area 38, Western Region, Interior Coal Province, Iowa and Missouri.

Tables

Table 1
Monitoring Program Summary
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Monitoring Point	Formation	Current Monitoring Program	Change for Next Sampling Event	UPL Exceedances	Total # of Samples in each monitoring program since January 1, 2018
Sampled Monitoring Wells					
MW-1R*	Shallow (Unconsolidated)	Routine	NC	None#	7
MW-12	Pennsylvanian Shale	Routine	NC	Chloride, Fluoride	7
MW-13	Pennsylvanian Shale	Routine	NC	Chloride	7
MW-14	Pennsylvanian Shale	Routine	NC	Arsenic, Chloride	7
MW-15R	Shallow (Unconsolidated)	Routine	NC	Boron, Cobalt, Magnesium, Manganese, TDS	7
MW-16R	Pennsylvanian Shale	Routine	NC	Barium, Chloride	7
MW-17	Shallow (Unconsolidated)	Routine	NC	N/A	4
MW-100R	Shallow (Unconsolidated)	Routine	NC	None	7
MW-101R	Shallow (Unconsolidated)	Routine	NC	Boron, Magnesium, Manganese, Selenium, TDS	7
MW-102P	Pennsylvanian Shale	Routine	NC	None#	7
MW-108	Shallow (Unconsolidated)	Routine	NC	Arsenic, Boron, Cobalt, Iron, Manganese, Zinc	7

Table 1
Monitoring Program Summary
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Monitoring Point	Formation	Current Monitoring Program	Change for Next Sampling Event	UPL Exceedances	Total # of Samples in each monitoring program since January 1, 2018
Water Level Only Monitoring Wells					
MW-5	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-6	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-8	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-9P	Pennsylvanian Shale	Routine	NC	N/A	Water levels only
MW-9M	Mississippian Limestone	Routine	NC	N/A	Water levels only
MW-10R	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-11R	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-102	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-102M	Mississippian Limestone	Routine	NC	N/A	Water levels only
MW-107	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-110	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-110P	Pennsylvanian Shale	Routine	NC	N/A	Water levels only
MW-111	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-112	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-115	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-116	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-116P	Pennsylvanian Shale	Routine	NC	N/A	Water levels only
MW-116M	Mississippian Limestone	Routine	NC	N/A	Water levels only
MW-117	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-122	Shallow (Unconsolidated)	Routine	NC	N/A	Water levels only
MW-122P	Pennsylvanian Shale	Routine	NC	N/A	Water levels only
MW-122M	Mississippian Limestone	Routine	NC	N/A	Water levels only

Table 1
Monitoring Program Summary
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Monitoring Point	Formation	Current Monitoring Program	Change for Next Sampling Event	UPL Exceedances	Total # of Samples in each monitoring program since January 1, 2018
Surface Water Monitoring Points					
SW-1R	N/A (Surface Water)	Routine	NC	N/A	1 (typically dry)
SW-2R	N/A (Surface Water)	Routine	NC	N/A	1 (typically dry)
SW-3	N/A (Surface Water)	Routine	NC	N/A	7
SW-4	N/A (Surface Water)	Routine	NC	N/A	2 (often dry)
SW-5	N/A (Surface Water)	Routine	NC	N/A	4
Other monitoring points					
Underdrain Wet Well/Pumping Station (GU-EX)	N/A (Underdrain)	Routine	NC	N/A	6
GU-1 Temp	N/A (Underdrain)	Routine	NC	N/A	5
GU-2 Temp	N/A (Underdrain)	Routine	NC	N/A	1 (typically dry)
TCB-1/2	N/A (Temporary Contact Basin)	Routine	NC	N/A	7
Leachate Wet Well/ Pumping Station	N/A (Leachate)	Routine (Voluntary)	NC	N/A	1
LP-1	N/A (Leachate)	Routine (Voluntary)	NC	N/A	0 (typically dry)
Leachate Basin	N/A (Leachate)	Routine (Voluntary)	NC	N/A	7

Comments:

*: MW-1R was installed in 2019 to replace former monitoring well MW-1

#: UPLs do not apply to MW-1R or MW-102P because they are background wells.

N/A = Not Applicable NC = No change

Updated by LH Date 9/26/2024
Checked by RM Date 11/5/2024

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Table 2
Monitoring Program Implementation Schedule
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

	Recent Sampling Dates and Constituents														Upcoming Sampling Dates and Constituents	
Monitoring Point	**4/19/2018**	**8/14/2018**	**4/16/2019**	**8/7-9/2019**	**5/20-21/2020***	**8/24-25/2020**	**4/12-13 & 15/2021**	**8/9-12/2021**	**4/13-14/2022**	**8/22-24/2022**	**4/3-4/2023**	**8/28-31/2023**	**4/3-4/2024**	**8/6-8/2024**	**April 2025**	**August 2025**
Sampled Monitoring Wells																
MW-1**	Groundwater Elevation	Not Sampled (Well Dry)	List A + Fluoride and TDS, Groundwater Elevation	Abandoned												
MW-1R**	Not Installed			List A + Fluoride and TDS, Groundwater Elevation	Groundwater Elevation	List A + Fluoride and TDS, Groundwater Elevation	Groundwater Elevation	List A + Fluoride and TDS, Groundwater Elevation	Groundwater Elevation	List A + Fluoride and TDS, Groundwater Elevation	Groundwater Elevation	List A + calcium, lithium, molybdenum, TDS, TSS, Groundwater Elevation	Groundwater Elevation	List A + calcium, lithium, molybdenum, TDS, TSS, Groundwater Elevation	Groundwater Elevation	List A + calcium, lithium, molybdenum, TDS, TSS, Groundwater Elevation
MW-12	Groundwater Elevation	List A + Fluoride and TDS, Groundwater Elevation	Groundwater Elevation													
MW-13																
MW-14																
MW-15R																
MW-16R																
MW-17																
MW-100R																
MW-101R																
MW-102P																
MW-108																
Water Level Only Monitoring Wells																
MW-5	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation
MW-6																
MW-8																
MW-9P																
MW-9M																
MW-10R																
MW-11R																
MW-102																
MW-102M																
MW-107																
MW-110																
MW-110P																
MW-111																
MW-112																
MW-115																
MW-116																
MW-116P																
MW-116M																
MW-117																
MW-122																
MW-122P																
MW-122M																
Surface Water Monitoring Points																
SW-1R	Water Level	List A + Fluoride and TDS, Water level	Water Level	List A + Fluoride and TDS, Water level	Water Level	List A + Fluoride and TDS, Water level	Water Level	List A + Fluoride and TDS, Water level	Water Level	List A + Fluoride and TDS, Water level	Water Level	List A + Ca, Li, Mo, F, and TDS, Water level	Water Level	List A + Ca, Li, Mo, F, and TDS, Water level	Water Level	List A + Ca, Li, Mo, F, and TDS, Water level
SW-2R																
SW-3																
SW-4																
SW-5																
Other monitoring points																
Underdrain Wet Well/Pumping Station (GU-EX)	--	List A + Fluoride and TDS	--	List A + Fluoride and TDS	--	List A + Fluoride and TDS	--	List A + Fluoride and TDS	--	List A + Fluoride and TDS	--	List A + Ca, Li, Mo, Fluoride and TDS	--	List A + Ca, Li, Mo, Fluoride and TDS	--	List A + Ca, Li, Mo, Fluoride and TDS
GU-1 Temp																
GU-2 Temp																
TCB-1/2																
Leachate Wet Well/ Pumping Station (Voluntary)																
Leachate Lagoon (Voluntary)																
LP-1 (Voluntary)	Leachate level measurements attempted during all events; point always dry														Leachate Level	

Notes:

(1): List A: Arsenic, barium, beryllium, boron, cobalt, copper, iron, lead, magnesium, manganese, selenium, zinc, sulfate, chloride, field pH, field specific conductance, field temperature, groundwater elevation, and well depth (metals reported as total). Fluoride and total dissolved solids were added in 2014.

(2): Quarterly background monitoring has not been completed at GU-2 Temp because this monitoring point has been dry during most sampling events.

*: The spring 2020 water level measurement event was delayed due to site access restrictions related to the COVID-19 pandemic.

**: MW-1R replaced MW-1 in 2019.

Updated by: LH, 09/26/2024
Checked by: RM, 11/4/2024

I:\25224073.00\Deliverables\2024 AWQR\Tables\[AWQR_OML_Tables_241104.xlsx]2 - Implementation Schedule

Table 3
Monitoring Well Maintenance and Performance Reevaluation Schedule
2024 Annual Water Quality Report
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Compliance with:	Monitoring Calendar Years						
	2019	2020	2021	2022	2023	2024	2025
567 IAC 115.21(2)a. high and low water levels (biennial)	Completed		Completed		Completed		Scheduled
567 IAC 115.21(2)b. changes in the hydrologic setting and flow paths (biennial)	Completed		Completed		Completed		Scheduled
567 IAC 115.21(2)c. well depths (annual)*	Completed	Completed	Completed	Completed	Completed	Completed	Scheduled
567 IAC 115.21(2)d. in-situ permeability tests (every 5 years)**	Not Applicable - Variance granted by IDNR (see comment below)						

Comments:
*: To avoid the potential for cross-contamination and increased sample turbidity associated with removing and re-installing dedicated pumps, well depths are not measured annually at wells with dedicated pumps.
**: A variance to IAC 567-110.9(2)(d) for in situ permeability tests every 5 years was granted by IDNR in a letter dated April 1, 1999. (Note: Although IAC 567-110 has been rescinded since the variance was granted, the same permeability test requirements are now in IAC 567-115.21(2), and our understanding is that the conditions of the variance still apply.)

Updated by: LH, 9/11/2024
Checked by: RM, 11/4/2024

I:\25224073.00\Deliverables\2024 AWQR\Tables\[AWQR_OML_Tables_241104.xlsx]3 - MW Main & Perform Schedule

Table 4A
Monitoring Well Maintenance and Performance Summary
2024 Annual Water Quality Report
Ottumwa Midland Landfill
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Well	Top of Casing	Top of Screen	Total Depth	Monitoring Parameter	Date of Measurements		Maximum Depth Discrepancy (ft) [1] April	Maximum Depth Discrepancy (ft) [1] August
					April 2-3, 2024	August 6-8, 2024		
MW-1R	823.31	814.01	24.30	Groundwater Level (ft)	12.34	9.77	N/A	N/A
				Groundwater Elevation (Ft MSL)	810.97	813.54		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-5	784.31	737.88	56.43	Groundwater Level (ft)	49.40	49.52	-0.14	0.33
				Groundwater Elevation (Ft MSL)	734.91	734.79		
				Measured Well Depth (ft)	56.57	56.10		
				Submerged screen	N	N		
MW-6	797.03	786.71	25.32	Groundwater Level (ft)	17.04	16.02	-0.66	-0.66
				Groundwater Elevation (Ft MSL)	779.99	781.01		
				Measured Well Depth (ft)	25.98	25.98		
				Submerged screen	N	N		
MW-8	804.96	794.56	20.40	Groundwater Level (ft)	17.37	17.12	0.15	0.13
				Groundwater Elevation (Ft MSL)	787.59	787.84		
				Measured Well Depth (ft)	20.25	20.27		
				Submerged screen	N	N		
MW-9P	789.78	701.87	92.91	Groundwater Level (ft)	67.23	67.35	-0.29	0.29
				Groundwater Elevation (Ft MSL)	722.55	722.43		
				Measured Well Depth (ft)	93.20	92.62		
				Submerged screen	Y	Y		
MW-9M	789.80	638.72	156.08	Groundwater Level (ft)	91.94	91.51	99.41	0.23
				Groundwater Elevation (Ft MSL)	697.86	698.29		
				Measured Well Depth (ft)	56.67(2)	155.85		
				Submerged screen	Y	Y		
MW-10R	788.56	763.06	40.30	Groundwater Level (ft)	32.30	30.75	-0.10	0.12
				Groundwater Elevation (Ft MSL)	756.26	757.81		
				Measured Well Depth (ft)	40.40	40.18		
				Submerged screen	N	N		

Table 4A
Monitoring Well Maintenance and Performance Summary
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Well	Top of Casing	Top of Screen	Total Depth	Monitoring Parameter	Date of Measurements		Maximum Depth Discrepancy (ft) [1] April	Maximum Depth Discrepancy (ft) [1] August
					April 2-3, 2024	August 6-8, 2024		
MW-11R	779.96	764.16	30.80	Groundwater Level (ft)	13.23	13.87	0.20	0.22
				Groundwater Elevation (Ft MSL)	766.73	766.09		
				Measured Well Depth (ft)	30.60	30.58		
				Submerged screen	Y	Y		
MW-12	822.43	701.71	125.72	Groundwater Level (ft)	99.90	99.80	N/A	N/A
				Groundwater Elevation (Ft MSL)	722.53	722.63		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	Y	Y		
MW-13	762.48	724.08	48.40	Groundwater Level (ft)	39.96	39.92	N/A	N/A
				Groundwater Elevation (Ft MSL)	722.52	722.56		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-14	761.02	723.04	47.98	Groundwater Level (ft)	38.42	38.40	N/A	N/A
				Groundwater Elevation (Ft MSL)	722.6	722.62		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-15R	808.49	765.79	57.70	Groundwater Level (ft)	47.68	48.04	N/A	N/A
				Groundwater Elevation (Ft MSL)	760.81	760.45		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-16R	814.13	724.13	105.00	Groundwater Level (ft)	97.16	91.66	N/A	N/A
				Groundwater Elevation (Ft MSL)	716.97	722.47		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-17	760.63	746.01	19.62	Groundwater Level (ft)	16.23	19.03	0.32	0.25
				Groundwater Elevation (Ft MSL)	744.40	741.60		
				Measured Well Depth (ft)	19.30	19.37		
				Submerged screen	N	N		

Table 4A
Monitoring Well Maintenance and Performance Summary
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Well	Top of Casing	Top of Screen	Total Depth	Monitoring Parameter	Date of Measurements		Maximum Depth Discrepancy (ft) [1] April	Maximum Depth Discrepancy (ft) [1] August
					April 2-3, 2024	August 6-8, 2024		
MW-100R	822.40	809.65	27.90	Groundwater Level (ft)	14.25	13.90	N/A	N/A
				Groundwater Elevation (Ft MSL)	808.15	808.5		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-101R	799.35	785.35	29.00	Groundwater Level (ft)	16.70	16.73	N/A	N/A
				Groundwater Elevation (Ft MSL)	782.65	782.62		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		
MW-102	797.24	782.80	29.70	Groundwater Level (ft)	19.43	17.92	0.25	0.28
				Groundwater Elevation (Ft MSL)	777.81	779.32		
				Measured Well Depth (ft)	29.45	29.42		
				Submerged screen	N	N		
MW-102P	797.64	700.10	103.20	Groundwater Level (ft)	74.73	74.75	N/A	N/A
				Groundwater Elevation (Ft MSL)	722.91	722.89		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	Y	Y		
MW-102M	798.03	652.65	152.10	Groundwater Level (ft)	88.19	99.97	N/A	N/A
				Groundwater Elevation (Ft MSL)	709.84	698.06		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	Y	Y		
MW-107	788.50	776.75	26.80	Groundwater Level (ft)	21.40	21.22	-1.00	0.01
				Groundwater Elevation (Ft MSL)	767.10	767.28		
				Measured Well Depth (ft)	27.80	26.79		
				Submerged screen	N	N		
MW-108	765.57	746.62	27.70	Groundwater Level (ft)	25.38	24.36	N/A	N/A
				Groundwater Elevation (Ft MSL)	740.19	741.21		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	N	N		

Table 4A
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Well	Top of Casing	Top of Screen	Total Depth	Monitoring Parameter	Date of Measurements		Maximum Depth Discrepancy (ft) [1] April	Maximum Depth Discrepancy (ft) [1] August
					April 2-3, 2024	August 6-8, 2024		
MW-110	760.39	737.92	37.60	Groundwater Level (ft)	20.62	20.93	0.15	0.25
				Groundwater Elevation (Ft MSL)	739.77	739.46		
				Measured Well Depth (ft)	37.45	37.35		
				Submerged screen	Y	Y		
MW-110P	760.23	689.67	74.80	Groundwater Level (ft)	36.58	36.26	-5.10	-0.08
				Groundwater Elevation (Ft MSL)	723.65	723.97		
				Measured Well Depth (ft)	79.90	74.88		
				Submerged screen	Y	Y		
MW-111	787.38	760.05	42.70	Groundwater Level (ft)	6.15	41.35	0.15	0.31
				Groundwater Elevation (Ft MSL)	781.23	746.03		
				Measured Well Depth (ft)	42.55	42.39		
				Submerged screen	Y	N		
MW-112	811.93	799.55	27.90	Groundwater Level (ft)	24.26	24.14	0.43	0.56
				Groundwater Elevation (Ft MSL)	787.67	787.79		
				Measured Well Depth (ft)	27.47	27.34		
				Submerged screen	N	N		
MW-115	752.44	740.59	27.40	Groundwater Level (ft)	26.14	25.65	0.51	0.52
				Groundwater Elevation (Ft MSL)	726.30	726.79		
				Measured Well Depth (ft)	26.89	26.88		
				Submerged screen	N	N		
MW-116	742.47	729.98	27.70	Groundwater Level (ft)	17.81	17.39	-0.08	-0.04
				Groundwater Elevation (Ft MSL)	724.66	725.08		
				Measured Well Depth (ft)	27.78	27.74		
				Submerged screen	N	N		
MW-116P	742.33	695.7	51.70	Groundwater Level (ft)	19.21	19.86	-0.80	0.14
				Groundwater Elevation (Ft MSL)	723.12	722.47		
				Measured Well Depth (ft)	52.50	51.56		
				Submerged screen	Y	Y		

Table 4A
Monitoring Well Maintenance and Performance Summary
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Well	Top of Casing	Top of Screen	Total Depth	Monitoring Parameter	Date of Measurements		Maximum Depth Discrepancy (ft) [1] April	Maximum Depth Discrepancy (ft) [1] August
					April 2-3, 2024	August 6-8, 2024		
MW-116M	742.25	640.06	107.20	Groundwater Level (ft)	19.50	19.52	-1.60	-0.21
				Groundwater Elevation (Ft MSL)	722.75	722.73		
				Measured Well Depth (ft)	108.80	107.41		
				Submerged screen	Y	Y		
MW-117	780.77	769.96	28.70	Groundwater Level (ft)	21.94	22.12	1.13	1.16
				Groundwater Elevation (Ft MSL)	758.83	758.65		
				Measured Well Depth (ft)	27.57	27.54		
				Submerged screen	N	N		
MW-122	794.02	765.84	43.80	Groundwater Level (ft)	21.12	21.33	0.38	0.34
				Groundwater Elevation (Ft MSL)	772.9	772.69		
				Measured Well Depth (ft)	43.42	43.46		
				Submerged screen	Y	Y		
MW-122P	794.74	665.65	104.70	Groundwater Level (ft)	72.07	72.04	-1.42	0.73
				Groundwater Elevation (Ft MSL)	722.67	722.70		
				Measured Well Depth (ft)	106.12	103.97		
				Submerged screen	Y	Y		
MW-122M	792.54	642.94	155.30	Groundwater Level (ft)	91.12	104.28	N/A	N/A
				Groundwater Elevation (Ft MSL)	701.42	688.26		
				Measured Well Depth (ft)	NM	NM		
				Submerged screen	Y	Y		
SW-01R	NA	NA	NA	Surface Water Depth (ft)	0.17	DRY	--	--
SW-02R	NA	NA	NA	Surface Water Depth (ft)	0.17	DRY	--	--
SW-03	NA	NA	NA	Surface Water Depth (ft)	NM	0.3	--	--
SW-04	NA	NA	NA	Surface Water Depth (ft)	0.25	DRY	--	--
SW-05	NA	NA	NA	Surface Water Depth (ft)	NM	DRY	--	--

Comments:

(1) To avoid the potential for cross-contamination and increased sample turbidity associated with removing and re-installing dedicated pumps, well depths are not measured annually at wells with dedicated pumps. Depths are checked when pumps are pulled for maintenance or replacement.

(2) The total depth measurement recorded in April 2024 was approximately 100' different than the expcted results and is likely a transcription error missing a leading 1.

Updated by LH Date: 9/26/2024
Checked by RM Date: 11/5/2024

Table 4B
Vertical Gradients
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	Well Pair		Vertical Hydraulic Gradient (feet/foot)(1)	
	Shallower Well	Deeper Well	April 2024	August 2024
Water Table & Pennsylvanian Wells	MW-1R	MW-12	-0.836	-0.849
	MW-10R	MW-9P	-0.637	-0.659
	MW-102	MW-102P	-0.725	-0.738
	MW-110	MW-110P	-0.379	-0.359
	MW-116	MW-116P	-0.058	-0.097
	MW-122	MW-122P	-0.728	-0.725
Pennsylvanian & Mississippian Wells	MW-9P	MW-9M	-0.391	-0.382
	MW-102P	MW-102M	-0.279	-0.531
	MW-116P	MW-116M	-0.007	0.005
	MW-122P	MW-122M	-0.408	-0.661

Comments:
(1) A negative value indicates a downward gradient; a positive value indicates an upward gradient.

Updated by: LH Date: 9/26/2024
Checked by: RM Date: 11/4/2024

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Table 5
Background Summary
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Interwell Background								
Constituent	**Units**	**Samples**	**Detections**	**UPL**	**Statistical Test**	**GWPS**	**Source**	**Other Standards**
Shallow Hydrogeologic Unit - MW-1/MW-1R								
Field pH	SU	8	8	N/A	N/A	none	--	SMCL <6.5 or >8.5
Field Temperature	deg C	8	8	N/A	N/A	none	--	--
Field Specific Conductance	µmhos/cm	8	8	N/A	N/A	none	--	--
Field Oxidation Potential	mV	2	2*	N/A	N/A	none	--	--
Dissolved Oxygen	mg/L	2	2*	N/A	N/A	none	--	--
Arsenic	µg/l	8	1	0.880	PL(NP)	10.00	MCL	--
Barium	µg/l	8	8	90.1	PL(P)	2,000	MCL	--
Beryllium	µg/l	8	1	DQ	DQ	4.00	MCL	--
Boron	µg/l	8	4	116	PL(P)	6,000	SWS	--
Calcium	mg/L	2	2	N/A	N/A	none	--	--
Cobalt	µg/l	8	3	0.370	PL(NP)	2.1	SWS	--
Copper	µg/l	8	3	2.10	PL(NP)	1,300	SWS	SMCL 1,000
Iron	µg/l	8	5	931	PL(P)	none	--	SMCL 300
Lead	µg/l	8	4	1.58	PL(P)	15.00	SWS	--
Lithium	µg/l	2	2	N/A	N/A	14	SWS	--
Magnesium	µg/l	8	8	48,100	PL(NP)	none	--	--
Manganese	µg/l	8	4	24.7	PL(P)	300	SWS	SWS 300, SMCL 50
Molybdenum	µg/l	2	2	N/A	N/A	40	SWS	--
Selenium	µg/l	8	5	2.98	PL(P)	50	MCL	--
Zinc	µg/l	8	1	10.0	PL(NP)	2,000	SWS	SMCL 5,000
Chloride	mg/L	8	8	298	PL(P)	none	--	SMCL 250
Fluoride	mg/L	8	7	0.972	PL(P)	4.00	MCL	SMCL 2
Sulfate	mg/L	8	8	459	PL(P)	none	--	SMCL 250
Total Dissolved Solids	mg/L	8	8	1,020	PL(P)	none	--	SMCL 500
Total Suspended Solids	mg/L	2	2	N/A	N/A	none	--	--

Table 5
Background Summary
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Interwell Background								
Constituent	**Units**	**Samples**	**Detections**	**UPL**	**Statistical Test**	**GWPS**	**Source**	**Other Standards**
Pennsylvanian Shale Hydrogeologic Unit - MW-102P								
Field pH	SU	8	8	N/A	N/A	none	--	SMCL <6.5 or >8.5
Field Temperature	deg C	8	8	N/A	N/A	none	--	--
Field Specific Conductance	µmhos/cm	8	8	N/A	N/A	none	--	--
Field Oxidation Potential	mV	2	2*	N/A	N/A	none	--	--
Dissolved Oxygen	mg/L	2	2*	N/A	N/A	none	--	--
Arsenic	µg/l	8	2	0.880	PL(NP)	10.00	MCL	--
Barium	µg/l	8	8	27.8	PL(P)	2,000	MCL	--
Beryllium	µg/l	8	1	1.30	PL(NP)	4.00	MCL	--
Boron	µg/l	8	8	2,180	PL(P)	6,000	SWS	--
Calcium	mg/L	2	2	N/A	N/A	none	--	--
Cobalt	µg/l	8	8	1.62	PL(P)	2.1	SWS	--
Copper	µg/l	8	3	4.30	PL(NP)	1,300	SWS	SMCL 1,000
Iron	µg/l	8	8	5,500	PL(NP)	none	--	SMCL 300
Lead	µg/l	8	2	1.10	PL(NP)	15.00	SWS	--
Lithium	µg/l	2	2	N/A	N/A	14	SWS	--
Magnesium	µg/l	8	8	204,000	PL(P)	none	--	--
Manganese	µg/l	8	8	574	PL(NP)	574	Background	SWS 300, SMCL 50
Molybdenum	µg/l	2	1	N/A	N/A	40	SWS	--
Selenium	µg/l	8	0	DQ	DQ	50	MCL	--
Zinc	µg/l	8	5	23.7	PL(P)	2,000	SWS	SMCL 5,000
Chloride	mg/L	8	8	9.77	PL(P)	none	--	SMCL 250
Fluoride	mg/L	8	6	1.07	PL(P)	4.00	MCL	SMCL 2
Sulfate	mg/L	8	8	2,230	PL(P)	none	--	SMCL 250
Total Dissolved Solids	mg/L	8	8	3,100	PL(NP)	none	--	SMCL 500
Total Suspended Solids	mg/L	2	2	N/A	N/A	none	--	--

PL(NP) - Prediction Limit (Non-Parametric)
PL(P) - Prediction Limit (Parametric)
MCL - Maximum Contaminant Level
SWS - Statewide Standard for Groundwater
SMCL - Secondary Maximum Contaminant Level
GWPS - Groundwater Protection Standard
DQ - Double Quantification

Notes:

* = Field parameters ORP and DO have been collected historically as part of stability requirements for low-flow sampling, but were not reported in AWQRs prior to 2023.

Updated by LH Date 10/31/2024
Checked by RM Date 11/4/2024

I:\25224073.00\Deliverables\2024 AWQR\Tables\[AWQR_OML_Tables_241104.xlsx]5 - Background & GWPS summary

Table 6
Summary of Well/Detected Constituent Pairs With No SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-1R*	Field pH	SU	6.97	N/A
	Field Temperature	deg C	14.4	N/A
	Field Specific Conductance	µmhos/cm	787	N/A
	Field Oxidation Potential	mV	107.2	N/A
	Dissolved Oxygen	mg/L	1.38	N/A
	Barium	µg/l	71	N/A
	Calcium	mg/L	90	N/A
	Iron	µg/l	46 J	N/A
	Lithium	µg/l	23	N/A
	Magnesium	µg/l	28000	N/A
	Molybdenum	µg/l	1.6 J	N/A
	Chloride	mg/L	29	N/A
	Fluoride	mg/L	0.46 J	N/A
	Sulfate	mg/L	80	N/A
	Total Dissolved Solids	mg/L	470	N/A
	Total Suspended Solids	mg/L	1.6 J	N/A
MW-12	Field pH	SU	7.23	N/A
	Field Temperature	deg C	17.1	N/A
	Field Specific Conductance	µmhos/cm	2369	N/A
	Field Oxidation Potential	mV	145.3	N/A
	Dissolved Oxygen	mg/L	8.03	N/A
	Barium	µg/l	15	27.8
	Boron	µg/l	1,400	2180
	Calcium	mg/L	14	N/A
	Iron	µg/l	43 J	931
	Lithium	µg/l	110	N/A
	Magnesium	µg/l	6400	204000
	Manganese	µg/l	140	574
	Sulfate	mg/L	720	2230
	Total Dissolved Solids	mg/L	1700	3100
	Total Suspended Solids	mg/L	2.0	N/A

Table 6

Summary of Well/Detected Constituent Pairs With No SSIs

2024 Annual Water Quality Report

Ottumwa Midland Landfill

Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-13	Field pH	SU	6.97	N/A
	Field Temperature	deg C	15.9	N/A
	Field Specific Conductance	µmhos/cm	3194	N/A
	Field Oxidation Potential	mV	-34.4	N/A
	Dissolved Oxygen	mg/L	0.15	N/A
	Barium	µg/l	18	27.8
	Boron	µg/l	1,800	2180
	Calcium	mg/L	120	N/A
	Cobalt	µg/l	1.1	1.62
	Iron	µg/l	130	931
	Lithium	µg/l	160	N/A
	Magnesium	µg/l	60000	204000
	Manganese	µg/l	250	574
	Fluoride	mg/L	0.68 J	1.07
	Sulfate	mg/L	1200	2230
	Total Dissolved Solids	mg/L	2,300	3100
	Total Suspended Solids	mg/L	1.4 J	N/A
MW-14	Field pH	SU	7.10	N/A
	Field Temperature	deg C	17.0	N/A
	Field Specific Conductance	µmhos/cm	3214	N/A
	Field Oxidation Potential	mV	46.0	N/A
	Dissolved Oxygen	mg/L	0.56	N/A
	Barium	µg/l	23	27.8
	Boron	µg/l	1,900	2180
	Calcium	mg/L	76	N/A
	Cobalt	µg/l	0.56	1.62
	Copper	µg/l	2.1 J	2.1
	Iron	µg/l	47 J	931
	Lithium	µg/l	140	N/A
	Magnesium	µg/l	34,000	204000
	Manganese	µg/l	160	574
	Molybdenum	µg/l	16	N/A
	Fluoride	mg/L	0.70 J	1.07
	Sulfate	mg/L	670	2230
	Total Dissolved Solids	mg/L	2000	3100
	Total Suspended Solids	mg/L	6.0	N/A

Table 6
Summary of Well/Detected Constituent Pairs With No SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-15R	Field pH	SU	6.27	N/A
	Field Temperature	deg C	14.0	N/A
	Field Specific Conductance	µmhos/cm	2101	N/A
	Field Oxidation Potential	mV	74.9	N/A
	Dissolved Oxygen	mg/L	0.42	N/A
	Barium	µg/l	36	90.1
	Calcium	mg/L	300	N/A
	Copper	µg/l	1.8 J	2.1
	Iron	µg/l	310	931
	Lithium	µg/l	42	N/A
	Molybdenum	µg/l	5.2	N/A
	Selenium	µg/l	1.4 J	2.98
	Chloride	mg/L	10	298
	Sulfate	mg/L	440	459
	Total Suspended Solids	mg/L	2.5	N/A
MW-16R	Field pH	SU	6.94	N/A
	Field Temperature	deg C	15.0	N/A
	Field Specific Conductance	µmhos/cm	3511	N/A
	Field Oxidation Potential	mV	-44.9	N/A
	Dissolved Oxygen	mg/L	0.20	N/A
	Boron	µg/l	2,000	2180
	Calcium	mg/L	81	N/A
	Cobalt	µg/l	0.93	1.62
	Iron	µg/l	480	5500
	Lithium	µg/l	110	N/A
	Magnesium	µg/l	39,000	204000
	Manganese	µg/l	270	574
	Fluoride	mg/L	0.45 J	1.07
	Sulfate	mg/L	790	2230
	Total Dissolved Solids	mg/L	2200	3100
	Total Suspended Solids	mg/L	2.9	N/A

Table 6
Summary of Well/Detected Constituent Pairs With No SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-100R	Field pH	SU	7.05	N/A
	Field Temperature	deg C	14.0	N/A
	Field Specific Conductance	µmhos/cm	1007	N/A
	Field Oxidation Potential	mV	123.3	N/A
	Dissolved Oxygen	mg/L	4.33	N/A
	Barium	µg/l	44	90.1
	Calcium	mg/L	130	N/A
	Lithium	µg/l	21	N/A
	Magnesium	µg/l	40000	48,100
	Molybdenum	µg/l	2.2	N/A
	Chloride	mg/L	28	298
	Sulfate	mg/L	180	459
	Total Dissolved Solids	mg/L	640	1020
MW-101R	Field pH	SU	6.80	N/A
	Field Temperature	deg C	13.8	N/A
	Field Specific Conductance	µmhos/cm	1,533	N/A
	Field Oxidation Potential	mV	112.2	N/A
	Dissolved Oxygen	mg/L	0.70	N/A
	Barium	µg/l	37	90.1
	Calcium	mg/L	220	N/A
	Cobalt	µg/l	0.22 J	0.37
	Copper	µg/l	2.0 J	2.1
	Iron	µg/l	82 J	931
	Lithium	µg/l	84	N/A
	Molybdenum	µg/l	6.5	N/A
	Chloride	mg/L	6.7	298
	Total Suspended Solids	mg/L	5.0	N/A

Table 6
Summary of Well/Detected Constituent Pairs With No SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-102P*	Field pH	SU	6.49	N/A
	Field Temperature	deg C	14.0	N/A
	Field Specific Conductance	µmhos/cm	3556	N/A
	Field Oxidation Potential	mV	-44.0	N/A
	Dissolved Oxygen	mg/L	0.02	N/A
	Barium	µg/l	23	N/A
	Boron	µg/l	1700	N/A
	Calcium	mg/L	430	N/A
	Cobalt	µg/l	0.74	N/A
	Copper	µg/l	4.3 J	N/A
	Iron	µg/l	5500	N/A
	Lithium	µg/l	230	N/A
	Magnesium	µg/l	150000	N/A
	Manganese	µg/l	530	N/A
	Zinc	µg/l	12 J	N/A
	Chloride	mg/L	9.4	N/A
	Fluoride	mg/L	0.53 J	N/A
	Sulfate	mg/L	1400	N/A
	Total Dissolved Solids	mg/L	2800	N/A
	Total Suspended Solids	mg/L	12	N/A

Table 6
Summary of Well/Detected Constituent Pairs With No SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL
MW-108	Field pH	SU	6.56	N/A
	Field Temperature	deg C	14.2	N/A
	Field Specific Conductance	µmhos/cm	621	N/A
	Field Oxidation Potential	mV	-27.3	N/A
	Dissolved Oxygen	mg/L	0.97	N/A
	Barium	µg/l	34	90.1
	Calcium	mg/L	75	N/A
	Lithium	µg/l	49	N/A
	Magnesium	µg/l	16,000	48,100
	Molybdenum	µg/l	3.0	N/A
	Chloride	mg/L	2.6 J	298
	Fluoride	mg/L	0.43 J	0.972
	Sulfate	mg/L	130	459
	Total Dissolved Solids	mg/L	390	1020
	Total Suspended Solids	mg/L	6.8	N/A

UPL = Upper Prediction Limit
SSI = Statistically Significant Increase
ND = Non-detect
J = Estimated concentration at or above the LOD and below the LOQ.

mg/= milligrams per liter
µg/L = micrograms per liter

Comments:
1. This table provides a summary of detected constituents from the 2023 sampling event that did not exceed the UPL in 2023. The background levels listed are interwell prediction limits calculated using MW-1/1R data for the shallow aquifer and MW-102P data for the Pennsylvanian unit. UPLs were first calculated in 2020 using data from 2017 through 2020, and were updated in 2022 and 2023.
2. Results below the limit of quantitation (J flags) are estimated values and are not compared to the UPL or GWPS. They are included in this table regardless of whether the estimated value is higher or lower than the UPL.

3. MW-17 was dry during the October 2024 sampling event.

*. UPLs do not apply to MW-1R and MW-102P because they are background wells.

Updated by LH　Date 9/16/2024
Checked by RM　Date 11/4/2024

Table 7
Summary of Ongoing and Newly Identified SSIs
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Constituent	Units	Most Recent Result	UPL	Action Level (GWPS)
Shallow Hydrogeologic Unit					
MW-15R	Boron	µg/l	380	116	6000
	Cobalt	µg/l	1.1	0.37	2
	Magnesium	µg/l	100000	48100	none
	Manganese	µg/l	440	24.7	300
	Total Dissolved Solids	mg/L	1500	1020	none
MW-101R	Boron	µg/l	720	116	6000
	Magnesium	µg/l	71000	48100	none
	Manganese	µg/l	180	25	300
	Selenium	µg/l	5.2	3	50
	Sulfate	mg/L	480	459	none
	Total Dissolved Solids	mg/L	1100	1020	none
MW-108	Arsenic	µg/l	4.1	0.88	10
	Boron	µg/l	300	116	6000
	Cobalt	µg/l	5.0	0.37	2
	Iron	µg/l	4300	931	none
	Manganese	µg/l	920	24.7	300
	Zinc	µg/l	43	10	2000
Mid-Depth (Pennsylvanian) Hydrogeologic Unit					
MW-12	Chloride	mg/L	49	9.77	none
	Fluoride	mg/L	2.6	1.07	4
MW-13	Chloride	mg/L	13	9.77	none
MW-14	Arsenic	µg/l	2.6	0.88	10
	Chloride	mg/L	20	9.77	none
MW-16R	Barium	µg/l	38	27.8	2000
	Chloride	mg/L	22	9.77	none

UPL = Upper Prediction Limit
GWPS = Groundwater Protection Standard

mg/= milligrams per liter
µg/L = micrograms per liter

Comments:
1. This table includes results for wells/constituents that exceeded the UPL in 2024, which is the fourth year for which UPLs were calculated.
2. Results below the limit of quantitation (J flags) are estimated values and are not compared to the UPL or GWPS.

Updated by: LH   Date 9/26/2024
Checked by: RM   Date 11/4/2024

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Table 8
Historic SSIs & GWPS Exceedances
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Key: gray =UPL; black =action level (GWPS)

Well	Constituent	2017	2018	2019	2020	2021	2022	2023	2024
Shallow Hydrogeologic Unit									
MW-1R	Lithium*							■	■
MW-15R	Boron				▨	▨	▨	▨	▨
	Cobalt	■	■	■	■	■	■	■	▨
	Iron				▨	▨			
	Lithium*							■	■
	Magnesium				▨	▨	▨	▨	▨
	Manganese	■	■	■	■	■	■	■	■
	Zinc					▨			
	Sulfate				▨	▨	▨	▨	
	Total Dissolved Solids				▨	▨	▨	▨	▨
MW-17	Boron				▨	▨	Dry in August 2022 - not sampled	Dry in August 2023 - not sampled	Dry in August 2024 - not sampled
	Cobalt				■	■			
	Manganese			■	■	■			
MW-100R	Lithium*							■	■
MW-101R	Boron				▨	▨	▨	▨	▨
	Lithium*							■	■
	Magnesium						▨	▨	▨
	Manganese				▨	▨		▨	▨
	Selenium								▨
	Sulfate							▨	
	Total Dissolved Solids								▨
MW-108	Arsenic				▨	▨			▨
	Boron				▨	▨	▨	▨	▨
	Cobalt	■	■	■	■	■	■	■	■
	Iron				▨	▨		▨	▨
	Lithium*							■	■
	Manganese	■	■	■	■	■	■	■	■
	Zinc				▨	▨	▨	▨	▨
Pennsylvanian Hydrogeologic Unit									
MW-12	Chloride				▨	▨	▨	▨	▨
	Fluoride				▨	▨	▨	▨	▨
	Lithium*							■	■
MW-13	Chloride				▨	▨	▨	▨	▨
	Lithium*							■	■
MW-14	Arsenic		■	■	■	■	▨	▨	▨
	Chloride				▨	▨	▨	▨	▨
	Lithium*							■	■
MW-16R	Barium				▨	▨	▨	▨	▨
	Chloride				▨	▨	▨	▨	▨
	Lithium*							■	■
MW-102P	Lithium*							■	■

Abbreviations:

UPL = Upper Prediction Limit   SSI = Statistically Significant Increase

GWPS = Groundwater Protection Standard

1: UPLs were calculated annually beginning in 2020 when at least four sampling events with unfiltered (total) data. UPLs are only applied to results from 2020 onwards in this table.

*: Lithium was added to the sampling program in 2023.

Updated by LH Date 9/26/2024
Checked by RM Date 11/4/2024

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Table 9
Historic Prediction Limits and Groundwater Protection Standards
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

		UPL					GWPS				
Constituent	**Units**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
Shallow Hydrogeological Units											
Arsenic	mg/L	0.880	0.880	0.880	0.880	0.880	10	10	10	10	10
Barium	µg/L	125	109	99.7	95.6	90.1	2,000	2,000	2,000	2,000	2,000
Beryllium	µg/L	0.270	0.270	DQ	DQ	DQ	4	4	4	4	4
Boron	µg/L	287	256	198	129	116	6,000	6,000	6,000	6,000	6,000
Cobalt	mg/L	1.10	0.799	0.37	0.37	0.37	2.10	2.10	2.10	2.10	2.10
Copper	mg/L	4.74	3.80	2.10	2.10	2.10	1,300	1,300	1,300	1,300	1,300
Iron	µg/L	1,140	840	4,000	665	931	none	none	none	none	none
Lead	µg/L	2.62	2.04	0.90	1.32	1.58	15.00	15.00	15.00	15.00	15.00
Magnesium	µg/L	135,000	48,100	48,100	48,100	48,100	none	none	none	none	none
Manganese	mg/L	59.00	391	85.50	33.00	24.70	300	391	300	300	300
Selenium	µg/L	4.42	3.48	2.87	3.45	2.98	50.00	50.00	50.00	50.00	50.00
Zinc	µg/L	10.0	10.0	10.0	10.0	10.0	2,000	2,000	2,000	2,000	2,000
Chloride	mg/L	180	335	178	287	298	none	none	none	none	none
Fluoride	µg/L	1.47	1.21	1.16	1.10	0.97	4	4	4	4	4
Sulfate	mg/L	482	482	485	483	459	none	none	none	none	none
Total Dissolved Solids	µg/L	1,600	1,350	1,240	1,130	1,020	none	none	none	none	none
Pennsylvanian Shale Hydrogeologic Unit											
Arsenic	mg/L	0.880	0.880	0.880	0.880	0.880	10	10	10	10	10
Barium	µg/L	32.1	29.9	29.9	28.0	27.8	2,000	2,000	2,000	2,000	2,000
Beryllium	µg/L	0.270	0.270	0.270	1.300	1.300	4	4	4	4	4
Boron	µg/L	3,090	2,690	2,400	2,190	2,180	6,000	6,000	6,000	6,000	6,000
Cobalt	mg/L	2.24	1.87	1.89	1.60	1.62	2.24	2.1	2.1	2.1	2.1
Copper	mg/L	2.00	2.00	2.00	2.70	4.30	1,300	1,300	1,300	1,300	1,300
Iron	µg/L	6,140	6,040	5,500	5,500	5,500	none	none	none	none	none
Lead	µg/L	1.10	1.10	1.10	1.10	1.10	15.00	15.00	15.00	15.00	15.00
Magnesium	µg/L	205,000	193,000	225,000	206,000	204,000	none	none	none	none	none
Manganese	mg/L	627	662	574	755	574	627	662	755	574	574
Selenium	µg/L	1.00	0.96	DQ	DQ	DQ	50	50	50	50	50
Zinc	µg/L	40.00	40.00	40.00	23.10	23.70	2,000	2,000	2,000	2,000	2,000
Chloride	mg/L	9.68	9.60	9.70	9.63	9.77	none	none	none	none	none
Fluoride	µg/L	1.80	1.53	1.44	1.06	1.07	4	4	4	4	4
Sulfate	mg/L	2,300	2,260	2,410	2,200	2,230	none	none	none	none	none
Total Dissolved Solids	µg/L	3,670	3,650	3,950	3,510	3,100	none	none	none	none	none

Comments: Graphs were not generated in 2024 due to the small number of events completed to date (2020 was first year for UPL calculations).

Updated by: LH, 10/31/2024
Checked by: RM, 11/4/2024

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Table 10
Groundwater Quality Trend Summary
2024 Annual Water Quality Report
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

Well	Current GWPS Exceedances	Trend
MW-108	Cobalt	Significant decreasing trend
	Manganese	No significant trend
MW-15R	Manganese	Significant decreasing trend

Comments:

Only well/constituent pairs with GWPS exceedances are included in this summary.

Updated by: LH, 10/30/2024

Checked by: RM, 11/4/2024

Table 11

Data Analytical Summary - Additional Points

2024 Annual Water Quality Report

Ottumwa Midland Landfill

Permit No. 90-SDP-8-92P

CHEMICAL PARAMETER	GWPS	GWPS SOURCE	EVENT	GU-1 TEMP	GU-2	GU-EX	LP-1	SW-1R	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	TCB-1/2
ARSENIC, µg/L	10	MCL	2024-Aug	<0.53	DRY	0.70 J	DRY	DRY	DRY	2.0	DRY	DRY	9.7	0.95 J
BARIUM, µg/L	2,000	MCL	2024-Aug	38		35				52			72	76
BERYLLIUM, µg/L	4	MCL	2024-Aug	<0.33		<0.33				<0.33			<0.33	<0.33
BORON, µg/L	6,000	SWS	2024-Aug	270		900				560			2,100	430
CALCIUM, mg/L	--	--	2024-Aug	230		150				61			260	130
COBALT, µg/L	2.1	SWS	2024-Aug	11		3.5				0.20 J			0.68	<0.17
COPPER, µg/L	1,300	SWS	2024-Aug	<1.8		<1.8				<1.8			<1.8	<1.8
FLUORIDE, mg/L	4	MCL	2024-Aug	0.42 J		0.46 J				<0.38			<0.38	<0.38
IRON, µg/L	--	--	2024-Aug	<36		260				76 J			<36	<36
LEAD, µg/L	15	SWS	2024-Aug	<0.26		<0.26				<0.26			<0.26	<0.26
LITHIUM, µg/L	14	SWS	2024-Aug	48		26				8.7 J			43	3.3 J
MAGNESIUM, µg/L	--	--	2024-Aug	61000		36000				23000			28000	14000
MANGANESE, µg/L	300	SWS	2024-Aug	2000		250				26			86	6.0 J
MOLYBDENUM, µg/L	40	SWS	2024-Aug	2.2		48				9.9			680	3.9
SELENIUM, µg/L	50	MCL	2024-Aug	1.4 J		4.7 J				1.9 J			76	<1.4
ZINC, µg/L	2000	SWS	2024-Aug	29		39				<9.7			<9.7	<9.7
CHLORIDE, mg/L	--	--	2024-Aug	20		32				4.6 J			1000	12
SULFATE, mg/L	--	--	2024-Aug	390		460				250			1,900	380
TOTAL DISSOLVED SOLIDS, mg/L	--	--	2024-Aug	1100		930				410			5,000	590
TOTAL SUSPENDED SOLIDS, mg/L	--	--	2024-Aug	<1.4		2.5				8.3			6.0	3.9
pH, SU	--	--	2024-Aug	6.73		7.70				8.56			8.60	8.06
TEMPERATURE, DEGREES C	--	--	2024-Aug	20.7		23.3				28.1			25.8	28.3
DISSOLVED OXYGEN	--	--	2024-Aug	6.66		7.22				8.94			12.64	8.39
OXIDATION REDUCTION POTENTIAL	--	--	2024-Aug	83.1		56.2				18.0			63.7	71.9
SPECIFIC CONDUCTANCE, UMHOS/CM	--	--	2024-Aug	1438		1281				651			6,769	863

NOTES:

MCL = Maximum Contaminant Level

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

SWS = Statewide Standard for Groundwater

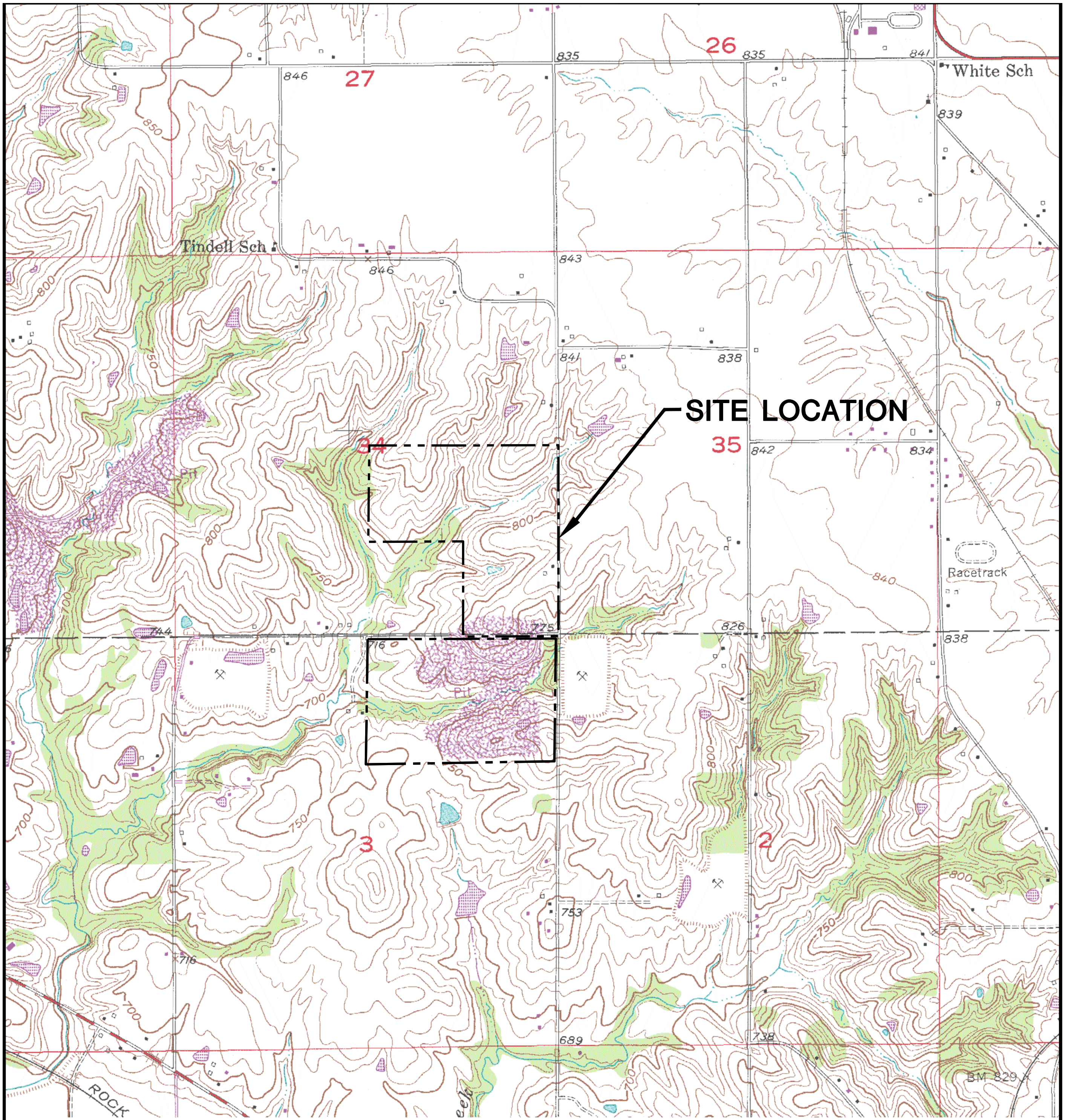
-- = Not Applicable

Updated by: LH Date: 9/26/2024

Checked by: RM Date: 11/5/2024

I:\25224073.00\Deliverables\2024 AWQR\Tables\[AWQR_OML_Tables_241104.xlsx]11-Additional Points

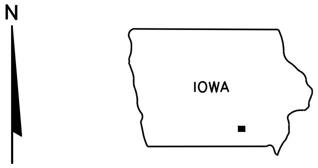
Figures



LEGEND

——— - - ——— APPROXIMATE PROPERTY LINE

OTTUMWA NORTH QUADRANGLE
IOWA–WAPELLO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 OTTUMWA NORTH 15' QUADRANGLE
1976
SCALE: 1" = 2,000'



CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

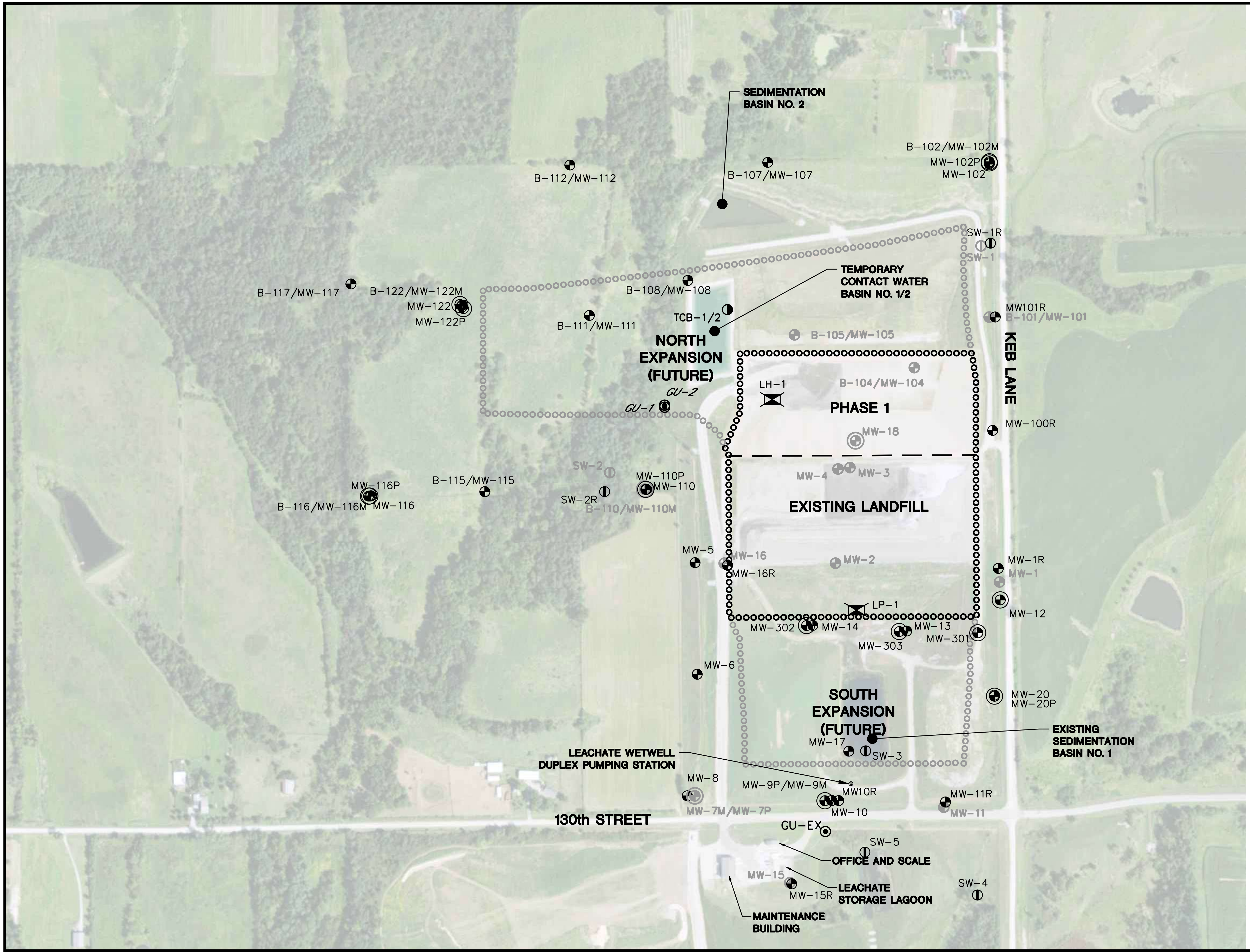
SITE LOCATION MAP

PROJECT NO.	25216073.00	DRAWN BY:	KP
DRAWN:	09/15/11	CHECKED BY:	MB
REVISED:	11/17/16	APPROVED BY:	TK 11/21/17

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718–6751
PHONE: (608) 224–2830

FIGURE
1

I:\25216073.00\Drawings\FIG 1 Site Location.dwg, 11/21/2017 3:30:42 PM



N

400 0 400

SCALE: 1" = 400'

LEGEND

— - —	APPROXIMATE PROPERTY LINE
○○○○○○○	APPROVED WASTE LIMITS
○○○○○○○	EXISTING WASTE LIMITS
— — —	PHASE LIMIT
	EXISTING SOIL BORING
◕	EXISTING MONITORING WELL
◉	EXISTING PIEZOMETER
◐	EXISTING SURFACE WATER MONITORING STAFF GAUGE
◕	ABANDONED MONITORING WELL
◐	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
⧗	LEACHATE HEADWELL
⊙	GROUNDWATER UNDERDRAIN
◑	TEMPORARY CONTACT WATER BASIN

NOTES:

1. 2015 AERIAL PHOTOGRAPH IS FROM THE IOWA GEOGRAPHIC MAP SERVER-IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT & RESEARCH FACILITY.
2. PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
3. PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
4. EXISTING LIMITS OF WASTE ARE APPROXIMATE.

PROJECT NO.	25221073.00	DRAWN BY:	AHB/KP
DRAWN:	11/17/2011	CHECKED BY:	PEG
REVISED:	02/16/2021	APPROVED BY:	TK, 11/10/2023

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT

INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

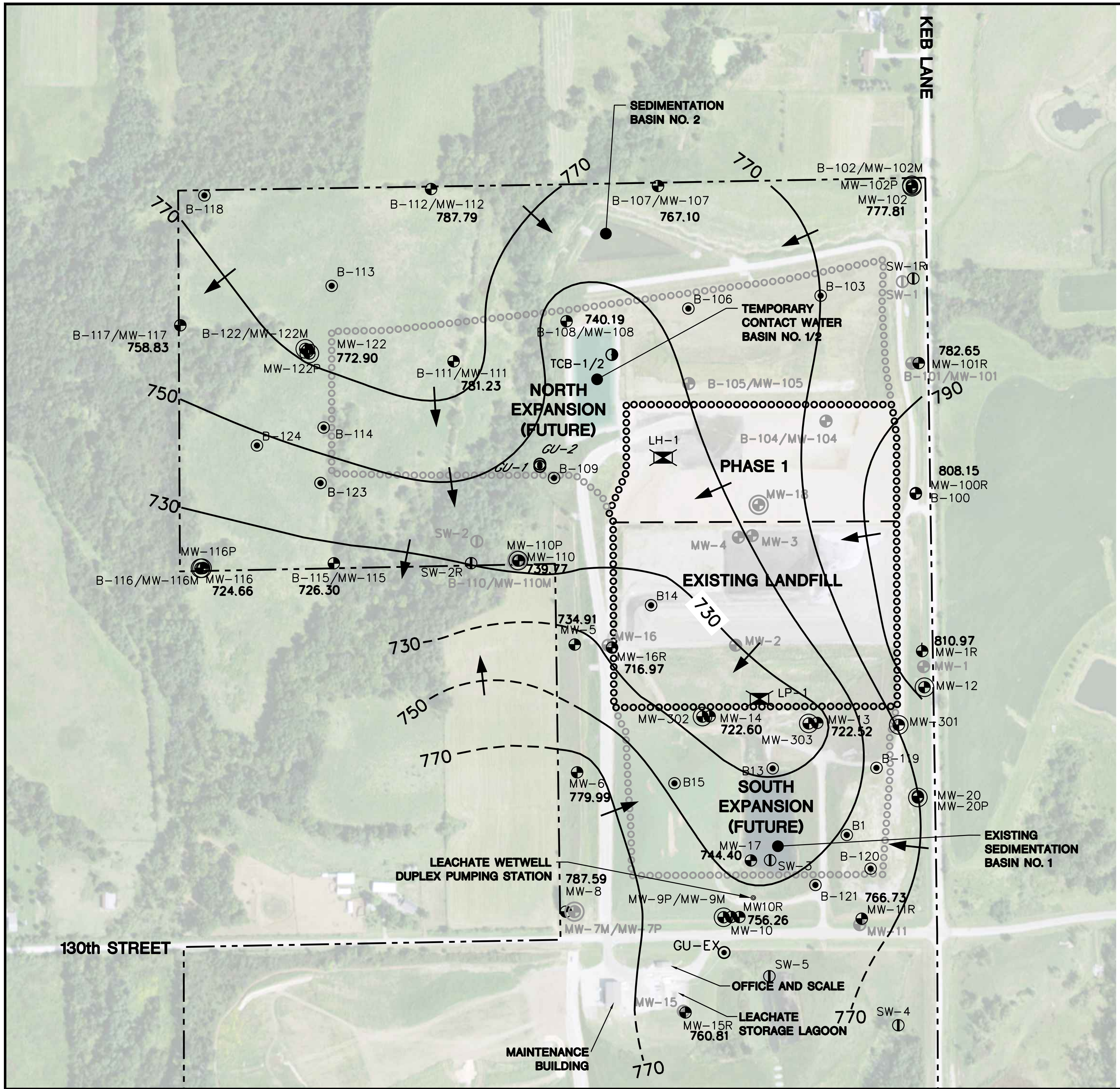
SITE

OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

SITE PLAN

FIGURE
2

I:\25221073.00\Drawings\Phasing-Monitoring Network.dwg, 10/28/2021 8:18:09 AM



LEGEND

— · —	APPROXIMATE PROPERTY LINE
○○○○○○○○	APPROVED LIMITS OF WASTE
○○○○○○○○	EXISTING WASTE LIMITS
— — —	PHASE LIMIT
◕	EXISTING MONITORING WELL
◉	EXISTING PIEZOMETER
◐	EXISTING SURFACE WATER MONITORING STAFF GAUGE
◐	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
◕	ABANDONED MONITORING WELL
⊠	LEACHATE HEADWELL
⊙	GROUNDWATER UNDERDRAIN
◑	TEMPORARY CONTACT WATER BASIN
782.65	WATER TABLE ELEVATION MEASURED IN APRIL 2024
(NM)	NOT MEASURED
— —	WATER TABLE CONTOUR 20-FOOT CONTOUR INTERVAL (DASHED WHERE INFERRED)
→	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. 2015 AERIAL PHOTOGRAPH IS FROM THE IOWA GEOGRAPHIC MAP SERVER-IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT & RESEARCH FACILITY.
2. PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
3. PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
4. EXISTING LIMITS OF WASTE ARE APPROXIMATE.
5. MW-13 AND MW-14 ARE USED IN THE INTERPRETATION OF BOTH THE WATER TABLE MAP AND THE POTENTIOMETRIC SURFACE MAP BECAUSE THEY ARE SCREENED IN THE PENNSYLVANIAN UNIT AND ACROSS WHAT COULD BE INTERPRETED AS THE WATER TABLE (1ST OCCURRENCE OF GROUNDWATER AT THE WELL LOCATIONS).
6. A GROUNDWATER UNDERDRAIN SYSTEM IS PRESENT BELOW THE BASE OF THE CURRENT FILL AREA. ELEVATIONS IN THE BASE UNDERDRAIN SYSTEM RANGE FROM 748' TO 762'. ADDITIONALLY, FINGER DRAINS WERE INSTALLED ALONG THE EASTERN EDGE OF THE FILL AREA AT THE AN ELEVATION OF APPROXIMATELY 795'. THESE FINGER DRAINS ARE TIED TO THE UNDERDRAIN SYSTEM.

N

400 0 400

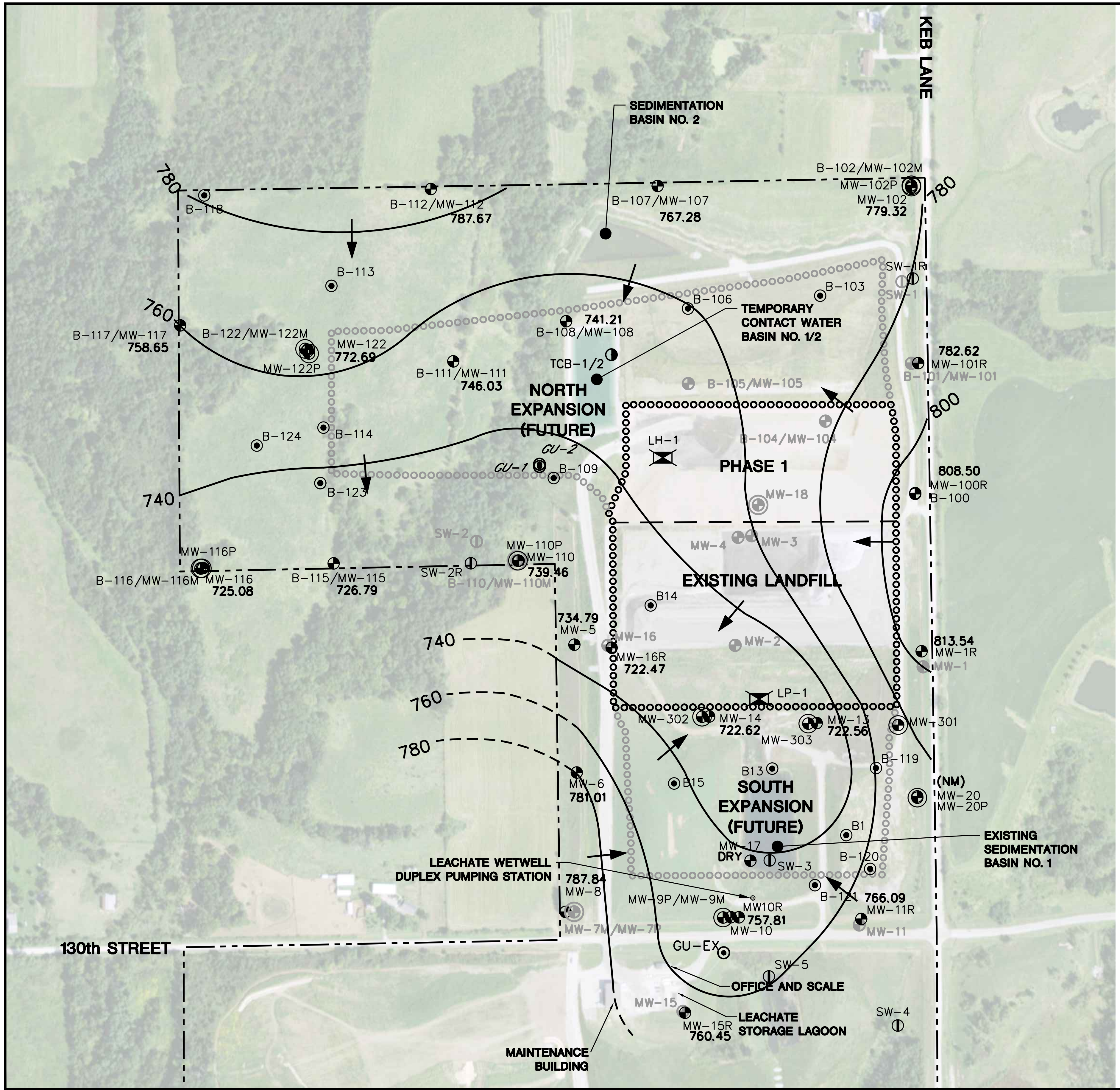
SCALE: 1" = 400'

PROJECT NO.	25224073.00	DRAWN BY:	SB/RAR	ENGINEER	**SCS ENGINEERS** 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	INTERSTATE POWER AND LIGHT CO. 15300 130th STREET OTTUMWA, IA 52501
DRAWN:	08/05/2024	CHECKED BY:	NLB 9/30/2024				
REVISED:	10/16/2024	APPROVED BY:	BRK 10/16/2024				

SITE: OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

WATER TABLE MAP
APRIL 2, 2024

FIGURE
3



LEGEND

— · — · —	APPROXIMATE PROPERTY LINE
○○○○○○○○	APPROVED LIMITS OF WASTE
○○○○○○○○	EXISTING WASTE LIMITS
— — —	PHASE LIMIT
◕	EXISTING MONITORING WELL
◉	EXISTING PIEZOMETER
◐	EXISTING SURFACE WATER MONITORING STAFF GAUGE
◐	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
◕	ABANDONED MONITORING WELL
⧗	LEACHATE HEADWELL
⊙	GROUNDWATER UNDERDRAIN
◑	TEMPORARY CONTACT WATER BASIN
782.62	WATER TABLE ELEVATION MEASURED IN AUGUST 2024
(NM)	NOT MEASURED
———	WATER TABLE CONTOUR 20-FOOT CONTOUR INTERVAL (DASHED WHERE INFERRED)
→	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. 2015 AERIAL PHOTOGRAPH IS FROM THE IOWA GEOGRAPHIC MAP SERVER–IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT & RESEARCH FACILITY.
2. PROPERTY LINE SOUTH OF 130TH STREET FROM SURVEY MAP PREPARED BY GARDEN & ASSOCIATES, OSKALOOSA, IOWA, DATED DECEMBER 20, 1988.
3. PROPERTY LINE NORTH OF 130TH STREET FROM PLAT OF SURVEY MAP PREPARED BY SCS ENGINEERS, MADISON, WISCONSIN, DATED FEBRUARY 20, 2013.
4. EXISTING LIMITS OF WASTE ARE APPROXIMATE.
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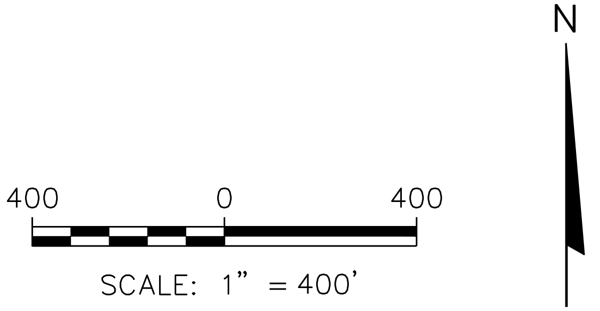
6. A GROUNDWATER UNDERDRAIN SYSTEM IS PRESENT BELOW THE BASE OF THE CURRENT FILL AREA. ELEVATIONS IN THE BASE UNDERDRAIN SYSTEM RANGE FROM 748' TO 762'. ADDITIONALLY, FINGER DRAINS WERE INSTALLED ALONG THE EASTERN EDGE OF THE FILL AREA AT THE AN ELEVATION OF APPROXIMATELY 795'. THESE FINGER DRAINS ARE TIED TO THE UNDERDRAIN SYSTEM.



PROJECT NO.	25224073.00	DRAWN BY:	SB/RAR
DRAWN:	09/03/2024	CHECKED BY:	NLB 9/30/2024
REVISED:	10/16/2024	APPROVED BY:	BRK 10/16/2024

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

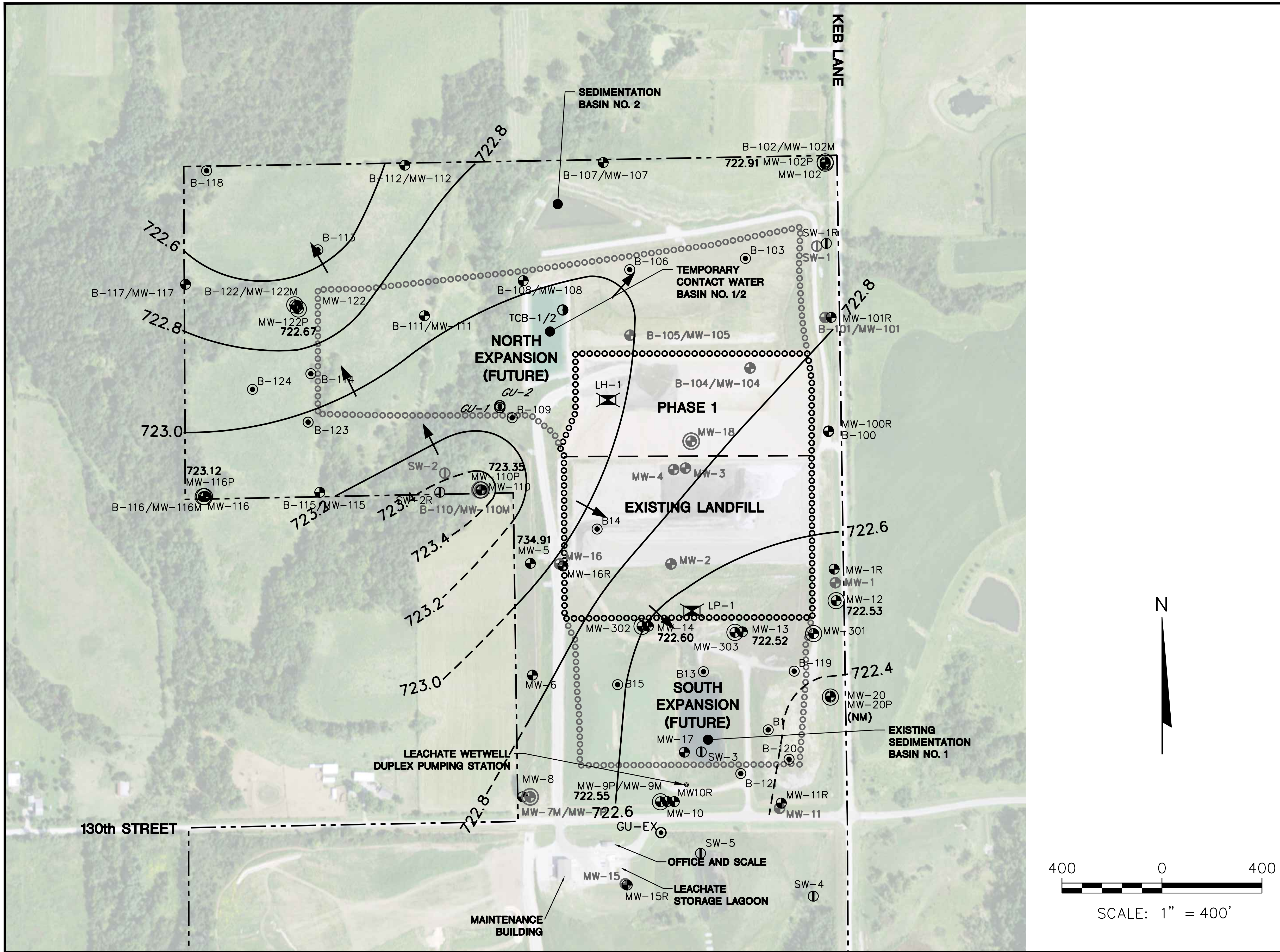
CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

WATER TABLE MAP
AUGUST 6-8, 2024

FIGURE
4

I:\25224073.00\Drawings\Aug 2024 Wtbl (State) Piezo.dwg, 10/16/2024 3:03:26 PM



LEGEND

— - - —	APPROXIMATE PROPERTY LINE
○○○○○○○○	APPROVED WASTE LIMITS
○○○○○○○○	EXISTING WASTE LIMITS
— — —	PHASE LIMIT
◕	EXISTING MONITORING WELL
◉	EXISTING PIEZOMETER
◐	EXISTING SURFACE WATER MONITORING STAFF GAUGE
◐	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
◕	ABANDONED MONITORING WELL
⊠	LEACHATE HEADWELL
⊙	GROUNDWATER UNDERDRAIN
◑	TEMPORARY CONTACT WATER BASIN
722.52	POTENTIOMETRIC GROUNDWATER SURFACE ELEVATION MEASURED ON APRIL 2024
(NM)	NOT MEASURED
——— - -	POTENTIOMETRIC SURFACE CONTOUR 0.2-FOOT CONTOUR INTERVAL (DASHED WHERE INFERRED)
→	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. 2015 AERIAL PHOTOGRAPH IS FROM THE IOWA GEOGRAPHIC MAP SERVER-IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT & RESEARCH FACILITY.
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PROJECT NO.	25224073.00	DRAWN BY:	SB/RAR
DRAWN:	08/05/2024	CHECKED BY:	NLB 9/30/2024
REVISED:	10/16/2024	APPROVED BY:	BRK 10/16/2024

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

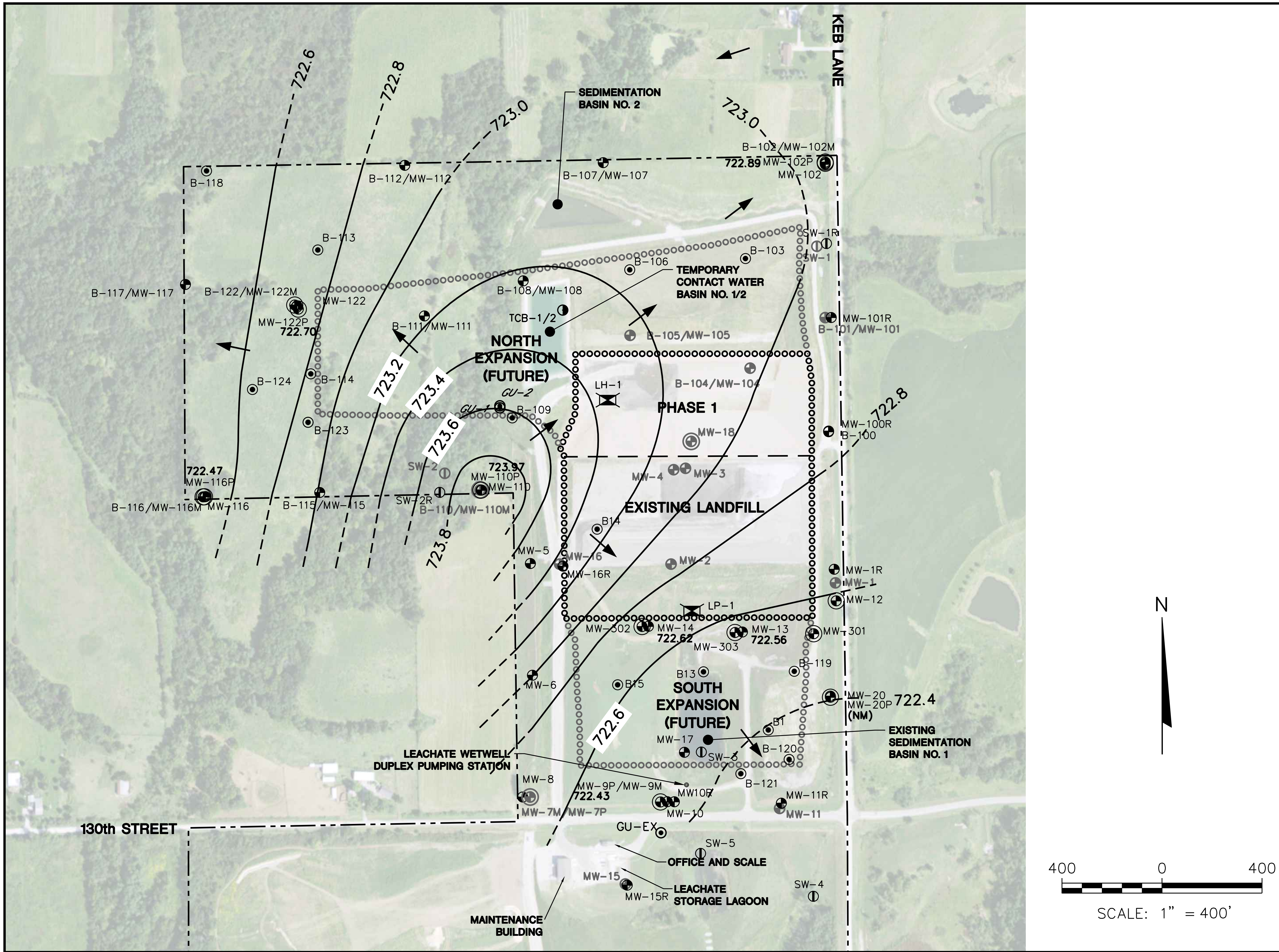
CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

POTENTIOMETRIC GROUNDWATER SURFACE CONTOUR MAP-PENNSYLVANIAN
APRIL 2, 2024

FIGURE
5

I:\25224073.00\Drawings\Aug 2024 Wtbl (State) Piezo.dwg, 10/16/2024 3:22:46 PM



LEGEND

— - - —	APPROXIMATE PROPERTY LINE
○○○○○○○○	APPROVED WASTE LIMITS
○○○○○○○○	EXISTING WASTE LIMITS
— — —	PHASE LIMIT
◕	EXISTING MONITORING WELL
◉	EXISTING PIEZOMETER
◑	EXISTING SURFACE WATER MONITORING STAFF GAUGE
◑	ABANDONED SURFACE WATER MONITORING STAFF GAUGE
◕	ABANDONED MONITORING WELL
⧗	LEACHATE HEADWELL
⊙	GROUNDWATER UNDERDRAIN
◑	TEMPORARY CONTACT WATER BASIN
722.52	POTENTIOMETRIC GROUNDWATER SURFACE ELEVATION MEASURED ON AUGUST 2024
(NM)	NOT MEASURED
——— - -	POTENTIOMETRIC GROUNDWATER SURFACE CONTOUR 0.2-FOOT CONTOUR INTERVAL (DASHED WHERE INFERRED)
→	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. 2015 AERIAL PHOTOGRAPH IS FROM THE IOWA GEOGRAPHIC MAP SERVER-IOWA STATE UNIVERSITY GEOGRAPHIC INFORMATION SYSTEMS SUPPORT & RESEARCH FACILITY.
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PROJECT NO.	25224073.00	DRAWN BY:	SB/RAR
DRAWN:	09/03/2024	CHECKED BY:	NLB 9/30/24
REVISED:	10/16/2024	APPROVED BY:	BRK 10/16/24

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

POTENTIOMETRIC GROUNDWATER SURFACE CONTOUR MAP-PENNSYLVANIAN
AUGUST 6-8, 2024

FIGURE
6

I:\25224073.00\Drawings\Aug 2024 Wtbl (State) Piezo.dwg, 10/16/2024 3:47:44 PM

Appendix A

Groundwater Sampling Field Sheets

SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No. 25224073.00 **Site** GML

Well No. MW-15R **Date** 8/6/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 48.04

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/6/24 7:30 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 300 ml/min

Water Color/Odor clear / none

Pump Start/Stop Time 8:10 / 9:16

Temperature: 64°F **Wind Direction:** [✓ N] E S [✓ W] **Precip:** None [✓ Light] Heavy **Sky:** [✓ Cloudy] Sunny Partly

3.3

2.3

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (μs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
8:10	48.12	16.5	6.15	5.22	2455	198.2	8.36	
8:15	48.28	15.0	6.29	2.15	2448	84.8	7.16	
8:20	48.37	14.9	6.25	1.12	2420	67.4	5.95	
8:25	48.47	14.7	6.24	0.78	2389	66.3	6.21	
8:30	48.53	15.5	6.24	0.69	2365	68.1	6.11	
8:35	48.64	15.7	6.26	0.68	2352	69.1	5.54	
8:40	48.74	15.6	6.26	0.63	2322	69.4	6.25	
8:45	48.86	15.1	6.27	0.58	2263	69.5	5.50	
8:50	49.23	14.0	6.27	0.45	2122	76.4	5.90	
8:55	49.55	14.0	6.27	0.46	2092	72.3	6.13	
9:00	49.71	14.0	6.27	0.42	2101	74.9	5.74	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft

S:\1_Scientist Log Forms\LOG FORMS\Groundwater Sampling Log_v3.docx

SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No. 25224073-00 **Site** OML

Well No. MW-1R **Date** 8/6/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 9.77

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/6/24 7:30

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 400 ml/min

Water Color/Odor clear / none

Pump Start/Stop Time 10:06 / 11:26

Temperature: 65°F **Wind Direction:** [✓ N] E S [✓ W] **Precip:** [✓ None] Light Heavy **Sky:** [✓ Cloudy] Sunny Partly

3.5
3.5
3.4
3.5

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
10:06	10.06	13.6	7.38	2.52	833	99.4	11.11	
10 11	10.52	13.3	7.13	1.25	827	102.6	7.56	
10 16	10.98	13.6	7.06	1.13	825	103.0	6.23	
10:21	11:22	14.4	7.13	3.50	786	104.8	7.23	
10:26	11:48	14.4	7.08	3.67	796	109.5	7.30	
10 31	11:55	14.8	7.04	3.10	803	111.4	7.74	
10:36	11:56	14.5	7.02	2.47	809	111.7	6.93	
10:41	11:62	14.4	7.00	1.94	810	111.0	6.85	
10:46	11.71	14.4	6.99	1.72	808	110.2	6.70	
10:51	11:79	14.4	6.98	1.58	806	109.4	6.48	
10:56	11.96	14.4	6.98	1.47	802	108.5	7.18	
11:01	12.22	14.3	6.97	1.42	795	107.9	6.71	
11:06	12:39	14.4	6.97	1.40	791	107.8	6.59	

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: 1 ft 1/4' tubing used

*: Volume in a 2-inch well = 617 ml/ft

S:\1_Scientist Log Forms\LOG FORMS\Groundwater Sampling Log_v3.docx

SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No.

Site OML

Well No. MW-1R cont..

Date 8/6/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked:

Turbidity meter model & unit ID #

Sampling Device: Bladder Pump Peristaltic Pump Other:

Pumping Rate:

Water Color/Odor /

Pump Start/Stop Time /

Temperature:

Wind Direction: N E S W

Precip: None Light Heavy

Sky: Cloudy Sunny Partly

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
11:11	12.53	14.4	6.97	1.38	787	107.2	6.46	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft

S:\1_Scientist Log Forms\LOG FORMS\Groundwater Sampling Log_v3.docx

SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW - 106R **Date** 8/6/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 13.90

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/6/24 7:30 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 350 ml/min

Water Color/Odor clear / none

Pump Start/Stop Time 11:43 / 12:45

Temperature: 65 °F **Wind Direction:** [✓ N] E S [✓ W] **Precip:** [✓ None] Light Heavy **Sky:** [✓ Cloudy] Sunny Partly

3.0
4.0
2.9

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
11:43	14.12	15.2	7.49	6.81	966	131.1	6.48	
11 48	14.52	13.1	7.15	4.50	942	130.1	5.39	
11:53	14.69	13.9	7.11	4.73	938	128.5	5.79	
11:58	14.73	14.1	7.08	4.59	963	127.9	6.02	
12:03	14.76	14.0	7.06	4.43	978	127.1	5.55	
12:08	14.80	14.0	7.06	4.38	987	126.1	5.38	
12:13	14.83	14.0	7.05	4.36	993	125.2	5.05	
12:18	14.92	13.9	7.05	4.34	998	124.5	6.53	
12:23	14.96	14.0	7.05	4.34	1001	124.1	5.97	
12:28	14.97	14.0	7.05	4.33	1005	123.8	5.64	
12:33	14.97	14.0	7.05	4.33	1007	123.3	5.77	Sample

Sample Bottles Collected:

Sample Date /Time:

Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft

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SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW-101R **Date** 8/6/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 16.73

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/6/24 7:30 Am

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 300 ml/min

Water Color/Odor clear / none

Pump Start/Stop Time 13:12 / 14:10

Temperature: 66°F **Wind Direction:** [✓ N] E S W **Precip:** [✓ None] Light Heavy **Sky:** [✓ Cloudy] Sunny Partly

3.0
2.7
1.3

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
13:12	17.05	15.6	7.29	6.88	1429	138.8	8.56	
13:17	17.44	13.0	6.84	1.04	1497	139.8	6.28	
13:22	17.61	13.3	6.81	0.80	1503	135.1	6.22	
13:27	17.82	13.3	6.80	0.68	1502	130.4	7.74	
13:32	17.97	13.5	6.80	0.73	1502	125.2	7.95	
13:37	18.18	13.5	6.80	0.79	1511	122.3	15.49	
13:42	18.27	13.9	6.80	0.80	1525	118.8	13.89	
13:47	18:42	13.9	6.80	0.72	1532	116.5	10.31	
13:52	18:56	13.9	6.80	0.73	1534	113.9	10.87	
13:57	18.64	13.8	6.80	0.70	1533	112.2	9.94	Sample

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: Some ants & other detritus present

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW-108 **Date** 8/7/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 24.36

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID # PRO DSS

Date/time pH Calibration Last Checked: 8/7/24 7:00 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 300 ml/min

Water Color/Odor brown tint /earthy smell

Pump Start/Stop Time 7:57 /9:09

Temperature: 62° F **Wind Direction:** [✓ N] E S W **Precip:** [✓ None] Light Heavy **Sky:** Cloudy [✓ Sunny] Partly

3.1
3.2
3.5

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
7:57	24.52	14.2	6.49	5.13	716	174.2	48.11	
8:02	24.78	13.6	6.57	1.58	794	78.7	55.29	
8:07	24.94	13.4	6.59	1.16	753	40.8	27.20	
8:12	25.05	13.4	6.57	1.02	678	-1.8	14.43	
8:17	25.09	13.6	6.42	1.59	557	16.6	6.86	
8:22	25.08	13.6	6.36	1.73	552	16.5	6.56	
8:27	25.12	13.7	6.39	1.59	565	8.7	5.04	
8:32	25.14	13.8	6.44	1.39	583	-1.2	5.10	
8:37	25.18	13.7	6.47	1.27	591	-8.7	5.14	
8:42	25.18	13.9	6.50	1.15	603	-14.3	4.49	
8:47	25.14	14.0	6.52	1.04	609	-18.9	4.26	
8:52	25.19	14.0	6.54	0.94	617	-23.7	4.38	

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: Sample became clear after ~15 min

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No.

Site OML

Well No. MW-108

Date 8/7/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked:

Turbidity meter model & unit ID #

Sampling Device: Bladder Pump Peristaltic Pump Other:

Pumping Rate:

Water Color/Odor /

Pump Start/Stop Time /

Temperature: **Wind Direction:** N E S W **Precip:** None Light Heavy **Sky:** Cloudy Sunny Partly

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
8:57	25.15	14.1	6.55	0.98	619	-25.2	4.11	
9:02	25.13	14.2	6.56	0.97	621	-27.3	3.86	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft

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SCS ENGINEERS Environmental Consultants & Contractors

Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW-14 **Date** 8/7/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 38.46

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/7/24 7:00 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 150 ml/min

Water Color/Odor clear / none

Pump Start/Stop Time 9:37 /

Temperature: 72 °F **Wind Direction:** [✓ N] [✓ E] S W **Precip:** [✓ None] Light Heavy **Sky:** Cloudy [✓ Sunny] Partly

2.8
2.1

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
9:37	38.48	26.1	7.05	7.64	2.7	79.2	13.00	
9:42	39.22	14.8	7.13	3.20	3215	48.0	6.55	
9:47	39:58	15.5	7.15	0.82	3196	39.8	4.86	
9:52	39:74	18.0	7.12	0.99	3216	37.3	4.23	
9:57	40.25	15.6	7.14	0.48	3196	37.2	5.50	
10:02	40.32	17.1	7.14	0.40	3177	36.6	5.68	
10:07	40,34	18.5	7.11	0.52	3203	37.8	6.42	
10:12	40.47	19.4	7.09	0.68	3220	39.1	7.29	
10:17	40.53	19.7	7.09	0.83	3223	40.8	8.64	
10:22	40.61	19.9	7.09	0.86	3226	42.4	9.63	
10:27	40.62	19.9	7.09	0.85	3226	43.6	9.26	
10:32	40.97	17.0	7.11	0.78	3225	45.3	9.68	

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: 2 ft 1/4" tubing used

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No.
Site OML
Well No. MW-14 cont ...
Date 8/7/24
Sampling Personnel Michael Morgan

Total Well Depth
Depth to Water
Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #
Date/time pH Calibration Last Checked:
Turbidity meter model & unit ID #

Sampling Device: Bladder Pump Peristaltic Pump Other:
Pumping Rate:
Water Color/Odor /
Pump Start/Stop Time /

Temperature: **Wind Direction:** N E S W **Precip:** None Light Heavy **Sky:** Cloudy Sunny Partly

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
10:37	41.01	17.5	7.12	0.57	3182	45.2	10.90	
10:42	41.04	17.2	7.11	0.62	3189	45.3	10.92	
10:47	41.09	17.0	7.10	0.56	3214	46.0	10.87	SAMPLE

Sample Bottles Collected:

Sample Date /Time:
Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft
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Groundwater Sampling Log

Project No. 25224073-00 **Site** OML

Well No. MW-102 P **Date** 8/7/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 74.75

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/7/24 7:00 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 400 ml/min

Water Color/Odor Clear / none

Pump Start/Stop Time 13:12 /

Temperature: 77°F **Wind Direction:** N [✓ E] S W **Precip:** [✓ None] Light Heavy **Sky:** Cloudy [✓ Sunny] Partly

3.0
3.2
3.7
4.7

SAMPLE

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
13:12	74.79	19.4	7.14	8.61	3113	41.4	8.79	
13:17	74.82	14.2	6.52	1.44	3359	-51.6	36.02	
13:22	74.72	13.9	6.51	0.31	3547	-44.5	23.86	
13:27	74.71	14.0	6.51	0.16	3564	-44.0	24.08	
13:32	74.71	13.9	6.50	0.11	3553	-43.9	29.81	
13:37	74.71	14.0	6.50	0.08	3551	-43.8	33.59	
13:42	74.71	14.0	6.50	0.04	3555	-43.9	31.36	
13:47	74.71	14.0	6.49	0.02	3556	-44.0	33.20	SAMPLE

Sample Bottles Collected:

Sample Date /Time: /Used

Additional Notes: Generator required ^. No water drawn in regular ~~[illegible]~~ controller

~1ft 1/4" tubing used

Turbidity re-calibrated post well

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW-16R **Date** 8/7/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 91.66

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/7/24 7:00 AM

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 300 ml/min

Water Color/Odor clear / None

Pump Start/Stop Time 14:30 / 15:21

Temperature: 77°F **Wind Direction:** N [✓ E] S W **Precip:** [✓ None] Light Heavy **Sky:** Cloudy [✓ Sunny] Partly

2.6
2.9

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
14:30	91.91	21.4	7.60	7.09	3538	-51.1	4.83	
14:35	91.93	15.2	7.16	3.55	3401	-9.5	15.68	
14:40	91.95	15.1	7.01	0.92	3403	-4.4	9.48	
14:45	91.95	15.0	6.98	0.50	3448	-22.4	8.02	
14:50	91.95	14.9	6.96	0.37	3468	-30.6	6.34	
14:55	91.94	15.0	6.95	0.28	3480	-344	7.70	
15:00	91.95	15.1	6.94	0.24	3492	-40.4	7.93	
15:05	91.95	15.0	6.94	0.20	3511	-44.9	7.43	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: Generator required/used.

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW - 12 **Date** Purged 8/7/24

Sampling Personnel Michael Morgan Sample 8/8/24

Total Well Depth

Depth to Water 99.80 pre purge

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/8/24 07:00

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate:

Water Color/Odor clear / none

Pump Start/Stop Time 7:37 / 7:53

Temperature: 64°F **Wind Direction:** [✓ N] E S [✓ W] **Precip:** [✓ None] Light Heavy **Sky:** [✓ Cloudy] Sunny Partly

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
7:40	101.66	17.1	7.23	8.03	2369	145.3	10.98	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: Water not flowing when pump on. Purged well on 8/7
Depth to top of pump = 122.20 ft
Depth to water at sampling = 101.66 Ft

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** OML

Well No. MW - 13 **Date** 8/8/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water 39.92

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/8/24 07:00

Turbidity meter model & unit ID #

Sampling Device: [✓ Bladder Pump] Peristaltic Pump Other:

Pumping Rate: 250 ml/min

Water Color/Odor clear / None

Pump Start/Stop Time 8:21 / 9:39

Temperature: 71°F **Wind Direction:** N E [✓ S] [✓ W] **Precip:** [✓ None] Light Heavy **Sky:** Cloudy Sunny [✓ Partly]

3.3
2.4
1.9

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
8:21	40.22	17.0	7.24	8.28	3140	143.9	2.96	
8:26	40.23	14.2	6.97	0.86	3202	146.9	4.91	
8:31	40.18	14.7	7.02	0.37	3205	133.7	3.64	
8:36	40.12	14.7	7.02	0.27	3202	106.9	5.46	
8:41	40.23	14.3	7.02	0.18	3198	77.7	9.05	
8:46		14.3	7.01	0.08	3190	50.2	6.60	
8:51		14.3	7.01	0.06	3188	19.4	6.25	
8:56		15.5	6.99	0.12	3184	1.6	6.39	
9:01		15.7	6.98	0.18	3195	-9.9	5.84	
9:06		15.8	6.97	0.20	3196	-17.9	6.97	
9:11		15.7	6.98	0.19	3199	-23.8	4.86	
9:16	40.03	15.7	6.97	0.17	3195	-28.1	5.87	

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: Batteries in water measure tape ~~dead~~ drying during stabilization

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** GML

Well No. MW-13 cont... **Date** 8/8/24

Sampling Personnel Michael Morgan

Total Well Depth

Depth to Water

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked:

Turbidity meter model & unit ID #

Sampling Device: Bladder Pump Peristaltic Pump Other:

Pumping Rate:

Water Color/Odor /

Pump Start/Stop Time /

Temperature: **Wind Direction:** N E S W **Precip:** None Light Heavy **Sky:** Cloudy Sunny Partly

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
9:21		15.8	6.97	0.16	3194	-31.9	6.36	
9:26	40.05	15.9	6.97	0.15	3194	-34.4	6.06	SAMPLE

Sample Bottles Collected:

Sample Date /Time:

Additional Notes:

*: Volume in a 2-inch well = 617 ml/ft

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Groundwater Sampling Log

Project No. 25224073.00 **Site** O.ML

Well No. MW-17 **Date** 8/8/24

Sampling Personnel Michael Morgan

Total Well Depth 19.37

Depth to Water 19.03

Well Volume*

pH/temp/cond/DO/ORP meter model & unit ID #

Date/time pH Calibration Last Checked: 8/8/24 7:00 AM

Turbidity meter model & unit ID #

Sampling Device: Bladder Pump [✓ Peristaltic Pump] Other:

Pumping Rate:

Water Color/Odor See notes / none

Pump Start/Stop Time 10:05 / 10:20

Temperature: 74°F **Wind Direction:** N E S [✓ W] **Precip:** [✓ None] Light Heavy **Sky:** Cloudy Sunny [✓ Partly]

Time	Depth to Water (ft)	Temp. (deg. C)	pH (standard units)	DO (mg/L)	Cond. (µs/cm)	ORP (mV)	Turbidity (NTU)	Notes
Stability Requirements – last 3 consecutive readings must be within:		+/- 3%	+/- 0.1 unit	+/- 10% or 3 readings <0.5 mg/L	+/- 3%	+/- 10mV	+/- 10% or 3 readings <5 NTU	
10:05	19.30	29.2	7.14	6.69	19.4	90.8	58.70	
10:10	19.32	26.7	6.77	5.94	2501	-86.4	48.75	
10:15	19:37	27.0	6.78	5.95	2499	-86.8	42.78	

Sample Bottles Collected:

Sample Date /Time:

Additional Notes: well went dry during stabalization
* clear with fine black particulates
* lock replaced.

*: Volume in a 2-inch well = 617 ml/ft

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SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. SW-1R	**Date/Time** 8/6/24 14:30
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☐ **Tile with Riser**
☑ **Drainage Ditch**	☐ **Other (describe)**

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☐ **Downstream**
☐ **Within Landfill**	☑ **Other (describe)** Drainage

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Monitoring point among shrubs, reeds & tall grass. Monitoring point was dry

Was monitoring point dry? Yes	**Too little water to sample?**
Was water flowing?	☐ **YES** ☐ **NO**
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Does water have odor?	☐ **YES** ☐ **NO**
If yes, describe	
Was ground discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Litter present?	☐ **YES** ☐ **NO**
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

D. FIELD MEASUREMENT

Weather Conditions 65 F°, cloudy, wind N

Field Measurements (after stabilization):

Temperature

Units

Equipment Used

D. FIELD MEASUREMENT (continued)

pH

Equipment Used

Specific Conditions

Units

Equipment Used

Comments

Monitoring point dry

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature

Date 8/12/24

Telephone 515-631-0778

Fax

Email MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. SW-5	**Date/Time** 8/7/24 16:10
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☐ **Tile with Riser**
☐ **Drainage Ditch**	☒ **Other (describe)** Wetland

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☐ **Downstream**
☐ **Within Landfill**	☐ **Other (describe)**

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Wetland assigned area with reeds & forbes. Muddy underfoot. Monitoring point was dry

Was monitoring point dry? Yes	**Too little water to sample?**
Was water flowing?	☐ **YES** ☐ **NO**
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Does water have odor?	☐ **YES** ☐ **NO**
If yes, describe	
Was ground discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Litter present?	☐ **YES** ☐ **NO**
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

D. FIELD MEASUREMENT

Weather Conditions 77°F Sunny, Wind E

Field Measurements (after stabilization):

Temperature	**Units**
Equipment Used	

D. FIELD MEASUREMENT (continued)

pH	
Equipment Used	
Specific Conditions	**Units**
Equipment Used	

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature		**Date** 8/12/24
Telephone 515-631-0778	**Fax**	**Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. SW-4	**Date/Time** 8/7/24 16:20
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☒ **Tile with Riser**
☐ **Drainage Ditch**	☐ **Other (describe)**

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☒ **Downstream**
☐ **Within Landfill**	☐ **Other (describe)**

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Outlet appears in good condition, drainage stream mostly dry w few small puddles. Monitoring point was dry

Was monitoring point dry? Yes	**Too little water to sample?**
Was water flowing?	☐ **YES** ☐ **NO**
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Does water have odor?	☐ **YES** ☐ **NO**
If yes, describe	
Was ground discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Litter present?	☐ **YES** ☐ **NO**
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

06/2011 cmz

DNR Form 542-1324

D. FIELD MEASUREMENT

Weather Conditions 77°F, Sunny, Wind E

Field Measurements (after stabilization):

Temperature **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH

Equipment Used

Specific Conditions **Units**

Equipment Used

Comments

* Culvert mouth to nearest water (stream) measured at 32.25 ft

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature **Date** 8/12/24

Telephone 515-631-0778 **Fax** **Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. SW-3	**Date/Time** 8/8/24 10:40
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ Stream	☐ Open Tile
☐ Road Ditch	☐ Tile with Riser
☐ Drainage Ditch	☒ Other (describe) Sediment basin

B. PURPOSE OF MONITORING POINT

☐ Upstream	☐ Downstream
☒ Within Landfill	☐ Other (describe)

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Depth at sample point ~3.5 in

Was monitoring point dry? No	**Too little water to sample?** No
Was water flowing?	☐ YES ☒ NO
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ YES ☒ NO
If yes, describe	
Does water have odor?	☐ YES ☒ NO
If yes, describe	
Was ground discolored?	☐ YES ☒ NO
If yes, describe	
Litter present?	☐ YES ☒ NO
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

06/2011 cmz

DNR Form 542-1324

D. FIELD MEASUREMENT

Weather Conditions Partly Cloudy, 76°F, Wind 9mph W

Field Measurements (after stabilization):

Temperature 28.1 | **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH 8.56

Equipment Used

Specific Conditions | **Units**

Equipment Used

Comments

DO = 8.94 mg/L * ~~[illegible]~~.

SPC = 651 us/cm

ORP = 18.0 mV

NTU = 4.35

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature | **Date** 8/12/24

Telephone 515-631-0778 | **Fax** | **Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. GU-2	**Date/Time** 8/8/24 11:35
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☐ **Tile with Riser**
☐ **Drainage Ditch**	☒ **Other (describe)** Underdrain

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☐ **Downstream**
☒ **Within Landfill**	☐ **Other (describe)**

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Ankle/knee high grass w/ some rocky areas near outlet

Was monitoring point dry? No	**Too little water to sample?** N/A
Was water flowing?	☐ **YES** ☒ **NO**
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ **YES** ☒ **NO**
If yes, describe	
Does water have odor?	☐ **YES** ☒ **NO**
If yes, describe	
Was ground discolored?	☒ **YES** ☐ **NO**
If yes, describe Dug out GU-1 on Tue 6/8/24	
Litter present?	☐ **YES** ☒ **NO**
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

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DNR Form 542-1324

D. FIELD MEASUREMENT

Weather Conditions Mostly cloudy, 77°F, wind W 8 mph

Field Measurements (after stabilization):

Temperature	**Units**
Equipment Used	

D. FIELD MEASUREMENT (continued)

pH	
Equipment Used	
Specific Conditions	**Units**
Equipment Used	

Comments

* CV-1 & CV-2 share outlet pool, only CV-1 flowing whilst on site 8/5/24 - 8/8/24. Pooled water most likely from CV-1 thus ~~samp~~ didnt sample at CV-2

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature		**Date** 8/12/24
Telephone 515-631-0778	**Fax**	**Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. GU-1	**Date/Time** 8/8/24 11:50
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ Stream	☐ Open Tile
☐ Road Ditch	☐ Tile with Riser
☐ Drainage Ditch	☒ Other (describe) underdrain

B. PURPOSE OF MONITORING POINT

☐ Upstream	☐ Downstream
☒ Within Landfill	☐ Other (describe)

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Ankle/knee high grass w̄ rocky areas near sampling point

Was monitoring point dry? No	**Too little water to sample?** No	
Was water flowing?	☑ YES	☐ NO
If yes, estimate quantity 350 ml/min	**If yes, estimate depth**	
Was water discolored?	☐ YES	☒ NO
If yes, describe		
Does water have odor?	☐ YES	☐ NO
If yes, describe		
Was ground discolored?	☒ YES	☐ NO
If yes, describe cleared out rock & vegetation on Tue 8/6/24		
Litter present?	☐ YES	☒ NO
If yes, describe		

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Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

D. FIELD MEASUREMENT

Weather Conditions Mostly cloudy, 77°F, wind W 8 mph

Field Measurements (after stabilization):

Temperature : 20.7 °C | **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH 6.73

Equipment Used

Specific Conditions | **Units**

Equipment Used

Comments

DO = 6.66 mg/L

SPC = 1438 µm/cm

ORP = 83.1 mV

NTU = 2.92

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature | **Date** 8/12/24

Telephone 515-631-0778 | **Fax** | **Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. GU - EX	**Date/Time** 8/8/24 13:15
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☐ **Tile with Riser**
☐ **Drainage Ditch**	☒ **Other (describe)** Underdrain

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☒ **Downstream**
☐ **Within Landfill**	☐ **Other (describe)**

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Storm water outfall - concrete outlet structure

350 gal / min

Was monitoring point dry? No	**Too little water to sample?** No	
Was water flowing?	☒ **YES**	☐ **NO**
If yes, estimate quantity 350 gal / min	**If yes, estimate depth** ~4 in	
Was water discolored?	☐ **YES**	☒ **NO**
If yes, describe		
Does water have odor?	☐ **YES**	☒ **NO**
If yes, describe		
Was ground discolored?	☐ **YES**	☒ **NO**
If yes, describe		
Litter present?	☐ **YES**	☒ **NO**
If yes, describe		

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

D. FIELD MEASUREMENT

Weather Conditions overcast 77°F, wind 17 mph NW

Field Measurements (after stabilization):

Temperature 23.3 °C	**Units**
Equipment Used	

D. FIELD MEASUREMENT (continued)

pH 7.70	
Equipment Used	
Specific Conditions	**Units**
Equipment Used	

Comments

DO = 7.22 mg/L

SPC = 1281 um/cm

ORP = 56.2 mV

NTU = 3.45

* discharge on a timer or can be manually turned on/off

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature		**Date** 8/12/24
Telephone 515-631-0778	**Fax**	**Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. SW-2R	**Date/Time** 8/8/24 13:30
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☒ Stream	☐ Open Tile
☐ Road Ditch	☐ Tile with Riser
☐ Drainage Ditch	☐ Other (describe)

B. PURPOSE OF MONITORING POINT

☐ Upstream	☒ Downstream
☐ Within Landfill	☐ Other (describe)

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

some erosion around staff gauge. In wooded area

Was monitoring point dry? Yes	**Too little water to sample?**
Was water flowing?	☐ YES ☐ NO
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ YES ☐ NO
If yes, describe	
Does water have odor?	☐ YES ☐ NO
If yes, describe	
Was ground discolored?	☐ YES ☐ NO
If yes, describe	
Litter present?	☐ YES ☐ NO
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

06/2011 cmz

DNR Form 542-1324

D. FIELD MEASUREMENT

Weather Conditions 77°F, overcast, Wind NW ~15 mph

Field Measurements (after stabilization):

Temperature | **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH

Equipment Used

Specific Conditions | **Units**

Equipment Used

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature

Date 8/12/24

Telephone 515-631-0778

Fax

Email MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. TCB 1/2	**Date/Time** 8/8/24 13:50
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ Stream	☐ Open Tile
☐ Road Ditch	☐ Tile with Riser
☐ Drainage Ditch	☒ Other (describe) contact water basin

B. PURPOSE OF MONITORING POINT

☐ Upstream	☐ Downstream
☒ Within Landfill	☐ Other (describe)

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

contact water basin. rock lined. Some Algae [illegible] around shore

Was monitoring point dry? No	**Too little water to sample?** No
Was water flowing?	☐ YES ☒ NO
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ YES ☒ NO
If yes, describe	
Does water have odor?	☐ YES ☒ NO
If yes, describe	
Was ground discolored?	☐ YES ☒ NO
If yes, describe	
Litter present?	☐ YES ☒ NO
If yes, describe	

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Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

D. FIELD MEASUREMENT

Weather Conditions 79°F, overcast, Wind NW ~15 mph

Field Measurements (after stabilization):

Temperature 28.3°C | **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH 8.06

Equipment Used

Specific Conditions | **Units**

Equipment Used

Comments

DO = 8.39 mg/L

SPC = 863 um/cm

ORP = 71.9 mV

NTU = 3.68

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature

Date 8/12/24

Telephone 515-631-0778

Fax

Email MAMorgan@scsengineers.com

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SURFACE WATER SAMPLING FORM

Site Name GML	**Permit No.**
Surface Monitoring Point No. LP-1	**Date/Time** 8/8/24 14:15
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ **Stream**	☐ **Open Tile**
☐ **Road Ditch**	☐ **Tile with Riser**
☐ **Drainage Ditch**	☒ **Other (describe)** Monitoring well

B. PURPOSE OF MONITORING POINT

☐ **Upstream**	☐ **Downstream**
☒ **Within Landfill**	☐ **Other (describe)**

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Hill slope, bottom of slope ephemeral wetland - mix of grass & reeds

Was monitoring point dry? Yes	**Too little water to sample?**
Was water flowing?	☐ **YES** ☐ **NO**
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Does water have odor?	☐ **YES** ☐ **NO**
If yes, describe	
Was ground discolored?	☐ **YES** ☐ **NO**
If yes, describe	
Litter present?	☐ **YES** ☐ **NO**
If yes, describe	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

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DNR Form 542-1324

D. FIELD MEASUREMENT

Weather Conditions 75°F, overcast, wind NW 19 mph

Field Measurements (after stabilization):

Temperature	**Units**
Equipment Used	

D. FIELD MEASUREMENT (continued)

pH	
Equipment Used	
Specific Conditions	**Units**
Equipment Used	

Comments

* Bring Leachate measuring wheel

- bring bailer if well has liquid in order to sample

* Wasp nest present in well head

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature		**Date** 8/12/24
Telephone 515-631-0778	**Fax**	**Email** MAMorgan@scsengineers.com

NOTE: Attach 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

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SURFACE WATER SAMPLING FORM

Site Name OML	**Permit No.**
Surface Monitoring Point No. Leachate Basin	**Date/Time** 8/8/24 14:25
Name of person sampling Michael Morgan	

A. TYPE OF MONITORING POINT

☐ Stream	☐ Open Tile
☐ Road Ditch	☐ Tile with Riser
☐ Drainage Ditch	☒ Other (describe) Basin / lagoon

B. PURPOSE OF MONITORING POINT

☐ Upstream	☐ Downstream
☒ Within Landfill	☐ Other (describe)

C. MONITORING POINT CONDITIONS

General description/condition of monitoring point

Leachate storage lagoon, concrete lined

Was monitoring point dry? No	**Too little water to sample?** No
Was water flowing?	☐ YES ☒ NO
If yes, estimate quantity	**If yes, estimate depth**
Was water discolored?	☒ YES ☐ NO
If yes, describe blue / green color, light	
Does water have odor?	☐ YES ☒ NO
If yes, describe	
Was ground discolored?	☐ YES ☒ NO
If yes, describe	
Litter present?	☐ YES ☒ NO
If yes, describe	

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D. FIELD MEASUREMENT

Weather Conditions 75°F, overcast, wind NW

Field Measurements (after stabilization):

Temperature 25.8°c | **Units**

Equipment Used

D. FIELD MEASUREMENT (continued)

pH 8.60

Equipment Used

Specific Conditions | **Units**

Equipment Used

Comments

DO = 12.64 mg/L

SPC = 6769 um/cm

ORP = 63.7 mV

NTU = 7.03

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature | **Date** 8/12/24

Telephone 515-631-0778 | **Fax** | **Email** MAMorgan@SCSengineers.com

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Appendix B

Laboratory Analytical Reports

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 8/23/2024 12:57:06 PM Revision 1

JOB DESCRIPTION

Ottumwa Midland LF - 25224073.00
25224073.00

JOB NUMBER

310-287904-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Eurofins Cedar Falls

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

Sandra Fredrick

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8/23/2024 12:57:06 PM
Revision 1

Authorized for release by
Sandie Fredrick, Senior Project Manager
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660

Table of Contents

Job ID: 310-287904-1 Eurofins Cedar Falls

Job Narrative
310-287904-1

Revision
The report being provided is a revision of the original report sent on 8/23/2024. The report (revision 1) is being revised due to: Removal of erroneous F1 Flag for revised report.

Receipt
The samples were received on 8/9/2024 4:40 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.4º C and 0.8º C.

HPLC/IC
Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-15R (310-287904-5), MW-100R (310-287904-7) and MW-101R (310-287904-8). Elevated reporting limits (RLs) are provided.

