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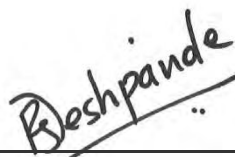
FORMER HUTSONVILLE POWER STATION - ASH POND D

**2021 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D**

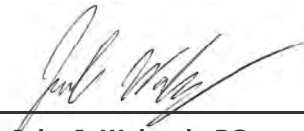
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ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
CCW	Coal Combustion Waste
EPA	Environmental Protection Agency
GMZ	Groundwater Management Zone
Hanson	Hanson Professional Services, Inc.
HDPE	High Density Polyethylene
Hutsonville	Former Hutsonville Power Station
IAC	Illinois Administrative Code
ILCS	Illinois Compiled Statutes
NRT	Natural Resource Technology, Inc.
TDS	Total Dissolved Solids

1. INTRODUCTION

1.1 Background

This report has been prepared for AmerenEnergy Medina Valley Cogen, LLC (Ameren) for the former Hutsonville Power Station (Hutsonville). The Hutsonville Ash Pond D (Figure 1-1) received coal combustion waste (CCW) from the coal fired power plant between 1968 and 2000. Ameren completed closure activities for Ash Pond D in January 2013 in accordance with the site-specific closure requirements of 35 Illinois Administrative Code (IAC) 840. Closure activities for Ash Pond D included placement of a 40-mil high density polyethylene (HDPE) cap covered with a three-foot thick vegetative soil layer, construction of surface water control structures, and construction of a groundwater collection system (i.e., Collection Trench). It is important to note that Ameren was unable to initiate operation of the Collection Trench until they received authorization for the associated discharge under Hutsonville's renewed National Pollutant Discharge Elimination System (NPDES) permit (IL0004120) with an effective date of March 1, 2015. Operation of the Collection Trench began in April 2015. Hutsonville Ash Pond D post-closure care requirements were established in the Post-Closure Care Plan (Hanson Professional Services, Inc. [Hanson], Natural Resource Technology, Inc. [NRT], 2011a) and the Groundwater Monitoring Plan (Hanson, NRT, 2011b), both dated July 26, 2011. Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond were clean-closed by relocating accumulated ash to Ash Pond A. Closure activities for Ash Pond A included grading according to the Closure Plan, and capping with a low permeability geosynthetic (40-mil HDPE) membrane covered with protective soil. Closure activities for Ash Pond A, Ash Pond B, Ash Pond C, and the Bottom Ash Sluice Pond were completed in June 2016 in accordance with the Closure Plan (Hanson, NRT, 2014b), and the site-specific Ash Pond D rule 35 IAC 840 to the extent feasible. This annual report only includes activities associated with the Ash Pond D.

Groundwater has been monitored at the site since 1984. The groundwater monitoring system for Ash Pond D, as defined by the Groundwater Monitoring Plan (Hanson, NRT, 2011b), originally consisted of two background monitoring wells, MW-10 and MW 10D, and nine downgradient compliance monitoring wells¹, MW-6, MW-7, MW-7D, MW-8, MW-11R, MW-14, MW-115S, MW-115D, and MW-121 (Figure 1-2). Background wells MW-10 and MW-10D were destroyed due to construction unrelated to Ameren operations after the first quarter, 2016 monitoring period. No trace of the former background wells was found using a metal detector, probes, or digging. As a result, these wells were replaced with new background monitoring wells, MW-23S and MW-23D, in November 2017. In addition, several other monitoring wells and piezometers located at Hutsonville are measured for groundwater level so that groundwater elevation contour maps can be created for the entire site. Ash Pond D is located near the southeast portion of the former Hutsonville Power Station, as shown on Figure 1-1, with the sampled monitoring wells shown on Figure 1-2.

The Groundwater Monitoring Plan (Hanson, NRT, 2011b), in accordance with 35 IAC 840.114 and 35 IAC 840.116, outlines groundwater monitoring and sampling procedures, establishes the parameters and methods to be used for analyzing the groundwater samples, and describes evaluation methods to assess post-closure groundwater quality and trends to demonstrate

¹ Note that in the 2017 Annual Report, Section 1.1, well MW-7D was mistakenly left off the list of compliance wells.

compliance with the applicable groundwater standards. The Groundwater Monitoring Program Schedule is provided in Table 1-1.

Monitoring well locations, installation dates, construction information, and the groundwater zone they monitor are provided in Table 1-2. Field and laboratory parameters for evaluating groundwater quality are shown in Table 1-3.

Post-closure groundwater monitoring and annual reporting according to the Groundwater Monitoring Plan (Hanson, NRT, 2011b) and the Post-Closure Care Plan (Hanson, NRT, 2011a) began in 2013. This ninth annual report includes the following elements:

- A summary of groundwater monitoring data collected in 2020 and 2021. Data tables are included in Appendix A.
- Quarterly Site Inspection Forms, including observations and descriptions of any maintenance activities performed on the pond cap, embankment, and groundwater collection trench and discharge system (Appendix B).
- Annual trend and statistical analysis results per Section 5.2 of the Groundwater Monitoring Plan (Hanson, NRT, 2011b), including an assessment of any statistically significant increasing trends (Appendix C).

1.2 Groundwater Quality Overview – 2013 to 2021

1.2.1 Summary of Cover System Construction and Maintenance

The closure activities for Ash Pond D included placement of a cover system, which included a 40-mil HDPE geomembrane liner covered with a three-foot thick vegetative soil layer, construction of surface water control structures, and construction of a collection trench.

Inspections of the cover system are performed on a quarterly schedule. Routine maintenance activities are performed at Ash Pond D 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 Post-Closure Plan (Hanson, NRT, 2011a).

1.2.2 Summary of 2013 to 2021 Groundwater Quality Data Review

Groundwater quality data collected since Ameren completed closure activities for Ash Pond D in 2013 have been reviewed to assess the overall condition of the groundwater and the performance of the cover system. This review has been performed independently from the compliance evaluations required by the Groundwater Monitoring Plan (Hanson, NRT, 2011b), which are focused on specific compliance criteria and proposed mitigation actions. This review is intended as a big-picture view of groundwater quality over time since closure.

Boron was identified as the primary indicator parameter for coal ash leachate impacts to groundwater at Ash Pond D in the Pond D Closure Alternatives Report (NRT, 2009). As such, boron was selected for this groundwater quality data review. Boron concentrations over time from closure completion (2013) are presented in Figures 1-3 through 1-8. On the figures, the lines through the concentration data represent the best fit linear regressions for boron concentrations in each well. 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. Generally, boron concentrations in most compliance monitoring wells have been stable or decreasing since 2013 and are currently below the Class I Groundwater Standard for the majority of the compliance groundwater monitoring wells. As illustrated in Figure 1-5, periodic high boron concentrations at MW-11R were recently observed (2019-2021), however as indicated by the regression line, concentrations have been decreasing since 2013. Boron concentration at MW-11R will continue to be monitored and evaluated in 2022.

Sulfate was also identified as an indicator parameter for coal ash at Ash Pond D in the Pond D Closure Alternatives Report (NRT, 2009); however, sulfate can have other anthropogenic sources for elevated concentrations in groundwater, and sulfate concentrations can decrease in groundwater under strongly reducing conditions. These caveats make sulfate a less reliable indicator for coal ash impacts than boron. Sulfate concentrations over time from closure completion (2013) are presented in Figures 1-8 through 1-12 along with best fit linear regression lines indicating general concentration "trends" over time. Similar to boron, sulfate concentrations have been stable or decreasing since the closure completion. As illustrated in Figure 1-11, periodic high sulfate concentrations at MW-11R were recently observed (2019-2021), however as indicated by the regression line, concentrations have been decreasing since 2013. Sulfate concentration at MW-11R will continue to be monitored and evaluated in 2022.

In addition, since completion of closure in 2013, 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 stable or decreasing boron and sulfate concentrations in the majority of compliance monitoring wells across the site are a strong indication that the cover system is functioning to improve overall groundwater quality beneath the pond.

2. GROUNDWATER MONITORING PLAN COMPLIANCE

2.1 Applicable Groundwater Quality Standards

2.1.1 On-Site Groundwater Standards

As described in Section 5.1.1 of the Groundwater Monitoring Plan (Hanson, NRT, 2011b) and pursuant to 35 IAC 840.16(a):

- Prior to the completion of the post-closure care period, the on-site applicable groundwater quality standards at Ash Pond D are the greater of either the actual groundwater monitoring result, or the Class I Potable Resource Groundwater standard set forth in 35 IAC 620.410.
- After completion of the post-closure care period, the on-site concentrations of contaminants from Ash Pond D as determined by groundwater monitoring, if those concentrations exceed the numeric standards for Class I Potable Resource Groundwater set forth in 35 IAC 620.410, are the applicable groundwater standards at Ash Pond D if the following criteria are addressed to the satisfaction of the Illinois EPA:
 - 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 Ash Pond D 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 the Illinois EPA. Existing potable uses of groundwater may be preserved as long as such uses remain fit for human consumption in accordance with accepted water supply principles.

2.1.2 Off-Site Groundwater Standards

As described in Section 5.1.2 of the Groundwater Monitoring Plan (Hanson, NRT, 2011b) and pursuant to 35 IAC 840.116(b):

- Off-site groundwater quality standards are the Class I Potable Resource standards [35 IAC 620.410] for the upper zone (defined during rulemaking as the fine-grained sediments directly beneath Ash Pond D) and the 35 IAC 620 Subpart C non-degradation standards for the lower zone, unless a groundwater management zone (GMZ) has been established as provided in 35 IAC 620.250. Currently, no GMZ is established for Pond D. However, a GMZ is established for Ash Pond A. In conjunction with Ameren's request for approval of the Closure Plan for Ash Pond A (Hanson, NRT, 2014b), Ameren submitted a request to establish a GMZ at Ash Pond A pursuant to 35 IAC 620.250(a)(2): Ash Ponds Closure, Groundwater Management Zone Application, dated September 8, 2014 (Hanson, NRT, 2014a), which was approved along with the Closure Plan (Hanson, NRT, 2014b).

2.2 Demonstration of Compliance

2.2.1 On-Site Groundwater Compliance

As described in Section 5.2.1 of the Groundwater Monitoring Plan (Hanson, NRT, 2011b):

- Compliance with on-site groundwater quality standards will be achieved when no statistically significant increasing trend that can be attributed to Ash Pond D is detected in the concentrations of all constituents monitored at the compliance (down-gradient) boundary of the site for four consecutive years after changing to an annual monitoring frequency.

2.2.2 Off-Site Groundwater Compliance

As described in Section 5.2.1 of the Groundwater Monitoring Plan (Hanson, NRT, 2011b):

- For off-site groundwater, the following compliance criteria must be met:
 - Statistically significant decreasing trends in concentration for all constituents monitored in accordance with 35 IAC 840.114 in the upper zone of the aquifer at the compliance boundary are detected for a period of four consecutive years after changing to annual monitoring.
 - No statistically significant increasing trend that can be attributed to Ash Pond D is detected in the concentrations of all constituents monitored in accordance with 35 IAC 840.114 in the lower zone of the aquifer at the compliance boundary for a period of four consecutive years after changing to an annual monitoring frequency.
 - All concentrations of constituents monitored in accordance with 35 IAC 840.114 are at or below the applicable groundwater quality standard as provided in 35 IAC 840.116(b) at the down-gradient boundaries of Ash Pond D.

2.2.3 Compliance Determination

As described in Section 5.2.3 of the Groundwater Monitoring Plan:

- Compliance is demonstrated by performing an annual trend analysis for each monitoring well located at the down-gradient boundaries of Ash Pond D for all constituents monitored in accordance with 35 IAC 840.114. The analysis shall use Sen's Estimate of Slope and be performed on a minimum of four consecutive samples.
- If a GMZ is established for off-site groundwater in the future, the demonstration of compliance will be set forth in the GMZ approved by the closure or post-closure care plan.
- If the results of sampling and analysis show a positive slope at any compliance monitoring well located at the downgradient boundaries of Ash Pond D, a Mann-Kendall test will be performed at 95 percent confidence to determine whether or not the increasing slope represents a statistically significant increasing trend. Ameren will investigate the cause of a statistically significant increasing trend as described below. If the statistically significant increasing trend occurs during post-closure care, the investigation will include more frequent inspection of the surface of the cover system and evaluation of background concentrations.
 - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify Illinois EPA 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 has been reduced pursuant to 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 Illinois EPA 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 flow for 2021 is represented using groundwater elevation contour maps for each quarterly sampling event (Figures 3-1 through 3-4). Groundwater in the upper (shallow) zone generally flowed from west to east and northeast towards the Wabash River during 2021, which is consistent with past evaluations. The Groundwater Collection Trench began operation in April 2015, and following startup, groundwater elevations have exhibited localized flow toward the trench with groundwater elevations generally lower near the trench (Figure 3-5). In the depictions of groundwater elevation contours, dashed lines have been used to infer the localized drawdown of groundwater levels resulting from trench operation, which is necessary with limited wells situated laterally along the length of the trench.

The horizontal hydraulic gradient in the upper migration zone beneath the northern extent of Ash Pond D ranged from 0.01 to 0.02 feet/feet during 2021, with the exception of Quarter 4 (Figure 3-4) where groundwater horizontal hydraulic gradient to the river decreased to 0.006 feet/feet. Horizontal hydraulic gradient was not calculated near the southern end of the pond due to the potential influence of the trench on groundwater flow.

Groundwater flow within the lower (deep alluvial) migration zone along the edge of the Wabash River valley was not contoured since all the deep alluvial monitoring wells are within a narrow zone between Ash Pond D and the Wabash River. Groundwater within the lower zone generally flows from southwest to northeast towards the Wabash River.

3.2 Review of Analytical Data (2020-2021)

Groundwater samples from the most recent eight monitoring events were collected on February 3, 2020; May 4, 2020; August 3, 2020; October 26, 2020; March 1, 2021; April 26, 2021; September 1, 2021; and November 1, 2021. All field and laboratory analytical results are tabulated in Appendix A. Sampling anomalies, such as wells that were dry, had water levels too low for sampling, or were not sampled during a sampling event for other reasons, are noted below:

- MW-6: Not sampled in the 4th quarter sampling event of 2020 due to insufficient water level.

Results of groundwater monitoring for constituents that exceeded the Class I Groundwater Standard during the 1999 hydrogeologic assessment (NRT, 2009) (boron, sulfate, manganese, and TDS) are discussed below:

- Boron has been identified as the primary indicator constituent for coal ash impacts to groundwater at Ash Pond D (see Section 1.2.2). In the 2020-2021 monitoring period, boron concentrations ranged from 0.05 to 22 milligrams per liter (mg/L) in shallow compliance monitoring wells. In deep monitoring wells, boron concentrations ranged from 0.05 to 0.99 mg/L (Figure 3-6 and Figure 3-7). As discussed in Sections 1.2.2-1.2.3, boron concentrations have been stable or decreasing in the majority of Ash Pond D compliance monitoring wells since closure. As illustrated in Figure 3-7, periodic boron concentrations above the Class I Groundwater Standard were observed at MW-11R, however as indicated by the regression line illustrated in Figure 1-5, concentrations have been decreasing since 2013 and no further action is required at this time. Boron concentrations at MW-11R will continue to be monitored and evaluated in 2022. During the current monitoring period, boron concentrations

continue to be stable over time which indicates that the cover system is functioning to improve overall groundwater quality beneath the ponds.

- Sulfate has also been identified as an indicator for coal ash impacts to groundwater (see Section 1.2.2). In the 2020-2021 monitoring period, sulfate concentrations ranged from 12 to 1,200 mg/L in shallow compliance monitoring wells. In deep monitoring wells, sulfate concentrations ranged from 22 to 270 mg/L (Figure 3-8 and Figure 3-9). Sulfate concentrations were highest at MW-11R and MW-8 in 2020 and 2021, where boron concentrations were also highest. As illustrated in Figure 3-9, periodic sulfate concentrations above the Class I Groundwater Standard were observed at MW-11R, however as indicated by the regression line illustrated in Figure 1-11, concentrations have been decreasing since 2013 and no further action is required at this time. Sulfate concentrations at MW-11R will continue to be monitored and evaluated in 2022. Overall, during this reporting period, sulfate distribution was similar to boron distribution at Ash Pond D.
- Box-whisker plots and timeseries plots illustrating concentrations for the most recent eight monitoring events (2020-2021), were developed for additional parameters – manganese and TDS (Figures 3-10 through 3-12). Similar to the identified indicator parameters, these parameters showed generally stable trends during this reporting period.

3.3 Statistical Analyses

Analytical data were evaluated to identify short-term (compliance) data trends in the 2020-2021 dataset. Trends were evaluated according to the procedure outlined in the Groundwater Monitoring plan (Hanson, NRT, 2011b).

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 C1. Outliers identified during the compliance period (2020-2021) by the Grubbs outlier test based on the date range of 1984-2021 were not eliminated from further statistical analysis due the lack of documentation indicating that the results don't represent actual field conditions. In addition, these outliers did not have any influence on the short-term compliance trends.

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 and results are listed in Appendix C2.

Data collected in 2020-2021 show 27 cases with positive slopes, 15 cases with negative slopes, and 222 cases with no slope (Table 3-1). The 27 cases with positive slopes were tested using the Mann-Kendall test to determine if the positive slopes represented 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 C2. Increasing short-term (compliance) trends are identified in Tables 3-1 and 3-2.

The Mann-Kendall test detected seven cases of increasing trend in the 2020-2021 dataset. The increasing short-term trend occurred for boron at well MW-11R; manganese at MW-8; sulfate at MW-6 and MW-11R; and TDS at MW-6, MW-11R, and MW-14. During this reporting period, sulfate concentrations at MW-6 and TDS concentrations at MW-6 and MW-14 were below their respective Class I Groundwater Standard, whereas boron, sulfate, and TDS concentrations at MW-11R and manganese concentrations at MW-8 exceeded their respective Class I Groundwater Standard.

3.4 Site Inspection

The Post-Closure Maintenance Program requires quarterly inspection for the first five years after closure. After five years, the inspection frequency can be reduced to semi-annually provided that semi-annual groundwater monitoring has been approved by Illinois EPA. After five years of semi-annual monitoring, the inspection frequency can be reduced to annually pending approval of annual groundwater monitoring. Discontinuance of Hutsonville inspections will occur after Illinois EPA approval of the certified Post-Closure Care Report.

Site inspections include assessment of the condition and need for repair of final cover and vegetation, as well as fencing, monitoring points, and surface water control features. The inspection reports for 2021 are included in Appendix B.

The site inspections performed on March 31, 2021, July 8, 2021, October 5, 2021, and December 12, 2021 indicated the closure system was in good condition.

4. EVALUATION OF COMPLIANCE AND CONCLUSIONS

Cover system construction and maintenance, as well as stable or decreasing boron and sulfate concentrations in the majority of Ash Pond D compliance monitoring wells, are strong indications that the cover system is functioning to improve overall groundwater quality beneath the pond.

Statistical analyses of analytical results for the most recent eight rounds of groundwater samples collected for 2020 to 2021 at the Hutsonville Ash Pond D showed both increasing short-term trend and concentrations above the Class I Groundwater Standard for boron, sulfate, and TDS at MW-11R and manganese at MW-8. These were isolated cases and not repeated from the 2019-2020 monitoring period; as such, no further action is required at this time. The concentration of boron, sulfate, and TDS at MW-11R and manganese at MW-8 will continue to be monitored and evaluated in 2022.

5. REFERENCES

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Natural Resource Technology, Inc. (NRT), 2009. *Pond D Closure Alternatives Report*. April 27, 2009.

35 Illinois Administrative Code 620: Groundwater Quality.

35 Illinois Administrative Code 840: Site-Specific Closures of Coal Combustion Waste Surface Impoundments.

765 Illinois Compiled Statutes 122: Uniform Environmental Covenants Act.

TABLES

**Table 1-1. Groundwater Monitoring Program Schedule
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Frequency	Duration	Sampling Quarter	Report Due Date
Quarterly	Begins: January 2013	January- March (1) April - June (2) July - September (3) October - December (4)	May 31 August 31 November 30 February 28
	Ends: 5 years after approval of closure plan and upon demonstration that monitoring effectiveness is not compromised and that there are no statistically significant increasing trends attributable to Ash Pond D.		
Semiannual	Begins: after IEPA approves that quarterly monitoring requirements have been satisfied.	April - June (2) October - December (4)	August 31 February 28
	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 Ash Pond D.		
Annual	Begins: Five years after approval of semi-annual monitoring and after Illinois EPA approval.	April - June (2)	August 31
	Ends: After successful completion of the post-closure activities required by 35 IAC 840.142 and approval of the Illinois EPA.		

**Table 1-2. Groundwater Monitoring System Wells
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Well	Installation Date	Surface Elevation (ft, MSL ²)	TOC ¹ Elevation (ft, MSL)	Top of Screen Elev (ft)	Bottom of Screen Elevation (ft)	Total Well Depth (ft, BGS)	Objective	Position	Monitoring Zone ³
Ash Pond D Groundwater Monitoring System Wells: Water Quality and Groundwater Elevations									
MW-6	2/9/1984	438.7	443.17	433.9	427.5	11.2	Compliance	Downgradient	UZ - s&g, ss
MW-7	2/8/1984	439.9	442.28	422.9	412.9	27.0	Compliance	Downgradient	UZ - si s&g
MW-7D	10/5/1998	438.9	442.75	398.2	393.2	45.7	Compliance	Downgradient	LZ - si s&g
MW-8	2/8/1984	440.0	443.65	422.9	417.9	22.1	Compliance	Downgradient	UZ - si s
MW-10 ⁴	10/7/1998	452.9	454.23	447.2	442.2	10.7	Background	Upgradient	UZ - si s&g, ss
MW-10D ⁴	10/7/1998	452.9	454.65	436.6	431.6	21.3	Background	Upgradient	UZ - ss
MW-11R	10/3/2001	440.4	443.01	435.4	425.4	15.0	Compliance	Downgradient	UZ - s&g
MW-14	10/3/2001	440.1	442.89	412.9	407.9	32.2	Compliance	Downgradient	LZ - s&g
MW-23D ⁴	11/28/2017	453.5	455.90	434.0	428.7	24.8	Background	Upgradient	UZ - ss, sh
MW-23S ⁴	11/28/2017	453.4	456.03	444.2	438.9	14.5	Background	Upgradient	UZ - s si, si s, ss
MW-115S	5/1/2004	438.7	440.88	408.4	403.4	35.3	Compliance	Downgradient	LZ - s&g
MW-115D	5/1/2004	439.1	441.39	356.4	351.4	87.7	Compliance	Downgradient	LZ - s&g
MW-121	10/2/2001	439.2	440.23	403.8	398.8	40.3	Compliance	Downgradient	LZ - s&g
Other Monitoring Wells and Piezometers: Groundwater Elevations									
MW-2D	10/14/2015	452.9	455.42	435.1	430.4	23.1	--	--	UZ - ss
MW-2R	6/4/2012	453.0	455.37	446.0	435.3	17.8	--	--	UZ - s&g
MW-3	2/9/1984	453.7	454.84	447.7	442.7	11.0	--	--	UZ - s&g
MW-3D	10/6/1998	453.57	455.01	433.6	428.6	24.971	--	--	UZ - ss
MW-4	2/13/1984	454.0	456.76	449.4	441.9	12.1	--	--	UZ - s&g, ss
MW-5	2/13/1984	452.1	454.67	447.3	434.3	17.8	--	--	UZ - s&g, ss
MW-9	2/14/1984	451.7	454.38	443.5	433.5	18.2	--	--	UZ - s&g
MW-12	10/8/1998	455.5	456.74	448.6	438.6	16.9	--	--	UZ - s&g
MW-22S	10/14/2015	449.2	451.48	441.9	437.2	12.7	--	--	UZ - si s&g, ss
MW-22D	10/14/2015	449.1	451.36	431.7	427.0	22.7	--	--	UZ - si s&g, ss

Notes:

1. TOC = top of casing
 2. BGS = below ground surface; MSL = mean sea level.
 3. UZ = Upper Zone, LZ = Lower Zone (deep alluvial aquifer); s = sand or sandy, s&g = sand and gravel, si = silt or silty, ss = sandstone, sh = shale
 4. Background wells MW-10 and MW-10D were damaged and replaced with background wells MW-23D and MW-23S.
- Not applicable. Wells listed are for development of groundwater elevation contour maps only.

**Table 1-3. Groundwater Monitoring Program Parameters
2021 Annual Report
Former Hutsonville Power Station - Ash Pond D**

Field Parameters	STORET Code
pH ²	00400
Specific Conductance ²	00094
Depth to Water (BMP)	72109
Elevation of GW Surface ²	71993
Depth of Well (BGS) ²	72008
Elevation of Measuring Point	72110
Laboratory Parameters¹	STORET Code
Boron ²	01020
Iron ²	01046
Manganese ²	01056
Sulfate ²	00946
Total Dissolved Solids (TDS) ²	70300
Antimony	01095
Arsenic	01000
Barium	01005
Beryllium	01010
Cadmium	01025
Chloride	00941
Chromium	01030
Cobalt	01035
Copper	01040
Cyanide	00720
Fluoride	00950
Lead	01049
Mercury	71890
Nickel	01065
Nitrate as N	00618
Selenium	01145
Silver	01075
Thallium	01057
Zinc	01090

Notes:

¹ Reported as dissolved (filtered) concentrations.

