Intended for
AmerenEnergy Medina Valley CoGen, LLC

Date
January 27, 2021

Project No.
1940100091

2020 ANNUAL REPORT

FORMER HUTSONVILLE POWER STATION - ASH POND D

RAMBOLL Bright ideas. Sustainable change.

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D

Project name	**Former Hutsonville Power Station - Ash Pond D**
Project no.	**1940100091**
Recipient	**AmerenEnergy Medina Valley CoGen, LLC**
Document type	**2020 Annual Report**
Revision	**0**
Version	**DRAFT**
Date	**January 27, 2021**
Prepared by	**Ruta S. Deshpande**
Checked by	**Jake J. Walczak, PG**
Approved by	**Sarah Meyer**

Ramboll
333 W. Wacker Drive
Suite 2700
Chicago, IL 60606
USA

T 312-288-3800
F 414-837-3608
https://ramboll.com

Ruta S. Deshpande, EIT
Environmental Engineer

Jake J. Walczak, PG
Senior Hydrogeologist

CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
CCW	Coal Combustion Waste
EPA	Environmental Protection Agency
GMZ	Groundwater Management Zone
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, 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 wells[1], 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 eighth annual report includes the following elements:

- A summary of groundwater monitoring data collected in 2019 and 2020. 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 2020

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 2020 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 1-7. 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.

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.

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 2020 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 2020, 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 (Table 1-2 and 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 2020. There was little variability in horizontal hydraulic gradient across Ash Pond D between sampling events. 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 (2019-2020)

Groundwater samples from the most recent eight monitoring events collected on February 25, 2019, June 17, 2019, August 26, 2019, October 28, 2019, February 3, 2020, May 4, 2020, August 3, 2020, and October 26, 2020. 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.
- During the October 2019 data review, inversion was observed for analytical data from MW-23S and MW-23D. Investigation indicated possible mislabeling or data switch.

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 2019-2020 monitoring period, boron concentrations ranged from 0.05 to 8 milligrams per liter (mg/L) in shallow compliance monitoring wells. In deep monitoring wells, boron concentrations ranged from 0.05 to 22 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. 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 2019-2020 monitoring period, sulfate concentrations ranged from 17 to 1,300 mg/L in shallow compliance monitoring wells. In deep monitoring wells, sulfate concentrations ranged from 14 to 2,100 mg/L (Figure 3-8 and Figure 3-9). Sulfate concentrations were highest at MW-11R and MW-8 in 2019 and 2020, where boron concentrations were also highest. 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 (2019-2020), 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 2019-2020 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 (2019-2020) by the Grubbs outlier test based on the date range of 1984-2020 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 2019-2020 show eight cases with positive slopes, 12 cases with negative slopes, and 244 cases with no slope (Table 3-1). The eight 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 one case of increasing trend in the 2019-2020 dataset. The increasing short-term trend occurred for chloride at well MW-7. During this reporting period, chloride concentrations at MW-7 were below the 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 wells as fencing, monitoring points, and surface water control features. The inspection reports for 2020 are included in Appendix B.

The site inspections performed on March 4, 2020, July 7, 2020, September 22, 2020, and December 16, 2020 noted a small amount of vegetation and debris in the drainage channels and a small hole from animal digging.

4. EVALUATION OF COMPLIANCE

During the most recent eight monitoring events (2019-2020), none of the parameters showed increasing short-term trends along with concentrations above the Class I Groundwater standard; as such, no further action is required at this time.

5. 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 2019 to 2020 at the Hutsonville Ash Pond D did not show both increasing short-term trend and concentrations above the Class I Groundwater Standard for any parameters; as such, no further action is required at this time.

6. REFERENCES

Hanson, Natural Resource Technology, Inc. (NRT), 2011a. *Ash Pond D, Post-Closure Care Plan – Hutsonville Power Station*. July 26, 2011.

Hanson, Natural Resource Technology, Inc. (NRT), 2011b. *Ash Pond D, Groundwater Monitoring Plan – Hutsonville Power Station*. July 26, 2011.

Hanson, Natural Resource Technology, Inc. (NRT), 2014a. *Ash Ponds Closure, Groundwater Management Zone Application – Hutsonville Power Station*. September 8, 2014.

Hanson, Natural Resource Technology, Inc. (NRT), 2014b. *Ash Ponds Closure, Closure Plan – Hutsonville Power Station*. September 15, 2014.

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
2020 Annual Report
Former Hutsonville Power Station - Ash Pond D

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

[O: YD/SJC, C: YD/SJC]

Table 1-2. Groundwater Monitoring System Wells
2020 Annual Report
Former Hutsonville Power Station - Ash Pond D

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-107	10/7/1998	452.9	454.23	447.2	442.2	10.7	Background	Upgradient	UZ - si s&g, ss
MW-10D7	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-23D7	11/28/2017	453.5	455.90	434.0	428.7	24.8	Background	Upgradient	UZ - ss, sh
MW-23S7	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
2020 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 Parameters[1]	**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
2020 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	Decrease	Decrease	Decrease	+	None	None	None	None	None	None
Cadmium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Chloride, dissolved	None	Increase	None	None	None	None	Decrease	None	None	None	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	-	None	None	+	+	None	None	None	+
Lead, dissolved	None	None	None	None	None	None	None	None	None	None	None
Manganese, dissolved	None	None	None	+	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
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	None	-	-	-	None	None	None	None	None	None	None
Thallium, dissolved	None	None	None	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	Decrease	Decrease	None	None	None	None	None	None	None	None
Zinc, dissolved	None	None	None	None	None	None	None	None	None	None	None

- "+" indicates that the Sen's non-parametric estimate of the median slope is positive. [O: RSD 1/8/2021, C: RAB 1/8/2021]
- "-" indicates that the Sen's non-parametric estimate of the median slope is negative.
- Statistically significant positive/negative slopes are hereby referred to as increasing/decreasing trends.
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- The most recent eight sampling events were used for analysis; date range for this analysis is 1/1/2019-12/31/2020.
- 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.

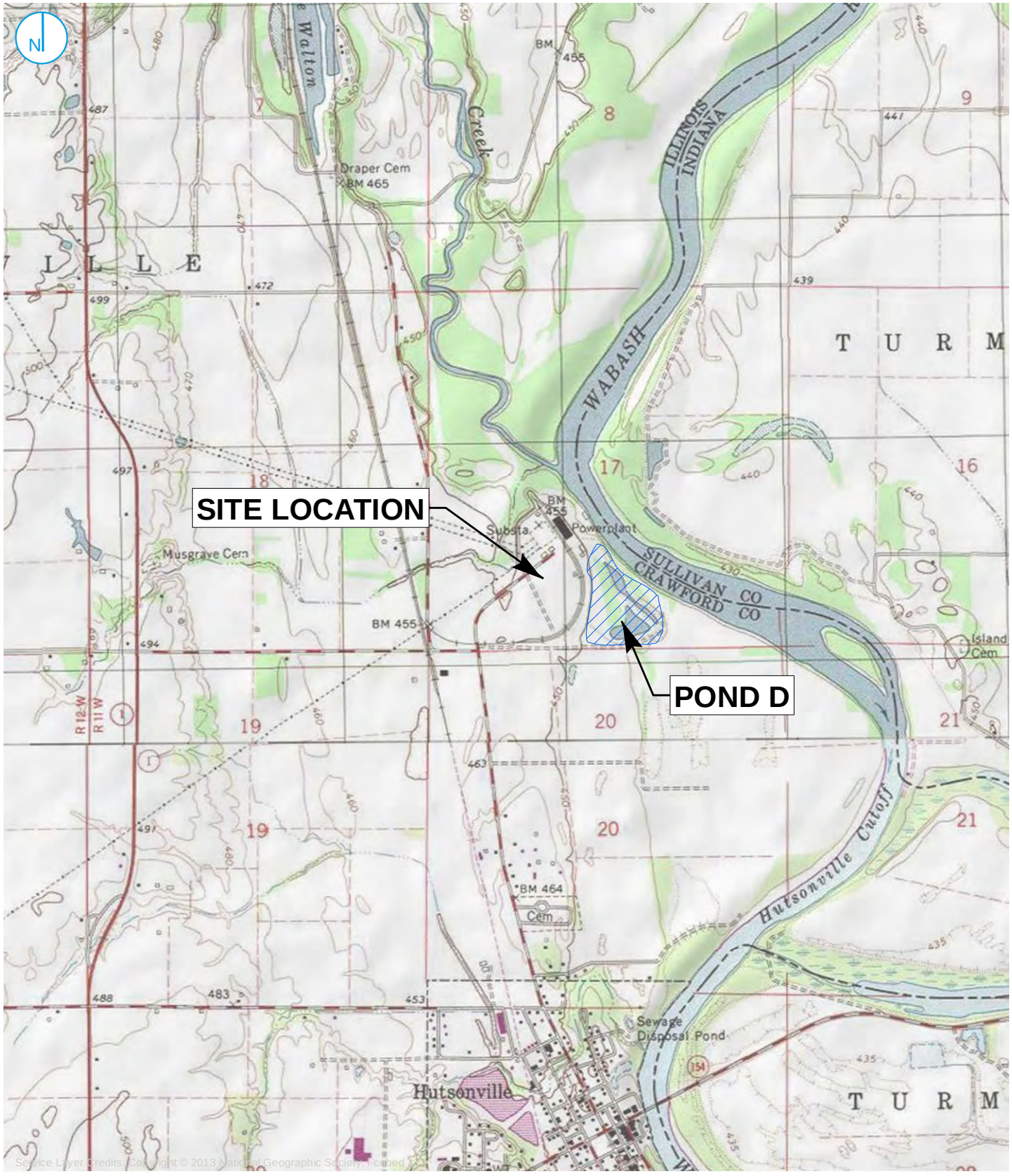
Table 3-2. Summary of Trend Analyses
2020 Annual Report
Former Hutsonville Power Station - Ash Pond D

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

[O: RSD 1/8/2021, C: RAB 1/8/2021]

Notes:
Trends based on data collected during the specified periods.
The number of samples per well location are noted on Table 3-1.
Long-terms trends were calculated with data since completion of closure in January 2013.

FIGURES



PROJECT: 72971 | DATED: 1/13/2021 | DESIGNER: galammc

Y:\Mapping\Projects\24\2420\MXDs\2020APD\Figure 1-1_Site Location Map Ash Pond D2.mxd

KEY MAP

Map Scale: 1:1:24,000;
Map Center: 87°39'45"W 39°7'53"N

0 1,000 2,000 Feet

SITE LOCATION MAP

2020 ANNUAL REPORT
FORMER HUTSONVILLE
POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 1-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY

RAMBOLL

- ASH POND D MONITORING WELL LOCATION
- NESTED ASH POND D MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- NESTED MONITORING WELL LOCATION
- ABANDONED NESTED MONITORING WELL LOCATION
- PROPERTY LINE
- APPROXIMATE BOUNDARY OF CAPPED ASH POND
- GROUNDWATER COLLECTION TRENCH (BEGAN OPERATION APRIL 2015)
- LIMITS OF ASH POND A GROUNDWATER MANAGEMENT ZONE

0 150 300 Feet

SITE BASE MAP

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY

RAMBOLL

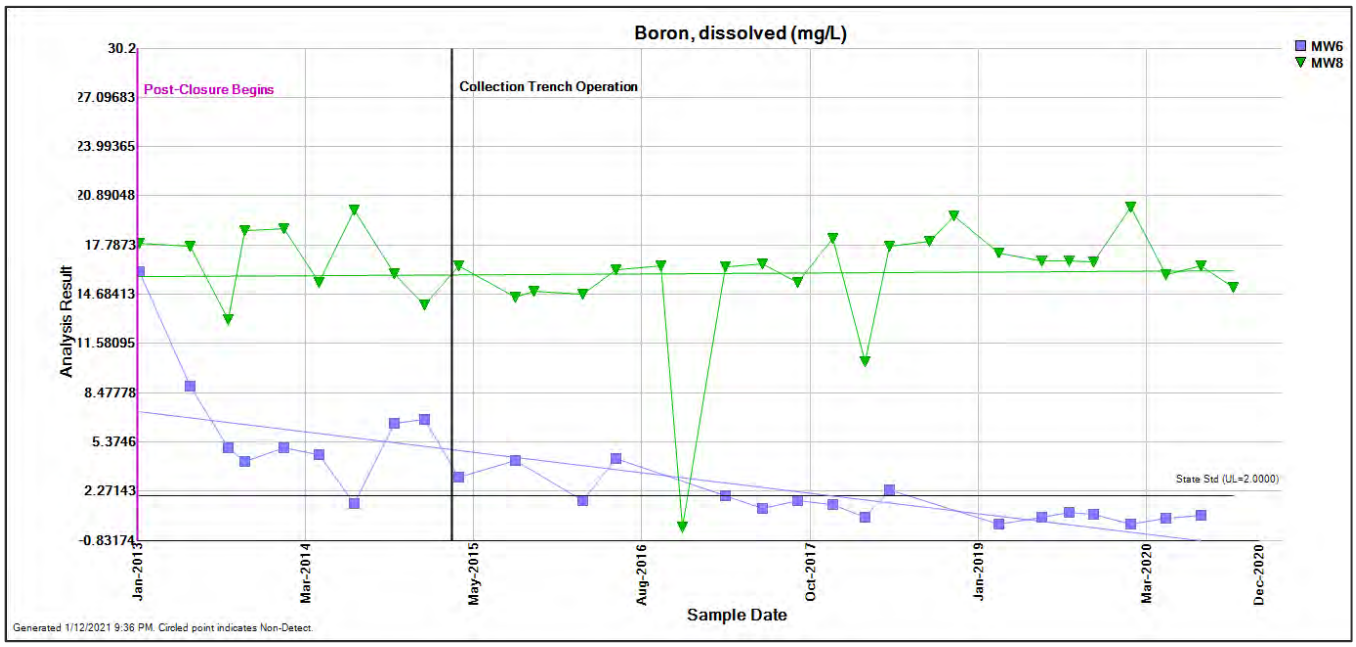


Figure 1-3. Boron concentrations over time since closure completion (2013) at compliance wells MW-6 and MW-8. (Note: Lines through the concentration data represent the best fit linear regressions)

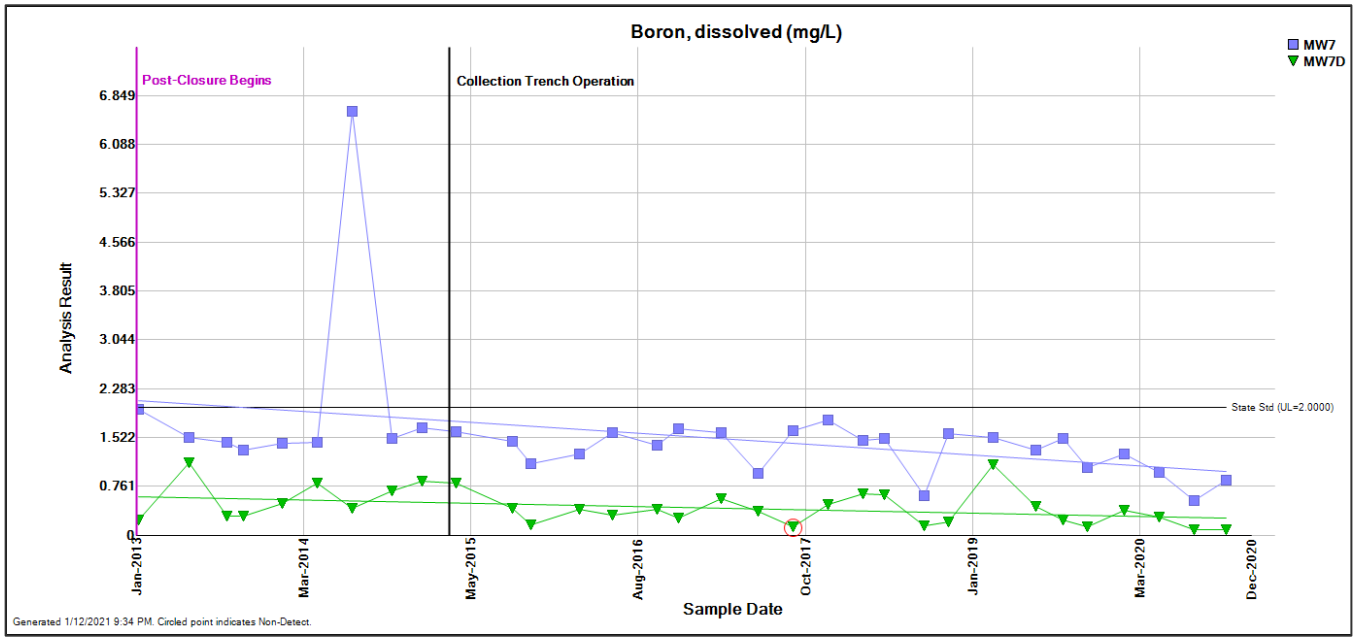


Figure 1-4. Boron concentrations over time since closure completion (2013) at compliance wells MW-7 and MW-7D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

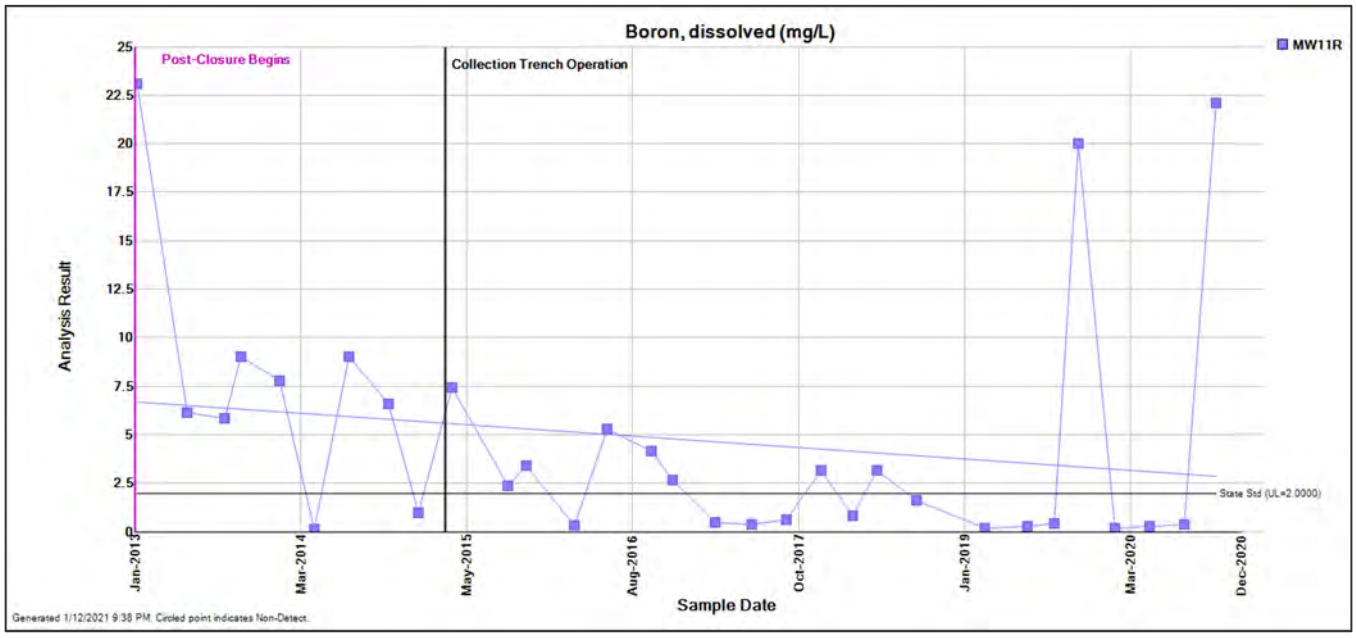


Figure 1-5. Boron concentrations over time since closure completion (2013) at compliance wells MW-11R. (Note: Lines through the concentration data represent the best fit linear regressions)