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

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

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

Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-287904-1	MW-1R	Water	08/06/24 11:11	08/09/24 16:40
310-287904-2	MW-12	Water	08/08/24 07:40	08/09/24 16:40
310-287904-3	MW-13	Water	08/08/24 09:26	08/09/24 16:40
310-287904-4	MW-14	Water	08/07/24 10:47	08/09/24 16:40
310-287904-5	MW-15R	Water	08/06/24 09:00	08/09/24 16:40
310-287904-6	MW-16R	Water	08/07/24 15:05	08/09/24 16:40
310-287904-7	MW-100R	Water	08/06/24 12:33	08/09/24 16:40
310-287904-8	MW-101R	Water	08/06/24 13:57	08/09/24 16:40
310-287904-9	MW-102P	Water	08/07/24 13:47	08/09/24 16:40
310-287904-10	MW-108	Water	08/07/24 09:02	08/09/24 16:40
310-287904-11	Field Blank	Water	08/08/24 14:45	08/09/24 16:40

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Client Sample ID: MW-1R

Lab Sample ID: 310-287904-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	29		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.46	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	80		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	71		2.0	0.66	ug/L	1		6020B	Total/NA
Calcium	90		0.50	0.19	mg/L	1		6020B	Total/NA
Iron	46	J	100	36	ug/L	1		6020B	Total/NA
Lithium	23		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	28000		500	150	ug/L	1		6020B	Total/NA
Molybdenum	1.6	J	2.0	1.3	ug/L	1		6020B	Total/NA
Total Suspended Solids	1.6	J	1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	470		50	42	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	813.54				ft	1		Field Sampling	Total/NA
Field pH	6.97				SU	1		Field Sampling	Total/NA
Field Conductivity	787				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.4				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-12

Lab Sample ID: 310-287904-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	49		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	2.6		1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	720		50	21	mg/L	50		9056A	Total/NA
Barium	15		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	1400		100	76	ug/L	1		6020B	Total/NA
Calcium	14		0.50	0.19	mg/L	1		6020B	Total/NA
Iron	43	J	100	36	ug/L	1		6020B	Total/NA
Lithium	110		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	6400		500	150	ug/L	1		6020B	Total/NA
Manganese	140		10	3.6	ug/L	1		6020B	Total/NA
Total Suspended Solids	2.0		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	1700		250	210	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	722.63				ft	1		Field Sampling	Total/NA
Field pH	7.23				SU	1		Field Sampling	Total/NA
Field Conductivity	2369				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	17.1				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-13

Lab Sample ID: 310-287904-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	13		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.68	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	1200		50	21	mg/L	50		9056A	Total/NA
Barium	18		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	1800		100	76	ug/L	1		6020B	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	1.1		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	130		100	36	ug/L	1		6020B	Total/NA
Lithium	160		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	60000		500	150	ug/L	1		6020B	Total/NA
Manganese	250		10	3.6	ug/L	1		6020B	Total/NA
Total Suspended Solids	1.4	J	1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	2300		250	210	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client Sample ID: MW-13 (Continued) — Lab Sample ID: 310-287904-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Groundwater Elevation	722.56				ft	1		Field Sampling	Total/NA
Field pH	6.97				SU	1		Field Sampling	Total/NA
Field Conductivity	3194				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	15.9				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-14 — Lab Sample ID: 310-287904-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.70	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	670		50	21	mg/L	50		9056A	Total/NA
Arsenic	2.6		2.0	0.53	ug/L	1		6020B	Total/NA
Barium	23		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	1900		100	76	ug/L	1		6020B	Total/NA
Calcium	76		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.56		0.50	0.17	ug/L	1		6020B	Total/NA
Copper	2.1	J	5.0	1.8	ug/L	1		6020B	Total/NA
Iron	47	J	100	36	ug/L	1		6020B	Total/NA
Lithium	140		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	34000		500	150	ug/L	1		6020B	Total/NA
Manganese	160		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	16		2.0	1.3	ug/L	1		6020B	Total/NA
Total Suspended Solids	6.0		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	2000		50	42	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	722.62				ft	1		Field Sampling	Total/NA
Field pH	7.10				SU	1		Field Sampling	Total/NA
Field Conductivity	3214				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	17.0				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-15R — Lab Sample ID: 310-287904-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	10		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	440		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	36		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	380		100	76	ug/L	1		6020B	Total/NA
Calcium	300		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	1.1		0.50	0.17	ug/L	1		6020B	Total/NA
Copper	1.8	J	5.0	1.8	ug/L	1		6020B	Total/NA
Iron	310		100	36	ug/L	1		6020B	Total/NA
Lithium	42		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	100000		2000	600	ug/L	4		6020B	Total/NA
Manganese	440		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	5.2		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	1.4	J	5.0	1.4	ug/L	1		6020B	Total/NA
Total Suspended Solids	2.5		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	1500		50	42	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	760.45				ft	1		Field Sampling	Total/NA
Field pH	6.27				SU	1		Field Sampling	Total/NA
Field Conductivity	2101				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.0				Degrees C	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client Sample ID: MW-16R

Lab Sample ID: 310-287904-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.45	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	790		50	21	mg/L	50		9056A	Total/NA
Barium	38		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	2000		100	76	ug/L	1		6020B	Total/NA
Calcium	81		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.93		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	480		100	36	ug/L	1		6020B	Total/NA
Lithium	110		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	39000		500	150	ug/L	1		6020B	Total/NA
Manganese	270		10	3.6	ug/L	1		6020B	Total/NA
Total Suspended Solids	2.9		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	2200		250	210	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	722.47				ft	1		Field Sampling	Total/NA
Field pH	6.94				SU	1		Field Sampling	Total/NA
Field Conductivity	3511				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	15.0				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-100R

Lab Sample ID: 310-287904-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	28		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	180		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	44		2.0	0.66	ug/L	1		6020B	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020B	Total/NA
Lithium	21		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	40000		500	150	ug/L	1		6020B	Total/NA
Molybdenum	2.2		2.0	1.3	ug/L	1		6020B	Total/NA
Total Dissolved Solids	640		50	42	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	808.50				ft	1		Field Sampling	Total/NA
Field pH	7.05				SU	1		Field Sampling	Total/NA
Field Conductivity	1007				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.0				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-101R

Lab Sample ID: 310-287904-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.7		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	480		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	37		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	720		100	76	ug/L	1		6020B	Total/NA
Calcium	220		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.22	J	0.50	0.17	ug/L	1		6020B	Total/NA
Copper	2.0	J	5.0	1.8	ug/L	1		6020B	Total/NA
Iron	82	J	100	36	ug/L	1		6020B	Total/NA
Lithium	84		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	71000		500	150	ug/L	1		6020B	Total/NA
Manganese	180		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	6.5		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	5.2		5.0	1.4	ug/L	1		6020B	Total/NA
Total Suspended Solids	5.0		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	1100		50	42	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Client Sample ID: MW-101R (Continued) — Lab Sample ID: 310-287904-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Groundwater Elevation	782.62				ft	1		Field Sampling	Total/NA
Field pH	6.80				SU	1		Field Sampling	Total/NA
Field Conductivity	1533				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.8				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-102P — Lab Sample ID: 310-287904-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.4		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.53	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	1400		50	21	mg/L	50		9056A	Total/NA
Barium	23		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	1700		100	76	ug/L	1		6020B	Total/NA
Calcium	430		2.0	0.76	mg/L	4		6020B	Total/NA
Cobalt	0.74		0.50	0.17	ug/L	1		6020B	Total/NA
Copper	4.3	J	5.0	1.8	ug/L	1		6020B	Total/NA
Iron	5500		100	36	ug/L	1		6020B	Total/NA
Lithium	230		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	150000		2000	600	ug/L	4		6020B	Total/NA
Manganese	530		10	3.6	ug/L	1		6020B	Total/NA
Zinc	12	J	20	9.7	ug/L	1		6020B	Total/NA
Total Suspended Solids	12		3.8	2.8	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	2800		250	210	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	722.89				ft	1		Field Sampling	Total/NA
Field pH	6.49				SU	1		Field Sampling	Total/NA
Field Conductivity	3556				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.0				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: MW-108 — Lab Sample ID: 310-287904-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2.6	J	5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.43	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	130		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	4.1		2.0	0.53	ug/L	1		6020B	Total/NA
Barium	34		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	300		100	76	ug/L	1		6020B	Total/NA
Calcium	75		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	5.0		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	4300		100	36	ug/L	1		6020B	Total/NA
Lithium	49		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	16000		500	150	ug/L	1		6020B	Total/NA
Manganese	920		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	3.0		2.0	1.3	ug/L	1		6020B	Total/NA
Zinc	43		20	9.7	ug/L	1		6020B	Total/NA
Total Suspended Solids	6.8		3.8	2.8	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	390		50	42	mg/L	1		SM 2540C	Total/NA
Groundwater Elevation	741.21				ft	1		Field Sampling	Total/NA
Field pH	6.56				SU	1		Field Sampling	Total/NA
Field Conductivity	621				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	14.2				Degrees C	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Client Sample ID: Field Blank **Lab Sample ID: 310-287904-11**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-1R
Date Collected: 08/06/24 11:11
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-1
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**29**		5.0	2.3	mg/L			08/16/24 14:47	5
Fluoride	**0.46**	**J**	1.0	0.38	mg/L			08/16/24 14:47	5
Sulfate	**80**		5.0	2.1	mg/L			08/16/24 14:47	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:22	1
Barium	**71**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:22	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:22	1
Boron	<76		100	76	ug/L		08/13/24 09:00	08/14/24 13:22	1
Calcium	**90**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:22	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:22	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:22	1
Iron	**46**	**J**	100	36	ug/L		08/13/24 09:00	08/14/24 13:22	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:22	1
Lithium	**23**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:22	1
Magnesium	**28000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:22	1
Manganese	<3.6		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:22	1
Molybdenum	**1.6**	**J**	2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:22	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:22	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**1.6**	**J**	1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**470**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**813.54**				ft			08/06/24 11:11	1
Field pH	**6.97**				SU			08/06/24 11:11	1
Field Conductivity	**787**				umhos/cm			08/06/24 11:11	1
Field Temperature	**14.4**				Degrees C			08/06/24 11:11	1

Client Sample ID: MW-12

Date Collected: 08/08/24 07:40
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-2
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**49**		5.0	2.3	mg/L			08/16/24 14:59	5
Fluoride	**2.6**		1.0	0.38	mg/L			08/16/24 14:59	5
Sulfate	**720**		50	21	mg/L			08/19/24 09:05	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:24	1
Barium	**15**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:24	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:24	1
Boron	**1400**		100	76	ug/L		08/13/24 09:00	08/14/24 13:24	1
Calcium	**14**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:24	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:24	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:24	1
Iron	**43**	**J**	100	36	ug/L		08/13/24 09:00	08/14/24 13:24	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:24	1
Lithium	**110**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:24	1
Magnesium	**6400**		500	150	ug/L		08/13/24 09:00	08/14/24 13:24	1
Manganese	**140**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:24	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:24	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:24	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**2.0**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**1700**		250	210	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**722.63**				ft			08/08/24 07:40	1
Field pH	**7.23**				SU			08/08/24 07:40	1
Field Conductivity	**2369**				umhos/cm			08/08/24 07:40	1
Field Temperature	**17.1**				Degrees C			08/08/24 07:40	1

Client Sample ID: MW-13

Lab Sample ID: 310-287904-3

Date Collected: 08/08/24 09:26

Matrix: Water

Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**13**		5.0	2.3	mg/L			08/16/24 15:11	5
Fluoride	**0.68**	**J**	1.0	0.38	mg/L			08/16/24 15:11	5
Sulfate	**1200**		50	21	mg/L			08/19/24 09:17	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:27	1
Barium	**18**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:27	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:27	1
Boron	**1800**		100	76	ug/L		08/13/24 09:00	08/14/24 13:27	1
Calcium	**120**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:27	1
Cobalt	**1.1**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:27	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:27	1
Iron	**130**		100	36	ug/L		08/13/24 09:00	08/14/24 13:27	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:27	1
Lithium	**160**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:27	1
Magnesium	**60000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:27	1
Manganese	**250**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:27	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:27	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:27	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**1.4**	**J**	1.9	1.4	mg/L			08/13/24 07:57	1
Total Dissolved Solids (SM 2540C)	**2300**		250	210	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**722.56**				ft			08/08/24 09:26	1
Field pH	**6.97**				SU			08/08/24 09:26	1
Field Conductivity	**3194**				umhos/cm			08/08/24 09:26	1
Field Temperature	**15.9**				Degrees C			08/08/24 09:26	1

Client Sample Results

Client Sample ID: MW-14

Date Collected: 08/07/24 10:47
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-4
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**20**		5.0	2.3	mg/L			08/16/24 15:23	5
Fluoride	**0.70**	**J**	1.0	0.38	mg/L			08/16/24 15:23	5
Sulfate	**670**		50	21	mg/L			08/19/24 09:29	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.6**		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:29	1
Barium	**23**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:29	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:29	1
Boron	**1900**		100	76	ug/L		08/13/24 09:00	08/14/24 13:29	1
Calcium	**76**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:29	1
Cobalt	**0.56**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:29	1
Copper	**2.1**	**J**	5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:29	1
Iron	**47**	**J**	100	36	ug/L		08/13/24 09:00	08/14/24 13:29	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:29	1
Lithium	**140**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:29	1
Magnesium	**34000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:29	1
Manganese	**160**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:29	1
Molybdenum	**16**		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:29	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:29	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**6.0**		1.9	1.4	mg/L			08/13/24 06:36	1
Total Dissolved Solids (SM 2540C)	**2000**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**722.62**				ft			08/07/24 10:47	1
Field pH	**7.10**				SU			08/07/24 10:47	1
Field Conductivity	**3214**				umhos/cm			08/07/24 10:47	1
Field Temperature	**17.0**				Degrees C			08/07/24 10:47	1

Client Sample Results

Client Sample ID: MW-15R

Date Collected: 08/06/24 09:00
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-5
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**10**		5.0	2.3	mg/L			08/16/24 15:59	5
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 15:59	5
Sulfate	**440**		5.0	2.1	mg/L			08/16/24 15:59	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:40	1
Barium	**36**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:40	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:40	1
Boron	**380**		100	76	ug/L		08/13/24 09:00	08/14/24 13:40	1
Calcium	**300**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:40	1
Cobalt	**1.1**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:40	1
Copper	**1.8**	**J**	5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:40	1
Iron	**310**		100	36	ug/L		08/13/24 09:00	08/14/24 13:40	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:40	1
Lithium	**42**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:40	1
Magnesium	**100000**		2000	600	ug/L		08/13/24 09:00	08/20/24 22:15	4
Manganese	**440**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:40	1
Molybdenum	**5.2**		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:40	1
Selenium	**1.4**	**J**	5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:40	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**2.5**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**1500**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**760.45**				ft			08/06/24 09:00	1
Field pH	**6.27**				SU			08/06/24 09:00	1
Field Conductivity	**2101**				umhos/cm			08/06/24 09:00	1
Field Temperature	**14.0**				Degrees C			08/06/24 09:00	1

Client Sample ID: MW-16R

Date Collected: 08/07/24 15:05
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-6
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**22**		5.0	2.3	mg/L			08/16/24 16:36	5
Fluoride	**0.45**	**J**	1.0	0.38	mg/L			08/16/24 16:36	5
Sulfate	**790**		50	21	mg/L			08/19/24 09:41	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:42	1
Barium	**38**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:42	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:42	1
Boron	**2000**		100	76	ug/L		08/13/24 09:00	08/14/24 13:42	1
Calcium	**81**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:42	1
Cobalt	**0.93**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:42	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:42	1
Iron	**480**		100	36	ug/L		08/13/24 09:00	08/14/24 13:42	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:42	1
Lithium	**110**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:42	1
Magnesium	**39000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:42	1
Manganese	**270**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:42	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:42	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:42	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**2.9**		1.9	1.4	mg/L			08/13/24 06:36	1
Total Dissolved Solids (SM 2540C)	**2200**		250	210	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**722.47**				ft			08/07/24 15:05	1
Field pH	**6.94**				SU			08/07/24 15:05	1
Field Conductivity	**3511**				umhos/cm			08/07/24 15:05	1
Field Temperature	**15.0**				Degrees C			08/07/24 15:05	1

Client Sample Results

Client Sample ID: MW-100R

Lab Sample ID: 310-287904-7

Date Collected: 08/06/24 12:33

Matrix: Water

Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**28**		5.0	2.3	mg/L			08/16/24 17:12	5
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 17:12	5
Sulfate	**180**		5.0	2.1	mg/L			08/16/24 17:12	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:44	1
Barium	**44**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:44	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:44	1
Boron	<76		100	76	ug/L		08/13/24 09:00	08/14/24 13:44	1
Calcium	**130**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:44	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:44	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:44	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/14/24 13:44	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:44	1
Lithium	**21**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:44	1
Magnesium	**40000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:44	1
Manganese	<3.6		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:44	1
Molybdenum	**2.2**		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:44	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:44	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	<1.4		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**640**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**808.50**				ft			08/06/24 12:33	1
Field pH	**7.05**				SU			08/06/24 12:33	1
Field Conductivity	**1007**				umhos/cm			08/06/24 12:33	1
Field Temperature	**14.0**				Degrees C			08/06/24 12:33	1

Client Sample ID: MW-101R

Date Collected: 08/06/24 13:57
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-8

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.7**		5.0	2.3	mg/L			08/16/24 17:24	5
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 17:24	5
Sulfate	**480**		5.0	2.1	mg/L			08/16/24 17:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:48	1
Barium	**37**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:48	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:48	1
Boron	**720**		100	76	ug/L		08/13/24 09:00	08/14/24 13:48	1
Calcium	**220**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:48	1
Cobalt	**0.22**	**J**	0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:48	1
Copper	**2.0**	**J**	5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:48	1
Iron	**82**	**J**	100	36	ug/L		08/13/24 09:00	08/14/24 13:48	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:48	1
Lithium	**84**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:48	1
Magnesium	**71000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:48	1
Manganese	**180**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:48	1
Molybdenum	**6.5**		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:48	1
Selenium	**5.2**		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:48	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**5.0**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**1100**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**782.62**				ft			08/06/24 13:57	1
Field pH	**6.80**				SU			08/06/24 13:57	1
Field Conductivity	**1533**				umhos/cm			08/06/24 13:57	1
Field Temperature	**13.8**				Degrees C			08/06/24 13:57	1

Client Sample Results

Client Sample ID: MW-102P
Date Collected: 08/07/24 13:47
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-9
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.4**		5.0	2.3	mg/L			08/16/24 17:36	5
Fluoride	**0.53**	**J**	1.0	0.38	mg/L			08/16/24 17:36	5
Sulfate	**1400**		50	21	mg/L			08/19/24 09:53	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:51	1
Barium	**23**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:51	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:51	1
Boron	**1700**		100	76	ug/L		08/13/24 09:00	08/14/24 13:51	1
Calcium	**430**		2.0	0.76	mg/L		08/13/24 09:00	08/20/24 22:26	4
Cobalt	**0.74**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:51	1
Copper	**4.3**	**J**	5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:51	1
Iron	**5500**		100	36	ug/L		08/13/24 09:00	08/14/24 13:51	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:51	1
Lithium	**230**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:51	1
Magnesium	**150000**		2000	600	ug/L		08/13/24 09:00	08/20/24 22:26	4
Manganese	**530**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:51	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:51	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:51	1
Zinc	**12**	**J**	20	9.7	ug/L		08/13/24 09:00	08/14/24 13:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**12**		3.8	2.8	mg/L			08/13/24 06:36	1
Total Dissolved Solids (SM 2540C)	**2800**		250	210	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**722.89**				ft			08/07/24 13:47	1
Field pH	**6.49**				SU			08/07/24 13:47	1
Field Conductivity	**3556**				umhos/cm			08/07/24 13:47	1
Field Temperature	**14.0**				Degrees C			08/07/24 13:47	1

Client Sample ID: MW-108
Date Collected: 08/07/24 09:02
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-10
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**2.6**	**J**	5.0	2.3	mg/L			08/16/24 17:48	5
Fluoride	**0.43**	**J**	1.0	0.38	mg/L			08/16/24 17:48	5
Sulfate	**130**		5.0	2.1	mg/L			08/16/24 17:48	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.1**		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:53	1
Barium	**34**		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:53	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:53	1
Boron	**300**		100	76	ug/L		08/13/24 09:00	08/14/24 13:53	1
Calcium	**75**		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:53	1
Cobalt	**5.0**		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:53	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:53	1
Iron	**4300**		100	36	ug/L		08/13/24 09:00	08/14/24 13:53	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:53	1
Lithium	**49**		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:53	1
Magnesium	**16000**		500	150	ug/L		08/13/24 09:00	08/14/24 13:53	1
Manganese	**920**		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:53	1
Molybdenum	**3.0**		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:53	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:53	1
Zinc	**43**		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**6.8**		3.8	2.8	mg/L			08/13/24 06:36	1
Total Dissolved Solids (SM 2540C)	**390**		50	42	mg/L			08/12/24 16:27	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**741.21**				ft			08/07/24 09:02	1
Field pH	**6.56**				SU			08/07/24 09:02	1
Field Conductivity	**621**				umhos/cm			08/07/24 09:02	1
Field Temperature	**14.2**				Degrees C			08/07/24 09:02	1

Client Sample Results

Client Sample ID: Field Blank

Date Collected: 08/08/24 14:45
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287904-11

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			08/16/24 18:00	1
Fluoride	<0.075		0.20	0.075	mg/L			08/16/24 18:00	1
Sulfate	<0.42		1.0	0.42	mg/L			08/16/24 18:00	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 13:55	1
Barium	<0.66		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 13:55	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 13:55	1
Boron	<76		100	76	ug/L		08/13/24 09:00	08/14/24 13:55	1
Calcium	<0.19		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 13:55	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 13:55	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 13:55	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/14/24 13:55	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 13:55	1
Lithium	<2.5		10	2.5	ug/L		08/13/24 09:00	08/14/24 13:55	1
Magnesium	<150		500	150	ug/L		08/13/24 09:00	08/14/24 13:55	1
Manganese	<3.6		10	3.6	ug/L		08/13/24 09:00	08/14/24 13:55	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 13:55	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 13:55	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 13:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	<1.4		1.9	1.4	mg/L			08/13/24 07:57	1
Total Dissolved Solids (SM 2540C)	<42		50	42	mg/L			08/13/24 15:37	1

Definitions/Glossary

Qualifiers

HPLC/IC

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.

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
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

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-430769/3
Matrix: Water
Analysis Batch: 430769

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			08/16/24 09:57	1
Fluoride	<0.075		0.20	0.075	mg/L			08/16/24 09:57	1
Sulfate	<0.42		1.0	0.42	mg/L			08/16/24 09:57	1

Lab Sample ID: LCS 310-430769/4
Matrix: Water
Analysis Batch: 430769

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.9		mg/L		109	90 - 110
Fluoride	2.00	2.03		mg/L		102	90 - 110
Sulfate	10.0	10.2		mg/L		102	90 - 110

Lab Sample ID: MB 310-430782/3
Matrix: Water
Analysis Batch: 430782

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			08/16/24 15:35	1
Fluoride	<0.075		0.20	0.075	mg/L			08/16/24 15:35	1
Sulfate	<0.42		1.0	0.42	mg/L			08/16/24 15:35	1

Lab Sample ID: LCS 310-430782/4
Matrix: Water
Analysis Batch: 430782

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.97		mg/L		100	90 - 110
Fluoride	2.00	2.07		mg/L		103	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Lab Sample ID: 310-287904-5 MS
Matrix: Water
Analysis Batch: 430782

Client Sample ID: MW-15R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10		25.0	33.6		mg/L		93	80 - 120
Fluoride	<0.38		5.00	5.14		mg/L		103	80 - 120
Sulfate	440		25.0	460	4	mg/L		67	80 - 120

Lab Sample ID: 310-287904-5 MSD
Matrix: Water
Analysis Batch: 430782

Client Sample ID: MW-15R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	10		25.0	33.3		mg/L		92	80 - 120	1	15
Fluoride	<0.38		5.00	5.20		mg/L		104	80 - 120	1	15
Sulfate	440		25.0	461	4	mg/L		72	80 - 120	0	15

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-430125/1-A
Matrix: Water
Analysis Batch: 430374

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 430125

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/14/24 12:53	1
Barium	<0.66		2.0	0.66	ug/L		08/13/24 09:00	08/14/24 12:53	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/14/24 12:53	1
Boron	<76		100	76	ug/L		08/13/24 09:00	08/14/24 12:53	1
Calcium	<0.19		0.50	0.19	mg/L		08/13/24 09:00	08/14/24 12:53	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/14/24 12:53	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/14/24 12:53	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/14/24 12:53	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/14/24 12:53	1
Lithium	<2.5		10	2.5	ug/L		08/13/24 09:00	08/14/24 12:53	1
Magnesium	<150		500	150	ug/L		08/13/24 09:00	08/14/24 12:53	1
Manganese	<3.6		10	3.6	ug/L		08/13/24 09:00	08/14/24 12:53	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/14/24 12:53	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/14/24 12:53	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/14/24 12:53	1

Lab Sample ID: LCS 310-430125/2-A
Matrix: Water
Analysis Batch: 430374

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 430125

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			200	214		ug/L		107	80 - 120		
Barium			100	109		ug/L		109	80 - 120		
Beryllium			100	101		ug/L		101	80 - 120		
Boron			200	191		ug/L		95	80 - 120		
Calcium			2.00	2.03		mg/L		102	80 - 120		
Cobalt			100	113		ug/L		113	80 - 120		
Copper			200	217		ug/L		108	80 - 120		
Iron			200	226		ug/L		113	80 - 120		
Lead			200	212		ug/L		106	80 - 120		
Lithium			200	209		ug/L		104	80 - 120		
Magnesium			2000	2180		ug/L		109	80 - 120		
Manganese			100	104		ug/L		104	80 - 120		
Molybdenum			200	206		ug/L		103	80 - 120		
Selenium			400	401		ug/L		100	80 - 120		
Zinc			200	204		ug/L		102	80 - 120		

Lab Sample ID: 310-287904-7 DU
Matrix: Water
Analysis Batch: 430374

Client Sample ID: MW-100R
Prep Type: Total/NA
Prep Batch: 430125

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Arsenic	<0.53			<0.53		ug/L				NC	20
Barium	44			44.0		ug/L				0.8	20
Beryllium	<0.33			<0.33		ug/L				NC	20
Boron	<76			<76		ug/L				NC	20
Calcium	130			130		mg/L				1	20
Cobalt	<0.17			<0.17		ug/L				NC	20
Copper	<1.8			<1.8		ug/L				NC	20

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

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

Lab Sample ID: 310-287904-7 DU
Matrix: Water
Analysis Batch: 430374

Client Sample ID: MW-100R
Prep Type: Total/NA
Prep Batch: 430125

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	<36		<36		ug/L		NC	20
Lead	<0.26		<0.26		ug/L		NC	20
Lithium	21		20.6		ug/L		0.1	20
Magnesium	40000		39900		ug/L		1	20
Manganese	<3.6		<3.6		ug/L		NC	20
Molybdenum	2.2		2.21		ug/L		2	20
Selenium	<1.4		<1.4		ug/L		NC	20
Zinc	<9.7		<9.7		ug/L		NC	20

Lab Sample ID: 310-287904-7 DU
Matrix: Water
Analysis Batch: 430986

Client Sample ID: MW-100R
Prep Type: Total/NA
Prep Batch: 430125

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	<0.33	^+	<0.33	^+	ug/L		NC	20

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-430112/1
Matrix: Water
Analysis Batch: 430112

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.7		5.0	3.7	mg/L			08/12/24 15:46	1

Lab Sample ID: LCS 310-430112/2
Matrix: Water
Analysis Batch: 430112

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	99.0		mg/L		99	81 - 116

Lab Sample ID: MB 310-430134/1
Matrix: Water
Analysis Batch: 430134

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.7		5.0	3.7	mg/L			08/13/24 06:36	1

Lab Sample ID: LCS 310-430134/2
Matrix: Water
Analysis Batch: 430134

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	98.0		mg/L		98	81 - 116

QC Sample Results

Method: I-3765-85 - Residue, Non-filterable (TSS) (Continued)

Lab Sample ID: MB 310-430158/1
Matrix: Water
Analysis Batch: 430158

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.7		5.0	3.7	mg/L			08/13/24 07:57	1

Lab Sample ID: LCS 310-430158/2
Matrix: Water
Analysis Batch: 430158

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Suspended Solids			100	99.0		mg/L		99	81 - 116		

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-430117/1
Matrix: Water
Analysis Batch: 430117

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<42		50	42	mg/L			08/12/24 16:27	1

Lab Sample ID: LCS 310-430117/2
Matrix: Water
Analysis Batch: 430117

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Dissolved Solids			1000	980		mg/L		98	88 - 110		

Lab Sample ID: MB 310-430251/1
Matrix: Water
Analysis Batch: 430251

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<42		50	42	mg/L			08/13/24 15:37	1

Lab Sample ID: LCS 310-430251/2
Matrix: Water
Analysis Batch: 430251

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Dissolved Solids			1000	996		mg/L		100	88 - 110		

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

HPLC/IC

Analysis Batch: 430769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	9056A	
310-287904-2	MW-12	Total/NA	Water	9056A	
310-287904-2	MW-12	Total/NA	Water	9056A	
310-287904-3	MW-13	Total/NA	Water	9056A	
310-287904-3	MW-13	Total/NA	Water	9056A	
310-287904-4	MW-14	Total/NA	Water	9056A	
310-287904-4	MW-14	Total/NA	Water	9056A	
MB 310-430769/3	Method Blank	Total/NA	Water	9056A	
LCS 310-430769/4	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 430782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-5	MW-15R	Total/NA	Water	9056A	
310-287904-6	MW-16R	Total/NA	Water	9056A	
310-287904-6	MW-16R	Total/NA	Water	9056A	
310-287904-7	MW-100R	Total/NA	Water	9056A	
310-287904-8	MW-101R	Total/NA	Water	9056A	
310-287904-9	MW-102P	Total/NA	Water	9056A	
310-287904-9	MW-102P	Total/NA	Water	9056A	
310-287904-10	MW-108	Total/NA	Water	9056A	
310-287904-11	Field Blank	Total/NA	Water	9056A	
MB 310-430782/3	Method Blank	Total/NA	Water	9056A	
LCS 310-430782/4	Lab Control Sample	Total/NA	Water	9056A	
310-287904-5 MS	MW-15R	Total/NA	Water	9056A	
310-287904-5 MSD	MW-15R	Total/NA	Water	9056A	

Metals

Prep Batch: 430125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	3005A	
310-287904-2	MW-12	Total/NA	Water	3005A	
310-287904-3	MW-13	Total/NA	Water	3005A	
310-287904-4	MW-14	Total/NA	Water	3005A	
310-287904-5	MW-15R	Total/NA	Water	3005A	
310-287904-6	MW-16R	Total/NA	Water	3005A	
310-287904-7	MW-100R	Total/NA	Water	3005A	
310-287904-8	MW-101R	Total/NA	Water	3005A	
310-287904-9	MW-102P	Total/NA	Water	3005A	
310-287904-10	MW-108	Total/NA	Water	3005A	
310-287904-11	Field Blank	Total/NA	Water	3005A	
MB 310-430125/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-430125/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-287904-7 DU	MW-100R	Total/NA	Water	3005A	

Analysis Batch: 430374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	6020B	430125
310-287904-2	MW-12	Total/NA	Water	6020B	430125
310-287904-3	MW-13	Total/NA	Water	6020B	430125
310-287904-4	MW-14	Total/NA	Water	6020B	430125

QC Association Summary

Metals (Continued)

Analysis Batch: 430374 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-5	MW-15R	Total/NA	Water	6020B	430125
310-287904-6	MW-16R	Total/NA	Water	6020B	430125
310-287904-7	MW-100R	Total/NA	Water	6020B	430125
310-287904-8	MW-101R	Total/NA	Water	6020B	430125
310-287904-9	MW-102P	Total/NA	Water	6020B	430125
310-287904-10	MW-108	Total/NA	Water	6020B	430125
310-287904-11	Field Blank	Total/NA	Water	6020B	430125
MB 310-430125/1-A	Method Blank	Total/NA	Water	6020B	430125
LCS 310-430125/2-A	Lab Control Sample	Total/NA	Water	6020B	430125
310-287904-7 DU	MW-100R	Total/NA	Water	6020B	430125

Analysis Batch: 430986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-5	MW-15R	Total/NA	Water	6020B	430125
310-287904-9	MW-102P	Total/NA	Water	6020B	430125
310-287904-7 DU	MW-100R	Total/NA	Water	6020B	430125

General Chemistry

Analysis Batch: 430112

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	I-3765-85	
310-287904-2	MW-12	Total/NA	Water	I-3765-85	
310-287904-5	MW-15R	Total/NA	Water	I-3765-85	
310-287904-7	MW-100R	Total/NA	Water	I-3765-85	
310-287904-8	MW-101R	Total/NA	Water	I-3765-85	
MB 310-430112/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-430112/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Analysis Batch: 430117

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	SM 2540C	
310-287904-4	MW-14	Total/NA	Water	SM 2540C	
310-287904-5	MW-15R	Total/NA	Water	SM 2540C	
310-287904-6	MW-16R	Total/NA	Water	SM 2540C	
310-287904-7	MW-100R	Total/NA	Water	SM 2540C	
310-287904-8	MW-101R	Total/NA	Water	SM 2540C	
310-287904-9	MW-102P	Total/NA	Water	SM 2540C	
310-287904-10	MW-108	Total/NA	Water	SM 2540C	
MB 310-430117/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-430117/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 430134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-4	MW-14	Total/NA	Water	I-3765-85	
310-287904-6	MW-16R	Total/NA	Water	I-3765-85	
310-287904-9	MW-102P	Total/NA	Water	I-3765-85	
310-287904-10	MW-108	Total/NA	Water	I-3765-85	
MB 310-430134/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-430134/2	Lab Control Sample	Total/NA	Water	I-3765-85	

QC Association Summary

General Chemistry

Analysis Batch: 430158

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-3	MW-13	Total/NA	Water	I-3765-85	
310-287904-11	Field Blank	Total/NA	Water	I-3765-85	
MB 310-430158/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-430158/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Analysis Batch: 430251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-2	MW-12	Total/NA	Water	SM 2540C	
310-287904-3	MW-13	Total/NA	Water	SM 2540C	
310-287904-11	Field Blank	Total/NA	Water	SM 2540C	
MB 310-430251/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-430251/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 430803

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287904-1	MW-1R	Total/NA	Water	Field Sampling	
310-287904-2	MW-12	Total/NA	Water	Field Sampling	
310-287904-3	MW-13	Total/NA	Water	Field Sampling	
310-287904-4	MW-14	Total/NA	Water	Field Sampling	
310-287904-5	MW-15R	Total/NA	Water	Field Sampling	
310-287904-6	MW-16R	Total/NA	Water	Field Sampling	
310-287904-7	MW-100R	Total/NA	Water	Field Sampling	
310-287904-8	MW-101R	Total/NA	Water	Field Sampling	
310-287904-9	MW-102P	Total/NA	Water	Field Sampling	
310-287904-10	MW-108	Total/NA	Water	Field Sampling	

Lab Chronicle

Client Sample ID: MW-1R

Lab Sample ID: 310-287904-1

Date Collected: 08/06/24 11:11
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430769	QTZ5	EET CF	08/16/24 14:47
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:22
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/06/24 11:11

Client Sample ID: MW-12

Lab Sample ID: 310-287904-2

Date Collected: 08/08/24 07:40
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430769	QTZ5	EET CF	08/16/24 14:59
Total/NA	Analysis	9056A		50	430769	QTZ5	EET CF	08/19/24 09:05
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:24
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 07:40

Client Sample ID: MW-13

Lab Sample ID: 310-287904-3

Date Collected: 08/08/24 09:26
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430769	QTZ5	EET CF	08/16/24 15:11
Total/NA	Analysis	9056A		50	430769	QTZ5	EET CF	08/19/24 09:17
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:27
Total/NA	Analysis	I-3765-85		1	430158	DGU1	EET CF	08/13/24 07:57
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 09:26

Client Sample ID: MW-14

Lab Sample ID: 310-287904-4

Date Collected: 08/07/24 10:47
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430769	QTZ5	EET CF	08/16/24 15:23
Total/NA	Analysis	9056A		50	430769	QTZ5	EET CF	08/19/24 09:29
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:29
Total/NA	Analysis	I-3765-85		1	430134	DGU1	EET CF	08/13/24 06:36

Client Sample ID: MW-14

Lab Sample ID: 310-287904-4

Date Collected: 08/07/24 10:47
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/07/24 10:47

Client Sample ID: MW-15R

Lab Sample ID: 310-287904-5

Date Collected: 08/06/24 09:00
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 15:59
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		4	430986	NFT2	EET CF	08/20/24 22:15
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:40
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/06/24 09:00

Client Sample ID: MW-16R

Lab Sample ID: 310-287904-6

Date Collected: 08/07/24 15:05
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 16:36
Total/NA	Analysis	9056A		50	430782	QTZ5	EET CF	08/19/24 09:41
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:42
Total/NA	Analysis	I-3765-85		1	430134	DGU1	EET CF	08/13/24 06:36
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/07/24 15:05

Client Sample ID: MW-100R

Lab Sample ID: 310-287904-7

Date Collected: 08/06/24 12:33
Date Received: 08/09/24 16:40

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 17:12
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:44
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/06/24 12:33

Lab Chronicle

Client Sample ID: MW-101R

Lab Sample ID: 310-287904-8
Date Collected: 08/06/24 13:57
Matrix: Water
Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 17:24
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:48
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/06/24 13:57

Client Sample ID: MW-102P

Lab Sample ID: 310-287904-9
Date Collected: 08/07/24 13:47
Matrix: Water
Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 17:36
Total/NA	Analysis	9056A		50	430782	QTZ5	EET CF	08/19/24 09:53
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		4	430986	NFT2	EET CF	08/20/24 22:26
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:51
Total/NA	Analysis	I-3765-85		1	430134	DGU1	EET CF	08/13/24 06:36
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/07/24 13:47

Client Sample ID: MW-108

Lab Sample ID: 310-287904-10
Date Collected: 08/07/24 09:02
Matrix: Water
Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 17:48
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:53
Total/NA	Analysis	I-3765-85		1	430134	DGU1	EET CF	08/13/24 06:36
Total/NA	Analysis	SM 2540C		1	430117	MDU9	EET CF	08/12/24 16:27
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/07/24 09:02

Client Sample ID: Field Blank

Lab Sample ID: 310-287904-11
Date Collected: 08/08/24 14:45
Matrix: Water
Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	430782	QTZ5	EET CF	08/16/24 18:00
Total/NA	Prep	3005A			430125	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430374	NFT2	EET CF	08/14/24 13:55
Total/NA	Analysis	I-3765-85		1	430158	DGU1	EET CF	08/13/24 07:57
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37

Lab Chronicle

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287904-1
SDG: 25224073.00

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

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.
USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

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310-287904 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information

Client: SCS

City/State: CITY STATE

Project:

Receipt Information

Date/Time Received: DATE 8/19/24 TIME 1610

Received By: XB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee

☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:__________

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 1 of ~~4~~ XB 2

Cooler Custody Seals Present? ☐ Yes ☒ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:__________ ☐ NONE

Thermometer ID: X

Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.4

Corrected Temp (°C): 0.4

• **Sample Container Temperature**

Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No

   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

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Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY STATE | Project:

Receipt Information

Date/Time Received: DATE 8/4/24 TIME 1640 | Received By: XB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:__________

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 2

Cooler Custody Seals Present? ☐ Yes ☒ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:________ ☐ NONE

Thermometer ID X | Correction Factor (°C): 0

• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0 8 | Corrected Temp (°C): 0 8

• Sample Container Temperature

Container(s) used.	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Document CED-P-SAM-FRM45521
Revision 26
Date 27 Jan 2022

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

eurofins

Client Information

Client Contact: Meghan Blodgett	Sampler: Micah Morgan	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
	Phone: 55 03 -0718	E-Mail: Sandie.Fredrick@et.eurofinsus.com	State of Origin:	Page: 1 of 2
Company: SCS Engineers	PWSID:			Job #:
Address: 2830 Dairy Dr	Due Date Requested:			
City: Madison	TAT Requested (days)			
State Zip: WI 53718	Compliance Project: ∆ Yes ∆ No			
Phone: 608-345-9221	PO #:			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Midland LF	Project #: 25224073 00			
Site: Ottumwa Midland LF	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E NaHSO4
F MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q Na2SO3
R Na2S2O3
S - H2SO4
T TSP Dodecahydrate
U - Acetone
V - MCAA
W pH 4-5
Y Trizma
Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020B - Metals (15)	2540C_Calcd, 9056A_ORGFM_28D, I_3765_85	Total Number of containers	Special Instructions/Note.
				Preservation Code:			D	N		
MW-1R			G	Water	N		X	X		
MW-12			G	Water	N		X	X		
MW-13			G	Water	N		X	X		
MW-14			G	Water	N		X	X		
MW-15R			G	Water	N		X	X		
MW-16R			G	Water	N		X	X		
[redacted]			G	Water	N		X	X		No sample
MW-100R			G	Water	N		X	X		
MW-101R			G	Water	N		X	X		
MW-102P			G	Water	N		X	X		
MW-108			G	Water	N		X	X		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *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: Micah Morgan	Date/Time: 8/14 at 9 AM	Company SCS Engineers	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 8/4/24 1648	Company: EE
Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No		Cooler Temperature(s) °C and Other Remarks:		

Ver: 01/12/2023

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

eurofins

Client Information	Sampler: Michael Morgan	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 55 63 0778	E-Mail: Sandie Fredrick@et.eurofinsus.com	State of Origin:	Page: 2 of 2
Company: SCS Engineers	PWSID:			Job #:

Address: 2830 Dairy Dr	Due Date Requested:
City: Madison	TAT Requested (days):
State Zip: WI 53718	Compliance Project: ∆ Yes ∆ No
Phone: 608-345-9221	PO #:
Email: mblodgett@scsengineers.com	WO #:
Project Name: Ottumwa Midland LF	Project #: 25224073 00
Site: Ottumwa Midland LF	SSOW#:

Analysis Requested

Preservation Codes:

A HCL	M - Hexane
B - NaOH	N - None
C Zn Acetate	O AsNaO2
D - Nitric Acid	P Na2O4S
E NaHSO4	Q - Na2SO3
F MeOH	R - Na2S2O3
G Amchlor	S H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I Ice	U - Acetone
J - DI Water	V MCAA
K - EDTA	W - pH 4-5
L - EDA	Y Trizma
	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020B Metals (15)	2540C_Calcd, 9056A_ORGFM_28D, I_3765_85	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
Field Blank			G	Water	N		X	X		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____________ *Months*

Deliverable Requested I II III IV Other (specify)

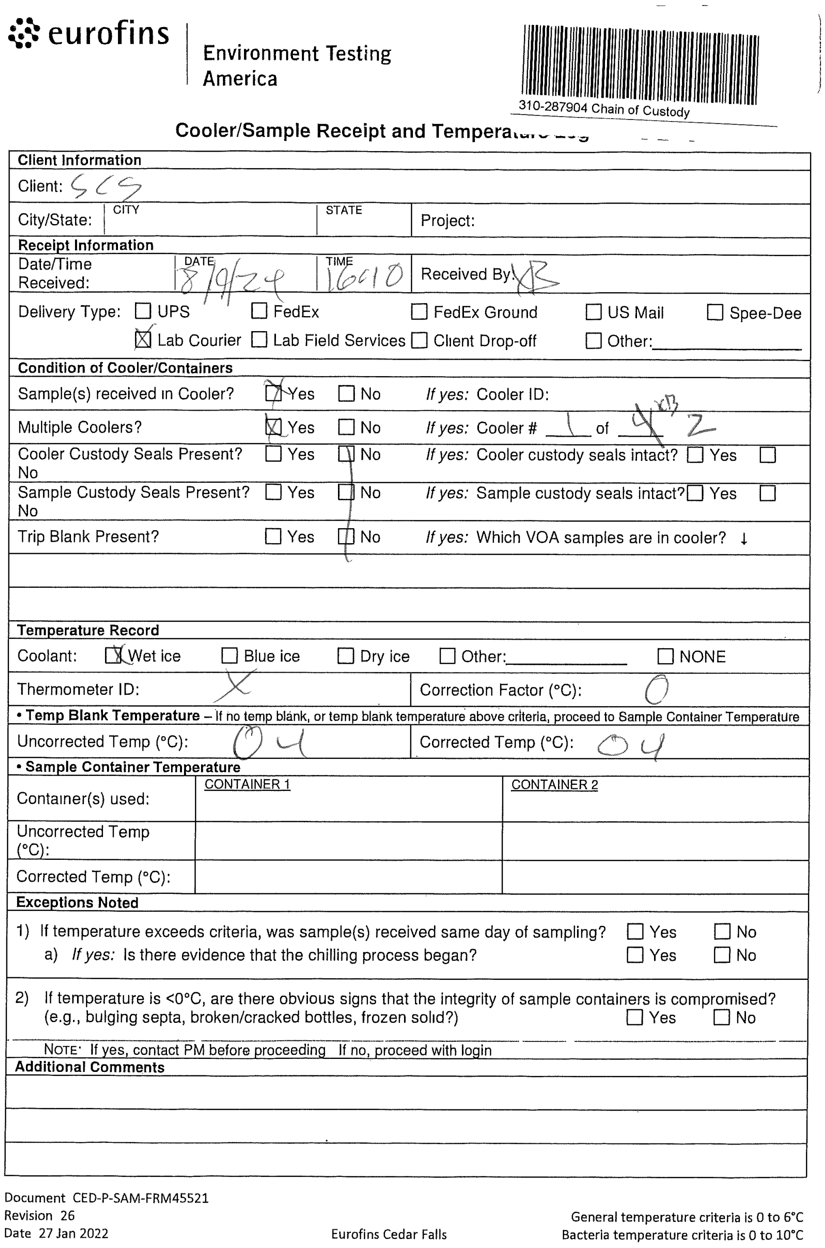
Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date.	Time	Method of Shipment:

Relinquished by: Mc Morgan	Date/Time: 8 9 24 [illegible] AM	Company SCS Engineers	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.

Ver: 01/12/2023



eurofins | Environment Testing America

310-287904 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information

Client: SCS

City/State: CITY STATE Project:

Receipt Information

Date/Time Received: DATE 8/9/24 TIME 1610 Received By: KB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:________

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 1 of ~~4~~ 2 KB

Cooler Custody Seals Present? ☐ Yes ☒ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:________ ☐ NONE

Thermometer ID: X Correction Factor (°C): 0

• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0 4 Corrected Temp (°C): 0 4

• Sample Container Temperature

Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Document CED-P-SAM-FRM45521
Revision 26
Date 27 Jan 2022

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY STATE | Project:

Receipt Information

Date/Time Received: DATE 8/4/24 TIME 1640 | Received By: XB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other ____________

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 2

Cooler Custody Seals Present? ☐ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☐ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☐ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant. ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:____________ ☐ NONE

Thermometer ID. X | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.8 | Corrected Temp (°C): 0.8

• **Sample Container Temperature**

Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Document CED-P-SAM-FRM45521
Revision 26
Date 27 Jan 2022

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

eurofins

Client Information	Sampler: Micah Morgan	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 55-6 -0778	E-Mail: Sandie.Fredrick@et.eurofinsus.com	State of Origin:	Page: 1 of 2
Company: SCS Engineers	PWSID:			Job #:

Address: 2830 Dairy Dr
City: Madison
State, Zip: WI 53718
Phone: 608-345-9221
Email: mblodgett@scsengineers.com
Project Name: Ottumwa Midland LF
Site: Ottumwa Midland LF

Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #:
WO #:
Project #: 25224073 00
SSOW#:

Analysis Requested

Preservation Codes.
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S H2SO4
T - TSP Dodecahydrate
U - Acetone
V MCAA
W - pH 4-5
Y - Trizma
Z other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020B - Metals (15)	2540C_Calcd, 9056A_ORGFM_28D, I_3765_85	Total Number of containers	Special Instructions/Note.
			Preservation Code.				D	N		
MW-1R			G	Water	N		X	X		
MW-12			G	Water	N		X	X		
MW-13			G	Water	N		X	X		
MW-14			G	Water	N		X	X		
MW-15R			G	Water	N		X	X		
MW-16R			G	Water	N		X	X		
[redacted]			G	Water	N		X	X		No sample
MW-100R			G	Water	N		X	X		
MW-101R			G	Water	N		X	X		
MW-102P			G	Water	N		X	X		
MW-108			G	Water	N		X	X		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *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: Micah Morgan	Date/Time: 8/9 + 9 am	Company SCS Engineers	Received by:	Date/Time	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 8/9/24 1648	Company: EE

Custody Seals Intact: Δ Yes Δ No
Custody Seal No
Cooler Temperature(s) °C and Other Remarks.

Ver: 01/12/2023

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

eurofins

Client Information	Sampler: Michael Morgan	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 5 03 0778	E-Mail: Sandie.Fredrick@et.eurofinsus.com	State of Origin:	Page: 2 of 2
Company: SCS Engineers	PWSID:			Job #:

Address: 2830 Dairy Dr	**Due Date Requested:**	**Analysis Requested**
City: Madison	**TAT Requested (days):**	
State, Zip: WI 53718	**Compliance Project:** Δ Yes Δ No	
Phone: 608-345-9221	PO #:	
Email: mblodgett@scsengineers.com	WO #:	
Project Name: Ottumwa Midland LF	Project #: 25224073 00	
Site: Ottumwa Midland LF	SSOW#:	

Preservation Codes

A - HCL
B NaOH
C - Zn Acetate
D Nitric Acid
E - NaHSO4
F MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U Acetone
V - MCAA
W - pH 4-5
Y Trizma
Z other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020B - Metals (15)	2540C_Calcd, 9056A_ORGFM_28D, I_3765_85												Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N													
Field Blank			G	Water	N		X	X													

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *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: Michael Morgan	Date/Time: 8/9/24 9:00 AM	Company SCS Engineers	Received by:	Date/Time:	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.

Ver: 01/12/2023

Table 1. Sampling Points and Parameters

Groundwater Monitoring - Ottumwa Midland CCR Landfill / SCS Engineers Project #25223073

		Groundwater Monitoring Wells																																	
	Parameter	MW-1R	MW-5	MW-6	MW-8	MW-9P	MW-9M	MW-10	MW-10R	MW-11R	MW-12	MW-13	MW-14	MW-15R	MW-16R	MW-17	MW-100R	MW-101R	MW-102	MW-102P	MW-102M	MW-107	MW-108	MW-110	MW-110P	MW-111	MW-112	MW-115	MW-116	MW-116P	MW-116M	MW-117	MW-122	MW-122P	MW-122M
Unfiltered Metals	Arsenic, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Barium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Beryllium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Boron, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Calcium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Cobalt, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Copper, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Iron, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Lead, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Lithium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Magnesium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Manganese, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Molybdenum, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Selenium, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Zinc, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
Additional Lab Parameters	Chloride, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Sulfate, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Fluoride, Total (Unfiltered)	x									x	x	x	x	x	x	x	x		x			x												
	Total Dissolved Solids	x									x	x	x	x	x	x	x	x		x			x												
	Total Suspended Solids	x									x	x	x	x	x	x	x	x		x			x												
	Field Parameters																																		
	pH	x									x	x	x	x	x	x	x	x		x			x												
	Conductance	x									x	x	x	x	x	x	x	x		x			x												
	Temperature	x									x	x	x	x	x	x	x	x		x			x												
	Turbidity, Field	x									x	x	x	x	x	x	x	x		x			x												
	Color, Field	x									x	x	x	x	x	x	x	x		x			x												
	Odor, Field	x									x	x	x	x	x	x	x	x		x			x												
	Water Elevation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Well Depth**		x	x	x	x	x	x	x	x						x			x			x		x	x	x	x	x	x	x	x	x	x	x	
	Surface Water Depth*																																		

Updated 7/20/2023

I.\25223073 00\Data and Calculations\Field Work Requests\August 2023\[State_Sampling_Points_Parameters_OML_Aug_Table for Lab xls]Sampling

		Groundwater Underdrain Discharge			Contact Water	Surface Water Monitoring Points					Leachate			
	Parameter	GU-1 Temp	GU-2 Temp	GU-EX	TCB-1/2**	SW-01R	SW-02R	SW-03	SW-04	SW-05	LP-1	Leachate Basin	Field Blank	TOTAL
Unfiltered Metals	Arsenic, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Barium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Beryllium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Boron, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Calcium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Cobalt, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Copper, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Iron, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Lead, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Lithium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Magnesium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Manganese, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Molybdenum, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Selenium, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Zinc, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
Additional Lab Parameters	Chloride, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Sulfate, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Fluoride, Total (Unfiltered)	x	x	x	x	x	x	x	x	x	x	x	x	23
	Total Dissolved Solids	x	x	x	x	x	x	x	x	x	x	x	x	23
	Total Suspended Solids	x	x	x	x	x	x	x	x	x	x	x	x	23
	Field Parameters													
	pH	x	x	x	x	x	x	x	x	x	x	x	x	23
	Conductance	x	x	x	x	x	x	x	x	x	x	x	x	23
	Temperature	x	x	x	x	x	x	x	x	x	x	x	x	23
	Turbidity, Field	x	x	x	x	x	x	x	x	x	x	x	x	23
	Color, Field	x	x	x	x	x	x	x	x	x			x	21
	Odor, Field	x	x	x	x	x	x	x	x	x			x	21
	Water Elevation													36
	Well Depth**													24
	Surface Water Depth*					x	x	x	x	x				5

* Measure surface water depth at staff gauge or, if no staff gauge present, measure depth at center of stream

** Total depth measurements not required at wells with dedicated pumps

Updated 7/20/2023

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Groundwater Monitoring Results - Sample Date and Time
Ottumwa Midland Landfill / SCS Engineers Project #25224073.00
August 2024

	Date	Time
MW-1R	8/6/2024	11:11
MW-12	8/8/2024	7:40
MW-13	8/8/2024	9:26
MW-14	8/7/2024	10:47
MW-15R	8/6/2024	9:00
MW-16R	8/7/2024	15:05
MW-100R	8/6/2024	12:33
MW-101R	8/6/2024	13:57
MW-102P	8/7/2024	13:47
MW-108	8/7/2024	9:02
Field Blank	8/8/2024	14:45
SW-2R	No Sample	Monitoring point dry
SW-3	8/8/2024	10:40
TCB-1/2	8/8/2024	13:50
GU-1 Temp	8/8/2024	11:50
GU-EX	8/8/2024	13:15
Leachate Basin	8/8/2024	14:25

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-287904-1
SDG Number: 25224073.00

Login Number: 287904
List Number: 1
Creator: Mathews, Emily A

List Source: Eurofins Cedar Falls

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.	N/A	
Sample custody seals, if present, are intact.	N/A	
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.	False	No sample date and/or time on COC
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.	True	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Groundwater Monitoring Results - Field Parameters
Ottumwa Midland Landfill / SCS Engineers Project #25224073.00
August 2024

Eurofins Report Number	Sample	Date	Temperature (Deg. C)	pH (Std. Units)	Specific Conductivity (µmhos/cm)	GW Elevation (feet)
310-287904-1	MW-1R	08/06/24	14.4	6.97	787	813.54
	MW-12	08/08/24	17.1	7.23	2369	722.63
	MW-13	08/08/24	15.9	6.97	3194	722.56
	MW-14	08/07/24	17.0	7.10	3214	722.62
	MW-15R	08/06/24	14.0	6.27	2101	760.45
	MW-16R	08/07/24	15.0	6.94	3511	722.47
	MW-100R	08/06/24	14.0	7.05	1007	808.50
	MW-101R	08/06/24	13.8	6.80	1533	782.62
	MW-102P	08/07/24	14.0	6.49	3556	722.89
	MW-108	08/07/24	14.2	6.56	621	741.21
310-287906-1	SW-3	08/08/24	28.1	8.56	651	--
	TCB-1/2	08/08/24	28.3	8.06	863	--
	GU-1 Temp	08/08/24	20.7	6.73	1438	--
	GU-EX	08/08/24	23.3	7.70	1281	--
	Leachate Basin	08/08/24	25.8	8.60	6769	--

Abbreviations:

amsl = above mean sea level

µmhos/cm = microSiemens per centimeter

NM = Not Measured

Created by: AJR Date: 08/15/19
Last revision by: RM Date: 08/19/24
Checked by: NLB Date: 08/19/24

eurofins

Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

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JOB DESCRIPTION

Ottumwa Midland LF - 25224073.00

JOB NUMBER

310-287906-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Eurofins Cedar Falls

Job Notes

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Authorization

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Case Narrative

Job ID: 310-287906-1 Eurofins Cedar Falls

Job Narrative
310-287906-1

Receipt
The samples were received on 8/9/2024 4:40 PM. 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 was 0.7º C.

Receipt Exceptions
The following samples were listed on the Chain of Custody (COC); however, no samples were received: SW-02R GU-1 (310-287906-1), GU-EX (310-287906-2), TCB-1/2 (310-287906-3), SW-03 (310-287906-4) and Leachate Basin (310-287906-5).

HPLC/IC
Method 9056A: The following samples were diluted due to the nature of the sample matrix: TCB-1/2 (310-287906-3), SW-03 (310-287906-4) and Leachate Basin (310-287906-5). Elevated reporting limits (RLs) are provided.

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

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

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287906-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-287906-1	GU-1	Water	08/08/24 11:50	08/09/24 16:40
310-287906-2	GU-EX	Water	08/08/24 13:15	08/09/24 16:40
310-287906-3	TCB-1/2	Water	08/08/24 13:50	08/09/24 16:40
310-287906-4	SW-03	Water	08/08/24 10:40	08/09/24 16:40
310-287906-5	Leachate Basin	Water	08/08/24 14:25	08/09/24 16:40

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287906-1

Client Sample ID: GU-1

Lab Sample ID: 310-287906-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.42	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	390		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	38		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	270		100	76	ug/L	1		6020B	Total/NA
Calcium	230		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	11		0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	48		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	61000		500	150	ug/L	1		6020B	Total/NA
Manganese	2000		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	2.2		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	1.4	J	5.0	1.4	ug/L	1		6020B	Total/NA
Zinc	29		20	9.7	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	42	mg/L	1		SM 2540C	Total/NA
Field pH	6.73				SU	1		Field Sampling	Total/NA
Field Conductivity	1438				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	20.7				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: GU-EX

Lab Sample ID: 310-287906-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	32		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.46	J	1.0	0.38	mg/L	5		9056A	Total/NA
Sulfate	460		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	0.70	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	35		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	900		100	76	ug/L	1		6020B	Total/NA
Calcium	150		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	3.5		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	260		100	36	ug/L	1		6020B	Total/NA
Lithium	26		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	36000		500	150	ug/L	1		6020B	Total/NA
Manganese	250		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	48		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	4.7	J	5.0	1.4	ug/L	1		6020B	Total/NA
Zinc	39		20	9.7	ug/L	1		6020B	Total/NA
Total Suspended Solids	2.5		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	930		50	42	mg/L	1		SM 2540C	Total/NA
Field pH	7.70				SU	1		Field Sampling	Total/NA
Field Conductivity	1281				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	23.3				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: TCB-1/2

Lab Sample ID: 310-287906-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	12		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	380		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	0.95	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	76		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	430		100	76	ug/L	1		6020B	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020B	Total/NA
Lithium	3.3	J	10	2.5	ug/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: TCB-1/2 (Continued) Lab Sample ID: 310-287906-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	14000		500	150	ug/L	1		6020B	Total/NA
Manganese	6.0	J	10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	3.9		2.0	1.3	ug/L	1		6020B	Total/NA
Total Suspended Solids	3.9		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	590		50	42	mg/L	1		SM 2540C	Total/NA
Field pH	8.06				SU	1		Field Sampling	Total/NA
Field Conductivity	863				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	28.3				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: SW-03 Lab Sample ID: 310-287906-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	4.6	J	5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	250		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	2.0		2.0	0.53	ug/L	1		6020B	Total/NA
Barium	52		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	560		100	76	ug/L	1		6020B	Total/NA
Calcium	61		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.20	J	0.50	0.17	ug/L	1		6020B	Total/NA
Iron	76	J	100	36	ug/L	1		6020B	Total/NA
Lithium	8.7	J	10	2.5	ug/L	1		6020B	Total/NA
Magnesium	23000		500	150	ug/L	1		6020B	Total/NA
Manganese	26		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	9.9		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	1.9	J	5.0	1.4	ug/L	1		6020B	Total/NA
Total Suspended Solids	8.3		1.9	1.4	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	410		50	42	mg/L	1		SM 2540C	Total/NA
Field pH	8.56				SU	1		Field Sampling	Total/NA
Field Conductivity	651				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	28.1				Degrees C	1		Field Sampling	Total/NA

Client Sample ID: Leachate Basin Lab Sample ID: 310-287906-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	1000		50	23	mg/L	50		9056A	Total/NA
Sulfate	1900		50	21	mg/L	50		9056A	Total/NA
Arsenic	9.7		2.0	0.53	ug/L	1		6020B	Total/NA
Barium	72		2.0	0.66	ug/L	1		6020B	Total/NA
Boron	2100		100	76	ug/L	1		6020B	Total/NA
Calcium	260		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.68		0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	43		10	2.5	ug/L	1		6020B	Total/NA
Magnesium	28000		500	150	ug/L	1		6020B	Total/NA
Manganese	86		10	3.6	ug/L	1		6020B	Total/NA
Molybdenum	680		2.0	1.3	ug/L	1		6020B	Total/NA
Selenium	76		5.0	1.4	ug/L	1		6020B	Total/NA
Total Suspended Solids	6.0		5.0	3.7	mg/L	1		I-3765-85	Total/NA
Total Dissolved Solids	5000		250	210	mg/L	1		SM 2540C	Total/NA
Field pH	8.60				SU	1		Field Sampling	Total/NA
Field Conductivity	6769				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	25.8				Degrees C	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GU-1

Lab Sample ID: 310-287906-1

Date Collected: 08/08/24 11:50
Matrix: Water
Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**20**		5.0	2.3	mg/L			08/16/24 18:12	5
Fluoride	**0.42**	**J**	1.0	0.38	mg/L			08/16/24 18:12	5
Sulfate	**390**		5.0	2.1	mg/L			08/16/24 18:12	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/15/24 15:46	1
Barium	**38**		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 15:46	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 15:46	1
Boron	**270**		100	76	ug/L		08/13/24 09:00	08/16/24 12:35	1
Calcium	**230**		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 15:46	1
Cobalt	**11**		0.50	0.17	ug/L		08/13/24 09:00	08/15/24 15:46	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 15:46	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/15/24 15:46	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 15:46	1
Lithium	**48**		10	2.5	ug/L		08/13/24 09:00	08/15/24 15:46	1
Magnesium	**61000**		500	150	ug/L		08/13/24 09:00	08/15/24 15:46	1
Manganese	**2000**		10	3.6	ug/L		08/13/24 09:00	08/15/24 15:46	1
Molybdenum	**2.2**		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 15:46	1
Selenium	**1.4**	**J**	5.0	1.4	ug/L		08/13/24 09:00	08/15/24 15:46	1
Zinc	**29**		20	9.7	ug/L		08/13/24 09:00	08/15/24 15:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	<1.4		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**1100**		50	42	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field pH	**6.73**				SU			08/08/24 11:50	1
Field Conductivity	**1438**				umhos/cm			08/08/24 11:50	1
Field Temperature	**20.7**				Degrees C			08/08/24 11:50	1

Client Sample ID: GU-EX

Lab Sample ID: 310-287906-2

Date Collected: 08/08/24 13:15

Matrix: Water

Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**32**		5.0	2.3	mg/L			08/16/24 18:25	5
Fluoride	**0.46**	**J**	1.0	0.38	mg/L			08/16/24 18:25	5
Sulfate	**460**		5.0	2.1	mg/L			08/16/24 18:25	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.70**	**J**	2.0	0.53	ug/L		08/13/24 09:00	08/15/24 15:56	1
Barium	**35**		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 15:56	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 15:56	1
Boron	**900**		100	76	ug/L		08/13/24 09:00	08/16/24 12:50	1
Calcium	**150**		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 15:56	1
Cobalt	**3.5**		0.50	0.17	ug/L		08/13/24 09:00	08/15/24 15:56	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 15:56	1
Iron	**260**		100	36	ug/L		08/13/24 09:00	08/15/24 15:56	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 15:56	1
Lithium	**26**		10	2.5	ug/L		08/13/24 09:00	08/15/24 15:56	1
Magnesium	**36000**		500	150	ug/L		08/13/24 09:00	08/15/24 15:56	1
Manganese	**250**		10	3.6	ug/L		08/13/24 09:00	08/15/24 15:56	1
Molybdenum	**48**		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 15:56	1
Selenium	**4.7**	**J**	5.0	1.4	ug/L		08/13/24 09:00	08/15/24 15:56	1
Zinc	**39**		20	9.7	ug/L		08/13/24 09:00	08/15/24 15:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**2.5**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**930**		50	42	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field pH	**7.70**				SU			08/08/24 13:15	1
Field Conductivity	**1281**				umhos/cm			08/08/24 13:15	1
Field Temperature	**23.3**				Degrees C			08/08/24 13:15	1

Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287906-1

Client Sample ID: TCB-1/2

Date Collected: 08/08/24 13:50
Date Received: 08/09/24 16:40

Lab Sample ID: 310-287906-3

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**12**		5.0	2.3	mg/L			08/16/24 18:37	5
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 18:37	5
Sulfate	**380**		5.0	2.1	mg/L			08/16/24 18:37	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.95**	**J**	2.0	0.53	ug/L		08/13/24 09:00	08/15/24 15:58	1
Barium	**76**		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 15:58	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 15:58	1
Boron	**430**		100	76	ug/L		08/13/24 09:00	08/16/24 12:52	1
Calcium	**130**		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 15:58	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/15/24 15:58	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 15:58	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/15/24 15:58	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 15:58	1
Lithium	**3.3**	**J**	10	2.5	ug/L		08/13/24 09:00	08/15/24 15:58	1
Magnesium	**14000**		500	150	ug/L		08/13/24 09:00	08/15/24 15:58	1
Manganese	**6.0**	**J**	10	3.6	ug/L		08/13/24 09:00	08/15/24 15:58	1
Molybdenum	**3.9**		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 15:58	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/15/24 15:58	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/15/24 15:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**3.9**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**590**		50	42	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field pH	**8.06**				SU			08/08/24 13:50	1
Field Conductivity	**863**				umhos/cm			08/08/24 13:50	1
Field Temperature	**28.3**				Degrees C			08/08/24 13:50	1

Client Sample ID: SW-03

Lab Sample ID: 310-287906-4

Date Collected: 08/08/24 10:40

Matrix: Water

Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**4.6**	**J**	5.0	2.3	mg/L			08/16/24 18:49	5
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 18:49	5
Sulfate	**250**		5.0	2.1	mg/L			08/16/24 18:49	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.0**		2.0	0.53	ug/L		08/13/24 09:00	08/15/24 16:01	1
Barium	**52**		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 16:01	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 16:01	1
Boron	**560**		100	76	ug/L		08/13/24 09:00	08/16/24 12:54	1
Calcium	**61**		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 16:01	1
Cobalt	**0.20**	**J**	0.50	0.17	ug/L		08/13/24 09:00	08/15/24 16:01	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 16:01	1
Iron	**76**	**J**	100	36	ug/L		08/13/24 09:00	08/15/24 16:01	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 16:01	1
Lithium	**8.7**	**J**	10	2.5	ug/L		08/13/24 09:00	08/15/24 16:01	1
Magnesium	**23000**		500	150	ug/L		08/13/24 09:00	08/15/24 16:01	1
Manganese	**26**		10	3.6	ug/L		08/13/24 09:00	08/15/24 16:01	1
Molybdenum	**9.9**		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 16:01	1
Selenium	**1.9**	**J**	5.0	1.4	ug/L		08/13/24 09:00	08/15/24 16:01	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/15/24 16:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**8.3**		1.9	1.4	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**410**		50	42	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field pH	**8.56**				SU			08/08/24 10:40	1
Field Conductivity	**651**				umhos/cm			08/08/24 10:40	1
Field Temperature	**28.1**				Degrees C			08/08/24 10:40	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-287906-1
Project/Site: Ottumwa Midland LF - 25224073.00

Client Sample ID: Leachate Basin

Lab Sample ID: 310-287906-5

Date Collected: 08/08/24 14:25

Matrix: Water

Date Received: 08/09/24 16:40

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1000**		50	23	mg/L			08/19/24 10:05	50
Fluoride	<0.38		1.0	0.38	mg/L			08/16/24 19:01	5
Sulfate	**1900**		50	21	mg/L			08/19/24 10:05	50

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**9.7**		2.0	0.53	ug/L		08/13/24 09:00	08/15/24 16:11	1
Barium	**72**		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 16:11	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 16:11	1
Boron	**2100**		100	76	ug/L		08/13/24 09:00	08/16/24 12:57	1
Calcium	**260**		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 16:11	1
Cobalt	**0.68**		0.50	0.17	ug/L		08/13/24 09:00	08/15/24 16:11	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 16:11	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/15/24 16:11	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 16:11	1
Lithium	**43**		10	2.5	ug/L		08/13/24 09:00	08/15/24 16:11	1
Magnesium	**28000**		500	150	ug/L		08/13/24 09:00	08/15/24 16:11	1
Manganese	**86**		10	3.6	ug/L		08/13/24 09:00	08/15/24 16:11	1
Molybdenum	**680**		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 16:11	1
Selenium	**76**		5.0	1.4	ug/L		08/13/24 09:00	08/15/24 16:11	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/15/24 16:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (USGS I-3765-85)	**6.0**		5.0	3.7	mg/L			08/12/24 15:46	1
Total Dissolved Solids (SM 2540C)	**5000**		250	210	mg/L			08/13/24 15:37	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field pH	**8.60**				SU			08/08/24 14:25	1
Field Conductivity	**6769**				umhos/cm			08/08/24 14:25	1
Field Temperature	**25.8**				Degrees C			08/08/24 14:25	1

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Qualifiers

HPLC/IC

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.

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.

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

QC Sample Results

Client: SCS Engineers
Job ID: 310-287906-1
Project/Site: Ottumwa Midland LF - 25224073.00

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-430782/3
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 430782

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			08/16/24 15:35	1
Fluoride	<0.075		0.20	0.075	mg/L			08/16/24 15:35	1
Sulfate	<0.42		1.0	0.42	mg/L			08/16/24 15:35	1

Lab Sample ID: LCS 310-430782/4
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 430782

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.97		mg/L		100	90 - 110
Fluoride	2.00	2.07		mg/L		103	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-430126/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 430554
Prep Batch: 430126

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.53		2.0	0.53	ug/L		08/13/24 09:00	08/15/24 15:41	1
Barium	<0.66		2.0	0.66	ug/L		08/13/24 09:00	08/15/24 15:41	1
Beryllium	<0.33		1.0	0.33	ug/L		08/13/24 09:00	08/15/24 15:41	1
Calcium	<0.19		0.50	0.19	mg/L		08/13/24 09:00	08/15/24 15:41	1
Cobalt	<0.17		0.50	0.17	ug/L		08/13/24 09:00	08/15/24 15:41	1
Copper	<1.8		5.0	1.8	ug/L		08/13/24 09:00	08/15/24 15:41	1
Iron	<36		100	36	ug/L		08/13/24 09:00	08/15/24 15:41	1
Lead	<0.26		0.50	0.26	ug/L		08/13/24 09:00	08/15/24 15:41	1
Lithium	<2.5		10	2.5	ug/L		08/13/24 09:00	08/15/24 15:41	1
Magnesium	<150		500	150	ug/L		08/13/24 09:00	08/15/24 15:41	1
Manganese	<3.6		10	3.6	ug/L		08/13/24 09:00	08/15/24 15:41	1
Molybdenum	<1.3		2.0	1.3	ug/L		08/13/24 09:00	08/15/24 15:41	1
Selenium	<1.4		5.0	1.4	ug/L		08/13/24 09:00	08/15/24 15:41	1
Zinc	<9.7		20	9.7	ug/L		08/13/24 09:00	08/15/24 15:41	1

Lab Sample ID: MB 310-430126/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 430653
Prep Batch: 430126

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<76		100	76	ug/L		08/13/24 09:00	08/16/24 12:31	1

Lab Sample ID: LCS 310-430126/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 430554
Prep Batch: 430126

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	200	206		ug/L		103	80 - 120
Barium	100	104		ug/L		104	80 - 120
Beryllium	100	103		ug/L		103	80 - 120

QC Sample Results

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

Lab Sample ID: LCS 310-430126/2-A
Matrix: Water
Analysis Batch: 430554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 430126

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Calcium			2.00	2.02		mg/L		101	80 - 120		
Cobalt			100	113		ug/L		113	80 - 120		
Copper			200	219		ug/L		109	80 - 120		
Iron			200	218		ug/L		109	80 - 120		
Lead			200	222		ug/L		111	80 - 120		
Lithium			200	216		ug/L		108	80 - 120		
Magnesium			2000	2130		ug/L		107	80 - 120		
Manganese			100	99.2		ug/L		99	80 - 120		
Molybdenum			200	197		ug/L		99	80 - 120		
Selenium			400	392		ug/L		98	80 - 120		
Zinc			200	200		ug/L		100	80 - 120		

Lab Sample ID: LCS 310-430126/2-A
Matrix: Water
Analysis Batch: 430653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 430126

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Boron			200	202		ug/L		101	80 - 120		

Lab Sample ID: 310-287906-1 MS
Matrix: Water
Analysis Batch: 430554

Client Sample ID: GU-1
Prep Type: Total/NA
Prep Batch: 430126

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic	<0.53		200	225		ug/L		113	75 - 125		
Barium	38		100	145		ug/L		108	75 - 125		
Beryllium	<0.33		100	111		ug/L		111	75 - 125		
Calcium	230		2.00	235	4	mg/L		410	75 - 125		
Cobalt	11		100	121		ug/L		111	75 - 125		
Copper	<1.8		200	212		ug/L		106	75 - 125		
Iron	<36		200	240		ug/L		120	75 - 125		
Lead	<0.26		200	214		ug/L		107	75 - 125		
Lithium	48		200	278		ug/L		115	75 - 125		
Magnesium	61000		2000	64700	4	ug/L		199	75 - 125		
Manganese	2000		100	2120	4	ug/L		152	75 - 125		
Molybdenum	2.2		200	214		ug/L		106	75 - 125		
Selenium	1.4	J	400	428		ug/L		107	75 - 125		
Zinc	29		200	237		ug/L		104	75 - 125		

Lab Sample ID: 310-287906-1 MS
Matrix: Water
Analysis Batch: 430653

Client Sample ID: GU-1
Prep Type: Total/NA
Prep Batch: 430126

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Boron	270		200	494		ug/L		111	75 - 125		

QC Sample Results

Client: SCS Engineers
Job ID: 310-287906-1
Project/Site: Ottumwa Midland LF - 25224073.00

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

Lab Sample ID: 310-287906-1 MSD
Matrix: Water
Analysis Batch: 430554

Client Sample ID: GU-1
Prep Type: Total/NA
Prep Batch: 430126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	<0.53		200	226		ug/L		113	75 - 125	0	20
Barium	38		100	147		ug/L		109	75 - 125	1	20
Beryllium	<0.33		100	112		ug/L		112	75 - 125	1	20
Calcium	230		2.00	237	4	mg/L		529	75 - 125	1	20
Cobalt	11		100	123		ug/L		112	75 - 125	1	20
Copper	<1.8		200	212		ug/L		106	75 - 125	0	20
Iron	<36		200	241		ug/L		120	75 - 125	0	20
Lead	<0.26		200	215		ug/L		108	75 - 125	0	20
Lithium	48		200	279		ug/L		115	75 - 125	1	20
Magnesium	61000		2000	65500	4	ug/L		243	75 - 125	1	20
Manganese	2000		100	2140	4	ug/L		168	75 - 125	1	20
Molybdenum	2.2		200	217		ug/L		107	75 - 125	1	20
Selenium	1.4	J	400	430		ug/L		107	75 - 125	0	20
Zinc	29		200	238		ug/L		104	75 - 125	0	20

Lab Sample ID: 310-287906-1 MSD
Matrix: Water
Analysis Batch: 430653

Client Sample ID: GU-1
Prep Type: Total/NA
Prep Batch: 430126

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Boron	270		200	516		ug/L		122	75 - 125	4	20

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-430112/1
Matrix: Water
Analysis Batch: 430112

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.7		5.0	3.7	mg/L			08/12/24 15:46	1

Lab Sample ID: LCS 310-430112/2
Matrix: Water
Analysis Batch: 430112

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	99.0		mg/L		99	81 - 116

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-430251/1
Matrix: Water
Analysis Batch: 430251

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<42		50	42	mg/L			08/13/24 15:37	1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 310-430251/2
Matrix: Water
Analysis Batch: 430251

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	996		mg/L		100	88 - 110

QC Association Summary

Client: SCS Engineers
Job ID: 310-287906-1
Project/Site: Ottumwa Midland LF - 25224073.00

HPLC/IC

Analysis Batch: 430782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	9056A	
310-287906-2	GU-EX	Total/NA	Water	9056A	
310-287906-3	TCB-1/2	Total/NA	Water	9056A	
310-287906-4	SW-03	Total/NA	Water	9056A	
310-287906-5	Leachate Basin	Total/NA	Water	9056A	
310-287906-5	Leachate Basin	Total/NA	Water	9056A	
MB 310-430782/3	Method Blank	Total/NA	Water	9056A	
LCS 310-430782/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 430126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	3005A	
310-287906-2	GU-EX	Total/NA	Water	3005A	
310-287906-3	TCB-1/2	Total/NA	Water	3005A	
310-287906-4	SW-03	Total/NA	Water	3005A	
310-287906-5	Leachate Basin	Total/NA	Water	3005A	
MB 310-430126/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-430126/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-287906-1 MS	GU-1	Total/NA	Water	3005A	
310-287906-1 MSD	GU-1	Total/NA	Water	3005A	

Analysis Batch: 430554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	6020B	430126
310-287906-2	GU-EX	Total/NA	Water	6020B	430126
310-287906-3	TCB-1/2	Total/NA	Water	6020B	430126
310-287906-4	SW-03	Total/NA	Water	6020B	430126
310-287906-5	Leachate Basin	Total/NA	Water	6020B	430126
MB 310-430126/1-A	Method Blank	Total/NA	Water	6020B	430126
LCS 310-430126/2-A	Lab Control Sample	Total/NA	Water	6020B	430126
310-287906-1 MS	GU-1	Total/NA	Water	6020B	430126
310-287906-1 MSD	GU-1	Total/NA	Water	6020B	430126

Analysis Batch: 430653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	6020B	430126
310-287906-2	GU-EX	Total/NA	Water	6020B	430126
310-287906-3	TCB-1/2	Total/NA	Water	6020B	430126
310-287906-4	SW-03	Total/NA	Water	6020B	430126
310-287906-5	Leachate Basin	Total/NA	Water	6020B	430126
MB 310-430126/1-A	Method Blank	Total/NA	Water	6020B	430126
LCS 310-430126/2-A	Lab Control Sample	Total/NA	Water	6020B	430126
310-287906-1 MS	GU-1	Total/NA	Water	6020B	430126
310-287906-1 MSD	GU-1	Total/NA	Water	6020B	430126

General Chemistry

Analysis Batch: 430112

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	I-3765-85	

General Chemistry (Continued)

Analysis Batch: 430112 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-2	GU-EX	Total/NA	Water	I-3765-85	
310-287906-3	TCB-1/2	Total/NA	Water	I-3765-85	
310-287906-4	SW-03	Total/NA	Water	I-3765-85	
310-287906-5	Leachate Basin	Total/NA	Water	I-3765-85	
MB 310-430112/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-430112/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Analysis Batch: 430251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	SM 2540C	
310-287906-2	GU-EX	Total/NA	Water	SM 2540C	
310-287906-3	TCB-1/2	Total/NA	Water	SM 2540C	
310-287906-4	SW-03	Total/NA	Water	SM 2540C	
310-287906-5	Leachate Basin	Total/NA	Water	SM 2540C	
MB 310-430251/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-430251/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 430803

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-287906-1	GU-1	Total/NA	Water	Field Sampling	
310-287906-2	GU-EX	Total/NA	Water	Field Sampling	
310-287906-3	TCB-1/2	Total/NA	Water	Field Sampling	
310-287906-4	SW-03	Total/NA	Water	Field Sampling	
310-287906-5	Leachate Basin	Total/NA	Water	Field Sampling	

Client Sample ID: GU-1 Lab Sample ID: 310-287906-1

Date Collected: 08/08/24 11:50 **Matrix: Water**

Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 18:12
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430554	NFT2	EET CF	08/15/24 15:46
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430653	NFT2	EET CF	08/16/24 12:35
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 11:50

Client Sample ID: GU-EX Lab Sample ID: 310-287906-2

Date Collected: 08/08/24 13:15 **Matrix: Water**

Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 18:25
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430554	NFT2	EET CF	08/15/24 15:56
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430653	NFT2	EET CF	08/16/24 12:50
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 13:15

Client Sample ID: TCB-1/2 Lab Sample ID: 310-287906-3

Date Collected: 08/08/24 13:50 **Matrix: Water**

Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 18:37
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430554	NFT2	EET CF	08/15/24 15:58
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430653	NFT2	EET CF	08/16/24 12:52
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 13:50

Client Sample ID: SW-03 Lab Sample ID: 310-287906-4

Date Collected: 08/08/24 10:40 **Matrix: Water**

Date Received: 08/09/24 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 18:49

Lab Chronicle

Client Sample ID: SW-03

Lab Sample ID: 310-287906-4

Date Collected: 08/08/24 10:40
Date Received: 08/09/24 16:40
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430554	NFT2	EET CF	08/15/24 16:01
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430653	NFT2	EET CF	08/16/24 12:54
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 10:40

Client Sample ID: Leachate Basin

Lab Sample ID: 310-287906-5

Date Collected: 08/08/24 14:25
Date Received: 08/09/24 16:40
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	430782	QTZ5	EET CF	08/16/24 19:01
Total/NA	Analysis	9056A		50	430782	QTZ5	EET CF	08/19/24 10:05
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430554	NFT2	EET CF	08/15/24 16:11
Total/NA	Prep	3005A			430126	DHM5	EET CF	08/13/24 09:00
Total/NA	Analysis	6020B		1	430653	NFT2	EET CF	08/16/24 12:57
Total/NA	Analysis	I-3765-85		1	430112	HE7K	EET CF	08/12/24 15:46
Total/NA	Analysis	SM 2540C		1	430251	MDU9	EET CF	08/13/24 15:37
Total/NA	Analysis	Field Sampling		1	430803	DN	EET CF	08/08/24 14:25

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: SCS Engineers	Job ID: 310-287906-1

Project/Site: Ottumwa Midland LF - 25224073.00

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Midland LF - 25224073.00

Job ID: 310-287906-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

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.
USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-287906 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY STATE Project:

Receipt Information

Date/Time Received: DATE 8/9/24 TIME 1640 Received By: XB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: ____________

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☒ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☐ Yes ☒ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: ____________ ☐ NONE

Thermometer ID: X Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.7 Corrected Temp (°C): 0.7

• **Sample Container Temperature**

Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Missing SW-02R

Document: CED-P-SAM-FRM45521
Revision 26
Date: 27 Jan 2022

Eurofins Cedar Falls

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

eurofins

Client Information	Sampler: Matt Morgan	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No.:
Client Contact: Meghan Blodgett	Phone: [illegible]	E-Mail: Sandie.Fredrick@et.eurofinsus.com	State of Origin:	Page:
Company: SCS Engineers	PWSID:			Job #:

Address: 2830 Dairy Dr
City: Madison
State, Zip: WI 53718
Phone: 608-345-9221
Email: mblodgett@scsengineers.com
Project Name: Ottumwa Midland LF
Site: Ottumwa Midland LF

Due Date Requested:
TAT Requested (days):
Compliance Project: Δ Yes Δ No
PO #:
WO #:
Project #: 25224073 00
SSOW#:

Analysis Requested

Preservation Codes:
- A - HCL
- B - NaOH
- C - Zn Acetate
- D Nitric Acid
- E - NaHSO4
- F MeOH
- G Amchlor
- H - Ascorbic Acid
- I Ice
- J - DI Water
- K - EDTA
- L - EDA
- M Hexane
- N None
- O - AsNaO2
- P - Na2O4S
- Q - Na2SO3
- R - Na2S2O3
- S - H2SO4
- T - TSP Dodecahydrate
- U - Acetone
- V MCAA
- W pH 4-5
- Y - Trizma
- Z other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020B - Metals (15)	2540C_Calcd, 9056A_ORGFM_28D, I_3765_85	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
GU-1			G	Water	N		X	X		
[redacted]			G	Water	N		X	X		No sample
GU-EX			G	Water	N		X	X		
TCB-1/2			G	Water	N		X	X		
[redacted]			G	Water	N		X	X		No sample
SW-02R			G	Water	N		X	X		
SW-03			G	Water	N		X	X		
[redacted]			G	Water	N		X	X		No sample
[redacted]			G	Water	N		X	X		No sample
[redacted]			G	Water	N		X	X		No sample
Leachate Basin			G	Water	N		X	X		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *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: Matt Morgan	Date/Time: 8/9/24 7 00 AM	Company: SCS Engineers	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 8/9/24 1640	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.		Cooler Temperature(s) °C and Other Remarks:		

Ver: 01/12/2023

Groundwater Monitoring Results - Sample Date and Time
Ottumwa Midland Landfill / SCS Engineers Project #25224073.00
August 2024

	Date	Time
MW-1R	8/6/2024	11:11
MW-12	8/8/2024	7:40
MW-13	8/8/2024	9:26
MW-14	8/7/2024	10:47
MW-15R	8/6/2024	9:00
MW-16R	8/7/2024	15:05
MW-100R	8/6/2024	12:33
MW-101R	8/6/2024	13:57
MW-102P	8/7/2024	13:47
MW-108	8/7/2024	9:02
Field Blank	8/8/2024	14:45
SW-2R	No Sample	Monitoring point dry
SW-3	8/8/2024	10:40
TCB-1/2	8/8/2024	13:50
GU-1 Temp	8/8/2024	11:50
GU-EX	8/8/2024	13:15
Leachate Basin	8/8/2024	14:25

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-287906-1
SDG Number:

Login Number: 287906
List Number: 1
Creator: Mathews, Emily A

List Source: Eurofins Cedar Falls

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.	N/A	
Sample custody seals, if present, are intact.	N/A	
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.	False	No sample date and/or time on COC
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	No SW-02R sample received
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.	True	
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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Groundwater Monitoring Results - Field Parameters
Ottumwa Midland Landfill / SCS Engineers Project #25224073.00
August 2024

Eurofins Report Number	Sample	Date	Temperature (Deg. C)	pH (Std. Units)	Specific Conductivity (µmhos/cm)	GW Elevation (feet)
310-287904-1	MW-1R	08/06/24	14.4	6.97	787	813.54
	MW-12	08/08/24	17.1	7.23	2369	722.63
	MW-13	08/08/24	15.9	6.97	3194	722.56
	MW-14	08/07/24	17.0	7.10	3214	722.62
	MW-15R	08/06/24	14.0	6.27	2101	760.45
	MW-16R	08/07/24	15.0	6.94	3511	722.47
	MW-100R	08/06/24	14.0	7.05	1007	808.50
	MW-101R	08/06/24	13.8	6.80	1533	782.62
	MW-102P	08/07/24	14.0	6.49	3556	722.89
	MW-108	08/07/24	14.2	6.56	621	741.21
310-287906-1	SW-3	08/08/24	28.1	8.56	651	--
	TCB-1/2	08/08/24	28.3	8.06	863	--
	GU-1 Temp	08/08/24	20.7	6.73	1438	--
	GU-EX	08/08/24	23.3	7.70	1281	--
	Leachate Basin	08/08/24	25.8	8.60	6769	--

Abbreviations:
amsl = above mean sea level
µmhos/cm = microSiemens per centimeter
NM = Not Measured

Created by: AJR Date: 08/15/19
Last revision by: RM Date: 08/19/24
Checked by: NLB Date: 08/19/24

Appendix C

Summary of Historical Groundwater Chemistry

IPL Ottumwa Midland Landfill
Historic Monitoring Results

ARSENIC
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
ARSENIC, DISSOLVED	1995-Aug	<5			<5	5.9										
ARSENIC, DISSOLVED	1995-Oct	<5		<5	<5	11.7			<5		<5	<5				
ARSENIC, DISSOLVED	1996-Apr	<1		<1	1	11			<1		<1	<1				
ARSENIC, DISSOLVED	1996-Jan	<1		<1	<1	9			<1			<1				
ARSENIC, DISSOLVED	1996-Jul	<5		<5	<5	15			<5		<5	<5				
ARSENIC, DISSOLVED	1996-Oct					8										
ARSENIC, DISSOLVED	1997-Apr					8.6										
ARSENIC, DISSOLVED	1997-Oct					5.3					<1					
ARSENIC, DISSOLVED	1998-Apr					2.6										
ARSENIC, DISSOLVED	1998-Oct					3.7	<1									
ARSENIC, DISSOLVED	1999-Sep				<1	2.3	3.4									
ARSENIC, DISSOLVED	2000-Sep	<1		<1	<1	2.7	<1		<1		1.3	<1				
ARSENIC, DISSOLVED	2001-Sep	<1		<1 NS	<1	<1	<1		<1		<1	<1				
ARSENIC, DISSOLVED	2002-Sep	<1		<1	<1	<1	<1		<1		<1	<1				
ARSENIC, DISSOLVED	2003-Sep	<1		<1	<1	1.7	<1		<2 R,N,S		<1	<1				
ARSENIC, DISSOLVED	2004-Oct															
ARSENIC, DISSOLVED	2004-Sep	<1		<1	<2 R	<1	<1		<2 R			<2 R				
ARSENIC, DISSOLVED	2005-Sep	<1 WT		<1 WT	<1 WT	1.2 WT	1.1 WT		<1 WT		<1 WT	<1 WT				
ARSENIC, DISSOLVED	2006-Sep	<1		<1	<2 RL1	<1	<1		<1		<1	<1				
ARSENIC, DISSOLVED	2007-Sep	<1		<1	<1	<1	<1		<1			<1				
ARSENIC, DISSOLVED	2008-Sep	<1		<1	<1	<1 pH>2	<1		<1		<1	<1				
ARSENIC, DISSOLVED	2009-Sep	<1		<1	<2	<1	<2		<2		<1	<2				
ARSENIC, DISSOLVED	2010-Aug	<2 RL1														
ARSENIC, DISSOLVED	2010-Sep			<1	<2 RL1	9.36	<4 RL1		<2		<2 RL1	<1				
ARSENIC, DISSOLVED	2011-Sep	<6 RL1		<1	<2 RL1	2.86	<12 RL1		<2 RL1			<2 RL1				
ARSENIC, DISSOLVED	2012-Sep	<3 RL1		<1	<2 RL1	<1	<2 RL1		<2 RL1			<1				
ARSENIC	2013-Sep															
ARSENIC, DISSOLVED	2013-Sep	<1		<1	<1	5.9	<1		<1		<1	<1				
ARSENIC	2014-Sep															
ARSENIC, DISSOLVED	2014-Sep	<0.05		0.071 J	<0.05	2.3	0.48		<0.05		<0.05					
ARSENIC	2015-Dec															
ARSENIC, DISSOLVED	2015-Dec												<4.5	<4.5	<4.5	<4.5
ARSENIC	2015-Sep															
ARSENIC, DISSOLVED	2015-Sep	<4.5		<4.5	<4.5	<4.5		<4.5		<4.5			<4.5	<4.5	6.9	<4.5
ARSENIC	2016-Jun															
ARSENIC, DISSOLVED	2016-Jun												0.21	0.37	1.2	0.93
ARSENIC	2016-Mar															
ARSENIC, DISSOLVED	2016-Mar												<3.9	<3.9	<3.9	<3.9
ARSENIC	2016-Sep															
ARSENIC, DISSOLVED	2016-Sep	0.12		0.46	<0.21 D3	0.4		0.43		0.4	<0.1		0.15	<0.1	0.86	0.5
ARSENIC	2017-Aug	0.2		0.19	0.12	6.9		0.55		0.21	0.052		0.18	0.25	0.61	1.1
ARSENIC	2018-Aug			0.27	0.16	13.7		1		0.35	0.31		0.27	0.44	0.66	1.7
ARSENIC	2019-Apr	<0.75														
ARSENIC	2019-Aug		<0.75	<0.75	<0.75	21		<0.75		<0.75	<0.75		<0.75	<0.75	<0.75	3

GW Standard:
MCL = 10

IPL Ottumwa Midland Landfill
Historic Monitoring Results

ARSENIC
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
ARSENIC, DISSOLVED	1995-Aug										<5						
ARSENIC, DISSOLVED	1995-Oct										<5						
ARSENIC, DISSOLVED	1996-Apr						<1		<1		<1						
ARSENIC, DISSOLVED	1996-Jan																
ARSENIC, DISSOLVED	1996-Jul						<5		<5		<5		<5				
ARSENIC, DISSOLVED	1996-Oct																
ARSENIC, DISSOLVED	1997-Apr																
ARSENIC, DISSOLVED	1997-Oct																
ARSENIC, DISSOLVED	1998-Apr						<1		<1				<1				
ARSENIC, DISSOLVED	1998-Oct						1.8		1.7				1				
ARSENIC, DISSOLVED	1999-Sep										1.8		<1				
ARSENIC, DISSOLVED	2000-Sep										<1		<1				
ARSENIC, DISSOLVED	2001-Sep						<1				<1		<1				
ARSENIC, DISSOLVED	2002-Sep										<1		<1				
ARSENIC, DISSOLVED	2003-Sep										<1		<1				
ARSENIC, DISSOLVED	2004-Oct																
ARSENIC, DISSOLVED	2004-Sep						2.2						<1				
ARSENIC, DISSOLVED	2005-Sep										< WT		<1				
ARSENIC, DISSOLVED	2006-Sep										1.45		<1				
ARSENIC, DISSOLVED	2007-Sep						1.72		<1		1.53		1.14				
ARSENIC, DISSOLVED	2008-Sep						1.5		1.25		2.94	2	<1				
ARSENIC, DISSOLVED	2009-Sep						1.14				<1		<1				
ARSENIC, DISSOLVED	2010-Aug																
ARSENIC, DISSOLVED	2010-Sep						1.74		<1		1.35	<1	1.63				
ARSENIC, DISSOLVED	2011-Sep												5.83				
ARSENIC, DISSOLVED	2012-Sep				<2						<1		7.19				
ARSENIC	2013-Sep													21			
ARSENIC, DISSOLVED	2013-Sep										<1	3.3	1.8				<1
ARSENIC	2014-Sep					0.76								2.8	5.8		<0.18
ARSENIC, DISSOLVED	2014-Sep						2	<15	1.3	<15	0.3 J	1.9	0.31 J				
ARSENIC	2015-Dec	<4.5														<4.5	<4.5
ARSENIC, DISSOLVED	2015-Dec	<4.5															
ARSENIC	2015-Sep	<4.5		<4.5							<4.5	4.7	<4.5	<4.5		<4.5	<4.5
ARSENIC, DISSOLVED	2015-Sep	<4.5															
ARSENIC	2016-Jun	0.12														1.6	<0.1
ARSENIC, DISSOLVED	2016-Jun	0.22															
ARSENIC	2016-Mar	<3.9														<3.9	<3.9
ARSENIC, DISSOLVED	2016-Mar	<3.9															
ARSENIC	2016-Sep	<0.1		0.34							1.6		2.8	2.1		2	<0.1
ARSENIC, DISSOLVED	2016-Sep																
ARSENIC	2017-Aug	0.079		0.68							1.7		4.1	2.8		1.4	<0.052
ARSENIC	2018-Aug	0.27		1							<4.9		4.7	3.1		1.8	<0.15
ARSENIC	2019-Apr																<0.75
ARSENIC	2019-Aug	<0.75	<0.75	1.9 J							1.9 J	7.3	1.5 J	4.6		3.5	<0.75

GW Standard:
MCL = 10

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BARIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
BARIUM, DISSOLVED	1995-Aug	184			58	152										
BARIUM, DISSOLVED	1995-Oct	183		37	43	105			104		53	119				
BARIUM, DISSOLVED	1996-Apr	142		40	33	59			77		34	76				
BARIUM, DISSOLVED	1996-Jan	192		60	62	114			74			93				
BARIUM, DISSOLVED	1996-Jul	156		29	32	74			63		120	55				
BARIUM, DISSOLVED	1997-Oct										60					
BARIUM, DISSOLVED	1998-Apr										27					
BARIUM, DISSOLVED	1998-Oct						28									
BARIUM, DISSOLVED	1999-Sep	92		43	21	53	25		42		53	36				
BARIUM, DISSOLVED	2000-Sep	70		33	17	49	24		33		74	34				
BARIUM, DISSOLVED	2001-Sep	59		45	21	42	13		34		64	38				
BARIUM, DISSOLVED	2002-Sep	71		44	23	46	28		33		38	32				
BARIUM, DISSOLVED	2003-Sep	64		39	19	38	24		29		37	34				
BARIUM, DISSOLVED	2004-Oct															
BARIUM, DISSOLVED	2004-Sep	57		36	21	39	22		32			31				
BARIUM, DISSOLVED	2005-Sep	80		23	20	36	25		28		39	29				
BARIUM, DISSOLVED	2006-Sep	62.7		28.2	18.1	39.9	14.3		27.1		33.4	27.8				
BARIUM, DISSOLVED	2007-Sep	60.3		22.3	22.2	29.4	28		22.2			26.3				
BARIUM, DISSOLVED	2008-Sep	86.9		30.3	20.2	34.3 pH>2	21.2		40.9		34.8	25.5				
BARIUM, DISSOLVED	2009-Sep	163		26	19	32.4	16.1		20.7		32.3	22.9				
BARIUM, DISSOLVED	2010-Aug	77.4														
BARIUM, DISSOLVED	2010-Sep			24.7	15.1	21.2	<10		20.9 S3		27	23.9				
BARIUM, DISSOLVED	2011-Sep	73.3		22.6	13.9	26.4	14		22.9			22.1				
BARIUM, DISSOLVED	2012-Sep	70.3		23.6	17.1	38.3	24.5		21.8			26.8				
BARIUM	2013-Sep															
BARIUM, DISSOLVED	2013-Sep	70		23	19	27	31		24		35	25				
BARIUM	2014-Sep															
BARIUM, DISSOLVED	2014-Sep	50		24 B	24 B	36 B	37 B		23 B		32 B					
BARIUM	2015-Dec															
BARIUM, DISSOLVED	2015-Dec												62	66	27	89
BARIUM	2015-Sep															
BARIUM, DISSOLVED	2015-Sep	82.6		31.2	17.9	39.4		37.7		90.5			79.4	74.4	33.9	97.5
BARIUM	2016-Jun															
BARIUM, DISSOLVED	2016-Jun												54.5	49.5	35.3	73.9
BARIUM	2016-Mar															
BARIUM, DISSOLVED	2016-Mar												59	59	38	92
BARIUM	2016-Sep															
BARIUM, DISSOLVED	2016-Sep	69.5		25.7	17.4	35.1		29.5		80.6	23.3		67.2	50.2	30.4	79.3
BARIUM	2017-Aug	61		21	18.2	26.8		40.6		49.7	19.4		54.2	40	22.7	35.4
BARIUM	2018-Aug			15.5	19.9	19.3		80.5		46.4	20.2		58.4	75.9	25.2	37.1
BARIUM	2019-Apr	81														
BARIUM	2019-Aug		75	32	19	12		37		44	47		50	28	24	34

GW Standard:
MCL = 2000

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BARIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
BARIUM, DISSOLVED	1995-Aug										46						
BARIUM, DISSOLVED	1995-Oct										75						
BARIUM, DISSOLVED	1996-Apr						97		64		33						
BARIUM, DISSOLVED	1996-Jan																
BARIUM, DISSOLVED	1996-Jul						124		101		59		59				
BARIUM, DISSOLVED	1997-Oct																
BARIUM, DISSOLVED	1998-Apr						95		67		58		47				
BARIUM, DISSOLVED	1998-Oct						95		78		82		47				
BARIUM, DISSOLVED	1999-Sep										99		81				
BARIUM, DISSOLVED	2000-Sep										133		54				
BARIUM, DISSOLVED	2001-Sep						196				110		147				
BARIUM, DISSOLVED	2002-Sep										92		101				
BARIUM, DISSOLVED	2003-Sep										58		167				
BARIUM, DISSOLVED	2004-Oct										87						
BARIUM, DISSOLVED	2004-Sep						169						114				
BARIUM, DISSOLVED	2005-Sep										83		162				
BARIUM, DISSOLVED	2006-Sep										65.7		109				
BARIUM, DISSOLVED	2007-Sep						160		53.8		80.6		85.4				
BARIUM, DISSOLVED	2008-Sep						196		105		79	105	35.3				
BARIUM, DISSOLVED	2009-Sep						133				95.6		21.7				
BARIUM, DISSOLVED	2010-Aug																
BARIUM, DISSOLVED	2010-Sep						142		64.8		109	106	121				
BARIUM, DISSOLVED	2011-Sep												52.3				
BARIUM, DISSOLVED	2012-Sep				35.9						79.3		25.7				
BARIUM	2013-Sep													34			
BARIUM, DISSOLVED	2013-Sep										43	130	230				<10
BARIUM	2014-Sep					26								46	34		<0.61
BARIUM, DISSOLVED	2014-Sep						100		52		60	56	48				
BARIUM	2015-Dec	42						<15		<15						69	<0.52
BARIUM, DISSOLVED	2015-Dec	49 D9															
BARIUM	2015-Sep	49.2		27							54.7	272	115	69.5		140	<0.52
BARIUM, DISSOLVED	2015-Sep	53 D9															
BARIUM	2016-Jun	61														138	0.31 B
BARIUM, DISSOLVED	2016-Jun	61.5 D9															
BARIUM	2016-Mar	39.7														72.4	<0.58
BARIUM, DISSOLVED	2016-Mar	43															
BARIUM	2016-Sep	41.1		28.3							63.7		44.7	8.8		72.4	<0.14
BARIUM, DISSOLVED	2016-Sep																
BARIUM	2017-Aug	40.1		33.8							54.8		195	12.5		98.5	0.17 B
BARIUM	2018-Aug	38.3		34.2							65.1		116	10.1		77	<0.34
BARIUM	2019-Apr																<0.84
BARIUM	2019-Aug	30	50	37							60	140	120	93		77	<0.84

GW Standard:
MCL = 2000

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BERYLLIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
BERYLLIUM, DISSOLVED	1999-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2000-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2001-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2002-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2003-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2004-Oct															
BERYLLIUM, DISSOLVED	2004-Sep	<10		<10	<10	<10	<10		<10			<10				
BERYLLIUM, DISSOLVED	2005-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2006-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2007-Sep	<10		<10	<10	<10	<10		<10			<10				
BERYLLIUM, DISSOLVED	2008-Sep	<10		<10	<10	<10 pH>2	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2009-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
BERYLLIUM, DISSOLVED	2010-Aug	11														
BERYLLIUM, DISSOLVED	2010-Sep			<10	<10	<10	34.8		<10 S3		<10	<10				
BERYLLIUM, DISSOLVED	2011-Sep	<10		<10	<10	<10	<10		<10			<10				
BERYLLIUM, DISSOLVED	2012-Sep	<1		<1	<1	1.92	<1		<1			<1				
BERYLLIUM	2013-Sep															
BERYLLIUM, DISSOLVED	2013-Sep	<1		<1	<1	<1	<1		<1		<1	<1				
BERYLLIUM	2014-Sep															
BERYLLIUM, DISSOLVED	2014-Sep	<0.3		<0.3	<0.3	<0.3	<0.3		<0.3		<0.3					
BERYLLIUM	2015-Dec															
BERYLLIUM, DISSOLVED	2015-Dec												<0.17	0.18	<0.17	<0.17
BERYLLIUM	2015-Sep															
BERYLLIUM, DISSOLVED	2015-Sep	0.34		0.74	<0.17	0.18		<0.17		<0.17			<0.17	<0.17	<0.17	<0.17
BERYLLIUM	2016-Jun															
BERYLLIUM, DISSOLVED	2016-Jun												<0.08	<0.08	<0.08	<0.08
BERYLLIUM	2016-Mar															
BERYLLIUM, DISSOLVED	2016-Mar												<0.26	<0.26	<0.26	<0.26
BERYLLIUM	2016-Sep															
BERYLLIUM, DISSOLVED	2016-Sep	<0.08		<0.08	<0.08	<0.08		<0.08		<0.08	<0.08		<0.08	<0.08	<0.16 D3	<0.08
BERYLLIUM	2017-Aug	<0.012		0.019	<0.012	<0.012		<0.012		0.016	<0.012		<0.012	0.02	0.013 M1	0.025
BERYLLIUM	2018-Aug			<0.12	<0.12	<0.12		<0.12		<0.12	<0.12		<0.12	<0.12	<0.12	<0.12
BERYLLIUM	2019-Apr	<0.27														
BERYLLIUM	2019-Aug		<0.27	<0.27	<0.27	<0.27		<0.27		<0.27	<0.27		<0.27	<0.27	<0.27	<0.27

GW Standard:
MCL = 4

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BERYLLIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
BERYLLIUM, DISSOLVED	1999-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2000-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2001-Sep						<10				<10		<10				
BERYLLIUM, DISSOLVED	2002-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2003-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2004-Oct										<10						
BERYLLIUM, DISSOLVED	2004-Sep						<10						<10				
BERYLLIUM, DISSOLVED	2005-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2006-Sep										<10		<10				
BERYLLIUM, DISSOLVED	2007-Sep						<10		<10		<10		<10				
BERYLLIUM, DISSOLVED	2008-Sep						<10		<10		<10	<10	<10				
BERYLLIUM, DISSOLVED	2009-Sep						<10				<10		<10				
BERYLLIUM, DISSOLVED	2010-Aug																
BERYLLIUM, DISSOLVED	2010-Sep						<10		<10		<10	<10	<10				
BERYLLIUM, DISSOLVED	2011-Sep												<10				
BERYLLIUM, DISSOLVED	2012-Sep				1.19						<1		<1				
BERYLLIUM	2013-Sep													<1			
BERYLLIUM, DISSOLVED	2013-Sep										<1	<1	<1				<1
BERYLLIUM	2014-Sep					<0.3								<0.3	<0.3		<0.3
BERYLLIUM, DISSOLVED	2014-Sep						<0.3		<0.3		<0.3	<0.3	<0.3				
BERYLLIUM	2015-Dec	<0.17														<0.17	<0.17
BERYLLIUM, DISSOLVED	2015-Dec	<0.17															
BERYLLIUM	2015-Sep	<0.17		<0.17							<0.17	<0.17	<0.17	<0.17		<0.17	<0.17
BERYLLIUM, DISSOLVED	2015-Sep	<0.17						<15		<15							
BERYLLIUM	2016-Jun	<0.08														<0.08	<0.08
BERYLLIUM, DISSOLVED	2016-Jun	<0.08															
BERYLLIUM	2016-Mar	<0.26														<0.26	<0.26
BERYLLIUM, DISSOLVED	2016-Mar	<0.26															
BERYLLIUM	2016-Sep	<0.08		<0.08							<0.08		<0.08	<0.08		<0.08	<0.08
BERYLLIUM, DISSOLVED	2016-Sep																
BERYLLIUM	2017-Aug	<0.012		<0.012							<0.012		<0.012	<0.012		<0.012	<0.012
BERYLLIUM	2018-Aug	<0.12		<0.12							<0.16		<0.12	<0.12		<0.12	<0.12
BERYLLIUM	2019-Apr																<0.27
BERYLLIUM	2019-Aug	<0.27	<0.27	<0.27							<0.27	<0.27	<0.27	<0.27		<0.27	<0.27

GW Standard:
MCL = 4

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BORON
UNITS: UG/L

CHEMICAL PARAMETER	**EVENT**	**MW-01**	**MW-01R**	**MW-07P**	**MW-12**	**MW-13**	**MW-14**	**MW-15**	**MW-15R**	**MW-16**	**MW-16R**	**MW-17**	**MW-18**	**MW-100R**	**MW-101R**	**MW-102P**	**MW-108**
BORON, DISSOLVED	2007-Sep	<100			1550	1740	1750	1060		1550			1460				
BORON, DISSOLVED	2008-Sep	100			1670	1950	2070 pH>2	1090		1660		1160	1580				
BORON, DISSOLVED	2009-Sep	<100		866	1470	1860	1840	1070		1520		1130	1460				
BORON, DISSOLVED	2010-Aug	123															
BORON, DISSOLVED	2010-Sep			507	1410	1880	1900	1060		1600		1590	1470				
BORON, DISSOLVED	2011-Sep	<100			1440	1820	1860	1230		1480			1400				
BORON, DISSOLVED	2012-Sep	104		1100	1590	2010	2020	800		1680			1630				
BORON	2013-Sep																
BORON, DISSOLVED	2013-Sep	<100			1400	1800	1800	550		1500		1200	1500				
BORON	2014-Sep																
BORON, DISSOLVED	2014-Sep	120			1400	1800	1800	520		1500		740					
BORON	2015-Dec																
BORON, DISSOLVED	2015-Dec													51	630	2000	470
BORON	2015-Sep																
BORON, DISSOLVED	2015-Sep	75.6			1530	1840	1950		1380		2260			62.5	660	1880	740
BORON	2016-Jun																
BORON, DISSOLVED	2016-Jun													<50	535	1880	384
BORON	2016-Mar																
BORON, DISSOLVED	2016-Mar													<50	580	2000	530
BORON	2016-Sep																
BORON, DISSOLVED	2016-Sep	84			1450	1920	1890		1450		2260	931		56.6	622	1890	484
BORON	2017-Aug	76			1430	2000	2010		1380		2130	1170		51.8	733	1770	302
BORON	2018-Aug				1530	2090	2160		1310		2140	1110		64.2	855	1920	338
BORON	2019-Apr	110 J															
BORON	2019-Aug		110 J,B		1600 B	1700 B	1700 B		1000		1700	580		<110	660	1400 B	310 B
Boron	2-Year Avg.	80		--	1480	2045	2085	--	1345	--	2135	1140	--	58	794	1845	320

GW Standard:
None

Note: Average of previous 2 years (2016-2017) is calculated for parameters that do not have an MCL, SMCL, or HAL. For parameters that were not detected, the detection limit is used in the calculation.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

BORON
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2
BORON, DISSOLVED	2007-Sep						<100		178		1220		468			
BORON, DISSOLVED	2008-Sep						<100		<100		1570	<100	1120			
BORON, DISSOLVED	2009-Sep						<100				1120		1270			
BORON, DISSOLVED	2010-Aug															
BORON, DISSOLVED	2010-Sep						<100		<100		857	<100	240			
BORON, DISSOLVED	2011-Sep												1740			
BORON, DISSOLVED	2012-Sep				1860						2180		1570			
BORON	2013-Sep													3700		
BORON, DISSOLVED	2013-Sep										820	250	850			
BORON	2014-Sep					1600								2400	3300	
BORON, DISSOLVED	2014-Sep						<50		<50		510	<50	300			
BORON	2015-Dec	240														460
BORON, DISSOLVED	2015-Dec	250 D9														
BORON	2015-Sep	425		952							846	62.1	802	1350		679
BORON, DISSOLVED	2015-Sep	442 D9														
BORON	2016-Jun	610														455
BORON, DISSOLVED	2016-Jun	629 D9														
BORON	2016-Mar	223														422
BORON, DISSOLVED	2016-Mar	220														
BORON	2016-Sep	520		820							846		597	4550		570
BORON, DISSOLVED	2016-Sep															
BORON	2017-Aug	660		862							1120		852	5330		820
BORON	2018-Aug	1020		867							1010		703	5440		1270
BORON	2019-Apr															
BORON	2019-Aug	260 B	330 B	830 B							530 B	<110	780 B	1900 B		1400 B
Boron	2-Year Avg.	590	--	864.5	--	--	--	--	--	--	1065	--	777.5	5385	--	1045

GW Standard:
None

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

COBALT
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
COBALT, DISSOLVED	1999-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COBALT, DISSOLVED	2000-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COBALT, DISSOLVED	2001-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COBALT, DISSOLVED	2002-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COBALT, DISSOLVED	2003-Sep	<20		<20	<20	<20	<20		<20		24	<20				
COBALT, DISSOLVED	2004-Oct															
COBALT, DISSOLVED	2004-Sep	<20		<20	<20	<20	<20		<20			<20				
COBALT, DISSOLVED	2005-Sep	<20		<20	<20	<20	25		<20		22	<20				
COBALT, DISSOLVED	2006-Sep	<20		<20	<20	<20	<20		<20		31.4	<20				
COBALT, DISSOLVED	2007-Sep	<20		<20	<20	<20	<20		<20			<20				
COBALT, DISSOLVED	2008-Sep	<20		<20	<20	<20 pH>2	<20		<20		<20	<20				
COBALT, DISSOLVED	2009-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COBALT, DISSOLVED	2010-Aug	2.72 J														
COBALT, DISSOLVED	2010-Sep			3.01 J	5.31 J	6.23 J	11.4 J		3.94 J		<1.55	<1.55				
COBALT, DISSOLVED	2011-Sep	<1.55		<1.55	<1.55	<1.55	<1.55		<1.55			<1.55				
COBALT, DISSOLVED	2012-Sep	<1.55			<1.55	2.71 J	<1.55		<1.55			<1.55				
COBALT	2013-Sep															
COBALT, DISSOLVED	2013-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
COBALT	2014-Sep															
COBALT, DISSOLVED	2014-Sep	1.3 J		<0.79	1.2 J	1.4 J	<0.79		1.7 J		0.81 J					
COBALT	2015-Dec															
COBALT, DISSOLVED	2015-Dec												<0.1	0.35	0.46	6.6
COBALT	2015-Sep															
COBALT, DISSOLVED	2015-Sep	0.16		0.39	0.64	1.7		3		1.3			<0.1	0.47	1.1	2.5
COBALT	2016-Jun															
COBALT, DISSOLVED	2016-Jun												<0.5	<0.5	0.91	5.3
COBALT	2016-Mar															
COBALT, DISSOLVED	2016-Mar												<0.5	<0.5	<0.5	2.8
COBALT	2016-Sep															
COBALT, DISSOLVED	2016-Sep	<0.5		<1 D3	1.3	1.9		2.8		<1.5 D3	<0.5		<0.5	<0.5	<1.5 D3	2.6
COBALT	2017-Aug	0.049		0.36	1.3	1.4		2.6		0.92	0.054		0.028	0.26	0.86	11.1
COBALT	2018-Aug			0.19	1.3	0.47		3.6		0.97	0.22		<0.15	1.5	1.1	10.6
COBALT	2019-Apr	0.37 J														
COBALT	2019-Aug		<0.091	1.3	1.1	0.41 J		3.5		0.84	1.4		<0.091	0.13 J	1.3 J	7.9
Cobalt	2-Year Avg.	0.27		0.275	1.3	0.935	--	3.1		0.945	0.137	--	0.09	0.88	0.98	10.85

GW Standard:

None

Note: Average of previous 2 years (2016-2017) is calculated for parameters that do not have an MCL, SMCL, or HAL. For parameters that were not detected, the detection limit is used in the calculation.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