² Mandatory monitoring parameter per 35 IAC 840.114(a).

Table 3-1. Trend Analysis Results
 2021 Annual Report
 Former Hutsonville Power Station - Ash Pond D

	MW-6	MW-7	MW-7D	MW-8	MW-11R	MW-14	MW-23D	MW-23S	MW-115S	MW-115D	MW-121
Number of Samples	7	8	8	8	8	8	8	8	8	8	8
Antimony, dissolved	None	None	None	None	None	None	None	None	None	None	None
Arsenic, dissolved	None	None	None	None	None	None	None	None	None	None	None
Barium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Beryllium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Boron, dissolved	+	None	None	-	Increase	+	None	None	None	None	None
Cadmium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Chloride, dissolved	-	+	+	None	None	-	Decrease	None	-	+	+
Chromium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Cobalt, dissolved	None	None	None	None	None	None	None	None	None	None	None
Copper, dissolved	None	None	None	None	None	None	None	None	None	None	None
Cyanide, total	None	None	None	None	None	None	None	None	None	None	None
Fluoride, dissolved	None	None	None	None	None	None	None	None	None	None	None
Iron, dissolved	None	None	Decrease	None	None	None	None	None	Decrease	+	-
Lead, dissolved	None	None	None	None	None	None	None	None	None	None	None
Manganese, dissolved	None	None	None	Increase	None	None	None	None	None	+	None
Mercury, dissolved	None	None	None	None	None	None	None	None	None	None	None
Nickel, dissolved	None	None	None	None	None	None	None	None	None	None	None
Nitrate nitrogen, dissolved	Decrease	None	None	None	-	None	None	None	None	None	None
Selenium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Silver, dissolved	None	None	None	None	None	None	None	None	None	None	None
Sulfate, dissolved	Increase	+	-	-	Increase	+	+	-	+	+	+
Thallium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Total Dissolved Solids	Increase	-	-	+	Increase	Increase	+	+	+	+	+
Zinc, dissolved	None	None	None	None	None	None	None	None	None	None	None

[O: RSD 12/30/21, C: RAB 1/3/22]

- "+" indicates that the Sen's non-parametric estimate of the median slope is positive.
- "-" indicates that the Sen's non-parametric estimate of the median slope is negative.
- "Decrease" indicates a statistically significant decreasing trend
- "Increase" indicates a statistically significant increasing trend
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- The most recent eight sampling events were used for analysis; date range for this analysis is 1/1/2020-12/31/2021.
- Green shading indicates increasing trends as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration lower than the Class I groundwater quality standard.
- Yellow shading indicates increasing trends as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration higher than the Class I groundwater quality standard.
- ID indicated that there was insufficient data to perform Sen's Estimate of Slope.

**Table 3-2. Summary of Trend Analyses
2021 Annual Report
Former Hutsonville Power Station - Ash Pond D**

Time Period	Short-Term Increasing Trends	Long-Term Decreasing Trends
2013-2014	7	-
2014-2015	2	-
2015-2016	1	-
2016-2017	2	-
2017-2018	8	-
2018-2019	13	-
2019-2020	1	-
2020-2021	7	21

[O: RSD 12/30/2021, C: RAB 1/3/22]

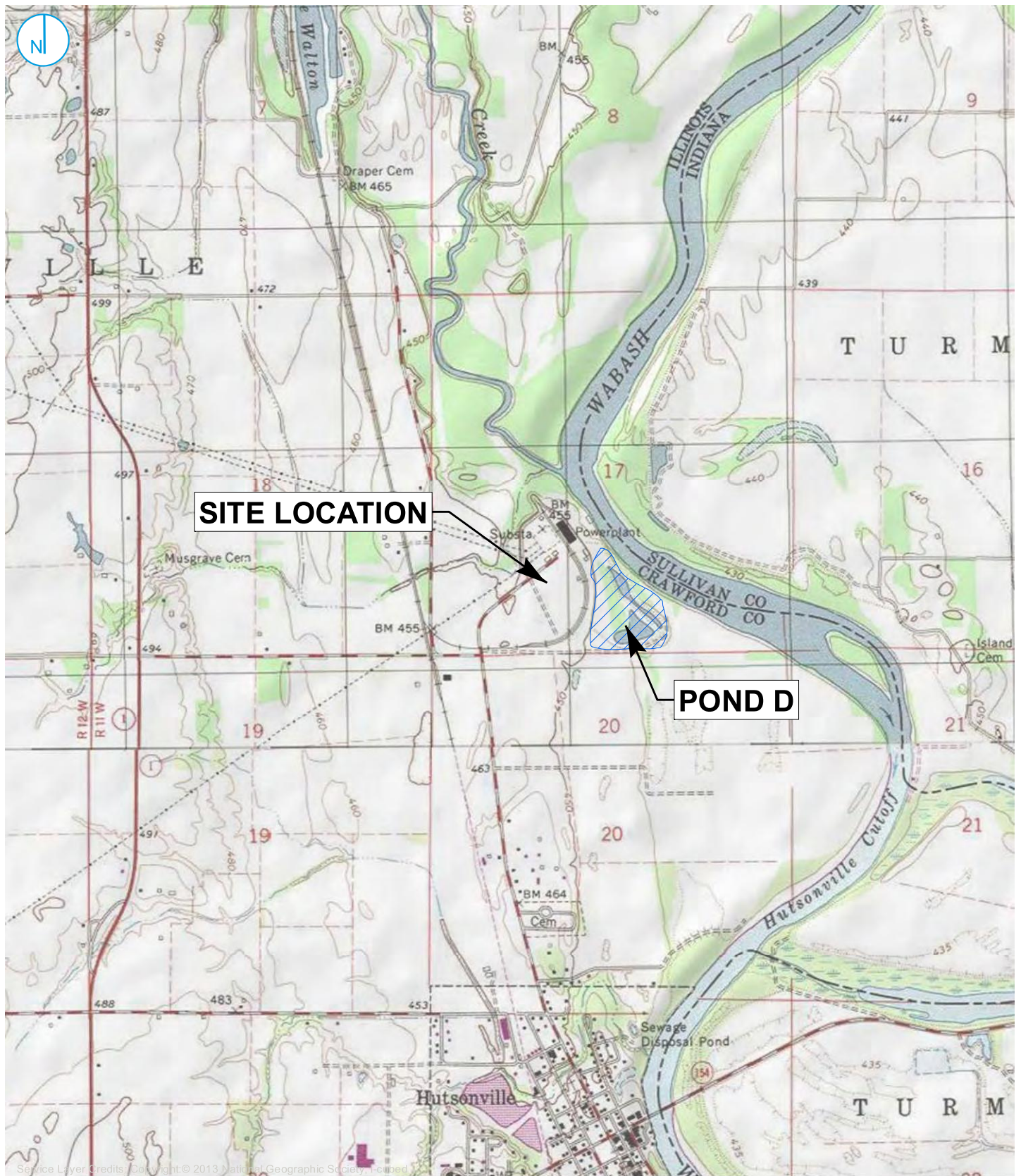
Notes:

Trends based on data collected during the specified periods.

The number of samples per well location for short-term trends are noted on Table 3-1.

Long-term trends were calculated with data since completion of closure in January 2013.

FIGURES



Map Scale: 1:124,000;
 Map Center: 87°39'45"W 39°7'53"N



SITE LOCATION MAP

FIGURE 1-1

2021 ANNUAL REPORT
FORMER HUTSONVILLE
POWER STATION - ASH POND D
 AMEREN ENERGY MEDINA VALLEY COGEN, LLC
 HUTSONVILLE, IL

RAMBOLL AMERICAS
 ENGINEERING SOLUTIONS, INC
 A RAMBOLL COMPANY





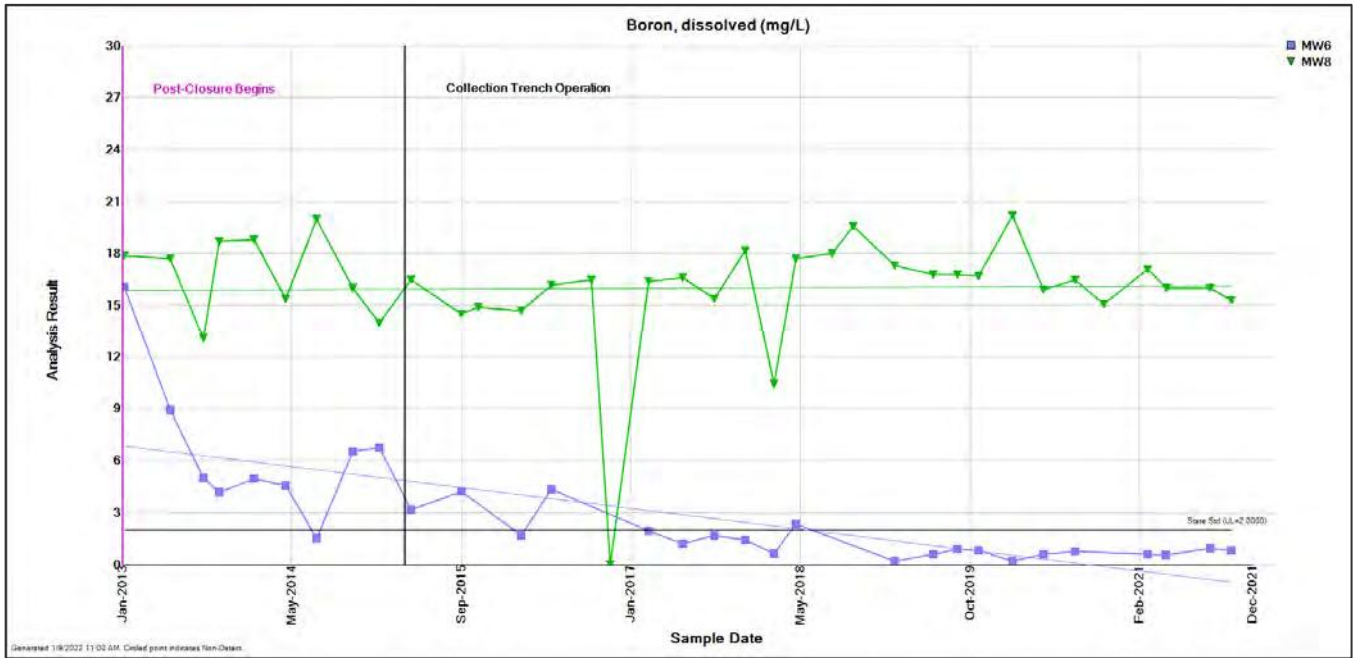


Figure 1-3. Boron concentrations over time since closure completion (2013) at compliance wells MW-6 and MW-8. (Note: Lines through the concentration data represent the best fit linear regressions)

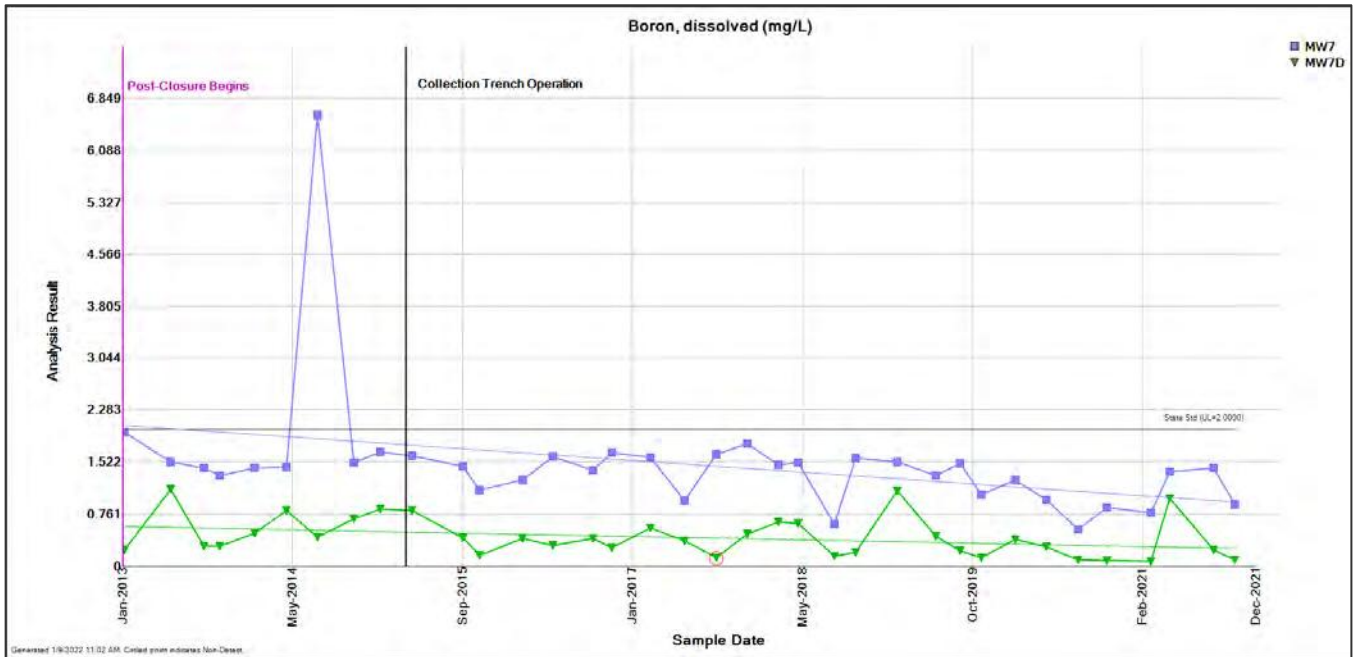


Figure 1-4. Boron concentrations over time since closure completion (2013) at compliance wells MW-7 and MW-7D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

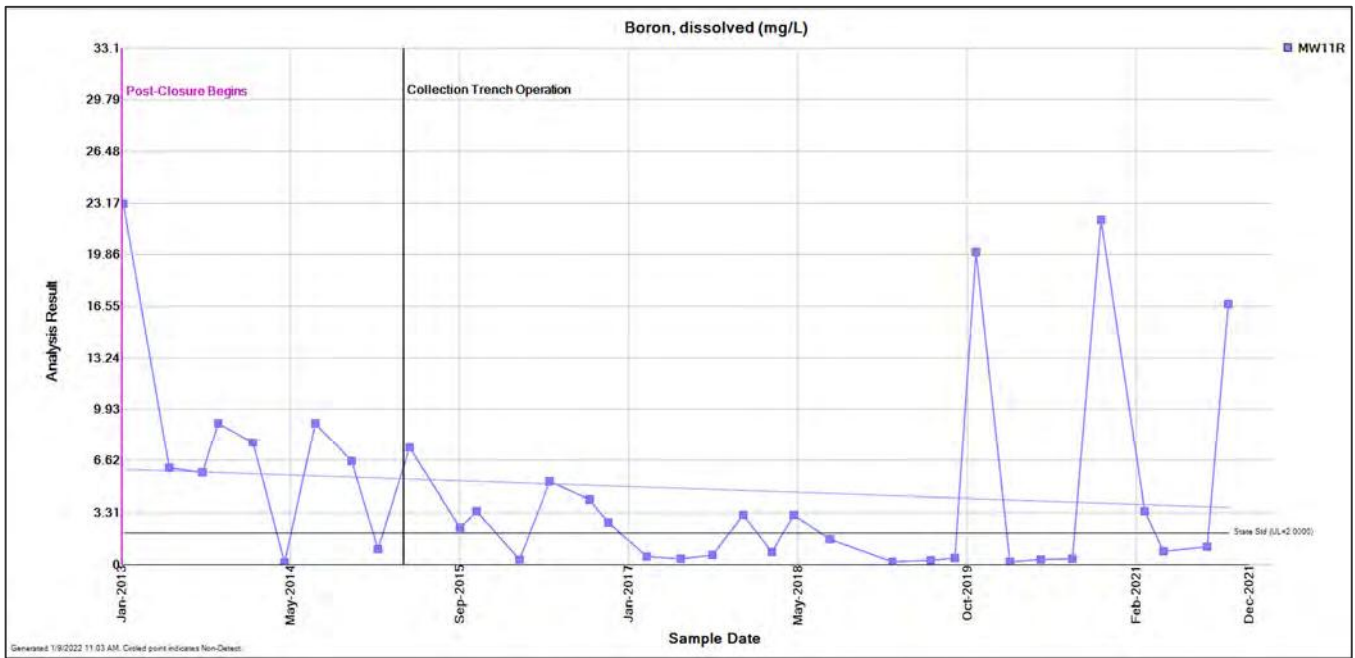


Figure 1-5. Boron concentrations over time since closure completion (2013) at compliance wells MW-11R. (Note: Lines through the concentration data represent the best fit linear regressions)

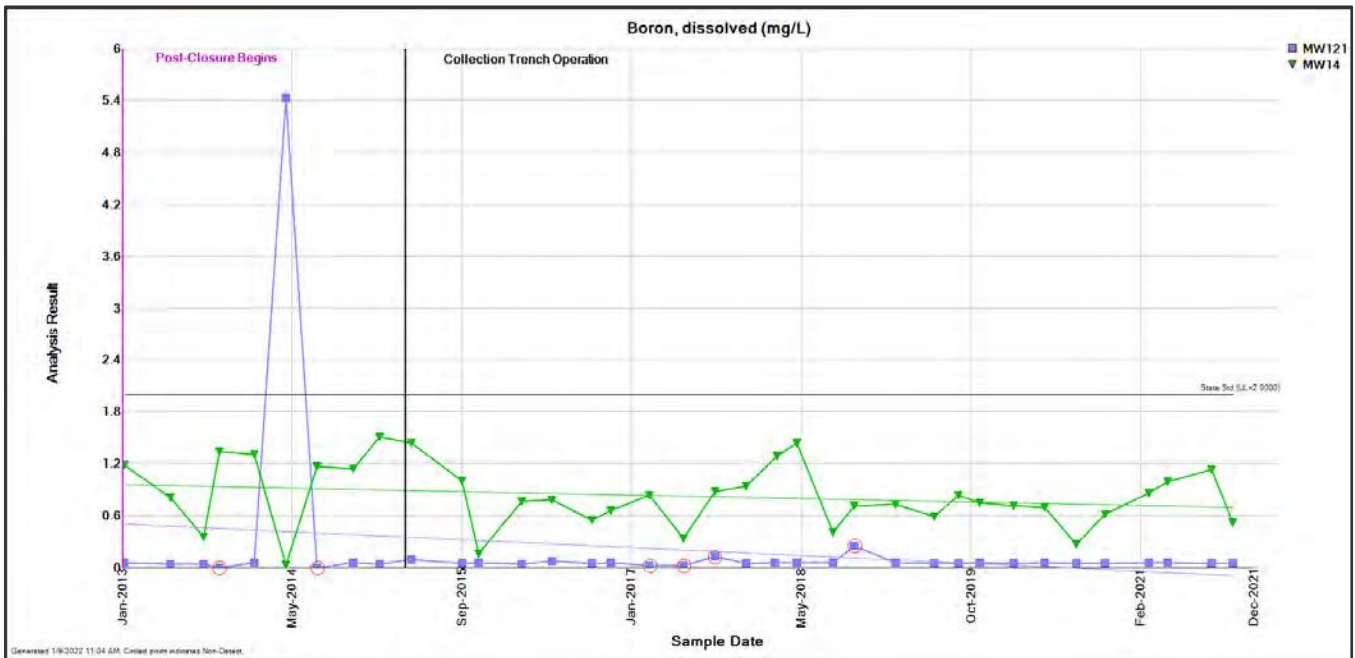


Figure 1-6. Boron concentrations over time since closure completion (2013) at compliance wells MW-121 and MW-14. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

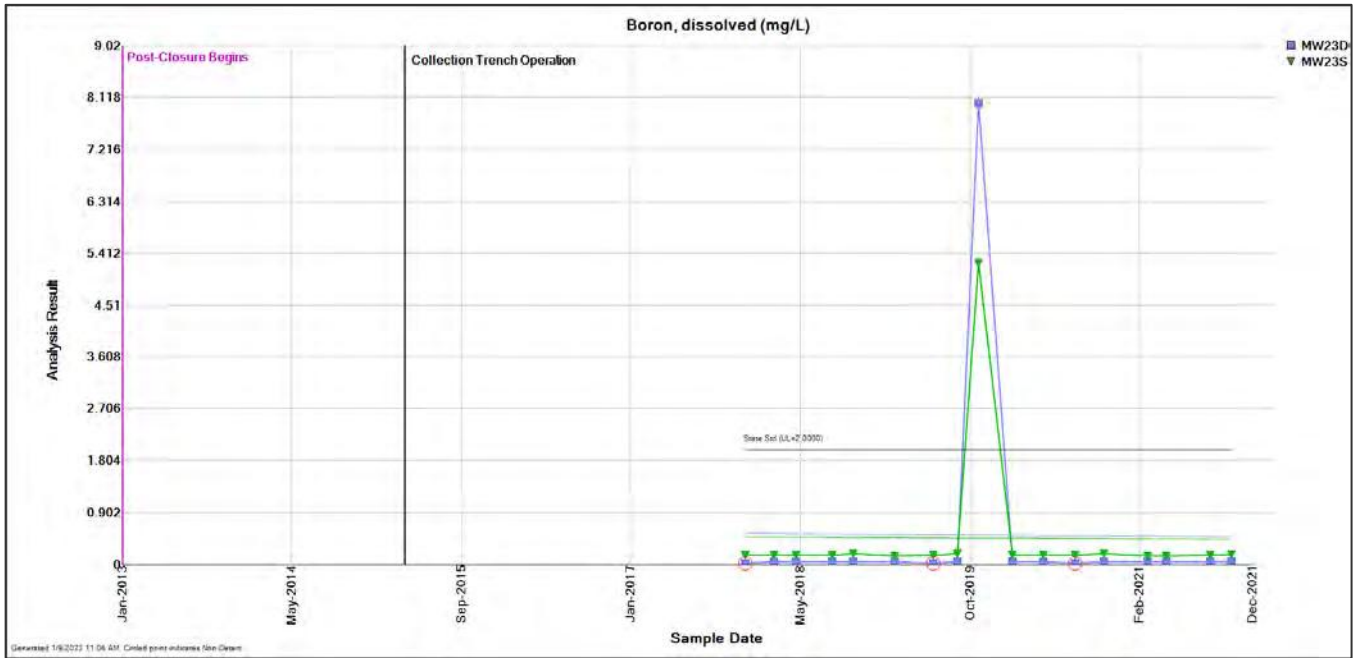


Figure 1-7. Boron concentrations over time since closure completion (2013) at background wells MW-23S and MW-23D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

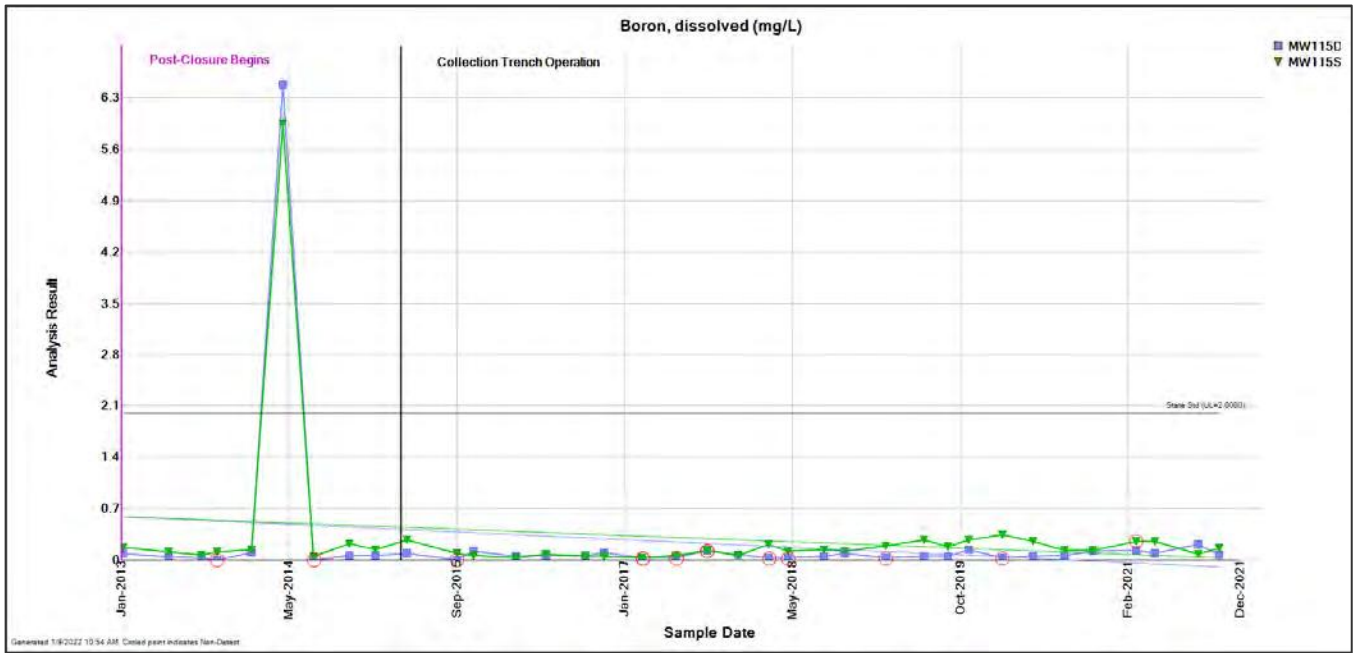


Figure 1-8. Boron concentrations over time since closure completion (2013) at compliance wells MW-115S and MW-115D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

