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2020 ANNUAL REPORT

FORMER VENICE POWER PLANT – ASH PONDS 2 & 3

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2020 ANNUAL REPORT
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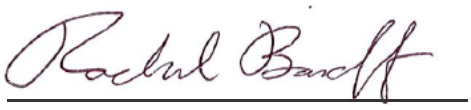

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ACRONYMS AND ABBREVIATIONS

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.

This 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 February 2018 through September 2020. Data collected in 2018 and 2019 were included, in addition to data collected in 2020, 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 a description 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 Groundwater Quality Overview – 2012 to 2020

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 (NRT, 2011), which are focused on specific compliance criteria and proposed mitigation actions. 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 polyvinyl chloride (PVC) geomembrane; a geocomposite drainage layer constructed of high-density polyethylene 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 (NRT, 2011).

1.2.2 Summary of 2012 to 2020 Groundwater Quality Data Review

The Closure Plan identified boron as the primary indicator constituent for coal ash impacts to groundwater at the Site because, while other sources of contamination are present in the area, Ash Ponds 2 & 3 are the only known significant source of boron, and boron is mobile in groundwater. As such, boron was selected for this groundwater quality data review. Boron concentrations over time from closure completion (2012) to the present are presented in Figures 1-2 through 1-7. Best fit linear regression lines are included in the figures to provide a convenient means of evaluating general concentration "trends" over time. It should be noted that the regression lines are not equivalent to the statistical trends discussed in the groundwater compliance section of this report. Numeric standards for Class I: Potable Resource Groundwater set forth in 35 IAC 620.410 (Class I Groundwater Standards) are also shown for reference, although they are not applicable compliance levels within the GMZ.

Generally, boron concentrations in most compliance monitoring wells have decreased since 2012 and are currently below or near the Class I Groundwater Standard. 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 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 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 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 (see 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
  - 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 March 2020 and September 2020 are illustrated in Figures 3-1 and 3-2. Groundwater was encountered in shallow monitoring wells at elevations between approximately 397 to 401 feet North American Vertical Datum of 1988 (NAVD88) in March 2020 (Figure 3-1) and 387 to 396 feet NAVD88 in September 2020 (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. On average, higher groundwater elevations were observed in March 2020 when the river stage elevation was higher, as compared to groundwater elevations observed in September, when the river stage elevation was lower (Figure 3-1 and 3-2). Groundwater flow directions in March 2020 and September 2020 were generally west-southwest (toward the Mississippi River), and horizontal hydraulic gradients were approximately 0.003 feet/foot and 0.006 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 March 2020 and September 2020 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 analysis. All laboratory analytical results for groundwater samples collected on February 12, 2018; May 1, 2018; August 27, 2018; November 5, 2018; February 4, 2019; September 10, 2019; March 10, 2020; and September 8, 2020, during the most recent eight groundwater monitoring events, are tabulated in Appendix A. The field data for 2020 are found in Appendix B. Selected analytes 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 2018-2020 monitoring period, boron concentrations ranged from 0.05 to 4.92 milligrams per liter (mg/L) in shallow compliance monitoring wells, except in MW-10 where boron concentrations ranged from 15.05 to 19.62 mg/L; in deep monitoring wells, boron concentrations ranged from 0.35 to 10.91 mg/L. (Figure 3-3). As discussed in Sections 1.2.2-1.2.3, boron concentrations have decreased in the majority of compliance monitoring wells across the Site since closure. During the current monitoring period, boron concentrations are continuing to decrease over time and 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 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, sulfate concentrations at the Ash Ponds 2 & 3 were highest at MW-6D, MW-10, and MW-11D (Figure

3-5) in 2018, 2019, and 2020, where boron concentrations were also highest. However, there are also differences between the sulfate distribution and the boron distribution at the Site. For example, MW-6 had boron concentrations greater than 4 mg/L (above the Class I Groundwater Standard for boron [2.0 mg/L]), suggesting coal ash impacts, even though sulfate concentrations were very low (below the Class I Groundwater Standard for sulfate [400 mg/L]). Conversely, background monitoring wells MW-8 and MW-9 had low boron concentrations (median concentrations below the Class I Groundwater Standard for boron of 0.741 mg/L and 0.676 mg/L, respectively), yet sulfate concentrations were similar to or higher than some of the wells which had elevated boron concentrations (i.e., wells 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 2018-2020 dataset. Trends were evaluated following a three-step procedure:

- Test for outliers using the Grubbs Outlier test.
- 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 statistical evidence of a high or low observation that differs significantly from the other data and provides statistical evidence of potential outliers. The test methodology and results are listed in Appendix D. Outliers identified by the Grubbs outlier test based on the date range of 1996-2020 were eliminated from further 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 data values. The test methodology is listed in Appendix D.

Data collected within the 2018-2020 monitoring period (most recent eight monitoring events) show 23 cases with positive slopes, 41 cases with negative slopes, and 188 cases with no slope (Table 3-1). The 23 cases with positive slopes were tested using the Mann-Kendall test (described in Section 3.3.3 below) to determine if the positive slopes represented statistically significant short-term (2018-2020) 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 eleven cases of increasing trends in the 2018-2020 dataset. The increasing short-term trends occurred for boron (MW-5, MW-6D, and MW-8), chloride (MW-6D), iron (MW-3D and MW-10), manganese (MW-5 and MW-10), sulfate (MW-5), TDS (MW-3D), and zinc (MW-6D). Of these identified short-term trends, only the manganese in MW-10 and TDS in MW-3D represent trends observed to continue over a period of two or more consecutive years. Therefore, the manganese trend in MW-10 and the TDS trend in MW-3D 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 2020. Groundwater monitoring field data worksheets which contain inspection records for 2020 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 as they are reported.

The March 2020 cover inspection report noted that the construction for the foundation for the replacement of Structure 161 was completed and the flexible membrane was no longer exposed. The disturbed areas were stabilized and protected with erosion control blanket and seeded, but the spring construction for the removal and monopole installation had disturbed a few areas that were stabilized. The soil surface was reseeded as mentioned in the June of 2020 cover inspection report, and the area has since regrown.

4. EVALUATION OF COMPLIANCE

The increasing short-term trends as identified in Section 3.3.3 and in Table 3-1 for the most recent eight monitoring events (2018-2020) 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 manganese trend at MW-10 and the short-term TDS trend at MW-3D, both of which represent the second occurrence of each short-term trend. Timeseries concentration plots, illustrating concentrations for the most recent eight monitoring events (2018-2020), were developed for parameters and monitoring wells with consecutive short-term increasing trends (i.e., MW-10 and MW-3D), as identified using the Mann-Kendall test, and graphed along with concentrations in background wells (i.e., MW-8 and MW-9), in Figures 4-1 and 4-2. The consecutive occurrences of short-term increasing trends for manganese at MW-10 and TDS at MW-3D are further evaluated below and are not attributed to a potential release at Ash Ponds 2 & 3.

4.1 Manganese: MW-10

A short-term increasing trend for manganese above the Class I Groundwater Standard (0.15 mg/L) occurred in 2020 at compliance monitoring well MW-10 (Figure 4-1). This is the second occurrence of such a trend at MW-10 in two consecutive years (i.e., 2019 and 2020); single occurrences of increasing trends of manganese have also been observed for MW-5 in 2016 and MW-11 in 2017. The solubility of manganese in groundwater is sensitive to redox conditions and concentrations often change due to natural variation, as evidenced by the sporadic increasing trends observed at various monitoring wells in the past. Natural variation of manganese is also evident at the Site from manganese concentrations at background wells (MW-8 and MW-9) which, like MW-10, have concentrations elevated above the Class I Groundwater Standard for manganese (see Figure 4-1). In addition, no long-term post-closure increasing trend (time period from 2012 to 2020) was identified for manganese at MW-10, further indicating the short-term increasing trends for manganese at MW-10 may be sporadic and attributed to natural variation at the Site. Further, since MW-10 does not have increasing short- or long-term trends of primary coal ash indicator parameter boron or secondary coal ash indicator parameter sulfate, the increasing short-term trends for manganese are likely a result of natural variation and do not indicate that a release from Ash Ponds 2 & 3 has occurred.

4.2 Total Dissolved Solids: MW-3D

A short-term increasing trend for TDS below the Class I Groundwater Standard (1,200 mg/L) occurred in 2020 at compliance monitoring well MW-3D (Figure 4-2). This is the second occurrence of such a trend at MW-3D in two consecutive years (i.e., 2019 and 2020); occurrences of increasing trends of TDS have been observed intermittently (non-consecutive years) at MW-6D (2014) and MW-9 (2016 and 2018). TDS is a non-specific measure of dissolved concentrations in groundwater, therefore, variation in TDS concentrations are subject to the natural variation in the concentrations of ions that contribute to TDS, as evidenced by the sporadic increasing trends observed at various monitoring wells in the past. Natural variation of TDS is evident at the Site from TDS concentrations at background wells (MW-8 and MW-9) which, like MW-3D, have TDS concentrations below the Class I Groundwater Standard, however TDS concentrations at background wells are consistently greater than concentrations observed at MW-3D (see Figure 4-2). In addition, no long-term post-closure increasing trend (time period from 2012 to 2020) was identified for TDS at MW-3D, indicating the short-term increasing trends for

TDS at MW-3D may be sporadic and attributed to natural variation at the Site. Further, the short-term trend of primary coal ash indicator parameter boron at MW-3D is downward and no long-term increasing trend was observed for boron at MW-3D. Likewise, the short- and long-term trends at MW-3D for secondary coal ash indicator parameter sulfate are decreasing. Short-term increasing trends for TDS at MW-3D are not coincident with increasing trends of coal ash indicator parameters boron and sulfate, which are decreasing during the same time period (2018 to 2020), therefore, the short-term increasing trends for TDS at MW-3D are likely a result of natural variation and do not indicate that a release from Ash Ponds 2 & 3 has occurred.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Statistical analyses of analytical results for the eight rounds of groundwater samples collected between 2018 to 2020 identified two cases of increasing trends that recurred over a period of two or more consecutive years, including:

- Manganese in MW-10
- TDS in MW-3D

As discussed in Section 4, the two cases of reoccurring increasing trends are not indicative of a potential release from Ash Ponds 2 & 3 as summarized below:

- Manganese is geochemically dependent on local redox conditions and subject to natural variation, site background wells were observed to have elevated manganese concentrations greater than the Class I Groundwater Standard for manganese, no long-term increasing trends of manganese were observed at MW-10, and MW-10 does not have increasing short- or long-term trends for coal ash indicator parameters boron or sulfate, thus the short-term increasing trends for manganese do not indicate that a release from Ash Ponds 2 & 3 has occurred.
- TDS is a non-specific measure of dissolved concentrations in groundwater and subject to the natural variation, site background wells were observed to have concentrations consistently greater than TDS concentrations observed at MW-3D, no long-term increasing trends of TDS were observed at MW-3D, and MW-3D does not have increasing short- or long-term trends for coal ash indicator parameters boron or sulfate, thus the short-term increasing trends for TDS do not indicate that a release from Ash Ponds 2 & 3 has occurred.

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. 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. Therefore, removal of lead and selenium from the list of groundwater monitoring program parameters is recommended (Table 1-3).

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.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
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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
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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
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Field Parameters	Method
pH	Field
Electrical conductance	Field
Temperature	Field
Water level	Field
Well depth	Field
Laboratory Parameters	**Method**
Antimony	SW-846 #3015 and #6020
Arsenic	SW-846 #3015 and #6020
Barium	EPA 200.7
Beryllium[1]	EPA 200.7
Boron	EPA 200.7
Cadmium	SW-846 #3015 and #6020
Chloride	ASTM D4327
Chromium	EPA 200.7
Cobalt	EPA 200.7
Copper	EPA 200.7
Cyanide	Std. Meth. 4500-CN
Fluoride	Std. Meth. 4500-F
Iron	EPA 200.7
Lead	SW-846 #3015 and #6020
Manganese	EPA 200.7
Mercury[1]	SW-846 #3015 and #6020
Nickel	EPA 200.7
Nitrate as N	ASTM D4327
Selenium	SW-846 #3015 and #6020
Silver	EPA 200.7
Sulfate	ASTM D4327
Thallium[1]	SW-846 #3015 and #6020
Total Dissolved Solids	EPA 160.1
Zinc	EPA 200.7

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

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

Table 3-1. Trend Analysis Results
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	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	6	8	8	8	8	8	8	8	8	8
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	decrease	-	decrease	decrease	increase	none	increase	increase	none	-	-	decrease
Cadmium, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Chloride, dissolved	-	+	+	-	-	decrease	increase	-	-	-	-	-
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	none	-	+	increase	+	decrease	decrease	none	+	increase	none	decrease
Lead, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Manganese, dissolved	decrease	none	-	none	increase	-	none	none	none	increase	none	decrease
Nickel, dissolved	none	none	none	none	none	none	none	none	none	none	none	none
Nitrate nitrogen, dissolved	+	none	none	none	none	none	none	none	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	+	-	-	decrease	increase	+	decrease	+	-	-	-	decrease
Total Dissolved Solids	-	-	-	increase	+	-	decrease	+	-	-	-	decrease
Zinc, dissolved	none	none	none	none	none	none	increase	none	none	none	none	none

|O: RAB 11/17/2020, C: RSD 11/18/2020|

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.
- Statistically significant positive/negative slopes are hereby referred to as increasing/decreasing trends.
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- The most recent eight sampling events were used for analysis; date range for this analysis is 1/1/2018-9/8/2020

Table 3-2. Summary of Trend Analyses
2020 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	27

[O: RAB 11/17/2020, C: RSD 11/18/2020]

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

2020 ANNUAL REPORT
FORMER VENICE POWER PLANT
ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

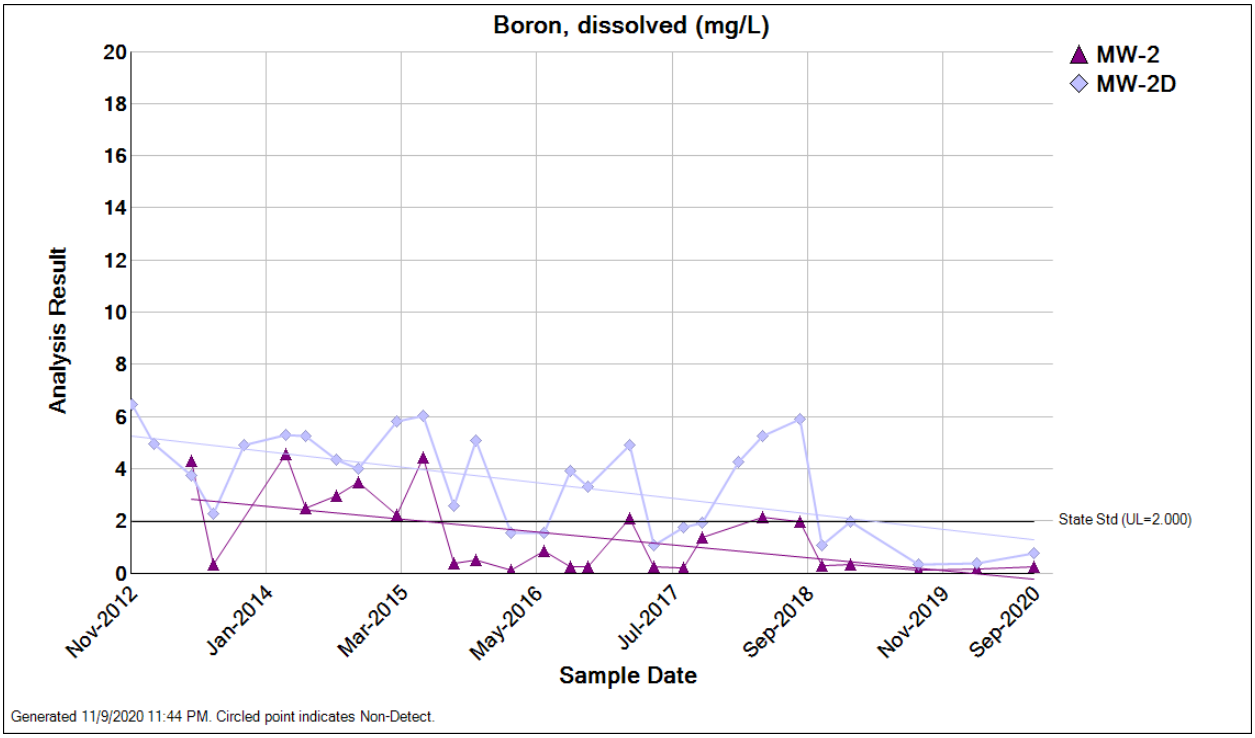


Figure 1-2. Boron concentrations over time since closure completion (2012) at compliance wells MW-2 and MW-2D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

