Intended for
AmerenEnergy Medina Valley CoGen, LLC

Date
March 25, 2022

Project No.
1940100700

2021 ANNUAL REPORT

MEREDOSIA POWER STATION

RAMBOLL Bright ideas. Sustainable change.

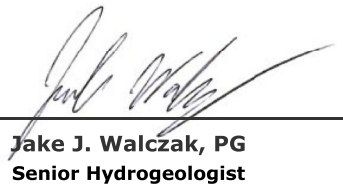
2021 ANNUAL REPORT
MEREDOSIA POWER STATION

Project name	**Meredosia Power Station**
Project no.	**1940100700**
Recipient	**AmerenEnergy Medina Valley CoGen, LLC**
Document type	**2021 Annual Report**
Revision	**0**
Version	**FINAL**
Date	**March 25, 2022**
Prepared by	**Ruta Deshpande, EIT**
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 Deshpande, EIT
Environmental Engineer



Jake J. Walczak, PG
Senior Hydrogeologist

CONTENTS

TABLES

FIGURES

APPENDICES

Appendix A	Monitoring Well Boring and Installation Logs
Appendix B	Groundwater Monitoring Results 2020-2021
Appendix C	Statistical Output (on CD)
	C1 Outlier Test
	C2 Test Descriptions
Appendix D	Site Inspection Reports

ACRONYMS AND ABBREVIATIONS

Ameren	AmerenEnergy Medina Valley Cogen, LLC
Class I Groundwater Standard	Groundwater Quality Standards for Class I: Potable Resource Groundwater (35 IAC 620.410)
GMZ	Groundwater Management Zone
GMP	Groundwater Monitoring Plan
HDPE	High-density polyethylene
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
Meredosia	Meredosia Power Station
mg/L	milligrams per liter
TDS	total dissolved solids
Ameren	AmerenEnergy Medina Valley Cogen, LLC

1. INTRODUCTION

1.1 Background

This 2021 Annual Report has been prepared for AmerenEnergy Medina Valley Cogen, LLC (Ameren) for the Meredosia Power Station (Meredosia, Figure 1-1, note that base map property lines were updated based on March 2019 Plat of Survey). The Old Ash Pond was decommissioned and capped during the 1970's (Kleinfelder West, Inc., 2011), and is not addressed in this groundwater monitoring program. Ameren completed closure activities for the Fly Ash Pond and Bottom Ash Pond in accordance with the Closure Plan (Geotechnology, Inc., 2018a) and site-specific closure requirements of Title 35 of the Illinois Administrative Code (IAC) Section 840 in December 2018. Closure activities, which included grading, placement of a high-density polyethylene (HDPE) geomembrane covered with ClosureTurf®/ArmorFill® synthetic turf, and construction of surface water control structures, began in March 2018 and were completed as of December 5, 2018.

The current groundwater monitoring network comprises 14 monitoring wells, including five installed in October 2010 (APW-1 through APW-5), four installed in October 2015 (APW-6 through APW-9), three installed in August 2018 (APW-10 through APW-12) and two installed in July 2021 (APW-13 and APW-14). From 2010 to 2012, monitoring wells APW-1 through APW-5 were sampled. Beginning in June 2017 and in accordance with the Groundwater Monitoring Plan (GMP) dated December 14, 2016 (Geotechnology, Inc.), groundwater sampling was restarted and conducted quarterly at monitoring wells APW-1 through APW-9. Beginning in September 2018 and in accordance with the GMP, monitoring wells APW-10, APW-11, and APW-12 were incorporated into the well network and were sampled quarterly along with wells APW-1 through APW-9. Monitoring wells APW-13 and APW-14 were incorporated into the well network in July 2021. These two wells have been dry since the installation, hence groundwater samples have not been collected at these locations. Monitoring wells were installed to define the lateral extent of impacts on site, as well as to assist in future groundwater monitoring of remedial actions. Locations of all monitoring wells are shown on Figure 1-2.

In conjunction with Ameren's request for approval of the Closure Plan, Ameren submitted a Groundwater Management Zone Plan, Fly Ash and Bottom Ash Pond, Meredosia Power Station (Geotechnology, Inc., 2016b) and a request to establish the Groundwater Management Zone (GMZ) pursuant to 35 IAC 620.250(a)(2): Ash Ponds Closure, Groundwater Management Zone Application, dated October 17, 2017, which was approved by the Illinois Environmental Protection Agency (IEPA) on November 1, 2017.

The GMP, 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 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.

Seven rounds of pre-closure groundwater data and twelve rounds of post-closure data have been collected between June 2017 and December 2021 to satisfy requirements of the GMP (Geotechnology, Inc., 2016a). This is the fifth annual report for Meredosia since groundwater monitoring was restarted in 2017. This annual report includes the following elements:

- Monitoring well boring and installation logs for the 14 currently installed wells, APW-1 through APW-14 (Appendix A).
- A summary of post-closure groundwater monitoring data in 2020 and 2021. Data tables are included in Appendix B.
- Methodology for the trend analysis and the outlier analysis along with the results for outlier analysis (Appendix C).
- Quarterly Site Inspection Forms, including observations and descriptions of any maintenance activities performed on the pond cap, embankment, roadway, and remaining basin (Appendix D).

1.2 Groundwater Quality Overview – 2019 to 2021

1.2.1 Summary of Cover System Construction and Maintenance

Closure activities, which included grading, placement of an HDPE geomembrane covered with ClosureTurf®/ArmorFill® synthetic turf, and construction of surface water control structures, began in March 2018 and were completed as of December 5, 2018.

Inspections of the cover system are performed on a quarterly schedule. Routine maintenance activities are performed at the Fly Ash Pond and Bottom Ash Pond, as needed and as soon as practicable after issues are identified, and may 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 Care Plan (Geotechnology, Inc., 2018b).

1.2.2 Summary of 2019 to 2021 Groundwater Quality Data

Groundwater quality data since completion of closure in December 2018 were reviewed to assess the overall condition of the groundwater and the performance of the cover system. This review was performed independently from the compliance evaluations required by the GMP (Geotechnology, Inc., 2016a), 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 constituent for coal ash leachate impacts to groundwater at the Fly Ash Pond and Bottom Ash Pond in the Closure Plan (Geotechnology, Inc., 2018a). As such, boron was selected for this groundwater quality data review. Boron concentrations over time since 2019 are presented in Figures 1-3 through 1-14. 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 2019 and most are currently below the Class I Groundwater Standard.

Arsenic was also identified as an indicator constituent for coal ash at the Fly Ash Pond and Bottom Ash Pond in the Closure Plan (Geotechnology, Inc., 2018a). Arsenic concentrations over time since 2019 are presented in Figures 1-15 through 1-26. Similar to boron, arsenic concentrations have generally been stable or decreasing since the closure completion. As further explained in Section 3, no statistically significant increasing trends that were above the Class I Groundwater Standard for arsenic were identified during the post-closure period.

1.2.3 Conclusion

The stable or decreasing indicator constituent concentrations (boron and arsenic) in the majority of compliance monitoring wells across the site is a strong indication that the cover system is functioning to improve overall groundwater quality beneath the pond. This observation is consistent with the results of groundwater modeling performed to simulate changes in groundwater quality resulting from pond closure.

2. GROUNDWATER MONITORING PLAN COMPLIANCE

2.1 Applicable Groundwater Quality Standards

2.1.1 On-Site Groundwater Standards

Pursuant to 35 IAC 620.450(a), the on-site groundwater quality shall be restored to the Groundwater Quality Standards for Class I: Potable Resource Groundwater (Class I Groundwater Standard) (35 IAC 620.410). Based on modeling results, it is anticipated that compliance with Class I Groundwater Standards will be achieved approximately six years after closure activities are complete.

If upon completion of the 30-year post-closure care period the observed concentrations in the site groundwater still exceed a Class I Groundwater Standard, the on-site standard may be adjusted, provided criteria are addressed to the satisfaction of the IEPA.

2.1.2 Off-Site Groundwater Standards

For off-site groundwater compliance, the Class I Groundwater Standards are used (35 IAC 620.410). A GMZ was requested and approved for Meredosia as part of the Closure Plan.

2.2 Demonstration of Compliance

Compliance will be based on attainment of post-closure groundwater quality that meets the Class I Groundwater Standards, as set forth in 35 IAC 620.410. Groundwater quality shall be in compliance when groundwater concentrations are below the Class I Groundwater Standards and there are no statistically significant increasing trends at the compliance GMZ boundary. The trend analysis shall be performed on a minimum of eight (8) consecutive post-closure groundwater samples and use Sen's Estimate of Slope for assessing groundwater concentration trends as discussed in Section 5.2 of the GMP (Geotechnology, Inc., 2016a).

2.2.1 Compliance Determination

As described in Section 5.2 of the GMP:

- GMZ compliance is demonstrated by performing an annual trend analysis for each monitoring well located at the downgradient boundaries of the Meredosia Power Station (Table 1-2) for all constituents listed in Table 1-3. The analysis shall use Sen's Estimate of Slope and be performed on a minimum of eight consecutive samples.
- If the results of sampling and analysis show a positive slope at any compliance monitoring well located at the downgradient boundaries of the Meredosia Power Station, a Mann-Kendall test will be performed at 95 percent confidence to determine whether or not the positive slope represents a statistically significant increasing trend. Ameren will investigate the cause of a statistically significant increasing trend as described below.
  - Notification of statistically significant increasing trends and revision to the sampling frequency must be reported to the IEPA within 30 days of making the determinations.
  - If the investigation attributes a statistically significant increasing trend to a superseding cause, Ameren will notify the IEPA in writing, stating the cause of the increasing trend and providing the rationale used in such a determination.

- If there is no superseding cause and the statistically significant increasing trend continues to be observed over two or more consecutive years, a hydrogeologic investigation (and additional site investigation(s), if necessary) will be performed.

Based on the outcome of the investigation above, Ameren will take action to mitigate statistically significant increasing trends that are causing, threatening or allowing exceedances of off-site groundwater quality standards. 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.

The point of compliance wells for the subject property will be APW-2 and APW-3. These wells are located adjacent to the Illinois River and downgradient relative to the site. If remedial activities do not reduce the contaminant concentrations to levels below the Class I groundwater standards, a plan for post-remediation monitoring will be submitted to the IEPA (Geotechnology, Inc., 2016b).

3. DATA ANALYSIS

3.1 Groundwater Flow

Groundwater flow for 2021 is represented using groundwater elevation contour maps for each quarterly sampling event (Figures 3-1 through 3-4). Two additional monitoring wells, APW-13 and APW-14, were installed in July 2021. Locations of these wells are shown on Figure 1-1, Figure 3-3, and Figure 3-4, and boring logs and well construction forms are available in Appendix A. The two monitoring wells were dry in the September 2021 and November 2021 monitoring events following installation in July 2021. Groundwater in the uppermost aquifer generally flowed from east to west and northwest towards the Illinois River during 2021, which is consistent with past evaluations.

Flooding along the Illinois River and southwest of the Fly Ash Pond was observed during the June 2021 (Figure 3-2) and November 2021 (Figure 3-4) monitoring events as a result of elevated river stage. Water levels at several wells could not be measured during June 2021 and November 2021 monitoring events. Although flooding was observed in June 2021 (Figure 3-2), no temporary reversal of groundwater flow direction was observed, and groundwater generally flowed from east to northwest towards the Illinois River. In November 2021 (Figure 3-4), a temporary flow reversal was observed near the east side of Fly Ash Pond, however, groundwater flow converged between the Fly Ash Pond and Old Ash Pond and the primary groundwater flow direction at the site was from east to west and northwest towards the Illinois River.

3.2 Review of Analytical Data (2020-2021)

Groundwater samples from the most recent eight post-closure monitoring events were collected on February 17, 2020; April 27, 2020; July 29, 2020; December 4, 2020, January 26, 2021; June 30, 2021; September 17, 2021; and November 11, 2021/December 13, 2021. All field and laboratory analytical results are tabulated in Appendix B. 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:

- Wells APW-13 and APW-14 were dry during the third and fourth quarter sampling events of 2021.
- Wells APW-4 and APW-12 were not sampled during the November 11, 2021 fourth quarter sampling event due to flooding in the area. These wells were sampled in the fourth quarter on December 13, 2021.
- During the December 2021 sampling event, bailers were used to collect groundwater samples from monitoring wells APW-4 and APW-12 instead of a portable pumping device.
- During the November 2021 and December 2021 sampling events samples were filtered in laboratory instead of in the field.

As discussed in Section 1.2, and according to the GMP, eight post-closure samples are required to conduct trend analyses for compliance. Since eight rounds of post-closure data are now available for all monitoring wells (except APW-13 and APW-14), trend analysis was completed and is presented in this 2021 Annual Report.

Results of groundwater monitoring for constituents that exceeded the Class I Groundwater Standard when the GMZ was established (boron, arsenic, iron, manganese, and sulfate) are discussed below.

- Boron has been identified as the primary indicator constituent for coal ash impacts to groundwater at the Fly Ash Pond and Bottom Ash Pond (see Section 1.2.2). In the 2020-2021 monitoring period, dissolved boron concentrations ranged from 0.043 to 6.8 milligrams per liter (mg/L) and total boron concentrations ranged from 0.049 to 7.0 mg/L in upgradient monitoring wells. In midgradient monitoring wells, dissolved boron concentrations ranged from 0.11 to 7.6 mg/L and total boron concentrations ranged from 0.1 to 8.1 mg/L. In downgradient monitoring wells, dissolved boron concentrations ranged from 0.062 to 18 mg/L and total boron concentrations ranged from 0.065 to 20 mg/L (Figures 3-6 through 3-9). As discussed in Sections 1.2.2-1.2.3, boron concentrations have been stable or decreasing in the majority of compliance monitoring wells across the site since closure which indicates that the cover system is functioning to improve overall groundwater quality beneath the ponds.
- Arsenic has also been identified as an indicator for coal ash impacts to groundwater at the Fly Ash Pond and Bottom Ash Pond (see Section 1.2.2). In the 2020-2021 monitoring period, dissolved arsenic ranged from 0.0004 to 0.0008 mg/L and total arsenic concentrations ranged from 0.0004 to 0.0059 mg/L in upgradient monitoring wells. In midgradient monitoring wells, dissolved arsenic concentrations ranged from 0.0004 to 0.0018 mg/L and total arsenic concentrations ranged from 0.0005 to 0.036 mg/L. In downgradient monitoring wells, dissolved arsenic concentrations ranged from 0.0004 to 0.27 mg/L and total arsenic concentrations ranged from 0.0006 to 0.31 mg/L (Figures 3-10 through 3-13). As discussed in Sections 1.2.2-1.2.3, arsenic concentrations have generally been stable or decreasing in the majority of compliance monitoring wells across the site since closure which indicates that the cover system is functioning to improve overall groundwater quality beneath the ponds.
- For sulfate, a non-indicator constituent, box-whisker plots and timeseries plots illustrating concentrations for the most recent eight monitoring events (2020-2021) were developed (Figures 3-14 and 3-15). Similar to the identified indicator parameters, sulfate showed generally stable trends during this reporting period.
- Changes of oxidation/reduction (redox) potential in the subsurface due to fluctuations in pH make evaluation of manganese and iron concentrations unreliable at this facility (Geotechnology, Inc., 2016b).

3.3 Statistical Analyses

Analytical data were evaluated to identify short-term (compliance) data trends in the 2020-2021 dataset. Trends were evaluated according to the procedure outlined in the GMP (Geotechnology, Inc., 2016a).

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.

The Grubbs outlier test determined 64 outliers from the 2021 sampling events out of which 41 outliers were from quarter four of 2021. The high number of outliers from November 2021 and December 2021 sampling events can be potentially attributed to sampling anomalies. As discussed in section 3.2, December 2021 samples were collected using bailers and December 2021 samples were laboratory filtered instead of field filtered. Outliers identified during the

compliance period (2020-2021) by the Grubbs outlier test based on the date range of 2010-2021 were not eliminated from further statistical analysis.

3.3.2 Sen's Estimate of Slope

Sen's estimate of slope is a non-parametric estimator of trend. It is the median of all slopes between all possible unique pairs of individual data points in the time period being analyzed. The slopes represent the rate of change of the measured parameter, with the y-axis being the parameter value and the x-axis being calendar time. The method is robust, and fairly insensitive to the presence of a small fraction of outliers and non-detect data values. The test methodology are listed in Appendix C2.

Data collected in 2020-2021 show 9 cases with positive slopes, 11 cases with negative slopes, and 32 cases with no slope for wells where concentrations above the Class I Groundwater Standard were identified (Table 3-1). Sen's estimate of slope was not determined for wells where concentrations were below the Class I Groundwater Standard during 2020-2021. The 9 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 Table 3-1.

The Mann-Kendall test detected four cases of increasing trends in the 2020-2021 dataset. The increasing short-term trends occurred for total iron at well APW-3, total and dissolved boron at APW-10, and total manganese at APW-12.

3.4 Site Inspection

The Post-Closure Maintenance Program requires quarterly inspection for the first five years after closure (i.e. through 2023). After five years, the inspection frequency can be reduced to semi-annually provided that semi-annual groundwater monitoring has been approved by IEPA. After five years of semiannual monitoring, the inspection frequency can be reduced to annually pending approval of annual groundwater monitoring. Discontinuance of site inspections will occur after IEPA 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 from 2021 are included in Appendix D.

Site inspections were performed on March 16, 2021, June 8, 2021, September 10, 2021, and November 29, 2021. As noted in the March 2021 inspection report, advancing erosion at Northeast Outlet beyond the toe of the berm was repaired. The June 2021 report noted need for spraying herbicide to address weeds in riprap. Weeds were sprayed with herbicide in July 2021 and September 2021. Based on these reports, all the components of the ClosureTurf®/ArmorFill® synthetic turf cover system are in good condition.

4. EVALUATION OF COMPLIANCE AND CONCLUSIONS

Cover system construction and maintenance, as well as stable or decreasing boron and arsenic concentrations in the majority of compliance monitoring wells across the site is a strong indication that the cover system is functioning to improve overall groundwater quality beneath the pond.

Statistical analyses of analytical results for the most recent eight rounds of groundwater samples collected for 2020 to 2021 compliance period at the Meredosia Fly Ash Pond and Bottom Ash Pond identified increasing short-term trends above the Class I Groundwater Standard for total iron at APW-3, total and dissolved boron at APW-10, and total manganese at APW-12. These were isolated cases and not repeated from the 2019-2020 monitoring period; as such, no further action is required at this time. The concentration of total iron at APW-3, total and dissolved boron at APW-10, and total manganese at APW-12 will continue to be monitored and evaluated in 2022.

5. REFERENCES

Geotechnology, Inc., 2016a. *Groundwater Monitoring Plan, Fly Ash Pond and Bottom Ash Pond, Meredosia Power Station*. December 14, 2016.

Geotechnology, Inc., 2016b. *Groundwater Management Zone Plan, Fly Ash Bottom Ash Pond, Meredosia Power Station, 800 South Washington Street, Meredosia, Illinois*. December 22, 2016.

Geotechnology, Inc., 2018a. *Closure Plan, Meredosia Power Station*. March 12, 2018.

Geotechnology, Inc., 2018b. *Post-Closure Care Plan, Meredosia Power Station*. March 12, 2018.

Illinois Environmental Protection Agency (IEPA), 1991. *Groundwater Quality Standards for Class I: Potable Resource Groundwater*, Title 35 of the Illinois Administrative Code Part 620: Groundwater Quality, amended 2013.

Kleinfelder West, Inc., 2011. *Coal Ash Impoundment Site Assessment Final Report, Meredosia Power Station, Ameren Energy Generating Company, Meredosia, Illinois.* May 10, 2011.

TABLES

Table 1-1. Groundwater Monitoring Program Schedule
2021 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Frequency	Duration	Sampling Quarter
Quarterly	Begins: June 2017	January- March (1) April - June (2) July - September (3) October - December (4)
	Ends: After successful completion of the post-closure activities required and approval of the Illinois EPA; or Acceptance of reduced frequency by IEPA based on successful demonstration under Semi-Annual or Annual Frequency	
Semi-Annual or Annual	Begins: Upon demonstration that monitoring effectiveness will not be compromised by reduced frequency, adequate data has been collected to characterize groundwater, and concentration of constituents monitored at downgradient boundaries do not demonstrate statistically significant increasing trends that can be attributed to the former ash ponds	April - June (2)
	Ends: After successful completion of the post-closure activities required and approval of the Illinois EPA	October - December (4)

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

Table 1-2. Groundwater Monitoring System Wells
2021 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Monitoring Well Number	Installation Date	Surface Elevation (ft, NAVD88)[1]	TOC Elevation (ft, NAVD88)[1]	Top of Screen Elevation (ft, NAVD88)[1]	Bottom of Screen Elevation (ft, NAVD88)[1]	Total Well Depth (ft, BGS)	Objective	Position	Monitoring Zone
APW-1	10/26/2010	446.06	449.26	431.40	421.40	24.7	Compliance	Upgradient	Uppermost Aquifer
APW-2	10/25/2010	433.97	436.87	421.10	411.10	22.9	Compliance	Downgradient	Uppermost Aquifer
APW-3	10/25/2010	433.35	436.28	420.80	410.80	22.6	Compliance	Downgradient	Uppermost Aquifer
APW-4	10/26/2010	431.90	434.86	415.80	409.30	26.1	Compliance	Downgradient	Uppermost Aquifer
APW-5	10/26/2010	450.48	453.20	431.00	421.00	29.5	Compliance	Upgradient	Uppermost Aquifer
APW-6	10/1/2015	448.60	451.90	431.10	421.10	28.0	Compliance	Midgradient	Uppermost Aquifer
APW-7	10/1/2015	435.00	438.70	429.00	419.00	16.5	Compliance	Midgradient	Uppermost Aquifer
APW-8	10/1/2015	460.50	463.90	431.90	421.90	39.1	Compliance	Midgradient	Uppermost Aquifer
APW-9	10/1/2015	445.00	448.10	426.20	416.20	29.3	Compliance	Downgradient	Uppermost Aquifer
APW-10	8/20/2018	454.10	457.45	424.90	414.90	39.4	Compliance	Midgradient	Uppermost Aquifer
APW-11	8/22/2018	461.89	465.40	427.64	417.64	44.45	Compliance	Upgradient	Uppermost Aquifer
APW-12	8/21/2018	431.94	435.52	422.10	412.10	20.0	Compliance	Downgradient	Uppermost Aquifer
APW-13	7/13/2021	457.84	461.55	437.34	427.34	31.0	Compliance	Midgradient	Uppermost Aquifer
APW-14	7/12/2021	455.55	459.27	439.04	429.04	27.0	Compliance	Midgradient	Uppermost Aquifer

[U: RSD 3/4/2022, C: RAB 3/10/22]

Notes:

1. Elevations referenced to North American Vertical Datum (NAVD) of 1988 with the exception of APW-5 through APW-9 which are referenced to feet above Mean Sea Level

TOC = top of casing (i.e. top of riser pipe)

BGS = below ground surface

ft = feet

Table 1-3. Groundwater Monitoring Program Parameters
2021 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

Field Parameters	STORET Code	
pH[2]	00400	
Specific Conductance[2]	00094	
Temperature (Fahrenheit)	00011	
Depth to Water (from TOC)	72109	
Elevation of GW Surface[2]	71993	
Depth of Well (BGS)[2]	72008	
Elevation of Measuring Point	72110	
Laboratory Parameters[1]	**STORET Code-Diss**	**STORET Code-Total**
Boron[2]	01020	01022
Iron[2]	01046	01045
Manganese[2]	01056	01055
Sulfate[2]	00946	- -
Total Dissolved Solids (TDS)[2]	70300	- -
Antimony	01095	01097
Arsenic	01000	01002
Barium	01005	01007
Beryllium	01010	01012
Cadmium	01025	01027
Chloride	00941	- -
Chromium	01030	01034
Cobalt	01035	01037
Copper	01040	01042
Cyanide	- -	00720
Fluoride	00950	- -
Lead	01049	01051
Mercury	71890	71900
Nickel	01065	01067
Nitrate as N	00613	- -
Nitrite as N	00618	- -
Selenium	01145	01147
Silver	01075	01077
Thallium	01057	01059
Vanadium	01085	01087
Zinc	01090	01092

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

Notes:

[1] Reported as dissolved (filtered) concentrations.