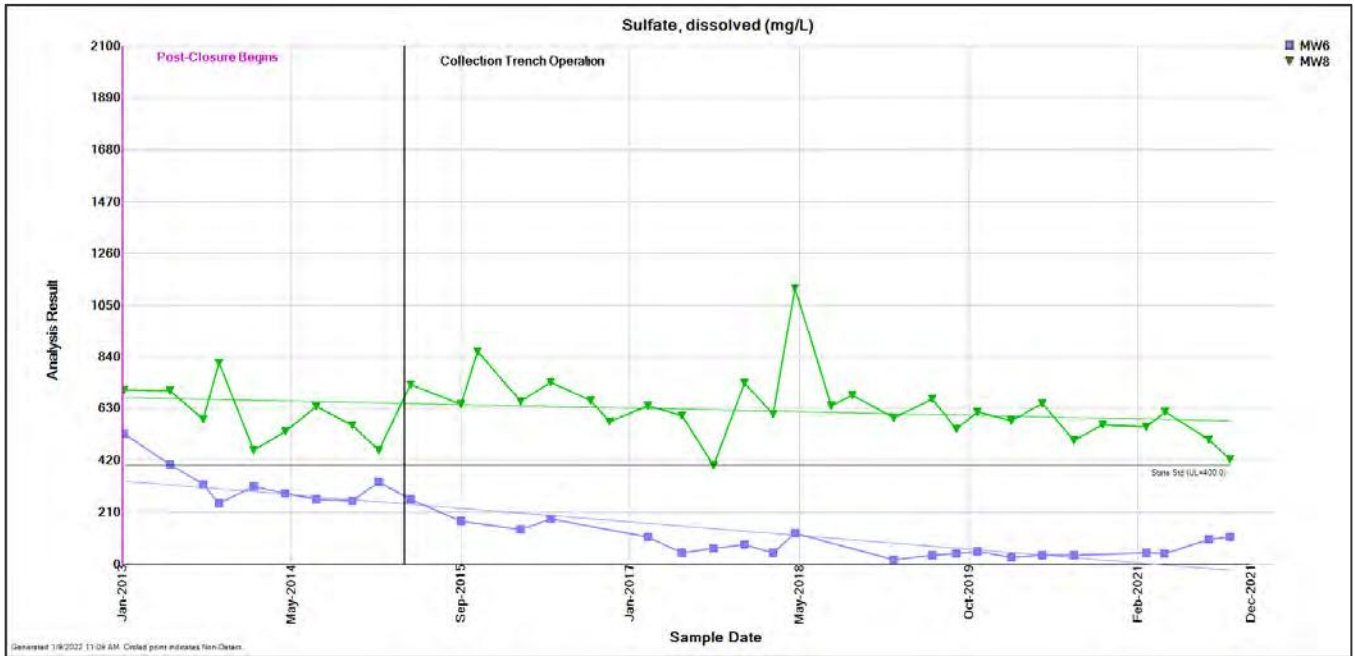


Figure 1-9. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-6 and MW-8. (Note: Lines through the concentration data represent the best fit linear regressions)

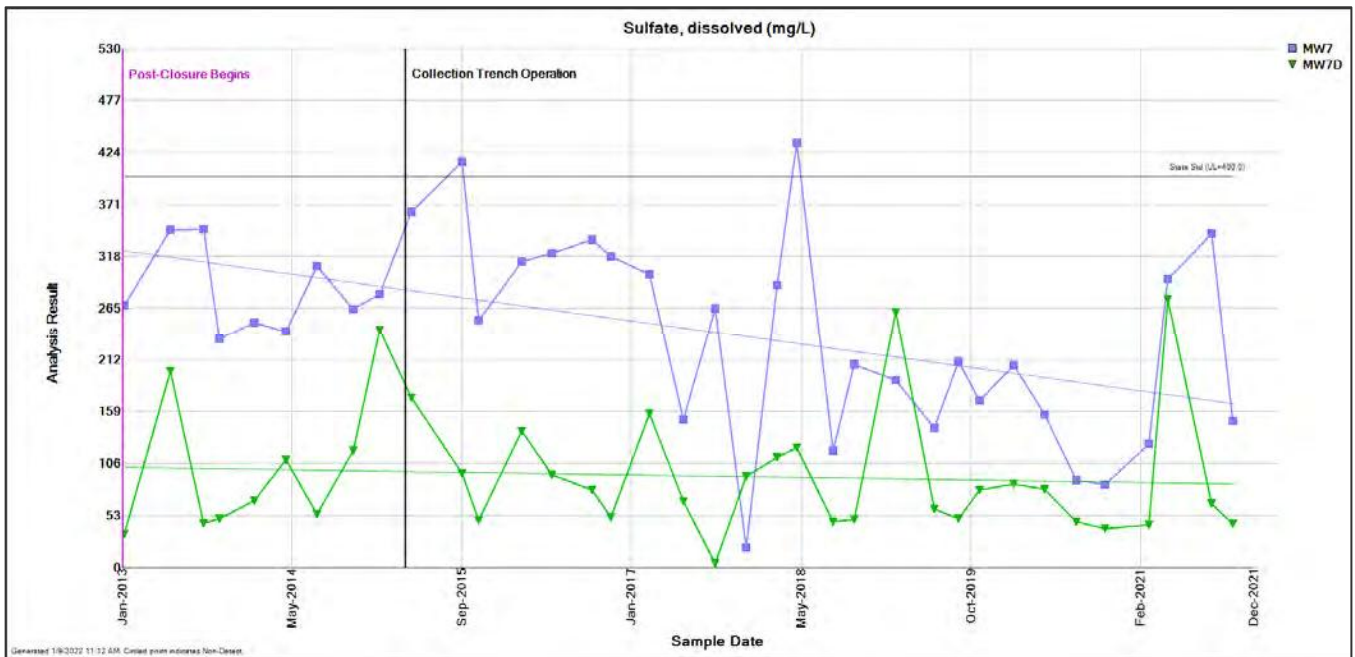


Figure 1-10. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-7 and MW-7D. (Note: Lines through the concentration data represent the best fit linear regressions)

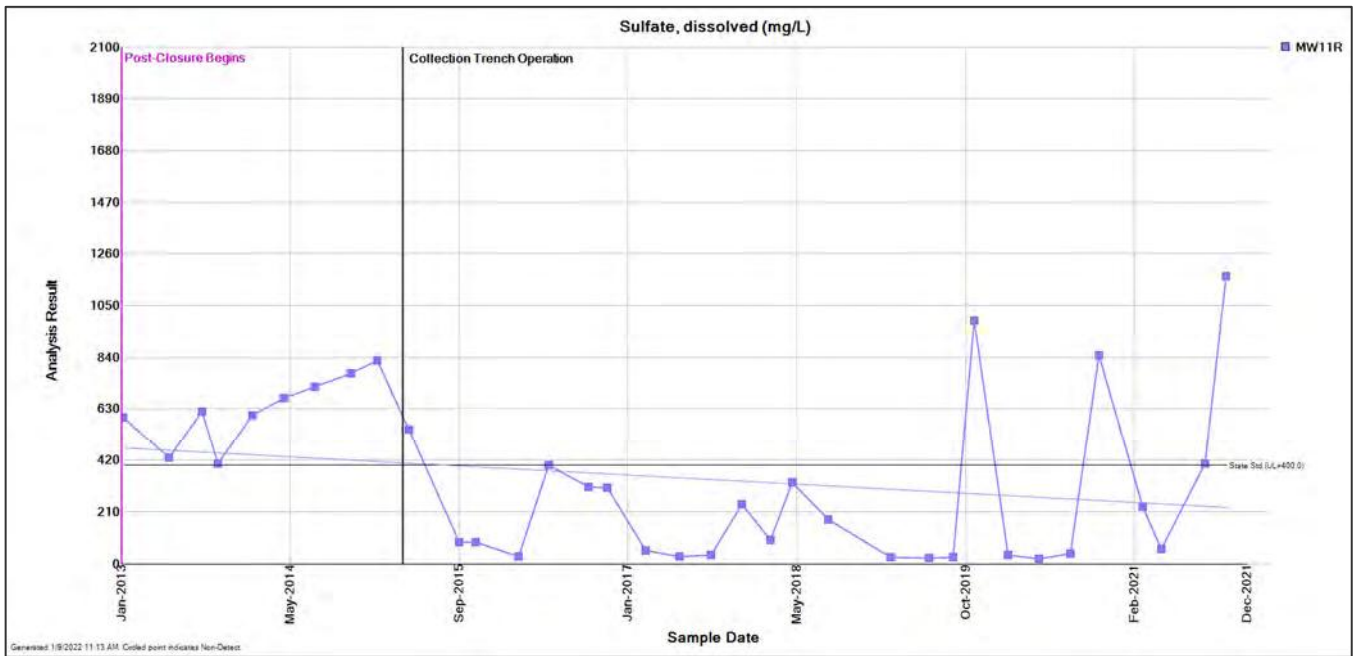


Figure 1-11. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-11R. (Note: Lines through the concentration data represent the best fit linear regressions)

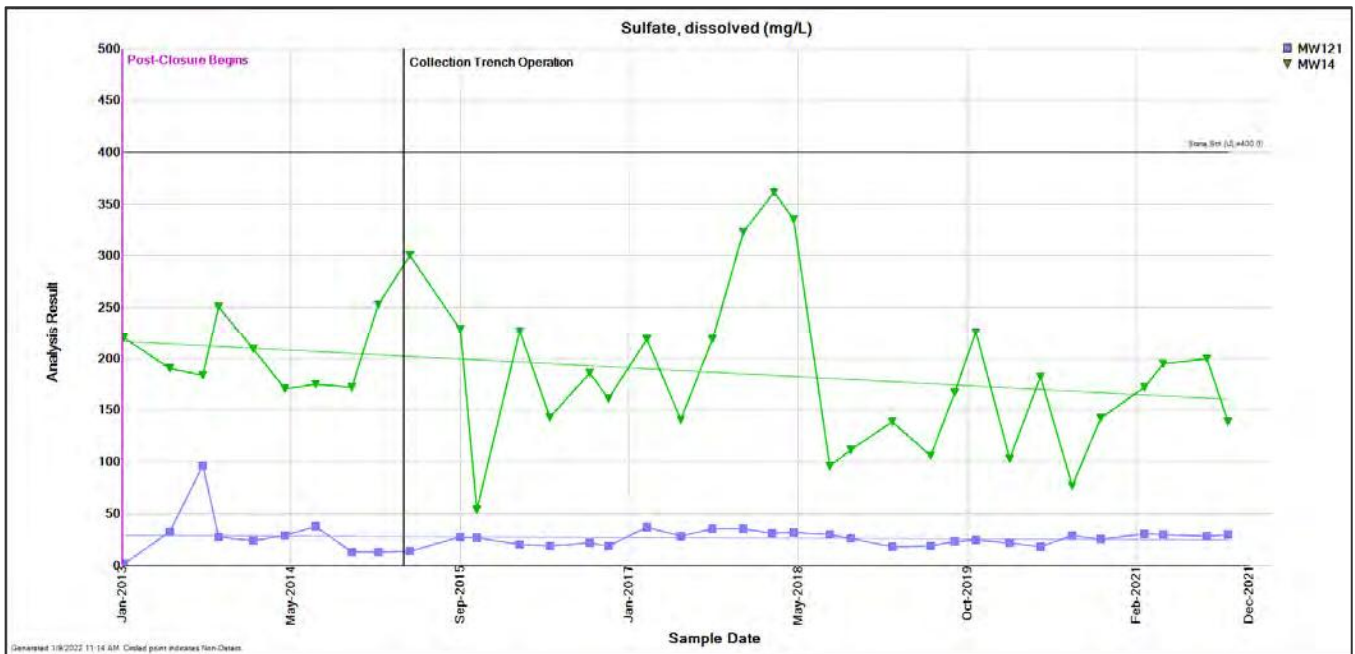


Figure 1-12. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-121 and MW-14. (Note: Lines through the concentration data represent the best fit linear regressions)

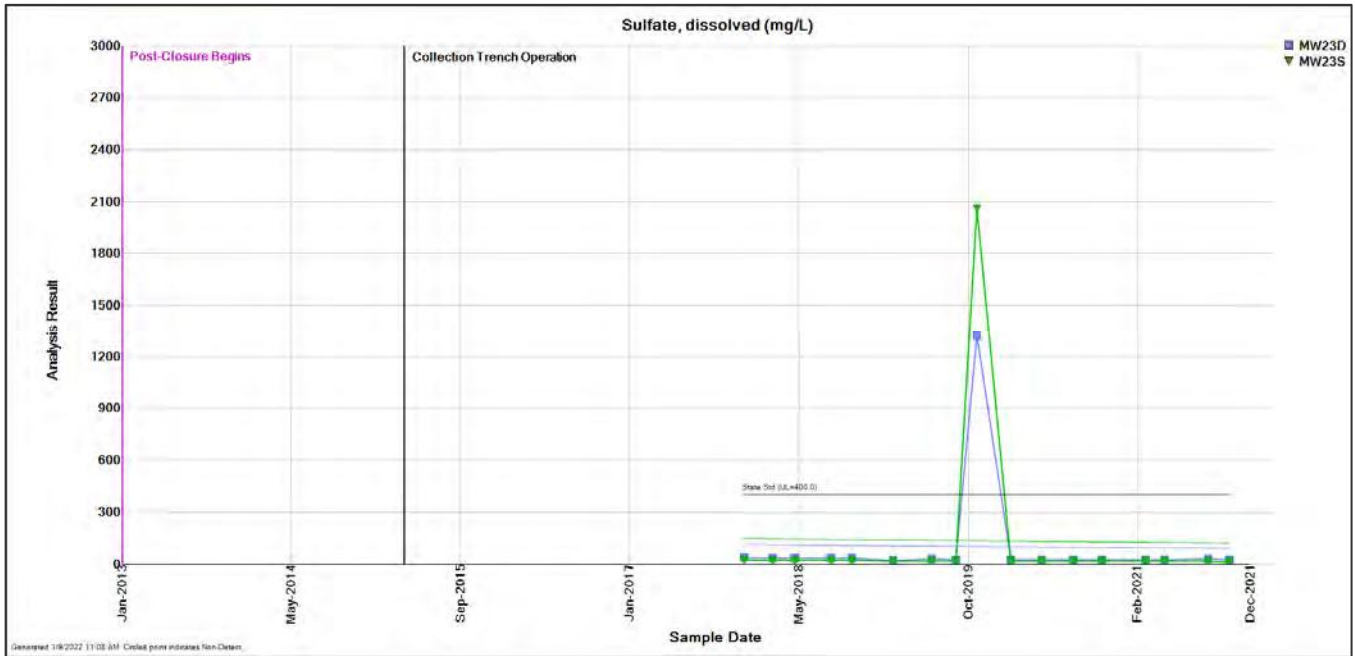


Figure 1-13. Sulfate concentrations over time since closure completion (2013) at background wells MW-23S and MW-23D. (Note: Lines through the concentration data represent the best fit linear regressions)

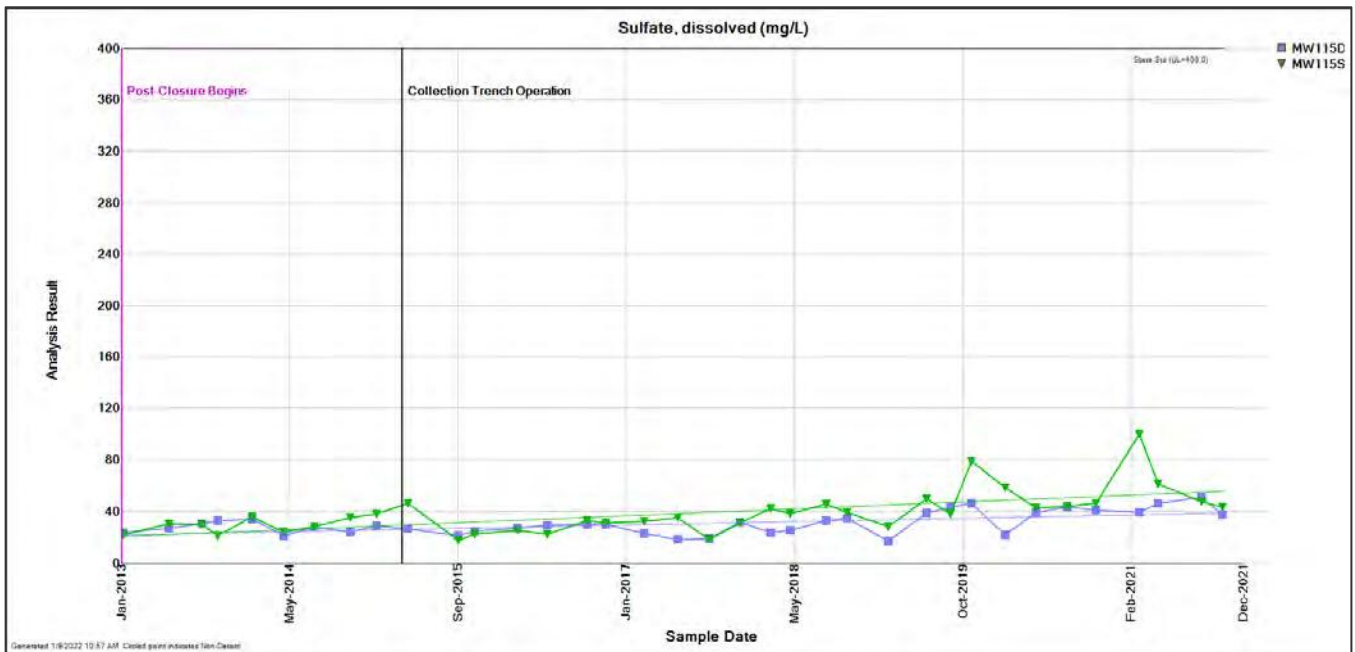


Figure 1-14. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-115S and MW-115D. (Note: Lines through the concentration data represent the best fit linear regressions)

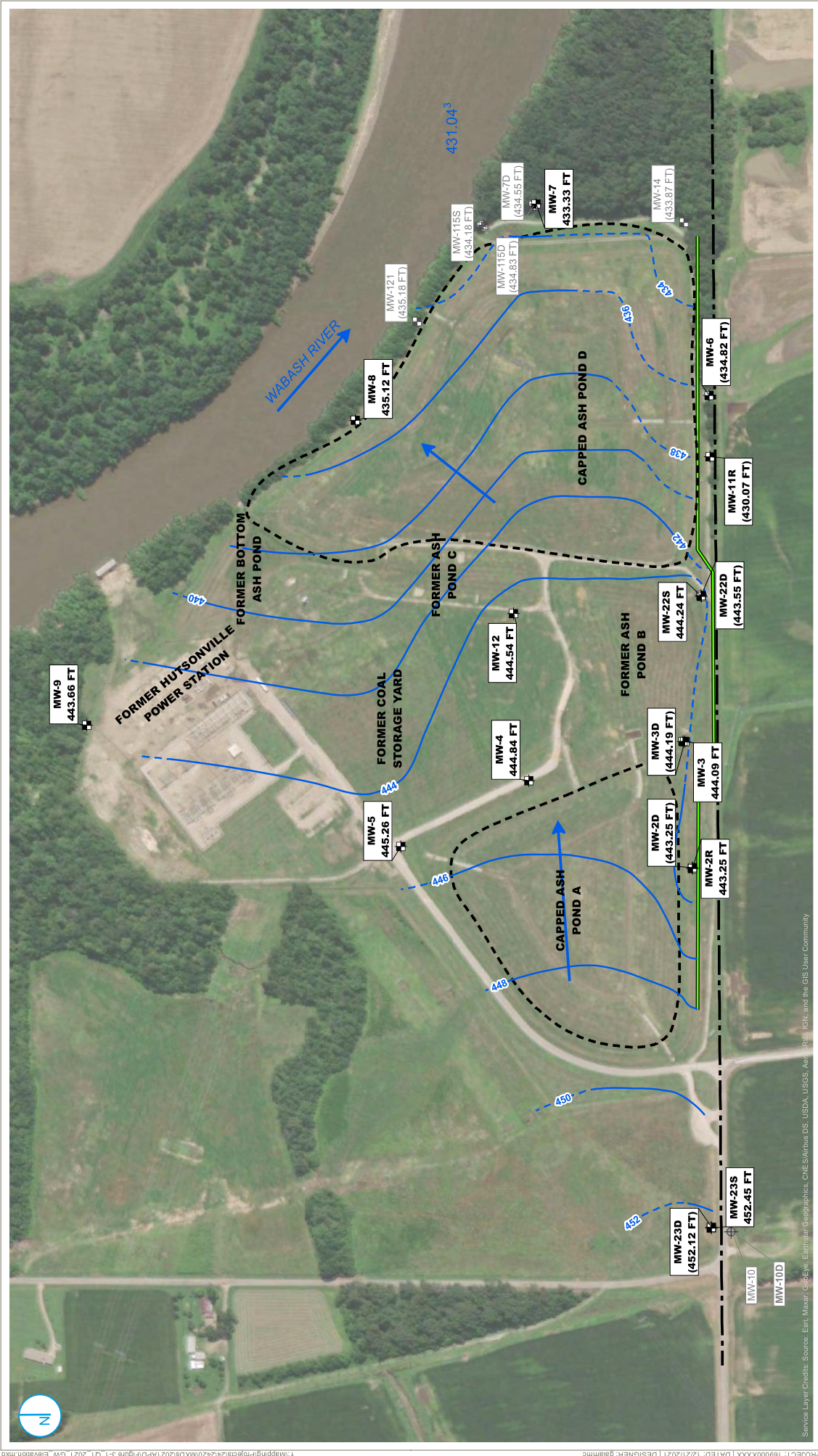


FIGURE 3-1
Q1 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP
MARCH 1, 2021
2021 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
 AMEREN ENERGY MEDINA VALLEY COGEN, LLC
 HUTSONVILLE, IL

UPPER MIGRATION ZONE MONITORING WELL
DEEP MIGRATION ZONE MONITORING WELL
ASH POND MONITORING WELL LOCATION
PROPERTY LINE

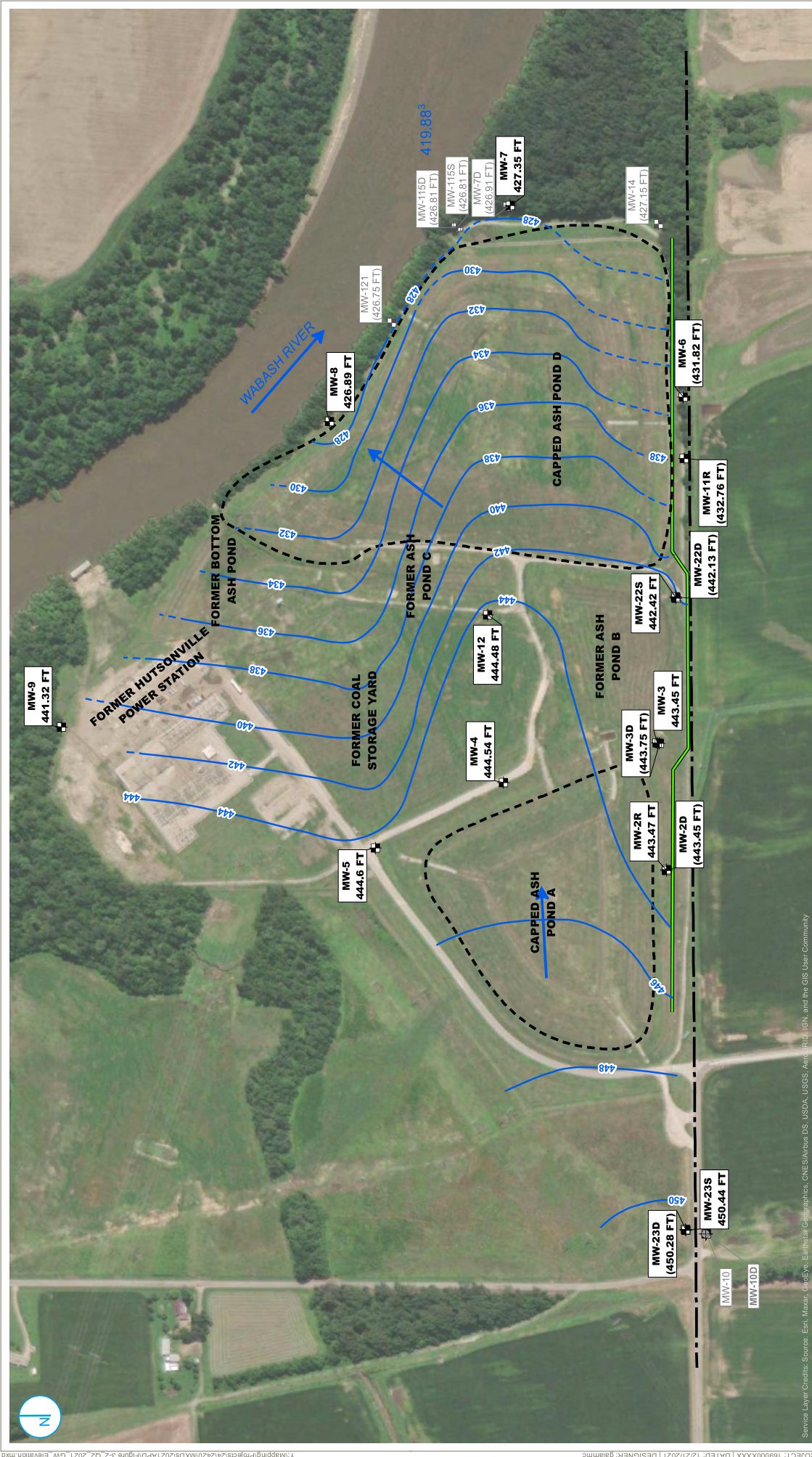
GROUNDWATER ELEVATION CONTOUR
 (2-FT CONTOUR INTERVAL)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
APPROXIMATE BOUNDARY OF CAPPED ASH POND
GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes
 1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988
 2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
 3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Service Layer Credits: Sources: Esri, Maxar, GeoEye, Earthstar, Geographic, CNES/Airbus DS, USDA, USGS, Aero, IGN, and the GIS User Community

