Intended for
Ameren Missouri

Date
December 28, 2023

Project No.
1940103764

2023 ANNUAL REPORT

FORMER VENICE POWER PLANT, ASH PONDS 2 & 3

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2023 ANNUAL REPORT
FORMER VENICE POWER PLANT, ASH PONDS 2 & 3

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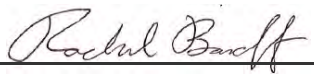

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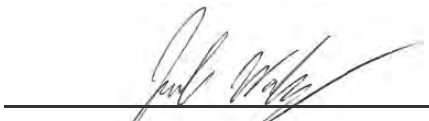

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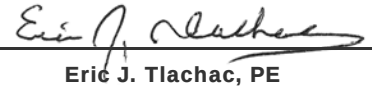

Eric J. Tlachac, PE
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ACRONYMS AND ABBREVIATIONS

Ameren	Ameren Missouri
GMZ	Groundwater Management Zone
IAC	Illinois Administrative Code
ILCS	Illinois Compiled Statutes
IEPA	Illinois Environmental Protection Agency
MDL	method detection limit
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NRT	Natural Resource Technology, Inc
PQL	practical quantitation limit
PVC	polyvinyl chloride
RL	reporting limit
Site	Former Venice Power Plant Ash Ponds 2 & 3
TDS	total dissolved solids

1. INTRODUCTION

1.1 Background

In May 2011, the Illinois Environmental Protection Agency (IEPA) approved Ameren Missouri's (Ameren) Closure Plan (Natural Resource Technology, Inc. [NRT], 2011) for the Former Venice Power Plant Ash Ponds 2 & 3 (Site) and established a Groundwater Management Zone (GMZ) for the Site. The Closure Plan included specifications for construction of a cover system over Ash Ponds 2 & 3 that conformed to the standards for final cover set forth in Illinois Landfill Regulations and a site-specific rulemaking governing closure of an ash pond at The Hutsonville Power Station, owned by an Ameren-affiliated company. See, generally, 35 Illinois Administrative Code (IAC) 840.126 and 35 IAC 811.314. Cover construction was completed in October 2012.

Groundwater quality has been monitored at the Site since 1996. The Closure Plan included a summary of the groundwater quality at the Site as of 2009 and a revised Groundwater Monitoring Plan that outlined a schedule for monitoring five field and 24 laboratory parameters at 12 groundwater monitoring wells (**Tables 1-1, 1-2, and 1-3, Figure 1-1**). The new Groundwater Monitoring Plan was implemented in March 2011 with existing groundwater monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-8, and MW-9). In accordance with the approved Closure Plan, additional groundwater monitoring wells were installed in July 2011 (MW-2D, MW-3D, MW-6D, MW-10, MW-11, and MW-11D) and included in the Groundwater Monitoring Plan. In 2019, IEPA approved a request to change the groundwater monitoring schedule from quarterly to semi-annually and to cease monitoring for beryllium, mercury, and thallium in accordance with the Groundwater Monitoring Plan. Recommendations presented in both the 2020 and 2021 Annual Reports included plans to cease monitoring for lead and selenium in accordance with the Groundwater Monitoring Plan. We request written concurrence to ceasing monitoring for lead and selenium.

This 2023 Annual Report is submitted per Section 5.4 of the Closure Plan and includes a review of the post-closure groundwater quality at the Site to provide an overview of the effectiveness of the cover system in improving groundwater quality downgradient from Ash Ponds 2 & 3. This report also includes the following Groundwater Monitoring Plan compliance elements:

- A summary of groundwater monitoring data collected during August 2020 through August 2023 Data collected from 2020 to 2022 were included, in addition to data collected in 2023, for completeness because they are used in the statistical analysis of groundwater quality data. Data tables are included in **Appendix A**.
- Short term trend analysis results per Section 3.4 of the Closure Plan.
- Groundwater monitoring field data worksheets which note descriptions of any maintenance or replacement activities performed (**Appendix B**).
- Final cover site inspection reports and a description of any maintenance activities performed on the cover (**Appendix C**).

1.2 Post-Closure Overview – 2012 to 2023

Groundwater quality data since completion of pond closure in 2012 were reviewed to assess the overall condition of the groundwater and the performance of the cover system. This review was performed independently from the compliance evaluations required by the Closure Plan presented

in this report, which are focused on specific compliance criteria. This review is intended as a broad view of groundwater quality over time since closure.

1.2.1 Summary of Cover System Construction and Maintenance

As part of closure activities, Ameren removed all standing surface waters from Ash Ponds 2 & 3 and a geosynthetic cover was constructed to provide a barrier to infiltration and subsequent generation and release of leachate from the ponds (NRT, 2011). The cover system consists of (from bottom up) a 40-mil geomembrane; a geocomposite drainage layer constructed of a geonet encapsulated in geotextile; and a 3-foot thick protective soil layer placed over re-graded ash in the ponds. The geocomposite was provided to drain surface water that infiltrates the protective soil layer. Storm water precipitation is routed away from the cover system toward two low areas at the north and south ends of the cover, then pumped over the levee to the Mississippi River. The cover is graded such that there is no off-site contribution, or run-on, of storm water from areas outside of the ash ponds.

Inspections of the cover system are performed on a quarterly schedule. Routine maintenance activities are performed at the Site, as needed and as soon as practicable after issues are identified, and include recontouring the ground surface, repairing drainage channels, repairing and replacing lining material, revegetating areas, and removing woody vegetation. Maintenance activities can be found in more detail in the Closure Plan.

1.2.2 Summary of 2012 to 2023 Groundwater Quality Data Review

Appendix C of the Closure Plan identified boron as the primary indicator constituent for coal ash impacts to groundwater at the Site. As such, boron was selected for this groundwater quality data review. Dissolved boron concentrations over time from closure completion (2012) to the present are presented in **Figures 1-2 to 1-7**. Best fit linear regression lines are included in the figures to provide a convenient means of evaluating general concentration patterns since closure. It should be noted that the regression lines are not equivalent to the statistical trends discussed in the groundwater compliance section of this report.

Generally, dissolved boron concentrations in most compliance monitoring wells have decreased since 2012. Since completion of closure in 2012, several decreasing trends for various analytical parameters were identified and are discussed in **Section 3.3** and summarized on **Tables 3-1 and 3-2**.

1.2.3 Conclusion

The decreasing dissolved boron concentrations in the majority of compliance monitoring wells across the Site is a strong indication that the cover system is functioning to improve overall groundwater quality beneath the ponds. This observation is consistent with the results of groundwater modeling performed in 2010 to simulate changes in groundwater quality resulting from pond closure. Modeling results suggested that dissolved boron concentrations in all monitoring wells would stabilize at levels below the Class I Groundwater Standard within 14 to 20 years, with the exception of on-site well MW-6, where dissolved boron concentrations were predicted to persist for a longer time period.

2. GROUNDWATER MONITORING PLAN COMPLIANCE

2.1 Applicable Groundwater Quality Standards

As described in Section 3.3 of the Closure Plan:

- On-site, prior to the completion of the post-closure care period, the applicable groundwater quality standards at Ash Ponds 2 & 3 are the concentrations as determined by groundwater monitoring if such concentrations exceed the Class I Groundwater Standards.
- After completion of the post-closure care period, the on-site concentrations of contaminants from Ash Ponds 2 & 3 as determined by groundwater monitoring, are the applicable groundwater standards, if such concentrations exceed the Class I Groundwater Standards, and if:
  - To the extent practicable, the exceedance has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned on site.
  - Any threat to public health or the environment on-site has been minimized.
  - An institutional control prohibiting potable uses of groundwater is placed on the Former Venice Power Plant site in accordance with the Uniform Environmental Covenants Act [765 Illinois Compiled Statutes (ILCS) 122] or an alternative instrument authorized for environmental uses under Illinois law and approved by IEPA is in effect. Existing potable uses of groundwater may be preserved as long as such uses are consistent with human consumption in accordance with accepted water supply principles.

Off-site standards were not proposed because: 1) Ameren did not receive permission from the adjacent property owner to monitor groundwater on that property; 2) the ponds have been covered, which minimizes exceedances of groundwater quality standards to the extent practical; 3) there are no groundwater receptors in this area; and 4) there is a groundwater restriction ordinance in effect for this area.

2.2 Demonstration of Compliance

As described in Section 3.4 of the Closure Plan:

- Compliance with on-site groundwater quality standards will be achieved when no statistically significant increasing trend that can be attributed to Ash Ponds 2 & 3 is detected in the concentrations of all constituents monitored at the downgradient boundaries of the Site for four consecutive years after changing to an annual monitoring frequency (**Table 1-1**).
- If the Sen's non-parametric estimate of slope shows a positive slope at any compliance monitoring well located at the downgradient boundaries of the Site GMZ as specified in **Table 1-2**, for any parameter (**Table 1-3**) a Mann-Kendall test will be performed at 95 percent confidence to determine whether the positive slope represents a statistically significant increasing trend. If a statistically significant increasing trend is identified, Ameren will take action as described below, and initiate more frequent inspection of the surface of the cover system and evaluation of background concentrations.
  - If the statistically significant increasing trend can be attributed to a superseding cause, Ameren will notify IEPA in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.

  - If there is no superseding cause for the statistically significant increasing trend and sampling frequency is semi-annual or annual sampling, a quarterly sampling schedule will be reestablished. After four consecutive quarterly samples show no statistically significant increasing trend, the frequency of groundwater monitoring will return to either semi-annual or annual, whichever frequency was utilized prior to the return to quarterly sampling.
  - Notifications concerning statistically significant increasing trends and revisions of the sampling frequency will be reported to IEPA in writing within 30 days after making the determinations.
- If a statistically significant increasing trend is observed to continue over a period of two or more consecutive years and there are no superseding causes for the trend, then Ameren will perform the following:
  - a hydrogeologic investigation; and
  - additional site investigation, if necessary.

Based on the outcome of the investigation above, Ameren may take action to mitigate statistically significant increasing trends. Such actions will be proposed as a modification to the Post-Closure Care Plan within 180 days after completion of the investigation activities described above.

3. DATA ANALYSIS

3.1 Groundwater Flow

Groundwater elevation contours and flow directions for the two semi-annual monitoring events which occurred in January 2023 and August 2023 are illustrated in **Figure 3-1** and **Figure 3-2**, respectively. Groundwater was encountered in shallow monitoring wells at elevations between approximately 384 to 388 feet North American Vertical Datum of 1988 (NAVD88) on January 24, 2023 (**Figure 3-1**) and 384 to 391 feet NAVD88 on August 31, 2023 (**Figure 3-2**). Groundwater elevations and flow directions in the vicinity of the Site are controlled by the Mississippi River, where water levels within the uppermost aquifer rise and fall with river stage. Monitoring well MW-3 was dry on January 24, 2023 and August 31, 2023 when river elevation was low. Groundwater elevation was estimated to be below the base of the well screen at MW-3 (less than 386.6 feet NAVD88), and groundwater elevation contours in the vicinity of MW-3 were inferred as illustrated on **Figure 3-1** and **Figure 3-2** for January 2023 and August 2023, respectively. Groundwater flow directions in January 2023 and August 2023 were generally northwest to southwest (toward the Mississippi River), and horizontal hydraulic gradients were approximately 0.002 feet/foot and 0.003 feet/foot, respectively. This is the predominant flow pattern during most of the year. During periods of high river stage, groundwater flow reversals can occur with groundwater flow away from the river, however, flow reversals were not observed during the January 2023 and August 2023 semi-annual monitoring events.

3.2 Review of Analytical Data

This report includes specific discussion of the analytical data for the most recent eight monitoring events to provide a basis for statistical analyses required for the compliance evaluation. All laboratory analytical results are tabulated in **Appendix A** for groundwater samples collected on March 10, 2020; September 8, 2020; March 1, 2021/ April 19, 2021; September 14, 2021/November 2, 2021/December 13, 2021; March 15, 2022/March 28, 2022; August 15, 2022/November 2, 2022; January 24, 2023/March 6, 2023; and August 31, 2023, the most recent eight groundwater monitoring events used to calculate groundwater quality trends for evaluation of compliance with related closure plan requirements. The field data for 2023 are found in **Appendix B** (field data for previous groundwater monitoring events were presented in previous Annual Reports). Sampling anomalies in 2023, such as wells that were dry, had water levels too low for sampling, or were not sampled during a sampling event for other reasons, are noted below (sampling anomalies for previous groundwater monitoring events were presented in previous Annual Reports):

- MW-2, MW-3, and MW-11 were not sampled in January 2023 due to the wells being dry or water levels too low for sampling. Sampling at MW-2, MW-3, and MW-11 was performed on March 6, 2023.
- MW-2 was not sampled in August 2023 due to water levels too low for sampling.
- MW-3 was not sampled in August 2023 due to the well being dry.
- Boron, chromium, iron, and zinc detections were observed in the field blanks during the January/March 2023 sampling event. All sample concentrations of boron were ten times greater than the field blank concentrations thus were not qualified. Chromium, iron, and zinc sample concentrations were all qualified as biased high. Chloride, sulfate, and zinc detections were observed in the field blanks in the August 2023 sampling event. All sample

concentrations of chloride and sulfate were ten times greater than the field blank concentrations thus were not qualified. Zinc sample concentrations were all qualified as biased high. Ameren is investigating the cause and will work to lower detections in the field blanks for the subsequent sampling events.

Select monitored parameters are discussed below.

- Boron was identified as the primary indicator constituent for coal ash impacts to groundwater at the Site (see Appendix C of the Closure Plan). In the 2020 - 2023 monitoring period, dissolved boron concentrations ranged from 0.13 to 5.08 milligrams per liter (mg/L) in shallow compliance monitoring wells, except in MW-10 where dissolved boron concentrations ranged from 12.42 to 17.06 mg/L (**Figure 3-3**). In deep monitoring wells, dissolved boron concentrations ranged from 0.37 to 14 mg/L (**Figure 3-3**). As discussed in **Sections 1.2.2 and 1.2.3**, dissolved boron concentrations have decreased in the majority of compliance monitoring wells across the Site since closure. During the current monitoring period, dissolved boron concentrations are continuing to decrease in the majority of compliance wells from concentrations observed prior to closure indicating that the cover system is functioning to improve overall groundwater quality beneath the ponds.
- Chloride is not a coal ash indicator constituent. It is noted here because increasing concentration trends for dissolved chloride were observed in some monitoring wells, and it has historically had, and continues to have, relatively higher concentrations (but still below the Class I Groundwater Standard of 200 mg/L) in background monitoring wells MW-8 and MW-9 than in the compliance monitoring wells (**Figure 3-4**).
- Sulfate can be an indicator constituent for coal ash; however, there are other anthropogenic sources for elevated sulfate concentrations in groundwater, and sulfate concentrations can decrease in groundwater under strongly reducing conditions. For these reasons, sulfate is a less reliable indicator for coal ash impacts than boron. As in past monitoring periods, dissolved sulfate concentrations at the Ash Ponds 2 & 3 were highest at MW-6D, MW-10, and MW-11D (**Figure 3-5**) during the 2020 - 2023 monitoring period, where dissolved boron concentrations were also highest. However, there are also differences between the spatial distribution of dissolved sulfate concentrations and dissolved boron concentrations at the Site. For example, MW-6 had a median dissolved boron concentration of 4.80 mg/L (above the Class I Groundwater Standard for boron of 2.0 mg/L), suggesting coal ash impacts, even though the median dissolved sulfate concentration was at 13.0 mg/L (below the Class I Groundwater Standard for sulfate of 400 mg/L). Conversely, background monitoring wells MW-8 and MW-9 had low dissolved boron concentrations (median concentrations of 0.784 mg/L and 0.619 mg/L, respectively, below the Class I Groundwater Standard for boron), yet dissolved sulfate concentrations were similar to or higher than some of the wells which had elevated boron concentrations (i.e., wells MW-2, MW-2D, MW-3D, MW-5, and MW-6). Due to these differences, which are consistent with previous monitoring periods, boron appears to be a more reliable indicator of coal ash constituents in groundwater and will, therefore, continue to be used as the primary indicator constituent for Ash Ponds 2 & 3.

3.3 Statistical Analysis

Analytical data were evaluated to identify short-term (compliance) data trends in the 2020 - 2023 dataset. Trends were evaluated following a three-step procedure:

- Test for outliers using the Grubbs outlier test as described in **Section 3.3.1**.
- Determine Sen's estimate of slope (in accordance with Section 3.4 of the Closure Plan).
- Perform a Mann-Kendall trend analysis for any cases (monitoring well/constituent) with a positive Sen's estimate of slope (in accordance with Section 3.4 of the Closure Plan).

3.3.1 Outlier Analysis

The Grubbs outlier test determines whether there is a high or low observation that differs statistically from the other data based upon the parameters of the test, including the presumption that the data are normally distributed. The test methodology and results are listed in **Appendix D**.

The Grubbs test provides statistical evidence of potential outliers, but cannot be used alone to determine whether or not a value is a true outlier that should be excluded from future statistical analysis. Corroborating evidence needed to exclude values includes a discrete data reporting or analytical error, or potential laboratory bias. Absent corroborating evidence, the flagged values are considered true but extreme values in the data set.

Outliers identified by the Grubbs outlier test based on the date range of 1996 - 2023 were considered for elimination from further statistical analysis. Ultimately, no new outliers were eliminated from statistical analysis.

3.3.2 Sen's Estimate of Slope

Sen's estimate of slope is a non-parametric estimator of trend. It is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed. The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar time. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect values. The test methodology is listed in **Appendix D**.

Data collected within the 2020 - 2023 monitoring period (most recent eight monitoring events) show 35 cases with positive slopes, 28 cases with negative slopes, and 189 cases with no slope (**Table 3-1**). The 35 cases with positive slopes were tested using the Mann-Kendall test (described in **Section 3.3.3**) to determine if the positive slopes represented statistically significant short-term (2020 - 2023) increasing trends.

3.3.3 Mann-Kendall Trend Analysis

The Mann-Kendall test is a non-parametric, one-tailed test to determine whether a dataset has a statistically significant increasing or decreasing trend. The test methodology is in **Appendix D**. Increasing short-term (compliance) trends are identified in **Tables 3-1 and 3-2**.

The Mann-Kendall test detected 16 cases of short-term increasing trends in the 2020 - 2023 dataset. The increasing short-term trends occurred for boron (MW-2, MW-2D, MW-3), chloride (MW-3D), iron (MW-2, MW-6, MW-6D, MW-11D), manganese (MW-2D, MW-6, MW-11, MW-11D), sulfate (MW-2D) and total dissolved solids (TDS) (MW-2D, MW-3, MW-6D). Of these identified short-term trends, boron (MW-2, MW-2D), iron (MW-11D), manganese (MW-2, MW-6, MW-11D), and total dissolved solids (TDS) (MW-2D, MW-6D) represent trends observed to continue over a

period of two or more consecutive years. The trends observed to continue over a period of two or more consecutive years were evaluated to determine whether they could be attributed to superseding causes (**Section 4**).

3.4 Groundwater Monitoring System Maintenance and Inspection

The monitoring wells were inspected during each sampling event of 2023. Groundwater monitoring field data worksheets which contain inspection records for 2023 are included in **Appendix B**.

3.5 Cover Inspection and Maintenance

Fly Ash Pond Final Cover Inspection Reports (**Appendix C**) are shared with the Venice plant by Ameren upon completion. The plant responds promptly to correct issues (if any) as they are reported. No issues were reported during the 2023 quarterly cover inspections.

4. EVALUATION OF COMPLIANCE

Most increasing short-term trends as identified in **Section 3.3.3** and in **Table 3-1** for the most recent eight monitoring events (2020 - 2023) were either first-time or non-consecutive occurrences and likely do not indicate a potential release from Ash Ponds 2 & 3. The exceptions are the short-term boron trends at MW-2 and MW-2D, iron trend at MW-11D, manganese trends at MW-2, MW-6 and MW-11D, and TDS trends at MW-2D and MW-6D, which represent the second occurrence of a short-term trend. The consecutive occurrences of short-term increasing trends are further evaluated in **Section 4.1**.

4.1 Indicator Parameter: Boron at MW-2 and MW-2D

As mentioned in **Section 3.1**, groundwater elevations and flow directions in the vicinity of the Site are controlled by the Mississippi River. Sustained periods of high river stage combined with potential fluctuations in groundwater flow directions at the Site may cause river water to influence groundwater at the Site by temporarily reducing concentrations of monitored parameters at the groundwater monitoring wells and increasing Site groundwater elevations. Elevated river stage may also have an impact on groundwater quality by raising groundwater levels across the Site and resaturating fly ash at the base of the former ponds as described in the Closure Plan (NRT, 2011). When the river stage decreases following these sustained periods of high river stage, the groundwater elevation lowers, normal groundwater flow directions are reestablished, and concentrations of monitored parameters may temporarily increase as a result of additional leachate from areas of resaturated ash slowly migrating vertically and horizontally through the monitoring system. The relationship between the river stage and increasing short-term trends at the Site is illustrated in **Figures 4-1 to 4-3**. For example, **Figures 4-1 and 4-2** show sustained high river stage events from August 2018 through September 2020, which may have caused an influx of river water to the monitoring system followed by reductions in the concentrations of dissolved boron at wells MW-2, MW-2D (**Figure 4-3**), which are located nearest to the Mississippi River. River stage subsequently decreased (**Figures 4-1 and 4-2**), and leachate from potentially resaturated ash may have migrated through the monitoring system causing increased concentrations of dissolved boron triggering a statistically significant short-term trend. A similar pattern of dissolved boron concentration reductions at MW-2 following a period of high river stage is apparent from December 1998 through July 1999 and from June 2001 through January 2003 (**Figures 4-1 and 4-3 to 4-6**). Subsequent increases in dissolved boron concentrations are also apparent following these time periods. Groundwater monitoring at MW-2D did not begin until 2012, so dissolved boron concentration patterns in this timeframe are unknown, but dissolved boron concentrations at MW-2D have trended with those at MW-2 since 2012.

The Base Case modeling results as presented in the Closure Plan (NRT, 2011) included a limited area where ash could resaturate as a result of seasonal highs in river stage, as a result, model predictions indicated that dissolved boron concentrations in all monitoring wells would stabilize at levels below the Class I Groundwater Standard within 14 to 20 years, with the exception of on-site well MW-6, where dissolved boron concentrations were predicted to persist for a longer time period. A conservative simulation was also completed as part of the modeling effort for the Closure Plan, which included the entire footprint of Ash Ponds 2 & 3 as susceptible to resaturation of ash during seasonal highs in river stage. The results of the conservative simulation were similar to the Base Case with the following exception: concentrations in MW-2 and MW-3

(downgradient, between the levee and ponds) stabilize around 4 to 5 mg/L. This suggests that if extent of ash resaturation during periods of high river stage is greater than that assumed for the Base Case, Class I exceedances may persist west of the ash ponds. Observations since modeling was completed indicate conditions in between the Base Case and conservative simulations, where dissolved boron concentrations at MW-2 and MW-2D decrease over the long-term as predicted by the modeled Base Case scenario and observed since closure in 2012 (**Section 1.2.2**), but may experience short-term increases that stabilize near 4 to 5 mg/L following a period of high river stage that potentially resaturate larger areas of ash within Ash Ponds 2 & 3 than originally predicted in the modeled Base Case.