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

BGS: Below Ground Surface

TOC: Top of Casing

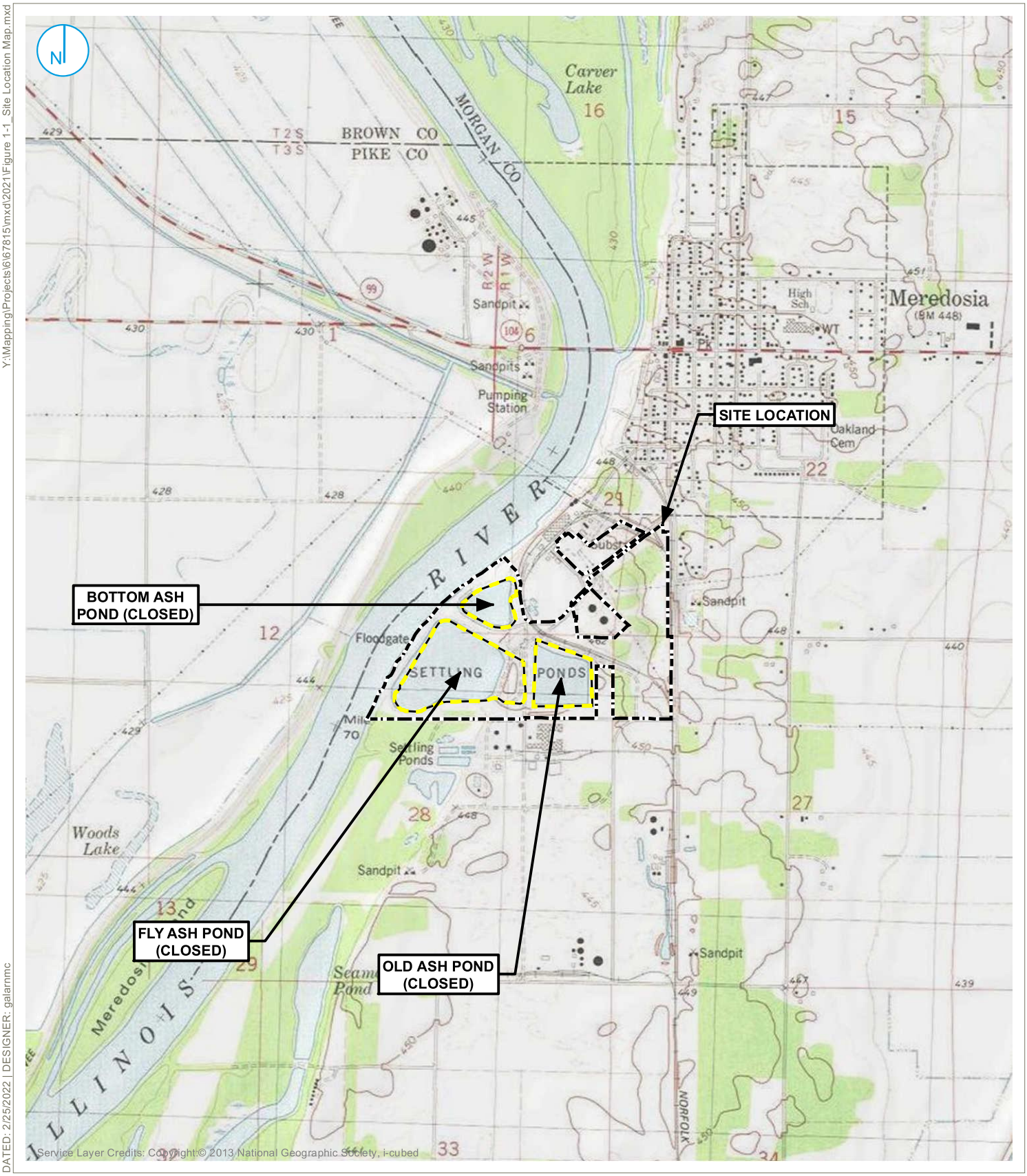
Table 3-1. Trend Analysis Results
2021 Annual Report
Meredosia Power Station - Fly Ash Pond and Bottom Ash Pond

	APW-1	APW-2	APW-3	APW-4	APW-5	APW-6	APW-7	APW-8	APW-9	APW-10	APW-11	APW-12
Number of Samples	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Antimony, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Antimony, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Arsenic, dissolved	DNE	DNE	None	None	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Arsenic, total	DNE	DNE	None	None	DNE	DNE	DNE	DNE	DNE	None	DNE	None
Barium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Barium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Beryllium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Beryllium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Boron, dissolved	DNE	-	+	DNE	DNE	DNE	DNE	-	None	Increase	-	DNE
Boron, total	DNE	-	+	DNE	DNE	DNE	DNE	None	-	Increase	-	DNE
Cadmium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Cadmium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Chloride, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Chromium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Chromium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Cobalt, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Cobalt, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Copper, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Copper, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Cyanide, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Fluoride, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Iron, dissolved	DNE	DNE	DNE	-	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Iron, total	+	DNE	Increase	-	DNE	DNE	DNE	DNE	DNE	None	-	+
Lead, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Lead, total	None	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None	DNE	None
Manganese, dissolved	DNE	None	None	None	DNE	DNE	None	DNE	DNE	DNE	DNE	+
Manganese, total	None	None	None	None	DNE	DNE	None	DNE	None	None	None	Increase
Mercury, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Mercury, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Nickel, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Nickel, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None	DNE	None
Nitrate (as N), dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Nitrite (as N), dissolved*	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Selenium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None	DNE	DNE	DNE	DNE
Selenium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None	DNE	DNE	DNE	DNE
Silver, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Silver, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Sulfate, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	Decrease	DNE	DNE	DNE
Thallium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Thallium, total	DNE	DNE	None	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None
Total Dissolved Solids	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	-	DNE	DNE	DNE
Vanadium, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Vanadium, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	None	DNE	None
Zinc, dissolved	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
Zinc, total	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE

[O: RSD 3/4/22, C: RAB 3/7/22]

Notes:
- "+" indicates that the Sen's non-parametric estimate of the median slope is positive.
- "-" indicates that the Sen's non-parametric estimate of the median slope is negative.
- "Increase" indicates a statistically significant Increase trend
- "Decrease" indicates a statistically significant decreasing trend
- DNE indicates constituents that did not exceed the Class I groundwater quality standard in the reporting period (2020-2021).
- "None" indicates insufficent evidence of a trend as determined using the Mann-Kendall test at 95% confidence for constituents with maximum concentration higher than the Class I groundwater quality standard.
- * indicates No Class 1 Standard
- Mann Kendall Trend analysis done with non-detects at one half the detection limit.
- Date range for the Sen's non-parametric estimate of the median slope and trend analysis is 1/1/2020-12/31/2021

FIGURES



KEY MAP

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

Map Scale: 1:1:24,000;
Map Center: 90°34'10"W 39°49'15"N

0 1,000 2,000 Feet

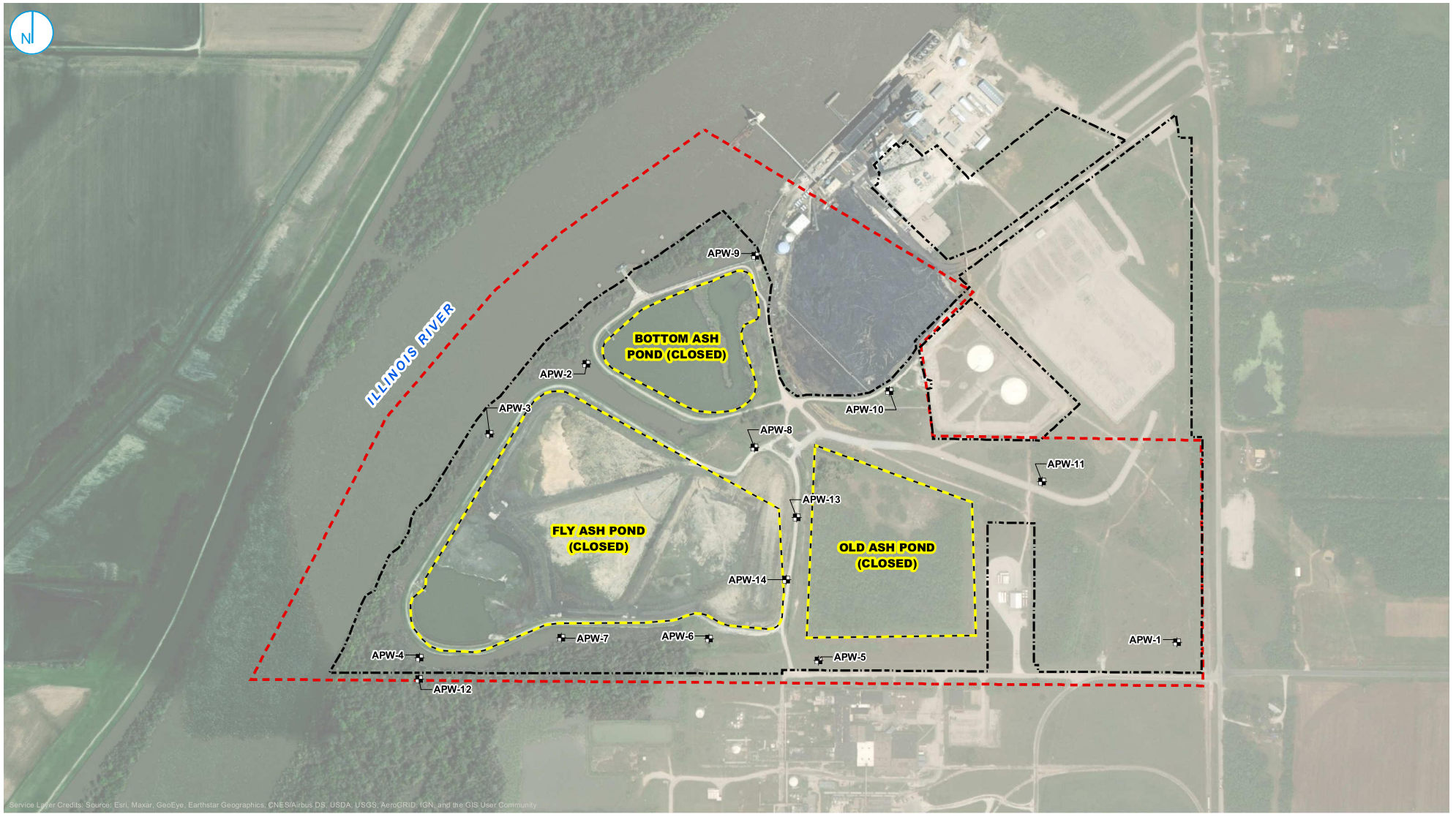
SITE LOCATION MAP

FIGURE 1-1

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



MONITORING WELL LOCATION
APPROXIMATE PROPERTY BOUNDARY
LIMITS OF CCP MANAGEMENT
APPROXIMATE GROUNDWATER MONITORING ZONE

0 240 480 Feet

SITE BASE MAP

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 1-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

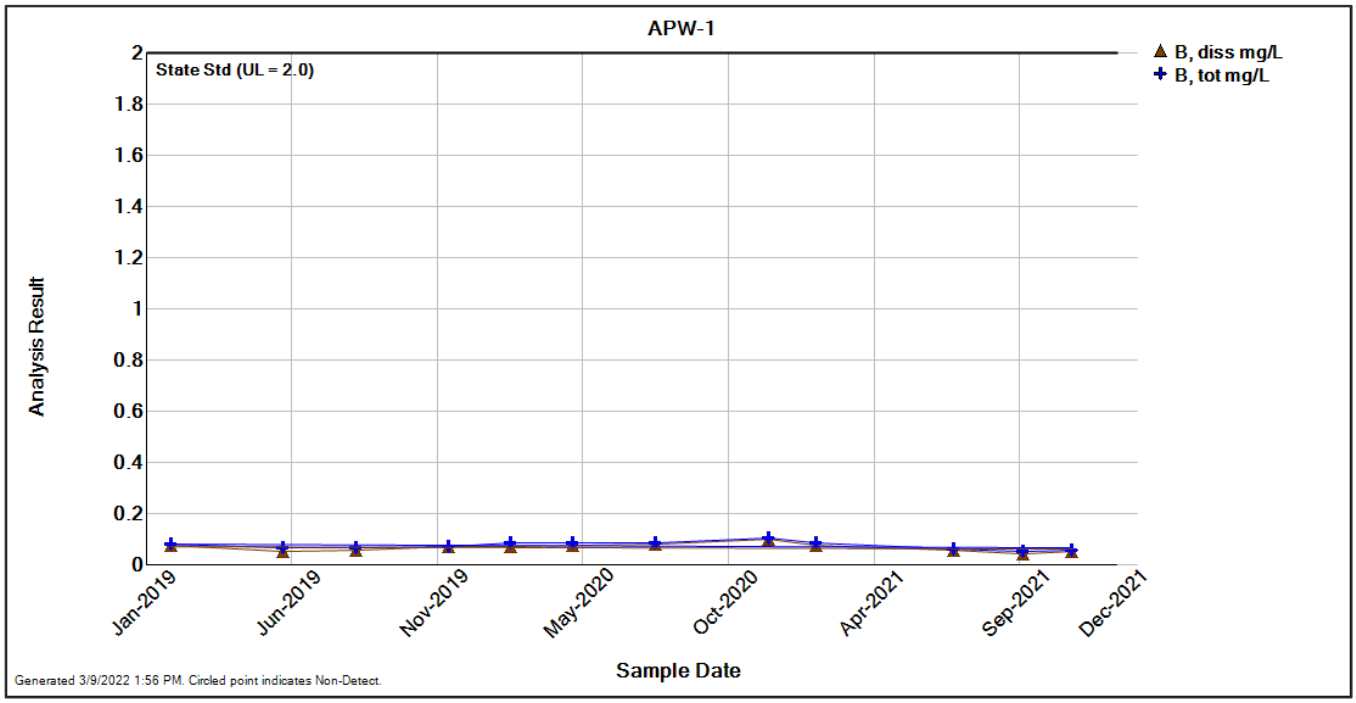


Figure 1-3. Boron (dissolved and total) concentrations since 2019 at upgradient well APW-1. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

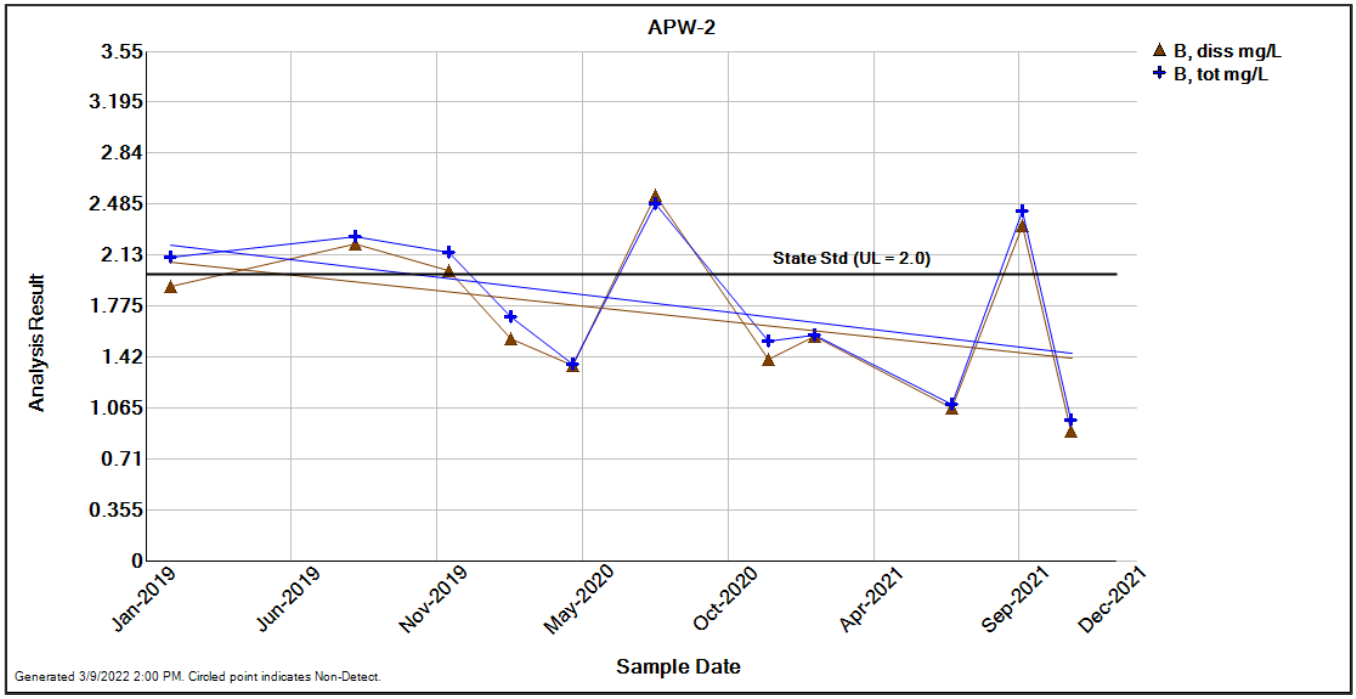


Figure 1-4. Boron (dissolved and total) concentrations since 2019 at downgradient well APW-2. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

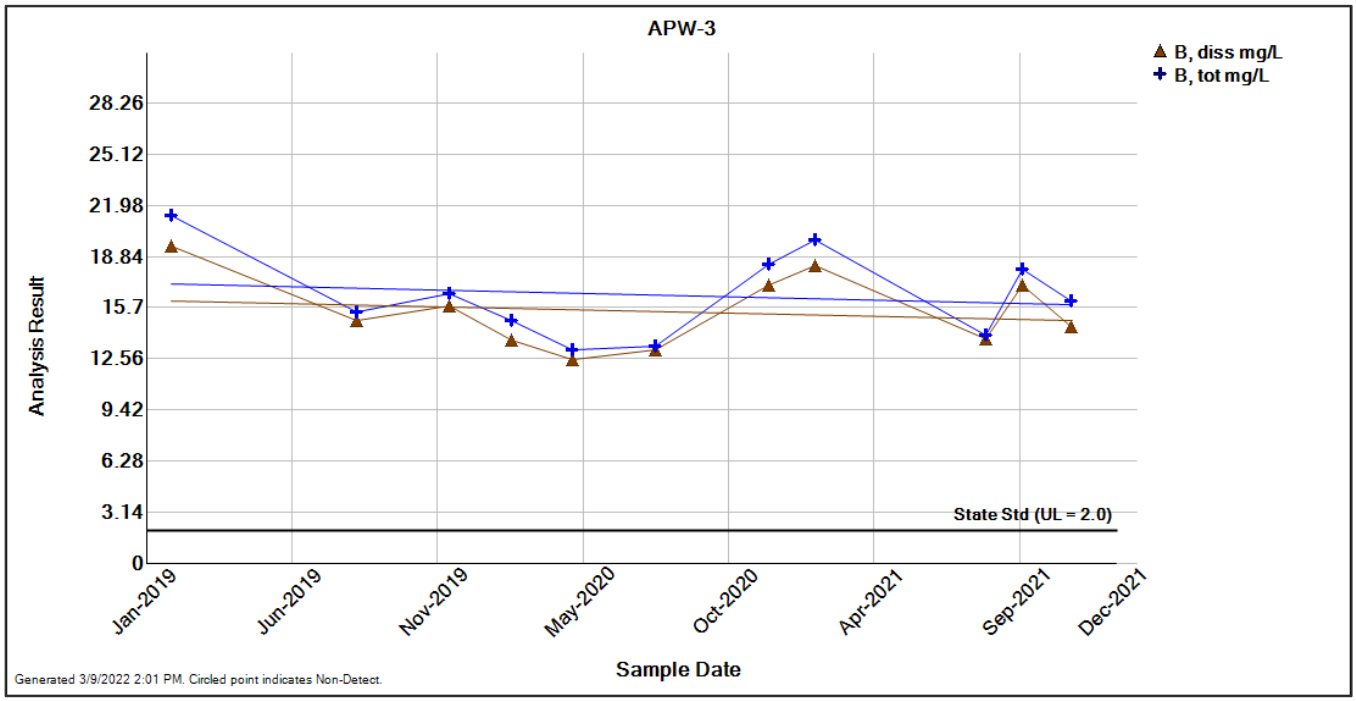


Figure 1-5. Boron (dissolved and total) concentrations since 2019 at downgradient well APW-3. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

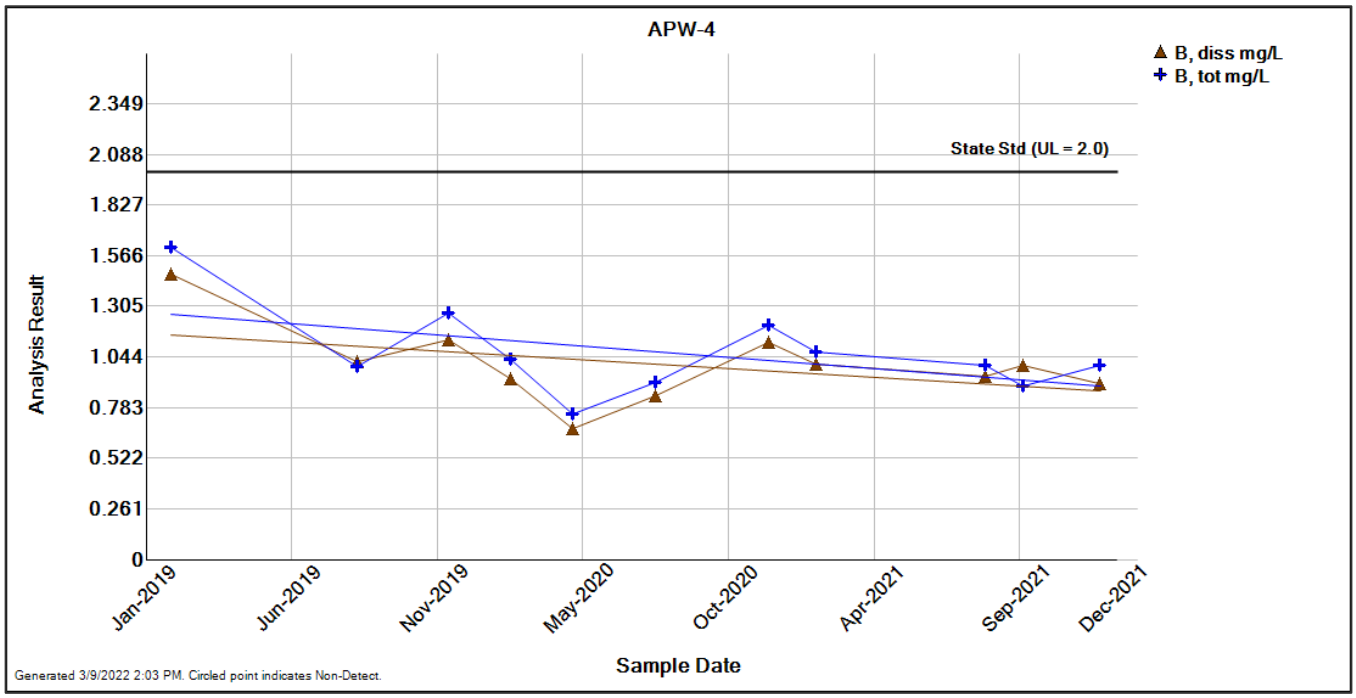


Figure 1-6. Boron (dissolved and total) concentrations since 2019 at downgradient well APW-4. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

