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REPORT

2023 Annual Groundwater Monitoring & Corrective Action Report

RD Morrow Generating Station, Purvis, Lamar County, Mississippi, USA

Submitted to:

Cooperative Energy
7037 US Hwy 49, Hattiesburg, MS 39402

Submitted by:

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January 31, 2024

Executive Summary

This report presents the *2023 Annual Groundwater Monitoring & Corrective Action Report, R.D. Morrow, Sr. Generating Station, Purvis, Lamar County, Mississippi*. Groundwater monitoring and reporting for the Site is performed in accordance with the United States Environmental Protection Agency (US EPA) Coal Combustion Residual (CCR) Rule published in the Code of Federal Regulations Title 40 Part 257 (40 CFR Part 257, Subpart D) dated April 17, 2015, 40 CFR § 257.50 through § 257.107. As required in 40 CFR § 257.90(e), this Annual Report describes the status of the groundwater monitoring program, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and presents key activities for the upcoming year.

The CCR Landfill located at the *R.D. Morrow, Sr. Generating Station* (Site or RD Morrow) is the only unit regulated by the CCR Rule at the Site. The CCR Landfill Unit is subject to Assessment Monitoring requirements in accordance with § 257.95. On May 16, 2018, Cooperative Energy filed a Notice of Establishment of Assessment Monitoring Program. The Site began and ended the 2023 annual reporting period in assessment monitoring.

2023 Groundwater Monitoring Activities for the CCR Landfill Unit

- Cooperative Energy completed its remedy selection analysis, and finalized the Remedy Selection Report on May 18, 2023, documenting the results.
- Monitored Natural Attenuation (MNA) was selected as the remedy for corrective action at the CCR Landfill. A Corrective Action Groundwater Monitoring Program was completed on August 16, 2023, in accordance with § 257.98.
- Cooperative Energy conducted groundwater monitoring sampling events for the CCR Landfill Unit in April (Semi-annual) and September 2023 (Semi-annual). Groundwater samples were collected and analyzed for both Appendix III and Appendix IV constituents from the Landfill unit CCR monitoring well network.
- Pursuant to 40 CFR § 257.90 (e)(6)(iii)-(iv), the following table presents the Appendix III and IV constituents with Statistically Significant Increases (SSIs) or Statistically Significant Levels (SSLs), respectively, for the CCR Landfill Unit.

Statistically Significant Increases (SSIs)		
Appendix III Constituent	**April 2023**	**September 2023**
Boron	MW-03, MW-04, MW-05	MW-03, MW-04
Calcium	MW-03, MW-04, MW-05	MW-03, MW-04, MW-05
Chloride	MW-05	NA
pH	MW-03, MW-05	MW-03, MW-05
Sulfate	MW-03, MW-04, MW-05	MW-03, MW-04, MW-05
TDS	MW-03, MW-04, MW-05	MW-03, MW-04, MW-05
Statistically Significant Levels (SSLs)		
Appendix IV Constituent	**April 2023**	**September 2023**
Lithium	MW-05	MW-05
Molybdenum	MW-05	MW-05

- At the end of 2023, Cooperative Energy remains in assessment monitoring. Remedial activities were conducted and are ongoing through 2023.

Based on review of the Appendix III and Appendix IV statistical results completed for the groundwater monitoring and corrective action program during the 2023 reporting period, the CCR Landfill Unit will remain in assessment monitoring.

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APPENDICES

Certification

This *2023 Annual Groundwater Monitoring & Corrective Action Report, R.D. Morrow, Sr. Generating Station*, *Purvis, Lamar County, Mississippi, USA* has been prepared to comply with the United States Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) rule (40 CFR Part 257 Subpart D, published in 80 Fed. Reg. 21302 (April 17, 2015) under the direction of a licensed professional engineer, with WSP USA Inc.

WSP USA Inc.

Brian Yelen
Senior Geologist

Dawn L. Prell, CPG
Technical Principal, Hydrogeologist

I hereby certify that this *2023 Annual Groundwater Monitoring & Corrective Action Report, R.D. Morrow, Sr. Generating Station* located at 304 Old Okahola School Road, Purvis, Lamar County, MS 39475 has been prepared to meet the requirements of 40 CFR § 257.90(e).

Daniel Smith, PE
Senior Associate, Engineer-Civil
Mississippi PE No, 32180

1.0 INTRODUCTION

This *2023 Annual Groundwater Monitoring and Corrective Action Report* (Annual Report) has been prepared by WSP USA Inc. (WSP) for the RD Morrow Generating Station (RD Morrow or Site) operated by Cooperative Energy.

1.1 Purpose

The United States Environmental Protection Agency (US EPA) Coal Combustion Residual (CCR) Rule was published in the Code of Federal Regulations Title 40 Part 257 (40 CFR Part 257, Subpart D) on April 17, 2015. The Rule identifies an effective date of October 19, 2015. The CCR Rule regulates CCRs as non-hazardous waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) and applies to new and existing landfills and surface impoundments.

As required in 40 CFR § 257.90(e), this Annual Report describes the status of the groundwater monitoring program and corrective action program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and presents project key activities for the upcoming year. Groundwater monitoring and reporting for RD Morrow are performed in accordance with the requirements of 40 CFR § 257.90 through § 257.98. This report documents the activities completed during the 2023 calendar year.

1.2 Site Description and Background

RD Morrow is located in the community of Okahola, a rural area of Lamar County, approximately 4.5 miles north of the City of Purvis and 8 miles southwest of Hattiesburg. Old Okahola School Road bisects the property into a northern and southern parcel. The location of the Site and surrounding area are shown on Figure 1, Site Location Map.

The CCR Landfill Unit is the only CCR unit on-site currently subject to the CCR Rule. Previously, a surface impoundment unit was subject to the CCR Rule and remained in detection monitoring until completion of closure by removal. The associated wells were decommissioned and abandoned in 2022. Figure 2 identifies the CCR Landfill Unit within the south parcel at RD Morrow.

1.3 CCR Landfill Unit Groundwater Monitoring Well Network

The groundwater monitoring network for the CCR Landfill Unit consists of five (5) detection monitoring wells and one (1) assessment monitoring well. Site monitoring wells are depicted on Figure 2. The site has completed an assessment of corrective measures and is currently performing corrective action monitoring in addition to assessment monitoring. Monitoring wells MW-04, MW-05, MW-06 and MW-10 also serve as corrective action monitoring locations following the *Corrective Action Groundwater Monitoring Program* (WSP 2023b). CCR monitoring wells are included in the monitoring network screened within the reworked Citronelle sequence underlying the CCR Landfill Unit. In accordance with 40 CFR § 257.91, the CCR Landfill Unit groundwater monitoring network contains monitoring wells, installed at the waste boundary, and represents the quality of groundwater in the uppermost aquifer. The network for the events covered by this Annual Report include:

Detection Monitoring Well Network	Assessment Monitoring Well Network	Corrective Action Groundwater Monitoring Well Network
MW-02 (upgradient)	MW-10	MW-04
MW-03 (downgradient)	--	MW-05
MW-04 (downgradient)	--	MW-06
MW-05 (downgradient)	--	MW-10
MW-06 (downgradient)	--	--

There were no changes to the landfill certified detection groundwater monitoring network or the assessment monitoring network during the 2023 calendar year.

Additional monitoring well-related activities to ensure continued compliance with 40 CFR § 257.91(e) included a visual inspection of well conditions for the CCR Landfill Unit monitoring well network prior to sampling, recording the site conditions, and any site maintenance to provide safe access for sampling. The network wells were found to be of sound integrity and in proper working order during each of the sampling events and did not require any repairs.

2.0 CCR LANDFILL UNIT GROUNDWATER MONITORING ACTIVITIES

In accordance with 40 CFR § 257.90(e), the following describes monitoring-related activities performed during the 2023 calendar year. Groundwater sampling was performed in accordance with 40 CFR § 257.93, as follows:

2.1 CCR Landfill Unit Assessment Monitoring

Cooperative Energy posted a Notice of Establishment of Assessment Monitoring Program for RD Morrow CCR Landfill Unit, dated May 16, 2018. Groundwater samples were collected for both Appendix III and Appendix IV constituents from each of the detection and assessment monitoring wells. The 2023 semi-annual monitoring events were conducted in April and September 2023. For the 2023 monitoring events, Cooperative Energy included its annual monitoring event for Appendix IV constituents concurrently with the first semi-annual monitoring event. Cooperative Energy also enhanced the sampling program to include the analysis of all Appendix IV constituents during the second semi-annual monitoring event in 2023.

2.2 Groundwater Sampling and Laboratory Analysis

The following sections describe methods used to conduct groundwater monitoring at the CCR Landfill Unit.

2.2.1 Groundwater Level Measurements

Prior to sampling, Environmental Management Services, Inc. recorded groundwater elevations from each detection and assessment monitoring well on April 12, 2023 and September 21, 2023. The April and September 2023 elevation data was used to develop potentiometric surface elevation contour maps to confirm the groundwater flow direction and to confirm that the groundwater monitoring well network for the CCR Landfill Unit remains sufficient to monitor groundwater downgradient of the unit. The direction of groundwater flow has not changed, which has been consistent since the inception of the CCR monitoring program at RD Morrow.

Groundwater flows south, based on 2023 groundwater elevation contour maps, included as Figure 3, First Semi-Annual 2023 Potentiometric Surface Elevation Contour Map (April 12, 2023) and Figure 4, Second Semi-Annual 2023 Potentiometric Surface Elevation Contour Map (September 21, 2023). No changes to the monitoring well network are necessary based on groundwater elevation data.

2.2.2 Groundwater Gradient and Flow Velocity

Groundwater flow rates at the Site were calculated based on hydraulic gradients, hydraulic conductivity from previous slug test results, and an estimated effective porosity of the screened horizon. Based on slug test data at the Site (EMS, 2020 and EMS, 2022), an average hydraulic conductivity value of 4.8 is used in the flow calculations. The hydraulic gradients were calculated between well pairs as shown below. Based on historical groundwater investigation (EMS, 2022), the effective porosity of 0.30 was used in the calculation.

Horizontal flow velocity was calculated using the commonly used derivative of Darcy's Law:

$$V = \frac{K * i}{n_e}$$

Where:

$V =$ Groundwater flow velocity $\left(\frac{feet}{day}\right)$

$K =$ Average Hydraulic Conductivity of the aquifer $\left(\frac{feet}{day}\right)$

$i =$ Horizontal hydraulic gradient $\left(\frac{feet}{feet}\right)$

$n_e =$ Effective porosity

Using this equation and groundwater elevations collected during both April 2023 and September 2023 sampling events, horizontal groundwater velocities are calculated for various areas of the Site and shown below.

Table 2.2.2 Groundwater Flow Velocity

Well Pairs	Date	Δ H (feet) [1]	Δ L (feet) [2]	Hydraulic Gradient [3] (Δ H/Δ L)	Average Hydraulic Conductivity[4], K (feet per day)	Assumed Effective Porosity[5] (n_e)	Average Linear Groundwater Velocity [6]	
							(feet per day)	(feet per year)
MW-2 / MW-5	4/12/2023	5.43	884	0.0061	4.8	0.30	0.10	35.9
	9/21/2023	2.81		0.0032			0.051	18.6
MW-5 / MW-10	4/12/2023	11.17	1090	0.0102	4.8		0.16	59.8
	9/21/2023	12.50		0.0115			0.18	67.0

Notes:
1. Δ H = Change in groundwater elevation.
2. Δ L = Distance along flow path.
3. I = Δ H / Δ L. Hydraulic gradient determined from groundwater well pairs along with potentiometric surface elevation contour maps.
4. K Range is based on the *38th Landfill Groundwater Monitoring Event Report* by Environmental Management Services, Inc., dated April 23, 2020 and aquifer performance tests presented in the CCR Landfill Assessment Monitoring Well Installation Certification Report by Environmental Management Services, Inc., dated March 5, 2020.
5. Effective porosity based on the *38th Landfill Groundwater Monitoring Event Report* by Environmental Management Services, Inc., dated August 23, 2022.
6. Velocity = $(I * K)/n_e$

As presented above, groundwater flow velocity at the Site ranges from approximately 0.051 to 0.18 ft/day (approximately 19 to 67 ft/year) in 2023. These calculated groundwater velocities at the Site are generally consistent with historical calculations, therefore, confirming the groundwater monitoring network is properly located to monitor the uppermost aquifer for the CCR Landfill Unit.

2.2.3 Groundwater Sampling

Groundwater samples were collected from detection and assessment monitoring wells in April and September 2023. Monitoring wells were purged and sampled using low-flow sampling procedures. Sample stabilization criteria is identified on field sampling forms. Following well stabilization, unfiltered samples were collected directly into appropriately preserved laboratory supplied sample containers, placed in iced coolers, and submitted to the laboratory following standard chain-of-custody protocol. Field data forms and chain-of-custody records are provided in Appendix A.

Groundwater samples were collected in accordance with 40 CFR § 257.93(a). Field sampling procedures included sample collection, field quality assurance/quality control (QA/QC), chain-of-custody controls, and field documentation. The groundwater samples for the CCR Landfill Unit for 2023 sampling events were analyzed for Appendix III and Appendix IV constituents, and results are summarized in Table 1 - Analytical Data Summary – CCR Landfill (April 2023), and Table 2 -Analytical Data Summary – CCR Landfill (September 2023). Analytical methods used for groundwater monitoring parameters are provided in laboratory reports. Laboratory analyses were performed by Micro Methods Laboratory, Inc. and Pace Analytical Services, LLC and are included in Appendix A.

3.0 COMPARATIVE STATISTICAL ANALYSES

Pursuant to 40 CFR § 257.93(f), the statistical methodology selected for RD Morrow meets the criteria referenced in the CCR Rule and the 2009 EPA Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities Unified Guidance (EPA, 2009) and is consistent with the *Statistical Analysis Plan* (EMS, 2017).

Statistical analyses of Appendix III constituents were completed for the CCR Landfill Unit. In the sections below, Cooperative Energy provides a summary of the comparative statistical analyses completed in 2023, which includes the analyses for both semi-annual monitoring events for the CCR Landfill Unit.

3.1 Groundwater Protection Standards (GWPS)

Interwell tolerance limits were used to calculate background limits from pooled upgradient well data for Appendix IV parameters with a target of 95% confidence and 95% coverage in accordance with the *Statistical Analysis Plan* (EMS, 2017). Results of the statistical analyses for both the April 2023 and September 2023 monitoring events are included in Appendix B.

A GWPS has been established for statistical comparison of each Appendix IV constituent for the CCR Landfill Unit. The Summary of Background Levels and GWPS table presented below, summarizes the site-specific background concentration for each monitoring event and the GWPS established under Federal rules. Where the background concentration is higher than the federal MCL, the background concentration is utilized as the GWPS for that constituent.

If the comparison of the constituent's lower confidence interval is greater than the GWPS, a statistically significant level (SSL) is identified for that well.

Table 3.1 Summary of Background Levels and GWPS

Analyte[1]	Units	Site Specific Background		Federal MCL	GWPS	
		April 2023	September 2023		April 2023	September 2023
Barium	mg/L	0.029	0.029	2	2	2
Beryllium	mg/L	0.009709	0.009738	0.004	0.009709	0.009738
Cobalt	mg/L	0.1785	0.1821	0.006	0.1785	0.1821
Fluoride	mg/L	1.106	1.0101	4	4	4
Lead	mg/L	0.009674	0.009925	0.015	0.015	0.015
Lithium	mg/L	1.42	1.42	0.04	1.42	1.42
Molybdenum	mg/L	0.0025	0.0025	0.1	0.1	0.1
Radium (226 + 228)	pCi/L	2.059	2.047	5	5	5

Notes:
mg/L - milligrams per liter
pCi/L - picocuries per liter
[1] Analytes not detected in 2023 are not presented in Table 3.1.
[2] The lithium GWPS was calculated using data from MW-02, MW-03 and MW-04 through 2020 when the ASD was documented because naturally-occurring lithium is present in soils and bedrock at the Site. Therefore, it was necessary to adjust the lithium GWPS for the Site accordingly. *See* Golder, 2020, Alternate Source Demonstration RD Morrow Generating Station – Landfill CCR Unit, Purvis, Mississippi. Golder Prepared for Cooperative Energy, Inc. September 11, 2020; and Supplemental Alternate Source Demonstration Cooperative Energy RD Morrow CCR Landfill, prepared by WSP USA Inc., December 22, 2023.