0 150 300 Feet

PROJECT: 189000XXXXX | DATE: 12/2/2021 | DESIGNER: gaimms
 Y:\Mapping\Projects\242420\KX\2021\FP\Figure 3-1_Q1_2021_GW_Elevation.mxd



PROJECT: 189000XXXXX | DATE: 12/21/2021 | DESIGNER: qa/mmms
 Y:\Mapping\Projects\24242424\2021\Figures\Figure 3-2_Q2_2021_GW_Elevation.mxd

Q2 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP
2021 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
 AMEREN ENERGY MEDINA VALLEY COGEN, LLC
 HUTSONVILLE, IL

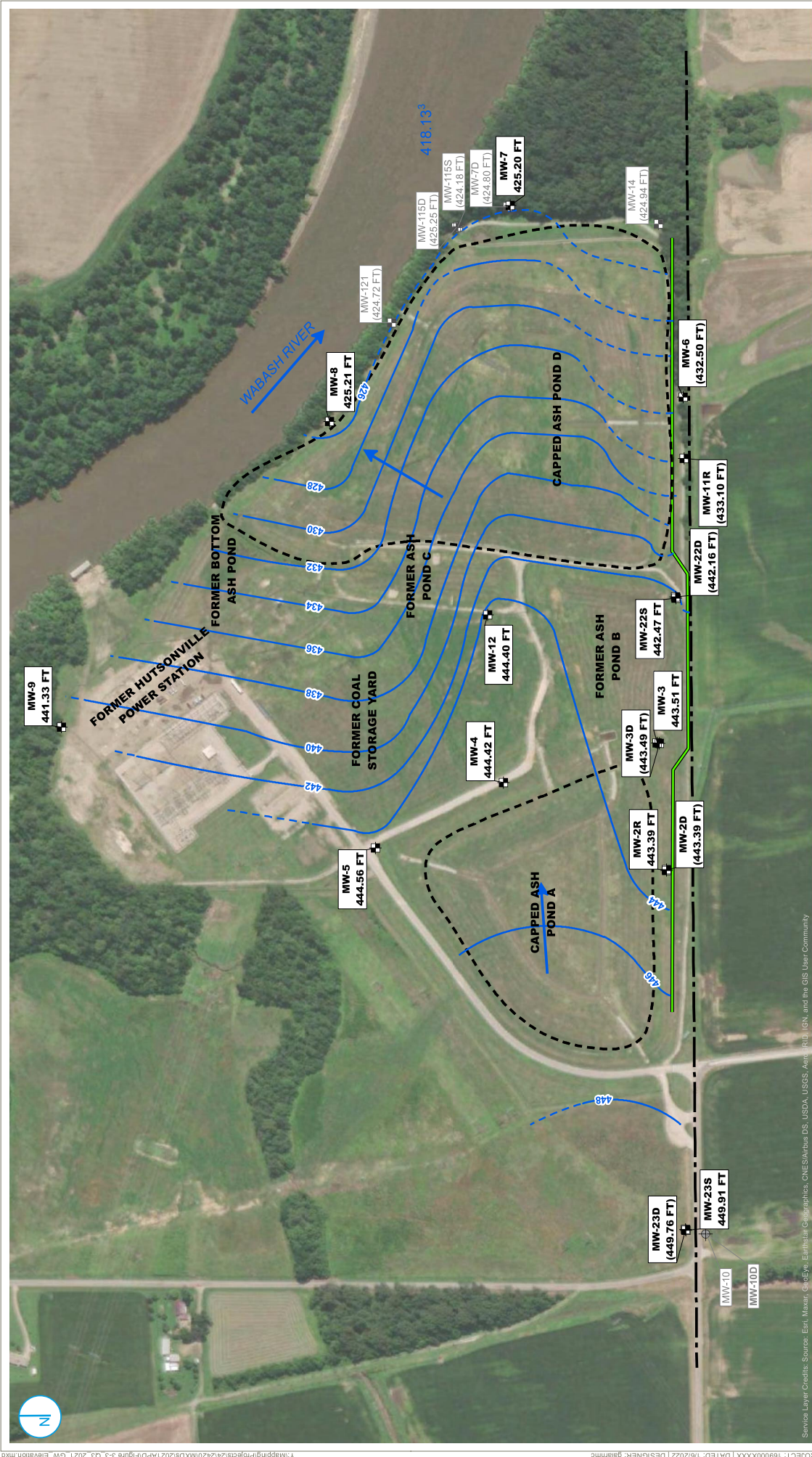
UPPER MIGRATION ZONE MONITORING WELL
DEEP MIGRATION ZONE MONITORING WELL
WELL LOCATED MONITORING WELL LOCATION
PROPERTY LINE

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
APPROXIMATE BOUNDARY OF CAPPED ASH POND
GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Notes
 1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988
 2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
 3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN NATIONAL GEODESIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 150 300 Feet



Q3 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 1, 2021
 2021 ANNUAL REPORT
 FORMER HUTSONVILLE POWER STATION - ASH POND D
 AMEREN ENERGY MEDINA VALLEY COGEN, LLC
 HUTSONVILLE, IL

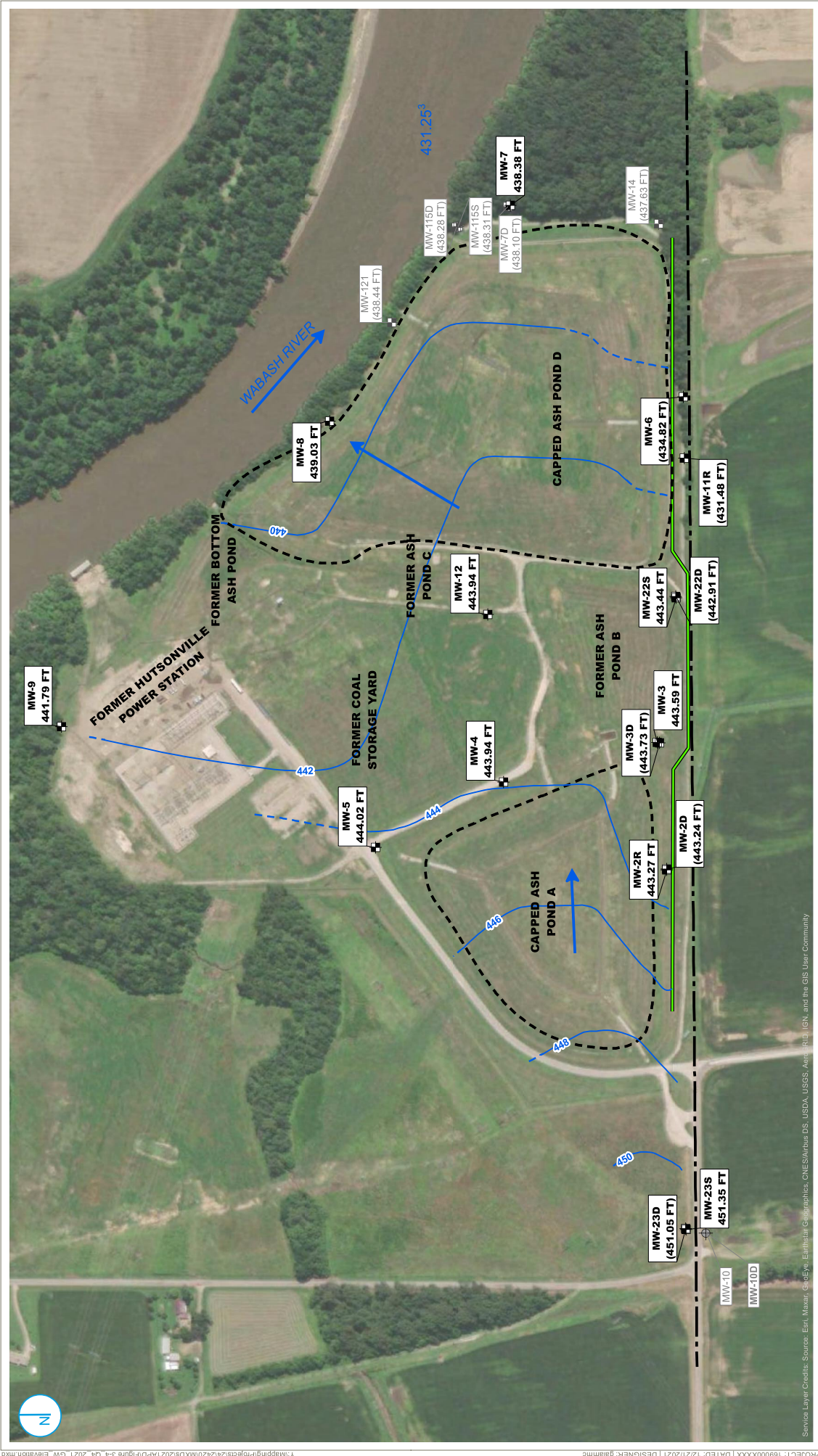
Notes

- 1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988
- 2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
- 3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1988.

Legend:

- UPPER MIGRATION ZONE MONITORING WELL
- DEEP MIGRATION ZONE MONITORING WELL
- WELL LOCATED MONITORING WELL LOCATION
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)

Scale: 0, 150, 300 Feet



Q4 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP NOVEMBER 1, 2021
 2021 ANNUAL REPORT
 FORMER HUTSONVILLE POWER STATION - ASH POND D
 AMEREN ENERGY MEDINA VALLEY COGEN, LLC
 HUTSONVILLE, IL

- Notes**
- 1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM.
 - 2) GROUNDWATER ELEVATIONS AS REPORTED BY USGS 0342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES DOWNSTREAM. RIVER ELEVATION REPORTED IN FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND CONVERTED TO FEET NORTH AMERICAN VERTICAL DATUM OF 1983. NO DATA AVAILABLE FOR RIVER ELEVATION FOR PERIOD FROM FEBRUARY TO OCTOBER 28, 2021. THE WABASH RIVER ELEVATION PRESENTED ON THIS FIGURE WAS COLLECTED ON OCTOBER 28, 2021.
- UPPER MIGRATION ZONE MONITORING WELL**
 DEEP MIGRATION ZONE MONITORING WELL LOCATED
 MONITORING WELL LOCATION
 PROPERTY LINE
 GROUNDWATER ELEVATION CONTOUR (± FT CONTOUR INTERVAL)
 INFERRED GROUNDWATER ELEVATION CONTOUR
 GROUNDWATER FLOW DIRECTION
 APPROXIMATE BOUNDARY OF CAPPED ASH POND
 GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)
- Service Layer Credits: Sources: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

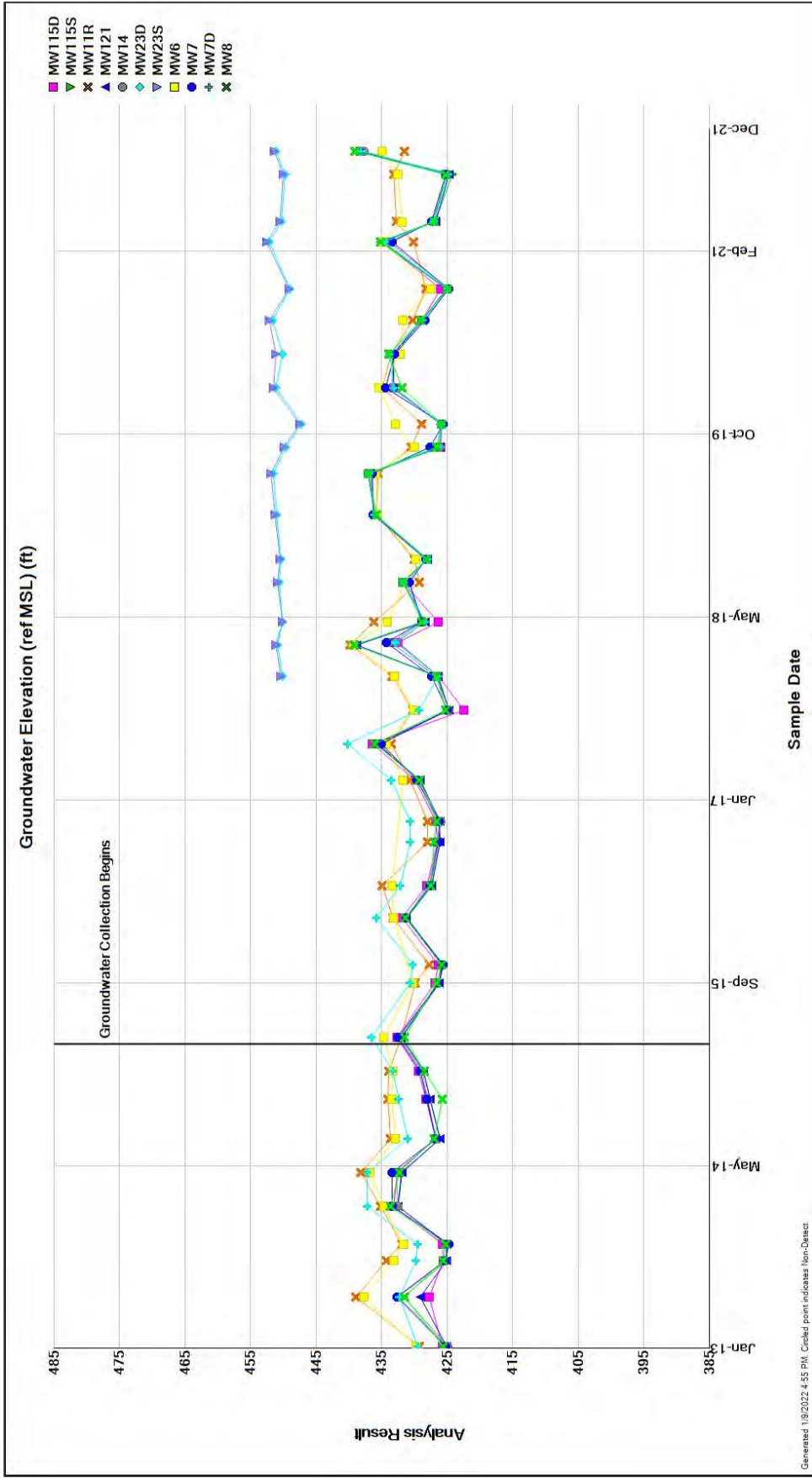


Figure 3-5. Groundwater elevations near groundwater collection trench

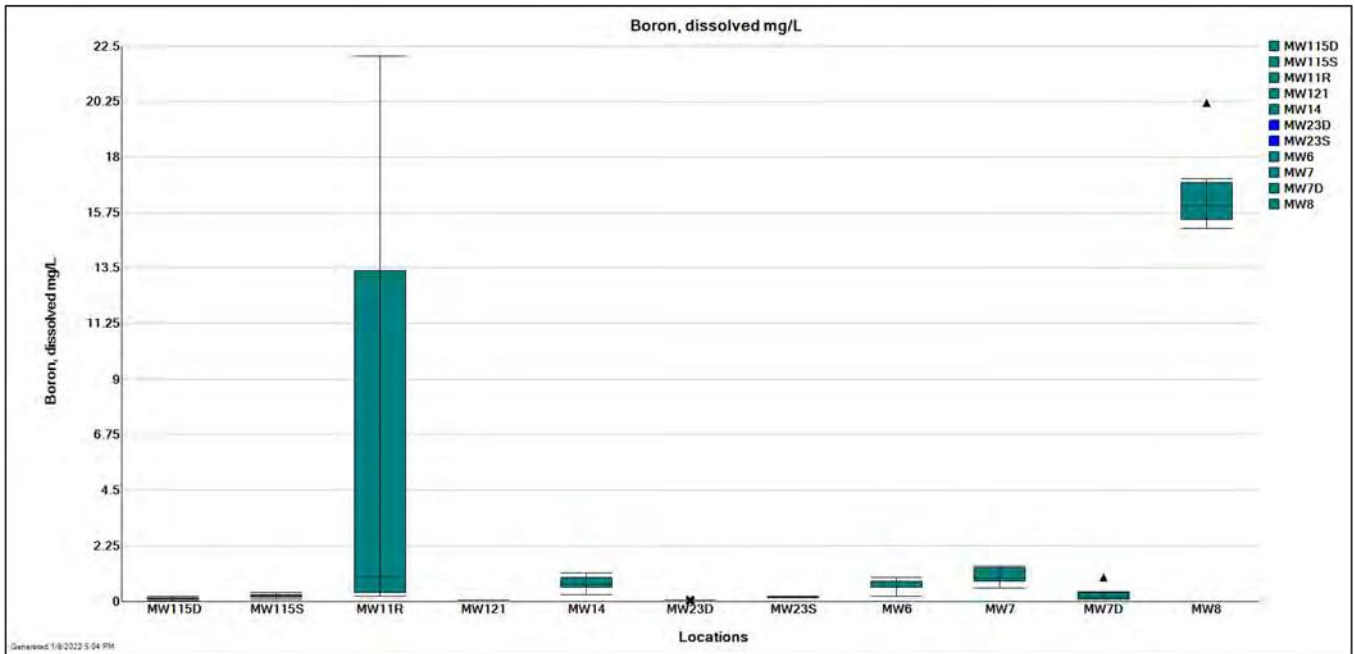


Figure 3-6A. Box-whisker plot showing distribution of **boron** concentration by monitoring well for data collected in 2020 and 2021. Note: Note: Box-whisker plots for background wells are blue and box-whisker plots for compliance wells are green.

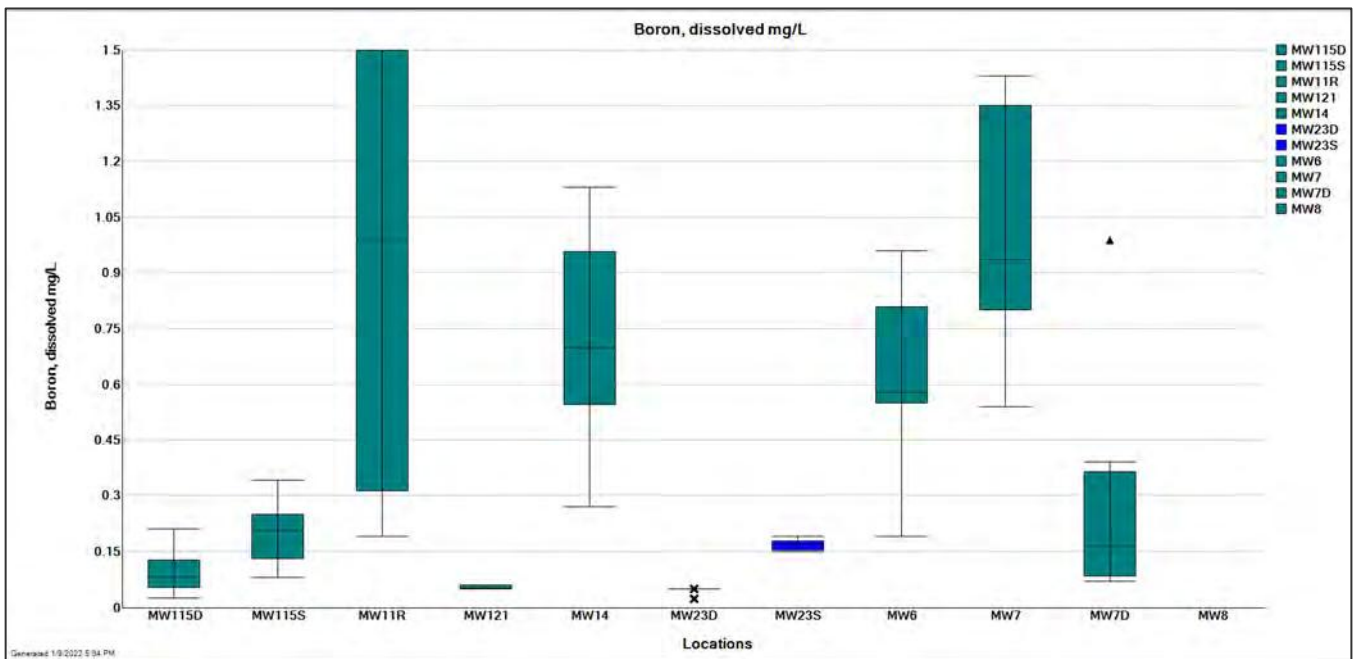


Figure 3-6B. Box-whisker plot showing distribution of **boron** concentration by monitoring well for data collected in 2020 and 2021 (zoomed in). Note: Note: Box-whisker plots for background wells are blue and box-whisker plots for compliance wells are green.

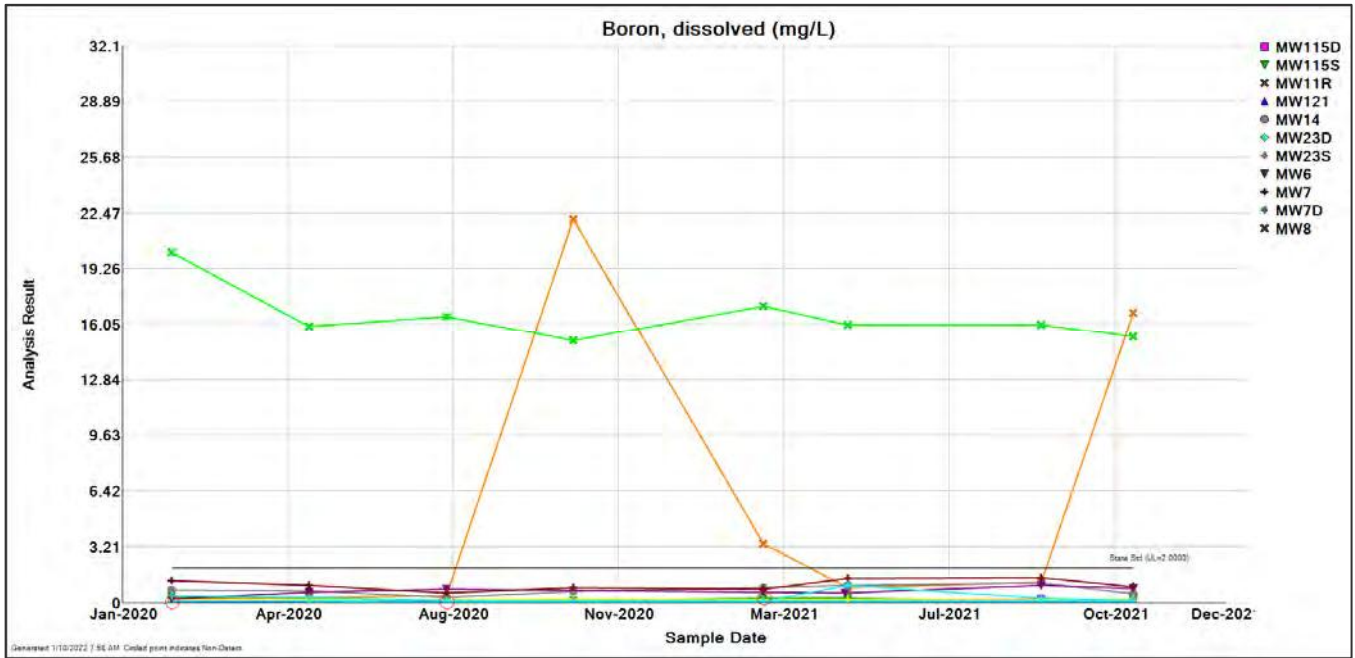


Figure 3-7. Boron concentrations during the reporting period (2020-2021) at all background and compliance wells. Circled results indicate non-detects.