Although, increasing short-term trends were observed, dissolved boron concentrations in all compliance monitoring wells have decreased or stabilized since completion of closure in 2012 as discussed in **Section 1.2.2**.

4.2 Non-Indicator Parameters

As discussed in **Section 4.1**, changes in river stage may influence dissolved metal concentrations in groundwater. Just as boron at wells MW-2 and MW-2D decreased during the sustained high river stage from August 2018 through September 2020 (**Figure 4-1 and 4-2**), and then increased following the decreases in river stage, dissolved iron concentrations at well MW-11D; dissolved manganese concentrations at wells MW-2, MW-6, and MW-11D; and TDS at wells MW-2D and MW-6D also exhibited a similar pattern (**Figures 4-4 to 4-6**).

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Statistical analyses of analytical results for the eight rounds of groundwater samples collected between 2020 to 2023 identified eight cases of increasing trends that recurred over a period of two or more consecutive years, including:

- Boron in MW-2 and MW-2D;
- Iron in MW-11D;
- Manganese in MW-2, MW-6, and MW-11D; and
- TDS in MW-2D and MW-6D.

As discussed in **Section 4**, the cases of reoccurring increasing trends are related to the river stage decreasing following sustained periods of high river stage. Observations since groundwater modeling was completed for the Closure Plan (NRT, 2011) indicate concentrations continue to decrease over the long-term as predicted, but may experience short-term increases following changes in river stage.

5.2 Recommendations

In accordance with Section 3.4 of the Closure Plan, the semi-annual sampling schedule should be continued.

Per Section 3.2.1 of the Closure Plan (Monitoring Parameters), any constituent that is not detectable at the reporting level (RL) or practical quantitation limit (PQL) in the downgradient wells for four consecutive quarters may be removed from the monitoring program in both the upgradient and downgradient wells. As recommended in Section 5.2 of the 2020 Annual Report, lead and selenium have been detected at or below the method detection limit (MDL) and, therefore, were detected below the RL/PQL for four consecutive sampling events. As of the 2022 Annual Report, concentrations continue to be low for selenium and lead at upgradient and downgradient wells. Recommendations presented in the 2020, 2021, and 2022 Annual Reports included plans to cease monitoring for lead and selenium in accordance with the Groundwater Monitoring Plan. We request written concurrence for ceasing monitoring for lead and selenium.

6. REFERENCES

Natural Resource Technology, Inc. (2011). *Closure Plan, Venice Power Plant Ash Ponds 2 & 3,* dated February 4, 2011 and revised on March 25, 2011.

United States Geological Survey [USGS], (2023). National Water Information System data available on the World Wide Web (USGS 07010000 Mississippi River at St. Louis, MO), accessed [December 26, 2023], at URL [https://waterdata.usgs.gov/nwis/uv?site_no=07010000&legacy=1.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2023 Annual Report
Former Venice Power Plant - Ash Ponds 2 & 3

Frequency	Duration
Quarterly	Begins: March 2011
	Ends: 5 years after completion of cap and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied.
	Ends: 5 years after initiation of semiannual monitoring and upon demonstration that monitoring effectiveness is not compromised and that there are no increasing trends attributable to the Venice ash ponds.
Annual	Begins: after IEPA approves that semiannual monitoring requirements have been satisfied.
	Ends: 4 consecutive years after initiation of annual monitoring if no increasing trends can be attributed to Venice Ash Ponds is detected in the concentrations of all constituents monitored at the downgradient boundaries of the Site and upon IEPA approval of a certified post-closure care report.

[O: SJC, C: YAD 3/9/18, U: RAB 11/20/2020]

Table 1-2. Groundwater Monitoring System Wells
2023 Annual Report
Former Venice Power Plant - Ash Ponds 2 & 3

Monitoring Well	Latitude	Longitude	Date Drilled	Surface Elevation (ft.)	Top of Well Casing Elevation (ft.)	Top of Screen Elevation (ft.)	Bottom of Screen Elevation (ft.)	Objective
MW-2	38-39-12.84	90-10-28.39	4/15/1996	412.75	412.31	394	384	Compliance
MW-2D	38-39-12.83	90-10-29.09	7/21/2011	412.61	412.36	370	365	Compliance
MW-3	38-39-03.34	90-10-30.00	4/15/1996	411.41	410.91	397	387	Compliance
MW-3D	38-39-03.40	90-10-30.00	7/20/2011	411.70	411.48	370	365	Compliance
MW-5	38-39-08.97	90-10-11.93	10/14/1997	433.16	432.93	394	384	Compliance
MW-6	38-39-02.24	90-10-18.17	10/15/1997	433.56	433.09	392	382	Compliance
MW-6D	38-39-02.24	90-10-18.09	7/19/2011	433.85	433.55	370	365	Compliance
MW-8	38-39-14.68	90-10-08.46	7/2/1999	416.50	416.27	383	373	Background
MW-9	39-39-27.23	90-10-15.93	7/2/1999	413.65	413.40	382	372	Background
MW-10	38-39-34.84	90-10-33.78	7/21/2011	422.11	424.99	391	381	Compliance
MW-11	38-39-22.64	90-10-32.25	7/22/2011	413.04	412.74	394	384	Compliance
MW-11D	38-39-22.58	90-10-32.24	7/22/2011	412.84	412.50	369	364	Compliance

[O: SJC, C: YAD 3/9/18]

Note:
Surface and well casing elevations based on survey of July 2012, vertical datum is NAVD 1988.

Table 1-3. Groundwater Monitoring Program Parameters
2023 Annual Report
Former Venice Power Plant - Ash Ponds 2 & 3

Field Parameters	Method
pH	SM, 22nd Edition, Method 4500-H+ B
Specific conductance	SM, 22nd Edition, Method 2510
Temperature	SM, 22nd Edition, Method 4500-H+ B
Water level	--
Well depth	--
Laboratory Parameters	**Method**
Antimony	EPA 200.8
Arsenic	EPA 200.8
Barium	EPA 200.8
Beryllium[1]	--
Boron	SM, 22nd Edition, Method 3120 B
Cadmium	EPA 200.8
Chloride	SM, 22nd Edition, Method 4110 B
Chromium	EPA 200.8
Cobalt	EPA 200.8
Copper	EPA 200.8
Cyanide	Lachat 10-204-00-1-X
Fluoride	SM, 22nd Edition, Method 4110 B
Iron	SM, 22nd Edition, Method 3120 B
Lead	EPA 200.8
Manganese	SM, 22nd Edition, Method 3120 B
Mercury[1]	--
Nickel	EPA 200.8
Nitrate as N	SM, 22nd Edition, Method 4110 B
Selenium	EPA 200.8
Silver	EPA 200.8
Sulfate	SM, 22nd Edition, Method 4110 B
Thallium[1]	--
Total Dissolved Solids	SM, 22nd Edition, Method 2540 C
Zinc	EPA 200.8

[O: SJC, C: YAD 3/9/18, U: RAB 12/20/22, C: KLT 12/20/22]

Notes:

[1] Eliminated from the monitoring program June 5, 2019 by IEPA approval.

Table 3-1. Trend Analysis Results
2023 Annual Report
Former Venice Power Plant - Ash Ponds 2 & 3

	MW-2	MW-2D	MW-3	MW-3D	MW-5	MW-6	MW-6D	MW-8	MW-9	MW-10	MW-11	MW-11D
Number of Samples	7	8	5	8	8	8	8	8	8	8	8	9
Antimony, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Arsenic, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Barium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Boron, dissolved	increase	increase	increase	+	none	-	decrease	none	none	-	+	+
Cadmium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Chloride, dissolved	-	decrease	-	increase	decrease	+	-	-	-	+	+	-
Chromium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Cobalt, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Copper, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Cyanide, total	none	none	none	none	none	none	none	none	none	none	none	none
Fluoride, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Iron, dissolved	increase	+	none	decrease	none	increase	increase	none	+	-	none	increase
Lead, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Manganese, dissolved	+	increase	none	none	-	increase	none	none	none	-	increase	increase
Nickel, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Nitrate nitrogen, dissolved	decrease	none	+	none	none	none	none	decrease	none	+	none	none
Selenium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Silver, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Sulfate, dissolved	-	increase	+	-	decrease	none	-	decrease	+	-	-	+
Total Dissolved Solids	+	increase	increase	decrease	-	+	increase	-	+	+	-	+
Zinc, dissolved	none	none	none	none	none	none	none	none	none	none	none	none

[O: RAB 11/16/23, C: KLT 11/29/23]

Notes:
- "+" indicates that the Sen's non-parametric estimate of the median slope is positive.
- "-" indicates that the Sen's non-parametric estimate of the median slope is negative.
- "decrease" indicates a statistically significant decreasing trend
- "increase" indicates a statistically significant increasing trend
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- Well MW-2 was dry on August 31, 2023.
- Well MW-3 was dry on September 8, 2020, August 15, 2022, and August 31, 2023.
- Sampling events from 3/10/2020-8/31/2023 were used for analysis.

Table 3-2. Summary of Trend Analyses
2023 Annual Report
Former Venice Power Plant - Ash Ponds 2 & 3

Reporting Date	Short-Term Increasing Trends	Long-Term Decreasing Trends
2012	15	-
2013	14	-
2014	6	-
2015	1	-
2016	20	-
2017	10	-
2018	2	-
2019	3	-
2020	11	-
2021	3	-
2022	10	-
2023	16	21

[O: RAB 11/16/23, C: KLT 11/29/23]

Notes:
Short-term trends were calculated on the basis of eight consecutive sampling events.
Long-terms trends were calculated with data since completion of closure in 2012.

FIGURES

MONITORING WELL LOCATION

GROUNDWATER MANAGEMENT ZONE

0 150 300 Feet

SITE MAP

FIGURE 1-1

2023 ANNUAL REPORT FORMER VENICE POWER PLANT ASH PONDS 2 & 3

AMEREN MISSOURI
VENICE, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

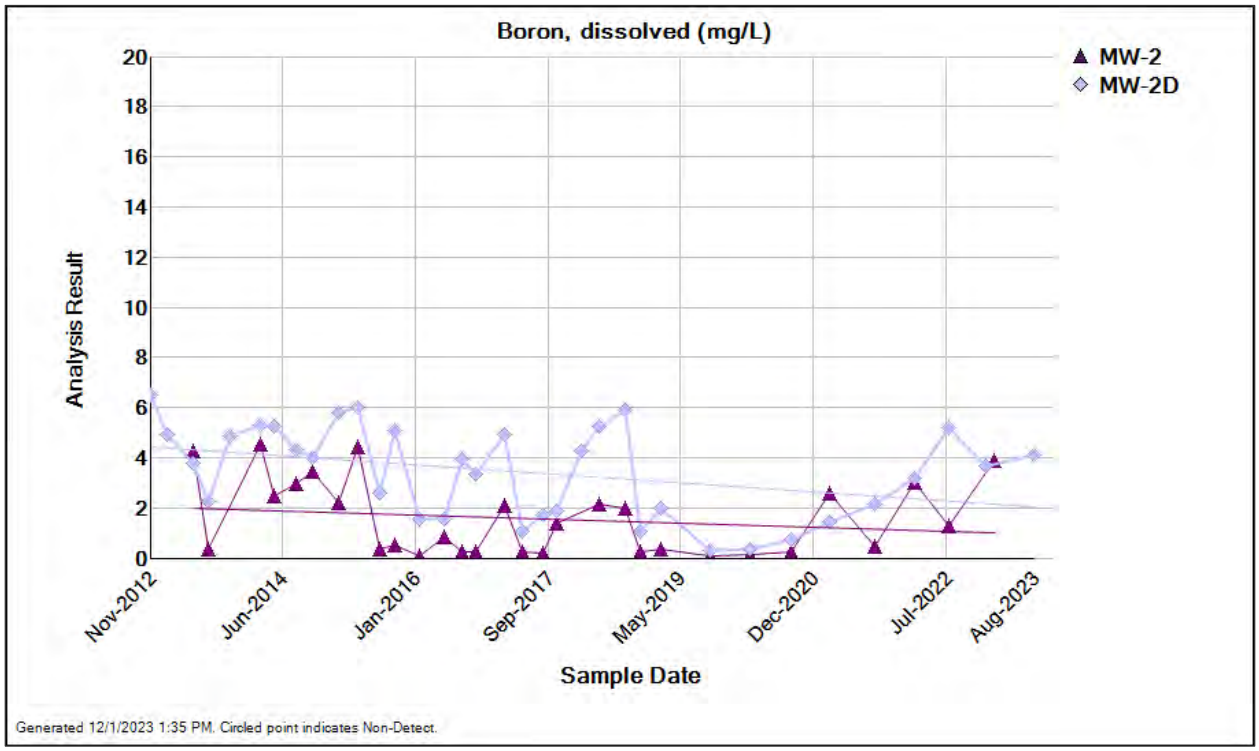


Figure 1-2. Boron concentrations over time since closure completion (2012) at compliance wells MW-2 and MW-2D.

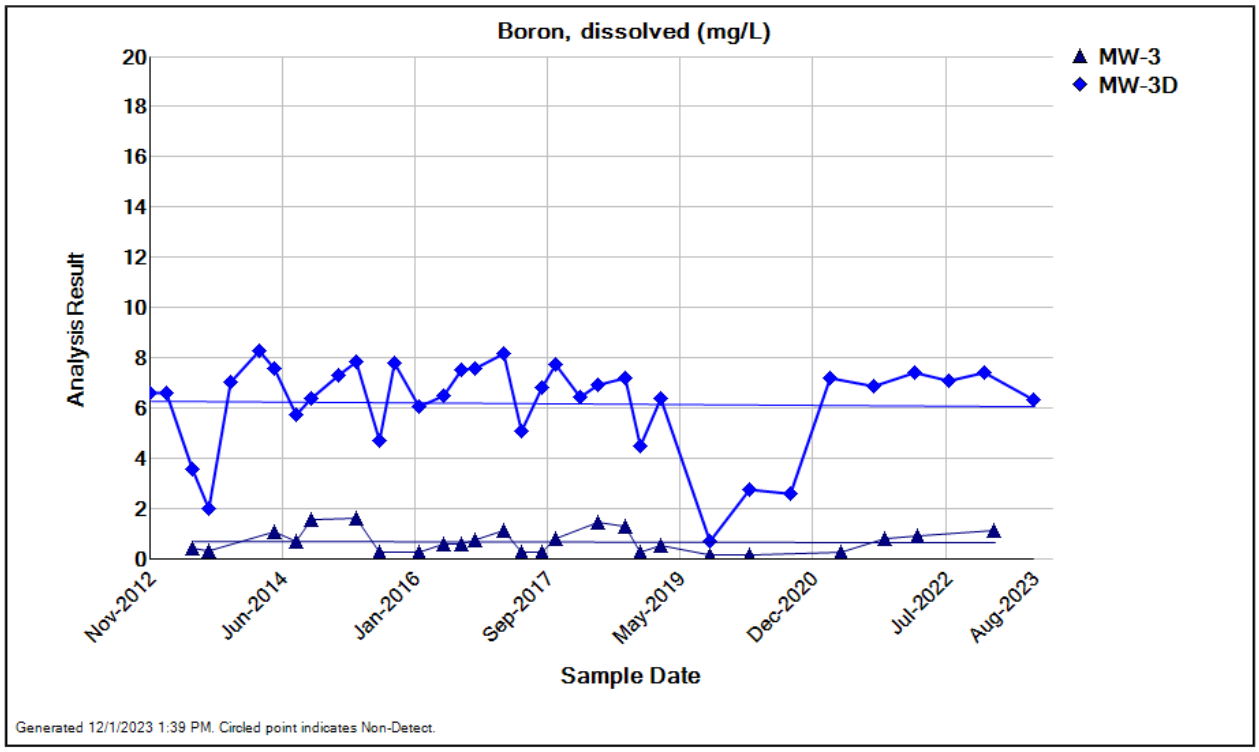


Figure 1-3. Boron concentrations over time since closure completion (2012) at compliance wells MW-3 and MW-3D.

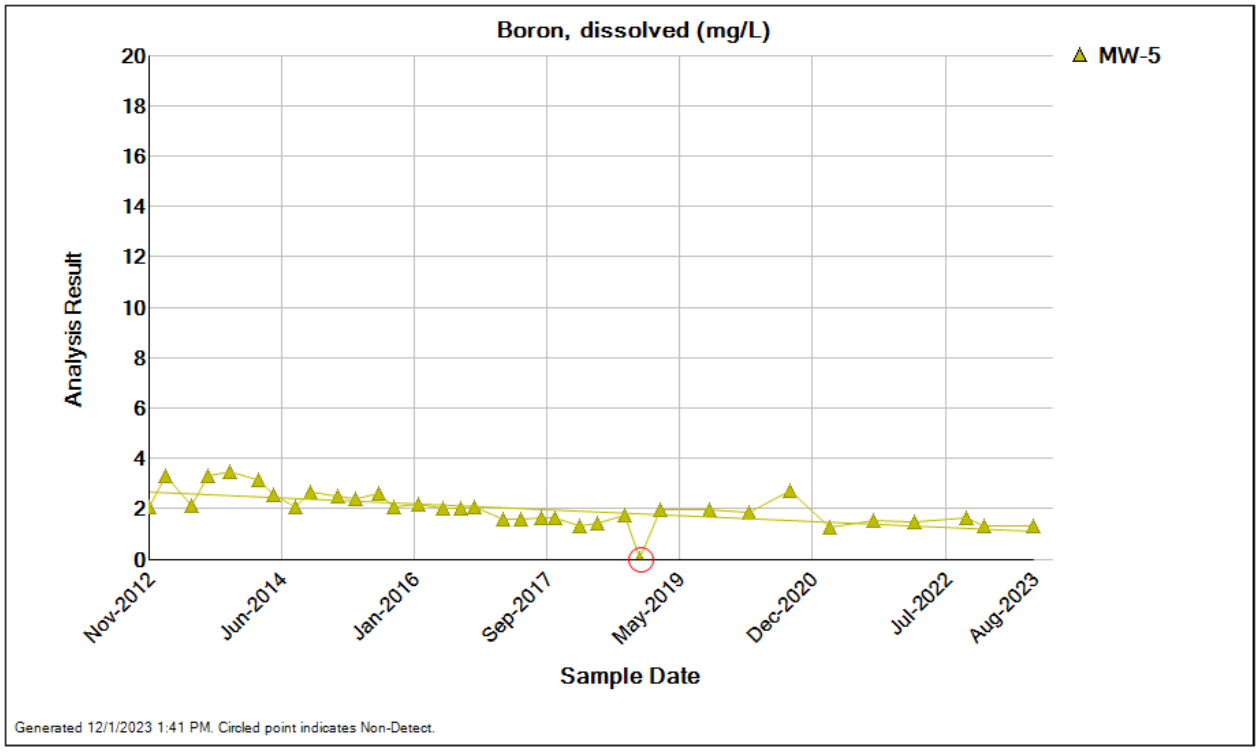


Figure 1-4. Boron concentrations over time since closure completion (2012) at compliance well MW-5.

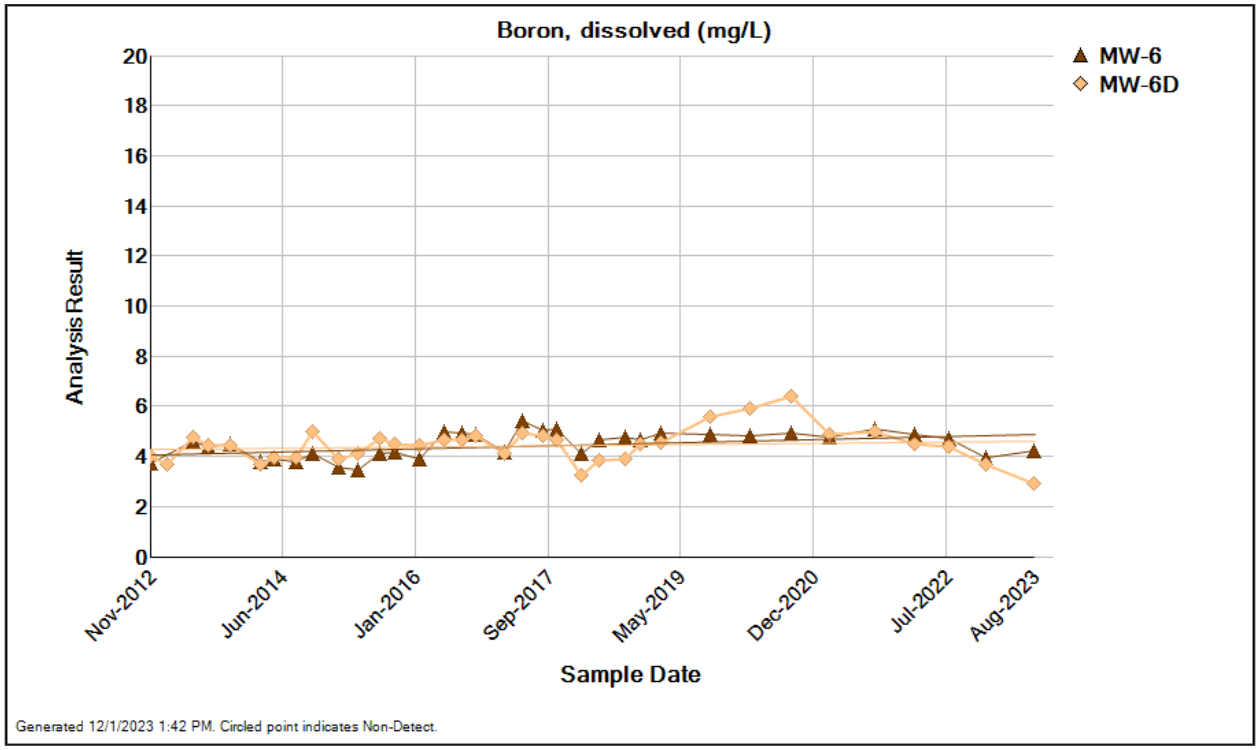


Figure 1-5. Boron concentrations over time since closure completion (2012) at compliance well MW-6 and MW-6D.