3.2 CCR Landfill Unit Statistical Analyses

Analytical data from the April 2023 and September 2023 monitoring events for the CCR Landfill Unit monitoring network have been statistically analyzed in accordance with the Site's certified statistical analysis method. Review of the Sanitas™ results indicates that verified exceedances of the established prediction limits for various Appendix III constituents continue to be observed. Using the GWPS established according to 40 CFR § 257.95(h), SSLs were identified at MW-05 for lithium and molybdenum following the 2023 monitoring events.

4.0 ALTERNATE SOURCE DEMONSTRATION

Pursuant to 40 CFR § 257.94(e)(2), in 2020, WSP prepared an ASD to address the noted SSLs for lithium that have been identified at monitoring wells MW-03 and MW-04 (Golder, 2020) (the 2020 ASD). The ASD presents multiple lines of evidence that conclude that the source of the elevated concentrations of lithium at MW-03 and MW-04 are not the result of a release from the CCR Landfill Unit but can be attributed to naturally-occurring lithium in subsurface aquifer materials. The analysis includes a comparison of porewater to groundwater, geochemical fingerprinting, and analysis of soil samples at the site, as lines of evidence to support the ASD.

During this Reporting Period, WSP prepared a Supplemental Alternative Source Demonstration that adds a new line of evidence to support the conclusions in the 2020 ASD. In October 2022, additional site soil samples were collected to further evaluate reported concentrations of lithium in groundwater at RD Morrow. Samples from the SB-02, SB-04, SB-05, and SB-10 borings collected in October 2022 were analyzed by Electron Micro Probe Analysis (EMPA), TESCAN Integrated Mineral Analysis (TIMA, an updated version of QEMSCAN) with Laser

Ablation- Inductively Coupled Plasma Mass Spectrometry (LA-ICPMS) methods to evaluate if the underlying clay material is a host for naturally occurring lithium in the aquifer. These methods have been widely used and accepted in the mining industry to determine the provenance of rare earth and trace metals and association with mineral deposits (Aylmore et al., 2018; Grammatikopoulos and Downing, 2020; Layton-Matthews and McClenaghan, 2021; Vermeesch et al., 2017). The analysis indicates that the majority of the lithium found in the Site groundwater is carried in the mixed-clay phases, notably, the Stratum IV, Green Silty Clay. Using these data, WSP developed a Supplemental Alternate Source Demonstration. Details of this supplemental sampling that was conducted at the site is presented in Appendix C, Supplemental Alternate Source Demonstration.

5.0 ASSESSMENT OF CORRECTIVE MEASURES

Following the requirements of 40 CFR § 257.96, RD Morrow initiated an Assessment of Corrective Measures (ACM). Notification of this action was placed in the operating record on September 12, 2019 (Golder, 2019) and a public meeting was held on September 27, 2022.

6.0 REMEDY SELECTION

Pursuant to 40 CFR § 257.97(a), Cooperative Energy completed and posted a final remedy selection report dated May 18, 2023. Cooperative Energy selected monitored natural attenuation (MNA) as its remedy. Remedy selection efforts were documented in the *Remedy Selection Report* (WSP 2023a). Cooperative Energy timely prepared a *Corrective Action Groundwater Monitoring Program* (WSP, 2023b) during the Reporting Period for the CCR Landfill Unit. Cooperative Energy continues to implement the Corrective Action Groundwater Monitoring Program.

6.1 Corrective Action Program

The *Corrective Action Groundwater Monitoring Program* (WSP, 2023b) was put in place in August 2023. It provides for sampling and analysis of the corrective action monitoring wells (MW-04, MW-05, MW-06, and MW-10). The Program provides for evaluation of the following:

1) Demonstrate natural attenuation is occurring.

2) Detect changes in environmental conditions.

3) Identify any potentially toxic and/or mobile transformation products.

4) Verify that the plume is not expanding downgradient, laterally, or vertically.

5) Verify no unacceptable impacts to downgradient receptors.

6) Detect new releases of contaminants to the environment.

7) Demonstrate the efficacy of institutional controls.

8) Verify attainment of remedial objectives.

September 2023 was the first monitoring event subject to corrective action program evaluation. The following summarizes findings based on review of the results.

Based on review of trend plots for molybdenum and lithium at MW-05 we can ascertain that natural attenuation is occurring. A significant and continued downward trend is observed following the September 2023 event for both lithium (-1.024) and molybdenum (-0.8051), (See Appendix B). There have been no new detections of Appendix IV constituents above the GWPS at the Site. Concentrations of lithium and molybdenum at corrective action wells remain below the groundwater protection standards, and therefore, there are no unacceptable impacts to downgradient receptors.

In general, review of the site geochemistry indicates that boron continues to decrease at well MW-05 and was below the observed concentration of the other downgradient corrective action wells (MW-03, MW-04, MW-06, and MW-10) during the September 2023 sampling event. Both sulfate and TDS have shown an overall decreasing trend at MW-05. Sulfate concentrations are similar to that of MW-03 and MW-04 as of the last sampling event while TDS has remained elevated primarily because of the elevated alkalinity remaining at MW-05.

The pH at MW-05 remains elevated compared to the rest of the Site monitoring wells (~6.5 vs ~4.5) which explains the elevated molybdenum concentrations above the GWPS. Molybdenum attenuates better at lower pH because it forms an anionic species. Due to the presence of elevated alkalinity, which acts as a buffer, the localized pH at MW-05 has not yet decreased to the site background which slows molybdenum attenuation. Based on the data evaluated to date, the objectives of the MNA corrective action at the site are being met.

7.0 PROGRAM TRANSITIONS

The groundwater monitoring program remained in assessment monitoring. Cooperative Energy initiated the Corrective Action Monitoring Program for the CCR Landfill Unit in 2023.

8.0 PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE IN 2023

There were no specific problems encountered with the CCR Landfill Unit monitoring well system in 2023.

9.0 CONCLUSIONS & FUTURE ACTIONS

This *2023 Annual Groundwater Monitoring and Corrective Action Report* has been prepared in accordance with 40 CFR § 257.90(e) and describes the status of the groundwater monitoring program during the 2023 calendar year and key actions for the upcoming calendar year 2024.

Project Key Activities for 2024

The proposed activities for the 2024 calendar year include semi-annual assessment and corrective action monitoring, as required by 40 CFR § 257.94, 40 CFR § 257.95 and 40 CFR § 257.98. Cooperative Energy will continue implementation of the Corrective Action Groundwater Monitoring Program to assure continued performance of the selected remedy.

10.0 REFERENCES

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Golder, 2020, Alternate Source Demonstration RD Morrow Generating Station – Landfill CCR Unit, Purvis, Mississippi. Golder Prepared for Cooperative Energy, Inc. September 11, 2020.

Grammatikopoulos, T. and Downing, S., 2020. The disruptive role of process mineralogy in geology and mineral processing industry. Asp. Min. Miner. Sci, 5, pp.571-579.

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WSP 2023a. Remedy Selection Report- Cooperative Energy, R.D. Morrow Sr. Generating Station – CCR Landfill Unit, prepared by WSP USA, Inc., dated May 18, 2023.

WSP 2023b. Corrective Action Groundwater Monitoring Program – Cooperative Energy, R.D. Morrow Sr. Generating Station – CCR Landfill Unit, prepared by WSP USA, Inc., dated August 16, 2023.

Figures

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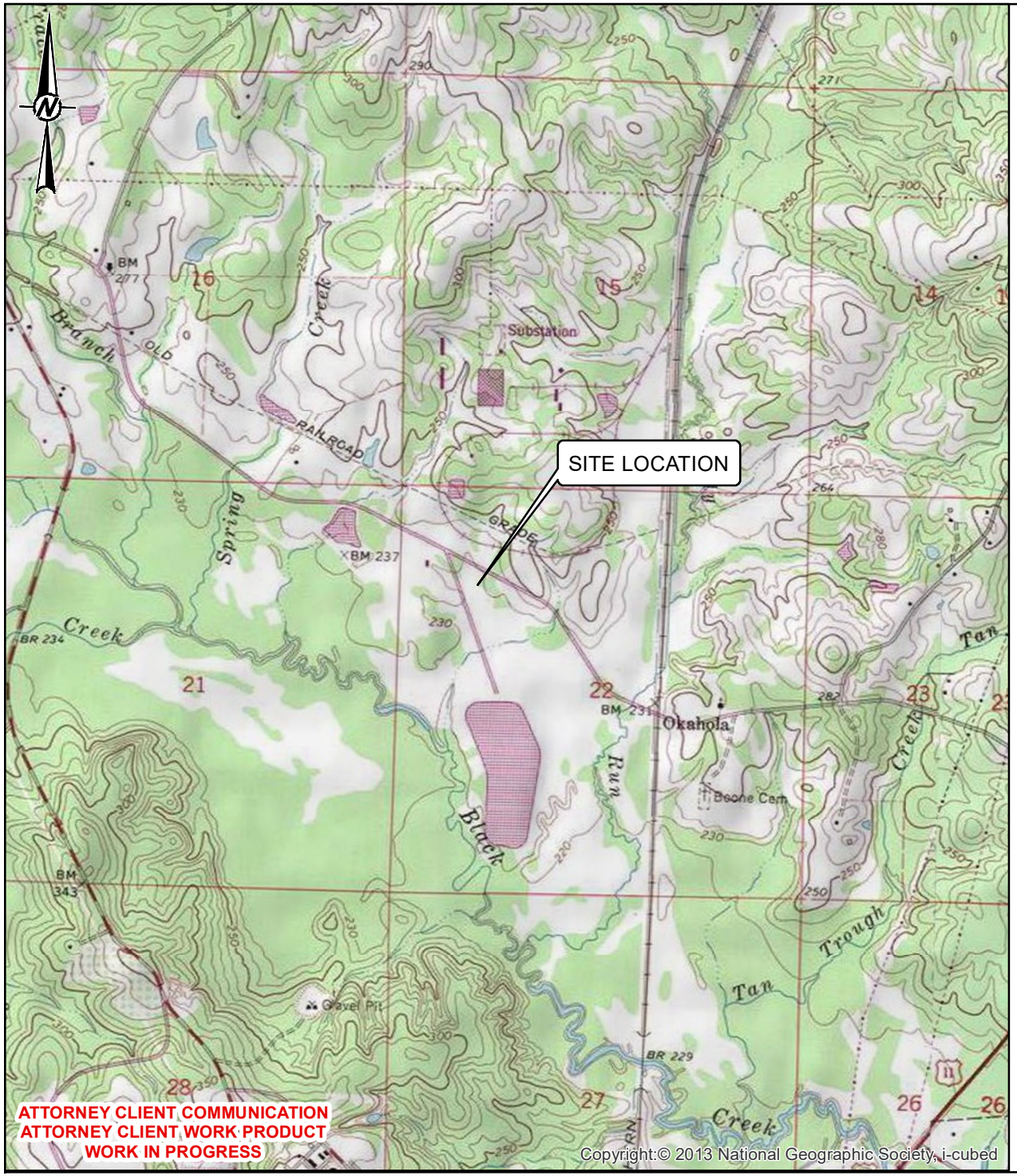

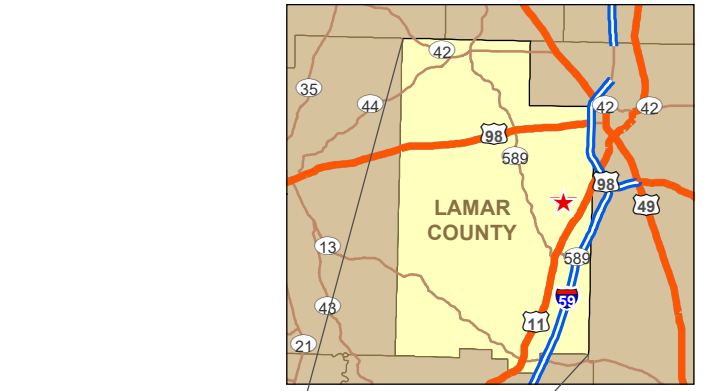

CLIENT
COOPERATIVE ENERGY

PROJECT
RD MORROW GENERATING STATION
PURVIS, MISSISSIPPI

TITLE
SITE LOCATION MAP

CONSULTANT
wsp

YYYY-MM-DD	2023-01-25
PREPARED	DJC
DESIGN	DLK
REVIEW	DLK
APPROVED	DLP

PROJECT No.	CONTROL	Rev.	FIGURE
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LEGEND

MW-XX LANDFILL UNIT MONITORING WELL LOCATION

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REFERENCE

BASE MAP TAKEN FROM ENVIRONMENTAL MANAGEMENT SERVICES, INC., MONITORING WELL LOCATIONS, DATED 2017-02-17 DELIVERED IN .DWG FORMAT.

CLIENT
COOPERATIVE ENERGY

CONSULTANT
wsp

YYYY-MM-DD	2023-01-25
DESIGNED	DLK
PREPARED	DJC
REVIEWED	DLK
APPROVED	DLP

PROJECT
RD MORROW GENERATING STATION
PURVIS, MISSISSIPPI

TITLE
WELL LOCATION MAP

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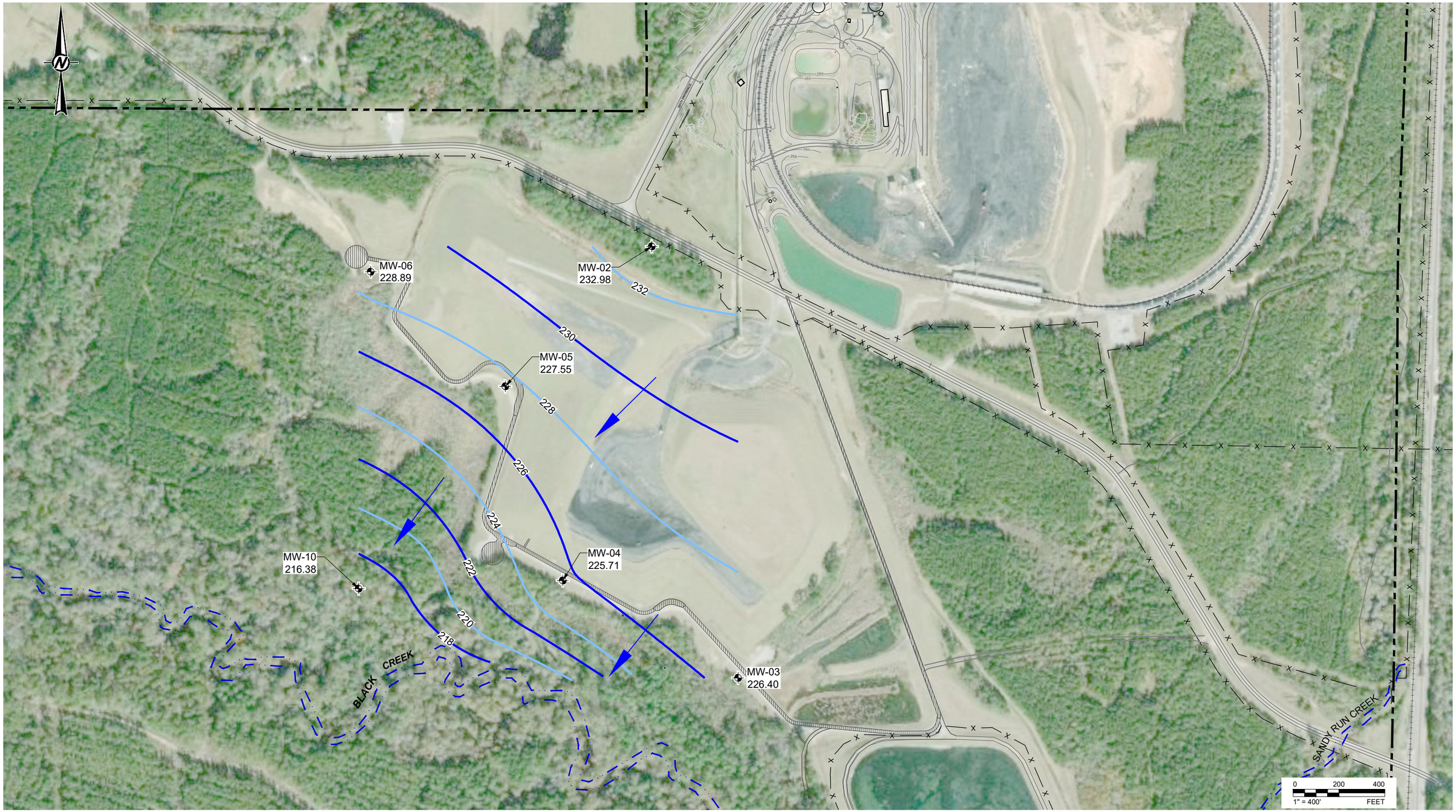

LEGEND

- PROPERTY BOUNDARY
- MW-XX — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
- 220 — GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

REFERENCE

BASE MAP TAKEN FROM ENVIRONMENTAL MANAGEMENT SERVICES, INC., MONITORING WELL LOCATIONS, DATED 2017-02-17 DELIVERED IN .DWG FORMAT.

