2021 Annual Groundwater Monitoring Report
Per EPA CCR Rule (CFR § 257.90-.98)

Asbury Generating Station CCR Impoundment
Jasper County, MO

January 2022

Prepared For:

The Empire District Electric Company
602 S. Joplin Avenue
Joplin, Missouri 64801

Anika Careaga
1/11/2022

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CERTIFICATE OF COMPLIANCE

Annual Groundwater Monitoring Report for Existing CCR Surface Impoundments
EPA CCR Rule Section 40 CFR 257.90 (e)
Empire District Electric Company – Asbury Power Plant
Asbury, Missouri

The following presents the Annual Groundwater Monitoring Report for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. This serves as certification that the facility is in compliance with 40 CFR 257.90 (e) of the EPA CCR.

40 CFR 257.90 (e) states:
(e) Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report.

CERTIFICATION 257.90 (e)
The undersigned Professional Engineer (P.E.) is familiar with the requirements of 40 CFR Part 257. The above summarizes the status of the Groundwater Monitoring for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. I hereby certify that the facility is in compliance with 40 CFR 257.90 (e) and all information has been placed in the Operating Record. Notification of availability of this document should be provided to the State Director as required in section 257.107(h).

Name: Anika Careaga, P.E.

Seal:

Signature: Anika Careaga

Date: 1/11/2022

Registration Number: 2005022085

State: Missouri

Anika Careaga
1/11/2022

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1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundment groundwater monitoring sampling report is in accordance with the EPA CCR Rule.

In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater monitoring system. Background data of Appendix III and Appendix IV was collected from January 2016 to August 2017. After review of the first semi-annual groundwater sampling event analytical results completed in October 2017, the constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan in accordance with the EPA CCR Rule.

On May 4 and 5, 2021 and November 8 and 9, 2021, semi-annual detection monitoring sampling events was conducted per the EPA CCR Rule (§ 257.94). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III only. Based on the results of the 2021 statistical analysis, the site will continue with detection monitoring for the 2022 sampling events per the EPA CCR Rule (§ 257.94).

The EPA CCR Rule requires the annual groundwater report completed by January 31st of the following year. This report serves as the annual groundwater report for the 2021 sampling events that will be completed by January 31, 2022 and posted on-line within 30 days. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. The Empire District will notify the MDNR "State Director" via e-mail when this document is posted on-line, as required in the CCR rule.

2.0 BACKGROUND DATA

The purpose of the groundwater monitoring plan is to monitor the groundwater quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. The groundwater monitoring system for the site consists of the following monitoring wells:

- MW-1 Sidegradient (water level only)
- MW-2 Upgradient
- MW-3 Upgradient
- MW-4 Downgradient
- MW-5 Downgradient
- MW-5A Downgradient
- MW-6 Downgradient
- MW-6A Downgradient
- MW-7 Sidegradient

Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of April/May and October/November. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017.

Four more sets of background data were available to add to the background data set for the November 2019 sampling event. The analysis of the additional data for the background data set was conducted. No trending was found in the additional four sets of data so they were added to the baseline data set to increase the statistical power of the background data.

3.0 ALTERNATIVE SOURCE DEMONSTRATION

The EPA Coal Combustion Residual (CCR) Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. The November 2020 sampling event report indicated a statistically significant increase (SSI) with a confirmed interwell prediction limit exceedance for Boron in MW-5A. Boron does not have a maximum contamination level (MCL).

The EPA CCR Rule 40 CFR § 257.94(e)(2) allows an alternative source demonstration to be completed within 90 days if the statistically significant increase (SSI) over background levels was caused by a source other than that CCR unit. The purpose of the Alternative Source Demonstration is to comply with the EPA CCR Rule 40 CFR 257.94(e)(2) "*The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.*"

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct. **Appendix A** contains the complete report for the Alternative Source Demonstration for the November 2020 sampling event.

4.0 MAY 2021 SAMPLING EVENT

On May 4 and 5, 2021, a semi-annual detection monitoring sampling event was conducted per the EPA CCR Rule (§ 257.94). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken.

Table 1 – Constituents During May 2021 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.13	<0.08J	<0.08	0.28	1.2	0.33	0.38	0.23
Calcium	mg/L	NA	36	97	200	100	300	260	180	480
Chloride	mg/L	NA	100	59	60	6.6	110	14	28	38
Fluoride	mg/L	4.0	0.37	0.14	0.2	0.35	0.33	0.31	0.35	<0.25J
pH	SU	NA	6.31	5.75	6.58	7.18	6.77	6.87	6.91	6.28
Sulfate	mg/L	NA	52	490	670	160	1500	1000	850	1800
Total Dissolved Solids	mg/L	NA	410	830	1300	580	2400	1700	1400	2700

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

There were no initial interwell prediction limit exceedances for the listed monitoring well during May 2021 sampling event. During the November 2020 sampling event, Initial interwell prediction exceedances in pH (MW-5, MW-6 and MW-6A) and total dissolved solids (MW-5A) were noted. There are no current primary (health based) MCLs for pH but the confirmed pH results are still within the acceptable range of 6.5 to 9 SU. The facility plans to resample as part of the November 2021 sampling event.

The results of the interwell prediction limit statistical analysis of the November 2020 and May 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct. **Appendix A** contains the completed Alternative Source Demonstration. **Appendix B** contains the complete report for the May 2021 sampling event.

Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis for the November 2021 sampling event.

5.0 NOVEMBER 2021 SAMPLING EVENT

On November 8 and 9, 2021, a semi-annual detection monitoring sampling event was conducted per the EPA CCR Rule (§ 257.94). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken.

Table 2 – Constituents During November 2021 Sampling Event

Constituent	Units	MCL	MW-2 (up)	MW-3 (up)	MW-4 (down)	MW-5 (down)	MW-5A (down)	MW-6 (down)	MW-6A (down)	MW-7 (side)
Appendix III										
Boron	mg/L	NA	0.23	0.09	<0.08J	0.29	1.6	0.38	0.41	0.24
Calcium	mg/L	NA	38	87	260	100	370	260	190	470
Chloride	mg/L	NA	110	73	3.9	6.1	140	16	22	37
Fluoride	mg/L	4.0	0.47	0.21	0.14	0.35	0.27	0.25	0.38	<0.25J
pH	SU	NA	6.45	6.02	6.72	7.23	6.84	7.09	7.17	6.42
Sulfate	mg/L	NA	<1	430	530	140	1700	1400	780	1700
Total Dissolved Solids	mg/L	NA	390	830	1400	580	3100	1800	1500	2800

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

No constituents were detected above the Federal Safe Drinking Water maximum contaminant level (MCL) during the sampling event. There were no initial interwell prediction limit exceedances for the listed monitoring well during November 2021 sampling event. During the November 2021 sampling event, interwell prediction exceedances in boron (MW-5A) and pH (MW-5, MW-6 and MW-6A) were confirmed. There are no current primary (health based) MCLs for pH but the confirmed pH results are still within the acceptable range of 6.5 to 9 SU. The facility will resample as part of the May 2022 sampling event.

The results of the interwell prediction limit statistical analysis of the November 2020, May 2021 and November 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct. Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis. **Appendix C** contains the full report for the November 2021 sampling event.

6.0 EXCUTIVE SUMMARY

This report is a summary of the 2021 sampling events and the findings of the statistical analysis of the results of the groundwater detection monitoring program at the Asbury Generating Station CCR Impoundment. Specific information of each sampling event can be obtained from the individual reports which are included as appendices and have been placed in the Asbury Operating Record. Statistical analysis will continue utilizing interwell prediction limits per EPA's request. The site continues with the detection monitoring program on a semi-annual basis per the EPA CCR Rule (§ 257.94).

APPENDIX A

Alternative Source Demonstration
(for the November 2020 Sampling Event)

Alternative Source Demonstration
Per EPA CCR Rule (40 CFR § 257.94(e)(2))

Asbury Generating Station CCR Impoundment
Jasper County, MO

April 2021

Prepared For:
The Empire District Electric Company
602 S. Joplin Avenue
Joplin, Missouri 64801

4-26-21

4/26/2021

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4/26/2021

1.0 CERTIFICATE OF COMPLIANCE

Alternative Source Demonstration for Existing CCR Surface Impoundments
EPA CCR Rule Section 40 CFR 257.94(e)(2)
Empire District Electric Company – Asbury Power Plant
Asbury, Missouri

The following Alternative Source Demonstration is being presented for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. This serves as certification that the facility has completed an Alternative Source Demonstration in compliance with 40 CFR 257.94 (e)(2) of the EPA CCR.

40 CFR 257.94(e)(2) states:
(2) The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

CERTIFICATION 257.94(e)(2)
The undersigned Professional Engineer (P.E.) is familiar with the requirements of 40 CFR Part 257. The above summarizes the status of the Alternative Source Demonstration for the Groundwater Monitoring Program for the Empire District Electric Company's CCR Impoundment at the Asbury Power Plant. I hereby certify that the facility is in compliance with 40 CFR 257.94(e)(2) and all information has been placed in the Operating Record. Notification of availability of this document should be provided to the State Director as required in section 257.107(h).

Name: Anika Careaga, P.E.

Signature: Anika Careaga

Date: 4/26/2021

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State: Missouri

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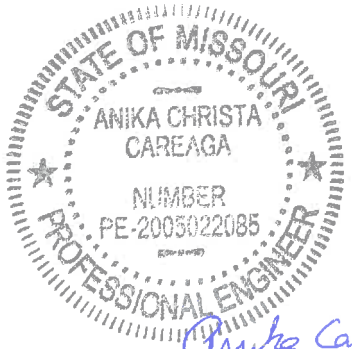


Anika Careaga
4/26/2021

2.0 INTRODUCTION

The EPA Coal Combustion Residual (CCR) Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. The November 2020 sampling event report indicated a statistically significant increase (SSI) with a confirmed interwell prediction limit exceedance for Boron in MW-5A. Boron does not have a maximum contamination level (MCL). The November 2020 sampling event is described in detail in Appendix B of the 2020 Annual Groundwater Monitoring Report.

The EPA CCR Rule 40 CFR § 257.94(e)(2) allows an alternative source demonstration to be completed within 90 days if the statistically significant increase (SSI) over background levels was caused by a source other than that CCR unit. The purpose of the Alternative Source Demonstration is to comply with the EPA CCR Rule 40 CFR 257.94(e)(2) "*The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.*"

This Alternative Source Demonstration is being completed to demonstrate the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

3.0 SITE HISTORY

The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. The site is located approximately 5.5 miles north-northeast of Asbury, Missouri, about 14 miles north-northwest of Joplin, Missouri. A map showing the locations of the monitoring wells is on **Figure 2**.

In March 1996, five (5) groundwater monitoring wells, MW-1 through MW-5, were installed around the perimeter of the Asbury Generating Station CCR impoundment. Monitoring wells MW-1, MW-2 and MW-3 were installed to a total depth of between 27.0 to 28.5 feet below ground surface (bgs). Monitoring wells MW-4 and MW-5 were installed to a total depth of 48 feet bgs. Each of the five monitoring wells was equipped with 10-foot well screens. Each well was installed with an above ground steel protective cover. The five wells were then developed, purged, and sampled in 1996.

In 2003, two (2) additional groundwater monitoring wells were installed and identified as MW-6 and MW-7. Both wells had 2-inch diameter PVC well casings installed to an approximate total depth of 44 feet below ground surface. Both wells were installed with an above ground steel protective cover. No other construction details such as well screen lengths were available for these two (2) wells.

In December 2015, two (2) additional groundwater monitoring wells were installed for compliance with the EPA CCR Rule and identified as MW-5A and MW-6A. Both wells were installed to a total depth of 46 feet bgs. Each well was equipped with a 5-foot well screen and an above ground steel protective cover.

Well logs are included in the April 2018 Asbury CCR Impoundment Groundwater Monitoring Plan Appendix B Groundwater Sampling and Analysis Plan. All wells are registered with Missouri Department of Natural Resources (MDNR) – Missouri Geological Survey (MGS) Program.

Historically, the potentiometric surface indicated the groundwater flow direction to the east. **Figure 3** is the Groundwater Piezometric Surface Map for the November 2020 sampling event.

4.0 ALTERNATIVE SOURCE DEMONSTRATION

This Alternative Source Demonstration is being completed to demonstrate the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater. The November 2020 sampling event report indicated a statistically significant increase (SSI) with a confirmed interwell prediction limit exceedance for Boron in MW-5A.

4.1 Groundwater Issues

In December 2015, two (2) additional groundwater monitoring wells were installed and identified as MW-5A and MW-6A for compliance with the EPA CCR Rule. Issues have since been noted in the sample results, statistical analysis and increased water level elevations for MW-5A compared to the existing wells. During the May 2018 sampling event it was noted that MW-5A had issues with ponding on the surface near the well. We continued to observe this situation during subsequent sampling events.

On December 11, 2019 an additional investigation of this well was completed. Palmerton & Parrish, Inc. (PPI) completed an inspection of the condition of the PVC riser and screen of MW-5A with a downhole camera. PPI determined that the conditions observed in the monitoring well pipe were normal. As part of this investigation MEC sampled the ponded water around MW-5A and water from the CCR impoundment. The results showed the levels of Boron in the ponded water were similar to Boron levels in the impoundment water sample.

The results of the interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed statistically significant increase (SSI) with an exceedance for Boron (MW-5A). Trending was found to be significant for Boron (MW-5A). Boron does not have a MCL. The facility chose to conduct an Alternative Source Demonstration in the next 90 days per the EPA CCR Rule (§ 257.94).

4.2 Historical Construction

The Asbury Power Plant was officially retired on March 1, 2020. Closure activities and closure design of the CCR Impoundment was initiated. During the design of the impoundment closure, historical drawings were discovered that indicated there was a dewatering trench and cutoff trench system designed and installed. This system was proposed in the Ash Pond Improvement Study by Black & Veatch dated April 3, 1987.

The Ash Pond Improvement Study was initiated due to concern with observed seepage at the toe of the bottom ash pond embankments and extensive erosion of the dam crest caused by wave action. The chosen alternative to limit seepage beneath the existing embankment was to construct a downstream cutoff trench. The cutoff trench was to be constructed of select clay fill with a permeability of 10^{-7} cm/sec or less. Excavation of this cutoff trench required the installation of a temporary dewatering system. This dewatering system consisted of a trench excavated near the toe of the slope to intercept seepage from the CCR pond. Once moisture conditions in the dewatering downstream area reached acceptable levels, excavation of the clay cutoff trench proceeded. The cutoff trench was approximately 10 feet wide at the bottom, with 2 (vertical) to 1 (horizontal) side slopes. The trench was filled with select compacted clay materials. The fill material had minimum permeability of approximately 10^{-7} cm/sec.

Black & Veatch prepared plans for the East Ash Pond Improvements. The plans that were issued for construction were dated October 28, 1987. MEC reviewed these plans to determine the

design location of the dewatering trench and cutoff trench in relation to the Groundwater Monitoring Wells. No as-built drawings for the construction could be found. These drawings included twenty-seven cross-sections through the northern, eastern, and southern berm of the lower portion of the CCR Impoundment. There were two Section Details for Construction for the two areas of the berms to be improved. **Figure 4** is Typical Details, Drawing S1005 of the Black & Veatch Drawings.

This figure includes Section 2 which is a typical detail for the dewatering trench and cutoff trench for Station 16+00 to Station 33+00. This is the area of the CCR Impoundment berm where MW-5A is located. The figure also includes Notes which discuss construction details for the dewatering trench and cutoff trench installation.

4.3 Drawing Interpretation

The information from the Black & Veatch drawings was digitized and then modeled by Barr Engineering to re-create this information. This information was then transferred to the most recent topographic mapping dated April 28, 2020 to reflect the current conditions at the CCR Impoundment. The dewatering trench and cutoff trench cross-section was modeled and a 3 dimensional surface was created for the dewatering trench and cutoff trench system. The location of the dewatering trench and cutoff trench is shown on **Figure 5** which is an aerial photograph and **Figure 6** which is a topographic map of the CCR Impoundment. The locations of the current groundwater monitoring wells are also shown on these plan sheets. Cross-sections were cut through the CCR Impoundment berm and the modeled dewatering trench and cutoff trench at the monitoring well locations. These cross-sections are shown on **Figure 7**.

Section 3 of **Figure 7** shows the newly developed cross-section through MW-5A. The direction of groundwater flow is from the left of the cross-section to the right of the cross-section.

Section 3 of **Figure 7** shows MW-5A was installed upgradient of both the dewatering trench and the cutoff trench. The purpose for the installation of this cutoff trench system was to eliminate seepage from the CCR impoundment. It is believed that water from the CCR Impoundment is being backed-up behind the cutoff trench system and is influencing the quality of the water within MW-5A. Therefore, MW-5A may actually be monitoring pond water instead of a potential release from the facility that impacts groundwater.

4.4 Summary of Findings

It was determined that monitoring well MW-5A was installed upgradient of the dewatering trench and cutoff trench. Upon this review, our theory is that the water accumulating within the man-made dewatering trench and behind (upgradient) of the cutoff trench could be impacting the quality of the water within this monitoring well. MW-5A may actually be monitoring pond water instead of a release from the facility impacting groundwater.

This would indicate that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

5.0 PROPOSED ACTIONS

It is recommended to install a replacement for monitoring well MW-5A. The monitoring well will be installed in accordance to MDNR Regulations. The new well will be located downgradient of the cutoff trench system to remove the potential influence of the dewatering trench and the cutoff trench. This will result in a system that will properly monitor the groundwater at the facility.

The replacement well proposed downgradient will include a PVC casing to eliminate any surface or trapped water from potentially impacting the new well and jeopardizing the integrity of the bedrock groundwater quality. MW-5A will continue to be monitored until the replacement well (MW-5AR) reaches the minimum eight (8) background samples needed to complete the required statistical analysis prior to abandoning MW-5A. This will also allow for a real-time comparison of the groundwater in the two wells.

6.0 CONCLUSIONS

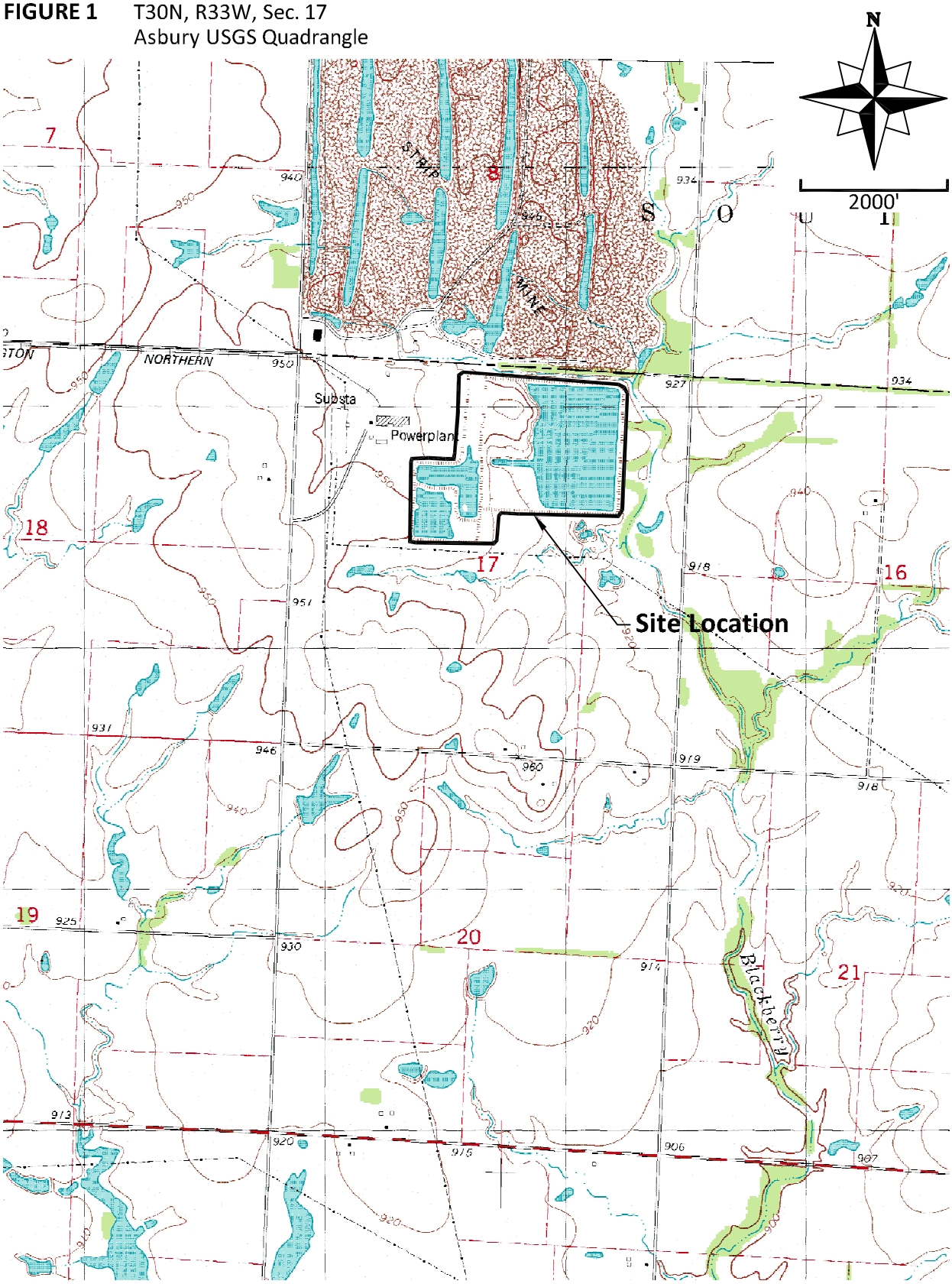
EPA CCR Rule 40 CFR § 257.94(e)(2) allows an alternative source demonstration that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. It is believed that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of the dewatering trench. The dewatering trench is filled with rock and an engineered cutoff trench of compacted clay material was constructed to prevent pond water from seeping through the berm. The water within the man-made dewatering trench and upgradient of the clay cutoff trench is impacting the quality of the water within MW-5A. MW-5AR will be installed downgradient of the cutoff trench system. The new well will be monitored to determine if the theory is correct.

Based upon these findings the site does not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

FIGURES

Asbury Generating Station CCR Impoundment
Alternative Source Demonstration
Site Location Map

FIGURE 1 T30N, R33W, Sec. 17
Asbury USGS Quadrangle



April 2021

Asbury Generating Station CCR Impoundment
Alternative Source Demonstration
Monitoring Well Locations

FIGURE 2

Well ID	Northing	Easting
MW-1	435791.18 *	2765165.35 *
MW-2	434428.46	2762861.37
MW-3	432842.77	2762720.80
MW-4	433709.99	2764938.99
MW-5	433659.27	2765966.23
MW-5A	434150.04	2765969.78
MW-6	434600.46	2765987.98
MW-6A	435071.44	2766010.46
MW-7	435505.42	2765993.13

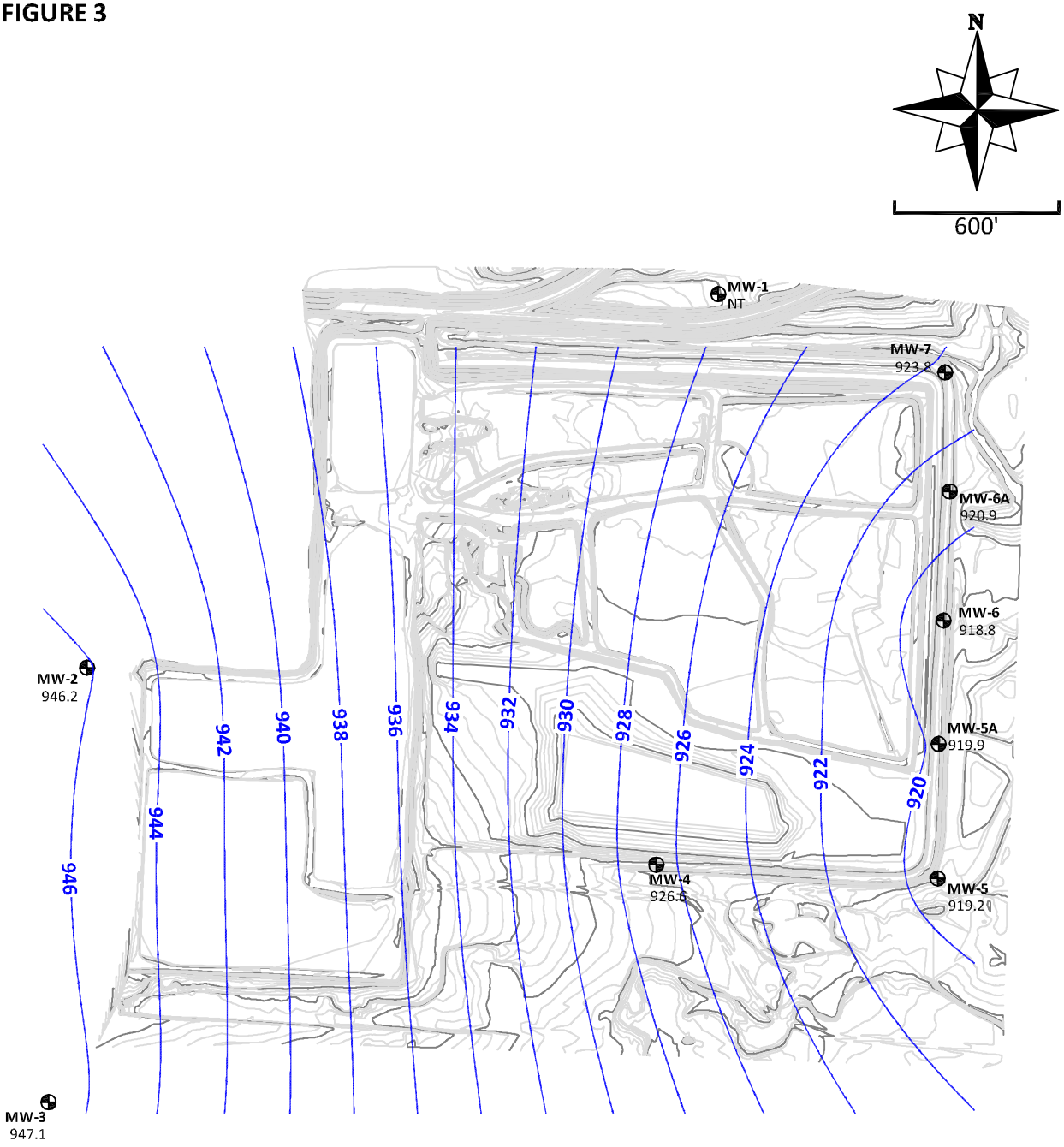
* Coordinate location is approximate

Legend

Monitoring Well

Asbury Generating Station CCR Impoundment
Alternative Source Demonstration
Groundwater Piezometric Surface Map - November 2020

FIGURE 3



Well ID	Northing	Easting	Top Of Casing	Static Water Level (BTOC)	Static Water Level
MW-1	435791.18	2765165.35	933.4	NT	NT
MW-2	434428.46	2762861.37	947.8	1.6	946.2
MW-3	432842.77	2762720.80	948.8	1.7	947.1
MW-4	433709.99	2764938.99	932.6	6.0	926.6
MW-5	433659.27	2765966.23	919.2	0.0	919.2
MW-5A	434150.04	2765969.78	929.3	9.4	919.9
MW-6	434600.46	2765987.98	928.0	9.2	918.8
MW-6A	435071.44	2766010.46	929.3	8.4	920.9
MW-7	435505.42	2765993.13	928.8	5.0	923.8

Legend

Monitoring Well

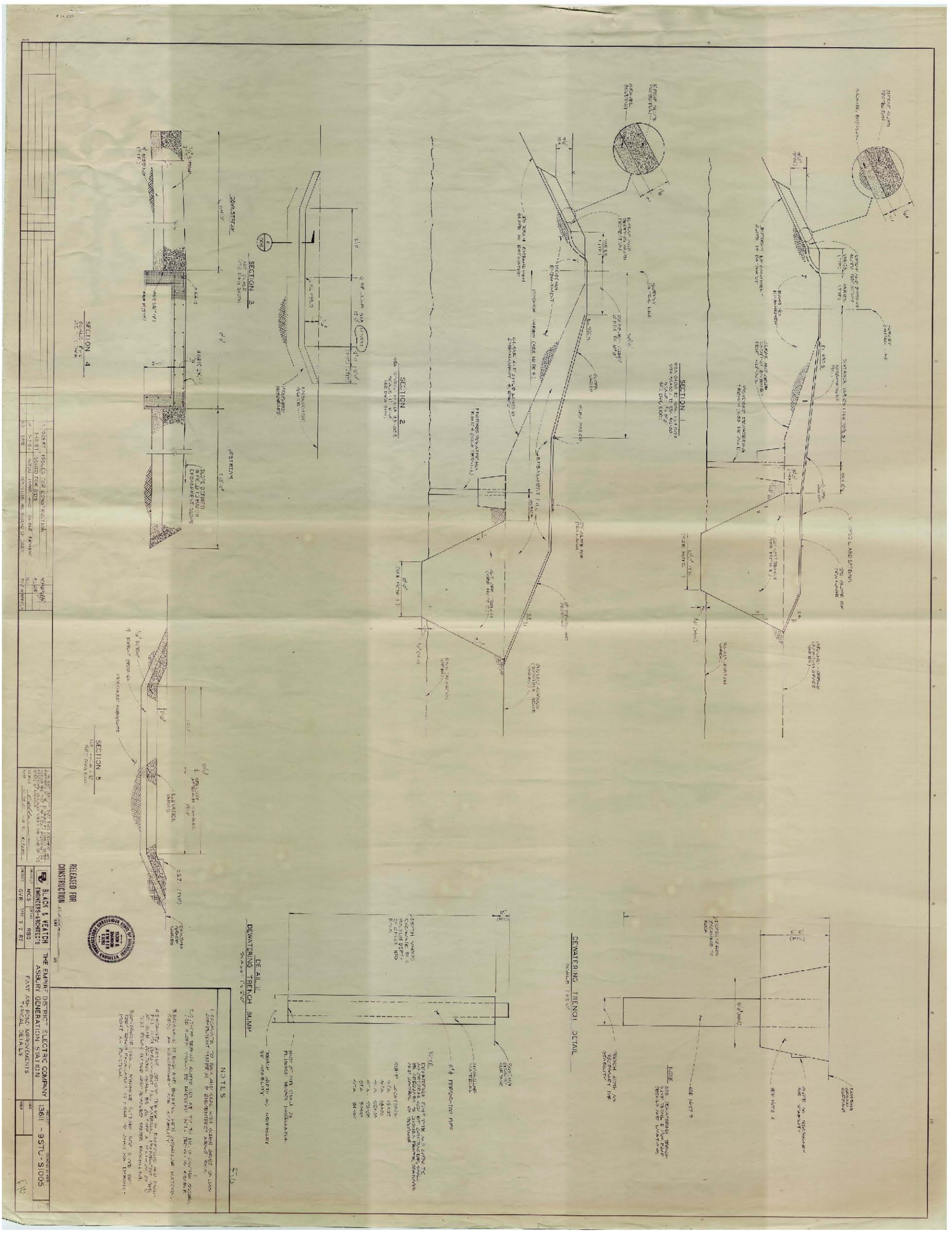
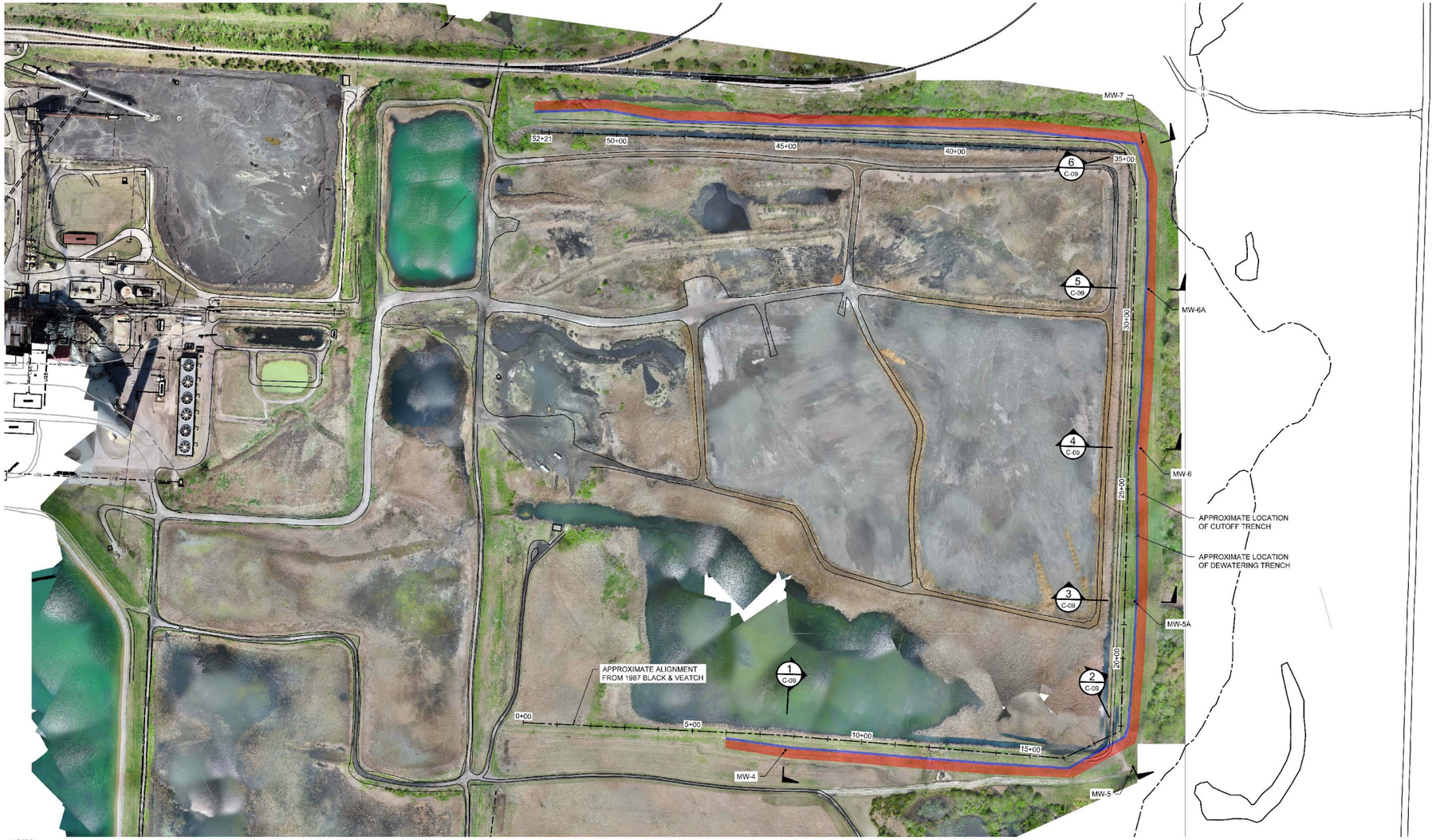


FIGURE 4

April 2021

Midwest Environmental CONSULTANTS

Asbury Generating Station CCR Impoundment
Alternative Source Demonstration
Black & Veach Typical Details Sheet



NOTES:

1. EXISTING TOPOGRAPHIC DATA FILES WERE PROVIDED BY MIDWEST ENVIRONMENTAL CONSULTANTS DATED APRIL 28, 2020 AND AUGUST 17, 2020.
2. BACKGROUND SITE IMAGES WERE PROVIDED BY MIDWEST ENVIRONMENTAL CONSULTANTS DATED APRIL 2020.
3. APPROXIMATE LOCATIONS OF DEWATERING TRENCH AND CUTOFF TRENCH WERE INTERPRETED BASED ON DATA CONTAINED IN THE ASBURY GENERATION STATION PLANS FOR EAST ASH POND IMPROVEMENTS DEVELOPED BY BLACK & VEATCH ENGINEERS-ARCHITECTS DATED JULY 7, 1987 (B&V 1987). DEWATERING TRENCH AND CUTOFF TRENCH DATA PROVIDED IN THE B&V 1987 PLAN SET IS DESIGN DATA THAT WAS RELEASED FOR CONSTRUCTION AND NOT AS-BUILT OR RECORD DATA.
4. APPROXIMATE ALIGNMENT SHOWN ON C-01 AND C-02 FROM 1987 BLACK & VEATCH IS INTERPRETED AND BASED ON DATA CONTAINED IN THE ASBURY GENERATION STATION PLANS FOR EAST ASH POND IMPROVEMENTS DEVELOPED BY BLACK & VEATCH ENGINEERS-ARCHITECTS DATED JULY 7, 1987 (B&V 1987).

1 PLAN: GROUNDWATER CUT OFF TRENCH

0 150 300
SCALE IN FEET

STATE OF MISSOURI
CRAIG A BUNGER
NUMBER PE-2009001060
PROFESSIONAL ENGINEER
2/25/2021

ISSUED FOR INFORMATIONAL PURPOSES AND REVIEW

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	JMB	CAB	TLM	02/25/21	ISSUED FOR INFORMATIONAL PURPOSES AND REVIEW

RELEASED TO/FOR: CLIENT, BID, CONSTRUCTION — DATE RELEASED: A B C 0 1 2 3 — 02/25/21

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Designed	
Approved	

LIBERTY UTILITIES
ASBURY, MISSOURI

LIBERTY UTILITIES
ASBURY POWER PLANT

SITE LAYOUT
GROUNDWATER CUTOFF TRENCH LOCATION

BARR PROJECT No. 25501021.01
CLIENT PROJECT No.
DWG. No. C-01
REV. No. A

CADD USER: Kate K. Brown FILE: M:\DES\MN\25501021\01\25501021.01_C-1 - SITE LAYOUT.DWG PLOT SCALE: 1:1 PLOT DATE: 2/25/2021 4:33 PM
BAR...M:\Mdist\CAD\2017\AutoCAD 2017 Supportfiles\Template\Barr_2011_Template.dwt Plot at 1: 10/25/2019 14:03:50

FIGURE 5

Asbury Generating Station CCR Impoundments
Alternative Source Demonstration
Barr CCR Impoundment Aerial Photograph

April 2021

Midwest Environmental CONSULTANTS

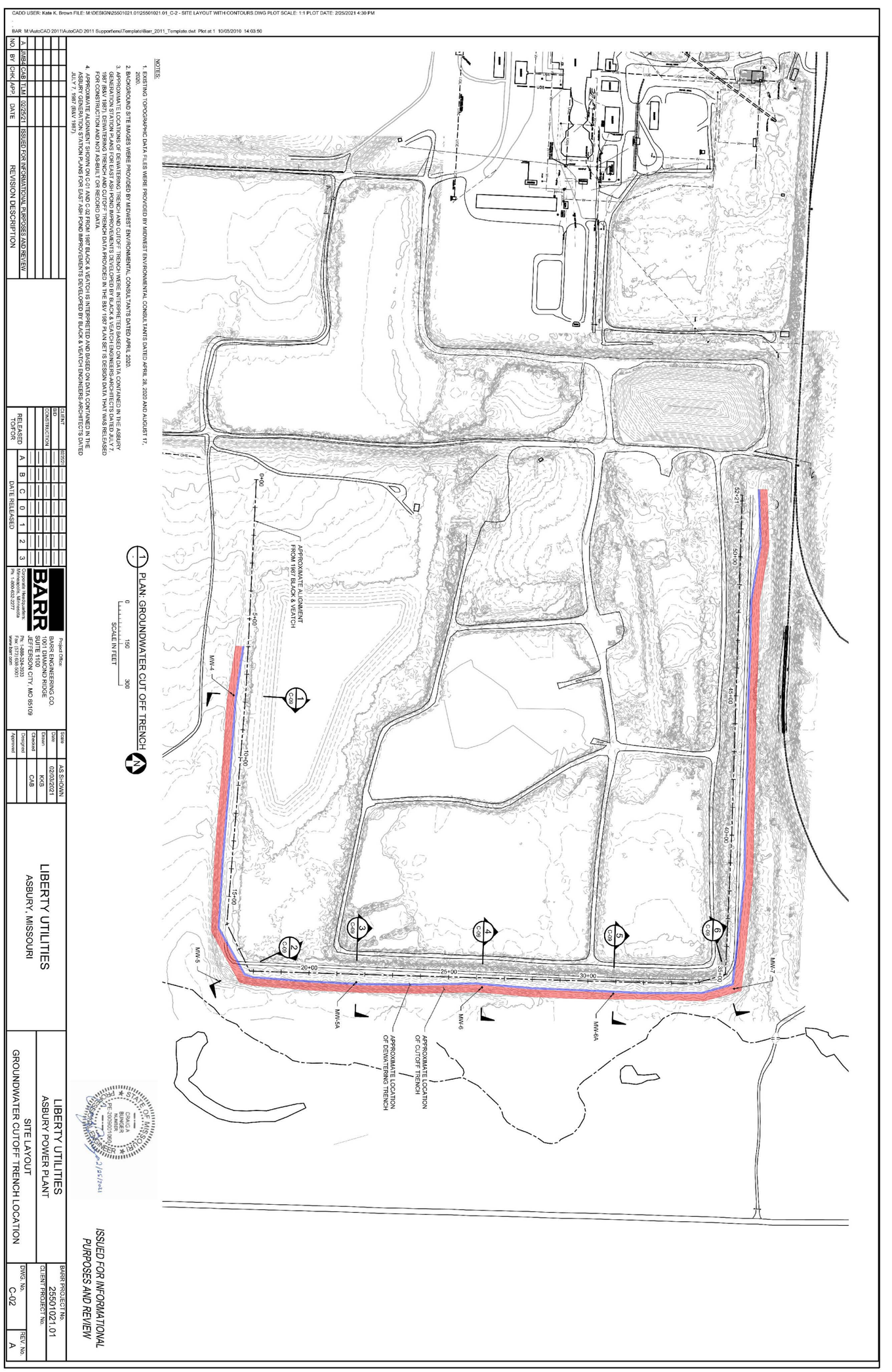
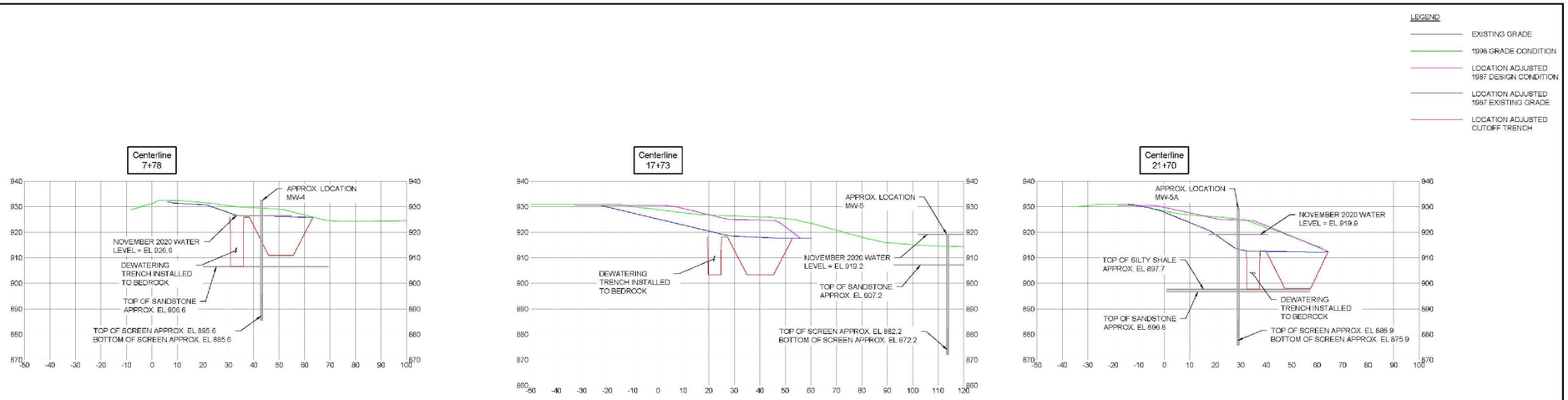


FIGURE 6

April 2021

Midwest Environmental CONSULTANTS

Asbury Generating Station CCR Impoundments
Alternative Source Demonstration
Barr CCR Impoundment Topographic Mapping



NOTES:

1. EXISTING TOPOGRAPHIC DATA FILES WERE PROVIDED BY MIDWEST ENVIRONMENTAL CONSULTANTS DATED APRIL 28, 2020, AND AUGUST 17, 2020.
2. 1996 GRADE CONDITION REFERS TO GROUND CONTOURS AND SURFACES DEVELOPED WITH DATA PROVIDED BY MIDWEST ENVIRONMENTAL CONSULTANTS DATED AUGUST 1998 DEVELOPED BY SCS ENGINEERS.
3. APPROXIMATE LOCATIONS OF DEWATERING TRENCH AND CUTOFF TRENCH WERE INTERPRETED BASED ON DATA CONTAINED IN THE ASBURY GENERATION STATION PLANS FOR EAST ASH POND IMPROVEMENTS DEVELOPED BY BLACK & VEATCH ENGINEERS-ARCHITECTS DATED JULY 7, 1987 (B&V 1987). DEWATERING TRENCH AND CUTOFF TRENCH DATA PROVIDED IN THE B&V 1987 PLAN SET IS DESIGN DATA THAT WAS RELEASED FOR CONSTRUCTION AND NOT AS-BUILT OR RECORD DATA.
4. APPROXIMATE ALIGNMENT SHOWN ON C-01 AND C-02 FROM 1987 BLACK & VEATCH AND USED FOR THE SECTIONS SHOWN IN C-03 THROUGH C-08 IS INTERPRETED AND BASED ON DATA CONTAINED IN THE ASBURY GENERATION STATION PLANS FOR EAST ASH POND IMPROVEMENTS DEVELOPED BY BLACK & VEATCH ENGINEERS-ARCHITECTS DATED JULY 7, 1987 (B&V 1987).
5. NOVEMBER 2020 WATER LEVELS PROVIDED ON SECTION 1 THROUGH 6 IS BASED ON DATA PROVIDED BY MIDWEST ENVIRONMENTAL CONSULTANTS.
6. MONITORING WELL DETAILS AND GEOLOGIC DETAILS PROVIDED ON SECTION 1 THROUGH 6 IS BASED ON MONITORING WELL CERTIFICATION RECORDS. MONITORING WELL CERTIFICATION RECORDS FROM MW-4 AND MW-5 ARE DATED MARCH 6, 1996. MONITORING WELL CERTIFICATION RECORDS FROM MW-5A AND MW-6A ARE DATED DECEMBER 3, 2015. MONITORING WELL CERTIFICATION RECORDS FOR MW-6 AND MW-7 WERE NOT DATED.

STATE OF MISSOURI CRAIG A BUNGER NUMBER PE-2006010667 NOTARIAL SEAL 02/25/2021

ISSUED FOR INFORMATIONAL PURPOSES AND REVIEW

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	JMB	CAB	TLM	02/25/21	ISSUED FOR INFORMATIONAL PUROSES AND REVIEW

CLIENT | B/D | CONSTRUCTION | RELEASED TO/FOR | 02/25/21 | A B C 0 1 2 3 | DATE RELEASED

BARR
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ASBURY, MISSOURI

LIBERTY UTILITIES
ASBURY POWER PLANT

MONITORING WELL CROSS SECTIONS
GROUNDWATER CUTOFF TRENCH LOCATION

BARR PROJECT No. 25501021.01
CLIENT PROJECT No.
DWG. No. C-09
REV. No. A

CADD USER: Julie M. Brown FILE: M:\DEGR\GN\25501021.01\25501021.01_C-09 - MONITORING WELL CROSS SECTIONS.DWG PLOT SCALE: 1:1 PLOT DATE: 2/25/2021 4:32 PM
BAR: W:\AutoCAD 2011\Autodraft 2011 Support\en-US\Templates\Barr_2011_Template.dwt Rd at 1 10/5/2010 14:53:36

FIGURE 7

Asbury Generating Station CCR Impoundments
Alternative Source Demonstration
Barr Monitoring Well Cross-Sections

April 2021

Midwest Environmental CONSULTANTS

APPENDIX B

May 2021 Sampling Event

2021 Groundwater Monitoring, Sampling & Statistics Per EPA CCR Rule (CFR § 257.90-.98)

May Sampling Event

Asbury Generating Station CCR Impoundment
Jasper County, MO

July 2021

Prepared For:
The Empire District Electric Company
602 S. Joplin Avenue
Joplin, Missouri 64801

Midwest Environmental CONSULTANTS

2009 E. McCarty St., Ste. 2 Jefferson City, MO 65101 (573) 636-9454 www.mecpc.com

TABLE OF CONTENTS

1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundment groundwater monitoring sampling report is in accordance with the EPA CCR Rule. In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater system (included in **Appendix 1**). Empire notified the MDNR "State Director" via e-mail when this document was posted on-line, as required in the CCR rule. The EPA CCR Rule requires the annual groundwater report be prepared by January 31st of the following year. The first report was due January 31, 2018. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. The annual groundwater report for the 2020 sampling events will be posted on-line within 30 days of placement in the operating record.

The purpose of the groundwater monitoring plan is to monitor the ground water quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of May and November. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017 to determine if a statistically significant increase (SSI) has occurred. If an SSI is verified, additional evaluation is required to determine if the SSI was caused by the CCR impoundment.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Boron does not have an MCL. The facility conducted an alternative source demonstration per the EPA CCR Rule (§ 257.94). The water within the man-made dewatering trench and upgradient of the clay cutoff trench is impacting the quality of the water within MW-5A. MW-5AR will be installed downgradient of the cutoff trench system. The new well will be monitored to determine if the theory is correct. Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

On May 4 and 5, 2021, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. After review of the first semi-annual groundwater sampling event analytical results completed in October 2017, the constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan in accordance with the EPA CCR Rule. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken. These samples were preserved and submitted directly to the laboratory.

This report is a summary of the May 2021 sampling event and the findings of the statistical analysis of the results of the groundwater monitoring program at the Asbury Generating Station CCR Impoundment. Specific information of each sampling event can be obtained from the individual report which is part of the Asbury Operating Record.

2.0 SITE LOCATION

The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. The site is located approximately 5.5 miles north-northeast of Asbury, Missouri, about 14 miles north-northwest of Joplin, Missouri. A map showing the locations of the monitoring wells is on **Figure 2**.

2.1 History

In March 1996, five (5) groundwater monitoring wells, MW-1 through MW-5, were installed around the perimeter of the Asbury Generating Station CCR impoundment. Monitoring wells MW-1, MW-2 and MW-3 were installed to a total depth of between 27.0 to 28.5 feet below ground surface (bgs). Monitoring wells MW-4 and MW-5 were installed to a total depth of 48 feet bgs. Each of the five monitoring wells was equipped with 10.0-foot well screens. The five wells were then developed, purged, and sampled in 1996.

In 2003, two (2) additional groundwater monitoring wells were installed and identified as MW-6 and MW-7. Both wells had 2-inch diameter PVC well casings installed to an approximate total depth of 44 feet below ground surface. Both wells were installed with an above ground steel protective cover. No other construction details such as well screen lengths were available for these two (2) wells. In December 2015, two (2) additional groundwater monitoring wells were installed and identified as MW-5A and MW-6A.

All wells are registered with MDNR – Missouri Geological Survey Program.

2.2 Site Geology

Drilling and subsurface investigation activities at the Site and as part of the MDNR approved CCR landfill Detailed Site Investigation (DSI) for the adjacent landfill area identified three (3) primary geologic units at the Site. These geologic units include the surficial soil layer, Warner Sandstone (uppermost aquifer), and Riverton Shale (confining unit). The information presented herein includes the primary elements of a site characterization work plan consistent with the MDNR guidance.

Surficial Soil. Soils at the site consist of a surficial unit of cohesive soils (e.g., CL, SC, ML, and CH) underlain by Pennsylvanian-age bedrock. Soil thickness at the Site ranges from approximately 15-25 feet.

Warner Sandstone. The Warner Sandstone (Sandstone) is the uppermost bedrock unit in south portion of the Site. In the north area of the Site, the Sandstone is overlain by the Riverton Shale (Shale). Based on the DSI information, the Sandstone and Shale can occur as alternating layers. The Sandstone and Shale are gradational in places and transition from shaley sandstone to sandy shale. According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Warner Sandstone formation is described as follows: “Generally, the lower part is interbedded, very fine grained sandstone and claystone. The upper part is largely medium-bedded to massive channel fill sandstone. In places, the Warner consists primarily of shale and claystone, with only minor amounts of sandstone” and “ranges in thickness from 0 to 15m (49.2 ft.).”

The Sandstone is more than 25-30 feet thick in places and is generally medium hard and thin to medium bedded with occasional shale partings. The degree of induration of the Sandstone varies and generally increases with depth. Slug tests performed at selected DSI piezometers screened in

the Sandstone exhibited hydraulic conductivities ranging from approximately 1.3x10-4 cm/sec to 5.9x10-6 cm/sec. The slug test results are consistent with values for sandstone and shaley sandstone. The groundwater gradient is towards the east and Blackberry Creek.

Riverton Shale. Layers of the Riverton Shale (Shale) exhibited thicknesses ranging from approximately one foot to more than 10 feet. The Shale is generally dark gray to light gray. The Shale is mainly thin bedded with hardness ranging from soft to hard. Six packer tests were performed during the DSI to assess the hydraulic conductivity of the Shale. The packer test results ranged from approximately $3.2x10^{-6}$ cm/sec to $4.9x10^{-8}$ cm/sec. The packer test data indicates that the Shale is an effective confining unit.

According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Riverton Shale formation is described as "dark gray to black, fine-grained, relatively brittle shale and contains as many as three coal beds, each of which is underlain by underclay" and "varies in thickness from a featheredge to more than 90 feet".

Unnamed Coal. The Shale includes coal seams in places that range in thickness from a few inches to approximately 1.5 feet. The coal is generally black to dark gray.

2.3 Groundwater Monitoring Network Design

The groundwater monitoring system for the CCR impoundment consists of nine (9) groundwater monitoring wells. Two (2) wells are considered upgradient. Two (2) wells are considered sidegradient; one is only monitored for groundwater elevation. The remaining five (5) wells are considered downgradient.

The groundwater monitoring wells (MWs) at the Asbury Generating Station are equipped with individual dedicated poly tubing to be connected to a peristaltic pump/controller at the surface. Low-flow, micro-purge and sampling techniques and technology are utilized to collect groundwater samples from the subject wells. The groundwater sampling procedures are discussed in further detail below.

2.4 Groundwater Monitoring Network

The locations of the monitoring wells are shown on **Figure 2**. The groundwater monitoring system for the site consists of the following monitoring wells:

- MW-1 Sidegradient (water level only)
- MW-2 Upgradient
- MW-3 Upgradient
- MW-4 Downgradient
- MW-5 Downgradient
- MW-5A Downgradient
- MW-6 Downgradient
- MW-6A Downgradient
- MW-7 Sidegradient

2.5 Seasonal Variation

Historical groundwater elevation data has been limited. However, adequate lengths of well screen have been utilized during the construction of the wells to accommodate typical seasonal groundwater elevation variations seen in southwest Missouri.

2.6 Groundwater Flow Direction

Historically, the seasonally high potentiometric surface indicated the groundwater flow direction to the east. **Figure 3** is a potentiometric map for this sampling event.

Originally MW-7 was thought to be a downgradient well but review of the potentiometric mapping from the eight background sampling events revealed that the well is actually a sidegradient well. Therefore, the designation for MW-7 has been changed from a downgradient to a sidegradient well for compliance monitoring.

3.0 BASELINE GROUNDWATER DATA

3.1 Baseline Data Collection

Per EPA CCR Rule § 257.94(b), the site initiated the detection monitoring program in January 2016 to include obtaining a minimum of eight (8) independent samples for each background and downgradient well. The eight (8) independent groundwater samples were obtained and analyzed as required by the CCR Rule under per the baseline groundwater monitoring plan. Background groundwater data was collected from January 2016 to August 2017.

Groundwater Monitoring Reports were completed for each sampling event and have been placed in the Operating Record. Summary tables of the results from each event are included in **Appendix 2**. A listing of each event is below:

- January 2016
- March 2016
- May 2016
- August 2016
- October 2016
- March 2017
- June 2017
- August 2017

Initial baseline monitoring was required at all monitoring wells. The sampling frequency was quarterly or more frequently for the first two (2) years. After the background data plus the first semi-annual sampling events, a reduced lower sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will be completed during the months of May and October.

The initial two (2) years of baseline and the first semi-annual detection monitoring included parameters listed in Appendix III and Appendix IV of the EPA CCR Rule. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. **Appendix 2** contains the list of constituents.

3.2 Background Data Analysis

Sanitas™ for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas™ training course and user manual. The background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**. Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3). MW-3 is an up-gradient well. Trending was not removed at that time; otherwise the site would be below the minimum of eight background samples needed to run statistics.

Four more sets of background data were available to add to the background data set for the November 2019 sampling event. The analysis of the additional data for the background data set was conducted and is included in **Appendix 5**. No trending was found in the additional four sets of data so they were added to the baseline data set to increase the statistical power of the background data.

4.0 GROUNDWATER SAMPLING EVENT

On May 4 and 5, 2021 eight (8) groundwater monitoring wells were sampled by Midwest Environmental Consultants (MEC) for the EPA CCR Rule Appendix III parameters. For quality assurance and quality control measures, a duplicate sample was taken at MW-5. The sampling protocol and methodology was to be conducted in accordance to the facility's Sampling and Analysis Plan. **Table 1** provides a list of the analytical methods employed by the subcontracted laboratory.

Table 1 – Analytical Methods	
Method	**Description**
9056A	Anions, Ion Chromatography
6020A	Metals (ICP/MS)
SM 2540C	Solids, Total Dissolved (TDS)
Field Sampling	Field Sampling

Appendix 3 includes Monitoring Well Field Inspection sheets and field notes. The physical integrity of the wells was good. During sample collection each of the wells was monitored for pump discharge and formation recharge. Initially, a static water level for each well was recorded (**Table 2**). To ensure sufficient recharge while sampling, static water levels were collected during pumping. Prior to sample collection, field parameters for each well were measured with a flow-through meter. When the field parameters stabilized, samples for analytical testing were collected and placed on ice for hand delivery to the laboratory. At the conclusion of sample collection from each well, a final static water level measurement was obtained. The samples were collected in the appropriately pre-preserved sample containers and placed on ice for delivery.

Table 2 - Groundwater Sampling Field Parameters Summary During May 2021 Sampling Event				
WELL ID	**STATIC WATER LEVEL (ft-BTOC)**		**PURGE RATE (mL/min)**	**STABILIZED pH**
	Initial	**Final**		
MW-1*	NT	NA	NA	NA
MW-2	1.03	4.84	200	6.31
MW-3	0.40	0.40	200	5.75
MW-4	6.22	15.72	200	6.58
MW-5	3.27	16.54	200	7.18
MW-5A	10.70	22.98	200	6.77
MW-6	8.94	19.21	200	6.87
MW-6A	8.10	20.43	200	6.91
MW-7	3.46	3.61	200	6.28

* Water Level Only NA – Not Applicable NT – Not Tested (inaccessible)

Appendix 4 includes the initial analytical results for the sampling event. Included with this analytical report are sample information; chain of custody; wet chemistry data; and volatile data.

5.0 DATA VALIDATION PROCEDURES FOR GROUNDWATER MONITORING DATA

Midwest Environmental Consultants receives Data Packages from the analytical laboratory (Test America). The internal quality control/quality assurance case narratives and reported data are then reviewed. Generally the data validation procedures established by the U.S. Environmental Protection Agency *Contract Laboratory Program Functional Guidelines for Organic Data Review* and *Functional Guidelines for Inorganic Data Review* is followed. These guidelines are used to assign data qualifiers to the data. A formal data validation report for the site is not prepared; however, any significant issues are noted in the groundwater monitoring report.

MEC evaluates the data set for precision, accuracy, representativeness, comparability, and completeness (PARCC).

5.1 Precision

Laboratory Precision. Laboratory quality control procedures to measure precision consist of laboratory control sample (LCS) analysis and analysis of matrix spike/matrix spike duplicates (MS/MSD). These analyses are used to define analytical variability.

Field Precision. Analyses of duplicate samples are used to define the total variability (replicability) of the sampling/analytical system as a whole. Field replicates are collected at a rate of one per sampling event.

5.2 Accuracy

Accuracy is determined by calculating the percent recoveries for analyses of surrogate compounds, LCSs, continuing calibration check standards, and matrix spike samples. Acceptable percent recoveries are established for SW-846 and EPA methods. Field and laboratory blank analysis are also used to address measurement bias.

Field Blanks. Field blanks consisted of a trip blank and a field blank. One trip blank per cooler accompanies samples for volatile organic analyses.

Laboratory Blanks. Method blanks, artificial, matrix-less samples, are analyzed to monitor the laboratory analysis system for interferences and contamination from glassware, reagents, etc. Method blanks are taken through the entire sample preparation process. They are included with each batch of extractions or digestions prepared, or with each 20 samples, whichever is more frequent.

5.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely reflect site condition. Representativeness of the data is determined by comparing actual sampling procedures to those delineated in the field sampling plan, comparing results from field replicate samples and reviewing the results of field blanks. Field notes are reviewed as part of our data validation process.

5.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured by using established and approved sample collection techniques and analytical methods, consistent basis of analysis, consistent reporting units, and analyzing standard reference materials.

5.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under controlled laboratory conditions. Completeness is defined as the valid data percentage of the total tests requested. Valid data are defined as those where the sample arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed chain-of-custody form. Furthermore, the sample must have been analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria were met.

6.0 STATISTICAL ANALYSIS

6.1 Sampling Results

The constituents with results above the laboratory reporting limits are included in **Table 3**. The Test America laboratory analytical results are included in **Appendix 4**.

Table 3 – Constituents During May 2021 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.13	<0.08J	<0.08	0.28	1.2	0.33	0.38	0.23
Calcium	mg/L	NA	36	97	200	100	300	260	180	480
Chloride	mg/L	NA	100	59	60	6.6	110	14	28	38
Fluoride	mg/L	4.0	0.37	0.14	0.2	0.35	0.33	0.31	0.35	<0.25J
pH	SU	NA	6.31	5.75	6.58	7.18	6.77	6.87	6.91	6.28
Sulfate	mg/L	NA	52	490	670	160	1500	1000	850	1800
Total Dissolved Solids	mg/L	NA	410	830	1300	580	2400	1700	1400	2700

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

No constituents were detected above the Federal Safe Drinking Water maximum contaminant level (MCL) during the sampling event.

6.2 Statistical Analysis

The November 2019 sampling event report indicated confirmed intrawell prediction limits exceedances. Intrawell prediction limits were utilized per the facility's 2018 Groundwater Statistical Analysis Plan. The Annual Report recommending the site move into assessment monitoring was stamped on January 23, 2020 and submitted to the facility. However, in February MEC received an email from the facility. MDNR had forwarded EPA correspondence requesting that the site change their statistical evaluation method to interwell prediction limits. EPA CCR Rule 40 CFR § 257.94(e)(2) allows at alternative source demonstration to be completed if the statistically significant increases are result of the statistical evaluation rather than from a release from the facility. **Appendix 1** contains the MDNR/EPA correspondence.

Prediction interval analyses compare one or more observations to a limit set by background data. Interwell analyses compare observations from background wells, which include upgradient and sidegradient wells per EPA Unified Guidance definitions, and their relation to the observations for the downgradient wells. Intrawell analyses compare background observations to current observations of the same well. In order to appropriately characterize the groundwater beneath the site, the statistical methods utilized at the facility consider the following facts as they relate to site:

- Potential differences in geochemical characteristics of the groundwater caused by the differing lithologies in contact with the screened interval from well to well.
- Potential impacts of surface infiltration into the groundwater environment.

Due to varying geology in the state of Missouri, intrawell analyses had initially been deemed a more appropriate method. Municipal and demolition waste landfills in Missouri typically utilize intrawell prediction limits per MDNR. However, it was noted that the power curve for these analyses was not considered strong yet. The data set consisted of only 13 sampling events from

January 2016 to November 2019. EPA Unified Guidance recommends 20 or more sampling events for background data for intrawell prediction limits. A small data set triggers an SSI when there is even a slight increase in concentration. Sanitas also note to each exceedance "*Insufficient data to test for seasonality: data were not deseasonalized.*" Minor increases in concentration noted in the May and November 2019 sampling events did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

The EPA Unified Guidance Chapter 5.2.3 states "*In groundwater data collection and testing, background conditions may not be static over time. Caution should be observed in removing observations which may signal a change in natural groundwater quality. Even when conditions have not changed, an apparently extreme measurement may represent nothing more than a portion of the background distribution that has yet to be observed. This is particularly true if the background data set contains fewer than 20 samples.*" Chapter 5.2.4 states "*With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples*". Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

MDNR made several requests per EPA in the correspondence located in **Appendix 1** which included the EPA review of the groundwater reports as seen in **Table 4**.

Table 4 – EPA Review of Groundwater Reports	
Facility	Asbury Power Plant
Location	Asbury, MO
Owner	Empire District Electric Company
Units	Upper Pond-unlined, South Pond-unlined, Lower Pond-unlined
Geology	Surficial unit of clay, clayey sand, and silt approximately 15 to 25 feet thick underlain by Warner Sandstone approximately 25-30 feet thick in the southern portion of the site and the Riverton Shale in the northern area of the site
Problematic Use of Intra Well Comparisons	Analytical results indicate consistent differences in contaminant concentrations between upgradient and downgradient wells. Consequently, interwell comparisons are feasible and would be preferable in the absence of compelling reasons to use intra well analysis
Problematic Alternate Source Determination	
Conclusions	While there are no boring logs in the documents to confirm that the wells are screened in the same geologic unit, consistency in the field parameters and the description of the geology suggest that the wells are screened in the sandstone. The analytical results indicate consistent differences in contaminant concentrations between upgradient and downgradient wells, consequently, interwell comparisons are feasible and would be preferable in the absence of compelling reasons to use intra wells analyses

Sanitas™ for Ground Water Version 9.6.25 was used to run the statistical analyses with settings used as recommended by the Sanitas™ training course and user manual. Interwell prediction intervals were run per EPA's request. The Sanitas™ output is included in **Appendix 5**.

Statistical analysis was performed on the Appendix III constituents from the sampling event compared to the updated background dataset. Prediction interval analyses compare one or more observations to a limit set by background data. Interwell analyses compare observations from upgradient background wells and their relation to the observations for the downgradient wells. Intrawell analyses compare background observations to current observations of the same well. Due to varying geology in the state of Missouri, intrawell analyses had initially been deemed a more appropriate method. However, EPA has requested the site utilize interwell prediction limits.

Statistical analysis results are presented below for those constituents determined to have an exceeded a prediction limit. However, EPA's "*Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*," March 2009, EPA 530/R-09-007 is referenced multiple times in the preamble of the EPA CCR regulations for groundwater sampling and analysis requirements. According to the EPA Unified Guidance, a prediction limit exceedance is not considered a statistically significant increase (SSI) until it is confirmed through retesting. SSIs generated by non-detectable results or with less than eight background events are considered statistically invalid.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). Boron does not have a MCL. The facility conducted an alternative source demonstration per the EPA CCR Rule (§ 257.94).

EPA CCR Rule 40 CFR § 257.94(e)(2) allows an alternative source demonstration that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. It is believed that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of the dewatering trench. The dewatering trench is filled with rock and an engineered cutoff trench of compacted clay material was constructed to prevent pond water from seeping through the berm. The water within the man-made dewatering trench and upgradient of the clay cutoff trench is impacting the quality of the water within MW-5A. MW-5AR will be installed downgradient of the cutoff trench system. The new well will be monitored to determine if the theory is correct.

Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

Table 5 lists the parameters with exceedances of prediction limits during the sampling event, the associated monitoring wells, if the exceedance is initial versus confirmed, the predicted limit, the measured concentration, and the MCL set forth in the National Drinking Water Regulations. The MCL is the highest level of a contaminant that is allowed in drinking water.

Table 5 – Interwell Prediction Limit Exceedances Observed During May 2021 Sampling Event					
Constituent	**Monitoring Well**	**Initial vs. Confirmed**	**Predicted Limit**	**Measured Concentration**	**Drinking Water MCLs**
Boron (mg/L)	MW-5A	Confirmed	0.4198	1.2	NA
pH* (SU)	MW-5	Confirmed	6.826	7.18	NA
pH* (SU)	MW-6	Confirmed	6.826	6.87	NA
pH* (SU)	MW-6A	Confirmed	6.826	6.91	NA

NA = Not Applicable
*Field Sampled (less precise but within the required hold time)

6.3 Results Interpretation

There were no initial interwell prediction limit exceedances for the listed monitoring well during May 2021 sampling event. During the November 2020 sampling event, Initial interwell prediction exceedances in pH (MW-5, MW-6 and MW-6A) and total dissolved solids (MW-5A) were noted. However, the initial prediction limit exceedance of total dissolved solids (MW-5A) was not confirmed during the May 2020 sampling event. There are no current primary (health based) MCLs for pH but the confirmed pH results are still within the acceptable range of 6.5 to 9 SU. The facility plans to resample as part of the November 2021 sampling event.

The results of the interwell prediction limit statistical analysis of the November 2020 and May 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

Below is a discussion of the previous results for comparison.

November 2020

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). Boron does not have a

MCL. The facility will conduct an alternative source demonstration in the next 90 days per the EPA CCR Rule (§ 257.94).

The results for pH (MW-5, MW-6 and MW-6A) and total dissolved solids (MW-5A) indicated initial interwell prediction limit exceedances for the listed monitoring well during November 2020 sampling event. There are no current primary (health based) MCLs for pH or total dissolved solids. The facility plans to resample as part of the May 2021 sampling event.

During the May 2020 sampling event, Initial interwell prediction exceedances in boron (MW-5A and MW-6A) and fluoride (MW-5A) were noted. However, the initial prediction limit exceedances of boron (MW-6A) and fluoride (MW-5A) were not confirmed during the November 2020 sampling event.

May 2020

The results of the EPA requested interwell prediction limit statistical analysis of the May 2020 sampling event indicate that the site is in compliance. The results for boron (MW-5A and MW-6A) and fluoride (MW-5A) indicated an initial interwell prediction limit exceedance for the listed monitoring well during May 2020 sampling event. There is a current primary (health based) MCL for fluoride of 4.0 mg/L but the result is below the limit. Boron does not have a MCL but does have an EPA proposed groundwater protection standard of 4.0 mg/L but all results were below that limit. Trending was found to be significant for boron (MW-5A) but not significant in boron (MW-6A) and fluoride (MW-5A). Boron is also trending upward in MW-2 which is an up-gradient well. The facility plans to resample as part of the November 2020 sampling event.

During the November 2019 sampling event, Initial interwell prediction exceedances in pH (MW-4, MW-5, MW-5A, MW-6 and MW-6A) were noted. However, these initial prediction limit exceedances were not confirmed during the May 2020 sampling event.

November 2019

The result for Chloride (MW-5A), pH (MW-4) and Sulfate (MW-5A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the November 2019 sampling event. There is no current primary (health based) MCL for chloride, pH or sulfate.

During the May 2019, the result for Boron (MW-5A) indicated an initial intrawell prediction limit exceedance and Total Dissolved Solids (MW-5A) indicated a confirmed intrawell prediction limit exceedance. There is no current primary (health based) MCL for boron and total dissolved solids. These prediction limit exceedances were confirmed during the November 2019 sampling event. A resample of MW-5A was conducted on December 11, 2019. The results of the resample confirmed the exceedances and the site planned to move into assessment monitoring.

However, in February MEC received an email from the facility. MDNR had forwarded EPA correspondence requesting that the site change their statistical evaluation method to interwell prediction limits. EPA CCR Rule 40 CFR § 257.94(e)(2) allows at alternative source demonstration to be completed if the statistically significant increases are result of the statistical evaluation rather than from a release from the facility. **Appendix 1** contains the MDNR/EPA correspondence.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2019 sampling event indicate that the site is in compliance. Initial interwell prediction

exceedances in pH (MW-4, MW-5, MW-5A, MW-6 and MW-6A) were noted but have not been confirmed. There is no current primary (health based) Maximum Contamination Level (MCL) for pH. Trending was not found to be significant for pH in any well during the analysis of the background data set.

May 2019

The result for Boron (MW-5A) and pH (MW-3(u), MW-5A, MW-6 and MW-6A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the May 2019 sampling event. There is no current primary (health based) MCL boron or pH. The facility plans to resample as part of the November 2019 sampling event.

During the November 2018, the result for Total Dissolved Solids (MW-5A) indicated an initial intrawell prediction limit exceedance. There is no current primary (health based) MCL for total dissolved solids. This initial prediction limit exceedances was confirmed during the May 2019 sampling event. However, it should be noted that the power curve for these analyses is not considered strong. A small data set triggers an SSI when there is even a slight increase in concentration. The EPA Unified Guidance Chapter 5.2.4 states "With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples".

Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated. It was also noted that higher levels of total dissolved solids were seen in the side-gradient well MW-7 demonstrating that a there was likely not a release from the facility. Therefore, the site will continue with detection monitoring on a semi-annual basis at this time.

November 2018

The result for Total Dissolved Solids (MW-5A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the November 2018 sampling event. There is no current primary (health based) MCL for total dissolved solids. The facility plans to resample MW-5A for Total Dissolved Solids as part of the May 2019 sampling event. During the May 2018, no intrawell prediction limits were exceeded. Therefore, there were no initial prediction limit exceedances to confirm during the November 2018 sampling event.

May 2018

No intrawell prediction limits were exceeded during the May 2018 sampling event. The October 2017 results for Total Dissolved Solids (MW-7) indicated an exceedance of the predicted limit for the listed monitoring wells. However, this initial prediction limit exceedance was not confirmed during the May 2018 sampling event.

October 2017

The result for Total Dissolved Solids (MW-7) indicated an initial intrawell prediction limit exceedance for the listed monitoring wells during the October 2017 sampling event. However, the result was below the tolerance limit. There is no current primary (health based) MCL for total dissolved solids. Review of the Total Dissolved Solids in the duplicate sample taken from the same well (MW-7) shows a result of 3,000 mg/L, which would not be an exceedance of the intrawell prediction limit of 3,069 mg/L. Due to the variances between the sample and the duplicate, the

site will re-evaluate MW-7 for Total Dissolved Solids during the next sampling event. MW-7 is considered a sidegradient well, therefore no further action is needed for exceedances in sidegradient or upgradient wells.