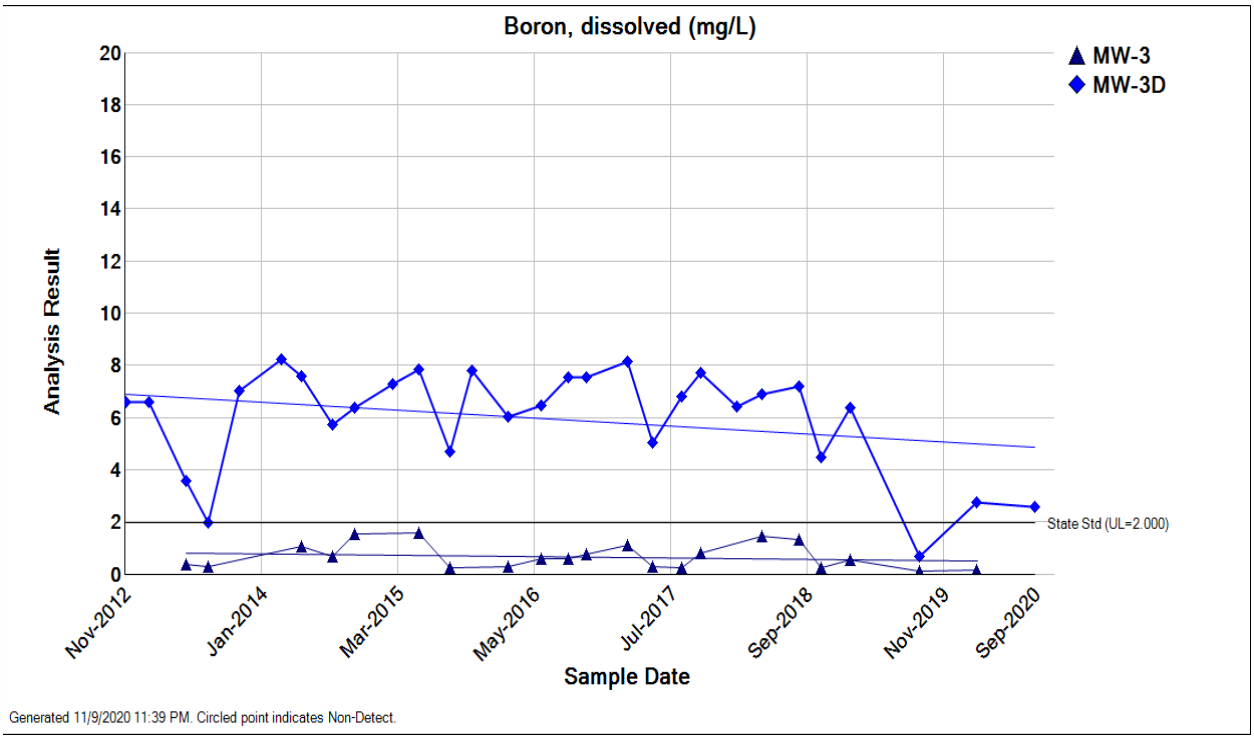


Figure 1-3. Boron concentrations over time since closure completion (2012) at compliance wells MW-3 and MW-3D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

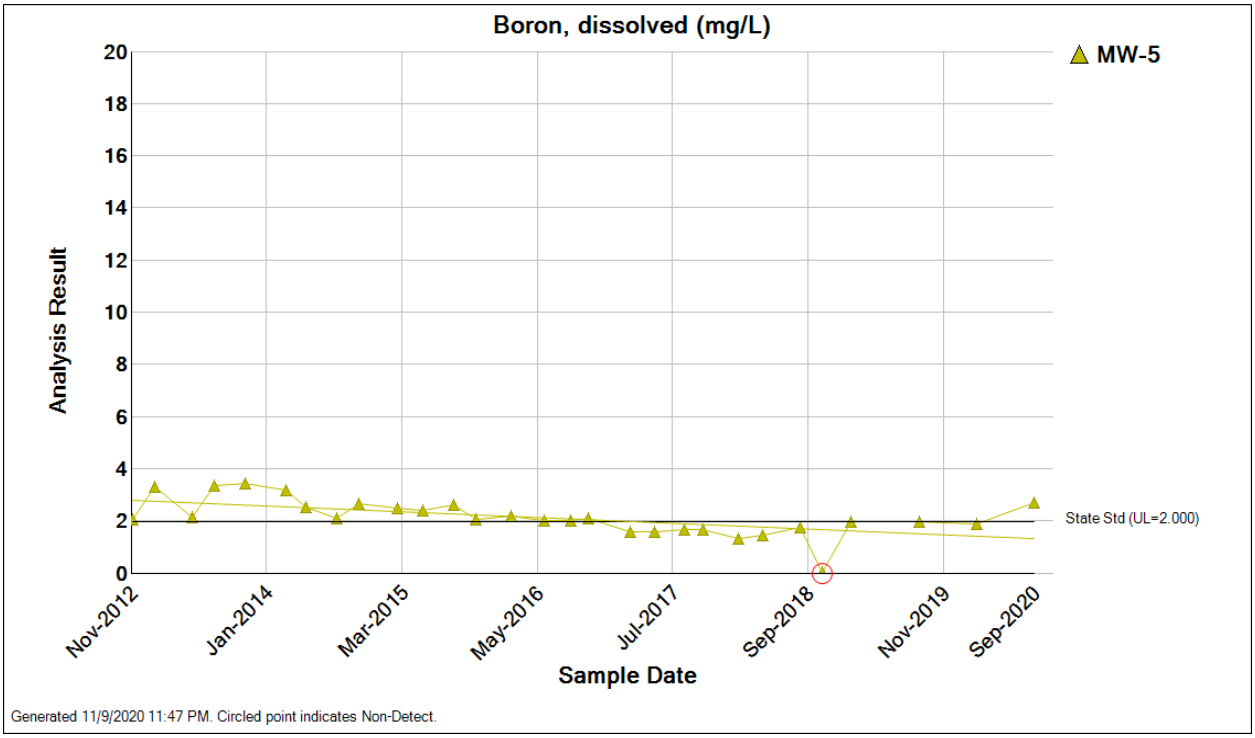


Figure 1-4. Boron concentrations over time since closure completion (2012) at compliance well MW-5. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

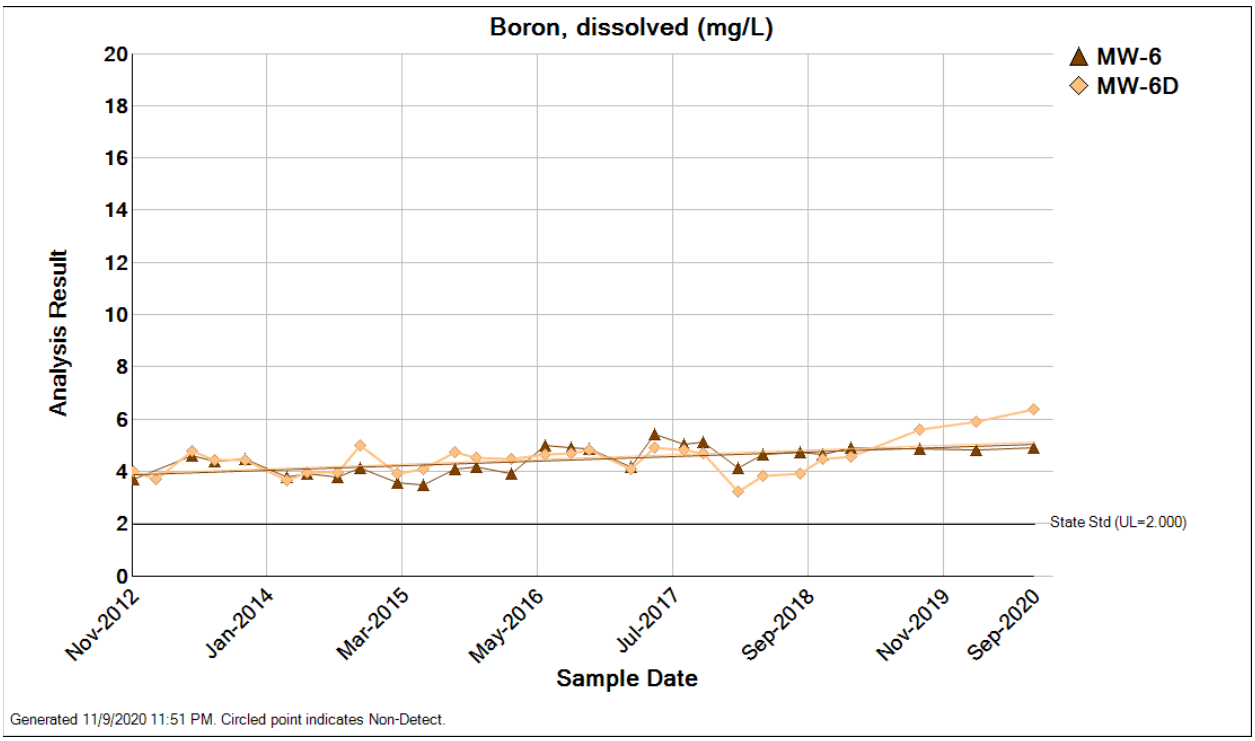


Figure 1-5. Boron concentrations over time since closure completion (2012) at compliance well MW-6 and MW-6D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

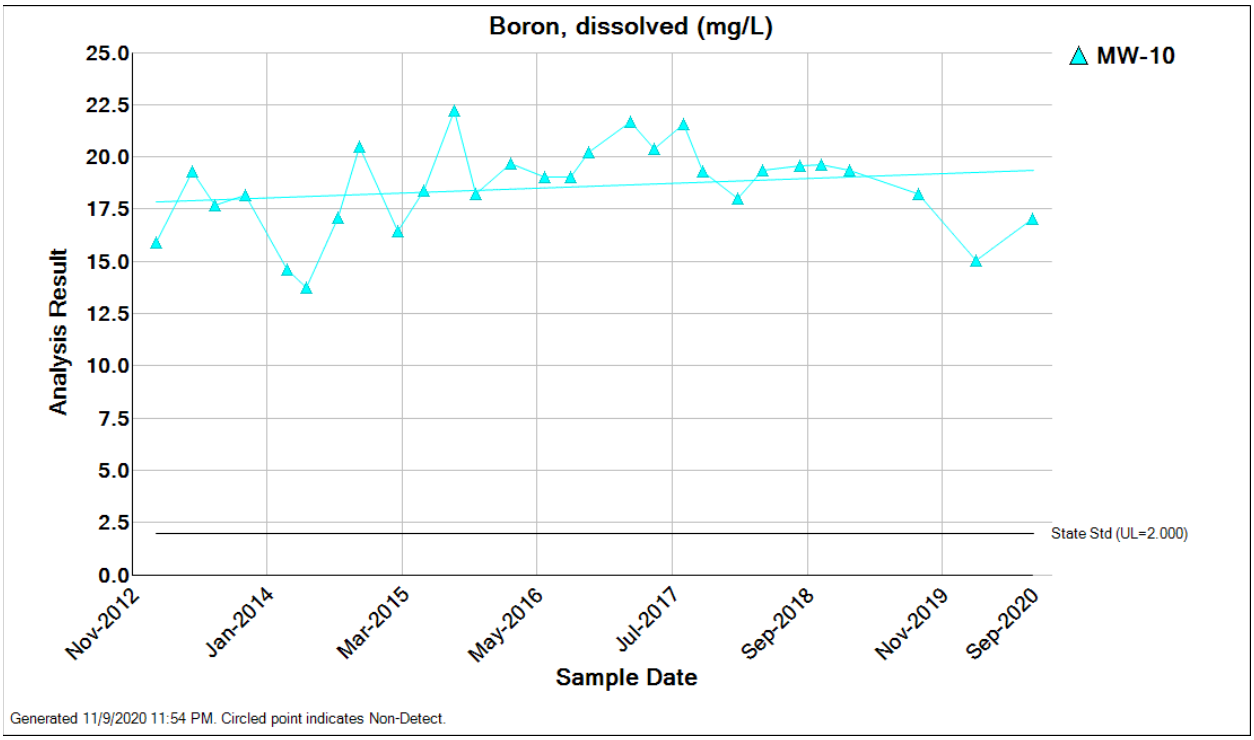


Figure 1-6. Boron concentrations over time since closure completion (2012) at compliance well MW-10. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

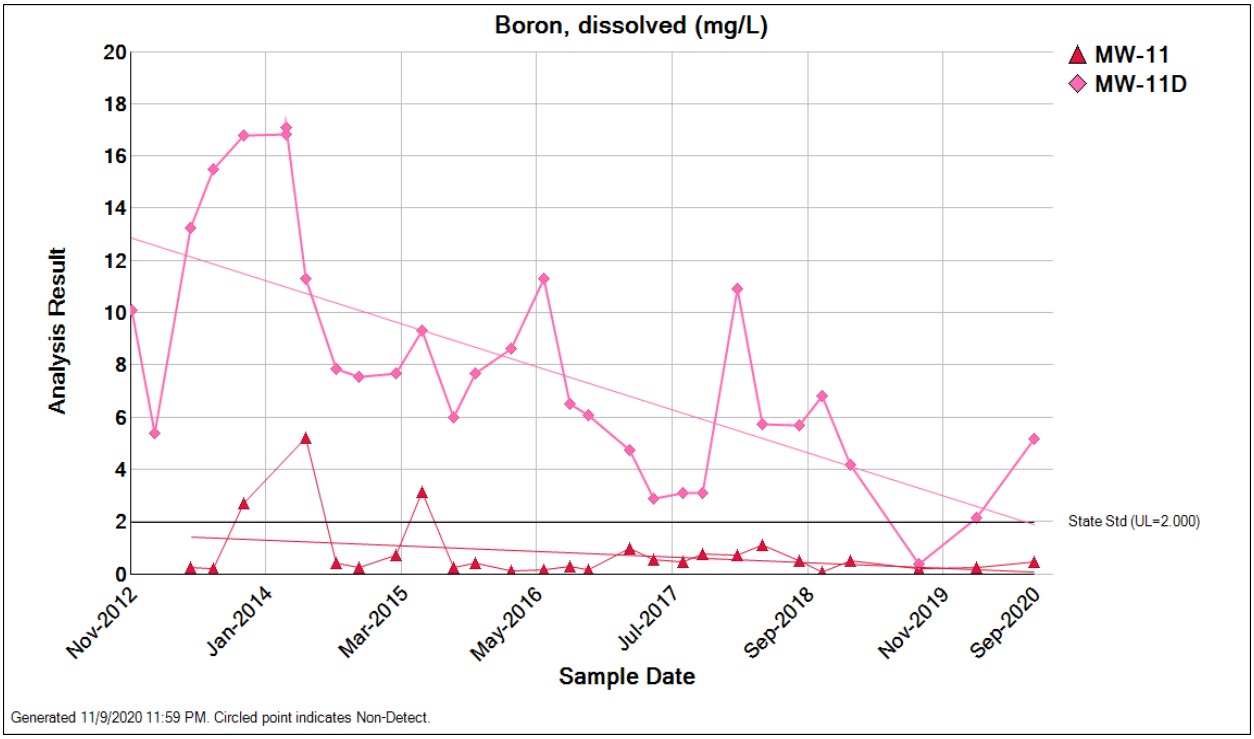
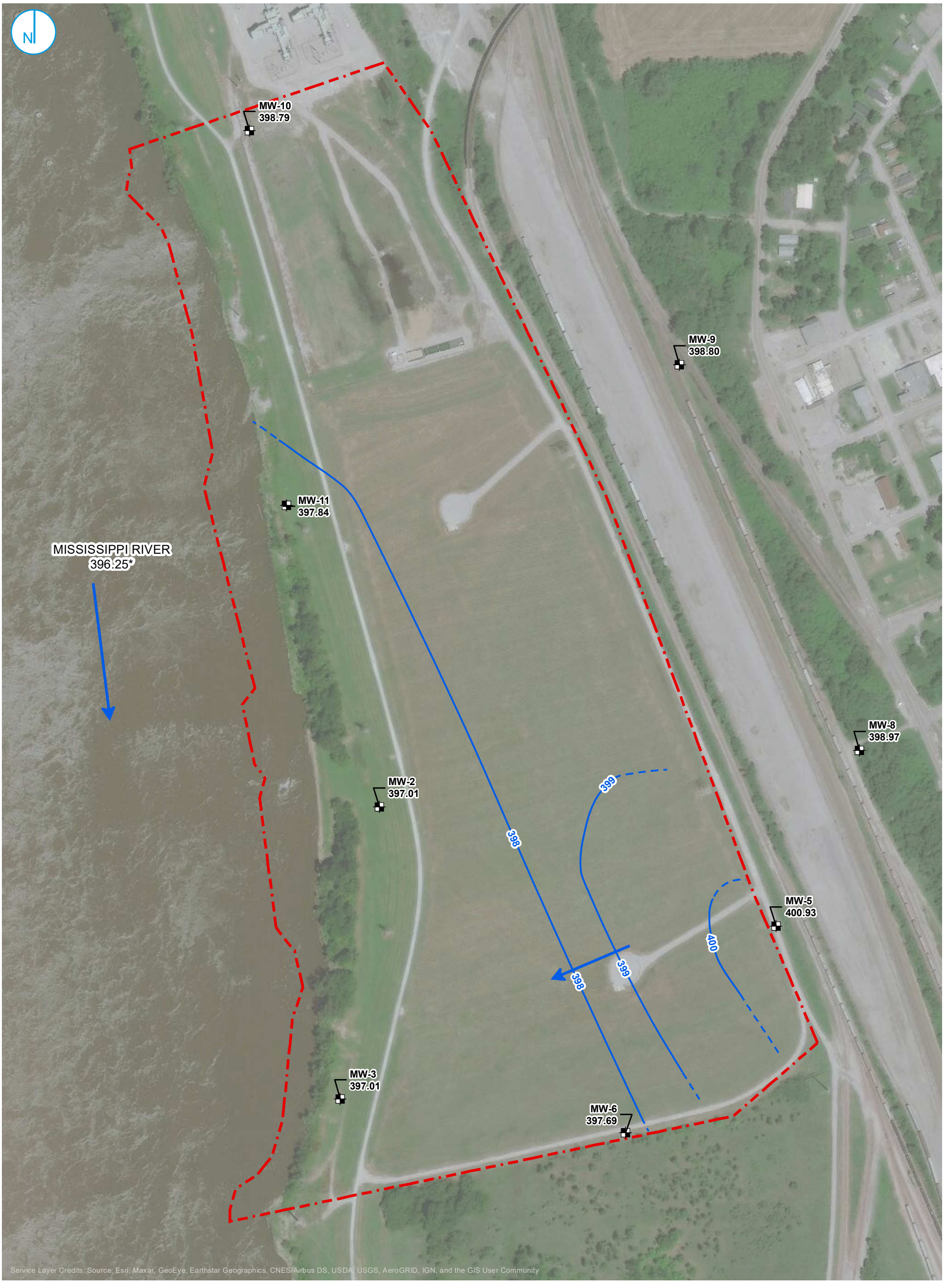