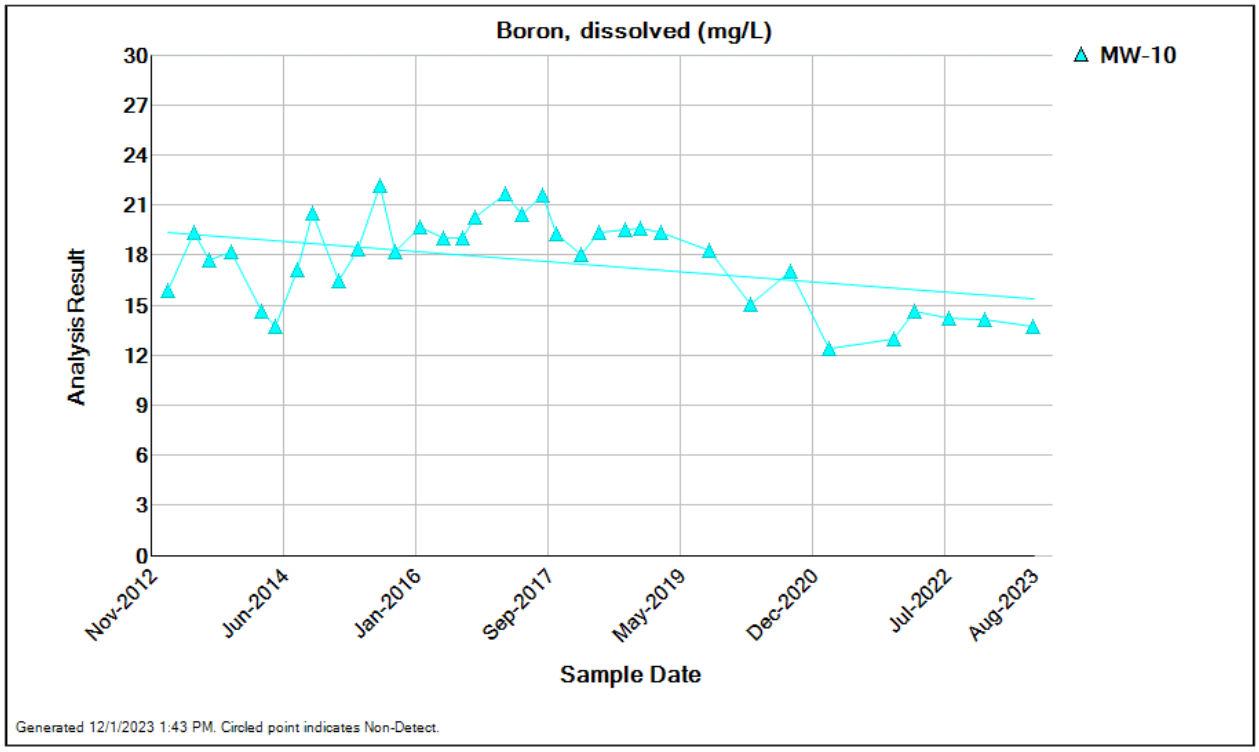


Figure 1-6. Boron concentrations over time since closure completion (2012) at compliance well MW-10.

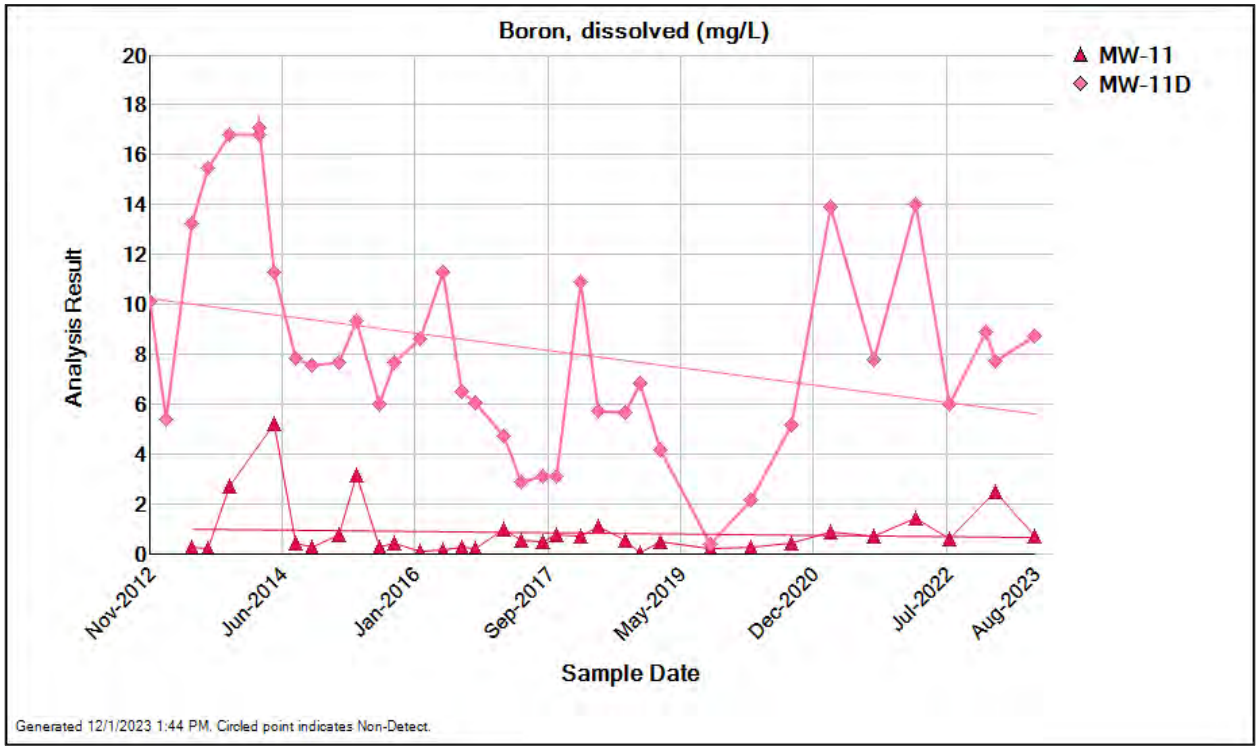
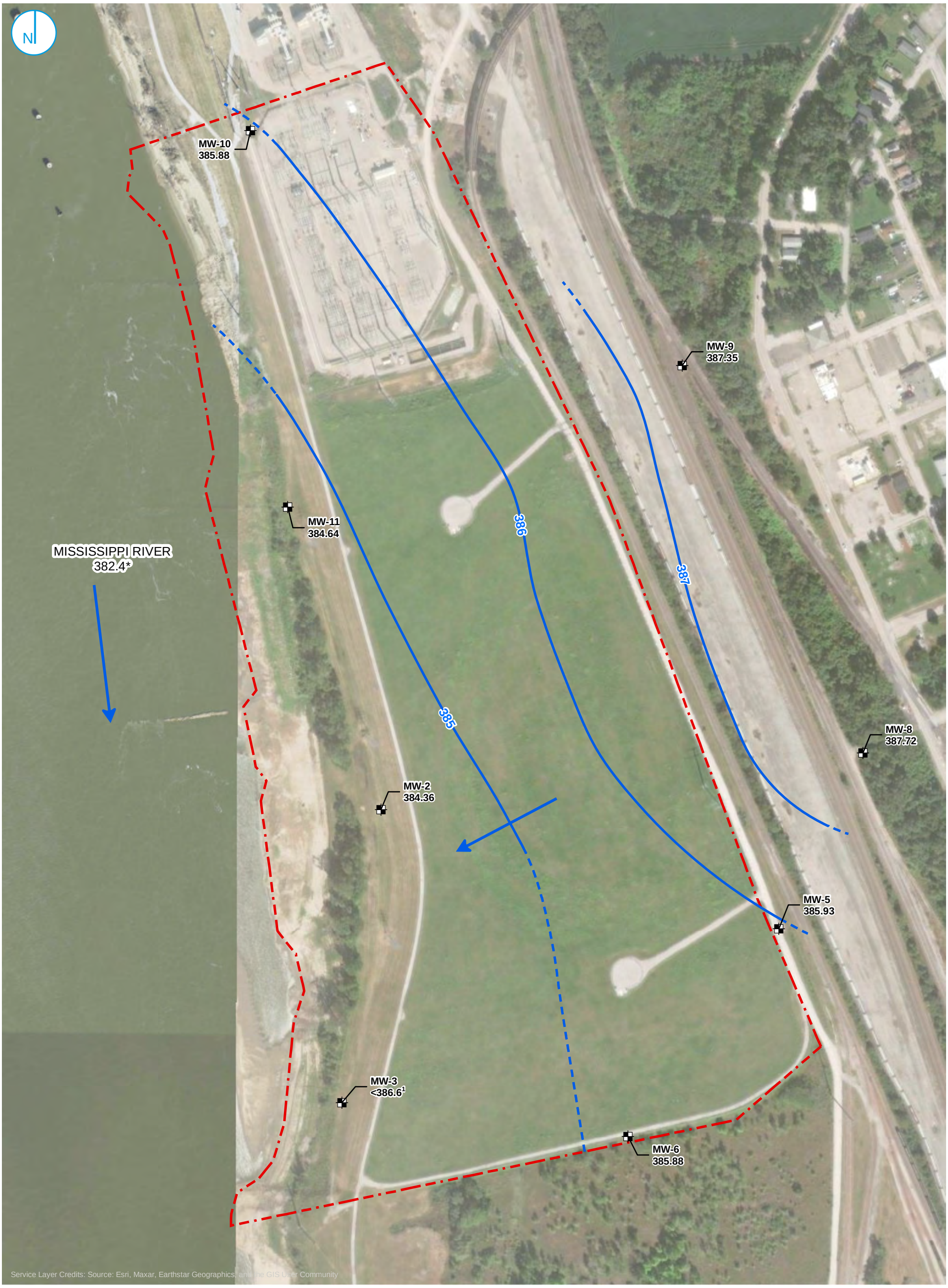


Figure 1-7. Boron concentrations over time since closure completion (2012) at compliance wells MW-11 and MW-11D.



MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
GROUNDWATER MANAGEMENT ZONE

0 150 300 Feet

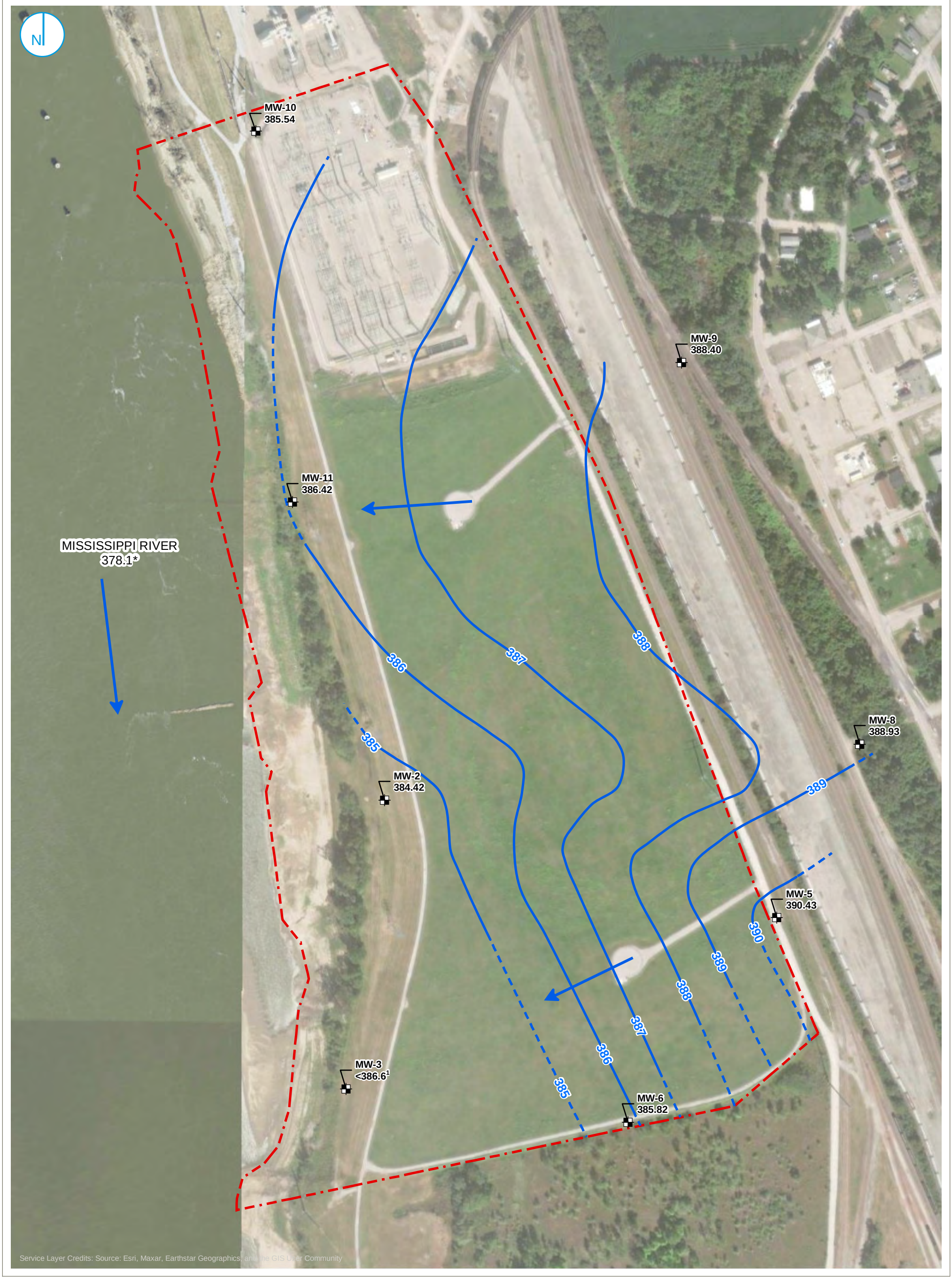
*RIVER ELEVATION OBTAINED FROM SITE STAFF GAGE JANUARY 24, 2023.
[1] = WELL DRY, GROUNDWATER LEVEL BELOW BOTTOM OF WELL SCREEN, LESS THAN 386.6 FEET NAVD88.

GROUNDWATER ELEVATION CONTOURS
JANUARY 24, 2023

2023 ANNUAL REPORT
FORMER VENICE POWER PLANT
ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 3-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

GROUNDWATER MANAGEMENT ZONE

0 150 300 Feet

*RIVER ELEVATION OBTAINED FROM SITE STAFF GAGE AUGUST 31, 2023.
[1] = WELL DRY, GROUNDWATER LEVEL BELOW BOTTOM OF WELL SCREEN, LESS THAN 386.6 FEET NAVD88.

GROUNDWATER ELEVATION CONTOURS
AUGUST 31, 2023

2023 ANNUAL REPORT
FORMER VENICE POWER PLANT
ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 3-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

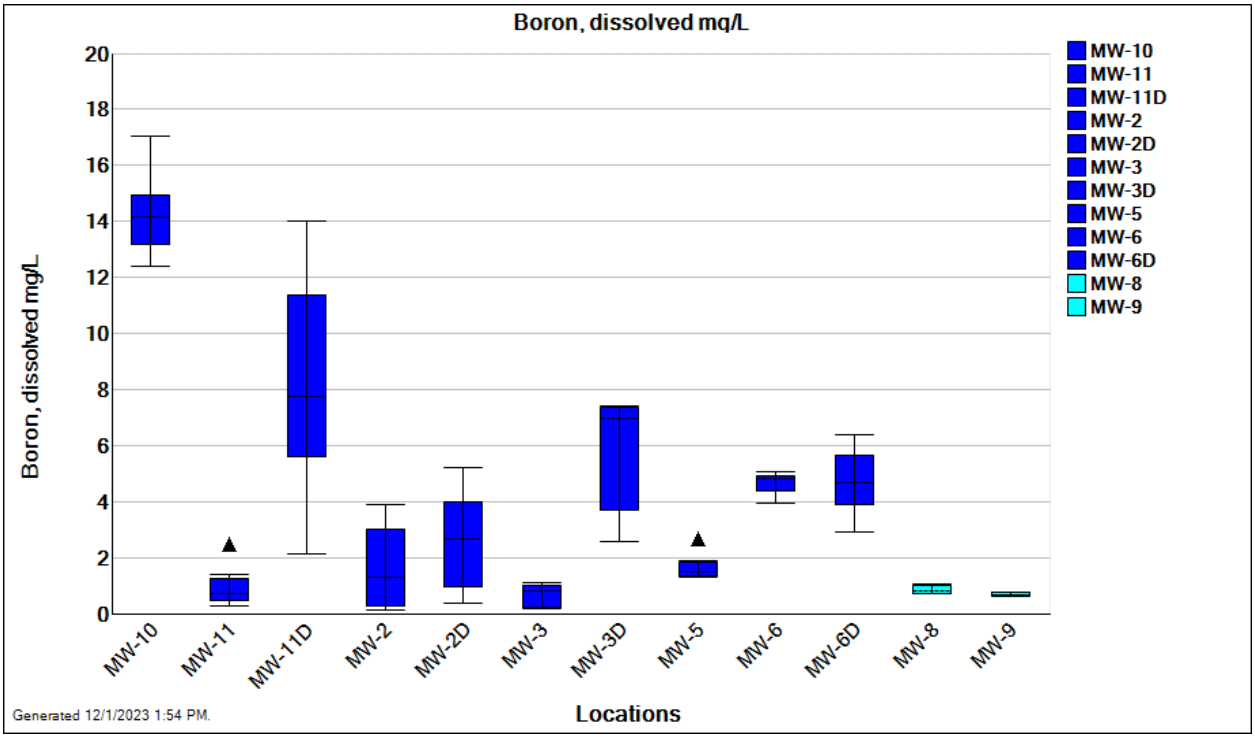


Figure 3-3. Box-whisker plot showing the distribution of boron concentrations by monitoring well for data collected during March 2020 through August 2023.

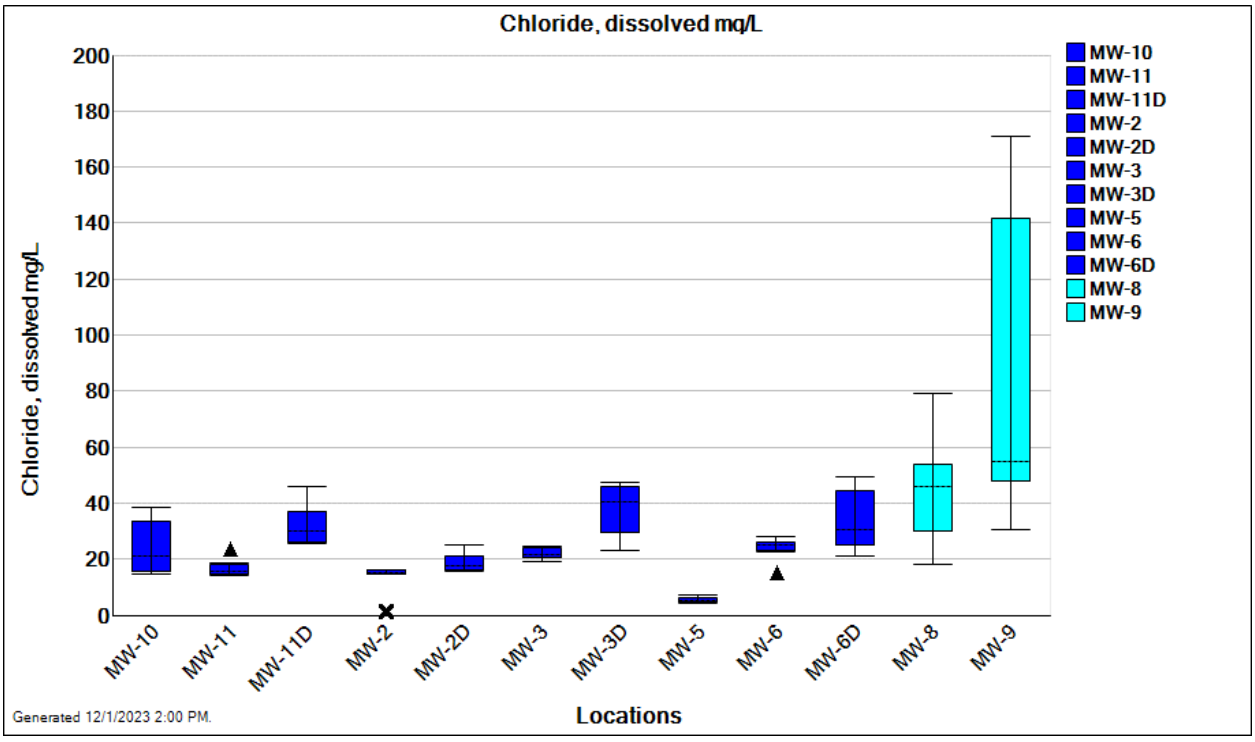


Figure 3-4. Box-whisker plot showing the distribution of chloride concentrations by monitoring well for data collected during March 2020 through August 2023.

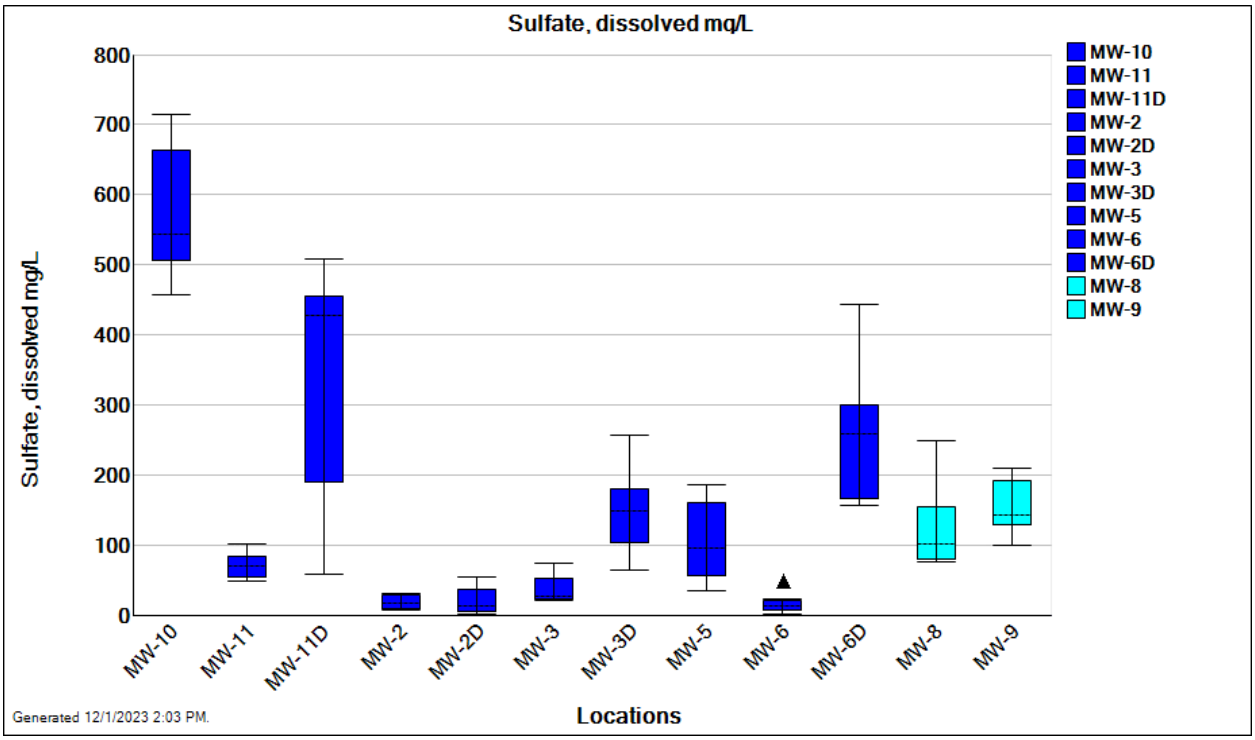


Figure 3-5. Box-whisker plot showing distribution of sulfate concentrations by monitoring well for data collected during March 2020 through August 2023.