6.4 Proposed Actions

Statistical analysis will continue to be completed with interwell prediction limits per EPA's request. The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 and May 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

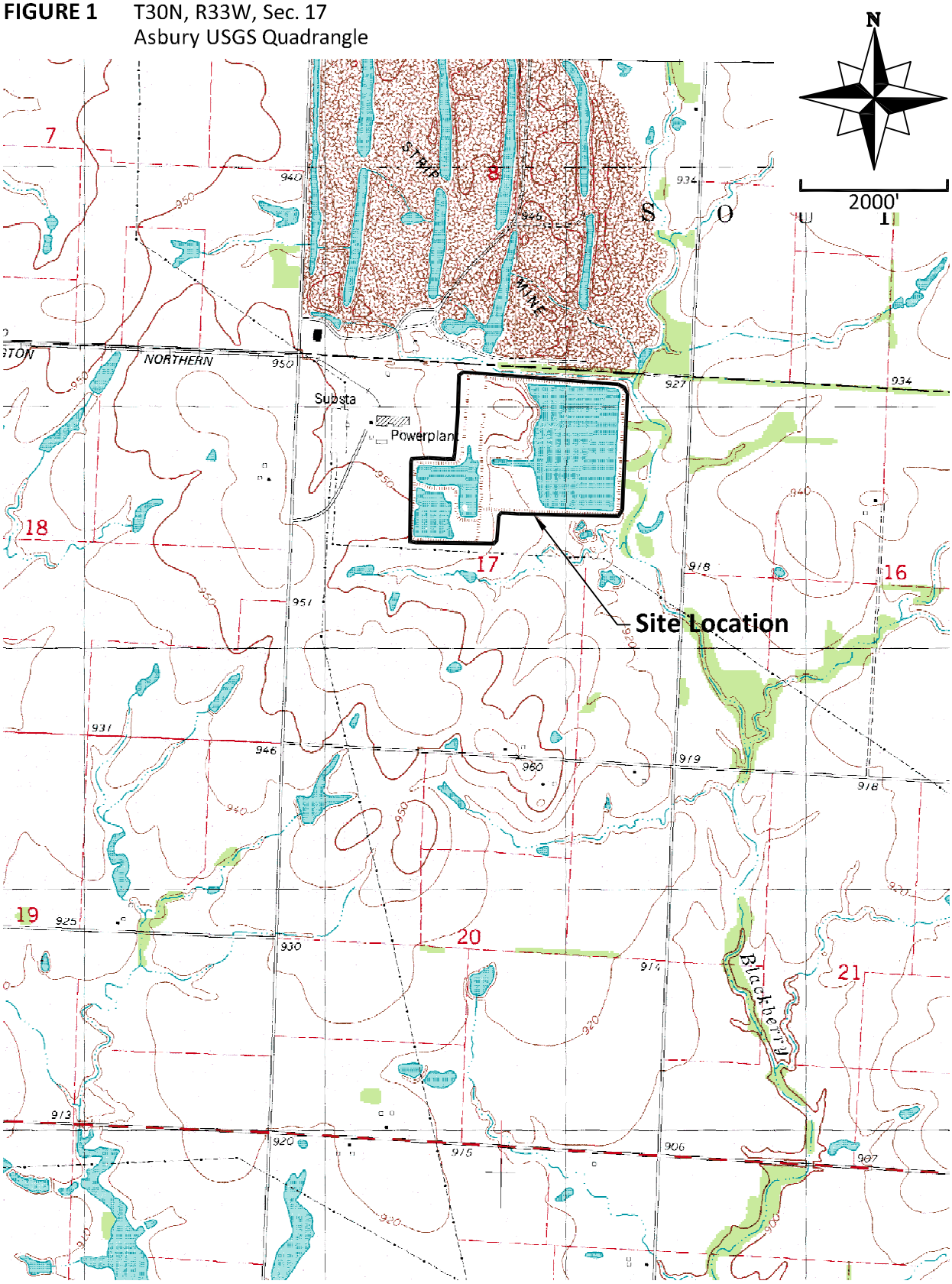
The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Based upon these findings the site does not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

FIGURES

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - May 2021
Site Location Map

FIGURE 1 T30N, R33W, Sec. 17
Asbury USGS Quadrangle



July 2021

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - May 2021
Groundwater Monitoring System

FIGURE 2

Well ID	Northing	Easting
MW-1	435791.18 *	2765165.35 *
MW-2	434428.46	2762861.37
MW-3	432842.77	2762720.80
MW-4	433709.99	2764938.99
MW-5	433659.27	2765966.23
MW-5A	434150.04	2765969.78
MW-6	434600.46	2765987.98
MW-6A	435071.44	2766010.46
MW-7	435505.42	2765993.13

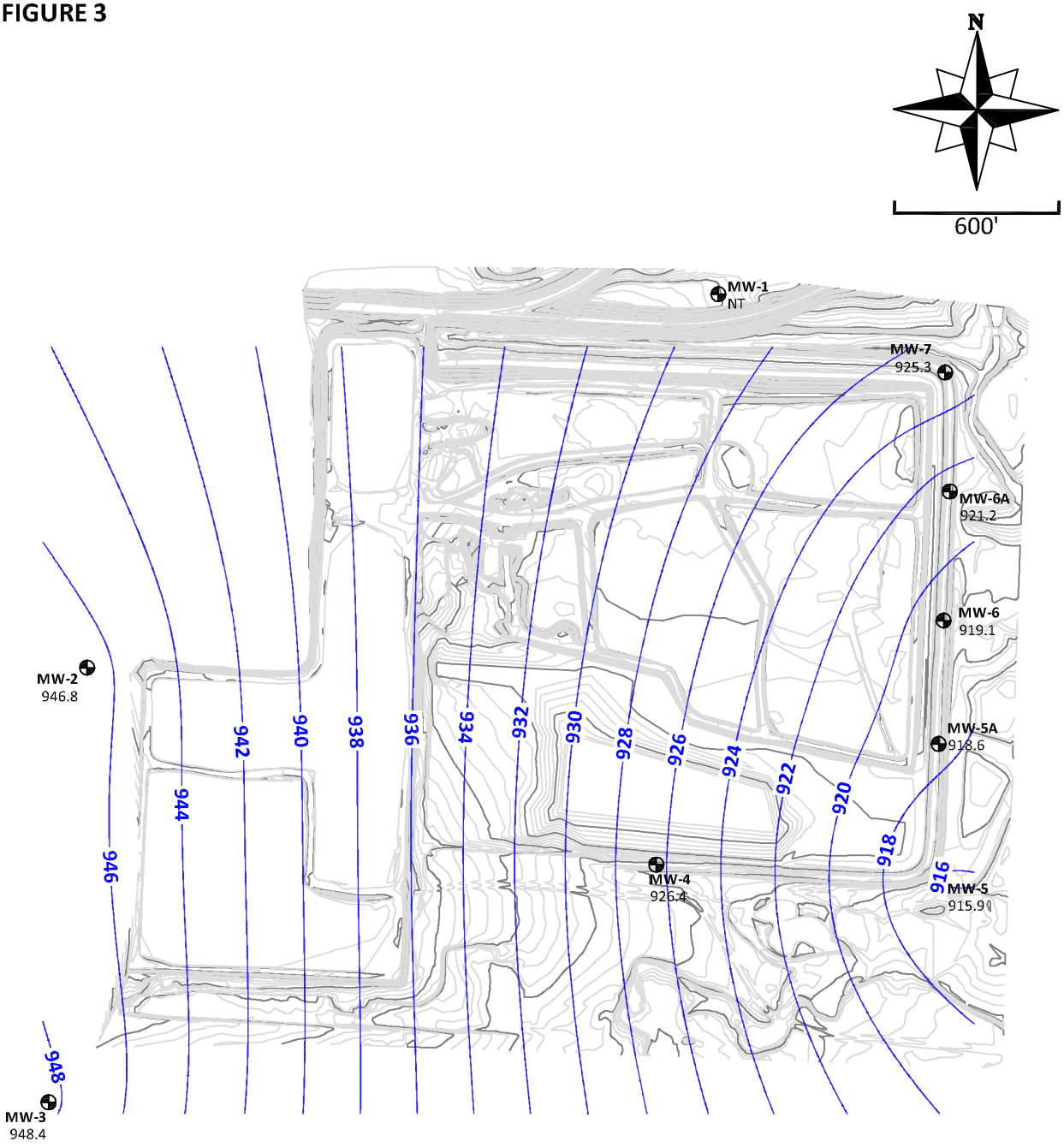
* Coordinate location is approximate

Legend

Monitoring Well

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - May 2021
Groundwater Piezometric Surface Map

FIGURE 3



Well ID	Northing	Easting	Top Of Casing	Static Water Level (BTOC)	Static Water Level
MW-1	435791.18	2765165.35	933.4	NT	NT
MW-2	434428.46	2762861.37	947.8	1.0	946.8
MW-3	432842.77	2762720.80	948.8	0.4	948.4
MW-4	433709.99	2764938.99	932.6	6.2	926.4
MW-5	433659.27	2765966.23	919.2	3.3	915.9
MW-5A	434150.04	2765969.78	929.3	10.7	918.6
MW-6	434600.46	2765987.98	928.0	8.9	919.1
MW-6A	435071.44	2766010.46	929.3	8.1	921.2
MW-7	435505.42	2765993.13	928.8	3.5	925.3

Legend

Monitoring Well

APPENDIX 1

EPA/MDNR Correspondence

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Eric R. Greitens, Governor
Carol S. Comer, Director

NOV 02 2017

Mr. Kavan Stull, Senior Environmental Coordinator
Empire District
602 South Joplin Avenue
Joplin, MO 64802

RE: Site Characterization Workplan

Dear Mr. Stull:

The Missouri Department of Natural Resources has reviewed the document "Site Characterization Workplan" dated May 16, 2017. The site has undergone extensive characterization regarding construction of a coal combustion residual (CCR) landfill near the CCR impoundments. The department's Water Protection Program has determined, through consulting with the Missouri Geological Survey, this characterization is sufficient and may be used in whole to complete the required monitoring of the sub-surface conditions at the site. Additional submittal of site characterization is not necessary, as the previous submittal meets the requirement for special condition 19(b) of the Missouri State Operating Permit MO-0095362. The facility may proceed with the next step laid out in the permit; special condition 19(c). Enclosed is the Missouri Geological Survey concurrence.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to 10 CSR 20 1.020 and Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is by mail at Administrative Hearing Commission, United States Post Office Building, Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102, by phone at 573-751-2422, by fax at 573-751-5018, and by website at www.oa.mo.gov/ahc.

If you have any questions, please do not hesitate to contact Ms. Pam Hackler by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176, by phone at 573-526-3386; or by email at pam.hackler@dnr.mo.gov. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

Michael J. Abbott, Chief
Operating Permits Section

MJA/php

Enclosure

c: Mr. Randall Willoughby, Southwest Regional Office

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Eric R. Greitens, Governor
Carol S. Comer, Director

MEMORANDUM

SWR18011
Jasper County

DATE: October 18, 2017

TO: Pam Hackler- WPP- Industrial Wastewater Unit

FROM: Fletcher N. Bone, Geologist, Environmental Geology Section, Geological Survey Program, MGS

Fletcher N. Bone

STATE OF MISSOURI
REGISTERED GEOLOGIST
2014000148
October 18, 2017

SUBJECT: Site characterization for existing CCR impoundments
Asbury Power Plant Site Characterization Work Plan- CCR
37 21 22.66 Latitude, -94 35 4.79 Longitude,
Jasper County, Missouri

The Missouri Geological Survey (MGS) has reviewed the documents titled, 'NPDES Permit MO-0095362 Asbury Power Plant, Jasper County, Missouri, Site Characterization Work Plan', prepared by Empire District Electric Company, dated September 8, 2017 and 'Site Characterization Work Plan, Coal Combustion Residuals Impoundments, Empire Electric Facility - Permit MO-0095362, Jasper County, Missouri, Geotechnology Project No. J021738.03', prepared by Geotechnology Inc., dated May 16, 2017. The MGS offers the following comment.

General Comment:

The MGS agrees that the existing Coal Combustion Residuals (CCR) impoundments (site 1) do not need further site characterization, at this time. The site characterization performed, as described in the Detailed Site Investigation Report (DSI), dated January 21, 2015, at the proposed CCR impoundment (site 2) that is approximately 1,000 feet south of the existing CCR impoundments (site 1), coupled with the geologic and hydrologic data provided that pertains to the existing CCR impoundments (site 1) (1996 to present data), provides adequate characterization of the geology and hydrology of the site 1. The geologic and hydrologic settings of both sites are similar, with geologic boring logs and potentiometric data of both sites being compared. The hydraulic conductivity testing conducted at the proposed CCR site (site 2) has demonstrated that there is a low potential for groundwater contamination for this area.

If you are in need of further assistance from our office or have questions regarding this evaluation please feel free to contact me at (573) 368-2161.

APPENDIX 2

Baseline Sampling Information

EPA CCR Rule

Appendix III to Part 257—Constituents for Detection Monitoring

Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)

Appendix IV to Part 257—Constituents for Assessment Monitoring

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined

1st Baseline Event –
January 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.33	<0.5 J	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Calcium	mg/L	NA	57	74	220	84	200	250	140	570
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.43	0.47	0.31	0.28	0.30	0.24	0.35	<0.2 J
pH	SU	NA	6.33	5.81	6.31	7.33	7.09	6.97	7.09	6.51
Sulfate	mg/L	NA	260	360	1100	140	800	1000	600	1800
Total Dissolved Solids	mg/L	NA	690	790	1900	590	1500	1800	1300	2800
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.002 J	0.01	<0.01 J	<0.02 J	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	2	0.044	0.0099	0.065	0.086	0.036	0.02	0.042	0.011
Beryllium	mg/L	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.01 J	<0.01 J	<0.01 J	<0.01 J	<0.01	<0.01
Cobalt	mg/L	NA	<0.01 J	<0.01 J	0.046	<0.002 J	0.018	0.0022	0.02	0.014
Lead	mg/L	0.015	<0.002 J	<0.002	<0.01 J	<0.002 J	<0.002	<0.002	<0.002	<0.002 J
Lithium	mg/L	NA	0.057	0.15	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.01 J	<0.002	<0.01 J	<0.002
Selenium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.477 J	<0.427 J	<2.08	<0.563 J	<0.392 J	<0.446 J	<0.306 J	<0.279 J

NA = Not Applicable

<x = Less than reporting limit (nondetectable)

J = Trace value seen above minimum detection limit but below reporting limit (trace)

2nd Baseline Event –
March 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.90	0.060	<0.25	0.29	0.29	0.34	0.34	0.29
Calcium	mg/L	NA	120	92	260	94	190	250	160	620
Chloride	mg/L	NA	180	70	15	4.4	23	9.0	36	34
Fluoride	mg/L	4	0.28	0.28	0.10	0.38	0.31	0.23	0.31	0.16
pH	SU	NA	5.82	5.68	6.72	7.15	6.94	6.79	6.98	6.22
Sulfate	mg/L	NA	570	400	570	140	710	970	550	1800
Total Dissolved Solids	mg/L	NA	1300	840	1600	590	1500	1800	1200	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002 J	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.002 J	0.024	0.0038	<0.002 J	0.0038	0.0026	0.0025	0.004
Barium	mg/L	2	0.060	0.012	0.034	0.047	0.042	0.026	0.051	0.0089
Beryllium	mg/L	0.004	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002 J	0.0034	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.017	0.0095	0.021	<0.002 J	0.02	0.0061	0.0063	0.016
Lead	mg/L	0.015	<0.002 J	<0.002 J	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Lithium	mg/L	NA	0.20	0.15	0.074	0.074	0.14	0.22	0.14	0.30
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002	<0.002 J	0.0041	<0.002 J	0.0038	<0.002
Selenium	mg/L	0.05	<0.002	<0.002	<0.002	0.0021	0.0028	0.0031	0.0031	<0.002
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.337 J	<0.389 J	<0.84 J	<0.315 J	<0.336 J	<0.319 J	<0.348 J	<0.329 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

3rd Baseline Event –
May 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.21	0.044	0.027	0.24	0.26	0.25	0.23	0.29
Calcium	mg/L	NA	130	100	91	5	59	11	90	36
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.28	0.27	0.22	0.55	0.35	0.26	0.43	0.18
pH	SU	NA	5.30	4.37	5.97	6.43	6.60	6.51	6.64	5.82
Sulfate	mg/L	NA	160	540	820	150	920	1400	620	2400
Total Dissolved Solids	mg/L	NA	500	800	1700	590	1500	1800	1100	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	0.0013	0.027	0.01	0.0043	0.01	0.007	0.0037	0.0082
Barium	mg/L	2	0.021	0.01	0.025	0.045	0.037	0.041	0.04	0.021
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	0.0025	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0072	0.0073	0.0071	<0.0005J	0.00081	0.0035	<0.0005J	0.0037
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001 J
Lithium	mg/L	NA	<0.05 J	0.15	<0.05 J	0.074	0.16	0.31	0.12	0.22
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0052	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005 J	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001
Combined Radium	pCi/L	5	<0.355	<0.427 J	<0.386 J	<0.402 J	<0.377 J	<0.357 J	<0.334 J	<0.333 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

4th Baseline Event –
August 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.19	0.057	0.067	0.27	0.27	0.29	0.27	0.22
Calcium	mg/L	NA	38	79	110	74	180	220	130	430
Chloride	mg/L	NA	120	77	35	6	35	12	65	49
Fluoride	mg/L	4	0.25	0.15	0.3	0.26	0.31	0.23	0.37	0.22
pH	SU	NA	6.04	5.73	7	7.17	7.04	6.88	7.14	6.29
Sulfate	mg/L	NA	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Total Dissolved Solids	mg/L	NA	460	850	730	540	1500	1800	1100	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.001 J	0.013	<0.001 J	<0.001 J	0.001	<0.001 J	<0.001 J	<0.001 J
Barium	mg/L	2	0.023	<0.01 J	0.012	0.035	0.031	0.014	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0052	0.0088	0.0038	<0.0005J	0.00075	<0.0005J	<0.0005J	0.015
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001
Lithium	mg/L	NA	<0.05 J	0.16	<0.05 J	0.078	0.16	0.22	0.11	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	<0.005	0.0067	<0.005
Selenium	mg/L	0.05	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.424 J	<0.465 J	<0.833	<0.441 J	<0.435 J	<0.45 J	<0.484 J	<0.418 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

5th Baseline Event –
October 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.2	0.053	0.047	0.24	0.33	0.34	0.31	0.26
Calcium	mg/L	NA	43	91	100	94	220	260	130	490
Chloride	mg/L	NA	130	65	74	6	29	13	65	56
Fluoride	mg/L	4	0.28	0.18	0.28	0.31	0.39	0.25	0.41	0.28
pH	SU	NA	6.59	5.95	7.21	7.51	8.00	6.98	7.85	6.75
Sulfate	mg/L	NA	99	470	120	120	1100	1100	570	1400
Total Dissolved Solids	mg/L	NA	460	850	580	570	1500	1700	1100	2800
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.001	0.014	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001 J	<0.001 J
Barium	mg/L	2	0.028	<0.01 J	0.02	0.03	0.033	0.013	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0051	0.0095	0.0013	0.00073	0.0072	<0.0005J	<0.0005J	0.014
Lead	mg/L	0.015	<0.001 J	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	<0.05	0.078	0.17	0.24	0.12	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0066	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005J	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.436J	<0.478J	<0.535J	<0.503J	<0.498J	<0.464J	<0.453J	<0.424J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

6th Baseline Event –
March 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.22	0.052	0.057	0.23	0.29	0.33	0.36	0.26
Calcium	mg/L	NA	38	93	250	86	200	260	170	500
Chloride	mg/L	NA	130	52	19	5.3	29	11	19	39
Fluoride	mg/L	4	0.21	0.12	<0.1 J	0.29	0.29	0.19	0.3	0.12
pH	SU	NA	6.07	5.84	6.67	7.32	7.38	7.15	7.21	6.40
Sulfate	mg/L	NA	130	540	630	150	1100	1000	720	1900
Total Dissolved Solids	mg/L	NA	500	940	1600	620	1700	1900	1400	3000
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001	0.037	0.0022	0.0013	0.0014	<0.001 J	0.0043	<0.001 J
Barium	mg/L	2	0.021	0.011	0.021	0.033	0.026	0.015	0.027	<0.01 J
Beryllium	mg/L	0.004	<0.001 J	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 J
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0071	0.0097	0.0096	<0.0005J	0.0022	0.0024	0.0017	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	0.072	0.076	0.16	0.23	0.14	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005 J	<0.005 J	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	0.575	1.63	0.287	1.50	0.803	2.68	1.73	1.62

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

7th Baseline Event –
June 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	<0.08J	<0.08J	0.034	0.27	0.31	0.37	0.36	0.26
Calcium	mg/L	NA	42	100	300	89	200	260	160	470
Chloride	mg/L	NA	130	54	110	5.4	23	12	26	48
Fluoride	mg/L	4	0.43	0.19	0.18	0.35	0.42	0.3	0.42	0.21
pH	SU	NA	6.35	5.78	6.62	7.22	7.04	6.93	7.09	6.41
Sulfate	mg/L	NA	78	650	1400	180	940	1300	780	2400
Total Dissolved Solids	mg/L	NA	450	950	2000	610	1600	1800	1400	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001J	0.1	0.0032	<0.001J	0.0037	<0.001	0.0018	<0.001
Barium	mg/L	2	0.03	0.016	0.048	0.04	0.026	0.017	0.025	<0.01J
Beryllium	mg/L	0.004	<0.001	0.0031	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.004	0.0088	0.0042	<0.0005J	0.0045	0.00087	0.0059	0.0015
Lead	mg/L	0.015	0.0033	0.001	0.0074	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.18	0.053	0.085	0.18	0.25	0.15	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005	<0.005J	<0.005	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.397J	<0.337J	<0.403	<0.291J	<0.343J	<0.414J	<0.33J	<0.314J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

8th Baseline Event –
August 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.16	<0.08J	<0.08J	0.28	0.33	0.34	0.38	0.27
Calcium	mg/L	NA	43	98	83	57	220	250	180	510
Chloride	mg/L	NA	130	45	8.1	5.3	23	12	26	38
Fluoride	mg/L	4	0.26	0.17	0.32	0.27	0.45	0.25	0.4	0.22
pH	SU	NA	6.2	5.7	6.7	7.3	7.0	7.2	7.1	6.3
Sulfate	mg/L	NA	82	550	63	140	920	1100	730	2200
Total Dissolved Solids	mg/L	NA	450	960	450	530	1600	1800	1400	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002
Arsenic	mg/L	0.01	<0.001J	0.013	<0.001J	0.002	<0.001J	<0.001J	<0.001J	<0.001J
Barium	mg/L	2	0.024	0.01	0.018	0.027	0.023	0.018	0.021	<0.01J
Beryllium	mg/L	0.004	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001J
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002J	<0.002	0.0026	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0036	0.01	0.00067	<0.0005J	0.0023	<0.0005J	0.0051	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.17	<0.05J	0.073	0.18	0.22	0.15	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005J	<0.005J	<0.005J	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.42J	<0.417J	<0.473	<0.476J	<0.383J	<0.389J	<0.291J	<0.346J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

APPENDIX 3

Monitoring Well Field Inspection Sheets and Field Notes

2021 Field Sampling Log

Facility: Asbury CCR (Permit #)

Monitoring Well ID: MW- 2

Sample X Blind Duplicate ☐ Field Blank ☐.

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 5 / 4 / -21 @ 1:16

Date / Time Completed: 5 / 4 / -21 @ 1:47

Well Purged To Dryness?: Y / (N)

Petroleum or Gas Detected? Y / (N)

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	NTU Turbidity ( )	Other (Color, Clarity, Odor)
1:20	200	800	13.3	6.57	.655	.84	72.7	.91	C
:22		1200	13.2	6.40	.654	.64	70.4	1.78	
:24		1600	13.2	6.33	.654	.51	68.7	4.03	
:26		2000	13.2	6.31	.654	.45	67.6	2.20	

Time sampled 1:30

Weather Conditions Rain 45°F

Water Level Start 1.03'

Water Level Finish 4.84'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature R Elgin

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW-3

Sample [X] Blind Duplicate [ ] Field Blank [X]

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing** 1:15

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 5-5-21 @ 12:58 Date / Time Completed: 5-5-21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
1:02	200	800	16.0	5.75	1.107	1.41	61.3	210.23	C
:04		1200	15.8	5.75	1.103	1.25	60.8	192.80	
:06		1600	15.6	5.75	1.103	1.12	60.5	201.73	
:08		2000	15.5	5.75	1.101	1.14	60.6	198.36	

Time sampled 1:10

Weather Conditions Sunny Calm ~60's

Water Level Start .40

Water Level Finish .40

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

X

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 4

Sample [X] Blind Duplicate [ ] Field Blank [ ]

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2200 mL post pump calibration .

Date / Time Initiated: 5 - 9 -21 @ 1:48 Date / Time Completed: 5 - 5 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
1:53	200	1000	15.7	6.56	1.517	5.63	68.7	8.38	
:55		1400	15.7	6.55	1.515	5.83	72.3	9.41	
:57		1800	15.7	6.56	1.522	5.62	73.9	15.01	
:59		2200	15.7	6.58	1.529	5.40	74.3	15.68	

Time sampled 2:00

Weather Conditions Sunny, Calm Low 70's

Water Level Start 6.22'

Water Level Finish 15.72'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature R Elgin

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #)

Monitoring Well ID: MW- 5

Sample [X] Blind Duplicate [X] Field Blank [X]

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 5 4 -21 @ 2:00

Date / Time Completed: 5 – 4 -21 @

Well Purged To Dryness?: Y / N

Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
2:04	200	800	14.2	7.16	.845	.61	86.8	2.25	C
:06		1200	14.2	7.17	.845	.93	84.4	4.59	
:08		1600	14.1	7.18	.844	.45	82.7	10.22	
:10		2000	14.0	7.18	.845	.41	77.2	14.67	

Time sampled 2:10 / Dup 2:35 / Blk

Weather Conditions Rain 49°F

Water Level Start 3.27'

Water Level Finish 16.54'

Name (MEC Field Sampler): Ryan Orthals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

X

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 5A

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1800 mL post pump calibration.

Date / Time Initiated: 5 / 4 / -21 @ 2:55 Date / Time Completed: 5 / 4 / -21 @

Well Purged To Dryness?: Y / (N) Petroleum or Gas Detected? Y / (N)

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity (NTU) ( )	Other (Color, Clarity, Odor)
2:58	200	600	14.2	6.92	2.782	.93	114.5	6.19	C
3:00		1000	13.8	6.83	2.779	.78	112.1	6.50	
:02		1400	13.7	6.79	2.778	.71	110.6	2.88	
:04		1800	13.6	6.77	2.778	.64	109.6	3.25	

Time sampled 3:05

Weather Conditions Sprinkling Cold

Water Level Start 10.70'

Water Level Finish 22.98'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 6

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1800 mL post pump calibration.

Date / Time Initiated: 5 4 -21 @ 3:42 Date / Time Completed: 5 – 4 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
3:45	200	600	14.3	7.03	1.922	1.94	103.9	13.64	C
:47		1000	14.0	6.90	1.921	~~1.93~~	101.2	6.07	|
:49		1400	14.0	6.88	1.919	.57	100.0	2.61	|
:51		1800	14.2	6.87	1.917	.49	99.1	2.07	|

.72

Time sampled 3:55

Weather Conditions Cloudy Windy Cold

Water Level Start 8.94'

Water Level Finish 19.21'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature R Elgin

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (**Permit #**) Monitoring Well ID: **MW-** 6A

Sample ☐ **Blind Duplicate** ☐ **Field Blank** ☐.

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1800 mL post pump calibration.

Date / Time Initiated: 5 – 4 -21 @ 4:23 Date / Time Completed: 5 – 4 -21- @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (ml)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
4:26	200	600	14.5	6.99	1.698	3.42	110.7	43.49	C
0:28		1000	14.3	6.94	1.697	3.35	111.5	37.21	|
:30		1400	14.3	6.92	1.698	3.29	113.0	24.08	|
:32		1800	14.3	6.91	1.697	3.26	113.9	20.12	↓

Time sampled 4:35

Weather Conditions PC Windy Cool

Water Level Start 8.10'

Water Level Finish 20.43'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 6A	MW-7					
pH	S.U.	6.87	6.12					
Specific Conductance	umhos/cm	1.601	2.699					
Total Well Depth	ft							
Average GW Depth	ft	7.28	3.04					
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	800	800					

X

2021 Field Sampling Log

Facility: Asbury CCR (**Permit #**) Monitoring Well ID: **MW-** 7

Sample X **Blind Duplicate** ☐ **Field Blank** ☐

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 5 – 5 -21 @ 2:34 Date / Time Completed: 5 – 5 -21- @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (ml)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
2:36	~200								
0:38		800	15.2	6.29	2.674	3.73	106.4	17.69	C
:40		1200	15.0	6.29	2.668	3.40	109.8	13.22	
:42		1600	14.9	6.29	2.669	3.27	112.3	9.81	
:44		2000	14.8	6.28	2.663	3.22	114.4	9.88	

Time sampled 2:45

Weather Conditions Sunny ~ 70°s

Water Level Start 3.46'

Water Level Finish 3.61'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 6A	MW-7					
pH	S.U.	6.87	6.12					
Specific Conductance	umhos/cm	1.601	2.699					
Total Well Depth	ft							
Average GW Depth	ft	7.28	3.04					
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	800	800					

APPENDIX 4

Analytical Results from Lab

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-121224-1
Client Project/Site: Asbury Ash Pond
Sampling Event: Asbury Ash Pond

For:
Midwest Environmental Consultants
2009 East McCarty Street
Suite 2
Jefferson City, Missouri 65101

Attn: Mr. Rick Elgin

Authorized for release by:
6/11/2021 4:05:02 PM

Andy Johnson, Manager of Project Management
(615)301-5045
Andy.Johnson@Eurofinset.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-121224-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-121224-1

Comments
No additional comments.

Receipt
The samples were received on 5/6/2021 10:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.5º C.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method SM 2540C: The following samples were analyzed outside of analytical holding time due to the samples being logged in with a collection date of 05/05/21 and subsequently changing to 05/04/21 per the client: MW-5A (180-121224-6), MW-6 (180-121224-7), MW-6A (180-121224-8), Dup (180-121224-9) and MW-2 (180-121224-10).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Midwest Environmental Consultants
Job ID: 180-121224-1
Project/Site: Asbury Ash Pond

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21 *
Connecticut	State	PH-0688	09-30-22
Florida	NELAP	E871008	06-03-21
Georgia	State	PA 02-00416	04-30-22
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-22
Kentucky (UST)	State	162013	04-30-21 *
Kentucky (WW)	State	KY98043	12-31-21
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-21
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-22
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-22
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21 *
Oregon	NELAP	PA-2151	02-06-22
Pennsylvania	NELAP	02-00416	04-30-22
Rhode Island	State	LAO00362	12-31-21
Texas	NELAP	T104704528	03-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	01-31-22
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-121224-1	MW-3	Water	05/05/21 13:10	05/06/21 10:15	
180-121224-2	MW-4	Water	05/05/21 14:00	05/06/21 10:15	
180-121224-3	MW-7	Water	05/05/21 14:45	05/06/21 10:15	
180-121224-4	Field Blank	Water	05/05/21 15:15	05/06/21 10:15	
180-121224-5	MW-5	Water	05/04/21 14:10	05/06/21 10:15	
180-121224-6	MW-5A	Water	05/04/21 15:05	05/06/21 10:15	
180-121224-7	MW-6	Water	05/04/21 15:55	05/06/21 10:15	
180-121224-8	MW-6A	Water	05/04/21 16:35	05/06/21 10:15	
180-121224-9	Dup	Water	05/04/21 00:00	05/06/21 10:15	
180-121224-10	MW-2	Water	05/04/21 13:30	05/06/21 10:15	

Method Summary

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-3

Date Collected: 05/05/21 13:10
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 13:53	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		5			356264	05/10/21 14:09	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 15:57	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:09	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356535	05/11/21 17:32	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-4

Date Collected: 05/05/21 14:00
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 18:44	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			356264	05/10/21 19:01	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:01	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:12	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356535	05/11/21 17:32	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-7

Date Collected: 05/05/21 14:45
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			356264	05/10/21 20:22	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		25			356264	05/10/21 20:39	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:04	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:15	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	356535	05/11/21 17:35	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: Field Blank

Lab Sample ID: 180-121224-4
Matrix: Water
Date Collected: 05/05/21 15:15
Date Received: 05/06/21 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 22:16	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:08	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:18	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356535	05/11/21 17:32	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-5

Lab Sample ID: 180-121224-5
Matrix: Water
Date Collected: 05/04/21 14:10
Date Received: 05/06/21 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 14:56	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:12	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:24	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356535	05/11/21 17:35	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-5A

Lab Sample ID: 180-121224-6
Matrix: Water
Date Collected: 05/04/21 15:05
Date Received: 05/06/21 10:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			356264	05/10/21 21:28	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		25			356264	05/10/21 21:44	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:15	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:30	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	356698	05/12/21 15:46	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-6

Date Collected: 05/04/21 15:55
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 19:50	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			356264	05/10/21 20:06	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:19	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:33	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356698	05/12/21 15:46	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-6A

Date Collected: 05/04/21 16:35
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 18:12	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			356264	05/10/21 18:28	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:22	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:36	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356698	05/12/21 15:46	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: Dup

Date Collected: 05/04/21 00:00
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 16:33	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		5			356264	05/10/21 16:50	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:33	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:39	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356698	05/12/21 15:46	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-2

Date Collected: 05/04/21 13:30
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			356264	05/10/21 17:39	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total Recoverable	Prep	3005A			50 mL	50 mL	356758	05/13/21 06:59	TLP	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			357468	05/18/21 16:37	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	EPA 9040C		1			356923	05/14/21 10:42	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	356698	05/12/21 15:46	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TLP = Tara Peterson

Batch Type: Analysis

EPS = Evan Scheuer
KMM = Kendric Moore
MTW = Michael Wesoloski
RSK = Robert Kurtz

Client: Midwest Environmental Consultants
Job ID: 180-121224-1
Project/Site: Asbury Ash Pond

Client Sample ID: MW-3
Lab Sample ID: 180-121224-1
Date Collected: 05/05/21 13:10
Matrix: Water
Date Received: 05/06/21 10:15

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	59		1.0	0.71	mg/L			05/10/21 13:53	1
Fluoride	0.14		0.10	0.026	mg/L			05/10/21 13:53	1
Sulfate	490		5.0	3.8	mg/L			05/10/21 14:09	5

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	97		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 15:57	1
Boron	0.056	J	0.080	0.039	mg/L		05/13/21 06:59	05/18/21 15:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	830		10	10	mg/L			05/11/21 17:32	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9	HF	0.1	0.1	SU			05/14/21 10:09	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-4

Date Collected: 05/05/21 14:00
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-2

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	60		1.0	0.71	mg/L			05/10/21 18:44	1
Fluoride	0.20		0.10	0.026	mg/L			05/10/21 18:44	1
Sulfate	670		10	7.6	mg/L			05/10/21 19:01	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	200		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:01	1
Boron	ND		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1300		10	10	mg/L			05/11/21 17:32	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.0	HF	0.1	0.1	SU			05/14/21 10:12	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-7

Date Collected: 05/05/21 14:45
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-3

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	38		2.5	1.8	mg/L			05/10/21 20:22	2.5
Fluoride	0.19	J	0.25	0.065	mg/L			05/10/21 20:22	2.5
Sulfate	1800		25	19	mg/L			05/10/21 20:39	25

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	480		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:04	1
Boron	0.23		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2700		20	20	mg/L			05/11/21 17:35	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.6	HF	0.1	0.1	SU			05/14/21 10:15	1

Client: Midwest Environmental Consultants
Job ID: 180-121224-1
Project/Site: Asbury Ash Pond

Client Sample ID: Field Blank
Lab Sample ID: 180-121224-4

Date Collected: 05/05/21 15:15
Matrix: Water
Date Received: 05/06/21 10:15

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**47**		1.0	0.71	mg/L			05/10/21 22:16	1
Fluoride	**3.9**		0.10	0.026	mg/L			05/10/21 22:16	1
Sulfate	ND		1.0	0.76	mg/L			05/10/21 22:16	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**5.0**		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:08	1
Boron	ND		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**130**		10	10	mg/L			05/11/21 17:32	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.0**	**HF**	0.1	0.1	SU			05/14/21 10:18	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-5

Date Collected: 05/04/21 14:10
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-5

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.6		1.0	0.71	mg/L			05/10/21 14:56	1
Fluoride	0.35		0.10	0.026	mg/L			05/10/21 14:56	1
Sulfate	160		1.0	0.76	mg/L			05/10/21 14:56	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:12	1
Boron	0.28		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	580		10	10	mg/L			05/11/21 17:35	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5	HF	0.1	0.1	SU			05/14/21 10:24	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-5A

Date Collected: 05/04/21 15:05
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-6

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110		2.5	1.8	mg/L			05/10/21 21:28	2.5
Fluoride	0.33		0.25	0.065	mg/L			05/10/21 21:28	2.5
Sulfate	1500		25	19	mg/L			05/10/21 21:44	25

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	300		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:15	1
Boron	1.2		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2400	H	20	20	mg/L			05/12/21 15:46	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.0	HF	0.1	0.1	SU			05/14/21 10:30	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-6

Date Collected: 05/04/21 15:55
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-7

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14		1.0	0.71	mg/L			05/10/21 19:50	1
Fluoride	0.31		0.10	0.026	mg/L			05/10/21 19:50	1
Sulfate	1000		10	7.6	mg/L			05/10/21 20:06	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	260		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:19	1
Boron	0.33		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1700	H	10	10	mg/L			05/12/21 15:46	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF	0.1	0.1	SU			05/14/21 10:33	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-6A

Date Collected: 05/04/21 16:35
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-8

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	28		1.0	0.71	mg/L			05/10/21 18:12	1
Fluoride	0.35		0.10	0.026	mg/L			05/10/21 18:12	1
Sulfate	850		10	7.6	mg/L			05/10/21 18:28	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	180		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:22	1
Boron	0.38		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1400	H	10	10	mg/L			05/12/21 15:46	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.2	HF	0.1	0.1	SU			05/14/21 10:36	1

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: Dup

Date Collected: 05/04/21 00:00
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-9

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	24		1.0	0.71	mg/L			05/10/21 16:33	1
Fluoride	0.15		0.10	0.026	mg/L			05/10/21 16:33	1
Sulfate	280		5.0	3.8	mg/L			05/10/21 16:50	5

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	97		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:33	1
Boron	0.28		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	580	H	10	10	mg/L			05/12/21 15:46	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1	0.1	SU			05/14/21 10:39	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Ash Pond

Job ID: 180-121224-1

Client Sample ID: MW-2

Date Collected: 05/04/21 13:30
Date Received: 05/06/21 10:15

Lab Sample ID: 180-121224-10

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	100		1.0	0.71	mg/L			05/10/21 17:39	1
Fluoride	0.37		0.10	0.026	mg/L			05/10/21 17:39	1
Sulfate	52		1.0	0.76	mg/L			05/10/21 17:39	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	36		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 16:37	1
Boron	0.13		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 16:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	410	H	10	10	mg/L			05/12/21 15:46	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.6	HF	0.1	0.1	SU			05/14/21 10:42	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-356264/6
Matrix: Water
Analysis Batch: 356264

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.71	mg/L			05/10/21 09:53	1
Fluoride	ND		0.10	0.026	mg/L			05/10/21 09:53	1
Sulfate	ND		1.0	0.76	mg/L			05/10/21 09:53	1

Lab Sample ID: LCS 180-356264/5
Matrix: Water
Analysis Batch: 356264

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.8		mg/L		104	80 - 120
Fluoride	2.50	2.67		mg/L		107	80 - 120
Sulfate	50.0	52.3		mg/L		105	80 - 120

Lab Sample ID: 180-121217-F-7 MS
Matrix: Water
Analysis Batch: 356264

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.9		50.0	53.6		mg/L		103	80 - 120
Fluoride	0.51		2.50	2.98		mg/L		99	80 - 120
Sulfate	120		50.0	165		mg/L		93	80 - 120

Lab Sample ID: 180-121217-F-7 MSD
Matrix: Water
Analysis Batch: 356264

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1.9		50.0	50.8		mg/L		98	80 - 120	5	15
Fluoride	0.51		2.50	2.89		mg/L		95	80 - 120	3	15
Sulfate	120		50.0	162		mg/L		88	80 - 120	1	15

Method: EPA 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-356758/1-A
Matrix: Water
Analysis Batch: 357468

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 356758

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50	0.13	mg/L		05/13/21 06:59	05/18/21 14:56	1
Boron	ND		0.080	0.039	mg/L		05/13/21 06:59	05/18/21 14:56	1

Lab Sample ID: LCS 180-356758/2-A
Matrix: Water
Analysis Batch: 357468

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 356758

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	25.0	26.6		mg/L		106	80 - 120
Boron	1.25	1.12		mg/L		90	80 - 120

Method: EPA 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 180-121217-D-9-B MS
Matrix: Water
Analysis Batch: 357468

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 356758

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	30		25.0	56.8		mg/L		109	75 - 125
Boron	0.043	J	1.25	1.17		mg/L		90	75 - 125

Lab Sample ID: 180-121217-D-9-C MSD
Matrix: Water
Analysis Batch: 357468

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 356758

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	30		25.0	55.7		mg/L		104	75 - 125	2	20
Boron	0.043	J	1.25	1.17		mg/L		90	75 - 125	0	20

Method: EPA 9040C - pH

Lab Sample ID: LCS 180-356923/1
Matrix: Water
Analysis Batch: 356923

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: 180-121224-5 DU
Matrix: Water
Analysis Batch: 356923

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.5	HF	7.5		SU		0.1	2

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 180-356535/2
Matrix: Water
Analysis Batch: 356535

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	10	mg/L			05/11/21 17:32	1

Lab Sample ID: LCS 180-356535/1
Matrix: Water
Analysis Batch: 356535

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	486	454		mg/L		93	80 - 120

Lab Sample ID: 180-121224-1 DU
Matrix: Water
Analysis Batch: 356535

Client Sample ID: MW-3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	830		858		mg/L		3	10

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 180-121224-2 DU
Matrix: Water
Analysis Batch: 356535

Client Sample ID: MW-4
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	1300			1280		mg/L				0.9	10

Lab Sample ID: MB 180-356698/2
Matrix: Water
Analysis Batch: 356698

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	10	mg/L			05/12/21 15:46	1

Lab Sample ID: LCS 180-356698/1
Matrix: Water
Analysis Batch: 356698

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			486	526		mg/L		108	80 - 120		

Lab Sample ID: 180-121265-A-8 DU
Matrix: Water
Analysis Batch: 356698

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	480			473		mg/L				2	10

HPLC/IC

Analysis Batch: 356264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-1	MW-3	Total/NA	Water	EPA 9056A	
180-121224-1	MW-3	Total/NA	Water	EPA 9056A	
180-121224-2	MW-4	Total/NA	Water	EPA 9056A	
180-121224-2	MW-4	Total/NA	Water	EPA 9056A	
180-121224-3	MW-7	Total/NA	Water	EPA 9056A	
180-121224-3	MW-7	Total/NA	Water	EPA 9056A	
180-121224-4	Field Blank	Total/NA	Water	EPA 9056A	
180-121224-5	MW-5	Total/NA	Water	EPA 9056A	
180-121224-6	MW-5A	Total/NA	Water	EPA 9056A	
180-121224-6	MW-5A	Total/NA	Water	EPA 9056A	
180-121224-7	MW-6	Total/NA	Water	EPA 9056A	
180-121224-7	MW-6	Total/NA	Water	EPA 9056A	
180-121224-8	MW-6A	Total/NA	Water	EPA 9056A	
180-121224-8	MW-6A	Total/NA	Water	EPA 9056A	
180-121224-9	Dup	Total/NA	Water	EPA 9056A	
180-121224-9	Dup	Total/NA	Water	EPA 9056A	
180-121224-10	MW-2	Total/NA	Water	EPA 9056A	
MB 180-356264/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-356264/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-121217-F-7 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-121217-F-7 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 356758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-1	MW-3	Total Recoverable	Water	3005A	
180-121224-2	MW-4	Total Recoverable	Water	3005A	
180-121224-3	MW-7	Total Recoverable	Water	3005A	
180-121224-4	Field Blank	Total Recoverable	Water	3005A	
180-121224-5	MW-5	Total Recoverable	Water	3005A	
180-121224-6	MW-5A	Total Recoverable	Water	3005A	
180-121224-7	MW-6	Total Recoverable	Water	3005A	
180-121224-8	MW-6A	Total Recoverable	Water	3005A	
180-121224-9	Dup	Total Recoverable	Water	3005A	
180-121224-10	MW-2	Total Recoverable	Water	3005A	
MB 180-356758/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-356758/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-121217-D-9-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-121217-D-9-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 357468

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-1	MW-3	Total Recoverable	Water	EPA 6020A	356758
180-121224-2	MW-4	Total Recoverable	Water	EPA 6020A	356758
180-121224-3	MW-7	Total Recoverable	Water	EPA 6020A	356758
180-121224-4	Field Blank	Total Recoverable	Water	EPA 6020A	356758
180-121224-5	MW-5	Total Recoverable	Water	EPA 6020A	356758
180-121224-6	MW-5A	Total Recoverable	Water	EPA 6020A	356758
180-121224-7	MW-6	Total Recoverable	Water	EPA 6020A	356758
180-121224-8	MW-6A	Total Recoverable	Water	EPA 6020A	356758

Metals (Continued)

Analysis Batch: 357468 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-9	Dup	Total Recoverable	Water	EPA 6020A	356758
180-121224-10	MW-2	Total Recoverable	Water	EPA 6020A	356758
MB 180-356758/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	356758
LCS 180-356758/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	356758
180-121217-D-9-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	356758
180-121217-D-9-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	356758

General Chemistry

Analysis Batch: 356535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-1	MW-3	Total/NA	Water	SM 2540C	
180-121224-2	MW-4	Total/NA	Water	SM 2540C	
180-121224-3	MW-7	Total/NA	Water	SM 2540C	
180-121224-4	Field Blank	Total/NA	Water	SM 2540C	
180-121224-5	MW-5	Total/NA	Water	SM 2540C	
MB 180-356535/2	Method Blank	Total/NA	Water	SM 2540C	
LCS 180-356535/1	Lab Control Sample	Total/NA	Water	SM 2540C	
180-121224-1 DU	MW-3	Total/NA	Water	SM 2540C	
180-121224-2 DU	MW-4	Total/NA	Water	SM 2540C	

Analysis Batch: 356698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-6	MW-5A	Total/NA	Water	SM 2540C	
180-121224-7	MW-6	Total/NA	Water	SM 2540C	
180-121224-8	MW-6A	Total/NA	Water	SM 2540C	
180-121224-9	Dup	Total/NA	Water	SM 2540C	
180-121224-10	MW-2	Total/NA	Water	SM 2540C	
MB 180-356698/2	Method Blank	Total/NA	Water	SM 2540C	
LCS 180-356698/1	Lab Control Sample	Total/NA	Water	SM 2540C	
180-121265-A-8 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 356923

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-121224-1	MW-3	Total/NA	Water	EPA 9040C	
180-121224-2	MW-4	Total/NA	Water	EPA 9040C	
180-121224-3	MW-7	Total/NA	Water	EPA 9040C	
180-121224-4	Field Blank	Total/NA	Water	EPA 9040C	
180-121224-5	MW-5	Total/NA	Water	EPA 9040C	
180-121224-6	MW-5A	Total/NA	Water	EPA 9040C	
180-121224-7	MW-6	Total/NA	Water	EPA 9040C	
180-121224-8	MW-6A	Total/NA	Water	EPA 9040C	
180-121224-9	Dup	Total/NA	Water	EPA 9040C	
180-121224-10	MW-2	Total/NA	Water	EPA 9040C	
LCS 180-356923/1	Lab Control Sample	Total/NA	Water	EPA 9040C	
180-121224-5 DU	MW-5	Total/NA	Water	EPA 9040C	

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: REGRO	Lab PM: Gartner, Cathy	Carrier Tracking No(s):	COC No: 490-52767-15725.1
Client Contact: Mr. Rick Elgin	Phone: 573-636-9454	E-Mail: cathy.gartner@testamericainc.com		Page: Page 1 of 1
Company: Midwest Environmental Consultants				Job #:
Address: 2009 East McCarty Street Suite 2	Due Date Requested: Std Tuen			
City: Jefferson City	TAT Requested (days):			
State, Zip: MO, 65101				
Phone: 573-636-9454(Tel)	PO #: Purchase Order not required			
Email: relgin@mecpc.com	WO #:			
Project Name: Asbury Ash Pond	Project #: 49010011			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056 Chloride, Fluoride, Sulfate	2540C_Calcd - Total Dissolved Solids	6020 Metals - Ca and Boron									Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	D										
MW-2	~~5-5-21~~		G	W															Field pH:
MW-3	5-5-21		G	W			1	1	1										Field pH:
MW-4	5-5-21		G	W			1	1	1										Field pH:
~~MW-5~~																			Field pH:
~~MW-5A~~																			Field pH:
~~MW-6~~																			Field pH:
~~MW-6A~~																			Field pH:
MW-7	5-5-21		G	W			1	1	1										Field pH:
~~Dup (MW-)~~																			Field pH:
Field Blank	5-5-21			W			1	1	1										Field pH:
																			Field pH:

180-121224 Chain of Custody

Possible Hazard Identification

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

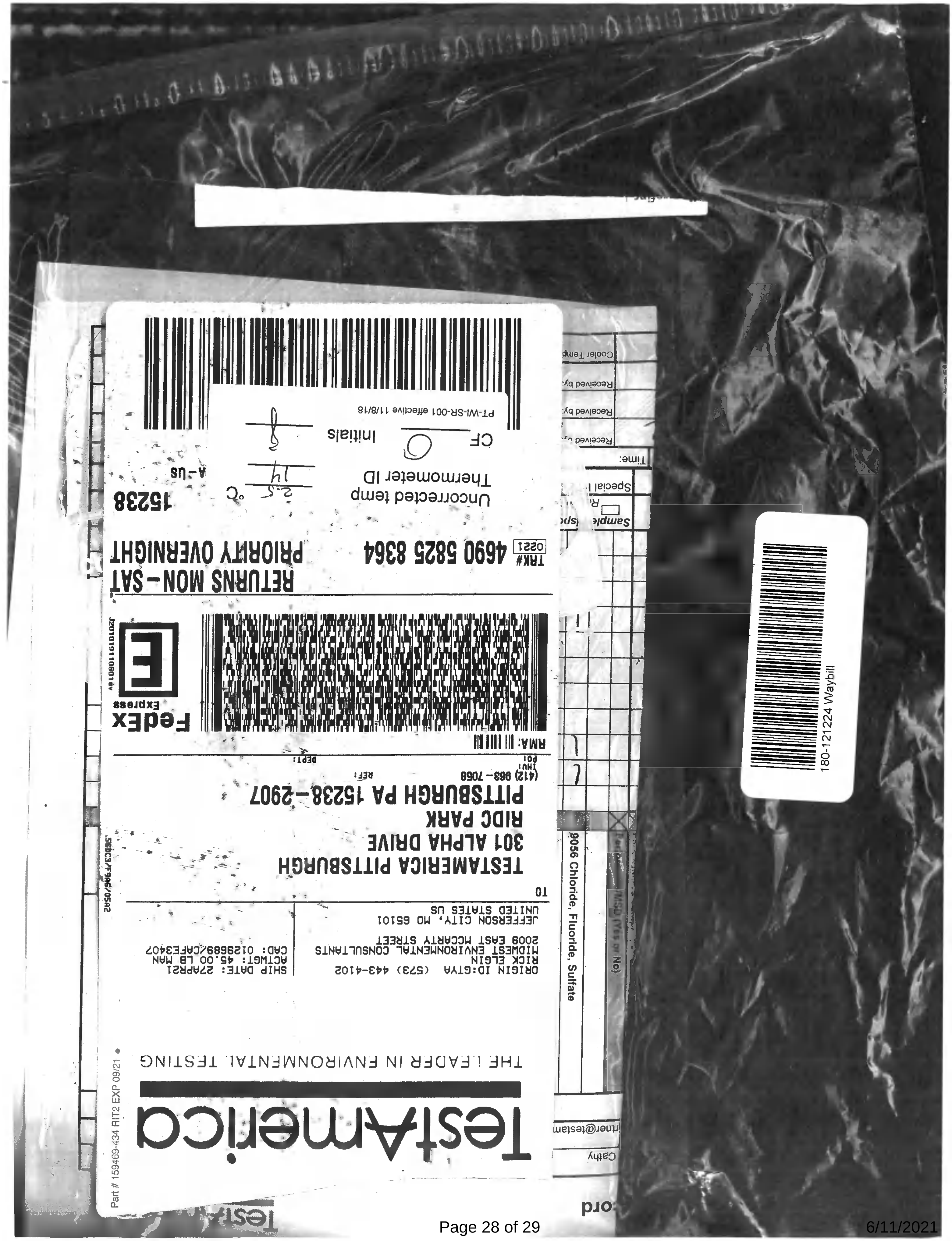
Special Instructions/QC Requirements: 6020A/6010C - Sb,As,Ba,Be,B,Cd,Ca,Cr,Co,Pb,,Mo, Li

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:	Date/Time: 5-5-21 4:00	Company: MEC	Received by: FedEx	Date/Time: 5-5-21 4:00	Company: FedEx		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 5/6/21 1015	Company: ETA PJT		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:


TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
ORIGIN ID:GTYA (573) 443-4102
RICK ELGIN
MIDWEST ENVIRONMENTAL CONSULTANTS
2009 EAST MCCARTY STREET
JEFFERSON CITY, MO 65101
UNITED STATES US
SHIP DATE: 27APR21
ACTWGT: 45.00 LB MAN
CAD: 0129689/CAFE3407
TO
TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 15238-2907
(412) 963-7058
REF:
INV:
PO:
DEPT:
RMA:
FedEx
Express
E
TRK# 0221 4690 5825 8364
RETURNS MON-SAT
PRIORITY OVERNIGHT
15238
A-US
Uncorrected temp 2.5 °C
Thermometer ID 14
CF 0
Initials
PT-WI-SR-001 effective 11/8/18
Part # 159469-434 RIT2 EXP 09/21
180-121224 Waybill
9056 Chloride, Fluoride, Sulfate
MSD (Yes or No)
Cathy
Sample
Special
Time:
Received by:
Received by:
Received by:
Cooler Temp

Login Sample Receipt Checklist

Client: Midwest Environmental Consultants

Job Number: 180-121224-1

Login Number: 121224
List Number: 1
Creator: Abernathy, Eric

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX 5

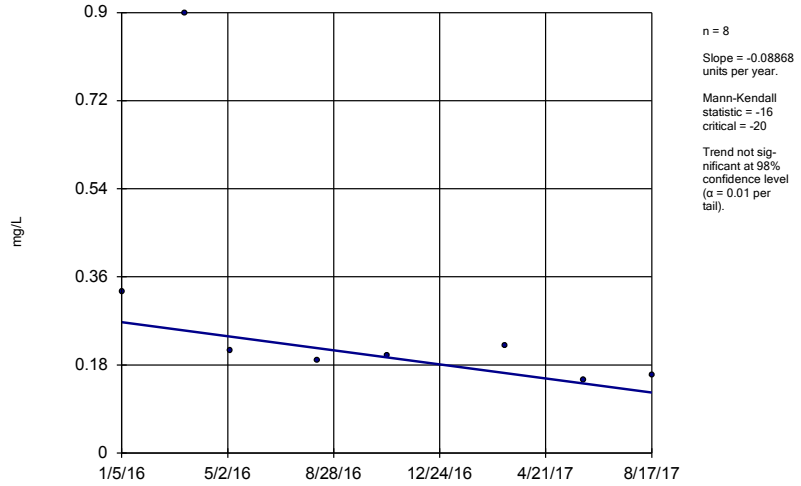
Statistical Analysis

Sanitas™ Output – Background

Trending Analysis

Boron

MW-2 (bg)



n = 8

Slope = -0.08868 units per year.

Mann-Kendall statistic = -16
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

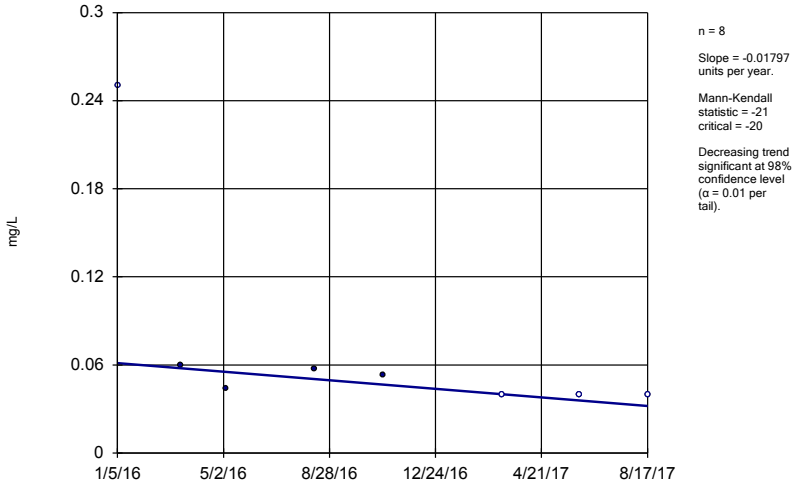
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-3 (bg)



n = 8

Slope = -0.01797 units per year.

Mann-Kendall statistic = -21
critical = -20

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

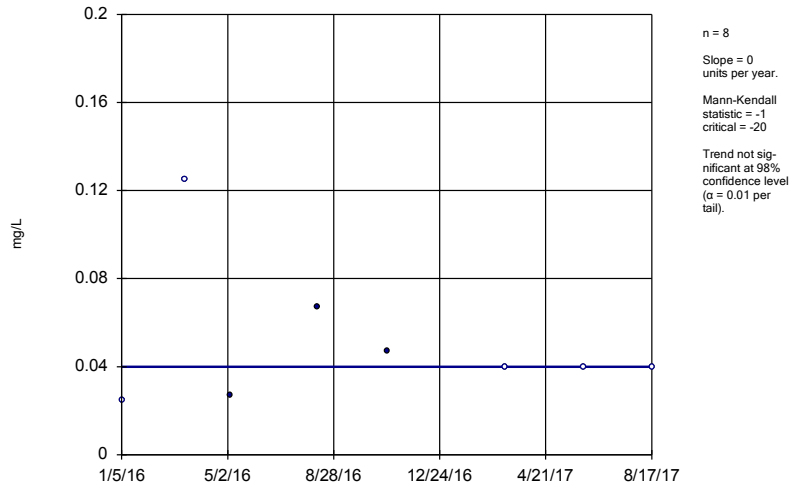
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-4



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

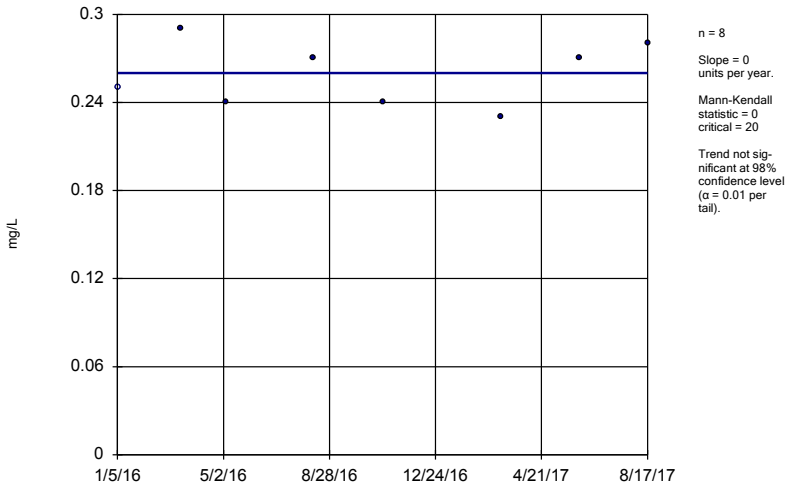
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-5



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

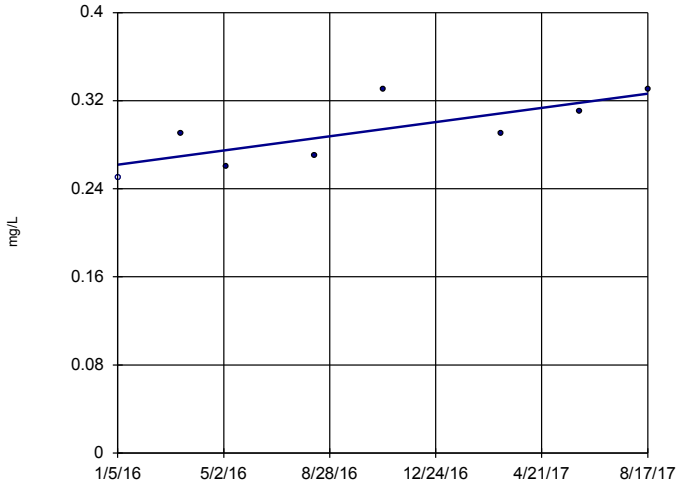
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-5A



n = 8

Slope = 0.03993 units per year.

Mann-Kendall statistic = 18 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

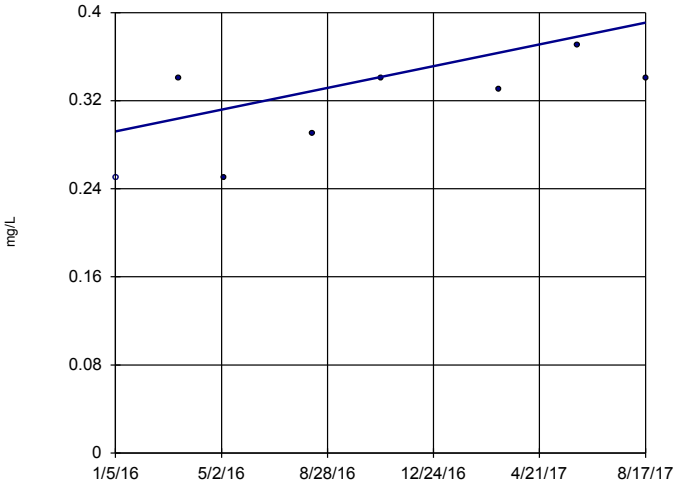
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-6



n = 8

Slope = 0.06117 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

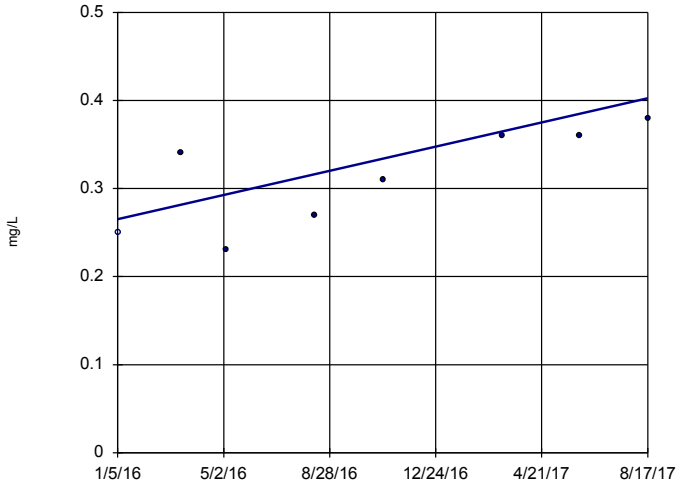
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-6A



n = 8

Slope = 0.08497 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

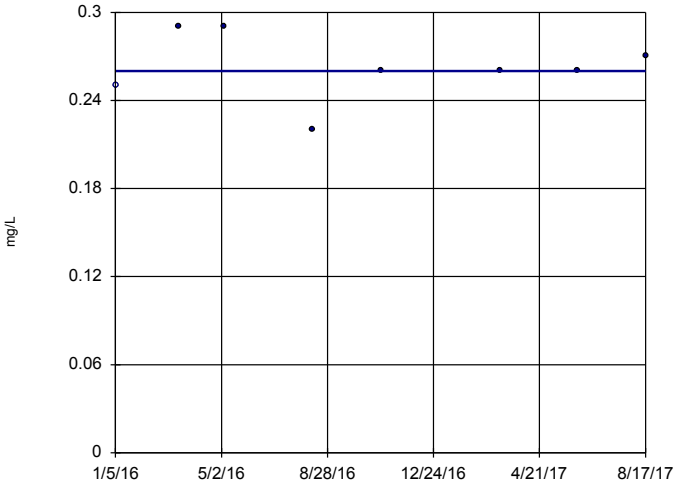
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-7



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 2 critical = 20

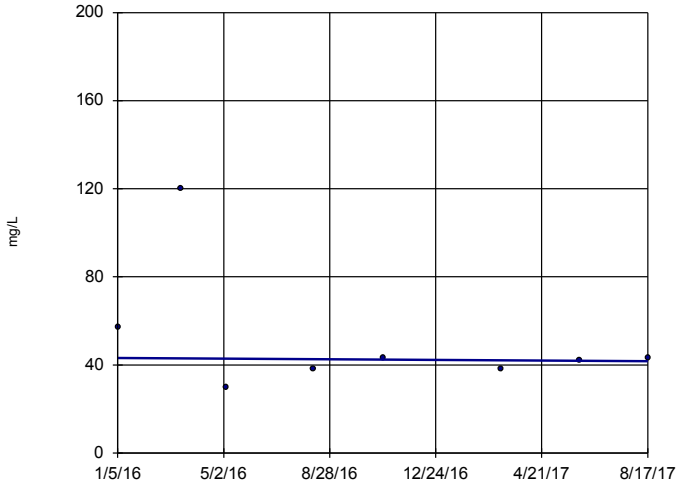
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Calcium

MW-2 (bg)



n = 8

Slope = -0.8333 units per year.

Mann-Kendall statistic = -2 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

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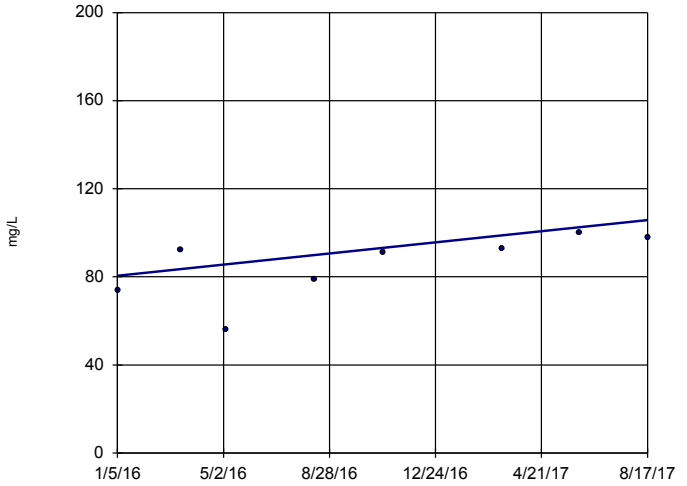
Calcium

MW-3 (bg)



n = 8

Slope = 15.6 units per year.

Mann-Kendall statistic = 18 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

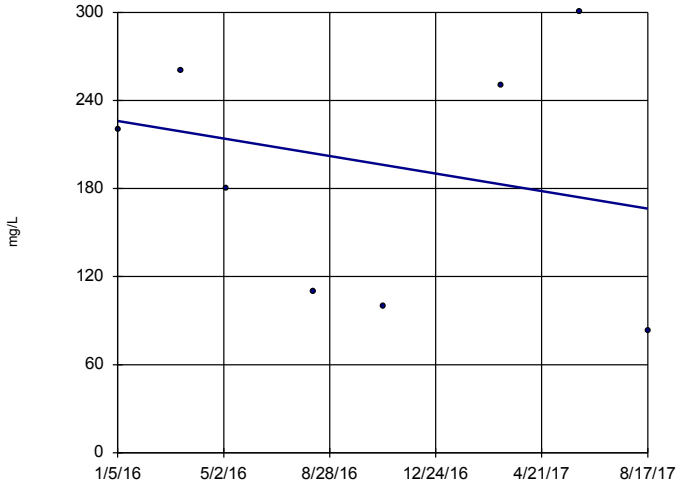
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-4



n = 8

Slope = -36.95 units per year.

Mann-Kendall statistic = -6 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

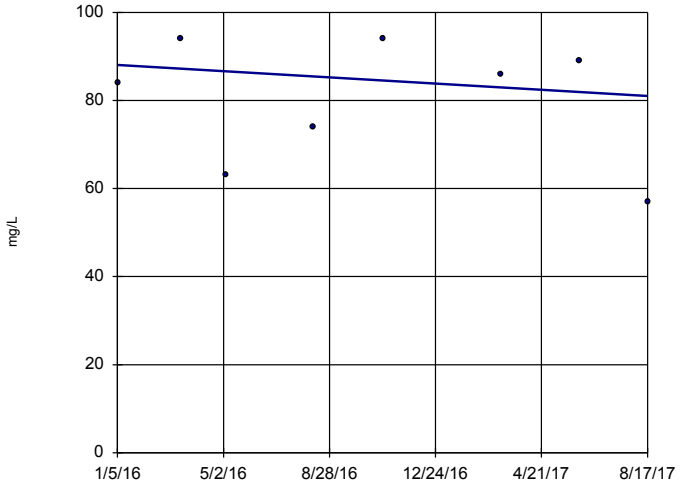
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-5



n = 8

Slope = -4.395 units per year.

Mann-Kendall statistic = -3 critical = -20

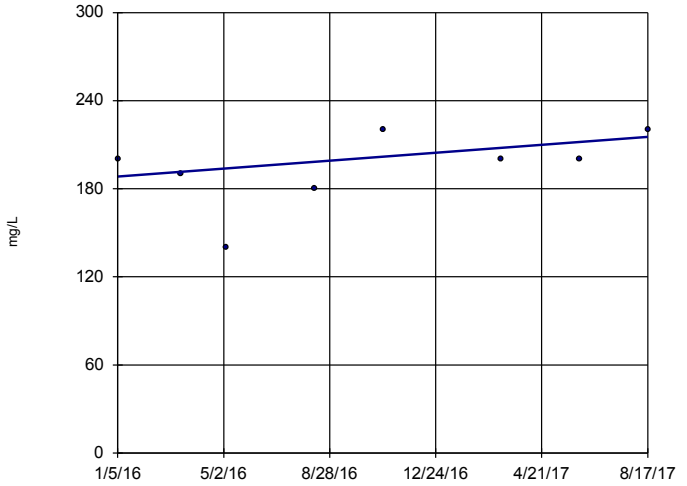
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Calcium

MW-5A



n = 8

Slope = 16.74 units per year.

Mann-Kendall statistic = 10
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

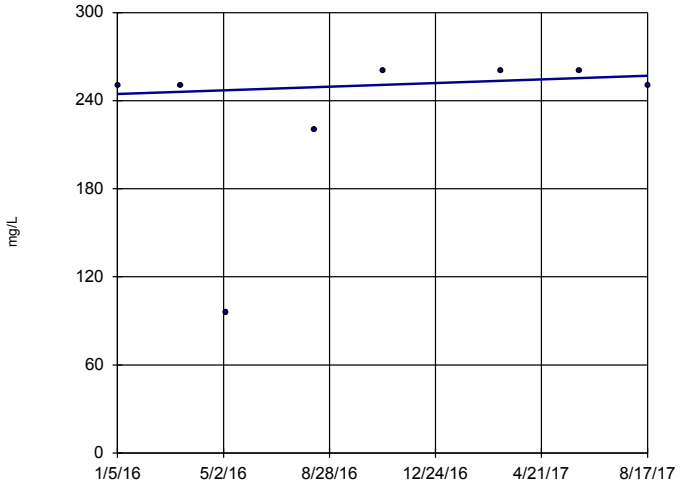
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-6



n = 8

Slope = 7.67 units per year.

Mann-Kendall statistic = 8
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

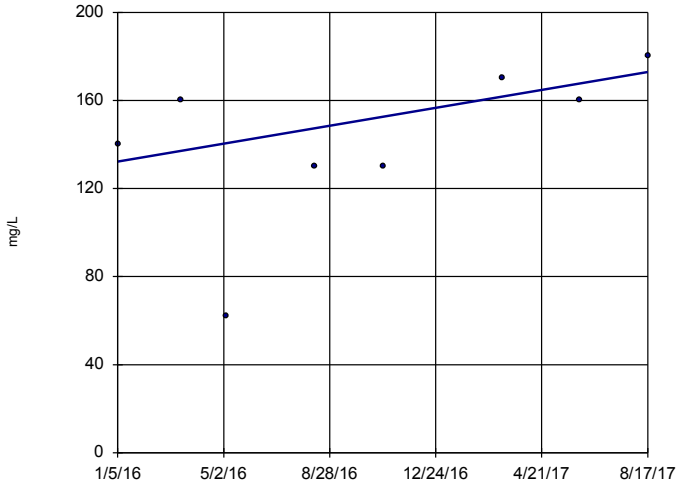
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-6A



n = 8

Slope = 25.16 units per year.

Mann-Kendall statistic = 12
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

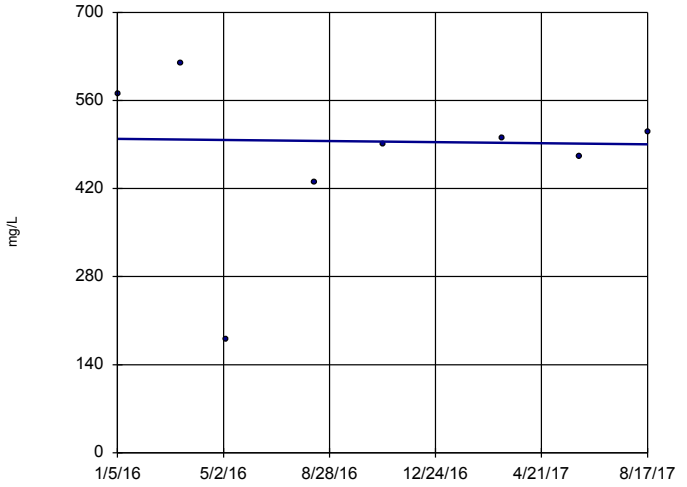
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-7



n = 8

Slope = -5.401 units per year.

Mann-Kendall statistic = 0
critical = 20

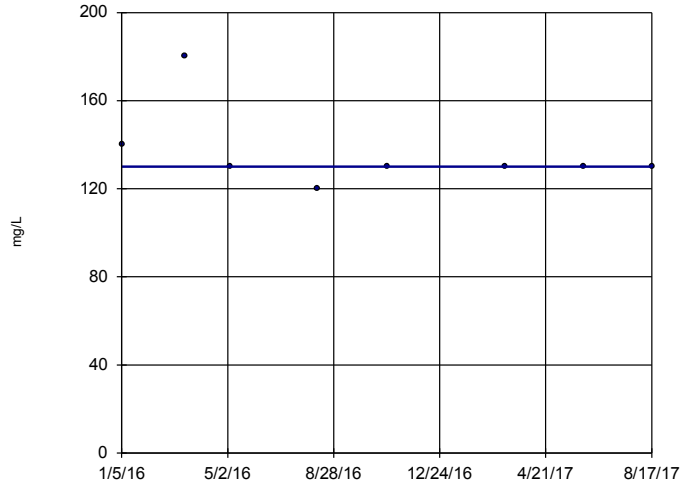
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Chloride

MW-2 (bg)



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

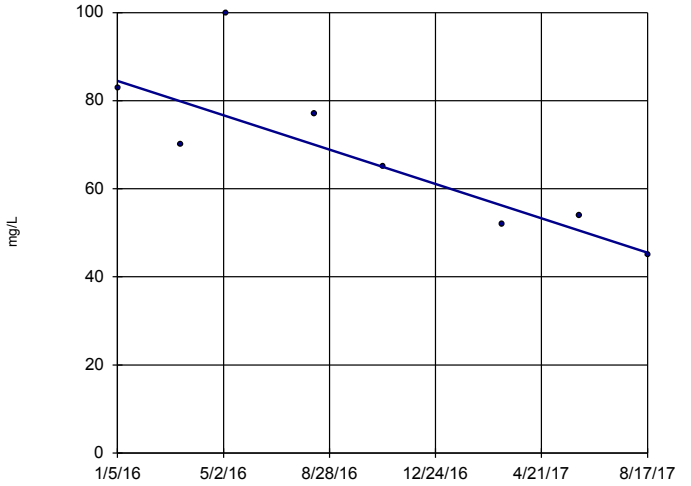
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-3 (bg)



n = 8

Slope = -24.13 units per year.

Mann-Kendall statistic = -20 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

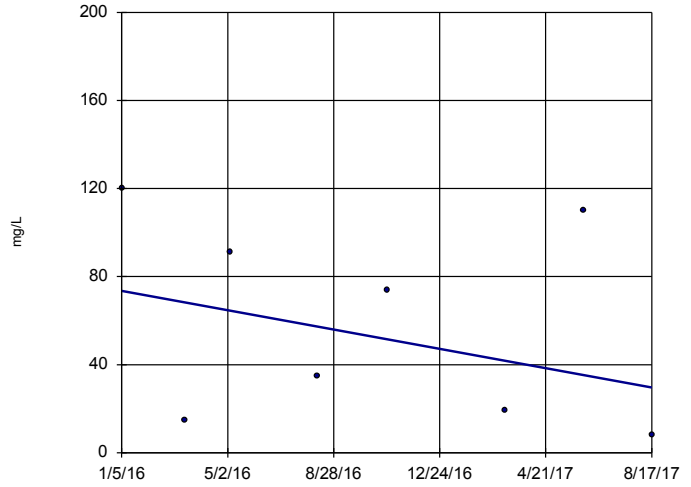
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-4



n = 8

Slope = -27.17 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

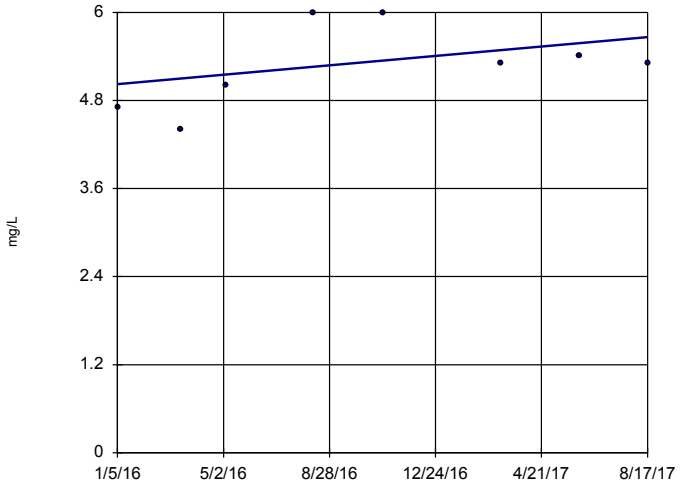
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-5



n = 8

Slope = 0.3955 units per year.