COBALT
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
COBALT, DISSOLVED	1999-Sep										<20		<20				
COBALT, DISSOLVED	2000-Sep										<20		<20				
COBALT, DISSOLVED	2001-Sep						<20				<20		<20				
COBALT, DISSOLVED	2002-Sep										<20		<20				
COBALT, DISSOLVED	2003-Sep										<20		<20				
COBALT, DISSOLVED	2004-Oct										<20						
COBALT, DISSOLVED	2004-Sep						<20						<20				
COBALT, DISSOLVED	2005-Sep										<20		<20				
COBALT, DISSOLVED	2006-Sep										<20		<20				
COBALT, DISSOLVED	2007-Sep						<20		<20		<20		<20				
COBALT, DISSOLVED	2008-Sep						<20		<20		<20	<20	<20				
COBALT, DISSOLVED	2009-Sep						<20				<20		<20				
COBALT, DISSOLVED	2010-Aug																
COBALT, DISSOLVED	2010-Sep						1.61 J		6.22 J		2.25 J	2.24 J	3.47 J				
COBALT, DISSOLVED	2011-Sep												<1.55				
COBALT, DISSOLVED	2012-Sep				2.76 J						<1.55		<1.55				
COBALT	2013-Sep													<5			
COBALT, DISSOLVED	2013-Sep										<5	<5	<5				<5
COBALT	2014-Sep					4.1								<0.79	2.4		<0.79
COBALT, DISSOLVED	2014-Sep						<0.79		<0.79		<0.79	<0.79	<0.79				
COBALT	2015-Dec	0.14														<0.1	<0.1
COBALT, DISSOLVED	2015-Dec	0.24															
COBALT	2015-Sep	4.1		8.8							0.32	3.1	0.45	0.19		0.12	<0.1
COBALT, DISSOLVED	2015-Sep	3.4															
COBALT	2016-Jun	2.7														<0.5	<0.5
COBALT, DISSOLVED	2016-Jun	2.5															
COBALT	2016-Mar	<0.5														<0.5	<0.5
COBALT, DISSOLVED	2016-Mar	<0.5															
COBALT	2016-Sep	4.6		1.1							<0.5		<0.5	<0.5		<0.5	<0.5
COBALT, DISSOLVED	2016-Sep																
COBALT	2017-Aug	10.2		1.3							0.21		0.74	0.18		0.12	<0.014
COBALT	2018-Aug	6.5		2.3							<0.87		0.25	0.2		<0.15	<0.15
COBALT	2019-Apr																<0.091
COBALT	2019-Aug	8.4	16	3.4							0.22 J	1.3	0.26 J	0.23 J		0.37 J	<0.091
Cobalt	2-Year Avg.	7.4	--	1.8	--	--	--	--	--	--	0.54	--	0.495	0.19	--	0.135	0.12

GW Standard:

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

None

IPL Ottumwa Midland Landfill
Historic Monitoring Results

COPPER
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
COPPER, DISSOLVED	1995-Aug	<20			<20	<20										
COPPER, DISSOLVED	1995-Oct	<20		<20	<20	<20			<20		<20	<20				
COPPER, DISSOLVED	1996-Apr	<30		<30	<30	<30			<30		<30	<30				
COPPER, DISSOLVED	1996-Jan	<30		<30	<30	<30			<30			<30				
COPPER, DISSOLVED	1996-Jul	<30		<30	<30	<30			<30		<30	<30				
COPPER, DISSOLVED	1997-Oct										<20					
COPPER, DISSOLVED	1998-Apr															
COPPER, DISSOLVED	1998-Oct						<20									
COPPER, DISSOLVED	1999-Sep						<20									
COPPER, DISSOLVED	2000-Sep						<20									
COPPER, DISSOLVED	2001-Sep						<20									
COPPER, DISSOLVED	2004-Oct															
COPPER, DISSOLVED	2004-Sep	<20		<20	<20	<20	<20		<20			<20				
COPPER, DISSOLVED	2005-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COPPER, DISSOLVED	2006-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COPPER, DISSOLVED	2007-Sep	<20		<20	<20	<20	<20		<20			<20				
COPPER, DISSOLVED	2008-Sep	<20		<20	<20	<20 pH>2	<20		<20		<20	<20				
COPPER, DISSOLVED	2009-Sep	<20		<20	<20	<20	<20		<20		<20	<20				
COPPER, DISSOLVED	2010-Aug	<20														
COPPER, DISSOLVED	2010-Sep			<20	<20	<20	<20		<20		<20	<20				
COPPER, DISSOLVED	2011-Sep	<20		<20	<20	<20	<20		<20			<20				
COPPER, DISSOLVED	2012-Sep	<20		<20	<20	<20	<20		<20			<20				
COPPER	2013-Sep															
COPPER, DISSOLVED	2013-Sep	<10		<10	<10	<10	<10		<10		<10	<10				
COPPER	2014-Sep															
COPPER, DISSOLVED	2014-Sep	15 J,B		4.1 J,B	6.7 J,B	3.9 J,B	4.6 J,B		4.2 J,B		3.6 J,B					
COPPER	2015-Dec															
COPPER, DISSOLVED	2015-Dec												1.4	1	<0.83	<0.83
COPPER	2015-Sep															
COPPER, DISSOLVED	2015-Sep	3.6 B		3.3 B	5.5 B	3.4 B		3 B		3.9 B			3.1 B	3.8 B	3.4 B	4.6 B
COPPER	2016-Jun															
COPPER, DISSOLVED	2016-Jun												2.2	0.94 B	2.1	3.5
COPPER	2016-Mar															
COPPER, DISSOLVED	2016-Mar												<1.1	<1.1	<1.1	<1.1
COPPER	2016-Sep															
COPPER, DISSOLVED	2016-Sep	1.1 B		0.49 B	0.73 B	0.64 B		0.53 B		0.51 B	1.5		0.85 B	1.1 B	1 B	1.2 B
COPPER	2017-Aug	0.99		0.94 B	0.62 B	0.54 B		0.38 B		0.97	0.52 B		0.32 B	0.92 B	0.23 B	0.61 B
COPPER	2018-Aug			<0.48	<0.48	0.6		2.7		<0.48	0.66		0.74	2.6	<0.48	0.57
COPPER	2019-Apr	2.1 J														
COPPER	2019-Aug		<2	<2	<2	<2		<2		<2	<2		<2	<2	<2	<2

GW Standard:
SMCL = 1000

IPL Ottumwa Midland Landfill
Historic Monitoring Results

COPPER
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
COPPER, DISSOLVED	1995-Aug										<20						
COPPER, DISSOLVED	1995-Oct										210						
COPPER, DISSOLVED	1996-Apr						<30		<30		<30						
COPPER, DISSOLVED	1996-Jan																
COPPER, DISSOLVED	1996-Jul						<30		<30		<30		<30				
COPPER, DISSOLVED	1997-Oct																
COPPER, DISSOLVED	1998-Apr						<20		<20		<20		<20				
COPPER, DISSOLVED	1998-Oct						<20		<20		<20		<20				
COPPER, DISSOLVED	1999-Sep										<20		<20				
COPPER, DISSOLVED	2000-Sep																
COPPER, DISSOLVED	2001-Sep																
COPPER, DISSOLVED	2004-Oct										<20						
COPPER, DISSOLVED	2004-Sep						<20						<20				
COPPER, DISSOLVED	2005-Sep										<20		<20				
COPPER, DISSOLVED	2006-Sep										<20		<20				
COPPER, DISSOLVED	2007-Sep						<20		<20		<20		<20				
COPPER, DISSOLVED	2008-Sep						<20		<20		<20	<20	<20				
COPPER, DISSOLVED	2009-Sep						<20				<20		<20				
COPPER, DISSOLVED	2010-Aug																
COPPER, DISSOLVED	2010-Sep						<20		<20		<20	<20	<20				
COPPER, DISSOLVED	2011-Sep												<20				
COPPER, DISSOLVED	2012-Sep				<20						<20		<20				
COPPER	2013-Sep													13			
COPPER, DISSOLVED	2013-Sep										<10	<10	<10				<10
COPPER	2014-Sep					1.5 J,B								8.7 J	8.2 J,B		<0.85
COPPER, DISSOLVED	2014-Sep						4.1 J,B		4.9 J,B		4.3 J,B	3.7 J,B	3.7 J,B				
COPPER	2015-Dec	2														1.7	8.2
COPPER, DISSOLVED	2015-Dec	1.2															
COPPER	2015-Sep	6.8 B		6.2 B							9.2 B	6.7 B	7.3 B	9.1 B		5.4 B	2.2 B
COPPER, DISSOLVED	2015-Sep	6.1 B															
COPPER	2016-Jun	0.37														0.66	<0.11
COPPER, DISSOLVED	2016-Jun	2.6 D9															
COPPER	2016-Mar	<1.1														<1.1	<1.1
COPPER, DISSOLVED	2016-Mar	<1.1															
COPPER	2016-Sep	0.25		0.74							1.1		0.28	1		0.52	<0.11
COPPER, DISSOLVED	2016-Sep																
COPPER	2017-Aug	0.3 B		1							0.55 B		0.64 B	1 B		0.38 B	0.073 B
COPPER	2018-Aug	0.8		1.6							4.5 B		<0.48	1		<0.48	<0.48
COPPER	2019-Apr																<2
COPPER	2019-Aug	<2	<2	<2							<2	<2	<2	<2		<2	<2

GW Standard:
SMCL = 1000

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

FLUORIDE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
FLUORIDE	1995-Aug	0.38			0.7	0.76										
FLUORIDE	1995-Oct	0.4		2.7	0.76	0.86			0.76		0.22	0.7				
FLUORIDE	1996-Apr	<0.2		<0.2	<0.2	<0.2			<0.2		<0.2	<0.2				
FLUORIDE	1996-Jan	<0.2		<0.2	<0.2	<0.2			<0.2			<0.2				
FLUORIDE	1996-Oct	<0.2		<0.2	<0.2	<0.2			<0.2		<0.2	<0.2				
FLUORIDE	2014-Sep	0.67		2.4	0.81	0.81	0.28									
FLUORIDE	2014-Sep								0.88		0.79					
FLUORIDE	2015-Dec												0.44	0.34	0.85	0.47
FLUORIDE	2015-Sep	0.45		2	0.68	0.7		0.22		0.48			0.36	0.26	0.44	0.32
FLUORIDE	2016-Jun												0.38	0.23	0.79	0.51
FLUORIDE	2016-Mar												0.51	0.35	0.75	0.67
FLUORIDE	2016-Sep	0.48		2.4	0.83	0.96		0.4		0.69	0.89		0.53	0.45	0.84	0.59
FLUORIDE	2017-Aug	0.58		2.5	0.71	0.89		0.39		0.58	0.78		0.53	0.44	0.74	0.61
FLUORIDE	2018-Aug			2.8	0.94	0.98		0.32		0.68	0.62		0.49	0.49	0.69	0.68
FLUORIDE	2019-Apr	0.35 J														
FLUORIDE	2019-Aug		0.85	0.76	<0.23	0.64		<0.23		<0.23	0.72	ater than or equal to the		<0.23	<0.23	0.9

GW Standard:
SMCL = 2

IPL Ottumwa Midland Landfill
Historic Monitoring Results

FLUORIDE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
FLUORIDE	1995-Aug																
FLUORIDE	1995-Oct																
FLUORIDE	1996-Apr																
FLUORIDE	1996-Jan																
FLUORIDE	1996-Oct																
FLUORIDE	2014-Sep					0.67	0.32		0.34		0.59	0.3	0.47	0.45	0.64		<0.1
FLUORIDE	2014-Sep																
FLUORIDE	2015-Dec	0.53														0.25	<0.066
FLUORIDE	2015-Sep	0.41		0.68							0.53	0.31	0.56	0.35		0.31	<0.066
FLUORIDE	2016-Jun	0.44														0.21	<0.073
FLUORIDE	2016-Mar	0.54														0.25	<0.073
FLUORIDE	2016-Sep	0.61		0.7							0.49		0.52	0.87		0.19	<0.027
FLUORIDE	2017-Aug	0.61		0.62							0.59		0.78	0.78		0.24	<0.1
FLUORIDE	2018-Aug	0.61		0.55							0.59		0.81	0.65		0.28	<0.063
FLUORIDE	2019-Apr																0.75
FLUORIDE	2019-Aug	0.55	<0.23	<0.23							0.62	<0.23	0.8	<0.23		<0.23	<0.045

GW Standard:
SMCL = 2

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

IRON
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
IRON, DISSOLVED	1995-Apr															
IRON, DISSOLVED	1995-Aug	<100			<100	<100										
IRON, DISSOLVED	1995-Oct	<100		110	140	<100			<100		330	<100				
IRON, DISSOLVED	1996-Apr	317		129	406	31			<30		<30	74				
IRON, DISSOLVED	1996-Jan	<30		53	<30	87			40			<30				
IRON, DISSOLVED	1996-Jul	<30		73	322	<30			<30		<30	83				
IRON, DISSOLVED	1996-Oct	<30		157	<30	48			<30		321	<30				
IRON, DISSOLVED	1997-Apr	<100		170	110	<100			190		<100	100				
IRON, DISSOLVED	1997-Oct	<100		180	120	<100			<100		<100	<100				
IRON, DISSOLVED	1998-Apr	<100		<100	120	<100					<100	500				
IRON, DISSOLVED	1998-Oct	<100		730	310	<100	<100		240			590				
IRON, DISSOLVED	1999-Sep	<100		<100	260	<100	<100		<100		140	320				
IRON, DISSOLVED	2000-Sep	<100		<100	270	110	<100		<100		540	<100				
IRON, DISSOLVED	2001-Sep	<100		<100	120	<100	<100		<100		<100	<100				
IRON, DISSOLVED	2002-Sep	<100		160	150	<100	<100		<100		<100	170				
IRON, DISSOLVED	2003-Sep	<100		100	230	<100	<100		100		800	110				
IRON, DISSOLVED	2004-Oct															
IRON, DISSOLVED	2004-Sep	<100		<100	120	<100	<100		180			<100				
IRON, DISSOLVED	2005-Sep	<100		<100	170	<100	160		<100		<100	<100				
IRON, DISSOLVED	2006-Sep	<100		686	<100	<100	<100		<100		<100	<100				
IRON, DISSOLVED	2007-Sep	<100		111	<100	<100	102		<100			<100				
IRON, DISSOLVED	2008-Sep	<100		670	176	<100 pH>2	<100		1040		<100	<100				
IRON, DISSOLVED	2009-Sep	6300		331	<100	<100	<100		<100		<100	<100				
IRON, DISSOLVED	2010-Aug	<100														
IRON, DISSOLVED	2010-Sep			1440	317	131	<100		<100		<100	182				
IRON, DISSOLVED	2011-Sep	<100		<100	156	<100	<100		<100			<100				
IRON, DISSOLVED	2012-Sep	<100		<100	238	<100	<100		<100			<100				
IRON	2013-Sep															
IRON, DISSOLVED	2013-Sep	<50		<50	110	<50	64		<50		<50	120				
IRON	2014-Sep															
IRON, DISSOLVED	2014-Sep	<24		<24	110	81	<24		<24		<24					
IRON	2015-Dec															
IRON, DISSOLVED	2015-Dec												16	20	23000	430
IRON	2015-Sep															
IRON, DISSOLVED	2015-Sep	16.4		20.4	310	32.2		1880		91.7			11.3	<9	5680	158
IRON	2016-Jun															
IRON, DISSOLVED	2016-Jun												<12.8	<12.8	9810	370
IRON	2016-Mar															
IRON, DISSOLVED	2016-Mar												<8.8	<8.8	16300	250
IRON	2016-Sep															
IRON, DISSOLVED	2016-Sep	<12.8		<25.5 D3	300	<25.5 D3		1980		273	20.4		22	231	14900	182
IRON	2017-Aug	12.5		473	324	91.5		2410		365	<9.6		16.2	140	5230	983
IRON	2018-Aug			27.1 B	155 B	81.8 B		5580		266	<14.9		86.3 B	949	5330	1300
IRON	2019-Apr	380														
IRON	2019-Aug		<66	180	290	230		2600		430	160		<66	<66	5200	3500

GW Standard:
SMCL = 300

IPL Ottumwa Midland Landfill
Historic Monitoring Results

IRON
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
IRON, DISSOLVED	1995-Apr										<100						
IRON, DISSOLVED	1995-Aug																
IRON, DISSOLVED	1995-Oct										<100						
IRON, DISSOLVED	1996-Apr						<30		<30		<30						
IRON, DISSOLVED	1996-Jan																
IRON, DISSOLVED	1996-Jul						<30		430		<30		<30				
IRON, DISSOLVED	1996-Oct										123		115				
IRON, DISSOLVED	1997-Apr						<100		<100		<100						
IRON, DISSOLVED	1997-Oct										<100						
IRON, DISSOLVED	1998-Apr						<100		<100		<100		<100				
IRON, DISSOLVED	1998-Oct						170		170		<100		<100				
IRON, DISSOLVED	1999-Sep										<100		<100				
IRON, DISSOLVED	2000-Sep										<100		<100				
IRON, DISSOLVED	2001-Sep						<100				<100		<100				
IRON, DISSOLVED	2002-Sep										<100		<100				
IRON, DISSOLVED	2003-Sep										<100		<100				
IRON, DISSOLVED	2004-Oct										<100						
IRON, DISSOLVED	2004-Sep						<100						<100				
IRON, DISSOLVED	2005-Sep										<100		740				
IRON, DISSOLVED	2006-Sep										<100		<100				
IRON, DISSOLVED	2007-Sep						<100		<100		<100		<100				
IRON, DISSOLVED	2008-Sep						<100		<100		<100	<100	<100				
IRON, DISSOLVED	2009-Sep						<100				<100		101				
IRON, DISSOLVED	2010-Aug																
IRON, DISSOLVED	2010-Sep						<100		<100		<100	<100	<100				
IRON, DISSOLVED	2011-Sep												<100				
IRON, DISSOLVED	2012-Sep				153						<100		<100				
IRON	2013-Sep													140			
IRON, DISSOLVED	2013-Sep										<50	100	<50				<50
IRON	2014-Sep					260								960	2400		<24
IRON, DISSOLVED	2014-Sep						130		170		<24	100	25				
IRON	2015-Dec	13														41	<9
IRON, DISSOLVED	2015-Dec	<9															
IRON	2015-Sep	140		1570							196	806	233	84.5		<9	<9
IRON, DISSOLVED	2015-Sep	37.8															
IRON	2016-Jun	<12.8														42.8	<12.8
IRON, DISSOLVED	2016-Jun	<12.8															
IRON	2016-Mar	<8.8														<8.8	<8.8
IRON, DISSOLVED	2016-Mar	<8.8															
IRON	2016-Sep	<12.8		1570							228		85.9	29.7		49.6	13.5
IRON, DISSOLVED	2016-Sep																
IRON	2017-Aug	<9.6		1370							52.9		581	38.8		<9.6	<9.6
IRON	2018-Aug	<14.9		4690							59.8		186 B	31.3 B,M1		6.2	<14.9
IRON	2019-Apr																<66
IRON	2019-Aug	<66	510	4700							77 J	1300	110	67 J		370	<66

GW Standard:
SMCL = 300

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

LEAD
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
LEAD, DISSOLVED	1995-Aug	<5			<5	<5										
LEAD, DISSOLVED	1995-Oct	<5		<5	<5	<5			<5		<5	<5				
LEAD, DISSOLVED	1996-Apr	<5		<5	<5	<5			<5		<5	<5				
LEAD, DISSOLVED	1996-Jan	<5		<5	<5	<5			<5			<5				
LEAD, DISSOLVED	1996-Jul	<5		<5	<5	<5			<5		<5	<5				
LEAD, DISSOLVED	1997-Oct										<4					
LEAD, DISSOLVED	1998-Apr															
LEAD, DISSOLVED	1998-Oct						<4									
LEAD, DISSOLVED	1999-Sep						<4									
LEAD, DISSOLVED	2000-Sep						<4									
LEAD, DISSOLVED	2001-Sep						<4									
LEAD, DISSOLVED	2004-Oct															
LEAD, DISSOLVED	2004-Sep	<4		<4	<4	<4	<4		<4			<4				
LEAD, DISSOLVED	2005-Sep	<4 WT		<4 WT	<4 WT	<4 WT	<4 WT		<4 WT		<4 WT	<4 WT				
LEAD, DISSOLVED	2006-Sep	<4		<4	<4	<4	<4		<4		<4	<4				
LEAD, DISSOLVED	2007-Sep	<4		<4	<4	<4	<4		<4			<4				
LEAD, DISSOLVED	2008-Sep	<4		<4	<4	<4 pH>2	<4		<4		<4	<4				
LEAD, DISSOLVED	2009-Sep	<4		<4	<4	<4	<4		<4		<4	<4				
LEAD, DISSOLVED	2010-Aug	<4														
LEAD, DISSOLVED	2010-Sep			<4	<4	<4	<4		<4		<4	<4				
LEAD, DISSOLVED	2011-Sep	<4		<4	<4	<4	<4		<4			<4				
LEAD, DISSOLVED	2012-Sep	<4		<4	<4	<4	<4		<4			<4				
LEAD	2013-Sep															
LEAD, DISSOLVED	2013-Sep	<1		<1	<1	<1	<1		<1		<1	<1				
LEAD	2014-Sep															
LEAD, DISSOLVED	2014-Sep	0.19 J,B		0.18 J,B	0.22 J,B	0.2 J,B	0.17 J,B		0.17 J,B		0.17 J,B					
LEAD	2015-Dec															
LEAD, DISSOLVED	2015-Dec												2	<1.9	<1.9	<1.9
LEAD	2015-Sep															
LEAD, DISSOLVED	2015-Sep	<1.9		<1.9	<1.9	<1.9		<1.9		<1.9			2.4	<1.9	<1.9	<1.9
LEAD	2016-Jun															
LEAD, DISSOLVED	2016-Jun												<0.19	<0.19	<0.19	<0.19
LEAD	2016-Mar															
LEAD, DISSOLVED	2016-Mar												<2.5	<2.5	<2.5	<2.5
LEAD	2016-Sep															
LEAD, DISSOLVED	2016-Sep	<0.19		<0.19	<0.19	<0.19		<0.19		<0.39 D3	<0.19		<0.19	0.2	<0.39 D3	<0.19
LEAD	2017-Aug	0.18		0.38	<0.033	0.22		0.24		0.4	<0.033		0.039	0.41	0.036	0.041
LEAD	2018-Aug			<0.12	<0.12	0.12		0.63		<0.12	<0.12		<0.12	0.6	<0.12	<0.12
LEAD	2019-Apr	0.71														
LEAD	2019-Aug		<0.27	0.31 J	<0.27	<0.27		<0.27		<0.27	<0.27		<0.27	<0.27	<1.1	<0.27

GW Standard:
Action Level: 15

IPL Ottumwa Midland Landfill
Historic Monitoring Results

LEAD
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
LEAD, DISSOLVED	1995-Aug										<5						
LEAD, DISSOLVED	1995-Oct										<5						
LEAD, DISSOLVED	1996-Apr						<5		<5		<5						
LEAD, DISSOLVED	1996-Jan																
LEAD, DISSOLVED	1996-Jul						<5		<5		<5		<5				
LEAD, DISSOLVED	1997-Oct																
LEAD, DISSOLVED	1998-Apr						<4		<4				<4				
LEAD, DISSOLVED	1998-Oct						<4		<4				<4				
LEAD, DISSOLVED	1999-Sep												<4				
LEAD, DISSOLVED	2000-Sep												<4				
LEAD, DISSOLVED	2001-Sep												<4				
LEAD, DISSOLVED	2004-Oct										<4						
LEAD, DISSOLVED	2004-Sep						<4						<4				
LEAD, DISSOLVED	2005-Sep										<4 WT		<4				
LEAD, DISSOLVED	2006-Sep										<4		<4				
LEAD, DISSOLVED	2007-Sep						<4		<4		<4		<4				
LEAD, DISSOLVED	2008-Sep						<4		<4		<4	<4	<4				
LEAD, DISSOLVED	2009-Sep						<4				<4		<4				
LEAD, DISSOLVED	2010-Aug																
LEAD, DISSOLVED	2010-Sep						<4		<4		<4	<4	<4				
LEAD, DISSOLVED	2011-Sep												<4				
LEAD, DISSOLVED	2012-Sep				<4						<4		<4				
LEAD	2013-Sep													<2 D3			
LEAD, DISSOLVED	2013-Sep										<1	<1	<1				<1
LEAD	2014-Sep					0.16 J,B								0.78 J,B	6.2		0.12 J,B
LEAD, DISSOLVED	2014-Sep						0.22 J,B		0.32 J,B		0.17 J,B	0.22 J,B	0.18 J,B				
LEAD	2015-Dec	<1.9														<1.9	<1.9
LEAD, DISSOLVED	2015-Dec	<1.9															
LEAD	2015-Sep	3.8 B		3.3 B							<1.9	<1.9	3.2 B	3.2 B		<1.9	<1.9
LEAD, DISSOLVED	2015-Sep	2.6															
LEAD	2016-Jun	<0.19														<0.19	<0.19
LEAD, DISSOLVED	2016-Jun	<0.19															
LEAD	2016-Mar	<2.5														<2.5	<2.5
LEAD, DISSOLVED	2016-Mar	<2.5															
LEAD	2016-Sep	<0.19		<0.19							0.23		<0.19	<0.19		<0.19	<0.19
LEAD, DISSOLVED	2016-Sep																
LEAD	2017-Aug	<0.033		0.33							0.1		0.33	<0.066 D3		<0.033	<0.033
LEAD	2018-Aug	<0.12		0.66							<3		<0.12	<0.24 D3		<0.12	<0.12
LEAD	2019-Apr																<0.27
LEAD	2019-Aug	<1.1	0.34 J	<0.27							<0.27	<0.27	<0.27	<0.27		0.42 J	<0.27

GW Standard:
Action Level: 15

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

MAGNESIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
MAGNESIUM, DISSOLVED	1995-Aug	58000			87000	31000										
MAGNESIUM, DISSOLVED	1995-Oct	56000		7800	82000	29000			33000		140000	43000				
MAGNESIUM, DISSOLVED	1996-Apr	50300		8230	76400	28200			35700		97000	43100				
MAGNESIUM, DISSOLVED	1996-Jan	60100		10300	83100	32300			29300			31200				
MAGNESIUM, DISSOLVED	1996-Jul	57300		6790	73000	29800			29400		<100	39700				
MAGNESIUM, DISSOLVED	1996-Oct					30600										
MAGNESIUM, DISSOLVED	1997-Apr	51000			62000	29000			31000		78000	36000				
MAGNESIUM, DISSOLVED	1997-Oct	56000			59000	30000			29000		62000	39000				
MAGNESIUM, DISSOLVED	1998-Apr	62000			54000	29000					42000	37000				
MAGNESIUM, DISSOLVED	1998-Oct	59000			55000	29000	200000		25000			39000				
MAGNESIUM, DISSOLVED	1999-Sep	60000		9500	50000	29000	190000		29000		47000	36000				
MAGNESIUM, DISSOLVED	2000-Sep	47000		9600	50000	31000	200000		29000		25000	34000				
MAGNESIUM, DISSOLVED	2001-Sep	35000		14800	49400	31400	186000		29500		40600	31900 *MSO				
MAGNESIUM, DISSOLVED	2002-Sep	40000		24000	47000	31000	200000		27000		48000	36000				
MAGNESIUM, DISSOLVED	2003-Sep	41300		22700	47800	30700	203000		32100		86600	31600				
MAGNESIUM, DISSOLVED	2004-Oct															
MAGNESIUM, DISSOLVED	2004-Sep	29000		19000 N*	46000	32000	200000		31000			31000				
MAGNESIUM, DISSOLVED	2005-Sep	41000		11000	50000 N*	33000	210000		31000		69000	35000				
MAGNESIUM, DISSOLVED	2006-Sep	29500		11300	44900	34800	200000		30600		104000	32000				
MAGNESIUM, DISSOLVED	2007-Sep	28700		9990	44400	30600	199000		33900			28600				
MAGNESIUM, DISSOLVED	2008-Sep	45400		10900 MHA	50600	35100 pH>2	204000		30600		29300	30700				
MAGNESIUM, DISSOLVED	2009-Sep	50100		9170	48900	34200	208000		34200		17600	29900				
MAGNESIUM, DISSOLVED	2010-Aug	64300														
MAGNESIUM, DISSOLVED	2010-Sep			7430	51400	31700	211000		33000		21400	26900				
MAGNESIUM, DISSOLVED	2011-Sep	61800		9310	50300	34300	237000		32000			26400				
MAGNESIUM, DISSOLVED	2012-Sep	52600		9420	52400	36100	121000		35400			28500				
MAGNESIUM	2013-Sep															
MAGNESIUM, DISSOLVED	2013-Sep	44600		8100	45200	31000	106000		32800		66000	28600				
MAGNESIUM	2014-Sep															
MAGNESIUM, DISSOLVED	2014-Sep	25600		7900	41700	30300	104000		22600		32800					
MAGNESIUM	2015-Dec															
MAGNESIUM, DISSOLVED	2015-Dec												39100	116000	242000	25000
MAGNESIUM	2015-Sep															
MAGNESIUM, DISSOLVED	2015-Sep	46300		7320	47000	31300		150000		71000			35300	92900	171000	22500
MAGNESIUM	2016-Jun															
MAGNESIUM, DISSOLVED	2016-Jun												33900 M1	88700	174000	18900
MAGNESIUM	2016-Mar															
MAGNESIUM, DISSOLVED	2016-Mar												37200	101000	205000	23400
MAGNESIUM	2016-Sep															
MAGNESIUM, DISSOLVED	2016-Sep	49500		8300	65400	32300		146000		85500	49200		36000	92600	198000	21500
MAGNESIUM	2017-Aug	48100		7830	61700	30400		139000		41700	58100		37000	72300	157000	17700
MAGNESIUM	2018-Aug			7230	60700	34200		146000		40400	84000		39600	70400	170000	20100
MAGNESIUM, DISSOLVED	2018-Aug															
MAGNESIUM	2019-Apr	31000														
MAGNESIUM	2019-Aug		14000	17000	60000	30000		140000		35000	24000		35000	59000	170000	14000
Magnesium	2-Year Avg.	48800		7530	61200	32300	--	142500	--	41050	71050	--	38300	71350	163500	18900

GW Standard:
None

Note: Average of previous 2 years (2016-2017) is calculated for parameters that do not have an MCL, SMCL, or HAL. For parameters that were not detected, the detection limit is used in the calculation.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

MAGNESIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
MAGNESIUM, DISSOLVED	1995-Aug										36000						
MAGNESIUM, DISSOLVED	1995-Oct										32000						
MAGNESIUM, DISSOLVED	1996-Apr						24000		34400		20900						
MAGNESIUM, DISSOLVED	1996-Jan																
MAGNESIUM, DISSOLVED	1996-Jul						18500		34200		14800		29500				
MAGNESIUM, DISSOLVED	1996-Oct																
MAGNESIUM, DISSOLVED	1997-Apr						18000		18000		28000						
MAGNESIUM, DISSOLVED	1997-Oct										27000						
MAGNESIUM, DISSOLVED	1998-Apr						17000		17000		26000		33000				
MAGNESIUM, DISSOLVED	1998-Oct						14000		14000		13000		23000				
MAGNESIUM, DISSOLVED	1999-Sep										25000		37000				
MAGNESIUM, DISSOLVED	2000-Sep										17000		27000				
MAGNESIUM, DISSOLVED	2001-Sep						29300				13800		18800				
MAGNESIUM, DISSOLVED	2002-Sep										22000 N*		28000				
MAGNESIUM, DISSOLVED	2003-Sep										42500		42600				
MAGNESIUM, DISSOLVED	2004-Oct										22900						
MAGNESIUM, DISSOLVED	2004-Sep						27000						26000				
MAGNESIUM, DISSOLVED	2005-Sep										36000		48000				
MAGNESIUM, DISSOLVED	2006-Sep										37900		49200				
MAGNESIUM, DISSOLVED	2007-Sep						28600		28200		23300		27800				
MAGNESIUM, DISSOLVED	2008-Sep						23800		21800 MHA		20400	12400	34300				
MAGNESIUM, DISSOLVED	2009-Sep						27000				16300 S3		25900				
MAGNESIUM, DISSOLVED	2010-Aug																
MAGNESIUM, DISSOLVED	2010-Sep						24900		12700		8710	14900	15200				
MAGNESIUM, DISSOLVED	2011-Sep												28400				
MAGNESIUM, DISSOLVED	2012-Sep				67400						47000		46500				
MAGNESIUM	2013-Sep													74400 M1			
MAGNESIUM, DISSOLVED	2013-Sep										26200	18500	30400				<50
MAGNESIUM	2014-Sep					73700								45600	54200		<17
MAGNESIUM, DISSOLVED	2014-Sep						9300		7700		17200	5200	13900				
MAGNESIUM	2015-Dec	42500														8500	14
MAGNESIUM, DISSOLVED	2015-Dec	45800 D9															
MAGNESIUM	2015-Sep	58800		38600							35000	31200	36200	29800		8460	<13.3
MAGNESIUM, DISSOLVED	2015-Sep	58700															
MAGNESIUM	2016-Jun	72500														9930	<15.8
MAGNESIUM, DISSOLVED	2016-Jun	67000															
MAGNESIUM	2016-Mar	44200														9740	<15.8
MAGNESIUM, DISSOLVED	2016-Mar	44600															
MAGNESIUM	2016-Sep	63600		82600							38300		33500	89200		9160	<15.8
MAGNESIUM, DISSOLVED	2016-Sep																
MAGNESIUM	2017-Aug	76100		81400							47800		47900	82600		14700	<15.4
MAGNESIUM	2018-Aug	114000		103000							36500		51400	88700		22400	<14
MAGNESIUM, DISSOLVED	2018-Aug															20200	
MAGNESIUM	2019-Apr																120 J
MAGNESIUM	2019-Aug	51000	64000	33000							22000	18000	32000	25000		12000	<29
Magnesium	2-Year Avg.	69850	--	92200	--	--	--	--	--	--	42150	--	49650	85650	--	21300	15.6

GW Standard:
None

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

MANGANESE
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
MANGANESE, DISSOLVED	1999-Sep	<10		546	234	286	3400		267		3700	166				
MANGANESE, DISSOLVED	2000-Sep	<10		329	177	338	3400		180		5900	170				
MANGANESE, DISSOLVED	2001-Sep	<10		529	278	238	1700		186		7070	192				
MANGANESE, DISSOLVED	2002-Sep	31		697	255	319	1000		212		8300	178				
MANGANESE, DISSOLVED	2003-Sep	<10		588	187	227	1400		156		8610	185				
MANGANESE, DISSOLVED	2004-Oct															
MANGANESE, DISSOLVED	2004-Sep	<10		555	215	207	967		170			109				
MANGANESE, DISSOLVED	2005-Sep	18		280	182	230	1900		226		8400	173				
MANGANESE, DISSOLVED	2006-Sep	15		387 S	191	246	1080		235		12900	171				
MANGANESE, DISSOLVED	2007-Sep	15.1		249	157	142	2880		173			103				
MANGANESE, DISSOLVED	2008-Sep	<10		273	164	219 pH>2	1130		220		411	102				
MANGANESE, DISSOLVED	2009-Sep	515		249	215	243	1180		142		15.9	83.1				
MANGANESE, DISSOLVED	2010-Aug	<10														
MANGANESE, DISSOLVED	2010-Sep			170	137	165	930		93.8 S3		<10	127				
MANGANESE, DISSOLVED	2011-Sep	<10		347	144	192	343		153			91				
MANGANESE, DISSOLVED	2012-Sep	30.1		66.1	140	316	305		118			120				
MANGANESE	2013-Sep															
MANGANESE, DISSOLVED	2013-Sep	6.6		250	140	180	240		140		1600	160				
MANGANESE	2014-Sep															
MANGANESE, DISSOLVED	2014-Sep	18		55	130	280	270		270		280					
MANGANESE	2015-Dec															
MANGANESE, DISSOLVED	2015-Dec												<2.4	390	1600	1100
MANGANESE	2015-Sep															
MANGANESE, DISSOLVED	2015-Sep	11.1		362	104	435		4570		777			8.8	658	714	1100
MANGANESE	2016-Jun															
MANGANESE, DISSOLVED	2016-Jun												3.4 B	120	986	965
MANGANESE	2016-Mar															
MANGANESE, DISSOLVED	2016-Mar												7.2	310	1300	990
MANGANESE	2016-Sep															
MANGANESE, DISSOLVED	2016-Sep	10.7		319	136	408		3160		583	28.6		4.9	48	1250	880
MANGANESE	2017-Aug	2		176	170	213		2990		415	10.8		0.9 B	74.1	558 M1	1150
MANGANESE	2018-Aug			114	178	93.7		3010		329	170		5.6	210	574	1100
MANGANESE	2019-Apr	20														
MANGANESE	2019-Aug		2.8 J	370	180	87		2600		330	440		<2.5	44	550	970

GW Standard:
SMCL = 50

IPL Ottumwa Midland Landfill
Historic Monitoring Results

MANGANESE
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
MANGANESE, DISSOLVED	1999-Sep										<10		42				
MANGANESE, DISSOLVED	2000-Sep										<10		281				
MANGANESE, DISSOLVED	2001-Sep						1870				<10		50				
MANGANESE, DISSOLVED	2002-Sep										<10		62				
MANGANESE, DISSOLVED	2003-Sep										<10		52				
MANGANESE, DISSOLVED	2004-Oct										<10						
MANGANESE, DISSOLVED	2004-Sep						2300						135				
MANGANESE, DISSOLVED	2005-Sep										11		335				
MANGANESE, DISSOLVED	2006-Sep										11.3		66.8				
MANGANESE, DISSOLVED	2007-Sep						1370		<10		30.3		49.8				
MANGANESE, DISSOLVED	2008-Sep						350		35.6		<10	55	118				
MANGANESE, DISSOLVED	2009-Sep						646				<10		36.8				
MANGANESE, DISSOLVED	2010-Aug																
MANGANESE, DISSOLVED	2010-Sep						1150		69.3		<10	185	86.9				
MANGANESE, DISSOLVED	2011-Sep												<10				
MANGANESE, DISSOLVED	2012-Sep				192						<10		10.8				
MANGANESE	2013-Sep													160			
MANGANESE, DISSOLVED	2013-Sep										84	310	38				<5
MANGANESE	2014-Sep					470								53	270		<2.5
MANGANESE, DISSOLVED	2014-Sep						85		84		14	24	49				
MANGANESE	2015-Dec	38														<2.4	<2.4
MANGANESE, DISSOLVED	2015-Dec	54 1e															
MANGANESE	2015-Sep	2950		1030							36.9	4020	330	56.8		<2.4	<2.4
MANGANESE, DISSOLVED	2015-Sep	2570															
MANGANESE	2016-Jun	2590														4.2	<0.19
MANGANESE, DISSOLVED	2016-Jun	2530															
MANGANESE	2016-Mar	503														<0.25	<0.25
MANGANESE, DISSOLVED	2016-Mar	500															
MANGANESE	2016-Sep	2740		156							54.3		295	110		6.4	0.2
MANGANESE, DISSOLVED	2016-Sep																
MANGANESE	2017-Aug	3260		104							27.3		477	9 B		5.3 B	0.31 B
MANGANESE	2018-Aug	5540		219							24		583	3.9 M1		7.5	<0.33
MANGANESE	2019-Apr																23
MANGANESE	2019-Aug	4700	3900	340							8.2 J	2000	170	13		23	<2.5

GW Standard:
SMCL = 50

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

SELENIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
SELENIUM, DISSOLVED	1995-Aug	<5			<5	<5										
SELENIUM, DISSOLVED	1995-Oct	<5		<5	<5	<5			<5		<5	<5				
SELENIUM, DISSOLVED	1996-Apr	<5		<5	<5	<5			<5		11	<5				
SELENIUM, DISSOLVED	1996-Jan	<5		<5	<5	<5			<5			<5				
SELENIUM, DISSOLVED	1996-Jul	<5		<5	<5	<5			<5		<5	<5				
SELENIUM, DISSOLVED	1996-Oct															
SELENIUM, DISSOLVED	1997-Apr										13.3					
SELENIUM, DISSOLVED	1997-Oct										<5					
SELENIUM, DISSOLVED	1998-Apr										<5					
SELENIUM, DISSOLVED	1998-Oct						<5									
SELENIUM, DISSOLVED	1999-Sep						<5				<5					
SELENIUM, DISSOLVED	2000-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2001-Sep	<5		<5 NS+	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2002-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2003-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2004-Oct															
SELENIUM, DISSOLVED	2004-Sep	<10 R		<5	<5	<5	<5		<5			<5				
SELENIUM, DISSOLVED	2005-Sep	<5		<5 NS	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2006-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2007-Sep	<5		<5	<5	<5	<20 RL1		<5			<5				
SELENIUM, DISSOLVED	2008-Sep	<5		<5 S	<5	<5 pH>2	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2009-Sep	<5		<5	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2010-Aug	<5														
SELENIUM, DISSOLVED	2010-Sep			<5 S, S3	<5	<5	<5		<5		<5	<5				
SELENIUM, DISSOLVED	2011-Sep	<5		<5	<5	<5 S S3	<5		<5			<5				
SELENIUM, DISSOLVED	2012-Sep	<5		<5	<5	<5	<5		<5 S,S3			<5				
SELENIUM	2013-Sep															
SELENIUM, DISSOLVED	2013-Sep	1		<1	<1	<1	<1		<1		<1	<1				
SELENIUM	2014-Sep															
SELENIUM, DISSOLVED	2014-Sep	0.41		<0.14	<0.14	<0.14	0.41 J		<0.14		0.52 J					
SELENIUM	2015-Dec															
SELENIUM, DISSOLVED	2015-Dec												<5.8	<5.8	<5.8	<5.8
SELENIUM	2015-Sep															
SELENIUM, DISSOLVED	2015-Sep	<5.8		<5.8	<5.8	<5.8		<5.8		<5.8			<5.8	7.2	<5.8	<5.8
SELENIUM	2016-Jun															
SELENIUM, DISSOLVED	2016-Jun												0.95	4.8	<0.18	0.21
SELENIUM	2016-Mar															
SELENIUM, DISSOLVED	2016-Mar												<5.4	<5.4	<5.4	<5.4
SELENIUM	2016-Sep															
SELENIUM, DISSOLVED	2016-Sep	1.1		<0.37 D3	<0.37 D3	<0.37 D3		<0.18		<0.55 D3	<0.18		0.68	6.1	<0.55 D3	<0.18
SELENIUM	2017-Aug	1.1		<0.086	<0.086	0.16		<0.086		0.099	0.25		0.95	4	<0.086	0.089
SELENIUM	2018-Aug			<0.16	<0.16	<0.16		0.4		<0.16	<0.16		0.95	3.7	<0.16	<0.16
SELENIUM	2019-Apr	<1														
SELENIUM	2019-Aug		1.4 J	<1	<1	<1		<1		<1	<1		<1	qual to the M	<1	<1

GW Standard:
MCL = 50

IPL Ottumwa Midland Landfill
Historic Monitoring Results

SELENIUM
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
SELENIUM, DISSOLVED	1995-Aug										<5						
SELENIUM, DISSOLVED	1995-Oct										<5						
SELENIUM, DISSOLVED	1996-Apr						<5		<5		26						
SELENIUM, DISSOLVED	1996-Jan																
SELENIUM, DISSOLVED	1996-Jul						<5		<5		13		<5				
SELENIUM, DISSOLVED	1996-Oct										6						
SELENIUM, DISSOLVED	1997-Apr										13						
SELENIUM, DISSOLVED	1997-Oct										10.5						
SELENIUM, DISSOLVED	1998-Apr						<5		<5		7		55				
SELENIUM, DISSOLVED	1998-Oct						<5		<5		<5		<5				
SELENIUM, DISSOLVED	1999-Sep										<5		<5				
SELENIUM, DISSOLVED	2000-Sep										<5		<5				
SELENIUM, DISSOLVED	2001-Sep						<5				<5		<5				
SELENIUM, DISSOLVED	2002-Sep										<5		<5 NS				
SELENIUM, DISSOLVED	2003-Sep										<5		<5				
SELENIUM, DISSOLVED	2004-Oct										<5						
SELENIUM, DISSOLVED	2004-Sep						<5						<5				
SELENIUM, DISSOLVED	2005-Sep										<5		<5				
SELENIUM, DISSOLVED	2006-Sep										<5		<5				
SELENIUM, DISSOLVED	2007-Sep						<5		<5		<5		<5				
SELENIUM, DISSOLVED	2008-Sep						<5		<5		5.96	<5	<5				
SELENIUM, DISSOLVED	2009-Sep						<5				<5		<5				
SELENIUM, DISSOLVED	2010-Aug																
SELENIUM, DISSOLVED	2010-Sep						<5		<5		<5	<5	<5				
SELENIUM, DISSOLVED	2011-Sep												<5				
SELENIUM, DISSOLVED	2012-Sep				<5 S S3						<5		<5				
SELENIUM	2013-Sep													39			
SELENIUM, DISSOLVED	2013-Sep										3.4	<1	<1				<1
SELENIUM	2014-Sep					3.6								13	16		<0.23
SELENIUM, DISSOLVED	2014-Sep						0.69 J		0.92 J		3.9	0.43 J	0.55 J				
SELENIUM	2015-Dec	<5.8														<5.8	<5.8
SELENIUM, DISSOLVED	2015-Dec	<5.8															
SELENIUM	2015-Sep	<5.8		<5.8							<5.8	<5.8	<5.8	9.9		<5.8	<5.8
SELENIUM, DISSOLVED	2015-Sep	<5.8															
SELENIUM	2016-Jun	1.3														1.8	<0.18
SELENIUM, DISSOLVED	2016-Jun	1.3															
SELENIUM	2016-Mar	<5.4														<5.4	<5.4
SELENIUM, DISSOLVED	2016-Mar	<5.4															
SELENIUM	2016-Sep	1.3		2.6							2.8		0.38	37.6		1.7	<0.18
SELENIUM, DISSOLVED	2016-Sep																
SELENIUM	2017-Aug	0.77		2.4							1.6		0.56	52		0.9	<0.086
SELENIUM	2018-Aug	0.85		2.1							<6.1		0.55	70.7		1.6	<0.16
SELENIUM	2019-Apr																1 J
SELENIUM	2019-Aug	<1	<1	2.1 J							1.1 J	<1	<1	52		2.3 J	<1

GW Standard:
MCL = 50

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

ZINC
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
ZINC, DISSOLVED	1995-Aug	<20			<20	<20										
ZINC, DISSOLVED	1995-Oct	<20		<20	<20	<20			<20		<20	<20				
ZINC, DISSOLVED	1996-Apr	<30		<30	<30	<30			<30		<30	<30				
ZINC, DISSOLVED	1996-Jan	<20		<20	<20	<20			<20			<20				
ZINC, DISSOLVED	1996-Jul	<30		<30	<30	<30			<30		<30	<30				
ZINC, DISSOLVED	1997-Oct										<20					
ZINC, DISSOLVED	1998-Apr															
ZINC, DISSOLVED	1998-Oct						<20									
ZINC, DISSOLVED	1999-Sep						32									
ZINC, DISSOLVED	2000-Sep						<20									
ZINC, DISSOLVED	2001-Sep						<20									
ZINC, DISSOLVED	2002-Sep						<20									
ZINC, DISSOLVED	2003-Sep						<20									
ZINC, DISSOLVED	2004-Oct															
ZINC, DISSOLVED	2004-Sep	<20		<40 IE	<40 IE	<40 IE	<20		<40 IE			<20				
ZINC, DISSOLVED	2005-Sep	29		<100 IE	<100 IE	<100 IE	87		<100 IE		41	<100 IE				
ZINC, DISSOLVED	2006-Sep	25.4		<60	118	<60 IE	29.1		<60 IE		45.1	<60 IE				
ZINC, DISSOLVED	2007-Sep	29.1		<100 IE,MI	<100 IE	<100 IE	183		<40 IE			<40 IE				
ZINC, DISSOLVED	2008-Sep	22.2		<100 IE	<100 IE	<100 IEpH>	91.3		<100 IE		28.3	<100 IE				
ZINC, DISSOLVED	2009-Sep	45.5		<60 IE	<60 IE	<60 IE	183		<60 IE		25.4	<60 IE				
ZINC, DISSOLVED	2010-Aug	<20														
ZINC, DISSOLVED	2010-Sep			<60 IE	<60 IE	<60 IE	<20		<60 IE		<20	<20				
ZINC, DISSOLVED	2011-Sep	<20		<100 IE	<100 IE	<100 IE	<20		<60 IE			<60 IE				
ZINC, DISSOLVED	2012-Sep	<20		<60 IE	<60 IE	<60 IE	<20		133			<60 IE				
ZINC	2013-Sep															
ZINC, DISSOLVED	2013-Sep	<50		<50	<50	<50	<50		<50		100	<50				
ZINC	2014-Sep															
ZINC, DISSOLVED	2014-Sep	22		<12	15	<12	<12		<12		28					
ZINC	2015-Dec															
ZINC, DISSOLVED	2015-Dec												2.8	<2.6	11	35
ZINC	2015-Sep															
ZINC, DISSOLVED	2015-Sep	<2.6		<2.6	5.9	3.3		<2.6		4.1			<2.6	<2.6	5.9	7.6
ZINC	2016-Jun															
ZINC, DISSOLVED	2016-Jun												3.3 B	4.1 B	14.6 B	22.7
ZINC	2016-Mar															
ZINC, DISSOLVED	2016-Mar												<7.1	<7.1	<7.1	<7.1
ZINC	2016-Sep															
ZINC, DISSOLVED	2016-Sep	3.7 B		2.7 B	4.2 B	2.8 B		3.2 B		3.2 B	11.6		6.2 B	3.9 B	28.5 B	6.3 B
ZINC	2017-Aug	2.4		3.7	2 B	1.7 B		1.5 B		1 B	10.4		0.88	1.8	3.6 M1	87.8
ZINC	2018-Aug			<3.7	<3.7	<3.7		6		<3.7	31.4		<3.7	6.7	4.3	88.1
ZINC	2019-Apr	<10														
ZINC	2019-Aug		<10	<10	<10	<10	ter than or equal to the MDL and the			<10	<10		<10	<10	<10	86

GW Standard:
SMCL = 5000

IPL Ottumwa Midland Landfill
Historic Monitoring Results

ZINC
UNITS: UG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
ZINC, DISSOLVED	1995-Aug										<20						
ZINC, DISSOLVED	1995-Oct										<20						
ZINC, DISSOLVED	1996-Apr						<30		<30		<30						
ZINC, DISSOLVED	1996-Jan																
ZINC, DISSOLVED	1996-Jul						<30		33		<30						
ZINC, DISSOLVED	1997-Oct																
ZINC, DISSOLVED	1998-Apr						<20		<20				<20				
ZINC, DISSOLVED	1998-Oct						<20		<20				<20				
ZINC, DISSOLVED	1999-Sep												<20				
ZINC, DISSOLVED	2000-Sep												<20				
ZINC, DISSOLVED	2001-Sep												<20				
ZINC, DISSOLVED	2002-Sep																
ZINC, DISSOLVED	2003-Sep																
ZINC, DISSOLVED	2004-Oct										<20						
ZINC, DISSOLVED	2004-Sep						<20						<20				
ZINC, DISSOLVED	2005-Sep										24		<20				
ZINC, DISSOLVED	2006-Sep										25.5		23.7				
ZINC, DISSOLVED	2007-Sep						33.2		62.6		26.7		31.1				
ZINC, DISSOLVED	2008-Sep						<20		<20		<20	35.7	<20				
ZINC, DISSOLVED	2009-Sep						38.9				21.9		25.5				
ZINC, DISSOLVED	2010-Aug																
ZINC, DISSOLVED	2010-Sep						<20		<20		<20	34.3	<20				
ZINC, DISSOLVED	2011-Sep												<20				
ZINC, DISSOLVED	2012-Sep				37.8						<20		<20				
ZINC	2013-Sep													<50			
ZINC, DISSOLVED	2013-Sep										<50	<50	<50				<50
ZINC	2014-Sep					27								<12	<12		<12
ZINC, DISSOLVED	2014-Sep						<12		<12		<12	<12	<12				
ZINC	2015-Dec	4.9														<2.6	4.7
ZINC, DISSOLVED	2015-Dec	7.1															
ZINC	2015-Sep	21.8		21.9							6.2	14.7	6.5	4.6		3.1	<2.6
ZINC, DISSOLVED	2015-Sep	22.5															
ZINC	2016-Jun	23.8														1.7	1.5
ZINC, DISSOLVED	2016-Jun	25.6 D9															
ZINC	2016-Mar	<7.1														<7.1	<7.1
ZINC, DISSOLVED	2016-Mar	<7.1															
ZINC	2016-Sep	17.2		15.9							2.9		2.6	2		10.1	4.1
ZINC, DISSOLVED	2016-Sep																
ZINC	2017-Aug	26.2		14.5							1.4 B		2.5 B	1.8 B		1.2 B	2 B
ZINC	2018-Aug	166		23.6							<3.5		<3.7	<3.7		<3.7	<3.7
ZINC	2019-Apr																<10
ZINC	2019-Aug	36	91	15 J							<10	<10	<10	<10		<10	<10

GW Standard:
SMCL = 5000

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

CHLORIDE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
CHLORIDE	1995-Aug	170			14	13										
CHLORIDE	1995-Oct	150		48	<5	<5			16		66	<5				
CHLORIDE	1996-Apr	121		48	17	18			16		19	22				
CHLORIDE	1996-Jan	174		54	32	35			21			20				
CHLORIDE	1996-Jul	138.3		46.6	17.5	18.1			16.2		9.9	21.7				
CHLORIDE	1996-Oct	106		53	27	25			26		21	31				
CHLORIDE	1997-Apr	98		49	19	19			18		9.5	22				
CHLORIDE	1997-Oct	120		50	18	19			18		8.9	23				
CHLORIDE	1998-Apr	120		51	19	23			19		6	24				
CHLORIDE	1998-Oct	580		50	18	20	8.6		18			22				
CHLORIDE	1999-Sep	110		49	17	22			20		5.6	24				
CHLORIDE	2000-Sep	89.6		52.1	16.8	24.4	7.4		20.2		<5	22.1				
CHLORIDE	2001-Sep	53.3		59.7	15.6	21	8.7		18.6		5.6	19.7				
CHLORIDE	2002-Sep	59.5		76.9	14.3	25	7.6		19.3		<5	22.9				
CHLORIDE	2003-Sep	64.8		71.8	13.6	21.6	7.5		18.3		5.6	20.4				
CHLORIDE	2004-Oct															
CHLORIDE	2004-Sep	37.9		63.9	13.5	21.7	7.7		18.9			18.5				
CHLORIDE	2005-Sep	60		55	13.4	21.6	6.9		18.8		5.8	20.2				
CHLORIDE	2006-Sep	35.9		55.3	14.1	22.6	7.08		19		5.88	20.5				
CHLORIDE	2007-Sep	34.5		53.5	13.6	22	7.49		17.9			17.2				
CHLORIDE	2008-Sep	70.4		56.9	13	20.5	6.51		17.8		5.51	16.2				
CHLORIDE	2009-Sep	84.9		53.2	14.2	21.6	6.92		17.9		<5	16.3				
CHLORIDE	2010-Aug	164														
CHLORIDE	2010-Sep			49.2	11.5	19.5	<10 RL1		17		4.73	16.5				
CHLORIDE	2011-Sep	113		51	13.1	21.8	5.98		17			16.5				
CHLORIDE	2012-Sep	74.4			12.7	22.4	<5 RL1		18.1			17.1				
CHLORIDE	2013-Sep	54.7		46.1	11.5	18.9	3.9		16.4		3.2	14.8				
CHLORIDE	2014-Sep	26.6		47.8	11.5	20.9	4		18.9		2.8					
CHLORIDE	2015-Dec												21.1	4.3	8.6	1.9
CHLORIDE	2015-Sep	62.4		47.7	11.2	19.4		10.9		28.5			26.5	3.8	8.6	2.3
CHLORIDE	2016-Jun												24.8	4.7	8.5	1.8
CHLORIDE	2016-Mar												22.7	4.6	9.3	1.9
CHLORIDE	2016-Sep	64.9		44.5	12.1	19.3		7.4		19.2	6.7		27.4	4.3	8.8	2
CHLORIDE	2017-Aug	60.6		47.4	11.5	17.7		5.6		20.7	7		26.4	5.3	8.6	2.1
CHLORIDE	2018-Aug			47.2	11.9	18.9		5.5		20.4	8		26.4	5.3	8.8	2.1
CHLORIDE	2019-Apr	24														
CHLORIDE	2019-Aug		25	50	13	18		6.3		22	qual to the MDL and the		27	6.7	9.1	2.7 J

GW Standard:
SMCL = 250

IPL Ottumwa Midland Landfill
Historic Monitoring Results

CHLORIDE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
CHLORIDE	1995-Aug										30						
CHLORIDE	1995-Oct										36						
CHLORIDE	1996-Apr						20		20		17						
CHLORIDE	1996-Jan																
CHLORIDE	1996-Jul						30.4		7.5		9		35.6				
CHLORIDE	1996-Oct										18		106				
CHLORIDE	1997-Apr						56		23		12						
CHLORIDE	1997-Oct										8.1						
CHLORIDE	1998-Apr						13		14		5.8		6.4				
CHLORIDE	1998-Oct						8.8		10		<5		<5				
CHLORIDE	1999-Sep										4.3		6.2				
CHLORIDE	2000-Sep										<5		<5				
CHLORIDE	2001-Sep						23.4				5.4		5.5				
CHLORIDE	2002-Sep										<5		<5				
CHLORIDE	2003-Sep										7		33.1				
CHLORIDE	2004-Oct										<5 MSO						
CHLORIDE	2004-Sep						18.5						<5				
CHLORIDE	2005-Sep										5.2		16.2				
CHLORIDE	2006-Sep										6.18		13.7				
CHLORIDE	2007-Sep						23.1		16.8		6.3		8.33				
CHLORIDE	2008-Sep						20.7		18.6		<5	10.2	9.39				
CHLORIDE	2009-Sep						17.2				<5		5.19				
CHLORIDE	2010-Aug																
CHLORIDE	2010-Sep						16.2		9.25		3.31	6.24	5.07				
CHLORIDE	2011-Sep												16.1				
CHLORIDE	2012-Sep				16.5						10.1		30.6				
CHLORIDE	2013-Sep										2.8	6.3	6.4	123			<1
CHLORIDE	2014-Sep					15.4	8.4		6.3		2.7	3.6	4.9	29.7	31.6		<0.5
CHLORIDE	2015-Dec	17.5														5	<0.5
CHLORIDE	2015-Sep	17.5		5.8							5.3	19.6	8.5	24		10.2	<0.5
CHLORIDE	2016-Jun	16														5.8	<0.5
CHLORIDE	2016-Mar	18.8														4.9	<0.5
CHLORIDE	2016-Sep	17.2		19.4							9.2		14.1	127		5.6	<0.5
CHLORIDE	2017-Aug	16.7		14.8							7		32.9	138		8.5	0.67
CHLORIDE	2018-Aug	12.8		16.4							11		38.8	147		8.1	<0.46
CHLORIDE	2019-Apr																25
CHLORIDE	2019-Aug	18	19	10							3.7 J	16	8.1	180		18	<0.29

GW Standard:
SMCL = 250

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

SULFATE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-07P	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
SULFATE	1999-Sep	350			440	640	510			550		390	440				
SULFATE	2000-Sep	340			740	840	610	2400		680		370	530				
SULFATE	2001-Sep	210 SA			880 SA	1100 SA	540 SA	1700 SA		570 SA		430 SA	450 SA				
SULFATE	2002-Sep	320 SA			710 SA	1000 SA	660 SA	2200 SA		690 SA		600 SA	600 SA				
SULFATE	2003-Sep	260 SA			760 SA	1000 SA	640 SA	1700 SA		820 SA		1300 SA	490 SA				
SULFATE	2004-Oct																
SULFATE	2004-Sep	160 SA			770 SA	920 SA	630 SA	2300 SA		850 SA			530 SA				
SULFATE	2005-Sep	260			840	1000	740	2100		810		900	590				
SULFATE	2006-Sep	157			930	645	970	3440		960		542	656				
SULFATE	2007-Sep	138			814	1040	694	1910		784			552				
SULFATE	2008-Sep	291			724	929	657	1850		716		561	493				
SULFATE	2009-Sep	298		845	726	921	638	1820		688		296	476				
SULFATE	2010-Aug	403															
SULFATE	2010-Sep			293	713	942	648	1820		697		381	481				
SULFATE	2011-Sep	374			733	1070	602	1830		642			431				
SULFATE	2012-Sep	318		705	752	961	692	762		734			507				
SULFATE	2013-Sep	264			680	966	646	707		783		1110	507				
SULFATE	2014-Sep	97.8			747	922	728	607		719		568					
SULFATE	2015-Dec													151	1020	2070	192
SULFATE	2015-Sep	312			759	982	667		1280		1170			154	931	1690	193
SULFATE	2016-Jun													153	942	1840	179
SULFATE	2016-Mar													146	922	1860	173
SULFATE	2016-Sep	323			821	1150	764 M1		1020		1470	881		170	883	1920	175
SULFATE	2017-Aug	346			710	1240	628		874		850	1060		176	607	1540	140
SULFATE	2018-Aug				782	1210	684		990		786	1360		169	526	1690	155
SULFATE	2019-Apr	190															
SULFATE	2019-Aug		60		810	1200	710		980		800	260		160	440	1600	99

GW Standard:
SMCL = 250

IPL Ottumwa Midland Landfill
Historic Monitoring Results

SULFATE
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2
SULFATE	1999-Sep										460		390			
SULFATE	2000-Sep										300		310			
SULFATE	2001-Sep						40 SA				330 SA		380 SA			
SULFATE	2002-Sep										460 SA		310 SA			
SULFATE	2003-Sep										880 SA		380 SA			
SULFATE	2004-Oct										390					
SULFATE	2004-Sep						20 SA						390 SA			
SULFATE	2005-Sep										610		400			
SULFATE	2006-Sep										644		428			
SULFATE	2007-Sep						36		328		403		283			
SULFATE	2008-Sep						23.4		35.6		457	21.8	463			
SULFATE	2009-Sep						30.6				289		447			
SULFATE	2010-Aug															
SULFATE	2010-Sep						30.8		37.6		221	45.1	104			
SULFATE	2011-Sep												489			
SULFATE	2012-Sep				948						901		598			
SULFATE	2013-Sep										380	36.3	276	4060		
SULFATE	2014-Sep					1170	14.1		17.1		298	10.3	175	1390	1360	
SULFATE	2015-Dec	249														242
SULFATE	2015-Sep	432		691							576	162	527	1060		287
SULFATE	2016-Jun	622														223
SULFATE	2016-Mar	241														229
SULFATE	2016-Sep	514		905							688		356	5000		240
SULFATE	2017-Aug	561		771							631		362	5290		411
SULFATE	2018-Aug	959		962							624		363	5920		549
SULFATE	2019-Apr															
SULFATE	2019-Aug	350	450	520							260	5.6	180	1800		750

GW Standard:
SMCL = 250

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

TOTAL DISSOLVED SOLIDS
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-12	MW-13	MW-14	MW-15R	MW-16R	MW-17	MW-100R	MW-101R	MW-102P	MW-108
TOTAL DISSOLVED SOLIDS	2015-Sep	929		1930	1940	2000	2480	2830		637	1900	3560	520
TOTAL DISSOLVED SOLIDS	2015-Dec									589	1880	3140	484
TOTAL DISSOLVED SOLIDS	2016-Mar									606	1760	3380	490
TOTAL DISSOLVED SOLIDS	2016-Jun									622	1780	2990	476
TOTAL DISSOLVED SOLIDS	2016-Sep	808		1560	2100	1850	2050	2830	1440	601	1510	2890	432
TOTAL DISSOLVED SOLIDS	2017-Aug	887		1700	2170	1820	2050	2340	1560	633	1290	2760	420
TOTAL DISSOLVED SOLIDS	2018-Aug			1860	2430	2090	2030	2320	2160	644	1160	2730	448
TOTAL DISSOLVED SOLIDS	2019-Apr	640											
TOTAL DISSOLVED SOLIDS	2019-Aug		530	1800	2400	2000	2300	2300	600	630	1100	3100	430

GW Standard:
SMCL = 500 mg/L

IPL Ottumwa Midland Landfill
Historic Monitoring Results

TOTAL DISSOLVED SOLIDS
UNITS: MG/L

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2	FIELD BLANK
TOTAL DISSOLVED SOLIDS	2015-Sep	1150		1170							939	558	927	1750		471	<5
TOTAL DISSOLVED SOLIDS	2015-Dec	792														423	10
TOTAL DISSOLVED SOLIDS	2016-Mar	828														383	16
TOTAL DISSOLVED SOLIDS	2016-Jun	1420														391	7
TOTAL DISSOLVED SOLIDS	2016-Sep	1110		1550							964		544	6730		334	<5
TOTAL DISSOLVED SOLIDS	2017-Aug	1270		1480							973		682	8340		611	<5
TOTAL DISSOLVED SOLIDS	2018-Aug	1710		1630							937		725	8850		791	10 H1
TOTAL DISSOLVED SOLIDS	2019-Apr																370
TOTAL DISSOLVED SOLIDS	2019-Aug	1100	1200	970							460	320	720	3100		1200	24 J

GW Standard:
SMCL = 500 mg/L

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

PH, LAB
UNITS: STD. UNITS

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-07M	MW-07P	MW-08	MW-09M	MW-09P	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
PH, LAB	2018-Aug																				
PH, FIELD	1995-Aug	7.15								7.03	7.17										
PH, FIELD	1995-Oct	6.95							6.43	6.9	6.96			6.67		6.94	7.29				
PH, FIELD	1996-Jan	7.88							8.28	8.18	7.47			7.94			7.83				
PH, FIELD	1996-Apr	7.5							8	7.3	7.4			7.7		7.2	7.1				
PH, FIELD	1996-Jul	7.3							8.1	7.2	7.5			7.8		7.4	7.3				
PH, FIELD	1996-Oct	7							8.1	6.9	7.1			7.5		6.8	7.2				
PH, FIELD	1997-Apr	7.4							8	7.2	7.4			7.4		7.4	7.3				
PH, FIELD	1997-Oct	7.4							8.2	7.3	7.5			7.7		7.5	7.3				
PH, FIELD	1998-Apr	6.82							7.47	6.79	7.09			7.11		6.9	7.07				
PH, FIELD	1998-Oct	6.7							7.4	7	6.7	6.4		7			6.5				
PH, FIELD	1999-Sep	7.1							7.6	6.8	6.7	6.4		7.2		6.9	6.9				
PH, FIELD	2000-Sep	7.11							7.87	7.13	7.47	6.53		7.4		7.03	7.03				
PH, FIELD	2001-Sep	7.33							7.82	7.07	7.23	6.67		7.4		7.04	7.04				
PH, FIELD	2002-Sep	7.15							7.5	7.03	7.12	6.83		7.16		7.35	6.98				
PH, FIELD	2003-Sep	7.33							7.31	7	7.3	5.83		6.97		7.06	7.29				
PH, FIELD	2004-Sep	7.23							7.68	7.11	7.4	6.48		7.25			7.1				
PH, FIELD	2004-Oct																				
PH, FIELD	2005-Sep	6.59							7.65	6.89	7.06	6.4		6.82		6.91	6.94				
PH, FIELD	2006-Sep	7.61							7.8	6.67	7.06	6.63		6.8		6.73	7.35				
PH, FIELD	2007-Sep	6.08							7.44	6.58	7.03			6.53			6.43				
PH, FIELD	2008-Sep	6.98							7.65	6.71	7.09	6.8		7.4		7.46	7.07				
PH, FIELD	2009-Sep	7			6.82				7.54	6.85	7.02	6.41		6.75		6.77	6.9				
PH, FIELD	2010-Aug	7.24																			
PH, FIELD	2010-Sep				6.79				7.71	7.16	7.15	6.76		7.31		7.19	7.26				
PH, FIELD	2011-Sep	8.5							8.09	7.57	7.73	6.84		7.24			7.55				
PH, FIELD	2012-Sep	8.23			7.53				6.72	6.94	7.23	5.47		7.41			7.27				
PH, FIELD	2013-Sep																				
PH, FIELD	2013-Sep	7.44		7.45		7.12			7.75	7.32	7.48	7		7.53		7	7.46				
PH, FIELD	2014-Sep	7.56			7.94	6.85	7.08	5.35	8.15	7.23	7.37	6.65		7.36		7.2					
PH, FIELD	2015-Sep	7.38							7.9	7.16	7.28		6.74		6.95				7.07	6.55	
PH, FIELD	2015-Dec																	6.78	6.84	6.12	6.87
PH, FIELD	2016-Mar																	7.27	6.93	6.5	7.09
PH, FIELD	2016-Jun																	7.17	7.29	7.01	7.25
PH, FIELD	2016-Sep	7.76							7.91	7.63	7.14		7.05		7.11	6.97		7.83	7.19	6.38	7.09
PH, FIELD	2017-Aug	7.27							7.7	6.97	7.18		6.44		6.84	6.87		7.07	6.73	6.26	6.62
PH, FIELD	2018-Aug								8.18	7.33	7.45		6.8		7.2	6.89		7.47	7.22	6.63	6.95
PH, FIELD	2019-Apr	7.36																			
PH, FIELD	2019-Aug		7.65						7.61	6.98	7.04		6.41		6.74	7.15		7.28	7.33	6.39	6.37

GW Standard:
SMCL = 8.5

IPL Ottumwa Midland Landfill
Historic Monitoring Results

PH, LAB
UNITS: STD. UNITS

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2
PH, LAB	2018-Aug															8.4 H6
PH, FIELD	1995-Aug										9.13					
PH, FIELD	1995-Oct										6.05					
PH, FIELD	1996-Jan															
PH, FIELD	1996-Apr						8.2		8		8.8					
PH, FIELD	1996-Jul						8.3		7.1		8.5		9			
PH, FIELD	1996-Oct										8.1		8.1			
PH, FIELD	1997-Apr						7.8		8.2		8.8					
PH, FIELD	1997-Oct										8.7					
PH, FIELD	1998-Apr						7.96		8.19		7.41		7.48			
PH, FIELD	1998-Oct						7.1		7.4		6.9		7.1			
PH, FIELD	1999-Sep										8.1		8.1			
PH, FIELD	2000-Sep										7.7		7.67			
PH, FIELD	2001-Sep						7.6				7.31		7.47			
PH, FIELD	2002-Sep										8.34		7.5			
PH, FIELD	2003-Sep										8.02		7.2			
PH, FIELD	2004-Sep						8.15						7.87			
PH, FIELD	2004-Oct										6.8					
PH, FIELD	2005-Sep										7.97		7.72			
PH, FIELD	2006-Sep										7.53		7.59			
PH, FIELD	2007-Sep						7.88		7.36		7.68		8.05			
PH, FIELD	2008-Sep						7.7		7.84		8.34	7.92	7.66			
PH, FIELD	2009-Sep						7.82				7.02		8.48			
PH, FIELD	2010-Aug															
PH, FIELD	2010-Sep						7.37		8.4		8.1	7.9	8.11			
PH, FIELD	2011-Sep												9.11			
PH, FIELD	2012-Sep										8.62		8.55			
PH, FIELD	2013-Sep													7.56		
PH, FIELD	2013-Sep										8.01	7.48	7.49			
PH, FIELD	2014-Sep					6.89	7.59		8.02		7.81	7.68	8.09	7.68	6.98	
PH, FIELD	2015-Sep	6.85		6.91					7.81		8.23	7.57	7.54	7.39		
PH, FIELD	2015-Dec	6.94														7.28
PH, FIELD	2016-Mar	6.43														8.48
PH, FIELD	2016-Jun	7.09														7.92
PH, FIELD	2016-Sep	8.1		6.8							7.61		8.23	7.13		8.89
PH, FIELD	2017-Aug	7.13		7.09							8.32		8.33	6.71		7.8
PH, FIELD	2018-Aug	6.94		7.15							7.5		7.99	8.1		8.81
PH, FIELD	2019-Apr															
PH, FIELD	2019-Aug			7.94							8.03	7.59	7.64	8.43		9.22

GW Standard:
SMCL = 8.5

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

TEMPERATURE
UNITS: DEG C

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-07M	MW-07P	MW-08	MW-09M	MW-09P	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
TEMPERATURE	1995-Aug	27.8								20.9	21.1										
TEMPERATURE	1995-Oct	11.3							8.5	8.6	8.6			10.4		13.7	8.8				
TEMPERATURE	1996-Jan	6.47							6.1	6.31	6.9			5.36			5				
TEMPERATURE	1996-Apr	8.5							11.5	9.5	10.5			11.7		6	9				
TEMPERATURE	1996-Jul	17							16	18.7	14			20.5		20.1	13.5				
TEMPERATURE	1996-Oct	14.4							12.8	12.2	12.8			12.2		14.4	11.7				
TEMPERATURE	1997-Apr	10							13	13	13			13		9	12				
TEMPERATURE	1997-Oct	17							15	14	13			15		20	14				
TEMPERATURE	1998-Apr	12							13	12	9			9		13.5	13.5				
TEMPERATURE	1998-Oct	14.4							12.5	15	13.2	12		12.6			12.5				
TEMPERATURE	1999-Sep	14							12.5	14.1	12	13		12.5		14.5	12.4				
TEMPERATURE	2000-Sep	21.5							16.1	15.1	16.7	16.8		12.8		22.7	12.9				
TEMPERATURE	2001-Sep	16.7							16.1	15.1	14.2	16.8		14.2		19.2	12.9				
TEMPERATURE	2002-Sep	17.2							24.1	17.6	16.5	15.2		16.1		21.1	19.4				
TEMPERATURE	2003-Sep	17.1							15.9	15.4	23.2	13.4		16.7		22.3	15.9				
TEMPERATURE	2004-Sep	16.8							15.9	16.7	16.1	15.8		17.5			15.8				
TEMPERATURE	2004-Oct																				
TEMPERATURE	2005-Sep	15.3							13.3	15.2	15.1	15.8		14.5		21.4	14.6				
TEMPERATURE	2006-Sep	17.4							18	16.6	19.2	16.3		17.2		21.5	14.5				
TEMPERATURE	2007-Sep	15.1							13.8	14.6	14.3			13			12.7				
TEMPERATURE	2008-Sep	18							17.1	14.8	14.8	21.1		16		25.4	15				
TEMPERATURE	2009-Sep	15.4			14				13.9	16.4	15.8	15.1		17.1		21.3	16.4				
TEMPERATURE	2010-Aug	17.6																			
TEMPERATURE	2010-Sep				16.8				16.6	15.8	16.1	18		15.9		21.4	15.2				
TEMPERATURE	2011-Sep	18.1							12.6	15.5	15.8	12.3		12.8			12.4				
TEMPERATURE	2012-Sep	16.8			15.1				15.2	12.5	11.8	10.5		14.3							
TEMPERATURE	2013-Sep	16.5		15.9		14.7			14.7	15.5	16.3	14.7		17.3		22.3	15.6				
TEMPERATURE	2014-Sep	17.6			13.1	14.3	16.3	14.5	15.8	14.6	15.3	13.5		14.4		24.5					
TEMPERATURE	2015-Sep	17							14.5	13.6	14		14.1		13.9				12.5	13.2	
TEMPERATURE	2015-Dec																	12.7	12.4	13.8	12.1
TEMPERATURE	2016-Mar																	11.5	12.2	13.8	12.8
TEMPERATURE	2016-Jun																	11.3	12	14.8	13.1
TEMPERATURE	2016-Sep	15.8							13.9	13.9	13.6		12.9		13.8	21		12.7	12.6	14.5	12.8
TEMPERATURE	2017-Aug	19.5							15.2	14.2	16.3		17.7		14.3	19.8		13.6	15	13.3	13.2
TEMPERATURE	2018-Aug								13.9	14.6	13.7		16.6		14	19.2		13.2	12.3	14.1	13.9
TEMPERATURE	2019-Apr	8.87																			
TEMPERATURE	2019-Aug		13.8						15.6	14.3	15.5		16.7		15	25.9		12.7	11.8	13.5	13.7

GW Standard:
None

IPL Ottumwa Midland Landfill
Historic Monitoring Results

TEMPERATURE
UNITS: DEG C

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	Leachate Basin	LEACHATE LIFT STATION	TCB-1/2
TEMPERATURE	1995-Aug										35.5					
TEMPERATURE	1995-Oct										11.4					
TEMPERATURE	1996-Jan										8.6					
TEMPERATURE	1996-Apr						13		12.2		9					
TEMPERATURE	1996-Jul						24.5		29.5		28.3		36			
TEMPERATURE	1996-Oct										12.2		13.3			
TEMPERATURE	1997-Apr						9		9		17					
TEMPERATURE	1997-Oct										23					
TEMPERATURE	1998-Apr						18.5		18.5		17		17			
TEMPERATURE	1998-Oct						14		13.2		15.5		15.5			
TEMPERATURE	1999-Sep										18		19			
TEMPERATURE	2000-Sep										17.5		22.5			
TEMPERATURE	2001-Sep						16.8				17.9		17.9			
TEMPERATURE	2002-Sep										26		25.1			
TEMPERATURE	2003-Sep										23.2		21.5			
TEMPERATURE	2004-Sep						21.4						23.5			
TEMPERATURE	2004-Oct										13.8					
TEMPERATURE	2005-Sep										22.2		19.7			
TEMPERATURE	2006-Sep										20.7		21.9			
TEMPERATURE	2007-Sep						16.5		15		22.4		22.1			
TEMPERATURE	2008-Sep						20.9		21.4		21.8	19.4	19.2			
TEMPERATURE	2009-Sep						19.5				21.9		23.6			
TEMPERATURE	2010-Aug															
TEMPERATURE	2010-Sep						25.1		22.5		24.6	23.8	26.9			
TEMPERATURE	2011-Sep						12.4						24.1			
TEMPERATURE	2012-Sep				16.33						18.44		21.13			
TEMPERATURE	2013-Sep										24.2	24.6	19.9	21.2		
TEMPERATURE	2014-Sep					18.1	20.3		21.7		23.1	20.8	22.5	21.6	18.7	
TEMPERATURE	2015-Sep	16.8		22					21		25.6	21.7	25.1	23.1		
TEMPERATURE	2015-Dec	9.8														1
TEMPERATURE	2016-Mar	11														10.5
TEMPERATURE	2016-Jun	15.6														29
TEMPERATURE	2016-Sep	17.2		15							26.9		27	18		27.2
TEMPERATURE	2017-Aug	18.5		15.4							23.4		21.7	18		22.8
TEMPERATURE	2018-Aug	19.9		13.8							24.7		25.3	22		28
TEMPERATURE	2019-Apr															
TEMPERATURE	2019-Aug										27.8	21.8	25.4	23.8		25.2

GW Standard:
None

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

IPL Ottumwa Midland Landfill
Historic Monitoring Results

CONDUCTANCE, SPECIFIC
UNITS: UMHOS/CM

CHEMICAL PARAMETER	EVENT	MW-01	MW-01R	MW-07M	MW-07P	MW-08	MW-09M	MW-09P	MW-12	MW-13	MW-14	MW-15	MW-15R	MW-16	MW-16R	MW-17	MW-18	MW-100R	MW-101R	MW-102P	MW-108
CONDUCTANCE, SPECIFIC	1995-Aug	1510								3990	2660										
CONDUCTANCE, SPECIFIC	1995-Oct	2180							4140	6460	4320			3200		4920	4880				
CONDUCTANCE, SPECIFIC	1996-Jan	1950							2880	4290	3040			2380			2160				
CONDUCTANCE, SPECIFIC	1996-Apr	1540							2700	3900	2800			2000		2300	2500				
CONDUCTANCE, SPECIFIC	1996-Jul	1340							2000	3200	2000			1700		1240	2000				
CONDUCTANCE, SPECIFIC	1996-Oct	1770							2600	3500	2600			2000		1490	2500				
CONDUCTANCE, SPECIFIC	1997-Apr	1570							2600	3200	2400			2100		1700	2400				
CONDUCTANCE, SPECIFIC	1997-Oct	1790							2400	2900	2600			2000		1940	2300				
CONDUCTANCE, SPECIFIC	1998-Apr	1460							2460	2860	2590			2090		1280	2370				
CONDUCTANCE, SPECIFIC	1998-Oct	1440							2370	2780	2390	2790		1900			2300				
CONDUCTANCE, SPECIFIC	1999-Sep	1520							2370	2840	2660	3180		2100		1630	2570				
CONDUCTANCE, SPECIFIC	2000-Sep	1374							2700	3030	2850	3530		2420		1042	2390				
CONDUCTANCE, SPECIFIC	2001-Sep	1015							2610	2970	2860	2610		2280		1366	2150				
CONDUCTANCE, SPECIFIC	2002-Sep	1179							2650	2990	3030	3490		2490		1564	2540				
CONDUCTANCE, SPECIFIC	2003-Sep	993							2310	2570	2970	3160		2070		2410	2380				
CONDUCTANCE, SPECIFIC	2004-Sep	830							1168	2610	3050	3470		2460			2100				
CONDUCTANCE, SPECIFIC	2004-Oct																				
CONDUCTANCE, SPECIFIC	2005-Sep	1531							2650	2850	2900	3480		2210		2050	2340				
CONDUCTANCE, SPECIFIC	2006-Sep	827							2540	2560	2600	3510		2380		2620	2340				
CONDUCTANCE, SPECIFIC	2007-Sep	834							2590	2580	2970			2290			2020				
CONDUCTANCE, SPECIFIC	2008-Sep	1297							2640	2910	3050	3520		2510		1353	1971				
CONDUCTANCE, SPECIFIC	2009-Sep	1340			2320				2740	2960	3020	3510		2300		830	1935				
CONDUCTANCE, SPECIFIC	2010-Aug	1618																			
CONDUCTANCE, SPECIFIC	2010-Sep				1409				2680	2840	3020	3380		2230		1103	1896				
CONDUCTANCE, SPECIFIC	2011-Sep	1507							2690	2520	2540	3780		2350			1917				
CONDUCTANCE, SPECIFIC	2012-Sep	1332			2117				2696	2813	3063	2372		2260			2045				
CONDUCTANCE, SPECIFIC	2013-Sep	923		2970		1893			2580	2680	2810	1657		1879		1411	1495				
CONDUCTANCE, SPECIFIC	2014-Sep	470			2520	2890	7440	7420	2890	3050	3240	1259		2600		1204					
CONDUCTANCE, SPECIFIC	2015-Sep	1139							2790	2830	3040		2530		3460				1804	3450	
CONDUCTANCE, SPECIFIC	2015-Dec																	880	2310	4480	739
CONDUCTANCE, SPECIFIC	2016-Mar																	815	1775	3860	652
CONDUCTANCE, SPECIFIC	2016-Jun																	865	1952	3602	715.9
CONDUCTANCE, SPECIFIC	2016-Sep	1263							2920	3330	3240		2590		4290	1677		933	1874	3980	714
CONDUCTANCE, SPECIFIC	2017-Aug	1663							3380	4121	3734		3360		4198	2482		1221	2087	4362	857
CONDUCTANCE, SPECIFIC	2018-Aug								2617	3149	2778		2633		3155	2394		907	1438	3291	673
CONDUCTANCE, SPECIFIC	2019-Apr	951																			
CONDUCTANCE, SPECIFIC	2019-Aug		791						2577	3103	2741		2640		3152	806		927	1425	3558	517

GW Standard:
None

IPL Ottumwa Midland Landfill
Historic Monitoring Results

CONDUCTANCE, SPECIFIC
UNITS: UMHOS/CM

CHEMICAL PARAMETER	EVENT	GU-1 TEMP	GU-2	GU-EX	GW GCS	UNDERDRAIN LIFT STATION	SW-1	SW-1R	SW-2	SW-2R	SW-3	SW-4	SW-5	LEACHATE BASIN	LEACHATE LIFT STATION	TCB-1/2
CONDUCTANCE, SPECIFIC	1995-Aug										900					
CONDUCTANCE, SPECIFIC	1995-Oct										1350					
CONDUCTANCE, SPECIFIC	1996-Jan															
CONDUCTANCE, SPECIFIC	1996-Apr						650		1180		880					
CONDUCTANCE, SPECIFIC	1996-Jul						650		1170		620		950			
CONDUCTANCE, SPECIFIC	1996-Oct										750		1480			
CONDUCTANCE, SPECIFIC	1997-Apr						680		730		1110					
CONDUCTANCE, SPECIFIC	1997-Oct										1150					
CONDUCTANCE, SPECIFIC	1998-Apr						410		440		890		1000			
CONDUCTANCE, SPECIFIC	1998-Oct						320		370		510		730			
CONDUCTANCE, SPECIFIC	1999-Sep										980		900			
CONDUCTANCE, SPECIFIC	2000-Sep										782		901			
CONDUCTANCE, SPECIFIC	2001-Sep						783				904		911			
CONDUCTANCE, SPECIFIC	2002-Sep										978		922			
CONDUCTANCE, SPECIFIC	2003-Sep										1550		1126			
CONDUCTANCE, SPECIFIC	2004-Sep						721						959			
CONDUCTANCE, SPECIFIC	2004-Oct										896					
CONDUCTANCE, SPECIFIC	2005-Sep										1220		997			
CONDUCTANCE, SPECIFIC	2006-Sep										1335		1168			
CONDUCTANCE, SPECIFIC	2007-Sep						704		891		1000		841			
CONDUCTANCE, SPECIFIC	2008-Sep						536		549		1027	363	1180			
CONDUCTANCE, SPECIFIC	2009-Sep						678				738		1063			
CONDUCTANCE, SPECIFIC	2010-Aug															
CONDUCTANCE, SPECIFIC	2010-Sep						606		374		569	410	431			
CONDUCTANCE, SPECIFIC	2011-Sep						1917						1194			
CONDUCTANCE, SPECIFIC	2012-Sep				2088						1699		810			
CONDUCTANCE, SPECIFIC	2013-Sep										669	505	667	6240		
CONDUCTANCE, SPECIFIC	2014-Sep					2630	278		242		649	713	513	2970	3360	
CONDUCTANCE, SPECIFIC	2015-Sep	1324		1268					813		1021	738	1051	2280		
CONDUCTANCE, SPECIFIC	2015-Dec	1144														660
CONDUCTANCE, SPECIFIC	2016-Mar	1093														532
CONDUCTANCE, SPECIFIC	2016-Jun	1627														550
CONDUCTANCE, SPECIFIC	2016-Sep	1461		1660							1156		802	7800		550
CONDUCTANCE, SPECIFIC	2017-Aug	2258		2437							1672		1324	12257		1126
CONDUCTANCE, SPECIFIC	2018-Aug	2144		2450							1172		1024	9518		1070
CONDUCTANCE, SPECIFIC	2019-Apr															
CONDUCTANCE, SPECIFIC	2019-Aug			1735							624	533	1123	3933		1546

GW Standard:
None

Note: August 2018 data for GU-1 Temp were listed under GU-2 in previous AWQR appendices.

Appendix D

Statistical Evaluation of Groundwater Monitoring Results

SCS ENGINEERS Environmental Consultants & Contractors

November 27, 2024
File No. 25224073.00

TECHNICAL MEMORANDUM

SUBJECT: Statistical Evaluation of Groundwater Monitoring Results
Ottumwa Midland Landfill, Shallow and Pennsylvanian Units, August 2024 Monitoring Event

PREPARED BY: Lindsey Hawksworth

CHECKED BY: Ryan Matzuk

STATISTICAL METHOD

The statistical analysis uses a prediction interval approach as recommended for detection monitoring in the March 2009 U.S. Environmental Protection Agency (U.S. EPA) Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities. For the prediction interval evaluation, interwell testing was selected based on the considerations outlined in Chapter 6 of the Unified Guidance. The statistical program used to calculate the interwell prediction interval is Sanitas™ (Version 10.0.16 and 10.0.23).

The Ottumwa Midland Landfill (OML) monitoring data are evaluated in two well groups, representing the shallow (water table) and mid-depth (Pennsylvanian) hydrogeologic units. For the shallow hydrogeologic unit, monitoring well MW-1/MW-1R is used as the background well. Monitoring well MW-1R replaced MW-1 beginning with the August 2019 sampling event. The combined historical results for MW-1 and MW-1R are shown under the MW-1R label in the Sanitas™ output. For the mid-depth hydrogeologic unit, piezometer MW-102P is used as the background well.

TIME SERIES PLOTS

Time series plots are prepared for the required monitoring parameters to show the concentration variations over time. Time series graphs are included in **Attachments D1** (shallow) and **D2** (Pennsylvanian). For metals, the time series plots only show monitoring results since August 2017, when the monitoring program transitioned from dissolved metals to total metals analysis. For sulfate, which is not typically affected by filtering, older historical results for background wells are included in the time series plots and are used in the determination of background for the statistical evaluation.

OUTLIER ANALYSIS

An outlier analysis is performed for background monitoring results at upgradient wells. A statistical outlier is a value that is extremely different from the other values in the data set. The Sanitas™ outlier tests identify data points that do not appear to fit the distribution of the rest of the data set and determine if they differ significantly from the rest of the data. The outlier analysis performed in Sanitas™ includes the following steps:

1) Run normality test (Shapiro Wilk/Francia).

2) If normally distributed, run U.S. EPA's 1989 Outlier Test to identify suspected outliers.

    a) If number of background samples is less than or equal to 25, run Dixon's test for suspected outliers.
    b) If number of background samples is more than 25, run Rosner's test for suspected outliers.

3) If not normally distributed, run Tukey's test for outliers.

4) Review data flagged as possible outliers to evaluate whether they should be removed from the background data set. Also review time series plots for possible outliers that were not picked up in the statistical evaluation (e.g., outlier test may not identify outliers when two values are similar to each other, but very different from all other data).

Results identified as statistical outliers are checked for possible lab instrument failure, field collection problems, or data entry errors; however, outliers may exist naturally in the data if there is an extremely wide inherent or temporal variability in the data. The Unified Guidance states that unless a likely error can be identified, the outlier should not be removed.

For the August 2024 sampling event, the following background values were identified as potential outliers and handled as described:

Shallow Hydrogeologic Unit

- **Barium (MW-1/MW-1R).** One low result from the August 2017 event was flagged as a statistical outlier. This result was kept in the dataset because there was no known explanation for the lower result, and it appeared to be within the range of potential natural variation relative to the other observed barium concentrations.

- **Beryllium (MW-1/MW-1R).** One low result below the limit of detection from the August 2017 event and one high result below the limit of quantitation from the August 2023 event were flagged as statistical outliers. The low non-detect result reflects a change in minimum detect limits by the laboratory. Both results were kept in the dataset because they appeared to be within the range of potential natural variation relative to the other observed beryllium concentrations.

- **Fluoride (MW-1/MW-1R).** One low result from the August 2022 event was flagged as a statistical outlier. This result was kept in the dataset because there was no known explanation for the lower result, and it appeared to be within the range of potential natural variation relative to the other observed fluoride concentrations.

- **Magnesium (MW-1/MW-1R).** One high result from the August 2017 event was flagged as a statistical outlier. This result was kept in the dataset because there was no known explanation for the higher result, and it appeared to be within the range of potential natural variation relative to the other observed magnesium concentrations.

- **Manganese (MW-1/MW-1R).** One high result from the April 2019 event was flagged as a statistical outlier. This result was kept in the dataset because there was no known explanation for the higher result, and it appeared to be within the range of potential natural variation relative to the other observed manganese concentrations. Iron was also high for this event, but not flagged as an outlier, suggesting that the high result could be due to a change in redox conditions or in suspended solids.

Pennsylvanian Unit

- **Beryllium (MW-102P).** One high result from the August 2023 event was flagged as a statistical outlier. This result was kept in the dataset because there it appeared to be within the range of potential natural variation relative to the other observed beryllium concentrations. The high non-detect value reflects an elevated minimum limit of detection from the laboratory caused by a 4X dilution factor applied to this parameter.

- **Sulfate (MW-102P).** One low result from the August 2023 event was flagged as a statistical outlier. This result was kept in the dataset because there was no known explanation for the lower result, and it appeared to be within the range of potential natural variation relative to the other observed sulfate concentrations.

- **Total Dissolved Solids (MW-102P).** One low result from the August 2021 event was flagged as a statistical outlier. The result was removed from the dataset during the 2021 data analysis because it appeared likely to represent a laboratory error. The result was approximately 10 percent of previous values, suggesting a possible calculation error. The total dissolved solids (TDS) result was approximately 20 percent of the sulfate value, which also suggested an erroneous result since the TDS should be greater than the sulfate result.

Outlier analysis results are included in **Attachments D3** (Shallow) and **D4** (Pennsylvanian).

INTERWELL PREDICTION LIMITS

Interwell prediction limits for each hydrogeologic unit are calculated using background data from the upgradient monitoring wells (MW-1/1R and MW-102P) for each monitored constituent, with outliers removed as noted above. The prediction limit analysis performed in Sanitas™ includes the following steps:

1) If 100 percent of the background values are non-detect, the Double Quantification rule applies and no prediction limit is calculated.

2) If 50 percent or more of results are non-detect, then a non-parametric prediction limit is calculated.

3) If fewer than 50 percent of the results are non-detect, run normality test (Shapiro Wilk/Francia) to assess whether the data fit a normal distribution or can be transformed to fit a normal distribution (e.g., lognormal).

4) If normal or transformed normal, calculate parametric prediction limit.

5) If not normal or transformed normal, calculate non-parametric prediction limit.

Consistent with the Unified Guidance, parametric prediction limits are calculated based on a 1-of-2 retesting protocol and a 10 percent site-wide false positive rate. Sanitas™ establishes the per-test significance level based on user inputs of the number of events per year, number of constituents being evaluated, and number of compliance wells. For the 2024 event, the following values were used:

Parameter	Value	Comments
Evaluations per year	1	August event
Constituents analyzed	15	Shallow: 20 constituents sampled. Beryllium not counted because all but one background results were non-detect. Calcium, lithium, molybdenum, and total suspended solids were added to program in 2023 and do not meet the minimum requirement of 4 samples for prediction limit statistical analysis. Pennsylvanian: 20 constituents, selenium not counted because all background results were non-detect. Calcium, lithium, molybdenum, and total suspended solids were added to program in 2023 and do not meet the minimum requirement of 4 samples for prediction limit statistical analysis.
Compliance wells	9	5 Shallow, 4 Pennsylvanian

Non-parametric prediction limits are also based on a 1-of-2 retesting protocol. The non-parametric limit is the highest value in the background dataset. Due to the small sample size, the false positive rate for the non-parametric tests is higher than for the parametric tests, but will go down as more background data are obtained.

For results with 100 percent non-detects in the background data, evaluation under the Double Quantification Rule means that a statistically significant increase (SSI) has not occurred for a compliance well unless two sample results from the well exceed the laboratory's reporting limit or quantification limit. For evaluation of parameters with less than 100 percent non-detects in the background sampling, the non-detects were replaced with the detection limit, unless the non-detects represent less than 15 percent of the total samples, in which case one-half of the detection limit was used.

Interwell prediction limit analysis results for 2024 are included in **Attachments D5** (Shallow) and **D6** (Pennsylvanian).

LH/RM//

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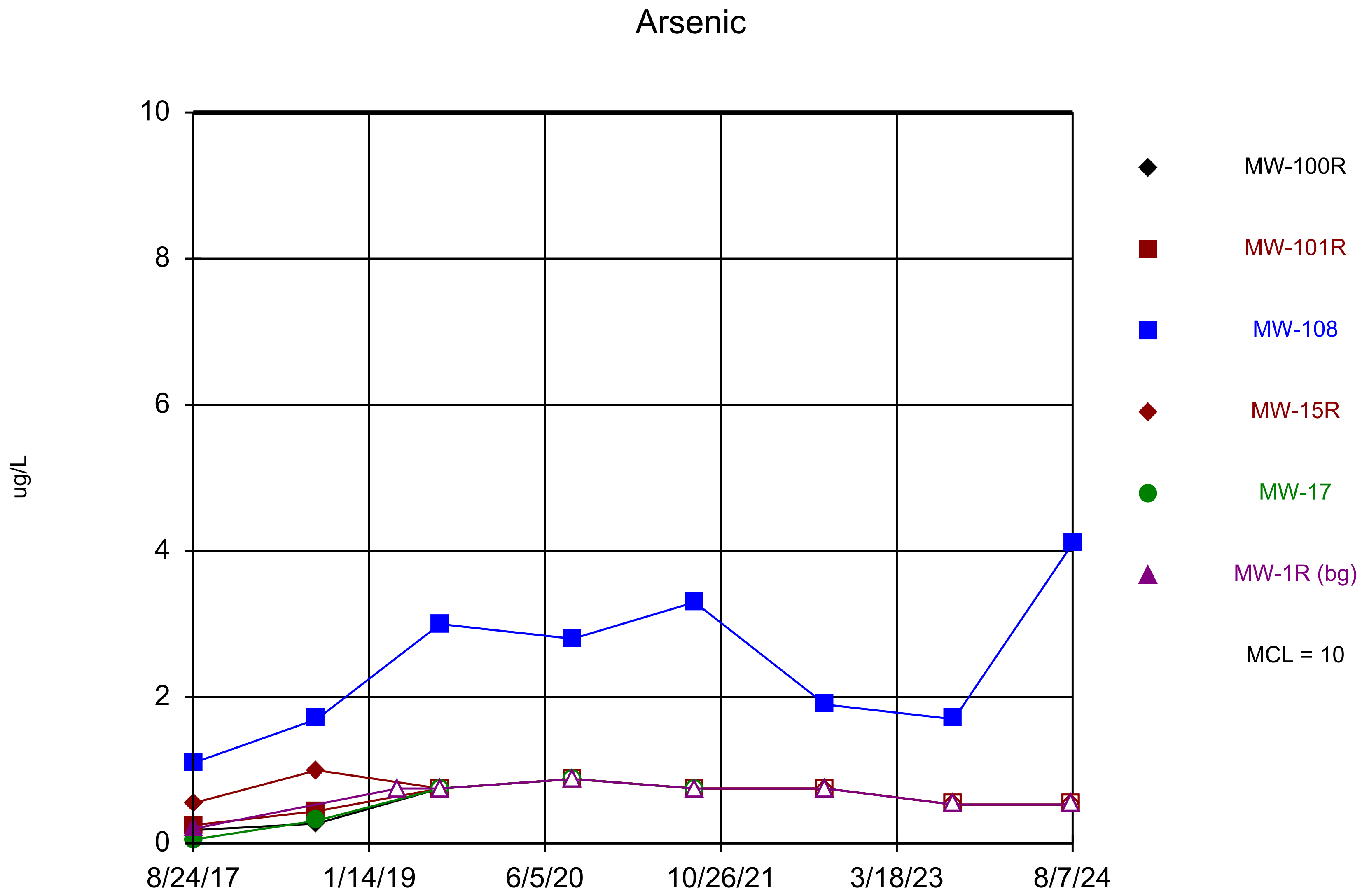
D1 – Times Series Graphs - Shallow

Sanitas™ v.10.0.16 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Arsenic (ug/L) Analysis Run 10/23/2024 2:20 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.18 (J)	0.25 (J)	1.1	0.55 (J)	0.052 (J)	0.2 (J)
8/16/2018	0.27 (J)	0.44 (J)	1.7	1	0.31 (J)	
4/6/2019						<0.75
8/7/2019	<0.75	<0.75	3	<0.75	<0.75	<0.75
8/24/2020	<0.88	<0.88	2.8		<0.88	<0.88
8/25/2020				<0.88		
8/10/2021					<0.75	<0.75
8/11/2021	<0.75	<0.75	3.3			
8/12/2021				<0.75		
8/23/2022						<0.75 (U)
8/24/2022	<0.75 (U)	<0.75 (U)	1.9 (J)	<0.75 (U)		
8/29/2023	<0.53 (U)	<0.53 (U)				<0.53 (U)
8/30/2023			1.7 (J)	<0.53 (U)		
8/6/2024	<0.53	<0.53		<0.53		<0.53
8/7/2024			4.1			

ND substitution: RL or RL/2 if <15% NDs.

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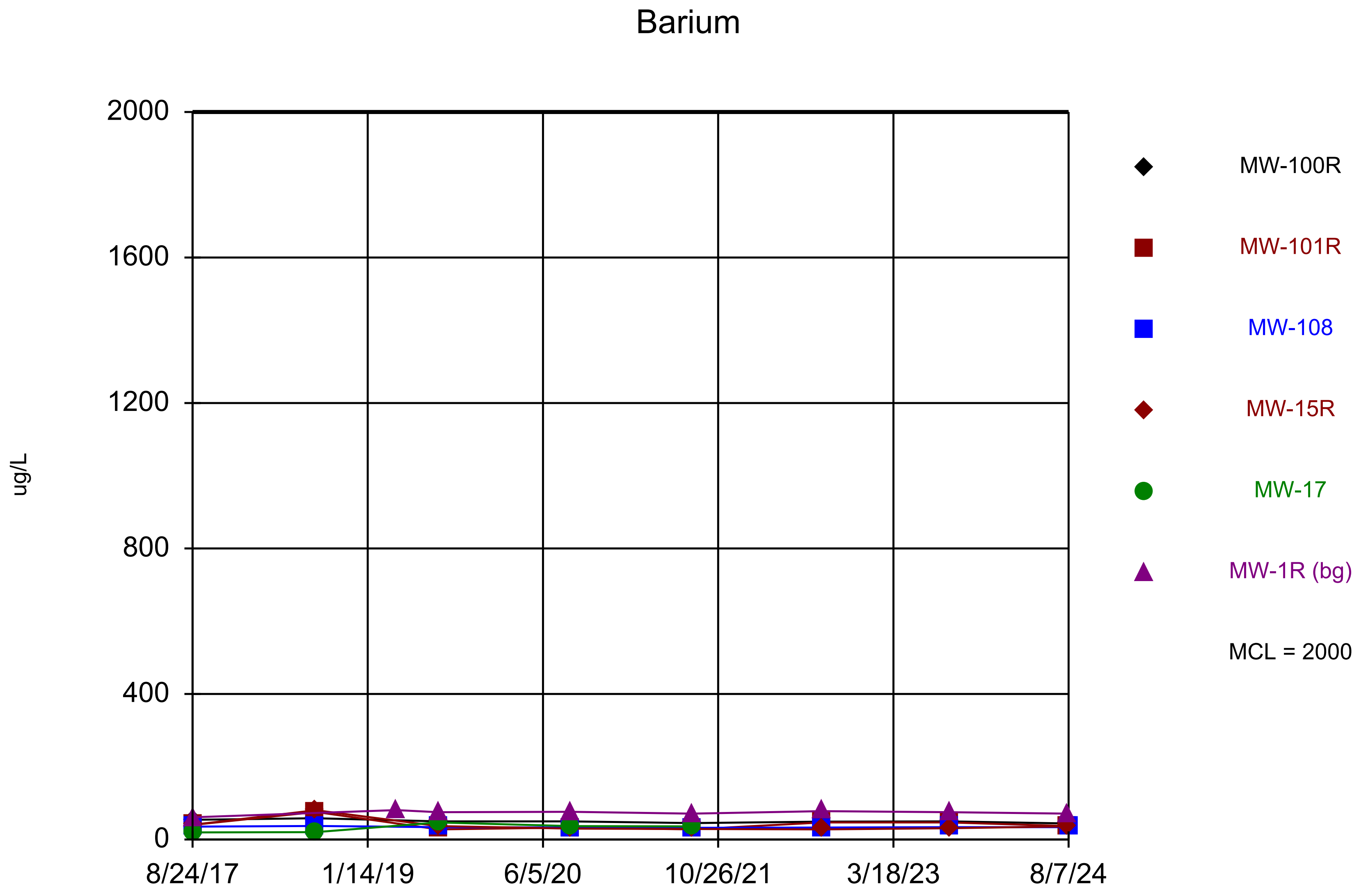

Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Barium (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	54.2	40	35.4	40.6	19.4	61
8/16/2018	58.4	75.9	37.1	80.5	20.2	
4/6/2019						81
8/7/2019	50	28	34	37	47	75
8/24/2020	50	33	33		37	76
8/25/2020				30		
8/10/2021					36 (B)	71 (B)
8/11/2021	45 (B)	28 (B)	32 (B)			
8/12/2021				29 (B)		
8/23/2022						78
8/24/2022	49	47	33	28		
8/29/2023	50	47				75
8/30/2023			34	31		
8/6/2024	44	37		36		71
8/7/2024			34			

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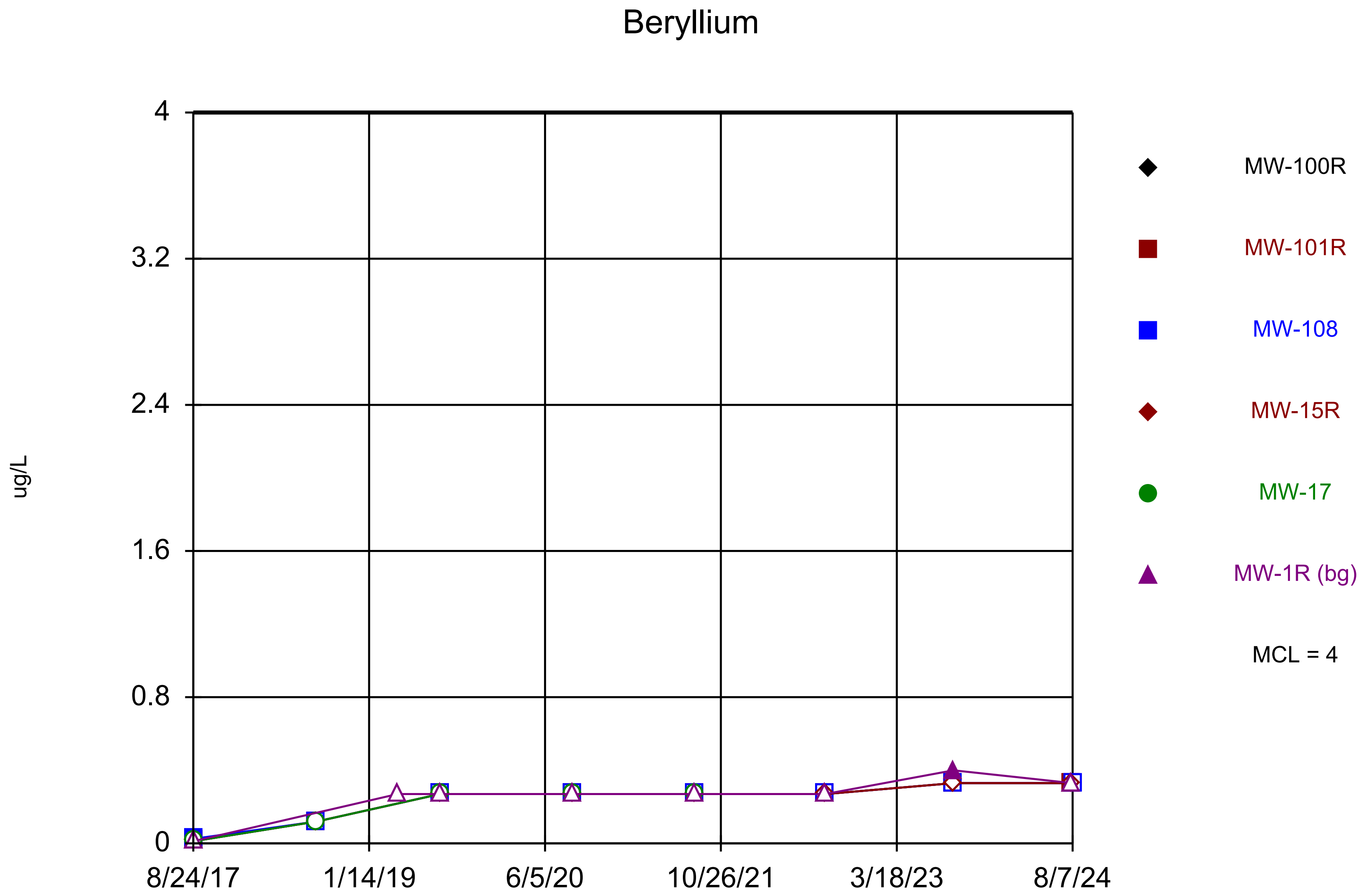
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Beryllium (ug/L) Analysis Run 10/23/2024 2:20 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	<0.012	0.02 (J)	0.025 (J)	<0.012	<0.012	<0.012
8/16/2018	<0.12	<0.12	<0.12	<0.12	<0.12	
4/6/2019						<0.27
8/7/2019	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27
8/24/2020	<0.27	<0.27	<0.27		<0.27	<0.27
8/25/2020				<0.27		
8/10/2021					<0.27	<0.27
8/11/2021	<0.27	<0.27	<0.27			
8/12/2021				<0.27		
8/23/2022						<0.27 (U)
8/24/2022	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)		
8/29/2023	<0.33 (U)	<0.33 (U)				0.4 (J)
8/30/2023			<0.33 (U)	<0.33 (U)		
8/6/2024	<0.33	<0.33		<0.33		<0.33
8/7/2024			<0.33			

ND substitution: RL or RL/2 if <15% NDs.