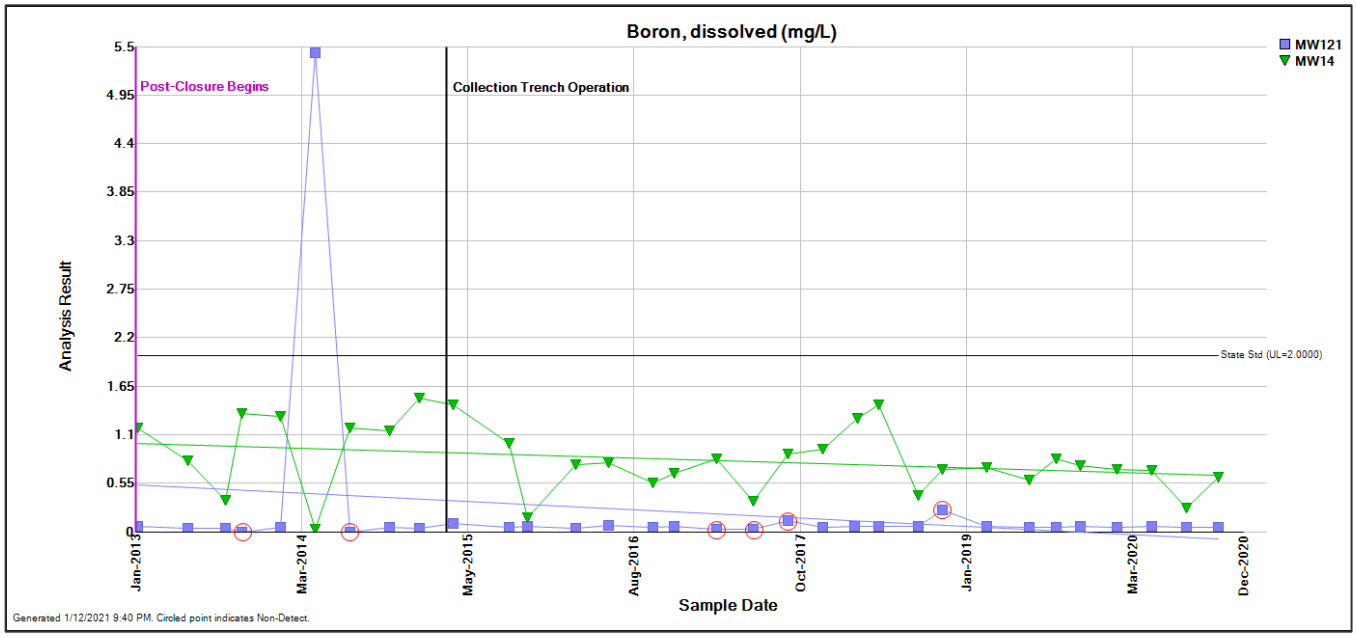


Figure 1-6. Boron concentrations over time since closure completion (2013) at compliance wells MW-121 and MW-14. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

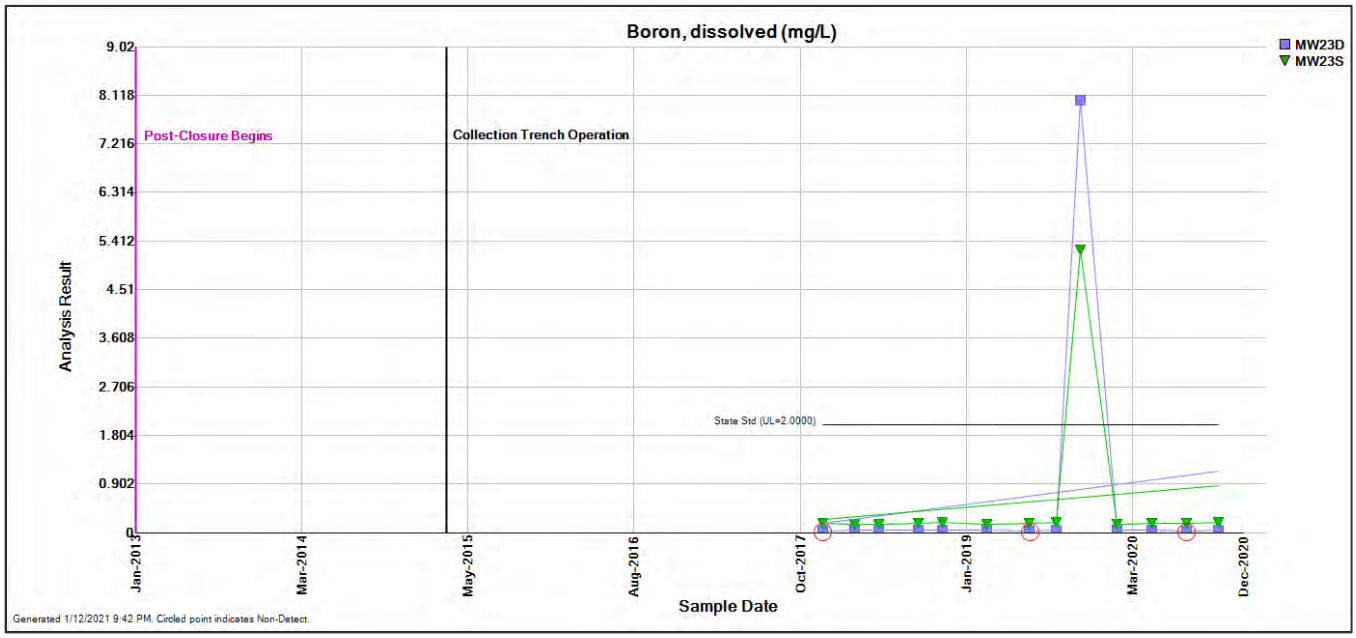


Figure 1-7. Boron concentrations over time since closure completion (2013) at compliance wells MW-23S and MW-23D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

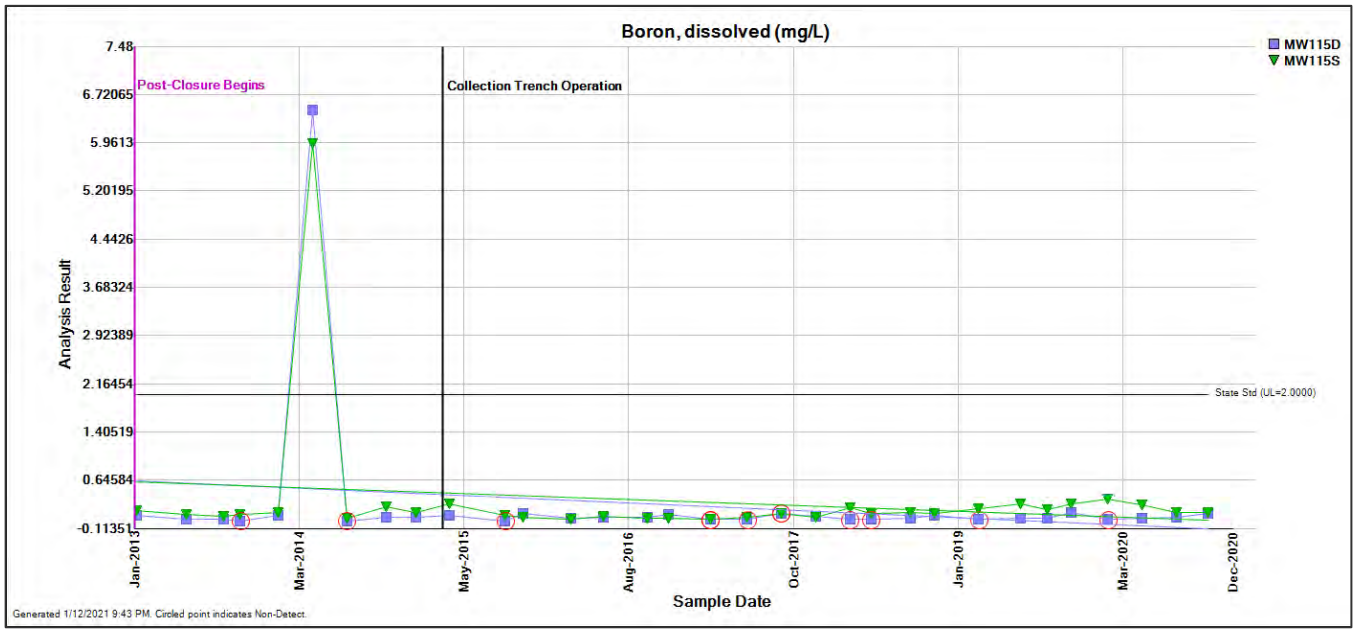


Figure 1-8. Boron concentrations over time since closure completion (2013) at compliance wells MW-115S and MW-115D. Circled results indicate non-detects. (Note: Lines through the concentration data represent the best fit linear regressions)

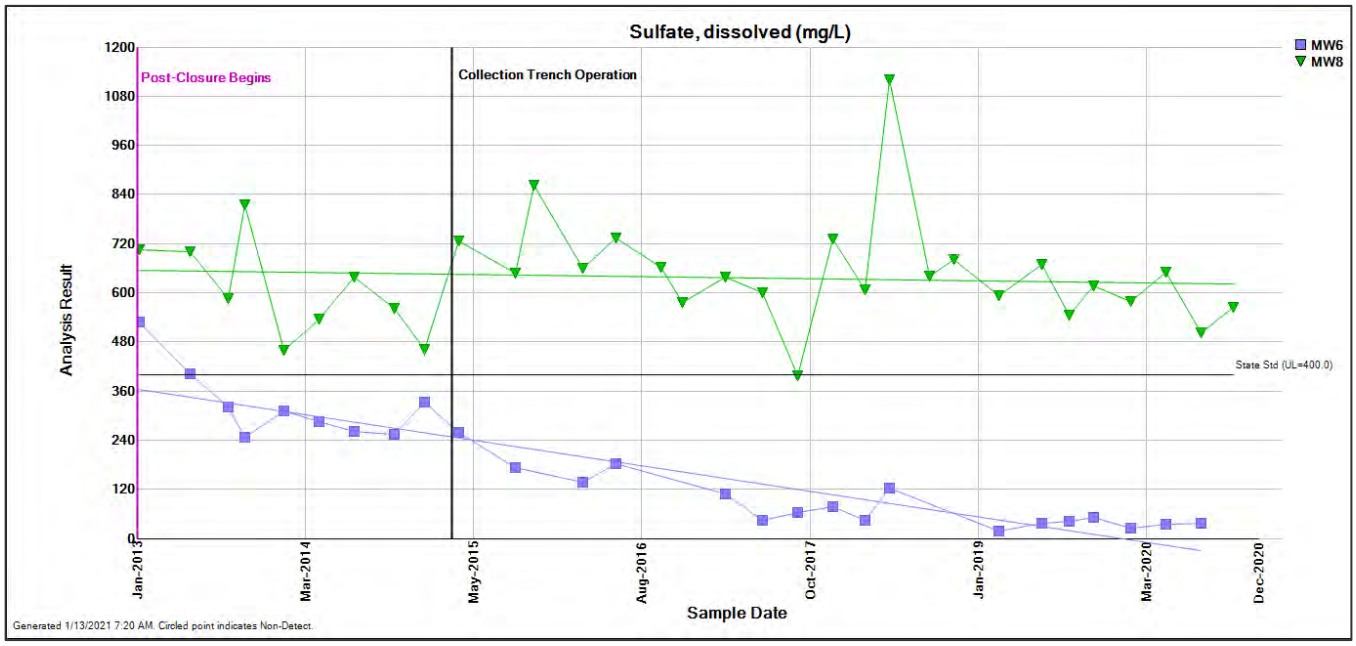


Figure 1-9. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-6 and MW-8. (Note: Lines through the concentration data represent the best fit linear regressions)

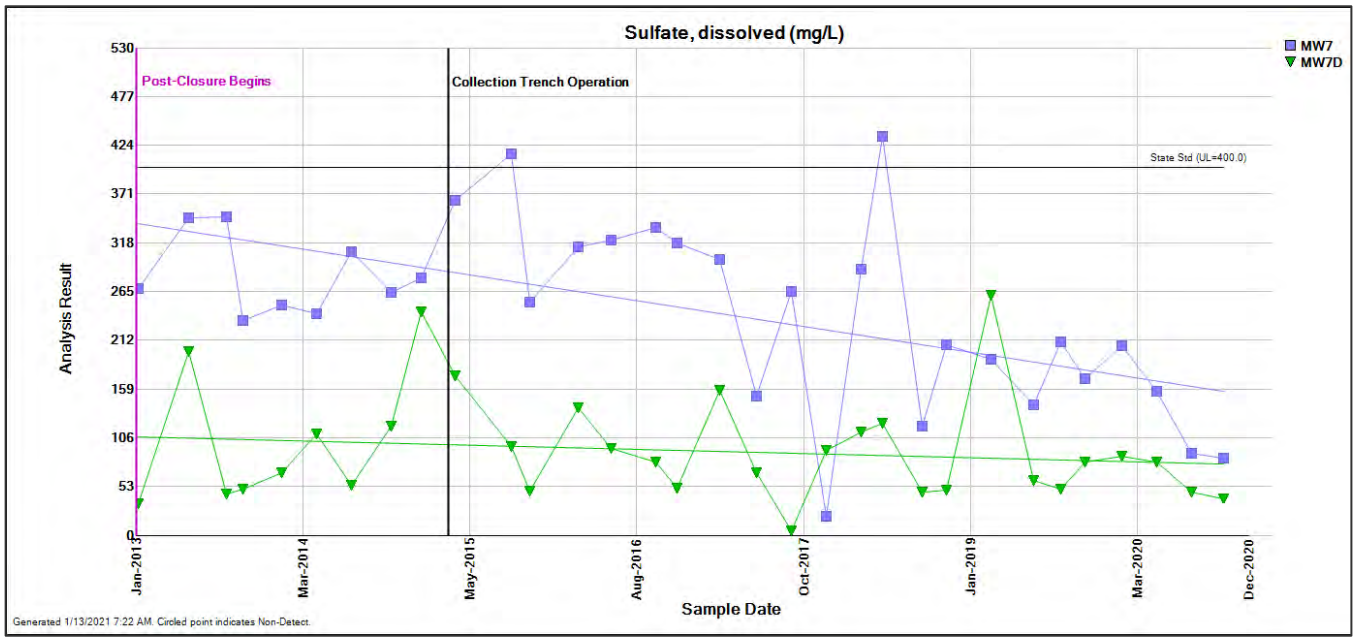


Figure 1-10. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-7 and MW-7D. (Note: Lines through the concentration data represent the best fit linear regressions)

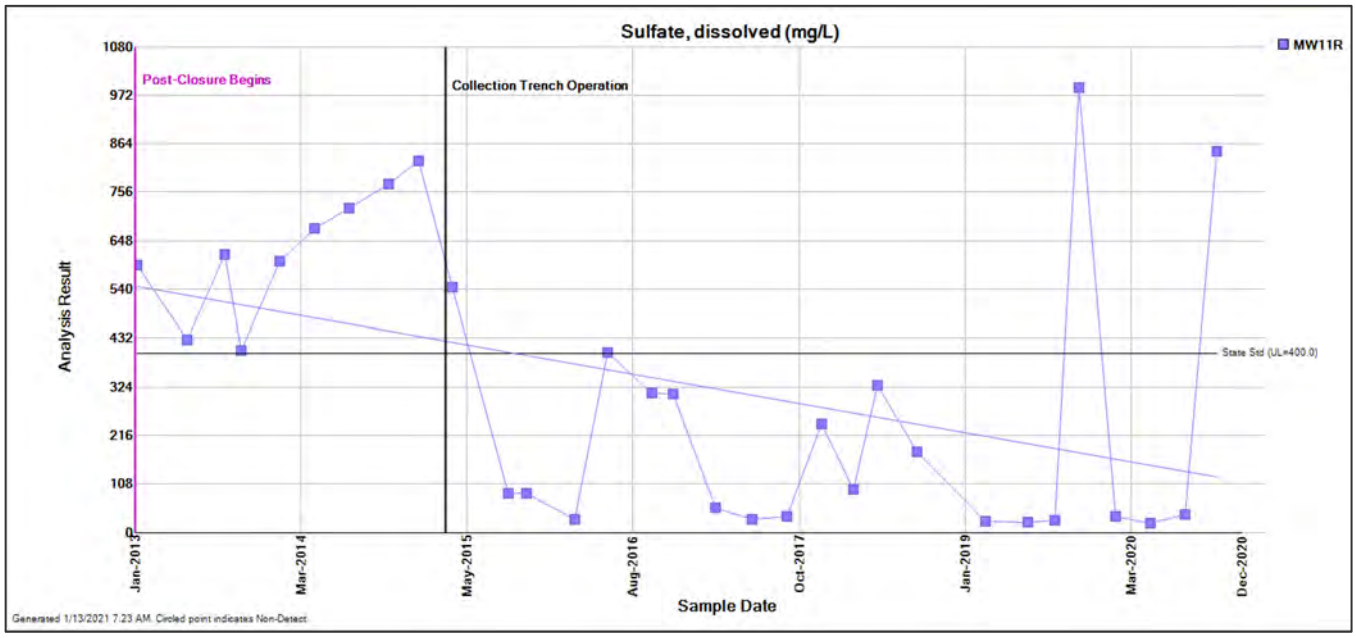


Figure 1-11. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-11R. (Note: Lines through the concentration data represent the best fit linear regressions)

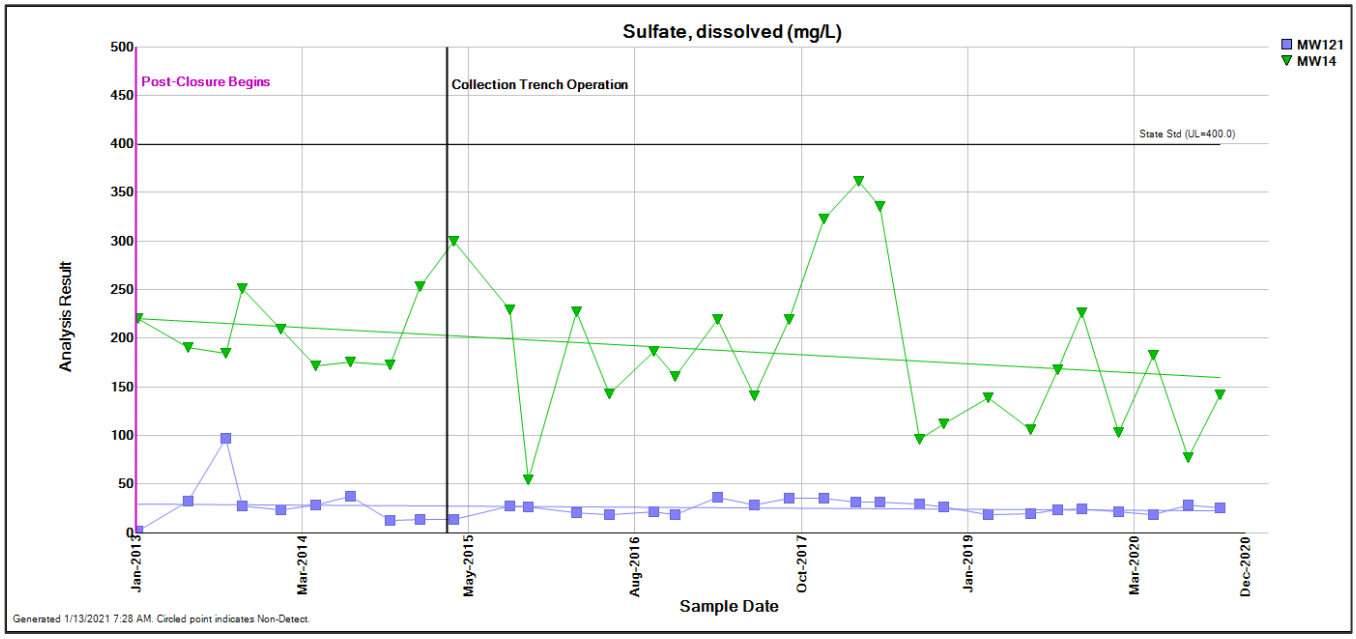


Figure 1-12. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-121 and MW-14. (Note: Lines through the concentration data represent the best fit linear regressions)

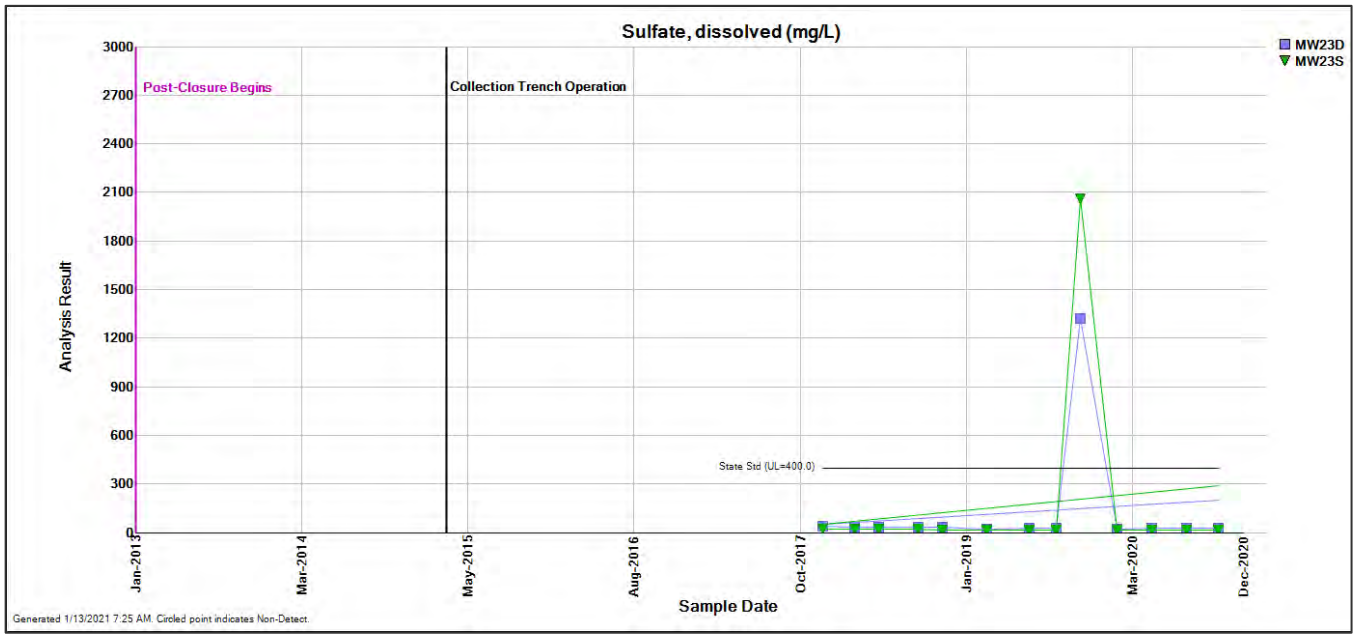


Figure 1-13. Sulfate concentrations over time since closure completion (2013) at compliance wells MW-23S and MW-23D. (Note: Lines through the concentration data represent the best fit linear regressions)