Mann-Kendall statistic = 10 critical = 20

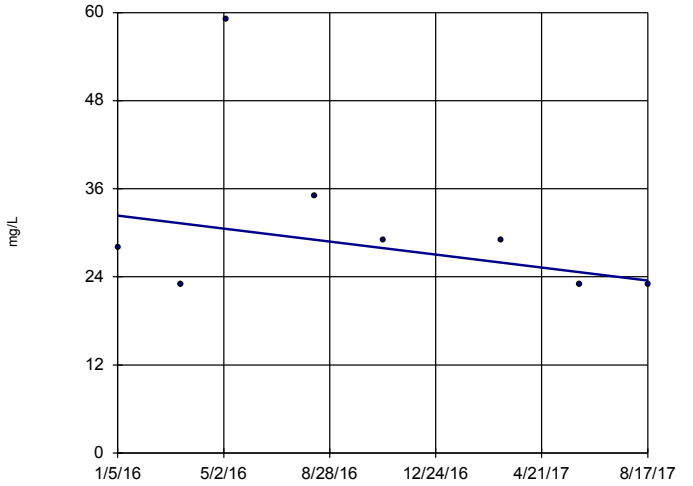
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Chloride

MW-5A



n = 8

Slope = -5.487 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

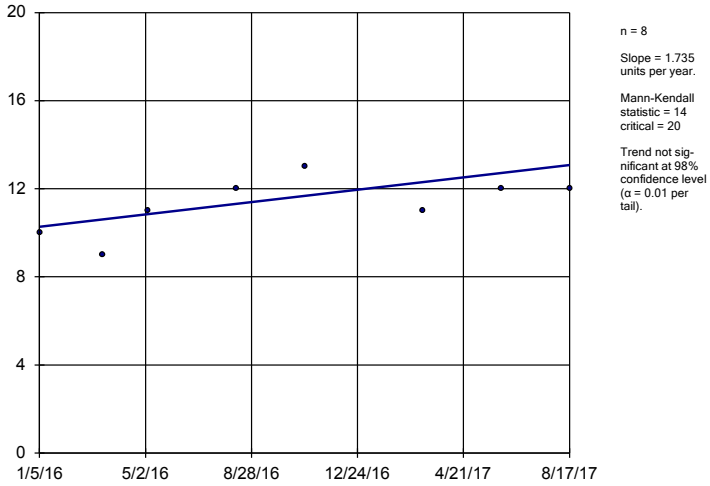
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6



n = 8

Slope = 1.735 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

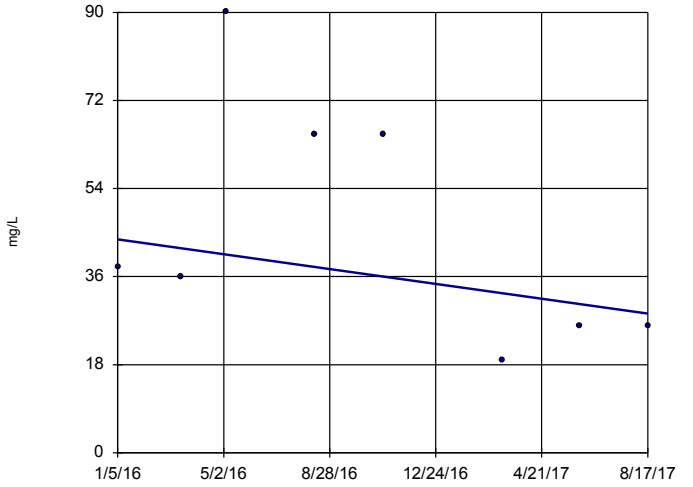
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6A



n = 8

Slope = -9.402 units per year.

Mann-Kendall statistic = -10 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

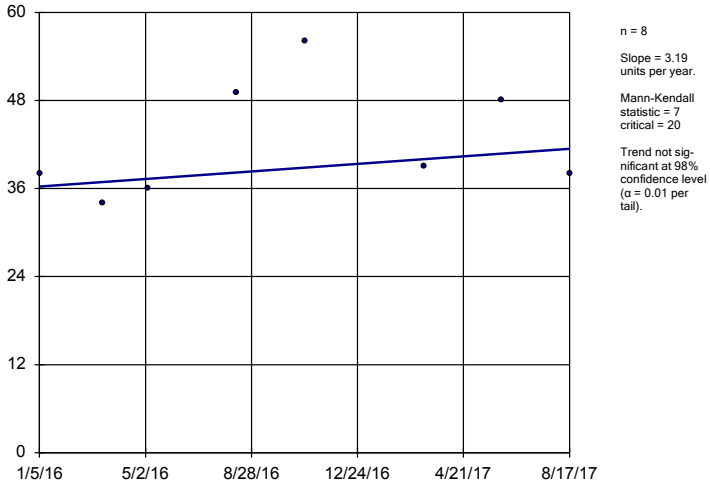
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-7



n = 8

Slope = 3.19 units per year.

Mann-Kendall statistic = 7 critical = 20

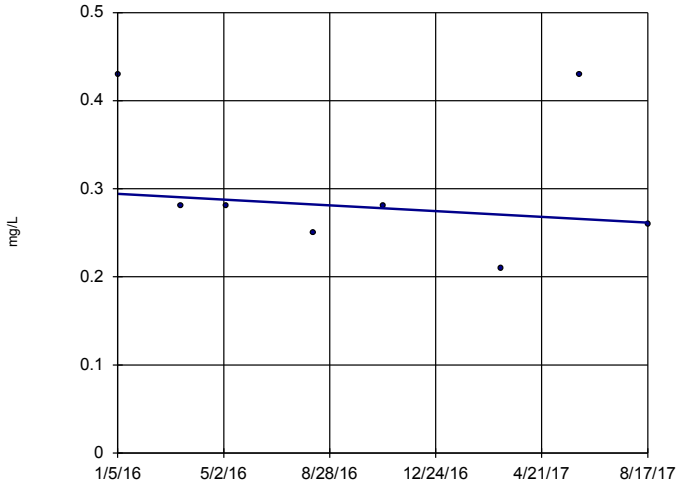
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-2 (bg)



n = 8

Slope = -0.02016 units per year.

Mann-Kendall statistic = -8 critical = -20

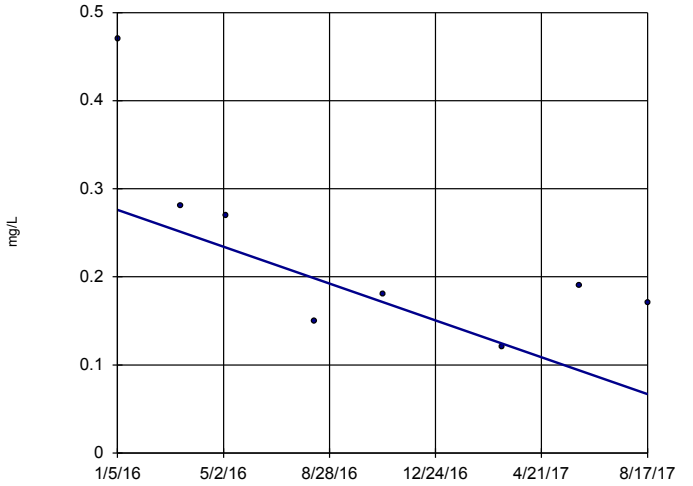
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-3 (bg)



n = 8

Slope = -0.1295 units per year.

Mann-Kendall statistic = -16 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

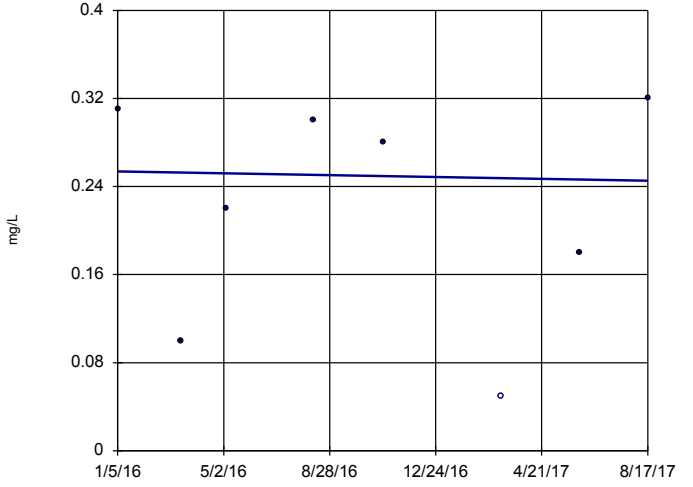
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Fluoride

MW-4



n = 8

Slope = -0.005278 units per year.

Mann-Kendall statistic = 0 critical = 20

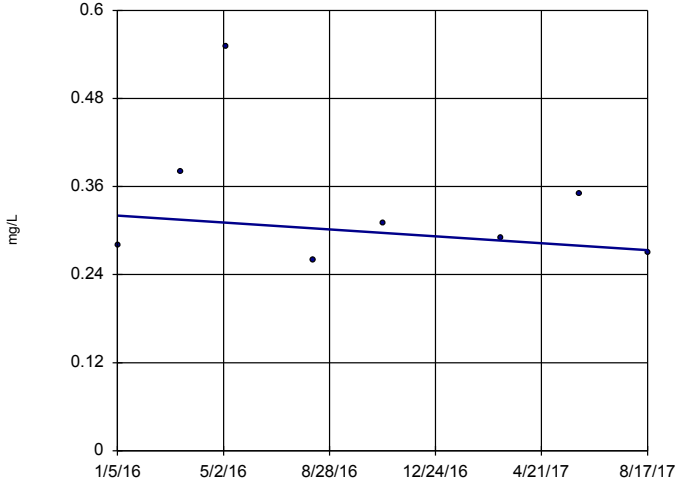
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-5



n = 8

Slope = -0.0291 units per year.

Mann-Kendall statistic = -4 critical = -20

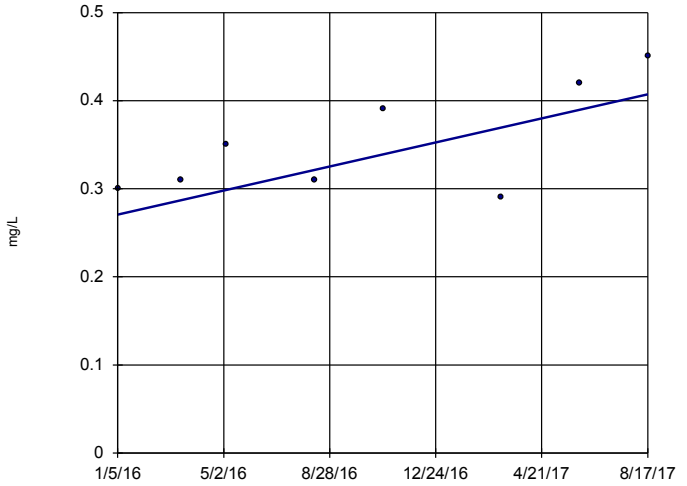
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-5A



n = 8

Slope = 0.08456 units per year.

Mann-Kendall statistic = 15 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

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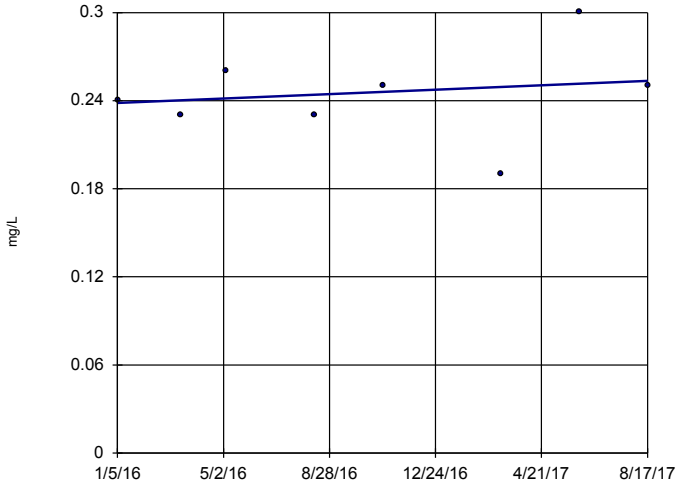
Fluoride

MW-6



n = 8

Slope = 0.00928 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

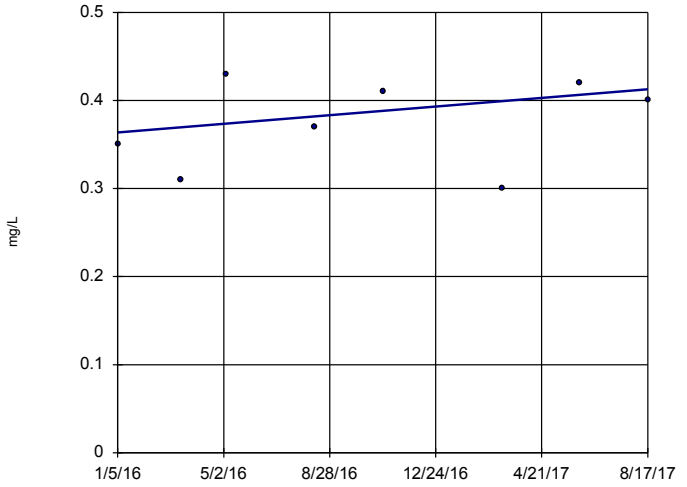
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6A



n = 8

Slope = 0.03022 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

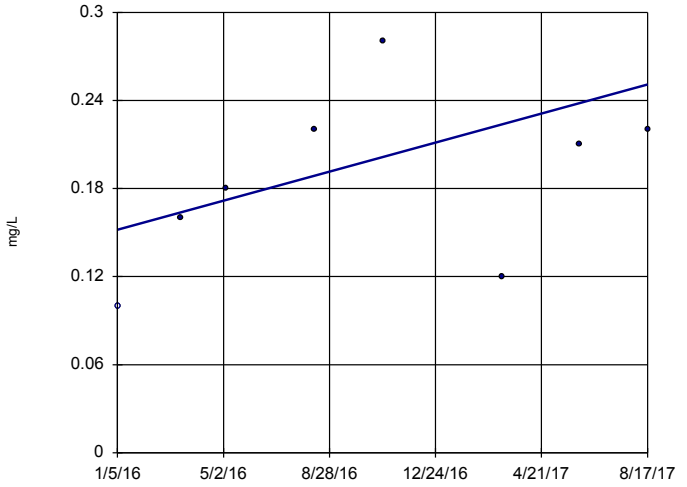
The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Fluoride

MW-7



n = 8

Slope = 0.06113 units per year.

Mann-Kendall statistic = 13 critical = 20

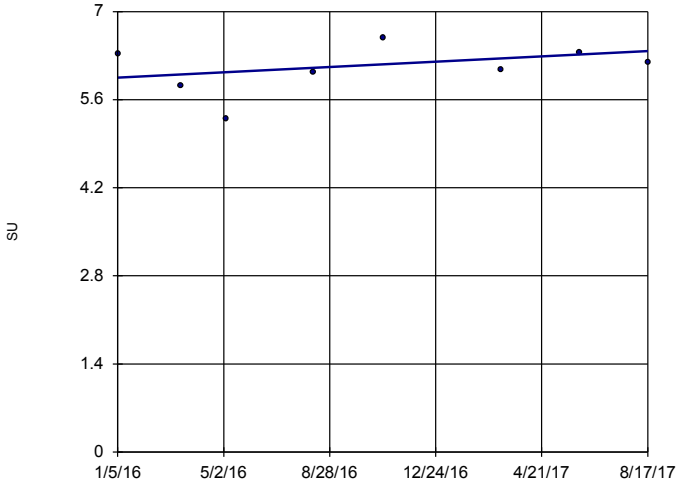
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

pH

MW-2 (bg)



n = 8

Slope = 0.2618 units per year.

Mann-Kendall statistic = 8 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

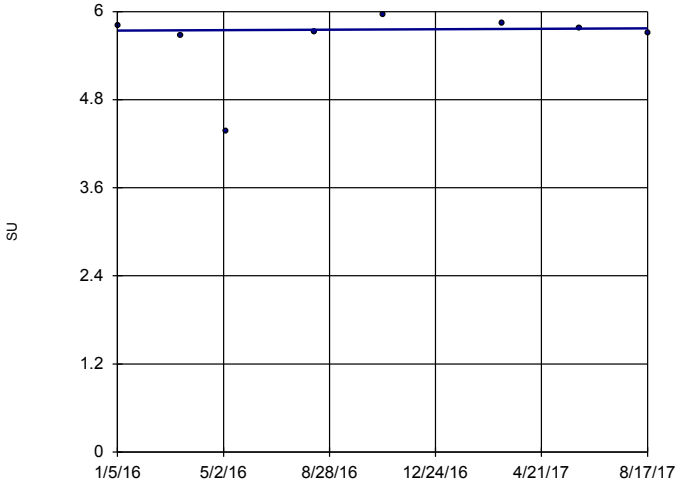
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-3 (bg)



n = 8

Slope = 0.01982 units per year.

Mann-Kendall statistic = 2 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

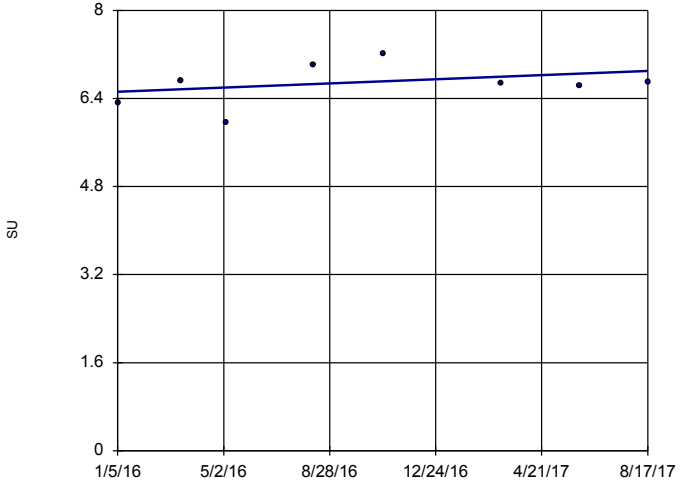
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-4



n = 8

Slope = 0.2307 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

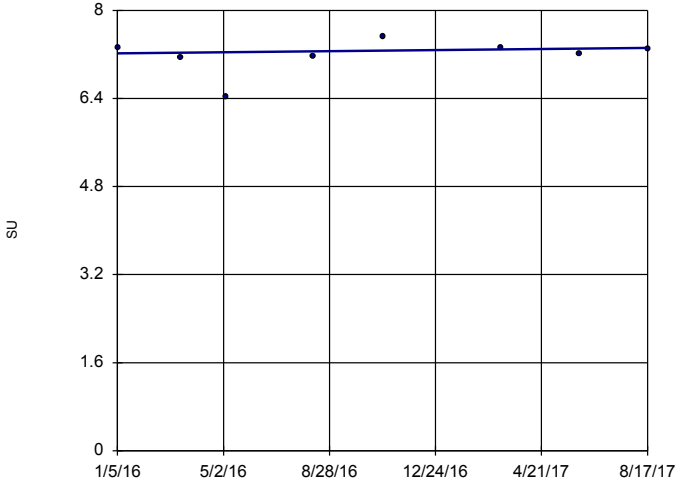
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-5



n = 8

Slope = 0.05967 units per year.

Mann-Kendall statistic = 4 critical = 20

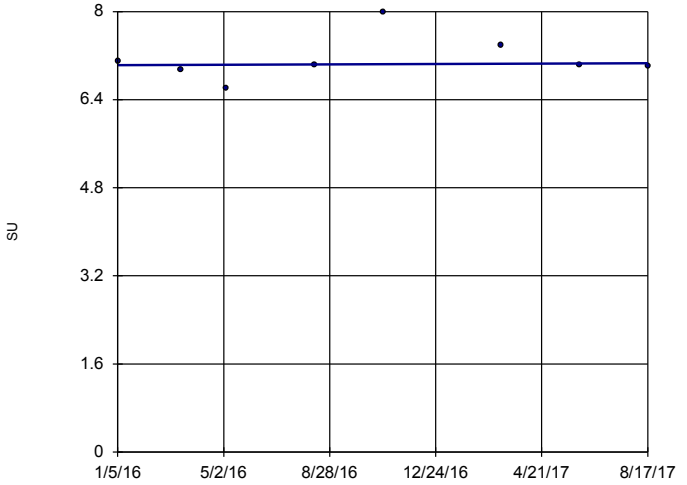
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

pH

MW-5A



n = 8

Slope = 0.0211 units per year.

Mann-Kendall statistic = 1 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

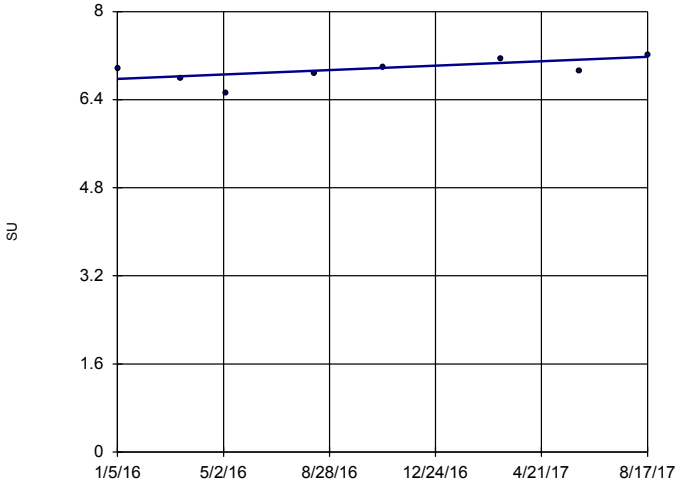
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6



n = 8

Slope = 0.2471 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

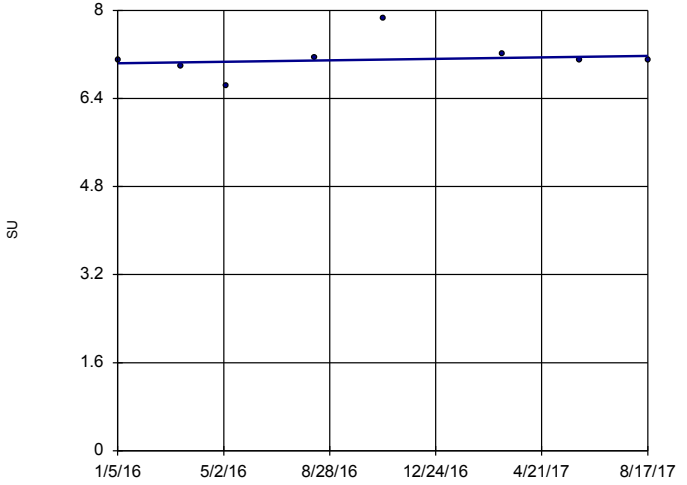
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6A



n = 8

Slope = 0.08386 units per year.

Mann-Kendall statistic = 7 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

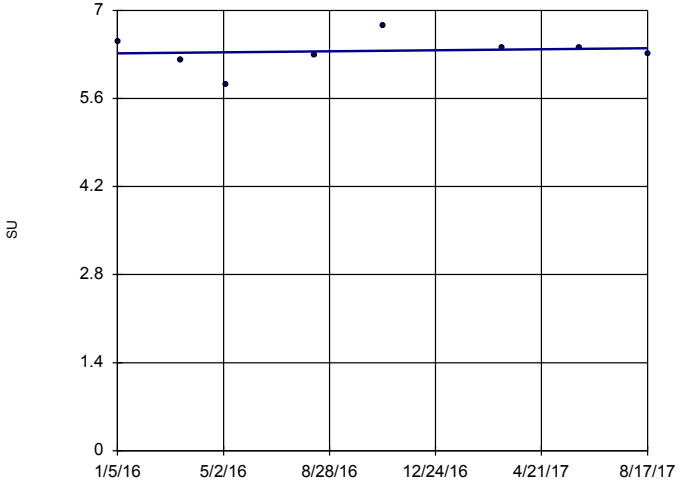
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-7



n = 8

Slope = 0.04935 units per year.

Mann-Kendall statistic = 4 critical = 20

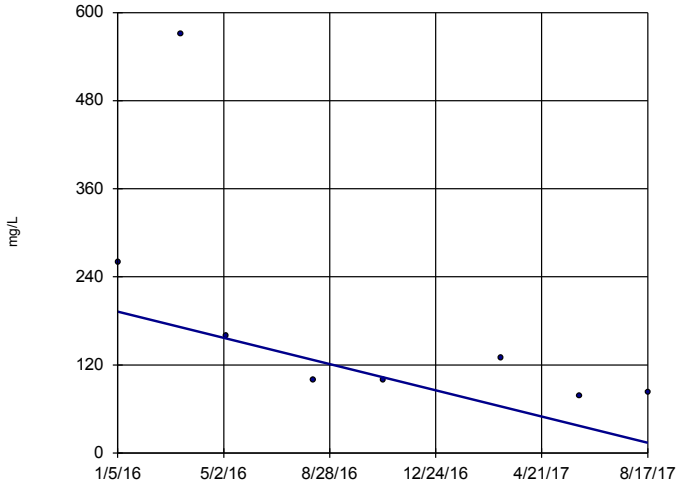
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sulfate

MW-2 (bg)



n = 8

Slope = -110.6 units per year.

Mann-Kendall statistic = -20 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

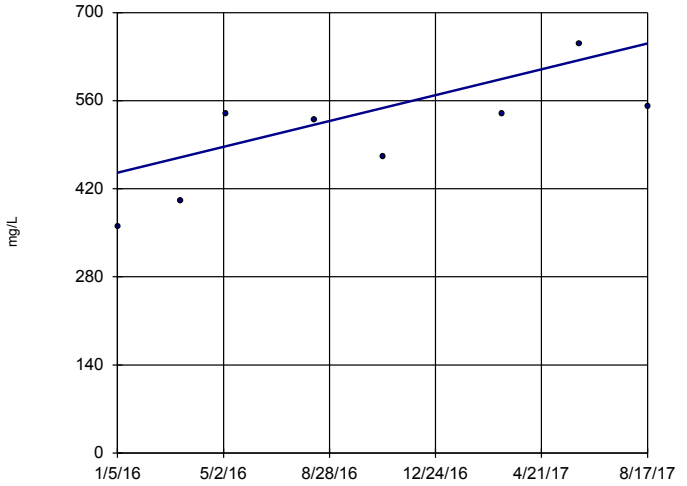
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-3 (bg)



n = 8

Slope = 126.8 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

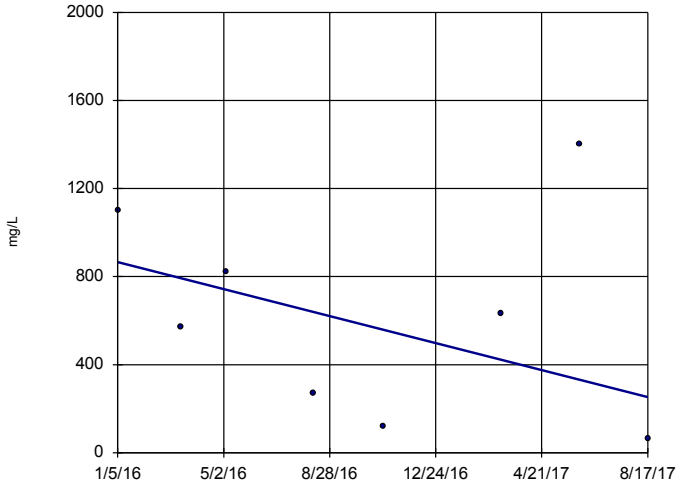
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-4



n = 8

Slope = -379.2 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

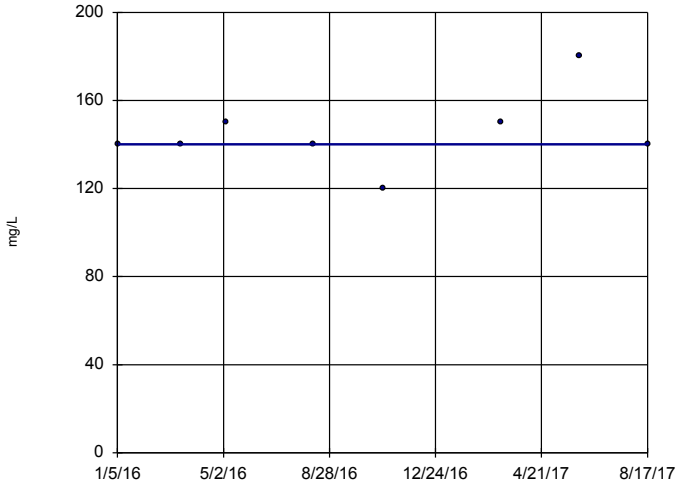
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-5



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 5 critical = 20

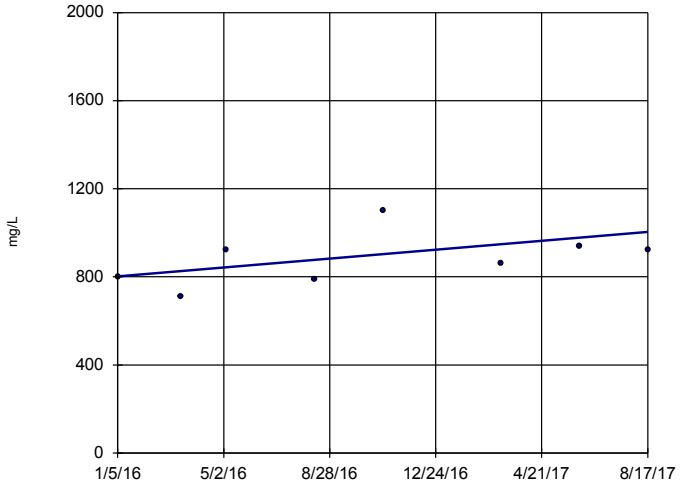
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sulfate

MW-5A



n = 8

Slope = 125.4 units per year.

Mann-Kendall statistic = 11 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

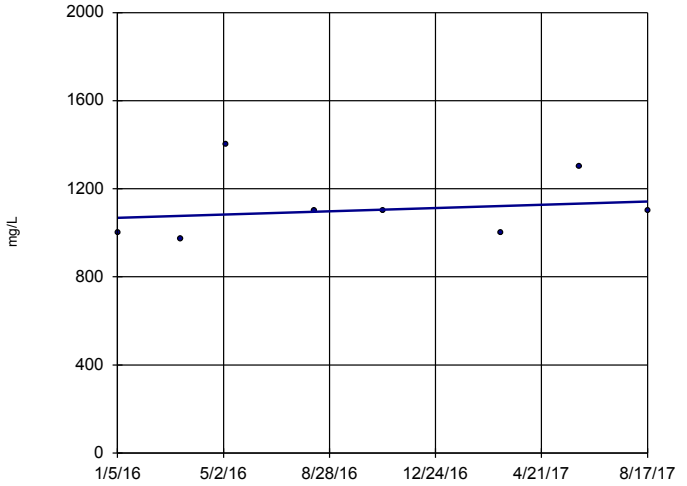
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6



n = 8

Slope = 46.31 units per year.

Mann-Kendall statistic = 6 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

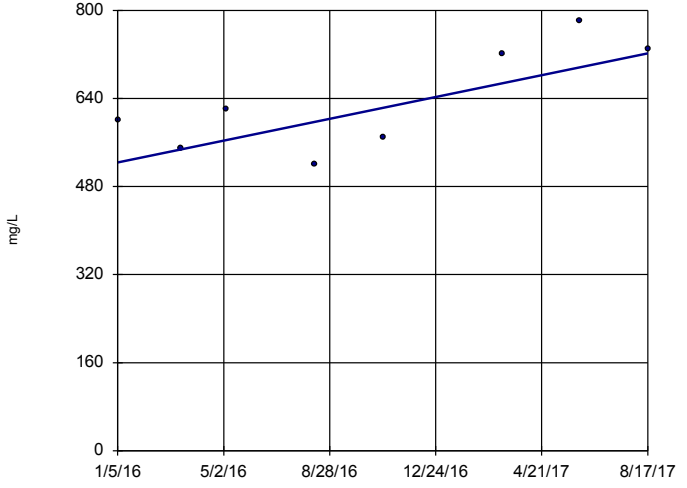
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6A



n = 8

Slope = 122.7 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

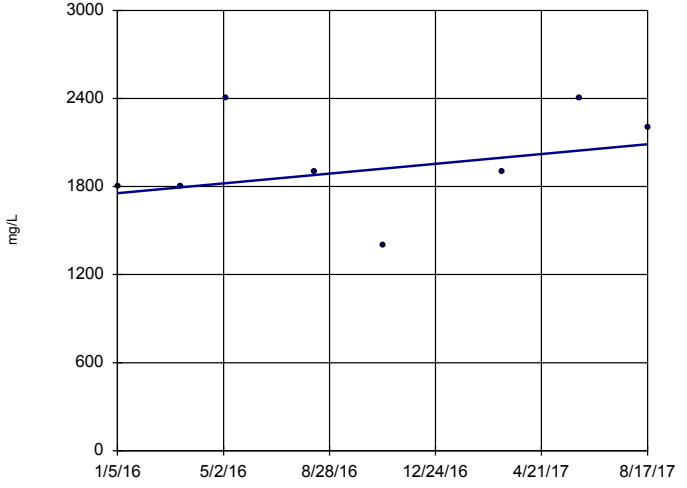
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-7



n = 8

Slope = 206.6 units per year.

Mann-Kendall statistic = 9 critical = 20

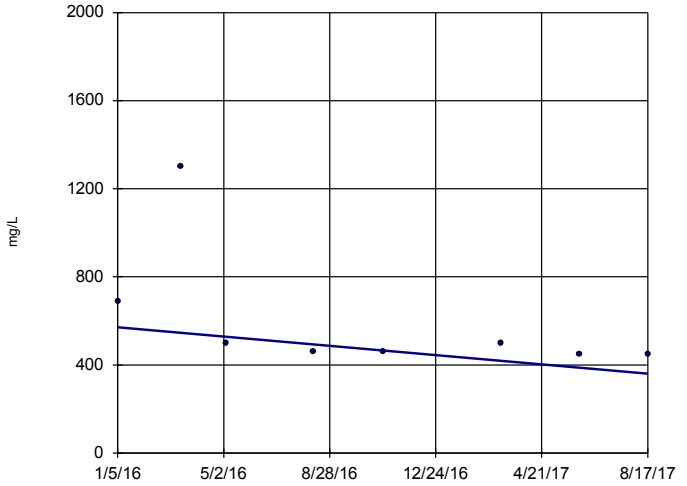
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-2 (bg)



n = 8

Slope = -130.2 units per year.

Mann-Kendall statistic = -19 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

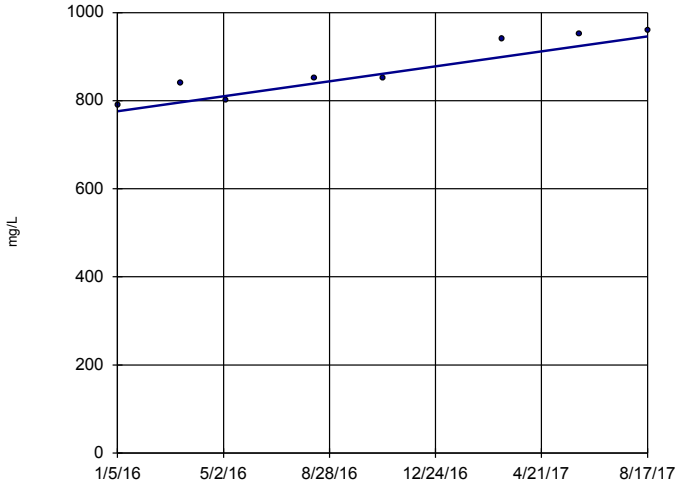
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-3 (bg)



n = 8

Slope = 105 units per year.

Mann-Kendall statistic = 25 critical = 20

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

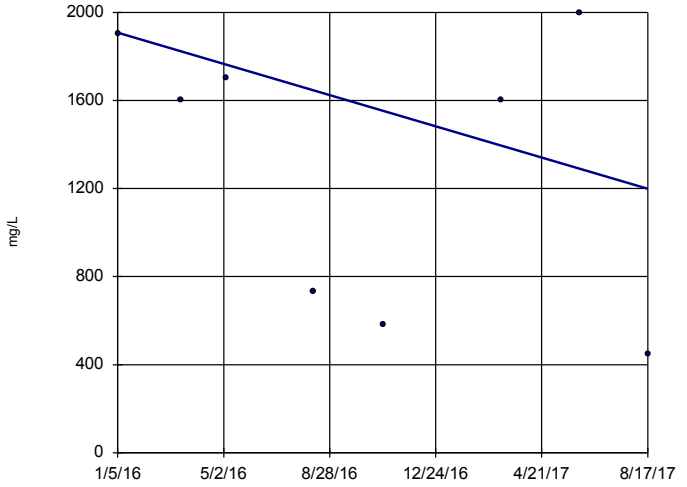
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-4



n = 8

Slope = -439 units per year.

Mann-Kendall statistic = -9 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

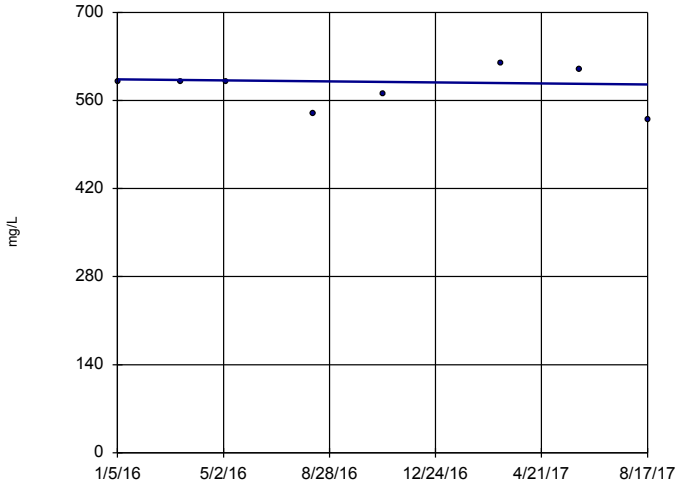
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-5



n = 8

Slope = -4.906 units per year.

Mann-Kendall statistic = -3 critical = -20

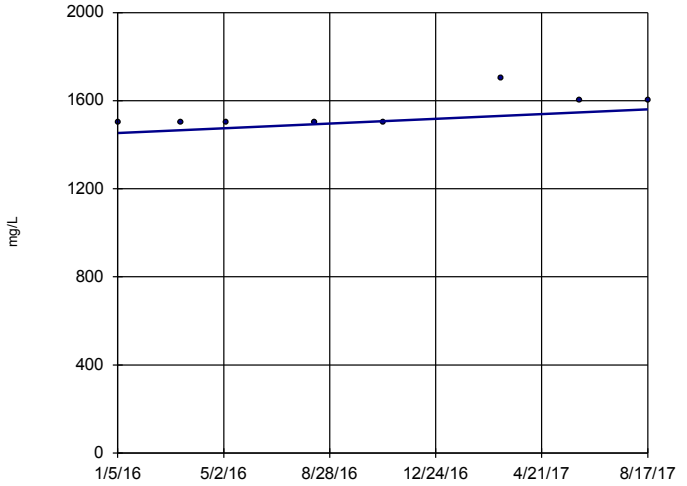
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-5A



n = 8

Slope = 66.1 units per year.

Mann-Kendall statistic = 13 critical = 20

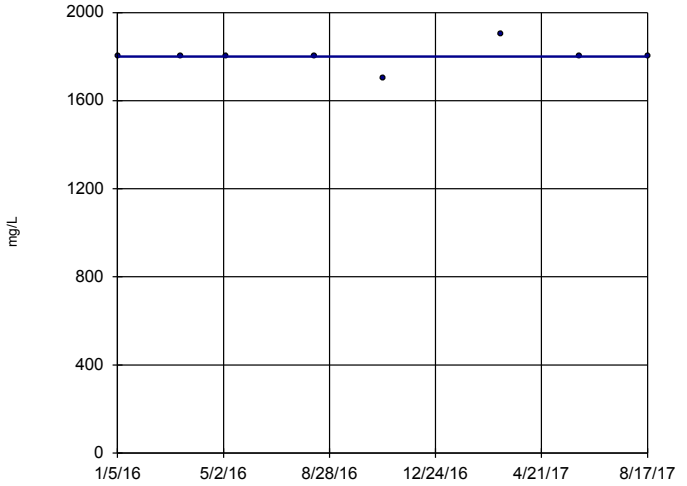
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-6



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 20

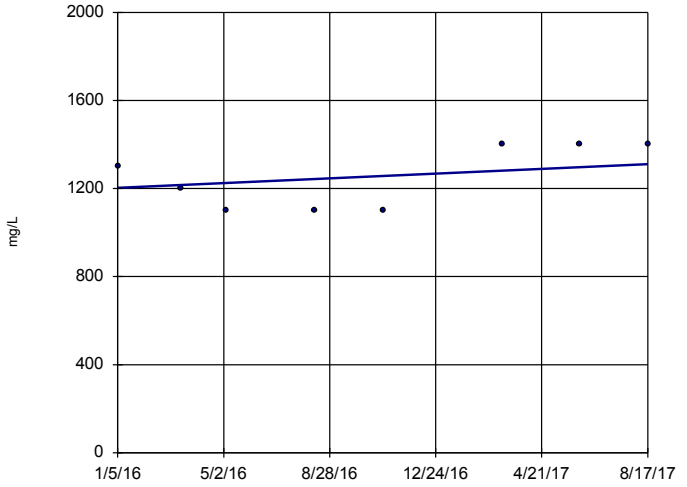
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-6A



n = 8

Slope = 66.44 units per year.

Mann-Kendall statistic = 8 critical = 20

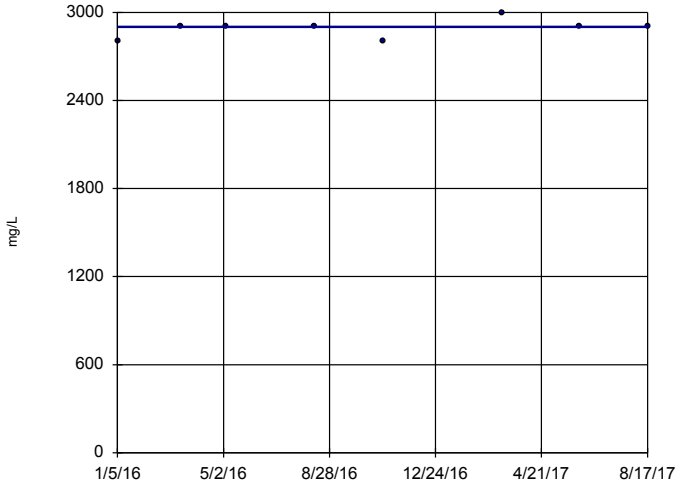
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-7



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 7 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3 only Printed 1/23/2018, 3:10 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-2 (bg)	-0.08868	-16	-20	No	8	0	n/a	n/a	0.02	NP
Boron (mg/L)	**MW-3 (bg)**	**-0.01797**	**-21**	**-20**	**Yes**	**8**	**50**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	MW-4	0	-1	-20	No	8	62.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5	0	0	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5A	0.03993	18	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6	0.06117	14	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6A	0.08497	19	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-7	0	2	20	No	8	12.5	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2 (bg)	-0.8333	-2	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-3 (bg)	15.6	18	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-4	-36.95	-6	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5	-4.395	-3	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5A	16.74	10	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6	7.67	8	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6A	25.16	12	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7	-5.401	0	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2 (bg)	0	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3 (bg)	-24.13	-20	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4	-27.17	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	0.3955	10	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5A	-5.487	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	1.735	14	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6A	-9.402	-10	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7	3.19	7	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2 (bg)	-0.02016	-8	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3 (bg)	-0.1295	-16	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4	-0.00...	0	20	No	8	12.5	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	-0.0291	-4	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5A	0.08456	15	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	0.00928	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6A	0.03022	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7	0.06113	13	20	No	8	12.5	n/a	n/a	0.02	NP
pH (SU)	MW-2 (bg)	0.2618	8	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-3 (bg)	0.01982	2	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-4	0.2307	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-5	0.05967	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-5A	0.0211	1	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-6	0.2471	14	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-6A	0.08386	7	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-7	0.04935	4	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-2 (bg)	-110.6	-20	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-3 (bg)	126.8	19	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-4	-379.2	-8	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5	0	5	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5A	125.4	11	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6	46.31	6	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6A	122.7	14	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7	206.6	9	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-2 (bg)	-130.2	-19	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-3 (bg)**	**105**	**25**	**20**	**Yes**	**8**	**0**	**n/a**	**n/a**	**0.02**	**NP**

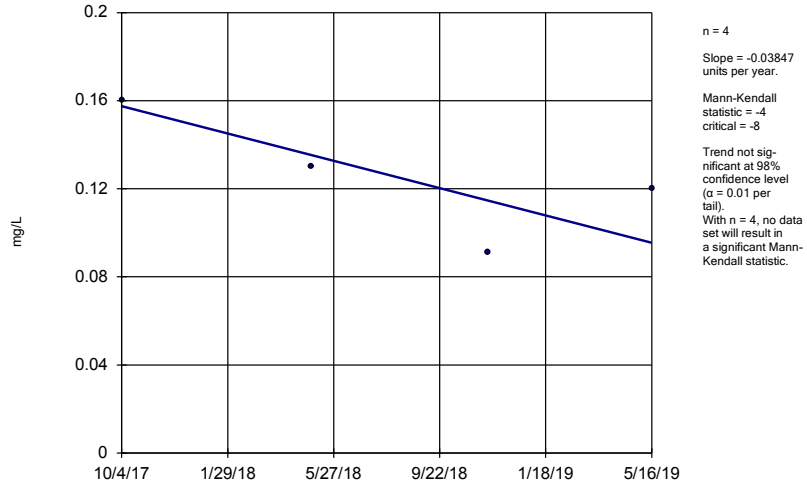
Trend Test

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3 only Printed 1/23/2018, 3:10 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Dissolved Solids (mg/L)	MW-4	-439	-9	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	-4.906	-3	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5A	66.1	13	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	0	1	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6A	66.44	8	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7	0	7	20	No	8	0	n/a	n/a	0.02	NP

Boron

MW-2 (bg)



n = 4

Slope = -0.03847 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

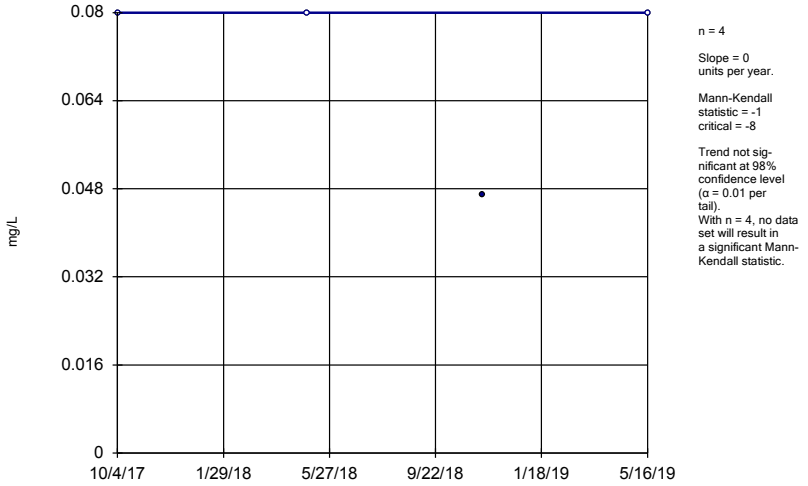
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-3 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-4

n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -8

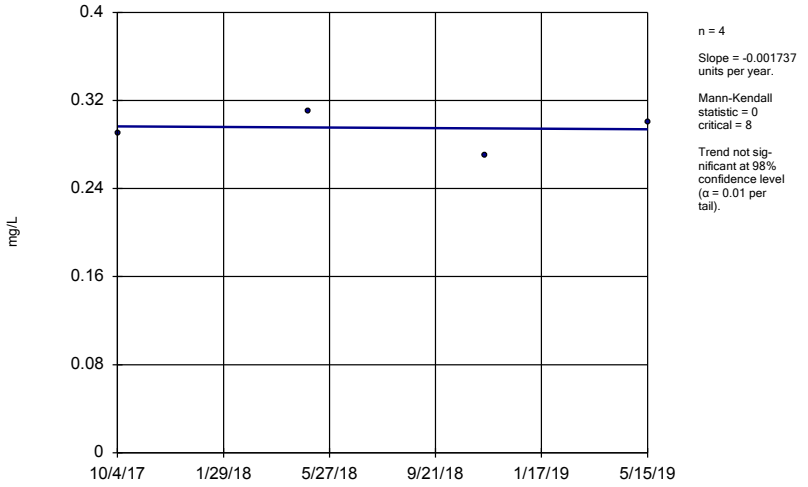
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Boron

MW-5



n = 4

Slope = -0.001737 units per year.

Mann-Kendall statistic = 0
critical = 8

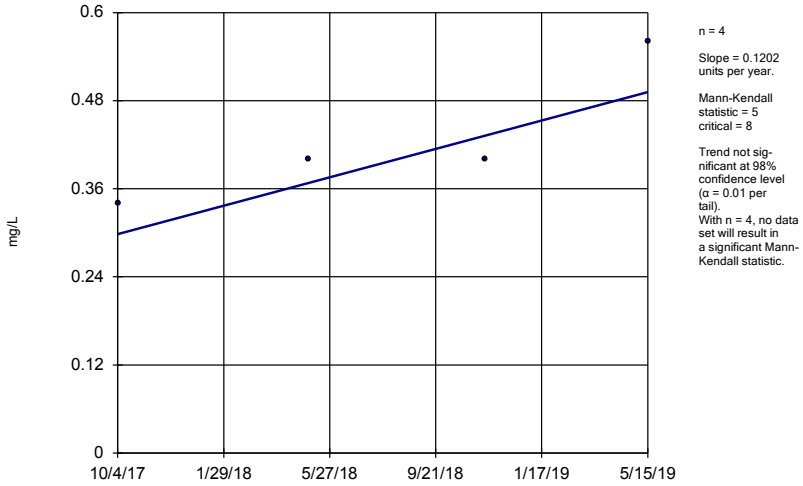
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Boron

MW-5A



n = 4

Slope = 0.1202 units per year.

Mann-Kendall statistic = 5
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

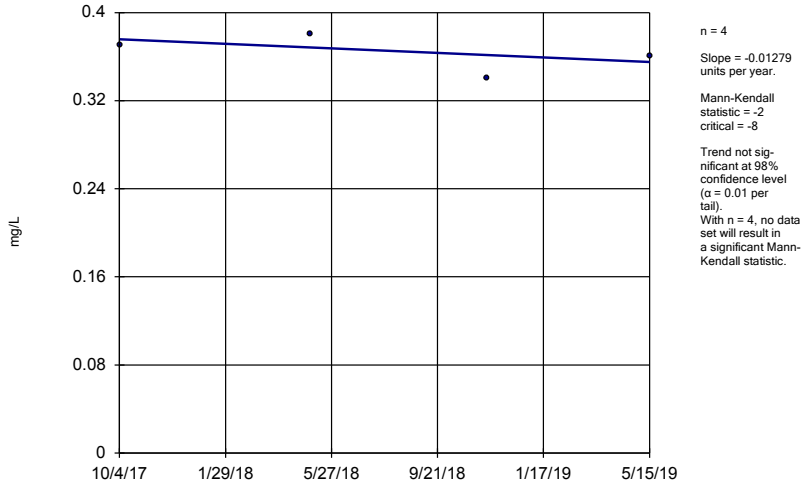
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Boron

MW-6



n = 4

Slope = -0.01279 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

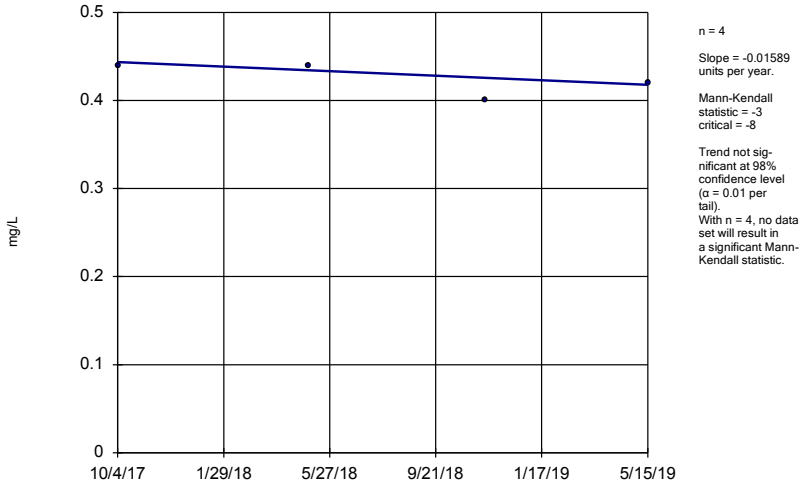
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Boron

MW-6A



n = 4

Slope = -0.01589 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

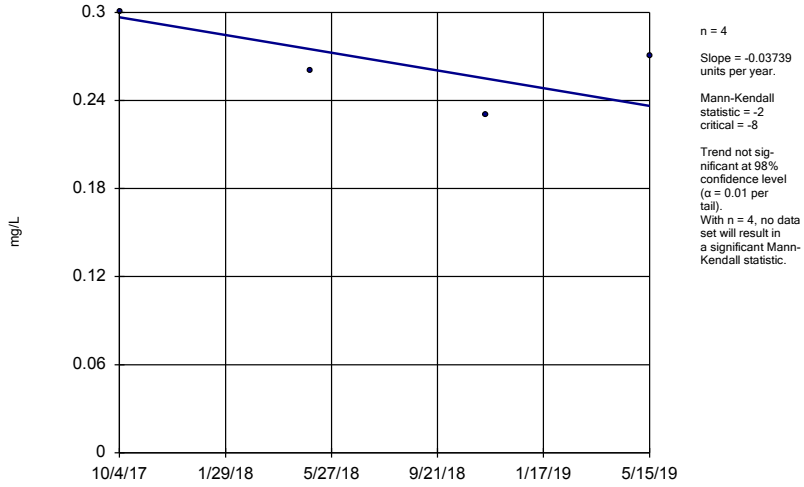
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Boron

MW-7 (bg)



n = 4

Slope = -0.03739 units per year.

Mann-Kendall statistic = -2
critical = -8

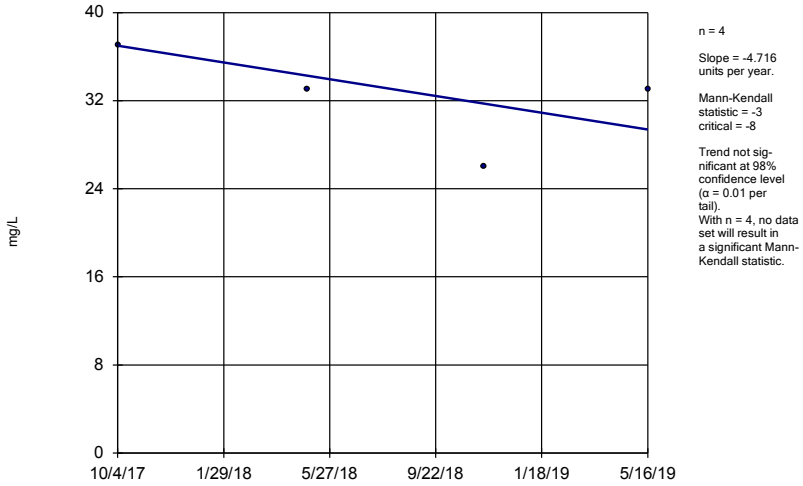
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Calcium

MW-2 (bg)



n = 4

Slope = -4.716 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

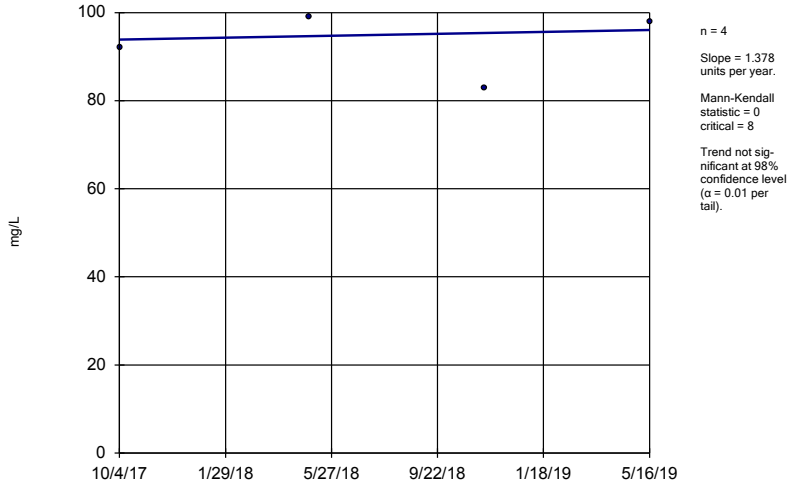
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-3 (bg)



n = 4

Slope = 1.378 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

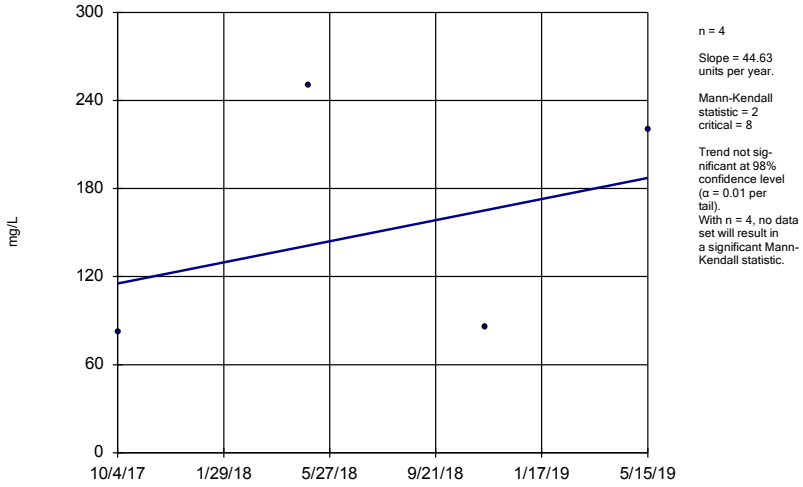
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-4



n = 4

Slope = 44.63 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

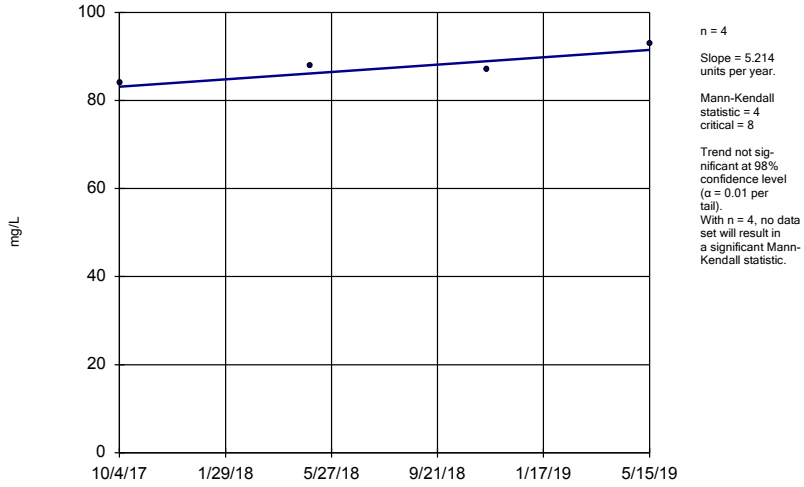
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-5



n = 4

Slope = 5.214 units per year.

Mann-Kendall statistic = 4
critical = 8

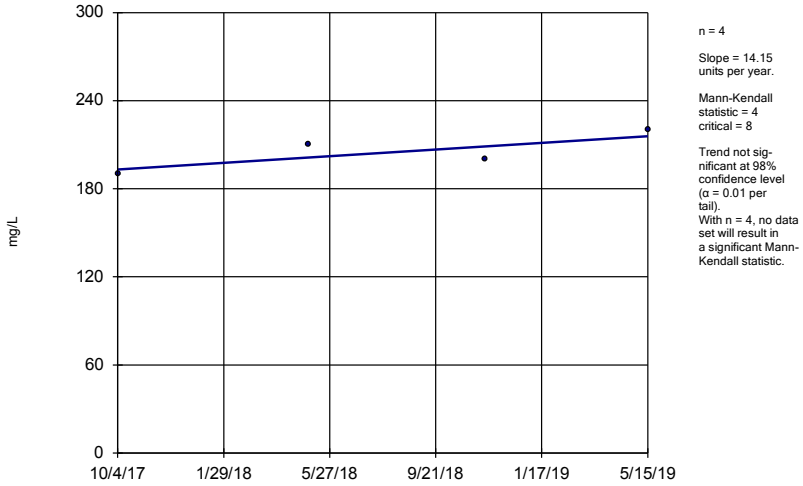
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Calcium

MW-5A



n = 4

Slope = 14.15 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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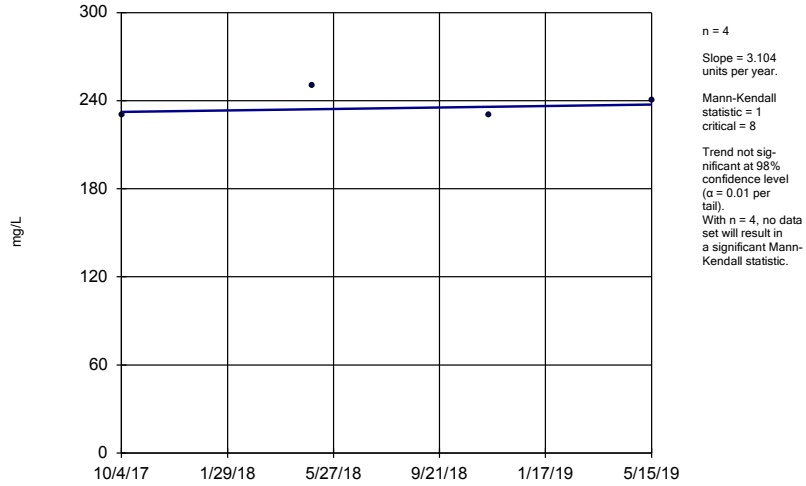
Calcium

MW-6



n = 4

Slope = 3.104 units per year.

Mann-Kendall statistic = 1
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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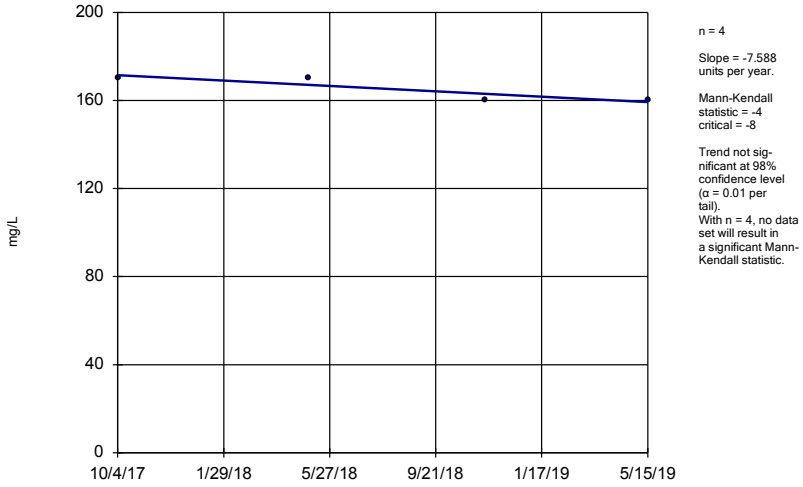
Calcium

MW-6A



n = 4

Slope = -7.588 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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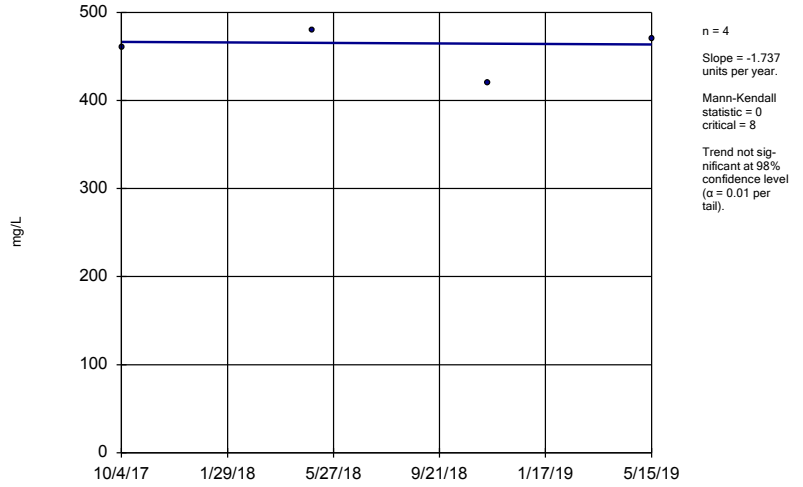
Calcium

MW-7 (bg)



n = 4

Slope = -1.737 units per year.

Mann-Kendall statistic = 0
critical = 8

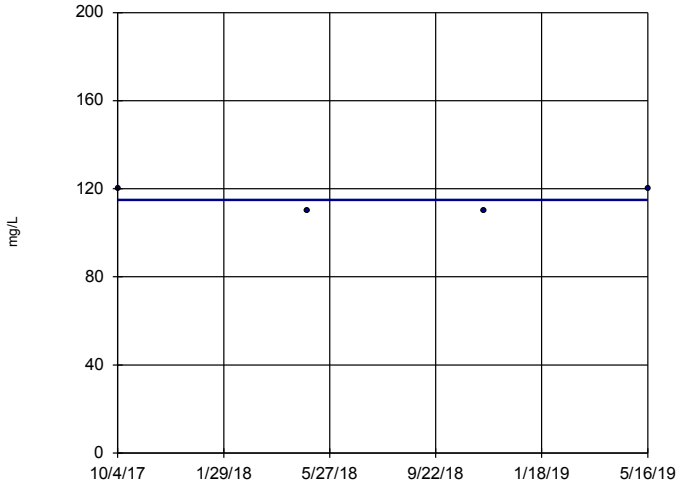
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Chloride

MW-2 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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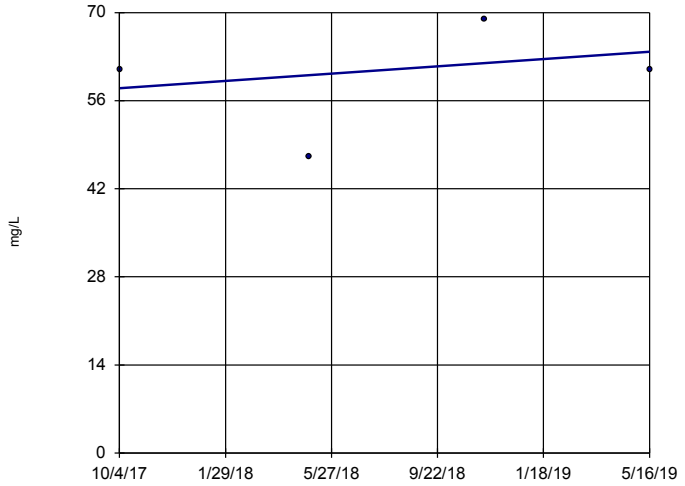
Chloride

MW-3 (bg)



n = 4

Slope = 3.596 units per year.

Mann-Kendall statistic = 1 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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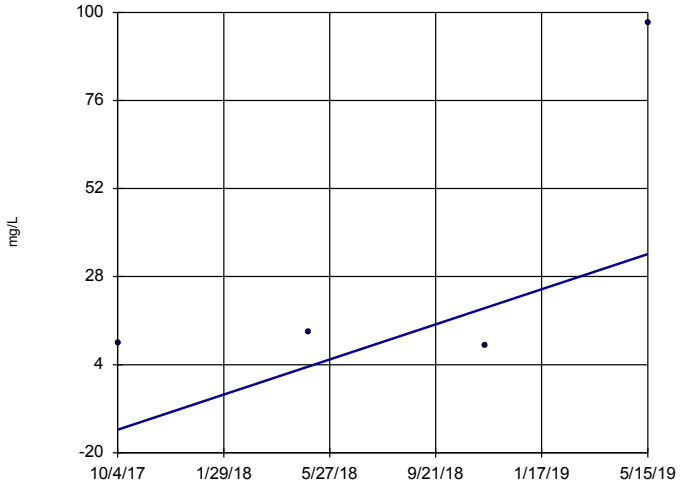
Chloride

MW-4



n = 4

Slope = 29.71 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

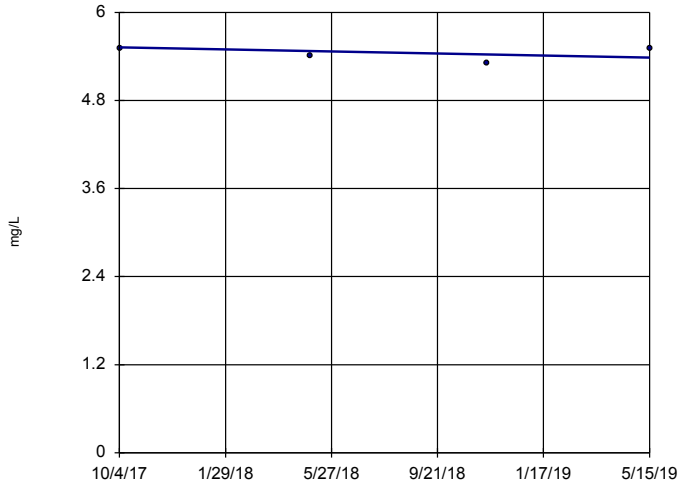
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-5



n = 4

Slope = -0.08649 units per year.

Mann-Kendall statistic = -1 critical = -8

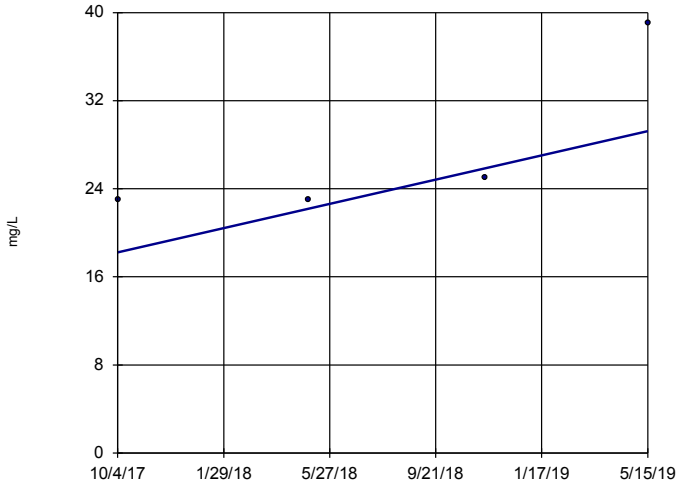
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Chloride

MW-5A



n = 4

Slope = 6.828 units per year.

Mann-Kendall statistic = 5 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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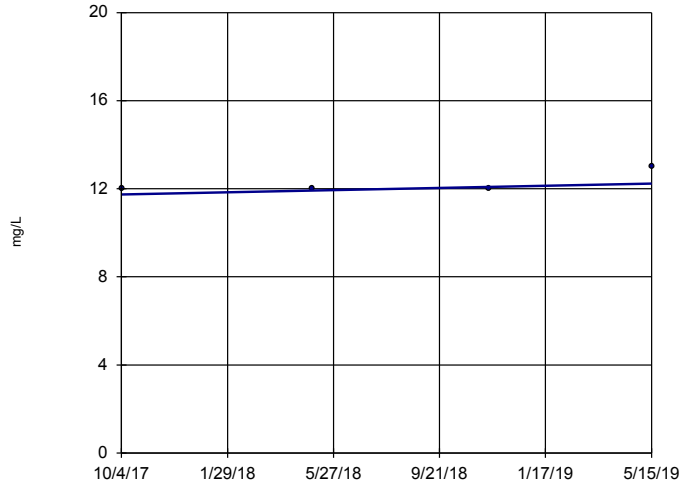
Chloride

MW-6



n = 4

Slope = 0.3104 units per year.

Mann-Kendall statistic = 3 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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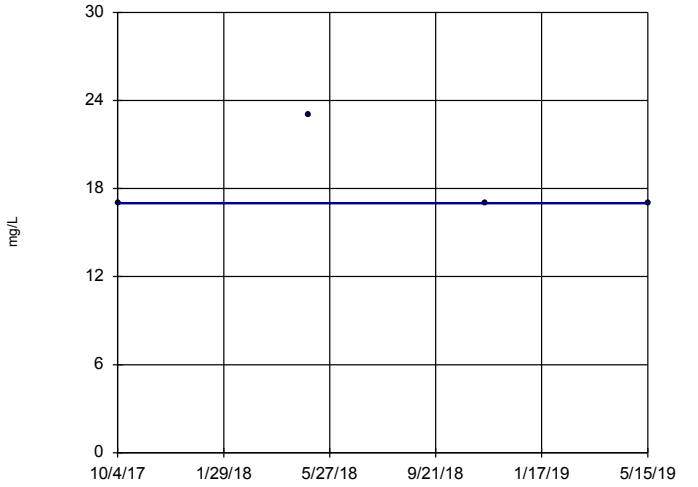
Chloride

MW-6A



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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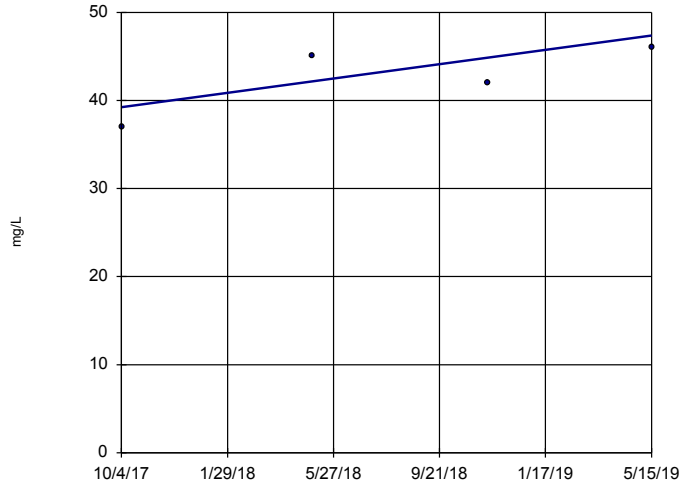
Chloride

MW-7 (bg)



n = 4

Slope = 5.041 units per year.

Mann-Kendall statistic = 4 critical = 8

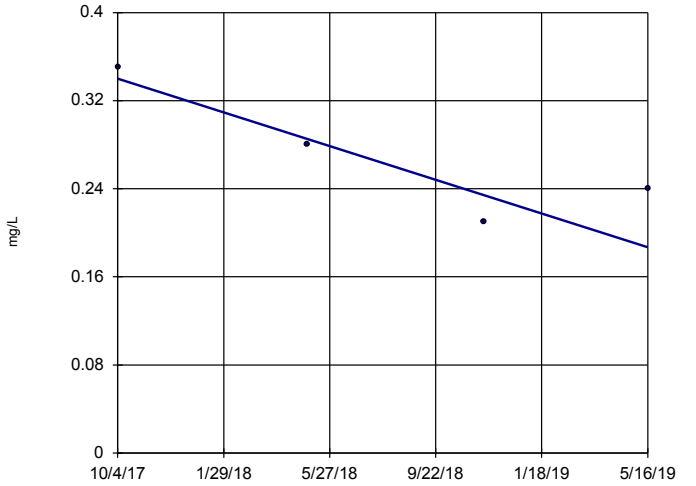
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Fluoride

MW-2 (bg)



n = 4

Slope = -0.09492 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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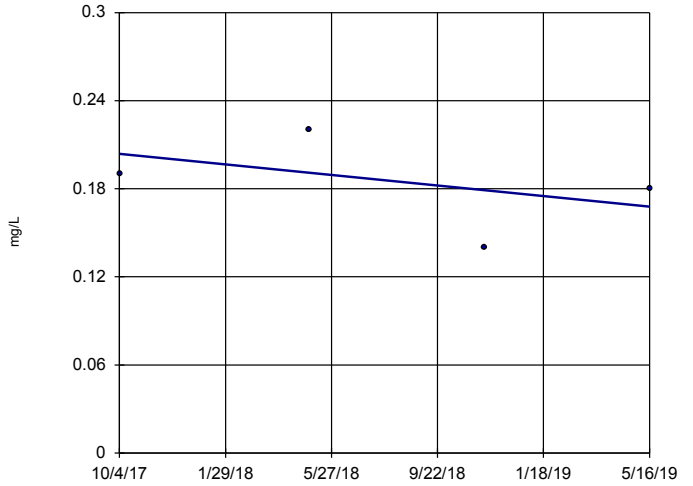
Fluoride

MW-3 (bg)



n = 4

Slope = -0.02236 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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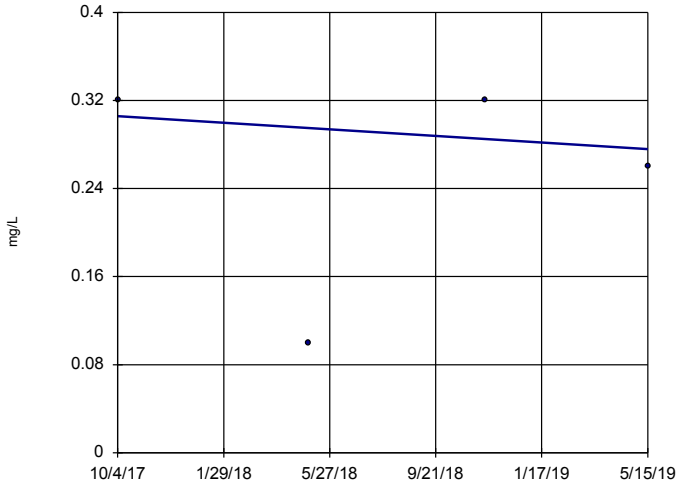
Fluoride

MW-4



n = 4

Slope = -0.01862 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

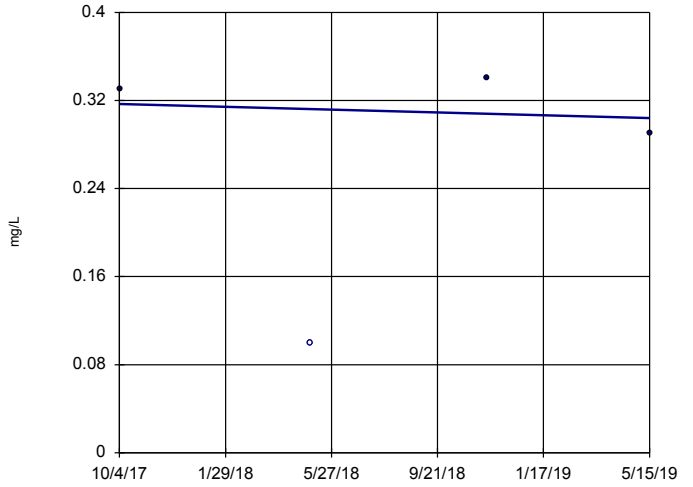
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Fluoride

MW-5



n = 4

Slope = -0.007931 units per year.