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YYYY-MM-DD	2023-11-16
DESIGNED	DLP
PREPARED	DJC
REVIEWED	
APPROVED	

PROJECT
RD MORROW GENERATING STATION
PURVIS, MISSISSIPPI

TITLE
FIRST SEMIANNUAL 2023 POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP
APRIL 12, 2023

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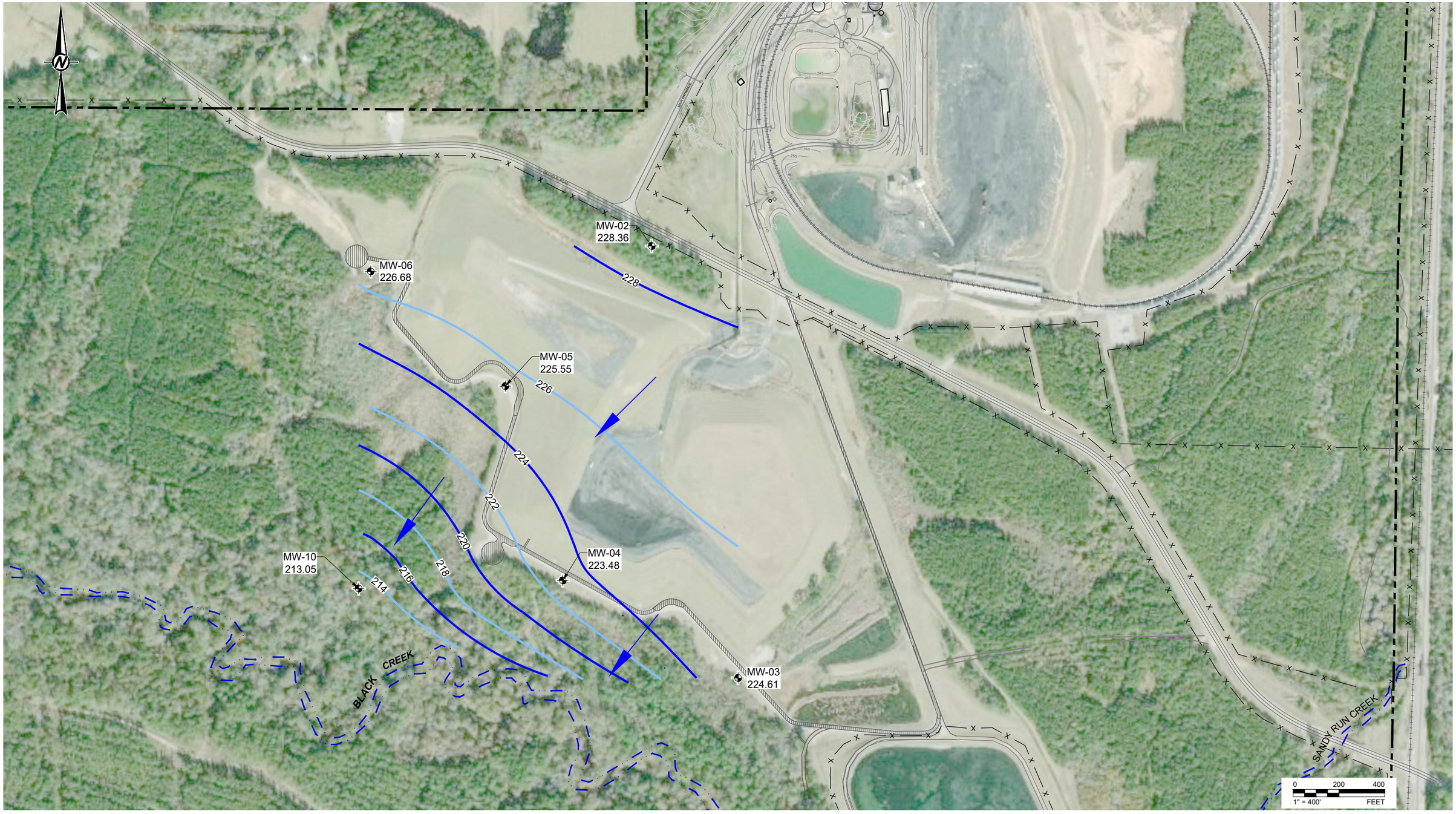

LEGEND

- PROPERTY BOUNDARY
- MW-XX — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
- 220 — GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

REFERENCE

BASE MAP TAKEN FROM ENVIRONMENTAL MANAGEMENT SERVICES, INC., MONITORING WELL LOCATIONS, DATED 2017-02-17 DELIVERED IN .DWG FORMAT.

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CLIENT
COOPERATIVE ENERGY

CONSULTANT
wsp

YYYY-MM-DD	2023-11-16
DESIGNED	DLP
PREPARED	DJC
REVIEWED	
APPROVED	

PROJECT
RD MORROW GENERATING STATION
PURVIS, MISSISSIPPI

TITLE
SECOND SEMIANNUAL 2023 POTENTIOMETRIC SURFACE ELEVATION CONTOUR MAP
SEPTEMBER 21, 2023

PROJECT NO.	CONTROL	REV.	FIGURE
GL21453914.002	GL21453914G004.dwg	0	4

Path: \\golder.gds\complexdata\office\Detroit\Cad\Projects\21x-Projects\21453914-Coop Energy\PRODUCTION\G-2023 GW MONITORING\ | File Name: GL21453914G004.dwg | Last Edited By: dcoss Date: 2023-11-16 Time:3:43:48 PM | Printed By: CmGomez Date: 2023-12-13 Time:12:51:31 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Tables

TABLE 1.
ANALYTICAL DATA SUMMARY - April 2023
RD Morrow Generating Station - CCR Landfill Unit
Purvis, Mississippi

Analyte	Units	DETECTION MONITORING WELLS					ASSESSMENT MONITORING WELL
		MW-02	MW-03	MW-04	MW-05	MW-06	MW-10
	Sample Date:	4/12/2023	4/12/2023	4/12/2023	4/12/2023	4/12/2023	4/12/2023
Appendix III							
BORON, TOTAL	mg/L	0.74	**6.2**	**9.37**	**20.1**	<0.05	**3.12**
CALCIUM, TOTAL	mg/L	53.8	**404**	**433**	**555**	1.75	59
CHLORIDE, TOTAL	mg/L	59.8	101	103	**299**	3.1	105
FLUORIDE, TOTAL	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	S.U.	4.37	**5.30**	5.05	**6.22**	4.70	3.84
SULFATE, TOTAL	mg/L	241	**1760**	**1960**	**2120**	8.84	355
TOTAL DISSOLVED SOLIDS	mg/L	521	**2697**	**2800**	**4010**	44	751
Appendix IV							
ANTIMONY, TOTAL	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
ARSENIC, TOTAL	mg/L	< 0.002	0.00260	0.00445	< 0.002	< 0.002	0.00410
BARIUM, TOTAL	mg/L	0.022	0.031	0.030	0.045	0.089	0.021
BERYLLIUM, TOTAL	mg/L	<0.00400	<0.00400	<0.00400	<0.00400	<0.00400	0.00584
CADMIUM, TOTAL	mg/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
CHROMIUM, TOTAL	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
COBALT, TOTAL	mg/L	0.0666	0.0214	0.0322	0.0431	0.00134	0.0699
FLUORIDE, TOTAL	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
LEAD, TOTAL	mg/L	0.00147	0.00315	<0.00100	<0.00100	<0.00100	0.00213
LITHIUM, TOTAL	mg/L	<0.040	0.677	0.764	**2.19**	<0.040	0.193
MERCURY, TOTAL	mg/L	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
MOLYBDENUM, TOTAL	mg/L	<0.00500	<0.00500	<0.00500	**1.94**	0.00647	<0.00500
RADIUM (226 + 228)	pCi/L	1.47	1.55	1.46	1.52	1.39	1.45
SELENIUM, TOTAL	mg/L	0.0210	0.00725	0.0144	< 0.0020	< 0.0020	0.0171
THALLIUM, TOTAL	mg/L	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020

NOTES:

1. mg/L - Milligrams per Liter; pCi/L - picocuries per Liter
2. < - Constituent was analyzed for, but was not detected above the minium reporting limit (MRL) and is considered a non-detect. Value is displayed as less than the MRL.
3. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement. the sample amount and elapsed time of the measurement.
4. Not Required - constituent analysis is not required per 40 CFR 257.96 . Annual scan of the Appendix IV constituents is conducted along with semi-annual monitoring for those constituents in Appendix III and those Appendix IV constituents detected during the annual scan event.
5. Bolded data indicates an exceedance of the PL for appendix III constituents and a statistically significant level based on 95% confidence interval above the Groundwater Protection Standard (GWPS) for appendix IV constituents.

TABLE 2.
ANALYTICAL DATA SUMMARY - September 2023
RD Morrow Generating Station - CCR Landfill Unit
Purvis, Mississippi

Analyte	Units	DETECTION MONITORING WELLS					ASSESSMENT MONITORING WELL
		MW-02	MW-03	MW-04	MW-05	MW-06	MW-10
	Sample Date:	9/21/2023	9/21/2023	9/21/2023	9/21/2023	9/21/2023	9/21/2023
Appendix III							
BORON, TOTAL	mg/L	0.654	**6.72**	**9.95**	1.35	0.244	**3.5**
CALCIUM, TOTAL	mg/L	48.5	**425**	**387**	**599**	3.12	70.5
CHLORIDE, TOTAL	mg/L	66.5	113	130	170	8.89	120
FLUORIDE, TOTAL	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	S.U.	4.33	**5.31**	4.78	**6.44**	4.59	3.80
SULFATE, TOTAL	mg/L	202	**1830**	**1660**	**1850**	17.4	385
TOTAL DISSOLVED SOLIDS	mg/L	424	**2880**	**2864**	**3677**	94	928
Appendix IV							
ANTIMONY, TOTAL	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
ARSENIC, TOTAL	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
BARIUM, TOTAL	mg/L	0.0272	0.0392	0.0393	0.0556	0.149	0.0234
BERYLLIUM, TOTAL	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	0.00596
CADMIUM, TOTAL	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CHROMIUM, TOTAL	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
COBALT, TOTAL	mg/L	0.0575	0.0206	0.0499	0.0118	0.00260	0.0757
FLUORIDE, TOTAL	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
LEAD, TOTAL	mg/L	0.00842	0.00228	0.00238	<0.00100	<0.00100	0.00214
LITHIUM, TOTAL	mg/L	<0.040	0.471	0.404	**0.576**	<0.040	<0.040
MERCURY, TOTAL	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
MOLYBDENUM, TOTAL	mg/L	<0.005	<0.005	<0.005	**1.74**	<0.005	<0.005
RADIUM (226 + 228)	pCi/L	1.84	2.02	1.74	1.95	1.98	1.42
SELENIUM, TOTAL	mg/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
THALLIUM, TOTAL	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

NOTES:

1. mg/L - Milligrams per Liter; pCi/L - picocuries per Liter
2. < - Constituent was analyzed for, but was not detected above the minium reporting limit (MRL) and is considered a non-detect. Value is displayed as less than the MRL.
3. Radium data is a combination of radium isotopes 226 and 228. When results are reported below the MDC (Minimum Detectable Concentration), data is displayed with an accompanying U. The MDC varies depending upon the sample amount and elapsed time of the measurement. the sample amount and elapsed time of the measurement.
4. Not Required - constituent analysis is not required per 40 CFR 257.96 . Annual scan of the Appendix IV constituents is conducted along with semi-annual monitoring for those constituents in Appendix III and those Appendix IV constituents detected during the annual scan event.
5. Bolded data indicates an exceedance of the PL for appendix III constituents and a statistically significant level based on 95% confidence interval above the Groundwater Protection Standard (GWPS) for appendix IV constituents.

APPENDIX A

Analytical Data and Field Data Forms

Mailing Address:
PO Box 1410
Ocean Springs, MS
39566-1410

6500 Sunplex Drive
Ocean Springs, MS 39564
228.875.6420 Phone
228.875.6423 Fax

May 15, 2023

Ken Ruckstuhl

Work Order # : 2304253

Purchase Order #:

Environmental Management Services
PO Box 15369
Hattiesburg, MS 39404-5369

RE: Cooperative Energy CCR Semiannual

Enclosed are Micro-Methods Laboratory, Inc. results of analyses performed on samples received 04/13/2023 13:18. If you have any questions concerning this report, please feel free to contact the office.

Sincerely,

Mitch Spicer

Lab Director
Micro-Methods Laboratory, Inc.

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
Ocean Springs, MS 39564
228-875-6420 Phone
228-875-6423 Fax

Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date/Time Sampled	Sampled by	Date/Time Received
MW-2	2304253-01	Water	04/12/2023 16:45	*Alan Niven*	04/13/2023 13:18
MW-3	2304253-02	Water	04/12/2023 15:10	*Alan Niven*	04/13/2023 13:18
MW-4	2304253-03	Water	04/12/2023 14:15	*Alan Niven*	04/13/2023 13:18
MW-5	2304253-04	Water	04/12/2023 13:00	*Alan Niven*	04/13/2023 13:18
MW-6	2304253-05	Water	04/12/2023 12:00	*Alan Niven*	04/13/2023 13:18
MW-10	2304253-06	Water	04/12/2023 11:00	*Alan Niven*	04/13/2023 13:18
BD-1	2304253-07	Water	04/12/2023 12:00	*Alan Niven*	04/13/2023 13:18

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Sample Receipt Conditions

Date/Time Received: 4/13/2023 1:18:00PM
Received by: Sarah E. Tomek
Date/Time Logged: 4/13/2023 2:23:00PM
Cooler ID: #381

Shipped by: Client Delivery
Submitted by: Alan Niven
Logged by: Sarah E. Tomek
Receipt Temperature: 0.6 °C

Cooler Custody Seals Present	No	*Received on Ice but Not Frozen*	Yes
Containers Intact	Yes	*No Ice, Short Trip*	No
COC/Labels Agree	Yes	*Obvious Contamination*	No
Labels Complete	Yes	*Rush to meet HT*	No
COC Complete	Yes	*Received within HT*	Yes
Volatile Vial Headspace >6mm	No	*Proper Containers for Analysis*	Yes
Field Sheet/Instructions Included	No	*Correct Preservation*	Yes
Samples Rejected/Documented in Log	No	*Adequate Sample for Analysis*	Yes
Temp Taken From Temp Blank	Yes	*Sample Custody Seals Present*	No
Temp Taken From Sample Container	No	*Samples Missing from COC/Cooler*	No
Temp Taken From Cooler	No		
COC meets acceptance criteria	Yes		

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Cooler ID: #517

Receipt Temperature: 2.4 °C

Cooler Custody Seals Present	No	*Received on Ice but Not Frozen*	Yes
Containers Intact	Yes	*No Ice, Short Trip*	No
COC/Labels Agree	Yes	*Obvious Contamination*	No
Labels Complete	Yes	*Rush to meet HT*	No
COC Complete	Yes	*Received within HT*	Yes
Volatile Vial Headspace >6mm	No	*Proper Containers for Analysis*	Yes
Field Sheet/Instructions Included	No	*Correct Preservation*	Yes
Samples Rejected/Documented in Log	No	*Adequate Sample for Analysis*	Yes
Temp Taken From Temp Blank	Yes	*Sample Custody Seals Present*	No
Temp Taken From Sample Container	No	*Samples Missing from COC/Cooler*	No
Temp Taken From Cooler	No		
COC meets acceptance criteria	Yes		

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-22-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	05/15/2023 11:55

CASE NARRATIVE SUMMARY

All reported results are within Micro-Methods Laboratory, Inc.defined laboratory quality control objectives unless detailed in narrative summary or identified as qualifications. NOTE: All results listed on this report are calculated on a wet weight basis (as received by the laboratory) unless otherwise noted in the analysis qualification sections.