Figure 1-7. Boron concentrations over time since closure completion (2012) at compliance wells MW-11 and MW-11D. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.



- MONITORING WELL LOCATION
- GROUNDWATER MANAGEMENT ZONE
- GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD 88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 150 300 Feet

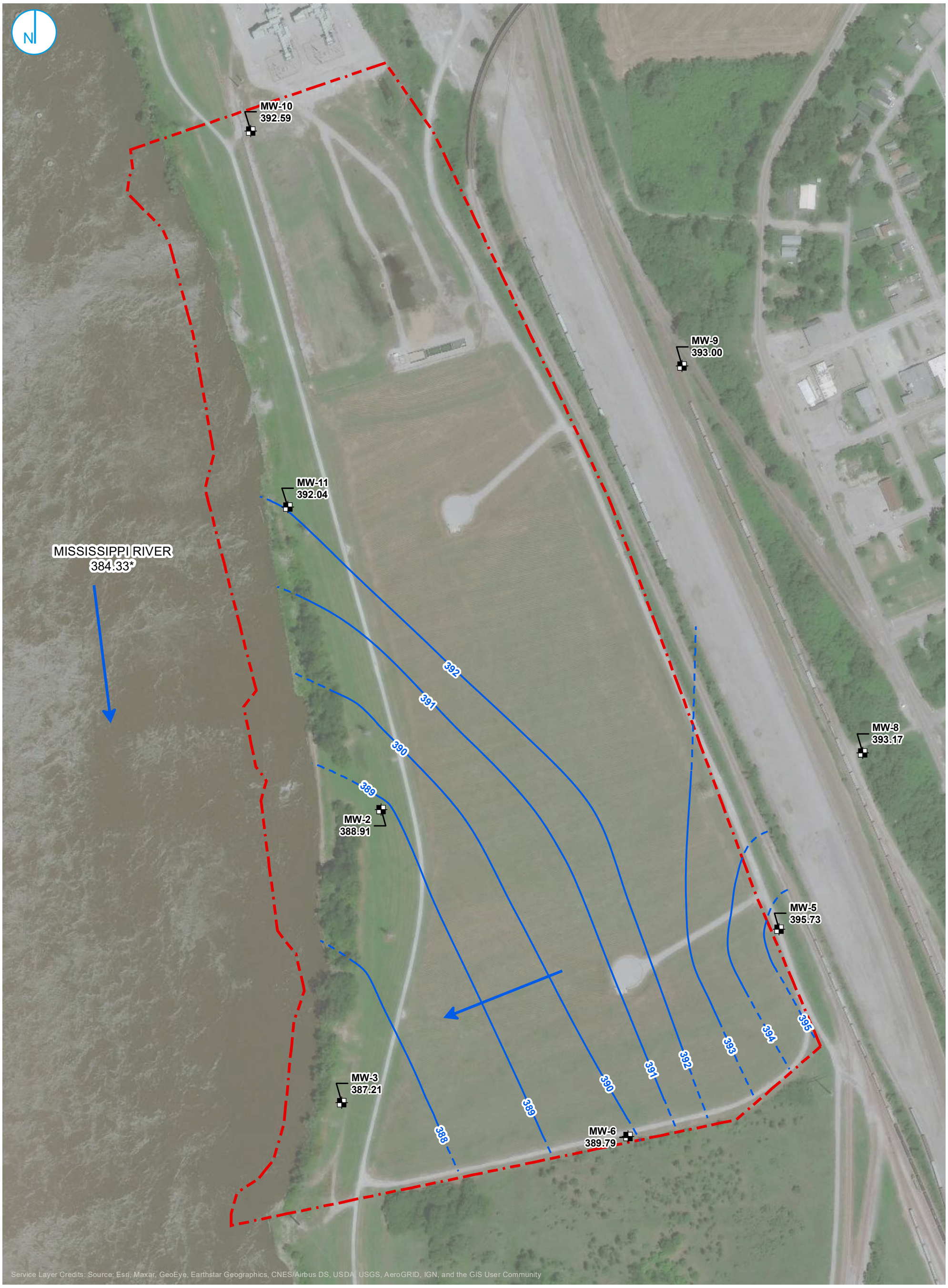
*RIVER ELEVATION OBTAINED FROM UNITED STATES GEOLOGICAL SURVEY MISSISSIPPI RIVER NEAR ST. LOUIS, MO GAUGING STATION (07010000).

GROUNDWATER ELEVATION CONTOURS
MARCH 10, 2020

2020 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 MANAGEMENT ZONE
GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL, NAVD 88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 150 300 Feet

*RIVER ELEVATION OBTAINED FROM UNITED STATES GEOLOGICAL SURVEY MISSISSIPPI RIVER NEAR ST. LOUIS, MO GAUGING STATION (07010000).

GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 8, 2020

2020 ANNUAL REPORT
FORMER VENICE POWER PLANT
ASH PONDS 2 & 3
AMEREN MISSOURI
VENICE, ILLINOIS

FIGURE 3-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

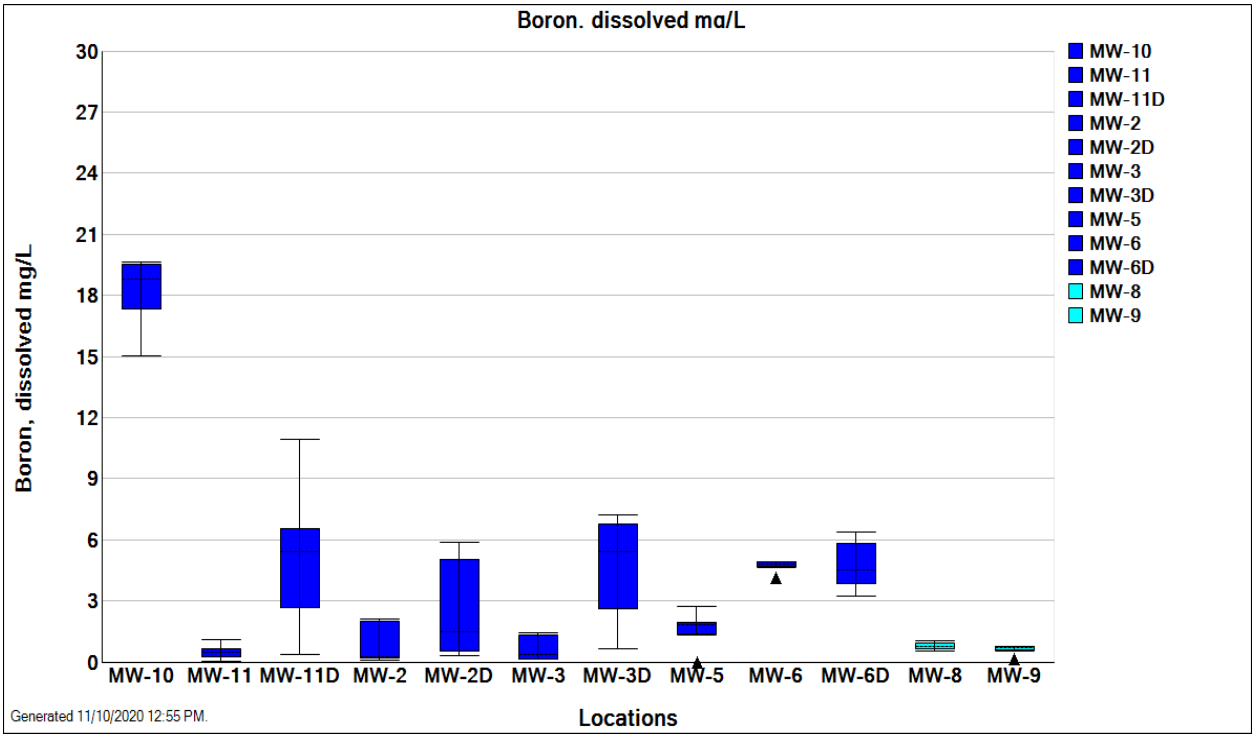


Figure 3-3. Box-whisker plot showing the distribution of boron concentrations by monitoring well for data collected during February 2018 through September 2020.

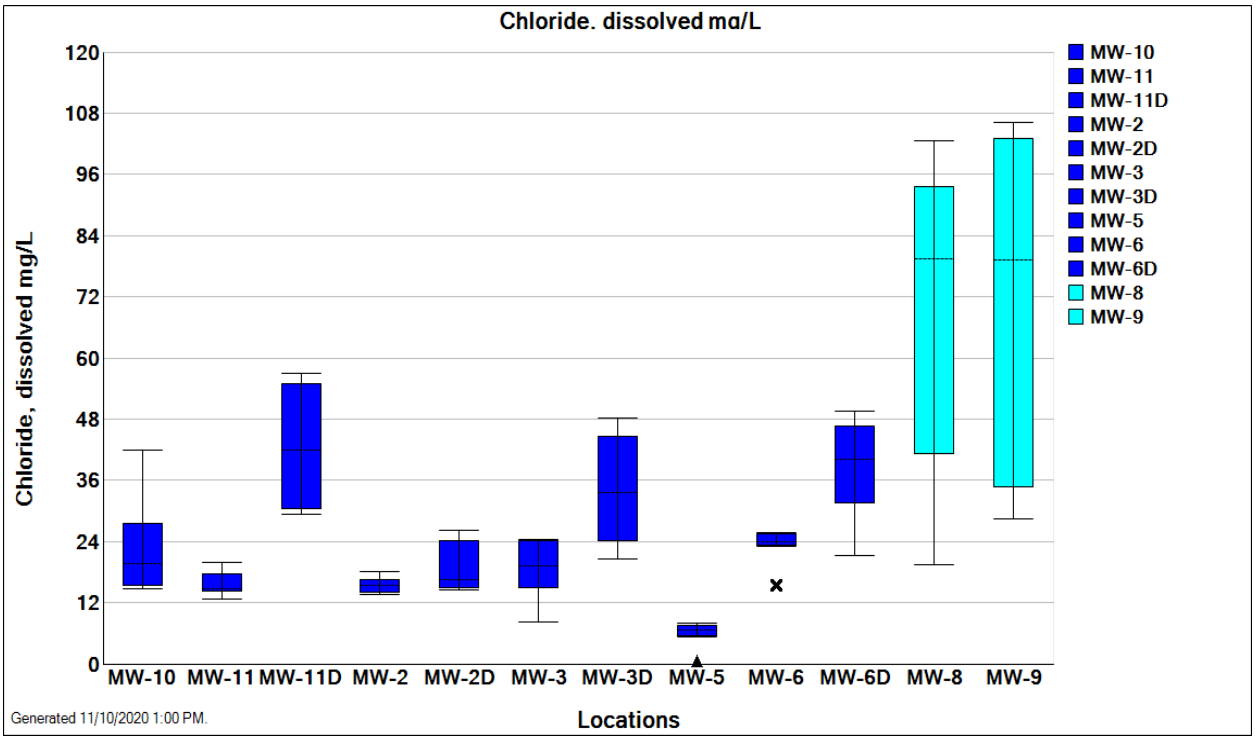


Figure 3-4. Box-whisker plot showing the distribution of chloride concentrations by monitoring well for data collected during February 2018 through September 2020. Background monitoring wells MW-8 and MW-9 had relatively high chloride concentrations.