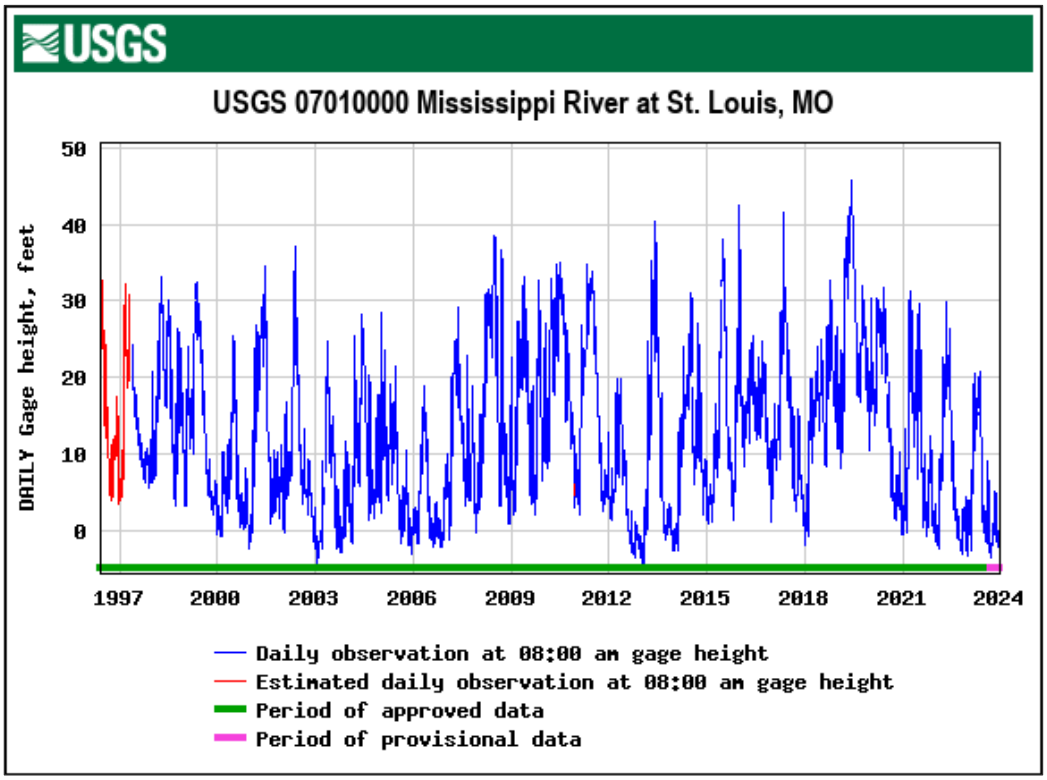


Figure 4-1. Daily Gage Height (feet) June 1, 1996 to December 25, 2023 for USGS Gaging Station 07010000 at the Mississippi River at St. Louis, MO.

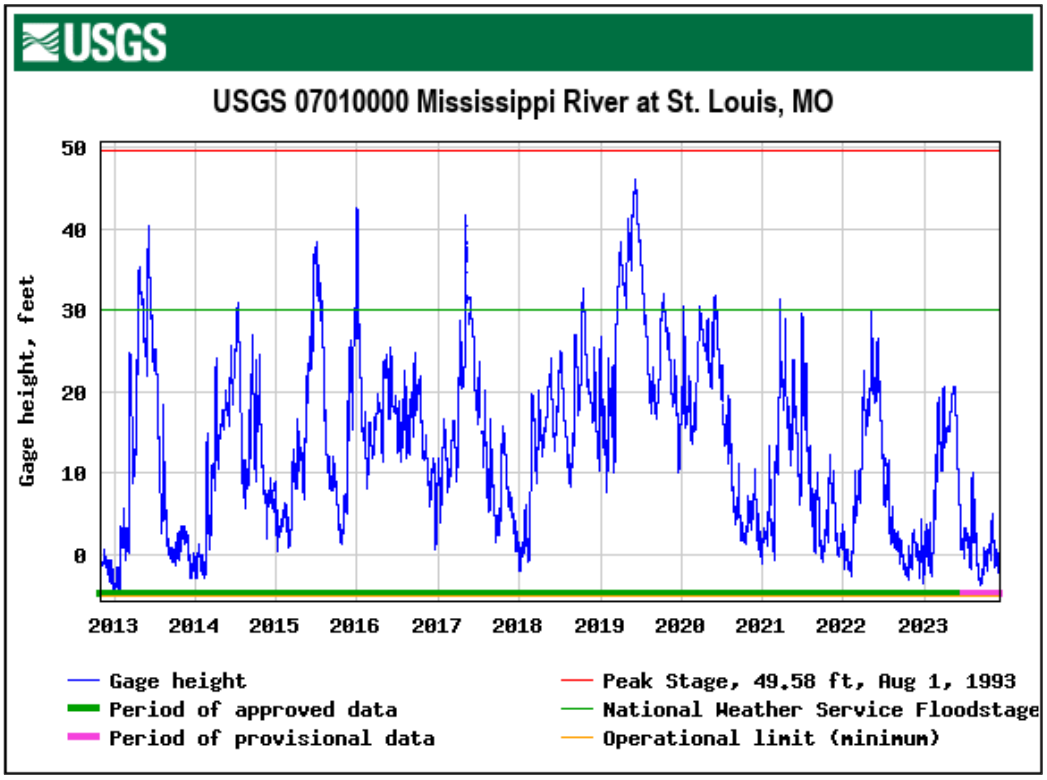


Figure 4-2. Daily Gage Height (feet) November 1, 2012 to December 6, 2023 for USGS Gaging Station 07010000 at the Mississippi River at St. Louis, MO.

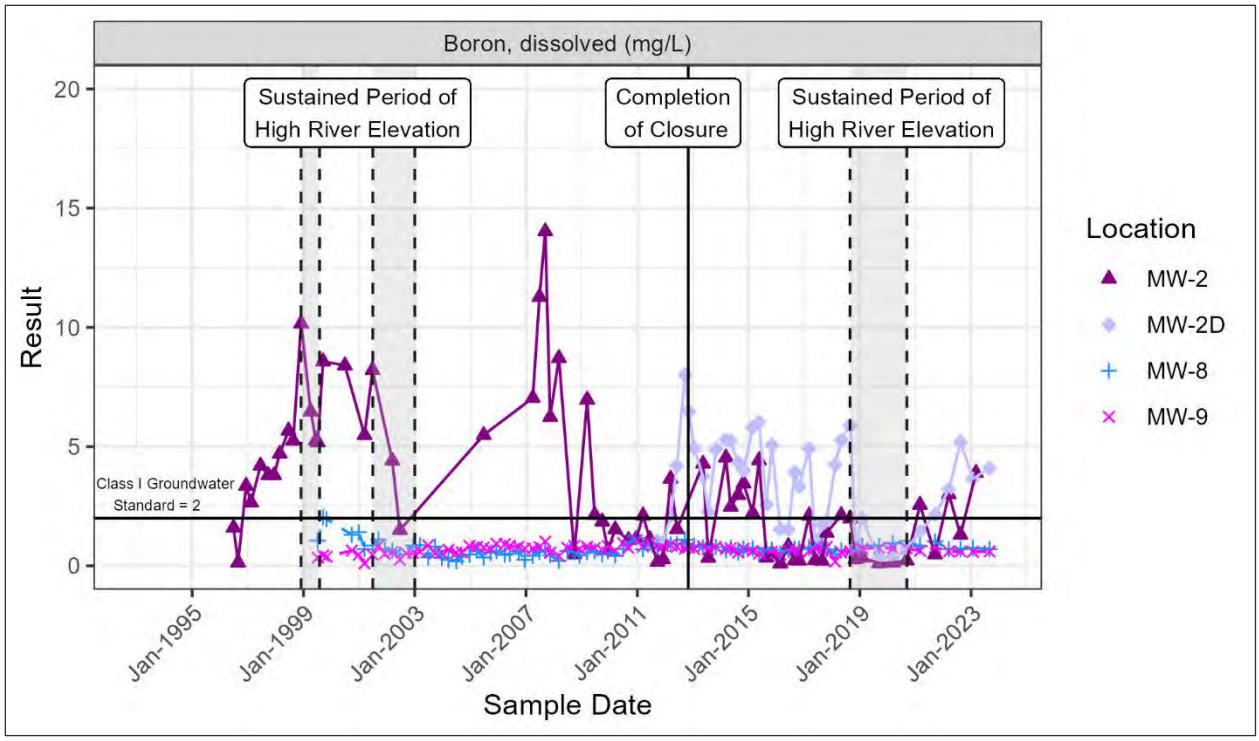


Figure 4-3. Time series for boron concentrations at compliance wells MW-2 and MW-2D compared to background wells MW-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

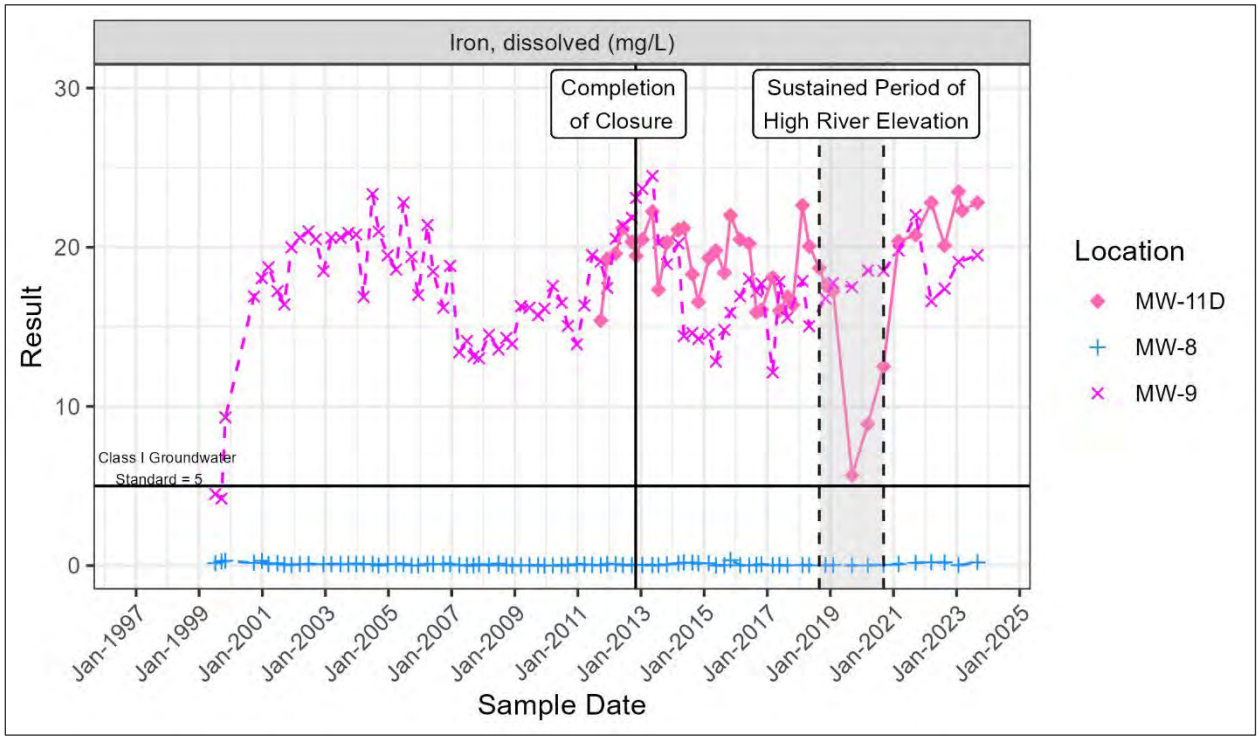


Figure 4-4. Time series for iron concentrations at compliance well MW-11D compared to background wells MW-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

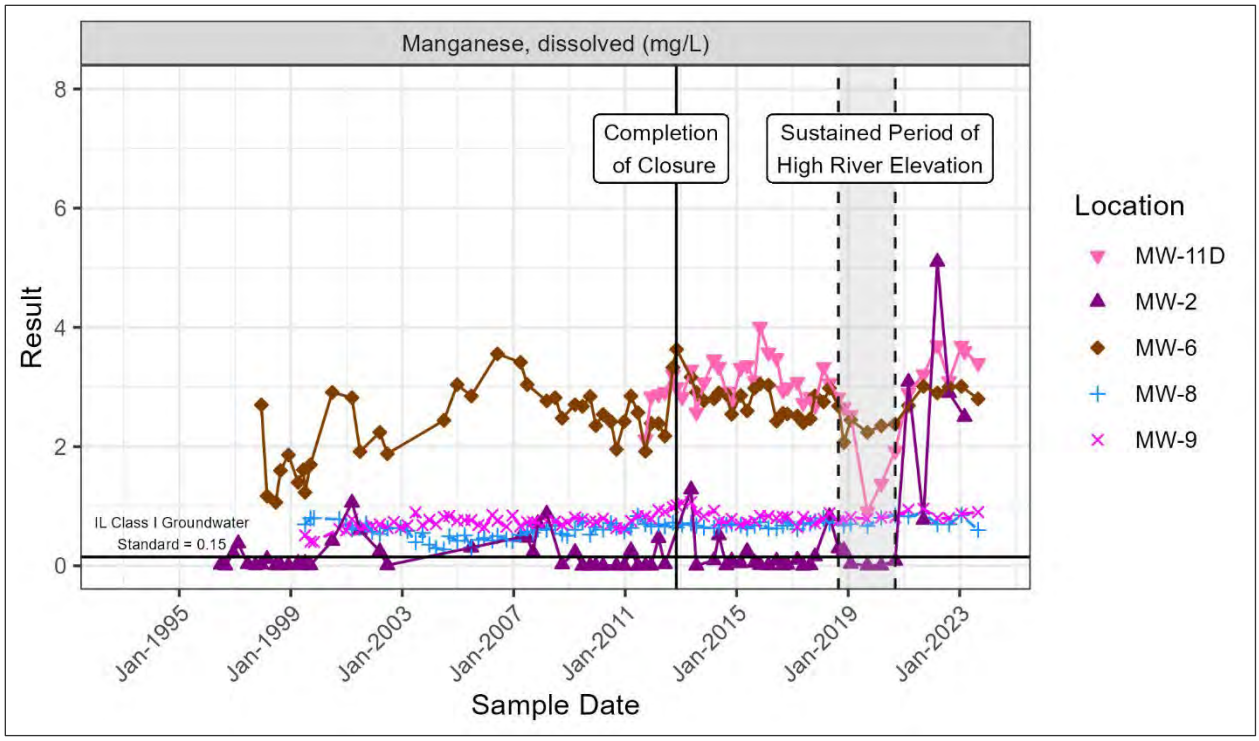


Figure 4-5. Time series for manganese concentrations at compliance wells MW-2, MW-6, and MW-11D compared to background wells MW-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

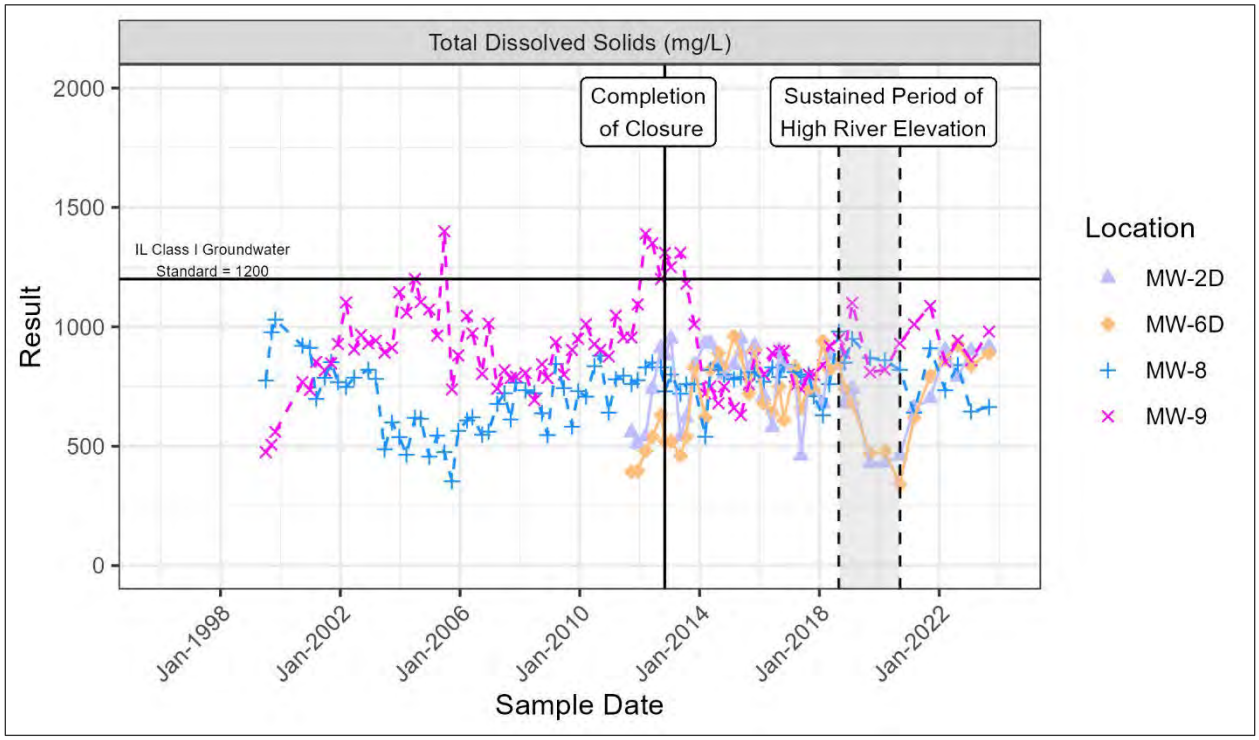


Figure 4-6. Time series for TDS concentrations at compliance wells MW-2D and MW-6D compared to background wells MW-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

APPENDIX A
GROUNDWATER MONITORING RESULTS 2020 - 2023 MONITORING PERIOD

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-2

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	3/6/2023	8/31/2023
Ag, diss, mg/L	0.001	0.001	<0.001		<0.001	<0.000	<0.000	<0.000	
As, diss, mg/L	<0.008	<0.008	0.041		0.033	0.094	0.079	0.074	
B, diss, mg/L	0.134	0.232	2.558		0.478	3.000	1.300	3.900	
Ba, diss, mg/L	0.217	0.207	0.402		0.282	0.461	0.510	0.507	
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	
Cl, diss, mg/L	15.4	15.3	15.9		15.9	1.6	14.9	14.4	
CN, tot, mg/L	<0.0010	<0.0010		0.0012	<0.0020	<0.0010	<0.0010	<0.0010	
Co, diss, mg/L	<0.001	0.001	0.066		0.013	0.091	0.035	0.022	
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	
Cu, diss, mg/L	0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	
F, diss, mg/L	0.20	0.23	0.21		0.19	0.30	0.16	0.30	
Fe, diss, mg/L	0.024	0.162	3.380		0.745	15.100	10.600	16.200	
GW Depth (TOC), ft	15.30	23.40	23.40	12.70	24.40	23.80	23.30	18.25	27.89
GW Elv, ft	397.01	388.91	388.91	399.61	387.91	388.51	389.01	394.06	384.42
Mn, diss, mg/L	0.005	0.086	3.087		0.773	5.100	2.900	2.500	
Ni, diss, mg/L	0.006	<0.003	0.029		0.011	0.027	0.019	0.013	
NO3, diss, mg/L	12.50	2.70	<0.10		<0.10	<0.10	<0.10	<0.10	
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	
pH (field), STD	6.87	6.80	7.00	6.90	6.93	6.90	7.00	7.20	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0002		0.0270	<0.0002	<0.0002	<0.0002	
Se, diss, mg/L	<0.009	<0.009	<0.009		0.025	0.001	0.000	0.000	
SO4, diss, mg/L	29.0	31.2	7.5		28.0	5.9	16.2	8.8	
Spec. Cond. (field), micromho	885	887	1093	1136	958	1205	1117	1166	
TDS, mg/L	570	520	690		613	763	701	662	
Temp (Celcius), degrees C	14.20	16.50	15.90	15.70	17.10	18.00	16.70	17.10	
Zn, diss, mg/L	<0.002	0.009	0.007		0.010	0.001	0.002	0.001	

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-2D

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	0.002	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	0.015	0.010		0.026	<0.000	0.021	0.031	0.037
B, diss, mg/L	0.372	0.738	1.443		2.144	3.200	5.200	3.650	4.100
Ba, diss, mg/L	0.228	0.283	0.338		0.418	0.420	0.423	0.487	0.491
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	24.9	21.9	17.8		17.9	15.7	17.4	15.4	16.0
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	0.000	<0.000	<0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cu, diss, mg/L	<0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	0.000
F, diss, mg/L	<0.05	0.13	0.24		0.17	0.20	0.17	0.27	0.23
Fe, diss, mg/L	13.450	18.130	18.410		21.930	24.800	21.300	21.780	20.500
GW Depth (TOC), ft	15.00	23.80	22.90	13.00	24.80	24.00	23.80	27.48	28.45
GW Elv, ft	397.36	388.56	389.46	399.36	387.56	388.36	388.56	384.88	383.91
Mn, diss, mg/L	0.554	0.791	0.584		1.017	1.400	1.200	1.440	1.400
Ni, diss, mg/L	<0.003	<0.003	<0.003		<0.003	<0.000	0.000	0.000	<0.000
NO3, diss, mg/L	<0.10	1.00	0.90		1.30	<0.10	1.30	<0.10	0.90
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	<0.000
pH (field), STD	7.12	7.00	7.40	7.00	7.23	7.20	7.10	7.40	7.30
Sb, diss, mg/L	<0.0010	<0.0010	<0.0002		0.0270	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	<0.000	0.000	<0.000	<0.000
SO4, diss, mg/L	12.6	5.2	5.4		1.1	12.9	36.7	54.8	37.1
Spec. Cond. (field), micromho	661	878	743	836	1182	1393	1252	1390	1400
TDS, mg/L	430	460	660		700	903	790	900	916
Temp (Celcius), degrees C	15.70	17.00	15.30	15.70	16.00	16.20	15.90	15.00	16.20
Zn, diss, mg/L	0.004	0.004	0.004		0.008	0.019	<0.000	0.003	0.007