Summary Comments:

See attached results from Sub-Contract Laboratory

Qualifiers: *No Data Qualification*

Analyte & Samples(s) Qualified: *None*

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
PO Box 15369
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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-2

2304253-01 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**59.8**	2.00	mg/L	1.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	"	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**241**	50.0	"	10.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**521**	1	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.022**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:05	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**0.740**	0.050	"	"	"	CLV	"	"	"	
Calcium 315.887 [Radial]	**53.8**	0.500	"	10.0	"	CLV	"	04/18/2023 14:17	"	
Lithium 610.362 [Axial]	ND	0.040	"	1.0	"	CLV	"	04/18/2023 13:05	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:15	EPA 200.8 Rev 5.4	
Arsenic [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0666**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	**0.00147**	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	**0.0210**	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-3

2304253-02 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**101**	4.00	mg/L	2.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**1760**	250	"	50.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2697**	3	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.031**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:19	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**6.20**	0.050	"	"	"	CLV	"	"	"	
Calcium 315.887 [Radial]	**404**	0.500	"	10.0	"	CLV	"	04/18/2023 14:24	"	
Lithium 610.362 [Axial]	**0.677**	0.040	"	1.0	"	CLV	"	04/18/2023 13:19	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:28	EPA 200.8 Rev 5.4	
Arsenic [He]	**0.00260**	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0214**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	**0.00315**	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	**0.00725**	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-4

2304253-03 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**103**	4.00	mg/L	2.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**1960**	250	"	50.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2800**	3	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.030**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:23	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**9.37**	0.500	"	10.0	"	CLV	"	04/18/2023 14:28	"	
Calcium 315.887 [Radial]	**433**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	**0.764**	0.040	"	1.0	"	CLV	"	04/18/2023 13:23	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:33	EPA 200.8 Rev 5.4	
Arsenic [He]	**0.00445**	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0322**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	ND	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	**0.0144**	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-5

2304253-04 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**299**	8.00	mg/L	4.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**2120**	250	"	50.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**4010**	3	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.045**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:26	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**20.1**	1.00	"	20.0	"	CLV	"	04/18/2023 14:32	"	
Calcium 315.887 [Radial]	**555**	1.00	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	**2.19**	0.040	"	1.0	"	CLV	"	04/18/2023 13:26	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:37	EPA 200.8 Rev 5.4	
Arsenic [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0431**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	ND	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	**1.94**	0.00500	"	5.0	"	GWG	"	04/18/2023 15:46	"	
Selenium [He]	ND	0.00200	"	1.0	"	GWG	"	04/18/2023 15:37	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-6

2304253-05 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**3.10**	2.00	mg/L	1.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	"	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**8.84**	5.00	"	"	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**44**	1	"	"	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.089**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:30	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	ND	0.050	"	"	"	CLV	"	"	"	
Calcium 315.887 [Radial]	**1.75**	0.050	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	ND	0.040	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:42	EPA 200.8 Rev 5.4	
Arsenic [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.00134**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	ND	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	**0.00647**	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

MW-10

2304253-06 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**105**	4.00	mg/L	2.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**355**	50.0	"	10.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**751**	1	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.021**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:33	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**3.12**	0.050	"	"	"	CLV	"	"	"	
Calcium 315.887 [Radial]	**59.0**	0.500	"	10.0	"	CLV	"	04/18/2023 14:35	"	
Lithium 610.362 [Axial]	**0.193**	0.040	"	1.0	"	CLV	"	04/18/2023 13:33	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:50	EPA 200.8 Rev 5.4	
Arsenic [He]	**0.00410**	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	**0.00584**	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0699**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	**0.00213**	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	**0.0171**	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

BD-1

2304253-07 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Chloride	**98.0**	4.00	mg/L	2.0	3D14014	DLW	04/14/2023 11:20	04/14/2023 14:11	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3D18057	ASC	04/18/2023 16:05	04/18/2023 16:24	SM 4500-F C 2011	
Sulfate as SO4	**1750**	250	"	50.0	3D14016	ASC	04/14/2023 08:45	04/14/2023 15:36	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2667**	3	"	1.0	3D17034	DLW	04/17/2023 10:45	04/19/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Barium 455.403 [Radial]	**0.030**	0.010	mg/L	1.0	3D17035	CLV	04/17/2023 10:00	04/18/2023 13:37	EPA 200.7 Rev 4.4	
Boron 249.773 [Radial]	**6.13**	0.050	"	"	"	CLV	"	"	"	
Calcium 315.887 [Radial]	**401**	0.500	"	10.0	"	CLV	"	04/18/2023 14:39	"	
Lithium 610.362 [Axial]	**0.698**	0.040	"	1.0	"	CLV	"	04/18/2023 13:37	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3D18049	GWG	04/17/2023 09:00	04/18/2023 15:55	EPA 200.8 Rev 5.4	
Arsenic [He]	**0.00260**	0.00200	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0214**	0.00100	"	"	"	GWG	"	"	"	
Lead [He]	**0.00100**	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [He]	**0.00739**	0.00200	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3D20016	GWG	04/20/2023 10:45	04/21/2023 10:35	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D14003 - Default Prep GenChem											
Blank (3D14003-BLK1)											
Sulfate as SO4	4/14/23 9:07	ND	5.00	mg/L							
Duplicate (3D14003-DUP1)			**Source: 2304253-05**								
Sulfate as SO4	4/14/23 10:04	8.56	5.00	mg/L		8.84			3.22	20	
Batch 3D14014 - Default Prep GenChem											
Blank (3D14014-BLK1)											
Chloride	4/14/23 14:11	ND	2.00	mg/L							
LCS (3D14014-BS1)											
Chloride	4/14/23 14:11	24.3	2.00	mg/L	25.0		97.2	85-115			
LCS Dup (3D14014-BSD1)											
Chloride	4/14/23 14:11	23.7	2.00	mg/L	25.0		94.8	85-115	2.50	30	
Duplicate (3D14014-DUP1)			**Source: 2304193-03**								
Chloride	4/14/23 14:11	27.8	2.00	mg/L		28.1			1.07	20	
Matrix Spike (3D14014-MS1)			**Source: 2304193-03**								
Chloride	4/14/23 14:11	43.8	2.00	mg/L	20.0	28.1	78.5	70-130			
Matrix Spike Dup (3D14014-MSD1)			**Source: 2304193-03**								
Chloride	4/14/23 14:11	43.5	2.00	mg/L	20.0	28.1	77.0	70-130	0.687	20	
Batch 3D14016 - Default Prep GenChem											
Blank (3D14016-BLK1)											
Sulfate as SO4	4/14/23 15:47	ND	5.00	mg/L							

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05/15/2023 11:55

Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D14016 - Default Prep GenChem											
LCS (3D14016-BS1)											
Sulfate as SO4	4/14/23 15:36	29.2	5.00	mg/L	30.0		97.3	88-108			
LCS Dup (3D14016-BSD1)											
Sulfate as SO4	4/14/23 15:47	30.6	5.00	mg/L	30.0		102	88-108	4.68	20	
Duplicate (3D14016-DUP1)			**Source: 2304253-05**								
Sulfate as SO4	4/14/23 16:08	8.56	5.00	mg/L		8.84			3.22	20	
Matrix Spike (3D14016-MS1)			**Source: 2304253-05**								
Sulfate as SO4	4/14/23 16:08	42.1	5.00	mg/L	30.0	8.84	111	74.1-129			
Matrix Spike Dup (3D14016-MSD1)			**Source: 2304253-05**								
Sulfate as SO4	4/14/23 16:08	41.6	5.00	mg/L	30.0	8.84	109	74.1-129	1.14	20	
Batch 3D17034 - Default Prep GenChem											
Blank (3D17034-BLK1)											
Total Dissolved Solids	4/19/23 0:00	ND	1	mg/L							
LCS (3D17034-BS1)											
Total Dissolved Solids	4/19/23 0:00	82	1	mg/L	101		81.2	60.3-100			
LCS Dup (3D17034-BSD1)											
Total Dissolved Solids	4/19/23 0:00	85	1	mg/L	101		84.2	60.3-100	3.59	10	
Duplicate (3D17034-DUP1)			**Source: 2304252-01**								
Total Dissolved Solids	4/19/23 0:00	517	1	mg/L		521			0.771	10	

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Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D17034 - Default Prep GenChem											
Duplicate (3D17034-DUP2)			**Source: 2304253-06**								
Total Dissolved Solids	4/19/23 0:00	746	1	mg/L		751			0.668	10	
Batch 3D18057 - Default Prep GenChem											
Blank (3D18057-BLK1)											
Fluoride	4/18/23 16:24	ND	0.50	mg/L							
LCS (3D18057-BS1)											
Fluoride	4/18/23 16:24	2.03	0.50	mg/L	2.00		102	87.8-113			
LCS Dup (3D18057-BSD1)											
Fluoride	4/18/23 16:24	2.05	0.50	mg/L	2.00		103	87.8-113	0.980	30	
Duplicate (3D18057-DUP1)			**Source: 2304253-01**								
Fluoride	4/18/23 16:24	0.47	0.50	mg/L		0.47			0.857	20	
Matrix Spike (3D18057-MS1)			**Source: 2304253-01**								
Fluoride	4/18/23 16:24	2.46	0.50	mg/L	2.00	0.47	99.6	70.2-127			
Matrix Spike Dup (3D18057-MSD1)			**Source: 2304253-01**								
Fluoride	4/18/23 16:24	2.49	0.50	mg/L	2.00	0.47	101	70.2-127	1.21	30	

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Metals by EPA 200 Series Methods ICP-AES - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D17035 - EPA 200.2 DCN 1017 Rev 10											
Blank (3D17035-BLK1)											
Barium 455.403 [Radial]	4/18/23 12:54	ND	0.010	mg/L							
Boron 249.773 [Radial]	4/18/23 12:54	ND	0.050	"							
Calcium 315.887 [Radial]	4/18/23 12:54	ND	0.050	"							
Lithium 610.362 [Axial]	4/18/23 12:54	ND	0.040	"							
LCS (3D17035-BS1)											
Barium 455.403 [Radial]	4/18/23 12:57	0.193	0.010	mg/L	0.200		96.7	85-115			
Boron 249.773 [Radial]	4/18/23 12:57	0.197	0.050	"	0.200		98.3	85-115			
Calcium 315.887 [Radial]	4/18/23 12:57	0.201	0.050	"	0.200		100	85-115			
Lithium 610.362 [Axial]	4/18/23 12:57	0.187	0.040	"	0.200		93.4	85-115			
LCS Dup (3D17035-BSD1)											
Barium 455.403 [Radial]	4/18/23 13:01	0.199	0.010	mg/L	0.200		99.3	85-115	2.66	20	
Boron 249.773 [Radial]	4/18/23 13:01	0.198	0.050	"	0.200		98.9	85-115	0.640	20	
Calcium 315.887 [Radial]	4/18/23 13:01	0.202	0.050	"	0.200		101	85-115	0.548	20	
Lithium 610.362 [Axial]	4/18/23 13:01	0.184	0.040	"	0.200		92.2	85-115	1.24	20	
Duplicate (3D17035-DUP1)			**Source: 2304253-01**								
Calcium 315.887 [Radial]	4/18/23 14:21	57.7	0.500	mg/L		53.8			7.12	20	
Matrix Spike (3D17035-MS1)			**Source: 2304253-01**								
Barium 455.403 [Radial]	4/18/23 13:08	0.221	0.010	mg/L	0.200	0.022	99.6	70-130			
Boron 249.773 [Radial]	4/18/23 13:08	0.944	0.050	"	0.200	0.740	102	70-130			
Lithium 610.362 [Axial]	4/18/23 13:08	0.178	0.040	"	0.200	0.034	72.1	70-130			
Matrix Spike Dup (3D17035-MSD1)			**Source: 2304253-01**								
Barium 455.403 [Radial]	4/18/23 13:12	0.223	0.010	mg/L	0.200	0.022	101	70-130	0.803	20	
Boron 249.773 [Radial]	4/18/23 13:12	0.961	0.050	"	0.200	0.740	111	70-130	1.80	20	
Lithium 610.362 [Axial]	4/18/23 13:12	0.186	0.040	"	0.200	0.034	76.2	70-130	4.53	20	

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Reported:
05/15/2023 11:55

Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D18049 - EPA 200.2 DCN 1017 Rev 10											
Blank (3D18049-BLK1)											
Antimony [He]	4/18/23 15:02	ND	0.00200	mg/L							
Arsenic [He]	4/18/23 15:02	ND	0.00200	"							
Beryllium [He]	4/18/23 15:02	ND	0.00400	"							
Cadmium [He]	4/18/23 15:02	ND	0.00500	"							
Chromium [He]	4/18/23 15:02	ND	0.0100	"							
Cobalt [He]	4/18/23 15:02	ND	0.00100	"							
Lead [He]	4/18/23 15:02	ND	0.00100	"							
Molybdenum [He]	4/18/23 15:02	ND	0.00500	"							
Nickel [He]	4/18/23 15:02	ND	0.00100	"							
Selenium [He]	4/18/23 15:02	ND	0.00200	"							
Thallium [He]	4/18/23 15:02	ND	0.00200	"							
LCS (3D18049-BS1)											
Antimony [He]	4/18/23 15:06	0.207	0.00200	mg/L	0.200		103	85-115			
Arsenic [He]	4/18/23 15:06	0.201	0.00200	"	0.200		100	85-115			
Beryllium [He]	4/18/23 15:06	0.216	0.00100	"	0.200		108	85-115			
Cadmium [He]	4/18/23 15:06	0.202	0.00100	"	0.200		101	85-115			
Chromium [He]	4/18/23 15:06	0.205	0.00100	"	0.200		102	85-115			
Cobalt [He]	4/18/23 15:06	0.207	0.00100	"	0.200		104	85-115			
Lead [He]	4/18/23 15:06	0.203	0.00100	"	0.200		102	85-115			
Molybdenum [He]	4/18/23 15:06	0.201	0.00100	"	0.200		100	85-115			
Nickel [He]	4/18/23 15:06	0.197	0.00100	"	0.200		98.3	85-115			
Selenium [He]	4/18/23 15:06	0.203	0.00200	"	0.200		102	85-115			
Thallium [He]	4/18/23 15:06	0.202	0.00200	"	0.200		101	85-115			
LCS Dup (3D18049-BSD1)											
Antimony [He]	4/18/23 15:11	0.201	0.00200	mg/L	0.200		101	85-115	2.86	20	
Arsenic [He]	4/18/23 15:11	0.194	0.00200	"	0.200		97.2	85-115	3.22	20	
Beryllium [He]	4/18/23 15:11	0.206	0.00100	"	0.200		103	85-115	4.39	20	
Cadmium [He]	4/18/23 15:11	0.195	0.00100	"	0.200		97.4	85-115	3.55	20	
Chromium [He]	4/18/23 15:11	0.198	0.00100	"	0.200		98.9	85-115	3.32	20	
Cobalt [He]	4/18/23 15:11	0.200	0.00100	"	0.200		100	85-115	3.43	20	
Lead [He]	4/18/23 15:11	0.198	0.00100	"	0.200		98.8	85-115	2.70	20	
Molybdenum [He]	4/18/23 15:11	0.198	0.00100	"	0.200		98.9	85-115	1.52	20	
Nickel [He]	4/18/23 15:11	0.192	0.00100	"	0.200		95.9	85-115	2.53	20	
Selenium [He]	4/18/23 15:11	0.190	0.00200	"	0.200		95.1	85-115	6.61	20	
Thallium [He]	4/18/23 15:11	0.196	0.00200	"	0.200		98.1	85-115	2.74	20	

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
Ocean Springs, MS 39564
228-875-6420 Phone
228-875-6423 Fax

Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D18049 - EPA 200.2 DCN 1017 Rev 10											
Matrix Spike (3D18049-MS1)			**Source: 2304253-01**								
Antimony [He]	4/18/23 15:19	0.212	0.00200	mg/L	0.200	ND	106	70-130			
Arsenic [He]	4/18/23 15:19	0.199	0.00200	"	0.200	0.002	98.9	70-130			
Beryllium [He]	4/18/23 15:19	0.222	0.00100	"	0.200	0.004	109	70-130			
Cadmium [He]	4/18/23 15:19	0.198	0.00100	"	0.200	0.0002	98.8	70-130			
Chromium [He]	4/18/23 15:19	0.201	0.00100	"	0.200	0.0003	100	70-130			
Cobalt [He]	4/18/23 15:19	0.269	0.00100	"	0.200	0.067	101	70-130			
Lead [He]	4/18/23 15:19	0.205	0.00100	"	0.200	0.001	102	70-130			
Molybdenum [He]	4/18/23 15:19	0.216	0.00100	"	0.200	0.0008	107	70-130			
Nickel [He]	4/18/23 15:19	0.211	0.00100	"	0.200	0.028	91.5	70-130			
Selenium [He]	4/18/23 15:19	0.212	0.00200	"	0.200	0.021	95.6	70-130			
Thallium [He]	4/18/23 15:19	0.201	0.00200	"	0.200	ND	101	70-130			
Matrix Spike Dup (3D18049-MSD1)			**Source: 2304253-01**								
Antimony [He]	4/18/23 15:24	0.210	0.00200	mg/L	0.200	ND	105	70-130	0.910	20	
Arsenic [He]	4/18/23 15:24	0.199	0.00200	"	0.200	0.002	98.7	70-130	0.164	20	
Beryllium [He]	4/18/23 15:24	0.219	0.00100	"	0.200	0.004	107	70-130	1.52	20	
Cadmium [He]	4/18/23 15:24	0.197	0.00100	"	0.200	0.0002	98.5	70-130	0.372	20	
Chromium [He]	4/18/23 15:24	0.199	0.00100	"	0.200	0.0003	99.2	70-130	1.07	20	
Cobalt [He]	4/18/23 15:24	0.267	0.00100	"	0.200	0.067	100	70-130	0.847	20	
Lead [He]	4/18/23 15:24	0.204	0.00100	"	0.200	0.001	101	70-130	0.641	20	
Molybdenum [He]	4/18/23 15:24	0.215	0.00100	"	0.200	0.0008	107	70-130	0.432	20	
Nickel [He]	4/18/23 15:24	0.210	0.00100	"	0.200	0.028	91.1	70-130	0.412	20	
Selenium [He]	4/18/23 15:24	0.209	0.00200	"	0.200	0.021	94.2	70-130	1.26	20	
Thallium [He]	4/18/23 15:24	0.201	0.00200	"	0.200	ND	100	70-130	0.408	20	

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228-875-6423 Fax

Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Mercury by EPA 200 Series Methods CVAAS - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3D20016 - EPA 245.1 DCN 1017 Rev 10											
Blank (3D20016-BLK1)											
Mercury	4/21/23 10:35	ND	0.00200	mg/L							
LCS (3D20016-BS1)											
Mercury	4/21/23 10:35	0.005	0.00200	mg/L	0.00500		102	85-115			
LCS Dup (3D20016-BSD1)											
Mercury	4/21/23 10:35	0.005	0.00200	mg/L	0.00500		102	85-115	0.00	20	
Matrix Spike (3D20016-MS1)			**Source: 2304253-01**								
Mercury	4/21/23 10:35	0.005	0.00200	mg/L	0.00500	0.0003	102	70-130			
Matrix Spike Dup (3D20016-MSD1)			**Source: 2304253-01**								
Mercury	4/21/23 10:35	0.005	0.00200	mg/L	0.00500	0.0003	86.0	70-130	16.0	20	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-22-001
Project Manager: Ken Ruckstuhl

Reported:
05/15/2023 11:55

Certified Analyses Included in this Report

Analyte	Certification Code
ASTM D 512-12 in Water	
Chloride	C01,C02
EPA 200.7 Rev 4.4 in Water	
Aluminum 394.401 [Radial]	C01,C02
Aluminum 396.152 [Radial]	C01,C02
Antimony 206.833 [Axial]	C01,C02
Arsenic 193.759 [Axial]	C01,C02
Barium 455.403 [Radial]	C01,C02
Barium 493.409 [Radial]	C01,C02
Beryllium 313.042 [Axial]	C01,C02
Boron 249.773 [Radial]	C01,C02
Cadmium 228.802 [Axial]	C01,C02
Calcium 315.887 [Radial]	C01,C02
Chromium 283.563 [Axial]	C01,C02
Cobalt 228.616 [Axial]	C01,C02
Copper 324.754 [Axial]	C01,C02
Iron 259.940 [Axial]	C01,C02
Iron 259.940 [Radial]	C01,C02
Lead 220.353 [Axial]	C01,C02
Lithium 610.362 [Axial]	C01,C02
Magnesium 285.213 [Radial]	C01,C02
Manganese 257.610 [Axial]	C01,C02
Molybdenum 202.030 [Axial]	C01,C02
Nickel 231.604 [Axial]	C01,C02
Potassium 766.490 [Radial]	C01,C02
Phosphorus 178.284 [Axial]	C01,C02
Phosphorus 178.284 [Radial]	C01,C02
Selenium 196.090 [Axial]	C01,C02
Silver 328.068 [Axial]	C01,C02
Sodium 589.592 [Axial]	C01,C02
Sodium 589.592 [Radial]	C01,C02
Strontium 346.446 [Radial]	C01,C02
Strontium 421.552 [Radial]	C01,C02
Thallium 190.856 [Axial]	C01,C02
Vanadium 309.311 [Axial]	C01,C02
Zinc 213.856 [Axial]	C01,C02
EPA 200.8 Rev 5.4 in Water	
Aluminum [He]	C01,C02
Antimony [He]	C01,C02
Antimony [HHe]	C01,C02
Antimony [NG]	C01,C02

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-22-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	05/15/2023 11:55

Arsenic [He]	C01,C02
Arsenic [HHe]	C01,C02
Arsenic [NG]	C01,C02
Barium [He]	C01,C02
Beryllium [He]	C01,C02
Boron [NG]	C01,C02
Cadmium [He]	C01,C02
Cadmium [HHe]	C01,C02
Cadmium [NG]	C01,C02
Chromium [He]	C01,C02
Cobalt [He]	C01,C02
Copper [He]	C01,C02
Copper [NG]	C01,C02
Iron [He]	C01,C02
Lead [He]	C01,C02
Lead [NG]	C01,C02
Manganese [He]	C01,C02
Molybdenum [He]	C01,C02
Nickel [He]	C01,C02
Selenium [He]	C01,C02
Selenium [HHe]	C01,C02
Selenium [NG]	C01,C02
Silver [He]	C01,C02
Silver [NG]	C01,C02
Strontium [He]	C01,C02
Thallium [He]	C01,C02
Vanadium [He]	C01,C02
Zinc [He]	C01,C02
EPA 245.1 Rev 3.0 in Water	
Mercury	C01,C02
SM 2540 C-2015 in Water	
Total Dissolved Solids	C01,C02
SM 4500-SO42 E 2011 in Water	
Sulfate as SO4	C01,C02

****Only compounds included in this list are associated with accredited analyses****

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-22-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	05/15/2023 11:55

Laboratory Accreditations/Certifications

Code	Description	Number	Expires
C01	*LA Environmental Lab Accreditation Program*	*01960*	*06/30/2023*
C02	*The NELAC Institute (NELAP)*	*TNI01397*	*06/30/2023*
C03	*Ms Dept of Health (Drinking Water Microbiology)*	*MS00021*	*12/31/2023*
C04	*Ms Dept of Health (Drinking Water Chemistry)*	*MS00021*	*12/31/2023*
C05	*Ms DEQ Lead Firm Certification*	*PBF-00000028*	*03/31/2024*
C06	*MsDEQ Asbestos Inspector : C.D. Bingham*	*ABI-00001348*	*02/09/2024*
C07	*MsDEQ Air Monitor : C.D. Bingham*	*AM-011572*	*02/10/2024*
C08	*MsDEQ Asbestos Inspector: C. W. Meins*	*ABI-00001821*	*09/09/2022*
C09	*MsDEQ Air Monitor : C.W. Meins*	*AM-011189*	*02/10/2024*
C14	*MsDEQ Lead Paint Inspector : C.D. Bingham*	*PBI-00003690*	*02/07/2024*
C15	*MsDEQ Lead Paint Inspector : C.W. Meins*	*PBI-00001740*	*02/07/2024*

Report Definitions

TNC	Too Numerous To Count
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the minimum reporting limit
NR	Not Reported
RPD	Relative Percent Difference
ICV	Initial Calibration Verfiication
CCV	Continuing Calibration Verification Standard
SSV	Secondary Source Verfication Standard
LCS	Lab Control Spike - Lab matrix prepared with known concentration of analyte/s of interest analyzed by method.
MS	Matrix Spike - Sample prepared with known concentration of analyte/s of interest analyzed by method.
MSD	Matrix Spike Duplicate - Duplicate sample prepared with known concentration of analyte/s of interest analyzed by method.
MRL	Minimum Reporting Limit
%REC	Percentage Recovery of known concentration added to matrix
Batch	Group of samples prepared for analysis not to exceed 20 samples.
Matrix	Material containing analyte/s of interest
Surrogate	Analyte added to sample to determine extraction efficiency of method.

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-22-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	05/15/2023 11:55

Analyst Initials Key

FullName	Initials
Alexandria S Calloway	ASC
Charles L Vorhoff	CLV
Dortha L. Wells	DLW
Garrett Givhan	GWG
Sarah E. Tomek	SET
Teresa Meins	TKM
Tina Tomek	TPT

MICRO-METHODS LABORATORY, INC.
PO Box 1410, Ocean Springs, MS 39566-1410
(228) 875-6420 FAX (228) 875-6423
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Chain of Custody Record

Lab ID# MS00021
LELAP ID # 01960
TNI ID # TNI01397

Print Form

M-M Lab WO # 2304253

Company Name: EMS	Project Manager: Ken Ruckstuhl
Address: 7350 US Hwy 98	Purchase Order #:
City: Hattiesburg State: MS Zip: 39402	Email Address : kruckstuhl@env-mgt.com
Phone: 601 544 3674	Sampler Name Printed: Alan Niven
Fax: 601 544 0504	Sampler Name Signed: Alan Niven

Turn Around Time & Reporting
Our normal turn around time is 10 working days
_x_Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax __Email
QC Level: Level 1 ☐ Level 2 ☐ Level 3 ☐

Project Name: Cooperative Energy CCR Semiannual
Project #: SOU2-22-001

List Analyses Requested

Sample Identification	Sampling Date/Time	Matrix Code	# of Containers	Grab (G) or Composite (C)	Appendix III	Appendix IV
			Preservative:			
MW-2	4-12-23 16:45	W		G	X	X
MW-3	4-12-23 15:10	W		G	X	X
MW-4	4-12-23 14:15	W		G	X	X
MW-5	4-12-23 13:00	W		G	X	X
MW-6	4-12-23 12:00	W		G	X	X
MW-10	4-12-23 11:00	W		G	X	X
BD-1	4-12-23 12:00	W		G	X	X

Field Testing

ID#	ID#	ID#	ID#
Field Test	Field Test	Field Test	Field Test

Matrix:
W = Water
DW = Drinking Water
S = Solid
SO = Soil
SE = Sediment
L = Liquid
A = Air
O = Oil
SL = Sludge

Preservation:
1= H2SO4
2= H3PO4
3=NaOH
4=ZnC4H10O6
5=ZnC4H10O6 & NaOH
6=HNO3
7=Na2S2O3
8=HCl
9=NaHSO4

Received on Ice: (Y) N Thermometer# 5 Cooler #_____ **Receipt Temp Corrected(°C)**
Date & Time _____ By: _____ Sample____ Blank__X__ Cooler_____
All Temps are Corrected Values

	Printed Name	Signature	Company	Date	Time
Relinquished by	Alan Niven	Alan Niven	EMS	4-13-23	13:18
Received by	Sarah Tomek	Sarah Tomek	MM	4/13/23	1318
Relinquished by					
Received by					
Relinquished by					
Received by					

Notes: Cooler # 517 2.4°c
See Work Order: Cooler # 381 0.6°c
Appendix III - boron, calcium, chloride, fluoride sulfate, total dissolved solids

Appendix IV - antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium, mercury, radium 226/228

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

May 11, 2023

Tina Tomek
Micro-Methods Lab
6500 Sunplex Drive
Ocean Springs, MS 39564

RE: Project: 2304253
Pace Project No.: 30580505

Dear Tina Tomek:

Enclosed are the analytical results for sample(s) received by the laboratory on April 20, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justin P. Horn
justin.horn@pacelabs.com
(724)850-5600
Project Manager

Enclosures

cc: Accounts Payable, Micro-Methods Lab

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 2304253
Pace Project No.: 30580505

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 2304253
Pace Project No.: 30580505

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30580505001	**2304253-01**	Water	04/12/23 16:45	04/20/23 10:00
30580505002	**2304253-02**	Water	04/12/23 15:10	04/20/23 10:00
30580505003	**2304253-03**	Water	04/12/23 14:15	04/20/23 10:00
30580505004	**2304253-04**	Water	04/12/23 13:00	04/20/23 10:00
30580505005	**2304253-05**	Water	04/12/23 12:00	04/20/23 10:00
30580505006	**2304253-06**	Water	04/12/23 11:00	04/20/23 10:00
30580505007	**2304253-07**	Water	04/12/23 12:00	04/20/23 10:00

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 2304253
Pace Project No.: 30580505

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30580505001	**2304253-01**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505002	**2304253-02**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505003	**2304253-03**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505004	**2304253-04**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505005	**2304253-05**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505006	**2304253-06**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30580505007	**2304253-07**	EPA 903.1	JDZ	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2304253
Pace Project No.: 30580505

Sample: 2304253-01 **Lab ID: 30580505001** Collected: 04/12/23 16:45 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.251 ± 0.461 (0.823) C:NA T:89%**	pCi/L	05/08/23 16:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.801 ± 0.384 (0.650) C:81% T:88%**	pCi/L	05/03/23 11:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.05 ± 0.845 (1.47)**	pCi/L	05/11/23 14:24	7440-14-4	

Sample: 2304253-02 **Lab ID: 30580505002** Collected: 04/12/23 15:10 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.372 ± 0.488 (0.812) C:NA T:93%**	pCi/L	05/08/23 16:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.912 ± 0.432 (0.734) C:82% T:86%**	pCi/L	05/03/23 11:22	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.28 ± 0.920 (1.55)**	pCi/L	05/11/23 14:24	7440-14-4	

Sample: 2304253-03 **Lab ID: 30580505003** Collected: 04/12/23 14:15 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.365 (0.791) C:NA T:95%**	pCi/L	05/08/23 16:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.08 ± 0.436 (0.670) C:81% T:84%**	pCi/L	05/03/23 11:23	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.08 ± 0.801 (1.46)**	pCi/L	05/11/23 14:24	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2304253
Pace Project No.: 30580505

Sample: 2304253-04 **Lab ID: 30580505004** Collected: 04/12/23 13:00 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0632 ± 0.372 (0.760) C:NA T:98%**	pCi/L	05/08/23 16:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.921 ± 0.441 (0.758) C:81% T:84%**	pCi/L	05/03/23 11:23	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.984 ± 0.813 (1.52)**	pCi/L	05/11/23 14:24	7440-14-4	

Sample: 2304253-05 **Lab ID: 30580505005** Collected: 04/12/23 12:00 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.567 ± 0.513 (0.757) C:NA T:95%**	pCi/L	05/08/23 16:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.44 ± 0.482 (0.631) C:81% T:84%**	pCi/L	05/03/23 11:23	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**2.01 ± 0.995 (1.39)**	pCi/L	05/11/23 14:24	7440-14-4	

Sample: 2304253-06 **Lab ID: 30580505006** Collected: 04/12/23 11:00 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.365 (0.773) C:NA T:98%**	pCi/L	05/08/23 16:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.54 ± 0.515 (0.679) C:77% T:84%**	pCi/L	05/03/23 11:23	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.54 ± 0.880 (1.45)**	pCi/L	05/11/23 14:24	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2304253
Pace Project No.: 30580505

Sample: 2304253-07 **Lab ID: 30580505007** Collected: 04/12/23 12:00 Received: 04/20/23 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.211 ± 0.459 (0.846) C:NA T:89%**	pCi/L	05/08/23 16:34	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.16 ± 0.451 (0.681) C:80% T:85%**	pCi/L	05/03/23 11:23	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.37 ± 0.910 (1.53)**	pCi/L	05/11/23 14:24	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 2304253
Pace Project No.: 30580505

QC Batch: 583198 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30580505001, 30580505002, 30580505003, 30580505004, 30580505005, 30580505006, 30580505007

METHOD BLANK: 2832270 Matrix: Water
Associated Lab Samples: 30580505001, 30580505002, 30580505003, 30580505004, 30580505005, 30580505006, 30580505007

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.258 ± 0.208 (0.116) C:NA T:97%	pCi/L	05/08/23 16:21	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 2304253
Pace Project No.: 30580505

QC Batch: 583199 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30580505001, 30580505002, 30580505003, 30580505004, 30580505005, 30580505006, 30580505007

METHOD BLANK: 2832272 Matrix: Water
Associated Lab Samples: 30580505001, 30580505002, 30580505003, 30580505004, 30580505005, 30580505006, 30580505007

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.677 ± 0.396 (0.724) C:80% T:79%	pCi/L	05/03/23 11:22	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 2304253
Pace Project No.: 30580505

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

MICRO-METHODS LABORATORY, INC.