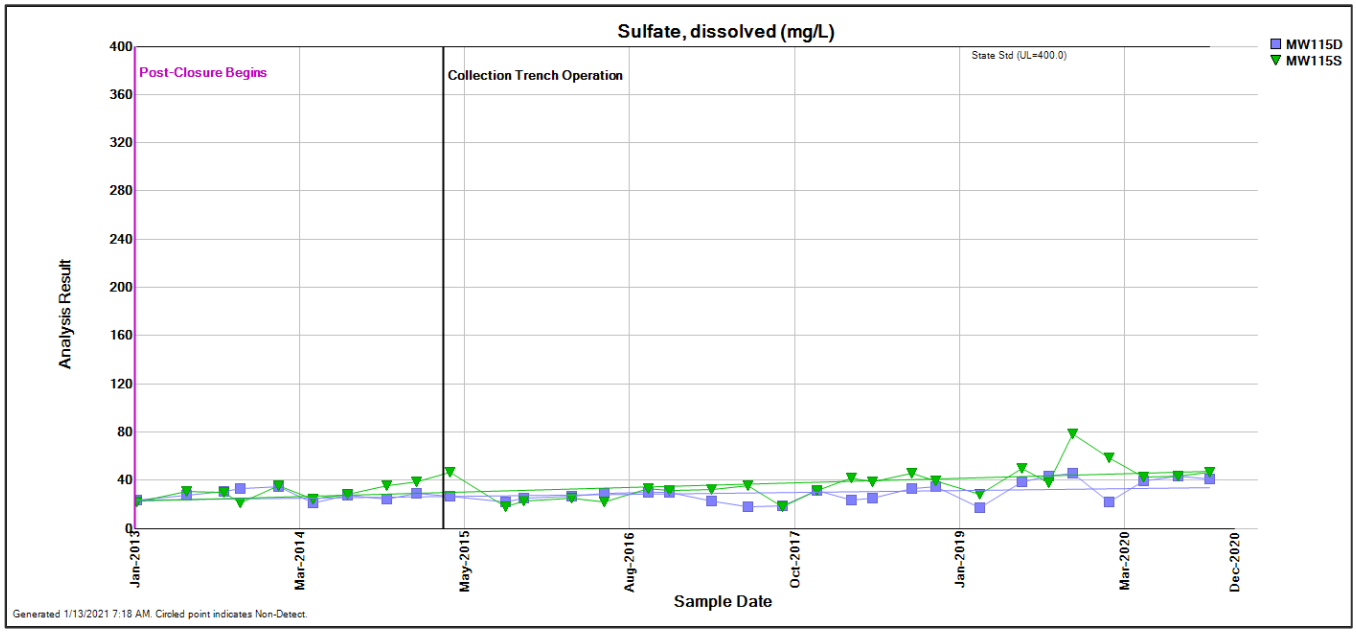
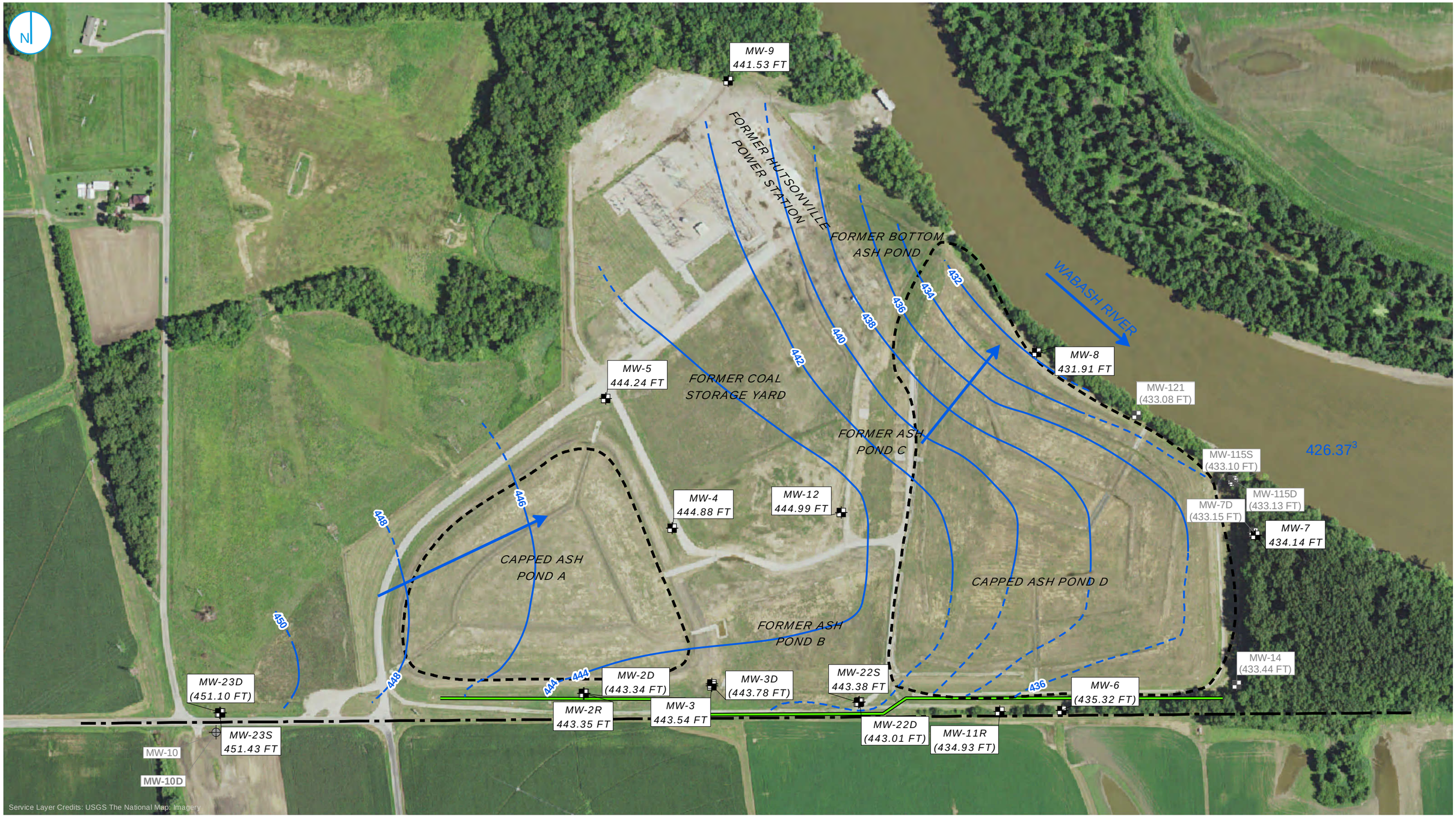


Figure 1-14. Sulfate concentrations over time since closure completion (2017) at compliance wells MW-115S and MW-115D. (Note: Lines through the concentration data represent the best fit linear regressions)

Y:\Mapping\Projects\241\2420\MXDs\2020APDFigure 2-1_Q1_2020_GW_Elevation.mxd

PROJECT: 169000XXXX | DATED: 1/13/2021 | DESIGNER: galarnmc



UPPER MIGRATION ZONE MONITORING WELL

DEEP MIGRATION ZONE MONITORING WELL

ABANDONED 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)

0 150 300 Feet

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 FROM USGS 03342000 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 1988.

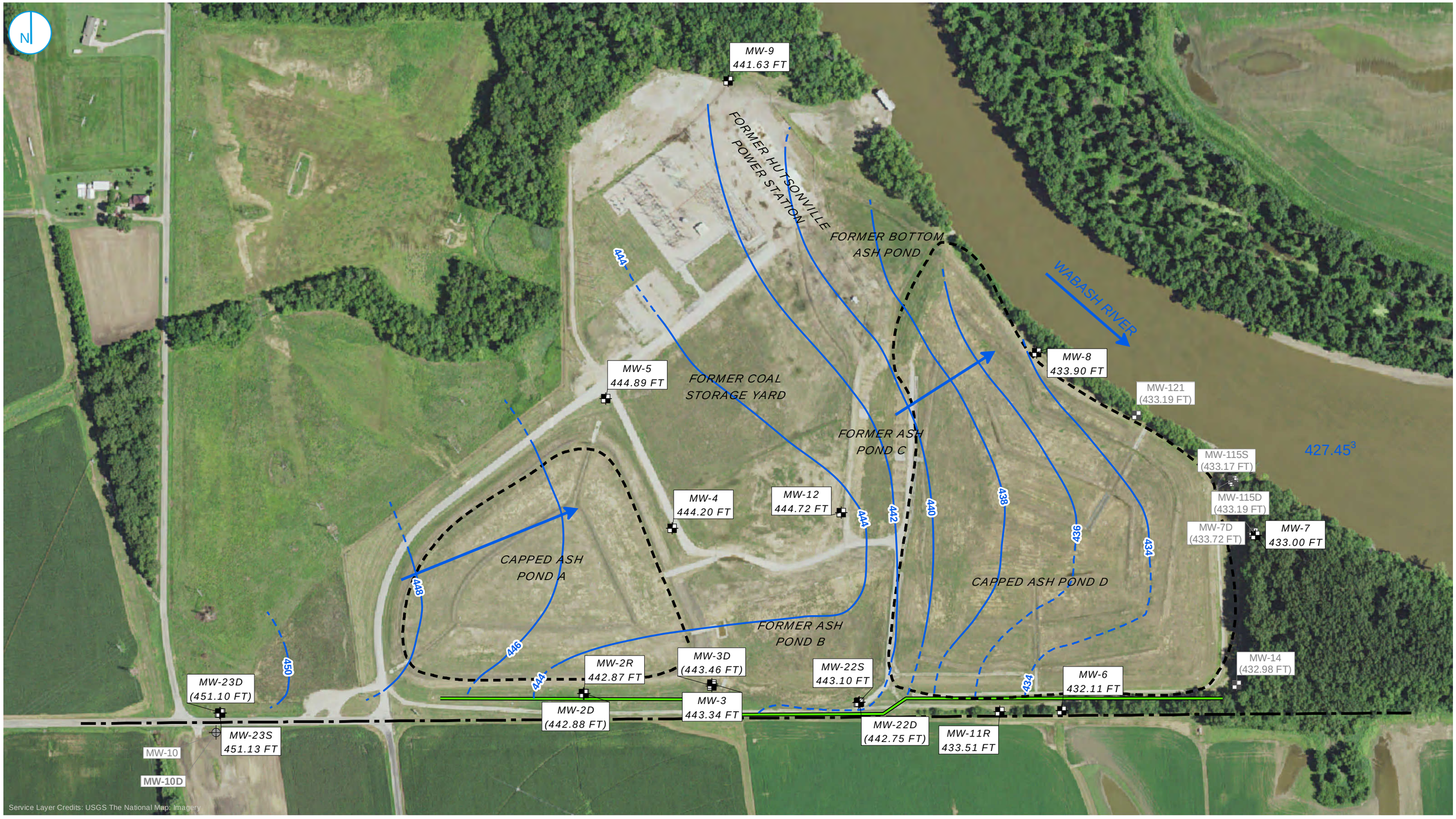
Q1 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP FEBRUARY 3, 2020

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 3-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY

RAMBOLL



UPPER MIGRATION ZONE MONITORING WELL
DEEP MIGRATION ZONE MONITORING WELL
ABANDONED 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)

0 150 300 Feet

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 FROM USGS 03342000 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 1988.

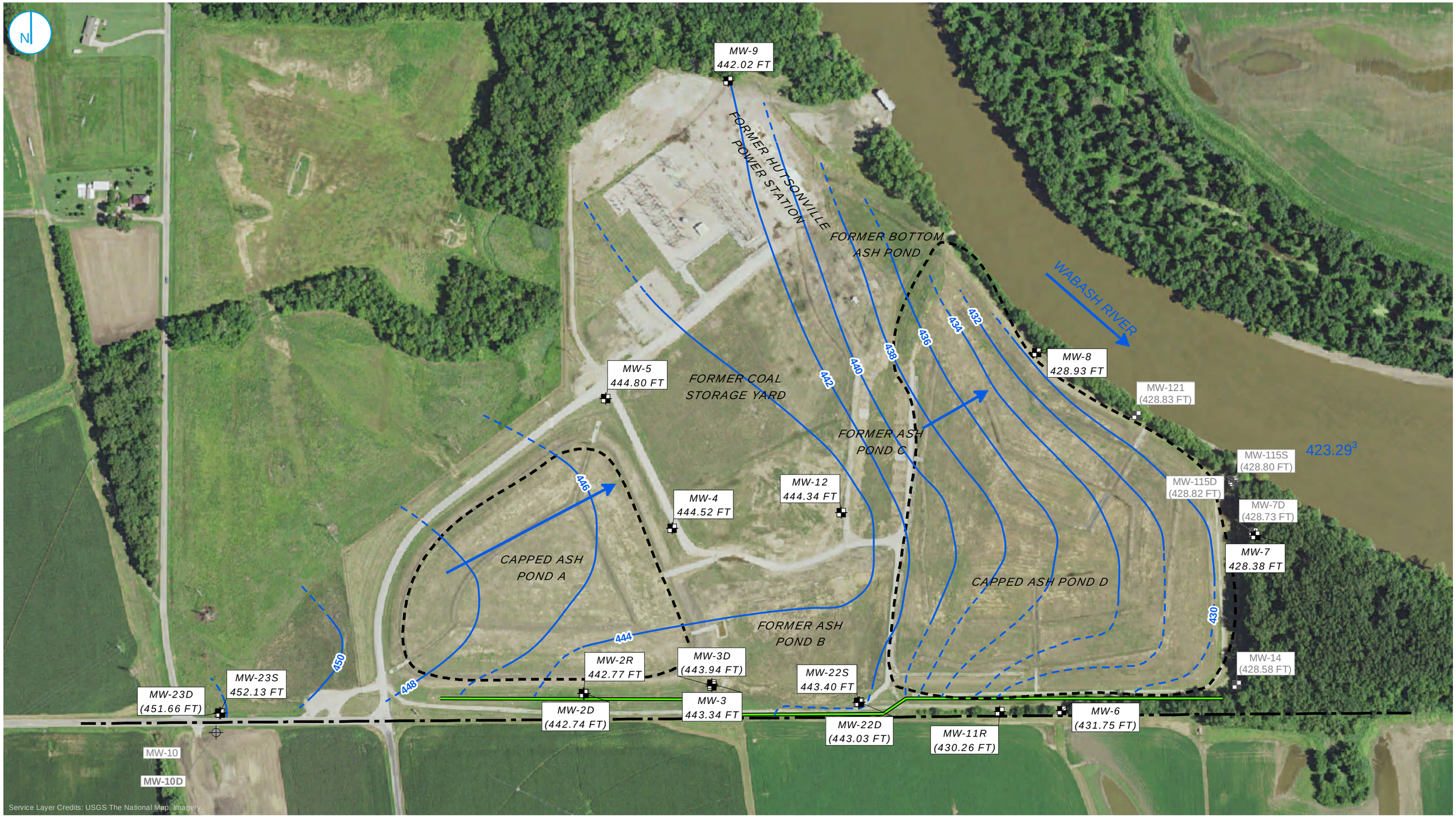
Q2 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP MAY 4, 2020

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 3-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY

RAMBOLL



UPPER MIGRATION ZONE MONITORING WELL
DEEP MIGRATION ZONE MONITORING WELL
ABANDONED 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)

0 150 300 Feet

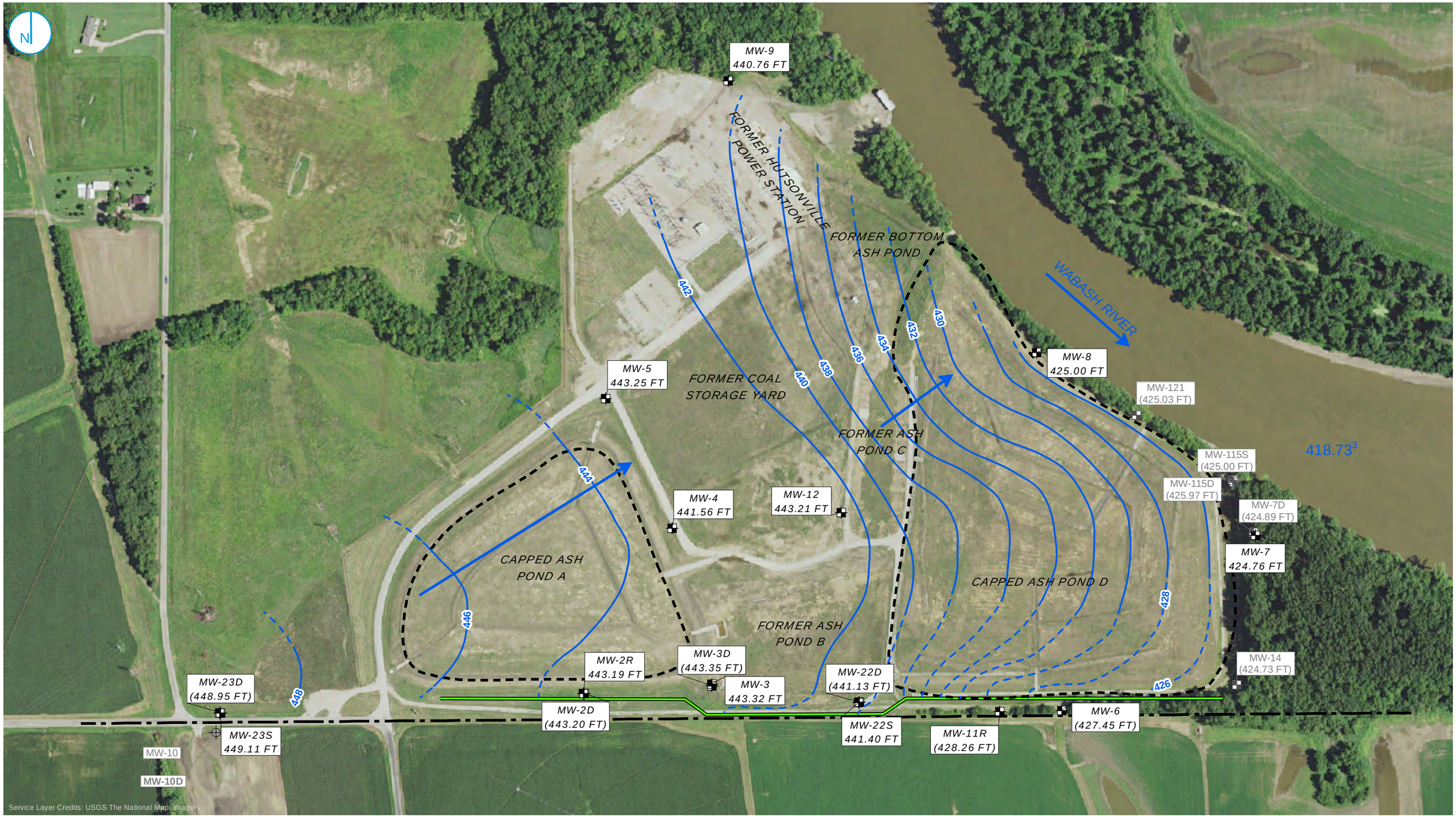
Notes
1) GROUNDWATER AND RIVER ELEVATIONS REPORTED IN FEET NORTH AMERICAN VERTICAL DATUM OF 1988.
2) GROUNDWATER ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
3) WABASH RIVER ELEVATIONS AS REPORTED BY USGS FROM USGS 03342000 WABASH RIVER AT RIVERTON, IN LOCATED APPROXIMATELY 12.5 RIVER MILES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

Q3 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP AUGUST 3, 2020

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 3-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY



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

0 150 300 Feet

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 FROM USGS 03342000 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 1988.