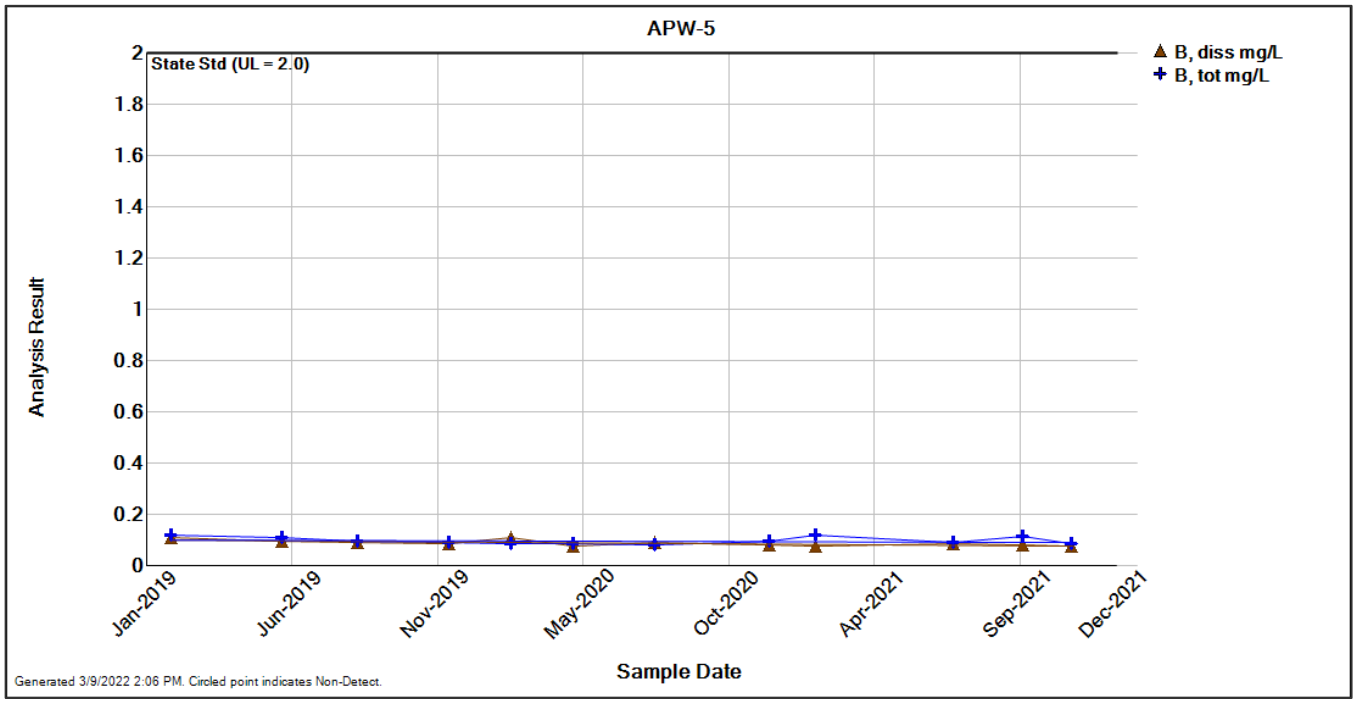


Figure 1-7. Boron (dissolved and total) concentrations since 2019 at upgradient well APW-5. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

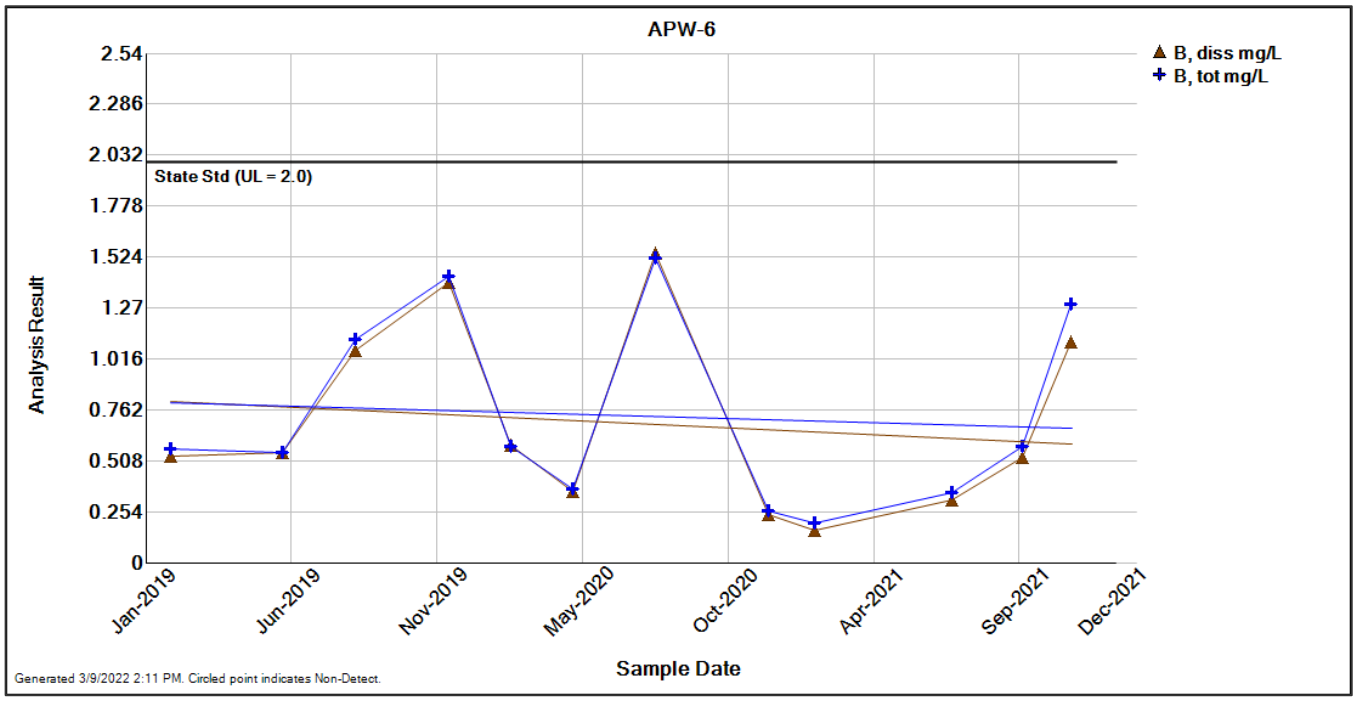


Figure 1-8. Boron (dissolved and total) concentrations since 2019 at midgradient well APW-6. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

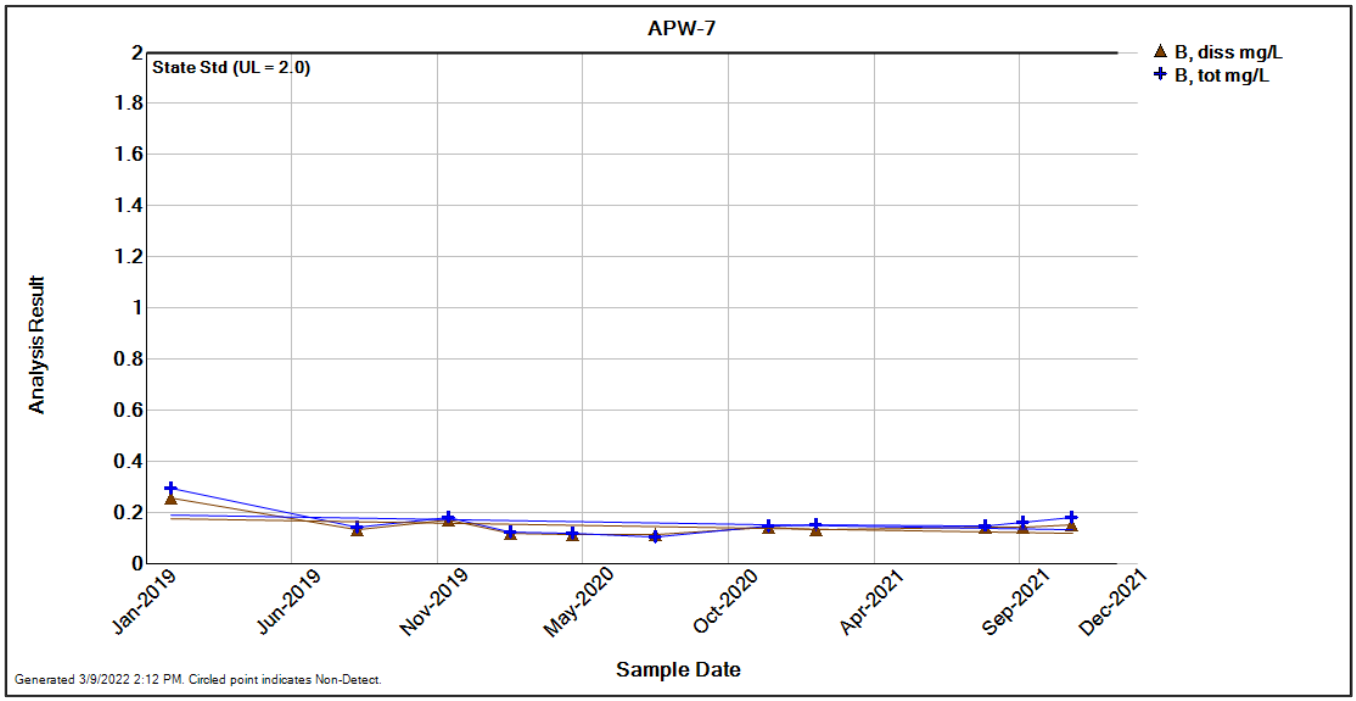


Figure 1-9. Boron (dissolved and total) concentrations since 2019 at midgradient well APW-7. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

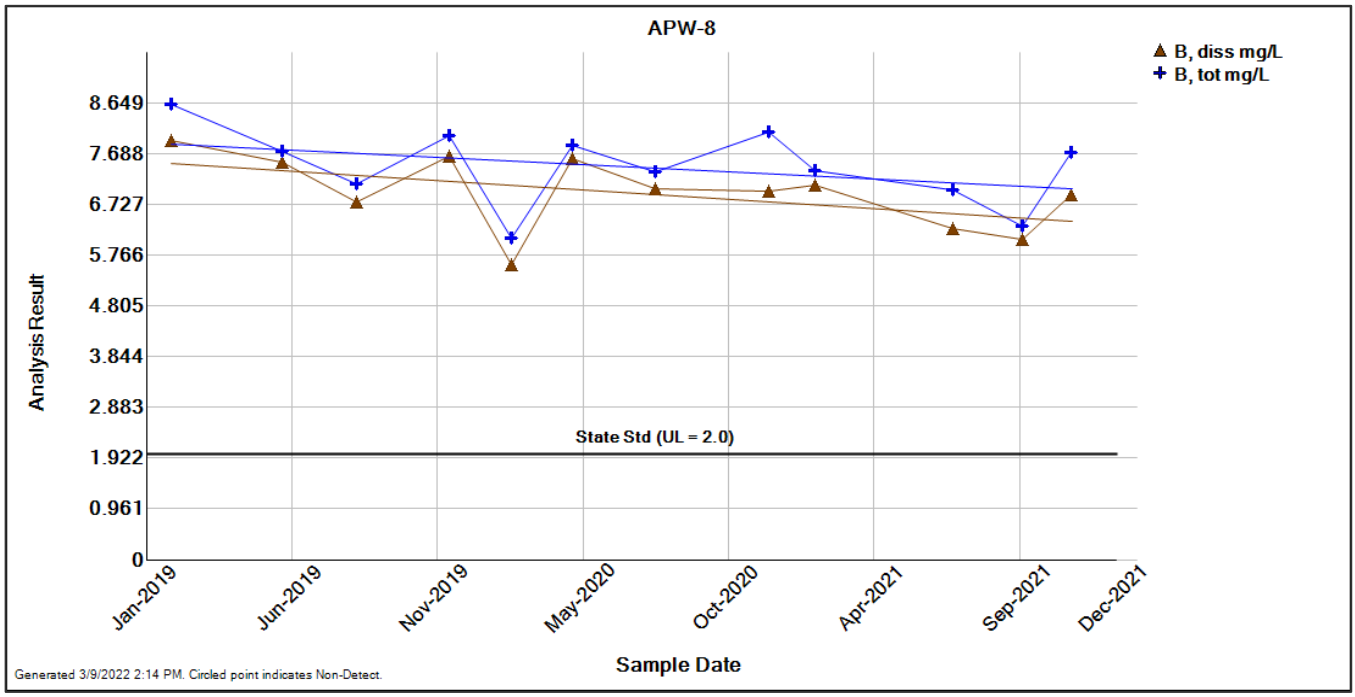


Figure 1-10. Boron (dissolved and total) concentrations since 2019 at midgradient well APW-8. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

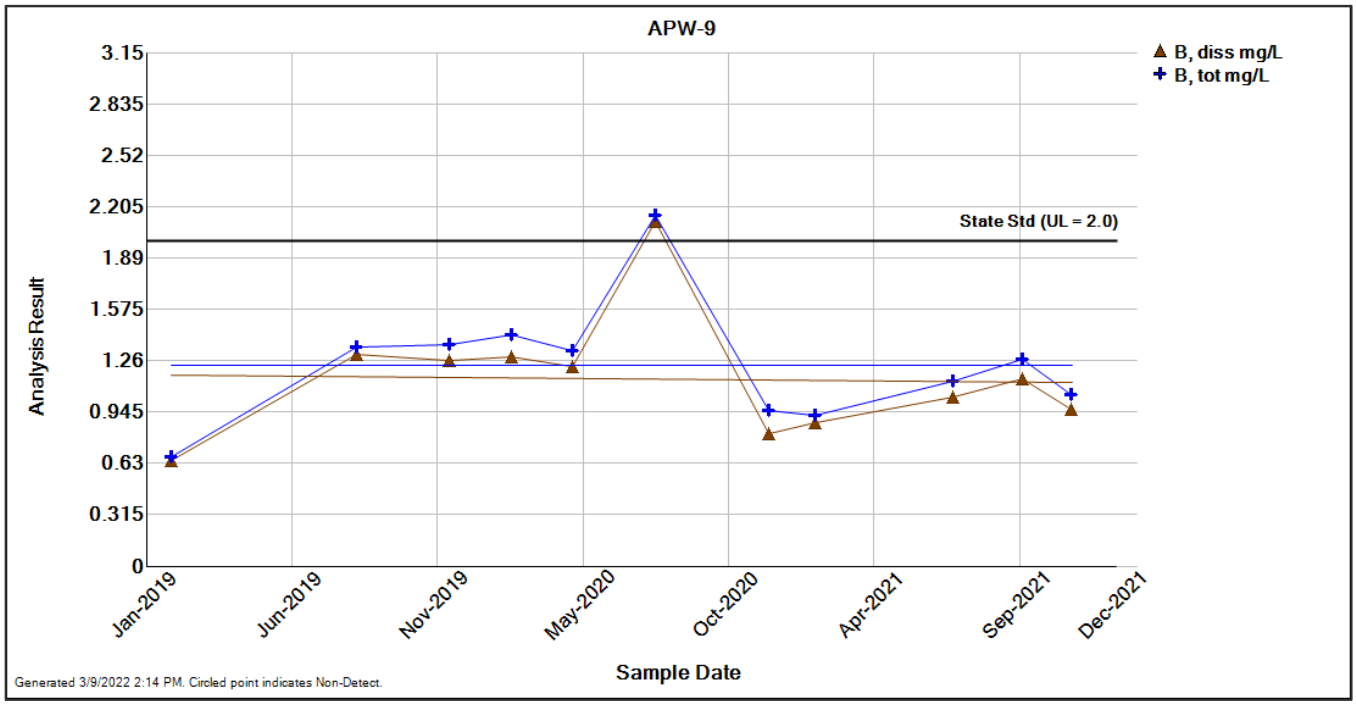


Figure 1-11. Boron (dissolved and total) concentrations since 2019 at downgradient well APW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

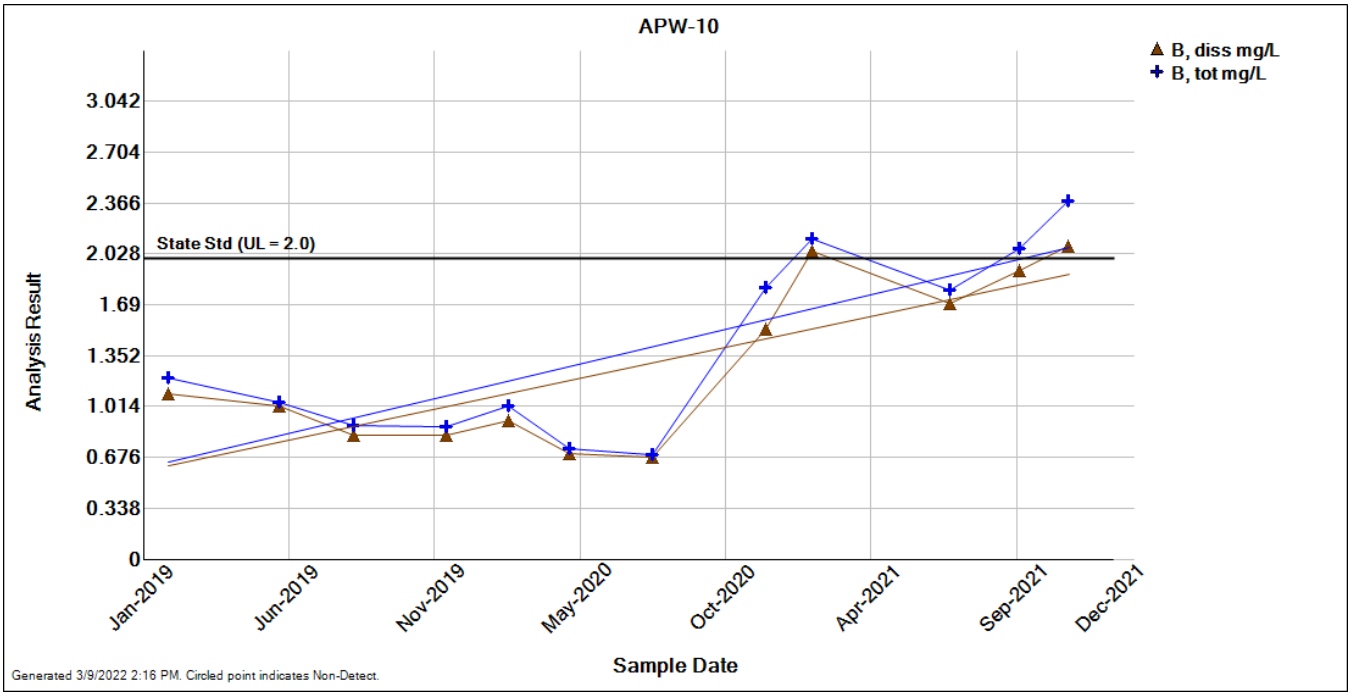


Figure 1-12. Boron (dissolved and total) concentrations since 2019 at midgradient well APW-10. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

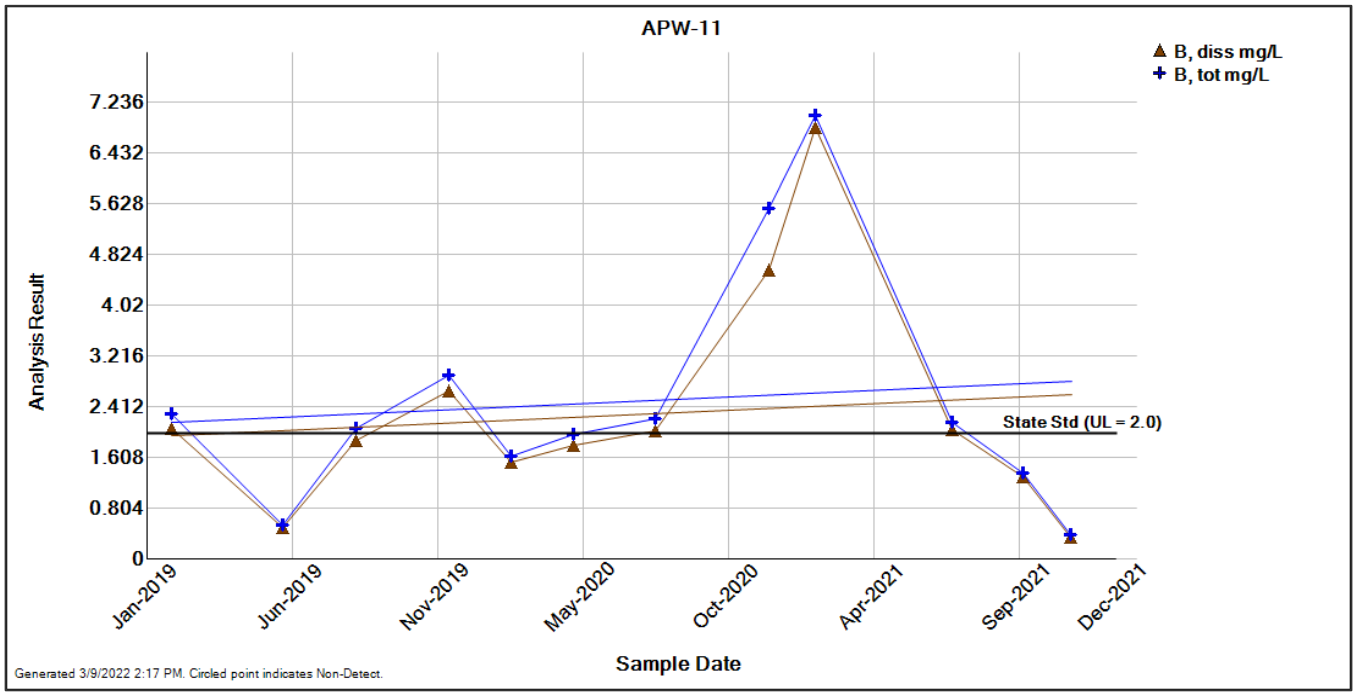


Figure 1-13. Boron (dissolved and total) concentrations since 2019 at upgradient well APW-11. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

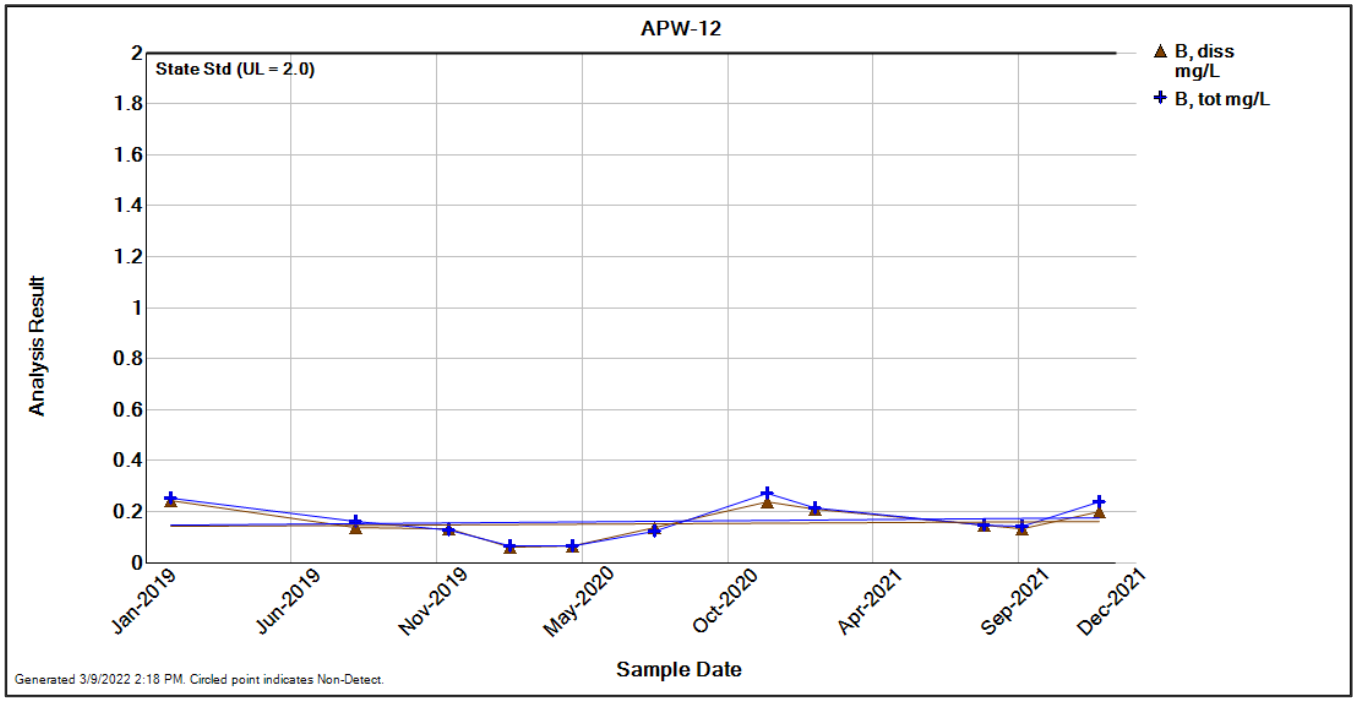


Figure 1-14. Boron (dissolved and total) concentrations since 2019 at downgradient well APW-12. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