SUBCONTRACT ORDER

Sending Laboratory:

Micro-Methods Laboratory, Inc.
6500 Sunplex Drive
Ocean Springs, MS 39564
Phone: 228.875.6420
Fax: 228.875.6423

Project Manager: Teresa Meins

Subcontracted Laboratory:

Pace Analytical-7
1638 Roseytown Rd. Suites 2, 3, 4
Greensburg, PA 15601
Phone: (724) 850-5600
Fax: -

WO# : 30580505

30580505

Work Order: 2304253

Analysis	Due	Expires	Comments
Sample ID: 2304253-01 ***Water Sampled: 04/12/2023 16:45*** ***Sample Name: MW-2***			001
Radium,Total 226 & 228 by EPA 903.1 & 90	04/21/2023	05/10/2023 16:45	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			
Sample ID: 2304253-02 ***Water Sampled: 04/12/2023 15:10*** ***Sample Name: MW-3***			002
Radium,Total 226 & 228 by EPA 903.1 & 90	04/21/2023	05/10/2023 15:10	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			
Sample ID: 2304253-03 ***Water Sampled: 04/12/2023 14:15*** ***Sample Name: MW-4***			003
Radium,Total 226 & 228 by EPA 903.1 & 90	04/21/2023	05/10/2023 14:15	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			
Sample ID: 2304253-04 ***Water Sampled: 04/12/2023 13:00*** ***Sample Name: MW-5***			004
Radium,Total 226 & 228 by EPA 903.1 & 90	04/21/2023	05/10/2023 13:00	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D) 1000mL Plastic w/HNO3 (E) 1000mL Plastic w/HNO3 (F)			
Sample ID: 2304253-05 ***Water Sampled: 04/12/2023 12:00*** ***Sample Name: MW-6***			005
Radium,Total 226 & 228 by EPA 903.1 & 90	04/21/2023	05/10/2023 12:00	

Sarah Jones	4/17/23 1630	UPS	4/17/23 1630
Released By	Date	Received By	Date
UPS			4/20/23 1000
Released By	Date	Received By	Date
Released By	Date	Received By	Date
Released By	Date	Received By	Date
Released By	Date	Received By	Date

Work Order: 2304253 (Continued)

Analysis	Due	Expires	Comments

Containers Supplied:
1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)

Sample ID: 2304253-06 ***Water Sampled: 04/12/2023 11:00 Sample Name: MW-10*** 006

Radium,Total 226 & 228 by EPA 903.1 & 90 04/21/2023 05/10/2023 11:00

Containers Supplied:
1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)

Sample ID: 2304253-07 ***Water Sampled: 04/12/2023 12:00 Sample Name: BD-1*** 007

Radium,Total 226 & 228 by EPA 903.1 & 90 04/21/2023 05/10/2023 12:00

Containers Supplied:
1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)

WO# : 30580505
PM: DAP Due Date: 05/11/23
CLIENT: MICROMETHOD

Released By: Sarah Jarmek 4/17/23 1630	Date	Received By: UPS 4/17/23 1630	Date
Released By: UPS	Date	Received By: [signature] 4/20/23 1000	Date
Released By	Date	Received By	Date
Released By	Date	Received By	Date
Released By	Date	Received By	Date

DC#_Title: ENV-FRM-GBUR-0088 v04_Sample
Pittsburgh

Effective Date: 02/03/2023

WO# : 30580505

PM: DAP **Due Date: 05/11/23**
CLIENT: MICROMETHOD

Client Name: Micro-Methods Laboratory

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other

Tracking Number: 1Z 353 063 03 6842 3718

Examined By	JA
Labeled By	JA
Temped By	NA

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No **Seals Intact:** ☐ Yes ☐ No

Thermometer Used: — **Type of Ice:** Wet Blue (None)

Cooler Temperature: Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

Comments:	Yes	No	NA	pH paper Lot# 10D3124 / D.P.D. Residual Chlorine Lot #
Chain of Custody Present	✓			1.
Chain of Custody Filled Out:	✓			2.
-Were client corrections present on COC		✓		
Chain of Custody Relinquished	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC:	✓			5.
-Includes date/time/ID				
Matrix:	WT			
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered:			✓	12.
Hex Cr Aqueous samples field filtered:			✓	13.
Organic Samples checked for dechlorination			✓	14:
Filtered volume received for dissolved tests:			✓	15:
All containers checked for preservation:	✓			16.
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, non-aqueous matrix				pH<2
All containers meet method preservation requirements:	✓			Initial when completed JA / Date/Time of Preservation
				Lot# of added Preservative
8260C/D: Headspace in VOA Vials (> 6mm)			✓	17.
624.1: Headspace in VOA Vials (0mm)			✓	18.
Trip Blank Present:			✓	Trip blank custody seal present? YES or NO
Rad Samples Screened <0.5 mrem/hr.	✓			Initial when completed JA / Date: 4-20-23 / Survey Meter SN: 1563

Comments:

Note: For NC compliance samples with discrepancies, a copy of this form must be sent to the DEHNR Certification office.
PM Review is documented electronically in LIMS through the SRF Review schedule in the Workorder Edit Screen.

Client Micro-Methods

Site 2304253

Page 1 of 1

Profile Number 14460

Notes

		Amber Glass					Plastic								Vials					Other									
Sample Line Item	Matrix	AG1H	AG3S	AG3U	AG5U	AG5T	BP1N	BP1U	BP2S	BP2U	BP3C	BP3N	BP3S	BP3U	DG9S	VG9H	VG9T	VG9U	VOAK	WGFU	WGKU	ZPLC	GCUB	GJN	12GN	GN	BG1U		
001	WT						2																						
002							2																						
003							2																						
004							4																						
005							2																						
006							2																						
007	WT						2																						

WO# : 30580505

PM: DAP **Due Date: 05/11/23**

CLIENT: MICROMETHOD

Container Codes

Glass

GJN	1 Gallon Jug with HNO3	DG9S	40mL amber VOA vial H2SO4
AG5U	100mL amber glass unpreserved	VG9U	40mL clear VOA vial
AG5T	100mL amber glass Na Thiosulfate	VG9T	40mL clear VOA vial Na Thiosulfate
GJN	1 Gallon Jug	VG9H	40mL clear VOA vial HCl
AG1S	1L amber glass H2SO4	JGFU	4oz amber wide jar
AG1H	1L amber glass HCl	WGFU	4oz wide jar unpreserved
AG1T	1L amber glass NA Thiosulfate	BG2U	500mL clear glass unpreserved
BG1U	1L clear glass unpreserved	AG2U	500mL amber glass unpreserved
AG3S	250mL amber glass H2SO4	WGKU	8oz wide jar unpreserved
AG3U	250mL amber glass unpreserved	GN	General

Plastic/Misc.

GCUB	1 gallon cubitainer
12GN	1/2 gallon cubitainer
SP5T	120mL coliform Na Thiosulfate
BP1N	1L plastic HNO3
BP1U	1L plastic unpreserved
BP3S	250mL plastic H2SO4
BP3N	250mL plastic HNO3
BP3U	250mL plastic unpreserved
BP3C	250mL plastic NAOH
BP2S	500mL plastic H2SO4
BP2U	500mL plastic unpreserved

EZI	5g Encore
VOAK	Kit Volatile Solic
I	Wipe/Swab
ZPLC	Siploc Bag

WT	Water
SL	Solid
OL	Non-Aq Liquid
WP	Wipe

Qualtrax ID: 55678

Pace® Analytical Services, LLC

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN — Well Number: MW-2

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 15:48	Sampling date/time	4-12-23 16:45
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	8.85	Gallons per well volume	
Top of casing to bottom	22.45	Total gallons evacuated	3.25 gal
Water level after evac	9.04		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
15:52	18.6	0.69	621	5.08	93.6	41.46	tan
15:58	18.6	0.37	654	4.71	106.5	30.62	clear
16:02	18.6	0.33	700	4.62	107.8	21.21	"
16:06	18.6	0.29	736	4.44	106.6	16.37	"
16:10	18.7	0.27	744	4.39	104.7	11.53	"
16:14	18.7	0.26	743	4.40	103.0	9.88	"
16:18	18.7	0.25	746	4.37	101.2	7.15	"

General Information

Weather Condition: light rain

Sample Characteristics:

Containers/Amounts: (2) 1L for Radiological (1) 1L for Metals (1) 500mL for Metals

Recommend/Observations:

Sampler/Collector: Alan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.164	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN

Well Number: MW-3

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 14:18	Sampling date/time	4-12-23 15:10
Method of evacuation	Peristaltic pump	Method of sampling	Low Flow
Top of casing to water	5.10	Gallons per well volume	
Top of casing to bottom	17.70	Total gallons evacuated	3.0 gal
Water level after evac	5.43		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
14:31	20.5	0.76	3139	5.27	8.1	28.39	Tan, orange particles
14:35	20.5	0.43	3130	5.28	-17.9	22.34	" "
14:39	20.5	0.33	3122	5.31	-52.6	12.65	clear
14:43	20.5	0.30	3119	5.30	-78.0	11.52	" "
14:48	20.5	0.26	3114	5.26	-102.9	7.06	" "
14:52	20.4	0.24	3110	5.26	-112.4	7.03	" "
14:56	20.4	0.24	3107	5.30	-116.2	6.23	" "

General Information

Weather Condition: overcast cool

Sample Characteristics:

Containers/Amounts: (4) 1L for radiological (2) 1L to Wet Lab; (2) 500mL for Metals
Blind duplicate < BD-1 4-12-23 12:00 >

Recommend/Observations:

Sampler/Collector

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.164 SS	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN

Well Number: MW-4

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 13:30	Sampling date/time	4-12-23 14:15
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	8.61	Gallons per well volume	
Top of casing to bottom	22.72	Total gallons evacuated	3.25 gal
Water level after evac	8.83		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
13:38	19.4	0.70	3294	5.21	118.6	3.75	clear
13:43	19.3	0.36	3266	5.16	121.0	3.19	"
13:48	19.3	0.29	3251	5.13	120.5	1.83	"
13:53	19.3	0.25	3239	5.09	117.1	1.45	"
13:58	19.3	0.23	3232	5.07	114.0	1.23	"
14:03	19.2	0.21	3223	5.05	110.8	1.39	"

General Information

Weather Condition: overcast

Sample Characteristics:

Containers/Amounts: (2) 1L for Radiological (1) 1L for Wetlab (1) 500mL for Metals

Recommend/Observations:

Sampler/Collector: Alan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.164 SS	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-5

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 12:08	Sampling date/time	4-12-23 13:00
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	6.30'	Gallons per well volume	
Top of casing to bottom	20.03'	Total gallons evacuated	2.5gal
Water level after evac	6.45'		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
12:20	20.1	0.73	2617	6.32	102.1	14.36	clear
12:25	20.0	0.42	2627	6.34	68.3	8.56	tan particles
12:30	20.0	0.32	3099	6.28	57.5	5.75	
12:35	20.0	0.29	3986	6.24	55.4	1.33	
12:40	20.0	0.26	4609	6.22	51.2	1.59	
12:45	20.0	0.25	4739	6.22	47.9	0.46	
12:50	20.0	0.24	4765	6.22	46.3	0.39	

General Information

Weather Condition: overcast

Sample Characteristics:

Containers/Amounts: (2) 1L for Radiological (2) 1L for Wetlab (2) 500mL for Metals

Recommend/Observations:

Sampler/Collector:

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.163	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-6

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 11:20	Sampling date/time	4-12-23 12:00
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	3.55	Gallons per well volume	
Top of casing to bottom	11.75	Total gallons evacuated	2.25 gal
Water level after evac	3.96		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
11:24	19.3	2.18	82.6	4.98	138.1	7.11	clear
11:29	19.3	1.83	81.2	4.94	133.3	6.51	"
11:34	19.3	1.86	79.8	4.86	130.3	2.17	"
11:39	19.3	2.01	79.3	4.78	128.9	1.10	"
11:44	19.3	2.10	79.0	4.73	126.8	0.63	"
11:49	19.3	2.13	79.1	4.70	125.3	0.67	

General Information

Weather Condition: Overcast

Sample Characteristics:

Containers/Amounts: (2) 1L Radiological (1) 1L for Wet lab (1) 500mL for Metals

Recommend/Observations:

Sampler/Collector: Alan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.164 SS	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN

Well Number: MW-10

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	4-12-23 9:50	Sampling date/time	4-12-23 11:00
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	10.04	Gallons per well volume	
Top of casing to bottom	22.45	Total gallons evacuated	3.5gal
Water level after evac	10.11		

Sample Data

	Temp [°C]	DO [mg/l]	Conductivity [µs/cm]	pH	ORP	NTU's	Appearance
10:32	18.1	0.75	1312	3.80	165.5	12.31	clear
10:37	18.0	0.45	1303	3.81	152.5	4.52	
10:42	18.0	0.40	1274	3.82	140.3	2.96	
10:47	18.0	0.50	1231	3.83	137.4	1.60	
10:52	18.0	0.65	1178	3.84	135.3	1.10	
10:57	18.0	0.76	1148	3.84	135.1	1.04	

General Information

Weather Condition: overcast cool

Sample Characteristics:

Containers/Amounts: (2)1L Radiological (1)1L for Wet lab (1)500mL Metals

Recommend/Observations: Peristaltic pump failure had to get a backup to Sample well

Sampler/Collector: Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.164 PVC	3"=0.367	6"=1.469
3/4"=0.03075	1 1/2"=0.100	2 1/2"=0.255	4"=0.656	8"=2.611

Print Form

MICRO-METHODS LABORATORY, INC.

PO Box 1410, Ocean Springs, MS 39566-1410
(228) 875-6420 FAX (228) 875-6423
www.micromethodslab.com

Chain of Custody Record

Lab ID# MS00021
LELAP ID # 01960
TNI ID # TNI01397

M-M Lab WO #

Company Name:	EMS
Address:	7350 US Hwy 98
City:	Hattiesburg State: MS Zip: 39402
Phone:	601 544 3674
Fax:	601 544 0504
Project Manager:	Ken Ruckstuhl
Purchase Order #:	
Email Address :	kruckstuhl@env-mgt.com
Sampler Name Printed:	Alan Niven
Sampler Name Signed:	Alan Niven

Turn Around Time & Reporting

Our normal turn around time is 10 working days

×Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax __Email

QC Level: Level 1 ☐ Level 2 ☐ Level 3 ☐

Project Name: Cooperative Energy CCR Semiannual

Project #: SOU2-22-001

List Analyses Requested

Sample Identification	Sampling Date/Time	Matrix Code	# of Containers	Grab (G) or Composite (C)	Appendix III	Appendix IV
MW-2	4-12-23 16:45	W		G	X	X
MW-3	4-12-23 15:10	W		G	X	X
MW-4	4-12-23 14:15	W		G	X	X
MW-5	4-12-23 13:00	W		G	X	X
MW-6	4-12-23 12:00	W		G	X	X
MW-10	4-12-23 11:00	W		G	X	X
BD-1	4-12-23 12:00	W		G	X	X

Preservative:

Field Testing

ID# Field Test	ID# Field Test	ID# Field Test	ID# Field Test

COPY

Matrix:
W = Water
DW = Drinking Water
S = Solid
SO = Soil
SE = Sediment
L = Liquid
A = Air
O = Oil
SL = Sludge

Preservation:
1= H2SO4
2= H3PO4
3=NaOH
4=ZnC4H10O6
5=ZnC4H10O6 & NaOH
6=HNO3
7=Na2S2O3
8=HCl
9=NaHSO4

Received on Ice? Y/ N Thermometer# 5 Cooler #_____ Receipt Temp Corrected(°C)

Date & Time _____ By: _____ Sample____ Blank X Cooler_____

All Temps are Corrected Values

	Printed Name	Signature	Company	Date	Time
Relinquished by	Alan Niven	Alan Niven	EMS	4-13-23	13:18
Received by	Sarah Tomek	Sarah Tomek	MM	4/13/23	1318
Relinquished by					
Received by					
Relinquished by					
Received by					

Notes: Cooler # 517 2.4°c
See Work Order: Cooler # 381 0.6°c

Appendix III = boron, calcium, chloride, fluoride sulfate, total dissolved solids

Appendix IV = antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium, mercury, radium 226/228

Physical Address: 6500 Sunplex Drive, Ocean Springs MS 39564

Mailing Address:
PO Box 1410
Ocean Springs, MS
39566-1410

6500 Sunplex Drive
Ocean Springs, MS 39564
228.875.6420 Phone
228.875.6423 Fax

October 12, 2023

Ken Ruckstuhl

Work Order # : 2309395

Purchase Order #:

Environmental Management Services
PO Box 15369
Hattiesburg, MS 39404-5369

RE: Cooperative Energy CCR Semiannual

Enclosed are Micro-Methods Laboratory, Inc. results of analyses performed on samples received 09/22/2023 13:37. If you have any questions concerning this report, please feel free to contact the office.