Q4 UPPER MIGRATION ZONE GROUNDWATER ELEVATION CONTOUR MAP OCTOBER 26, 2020

2020 ANNUAL REPORT
FORMER HUTSONVILLE POWER STATION - ASH POND D
AMEREN ENERGY MEDINA VALLEY COGEN, LLC
HUTSONVILLE, IL

FIGURE 3-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC
A RAMBOLL COMPANY

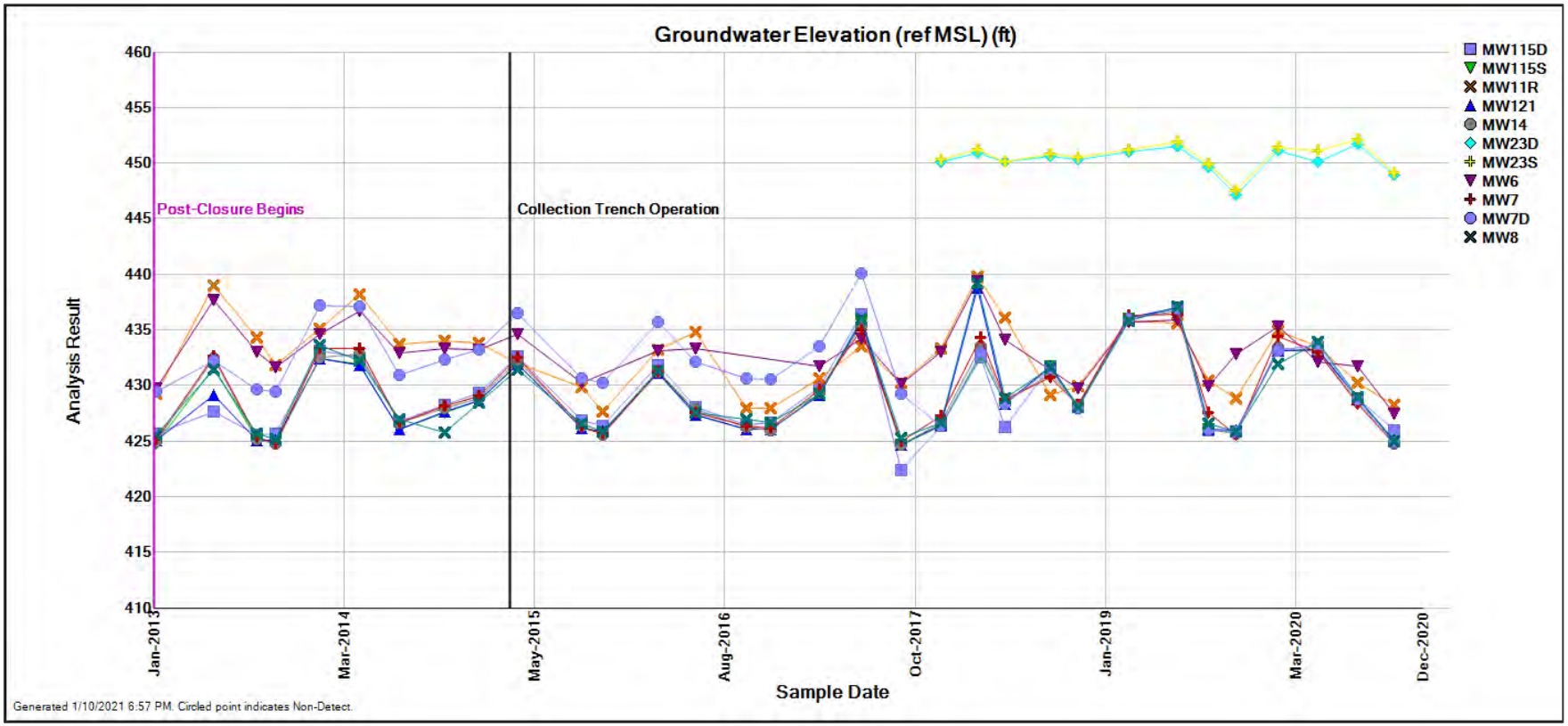


Figure 3-5. Groundwater elevations near groundwater collection trench

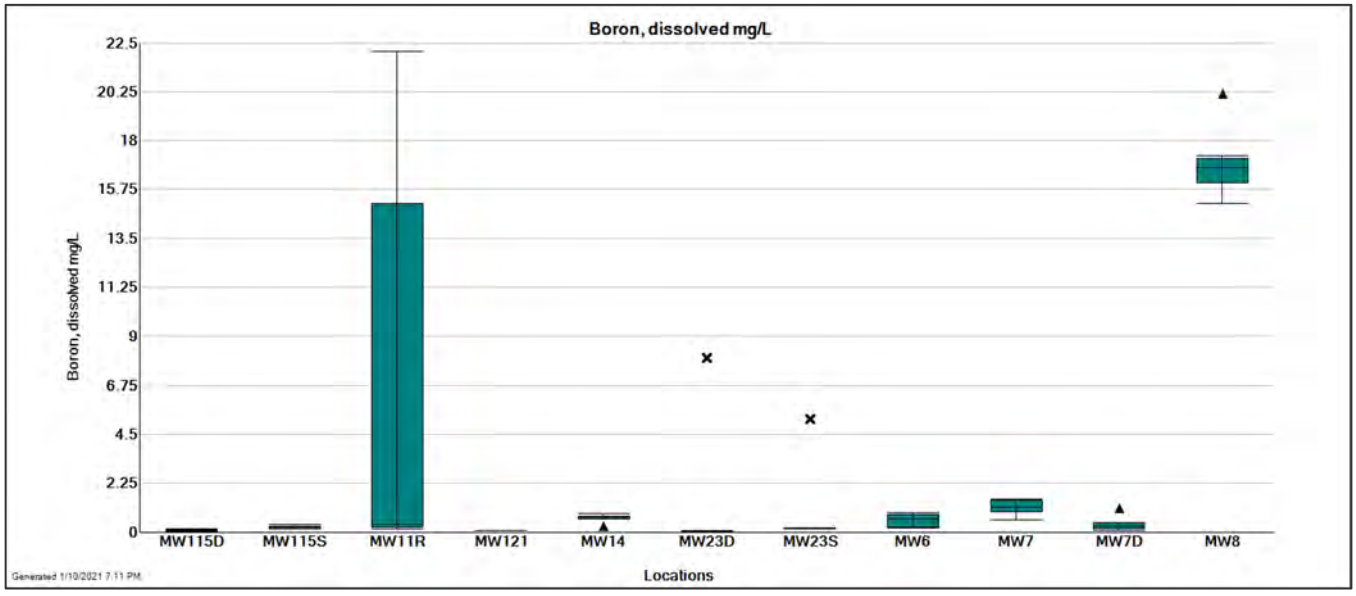


Figure 3-6A. Box-whisker plot showing distribution of **boron** concentration by monitoring well for data collected in 2019 and 2020.

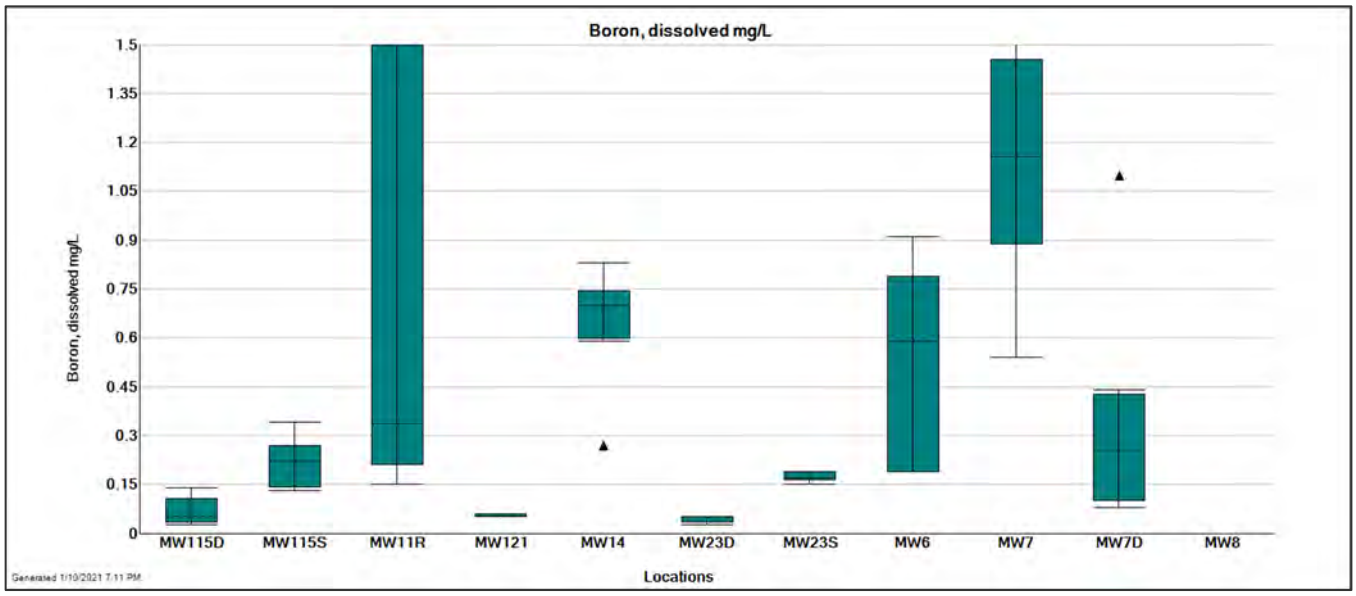


Figure 3-6B. Box-whisker plot showing distribution of **boron** concentration by monitoring well for data collected in 2019 and 2020 (zoomed in).

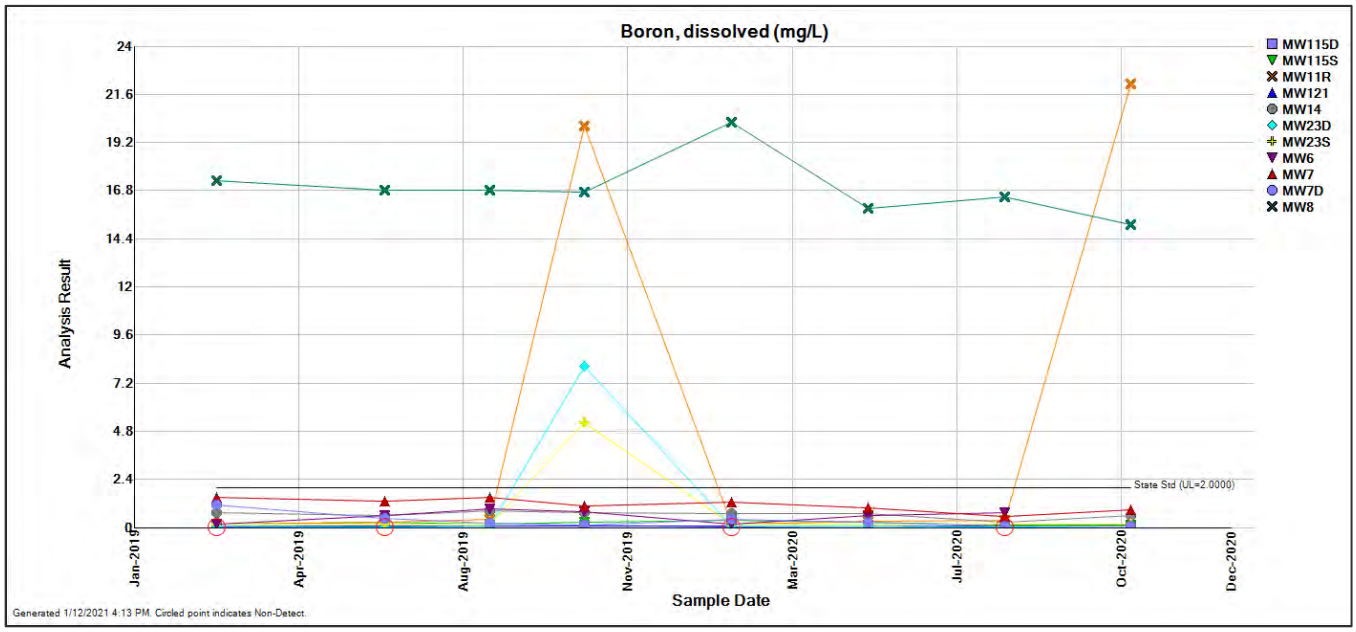


Figure 3-7. Boron concentrations during the reporting period (2019-2020) at all compliance wells. Circled results indicate non-detects.

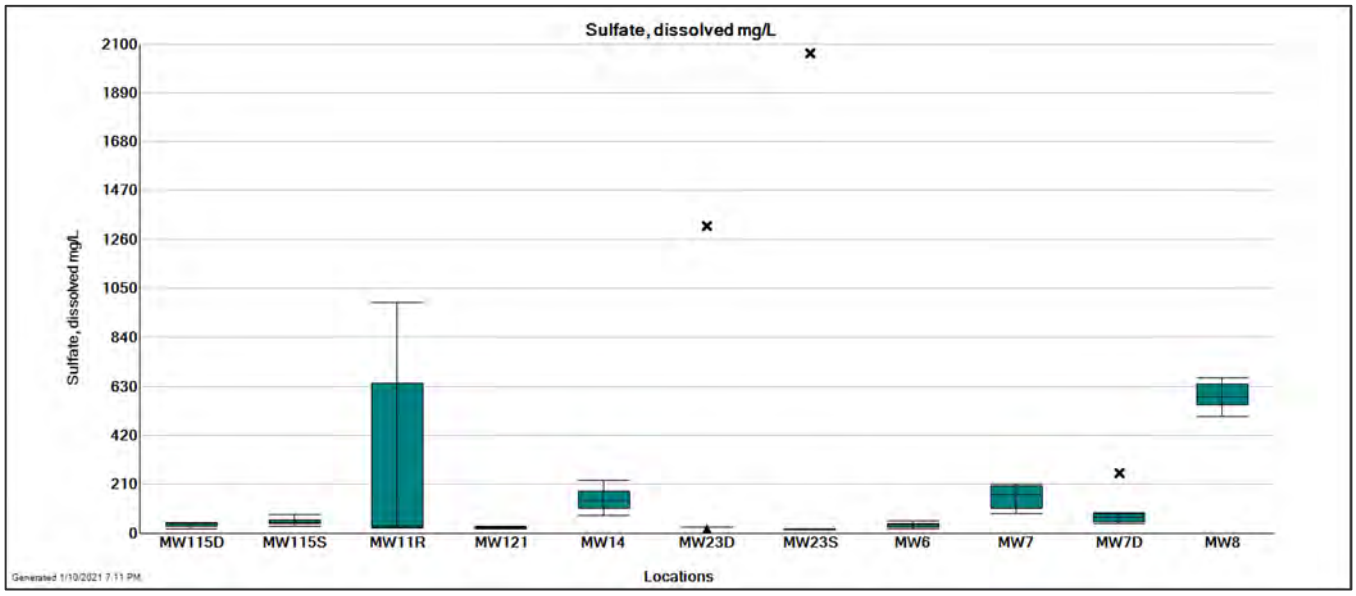


Figure 3-8. Box-whisker plot showing distribution of **sulfate** concentration by monitoring well for data collected in 2019 and 2020.

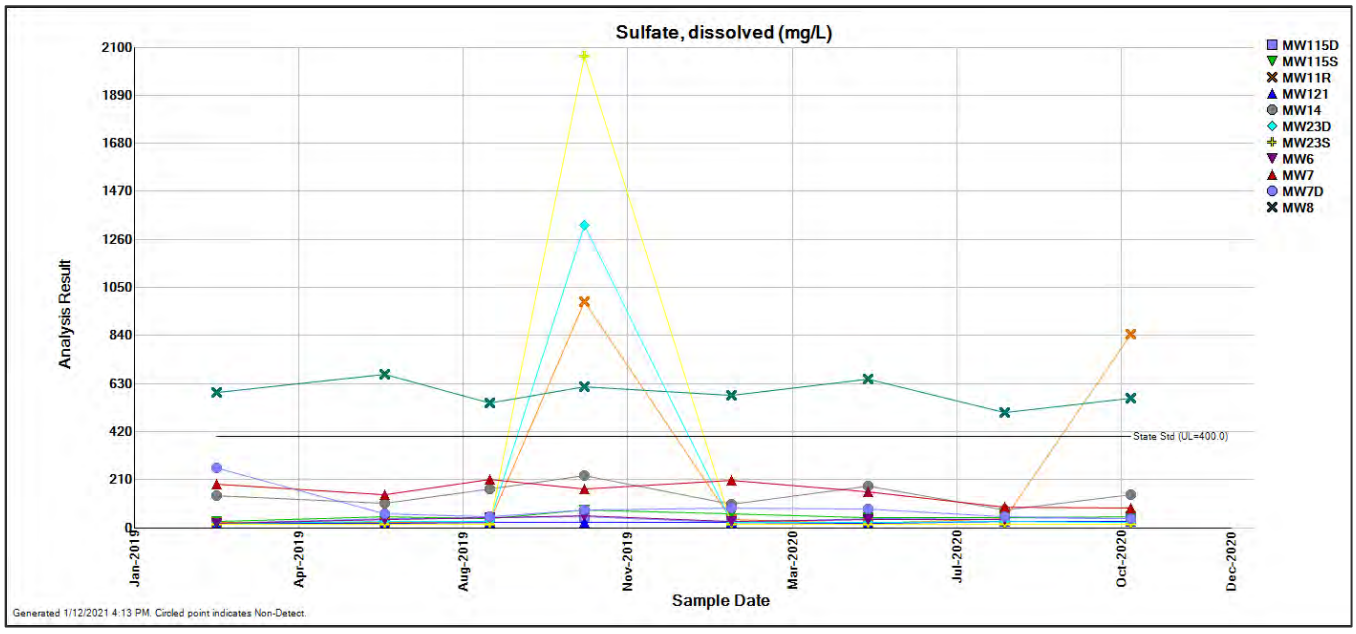


Figure 3-9. Sulfate concentrations during the reporting period (2019-2020) at all compliance wells.

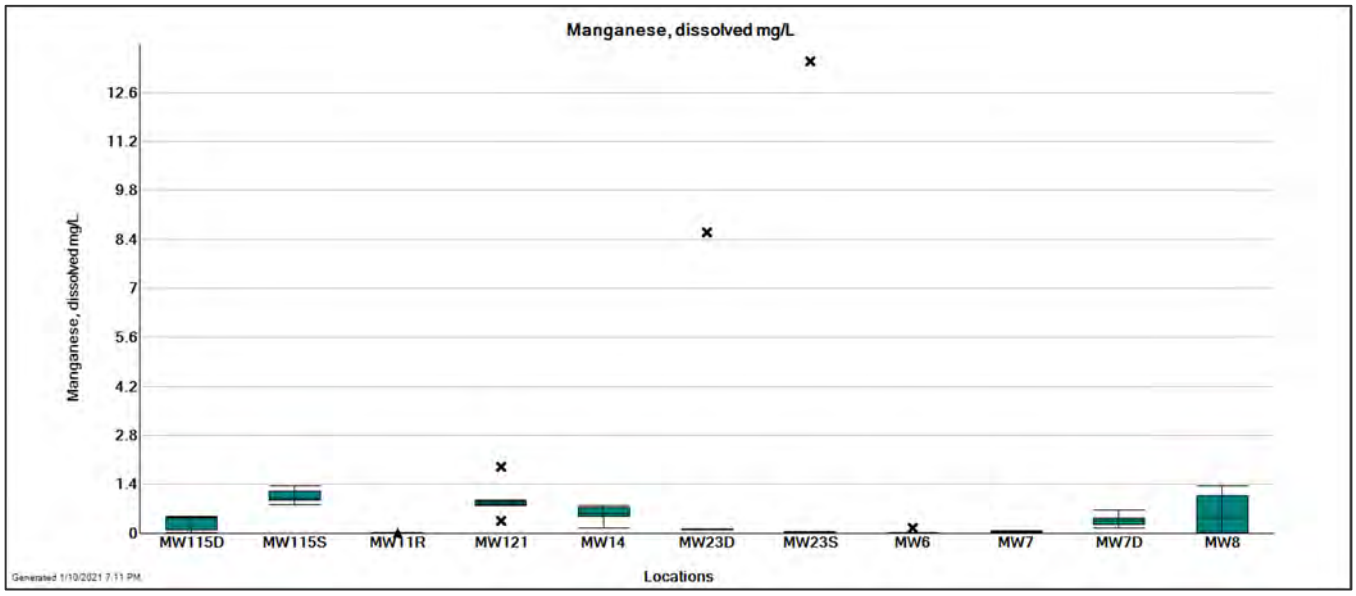


Figure 3-10A. Box-whisker plot showing distribution of **manganese** concentration by monitoring well for data collected in 2019 and 2020.