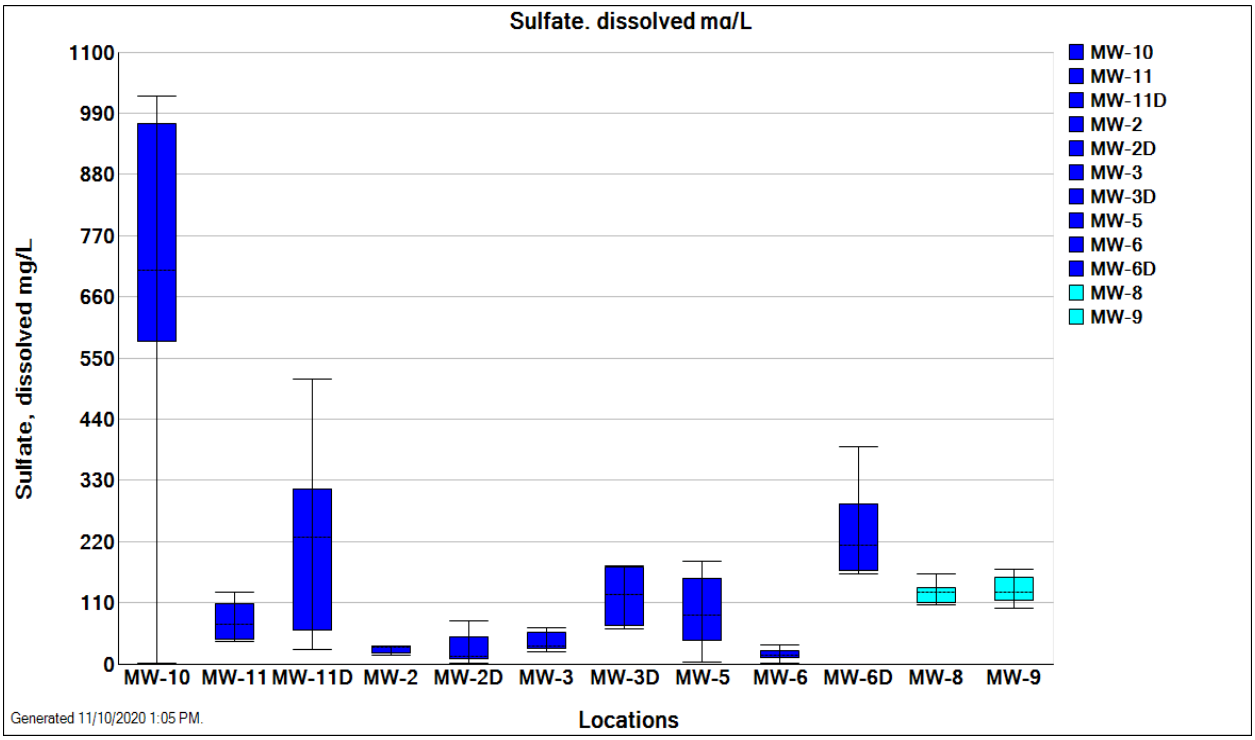


Figure 3-5. Box-whisker plot showing distribution of sulfate concentrations by monitoring well for data collected during February 2018 through September 2020. Similar to boron, the highest sulfate concentrations occurred in MW-10 and MW-11D; however, this plot is dissimilar to the boron plot because background monitoring wells MW-8 and MW-9 had similar or higher sulfate concentrations than MW-11, MW-2, MW-2D, MW-3, MW-3D, MW-5, and MW-6.

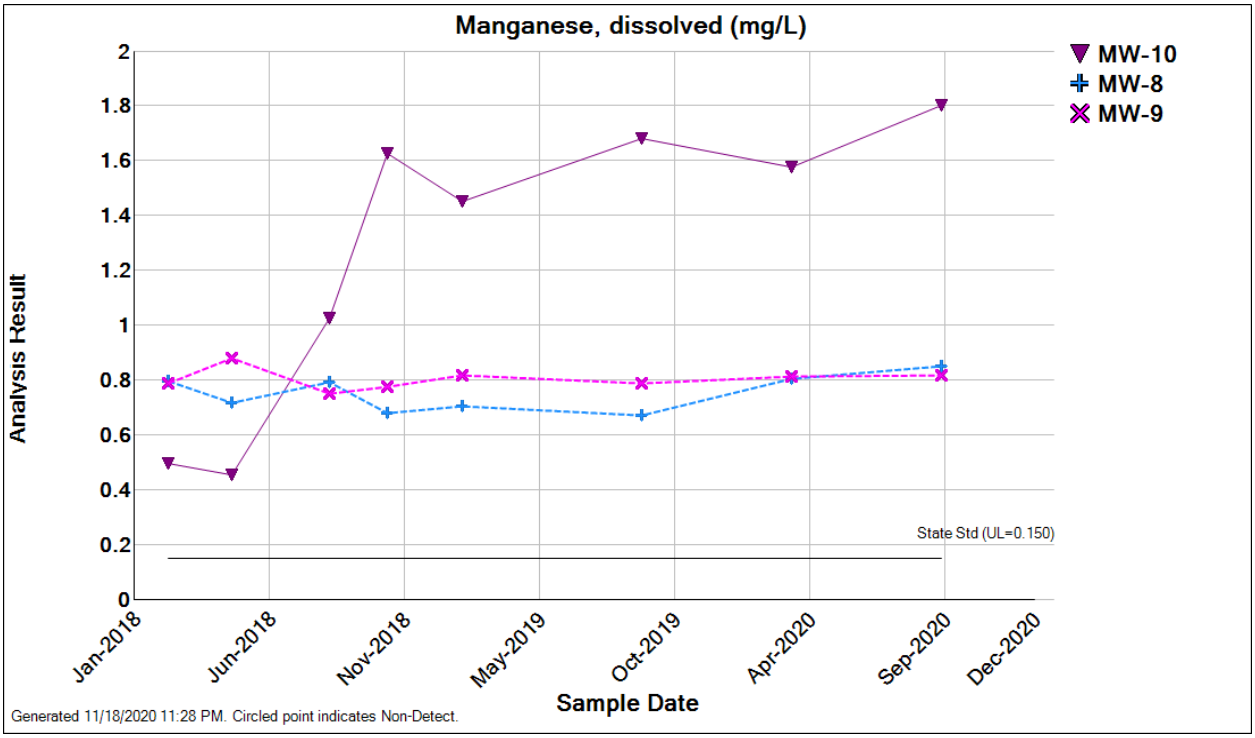


Figure 4-1. Increasing trends for manganese at compliance well MW-10 compared to background wells M-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

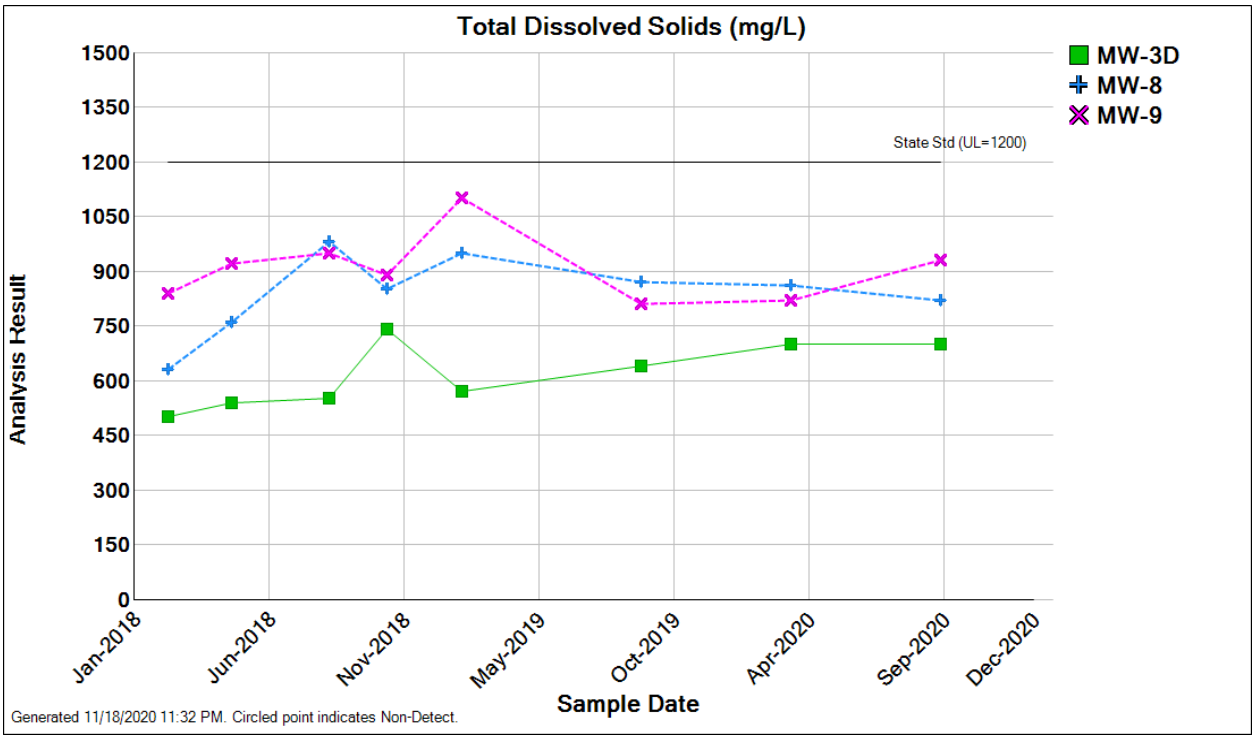


Figure 4-2. Increasing trends for total dissolved solids at compliance well MW-3D compared to background wells M-8 and MW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

APPENDICES

APPENDIX A
GROUNDWATER MONITORING RESULTS 2018-2020 MONITORING PERIOD

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-2

	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	<0.001	0.001	<0.001	<0.001	<0.001	0.001	0.001
As, diss, mg/L	0.045	<0.008	<0.008	<0.008	0.008	<0.008	<0.008
B, diss, mg/L	2.122	1.984	0.270	0.344	0.104	0.134	0.232
Ba, diss, mg/L	0.254	0.313	0.256	0.248	0.197	0.217	0.207
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	16.5	14.8	18.1	13.6	13.9	15.4	15.3
CN, total, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	0.009	0.003	0.003	<0.001	<0.001	<0.001	0.001
Cr, diss, mg/L	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
Cu, diss, mg/L	0.002	0.002	0.001	0.001	0.001	0.001	<0.001
F, diss, mg/L	0.23	0.19	0.28	0.23	0.22	0.20	0.23
Fe, diss, mg/L	3.834	0.011	0.203	0.423	0.250	0.024	0.162
GW Depth (TOC), ft	17.20	17.50	10.00	17.90	14.30	15.30	23.40
GW Elv, ft	395.11	394.81	402.31	394.41	398.01	397.01	388.91
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.831	0.295	0.259	0.033	0.007	0.005	0.086
Ni, diss, mg/L	0.015	0.013	0.005	0.003	<0.003	0.006	<0.003
NO3, diss, mg/L	<0.10	1.20	3.80	2.90	9.50	12.50	2.70
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.88	6.69	6.90	6.86	7.00	6.87	6.80
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	18.4	16.3	31.3	30.8	26.8	29.0	31.2
Spec. Cond. (field), micromho	1075	1135	777	901	783	885	887
TDS, mg/L	720	700	500	580	480	570	520
Temp (Celcius), degrees C	16.50	16.50	16.50	16.20	16.40	14.20	16.50
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	0.002	0.002	0.002	0.003	0.004	<0.002	0.009

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-2D

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	0.003	0.002	<0.001	0.002	<0.001	0.001	0.002
As, diss, mg/L	0.019	0.024	0.022	0.011	0.002	0.014	<0.008	0.015
B, diss, mg/L	4.247	5.269	5.888	1.044	1.984	0.318	0.372	0.738
Ba, diss, mg/L	0.386	0.407	0.396	0.348	0.393	0.227	0.228	0.283
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.001	0.002	0.002	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	14.8	14.6	16.9	16.3	15.2	26.2	24.9	21.9
CN, total, mg/L	0.0062	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
F, diss, mg/L	0.32	0.16	0.16	0.15	0.15	0.17	<0.05	0.13
Fe, diss, mg/L	16.740	17.580	15.750	15.220	20.390	14.810	13.450	18.130
GW Depth (TOC), ft	28.60	16.90	19.00	10.80	18.80	13.80	15.00	23.80
GW Elv, ft	383.76	395.46	393.36	401.56	393.56	398.56	397.36	388.56
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.990	1.182	0.989	0.892	1.084	0.611	0.554	0.791
Ni, diss, mg/L	<0.003	0.004	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.10	<0.10	1.20	<0.10	<0.10	<0.10	1.00
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.14	6.99	7.08	7.00	6.99	7.00	7.12	7.00
Sb, diss, mg/L	0.0015	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	30.7	53.3	78.2	12.6	1.4	13.7	12.6	5.2
Spec. Cond. (field), micromho	1243	1342	1252	1065	1173	736	661	878
TDS, mg/L	680	880	840	680	740	430	430	460
Temp (Celcius), degrees C	15.70	16.40	17.20	15.40	15.90	15.40	15.70	17.00
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	0.002	0.002	0.004	0.003	0.004	0.004

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-3

	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	0.001	<0.001	0.002	0.003	0.001	
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	
B, diss, mg/L	1.438	1.300	0.251	0.523	0.127	0.154	
Ba, diss, mg/L	0.174	0.188	0.090	0.259	0.120	0.149	
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	
Cl, diss, mg/L	18.4	20.2	8.2	17.1	24.0	24.4	
CN, total, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	
Co, diss, mg/L	0.003	0.005	<0.001	0.003	0.001	0.001	
Cr, diss, mg/L	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	
Cu, diss, mg/L	0.001	0.001	0.006	0.001	0.001	0.001	
F, diss, mg/L	0.16	0.18	0.09	0.13	0.18	0.18	
Fe, diss, mg/L	0.389	0.466	1.744	1.308	0.386	0.886	
GW Depth (TOC), ft	15.40	18.20	10.00	18.20	12.90	13.90	23.70
GW Elv, ft	395.51	392.71	400.91	392.71	398.01	397.01	387.21
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.990	1.147	0.063	0.972	0.366	0.452	
Ni, diss, mg/L	0.018	0.019	<0.003	0.011	0.006	0.010	
NO3, diss, mg/L	<0.10	<0.10	2.70	1.30	<0.10	<0.10	
Pb, diss, mg/L	<0.007	0.008	<0.007	<0.007	<0.007	<0.007	
pH (field), STD	6.40	6.56	6.60	7.61	6.90	6.81	
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	
SO4, diss, mg/L	54.1	64.7	20.7	34.3	28.5	29.2	
Spec. Cond. (field), micromho	1025	1160	800	1061	763	843	
TDS, mg/L	680	740	290	700	440	520	
Temp (Celcius), degrees C	16.90	16.80	15.40	16.50	16.90	15.00	
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	0.003	0.005	0.014	0.008	0.002	0.005	

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-3D

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	0.001	0.004	<0.001	0.004	<0.001	0.001	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	6.429	6.893	7.196	4.469	6.364	0.674	2.737	2.580
Ba, diss, mg/L	0.176	0.136	0.139	0.269	0.178	0.283	0.264	0.273
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.001	0.001	0.001	<0.001	<0.001	0.001	<0.001
Cl, diss, mg/L	37.0	46.4	48.1	30.0	39.6	20.5	27.6	22.9
CN, total, mg/L	0.0076	<0.0010	0.0013	<0.0010	<0.0010	0.0017	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001
Cr, diss, mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	0.003
F, diss, mg/L	0.35	0.11	0.12	0.10	0.11	0.16	<0.05	0.14
Fe, diss, mg/L	2.990	2.947	2.649	7.245	5.076	13.330	13.880	12.620
GW Depth (TOC), ft	29.00	16.00	18.80	9.80	19.00	13.10	14.50	24.40
GW Elv, ft	382.48	395.48	392.68	401.68	392.48	398.38	396.98	387.08
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.310	0.275	0.232	0.562	0.361	0.745	0.679	0.606
Ni, diss, mg/L	0.003	0.004	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
NO3, diss, mg/L	<0.10	<0.10	<0.10	1.40	<0.10	<0.10	0.80	<0.10
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.40	7.28	7.38	6.70	7.13	6.70	6.79	6.70
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	176.7	175.4	171.2	67.4	156.7	69.4	92.3	63.5
Spec. Cond. (field), micromho	913	779	778	1112	840	1108	1077	1113
TDS, mg/L	500	540	550	740	570	640	700	700
Temp (Celcius), degrees C	15.50	16.60	16.90	15.40	16.20	15.80	14.80	16.10
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	0.002	<0.002	0.002	0.002	0.002	0.004	0.005

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-5

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.004	0.002	0.003	<0.001	0.003	<0.001	0.001	<0.001
As, diss, mg/L	0.077	0.092	0.086	<0.008	0.081	0.099	0.074	0.099
B, diss, mg/L	1.305	1.433	1.760	<0.011	1.953	1.945	1.867	2.706
Ba, diss, mg/L	0.070	0.060	0.082	0.019	0.111	0.096	0.095	0.153
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cl, diss, mg/L	8.0	6.8	7.4	0.6	6.3	7.5	5.3	5.3
CN, total, mg/L	0.0097	0.0069	0.0056	<0.0010	0.0049	0.0058	0.0025	<0.0010
Co, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.002
Cr, diss, mg/L	0.001	<0.001	<0.001	0.004	<0.001	0.001	<0.001	0.021
Cu, diss, mg/L	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.007
F, diss, mg/L	0.45	0.27	0.25	0.07	0.26	0.28	0.28	0.29
Fe, diss, mg/L	1.715	1.473	2.166	0.944	1.184	2.314	2.109	4.674
GW Depth (TOC), ft	44.00	36.40	36.00	30.00	34.00	29.80	32.00	37.20
GW Elv, ft	388.93	396.53	396.93	402.93	398.93	403.13	400.93	395.73
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	1.833	1.665	2.086	0.044	2.210	2.530	2.561	3.379
Ni, diss, mg/L	0.003	0.004	0.005	<0.003	0.004	<0.003	<0.003	0.013
NO3, diss, mg/L	<0.10	<0.10	<0.10	1.50	<0.10	11.40	<0.10	1.20
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.007
pH (field), STD	7.49	7.53	7.44	9.00	7.44	7.40	7.43	7.20
Sb, diss, mg/L	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	0.0017	0.0013	0.0022
Se, diss, mg/L	0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	40.8	42.0	87.6	3.2	95.4	88.7	172.1	184.8
Spec. Cond. (field), micromho	1028	985	1125	60	1121	1073	1145	1099
TDS, mg/L	750	620	740	50	800	690	800	760
Temp (Celcius), degrees C	15.70	17.40	17.20	12.10	16.20	17.70	15.20	18.20
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	0.006	<0.002	0.010	0.003	0.006	0.003	0.044