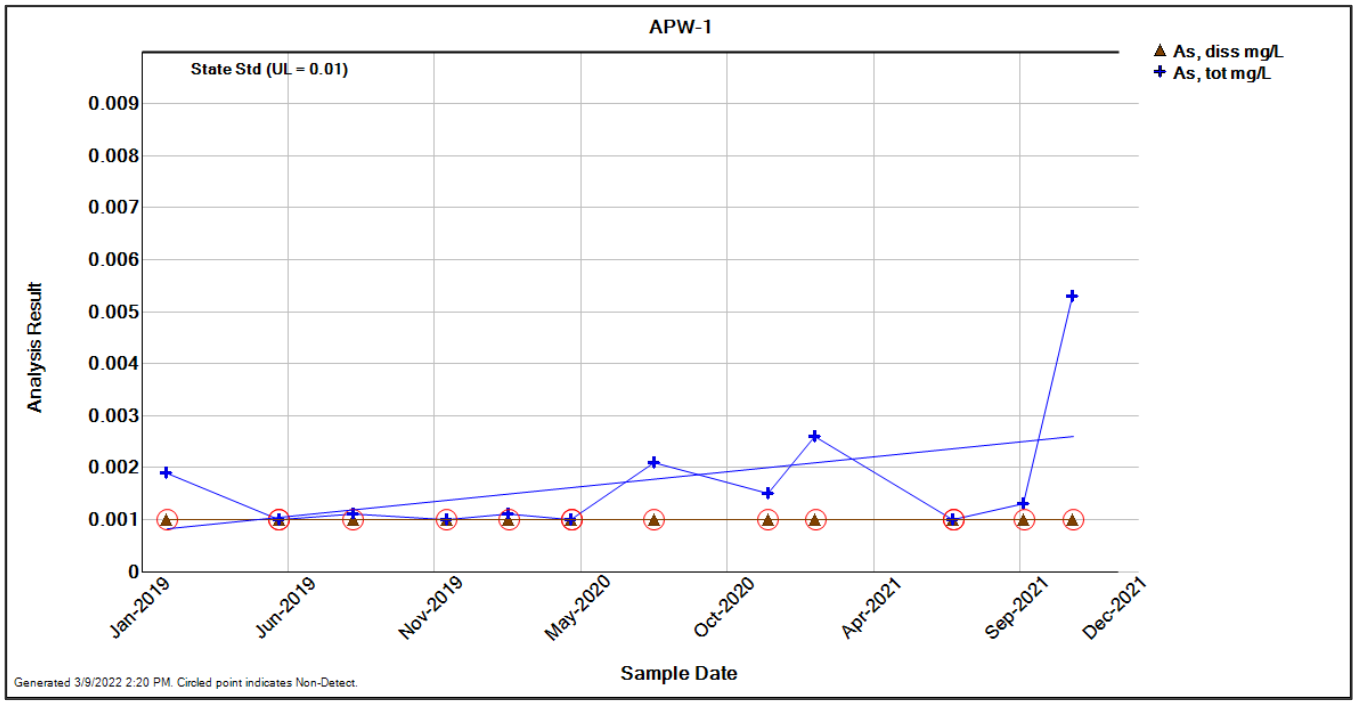


Figure 1-15. Arsenic (dissolved and total) concentrations since 2019 at upgradient well APW-1. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

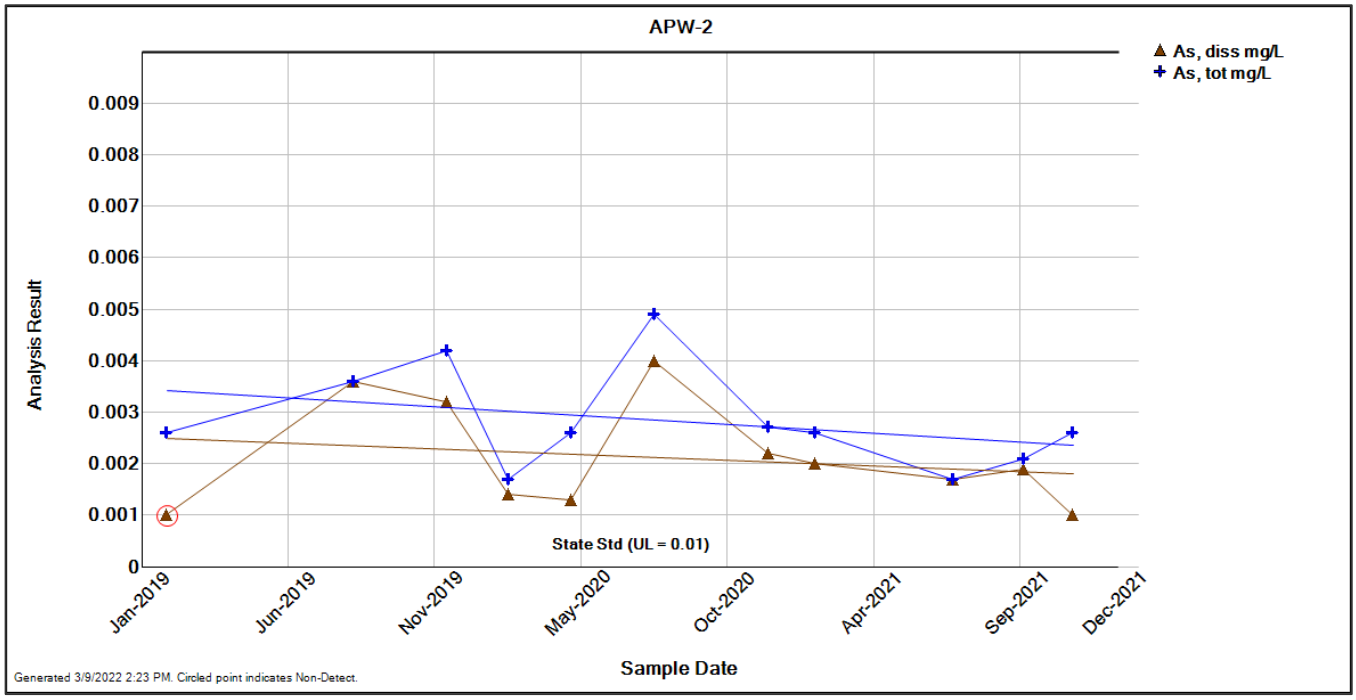


Figure 1-16. Arsenic (dissolved and total) concentrations since 2019 at downgradient well APW-2. The Class Groundwater Standard is not applicable within the GMZ and is shown for reference only.

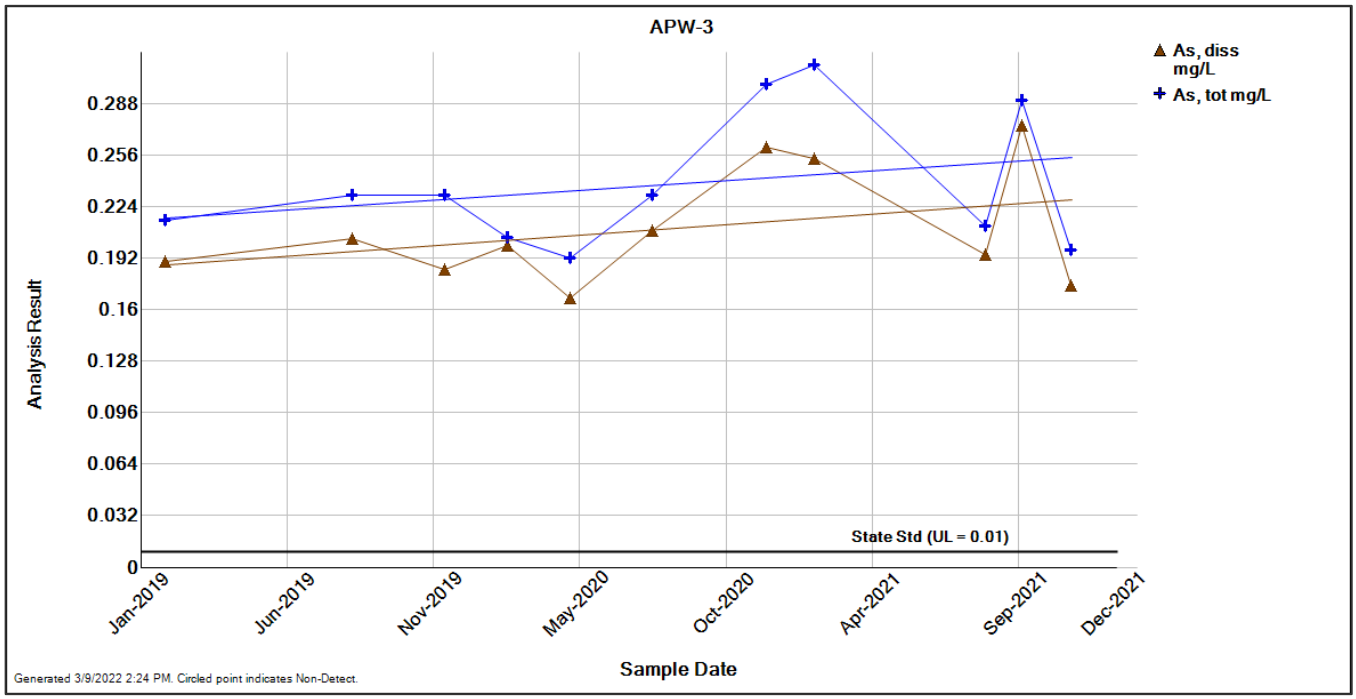


Figure 1-17. Arsenic (dissolved and total) concentrations since 2019 at downgradient well APW-3. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only. Circled results indicate non-detects.

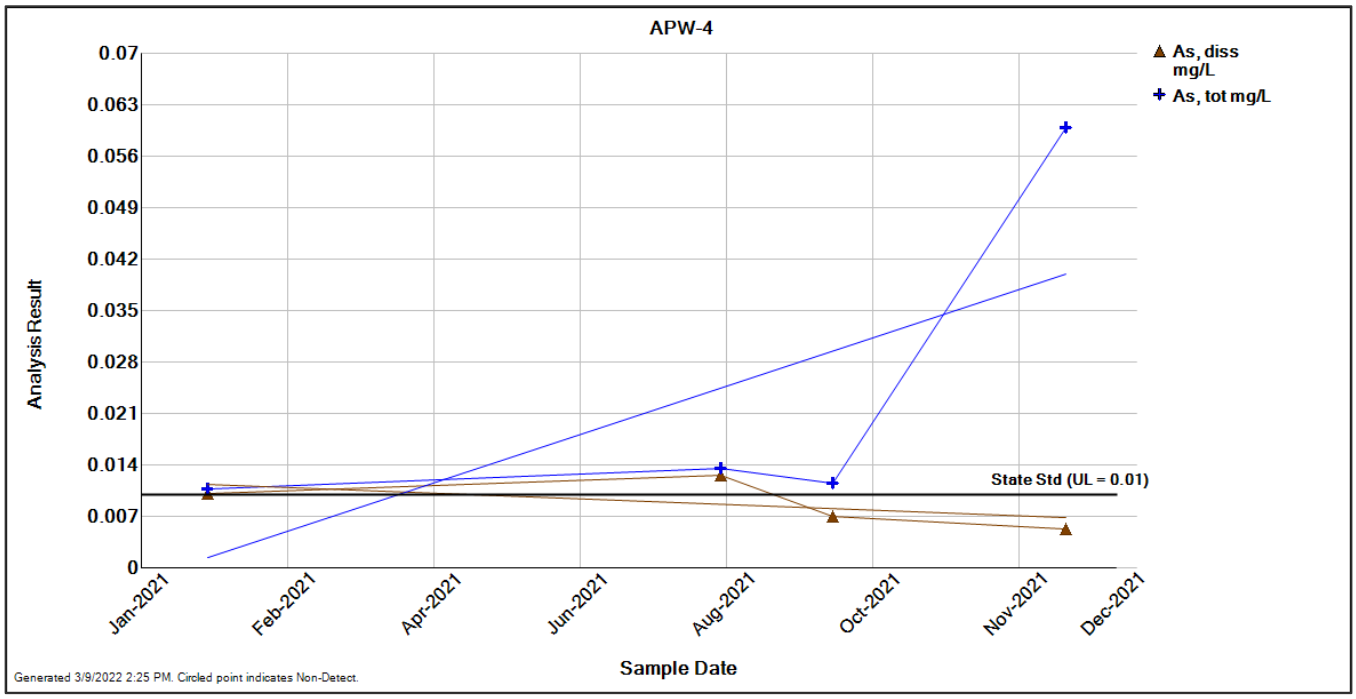


Figure 1-18. Arsenic (dissolved and total) concentrations since 2019 at downgradient well APW-4. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

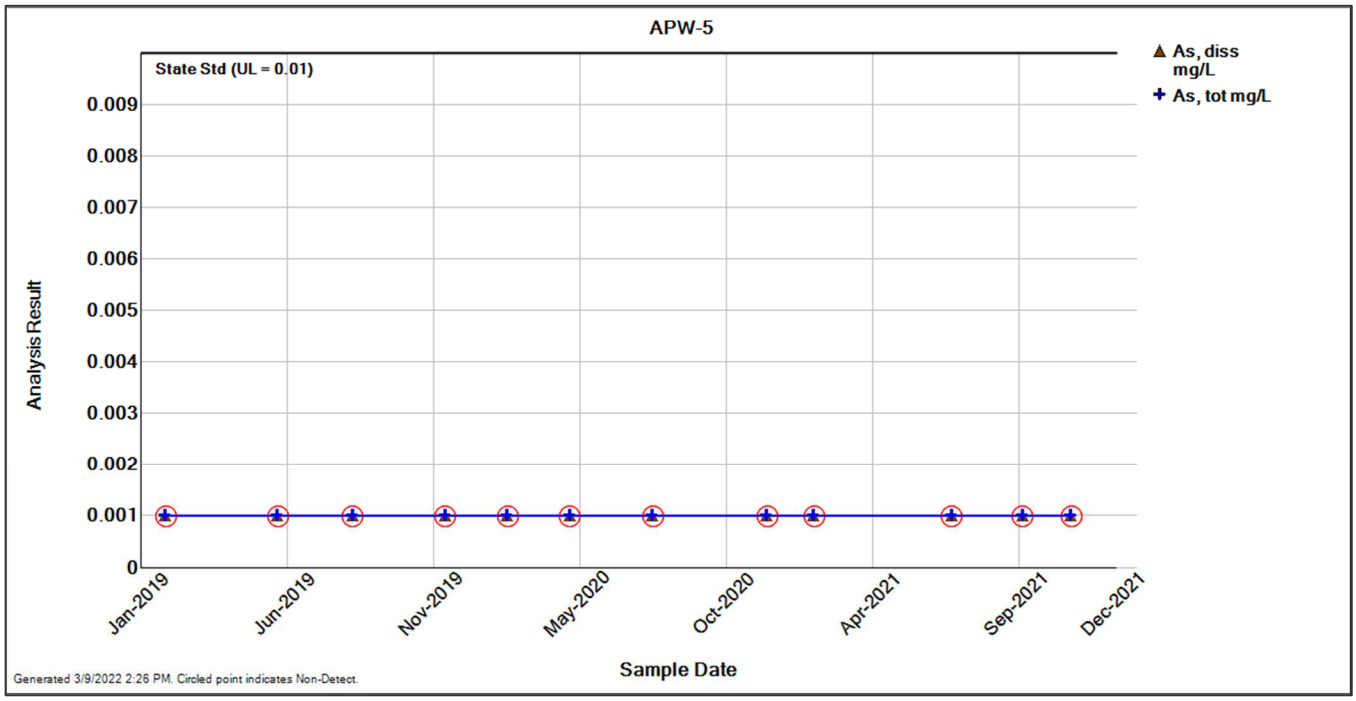


Figure 1-19. Arsenic (dissolved and total) concentrations since 2019 at upgradient well APW-5. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

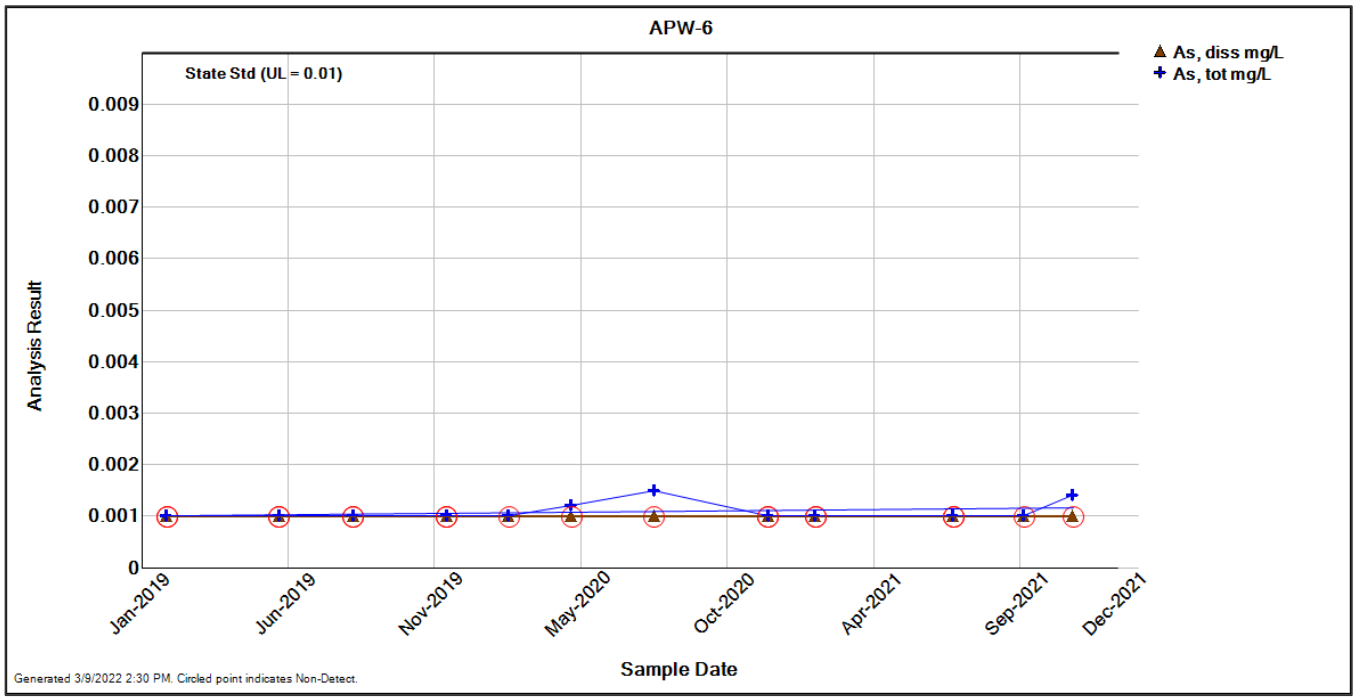


Figure 1-20. Arsenic (dissolved and total) concentrations since 2019 at midgradient well APW-6. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

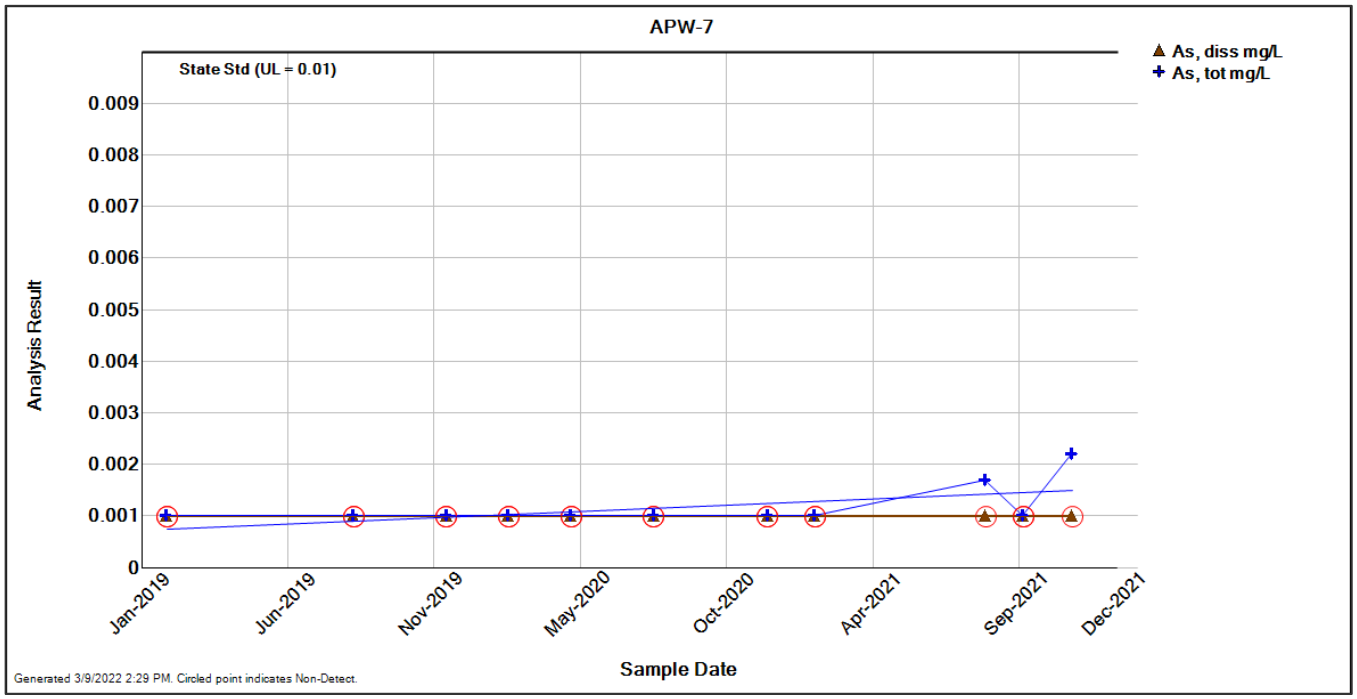


Figure 1-21. Arsenic (dissolved and total) concentrations since 2019 at midgradient well APW-7. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

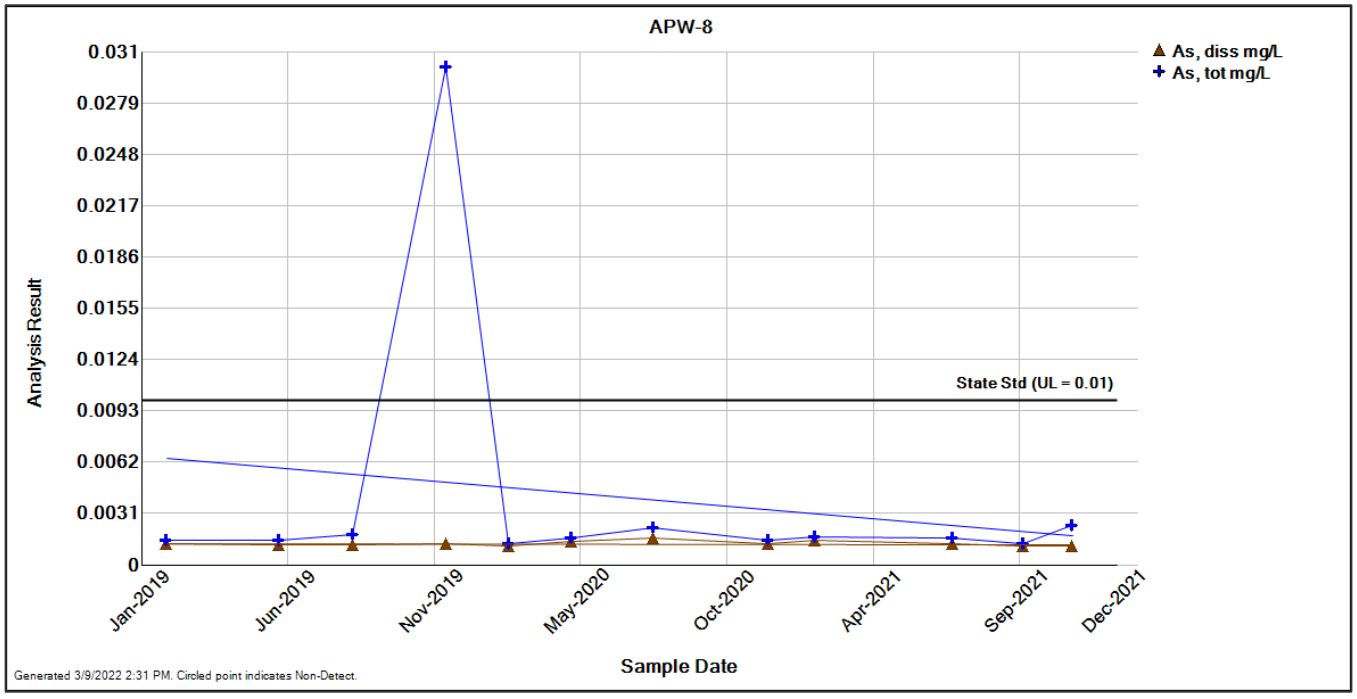


Figure 1-22. Arsenic (dissolved and total) concentrations since 2019 at midgradient well APW-8. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