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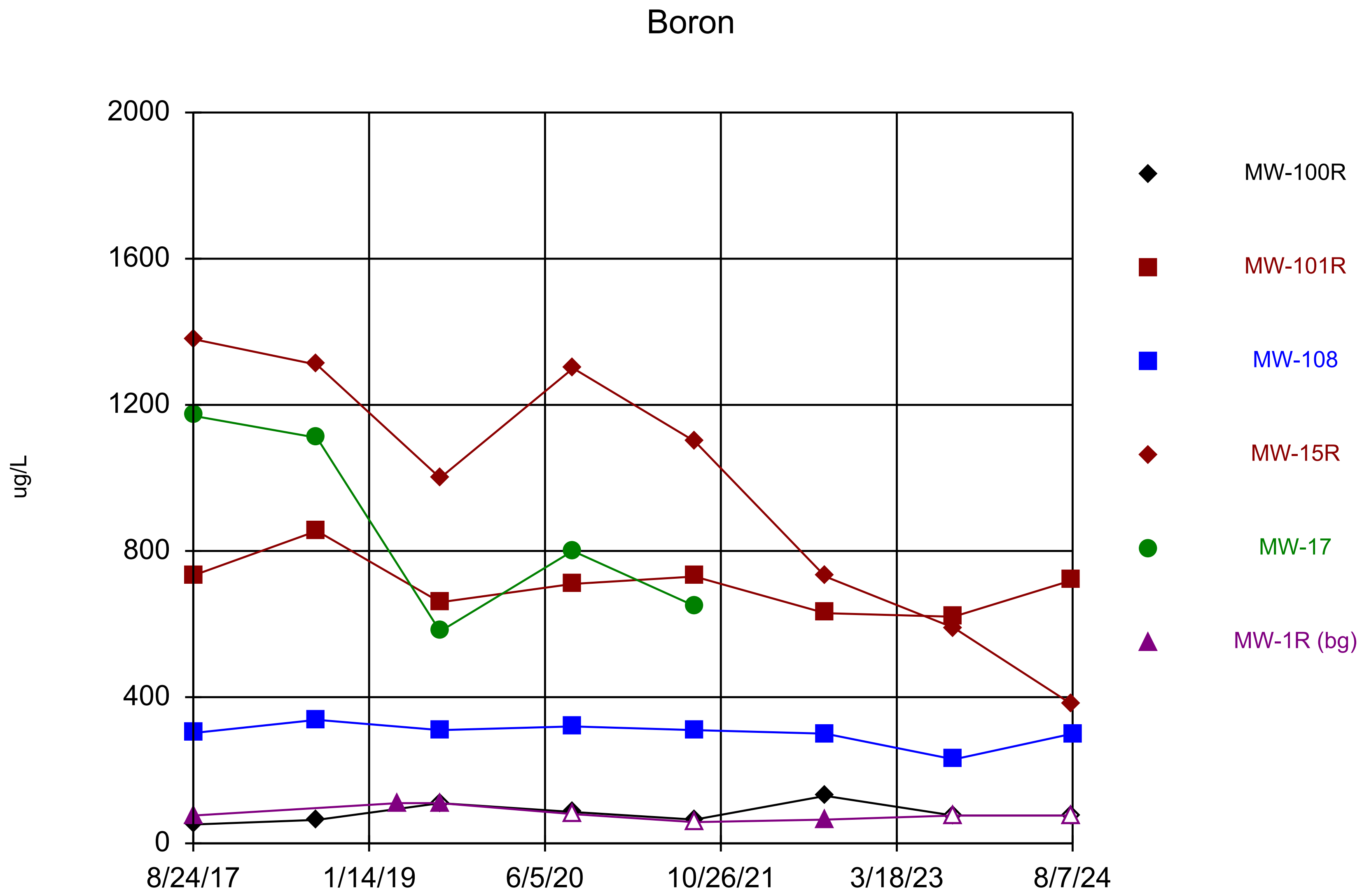
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

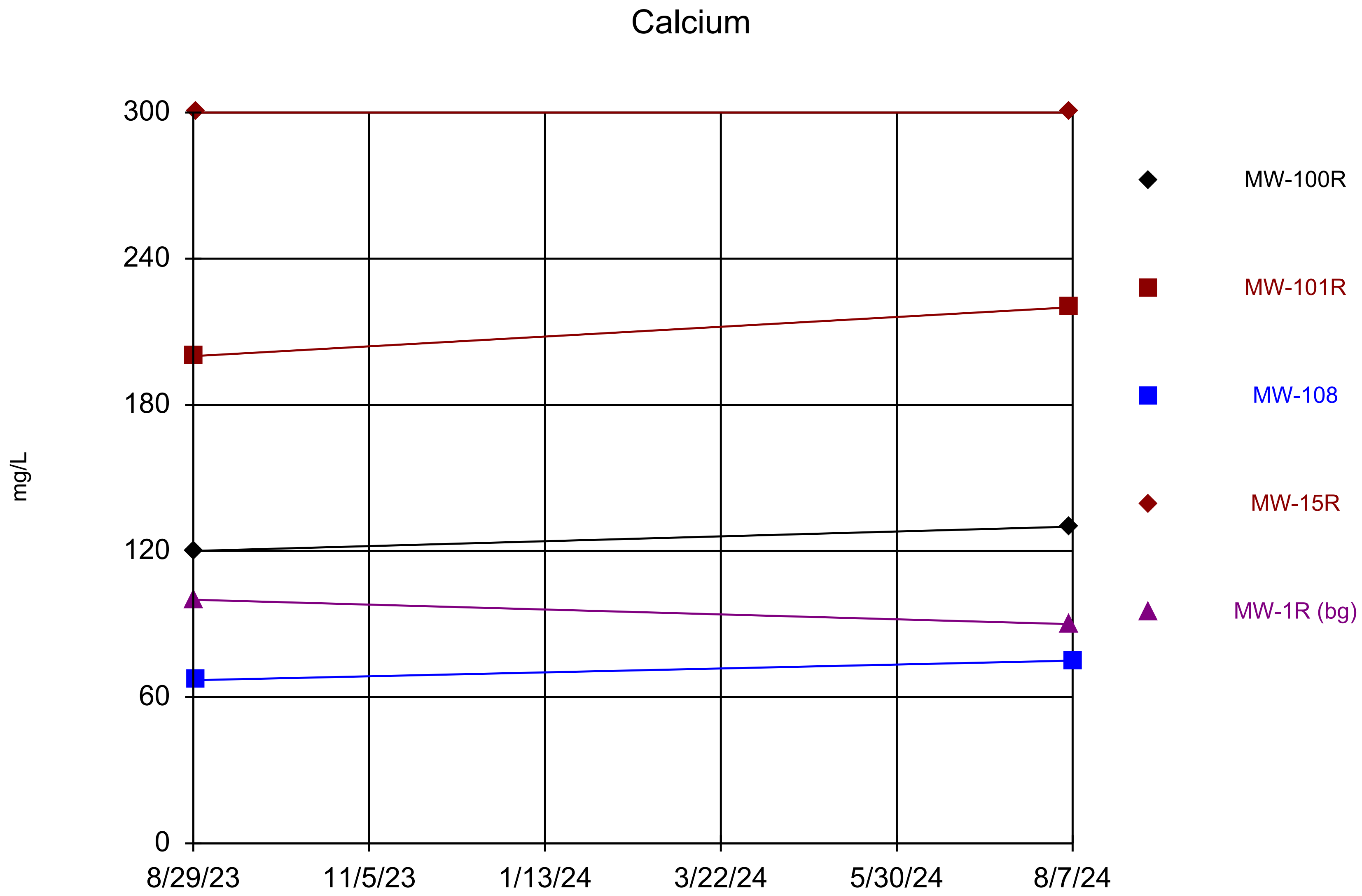
Time Series

Constituent: Boron (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	51.8 (J)	733	302	1380	1170	76 (J)
8/16/2018	64.2 (J)	855	338	1310	1110	
4/6/2019						110 (J)
8/7/2019	<110	660 (B)	310 (B)	1000 (B)	580 (B)	110 (J,B)
8/24/2020	86 (J)	710	320		800	<80
8/25/2020				1300		
8/10/2021					650	<58
8/11/2021	65 (J)	730	310			
8/12/2021				1100		
8/23/2022						65 (J)
8/24/2022	130	630	300	730		
8/29/2023	<76 (U)	620				<76 (U)
8/30/2023			230	590		
8/6/2024	<76	720		380		<76
8/7/2024			300			

ND substitution: RL or RL/2 if <15% NDs.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Calcium (mg/L) Analysis Run 10/23/2024 2:20 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-1R (bg)
8/29/2023	120	200			100
8/30/2023			67	300	
8/6/2024	130	220		300	90
8/7/2024			75		

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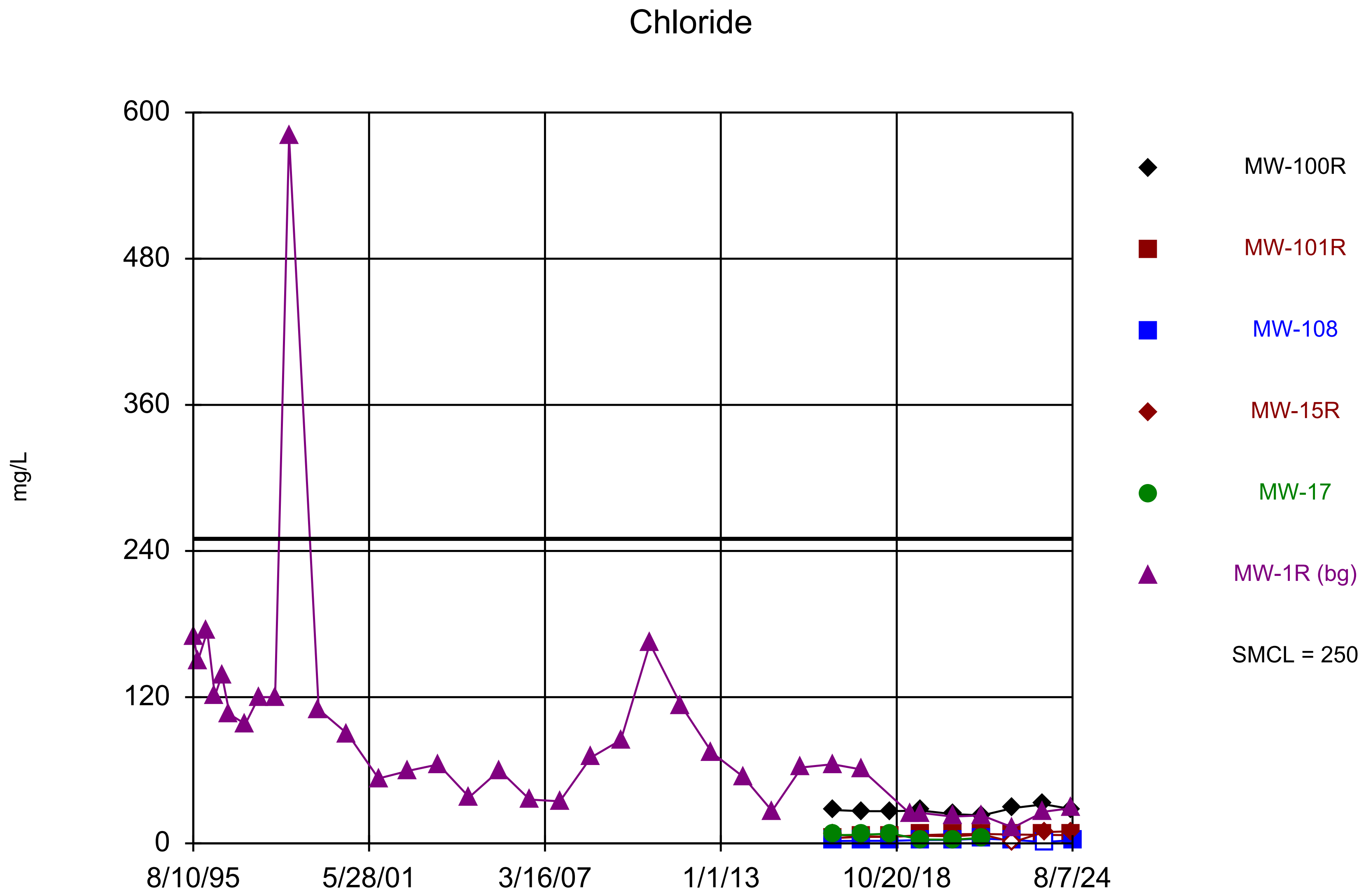
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Chloride (mg/L) Analysis Run 10/23/2024 2:20 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/10/1995						170
10/6/1995						150
1/25/1996						174
4/26/1996						121
7/19/1996						138.3
10/21/1996						106
4/28/1997						98
10/6/1997						120
4/22/1998						120
10/7/1998						580 (X)
9/29/1999						110
9/13/2000						89.6
9/19/2001						53.3
9/11/2002						59.5
9/10/2003						64.8
9/15/2004						37.9
9/14/2005						60
9/13/2006						35.9
9/12/2007						34.5
9/17/2008						70.4
9/16/2009						84.9
8/31/2010						164
9/13/2011						113
9/18/2012						74.4
9/27/2013						54.7
9/10/2014						26.6
9/2/2015						62.4
9/7/2016	27.4	4.3	2	7.4	6.7	64.9
8/24/2017	26.4	5.3	2.1	5.6	7	60.6
8/16/2018	26.4	5.3	2.1	5.5	8	
4/6/2019						24
8/7/2019	27	6.7	2.7 (J)	6.3	3.2 (J)	25
8/24/2020	24	7.5	2.8 (J)		3.1 (J)	22
8/25/2020				5.7		
8/10/2021					4.4 (J)	23
8/11/2021	23	7.7	3.9 (J)			
8/12/2021				7.3		
8/23/2022						13
8/24/2022	29	7.3	2.8 (J)	<2.3 (U)		
8/29/2023	32	6.9				26
8/30/2023			<2.3 (U)	9.2		
8/6/2024	28	6.7		10		29
8/7/2024			2.6 (J)			

ND substitution: RL or RL/2 if <15% NDs.

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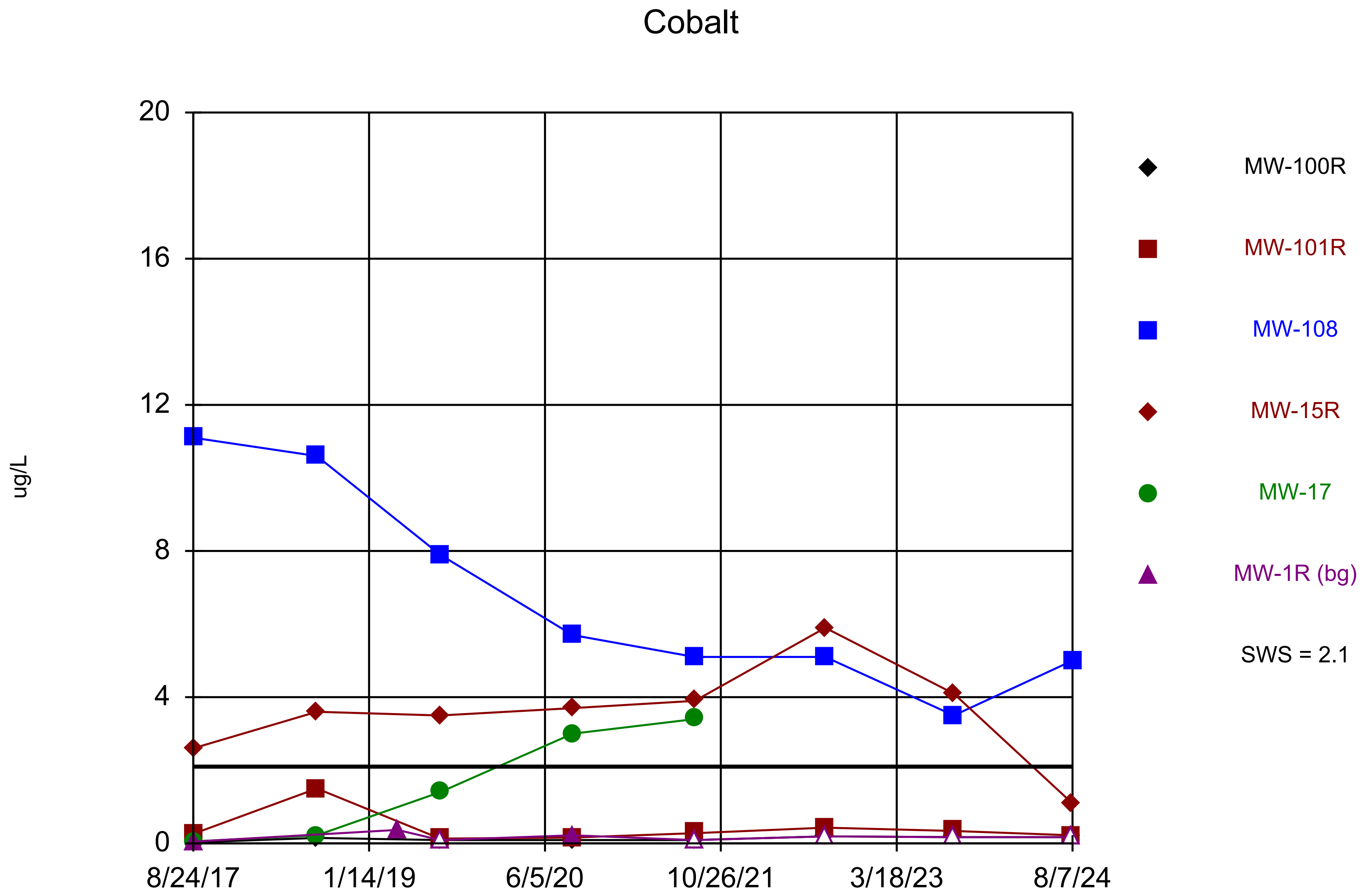
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Cobalt (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.028 (J)	0.26 (J)	11.1	2.6	0.054 (J)	0.049 (J)
8/16/2018	<0.15	1.5	10.6	3.6	0.22 (J)	
4/6/2019						0.37 (J)
8/7/2019	<0.091	0.13 (J)	7.9	3.5	1.4	<0.091
8/24/2020	<0.091	0.16 (J)	5.7		3	0.22 (J)
8/25/2020				3.7		
8/10/2021					3.4	<0.091
8/11/2021	<0.091	0.28 (J)	5.1			
8/12/2021				3.9		
8/23/2022						<0.19 (U)
8/24/2022	<0.19 (U)	0.43 (J)	5.1	5.9		
8/29/2023	<0.17 (U)	0.34 (J)				<0.17 (U)
8/30/2023			3.5	4.1		
8/6/2024	<0.17	0.22 (J)		1.1		<0.17
8/7/2024			5			

ND substitution: RL or RL/2 if <15% NDs.

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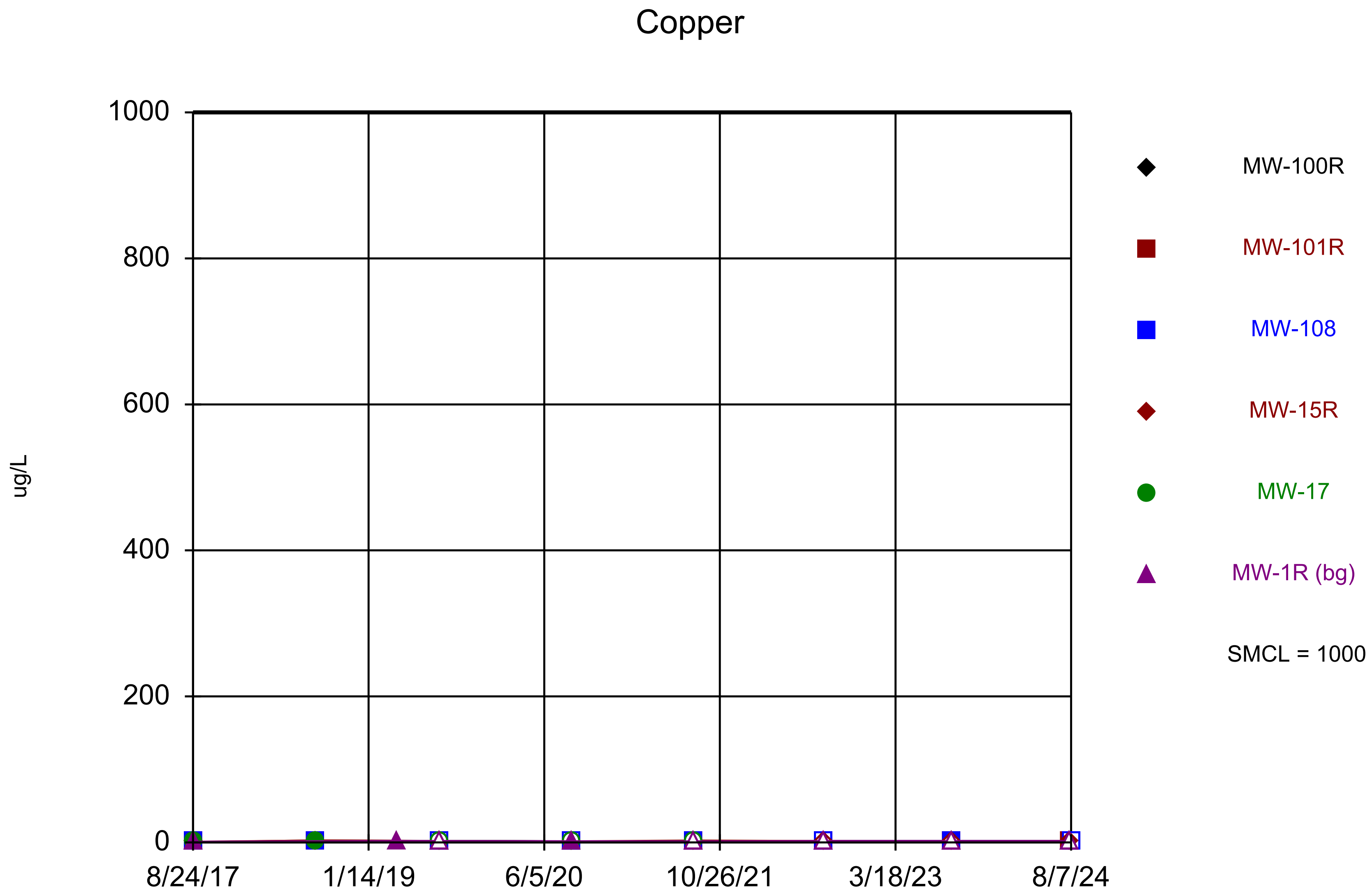
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Copper (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.32 (J)	0.92 (J)	0.61 (J)	0.38 (J)	0.52 (J)	0.99 (J)
8/16/2018	0.74 (J)	2.6	0.57 (J)	2.7	0.66 (J)	
4/6/2019						2.1 (J)
8/7/2019	<2	<2	<2	<2	<2	<2
8/24/2020	<1.5	<1.5	<1.5		<1.5	1.6 (J)
8/25/2020				<1.5		
8/10/2021					<1.4	<1.4
8/11/2021	<1.4	<1.4	1.7 (J)			
8/12/2021				2.5 (J)		
8/23/2022						<1.8 (U)
8/24/2022	<1.8 (U)	<1.8 (U)	<1.8 (U)	<1.8 (U)		
8/29/2023	1.8 (J)	<1.8 (U)				<1.8 (U)
8/30/2023			2 (J)	<1.8 (U)		
8/6/2024	<1.8	2 (J)		1.8 (J)		<1.8
8/7/2024			<1.8			

ND substitution: RL or RL/2 if <15% NDs.

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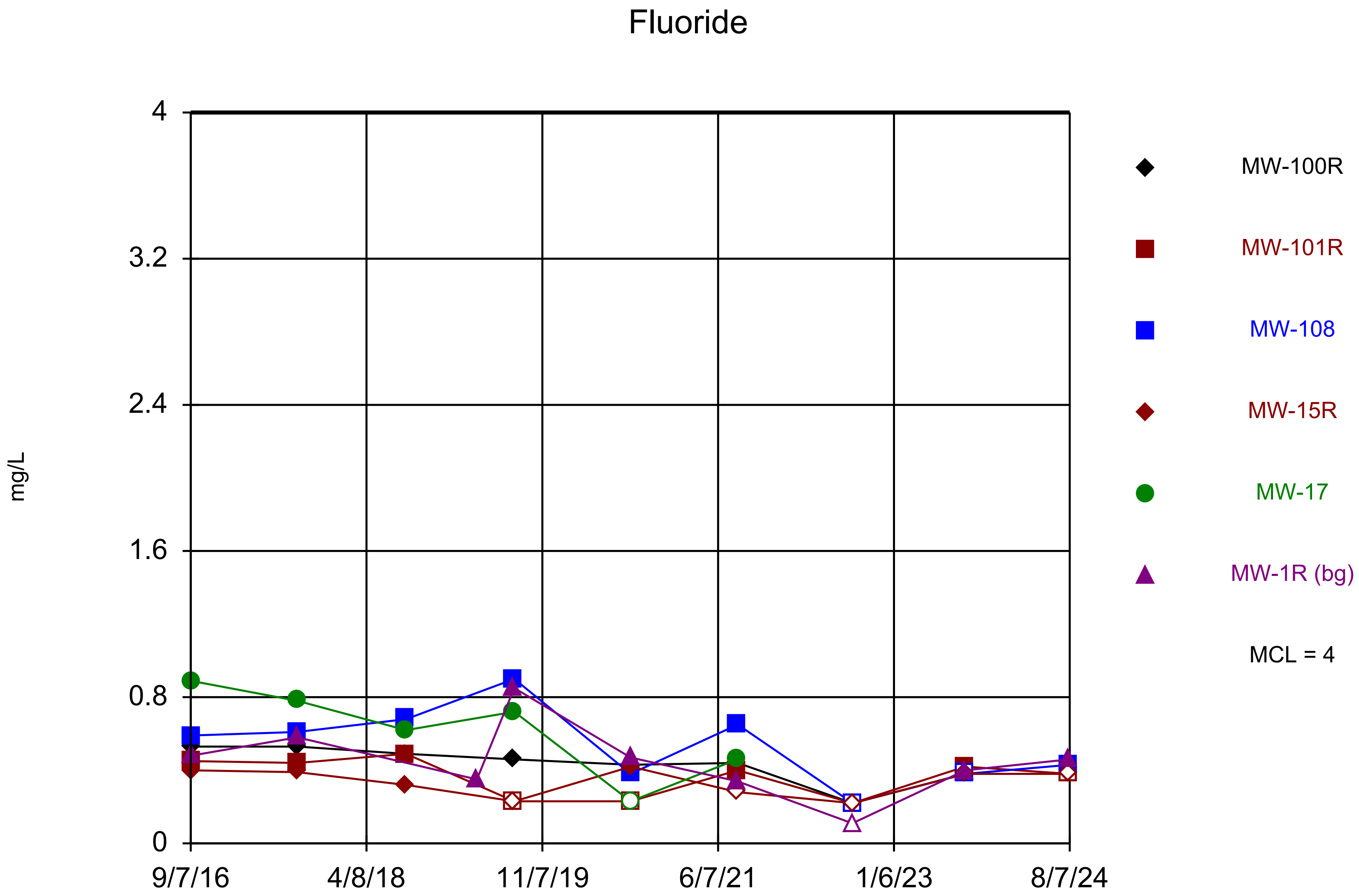
Hollow symbols indicate censored values.



Time Series   Analysis Run 10/23/2024 2:06 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

Constituent: Fluoride (mg/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
9/7/2016	0.53	0.45	0.59	0.4	0.89	0.48
8/24/2017	0.53	0.44	0.61	0.39	0.78	0.58
8/16/2018	0.49	0.49	0.68	0.32	0.62	
4/6/2019						0.35 (J)
8/7/2019	0.46 (J)	<0.23	0.9	<0.23	0.72	0.85
8/24/2020	0.43 (J)	<0.23	0.38 (J)		<0.23	0.47 (J)
8/25/2020				0.42 (J)		
8/10/2021					0.46 (J)	0.34 (J)
8/11/2021	0.44 (J)	0.4 (J)	0.65			
8/12/2021				<0.28		
8/23/2022						<0.22 (U)
8/24/2022	<0.22 (U)	<0.22 (U)	<0.22 (U)	<0.22 (U)		
8/29/2023	<0.38 (U)	0.42 (J)				0.4 (J)
8/30/2023			<0.38 (U)	<0.38 (U)		
8/6/2024	<0.38	<0.38		<0.38		0.46 (J)
8/7/2024			0.43 (J)			

ND substitution: RL or RL/2 if <15% NDs.

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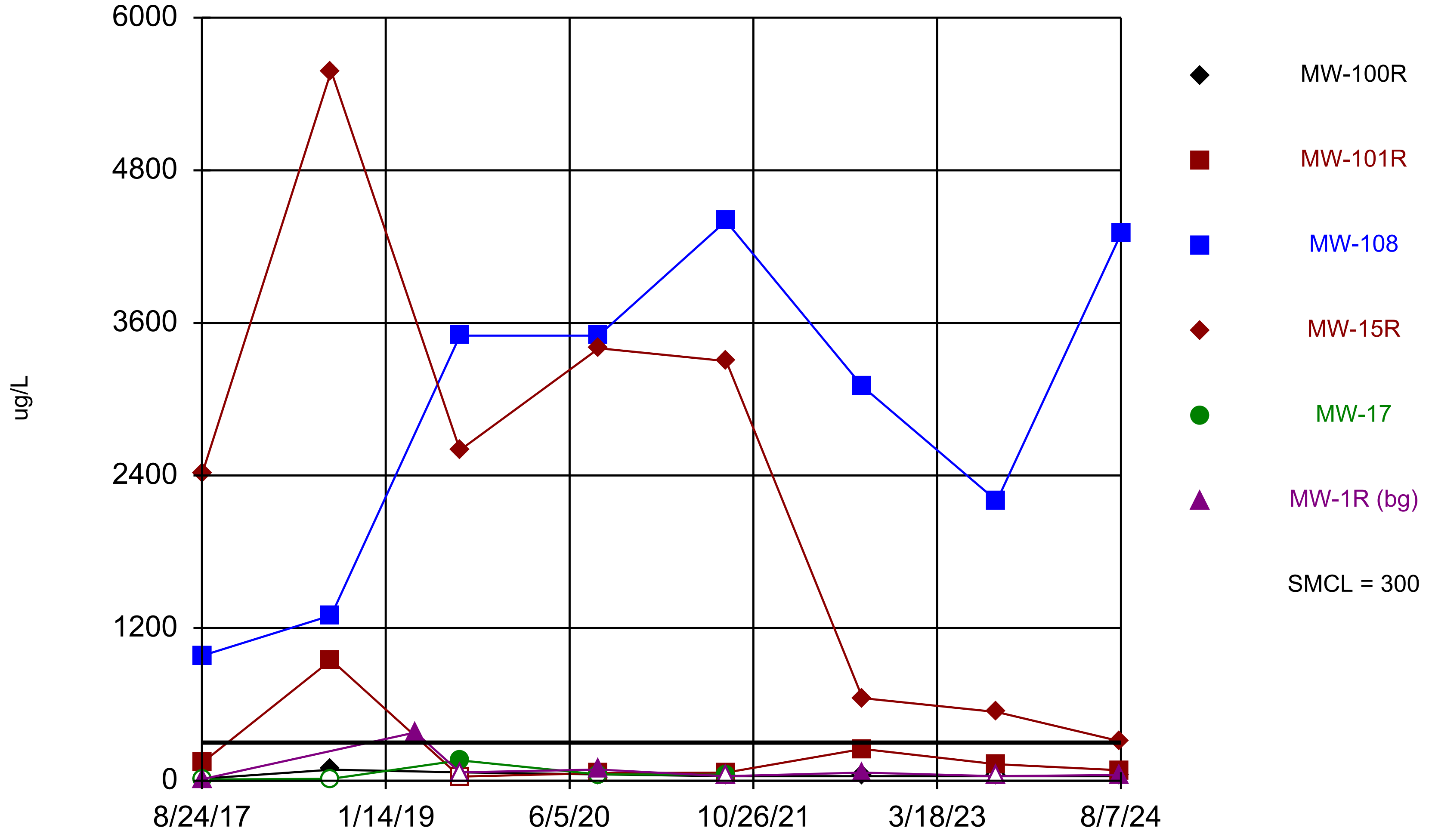
Hollow symbols indicate censored values.

Iron



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Iron (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	16.2 (J)	140	983	2410	<9.6	12.5 (J)
8/16/2018	86.3	949	1300	5580	<14.9	
4/6/2019						380
8/7/2019	<66	<66	3500	2600	160	<66
8/24/2020	<50	60 (J)	3500		<50	88 (J)
8/25/2020				3400		
8/10/2021					48 (J)	<36
8/11/2021	<36	64 (J)	4400			
8/12/2021				3300		
8/23/2022						64 (J)
8/24/2022	<36 (U)	250	3100	650		
8/29/2023	<36 (U)	130				<36 (U)
8/30/2023			2200	540		
8/6/2024	<36	82 (J)		310		46 (J)
8/7/2024			4300			

ND substitution: RL or RL/2 if <15% NDs.

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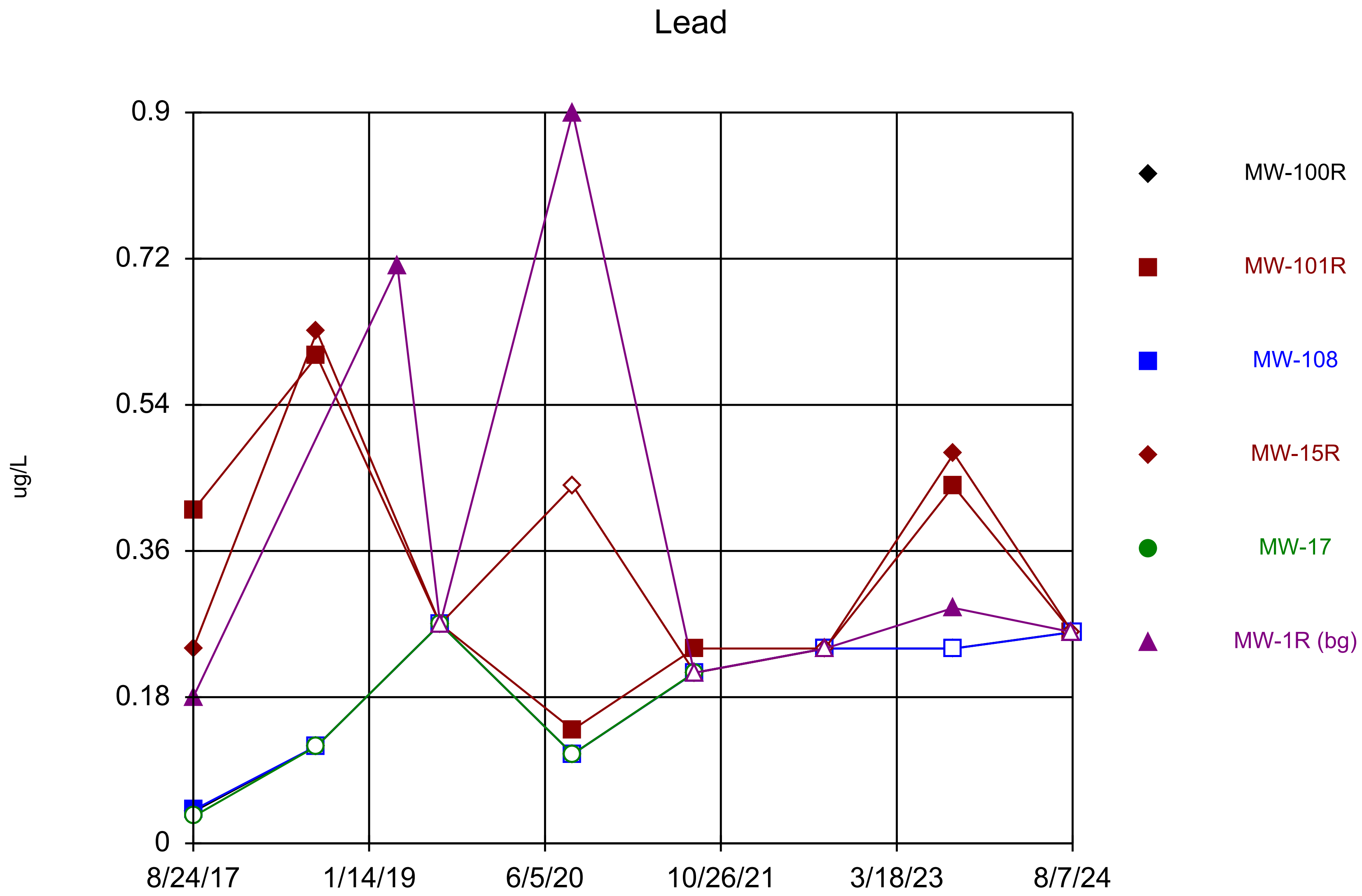
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

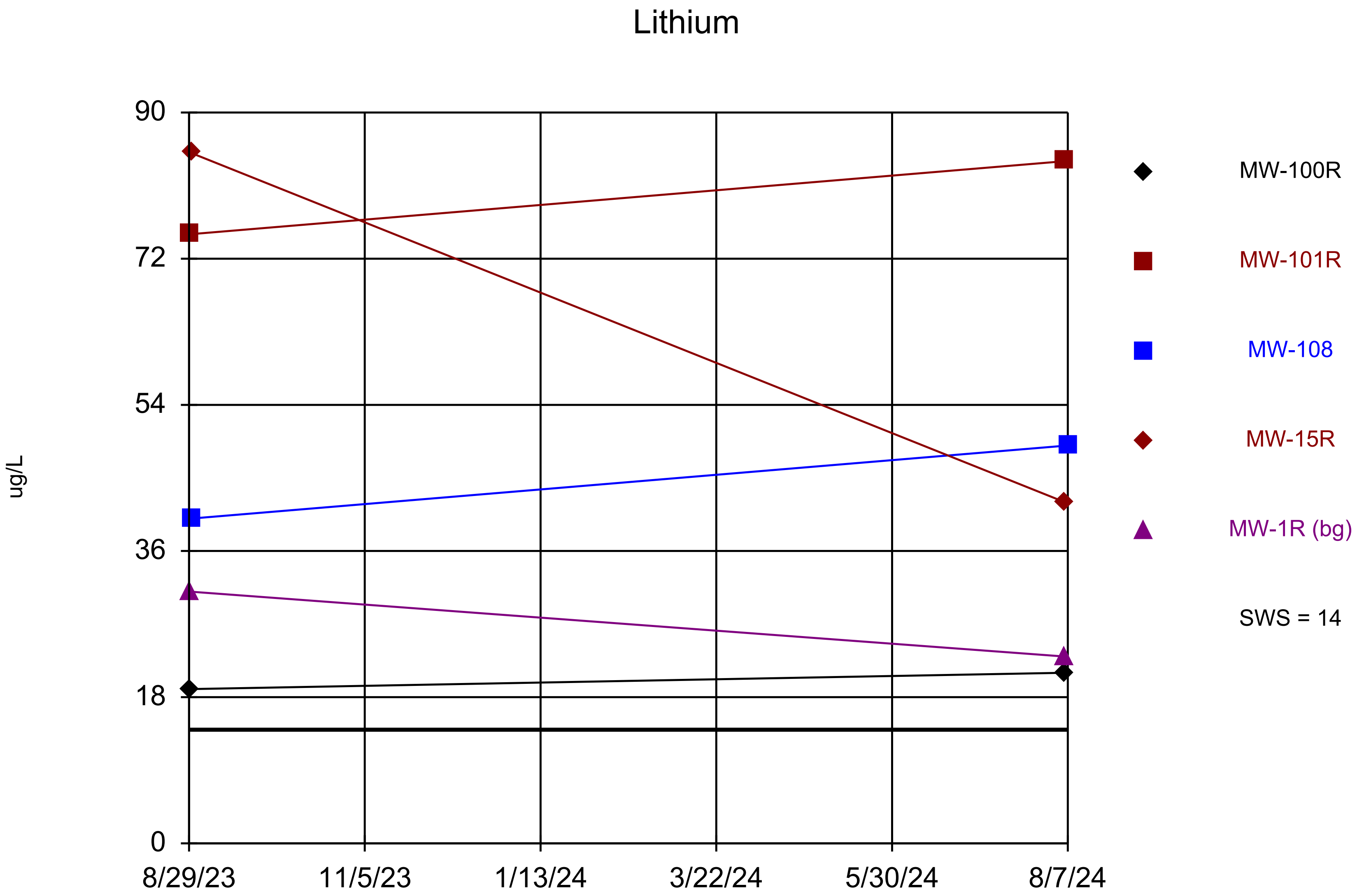
Time Series

Constituent: Lead (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.039 (J)	0.41 (J)	0.041 (J)	0.24 (J)	<0.033	0.18 (J)
8/16/2018	<0.12	0.6 (J)	<0.12	0.63 (J)	<0.12	
4/6/2019						0.71
8/7/2019	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27
8/24/2020	<0.11	0.14 (J)	<0.11		<0.11	0.9
8/25/2020				<0.44		
8/10/2021					<0.21	<0.21
8/11/2021	<0.21	0.24 (J)	<0.21			
8/12/2021				<0.21		
8/23/2022						<0.24 (U)
8/24/2022	<0.24 (U)	<0.24 (U)	<0.24 (U)	<0.24 (U)		
8/29/2023	0.24 (JB)	0.44 (JB)				0.29 (JB)
8/30/2023			<0.24 (U)	0.48 (JB)		
8/6/2024	<0.26	<0.26		<0.26		<0.26
8/7/2024			<0.26			

ND substitution: RL or RL/2 if <15% NDs.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Lithium (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-1R (bg)
8/29/2023	19	75			31
8/30/2023			40	85	
8/6/2024	21	84		42	23
8/7/2024			49		

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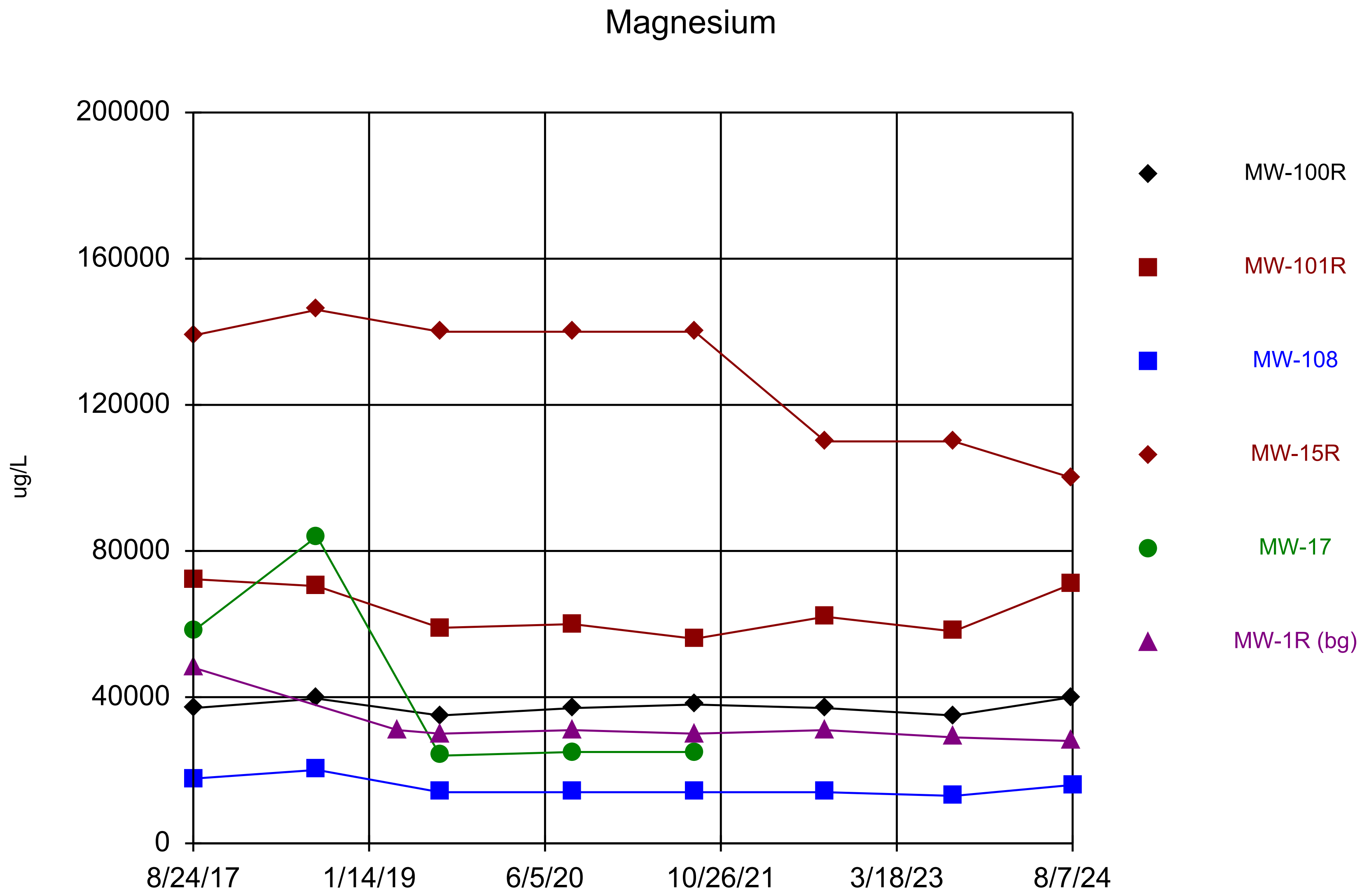

Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Magnesium (ug/L) Analysis Run 10/23/2024 2:20 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	37000	72300	17700	139000	58100	48100
8/16/2018	39600	70400	20100	146000	84000	
4/6/2019						31000
8/7/2019	35000	59000	14000	140000	24000	30000
8/24/2020	37000	60000	14000		25000	31000
8/25/2020				140000		
8/10/2021					25000	30000
8/11/2021	38000	56000	14000			
8/12/2021				140000		
8/23/2022						31000
8/24/2022	37000	62000	14000	110000		
8/29/2023	35000	58000				29000
8/30/2023			13000	110000		
8/6/2024	40000	71000		100000		28000
8/7/2024			16000			

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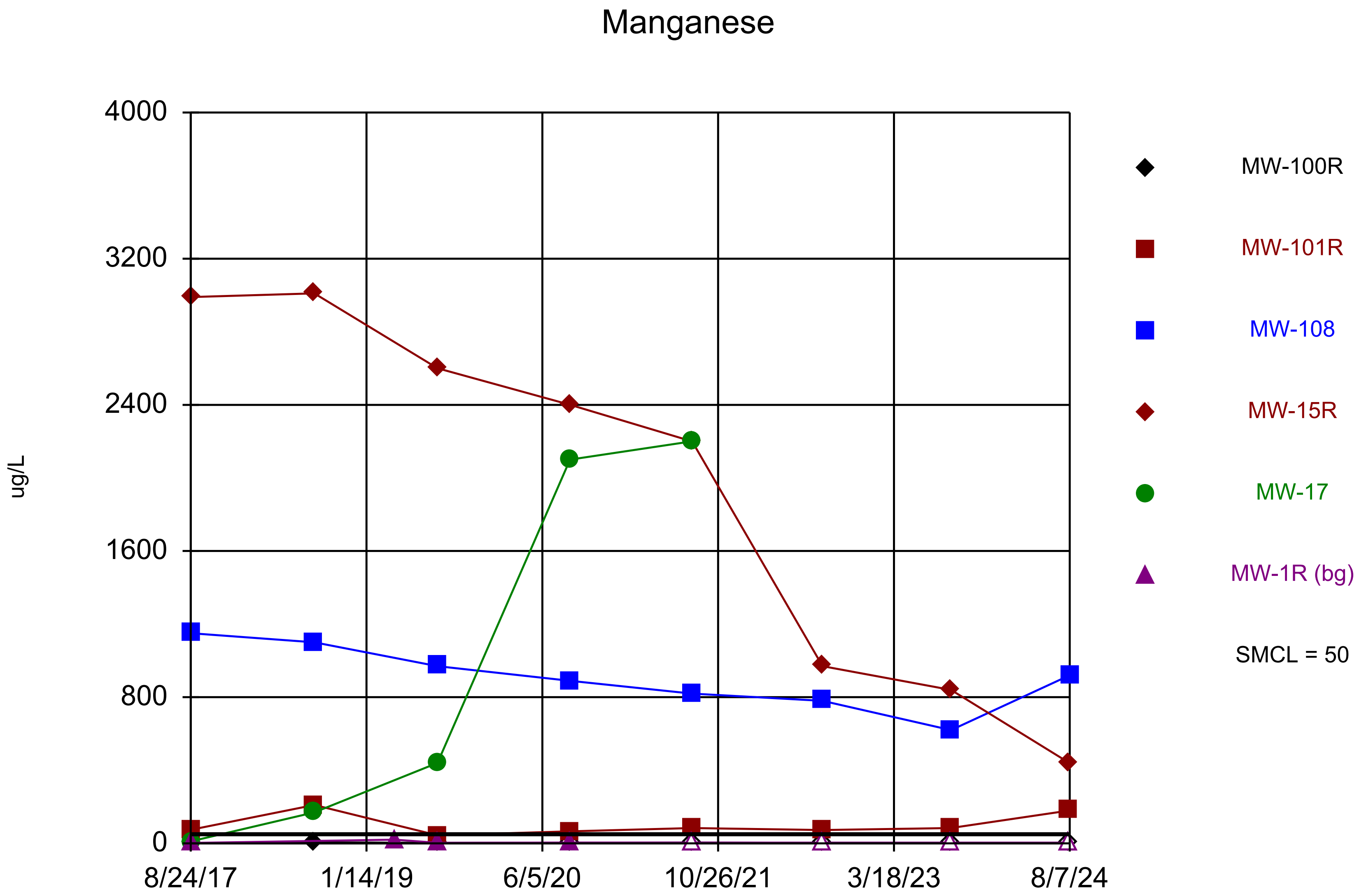
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Manganese (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.9 (J)	74.1	1150	2990	10.8	2
8/16/2018	5.6	210	1100	3010	170	
4/6/2019						20
8/7/2019	<2.5	44	970	2600	440	2.8 (J)
8/24/2020	<4	66	890		2100	4.7 (J)
8/25/2020				2400		
8/10/2021					2200	<4.4
8/11/2021	<4.4	84	820			
8/12/2021				2200		
8/23/2022						<3.6 (U)
8/24/2022	<3.6 (U)	73	780	970		
8/29/2023	<3.6 (U)	84				<3.6 (U)
8/30/2023			620	840		
8/6/2024	<3.6	180		440		<3.6
8/7/2024			920			

ND substitution: RL or RL/2 if <15% NDs.

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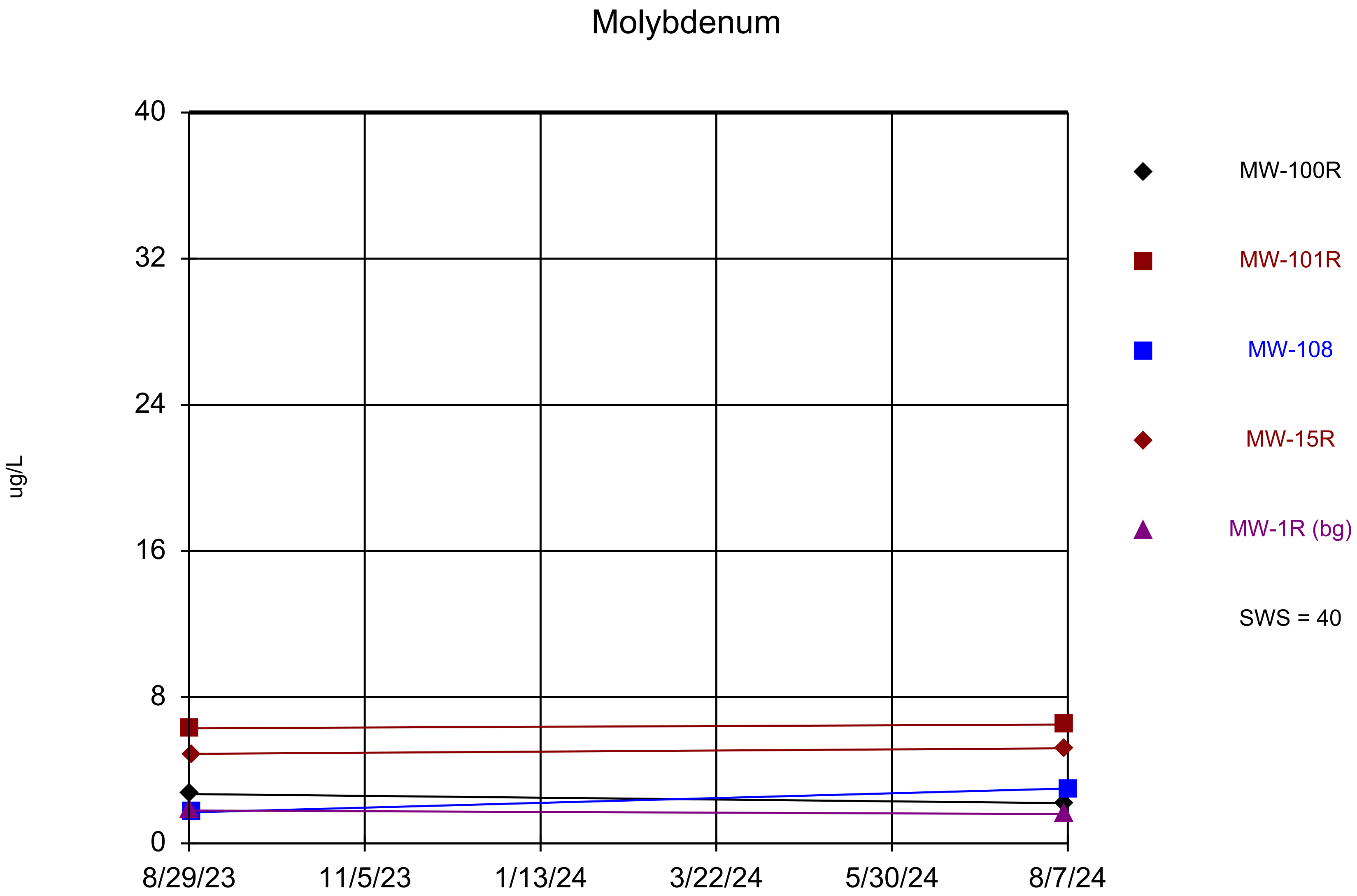

Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Molybdenum (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-1R (bg)
8/29/2023	2.7	6.3			1.8 (J)
8/30/2023			1.7 (J)	4.9	
8/6/2024	2.2	6.5		5.2	1.6 (J)
8/7/2024			3		

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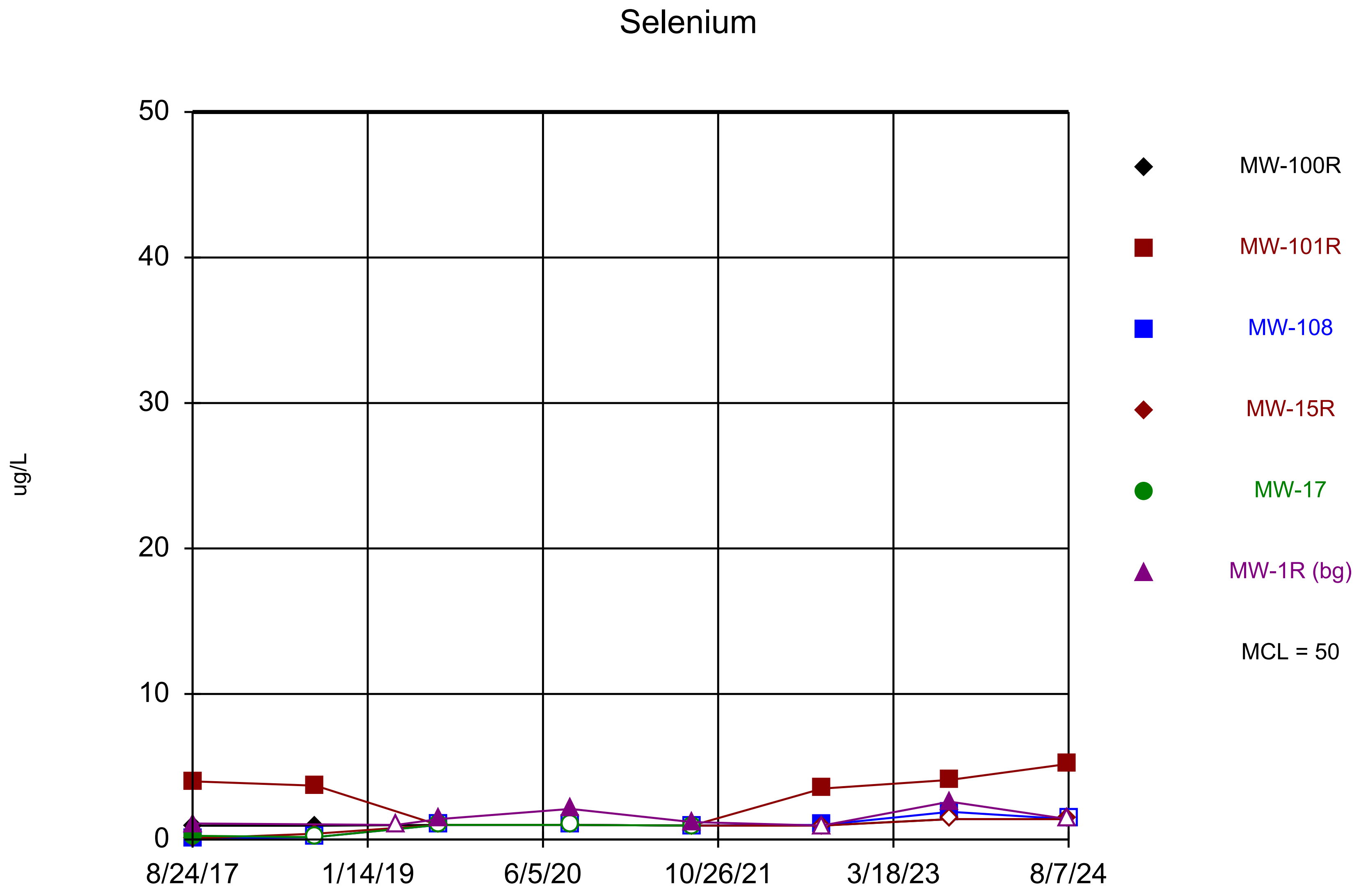
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

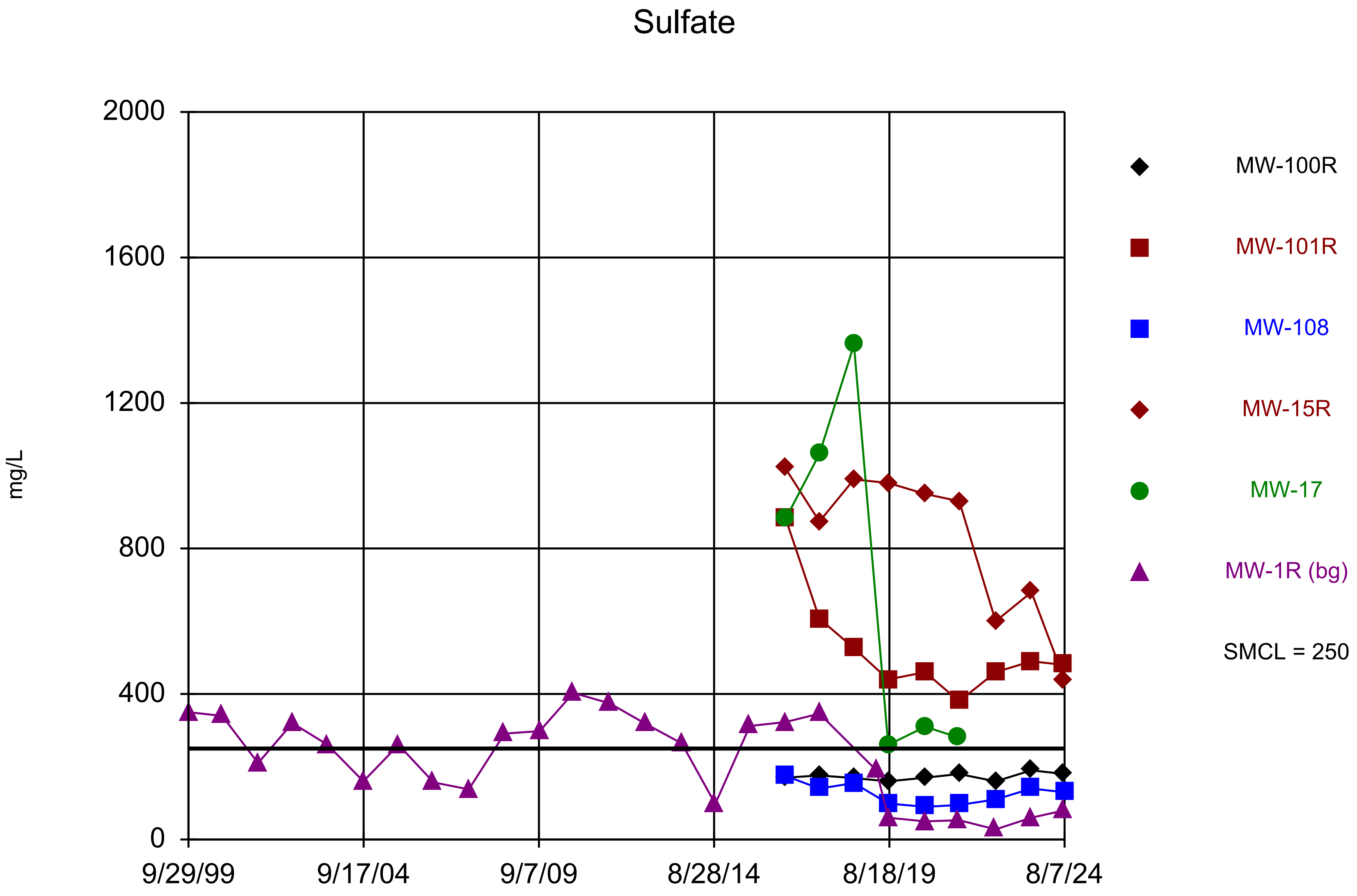
Time Series

Constituent: Selenium (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.95 (J)	4	0.089 (J)	<0.086	0.25 (J)	1.1
8/16/2018	0.95 (J)	3.7	<0.16	0.4 (J)	<0.16	
4/6/2019						<1
8/7/2019	<1	1 (J)	<1	<1	<1	1.4 (J)
8/24/2020	<1	<1	<1		<1	2.1 (J)
8/25/2020				<1		
8/10/2021					<0.96	1.2 (J)
8/11/2021	<0.96	<0.96	<0.96			
8/12/2021				<0.96		
8/23/2022						<0.96 (U)
8/24/2022	0.97 (J)	3.5 (J)	1 (J)	<0.96 (U)		
8/29/2023	1.4 (J)	4.1 (J)				2.6 (J)
8/30/2023			1.9 (J)	<1.4 (U)		
8/6/2024	<1.4	5.2		1.4 (J)		<1.4
8/7/2024			<1.4			

ND substitution: RL or RL/2 if <15% NDs.



Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Sulfate (mg/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
9/29/1999						350
9/13/2000						340
9/19/2001						210
9/11/2002						320
9/10/2003						260
9/15/2004						160
9/14/2005						260
9/13/2006						157
9/12/2007						138
9/17/2008						291
9/16/2009						298
8/31/2010						403
9/13/2011						374
9/18/2012						318
9/27/2013						264
9/10/2014						97.8
9/2/2015						312
9/7/2016	170	883	175	1020	881	323
8/24/2017	176	607	140	874	1060	346
8/16/2018	169	526	155	990	1360	
4/6/2019						190
8/7/2019	160	440	99	980	260	60
8/24/2020	170	460	90		310	50
8/25/2020				950		
8/10/2021					280	53
8/11/2021	180	380	95			
8/12/2021				930		
8/23/2022						28
8/24/2022	160	460	110	600		
8/29/2023	190	490				60
8/30/2023			140	680		
8/6/2024	180	480		440		80
8/7/2024			130			

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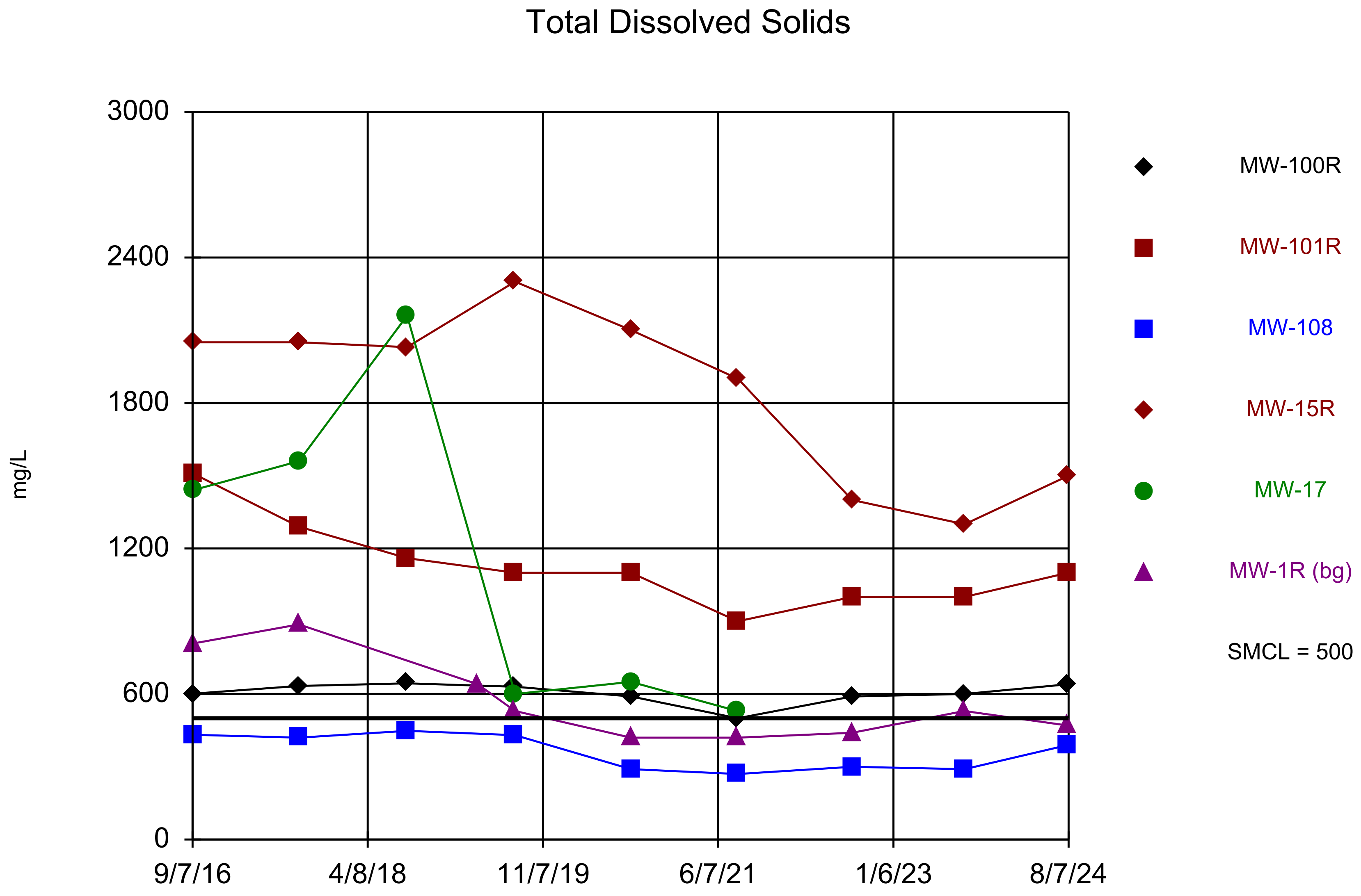

Time Series Analysis Run 10/23/2024 2:06 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Total Dissolved Solids (mg/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
9/7/2016	601	1510	432	2050	1440	808
8/24/2017	633	1290	420	2050	1560	887
8/16/2018	644	1160	448	2030	2160	
4/6/2019						640
8/7/2019	630	1100	430	2300	600	530
8/24/2020	590	1100	290		650	420
8/25/2020				2100		
8/10/2021					530	420
8/11/2021	500	900	270			
8/12/2021				1900		
8/23/2022						440
8/24/2022	590	1000	300	1400		
8/29/2023	600	1000				530
8/30/2023			290	1300		
8/6/2024	640	1100		1500		470
8/7/2024			390			

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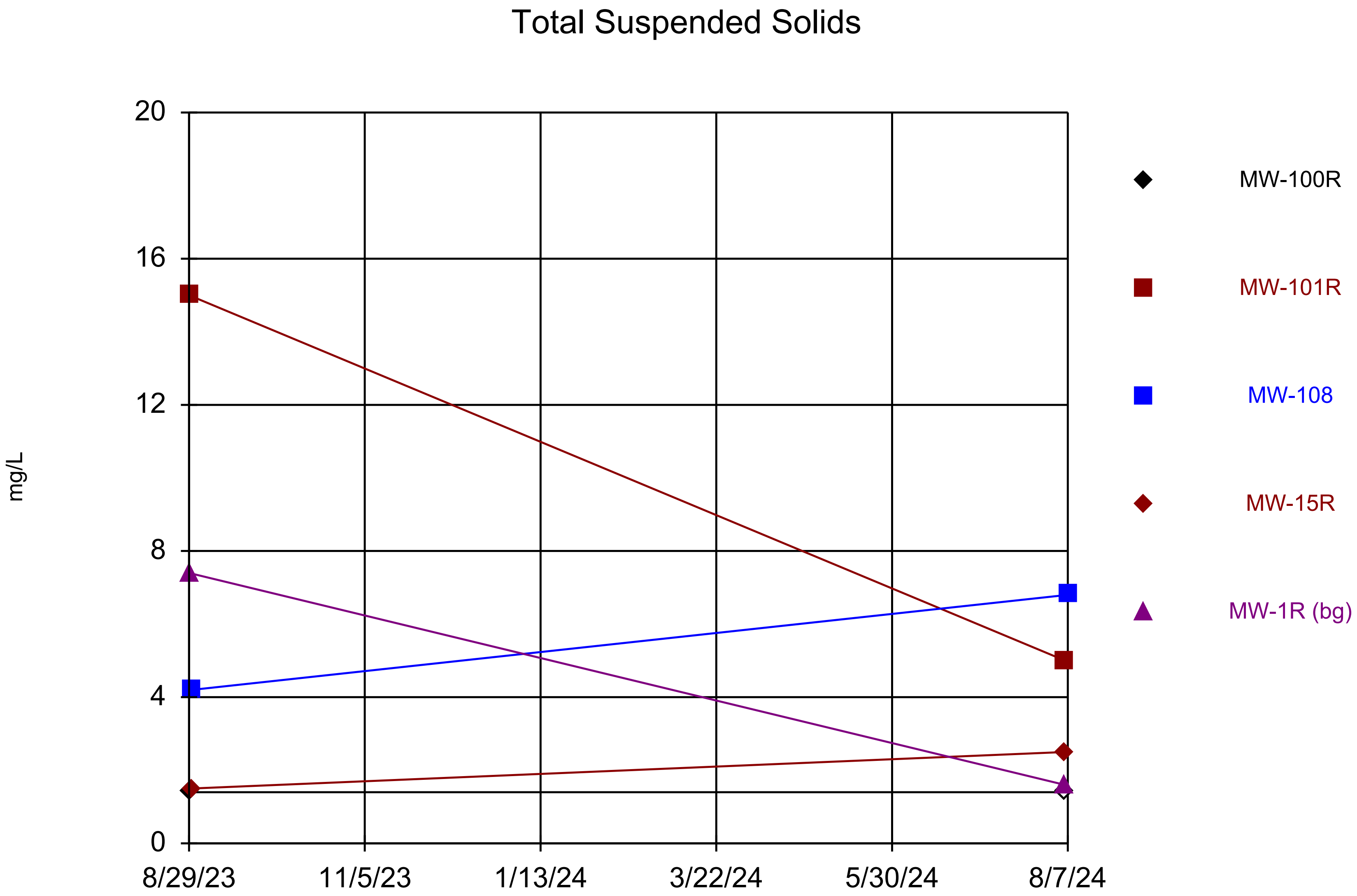
Hollow symbols indicate censored values.



Time Series   Analysis Run 10/23/2024 2:06 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

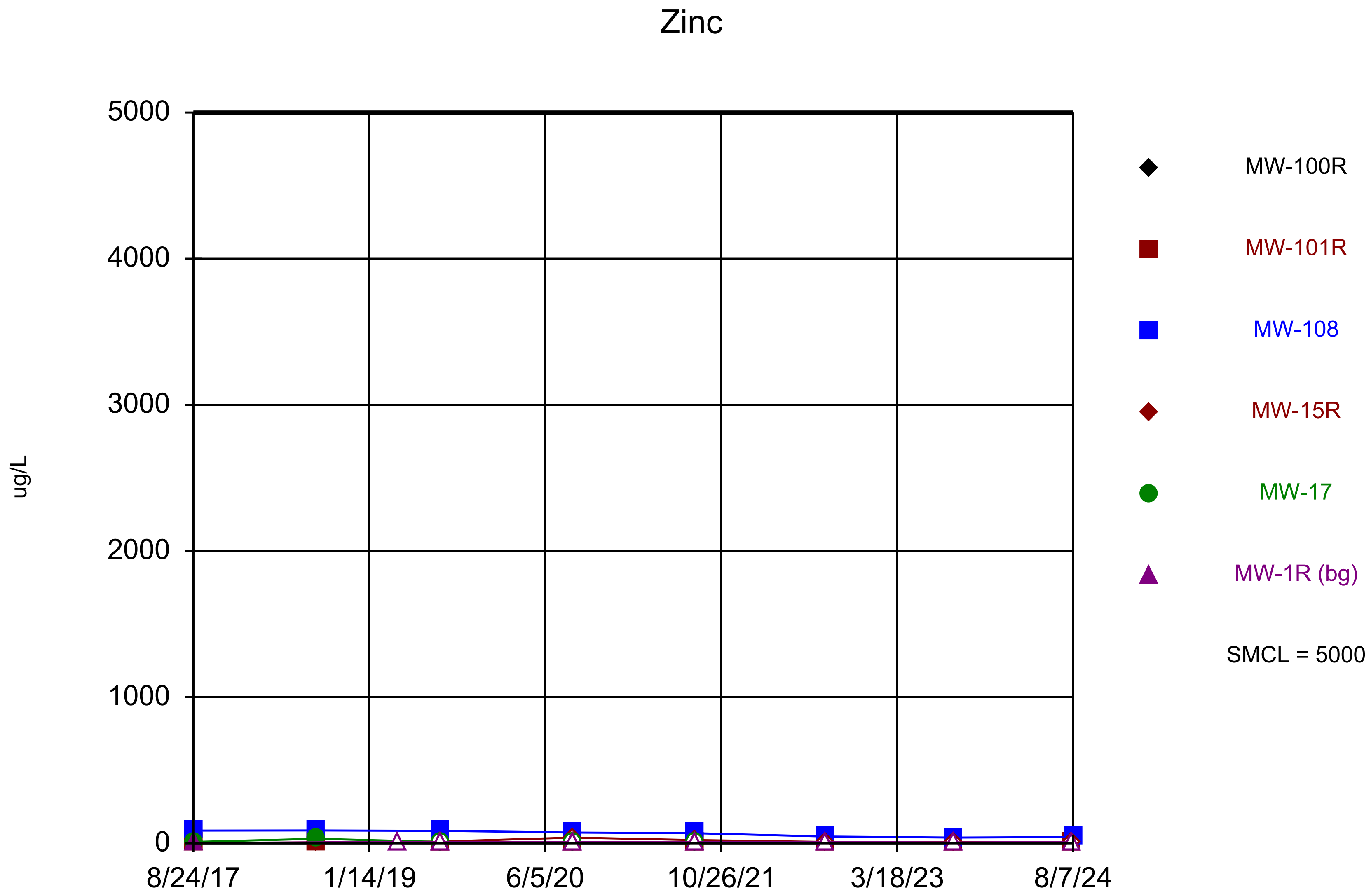
Constituent: Total Suspended Solids (mg/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-1R (bg)
8/29/2023	1.4 (J)	15			7.4
8/30/2023			4.2	1.5 (J)	
8/6/2024	<1.4	5		2.5	1.6 (J)
8/7/2024			6.8		

ND substitution: RL or RL/2 if <15% NDs.

Sanitas™ v.10.0.16 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.



Time Series   Analysis Run 10/23/2024 2:06 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

Constituent: Zinc (ug/L)   Analysis Run 10/23/2024 2:20 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-101R	MW-108	MW-15R	MW-17	MW-1R (bg)
8/24/2017	0.88 (J)	1.8 (J)	87.8	1.5 (J)	10.4	2.4 (J)
8/16/2018	<3.7	6.7 (J)	88.1	6 (J)	31.4	
4/6/2019						<10
8/7/2019	<10	<10	86	13 (J)	<10	<10
8/24/2020	<10	<10	74		<10	<10
8/25/2020				<40		
8/10/2021					<10	<10
8/11/2021	<10	<10	70			
8/12/2021				23		
8/23/2022						<10 (U)
8/24/2022	<10 (U)	<10 (U)	47	<10 (U)		
8/29/2023	<6.4 (U)	<6.4 (U)				<6.4 (U)
8/30/2023			40	<6.4 (U)		
8/6/2024	<9.7	<9.7		<9.7		<9.7
8/7/2024			43			

ND substitution: RL or RL/2 if <15% NDs.

D2 – Times Series Graphs - Pennsylvanian

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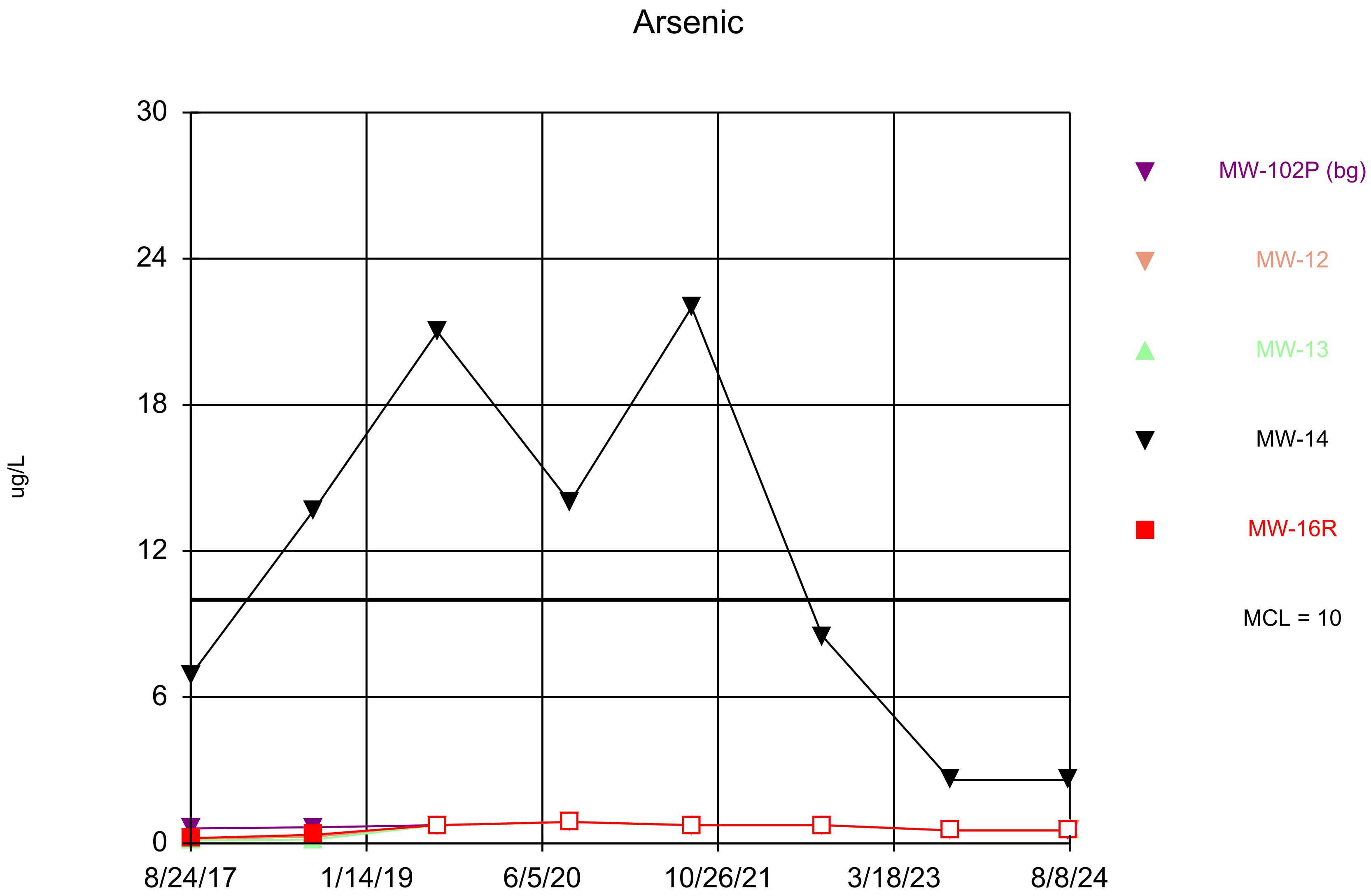
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Arsenic (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	0.61 (J)	0.19 (J)	0.12 (J)	6.9	0.21 (J)
8/16/2018	0.66 (J)	0.27 (J)	0.16 (J)	13.7	0.35 (J)
8/7/2019	<0.75	<0.75	<0.75	21	<0.75
8/24/2020	<0.88	<0.88	<0.88	14	
8/25/2020					<0.88
8/10/2021		<0.75			
8/11/2021	<0.75		<0.75	22	<0.75
8/24/2022	<0.75 (U)	<0.75 (U)	<0.75 (U)	8.5	<0.75 (U)
8/29/2023	<0.53 (U)	<0.53 (U)			<0.53 (U)
8/30/2023			<0.53 (U)	2.6	
8/7/2024	<0.53			2.6	<0.53
8/8/2024		<0.53	<0.53		

ND substitution: RL or RL/2 if <15% NDs.

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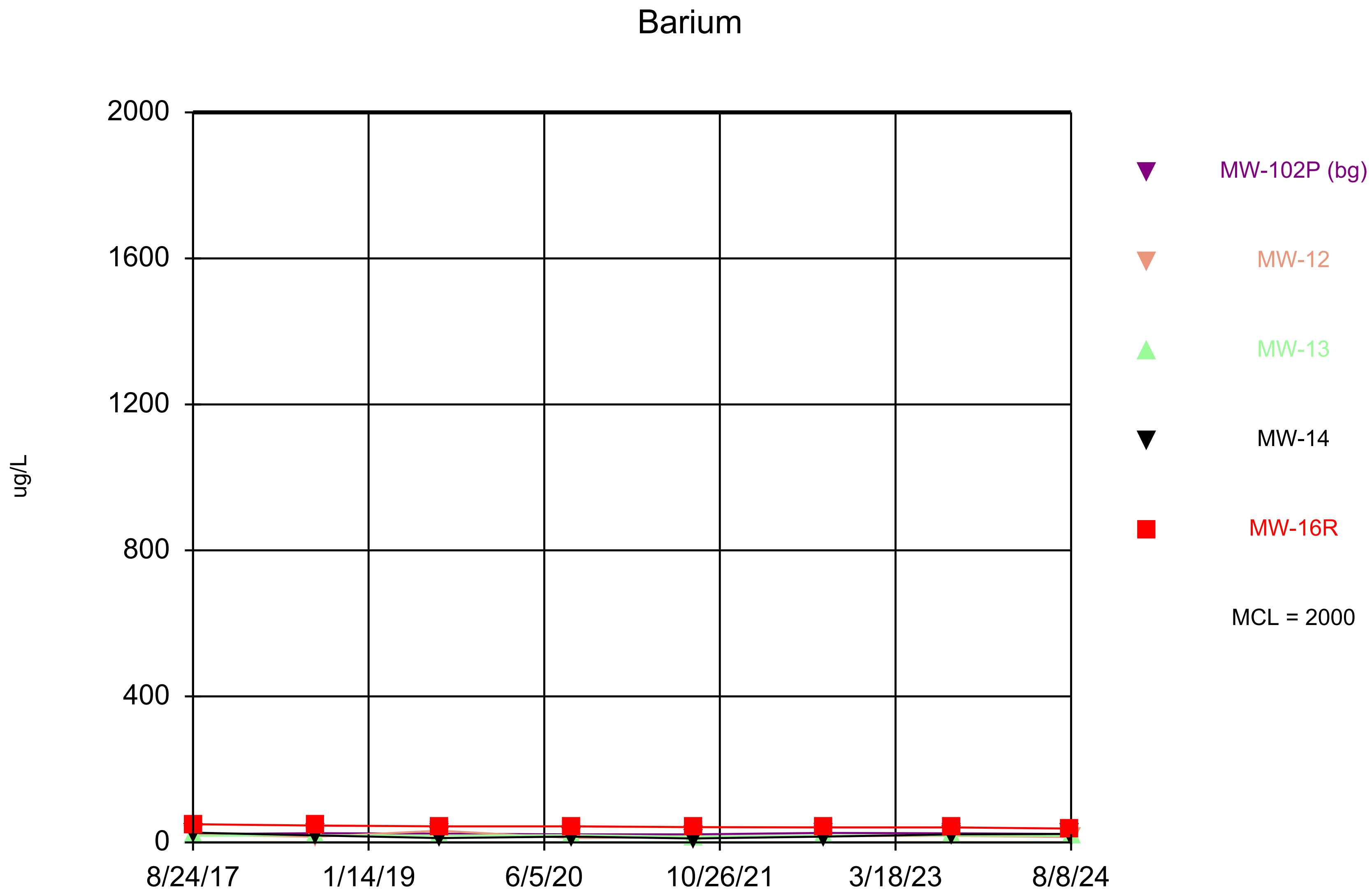

Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Barium (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	22.7	21	18.2	26.8	49.7
8/16/2018	25.2	15.5	19.9	19.3	46.4
8/7/2019	24	32	19	12	44
8/24/2020	22	12	20	16	
8/25/2020					44
8/10/2021		15 (B)			
8/11/2021	22 (B)		16 (B)	11 (B)	42 (B)
8/24/2022	26	17	19	16	41
8/29/2023	25	18			41
8/30/2023			19	22	
8/7/2024	23			23	38
8/8/2024		15	18		

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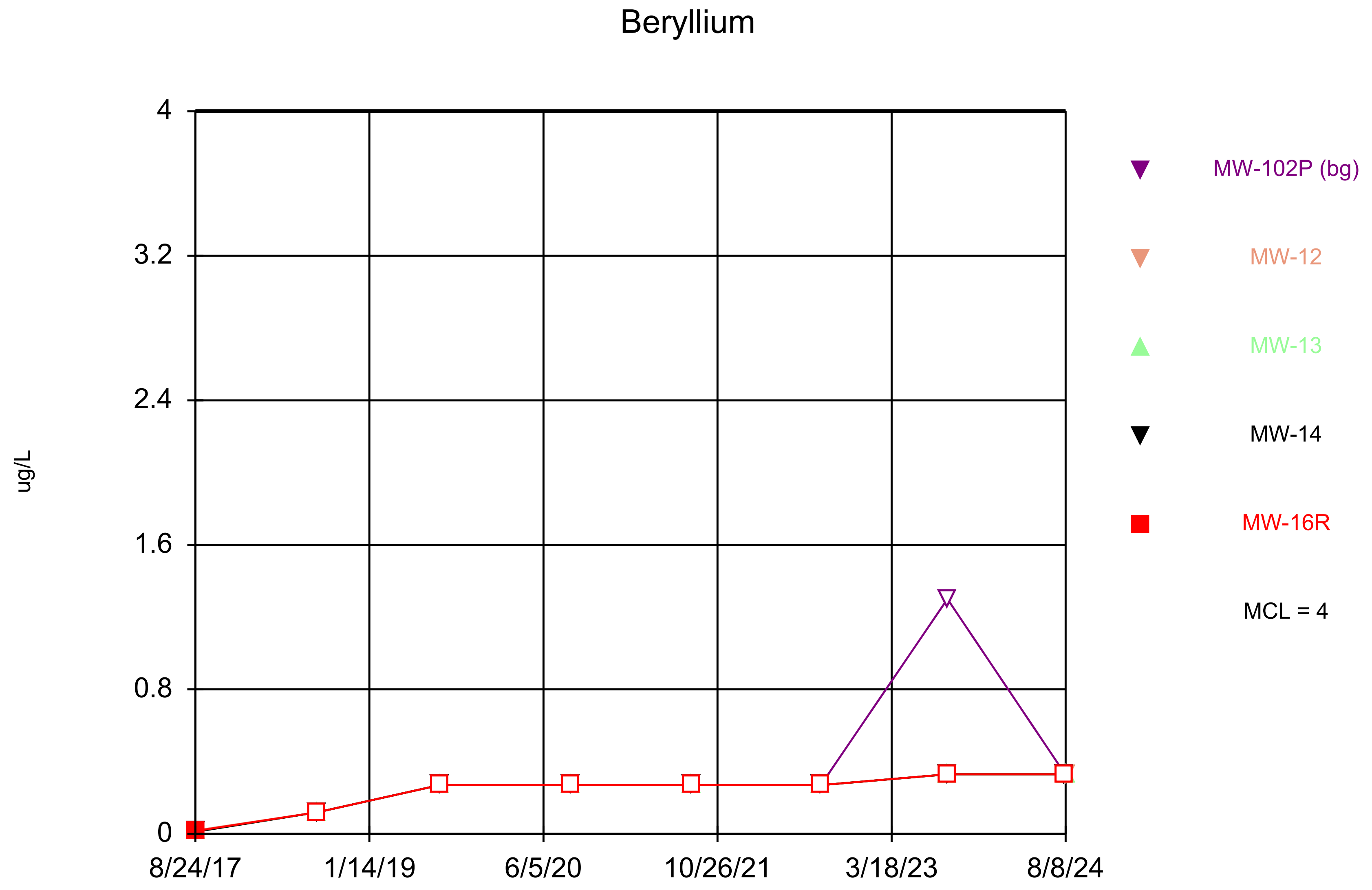
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

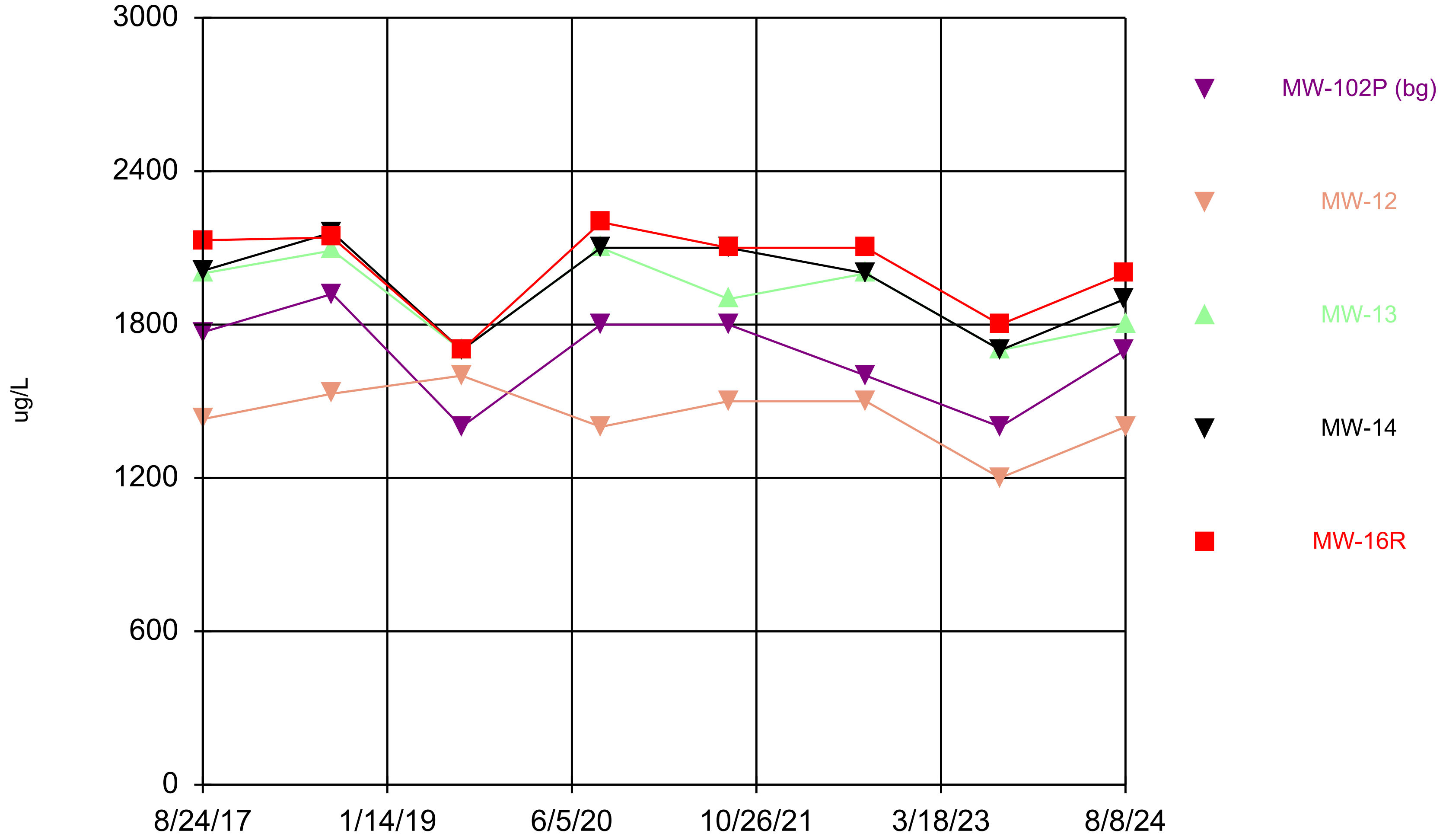
Constituent: Beryllium (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	0.013 (J)	0.019 (J)	<0.012	<0.012	0.016 (J)
8/16/2018	<0.12	<0.12	<0.12	<0.12	<0.12
8/7/2019	<0.27	<0.27	<0.27	<0.27	<0.27
8/24/2020	<0.27	<0.27	<0.27	<0.27	
8/25/2020					<0.27
8/10/2021		<0.27			
8/11/2021	<0.27		<0.27	<0.27	<0.27
8/24/2022	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)
8/29/2023	<1.3 (U)	<0.33 (U)			<0.33 (U)
8/30/2023			<0.33 (U)	<0.33 (U)	
8/7/2024	<0.33			<0.33	<0.33
8/8/2024		<0.33	<0.33		

ND substitution: RL or RL/2 if <15% NDs.

Boron



Time Series   Analysis Run 10/23/2024 2:24 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

Constituent: Boron (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	1770	1430	2000	2010	2130
8/16/2018	1920	1530	2090	2160	2140
8/7/2019	1400 (B)	1600 (B)	1700 (B)	1700 (B)	1700 (B)
8/24/2020	1800	1400	2100	2100	
8/25/2020					2200
8/10/2021		1500			
8/11/2021	1800		1900	2100	2100
8/24/2022	1600	1500	2000	2000	2100
8/29/2023	1400	1200			1800
8/30/2023			1700	1700	
8/7/2024	1700			1900	2000
8/8/2024		1400	1800		

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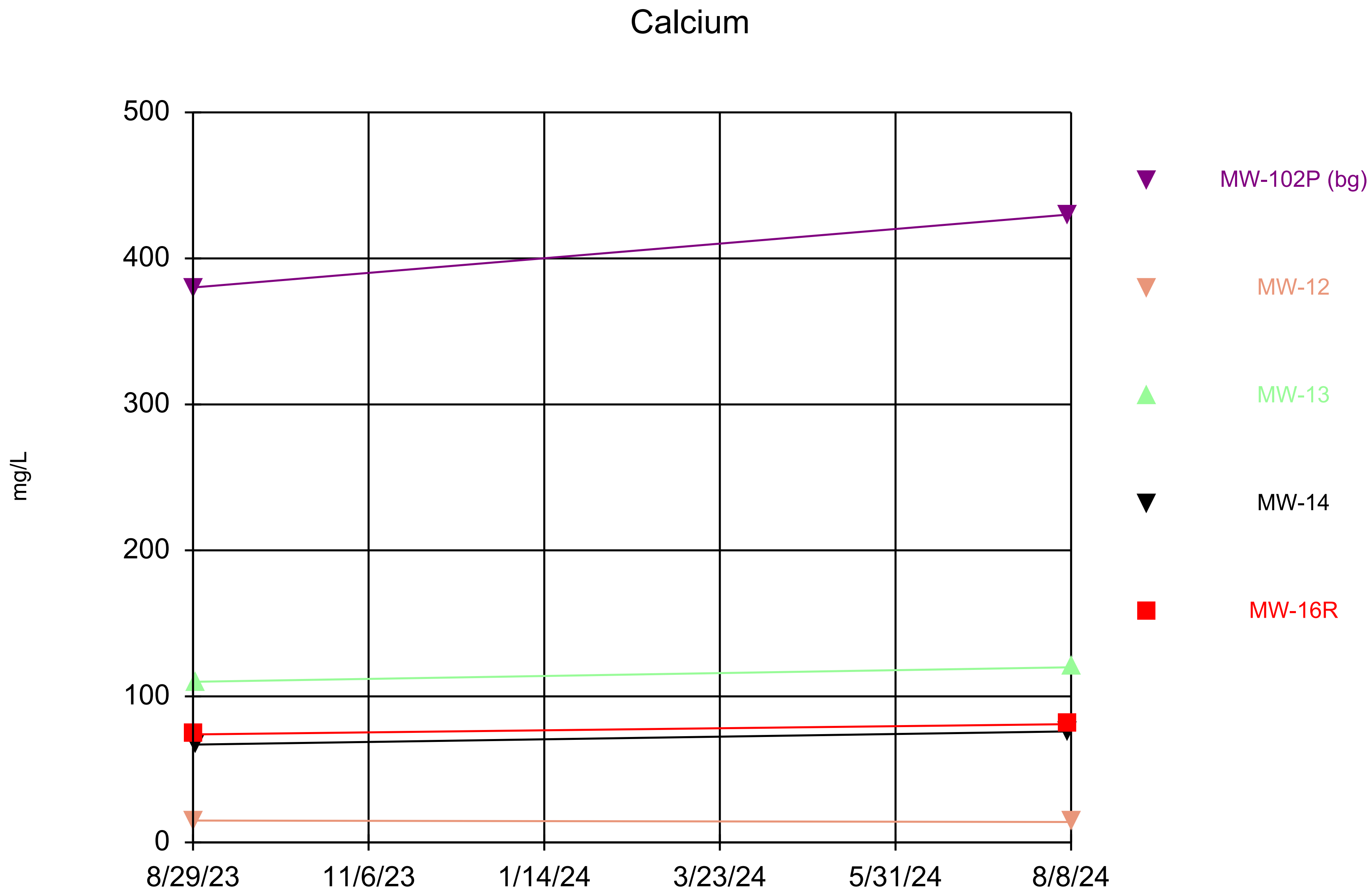

Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Calcium (mg/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/29/2023	380	15			74
8/30/2023			110	67	
8/7/2024	430			76	81
8/8/2024		14	120		

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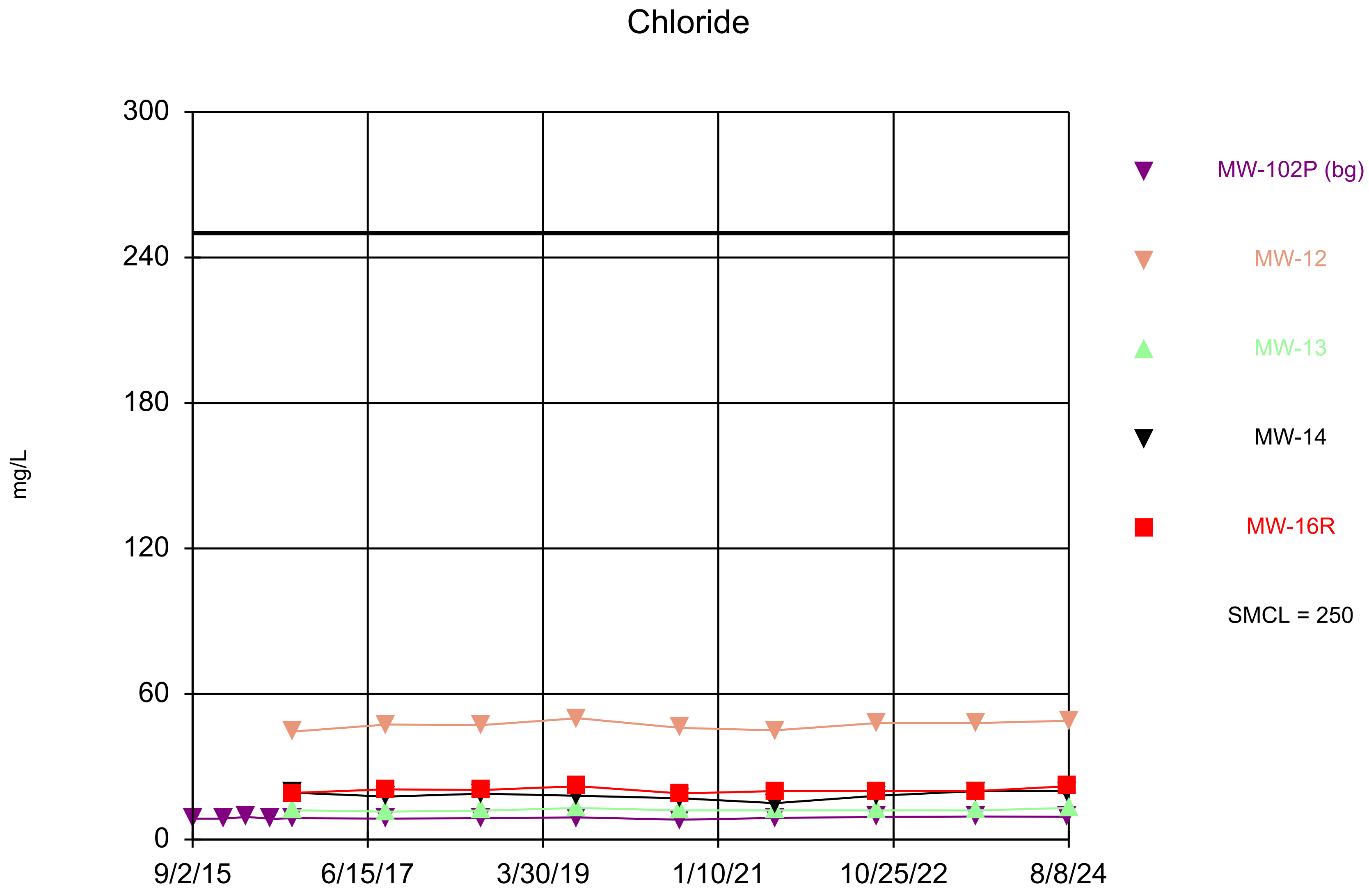

Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Chloride (mg/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
9/2/2015	8.6				
12/30/2015	8.6				
3/23/2016	9.3				
6/21/2016	8.5				
9/7/2016	8.8	44.5	12.1	19.3	19.2
8/24/2017	8.6	47.4	11.5	17.7	20.7
8/16/2018	8.8	47.2	11.9	18.9	20.4
8/7/2019	9.1	50	13	18	22
8/24/2020	8.2	46	12	17	
8/25/2020					19
8/10/2021		45			
8/11/2021	8.9		12	15	20
8/24/2022	9.3	48	12	18	20
8/29/2023	9.5	48			20
8/30/2023			12	20	
8/7/2024	9.4			20	22
8/8/2024		49	13		

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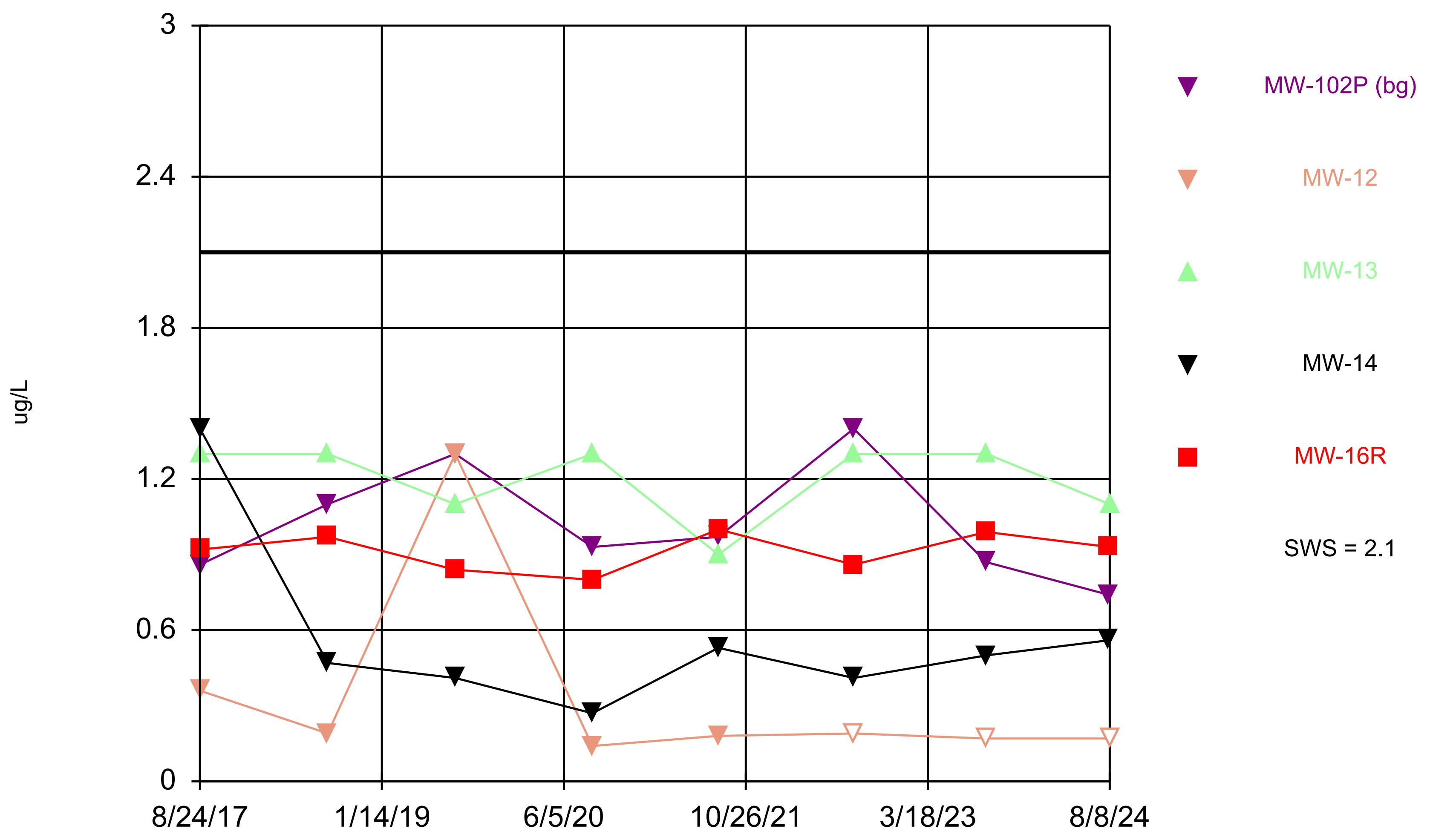
Hollow symbols indicate censored values.

Cobalt



Time Series   Analysis Run 10/23/2024 2:24 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

Constituent: Cobalt (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	0.86 (J)	0.36 (J)	1.3	1.4	0.92 (J)
8/16/2018	1.1	0.19 (J)	1.3	0.47 (J)	0.97 (J)
8/7/2019	1.3 (J)	1.3	1.1	0.41 (J)	0.84
8/24/2020	0.93	0.14 (J)	1.3	0.27 (J)	
8/25/2020					0.8
8/10/2021		0.18 (J)			
8/11/2021	0.97		0.9	0.53	1
8/24/2022	1.4	<0.19 (U)	1.3	0.41 (J)	0.86
8/29/2023	0.87	<0.17 (U)			0.99
8/30/2023			1.3	0.5	
8/7/2024	0.74			0.56	0.93
8/8/2024		<0.17	1.1		

ND substitution: RL or RL/2 if <15% NDs.

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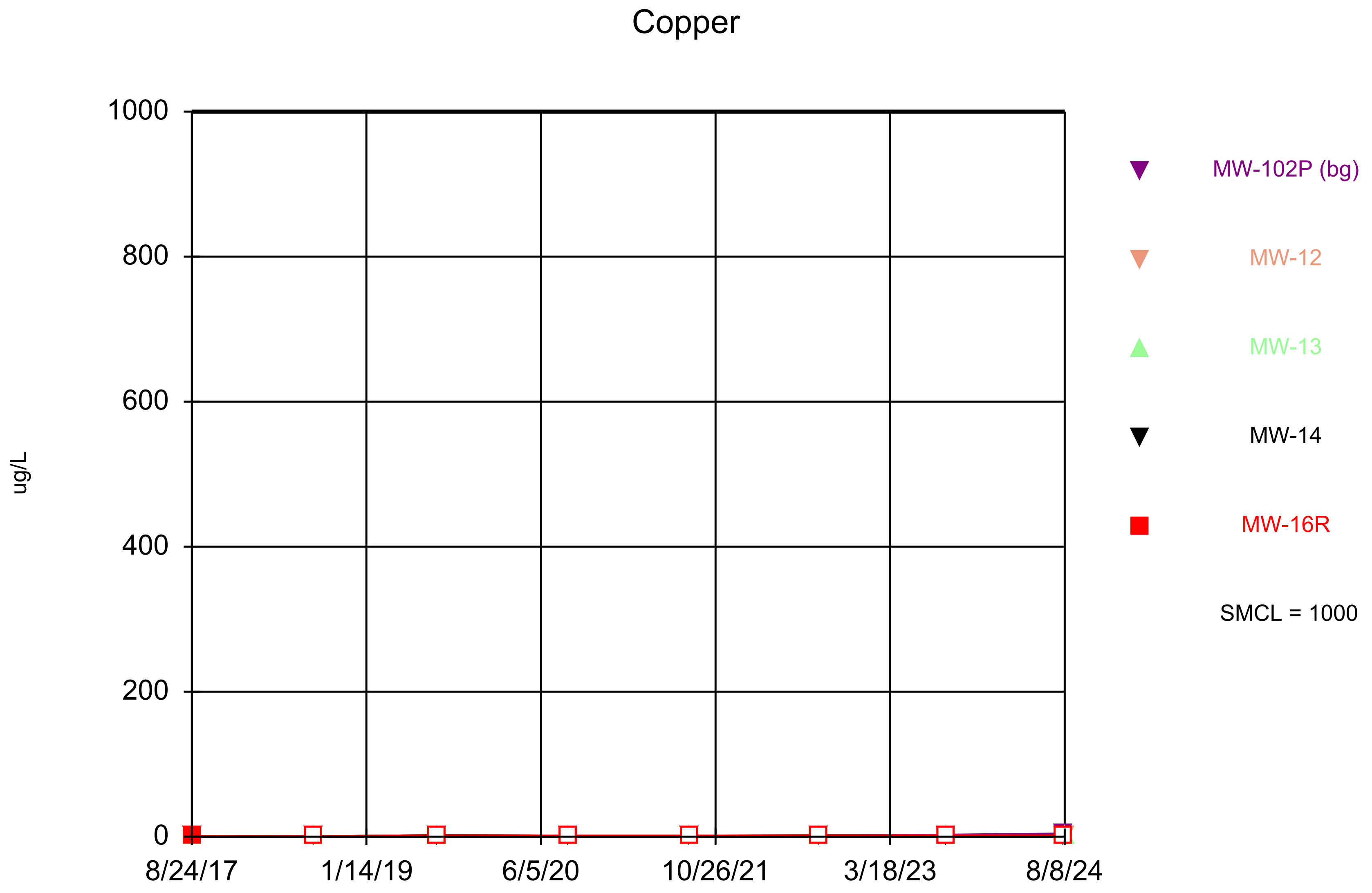
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Copper (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	0.23 (J)	0.94 (J)	0.62 (J)	0.54 (J)	0.97 (J)
8/16/2018	<0.48	<0.48	<0.48	0.6 (J)	<0.48
8/7/2019	<2	<2	<2	<2	<2
8/24/2020	<1.5	<1.5	<1.5	<1.5	
8/25/2020					<1.5
8/10/2021		<1.4			
8/11/2021	<1.4		<1.4	<1.4	<1.4
8/24/2022	<1.8 (U)	<1.8 (U)	<1.8 (U)	<1.8 (U)	<1.8 (U)
8/29/2023	2.7 (J)	<1.8 (U)			<1.8 (U)
8/30/2023			<1.8 (U)	<1.8 (U)	
8/7/2024	4.3 (J)			2.1 (J)	<1.8
8/8/2024		<1.8	<1.8		

ND substitution: RL or RL/2 if <15% NDs.

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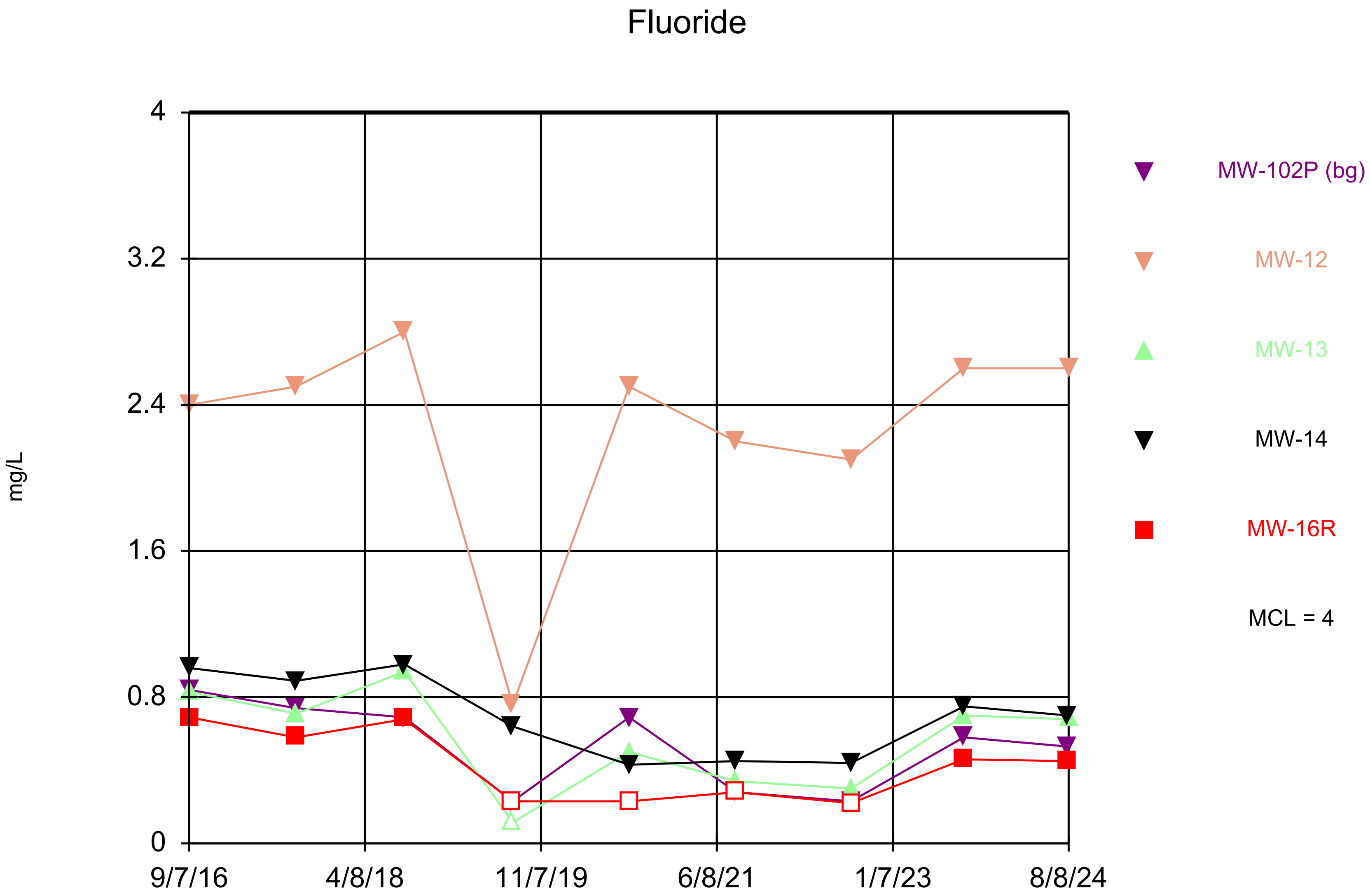
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Fluoride (mg/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
9/7/2016	0.84	2.4	0.83	0.96	0.69
8/24/2017	0.74	2.5	0.71	0.89	0.58
8/16/2018	0.69	2.8	0.94	0.98	0.68
8/7/2019	<0.23	0.76	<0.23	0.64	<0.23
8/24/2020	0.69	2.5	0.5	0.43 (J)	
8/25/2020					<0.23
8/10/2021		2.2			
8/11/2021	<0.28		0.34 (J)	0.45 (J)	<0.28
8/24/2022	0.23 (J)	2.1	0.3 (J)	0.44 (J)	<0.22 (U)
8/29/2023	0.58 (J)	2.6			0.46 (J)
8/30/2023			0.7 (J)	0.75 (J)	
8/7/2024	0.53 (J)			0.7 (J)	0.45 (J)
8/8/2024		2.6	0.68 (J)		

ND substitution: RL or RL/2 if <15% NDs.

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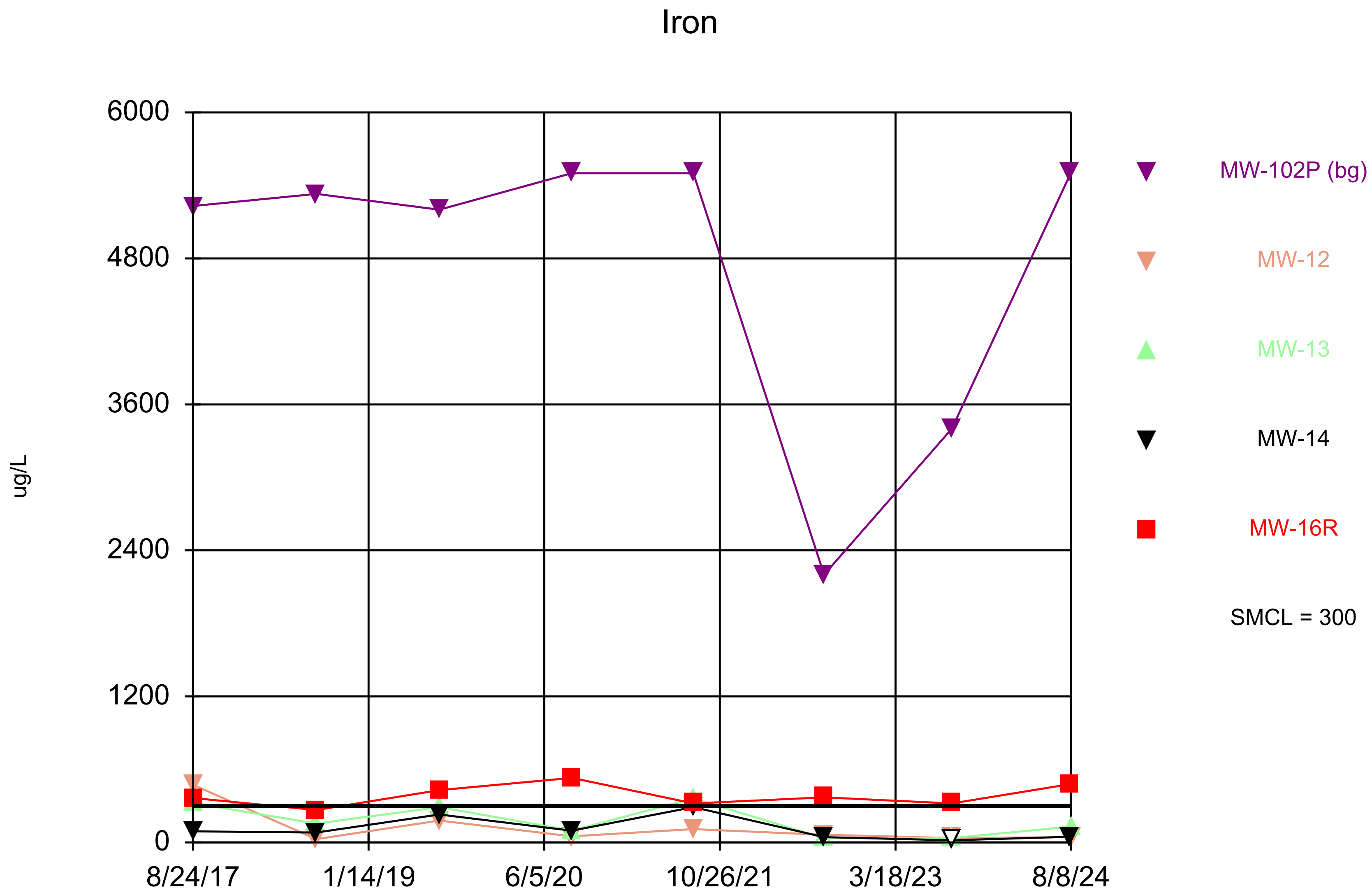
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Iron (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	5230	473	324	91.5	365
8/16/2018	5330	27.1 (J)	155	81.8	266
8/7/2019	5200	180	290	230	430
8/24/2020	5500	<50	98 (J)	97 (J)	
8/25/2020					530
8/10/2021		110			
8/11/2021	5500		360	290	320
8/24/2022	2200	63 (J)	<36 (U)	43 (J)	370
8/29/2023	3400	<36 (U)			320
8/30/2023			<36 (U)	<36 (U)	
8/7/2024	5500			47 (J)	480
8/8/2024		43 (J)	130		

ND substitution: RL or RL/2 if <15% NDs.