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-6

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.001	0.005
As, diss, mg/L	0.081	0.080	0.077	0.052	0.066	0.052	0.047	0.053
B, diss, mg/L	4.132	4.655	4.744	4.663	4.924	4.865	4.825	4.912
Ba, diss, mg/L	0.333	0.338	0.308	0.264	0.291	0.267	0.266	0.275
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.002	0.003	0.002	0.001	0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	25.7	25.6	24.8	24.8	23.2	23.1	15.4	23.0
CN, total, mg/L	0.0016	<0.0010	0.0025	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Co, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	0.001	0.002	0.001	<0.001	0.001	0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	0.020	0.001	<0.001	<0.001	<0.001	0.001	0.003
F, diss, mg/L	0.61	0.44	0.43	0.43	0.45	0.47	0.51	0.53
Fe, diss, mg/L	27.060	23.370	20.160	14.160	17.540	12.860	13.780	14.040
GW Depth (TOC), ft	47.20	38.00	39.50	32.00	39.00	33.90	35.40	43.30
GW Elv, ft	385.89	395.09	393.59	401.09	394.09	399.19	397.69	389.79
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	2.750	2.979	2.680	2.070	2.446	2.240	2.350	2.378
Ni, diss, mg/L	0.003	0.015	0.009	0.005	0.006	0.004	0.006	<0.003
NO3, diss, mg/L	1.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	3.30
Pb, diss, mg/L	0.008	0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.23	7.23	7.22	7.30	7.21	7.30	7.29	7.20
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	0.7	11.3	13.0	34.9	18.3	24.7	14.2	22.3
Spec. Cond. (field), micromho	931	843	838	762	807	735	772	827
TDS, mg/L	420	550	520	490	520	440	440	460
Temp (Celcius), degrees C	14.80	16.70	16.60	15.30	15.60	16.90	15.30	17.20
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	0.002	0.006	0.003	0.002	0.003	0.002	0.004	0.005

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-6D

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.007	0.005	0.004	<0.001	0.001	0.004	<0.001	0.005
As, diss, mg/L	<0.008	<0.008	0.008	<0.008	<0.008	<0.008	<0.008	0.008
B, diss, mg/L	3.217	3.833	3.898	4.485	4.555	5.603	5.896	6.377
Ba, diss, mg/L	0.322	0.293	0.297	0.277	0.252	0.194	0.176	0.141
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	21.3	32.6	31.0	46.2	38.4	41.7	46.8	49.5
CN, total, mg/L	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	0.0015	<0.0010
Co, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	0.001	0.001	0.001	<0.001	0.001	0.001	<0.001
F, diss, mg/L	0.41	<0.10	0.06	<0.05	<0.05	<0.10	<0.05	0.06
Fe, diss, mg/L	0.868	0.664	0.639	0.448	0.460	0.210	0.196	0.103
GW Depth (TOC), ft	48.40	38.20	40.00	32.00	39.00	34.20	35.80	23.70
GW Elv, ft	385.15	395.35	393.55	401.55	394.55	399.35	397.75	409.85
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.274	0.232	0.221	0.166	0.169	0.094	0.086	0.060
Ni, diss, mg/L	<0.003	0.005	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	1.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	0.005	0.008	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.96	8.02	7.96	8.10	8.02	8.20	8.16	8.10
Sb, diss, mg/L	0.0022	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001
Se, diss, mg/L	0.010	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	389.8	252.0	299.0	215.7	212.2	165.3	175.1	162.3
Spec. Cond. (field), micromho	1179	1140	1128	1036	957	725	710	598
TDS, mg/L	940	820	850	740	680	470	480	340
Temp (Celcius), degrees C	15.30	16.30	16.90	15.30	15.60	17.60	15.60	20.30
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.003

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-8

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.004	0.004	0.001	<0.001	<0.001	0.001	0.001	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	0.513	0.642	0.602	0.648	0.837	0.834	0.938	1.044
Ba, diss, mg/L	0.099	0.196	0.140	0.117	0.112	0.107	0.117	0.111
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	19.4	80.1	102.5	94.9	58.5	90.0	79.0	35.4
CN, total, mg/L	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	<0.0010
Co, diss, mg/L	0.003	0.002	0.001	0.002	0.003	0.002	0.003	0.003
Cr, diss, mg/L	<0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
F, diss, mg/L	0.48	0.35	0.22	0.33	0.34	0.28	0.27	0.26
Fe, diss, mg/L	0.032	0.020		0.021	0.035	0.012	0.013	0.041
GW Depth (TOC), ft	28.60	20.50	18.30	14.50		15.30	17.30	23.10
GW Elv, ft	387.67	395.77	397.97	401.77		400.97	398.97	393.17
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.797	0.716	0.790	0.679	0.703	0.670	0.804	0.850
Ni, diss, mg/L	0.016	0.017		0.009	0.011	0.010	0.014	0.013
NO3, diss, mg/L	1.30	1.90	<0.10	1.60	1.40	1.20	0.90	3.80
Pb, diss, mg/L	<0.007	0.010	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.82	6.90	6.89	6.80	6.92	6.80	6.71	6.70
Sb, diss, mg/L	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0011
Se, diss, mg/L	0.011	0.013	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	136.8	105.1	136.7	105.4	117.1	120.1	135.4	161.6
Spec. Cond. (field), micromho	1120	1203	1287	1306	1190	1243	1279	1246
TDS, mg/L	630	760	980	850	950	870	860	820
Temp (Celcius), degrees C	15.40	17.10	16.90	15.50	17.10	16.50	13.30	16.80
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	0.002	0.002	0.007	0.003	0.004	0.008

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-9

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	<0.001	0.002	0.001	<0.001	<0.001	<0.001	0.001	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	0.012	<0.008	<0.008
B, diss, mg/L	0.175	0.558	0.611	0.629	0.722	0.743	0.747	0.735
Ba, diss, mg/L	0.151	0.138	0.110	0.155	0.157	0.146	0.154	0.153
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.002	0.001	0.001	0.001	<0.001	0.001	<0.001
Cl, diss, mg/L	80.6	100.5	106.2	104.0	77.8	28.5	30.4	47.8
CN, total, mg/L	0.0038	0.0018	<0.0010	<0.0010	<0.0010	0.0017	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001
F, diss, mg/L	0.43	0.21	0.33	0.24	0.22	0.22	0.22	0.24
Fe, diss, mg/L	17.880	15.040		16.780	17.760	17.500	18.540	18.520
GW Depth (TOC), ft	26.30	17.50	21.10	11.60		12.80	14.60	20.40
GW Elv, ft	387.10	395.90	392.30	401.80		400.60	398.80	393.00
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.787	0.881	0.750	0.776	0.816	0.786	0.811	0.815
Ni, diss, mg/L	0.004	0.007		<0.003	0.004	<0.003	0.007	<0.003
NO3, diss, mg/L	<0.10	<0.10	3.00	<0.10	<0.10	<0.10	<0.10	<0.10
Pb, diss, mg/L	<0.007	0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.82	6.93	6.82	6.90	6.98	6.80	6.76	6.80
Sb, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0011
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	170.7	122.4	108.9	154.9	154.2	130.2	128.8	100.2
Spec. Cond. (field), micromho	1328	1288	1276	1331	1291	1169	1227	1318
TDS, mg/L	840	920	950	890	1100	810	820	930
Temp (Celcius), degrees C	15.00	16.80	16.60	15.80	16.80	17.00	14.70	16.70
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	<0.002	0.002	0.005	0.005	0.004	0.005

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-10

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	0.001	0.001	<0.001	<0.001	0.002	<0.001	0.001
As, diss, mg/L	0.013	0.014	0.030	0.014	0.030	0.052	0.026	0.023
B, diss, mg/L	18.000	19.350	19.550	19.620	19.340	18.240	15.050	17.060
Ba, diss, mg/L	0.044	0.035	0.044	0.060	0.060	0.046	0.046	0.052
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	42.0	15.9	20.9	29.4	21.6	18.6	14.8	15.0
CN, total, mg/L	0.0069	0.0014	0.0012	<0.0010	<0.0010	0.0022	<0.0010	<0.0010
Co, diss, mg/L	<0.001	<0.001	0.002	<0.001	0.001	0.001	0.001	<0.001
Cr, diss, mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.002	0.001	0.001	0.001	0.001	0.001	<0.001	0.001
F, diss, mg/L	0.79	0.19	0.18	0.15	0.17	0.23	0.28	0.27
Fe, diss, mg/L	0.013	0.134	0.406	0.221	0.539	2.077	1.824	1.963
GW Depth (TOC), ft	39.50	28.50	30.00	21.40	29.00	24.00	26.20	32.40
GW Elv, ft	385.49	396.49	394.99	403.59	395.99	400.99	398.79	392.59
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	0.496	0.451	1.026	1.627	1.449	1.679	1.576	1.801
Ni, diss, mg/L	0.004	0.004	0.004	0.003	<0.003	<0.003	0.004	<0.003
NO3, diss, mg/L	2.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.20
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.51	8.32	7.52	7.30	7.39	7.40	7.34	7.30
Sb, diss, mg/L	0.0019	0.0014	0.0039	0.0014	0.0016	0.0022	<0.0010	0.0016
Se, diss, mg/L	<0.009	0.004	<0.009	<0.009	0.006	<0.009	<0.009	<0.009
SO4, diss, mg/L	<0.2	751.1	977.3	1021.7	954.0	662.9	560.5	634.5
Spec. Cond. (field), micromho	1778	1458	1784	1986	1947	1500	1319	1407
TDS, mg/L	1590	1360	1780	1750	1860	1280	1070	1240
Temp (Celcius), degrees C	15.10	17.70	17.00	15.80	16.00	17.10	14.10	17.60
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003	0.012

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-11

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	<0.001	<0.001	<0.001	0.002	0.004	0.001	0.004
As, diss, mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
B, diss, mg/L	0.704	1.106	0.509	0.048	0.487	0.198	0.247	0.443
Ba, diss, mg/L	0.282	0.175	0.161	0.137	0.183	0.187	0.219	0.175
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cl, diss, mg/L	12.7	15.2	18.2	20.0	14.4	16.4	14.4	14.2
CN, total, mg/L	0.0018	0.0020	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
Co, diss, mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cu, diss, mg/L	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
F, diss, mg/L	0.23	0.21	0.25	0.37	0.28	0.28	0.26	0.19
Fe, diss, mg/L	1.732	0.047	0.005	0.011	0.026	0.013	0.009	0.055
GW Depth (TOC), ft	26.90	17.90	18.40	9.40	17.50	12.60	14.90	20.70
GW Elv, ft	385.84	394.84	394.34	403.34	395.24	400.14	397.84	392.04
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	1.244	0.129	0.001	0.001	0.001	0.002	0.004	0.026
Ni, diss, mg/L	0.009	0.010	0.006	0.003	0.003	<0.003	0.005	0.005
NO3, diss, mg/L	1.60	1.60	4.50	2.20	6.50	9.20	2.00	1.30
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	6.79	6.61	6.79	6.80	6.74	6.80	6.75	6.60
Sb, diss, mg/L	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Se, diss, mg/L	<0.009	<0.009	0.010	<0.009	0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	127.8	114.4	66.5	41.1	45.4	42.0	85.3	75.3
Spec. Cond. (field), micromho	1244	1139	950	731	890	927	1099	1091
TDS, mg/L	1010	780	690	450	680	640	720	760
Temp (Celcius), degrees C		16.20	16.40	17.10	16.10	16.20	14.30	16.50
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	0.003	0.002	<0.002	0.003	0.002	<0.002	0.007	0.004

Venice
Groundwater Monitoring Results 2018-2020 Monitoring Period

Date Range: 01/01/2018 to 12/31/2020
Well: MW-11D

	2/12/2018	5/1/2018	8/27/2018	11/5/2018	2/4/2019	9/10/2019	3/10/2020	9/8/2020
Ag, diss, mg/L	0.002	0.003	0.001	<0.001	0.002	<0.001	0.001	<0.001
As, diss, mg/L	0.012	0.014	<0.008	<0.008	0.009	0.012	<0.008	0.011
B, diss, mg/L	10.910	5.738	5.678	6.814	4.153	0.346	2.125	5.168
Ba, diss, mg/L	0.201	0.171	0.175	0.177	0.161	0.068	0.115	0.161
Be, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Cd, diss, mg/L	0.001	0.002	0.002	0.001	0.001	<0.001	<0.001	0.003
Cl, diss, mg/L	35.9	47.8	49.8	56.9	56.7	31.9	29.3	30.0
CN, total, mg/L	0.0146	0.0132	0.0102	0.0067	0.0041	0.0026	0.0011	0.0020
Co, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu, diss, mg/L	0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
F, diss, mg/L	0.35	0.19	0.21	0.20	0.20	0.26	0.25	0.26
Fe, diss, mg/L	22.630	20.060	18.690	17.610	17.230	5.673	8.890	12.500
GW Depth (TOC), ft	29.80	16.80	19.60	11.00	19.50	12.60	15.30	24.90
GW Elv, ft	382.70	395.70	392.90	401.50	393.00	399.90	397.20	387.60
Hg, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Mn, diss, mg/L	3.331	3.065	2.827	2.657	2.532	0.908	1.380	1.930
Ni, diss, mg/L	<0.003	0.006	0.003	0.004	0.003	<0.003	<0.003	<0.003
NO3, diss, mg/L	<0.10	<0.10	<0.10	1.20	<0.10	<0.10	<0.10	1.00
Pb, diss, mg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
pH (field), STD	7.09	6.53	6.98	6.90	6.96	7.10	7.17	7.00
Sb, diss, mg/L	0.0014	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
Se, diss, mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
SO4, diss, mg/L	511.0	320.3	291.8	272.7	184.6	26.0	63.2	57.6
Spec. Cond. (field), micromho	1637	1522	1479	1456	1364	522	737	1021
TDS, mg/L	1500	1220	1230	1090	960	280	440	770
Temp (Celcius), degrees C	15.20	16.10	16.70	15.00	15.70	16.20	15.20	16.30
Tl, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001			
Zn, diss, mg/L	<0.002	<0.002	0.002	<0.002	0.007	<0.002	0.003	0.009

APPENDIX B
2020 GROUNDWATER MONITORING FIELD DATA WORKSHEETS

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 03 / 10 / 20

River Level: 16 - 17* 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 is broke	
Internal piping unobstructed and in good condition (note any deficiency)					in two pieces	
Water Level (±0.01 feet, from top of casing mark)	15,3	15,0	13,9	14,5	32,0	35,4
Total Well Depth (±0.01 feet)	23,1	47,5	22,1	47,0	49,0	51,0
Time purging began (24-hour clock)	13:45	13:55	14:20	14:40	15:40	15:05
Conductivity after 10 minutes µS/cm	885	661	843	1077	1145	772
Temperature °C	14,1	14,3	15,2	14,2	15,7	15,0
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	900	667	855	1072	1140	745
Time to reach final conductivity (min)	15	15	15	15	15	15
Temperature °C	14,6	14,6	15,5	14,6	16	15,2
pH (on site) (±0.01)	6,87	7,12	6,81	6,79	7,43	7,29