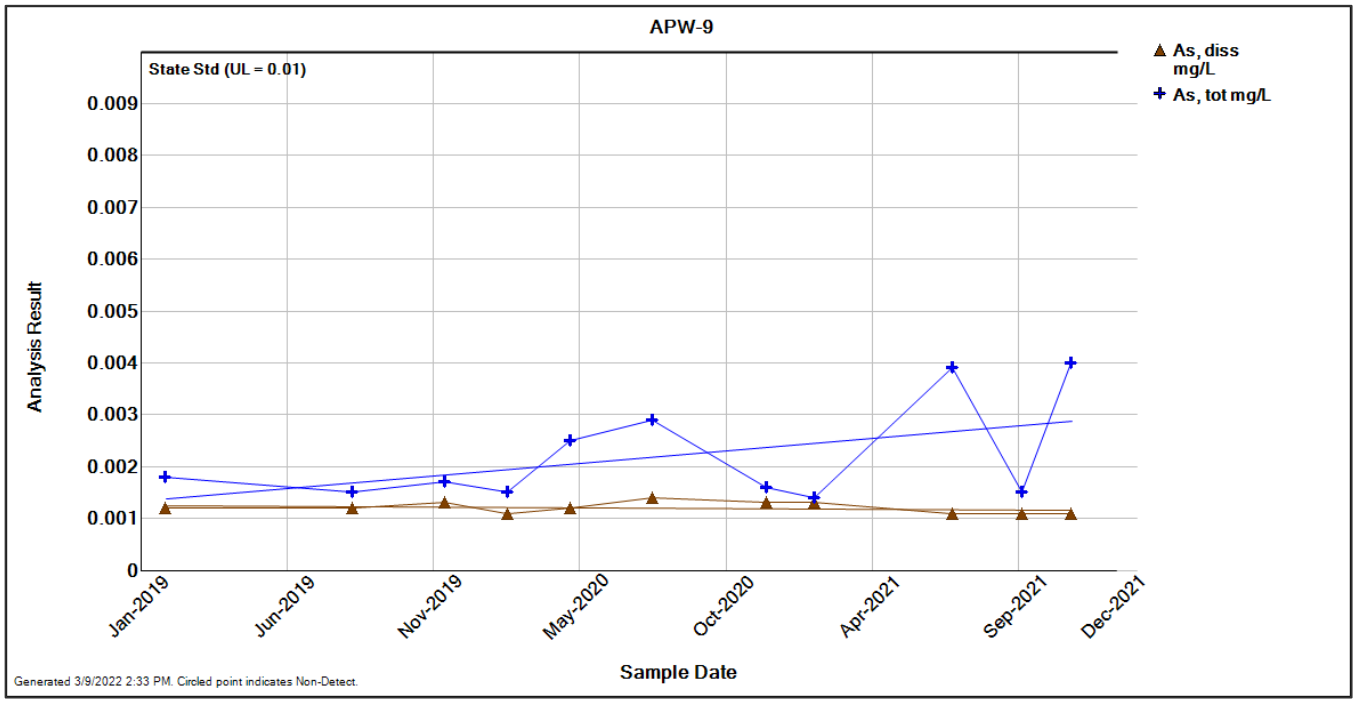


Figure 1-23. Arsenic (dissolved and total) concentrations since 2019 at downgradient well APW-9. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

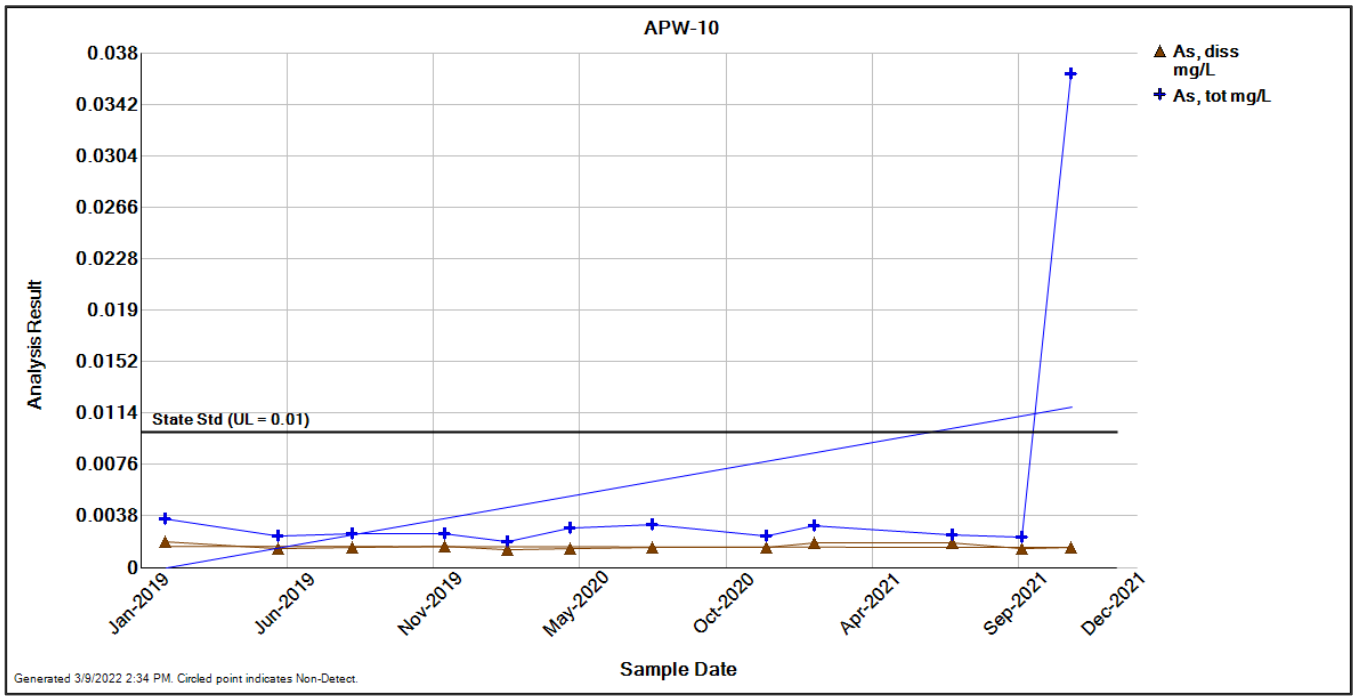


Figure 1-24. Arsenic (dissolved and total) concentrations since 2019 at midgradient well APW-10. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

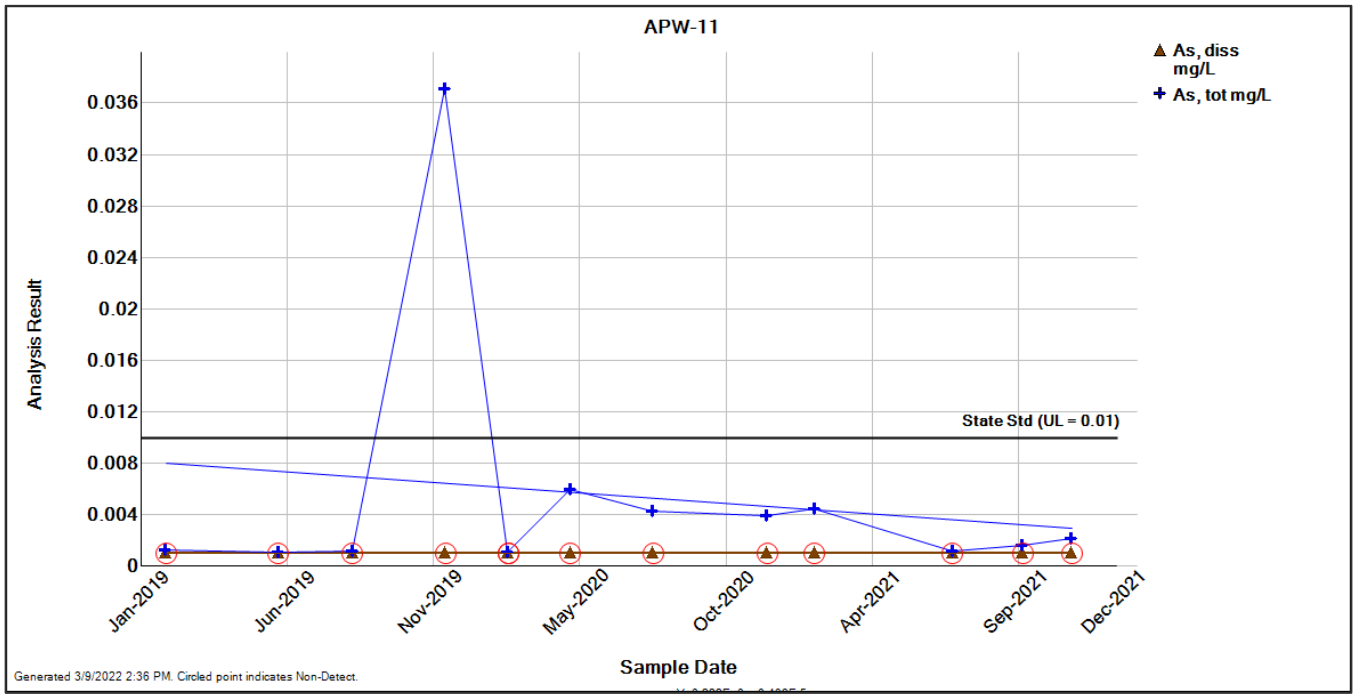


Figure 1-25. Arsenic (dissolved and total) concentrations since 2019 at upgradient APW-11. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.

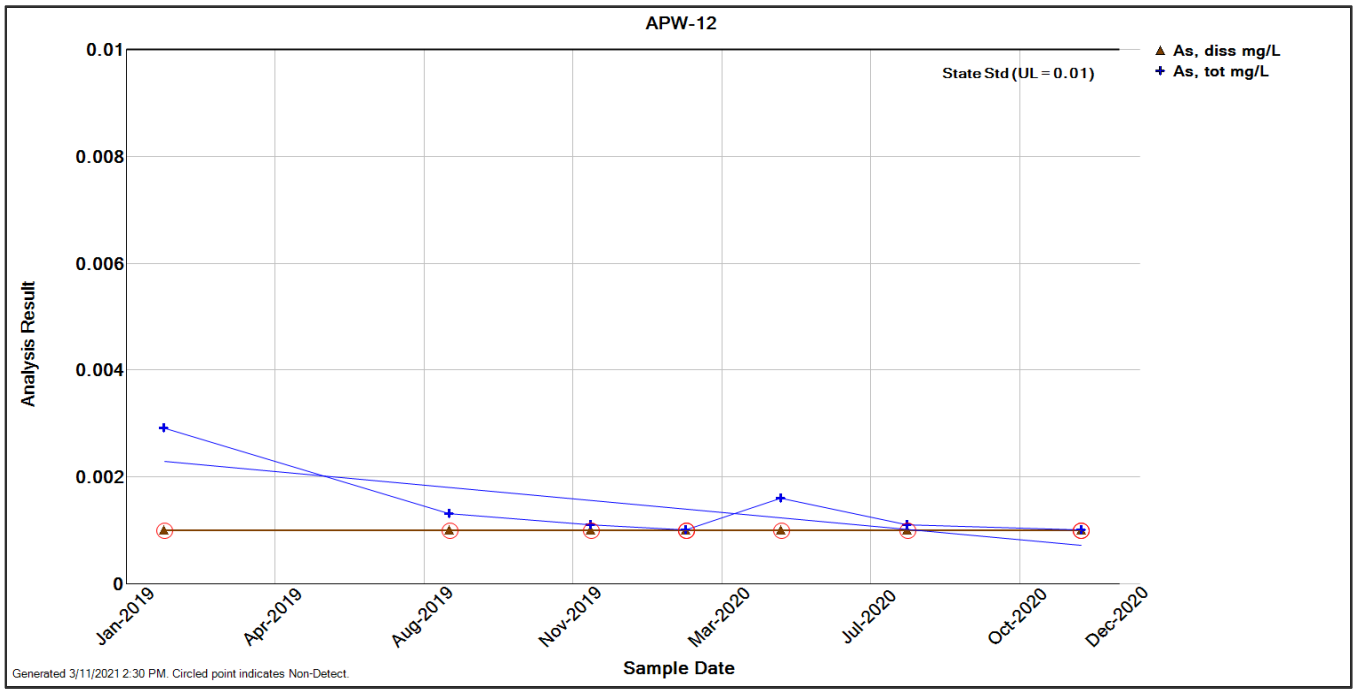
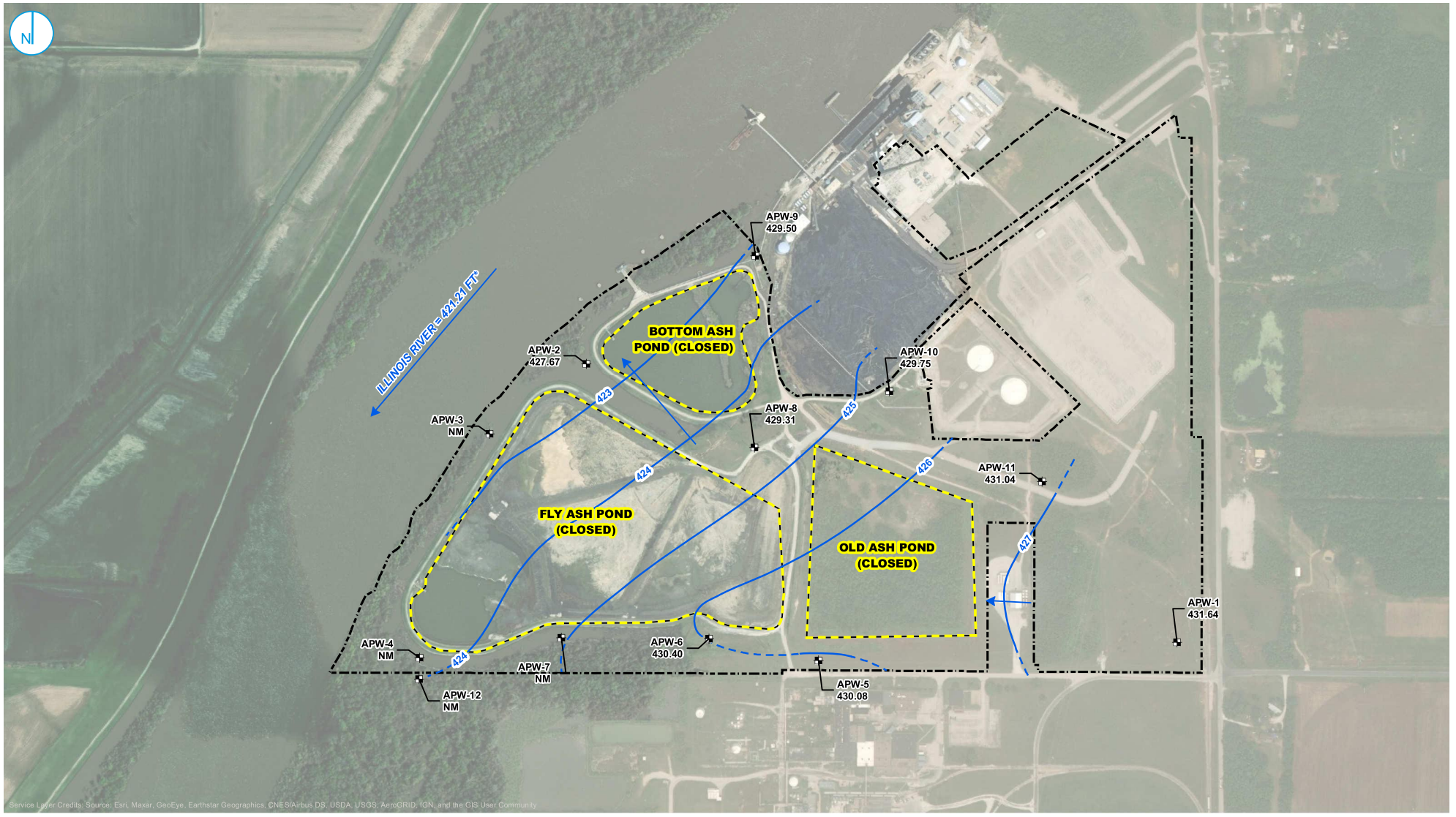


Figure 1-26. Arsenic (dissolved and total) concentrations since 2019 at downgradient APW-12. The Class I Groundwater Standard is not applicable within the GMZ and is shown for reference only.



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 240 480 Feet

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.
NGVD29 = National Geodetic Vertical Datum of 1929
NAVD88 = North American Vertical Datum of 1988

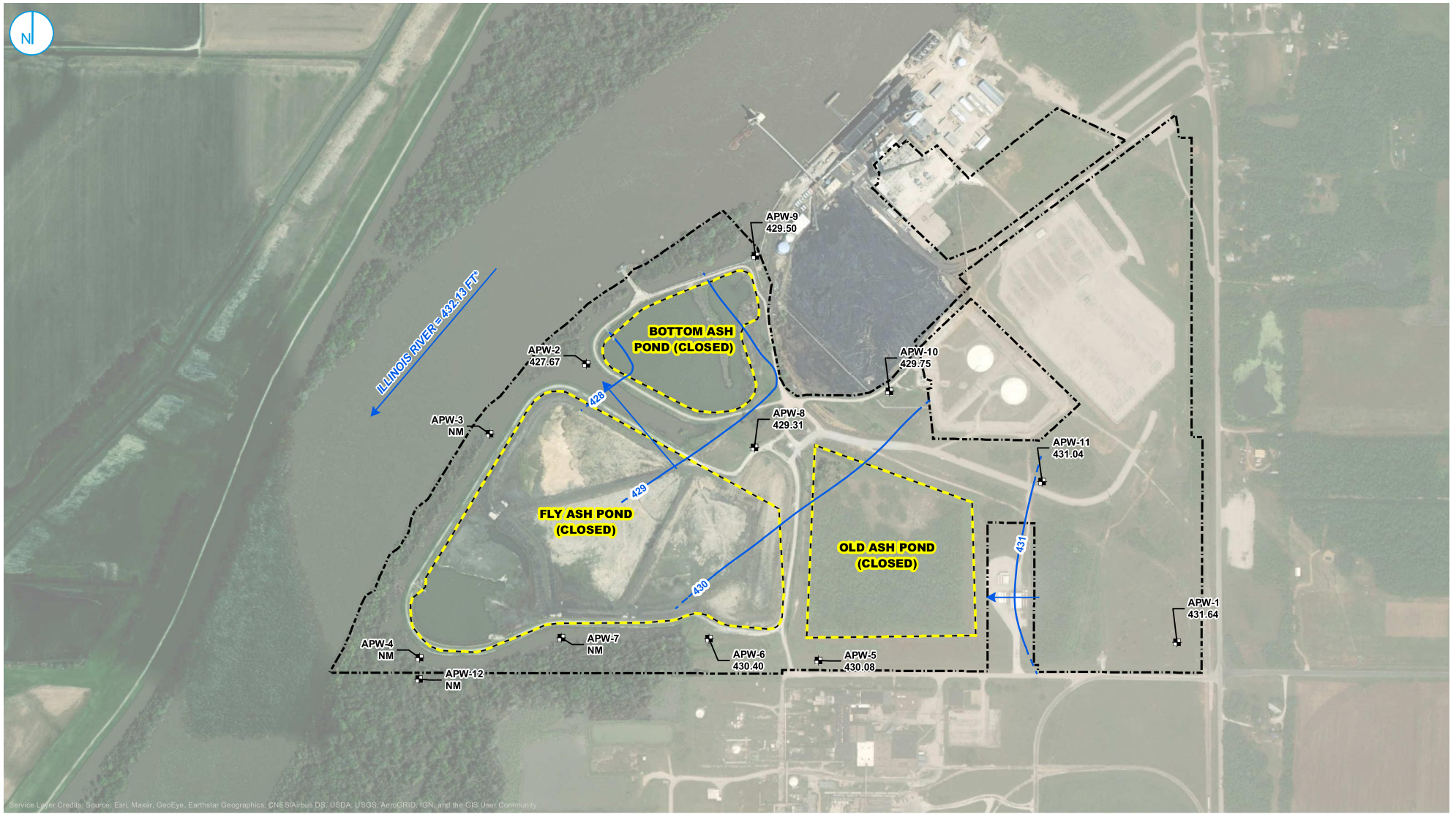
GROUNDWATER ELEVATIONS - JANUARY 26, 2021

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 3-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 240 480 Feet

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.
NM= Groundwater Elevation Not Measured
NGVD29 = National Geodetic Vertical Datum of 1929
NAVD88 = North American Vertical Datum of 1988

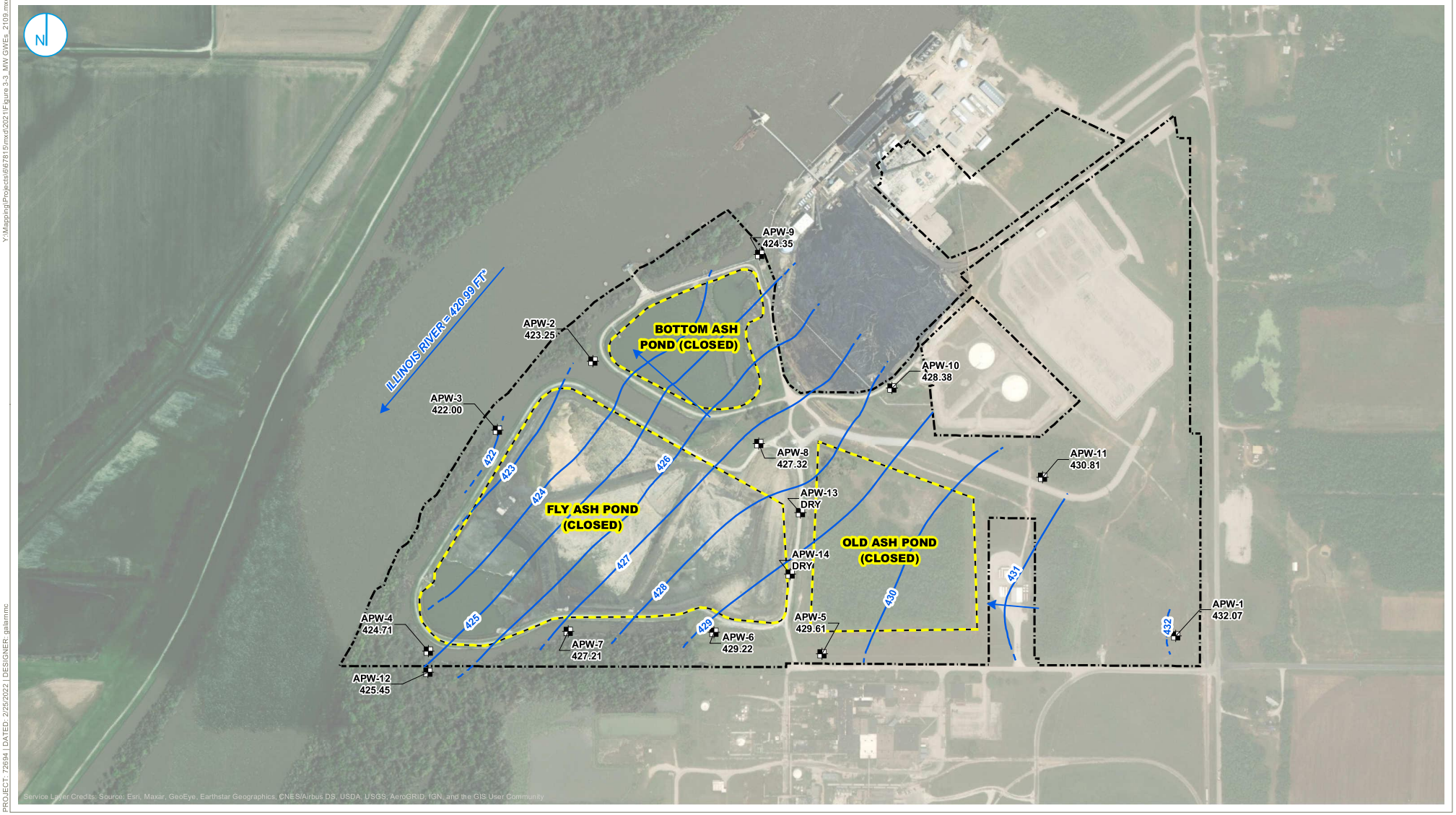
GROUNDWATER ELEVATIONS - JUNE 30, 2021

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 3-2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 240 480 Feet