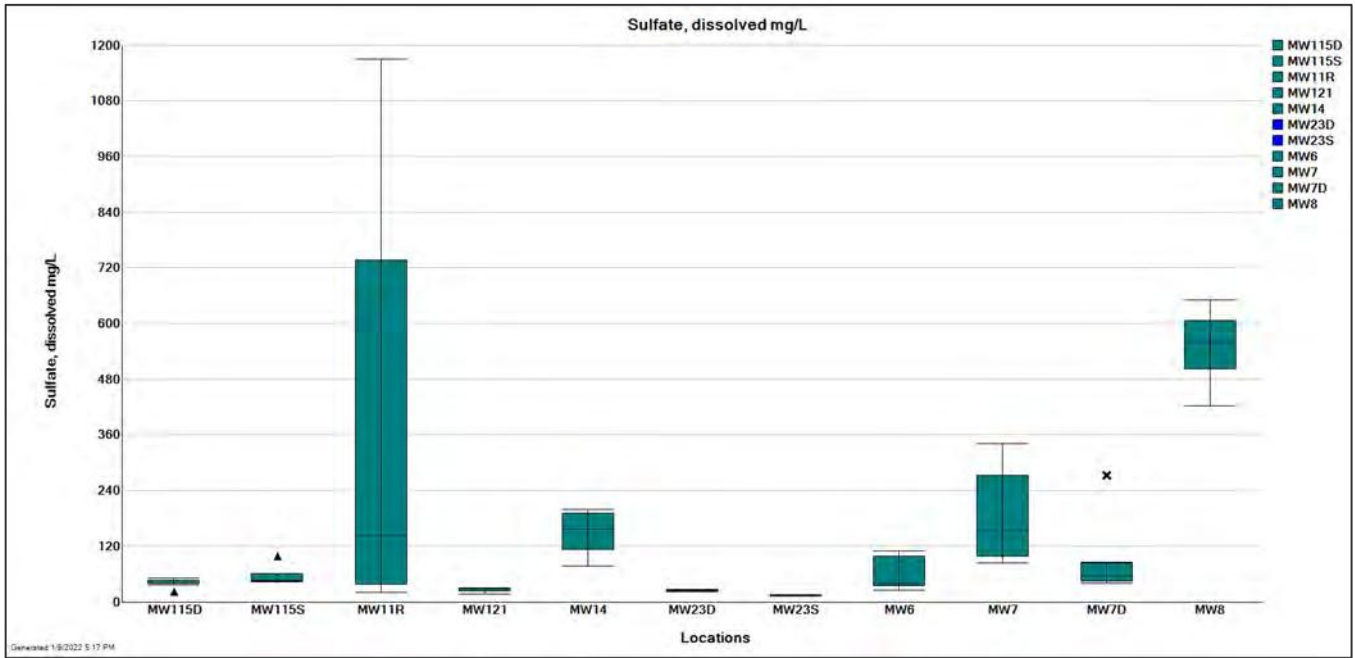


Figure 3-8. Box-whisker plot showing distribution of **sulfate** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for background wells are blue and box-whisker plots for compliance wells are green.

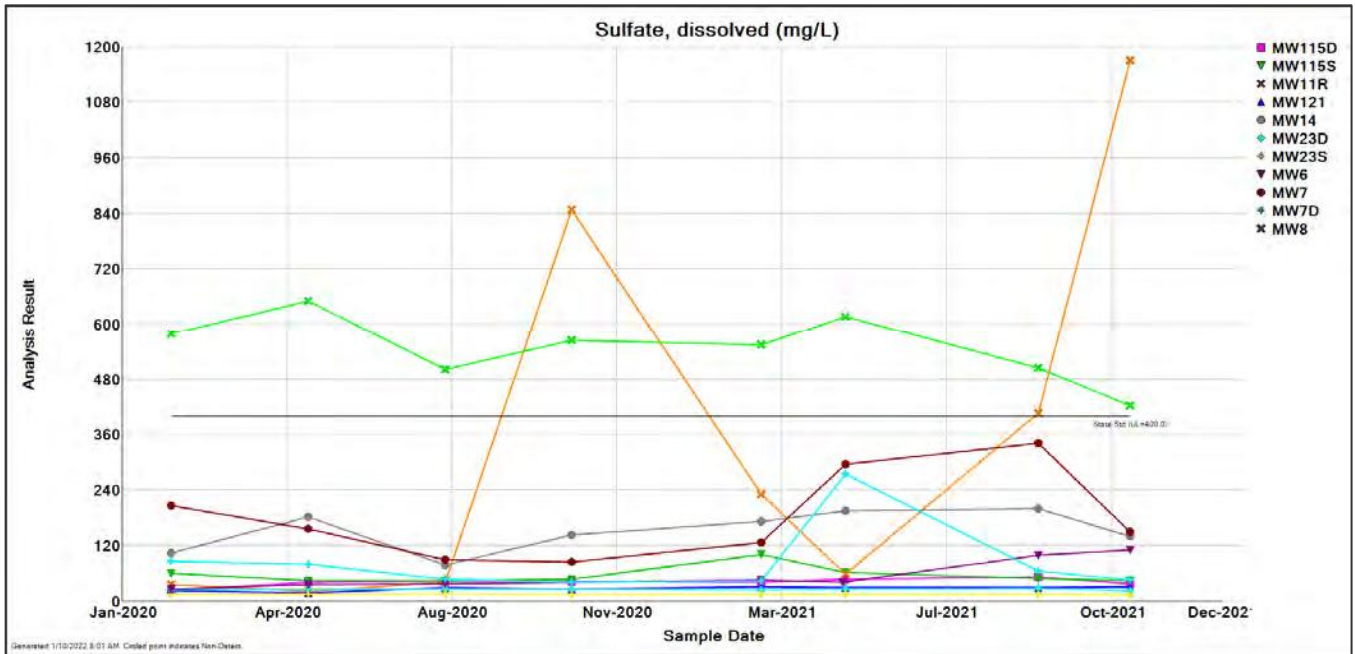


Figure 3-9. Sulfate concentrations during the reporting period (2020-2021) at all background and compliance wells.

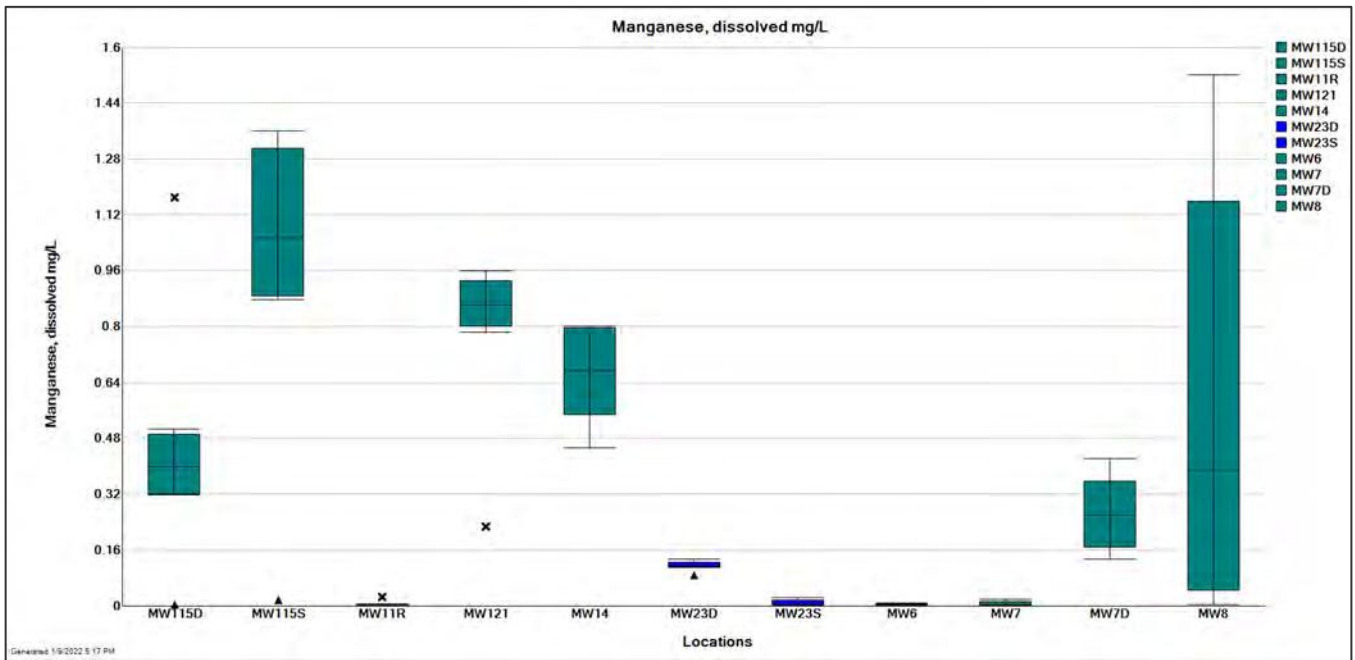


Figure 3-10. Box-whisker plot showing distribution of **manganese** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for background wells are blue and box-whisker plots for compliance wells are green.

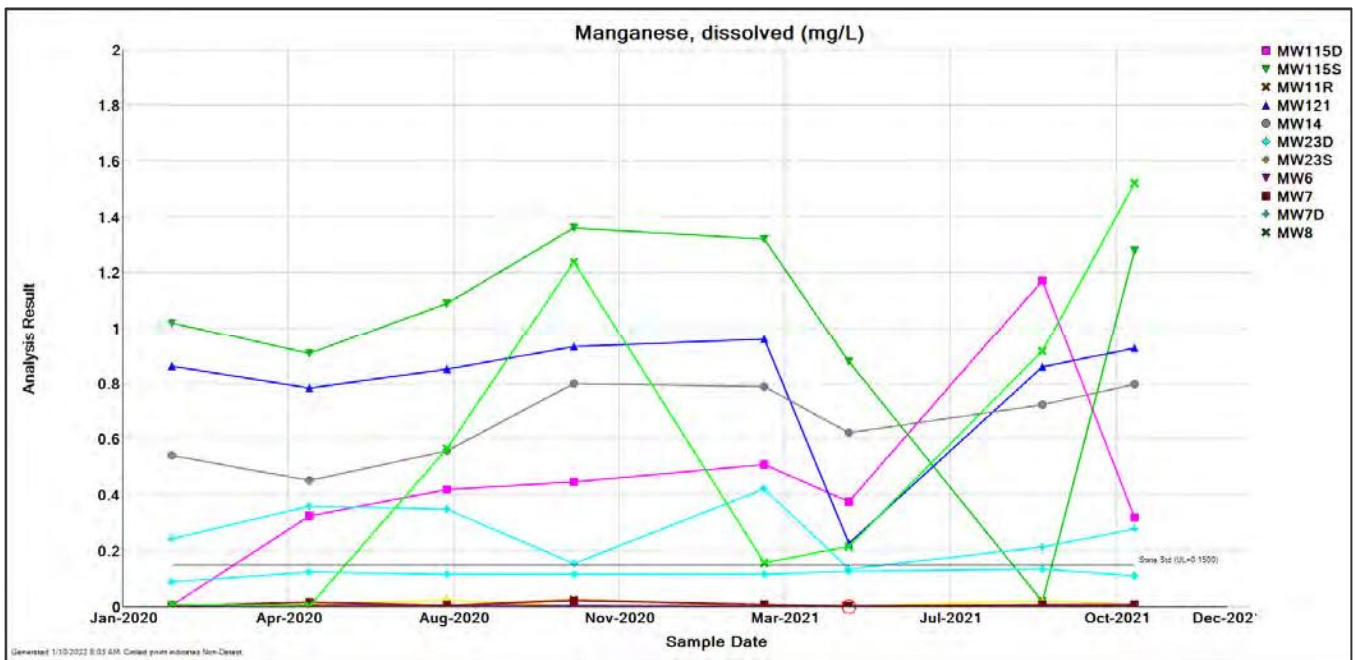


Figure 3-11. **Manganese** concentrations during the reporting period (2020-2021) at all background and compliance wells. Circled results indicate non-detects.

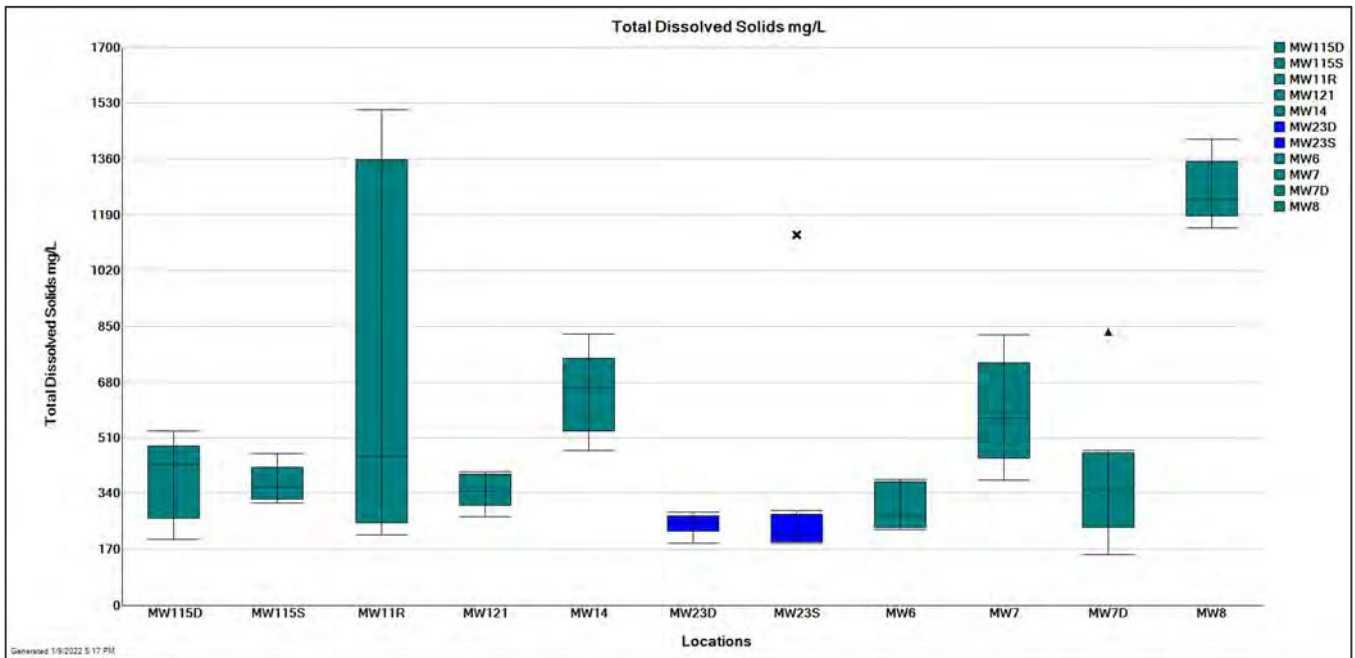


Figure 3-12. Box-whisker plot showing distribution of **total dissolved solids** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for background wells are blue and box-whisker plots for compliance wells are green.

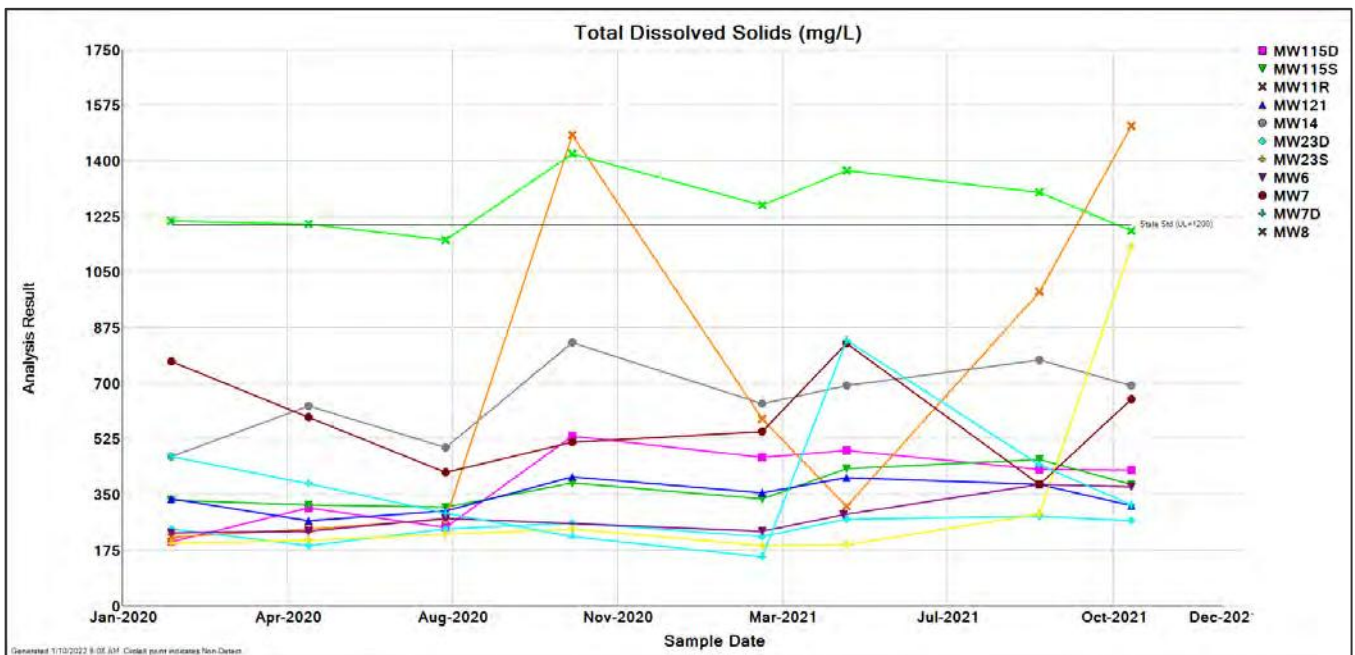


Figure 3-13. **Total dissolved solids** concentrations during the reporting period (2020-2021) at all background and compliance wells.

APPENDIX A
GROUNDWATER MONITORING RESULTS 2020-2021

**Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)**

Date Range: 01/01/2020 to 12/31/2021

Well: MW6

	2/3/2020	5/4/2020	8/3/2020	10/26/2020	3/1/2021	4/24/2021	9/1/2021	11/1/2021
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003
B, diss, mg/L	0.1900	0.5800	0.7600		0.5800	0.5500	0.9600	0.8100
Ba, diss, mg/L	0.012	0.012	0.030		0.010	0.020	0.020	0.019
Be, diss, mg/L	<0.0010	<0.0010	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010
Cd, diss, mg/L	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	16.4	12.1	9.8		8.6	11.5	8.1	15.9
CN, total, mg/L	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Co, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.0010	0.0004	0.0004		0.0003	0.0003	<0.0010	0.0003
Cu, diss, mg/L	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	0.2		<0.1	<0.1	<0.1	<0.1
Fe, diss, mg/L	<0.010	<0.010	0.080		<0.010	0.047	0.237	0.135
GW Depth (TOC), ft	7.85	11.06	11.42	15.72	8.35	11.35	10.67	8.35
GW Elv, ft	435.32	432.11	431.75	427.45	434.82	431.82	432.50	434.82
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0003	0.0036	0.0054		0.0010	0.0023	0.0067	0.0057
Ni, diss, mg/L	0.0002	0.0002	0.0002		0.0003	0.0003	0.0003	<0.0003
NO3, diss, mg/L	2.970	2.260	1.360		0.282	0.852	1.400	0.209
Pb, diss, mg/L	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
pH (field), STD	7.38	7.04	6.87		7.01	6.98	6.64	6.82
Sb, diss, mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	0.0016	0.0026	0.0032		0.0054	0.0045	0.0016	0.0039
SO4, diss, mg/L	25.5	34.2	36.4		44.2	40.7	98.4	110.0
Spec. Cond. (field), micromho	434	452	573		609	533	628	897
TDS, mg/L	230	234	274		234	286	382	374
Temp (Fahrenheit), degrees F	54.1	56.6	65.1		48.0	52.2	65.8	59.1
Tl, diss, mg/L	<0.0003	<0.0003	<0.0003		<0.0003	<0.0003	<0.0003	<0.0003
Zn, diss, mg/L	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2020 to 12/31/2021

Well: MW8

	2/3/2020	5/4/2020	8/3/2020	10/26/2020	3/1/2021	4/26/2021	9/1/2021	11/1/2021
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
B, diss, mg/L	20.2000	15.9000	16.5000	15.1000	17.1000	16.0000	16.0000	15.3000
Ba, diss, mg/L	0.017	0.017	0.020	0.020	0.014	0.016	0.017	0.015
Be, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cd, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	11.9	11.0	11.5	12.9	11.3	10.0	11.2	15.6
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.0010	0.0003	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cu, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fe, diss, mg/L	<0.010	<0.010	0.021	0.159	<0.010	0.046	0.335	0.142
GW Depth (TOC), ft	11.74	9.75	14.72	18.65	8.53	16.76	18.44	4.62
GW Elv, ft	431.91	433.90	428.93	425.00	435.12	426.89	425.21	439.03
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0070	0.0027	0.5650	1.2400	0.1560	0.2150	0.9170	1.5200
Ni, diss, mg/L	0.0040	0.0042	0.0059	0.0072	0.0045	0.0049	0.0060	0.0066
NO3, diss, mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pH (field), STD	6.93	6.97	6.87	6.97	6.95	7.09	6.83	6.86
Sb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SO4, diss, mg/L	579.0	650.0	501.0	564.0	554.0	616.0	504.0	422.0
Spec. Cond. (field), micromho	1500	1580	1620	1690	1730	1600	1620	1650
TDS, mg/L	1210	1200	1150	1420	1260	1370	1300	1180
Temp (Fahrenheit), degrees F	55.4	60.4	63.4	54.9	51.6	59.2	63.5	62.9
Tl, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Zn, diss, mg/L	<0.01	<0.01	0.01	0.01	0.01	<0.01	<0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2020 to 12/31/2021
Well: MW11R

	2/3/2020	5/4/2020	8/3/2020	10/26/2020	3/1/2021	4/26/2021	9/1/2021	11/1/2021
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0005
As, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
B, diss, mg/L	0.1900	0.2900	0.3800	22.1000	3.3900	0.8300	1.1500	16.7000
Ba, diss, mg/L	0.031	0.052	0.060	0.145	0.042	0.036	0.098	0.085
Be, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050
Cd, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	15.3	16.3	17.8	9.4	15.9	9.3	10.2	21.2
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.0010	0.0003	<0.0010	0.0004	<0.0010	<0.0010	<0.0010	<0.0010
Cu, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	0.2	<0.1	<0.1	0.2	<0.1	<0.1
Fe, diss, mg/L	<0.010	<0.010	0.023	0.154	<0.010	0.041	0.157	0.129
GW Depth (TOC), ft	8.08	9.50	12.75	14.75	12.94	10.25	9.91	11.53
GW Elv, ft	434.93	433.51	430.26	428.26	430.07	432.76	433.10	431.48
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002
Mn, diss, mg/L	0.0006	0.0014	0.0006	0.0254	0.0008	<0.0010	0.0035	0.0062
Ni, diss, mg/L	0.0005	0.0006	0.0002	0.0011	0.0005	0.0002	0.0011	0.0013
NO3, diss, mg/L	3.140	11.500	12.800	<0.100	8.660	8.390	2.800	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pH (field), STD	7.25	6.91	7.23	6.98	6.93	7.31	6.55	6.68
Sb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	<0.0005	0.0010	<0.0005	<0.0005	0.0018	<0.0005	0.0016	<0.0005
SO4, diss, mg/L	35.8	19.9	40.4	847.0	231.0	58.4	406.0	1170.0
Spec. Cond. (field), micromho	407	469	612	1990	1110	534	1270	760
TDS, mg/L	214	240	272	1480	588	312	986	1510
Temp (Fahrenheit), degrees F	49.0	56.5	62.7	58.2	54.0	52.1	65.7	59.7
Tl, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Zn, diss, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01

Hutsonville Ash Impoundment
Analysis Results by Date (column) and Parameter (row)

Date Range: 01/01/2020 to 12/31/2021

Well: MW1155

	2/3/2020	5/4/2020	8/3/2020	10/26/2020	3/1/2021	4/26/2021	9/1/2021	11/1/2021
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0053	0.0037	0.0038	0.0036	0.0014	0.0037	0.0006	0.0028
B, diss, mg/L	0.3400	0.2500	0.1300	0.1300	<0.2500	0.2500	0.0800	0.1600
Ba, diss, mg/L	0.052	0.050	0.062	0.052	0.050	0.057	0.055	0.053
Be, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050
Cd, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	18.6	18.0	17.8	18.4	17.7	17.6	44.9	15.9
CN, total, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cu, diss, mg/L	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2	<0.1
Fe, diss, mg/L	2.260	1.140	1.460	1.080	0.493	0.130	0.357	0.136
GW Depth (TOC), ft	7.78	7.71	12.08	15.88	6.02	14.07	16.70	2.57
GW Elv, ft	433.10	433.17	428.80	425.00	434.86	426.81	424.18	438.31
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	1.0200	0.9090	1.0900	1.3600	1.3200	0.8770	0.0175	1.2800
Ni, diss, mg/L	0.0012	0.0028	0.0008	0.0008	0.0009	0.0008	0.0005	0.0007
NO3, diss, mg/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.371	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pH (field), STD	7.51	7.47	7.41	7.48	7.38	7.41	7.45	7.46
Sb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SO4, diss, mg/L	58.8	42.9	43.7	46.3	99.8	61.4	47.4	43.6
Spec. Cond. (field), micromho	622	619	686	724	865	746	827	750
TDS, mg/L	332	316	310	386	336	430	460	382
Temp (Fahrenheit), degrees F	57.7	58.9	60.9	54.5	50.8	57.0	59.9	55.8
Tl, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Zn, diss, mg/L	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

APPENDIX B
SITE INSPECTION REPORTS

Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	03/31/2021
Inspector	MRK
Temperature	50 degrees F
Weather	Sunny & clear

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion on Cap	GC	
	Liner	GC	
	Water Control Features (berms, vegetated flumes, etc.)	GC	Small amount of vegetation, debris in drainage channels
	Other		
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (riprap, paved flumes, etc.)	GC	
	Other		
Groundwater Collection Trench and Discharge System	Control Panels	GC	Exterior looks fine - did not open
	Drainage Sumps / Manholes	GC	
	Pumps	NI	
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	NI	Not in service
	Diver-Mate Data Collector (data download)	NI	Not in service
	Other		

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.