Mann-Kendall statistic = 0
critical = 8

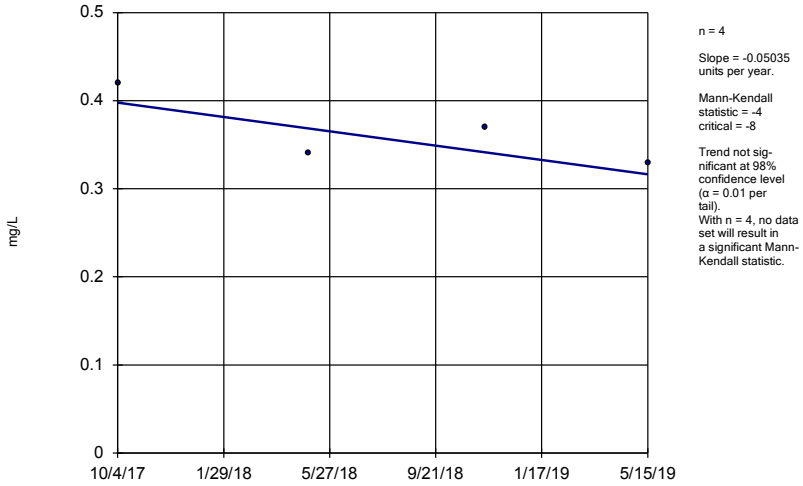
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Fluoride

MW-5A



n = 4

Slope = -0.05035 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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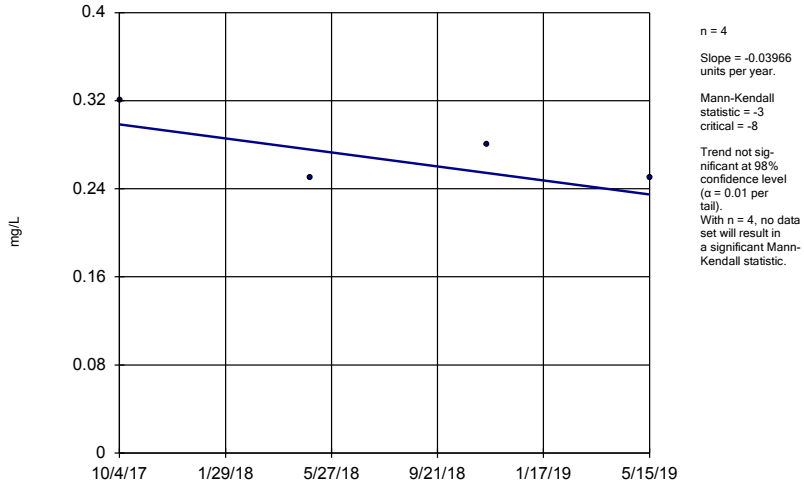
Fluoride

MW-6



n = 4

Slope = -0.03966 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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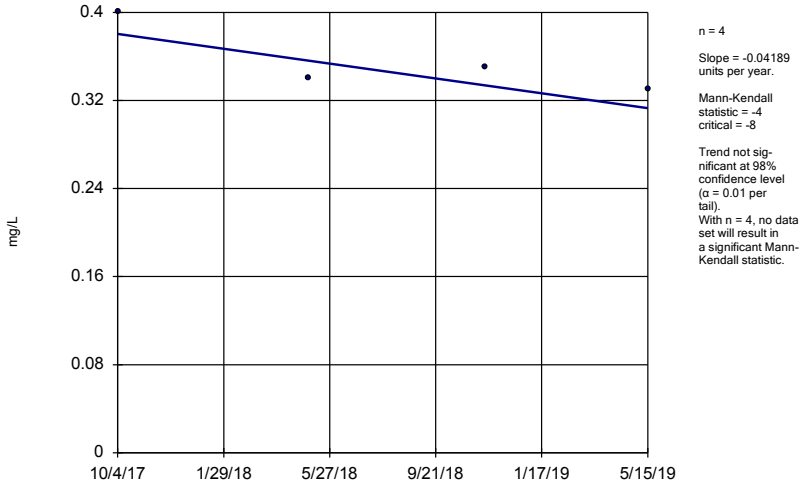
Fluoride

MW-6A



n = 4

Slope = -0.04189 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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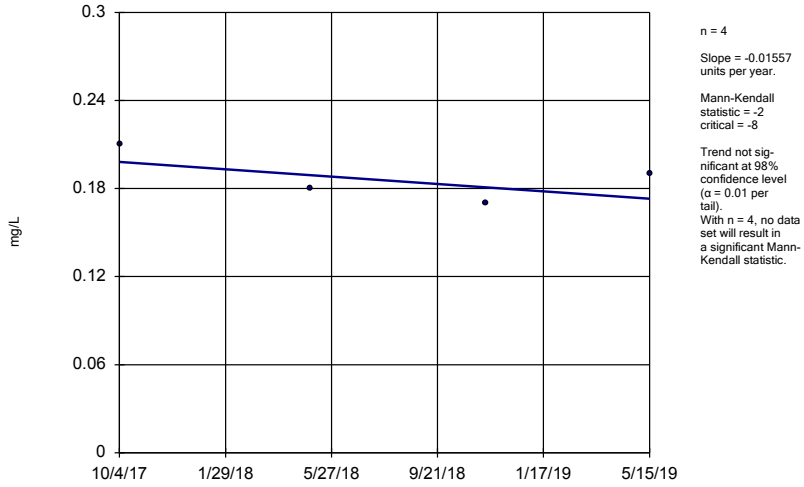
Fluoride

MW-7 (bg)



n = 4

Slope = -0.01557 units per year.

Mann-Kendall statistic = -2
critical = -8

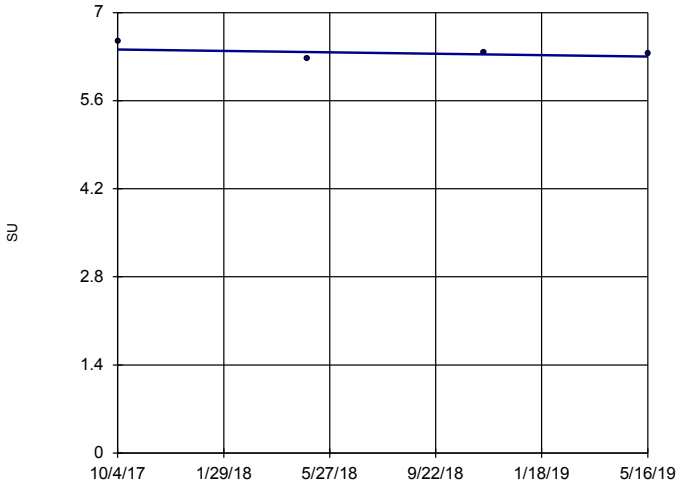
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

pH

MW-2 (bg)



n = 4

Slope = -0.0689 units per year.

Mann-Kendall statistic = -2 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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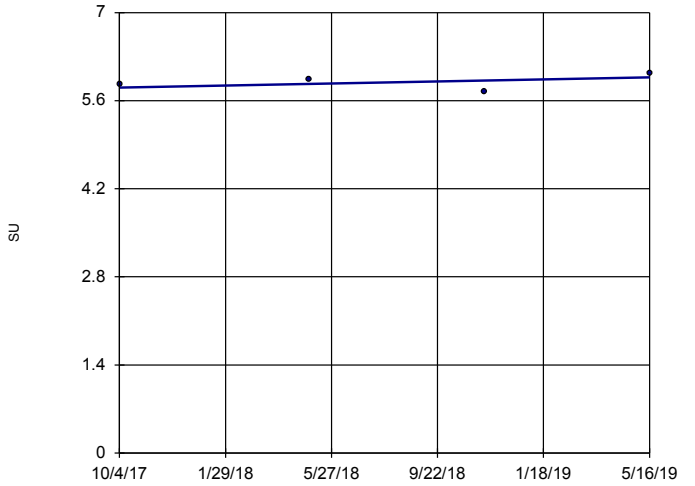
pH

MW-3 (bg)



n = 4

Slope = 0.1008 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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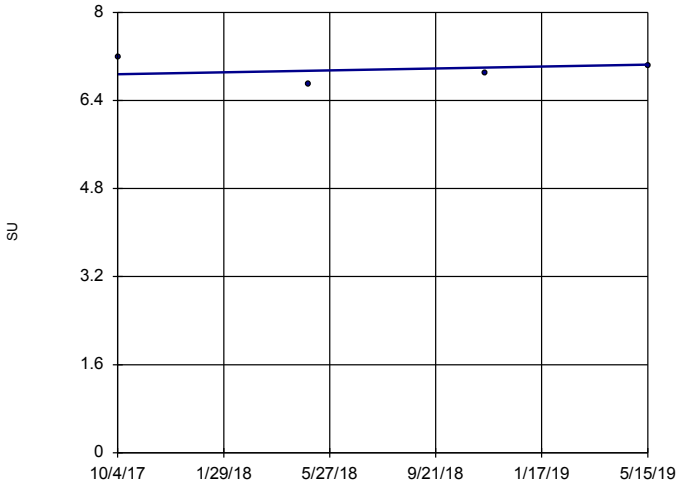
pH

MW-4



n = 4

Slope = 0.1078 units per year.

Mann-Kendall statistic = 0 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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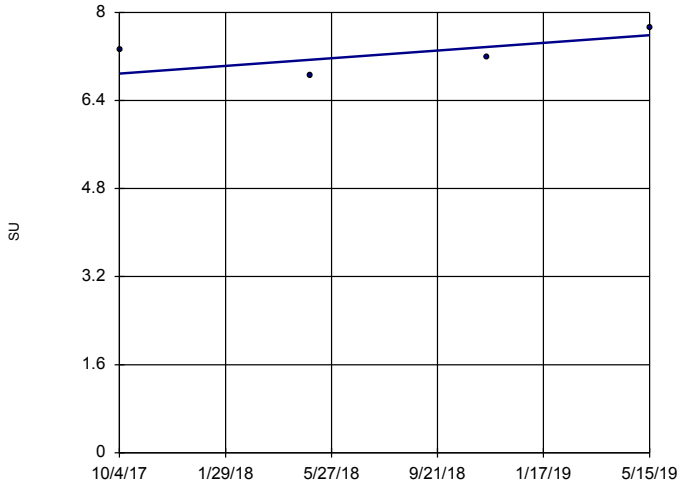
pH

MW-5



n = 4

Slope = 0.4345 units per year.

Mann-Kendall statistic = 2 critical = 8

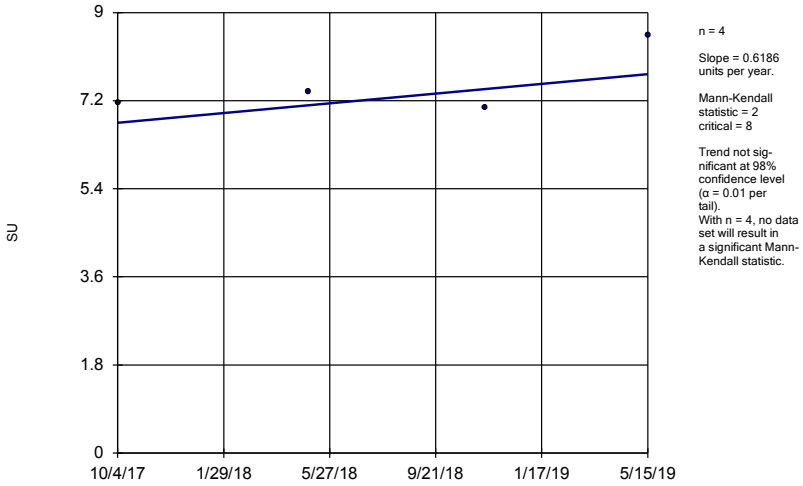
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

pH

MW-5A



n = 4

Slope = 0.6186 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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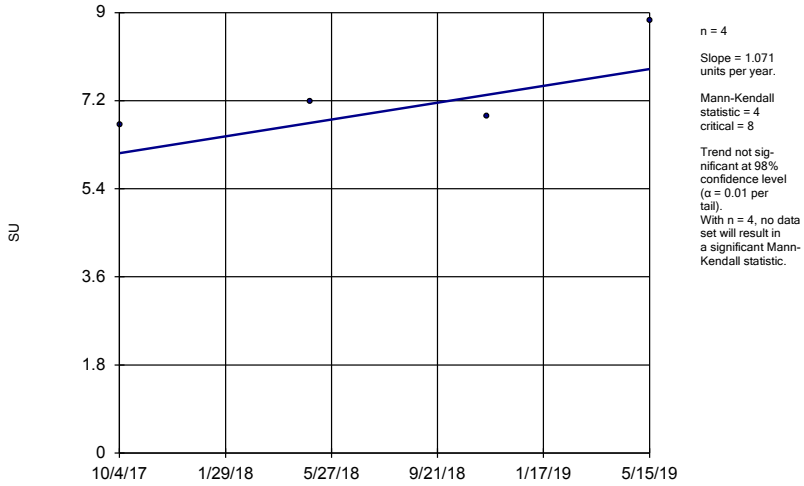
pH

MW-6



n = 4

Slope = 1.071 units per year.

Mann-Kendall statistic = 4 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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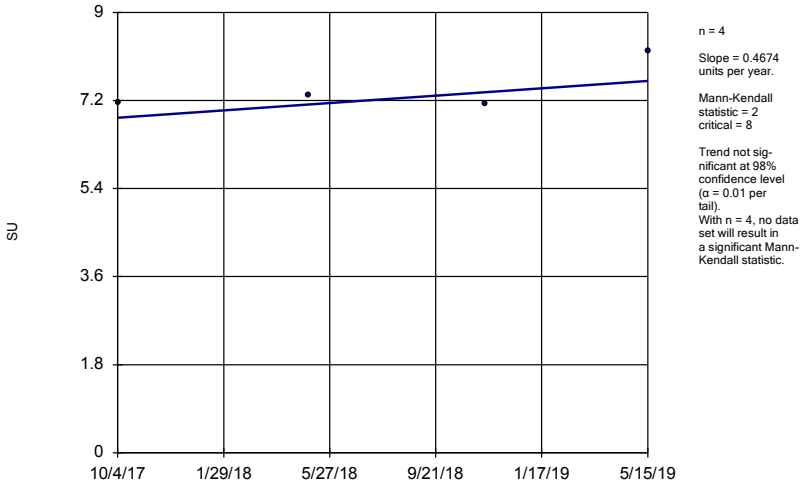
pH

MW-6A



n = 4

Slope = 0.4674 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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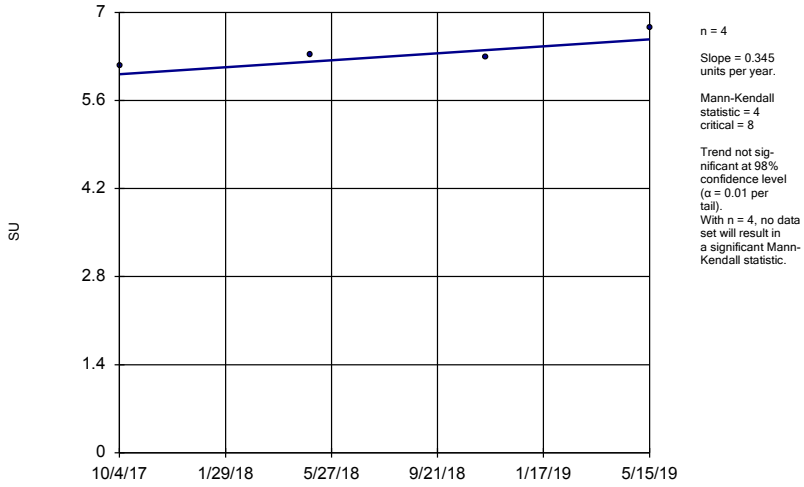
pH

MW-7 (bg)



n = 4

Slope = 0.345 units per year.

Mann-Kendall statistic = 4 critical = 8

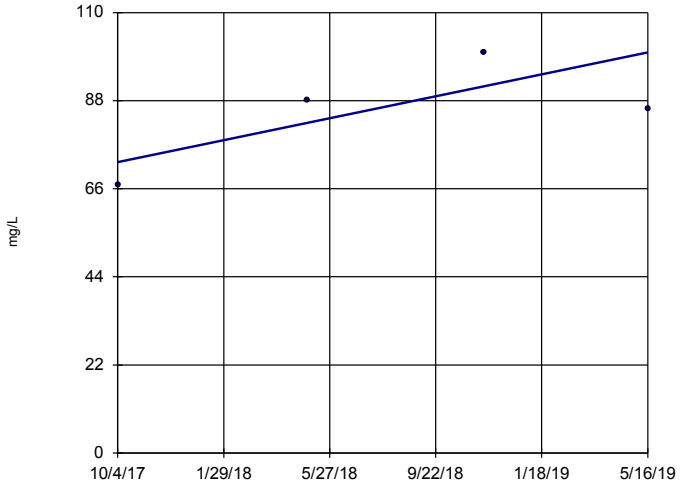
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sulfate

MW-2 (bg)



n = 4

Slope = 17 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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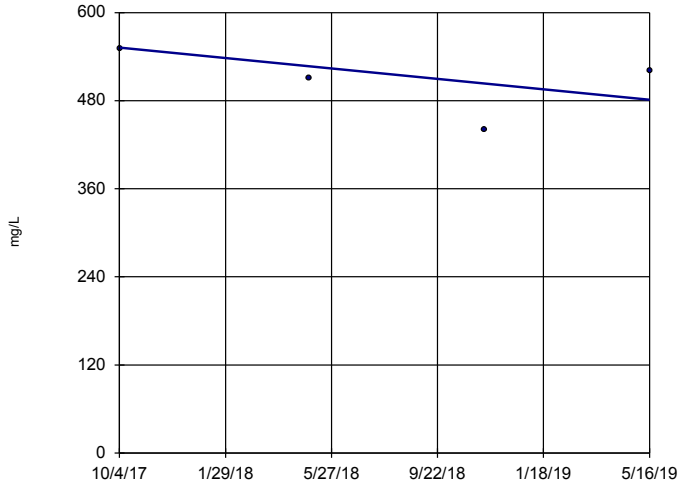
Sulfate

MW-3 (bg)



n = 4

Slope = -44.06 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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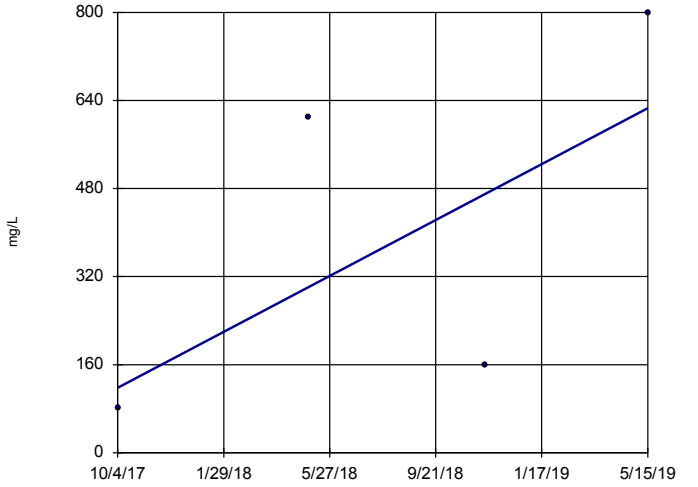
Sulfate

MW-4



n = 4

Slope = 315.1 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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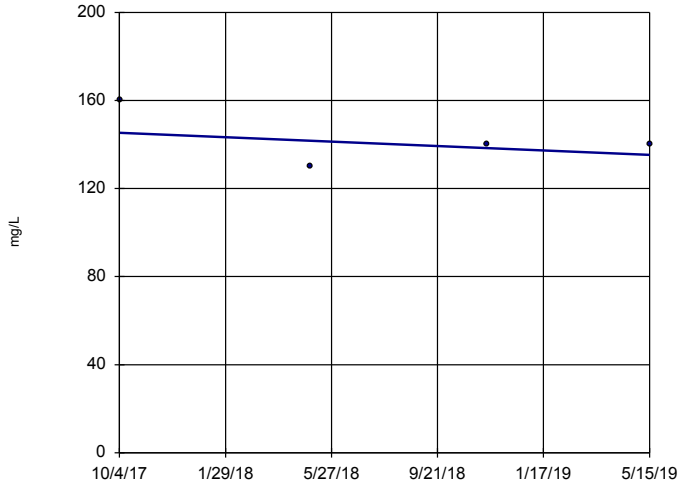
Sulfate

MW-5



n = 4

Slope = -6.207 units per year.

Mann-Kendall statistic = -1
critical = -8

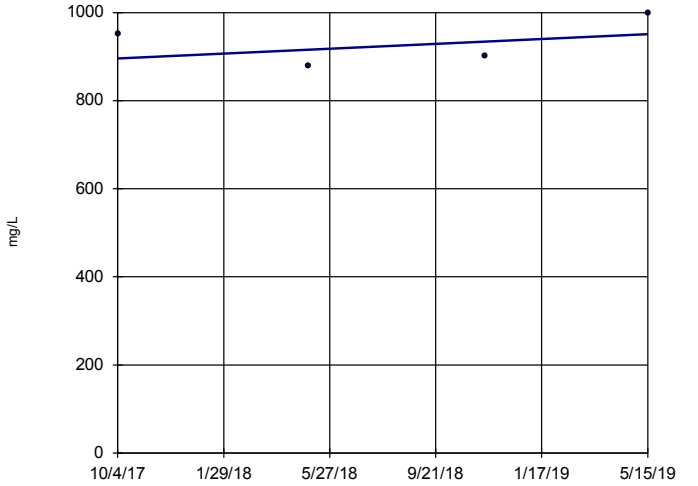
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sulfate

MW-5A



n = 4

Slope = 34.14 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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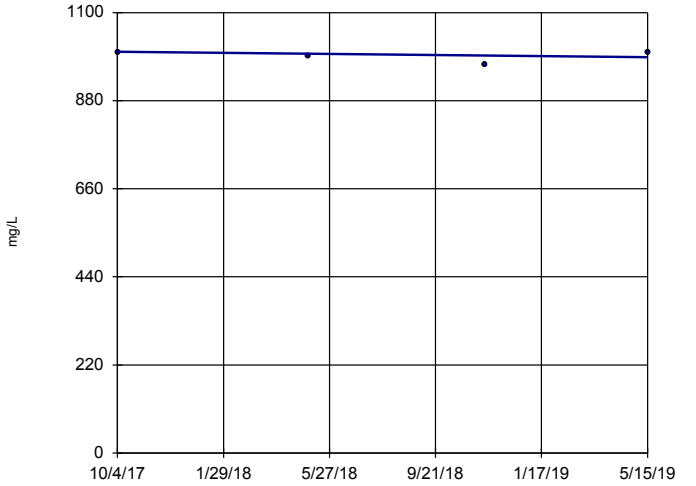
Sulfate

MW-6



n = 4

Slope = -8.649 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

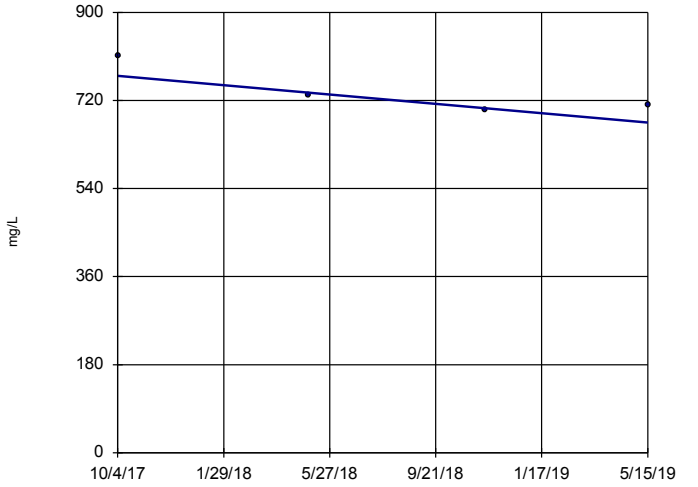
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6A



n = 4

Slope = -58.97 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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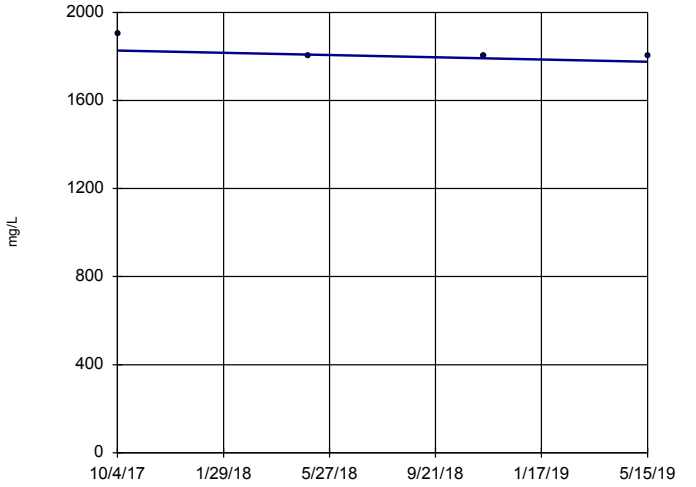
Sulfate

MW-7 (bg)



n = 4

Slope = -31.04 units per year.

Mann-Kendall statistic = -3
critical = -8

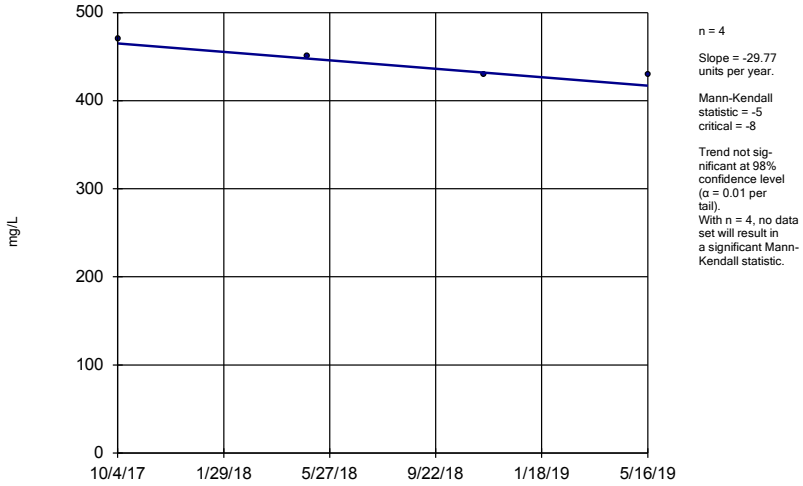
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Total Dissolved Solids

MW-2 (bg)



n = 4

Slope = -29.77 units per year.

Mann-Kendall statistic = -5
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

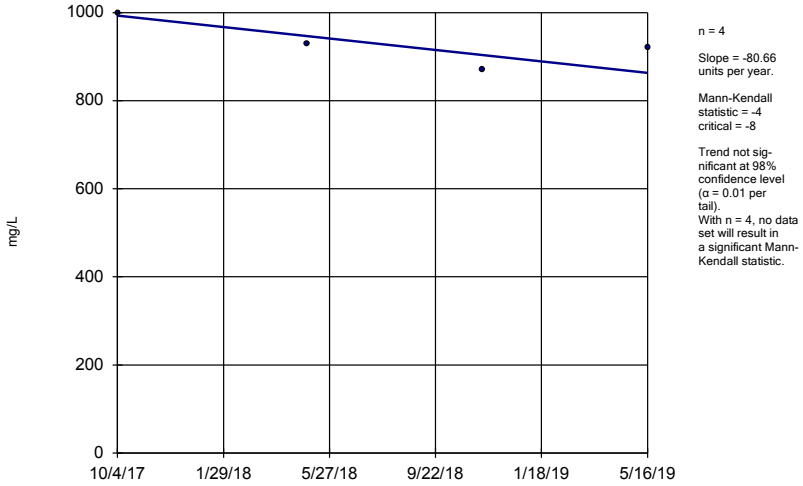
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-3 (bg)



n = 4

Slope = -80.66 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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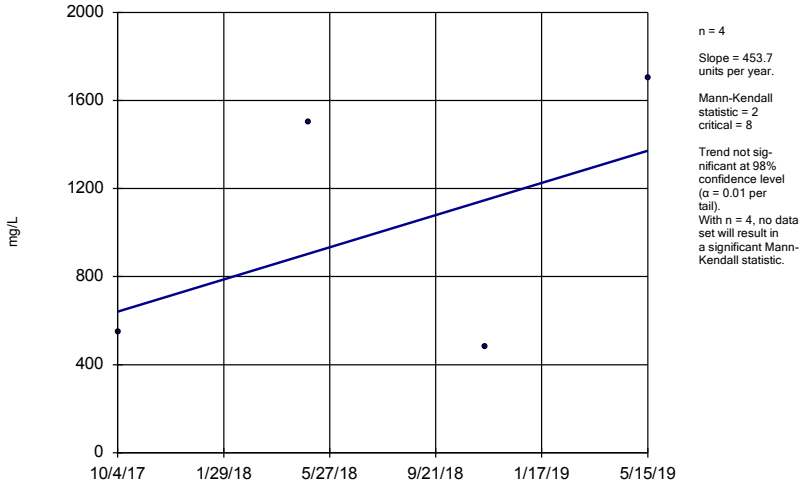
Total Dissolved Solids

MW-4



n = 4

Slope = 453.7 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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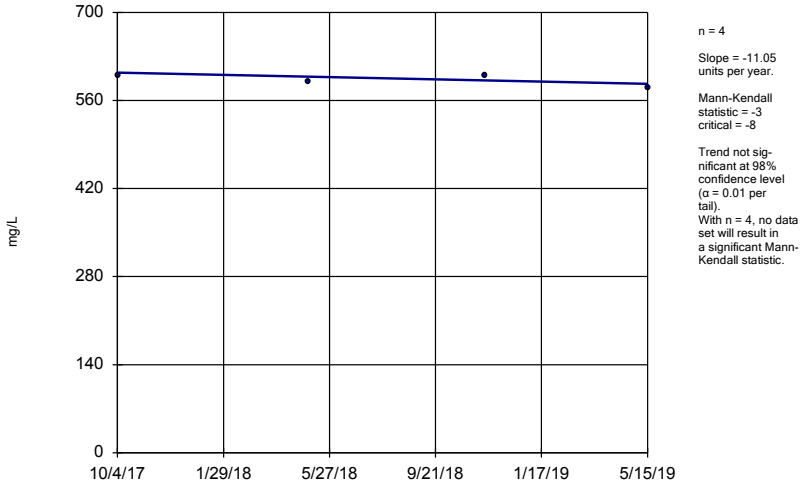
Total Dissolved Solids

MW-5



n = 4

Slope = -11.05 units per year.

Mann-Kendall statistic = -3
critical = -8

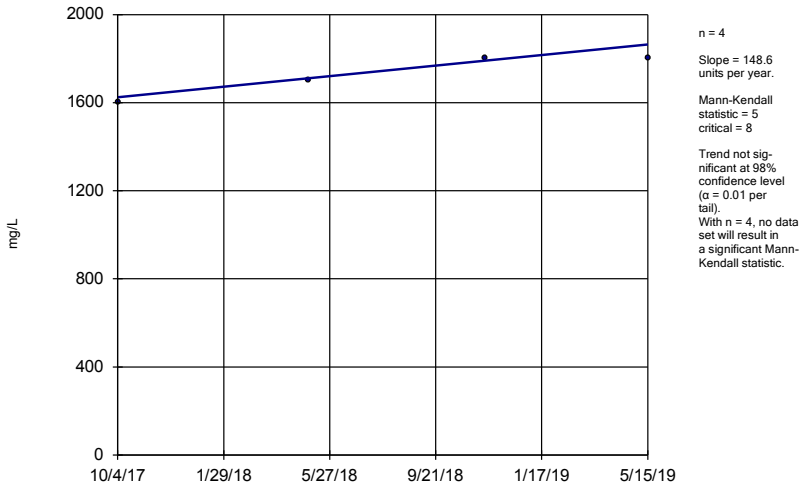
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Total Dissolved Solids

MW-5A



n = 4

Slope = 148.6 units per year.

Mann-Kendall statistic = 5 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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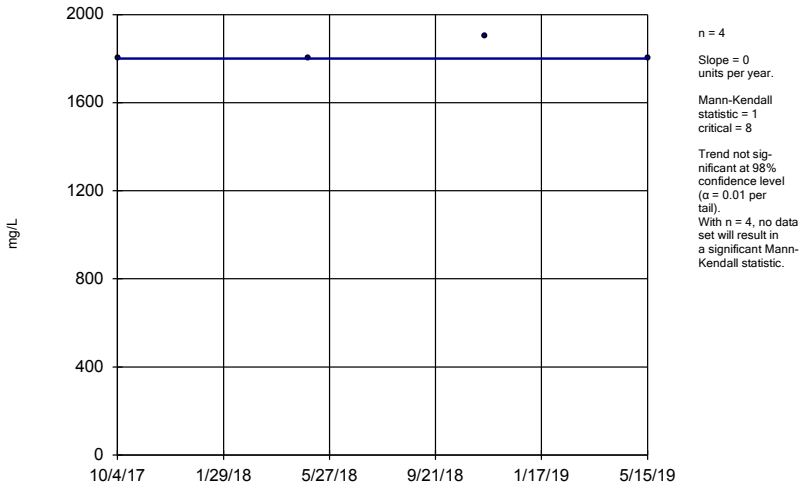
Total Dissolved Solids

MW-6



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

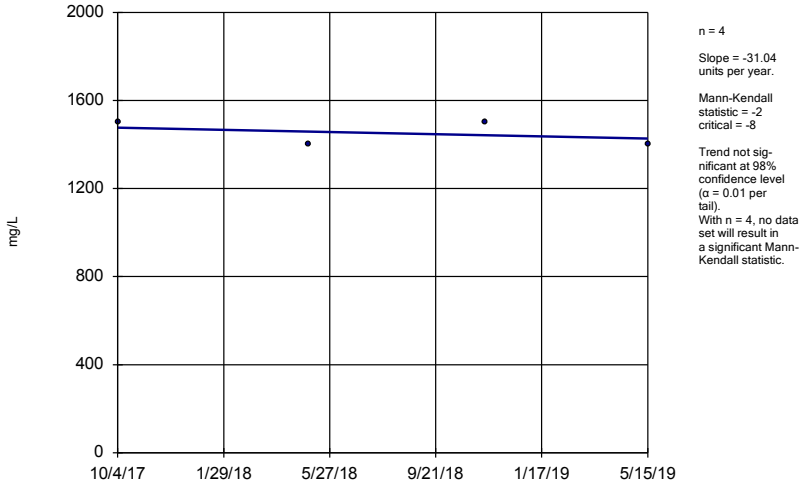
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-6A



n = 4

Slope = -31.04 units per year.

Mann-Kendall statistic = -2 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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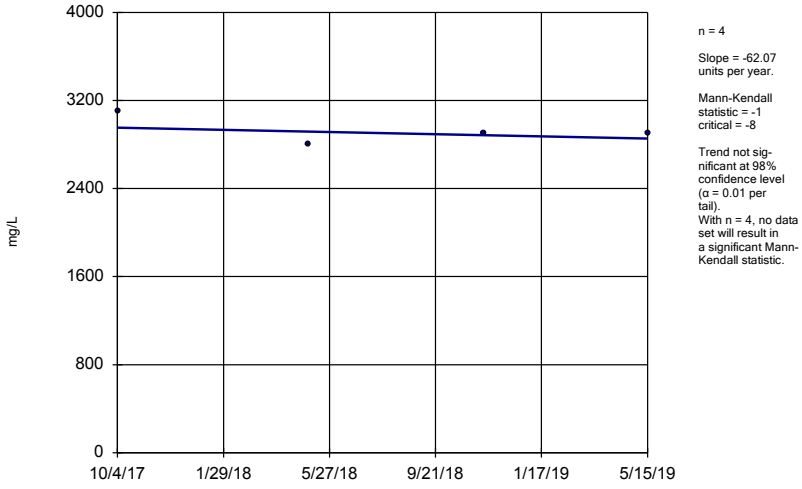
Total Dissolved Solids

MW-7 (bg)



n = 4

Slope = -62.07 units per year.

Mann-Kendall statistic = -1 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background Printed 12/4/2019, 2:13 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-2 (bg)	-0.03847	-4	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-3 (bg)	0	-1	-8	No	4	75	n/a	n/a	0.02	NP
Boron (mg/L)	MW-4	0	-1	-8	No	4	75	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5	-0.00...	0	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5A	0.1202	5	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6	-0.01279	-2	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6A	-0.01589	-3	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-7 (bg)	-0.03739	-2	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2 (bg)	-4.716	-3	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-3 (bg)	1.378	0	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-4	44.63	2	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5	5.214	4	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5A	14.15	4	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6	3.104	1	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6A	-7.588	-4	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7 (bg)	-1.737	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2 (bg)	0	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3 (bg)	3.596	1	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4	29.71	2	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	-0.08649	-1	-8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5A	6.828	5	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	0.3104	3	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6A	0	-1	-8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7 (bg)	5.041	4	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2 (bg)	-0.09492	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3 (bg)	-0.02236	-2	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4	-0.01862	-1	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	-0.00...	0	8	No	4	25	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5A	-0.05035	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	-0.03966	-3	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6A	-0.04189	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7 (bg)	-0.01557	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-2 (bg)	-0.0689	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-3 (bg)	0.1008	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-4	0.1078	0	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5	0.4345	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5A	0.6186	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6	1.071	4	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6A	0.4674	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-7 (bg)	0.345	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-2 (bg)	17	2	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-3 (bg)	-44.06	-2	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-4	315.1	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5	-6.207	-1	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5A	34.14	2	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6	-8.649	-1	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6A	-58.97	-4	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7 (bg)	-31.04	-3	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-2 (bg)	-29.77	-5	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-3 (bg)	-80.66	-4	-8	No	4	0	n/a	n/a	0.02	NP

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background Printed 12/4/2019, 2:13 PM

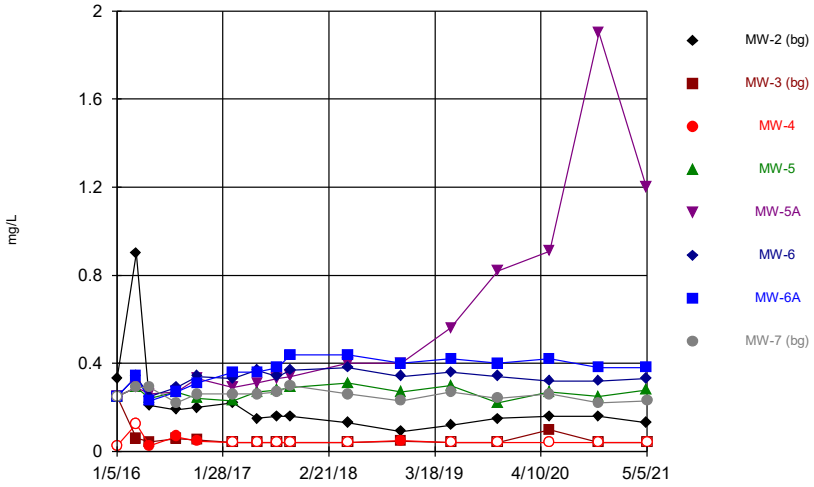
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Dissolved Solids (mg/L)	MW-4	453.7	2	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	-11.05	-3	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5A	148.6	5	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	0	1	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6A	-31.04	-2	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7 (bg)	-62.07	-1	-8	No	4	0	n/a	n/a	0.02	NP

Sanitas™ Output – Sampling Event

Time Series Analysis

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

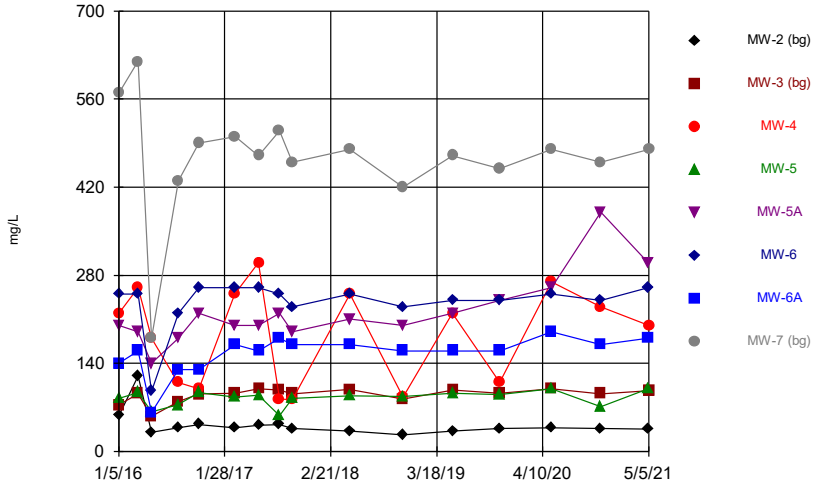


Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

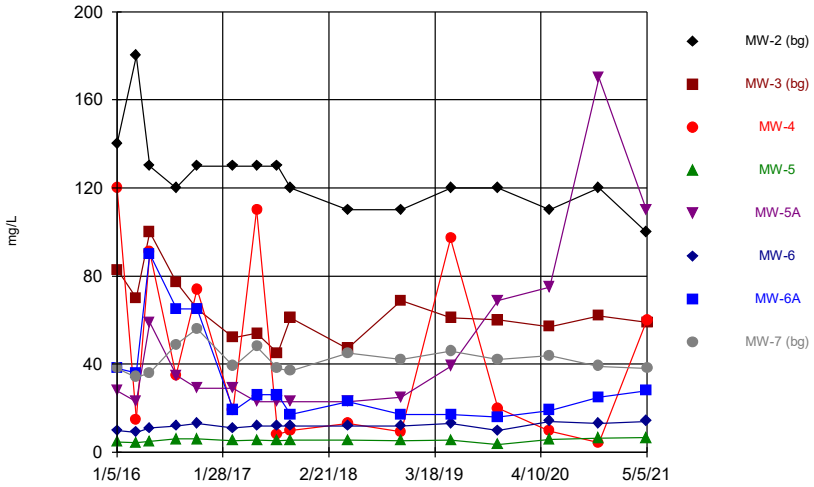


Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

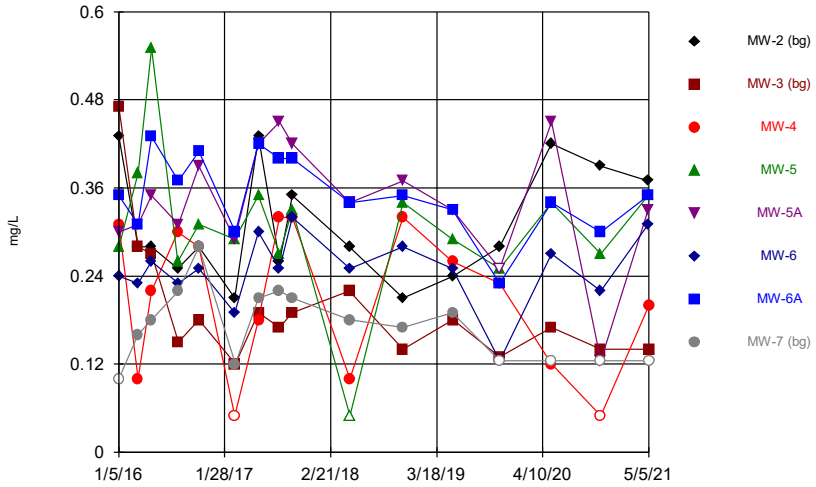


Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

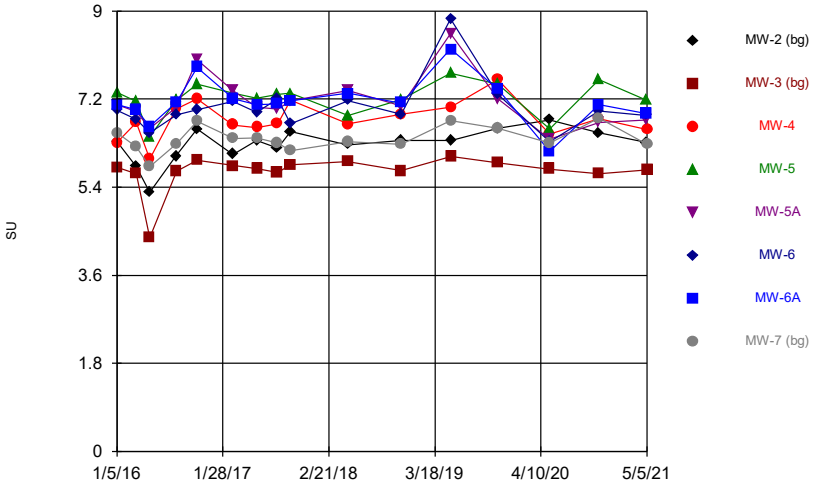
Fluoride



Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

pH

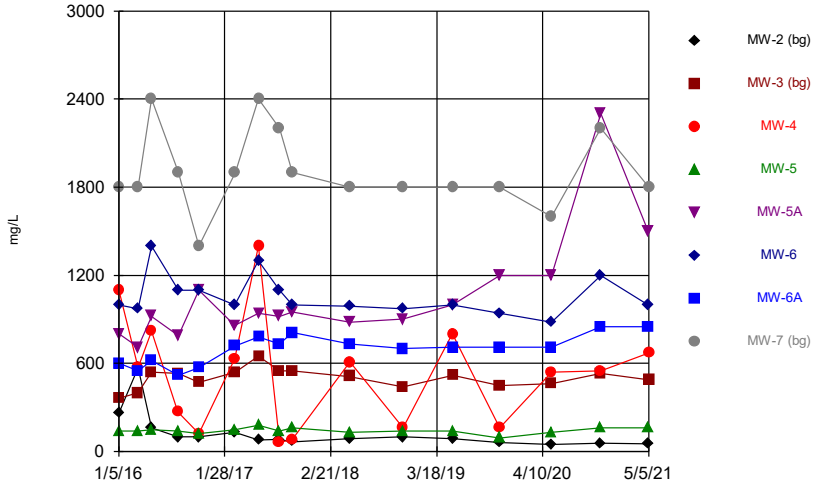


Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

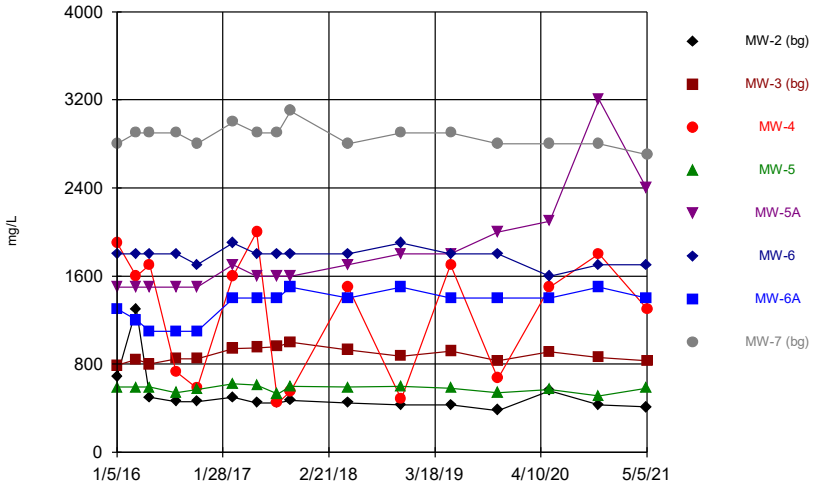


Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids



Time Series Analysis Run 6/24/2021 3:14 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ Output – Sampling Event

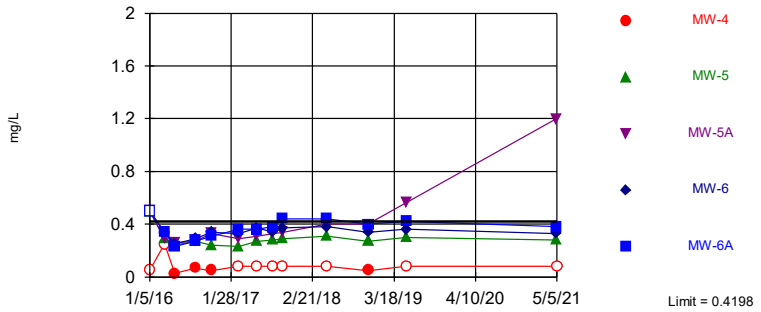
Prediction Limits

Hollow symbols indicate censored values.

Exceeds Limit: MW-5A

Boron

Interwell Parametric



Background Data Summary (based on cube root transformation) (after Kaplan-Meier Adjustment): Mean=0.4903, Std. Dev.=0.1363, n=39, 23.08% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9376, critical = 0.917. Kappa = 1.896 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001504. Comparing 5 points to limit.

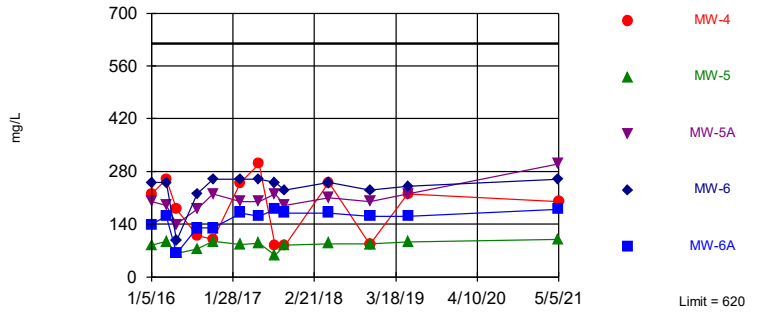
Prediction Limit Analysis Run 6/24/2021 3:32 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Within Limit

Calcium

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 39 background values. Annual per-constituent alpha = 0.01194. Individual comparison alpha = 0.0012 (1 of 2). Comparing 5 points to limit. Seasonality was not detected with 95% confidence.

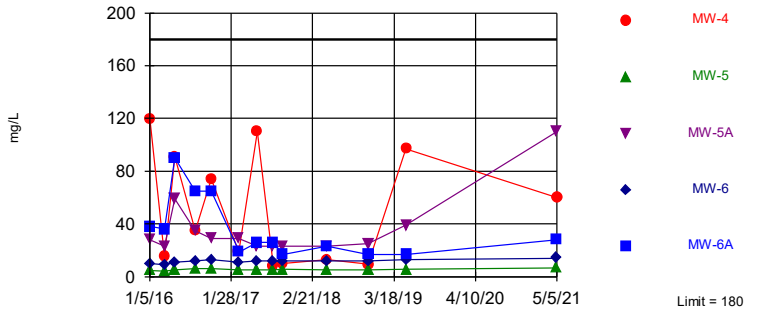
Prediction Limit Analysis Run 6/24/2021 3:32 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Within Limit

Chloride

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 39 background values. Annual per-constituent alpha = 0.01194. Individual comparison alpha = 0.0012 (1 of 2). Comparing 5 points to limit. Seasonality was not detected with 95% confidence.

Prediction Limit Analysis Run 6/24/2021 3:32 PM

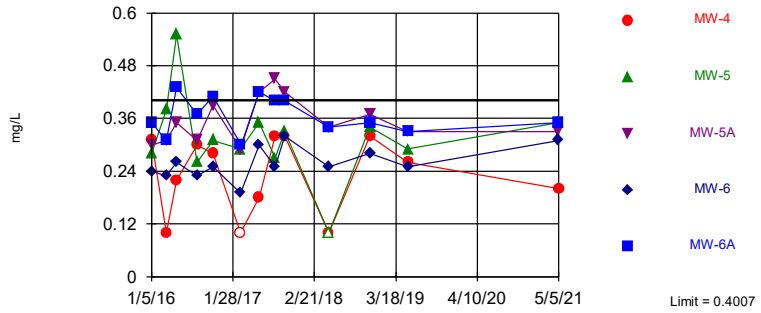
The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Within Limit

Fluoride

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=0.4779, Std. Dev.=0.08183, n=39, 5.128% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9373, critical = 0.917. Kappa = 1.896 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001504. Comparing 5 points to limit.

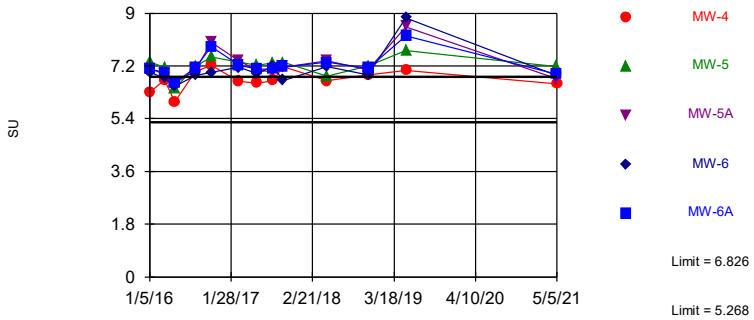
Prediction Limit Analysis Run 6/24/2021 3:32 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Exceeds Limits: MW-5, MW-6, MW-6A

pH

Interwell Parametric



Background Data Summary (based on square transformation): Mean=37.17, Std. Dev.=4.969, n=39. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.919, critical = 0.917. Kappa = 1.896 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.000752. Comparing 5 points to limit.

Prediction Limit Analysis Run 6/24/2021 3:32 PM

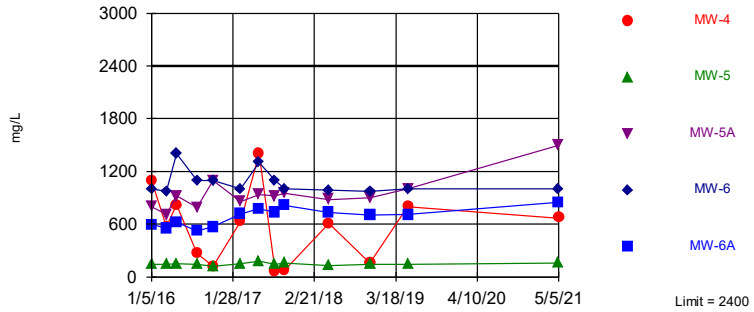
The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit

Sulfate

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 39 background values. Annual per-constituent alpha = 0.01194. Individual comparison alpha = 0.0012 (1 of 2). Comparing 5 points to limit. Seasonality was not detected with 95% confidence.

Prediction Limit Analysis Run 6/24/2021 3:32 PM

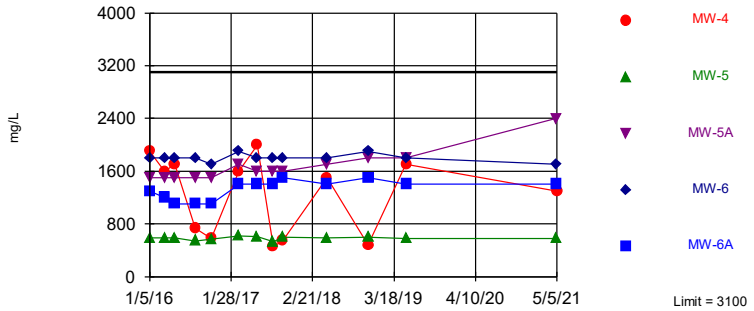
The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.29 Sanitas software licensed to Midwest Environmental Consultants. UG

Within Limit

Total Dissolved Solids

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 39 background values. Annual per-constituent alpha = 0.01194. Individual comparison alpha = 0.0012 (1 of 2). Comparing 5 points to limit. Seasonality was not detected with 95% confidence.

Prediction Limit Analysis Run 6/24/2021 3:32 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

Prediction Limit

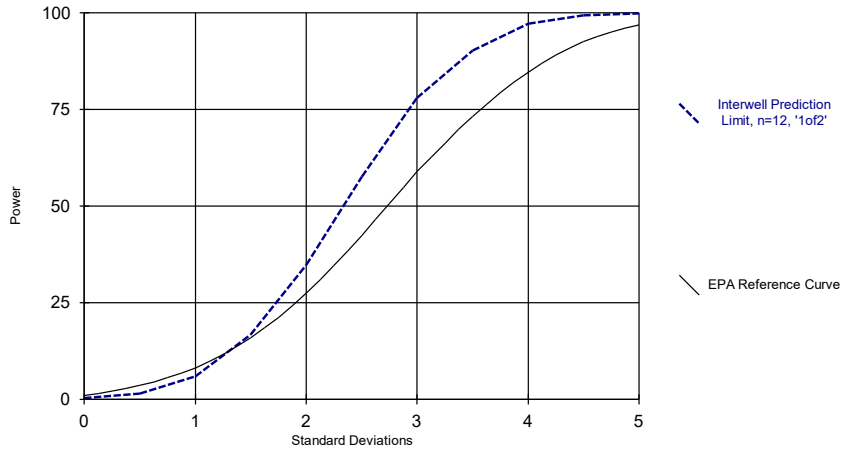
The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background Printed 6/24/2021, 3:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	MW-4	0.4198	n/a	5/5/2021	0.08ND	No	39	23.08	x^(1/3)	0.001504	Param Inter 1 of 2
Boron (mg/L)	MW-5	0.4198	n/a	5/4/2021	0.28	No	39	23.08	x^(1/3)	0.001504	Param Inter 1 of 2
Boron (mg/L)	**MW-5A**	**0.4198**	**n/a**	**5/4/2021**	**1.2**	**Yes**	**39**	**23.08**	**x^(1/3)**	**0.001504**	**Param Inter 1 of 2**
Boron (mg/L)	MW-6	0.4198	n/a	5/4/2021	0.33	No	39	23.08	x^(1/3)	0.001504	Param Inter 1 of 2
Boron (mg/L)	MW-6A	0.4198	n/a	5/4/2021	0.38	No	39	23.08	x^(1/3)	0.001504	Param Inter 1 of 2
Calcium (mg/L)	MW-4	620	n/a	5/5/2021	200	No	39	0	n/a	0.0012	NP Inter (normality) ...
Calcium (mg/L)	MW-5	620	n/a	5/4/2021	100	No	39	0	n/a	0.0012	NP Inter (normality) ...
Calcium (mg/L)	MW-5A	620	n/a	5/4/2021	300	No	39	0	n/a	0.0012	NP Inter (normality) ...
Calcium (mg/L)	MW-6	620	n/a	5/4/2021	260	No	39	0	n/a	0.0012	NP Inter (normality) ...
Calcium (mg/L)	MW-6A	620	n/a	5/4/2021	180	No	39	0	n/a	0.0012	NP Inter (normality) ...
Chloride (mg/L)	MW-4	180	n/a	5/5/2021	60	No	39	0	n/a	0.0012	NP Inter (normality) ...
Chloride (mg/L)	MW-5	180	n/a	5/4/2021	6.6	No	39	0	n/a	0.0012	NP Inter (normality) ...
Chloride (mg/L)	MW-5A	180	n/a	5/4/2021	110	No	39	0	n/a	0.0012	NP Inter (normality) ...
Chloride (mg/L)	MW-6	180	n/a	5/4/2021	14	No	39	0	n/a	0.0012	NP Inter (normality) ...
Chloride (mg/L)	MW-6A	180	n/a	5/4/2021	28	No	39	0	n/a	0.0012	NP Inter (normality) ...
Fluoride (mg/L)	MW-4	0.4007	n/a	5/5/2021	0.2	No	39	5.128	sqrt(x)	0.001504	Param Inter 1 of 2
Fluoride (mg/L)	MW-5	0.4007	n/a	5/4/2021	0.35	No	39	5.128	sqrt(x)	0.001504	Param Inter 1 of 2
Fluoride (mg/L)	MW-5A	0.4007	n/a	5/4/2021	0.33	No	39	5.128	sqrt(x)	0.001504	Param Inter 1 of 2
Fluoride (mg/L)	MW-6	0.4007	n/a	5/4/2021	0.31	No	39	5.128	sqrt(x)	0.001504	Param Inter 1 of 2
Fluoride (mg/L)	MW-6A	0.4007	n/a	5/4/2021	0.35	No	39	5.128	sqrt(x)	0.001504	Param Inter 1 of 2
pH (SU)	MW-4	6.826	5.268	5/5/2021	6.58	No	39	0	x^2	0.000752	Param Inter 1 of 2
pH (SU)	**MW-5**	**6.826**	**5.268**	**5/4/2021**	**7.18**	**Yes**	**39**	**0**	**x^2**	**0.000752**	**Param Inter 1 of 2**
pH (SU)	MW-5A	6.826	5.268	5/4/2021	6.77	No	39	0	x^2	0.000752	Param Inter 1 of 2
pH (SU)	**MW-6**	**6.826**	**5.268**	**5/4/2021**	**6.87**	**Yes**	**39**	**0**	**x^2**	**0.000752**	**Param Inter 1 of 2**
pH (SU)	**MW-6A**	**6.826**	**5.268**	**5/4/2021**	**6.91**	**Yes**	**39**	**0**	**x^2**	**0.000752**	**Param Inter 1 of 2**
Sulfate (mg/L)	MW-4	2400	n/a	5/5/2021	670	No	39	0	n/a	0.0012	NP Inter (normality) ...
Sulfate (mg/L)	MW-5	2400	n/a	5/4/2021	160	No	39	0	n/a	0.0012	NP Inter (normality) ...
Sulfate (mg/L)	MW-5A	2400	n/a	5/4/2021	1500	No	39	0	n/a	0.0012	NP Inter (normality) ...
Sulfate (mg/L)	MW-6	2400	n/a	5/4/2021	1000	No	39	0	n/a	0.0012	NP Inter (normality) ...
Sulfate (mg/L)	MW-6A	2400	n/a	5/4/2021	850	No	39	0	n/a	0.0012	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-4	3100	n/a	5/5/2021	1300	No	39	0	n/a	0.0012	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-5	3100	n/a	5/4/2021	580	No	39	0	n/a	0.0012	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-5A	3100	n/a	5/4/2021	2400	No	39	0	n/a	0.0012	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-6	3100	n/a	5/4/2021	1700	No	39	0	n/a	0.0012	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-6A	3100	n/a	5/4/2021	1400	No	39	0	n/a	0.0012	NP Inter (normality) ...

Sanitas™ Output – Sampling Event

Power Curve

Power Curve



Kappa = 2.292, based on 5 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 6/24/2021 3:54 PM

The Empire District Client: Midwest Environmental Consultants Data: 5-21 App 3 Asbury ponds with background

APPENDIX C

November 2021 Sampling Event

2021 Groundwater Monitoring, Sampling & Statistics Per EPA CCR Rule (CFR § 257.90-.98)

November Sampling Event

Asbury Generating Station CCR Impoundment
Jasper County, MO

January 2022

Prepared For:
The Empire District Electric Company
602 S. Joplin Avenue
Joplin, Missouri 64801

Midwest Environmental CONSULTANTS

2009 E. McCarty St., Ste. 2 Jefferson City, MO 65101 (573) 636-9454 www.mecpc.com

TABLE OF CONTENTS

1.0 INTRODUCTION

The EPA Coal Combustion Residual Regulations (40 CFR Part 257) (CCR Rule) require groundwater monitoring of CCR impoundments. This Asbury Generating Station CCR impoundment groundwater monitoring sampling report is in accordance with the EPA CCR Rule. In accordance with the EPA CCR Rule (§ 257.90-.98) the status of the Groundwater Monitoring was placed on-line October 17, 2017, as required by the EPA CCR rule. On November 2, 2017 the facility received approval from Missouri Department of Natural Resources (MDNR) of their groundwater system (included in **Appendix 1**). Empire notified the MDNR "State Director" via e-mail when this document was posted on-line, as required in the CCR rule. The EPA CCR Rule requires the annual groundwater report be prepared by January 31st of the following year. The first report was due January 31, 2018. This report was prepared in general accordance with the EPA CCR Rule for groundwater requirements. These regulations outline groundwater monitoring requirements and data evaluation methods. The annual groundwater report for the 2020 sampling events will be posted on-line within 30 days of placement in the operating record.

The purpose of the groundwater monitoring plan is to monitor the ground water quality surrounding the facility and to evaluate potential impacts and/or releases from facility operations. Background groundwater data was collected from January 2016 to August 2017. After the background data plus the first semi-annual sampling events, a reduced sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will generally be completed during the months of May and November. Statistical analysis for EPA Appendix III began after the first semi-annual sampling event was collected on October 4, 2017 to determine if a statistically significant increase (SSI) has occurred. If an SSI is verified, additional evaluation is required to determine if the SSI was caused by the CCR impoundment.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Boron does not have an MCL. The facility conducted an alternative source demonstration per the EPA CCR Rule (§ 257.94). The water within the man-made dewatering trench and upgradient of the clay cutoff trench is impacting the quality of the water within MW-5A. MW-5AR will be installed downgradient of the cutoff trench system. The new well will be monitored to determine if the theory is correct. Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

On November 8 and 9, 2021, a semi-annual sampling event was conducted per the EPA CCR Rule (§ 257.90-.98). Eight (8) groundwater-monitoring wells were sampled and analyzed for the EPA Appendix III. After review of the first semi-annual groundwater sampling event analytical results completed in October 2017, the constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan in accordance with the EPA CCR Rule. For quality assurance and quality control measures, a duplicate sample at MW-5 was taken. These samples were preserved and submitted directly to the laboratory.

This report is a summary of the November 2021 sampling event and the findings of the statistical analysis of the results of the groundwater monitoring program at the Asbury Generating Station CCR Impoundment. Specific information of each sampling event can be obtained from the individual report which is part of the Asbury Operating Record.

2.0 SITE LOCATION

The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. The site is located approximately 5.5 miles north-northeast of Asbury, Missouri, about 14 miles north-northwest of Joplin, Missouri. A map showing the locations of the monitoring wells is on **Figure 2**.

2.1 History

In March 1996, five (5) groundwater monitoring wells, MW-1 through MW-5, were installed around the perimeter of the Asbury Generating Station CCR impoundment. Monitoring wells MW-1, MW-2 and MW-3 were installed to a total depth of between 27.0 to 28.5 feet below ground surface (bgs). Monitoring wells MW-4 and MW-5 were installed to a total depth of 48 feet bgs. Each of the five monitoring wells was equipped with 10.0-foot well screens. The five wells were then developed, purged, and sampled in 1996.

In 2003, two (2) additional groundwater monitoring wells were installed and identified as MW-6 and MW-7. Both wells had 2-inch diameter PVC well casings installed to an approximate total depth of 44 feet below ground surface. Both wells were installed with an above ground steel protective cover. No other construction details such as well screen lengths were available for these two (2) wells. In December 2015, two (2) additional groundwater monitoring wells were installed and identified as MW-5A and MW-6A.

All wells are registered with MDNR – Missouri Geological Survey Program.

2.2 Site Geology

Drilling and subsurface investigation activities at the Site and as part of the MDNR approved CCR landfill Detailed Site Investigation (DSI) for the adjacent landfill area identified three (3) primary geologic units at the Site. These geologic units include the surficial soil layer, Warner Sandstone (uppermost aquifer), and Riverton Shale (confining unit). The information presented herein includes the primary elements of a site characterization work plan consistent with the MDNR guidance.

Surficial Soil. Soils at the site consist of a surficial unit of cohesive soils (e.g., CL, SC, ML, and CH) underlain by Pennsylvanian-age bedrock. Soil thickness at the Site ranges from approximately 15-25 feet.

Warner Sandstone. The Warner Sandstone (Sandstone) is the uppermost bedrock unit in south portion of the Site. In the north area of the Site, the Sandstone is overlain by the Riverton Shale (Shale). Based on the DSI information, the Sandstone and Shale can occur as alternating layers. The Sandstone and Shale are gradational in places and transition from shaley sandstone to sandy shale. According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Warner Sandstone formation is described as follows: “Generally, the lower part is interbedded, very fine grained sandstone and claystone. The upper part is largely medium-bedded to massive channel fill sandstone. In places, the Warner consists primarily of shale and claystone, with only minor amounts of sandstone” and “ranges in thickness from 0 to 15m (49.2 ft.).”

The Sandstone is more than 25-30 feet thick in places and is generally medium hard and thin to medium bedded with occasional shale partings. The degree of induration of the Sandstone varies and generally increases with depth. Slug tests performed at selected DSI piezometers screened in

the Sandstone exhibited hydraulic conductivities ranging from approximately 1.3x10-4 cm/sec to 5.9x10-6 cm/sec. The slug test results are consistent with values for sandstone and shaley sandstone. The groundwater gradient is towards the east and Blackberry Creek.

Riverton Shale. Layers of the Riverton Shale (Shale) exhibited thicknesses ranging from approximately one foot to more than 10 feet. The Shale is generally dark gray to light gray. The Shale is mainly thin bedded with hardness ranging from soft to hard. Six packer tests were performed during the DSI to assess the hydraulic conductivity of the Shale. The packer test results ranged from approximately $3.2x10^{-6}$ cm/sec to $4.9x10^{-8}$ cm/sec. The packer test data indicates that the Shale is an effective confining unit.

According to the MDNR publication on the Pennsylvanian Subsystem in Missouri, the Riverton Shale formation is described as "dark gray to black, fine-grained, relatively brittle shale and contains as many as three coal beds, each of which is underlain by underclay" and "varies in thickness from a featheredge to more than 90 feet".

Unnamed Coal. The Shale includes coal seams in places that range in thickness from a few inches to approximately 1.5 feet. The coal is generally black to dark gray.

2.3 Groundwater Monitoring Network Design

The groundwater monitoring system for the CCR impoundment consists of nine (9) groundwater monitoring wells. Two (2) wells are considered upgradient. Two (2) wells are considered sidegradient; one is only monitored for groundwater elevation. The remaining five (5) wells are considered downgradient.

The groundwater monitoring wells (MWs) at the Asbury Generating Station is equipped with individual dedicated poly tubing to be connected to a peristaltic pump/controller at the surface. Low-flow, micro-purge and sampling techniques and technology are utilized to collect groundwater samples from the subject wells. The groundwater sampling procedures are discussed in further detail below.

2.4 Groundwater Monitoring Network

The locations of the monitoring wells are shown on **Figure 2**. The groundwater monitoring system for the site consists of the following monitoring wells:

- MW-1 Sidegradient (water level only)
- MW-2 Upgradient
- MW-3 Upgradient
- MW-4 Downgradient
- MW-5 Downgradient
- MW-5A Downgradient
- MW-6 Downgradient
- MW-6A Downgradient
- MW-7 Sidegradient

2.5 Seasonal Variation

Historical groundwater elevation data has been limited. However, adequate lengths of well screen have been utilized during the construction of the wells to accommodate typical seasonal groundwater elevation variations seen in southwest Missouri.

2.6 Groundwater Flow Direction

Historically, the seasonally high potentiometric surface indicated the groundwater flow direction to the east. **Figure 3** is a potentiometric map for this sampling event.

Originally MW-7 was thought to be a downgradient well but review of the potentiometric mapping from the eight background sampling events revealed that the well is actually a sidegradient well. Therefore, the designation for MW-7 has been changed from a downgradient to a sidegradient well for compliance monitoring.

3.0 BASELINE GROUNDWATER DATA

3.1 Baseline Data Collection

Per EPA CCR Rule § 257.94(b), the site initiated the detection monitoring program in January 2016 to include obtaining a minimum of eight (8) independent samples for each background and downgradient well. The eight (8) independent groundwater samples were obtained and analyzed as required by the CCR Rule under per the baseline groundwater monitoring plan. Background groundwater data was collected from January 2016 to August 2017.

Groundwater Monitoring Reports were completed for each sampling event and have been placed in the Operating Record. Summary tables of the results from each event are included in **Appendix 2**. A listing of each event is below:

- January 2016
- March 2016
- May 2016
- August 2016
- October 2016
- March 2017
- June 2017
- August 2017

Initial baseline monitoring was required at all monitoring wells. The sampling frequency was quarterly or more frequently for the first two (2) years. After the background data plus the first semi-annual sampling events, a reduced lower sampling frequency replaced the quarterly events to semi-annual events. This lessened sampling frequency will be completed during the months of May and October.

The initial two (2) years of baseline and the first semi-annual detection monitoring included parameters listed in Appendix III and Appendix IV of the EPA CCR Rule. The constituents listed in Appendix IV were eliminated from the overall semi-annual detection monitoring plan after review of the first semi-annual groundwater sampling event analytical results in January 2018, according to the EPA CCR Rule. **Appendix 2** contains the list of constituents.

3.2 Background Data Analysis

Sanitas™ for Ground Water Version 9.2.13 was used to run the statistical analyses with settings used as recommended by the Sanitas™ training course and user manual. The background data consisted of eight sampling events between January 2016 and August 2017 for both the Appendix III and IV constituents. Eight background events are needed for statistical analysis. An analysis of the Appendix III background data was conducted and is included in **Appendix 5**. Trending was found in Boron (MW-3) and Total Dissolved Solids (MW-3). MW-3 is an up-gradient well. Trending was not removed at that time; otherwise the site would be below the minimum of eight background samples needed to run statistics.

Four more sets of background data were available to add to the background data set for the November 2019 sampling event and then four more sets for the November 2021 sampling event. The analysis of the additional data for the background data sets was conducted and is included in **Appendix 5**. No trending was found in any of the additional sets of data so they were added to the baseline data set to increase the statistical power of the background data.

4.0 GROUNDWATER SAMPLING EVENT

On November 8 and 9, 2021 eight (8) groundwater monitoring wells were sampled by Midwest Environmental Consultants (MEC) for the EPA CCR Rule Appendix III parameters. For quality assurance and quality control measures, a duplicate sample was taken at MW-5. The sampling protocol and methodology was to be conducted in accordance to the facility's Sampling and Analysis Plan. **Table 1** provides a list of the analytical methods employed by the subcontracted laboratory.

Table 1 – Analytical Methods	
Method	**Description**
9056A	Anions, Ion Chromatography
6020A	Metals (ICP/MS)
SM 2540C	Solids, Total Dissolved (TDS)
Field Sampling	Field Sampling

Appendix 3 includes Monitoring Well Field Inspection sheets and field notes. The physical integrity of the wells was good. During sample collection each of the wells was monitored for pump discharge and formation recharge. Initially, a static water level for each well was recorded (**Table 2**). To ensure sufficient recharge while sampling, static water levels were collected during pumping. Prior to sample collection, field parameters for each well were measured with a flow-through meter. When the field parameters stabilized, samples for analytical testing were collected and placed on ice for hand delivery to the laboratory. At the conclusion of sample collection from each well, a final static water level measurement was obtained. The samples were collected in the appropriately pre-preserved sample containers and placed on ice for delivery.