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.
NM= Groundwater Elevation Not Measured
NGVD29 = National Geodetic Vertical Datum of 1929
NAVD88 = North American Vertical Datum of 1988

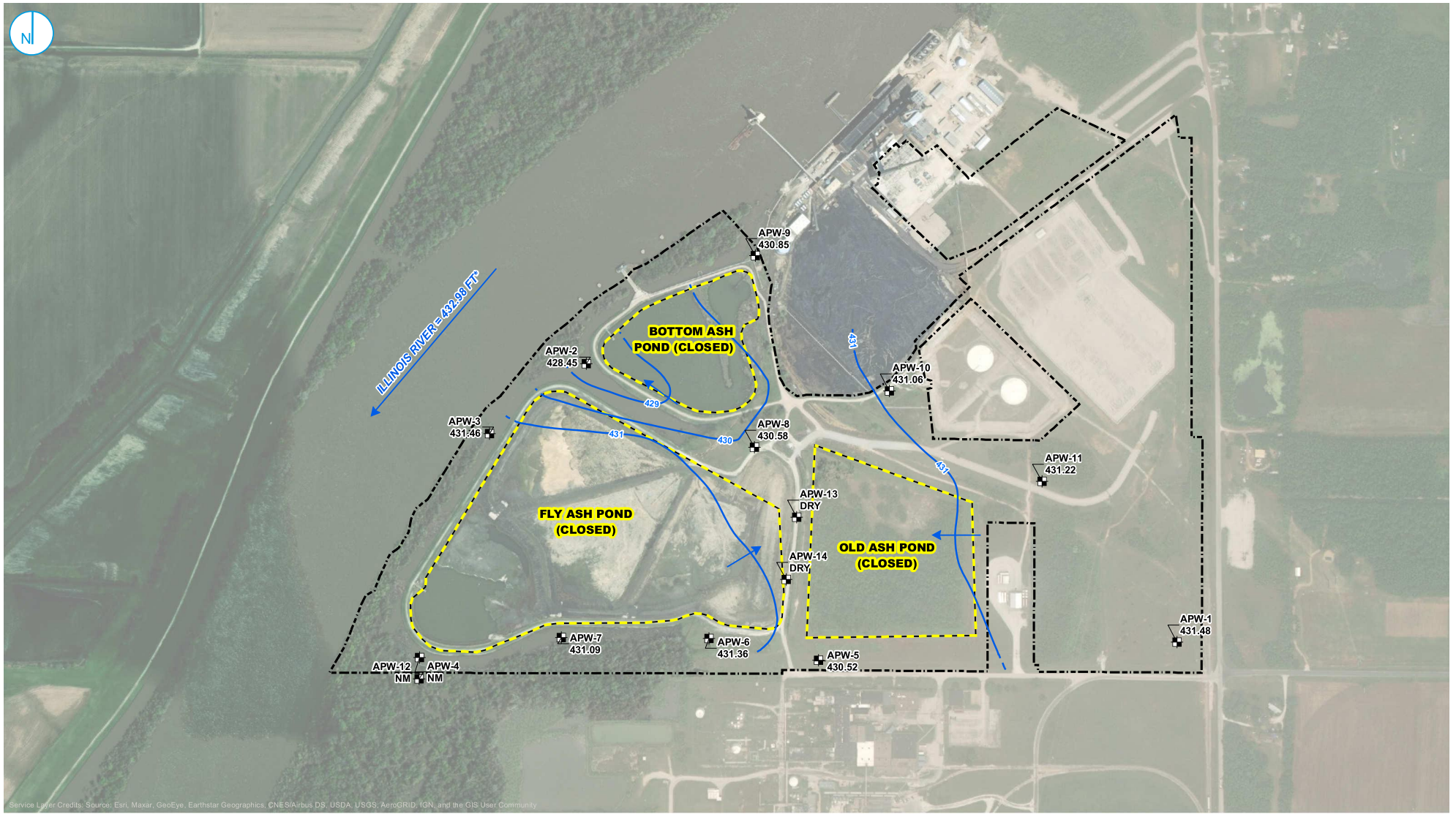
GROUNDWATER ELEVATIONS - SEPTEMBER 17, 2021

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 3-3

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

0 240 480 Feet

APPROXIMATE PROPERTY BOUNDARY

LIMITS OF CCP MANAGEMENT

*River Elevation obtained from United States Geological Survey 05585500 Meredosia, IL gaging station. The elevation was reported in NGVD29 and then converted to NAVD88 at the time of this drawing.
NM= Groundwater Elevation Not Measured Due to Flooding
NGVD29 = National Geodetic Vertical Datum of 1929
NAVD88 = North American Vertical Datum of 1988

GROUNDWATER ELEVATIONS - NOVEMBER 11, 2021

2021 ANNUAL REPORT
AMEREN ENERGY RESOURCES
MEREDOSIA POWER STATION
MORGAN COUNTY, ILLINOIS

FIGURE 3-4

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

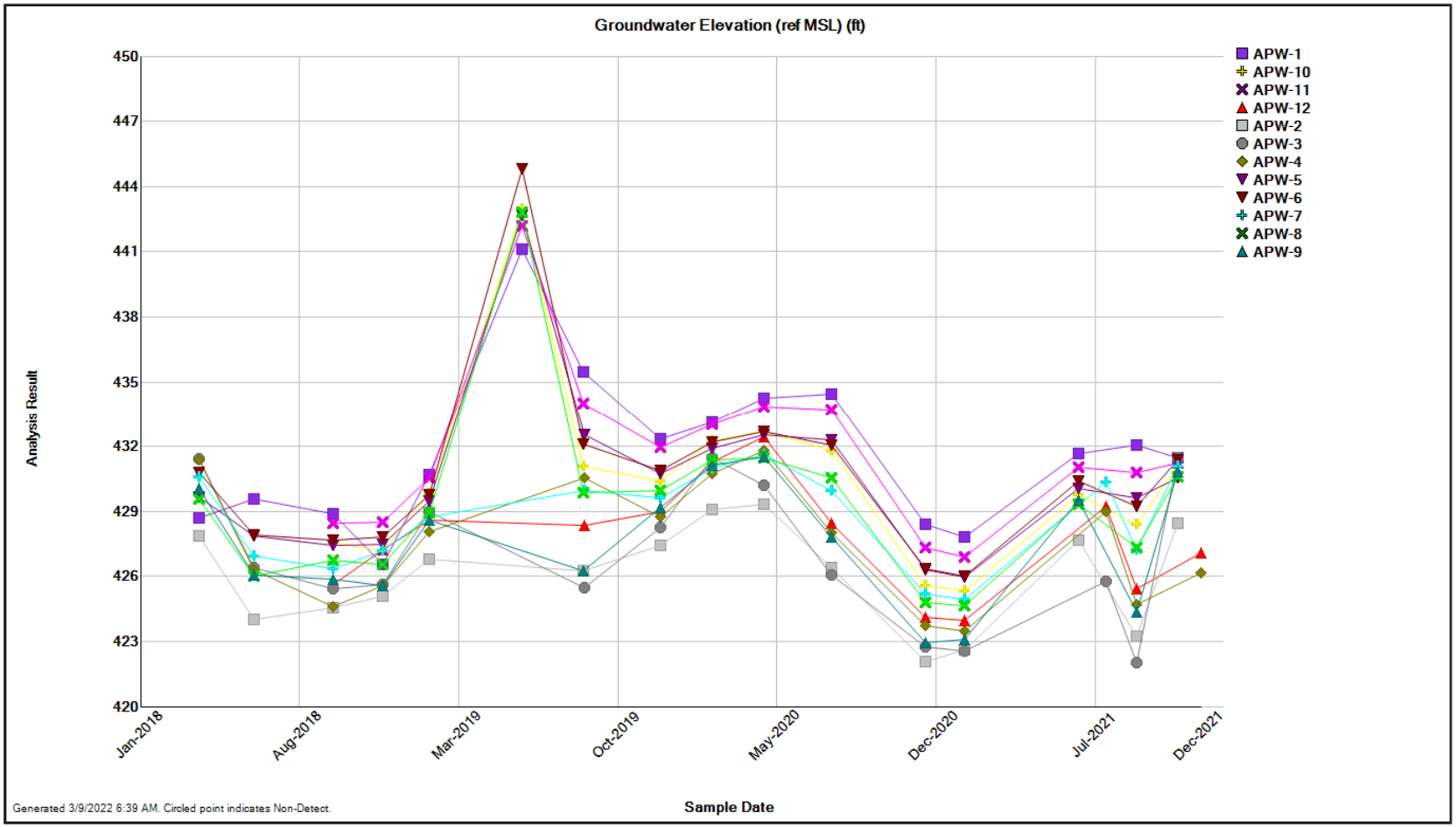


Figure 3-5. Groundwater elevations timeseries plot

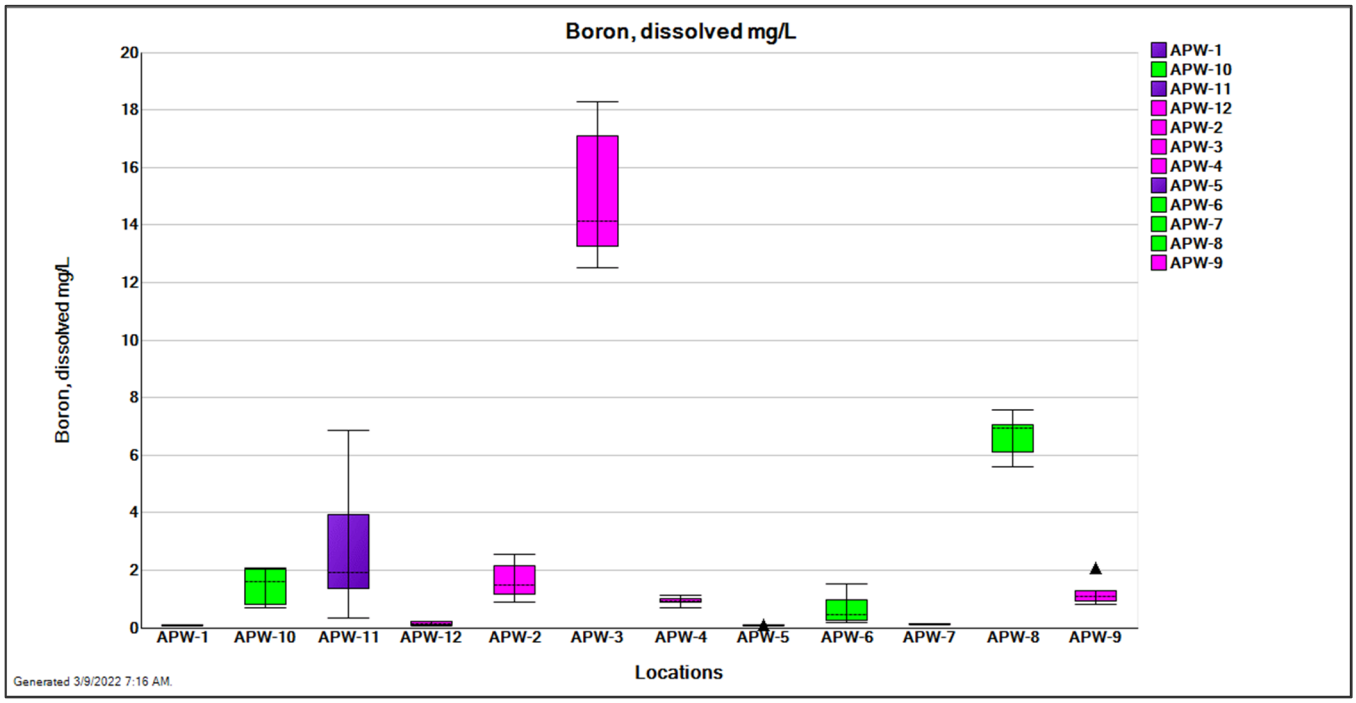


Figure 3-6. Box-whisker plot showing distribution of **dissolved boron** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

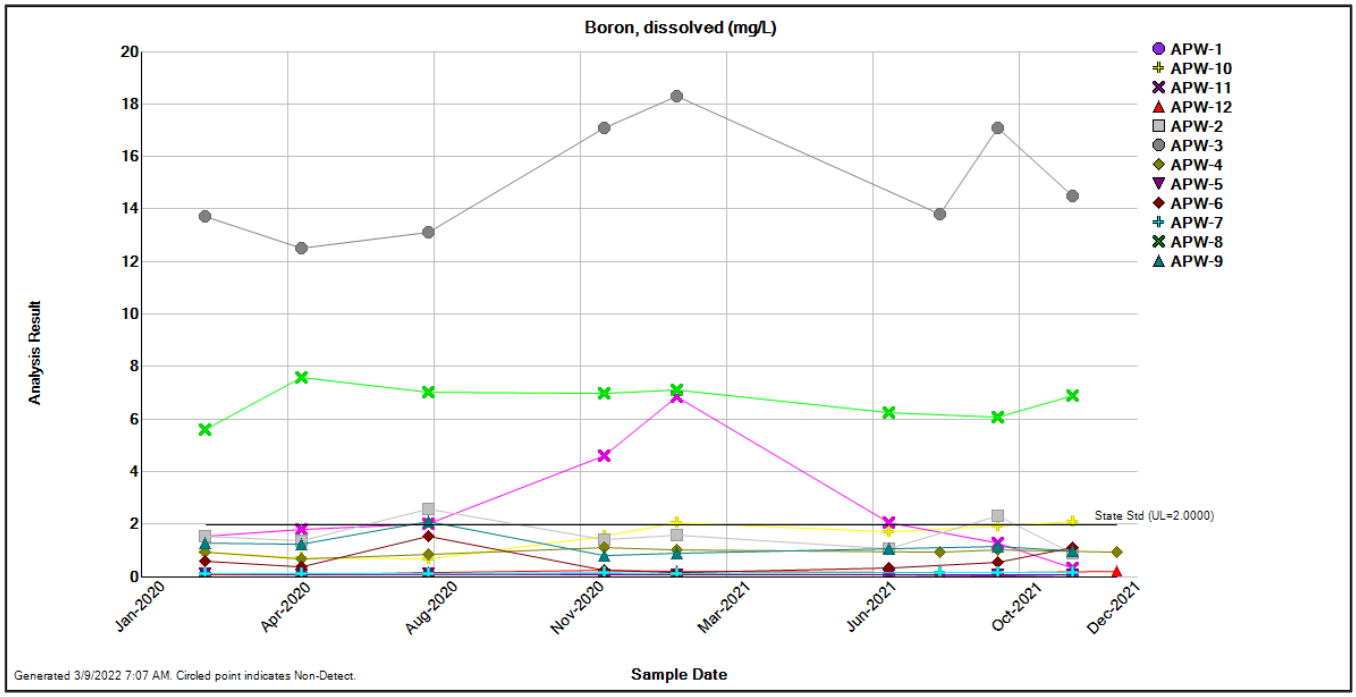


Figure 3-7. Dissolved boron concentrations during the reporting period (2020-2021) at all compliance wells. Circled results indicate non-detects.

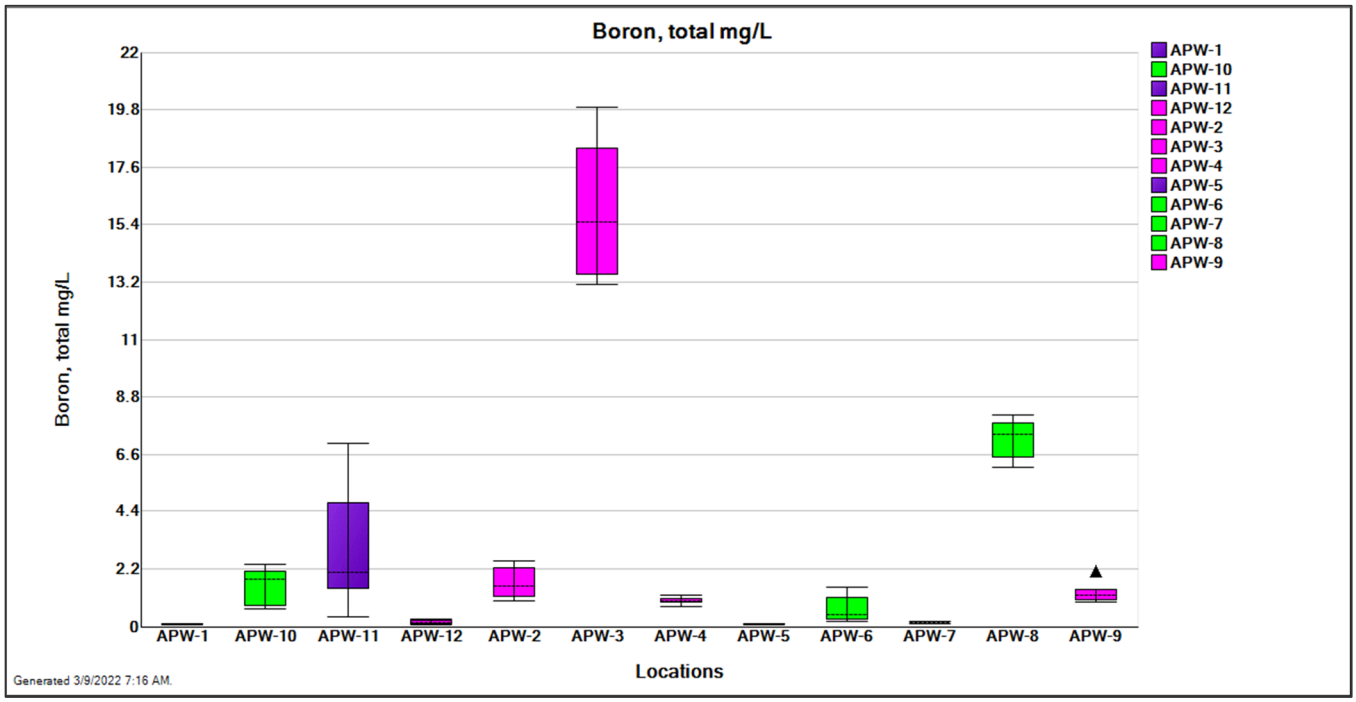


Figure 3-8. Box-whisker plot showing distribution of **total boron** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

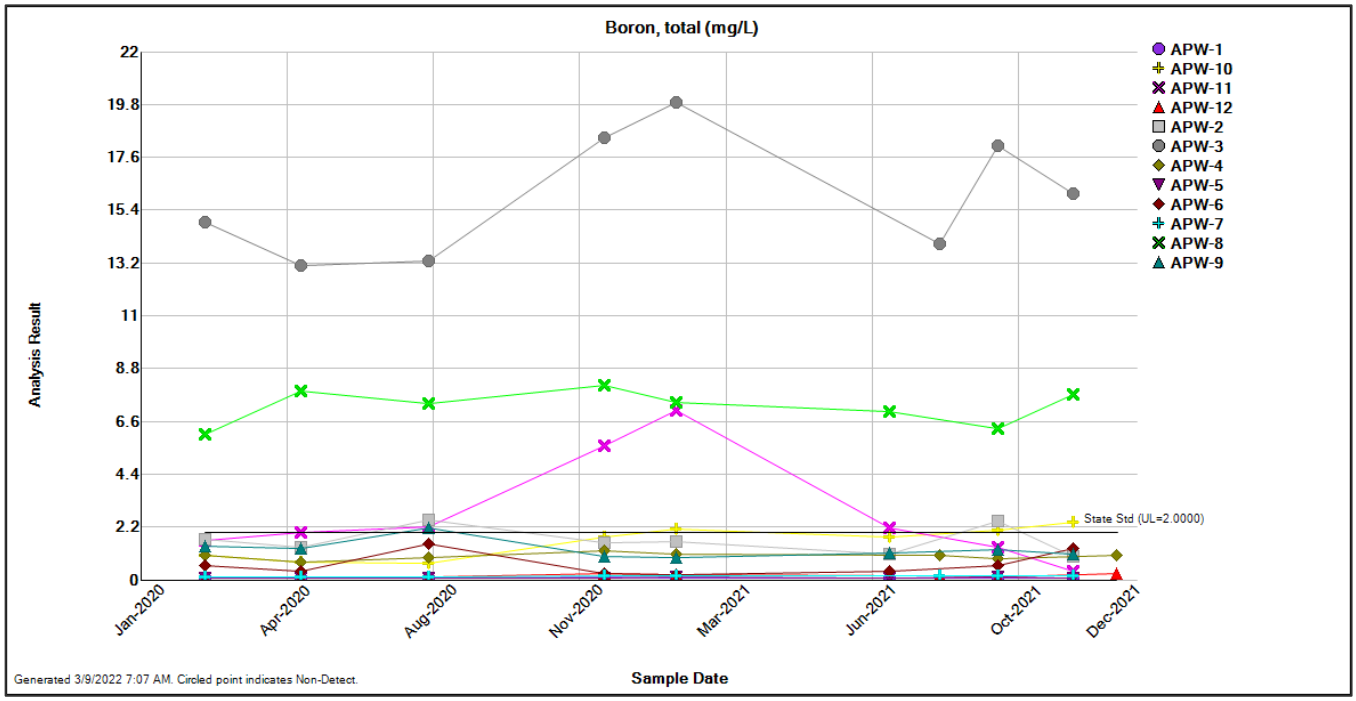


Figure 3-9. Total boron concentrations during the reporting period (2020-2021) at all compliance wells.