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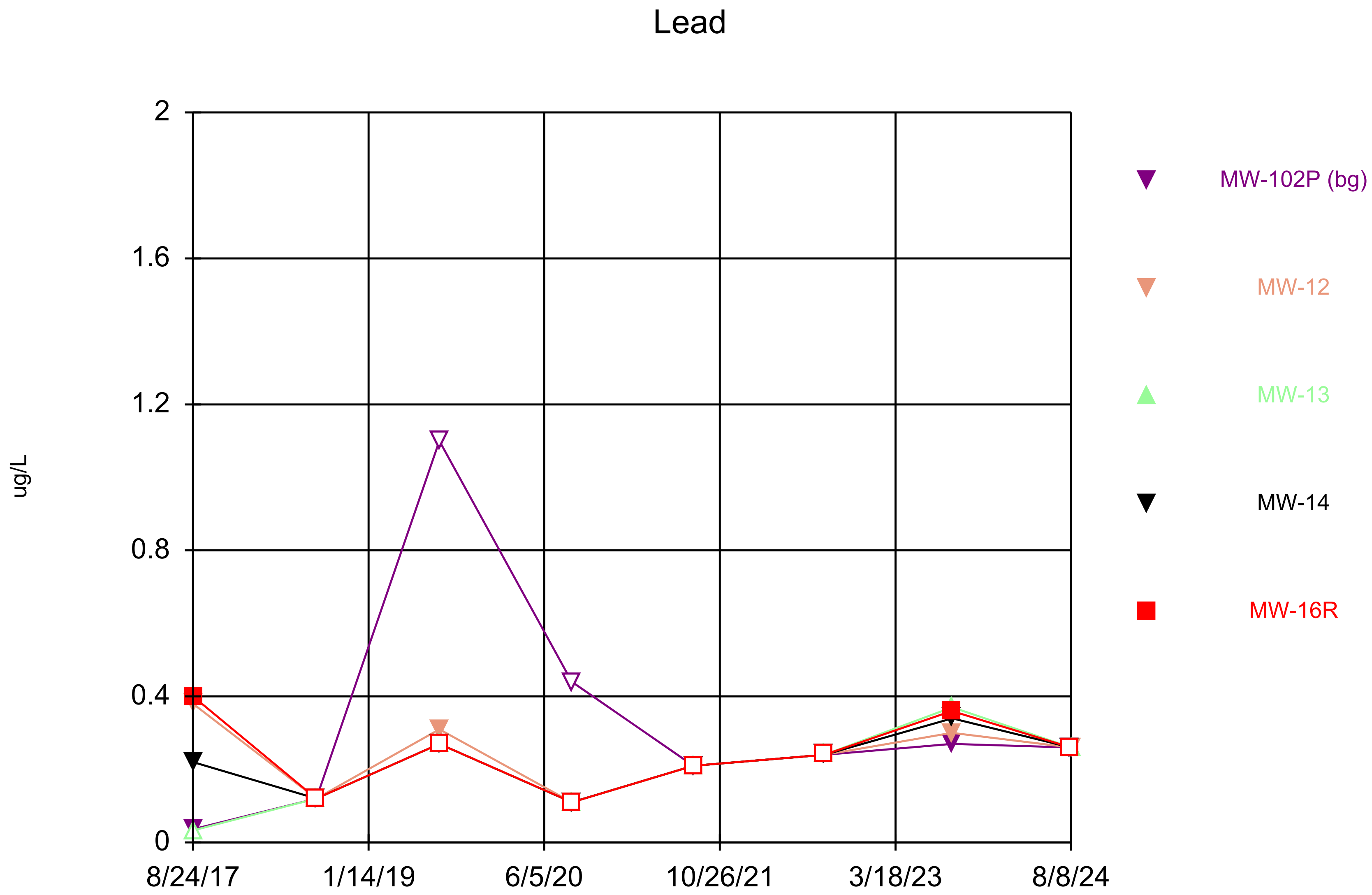
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

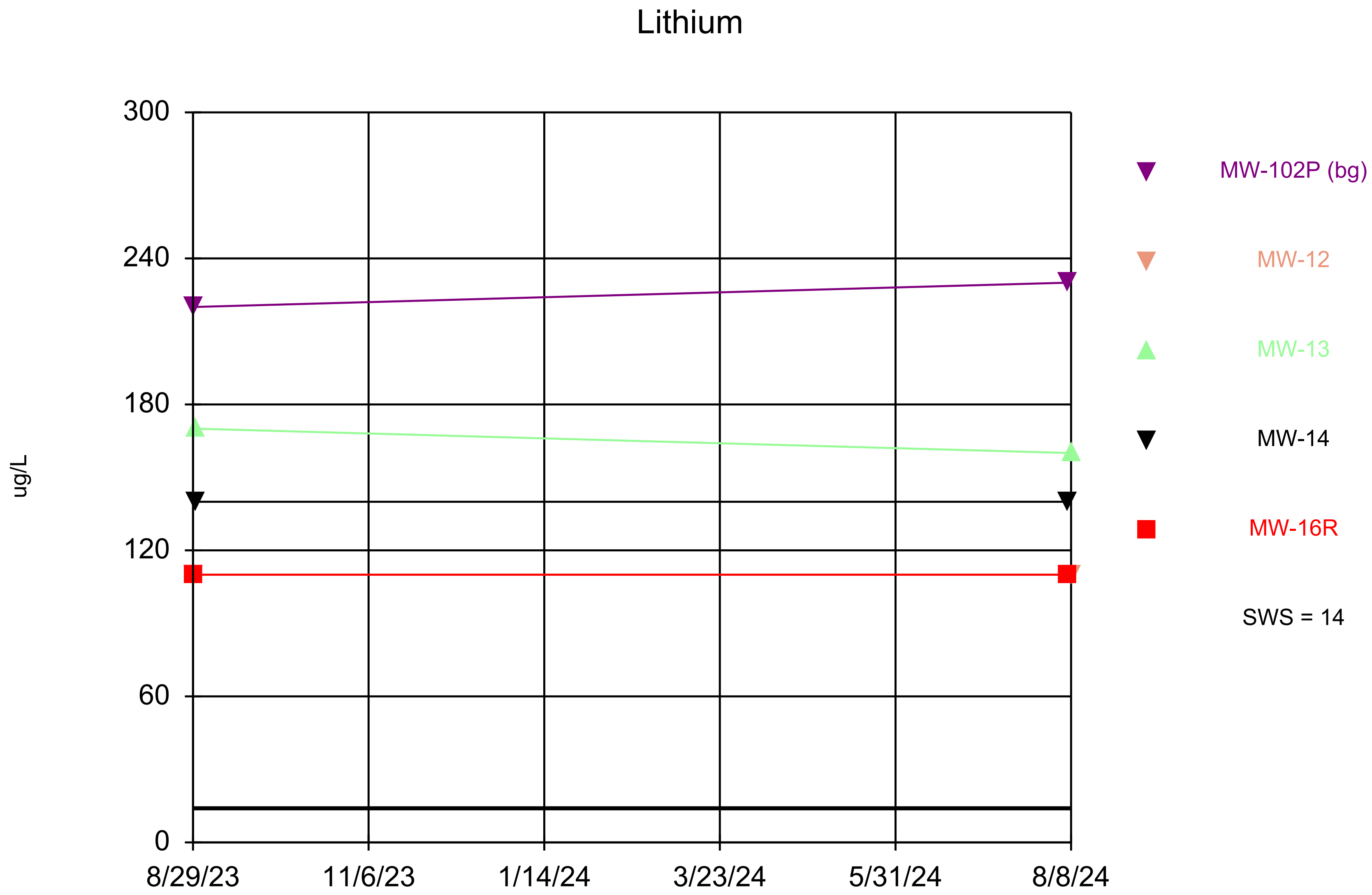
Time Series

Constituent: Lead (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	0.036 (J)	0.38 (J)	<0.033	0.22 (J)	0.4 (J)
8/16/2018	<0.12	<0.12	<0.12	0.12 (J)	<0.12
8/7/2019	<1.1	0.31 (J)	<0.27	<0.27	<0.27
8/24/2020	<0.44	<0.11	<0.11	<0.11	
8/25/2020					<0.11
8/10/2021		0.21 (J)			
8/11/2021	<0.21		<0.21	<0.21	<0.21
8/24/2022	<0.24 (U)	<0.24 (U)	<0.24 (U)	<0.24 (U)	<0.24 (U)
8/29/2023	0.27 (JB)	0.3 (JB)			0.36 (JB)
8/30/2023			0.37 (JB)	0.34 (JB)	
8/7/2024	<0.26			<0.26	<0.26
8/8/2024		<0.26	<0.26		

ND substitution: RL or RL/2 if <15% NDs.



Time Series Analysis Run 10/23/2024 2:24 PM View: Pennsylvanian Unit

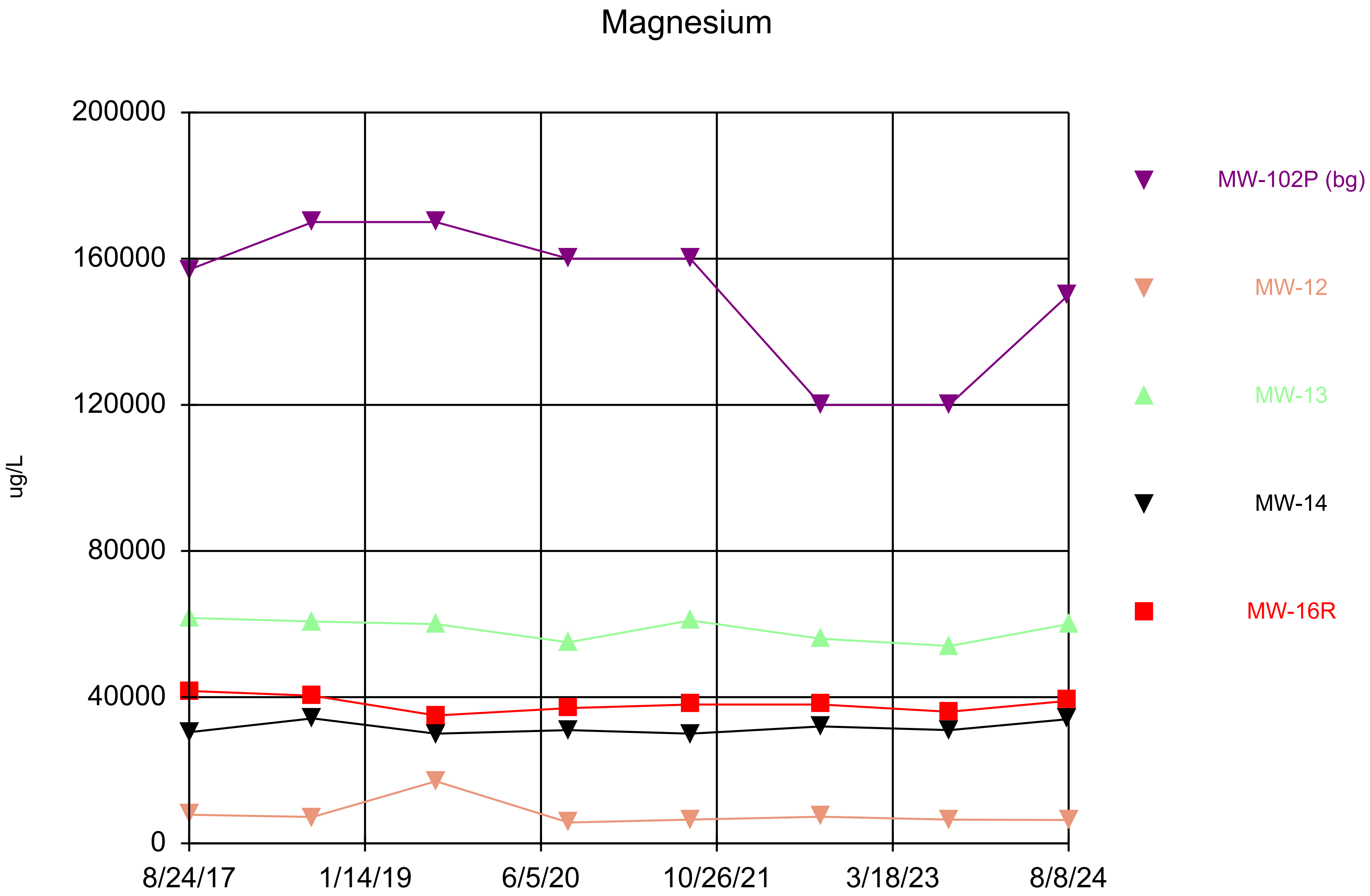
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Lithium (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/29/2023	220	110			110
8/30/2023			170	140	
8/7/2024	230			140	110
8/8/2024		110	160		



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Magnesium (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	157000	7830	61700	30400	41700
8/16/2018	170000	7230	60700	34200	40400
8/7/2019	170000	17000	60000	30000	35000
8/24/2020	160000	5700	55000	31000	
8/25/2020					37000
8/10/2021		6500			
8/11/2021	160000		61000	30000	38000
8/24/2022	120000	7300	56000	32000	38000
8/29/2023	120000	6500			36000
8/30/2023			54000	31000	
8/7/2024	150000			34000	39000
8/8/2024		6400	60000		

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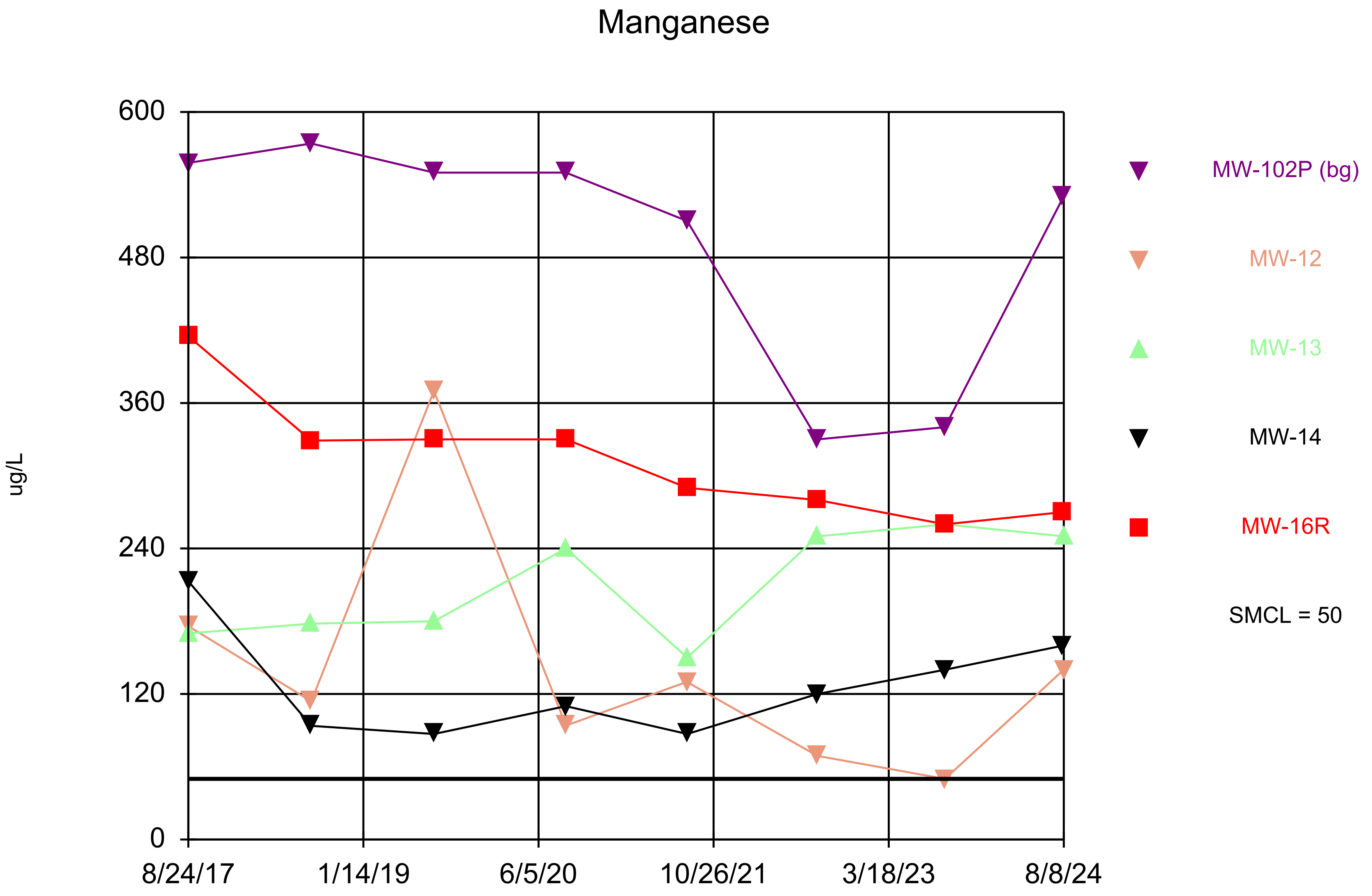

Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Manganese (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	558	176	170	213	415
8/16/2018	574	114	178	93.7	329
8/7/2019	550	370	180	87	330
8/24/2020	550	94	240	110	
8/25/2020					330
8/10/2021		130			
8/11/2021	510		150	87	290
8/24/2022	330	69	250	120	280
8/29/2023	340	50			260
8/30/2023			260	140	
8/7/2024	530			160	270
8/8/2024		140	250		

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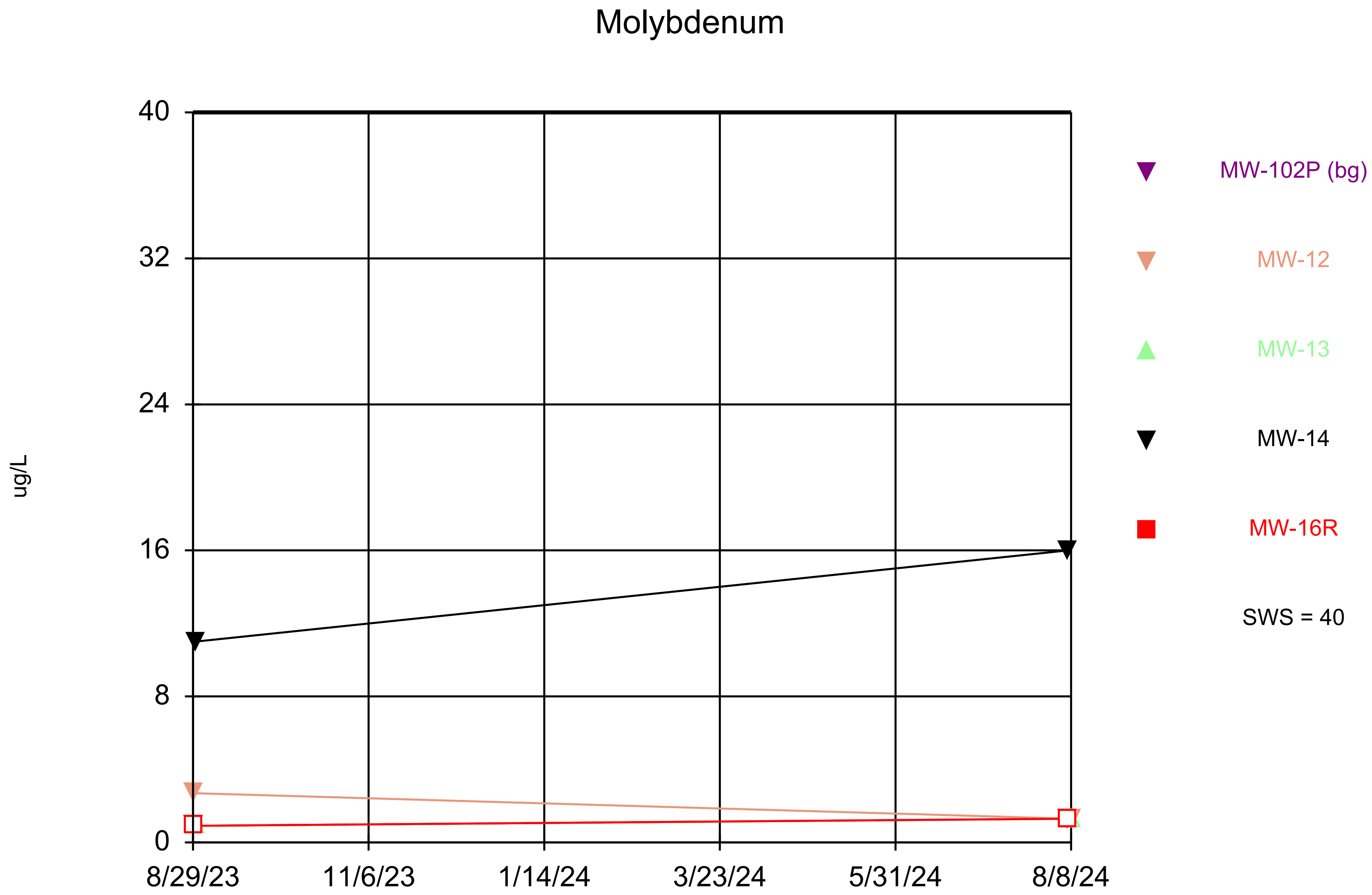
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Molybdenum (ug/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/29/2023	<0.91 (U)	2.7			<0.91 (U)
8/30/2023			<0.91 (U)	11	
8/7/2024	<1.3			16	<1.3
8/8/2024		<1.3	<1.3		

ND substitution: RL or RL/2 if <15% NDs.

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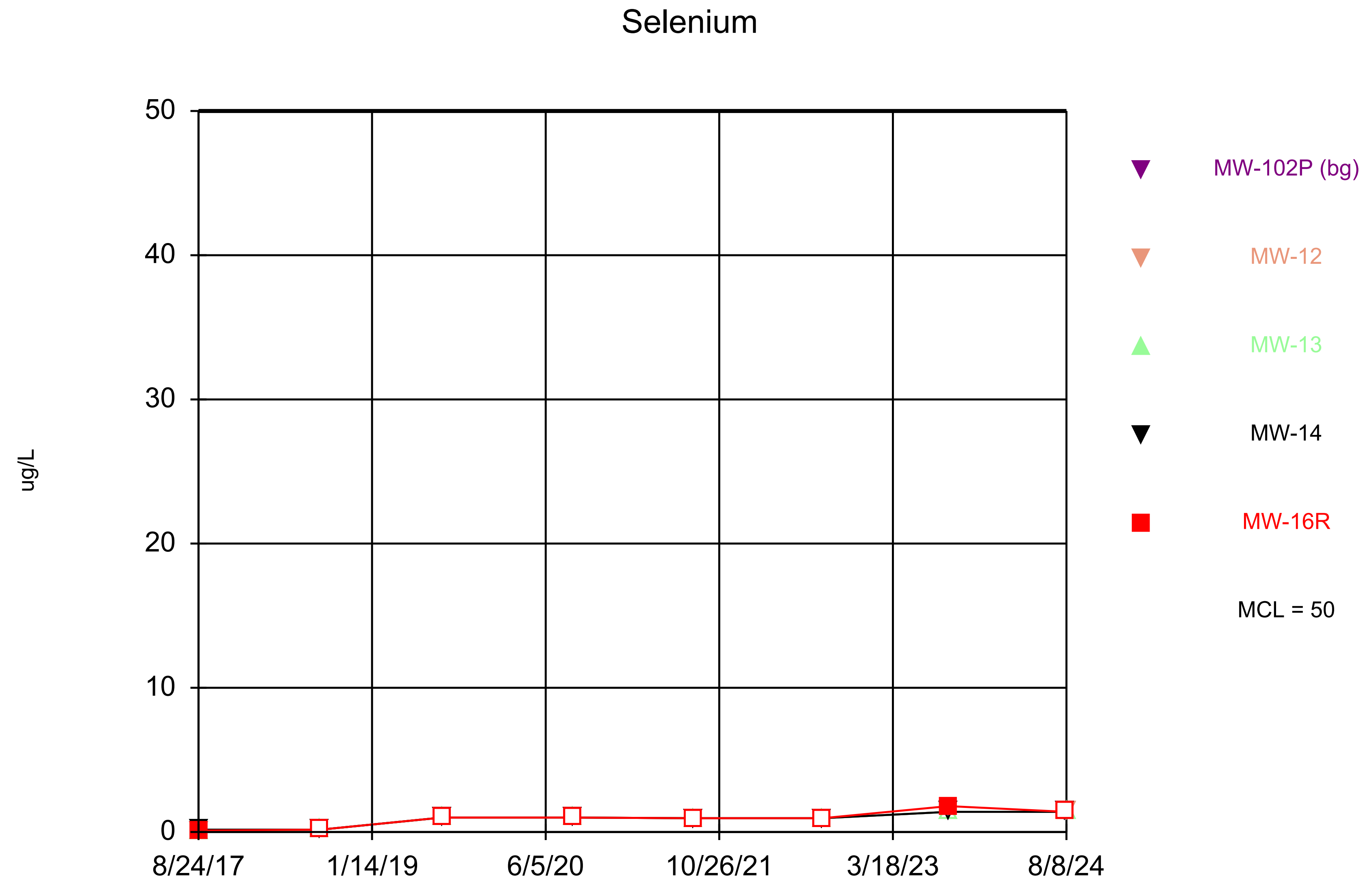
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Selenium (ug/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	<0.086	<0.086	<0.086	0.16 (J)	0.099 (J)
8/16/2018	<0.16	<0.16	<0.16	<0.16	<0.16
8/7/2019	<1	<1	<1	<1	<1
8/24/2020	<1	<1	<1	<1	
8/25/2020					<1
8/10/2021		<0.96			
8/11/2021	<0.96		<0.96	<0.96	<0.96
8/24/2022	<0.96 (U)	<0.96 (U)	<0.96 (U)	<0.96 (U)	<0.96 (U)
8/29/2023	<1.4 (U)	1.4 (J)			1.8 (J)
8/30/2023			<1.4 (U)	<1.4 (U)	
8/7/2024	<1.4			<1.4	<1.4
8/8/2024		<1.4	<1.4		

ND substitution: RL or RL/2 if <15% NDs.

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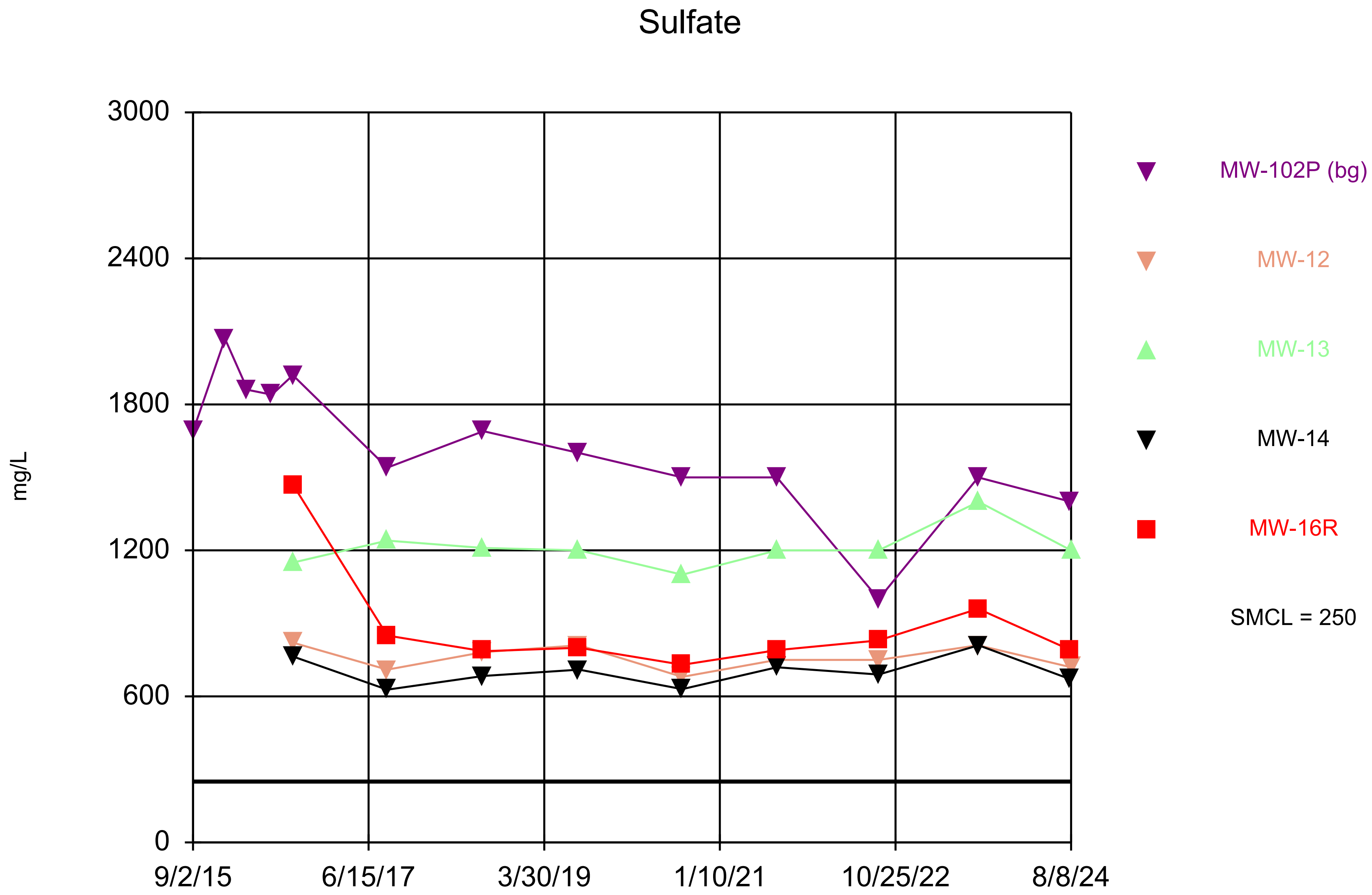

Time Series   Analysis Run 10/23/2024 2:25 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

Time Series

Constituent: Sulfate (mg/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
9/2/2015	1690				
12/30/2015	2070				
3/23/2016	1860				
6/21/2016	1840				
9/7/2016	1920	821	1150	764	1470
8/24/2017	1540	710	1240	628	850
8/16/2018	1690	782	1210	684	786
8/7/2019	1600	810	1200	710	800
8/24/2020	1500	680	1100	630	
8/25/2020					730
8/10/2021		750			
8/11/2021	1500		1200	720	790
8/24/2022	1000	750	1200	690	830
8/29/2023	1500	810			960
8/30/2023			1400	810	
8/7/2024	1400			670	790
8/8/2024		720	1200		

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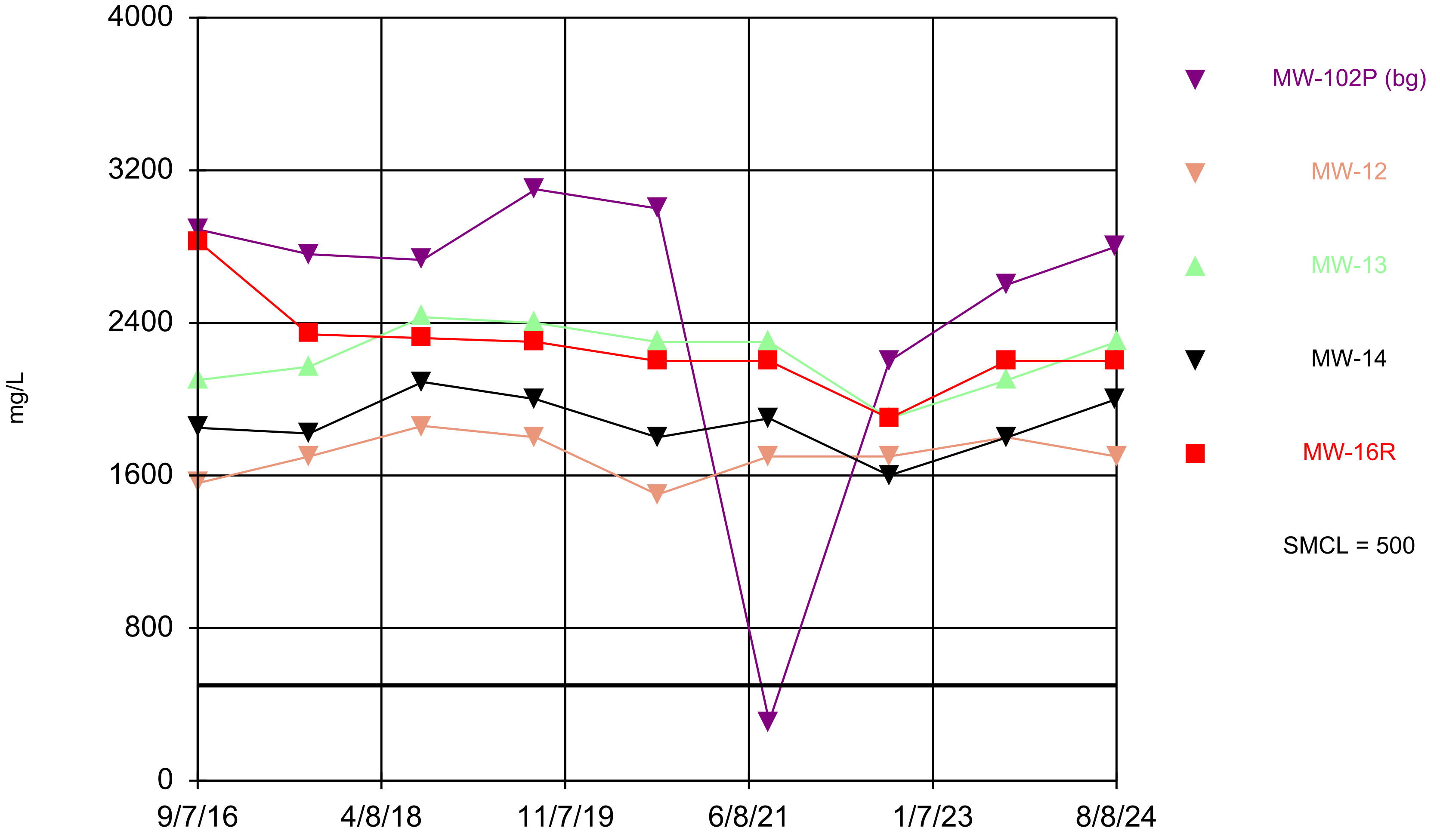
Total Dissolved Solids



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

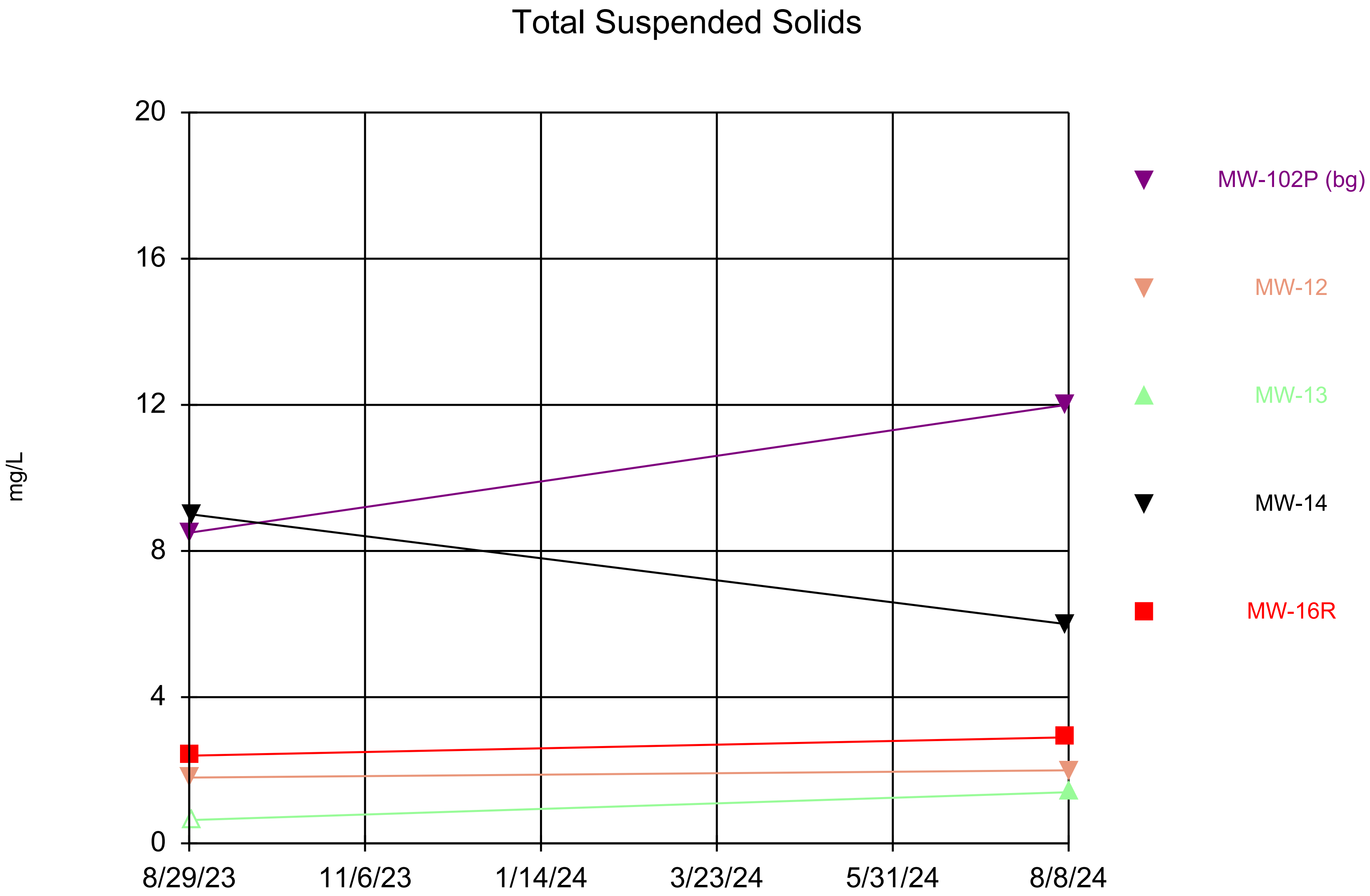
Time Series

Constituent: Total Dissolved Solids (mg/L)   Analysis Run 10/23/2024 3:19 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
9/7/2016	2890	1560	2100	1850	2830
8/24/2017	2760	1700	2170	1820	2340
8/16/2018	2730	1860	2430	2090	2320
8/7/2019	3100	1800	2400	2000	2300
8/24/2020	3000	1500	2300	1800	
8/25/2020					2200
8/10/2021		1700			
8/11/2021	310 (X)		2300	1900	2200
8/24/2022	2200	1700	1900	1600	1900
8/29/2023	2600	1800			2200
8/30/2023			2100	1800	
8/7/2024	2800			2000	2200
8/8/2024		1700	2300		

Sanitas™ v.10.0.16 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

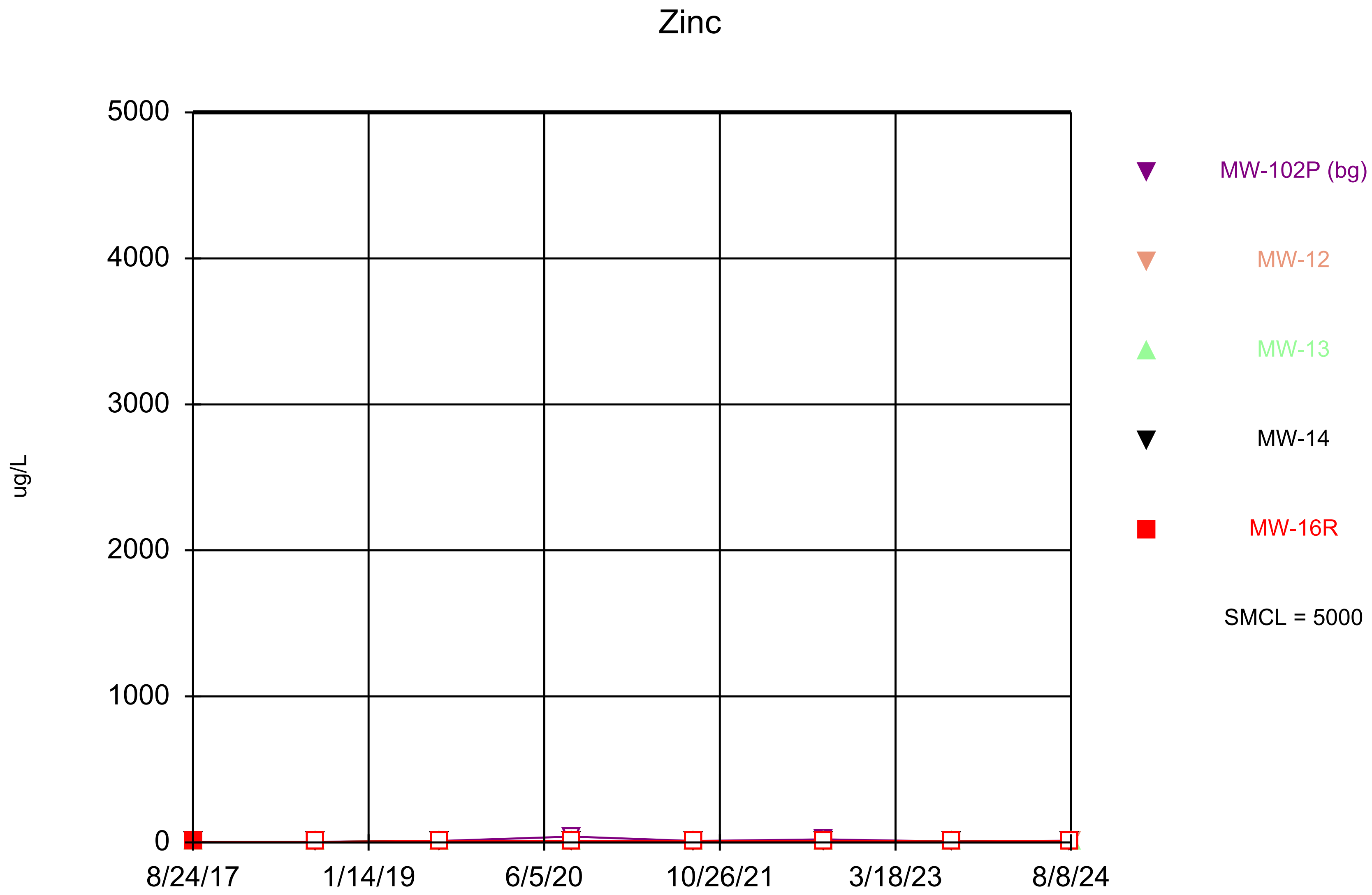
Constituent: Total Suspended Solids (mg/L) Analysis Run 10/23/2024 3:19 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/29/2023	8.5	1.8 (J)			2.4
8/30/2023			<0.64 (U)	9	
8/7/2024	12			6	2.9
8/8/2024		2	1.4 (J)		

ND substitution: RL or RL/2 if <15% NDs.

Sanitas™ v.10.0.16 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.



Time Series Analysis Run 10/23/2024 2:25 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Data: 191022-input-OML

Time Series

Constituent: Zinc (ug/L)　Analysis Run 10/23/2024 3:19 PM　View: Pennsylvanian Unit
Ottumwa-Midland Landfill　Data: 191022-input-OML

	MW-102P (bg)	MW-12	MW-13	MW-14	MW-16R
8/24/2017	3.6 (J)	3.7 (J)	2 (J)	1.7 (J)	1 (J)
8/16/2018	4.3 (J)	<3.7	<3.7	<3.7	<3.7
8/7/2019	<10	<10	<10	<10	<10
8/24/2020	<40	<10	<10	<10	
8/25/2020					<10
8/10/2021		<10			
8/11/2021	<10		<10	<10	<10
8/24/2022	21	<10 (U)	<10 (U)	<10 (U)	<10 (U)
8/29/2023	6.9 (J)	<6.4 (U)			<6.4 (U)
8/30/2023			<6.4 (U)	<6.4 (U)	
8/7/2024	12 (J)			<9.7	<9.7
8/8/2024		<9.7	<9.7		

ND substitution: RL or RL/2 if <15% NDs.

D3 – Outlier Analysis Results - Shallow

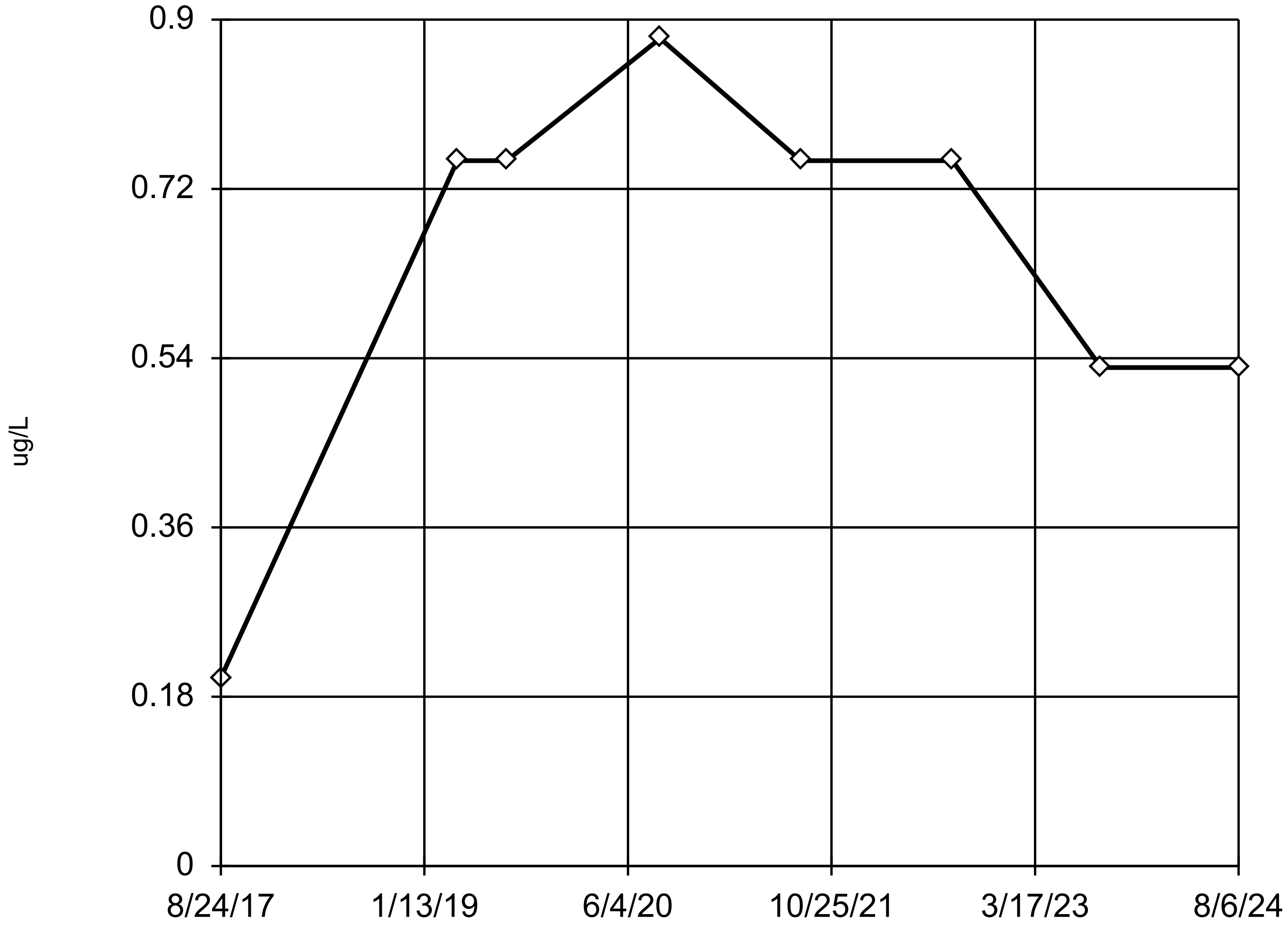
Outlier Analysis

Ottumwa-Midland Landfill Data: 191022-input-OML Printed 10/21/2024, 12:33 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Arsenic (ug/L)	MW-1R (bg)	n/a	n/a	n/a	NP (nrm)	NaN	8	0.6425	0.2151	unknown	ShapiroWilk
Barium (ug/L)	**MW-1R (bg)**	**Yes**	**61**	**8/24/2017**	**Dixon`s**	**0.05**	**8**	**73.5**	**6.047**	**normal**	**ShapiroWilk**
Beryllium (ug/L)	**MW-1R (bg)**	**Yes**	**0.012,0.4**	**8/24/2017...**	**NP (nrm)**	**NaN**	**8**	**0.2615**	**0.1112**	**unknown**	**ShapiroWilk**
Boron (ug/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	8	81.38	19.06	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	36	90.58	95.78	ln(x)	ShapiroWilk
Cobalt (ug/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.1689	0.1	normal	ShapiroWilk
Copper (ug/L)	MW-1R (bg)	No	n/a	n/a	Dixon`s	0.05	8	1.686	0.3551	normal	ShapiroWilk
Fluoride (mg/L)	**MW-1R (bg)**	**Yes**	**0.11**	**8/23/2022**	**Dixon`s**	**0.05**	**9**	**0.4489**	**0.1995**	**ln(x)**	**ShapiroWilk**
Iron (ug/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	8	91.06	119	ln(x)	ShapiroWilk
Lead (ug/L)	MW-1R (bg)	No	n/a	n/a	NP (nrm)	NaN	8	0.3825	0.2679	unknown	ShapiroWilk
Magnesium (ug/L)	**MW-1R (bg)**	**Yes**	**48100**	**8/24/2017**	**Dixon`s**	**0.05**	**8**	**32263**	**6488**	**normal**	**ShapiroWilk**
Manganese (ug/L)	**MW-1R (bg)**	**Yes**	**20**	**4/6/2019**	**Dixon`s**	**0.05**	**8**	**5.587**	**5.885**	**normal**	**ShapiroWilk**
Selenium (ug/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	8	1.47	0.5824	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-1R (bg)	No	n/a	n/a	NP (nrm)	NaN	26	220.9	119	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1R (bg)	No	n/a	n/a	EPA 1989	0.05	9	571.7	172.2	ln(x)	ShapiroWilk
Zinc (ug/L)	MW-1R (bg)	No	n/a	n/a	NP (nrm)	NaN	8	8.562	2.785	unknown	ShapiroWilk

Arsenic

MW-1R (bg)



n = 8

No outliers found.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Tukey's Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Tukey's Outlier Screening

Constituent: Arsenic (ug/L) Analysis Run 10/21/2024 12:33 PM View: Shallow

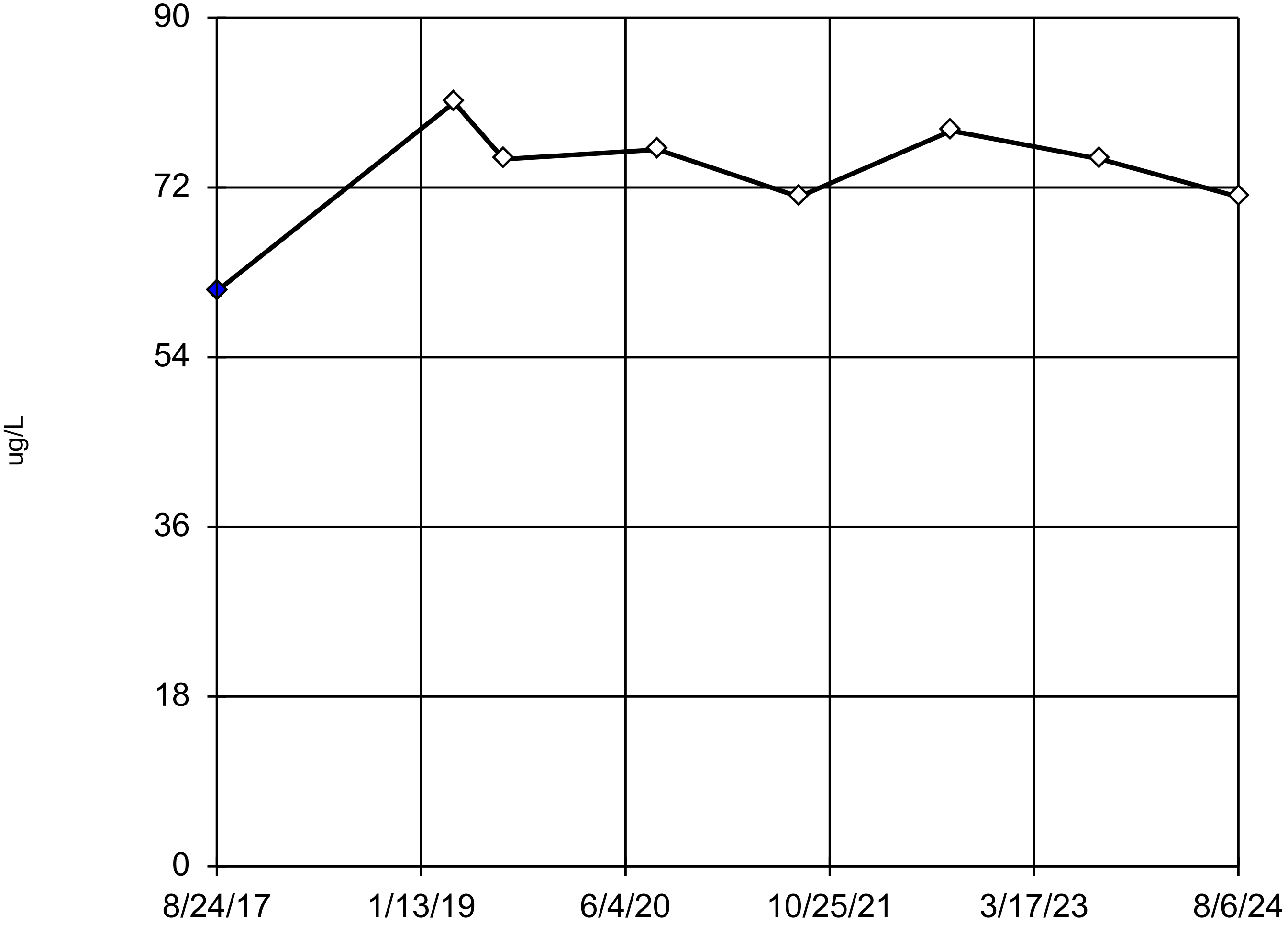
Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	0.2 (J)
4/6/2019	<0.75
8/7/2019	<0.75
8/24/2020	<0.88
8/10/2021	<0.75
8/23/2022	<0.75 (U)
8/29/2023	<0.53 (U)
8/6/2024	<0.53

ND substitution: RL or RL/2 if <15% NDs.

Barium

MW-1R (bg)



n = 8

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 73.5.
Std. Dev. = 6.047.
61: c = 0.5882
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.932
Critical = 0.838
The distribution, after
removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test   Analysis Run 10/21/2024 12:32 PM   View: Shallow

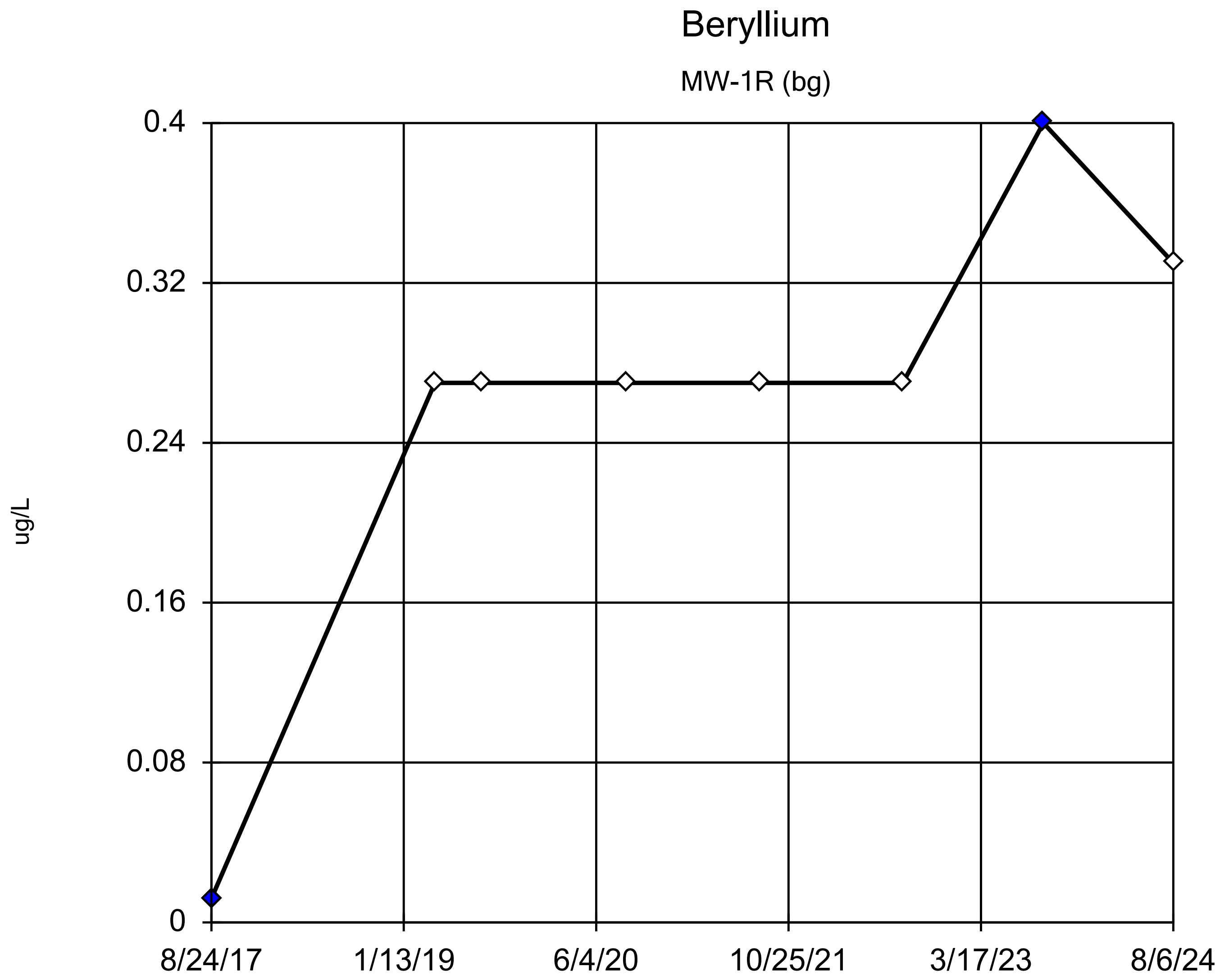
Ottumwa-Midland Landfill   Data: 191022-input-OML

Dixon's Outlier Test

Constituent: Barium (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	61 (O)
4/6/2019	81
8/7/2019	75
8/24/2020	76
8/10/2021	71 (B)
8/23/2022	78
8/29/2023	75
8/6/2024	71



n = 8

Outliers are drawn as solid.
Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.

High cutoff = 0.39, low cutoff = 0.18, based on IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

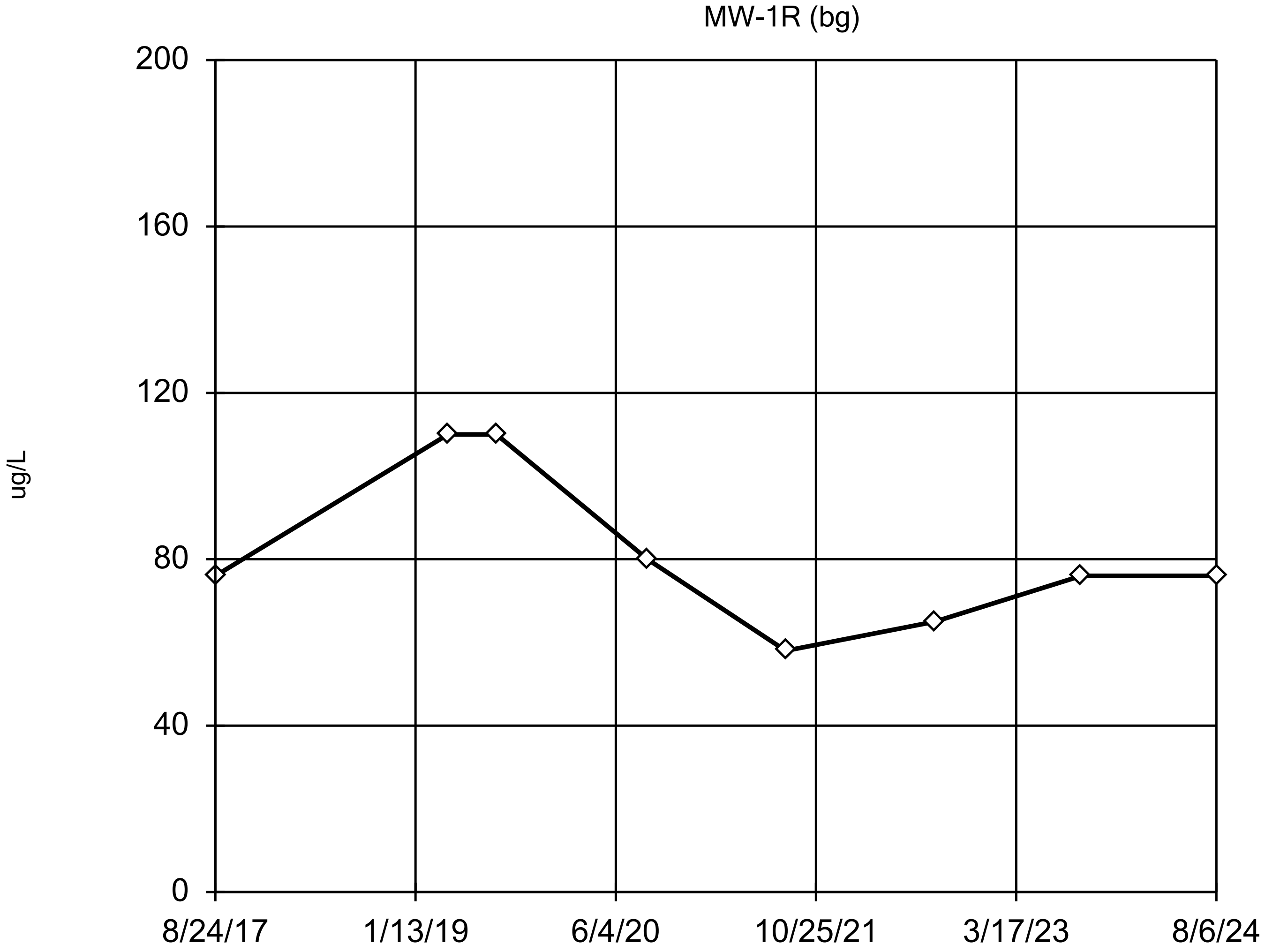
Tukey's Outlier Screening

Constituent: Beryllium (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow
Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	<0.012 (O)
4/6/2019	<0.27
8/7/2019	<0.27
8/24/2020	<0.27
8/10/2021	<0.27
8/23/2022	<0.27 (U)
8/29/2023	0.4 (JO)
8/6/2024	<0.33

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 81.38, std. dev. 19.06, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8871
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

EPA 1989 Outlier Screening

Constituent: Boron (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

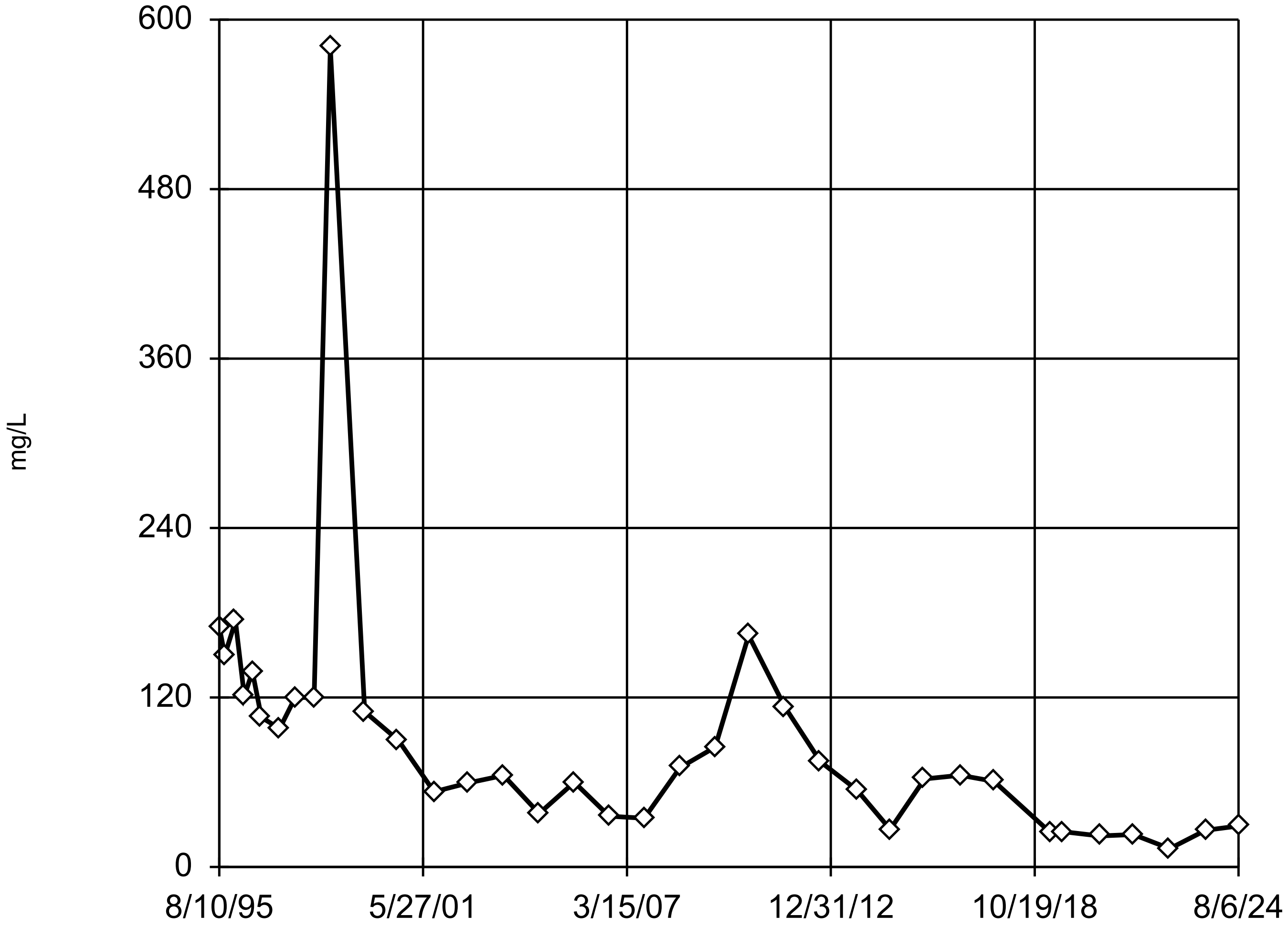
Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	76 (J)
4/6/2019	110 (J)
8/7/2019	110 (J,B)
8/24/2020	<80
8/10/2021	<58
8/23/2022	65 (J)
8/29/2023	<76 (U)
8/6/2024	<76

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Rosner's Test)

MW-1R (bg)



n = 36

Rosner's will not be run. No suspect values identified or unable to establish suspect values. Mean 90.58, std. dev. 95.78, critical Tn 2.823

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9704
Critical = 0.945 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

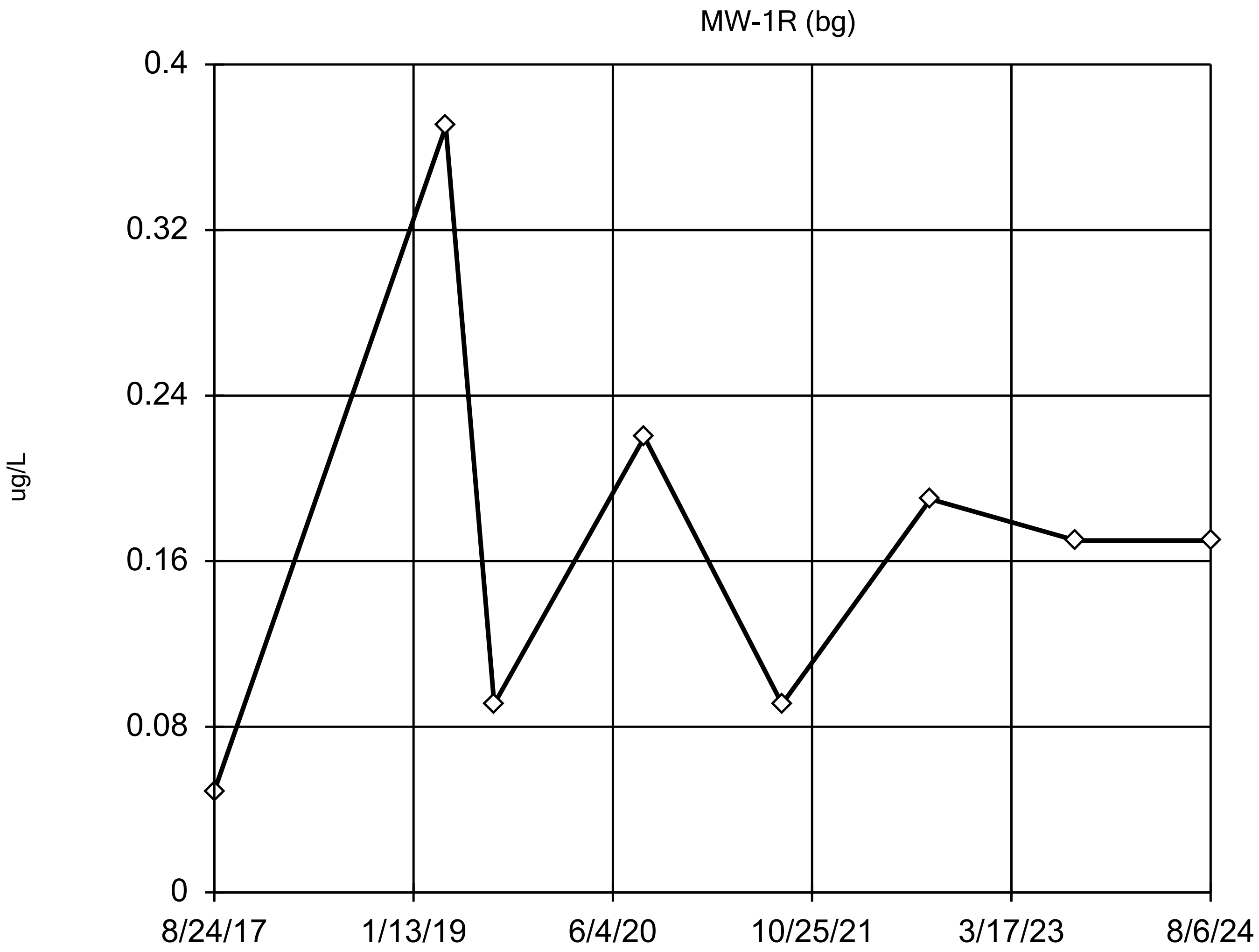
EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 10/21/2024 12:33 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)
8/10/1995	170
10/6/1995	150
1/25/1996	174
4/26/1996	121
7/19/1996	138.3
10/21/1996	106
4/28/1997	98
10/6/1997	120
4/22/1998	120
10/7/1998	580 (X)
9/29/1999	110
9/13/2000	89.6
9/19/2001	53.3
9/11/2002	59.5
9/10/2003	64.8
9/15/2004	37.9
9/14/2005	60
9/13/2006	35.9
9/12/2007	34.5
9/17/2008	70.4
9/16/2009	84.9
8/31/2010	164
9/13/2011	113
9/18/2012	74.4
9/27/2013	54.7
9/10/2014	26.6
9/2/2015	62.4
9/7/2016	64.9
8/24/2017	60.6
4/6/2019	24
8/7/2019	25
8/24/2020	22
8/10/2021	23
8/23/2022	13
8/29/2023	26
8/6/2024	29

EPA Screening (suspected outliers for Dixon's Test)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.1689, std. dev. 0.1, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9095
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening Analysis Run 10/21/2024 12:32 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

EPA 1989 Outlier Screening

Constituent: Cobalt (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

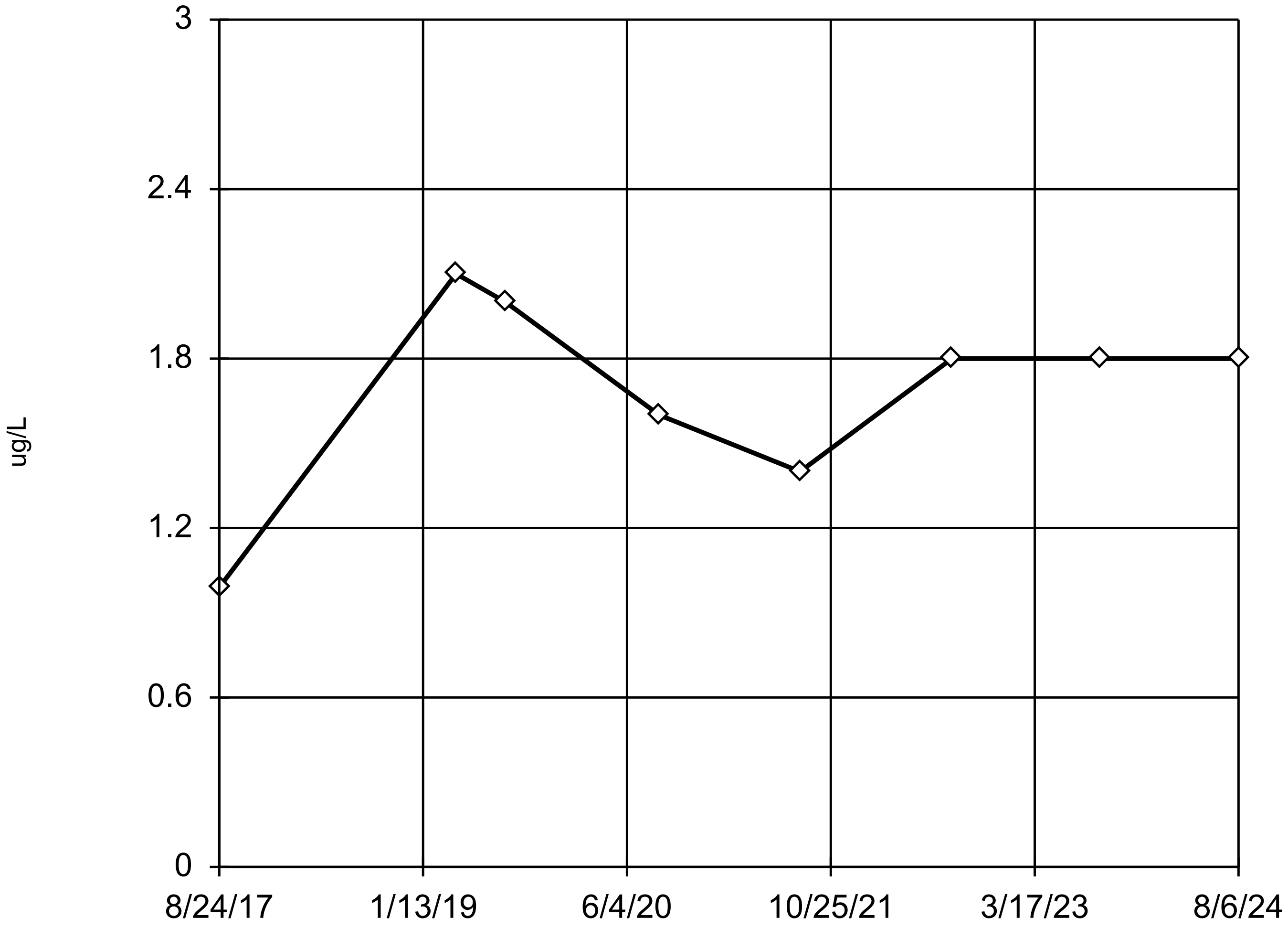
Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	0.049 (J)
4/6/2019	0.37 (J)
8/7/2019	<0.091
8/24/2020	0.22 (J)
8/10/2021	<0.091
8/23/2022	<0.19 (U)
8/29/2023	<0.17 (U)
8/6/2024	<0.17

ND substitution: RL or RL/2 if <15% NDs.

Copper

MW-1R (bg)



n = 8

No statistical outliers.
Testing for 1 low outlier.
Mean = 1.686.
Std. Dev. = 0.3551.
0.99 (J): c = 0.4059
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9461
Critical = 0.838
The distribution was found to be normally distributed.

Dixon's Outlier Test   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

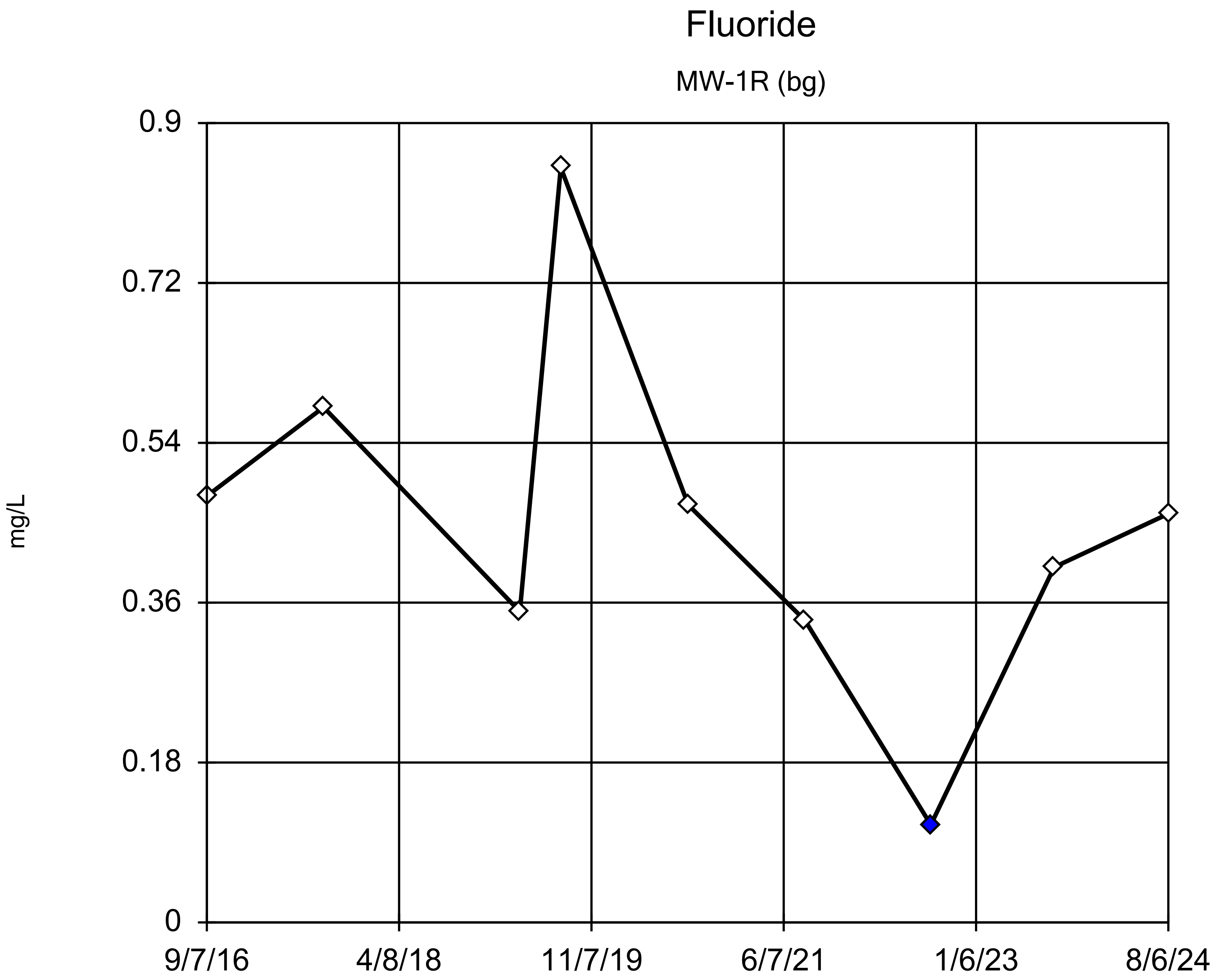
Dixon's Outlier Test

Constituent: Copper (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	0.99 (J)
4/6/2019	2.1 (J)
8/7/2019	<2
8/24/2020	1.6 (J)
8/10/2021	<1.4
8/23/2022	<1.8 (U)
8/29/2023	<1.8 (U)
8/6/2024	<1.8

ND substitution: RL or RL/2 if <15% NDs.



n = 9

Statistical outlier is drawn as solid.
Testing for 1 low outlier.
Mean = 0.4489.
Std. Dev. = 0.1995.
-2.207 (U): c = 0.6788
tabl = 0.512.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9098
Critical = 0.851 (after natural log transformation)
The distribution, after removal of suspect value, was found to be lognormal.

Dixon's Outlier Test   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Dixon's Outlier Test

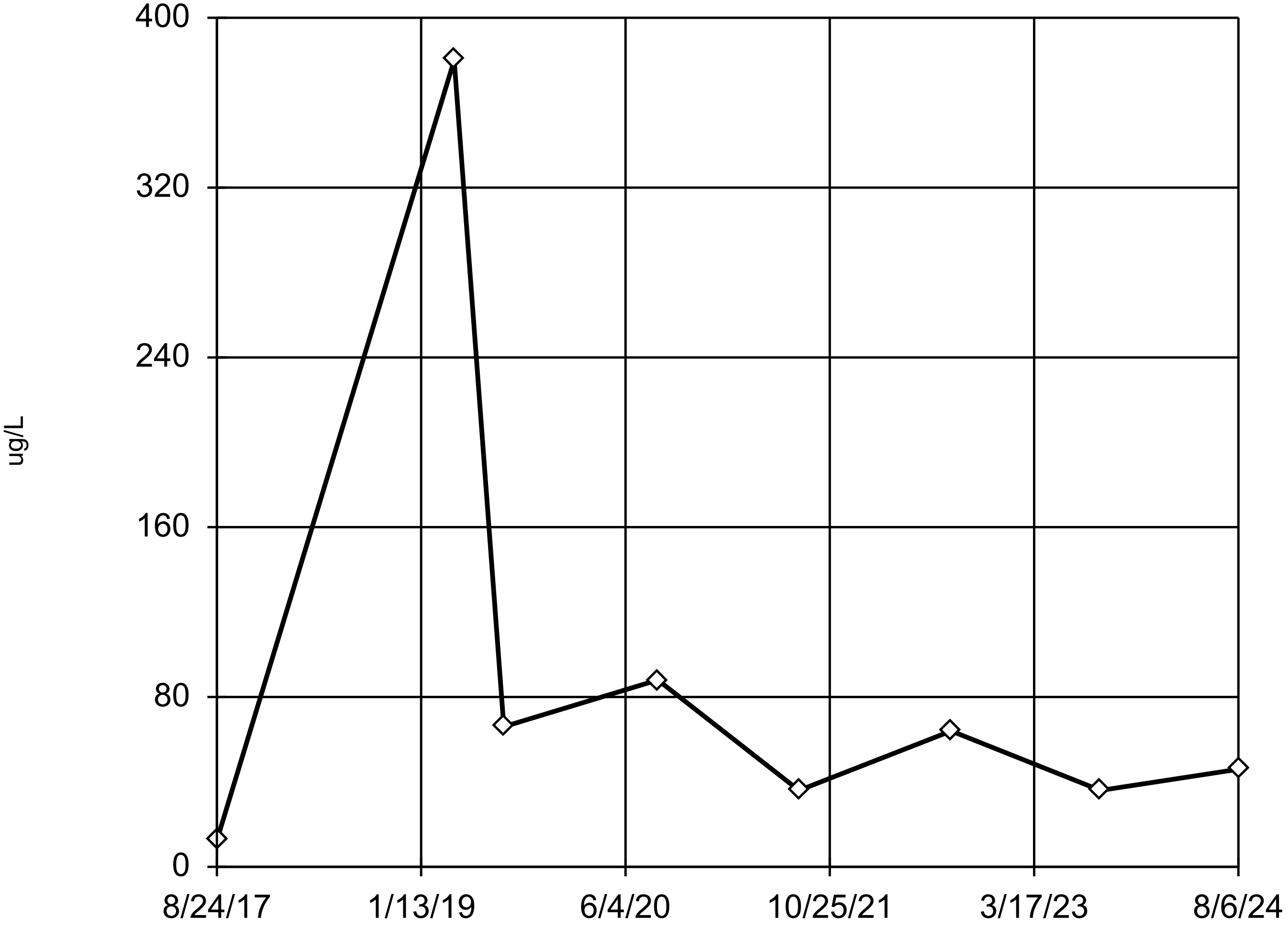
Constituent: Fluoride (mg/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow
Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
9/7/2016	0.48
8/24/2017	0.58
4/6/2019	0.35 (J)
8/7/2019	0.85
8/24/2020	0.47 (J)
8/10/2021	0.34 (J)
8/23/2022	<0.22 (UO)
8/29/2023	0.4 (J)
8/6/2024	0.46 (J)

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)

MW-1R (bg)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 91.06, std. dev. 119, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9279
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

EPA 1989 Outlier Screening

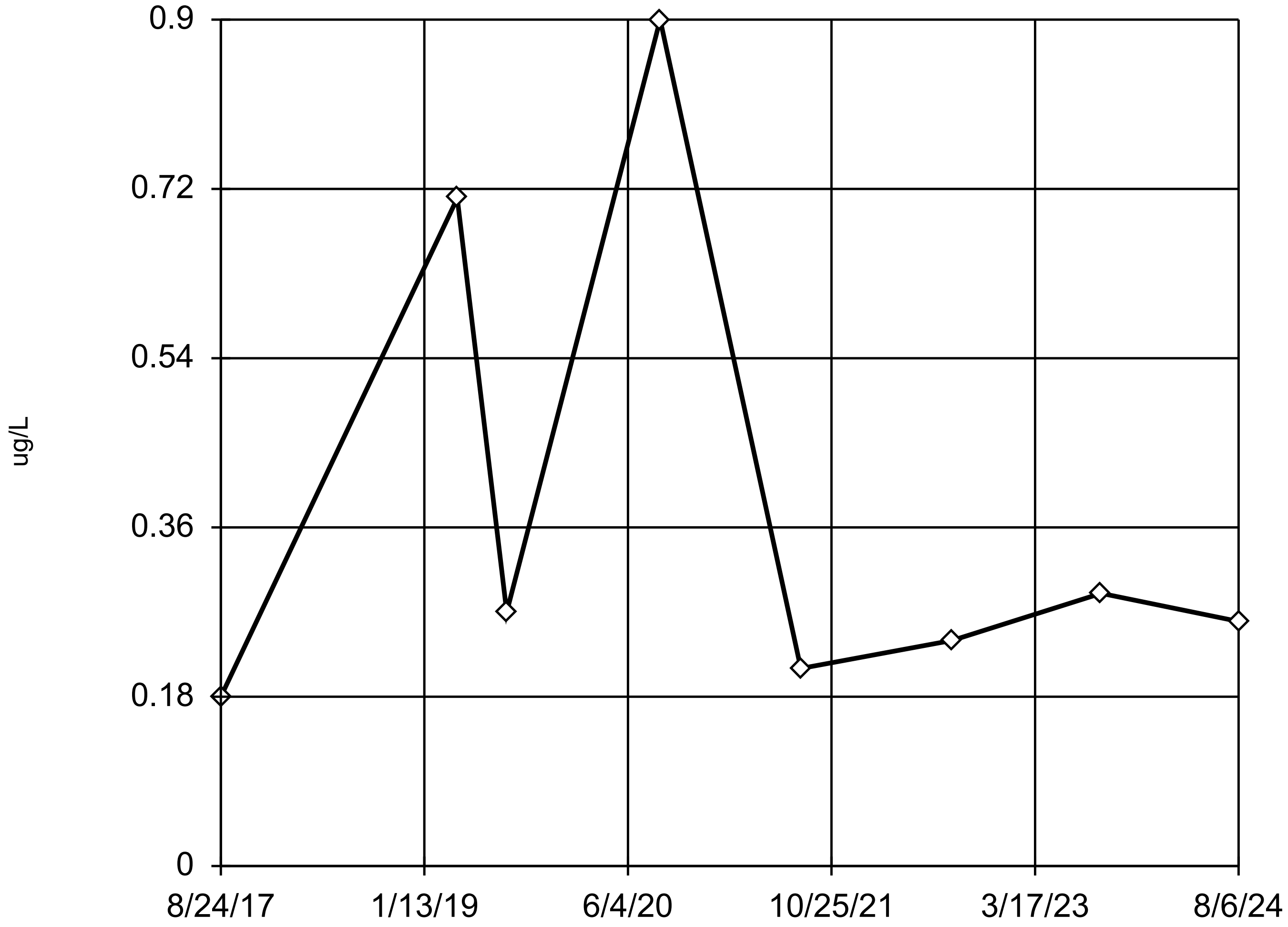
Constituent: Iron (ug/L) Analysis Run 10/21/2024 12:33 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	12.5 (J)
4/6/2019	380
8/7/2019	<66
8/24/2020	88 (J)
8/10/2021	<36
8/23/2022	64 (J)
8/29/2023	<36 (U)
8/6/2024	46 (J)

ND substitution: RL or RL/2 if <15% NDs.

Lead

MW-1R (bg)



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 1.325, low
cutoff = -0.6, based on
IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Tukey's Outlier Screening

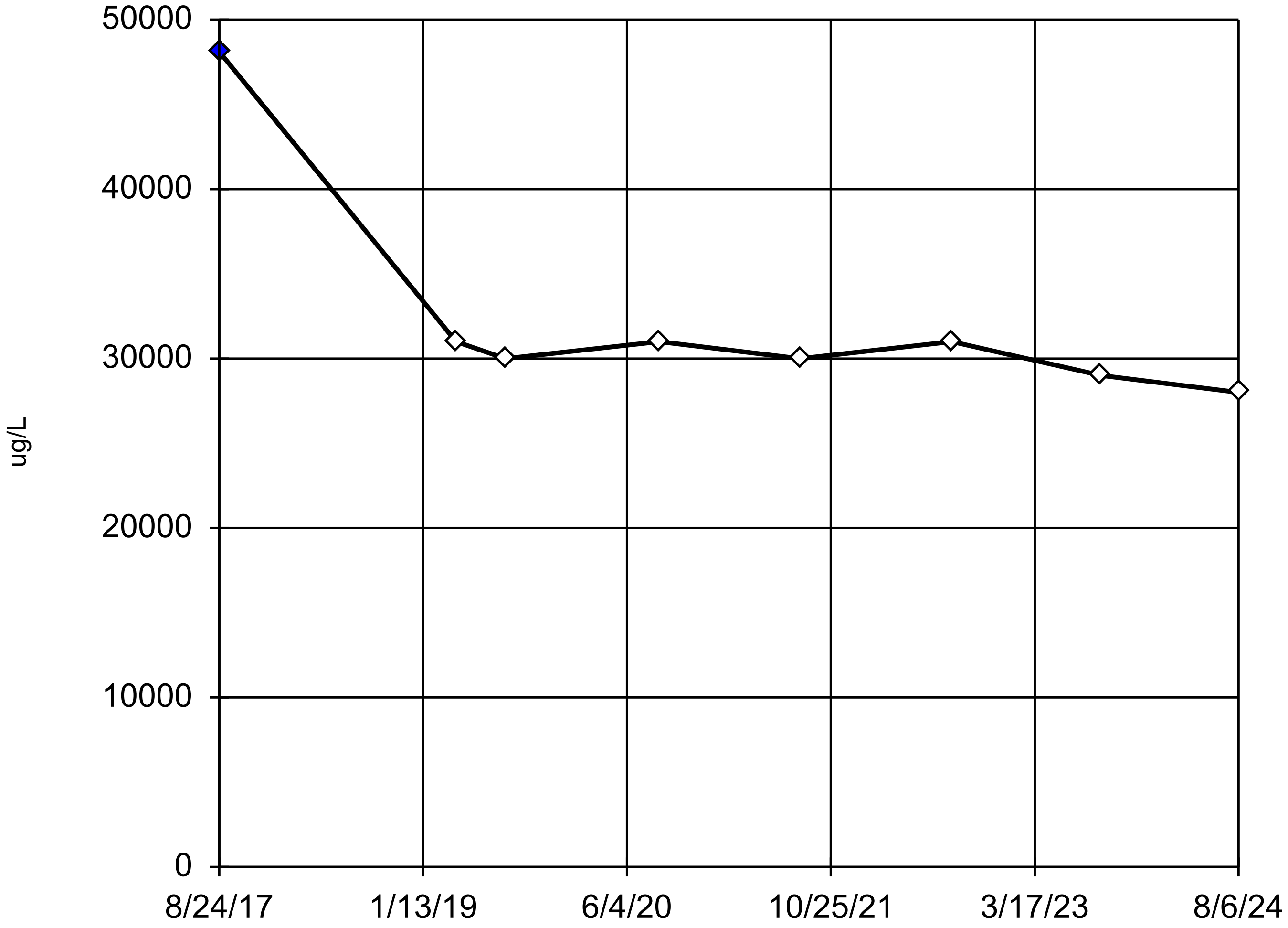
Constituent: Lead (ug/L) Analysis Run 10/21/2024 12:33 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	0.18 (J)
4/6/2019	0.71
8/7/2019	<0.27
8/24/2020	0.9
8/10/2021	<0.21
8/23/2022	<0.24 (U)
8/29/2023	0.29 (JB)
8/6/2024	<0.26

ND substitution: RL or RL/2 if <15% NDs.

Magnesium

MW-1R (bg)



n = 8

Statistical outlier is
drawn as solid.
Testing for 1 high outlier.
Mean = 32263.
Std. Dev. = 6488.
48100: c = 0.8953
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8556
Critical = 0.838
The distribution, after removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test   Analysis Run 10/21/2024 12:32 PM   View: Shallow

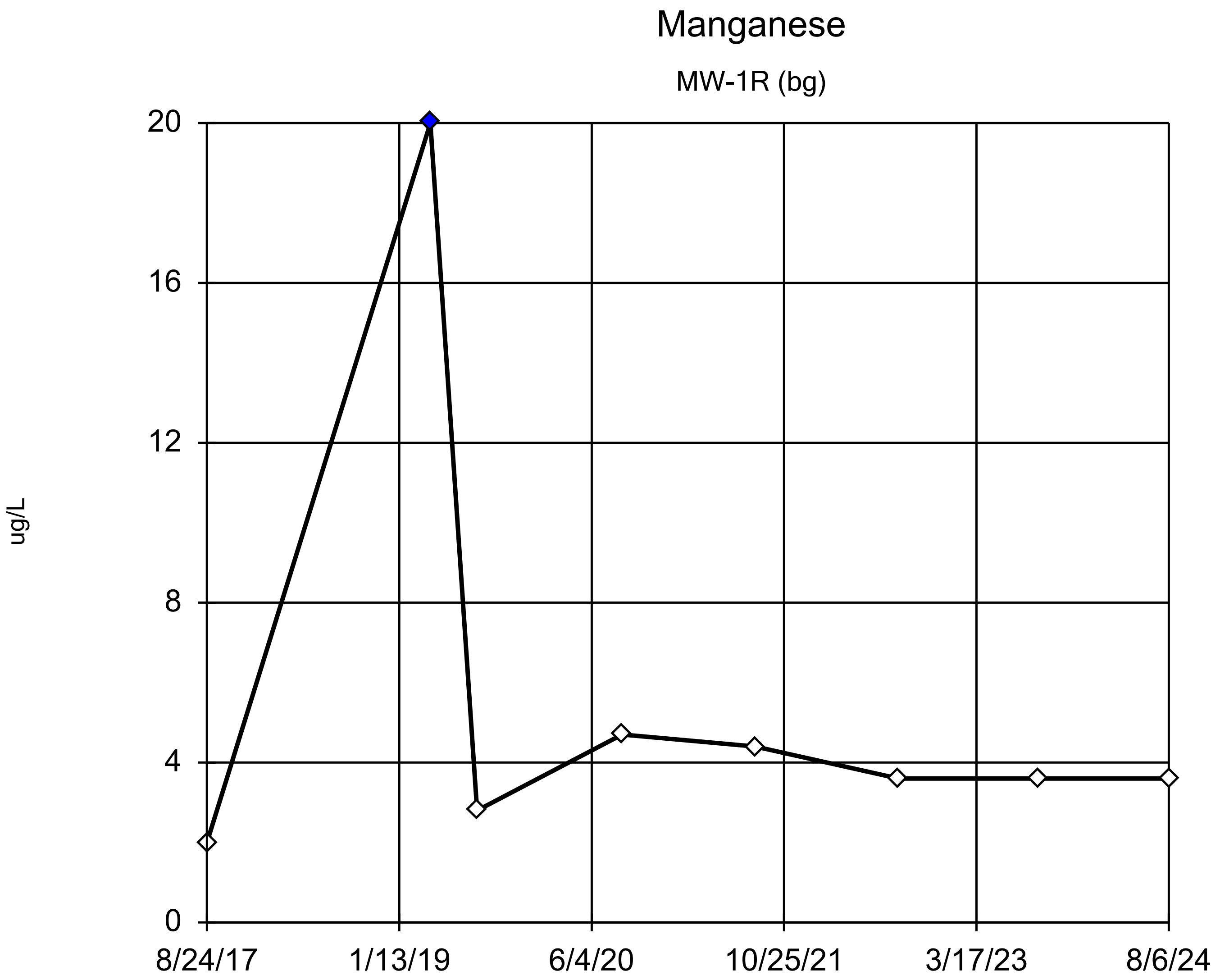
Ottumwa-Midland Landfill   Data: 191022-input-OML

Dixon's Outlier Test

Constituent: Magnesium (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	48100 (O)
4/6/2019	31000
8/7/2019	30000
8/24/2020	31000
8/10/2021	30000
8/23/2022	31000
8/29/2023	29000
8/6/2024	28000



n = 8

Statistical outlier is
drawn as solid.
Testing for 1 high outlier.
Mean = 5.587.
Std. Dev. = 5.885.
20: c = 0.8895
tabl = 0.554.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9373
Critical = 0.838
The distribution, after
removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test Analysis Run 10/21/2024 12:32 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Dixon's Outlier Test

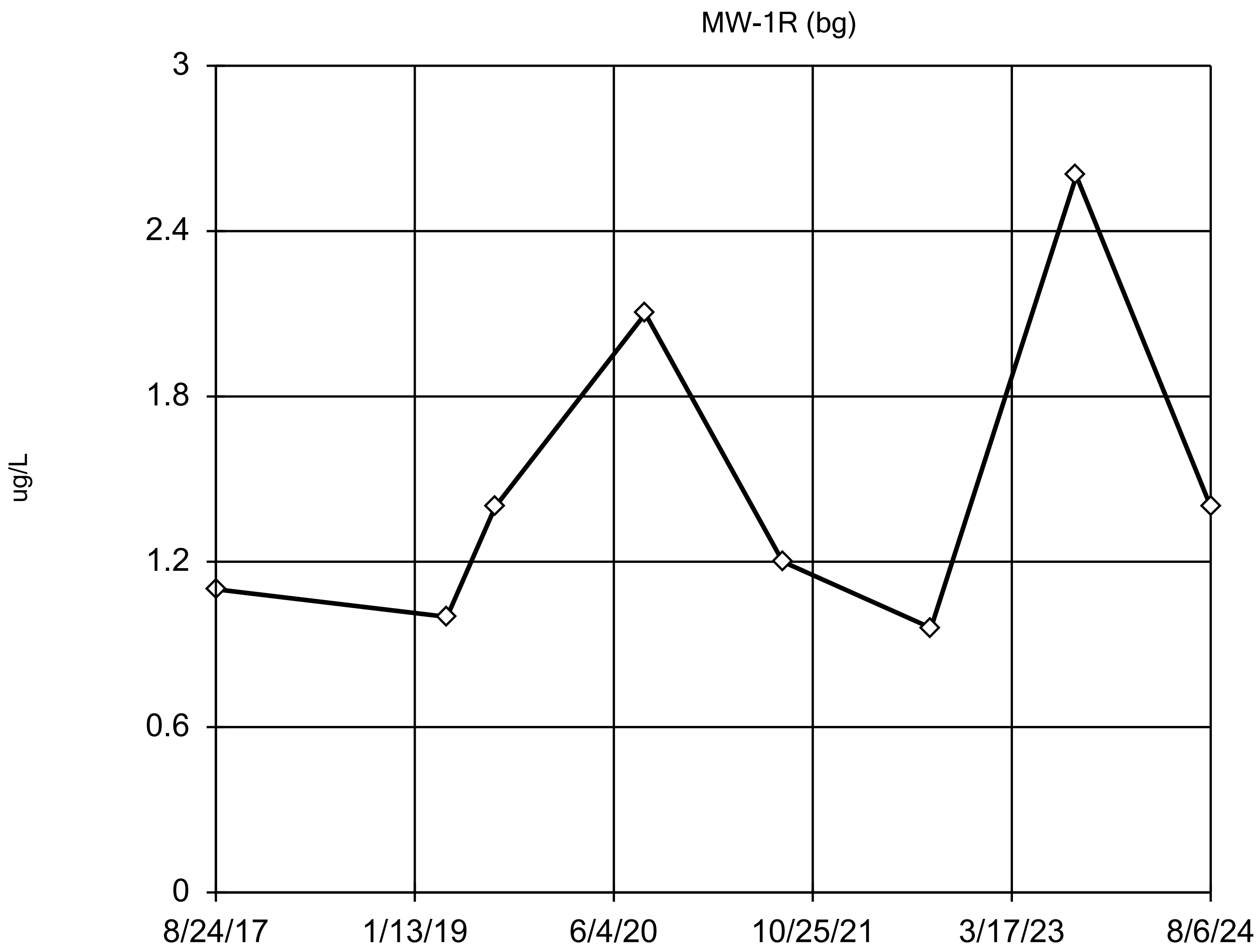
Constituent: Manganese (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	2
4/6/2019	20 (O)
8/7/2019	2.8 (J)
8/24/2020	4.7 (J)
8/10/2021	<4.4
8/23/2022	<3.6 (U)
8/29/2023	<3.6 (U)
8/6/2024	<3.6

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 1.47, std. dev. 0.5824, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8926
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

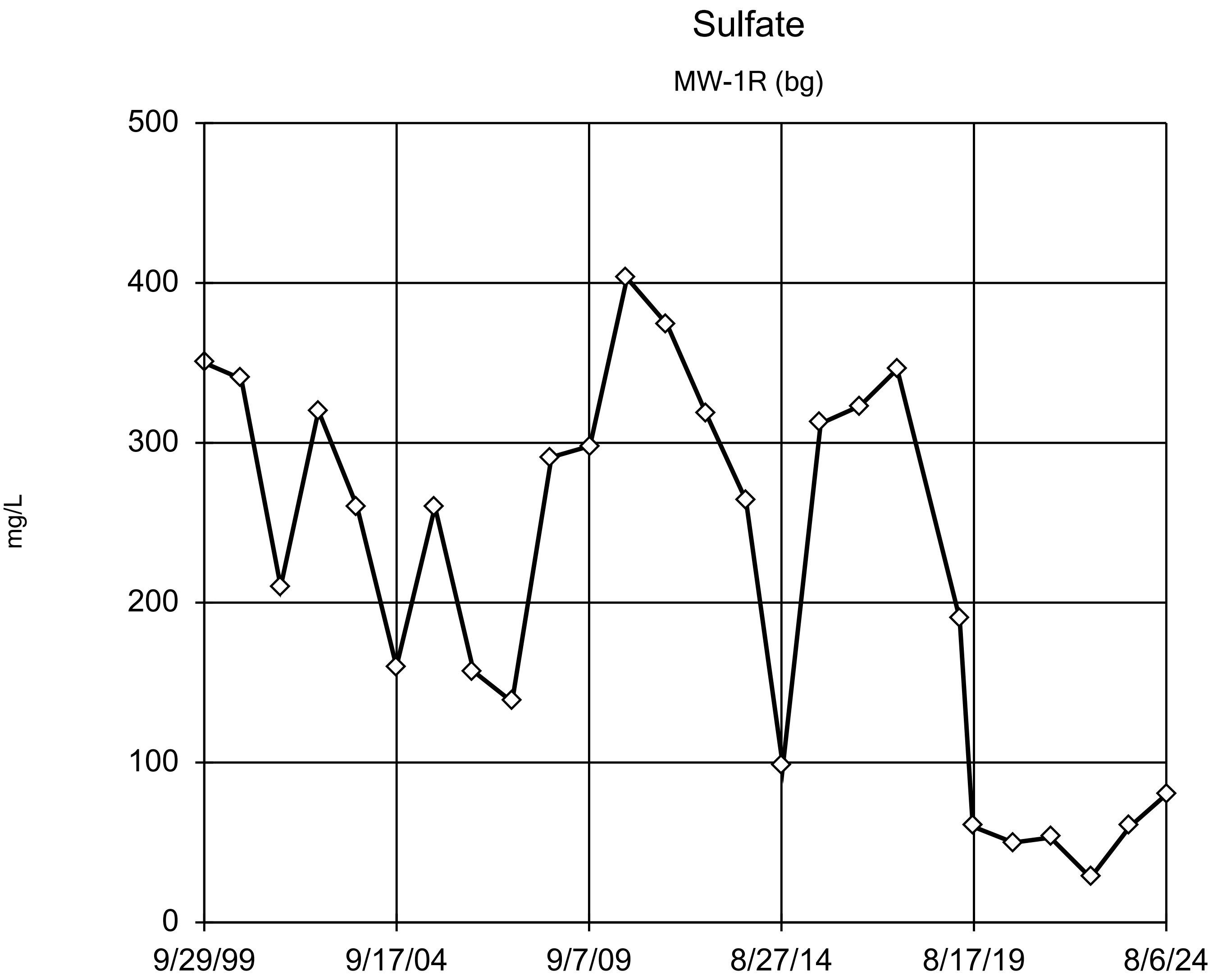
EPA 1989 Outlier Screening

Constituent: Selenium (ug/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	1.1
4/6/2019	<1
8/7/2019	1.4 (J)
8/24/2020	2.1 (J)
8/10/2021	1.2 (J)
8/23/2022	<0.96 (U)
8/29/2023	2.6 (J)
8/6/2024	<1.4

ND substitution: RL or RL/2 if <15% NDs.



n = 26

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 1019, low
cutoff = -608.9, based
on IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Tukey's Outlier Screening

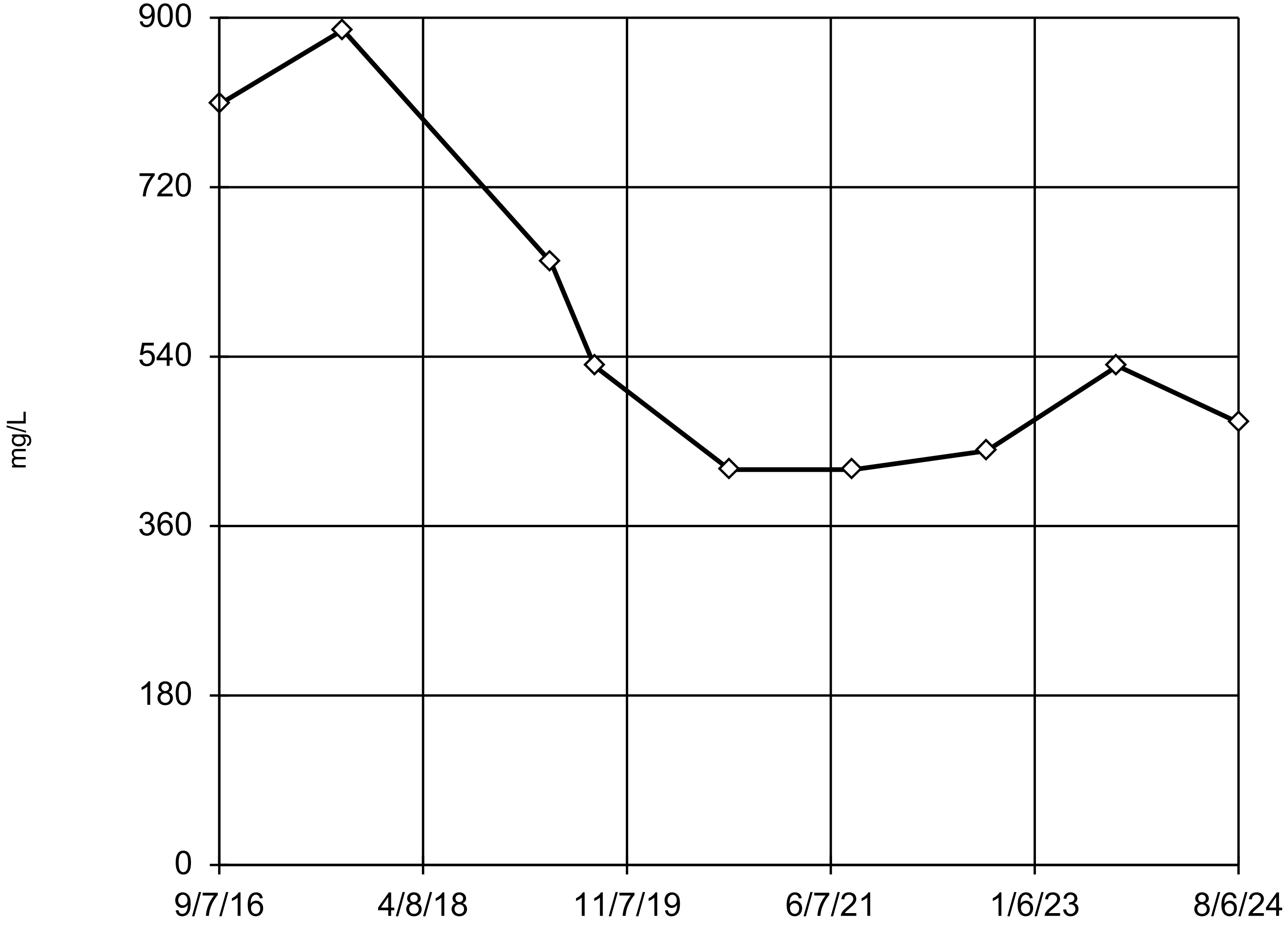
Constituent: Sulfate (mg/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
9/29/1999	350
9/13/2000	340
9/19/2001	210
9/11/2002	320
9/10/2003	260
9/15/2004	160
9/14/2005	260
9/13/2006	157
9/12/2007	138
9/17/2008	291
9/16/2009	298
8/31/2010	403
9/13/2011	374
9/18/2012	318
9/27/2013	264
9/10/2014	97.8
9/2/2015	312
9/7/2016	323
8/24/2017	346
4/6/2019	190
8/7/2019	60
8/24/2020	50
8/10/2021	53
8/23/2022	28
8/29/2023	60
8/6/2024	80

EPA Screening (suspected outliers for Dixon's Test)

MW-1R (bg)



n = 9

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 571.7, std. dev. 172.2, critical Tn 2.11

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8753
Critical = 0.859 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening

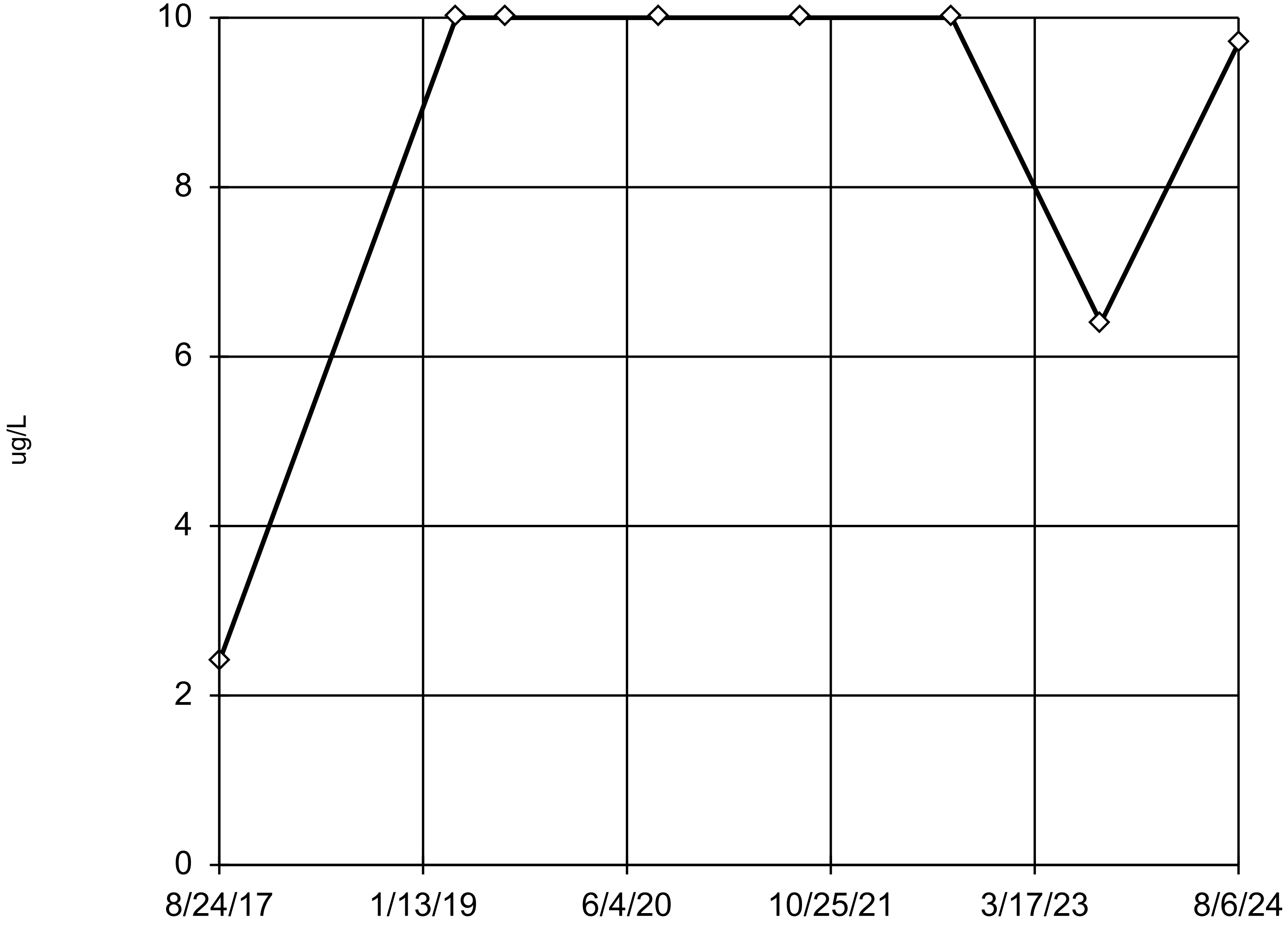
Constituent: Total Dissolved Solids (mg/L)   Analysis Run 10/21/2024 12:33 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)
9/7/2016	808
8/24/2017	887
4/6/2019	640
8/7/2019	530
8/24/2020	420
8/10/2021	420
8/23/2022	440
8/29/2023	530
8/6/2024	470

Zinc

MW-1R (bg)



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 15.85, low
cutoff = 2.2, based on
IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 12:32 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Tukey's Outlier Screening

Constituent: Zinc (ug/L) Analysis Run 10/21/2024 12:33 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)
8/24/2017	2.4 (J)
4/6/2019	<10
8/7/2019	<10
8/24/2020	<10
8/10/2021	<10
8/23/2022	<10 (U)
8/29/2023	<6.4 (U)
8/6/2024	<9.7

ND substitution: RL or RL/2 if <15% NDs.