Table 2 - Groundwater Sampling Field Parameters Summary During November 2021 Sampling Event				
WELL ID	**STATIC WATER LEVEL (ft-BTOC)**		**PURGE RATE (mL/min)**	**STABILIZED pH**
	Initial	**Final**		
MW-1*	6.44	NA	NA	NA
MW-2	1.23	4.20	200	6.45
MW-3	0.73	0.80	200	6.02
MW-4	6.36	12.69	200	6.72
MW-5	0.0	11.48	200	7.23
MW-5A	9.01	18.41	200	6.84
MW-6	8.61	18.73	200	7.09
MW-6A	7.87	17.70	200	7.17
MW-7	4.31	4.47	200	6.42

* Water Level Only NA – Not Applicable NT – Not Tested (inaccessible)

Appendix 4 includes the initial analytical results for the sampling event. Included with this analytical report are sample information; chain of custody; wet chemistry data; and volatile data.

5.0 DATA VALIDATION PROCEDURES FOR GROUNDWATER MONITORING DATA

Midwest Environmental Consultants receives Data Packages from the analytical laboratory (Test America). The internal quality control/quality assurance case narratives and reported data are then reviewed. Generally the data validation procedures established by the U.S. Environmental Protection Agency *Contract Laboratory Program Functional Guidelines for Organic Data Review* and *Functional Guidelines for Inorganic Data Review* is followed. These guidelines are used to assign data qualifiers to the data. A formal data validation report for the site is not prepared; however, any significant issues are noted in the groundwater monitoring report.

MEC evaluates the data set for precision, accuracy, representativeness, comparability, and completeness (PARCC).

5.1 Precision

Laboratory Precision. Laboratory quality control procedures to measure precision consist of laboratory control sample (LCS) analysis and analysis of matrix spike/matrix spike duplicates (MS/MSD). These analyses are used to define analytical variability.

Field Precision. Analyses of duplicate samples are used to define the total variability (replicability) of the sampling/analytical system as a whole. Field replicates are collected at a rate of one per sampling event.

5.2 Accuracy

Accuracy is determined by calculating the percent recoveries for analyses of surrogate compounds, LCSs, continuing calibration check standards, and matrix spike samples. Acceptable percent recoveries are established for SW-846 and EPA methods. Field and laboratory blank analysis are also used to address measurement bias.

Field Blanks. Field blanks consisted of a trip blank and a field blank. One trip blank per cooler accompanies samples for volatile organic analyses.

Laboratory Blanks. Method blanks, artificial, matrix-less samples, are analyzed to monitor the laboratory analysis system for interferences and contamination from glassware, reagents, etc. Method blanks are taken through the entire sample preparation process. They are included with each batch of extractions or digestions prepared, or with each 20 samples, whichever is more frequent.

5.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely reflect site condition. Representativeness of the data is determined by comparing actual sampling procedures to those delineated in the field sampling plan, comparing results from field replicate samples and reviewing the results of field blanks. Field notes are reviewed as part of our data validation process.

5.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured by using established and approved sample collection techniques and analytical methods, consistent basis of analysis, consistent reporting units, and analyzing standard reference materials.

5.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under controlled laboratory conditions. Completeness is defined as the valid data percentage of the total tests requested. Valid data are defined as those where the sample arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed chain-of-custody form. Furthermore, the sample must have been analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria were met.

6.0 STATISTICAL ANALYSIS

6.1 Sampling Results

The constituents with results above the laboratory reporting limits are included in **Table 3**. The Test America laboratory analytical results are included in **Appendix 4**.

Table 3 – Constituents During November 2021 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.23	0.09	<0.08J	0.29	1.6	0.38	0.41	0.24
Calcium	mg/L	NA	38	87	260	100	370	260	190	470
Chloride	mg/L	NA	110	73	3.9	6.1	140	16	22	37
Fluoride	mg/L	4.0	0.47	0.21	0.14	0.35	0.27	0.25	0.38	<0.25J
pH	SU	NA	6.45	6.02	6.72	7.23	6.84	7.09	7.17	6.42
Sulfate	mg/L	NA	<1	430	530	140	1700	1400	780	1700
Total Dissolved Solids	mg/L	NA	390	830	1400	580	3100	1800	1500	2800

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

No constituents were detected above the Federal Safe Drinking Water maximum contaminant level (MCL) during the sampling event.

6.2 Statistical Analysis

The November 2019 sampling event report indicated confirmed intrawell prediction limits exceedances. Intrawell prediction limits were utilized per the facility's 2018 Groundwater Statistical Analysis Plan. The Annual Report recommending the site move into assessment monitoring was stamped on January 23, 2020 and submitted to the facility. However, in February MEC received an email from the facility. MDNR had forwarded EPA correspondence requesting that the site change their statistical evaluation method to interwell prediction limits. EPA CCR Rule 40 CFR § 257.94(e)(2) allows at alternative source demonstration to be completed if the statistically significant increases are result of the statistical evaluation rather than from a release from the facility. **Appendix 1** contains the MDNR/EPA correspondence.

Prediction interval analyses compare one or more observations to a limit set by background data. Interwell analyses compare observations from background wells, which include upgradient and sidegradient wells per EPA Unified Guidance definitions, and their relation to the observations for the downgradient wells. Intrawell analyses compare background observations to current observations of the same well. In order to appropriately characterize the groundwater beneath the site, the statistical methods utilized at the facility consider the following facts as they relate to site:

- Potential differences in geochemical characteristics of the groundwater caused by the differing lithologies in contact with the screened interval from well to well.
- Potential impacts of surface infiltration into the groundwater environment.

Due to varying geology in the state of Missouri, intrawell analyses had initially been deemed a more appropriate method. Municipal and demolition waste landfills in Missouri typically utilize intrawell prediction limits per MDNR. However, it was noted that the power curve for these analyses was not considered strong yet. The data set consisted of only 13 sampling events from

January 2016 to November 2019. EPA Unified Guidance recommends 20 or more sampling events for background data for intrawell prediction limits. A small data set triggers an SSI when there is even a slight increase in concentration. Sanitas also note to each exceedance "*Insufficient data to test for seasonality: data were not deseasonalized.*" Minor increases in concentration noted in the May and November 2019 sampling events did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

The EPA Unified Guidance Chapter 5.2.3 states "*In groundwater data collection and testing, background conditions may not be static over time. Caution should be observed in removing observations which may signal a change in natural groundwater quality. Even when conditions have not changed, an apparently extreme measurement may represent nothing more than a portion of the background distribution that has yet to be observed. This is particularly true if the background data set contains fewer than 20 samples.*" Chapter 5.2.4 states "*With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples*". Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated.

MDNR made several requests per EPA in the correspondence located in **Appendix 1** which included the EPA review of the groundwater reports as seen in **Table 4**.

Table 4 – EPA Review of Groundwater Reports	
Facility	Asbury Power Plant
Location	Asbury, MO
Owner	Empire District Electric Company
Units	Upper Pond-unlined, South Pond-unlined, Lower Pond-unlined
Geology	Surficial unit of clay, clayey sand, and silt approximately 15 to 25 feet thick underlain by Warner Sandstone approximately 25-30 feet thick in the southern portion of the site and the Riverton Shale in the northern area of the site
Problematic Use of Intra Well Comparisons	Analytical results indicate consistent differences in contaminant concentrations between upgradient and downgradient wells. Consequently, interwell comparisons are feasible and would be preferable in the absence of compelling reasons to use intra well analysis
Problematic Alternate Source Determination	
Conclusions	While there are no boring logs in the documents to confirm that the wells are screened in the same geologic unit, consistency in the field parameters and the description of the geology suggest that the wells are screened in the sandstone. The analytical results indicate consistent differences in contaminant concentrations between upgradient and downgradient wells, consequently, interwell comparisons are feasible and would be preferable in the absence of compelling reasons to use intra wells analyses

Sanitas™ for Ground Water Version 9.6.25 was used to run the statistical analyses with settings used as recommended by the Sanitas™ training course and user manual. Interwell prediction intervals were run per EPA's request. The Sanitas™ output is included in **Appendix 5**.

Statistical analysis was performed on the Appendix III constituents from the sampling event compared to the updated background dataset. Prediction interval analyses compare one or more observations to a limit set by background data. Interwell analyses compare observations from upgradient background wells and their relation to the observations for the downgradient wells. Intrawell analyses compare background observations to current observations of the same well. Due to varying geology in the state of Missouri, intrawell analyses had initially been deemed a more appropriate method. However, EPA has requested the site utilize interwell prediction limits.

Statistical analysis results are presented below for those constituents determined to have an exceeded a prediction limit. However, EPA's "*Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*," March 2009, EPA 530/R-09-007 is referenced multiple times in the preamble of the EPA CCR regulations for groundwater sampling and analysis requirements. According to the EPA Unified Guidance, a prediction limit exceedance is not considered a statistically significant increase (SSI) until it is confirmed through retesting. SSIs generated by non-detectable results or with less than eight background events are considered statistically invalid.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). Boron does not have a MCL. The facility conducted an alternative source demonstration per the EPA CCR Rule (§ 257.94).

EPA CCR Rule 40 CFR § 257.94(e)(2) allows an alternative source demonstration that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. It is believed that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of the dewatering trench. The dewatering trench is filled with rock and an engineered cutoff trench of compacted clay material was constructed to prevent pond water from seeping through the berm. The water within the man-made dewatering trench and upgradient of the clay cutoff trench is impacting the quality of the water within MW-5A. MW-5AR will be installed downgradient of the cutoff trench system. The new well will be monitored to determine if the theory is correct.

Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

Table 5 lists the parameters with exceedances of prediction limits during the sampling event, the associated monitoring wells, if the exceedance is initial versus confirmed, the predicted limit, the measured concentration, and the MCL set forth in the National Drinking Water Regulations. The MCL is the highest level of a contaminant that is allowed in drinking water.

Table 5 – Interwell Prediction Limit Exceedances Observed During November 2021 Sampling Event					
Constituent	**Monitoring Well**	**Initial vs. Confirmed**	**Predicted Limit**	**Measured Concentration**	**Drinking Water MCLs**
Boron (mg/L)	MW-5A	Confirmed	0.9	1.6	NA
pH* (SU)	MW-5	Confirmed	6.886	7.23	NA
pH* (SU)	MW-6	Confirmed	6.886	7.09	NA
pH* (SU)	MW-6A	Confirmed	6.886	7.17	NA

NA = Not Applicable
*Field Sampled (less precise but within the required hold time)

6.3 Results Interpretation

There were no initial interwell prediction limit exceedances for the listed monitoring well during November 2021 sampling event. During the November 2021 sampling event, interwell prediction exceedances in boron (MW-5A) and pH (MW-5, MW-6 and MW-6A) were confirmed. There are no current primary (health based) MCLs for pH but the confirmed pH results are still within the acceptable range of 6.5 to 9 SU. The facility will resample as part of the May 2022 sampling event.

The results of the interwell prediction limit statistical analysis of the November 2020, May 2021 and November 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

Below is a discussion of the previous results for comparison.

May 2021

There were no initial interwell prediction limit exceedances for the listed monitoring well during May 2021 sampling event. During the November 2020 sampling event, Initial interwell prediction exceedances in pH (MW-5, MW-6 and MW-6A) and total dissolved solids (MW-5A) were noted. However, the initial prediction limit exceedance of total dissolved solids (MW-5A) was not

confirmed during the May 2020 sampling event. There are no current primary (health based) MCLs for pH but the confirmed pH results are still within the acceptable range of 6.5 to 9 SU. The facility plans to resample as part of the November 2021 sampling event.

The results of the interwell prediction limit statistical analysis of the November 2020 and May 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct. Based upon these findings the site did not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

November 2020

The results of the EPA requested interwell prediction limit statistical analysis of the November 2020 sampling event indicate a confirmed exceedance for Boron (MW-5A). Boron does not have a MCL. The facility will conduct an alternative source demonstration in the next 90 days per the EPA CCR Rule (§ 257.94).

The results for pH (MW-5, MW-6 and MW-6A) and total dissolved solids (MW-5A) indicated initial interwell prediction limit exceedances for the listed monitoring well during November 2020 sampling event. There are no current primary (health based) MCLs for pH or total dissolved solids. The facility plans to resample as part of the May 2021 sampling event. During the May 2020 sampling event, Initial interwell prediction exceedances in boron (MW-5A and MW-6A) and fluoride (MW-5A) were noted. However, the initial prediction limit exceedances of boron (MW-6A) and fluoride (MW-5A) were not confirmed during the November 2020 sampling event.

May 2020

The results of the EPA requested interwell prediction limit statistical analysis of the May 2020 sampling event indicate that the site is in compliance. The results for boron (MW-5A and MW-6A) and fluoride (MW-5A) indicated an initial interwell prediction limit exceedance for the listed monitoring well during May 2020 sampling event. There is a current primary (health based) MCL for fluoride of 4.0 mg/L but the result is below the limit. Boron does not have a MCL but does have an EPA proposed groundwater protection standard of 4.0 mg/L but all results were below that limit. Trending was found to be significant for boron (MW-5A) but not significant in boron (MW-6A) and fluoride (MW-5A). Boron is also trending upward in MW-2 which is an up-gradient well. The facility plans to resample as part of the November 2020 sampling event.

During the November 2019 sampling event, Initial interwell prediction exceedances in pH (MW-4, MW-5, MW-5A, MW-6 and MW-6A) were noted. However, these initial prediction limit exceedances were not confirmed during the May 2020 sampling event.

November 2019
The result for Chloride (MW-5A), pH (MW-4) and Sulfate (MW-5A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the November 2019 sampling event. There is no current primary (health based) MCL for chloride, pH or sulfate.

During the May 2019, the result for Boron (MW-5A) indicated an initial intrawell prediction limit exceedance and Total Dissolved Solids (MW-5A) indicated a confirmed intrawell prediction limit exceedance. There is no current primary (health based) MCL for boron and total dissolved solids. These prediction limit exceedances were confirmed during the November 2019 sampling event. A resample of MW-5A was conducted on December 11, 2019. The results of the resample confirmed the exceedances and the site planned to move into assessment monitoring.

However, in February MEC received an email from the facility. MDNR had forwarded EPA correspondence requesting that the site change their statistical evaluation method to interwell prediction limits. EPA CCR Rule 40 CFR § 257.94(e)(2) allows at alternative source demonstration to be completed if the statistically significant increases are result of the statistical evaluation rather than from a release from the facility. **Appendix 1** contains the MDNR/EPA correspondence.

The results of the EPA requested interwell prediction limit statistical analysis of the November 2019 sampling event indicate that the site is in compliance. Initial interwell prediction exceedances in pH (MW-4, MW-5, MW-5A, MW-6 and MW-6A) were noted but have not been confirmed. There is no current primary (health based) Maximum Contamination Level (MCL) for pH. Trending was not found to be significant for pH in any well during the analysis of the background data set.

May 2019
The result for Boron (MW-5A) and pH (MW-3(u), MW-5A, MW-6 and MW-6A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the May 2019 sampling event. There is no current primary (health based) MCL boron or pH. The facility plans to resample as part of the November 2019 sampling event. During the November 2018, the result for Total Dissolved Solids (MW-5A) indicated an initial intrawell prediction limit exceedance. There is no current primary (health based) MCL for total dissolved solids. This initial prediction limit exceedances was confirmed during the May 2019 sampling event. However, it should be noted that the power curve for these analyses is not considered strong. A small data set triggers an SSI when there is even a slight increase in concentration. The EPA Unified Guidance Chapter 5.2.4 states “With such a small background sample, it can be difficult to develop an adequately powerful intrawell prediction level or control chart, even when retesting is employed (Chapter 19). Thus, additional background data will be needed to augment compliance well samples”. Minor increases in concentrations did not result in any primary MCLs to be exceeded by any of the prediction limit exceedances during the sampling event, demonstrating that the groundwater has not been contaminated. It was also noted that higher levels of total dissolved solids were seen in the side-gradient well MW-7 demonstrating that a there was likely not a release from the facility. Therefore, the site will continue with detection monitoring on a semi-annual basis at this time.

November 2018
The result for Total Dissolved Solids (MW-5A) indicated an initial intrawell prediction limit exceedance for the listed monitoring well during the November 2018 sampling event. There is no current primary (health based) MCL for total dissolved solids. The facility plans to resample MW-5A for Total Dissolved Solids as part of the May 2019 sampling event. During the May 2018, no intrawell prediction limits were exceeded. Therefore, there were no initial prediction limit exceedances to confirm during the November 2018 sampling event.

May 2018
No intrawell prediction limits were exceeded during the May 2018 sampling event. The October 2017 results for Total Dissolved Solids (MW-7) indicated an exceedance of the predicted limit for the listed monitoring wells. However, this initial prediction limit exceedance was not confirmed during the May 2018 sampling event.

October 2017
The result for Total Dissolved Solids (MW-7) indicated an initial intrawell prediction limit exceedance for the listed monitoring wells during the October 2017 sampling event. However, the result was below the tolerance limit. There is no current primary (health based) MCL for total dissolved solids. Review of the Total Dissolved Solids in the duplicate sample taken from the same well (MW-7) shows a result of 3,000 mg/L, which would not be an exceedance of the intrawell prediction limit of 3,069 mg/L. Due to the variances between the sample and the duplicate, the site will re-evaluate MW-7 for Total Dissolved Solids during the next sampling event. MW-7 is considered a sidegradient well, therefore no further action is needed for exceedances in sidegradient or upgradient wells.

6.4 Proposed Actions
Statistical analysis will continue to be completed with interwell prediction limits per EPA's request. The results of the EPA requested interwell prediction limit statistical analysis of the November 2020, May 2021 and November 2021 sampling events indicate a confirmed exceedance for Boron (MW-5A). EPA CCR Rule 40 CFR § 257.94(e)(2) allows an Alternative Source Demonstration (ASD) that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality for a constituent found in a monitoring well. This ASD was completed in April 2021 and placed in the operating record. The ASD found the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality instead of a release to groundwater.

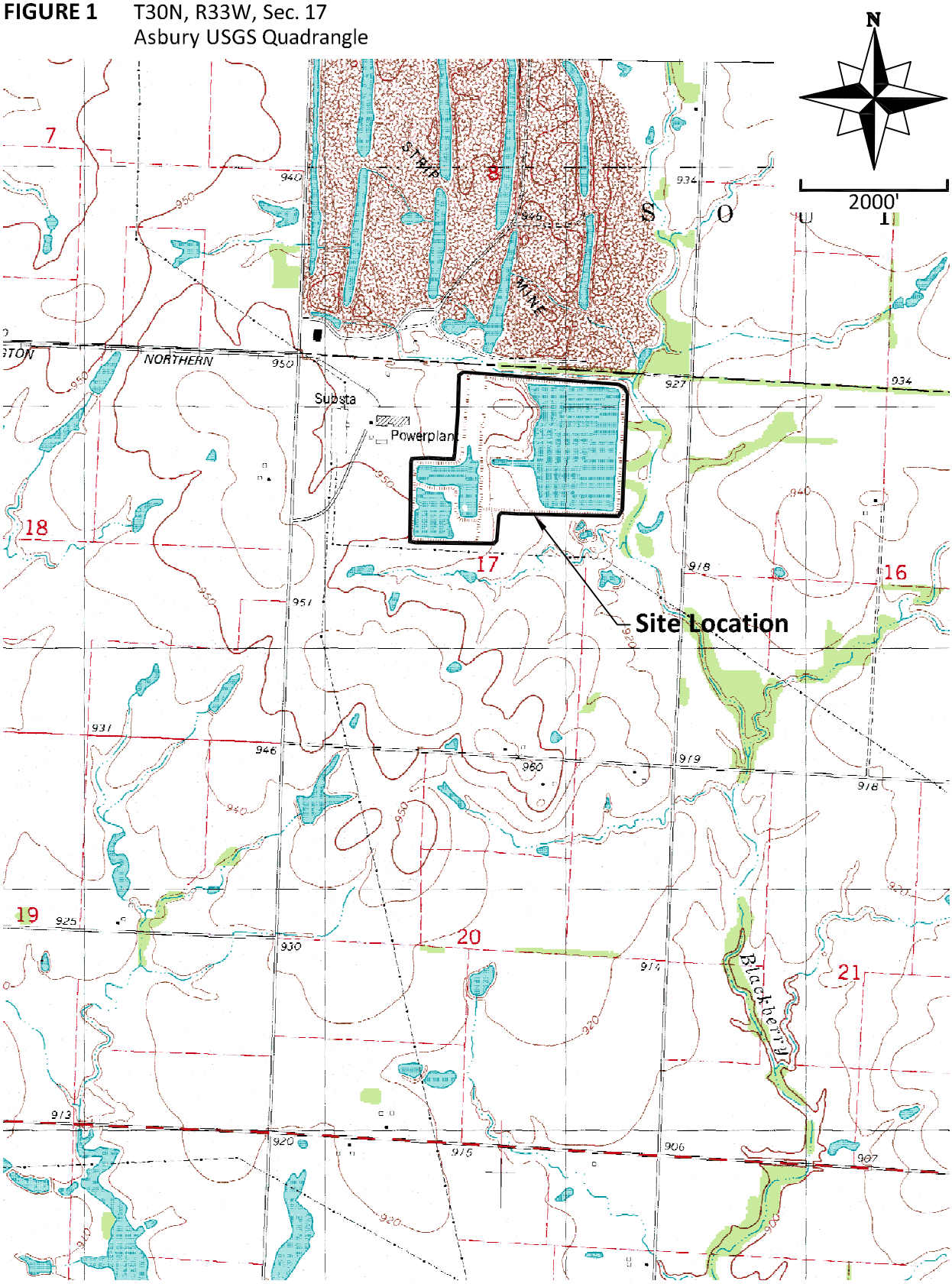
The ASD theorizes that this SSI is an issue with the location of the well rather than from a release from the facility. This alternative source demonstration confirms that MW-5A may be impacted by its placement upgradient of a historic dewatering trench and cutoff trench. The ASD proposes a replacement well for MW-5A be installed downgradient of the dewatering trench and cutoff trench system. The new replacement well will be monitored and compared to the existing MW-5A to determine if the theory is correct.

Based upon these findings the site does not need to move into the assessment monitoring program at this time and will continue with the detection monitoring program per the EPA CCR Rule (§ 257.94) on a semi-annual basis.

FIGURES

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - November 2021
Site Location Map

FIGURE 1 T30N, R33W, Sec. 17
Asbury USGS Quadrangle



January 2022

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - November 2021
Groundwater Monitoring System

FIGURE 2

Well ID	Northing	Easting
MW-1	435791.18 *	2765165.35 *
MW-2	434428.46	2762861.37
MW-3	432842.77	2762720.80
MW-4	433709.99	2764938.99
MW-5	433659.27	2765966.23
MW-5A	434150.04	2765969.78
MW-6	434600.46	2765987.98
MW-6A	435071.44	2766010.46
MW-7	435505.42	2765993.13

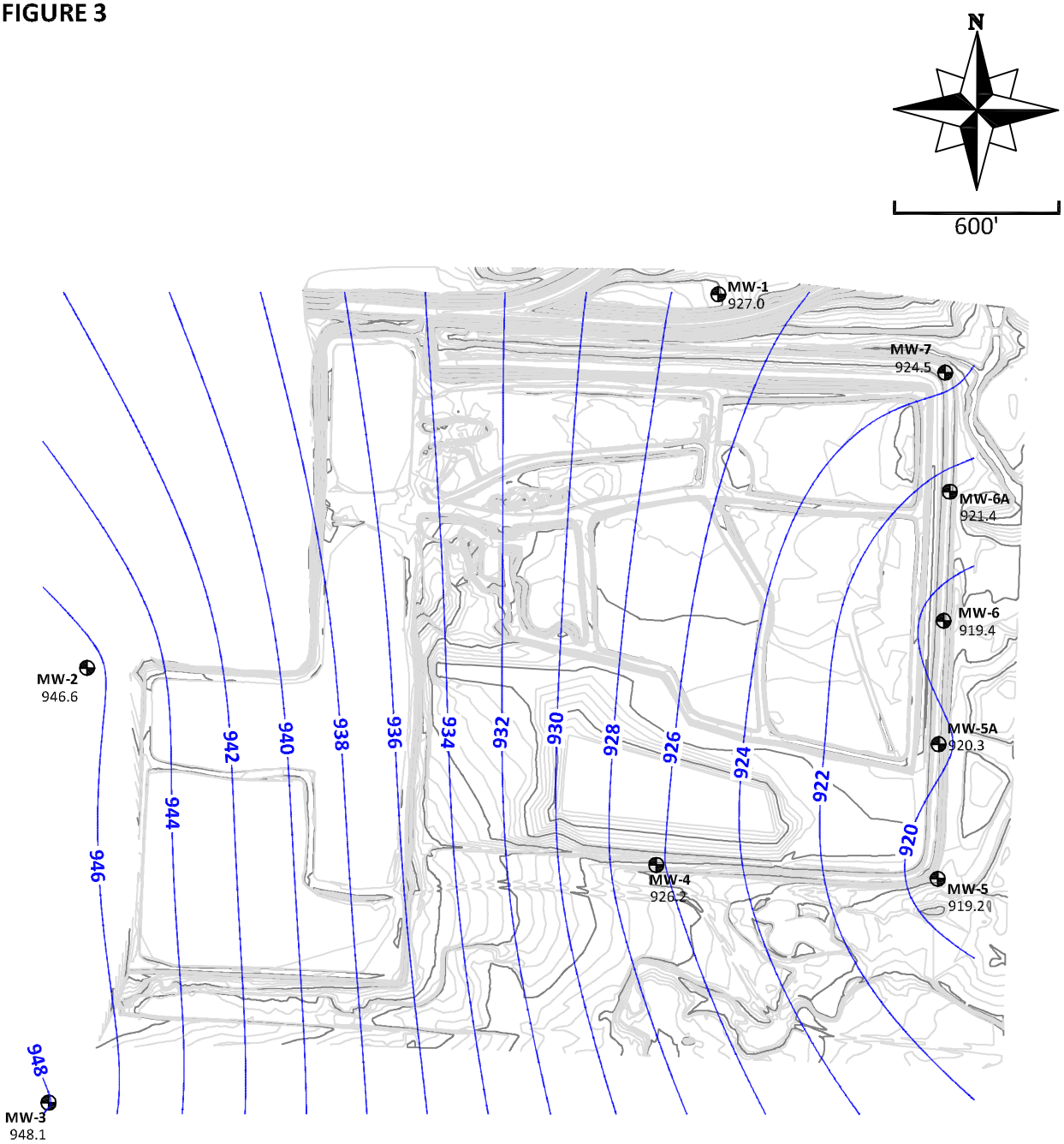
* Coordinate location is approximate

Legend

Monitoring Well

Asbury Generating Station CCR Impoundment
Groundwater Sampling Event - November 2021
Groundwater Piezometric Surface Map

FIGURE 3



Well ID	Northing	Easting	Top Of Casing	Static Water Level (BTOC)	Static Water Level
MW-1	435791.18	2765165.35	933.4	6.4	927.0
MW-2	434428.46	2762861.37	947.8	1.2	946.6
MW-3	432842.77	2762720.80	948.8	0.7	948.1
MW-4	433709.99	2764938.99	932.6	6.4	926.2
MW-5	433659.27	2765966.23	919.2	0.0	919.2
MW-5A	434150.04	2765969.78	929.3	9.0	920.3
MW-6	434600.46	2765987.98	928.0	8.6	919.4
MW-6A	435071.44	2766010.46	929.3	7.9	921.4
MW-7	435505.42	2765993.13	928.8	4.3	924.5

Legend

Monitoring Well

APPENDIX 1

EPA/MDNR Correspondence

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Eric R. Greitens, Governor
Carol S. Comer, Director

NOV 02 2017

Mr. Kavan Stull, Senior Environmental Coordinator
Empire District
602 South Joplin Avenue
Joplin, MO 64802

RE: Site Characterization Workplan

Dear Mr. Stull:

The Missouri Department of Natural Resources has reviewed the document "Site Characterization Workplan" dated May 16, 2017. The site has undergone extensive characterization regarding construction of a coal combustion residual (CCR) landfill near the CCR impoundments. The department's Water Protection Program has determined, through consulting with the Missouri Geological Survey, this characterization is sufficient and may be used in whole to complete the required monitoring of the sub-surface conditions at the site. Additional submittal of site characterization is not necessary, as the previous submittal meets the requirement for special condition 19(b) of the Missouri State Operating Permit MO-0095362. The facility may proceed with the next step laid out in the permit; special condition 19(c). Enclosed is the Missouri Geological Survey concurrence.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to 10 CSR 20 1.020 and Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is by mail at Administrative Hearing Commission, United States Post Office Building, Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102, by phone at 573-751-2422, by fax at 573-751-5018, and by website at www.oa.mo.gov/ahc.

If you have any questions, please do not hesitate to contact Ms. Pam Hackler by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176, by phone at 573-526-3386; or by email at pam.hackler@dnr.mo.gov. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

Michael J. Abbott, Chief
Operating Permits Section

MJA/php

Enclosure

c: Mr. Randall Willoughby, Southwest Regional Office

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Eric R. Greitens, Governor
Carol S. Comer, Director

MEMORANDUM

SWR18011
Jasper County

DATE: October 18, 2017

TO: Pam Hackler- WPP- Industrial Wastewater Unit

FROM: Fletcher N. Bone, Geologist, Environmental Geology Section, Geological Survey Program, MGS

Fletcher N. Bone

STATE OF MISSOURI
REGISTERED GEOLOGIST
2014000148
October 18, 2017

SUBJECT: Site characterization for existing CCR impoundments
Asbury Power Plant Site Characterization Work Plan- CCR
37 21 22.66 Latitude, -94 35 4.79 Longitude,
Jasper County, Missouri

The Missouri Geological Survey (MGS) has reviewed the documents titled, 'NPDES Permit MO-0095362 Asbury Power Plant, Jasper County, Missouri, Site Characterization Work Plan', prepared by Empire District Electric Company, dated September 8, 2017 and 'Site Characterization Work Plan, Coal Combustion Residuals Impoundments, Empire Electric Facility - Permit MO-0095362, Jasper County, Missouri, Geotechnology Project No. J021738.03', prepared by Geotechnology Inc., dated May 16, 2017. The MGS offers the following comment.

General Comment:

The MGS agrees that the existing Coal Combustion Residuals (CCR) impoundments (site 1) do not need further site characterization, at this time. The site characterization performed, as described in the Detailed Site Investigation Report (DSI), dated January 21, 2015, at the proposed CCR impoundment (site 2) that is approximately 1,000 feet south of the existing CCR impoundments (site 1), coupled with the geologic and hydrologic data provided that pertains to the existing CCR impoundments (site 1) (1996 to present data), provides adequate characterization of the geology and hydrology of the site 1. The geologic and hydrologic settings of both sites are similar, with geologic boring logs and potentiometric data of both sites being compared. The hydraulic conductivity testing conducted at the proposed CCR site (site 2) has demonstrated that there is a low potential for groundwater contamination for this area.

If you are in need of further assistance from our office or have questions regarding this evaluation please feel free to contact me at (573) 368-2161.

APPENDIX 2

Baseline Sampling Information

EPA CCR Rule

Appendix III to Part 257—Constituents for Detection Monitoring

Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)

Appendix IV to Part 257—Constituents for Assessment Monitoring

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined

1st Baseline Event –
January 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.33	<0.5 J	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Calcium	mg/L	NA	57	74	220	84	200	250	140	570
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.43	0.47	0.31	0.28	0.30	0.24	0.35	<0.2 J
pH	SU	NA	6.33	5.81	6.31	7.33	7.09	6.97	7.09	6.51
Sulfate	mg/L	NA	260	360	1100	140	800	1000	600	1800
Total Dissolved Solids	mg/L	NA	690	790	1900	590	1500	1800	1300	2800
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.002 J	0.01	<0.01 J	<0.02 J	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	2	0.044	0.0099	0.065	0.086	0.036	0.02	0.042	0.011
Beryllium	mg/L	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.01 J	<0.01 J	<0.01 J	<0.01 J	<0.01	<0.01
Cobalt	mg/L	NA	<0.01 J	<0.01 J	0.046	<0.002 J	0.018	0.0022	0.02	0.014
Lead	mg/L	0.015	<0.002 J	<0.002	<0.01 J	<0.002 J	<0.002	<0.002	<0.002	<0.002 J
Lithium	mg/L	NA	0.057	0.15	<0.05 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002 J	<0.002 J	<0.01 J	<0.002	<0.01 J	<0.002
Selenium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.477 J	<0.427 J	<2.08	<0.563 J	<0.392 J	<0.446 J	<0.306 J	<0.279 J

NA = Not Applicable

<x = Less than reporting limit (nondetectable)

J = Trace value seen above minimum detection limit but below reporting limit (trace)

2nd Baseline Event –
March 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.90	0.060	<0.25	0.29	0.29	0.34	0.34	0.29
Calcium	mg/L	NA	120	92	260	94	190	250	160	620
Chloride	mg/L	NA	180	70	15	4.4	23	9.0	36	34
Fluoride	mg/L	4	0.28	0.28	0.10	0.38	0.31	0.23	0.31	0.16
pH	SU	NA	5.82	5.68	6.72	7.15	6.94	6.79	6.98	6.22
Sulfate	mg/L	NA	570	400	570	140	710	970	550	1800
Total Dissolved Solids	mg/L	NA	1300	840	1600	590	1500	1800	1200	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002 J	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.002 J	0.024	0.0038	<0.002 J	0.0038	0.0026	0.0025	0.004
Barium	mg/L	2	0.060	0.012	0.034	0.047	0.042	0.026	0.051	0.0089
Beryllium	mg/L	0.004	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002 J	0.0034	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.017	0.0095	0.021	<0.002 J	0.02	0.0061	0.0063	0.016
Lead	mg/L	0.015	<0.002 J	<0.002 J	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Lithium	mg/L	NA	0.20	0.15	0.074	0.074	0.14	0.22	0.14	0.30
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.002	<0.002 J	<0.002	<0.002 J	0.0041	<0.002 J	0.0038	<0.002
Selenium	mg/L	0.05	<0.002	<0.002	<0.002	0.0021	0.0028	0.0031	0.0031	<0.002
Thallium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Combined Radium	pCi/L	5	<0.337 J	<0.389 J	<0.84 J	<0.315 J	<0.336 J	<0.319 J	<0.348 J	<0.329 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

3rd Baseline Event –
May 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.21	0.044	0.027	0.24	0.26	0.25	0.23	0.29
Calcium	mg/L	NA	130	100	91	5	59	11	90	36
Chloride	mg/L	NA	140	83	120	4.7	28	10	38	38
Fluoride	mg/L	4	0.28	0.27	0.22	0.55	0.35	0.26	0.43	0.18
pH	SU	NA	5.30	4.37	5.97	6.43	6.60	6.51	6.64	5.82
Sulfate	mg/L	NA	160	540	820	150	920	1400	620	2400
Total Dissolved Solids	mg/L	NA	500	800	1700	590	1500	1800	1100	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	0.0013	0.027	0.01	0.0043	0.01	0.007	0.0037	0.0082
Barium	mg/L	2	0.021	0.01	0.025	0.045	0.037	0.041	0.04	0.021
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	0.0025	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0072	0.0073	0.0071	<0.0005J	0.00081	0.0035	<0.0005J	0.0037
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001 J
Lithium	mg/L	NA	<0.05 J	0.15	<0.05 J	0.074	0.16	0.31	0.12	0.22
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0052	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005 J	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001
Combined Radium	pCi/L	5	<0.355	<0.427 J	<0.386 J	<0.402 J	<0.377 J	<0.357 J	<0.334 J	<0.333 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

4th Baseline Event –
August 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.19	0.057	0.067	0.27	0.27	0.29	0.27	0.22
Calcium	mg/L	NA	38	79	110	74	180	220	130	430
Chloride	mg/L	NA	120	77	35	6	35	12	65	49
Fluoride	mg/L	4	0.25	0.15	0.3	0.26	0.31	0.23	0.37	0.22
pH	SU	NA	6.04	5.73	7	7.17	7.04	6.88	7.14	6.29
Sulfate	mg/L	NA	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Total Dissolved Solids	mg/L	NA	460	850	730	540	1500	1800	1100	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Arsenic	mg/L	0.01	<0.001 J	0.013	<0.001 J	<0.001 J	0.001	<0.001 J	<0.001 J	<0.001 J
Barium	mg/L	2	0.023	<0.01 J	0.012	0.035	0.031	0.014	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0052	0.0088	0.0038	<0.0005J	0.00075	<0.0005J	<0.0005J	0.015
Lead	mg/L	0.015	<0.001 J	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001	<0.001 J	<0.001
Lithium	mg/L	NA	<0.05 J	0.16	<0.05 J	0.078	0.16	0.22	0.11	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	<0.005	0.0067	<0.005
Selenium	mg/L	0.05	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005 J	<0.005	<0.005 J	<0.005 J
Thallium	mg/L	0.002	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.424 J	<0.465 J	<0.833	<0.441 J	<0.435 J	<0.45 J	<0.484 J	<0.418 J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

5th Baseline Event –
October 2016 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.2	0.053	0.047	0.24	0.33	0.34	0.31	0.26
Calcium	mg/L	NA	43	91	100	94	220	260	130	490
Chloride	mg/L	NA	130	65	74	6	29	13	65	56
Fluoride	mg/L	4	0.28	0.18	0.28	0.31	0.39	0.25	0.41	0.28
pH	SU	NA	6.59	5.95	7.21	7.51	8.00	6.98	7.85	6.75
Sulfate	mg/L	NA	99	470	120	120	1100	1100	570	1400
Total Dissolved Solids	mg/L	NA	460	850	580	570	1500	1700	1100	2800
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002 J	<0.002
Arsenic	mg/L	0.01	<0.001	0.014	<0.001 J	<0.001 J	<0.001 J	<0.001	<0.001 J	<0.001 J
Barium	mg/L	2	0.028	<0.01 J	0.02	0.03	0.033	0.013	0.037	<0.01 J
Beryllium	mg/L	0.004	<0.001	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0051	0.0095	0.0013	0.00073	0.0072	<0.0005J	<0.0005J	0.014
Lead	mg/L	0.015	<0.001 J	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	<0.05	0.078	0.17	0.24	0.12	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005	<0.005	<0.005	<0.005 J	0.0066	<0.005	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005J	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.436J	<0.478J	<0.535J	<0.503J	<0.498J	<0.464J	<0.453J	<0.424J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

6th Baseline Event –
March 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.22	0.052	0.057	0.23	0.29	0.33	0.36	0.26
Calcium	mg/L	NA	38	93	250	86	200	260	170	500
Chloride	mg/L	NA	130	52	19	5.3	29	11	19	39
Fluoride	mg/L	4	0.21	0.12	<0.1 J	0.29	0.29	0.19	0.3	0.12
pH	SU	NA	6.07	5.84	6.67	7.32	7.38	7.15	7.21	6.40
Sulfate	mg/L	NA	130	540	630	150	1100	1000	720	1900
Total Dissolved Solids	mg/L	NA	500	940	1600	620	1700	1900	1400	3000
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001	0.037	0.0022	0.0013	0.0014	<0.001 J	0.0043	<0.001 J
Barium	mg/L	2	0.021	0.011	0.021	0.033	0.026	0.015	0.027	<0.01 J
Beryllium	mg/L	0.004	<0.001 J	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 J
Cadmium	mg/L	0.005	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J	<0.002 J
Cobalt	mg/L	NA	0.0071	0.0097	0.0096	<0.0005J	0.0022	0.0024	0.0017	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05 J	0.17	0.072	0.076	0.16	0.23	0.14	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005 J	<0.005 J	<0.005	<0.005	<0.005 J	<0.005	<0.005 J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001 J	<0.001 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	0.575	1.63	0.287	1.50	0.803	2.68	1.73	1.62

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

7th Baseline Event –
June 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	<0.08J	<0.08J	0.034	0.27	0.31	0.37	0.36	0.26
Calcium	mg/L	NA	42	100	300	89	200	260	160	470
Chloride	mg/L	NA	130	54	110	5.4	23	12	26	48
Fluoride	mg/L	4	0.43	0.19	0.18	0.35	0.42	0.3	0.42	0.21
pH	SU	NA	6.35	5.78	6.62	7.22	7.04	6.93	7.09	6.41
Sulfate	mg/L	NA	78	650	1400	180	940	1300	780	2400
Total Dissolved Solids	mg/L	NA	450	950	2000	610	1600	1800	1400	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/L	0.01	<0.001J	0.1	0.0032	<0.001J	0.0037	<0.001	0.0018	<0.001
Barium	mg/L	2	0.03	0.016	0.048	0.04	0.026	0.017	0.025	<0.01J
Beryllium	mg/L	0.004	<0.001	0.0031	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002J	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.004	0.0088	0.0042	<0.0005J	0.0045	0.00087	0.0059	0.0015
Lead	mg/L	0.015	0.0033	0.001	0.0074	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.18	0.053	0.085	0.18	0.25	0.15	0.34
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005	<0.005J	<0.005	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.397J	<0.337J	<0.403	<0.291J	<0.343J	<0.414J	<0.33J	<0.314J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

8th Baseline Event –
August 2017 Sampling Event

Constituent	Units	MCL	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6	MW-6A	MW-7
Appendix III										
Boron	mg/L	NA	0.16	<0.08J	<0.08J	0.28	0.33	0.34	0.38	0.27
Calcium	mg/L	NA	43	98	83	57	220	250	180	510
Chloride	mg/L	NA	130	45	8.1	5.3	23	12	26	38
Fluoride	mg/L	4	0.26	0.17	0.32	0.27	0.45	0.25	0.4	0.22
pH	SU	NA	6.2	5.7	6.7	7.3	7.0	7.2	7.1	6.3
Sulfate	mg/L	NA	82	550	63	140	920	1100	730	2200
Total Dissolved Solids	mg/L	NA	450	960	450	530	1600	1800	1400	2900
Appendix IV										
Antimony	mg/L	0.006	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002J	<0.002
Arsenic	mg/L	0.01	<0.001J	0.013	<0.001J	0.002	<0.001J	<0.001J	<0.001J	<0.001J
Barium	mg/L	2	0.024	0.01	0.018	0.027	0.023	0.018	0.021	<0.01J
Beryllium	mg/L	0.004	<0.001	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001J
Cadmium	mg/L	0.005	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.1	<0.002J	<0.002	0.0026	<0.002	<0.002	<0.002	<0.002	<0.002
Cobalt	mg/L	NA	0.0036	0.01	0.00067	<0.0005J	0.0023	<0.0005J	0.0051	0.014
Lead	mg/L	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	mg/L	NA	<0.05J	0.17	<0.05J	0.073	0.18	0.22	0.15	0.32
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	NA	<0.005	<0.005J	<0.005	<0.005J	<0.005J	<0.005J	<0.005J	<0.005
Selenium	mg/L	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	mg/L	0.002	<0.001J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Combined Radium	pCi/L	5	<0.42J	<0.417J	<0.473	<0.476J	<0.383J	<0.389J	<0.291J	<0.346J

NA = Not Applicable
<x = Less than reporting limit (nondetectable)
J = Trace value seen above minimum detection limit but below reporting limit (trace)

APPENDIX 3

Monitoring Well Field Inspection Sheets and Field Notes

MW-1 6.44

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 2

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1000 mL post pump calibration.

Date / Time Initiated: 11 8 -21 @ 3:00 Date / Time Completed: 11 - 8 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data: * Fast Recharge

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity (NTU)	Other (Color, Clarity, Odor)
3:02	200	400	19.2	6.66	707	19.4	41.1	2.97	C
:04		600	18.9	6.55	703	16.5	35.9	4.85	
:06		800	18.8	6.47	702	14.7	33.5	2.79	
:08		1000	18.8	6.45	703	13.9	33.2	2.31	

Time sampled 3:10

Weather Conditions 70° Clear Windy

Water Level Start 1.23

Water Level Finish 4.20

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

X

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 3

Sample ☑ Blind Duplicate ☐ Field Blank ☐

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2200 mL post pump calibration.

Date / Time Initiated: 11 9 -21 @ 12:40 Date / Time Completed: 11 – 9 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
12:45	200	1000	17.2	6.37	1125	40.8	36.3	244	
:47		1400	17.1	6.19	1122	34.7	35	143	
:49		1800	17.0	6.08	1120	30.9	34	82	
:51		2200	16.9	6.02	1119	30.3	33.1	79	

Time sampled 12:55

Weather Conditions Cloudy 60's

Water Level Start 0.73'

Water Level Finish 0.80'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	(G)	F	P
Pad Condition	(G)	F	P
Casing Condition	G	(F)	P
Locking Cap & Lock	G	(F)	P
Riser Condition	G	(F)	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	(N)	N/A
Standing Water	(Y)	(N)	N/A
Clear of Weeds	(Y)	N	N/A
Measuring Point	(Y)	N	N/A
Split sample with MDNR	Y	(N)	N/A
Maintenance Performed	Y	(N)	N/A
Decontamination Normal	(Y)	N	N/A
Equipment Calibration Normal	(Y)	N	N/A
Redevelopment Needed	(Y)	N	N/A
Any deviations from SAP	Y	(N)	N/A
Sediment Thickness Checked	Y	(N)	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

X

2021 Field Sampling Log

Facility: Asbury CCR (**Permit #**)

Monitoring Well ID: **MW-** 4

Sample [X] **Blind Duplicate** [ ] **Field Blank** [ ]

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1400 mL post pump calibration .

Date / Time Initiated: 11 - 8 -21 @ 3:35 Date / Time Completed: 11 - 8 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
3:39	200	800	18.5	6.67	1740	20.0	12.6	44.71	Cloudy
:41		1000	18.3	6.69	1803	16.9	7.4	38.14	"
:43		1200	18.2	6.71	1807	15.2	1.2	37.72	"
:45		1400	18.1	6.72	1804	~~[illegible]~~	-1.6	42.66	
						14.3			

Time sampled 3:45

Weather Conditions 70° Windy Clear

Water Level Start 6.36'

Water Level Finish 12.69'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 5

Sample X Blind Duplicate X Field Blank X

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing** 9:00 9:15

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 11 9 -21 @ 8:29 Date / Time Completed: 11 – 9 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
8:33	200	800	16.4	7.58	886	23.1	13.5	5.56	C
:35		1200	16.7	7.30	884	19.5	[illegible]	2.02	
:37		1600	16.7	7.26	885	17.9	-35.6	11.2	
:39		2000	16.8	7.23	886	16.2	-46.2	20.46	

Time sampled 8:40

Weather Conditions Cloudy VP 50's

Water Level Start 0.0'

Water Level Finish 11.48'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW-5A

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 1600 mL post pump calibration .

Date / Time Initiated: 11 9 -21 @ 9:25 Date / Time Completed: 11 – 9 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
9:24	200	400	16.4	7.26	3707	31.0	59.0	23.35	C
29		800	16.2	7.07	3842	21.7	43.7	16.66	
31		1200	16.3	6.94	3859	17.8	32.9	66.74	
33		1600	16.2	6.84	3861	16.2	26.7	28.45	

Time sampled 9:35

Weather Conditions Cloudy UP 50s

Water Level Start 9.01'

Water Level Finish 18.41'

Name (MEC Field Sampler): Ryan Orthals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

X

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 6

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2600 mL post pump calibration.

Date / Time Initiated: 11 - 9 -21 @ 10:07 Date / Time Completed: 11 - 9 -21 @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (mL)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
10:14	200	1400	17.3	7.26	2035	17.4	29.7	37.46	C
:16		1800	17.3	7.18	2029	19.5	26.6	111.55	C
:18		2200	17.3	7.12	2020	14.4	24.3	181.12	
:20		2600	17.3	7.09	2015	1460	23.1	205.21	

Time sampled 10:20

Weather Conditions Cloudy 60° Windy

Water Level Start 8.61'

Water Level Finish 18.73

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 1	MW-2	MW-3	MW-4	MW-5	MW-5A	MW-6
pH	S.U.	NO TEST	5.83	5.08	6.30	6.83	6.82	6.72
Specific Conductance	umhos/cm	GW	0.786	1.132	2.083	0.841	1.769	1.900
Total Well Depth	ft	Level						
Average GW Depth	ft	Only	1.24	0.4	5.39	1.32	6.92	7.86
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	DON'T SAMPLE	800	800	800	800	800	800

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 6A

Sample [X] Blind Duplicate [ ] Field Blank [ ].

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2200 mL post pump calibration.

Date / Time Initiated: 11 – 9 -21 @ 10:56 Date / Time Completed: 11 – 9 -21- @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (ml)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
11:01	200	1000	16.7	7.36	1804	20.0	50.4	14.17	C
0 :03		1400	16.6	7.30	1803	18.1	46.9	16.37	
:05		1800	16.6	7.22	1802	16.0	42.1	17.34	
:07		2200	16.6	7.17	1801	15.0	38.5	16.62	

Time sampled 11:10

Weather Conditions Cloudy 60°

Water Level Start 7.87'

Water Level Finish 17.70'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 6A	MW-7					
pH	S.U.	6.87	6.12					
Specific Conductance	umhos/cm	1.601	2.699					
Total Well Depth	ft							
Average GW Depth	ft	7.28	3.04					
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	800	800					

2021 Field Sampling Log

Facility: Asbury CCR (Permit #) Monitoring Well ID: MW- 7

Sample ☐ Blind Duplicate ☐ Field Blank ☐.

Purge Information:

Method of Well Purge: **Peristaltic Pump with 3/8 - inch Diameter Tubing**

Actual Purge Volume Removed: 2000 mL post pump calibration.

Date / Time Initiated: 11 – 9 -21 @ 11:38 Date / Time Completed: 11 – 9 -21- @

Well Purged To Dryness?: Y / N Petroleum or Gas Detected? Y / N

Purge Data:

Time	Purge Rate (mL/min)	Cumulative Volume (ml)	Temp. (°C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (MV)	Turbidity ( )	Other (Color, Clarity, Odor)
11:42	200	800	17.0	6.71	2833	24.0	18.9	20.40	C
0:44		1200	17.0	6.53	2836	18.6	18.8	17.42	
:46		1600	17.0	6.46	2836	16.8	18.5	21.23	
:48		2000	17.0	6.42	2835	16.0	17.9	21.17	

MW-1 @ 44'

Time sampled 11:50

Weather Conditions Cloudy 60°

Water Level Start 4.31'

Water Level Finish 4.47'

Name (MEC Field Sampler): Ryan Ortbals and Rick Elgin

Sampler Signature

Field Inspection	Good	Fair	Poor
Access	G	F	P
Pad Condition	G	F	P
Casing Condition	G	F	P
Locking Cap & Lock	G	F	P
Riser Condition	G	F	P

Field Inspection	Yes	No	N/A
Well ID Visible	Y	N	N/A
Standing Water	Y	N	N/A
Clear of Weeds	Y	N	N/A
Measuring Point	Y	N	N/A
Split sample with MDNR	Y	N	N/A
Maintenance Performed	Y	N	N/A
Decontamination Normal	Y	N	N/A
Equipment Calibration Normal	Y	N	N/A
Redevelopment Needed	Y	N	N/A
Any deviations from SAP	Y	N	N/A
Sediment Thickness Checked	Y	N	N/A

Historical Data: Average of sampling events

Constituent	Units	MW- 6A	MW-7					
pH	S.U.	6.87	6.12					
Specific Conductance	umhos/cm	1.601	2.699					
Total Well Depth	ft							
Average GW Depth	ft	7.28	3.04					
Average GW Drop	ft							
2 System Volumes (Min Purged Amount)	mL	800	800					

X

APPENDIX 4

Analytical Results from Lab

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-129771-1
Client Project/Site: Asbury Pond - EPA

For:
Midwest Environmental Consultants
2009 East McCarty Street
Suite 2
Jefferson City, Missouri 65101

Attn: Anika Careaga

Authorized for release by:
11/18/2021 3:57:57 PM

Andy Johnson, Manager of Project Management
(615)301-5045
Andy.Johnson@Eurofinset.com

PA Lab ID: 02-00416

Table of Contents

Job ID: 180-129771-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-129771-1

Comments
No additional comments.

Receipt
The samples were received on 11/10/2021 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 2.1º C and 2.6º C.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Field Service / Mobile Lab
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21 *
California	State	2891	04-30-22
Connecticut	State	PH-0688	09-30-22
Florida	NELAP	E871008	06-30-22
Georgia	State	PA 02-00416	04-30-22
Illinois	NELAP	004375	06-30-22
Kansas	NELAP	E-10350	01-31-22
Kentucky (UST)	State	162013	04-30-22
Kentucky (WW)	State	KY98043	12-31-21
Louisiana	NELAP	04041	06-30-22
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-21
Nevada	State	PA00164	08-31-22
New Hampshire	NELAP	2030	04-05-22
New Jersey	NELAP	PA005	06-30-22
New York	NELAP	11182	04-01-22
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-22
Oregon	NELAP	PA-2151	02-06-22
Pennsylvania	NELAP	02-00416	04-30-22
Rhode Island	State	LAO00362	12-31-21
South Carolina	State	89014	04-30-22
Texas	NELAP	T104704528	03-31-22
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-22
Virginia	NELAP	10043	09-15-22
West Virginia DEP	State	142	01-31-22
Wisconsin	State	998027800	08-31-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-129771-1	MW-2	Water	11/08/21 15:10	11/10/21 10:00
180-129771-2	MW-3	Water	11/09/21 12:55	11/10/21 10:00
180-129771-3	MW-4	Water	11/08/21 15:45	11/10/21 10:00
180-129771-4	MW-5	Water	11/09/21 08:40	11/10/21 10:00
180-129771-5	MW-5A	Water	11/09/21 09:35	11/10/21 10:00
180-129771-6	MW-6	Water	11/09/21 10:20	11/10/21 10:00
180-129771-7	MW-6A	Water	11/09/21 11:10	11/10/21 10:00
180-129771-8	MW-7	Water	11/09/21 11:50	11/10/21 10:00
180-129771-9	Duplicate	Water	11/09/21 09:00	11/10/21 10:00
180-129771-10	Field Blank	Water	11/09/21 09:15	11/10/21 10:00

Method Summary

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PIT
Field Sampling	Field Sampling	EPA	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-2

Date Collected: 11/08/21 15:10
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 15:36	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 19:45	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/08/21 16:10	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-3

Date Collected: 11/09/21 12:55
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1	1 mL	1.0 mL	378879	11/14/21 16:46	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			378879	11/14/21 17:02	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 19:48	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 13:55	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-4

Date Collected: 11/08/21 15:45
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 17:19	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			378879	11/14/21 17:35	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 19:52	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/08/21 16:45	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-5

Date Collected: 11/09/21 08:40
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 18:30	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:03	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 09:40	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-5A

Date Collected: 11/09/21 09:35
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			378879	11/14/21 19:08	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			378879	11/14/21 19:26	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:07	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 10:35	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-6

Date Collected: 11/09/21 10:20
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			378879	11/14/21 19:45	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			378879	11/14/21 20:04	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:10	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 11:20	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-6A
Date Collected: 11/09/21 11:10
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 20:22	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			378879	11/14/21 20:41	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:14	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 12:10	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: MW-7
Date Collected: 11/09/21 11:50
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			378879	11/14/21 21:00	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			378879	11/14/21 21:18	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:17	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 12:50	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: Duplicate
Date Collected: 11/09/21 09:00
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 22:14	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:21	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Field Sampling		1			378618	11/09/21 10:00	KAR	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: Field Blank
Lab Sample ID: 180-129771-10
Date Collected: 11/09/21 09:15
Matrix: Water
Date Received: 11/10/21 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			378879	11/14/21 22:52	JRB	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	378954	11/16/21 10:30	KFS	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			379323	11/17/21 20:25	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Analysis	SM 2540C		1	100 mL	100 mL	378658	11/11/21 17:13	KMM	TAL PIT
	Instrument ID: NOEQUIP									

Laboratory References:

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KFS = Kelly Shannon

Batch Type: Analysis

JRB = James Burzio

KAR = Kacy Reitnauer

KMM = Kendric Moore

RSK = Robert Kurtz

Client Sample Results

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: MW-2
Lab Sample ID: 180-129771-1

Date Collected: 11/08/21 15:10
Matrix: Water
Date Received: 11/10/21 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110		1.0	0.71	mg/L			11/14/21 15:36	1
Fluoride	0.47		0.10	0.026	mg/L			11/14/21 15:36	1
Sulfate	ND		1.0	0.76	mg/L			11/14/21 15:36	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.23		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 19:45	1
Calcium	38		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 19:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	390		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.45				SU			11/08/21 16:10	1

Client Sample Results

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: MW-3
Date Collected: 11/09/21 12:55
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-2
Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	73		1.0	0.71	mg/L			11/14/21 16:46	1
Fluoride	0.21		0.10	0.026	mg/L			11/14/21 16:46	1
Sulfate	430		10	7.6	mg/L			11/14/21 17:02	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.090		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 19:48	1
Calcium	87		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 19:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	830		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.02				SU			11/09/21 13:55	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-4

Date Collected: 11/08/21 15:45
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-3

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.9		1.0	0.71	mg/L			11/14/21 17:19	1
Fluoride	0.14		0.10	0.026	mg/L			11/14/21 17:19	1
Sulfate	530		10	7.6	mg/L			11/14/21 17:35	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.063	J	0.080	0.039	mg/L		11/16/21 10:30	11/17/21 19:52	1
Calcium	260		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 19:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1400		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.72				SU			11/08/21 16:45	1

Client Sample Results

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: MW-5
Lab Sample ID: 180-129771-4

Date Collected: 11/09/21 08:40
Matrix: Water
Date Received: 11/10/21 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.1		1.0	0.71	mg/L			11/14/21 18:30	1
Fluoride	0.35		0.10	0.026	mg/L			11/14/21 18:30	1
Sulfate	140		1.0	0.76	mg/L			11/14/21 18:30	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.29		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:03	1
Calcium	100		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	580		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.23				SU			11/09/21 09:40	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-5A

Date Collected: 11/09/21 09:35
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-5

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		2.5	1.8	mg/L			11/14/21 19:08	2.5
Fluoride	0.27		0.25	0.065	mg/L			11/14/21 19:08	2.5
Sulfate	1700		25	19	mg/L			11/14/21 19:26	25

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.6		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:07	1
Calcium	370		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	3100		20	20	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.84				SU			11/09/21 10:35	1

Client Sample Results

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: MW-6
Lab Sample ID: 180-129771-6

Date Collected: 11/09/21 10:20
Matrix: Water
Date Received: 11/10/21 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16		2.5	1.8	mg/L			11/14/21 19:45	2.5
Fluoride	0.25		0.25	0.065	mg/L			11/14/21 19:45	2.5
Sulfate	1400		25	19	mg/L			11/14/21 20:04	25

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.38		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:10	1
Calcium	260		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.09				SU			11/09/21 11:20	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-6A

Date Collected: 11/09/21 11:10
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-7

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	22		1.0	0.71	mg/L			11/14/21 20:22	1
Fluoride	0.38		0.10	0.026	mg/L			11/14/21 20:22	1
Sulfate	780		10	7.6	mg/L			11/14/21 20:41	10

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.41		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:14	1
Calcium	190		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1500		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.17				SU			11/09/21 12:10	1

Client Sample Results

Client: Midwest Environmental Consultants
Project/Site: Asbury Pond - EPA

Job ID: 180-129771-1

Client Sample ID: MW-7

Date Collected: 11/09/21 11:50
Date Received: 11/10/21 10:00

Lab Sample ID: 180-129771-8

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	37		2.5	1.8	mg/L			11/14/21 21:00	2.5
Fluoride	0.14	J	0.25	0.065	mg/L			11/14/21 21:00	2.5
Sulfate	1700		25	19	mg/L			11/14/21 21:18	25

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.24		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:17	1
Calcium	470		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2800		20	20	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.42				SU			11/09/21 12:50	1

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: Duplicate
Lab Sample ID: 180-129771-9

Date Collected: 11/09/21 09:00
Matrix: Water
Date Received: 11/10/21 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.9		1.0	0.71	mg/L			11/14/21 22:14	1
Fluoride	0.37		0.10	0.026	mg/L			11/14/21 22:14	1
Sulfate	140		1.0	0.76	mg/L			11/14/21 22:14	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.30		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:21	1
Calcium	90		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	560		10	10	mg/L			11/11/21 17:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.23				SU			11/09/21 10:00	1

Client: Midwest Environmental Consultants
Job ID: 180-129771-1
Project/Site: Asbury Pond - EPA

Client Sample ID: Field Blank
Lab Sample ID: 180-129771-10

Date Collected: 11/09/21 09:15
Matrix: Water
Date Received: 11/10/21 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	72		1.0	0.71	mg/L			11/14/21 22:52	1
Fluoride	3.5		0.10	0.026	mg/L			11/14/21 22:52	1
Sulfate	ND		1.0	0.76	mg/L			11/14/21 22:52	1

Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.057	J	0.080	0.039	mg/L		11/16/21 10:30	11/17/21 20:25	1
Calcium	5.2		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 20:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	210		10	10	mg/L			11/11/21 17:13	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-378879/7
Matrix: Water
Analysis Batch: 378879

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	0.71	mg/L			11/14/21 14:25	1
Fluoride	ND		0.10	0.026	mg/L			11/14/21 14:25	1
Sulfate	ND		1.0	0.76	mg/L			11/14/21 14:25	1

Lab Sample ID: LCS 180-378879/6
Matrix: Water
Analysis Batch: 378879

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	48.5		mg/L		97	80 - 120
Fluoride	2.50	2.46		mg/L		99	80 - 120
Sulfate	50.0	48.7		mg/L		97	80 - 120

Lab Sample ID: 180-129771-1 MS
Matrix: Water
Analysis Batch: 378879

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	100		125	230		mg/L		103	80 - 120
Fluoride	0.37	J	6.25	6.93		mg/L		105	80 - 120
Sulfate	44		125	175		mg/L		105	80 - 120

Lab Sample ID: 180-129771-1 MSD
Matrix: Water
Analysis Batch: 378879

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	100		125	230		mg/L		102	80 - 120	0	15
Fluoride	0.37	J	6.25	6.95		mg/L		105	80 - 120	0	15
Sulfate	44		125	173		mg/L		103	80 - 120	1	15

Method: EPA 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-378954/1-A
Matrix: Water
Analysis Batch: 379323

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 378954

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.080	0.039	mg/L		11/16/21 10:30	11/17/21 18:58	1
Calcium	ND		0.50	0.13	mg/L		11/16/21 10:30	11/17/21 18:58	1

Lab Sample ID: LCS 180-378954/2-A
Matrix: Water
Analysis Batch: 379323

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 378954

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.25	1.08		mg/L		87	80 - 120
Calcium	25.0	27.0		mg/L		108	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 180-378658/2
Matrix: Water
Analysis Batch: 378658

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10	10	mg/L			11/11/21 17:13	1

Lab Sample ID: LCS 180-378658/1
Matrix: Water
Analysis Batch: 378658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			422	406		mg/L		96	80 - 120		

Lab Sample ID: 180-129771-1 DU
Matrix: Water
Analysis Batch: 378658

Client Sample ID: MW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	390			379		mg/L				2	10

HPLC/IC

Analysis Batch: 378879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-129771-1	MW-2	Total/NA	Water	EPA 9056A	
180-129771-2	MW-3	Total/NA	Water	EPA 9056A	
180-129771-2	MW-3	Total/NA	Water	EPA 9056A	
180-129771-3	MW-4	Total/NA	Water	EPA 9056A	
180-129771-3	MW-4	Total/NA	Water	EPA 9056A	
180-129771-4	MW-5	Total/NA	Water	EPA 9056A	
180-129771-5	MW-5A	Total/NA	Water	EPA 9056A	
180-129771-5	MW-5A	Total/NA	Water	EPA 9056A	
180-129771-6	MW-6	Total/NA	Water	EPA 9056A	
180-129771-6	MW-6	Total/NA	Water	EPA 9056A	
180-129771-7	MW-6A	Total/NA	Water	EPA 9056A	
180-129771-7	MW-6A	Total/NA	Water	EPA 9056A	
180-129771-8	MW-7	Total/NA	Water	EPA 9056A	
180-129771-8	MW-7	Total/NA	Water	EPA 9056A	
180-129771-9	Duplicate	Total/NA	Water	EPA 9056A	
180-129771-10	Field Blank	Total/NA	Water	EPA 9056A	
MB 180-378879/7	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-378879/6	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-129771-1 MS	MW-2	Total/NA	Water	EPA 9056A	
180-129771-1 MSD	MW-2	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 378954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-129771-1	MW-2	Total Recoverable	Water	3005A	
180-129771-2	MW-3	Total Recoverable	Water	3005A	
180-129771-3	MW-4	Total Recoverable	Water	3005A	
180-129771-4	MW-5	Total Recoverable	Water	3005A	
180-129771-5	MW-5A	Total Recoverable	Water	3005A	
180-129771-6	MW-6	Total Recoverable	Water	3005A	
180-129771-7	MW-6A	Total Recoverable	Water	3005A	
180-129771-8	MW-7	Total Recoverable	Water	3005A	
180-129771-9	Duplicate	Total Recoverable	Water	3005A	
180-129771-10	Field Blank	Total Recoverable	Water	3005A	
MB 180-378954/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-378954/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 379323

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-129771-1	MW-2	Total Recoverable	Water	EPA 6020A	378954
180-129771-2	MW-3	Total Recoverable	Water	EPA 6020A	378954
180-129771-3	MW-4	Total Recoverable	Water	EPA 6020A	378954
180-129771-4	MW-5	Total Recoverable	Water	EPA 6020A	378954
180-129771-5	MW-5A	Total Recoverable	Water	EPA 6020A	378954
180-129771-6	MW-6	Total Recoverable	Water	EPA 6020A	378954
180-129771-7	MW-6A	Total Recoverable	Water	EPA 6020A	378954
180-129771-8	MW-7	Total Recoverable	Water	EPA 6020A	378954
180-129771-9	Duplicate	Total Recoverable	Water	EPA 6020A	378954
180-129771-10	Field Blank	Total Recoverable	Water	EPA 6020A	378954
MB 180-378954/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	378954

Metals (Continued)

Analysis Batch: 379323 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-378954/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	378954

General Chemistry

Analysis Batch: 378658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-129771-1	MW-2	Total/NA	Water	SM 2540C	
180-129771-2	MW-3	Total/NA	Water	SM 2540C	
180-129771-3	MW-4	Total/NA	Water	SM 2540C	
180-129771-4	MW-5	Total/NA	Water	SM 2540C	
180-129771-5	MW-5A	Total/NA	Water	SM 2540C	
180-129771-6	MW-6	Total/NA	Water	SM 2540C	
180-129771-7	MW-6A	Total/NA	Water	SM 2540C	
180-129771-8	MW-7	Total/NA	Water	SM 2540C	
180-129771-9	Duplicate	Total/NA	Water	SM 2540C	
180-129771-10	Field Blank	Total/NA	Water	SM 2540C	
MB 180-378658/2	Method Blank	Total/NA	Water	SM 2540C	
LCS 180-378658/1	Lab Control Sample	Total/NA	Water	SM 2540C	
180-129771-1 DU	MW-2	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 378618

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-129771-1	MW-2	Total/NA	Water	Field Sampling	
180-129771-2	MW-3	Total/NA	Water	Field Sampling	
180-129771-3	MW-4	Total/NA	Water	Field Sampling	
180-129771-4	MW-5	Total/NA	Water	Field Sampling	
180-129771-5	MW-5A	Total/NA	Water	Field Sampling	
180-129771-6	MW-6	Total/NA	Water	Field Sampling	
180-129771-7	MW-6A	Total/NA	Water	Field Sampling	
180-129771-8	MW-7	Total/NA	Water	Field Sampling	
180-129771-9	Duplicate	Total/NA	Water	Field Sampling	

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: RICK ELGIN	Lab PM: Gartner, Cathy	Carrier Tracking No(s):	COC No: 490-52767-15725.1
Client Contact: Mr. Rick Elgin	Phone: 573-636-9454	E-Mail: cathy.gartner@testamericainc.com		Page: Page 1 of 1
Company: Midwest Environmental Consultants				Job #:

Address: 2009 East McCarty Street Suite 2	Due Date Requested: NORM
City: Jefferson City	TAT Requested (days):
State, Zip: MO, 65101	
Phone: 573-636-9454(Tel)	PO #: Purchase Order not required
Email: relgin@mecpc.com	WO #:
Project Name: Asbury Pond - EPA	Project #: 49010011
Site:	SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, M - Hexane, N - None, AsNaO2, a2O4S, a2SO3, a2S2O3, 2SO4, SP Dodecahydrate, cetone, CAA, h 4-5, her (specify)

180-129771 Chain of Custody

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056A - Chloride, Fluoride, Sulfate	2540C - Total Dissolved Solids	6020A - Calcium and Boron	Total Number of cont	Special Instructions/Note:
			Preservation Code:				N	N	D		
MW-2	8-21	9:10	G	GW			X	X	X		Field pH: 6.45
MW-3	9	12:55									Field pH: 6.02
MW-4	8	3:45									Field pH: 6.72
MW-5	9	8:40									Field pH: 7.23
MW-5A	9	9:35									Field pH: 6.84
MW-6	9	10:20									Field pH: 7.09
MW-6A	9	11:10									Field pH: 7.17
MW-7	9	11:50									Field pH: 6.42
Duplicate (@MW-5)	9	9:00									Field pH: 7.23
Field Blank	9	9:15									Field pH: —

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 6020A/6010C - Sb,As,Ba,Be,B,Cd,Ca,Cr,Co,Pb,,Mo, Li

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11-9-21 4:00	MEC	FedEx	11-9-21 4:00	FedEx
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
					11-10-21 10:00	EA PH
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

eurofins | Environment Testing TestAmerica

Part # 159470-434 RIT2 EXP 05/22

ORIGIN ID:PHDA (573) 636-9454
RICK ELGIN
MIDWEST ENVIRONMENTAL CONSULTANTS
FIRST MCCARTY STREET
SUITE 2
JEFFERSON CITY, MO 65101
UNITED STATES US

SHIP DATE: 02NOV21
ACTWGT: 10.00 LB MAN
CAD: 0562065/CAFE3502

4955/2288/TCDAS

TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
DEL: S490-108853
SHA:

Uncorrected temp 2.8 °C
Thermometer ID 8
CF 0 Initials MO
PT-WI-SR-001 effective 11/8/18

FedEx Express

FedEx
TRK# 0221 5293 4341 4950

WED - 10 NOV 11:30A
PRIORITY OVERNIGHT

XN AGCA

15238
PA-US PIT

56DJ2/9A7E/FE4A

Part # 159297-495 REPB EXP 06/22

180-12977 Waybill

98
FZ
RT
1
11:30
A
4950
11-1

Login Sample Receipt Checklist

Client: Midwest Environmental Consultants

Job Number: 180-129771-1

Login Number: 129771
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX 5

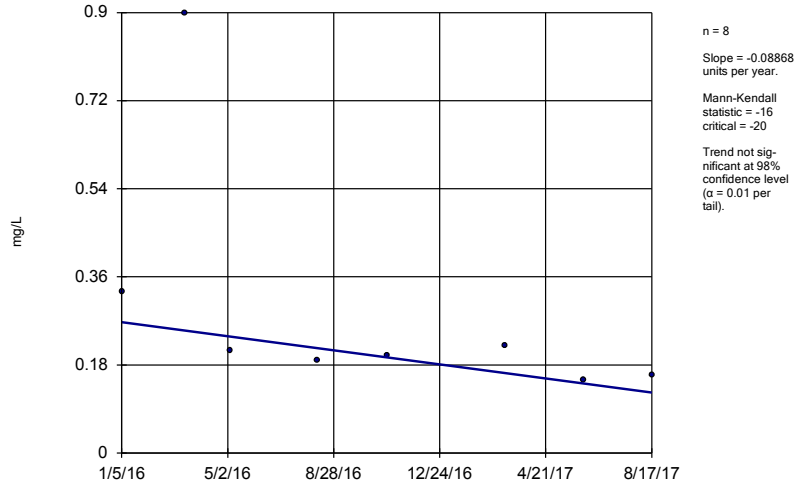
Statistical Analysis

Sanitas™ Output – Background

Trending Analysis

Boron

MW-2 (bg)



n = 8

Slope = -0.08868 units per year.

Mann-Kendall statistic = -16
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

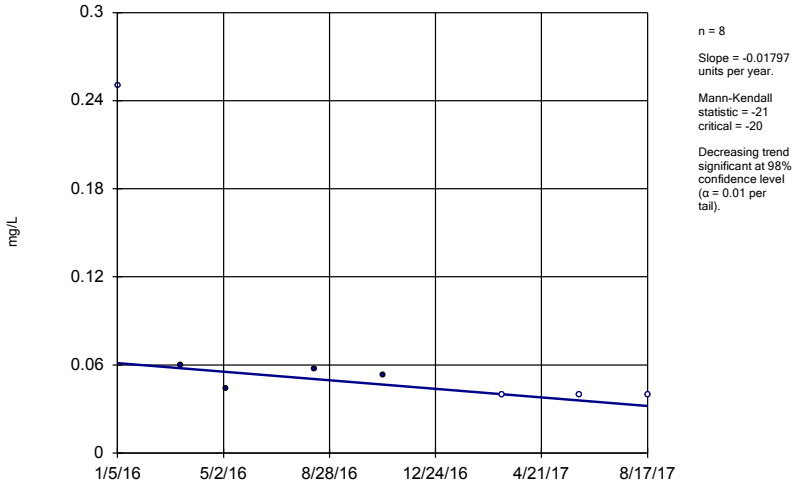
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-3 (bg)



n = 8

Slope = -0.01797 units per year.

Mann-Kendall statistic = -21
critical = -20

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

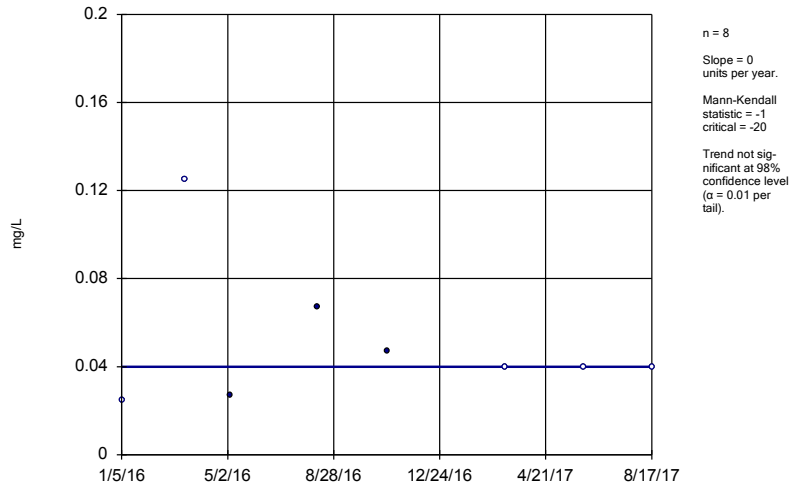
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-4



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

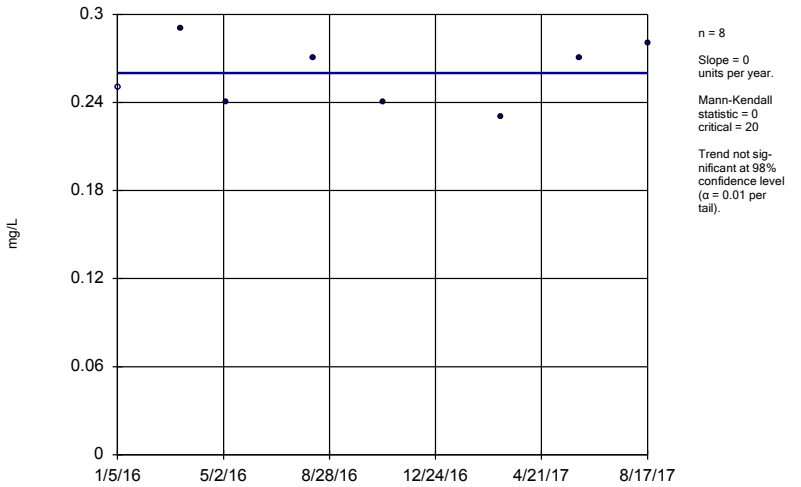
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Boron

MW-5



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

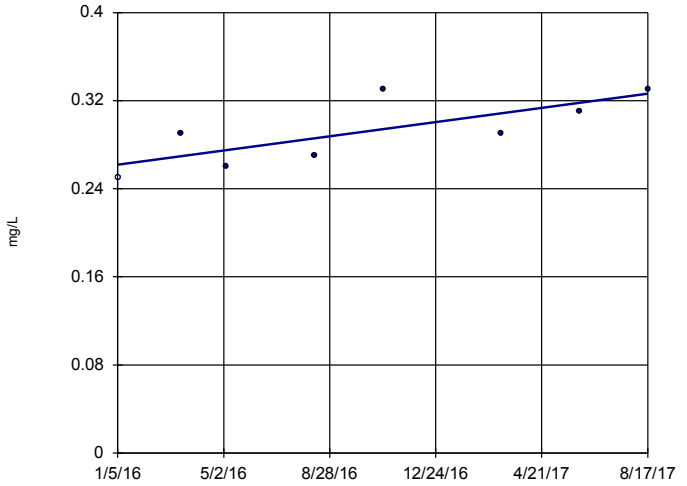
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-5A



n = 8

Slope = 0.03993 units per year.