Sincerely,

Mitch Spicer

Lab Director
Micro-Methods Laboratory, Inc.

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
Ocean Springs, MS 39564
228-875-6420 Phone
228-875-6423 Fax

Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date/Time Sampled	Sampled by	Date/Time Received
MW-2	2309395-01	Water	09/21/2023 17:40	*Alan Niven*	09/22/2023 13:37
MW-3	2309395-02	Water	09/21/2023 16:20	*Alan Niven*	09/22/2023 13:37
MW-4	2309395-03	Water	09/21/2023 14:40	*Alan Niven*	09/22/2023 13:37
MW-5	2309395-04	Water	09/21/2023 13:15	*Alan Niven*	09/22/2023 13:37
MW-6	2309395-05	Water	09/21/2023 11:45	*Alan Niven*	09/22/2023 13:37
MW-10	2309395-06	Water	09/21/2023 10:45	*Alan Niven*	09/22/2023 13:37
BD-1	2309395-07	Water	09/21/2023 12:00	*Alan Niven*	09/22/2023 13:37

MICRO-METHODS LABORATORY, INC.

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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

Sample Receipt Conditions

Date/Time Received: 9/22/2023 1:37:00PM
Received by: Sarah E. Tomek
Date/Time Logged: 9/22/2023 2:26:00PM
Cooler ID: #1146

Shipped by: Client Delivery
Submitted by: Alan Niven
Logged by: Sarah E. Tomek
Receipt Temperature: 0.3 °C

Cooler Custody Seals Present	No	*Received on Ice but Not Frozen*	Yes
Containers Intact	Yes	*No Ice, Short Trip*	No
COC/Labels Agree	Yes	*Obvious Contamination*	No
Labels Complete	Yes	*Rush to meet HT*	No
COC Complete	Yes	*Received within HT*	Yes
Volatile Vial Headspace >6mm	No	*Proper Containers for Analysis*	Yes
Field Sheet/Instructions Included	No	*Correct Preservation*	Yes
Samples Rejected/Documented in Log	No	*Adequate Sample for Analysis*	Yes
Temp Taken From Temp Blank	Yes	*Sample Custody Seals Present*	No
Temp Taken From Sample Container	No	*Samples Missing from COC/Cooler*	No
Temp Taken From Cooler	No		
COC meets acceptance criteria	Yes		

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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

Cooler ID: #685

Receipt Temperature: 0.6 °C

Cooler Custody Seals Present	No	*Received on Ice but Not Frozen*	Yes
Containers Intact	Yes	*No Ice, Short Trip*	No
COC/Labels Agree	Yes	*Obvious Contamination*	No
Labels Complete	Yes	*Rush to meet HT*	No
COC Complete	Yes	*Received within HT*	Yes
Volatile Vial Headspace >6mm	No	*Proper Containers for Analysis*	Yes
Field Sheet/Instructions Included	No	*Correct Preservation*	Yes
Samples Rejected/Documented in Log	No	*Adequate Sample for Analysis*	Yes
Temp Taken From Temp Blank	Yes	*Sample Custody Seals Present*	No
Temp Taken From Sample Container	No	*Samples Missing from COC/Cooler*	No
Temp Taken From Cooler	No		
COC meets acceptance criteria	Yes		

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
Ocean Springs, MS 39564
228-875-6420 Phone
228-875-6423 Fax

Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-23-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	10/12/2023 13:13

CASE NARRATIVE SUMMARY

All reported results are within Micro-Methods Laboratory, Inc.defined laboratory quality control objectives unless detailed in narrative summary or identified as qualifications. NOTE: All results listed on this report are calculated on a wet weight basis (as received by the laboratory) unless otherwise noted in the analysis qualification sections.

Summary Comments:

See attached results from Sub-Contract Laboratory

Total Metals-EPA 200.7 Rev 4.4

Qualifiers:

L1 LCS and/or LCSD Recovery Limit exceeded.

Sodium 589.592 [Radial]
3J02028-BS1

M1 MS/MSD Recovery limit exceeded.

Magnesium 285.213 [Radial]
3J02028-MSD1

Mercury Total-EPA 245.1 Rev 3.0

Qualifiers:

M3 MS/MSD Precision Limit exceeded.

Mercury
3J02025-MSD1

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-2

2309395-01 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	ND	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	ND	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**66.5**	2.00	"	"	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	"	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**202**	50.0	"	10.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**424**	1	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**0.654**	0.500	mg/L	10.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 14:51	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**48.5**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	ND	0.040	"	1.0	"	CLV	"	10/03/2023 15:58	"	
Magnesium 285.213 [Radial]	**30.7**	0.500	"	10.0	"	CLV	"	10/03/2023 14:51	"	
Potassium 766.490 [Radial]	**1.60**	1.00	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**18.3**	1.00	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:15	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0272**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0575**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**0.288**	0.0250	"	"	"	GWG	"	"	"	
Lead [He]	**0.00842**	0.00100	"	"	"	GWG	"	"	"	
Manganese [He]	**1.17**	0.00200	"	2.0	"	GWG	"	09/28/2023 15:03	"	
Molybdenum [He]	ND	0.00500	"	1.0	"	GWG	"	09/28/2023 14:15	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Ocean Springs, MS 39564
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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-3

2309395-02 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	**61.3**	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	**62.5**	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**113**	4.00	"	2.0	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**1830**	250	"	50.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2880**	2	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**6.72**	0.500	mg/L	10.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 14:58	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**425**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	**0.471**	0.040	"	1.0	"	CLV	"	10/03/2023 16:05	"	
Magnesium 285.213 [Radial]	**145**	0.500	"	10.0	"	CLV	"	10/03/2023 14:58	"	
Potassium 766.490 [Radial]	**81.9**	1.00	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**52.0**	1.00	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:21	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0392**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0206**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**3.78**	0.125	"	5.0	"	GWG	"	09/28/2023 15:33	"	
Lead [He]	**0.00228**	0.00100	"	1.0	"	GWG	"	09/28/2023 14:21	"	
Manganese [He]	**2.73**	0.00500	"	5.0	"	GWG	"	09/28/2023 15:33	"	
Molybdenum [He]	ND	0.00500	"	1.0	"	GWG	"	09/28/2023 14:21	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Ocean Springs, MS 39564
228-875-6420 Phone
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Environmental Management Services
PO Box 15369
Hattiesburg MS, 39404-5369

Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-4

2309395-03 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	**15.6**	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	**17.5**	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**130**	4.00	"	2.0	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**1660**	250	"	50.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2864**	2	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**9.95**	0.500	mg/L	10.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 15:05	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**387**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	**0.404**	0.040	"	1.0	"	CLV	"	10/03/2023 16:14	"	
Magnesium 285.213 [Radial]	**151**	0.500	"	10.0	"	CLV	"	10/03/2023 15:05	"	
Potassium 766.490 [Radial]	**79.6**	1.00	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**63.1**	1.00	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:27	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0393**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0499**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**1.32**	0.125	"	5.0	"	GWG	"	09/28/2023 15:39	"	
Lead [He]	**0.00238**	0.00100	"	1.0	"	GWG	"	09/28/2023 14:27	"	
Manganese [He]	**4.11**	0.00500	"	5.0	"	GWG	"	09/28/2023 15:39	"	
Molybdenum [He]	ND	0.00500	"	1.0	"	GWG	"	09/28/2023 14:27	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

MICRO-METHODS LABORATORY, INC.

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-5

2309395-04 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	**543**	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	**548**	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**170**	4.00	"	2.0	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**1850**	250	"	50.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**3677**	3	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**1.35**	0.050	mg/L	1.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 15:12	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**599**	1.00	"	20.0	"	CLV	"	10/03/2023 15:38	"	
Lithium 610.362 [Axial]	**0.576**	0.040	"	1.0	"	CLV	"	10/03/2023 16:17	"	
Magnesium 285.213 [Radial]	**20.1**	0.050	"	"	"	CLV	"	10/03/2023 15:12	"	
Potassium 766.490 [Radial]	**12.4**	0.100	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**6.73**	0.100	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:34	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0556**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0118**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**0.462**	0.0250	"	"	"	GWG	"	"	"	
Lead [He]	ND	0.00100	"	"	"	GWG	"	"	"	
Manganese [He]	**1.90**	0.00500	"	5.0	"	GWG	"	09/28/2023 15:46	"	
Molybdenum [He]	**1.74**	0.00500	"	"	"	GWG	"	"	"	
Selenium [NG]	ND	0.0500	"	1.0	"	GWG	"	09/28/2023 14:34	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-6

2309395-05 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	ND	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	ND	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**8.89**	2.00	"	"	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	"	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**17.4**	5.00	"	"	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**94**	1	"	"	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**0.244**	0.050	mg/L	1.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 13:28	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**3.12**	0.050	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	ND	0.040	"	"	"	CLV	"	"	"	
Magnesium 285.213 [Radial]	**3.76**	0.050	"	"	"	CLV	"	"	"	
Potassium 766.490 [Radial]	**1.50**	0.100	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**5.74**	0.100	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:40	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.149**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.00260**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	ND	0.0250	"	"	"	GWG	"	"	"	
Lead [He]	ND	0.00100	"	"	"	GWG	"	"	"	
Manganese [He]	**0.134**	0.00100	"	"	"	GWG	"	"	"	
Molybdenum [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

MW-10

2309395-06 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	ND	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	ND	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**120**	4.00	"	2.0	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**385**	50.0	"	10.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**928**	1	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**3.50**	0.500	mg/L	10.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 15:20	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**70.5**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	ND	0.040	"	1.0	"	CLV	"	10/03/2023 16:21	"	
Magnesium 285.213 [Radial]	**61.7**	0.500	"	10.0	"	CLV	"	10/03/2023 15:20	"	
Potassium 766.490 [Radial]	**11.8**	1.00	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**35.8**	1.00	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:46	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0234**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	**0.00596**	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0757**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**0.186**	0.0250	"	"	"	GWG	"	"	"	
Lead [He]	**0.00214**	0.00100	"	"	"	GWG	"	"	"	
Manganese [He]	**4.55**	0.0100	"	10.0	"	GWG	"	09/28/2023 16:14	"	
Molybdenum [He]	ND	0.00500	"	1.0	"	GWG	"	09/28/2023 14:46	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

BD-1

2309395-07 (Water)

Analyte	Result	MRL	Units	Dil	Batch	Analyst	Date Time Prepared	Date Time Analyzed	Method	Qualifiers
Classical Chemistry Parameters										
Bicarbonate Alkalinity	**16.3**	10.0	mg/L	1.0	3I25026	JBM	09/25/2023 09:00	09/25/2023 11:24	SM 2320B 2011	
Carbonate Alkalinity	ND	10.0	"	"	3I25027	JBM	"	09/25/2023 11:28	"	
Total Alkalinity	**18.8**	10.0	"	"	3I25025	JBM	"	09/25/2023 11:19	"	
Chloride	**114**	4.00	"	2.0	3I25034	DLW	09/25/2023 13:50	09/25/2023 15:18	ASTM D 512-12	
Fluoride	ND	0.50	"	1.0	3I28013	CRG	09/28/2023 08:45	09/28/2023 13:14	SM 4500-F C 2011	
Sulfate as SO4	**1770**	250	"	50.0	3I26035	DLW	09/26/2023 08:45	09/26/2023 10:01	SM 4500-SO42 E 2011	
Total Dissolved Solids	**2872**	2	"	1.0	3I25037	DLW	09/25/2023 16:15	09/27/2023 00:00	SM 2540 C-2015	
Metals by EPA 200 Series Methods ICP-AES										
Boron 249.773 [Radial]	**10.1**	0.500	mg/L	10.0	3J02028	CLV	09/28/2023 08:45	10/03/2023 15:27	EPA 200.7 Rev 4.4	
Calcium 315.887 [Radial]	**398**	0.500	"	"	"	CLV	"	"	"	
Lithium 610.362 [Axial]	**0.395**	0.040	"	1.0	"	CLV	"	10/03/2023 16:24	"	
Magnesium 285.213 [Radial]	**156**	0.500	"	10.0	"	CLV	"	10/03/2023 15:27	"	
Potassium 766.490 [Radial]	**82.6**	1.00	"	"	"	CLV	"	"	"	
Sodium 589.592 [Radial]	**65.6**	1.00	"	"	"	CLV	"	"	"	
Metals by EPA 200 Series Methods ICP-MS [Analysis Mode]										
Antimony [He]	ND	0.00200	mg/L	1.0	3I28007	GWG	"	09/28/2023 14:53	EPA 200.8 Rev 5.4	
Arsenic [NG]	ND	0.00200	"	"	"	GWG	"	"	"	
Barium [He]	**0.0412**	0.00100	"	"	"	GWG	"	"	"	
Beryllium [He]	ND	0.00400	"	"	"	GWG	"	"	"	
Cadmium [He]	ND	0.00500	"	"	"	GWG	"	"	"	
Chromium [He]	ND	0.0100	"	"	"	GWG	"	"	"	
Cobalt [He]	**0.0527**	0.00100	"	"	"	GWG	"	"	"	
Iron [He]	**1.47**	0.125	"	5.0	"	GWG	"	09/28/2023 15:58	"	
Lead [He]	**0.00243**	0.00100	"	1.0	"	GWG	"	09/28/2023 14:53	"	
Manganese [He]	**4.28**	0.00500	"	5.0	"	GWG	"	09/28/2023 15:58	"	
Molybdenum [He]	ND	0.00500	"	1.0	"	GWG	"	09/28/2023 14:53	"	
Selenium [NG]	ND	0.0500	"	"	"	GWG	"	"	"	
Thallium [He]	ND	0.00200	"	"	"	GWG	"	"	"	
Mercury by EPA 200 Series Methods CVAAS										
Mercury	ND	0.00200	mg/L	1.0	3J02025	GWG	10/02/2023 09:30	10/03/2023 08:20	EPA 245.1 Rev 3.0	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I25025 - Default Prep GenChem											
Blank (3I25025-BLK1)											
Total Alkalinity	9/25/23 11:19	ND	10.0	mg/L							
LCS (3I25025-BS1)											
Total Alkalinity	9/25/23 11:19	925	10.0	mg/L	1000		92.5	85-115			
Duplicate (3I25025-DUP1)			**Source: 2309395-04**								
Total Alkalinity	9/25/23 11:19	546	10.0	mg/L		548			0.229	30	
Batch 3I25026 - Default Prep GenChem											
Blank (3I25026-BLK1)											
Bicarbonate Alkalinity	9/25/23 11:24	ND	10.0	mg/L							
Duplicate (3I25026-DUP1)			**Source: 2309395-04**								
Bicarbonate Alkalinity	9/25/23 11:24	541	10.0	mg/L		543			0.231	30	
Batch 3I25027 - Default Prep GenChem											
Blank (3I25027-BLK1)											
Carbonate Alkalinity	9/25/23 11:28	ND	10.0	mg/L							
Duplicate (3I25027-DUP1)			**Source: 2309395-04**								
Carbonate Alkalinity	9/25/23 11:28	ND	10.0	mg/L		ND				200	
Batch 3I25034 - Default Prep GenChem											
Blank (3I25034-BLK1)											
Chloride	9/25/23 15:18	ND	2.00	mg/L							

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Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I25034 - Default Prep GenChem											
LCS (3I25034-BS1)											
Chloride	9/25/23 15:18	23.5	2.00	mg/L	25.0		94.0	85-115			
LCS Dup (3I25034-BSD1)											
Chloride	9/25/23 15:18	23.0	2.00	mg/L	25.0		92.0	85-115	2.15	30	
Duplicate (3I25034-DUP1)			**Source: 2309374-06**								
Chloride	9/25/23 15:18	18.5	2.00	mg/L		18.1			2.19	20	
Matrix Spike (3I25034-MS1)			**Source: 2309374-06**								
Chloride	9/25/23 15:18	36.2	2.00	mg/L	20.0	18.1	90.5	70-130			
Matrix Spike Dup (3I25034-MSD1)			**Source: 2309374-06**								
Chloride	9/25/23 15:18	36.0	2.00	mg/L	20.0	18.1	89.5	70-130	0.554	20	
Batch 3I25037 - Default Prep GenChem											
Blank (3I25037-BLK1)											
Total Dissolved Solids	9/27/23 0:00	ND	1	mg/L							
LCS (3I25037-BS1)											
Total Dissolved Solids	9/27/23 0:00	87	1	mg/L	99.8		87.2	60.3-100			
LCS Dup (3I25037-BSD1)											
Total Dissolved Solids	9/27/23 0:00	83	1	mg/L	99.8		83.2	60.3-100	4.71	10	
Duplicate (3I25037-DUP1)			**Source: 2309374-06**								
Total Dissolved Solids	9/27/23 0:00	398	1	mg/L		400			0.501	10	