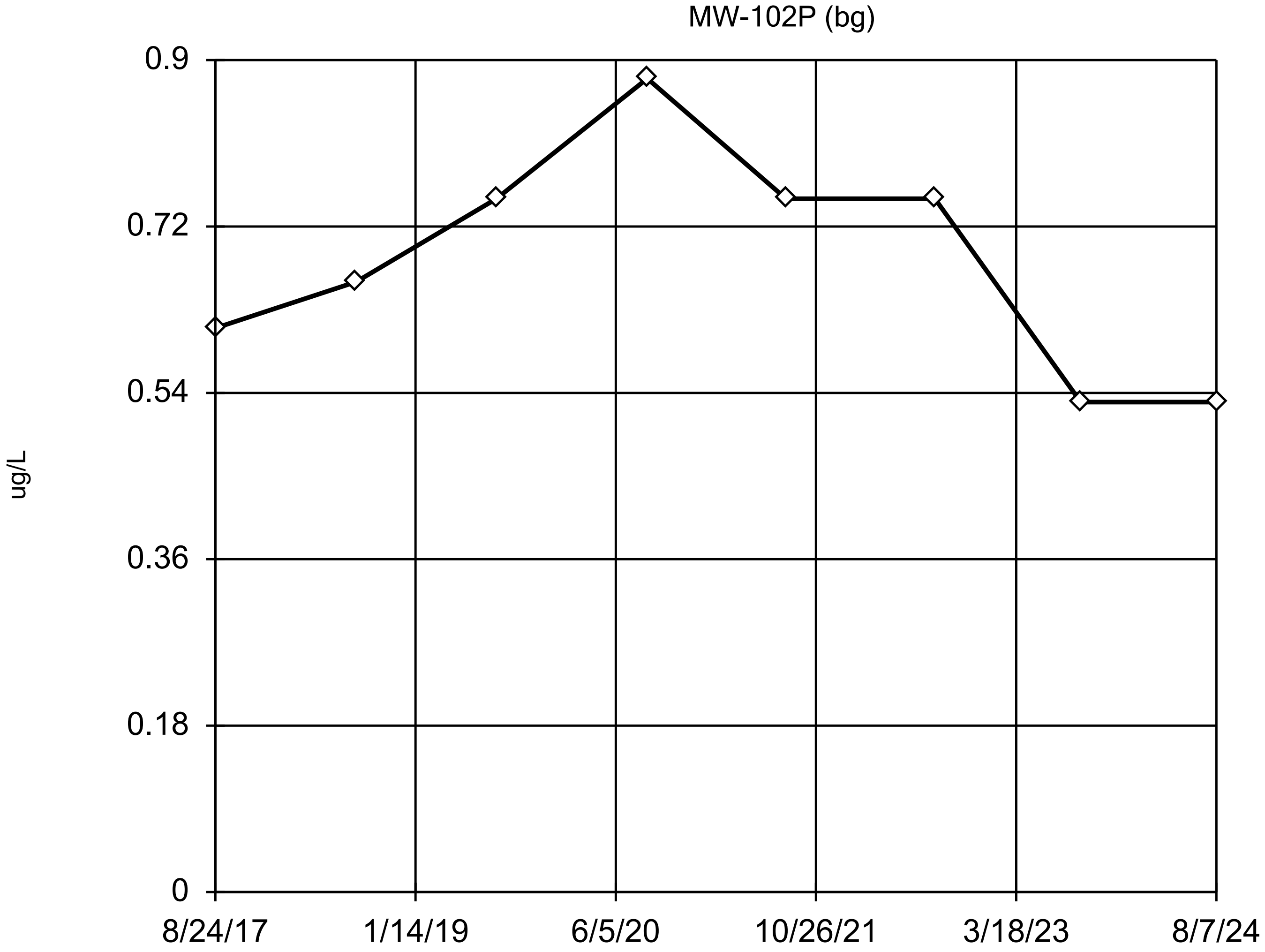
D4 – Outlier Analysis Results - Pennsylvanian

Outlier Analysis

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML   Printed 10/21/2024, 5:56 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Arsenic (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.6825	0.1224	normal	ShapiroWilk
Barium (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	23.74	1.539	normal	ShapiroWilk
Beryllium (ug/L)	**MW-102P (bg)**	**Yes**	**1.3**	**8/29/2023**	**NP (nrm)**	**NaN**	**8**	**0.3554**	**0.3955**	**unknown**	**ShapiroWilk**
Boron (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	1674	191.9	normal	ShapiroWilk
Chloride (mg/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	13	8.892	0.3989	normal	ShapiroWilk
Cobalt (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	1.021	0.2288	normal	ShapiroWilk
Copper (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	1.801	1.285	normal	ShapiroWilk
Fluoride (mg/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	9	0.5344	0.2335	normal	ShapiroWilk
Iron (ug/L)	MW-102P (bg)	No	n/a	n/a	NP (nrm)	NaN	8	4733	1241	unknown	ShapiroWilk
Lead (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	0.3345	0.3309	ln(x)	ShapiroWilk
Magnesium (ug/L)	MW-102P (bg)	No	n/a	n/a	NP (nrm)	NaN	8	150875	20153	unknown	ShapiroWilk
Manganese (ug/L)	MW-102P (bg)	No	n/a	n/a	NP (nrm)	NaN	8	492.8	99.23	unknown	ShapiroWilk
Selenium (ug/L)	MW-102P (bg)	No	n/a	n/a	NP (nrm)	NaN	8	0.8707	0.4972	unknown	ShapiroWilk
Sulfate (mg/L)	**MW-102P (bg)**	**Yes**	**1000**	**8/24/2022**	**Dixon`s**	**0.05**	**13**	**1624**	**272.5**	**normal**	**ShapiroWilk**
Total Dissolved Solids (mg/L)	**MW-102P (bg)**	**Yes**	**310**	**8/11/2021**	**Dixon`s**	**0.05**	**9**	**2488**	**856.4**	**normal**	**ShapiroWilk**
Zinc (ug/L)	MW-102P (bg)	No	n/a	n/a	EPA 1989	0.05	8	13.48	12.02	ln(x)	ShapiroWilk

EPA Screening (suspected outliers for Dixon's Test)



n = 8

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 0.6825, std. dev. 0.1224, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9209
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

EPA 1989 Outlier Screening

Constituent: Arsenic (ug/L) Analysis Run 10/21/2024 5:55 PM View: Pennsylvanian Unit

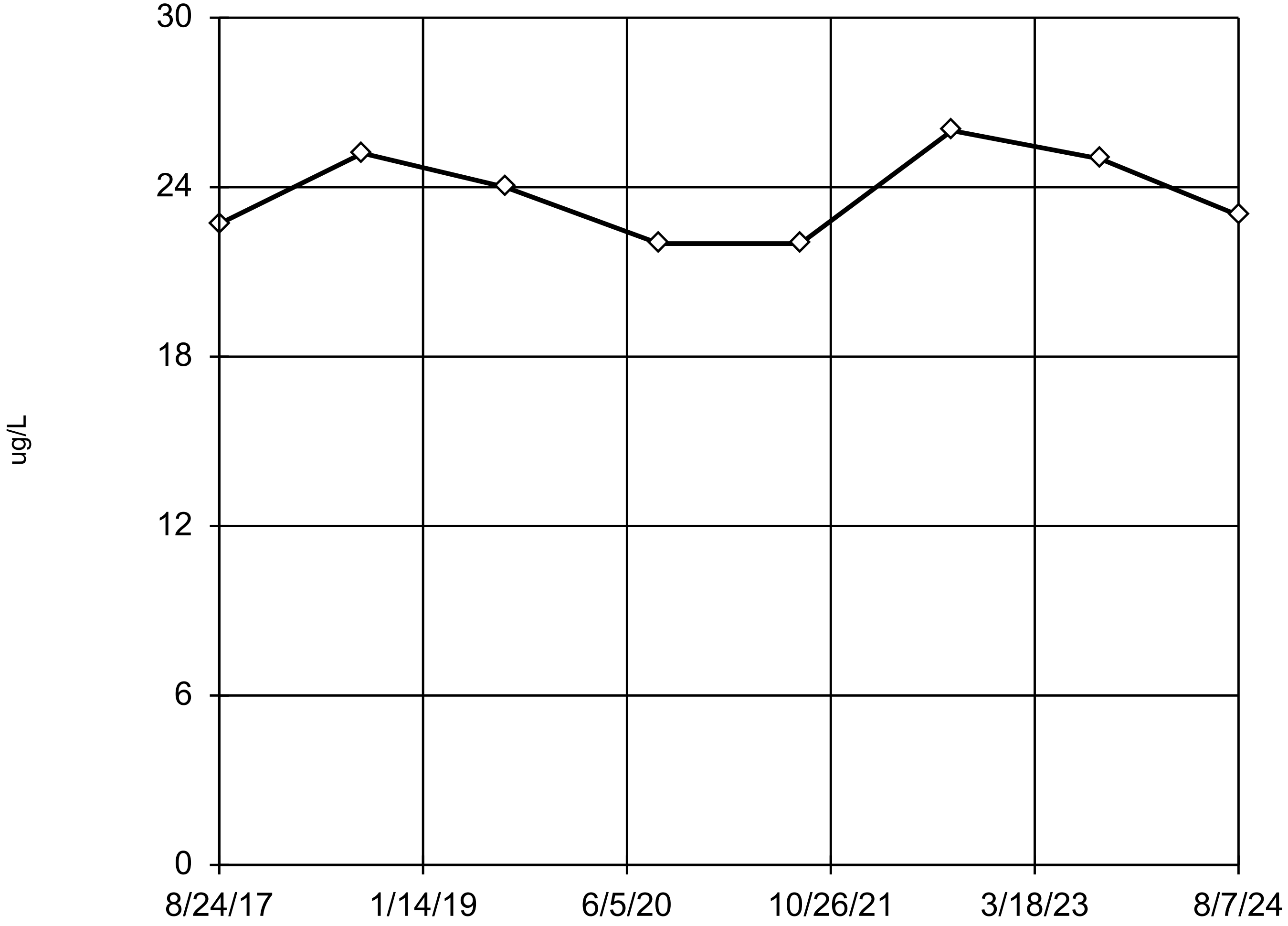
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	0.61 (J)
8/16/2018	0.66 (J)
8/7/2019	<0.75
8/24/2020	<0.88
8/11/2021	<0.75
8/24/2022	<0.75 (U)
8/29/2023	<0.53 (U)
8/7/2024	<0.53

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 8

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 23.74, std. dev. 1.539, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9129
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

EPA 1989 Outlier Screening

Constituent: Barium (ug/L) Analysis Run 10/21/2024 5:55 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	22.7
8/16/2018	25.2
8/7/2019	24
8/24/2020	22
8/11/2021	22 (B)
8/24/2022	26
8/29/2023	25
8/7/2024	23

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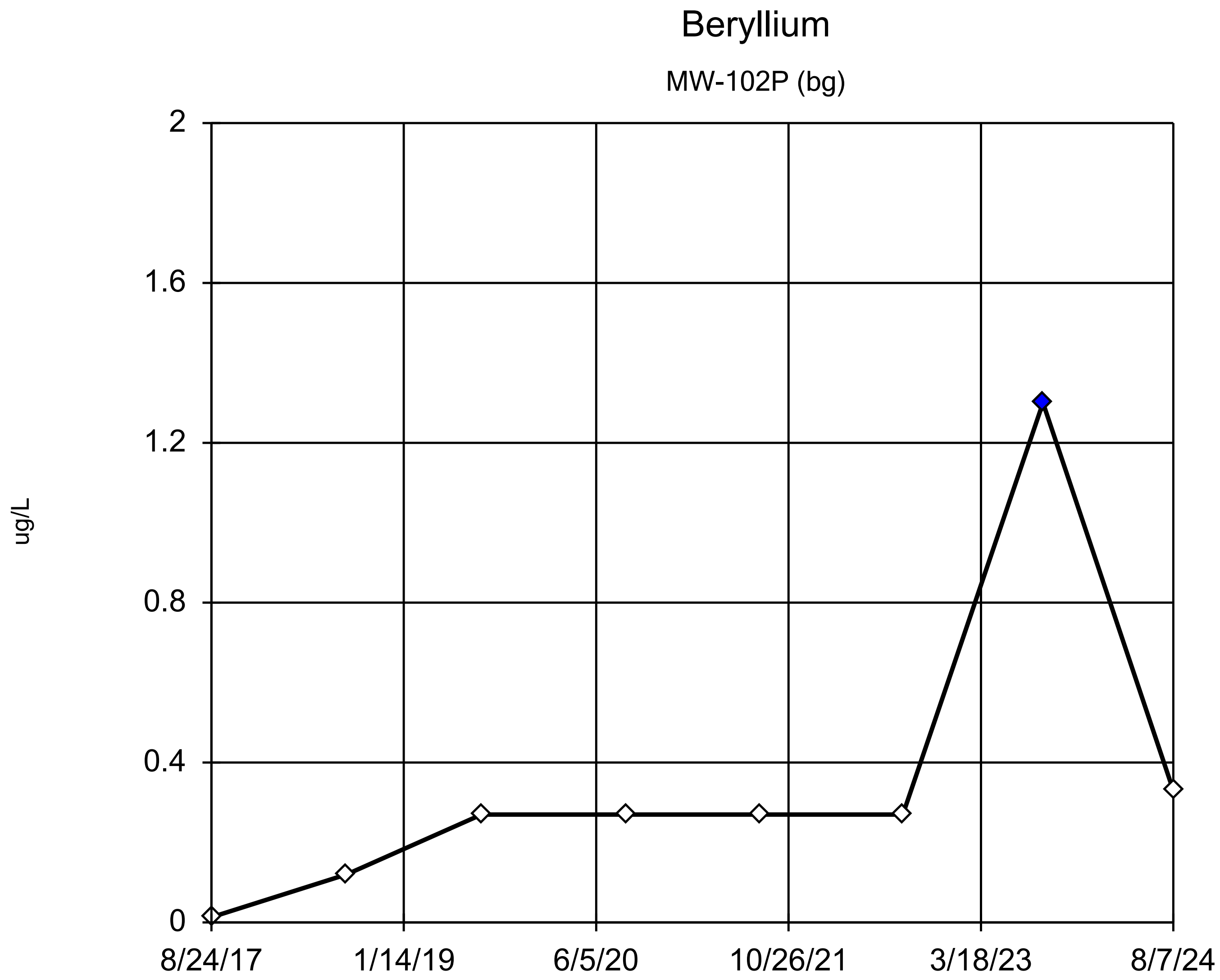


n = 8

Outlier is drawn as solid.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 0.615, low
cutoff = -0.12, based
on IQR multiplier of 3.

Tukey's Outlier Screening Analysis Run 10/21/2024 5:53 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Tukey's Outlier Screening

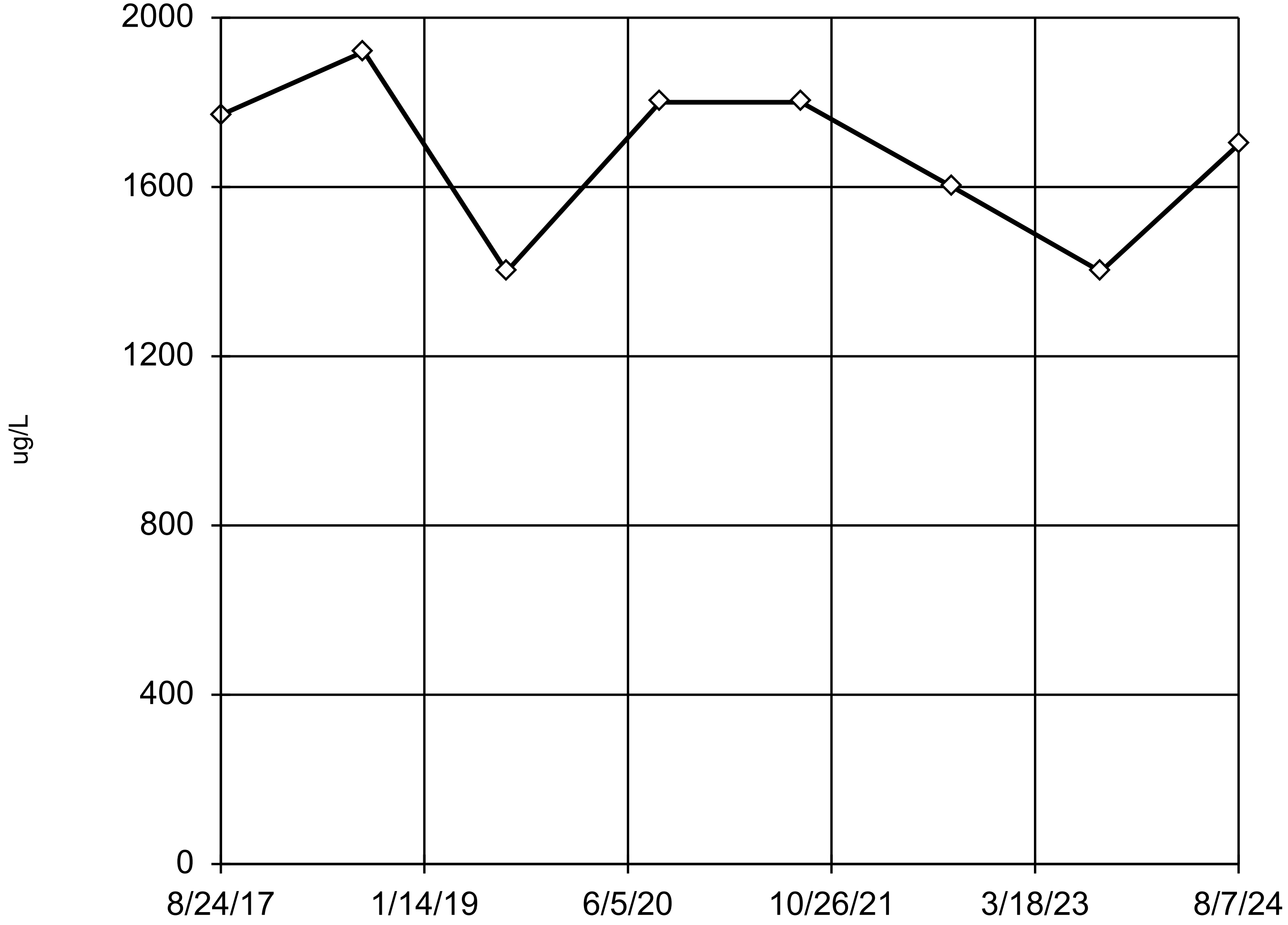
Constituent: Beryllium (ug/L) Analysis Run 10/21/2024 5:55 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	0.013 (J)
8/16/2018	<0.12
8/7/2019	<0.27
8/24/2020	<0.27
8/11/2021	<0.27
8/24/2022	<0.27 (U)
8/29/2023	<1.3 (UO)
8/7/2024	<0.33

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 1674, std. dev. 191.9, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8939
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

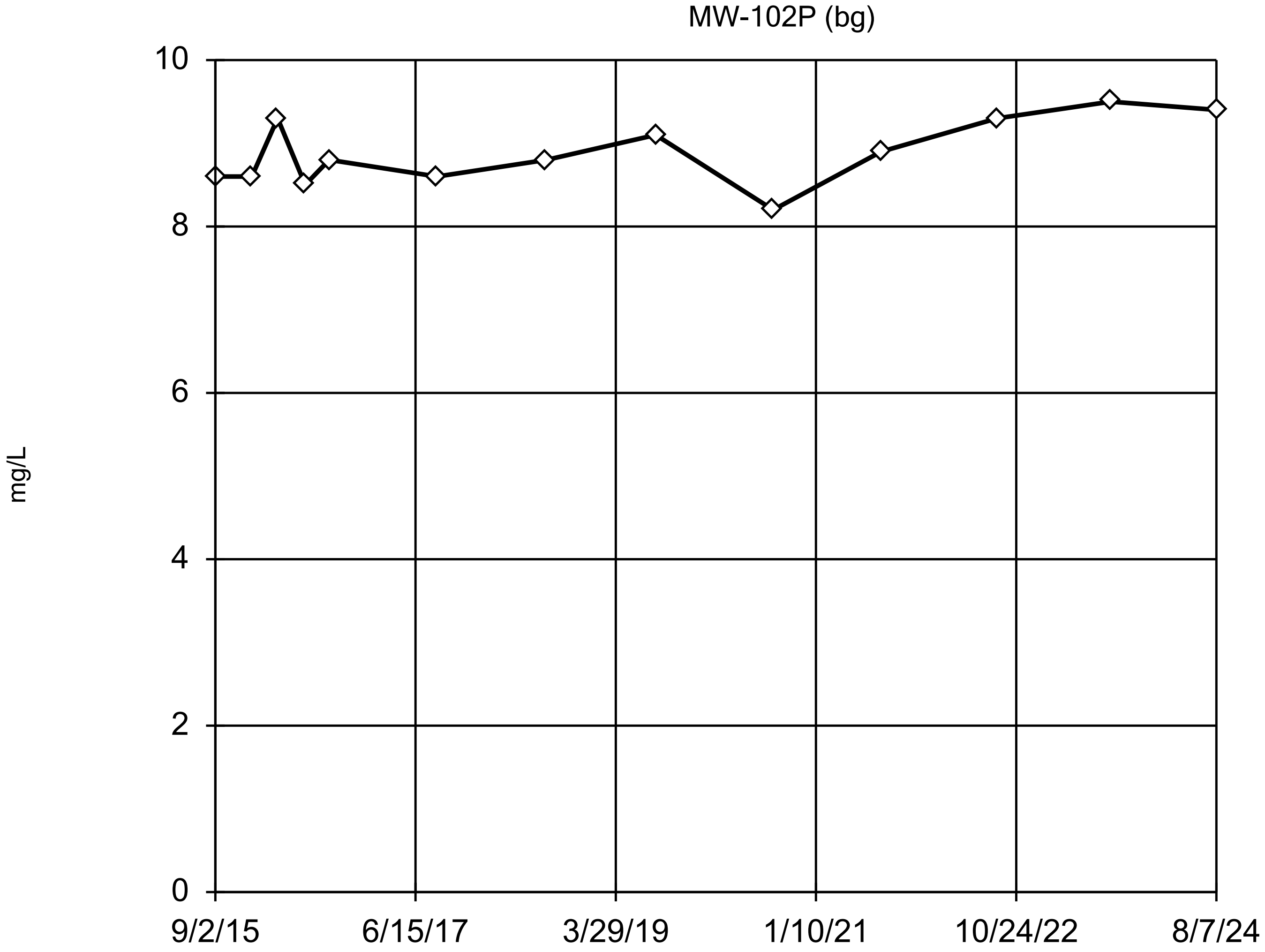
EPA 1989 Outlier Screening

Constituent: Boron (ug/L)   Analysis Run 10/21/2024 5:55 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	1770
8/16/2018	1920
8/7/2019	1400 (B)
8/24/2020	1800
8/11/2021	1800
8/24/2022	1600
8/29/2023	1400
8/7/2024	1700

EPA Screening (suspected outliers for Dixon's Test)



n = 13

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 8.892, std. dev. 0.3989, critical Tn 2.331

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9469
Critical = 0.889
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening Analysis Run 10/21/2024 5:53 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

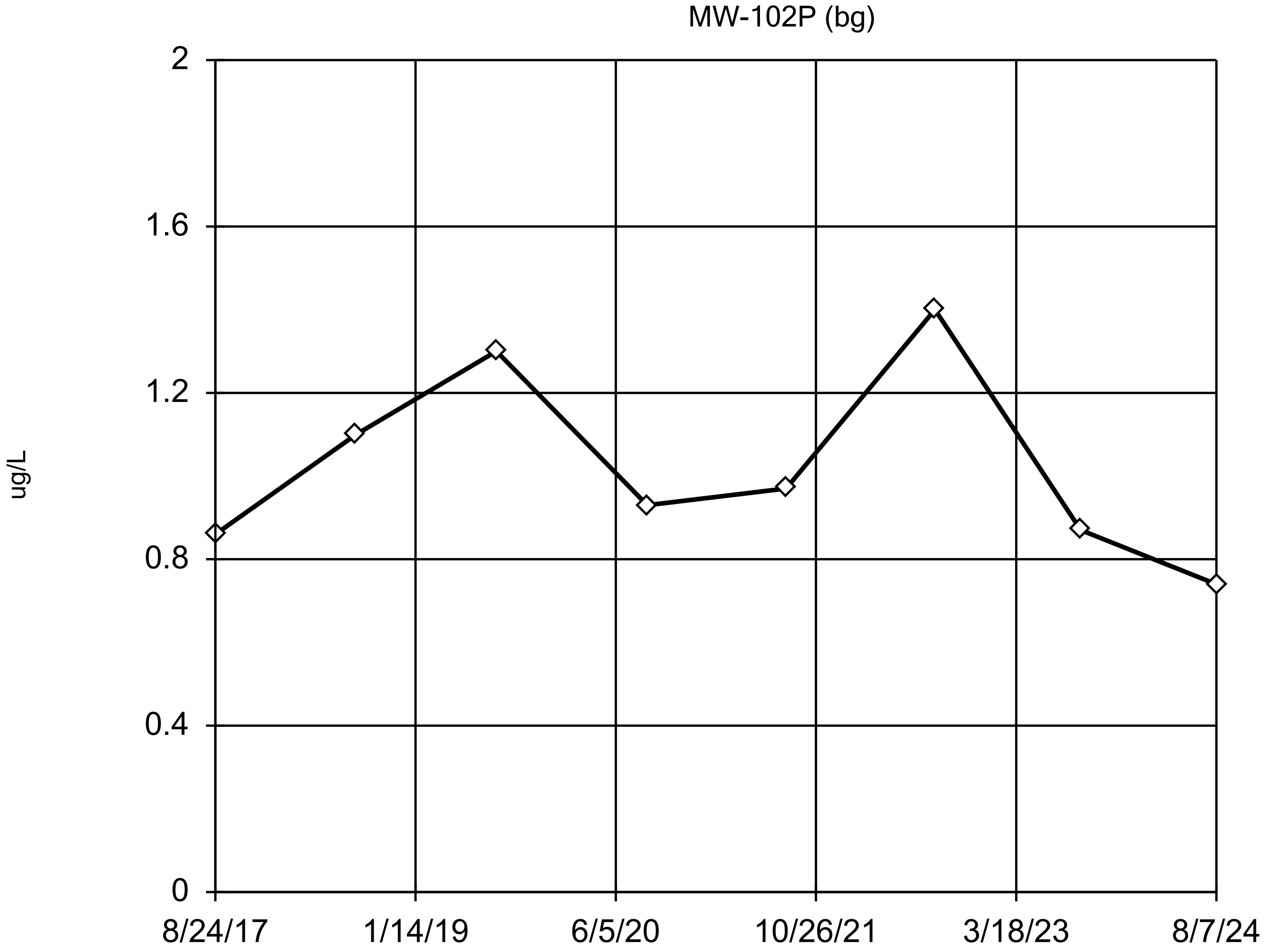
EPA 1989 Outlier Screening

Constituent: Chloride (mg/L)   Analysis Run 10/21/2024 5:55 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
9/2/2015	8.6
12/30/2015	8.6
3/23/2016	9.3
6/21/2016	8.5
9/7/2016	8.8
8/24/2017	8.6
8/16/2018	8.8
8/7/2019	9.1
8/24/2020	8.2
8/11/2021	8.9
8/24/2022	9.3
8/29/2023	9.5
8/7/2024	9.4

EPA Screening (suspected outliers for Dixon's Test)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 1.021, std. dev. 0.2288, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9215
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

EPA 1989 Outlier Screening

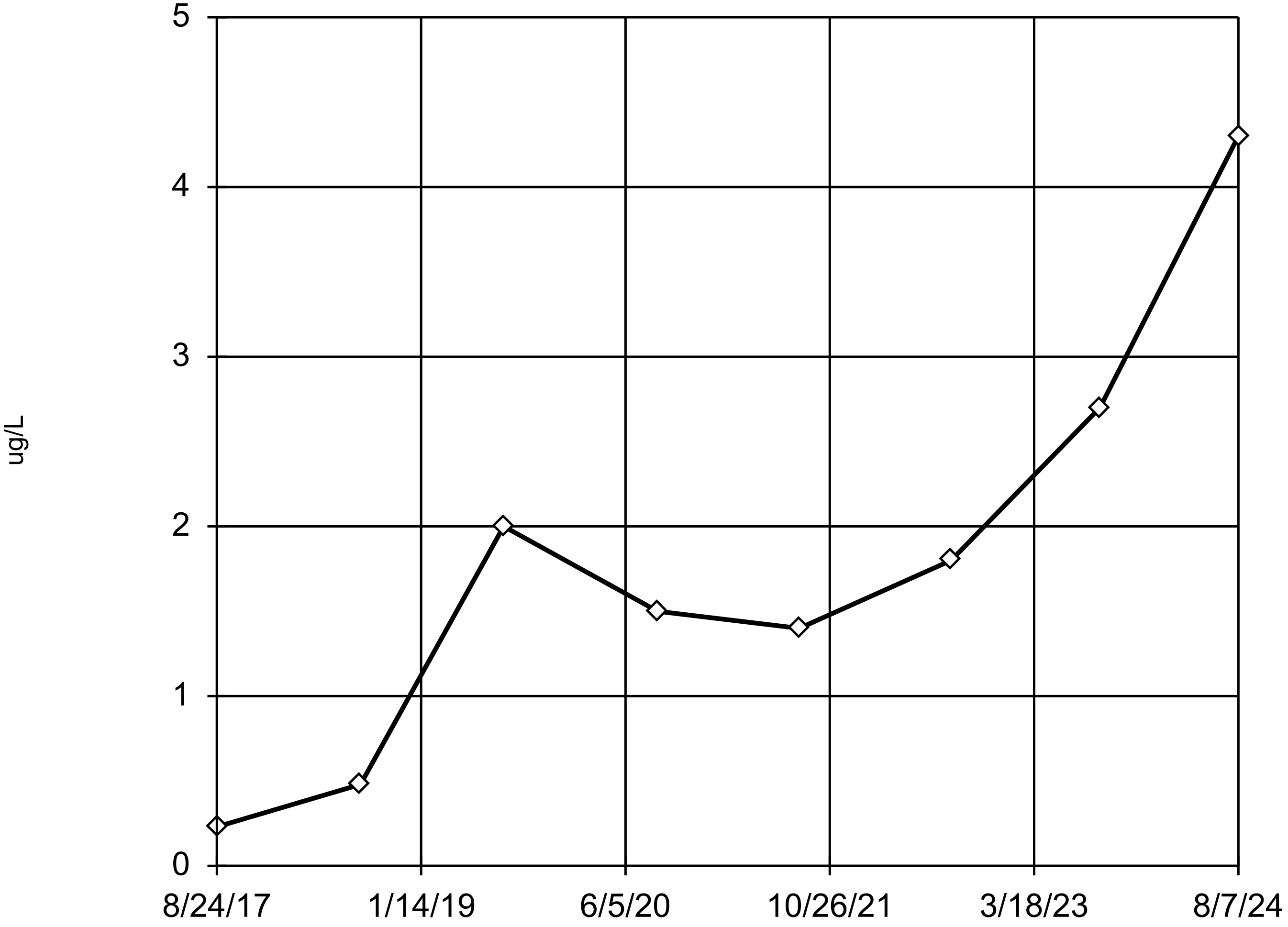
Constituent: Cobalt (ug/L) Analysis Run 10/21/2024 5:55 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	0.86 (J)
8/16/2018	1.1
8/7/2019	1.3 (J)
8/24/2020	0.93
8/11/2021	0.97
8/24/2022	1.4
8/29/2023	0.87
8/7/2024	0.74

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 8

Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 1.801, std. dev. 1.285, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9348
Critical = 0.851
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

EPA 1989 Outlier Screening

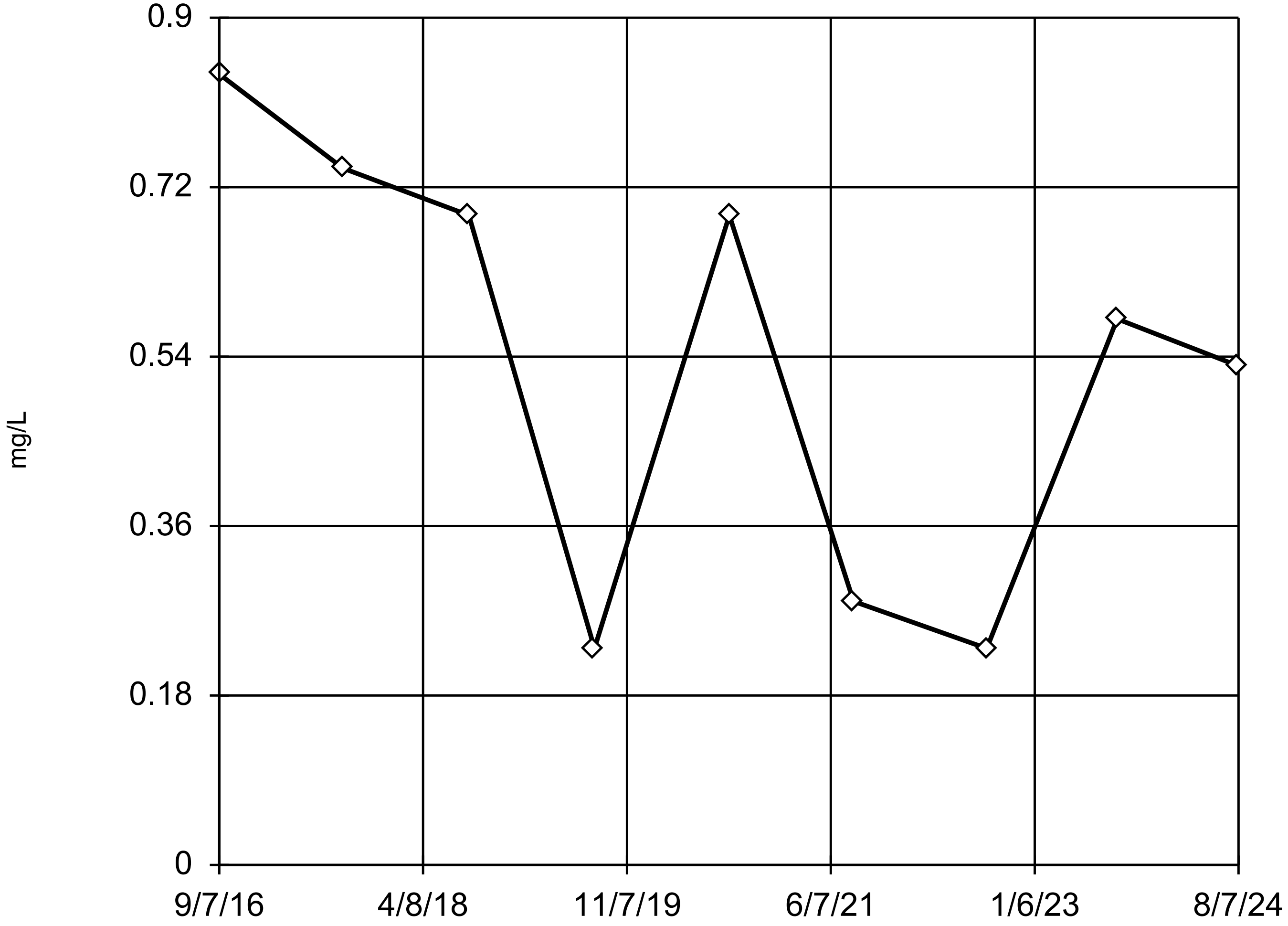
Constituent: Copper (ug/L)   Analysis Run 10/21/2024 5:56 PM   View: Pennsylvanian Unit
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	0.23 (J)
8/16/2018	<0.48
8/7/2019	<2
8/24/2020	<1.5
8/11/2021	<1.4
8/24/2022	<1.8 (U)
8/29/2023	2.7 (J)
8/7/2024	4.3 (J)

ND substitution: RL or RL/2 if <15% NDs.

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 9

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.5344, std. dev. 0.2335, critical Tn 2.11

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.8834
Critical = 0.859
The distribution was found to be normally distributed.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

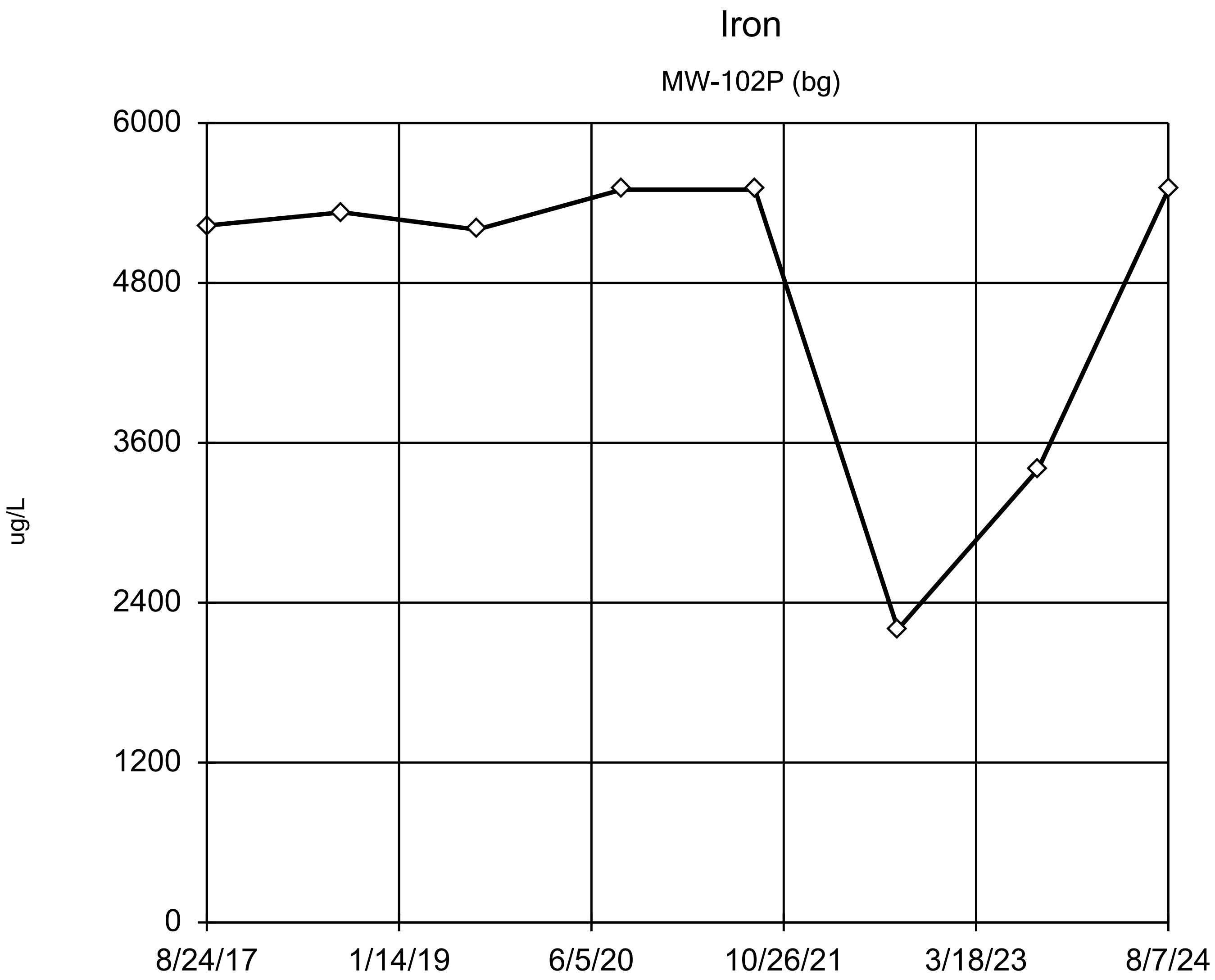
EPA 1989 Outlier Screening

Constituent: Fluoride (mg/L)   Analysis Run 10/21/2024 5:56 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
9/7/2016	0.84
8/24/2017	0.74
8/16/2018	0.69
8/7/2019	<0.23
8/24/2020	0.69
8/11/2021	<0.28
8/24/2022	0.23 (J)
8/29/2023	0.58 (J)
8/7/2024	0.53 (J)

ND substitution: RL or RL/2 if <15% NDs.



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 9100, low
cutoff = 700, based on
IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

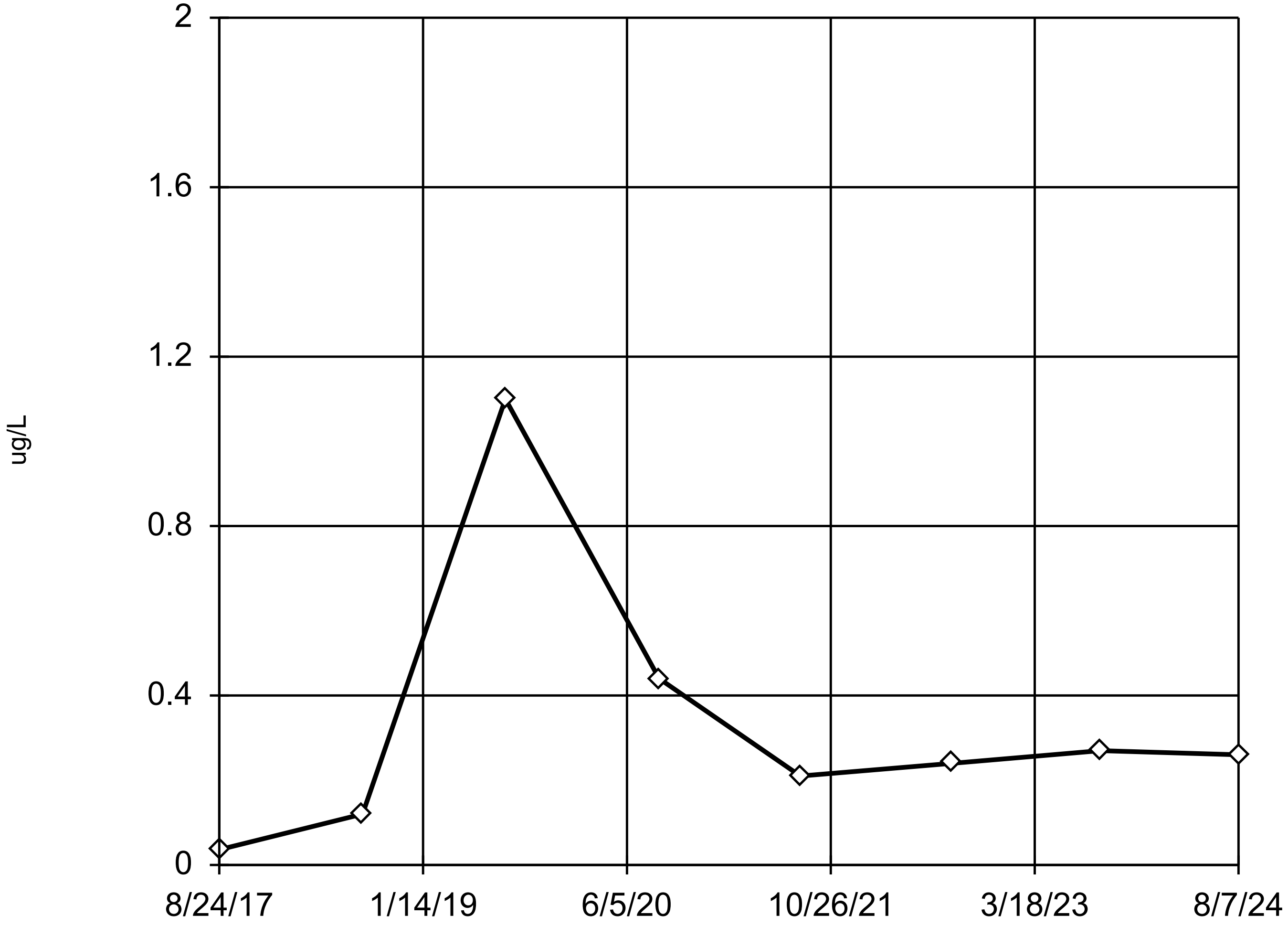
Tukey's Outlier Screening

Constituent: Iron (ug/L) Analysis Run 10/21/2024 5:56 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	5230
8/16/2018	5330
8/7/2019	5200
8/24/2020	5500
8/11/2021	5500
8/24/2022	2200
8/29/2023	3400
8/7/2024	5500

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 0.3345, std. dev. 0.3309, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9428
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

EPA 1989 Outlier Screening

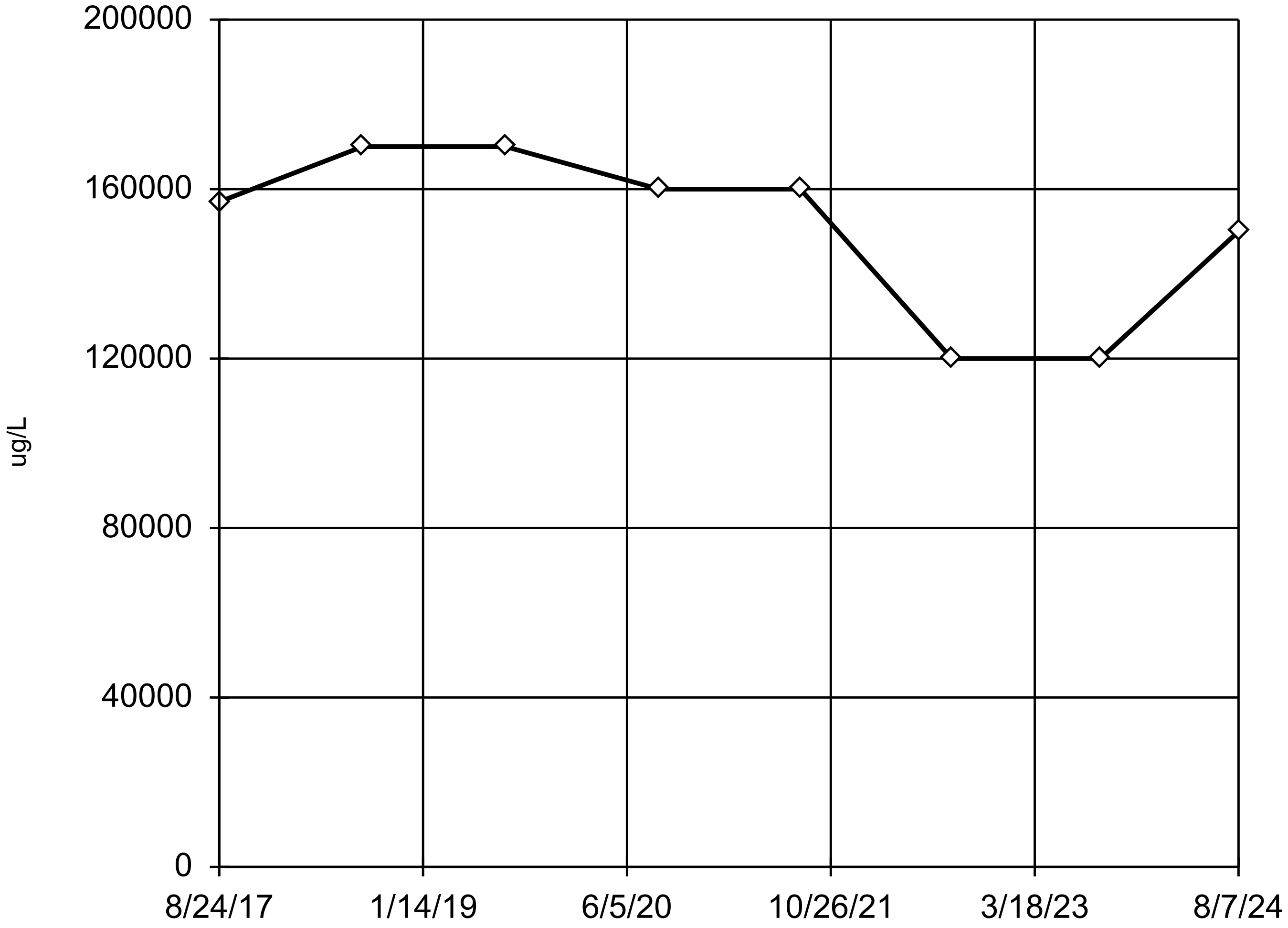
Constituent: Lead (ug/L)   Analysis Run 10/21/2024 5:56 PM   View: Pennsylvanian Unit
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	0.036 (J)
8/16/2018	<0.12
8/7/2019	<1.1
8/24/2020	<0.44
8/11/2021	<0.21
8/24/2022	<0.24 (U)
8/29/2023	0.27 (JB)
8/7/2024	<0.26

ND substitution: RL or RL/2 if <15% NDs.

Magnesium

MW-102P (bg)



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 255000,
low cutoff = 45000, based
on IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

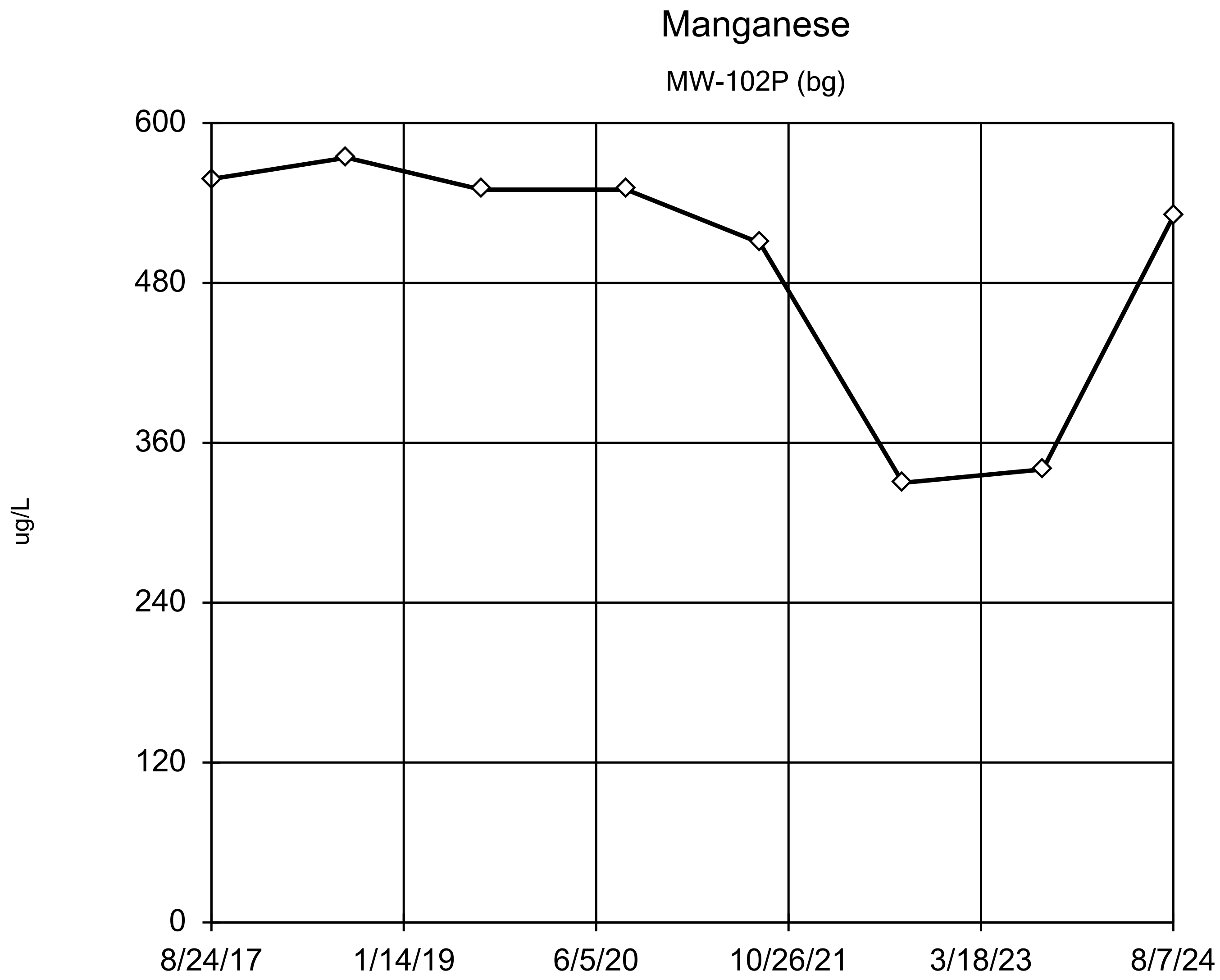
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Tukey's Outlier Screening

Constituent: Magnesium (ug/L) Analysis Run 10/21/2024 5:56 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	157000
8/16/2018	170000
8/7/2019	170000
8/24/2020	160000
8/11/2021	160000
8/24/2022	120000
8/29/2023	120000
8/7/2024	150000



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 941, low
cutoff = 38, based on
IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

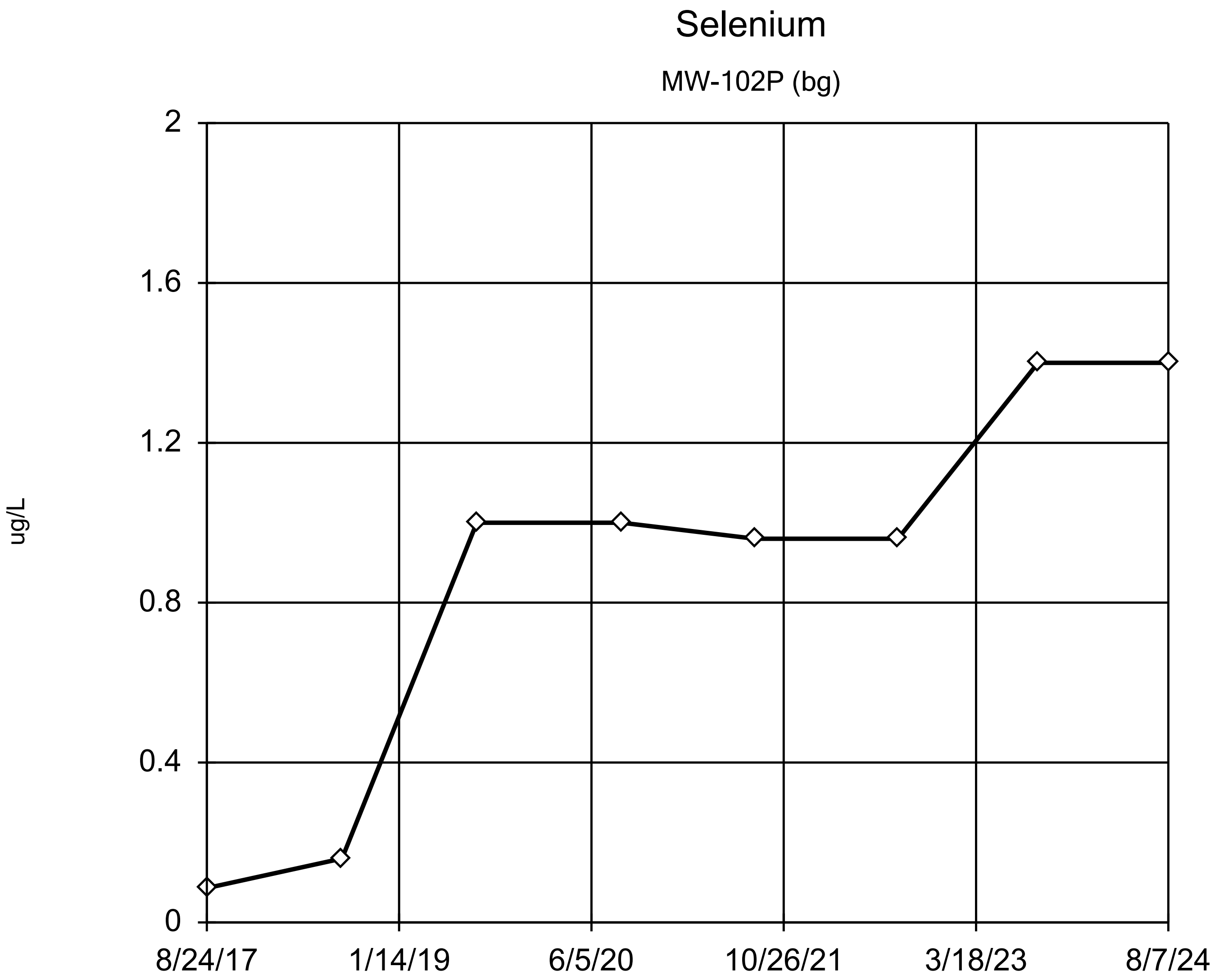
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Tukey's Outlier Screening

Constituent: Manganese (ug/L)   Analysis Run 10/21/2024 5:56 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	558
8/16/2018	574
8/7/2019	550
8/24/2020	550
8/11/2021	510
8/24/2022	330
8/29/2023	340
8/7/2024	530



n = 8

No outliers found.
Tukey's method used in
lieu of parametric test
because the Shapiro Wilk
normality test failed
at the 0.1 alpha level.

High cutoff = 3.12, low
cutoff = -1.36, based
on IQR multiplier of 3.

Tukey's Outlier Screening   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

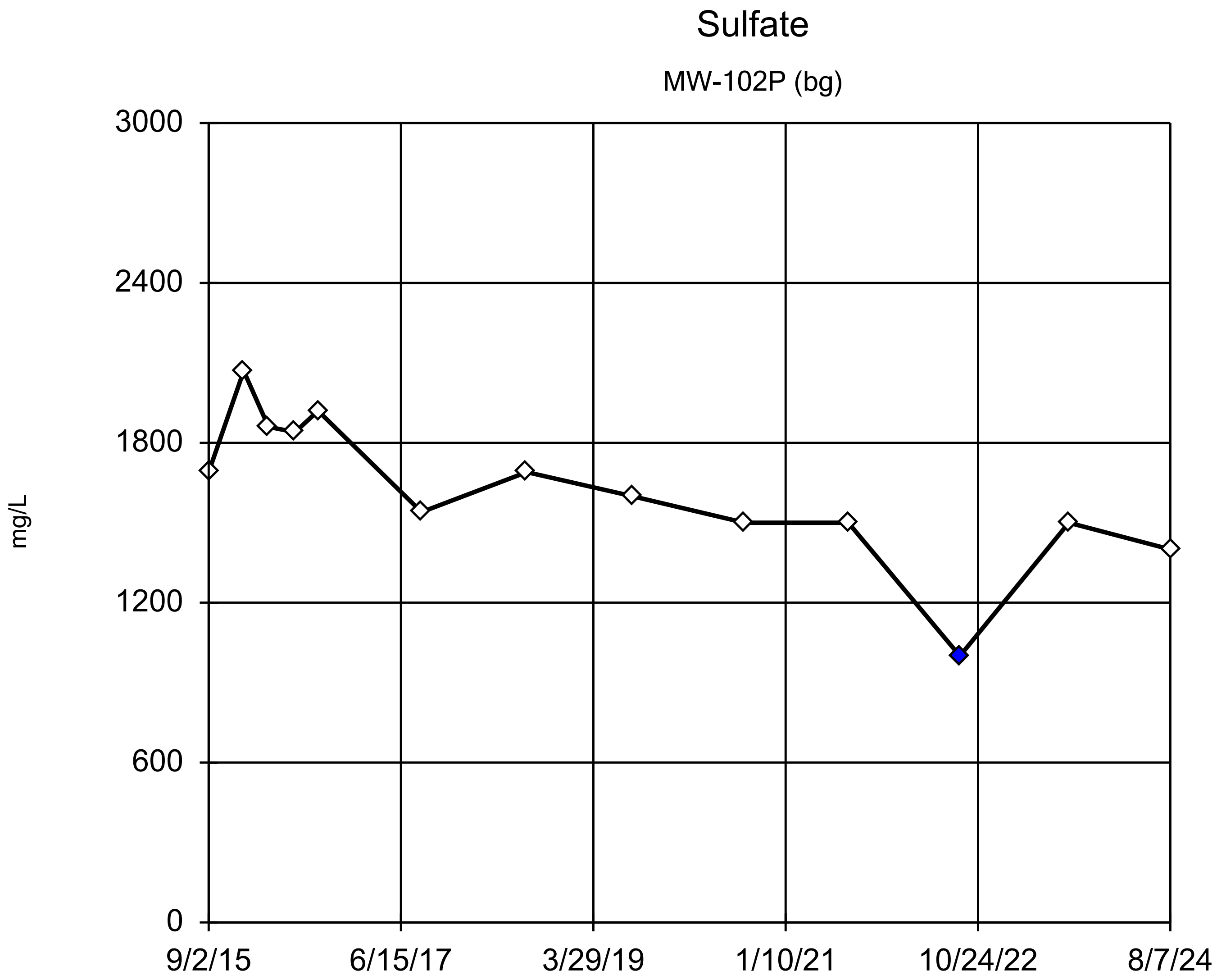
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Tukey's Outlier Screening

Constituent: Selenium (ug/L) Analysis Run 10/21/2024 5:56 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	<0.086
8/16/2018	<0.16
8/7/2019	<1
8/24/2020	<1
8/11/2021	<0.96
8/24/2022	<0.96 (U)
8/29/2023	<1.4 (U)
8/7/2024	<1.4

ND substitution: RL or RL/2 if <15% NDs.



n = 13

Statistical outlier is
drawn as solid.
Testing for 1 low outlier.
Mean = 1624.
Std. Dev. = 272.5.
1000: c = 0.5435
tabl = 0.521.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9323
Critical = 0.883
The distribution, after removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Dixon's Outlier Test

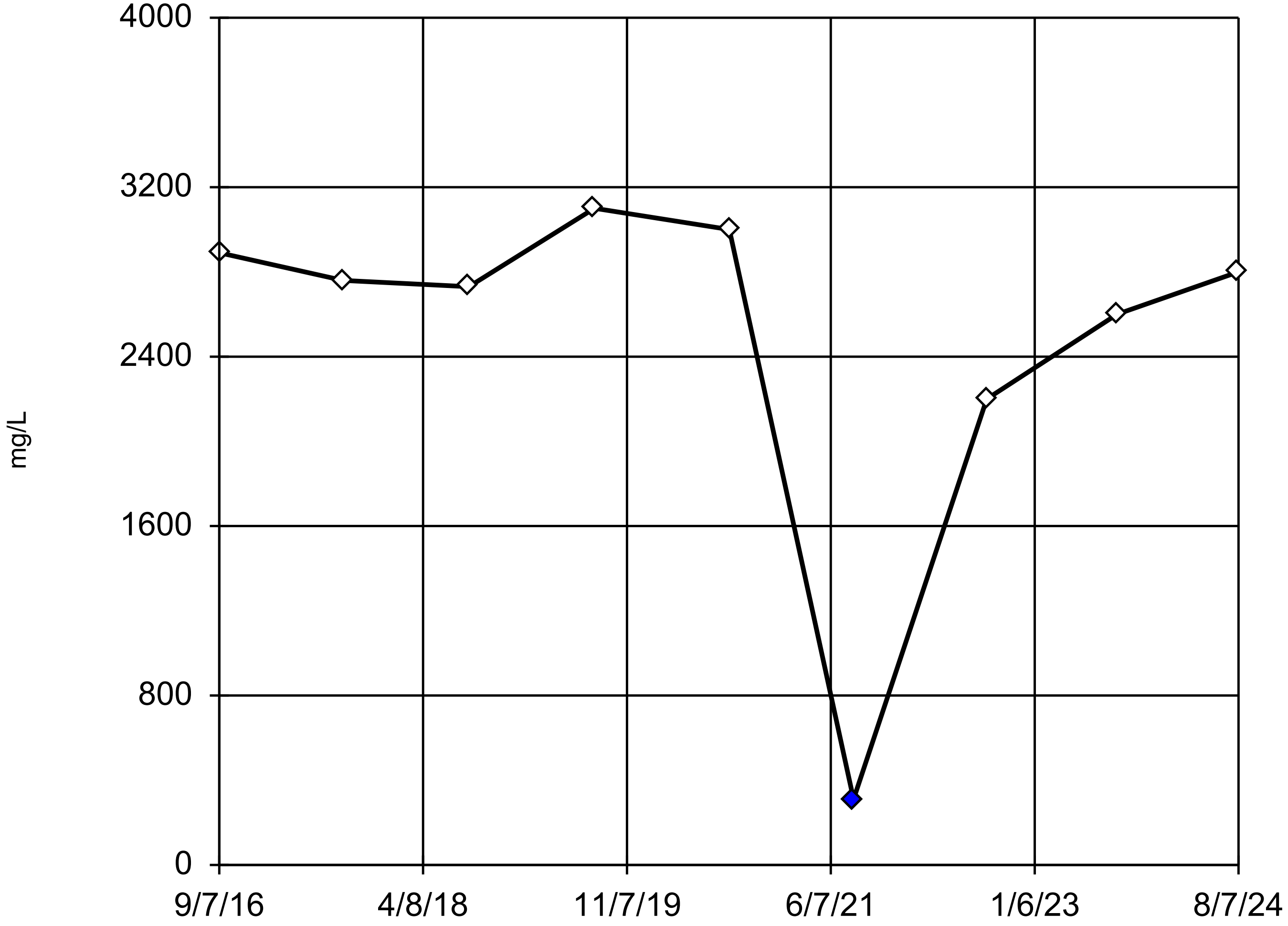
Constituent: Sulfate (mg/L) Analysis Run 10/21/2024 5:56 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
9/2/2015	1690
12/30/2015	2070
3/23/2016	1860
6/21/2016	1840
9/7/2016	1920
8/24/2017	1540
8/16/2018	1690
8/7/2019	1600
8/24/2020	1500
8/11/2021	1500
8/24/2022	1000 (O)
8/29/2023	1500
8/7/2024	1400

Total Dissolved Solids

MW-102P (bg)



n = 9

Statistical outlier is drawn as solid.
Testing for 2 low outliers.
Mean = 2488.
Std. Dev. = 856.4.
2200: c = 0.5
tabl = 0.512.
Alpha = 0.05.
310 (X): c = 0.7026
tabl = 0.512.
Alpha = 0.05.

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.925
Critical = 0.851
The distribution, after removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test   Analysis Run 10/21/2024 5:53 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Dixon's Outlier Test

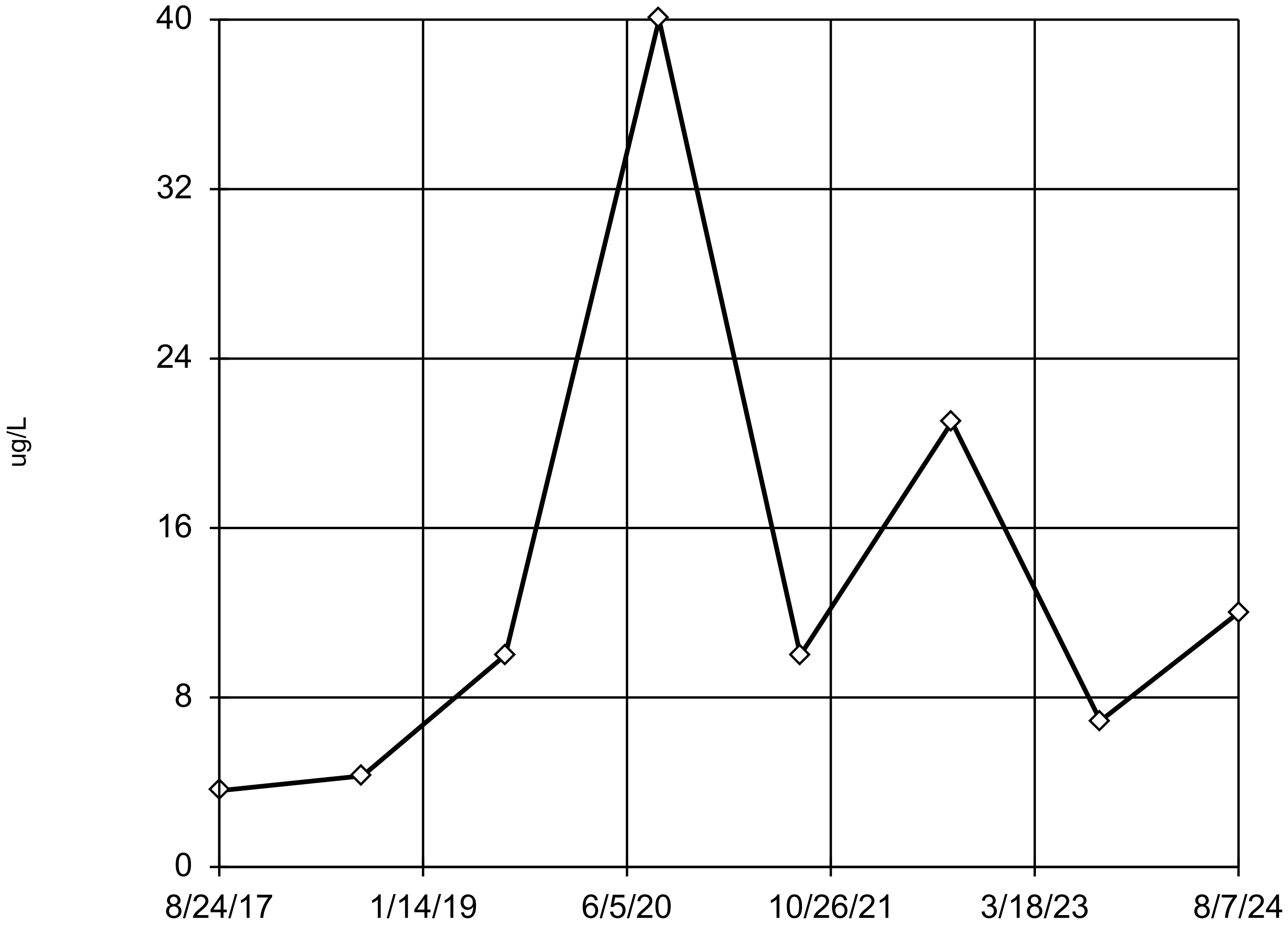
Constituent: Total Dissolved Solids (mg/L) Analysis Run 10/21/2024 5:56 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)
9/7/2016	2890
8/24/2017	2760
8/16/2018	2730
8/7/2019	3100
8/24/2020	3000
8/11/2021	310 (XO)
8/24/2022	2200
8/29/2023	2600
8/7/2024	2800

EPA Screening (suspected outliers for Dixon's Test)

MW-102P (bg)



n = 8

Dixon's will not be run.
No suspect values identified or unable to establish suspect values.
Mean 13.48, std. dev. 12.02, critical Tn 2.032

Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9606
Critical = 0.851 (after natural log transformation)
The distribution was found to be log-normal.

EPA 1989 Outlier Screening Analysis Run 10/21/2024 5:54 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

EPA 1989 Outlier Screening

Constituent: Zinc (ug/L)   Analysis Run 10/21/2024 5:56 PM   View: Pennsylvanian Unit
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)
8/24/2017	3.6 (J)
8/16/2018	4.3 (J)
8/7/2019	<10
8/24/2020	<40
8/11/2021	<10
8/24/2022	21
8/29/2023	6.9 (J)
8/7/2024	12 (J)

ND substitution: RL or RL/2 if <15% NDs.

D5 – Interwell Prediction Limit Analysis Results - Shallow

Prediction Limit

Ottumwa-Midland Landfill   Data: 191022-input-OML   Printed 10/21/2024, 12:57 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Wells	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Arsenic (ug/L)	MW-100R	0.880	n/a	8/6/2024	0.53ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Arsenic (ug/L)	MW-101R	0.880	n/a	8/6/2024	0.53ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Arsenic (ug/L)	**MW-108**	**0.880**	**n/a**	**8/7/2024**	**4.1**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**87.5**	**n/a**	**n/a**	**0.01952**	**NP Inter (NDs) 1 of 2**
Arsenic (ug/L)	MW-15R	0.880	n/a	8/6/2024	0.53ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Arsenic (ug/L)	MW-17	0.880	n/a	8/10/2021	0.75ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Barium (ug/L)	MW-100R	90.1	n/a	8/6/2024	44	No	8	MW-1R	73.5	6.047	0	None	No	0.001404	Param Inter 1 of 2
Barium (ug/L)	MW-101R	90.1	n/a	8/6/2024	37	No	8	MW-1R	73.5	6.047	0	None	No	0.001404	Param Inter 1 of 2
Barium (ug/L)	MW-108	90.1	n/a	8/7/2024	34	No	8	MW-1R	73.5	6.047	0	None	No	0.001404	Param Inter 1 of 2
Barium (ug/L)	MW-15R	90.1	n/a	8/6/2024	36	No	8	MW-1R	73.5	6.047	0	None	No	0.001404	Param Inter 1 of 2
Barium (ug/L)	MW-17	90.1	n/a	8/10/2021	36	No	8	MW-1R	73.5	6.047	0	None	No	0.001404	Param Inter 1 of 2
Boron (ug/L)	MW-100R	116	n/a	8/6/2024	76ND	No	8	MW-1R	71.79	16.02	50	Kapla...	No	0.001404	Param Inter 1 of 2
Boron (ug/L)	**MW-101R**	**116**	**n/a**	**8/6/2024**	**720**	**Yes**	**8**	**MW-1R**	**71.79**	**16.02**	**50**	**Kapla...**	**No**	**0.001404**	**Param Inter 1 of 2**
Boron (ug/L)	**MW-108**	**116**	**n/a**	**8/7/2024**	**300**	**Yes**	**8**	**MW-1R**	**71.79**	**16.02**	**50**	**Kapla...**	**No**	**0.001404**	**Param Inter 1 of 2**
Boron (ug/L)	**MW-15R**	**116**	**n/a**	**8/6/2024**	**380**	**Yes**	**8**	**MW-1R**	**71.79**	**16.02**	**50**	**Kapla...**	**No**	**0.001404**	**Param Inter 1 of 2**
Boron (ug/L)	**MW-17**	**116**	**n/a**	**8/10/2021**	**650**	**Yes**	**8**	**MW-1R**	**71.79**	**16.02**	**50**	**Kapla...**	**No**	**0.001404**	**Param Inter 1 of 2**
Chloride (mg/L)	MW-100R	298	n/a	8/6/2024	28	No	36	MW-1R	4.19	0.7801	0	None	ln(x)	0.001404	Param Inter 1 of 2
Chloride (mg/L)	MW-101R	298	n/a	8/6/2024	6.7	No	36	MW-1R	4.19	0.7801	0	None	ln(x)	0.001404	Param Inter 1 of 2
Chloride (mg/L)	MW-108	298	n/a	8/7/2024	2.6J	No	36	MW-1R	4.19	0.7801	0	None	ln(x)	0.001404	Param Inter 1 of 2
Chloride (mg/L)	MW-15R	298	n/a	8/6/2024	10	No	36	MW-1R	4.19	0.7801	0	None	ln(x)	0.001404	Param Inter 1 of 2
Chloride (mg/L)	MW-17	298	n/a	8/10/2021	4.4J	No	36	MW-1R	4.19	0.7801	0	None	ln(x)	0.001404	Param Inter 1 of 2
Cobalt (ug/L)	MW-100R	0.370	n/a	8/6/2024	0.17ND	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Cobalt (ug/L)	MW-101R	0.370	n/a	8/6/2024	0.22J	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Cobalt (ug/L)	**MW-108**	**0.370**	**n/a**	**8/7/2024**	**5**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**62.5**	**n/a**	**n/a**	**0.01952**	**NP Inter (NDs) 1 of 2**
Cobalt (ug/L)	**MW-15R**	**0.370**	**n/a**	**8/6/2024**	**1.1**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**62.5**	**n/a**	**n/a**	**0.01952**	**NP Inter (NDs) 1 of 2**
Cobalt (ug/L)	**MW-17**	**0.370**	**n/a**	**8/10/2021**	**3.4**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**62.5**	**n/a**	**n/a**	**0.01952**	**NP Inter (NDs) 1 of 2**
Copper (ug/L)	MW-100R	2.10	n/a	8/6/2024	1.8ND	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-101R	2.10	n/a	8/6/2024	2J	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-108	2.10	n/a	8/7/2024	1.8ND	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-15R	2.10	n/a	8/6/2024	1.8J	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-17	2.10	n/a	8/10/2021	1.4ND	No	8	MW-1R	n/a	n/a	62.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-100R	0.972	n/a	8/6/2024	0.19ND	No	9	MW-1R	0.4489	0.1995	11.11	None	No	0.001404	Param Inter 1 of 2
Fluoride (mg/L)	MW-101R	0.972	n/a	8/6/2024	0.19ND	No	9	MW-1R	0.4489	0.1995	11.11	None	No	0.001404	Param Inter 1 of 2
Fluoride (mg/L)	MW-108	0.972	n/a	8/7/2024	0.43J	No	9	MW-1R	0.4489	0.1995	11.11	None	No	0.001404	Param Inter 1 of 2
Fluoride (mg/L)	MW-15R	0.972	n/a	8/6/2024	0.19ND	No	9	MW-1R	0.4489	0.1995	11.11	None	No	0.001404	Param Inter 1 of 2
Fluoride (mg/L)	MW-17	0.972	n/a	8/10/2021	0.46J	No	9	MW-1R	0.4489	0.1995	11.11	None	No	0.001404	Param Inter 1 of 2
Iron (ug/L)	MW-100R	931	n/a	8/6/2024	36ND	No	8	MW-1R	3.637	1.163	37.5	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Iron (ug/L)	MW-101R	931	n/a	8/6/2024	82J	No	8	MW-1R	3.637	1.163	37.5	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Iron (ug/L)	**MW-108**	**931**	**n/a**	**8/7/2024**	**4300**	**Yes**	**8**	**MW-1R**	**3.637**	**1.163**	**37.5**	**Kapla...**	**ln(x)**	**0.001404**	**Param Inter 1 of 2**
Iron (ug/L)	MW-15R	931	n/a	8/6/2024	310	No	8	MW-1R	3.637	1.163	37.5	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Iron (ug/L)	MW-17	931	n/a	8/10/2021	48J	No	8	MW-1R	3.637	1.163	37.5	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Lead (ug/L)	MW-100R	1.58	n/a	8/6/2024	0.26ND	No	8	MW-1R	-1.282	0.633	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Lead (ug/L)	MW-101R	1.58	n/a	8/6/2024	0.26ND	No	8	MW-1R	-1.282	0.633	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Lead (ug/L)	MW-108	1.58	n/a	8/7/2024	0.26ND	No	8	MW-1R	-1.282	0.633	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Lead (ug/L)	MW-15R	1.58	n/a	8/6/2024	0.26ND	No	8	MW-1R	-1.282	0.633	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Lead (ug/L)	MW-17	1.58	n/a	8/10/2021	0.21ND	No	8	MW-1R	-1.282	0.633	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Magnesium (ug/L)	MW-100R	48100	n/a	8/6/2024	40000	No	8	MW-1R	n/a	n/a	0	n/a	n/a	0.01952	NP Inter (normality) ...
Magnesium (ug/L)	**MW-101R**	**48100**	**n/a**	**8/6/2024**	**71000**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.01952**	**NP Inter (normality) ...**
Magnesium (ug/L)	MW-108	48100	n/a	8/7/2024	16000	No	8	MW-1R	n/a	n/a	0	n/a	n/a	0.01952	NP Inter (normality) ...
Magnesium (ug/L)	**MW-15R**	**48100**	**n/a**	**8/6/2024**	**100000**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.01952**	**NP Inter (normality) ...**
Magnesium (ug/L)	MW-17	48100	n/a	8/10/2021	25000	No	8	MW-1R	n/a	n/a	0	n/a	n/a	0.01952	NP Inter (normality) ...

Prediction Limit

Ottumwa-Midland Landfill Data: 191022-input-OML Printed 10/21/2024, 12:57 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Wells	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Manganese (ug/L)	MW-100R	24.7	n/a	8/6/2024	3.6ND	No	8	MW-1R	1.214	0.7247	50	Kapla...	ln(x)	0.001404	Param Inter 1 of 2
Manganese (ug/L)	**MW-101R**	**24.7**	**n/a**	**8/6/2024**	**180**	**Yes**	**8**	**MW-1R**	**1.214**	**0.7247**	**50**	**Kapla...**	**ln(x)**	**0.001404**	**Param Inter 1 of 2**
Manganese (ug/L)	**MW-108**	**24.7**	**n/a**	**8/7/2024**	**920**	**Yes**	**8**	**MW-1R**	**1.214**	**0.7247**	**50**	**Kapla...**	**ln(x)**	**0.001404**	**Param Inter 1 of 2**
Manganese (ug/L)	**MW-15R**	**24.7**	**n/a**	**8/6/2024**	**440**	**Yes**	**8**	**MW-1R**	**1.214**	**0.7247**	**50**	**Kapla...**	**ln(x)**	**0.001404**	**Param Inter 1 of 2**
Manganese (ug/L)	**MW-17**	**24.7**	**n/a**	**8/10/2021**	**2200**	**Yes**	**8**	**MW-1R**	**1.214**	**0.7247**	**50**	**Kapla...**	**ln(x)**	**0.001404**	**Param Inter 1 of 2**
Selenium (ug/L)	MW-100R	2.98	n/a	8/6/2024	1.4ND	No	8	MW-1R	1.422	0.5671	37.5	Kapla...	No	0.001404	Param Inter 1 of 2
Selenium (ug/L)	**MW-101R**	**2.98**	**n/a**	**8/6/2024**	**5.2**	**Yes**	**8**	**MW-1R**	**1.422**	**0.5671**	**37.5**	**Kapla...**	**No**	**0.001404**	**Param Inter 1 of 2**
Selenium (ug/L)	MW-108	2.98	n/a	8/7/2024	1.4ND	No	8	MW-1R	1.422	0.5671	37.5	Kapla...	No	0.001404	Param Inter 1 of 2
Selenium (ug/L)	MW-15R	2.98	n/a	8/6/2024	1.4J	No	8	MW-1R	1.422	0.5671	37.5	Kapla...	No	0.001404	Param Inter 1 of 2
Selenium (ug/L)	MW-17	2.98	n/a	8/10/2021	0.96ND	No	8	MW-1R	1.422	0.5671	37.5	Kapla...	No	0.001404	Param Inter 1 of 2
Sulfate (mg/L)	MW-100R	459	n/a	8/6/2024	180	No	26	MW-1R	220.9	119	0	None	No	0.001404	Param Inter 1 of 2
Sulfate (mg/L)	**MW-101R**	**459**	**n/a**	**8/6/2024**	**480**	**Yes**	**26**	**MW-1R**	**220.9**	**119**	**0**	**None**	**No**	**0.001404**	**Param Inter 1 of 2**
Sulfate (mg/L)	MW-108	459	n/a	8/7/2024	130	No	26	MW-1R	220.9	119	0	None	No	0.001404	Param Inter 1 of 2
Sulfate (mg/L)	MW-15R	459	n/a	8/6/2024	440	No	26	MW-1R	220.9	119	0	None	No	0.001404	Param Inter 1 of 2
Sulfate (mg/L)	MW-17	459	n/a	8/10/2021	280	No	26	MW-1R	220.9	119	0	None	No	0.001404	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-100R	1020	n/a	8/6/2024	640	No	9	MW-1R	571.7	172.2	0	None	No	0.001404	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	**MW-101R**	**1020**	**n/a**	**8/6/2024**	**1100**	**Yes**	**9**	**MW-1R**	**571.7**	**172.2**	**0**	**None**	**No**	**0.001404**	**Param Inter 1 of 2**
Total Dissolved Solids (mg/L)	MW-108	1020	n/a	8/7/2024	390	No	9	MW-1R	571.7	172.2	0	None	No	0.001404	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	**MW-15R**	**1020**	**n/a**	**8/6/2024**	**1500**	**Yes**	**9**	**MW-1R**	**571.7**	**172.2**	**0**	**None**	**No**	**0.001404**	**Param Inter 1 of 2**
Total Dissolved Solids (mg/L)	MW-17	1020	n/a	8/10/2021	530	No	9	MW-1R	571.7	172.2	0	None	No	0.001404	Param Inter 1 of 2
Zinc (ug/L)	MW-100R	10.0	n/a	8/6/2024	9.7ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Zinc (ug/L)	MW-101R	10.0	n/a	8/6/2024	9.7ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Zinc (ug/L)	**MW-108**	**10.0**	**n/a**	**8/7/2024**	**43**	**Yes**	**8**	**MW-1R**	**n/a**	**n/a**	**87.5**	**n/a**	**n/a**	**0.01952**	**NP Inter (NDs) 1 of 2**
Zinc (ug/L)	MW-15R	10.0	n/a	8/6/2024	9.7ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2
Zinc (ug/L)	MW-17	10.0	n/a	8/10/2021	10ND	No	8	MW-1R	n/a	n/a	87.5	n/a	n/a	0.01952	NP Inter (NDs) 1 of 2

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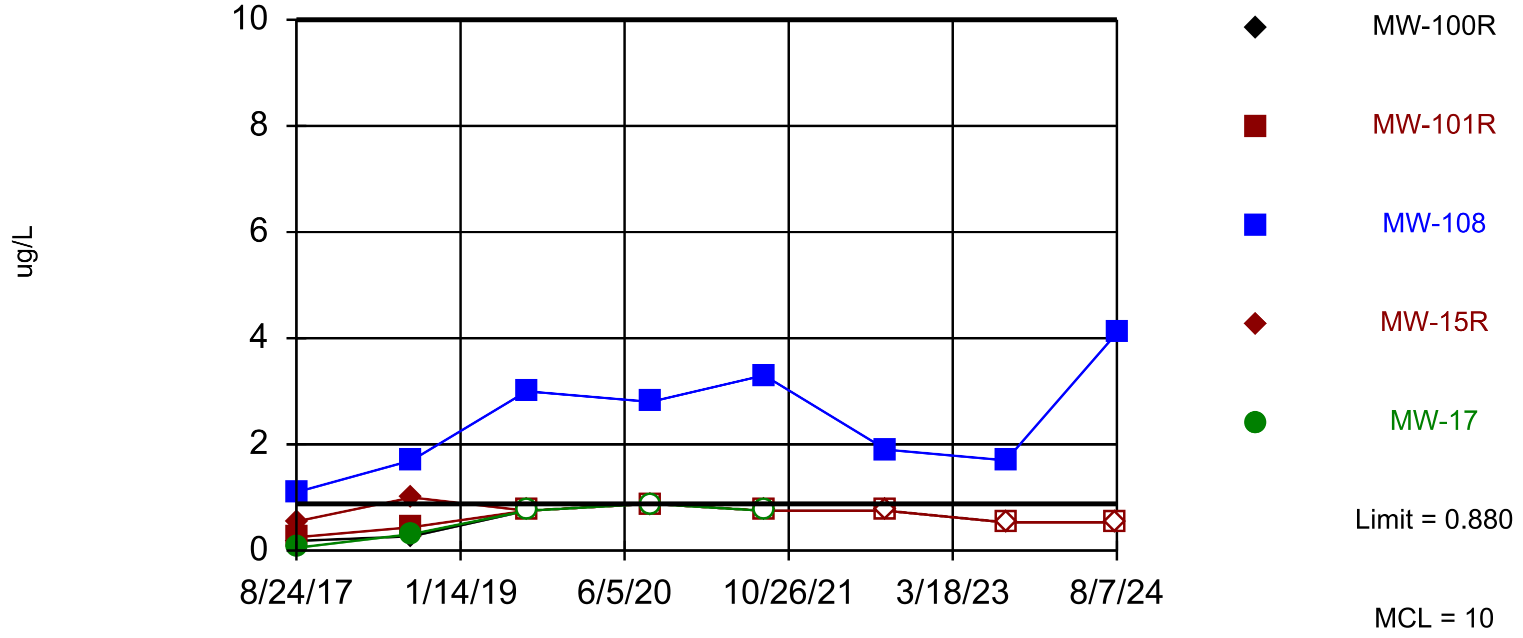
Hollow symbols indicate censored values.

Exceeds Limit: MW-108

Arsenic

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 87.5% NDs. Annual per-constituent alpha = 0.09387. Individual comparison alpha = 0.01952 (1 of 2). Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Arsenic (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.18 (J)	0.052 (J)	0.55 (J)	1.1	0.25 (J)	0.2 (J)
8/16/2018	0.27 (J)	0.31 (J)	1	1.7	0.44 (J)	
4/6/2019						<0.75
8/7/2019	<0.75	<0.75	<0.75	3	<0.75	<0.75
8/24/2020	<0.88	<0.88		2.8	<0.88	<0.88
8/25/2020			<0.88			
8/10/2021		<0.75				<0.75
8/11/2021	<0.75			3.3	<0.75	
8/12/2021			<0.75			
8/23/2022						<0.75 (U)
8/24/2022	<0.75 (U)		<0.75 (U)	1.9 (J)	<0.75 (U)	
8/29/2023	<0.53 (U)				<0.53 (U)	<0.53 (U)
8/30/2023			<0.53 (U)	1.7 (J)		
8/6/2024	<0.53		<0.53		<0.53	<0.53
8/7/2024				4.1		

ND substitution: RL or RL/2 if <15% NDs.

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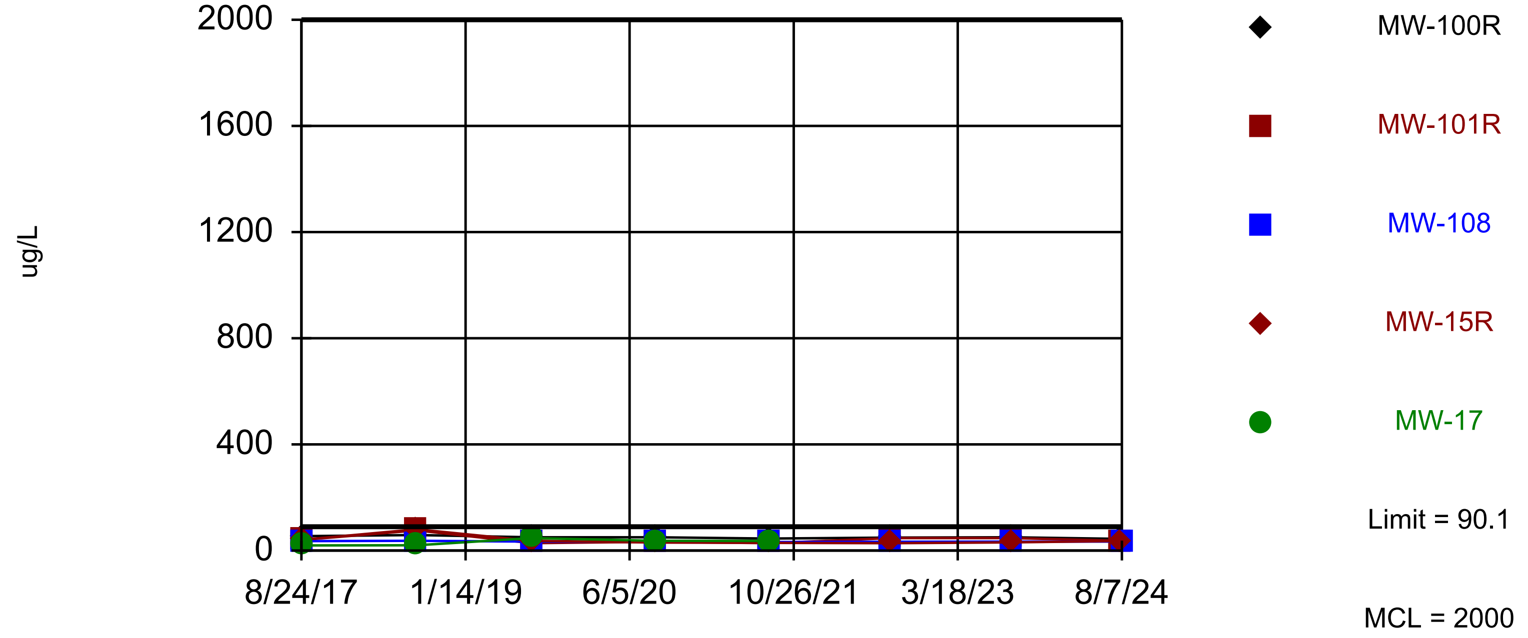
Within Limit

Barium

Interwell Parametric



Background Data Summary: Mean=73.5, Std. Dev.=6.047, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9013, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Barium (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	54.2	19.4	40.6	35.4	40	61
8/16/2018	58.4	20.2	80.5	37.1	75.9	
4/6/2019						81
8/7/2019	50	47	37	34	28	75
8/24/2020	50	37		33	33	76
8/25/2020			30			
8/10/2021		36 (B)				71 (B)
8/11/2021	45 (B)			32 (B)	28 (B)	
8/12/2021			29 (B)			
8/23/2022						78
8/24/2022	49		28	33	47	
8/29/2023	50				47	75
8/30/2023			31	34		
8/6/2024	44		36		37	71
8/7/2024				34		

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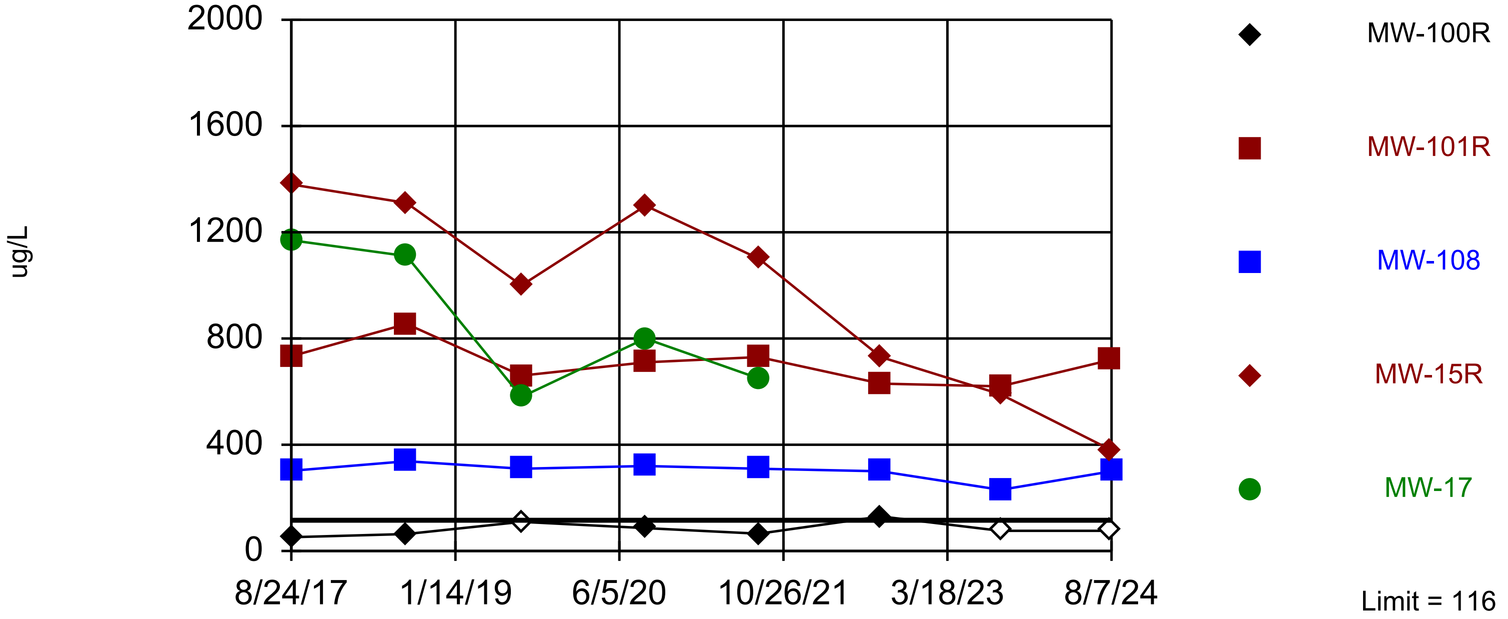
Hollow symbols indicate censored values.

Exceeds Limit: MW-101R, MW-108, MW-15R, MW-17

Boron

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=71.79, Std. Dev.=16.02, n=8, 50% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8472, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Boron (ug/L) Analysis Run 10/21/2024 12:57 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	51.8 (J)	1170	1380	302	733	76 (J)
8/16/2018	64.2 (J)	1110	1310	338	855	
4/6/2019						110 (J)
8/7/2019	<110	580 (B)	1000 (B)	310 (B)	660 (B)	110 (J,B)
8/24/2020	86 (J)	800		320	710	<80
8/25/2020			1300			
8/10/2021		650				<58
8/11/2021	65 (J)			310	730	
8/12/2021			1100			
8/23/2022						65 (J)
8/24/2022	130		730	300	630	
8/29/2023	<76 (U)				620	<76 (U)
8/30/2023			590	230		
8/6/2024	<76		380		720	<76
8/7/2024				300		

ND substitution: RL or RL/2 if <15% NDs.

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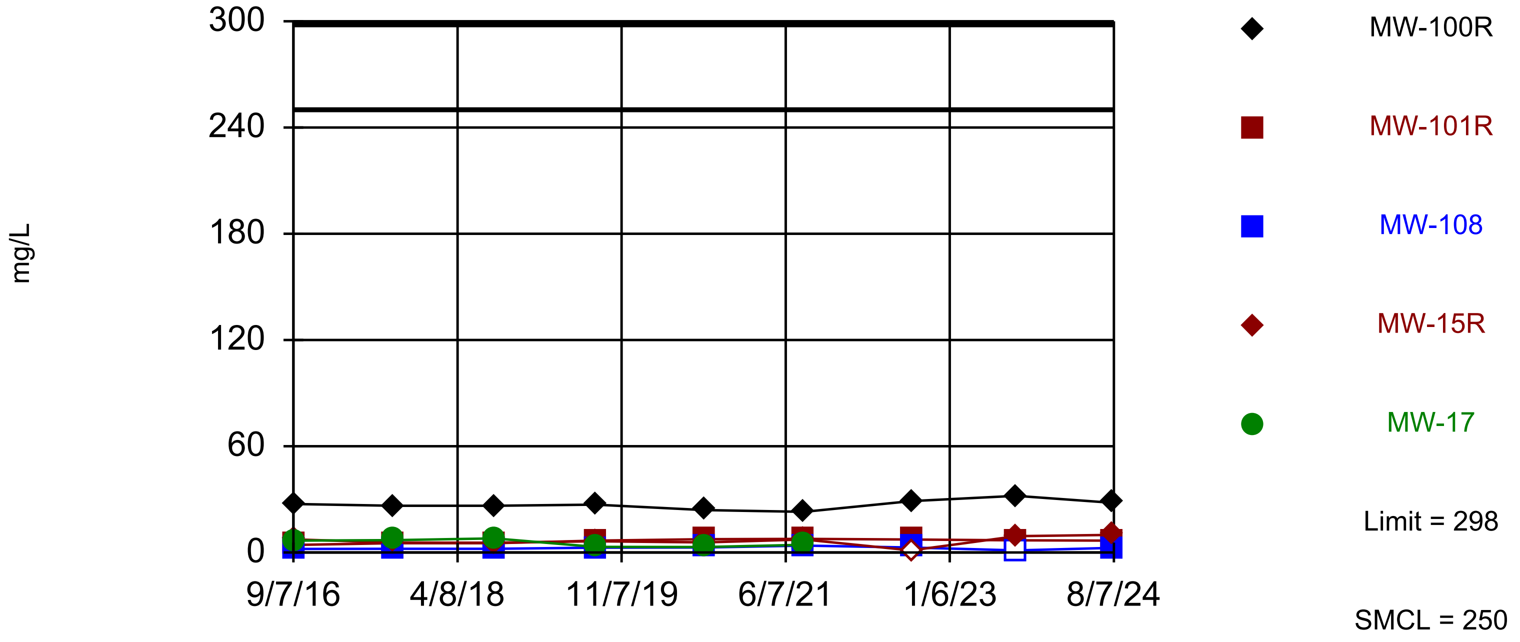
Hollow symbols indicate censored values.

Within Limit

Chloride

Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=4.19, Std. Dev.=0.7801, n=36. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9704, critical = 0.912. Kappa = 1.93 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit   Analysis Run 10/21/2024 12:56 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Prediction Limit

Constituent: Chloride (mg/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-1R (bg)	MW-17	MW-100R	MW-15R	MW-108	MW-101R
8/10/1995	170					
10/6/1995	150					
1/25/1996	174					
4/26/1996	121					
7/19/1996	138.3					
10/21/1996	106					
4/28/1997	98					
10/6/1997	120					
4/22/1998	120					
10/7/1998	580 (X)					
9/29/1999	110					
9/13/2000	89.6					
9/19/2001	53.3					
9/11/2002	59.5					
9/10/2003	64.8					
9/15/2004	37.9					
9/14/2005	60					
9/13/2006	35.9					
9/12/2007	34.5					
9/17/2008	70.4					
9/16/2009	84.9					
8/31/2010	164					
9/13/2011	113					
9/18/2012	74.4					
9/27/2013	54.7					
9/10/2014	26.6					
9/2/2015	62.4					
9/7/2016	64.9	6.7	27.4	7.4	2	4.3
8/24/2017	60.6	7	26.4	5.6	2.1	5.3
8/16/2018		8	26.4	5.5	2.1	5.3
4/6/2019	24					
8/7/2019	25	3.2 (J)	27	6.3	2.7 (J)	6.7
8/24/2020	22	3.1 (J)	24		2.8 (J)	7.5
8/25/2020				5.7		
8/10/2021	23	4.4 (J)				
8/11/2021			23		3.9 (J)	7.7
8/12/2021				7.3		
8/23/2022	13					
8/24/2022			29	<2.3 (U)	2.8 (J)	7.3
8/29/2023	26		32			6.9
8/30/2023				9.2	<2.3 (U)	
8/6/2024	29		28	10		6.7
8/7/2024					2.6 (J)	

ND substitution: RL or RL/2 if <15% NDs.

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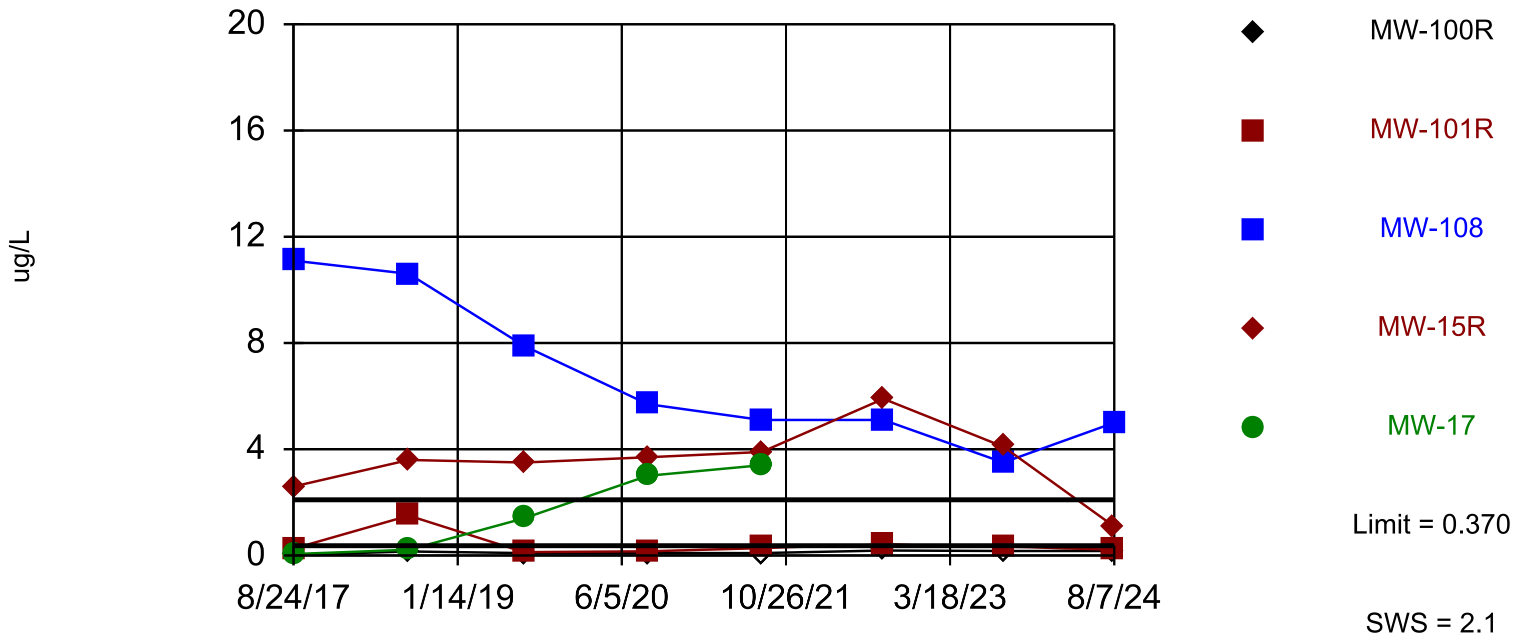
Hollow symbols indicate censored values.

Exceeds Limit: MW-108, MW-15R, MW-17

Cobalt

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Annual per-constituent alpha = 0.09387. Individual comparison alpha = 0.01952 (1 of 2). Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow
Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Cobalt (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.028 (J)	0.054 (J)	2.6	11.1	0.26 (J)	0.049 (J)
8/16/2018	<0.15	0.22 (J)	3.6	10.6	1.5	
4/6/2019						0.37 (J)
8/7/2019	<0.091	1.4	3.5	7.9	0.13 (J)	<0.091
8/24/2020	<0.091	3		5.7	0.16 (J)	0.22 (J)
8/25/2020			3.7			
8/10/2021		3.4				<0.091
8/11/2021	<0.091			5.1	0.28 (J)	
8/12/2021			3.9			
8/23/2022						<0.19 (U)
8/24/2022	<0.19 (U)		5.9	5.1	0.43 (J)	
8/29/2023	<0.17 (U)				0.34 (J)	<0.17 (U)
8/30/2023			4.1	3.5		
8/6/2024	<0.17		1.1		0.22 (J)	<0.17
8/7/2024				5		

ND substitution: RL or RL/2 if <15% NDs.

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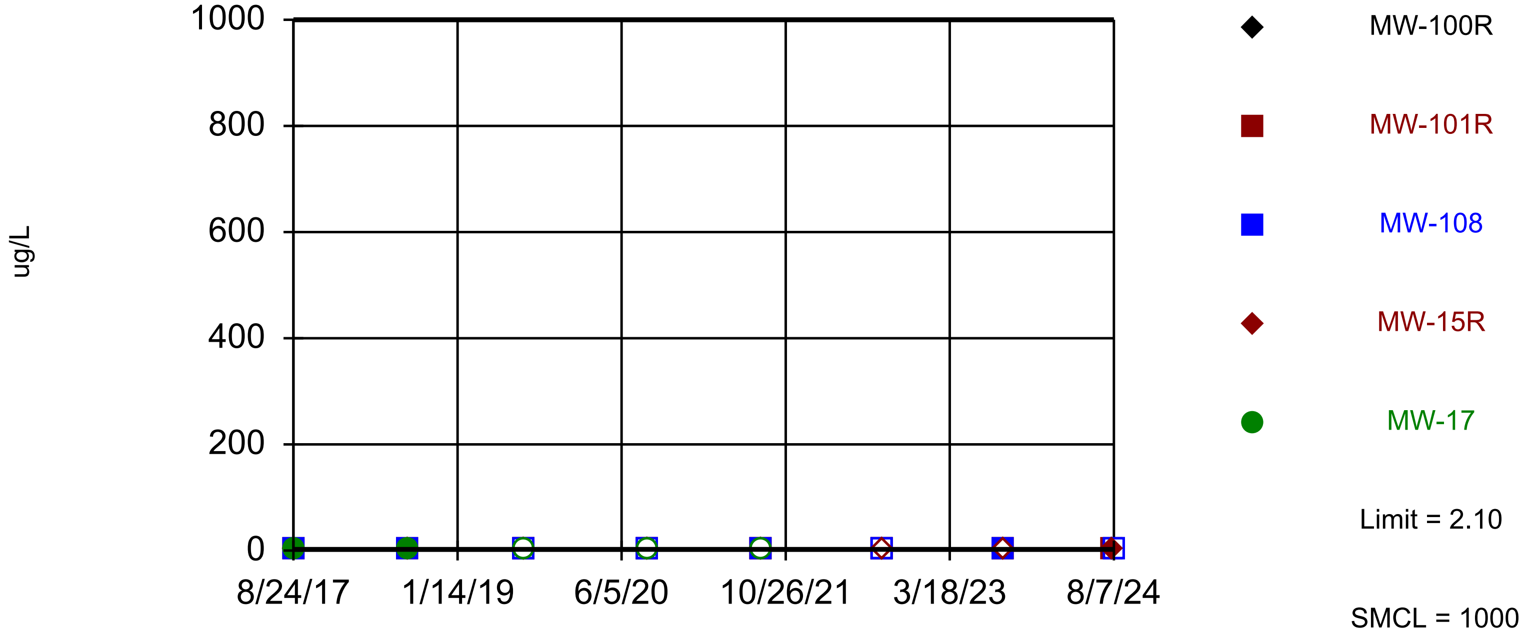
Hollow symbols indicate censored values.

Within Limit

Copper

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Annual per-constituent alpha = 0.09387. Individual comparison alpha = 0.01952 (1 of 2). Comparing 5 points to limit.

Prediction Limit   Analysis Run 10/21/2024 12:56 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Prediction Limit

Constituent: Copper (ug/L) Analysis Run 10/21/2024 12:57 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.32 (J)	0.52 (J)	0.38 (J)	0.61 (J)	0.92 (J)	0.99 (J)
8/16/2018	0.74 (J)	0.66 (J)	2.7	0.57 (J)	2.6	
4/6/2019						2.1 (J)
8/7/2019	<2	<2	<2	<2	<2	<2
8/24/2020	<1.5	<1.5		<1.5	<1.5	1.6 (J)
8/25/2020			<1.5			
8/10/2021		<1.4				<1.4
8/11/2021	<1.4			1.7 (J)	<1.4	
8/12/2021			2.5 (J)			
8/23/2022						<1.8 (U)
8/24/2022	<1.8 (U)		<1.8 (U)	<1.8 (U)	<1.8 (U)	
8/29/2023	1.8 (J)				<1.8 (U)	<1.8 (U)
8/30/2023			<1.8 (U)	2 (J)		
8/6/2024	<1.8		1.8 (J)		2 (J)	<1.8
8/7/2024				<1.8		

ND substitution: RL or RL/2 if <15% NDs.

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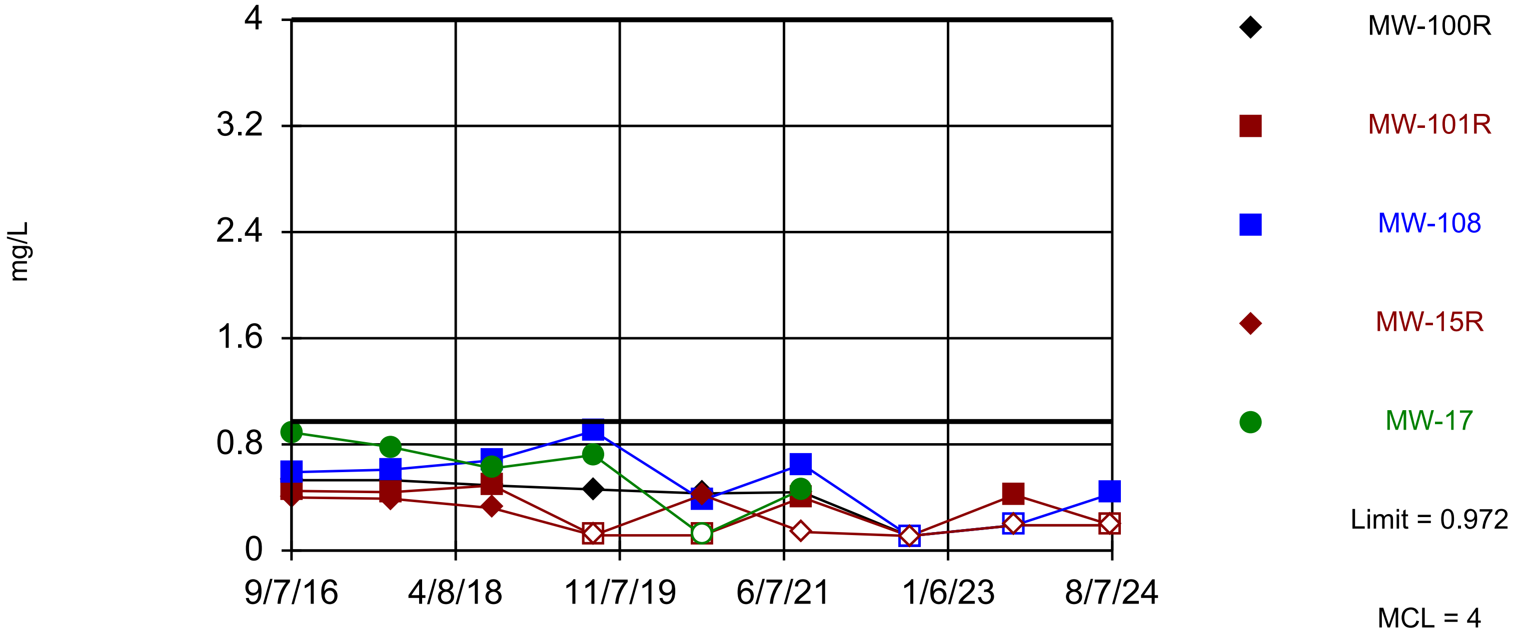
Hollow symbols indicate censored values.