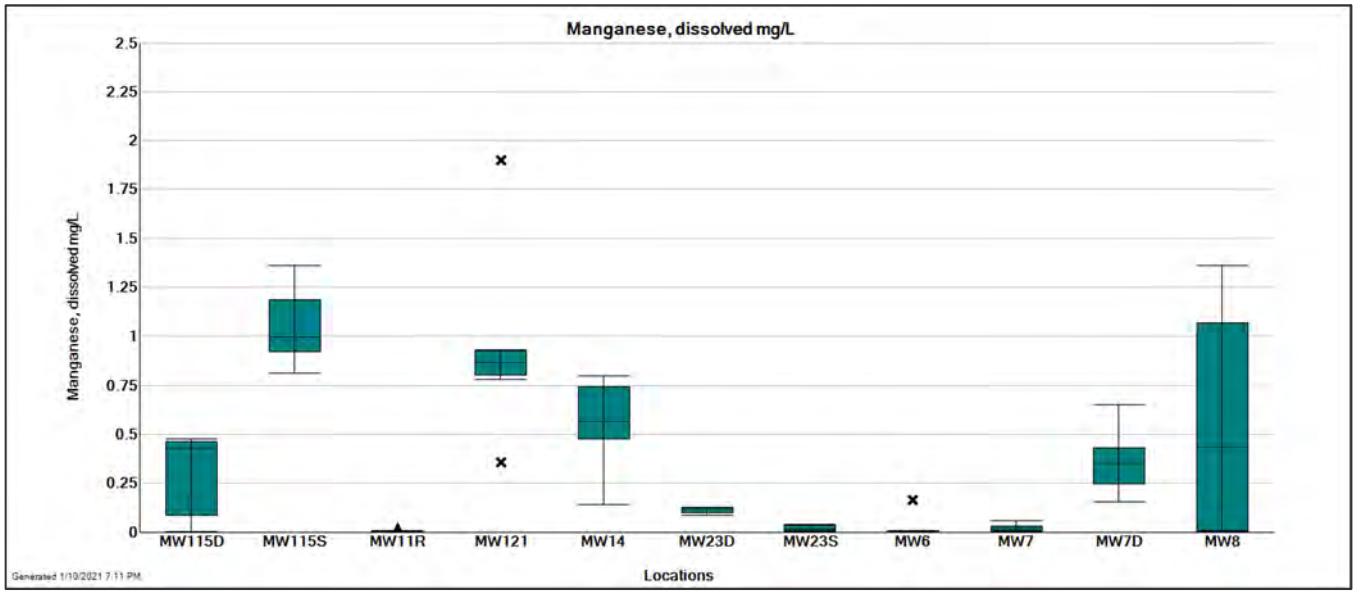


Figure 3-10B. Box-whisker plot showing distribution of **manganese** concentration by monitoring well for data collected in 2019 and 2020 (zoomed in).

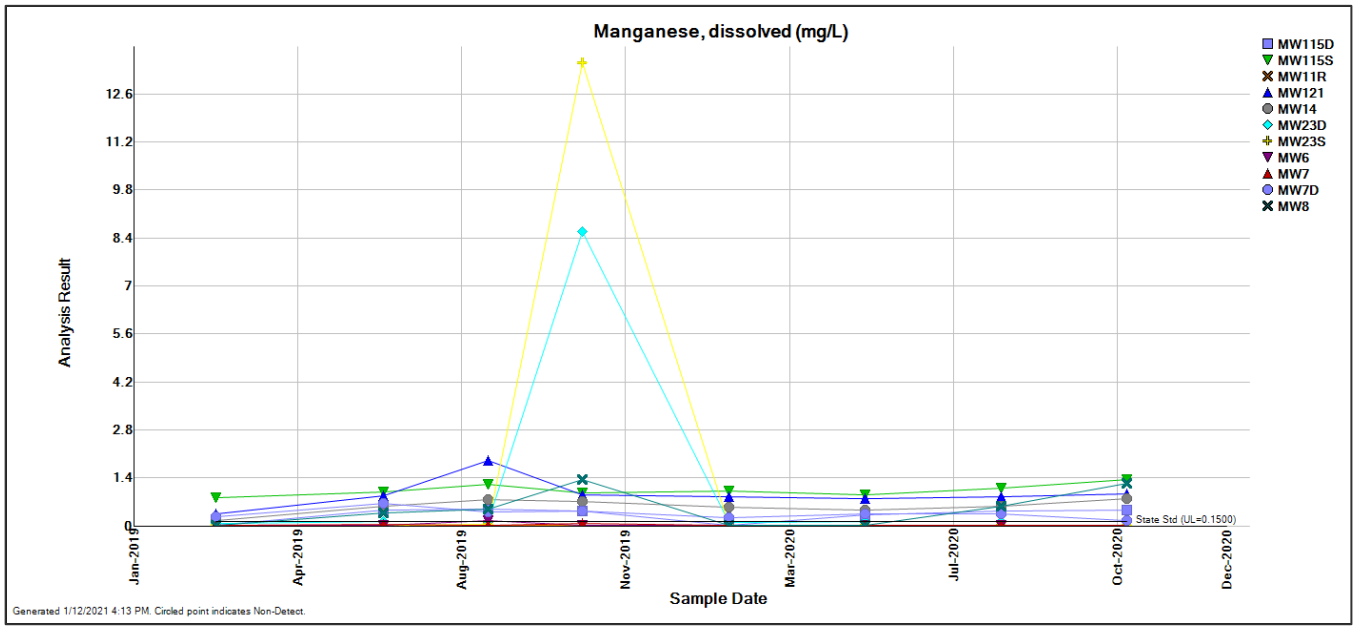


Figure 3-11A. Manganese concentrations during the reporting period (2019-2020) at all compliance wells.

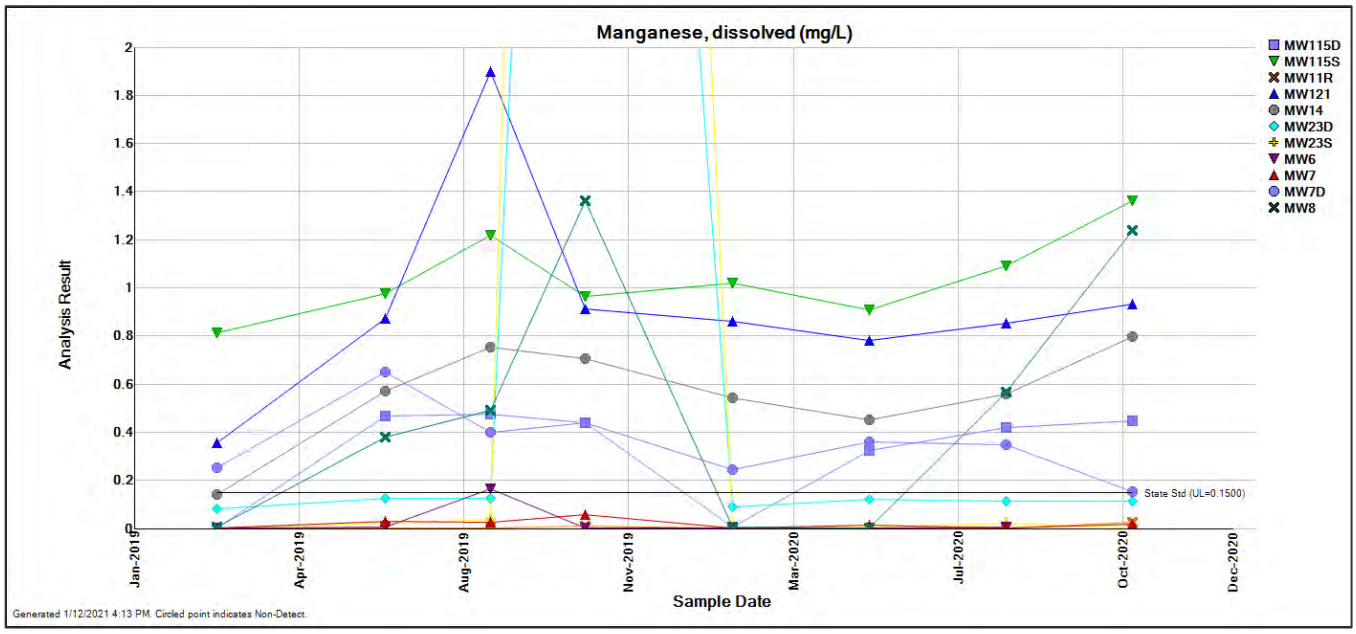


Figure 3-11B. Manganese concentrations during the reporting period (2019-2020) at all compliance wells. Zoomed in to show the Class I groundwater standard.

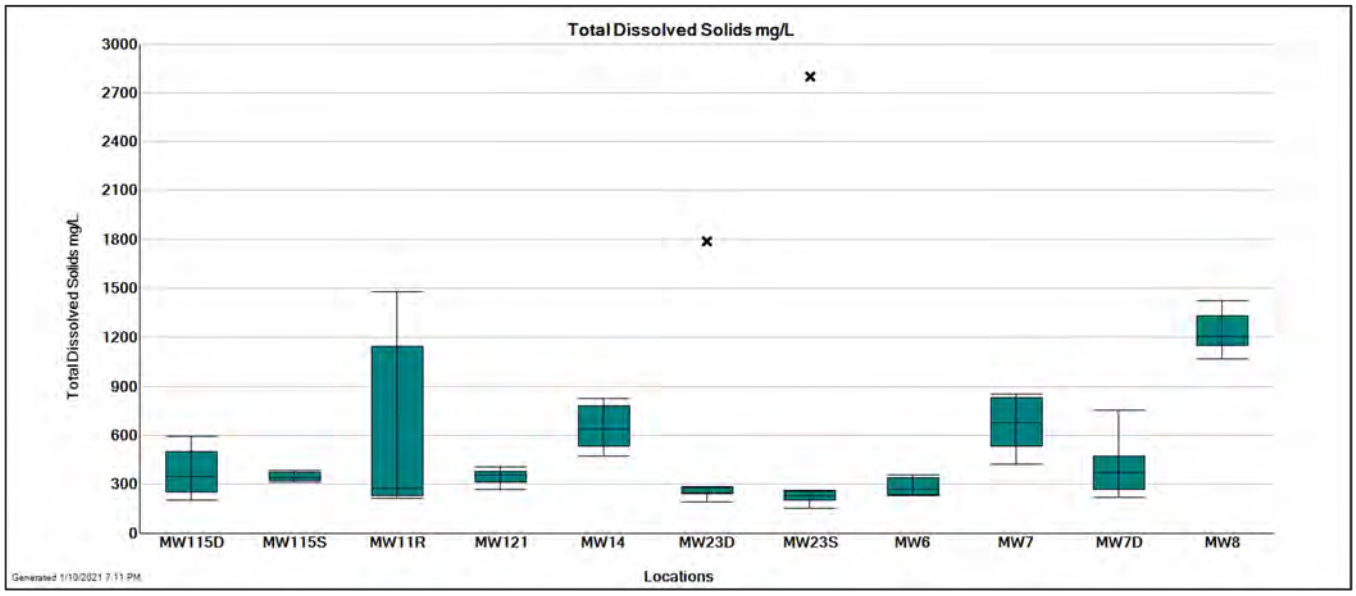


Figure 3-12. Box-whisker plot showing distribution of **total dissolved solids** concentration by monitoring well for data collected in 2019 and 2020.

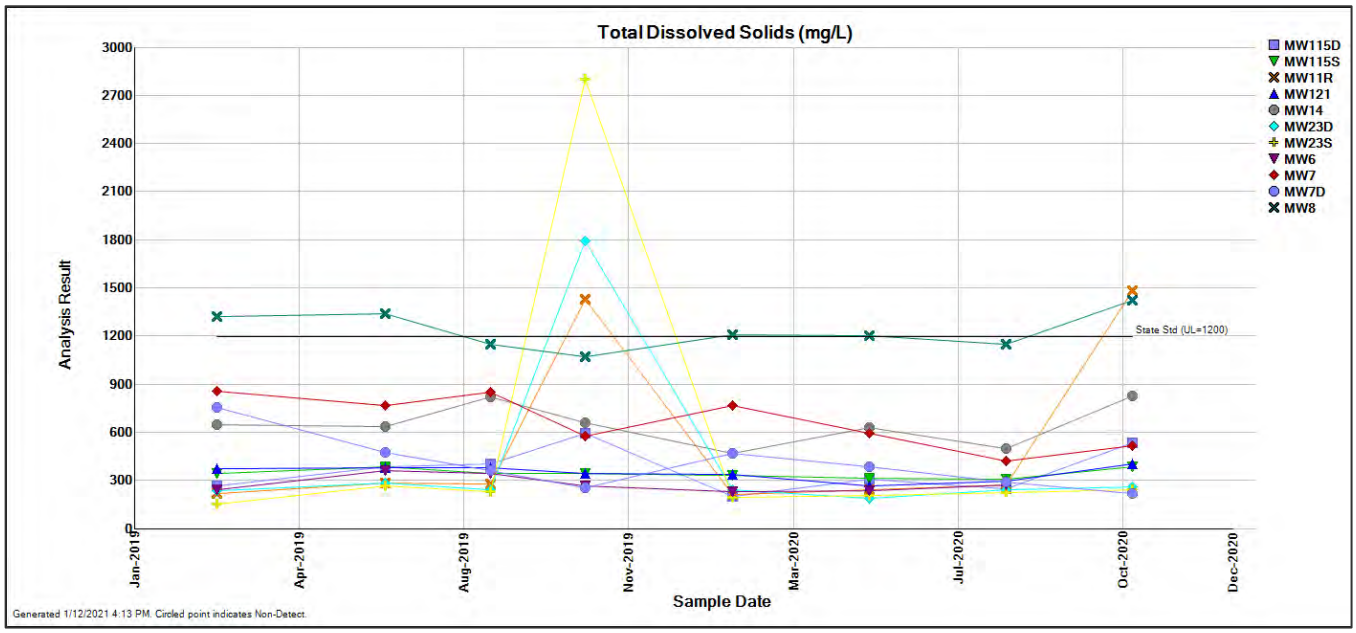


Figure 3-13. Total dissolved solids concentrations during the reporting period (2019-2020) at all compliance wells.

APPENDIX A
GROUNDWATER MONITORING RESULTS 2019-2020

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

Date Range: 01/01/2019 to 12/31/2020
Well: MW6

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020
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	0.0015	<0.0003	<0.0003	<0.0003	<0.0003
B, diss, mg/L	0.1900	0.5900	0.9100	0.7900	0.1900	0.5800	0.7600
Ba, diss, mg/L	0.010	0.014	0.029	0.016	0.012	0.012	0.030
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	14.7	15.2	14.3	11.2	16.4	12.1	9.8
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	<0.0010	<0.0010	<0.0010	<0.0010	0.0004	0.0004
Cu, diss, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	0.2	0.2	0.2	<0.1	<0.1	0.2
Fe, diss, mg/L	<0.010	<0.010	0.946	0.208	<0.010	<0.010	0.080
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0011	0.0047	0.1650	0.0013	0.0003	0.0036	0.0054
Ni, diss, mg/L	0.0004	0.0004	0.0008	0.0011	0.0002	0.0002	0.0002
NO3, diss, mg/L	1.830	5.280	4.910	4.660	2.970	2.260	1.360
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	0.0010	<0.0005	<0.0005	0.0034	0.0016	0.0026	0.0032
SO4, diss, mg/L	17.4	36.3	41.9	51.0	25.5	34.2	36.4
TDS, mg/L	240	358	340	268	230	234	274
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: 01/01/2019 to 12/31/2020
Well: MW7

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
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	1.5200	1.3200	1.5000	1.0500	1.2600	0.9700	0.5400	0.8600
Ba, diss, mg/L	0.052	0.040	0.058	0.041	0.048	0.038	0.038	0.037
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	6.6	9.2	8.0	15.3	8.6	11.3	14.4	14.5
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	0.0004	<0.0010	0.0003
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	0.2	<0.1	<0.1	0.2	0.2
Fe, diss, mg/L	<0.010	0.024	0.203	0.234	<0.010	<0.010	0.039	0.161
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0005	0.0288	0.0268	0.0575	0.0006	0.0146	0.0029	0.0190
Ni, diss, mg/L	0.0004	0.0002	0.0006	0.0008	0.0004	0.0003	0.0003	0.0007
NO3, diss, mg/L	1.150	0.541	0.335	<0.100	0.756	0.309	<0.100	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sb, diss, mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Se, diss, mg/L	0.0010	<0.0005	<0.0005	<0.0005	0.0031	<0.0005	<0.0005	<0.0005
SO4, diss, mg/L	191.0	142.0	210.0	170.0	206.0	156.0	88.8	84.2
TDS, mg/L	854	764	852	576	768	592	420	514
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: 01/01/2019 to 12/31/2020
Well: MW7D

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0024	0.0043	0.0045	0.0016	0.0031	0.0032	0.0034	0.0014
B, diss, mg/L	1.1000	0.4400	0.2300	0.1300	0.3900	0.2800	0.0900	0.0800
Ba, diss, mg/L	0.058	0.043	0.042	0.036	0.042	0.044	0.049	0.036
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	9.0	16.4	17.1	21.2	14.6	15.2	17.3	18.3
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	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	0.2	0.2	0.2	0.2	<0.1	0.2	0.2
Fe, diss, mg/L	0.726	2.670	2.400	0.528	1.390	1.420	1.250	0.714
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.2540	0.6510	0.4010	0.4410	0.2430	0.3590	0.3480	0.1520
Ni, diss, mg/L	0.0006	0.0008	0.0006	0.0004	0.0007	0.0005	0.0004	0.0012
NO3, diss, mg/L	<0.050	<0.050	<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
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	<0.0025
SO4, diss, mg/L	261.0	59.8	49.6	79.1	85.6	79.6	46.8	39.7
TDS, mg/L	752	472	358	254	470	384	292	218
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: 01/01/2019 to 12/31/2020
Well: MW8

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
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	17.3000	16.8000	16.8000	16.7000	20.2000	15.9000	16.5000	15.1000
Ba, diss, mg/L	0.017	0.014	0.018	0.020	0.017	0.017	0.020	0.020
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	11.5	12.3	11.7	13.2	11.9	11.0	11.5	12.9
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	0.0003	<0.0010	<0.0010	0.0003	<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	0.290	0.278	<0.010	<0.010	0.021	0.159
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0066	0.3810	0.4920	1.3600	0.0070	0.0027	0.5650	1.2400
Ni, diss, mg/L	0.0044	0.0056	0.0046	0.0062	0.0040	0.0042	0.0059	0.0072
NO3, diss, mg/L	<0.050	<0.050	<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
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	592.0	668.0	545.0	616.0	579.0	650.0	501.0	564.0
TDS, mg/L	1320	1340	1150	1070	1210	1200	1150	1420
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: 01/01/2019 to 12/31/2020
Well: MW11R

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
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	0.1500	0.2800	0.4100	20.0000	0.1900	0.2900	0.3800	22.1000
Ba, diss, mg/L	0.026	0.035	0.053	0.204	0.031	0.052	0.060	0.145
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	14.7	7.8	12.4	11.7	15.3	16.3	17.8	9.4
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	0.0003	<0.0010	<0.0010	0.0003	<0.0010	0.0004
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	0.2	<0.1	<0.1	0.2	<0.1
Fe, diss, mg/L	<0.010	<0.010	0.226	0.264	<0.010	<0.010	0.023	0.154
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0017	0.0014	0.0016	0.0090	0.0006	0.0014	0.0006	0.0254
Ni, diss, mg/L	0.0009	0.0003	0.0002	0.0013	0.0005	0.0006	0.0002	0.0011
NO3, diss, mg/L	3.410	3.520	9.780	0.206	3.140	11.500	12.800	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	<0.0005	0.0010	<0.0005	<0.0005
SO4, diss, mg/L	25.0	22.6	26.8	989.0	35.8	19.9	40.4	847.0
TDS, mg/L	216	286	278	1430	214	240	272	1480
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: 01/01/2019 to 12/31/2020
Well: MW14

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0005	0.0028	0.0022	0.0014	0.0009	0.0021	0.0018	0.0017
B, diss, mg/L	0.7300	0.5900	0.8300	0.7500	0.7100	0.6900	0.2700	0.6200
Ba, diss, mg/L	0.059	0.055	0.079	0.073	0.068	0.063	0.063	0.081
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	21.4	25.5	20.6	25.4	27.6	22.9	27.0	25.8
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	0.0007	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cu, diss, mg/L	<0.0005	<0.0005	0.0371	<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	<0.1	<0.1
Fe, diss, mg/L	<0.010	1.150	1.390	0.323	0.434	0.591	0.646	1.160
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.1410	0.5720	0.7550	0.7060	0.5410	0.4520	0.5590	0.7990
Ni, diss, mg/L	0.0009	0.0013	0.0021	0.0018	0.0011	0.0014	0.0008	0.0013
NO3, diss, mg/L	0.104	<0.050	<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
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	139.0	106.0	167.0	226.0	103.0	182.0	76.8	142.0
TDS, mg/L	646	634	822	660	470	628	498	828
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: 01/01/2019 to 12/31/2020
Well: MW23D