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)	35,8	17,3	14,6	26,2	14,9	15,3
Total Well Depth (±0.01 feet)	68,4	42,7	41,4	43,8	28,7	48,7
Time purging began (24-hour clock)	15:15	11:25	11:00	16:30	13:15	13:05
Conductivity after 10 minutes µS/cm	710	1279	1227	1319	1099	737
Temperature °C	14,8	15,2	15,3	15,6	13,3	14,7
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	709	1290	1222	1330	1073	746
Time to reach final conductivity (min)						
Temperature °C	15,0	15,5	15,6	15,8	14,2	14,7
pH (on site) (±0.01)	8,16	6,71	6,76	7,34	6,75	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: _____

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

Venice Groundwater Monitoring Field Data Worksheet

Sample Date: 09 / 08 / 20

River Level: 4.7 feet

	Well #2	Well #2D	Well #3	Well #3D	Well #5	Well #6
Well name sign, lock, and inner cap present (note any deficiency)	✓	✓	yes	yes	bad	✓
Casing and concrete pad in good condition (note any deficiency)	✓	✓	below grade	below grade	sort of	✓
Internal piping unobstructed and in good condition (note any deficiency)	✓	✓	yes	yes	not really	✓
Water Level (±0.01 feet, from top of casing mark)	23.4	23.8	23.7	24.4	37.2	43.3
Total Well Depth (±0.01 feet)	29.0	47.5	23.7	47.1	49.1	50.9
Time purging began (24-hour clock)	15 : 15	15 : 20	~~14 : 30~~	14 : 30	13 : 00	13 : 30
Conductivity after 10 minutes µS/cm	813	569		1112	1054	822
Temperature °C	19.1	17.9		16.5	19.0	17.4
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	887	878		1113	1099	827
Time to reach final conductivity (min)	15	15	~~NR~~	15	15	15
Temperature °C	16.5	17.0		16.1	18.2	17.2
pH (on site) (±0.01)	6.77	6.95		6.72	7.23	7.19

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)	23.7	23.1	20.4	32.4	20.7	24.9
Total Well Depth (±0.01 feet)	68.4	42.7	41.4	44.0	28.6	48.7
Time purging began (24-hour clock)	13 : 30	11 : 45	11 : 20	16 : 30	15 : 50	15 : 55
Conductivity after 10 minutes µS/cm	564	1234	1245	1358	1059	1021
Temperature °C	22.2	17.1	18.2	18.2	17.8	16.6
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	598	1246	1318	1407	1091	1021
Time to reach final conductivity (min)	15	15	15	15	15	15
Temperature °C	20.3	16.8	16.7	17.6	16.5	16.3
pH (on site) (±0.01)	8.08	6.66	6.78	7.33	6.64	7.00

Sample collectors: SMS / ES

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: Wells #3, 3D concrete casing is below grade. Well #3 was dry - no sample

Well #5 - Cap is broke in two, most of concrete pad is buried under hand packed gravel due to road being used for construction south of plant. Well is also in road path.

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

APPENDIX C
2020 FINAL COVER SITE INSPECTION REPORTS

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 03/04/2020

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 54°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			*The temporary construction area related to the removal and replacement of Structure 161 has been stabilized; however, some areas were currently being repaired with new erosion control blanket.*
5. Is vegetation in acceptable condition?	X			*The temporary construction area related to the removal and replacement of Structure 161 has been stabilized; however, some areas were currently being repaired with new erosion control blanket and seeded to provide adequate vegetation cover.*
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		*The temporary construction area related to the removal and replacement of Structure 161 has been stabilized; however, some areas were currently being repaired with new erosion control blanket and seeded to provide adequate vegetation cover.*
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			*The temporary construction area related to the removal and replacement of Structure 161 was currently being repaired with new erosion control blanket where a few ruts have occurred.*
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		*The fall construction for the foundation for the replacement of Structure 161 was completed and the flexible membrane is no longer exposed.*
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)

_____ The spring construction for the removal and monopole installation has disturbed a few areas that were stabilized. These areas were currently being repaired with erosion control blanket and seeded.

Item # Corrective Actions Taken Since Last Report

_____ The fall construction for the foundation for the replacement of Structure 161 was completed and the flexible membrane is no longer exposed. After completion of the fall construction, the disturbed areas were stabilized and protected with erosion control blanket and seeded.

See attached photos below.

Inspector Signature: Julianne Epplin Date: 03/04/2020

North Pump Station, facing north.

North Pump Station, facing south.

South Pump Station, facing north.

South Pump Station, facing south.

The fall construction for the foundation for the replacement of Structure 161 was completed and the flexible membrane is no longer exposed.

The spring construction for the removal and monopole installation has disturbed a few areas that were stabilized. These areas were currently being repaired with erosion control blanket and seeded.

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 06/15/2020

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 68°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
	The spring construction for the monopole installation had disturbed the soil surface and was reseeded. The area is in the process of regrowth.

Inspector Signature: Julianne Epplin Date: 06/17/2020

North Pump Station, facing north.

North Pump Station, facing south.

South Pump Station, facing north.

South Pump Station, facing south.

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 08/03/2020

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 70°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: Julianne Epplin Date: 08/12/2020

North Pump Station, facing north.

North Pump Station, facing south.

South Pump Station, facing north.

South Pump Station, facing south.

Ameren Missouri
Fly Ash Pond Final Cover Site Inspection

Facility Name: Venice Energy Center Inspection Date: 10/12/2020

Facility Address: 701 Main Street, Venice, IL 62090

Inspection Conditions: 68°F, sunny, windy

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: Julianne Epplin Date: 10/21/2020

North Pump Station, facing north.

North Pump Station, facing south.

South Pump Station, facing north.

South Pump Station, facing south.

APPENDIX D
STATISTICAL OUTPUT (ON CD)

APPENDIX D1
OUTLIER ANALYSIS RESULTS

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/08/2020
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: 0.00156
Standard Deviation of all data: 0.000840
Largest Observation Concentration of all data: Xn = 0.00390
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00390	False		1

Antimony, dissolved, mg/L
Location: MW-11

Mean of all data: 0.000810
Standard Deviation of all data: 0.000573
Largest Observation Concentration of all data: Xn = 0.00230
Test Statistic, high extreme of all data: Tn = 2.60
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.00156
Standard Deviation of all data: 0.00121
Largest Observation Concentration of all data: Xn = 0.00430
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.000997
Standard Deviation of all data: 0.000737
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 2.72
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00105
Standard Deviation of all data: 0.000697
Largest Observation Concentration of all data: Xn = 0.00280
Test Statistic, high extreme of all data: Tn = 2.51
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L

Location: MW-3

Mean of all data: 0.000827
Standard Deviation of all data: 0.000498
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.35
T Critical of all data: Tcr = 2.68

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 09/08/2020
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: 0.000794
Standard Deviation of all data: 0.000601
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 = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/22/2013	0.00300	False		1

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

Mean of all data: 0.00139
Standard Deviation of all data: 0.00103
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.50
T Critical of all data: Tcr = 2.86

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

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

Mean of all data: 0.000762
Standard Deviation of all data: 0.000850
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 4.98
T Critical of all data: Tcr = 2.85

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 09/08/2020
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: 0.000992
Standard Deviation of all data: 0.000659
Largest Observation Concentration of all data: Xn = 0.00280
Test Statistic, high extreme of all data: Tn = 2.75
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW-8

Mean of all data: 0.00125
Standard Deviation of all data: 0.00112
Largest Observation Concentration of all data: Xn = 0.00570
Test Statistic, high extreme of all data: Tn = 3.98
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.00570	False		1

Antimony, dissolved, mg/L
Location: MW-9

Mean of all data: 0.00115
Standard Deviation of all data: 0.000969
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.97
T Critical of all data: Tcr = 2.86

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 09/08/2020
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: 0.0179
Standard Deviation of all data: 0.0116
Largest Observation Concentration of all data: Xn = 0.0520
Test Statistic, high extreme of all data: Tn = 2.94
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.0520	False		1

Arsenic, dissolved, mg/L
Location: MW-11

Mean of all data: 0.00534
Standard Deviation of all data: 0.00530
Largest Observation Concentration of all data: Xn = 0.0290
Test Statistic, high extreme of all data: Tn = 4.46
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0290	False		1

Arsenic, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.0119
Standard Deviation of all data: 0.00804
Largest Observation Concentration of all data: Xn = 0.0340
Test Statistic, high extreme of all data: Tn = 2.75
T Critical of all data: Tcr = 2.81

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Arsenic, dissolved, mg/L

Location: MW-2

Mean of all data: 0.00695
Standard Deviation of all data: 0.00835
Largest Observation Concentration of all data: Xn = 0.0450
Test Statistic, high extreme of all data: Tn = 4.56
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.0450	False		1

Arsenic, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.0202
Standard Deviation of all data: 0.00753
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 3.03
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/23/2011	0.0430	False		1

Arsenic, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00583
Standard Deviation of all data: 0.00798
Largest Observation Concentration of all data: Xn = 0.0430
Test Statistic, high extreme of all data: Tn = 4.66
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 0.00563
Standard Deviation of all data: 0.00695
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 5.23
T Critical of all data: Tcr = 2.80

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: 0.0739
Standard Deviation of all data: 0.0750
Largest Observation Concentration of all data: Xn = 0.690
Test Statistic, high extreme of all data: Tn = 8.21
T Critical of all data: Tcr = 3.11

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: 0.0742
Standard Deviation of all data: 0.0180
Largest Observation Concentration of all data: Xn = 0.123
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.00463
Standard Deviation of all data: 0.00289
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.86
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L

Location: MW-8

Mean of all data: 0.00501
Standard Deviation of all data: 0.00638
Largest Observation Concentration of all data: Xn = 0.0350
Test Statistic, high extreme of all data: Tn = 4.70
T Critical of all data: Tcr = 3.13

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: 0.00789
Standard Deviation of all data: 0.00844
Largest Observation Concentration of all data: Xn = 0.0380
Test Statistic, high extreme of all data: Tn = 3.57
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 0.0766
Standard Deviation of all data: 0.0483
Largest Observation Concentration of all data: Xn = 0.278
Test Statistic, high extreme of all data: Tn = 4.16
T Critical of all data: Tcr = 2.77

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: 0.188
Standard Deviation of all data: 0.0328
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 2.99
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2013	0.286	False		1

Barium, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.217
Standard Deviation of all data: 0.0512
Largest Observation Concentration of all data: Xn = 0.292
Test Statistic, high extreme of all data: Tn = 1.47
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/10/2019	0.0680	False	-1	

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Barium, dissolved, mg/L
Location: MW-2

Mean of all data: 0.212
Standard Deviation of all data: 0.0527
Largest Observation Concentration of all data: Xn = 0.324
Test Statistic, high extreme of all data: Tn = 2.13
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-2D

Mean of all data: 0.352
Standard Deviation of all data: 0.0590
Largest Observation Concentration of all data: Xn = 0.460
Test Statistic, high extreme of all data: Tn = 1.84
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW-3

Mean of all data: 0.184
Standard Deviation of all data: 0.0579
Largest Observation Concentration of all data: Xn = 0.273
Test Statistic, high extreme of all data: Tn = 1.53
T Critical of all data: Tcr = 2.71

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 09/08/2020
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: 0.178
Standard Deviation of all data: 0.0581
Largest Observation Concentration of all data: Xn = 0.286
Test Statistic, high extreme of all data: Tn = 1.86
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.0783
Standard Deviation of all data: 0.0202
Largest Observation Concentration of all data: Xn = 0.153
Test Statistic, high extreme of all data: Tn = 3.69
T Critical of all data: Tcr = 2.90

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: 0.305
Standard Deviation of all data: 0.0409
Largest Observation Concentration of all data: Xn = 0.395
Test Statistic, high extreme of all data: Tn = 2.19
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 09/08/2020
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: 0.246
Standard Deviation of all data: 0.0747
Largest Observation Concentration of all data: Xn = 0.373
Test Statistic, high extreme of all data: Tn = 1.71
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW-8

Mean of all data: 0.111
Standard Deviation of all data: 0.0168
Largest Observation Concentration of all data: Xn = 0.196
Test Statistic, high extreme of all data: Tn = 5.05
T Critical of all data: Tcr = 2.90

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: 0.153
Standard Deviation of all data: 0.0247
Largest Observation Concentration of all data: Xn = 0.203
Test Statistic, high extreme of all data: Tn = 2.03
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 09/08/2020
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: 18.5
Standard Deviation of all data: 2.18
Largest Observation Concentration of all data: Xn = 22.2
Test Statistic, high extreme of all data: Tn = 1.71
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW-11

Mean of all data: 1.34
Standard Deviation of all data: 1.90
Largest Observation Concentration of all data: Xn = 7.83
Test Statistic, high extreme of all data: Tn = 3.41
T Critical of all data: Tcr = 2.76

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: 9.30
Standard Deviation of all data: 5.69
Largest Observation Concentration of all data: Xn = 23.5
Test Statistic, high extreme of all data: Tn = 2.50
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 3.27
Standard Deviation of all data: 3.13
Largest Observation Concentration of all data: Xn = 14.0
Test Statistic, high extreme of all data: Tn = 3.44
T Critical of all data: Tcr = 3.06

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: 3.43
Standard Deviation of all data: 2.05
Largest Observation Concentration of all data: Xn = 8.01
Test Statistic, high extreme of all data: Tn = 2.24
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.629
Standard Deviation of all data: 0.582
Largest Observation Concentration of all data: Xn = 3.94
Test Statistic, high extreme of all data: Tn = 5.70
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 5.76
Standard Deviation of all data: 2.08
Largest Observation Concentration of all data: Xn = 8.24
Test Statistic, high extreme of all data: Tn = 1.20
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 3.64
Standard Deviation of all data: 1.85
Largest Observation Concentration of all data: Xn = 7.46
Test Statistic, high extreme of all data: Tn = 2.07
T Critical of all data: Tcr = 3.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 4.24
Standard Deviation of all data: 0.726
Largest Observation Concentration of all data: Xn = 6.17
Test Statistic, high extreme of all data: Tn = 2.66
T Critical of all data: Tcr = 3.06

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

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

Mean of all data: 4.54
Standard Deviation of all data: 0.658
Largest Observation Concentration of all data: Xn = 6.38
Test Statistic, high extreme of all data: Tn = 2.79
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW-8

Mean of all data: 0.719
Standard Deviation of all data: 0.312
Largest Observation Concentration of all data: Xn = 2.03
Test Statistic, high extreme of all data: Tn = 4.21
T Critical of all data: Tcr = 3.13

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: 0.673
Standard Deviation of all data: 0.177
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 0.000516
Standard Deviation of all data: 0.0000884
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 5.48
T Critical of all data: Tcr = 2.77

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: 0.000548
Standard Deviation of all data: 0.000150
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 3.01
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/22/2016	0.00100	False		1

Cadmium, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.00120
Standard Deviation of all data: 0.000597
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.02
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.00109
Standard Deviation of all data: 0.00103
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.83
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.000956
Standard Deviation of all data: 0.000396
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.63
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00109
Standard Deviation of all data: 0.000989
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.94
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 0.000603
Standard Deviation of all data: 0.000205
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.93
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.0317
Standard Deviation of all data: 0.267
Largest Observation Concentration of all data: Xn = 2.31
Test Statistic, high extreme of all data: Tn = 8.54
T Critical of all data: Tcr = 3.11

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: 0.00161
Standard Deviation of all data: 0.00246
Largest Observation Concentration of all data: Xn = 0.0203
Test Statistic, high extreme of all data: Tn = 7.59
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.000544
Standard Deviation of all data: 0.000144
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/27/2018	0.00100	False		1

Cadmium, dissolved, mg/L
Location: MW-8

Mean of all data: 0.000702
Standard Deviation of all data: 0.000551
Largest Observation Concentration of all data: Xn = 0.00310
Test Statistic, high extreme of all data: Tn = 4.35
T Critical of all data: Tcr = 3.13

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: 0.000860
Standard Deviation of all data: 0.000461
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 = 3.13

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Chloride, dissolved, mg/L
Location: MW-10

Mean of all data: 50.2
Standard Deviation of all data: 24.2
Largest Observation Concentration of all data: Xn = 94.0
Test Statistic, high extreme of all data: Tn = 1.81
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW-11

Mean of all data: 17.1
Standard Deviation of all data: 7.01
Largest Observation Concentration of all data: Xn = 41.5
Test Statistic, high extreme of all data: Tn = 3.48
T Critical of all data: Tcr = 2.76