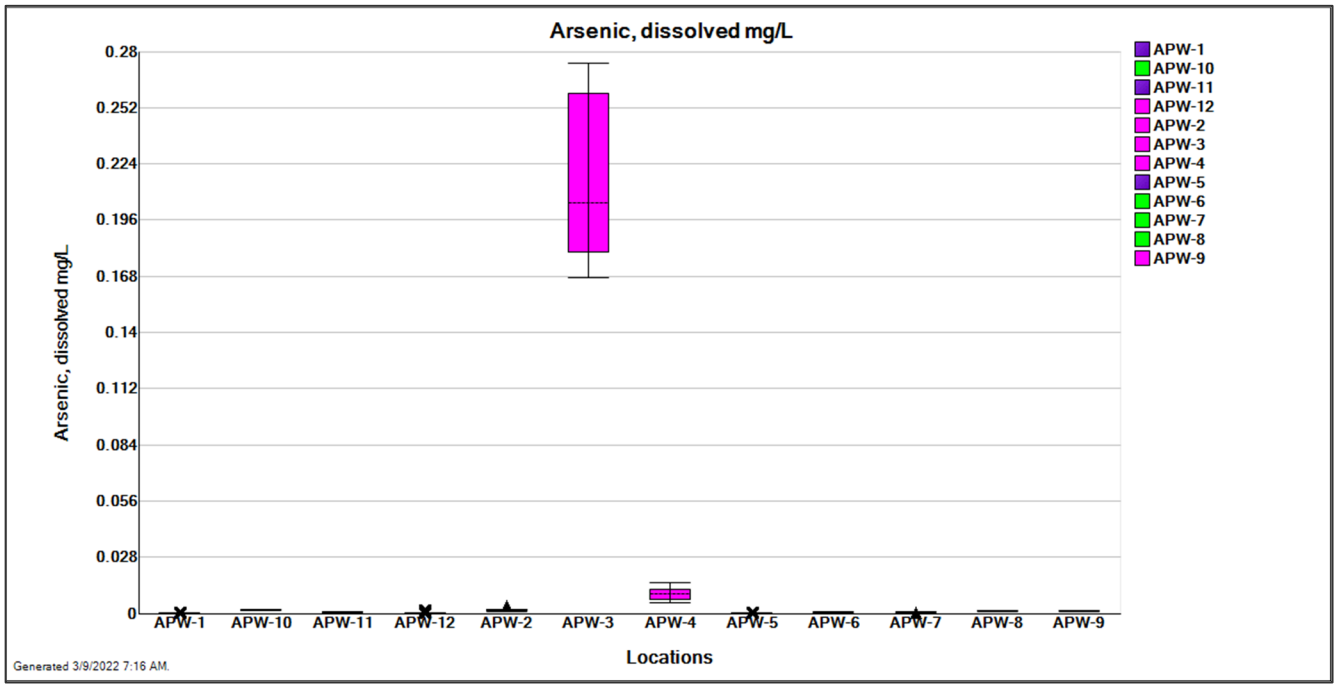


Figure 3-10A. Box-whisker plot showing distribution of **dissolved arsenic** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

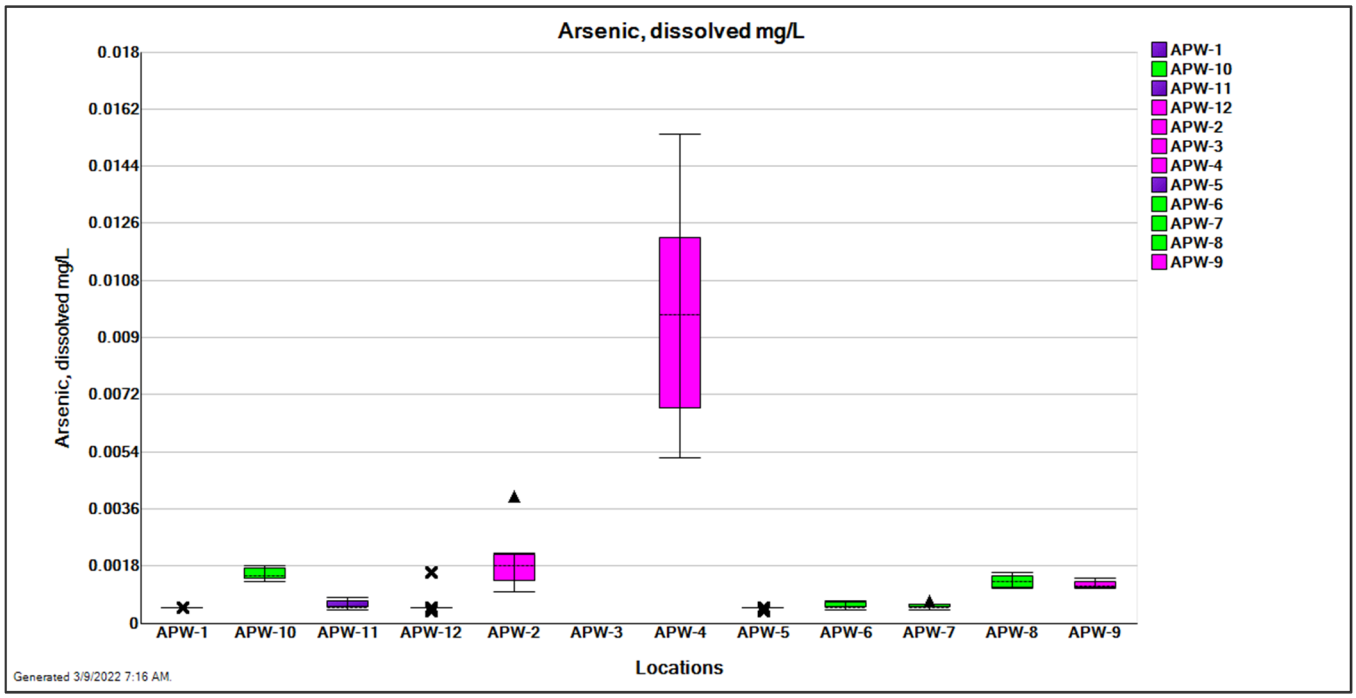


Figure 3-10B. Box-whisker plot showing distribution of **dissolved arsenic** concentration by monitoring well for data collected in 2020 and 2021 (zoomed in). Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

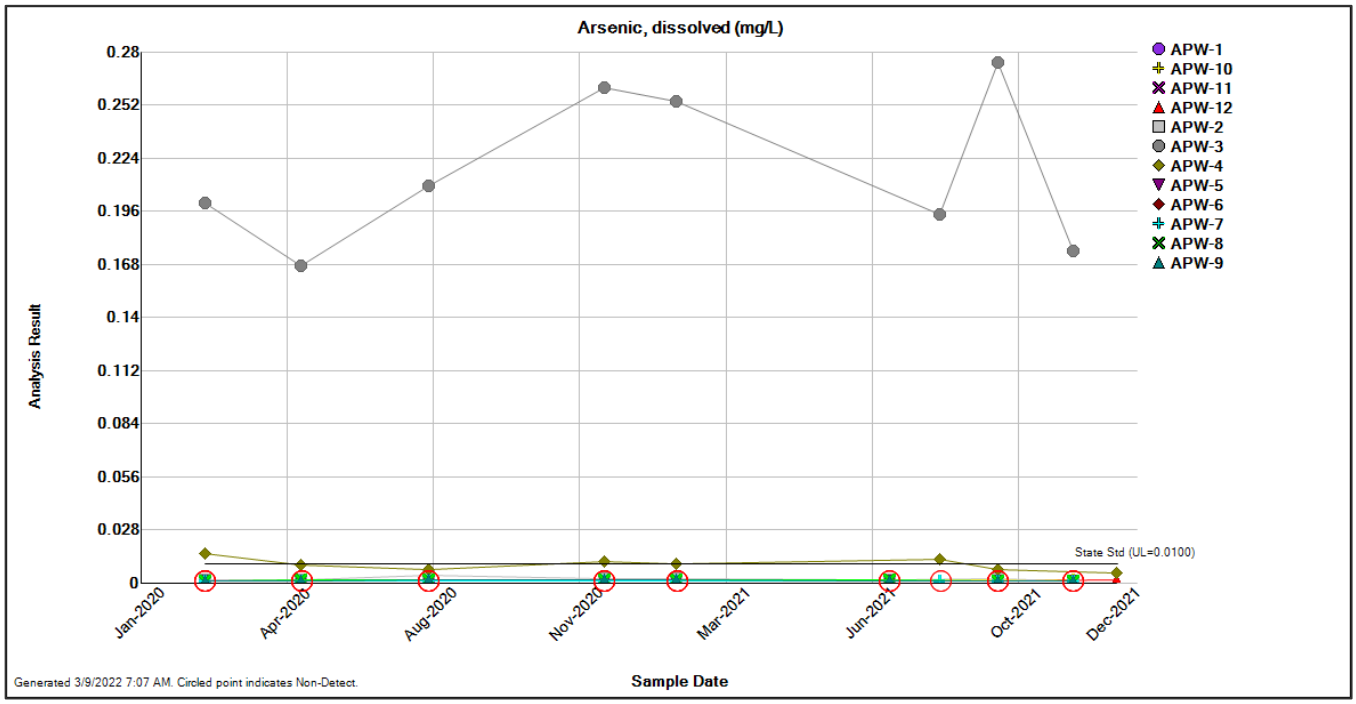


Figure 3-11A. Dissolved arsenic concentrations during the reporting period (2020-2021) at all compliance wells.

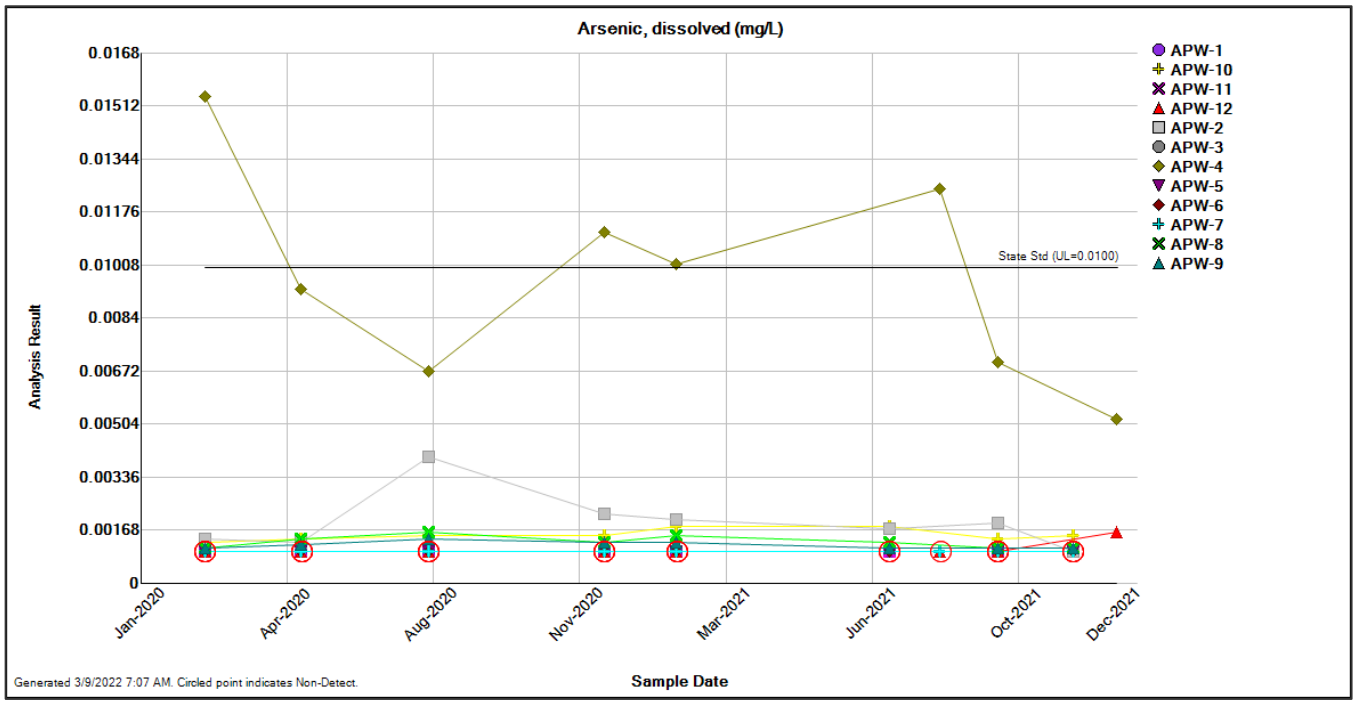


Figure 3-11B. Dissolved arsenic concentrations during the reporting period (2020-2021) at all compliance wells (zoomed in)

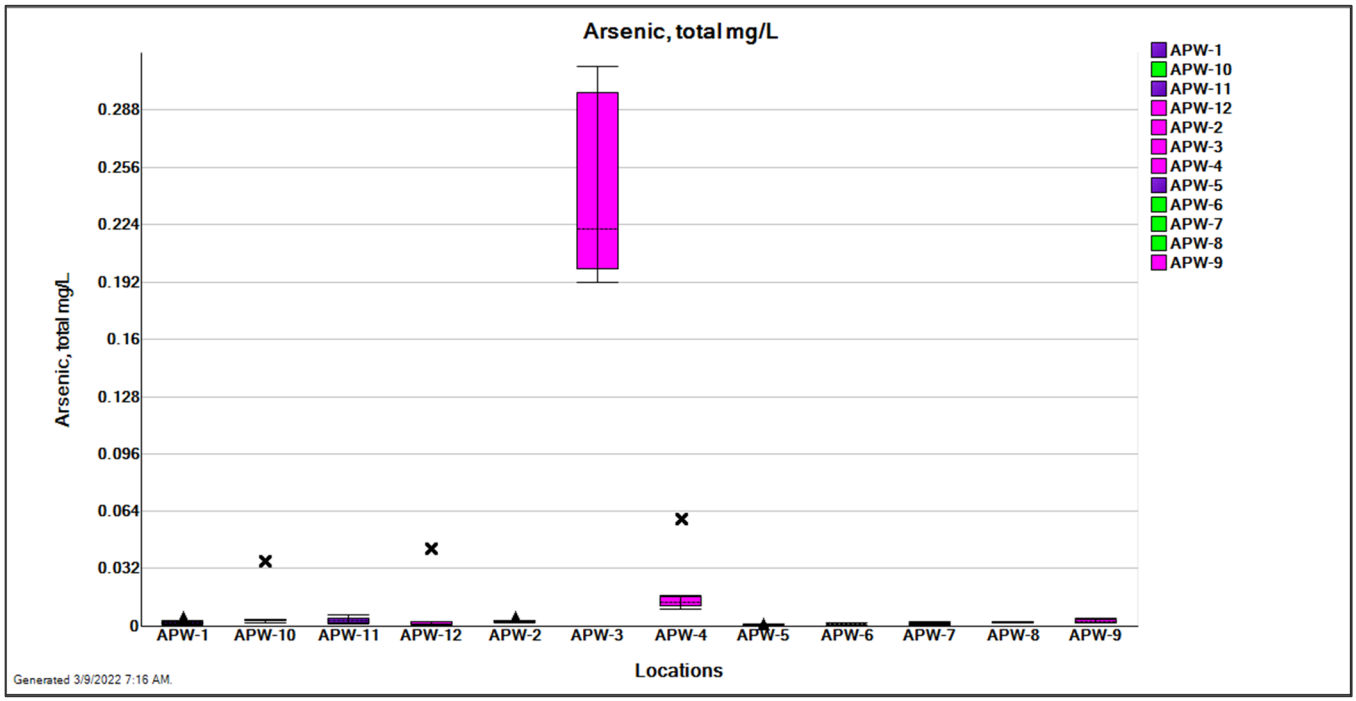


Figure 3-12A. Box-whisker plot showing distribution of **total arsenic** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

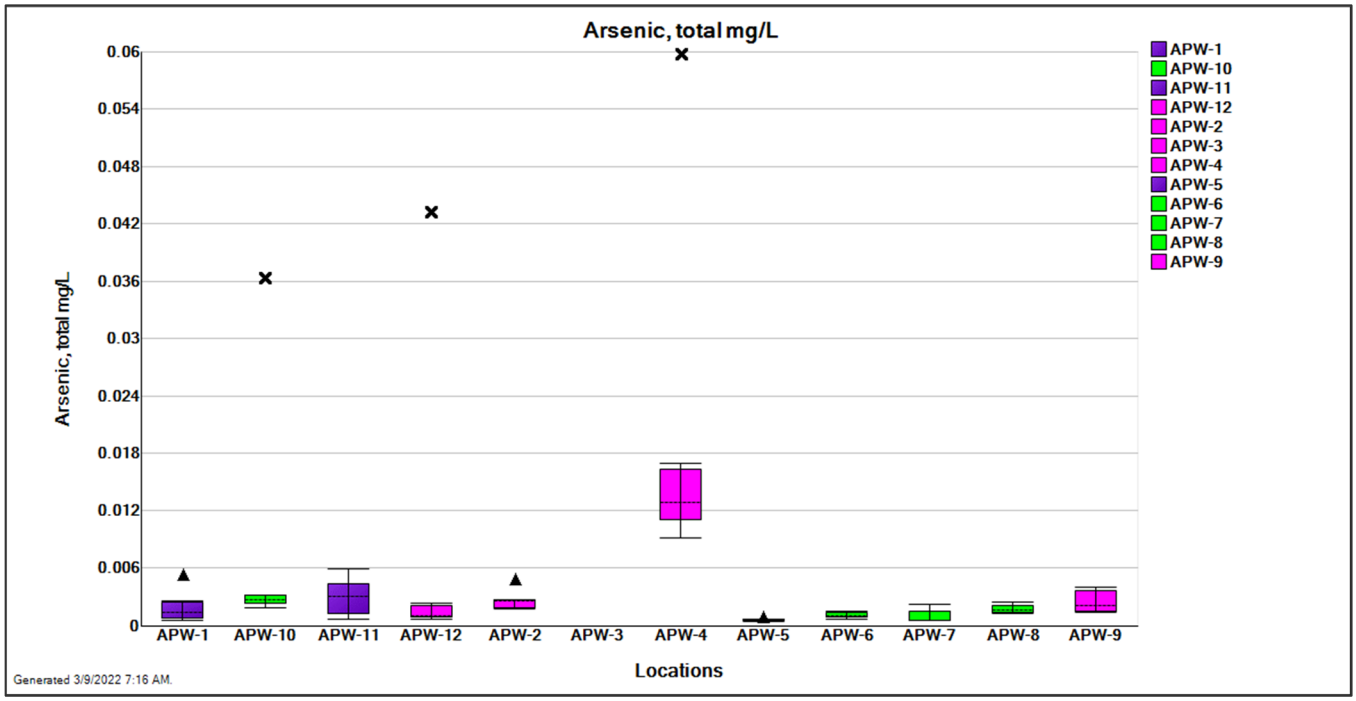


Figure 3-12B. Box-whisker plot showing distribution of **total arsenic** concentration by monitoring well for data collected in 2020 and 2021(zoomed in). Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

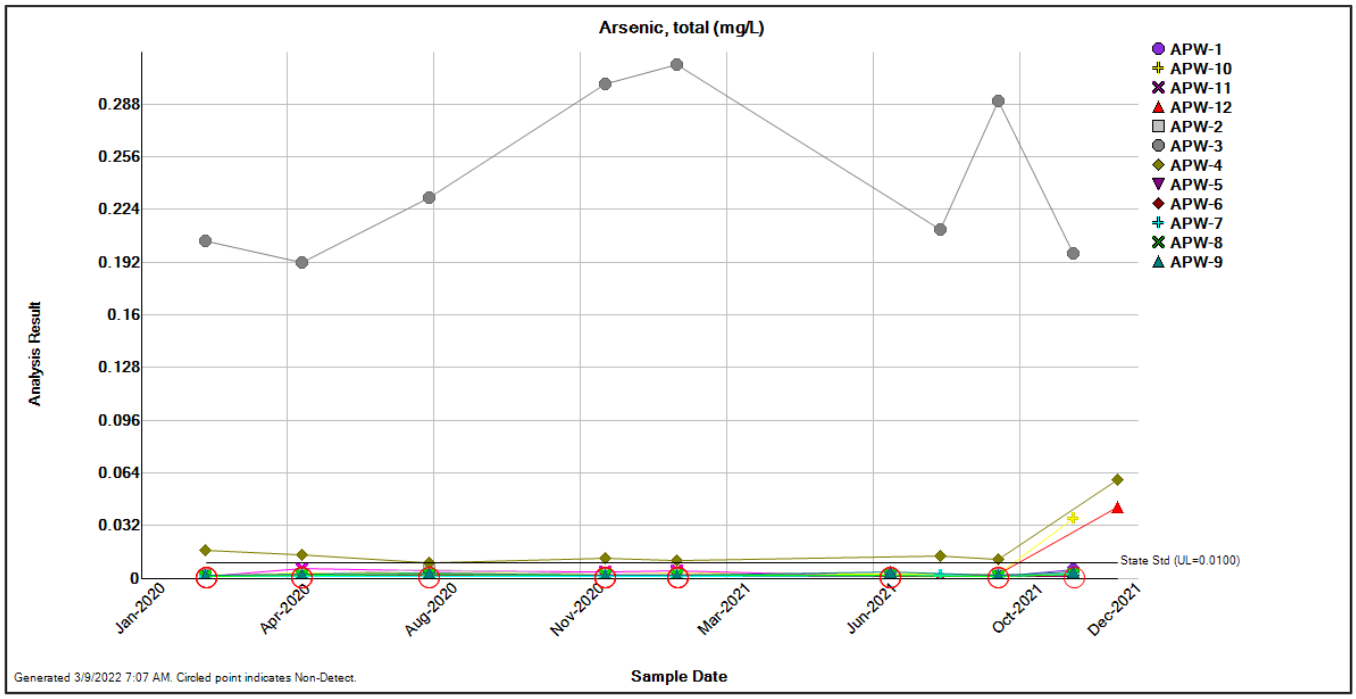


Figure 3-13A. Total arsenic concentrations during the reporting period (2020-2021) at all compliance wells.

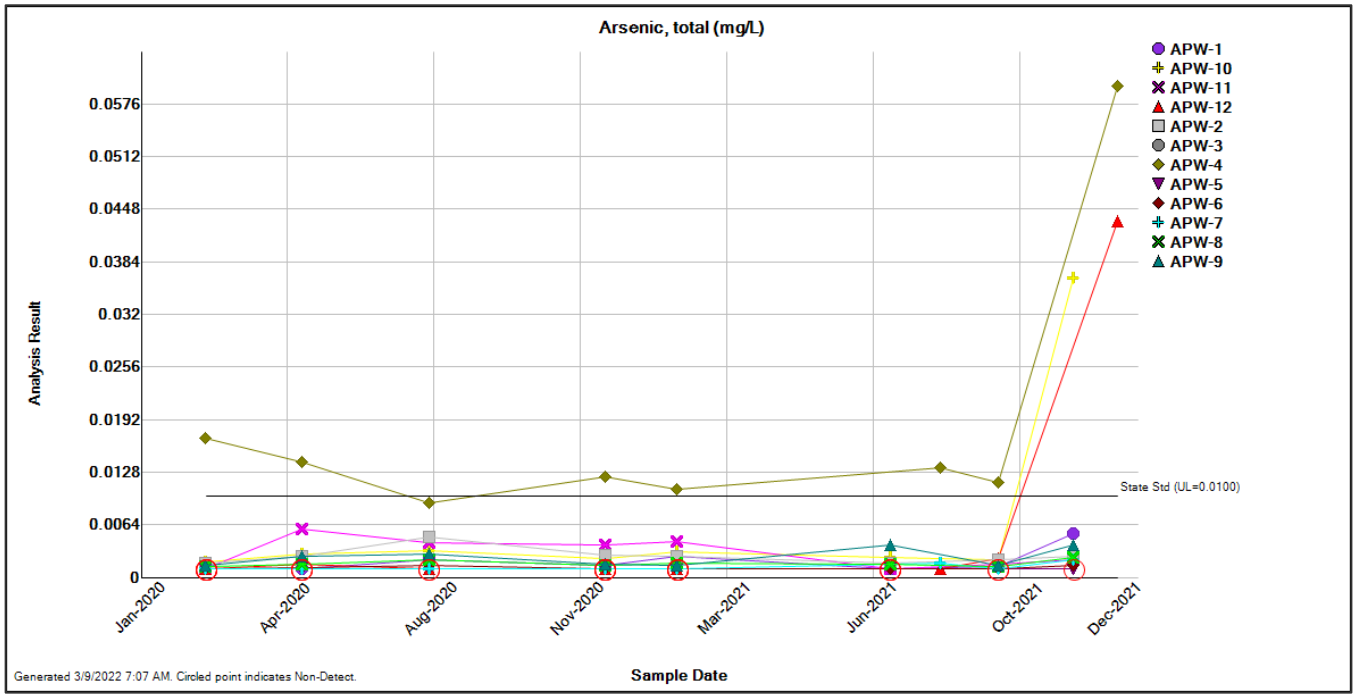


Figure 3-13B. Total arsenic concentrations during the reporting period (2020-2021) at all compliance wells (zoomed in).