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0022	0.0036	0.0040	0.0017	0.0022	0.0028	0.0032	0.0036
B, diss, mg/L	0.0500	<0.0250	0.0500	8.0200	0.0500	0.0500	<0.0250	0.0500
Ba, diss, mg/L	0.042	0.041	0.047	0.029	0.045	0.045	0.056	0.049
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	0.0016	<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	5.4	6.4	5.9	9.7	5.3	5.0	4.7	5.0
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	0.105	<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	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1
Fe, diss, mg/L	0.221	0.797	0.858	70.000	0.277	0.412	0.565	0.697
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0832	0.1270	0.1260	8.6000	0.0887	0.1230	0.1140	0.1140
Ni, diss, mg/L	0.0002	0.0003	0.0004	0.0465	0.0002	<0.0003	<0.0003	0.0003
NO3, diss, mg/L	<0.050	<0.050	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
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	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005
SO4, diss, mg/L	20.0	26.4	25.5	1320.0	23.8	25.0	26.0	24.6
TDS, mg/L	238	282	244	1790	242	188	240	260
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	0.19	<0.01	<0.01	<0.01	<0.01

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

Date Range: 01/01/2019 to 12/31/2020
Well: MW23S

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
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	0.0092	<0.0003	<0.0003	<0.0003	<0.0003
B, diss, mg/L	0.1500	0.1700	0.1900	5.2400	0.1600	0.1700	0.1700	0.1900
Ba, diss, mg/L	0.031	0.033	0.040	0.009	0.039	0.043	0.049	0.040
Be, diss, mg/L	<0.0010	<0.0010	<0.0010	0.0082	<0.0010	<0.0010	<0.0010	<0.0010
Cd, diss, mg/L	<0.0003	<0.0003	<0.0003	0.0051	<0.0003	<0.0003	<0.0003	<0.0003
Cl, diss, mg/L	2.1	7.0	2.7	10.1	2.3	2.3	2.0	2.0
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	0.091	<0.001	<0.001	<0.001	<0.001
Cr, diss, mg/L	<0.0010	<0.0010	<0.0010	0.0003	<0.0010	<0.0010	<0.0010	<0.0010
Cu, diss, mg/L	<0.0005	<0.0005	0.0064	0.0078	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	0.6
Fe, diss, mg/L	<0.010	<0.010	0.249	204.000	<0.010	<0.010	0.059	0.148
Hg, diss, mg/L	<0.0001	<0.0001	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0037	0.0230	0.0375	13.5000	0.0021	0.0068	0.0219	0.0020
Ni, diss, mg/L	0.0003	0.0003	0.0005	0.1190	0.0004	0.0002	0.0004	0.0002
NO3, diss, mg/L	0.371	0.180	<0.100	<0.100	0.287	0.363	0.395	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.010	0.007	<0.001	<0.001	<0.001	<0.001
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	<0.0050	<0.0005	<0.0005	<0.0005	<0.0005
SO4, diss, mg/L	13.5	15.6	15.3	2060.0	14.3	14.1	14.8	14.0
TDS, mg/L	152	264	230	2800	196	206	224	240
Tl, diss, mg/L	<0.0003	<0.0003	<0.0025	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Zn, diss, mg/L	<0.01	<0.01	<0.01	0.60	<0.01	<0.01	<0.01	<0.01

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

Date Range: 01/01/2019 to 12/31/2020
Well: MW115D

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0009	0.0030	0.0049	0.0032	0.0011	0.0015	0.0039	0.0040
B, diss, mg/L	<0.0250	0.0500	0.0500	0.1400	<0.0250	0.0500	0.0600	0.1200
Ba, diss, mg/L	0.036	0.063	0.071	0.076	0.038	0.069	0.071	0.069
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	19.4	26.4	20.9	141.0	17.5	27.2	35.3	94.0
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	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	0.2	0.2	0.3	<0.1	<0.1	<0.1	0.2
Fe, diss, mg/L	0.033	2.530	2.190	0.497	0.075	0.336	1.410	1.590
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.0007	0.4680	0.4770	0.4410	0.0051	0.3250	0.4200	0.4470
Ni, diss, mg/L	0.0011	0.0007	0.0008	0.0003	0.0012	0.0010	0.0006	0.0006
NO3, diss, mg/L	3.690	0.257	<0.100	<0.100	3.300	<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
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	17.1	38.6	43.6	46.1	22.0	39.3	43.4	41.1
TDS, mg/L	264	382	404	592	200	308	246	532
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: 01/01/2019 to 12/31/2020
Well: MW115S

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0041	0.0041	0.0051	0.0027	0.0053	0.0037	0.0038	0.0036
B, diss, mg/L	0.1900	0.2700	0.1800	0.2700	0.3400	0.2500	0.1300	0.1300
Ba, diss, mg/L	0.041	0.039	0.047	0.045	0.052	0.050	0.062	0.052
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	16.4	18.9	18.5	21.6	18.6	18.0	17.8	18.4
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	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.0005
F, diss, mg/L	<0.1	0.2	0.2	0.2	<0.1	<0.1	<0.1	0.2
Fe, diss, mg/L	1.080	1.700	1.750	0.409	2.260	1.140	1.460	1.080
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.8140	0.9770	1.2200	0.9640	1.0200	0.9090	1.0900	1.3600
Ni, diss, mg/L	0.0012	0.0010	0.0010	0.0008	0.0012	0.0028	0.0008	0.0008
NO3, diss, mg/L	<0.050	<0.050	<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
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	28.4	49.5	37.9	78.7	58.8	42.9	43.7	46.3
TDS, mg/L	342	384	342	340	332	316	310	386
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: 01/01/2019 to 12/31/2020
Well: MW121

	2/25/2019	6/17/2019	8/26/2019	10/28/2019	2/3/2020	5/4/2020	8/3/2020	10/26/2020
Ag, diss, mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
As, diss, mg/L	0.0021	0.0049	0.0041	0.0026	0.0061	0.0029	0.0034	0.0038
B, diss, mg/L	0.0600	0.0500	0.0500	0.0600	0.0500	0.0600	0.0500	0.0500
Ba, diss, mg/L	0.034	0.052	0.049	0.042	0.052	0.047	0.056	0.049
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	16.1	24.0	19.2	21.8	19.1	17.9	18.3	18.3
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	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
F, diss, mg/L	<0.1	0.2	0.2	0.2	<0.1	<0.1	<0.1	0.2
Fe, diss, mg/L	0.234	3.000	1.030	0.430	2.700	0.819	1.580	1.420
Hg, diss, mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mn, diss, mg/L	0.3570	0.8730	1.9000	0.9120	0.8620	0.7820	0.8510	0.9330
Ni, diss, mg/L	0.0006	0.0010	0.0011	0.0005	0.0006	0.0004	0.0004	0.0003
NO3, diss, mg/L	0.521	0.166	<0.100	<0.100	0.292	0.217	<0.100	<0.100
Pb, diss, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
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	18.1	18.9	23.2	24.2	21.6	17.9	28.7	25.3
TDS, mg/L	370	376	378	340	336	268	298	404
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	03/04/2020
Inspector	MRK
Temperature	52 degrees F
Weather	Overcast

	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

Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan
Quarterly Site Inspection Checksheet

Date	07/07/2020
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 (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

Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan
Quarterly Site Inspection Checksheet

Date	09/22/2020
Inspector	MRK
Temperature	71 degrees F
Weather	Sunny

	Item	Condition Code *	Comments
Pond Cap	Vent Pipes	GC	
	Drainage Berms	GC	
	Vegetation	GC	
	Erosion on Cap	GC	Small hole from animal digging
	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

Hutsonville Power Station
Ash Pond D Closure Cap - Post-Closure Care Plan
Quarterly Site Inspection Checksheet

Date	12/16/2020
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 10/26/2020
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: 0.000800
Standard Deviation of all data: 0.000992
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW115S

Mean of all data: 0.000800
Standard Deviation of all data: 0.000992
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW11R

Mean of all data: 0.00108
Standard Deviation of all data: 0.00166
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 4.77
T Critical of all data: Tcr = 2.86

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000900
Standard Deviation of all data: 0.00110
Largest Observation Concentration of all data: Xn = 0.00400
Test Statistic, high extreme of all data: Tn = 2.81
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW14

Mean of all data: 0.000800
Standard Deviation of all data: 0.000992
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

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: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW6

Mean of all data: 0.000853
Standard Deviation of all data: 0.00105
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 2.05
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW7

Mean of all data: 0.000950
Standard Deviation of all data: 0.00128
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 3.95
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.00600	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000821
Standard Deviation of all data: 0.000997
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Antimony, dissolved, mg/L
Location: MW8

Mean of all data: 0.00105
Standard Deviation of all data: 0.00175
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.10
T Critical of all data: Tcr = 2.87

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

Arsenic, dissolved, mg/L
Location: MW115D

Mean of all data: 0.00296
Standard Deviation of all data: 0.00351
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 3.43
T Critical of all data: Tcr = 2.87

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00267
Standard Deviation of all data: 0.00281
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 4.39
T Critical of all data: Tcr = 2.87

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

Arsenic, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000706
Standard Deviation of all data: 0.00180
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 4.60
T Critical of all data: Tcr = 2.86

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

Arsenic, dissolved, mg/L
Location: MW121

Mean of all data: 0.00338
Standard Deviation of all data: 0.00286
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 3.02
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00129
Standard Deviation of all data: 0.00183
Largest Observation Concentration of all data: Xn = 0.00900
Test Statistic, high extreme of all data: Tn = 4.20
T Critical of all data: Tcr = 2.87

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

Arsenic, dissolved, mg/L
Location: MW23D

Mean of all data: 0.00279
Standard Deviation of all data: 0.000968
Largest Observation Concentration of all data: Xn = 0.00410
Test Statistic, high extreme of all data: Tn = 1.35
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW23S

Mean of all data: 0.000938
Standard Deviation of all data: 0.00248
Largest Observation Concentration of all data: Xn = 0.00920
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000429
Standard Deviation of all data: 0.000682
Largest Observation Concentration of all data: Xn = 0.00210
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Arsenic, dissolved, mg/L
Location: MW7

Mean of all data: 0.000483
Standard Deviation of all data: 0.00132
Largest Observation Concentration of all data: Xn = 0.00800
Test Statistic, high extreme of all data: Tn = 5.68
T Critical of all data: Tcr = 2.87

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

Arsenic, dissolved, mg/L
Location: MW7D

Mean of all data: 0.00338
Standard Deviation of all data: 0.00353
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 3.00
T Critical of all data: Tcr = 2.86

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000499
Standard Deviation of all data: 0.00109
Largest Observation Concentration of all data: Xn = 0.00610
Test Statistic, high extreme of all data: Tn = 5.15
T Critical of all data: Tcr = 2.87

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

Barium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.0609
Standard Deviation of all data: 0.0208
Largest Observation Concentration of all data: Xn = 0.158
Test Statistic, high extreme of all data: Tn = 4.66
T Critical of all data: Tcr = 2.87

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

Barium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.0599
Standard Deviation of all data: 0.0311
Largest Observation Concentration of all data: Xn = 0.206
Test Statistic, high extreme of all data: Tn = 4.69
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.0375
Standard Deviation of all data: 0.0395
Largest Observation Concentration of all data: Xn = 0.204
Test Statistic, high extreme of all data: Tn = 4.22
T Critical of all data: Tcr = 2.86

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

Barium, dissolved, mg/L
Location: MW121

Mean of all data: 0.0588
Standard Deviation of all data: 0.0262
Largest Observation Concentration of all data: Xn = 0.198
Test Statistic, high extreme of all data: Tn = 5.31
T Critical of all data: Tcr = 2.87

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

Barium, dissolved, mg/L
Location: MW14

Mean of all data: 0.0779
Standard Deviation of all data: 0.0203
Largest Observation Concentration of all data: Xn = 0.127
Test Statistic, high extreme of all data: Tn = 2.42
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.0431
Standard Deviation of all data: 0.00717
Largest Observation Concentration of all data: Xn = 0.0560
Test Statistic, high extreme of all data: Tn = 1.80
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0325
Standard Deviation of all data: 0.0102
Largest Observation Concentration of all data: Xn = 0.0490
Test Statistic, high extreme of all data: Tn = 1.61
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Barium, dissolved, mg/L
Location: MW6

Mean of all data: 0.0215
Standard Deviation of all data: 0.0105
Largest Observation Concentration of all data: Xn = 0.0570
Test Statistic, high extreme of all data: Tn = 3.38
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0570	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.0514
Standard Deviation of all data: 0.0147
Largest Observation Concentration of all data: Xn = 0.119
Test Statistic, high extreme of all data: Tn = 4.60
T Critical of all data: Tcr = 2.87

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

Barium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.0496
Standard Deviation of all data: 0.0160
Largest Observation Concentration of all data: Xn = 0.0960
Test Statistic, high extreme of all data: Tn = 2.90
T Critical of all data: Tcr = 2.86

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

Barium, dissolved, mg/L
Location: MW8

Mean of all data: 0.0222
Standard Deviation of all data: 0.00533
Largest Observation Concentration of all data: Xn = 0.0330
Test Statistic, high extreme of all data: Tn = 2.03
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000385
Standard Deviation of all data: 0.000493
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000450
Standard Deviation of all data: 0.000552
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.81
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L

Location: MW14

Mean of all data: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

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: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00155
Standard Deviation of all data: 0.00200
Largest Observation Concentration of all data: Xn = 0.00820
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Beryllium, dissolved, mg/L
Location: MW6

Mean of all data: 0.000382
Standard Deviation of all data: 0.000493
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW7

Mean of all data: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000410
Standard Deviation of all data: 0.000498
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Beryllium, dissolved, mg/L
Location: MW8

Mean of all data: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW115D

Mean of all data: 0.226
Standard Deviation of all data: 1.02
Largest Observation Concentration of all data: Xn = 6.48
Test Statistic, high extreme of all data: Tn = 6.16
T Critical of all data: Tcr = 2.87

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.271
Standard Deviation of all data: 0.924
Largest Observation Concentration of all data: Xn = 5.95
Test Statistic, high extreme of all data: Tn = 6.15
T Critical of all data: Tcr = 2.87

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

Boron, dissolved, mg/L
Location: MW11R

Mean of all data: 8.44
Standard Deviation of all data: 9.82
Largest Observation Concentration of all data: Xn = 35.0
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW121

Mean of all data: 0.192
Standard Deviation of all data: 0.850
Largest Observation Concentration of all data: Xn = 5.43
Test Statistic, high extreme of all data: Tn = 6.16
T Critical of all data: Tcr = 2.87

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.777
Standard Deviation of all data: 0.362
Largest Observation Concentration of all data: Xn = 1.51
Test Statistic, high extreme of all data: Tn = 2.02
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW23D

Mean of all data: 0.657
Standard Deviation of all data: 2.21
Largest Observation Concentration of all data: Xn = 8.02
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Boron, dissolved, mg/L
Location: MW23S

Mean of all data: 0.561
Standard Deviation of all data: 1.41
Largest Observation Concentration of all data: Xn = 5.24
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 6.96
Standard Deviation of all data: 7.73
Largest Observation Concentration of all data: Xn = 23.0
Test Statistic, high extreme of all data: Tn = 2.08
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Boron, dissolved, mg/L
Location: MW7

Mean of all data: 1.61
Standard Deviation of all data: 0.892
Largest Observation Concentration of all data: Xn = 6.61
Test Statistic, high extreme of all data: Tn = 5.61
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	6.61	False		1

Boron, dissolved, mg/L
Location: MW7D

Mean of all data: 0.477
Standard Deviation of all data: 0.316
Largest Observation Concentration of all data: Xn = 1.30
Test Statistic, high extreme of all data: Tn = 2.60
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 3.37
Largest Observation Concentration of all data: Xn = 20.2
Test Statistic, high extreme of all data: Tn = 1.15
T Critical of all data: Tcr = 2.87

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

Cadmium, dissolved, mg/L

Location: MW115D

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW115S

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000163
Standard Deviation of all data: 0.000298
Largest Observation Concentration of all data: Xn = 0.00150
Test Statistic, high extreme of all data: Tn = 4.49
T Critical of all data: Tcr = 2.86

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

Cadmium, dissolved, mg/L
Location: MW121

Mean of all data: 0.000150
Standard Deviation of all data: 0.000324
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 5.71
T Critical of all data: Tcr = 2.87

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

Cadmium, dissolved, mg/L
Location: MW14

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000354
Standard Deviation of all data: 0.000374
Largest Observation Concentration of all data: Xn = 0.00160
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Cadmium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.000623
Standard Deviation of all data: 0.00135
Largest Observation Concentration of all data: Xn = 0.00510
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Cadmium, dissolved, mg/L
Location: MW6

Mean of all data: 0.0000956
Standard Deviation of all data: 0.000123
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW7D

Mean of all data: 0.000108
Standard Deviation of all data: 0.000126
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.13
T Critical of all data: Tcr = 2.84

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cadmium, dissolved, mg/L

Location: MW8

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 44.9
Standard Deviation of all data: 40.3
Largest Observation Concentration of all data: Xn = 213.
Test Statistic, high extreme of all data: Tn = 4.17
T Critical of all data: Tcr = 2.87

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

Chloride, dissolved, mg/L
Location: MW115S

Mean of all data: 31.2
Standard Deviation of all data: 55.9
Largest Observation Concentration of all data: Xn = 373.
Test Statistic, high extreme of all data: Tn = 6.11
T Critical of all data: Tcr = 2.87

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

Chloride, dissolved, mg/L
Location: MW11R

Mean of all data: 14.7
Standard Deviation of all data: 4.34
Largest Observation Concentration of all data: Xn = 25.0
Test Statistic, high extreme of all data: Tn = 2.37
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 25.9
Standard Deviation of all data: 33.5
Largest Observation Concentration of all data: Xn = 230.
Test Statistic, high extreme of all data: Tn = 6.10
T Critical of all data: Tcr = 2.87

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

Chloride, dissolved, mg/L
Location: MW14

Mean of all data: 19.7
Standard Deviation of all data: 5.86
Largest Observation Concentration of all data: Xn = 28.1
Test Statistic, high extreme of all data: Tn = 1.43
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW23D

Mean of all data: 5.89
Standard Deviation of all data: 1.25
Largest Observation Concentration of all data: Xn = 9.70
Test Statistic, high extreme of all data: Tn = 3.05
T Critical of all data: Tcr = 2.33

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 3.49
Standard Deviation of all data: 2.38
Largest Observation Concentration of all data: Xn = 10.1
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 2.33

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

Chloride, dissolved, mg/L
Location: MW6

Mean of all data: 17.1
Standard Deviation of all data: 5.21
Largest Observation Concentration of all data: Xn = 28.0
Test Statistic, high extreme of all data: Tn = 2.09
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chloride, dissolved, mg/L
Location: MW7

Mean of all data: 12.2
Standard Deviation of all data: 3.33
Largest Observation Concentration of all data: Xn = 21.3
Test Statistic, high extreme of all data: Tn = 2.73
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 18.1
Standard Deviation of all data: 7.15
Largest Observation Concentration of all data: Xn = 44.0
Test Statistic, high extreme of all data: Tn = 3.63
T Critical of all data: Tcr = 2.86

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

Chloride, dissolved, mg/L
Location: MW8

Mean of all data: 12.8
Standard Deviation of all data: 3.02
Largest Observation Concentration of all data: Xn = 29.0
Test Statistic, high extreme of all data: Tn = 5.38
T Critical of all data: Tcr = 2.87

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

Chromium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.00236
Standard Deviation of all data: 0.00563
Largest Observation Concentration of all data: Xn = 0.0330
Test Statistic, high extreme of all data: Tn = 5.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00170
Standard Deviation of all data: 0.00386
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 5.25
T Critical of all data: Tcr = 2.87

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

Chromium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000974
Standard Deviation of all data: 0.00228
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 5.26
T Critical of all data: Tcr = 2.86

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

Chromium, dissolved, mg/L
Location: MW121

Mean of all data: 0.00133
Standard Deviation of all data: 0.00298
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 5.59
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00154
Standard Deviation of all data: 0.00261
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 3.24
T Critical of all data: Tcr = 2.87

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

Chromium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.00100
Standard Deviation of all data: 0.0
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Chromium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.000946
Standard Deviation of all data: 0.000194
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 0.277
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00134
Standard Deviation of all data: 0.00337
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 3.76
T Critical of all data: Tcr = 2.77

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/13/2012	0.0140	False		1

Chromium, dissolved, mg/L
Location: MW7

Mean of all data: 0.00177
Standard Deviation of all data: 0.00368
Largest Observation Concentration of all data: Xn = 0.0190
Test Statistic, high extreme of all data: Tn = 4.68
T Critical of all data: Tcr = 2.87