Mann-Kendall statistic = 18 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

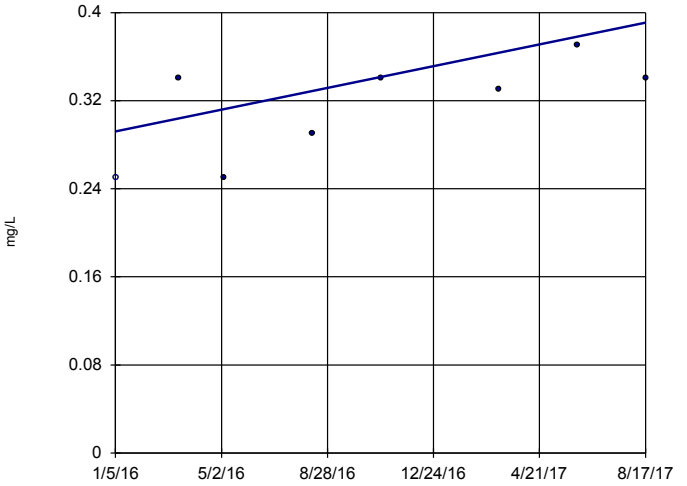
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-6



n = 8

Slope = 0.06117 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

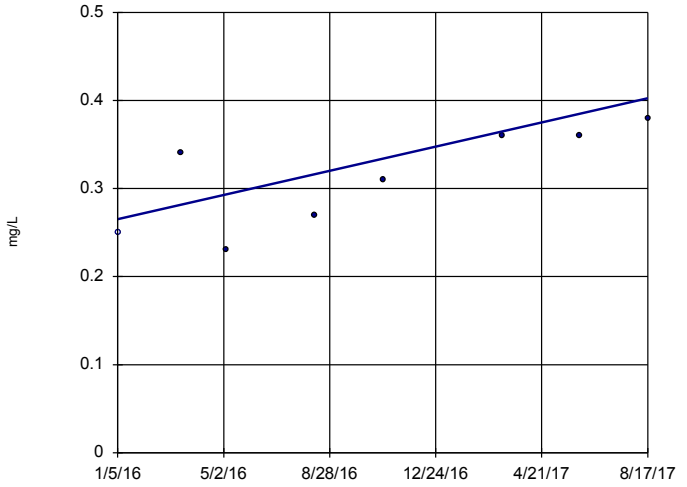
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-6A



n = 8

Slope = 0.08497 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

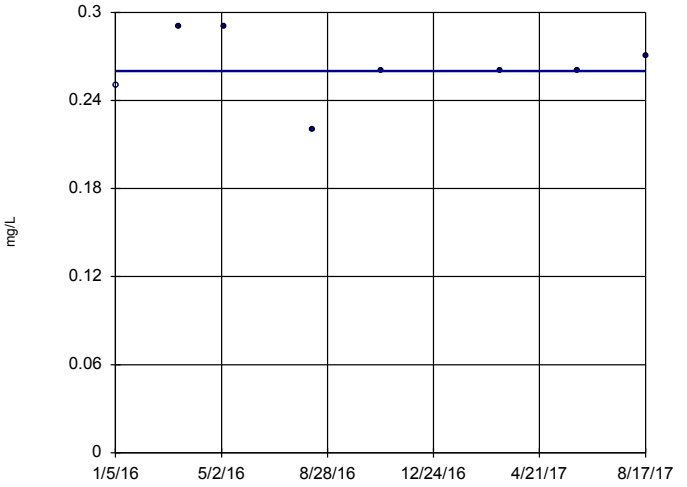
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

MW-7



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 2 critical = 20

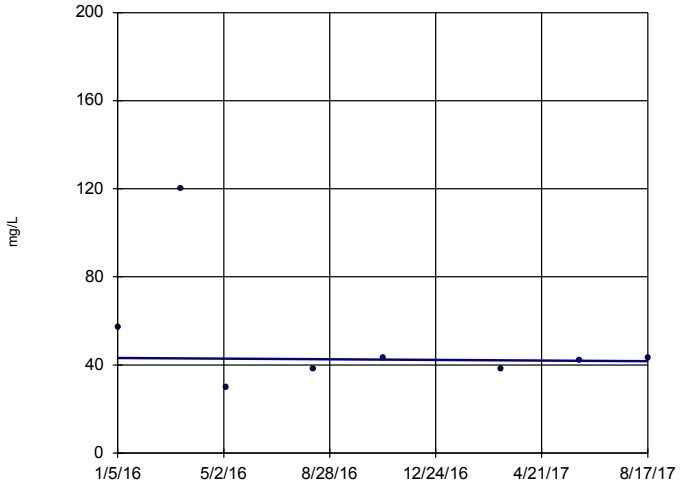
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Calcium

MW-2 (bg)



n = 8

Slope = -0.8333 units per year.

Mann-Kendall statistic = -2 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

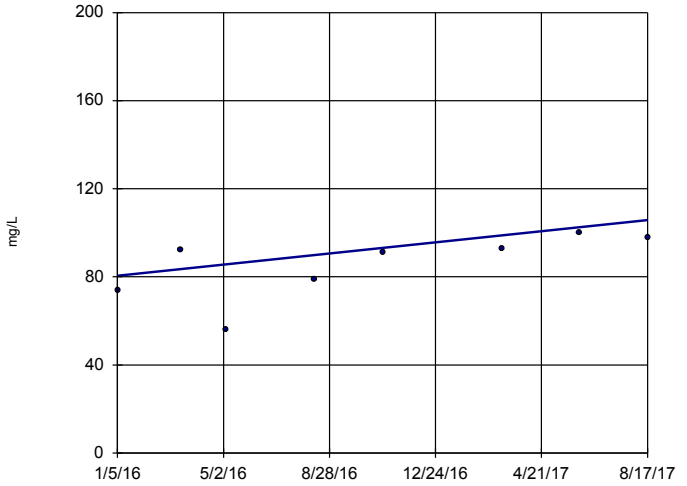
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-3 (bg)



n = 8

Slope = 15.6 units per year.

Mann-Kendall statistic = 18 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

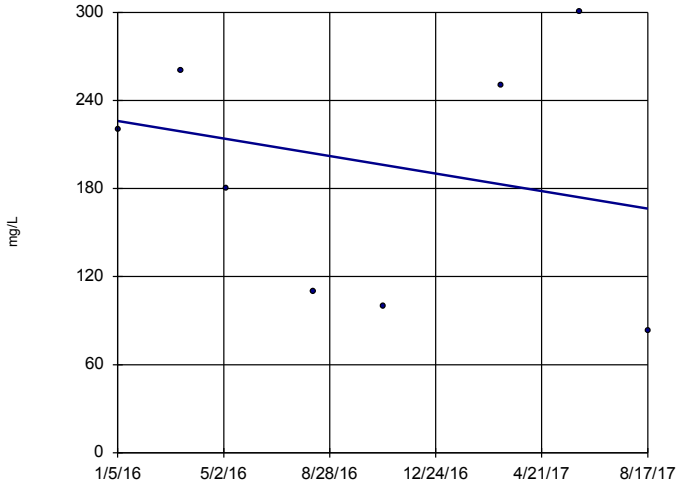
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-4



n = 8

Slope = -36.95 units per year.

Mann-Kendall statistic = -6 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

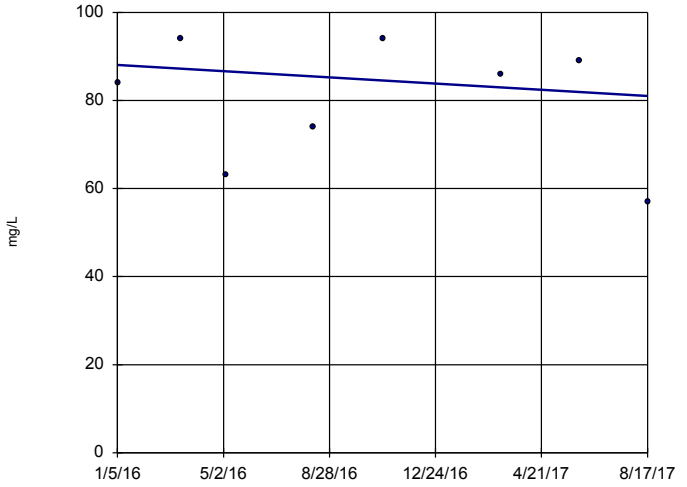
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-5



n = 8

Slope = -4.395 units per year.

Mann-Kendall statistic = -3 critical = -20

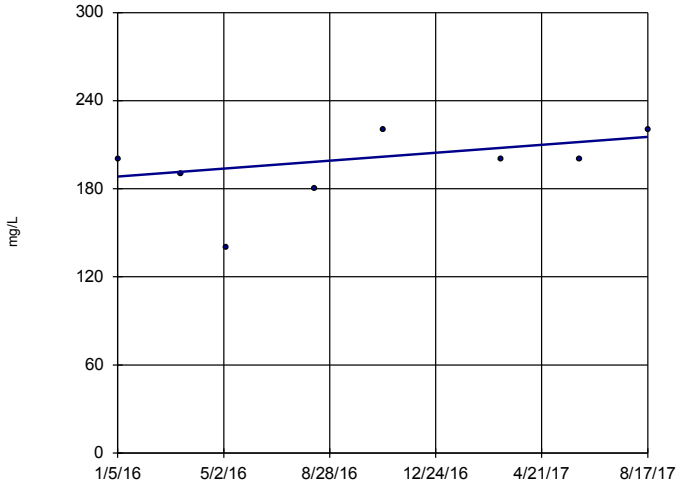
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Calcium

MW-5A



n = 8

Slope = 16.74 units per year.

Mann-Kendall statistic = 10
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

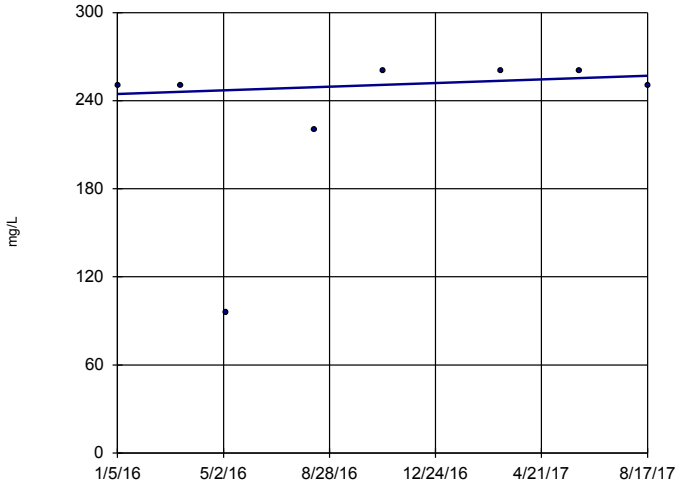
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-6



n = 8

Slope = 7.67 units per year.

Mann-Kendall statistic = 8
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

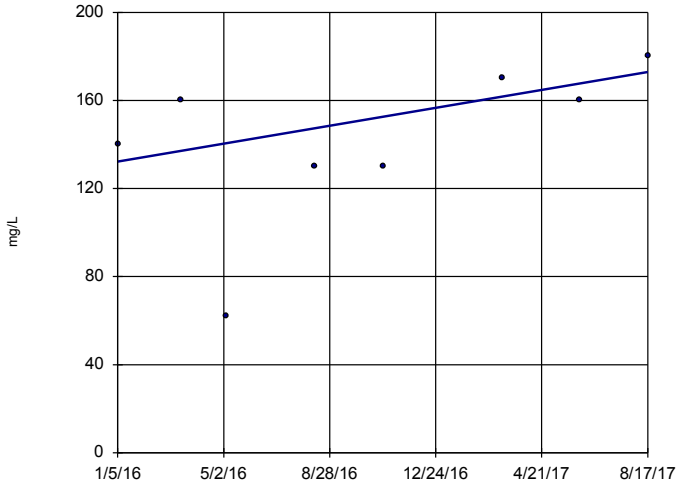
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-6A



n = 8

Slope = 25.16 units per year.

Mann-Kendall statistic = 12
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

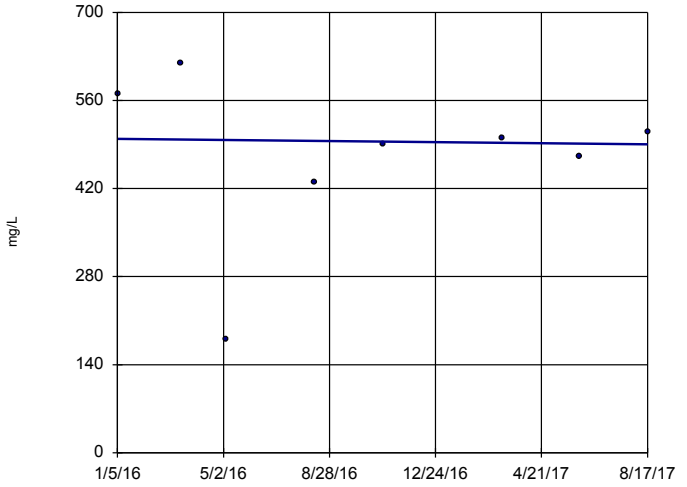
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-7



n = 8

Slope = -5.401 units per year.

Mann-Kendall statistic = 0
critical = 20

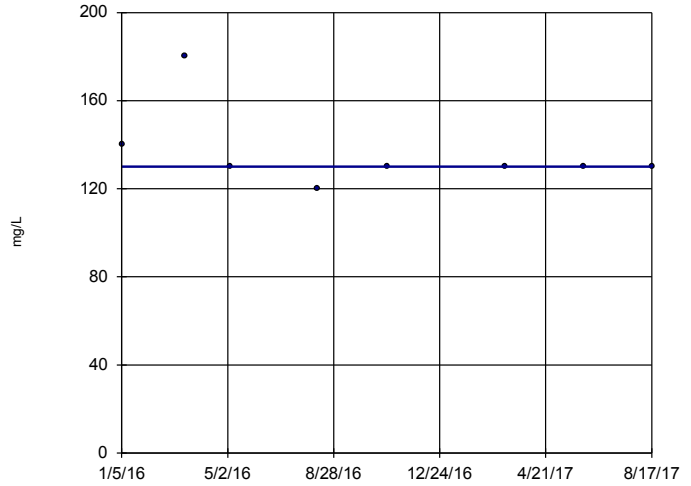
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Chloride

MW-2 (bg)



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

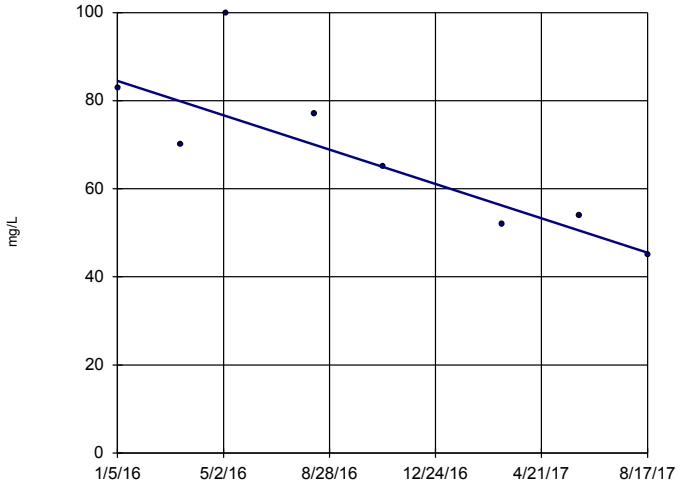
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-3 (bg)



n = 8

Slope = -24.13 units per year.

Mann-Kendall statistic = -20 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

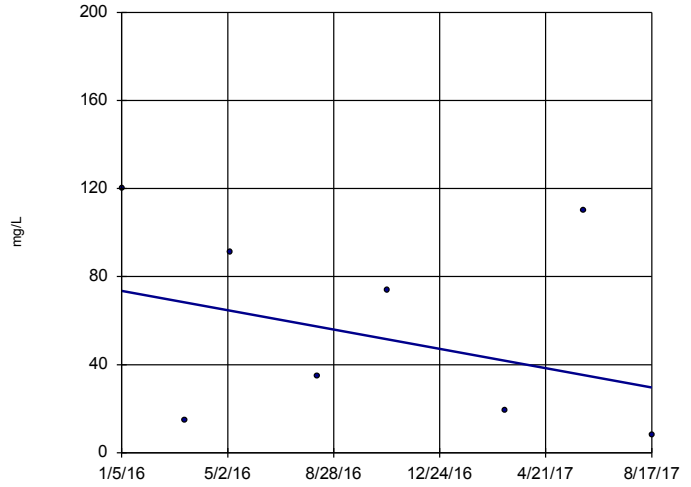
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-4



n = 8

Slope = -27.17 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

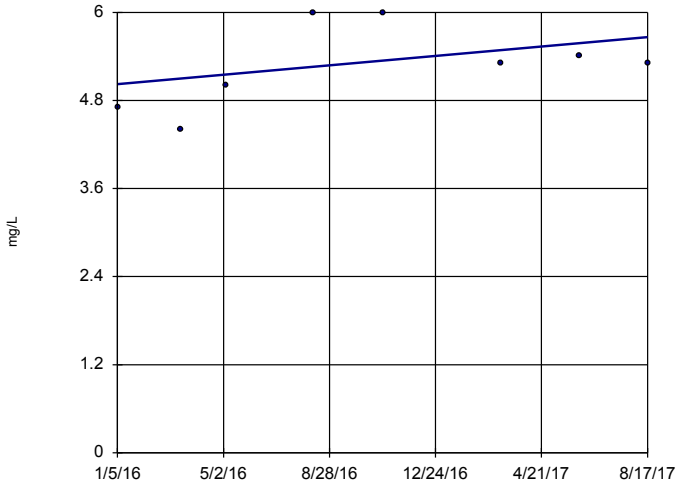
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-5



n = 8

Slope = 0.3955 units per year.

Mann-Kendall statistic = 10 critical = 20

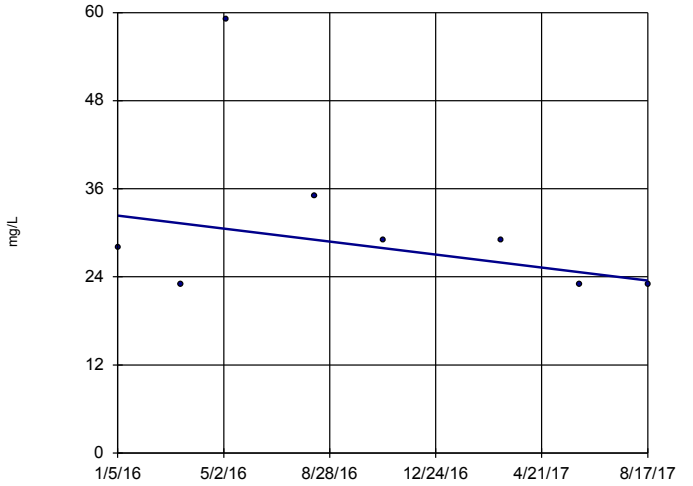
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Chloride

MW-5A



n = 8

Slope = -5.487 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

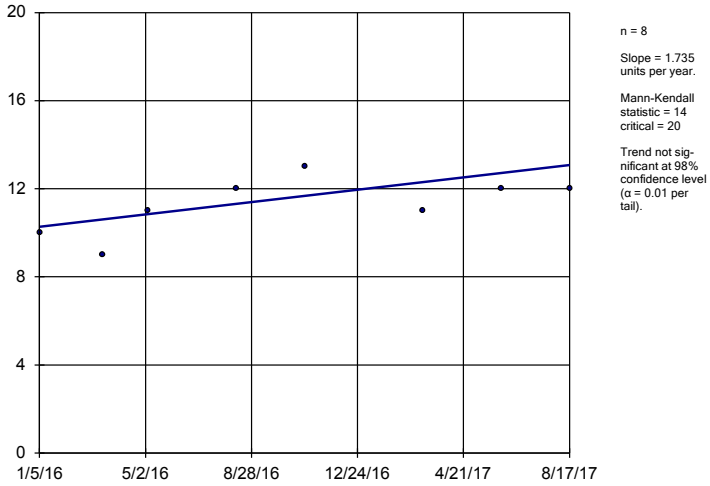
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6



n = 8

Slope = 1.735 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

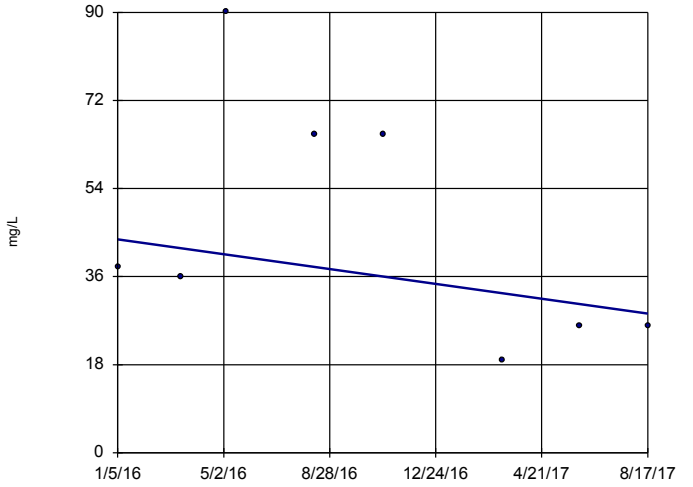
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6A



n = 8

Slope = -9.402 units per year.

Mann-Kendall statistic = -10 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

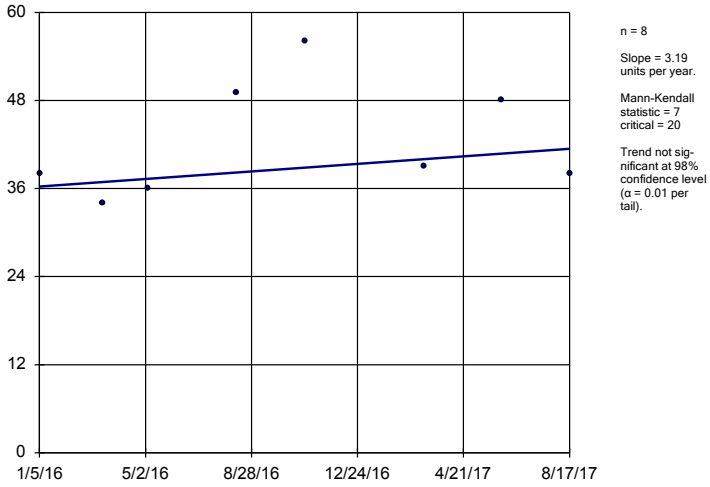
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-7



n = 8

Slope = 3.19 units per year.

Mann-Kendall statistic = 7 critical = 20

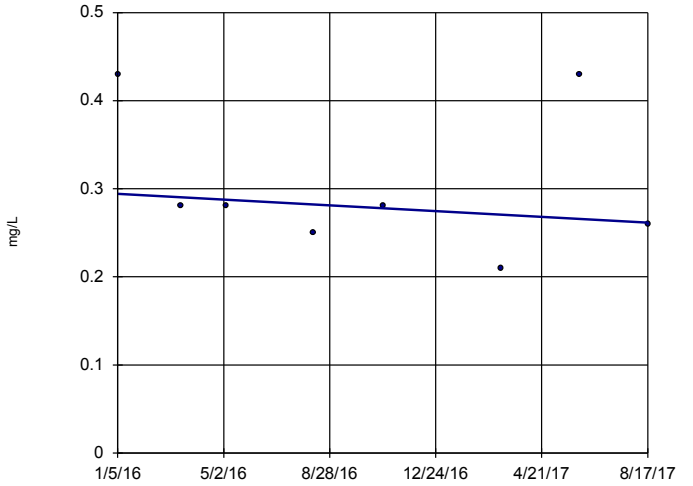
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-2 (bg)



n = 8

Slope = -0.02016 units per year.

Mann-Kendall statistic = -8 critical = -20

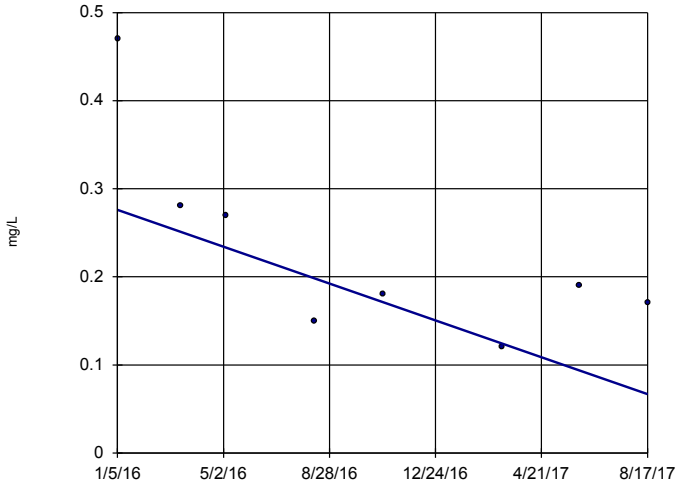
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-3 (bg)



n = 8

Slope = -0.1295 units per year.

Mann-Kendall statistic = -16 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

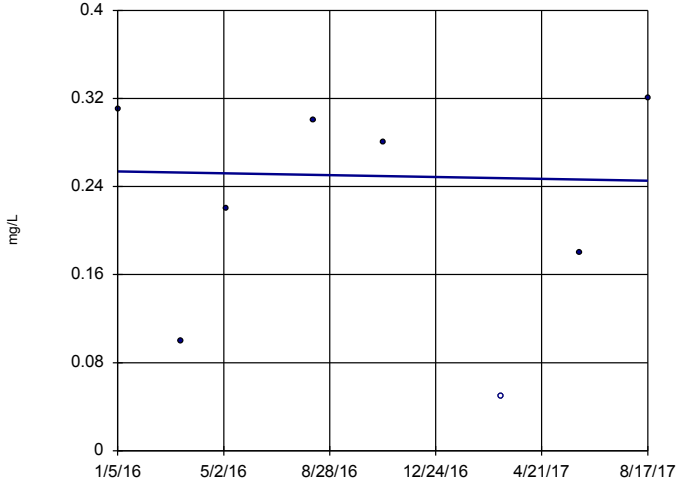
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Hollow symbols indicate censored values.

Fluoride

MW-4



n = 8

Slope = -0.005278 units per year.

Mann-Kendall statistic = 0 critical = 20

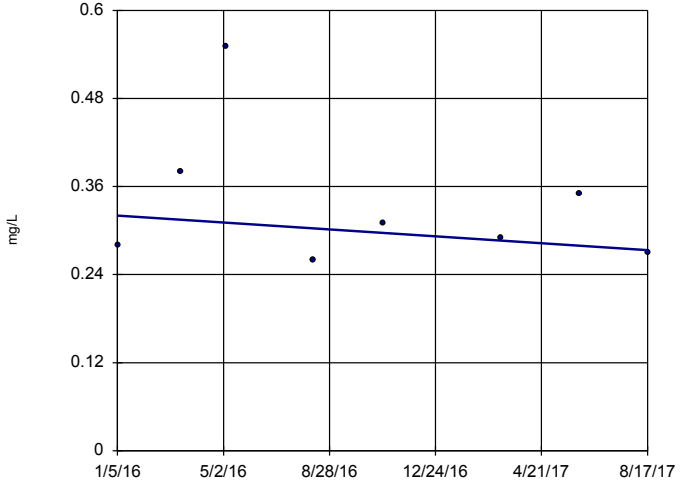
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-5



n = 8

Slope = -0.0291 units per year.

Mann-Kendall statistic = -4 critical = -20

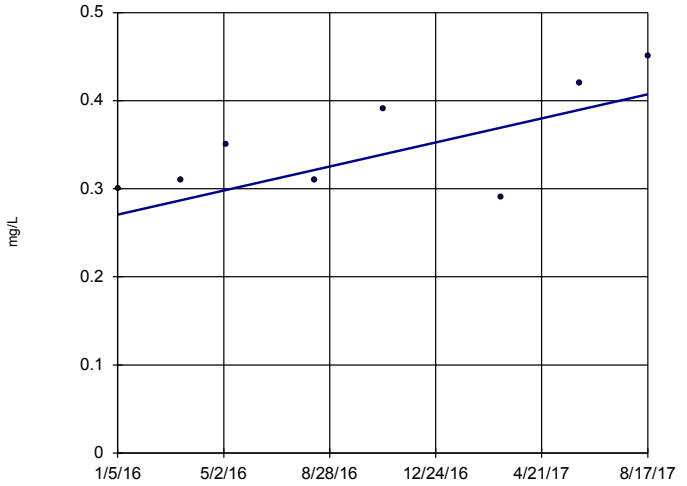
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Fluoride

MW-5A



n = 8

Slope = 0.08456 units per year.

Mann-Kendall statistic = 15 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

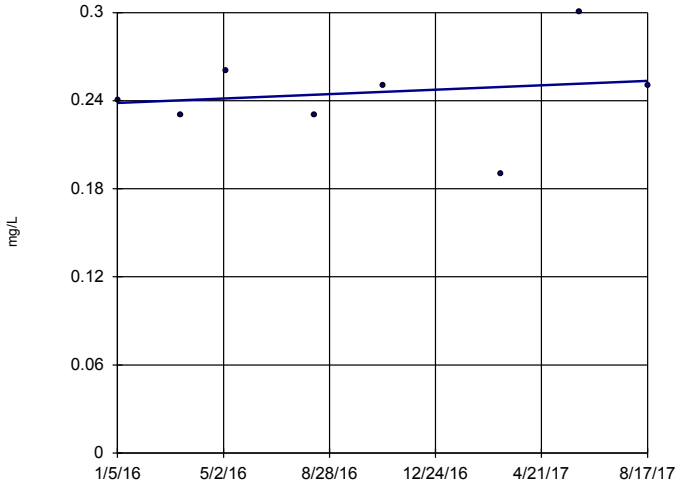
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6



n = 8

Slope = 0.00928 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

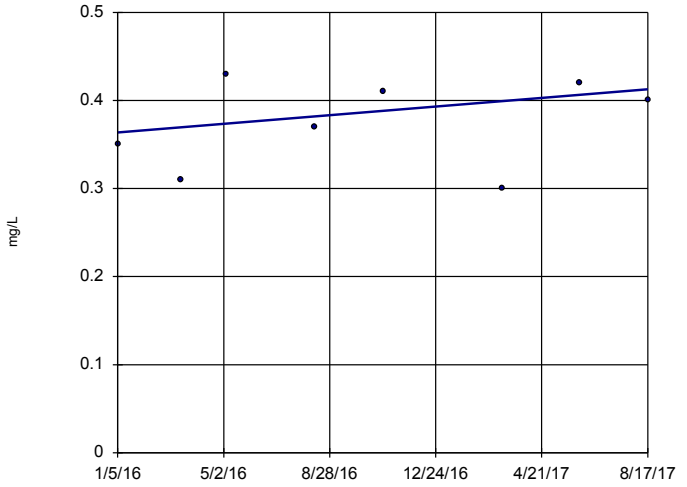
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6A



n = 8

Slope = 0.03022 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

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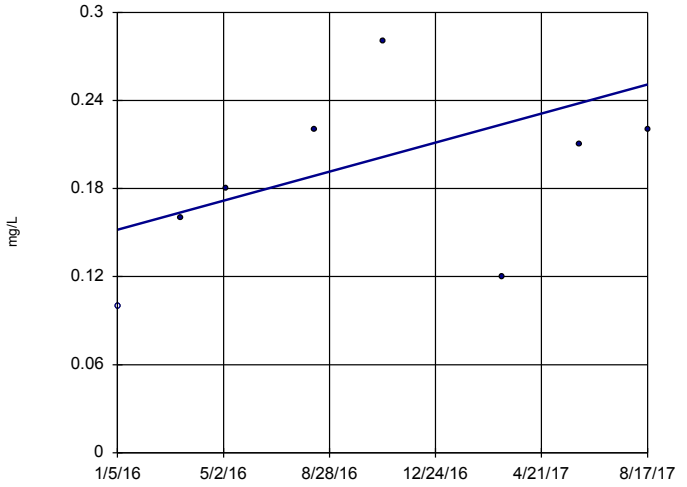
Hollow symbols indicate censored values.

Fluoride

MW-7



n = 8

Slope = 0.06113 units per year.

Mann-Kendall statistic = 13 critical = 20

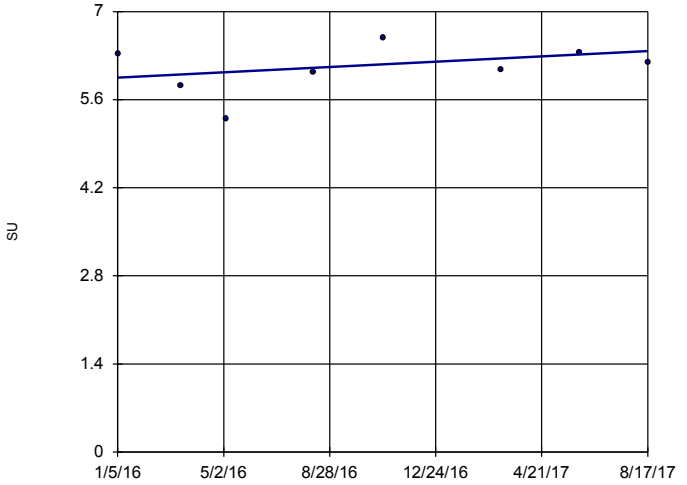
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

pH

MW-2 (bg)



n = 8

Slope = 0.2618 units per year.

Mann-Kendall statistic = 8 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

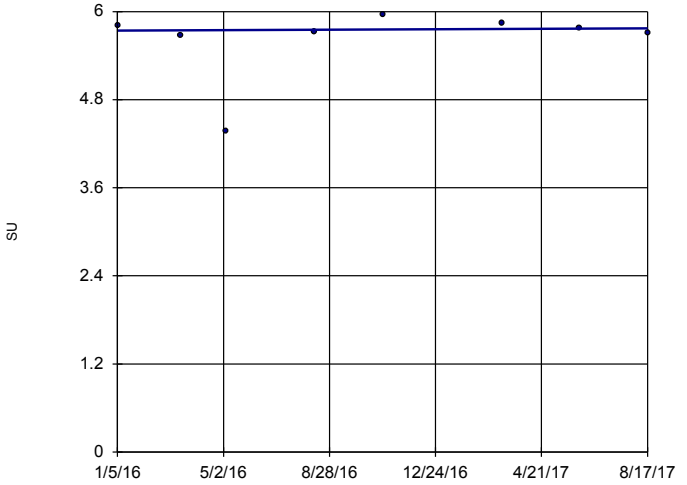
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-3 (bg)



n = 8

Slope = 0.01982 units per year.

Mann-Kendall statistic = 2 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

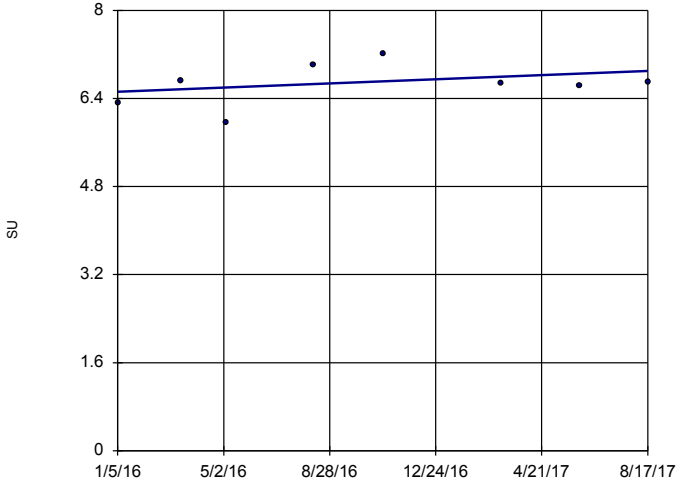
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-4



n = 8

Slope = 0.2307 units per year.

Mann-Kendall statistic = 4 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

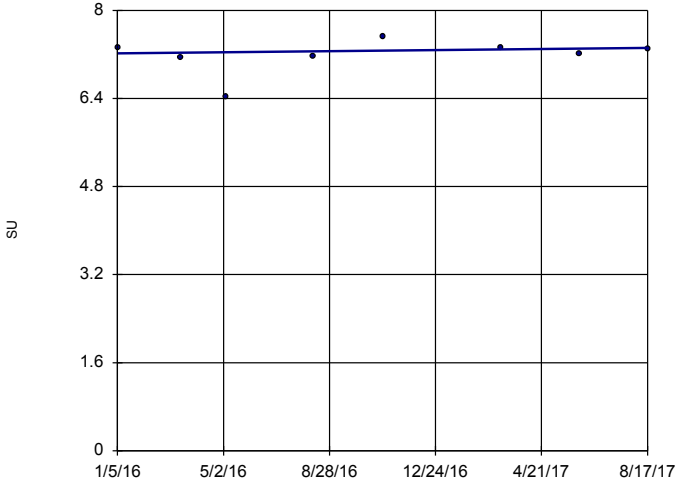
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-5



n = 8

Slope = 0.05967 units per year.

Mann-Kendall statistic = 4 critical = 20

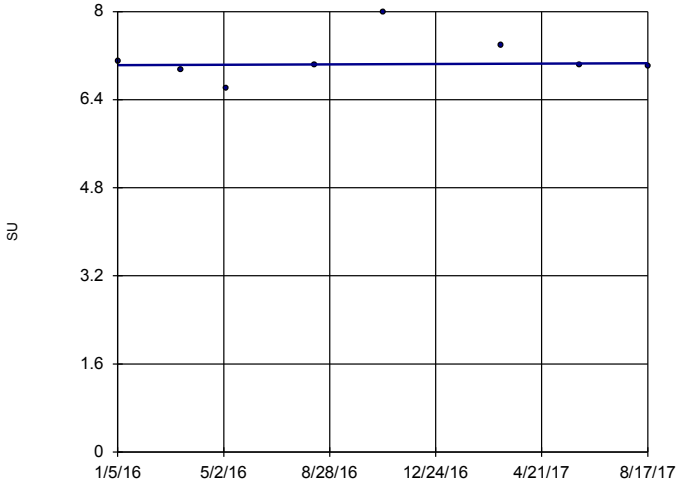
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

pH

MW-5A



n = 8

Slope = 0.0211 units per year.

Mann-Kendall statistic = 1 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

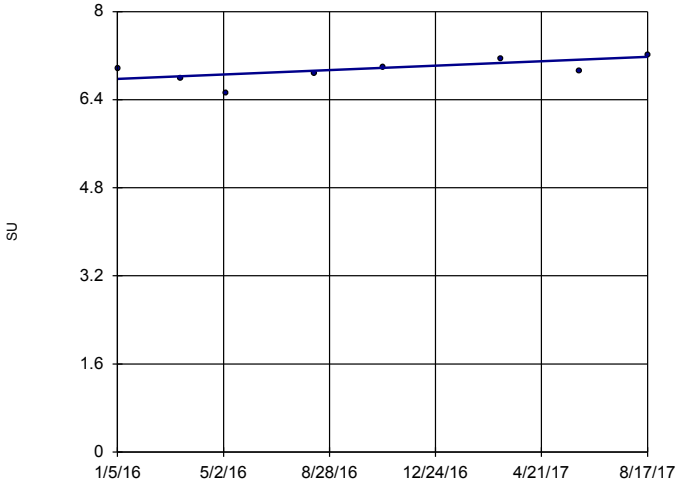
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6



n = 8

Slope = 0.2471 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

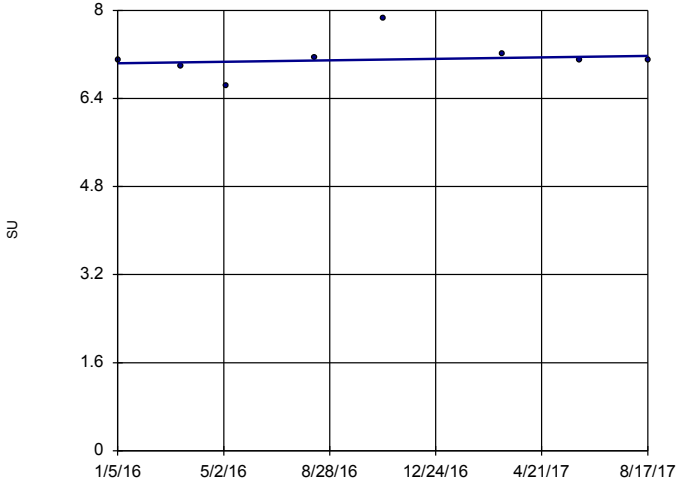
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6A



n = 8

Slope = 0.08386 units per year.

Mann-Kendall statistic = 7 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

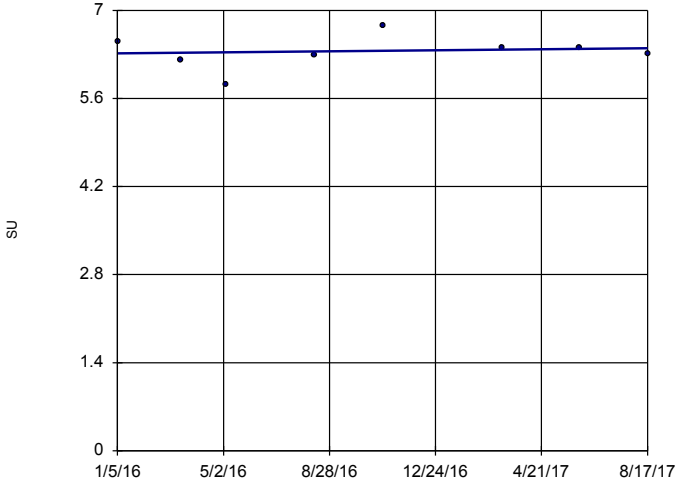
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-7



n = 8

Slope = 0.04935 units per year.

Mann-Kendall statistic = 4 critical = 20

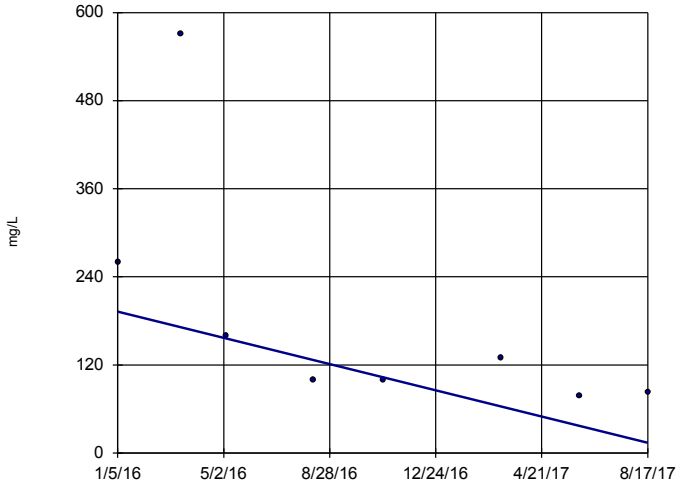
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sulfate

MW-2 (bg)



n = 8

Slope = -110.6 units per year.

Mann-Kendall statistic = -20 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

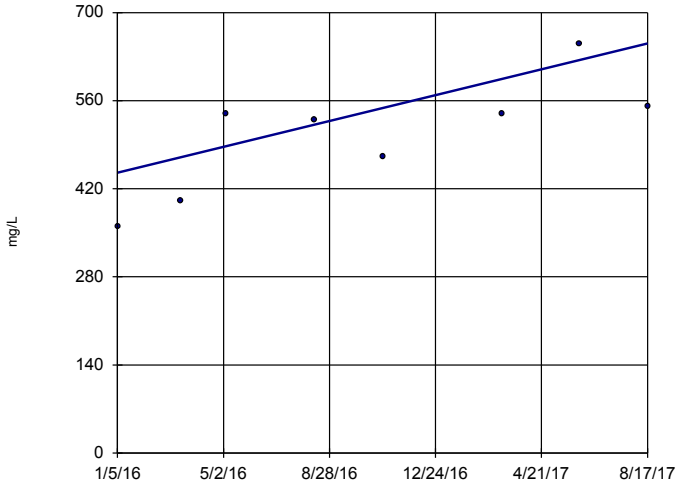
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-3 (bg)



n = 8

Slope = 126.8 units per year.

Mann-Kendall statistic = 19 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

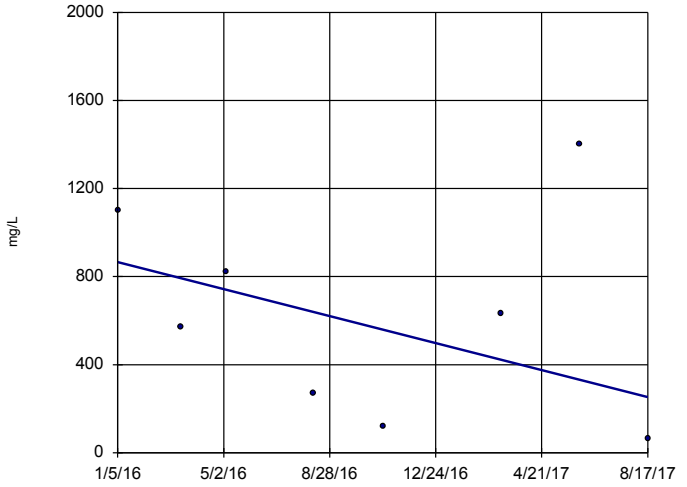
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-4



n = 8

Slope = -379.2 units per year.

Mann-Kendall statistic = -8 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

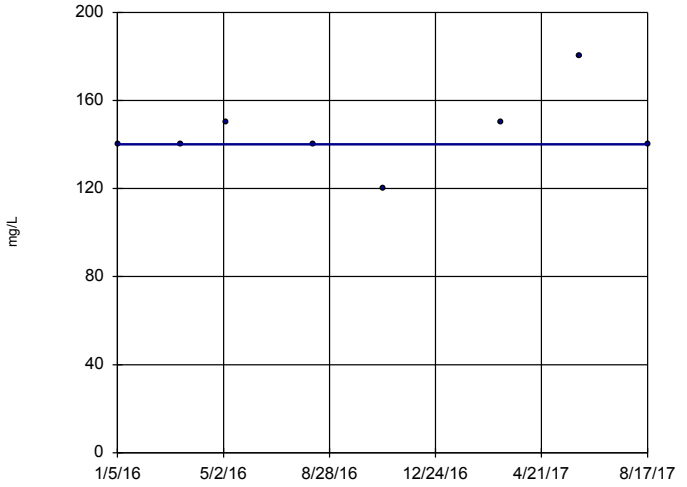
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-5



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 5 critical = 20

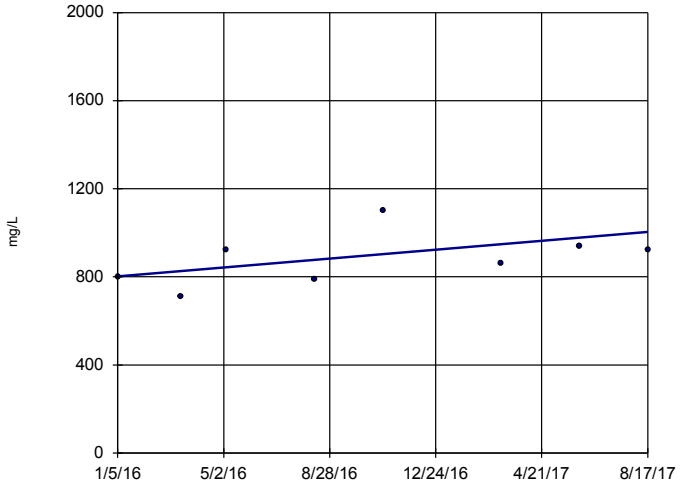
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sulfate

MW-5A



n = 8

Slope = 125.4 units per year.

Mann-Kendall statistic = 11 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

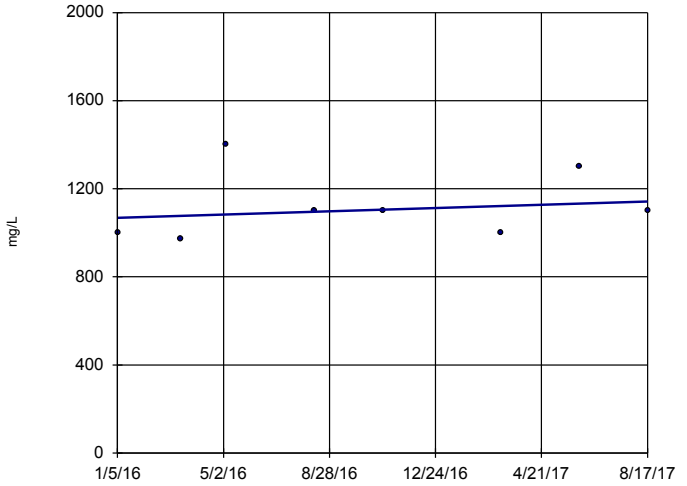
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6



n = 8

Slope = 46.31 units per year.

Mann-Kendall statistic = 6 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

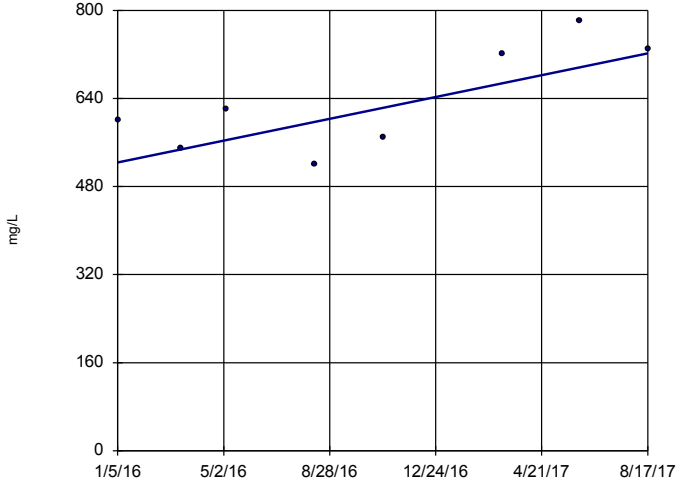
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6A



n = 8

Slope = 122.7 units per year.

Mann-Kendall statistic = 14 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

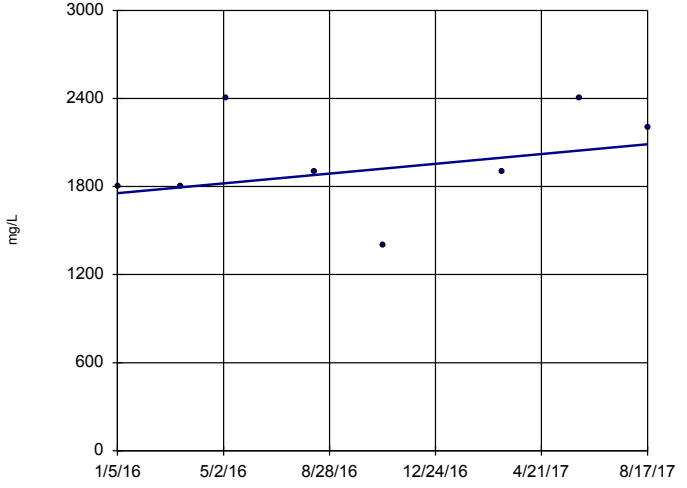
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-7



n = 8

Slope = 206.6 units per year.

Mann-Kendall statistic = 9 critical = 20

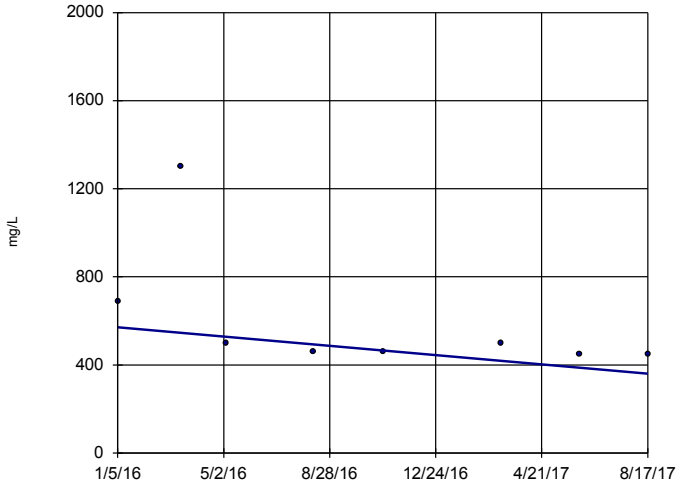
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-2 (bg)



n = 8

Slope = -130.2 units per year.

Mann-Kendall statistic = -19 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

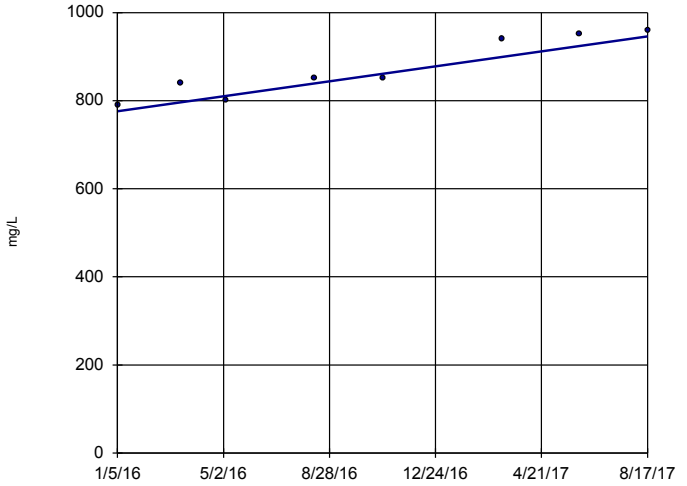
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-3 (bg)



n = 8

Slope = 105 units per year.

Mann-Kendall statistic = 25 critical = 20

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

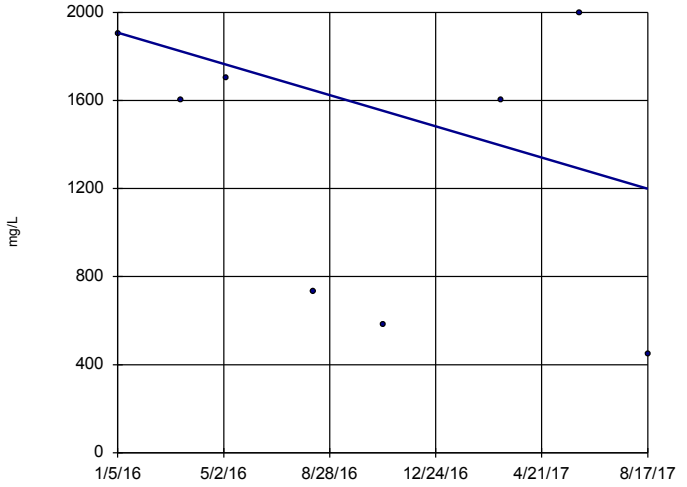
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-4



n = 8

Slope = -439 units per year.

Mann-Kendall statistic = -9 critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

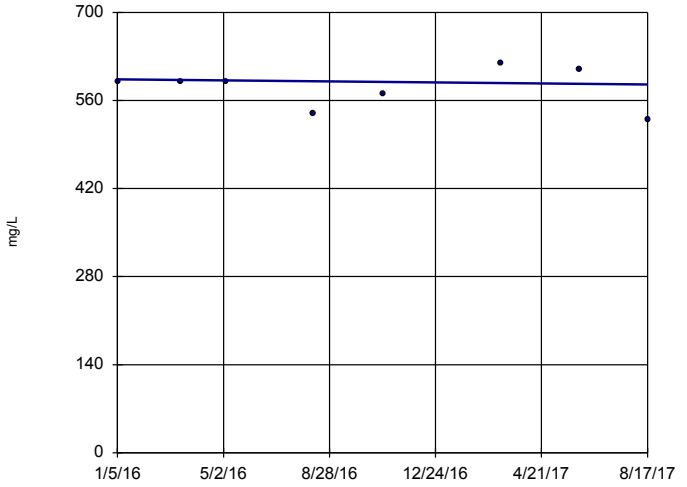
Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Sanitas™ v.9.5.32 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-5



n = 8

Slope = -4.906 units per year.

Mann-Kendall statistic = -3 critical = -20

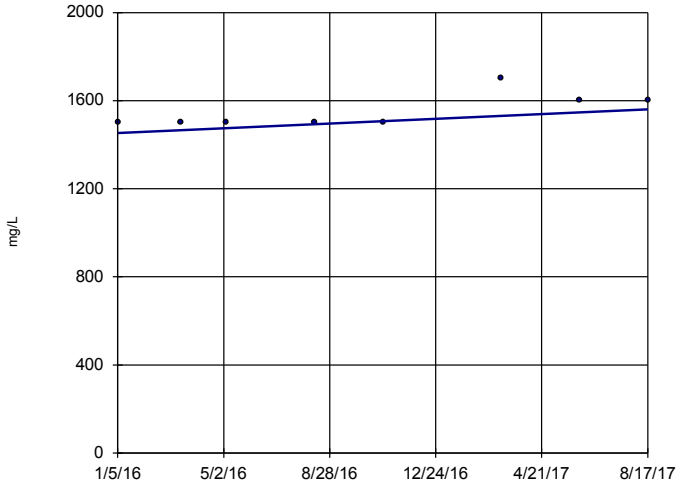
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:08 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-5A



n = 8

Slope = 66.1 units per year.

Mann-Kendall statistic = 13 critical = 20

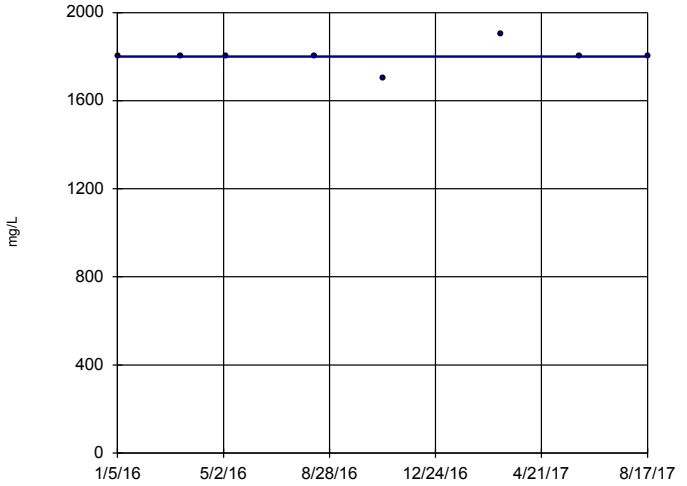
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-6



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 20

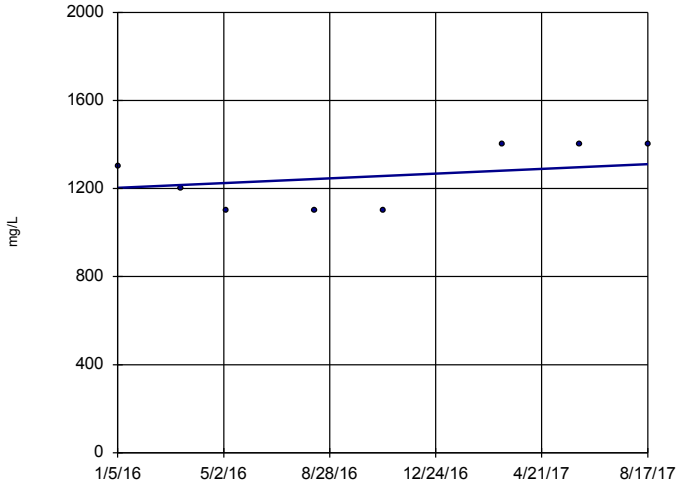
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-6A



n = 8

Slope = 66.44 units per year.

Mann-Kendall statistic = 8 critical = 20

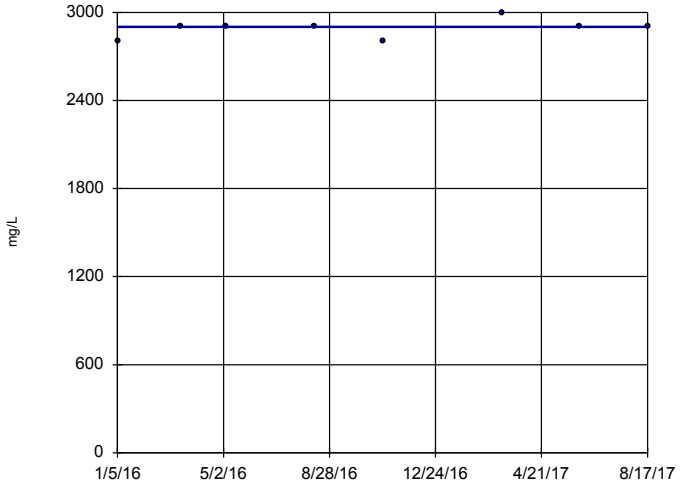
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Total Dissolved Solids

MW-7



n = 8

Slope = 0 units per year.

Mann-Kendall statistic = 7 critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/23/2018 3:09 PM

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3 only Printed 1/23/2018, 3:10 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-2 (bg)	-0.08868	-16	-20	No	8	0	n/a	n/a	0.02	NP
Boron (mg/L)	**MW-3 (bg)**	**-0.01797**	**-21**	**-20**	**Yes**	**8**	**50**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	MW-4	0	-1	-20	No	8	62.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5	0	0	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5A	0.03993	18	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6	0.06117	14	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6A	0.08497	19	20	No	8	12.5	n/a	n/a	0.02	NP
Boron (mg/L)	MW-7	0	2	20	No	8	12.5	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2 (bg)	-0.8333	-2	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-3 (bg)	15.6	18	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-4	-36.95	-6	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5	-4.395	-3	-20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5A	16.74	10	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6	7.67	8	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6A	25.16	12	20	No	8	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7	-5.401	0	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2 (bg)	0	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3 (bg)	-24.13	-20	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4	-27.17	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	0.3955	10	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5A	-5.487	-8	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	1.735	14	20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6A	-9.402	-10	-20	No	8	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7	3.19	7	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2 (bg)	-0.02016	-8	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3 (bg)	-0.1295	-16	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4	-0.00...	0	20	No	8	12.5	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	-0.0291	-4	-20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5A	0.08456	15	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	0.00928	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6A	0.03022	4	20	No	8	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7	0.06113	13	20	No	8	12.5	n/a	n/a	0.02	NP
pH (SU)	MW-2 (bg)	0.2618	8	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-3 (bg)	0.01982	2	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-4	0.2307	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-5	0.05967	4	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-5A	0.0211	1	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-6	0.2471	14	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-6A	0.08386	7	20	No	8	0	n/a	n/a	0.02	NP
pH (SU)	MW-7	0.04935	4	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-2 (bg)	-110.6	-20	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-3 (bg)	126.8	19	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-4	-379.2	-8	-20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5	0	5	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5A	125.4	11	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6	46.31	6	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6A	122.7	14	20	No	8	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7	206.6	9	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-2 (bg)	-130.2	-19	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	**MW-3 (bg)**	**105**	**25**	**20**	**Yes**	**8**	**0**	**n/a**	**n/a**	**0.02**	**NP**

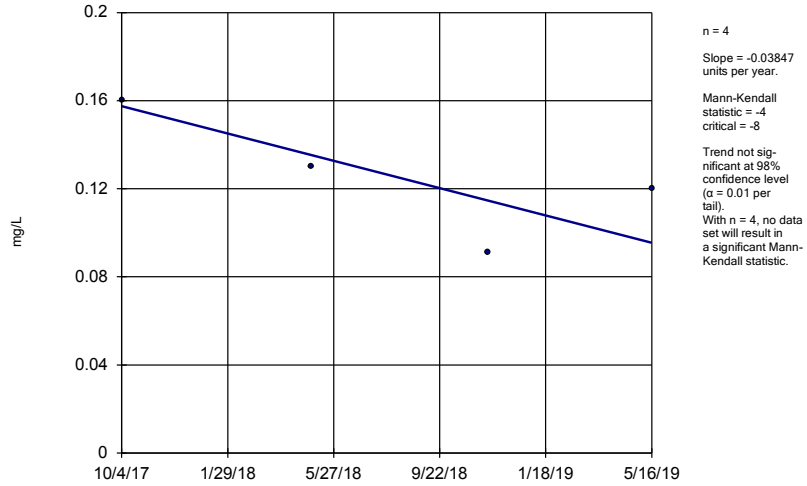
Trend Test

The Empire District Client: Midwest Environmental Consultants Data: Asbury CCR Impoundments GW Baseline Database - App 3 only Printed 1/23/2018, 3:10 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Dissolved Solids (mg/L)	MW-4	-439	-9	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	-4.906	-3	-20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5A	66.1	13	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	0	1	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6A	66.44	8	20	No	8	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7	0	7	20	No	8	0	n/a	n/a	0.02	NP

Boron

MW-2 (bg)



n = 4

Slope = -0.03847 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

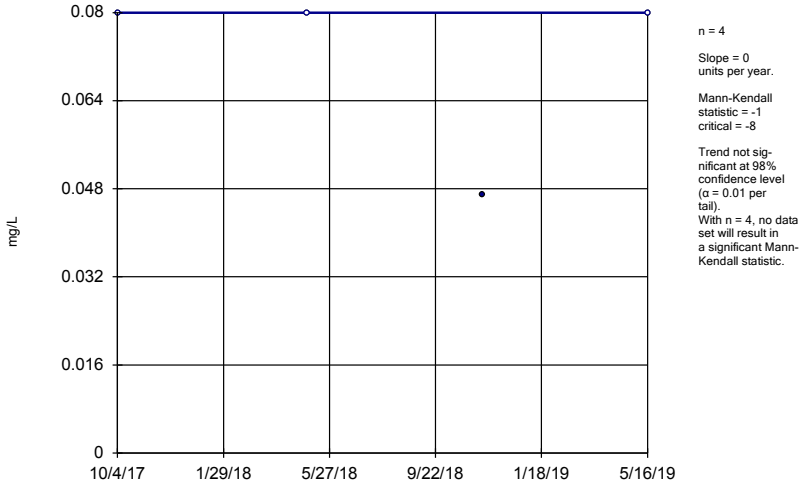
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-3 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-4

n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -8

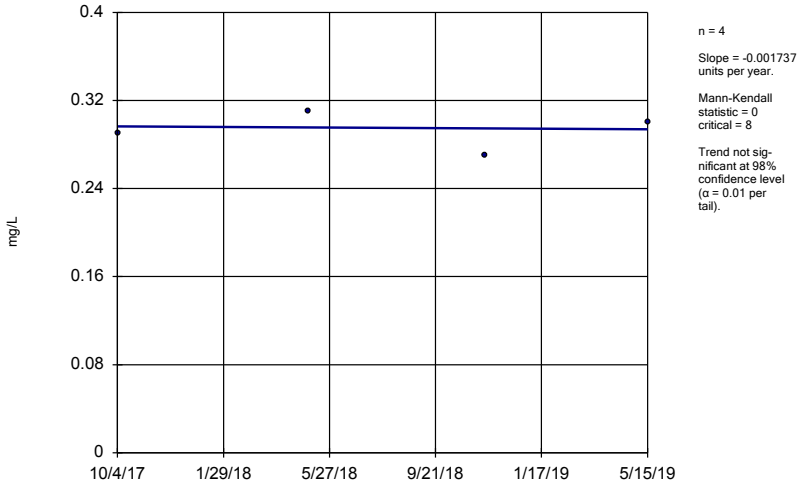
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Boron

MW-5



n = 4

Slope = -0.001737 units per year.

Mann-Kendall statistic = 0
critical = 8

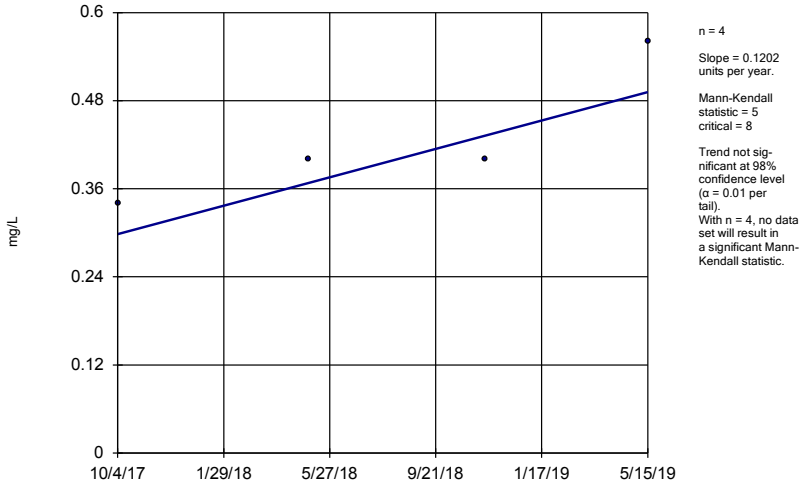
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Boron

MW-5A



n = 4

Slope = 0.1202 units per year.

Mann-Kendall statistic = 5
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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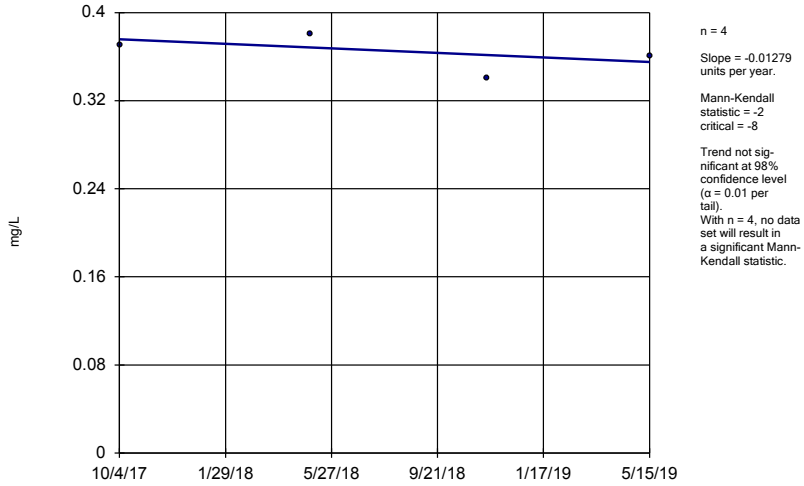
Boron

MW-6



n = 4

Slope = -0.01279 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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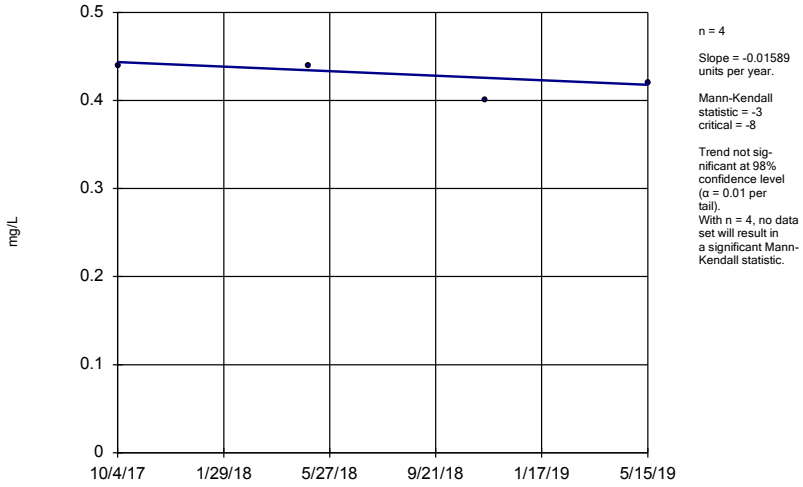
Boron

MW-6A



n = 4

Slope = -0.01589 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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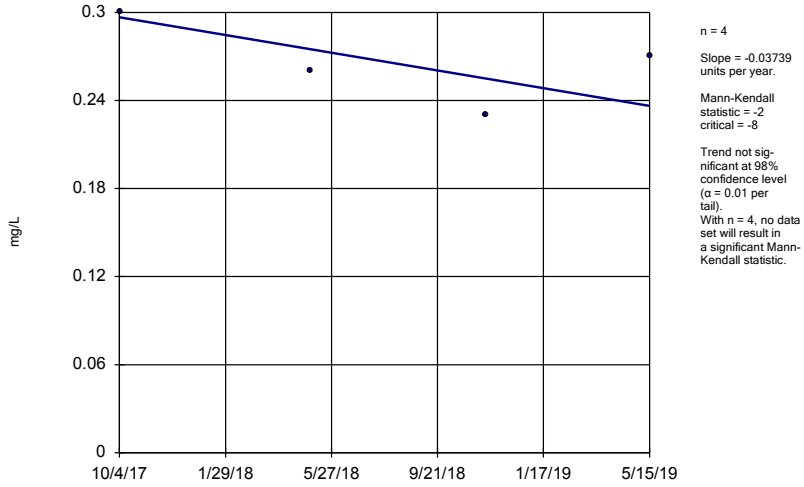
Boron

MW-7 (bg)



n = 4

Slope = -0.03739 units per year.

Mann-Kendall statistic = -2
critical = -8

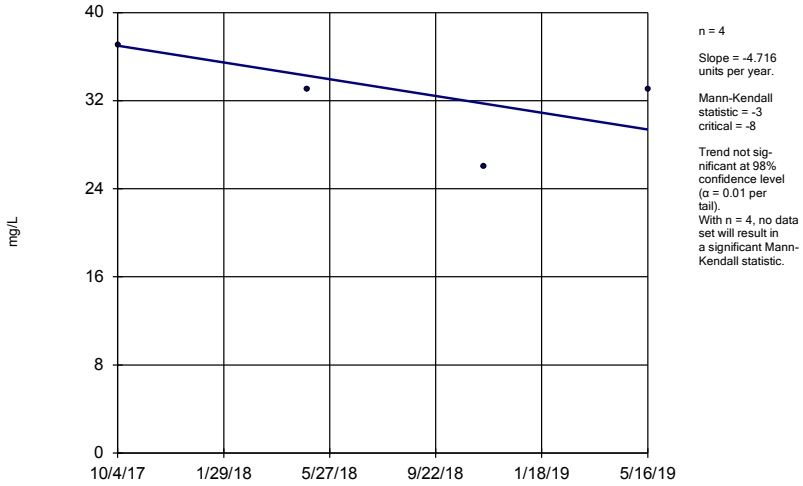
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Calcium

MW-2 (bg)



n = 4

Slope = -4.716 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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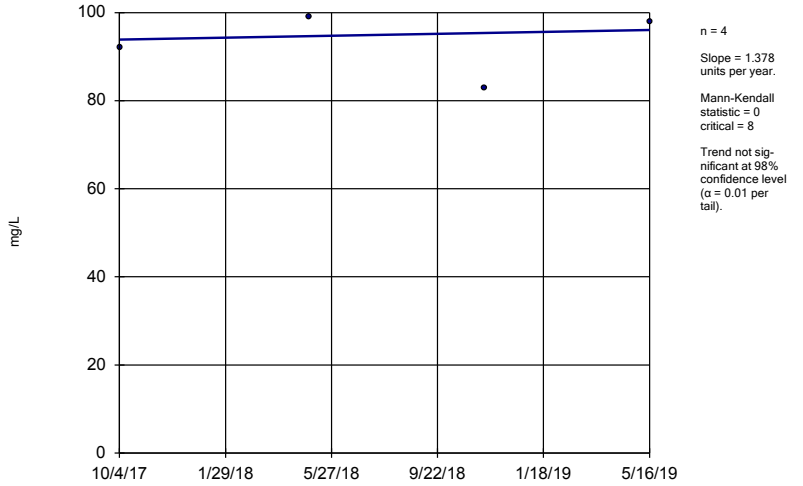
Calcium

MW-3 (bg)



n = 4

Slope = 1.378 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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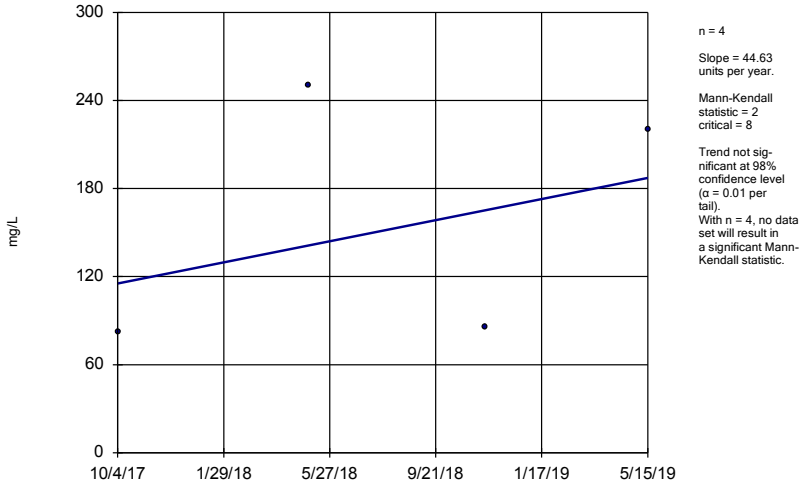
Calcium

MW-4



n = 4

Slope = 44.63 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

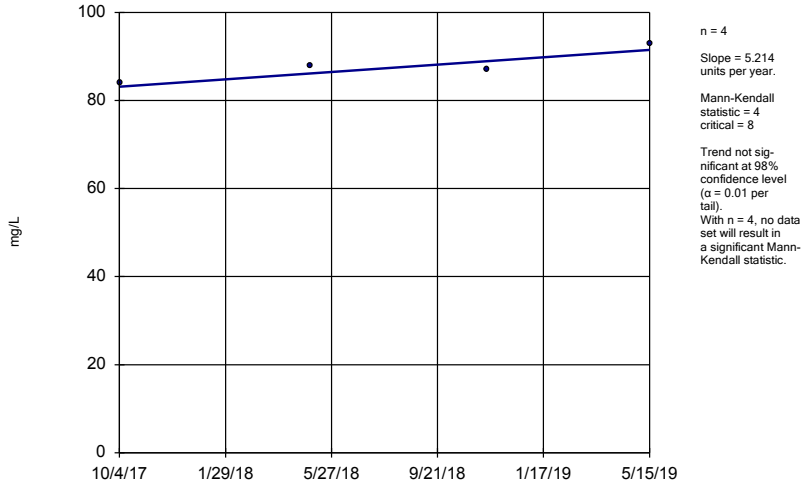
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-5



n = 4

Slope = 5.214 units per year.