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: 37.9
Standard Deviation of all data: 11.1
Largest Observation Concentration of all data: Xn = 57.3
Test Statistic, high extreme of all data: Tn = 1.75
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 15.5
Standard Deviation of all data: 3.05
Largest Observation Concentration of all data: Xn = 23.0
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-2D

Mean of all data: 16.4
Standard Deviation of all data: 4.30
Largest Observation Concentration of all data: Xn = 27.0
Test Statistic, high extreme of all data: Tn = 2.47
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-3

Mean of all data: 20.3
Standard Deviation of all data: 4.77
Largest Observation Concentration of all data: Xn = 33.0
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 2.66

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 09/08/2020
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: 35.9
Standard Deviation of all data: 7.84
Largest Observation Concentration of all data: Xn = 48.1
Test Statistic, high extreme of all data: Tn = 1.56
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-5

Mean of all data: 16.5
Standard Deviation of all data: 9.30
Largest Observation Concentration of all data: Xn = 39.2
Test Statistic, high extreme of all data: Tn = 2.44
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L

Location: MW-6

Mean of all data: 27.0
Standard Deviation of all data: 3.47
Largest Observation Concentration of all data: Xn = 33.3
Test Statistic, high extreme of all data: Tn = 1.82
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 33.7
Standard Deviation of all data: 6.76
Largest Observation Concentration of all data: Xn = 49.5
Test Statistic, high extreme of all data: Tn = 2.33
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW-8

Mean of all data: 60.0
Standard Deviation of all data: 27.3
Largest Observation Concentration of all data: Xn = 147.
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 2.82

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: 73.2
Standard Deviation of all data: 30.0
Largest Observation Concentration of all data: Xn = 146.
Test Statistic, high extreme of all data: Tn = 2.43
T Critical of all data: Tcr = 2.82

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 09/08/2020
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: 0.00100
Standard Deviation of all data: 0.000830
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.61
T Critical of all data: Tcr = 2.75

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: 0.000776
Standard Deviation of all data: 0.000544
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 4.09
T Critical of all data: Tcr = 2.73

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: 0.00126
Standard Deviation of all data: 0.00176
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.97
T Critical of all data: Tcr = 2.79

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L
Location: MW-2

Mean of all data: 0.00155
Standard Deviation of all data: 0.00517
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 7.62
T Critical of all data: Tcr = 3.04

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: 0.000766
Standard Deviation of all data: 0.000568
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 = 2.77

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: 0.000744
Standard Deviation of all data: 0.000671
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 4.85
T Critical of all data: Tcr = 2.96

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

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

Mean of all data: 0.000828
Standard Deviation of all data: 0.000617
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.52
T Critical of all data: Tcr = 2.77

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: 0.00249
Standard Deviation of all data: 0.00832
Largest Observation Concentration of all data: Xn = 0.0630
Test Statistic, high extreme of all data: Tn = 7.27
T Critical of all data: Tcr = 3.10

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: 0.00100
Standard Deviation of all data: 0.000908
Largest Observation Concentration of all data: Xn = 0.00420
Test Statistic, high extreme of all data: Tn = 3.52
T Critical of all data: Tcr = 3.05

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Chromium, dissolved, mg/L
Location: MW-6D

Mean of all data: 0.000766
Standard Deviation of all data: 0.000672
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 4.81
T Critical of all data: Tcr = 2.77

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: 0.00133
Standard Deviation of all data: 0.00374
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 8.43
T Critical of all data: Tcr = 3.12

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: 0.000980
Standard Deviation of all data: 0.00209
Largest Observation Concentration of all data: Xn = 0.0184
Test Statistic, high extreme of all data: Tn = 8.34
T Critical of all data: Tcr = 3.13

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, Dis, mg/L

Location: MW-10

Mean of all data: 0.000953
Standard Deviation of all data: 0.000514
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.04
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-11

Mean of all data: 0.000597
Standard Deviation of all data: 0.000201
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.01
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW-11D

Mean of all data: 0.000614
Standard Deviation of all data: 0.000366
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.79
T Critical of all data: Tcr = 2.81

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, Dis, mg/L
Location: MW-2

Mean of all data: 0.00162
Standard Deviation of all data: 0.00241
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 3.06
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	0.00900	False		1

Cobalt, Dis, mg/L
Location: MW-2D

Mean of all data: 0.000603
Standard Deviation of all data: 0.000205
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.93
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW-3

Mean of all data: 0.00298
Standard Deviation of all data: 0.00168
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.40
T Critical of all data: Tcr = 2.68

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, Dis, mg/L
Location: MW-3D

Mean of all data: 0.000574
Standard Deviation of all data: 0.000180
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.37
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW-5

Mean of all data: 0.000731
Standard Deviation of all data: 0.000760
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 5.62
T Critical of all data: Tcr = 2.86

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

Cobalt, Dis, mg/L
Location: MW-6

Mean of all data: 0.000737
Standard Deviation of all data: 0.000742
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 5.75
T Critical of all data: Tcr = 2.85

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cobalt, Dis, mg/L
Location: MW-6D

Mean of all data: 0.000588
Standard Deviation of all data: 0.000193
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.13
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW-8

Mean of all data: 0.00236
Standard Deviation of all data: 0.000843
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.13
T Critical of all data: Tcr = 2.86

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

Cobalt, Dis, mg/L
Location: MW-9

Mean of all data: 0.000923
Standard Deviation of all data: 0.00122
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 4.15
T Critical of all data: Tcr = 2.86

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L
Location: MW-10

Mean of all data: 0.00142
Standard Deviation of all data: 0.00158
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.16
T Critical of all data: Tcr = 2.77

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: 0.00106
Standard Deviation of all data: 0.000901
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 = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	0.00400	False		1

Copper, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.000629
Standard Deviation of all data: 0.000305
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 4.49
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.00223
Standard Deviation of all data: 0.00259
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 4.54
T Critical of all data: Tcr = 3.06

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: 0.000559
Standard Deviation of all data: 0.000164
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW-3

Mean of all data: 0.00155
Standard Deviation of all data: 0.00309
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 5.32
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 0.000794
Standard Deviation of all data: 0.000592
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.73
T Critical of all data: Tcr = 2.80

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: 0.00287
Standard Deviation of all data: 0.0161
Largest Observation Concentration of all data: Xn = 0.140
Test Statistic, high extreme of all data: Tn = 8.53
T Critical of all data: Tcr = 3.11

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: 0.00257
Standard Deviation of all data: 0.0107
Largest Observation Concentration of all data: Xn = 0.0850
Test Statistic, high extreme of all data: Tn = 7.71
T Critical of all data: Tcr = 3.06

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

Copper, dissolved, mg/L
Location: MW-6D

Mean of all data: 0.000721
Standard Deviation of all data: 0.000393
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.26
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.00200	False		1

Copper, dissolved, mg/L
Location: MW-8

Mean of all data: 0.00170
Standard Deviation of all data: 0.00582
Largest Observation Concentration of all data: Xn = 0.0520
Test Statistic, high extreme of all data: Tn = 8.64
T Critical of all data: Tcr = 3.13

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: 0.00193
Standard Deviation of all data: 0.0103
Largest Observation Concentration of all data: Xn = 0.0930
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
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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Cyanide, total, mg/L
Location: MW-10

Mean of all data: 0.00175
Standard Deviation of all data: 0.00129
Largest Observation Concentration of all data: Xn = 0.00690
Test Statistic, high extreme of all data: Tn = 3.98
T Critical of all data: Tcr = 2.77

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: 0.00185
Standard Deviation of all data: 0.00237
Largest Observation Concentration of all data: Xn = 0.0136
Test Statistic, high extreme of all data: Tn = 4.96
T Critical of all data: Tcr = 2.76

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: 0.0159
Standard Deviation of all data: 0.0172
Largest Observation Concentration of all data: Xn = 0.0660
Test Statistic, high extreme of all data: Tn = 2.92
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	0.0660	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/08/2020
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: 0.00157
Standard Deviation of all data: 0.00130
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.65
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L
Location: MW-2D

Mean of all data: 0.00192
Standard Deviation of all data: 0.00184
Largest Observation Concentration of all data: Xn = 0.00830
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 2.80

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: 0.00160
Standard Deviation of all data: 0.00136
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.49
T Critical of all data: Tcr = 2.68

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 09/08/2020
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: 0.00186
Standard Deviation of all data: 0.00189
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 3.77
T Critical of all data: Tcr = 2.80

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: 0.00522
Standard Deviation of all data: 0.00255
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 3.05
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2010	0.0130	False		1

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

Mean of all data: 0.00176
Standard Deviation of all data: 0.00134
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.42
T Critical of all data: Tcr = 2.84

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 09/08/2020
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: 0.00153
Standard Deviation of all data: 0.000943
Largest Observation Concentration of all data: Xn = 0.00250
Test Statistic, high extreme of all data: Tn = 1.03
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.00170
Standard Deviation of all data: 0.00121
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.72
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.00179
Standard Deviation of all data: 0.00124
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 2.58
T Critical of all data: Tcr = 2.85

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 09/08/2020
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: 0.588
Standard Deviation of all data: 0.215
Largest Observation Concentration of all data: Xn = 0.850
Test Statistic, high extreme of all data: Tn = 1.22
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW-11

Mean of all data: 0.322
Standard Deviation of all data: 0.111
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 3.49
T Critical of all data: Tcr = 2.76

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: 0.482
Standard Deviation of all data: 0.163
Largest Observation Concentration of all data: Xn = 0.760
Test Statistic, high extreme of all data: Tn = 1.71
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.267
Standard Deviation of all data: 0.0771
Largest Observation Concentration of all data: Xn = 0.550
Test Statistic, high extreme of all data: Tn = 3.67
T Critical of all data: Tcr = 2.79

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: 0.255
Standard Deviation of all data: 0.0993
Largest Observation Concentration of all data: Xn = 0.500
Test Statistic, high extreme of all data: Tn = 2.46
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW-3

Mean of all data: 0.213
Standard Deviation of all data: 0.0601
Largest Observation Concentration of all data: Xn = 0.330
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 2.68

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 09/08/2020
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: 0.309
Standard Deviation of all data: 0.137
Largest Observation Concentration of all data: Xn = 0.640
Test Statistic, high extreme of all data: Tn = 2.41
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L

Location: MW-5

Mean of all data: 0.366
Standard Deviation of all data: 0.116
Largest Observation Concentration of all data: Xn = 0.660
Test Statistic, high extreme of all data: Tn = 2.54
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-6

Mean of all data: 0.596
Standard Deviation of all data: 0.106
Largest Observation Concentration of all data: Xn = 0.830
Test Statistic, high extreme of all data: Tn = 2.22
T Critical of all data: Tcr = 2.84

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 09/08/2020
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: 0.285
Standard Deviation of all data: 0.143
Largest Observation Concentration of all data: Xn = 0.570
Test Statistic, high extreme of all data: Tn = 2.00
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW-8

Mean of all data: 0.448
Standard Deviation of all data: 0.150
Largest Observation Concentration of all data: Xn = 0.840
Test Statistic, high extreme of all data: Tn = 2.61
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/18/2014	<0.00500	True	-1	

Fluoride, dissolved, mg/L
Location: MW-9

Mean of all data: 0.378
Standard Deviation of all data: 0.114
Largest Observation Concentration of all data: Xn = 0.710
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.85

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 09/08/2020
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: 1.58
Standard Deviation of all data: 1.74
Largest Observation Concentration of all data: Xn = 6.59
Test Statistic, high extreme of all data: Tn = 2.88
T Critical of all data: Tcr = 2.77

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: 0.155
Standard Deviation of all data: 0.410
Largest Observation Concentration of all data: Xn = 1.73
Test Statistic, high extreme of all data: Tn = 3.85
T Critical of all data: Tcr = 2.76

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: 18.2
Standard Deviation of all data: 3.55
Largest Observation Concentration of all data: Xn = 22.6
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.81

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Iron, dissolved, mg/L
Location: MW-2

Mean of all data: 0.128
Standard Deviation of all data: 0.485
Largest Observation Concentration of all data: Xn = 3.83
Test Statistic, high extreme of all data: Tn = 7.65
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/01/2018	3.83	False		1

Iron, dissolved, mg/L
Location: MW-2D

Mean of all data: 16.5
Standard Deviation of all data: 2.40
Largest Observation Concentration of all data: Xn = 20.7
Test Statistic, high extreme of all data: Tn = 1.77
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW-3

Mean of all data: 1.64
Standard Deviation of all data: 1.43
Largest Observation Concentration of all data: Xn = 4.93
Test Statistic, high extreme of all data: Tn = 2.30
T Critical of all data: Tcr = 2.97

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

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

Mean of all data: 5.69
Standard Deviation of all data: 3.48
Largest Observation Concentration of all data: Xn = 13.9
Test Statistic, high extreme of all data: Tn = 2.35
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.790
Standard Deviation of all data: 0.767
Largest Observation Concentration of all data: Xn = 4.67
Test Statistic, high extreme of all data: Tn = 5.07
T Critical of all data: Tcr = 3.11

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: 19.0
Standard Deviation of all data: 5.81
Largest Observation Concentration of all data: Xn = 30.5
Test Statistic, high extreme of all data: Tn = 1.97
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.524
Standard Deviation of all data: 0.209
Largest Observation Concentration of all data: Xn = 0.929
Test Statistic, high extreme of all data: Tn = 1.94
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW-8

Mean of all data: 0.0630
Standard Deviation of all data: 0.0712
Largest Observation Concentration of all data: Xn = 0.339
Test Statistic, high extreme of all data: Tn = 3.88
T Critical of all data: Tcr = 3.12

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: 17.3
Standard Deviation of all data: 3.64
Largest Observation Concentration of all data: Xn = 24.5
Test Statistic, high extreme of all data: Tn = 1.97
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 0.00244
Standard Deviation of all data: 0.00139
Largest Observation Concentration of all data: Xn = 0.00350
Test Statistic, high extreme of all data: Tn = 0.766
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW-11

Mean of all data: 0.00257
Standard Deviation of all data: 0.00164
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.00312
Standard Deviation of all data: 0.00136
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.12
T Critical of all data: Tcr = 2.80

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Lead, dissolved, mg/L
Location: MW-2

Mean of all data: 0.00167
Standard Deviation of all data: 0.00182
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.13
T Critical of all data: Tcr = 3.05

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: 0.00286
Standard Deviation of all data: 0.00114
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.87
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW-3

Mean of all data: 0.00179
Standard Deviation of all data: 0.00180
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 = 2.96

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

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

Mean of all data: 0.00245
Standard Deviation of all data: 0.00146
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 1.74
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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

Mean of all data: 0.00148
Standard Deviation of all data: 0.00151
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 = 3.10

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: 0.00291
Standard Deviation of all data: 0.00236
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 3.85
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.00259
Standard Deviation of all data: 0.00183
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 2.95
T Critical of all data: Tcr = 2.79

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: 0.00175
Standard Deviation of all data: 0.00200
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.62
T Critical of all data: Tcr = 3.13

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: 0.00229
Standard Deviation of all data: 0.00189
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 4.60
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 1.35
Standard Deviation of all data: 0.637
Largest Observation Concentration of all data: Xn = 2.50
Test Statistic, high extreme of all data: Tn = 1.81
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-11

Mean of all data: 0.136
Standard Deviation of all data: 0.288
Largest Observation Concentration of all data: Xn = 1.24
Test Statistic, high extreme of all data: Tn = 3.85
T Critical of all data: Tcr = 2.76

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: 2.90
Standard Deviation of all data: 0.596
Largest Observation Concentration of all data: Xn = 4.01
Test Statistic, high extreme of all data: Tn = 1.87
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.177
Standard Deviation of all data: 0.278
Largest Observation Concentration of all data: Xn = 1.28
Test Statistic, high extreme of all data: Tn = 3.96
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/13/2013	1.28	False		1

Manganese, dissolved, mg/L

Location: MW-2D

Mean of all data: 1.05
Standard Deviation of all data: 0.191
Largest Observation Concentration of all data: Xn = 1.36
Test Statistic, high extreme of all data: Tn = 1.59
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-3

Mean of all data: 0.844
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 = 2.97