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

Chromium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.00279
Standard Deviation of all data: 0.00857
Largest Observation Concentration of all data: Xn = 0.0510
Test Statistic, high extreme of all data: Tn = 5.63
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00152
Standard Deviation of all data: 0.00324
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 4.47
T Critical of all data: Tcr = 2.87

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

Cobalt, Dis, mg/L

Location: MW115D

Mean of all data: 0.000475
Standard Deviation of all data: 0.000554
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.75
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L

Location: MW115S

Mean of all data: 0.000500
Standard Deviation of all data: 0.000555
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00133
Standard Deviation of all data: 0.00262
Largest Observation Concentration of all data: Xn = 0.0150
Test Statistic, high extreme of all data: Tn = 5.22
T Critical of all data: Tcr = 2.86

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

Cobalt, Dis, mg/L
Location: MW121

Mean of all data: 0.000525
Standard Deviation of all data: 0.000679
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.65
T Critical of all data: Tcr = 2.87

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

Cobalt, Dis, mg/L
Location: MW14

Mean of all data: 0.000675
Standard Deviation of all data: 0.000764
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.04
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00992
Standard Deviation of all data: 0.0287
Largest Observation Concentration of all data: Xn = 0.105
Test Statistic, high extreme of all data: Tn = 3.31
T Critical of all data: Tcr = 2.33

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

Cobalt, Dis, mg/L
Location: MW23S

Mean of all data: 0.00792
Standard Deviation of all data: 0.0250
Largest Observation Concentration of all data: Xn = 0.0910
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Cobalt, Dis, mg/L
Location: MW6

Mean of all data: 0.000444
Standard Deviation of all data: 0.000570
Largest Observation Concentration of all data: Xn = 0.00210
Test Statistic, high extreme of all data: Tn = 2.91
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/11/2011	0.00210	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cobalt, Dis, mg/L
Location: MW7D

Mean of all data: 0.000574
Standard Deviation of all data: 0.000705
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.44
T Critical of all data: Tcr = 2.86

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

Cobalt, Dis, mg/L
Location: MW8

Mean of all data: 0.000563
Standard Deviation of all data: 0.000928
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 4.78
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
12/18/2017	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 10/26/2020
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: 0.00117
Standard Deviation of all data: 0.00347
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 6.00
T Critical of all data: Tcr = 2.87

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

Copper, dissolved, mg/L
Location: MW115S

Mean of all data: 0.00147
Standard Deviation of all data: 0.00385
Largest Observation Concentration of all data: Xn = 0.0190
Test Statistic, high extreme of all data: Tn = 4.56
T Critical of all data: Tcr = 2.87

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

Copper, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000826
Standard Deviation of all data: 0.00135
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.09
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.000890
Standard Deviation of all data: 0.00183
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 4.98
T Critical of all data: Tcr = 2.87

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

Copper, dissolved, mg/L
Location: MW14

Mean of all data: 0.00174
Standard Deviation of all data: 0.00614
Largest Observation Concentration of all data: Xn = 0.0371
Test Statistic, high extreme of all data: Tn = 5.76
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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: Xn = 0.000500
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00152
Standard Deviation of all data: 0.00249
Largest Observation Concentration of all data: Xn = 0.00780
Test Statistic, high extreme of all data: Tn = 2.52
T Critical of all data: Tcr = 2.33

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

Copper, dissolved, mg/L
Location: MW6

Mean of all data: 0.000676
Standard Deviation of all data: 0.000861
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 2.70
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Copper, dissolved, mg/L
Location: MW7

Mean of all data: 0.000700
Standard Deviation of all data: 0.00109
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.94
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.000821
Standard Deviation of all data: 0.00178
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.17
T Critical of all data: Tcr = 2.86

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

Copper, dissolved, mg/L
Location: MW8

Mean of all data: 0.00161
Standard Deviation of all data: 0.00492
Largest Observation Concentration of all data: Xn = 0.0307
Test Statistic, high extreme of all data: Tn = 5.92
T Critical of all data: Tcr = 2.87

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

Cyanide, total, mg/L
Location: MW115D

Mean of all data: 0.00324
Standard Deviation of all data: 0.00409
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.65
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00345
Standard Deviation of all data: 0.00406
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.61
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L
Location: MW11R

Mean of all data: 0.00612
Standard Deviation of all data: 0.0119
Largest Observation Concentration of all data: Xn = 0.0700
Test Statistic, high extreme of all data: Tn = 5.35
T Critical of all data: Tcr = 2.88

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/19/2017	0.0700	False		1

Cyanide, total, mg/L
Location: MW121

Mean of all data: 0.00333
Standard Deviation of all data: 0.00408
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.63
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00664
Standard Deviation of all data: 0.0186
Largest Observation Concentration of all data: Xn = 0.120
Test Statistic, high extreme of all data: Tn = 6.10
T Critical of all data: Tcr = 2.89

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

Cyanide, total, mg/L
Location: MW23D

Mean of all data: 0.00808
Standard Deviation of all data: 0.00253
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 0.760
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Cyanide, total, mg/L
Location: MW23S

Mean of all data: 0.00808
Standard Deviation of all data: 0.00253
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 0.760
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00383
Standard Deviation of all data: 0.00477
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 2.97
T Critical of all data: Tcr = 2.82

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/30/2012	0.0180	False		1

Cyanide, total, mg/L
Location: MW7

Mean of all data: 0.00452
Standard Deviation of all data: 0.00756
Largest Observation Concentration of all data: Xn = 0.0450
Test Statistic, high extreme of all data: Tn = 5.36
T Critical of all data: Tcr = 2.89

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

Cyanide, total, mg/L
Location: MW7D

Mean of all data: 0.00773
Standard Deviation of all data: 0.0233
Largest Observation Concentration of all data: Xn = 0.150
Test Statistic, high extreme of all data: Tn = 6.12
T Critical of all data: Tcr = 2.88

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00355
Standard Deviation of all data: 0.00402
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 1.61
T Critical of all data: Tcr = 2.89

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW115D

Mean of all data: 0.166
Standard Deviation of all data: 0.113
Largest Observation Concentration of all data: Xn = 0.466
Test Statistic, high extreme of all data: Tn = 2.64
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW115S

Mean of all data: 0.196
Standard Deviation of all data: 0.131
Largest Observation Concentration of all data: Xn = 0.571
Test Statistic, high extreme of all data: Tn = 2.87
T Critical of all data: Tcr = 2.87

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.155
Largest Observation Concentration of all data: Xn = 0.645
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.86

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

Fluoride, dissolved, mg/L
Location: MW121

Mean of all data: 0.175
Standard Deviation of all data: 0.120
Largest Observation Concentration of all data: Xn = 0.504
Test Statistic, high extreme of all data: Tn = 2.74
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW14

Mean of all data: 0.0956
Standard Deviation of all data: 0.126
Largest Observation Concentration of all data: Xn = 0.534
Test Statistic, high extreme of all data: Tn = 3.48
T Critical of all data: Tcr = 2.87

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.158
Standard Deviation of all data: 0.151
Largest Observation Concentration of all data: Xn = 0.600
Test Statistic, high extreme of all data: Tn = 2.93
T Critical of all data: Tcr = 2.29

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

Fluoride, dissolved, mg/L
Location: MW23S

Mean of all data: 0.223
Standard Deviation of all data: 0.256
Largest Observation Concentration of all data: Xn = 0.900
Test Statistic, high extreme of all data: Tn = 2.65
T Critical of all data: Tcr = 2.29

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

Fluoride, dissolved, mg/L
Location: MW6

Mean of all data: 0.136
Standard Deviation of all data: 0.115
Largest Observation Concentration of all data: Xn = 0.400
Test Statistic, high extreme of all data: Tn = 2.30
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.512
Standard Deviation of all data: 2.74
Largest Observation Concentration of all data: Xn = 17.4
Test Statistic, high extreme of all data: Tn = 6.16
T Critical of all data: Tcr = 2.87

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

Fluoride, dissolved, mg/L
Location: MW7D

Mean of all data: 0.167
Standard Deviation of all data: 0.129
Largest Observation Concentration of all data: Xn = 0.529
Test Statistic, high extreme of all data: Tn = 2.81
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Fluoride, dissolved, mg/L
Location: MW8

Mean of all data: 0.0606
Standard Deviation of all data: 0.0706
Largest Observation Concentration of all data: Xn = 0.300
Test Statistic, high extreme of all data: Tn = 3.39
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 1.39
Standard Deviation of all data: 1.57
Largest Observation Concentration of all data: Xn = 4.91
Test Statistic, high extreme of all data: Tn = 2.23
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW115S

Mean of all data: 1.82
Standard Deviation of all data: 3.14
Largest Observation Concentration of all data: Xn = 17.6
Test Statistic, high extreme of all data: Tn = 5.03
T Critical of all data: Tcr = 2.87

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

Iron, dissolved, mg/L
Location: MW11R

Mean of all data: 0.497
Standard Deviation of all data: 0.835
Largest Observation Concentration of all data: Xn = 4.06
Test Statistic, high extreme of all data: Tn = 4.27
T Critical of all data: Tcr = 2.86

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 1.60
Standard Deviation of all data: 1.33
Largest Observation Concentration of all data: Xn = 5.40
Test Statistic, high extreme of all data: Tn = 2.87
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Iron, dissolved, mg/L
Location: MW14

Mean of all data: 0.799
Standard Deviation of all data: 0.741
Largest Observation Concentration of all data: Xn = 3.07
Test Statistic, high extreme of all data: Tn = 3.07
T Critical of all data: Tcr = 2.87

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

Iron, dissolved, mg/L
Location: MW23D

Mean of all data: 5.79
Standard Deviation of all data: 19.3
Largest Observation Concentration of all data: Xn = 70.0
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 15.7
Standard Deviation of all data: 56.6
Largest Observation Concentration of all data: Xn = 204.
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

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

Iron, dissolved, mg/L
Location: MW6

Mean of all data: 0.384
Standard Deviation of all data: 0.486
Largest Observation Concentration of all data: Xn = 1.94
Test Statistic, high extreme of all data: Tn = 3.20
T Critical of all data: Tcr = 2.85

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

Iron, dissolved, mg/L
Location: MW7

Mean of all data: 0.433
Standard Deviation of all data: 0.834
Largest Observation Concentration of all data: Xn = 4.96
Test Statistic, high extreme of all data: Tn = 5.43
T Critical of all data: Tcr = 2.91

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 1.52
Standard Deviation of all data: 1.15
Largest Observation Concentration of all data: Xn = 5.14
Test Statistic, high extreme of all data: Tn = 3.15
T Critical of all data: Tcr = 2.86

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

Iron, dissolved, mg/L
Location: MW8

Mean of all data: 0.989
Standard Deviation of all data: 1.19
Largest Observation Concentration of all data: Xn = 5.25
Test Statistic, high extreme of all data: Tn = 3.58
T Critical of all data: Tcr = 2.91

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

Lead, dissolved, mg/L
Location: MW115D

Mean of all data: 0.000525
Standard Deviation of all data: 0.000679
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.65
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.000925
Standard Deviation of all data: 0.00193
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.23
T Critical of all data: Tcr = 2.87

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

Lead, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000538
Standard Deviation of all data: 0.000682
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 3.61
T Critical of all data: Tcr = 2.86

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

Lead, dissolved, mg/L
Location: MW121

Mean of all data: 0.00113
Standard Deviation of all data: 0.00346
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 6.04
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.000400
Standard Deviation of all data: 0.000496
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW23D

Mean of all data: 0.00108
Standard Deviation of all data: 0.000277
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.00200	False		1

Lead, dissolved, mg/L
Location: MW23S

Mean of all data: 0.00215
Standard Deviation of all data: 0.00288
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 2.72
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.0100	True		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000441
Standard Deviation of all data: 0.000561
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 2.78
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Lead, dissolved, mg/L
Location: MW7

Mean of all data: 0.000700
Standard Deviation of all data: 0.00160
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.80
T Critical of all data: Tcr = 2.87

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

Lead, dissolved, mg/L
Location: MW7D

Mean of all data: 0.000590
Standard Deviation of all data: 0.00102
Largest Observation Concentration of all data: Xn = 0.00600
Test Statistic, high extreme of all data: Tn = 5.31
T Critical of all data: Tcr = 2.86

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000648
Standard Deviation of all data: 0.000883
Largest Observation Concentration of all data: Xn = 0.00390
Test Statistic, high extreme of all data: Tn = 3.68
T Critical of all data: Tcr = 2.87

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

Manganese, dissolved, mg/L
Location: MW115D

Mean of all data: 0.321
Standard Deviation of all data: 0.219
Largest Observation Concentration of all data: Xn = 0.590
Test Statistic, high extreme of all data: Tn = 1.23
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L
Location: MW115S

Mean of all data: 0.946
Standard Deviation of all data: 0.340
Largest Observation Concentration of all data: Xn = 1.78
Test Statistic, high extreme of all data: Tn = 2.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.603
Standard Deviation of all data: 1.22
Largest Observation Concentration of all data: Xn = 5.87
Test Statistic, high extreme of all data: Tn = 4.31
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/18/2012	5.87	False		1

Manganese, dissolved, mg/L
Location: MW121

Mean of all data: 0.853
Standard Deviation of all data: 0.398
Largest Observation Concentration of all data: Xn = 1.90
Test Statistic, high extreme of all data: Tn = 2.63
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Manganese, dissolved, mg/L
Location: MW14

Mean of all data: 0.595
Standard Deviation of all data: 0.299
Largest Observation Concentration of all data: Xn = 1.59
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/07/2016	1.59	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.779
Standard Deviation of all data: 2.35
Largest Observation Concentration of all data: Xn = 8.60
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	8.60	False		1

Manganese, dissolved, mg/L
Location: MW23S

Mean of all data: 1.07
Standard Deviation of all data: 3.73
Largest Observation Concentration of all data: Xn = 13.5
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	13.5	False		1

Manganese, dissolved, mg/L
Location: MW6

Mean of all data: 0.120
Standard Deviation of all data: 0.186
Largest Observation Concentration of all data: Xn = 0.840
Test Statistic, high extreme of all data: Tn = 3.87
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.0580
Standard Deviation of all data: 0.184
Largest Observation Concentration of all data: Xn = 1.16
Test Statistic, high extreme of all data: Tn = 5.98
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/09/2012	1.16	False		1

Manganese, dissolved, mg/L

Location: MW7D

Mean of all data: 0.584
Standard Deviation of all data: 0.560
Largest Observation Concentration of all data: Xn = 3.23
Test Statistic, high extreme of all data: Tn = 4.73
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	3.23	False		1

Manganese, dissolved, mg/L

Location: MW8

Mean of all data: 1.86
Standard Deviation of all data: 1.43
Largest Observation Concentration of all data: Xn = 4.11
Test Statistic, high extreme of all data: Tn = 1.58
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.0000900
Standard Deviation of all data: 0.000314
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 6.09
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.00200	False		1

Mercury, dissolved, mg/L
Location: MW115S

Mean of all data: 0.0000400
Standard Deviation of all data: 0.0000496
Largest Observation Concentration of all data: Xn = 0.000100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW11R

Mean of all data: 0.000100
Standard Deviation of all data: 0.000321
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 5.92
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.00200	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.0000400
Standard Deviation of all data: 0.0000496
Largest Observation Concentration of all data: Xn = 0.000100
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW14

Mean of all data: 0.000103
Standard Deviation of all data: 0.000315
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 6.02
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.00200	False		1

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: Xn = 0.000100
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000169
Standard Deviation of all data: 0.000250
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.00100	True		1

Mercury, dissolved, mg/L
Location: MW6

Mean of all data: 0.0000647
Standard Deviation of all data: 0.000155
Largest Observation Concentration of all data: Xn = 0.000900
Test Statistic, high extreme of all data: Tn = 5.37
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.000900	False		1

Mercury, dissolved, mg/L
Location: MW7

Mean of all data: 0.0000475
Standard Deviation of all data: 0.0000640
Largest Observation Concentration of all data: Xn = 0.000300
Test Statistic, high extreme of all data: Tn = 3.95
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.0000462
Standard Deviation of all data: 0.0000555
Largest Observation Concentration of all data: Xn = 0.000200
Test Statistic, high extreme of all data: Tn = 2.77
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Mercury, dissolved, mg/L
Location: MW8

Mean of all data: 0.000620
Standard Deviation of all data: 0.00347
Largest Observation Concentration of all data: Xn = 0.0220
Test Statistic, high extreme of all data: Tn = 6.16
T Critical of all data: Tcr = 2.87

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

Nickel, dissolved, mg/L
Location: MW115D

Mean of all data: 0.00264
Standard Deviation of all data: 0.00428
Largest Observation Concentration of all data: Xn = 0.0240
Test Statistic, high extreme of all data: Tn = 4.99
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00349
Standard Deviation of all data: 0.00427
Largest Observation Concentration of all data: Xn = 0.0180
Test Statistic, high extreme of all data: Tn = 3.40
T Critical of all data: Tcr = 2.87

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

Nickel, dissolved, mg/L
Location: MW11R

Mean of all data: 0.00891
Standard Deviation of all data: 0.0109
Largest Observation Concentration of all data: Xn = 0.0410
Test Statistic, high extreme of all data: Tn = 2.95
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	0.0410	False		1

Nickel, dissolved, mg/L
Location: MW121

Mean of all data: 0.00293
Standard Deviation of all data: 0.00408
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 3.45
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00505
Standard Deviation of all data: 0.00495
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 2.41
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW23D

Mean of all data: 0.00411
Standard Deviation of all data: 0.0128
Largest Observation Concentration of all data: Xn = 0.0465
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.0465	False		1

Nickel, dissolved, mg/L
Location: MW23S

Mean of all data: 0.00968
Standard Deviation of all data: 0.0328
Largest Observation Concentration of all data: Xn = 0.119
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00664
Standard Deviation of all data: 0.00867
Largest Observation Concentration of all data: Xn = 0.0300
Test Statistic, high extreme of all data: Tn = 2.69
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nickel, dissolved, mg/L
Location: MW7

Mean of all data: 0.00714
Standard Deviation of all data: 0.0165
Largest Observation Concentration of all data: Xn = 0.102
Test Statistic, high extreme of all data: Tn = 5.74
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.102	False		1

Nickel, dissolved, mg/L
Location: MW7D

Mean of all data: 0.0101
Standard Deviation of all data: 0.0378
Largest Observation Concentration of all data: Xn = 0.238
Test Statistic, high extreme of all data: Tn = 6.03
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.0123
Standard Deviation of all data: 0.00959
Largest Observation Concentration of all data: Xn = 0.0370
Test Statistic, high extreme of all data: Tn = 2.58
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW115D

Mean of all data: 1.40
Standard Deviation of all data: 1.86
Largest Observation Concentration of all data: Xn = 5.32
Test Statistic, high extreme of all data: Tn = 2.10
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW115S

Mean of all data: 0.353
Standard Deviation of all data: 0.667
Largest Observation Concentration of all data: Xn = 2.40
Test Statistic, high extreme of all data: Tn = 3.07
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	2.40	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 5.40
Standard Deviation of all data: 4.11
Largest Observation Concentration of all data: Xn = 17.0
Test Statistic, high extreme of all data: Tn = 2.83
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW121

Mean of all data: 0.439
Standard Deviation of all data: 0.974
Largest Observation Concentration of all data: Xn = 3.72
Test Statistic, high extreme of all data: Tn = 3.37
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	3.72	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW14

Mean of all data: 0.269
Standard Deviation of all data: 0.520
Largest Observation Concentration of all data: Xn = 2.72
Test Statistic, high extreme of all data: Tn = 4.71
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/02/2016	2.72	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.0731
Standard Deviation of all data: 0.0259
Largest Observation Concentration of all data: Xn = 0.100
Test Statistic, high extreme of all data: Tn = 1.04
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW23S

Mean of all data: 0.237
Standard Deviation of all data: 0.131
Largest Observation Concentration of all data: Xn = 0.450
Test Statistic, high extreme of all data: Tn = 1.62
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L

Location: MW6

Mean of all data: 3.65
Standard Deviation of all data: 3.13
Largest Observation Concentration of all data: Xn = 10.2
Test Statistic, high extreme of all data: Tn = 2.09
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.810
Standard Deviation of all data: 0.545
Largest Observation Concentration of all data: Xn = 1.95
Test Statistic, high extreme of all data: Tn = 2.09
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Nitrate nitrogen, dissolved, mg/L
Location: MW7D

Mean of all data: 0.268
Standard Deviation of all data: 0.553
Largest Observation Concentration of all data: Xn = 2.92
Test Statistic, high extreme of all data: Tn = 4.79
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	2.92	False		1

Nitrate nitrogen, dissolved, mg/L
Location: MW8

Mean of all data: 0.0737
Standard Deviation of all data: 0.102
Largest Observation Concentration of all data: Xn = 0.410
Test Statistic, high extreme of all data: Tn = 3.30
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/12/2018	0.410	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

pH (field), STD
Location: MW115D

Mean of all data: 7.42
Standard Deviation of all data: 0.33
Largest Observation Concentration of all data: Xn = 8.24
Test Statistic, high extreme of all data: Tn = 2.51
T Critical of all data: Tcr = 3.01