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-3

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	11/2/2021	3/28/2022	1/24/2023	3/6/2023
Ag, diss, mg/L	0.001			<0.001	0.001	<0.000		<0.000
As, diss, mg/L	<0.008			0.001	0.018	<0.000		<0.000
B, diss, mg/L	0.154			0.228	0.811	0.900		1.100
Ba, diss, mg/L	0.149			0.223	0.280	0.299		0.371
Cd, diss, mg/L	<0.001			0.001	<0.001	0.000		0.001
Cl, diss, mg/L	24.4			23.5	21.5	19.1		21.8
CN, tot, mg/L	<0.0010			<0.0010	<0.0010	<0.0010		<0.0010
Co, diss, mg/L	0.001			0.001	0.004	0.001		0.001
Cr, diss, mg/L	<0.001			0.000	0.001	<0.000		<0.000
Cu, diss, mg/L	0.001			0.002	<0.001	0.001		0.000
F, diss, mg/L	0.18			0.19	0.20	0.22		0.21
Fe, diss, mg/L	0.886			0.012	0.218	<0.200		<0.200
GW Depth (TOC), ft	13.90	23.70	22.30	11.60	22.50	18.50	24.40	
GW Elv, ft	397.01	387.21	388.61	399.31	388.41	392.41	386.51	
Mn, diss, mg/L	0.452			0.507	1.367	0.900		0.700
Ni, diss, mg/L	0.010			0.011	0.016	0.010		0.013
NO3, diss, mg/L	<0.10			0.30	2.00	1.20		0.70
Pb, diss, mg/L	<0.007			0.001	0.007	<0.000		<0.000
pH (field), STD	6.81			6.70	5.48	6.80		6.60
Sb, diss, mg/L	<0.0010			0.0007	0.0270	<0.0002		<0.0002
Se, diss, mg/L	<0.009			0.004	0.016	<0.000		0.000
SO4, diss, mg/L	29.2			20.7	27.5	20.7		74.0
Spec. Cond. (field), micromho	843			1042	1355	1201		1322
TDS, mg/L	520			630	657	718		832
Temp (Celcius), degrees C	15.00			16.00	16.00	15.90		17.80
Zn, diss, mg/L	0.005			<0.000	0.015	0.005		0.002

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-3D

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	0.004	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	<0.008	<0.008		0.013	0.001	0.001	0.000	0.000
B, diss, mg/L	2.737	2.580	7.162		6.837	7.400	7.100	7.400	6.300
Ba, diss, mg/L	0.264	0.273	0.206		0.196	0.100	0.149	0.112	0.129
Cd, diss, mg/L	0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	27.6	22.9	35.1		37.9	47.4	44.0	46.6	42.5
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	0.0017
Co, diss, mg/L	0.001	<0.001	<0.001		0.003	<0.000	<0.000	<0.000	<0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		0.001	<0.000	<0.000	<0.000	<0.000
Cu, diss, mg/L	<0.001	0.003	<0.001		<0.001	<0.000	0.000	<0.000	0.000
F, diss, mg/L	<0.05	0.14	0.12		0.12	0.10	0.05	0.08	0.10
Fe, diss, mg/L	13.880	12.620	6.516		6.279	3.100	3.600	1.730	1.800
GW Depth (TOC), ft	14.50	24.40	22.20	12.30	27.00	25.10	26.00	29.05	30.59
GW Elv, ft	396.98	387.08	389.28	399.18	384.48	386.38	385.48	382.43	380.89
Mn, diss, mg/L	0.679	0.606	0.380		0.412	0.300	0.300	0.190	0.200
Ni, diss, mg/L	0.003	<0.003	<0.003		<0.003	0.001	0.001	0.001	0.000
NO3, diss, mg/L	0.80	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	0.000	<0.000	<0.000	<0.000
pH (field), STD	6.79	6.70	7.30	6.90	7.15	7.40	7.40	7.30	7.70
Sb, diss, mg/L	<0.0010	<0.0010	<0.0002		0.0260	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		0.012	<0.000	<0.000	<0.000	<0.000
SO4, diss, mg/L	92.3	63.5	183.0		256.6	162.9	166.8	132.4	125.6
Spec. Cond. (field), micromho	1077	1113	938	1045	911	720	770	668	753
TDS, mg/L	700	700	640		606	509	552	449	512
Temp (Celcius), degrees C	14.80	16.10	15.60	15.90	16.40	16.20	16.30	15.40	16.70
Zn, diss, mg/L	0.004	0.005	0.003		0.002	<0.000	0.000	0.001	0.002

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-5

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	11/2/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	0.074	0.099	0.089		0.120	0.082	0.085	0.146	0.075
B, diss, mg/L	1.867	2.706	1.282		1.513	1.500	1.650	1.330	1.300
Ba, diss, mg/L	0.095	0.153	0.100		0.072	0.087	0.086	0.071	0.080
Cd, diss, mg/L	<0.001	0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	5.3	5.3	7.4		4.7	6.5	5.1	4.4	4.2
CN, tot, mg/L	0.0025	<0.0010		0.0087	0.0074	0.0073	0.0100	0.0063	0.0097
Co, diss, mg/L	<0.001	0.002	<0.001		<0.001	0.000	0.000	0.001	0.000
Cr, diss, mg/L	<0.001	0.021	0.002		<0.001	<0.000	0.000	<0.000	<0.000
Cu, diss, mg/L	0.001	0.007	0.001		<0.001	0.000	0.000	<0.000	0.000
F, diss, mg/L	0.28	0.29	0.30		0.28	0.30	0.29	0.36	0.27
Fe, diss, mg/L	2.109	4.674	1.316		1.553	2.000	2.060	2.340	1.800
GW Depth (TOC), ft	32.00	37.20	42.00	32.50	38.60	42.70	42.70	47.00	42.50
GW Elv, ft	400.93	395.73	390.93	400.43	394.33	390.23	390.23	385.93	390.43
Mn, diss, mg/L	2.561	3.379	2.397		2.276	2.500	2.860	2.360	1.800
Ni, diss, mg/L	<0.003	0.013	<0.003		<0.003	0.001	0.001	0.002	0.000
NO3, diss, mg/L	<0.10	1.20	1.00		<0.10	<0.10	<0.10	0.90	<0.10
Pb, diss, mg/L	<0.007	0.007	<0.007		<0.007	0.000	<0.000	<0.000	<0.000
pH (field), STD	7.43	7.20	7.30	7.20	7.16	7.60	7.50	7.60	7.60
Sb, diss, mg/L	0.0013	0.0022	<0.0002		0.0330	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		0.022	<0.000	0.000	0.000	0.000
SO4, diss, mg/L	172.1	184.8	99.7		50.7	123.9	91.4	33.7	66.7
Spec. Cond. (field), micromho	1145	1099	1177	1107	943	1287	1131	1100	1055
TDS, mg/L	800	760	760		609	874	762	591	710
Temp (Celcius), degrees C	15.20	18.20	16.20	16.70	17.60	16.80	16.70	14.20	17.50
Zn, diss, mg/L	0.003	0.044	0.005		0.006	0.006	0.000	0.001	0.004

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-6

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	0.005	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	0.047	0.053	0.058		0.102	0.079	0.078	0.100	0.100
B, diss, mg/L	4.825	4.912	4.773		5.084	4.900	4.700	3.930	4.200
Ba, diss, mg/L	0.266	0.275	0.303		0.325	0.336	0.364	0.347	0.320
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	15.4	23.0	26.0		28.1	25.7	26.0	24.0	22.6
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	0.000	0.000	0.000	0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cu, diss, mg/L	0.001	0.003	0.002		<0.001	0.001	<0.000	<0.000	<0.000
F, diss, mg/L	0.51	0.53	0.53		0.48	0.40	0.73	0.54	0.54
Fe, diss, mg/L	13.780	14.040	16.910		16.630	24.000	21.700	24.360	21.700
GW Depth (TOC), ft	35.40	43.30	44.10	34.00	43.70	44.30	42.30	47.21	47.27
GW Elv, ft	397.69	389.79	388.99	399.09	389.39	388.79	390.79	385.88	385.82
Mn, diss, mg/L	2.350	2.378	2.688		3.010	2.900	3.000	3.010	2.800
Ni, diss, mg/L	0.006	<0.003	<0.003		0.003	0.005	0.006	0.007	0.007
NO3, diss, mg/L	<0.10	3.30	<0.10		<0.10	<0.10	10.30	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	<0.000
pH (field), STD	7.29	7.20	7.30	7.00	7.19	7.30	7.10	7.50	7.40
Sb, diss, mg/L	<0.0010	<0.0001	<0.0002		<0.0130	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	<0.000	0.000	0.000	0.000
SO4, diss, mg/L	14.2	22.3	1.7		10.6	12.6	48.7	3.3	13.4
Spec. Cond. (field), micromho	772	827	901	887	894	927	937	950	893
TDS, mg/L	440	460	210		574	589	560	562	560
Temp (Celcius), degrees C	15.30	17.20	15.30	16.20	16.40	16.40	16.30	15.00	17.20
Zn, diss, mg/L	0.004	0.005	0.007		0.008	<0.000	0.000	0.001	0.003

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-6D

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	<0.001	0.005	0.002		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	0.008	<0.008		0.023	0.001	0.001	0.001	0.001
B, diss, mg/L	5.896	6.377	4.872		4.976	4.500	4.400	3.690	2.900
Ba, diss, mg/L	0.176	0.141	0.253		0.299	0.291	0.339	0.305	0.372
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	46.8	49.5	35.4		25.1	24.8	25.2	21.1	37.8
CN, tot, mg/L	0.0015	<0.0010		<0.0010	<0.0020	0.0005	<0.0010	<0.0010	0.0015
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	0.000	<0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		0.001	0.000	<0.000	0.000	<0.000
Cu, diss, mg/L	0.001	<0.001	0.003		<0.001	<0.000	0.000	<0.000	<0.000
F, diss, mg/L	<0.05	0.06	0.05		<0.05	<0.05	<0.05	0.07	0.06
Fe, diss, mg/L	0.196	0.103	0.343		0.446	0.600	0.800	1.030	1.700
GW Depth (TOC), ft	35.80	23.70	44.20	34.40	44.10	44.60	42.70	47.60	47.60
GW Elv, ft	397.75	409.85	389.35	399.15	389.45	388.95	390.85	385.95	385.95
Mn, diss, mg/L	0.086	0.060	0.140		0.190	0.200	0.300	0.410	0.600
Ni, diss, mg/L	<0.003	<0.003	<0.003		<0.003	<0.000	0.001	0.001	<0.000
NO3, diss, mg/L	<0.10	<0.10	<0.10		<0.10	<0.10	1.20	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	<0.000
pH (field), STD	8.16	8.10	8.40	8.10	8.07	8.00	8.00	7.80	7.90
Sb, diss, mg/L	<0.0010	<0.0001	<0.0002		0.0270	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	0.000	0.000	<0.000	<0.000
SO4, diss, mg/L	175.1	162.3	283.9		442.9	304.3	264.5	254.0	156.5
Spec. Cond. (field), micromho	710	598	987	800	1039	1143	1239	1148	13
TDS, mg/L	480	340	620		793	865	925	838	890
Temp (Celcius), degrees C	15.60	20.30	15.30	16.10	16.80	16.30	16.20	14.90	17.20
Zn, diss, mg/L	0.003	0.003	0.003		0.005	<0.000	0.004	0.001	0.004

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-8

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	0.004	0.001		0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	<0.008	<0.008		0.025	0.000	0.000	0.000	0.000
B, diss, mg/L	0.938	1.044	0.818		1.026	0.700	0.700	0.750	0.700
Ba, diss, mg/L	0.117	0.111	0.100		0.115	0.095	0.110	0.096	0.094
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	79.0	35.4	48.2		43.3	55.2	49.2	27.9	18.3
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	0.0010
Co, diss, mg/L	0.003	0.003	0.001		0.004	0.002	0.002	0.003	0.002
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001	0.000	<0.000	0.000	<0.000
Cu, diss, mg/L	0.001	0.001	<0.001		<0.001	<0.000	0.001	<0.000	0.000
F, diss, mg/L	0.27	0.26	0.32		0.31	0.30	0.27	0.31	0.30
Fe, diss, mg/L	0.013	0.041	0.099		0.174	<0.200	<0.200	0.030	<0.200
GW Depth (TOC), ft	17.30	23.10	26.50	16.80	24.00	26.40	22.20	28.55	27.34
GW Elv, ft	398.97	393.17	389.77	399.47	392.27	389.87	394.07	387.72	388.93
Mn, diss, mg/L	0.804	0.850	0.830		0.880	0.700	0.700	0.850	0.600
Ni, diss, mg/L	0.014	0.013	0.010		0.006	0.006	0.007	0.009	0.006
NO3, diss, mg/L	0.90	3.80	1.50		<0.10	1.00	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	<0.000
pH (field), STD	6.71	6.70	6.90	6.60	6.68	6.90	6.70	7.10	7.00
Sb, diss, mg/L	<0.0010	0.0011	0.0023		0.0340	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	0.001	<0.000	0.000	0.000
SO4, diss, mg/L	135.4	161.6	107.0		249.5	84.7	95.0	74.9	77.9
Spec. Cond. (field), micromho	1279	1246	1183	1269	1304	1154	1178	1038	1024
TDS, mg/L	860	820	640		910	734	840	645	664
Temp (Celcius), degrees C	13.30	16.80	15.50	16.10	16.30	16.00	15.80	15.10	15.90
Zn, diss, mg/L	0.004	0.008	0.004		0.007	<0.000	0.001	0.004	0.008

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-9

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	0.001	0.004	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	<0.008	<0.008		0.025	0.003	0.004	0.003	0.005
B, diss, mg/L	0.747	0.735	0.637		0.769	0.600	0.600	0.590	0.600
Ba, diss, mg/L	0.154	0.153	0.177		0.184	0.133	0.150	0.158	0.161
Cd, diss, mg/L	0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	30.4	47.8	163.0		170.9	78.6	55.8	53.7	48.9
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	<0.001		0.002	<0.000	<0.000	<0.000	<0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cu, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	0.002	<0.000	<0.000
F, diss, mg/L	0.22	0.24	0.20		0.25	0.20	0.20	0.21	0.26
Fe, diss, mg/L	18.540	18.520	19.790		22.020	16.600	17.400	19.070	19.500
GW Depth (TOC), ft	14.60	20.40	23.50	14.00	21.40	23.60	19.90	26.05	25.00
GW Elv, ft	398.80	393.00	389.90	399.40	392.00	389.80	393.50	387.35	388.40
Mn, diss, mg/L	0.811	0.815	0.941		0.958	0.800	0.800	0.870	0.900
Ni, diss, mg/L	0.007	<0.003	<0.003		0.006	<0.000	0.001	0.001	<0.000
NO3, diss, mg/L	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	<0.000	<0.000	<0.000	<0.000
pH (field), STD	6.76	6.80	6.80	6.70	6.86	7.00	6.80	6.80	7.10
Sb, diss, mg/L	<0.0010	0.0011	0.0011		0.0180	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		0.018	<0.000	<0.000	<0.000	<0.000
SO4, diss, mg/L	128.8	100.2	143.9		194.9	127.9	142.0	182.2	209.8
Spec. Cond. (field), micromho	1227	1318	1667	1558	1640	1288	1274	1272	1379
TDS, mg/L	820	930	1010		1087	854	943	860	980
Temp (Celcius), degrees C	14.70	16.70	15.60	16.10	16.40	16.10	16.10	15.30	16.50
Zn, diss, mg/L	0.004	0.005	0.005		0.008	<0.000	0.001	0.001	0.006

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-10

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	12/13/2021	3/15/2022	8/15/2022	1/24/2023	8/31/2023
Ag, diss, mg/L	<0.001	0.001	0.001		<0.001		<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	0.026	0.023	0.010		0.067		0.007	0.042	0.006	0.009
B, diss, mg/L	15.050	17.060	12.420			13.000	14.600	14.200	14.110	13.700
Ba, diss, mg/L	0.046	0.052	0.039		0.071		0.054	0.068	0.068	0.049
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001		<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	14.8	15.0	33.8		21.2		33.2	16.5	38.7	20.9
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020		<0.0010	<0.0010	<0.0010	0.0024
Co, diss, mg/L	0.001	<0.001	<0.001		<0.001		0.001	0.001	0.001	0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		<0.001		<0.000	<0.000	0.000	<0.000
Cu, diss, mg/L	<0.001	0.001	0.002		<0.001		0.001	0.001	<0.000	0.002
F, diss, mg/L	0.28	0.27	0.20		0.20		0.20	0.15	0.38	0.25
Fe, diss, mg/L	1.824	1.963	0.104		2.474		<0.200	1.400	0.070	<0.200
GW Depth (TOC), ft	26.20	32.40	35.20	23.10	33.60	38.70	35.70	33.60	39.11	39.45
GW Elv, ft	398.79	392.59	389.79	401.89	391.39	386.29	389.29	391.39	385.88	385.54
Mn, diss, mg/L	1.576	1.801	0.041		1.013		0.700	1.000	0.890	0.200
Ni, diss, mg/L	0.004	<0.003	<0.003		0.003		0.001	0.002	0.002	0.002
NO3, diss, mg/L	<0.10	1.20	4.30		<0.10		0.90	<0.10	1.70	3.60
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007		<0.000	<0.000	<0.000	<0.000
pH (field), STD	7.34	7.30	7.60	7.20	7.22	7.42	7.30	7.40	7.50	7.50
Sb, diss, mg/L	<0.0010	0.0016	0.0006		0.0320		0.0002	<0.0002	0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		0.009		0.001	0.000	<0.000	0.000
SO4, diss, mg/L	560.5	634.5	457.1		713.9		505.4	673.3	527.0	509.1
Spec. Cond. (field), micromho	1319	1407	1487	1478	1517	1489	1548	1602	1589	1550
TDS, mg/L	1070	1240	1310		1252		1236	1411	1266	1218
Temp (Celcius), degrees C	14.10	17.60	15.50	16.50	17.40	15.10	16.50	16.50	15.30	17.90
Zn, diss, mg/L	0.003	0.012	0.005		0.007		0.013	0.001	0.001	0.002

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-11

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	3/6/2023	8/31/2023
Ag, diss, mg/L	0.001	0.004	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	<0.008	<0.008		0.030	0.000	0.001	0.001	0.000
B, diss, mg/L	0.247	0.443	0.860		0.712	1.400	0.600	2.500	0.700
Ba, diss, mg/L	0.219	0.175	0.246		0.214	0.216	0.195	0.251	0.240
Cd, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	14.4	14.2	16.0		18.4	15.3	16.9	14.1	24.0
CN, tot, mg/L	<0.0010	<0.0010		<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.000	0.000	<0.000	<0.000
Cr, diss, mg/L	<0.001	0.001	0.002		<0.001	<0.000	<0.000	<0.000	<0.000
Cu, diss, mg/L	0.001	0.001	<0.001		<0.001	0.001	0.003	<0.000	0.001
F, diss, mg/L	0.26	0.19	0.21		0.16	0.20	0.15	0.25	0.21
Fe, diss, mg/L	0.009	0.055	1.368		0.103	<0.200	<0.200	<0.200	<0.200
GW Depth (TOC), ft	14.90	20.70	24.90	12.50	21.80	24.80	21.60	23.40	26.32
GW Elv, ft	397.84	392.04	387.84	400.24	390.94	387.94	391.14	389.34	386.42
Mn, diss, mg/L	0.004	0.026	0.192		0.006	0.300	<0.200	0.700	1.000
Ni, diss, mg/L	0.005	0.005	0.009		<0.003	0.005	0.002	0.007	0.005
NO3, diss, mg/L	2.00	1.30	0.90		7.80	<0.10	2.90	0.80	1.80
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	0.001	0.000	<0.000	<0.000
pH (field), STD	6.75	6.60	7.00	7.00	6.79	6.80	6.90	7.00	6.90
Sb, diss, mg/L	<0.0010	<0.0010	0.0004		0.0240	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	<0.000	0.004	<0.000	0.001
SO4, diss, mg/L	85.3	75.3	52.4		68.4	53.5	69.4	101.8	48.0
Spec. Cond. (field), micromho	1099	1091	1051	1528	1052	1133	1006	1310	1048
TDS, mg/L	720	760	1120		736	720	722	864	662
Temp (Celcius), degrees C	14.30	16.50	15.80	15.70	15.80	16.70	15.30	16.50	17.60
Zn, diss, mg/L	0.007	0.004	0.010		0.007	0.002	0.004	<0.000	0.009

Venice
Groundwater Monitoring Results 2020-2023 Monitoring Period

Date Range: 01/01/2020 to 08/31/2023
Well: MW-11D

	3/10/2020	9/8/2020	3/1/2021	4/19/2021	9/14/2021	3/15/2022	8/15/2022	1/24/2023	3/6/2023	8/31/2023
Ag, diss, mg/L	0.001	<0.001	<0.001		<0.001	<0.000	<0.000	<0.000	<0.000	<0.000
As, diss, mg/L	<0.008	0.011	<0.008		0.028	0.011	0.012	0.012	0.011	0.010
B, diss, mg/L	2.125	5.168	13.880		7.756	14.000	6.000	8.870	7.700	8.700
Ba, diss, mg/L	0.115	0.161	0.226		0.219	0.250	0.234	<0.000	0.237	0.217
Cd, diss, mg/L	<0.001	0.003	<0.001		0.001	<0.000	<0.000	<0.000	<0.000	<0.000
Cl, diss, mg/L	29.3	30.0	30.3		43.9	26.2	45.7	25.5	25.8	30.3
CN, tot, mg/L	0.0011	0.0020		0.0119	0.0152	0.0600	0.0668	0.0842	0.0751	0.0510
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	0.000	<0.000	<0.000	<0.000	<0.000
Cr, diss, mg/L	<0.001	<0.001	0.001		0.001	0.001	<0.000	0.000	<0.000	<0.000
Cu, diss, mg/L	<0.001	<0.001	<0.001		<0.001	0.000	<0.000	<0.000	<0.000	<0.000
F, diss, mg/L	0.25	0.26	0.21		0.21	0.20	0.19	0.25	0.20	0.22
Fe, diss, mg/L	8.890	12.500	20.370		20.760	22.800	20.100	23.480	22.300	22.800
GW Depth (TOC), ft	15.30	24.90	22.30	13.70	26.30	24.30	25.40	28.65	16.85	29.94
GW Elv, ft	397.20	387.60	390.20	398.80	386.20	388.20	387.10	383.85	395.65	382.56
Mn, diss, mg/L	1.380	1.930	2.900		3.213	3.700	3.100	3.690	3.600	3.400
Ni, diss, mg/L	<0.003	<0.003	0.003		<0.003	0.002	0.000	0.000	0.000	<0.000
NO3, diss, mg/L	<0.10	1.00	<0.10		2.70	<0.10	<0.10	<0.10	2.60	2.40
Pb, diss, mg/L	<0.007	<0.007	<0.007		<0.007	0.000	<0.000	<0.000	<0.000	<0.000
pH (field), STD	7.17	7.00	7.20	7.00	7.18	7.00	7.20	7.40	7.20	7.20
Sb, diss, mg/L	<0.0010	0.0011	<0.0002		0.0360	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Se, diss, mg/L	<0.009	<0.009	<0.009		<0.009	0.001	<0.000	0.000	0.000	<0.000
SO4, diss, mg/L	63.2	57.6	507.6		439.7	462.3	313.0	446.2	401.6	426.9
Spec. Cond. (field), micromho	737	1021	1691	718	1574	1807	1633	1769	1724	1673
TDS, mg/L	440	770	1710		1256	1469	1310	1387	1262	1356
Temp (Celcius), degrees C	15.20	16.30	15.40	12.70	15.80	15.90	16.00	14.90	16.10	16.80
Zn, diss, mg/L	0.003	0.009	0.006		0.009	0.007	<0.000	<0.000	<0.000	0.000