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 09/08/2020
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: 0.352
Standard Deviation of all data: 0.153
Largest Observation Concentration of all data: Xn = 0.745
Test Statistic, high extreme of all data: Tn = 2.57
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-5

Mean of all data: 1.22
Standard Deviation of all data: 0.646
Largest Observation Concentration of all data: Xn = 3.38
Test Statistic, high extreme of all data: Tn = 3.34
T Critical of all data: Tcr = 3.11

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/08/2020	3.38	False		1

Manganese, dissolved, mg/L

Location: MW-6

Mean of all data: 2.51
Standard Deviation of all data: 0.542
Largest Observation Concentration of all data: Xn = 3.63
Test Statistic, high extreme of all data: Tn = 2.06
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.180
Standard Deviation of all data: 0.0670
Largest Observation Concentration of all data: Xn = 0.309
Test Statistic, high extreme of all data: Tn = 1.93
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L

Location: MW-8

Mean of all data: 0.622
Standard Deviation of all data: 0.125
Largest Observation Concentration of all data: Xn = 0.850
Test Statistic, high extreme of all data: Tn = 1.83
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-9

Mean of all data: 0.757
Standard Deviation of all data: 0.116
Largest Observation Concentration of all data: Xn = 1.07
Test Statistic, high extreme of all data: Tn = 2.69
T Critical of all data: Tcr = 3.13

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 09/08/2020
Confidence Level: 95%
Transform: None

LT Multiplier: x 0.50
Number of Outliers: One Outlier

Nickel, dissolved, mg/L

Location: MW-10

Mean of all data: 0.00252
Standard Deviation of all data: 0.00173
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 2.77

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: 0.00447
Standard Deviation of all data: 0.00300
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.84
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L

Location: MW-11D

Mean of all data: 0.00259
Standard Deviation of all data: 0.00266
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.0113
Standard Deviation of all data: 0.0124
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.13
T Critical of all data: Tcr = 3.06

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: 0.00129
Standard Deviation of all data: 0.000863
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 3.14
T Critical of all data: Tcr = 2.80

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: 0.0185
Standard Deviation of all data: 0.0176
Largest Observation Concentration of all data: Xn = 0.0800
Test Statistic, high extreme of all data: Tn = 3.50
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 0.00174
Standard Deviation of all data: 0.00134
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.92
T Critical of all data: Tcr = 2.80

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: 0.00585
Standard Deviation of all data: 0.00821
Largest Observation Concentration of all data: Xn = 0.0329
Test Statistic, high extreme of all data: Tn = 3.29
T Critical of all data: Tcr = 3.11

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: 0.0108
Standard Deviation of all data: 0.0128
Largest Observation Concentration of all data: Xn = 0.0470
Test Statistic, high extreme of all data: Tn = 2.82
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.00150
Standard Deviation of all data: 0.00102
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.42
T Critical of all data: Tcr = 2.80

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: 0.0135
Standard Deviation of all data: 0.0146
Largest Observation Concentration of all data: Xn = 0.117
Test Statistic, high extreme of all data: Tn = 7.10
T Critical of all data: Tcr = 3.13

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: 0.00794
Standard Deviation of all data: 0.0104
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 3.18
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 2.16
Standard Deviation of all data: 3.72
Largest Observation Concentration of all data: Xn = 16.9
Test Statistic, high extreme of all data: Tn = 3.97
T Critical of all data: Tcr = 2.77

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: 7.88
Standard Deviation of all data: 11.4
Largest Observation Concentration of all data: Xn = 55.6
Test Statistic, high extreme of all data: Tn = 4.18
T Critical of all data: Tcr = 2.76

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: 2.32
Standard Deviation of all data: 7.39
Largest Observation Concentration of all data: Xn = 44.0
Test Statistic, high extreme of all data: Tn = 5.64
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 4.62
Standard Deviation of all data: 4.27
Largest Observation Concentration of all data: Xn = 15.0
Test Statistic, high extreme of all data: Tn = 2.43
T Critical of all data: Tcr = 2.76

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: 1.53
Standard Deviation of all data: 2.33
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 3.64
T Critical of all data: Tcr = 2.80

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: 3.14
Standard Deviation of all data: 4.42
Largest Observation Concentration of all data: Xn = 14.2
Test Statistic, high extreme of all data: Tn = 2.50
T Critical of all data: Tcr = 2.66

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 09/08/2020
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: 1.47
Standard Deviation of all data: 2.22
Largest Observation Concentration of all data: Xn = 11.2
Test Statistic, high extreme of all data: Tn = 4.38
T Critical of all data: Tcr = 2.80

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: 1.59
Standard Deviation of all data: 2.30
Largest Observation Concentration of all data: Xn = 11.4
Test Statistic, high extreme of all data: Tn = 4.26
T Critical of all data: Tcr = 2.82

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: 1.16
Standard Deviation of all data: 1.46
Largest Observation Concentration of all data: Xn = 6.00
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.81

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/24/2015	6.00	False		1

Based on Grubbs one-sided outlier test

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/08/2020
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: 1.34
Standard Deviation of all data: 2.58
Largest Observation Concentration of all data: Xn = 14.6
Test Statistic, high extreme of all data: Tn = 5.13
T Critical of all data: Tcr = 2.80

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: 2.39
Standard Deviation of all data: 2.76
Largest Observation Concentration of all data: Xn = 10.0
Test Statistic, high extreme of all data: Tn = 2.76
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-9

Mean of all data: 1.14
Standard Deviation of all data: 1.94
Largest Observation Concentration of all data: Xn = 9.27
Test Statistic, high extreme of all data: Tn = 4.19
T Critical of all data: Tcr = 2.82

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 09/08/2020
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: 0.00558
Standard Deviation of all data: 0.00343
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.17
T Critical of all data: Tcr = 2.76

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L
Location: MW-11

Mean of all data: 0.00587
Standard Deviation of all data: 0.00333
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.24
T Critical of all data: Tcr = 2.75

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L
Location: MW-11D

Mean of all data: 0.00475
Standard Deviation of all data: 0.00495
Largest Observation Concentration of all data: Xn = 0.0250
Test Statistic, high extreme of all data: Tn = 4.09
T Critical of all data: Tcr = 2.80

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 09/08/2020
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: 0.00490
Standard Deviation of all data: 0.00337
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.22
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-2D

Mean of all data: 0.00417
Standard Deviation of all data: 0.00348
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.39
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L

Location: MW-3

Mean of all data: 0.00498
Standard Deviation of all data: 0.00327
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 1.23
T Critical of all data: Tcr = 2.66

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 09/08/2020
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: 0.00476
Standard Deviation of all data: 0.00386
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.79

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: 0.00493
Standard Deviation of all data: 0.00437
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 2.99
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/18/2015	0.0180	False		1

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

Mean of all data: 0.00443
Standard Deviation of all data: 0.00368
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.33
T Critical of all data: Tcr = 2.84

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 09/08/2020
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: 0.00520
Standard Deviation of all data: 0.00342
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.40
T Critical of all data: Tcr = 2.79

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L
Location: MW-8

Mean of all data: 0.00493
Standard Deviation of all data: 0.00356
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 2.27
T Critical of all data: Tcr = 2.85

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Selenium, dissolved, mg/L
Location: MW-9

Mean of all data: 0.00471
Standard Deviation of all data: 0.00391
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 2.63
T Critical of all data: Tcr = 2.85

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 09/08/2020
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: 0.00100
Standard Deviation of all data: 0.00142
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.93
T Critical of all data: Tcr = 2.75

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: 0.00109
Standard Deviation of all data: 0.00134
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.68
T Critical of all data: Tcr = 2.73

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: 0.000894
Standard Deviation of all data: 0.00123
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 4.97
T Critical of all data: Tcr = 2.79

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 09/08/2020
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: 0.00107
Standard Deviation of all data: 0.00177
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.04
T Critical of all data: Tcr = 2.76

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: 0.00128
Standard Deviation of all data: 0.00131
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.59
T Critical of all data: Tcr = 2.77

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: 0.00148
Standard Deviation of all data: 0.00173
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 2.61
T Critical of all data: Tcr = 2.66

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 09/08/2020
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: 0.00131
Standard Deviation of all data: 0.00156
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 3.64
T Critical of all data: Tcr = 2.77

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: 0.00109
Standard Deviation of all data: 0.00113
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.47
T Critical of all data: Tcr = 2.82

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: 0.000950
Standard Deviation of all data: 0.00113
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.59
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 0.00178
Standard Deviation of all data: 0.00208
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 2.51
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW-8

Mean of all data: 0.00126
Standard Deviation of all data: 0.00152
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.13
T Critical of all data: Tcr = 2.82

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: 0.00106
Standard Deviation of all data: 0.00147
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 4.73
T Critical of all data: Tcr = 2.82

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 09/08/2020
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: 837.
Standard Deviation of all data: 211.
Largest Observation Concentration of all data: Xn = 1100.
Test Statistic, high extreme of all data: Tn = 1.24
T Critical of all data: Tcr = 2.77

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: 89.5
Standard Deviation of all data: 74.3
Largest Observation Concentration of all data: Xn = 383.
Test Statistic, high extreme of all data: Tn = 3.95
T Critical of all data: Tcr = 2.76

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: 439.
Standard Deviation of all data: 233.
Largest Observation Concentration of all data: Xn = 927.
Test Statistic, high extreme of all data: Tn = 2.09
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 41.1
Standard Deviation of all data: 47.7
Largest Observation Concentration of all data: Xn = 287.
Test Statistic, high extreme of all data: Tn = 5.15
T Critical of all data: Tcr = 2.76

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: 41.2
Standard Deviation of all data: 48.0
Largest Observation Concentration of all data: Xn = 181.
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.80

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: 72.2
Standard Deviation of all data: 56.6
Largest Observation Concentration of all data: Xn = 230.
Test Statistic, high extreme of all data: Tn = 2.79
T Critical of all data: Tcr = 2.66

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 09/08/2020
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: 165.
Standard Deviation of all data: 96.8
Largest Observation Concentration of all data: Xn = 638.
Test Statistic, high extreme of all data: Tn = 4.88
T Critical of all data: Tcr = 2.80

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: 113.
Standard Deviation of all data: 72.0
Largest Observation Concentration of all data: Xn = 340.
Test Statistic, high extreme of all data: Tn = 3.16
T Critical of all data: Tcr = 2.82

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: 11.2
Standard Deviation of all data: 8.72
Largest Observation Concentration of all data: Xn = 34.9
Test Statistic, high extreme of all data: Tn = 2.72
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 252.
Standard Deviation of all data: 72.4
Largest Observation Concentration of all data: Xn = 417.
Test Statistic, high extreme of all data: Tn = 2.28
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW-8

Mean of all data: 129.
Standard Deviation of all data: 23.7
Largest Observation Concentration of all data: Xn = 186.
Test Statistic, high extreme of all data: Tn = 2.42
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/29/2016	45.2	False	-1	

Sulfate, dissolved, mg/L
Location: MW-9

Mean of all data: 177.
Standard Deviation of all data: 63.5
Largest Observation Concentration of all data: Xn = 365.
Test Statistic, high extreme of all data: Tn = 2.97
T Critical of all data: Tcr = 2.82

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 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

Total Dissolved Solids, mg/L

Location: MW-10

Mean of all data: 1650.
Standard Deviation of all data: 230.
Largest Observation Concentration of all data: Xn = 2130.
Test Statistic, high extreme of all data: Tn = 2.10
T Critical of all data: Tcr = 2.77

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: 761.
Standard Deviation of all data: 420.
Largest Observation Concentration of all data: Xn = 2770.
Test Statistic, high extreme of all data: Tn = 4.78
T Critical of all data: Tcr = 2.76

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: 1240.
Standard Deviation of all data: 335.
Largest Observation Concentration of all data: Xn = 1730.
Test Statistic, high extreme of all data: Tn = 1.45
T Critical of all data: Tcr = 2.81

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 09/08/2020
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: 731.
Standard Deviation of all data: 232.
Largest Observation Concentration of all data: Xn = 1560.
Test Statistic, high extreme of all data: Tn = 3.56
T Critical of all data: Tcr = 3.06

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: 739.
Standard Deviation of all data: 167.
Largest Observation Concentration of all data: Xn = 950.
Test Statistic, high extreme of all data: Tn = 1.26
T Critical of all data: Tcr = 2.80

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: 726.
Standard Deviation of all data: 141.
Largest Observation Concentration of all data: Xn = 1130.
Test Statistic, high extreme of all data: Tn = 2.85
T Critical of all data: Tcr = 2.97

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 09/08/2020
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: 578.
Standard Deviation of all data: 89.0
Largest Observation Concentration of all data: Xn = 750.
Test Statistic, high extreme of all data: Tn = 1.93
T Critical of all data: Tcr = 2.80

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: 765.
Standard Deviation of all data: 203.
Largest Observation Concentration of all data: Xn = 1320.
Test Statistic, high extreme of all data: Tn = 2.74
T Critical of all data: Tcr = 3.11

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: 98.2
Largest Observation Concentration of all data: Xn = 1040.
Test Statistic, high extreme of all data: Tn = 5.47
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 674.
Standard Deviation of all data: 173.
Largest Observation Concentration of all data: Xn = 960.
Test Statistic, high extreme of all data: Tn = 1.66
T Critical of all data: Tcr = 2.80

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: 133.
Largest Observation Concentration of all data: Xn = 1030.
Test Statistic, high extreme of all data: Tn = 2.21
T Critical of all data: Tcr = 3.13

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: 911.
Standard Deviation of all data: 188.
Largest Observation Concentration of all data: Xn = 1400.
Test Statistic, high extreme of all data: Tn = 2.59
T Critical of all data: Tcr = 3.13

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 09/08/2020
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: 0.00631
Standard Deviation of all data: 0.00961
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.34
T Critical of all data: Tcr = 2.76

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: 0.00682
Standard Deviation of all data: 0.0101
Largest Observation Concentration of all data: Xn = 0.0490
Test Statistic, high extreme of all data: Tn = 4.18
T Critical of all data: Tcr = 2.75

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: 0.00734
Standard Deviation of all data: 0.0105
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.07
T Critical of all data: Tcr = 2.80

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 09/08/2020
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: 0.0142
Standard Deviation of all data: 0.0568
Largest Observation Concentration of all data: Xn = 0.454
Test Statistic, high extreme of all data: Tn = 7.74
T Critical of all data: Tcr = 3.05

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: 0.00611
Standard Deviation of all data: 0.00856
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.89
T Critical of all data: Tcr = 2.79

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: 0.0108
Standard Deviation of all data: 0.0180
Largest Observation Concentration of all data: Xn = 0.108
Test Statistic, high extreme of all data: Tn = 5.41
T Critical of all data: Tcr = 2.96

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 09/08/2020
Confidence Level: 95%
Transform: None
LT Multiplier: x 0.50
Number of Outliers: One Outlier

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

Mean of all data: 0.00698
Standard Deviation of all data: 0.0113
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 3.79
T Critical of all data: Tcr = 2.79

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: 0.00714
Standard Deviation of all data: 0.0101
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 4.24
T Critical of all data: Tcr = 3.10

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: 0.0162
Standard Deviation of all data: 0.0594
Largest Observation Concentration of all data: Xn = 0.478
Test Statistic, high extreme of all data: Tn = 7.78
T Critical of all data: Tcr = 3.06

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 09/08/2020
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: 0.00579
Standard Deviation of all data: 0.0104
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 3.49
T Critical of all data: Tcr = 2.79

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: 0.00713
Standard Deviation of all data: 0.0114
Largest Observation Concentration of all data: Xn = 0.0720
Test Statistic, high extreme of all data: Tn = 5.71
T Critical of all data: Tcr = 3.13

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: 0.00674
Standard Deviation of all data: 0.00842
Largest Observation Concentration of all data: Xn = 0.0500
Test Statistic, high extreme of all data: Tn = 5.14
T Critical of all data: Tcr = 3.13

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

Venice
Outlier Analysis Results

User Supplied Information

Date Range: 06/27/1996 to 09/08/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

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
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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: $T_s = \dfrac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}}$ *for* $3 \le n \le 7$ $T_s = \dfrac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $8 \le n \le 10$ $T_s = \dfrac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}}$ *for* $11 \le n \le 13$ $T_s = \dfrac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}}$ *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).