MM = Item needing Minor Maintenance and/or repairs within the year.

OB = Condition requires regular observation to ensure that the condition does not become worse.

GC = Good Condition. Working properly.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment













Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	07/08/2021
Inspector	MRK
Temperature	84 degrees F
Weather	Mostly Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion on Cap	GC	
	Liner	GC	
	Water Control Features (berms, vegetated flumes, etc.)	GC	Small amount of vegetation, debris in drainage channels
	Other		
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (riprap, paved flumes, etc.)	GC	
	Other		
Groundwater Collection Trench and Discharge System	Control Panels	GC	Exterior looks fine - did not open
	Drainage Sumps / Manholes	GC	
	Pumps	NI	
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	NI	Not in service
	Diver-Mate Data Collector (data download)	NI	Not in service
	Other		

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.

MM = Item needing Minor Maintenance and/or repairs within the year.

OB = Condition requires regular observation to ensure that the condition does not become worse.

GC = Good Condition. Working properly.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment













Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	10/05/2021
Inspector	MRK
Temperature	62
Weather	Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion on Cap	GC	
	Liner	GC	
	Water Control Features (berms, vegetated flumes, etc.)	GC	Small amount of vegetation, debris in drainage channels
	Other		
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (riprap, paved flumes, etc.)	GC	
	Other		
Groundwater Collection Trench and Discharge System	Control Panels	GC	Exterior looks fine - did not open
	Drainage Sumps / Manholes	GC	
	Pumps	NI	
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	NI	Not in service
	Diver-Mate Data Collector (data download)	NI	Not in service
	Other		

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.

MM = Item needing Minor Maintenance and/or repairs within the year.

OB = Condition requires regular observation to ensure that the condition does not become worse.

GC = Good Condition. Working properly.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment









Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan

Quarterly Site Inspection Checksheet

Date	12/13/2021
Inspector	MRK
Temperature	43 degrees F
Weather	Cloudy/Hazy

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion on Cap	GC	
	Liner	GC	
	Water Control Features (berms, vegetated flumes, etc.)	GC	Small amount of vegetation, debris in drainage channels
	Other		
Embankment	Vegetation	GC	
	Liner	GC	
	Erosion	GC	
	Fencing	GC	
	Drainage Channels (rip-rap, paved flumes, etc.)	GC	
	Other		
Groundwater Collection Trench and Discharge System	Control Panels	GC	Exterior looks fine - did not open
	Drainage Sumps / Manholes	GC	
	Pumps	NI	
	Groundwater Monitoring Wells	GC	
	Flow Meter Totalizer	NI	Not in service
	Diver-Mate Data Collector (data download)	NI	Not in service
	Other		

Condition Codes

IM = Item needing Immediate Maintenance. Remediation should be completed within 1 month.

MM = Item needing Minor Maintenance and/or repairs within the year.

OB = Condition requires regular observation to ensure that the condition does not become worse.

GC = Good Condition. Working properly.

NE = No Evidence of a problem.

NI = Not Inspected. Reason should be stated in comment

















APPENDIX C
STATISTICAL OUTPUT

**APPENDIX C1
OUTLIER TEST**

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Antimony, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000909

Standard Deviation of all data: 0.00101

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000909

Standard Deviation of all data: 0.00101

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW11R

Mean of all data: 0.00116

Standard Deviation of all data: 0.00160

Largest Observation Concentration of all data: $X_n = 0.00900$

Test Statistic, high extreme of all data: $T_n = 4.89$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.00900	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Antimony, dissolved, mg/L

Location: MW121

Mean of all data: 0.00100

Standard Deviation of all data: 0.00110

Largest Observation Concentration of all data: $X_n = 0.00400$

Test Statistic, high extreme of all data: $T_n = 2.73$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW14

Mean of all data: 0.000909

Standard Deviation of all data: 0.00101

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW23D

Mean of all data: 0.00200

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Antimony, dissolved, mg/L

Location: MW23S

Mean of all data: 0.00200

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW6

Mean of all data: 0.000974

Standard Deviation of all data: 0.00105

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 1.93$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW7

Mean of all data: 0.00105

Standard Deviation of all data: 0.00126

Largest Observation Concentration of all data: $X_n = 0.00600$

Test Statistic, high extreme of all data: $T_n = 3.94$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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04/21/2014	0.00600	False		1
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Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Antimony, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000930

Standard Deviation of all data: 0.00101

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 1.06$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Antimony, dissolved, mg/L

Location: MW8

Mean of all data: 0.00114

Standard Deviation of all data: 0.00169

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 5.24$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/18/2012	0.0100	False		1

Arsenic, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00288

Standard Deviation of all data: 0.00336

Largest Observation Concentration of all data: $X_n = 0.0150$

Test Statistic, high extreme of all data: $T_n = 3.60$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/18/2012	0.0150	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Arsenic, dissolved, mg/L

Location: MW115S

Mean of all data: 0.00262

Standard Deviation of all data: 0.00271

Largest Observation Concentration of all data: $X_n = 0.0150$

Test Statistic, high extreme of all data: $T_n = 4.57$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/18/2012	0.0150	False		1

Arsenic, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000664

Standard Deviation of all data: 0.00172

Largest Observation Concentration of all data: $X_n = 0.00900$

Test Statistic, high extreme of all data: $T_n = 4.84$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.00900	False		1

Arsenic, dissolved, mg/L

Location: MW121

Mean of all data: 0.00325

Standard Deviation of all data: 0.00275

Largest Observation Concentration of all data: $X_n = 0.0120$

Test Statistic, high extreme of all data: $T_n = 3.17$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.0120	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Arsenic, dissolved, mg/L

Location: MW14

Mean of all data: 0.00131

Standard Deviation of all data: 0.00176

Largest Observation Concentration of all data: $X_n = 0.00900$

Test Statistic, high extreme of all data: $T_n = 4.37$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.00900	False		1

Arsenic, dissolved, mg/L

Location: MW23D

Mean of all data: 0.00269

Standard Deviation of all data: 0.000927

Largest Observation Concentration of all data: $X_n = 0.00410$

Test Statistic, high extreme of all data: $T_n = 1.52$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Arsenic, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000776

Standard Deviation of all data: 0.00217

Largest Observation Concentration of all data: $X_n = 0.00920$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.00920	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Arsenic, dissolved, mg/L

Location: MW6

Mean of all data: 0.000411

Standard Deviation of all data: 0.000647

Largest Observation Concentration of all data: $X_n = 0.00210$

Test Statistic, high extreme of all data: $T_n = 2.61$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Arsenic, dissolved, mg/L

Location: MW7

Mean of all data: 0.000461

Standard Deviation of all data: 0.00126

Largest Observation Concentration of all data: $X_n = 0.00800$

Test Statistic, high extreme of all data: $T_n = 5.97$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.00800	False		1

Arsenic, dissolved, mg/L

Location: MW7D

Mean of all data: 0.00323

Standard Deviation of all data: 0.00339

Largest Observation Concentration of all data: $X_n = 0.0140$

Test Statistic, high extreme of all data: $T_n = 3.17$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/18/2012	0.0140	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Arsenic, dissolved, mg/L

Location: MW8

Mean of all data: 0.000476

Standard Deviation of all data: 0.00104

Largest Observation Concentration of all data: $X_n = 0.00610$

Test Statistic, high extreme of all data: $T_n = 5.42$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
12/18/2017	0.00610	False		1

Barium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0609

Standard Deviation of all data: 0.0200

Largest Observation Concentration of all data: $X_n = 0.158$

Test Statistic, high extreme of all data: $T_n = 4.86$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.158	False		1

Barium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0593

Standard Deviation of all data: 0.0297

Largest Observation Concentration of all data: $X_n = 0.206$

Test Statistic, high extreme of all data: $T_n = 4.94$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.206	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Barium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0400

Standard Deviation of all data: 0.0393

Largest Observation Concentration of all data: $X_n = 0.204$

Test Statistic, high extreme of all data: $T_n = 4.17$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.204	False		1

Barium, dissolved, mg/L

Location: MW121

Mean of all data: 0.0575

Standard Deviation of all data: 0.0253

Largest Observation Concentration of all data: $X_n = 0.198$

Test Statistic, high extreme of all data: $T_n = 5.55$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.198	False		1

Barium, dissolved, mg/L

Location: MW14

Mean of all data: 0.0772

Standard Deviation of all data: 0.0195

Largest Observation Concentration of all data: $X_n = 0.127$

Test Statistic, high extreme of all data: $T_n = 2.55$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Barium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0436

Standard Deviation of all data: 0.00648

Largest Observation Concentration of all data: $X_n = 0.0560$

Test Statistic, high extreme of all data: $T_n = 1.91$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Barium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0339

Standard Deviation of all data: 0.00933

Largest Observation Concentration of all data: $X_n = 0.0490$

Test Statistic, high extreme of all data: $T_n = 1.62$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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10/28/2019	0.00900	False	-1	
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Barium, dissolved, mg/L

Location: MW6

Mean of all data: 0.0211

Standard Deviation of all data: 0.0101

Largest Observation Concentration of all data: $X_n = 0.0570$

Test Statistic, high extreme of all data: $T_n = 3.56$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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07/21/2014	0.0570	False		1
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Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Barium, dissolved, mg/L

Location: MW7

Mean of all data: 0.0508

Standard Deviation of all data: 0.0144

Largest Observation Concentration of all data: $X_n = 0.119$

Test Statistic, high extreme of all data: $T_n = 4.75$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/09/2012	0.119	False		1

Barium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0491

Standard Deviation of all data: 0.0158

Largest Observation Concentration of all data: $X_n = 0.0960$

Test Statistic, high extreme of all data: $T_n = 2.96$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.0960	False		1

Barium, dissolved, mg/L

Location: MW8

Mean of all data: 0.0216

Standard Deviation of all data: 0.00545

Largest Observation Concentration of all data: $X_n = 0.0330$

Test Statistic, high extreme of all data: $T_n = 2.10$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Beryllium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000545

Standard Deviation of all data: 0.000848

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 5.25$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/01/2021	<0.00500	True		1

Beryllium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000545

Standard Deviation of all data: 0.000848

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 5.25$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/01/2021	<0.00500	True		1

Beryllium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000535

Standard Deviation of all data: 0.000855

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 5.22$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/01/2021	<0.00500	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Beryllium, dissolved, mg/L

Location: MW121

Mean of all data: 0.000591

Standard Deviation of all data: 0.000871

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 5.06$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/01/2021	<0.00500	True		1

Beryllium, dissolved, mg/L

Location: MW14

Mean of all data: 0.000545

Standard Deviation of all data: 0.000848

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 5.25$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/01/2021	<0.00500	True		1

Beryllium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.00100

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Beryllium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.00142

Standard Deviation of all data: 0.00175

Largest Observation Concentration of all data: $X_n = 0.00820$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.00820	False		1

Beryllium, dissolved, mg/L

Location: MW6

Mean of all data: 0.000447

Standard Deviation of all data: 0.000504

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.10$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Beryllium, dissolved, mg/L

Location: MW7

Mean of all data: 0.000455

Standard Deviation of all data: 0.000504

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Beryllium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000465

Standard Deviation of all data: 0.000505

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.06$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Beryllium, dissolved, mg/L

Location: MW8

Mean of all data: 0.000455

Standard Deviation of all data: 0.000504

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Boron, dissolved, mg/L

Location: MW115D

Mean of all data: 0.217

Standard Deviation of all data: 0.967

Largest Observation Concentration of all data: $X_n = 6.48$

Test Statistic, high extreme of all data: $T_n = 6.48$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	6.48	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Boron, dissolved, mg/L

Location: MW115S

Mean of all data: 0.263

Standard Deviation of all data: 0.881

Largest Observation Concentration of all data: $X_n = 5.95$

Test Statistic, high extreme of all data: $T_n = 6.46$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	5.95	False		1

Boron, dissolved, mg/L

Location: MW11R

Mean of all data: 8.17

Standard Deviation of all data: 9.59

Largest Observation Concentration of all data: $X_n = 35.0$

Test Statistic, high extreme of all data: $T_n = 2.80$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Boron, dissolved, mg/L

Location: MW121

Mean of all data: 0.179

Standard Deviation of all data: 0.811

Largest Observation Concentration of all data: $X_n = 5.43$

Test Statistic, high extreme of all data: $T_n = 6.48$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	5.43	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Boron, dissolved, mg/L

Location: MW14

Mean of all data: 0.786

Standard Deviation of all data: 0.353

Largest Observation Concentration of all data: $X_n = 1.51$

Test Statistic, high extreme of all data: $T_n = 2.05$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Boron, dissolved, mg/L

Location: MW23D

Mean of all data: 0.514

Standard Deviation of all data: 1.93

Largest Observation Concentration of all data: $X_n = 8.02$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	8.02	False		1

Boron, dissolved, mg/L

Location: MW23S

Mean of all data: 0.467

Standard Deviation of all data: 1.23

Largest Observation Concentration of all data: $X_n = 5.24$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	5.24	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Boron, dissolved, mg/L

Location: MW6

Mean of all data: 6.31

Standard Deviation of all data: 7.55

Largest Observation Concentration of all data: $X_n = 23.0$

Test Statistic, high extreme of all data: $T_n = 2.21$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Boron, dissolved, mg/L

Location: MW7

Mean of all data: 1.56

Standard Deviation of all data: 0.865

Largest Observation Concentration of all data: $X_n = 6.61$

Test Statistic, high extreme of all data: $T_n = 5.83$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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07/21/2014	6.61	False		1
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Boron, dissolved, mg/L

Location: MW7D

Mean of all data: 0.465

Standard Deviation of all data: 0.325

Largest Observation Concentration of all data: $X_n = 1.30$

Test Statistic, high extreme of all data: $T_n = 2.57$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Boron, dissolved, mg/L

Location: MW8

Mean of all data: 16.3

Standard Deviation of all data: 3.22

Largest Observation Concentration of all data: $X_n = 20.2$

Test Statistic, high extreme of all data: $T_n = 1.21$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
11/21/2016	0.0124	False	-1	

Cadmium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
<i>No Outliers</i>				

Cadmium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cadmium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000171

Standard Deviation of all data: 0.000284

Largest Observation Concentration of all data: $X_n = 0.00150$

Test Statistic, high extreme of all data: $T_n = 4.68$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
05/24/2011	0.00150	False		1

Cadmium, dissolved, mg/L

Location: MW121

Mean of all data: 0.000159

Standard Deviation of all data: 0.000310

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 5.94$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/03/2014	0.00200	False		1

Cadmium, dissolved, mg/L

Location: MW14

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cadmium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000329

Standard Deviation of all data: 0.000327

Largest Observation Concentration of all data: $X_n = 0.00160$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.00160	False		1

Cadmium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000535

Standard Deviation of all data: 0.00118

Largest Observation Concentration of all data: $X_n = 0.00510$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.00510	False		1

Cadmium, dissolved, mg/L

Location: MW6

Mean of all data: 0.000112

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.10$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cadmium, dissolved, mg/L

Location: MW7

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Cadmium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000122

Standard Deviation of all data: 0.000127

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.01$

T Critical of all data: $T_{cr} = 2.88$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Cadmium, dissolved, mg/L

Location: MW8

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chloride, dissolved, mg/L

Location: MW115D

Mean of all data: 46.2

Standard Deviation of all data: 40.3

Largest Observation Concentration of all data: Xn = 213.

Test Statistic, high extreme of all data: Tn = 4.14

T Critical of all data: Tcr = 2.91

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/02/2015	213.	False		1

Chloride, dissolved, mg/L

Location: MW115S

Mean of all data: 30.6

Standard Deviation of all data: 53.4

Largest Observation Concentration of all data: Xn = 373.

Test Statistic, high extreme of all data: Tn = 6.41

T Critical of all data: Tcr = 2.91

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	373.	False		1

Chloride, dissolved, mg/L

Location: MW11R

Mean of all data: 14.6

Standard Deviation of all data: 4.39

Largest Observation Concentration of all data: Xn = 25.0

Test Statistic, high extreme of all data: Tn = 2.36

T Critical of all data: Tcr = 2.90

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chloride, dissolved, mg/L

Location: MW121

Mean of all data: 25.2

Standard Deviation of all data: 32.0

Largest Observation Concentration of all data: $X_n = 230$.

Test Statistic, high extreme of all data: $T_n = 6.41$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	230.	False		1

Chloride, dissolved, mg/L

Location: MW14

Mean of all data: 19.9

Standard Deviation of all data: 5.71

Largest Observation Concentration of all data: $X_n = 28.1$

Test Statistic, high extreme of all data: $T_n = 1.43$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Chloride, dissolved, mg/L

Location: MW23D

Mean of all data: 5.58

Standard Deviation of all data: 1.24

Largest Observation Concentration of all data: $X_n = 9.70$

Test Statistic, high extreme of all data: $T_n = 3.33$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	9.70	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chloride, dissolved, mg/L

Location: MW23S

Mean of all data: 3.33

Standard Deviation of all data: 2.15

Largest Observation Concentration of all data: $X_n = 10.1$

Test Statistic, high extreme of all data: $T_n = 3.15$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	10.1	False		1

Chloride, dissolved, mg/L

Location: MW6

Mean of all data: 16.5

Standard Deviation of all data: 5.37

Largest Observation Concentration of all data: $X_n = 28.0$

Test Statistic, high extreme of all data: $T_n = 2.14$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Chloride, dissolved, mg/L

Location: MW7

Mean of all data: 12.3

Standard Deviation of all data: 3.52

Largest Observation Concentration of all data: $X_n = 21.3$

Test Statistic, high extreme of all data: $T_n = 2.57$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chloride, dissolved, mg/L

Location: MW7D

Mean of all data: 17.7

Standard Deviation of all data: 7.03

Largest Observation Concentration of all data: $X_n = 44.0$

Test Statistic, high extreme of all data: $T_n = 3.74$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/11/2011	44.0	False		1

Chloride, dissolved, mg/L

Location: MW8

Mean of all data: 12.7

Standard Deviation of all data: 2.95

Largest Observation Concentration of all data: $X_n = 29.0$

Test Statistic, high extreme of all data: $T_n = 5.52$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/11/2011	29.0	False		1

Chromium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00223

Standard Deviation of all data: 0.00537

Largest Observation Concentration of all data: $X_n = 0.0330$

Test Statistic, high extreme of all data: $T_n = 5.73$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0330	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chromium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.00164

Standard Deviation of all data: 0.00369

Largest Observation Concentration of all data: $X_n = 0.0220$

Test Statistic, high extreme of all data: $T_n = 5.52$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0220	False		1

Chromium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000977

Standard Deviation of all data: 0.00217

Largest Observation Concentration of all data: $X_n = 0.0130$

Test Statistic, high extreme of all data: $T_n = 5.53$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0130	False		1

Chromium, dissolved, mg/L

Location: MW121

Mean of all data: 0.00130

Standard Deviation of all data: 0.00284

Largest Observation Concentration of all data: $X_n = 0.0180$

Test Statistic, high extreme of all data: $T_n = 5.88$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0180	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chromium, dissolved, mg/L

Location: MW14

Mean of all data: 0.00149

Standard Deviation of all data: 0.00249

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 3.41$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0100	False		1

Chromium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000959

Standard Deviation of all data: 0.000170

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 0.243$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/01/2021	0.000300	False	-1	

Chromium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000959

Standard Deviation of all data: 0.000170

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 0.243$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.000300	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chromium, dissolved, mg/L

Location: MW6

Mean of all data: 0.00124

Standard Deviation of all data: 0.00318

Largest Observation Concentration of all data: $X_n = 0.0140$

Test Statistic, high extreme of all data: $T_n = 4.01$

T Critical of all data: $T_{cr} = 2.82$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0140	False		1

Chromium, dissolved, mg/L

Location: MW7

Mean of all data: 0.00168

Standard Deviation of all data: 0.00352

Largest Observation Concentration of all data: $X_n = 0.0190$

Test Statistic, high extreme of all data: $T_n = 4.92$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
08/26/2013	0.0190	False		1

Chromium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.00263

Standard Deviation of all data: 0.00817

Largest Observation Concentration of all data: $X_n = 0.0510$

Test Statistic, high extreme of all data: $T_n = 5.92$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
08/26/2013	0.0510	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Chromium, dissolved, mg/L

Location: MW8

Mean of all data: 0.00148

Standard Deviation of all data: 0.00309

Largest Observation Concentration of all data: $X_n = 0.0160$

Test Statistic, high extreme of all data: $T_n = 4.70$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/13/2012	0.0160	False		1

Cobalt, Dis, mg/L

Location: MW115D

Mean of all data: 0.000523

Standard Deviation of all data: 0.000549

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 2.69$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Cobalt, Dis, mg/L

Location: MW115S

Mean of all data: 0.000545

Standard Deviation of all data: 0.000548

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 2.65$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cobalt, Dis, mg/L

Location: MW11R

Mean of all data: 0.00130

Standard Deviation of all data: 0.00249

Largest Observation Concentration of all data: $X_n = 0.0150$

Test Statistic, high extreme of all data: $T_n = 5.50$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	0.0150	False		1

Cobalt, Dis, mg/L

Location: MW121

Mean of all data: 0.000568

Standard Deviation of all data: 0.000661

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 3.68$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/03/2014	0.00300	False		1

Cobalt, Dis, mg/L

Location: MW14

Mean of all data: 0.000705

Standard Deviation of all data: 0.000734

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 3.13$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.00300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cobalt, Dis, mg/L

Location: MW23D

Mean of all data: 0.00782

Standard Deviation of all data: 0.0252

Largest Observation Concentration of all data: $X_n = 0.105$

Test Statistic, high extreme of all data: $T_n = 3.86$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.105	False		1

Cobalt, Dis, mg/L

Location: MW23S

Mean of all data: 0.00629

Standard Deviation of all data: 0.0218

Largest Observation Concentration of all data: $X_n = 0.0910$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.0910	False		1

Cobalt, Dis, mg/L

Location: MW6

Mean of all data: 0.000503

Standard Deviation of all data: 0.000565

Largest Observation Concentration of all data: $X_n = 0.00210$

Test Statistic, high extreme of all data: $T_n = 2.83$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cobalt, Dis, mg/L

Location: MW7

Mean of all data: 0.000455

Standard Deviation of all data: 0.000504

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Cobalt, Dis, mg/L

Location: MW7D

Mean of all data: 0.000614

Standard Deviation of all data: 0.000682

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 3.50$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.00300	False		1

Cobalt, Dis, mg/L

Location: MW8

Mean of all data: 0.000602

Standard Deviation of all data: 0.000893

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 4.92$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
12/18/2017	0.00500	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Copper, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00110

Standard Deviation of all data: 0.00331

Largest Observation Concentration of all data: $X_n = 0.0220$

Test Statistic, high extreme of all data: $T_n = 6.31$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0220	False		1

Copper, dissolved, mg/L

Location: MW115S

Mean of all data: 0.00138

Standard Deviation of all data: 0.00367

Largest Observation Concentration of all data: $X_n = 0.0190$

Test Statistic, high extreme of all data: $T_n = 4.79$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0190	False		1

Copper, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000795

Standard Deviation of all data: 0.00129

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 3.27$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.00500	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Copper, dissolved, mg/L