Within Limit

Fluoride

Interwell Parametric



Background Data Summary: Mean=0.4489, Std. Dev.=0.1995, n=9, 11.11% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9356, critical = 0.764. Kappa = 2.62 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Fluoride (mg/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-1R (bg)	MW-108	MW-101R
9/7/2016	0.53	0.89	0.4	0.48	0.59	0.45
8/24/2017	0.53	0.78	0.39	0.58	0.61	0.44
8/16/2018	0.49	0.62	0.32		0.68	0.49
4/6/2019				0.35 (J)		
8/7/2019	0.46 (J)	0.72	<0.23	0.85	0.9	<0.23
8/24/2020	0.43 (J)	<0.23		0.47 (J)	0.38 (J)	<0.23
8/25/2020			0.42 (J)			
8/10/2021		0.46 (J)		0.34 (J)		
8/11/2021	0.44 (J)				0.65	0.4 (J)
8/12/2021			<0.28			
8/23/2022				<0.22 (U)		
8/24/2022	<0.22 (U)		<0.22 (U)		<0.22 (U)	<0.22 (U)
8/29/2023	<0.38 (U)			0.4 (J)		0.42 (J)
8/30/2023			<0.38 (U)		<0.38 (U)	
8/6/2024	<0.38		<0.38	0.46 (J)		<0.38
8/7/2024					0.43 (J)	

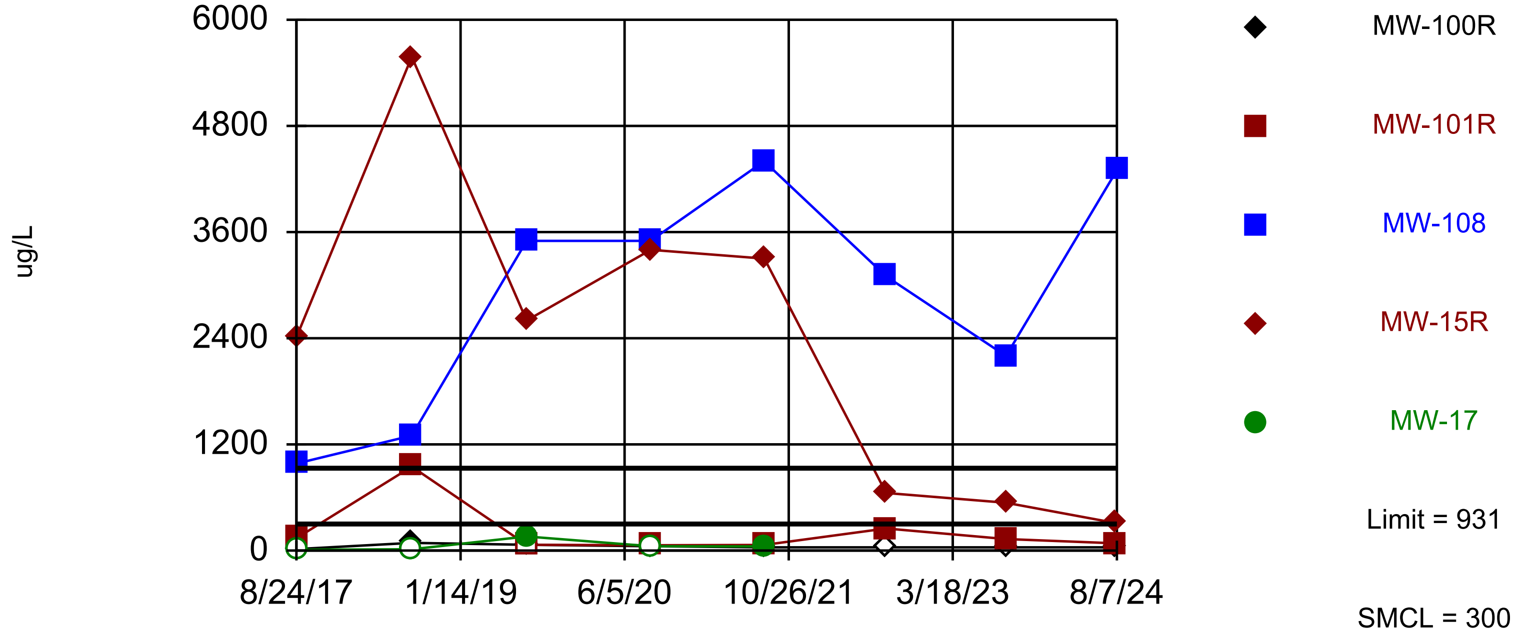
ND substitution: RL or RL/2 if <15% NDs.

Sanitas™ v.10.0.16 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Exceeds Limit: MW-108

Iron

Interwell Parametric



Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=3.637, Std. Dev.=1.163, n=8, 37.5% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9279, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Iron (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	16.2 (J)	<9.6	2410	983	140	12.5 (J)
8/16/2018	86.3	<14.9	5580	1300	949	
4/6/2019						380
8/7/2019	<66	160	2600	3500	<66	<66
8/24/2020	<50	<50		3500	60 (J)	88 (J)
8/25/2020			3400			
8/10/2021		48 (J)				<36
8/11/2021	<36			4400	64 (J)	
8/12/2021			3300			
8/23/2022						64 (J)
8/24/2022	<36 (U)		650	3100	250	
8/29/2023	<36 (U)				130	<36 (U)
8/30/2023			540	2200		
8/6/2024	<36		310		82 (J)	46 (J)
8/7/2024				4300		

ND substitution: RL or RL/2 if <15% NDs.

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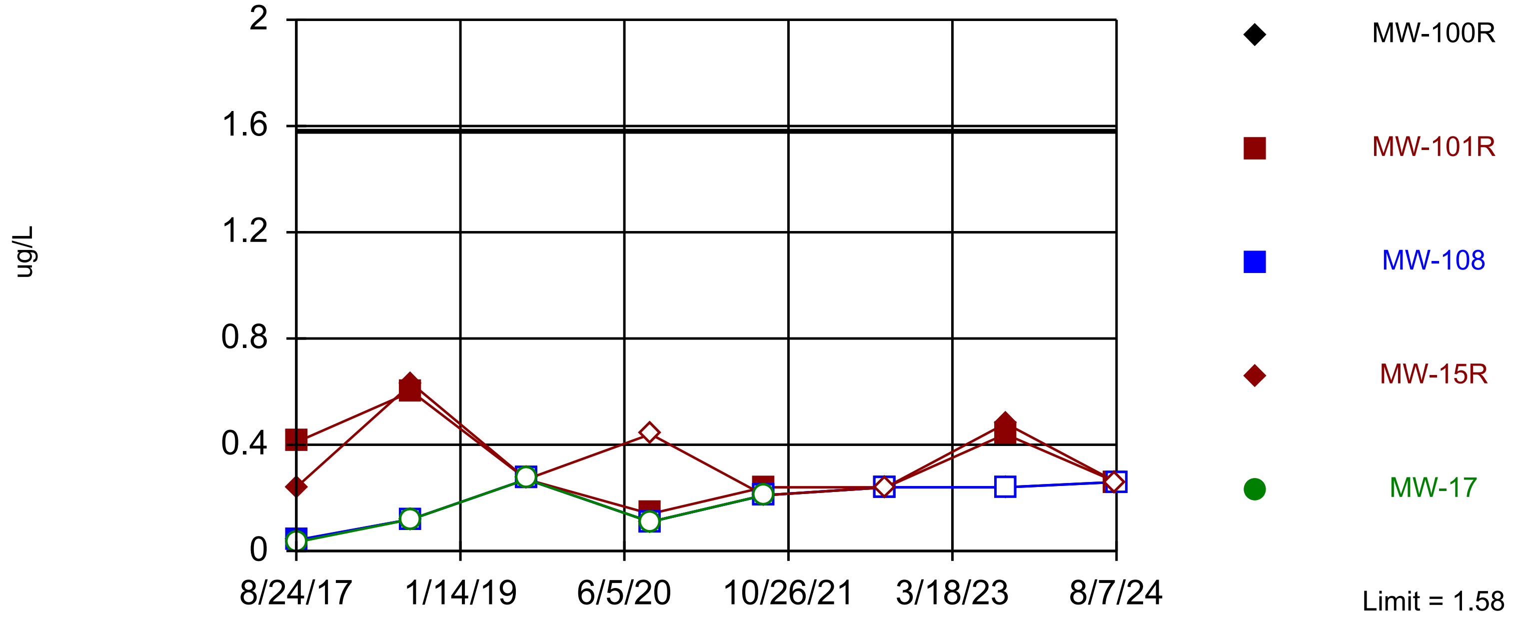
Hollow symbols indicate censored values.

Within Limit

Lead

Interwell Parametric



Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-1.282, Std. Dev.=0.633, n=8, 50% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8183, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Lead (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow
Ottumwa-Midland Landfill   Data: 191022-input-OML

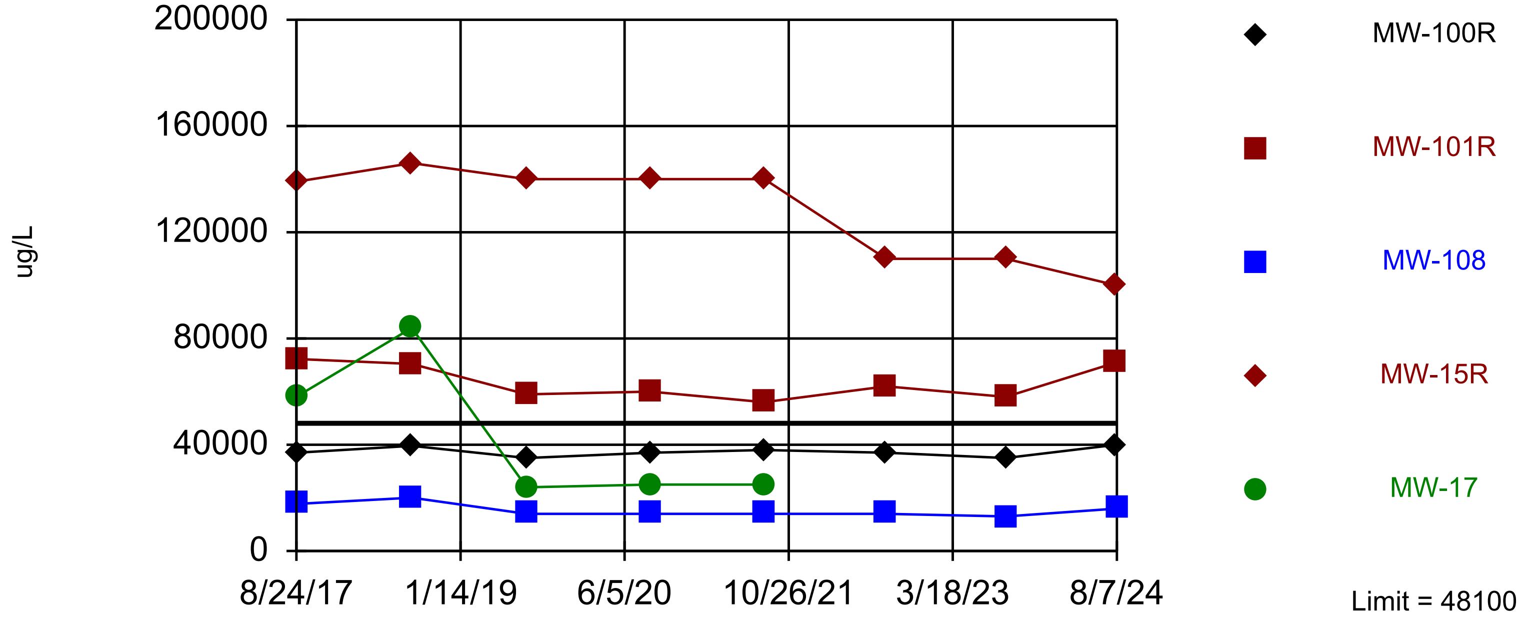
	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.039 (J)	<0.033	0.24 (J)	0.041 (J)	0.41 (J)	0.18 (J)
8/16/2018	<0.12	<0.12	0.63 (J)	<0.12	0.6 (J)	
4/6/2019						0.71
8/7/2019	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27
8/24/2020	<0.11	<0.11		<0.11	0.14 (J)	0.9
8/25/2020			<0.44			
8/10/2021		<0.21				<0.21
8/11/2021	<0.21			<0.21	0.24 (J)	
8/12/2021			<0.21			
8/23/2022						<0.24 (U)
8/24/2022	<0.24 (U)		<0.24 (U)	<0.24 (U)	<0.24 (U)	
8/29/2023	0.24 (JB)				0.44 (JB)	0.29 (JB)
8/30/2023			0.48 (JB)	<0.24 (U)		
8/6/2024	<0.26		<0.26		<0.26	<0.26
8/7/2024				<0.26		

ND substitution: RL or RL/2 if <15% NDs.

Exceeds Limit: MW-101R, MW-15R

Magnesium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Annual per-constituent alpha = 0.09387. Individual comparison alpha = 0.01952 (1 of 2). Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Magnesium (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	37000	58100	139000	17700	72300	48100
8/16/2018	39600	84000	146000	20100	70400	
4/6/2019						31000
8/7/2019	35000	24000	140000	14000	59000	30000
8/24/2020	37000	25000		14000	60000	31000
8/25/2020			140000			
8/10/2021		25000				30000
8/11/2021	38000			14000	56000	
8/12/2021			140000			
8/23/2022						31000
8/24/2022	37000		110000	14000	62000	
8/29/2023	35000				58000	29000
8/30/2023			110000	13000		
8/6/2024	40000		100000		71000	28000
8/7/2024				16000		

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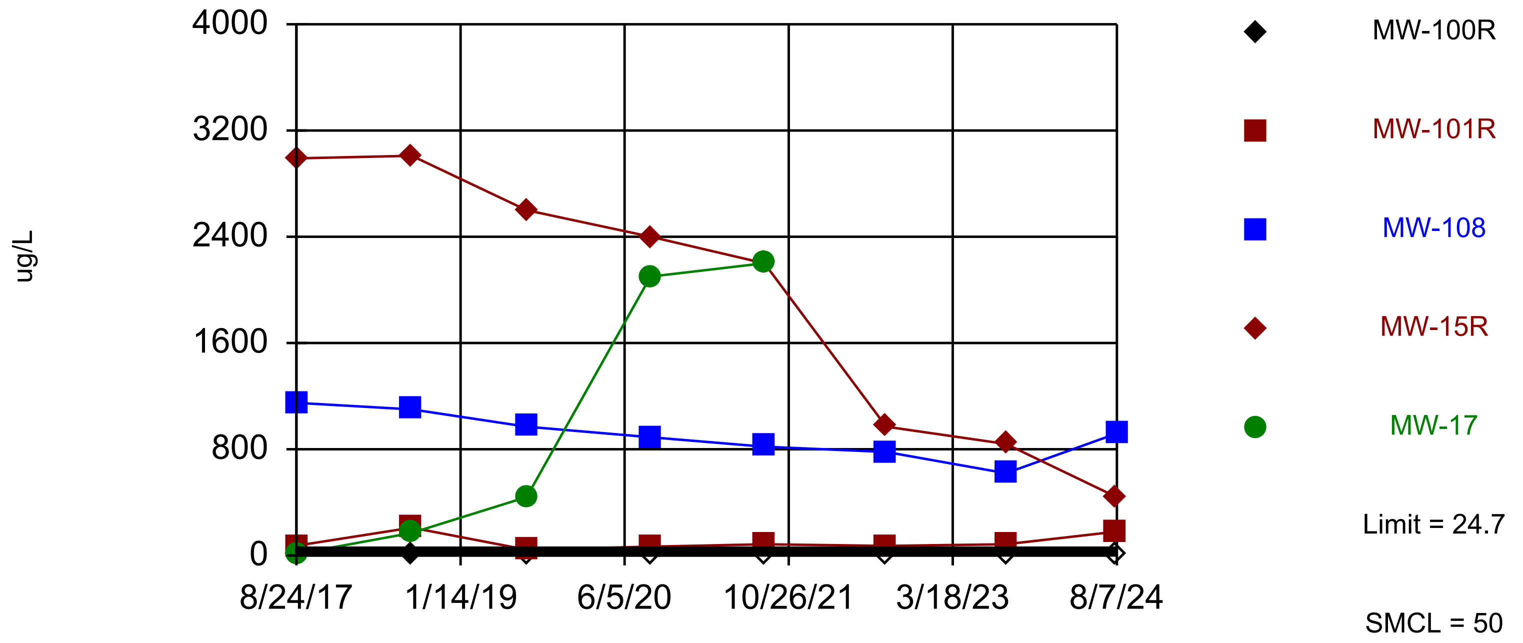
Hollow symbols indicate censored values.

Exceeds Limit: MW-101R, MW-108, MW-15R, MW-17

Manganese

Interwell Parametric



Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=1.214, Std. Dev.=0.7247, n=8, 50% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7838, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit   Analysis Run 10/21/2024 12:56 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Prediction Limit

Constituent: Manganese (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.9 (J)	10.8	2990	1150	74.1	2
8/16/2018	5.6	170	3010	1100	210	
4/6/2019						20
8/7/2019	<2.5	440	2600	970	44	2.8 (J)
8/24/2020	<4	2100		890	66	4.7 (J)
8/25/2020			2400			
8/10/2021		2200				<4.4
8/11/2021	<4.4			820	84	
8/12/2021			2200			
8/23/2022						<3.6 (U)
8/24/2022	<3.6 (U)		970	780	73	
8/29/2023	<3.6 (U)				84	<3.6 (U)
8/30/2023			840	620		
8/6/2024	<3.6		440		180	<3.6
8/7/2024				920		

ND substitution: RL or RL/2 if <15% NDs.

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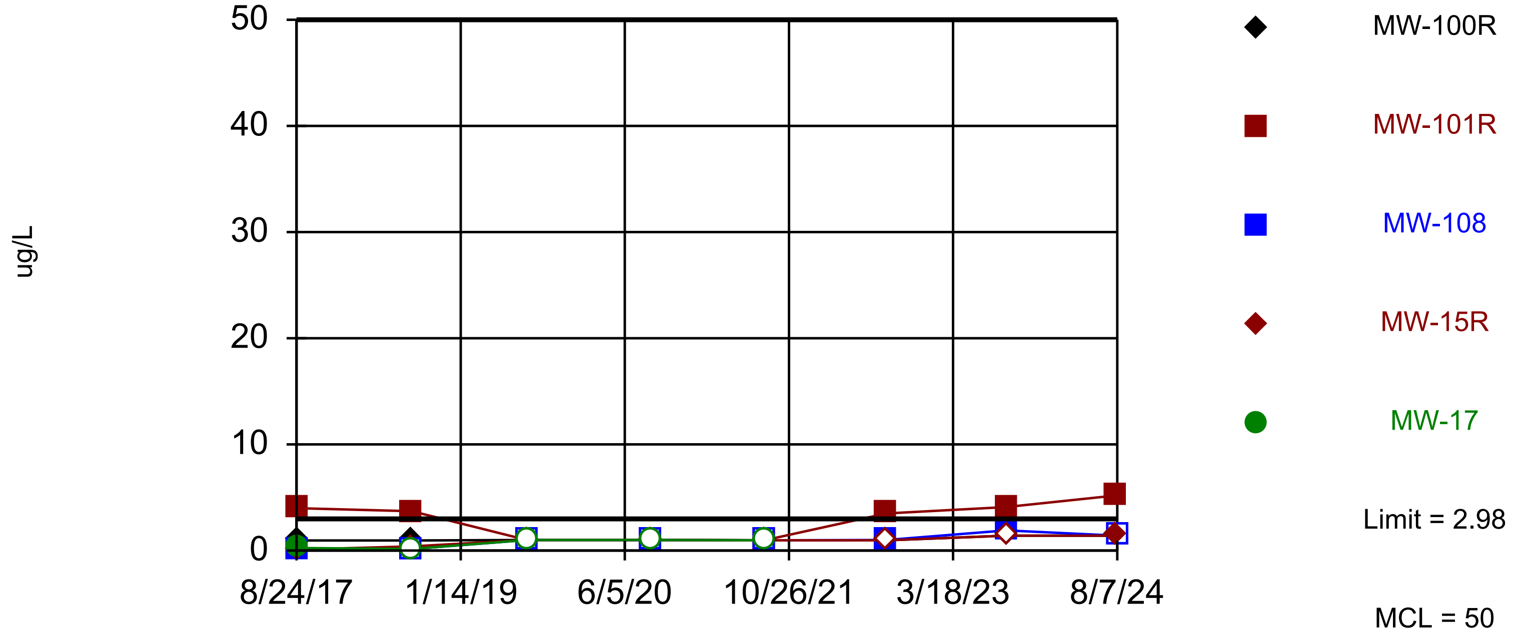
Hollow symbols indicate censored values.

Exceeds Limit: MW-101R

Selenium

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=1.422, Std. Dev.=0.5671, n=8, 37.5% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8303, critical = 0.749. Kappa = 2.75 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit   Analysis Run 10/21/2024 12:56 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

Prediction Limit

Constituent: Selenium (ug/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.95 (J)	0.25 (J)	<0.086	0.089 (J)	4	1.1
8/16/2018	0.95 (J)	<0.16	0.4 (J)	<0.16	3.7	
4/6/2019						<1
8/7/2019	<1	<1	<1	<1	1 (J)	1.4 (J)
8/24/2020	<1	<1		<1	<1	2.1 (J)
8/25/2020			<1			
8/10/2021		<0.96				1.2 (J)
8/11/2021	<0.96			<0.96	<0.96	
8/12/2021			<0.96			
8/23/2022						<0.96 (U)
8/24/2022	0.97 (J)		<0.96 (U)	1 (J)	3.5 (J)	
8/29/2023	1.4 (J)				4.1 (J)	2.6 (J)
8/30/2023			<1.4 (U)	1.9 (J)		
8/6/2024	<1.4		1.4 (J)		5.2	<1.4
8/7/2024				<1.4		

ND substitution: RL or RL/2 if <15% NDs.

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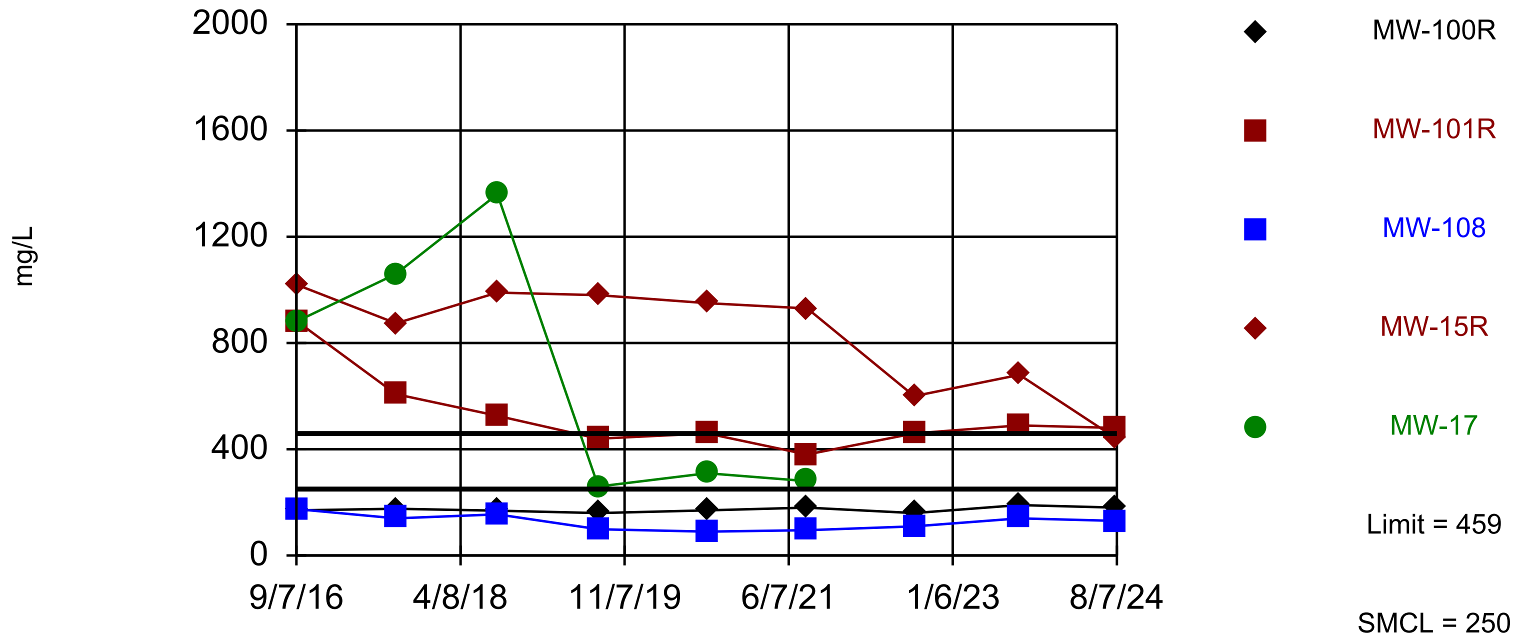
Exceeds Limit: MW-101R

Sulfate

Interwell Parametric



Background Data Summary: Mean=220.9, Std. Dev.=119, n=26. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9115, critical = 0.891. Kappa = 2 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 10/21/2024 12:57 PM View: Shallow

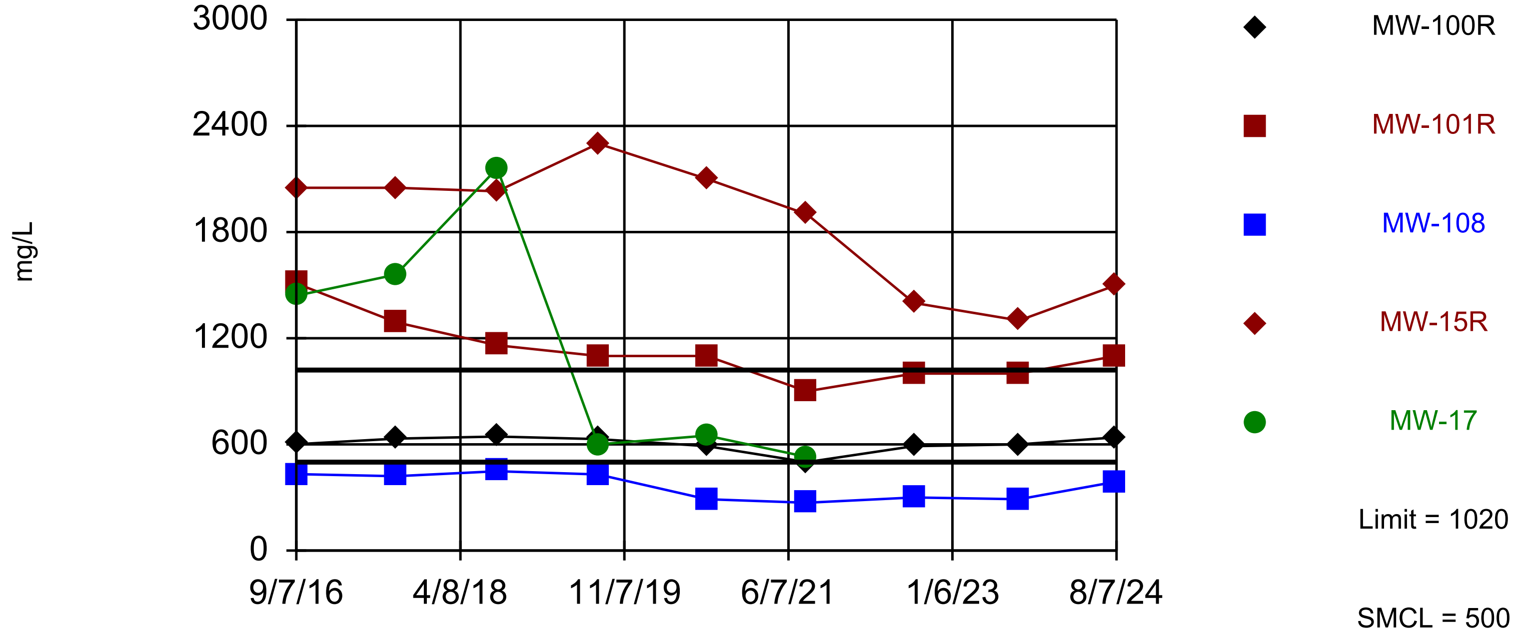
Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-1R (bg)	MW-100R	MW-15R	MW-17	MW-101R	MW-108
9/29/1999	350					
9/13/2000	340					
9/19/2001	210					
9/11/2002	320					
9/10/2003	260					
9/15/2004	160					
9/14/2005	260					
9/13/2006	157					
9/12/2007	138					
9/17/2008	291					
9/16/2009	298					
8/31/2010	403					
9/13/2011	374					
9/18/2012	318					
9/27/2013	264					
9/10/2014	97.8					
9/2/2015	312					
9/7/2016	323	170	1020	881	883	175
8/24/2017	346	176	874	1060	607	140
8/16/2018		169	990	1360	526	155
4/6/2019	190					
8/7/2019	60	160	980	260	440	99
8/24/2020	50	170		310	460	90
8/25/2020			950			
8/10/2021	53			280		
8/11/2021		180			380	95
8/12/2021			930			
8/23/2022	28					
8/24/2022		160	600		460	110
8/29/2023	60	190			490	
8/30/2023			680			140
8/6/2024	80	180	440		480	
8/7/2024						130

Exceeds Limit: MW-101R, MW-15R

Total Dissolved Solids

Interwell Parametric



Background Data Summary: Mean=571.7, Std. Dev.=172.2, n=9. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8391, critical = 0.764. Kappa = 2.62 (c=15, w=5, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001404. Comparing 5 points to limit.

Prediction Limit Analysis Run 10/21/2024 12:56 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

Prediction Limit

Constituent: Total Dissolved Solids (mg/L)   Analysis Run 10/21/2024 12:57 PM   View: Shallow

Ottumwa-Midland Landfill   Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-1R (bg)	MW-108	MW-101R
9/7/2016	601	1440	2050	808	432	1510
8/24/2017	633	1560	2050	887	420	1290
8/16/2018	644	2160	2030		448	1160
4/6/2019				640		
8/7/2019	630	600	2300	530	430	1100
8/24/2020	590	650		420	290	1100
8/25/2020			2100			
8/10/2021		530		420		
8/11/2021	500				270	900
8/12/2021			1900			
8/23/2022				440		
8/24/2022	590		1400		300	1000
8/29/2023	600			530		1000
8/30/2023			1300		290	
8/6/2024	640		1500	470		1100
8/7/2024					390	

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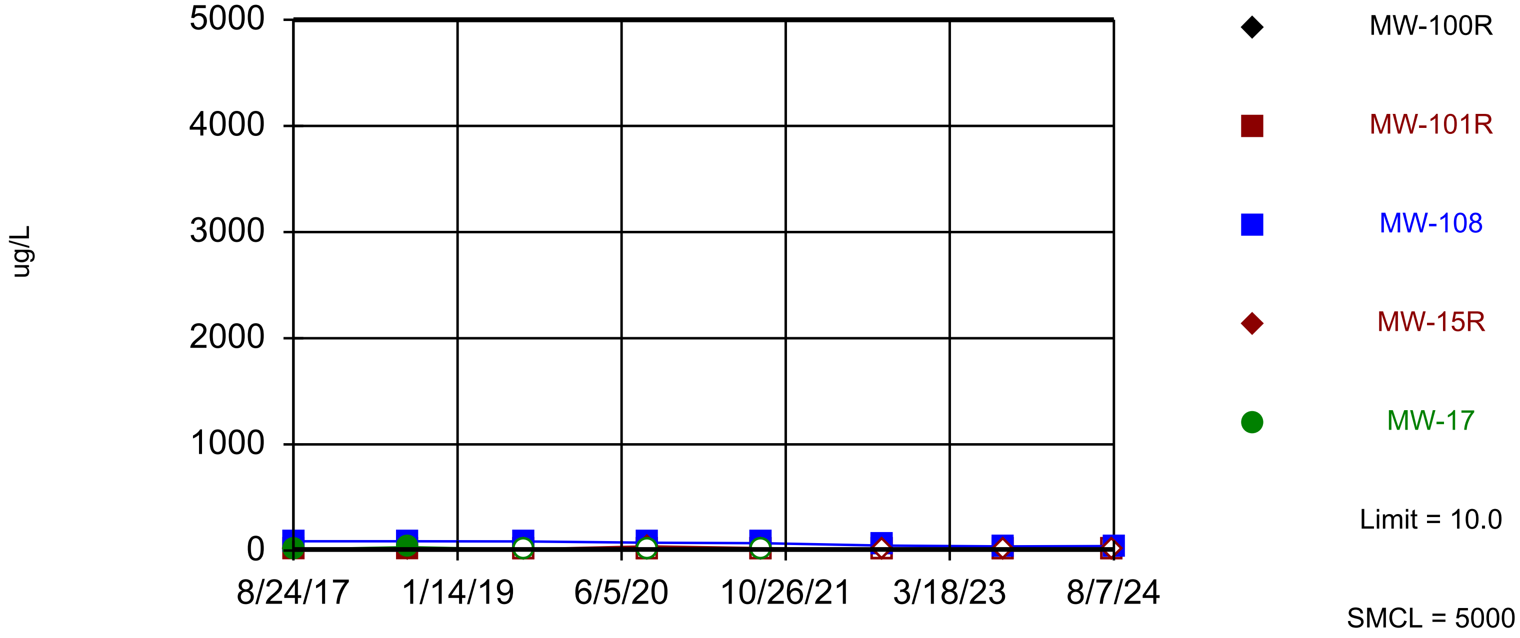
Hollow symbols indicate censored values.

Exceeds Limit: MW-108

Zinc

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 87.5% NDs. Annual per-constituent alpha = 0.09387. Individual comparison alpha = 0.01952 (1 of 2). Comparing 5 points to limit.

Prediction Limit   Analysis Run 10/21/2024 12:56 PM   View: Shallow
Ottumwa-Midland Landfill   Data: 191022-input-OML

Prediction Limit

Constituent: Zinc (ug/L) Analysis Run 10/21/2024 12:57 PM View: Shallow

Ottumwa-Midland Landfill Data: 191022-input-OML

	MW-100R	MW-17	MW-15R	MW-108	MW-101R	MW-1R (bg)
8/24/2017	0.88 (J)	10.4	1.5 (J)	87.8	1.8 (J)	2.4 (J)
8/16/2018	<3.7	31.4	6 (J)	88.1	6.7 (J)	
4/6/2019						<10
8/7/2019	<10	<10	13 (J)	86	<10	<10
8/24/2020	<10	<10		74	<10	<10
8/25/2020			<40			
8/10/2021		<10				<10
8/11/2021	<10			70	<10	
8/12/2021			23			
8/23/2022						<10 (U)
8/24/2022	<10 (U)		<10 (U)	47	<10 (U)	
8/29/2023	<6.4 (U)				<6.4 (U)	<6.4 (U)
8/30/2023			<6.4 (U)	40		
8/6/2024	<9.7		<9.7		<9.7	<9.7
8/7/2024				43		

ND substitution: RL or RL/2 if <15% NDs.

D6 – Interwell Prediction Limit Analysis Results - Pennsylvanian

Prediction Limit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML Printed 10/30/2024, 12:09 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Arsenic (ug/L)	MW-12	0.880	n/a	8/8/2024	0.53ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Arsenic (ug/L)	MW-13	0.880	n/a	8/8/2024	0.53ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Arsenic (ug/L)	**MW-14**	**0.880**	**n/a**	**8/7/2024**	**2.6**	**Yes**	**8**	**75**	**n/a**	**0.0201**	**NP Inter (NDs) 1 of 2**
Arsenic (ug/L)	MW-16R	0.880	n/a	8/7/2024	0.53ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Barium (ug/L)	MW-12	27.8	n/a	8/8/2024	15	No	8	0	No	0.001754	Param Inter 1 of 2
Barium (ug/L)	MW-13	27.8	n/a	8/8/2024	18	No	8	0	No	0.001754	Param Inter 1 of 2
Barium (ug/L)	MW-14	27.8	n/a	8/7/2024	23	No	8	0	No	0.001754	Param Inter 1 of 2
Barium (ug/L)	**MW-16R**	**27.8**	**n/a**	**8/7/2024**	**38**	**Yes**	**8**	**0**	**No**	**0.001754**	**Param Inter 1 of 2**
Beryllium (ug/L)	MW-12	1.30	n/a	8/8/2024	0.33ND	No	8	87.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Beryllium (ug/L)	MW-13	1.30	n/a	8/8/2024	0.33ND	No	8	87.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Beryllium (ug/L)	MW-14	1.30	n/a	8/7/2024	0.33ND	No	8	87.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Beryllium (ug/L)	MW-16R	1.30	n/a	8/7/2024	0.33ND	No	8	87.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Boron (ug/L)	MW-12	2180	n/a	8/8/2024	1400	No	8	0	No	0.001754	Param Inter 1 of 2
Boron (ug/L)	MW-13	2180	n/a	8/8/2024	1800	No	8	0	No	0.001754	Param Inter 1 of 2
Boron (ug/L)	MW-14	2180	n/a	8/7/2024	1900	No	8	0	No	0.001754	Param Inter 1 of 2
Boron (ug/L)	MW-16R	2180	n/a	8/7/2024	2000	No	8	0	No	0.001754	Param Inter 1 of 2
Chloride (mg/L)	**MW-12**	**9.77**	**n/a**	**8/8/2024**	**49**	**Yes**	**13**	**0**	**No**	**0.001754**	**Param Inter 1 of 2**
Chloride (mg/L)	**MW-13**	**9.77**	**n/a**	**8/8/2024**	**13**	**Yes**	**13**	**0**	**No**	**0.001754**	**Param Inter 1 of 2**
Chloride (mg/L)	**MW-14**	**9.77**	**n/a**	**8/7/2024**	**20**	**Yes**	**13**	**0**	**No**	**0.001754**	**Param Inter 1 of 2**
Chloride (mg/L)	**MW-16R**	**9.77**	**n/a**	**8/7/2024**	**22**	**Yes**	**13**	**0**	**No**	**0.001754**	**Param Inter 1 of 2**
Cobalt (ug/L)	MW-12	1.62	n/a	8/8/2024	0.085ND	No	8	0	No	0.001754	Param Inter 1 of 2
Cobalt (ug/L)	MW-13	1.62	n/a	8/8/2024	1.1	No	8	0	No	0.001754	Param Inter 1 of 2
Cobalt (ug/L)	MW-14	1.62	n/a	8/7/2024	0.56	No	8	0	No	0.001754	Param Inter 1 of 2
Cobalt (ug/L)	MW-16R	1.62	n/a	8/7/2024	0.93	No	8	0	No	0.001754	Param Inter 1 of 2
Copper (ug/L)	MW-12	4.30	n/a	8/8/2024	1.8ND	No	8	62.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-13	4.30	n/a	8/8/2024	1.8ND	No	8	62.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-14	4.30	n/a	8/7/2024	2.1J	No	8	62.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Copper (ug/L)	MW-16R	4.30	n/a	8/7/2024	1.8ND	No	8	62.5	n/a	0.0201	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	**MW-12**	**1.07**	**n/a**	**8/8/2024**	**2.6**	**Yes**	**9**	**22.22**	**No**	**0.001754**	**Param Inter 1 of 2**
Fluoride (mg/L)	MW-13	1.07	n/a	8/8/2024	0.68J	No	9	22.22	No	0.001754	Param Inter 1 of 2
Fluoride (mg/L)	MW-14	1.07	n/a	8/7/2024	0.7J	No	9	22.22	No	0.001754	Param Inter 1 of 2
Fluoride (mg/L)	MW-16R	1.07	n/a	8/7/2024	0.45J	No	9	22.22	No	0.001754	Param Inter 1 of 2
Iron (ug/L)	MW-12	5500	n/a	8/8/2024	43J	No	8	0	n/a	0.0201	NP Inter (normality) ...
Iron (ug/L)	MW-13	5500	n/a	8/8/2024	130	No	8	0	n/a	0.0201	NP Inter (normality) ...
Iron (ug/L)	MW-14	5500	n/a	8/7/2024	47J	No	8	0	n/a	0.0201	NP Inter (normality) ...
Iron (ug/L)	MW-16R	5500	n/a	8/7/2024	480	No	8	0	n/a	0.0201	NP Inter (normality) ...
Lead (ug/L)	MW-12	1.10	n/a	8/8/2024	0.26ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Lead (ug/L)	MW-13	1.10	n/a	8/8/2024	0.26ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Lead (ug/L)	MW-14	1.10	n/a	8/7/2024	0.26ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Lead (ug/L)	MW-16R	1.10	n/a	8/7/2024	0.26ND	No	8	75	n/a	0.0201	NP Inter (NDs) 1 of 2
Magnesium (ug/L)	MW-12	204000	n/a	8/8/2024	6400	No	8	0	No	0.001754	Param Inter 1 of 2
Magnesium (ug/L)	MW-13	204000	n/a	8/8/2024	60000	No	8	0	No	0.001754	Param Inter 1 of 2
Magnesium (ug/L)	MW-14	204000	n/a	8/7/2024	34000	No	8	0	No	0.001754	Param Inter 1 of 2
Magnesium (ug/L)	MW-16R	204000	n/a	8/7/2024	39000	No	8	0	No	0.001754	Param Inter 1 of 2
Manganese (ug/L)	MW-12	574	n/a	8/8/2024	140	No	8	0	n/a	0.0201	NP Inter (normality) ...
Manganese (ug/L)	MW-13	574	n/a	8/8/2024	250	No	8	0	n/a	0.0201	NP Inter (normality) ...
Manganese (ug/L)	MW-14	574	n/a	8/7/2024	160	No	8	0	n/a	0.0201	NP Inter (normality) ...
Manganese (ug/L)	MW-16R	574	n/a	8/7/2024	270	No	8	0	n/a	0.0201	NP Inter (normality) ...
Sulfate (mg/L)	MW-12	2230	n/a	8/8/2024	720	No	13	0	No	0.001754	Param Inter 1 of 2
Sulfate (mg/L)	MW-13	2230	n/a	8/8/2024	1200	No	13	0	No	0.001754	Param Inter 1 of 2

Prediction Limit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML Printed 10/30/2024, 12:09 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Sulfate (mg/L)	MW-14	2230	n/a	8/7/2024	670	No	13	0	No	0.001754	Param Inter 1 of 2
Sulfate (mg/L)	MW-16R	2230	n/a	8/7/2024	790	No	13	0	No	0.001754	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-12	3100	n/a	8/8/2024	1700	No	9	0	n/a	0.01707	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-13	3100	n/a	8/8/2024	2300	No	9	0	n/a	0.01707	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-14	3100	n/a	8/7/2024	2000	No	9	0	n/a	0.01707	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-16R	3100	n/a	8/7/2024	2200	No	9	0	n/a	0.01707	NP Inter (normality) ...
Zinc (ug/L)	MW-12	23.7	n/a	8/8/2024	9.7ND	No	8	37.5	No	0.001754	Param Inter 1 of 2
Zinc (ug/L)	MW-13	23.7	n/a	8/8/2024	9.7ND	No	8	37.5	No	0.001754	Param Inter 1 of 2
Zinc (ug/L)	MW-14	23.7	n/a	8/7/2024	9.7ND	No	8	37.5	No	0.001754	Param Inter 1 of 2
Zinc (ug/L)	MW-16R	23.7	n/a	8/7/2024	9.7ND	No	8	37.5	No	0.001754	Param Inter 1 of 2

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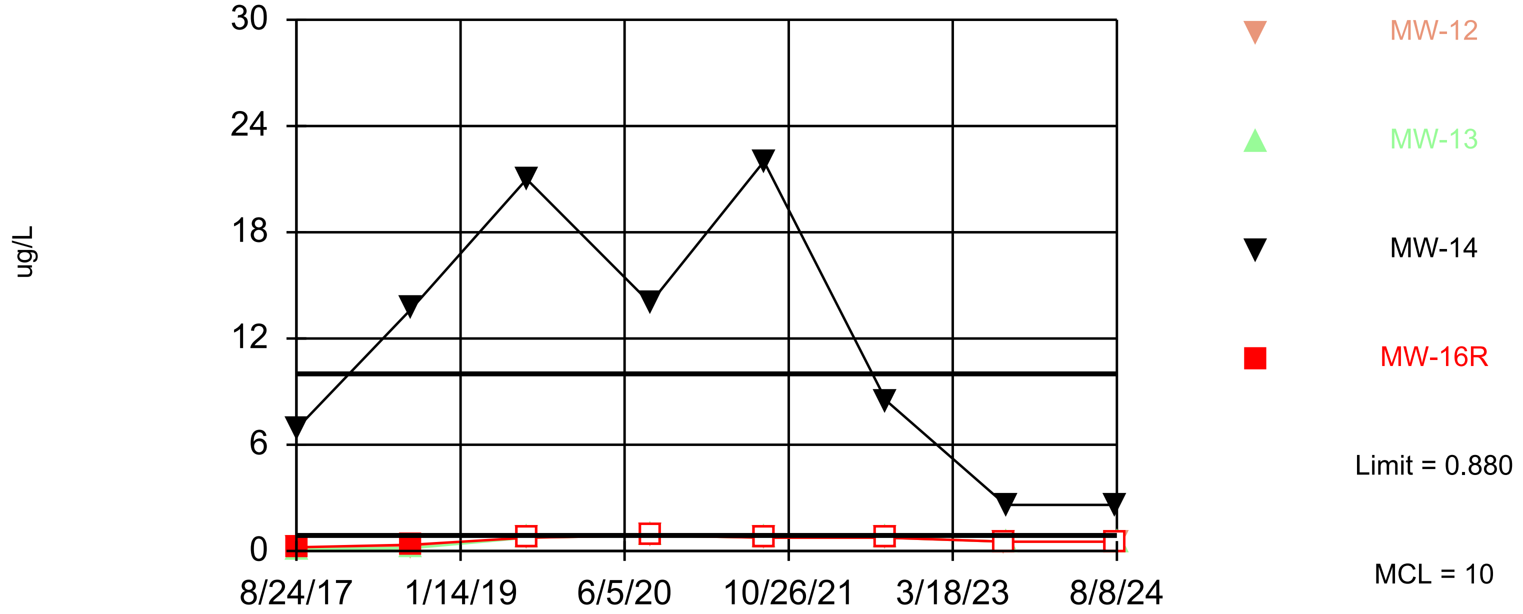
Hollow symbols indicate censored values.

Exceeds Limit: MW-14

Arsenic

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 75% NDs. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Arsenic (ug/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

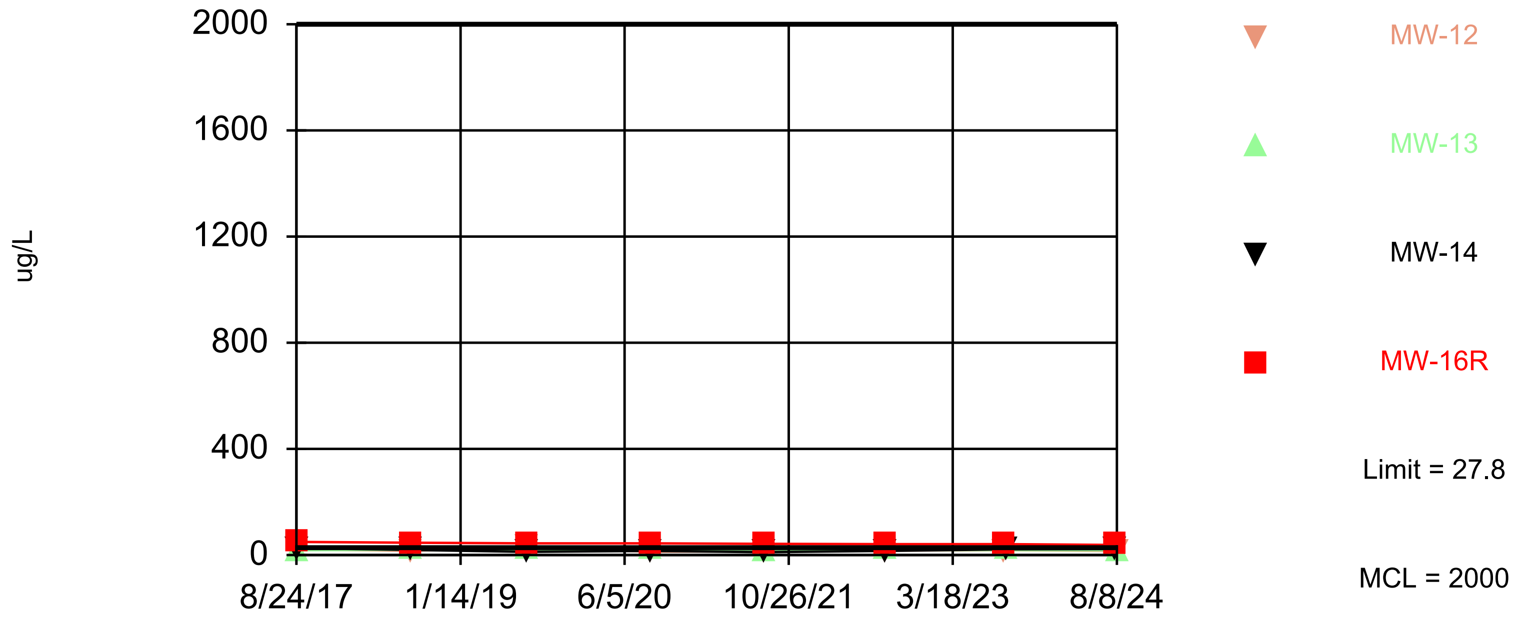
	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	0.61 (J)	0.21 (J)	0.19 (J)	6.9	0.12 (J)
8/16/2018	0.66 (J)	0.35 (J)	0.27 (J)	13.7	0.16 (J)
8/7/2019	<0.75	<0.75	<0.75	21	<0.75
8/24/2020	<0.88		<0.88	14	<0.88
8/25/2020		<0.88			
8/10/2021			<0.75		
8/11/2021	<0.75	<0.75		22	<0.75
8/24/2022	<0.75 (U)	<0.75 (U)	<0.75 (U)	8.5	<0.75 (U)
8/29/2023	<0.53 (U)	<0.53 (U)	<0.53 (U)		
8/30/2023				2.6	<0.53 (U)
8/7/2024	<0.53	<0.53		2.6	
8/8/2024			<0.53		<0.53

ND substitution: RL or RL/2 if <15% NDs.

Exceeds Limit: MW-16R

Barium

Interwell Parametric



Background Data Summary: Mean=23.74, Std. Dev.=1.539, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9129, critical = 0.749. Kappa = 2.63 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Barium (ug/L)   Analysis Run 10/30/2024 12:09 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	22.7	49.7	21	26.8	18.2
8/16/2018	25.2	46.4	15.5	19.3	19.9
8/7/2019	24	44	32	12	19
8/24/2020	22		12	16	20
8/25/2020		44			
8/10/2021			15 (B)		
8/11/2021	22 (B)	42 (B)		11 (B)	16 (B)
8/24/2022	26	41	17	16	19
8/29/2023	25	41	18		
8/30/2023				22	19
8/7/2024	23	38		23	
8/8/2024			15		18

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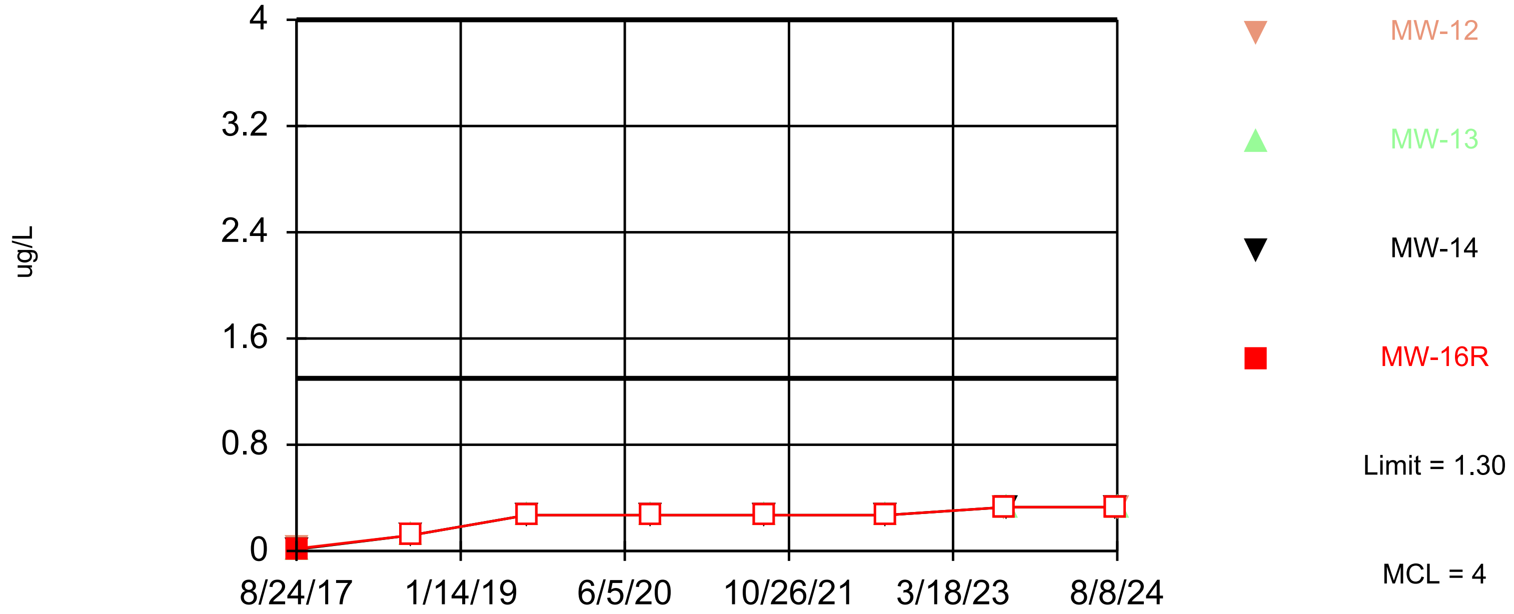
Hollow symbols indicate censored values.

Within Limit

Beryllium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 87.5% NDs. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit   Analysis Run 10/30/2024 12:05 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Prediction Limit

Constituent: Beryllium (ug/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	0.013 (J)	0.016 (J)	0.019 (J)	<0.012	<0.012
8/16/2018	<0.12	<0.12	<0.12	<0.12	<0.12
8/7/2019	<0.27	<0.27	<0.27	<0.27	<0.27
8/24/2020	<0.27		<0.27	<0.27	<0.27
8/25/2020		<0.27			
8/10/2021			<0.27		
8/11/2021	<0.27	<0.27		<0.27	<0.27
8/24/2022	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)
8/29/2023	<1.3 (U)	<0.33 (U)	<0.33 (U)		
8/30/2023				<0.33 (U)	<0.33 (U)
8/7/2024	<0.33	<0.33		<0.33	
8/8/2024			<0.33		<0.33

ND substitution: RL or RL/2 if <15% NDs.

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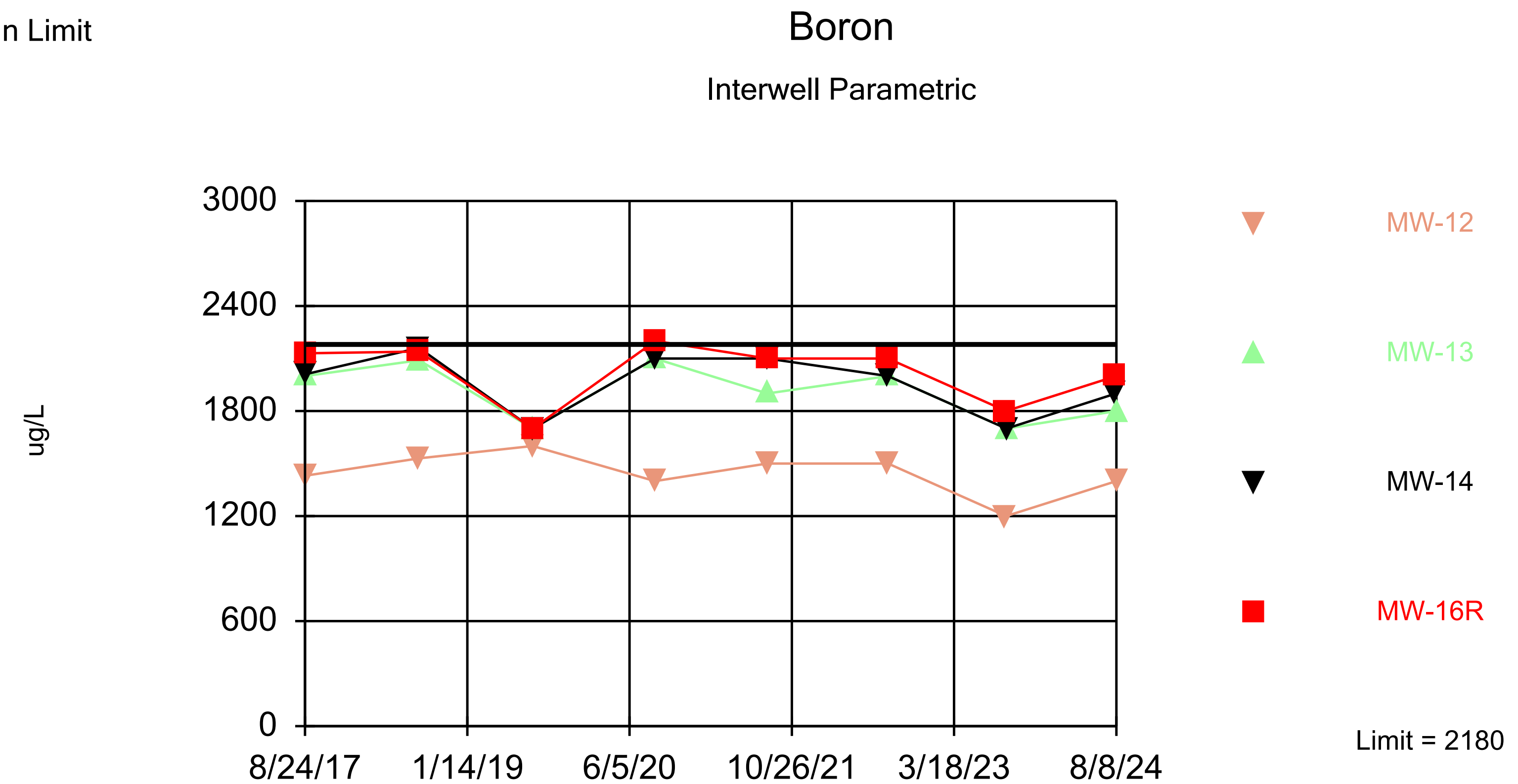
Within Limit



Background Data Summary: Mean=1674, Std. Dev.=191.9, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8939, critical = 0.749. Kappa = 2.63 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Boron (ug/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	1770	2130	1430	2010	2000
8/16/2018	1920	2140	1530	2160	2090
8/7/2019	1400 (B)	1700 (B)	1600 (B)	1700 (B)	1700 (B)
8/24/2020	1800		1400	2100	2100
8/25/2020		2200			
8/10/2021			1500		
8/11/2021	1800	2100		2100	1900
8/24/2022	1600	2100	1500	2000	2000
8/29/2023	1400	1800	1200		
8/30/2023				1700	1700
8/7/2024	1700	2000		1900	
8/8/2024			1400		1800

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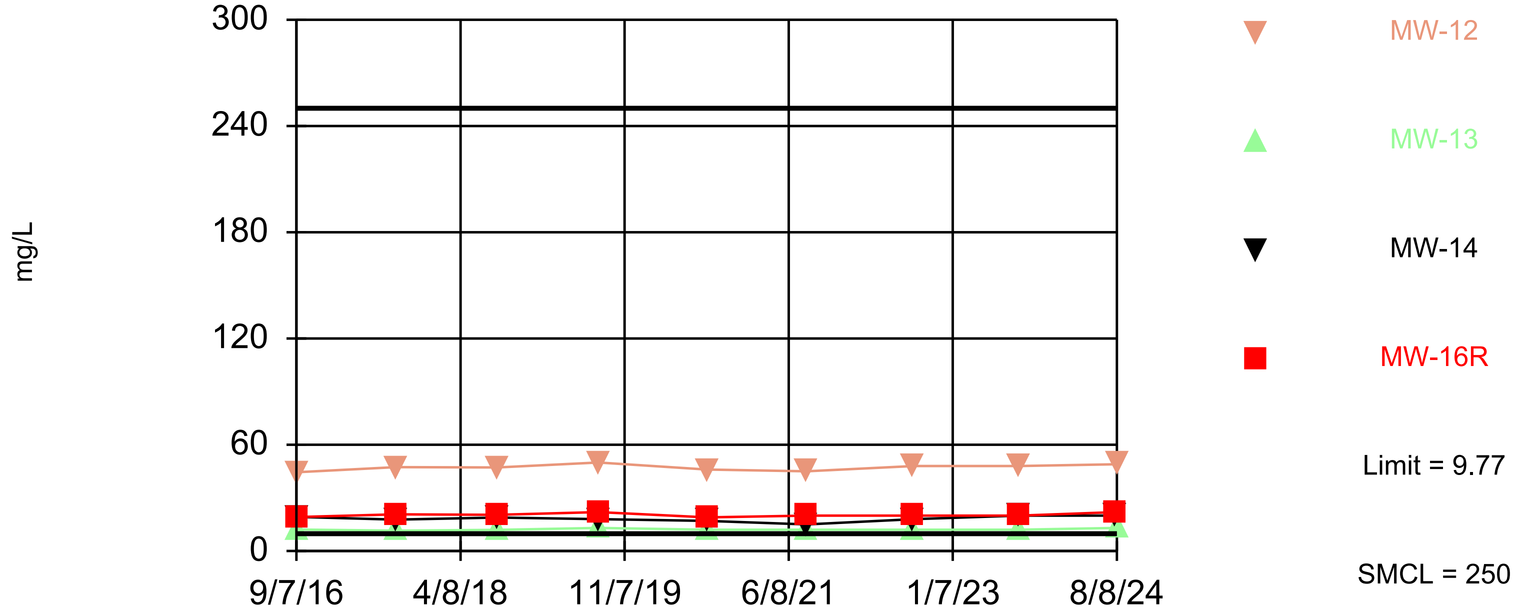
Exceeds Limit: MW-12, MW-13, MW-14, MW-16R

Chloride

Interwell Parametric



Background Data Summary: Mean=8.892, Std. Dev.=0.3989, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9469, critical = 0.814. Kappa = 2.21 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Chloride (mg/L)   Analysis Run 10/30/2024 12:09 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-14	MW-12	MW-13
9/2/2015	8.6				
12/30/2015	8.6				
3/23/2016	9.3				
6/21/2016	8.5				
9/7/2016	8.8	19.2	19.3	44.5	12.1
8/24/2017	8.6	20.7	17.7	47.4	11.5
8/16/2018	8.8	20.4	18.9	47.2	11.9
8/7/2019	9.1	22	18	50	13
8/24/2020	8.2		17	46	12
8/25/2020		19			
8/10/2021				45	
8/11/2021	8.9	20	15		12
8/24/2022	9.3	20	18	48	12
8/29/2023	9.5	20		48	
8/30/2023			20		12
8/7/2024	9.4	22	20		
8/8/2024				49	13

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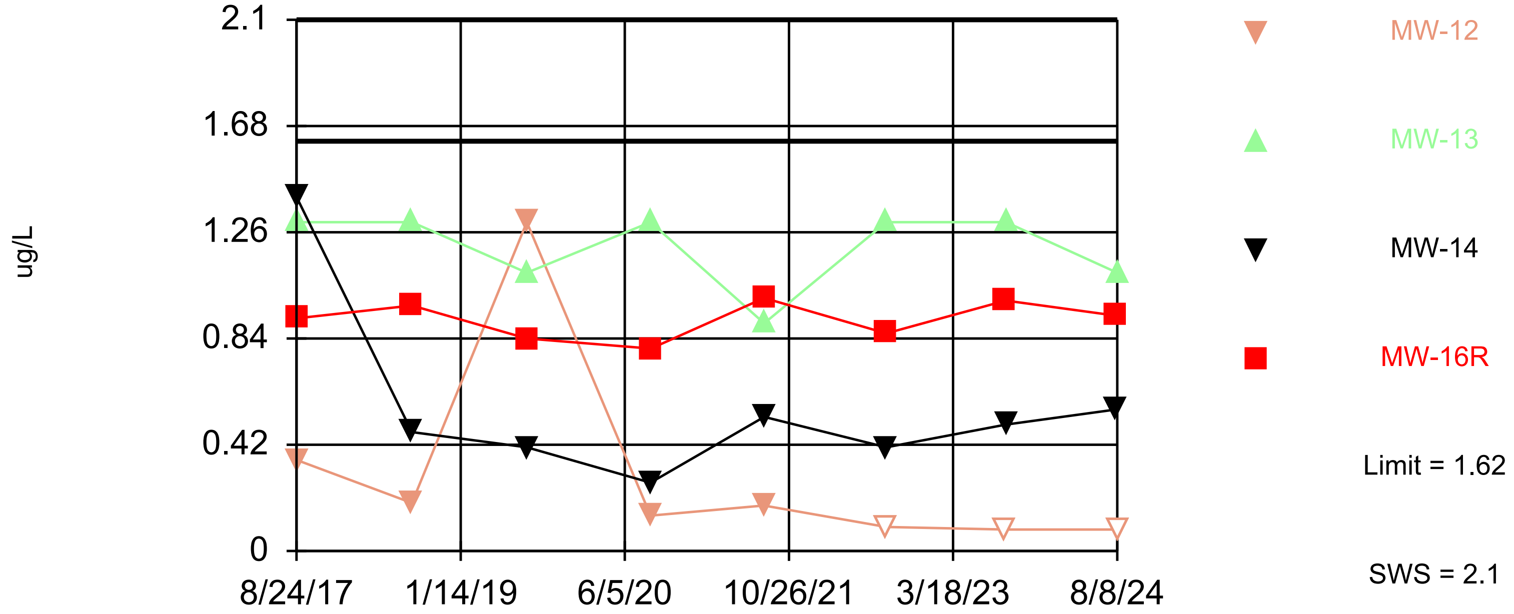
Hollow symbols indicate censored values.

Within Limit

Cobalt

Interwell Parametric



Background Data Summary: Mean=1.021, Std. Dev.=0.2288, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9215, critical = 0.749. Kappa = 2.63 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Cobalt (ug/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	0.86 (J)	0.92 (J)	0.36 (J)	1.4	1.3
8/16/2018	1.1	0.97 (J)	0.19 (J)	0.47 (J)	1.3
8/7/2019	1.3 (J)	0.84	1.3	0.41 (J)	1.1
8/24/2020	0.93		0.14 (J)	0.27 (J)	1.3
8/25/2020		0.8			
8/10/2021			0.18 (J)		
8/11/2021	0.97	1		0.53	0.9
8/24/2022	1.4	0.86	<0.19 (U)	0.41 (J)	1.3
8/29/2023	0.87	0.99	<0.17 (U)		
8/30/2023				0.5	1.3
8/7/2024	0.74	0.93		0.56	
8/8/2024			<0.17		1.1

ND substitution: RL or RL/2 if <15% NDs.

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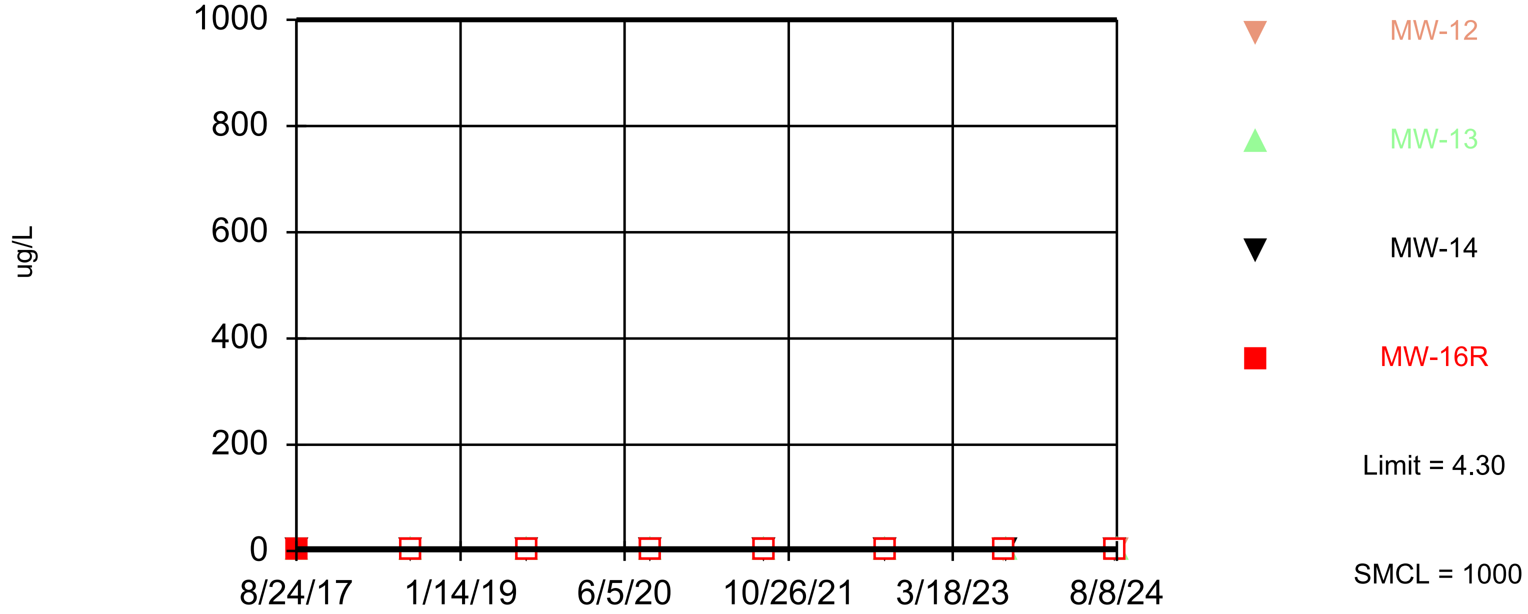
Hollow symbols indicate censored values.

Within Limit

Copper

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Copper (ug/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	0.23 (J)	0.97 (J)	0.94 (J)	0.54 (J)	0.62 (J)
8/16/2018	<0.48	<0.48	<0.48	0.6 (J)	<0.48
8/7/2019	<2	<2	<2	<2	<2
8/24/2020	<1.5		<1.5	<1.5	<1.5
8/25/2020		<1.5			
8/10/2021			<1.4		
8/11/2021	<1.4	<1.4		<1.4	<1.4
8/24/2022	<1.8 (U)	<1.8 (U)	<1.8 (U)	<1.8 (U)	<1.8 (U)
8/29/2023	2.7 (J)	<1.8 (U)	<1.8 (U)		
8/30/2023				<1.8 (U)	<1.8 (U)
8/7/2024	4.3 (J)	<1.8		2.1 (J)	
8/8/2024			<1.8		<1.8

ND substitution: RL or RL/2 if <15% NDs.

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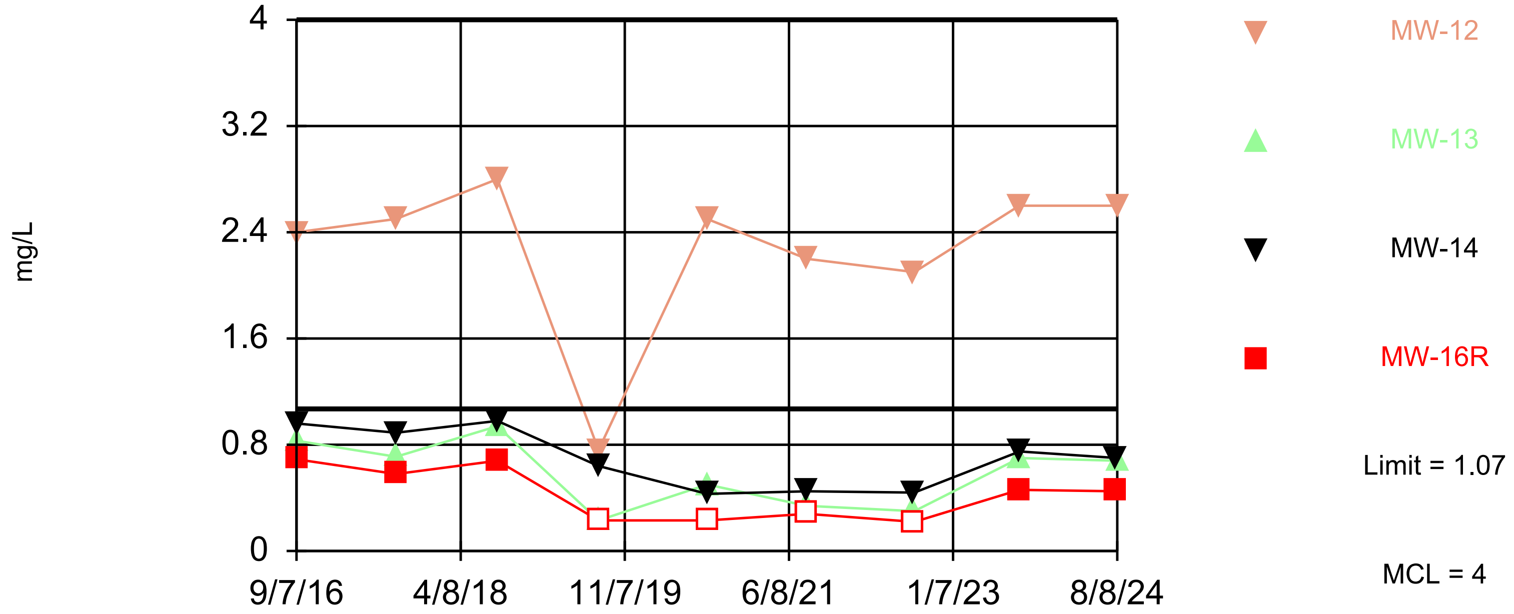
Hollow symbols indicate censored values.

Exceeds Limit: MW-12

Fluoride

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=0.4922, Std. Dev.=0.2309, n=9, 22.22% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8834, critical = 0.764. Kappa = 2.51 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 10/30/2024 12:09 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-13	MW-14	MW-12	MW-16R
9/7/2016	0.84	0.83	0.96	2.4	0.69
8/24/2017	0.74	0.71	0.89	2.5	0.58
8/16/2018	0.69	0.94	0.98	2.8	0.68
8/7/2019	<0.23	<0.23	0.64	0.76	<0.23
8/24/2020	0.69	0.5	0.43 (J)	2.5	
8/25/2020					<0.23
8/10/2021				2.2	
8/11/2021	<0.28	0.34 (J)	0.45 (J)		<0.28
8/24/2022	0.23 (J)	0.3 (J)	0.44 (J)	2.1	<0.22 (U)
8/29/2023	0.58 (J)			2.6	0.46 (J)
8/30/2023		0.7 (J)	0.75 (J)		
8/7/2024	0.53 (J)		0.7 (J)		0.45 (J)
8/8/2024		0.68 (J)		2.6	

ND substitution: RL or RL/2 if <15% NDs.

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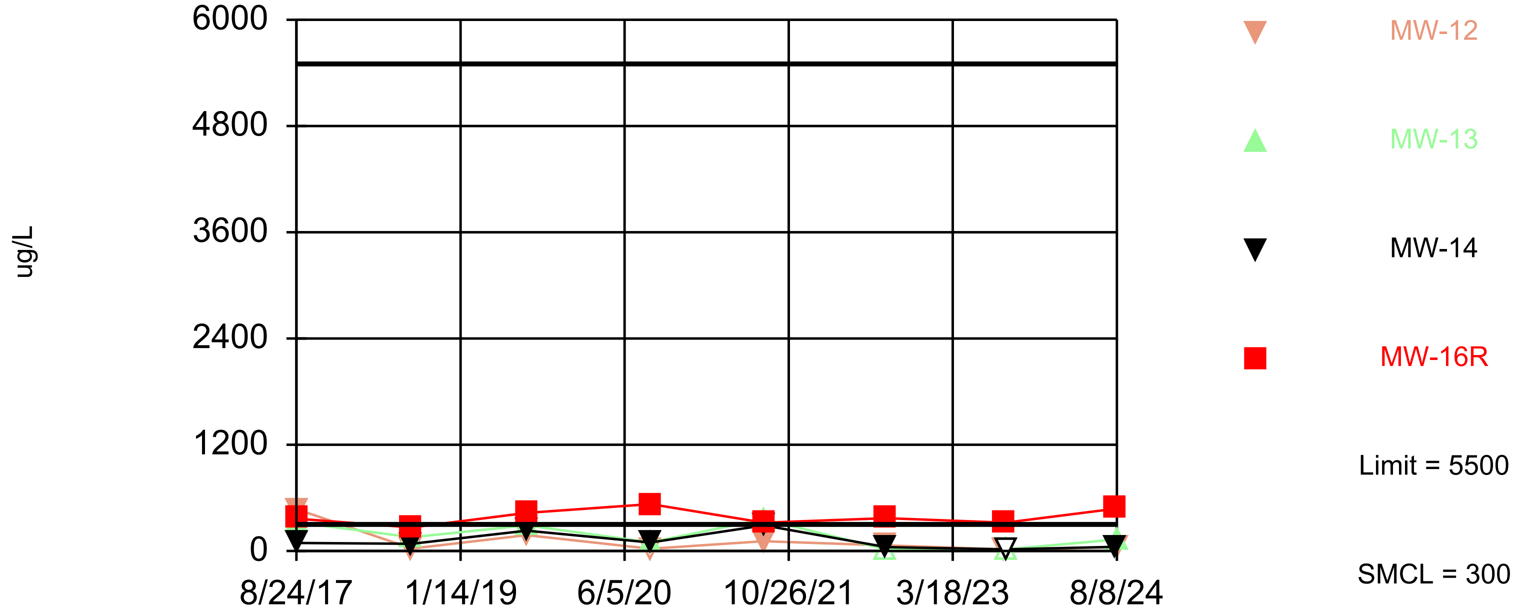
Hollow symbols indicate censored values.

Within Limit

Iron

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Iron (ug/L) Analysis Run 10/30/2024 12:10 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	5230	365	473	91.5	324
8/16/2018	5330	266	27.1 (J)	81.8	155
8/7/2019	5200	430	180	230	290
8/24/2020	5500		<50	97 (J)	98 (J)
8/25/2020		530			
8/10/2021			110		
8/11/2021	5500	320		290	360
8/24/2022	2200	370	63 (J)	43 (J)	<36 (U)
8/29/2023	3400	320	<36 (U)		
8/30/2023				<36 (U)	<36 (U)
8/7/2024	5500	480		47 (J)	
8/8/2024			43 (J)		130

ND substitution: RL or RL/2 if <15% NDs.

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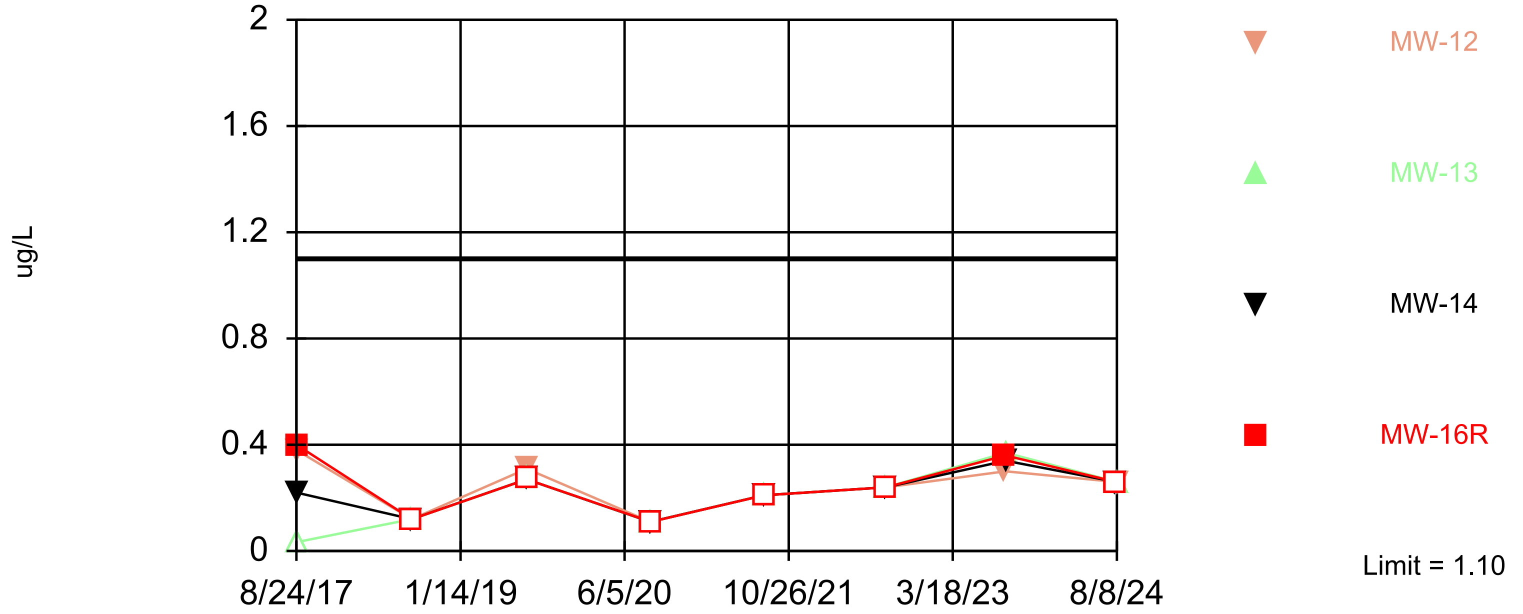
Hollow symbols indicate censored values.

Within Limit

Lead

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 75% NDs. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Lead (ug/L)   Analysis Run 10/30/2024 12:10 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

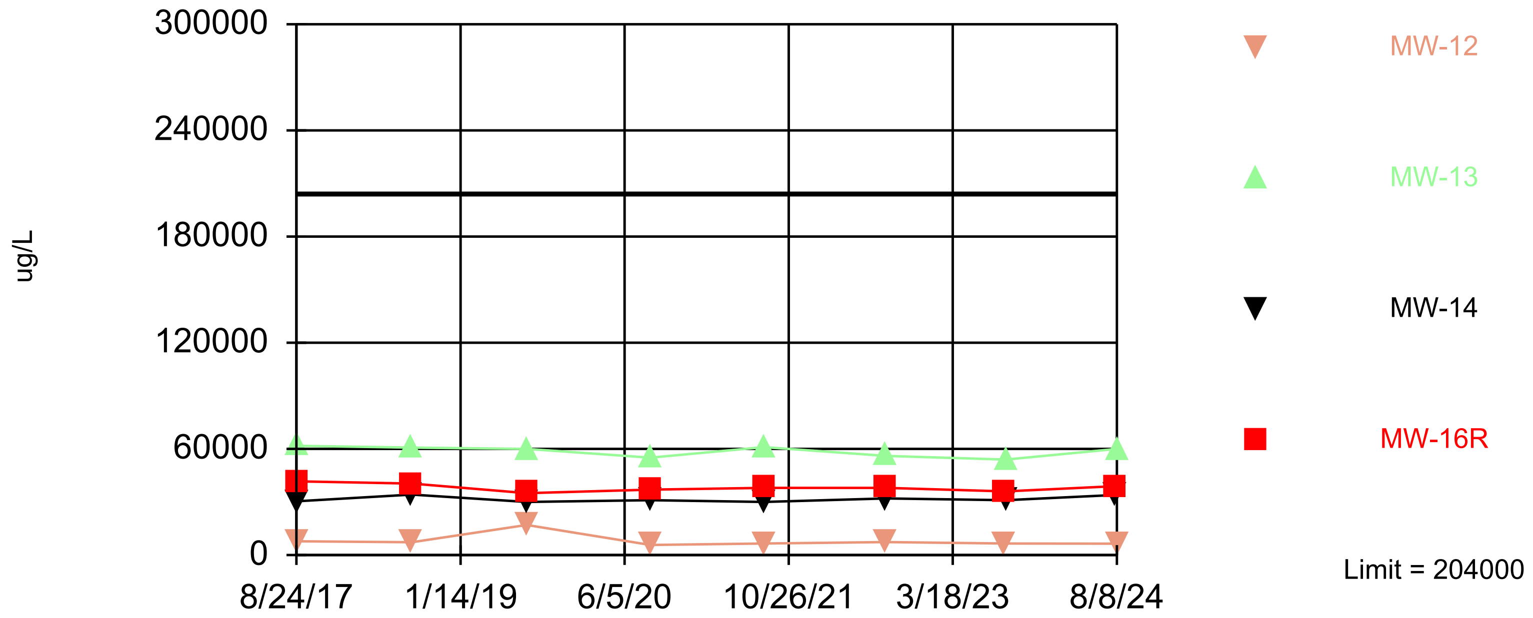
	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	0.036 (J)	0.4 (J)	0.38 (J)	0.22 (J)	<0.033
8/16/2018	<0.12	<0.12	<0.12	0.12 (J)	<0.12
8/7/2019	<1.1	<0.27	0.31 (J)	<0.27	<0.27
8/24/2020	<0.44		<0.11	<0.11	<0.11
8/25/2020		<0.11			
8/10/2021			0.21 (J)		
8/11/2021	<0.21	<0.21		<0.21	<0.21
8/24/2022	<0.24 (U)	<0.24 (U)	<0.24 (U)	<0.24 (U)	<0.24 (U)
8/29/2023	0.27 (JB)	0.36 (JB)	0.3 (JB)		
8/30/2023				0.34 (JB)	0.37 (JB)
8/7/2024	<0.26	<0.26		<0.26	
8/8/2024			<0.26		<0.26

ND substitution: RL or RL/2 if <15% NDs.

Within Limit

Magnesium

Interwell Parametric



Background Data Summary: Mean=150875, Std. Dev.=20153, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8102, critical = 0.749. Kappa = 2.63 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:05 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Magnesium (ug/L)   Analysis Run 10/30/2024 12:10 PM   View: Pennsylvanian Unit

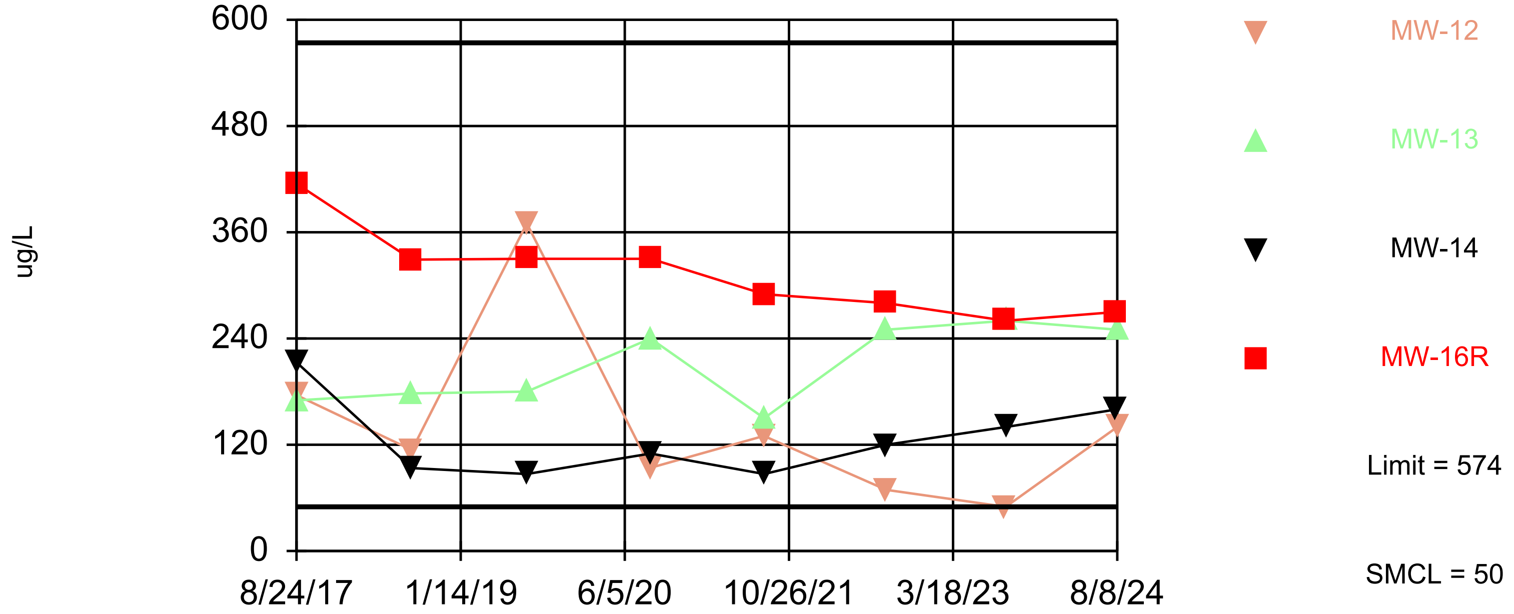
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	157000	41700	7830	30400	61700
8/16/2018	170000	40400	7230	34200	60700
8/7/2019	170000	35000	17000	30000	60000
8/24/2020	160000		5700	31000	55000
8/25/2020		37000			
8/10/2021			6500		
8/11/2021	160000	38000		30000	61000
8/24/2022	120000	38000	7300	32000	56000
8/29/2023	120000	36000	6500		
8/30/2023				31000	54000
8/7/2024	150000	39000		34000	
8/8/2024			6400		60000

Within Limit

Manganese

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Annual per-constituent alpha = 0.07802. Individual comparison alpha = 0.0201 (1 of 2). Comparing 4 points to limit.

Prediction Limit   Analysis Run 10/30/2024 12:05 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

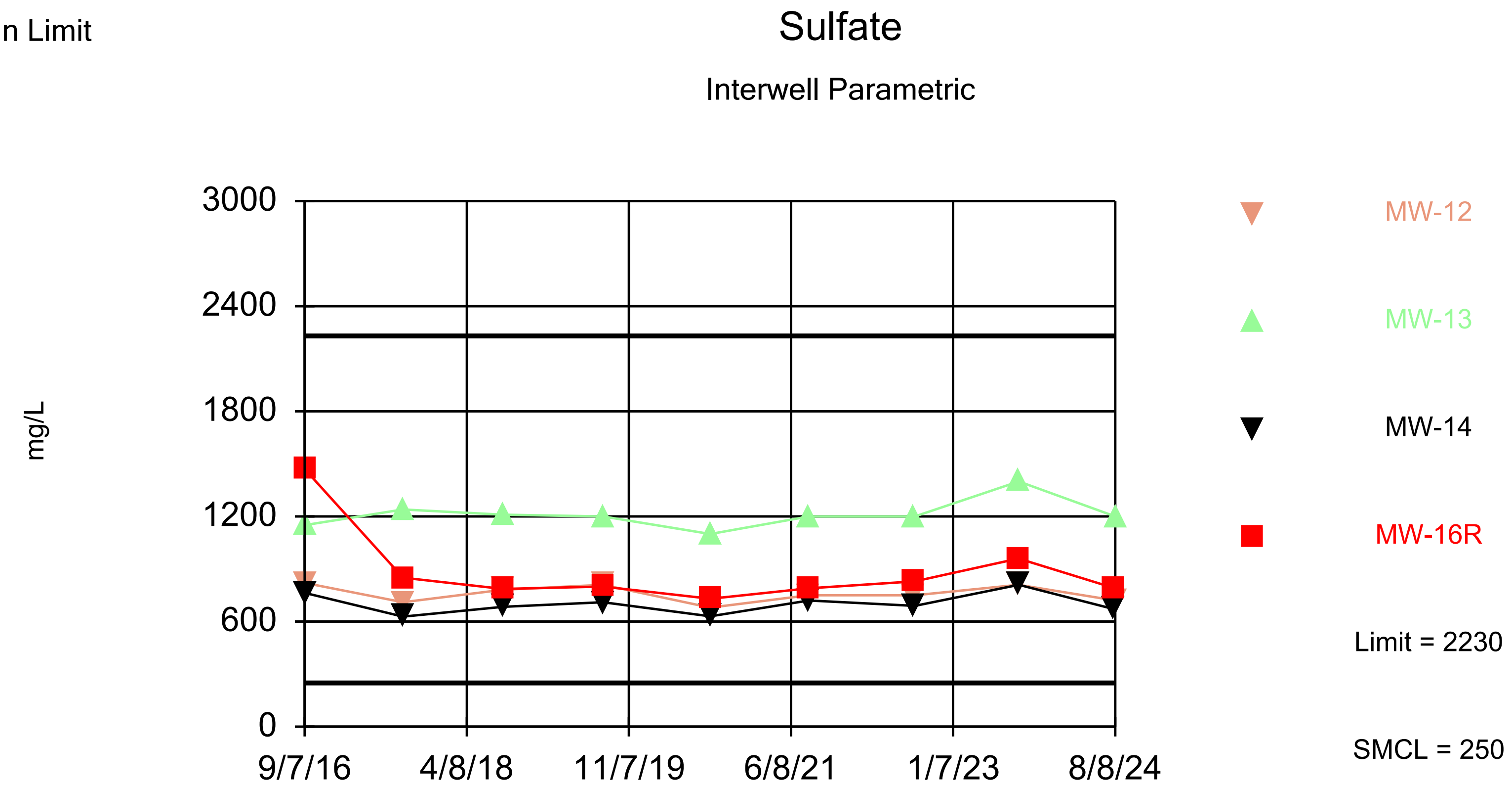
Prediction Limit

Constituent: Manganese (ug/L)   Analysis Run 10/30/2024 12:10 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	558	415	176	213	170
8/16/2018	574	329	114	93.7	178
8/7/2019	550	330	370	87	180
8/24/2020	550		94	110	240
8/25/2020		330			
8/10/2021			130		
8/11/2021	510	290		87	150
8/24/2022	330	280	69	120	250
8/29/2023	340	260	50		
8/30/2023				140	260
8/7/2024	530	270		160	
8/8/2024			140		250

Within Limit



Background Data Summary: Mean=1624, Std. Dev.=272.5, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9504, critical = 0.814. Kappa = 2.21 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:06 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 10/30/2024 12:10 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-14	MW-12	MW-13
9/2/2015	1690				
12/30/2015	2070				
3/23/2016	1860				
6/21/2016	1840				
9/7/2016	1920	1470	764	821	1150
8/24/2017	1540	850	628	710	1240
8/16/2018	1690	786	684	782	1210
8/7/2019	1600	800	710	810	1200
8/24/2020	1500		630	680	1100
8/25/2020		730			
8/10/2021				750	
8/11/2021	1500	790	720		1200
8/24/2022	1000	830	690	750	1200
8/29/2023	1500	960		810	
8/30/2023			810		1400
8/7/2024	1400	790	670		
8/8/2024				720	1200

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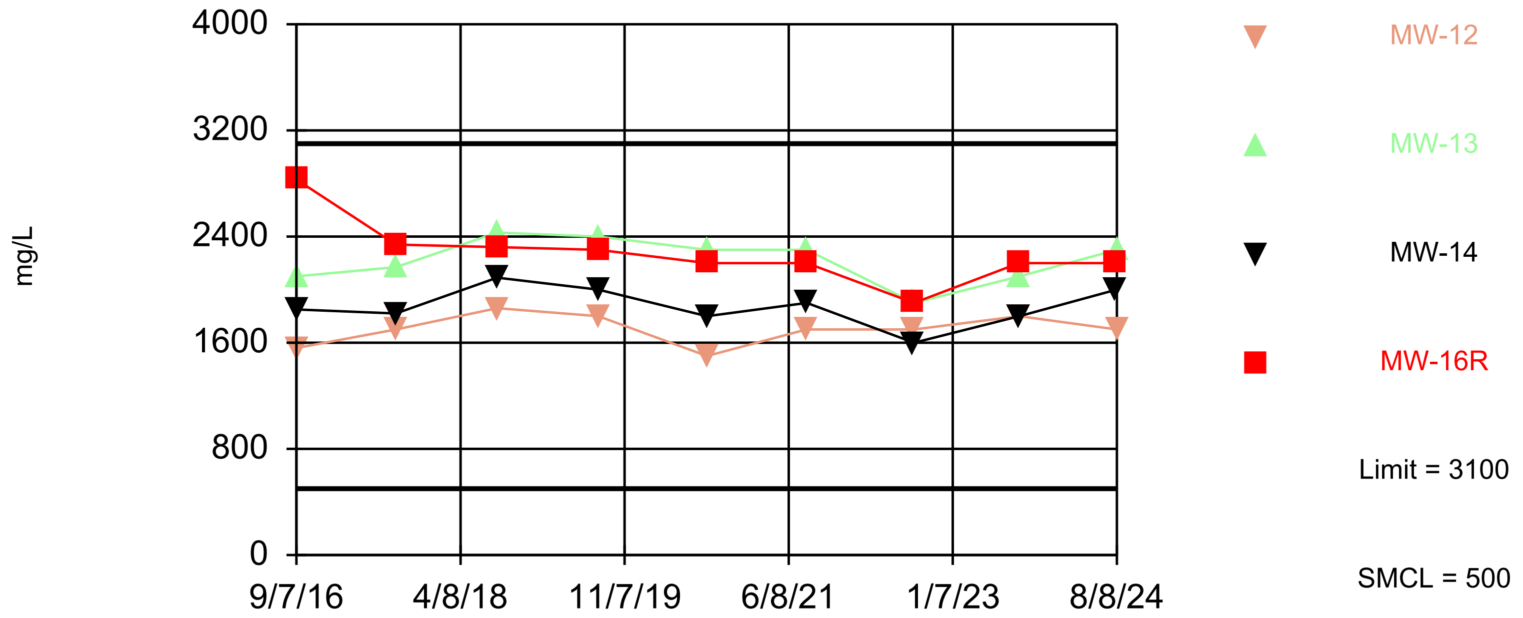
Within Limit

Total Dissolved Solids

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 9 background values. Annual per-constituent alpha = 0.06656. Individual comparison alpha = 0.01707 (1 of 2). Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:06 PM View: Pennsylvanian Unit

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Total Dissolved Solids (mg/L)   Analysis Run 10/30/2024 12:10 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

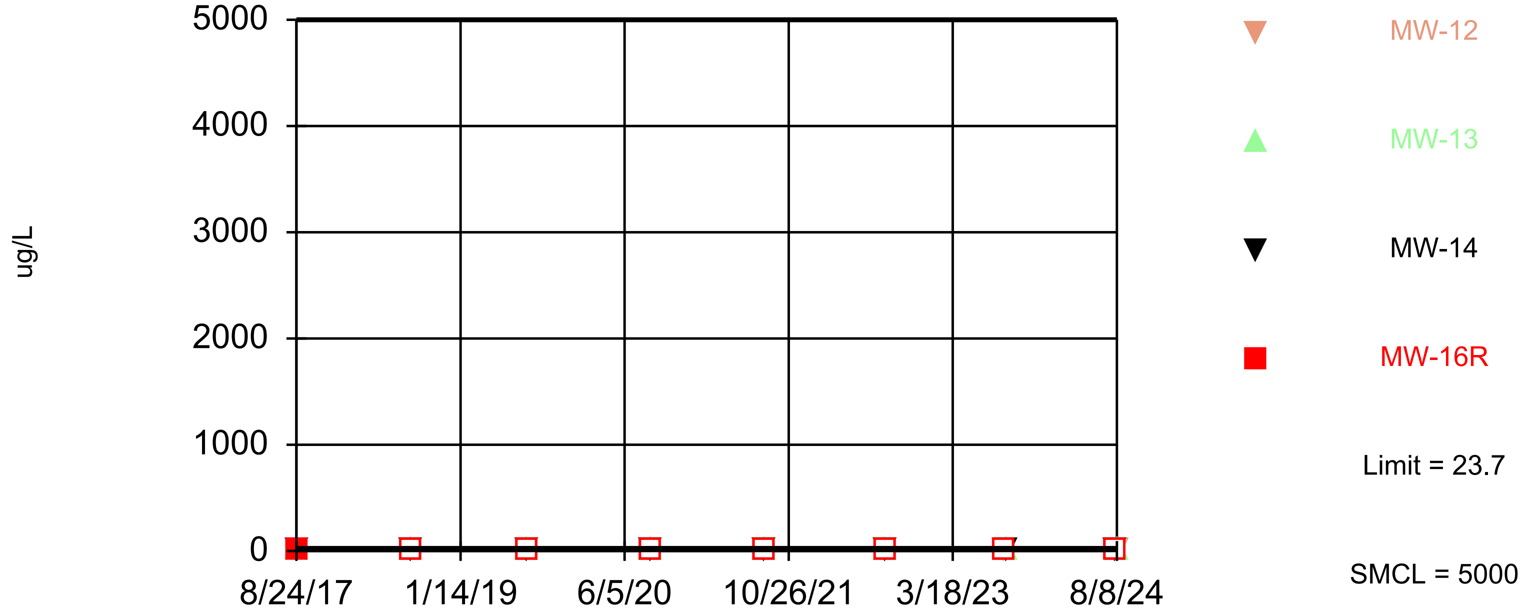
	MW-102P (bg)	MW-13	MW-14	MW-12	MW-16R
9/7/2016	2890	2100	1850	1560	2830
8/24/2017	2760	2170	1820	1700	2340
8/16/2018	2730	2430	2090	1860	2320
8/7/2019	3100	2400	2000	1800	2300
8/24/2020	3000	2300	1800	1500	
8/25/2020					2200
8/10/2021				1700	
8/11/2021	310 (X)	2300	1900		2200
8/24/2022	2200	1900	1600	1700	1900
8/29/2023	2600			1800	2200
8/30/2023		2100	1800		
8/7/2024	2800		2000		2200
8/8/2024		2300		1700	

Sanitas™ v.10.0.23 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Zinc

Interwell Parametric



Background Data Summary (after Kaplan-Meier Adjustment): Mean=8.238, Std. Dev.=5.876, n=8, 37.5% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7864, critical = 0.749. Kappa = 2.63 (c=15, w=4, 1 of 2, event alpha = 0.1). Report alpha = 0.006999. Individual comparison alpha = 0.001754. Comparing 4 points to limit.

Prediction Limit Analysis Run 10/30/2024 12:06 PM View: Pennsylvanian Unit
Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Prediction Limit

Constituent: Zinc (ug/L)   Analysis Run 10/30/2024 12:10 PM   View: Pennsylvanian Unit

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-102P (bg)	MW-16R	MW-12	MW-14	MW-13
8/24/2017	3.6 (J)	1 (J)	3.7 (J)	1.7 (J)	2 (J)
8/16/2018	4.3 (J)	<3.7	<3.7	<3.7	<3.7
8/7/2019	<10	<10	<10	<10	<10
8/24/2020	<40		<10	<10	<10
8/25/2020		<10			
8/10/2021			<10		
8/11/2021	<10	<10		<10	<10
8/24/2022	21	<10 (U)	<10 (U)	<10 (U)	<10 (U)
8/29/2023	6.9 (J)	<6.4 (U)	<6.4 (U)		
8/30/2023				<6.4 (U)	<6.4 (U)
8/7/2024	12 (J)	<9.7		<9.7	
8/8/2024			<9.7		<9.7

ND substitution: RL or RL/2 if <15% NDs.

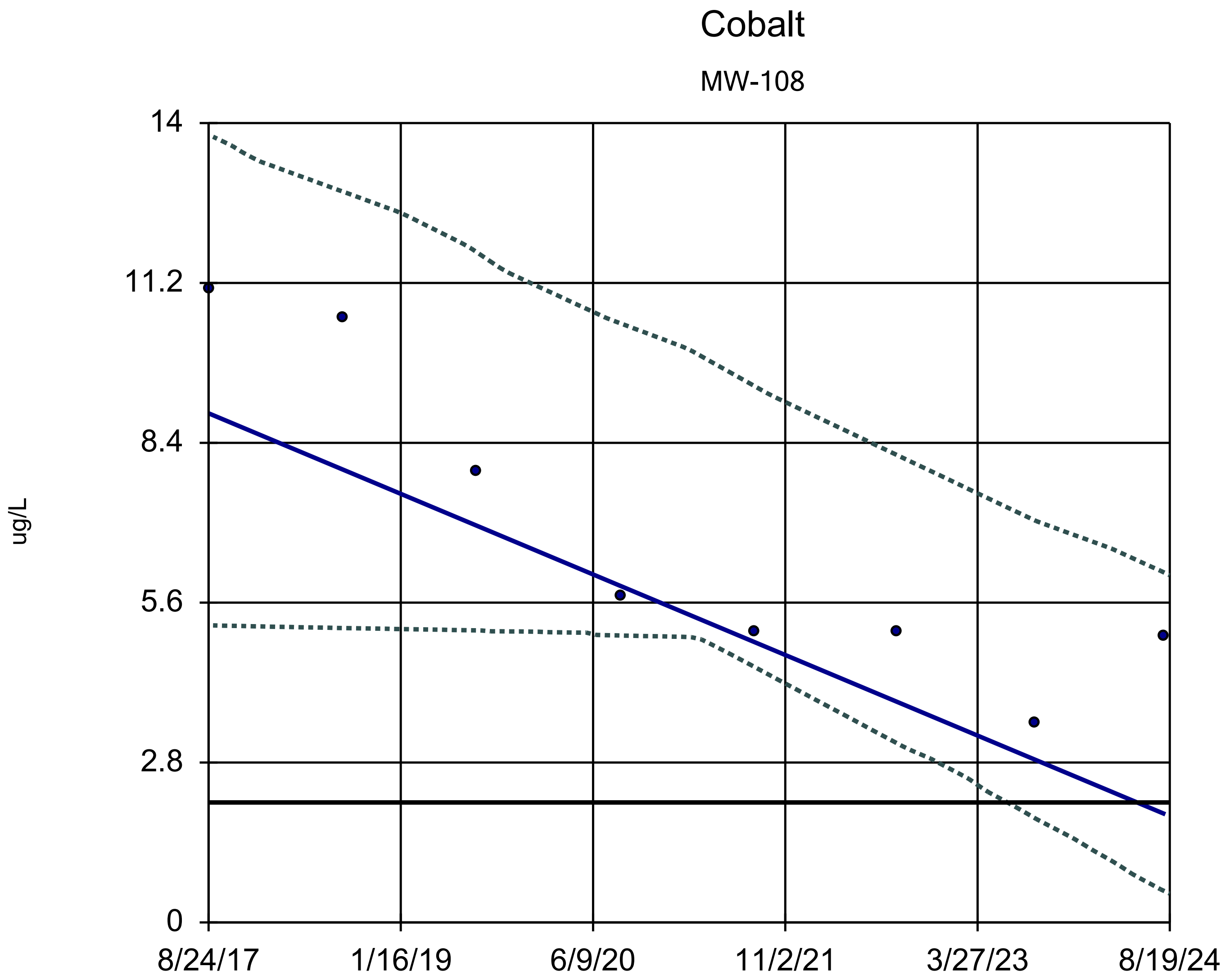
Appendix E

Groundwater Quality Trend Summary

Trend Test

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML   Printed 11/4/2024, 3:10 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Cobalt (ug/L)	**MW-108**	**-1.009**	**-25**	**-20**	**Yes**	**8**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Cobalt (ug/L)	MW-15R	0.1402	10	20	No	8	0	n/a	n/a	0.02	NP
Manganese (ug/L)	MW-108	-75.37	-20	-20	No	8	0	n/a	n/a	0.02	NP
Manganese (ug/L)	**MW-15R**	**-412.1**	**-26**	**-20**	**Yes**	**8**	**0**	**n/a**	**n/a**	**0.02**	**NP**



n = 8

Slope = -1.009
units per year.

Mann-Kendall
statistic = -25
critical = -20

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

Confidence band intersects
SWS (2.1) on 07/10/23.

Sen's Slope and 95% Confidence Band   Analysis Run 11/4/2024 2:46 PM

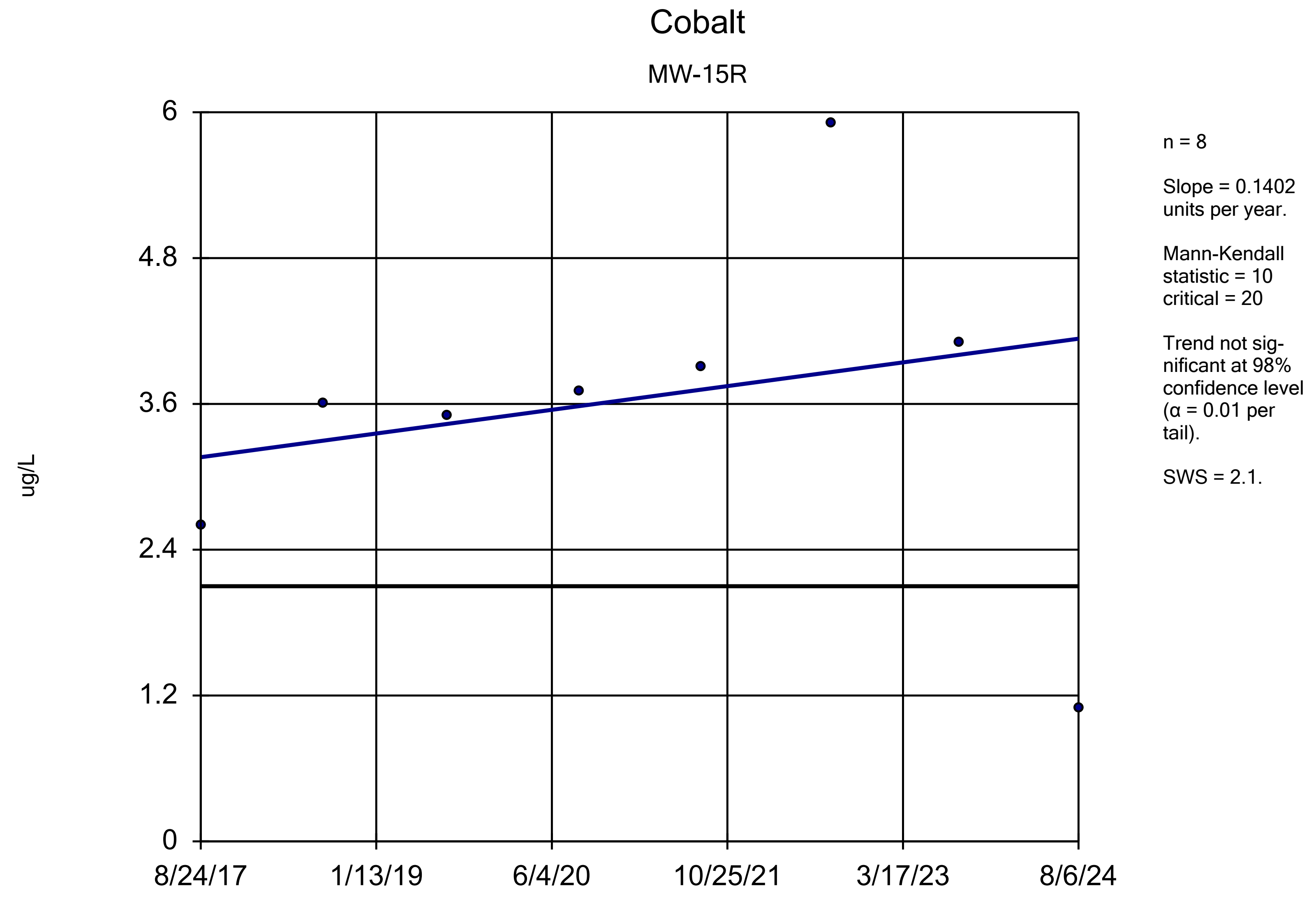
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Sen's Slope Estimator

Constituent: Cobalt (ug/L)   Analysis Run 11/4/2024 3:10 PM

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-108	LCL	UCL
8/24/2017	11.1	5.203	13.8
8/16/2018	10.6	5.156	12.8
8/7/2019	7.9	5.115	11.73
8/24/2020	5.7	5.025	10.49
8/11/2021	5.1	4.479	9.398
8/24/2022	5.1	3.144	8.191
8/30/2023	3.5	1.813	7.03
8/7/2024	5	0.5404	6.119



Sen's Slope and 95% Confidence Band   Analysis Run 11/4/2024 2:46 PM

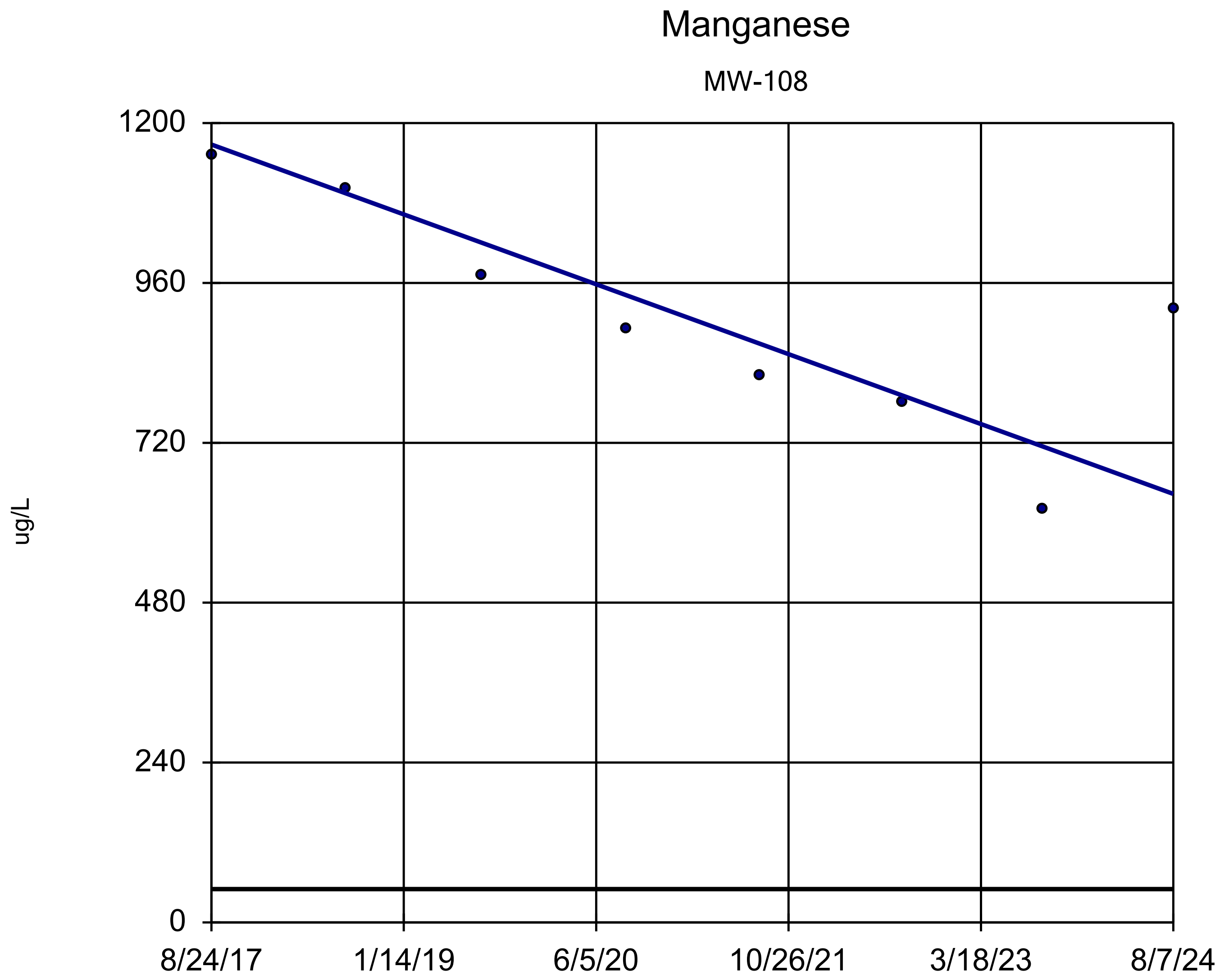
Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 11/4/2024 3:10 PM

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

	MW-15R
8/24/2017	2.6
8/16/2018	3.6
8/7/2019	3.5
8/25/2020	3.7
8/12/2021	3.9
8/24/2022	5.9
8/30/2023	4.1
8/6/2024	1.1



n = 8

Slope = -75.37 units per year.