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
06/09/2009	6.30	False	-1	

pH (field), STD
Location: MW115S

Mean of all data: 7.41
Standard Deviation of all data: 0.32
Largest Observation Concentration of all data: Xn = 7.97
Test Statistic, high extreme of all data: Tn = 1.72
T Critical of all data: Tcr = 3.01

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/04/2009	6.00	False	-1	

pH (field), STD
Location: MW11R

Mean of all data: 6.82
Standard Deviation of all data: 0.39
Largest Observation Concentration of all data: Xn = 7.47
Test Statistic, high extreme of all data: Tn = 1.64
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

pH (field), STD
Location: MW121

Mean of all data: 7.35
Standard Deviation of all data: 0.26
Largest Observation Concentration of all data: Xn = 7.90
Test Statistic, high extreme of all data: Tn = 2.09
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/11/2009	6.40	False	-1	

pH (field), STD
Location: MW14

Mean of all data: 6.99
Standard Deviation of all data: 0.30
Largest Observation Concentration of all data: Xn = 7.89
Test Statistic, high extreme of all data: Tn = 2.97
T Critical of all data: Tcr = 3.09

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/11/2009	6.00	False	-1	

pH (field), STD
Location: MW23D

Mean of all data: 7.18
Standard Deviation of all data: 0.59
Largest Observation Concentration of all data: Xn = 7.62
Test Statistic, high extreme of all data: Tn = 0.74
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
LT Multiplier: x 0.50
Confidence Level: 95%
Number of Outliers: One Outlier
Transform: None

pH (field), STD
Location: MW23S

Mean of all data: 6.76
Standard Deviation of all data: 0.92
Largest Observation Concentration of all data: Xn = 7.35
Test Statistic, high extreme of all data: Tn = 0.64
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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: Xn = 7.60
Test Statistic, high extreme of all data: Tn = 2.61
T Critical of all data: Tcr = 3.21

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

pH (field), STD
Location: MW7

Mean of all data: 6.94
Standard Deviation of all data: 0.24
Largest Observation Concentration of all data: Xn = 7.98
Test Statistic, high extreme of all data: Tn = 4.43
T Critical of all data: Tcr = 3.23

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/30/1999	7.98	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: Xn = 8.64
Test Statistic, high extreme of all data: Tn = 3.80
T Critical of all data: Tcr = 3.10

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	8.64	False		1

pH (field), STD
Location: MW8

Mean of all data: 7.09
Standard Deviation of all data: 0.26
Largest Observation Concentration of all data: Xn = 7.92
Test Statistic, high extreme of all data: Tn = 3.22
T Critical of all data: Tcr = 3.22

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
02/26/1999	7.92	False		1

Selenium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.000715
Standard Deviation of all data: 0.00168
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.54
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.000593
Standard Deviation of all data: 0.00162
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 5.82
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0100	False		1

Selenium, dissolved, mg/L
Location: MW11R

Mean of all data: 0.00192
Standard Deviation of all data: 0.00399
Largest Observation Concentration of all data: Xn = 0.0170
Test Statistic, high extreme of all data: Tn = 3.78
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	0.0170	False		1

Selenium, dissolved, mg/L
Location: MW121

Mean of all data: 0.000603
Standard Deviation of all data: 0.00175
Largest Observation Concentration of all data: Xn = 0.0110
Test Statistic, high extreme of all data: Tn = 5.95
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0110	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.00160
Standard Deviation of all data: 0.00623
Largest Observation Concentration of all data: Xn = 0.0387
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	0.0387	False		1

Selenium, dissolved, mg/L
Location: MW23D

Mean of all data: 0.000846
Standard Deviation of all data: 0.00125
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	<0.00500	True		1

Selenium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.000846
Standard Deviation of all data: 0.00125
Largest Observation Concentration of all data: Xn = 0.00500
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00285
Standard Deviation of all data: 0.00326
Largest Observation Concentration of all data: Xn = 0.0120
Test Statistic, high extreme of all data: Tn = 2.80
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	0.0120	False		1

Selenium, dissolved, mg/L
Location: MW7

Mean of all data: 0.00156
Standard Deviation of all data: 0.00232
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 3.64
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/12/2011	0.0100	False		1

Selenium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.00100
Standard Deviation of all data: 0.00336
Largest Observation Concentration of all data: Xn = 0.0210
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00145
Standard Deviation of all data: 0.00332
Largest Observation Concentration of all data: Xn = 0.0160
Test Statistic, high extreme of all data: Tn = 4.38
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0160	False		1

Silver, dissolved, mg/L
Location: MW115D

Mean of all data: 0.000475
Standard Deviation of all data: 0.00206
Largest Observation Concentration of all data: Xn = 0.0130
Test Statistic, high extreme of all data: Tn = 6.09
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0130	False		1

Silver, dissolved, mg/L
Location: MW115S

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000455
Standard Deviation of all data: 0.00223
Largest Observation Concentration of all data: Xn = 0.0140
Test Statistic, high extreme of all data: Tn = 6.08
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/10/2013	0.0140	False		1

Silver, dissolved, mg/L
Location: MW121

Mean of all data: 0.000150
Standard Deviation of all data: 0.000324
Largest Observation Concentration of all data: Xn = 0.00200
Test Statistic, high extreme of all data: Tn = 5.71
T Critical of all data: Tcr = 2.87

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

Silver, dissolved, mg/L
Location: MW14

Mean of all data: 0.000350
Standard Deviation of all data: 0.00157
Largest Observation Concentration of all data: Xn = 0.0100
Test Statistic, high extreme of all data: Tn = 6.15
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

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: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW6

Mean of all data: 0.0000956
Standard Deviation of all data: 0.000123
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW7D

Mean of all data: 0.000103
Standard Deviation of all data: 0.000125
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.18
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Silver, dissolved, mg/L
Location: MW8

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 629
Standard Deviation of all data: 226
Largest Observation Concentration of all data: Xn = 1160
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW115S

Mean of all data: 592
Standard Deviation of all data: 179
Largest Observation Concentration of all data: Xn = 1390
Test Statistic, high extreme of all data: Tn = 4
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/20/2015	1390	False		1

Specific Conductance (field), micromhos/cm
Location: MW11R

Mean of all data: 1140
Standard Deviation of all data: 554
Largest Observation Concentration of all data: Xn = 2100
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 590
Standard Deviation of all data: 95
Largest Observation Concentration of all data: Xn = 727
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW14

Mean of all data: 1009
Standard Deviation of all data: 201
Largest Observation Concentration of all data: Xn = 1270
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW23D

Mean of all data: 582
Standard Deviation of all data: 484
Largest Observation Concentration of all data: Xn = 2180
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2180	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 543
Standard Deviation of all data: 688
Largest Observation Concentration of all data: Xn = 2800
Test Statistic, high extreme of all data: Tn = 3
T Critical of all data: Tcr = 2

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800	False		1

Specific Conductance (field), micromhos/cm
Location: MW6

Mean of all data: 979
Standard Deviation of all data: 323
Largest Observation Concentration of all data: Xn = 1566
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW7

Mean of all data: 1143
Standard Deviation of all data: 191
Largest Observation Concentration of all data: Xn = 1470
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 778
Standard Deviation of all data: 256
Largest Observation Concentration of all data: Xn = 1340
Test Statistic, high extreme of all data: Tn = 2
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Specific Conductance (field), micromhos/cm
Location: MW8

Mean of all data: 1323
Standard Deviation of all data: 385
Largest Observation Concentration of all data: Xn = 1899
Test Statistic, high extreme of all data: Tn = 1
T Critical of all data: Tcr = 3

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	20	False	-1	

Sulfate, dissolved, mg/L
Location: MW115D

Mean of all data: 30.0
Standard Deviation of all data: 7.20
Largest Observation Concentration of all data: Xn = 46.1
Test Statistic, high extreme of all data: Tn = 2.23
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 34.5
Standard Deviation of all data: 12.7
Largest Observation Concentration of all data: Xn = 78.7
Test Statistic, high extreme of all data: Tn = 3.49
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	78.7	False		1

Sulfate, dissolved, mg/L
Location: MW11R

Mean of all data: 382.
Standard Deviation of all data: 293.
Largest Observation Concentration of all data: Xn = 989.
Test Statistic, high extreme of all data: Tn = 2.07
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW121

Mean of all data: 25.9
Standard Deviation of all data: 14.4
Largest Observation Concentration of all data: Xn = 96.6
Test Statistic, high extreme of all data: Tn = 4.92
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2013	96.6	False		1

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 70.5
Largest Observation Concentration of all data: Xn = 361.
Test Statistic, high extreme of all data: Tn = 2.55
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW23D

Mean of all data: 127.
Standard Deviation of all data: 358.
Largest Observation Concentration of all data: Xn = 1320.
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	1320.	False		1

Sulfate, dissolved, mg/L
Location: MW23S

Mean of all data: 174.
Standard Deviation of all data: 567.
Largest Observation Concentration of all data: Xn = 2060.
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 256.
Standard Deviation of all data: 207.
Largest Observation Concentration of all data: Xn = 610.
Test Statistic, high extreme of all data: Tn = 1.71
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW7

Mean of all data: 255.
Standard Deviation of all data: 89.0
Largest Observation Concentration of all data: Xn = 434.
Test Statistic, high extreme of all data: Tn = 2.02
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Sulfate, dissolved, mg/L
Location: MW7D

Mean of all data: 94.9
Standard Deviation of all data: 61.3
Largest Observation Concentration of all data: Xn = 261.
Test Statistic, high extreme of all data: Tn = 2.71
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 656.
Standard Deviation of all data: 127.
Largest Observation Concentration of all data: Xn = 1120.
Test Statistic, high extreme of all data: Tn = 3.65
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
05/14/2018	1120.	False		1

Thallium, dissolved, mg/L
Location: MW115D

Mean of all data: 0.000175
Standard Deviation of all data: 0.000474
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.00300	False		1

Thallium, dissolved, mg/L
Location: MW115S

Mean of all data: 0.000100
Standard Deviation of all data: 0.000124
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.21
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000196
Standard Deviation of all data: 0.000621
Largest Observation Concentration of all data: Xn = 0.00390
Test Statistic, high extreme of all data: Tn = 5.97
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/19/2015	0.00390	False		1

Thallium, dissolved, mg/L
Location: MW121

Mean of all data: 0.000175
Standard Deviation of all data: 0.000474
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.87

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

Thallium, dissolved, mg/L
Location: MW14

Mean of all data: 0.000175
Standard Deviation of all data: 0.000474
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 0.0
T Critical of all data: Tcr = 0.0

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Thallium, dissolved, mg/L
Location: MW23S

Mean of all data: 0.000423
Standard Deviation of all data: 0.000624
Largest Observation Concentration of all data: Xn = 0.00250
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/26/2019	<0.00250	True		1

Thallium, dissolved, mg/L
Location: MW6

Mean of all data: 0.0000956
Standard Deviation of all data: 0.000123
Largest Observation Concentration of all data: Xn = 0.000250
Test Statistic, high extreme of all data: Tn = 1.25
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 0.000175
Standard Deviation of all data: 0.000474
Largest Observation Concentration of all data: Xn = 0.00300
Test Statistic, high extreme of all data: Tn = 5.96
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	0.00300	False		1

Thallium, dissolved, mg/L
Location: MW7D

Mean of all data: 0.000282
Standard Deviation of all data: 0.00111
Largest Observation Concentration of all data: Xn = 0.00700
Test Statistic, high extreme of all data: Tn = 6.05
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
03/15/2012	0.00700	False		1

Thallium, dissolved, mg/L
Location: MW8

Mean of all data: 0.000125
Standard Deviation of all data: 0.000188
Largest Observation Concentration of all data: Xn = 0.00100
Test Statistic, high extreme of all data: Tn = 4.66
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 372.
Standard Deviation of all data: 165.
Largest Observation Concentration of all data: Xn = 920.
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.97

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
09/14/2015	920.	False		1

Total Dissolved Solids, mg/L
Location: MW115S

Mean of all data: 309.
Standard Deviation of all data: 109.
Largest Observation Concentration of all data: Xn = 684.
Test Statistic, high extreme of all data: Tn = 3.43
T Critical of all data: Tcr = 2.98

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/07/2013	684.	False		1

Total Dissolved Solids, mg/L
Location: MW11R

Mean of all data: 968.
Standard Deviation of all data: 407.
Largest Observation Concentration of all data: Xn = 1510.
Test Statistic, high extreme of all data: Tn = 1.33
T Critical of all data: Tcr = 3.05

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 336.
Standard Deviation of all data: 96.2
Largest Observation Concentration of all data: Xn = 604.
Test Statistic, high extreme of all data: Tn = 2.79
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	<0.0	True	-1	

Total Dissolved Solids, mg/L
Location: MW14

Mean of all data: 729.
Standard Deviation of all data: 135.
Largest Observation Concentration of all data: Xn = 1040.
Test Statistic, high extreme of all data: Tn = 2.31
T Critical of all data: Tcr = 3.06

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
08/28/2018	289.	False	-1	

Total Dissolved Solids, mg/L
Location: MW23D

Mean of all data: 372.
Standard Deviation of all data: 427.
Largest Observation Concentration of all data: Xn = 1790.
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 415.
Standard Deviation of all data: 718.
Largest Observation Concentration of all data: Xn = 2800.
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	2800.	False		1

Total Dissolved Solids, mg/L
Location: MW6

Mean of all data: 821.
Standard Deviation of all data: 314.
Largest Observation Concentration of all data: Xn = 1660.
Test Statistic, high extreme of all data: Tn = 2.67
T Critical of all data: Tcr = 3.19

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L
Location: MW7

Mean of all data: 847.
Standard Deviation of all data: 149.
Largest Observation Concentration of all data: Xn = 1320.
Test Statistic, high extreme of all data: Tn = 3.17
T Critical of all data: Tcr = 3.21

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

Based on Grubbs one-sided outlier test

Hutsonville Ash Impoundment
Outlier Analysis Results

User Supplied Information

Date Range: 01/01/1984 to 10/26/2020
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: 468.
Standard Deviation of all data: 184.
Largest Observation Concentration of all data: Xn = 1010.
Test Statistic, high extreme of all data: Tn = 2.95
T Critical of all data: Tcr = 3.07

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Total Dissolved Solids, mg/L

Location: MW8

Mean of all data: 1260.
Standard Deviation of all data: 361.
Largest Observation Concentration of all data: Xn = 1960.
Test Statistic, high extreme of all data: Tn = 1.95
T Critical of all data: Tcr = 3.21

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side

No Outliers

Zinc, dissolved, mg/L

Location: MW115D

Mean of all data: 0.00781
Standard Deviation of all data: 0.0191
Largest Observation Concentration of all data: Xn = 0.119
Test Statistic, high extreme of all data: Tn = 5.83
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	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 10/26/2020
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: 0.00833
Standard Deviation of all data: 0.0171
Largest Observation Concentration of all data: Xn = 0.0880
Test Statistic, high extreme of all data: Tn = 4.66
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0880	False		1

Zinc, dissolved, mg/L
Location: MW11R

Mean of all data: 0.0175
Standard Deviation of all data: 0.0258
Largest Observation Concentration of all data: Xn = 0.137
Test Statistic, high extreme of all data: Tn = 4.63
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
01/20/2014	0.137	False		1

Zinc, dissolved, mg/L
Location: MW121

Mean of all data: 0.00633
Standard Deviation of all data: 0.0130
Largest Observation Concentration of all data: Xn = 0.0740
Test Statistic, high extreme of all data: Tn = 5.19
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00448
Standard Deviation of all data: 0.00729
Largest Observation Concentration of all data: Xn = 0.0420
Test Statistic, high extreme of all data: Tn = 5.15
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0420	False		1

Zinc, dissolved, mg/L
Location: MW23D

Mean of all data: 0.0192
Standard Deviation of all data: 0.0513
Largest Observation Concentration of all data: Xn = 0.190
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
10/28/2019	0.190	False		1

Zinc, dissolved, mg/L
Location: MW23S

Mean of all data: 0.0508
Standard Deviation of all data: 0.165
Largest Observation Concentration of all data: Xn = 0.600
Test Statistic, high extreme of all data: Tn = 3.33
T Critical of all data: Tcr = 2.33

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00579
Standard Deviation of all data: 0.00698
Largest Observation Concentration of all data: Xn = 0.0290
Test Statistic, high extreme of all data: Tn = 3.32
T Critical of all data: Tcr = 2.80

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0290	False		1

Zinc, dissolved, mg/L
Location: MW7

Mean of all data: 0.00493
Standard Deviation of all data: 0.00692
Largest Observation Concentration of all data: Xn = 0.0320
Test Statistic, high extreme of all data: Tn = 3.91
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
04/21/2014	0.0320	False		1

Zinc, dissolved, mg/L
Location: MW7D

Mean of all data: 0.00581
Standard Deviation of all data: 0.0101
Largest Observation Concentration of all data: Xn = 0.0480
Test Statistic, high extreme of all data: Tn = 4.16
T Critical of all data: Tcr = 2.86

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
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 10/26/2020
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: 0.00806
Standard Deviation of all data: 0.0111
Largest Observation Concentration of all data: Xn = 0.0600
Test Statistic, high extreme of all data: Tn = 4.69
T Critical of all data: Tcr = 2.87

Sample Date	Value	LT_Value	Outlier Low Side	Outlier High Side
07/21/2014	0.0600	False		1

Based on Grubbs one-sided outlier test

APPENDIX C2
TEST DESCRIPTIONS

ELECTRIC POWER RESEARCH INSTITUTE

MANAGES

Groundwater Data Management and Evaluation Software

Software Manual Product ID #1012581

Software Manual, February 2010

EPRI Project Manager
K. Ladwig

ELECTRIC POWER RESEARCH INSTITUTE
3420 Hillview Avenue, Palo Alto, California 94304-1338 ▪ PO Box 10412, Palo Alto, California 94303-0813 ▪ USA
800.313.3774 ▪ 650.855.2121 ▪ askepri@epri.com ▪ www.epri.com

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITIES

ELECTRIC POWER RESEARCH INSTITUTE, INC. ("EPRI") RESERVES ALL RIGHTS IN THE PROGRAM AS DELIVERED. THE PROGRAM OR ANY PORTION THEREOF MAY NOT BE REPRODUCED IN ANY FORM WHATSOEVER EXCEPT AS PROVIDED BY LICENSE, WITHOUT THE CONSENT OF EPRI.

A LICENSE UNDER EPRI'S RIGHTS IN THE PROGRAM CAN BE OBTAINED DIRECTLY FROM EPRI.

THE EMBODIMENTS OF THIS PROGRAM AND SUPPORTING MATERIALS MAY BE INDEPENDENTLY AVAILABLE FROM ELECTRIC POWER SOFTWARE CENTER (EPSC) FOR AN APPROPRIATE DISTRIBUTION FEE.

Electric Power Software Center (EPSC)
9625 Research Drive
Charlotte, NC 28262

THIS NOTICE MAY NOT BE REMOVED FROM THE PROGRAM BY ANY USER THEREOF.

NEITHER EPRI, ANY MEMBER OF EPRI, THE ORGANIZATION(S) BELOW, NOR ANY PERSON ACTING ON BEHALF OF ANY OF THEM:

1. MAKES ANY WARRANTY OR REPRESENTATION WHATSOEVER, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS OF ANY PURPOSE WITH RESPECT TO THE PROGRAM ; OR
2. ASSUMES ANY LIABILITY WHATSOEVER WITH RESPECT TO ANY USE OF THE PROGRAM OR ANY PORTION THEREOF OR WITH RESPECT TO ANY DAMAGES WHICH MAY RESULT FROM SUCH USE.

RESTRICTED RIGHTS LEGEND: USE, DUPLICATION, OR DISCLOSURE BY THE GOVERNMENT IS SUBJECT TO RESTRICTION AS SET FORTH IN PARAGRAPH (G) (3) (I), WITH THE EXCEPTION OF PARAGRAPH (G) (3) (I) (B) (5), OF THE RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE CLAUSE IN FAR 52.227-14, ALTERNATE III.

Research Contractor Company Name (add others on lines below if more than one)

NOTE

For further information about EPRI, call the EPRI Customer Assistance Center at 800.313.3774 or e-mail askepri@epri.com.

10
STATISTICAL ANALYSIS

Stand-Alone Statistical Tests

Statistical Evaluation Report

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

User Selections:

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

Mann-Kendall Trend and Seasonal Analysis Tests

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

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

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

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

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

Kruskal-Wallis Analysis (Test for Seasonality)

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

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

	or $Z_i \geq SCL$.

Outlier Tests

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

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

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

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

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

User Selections:

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

Technical Details

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

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

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

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

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

Other Statistical Calculations Used in MANAGES

Sen Estimate of Slope

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

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

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

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

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

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

Coefficient of Skewness for Normality

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