Mann-Kendall statistic = 4
critical = 8

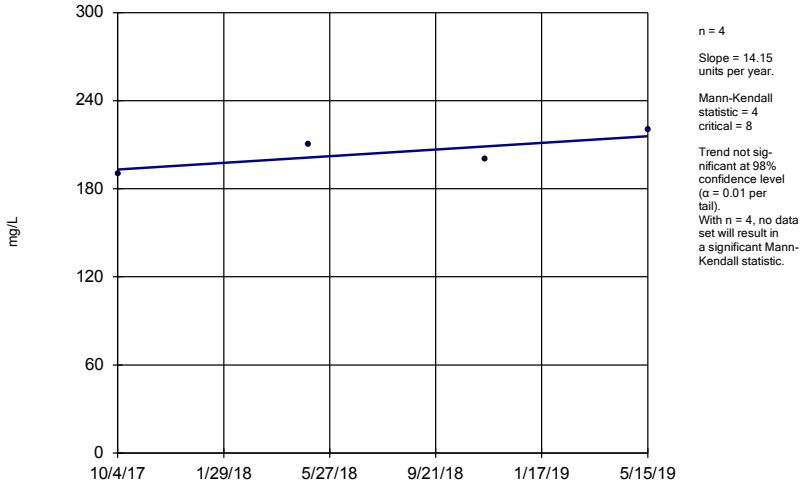
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Calcium

MW-5A



n = 4

Slope = 14.15 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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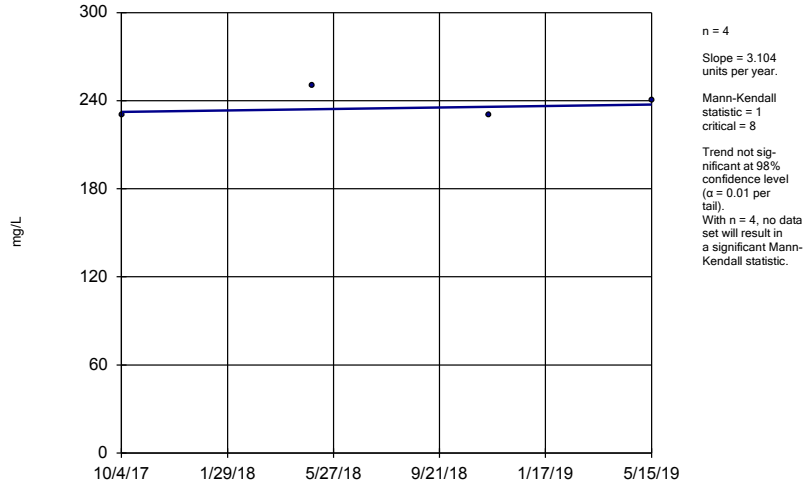
Calcium

MW-6



n = 4

Slope = 3.104 units per year.

Mann-Kendall statistic = 1
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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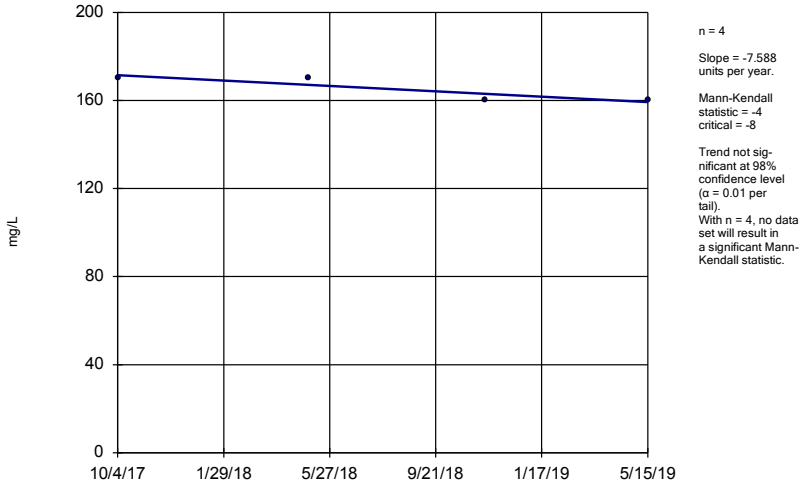
Calcium

MW-6A



n = 4

Slope = -7.588 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

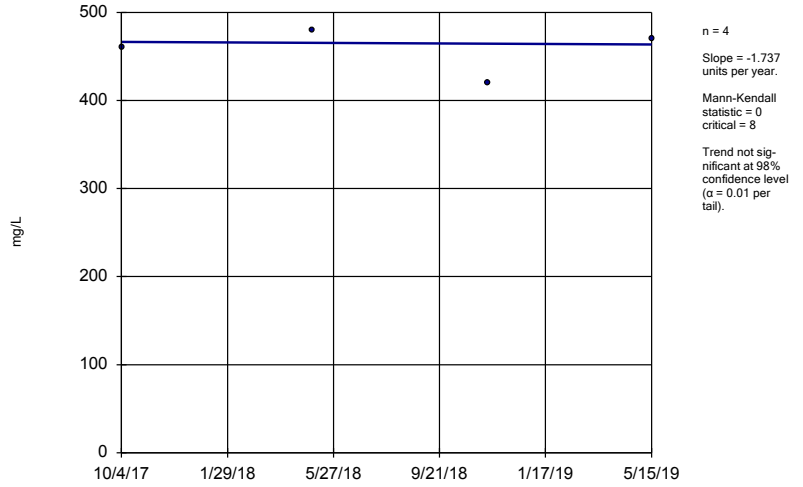
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-7 (bg)



n = 4

Slope = -1.737 units per year.

Mann-Kendall statistic = 0
critical = 8

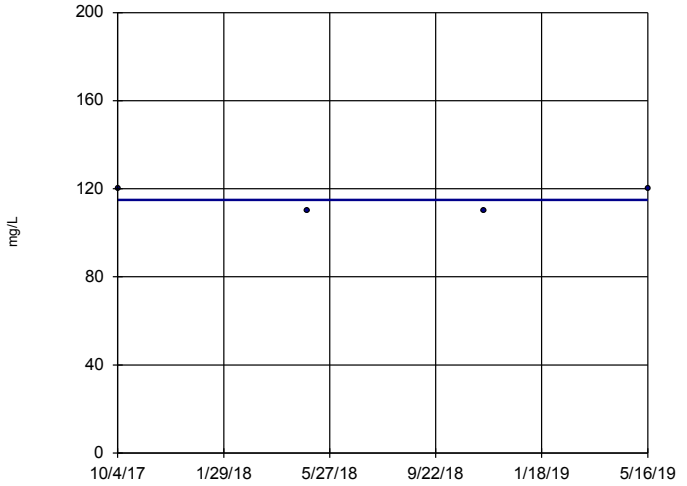
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Chloride

MW-2 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

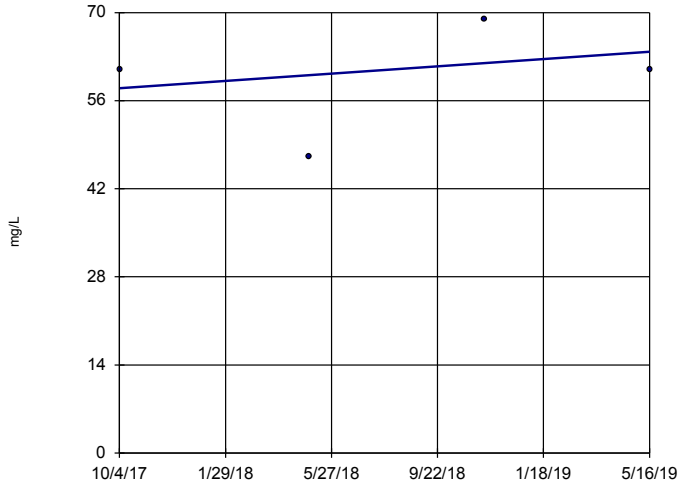
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-3 (bg)



n = 4

Slope = 3.596 units per year.

Mann-Kendall statistic = 1 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

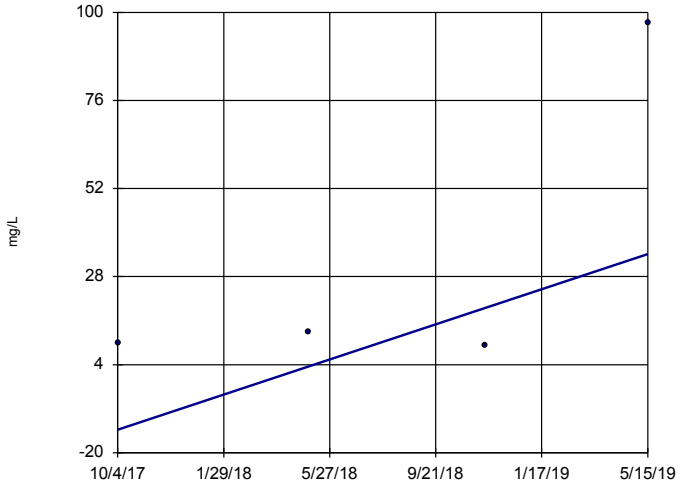
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-4



n = 4

Slope = 29.71 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

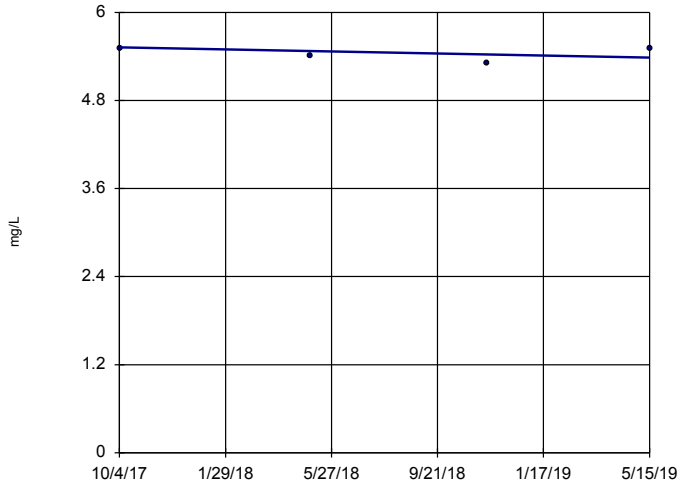
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-5



n = 4

Slope = -0.08649 units per year.

Mann-Kendall statistic = -1 critical = -8

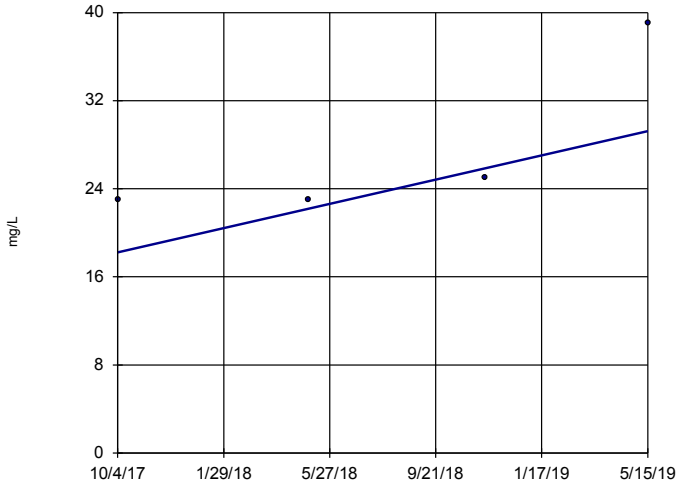
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Chloride

MW-5A



n = 4

Slope = 6.828 units per year.

Mann-Kendall statistic = 5 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

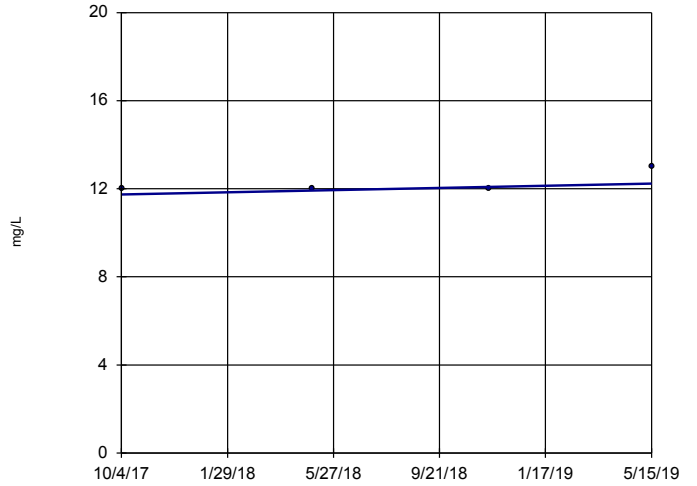
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6



n = 4

Slope = 0.3104 units per year.

Mann-Kendall statistic = 3 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

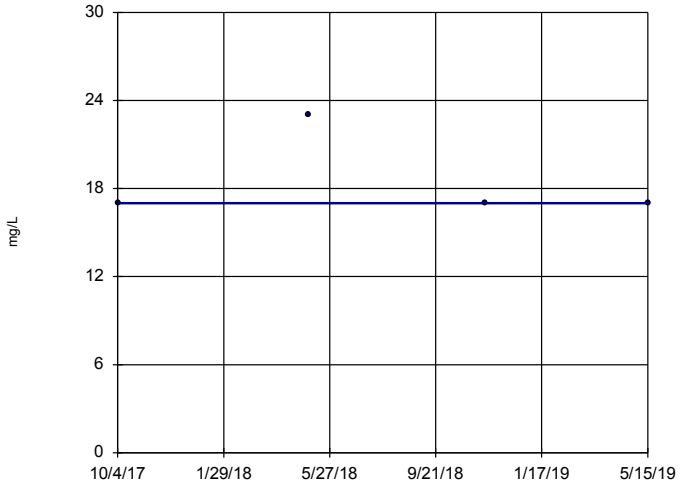
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6A



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

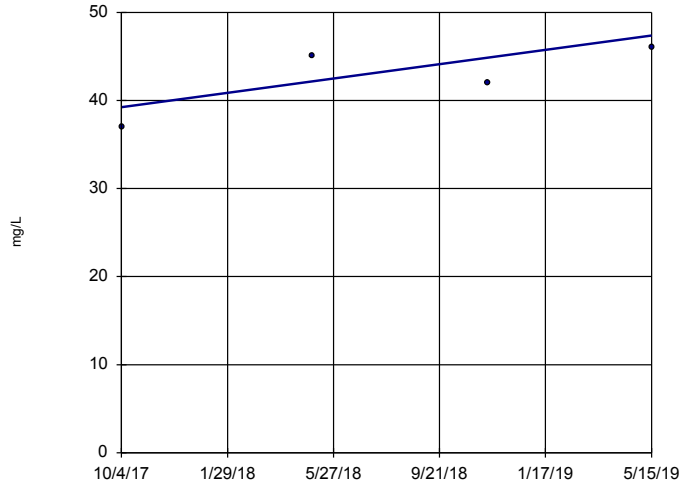
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-7 (bg)



n = 4

Slope = 5.041 units per year.

Mann-Kendall statistic = 4 critical = 8

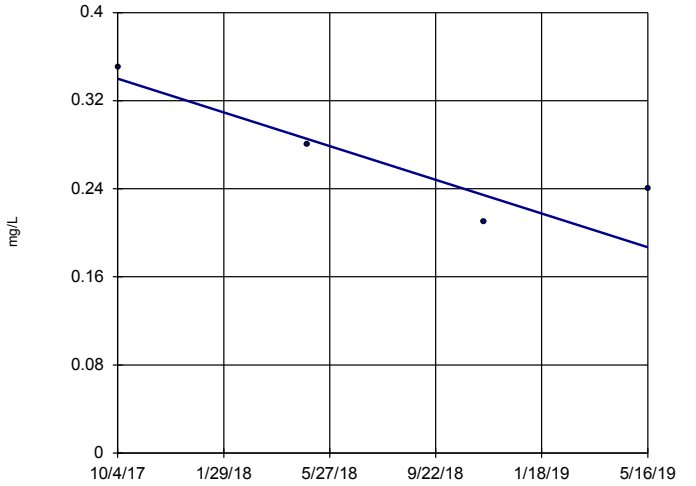
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Fluoride

MW-2 (bg)



n = 4

Slope = -0.09492 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

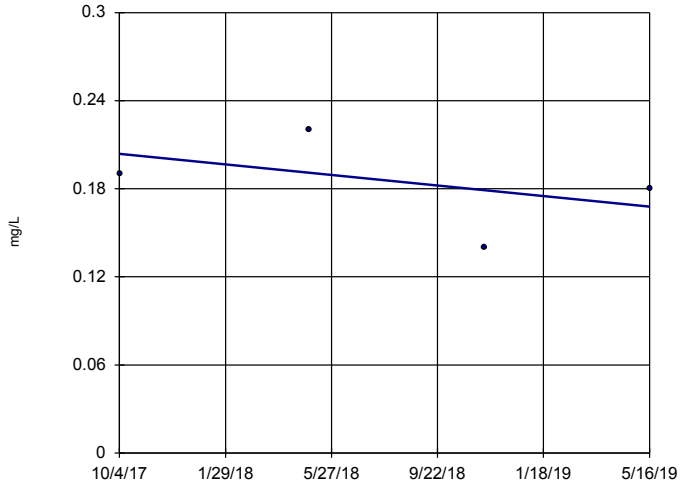
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-3 (bg)



n = 4

Slope = -0.02236 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

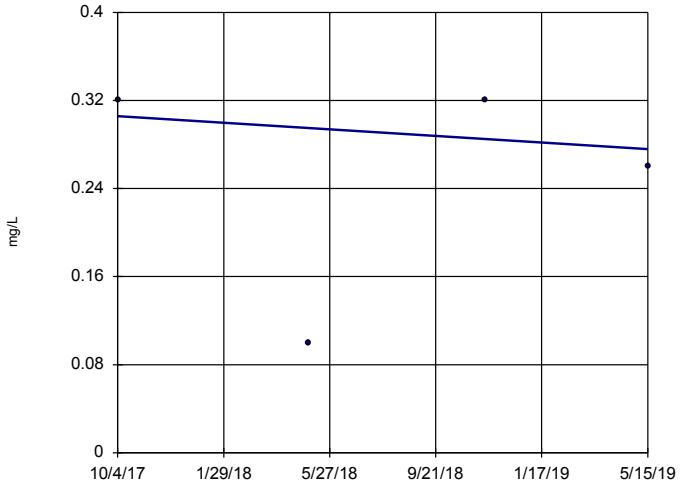
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-4



n = 4

Slope = -0.01862 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

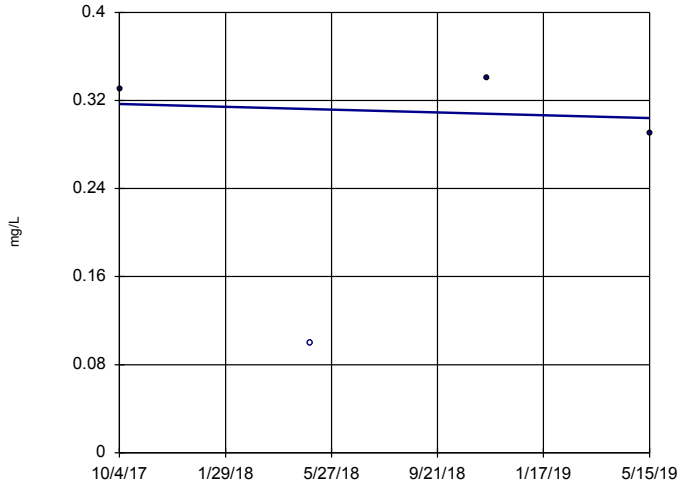
Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Fluoride

MW-5



n = 4

Slope = -0.007931 units per year.

Mann-Kendall statistic = 0
critical = 8

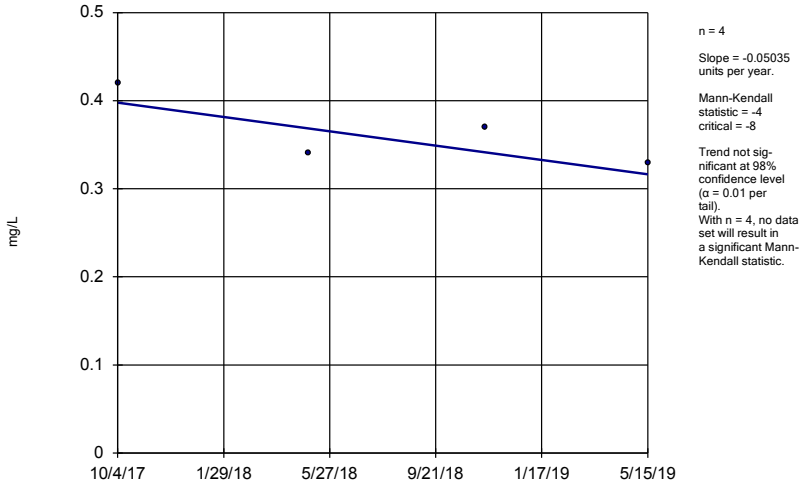
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 12/4/2019 2:11 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Fluoride

MW-5A



n = 4

Slope = -0.05035 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

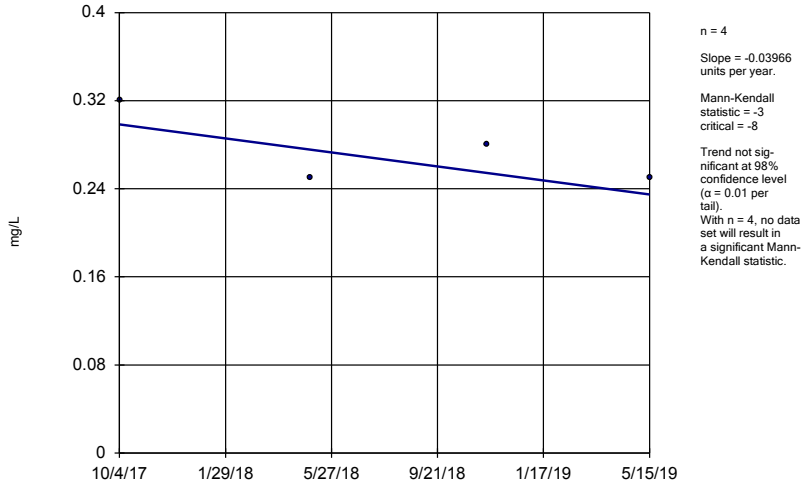
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6



n = 4

Slope = -0.03966 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

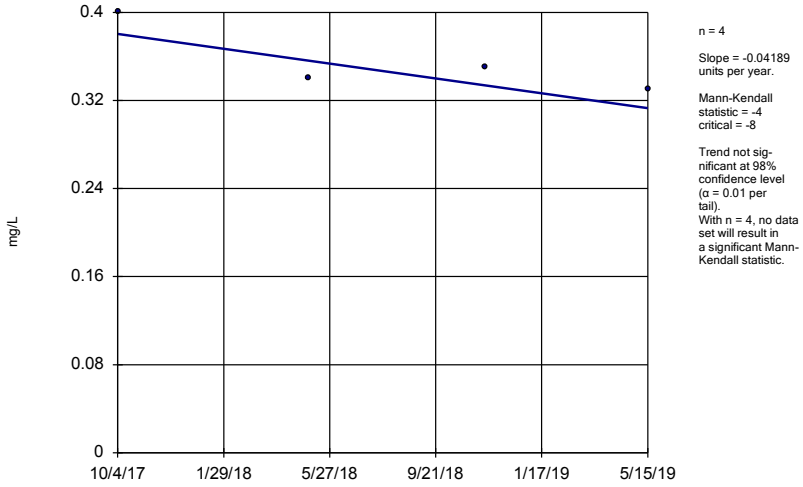
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6A



n = 4

Slope = -0.04189 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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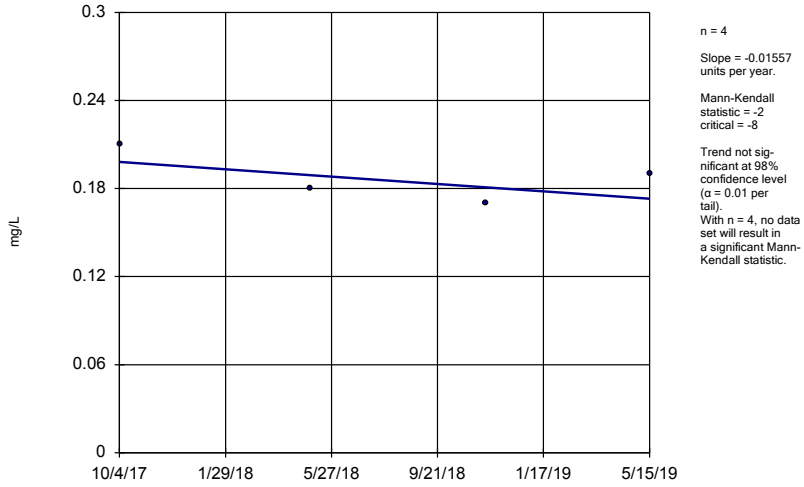
Fluoride

MW-7 (bg)



n = 4

Slope = -0.01557 units per year.

Mann-Kendall statistic = -2
critical = -8

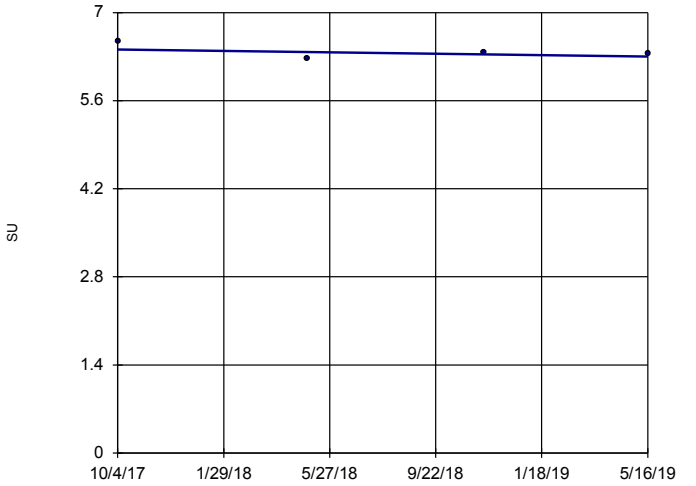
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

pH

MW-2 (bg)



n = 4

Slope = -0.0689 units per year.

Mann-Kendall statistic = -2 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

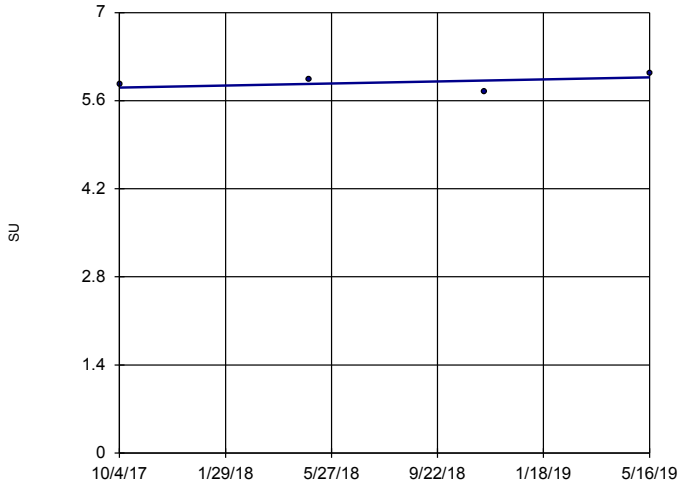
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-3 (bg)



n = 4

Slope = 0.1008 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

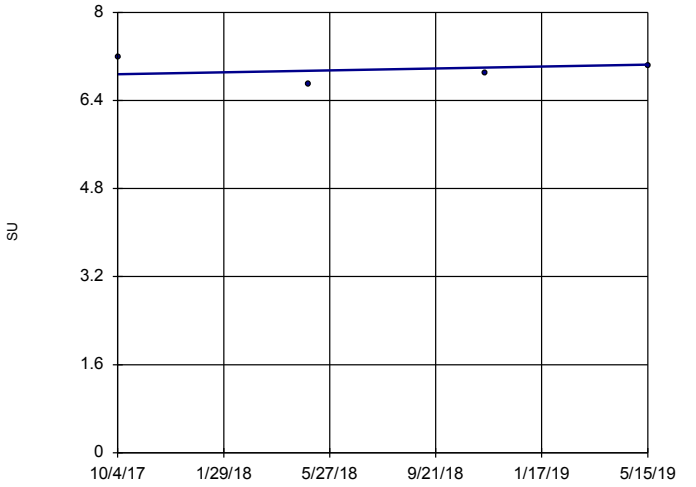
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-4



n = 4

Slope = 0.1078 units per year.

Mann-Kendall statistic = 0 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

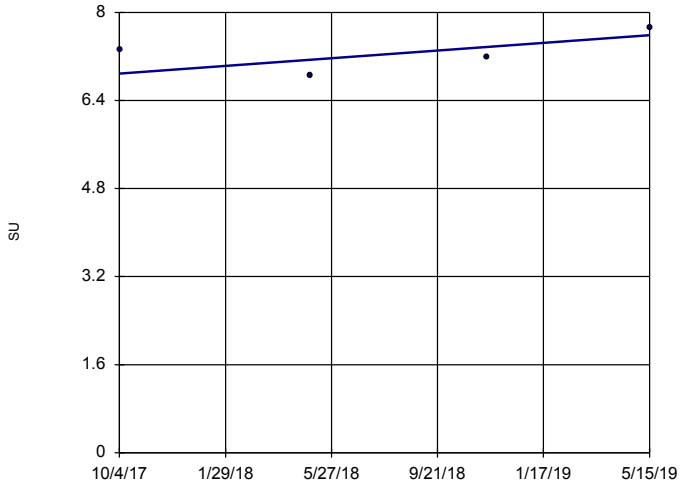
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-5



n = 4

Slope = 0.4345 units per year.

Mann-Kendall statistic = 2 critical = 8

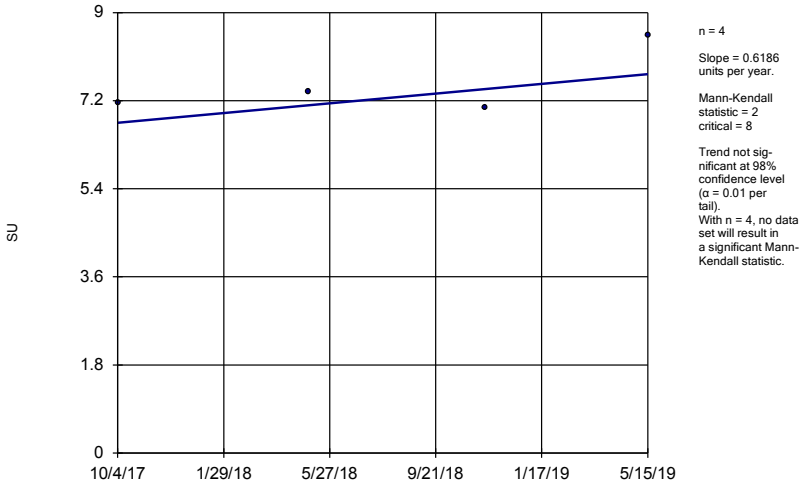
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

pH

MW-5A



n = 4

Slope = 0.6186 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

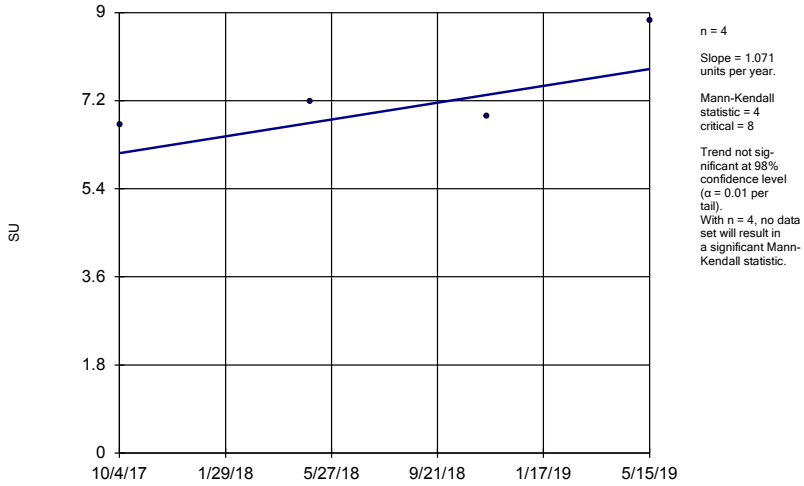
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6



n = 4

Slope = 1.071 units per year.

Mann-Kendall statistic = 4 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

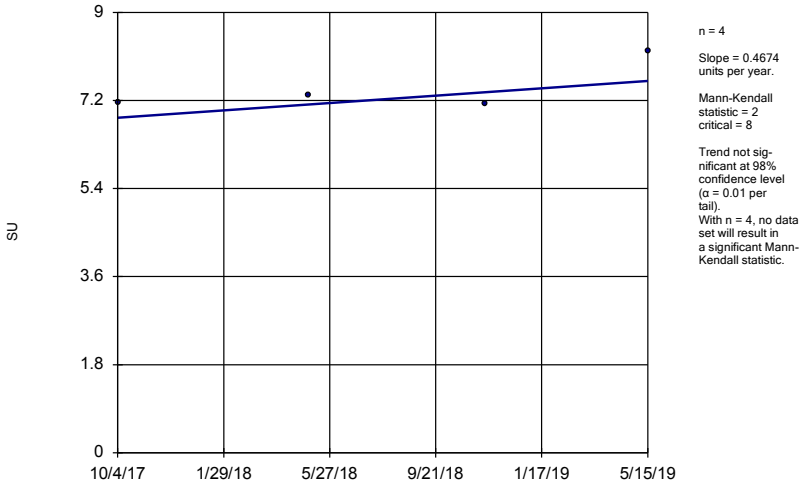
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-6A



n = 4

Slope = 0.4674 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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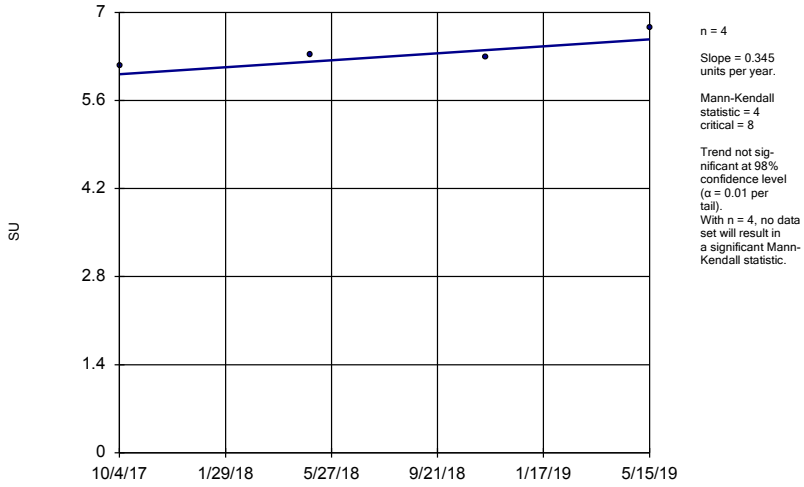
pH

MW-7 (bg)



n = 4

Slope = 0.345 units per year.

Mann-Kendall statistic = 4 critical = 8

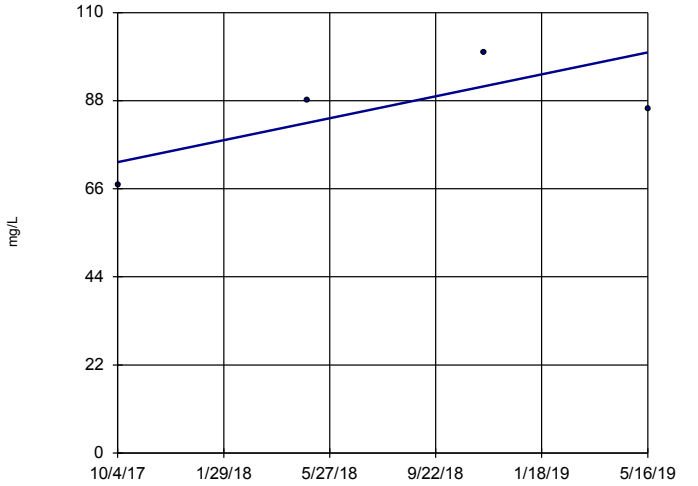
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sulfate

MW-2 (bg)



n = 4

Slope = 17 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

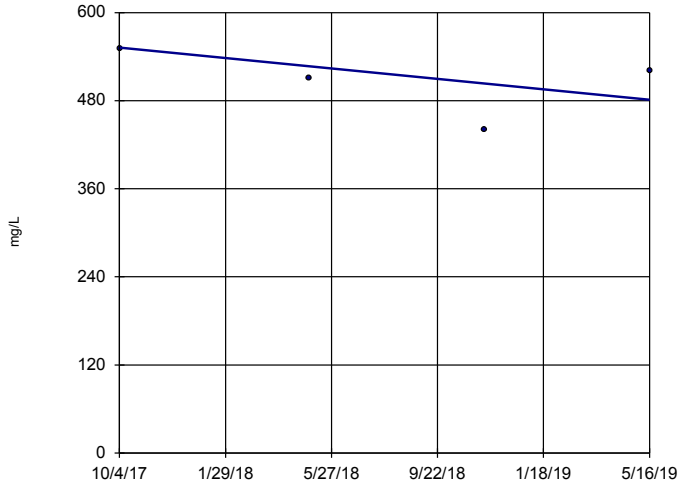
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-3 (bg)



n = 4

Slope = -44.06 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

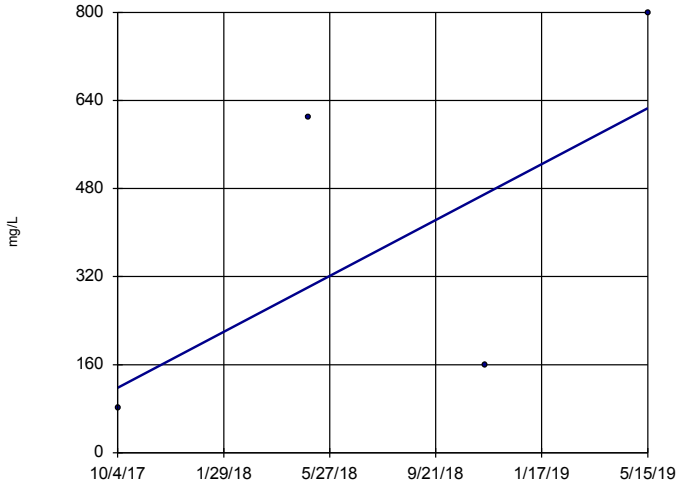
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-4



n = 4

Slope = 315.1 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

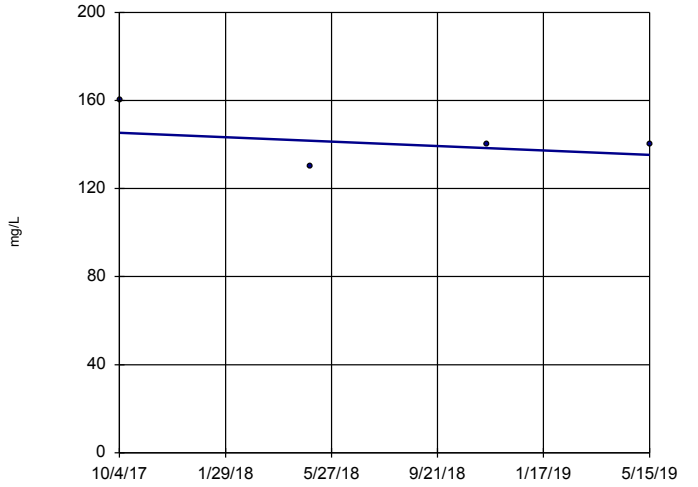
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-5



n = 4

Slope = -6.207 units per year.

Mann-Kendall statistic = -1
critical = -8

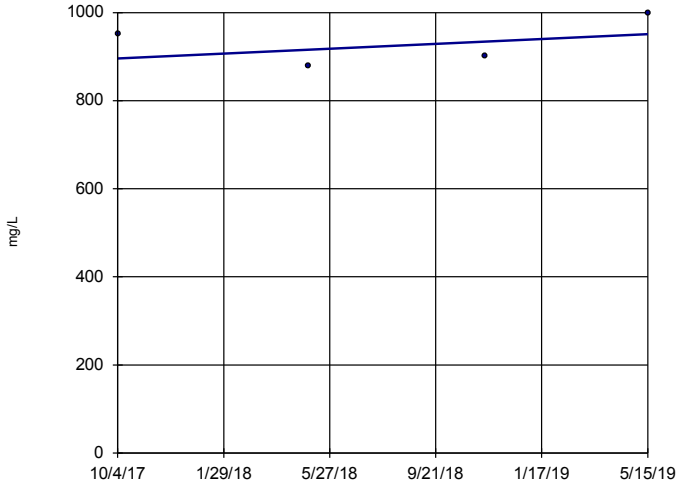
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sulfate

MW-5A



n = 4

Slope = 34.14 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

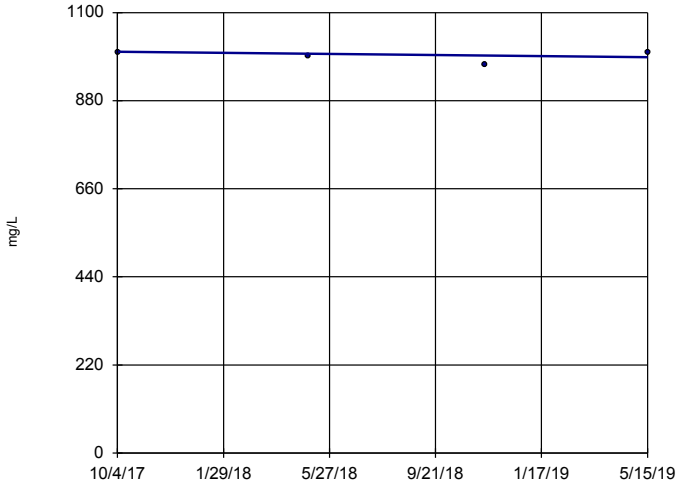
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6



n = 4

Slope = -8.649 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

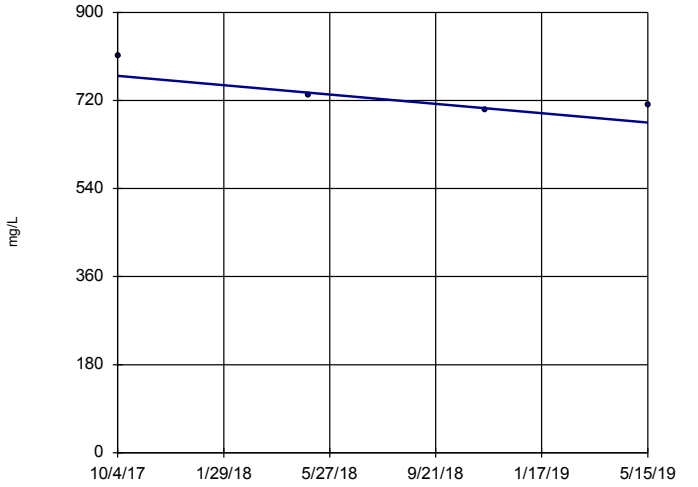
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6A



n = 4

Slope = -58.97 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

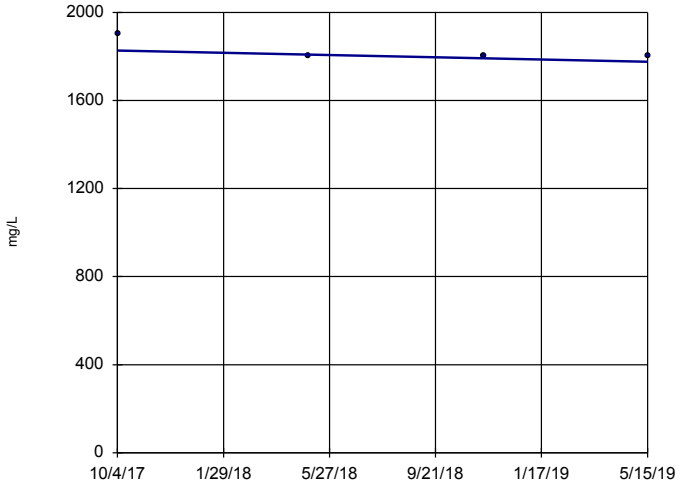
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-7 (bg)



n = 4

Slope = -31.04 units per year.

Mann-Kendall statistic = -3
critical = -8

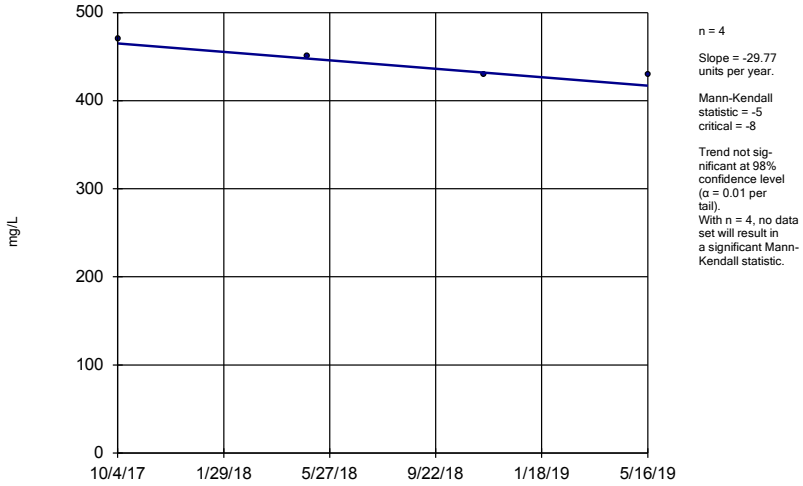
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Total Dissolved Solids

MW-2 (bg)



n = 4

Slope = -29.77 units per year.

Mann-Kendall statistic = -5
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

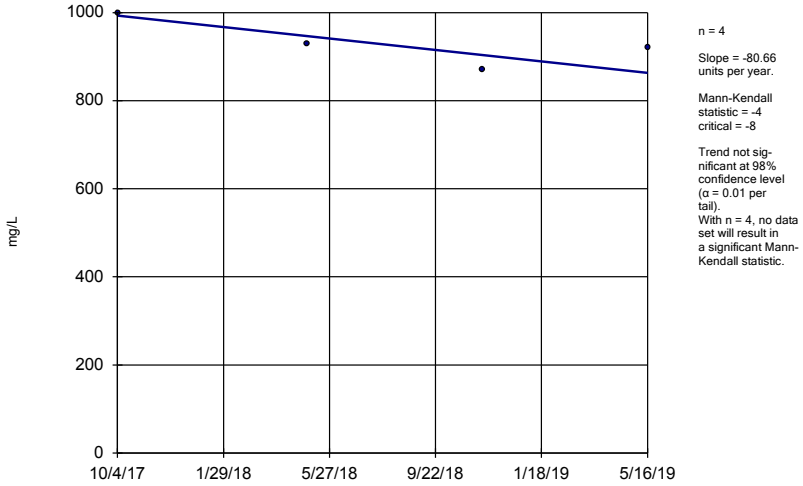
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-3 (bg)



n = 4

Slope = -80.66 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

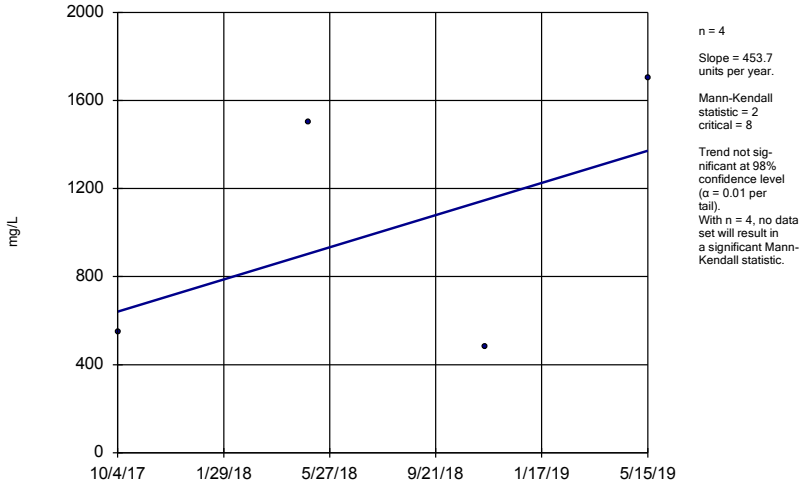
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-4



n = 4

Slope = 453.7 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

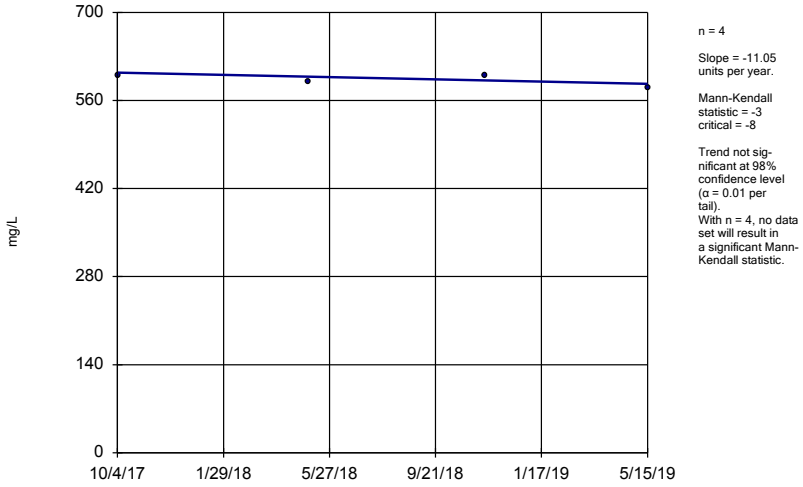
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-5



n = 4

Slope = -11.05 units per year.

Mann-Kendall statistic = -3
critical = -8

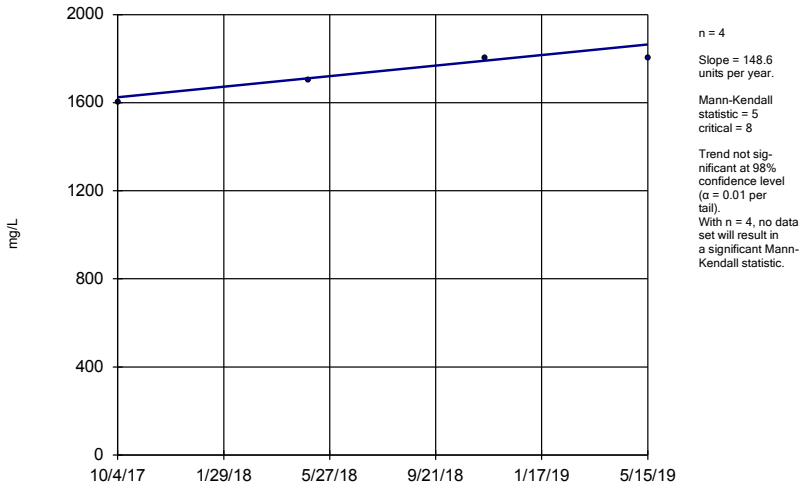
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Total Dissolved Solids

MW-5A



n = 4

Slope = 148.6 units per year.

Mann-Kendall statistic = 5 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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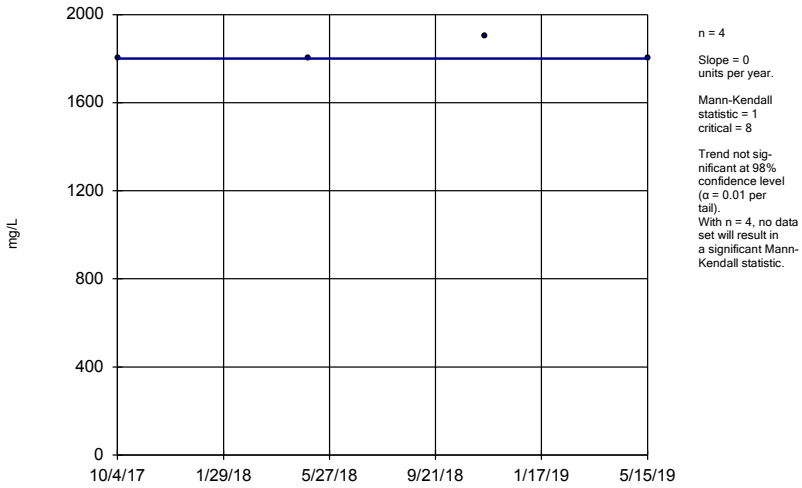
Total Dissolved Solids

MW-6



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 1 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

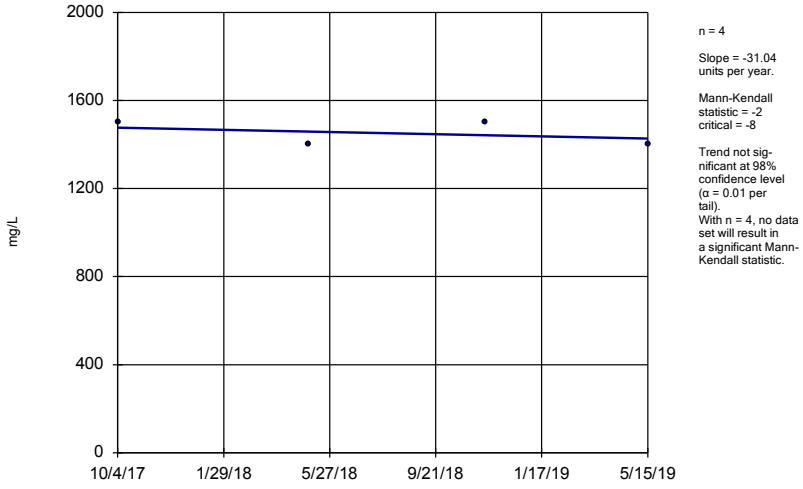
Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Sanitas™ v.9.6.23 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-6A



n = 4

Slope = -31.04 units per year.

Mann-Kendall statistic = -2 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

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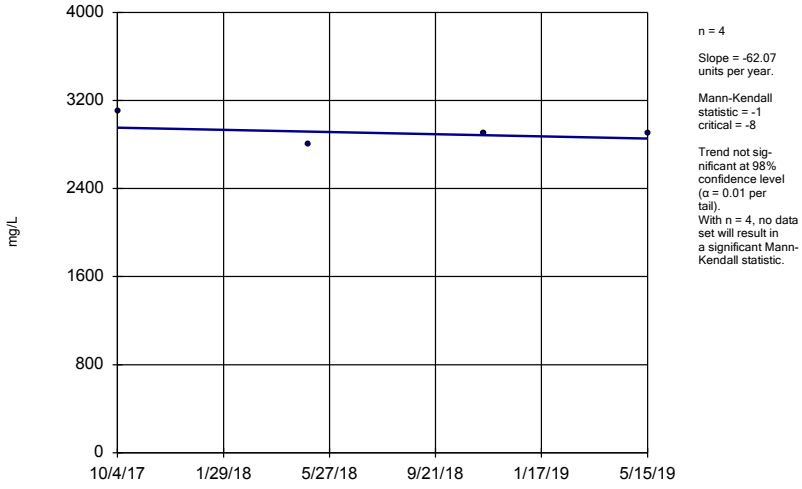
Total Dissolved Solids

MW-7 (bg)



n = 4

Slope = -62.07 units per year.

Mann-Kendall statistic = -1 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 12/4/2019 2:12 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background Printed 12/4/2019, 2:13 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-2 (bg)	-0.03847	-4	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-3 (bg)	0	-1	-8	No	4	75	n/a	n/a	0.02	NP
Boron (mg/L)	MW-4	0	-1	-8	No	4	75	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5	-0.00...	0	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5A	0.1202	5	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6	-0.01279	-2	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6A	-0.01589	-3	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-7 (bg)	-0.03739	-2	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2 (bg)	-4.716	-3	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-3 (bg)	1.378	0	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-4	44.63	2	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5	5.214	4	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5A	14.15	4	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6	3.104	1	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6A	-7.588	-4	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7 (bg)	-1.737	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2 (bg)	0	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3 (bg)	3.596	1	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4	29.71	2	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	-0.08649	-1	-8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5A	6.828	5	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	0.3104	3	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6A	0	-1	-8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7 (bg)	5.041	4	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2 (bg)	-0.09492	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3 (bg)	-0.02236	-2	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4	-0.01862	-1	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	-0.00...	0	8	No	4	25	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5A	-0.05035	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	-0.03966	-3	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6A	-0.04189	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7 (bg)	-0.01557	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-2 (bg)	-0.0689	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-3 (bg)	0.1008	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-4	0.1078	0	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5	0.4345	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5A	0.6186	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6	1.071	4	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6A	0.4674	2	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-7 (bg)	0.345	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-2 (bg)	17	2	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-3 (bg)	-44.06	-2	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-4	315.1	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5	-6.207	-1	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5A	34.14	2	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6	-8.649	-1	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6A	-58.97	-4	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7 (bg)	-31.04	-3	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-2 (bg)	-29.77	-5	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-3 (bg)	-80.66	-4	-8	No	4	0	n/a	n/a	0.02	NP

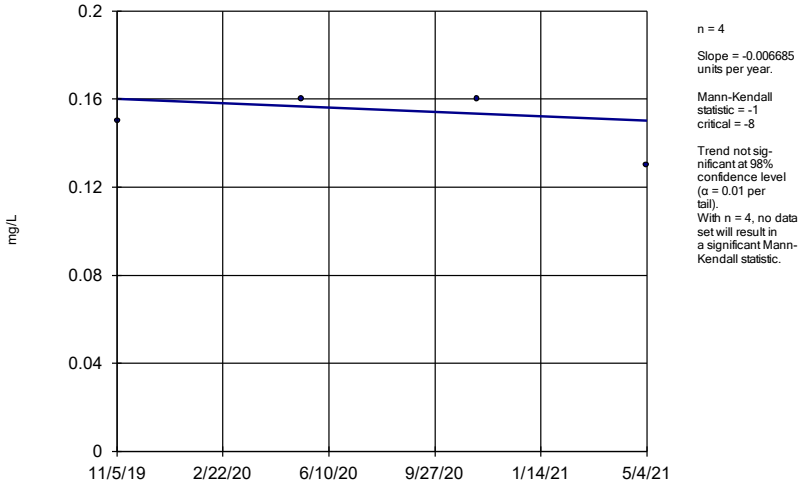
Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-19 App 3 Asbury ponds with background Printed 12/4/2019, 2:13 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Dissolved Solids (mg/L)	MW-4	453.7	2	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	-11.05	-3	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5A	148.6	5	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	0	1	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6A	-31.04	-2	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7 (bg)	-62.07	-1	-8	No	4	0	n/a	n/a	0.02	NP

Boron

MW-2 (bg)



n = 4

Slope = -0.006685 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

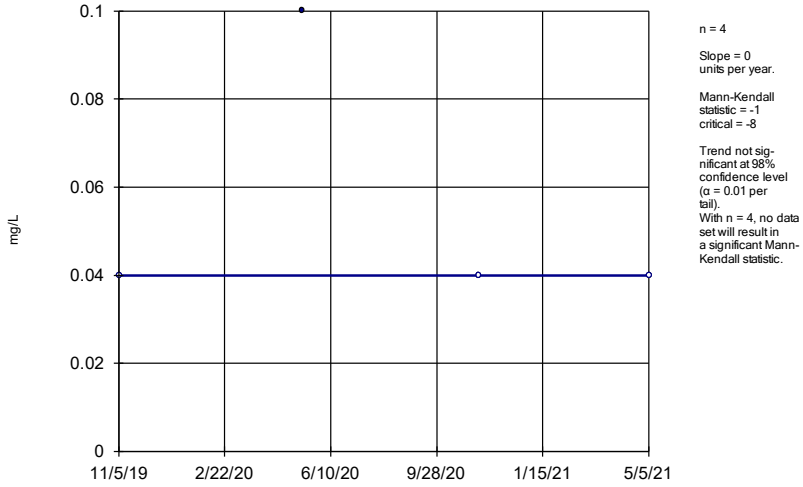
Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-3 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

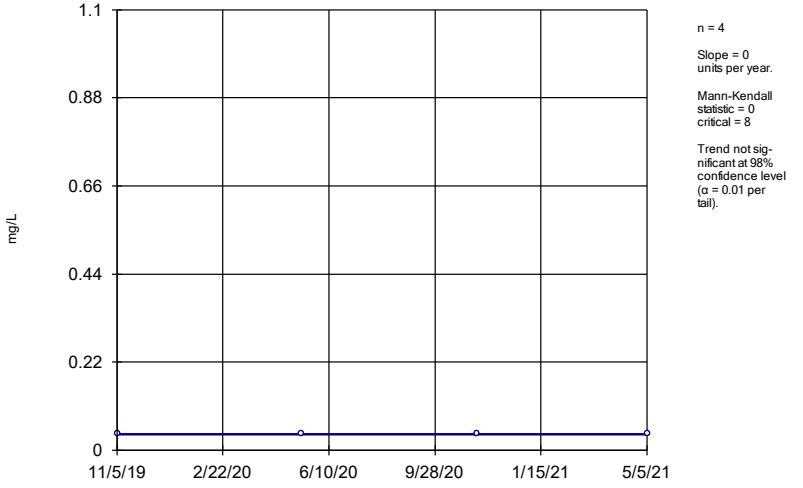
Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Hollow symbols indicate censored values.

Boron

MW-4



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 8

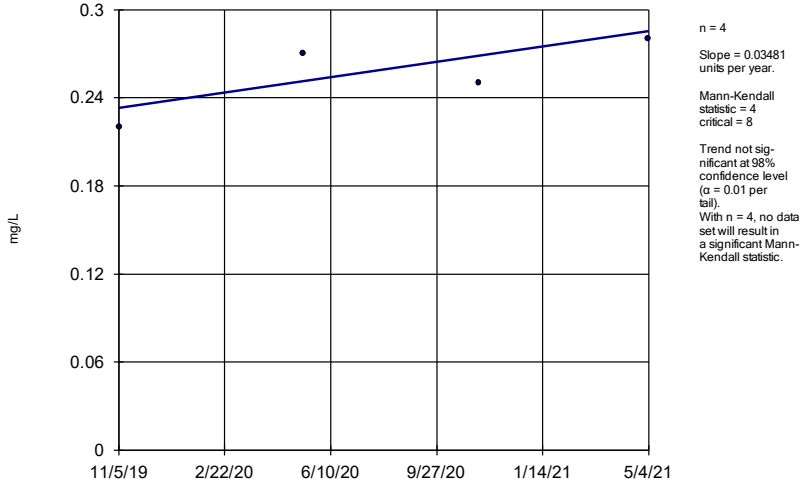
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Boron

MW-5



n = 4

Slope = 0.03481 units per year.

Mann-Kendall statistic = 4
critical = 8

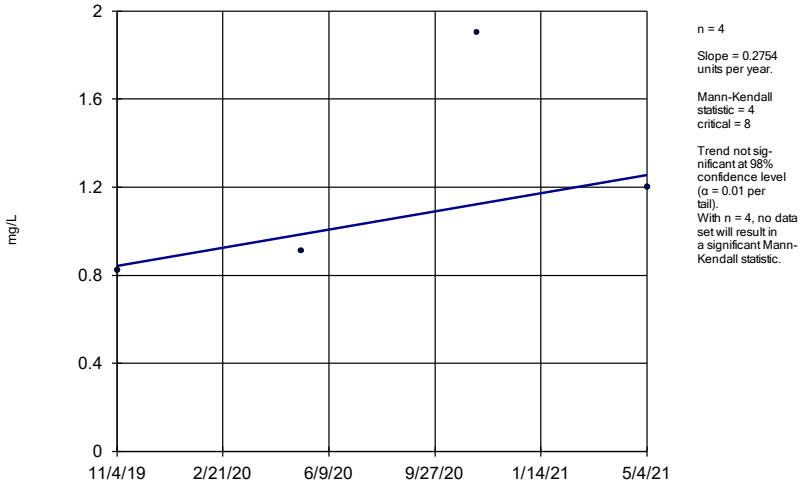
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Boron

MW-5A



n = 4

Slope = 0.2754 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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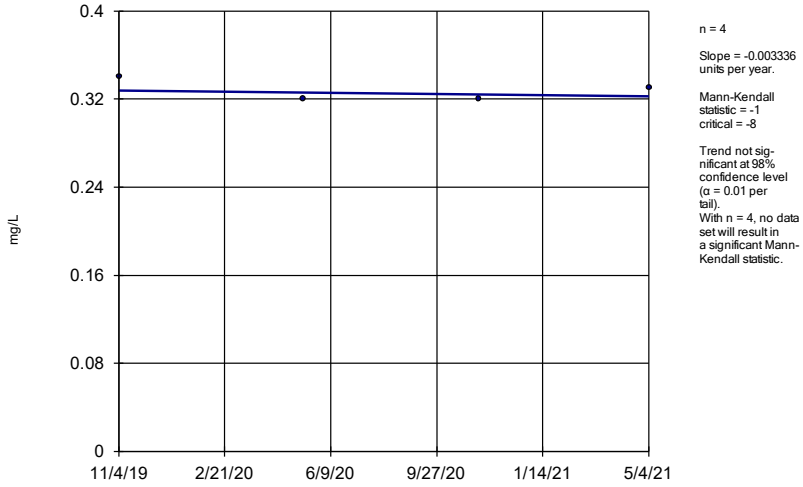
Boron

MW-6



n = 4

Slope = -0.003336 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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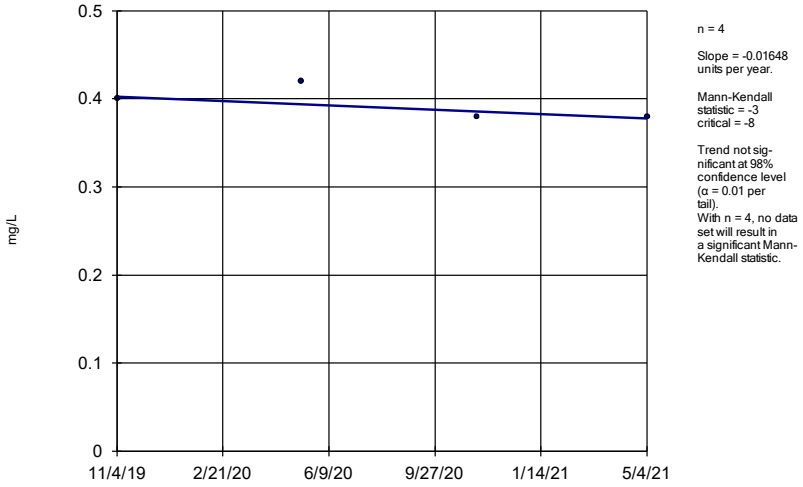
Boron

MW-6A



n = 4

Slope = -0.01648 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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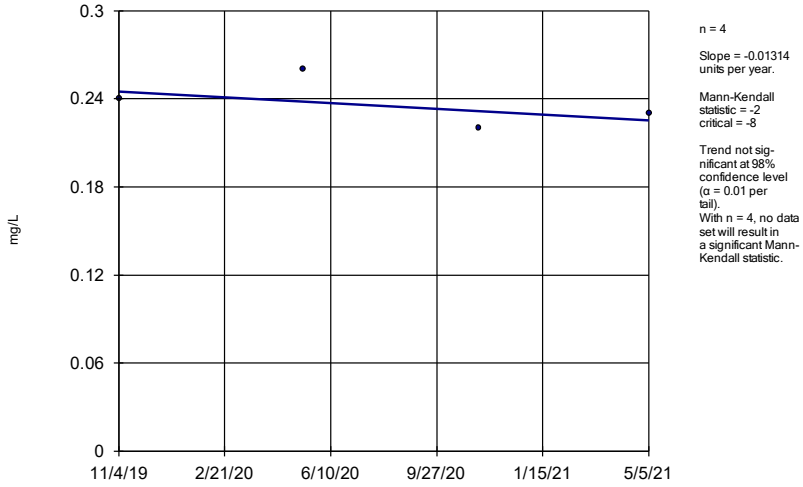
Boron

MW-7 (bg)



n = 4

Slope = -0.01314 units per year.

Mann-Kendall statistic = -2
critical = -8

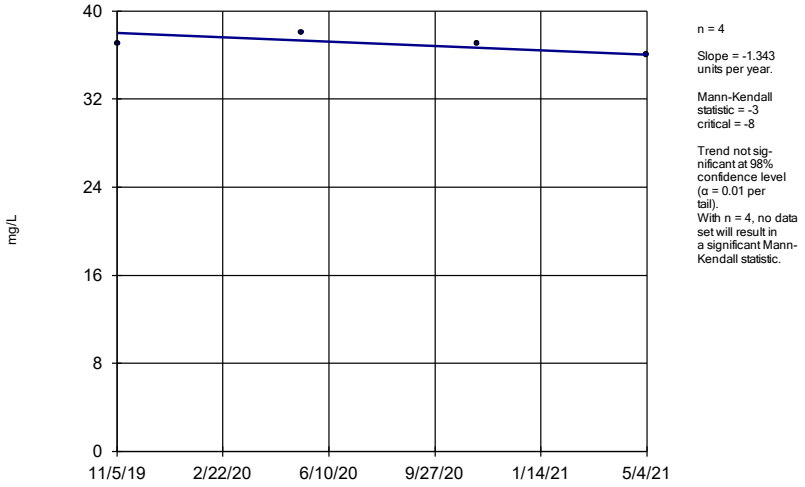
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Calcium

MW-2 (bg)



n = 4

Slope = -1.343 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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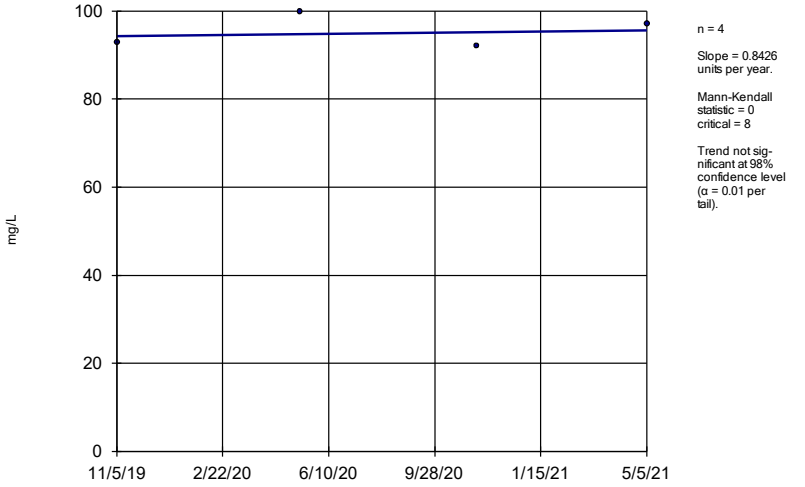
Calcium

MW-3 (bg)



n = 4

Slope = 0.8426 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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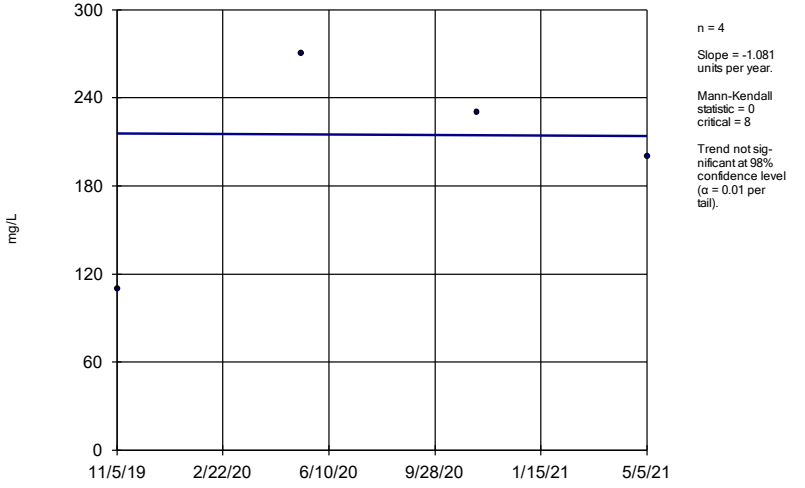
Calcium

MW-4



n = 4

Slope = -1.081 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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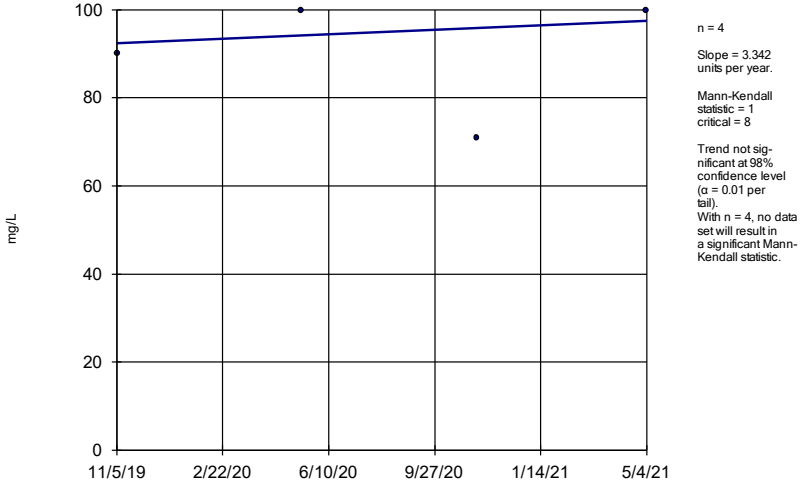
Calcium

MW-5



n = 4

Slope = 3.342 units per year.

Mann-Kendall statistic = 1
critical = 8

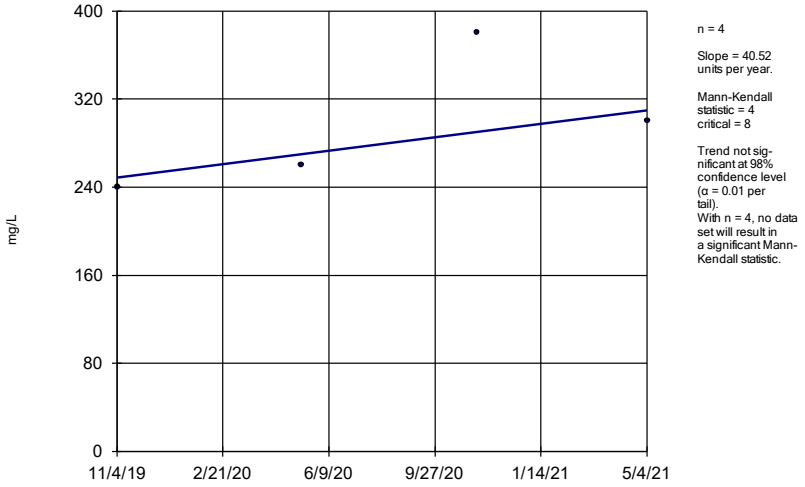
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Calcium

MW-5A



n = 4

Slope = 40.52 units per year.