APPENDIX B
2023 GROUNDWATER MONITORING FIELD DATA WORKSHEETS

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 24 / Jun / 2023

River Level: 2.5 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	✓		✓		✓	✓
Casing and concrete pad in good condition (note any deficiency)	✓		✓		cover broken	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓		✓		✓	✓
Water Level (±0.01 feet, from top of casing mark)	27.95	27.48	24.40	29.05	47.00	47.21
Total Well Depth (±0.01 feet)	29.10	47.72	24.40	48.75	49.05	50.95
Time purging began (24-hour clock)	:	13 : 45	:	14 : 20	15 : 20	14 : 45
Conductivity after 10 minutes µS/cm	No Sample	1396	No Sample	673	960	976
Temperature °C		~~14.0~~ 14.9		15.2	12.8	14.8
Conductivity after 15 minutes (µS/cm)	No Sample		No Sample			
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm		1390		668	1100	950
Time to reach final conductivity (min)		15		15	15	15
Temperature °C		15.0		15.4	14.2	15.0
pH (on site) (±0.01)		7.37		7.25	7.62	7.54

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)	✓	✓	✓	✓	✓	✓
Casing and concrete pad in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓	✓	✓	✓	✓	✓
Water Level (±0.01 feet, from top of casing mark)	47.60	28.55	26.05	39.11	28.10	28.65
Total Well Depth (±0.01 feet)	68.61	42.75	41.40	44.60	28.90	48.92
Time purging began (24-hour clock)	15 : 00	11 : 00	11 : 25	15 : 50	: 0	13 : 15
Conductivity after 10 minutes µS/cm	1125	1032	1263	1584	Dry	1781
Temperature °C	14.9	14.8	15.1	15.3		14.6
Conductivity after 15 minutes (µS/cm)					NO	
Temperature °C					W	
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	1148	1038	1272	1589		1769
Time to reach final conductivity (min)	15	15	15	15		15
Temperature °C	14.9	15.1	15.3	15.3		14.9
pH (on site) (±0.01)	7.82	7.05	6.80	7.51		7.35

Sample collectors: EPH / SMS

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet
(Page 3 of 3)

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 03/06/23

River Level: 19.05 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	✓		✓			
Casing and concrete pad in good condition (note any deficiency)	✓		✓			
Internal piping unobstructed and in good condition (note any deficiency)	✓		✓			
Water Level (±0.01 feet, from top of casing mark)	18.25					
Total Well Depth (±0.01 feet)	29.00					
Time purging began (24-hour clock)	13:30	:__	14:00	:__	:__	:__
Conductivity after 10 minutes µS/cm	1161		1242			
Temperature °C	17.4		18.3			
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm	1166		1322			
Time to reach final conductivity (min)	15		15			
Temperature °C	17.1		17.8			
pH (on site) (±0.01)	7.21		6.57			

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

(Page 2 of 3)

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)					✓	✓
Casing and concrete pad in good condition (note any deficiency)					✓	✓
Internal piping unobstructed and in good condition (note any deficiency)					✓	✓
Water Level (±0.01 feet, from top of casing mark)					23.40	16.85
Total Well Depth (±0.01 feet)					28.95	49.01
Time purging began (24-hour clock)	___:___	___:___	___:___	___:___	14:30	14:50
Conductivity after 10 minutes µS/cm					1288	1685
Temperature °C					16.9	16.8
Conductivity after 15 minutes (µS/cm)						
Temperature °C						
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm					1310	1724
Time to reach final conductivity (min)					15	15
Temperature °C					16.5	16.1
pH (on site) (±0.01)					6.97	7.18

Sample collectors: SMS DTJ

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet
(Page 3 of 3)

NOTES: _____

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

Venice Groundwater Monitoring Field Data Worksheet

(Page 1 of 3)

Sample Date: 8 / 31 / 23

River Level: _____ feet

	Well #2 Not Enough Sample	Well #2D	Well #3 DRY	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	27.89	28.45		30.59	42.50	47.27
Total Well Depth (±0.01 feet)	29.02	47.53		49.00	49.30	51.23
Time purging began (24-hour clock)	13:00	13:30	:	14:00	11:30	12:00
Conductivity after 10 minutes µS/cm		1336		748	1008	902
Temperature °C		17.4		16.9	17.8	17.8
Conductivity after 15 minutes (µS/cm)		1400		753	1055	893
Temperature °C		16.2		16.7	17.5	17.2
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)						
Temperature °C						
pH (on site) (±0.01)		7.26		7.66	7.62	7.38

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet

	Well #6D	Well #8	Well #9	Well #10	Well #11	Well #11D
Well name sign, lock, and inner cap present (note any deficiency)						
Casing and concrete pad in good condition (note any deficiency)						
Internal piping unobstructed and in good condition (note any deficiency)						
Water Level (±0.01 feet, from top of casing mark)	47.60	27.34	25.00	39.45	26.32	29.94
Total Well Depth (±0.01 feet)	68.61	43.00	41.65	44.07	28.86	48.95
Time purging began (24-hour clock)	12:30	10:30	11:00	15:30	14:30	15:00
Conductivity after 10 minutes µS/cm	12.69	10,24	13.84	15,26	1041	1675
Temperature °C	17,5	16.2	17.3	17,8	16.8	17.1
Conductivity after 15 minutes (µS/cm)	12,86	10,24	13.79	1550	1048	1673
Temperature °C	17.2	15,9	16.5	17.9	17,6	16,8
If conductivity changed more than 10% between 10 and 15 minute samples, continue purging and measure conductivity every 5 minutes, until the conductivity changes less than 10% between samples.						
Final Conductivity, µS/cm						
Time to reach final conductivity (min)		1				
Temperature °C						
pH (on site) (±0.01)	7,90	7,02	7.11	7,46	6,92	7,17

Sample collectors: _____

Note any items requiring maintenance at any well, and report to supervisor after return to Lab Services.

Venice Groundwater Monitoring Field Data Worksheet
(Page 3 of 3)

NOTES:

Well 11 –
Water level very shallow. Could not flush for full 10 minutes before taking sample

Attach completed form to the Request for Chemical Analysis for inclusion in the final report.

APPENDIX C
2023 FINAL COVER SITE INSPECTION REPORTS

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 03/15/23

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 50°F, sunny

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so, is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: Date: 03/15/23

North embankment, facing west

North Pump Station, facing north

North Pump Station, facing south

South Pump Station, facing north

South Pump Station, facing south

South Embankment, facing east

West Embankment, south section

West Embankment, center section

West Embankment, north section

South Pump station, facing east

North Pump station, facing east

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 04/27/23

Facility Address: 701 Main Street, Venice, IL

62090 Inspection Conditions: 60°F, mostly cloudy

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so, is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature: L A Meyer Date: 04/27/23

North embankment, facing west

North Pump Station, facing north

North Pump Station, facing south

South Pump Station, facing north

South Pump Station, facing south

South Embankment, facing east

West Embankment, south section

West Embankment, center section

West Embankment, north section

South Pump station, facing east

North Pump station, facing east

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 09/28/23

Facility Address: 701 Main Street, Venice, IL 62090

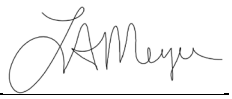
Inspection Conditions: 71°F, partly cloudy

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so, is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature:  Date: 09/28/23

North embankment, facing west

North Pump Station, facing north

North Pump Station, facing south

South Pump Station, facing north

South Pump Station, facing south

South Embankment, facing east

West Embankment, south section

West Embankment, center section

West Embankment, north section

South Pump station, facing east

North Pump station, facing east

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 12/04/23

Facility Address: 701 Main Street, Venice, IL 62090

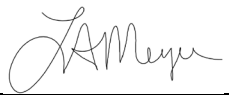
Inspection Conditions: 40°F, light rain

SECURITY & ACCESS	YES	NO	N/A	Comments
1. Is access controlled?	X			
2. Are "No Trespassing" signs posted?			X	
3. Is there evidence of trespassing?		X		
COVER & VEGETATION				
4. Is cover in acceptable condition?	X			
5. Is vegetation in acceptable condition?	X			
6. Is there any woody species of plant growing (i.e., trees and shrubs greater than 18")?		X		
7. Is there any area with more than 100 square feet of failed or eroded vegetation?		X		
8. Is there any erosion or sloughing of embankment slopes?		X		
DRAINAGE				
9. Are appropriate temporary runoff controls in place?			X	
10. Are there any rills, gullies, or crevices that are 6" or deeper?		X		
11. Are drainage channels in acceptable condition?	X			
12. Are there any low areas or depressions that could facilitate the ponding of water for extended periods of time?		X		
GEO-MEMBRANE				
13. Is there any exposed flexible membrane?		X		
14. If so, is the flexible membrane damaged?			X	
PUMP STATION				
15. Are the pump station inlets free of debris?	X			
16. Are there any structural deficiencies at the pump station?		X		

N/A = Not Applicable

Item # Additional Comment(s)

Item # Corrective Actions Taken Since Last Report

Inspector Signature:  Date: 12/04/23

North embankment, facing west

North Pump Station, facing north

North Pump Station, facing south

South Pump Station, facing north

South Pump Station, facing south

South Embankment, facing east

West Embankment, south section

West Embankment, center section

West Embankment, north section

South Pump station, facing east

North Pump station, facing east

APPENDIX D
STATISTICAL OUTPUT (ON CD)

APPENDIX D1
OUTLIER ANALYSIS RESULTS

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00219
Standard Deviation of all data: 0.00505
Largest Observation Concentration of all data: Xn = 0.0320
Test Statistic, high extreme of all data: Tn = 5.91
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0320	False		1

Antimony, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00135
Standard Deviation of all data: 0.00387
Largest Observation Concentration of all data: Xn = 0.0240
Test Statistic, high extreme of all data: Tn = 5.85
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0240	False		1

Antimony, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00217
Standard Deviation of all data: 0.00548
Largest Observation Concentration of all data: Xn = 0.0360
Test Statistic, high extreme of all data: Tn = 6.17
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0360	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00159
Standard Deviation of all data: 0.00430
Largest Observation Concentration of all data: Xn = 0.0270
Test Statistic, high extreme of all data: Tn = 5.91
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0270	False		1

Antimony, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00158
Standard Deviation of all data: 0.00418
Largest Observation Concentration of all data: Xn = 0.0270
Test Statistic, high extreme of all data: Tn = 6.08
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0270	False		1

Antimony, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00165
Standard Deviation of all data: 0.00481
Largest Observation Concentration of all data: Xn = 0.0270
Test Statistic, high extreme of all data: Tn = 5.27
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2021	0.0270	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00134
Standard Deviation of all data: 0.00404
Largest Observation Concentration of all data: Xn = 0.0260
Test Statistic, high extreme of all data: Tn = 6.10
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0260	False		1

Antimony, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00195
Standard Deviation of all data: 0.00485
Largest Observation Concentration of all data: Xn = 0.0330
Test Statistic, high extreme of all data: Tn = 6.41
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0330	False		1

Antimony, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000817
Standard Deviation of all data: 0.00120
Largest Observation Concentration of all data: Xn = 0.00650
Test Statistic, high extreme of all data: Tn = 4.74
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	<0.00650	True		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Antimony, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00153
Standard Deviation of all data: 0.00419
Largest Observation Concentration of all data: Xn = 0.0270
Test Statistic, high extreme of all data: Tn = 6.09
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0270	False		1

Antimony, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00190
Standard Deviation of all data: 0.00502
Largest Observation Concentration of all data: Xn = 0.0340
Test Statistic, high extreme of all data: Tn = 6.40
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0340	False		1

Antimony, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00143
Standard Deviation of all data: 0.00270
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 6.14
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0180	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Arsenic, dissolved, mg/L

Location: MW-10

Mean of all data: 0.0187
Standard Deviation of all data: 0.0143
Largest Observation Concentration of all data: Xn = 0.0670
Test Statistic, high extreme of all data: Tn = 3.37
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0670	False		1

Arsenic, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00544
Standard Deviation of all data: 0.00656
Largest Observation Concentration of all data: Xn = 0.0300
Test Statistic, high extreme of all data: Tn = 3.75
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0300	False		1

Arsenic, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.0120
Standard Deviation of all data: 0.00785
Largest Observation Concentration of all data: Xn = 0.0340
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Arsenic, dissolved, mg/L

Location: MW-2

Mean of all data: 0.0110
Standard Deviation of all data: 0.0180
Largest Observation Concentration of all data: Xn = 0.0942
Test Statistic, high extreme of all data: Tn = 4.62
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2022	0.0942	False		1

Arsenic, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.0203
Standard Deviation of all data: 0.00849
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00574
Standard Deviation of all data: 0.00797
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 4.68
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2010	0.0430	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Arsenic, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00528
Standard Deviation of all data: 0.00669
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 5.49
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0420	False		1

Arsenic, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0758
Standard Deviation of all data: 0.0728
Largest Observation Concentration of all data: Xn = 0.690
Test Statistic, high extreme of all data: Tn = 8.44
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.690	False		1

Arsenic, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0752
Standard Deviation of all data: 0.0182
Largest Observation Concentration of all data: Xn = 0.123
Test Statistic, high extreme of all data: Tn = 2.63
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/20/2002	0.0150	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Arsenic, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00468
Standard Deviation of all data: 0.00416
Largest Observation Concentration of all data: Xn = 0.0230
Test Statistic, high extreme of all data: Tn = 4.40
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0230	False		1

Arsenic, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00501
Standard Deviation of all data: 0.00660
Largest Observation Concentration of all data: Xn = 0.0350
Test Statistic, high extreme of all data: Tn = 4.54
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2010	0.0350	False		1

Arsenic, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00785
Standard Deviation of all data: 0.00841
Largest Observation Concentration of all data: Xn = 0.0380
Test Statistic, high extreme of all data: Tn = 3.58
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/28/2009	0.0380	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Barium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.0737
Standard Deviation of all data: 0.0450
Largest Observation Concentration of all data: Xn = 0.278
Test Statistic, high extreme of all data: Tn = 4.54
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.278	False		1

Barium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.194
Standard Deviation of all data: 0.0344
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.213
Standard Deviation of all data: 0.0579
Largest Observation Concentration of all data: Xn = 0.292
Test Statistic, high extreme of all data: Tn = 1.36
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/24/2023	<0.000100	True	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Barium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.238
Standard Deviation of all data: 0.0924
Largest Observation Concentration of all data: Xn = 0.510
Test Statistic, high extreme of all data: Tn = 2.94
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/15/2022	0.510	False		1

Barium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.363
Standard Deviation of all data: 0.0643
Largest Observation Concentration of all data: Xn = 0.491
Test Statistic, high extreme of all data: Tn = 1.99
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.198
Standard Deviation of all data: 0.0680
Largest Observation Concentration of all data: Xn = 0.371
Test Statistic, high extreme of all data: Tn = 2.55
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Barium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.174
Standard Deviation of all data: 0.0567
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 1.98
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0789
Standard Deviation of all data: 0.0193
Largest Observation Concentration of all data: Xn = 0.153
Test Statistic, high extreme of all data: Tn = 3.84
T Critical of all data: Tcr = 2.95

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	0.153	False		1

Barium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.309
Standard Deviation of all data: 0.0399
Largest Observation Concentration of all data: Xn = 0.395
Test Statistic, high extreme of all data: Tn = 2.16
T Critical of all data: Tcr = 2.94

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Barium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.255
Standard Deviation of all data: 0.0739
Largest Observation Concentration of all data: Xn = 0.373
Test Statistic, high extreme of all data: Tn = 1.59
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.110
Standard Deviation of all data: 0.0163
Largest Observation Concentration of all data: Xn = 0.196
Test Statistic, high extreme of all data: Tn = 5.28
T Critical of all data: Tcr = 2.95

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.196	False		1

Barium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.154
Standard Deviation of all data: 0.0240
Largest Observation Concentration of all data: Xn = 0.203
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.95

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Boron, dissolved, mg/L

Location: MW-10

Mean of all data: 17.7
Standard Deviation of all data: 2.69
Largest Observation Concentration of all data: Xn = 22.2
Test Statistic, high extreme of all data: Tn = 1.67
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-11

Mean of all data: 1.30
Standard Deviation of all data: 1.76
Largest Observation Concentration of all data: Xn = 7.83
Test Statistic, high extreme of all data: Tn = 3.71
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	7.83	False		1

Boron, dissolved, mg/L

Location: MW-11D

Mean of all data: 9.35
Standard Deviation of all data: 5.32
Largest Observation Concentration of all data: Xn = 23.5
Test Statistic, high extreme of all data: Tn = 2.66
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Boron, dissolved, mg/L

Location: MW-2

Mean of all data: 3.19
Standard Deviation of all data: 3.04
Largest Observation Concentration of all data: Xn = 14.0
Test Statistic, high extreme of all data: Tn = 3.56
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/11/2007	14.0	False		1

Boron, dissolved, mg/L

Location: MW-2D

Mean of all data: 3.41
Standard Deviation of all data: 1.95
Largest Observation Concentration of all data: Xn = 8.01
Test Statistic, high extreme of all data: Tn = 2.37
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-3

Mean of all data: 0.639
Standard Deviation of all data: 0.568
Largest Observation Concentration of all data: Xn = 3.94
Test Statistic, high extreme of all data: Tn = 5.82
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/19/2004	3.94	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Boron, dissolved, mg/L
Location: MW-3D

Mean of all data: 5.95
Standard Deviation of all data: 1.97
Largest Observation Concentration of all data: Xn = 8.24
Test Statistic, high extreme of all data: Tn = 1.16
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW-5

Mean of all data: 3.47
Standard Deviation of all data: 1.87
Largest Observation Concentration of all data: Xn = 7.46
Test Statistic, high extreme of all data: Tn = 2.13
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW-6

Mean of all data: 4.27
Standard Deviation of all data: 0.712
Largest Observation Concentration of all data: Xn = 6.17
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/30/2004	2.00	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Boron, dissolved, mg/L

Location: MW-6D

Mean of all data: 4.49
Standard Deviation of all data: 0.678
Largest Observation Concentration of all data: Xn = 6.38
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L

Location: MW-8

Mean of all data: 0.723
Standard Deviation of all data: 0.303
Largest Observation Concentration of all data: Xn = 2.03
Test Statistic, high extreme of all data: Tn = 4.32
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	2.03	False		1

Boron, dissolved, mg/L

Location: MW-9

Mean of all data: 0.670
Standard Deviation of all data: 0.172
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.35
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2001	0.100	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cadmium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.000471
Standard Deviation of all data: 0.000152
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00100	False		1

Cadmium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000497
Standard Deviation of all data: 0.000196
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.56
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00105
Standard Deviation of all data: 0.000657
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 2.97
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	0.00300	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cadmium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00103
Standard Deviation of all data: 0.00101
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.93
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000848
Standard Deviation of all data: 0.000455
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.54
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00105
Standard Deviation of all data: 0.000963
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/29/2016	0.00400	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cadmium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000560
Standard Deviation of all data: 0.000253
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.74
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.0293
Standard Deviation of all data: 0.257
Largest Observation Concentration of all data: Xn = 2.31
Test Statistic, high extreme of all data: Tn = 8.89
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	2.31	False		1

Cadmium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00149
Standard Deviation of all data: 0.00239
Largest Observation Concentration of all data: Xn = 0.0203
Test Statistic, high extreme of all data: Tn = 7.88
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	0.0203	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cadmium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000498
Standard Deviation of all data: 0.000189
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.66
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.000669
Standard Deviation of all data: 0.000547
Largest Observation Concentration of all data: Xn = 0.00310
Test Statistic, high extreme of all data: Tn = 4.44
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	0.00310	False		1

Cadmium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000817
Standard Deviation of all data: 0.000475
Largest Observation Concentration of all data: Xn = 0.00220
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chloride, dissolved, mg/L

Location: MW-10

Mean of all data: 46.6
Standard Deviation of all data: 23.9
Largest Observation Concentration of all data: Xn = 94.0
Test Statistic, high extreme of all data: Tn = 1.98
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-11

Mean of all data: 17.2
Standard Deviation of all data: 6.53
Largest Observation Concentration of all data: Xn = 41.5
Test Statistic, high extreme of all data: Tn = 3.73
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	41.5	False		1

Chloride, dissolved, mg/L

Location: MW-11D

Mean of all data: 37.0
Standard Deviation of all data: 10.8
Largest Observation Concentration of all data: Xn = 57.3
Test Statistic, high extreme of all data: Tn = 1.88
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chloride, dissolved, mg/L

Location: MW-2

Mean of all data: 15.1
Standard Deviation of all data: 3.66
Largest Observation Concentration of all data: Xn = 23.0
Test Statistic, high extreme of all data: Tn = 2.16
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2022	1.60	False	-1	

Chloride, dissolved, mg/L

Location: MW-2D

Mean of all data: 16.4
Standard Deviation of all data: 3.98
Largest Observation Concentration of all data: Xn = 27.0
Test Statistic, high extreme of all data: Tn = 2.66
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-3

Mean of all data: 20.4
Standard Deviation of all data: 4.48
Largest Observation Concentration of all data: Xn = 33.0
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/27/2014	33.0	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chloride, dissolved, mg/L

Location: MW-3D

Mean of all data: 36.8
Standard Deviation of all data: 7.77
Largest Observation Concentration of all data: Xn = 48.1
Test Statistic, high extreme of all data: Tn = 1.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-5

Mean of all data: 14.9
Standard Deviation of all data: 9.46
Largest Observation Concentration of all data: Xn = 39.2
Test Statistic, high extreme of all data: Tn = 2.57
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-6

Mean of all data: 26.8
Standard Deviation of all data: 3.32
Largest Observation Concentration of all data: Xn = 33.3
Test Statistic, high extreme of all data: Tn = 1.97
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/10/2020	15.4	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chloride, dissolved, mg/L

Location: MW-6D

Mean of all data: 32.9
Standard Deviation of all data: 6.95
Largest Observation Concentration of all data: Xn = 49.5
Test Statistic, high extreme of all data: Tn = 2.38
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-8