Location: MW121

Mean of all data: 0.000855

Standard Deviation of all data: 0.00174

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 5.24$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0100	False		1

Copper, dissolved, mg/L

Location: MW14

Mean of all data: 0.00163

Standard Deviation of all data: 0.00586

Largest Observation Concentration of all data: $X_n = 0.0371$

Test Statistic, high extreme of all data: $T_n = 6.05$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2019	0.0371	False		1

Copper, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000500

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.000500$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Copper, dissolved, mg/L

Location: MW23S

Mean of all data: 0.00128

Standard Deviation of all data: 0.00221

Largest Observation Concentration of all data: $X_n = 0.00780$

Test Statistic, high extreme of all data: $T_n = 2.96$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.00780	False		1

Copper, dissolved, mg/L

Location: MW6

Mean of all data: 0.000658

Standard Deviation of all data: 0.000815

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 2.88$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/30/2012	0.00300	False		1

Copper, dissolved, mg/L

Location: MW7

Mean of all data: 0.000682

Standard Deviation of all data: 0.00104

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 4.15$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.00500	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Copper, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000791

Standard Deviation of all data: 0.00169

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 5.45$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0100	False		1

Copper, dissolved, mg/L

Location: MW8

Mean of all data: 0.00150

Standard Deviation of all data: 0.00469

Largest Observation Concentration of all data: $X_n = 0.0307$

Test Statistic, high extreme of all data: $T_n = 6.22$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/13/2017	0.0307	False		1

Cyanide, total, mg/L

Location: MW115D

Mean of all data: 0.00383

Standard Deviation of all data: 0.00435

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 1.42$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cyanide, total, mg/L

Location: MW115S

Mean of all data: 0.00402

Standard Deviation of all data: 0.00430

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 1.39$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Cyanide, total, mg/L

Location: MW11R

Mean of all data: 0.00647

Standard Deviation of all data: 0.0114

Largest Observation Concentration of all data: $X_n = 0.0700$

Test Statistic, high extreme of all data: $T_n = 5.56$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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06/19/2017	0.0700	False		1
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Cyanide, total, mg/L

Location: MW121

Mean of all data: 0.00391

Standard Deviation of all data: 0.00434

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 1.40$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cyanide, total, mg/L

Location: MW14

Mean of all data: 0.00693

Standard Deviation of all data: 0.0178

Largest Observation Concentration of all data: $X_n = 0.120$

Test Statistic, high extreme of all data: $T_n = 6.37$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/21/2016	0.120	False		1

Cyanide, total, mg/L

Location: MW23D

Mean of all data: 0.00853

Standard Deviation of all data: 0.00235

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 0.626$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Cyanide, total, mg/L

Location: MW23S

Mean of all data: 0.00853

Standard Deviation of all data: 0.00235

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 0.626$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cyanide, total, mg/L

Location: MW6

Mean of all data: 0.00445

Standard Deviation of all data: 0.00489

Largest Observation Concentration of all data: $X_n = 0.0180$

Test Statistic, high extreme of all data: $T_n = 2.77$

T Critical of all data: $T_{cr} = 2.87$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Cyanide, total, mg/L

Location: MW7

Mean of all data: 0.00500

Standard Deviation of all data: 0.00738

Largest Observation Concentration of all data: $X_n = 0.0450$

Test Statistic, high extreme of all data: $T_n = 5.42$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
05/20/2013	0.0450	False		1

Cyanide, total, mg/L

Location: MW7D

Mean of all data: 0.00793

Standard Deviation of all data: 0.0222

Largest Observation Concentration of all data: $X_n = 0.150$

Test Statistic, high extreme of all data: $T_n = 6.41$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
05/20/2013	0.150	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Cyanide, total, mg/L

Location: MW8

Mean of all data: 0.00411

Standard Deviation of all data: 0.00425

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 1.38$

T Critical of all data: $T_{cr} = 2.92$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Fluoride, dissolved, mg/L

Location: MW115D

Mean of all data: 0.163

Standard Deviation of all data: 0.110

Largest Observation Concentration of all data: $X_n = 0.466$

Test Statistic, high extreme of all data: $T_n = 2.75$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Fluoride, dissolved, mg/L

Location: MW115S

Mean of all data: 0.190

Standard Deviation of all data: 0.127

Largest Observation Concentration of all data: $X_n = 0.571$

Test Statistic, high extreme of all data: $T_n = 3.00$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/02/2015	0.571	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Fluoride, dissolved, mg/L

Location: MW11R

Mean of all data: 0.128

Standard Deviation of all data: 0.149

Largest Observation Concentration of all data: $X_n = 0.645$

Test Statistic, high extreme of all data: $T_n = 3.47$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/02/2015	0.645	False		1

Fluoride, dissolved, mg/L

Location: MW121

Mean of all data: 0.170

Standard Deviation of all data: 0.116

Largest Observation Concentration of all data: $X_n = 0.504$

Test Statistic, high extreme of all data: $T_n = 2.87$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Fluoride, dissolved, mg/L

Location: MW14

Mean of all data: 0.0960

Standard Deviation of all data: 0.120

Largest Observation Concentration of all data: $X_n = 0.534$

Test Statistic, high extreme of all data: $T_n = 3.65$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/02/2015	0.534	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Fluoride, dissolved, mg/L

Location: MW23D

Mean of all data: 0.144

Standard Deviation of all data: 0.131

Largest Observation Concentration of all data: $X_n = 0.600$

Test Statistic, high extreme of all data: $T_n = 3.47$

T Critical of all data: $T_{cr} = 2.44$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.600	False		1

Fluoride, dissolved, mg/L

Location: MW23S

Mean of all data: 0.192

Standard Deviation of all data: 0.226

Largest Observation Concentration of all data: $X_n = 0.900$

Test Statistic, high extreme of all data: $T_n = 3.13$

T Critical of all data: $T_{cr} = 2.44$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.900	False		1

Fluoride, dissolved, mg/L

Location: MW6

Mean of all data: 0.133

Standard Deviation of all data: 0.109

Largest Observation Concentration of all data: $X_n = 0.400$

Test Statistic, high extreme of all data: $T_n = 2.46$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Fluoride, dissolved, mg/L

Location: MW7

Mean of all data: 0.475

Standard Deviation of all data: 2.61

Largest Observation Concentration of all data: $X_n = 17.4$

Test Statistic, high extreme of all data: $T_n = 6.48$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
11/02/2015	17.4	False		1

Fluoride, dissolved, mg/L

Location: MW7D

Mean of all data: 0.163

Standard Deviation of all data: 0.124

Largest Observation Concentration of all data: $X_n = 0.529$

Test Statistic, high extreme of all data: $T_n = 2.96$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
11/02/2015	0.529	False		1

Fluoride, dissolved, mg/L

Location: MW8

Mean of all data: 0.0642

Standard Deviation of all data: 0.0682

Largest Observation Concentration of all data: $X_n = 0.300$

Test Statistic, high extreme of all data: $T_n = 3.46$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
03/12/2018	0.300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Iron, dissolved, mg/L

Location: MW115D

Mean of all data: 1.33

Standard Deviation of all data: 1.52

Largest Observation Concentration of all data: $X_n = 4.91$

Test Statistic, high extreme of all data: $T_n = 2.35$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Iron, dissolved, mg/L

Location: MW115S

Mean of all data: 1.68

Standard Deviation of all data: 3.02

Largest Observation Concentration of all data: $X_n = 17.6$

Test Statistic, high extreme of all data: $T_n = 5.27$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/13/2012	17.6	False		1

Iron, dissolved, mg/L

Location: MW11R

Mean of all data: 0.458

Standard Deviation of all data: 0.804

Largest Observation Concentration of all data: $X_n = 4.06$

Test Statistic, high extreme of all data: $T_n = 4.48$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	4.06	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Iron, dissolved, mg/L

Location: MW121

Mean of all data: 1.56

Standard Deviation of all data: 1.31

Largest Observation Concentration of all data: $X_n = 5.40$

Test Statistic, high extreme of all data: $T_n = 2.93$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/20/2015	5.40	False		1

Iron, dissolved, mg/L

Location: MW14

Mean of all data: 0.774

Standard Deviation of all data: 0.715

Largest Observation Concentration of all data: $X_n = 3.07$

Test Statistic, high extreme of all data: $T_n = 3.21$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
03/13/2017	3.07	False		1

Iron, dissolved, mg/L

Location: MW23D

Mean of all data: 4.51

Standard Deviation of all data: 16.9

Largest Observation Concentration of all data: $X_n = 70.0$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/28/2019	70.0	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Iron, dissolved, mg/L

Location: MW23S

Mean of all data: 12.1

Standard Deviation of all data: 49.5

Largest Observation Concentration of all data: $X_n = 204$.

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	204.	False		1

Iron, dissolved, mg/L

Location: MW6

Mean of all data: 0.357

Standard Deviation of all data: 0.470

Largest Observation Concentration of all data: $X_n = 1.94$

Test Statistic, high extreme of all data: $T_n = 3.37$

T Critical of all data: $T_{cr} = 2.89$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/13/2012	1.94	False		1

Iron, dissolved, mg/L

Location: MW7

Mean of all data: 0.407

Standard Deviation of all data: 0.803

Largest Observation Concentration of all data: $X_n = 4.96$

Test Statistic, high extreme of all data: $T_n = 5.67$

T Critical of all data: $T_{cr} = 2.94$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/09/2012	4.96	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Iron, dissolved, mg/L

Location: MW7D

Mean of all data: 1.40

Standard Deviation of all data: 1.15

Largest Observation Concentration of all data: $X_n = 5.14$

Test Statistic, high extreme of all data: $T_n = 3.24$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
07/21/2014	5.14	False		1

Iron, dissolved, mg/L

Location: MW8

Mean of all data: 0.918

Standard Deviation of all data: 1.16

Largest Observation Concentration of all data: $X_n = 5.25$

Test Statistic, high extreme of all data: $T_n = 3.73$

T Critical of all data: $T_{cr} = 2.94$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
07/09/2012	5.25	False		1

Lead, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000568

Standard Deviation of all data: 0.000661

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 3.68$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.00300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Lead, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000932

Standard Deviation of all data: 0.00184

Largest Observation Concentration of all data: $X_n = 0.0110$

Test Statistic, high extreme of all data: $T_n = 5.49$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/13/2012	0.0110	False		1

Lead, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000581

Standard Deviation of all data: 0.000663

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 3.65$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/19/2015	0.00300	False		1

Lead, dissolved, mg/L

Location: MW121

Mean of all data: 0.00111

Standard Deviation of all data: 0.00329

Largest Observation Concentration of all data: $X_n = 0.0220$

Test Statistic, high extreme of all data: $T_n = 6.34$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2013	0.0220	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Lead, dissolved, mg/L

Location: MW14

Mean of all data: 0.000455

Standard Deviation of all data: 0.000504

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Lead, dissolved, mg/L

Location: MW23D

Mean of all data: 0.00106

Standard Deviation of all data: 0.000243

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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10/28/2019	0.00200	False		1
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Lead, dissolved, mg/L

Location: MW23S

Mean of all data: 0.00188

Standard Deviation of all data: 0.00255

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 3.19$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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08/26/2019	<0.0100	True		1
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Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Lead, dissolved, mg/L

Location: MW6

Mean of all data: 0.000500

Standard Deviation of all data: 0.000558

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 2.69$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Lead, dissolved, mg/L

Location: MW7

Mean of all data: 0.000727

Standard Deviation of all data: 0.00153

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 6.06$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/09/2012	0.0100	False		1

Lead, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000628

Standard Deviation of all data: 0.000976

Largest Observation Concentration of all data: $X_n = 0.00600$

Test Statistic, high extreme of all data: $T_n = 5.50$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.00600	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Lead, dissolved, mg/L

Location: MW8

Mean of all data: 0.000680

Standard Deviation of all data: 0.000848

Largest Observation Concentration of all data: $X_n = 0.00390$

Test Statistic, high extreme of all data: $T_n = 3.80$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/11/2011	0.00390	False		1

Manganese, dissolved, mg/L

Location: MW115D

Mean of all data: 0.346

Standard Deviation of all data: 0.246

Largest Observation Concentration of all data: $X_n = 1.17$

Test Statistic, high extreme of all data: $T_n = 3.36$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
09/01/2021	1.17	False		1

Manganese, dissolved, mg/L

Location: MW115S

Mean of all data: 0.939

Standard Deviation of all data: 0.362

Largest Observation Concentration of all data: $X_n = 1.78$

Test Statistic, high extreme of all data: $T_n = 2.32$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Manganese, dissolved, mg/L

Location: MW11R

Mean of all data: 0.548

Standard Deviation of all data: 1.18

Largest Observation Concentration of all data: $X_n = 5.87$

Test Statistic, high extreme of all data: $T_n = 4.53$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/18/2012	5.87	False		1

Manganese, dissolved, mg/L

Location: MW121

Mean of all data: 0.843

Standard Deviation of all data: 0.391

Largest Observation Concentration of all data: $X_n = 1.90$

Test Statistic, high extreme of all data: $T_n = 2.70$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Manganese, dissolved, mg/L

Location: MW14

Mean of all data: 0.608

Standard Deviation of all data: 0.288

Largest Observation Concentration of all data: $X_n = 1.59$

Test Statistic, high extreme of all data: $T_n = 3.41$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/07/2016	1.59	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Manganese, dissolved, mg/L

Location: MW23D

Mean of all data: 0.624

Standard Deviation of all data: 2.06

Largest Observation Concentration of all data: $X_n = 8.60$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	8.60	False		1

Manganese, dissolved, mg/L

Location: MW23S

Mean of all data: 0.823

Standard Deviation of all data: 3.27

Largest Observation Concentration of all data: $X_n = 13.5$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	13.5	False		1

Manganese, dissolved, mg/L

Location: MW6

Mean of all data: 0.107

Standard Deviation of all data: 0.180

Largest Observation Concentration of all data: $X_n = 0.840$

Test Statistic, high extreme of all data: $T_n = 4.08$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/11/2011	0.840	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Manganese, dissolved, mg/L

Location: MW7

Mean of all data: 0.0530

Standard Deviation of all data: 0.176

Largest Observation Concentration of all data: $X_n = 1.16$

Test Statistic, high extreme of all data: $T_n = 6.28$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/09/2012	1.16	False		1

Manganese, dissolved, mg/L

Location: MW7D

Mean of all data: 0.554

Standard Deviation of all data: 0.542

Largest Observation Concentration of all data: $X_n = 3.23$

Test Statistic, high extreme of all data: $T_n = 4.94$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
09/14/2015	3.23	False		1

Manganese, dissolved, mg/L

Location: MW8

Mean of all data: 1.76

Standard Deviation of all data: 1.41

Largest Observation Concentration of all data: $X_n = 4.11$

Test Statistic, high extreme of all data: $T_n = 1.67$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Mercury, dissolved, mg/L

Location: MW115D

Mean of all data: 0.0000909

Standard Deviation of all data: 0.000299

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 6.39$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/10/2013	0.00200	False		1

Mercury, dissolved, mg/L

Location: MW115S

Mean of all data: 0.0000455

Standard Deviation of all data: 0.0000504

Largest Observation Concentration of all data: $X_n = 0.000100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Mercury, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000102

Standard Deviation of all data: 0.000306

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 6.20$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/10/2013	0.00200	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Mercury, dissolved, mg/L

Location: MW121

Mean of all data: 0.0000455

Standard Deviation of all data: 0.0000504

Largest Observation Concentration of all data: $X_n = 0.000100$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Mercury, dissolved, mg/L

Location: MW14

Mean of all data: 0.000102

Standard Deviation of all data: 0.000300

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 6.33$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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10/10/2013	0.00200	False		1
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Mercury, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000100

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.000100$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Mercury, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000153

Standard Deviation of all data: 0.000218

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
08/26/2019	<0.00100	True		1

Mercury, dissolved, mg/L

Location: MW6

Mean of all data: 0.0000684

Standard Deviation of all data: 0.000147

Largest Observation Concentration of all data: $X_n = 0.000900$

Test Statistic, high extreme of all data: $T_n = 5.65$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
07/21/2014	0.000900	False		1

Mercury, dissolved, mg/L

Location: MW7

Mean of all data: 0.0000523

Standard Deviation of all data: 0.0000628

Largest Observation Concentration of all data: $X_n = 0.000300$

Test Statistic, high extreme of all data: $T_n = 3.94$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/13/2012	0.000300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Mercury, dissolved, mg/L

Location: MW7D

Mean of all data: 0.0000512

Standard Deviation of all data: 0.0000551

Largest Observation Concentration of all data: $X_n = 0.000200$

Test Statistic, high extreme of all data: $T_n = 2.70$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Mercury, dissolved, mg/L

Location: MW8

Mean of all data: 0.000573

Standard Deviation of all data: 0.00331

Largest Observation Concentration of all data: $X_n = 0.0220$

Test Statistic, high extreme of all data: $T_n = 6.48$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0220	False		1

Nickel, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00245

Standard Deviation of all data: 0.00412

Largest Observation Concentration of all data: $X_n = 0.0240$

Test Statistic, high extreme of all data: $T_n = 5.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0240	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nickel, dissolved, mg/L

Location: MW115S

Mean of all data: 0.00324

Standard Deviation of all data: 0.00415

Largest Observation Concentration of all data: $X_n = 0.0180$

Test Statistic, high extreme of all data: $T_n = 3.56$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0180	False		1

Nickel, dissolved, mg/L

Location: MW11R

Mean of all data: 0.00816

Standard Deviation of all data: 0.0106

Largest Observation Concentration of all data: $X_n = 0.0410$

Test Statistic, high extreme of all data: $T_n = 3.09$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	0.0410	False		1

Nickel, dissolved, mg/L

Location: MW121

Mean of all data: 0.00269

Standard Deviation of all data: 0.00395

Largest Observation Concentration of all data: $X_n = 0.0170$

Test Statistic, high extreme of all data: $T_n = 3.62$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0170	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nickel, dissolved, mg/L

Location: MW14

Mean of all data: 0.00472

Standard Deviation of all data: 0.00484

Largest Observation Concentration of all data: $X_n = 0.0170$

Test Statistic, high extreme of all data: $T_n = 2.54$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nickel, dissolved, mg/L

Location: MW23D

Mean of all data: 0.00320

Standard Deviation of all data: 0.0112

Largest Observation Concentration of all data: $X_n = 0.0465$

Test Statistic, high extreme of all data: $T_n = 3.87$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.0465	False		1

Nickel, dissolved, mg/L

Location: MW23S

Mean of all data: 0.00746

Standard Deviation of all data: 0.0287

Largest Observation Concentration of all data: $X_n = 0.119$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.119	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nickel, dissolved, mg/L

Location: MW6

Mean of all data: 0.00597

Standard Deviation of all data: 0.00843

Largest Observation Concentration of all data: $X_n = 0.0300$

Test Statistic, high extreme of all data: $T_n = 2.85$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2013	0.0300	False		1

Nickel, dissolved, mg/L

Location: MW7

Mean of all data: 0.00654

Standard Deviation of all data: 0.0159

Largest Observation Concentration of all data: $X_n = 0.102$

Test Statistic, high extreme of all data: $T_n = 6.02$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2013	0.102	False		1

Nickel, dissolved, mg/L

Location: MW7D

Mean of all data: 0.00923

Standard Deviation of all data: 0.0360

Largest Observation Concentration of all data: $X_n = 0.238$

Test Statistic, high extreme of all data: $T_n = 6.35$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2013	0.238	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nickel, dissolved, mg/L

Location: MW8

Mean of all data: 0.0117

Standard Deviation of all data: 0.00935

Largest Observation Concentration of all data: $X_n = 0.0370$

Test Statistic, high extreme of all data: $T_n = 2.71$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW115D

Mean of all data: 1.28

Standard Deviation of all data: 1.82

Largest Observation Concentration of all data: $X_n = 5.32$

Test Statistic, high extreme of all data: $T_n = 2.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW115S

Mean of all data: 0.337

Standard Deviation of all data: 0.638

Largest Observation Concentration of all data: $X_n = 2.40$

Test Statistic, high extreme of all data: $T_n = 3.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/12/2011	2.40	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW11R

Mean of all data: 5.36

Standard Deviation of all data: 4.07

Largest Observation Concentration of all data: $X_n = 17.0$

Test Statistic, high extreme of all data: $T_n = 2.86$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW121

Mean of all data: 0.415

Standard Deviation of all data: 0.931

Largest Observation Concentration of all data: $X_n = 3.72$

Test Statistic, high extreme of all data: $T_n = 3.55$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	3.72	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW14

Mean of all data: 0.254

Standard Deviation of all data: 0.498

Largest Observation Concentration of all data: $X_n = 2.72$

Test Statistic, high extreme of all data: $T_n = 4.95$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
06/02/2016	2.72	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0794

Standard Deviation of all data: 0.0254

Largest Observation Concentration of all data: $X_n = 0.100$

Test Statistic, high extreme of all data: $T_n = 0.812$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW23S

Mean of all data: 0.233

Standard Deviation of all data: 0.119

Largest Observation Concentration of all data: $X_n = 0.450$

Test Statistic, high extreme of all data: $T_n = 1.82$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW6

Mean of all data: 3.34

Standard Deviation of all data: 3.10

Largest Observation Concentration of all data: $X_n = 10.2$

Test Statistic, high extreme of all data: $T_n = 2.21$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Nitrate nitrogen, dissolved, mg/L

Location: MW7

Mean of all data: 0.795

Standard Deviation of all data: 0.538

Largest Observation Concentration of all data: $X_n = 1.95$

Test Statistic, high extreme of all data: $T_n = 2.15$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW7D

Mean of all data: 0.256

Standard Deviation of all data: 0.528

Largest Observation Concentration of all data: $X_n = 2.92$

Test Statistic, high extreme of all data: $T_n = 5.05$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/20/2015	2.92	False		1

Nitrate nitrogen, dissolved, mg/L

Location: MW8

Mean of all data: 0.0761

Standard Deviation of all data: 0.0974

Largest Observation Concentration of all data: $X_n = 0.410$

Test Statistic, high extreme of all data: $T_n = 3.43$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/12/2018	0.410	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

pH (field), STD

Location: MW115D

Mean of all data: 7.41

Standard Deviation of all data: 0.32

Largest Observation Concentration of all data: Xn = 8.24

Test Statistic, high extreme of all data: Tn = 2.60

T Critical of all data: Tcr = 3.04

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
06/09/2009	6.30	False	-1	

pH (field), STD

Location: MW115S

Mean of all data: 7.41

Standard Deviation of all data: 0.31

Largest Observation Concentration of all data: Xn = 7.97

Test Statistic, high extreme of all data: Tn = 1.78

T Critical of all data: Tcr = 3.04

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/04/2009	6.00	False	-1	

pH (field), STD

Location: MW11R

Mean of all data: 6.83

Standard Deviation of all data: 0.39

Largest Observation Concentration of all data: Xn = 7.47

Test Statistic, high extreme of all data: Tn = 1.66

T Critical of all data: Tcr = 3.11

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	5.31	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

pH (field), STD

Location: MW121

Mean of all data: 7.34

Standard Deviation of all data: 0.26

Largest Observation Concentration of all data: $X_n = 7.90$

Test Statistic, high extreme of all data: $T_n = 2.16$

T Critical of all data: $T_{cr} = 3.11$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
03/11/2009	6.40	False	-1	

pH (field), STD

Location: MW14

Mean of all data: 6.99

Standard Deviation of all data: 0.29

Largest Observation Concentration of all data: $X_n = 7.89$

Test Statistic, high extreme of all data: $T_n = 3.06$

T Critical of all data: $T_{cr} = 3.11$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
03/11/2009	6.00	False	-1	

pH (field), STD

Location: MW23D

Mean of all data: 7.22

Standard Deviation of all data: 0.52

Largest Observation Concentration of all data: $X_n = 7.62$

Test Statistic, high extreme of all data: $T_n = 0.78$

T Critical of all data: $T_{cr} = 2.47$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/28/2019	5.28	False	-1	

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

pH (field), STD

Location: MW23S

Mean of all data: 6.79

Standard Deviation of all data: 0.80

Largest Observation Concentration of all data: $X_n = 7.35$

Test Statistic, high extreme of all data: $T_n = 0.69$

T Critical of all data: $T_{cr} = 2.47$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	3.75	False	-1	

pH (field), STD

Location: MW6

Mean of all data: 6.88

Standard Deviation of all data: 0.27

Largest Observation Concentration of all data: $X_n = 7.60$

Test Statistic, high extreme of all data: $T_n = 2.65$

T Critical of all data: $T_{cr} = 3.22$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

pH (field), STD

Location: MW7

Mean of all data: 6.93

Standard Deviation of all data: 0.23

Largest Observation Concentration of all data: $X_n = 7.98$

Test Statistic, high extreme of all data: $T_n = 4.50$

T Critical of all data: $T_{cr} = 3.24$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/30/1999	7.98	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

pH (field), STD

Location: MW7D

Mean of all data: 7.30

Standard Deviation of all data: 0.35

Largest Observation Concentration of all data: $X_n = 8.64$

Test Statistic, high extreme of all data: $T_n = 3.87$

T Critical of all data: $T_{cr} = 3.12$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
08/26/2013	8.64	False		1

pH (field), STD

Location: MW8

Mean of all data: 7.09

Standard Deviation of all data: 0.25

Largest Observation Concentration of all data: $X_n = 7.92$

Test Statistic, high extreme of all data: $T_n = 3.28$

T Critical of all data: $T_{cr} = 3.24$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
02/26/1999	7.92	False		1