Mann-Kendall statistic = 4 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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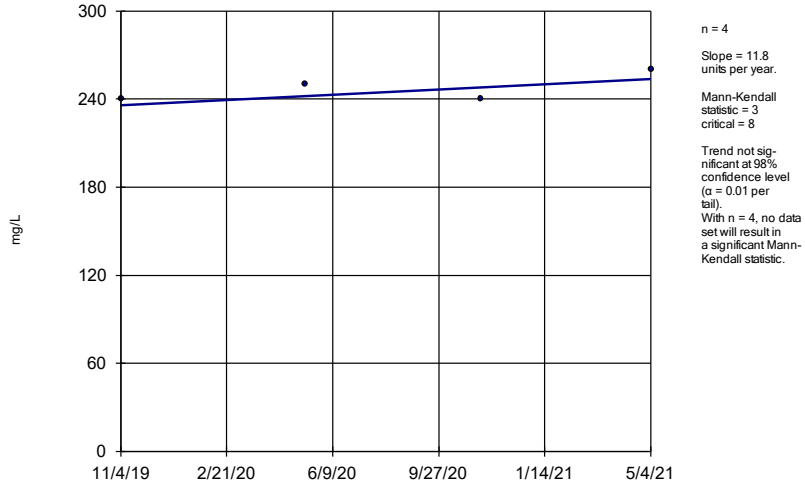
Calcium

MW-6



n = 4

Slope = 11.8 units per year.

Mann-Kendall statistic = 3 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

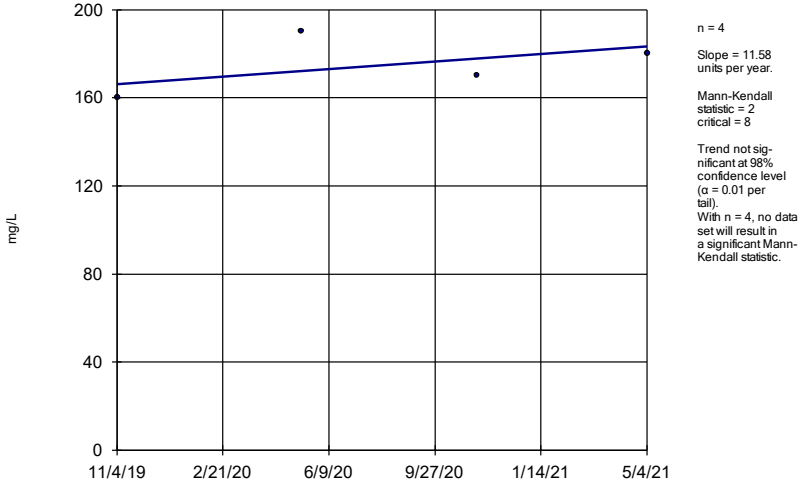
Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-6A



n = 4

Slope = 11.58 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

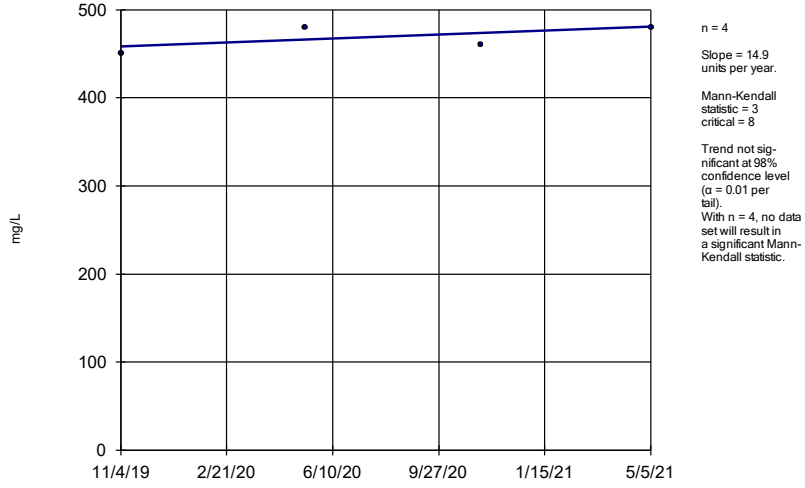
Sen's Slope Estimator Analysis Run 11/18/2021 4:27 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

MW-7 (bg)



n = 4

Slope = 14.9 units per year.

Mann-Kendall statistic = 3 critical = 8

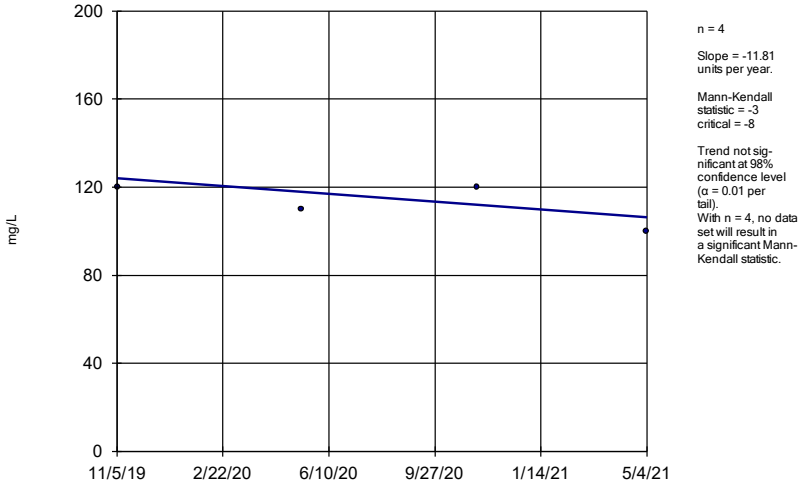
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Chloride

MW-2 (bg)



n = 4

Slope = -11.81 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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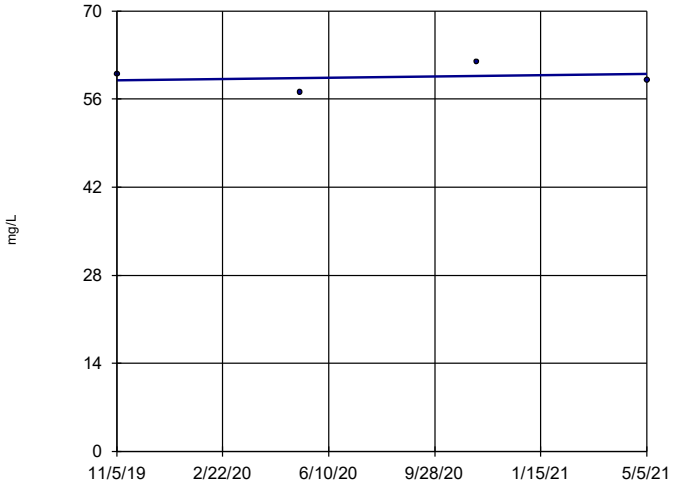
Chloride

MW-3 (bg)



n = 4

Slope = 0.6502 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

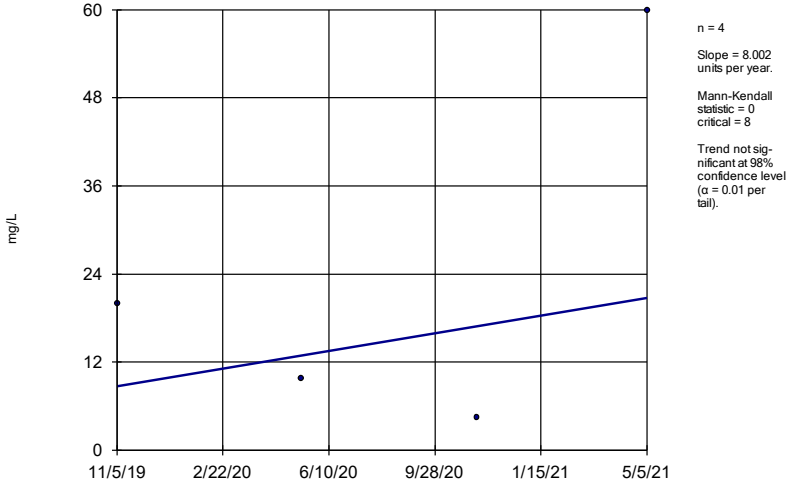
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-4



n = 4

Slope = 8.002 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

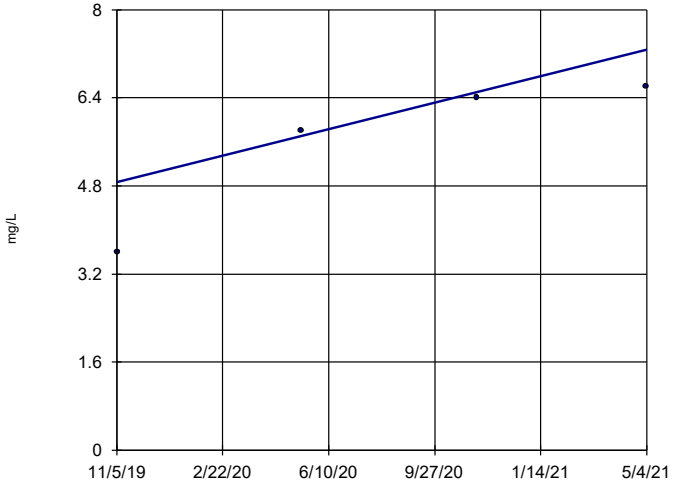
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-5



n = 4

Slope = 1.608 units per year.

Mann-Kendall statistic = 6
critical = 8

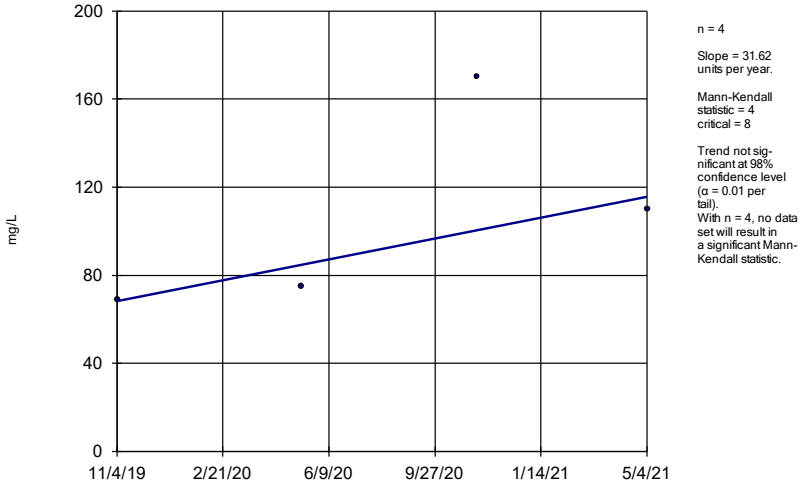
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Chloride

MW-5A



n = 4

Slope = 31.62 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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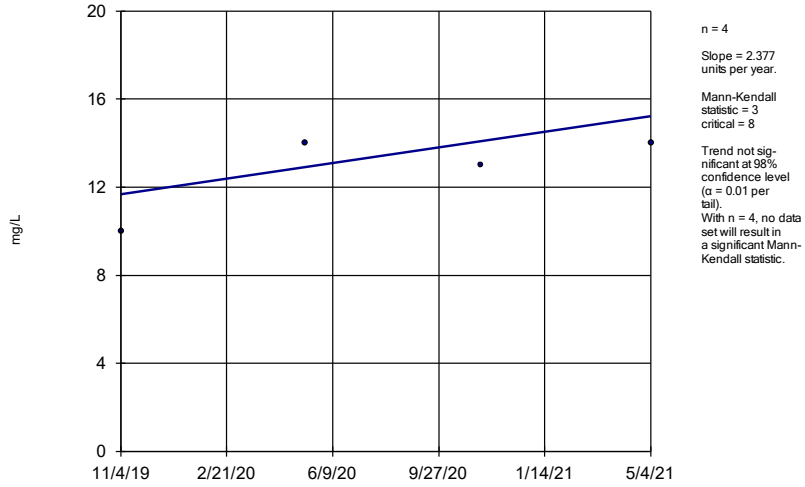
Chloride

MW-6



n = 4

Slope = 2.377 units per year.

Mann-Kendall statistic = 3
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

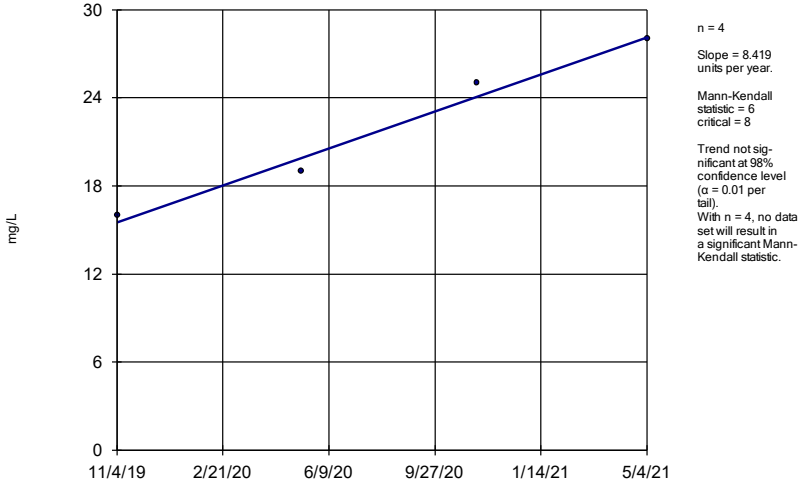
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

MW-6A



n = 4

Slope = 8.419 units per year.

Mann-Kendall statistic = 6
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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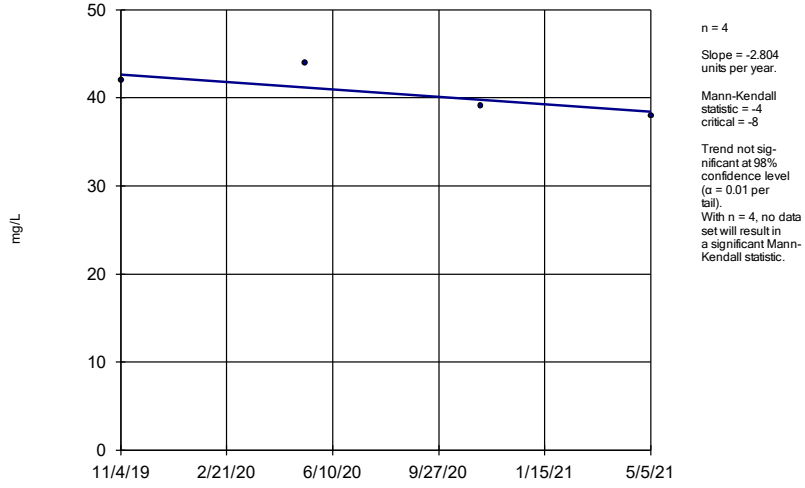
Chloride

MW-7 (bg)



n = 4

Slope = -2.804 units per year.

Mann-Kendall statistic = -4
critical = -8

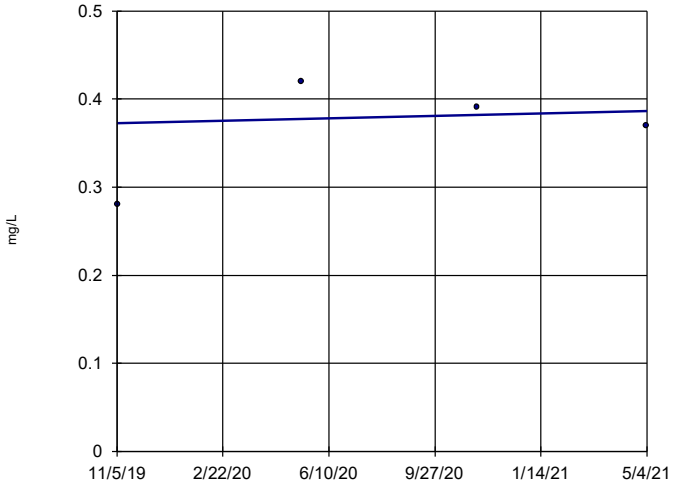
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Fluoride

MW-2 (bg)



n = 4

Slope = 0.009225 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

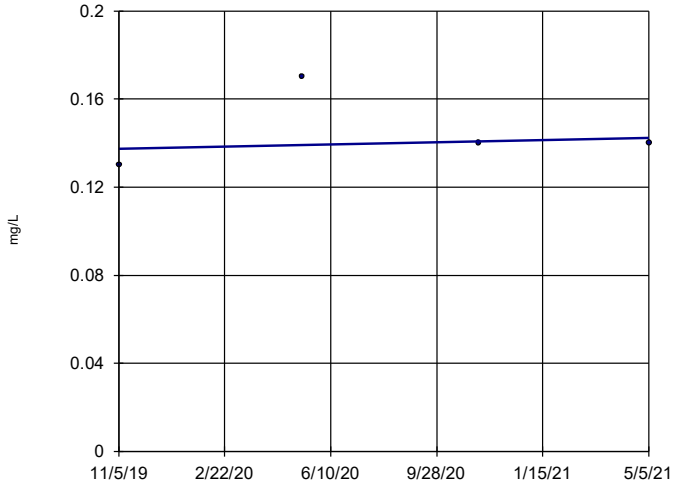
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-3 (bg)



n = 4

Slope = 0.003336 units per year.

Mann-Kendall statistic = 1
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

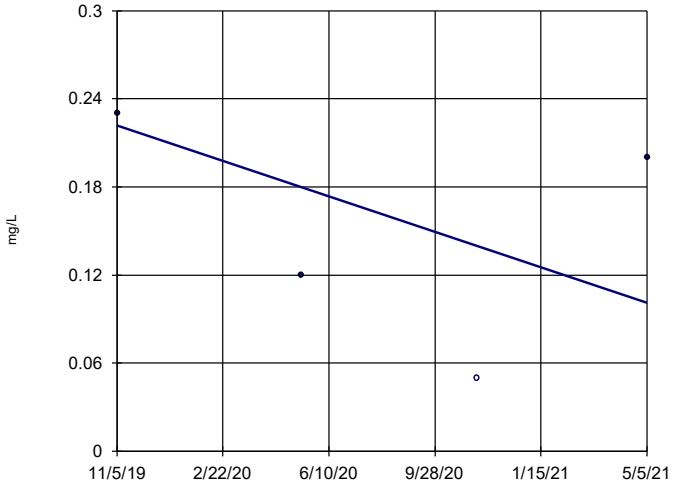
The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Fluoride

MW-4



n = 4

Slope = -0.08059 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

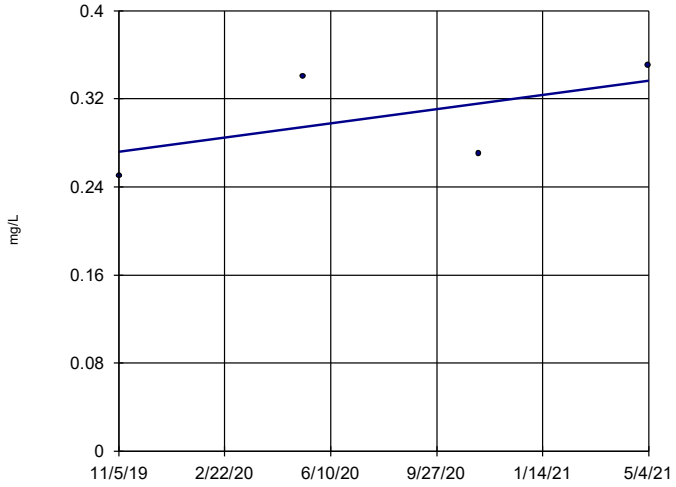
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-5



n = 4

Slope = 0.04326 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

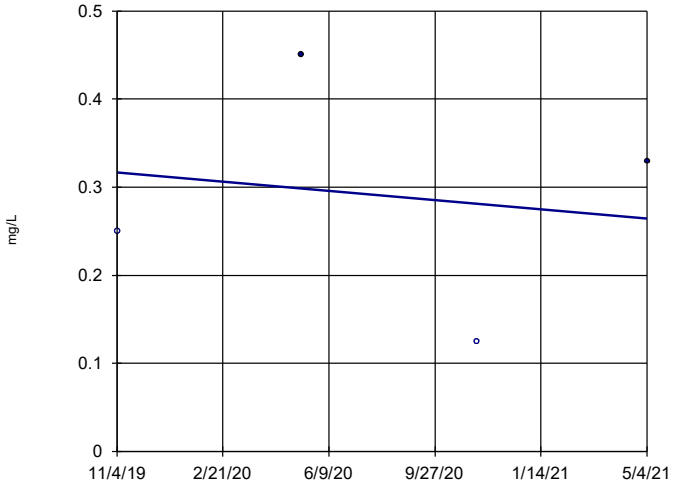
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Fluoride

MW-5A



n = 4

Slope = -0.03463 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

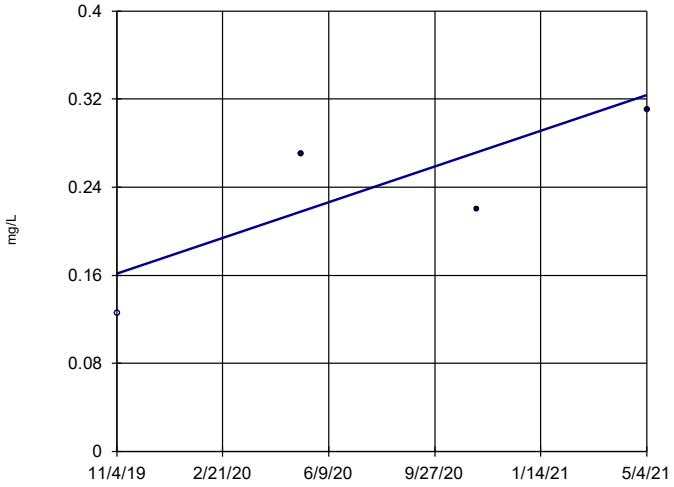
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Fluoride

MW-6



n = 4

Slope = 0.1083 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

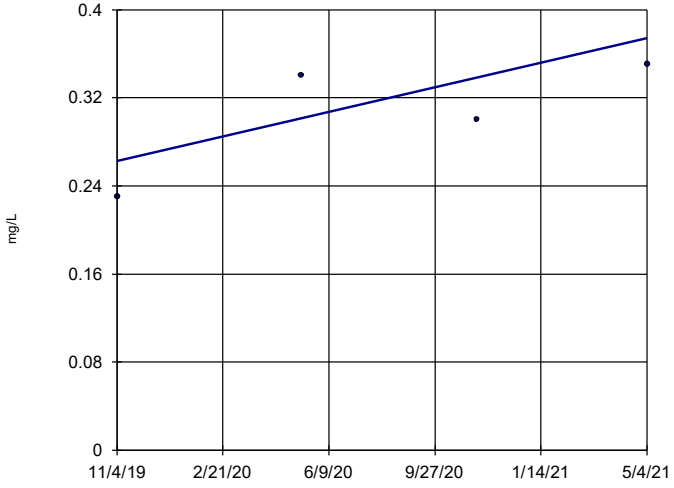
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Fluoride

MW-6A



n = 4

Slope = 0.07438 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

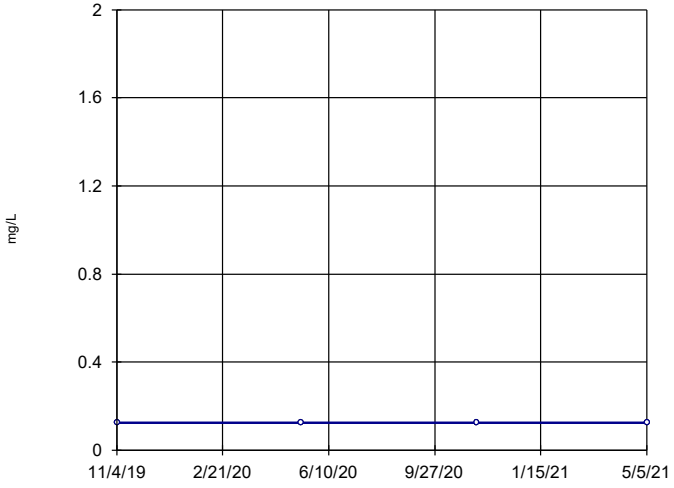
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Fluoride

MW-7 (bg)



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 0
critical = 8

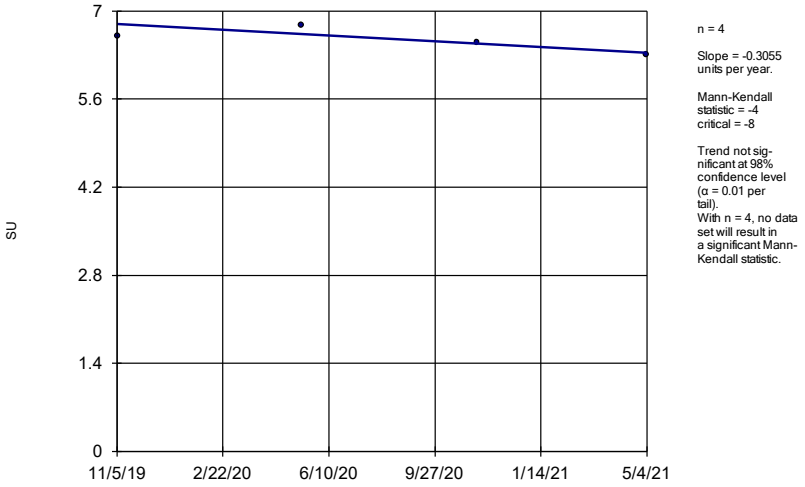
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

pH

MW-2 (bg)



n = 4

Slope = -0.3055 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

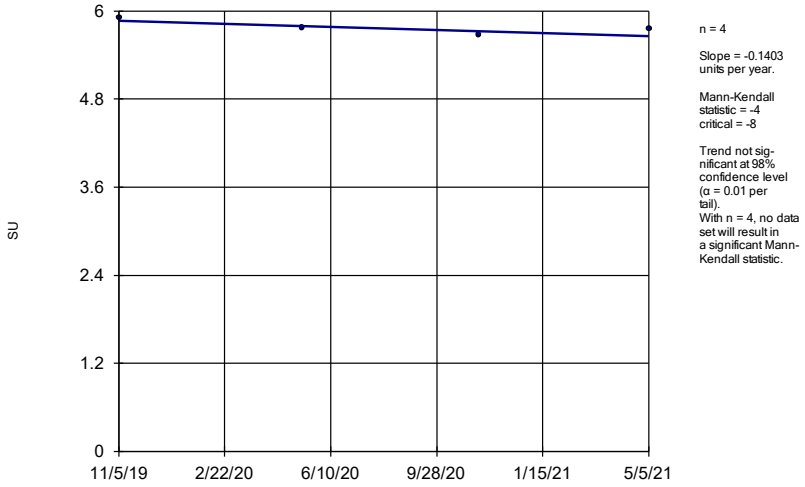
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-3 (bg)



n = 4

Slope = -0.1403 units per year.

Mann-Kendall statistic = -4
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

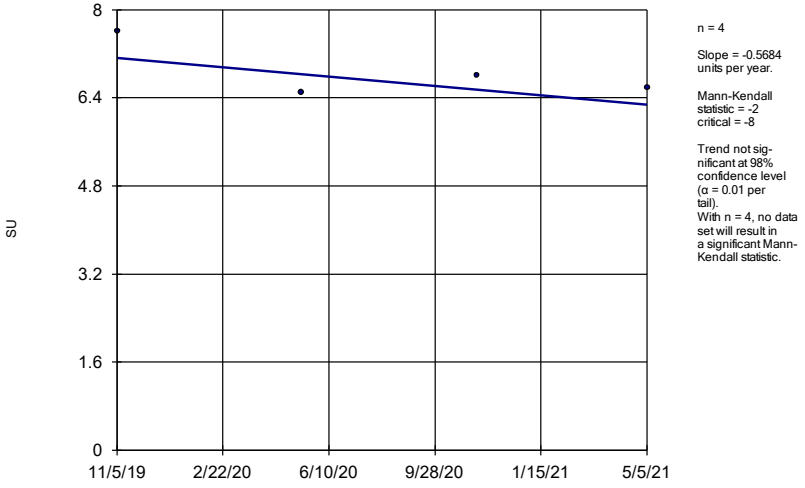
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

pH

MW-4



n = 4

Slope = -0.5684 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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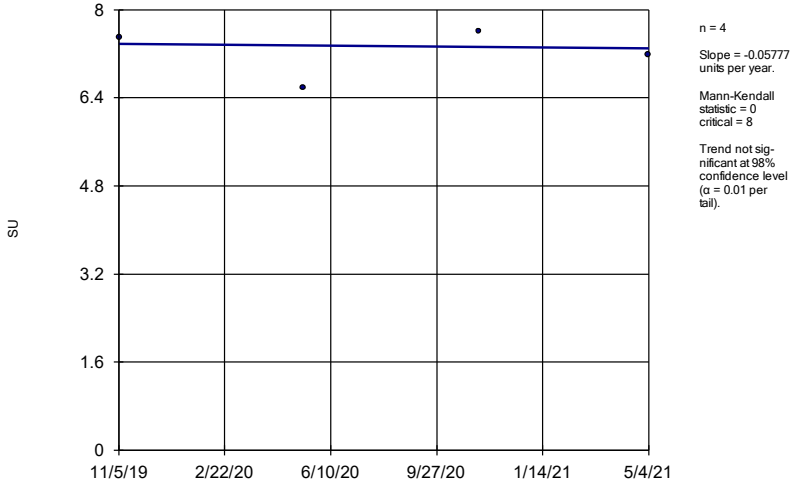
pH

MW-5



n = 4

Slope = -0.05777 units per year.

Mann-Kendall statistic = 0
critical = 8

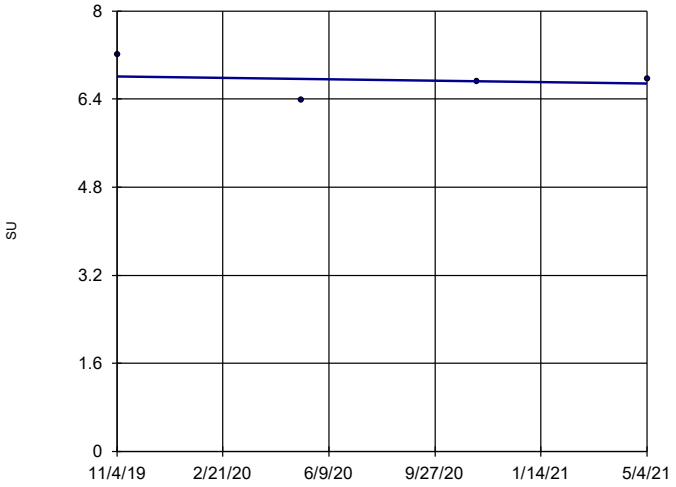
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

pH

MW-5A



n = 4

Slope = -0.09132 units per year.

Mann-Kendall statistic = 0
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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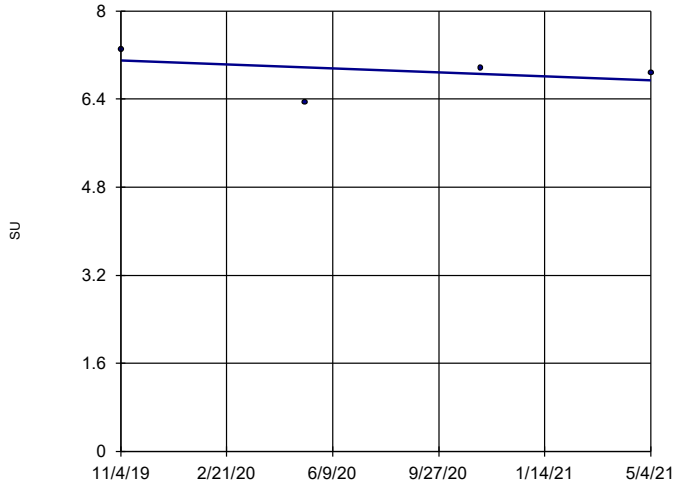
pH

MW-6



n = 4

Slope = -0.2373 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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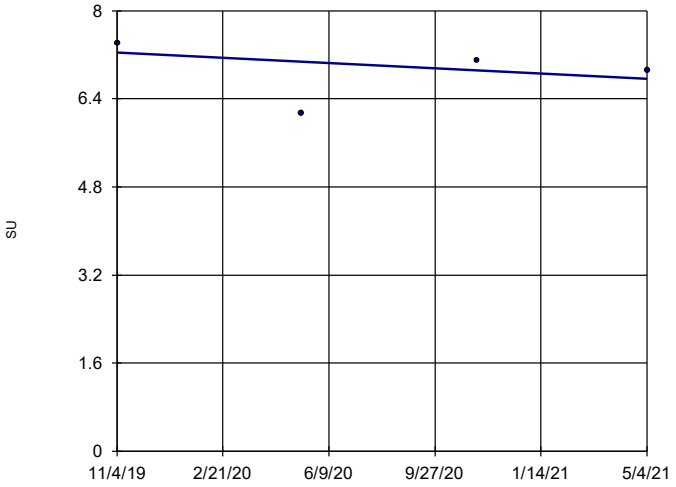
pH

MW-6A



n = 4

Slope = -0.3156 units per year.

Mann-Kendall statistic = -2
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

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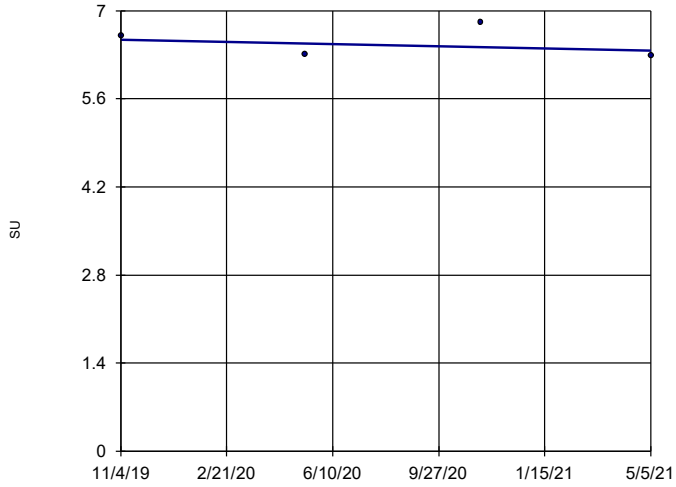
pH

MW-7 (bg)



n = 4

Slope = -0.1168 units per year.

Mann-Kendall statistic = -2
critical = -8

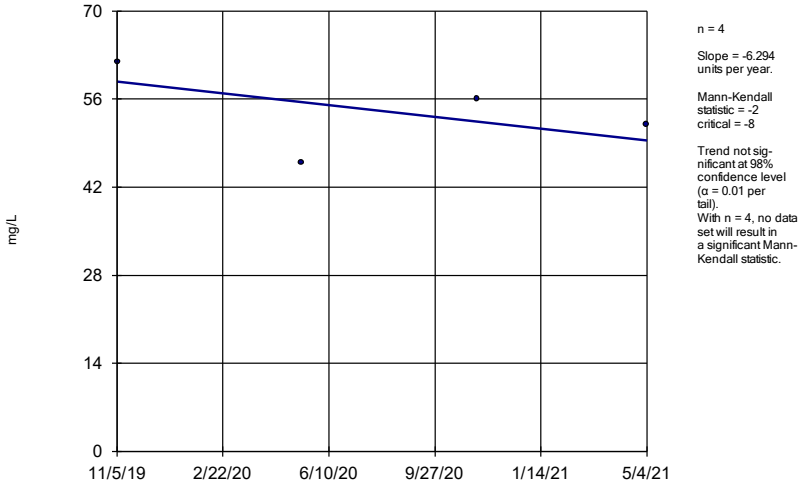
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sulfate

MW-2 (bg)



n = 4

Slope = -6.294 units per year.

Mann-Kendall statistic = -2 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

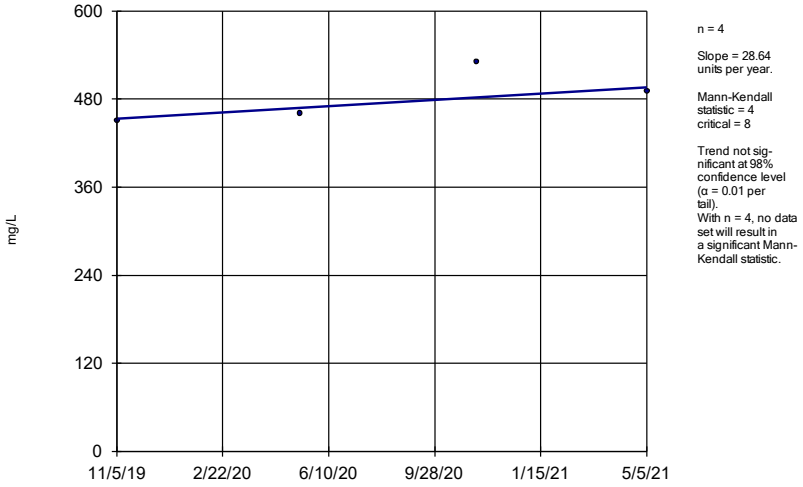
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-3 (bg)



n = 4

Slope = 28.64 units per year.

Mann-Kendall statistic = 4 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

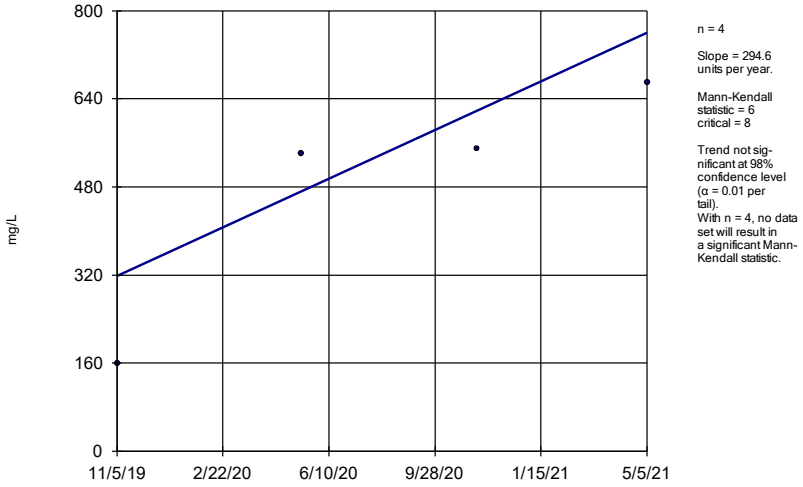
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-4



n = 4

Slope = 294.6 units per year.

Mann-Kendall statistic = 6 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

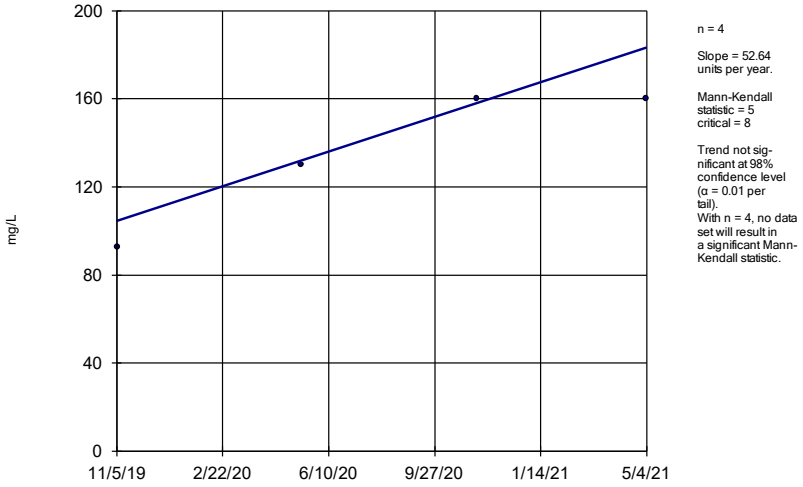
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-5



n = 4

Slope = 52.64 units per year.

Mann-Kendall statistic = 5 critical = 8

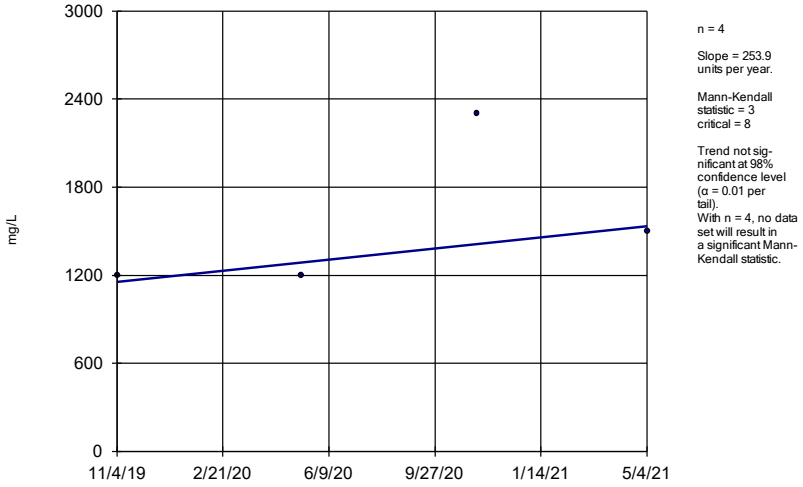
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sulfate

MW-5A



n = 4

Slope = 253.9 units per year.

Mann-Kendall statistic = 3
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

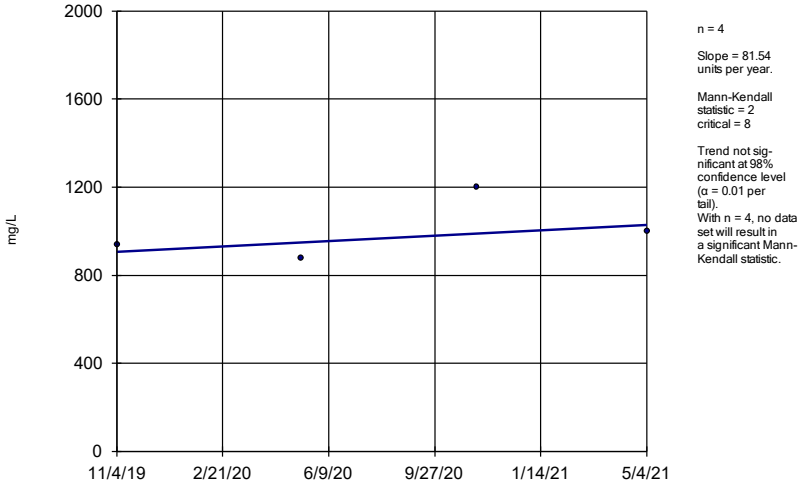
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6



n = 4

Slope = 81.54 units per year.

Mann-Kendall statistic = 2
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

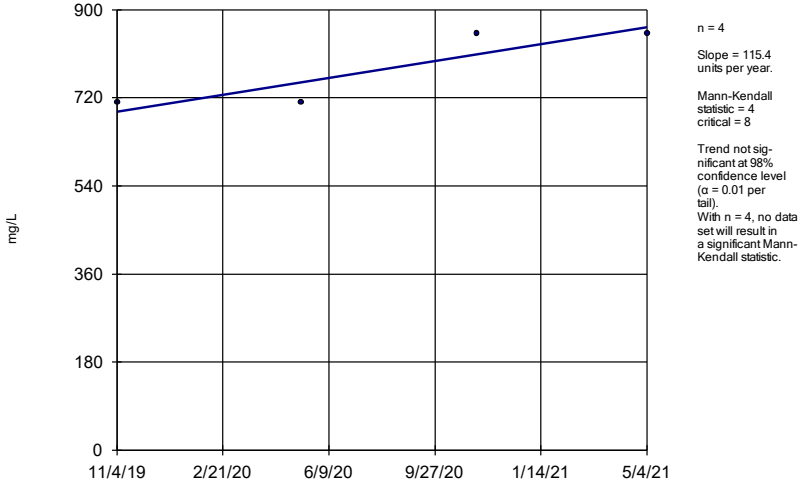
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-6A



n = 4

Slope = 115.4 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

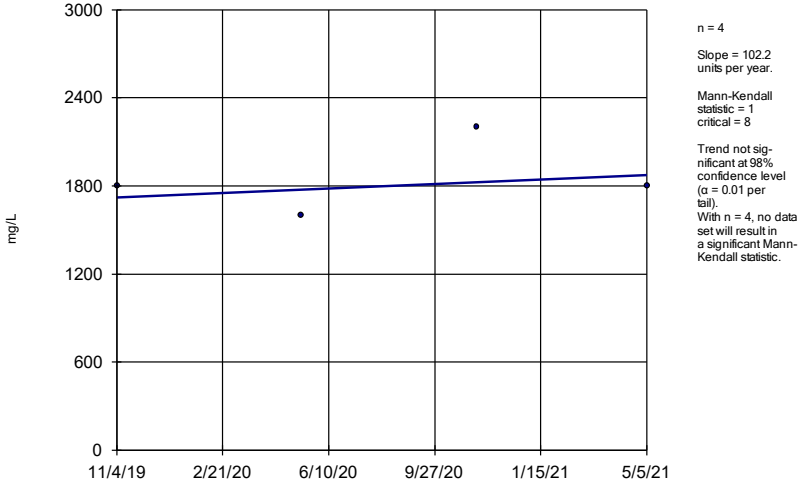
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Sulfate

MW-7 (bg)



n = 4

Slope = 102.2 units per year.

Mann-Kendall statistic = 1
critical = 8

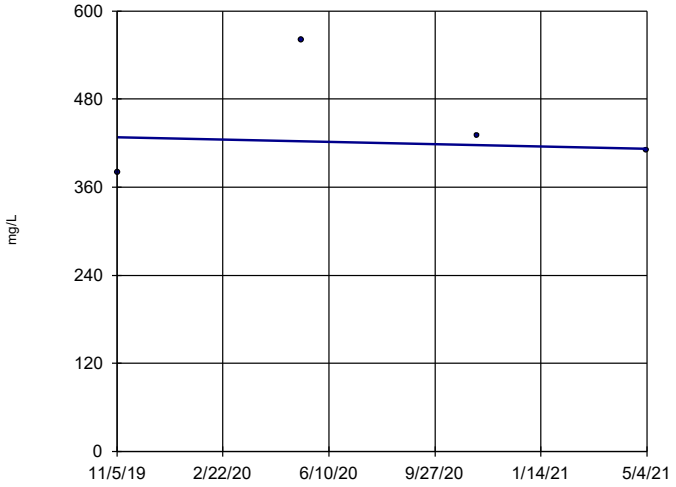
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Total Dissolved Solids

MW-2 (bg)



n = 4

Slope = -10.83 units per year.

Mann-Kendall statistic = 0 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).

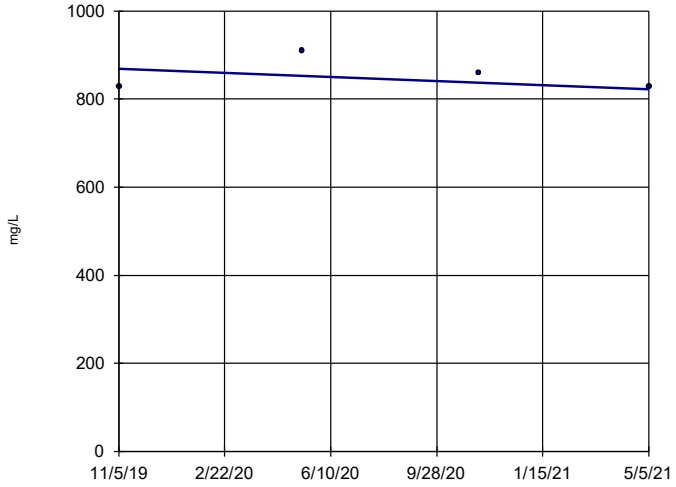
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-3 (bg)



n = 4

Slope = -31.11 units per year.

Mann-Kendall statistic = -1 critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

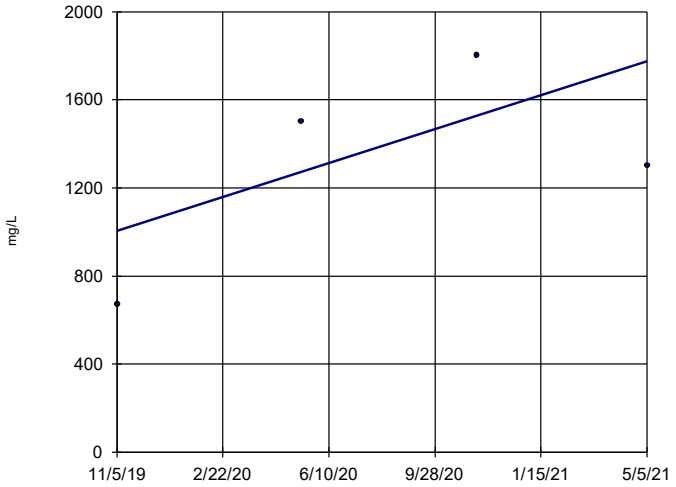
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-4



n = 4

Slope = 512.7 units per year.

Mann-Kendall statistic = 2 critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

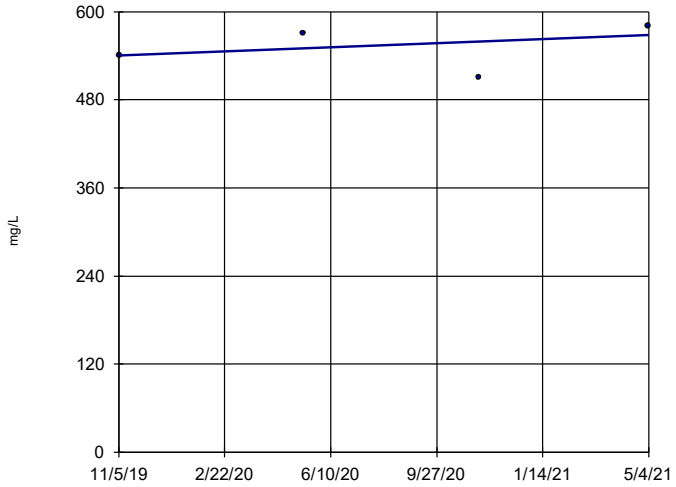
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-5



n = 4

Slope = 18.5 units per year.

Mann-Kendall statistic = 2 critical = 8

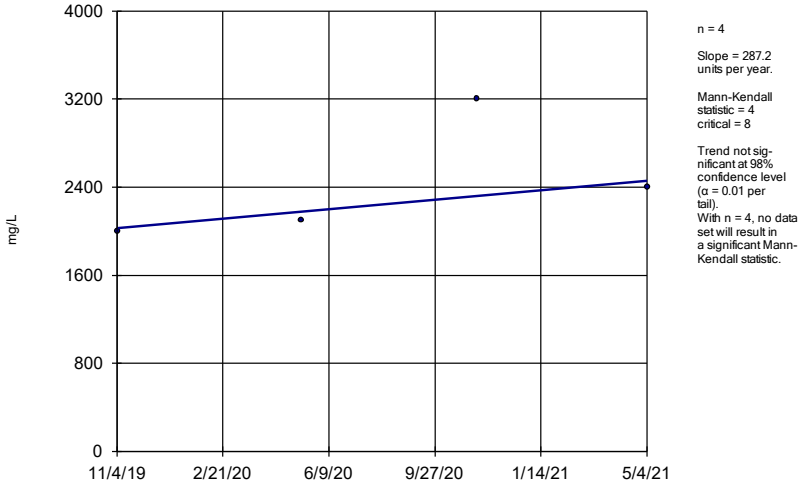
Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Total Dissolved Solids

MW-5A



n = 4

Slope = 287.2 units per year.

Mann-Kendall statistic = 4
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

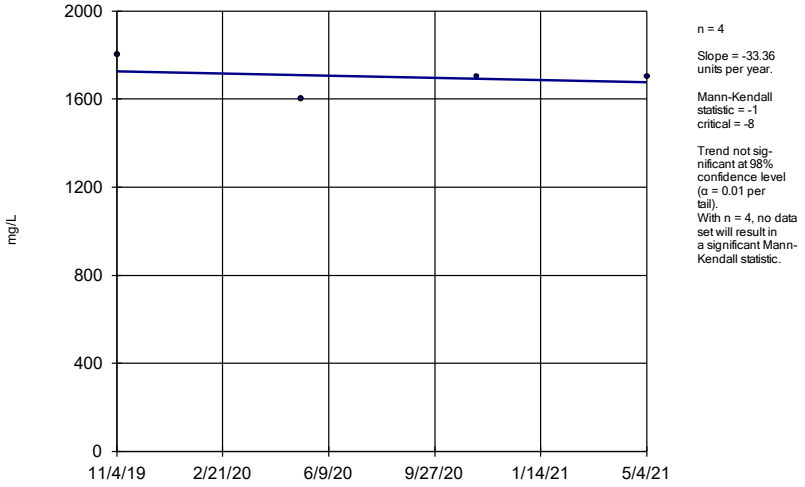
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-6



n = 4

Slope = -33.36 units per year.

Mann-Kendall statistic = -1
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

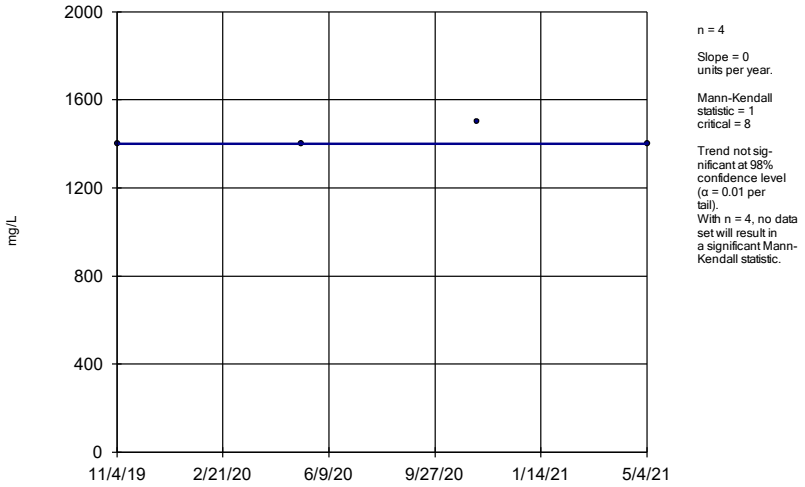
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-6A



n = 4

Slope = 0 units per year.

Mann-Kendall statistic = 1
critical = 8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

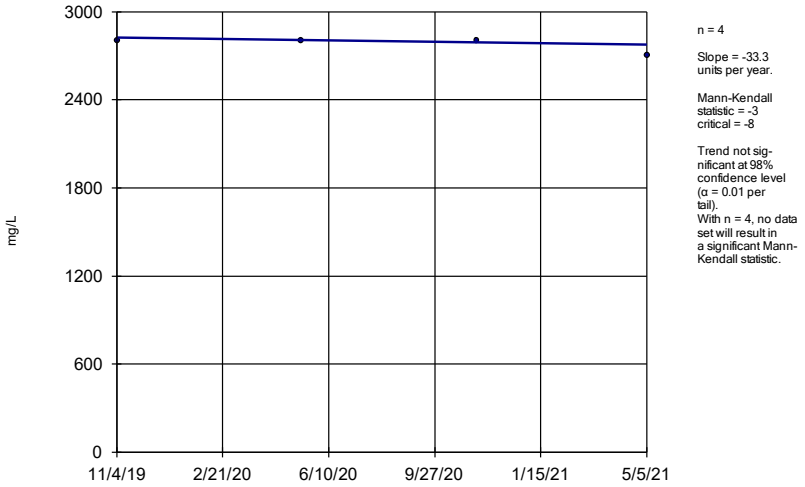
Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids

MW-7 (bg)



n = 4

Slope = -33.3 units per year.

Mann-Kendall statistic = -3
critical = -8

Trend not significant at 98% confidence level (α = 0.01 per tail).
With n = 4, no data set will result in a significant Mann-Kendall statistic.

Sen's Slope Estimator Analysis Run 11/18/2021 4:28 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background Printed 11/18/2021, 4:28 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-2 (bg)	-0.00...	-1	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-3 (bg)	0	-1	-8	No	4	75	n/a	n/a	0.02	NP
Boron (mg/L)	MW-4	0	0	8	No	4	100	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5	0.03481	4	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-5A	0.2754	4	8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6	-0.00...	-1	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-6A	-0.01648	-3	-8	No	4	0	n/a	n/a	0.02	NP
Boron (mg/L)	MW-7 (bg)	-0.01314	-2	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-2 (bg)	-1.343	-3	-8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-3 (bg)	0.8426	0	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-4	-1.081	0	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5	3.342	1	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-5A	40.52	4	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6	11.8	3	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-6A	11.58	2	8	No	4	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-7 (bg)	14.9	3	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-2 (bg)	-11.81	-3	-8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-3 (bg)	0.6502	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-4	8.002	0	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5	1.608	6	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-5A	31.62	4	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6	2.377	3	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-6A	8.419	6	8	No	4	0	n/a	n/a	0.02	NP
Chloride (mg/L)	MW-7 (bg)	-2.804	-4	-8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2 (bg)	0.009225	0	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-3 (bg)	0.003336	1	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-4	-0.08059	-2	-8	No	4	25	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5	0.04326	4	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-5A	-0.03463	0	8	No	4	50	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6	0.1083	4	8	No	4	25	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-6A	0.07438	4	8	No	4	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-7 (bg)	0	0	8	No	4	100	n/a	n/a	0.02	NP
pH (SU)	MW-2 (bg)	-0.3055	-4	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-3 (bg)	-0.1403	-4	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-4	-0.5684	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5	-0.05777	0	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-5A	-0.09132	0	8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6	-0.2373	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-6A	-0.3156	-2	-8	No	4	0	n/a	n/a	0.02	NP
pH (SU)	MW-7 (bg)	-0.1168	-2	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-2 (bg)	-6.294	-2	-8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-3 (bg)	28.64	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-4	294.6	6	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5	52.64	5	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-5A	253.9	3	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6	81.54	2	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-6A	115.4	4	8	No	4	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-7 (bg)	102.2	1	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-2 (bg)	-10.83	0	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-3 (bg)	-31.11	-1	-8	No	4	0	n/a	n/a	0.02	NP

Trend Test

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background Printed 11/18/2021, 4:28 PM

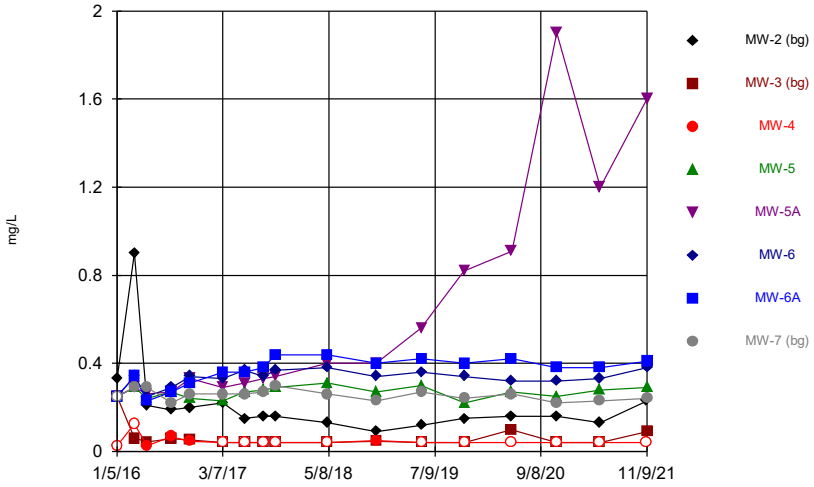
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Total Dissolved Solids (mg/L)	MW-4	512.7	2	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5	18.5	2	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-5A	287.2	4	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6	-33.36	-1	-8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-6A	0	1	8	No	4	0	n/a	n/a	0.02	NP
Total Dissolved Solids (mg/L)	MW-7 (bg)	-33.3	-3	-8	No	4	0	n/a	n/a	0.02	NP

Sanitas™ Output – Sampling Event

Time Series Analysis

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

Boron

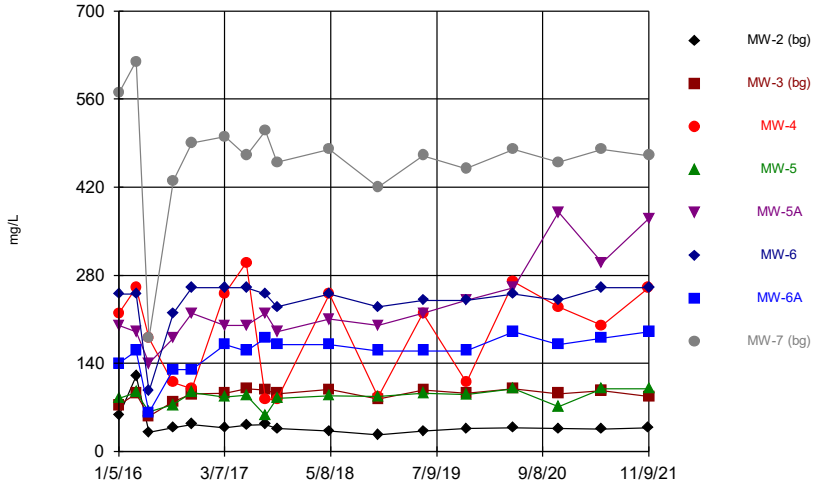


Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Calcium

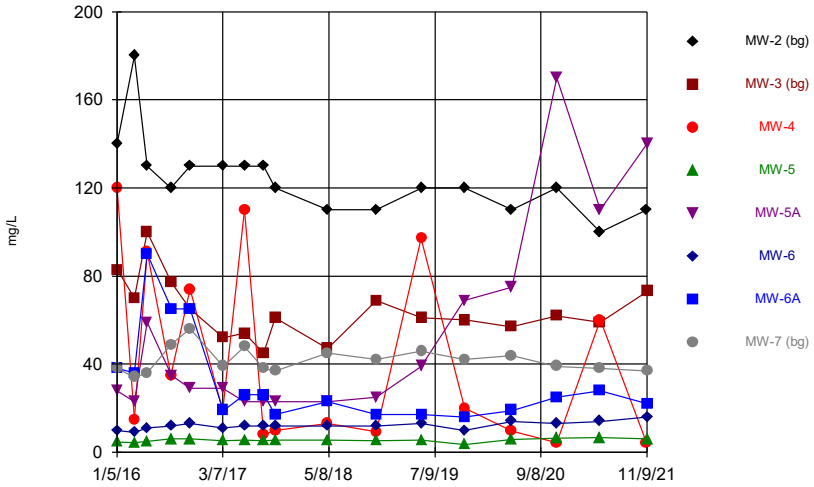


Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Chloride

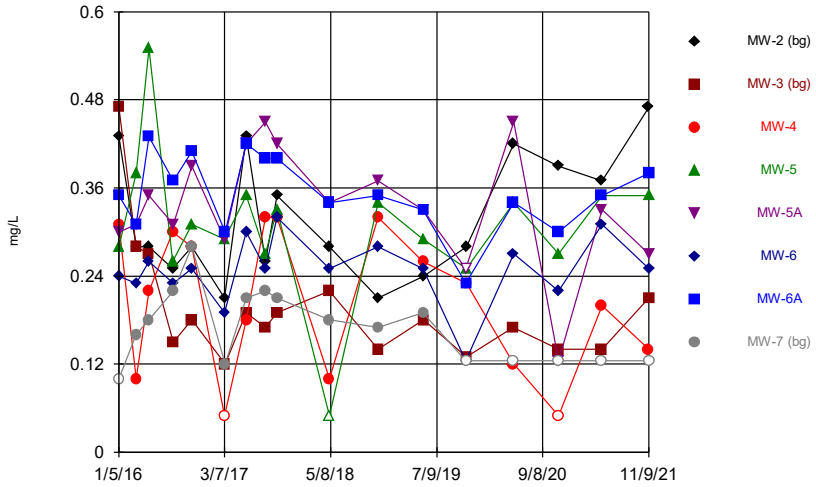


Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG
Hollow symbols indicate censored values.

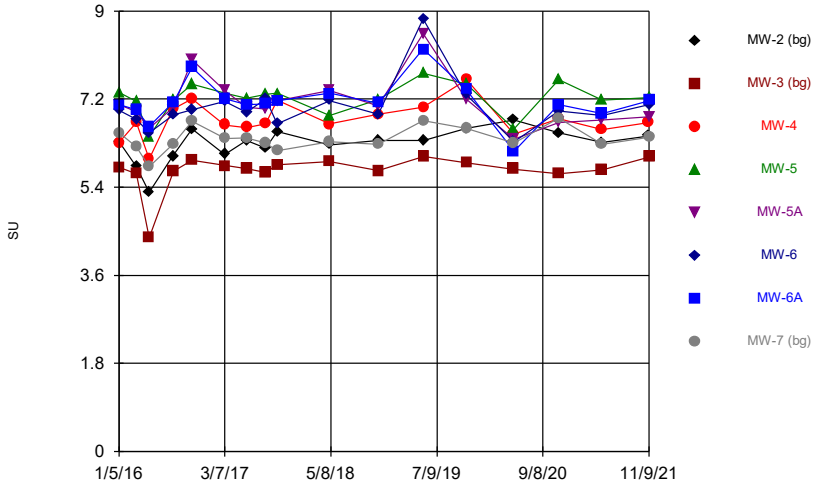
Fluoride



Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

pH



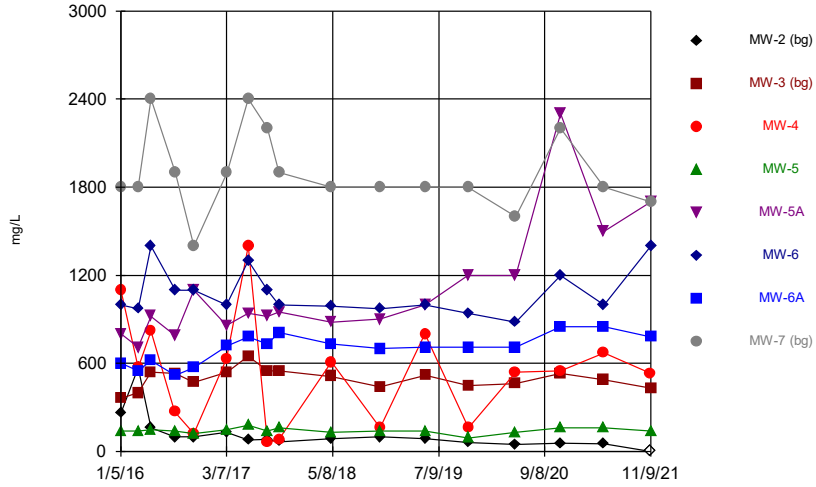
Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Hollow symbols indicate censored values.

Sulfate

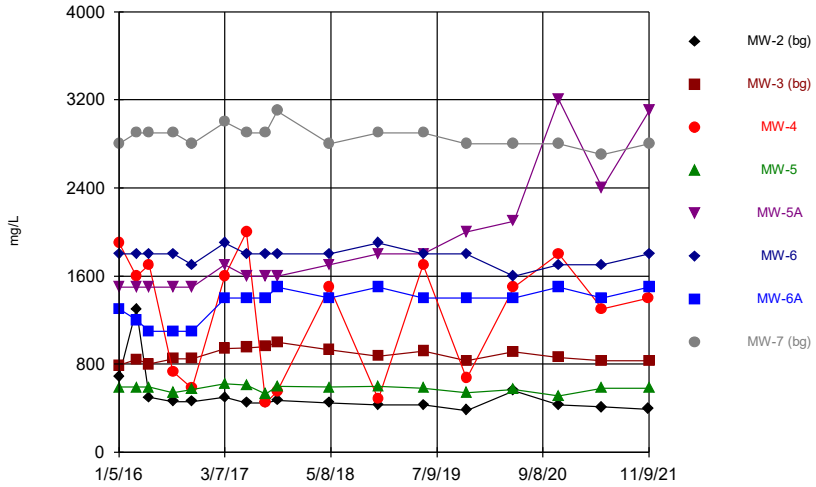


Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Total Dissolved Solids



Time Series Analysis Run 11/18/2021 4:30 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ Output – Sampling Event

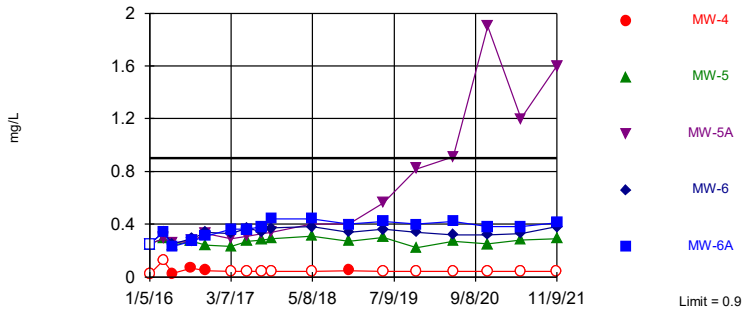
Prediction Limits

Hollow symbols indicate censored values.

Exceeds Limit: MW-5A

Boron

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 51 background values. 21.57% NDs. Annual per-constituent alpha = 0.004342. Individual comparison alpha = 0.000725 (1 of 2). Comparing 5 points to limit. Seasonality was not detected with 95% confidence.

Prediction Limit Analysis Run 11/18/2021 4:33 PM

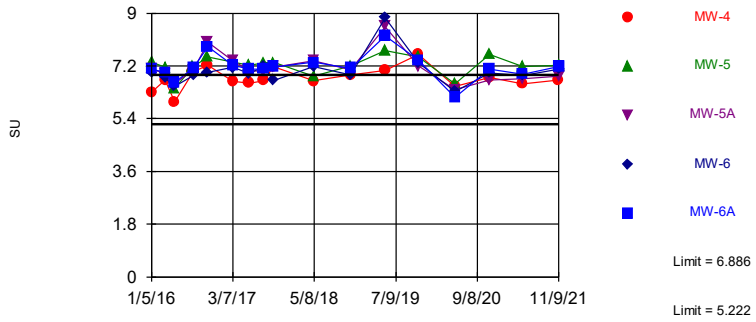
The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Sanitas™ v.9.6.31 Sanitas software licensed to Midwest Environmental Consultants. UG

Exceeds Limits: MW-5, MW-6, MW-6A

pH

Interwell Parametric



Background Data Summary (based on cube transformation): Mean=234.5, Std. Dev.=45.03, n=51. Seasonality was not detected with 95% confidence. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9477, critical = 0.935. Kappa = 2.044 (c=23, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002288. Individual comparison alpha = 0.0003816. Comparing 5 points to limit.

Prediction Limit Analysis Run 11/18/2021 4:33 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background

Prediction Limit

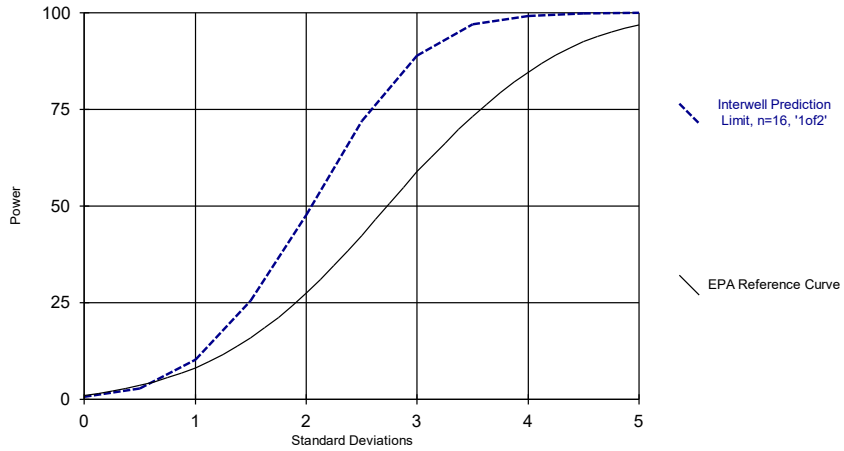
The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background Printed 11/18/2021, 4:34 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	MW-4	0.9	n/a	11/8/2021	0.04ND	No	51	21.57	n/a	0.000725	NP Inter (normality) ...
Boron (mg/L)	MW-5	0.9	n/a	11/9/2021	0.29	No	51	21.57	n/a	0.000725	NP Inter (normality) ...
Boron (mg/L)	**MW-5A**	**0.9**	**n/a**	**11/9/2021**	**1.6**	**Yes**	**51**	**21.57**	**n/a**	**0.000725**	**NP Inter (normality) ...**
Boron (mg/L)	MW-6	0.9	n/a	11/9/2021	0.38	No	51	21.57	n/a	0.000725	NP Inter (normality) ...
Boron (mg/L)	MW-6A	0.9	n/a	11/9/2021	0.41	No	51	21.57	n/a	0.000725	NP Inter (normality) ...
Calcium (mg/L)	MW-4	620	n/a	11/8/2021	260	No	51	0	n/a	0.000725	NP Inter (normality) ...
Calcium (mg/L)	MW-5	620	n/a	11/9/2021	100	No	51	0	n/a	0.000725	NP Inter (normality) ...
Calcium (mg/L)	MW-5A	620	n/a	11/9/2021	370	No	51	0	n/a	0.000725	NP Inter (normality) ...
Calcium (mg/L)	MW-6	620	n/a	11/9/2021	260	No	51	0	n/a	0.000725	NP Inter (normality) ...
Calcium (mg/L)	MW-6A	620	n/a	11/9/2021	190	No	51	0	n/a	0.000725	NP Inter (normality) ...
Chloride (mg/L)	MW-4	180	n/a	11/8/2021	3.9	No	51	0	n/a	0.000725	NP Inter (normality) ...
Chloride (mg/L)	MW-5	180	n/a	11/9/2021	6.1	No	51	0	n/a	0.000725	NP Inter (normality) ...
Chloride (mg/L)	MW-5A	180	n/a	11/9/2021	140	No	51	0	n/a	0.000725	NP Inter (normality) ...
Chloride (mg/L)	MW-6	180	n/a	11/9/2021	16	No	51	0	n/a	0.000725	NP Inter (normality) ...
Chloride (mg/L)	MW-6A	180	n/a	11/9/2021	22	No	51	0	n/a	0.000725	NP Inter (normality) ...
Fluoride (mg/L)	MW-4	0.4456	n/a	11/8/2021	0.14	No	51	11.76	sqrt(x)	0.000...	Param Inter 1 of 2
Fluoride (mg/L)	MW-5	0.4456	n/a	11/9/2021	0.35	No	51	11.76	sqrt(x)	0.000...	Param Inter 1 of 2
Fluoride (mg/L)	MW-5A	0.4456	n/a	11/9/2021	0.27	No	51	11.76	sqrt(x)	0.000...	Param Inter 1 of 2
Fluoride (mg/L)	MW-6	0.4456	n/a	11/9/2021	0.25	No	51	11.76	sqrt(x)	0.000...	Param Inter 1 of 2
Fluoride (mg/L)	MW-6A	0.4456	n/a	11/9/2021	0.38	No	51	11.76	sqrt(x)	0.000...	Param Inter 1 of 2
pH (SU)	MW-4	6.886	5.222	11/8/2021	6.72	No	51	0	x^3	0.000...	Param Inter 1 of 2
pH (SU)	**MW-5**	**6.886**	**5.222**	**11/9/2021**	**7.23**	**Yes**	**51**	**0**	**x^3**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	MW-5A	6.886	5.222	11/9/2021	6.84	No	51	0	x^3	0.000...	Param Inter 1 of 2
pH (SU)	**MW-6**	**6.886**	**5.222**	**11/9/2021**	**7.09**	**Yes**	**51**	**0**	**x^3**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	**MW-6A**	**6.886**	**5.222**	**11/9/2021**	**7.17**	**Yes**	**51**	**0**	**x^3**	**0.000...**	**Param Inter 1 of 2**
Sulfate (mg/L)	MW-4	2400	n/a	11/8/2021	530	No	51	1.961	n/a	0.000725	NP Inter (normality) ...
Sulfate (mg/L)	MW-5	2400	n/a	11/9/2021	140	No	51	1.961	n/a	0.000725	NP Inter (normality) ...
Sulfate (mg/L)	MW-5A	2400	n/a	11/9/2021	1700	No	51	1.961	n/a	0.000725	NP Inter (normality) ...
Sulfate (mg/L)	MW-6	2400	n/a	11/9/2021	1400	No	51	1.961	n/a	0.000725	NP Inter (normality) ...
Sulfate (mg/L)	MW-6A	2400	n/a	11/9/2021	780	No	51	1.961	n/a	0.000725	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-4	3100	n/a	11/8/2021	1400	No	51	0	n/a	0.000725	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-5	3100	n/a	11/9/2021	580	No	51	0	n/a	0.000725	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-5A	3100	n/a	11/9/2021	3100	No	51	0	n/a	0.000725	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-6	3100	n/a	11/9/2021	1800	No	51	0	n/a	0.000725	NP Inter (normality) ...
Total Dissolved Solids (mg/L)	MW-6A	3100	n/a	11/9/2021	1500	No	51	0	n/a	0.000725	NP Inter (normality) ...

Sanitas™ Output – Sampling Event

Power Curve

Power Curve



Kappa = 1.96, based on 3 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 11/18/2021 4:43 PM

The Empire District Client: Midwest Environmental Consultants Data: 11-21 App 3 Asbury ponds with background