Mean of all data: 57.2
Standard Deviation of all data: 26.7
Largest Observation Concentration of all data: Xn = 147.
Test Statistic, high extreme of all data: Tn = 3.35
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/22/2017	147.	False		1

Chloride, dissolved, mg/L

Location: MW-9

Mean of all data: 76.3
Standard Deviation of all data: 34.9
Largest Observation Concentration of all data: Xn = 171.
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chromium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.000892
Standard Deviation of all data: 0.000806
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.86
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Chromium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000726
Standard Deviation of all data: 0.000584
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.89
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00113
Standard Deviation of all data: 0.00163
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.0100	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chromium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00146
Standard Deviation of all data: 0.00499
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 7.93
T Critical of all data: Tcr = 3.07

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0410	False		1

Chromium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000695
Standard Deviation of all data: 0.000562
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 4.10
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.000719
Standard Deviation of all data: 0.000660
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 4.97
T Critical of all data: Tcr = 2.99

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chromium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000761
Standard Deviation of all data: 0.000611
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.67
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00300	False		1

Chromium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00233
Standard Deviation of all data: 0.00801
Largest Observation Concentration of all data: Xn = 0.0630
Test Statistic, high extreme of all data: Tn = 7.57
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.0630	False		1

Chromium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000942
Standard Deviation of all data: 0.000894
Largest Observation Concentration of all data: Xn = 0.00420
Test Statistic, high extreme of all data: Tn = 3.64
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/30/2004	0.00420	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chromium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000716
Standard Deviation of all data: 0.000646
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 5.09
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00400	False		1

Chromium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00126
Standard Deviation of all data: 0.00362
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 8.75
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/21/2004	0.0329	False		1

Chromium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000934
Standard Deviation of all data: 0.00202
Largest Observation Concentration of all data: Xn = 0.0184
Test Statistic, high extreme of all data: Tn = 8.64
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/29/2005	0.0184	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, dissolved, mg/L

Location: MW-10

Mean of all data: 0.000921
Standard Deviation of all data: 0.000500
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.16
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000541
Standard Deviation of all data: 0.000236
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.000550
Standard Deviation of all data: 0.000370
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.91
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	0.00200	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00736
Standard Deviation of all data: 0.0185
Largest Observation Concentration of all data: Xn = 0.0906
Test Statistic, high extreme of all data: Tn = 4.51
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2022	0.0906	False		1

Cobalt, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000550
Standard Deviation of all data: 0.000239
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.89
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00283
Standard Deviation of all data: 0.00167
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.50
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000585
Standard Deviation of all data: 0.000449
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 5.38
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.00300	False		1

Cobalt, dissolved, mg/L

Location: MW-5

Mean of all data: 0.000707
Standard Deviation of all data: 0.000715
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 6.01
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Cobalt, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000689
Standard Deviation of all data: 0.000700
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 6.16
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000540
Standard Deviation of all data: 0.000224
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00237
Standard Deviation of all data: 0.000859
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/28/2010	<0.00500	True		1

Cobalt, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000864
Standard Deviation of all data: 0.00117
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 4.37
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	0.00600	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Copper, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00136
Standard Deviation of all data: 0.00148
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.49
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.00800	False		1

Copper, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00105
Standard Deviation of all data: 0.000916
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.22
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.00400	False		1

Copper, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.000564
Standard Deviation of all data: 0.000322
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 4.46
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00200	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Copper, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00209
Standard Deviation of all data: 0.00255
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 4.68
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0140	False		1

Copper, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000530
Standard Deviation of all data: 0.000209
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.25
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00150
Standard Deviation of all data: 0.00298
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 5.53
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.0180	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Copper, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.000718
Standard Deviation of all data: 0.000579
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.94
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	0.00300	False		1

Copper, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00269
Standard Deviation of all data: 0.0155
Largest Observation Concentration of all data: Xn = 0.140
Test Statistic, high extreme of all data: Tn = 8.87
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.140	False		1

Copper, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00240
Standard Deviation of all data: 0.0102
Largest Observation Concentration of all data: Xn = 0.0850
Test Statistic, high extreme of all data: Tn = 8.06
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0850	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Copper, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.000713
Standard Deviation of all data: 0.000549
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 4.17
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/01/2021	0.00300	False		1

Copper, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00161
Standard Deviation of all data: 0.00562
Largest Observation Concentration of all data: Xn = 0.0520
Test Statistic, high extreme of all data: Tn = 8.96
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0520	False		1

Copper, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00184
Standard Deviation of all data: 0.00991
Largest Observation Concentration of all data: Xn = 0.0930
Test Statistic, high extreme of all data: Tn = 9.20
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/31/2007	0.0930	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Cyanide, total, mg/L

Location: MW-10

Mean of all data: 0.00162
Standard Deviation of all data: 0.00126
Largest Observation Concentration of all data: Xn = 0.00690
Test Statistic, high extreme of all data: Tn = 4.21
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	0.00690	False		1

Cyanide, total, mg/L

Location: MW-11

Mean of all data: 0.00164
Standard Deviation of all data: 0.00222
Largest Observation Concentration of all data: Xn = 0.0136
Test Statistic, high extreme of all data: Tn = 5.40
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	0.0136	False		1

Cyanide, total, mg/L

Location: MW-11D

Mean of all data: 0.0219
Standard Deviation of all data: 0.0234
Largest Observation Concentration of all data: Xn = 0.0842
Test Statistic, high extreme of all data: Tn = 2.66
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cyanide, total, mg/L

Location: MW-2

Mean of all data: 0.00146
Standard Deviation of all data: 0.00124
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.85
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/16/2011	<0.00500	True		1

Cyanide, total, mg/L

Location: MW-2D

Mean of all data: 0.00172
Standard Deviation of all data: 0.00176
Largest Observation Concentration of all data: Xn = 0.00830
Test Statistic, high extreme of all data: Tn = 3.74
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	0.00830	False		1

Cyanide, total, mg/L

Location: MW-3

Mean of all data: 0.00145
Standard Deviation of all data: 0.00132
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.68
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Cyanide, total, mg/L

Location: MW-3D

Mean of all data: 0.00170
Standard Deviation of all data: 0.00179
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 4.07
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	0.00900	False		1

Cyanide, total, mg/L

Location: MW-5

Mean of all data: 0.00563
Standard Deviation of all data: 0.00264
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L

Location: MW-6

Mean of all data: 0.00161
Standard Deviation of all data: 0.00130
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.61
T Critical of all data: Tcr = 2.90

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Cyanide, total, mg/L
Location: MW-6D

Mean of all data: 0.00141
Standard Deviation of all data: 0.000924
Largest Observation Concentration of all data: Xn = 0.00250
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L
Location: MW-8

Mean of all data: 0.00156
Standard Deviation of all data: 0.00118
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.90
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L
Location: MW-9

Mean of all data: 0.00163
Standard Deviation of all data: 0.00123
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.74
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Fluoride, dissolved, mg/L

Location: MW-10

Mean of all data: 0.531
Standard Deviation of all data: 0.239
Largest Observation Concentration of all data: Xn = 0.850
Test Statistic, high extreme of all data: Tn = 1.34
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-11

Mean of all data: 0.302
Standard Deviation of all data: 0.113
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 3.63
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	0.710	False		1

Fluoride, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.437
Standard Deviation of all data: 0.180
Largest Observation Concentration of all data: Xn = 0.760
Test Statistic, high extreme of all data: Tn = 1.80
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Fluoride, dissolved, mg/L

Location: MW-2

Mean of all data: 0.263
Standard Deviation of all data: 0.0757
Largest Observation Concentration of all data: Xn = 0.550
Test Statistic, high extreme of all data: Tn = 3.80
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	0.550	False		1

Fluoride, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.249
Standard Deviation of all data: 0.0937
Largest Observation Concentration of all data: Xn = 0.500
Test Statistic, high extreme of all data: Tn = 2.68
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-3

Mean of all data: 0.212
Standard Deviation of all data: 0.0560
Largest Observation Concentration of all data: Xn = 0.330
Test Statistic, high extreme of all data: Tn = 2.10
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Fluoride, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.277
Standard Deviation of all data: 0.148
Largest Observation Concentration of all data: Xn = 0.640
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-5

Mean of all data: 0.357
Standard Deviation of all data: 0.111
Largest Observation Concentration of all data: Xn = 0.660
Test Statistic, high extreme of all data: Tn = 2.74
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-6

Mean of all data: 0.588
Standard Deviation of all data: 0.107
Largest Observation Concentration of all data: Xn = 0.830
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 2.90

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Fluoride, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.248
Standard Deviation of all data: 0.158
Largest Observation Concentration of all data: Xn = 0.570
Test Statistic, high extreme of all data: Tn = 2.04
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-8

Mean of all data: 0.428
Standard Deviation of all data: 0.148
Largest Observation Concentration of all data: Xn = 0.840
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-9

Mean of all data: 0.356
Standard Deviation of all data: 0.120
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 2.96
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	0.710	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Iron, dissolved, mg/L

Location: MW-10

Mean of all data: 1.45
Standard Deviation of all data: 1.67
Largest Observation Concentration of all data: Xn = 6.59
Test Statistic, high extreme of all data: Tn = 3.09
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	6.59	False		1

Iron, dissolved, mg/L

Location: MW-11

Mean of all data: 0.180
Standard Deviation of all data: 0.425
Largest Observation Concentration of all data: Xn = 1.73
Test Statistic, high extreme of all data: Tn = 3.65
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	1.73	False		1

Iron, dissolved, mg/L

Location: MW-11D

Mean of all data: 18.8
Standard Deviation of all data: 3.55
Largest Observation Concentration of all data: Xn = 23.5
Test Statistic, high extreme of all data: Tn = 1.32
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	5.67	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW-2

Mean of all data: 0.776
Standard Deviation of all data: 2.92
Largest Observation Concentration of all data: Xn = 16.2
Test Statistic, high extreme of all data: Tn = 5.28
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/06/2023	16.2	False		1

Iron, dissolved, mg/L

Location: MW-2D

Mean of all data: 17.2
Standard Deviation of all data: 2.95
Largest Observation Concentration of all data: Xn = 24.8
Test Statistic, high extreme of all data: Tn = 2.57
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW-3

Mean of all data: 1.53
Standard Deviation of all data: 1.44
Largest Observation Concentration of all data: Xn = 4.93
Test Statistic, high extreme of all data: Tn = 2.37
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Iron, dissolved, mg/L

Location: MW-3D

Mean of all data: 5.42
Standard Deviation of all data: 3.35
Largest Observation Concentration of all data: Xn = 13.9
Test Statistic, high extreme of all data: Tn = 2.52
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L

Location: MW-5

Mean of all data: 0.868
Standard Deviation of all data: 0.793
Largest Observation Concentration of all data: Xn = 4.67
Test Statistic, high extreme of all data: Tn = 4.80
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	4.67	False		1

Iron, dissolved, mg/L

Location: MW-6

Mean of all data: 19.2
Standard Deviation of all data: 5.65
Largest Observation Concentration of all data: Xn = 30.5
Test Statistic, high extreme of all data: Tn = 2.00
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Iron, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.569
Standard Deviation of all data: 0.283
Largest Observation Concentration of all data: Xn = 1.70
Test Statistic, high extreme of all data: Tn = 4.00
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/31/2023	1.70	False		1

Iron, dissolved, mg/L

Location: MW-8

Mean of all data: 0.0657
Standard Deviation of all data: 0.0701
Largest Observation Concentration of all data: Xn = 0.339
Test Statistic, high extreme of all data: Tn = 3.90
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	0.339	False		1

Iron, dissolved, mg/L

Location: MW-9

Mean of all data: 17.4
Standard Deviation of all data: 3.57
Largest Observation Concentration of all data: Xn = 24.5
Test Statistic, high extreme of all data: Tn = 1.98
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	4.21	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Lead, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00224
Standard Deviation of all data: 0.00150
Largest Observation Concentration of all data: Xn = 0.00350
Test Statistic, high extreme of all data: Tn = 0.842
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00236
Standard Deviation of all data: 0.00169
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.74
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00277
Standard Deviation of all data: 0.00159
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.03
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00166
Standard Deviation of all data: 0.00181
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.16
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2001	0.0110	False		1

Lead, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00261
Standard Deviation of all data: 0.00136
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.75
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00182
Standard Deviation of all data: 0.00190
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.26
T Critical of all data: Tcr = 2.99

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00800	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Lead, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00227
Standard Deviation of all data: 0.00155
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.77
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00146
Standard Deviation of all data: 0.00152
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.65
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	0.00700	False		1

Lead, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00277
Standard Deviation of all data: 0.00235
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 3.93
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/28/2009	0.0120	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Lead, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00238
Standard Deviation of all data: 0.00187
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.01
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00800	False		1

Lead, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00171
Standard Deviation of all data: 0.00198
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.69
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/28/2006	<0.0110	True		1

Lead, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00222
Standard Deviation of all data: 0.00189
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.64
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/28/2006	<0.0110	True		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Manganese, dissolved, mg/L

Location: MW-10

Mean of all data: 1.23
Standard Deviation of all data: 0.657
Largest Observation Concentration of all data: Xn = 2.50
Test Statistic, high extreme of all data: Tn = 1.92
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-11

Mean of all data: 0.176
Standard Deviation of all data: 0.313
Largest Observation Concentration of all data: Xn = 1.24
Test Statistic, high extreme of all data: Tn = 3.41
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	1.24	False		1

Manganese, dissolved, mg/L

Location: MW-11D

Mean of all data: 2.98
Standard Deviation of all data: 0.584
Largest Observation Concentration of all data: Xn = 4.01
Test Statistic, high extreme of all data: Tn = 1.77
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.908	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023 | **LT Multiplier: x 0.50**
Confidence Level: 95% | **Number of Outliers: One Outlier**
Transform: None

Manganese, dissolved, mg/L

Location: MW-2

Mean of all data: 0.370
Standard Deviation of all data: 0.836
Largest Observation Concentration of all data: Xn = 5.10
Test Statistic, high extreme of all data: Tn = 5.66
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2022	5.10	False		1

Manganese, dissolved, mg/L

Location: MW-2D

Mean of all data: 1.07
Standard Deviation of all data: 0.217
Largest Observation Concentration of all data: Xn = 1.44
Test Statistic, high extreme of all data: Tn = 1.70
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-3

Mean of all data: 0.846
Standard Deviation of all data: 0.320
Largest Observation Concentration of all data: Xn = 1.41
Test Statistic, high extreme of all data: Tn = 1.75
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Manganese, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.344
Standard Deviation of all data: 0.146
Largest Observation Concentration of all data: Xn = 0.745
Test Statistic, high extreme of all data: Tn = 2.75
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-5

Mean of all data: 1.31
Standard Deviation of all data: 0.696
Largest Observation Concentration of all data: Xn = 3.38
Test Statistic, high extreme of all data: Tn = 2.98
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-6

Mean of all data: 2.54
Standard Deviation of all data: 0.531
Largest Observation Concentration of all data: Xn = 3.63
Test Statistic, high extreme of all data: Tn = 2.04
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Manganese, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.199
Standard Deviation of all data: 0.0987
Largest Observation Concentration of all data: Xn = 0.600
Test Statistic, high extreme of all data: Tn = 4.07
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/31/2023	0.600	False		1

Manganese, dissolved, mg/L

Location: MW-8

Mean of all data: 0.632
Standard Deviation of all data: 0.128
Largest Observation Concentration of all data: Xn = 0.880
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-9

Mean of all data: 0.766
Standard Deviation of all data: 0.117
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.59
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nickel, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00243
Standard Deviation of all data: 0.00161
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.45
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.00800	False		1

Nickel, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00456
Standard Deviation of all data: 0.00295
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.85
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00233
Standard Deviation of all data: 0.00252
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 3.44
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	0.0110	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nickel, dissolved, mg/L

Location: MW-2

Mean of all data: 0.0119
Standard Deviation of all data: 0.0123
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.11
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/27/2007	0.0500	False		1

Nickel, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00120
Standard Deviation of all data: 0.000861
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.26
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00400	False		1

Nickel, dissolved, mg/L

Location: MW-3

Mean of all data: 0.0181
Standard Deviation of all data: 0.0170
Largest Observation Concentration of all data: Xn = 0.0800
Test Statistic, high extreme of all data: Tn = 3.64
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/1997	0.0800	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nickel, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00162
Standard Deviation of all data: 0.00128
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 4.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/06/2017	0.00700	False		1

Nickel, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00551
Standard Deviation of all data: 0.00799
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 3.43
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/26/2001	0.0329	False		1

Nickel, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0103
Standard Deviation of all data: 0.0124
Largest Observation Concentration of all data: Xn = 0.0470
Test Statistic, high extreme of all data: Tn = 2.96
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nickel, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00140
Standard Deviation of all data: 0.000999
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.60
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00500	False		1

Nickel, dissolved, mg/L

Location: MW-8

Mean of all data: 0.0131
Standard Deviation of all data: 0.0141
Largest Observation Concentration of all data: Xn = 0.117
Test Statistic, high extreme of all data: Tn = 7.35
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/16/1999	0.117	False		1

Nickel, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00749
Standard Deviation of all data: 0.0102
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 3.30
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/27/2007	0.0410	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW-10

Mean of all data: 2.09
Standard Deviation of all data: 3.47
Largest Observation Concentration of all data: Xn = 16.9
Test Statistic, high extreme of all data: Tn = 4.27
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2015	16.9	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-11

Mean of all data: 6.99
Standard Deviation of all data: 10.7
Largest Observation Concentration of all data: Xn = 55.6
Test Statistic, high extreme of all data: Tn = 4.55
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	55.6	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-11D

Mean of all data: 2.12
Standard Deviation of all data: 6.76
Largest Observation Concentration of all data: Xn = 44.0
Test Statistic, high extreme of all data: Tn = 6.20
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/07/2011	44.0	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW-2

Mean of all data: 3.98
Standard Deviation of all data: 4.27
Largest Observation Concentration of all data: Xn = 15.0
Test Statistic, high extreme of all data: Tn = 2.58
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW-2D

Mean of all data: 1.42
Standard Deviation of all data: 2.17
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 3.96
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	10.0	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-3

Mean of all data: 2.85
Standard Deviation of all data: 4.16
Largest Observation Concentration of all data: Xn = 14.2
Test Statistic, high extreme of all data: Tn = 2.73
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW-3D

Mean of all data: 1.25
Standard Deviation of all data: 2.11
Largest Observation Concentration of all data: Xn = 11.2
Test Statistic, high extreme of all data: Tn = 4.72
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	11.2	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-5

Mean of all data: 1.41
Standard Deviation of all data: 2.18
Largest Observation Concentration of all data: Xn = 11.4
Test Statistic, high extreme of all data: Tn = 4.58
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	11.4	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-6

Mean of all data: 1.24
Standard Deviation of all data: 2.01
Largest Observation Concentration of all data: Xn = 10.3
Test Statistic, high extreme of all data: Tn = 4.51
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/15/2022	10.3	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW-6D

Mean of all data: 1.18
Standard Deviation of all data: 2.42
Largest Observation Concentration of all data: Xn = 14.6
Test Statistic, high extreme of all data: Tn = 5.56
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	14.6	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-8

Mean of all data: 2.11
Standard Deviation of all data: 2.65
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 2.98
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/27/2014	10.0	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW-9

Mean of all data: 0.986
Standard Deviation of all data: 1.84
Largest Observation Concentration of all data: Xn = 9.27
Test Statistic, high extreme of all data: Tn = 4.51
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	9.27	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Selenium, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00507
Standard Deviation of all data: 0.00361
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.20
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00528
Standard Deviation of all data: 0.00342
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.38
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00420
Standard Deviation of all data: 0.00472
Largest Observation Concentration of all data: Xn = 0.0250
Test Statistic, high extreme of all data: Tn = 4.40
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.0250	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Selenium, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00507
Standard Deviation of all data: 0.00476
Largest Observation Concentration of all data: Xn = 0.0250
Test Statistic, high extreme of all data: Tn = 4.19
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0250	False		1

Selenium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00377
Standard Deviation of all data: 0.00342
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.53
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00501
Standard Deviation of all data: 0.00389
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 2.82
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/02/2021	0.0160	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Selenium, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00446
Standard Deviation of all data: 0.00402
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 2.87
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	0.0160	False		1

Selenium, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00488
Standard Deviation of all data: 0.00503
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 3.40
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0220	False		1

Selenium, dissolved, mg/L

Location: MW-6

Mean of all data: 0.00405
Standard Deviation of all data: 0.00362
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.47
T Critical of all data: Tcr = 2.90

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Selenium, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00464
Standard Deviation of all data: 0.00350
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.53
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00448
Standard Deviation of all data: 0.00356
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.39
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00459
Standard Deviation of all data: 0.00438
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	0.0180	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L

Location: MW-10

Mean of all data: 0.000886
Standard Deviation of all data: 0.00133
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 5.37
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/25/2016	0.00800	False		1

Silver, dissolved, mg/L

Location: MW-11

Mean of all data: 0.000940
Standard Deviation of all data: 0.00126
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 4.02
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.000775
Standard Deviation of all data: 0.00115
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 5.43
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00700	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L

Location: MW-2

Mean of all data: 0.000960
Standard Deviation of all data: 0.00167
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.43
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.0100	False		1

Silver, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00113
Standard Deviation of all data: 0.00126
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.86
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/29/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00133
Standard Deviation of all data: 0.00165
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.82
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/25/2016	0.00600	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00116
Standard Deviation of all data: 0.00148
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.94
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/25/2016	0.00700	False		1

Silver, dissolved, mg/L

Location: MW-5

Mean of all data: 0.000980
Standard Deviation of all data: 0.00109
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.70
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00500	False		1

Silver, dissolved, mg/L

Location: MW-6

Mean of all data: 0.000857
Standard Deviation of all data: 0.00107
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.86
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	0.00500	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Silver, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00158
Standard Deviation of all data: 0.00199
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.73
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00113
Standard Deviation of all data: 0.00144
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.37
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00600	False		1

Silver, dissolved, mg/L

Location: MW-9

Mean of all data: 0.000944
Standard Deviation of all data: 0.00139
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 5.09
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00800	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Sulfate, dissolved, mg/L

Location: MW-10

Mean of all data: 794.
Standard Deviation of all data: 221.
Largest Observation Concentration of all data: Xn = 1100.
Test Statistic, high extreme of all data: Tn = 1.38
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/12/2018	<0.100	True	-1	

Sulfate, dissolved, mg/L

Location: MW-11

Mean of all data: 85.6
Standard Deviation of all data: 68.9
Largest Observation Concentration of all data: Xn = 383.
Test Statistic, high extreme of all data: Tn = 4.32
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/13/2012	383.	False		1

Sulfate, dissolved, mg/L

Location: MW-11D

Mean of all data: 437.
Standard Deviation of all data: 214.
Largest Observation Concentration of all data: Xn = 927.
Test Statistic, high extreme of all data: Tn = 2.29
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Sulfate, dissolved, mg/L