Selenium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000695

Standard Deviation of all data: 0.00160

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 5.83$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/10/2013	0.0100	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Selenium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000584

Standard Deviation of all data: 0.00154

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 6.11$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/10/2013	0.0100	False		1

Selenium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.00184

Standard Deviation of all data: 0.00381

Largest Observation Concentration of all data: $X_n = 0.0170$

Test Statistic, high extreme of all data: $T_n = 3.98$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
07/12/2011	0.0170	False		1

Selenium, dissolved, mg/L

Location: MW121

Mean of all data: 0.000593

Standard Deviation of all data: 0.00167

Largest Observation Concentration of all data: $X_n = 0.0110$

Test Statistic, high extreme of all data: $T_n = 6.25$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/10/2013	0.0110	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Selenium, dissolved, mg/L

Location: MW14

Mean of all data: 0.00150

Standard Deviation of all data: 0.00594

Largest Observation Concentration of all data: $X_n = 0.0387$

Test Statistic, high extreme of all data: $T_n = 6.26$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/20/2015	0.0387	False		1

Selenium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000765

Standard Deviation of all data: 0.00109

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/28/2019	<0.00500	True		1

Selenium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000765

Standard Deviation of all data: 0.00109

Largest Observation Concentration of all data: $X_n = 0.00500$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
10/28/2019	<0.00500	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Selenium, dissolved, mg/L

Location: MW6

Mean of all data: 0.00296

Standard Deviation of all data: 0.00313

Largest Observation Concentration of all data: $X_n = 0.0120$

Test Statistic, high extreme of all data: $T_n = 2.89$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
08/26/2013	0.0120	False		1

Selenium, dissolved, mg/L

Location: MW7

Mean of all data: 0.00166

Standard Deviation of all data: 0.00227

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 3.67$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
07/12/2011	0.0100	False		1

Selenium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000984

Standard Deviation of all data: 0.00320

Largest Observation Concentration of all data: $X_n = 0.0210$

Test Statistic, high extreme of all data: $T_n = 6.26$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
03/15/2012	0.0210	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Selenium, dissolved, mg/L

Location: MW8

Mean of all data: 0.00136

Standard Deviation of all data: 0.00318

Largest Observation Concentration of all data: $X_n = 0.0160$

Test Statistic, high extreme of all data: $T_n = 4.61$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.0160	False		1

Silver, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000455

Standard Deviation of all data: 0.00196

Largest Observation Concentration of all data: $X_n = 0.0130$

Test Statistic, high extreme of all data: $T_n = 6.40$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/10/2013	0.0130	False		1

Silver, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Silver, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000442

Standard Deviation of all data: 0.00212

Largest Observation Concentration of all data: $X_n = 0.0140$

Test Statistic, high extreme of all data: $T_n = 6.39$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/10/2013	0.0140	False		1

Silver, dissolved, mg/L

Location: MW121

Mean of all data: 0.000159

Standard Deviation of all data: 0.000310

Largest Observation Concentration of all data: $X_n = 0.00200$

Test Statistic, high extreme of all data: $T_n = 5.94$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/03/2014	0.00200	False		1

Silver, dissolved, mg/L

Location: MW14

Mean of all data: 0.000341

Standard Deviation of all data: 0.00150

Largest Observation Concentration of all data: $X_n = 0.0100$

Test Statistic, high extreme of all data: $T_n = 6.46$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/10/2013	0.0100	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Silver, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000250

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Silver, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000250

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Silver, dissolved, mg/L

Location: MW6

Mean of all data: 0.000112

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.10$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Silver, dissolved, mg/L

Location: MW7

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Silver, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000116

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.06$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Silver, dissolved, mg/L

Location: MW8

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Specific Conductance (field), micromhos/cm

Location: MW115D

Mean of all data: 660

Standard Deviation of all data: 239

Largest Observation Concentration of all data: $X_n = 1180$

Test Statistic, high extreme of all data: $T_n = 2$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Specific Conductance (field), micromhos/cm

Location: MW115S

Mean of all data: 612

Standard Deviation of all data: 181

Largest Observation Concentration of all data: $X_n = 1390$

Test Statistic, high extreme of all data: $T_n = 4$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/20/2015	1390	False		1

Specific Conductance (field), micromhos/cm

Location: MW11R

Mean of all data: 1117

Standard Deviation of all data: 537

Largest Observation Concentration of all data: $X_n = 2100$

Test Statistic, high extreme of all data: $T_n = 2$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Specific Conductance (field), micromhos/cm

Location: MW121

Mean of all data: 604

Standard Deviation of all data: 99

Largest Observation Concentration of all data: $X_n = 747$

Test Statistic, high extreme of all data: $T_n = 1$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Specific Conductance (field), micromhos/cm

Location: MW14

Mean of all data: 1023

Standard Deviation of all data: 197

Largest Observation Concentration of all data: $X_n = 1270$

Test Statistic, high extreme of all data: $T_n = 1$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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11/02/2015	457	False	-1	
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Specific Conductance (field), micromhos/cm

Location: MW23D

Mean of all data: 563

Standard Deviation of all data: 421

Largest Observation Concentration of all data: $X_n = 2180$

Test Statistic, high extreme of all data: $T_n = 4$

T Critical of all data: $T_{cr} = 2$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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10/28/2019	2180	False		1
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Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Specific Conductance (field), micromhos/cm

Location: MW23S

Mean of all data: 526

Standard Deviation of all data: 597

Largest Observation Concentration of all data: $X_n = 2800$

Test Statistic, high extreme of all data: $T_n = 4$

T Critical of all data: $T_{cr} = 2$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	2800	False		1

Specific Conductance (field), micromhos/cm

Location: MW6

Mean of all data: 961

Standard Deviation of all data: 323

Largest Observation Concentration of all data: $X_n = 1566$

Test Statistic, high extreme of all data: $T_n = 2$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Specific Conductance (field), micromhos/cm

Location: MW7

Mean of all data: 1143

Standard Deviation of all data: 188

Largest Observation Concentration of all data: $X_n = 1470$

Test Statistic, high extreme of all data: $T_n = 2$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Specific Conductance (field), micromhos/cm

Location: MW7D

Mean of all data: 784

Standard Deviation of all data: 254

Largest Observation Concentration of all data: $X_n = 1340$

Test Statistic, high extreme of all data: $T_n = 2$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Specific Conductance (field), micromhos/cm

Location: MW8

Mean of all data: 1341

Standard Deviation of all data: 382

Largest Observation Concentration of all data: $X_n = 1899$

Test Statistic, high extreme of all data: $T_n = 1$

T Critical of all data: $T_{cr} = 3$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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01/07/2013	20	False	-1	
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Sulfate, dissolved, mg/L

Location: MW115D

Mean of all data: 31.2

Standard Deviation of all data: 8.09

Largest Observation Concentration of all data: $X_n = 51.2$

Test Statistic, high extreme of all data: $T_n = 2.47$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Sulfate, dissolved, mg/L

Location: MW115S

Mean of all data: 37.1

Standard Deviation of all data: 16.1

Largest Observation Concentration of all data: $X_n = 99.8$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/01/2021	99.8	False		1

Sulfate, dissolved, mg/L

Location: MW11R

Mean of all data: 390.

Standard Deviation of all data: 309.

Largest Observation Concentration of all data: $X_n = 1170.$

Test Statistic, high extreme of all data: $T_n = 2.53$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Sulfate, dissolved, mg/L

Location: MW121

Mean of all data: 26.2

Standard Deviation of all data: 13.7

Largest Observation Concentration of all data: $X_n = 96.6$

Test Statistic, high extreme of all data: $T_n = 5.13$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/26/2013	96.6	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Sulfate, dissolved, mg/L

Location: MW14

Mean of all data: 181.

Standard Deviation of all data: 67.5

Largest Observation Concentration of all data: $X_n = 361$.

Test Statistic, high extreme of all data: $T_n = 2.67$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Sulfate, dissolved, mg/L

Location: MW23D

Mean of all data: 103.

Standard Deviation of all data: 314.

Largest Observation Concentration of all data: $X_n = 1320$.

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	1320.	False		1

Sulfate, dissolved, mg/L

Location: MW23S

Mean of all data: 136.

Standard Deviation of all data: 496.

Largest Observation Concentration of all data: $X_n = 2060$.

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	2060.	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Sulfate, dissolved, mg/L

Location: MW6

Mean of all data: 237.

Standard Deviation of all data: 204.

Largest Observation Concentration of all data: $X_n = 610$.

Test Statistic, high extreme of all data: $T_n = 1.83$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Sulfate, dissolved, mg/L

Location: MW7

Mean of all data: 252.

Standard Deviation of all data: 89.6

Largest Observation Concentration of all data: $X_n = 434$.

Test Statistic, high extreme of all data: $T_n = 2.03$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Sulfate, dissolved, mg/L

Location: MW7D

Mean of all data: 96.0

Standard Deviation of all data: 65.6

Largest Observation Concentration of all data: $X_n = 274$.

Test Statistic, high extreme of all data: $T_n = 2.71$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Sulfate, dissolved, mg/L

Location: MW8

Mean of all data: 644.

Standard Deviation of all data: 129.

Largest Observation Concentration of all data: $X_n = 1120$.

Test Statistic, high extreme of all data: $T_n = 3.69$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
05/14/2018	1120.	False		1

Thallium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000182

Standard Deviation of all data: 0.000452

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 6.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
01/07/2013	0.00300	False		1

Thallium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000114

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.08$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
<i>No Outliers</i>				

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Thallium, dissolved, mg/L

Location: MW11R

Mean of all data: 0.000201

Standard Deviation of all data: 0.000591

Largest Observation Concentration of all data: $X_n = 0.00390$

Test Statistic, high extreme of all data: $T_n = 6.26$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/19/2015	0.00390	False		1

Thallium, dissolved, mg/L

Location: MW121

Mean of all data: 0.000182

Standard Deviation of all data: 0.000452

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 6.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
11/03/2014	0.00300	False		1

Thallium, dissolved, mg/L

Location: MW14

Mean of all data: 0.000182

Standard Deviation of all data: 0.000452

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 6.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.00300	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Thallium, dissolved, mg/L

Location: MW23D

Mean of all data: 0.000250

Standard Deviation of all data: 0.0

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 0.0$

T Critical of all data: $T_{cr} = 0.0$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Thallium, dissolved, mg/L

Location: MW23S

Mean of all data: 0.000382

Standard Deviation of all data: 0.000546

Largest Observation Concentration of all data: $X_n = 0.00250$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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08/26/2019	<0.00250	True		1
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Thallium, dissolved, mg/L

Location: MW6

Mean of all data: 0.000112

Standard Deviation of all data: 0.000126

Largest Observation Concentration of all data: $X_n = 0.000250$

Test Statistic, high extreme of all data: $T_n = 1.10$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Thallium, dissolved, mg/L

Location: MW7

Mean of all data: 0.000182

Standard Deviation of all data: 0.000452

Largest Observation Concentration of all data: $X_n = 0.00300$

Test Statistic, high extreme of all data: $T_n = 6.23$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	0.00300	False		1

Thallium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000279

Standard Deviation of all data: 0.00106

Largest Observation Concentration of all data: $X_n = 0.00700$

Test Statistic, high extreme of all data: $T_n = 6.36$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
03/15/2012	0.00700	False		1

Thallium, dissolved, mg/L

Location: MW8

Mean of all data: 0.000136

Standard Deviation of all data: 0.000182

Largest Observation Concentration of all data: $X_n = 0.00100$

Test Statistic, high extreme of all data: $T_n = 4.73$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.00100	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Total Dissolved Solids, mg/L

Location: MW115D

Mean of all data: 378.

Standard Deviation of all data: 160.

Largest Observation Concentration of all data: $X_n = 920$.

Test Statistic, high extreme of all data: $T_n = 3.38$

T Critical of all data: $T_{cr} = 3.00$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
09/14/2015	920.	False		1

Total Dissolved Solids, mg/L

Location: MW115S

Mean of all data: 315.

Standard Deviation of all data: 109.

Largest Observation Concentration of all data: $X_n = 684$.

Test Statistic, high extreme of all data: $T_n = 3.39$

T Critical of all data: $T_{cr} = 3.01$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/07/2013	684.	False		1

Total Dissolved Solids, mg/L

Location: MW11R

Mean of all data: 961.

Standard Deviation of all data: 411.

Largest Observation Concentration of all data: $X_n = 1510$.

Test Statistic, high extreme of all data: $T_n = 1.34$

T Critical of all data: $T_{cr} = 3.07$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Total Dissolved Solids, mg/L

Location: MW121

Mean of all data: 338.

Standard Deviation of all data: 93.8

Largest Observation Concentration of all data: $X_n = 604$.

Test Statistic, high extreme of all data: $T_n = 2.84$

T Critical of all data: $T_{cr} = 3.08$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	<0.0	True	-1	

Total Dissolved Solids, mg/L

Location: MW14

Mean of all data: 727.

Standard Deviation of all data: 132.

Largest Observation Concentration of all data: $X_n = 1040$.

Test Statistic, high extreme of all data: $T_n = 2.38$

T Critical of all data: $T_{cr} = 3.08$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
08/28/2018	289.	False	-1	

Total Dissolved Solids, mg/L

Location: MW23D

Mean of all data: 346.

Standard Deviation of all data: 374.

Largest Observation Concentration of all data: $X_n = 1790$.

Test Statistic, high extreme of all data: $T_n = 3.87$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	1790.	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Total Dissolved Solids, mg/L

Location: MW23S

Mean of all data: 423.

Standard Deviation of all data: 652.

Largest Observation Concentration of all data: $X_n = 2800$.

Test Statistic, high extreme of all data: $T_n = 3.64$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	2800.	False		1

Total Dissolved Solids, mg/L

Location: MW6

Mean of all data: 801.

Standard Deviation of all data: 324.

Largest Observation Concentration of all data: $X_n = 1660$.

Test Statistic, high extreme of all data: $T_n = 2.66$

T Critical of all data: $T_{cr} = 3.20$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Total Dissolved Solids, mg/L

Location: MW7

Mean of all data: 838.

Standard Deviation of all data: 157.

Largest Observation Concentration of all data: $X_n = 1320$.

Test Statistic, high extreme of all data: $T_n = 3.07$

T Critical of all data: $T_{cr} = 3.22$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	230.	False	-1	

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Total Dissolved Solids, mg/L

Location: MW7D

Mean of all data: 466.

Standard Deviation of all data: 189.

Largest Observation Concentration of all data: $X_n = 1010$.

Test Statistic, high extreme of all data: $T_n = 2.88$

T Critical of all data: $T_{cr} = 3.09$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Total Dissolved Solids, mg/L

Location: MW8

Mean of all data: 1260.

Standard Deviation of all data: 354.

Largest Observation Concentration of all data: $X_n = 1960$.

Test Statistic, high extreme of all data: $T_n = 1.98$

T Critical of all data: $T_{cr} = 3.22$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
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No Outliers

Zinc, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00756

Standard Deviation of all data: 0.0182

Largest Observation Concentration of all data: $X_n = 0.119$

Test Statistic, high extreme of all data: $T_n = 6.13$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.119	False		1

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Zinc, dissolved, mg/L

Location: MW115S

Mean of all data: 0.00803

Standard Deviation of all data: 0.0163

Largest Observation Concentration of all data: $X_n = 0.0880$

Test Statistic, high extreme of all data: $T_n = 4.91$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0880	False		1

Zinc, dissolved, mg/L

Location: MW11R

Mean of all data: 0.0164

Standard Deviation of all data: 0.0248

Largest Observation Concentration of all data: $X_n = 0.137$

Test Statistic, high extreme of all data: $T_n = 4.86$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
01/20/2014	0.137	False		1

Zinc, dissolved, mg/L

Location: MW121

Mean of all data: 0.00620

Standard Deviation of all data: 0.0124

Largest Observation Concentration of all data: $X_n = 0.0740$

Test Statistic, high extreme of all data: $T_n = 5.46$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0740	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Zinc, dissolved, mg/L

Location: MW14

Mean of all data: 0.00453

Standard Deviation of all data: 0.00695

Largest Observation Concentration of all data: $X_n = 0.0420$

Test Statistic, high extreme of all data: $T_n = 5.40$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
04/21/2014	0.0420	False		1

Zinc, dissolved, mg/L

Location: MW23D

Mean of all data: 0.0159

Standard Deviation of all data: 0.0449

Largest Observation Concentration of all data: $X_n = 0.190$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.190	False		1

Zinc, dissolved, mg/L

Location: MW23S

Mean of all data: 0.0400

Standard Deviation of all data: 0.144

Largest Observation Concentration of all data: $X_n = 0.600$

Test Statistic, high extreme of all data: $T_n = 3.88$

T Critical of all data: $T_{cr} = 2.48$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
10/28/2019	0.600	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Zinc, dissolved, mg/L

Location: MW6

Mean of all data: 0.00571

Standard Deviation of all data: 0.00660

Largest Observation Concentration of all data: $X_n = 0.0290$

Test Statistic, high extreme of all data: $T_n = 3.53$

T Critical of all data: $T_{cr} = 2.85$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0290	False		1

Zinc, dissolved, mg/L

Location: MW7

Mean of all data: 0.00493

Standard Deviation of all data: 0.00659

Largest Observation Concentration of all data: $X_n = 0.0320$

Test Statistic, high extreme of all data: $T_n = 4.11$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0320	False		1

Zinc, dissolved, mg/L

Location: MW7D

Mean of all data: 0.00573

Standard Deviation of all data: 0.00965

Largest Observation Concentration of all data: $X_n = 0.0480$

Test Statistic, high extreme of all data: $T_n = 4.38$

T Critical of all data: $T_{cr} = 2.90$

<u>Sample Date</u>	<u>Value</u>	<u>LT_Value</u>	Outlier <u>Low Side</u>	Outlier <u>High Side</u>
04/21/2014	0.0480	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 11/01/2021

LT Multiplier: x 0.50

Confidence Level: 95%

Number of Outliers: One Outlier

Transform: None

Zinc, dissolved, mg/L

Location: MW8

Mean of all data: 0.00789

Standard Deviation of all data: 0.0106

Largest Observation Concentration of all data: $X_n = 0.0600$

Test Statistic, high extreme of all data: $T_n = 4.92$

T Critical of all data: $T_{cr} = 2.91$

<u>Sample Date</u>	<u>Value</u>	<u>LT Value</u>	<u>Outlier Low Side</u>	<u>Outlier High Side</u>
07/21/2014	0.0600	False		1

APPENDIX C2
TEST DESCRIPTIONS

APPENDIX C2

STATISTICAL OUTPUT – TEST DESCRIPTIONS

MANAGES

Groundwater Data Management and Evaluation
Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

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10

STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

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

User Selections:

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

Mann-Kendall Trend and Seasonal Analysis Tests

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

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

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

<p>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 ties) values (Gilbert, 1987; p. 208)</p>	
<p>Indicator Function</p> <p>$\text{sgn}(x_{ij} - x_{jk})$</p>	<p>$= 1$ if $(x_{ij} - x_{jk}) > 0$</p> <p>$= 0$ if $(x_{ij} - x_{jk}) = 0$</p> <p>$= -1$ if $(x_{ij} - x_{jk}) < 0$</p> <p>where $x_{i1}, x_{i2}, \dots, x_{in}$ are the time ordered data (n_i is total of data in the i-th season).</p>
<p>Mann-Kendall Statistic, S_i</p>	$= \sum_{k=1}^{n_i-1} \sum_{j=k+1}^{n_i} \text{sgn}(x_{ij} - x_{jk})$
<p>Variance of S_i $VAR(S_i)$</p>	$VAR(S_i) = \frac{1}{18} \left\{ n_i(n_i - 1)(2n_i + 5) - \sum_{p=1}^{g_i} t_{ip}(t_{ip} - 1)(2t_{ip} + 5) - \sum_{q=1}^{h_i} u_{iq}(u_{iq} - 1)(2u_{iq} + 5) \right\}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip} - 1)(t_{ip} - 2) \sum_{q=1}^{h_i} u_{iq}(u_{iq} - 1)(u_{iq} - 2)}{9n_i(n_i - 1)(n_i - 2)}$ $+ \frac{\sum_{p=1}^{g_i} t_{ip}(t_{ip} - 1) \sum_{q=1}^{h_i} u_{iq}(u_{iq} - 1)}{2n_i(n_i - 1)}$ <p>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.</p>

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

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 were 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

<p>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.</p>	
<p>The number of observations taken during a specified scoping period; n</p>	<p>n</p>

Statistical Analysis

<p>Mean of the observed data during the scoping period; \bar{X}</p>	$\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i$ <p>where X_i is the i-th observation.</p>
<p>Standard deviation of observed data; S_x.</p>	$S_x = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^n (X_i - \bar{X})^2}$
<p>Test statistics: T_l & T_n</p>	<p>Sort the data into ascending order, then compute the statistics</p> $T_l = (\bar{X} - X_l) / S_x$ $T_n = (X_n - \bar{X}) / S_x$ <p>where X_l is the smallest value of the n observations and X_n is the largest value of the n observations.</p>
<p>One-sided test with a $(1-\alpha)$ confidence level that there is a single extreme outlier within the n observations.</p>	<p>Grubbs single, one-sided test of either an extreme low outlier :</p> $X_l \text{ is an outlier if } T_l \geq T_{cr(1-\alpha,n)}$ <p>or an extreme high outlier:</p> $X_n \text{ is an outlier if } T_n \geq T_{cr(1-\alpha,n)}$ <p>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.</p>

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

<p>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.</p>	
<p>The number of observations taken during a specified scoping period; n</p>	<p>Number of observations, n, where $3 \leq n \leq 25$.</p>
<p>Sorting the sample data</p>	<p>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., $X_{(j)} = \text{Ln}[X_{(j)}]$.</p>
<p>Goodness-of fit tests</p>	<p>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.</p>
<p>Test statistic, T_s, for the minimum data value</p>	<p>Compute the T_s test statistic for $X_{(1)}$ as an outlier:</p> $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \quad \text{for } 3 \leq n \leq 7$ $T_s = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \quad \text{for } 8 \leq n \leq 10$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \quad \text{for } 11 \leq n \leq 13$ $T_s = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}} \quad \text{for } 14 \leq n \leq 25.$
<p>Test statistic, T_s, for the maximum data value</p>	<p>Compute the T_s test statistic for $X_{(n)}$ as an outlier:</p>

	$T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}} \quad \text{for } 3 \leq n \leq 7$ $T_s = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}} \quad \text{for } 8 \leq n \leq 10$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}} \quad \text{for } 11 \leq n \leq 13$ $T_s = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}} \quad \text{for } 14 \leq n \leq 25.$
<p>Critical value T_c</p>	<p>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.</p>
<p>One-sided test with a $(1-\alpha)$ confidence level that there is a single extreme outlier within the n observations.</p>	<p>Dixon's single, one-sided test for statistical evidence of either an extreme low-valued outlier:</p> <p>$X_{(1)}$ is an outlier if $T_s \geq T_c$</p> <p>or an extreme high-valued outlier:</p> <p>$X_{(n)}$ is an outlier if $T_s \geq T_c$.</p> <p>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.</p>

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.

<p>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).</p>	
<p>Slope, Q</p>	$= \frac{x_{i'} - x_i}{i' - i}$ <p>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.</p>
<p>N'</p>	<p>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:</p> $N' = n(n-1)/2$

<p>Sen's Slope Estimate</p>	<p>Sen's slope estimator = median slope</p> <p>= $Q_{[(N'+1)/2]}$ if N' is odd</p> <p>= $\frac{1}{2}(Q_{[N'/2]} + Q_{[(N'+2)/2]})$ if N' is even</p> <p>where the Q values have first been ranked from smallest to largest.</p>
<p>$Z_{1-\alpha/2}$</p>	<p>Statistic for the cumulative normal distribution (Gilbert, 1987; p. 254) for the two-sided, α significance level.</p>
<p>Variance estimate of the Mann-Kendall S Statistic, VAR(S)</p>	<p>VAR(S)</p> <p>= $\frac{1}{18}[n(n-1)(2n+5) - \sum_{p=1}^g t_p(t_p-1)(2t_p+5)]$</p> <p>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.</p>
<p>C_α</p>	<p>= $Z_{1-\alpha/2} \sqrt{VAR(S)}$</p>
<p>Sen's Slope, a two-sided test at the α significance level</p>	<p>$M_1 = \frac{(N' - C_\alpha)}{2}$</p> <p>$M_2 = \frac{(N' + C_\alpha)}{2}$</p> <p>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.</p>

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 Evaluation Report, Statistical Overview. Additional information on data normality is given by Montgomery, et al. (1987).