Mann-Kendall statistic = -20 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

SMCL = 50.

Sen's Slope and 95% Confidence Band Analysis Run 11/4/2024 2:46 PM

Ottumwa-Midland Landfill Client: SCS Engineers Data: 191022-input-OML

Sen's Slope Estimator

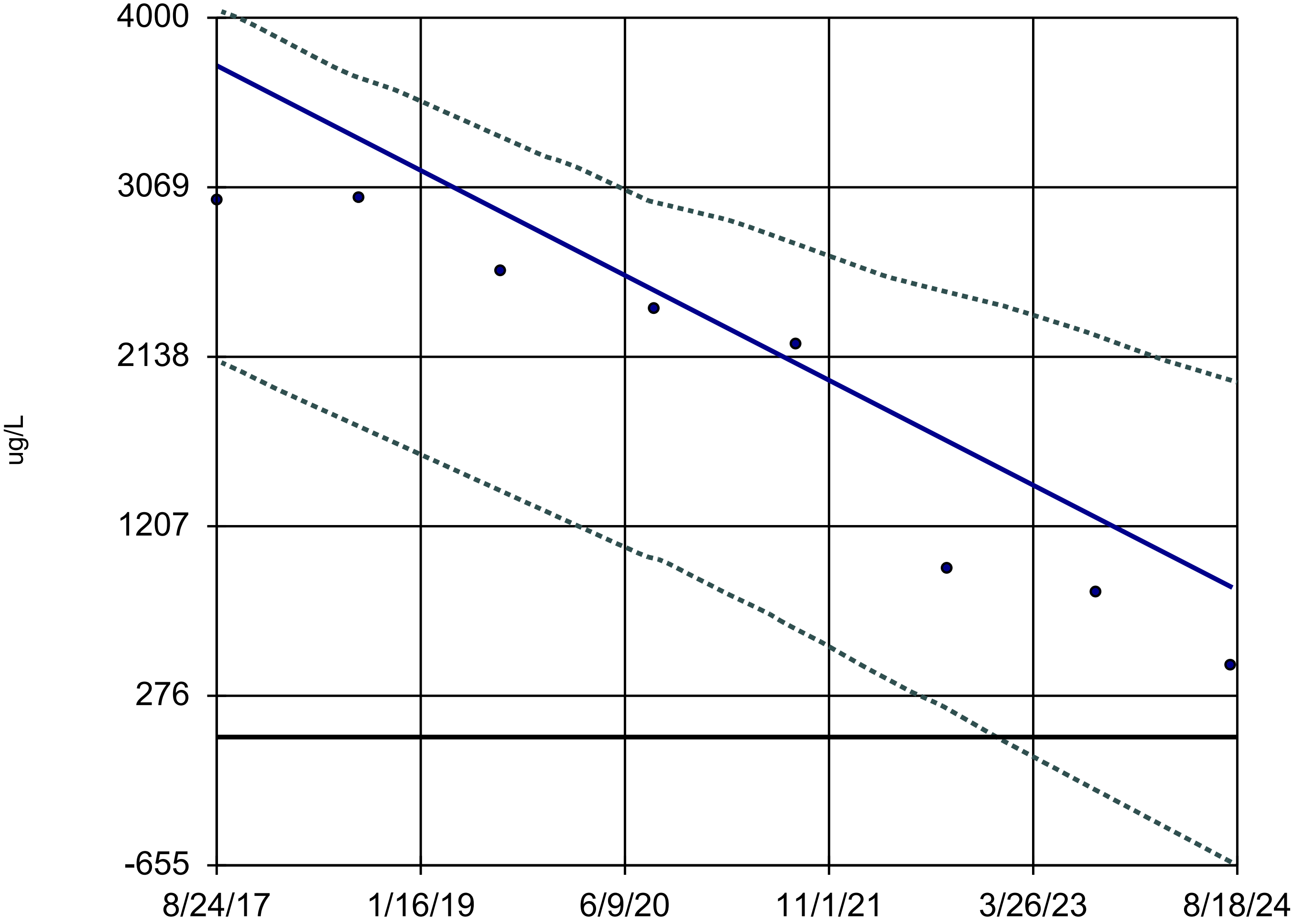
Constituent: Manganese (ug/L)   Analysis Run 11/4/2024 3:10 PM

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-108
8/24/2017	1150
8/16/2018	1100
8/7/2019	970
8/24/2020	890
8/11/2021	820
8/24/2022	780
8/30/2023	620
8/7/2024	920

Manganese

MW-15R



n = 8

Slope = -412.1
units per year.

Mann-Kendall
statistic = -26
critical = -20

Decreasing trend
significant at 98%
confidence level
(α = 0.01 per
tail).

Confidence band intersects
SMCL (50) on 01/12/23.

Sen's Slope and 95% Confidence Band   Analysis Run 11/4/2024 2:46 PM

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

Sen's Slope Estimator

Constituent: Manganese (ug/L)   Analysis Run 11/4/2024 3:10 PM

Ottumwa-Midland Landfill   Client: SCS Engineers   Data: 191022-input-OML

	MW-15R	LCL	UCL
8/24/2017	2990	2119	4045
8/16/2018	3010	1754	3669
8/7/2019	2600	1399	3343
8/25/2020	2400	1031	2985
8/12/2021	2200	641.4	2757
8/24/2022	970	205.8	2494
8/30/2023	840	-240.7	2256
8/6/2024	440	-640.7	2006

Appendix F

Additional Points Data History, 2020-Present

Appendix F
Additional Points Data History, 2020-Present*
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

CHEMICAL PARAMETER	**GU-1 TEMP**					**GU-2**					**GU-EX**					**LP-1**				
	2020	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
ARSENIC, UG/L	<0.88	<0.75	Too Little Water to Sample	DRY	<0.53	DRY	DRY	DRY	DRY	DRY	<0.88	1.9 J	2.2	DRY	0.70 J	DRY	DRY	DRY	DRY	DRY
BARIUM, UG/L	45	41 B			38						30	25 B	64		35					
BERYLLIUM, UG/L	<0.27	<0.27			<0.33						<0.27	<0.27	<0.27		<0.33					
BORON, UG/L	520	370			270						1,000	1,000	870		900					
CALCIUM, MG/L(1)	--	--			230						--	--	--		150					
COBALT, UG/L	11	14			11						1.3	2.6	4.0		3.5					
COPPER	<1.5	<1.4			<1.8						<1.5	<1.4	7.5		<1.8					
FLUORIDE, MG/L	<0.23	0.47 J			0.42 J						0.30 J	0.76	<0.22		0.46 J					
IRON, UG/L	<50.0	41 J			<36						720	810	6,900		260					
LEAD, UG/L	<0.11	<0.21			<0.26						<0.11	<0.21	1.1		<0.26					
LITHIUM, UG/L(1)	--	--			48						--	--	--		26					
MAGNESIUM, UG/L	70,000	67,000			61000						29,000	38,000	53,000		36000					
MANGANESE, UG/L	3,100	3,000			2000						240	530	400		250					
MOLYBDENUM, UG/L(1)	--	--			2.2						--	--	--		48					
SELENIUM, UG/L	<1.0	<0.96			1.4 J						<1.0	0.97 J	2.0 J		4.7 J					
ZINC, UG/L	40	35			29						10.0 J	<10	36		39					
CHLORIDE, MG/L	16	17			20						5.5	8.2	15		32					
SULFATE, MG/L	500	460			390						390	440	700		460					
TOTAL DISSOLVED SOLIDS, MG/L	1,200	1,100			1100						750	880	1,200		930					
TOTAL SUSPENDED SOLIDS, MG/L(1)	--	--			<1.4						--	--	--		2.5					
pH, SU	7.03	6.44			6.73						7.16	7.25	6.76		7.7					
TEMPERATURE, DEGREES C	16	15.9			20.7						20.5	19.9	17.8		23.3					
SPECIFIC CONDUCTANCE, UMHOS/CM	1,758	1,615			6.66						1,114	1,298	1,489		7.22					
OXIDATION REDUCTION POTENTIAL, MV(1)	--	--			83.1						--	--	--		56.2					
DISSOLVED OXYGEN, MG/L(1)	--	--			1438						--	--	--		1281					

NOTES:

1. Parameter added to sampling list in 2023 as part of monitoring program modifications directed by IDNR.
2. Specific conductivity probe was likely not fully submerged in liquid at SW-3 in 2023.

* Historical data through 2019 are included in Appendix C

C:\Users\lhawksworth\AppData\Roaming\Microsoft\Excel\[AWQR_OML_Tables_241104 (version 1).xlsb]Appendix F_Add. Points History

Updated: LH, 9/26/2024
Checked: RM, 11/5/2024

Appendix F
Additional Points Data History, 2020-Present*
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

CHEMICAL PARAMETER	**SW-1R**					**SW-2R**					**SW-3**					**SW-4**				
	2020	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
ARSENIC, UG/L	DRY	3.7	DRY	DRY	DRY	DRY	2.5	DRY	DRY	DRY	1.1 J	1.8 J	4.4	3.1	2	5.9	DRY	DRY	DRY	DRY
BARIUM, UG/L		130 B					150 B				42	57 B	84.0	21	52	270.0				
BERYLLIUM, UG/L		<0.27					<0.27				<0.27	<0.27	<0.27	<0.33	<0.33	<0.27				
BORON, UG/L		71 J					150				740	590	860	960	560	130				
CALCIUM, MG/L(1)		--					--				--	--	--	140	61	--				
COBALT, UG/L		0.55					5.1				0.096 J	0.36 J	0.67	0.41 J	0.20 J	1.8				
COPPER		<1.4					6.9				<1.5	9.3	2.3 J	<1.8	<1.8	<1.5				
FLUORIDE, MG/L		0.52					0.6				0.24 J	0.43 J	<0.22	<0.38	<0.38	<0.23				
IRON, UG/L		210					5600				<50.0	260	590	130	76 J	950				
LEAD, UG/L		<0.21					3.2				<0.11	0.35 J	0.44 J	0.28 J	<0.26	0.42 J				
LITHIUM, UG/L(1)		--					--				--	--	--	11	8.7 J	--				
MAGNESIUM, UG/L		25,000					24,000				25,000	26,000	36,000	54000	23000	26,000				
MANGANESE, UG/L		600					690				<4.0	50	25	45	26	4700				
MOLYBDENUM, UG/L(1)		--					--				--	--	--	25	9.9	--				
SELENIUM, UG/L		<0.96					1.2 J				<1.0	1.3 J	2.4 J	2.1 J	1.9 J	<1.0				
ZINC, UG/L		<10					53				<10.0	44	<10	9.8 J	<9.7	<10.0				
CHLORIDE, MG/L		19					13				3.5 J	5.3	5.7	16	4.6 J	20				
SULFATE, MG/L		23					130				310	270	470	830	250	36				
TOTAL DISSOLVED SOLIDS, MG/L		340					390				490	470	730	1000	410	410				
TOTAL SUSPENDED SOLIDS, MG/L(1)		--					--				--	--	--	14	8.3	--				
pH, SU		7.52					7.73				8.93	7.41	8.68	9.01	8.56	7.55				
TEMPERATURE, DEGREES C		23.4					23.3				26.8	28.4	29.4	31.4	28.1	22.5				
SPECIFIC CONDUCTANCE, UMHOS/CM		461					647				786	741	963	--(2)	8.94	721				
OXIDATION REDUCTION POTENTIAL, MV(1)		--					--				--	--	--	45.8	18.0	--				
DISSOLVED OXYGEN, MG/L(1)		--					--				--	--	--	7.64	651	--				

Appendix F
Additional Points Data History, 2020-Present*
Ottumwa Midland Landfill
Permit No. 90-SDP-8-92P

CHEMICAL PARAMETER	SW-5					LEACHATE BASIN					TCB-1/2				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
ARSENIC, UG/L	0.99 J	8.9	DRY	Too Little Water to Sample	DRY	3.2	30	9.4	4.9	9.7	1.4 J	1.1 J	1.0 J	1.3 J	0.95 J
BARIUM, UG/L	58	140 B				70	42 B	55.0	61	72	140.0	150 B	110	63	76
BERYLLIUM, UG/L	<0.27	<0.27				<0.27	<0.27	<0.27	<0.33	<0.33	<0.27	<0.27	<0.27	<0.33	<0.33
BORON, UG/L	1,100	1,300				4300	2500	2,400	2200	2100	870	440	450	480	430
CALCIUM, MG/L(1)	--	--				--	--	--	200	260	--	--	--	140	130
COBALT, UG/L	0.25 J	3.8				0.26 J	0.47 J	0.31 J	0.30 J	0.68	<0.091	<0.091	<0.19	<0.17	<0.17
COPPER	<1.5	1.7 J				1.5 J	4.9 J	2.0 J	2.4 J	<1.8	<1.5	<1.4	<1.8	<1.8	<1.8
FLUORIDE, MG/L	0.44 J	0.7				<0.23	<0.28	<0.22	<0.38	<0.38	<0.23	0.35 J	<0.22	<0.38	<0.38
IRON, UG/L	61.0 J	3,200				<50.0	90 J	45 J	<36	<36	<50.0	<36	<36	52 J	<36
LEAD, UG/L	<0.11	0.77				<0.11	<0.21	<0.24	<0.24	<0.26	<0.11	<0.21	<0.24	<0.24	<0.26
LITHIUM, UG/L(1)	--	--				--	--	--	35	43	--	--	--	<2.5	3.3 J
MAGNESIUM, UG/L	32,000	39,000				85,000	21,000	31,000	34000	28000	10,000	7,500	12,000	15000	14000
MANGANESE, UG/L	300	7,500				62	33	15	16	86	4.7 J	6.4 J	<3.6	8.9 J	6.0 J
MOLYBDENUM, UG/L(1)	--	--				--	--	--	790	680	--	--	--	4.1	3.9
SELENIUM, UG/L	<1.0	1.0 J				33	60	37	38	76	1.1 J	1.3 J	1.0 J	<1.4	<1.4
ZINC, UG/L	<10.0	<10				<10.0	14 J	<10	6.9 J	<9.7	<10.0	<10	<10	<6.4	<9.7
CHLORIDE, MG/L	7.4	13				150	290	230	410	1000	11	12	<2.3	18	12
SULFATE, MG/L	430	450				4,300	1,600	2,200	2500	1900	370	270	370	560	380
TOTAL DISSOLVED SOLIDS, MG/L	760	900				7,500	2,900	3,500	3300	5000	590	420	570	730	590
TOTAL SUSPENDED SOLIDS, MG/L(1)	--	--				--	--	--	8.7	6	--	--	--	1.3 J	3.9
pH, SU	7.45	7.14				8.59	8.45	8.86	8.86	8.6	8.46	7.44	8.79	7.79	8.06
TEMPERATURE, DEGREES C	22.8	27.8				26.8	27	29.1	30.3	25.8	27.7	29.1	27.3	26.6	28.3
SPECIFIC CONDUCTANCE, UMHOS/CM	1,196	1,416				4,097	4,306	4,567	5364	12.64	917	695	772	1003	8.39
OXIDATION REDUCTION POTENTIAL, MV(1)	--	--				--	--	--	63.3	63.7	--	--	--	67.0	71.9
DISSOLVED OXYGEN, MG/L(1)	--	--				--	--	--	10.4	6769	--	--	--	7.47	863

Appendix G

2024 Annual Facility Inspection Summary and Leachate Control System Performance Evaluation

Annual Facility Inspection Summary – 2024
Interstate Power and Light Company
Ottumwa-Midland Commercial Landfill
Permit No. 90-SDP-8-92P

This annual facility inspection summary for the Interstate Power and Light Company (IPL) Ottumwa-Midland Landfill (OML) includes the following elements:

- Engineering inspection described in Section 8.0 of the August 2016 Operations Manual.
- Annual National Pollutant Discharge Elimination System Storm Water Pollution Prevention Plan (SWPPP) review.
- Annual Leachate Control System Performance Evaluation required by Special Provision 6.c. of the permit for OML (Sanitary Disposal Permit No. 90-SDP-8-92P).
- Groundwater monitoring well inspections.
- Iowa Department of Natural Resources (IDNR) inspections.

A summary of each annual inspection element is provided in the sections below.

No portion of the facility has received final cover, so no annual post-closure inspections have been completed per 567 IAC 103.1(5) f.

ENGINEERING INSPECTION

On August 15, 2024, Mr. Eric Nelson, PE with SCS Engineers, conducted a site inspection. The inspection included a review of operating records kept for compliance with U.S. Environmental Protection Agency (U.S. EPA) Rule 40 CFR 257, Subpart D - Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfill and Surface Impoundments, and a visual review of the landfill facility for signs of distress or malfunction. This inspection summary addresses the report items described in Section 8.0 of the Operations Manual.

Changes in Geometry

No apparent changes in geometry were noted that would indicate distress or malfunction of the CCR unit at the facility since the previous annual inspection at OML, completed under 40 CFR 257.84(b)(1). All changes in geometry observed during the annual inspection were the result of planned CCR filling or intermediate soil cover placement activities.

CCR Volumes

Approximately 1.292 million cubic yards (MCY) of CCR was in place at OML as of August 15, 2024. This estimate is based on:

- The in-place volume as of August 22, 2023, as calculated using a topographic survey of the site and record surveys of liner construction.

- The volume of CCR material placed between August 22, 2023, and August 15, 2024, as estimated using disposal records provided by IPL.

Appearance of Structural Weakness

The inspection included a review of the appearance of an actual or potential structural weakness of the CCR unit as indicated by the following:

Signs of Surface Movement or Instability

No signs of surface movement or instability were noted during the inspection.

Inappropriate Vegetation Growth

Woody vegetation was present in the leachate drainage layer sand at the toe of slope in the northeast corner of Expansion Phase 1 near the contact water swale. If left to grow it could impede contact water flow or leachate flow within the sand leachate drainage layer. SCS recommends spot removing the woody vegetation and monitoring these areas for renewed growth during the 7-day inspections.

Animal Burrows

No animal burrows were noted during the inspection.

Erosion Damage

The following erosion damage was observed during the annual inspection.

- **Existing Landfill intermediate cover.** Minor exposed soil areas without vegetation were present within the intermediate soil cover area. If left unaddressed, CCR material could become exposed. SCS recommends that vegetation be restored and that these areas be monitored during the 7-day inspections for improved growth.

- **South slope of Sedimentation Basin No. 2.** Exposed soil areas lacking vegetation were present along the south slope of Sedimentation Basin No. 2. This could impact stormwater run-on/run-off control features if vegetation is not restored. SCS recommends adding topsoil, seed, and erosion mat to exposed areas to restore vegetation, and monitoring growth during the 7-day inspections.

Unusual Surface Damage Caused by Vehicle Traffic

No unusual surface damage was noted during the inspection.

Disruptive Conditions

Existing Disruptive Conditions

No existing disruptive conditions were noted during the inspection.

Potentially Disruptive Conditions

Location	Observation	Possible Resolution
Leachate Sump	Leachate is actively being removed from Expansion Phase 1, but leachate levels are high enough to trigger the high-level alarm condition in the sump.	• Continue to actively remove leachate from OML to reduce sump and leachate head levels.
Expansion Phase 1	Woody vegetation, CCR, and sediment build-up in contact water management features at the toe of slope in the northeast corner is reducing the freeboard available for contact water run-off.	• Remove the woody vegetation and accumulated CCR/sediment. • Monitor the area during the 7-day inspections.
Expansion Phase 1	Stitched rain cover ballast material seams have started to separate at various locations on the rain cover ballast.	• Repair the separated stitching, or • Add supplemental sandbag ballast in lieu of stitching. • Monitor the ballast material seams during the 7-day inspections.

Other Changes Since Previous Annual Inspection

No changes to site conditions that appear to have the potential to affect the stability or operation of the facility were noted during the inspection.

Potentially disruptive conditions pertaining to the Expansion Phase 1 leachate collection system vault control unit and level sensor mentioned in the 2023 Facility Inspection Report were resolved in 2024. IPL staff worked with EPG Companies to replace the LH-1 leachate panel and to replace and calibrate the Headwell Sensor. This work was completed as of February 21, 2024. The LH-1 liquid level sensor and readout are now functioning as intended. The completion of this work was previously reported to IDNR in a letter dated September 13, 2024.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM SWPPP

The SWPPP – Annual Site Compliance Evaluation/Report was completed in November 2024. A copy of the 2024 SWPPP – Annual Site Compliance Evaluation/Report is presented in **Attachment A.** Site personnel training records are included in **Attachment B.**

LEACHATE CONTROL SYSTEM PERFORMANCE

Leachate head levels are measured monthly by the landfill operator from LP-1 and LH-1. The records for leachate head levels are kept available at the site at all times. Monthly leachate elevation and head measurement records were viewed during the inspection and were complete.

Records of volume of leachate collected and the volume of leachate and contact water transported off site for treatment/disposal are kept available at the site at all times. Leachate and contact water removal and hauling records were viewed during the inspection. The Leachate Control System Performance Evaluation (LCSPE) is included as **Attachment C.**

Every 3 years leachate collection lines are to be cleaned and inspected. The collection lines were last cleaned in October 2023. The LCSPE includes information about the collection line cleaning.

GROUNDWATER WELLS

Michael Morgan of SCS Engineers conducted an inspection of the site monitoring wells on August 12, 2024. All wells were found to be in good condition.

IDNR INSPECTIONS

The most recent IDNR inspection of the facility was performed on June 1, 2021. The inspection report is included as **Attachment D.**

I:\25224073.00\Deliverables\2024 AWQR\App G - Inspection\2024 Annual Facility Inspection Report_Final.docx

Attachment A

SWPPP – Annual Site Compliance Evaluation/Report and Signature Log

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

ANNUAL SITE COMPLIANCE EVALUATION / REPORT

for the

Ottumwa Midland Landfill

Inspection date: 11/20/2024

Prepared by

Rob Saunders

Guidance for Inspectors

During the inspection, use these guidelines:

- Employees should use common sense and maintain a neat, clean working environment which will help prevent spilling of significant materials. Any spills should be promptly cleaned up.
- All portable containers are required to be clearly labeled as to the contents.
- Is there evidence of pollutants entering the storm drainage system?
- Are the BMPs that are implemented effective in preventing storm water pollution?
- Is the Storm Water Pollution Prevention Plan up to date?
- Storm water pollution prevention equipment including dikes, curbs, gutter, drains, valves, concrete, containers, and drums should be given necessary preventative maintenance to prevent releases to storm water.
- All storm water pollution equipment will be maintained in a good operating order.
- Other equipment (such as tanks, containers, and drums) will be checked regularly for signs of deterioration.

For Section 313 Water Priority Chemicals, the periodic storm water inspections will include observations for the following:

- Leaks or conditions that would lead to discharges of section 313 Water Priority Chemicals.
- Conditions that could lead to direct contact of storm water with raw materials, intermediate materials, or products.
- Piping, pumps, storage tank and bins, pressure vessels, process and material handling equipment, and material bulk storage areas for leaks, wind blowing, corrosion, support or foundation failure, or other deterioration or non-containment.

Construction activities may involve the removal of large areas of vegetative cover exposing raw soil to erosion. During these construction periods, procedures should be implemented to reduce erosion. These procedures may include the following:

- Compliance with any applicable Storm Water Pollution Plan for Construction Activities.
- Seeding erodeable areas with a suitable grass.
- Spreading crushed rock on erodable areas.
- Minimizing the time period raw soil is exposed.
- Building temporary silt retention dams in ditches to allow settling of suspended soil before discharge.
- Applying biodegradable soil cover such as straw or burlap to highly erodable areas until a more permanent solution can be implemented.
- Use of silt fences.
- Use of velocity reduction structures (rip rap).

ANNUAL SITE COMPLIANCE EVALUATION / REPORT

In accordance with published EPA guidelines and requirements for Storm Water Discharges Associated with Industrial Activities, this ANNUAL SITE COMPLIANCE EVALUATION / REPORT is provided for record and authorization.

Facility Name: Ottumwa Midland Landfill

Facility Address: 15300 130th Street
Ottumwa, Iowa 52501

Date: 11/20/2024

Inspector(s) Rob Saunders

REQUIRED OBSERVATIONS and ACTIVITIES:

Do you see: (Y or N)	No	Pollutants entering stormwater drainage area, if "YES" then describe on an attached sheet?
	Yes	BMP measures effectively reducing pollutant loading, if "NO" then describe on an attached sheet?
	No	Areas needing new or additional BMP measures, if "YES" then describe on attached sheet?
	Yes	BMP measures operating properly, if "NO" then describe on an attached sheet?
	Yes	Effective and proper use of any equipment in use for this plan's implementation, if "NO" then describe on an attached sheet?
	Yes	Any areas of noncompliance, if "YES" then describe on an attached sheet?

Note: (✓) Prepare an ANNUAL SITE COMPLIANCE EVALUATION/REPORT, include the following:

- A) Inspection date,
- B) Inspection personnel,
- C) Incidents of noncompliance,
- D) Inspection results,
- E) Follow-up activities (schedule), and
- F) Certification

(✓) Was the current SWPPP reviewed and is it up to date?[1]

(✓) Sign the report in accordance with Section 2.6.2 and keep with plan.
(EPA Guidance Manual)

---

[1] Update the SWPPP. Be sure to update the revision date on the title page and in the footer on each page. Be sure to update the revision sheet to reflect the review, even if no changes were made. Send an updated copy to the site See OGS Environmental Procedure 088: "How to Update SWPPP Plans."

ANNUAL SITE COMPLIANCE EVALUATION / REPORT

INCIDENTS of NON-COMPLIANCE:

- Junk tire in Storm Water Outfall 005 discharge area.
- Three of the neighbor's cows jumped the fence and were on OML property.

INSPECTION RESULTS:

- See the attached document, "Annual Facility Site Compliance Inspection (AFSCI) Finding Tracking Log."

FOLLOW-UP ACTIVITIES (SCHEDULE):

- Follow up on all incidents of non-compliance in one month (12/20/2024).

ADDITIONAL INFORMATION

- None

It is therefore the position of this team, that the **Ottumwa Midland Landfill** Storm Water Pollution Prevention Plan (SWPPP) is in compliance and will effectively reduce (or eliminate) storm water pollution at its source.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware of the significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (type or print): Derek Roberts Manager GENCO Operations Ottumwa Generating Station	B. Area Code and Telephone No: (641) 935-2908
C. Signature:	D. Date Signed: 11/21/24

Attachment B

Site Personnel Training Records

Alliant Energy Ottumwa Generating Station	OGS Safety Procedure 323: Training Sign In Sheet	Revision Date: 4/19/2023 Author: Rob Saunders

Training Date:	4/20/2023

Row No.	**Trainer Name**	**Course Name:**	**Course Code:**
1	Rob Saunders	CCR Rule Refresher Training	ENV0404
2			
3			
4			

Row No.	**Employee Name**	**Employee Number**	**Employee Signature**
1	Aaron Thamke (17163)	17163	
2	Adam Phillips (17558)	17558	
3	Al White (09792)[C]	09792	
4	Blake McClaflin (15299)	15299	
5	Brandon Hartley (19504)	19504	
6	Brandon Saner (16819)	16819	
7	Brian Crall (17165)	17165	
8	Brian Johnson (19737)	19737	
9	Chad Black (17016)	17016	
10	Clinton Thompson (16207)	16207	
11	Cole Campbell (19712)	19712	
12	Conner Glosser (21413)	21413	
13	Dalton Burnstedt (22020)	22020	
14	Dan Griffith (17610)	17610	
15	Daniel Thrasher (09804)	09804	
16	Dave Bettis (16685)	16685	
17	David Jasper (05030)	05030	
18	Derek Roberts (09346)	09346	
19	Dexter Barclay (13268)	13268	
20	Douglas Sloan (04409)	04409	
21	Douglas Sparks (05425)	05425	
22	Eddie Mitchell (03250)	03250	

23	Frederick Latham (17010)	17010	
24	Greg Wynn (17443)	17443	
25	James Rose (13818)	13818	
26	Jason Marth (16760)	16760	
27	Jason Van Antwerp (23264)	23264	
28	Jeffery Annee (13533)	13533	
29	Jeffrey Deahl (07172)	07172	
30	Jeremy Kohlhaas (07562)	07562	
31	Jessica Ewing (19796)	19796	
32	John Gerths (16835)	16835	
33	John McAninch (17563)	17563	
34	John Sheston (17410)	17410	
35	John Watts (09920)	09920	
36	Jon Bickford (09794)	09794	
37	Jon Morlan (18358)	18358	
38	Keith Young (14740)	14740	
39	Kirk McAninch (16829)	16829 Kirk McAninch	
40	Leon Wickenkamp (08594)	08594	
41	Marcy Valdez (11211)	11211	
42	Mark Houg (16388)	16388	
43	Mark Lunsford (09822)	09822	
44	Martin Lamb (15512)	15512	
45	Michael Paxton (17059)	17059	
46	Nathan Miller (14197)	14197	
47	Randall Raskie (21439)	21439	
48	Rebecca Jaques (03385)	03385	
49	Rob Saunders (16073)	16073 Rob Saunders	
50	Robert Taylor (09830)	09830	
51	Roger Lovelady (21994)	21994	
52	Roy Hicks (16729)	16729	
53	Ryan Black (17011)	17011	
54	Scott Johnson (09802)	09802	
55	Stephen Keck (03370)	03370 Stephen Keck	
56	Taylor Crall (19715)	19715	

	Terence Helton (17584)	17584	
	Teri Burch (16818)	16818	
	Terry Harris (09835)	09835	
	Tom Barr (18891)	18891	
61	Tyler Smith (15603)	15603	
62	W. Alan Campbell (11159)	11159	
63	Wade Hart (16789)	16789 Wade Hart	
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Note to the E&S Specialist. Submit a copy to The Point--> Submit a Service Ticket --> IPL Ops Support Coordinator --> Category = IPL Training, Subcategory = Training Attendance Sheet.

☐ Submitted to the IPL Operations Support Services on 4-20-23

Alliant Energy Ottumwa Generating Station	OGS Environmental Procedure 119: Environmental Training Sign In Sheet	Revision date: 05/16/2022 Author: Rob Saunders	Page 1 of 2

Procedure

Use this sign in sheet to document attendance at required environmental training sessions. Indicate the date, site, topic, and trainer.

Note to the Environmental Specialist: Submit a copy to The Point → Submit a Service Ticket → IPL Ops Support Coordinator → Category = IPL Training, Subcategory = Training Attendance Sheet

☐ Submitted to IPL Operations Support Services on NA.

1. Date:	03/16/2023
2. Site:	☐ OGS ☒ OML

3. Topic:[1]	☐ RCRA Waste Training (ENV0020) ☐ SWPPP (ENV0002) ☐ SPCC, Site Specific[2] ☐ Fugitive Dust (ENV0012) ☒ ERRAP[3] ☐ CCR Rule Training for Inspectors (ENV0404) ☐ DOT Haz Mat Training (ENV0061) ☐ LOTO Initial 6-hr (SAF0107) ☐ Other: ____
4. Trainer:	☒ Rob Saunders ☐ Other: ____

Line no.	Print your Name (Legibly)	Employee Number (NOT A0 number)
1.	Martin D Lamb	15512
2.	Wade Hart	16789
3.	Steve Keck	3370
4.	Kirk McAninch	16829
5.	DEREK ROBERTS	09346
6.	Rob Saunders	16073
7.		
8.		
9.		
10.		

Continued on back:

Alliant Energy Ottumwa Generating Station	OGS Safety Procedure 323: Training Sign In Sheet	Revision Date: 1/30/2024 Author: Rob Saunders

Training Date:	04/18/24

Row No.	**Trainer Name**	**Course Name:**	**Course Code:**
1	Rob Saunders	CCR Rule Refresher Training	
2			
3			
4			

Row No.	**Employee Name**	**Employee Number**	**Employee Signature**
1	Aaron Thamke (17163)	17163	
2	Adam Phillips (17558)	17558	
3	Al White (09792)[C]	09792	
4	Blake McClaflin (15299)	15299	
5	Brandon Hartley (19504)	19504	
6	Brandon Saner (16819)	16819	
7	Brian Crall (17165)	17165	
8	Brian Johnson (19737)	19737	
9	Chad Black (17016)	17016	
10	Clinton Thompson (16207)	16207	
11	Cole Campbell (19712)	19712	
12	Conner Glosser (21413)	21413	
13	Dalton Burnstedt (22020)	22020	
14	Dan Griffith (17610)	17610	
15	Daniel Thrasher (09804)	09804	
16	Danny Lamb (15512)	15512	
17	Dave Bettis (16685)	16685	
18	David Jasper (05030)	05030	
19	Derek Roberts (09346)	09346	
20	Dexter Barclay (13268)	13268	
21	Douglas Sloan (04409)	04409	
22	Douglas Sparks (05425)	05425	

23	Eddie Mitchell (03250)	03250	
24	Frederick Latham (17010)	17010	
25	Greg Wynn (17443)	17443	
26	James Rose (13818)	13818	
27	Jason Marth (16760)	16760	
28	Jeffery Annee (13533)	13533	
29	Jeffrey Deahl (07172)	07172	
30	Jeremy Kohlhaas (07562)	07562	
31	Jessica Ewing (19796)	19796	
32	Jevin Jensen (23728)	23728	
33	John Gerths (16835)	16835	
34	John McAninch (17563)	17563	
35	John Sheston (17410)	17410	
36	Jon Bickford (09794)	09794	
37	Jon Morlan (18358)	18358	
38	Keith Young (14740)	14740	
39	Kirk McAninch (16829)	16829	
40	Leon Wickenkamp (08594)	08594	
41	Mark Houg (16388)	16388	
42	Mark Lunsford (09822)	09822	
43	Michael Paxton (17059)	17059	
44	Nathan Miller (14197)	14197	
45	Nathan Moorman (23556)	23556	
46	Randall Raskie (21439)	21439	
47	Rebecca Jaques (03385)	03385	
48	Rob Saunders (16073)	16073	Rob Saunders
49	Robert Taylor (09830)	09830	
50	Roger Lovelady (21994)	21994	
51	Roy Hicks (16729)	16729	
52	Ryan Black (17011)	17011	
53	Ryan Giltner (23555)	23555	
54	Scott Johnson (09802)	09802	
55	Stephen Keck (03370)	03370 S Keck	
56	Taylor Crall (19715)	19715	

	Terence Helton (17584)	17584	
	Teri Burch (16818)	16818	
	Terry Harris (09835)	09835	
	Tom Barr (18891)	18891	
61	Tyler Smith (15603)	15603	
62	W. Alan Campbell (11159)	11159	
63	Wade Hart (16789)	16789	Wade Hart
64			
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Note to the E&S Specialist: If a training was presented that has a THRIVE Course Code, then:
Submit a copy of this document to The Point--> Submit a Service Ticket --> IPL Ops Support Coordinator --> Category = IPL Training, Subcategory = Training Attendance Sheet. Be sure to add this document as an attachment to the Service Ticket.
☐ Submitted to the IPL Operations Support Services on ________________.

Alliant Energy Ottumwa Generating Station	OGS Safety Procedure 323: Training Sign In Sheet	Revision Date: 6/5/2024 Author: Rob Saunders

Training Date:	06/06/24

Row No.	**Trainer Name**	**Course Name:**	**Course Code:**
1	Rob Saunders	ERRAP Annual Training	
2			
3			
4			

Row No.	**Employee Name**	**Employee Number**	**Employee Signature**
1	Aaron Thamke (17163)	17163	
2	Adam Phillips (17558)	17558	
3	Al White (09792)[C]	09792	
4	Blake McClaflin (15299)	15299	
5	Brandon Hartley (19504)	19504	
6	Brandon Saner (16819)	16819	
7	Brian Crall (17165)	17165	
8	Brian Johnson (19737)	19737	
9	Chad Black (17016)	17016	
10	Clinton Thompson (16207)	16207	
11	Cole Campbell (19712)	19712	
12	Conner Glosser (21413)	21413	
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14	Dan Griffith (17610)	17610	
15	Daniel Thrasher (09804)	09804	
16	Danny Lamb (15512)	15512	
17	Dave Bettis (16685)	16685	
18	David Jasper (05030)	05030	
19	Derek Roberts (09346)	09346	
20	Dexter Barclay (13268)	13268	
21	Douglas Sloan (04409)	04409	
22	Douglas Sparks (05425)	05425	

	Eddie Mitchell (03250)	03250	
	Frederick Latham (17010)	17010	
	Greg Wynn (17443)	17443	
	Hunter Gerths (24020)	24020	
27	James Rose (13818)	13818	
28	Jason Marth (16760)	16760	
29	Jeff Major (23895)	23895	
30	Jeffery Annee (13533)	13533	
31	Jeffrey Deahl (07172)	07172	
32	Jeremy Kohlhaas (07562)	07562	
33	Jessica Ewing (19796)	19796	
34	Jevin Jensen (23728)	23728	
35	John Gerths (16835)	16835	
36	John McAninch (17563)	17563	
37	John Sheston (17410)	17410	
38	Jon Bickford (09794)	09794	
39	Jon Morlan (18358)	18358	
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42	Leon Wickenkamp (08594)	08594	
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44	Mark Lunsford (09822)	09822	
45	Michael Paxton (17059)	17059	
46	Nathan Miller (14197)	14197	
47	Nathan Moorman (23556)	23556	
48	Randall Raskie (21439)	21439	
49	Rebecca Jaques (03385)	03385	
50	Rob Saunders (16073)	16073	Rob Saunders
51	Robert Taylor (09830)	09830	
52	Roger Lovelady (21994)	21994	
53	Roy Hicks (16729)	16729	
54	Ryan Black (17011)	17011	
55	Ryan Giltner (23555)	23555	
56	Scott Johnson (09802)	09802	

	Stephen Keck (03370)	03370	Keck
	Taylor Crall (19715)	19715	
	Terence Helton (17584)	17584	
	Teri Burch (16818)	16818	
	Terry Harris (09835)	09835	
62	Tom Barr (18891)	18891	
63	Tyler Smith (15603)	15603	
64	W. Alan Campbell (11159)	11159	
65	Wade Hart (16789)	16789	Wade Hart
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Note to the E&S Specialist: If a training was presented that has a THRIVE Course Code, then:
Submit a copy of this document to The Point--> Submit a Service Ticket --> IPL Ops Support Coordinator --> Category = IPL Training, Subcategory = Training Attendance Sheet. Be sure to add this document as an attachment to the Service Ticket.
☐ Submitted to the IPL Operations Support Services on ___________________.

Employee ID	Employee Name	Job Title	Location Name	Activity Code	Activity Name	Last Completed Date	Expiration Date	Manager Name
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0012	ENV0012 Fugitive Dust	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0012	OGS0012 OGS Fugitive Dust Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0012	ENV0012 Fugitive Dust	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0012	OGS0012 OGS Fugitive Dust Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
03370	Keck, Stephen B	Ash Disposal Facility Foreman	Ottumwa Generating Station	ENV0012	ENV0012 Fugitive Dust	Apr 2, 2024	Dec 31, 2025	Lamb, Martin
03370	Keck, Stephen B	Ash Disposal Facility Foreman	Ottumwa Generating Station	OGS0012	OGS0012 OGS Fugitive Dust Training	Apr 2, 2024	Dec 31, 2025	Lamb, Martin
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0002	ENV0002 SWPPP Annual Training	Jan 5, 2024	Dec 31, 2025	Lamb, Martin
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0002	OGS0002 OGS and OML SWPPP Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0002	ENV0002 SWPPP Annual Training	Jan 5, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0002	OGS0002 OGS and OML SWPPP Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
03370	Keck, Stephen B	Ash Disposal Facility Foreman	Ottumwa Generating Station	OGS0002	OGS0002 OGS and OML SWPPP Training	Mar 25, 2024	Dec 31, 2025	Lamb, Martin
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0020-GEN	ENV0020 Waste Awareness (Generation)	Jan 5, 2024	Dec 31, 2025	Lamb, Martin
16789	Hart, Wade	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0020	OGS0020 OGS and OML RCRA Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	ENV0020-GEN	ENV0020 Waste Awareness (Generation)	Jan 5, 2024	Dec 31, 2025	Lamb, Martin
16829	McAninch, Kirk A	Ash Disposal Facility Operator	Ottumwa Generating Station	OGS0020	OGS0020 OGS and OML RCRA Training	Jan 3, 2024	Dec 31, 2025	Lamb, Martin
03370	Keck, Stephen B	Ash Disposal Facility Foreman	Ottumwa Generating Station	OGS0020	OGS0020 OGS and OML RCRA Training	Mar 25, 2024	Dec 31, 2025	Lamb, Martin

Attachment C

Leachate Control System Performance Evaluation

SCS ENGINEERS Environmental Consultants & Contractors

November 27, 2024
File No. 25224073.00

Mr. Jeffrey Maxted
Alliant Energy
4902 N. Biltmore Lane
Madison, WI 53718

Subject: Leachate Control System Performance Evaluation
Interstate Power and Light Company
Ottumwa-Midland Commercial Landfill
Permit #90-SDP-08-92P

Dear Mr. Maxted:

This Leachate Control System Performance Evaluation (LCSPE) Report is provided by SCS Engineers (SCS) as per the requirements of the July 21, 2017, permit renewal for the Ottumwa-Midland Commercial Landfill (OML). This report is a supplement to the 2024 Annual Water Quality Report.

BACKGROUND

OML accepts coal combustion residuals (CCR). The current Phase 1 landfill is approximately 10 acres in size. The initial landfill permit was approved on September 23, 1994, by the Iowa Department of Natural Resources (IDNR). Landfill activities began in 1995. The last permit renewal was approved by the IDNR on July 21, 2017.

ORIGINAL LANDFILL LEACHATE CONTROL SYSTEM

The leachate control system in the original landfill area at OML consists of a leachate collection system, a leachate lift station, and a leachate storage lagoon. Construction of the leachate control system is described in the July 1995 Construction Certification Report that was prepared by Montgomery Watson. The leachate collection system layout is shown on **Figure 1**. A summary of the original landfill leachate control system is provided below.

The active leachate collection system in the original landfill consists of the following components:

- Twelve-inch protective general fill layer
- Geocomposite drainage layer
- Leachate collection pipes/trenches and cleanouts

Leachate collection pipe consists of 6-inch-diameter, perforated, heavy duty, smooth interior, corrugated polyethylene pipe (CPEP). Leachate collection system piping is installed in trenches excavated 18 inches into the 4-foot-thick compacted clay liner. One north-south-oriented trench and five east-west-oriented leachate collection trenches are installed at the base of the landfill. Leachate collection piping is bedded and covered with 1.5-inch clean stone, and the trenches are wrapped with geotextile. The geotextile-wrapped, stone-filled leachate collection trenches extend beneath the geocomposite drainage layer and 12-inch protective general fill layer. The east-west leachate collection pipes are sloped to the interior north-south-oriented leachate collection pipe. The north-south leachate collection pipe then drains south to a leachate transport pipe.

Each end of the east-west-oriented leachate collection pipes are connected to a 6-inch-diameter, non-perforated, heavy duty, smooth interior, CPEP leachate cleanout pipe. The north end of the north-south-oriented leachate collection pipe is also connected to a CPEP cleanout pipe. The cleanout pipes extend up the liner side slopes and are exposed above grade at the limits of the landfill liner to provide cleanout access at the ground surface.

The north-south-oriented leachate collection pipe is connected to a 6-inch-diameter, non-perforated, Standard Dimension Ratio (SDR) 17 high-density polyethylene (HDPE) leachate transport pipe where it exits the lined limits of the original landfill to the south. The leachate transport pipe drains leachate by gravity to the leachate wet well/lift station located south of the sediment pond. From the lift station, leachate is pumped under 130th Street to the leachate lagoon via a 2-inch-diameter, non-perforated, SDR 17 HDPE force main.

Leachate is pumped from the lagoon for on-site reuse for moisture conditioning during CCR placement in the landfill or dust control within the lined limits of OML. Leachate is also transported off-site for treatment or disposal.

PHASE 1 EXPANSION LEACHATE CONTROL SYSTEM

The leachate control system in the Phase 1 Expansion area at OML consists of a leachate collection system, a leachate riser pipe and pump, and a leachate vault. Construction of the leachate control system is described in the November 5, 2015, Phase 1 Liner Construction Documentation Report, that was prepared by SCS. The leachate collection system layout is shown on **Figure 2**. A summary of the leachate control system in Phase 1 is provided below.

The active leachate collection system in Phase 1 consists of the following components:

- Twelve-inch leachate drainage layer
- Twelve-inch drainage filter and 12-inch coarse aggregate bedding over leachate collection pipes
- Leachate collection pipes/trenches and cleanouts

Leachate collection pipe consists of 6-inch-diameter, perforated, SDR 11, HDPE pipe. Leachate collection system piping is installed in a trench that is a minimum of 18 inches deep. The full 2-foot thickness of the clay liner was maintained under the trench during construction. One east-west-oriented leachate collection trench is installed at the base of the landfill cell, and gravity drains to the west. A sweep bend is located at the west end of the leachate collection piping, and the pipe is oriented to the southwest toward the leachate sump.

The east end and southwest ends of the leachate collection pipe are connected to a 6-inch-diameter, non-perforated, HDPE cleanout pipe. The cleanout pipes extend up the liner side slopes and are exposed above grade to provide cleanout access at the ground surface.

An 18-inch-diameter SDR 17 HDPE leachate collection sump riser pipe is installed in the leachate collection sump. The riser pipe extends up the liner side slope in the southwest corner of Phase 1 to the leachate vault. A pump is installed in the riser pipe and pumps leachate from the leachate sump to the leachate vault. From the leachate vault, leachate is pumped through a 3-inch HDPE force main to the leachate lift station. From the leachate lift station, leachate is pumped across 130th Street to the leachate lagoon via a 2-inch-diameter, non-perforated, SDR 17 HDPE force main.

Leachate is pumped from the lagoon for on-site reuse for moisture conditioning during CCR placement in the landfill or dust control within the lined limits of OML. Leachate is also transported off-site for treatment or disposal.

LEACHATE CONTROL SYSTEM PERFORMANCE EVALUATION

The July 21, 2017, permit renewal requires an annual evaluation of the effectiveness of the leachate control system. The evaluation is based on a review of the following items provided by Interstate Power and Light (IPL):

- Volume of Leachate Collected
- Leachate Head Well Measurements
- Leachate Collection Line Cleaning/Jetting

The following subsections provide a summary of each of these items.

Volume of Leachate Collected

The daily leachate volumes pumped from the landfill into the lagoon and transported off-site are shown in **Attachment A**. A total of 3,371,754 gallons of leachate was transported off-site to either the City of Ottumwa or the Ottumwa Generating Station during November 2023 through October 2024, according to IPL records. Remaining leachate was used for waste conditioning and dust control within the active disposal areas or remains stored in the leachate lagoon. Historical data that summarizes quantities of leachate transported off-site are provided in Table A-2 of **Attachment A**.

Leachate Head Well Measurements

The location of leachate head wells LP-1 and LH-1 are shown on **Figures 1** and **2**. LP-1 was installed on June 7, 2011, and is constructed of 2-inch-diameter Schedule 40 PVC with a 1-foot-long Schedule 40 PVC well screen. LP-1 was installed directly above the geocomposite.

LH-1 was constructed in 2015 during the Phase 1 construction project. LH-1 is constructed of a 3-inch-diameter, Schedule 80 PVC pipe with a 5-foot screened section at the end with 0.010-inch slots (10-slot). The headwell was installed at a constant elevation of approximately 753.55 feet directly on the geomembrane. The PVC pipe section is connected to a 3-inch-diameter solid SDR 17 HDPE riser pipe with an HDPE-to-PVC transition fitting prior to the 22½ degree HDPE elbow. A submersible level sensor was installed within the flat portion of the headwell just beyond the 22½ degree HDPE elbow.

A sensor malfunction hindered leachate head measurements at LH-1 in 2023. Repair work, which included ordering and installing upgraded wiring to address a short in the control wiring, was completed on August 1, 2023; however, similar issues with the system status screen and level sensor readout were noted during the August 22, 2023, inspection. IPL staff worked with EPG Companies to replace the LH-1 leachate panel and to replace and calibrate the Headwell Sensor. This work was completed as of February 21, 2024. The LH-1 liquid level sensor and readout are now functioning as intended. The completion of this work was previously reported to IDNR in a letter dated September 13, 2024 (IDNR Document ID #110868).

A summary table of 2023 and 2024 leachate head level measurements for LP-1 and LH-1 is included in **Attachment B**. Leachate head measurements at LH-1 were under 1 foot during each month from November 2023 through October 2024. Levels were highest in May 2024, when site staff noted issues with the leachate pump, and in August 2024 following heavy rains. As noted in the August 2024 site inspection, active leachate removal was being performed in Expansion Phase 1 and continued active removal was recommended to reduce sump and leachate head levels.

Leachate Collection Line Cleaning/Jetting

The last jetting of the leachate collection lines was performed on October 11, 2023. The jetting documentation is included in **Attachment C**. The next leachate line jetting is scheduled to be performed in 2026.

Summary of Leachate Control System Performance Evaluation

Based on a review of the leachate data included in this submittal, the leachate control system at OML appears to be functioning as designed. The leachate is pumped from the leachate collection system to the leachate storage lagoon. Leachate from the lagoon is primarily used for dust control within the landfill. A total of 3,371,754 gallons of leachate was transported off-site during November 2023 through October 2024. The leachate collection lines were cleaned on October 11, 2023. The leachate control measures appear to be adequate.

Two recommendations related to the leachate collection system were made after an August 2024 site inspection: continuing to actively remove leachate from OML to reduce sump and leachate head levels and repair of the rain cover ballast material stitching. Work in response to this recommendation is ongoing.

If you have any questions about this report, please contact Tom Karwoski at 608-216-7369.

Sincerely,

Thomas J. Karwoski
Project Manager
SCS Engineers

Ethan Schaefer
Associate Geologist
SCS Engineers

EMS/MDB/lmh/EJN

Enclosures:
- Figure 1 – Leachate Control System
- Figure 2 – Expansion Phase 1 Leachate Lines
- Attachment A – Leachate Volumes
- Attachment B – Leachate Head Measurements
- Attachment C – Leachate Line Jetting Documentation

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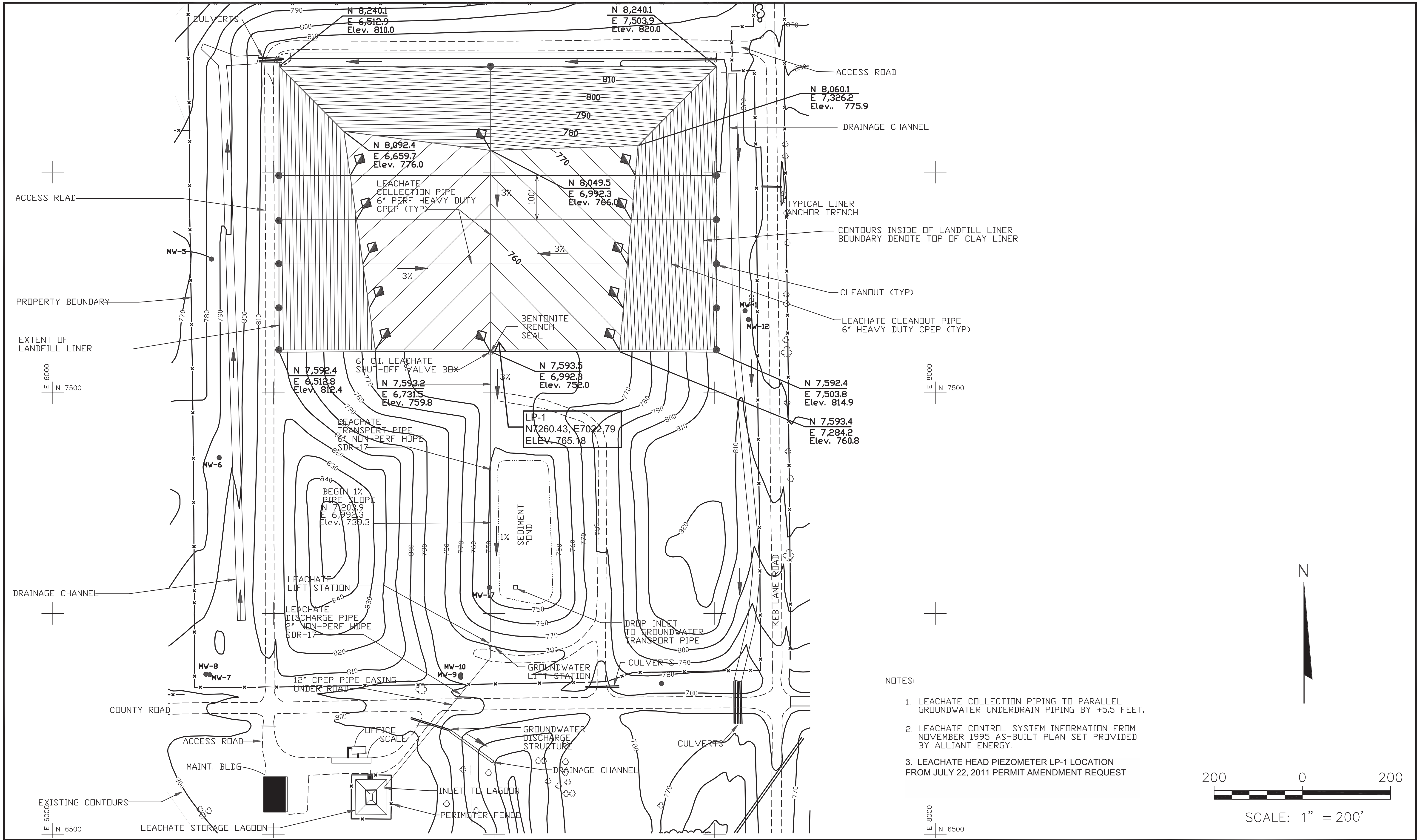
Figures



NOTES:

1. LEACHATE COLLECTION PIPING TO PARALLEL GROUNDWATER UNDERDRAIN PIPING BY +5.5 FEET.
2. LEACHATE CONTROL SYSTEM INFORMATION FROM NOVEMBER 1995 AS-BUILT PLAN SET PROVIDED BY ALLIANT ENERGY.
3. LEACHATE HEAD PIEZOMETER LP-1 LOCATION FROM JULY 22, 2011 PERMIT AMENDMENT REQUEST

PROJECT NO.	25213068.00	DRAWN BY:	KP
DRAWN:	11/19/13	CHECKED BY:	TK
REVISED:	11/28/2023	APPROVED BY:	MDB

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

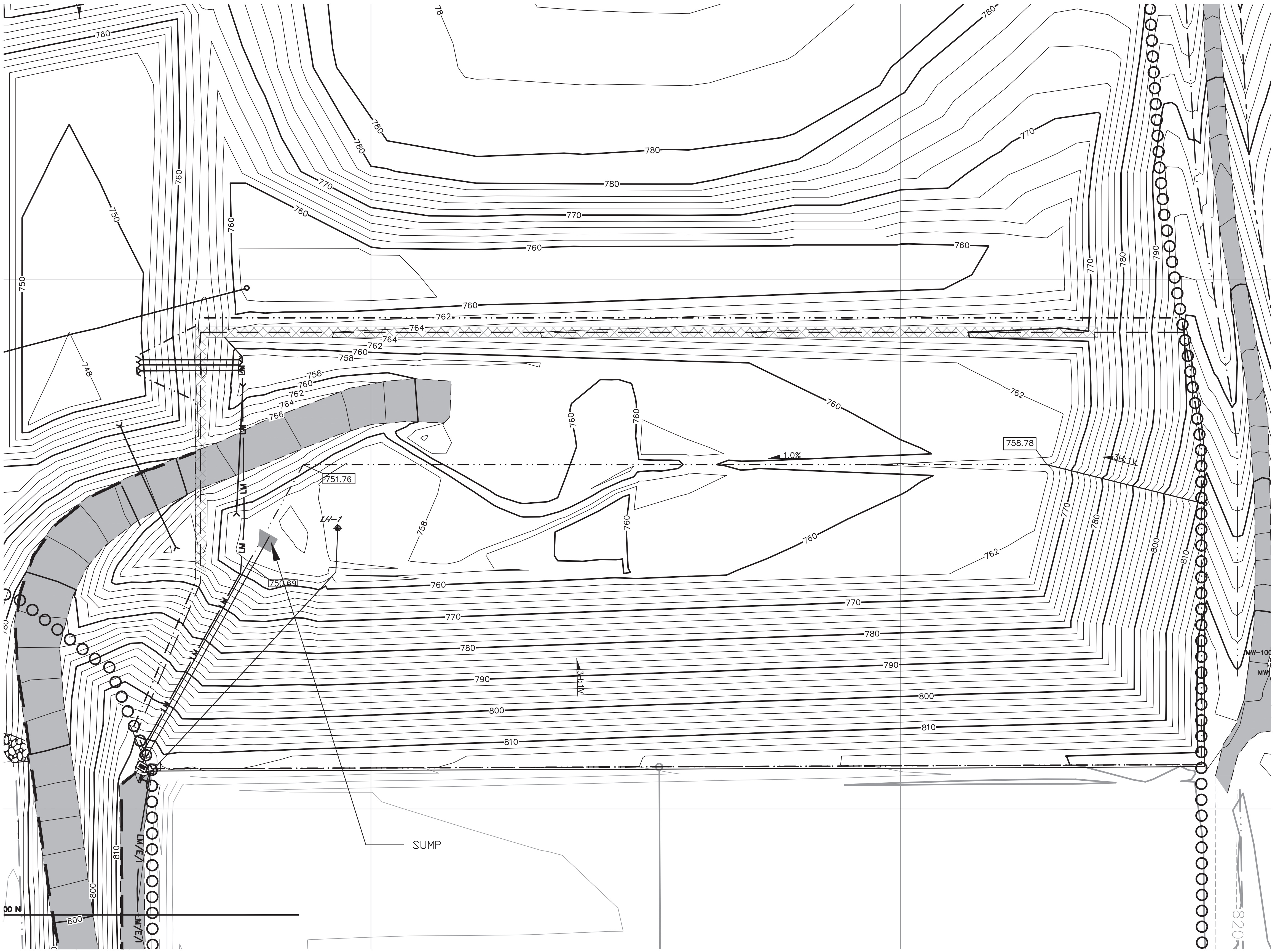
CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

LEACHATE CONTROL SYSTEM

FIGURE
1

I:\25213068\Drawings-General\Leachate system.DWG, 11/19/2013 9:51:21 AM



LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF WASTE
- PHASE LIMITS
- 770 EXISTING GROUND SURFACE (10' CONTOUR)
- EXISTING GROUND SURFACE (2' CONTOUR)
- 760 AS-BUILT GRADE (10' CONTOUR)
- 762 AS-BUILT GRADE (2' CONTOUR)
- LIMITS OF 2' CLAY LINER
- EXISTING DITCH
- EXISTING STREAM
- 1.0% SLOPE AND DIRECTION
- PERIMETER DITCH
- REALIGNED STREAM
- ACCESS ROAD
- CONCRETE BARRIER
- CULVERT
- PHASE DELINEATION BERM
- 6" DIA. PERFORATED LEACHATE COLLECTION PIPE
- 6" DIA. NON-PERFORATED LEACHATE RISER PIPE
- LM — LM 6" DIA. LEACHATE FORCEMAIN
- LM/E/I — LM/E/I 6" DIA. LEACHATE FORCEMAIN, ELECTRIC AND INSTRUMENT CONDUITS
- LEACHATE CLEANOUT RISER
- LH2 LEACHATE HEADWELL
- LEACHATE VAULT
- ELECTRIC VAULT
- E/I — E/I ELECTRIC AND INSTRUMENT CONDUITS
- —x—x—x—x—x— 6' HIGH CHAIN LINK FENCE
- RIPRAP

NOTES

1. CONTOURS WITHIN CELL LIMITS REPRESENT TOP OF LEACHATE DRAINAGE LAYER GRADES
2. CONTOURS OUTSIDE CELL LIMITS REPRESENT TOP OF TOPSOIL GRADES

N

100 0 100

SCALE: 1" =100'

PROJECT NO.	25216073.00	DRAWN BY:	BJM
DRAWN:	11/10/16	CHECKED BY:	MDB
REVISED:	11/10/16	APPROVED BY:	TK 11/23/2021

ENGINEER
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT
INTERSTATE POWER AND LIGHT CO.
15300 130th STREET
OTTUMWA, IA 52501

SITE
OTTUMWA MIDLAND LANDFILL
OTTUMWA, IOWA

EXPANSION PHASE 1 LEACHATE LINES

FIGURE
2

Attachment A

Leachate Volumes

Leachate Removal and Hauling Records
Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

Instructions for Use

1. Enter the dates for the month in the date column.
2. Enter the accumulated total generated leachate volume from the end of the previous month from the leachate totalizer in C12.
3. Enter the accumulated total generated leachate for each day from the leachate totalizer in Column C.
4. Enter the daily volume (in gallons) of leachate hauled off site and the offsite location in Column D. Note since we do not have a flow meter, convert from pounds to gallons: X lbs ÷ 8.34 = gallons.
5. The spreadsheet will calculate the daily leachate generated and the cumulative volume of leachate hauled for the month.

Revision Date: 08/29/16

Nov-23	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month		960,741		29,554,941					
11/1/2023	984	961,725	0	29,554,941				N	
11/2/2023	851	962,576	0	29,554,941				N	
11/3/2023									
11/4/2023									
11/5/2023									
11/6/2023	11,529	974,105	6,687	29,561,628				N	
11/7/2023	843	974,948	0	29,561,628				N	
11/8/2023	1,327	976,275	0	29,561,628				N	
11/9/2023	1,380	977,655	0	29,561,628				N	
11/10/2023									
11/11/2023									
11/12/2023									
11/13/2023	10,273	987,928	6,336	29,567,946				N	
11/14/2023	927	988,855	0	29,567,946				N	
11/15/2023	1,266	990,121	0	29,567,946				N	
11/16/2023	796	990,917	0	29,567,946				N	
11/17/2023									
11/18/2023									
11/19/2023									
11/20/2023	11,655	1,002,572	6,918	29,574,864				N	
11/21/2023	8,675	1,011,247	6,325	29,581,189				N	
11/22/2023	969	1,012,216	1,382	29,582,571				N	
11/23/2023									
11/24/2023									
11/25/2023									
11/26/2023									
11/27/2023	3,668	1,015,884	181	29,582,752				N	
11/28/2023	0	1,015,884	0	29,582,752				N	
11/29/2023	0	1,015,884	0	29,582,752	5,700	5,700	City	N	
11/30/2023	15,525	1,031,409	13,667	29,596,419	22,374	28,074	City	N	
Totals	70,668	NA	**41,496**	NA	**28,074**	NA	NA		NA

[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

Leachate Removal and Hauling Records
Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

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5. The spreadsheet will calculate the daily leachate generated and the cumulative volume of leachate hauled for the month.

Revision Date: 08/29/16

Dec-23	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	1,031,409	NA	29,596,419	NA	NA	NA		
12/1/2023									
12/2/2023									
12/3/2023									
12/4/2023	9,680	1,041,089	5,681	29,602,100	22,367	22,367	City	N	
12/5/2023	1,017	1,042,106	0	29,602,100	22,312	44,679	City	N	
12/6/2023	383	1,042,489	0	29,602,100	16,940	61,619	City	N	
12/7/2023						61,619			
12/8/2023						61,619			
12/9/2023						61,619			
12/10/2023						61,619			
12/11/2023	16,695	1,059,184	11,381	29,613,481		61,619		N	
12/12/2023	619	1,059,803	0	29,613,481		61,619		N	
12/13/2023	572	1,060,375	0	29,613,481	50,638	112,257	OGS	N	PH 8.06
12/14/2023	798	1,061,173	0	29,613,481	17,026	129,283	OGS	N	PH 8.14
12/15/2023						129,283			
12/16/2023						129,283			
12/17/2023						129,283			
12/18/2023	10,449	1,071,622	6,808	29,620,289		129,283		N	
12/19/2023	997	1,072,619	805	29,621,094		129,283		N	
12/20/2023	6,314	1,078,933	4,923	29,626,017		129,283		N	
12/21/2023	991	1,079,924	0	29,626,017		129,283		N	
12/22/2023						129,283			
12/23/2023						129,283			
12/24/2023						129,283			
12/25/2023						129,283			
12/26/2023						129,283			
12/27/2023	62,324	1,142,248	54,305	29,680,322	39,837	169,120	OGS	N	PH 7.89
12/28/2023	2,621	1,144,869	1,494	29,681,816	39,398	208,518	OGS	N	PH 7.64
12/29/2023	7,013	1,151,882	6,035	29,687,851				N	
12/30/2023									
12/31/2023									
Totals	120,473	NA	**91,432**	NA	**208,518**	NA	NA		NA

---

[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

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Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

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Revision Date: 08/29/16

Jan-24	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month		1,151,882		29,687,851					
1/1/2024									
1/2/2024	13,850	1,165,732	12,187	29,700,038				N	
1/3/2024	1,605	1,167,337	0	29,700,038				N	
1/4/2024	784	1,168,121	0	29,700,038				N	
1/5/2024	7,047	1,175,168	6,089	29,706,127				N	
1/6/2024									
1/7/2024									
1/8/2024	9,281	1,184,449	6,125	29,712,252				N	
1/9/2024	1,221	1,185,670	0	29,712,252				N	
1/10/2024	7,075	1,192,745	6,125	29,718,377				N	
1/11/2024	7,302	1,200,047	6,196	29,724,573				N	
1/12/2024									
1/13/2024									
1/14/2024									
1/15/2024	16,523	1,216,570	12,082	29,736,655				N	
1/16/2024	6,687	1,223,257	0	29,736,655				N	
1/17/2024	1,189	1,224,446	5,959	29,742,614				N	
1/18/2024	798	1,225,244	0	29,742,614				N	
1/19/2024									
1/20/2024									
1/21/2024									
1/22/2024	4,300	1,229,544	0	29,742,614				N	
1/23/2024	1,218	1,230,762	0	29,742,614				N	
1/24/2024	2,188	1,232,950	0	29,742,614	33,719	33,719	OGS	N	PH 8.07
1/25/2024	9,295	1,242,245	5,495	29,748,109	39,849	73,568	OGS	N	PH 8.36
1/26/2024						73,568			
1/27/2024						73,568			
1/28/2024						73,568			
1/29/2024	73,655	1,315,900	55,829	29,803,938	22,753	96,321	City	N	PH 7.79
1/30/2024	23,241	1,339,141	15,382	29,819,320	22,751	119,072	City	N	PH 7.33
1/31/2024	25,602	1,364,743	14,933	29,834,253	22712 / 17082	158,866	City / OGS	N	PH 7.28
Totals	212,861	NA	**146,402**	NA	**158,866**	NA	NA		NA

[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

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Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

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Revision Date: 08/29/16

Febuary 2024	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	1,364,743	NA	29,834,253	NA	NA	NA		
2/1/2024	26,807	1,391,550	16,967	29,851,220	39,844	39,844	OGS	N	PH 7.28
2/2/2024						39,844			
2/3/2024						39,844			
2/4/2024						39,844			
2/5/2024	49,890	1,441,440	29,045	29,880,265	22,712	62,556	City	N	PH 8.02
2/6/2024	22,080	1,463,520	19,923	29,900,188	22,782	85,338	City	N	PH 8.04
2/7/2024	12,883	1,476,403	9,137	29,909,325	45,434	130,772	OGS	N	PH 7.86
2/8/2024	11,891	1,488,294	9,507	29,918,832	33,803	164,575	OGS	N	PH 7.75
2/9/2024						164,575			
2/10/2024						164,575			
2/11/2024						164,575			
2/12/2024	24,042	1,512,336	20,298	29,939,130	22,688	187,263	City	N	PH 7.60
2/13/2024	33,549	1,545,885	31,991	29,971,121	22,667	209,930	City	N	PH 7.83
2/14/2024	12,475	1,558,360	10,329	29,981,450	22,799	232,729	City	N	PH 8.10
2/15/2024	16,299	1,574,659	15,394	29,996,844	0	232,729		N	PH 8.22
2/16/2024						232,729			
2/17/2024						232,729			
2/18/2024						232,729			
2/19/2024	45,542	1,620,201	39,537	30,036,381	22,767	255,496	City	N	PH 8.19
2/20/2024	10,475	1,630,676	6,117	30,042,498	22,779	278,275	City	N	PH 8.16
2/21/2024	6,093	1,636,769	7,990	30,050,488	22,544	300,819	City	N	PH 7.86
2/22/2024	10,525	1,647,294	9,443	30,059,931	39,847	340,666	OGS	N	PH 8.21
2/23/2024						340,666			
2/24/2024						340,666			
2/25/2024						340,666			
2/26/2024	35,344	1,682,638	29,592	30,089,523		340,666		N	
2/27/2024	6,109	1,688,747	4,544	30,094,067		340,666		N	
2/28/2024	6,063	1,694,810	4,634	30,098,701		340,666		N	
2/29/2024	10,377	1,705,187	9,157	30,107,858		340,666		N	
Totals	340,444	NA	**273,605**	NA	**340,666**	NA	NA		NA

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Ottumwa-Midland Commercial Landfill

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Revision Date: 08/29/16

Mar-24	**Daily Total Generated [Wetwell Flow Meter] (Gallons)**	**Cumulative Total Generated [Wetwell Flow Meter] (Gallons)**	**Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Offsite Treatment Location ("OGS" or other)**	**Ground Water Discharged >25,000 gpd? (Y or N)[1]**	**Comments**
Last month	NA	1,705,187	NA	30,107,858	NA	NA	NA		
3/1/2024									
3/2/2024									
3/3/2024									
3/4/2024	24,333	1,729,520	18,487	30,126,345	11,372	11,372	City	N	PH 8.32 SK/06:48 a.m.
3/5/2024	13,565	1,743,085	5,199	30,131,544		11,372		N	
3/6/2024	10,200	1,753,285	6,726	30,138,270		11,372		N	
3/7/2024	13,940	1,767,225	6,590	30,144,860	22,717	34,089	City	N	PH 8.39 SK/06:58 a.m.
3/8/2024						34,089			
3/9/2024						34,089			
3/10/2024						34,089			
3/11/2024	41,676	1,808,901	23,731	30,168,591	22,676	56,765	City	N	PH 8.39 SK/07:30 a.m.
3/12/2024	7,299	1,816,200	4,356	30,172,947	17,002	73,767	City	N	PH 8.38 SK/10:25 a.m.
3/13/2024	6,188	1,822,388	875	30,173,822	22,715	96,482	City	N	PH 8.38 KM/06:54 a.m.
3/14/2024	28,742	1,851,130	23,062	30,196,884	17,019	113,501	Ciy	N	PH 7.70 WH/07:54 a.m.
3/15/2024						113,501			
3/16/2024						113,501			
3/17/2024						113,501			
3/18/2024	58,862	1,909,992	19,196	30,216,080	22,537	136,038	City	N	PH 8.31 SK/07:15 a.m.
3/19/2024	6,509	1,916,501	4,089	30,220,169	22,669	158,707	City	N	PH 8.28 WH/07:05 a.m.
3/20/2024	11,010	1,927,511	2,395	30,222,564	22,707	181,414	City	N	PH 8.37 KM/06:51 a.m.
3/21/2024	4,492	1,932,003	1,738	30,224,302	22,758	204,172	City	N	PH 8.31 SK/10:05 a.m.
3/22/2024						204,172			
3/23/2024						204,172			
3/24/2024						204,172			
3/25/2024	24,315	1,956,318	19,480	30,243,782	11,689	215,861	City	N	PH 8.25 WH/09:10 a.m.
3/26/2024	17,460	1,973,778	15,420	30,259,202	22,779	238,640	City	N	PH 8.15 WH/06:21 a.m.
3/27/2024	7,531	1,981,309	5,185	30,264,387	22,633	261,273	City	N	PH 7.99 KM / 6:40 a.m.
3/28/2024	6,685	1,987,994	4,595	30,268,982		261,273		N	
3/29/2024						261,273			
3/30/2024						261,273			
3/31/2024						261,273			
Totals	282,807	NA	**161,124**	NA	**261,273**	NA	NA		NA

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Revision Date: 08/29/16

Apr-24	**Daily Total Generated [Wetwell Flow Meter] (Gallons)**	**Cumulative Total Generated [Wetwell Flow Meter] (Gallons)**	**Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Offsite Treatment Location ("OGS" or other)**	**Ground Water Discharged >25,000 gpd? (Y or N)[1]**	**Comments**
Last month	NA	1,987,994	NA	30,268,982	NA	NA	NA		
4/1/2024	35,604	2,023,598	26,688	30,295,670	22,693	22,693	City	N	PH 7.85 SK / 0740
4/2/2024	41,340	2,064,938	14,317	30,309,987	22,784	45,477	City	N	PH 7.63 KM / 0700
4/3/2024	64,130	2,129,068	35,490	30,345,477	39,813	85,290	OGS	N	PH 7.53 SK / 0718
4/4/2024	18,700	2,147,768	5,555	30,351,032	45,348	130,638	OGS	N	PH 7.69 SK / 0648
4/5/2024						130,638			
4/6/2024						130,638			
4/7/2024						130,638			
4/8/2024	58,312	2,206,080	23,031	30,374,063		130,638		N	
4/9/2024	17,682	2,223,762	5,680	30,379,743		130,638		N	
4/10/2024	24,483	2,248,245	6,141	30,385,884	11319 / 5686	147,643	City/OGS	N	PH 8.19 1142 / SK
4/11/2024	12,384	2,260,629	9,672	30,395,556	45,142	192,785	OGS	N	PH 8.24 0642 / SK
4/12/2024						192,785			
4/13/2024						192,785			
4/14/2024						192,785			
4/15/2024	28,394	2,289,023	20,405	30,415,961	22,501	215,286	City	N	PH 8.23 0650 / SK
4/16/2024	7,852	2,296,873	6,095	30,422,056		215,286		N	
4/17/2024	21,372	2,318,245	19,967	30,442,023	22,621	237,907	City	N	PH 8.27 0700 / WH
4/18/2024	20,994	2,339,239	18,624	30,460,647	11,043 / 22,609	271,559	City / OGS	N	PH 8.50 0626 / KM
4/19/2024						271,559			
4/20/2024						271,559			
4/21/2024						271,559			
4/22/2024	72,007	2,411,246	37,805	30,498,452	22,703	294,262	City	N	PH 8.43 0644 / SK
4/23/2024	11,200	2,422,446	4,628	30,503,080	22,683	316,945	City	N	PH 8.58 0616 / KM
4/24/2024	7,079	2,429,525	4,802	30,507,882	17,002 / 11245	345,192	City/OGS	N	PH 8.52 0652 / SK
4/25/2024	7,707	2,437,232	6,205	30,514,087	28,317	373,509	OGS	N	PH 8.30 0615 / WH
4/26/2024						373,509			
4/27/2024						373,509			
4/28/2024						373,509			
4/29/2024	76,477	2,513,709	42,024	30,556,111	22,775	396,284	City	N	PH 8.13 7:05 / KM
4/30/2024	19,063	2,532,772	9,374	30,565,485	22,782	419,066	City	N	PH 8.20 1009 / SK
Totals	544,780	NA	**296,503**	NA	**419,066**	NA	NA		NA

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Revision Date: 08/29/16

May	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	2,532,772	NA	30,565,485	NA	NA	NA		
5/1/2024	5,845	2,538,617	0	30,565,485	17082 / 5693	22,775	City/OGS	N	PH 8.34 1004 / SK
5/2/2024	13,130	2,551,747	0	30,565,485	51,050	73,825	OGS	N	PH 7.88 0645 / SK
5/3/2024						73,825			
5/4/2024						73,825			
5/5/2024						73,825			
5/6/2024	75,060	2,626,807	6,480	30,571,965	39,571	113,396	City	N	PH 7.58 0622 / SK
5/7/2024	43,900	2,670,707	38,177	30,610,142	39,676	153,072	City	N	PH 7.67 0640 / SK
5/8/2024	37,860	2,708,567	32,310	30,642,452	39,729	192,801	City	N	PH 7.85 0635 / SK
5/9/2024	39,770	2,748,337	34,560	30,677,012	99,664	292,465	OGS	N	PH 7.79 0648 / WH
5/10/2024	62,608	2,810,945	61,188	30,738,200	105,914	398,379	OGS	N	PH 7.86 0510 / WH
5/11/2024						398,379			
5/12/2024						398,379			
5/13/2024	124,470	2,935,415	114,380	30,852,580	34,089	432,468	City	N	PH 7.78 0630 / WH
5/14/2024	52,470	2,987,885	32,805	30,885,385	39,703	472,171	City	N	PH 6.73 0642 / KM
5/15/2024	39,404	3,027,289	32,791	30,918,176	33,993	506,164	City	N	PH 7.86 0615 / WH
5/16/2024	24,619	3,051,908	16,683	30,934,859		506,164	City	N	PH 8.01 0654 / SK
5/17/2024						506,164			
5/18/2024						506,164			
5/19/2024						506,164			
5/20/2024	20,690	3,072,598	13,243	30,948,102	39,592	545,756	City	N	PH 8.04 0633 / KM
5/21/2024	35,570	3,108,168	35,110	30,983,212	39,775	585,531	City	N	PH 6.99 0730 / KM
5/22/2024	36,899	3,145,067	32,710	31,015,922	22693 / 5703	613,927	City / OGS	N	PH 7.55 1025 / KM
5/23/2024	32,337	3,177,404	16,389	31,032,311	5691 / 28444	648,062	OGS / City	N	PH 8.28 0705 / KM
5/24/2024						648,062			
5/25/2024						648,062			
5/26/2024						648,062			
5/27/2024						648,062			
5/28/2024	86,271	3,263,675	59,711	31,092,022	28,434	676,496	City	N	PH 8.37 6:50 / WH
5/29/2024	39,796	3,303,471	28,008	31,120,030	28,386	704,882	City	N	PH 8.46 6:25 / WH
5/30/2024	18,001	3,321,472	10,205	31,130,235	34,065	738,947	City	N	PH 8.51 6:25 / WH
5/31/2024	14,117	3,335,589	10,125	31,140,360	28,441	767,388	City	N	PH 8.54 7:10 / KM
Totals	802,817	NA	**574,875**	NA	**767,388**	NA	NA		NA

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Revision Date: 08/29/16

Jun-24	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	3,335,589	NA	31,140,360	NA	NA	NA		
6/1/2024									
6/2/2024									
6/3/2024	91,166	3,426,759	29,710	31,170,070	22,542	22,542	City	N	PH 8.22 0730 SK
6/4/2024	33,294	3,460,053	9,454	31,179,524	22,712	45,254	City	N	PH 8.19 0642 WH
6/5/2024	27,410	3,487,463	6,915	31,186,439		45,254		N	
6/6/2024	70,380	3,557,843	7,673	31,194,112	22,487	67,741	City	N	PH 8.58 0729 SK
6/7/2024						67,741			
6/8/2024						67,741			
6/9/2024						67,741			
6/10/2024	42,509	3,600,352	31,564	31,225,677		67,741		N	
6/11/2024	7,911	3,608,263	4,758	31,230,435		67,741		N	
6/12/2024	14,797	3,623,060	9,489	31,239,924		67,741		N	
6/13/2024	17,693	3,640,753	4,757	31,244,681		67,741		N	
6/14/2024						67,741			
6/15/2024						67,741			
6/16/2024						67,741			
6/17/2024	55,000	3,695,753	23,402	31,268,083	22,763	90,504	City	N	PH 8.55 0808 KM
6/18/2024	18,420	3,714,173	8,074	31,276,157	22,676	113,180	City	N	PH 8.58 0635 SK
6/19/2024	8,370	3,722,543	5,876	31,282,033	22,631	135,811	City	N	PH 8.68 0730 SK
6/20/2024	6,482	3,729,025	4,626	31,286,659		135,811		N	
6/21/2024						135,811			
6/22/2024						135,811			
6/23/2024						135,811			
6/24/2024	32,220	3,761,245	18,213	31,304,872		135,811		N	
6/25/2024	10,114	3,771,359	4,522	31,309,394	22,540	158,351	City	N	PH 8.4 0715 WH
6/26/2024	5,851	3,777,210	4,592	31,313,986	22,465	180,816	City	N	PH 8.49 0720 SK
6/27/2024	6,377	3,783,587	4,658	31,318,644	22,583	203,399	City	N	PH 8.50 0734 SK
6/28/2024						203,399			
6/29/2024						203,399			
6/30/2024						203,399			
Totals	447,994	NA	**178,283**	NA	**203,399**	NA	NA		NA

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Revision Date: 08/29/16

Jul-24	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	6,482	3,729,025	4,626	31,286,659	NA	NA	NA		
7/1/2024	99,256	3,828,281	72,523	31,359,182				N	
7/2/2024	6,211	3,834,492	4,603	31,363,785	22,636	22,636	City	N	PH 7.83 0708 WH
7/3/2024	16,207	3,850,699	15,403	31,379,188		22,636	City	N	PH 7.98 0720 KM
7/4/2024						22,636			
7/5/2024	17,201	3,867,900	14,030	31,393,218		22,636		N	
7/6/2024						22,636			
7/7/2024						22,636			
7/8/2024	31,334	3,899,234	27,909	31,421,127	22,739	45,375	City	N	PH 7.91 0725 SK
7/9/2024	8,430	3,907,664	5,027	31,426,154	22,684	68,059	City	N	PH 8.04 0715 KM
7/10/2024	6,830	3,914,494	8,074	31,434,228	22,729	90,788	City	N	PH 7.89 0707 WH
7/11/2024	7,520	3,922,014	5,962	31,440,190	22,684	113,472	City	N	PH 8.10 0820 SK
7/12/2024						113,472			
7/13/2024						113,472			
7/14/2024						113,472			
7/15/2024	28,768	3,950,782	23,419	31,463,609		113,472		N	
7/16/2024	6,022	3,956,804	4,598	31,468,207		113,472		N	
7/17/2024	6,122	3,962,926	4,688	31,472,895		113,472		N	
7/18/2024	6,219	3,969,145	4,710	31,477,605		113,472		N	
7/19/2024						113,472			
7/20/2024						113,472			
7/21/2024						113,472			
7/22/2024	35,338	4,004,483	18,676	31,496,281		113,472		N	
7/23/2024	9,945	4,014,428	4,664	31,500,945		113,472		N	
7/24/2024	7,215	4,021,643	4,695	31,505,640		113,472		N	
7/25/2024	9,517	4,031,160	4,686	31,510,326		113,472		N	
7/26/2024						113,472			
7/27/2024						113,472			
7/28/2024						113,472			
7/29/2024	13,609	4,044,769	7,339	31,517,665		113,472		N	
7/30/2024	5,810	4,050,579	1,912	31,519,577	22,731	136,203	City	N	PH 8.45 0630 WH
7/31/2024	43,398	4,093,977	8,574	31,528,151	22,715	158,918	City	N	PH 8.15 6:35 KM
Totals	364,952	NA	**241,492**	NA	**158,918**	NA	NA		NA

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Leachate Removal and Hauling Records
Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

Instructions for Use

1. Enter the dates for the month in the date column.
2. Enter the accumulated total generated leachate volume from the end of the previous month from the leachate totalizer in C12.
3. Enter the accumulated total generated leachate for each day from the leachate totalizer in Column C.
4. Enter the daily volume (in gallons) of leachate hauled off site and the offsite location in Column D. Note since we do not have a flow meter, convert from pounds to gallons: X lbs÷ 8.34 = gallons.
5. The spreadsheet will calculate the daily leachate generated and the cumulative volume of leachate hauled for the month.

Revision Date: 08/29/16

Aug-24	**Daily Total Generated [Wetwell Flow Meter] (Gallons)**	**Cumulative Total Generated [Wetwell Flow Meter] (Gallons)**	**Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)**	**Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)**	**Offsite Treatment Location ("OGS" or other)**	**Ground Water Discharged >25,000 gpd? (Y or N)[1]**	**Comments**
Last month	43,398	4,093,977	8,574	31,528,151	NA	NA	NA		
8/1/2024	31,098	4,125,075	3,219	31,531,370	22,741	22,741	City	N	PH 8.33 6:25/ WH
8/2/2024			Preloaded 8-1-2024 / Delivered 8		5,583	28,324	City	N	PH 8.33 6:25/ WH
8/3/2024						28,324			
8/4/2024						28,324			
8/5/2024	158,300	4,283,375	33,250	31,564,620	22,506	50,830	City	N	PH 7.94 0716 SK
8/6/2024	46,240	4,329,615	22,521	31,587,141	30,556	81,386	City	N	PH 8.05 0706 WH
8/7/2024	31,220	4,360,835	31,591	31,618,732	47,101	128,487	City	N	PH 8.19 0638 KM
8/8/2024	50,220	4,411,055	36,028	31,654,760	33,914	162,401	City	N	PH 8.42 0622 KM
8/9/2024						162,401			
8/10/2024						162,401			
8/11/2024						162,401			
8/12/2024	51,850	4,462,950	37,790	31,692,550	28,408	190,809	City	N	PH 8.34 6:37 WH
8/13/2024	31,085	4,494,035	26,416	31,718,966	34,101	224,910	City	N	PH 8.15 0655 SK
8/14/2024	35,960	4,529,995	31,540	31,750,506	34,101	259,011	City	N	PH 8.35 7:56 KM
8/15/2024	29,820	4,559,815	26,119	31,776,625	28,415	287,426	City	N	PH 8.42 0742 WH
8/16/2024						287,426			
8/17/2024						287,426			
8/18/2024						287,426			
8/19/2024	55,170	4,614,985	37,338	31,813,963	34,115	321,541	City	N	PH 7.78 0745 SK
8/20/2024	41,756	4,656,741	36,713	31,850,676	28,453	349,994	City	N	PH 8.09 0808 WH
8/21/2024	38,404	4,695,145	25,540	31,876,216	28,451	378,445	City	N	PH 8.15 0820 WH
8/22/2024	34,210	4,729,355	31,220	31,907,436	34,146	412,591	City	N	PH 8.29 0732 SK
8/23/2024						412,591			
8/24/2024						412,591			
8/25/2024						412,591			
8/26/2024	37,660	4,767,015	33,147	31,940,583	34,106	446,697	City	N	PH 7.98 0655 SK
8/27/2024	37,620	4,804,635	31,611	31,972,194	34,041	480,738	City	N	PH 8.19 0655 SK
8/28/2024	20,640	4,825,275	13,470	31,985,664	28,400	509,138	City	N	PH 8.12 0820 SK
8/29/2024	15,454	4,840,729	8,327	31,993,991	22,712	531,850	City	N	PH 8.21 9:12 KM
8/30/2024						531,850			
8/31/2024						531,850			
Totals	746,707	NA	**465,840**	NA	**531,850**	NA	NA		NA

[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

Leachate Removal and Hauling Records
Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

Instructions for Use

1. Enter the dates for the month in the date column.
2. Enter the accumulated total generated leachate volume from the end of the previous month from the leachate totalizer in C12.
3. Enter the accumulated total generated leachate for each day from the leachate totalizer in Column C.
4. Enter the daily volume (in gallons) of leachate hauled off site and the offsite location in Column D. Note since we do not have a flow meter, convert from pounds to gallons: X lbs÷ 8.34 = gallons.
5. The spreadsheet will calculate the daily leachate generated and the cumulative volume of leachate hauled for the month.

Revision Date: 08/29/16

Sep-24	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	4,840,729	NA	31,993,991	NA	NA	NA		
9/1/2024									
9/2/2024									
9/3/2024	126,552	4,967,281	57,167	32,051,158	22,700	22,700	City	N	PH 8.29 0655 SK
9/4/2024	6,233	4,973,514	5,058	32,056,216	22,727	45,427	City	N	PH 8.21 0719 SK
9/5/2024	13,443	4,986,957	9,892	32,066,108		45,427		N	
9/6/2024	6,754	4,993,711	4,254	32,070,362		45,427		N	
9/7/2024						45,427			
9/8/2024						45,427			
9/9/2024	47,580	5,041,291	18,275	32,088,637		45,427		N	
9/10/2024	9,972	5,051,263	5,354	32,093,391		45,427		N	
9/11/2024	6,538	5,057,801	4,020	32,097,411		45,427		N	
9/12/2024	4,327	5,062,128	4,529	32,101,940		45,427		N	
9/13/2024						45,427			
9/14/2024						45,427			
9/15/2024						45,427			
9/16/2024	33,620	5,095,748	7,433	32,109,373		45,427		N	
9/17/2024	14,210	5,109,958	11,756	32,121,129		45,427		N	
9/18/2024	18,030	5,127,988	11,112	32,132,241	9,729	55,156	City	N	PH 8.21 SK 1058
9/19/2024	6,520	5,134,508	5,427	32,137,668		55,156		N	
9/20/2024						55,156			
9/21/2024						55,156			
9/22/2024						55,156			
9/23/2024	3	5,134,511	0	32,137,668		55,156		N	
9/24/2024	14,160	5,148,671	10,926	32,148,594	22,643	77,799	City	N	PH 8.36 SK 0700
9/25/2024	30,380	5,179,051		OFF	22,751	100,550	City	N	PH 8.25 SK 0702
9/26/2024	4,399	5,183,450	20,555	32,169,149	22,650	123,200	City	N	PH 8.41 SK 0905
9/27/2024	41,301	5,224,751	30,399	32,199,548	22,746	145,946	City	N	PH 8.08 WH 7:07
9/28/2024						145,946			
9/29/2024						145,946			
9/30/2024	20,808	5,245,559	17,976	32,217,524	22,765	168,711	City	N	PH 8.29 SK 0633
Totals	404,830	NA	**224,133**	NA	**168,711**	NA	NA		NA

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[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

Leachate Removal and Hauling Records
Ottumwa-Midland Commercial Landfill

enter blue data
spreadsheet calculates red data

Instructions for Use
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5. The spreadsheet will calculate the daily leachate generated and the cumulative volume of leachate hauled for the month.

Revision Date: 08/29/16

Oct-24	Daily Total Generated [Wetwell Flow Meter] (Gallons)	Cumulative Total Generated [Wetwell Flow Meter] (Gallons)	Daily Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Cumulative Total Generated [Phase 1 (LV-1) Flow Meter] (Gallons)	Batch Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Cumulative Total to Offsite Treatment [Loading Facility Flow Meter] (Gallons)	Offsite Treatment Location ("OGS" or other)	Ground Water Discharged >25,000 gpd? (Y or N)[1]	Comments
Last month	NA	5,245,559	NA	32,199,524	NA	NA	NA		
10/1/2024	5,140	5,250,699	22,245	32,221,769	11,384	11,384	City	N	PH 8.51 KM 0836
10/2/2024	2,060	5,252,759	87	32,221,856		11,384		N	
10/3/2024	3,210	5,255,969	4,264	32,226,120		11,384		N	
10/4/2024						11,384			
10/5/2024						11,384			
10/6/2024						11,384			
10/7/2024	26,400	5,282,369	25,935	32,252,055		11,384		N	
10/8/2024	7,922	5,290,291	4,129	32,256,184		11,384		N	
10/9/2024	5,424	5,295,715	4,425	32,260,609		11,384		N	
10/10/2024	5,277	5,300,992	4,530	32,265,139		11,384		N	
10/11/2024						11,384			
10/12/2024						11,384			
10/13/2024						11,384			
10/14/2024	12,660	5,313,652	9,063	32,274,202	22,758	34,142	City	N	PH 8.43 WH 8:00
10/15/2024	5,166	5,318,818	4,529	32,278,731		34,142		N	
10/16/2024	5,354	5,324,172	4,497	32,283,228		34,142		N	
10/17/2024	802	5,324,974	0	32,283,228		34,142		N	
10/18/2024						34,142			
10/19/2024						34,142			
10/20/2024						34,142			
10/21/2024	16,927	5,341,901	13,914	32,297,142		34,142		N	
10/22/2024	870	5,342,771	0	32,297,142		34,142		N	
10/23/2024	5,460	5,348,231	4,515	32,301,657	22,820	56,962	City	N	PH 8.30 SK 0905
10/24/2024	941	5,349,172	898	32,302,555		56,962		N	
10/25/2024						56,962			
10/26/2024						56,962			
10/27/2024						56,962			
10/28/2024	28,233	5,377,405	24,116	32,326,671	22,751	79,713	City	N	PH 7.73 SK 0633
10/29/2024	806	5,378,211	0	32,326,671		79,713		N	
10/30/2024	5,715	5,383,926	4,482	32,331,153	22,681	102,394	City	N	PH 8.17 KM 1018
10/31/2024	37,552	5,421,478	39,341	32,370,494	22,631	125,025	City	N	PH 8.29 KM 8:19
Totals	175,919	NA	**170,970**	NA	**125,025**	NA	NA		NA

[1] "Ground Water" refers to combination of old cell under-drain water plus storm water discharged form the old storm water pond. Both are discharged to the same wetwell. So, when storm water is discharged, there is no way to estimate the volume of under-drain water discharged, as the two streams are commingled in the wetwell. Storm water is not often discharged. This means that most of the time, but not all of the time, we are able to estimate the volume of under-drain water discharged. Ground water withdrawls that exceed 25,000 gpd would require a DNR water use permit.

Table A-2. Summary of Leachate and Contact Water Quantities Transported to Ottumwa Generating Station or Other Offsite Disposal Location, 2013-2024
Ottumwa-Midland Commercial Landfill
Wapello County, Iowa

	Volume (gallons)											
Month	**2013***	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
January	--	--	46,500	528,115	--	--	--	--	255,594	--	169,013	158,866
February	--	--	71,300	310,180	--	--	--	--	301,065	91,834	120,820	340,666
March	41,242	--	--	675,520	--	--	--	59,806	473,255	383,001	355,568	261,273
April	159,710	--	37,200	531,440	129,817	366,173	--	376,426	342,758	259,322	265,282	419,066
May	210,988	98,419	182,900	439,047	735,442	486,212	127,770	416,619	367,950	271,152	193,099	767,388
June	--	23,800	1,036,300	628,126	492,458	--	363,490	401,999	247,168	187,212	90,528	203,399
July	--	--	770,550	522,497	--	--	--	144,309	598,589	72,802	118,775	158,918
August	--	--	1,106,800	622,201	--	--	144,477	41,348	103,526	--	90,640	531,850
September	--	17,000	779,300	563,082	--	916,824	206,826	246,230	90,923	169,815	90,780	168,711
October	--	--	--	47,187	--	--	579,793	91,055	181,751	87,169	84,706	125,025
November	--	--	430,190	--	--	--	73,311	101,914	211,827	242,499	28,074	N/A
December	--	--	2,501,725	--	--	--	133,176	157,652	217,013	156,256	208,518	N/A
Total	411,940	139,219	6,962,765	4,867,395	1,357,717	1,769,209	1,628,843	2,037,358	3,391,419	1,921,062	1,815,803	3,135,162

-- = No hauling N/A = Data not yet available

*: Quantities for years prior to 2013 were included in previous AWQRs.

Created by: MDB Date: 11/1/2019
Last revision by: EMS Date: 11/14/2024
Checked by: JSN Date: 11/15/2024

I:\25224073.00\Deliverables\2024 AWQR\App G - Inspection\Attachments\C_LCSPE\Attachments\[A2_Leachate Hauling Table.xlsx]Hauled Volume

Attachment B

Leachate Head Measurements

Monthly Leachate Elevation and Head Measurement Records
LP-1
Ottumwa Midland Landfill

Year: 2023

enter blue data
spreadsheet calculates red data

Operator: Keck, Hart, McAninch
Equipment Used: Model 101, Serial number 223320

Revised 10/11/2017

Month	Leachate Piezometer	Location (Phase)	TOC Elev. (NGVD) a	BOC Elev. (NGVD) b	Top of Clay Liner Elev. (NGVD) c	Depth to Leachate (ft) d	Leachate Elev. (NGVD) a-d	Leachate Head at Top of Clay Liner (ft) a-c-d	Date Read/Comments
NA	LP-1	Original Cell	765.18	753.56	753.11	NA	NA	NA	NA
January	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
February	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
March	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
April	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
May	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
June	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
July	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
August	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
September	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
October	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
November	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		
December	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		

Notes:
1) TOC = Top of Casing. Based on June 15, 2011 survey and boring log/well construction form = 765.18
2) BOC = Bottom of Casing. Based on June 15, 2011 survey and boring log/well construction form = 753.56
3) Top of Clay Liner Elevation based on June 15, 2011 survey and boring log/well construction form = 753.11
4) NGVD = National Geodetic Vertical Datum
5) TBD = To Be Determined, well has not been installed
6) Per a phone conversation with OML staff on 11/19/2024, a recorded "Depth to Leachate" measurement of 11.55' at LP-1 indicates that LP-1 was dry.

Monthly Leachate Elevation and Head Measurement Records
LP-1
Ottumwa Midland Landfill

Year: 2024

enter blue data
spreadsheet calculates red data

Operator: Keck, Hart, McAninch
Equipment Used: Model 101, Serial number 223320

Revised 10/11/2017

Month	Leachate Piezometer	Location (Phase)	TOC Elev. (NGVD) a	BOC Elev. (NGVD) b	Top of Clay Liner Elev. (NGVD) c	Depth to Leachate (ft) d	Leachate Elev. (NGVD) a-d	Leachate Head at Top of Clay Liner (ft) a-c-d	Date Read/Comments
NA	LP-1	Original Cell	765.18	753.56	753.11	NA	NA	NA	NA
January	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		1/1/2024
February	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		2/4/2024
March	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		3/4/2024
April	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		4/1/2024
May	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		5/1/2024
June	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		6/3/2024
July	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		7/3/2024
August	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		8/5/2024
September	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		9/3/2024
October	LP-1	Original Cell	765.18	753.56	753.11	11.55	Dry(6)		10/7/2024
November	LP-1	Original Cell	765.18	753.56	753.11	10.75	754.43	1.32	11/4/2024
December	LP-1	Original Cell	765.18	753.56	753.11	?	#VALUE!	#VALUE!	

Notes:
1) TOC = Top of Casing. Based on June 15, 2011 survey and boring log/well construction form = 765.18
2) BOC = Bottom of Casing. Based on June 15, 2011 survey and boring log/well construction form = 753.56
3) Top of Clay Liner Elevation based on June 15, 2011 survey and boring log/well construction form = 753.11
4) NGVD = National Geodetic Vertical Datum
5) TBD = To Be Determined, well has not been installed
6) Per a phone conversation with OML staff on 11/19/2024, a recorded "Depth to Leachate" measurement of 11.55' at LP-1 indicates that LP-1 was dry.

Monthly Leachate Elevation and Head Measurement Records
LH-1
Ottumwa Midland Landfill

Year: 2023

Operator: Keck

Equipment Used: Vault reading

Revised 10/24/2013

Month	Leachate Piezometer	Location (Phase)	TOC Elev. (NGVD) a	BOC Elev. (NGVD) b	Top of Clay Liner Elev. (NGVD) c	Depth to Leachate (ft) d	Leachate Elev. (NGVD) a-d	Leachate Head at Top of Clay Liner (ft) a-c-d	Comments
	LH-1	Phase 1	TBD	TDB	TBD				See Notes
January	LH-1						0		Sensor malfunction
February	LH-1						0		Sensor malfunction
March	LH-1						0		Sensor malfunction
April	LH-1						0		Sensor malfunction
May	LH-1						0		Sensor malfunction
June	LH-1						0		Sensor malfunction
July	LH-1						4.25	0.35	
August	LH-1						2.2	0.18	
September	LH-1						1.67	0.14	
October	LH-1						2.75	0.23	
November	LH-1						4.67	0.39	
December	LH-1						2.5	0.21	

Notes:
1) TOC = Top of Casing. Based on _________ survey and boring log/well construction form.
2) BOC = Bottom of Casing. Based on _________ survey and boring log/well construction form.
3) Top of Clay Liner Elevation based on _________ survey and boring log/well construction form.
4) NGVD = National Geodetic Vertical Datum
5) TBD = To Be Determined, well has not been installed
6) The data recorded in the column labeled "Leachate Elev. (NDVD)" is the leachate head above the transducer installed in LH-1 as read from the control panel display. The leachate head is displayed in units of "inches" and has been converted to units of "feet" by dividing the reading by 12 for reporting in the column labeled "Leachate Head at "Top of Clay Liner (ft)."

Note: The liner elevation at transducer location in LH-1 is 753.59 feet per the November 2015 Phase 1 Liner Construction Documentation Report prepared by SCS. (Source: Email from Eric Nelson, 10/18/2017, 1:18 PM.)

How to use this spreadsheet: (RJS 10/19/2017):
1. Enter the leachate head level from the transducer panel located near Leachate Vault-1 (LV-1) in column J in decimal feet.
2. Add the observed leachate level to the liner elevation at transducer location LH-1. Enter this value into column I. This will represent the leachate head elevation above the liner.

For example: The observed leachate level in 0.375 ft on the digital readout for LH-1. Enter this into column J. Add 0.375 to the liner elevation at LH-1 to get the elevation of the leachate: 753.59 + 0.375 = 753.965. Enter this value into column I.

Monthly Leachate Elevation and Head Measurement Records
LH-1
Ottumwa Midland Landfill

Year: 2024

Operator: Keck

Equipment Used: Display

Revised 10/24/2013

Month	Leachate Piezometer	Location (Phase)	TOC Elev. (NGVD) a	BOC Elev. (NGVD) b	Top of Clay Liner Elev. (NGVD) c	Depth to Leachate (ft) d	Leachate Elev. (NGVD) a-d	Leachate Head at Top of Clay Liner (ft) a-c-d	Comments
	LH-1	Phase 1	TBD	TDB	TBD				See Notes
January	LH-1						1.42	0.12	
February	LH-1						2.3	0.19	
March	LH-1						2.92	0.24	
April	LH-1						1.67	0.14	
May	LH-1						7.17	0.60	Leachate Pump issues
June	LH-1						1.8	0.15	
July	LH-1						3	0.25	
August	LH-1						8.3	0.69	Recent heavy rains
September	LH-1						1.9	0.16	
October	LH-1						2.5	0.21	
November	LH-1						5	0.42	
December	LH-1								

Notes:
1) TOC = Top of Casing. Based on _________ survey and boring log/well construction form.
2) BOC = Bottom of Casing. Based on _________ survey and boring log/well construction form.
3) Top of Clay Liner Elevation based on _________ survey and boring log/well construction form.
4) NGVD = National Geodetic Vertical Datum
5) TBD = To Be Determined, well has not been installed
6) The data recorded in the column labeled "Leachate Elev. (NDVD)" is the leachate head above the transducer installed in LH-1 as read from the control panel display. The leachate head is displayed in units of "inches" and has been converted to units of "feet" by dividing the reading by 12 for reporting in the column labeled "Leachate Head at "Top of Clay Liner (ft)."

Note: The liner elevation at transducer location in LH-1 is 753.59 feet per the November 2015 Phase 1 Liner Construction Documentation Report prepared by SCS. (Source: Email from Eric Nelson, 10/18/2017, 1:18 PM.)

How to use this spreadsheet: (RJS 10/19/2017):
1. Enter the leachate head level from the transducer panel located near Leachate Vault-1 (LV-1) in column J in decimal feet.
2. Add the observed leachate level to the liner elevation at transducer location LH-1. Enter this value into column I. This will represent the leachate head elevation above the liner.

For example: The observed leachate level in 0.375 ft on the digital readout for LH-1. Enter this into column J. Add 0.375 to the liner elevation at LH-1 to get the elevation of the leachate: 753.59 + 0.375 = 753.965. Enter this value into column I.

Attachment C

Leachate Line Jetting Documentation

Interstate Power & Light Company
1031 Iowa St. Suite # 5007
Dubuque IA 52001-5007

October 11, 2023

Attn: Steve Keck
Fly Ash Disposal Foreman
Ottumwa Midland Landfull

Services renderred at Ottumwa Midland Landfill, 15300 130th Street, Ottumwa IA 52501

We, George Boitnott Enterprises, Inc. were on site on 10/10/23 & 10/11/23 to jet the lateral lines at the Ottumwa Midland Landfill using 3,500 gallons of water. All lines were clean with no blockages found while jetting of any lines.

Sincerely,

Kevin McIntosh

Kevin McIntosh
George Boitnott Enterprise Service Supervisor.

George & Jeff Boitnott Enterprises, Inc.
735 Gateway Drive • P.O. Box 157 • Ottumwa, IA 52501
☎ 641-682-5157 or 1-800-373-9433 • Fax 641-682-6872

Attachment D

IDNR Landfill Compliance Visit Report

IOWA DEPARTMENT OF NATURAL RESOURCES

GOVERNOR KIM REYNOLDS
LT. GOVERNOR ADAM GREGG
DIRECTOR KAYLA LYON

June 22, 2021

Alliant Energy Corporate Services, Inc.
Attn: Tasha Campbell, Environmental Specialist II
4902 North Bitmore Lane
Madison, WI 53718

Subject: Ottumwa-Midland CCR Landfill Compliance Visit
Facility No: 90-SDP-08-92P

Dear Ms. Campbell:

On June 1, 2021 I met with Rob Saunders, Blake McClaflin and Steve Keck to conduct a compliance visit at the Ottumwa-Midland CCR Landfill. Please review the enclosed report which outlines various items discussed and observed during the course of our visit.

If you have any questions or would like further explanation of any part of this report, please contact me at this office at 319-653-2135 or at ryan.stouder@dnr.iowa.gov.

Sincerely,

FIELD SERVICES & COMPLIANCE BUREAU

Ryan St

Ryan Stouder
Environmental Specialist Senior

Encl. SDP Visit Report

N:\SHARED\SW 2021\Midland CCR visit cover 060121

xc: Becky Jolly, IDNR Solid Waste Section, via email
Alliant Energy, Attn:Rob Saunders, 20775 Powerplant Rd, Ottumwa, IA 52501 (w/encl)
Ottumwa Midland CCR SW File

Environmental Services Division, Field Office #6, 1023 W. Madison, Washington, Iowa 52353-1623
Tel 319-653-2135 Fax 319-653-2856
www.IowaDNR.gov

IOWA [illegible]EPARTMENT OF NATURAL RESOU[illegible]ES
Field Office 6
1023 West Madison, Washington, IA 52353
319-653-2135
Sanitary Landfill Visit

Permit #: 90-SDP-08-92P

Date this Visit: 06/01/2021

Previous Visit Date: 9/11/12

Weather Conditions at Time of Visit: 73 deg. F, Sunny, Wind: South 5 mph

Person(s) Contacted: Rob Saunders, Blake McClaflin, Steve Keck

Were deficiencies noted or significant observations made during this inspection?
Yes – See Comments Sec., No – No deficiencies noted, Blank – Not applicable or observed, PND – Previously Noted Deficiency

Observations

Yes	No	PND	Item	Yes	No	PND	Item
☐	☒	☐	1. Fill Cover: daily; intermediate; final	☐	☐	☐	10. Special Waste Handling
☐	☒	☐	2. Control of Face: slope; width; location	☐	☒	☐	11. ERRAP/GP1
☐	☒	☐	3. Compaction	☐	☒	☐	12. Operator Certification
☐	☒	☐	4. Cover erosion; minor rills	☐	☒	☐	13. Staffing
☐	☒	☐	5. Drainage into fill	☐	☒	☐	14. Equipment Backup/Maintenance
☐	☒	☐	6. Leachate Mgmt. & Control	☐	☒	☐	15. Interior Roads
☐	☒	☒	7. Fugitive Dust	☐	☒	☐	16. Perimeter fence, gate, signs, mon. wells
☐	☒	☐	8. Wet Weather Area	☐	☒		17. Photos taken
☐	☐	☐	9. Construction & Demolition Area	☐	☒		18. Follow-up needed

Comments: Expansion phase 1 is being utilized, this area has been used for the past 3 or 4 years. Most of the bottom ash comes from the Ottumwa Generating Station and some loads come from the Prairie Creek Cedar Rapids plant. The ash material was being spread at the time of my visit. No fugitive dust issues were observed. A water truck usually follows the drier material, the weather conditions have been moderately wet so not as much water has been utilized. The main working face is covered with soil. The soil cover is from the stockpile north or the sides of the main working face. There was minor erosion in the area near the working face.

The haul roads are well maintained with ditches designed convey stormwater runoff offsite. The older portions of the landfill have a well-established grassed cover. This area is mowed and maintained as needed to prevent tree growth.

The leachate pond observed in the discharge area on the northwest corner. The area around the leachate pond was absent of trees and maintained with gravel to reduce woody plants. A leachate pond loadout is located near the main gate and office. I was able to review records of ash deliver loads and CCR well monitoring data, landfill operation and policy guidance.

No issues were observed with the monitoring wells located around the landfill property.

AUTHENTICATION

INSPECTOR: Ryan Stouder Ryan Stoud

REVIEWER: Kurt Levetzow Kurt Levetzow 6/24/21

Appendix H

Receptor Survey

GeoSAM Search Results Within 1 Mile of Ottumwa Midland Landfill, November 2024

wnumber	**14415**	**14333**	**16729**	**16736**	**19202**	**18797**	**27717**	**22353**
FID	12809	13863	15268	15284	16115	16556	24587	
owner_name	Ward, Robert	Ward, R.L.	Peterson, Ed	Ward, Robert	Sondoge, H.	Behringer, Bob	Rogers, Ratherine	Crady, Dale
alt_name				#3	BAILER, KEN			
pwts_id	0	0	0	0	0	0	0	0
project	Geologic Data Preservation	Geologic Data Preservation	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
operator	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
county	Wapello	Wapello	Wapello	Wapello	Wapello	Wapello	Wapello	Wapello
quad	Ottumwa North,	Ottumwa North,	Ottumwa North,	Ottumwa North,	Ottumwa North,	Ottumwa North,	Ottumwa North,	Ottumwa North,
township	T73N	T73N	T73N	T73N	T72N	T72N	T72N	T73N
range	R14W	R14W	R14W	R14W	R14W	R14W	R14W	R14W
section	35	35	35	35	3	2	2	34
quarter					SE NE SE NE	NE SW SW NW	NW SW	NW NE NE NW
latitude	41.082826	41.082826	41.082826	41.082826	41.063432	41.071081	41.069743	41.089533
longitude	-92.438689	-92.438689	-92.438689	-92.438689	-92.448759	-92.437911	-92.445914	-2.460711
ll_acc	Calc. +/- 3730 ft.	Calc. +/- 3730 ft.	Calc. +/- 3730 ft.	Calc. +/- 3730 ft.	Calc. +/- 230 ft.	Calc. +/- 230 ft.	Calc. +/- 930 ft.	Calc. +/- 230 ft.
utm_x	547148	547148	547148	547148	546316	547222	546550	545294
utm_y	4548103	4548103	4548103	4548103	4545945	4546800	4546647	4548836
elevation	842	842	842	842	745	785	784	832
elev_acc	Digital Elevation Model Accurate to 10 ft	Digital Elevation Model Accurate to 10 ft	Digital Elevation Model Accurate to 10 ft	Digital Elevation Model Accurate to 10 ft	Topo Map Accurate to 5 ft	Unknown	Digital Elevation Model Accurate to 5 ft	Digital Elevation Model Accurate to 5 ft
field_loca	0	0	0	0	0	0	0	No
site_type	Drilled hole	Drilled hole	Drilled hole	Drilled hole	Drilled hole	Drilled hole	Drilled hole	Drilled hole
position	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
dpth_br	0	0	0	0	20	10	15	40
dpth_well	30	30	31	39	155	293	152	208
dpth_tot	30	30	31	39	155	293	152	208
drill_comp	Schlicher Well Co.	Schlicher Well Co.	Schlicher Well Co.	Schlicher Well Co.	Schlicher Well Co.	Verwers Well Co.	Bruinekool, Dwayne	Schlicher Well Co.
icon	3	3	2	2	2	2	0	
drl_date	22-Oct-62	30-May-62	31-Oct-63	30-Oct-63	8-Oct-66	6-Apr-66	3-May-85	11/6/1968
aquifer					Mississippian	Mississippian		
well_type	Unknown	Unknown	Unknown	Private	Private	Private	Private	Private
smpl_type	Chips	Chips	Chips	Chips	Chips	Chips	Chips	
log_drlr	1	1	0	0	0	0	0	1
log_strp	1	1	1	1	1	1	0	1
log_geop	0	0	0	0	0	0	0	0
log_other	0	0	0	1	0	0	1	0
HLINK	https://www.iihr.uiowa.edu/igs/geosam/well/14415/general-	https://www.iihr.uiowa.edu/igs/geosam/well/14333/general-	https://www.iihr.uiowa.edu/igs/geosam/well/16729/general-	https://www.iihr.uiowa.edu/igs/geosam/well/16736/general-	https://www.iihr.uiowa.edu/igs/geosam/well/19202/general-	https://www.iihr.uiowa.edu/igs/geosam/well/18797/general-	https://www.iihr.uiowa.edu/igs/geosam/well/27717/general-	https://www.iihr.uiowa.edu/igs/geosam/well/22353/general-
x	-10290227.79	-10290227.79	-10290227.79	-10290227.79	-10291348.78	-10290141.18	-10291032.07	
y	5024566.1666414365	5024566.1666414365	5024566.1666414365	5024566.1666414365	5021702.376307149	5022831.7552704625	5022634.189370096	

Ottumwa Midland Landfill 2024 Receptor Survey

GeoSAM Wells Within 1 Mile of OML