Location: MW-2

Mean of all data: 37.2
Standard Deviation of all data: 45.4
Largest Observation Concentration of all data: Xn = 287.
Test Statistic, high extreme of all data: Tn = 5.51
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	287.	False		1

Sulfate, dissolved, mg/L

Location: MW-2D

Mean of all data: 38.7
Standard Deviation of all data: 45.2
Largest Observation Concentration of all data: Xn = 181.
Test Statistic, high extreme of all data: Tn = 3.15
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	181.	False		1

Sulfate, dissolved, mg/L

Location: MW-3

Mean of all data: 67.1
Standard Deviation of all data: 54.6
Largest Observation Concentration of all data: Xn = 230.
Test Statistic, high extreme of all data: Tn = 2.98
T Critical of all data: Tcr = 2.73

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	230.	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Sulfate, dissolved, mg/L

Location: MW-3D

Mean of all data: 166.
Standard Deviation of all data: 90.7
Largest Observation Concentration of all data: Xn = 638.
Test Statistic, high extreme of all data: Tn = 5.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	638.	False		1

Sulfate, dissolved, mg/L

Location: MW-5

Mean of all data: 108.
Standard Deviation of all data: 68.7
Largest Observation Concentration of all data: Xn = 340.
Test Statistic, high extreme of all data: Tn = 3.39
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/10/2014	340.	False		1

Sulfate, dissolved, mg/L

Location: MW-6

Mean of all data: 11.8
Standard Deviation of all data: 10.2
Largest Observation Concentration of all data: Xn = 48.7
Test Statistic, high extreme of all data: Tn = 3.63
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/15/2022	48.7	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Sulfate, dissolved, mg/L

Location: MW-6D

Mean of all data: 257.
Standard Deviation of all data: 75.3
Largest Observation Concentration of all data: Xn = 443.
Test Statistic, high extreme of all data: Tn = 2.47
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L

Location: MW-8

Mean of all data: 127.
Standard Deviation of all data: 32.4
Largest Observation Concentration of all data: Xn = 250.
Test Statistic, high extreme of all data: Tn = 3.79
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2021	250.	False		1

Sulfate, dissolved, mg/L

Location: MW-9

Mean of all data: 175.
Standard Deviation of all data: 59.9
Largest Observation Concentration of all data: Xn = 365.
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2012	365.	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Total Dissolved Solids, mg/L

Location: MW-10

Mean of all data: 1590.
Standard Deviation of all data: 251.
Largest Observation Concentration of all data: Xn = 2130.
Test Statistic, high extreme of all data: Tn = 2.15
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-11

Mean of all data: 768.
Standard Deviation of all data: 389.
Largest Observation Concentration of all data: Xn = 2770.
Test Statistic, high extreme of all data: Tn = 5.14
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/23/2017	2770.	False		1

Total Dissolved Solids, mg/L

Location: MW-11D

Mean of all data: 1270.
Standard Deviation of all data: 316.
Largest Observation Concentration of all data: Xn = 1730.
Test Statistic, high extreme of all data: Tn = 1.46
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	280.	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L

Location: MW-2

Mean of all data: 728.
Standard Deviation of all data: 224.
Largest Observation Concentration of all data: Xn = 1560.
Test Statistic, high extreme of all data: Tn = 3.70
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/24/2005	1560.	False		1

Total Dissolved Solids, mg/L

Location: MW-2D

Mean of all data: 750.
Standard Deviation of all data: 161.
Largest Observation Concentration of all data: Xn = 950.
Test Statistic, high extreme of all data: Tn = 1.24
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-3

Mean of all data: 725.
Standard Deviation of all data: 137.
Largest Observation Concentration of all data: Xn = 1130.
Test Statistic, high extreme of all data: Tn = 2.93
T Critical of all data: Tcr = 3.00

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2018	290.	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L

Location: MW-3D

Mean of all data: 573.
Standard Deviation of all data: 86.5
Largest Observation Concentration of all data: Xn = 750.
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-5

Mean of all data: 761.
Standard Deviation of all data: 197.
Largest Observation Concentration of all data: Xn = 1320.
Test Statistic, high extreme of all data: Tn = 2.84
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
11/05/2018	50.0	False	-1	

Total Dissolved Solids, mg/L

Location: MW-6

Mean of all data: 503.
Standard Deviation of all data: 102.
Largest Observation Concentration of all data: Xn = 1040.
Test Statistic, high extreme of all data: Tn = 5.28
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/30/2004	1040.	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L

Location: MW-6D

Mean of all data: 696.
Standard Deviation of all data: 172.
Largest Observation Concentration of all data: Xn = 960.
Test Statistic, high extreme of all data: Tn = 1.53
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-8

Mean of all data: 737.
Standard Deviation of all data: 131.
Largest Observation Concentration of all data: Xn = 1030.
Test Statistic, high extreme of all data: Tn = 2.24
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW-9

Mean of all data: 914.
Standard Deviation of all data: 183.
Largest Observation Concentration of all data: Xn = 1400.
Test Statistic, high extreme of all data: Tn = 2.65
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Zinc, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00606
Standard Deviation of all data: 0.00897
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.67
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0480	False		1

Zinc, dissolved, mg/L

Location: MW-11

Mean of all data: 0.00657
Standard Deviation of all data: 0.00934
Largest Observation Concentration of all data: Xn = 0.0490
Test Statistic, high extreme of all data: Tn = 4.55
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0490	False		1

Zinc, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00664
Standard Deviation of all data: 0.00978
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.44
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0500	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Zinc, dissolved, mg/L

Location: MW-2

Mean of all data: 0.0135
Standard Deviation of all data: 0.0548
Largest Observation Concentration of all data: Xn = 0.454
Test Statistic, high extreme of all data: Tn = 8.04
T Critical of all data: Tcr = 3.08

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.454	False		1

Zinc, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00622
Standard Deviation of all data: 0.00823
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 5.08
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0480	False		1

Zinc, dissolved, mg/L

Location: MW-3

Mean of all data: 0.0105
Standard Deviation of all data: 0.0174
Largest Observation Concentration of all data: Xn = 0.108
Test Statistic, high extreme of all data: Tn = 5.60
T Critical of all data: Tcr = 2.99

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/08/2008	0.108	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Zinc, dissolved, mg/L

Location: MW-3D

Mean of all data: 0.00611
Standard Deviation of all data: 0.0106
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.13
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0500	False		1

Zinc, dissolved, mg/L

Location: MW-5

Mean of all data: 0.00688
Standard Deviation of all data: 0.00977
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.41
T Critical of all data: Tcr = 3.13

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	<0.0500	True		1

Zinc, dissolved, mg/L

Location: MW-6

Mean of all data: 0.0151
Standard Deviation of all data: 0.0569
Largest Observation Concentration of all data: Xn = 0.478
Test Statistic, high extreme of all data: Tn = 8.14
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/1998	0.478	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 08/31/2023
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Zinc, dissolved, mg/L

Location: MW-6D

Mean of all data: 0.00534
Standard Deviation of all data: 0.00961
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 3.81
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0420	False		1

Zinc, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00691
Standard Deviation of all data: 0.0110
Largest Observation Concentration of all data: Xn = 0.0720
Test Statistic, high extreme of all data: Tn = 5.92
T Critical of all data: Tcr = 3.15

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/17/2011	0.0720	False		1

Zinc, dissolved, mg/L

Location: MW-9

Mean of all data: 0.00650
Standard Deviation of all data: 0.00820
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 5.31
T Critical of all data: Tcr = 3.16

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/21/2004	<0.0500	True		1

Based on Grubbs one-sided outlier test

APPENDIX D2
TEST DESCRIPTIONS

ELECTRIC POWER RESEARCH INSTITUTE

MANAGES

Groundwater Data Management and Evaluation Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

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10
STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

The Statistical Evaluation Report is comprised of a series of subreports as described below.

User Selections:

- One location.
- Sample date range for data selection.
- Interval length: the length of the averaging period in months (1,2,3,4, or 6).
- One parameter.
- Non-detect processing: multiplier between 0 and 1.
- One-sided confidence $(1-\alpha)$ level – 0.90, 0.95 or 0.99.
- Limit type: used in the statistical overview to determine exceedances.

Mann-Kendall Trend and Seasonal Analysis Tests

The Mann-Kendall test for trend is insensitive to the presence or absence of seasonality. The test is non-parametric and does not assume any type of data distribution. Nonetheless, two forms of the test are provided in MANAGES, one ignoring data seasonality even if it is present, and one considering data seasonality. In the test, the null hypothesis, H_0, is that the Sen trend is zero, and the alternate hypothesis, H_a, is that the trend is non-zero.

In general, the Mann-Kendall test considering seasonality indicates a larger range for allowable Sen estimate of trend when seasonality is actually present than the range indicated by the test performed ignoring seasonality.

In the Mann-Kendall Trend Analysis, available in under the Statistical Evaluation Report and in the Statistical Procedure for Detection Monitoring, and Mann-Kendall Seasonal Analysis, found under the Statistical Evaluation Report, MANAGES first calculates the Sen slope and the upper and lower confidence limits of the Sen slope, and then determines whether the Sen slope is statistically significant. Slope is statistically significant if it is non-zero.

Mann-Kendall Test for Sen Slope Significance – a two-sided, non-parametric method for data sets as small as 10, unless there are many tied (e.g., equal, NDs are treated as tieds) values (Gilbert, 1987; p. 208)	
Indicator Function $\mathrm{sgn}(x_{ij} - x_{jk})$	= 1 if $(x_{ij} - x_{jk}) > 0$ = 0 if $(x_{ij} - x_{jk}) = 0$ = -1 if $(x_{ij} - x_{jk}) < 0$ where $x_{i1}, x_{i2}, \ldots, x_{in}$ are the time ordered data (n_i is total of data in the i-th season).
Mann-Kendall Statistic, S_i	$= \sum_{k=1}^{n_i-1} \sum_{j=k+1}^{n_i} \mathrm{sgn}(x_{ij} - x_{jk})$
Variance of S_i $VAR(S_i)$	$VAR(S_i) =$ $\frac{1}{18}\left\{ n_i(n_i-1)(2n_i+5) - \sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(2t_{ip}+5) - \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(2u_{iq}+5) \right\}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1)(t_{ip}-2) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)(u_{iq}-2)}{9n_i(n_i-1)(n_i-2)}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip}-1) \sum_{q=1}^{h_i} u_{iq}(u_{iq}-1)}{2n_i(n_i-1)}.$ The variable g_i is the number of tied groups (equal-valued) data in the i-th season, t_{ip} is the number of tied data in the p-th group for the i-th season, h_i is the number of sampling times (or time periods) in the i-th season that contain multiple data, u_{iq} is the number of multiple data in the q-th time period in the i-th season, and n_i is the number of data values in the i-th season.

Test Statistic, Z	If $S' = \sum_{i=1}^{K} S_i$, where K is the number of seasons, then the test statistic Z is computed as: $$Z = \begin{cases} \dfrac{S'-1}{[VAR(S')]^{1/2}} & \text{iff } S' > 0 \\ 0 & \text{iff } S' = 0 \\ \dfrac{S'+1}{[VAR(S')]^{1/2}} & \text{iff } S' < 0 \end{cases}$$ Where "iff" is an acroym meaning: if-and-only-if. A positive Z value means an upward trend and a negative Z value means a negative trend.
Hypothesis Test: H_0 = no trend H_a = trend present This is a two-sided test at the α significance level.	Accept the null hypothesis H_0 of no trend if $\lvert Z \rvert \leq Z_{1-\alpha/2}$ Reject the null hypothesis H_0 if $\lvert Z \rvert > Z_{1-\alpha/2}$ where $Z_{1-\alpha/2}$ is obtained from Table A1 in Gilbert (1987; p. 254).

Kruskal-Wallis Analysis (Test for Seasonality)

To perform the Kruskal-Wallis test for data seasonality, data points are first segmented according to season (Gilbert, 1987). The null hypothesis, H_0, is that all seasons have the same mean value. The alternative hypothesis, H_a ,is that at least one season has a mean larger or smaller than the mean of at least one other season. Montgomery et al. (1987) provide additional information on groundwater data seasonality. This is a two-sided, non-parametric test.

In MANAGES, the Kruskal-Wallis Test for Seasonality is found under Data Review // Non-Parametric Methods // Kruskal-Wallis Analysis. It determines whether the seasonal means for the specified parameter at the specified location are statistically the same.

	or $Z_i \geq SCL$.

Outlier Tests

Outlier tests are useful in detecting inconsistencies of measurement within a data set. An outlier is defined as an observation that appears to deviate markedly from other values of a sample set. There are many possible reasons for the presence of an outlier, including 1) the presence of a true but extreme value from a single population, resulting from random variability inherent in the data; 2) an improper identification of the underlying distribution describing the population from which the sample set comes from; 3) the occurrence of some unknown event(s) such as a spill, creating a mixture of two or more populations; 4) a gross deviation from prescribed sampling procedures or laboratory analysis; 5) a transcription error in the data value or data unit of measurement.

USEPA (1989; p. 8-11) states that the purpose of a test for outliers is to determine whether or not there is statistical evidence that an observation that appears extreme does not fit the distribution of the rest of the data. If an observation is identified as an outlier, then steps need to be taken to determine whether it is the result of an error or a valid extreme observation. If a true error, such as in transcription, dilution, or analytical procedure, can be identified, then the suspect value should be replaced with its corrected value. If the source of the error can be determined but no correction is possible, then the observation is deleted and the reason for deletion is reported along with any statistical analysis. If no source of error can be documented, then it must be assumed that the observation is a true but extreme value of the data set. If this is the case, the outlier observation(s) must not be altered or excluded from any statistical analysis. Identification of an observation as an outlier but with no error documented could be used to suggest resampling to confirm the value (USEPA, 1989; p. 8-13).

The outlier tests provided in MANAGES are based on either the single outlier test of Grubbs (1969), which is used by USEPA (1989; pp. 8-10 to 8-13) or the single outlier test of Dixon (1951, 1953), which is used by USEPA (2000; pp. 4-24) and by ASTM (1998). The outlier tests assume the data come from a normal distribution. Only one outlier, either an extreme low or an extreme high, can be detected during a single analysis of a data set. Additional outliers can be detected by temporarily removing a previously detected outlier from a data set and then repeating the test on the remaining, reduced, data set. During each pass of the outlier test, the sample mean, standard deviation, and sample size used in the test statistics are computed using only the data remaining in the set. The process can be continued until there is either an insufficient amount of data remaining (a minimum of 3 values) or when no additional outliers are found. When using MANAGES, the user will be asked how many outliers are to be checked and it will then automatically perform all of the recursive calls and data reductions with the Grubbs or Dixon routine. When done, a report can be generated that will show each outlier marked with a flag indicating the sequential order in which the outliers were identified.

Critical values used in the one-sided Grubbs test are taken directly from those in Grubbs and Beck (1972) for sample sizes smaller than 147 observations. Critical values for sample sizes larger than 147 were generated numerically using a Monte Carlo routine, where each sampling event was simulated 100,000 times. Sample sizes ranging from 148 to 5,000 where used and then their resultant test statistic T_n curve fitted at specific significance levels. By this method, it was possible to match Grubbs results to at least four significant digits for corresponding tabulated values.

Critical values used in the one-sided Dixon outlier test are taken directly from tables given in Dixon (1951), Dixon (1953; page 89), and USEPA (2000; p. A-5, Table A-3). The critical values were then curve fitted for every sample size between 3 and 25 as a function of the significance level. By this method, it was possible to match Dixon's results to at least four significant digits for corresponding tabulated values. Note that the Dixon test assumes the data are either normally or lognormally distributed. Hence, sample sizes can only range between 3 and 25, inclusive. Dixon never developed an outlier test for sample sizes larger than 25.

User Selections:

- One or up to 100 locations: a separate test is performed for each location.
- One or up to 100 parameters: a separate test is performed for each parameter.
- Evaluation date range.
- Confidence $(1-\alpha)$ level: 0.90, 0.95 or 0.99.
- Non-detect processing: multiplier between 0 and 1.
- Data transformation option: none and log (base e).
- Number of outliers: one, two, first 5%, first 10%. Selecting any option other than one causes MANAGES to rerun the test, with outliers from prior tests removed, until either no outliers are detected or the specified number of outliers are detected.

Technical Details

Grubbs Outlier Test – The Grubbs outlier test determines whether there is statistical evidence that an observation does not fit the remaining data (USEPA, 1989; p. 8-11). This significance test looks at either the highest or the lowest observation in normal samples.	
The number of observations taken during a specified scoping period; n	*n*

Mean of the observed data during the scoping period; $\overline{X}$	$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$ where X_i is the i-th observation.
Standard deviation of observed data; S_x.	$S_x = \sqrt{\frac{1}{(n-1)}\sum_{i=1}^{n}(X_i - \overline{X})^2}$
Test statistics: T_l & T_n	Sort the data into ascending order, then compute the statistics $T_l = (\overline{X} - X_l)/S_x$ $T_n = (X_n - \overline{X})/S_x$ where X_l is the smallest value of the n observations and X_n is the largest value of the n observations.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Grubbs single, one-sided test of either an extreme low outlier : X_l *is an outlier if* $T_l \geq T_{cr(1-\alpha,n)}$ or an extreme high outlier: X_n *is an outlier if* $T_n \geq T_{cr(1-\alpha,n)}$. The function $T_{cr(1-\alpha,n)}$ is the critical value, given in Grubbs and Beck (1972; Table 1) and USEPA (1989; p. B-11, Table 8) . Note that the critical value assumes that the mean and standard deviation are computed from the sample being tested.

Dixon Outlier Test – The Dixon outlier test determines whether there is statistical evidence that an extreme observation does not fit the remaining data (USEPA, 2000; p. 4-24 and ASTM D6312, 1998). This significance test looks at both the highest and the

lowest observations in a sample data set. However, the routine will only perform the outlier tests if several conditions are first satisfied. For example, the Dixon outlier algorithm checks the distribution of the sample data for both normality and lognormality using the Shapiro-Wilk W-test. The outlier routine will not proceed with a data set if the W-test fails. In addition, the Dixon outlier test is limited to a minimum of 3 and a maximum sample size n of 25 data values.	
The number of observations taken during a specified scoping period; n	Number of observations, n, where $3 \le n \le 25$.
Sorting the sample data	Sort the data into ascending order, with the minimum data value $X_{(1)}$ first and the maximum data value $X_{(n)}$ last. Use the natural log of the data values if data are lognormally distributed, i.e., $X_{(j)} = \text{Ln}[X_{(j)}]$.
Goodness-of fit tests	After temporarily excluding either the minimum or maximum value of the data set, the Shapiro-Wilk's W-test is used to determine if the remaining $n-1$ values are normally or lognormally distributed. If not, the Dixon outlier test can't be used.
Test statistic, T_s, for the minimum data value	Compute the T_s test statistic for $X_{(1)}$ as an outlier: $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}}$ *for* $14 \le n \le 25.$
Test statistic, T_s, for the maximum data value	Compute the T_s test statistic for $X_{(n)}$ as an outlier:

	$T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}}$ *for* $8 \le n \le 10$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}}$ *for* $11 \le n \le 13$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}}$ *for* $14 \le n \le 25$.
Critical value T_c	USEPA (2000; p. A-5, Table A-3) lists the critical values of the Dixon test as a function of sample size for a one-sided extreme value test at the significance levels α of 0.1, 0.05, and 0.01.
One-sided test with a (1-α) confidence level that there is a single extreme outlier within the n observations.	Dixon's single, one-sided test for statistical evidence of either an extreme low-valued outlier: $X_{(1)}$ *is an outlier if* $T_s \ge T_c$ or an extreme high-valued outlier: $X_{(n)}$ *is an outlier if* $T_s \ge T_c$. The function T_c is the critical value, given in Dixon (1953; page 89) and USEPA (2000; p. A-5, Table A-3). Note that the critical value assumes that the data are either normally or lognormally distributed.

Other Statistical Calculations Used in MANAGES

Sen Estimate of Slope

The Sen estimate of slope is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed (Gilbert, 1987). The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar days. Sen's estimate of slope is a non-parametric estimator of trend. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. In contrast, linear regression and other least squares estimators of slope are significantly more sensitive, and more likely to give erroneous slope indications, even when only a few outlier values are present.

When data averaging is not activated, the Sen slope is calculated using individual data points and actual sampling dates. When data averaging is activated, multiple data points within each specified season period are reduced to one data point by arithmetic averaging over each of the season periods. These averaged values are then assigned to the day that corresponds to the middle of that season's period.

The approximate lower and upper confidence limits for the Sen slope can also be calculated using normal theory (Gilbert, 1987). It should be noted that confidence limits for the Sen slope are not necessarily symmetrical about the estimated slope since ranked values of slope are used in the calculation.

MANAGES calculates Sen slope in the Sen Slope Overlay Graph, Statistical Summary reports and in the two Mann-Kendall tests performed under the Statistical Evaluation Report.

Sen's Estimate of Slope – two-sided, non-parametric method that calculates the trend of a single data series. It is less sensitive to outliers and non-detect values than linear regression (Gilbert, 1987; p. 217).	
Slope, Q	$= \frac{x_{i'} - x_i}{i' - i}$ where $X_{i'}$ and x_i are data values at times i' and i, respectively, and where $i'>i$. Typically, i' and i are expressed in units of either days for trend analysis or years for seasonal analysis.
N′	Number of unique data point pairs that can be made for the observations in the data set, for $i'>i$. For n monitoring events, N′ is given as: N′ = n(n-1)/2

Sen's Slope Estimate	Sen's slope estimator = median slope $= Q_{[(N'+1)/2]}$ if N' is odd $= \frac{1}{2}(Q_{[N'/2]} + Q_{[(N'+2)/2]})$ if N' is even where the Q values have first been ranked from smallest to largest.
$Z_{1-\alpha/2}$	Statistic for the cumulative normal distribution (Gilbert, 1987; p. 254) for the two-sided, α significance level.
Variance estimate of the Mann-Kendall S Statistic, VAR(S)	VAR(S) $= \frac{1}{18}\left[n(n-1)(2n+5) - \sum_{p=1}^{g} t_p(t_p-1)(2t_p+5)\right]$ where g is the number of tied groups, t_p is the number of data in the pth group, and n is the number of data values.
C_α	$= Z_{1-\alpha/2}\sqrt{VAR(S)}$
Sen's Slope , a two-sided test at the α significance level	$M_1 = \frac{(N'-C_\alpha)}{2}$ $M_2 = \frac{(N'+C_\alpha)}{2}$ Lower limit of confidence interval is the M_1-th largest slope, and upper limit of confidence interval is the (M_2+1)-th largest of the N′ ordered slope estimates.

Coefficient of Skewness for Normality

The coefficient of skewness is another measure for data normality (Gilbert, 1987). MANAGES provides the value of the coefficient of skewness in the Statistical Evalueation Report, Statistical Overview. Additional information on data normality is given by Montgomery, et al. (1987).