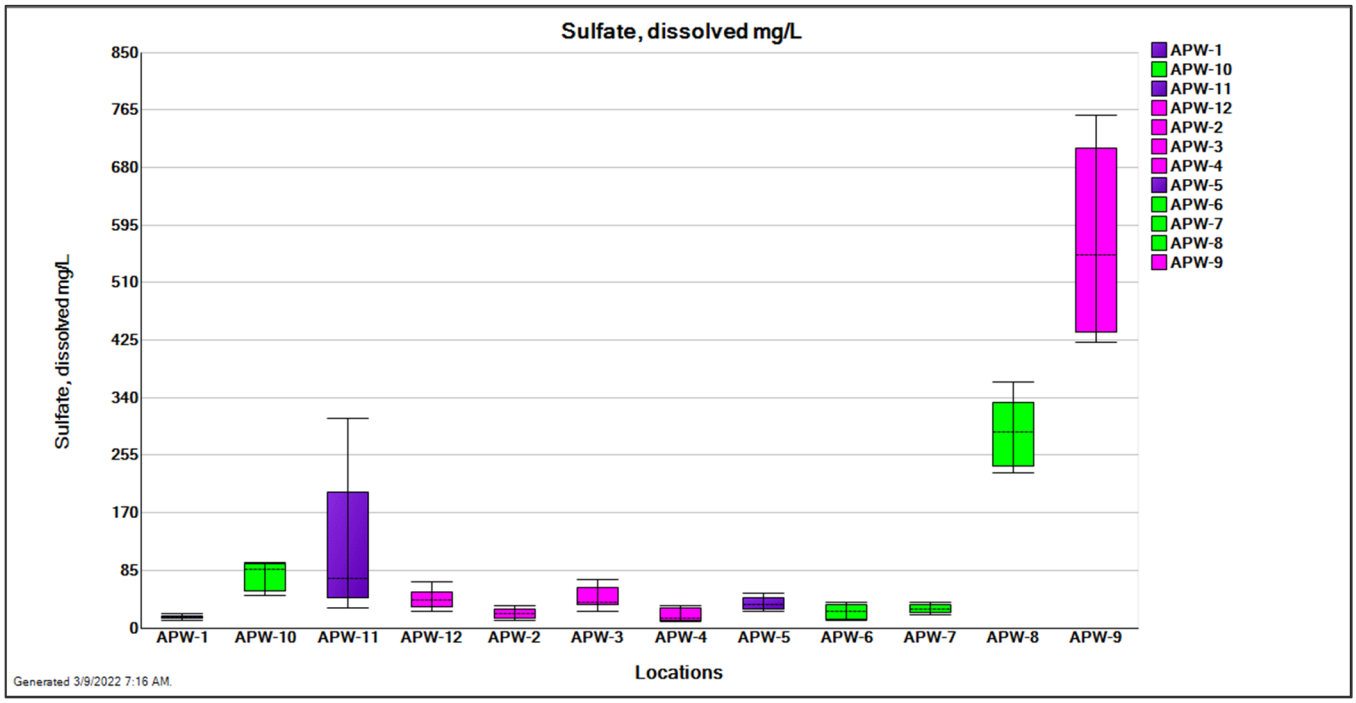


Figure 3-14. Box-whisker plot showing distribution of **dissolved sulfate** concentration by monitoring well for data collected in 2020 and 2021. Note: Box-whisker plots for upgradient wells are purple, for midgradient wells are green, and for downgradient wells are pink.

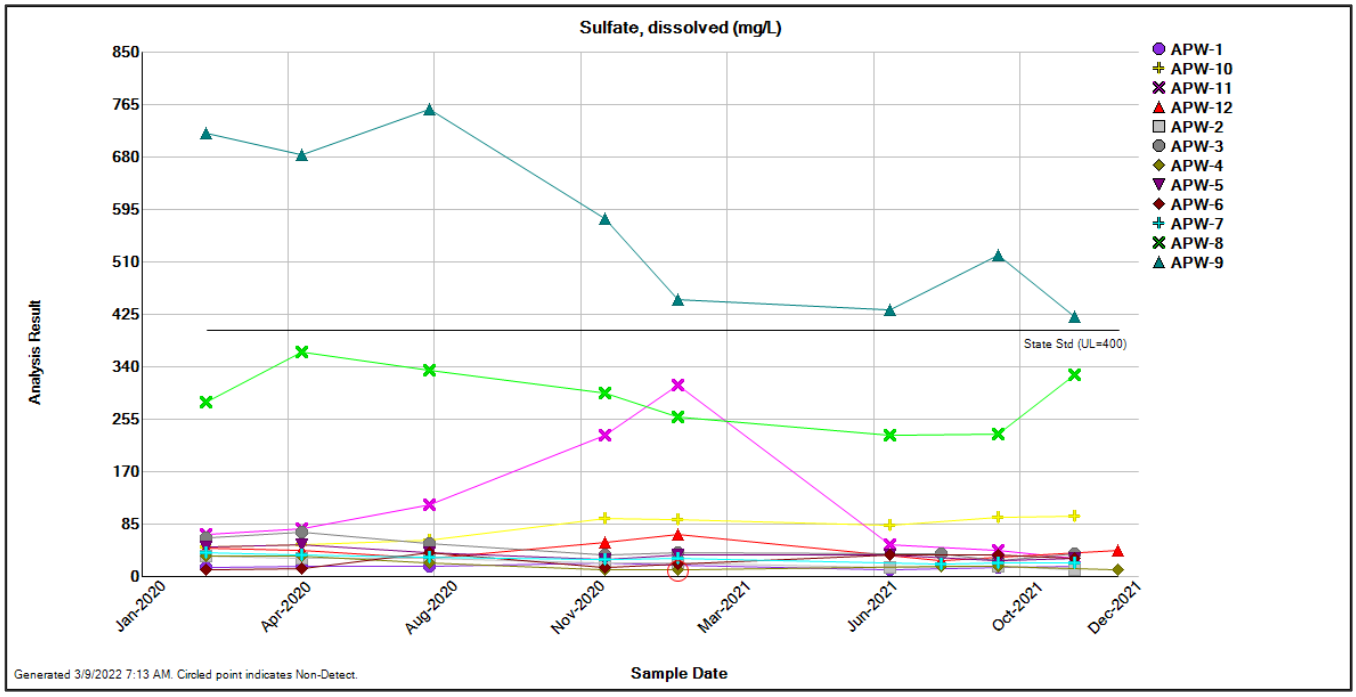


Figure 3-15. Dissolved sulfate concentrations during the reporting period (2020-2021) at all compliance wells.

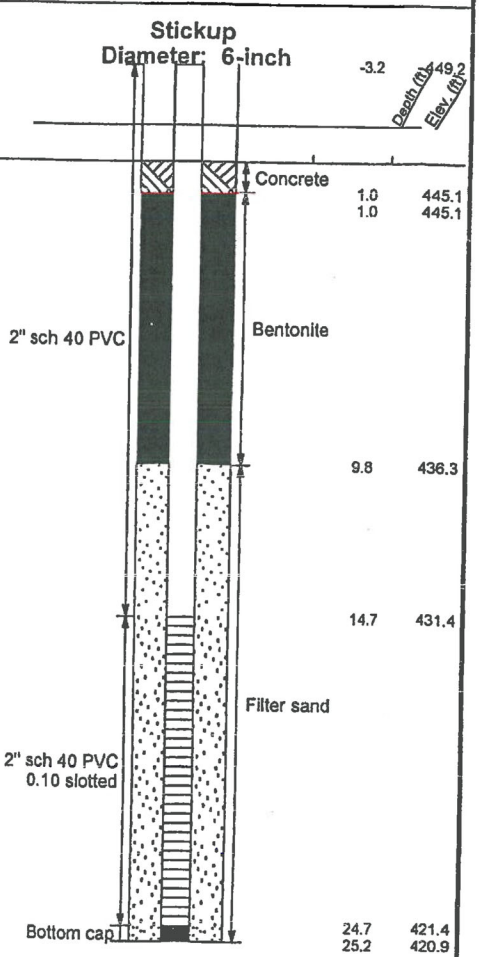
APPENDIX A
MONITORING WELL BORING AND CONSTRUCTION LOGS

Surface Elevation: 446.06
Datum msl

Completion Date: 10/26/10
Northing: 1147018.68
Easting: 2185605.2

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			1-1-1	SS1
5			2-2-1	SS2
			2-4-4	SS3
10			3-3-3	SS4
	Loose, brown fine to coarse SAND, trace gravel - SP ▽			
15			1-1-2	SS5
20			1-1-2	SS6
	Loose, brown, fine SAND - SP			
25	Boring terminated at 25 feet.		0-1-2	SS7
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 1/11/11

GROUNDWATER DATA

ENCOUNTERED AT 13 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

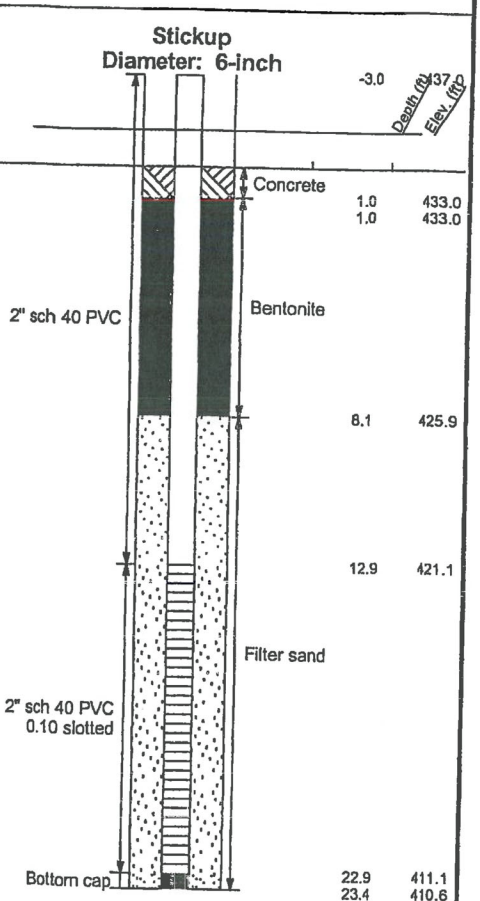
LOG OF BORING: APW-1

Project No. J017150.01

Surface Elevation: 433.97
Datum msl
Completion Date: 10/25/10
Northing: 1148489.69
Easting: 2182485.19

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Soft to medium stiff, brown and gray CLAY, trace sand - CH			
			2-2-2	SS1
5			2-2-2	SS2
			2-2-4	SS3
10			0-2-3	SS4
15			2-2-3	SS5
	Soft, gray, silty CLAY with shells, trace to some sand - CL			
20			0-1-1	SS6
	Very loose, brown, fine to medium SAND - SP			
25			0-0-1	SS7
	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTK	App'vd. by: KGP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

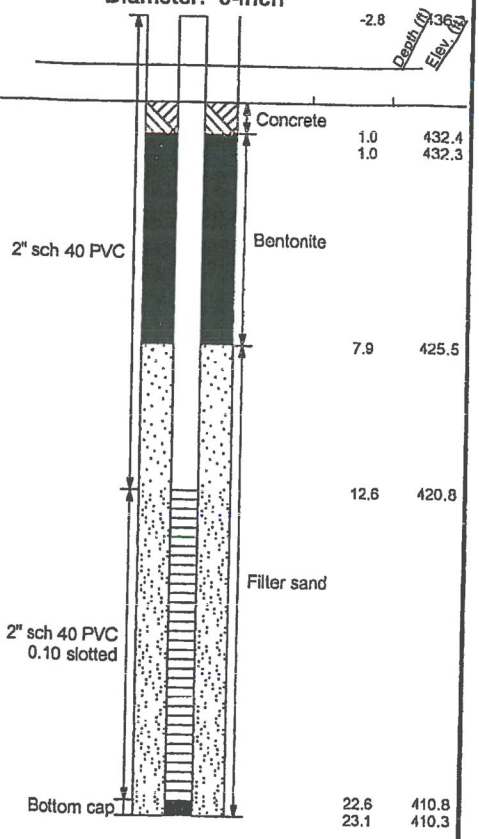
LOG OF BORING: APW-2/MW-2

Project No. J017150.01

Surface Elevation: 433.35
Datum msl
Completion Date: 10/25/10
Northing: 1148118.6
Easting: 2181973.76

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff, brown and gray CLAY, trace sand and wood - CH			
			2-3-3	SS1
			2-2-3	SS2
5			0-2-3	SS3
			0-1-2	SS4
10				
	Gray, silty CLAY, trace sand - CL		95	ST5
15				
	Soft, gray, silty SAND with shells and silty clay seams - SM			
20			0-1-1	SS6
	Wood		8-11-7	SS7
25	Boring terminated at 25 feet.			
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 12 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DK	App'vd. by: RSP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-3/B-10

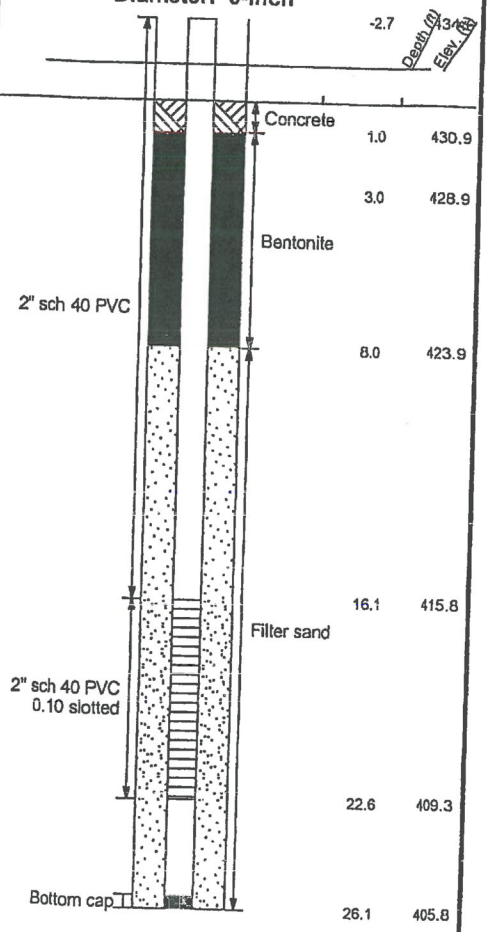
Project No. J017150.01

Surface Elevation: 431.90
Datum msl

Completion Date: 10/26/10
Northing: 1146935.94
Easting: 2181602.97

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Medium stiff to soft, brown and gray CLAY, trace sand and wood - CH			
			0-0-4	SS1
5			2-4-4	SS2
			1-1-1	SS3
10			1-1-2	SS4
	Loose, brown, fine SAND - SP			
15			3-6-7	SS5
20			0-2-2	SS6
25	Boring terminated at 25 feet.		0-0-0	SS7
30				
35				

WELL DIAGRAM



GROUNDWATER DATA

ENCOUNTERED AT 11.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DK	App'vd. by: ABP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-4

Project No. J017150.01

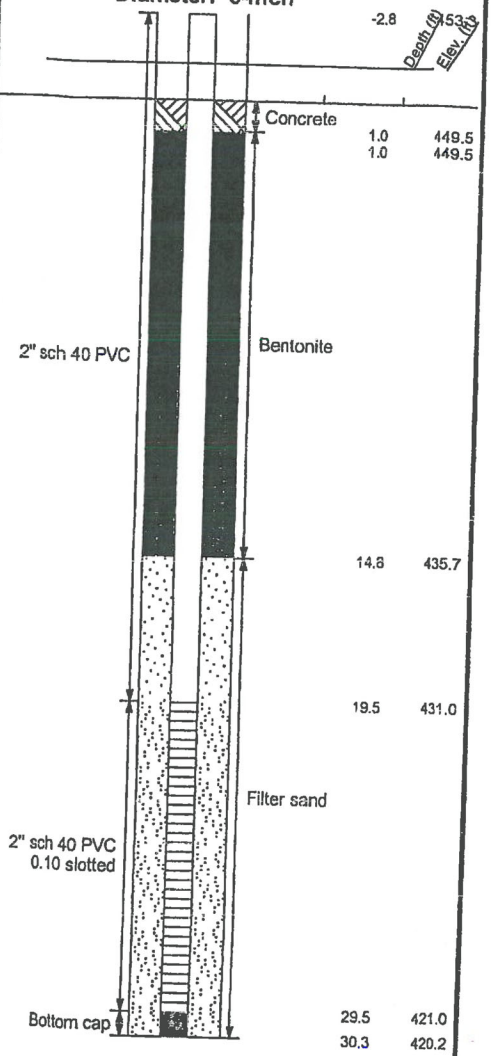
NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 450.48
Datum msl
Completion Date: 10/26/10
Northing: 1146922.64
Easting: 2183711.11

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Loose, brown, fine SAND - SP			
			3-3-3	SS1
5			2-2-2	SS2
			1-3-4	SS3
10			2-3-3	SS4
15			2-3-4	SS5
20	Loose, brown, fine to coarse SAND, trace to some gravel - SP		2-1-2	SS6
25			3-3-3	SS7
30	Boring terminated at 30 feet.		1-1-1	SS8
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 19.5 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
MB DRILLER LAH LOGGER
CME 550X DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: DTR	App'vd. by: RBP
Date: 11/3/10	Date: 2-17-11	Date: 2/17/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Generating Facility
Meredosia, Illinois

LOG OF BORING: APW-5

Project No. J017150.01

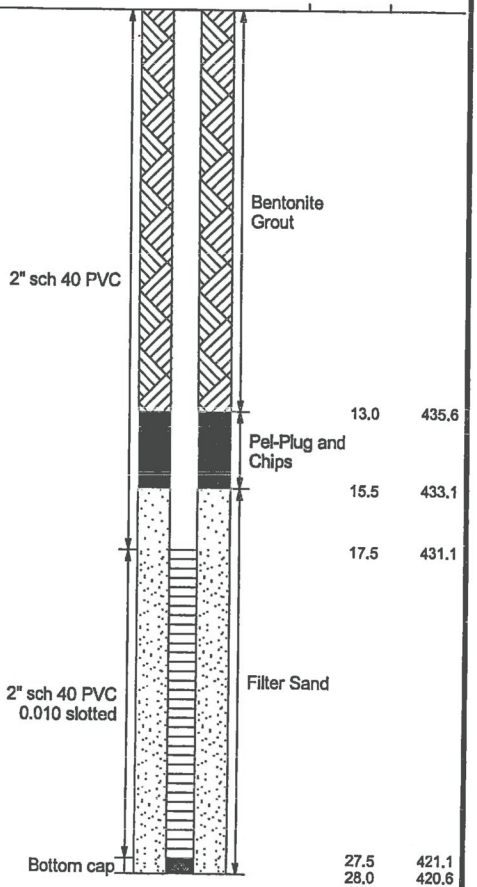
LOG OF BORING 2002 WL J017150.01 - MEREDOSIA.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 448.55
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.570556

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Brown, fine grained SAND - SP		0-3-4	SS1
			3-4-6	SS2
5			2-3-1	SS3
			2-2-2	SS4
			3-3-5	SS5
10			4-5-6	SS6
			1-3-3	SS7
			1-2-3	SS8
15			4-6-7	SS9
	Brown, medium grained SAND - SP ▽		4-3-4	SS10
			1-2-2	SS11
20				
	Blind drilled - heaving sands			
25				
	Boring terminated at 28 feet.			
30				
35				

WELL DIAGRAM

Stickup = 3.3 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 18 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: [illegible]	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-6

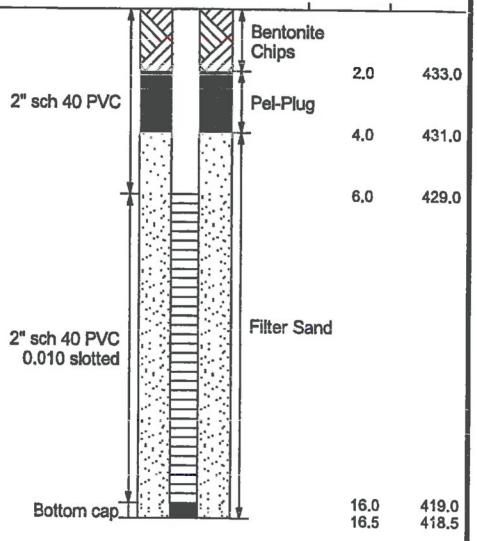
Project No. J024917.01

Surface Elevation: 435.03
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.815833
Longitude: -90.573333

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Black, silty CLAY - CL		2-4-3	SS1
	Brown, silty CLAY - CL		2-3-4	SS2
5			1-2-1	SS3
	Brown, fine grained SAND - SP		1-1-1	SS4
			0-0-1	SS5
10	Blind drilled - heaving sands			
15				
	Boring terminated at 17 feet.			
20				
25				
30				
35				

WELL DIAGRAM

Stickup = 3.7 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/15

GROUNDWATER DATA

ENCOUNTERED AT 6 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: [illegible]	App'vd. by: AMS
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-7

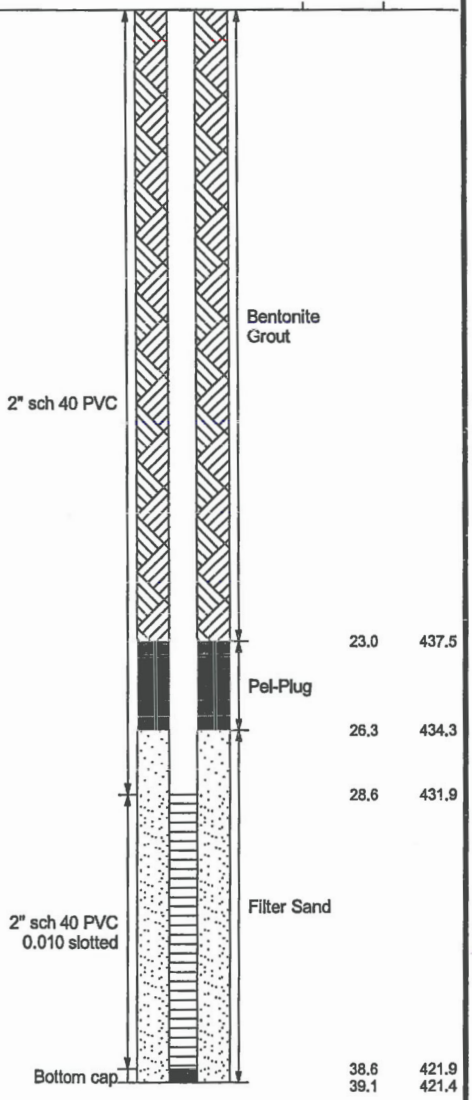
Project No. J024917.01

Surface Elevation: 460.54
Datum: _____
Completion Date: 10/1/2015
Latitude: 39.818611
Longitude: -90.5697222

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Brown, fine grained, poorly graded SAND - SP		3-9-9	SS1
			7-11-12	SS2
5			3-4-5	SS3
			2-3-3	SS4
			2-3-4	SS5
10			2-3-5	SS6
			3-5-9	SS7
15			5-7-7	SS8
			5-7-8	SS9
			5-7-8	SS10
20			9-15-16	SS11
			7-12-13	SS12
25			8-13-14	SS13
			9-10-11	SS14
	Brown, medium grained, poorly graded SAND - SP		6-6-9	SS15
30		▽	5-8-9	SS16
			4-5-6	SS17
	Blind drilled - heaving sands			
35				
40	Boring terminated at 40 feet.			

WELL DIAGRAM

Stickup = 3.4 ft
Diameter: 8 1/2 inch



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J024917.01 - MEREDOSIA WELL.GPJ 00 CLONE ME.GPJ 12/29/00

GROUNDWATER DATA

ENCOUNTERED AT 32 FEET ▽

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM
WASHBORING FROM ___ FEET
SMP DRILLER SJK LOGGER
CME 550 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: [illegible]	App'vd. by: [illegible]
Date: 10/9/2015	Date: 8/5/16	Date: 8/5/16

GEOTECHNOLOGY INC
FROM THE GROUND UP

Meredosia Power Plant
Ameren Missouri

LOG OF BORING: APW-8

Project No. J024917.01