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Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I25037 - Default Prep GenChem											
Duplicate (3I25037-DUP2)			**Source: 2309401-01**								
Total Dissolved Solids	9/27/23 0:00	1563	3	mg/L		1573			0.638	10	
Batch 3I26035 - Default Prep GenChem											
Blank (3I26035-BLK1)											
Sulfate as SO4	9/26/23 10:01	ND	5.00	mg/L							
LCS (3I26035-BS1)											
Sulfate as SO4	9/26/23 10:01	29.6	5.00	mg/L	30.0		98.6	88-108			
LCS Dup (3I26035-BSD1)											
Sulfate as SO4	9/26/23 10:01	29.5	5.00	mg/L	30.0		98.5	88-108	0.146	20	
Duplicate (3I26035-DUP1)			**Source: 2309395-05**								
Sulfate as SO4	9/26/23 10:01	16.4	5.00	mg/L		17.4			6.12	20	
Matrix Spike (3I26035-MS1)			**Source: 2309395-05**								
Sulfate as SO4	9/26/23 10:01	39.7	5.00	mg/L	20.0	17.4	112	74.1-129			
Matrix Spike Dup (3I26035-MSD1)			**Source: 2309395-05**								
Sulfate as SO4	9/26/23 10:01	39.2	5.00	mg/L	20.0	17.4	109	74.1-129	1.42	20	
Batch 3I28013 - Default Prep GenChem											
Blank (3I28013-BLK1)											
Fluoride	9/28/23 13:14	ND	0.50	mg/L							

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Classical Chemistry Parameters - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I28013 - Default Prep GenChem											
LCS (3I28013-BS1)											
Fluoride	9/28/23 13:14	1.85	0.50	mg/L	2.00		92.5	87.8-113			
LCS Dup (3I28013-BSD1)											
Fluoride	9/28/23 13:14	1.88	0.50	mg/L	2.00		94.0	87.8-113	1.61	30	
Matrix Spike (3I28013-MS1)			**Source: 2309395-03**								
Fluoride	9/28/23 13:14	2.02	0.50	mg/L	2.00	0.33	84.6	70.2-127			
Matrix Spike Dup (3I28013-MSD1)			**Source: 2309395-03**								
Fluoride	9/28/23 13:14	2.07	0.50	mg/L	2.00	0.33	87.1	70.2-127	2.44	30	

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Project: Cooperative Energy CCR Semiannual
Project Number: SOU2-23-001
Project Manager: Ken Ruckstuhl

Reported:
10/12/2023 13:13

Metals by EPA 200 Series Methods ICP-AES - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3J02028 - EPA 200.2 DCN 1017 Rev 10											
Blank (3J02028-BLK1)											
Boron 249.773 [Radial]	10/3/23 14:36	ND	0.050	mg/L							
Calcium 315.887 [Radial]	10/3/23 14:36	ND	0.050	"							
Iron 259.940 [Axial]	10/3/23 14:36	ND	0.050	"							
Iron 259.940 [Radial]	10/3/23 14:36	ND	0.050	"							
Lithium 610.362 [Axial]	10/3/23 14:36	ND	0.040	"							
Magnesium 285.213 [Radial]	10/3/23 14:36	ND	0.050	"							
Manganese 257.610 [Axial]	10/3/23 14:36	ND	0.050	"							
Potassium 766.490 [Radial]	10/3/23 14:36	ND	0.100	"							
Sodium 589.592 [Radial]	10/3/23 14:36	ND	0.100	"							
LCS (3J02028-BS1)											
Boron 249.773 [Radial]	10/3/23 13:14	0.207	0.050	mg/L	0.200		104	85-115			
Calcium 315.887 [Radial]	10/3/23 13:14	0.209	0.050	"	0.200		105	85-115			
Iron 259.940 [Radial]	10/3/23 13:14	0.205	0.050	"	0.200		102	85-115			
Iron 259.940 [Axial]	10/3/23 13:14	0.204	0.050	"	0.200		102	85-115			
Lithium 610.362 [Axial]	10/3/23 13:14	0.198	0.040	"	0.200		98.8	85-115			
Magnesium 285.213 [Radial]	10/3/23 13:14	0.207	0.050	"	0.200		104	85-115			
Manganese 257.610 [Axial]	10/3/23 13:14	0.207	0.050	"	0.200		104	85-115			
Potassium 766.490 [Radial]	10/3/23 14:41	0.453	0.100	"	0.400		113	85-115			
Sodium 589.592 [Radial]	10/3/23 13:14	0.465	0.100	"	0.400		116	85-115			L1
LCS Dup (3J02028-BSD1)											
Boron 249.773 [Radial]	10/3/23 13:17	0.207	0.050	mg/L	0.200		104	85-115	0.0258	20	
Calcium 315.887 [Radial]	10/3/23 13:17	0.208	0.050	"	0.200		104	85-115	0.910	20	
Iron 259.940 [Axial]	10/3/23 13:17	0.204	0.050	"	0.200		102	85-115	0.233	20	
Iron 259.940 [Radial]	10/3/23 13:17	0.204	0.050	"	0.200		102	85-115	0.318	20	
Lithium 610.362 [Axial]	10/3/23 13:17	0.197	0.040	"	0.200		98.4	85-115	0.401	20	
Magnesium 285.213 [Radial]	10/3/23 13:17	0.206	0.050	"	0.200		103	85-115	0.679	20	
Manganese 257.610 [Axial]	10/3/23 13:17	0.208	0.050	"	0.200		104	85-115	0.336	20	
Potassium 766.490 [Radial]	10/3/23 13:17	0.448	0.100	"	0.400		112	85-115	1.13	20	
Sodium 589.592 [Radial]	10/3/23 13:17	0.453	0.100	"	0.400		113	85-115	2.66	20	

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Project Manager: Ken Ruckstuhl

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Metals by EPA 200 Series Methods ICP-AES - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3J02028 - EPA 200.2 DCN 1017 Rev 10											
Matrix Spike (3J02028-MS1)			**Source: 2309395-05**								
Boron 249.773 [Radial]	10/3/23 13:32	0.456	0.050	mg/L	0.200	0.244	106	70-130			
Calcium 315.887 [Radial]	10/3/23 13:32	3.32	0.050	"	0.200	3.12	95.7	70-130			
Iron 259.940 [Radial]	10/3/23 13:32	0.197	0.050	"	0.200	ND	98.7	70-130			
Iron 259.940 [Axial]	10/3/23 13:32	0.193	0.050	"	0.200	ND	96.7	70-130			
Lithium 610.362 [Axial]	10/3/23 13:32	0.200	0.040	"	0.200	ND	99.9	70-130			
Magnesium 285.213 [Radial]	10/3/23 13:32	3.99	0.050	"	0.200	3.76	114	70-130			
Manganese 257.610 [Axial]	10/3/23 13:32	0.338	0.050	"	0.200	0.138	100	70-130			
Potassium 766.490 [Radial]	10/3/23 13:32	1.92	0.100	"	0.400	1.50	103	70-130			
Sodium 589.592 [Radial]	10/3/23 13:32	6.14	0.100	"	0.400	5.74	98.4	70-130			
Matrix Spike Dup (3J02028-MSD1)			**Source: 2309395-05**								
Boron 249.773 [Radial]	10/3/23 13:35	0.459	0.050	mg/L	0.200	0.244	107	70-130	0.671	20	
Calcium 315.887 [Radial]	10/3/23 13:35	3.37	0.050	"	0.200	3.12	122	70-130	1.55	20	
Iron 259.940 [Radial]	10/3/23 13:35	0.213	0.050	"	0.200	ND	106	70-130	7.51	20	
Iron 259.940 [Axial]	10/3/23 13:35	0.212	0.050	"	0.200	ND	106	70-130	9.23	20	
Lithium 610.362 [Axial]	10/3/23 13:35	0.199	0.040	"	0.200	ND	99.7	70-130	0.252	20	
Magnesium 285.213 [Radial]	10/3/23 13:35	4.04	0.050	"	0.200	3.76	139	70-130	1.24	20	M1
Manganese 257.610 [Axial]	10/3/23 13:35	0.339	0.050	"	0.200	0.138	101	70-130	0.152	20	
Potassium 766.490 [Radial]	10/3/23 13:35	1.92	0.100	"	0.400	1.50	104	70-130	0.115	20	
Sodium 589.592 [Radial]	10/3/23 13:35	6.12	0.100	"	0.400	5.74	93.4	70-130	0.325	20	

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Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I28007 - EPA 200.2 DCN 1017 Rev 10											
Blank (3I28007-BLK1)											
Antimony [He]	9/28/23 12:14	ND	0.00200	mg/L							
Arsenic [NG]	9/28/23 12:14	ND	0.00200	"							
Barium [He]	9/28/23 12:14	ND	0.00100	"							
Beryllium [He]	9/28/23 12:14	ND	0.00400	"							
Cadmium [He]	9/28/23 12:14	ND	0.00500	"							
Chromium [He]	9/28/23 12:14	ND	0.0100	"							
Cobalt [He]	9/28/23 12:14	ND	0.00100	"							
Iron [He]	9/28/23 12:14	ND	0.00500	"							
Lead [He]	9/28/23 12:14	ND	0.00100	"							
Manganese [He]	9/28/23 12:14	ND	0.00100	"							
Molybdenum [He]	9/28/23 12:14	ND	0.00500	"							
Nickel [He]	9/28/23 12:14	ND	0.00100	"							
Selenium [NG]	9/28/23 12:14	ND	0.0500	"							
Thallium [He]	9/28/23 12:14	ND	0.00100	"							
LCS (3I28007-BS1)											
Antimony [He]	9/28/23 12:20	0.103	0.00200	mg/L	0.100		103	85-115			
Arsenic [NG]	9/28/23 12:20	0.101	0.00200	"	0.100		101	85-115			
Barium [He]	9/28/23 12:20	0.104	0.00100	"	0.100		104	85-115			
Beryllium [He]	9/28/23 12:20	0.103	0.00100	"	0.100		103	85-115			
Cadmium [He]	9/28/23 12:20	0.102	0.00100	"	0.100		102	85-115			
Chromium [He]	9/28/23 12:20	0.106	0.00100	"	0.100		106	85-115			
Cobalt [He]	9/28/23 12:20	0.107	0.00100	"	0.100		107	85-115			
Iron [He]	9/28/23 12:20	0.111	0.00500	"	0.100		111	85-115			
Lead [He]	9/28/23 12:20	0.106	0.00100	"	0.100		106	85-115			
Manganese [He]	9/28/23 12:20	0.102	0.00100	"	0.100		102	85-115			
Molybdenum [He]	9/28/23 12:20	0.105	0.00100	"	0.100		105	85-115			
Nickel [He]	9/28/23 12:20	0.105	0.00100	"	0.100		105	85-115			
Selenium [NG]	9/28/23 12:20	0.104	0.00500	"	0.100		104	85-115			
Thallium [He]	9/28/23 12:20	0.106	0.00100	"	0.100		106	85-115			

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Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I28007 - EPA 200.2 DCN 1017 Rev 10											
LCS Dup (3I28007-BSD1)											
Antimony [He]	9/28/23 12:26	0.103	0.00200	mg/L	0.100		103	85-115	0.581	20	
Arsenic [NG]	9/28/23 12:26	0.104	0.00200	"	0.100		104	85-115	2.85	20	
Barium [He]	9/28/23 12:26	0.103	0.00100	"	0.100		103	85-115	0.801	20	
Beryllium [He]	9/28/23 12:26	0.104	0.00100	"	0.100		104	85-115	1.11	20	
Cadmium [He]	9/28/23 12:26	0.103	0.00100	"	0.100		103	85-115	0.918	20	
Chromium [He]	9/28/23 12:26	0.107	0.00100	"	0.100		107	85-115	0.677	20	
Cobalt [He]	9/28/23 12:26	0.108	0.00100	"	0.100		108	85-115	0.223	20	
Iron [He]	9/28/23 12:26	0.110	0.00500	"	0.100		110	85-115	0.588	20	
Lead [He]	9/28/23 12:26	0.106	0.00100	"	0.100		106	85-115	0.501	20	
Manganese [He]	9/28/23 12:26	0.103	0.00100	"	0.100		103	85-115	0.807	20	
Molybdenum [He]	9/28/23 12:26	0.106	0.00100	"	0.100		106	85-115	0.971	20	
Nickel [He]	9/28/23 12:26	0.104	0.00100	"	0.100		104	85-115	0.315	20	
Selenium [NG]	9/28/23 12:26	0.108	0.00500	"	0.100		108	85-115	3.33	20	
Thallium [He]	9/28/23 12:26	0.106	0.00100	"	0.100		106	85-115	0.306	20	
Matrix Spike (3I28007-MS1)			**Source: 2309432-04**								
Antimony [He]	9/28/23 12:57	0.100	0.00200	mg/L	0.100	ND	100	70-130			
Arsenic [NG]	9/28/23 12:57	0.098	0.00200	"	0.100	ND	98.4	70-130			
Barium [He]	9/28/23 12:57	0.101	0.00100	"	0.100	0.0002	101	70-130			
Beryllium [He]	9/28/23 12:57	0.102	0.00100	"	0.100	ND	102	70-130			
Cadmium [He]	9/28/23 12:57	0.100	0.00100	"	0.100	ND	100	70-130			
Chromium [He]	9/28/23 12:57	0.106	0.00100	"	0.100	ND	106	70-130			
Cobalt [He]	9/28/23 12:57	0.106	0.00100	"	0.100	ND	106	70-130			
Iron [He]	9/28/23 12:57	0.108	0.00500	"	0.100	ND	108	70-130			
Lead [He]	9/28/23 12:57	0.105	0.00100	"	0.100	ND	105	70-130			
Manganese [He]	9/28/23 12:57	0.100	0.00100	"	0.100	ND	99.7	70-130			
Molybdenum [He]	9/28/23 12:57	0.104	0.00100	"	0.100	ND	104	70-130			
Nickel [He]	9/28/23 12:57	0.104	0.00100	"	0.100	ND	104	70-130			
Selenium [NG]	9/28/23 12:57	0.101	0.00500	"	0.100	ND	101	70-130			
Thallium [He]	9/28/23 12:57	0.105	0.00100	"	0.100	ND	105	70-130			

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Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I28007 - EPA 200.2 DCN 1017 Rev 10											
Matrix Spike (3I28007-MS2)			**Source: 2309435-01**								
Antimony [He]	9/28/23 12:38	0.105	0.00200	mg/L	0.100	0.0005	104	70-130			
Arsenic [NG]	9/28/23 12:38	0.100	0.00200	"	0.100	ND	100	70-130			
Barium [He]	9/28/23 12:38	0.109	0.00100	"	0.100	0.005	104	70-130			
Beryllium [He]	9/28/23 12:38	0.101	0.00100	"	0.100	ND	101	70-130			
Cadmium [He]	9/28/23 12:38	0.100	0.00100	"	0.100	ND	99.7	70-130			
Chromium [He]	9/28/23 12:38	0.103	0.00100	"	0.100	0.0003	102	70-130			
Cobalt [He]	9/28/23 12:38	0.101	0.00100	"	0.100	0.0001	101	70-130			
Iron [He]	9/28/23 12:38	0.150	0.00500	"	0.100	0.047	103	70-130			
Lead [He]	9/28/23 12:38	0.106	0.00100	"	0.100	ND	106	70-130			
Manganese [He]	9/28/23 12:38	0.100	0.00100	"	0.100	0.004	96.0	70-130			
Molybdenum [He]	9/28/23 12:38	0.114	0.00100	"	0.100	0.0008	114	70-130			
Nickel [He]	9/28/23 12:38	0.099	0.00100	"	0.100	0.0008	98.6	70-130			
Selenium [NG]	9/28/23 12:38	0.098	0.00500	"	0.100	ND	98.1	70-130			
Thallium [He]	9/28/23 12:38	0.106	0.00100	"	0.100	ND	106	70-130			
Matrix Spike Dup (3I28007-MSD1)			**Source: 2309432-04**								
Antimony [He]	9/28/23 13:03	0.101	0.00200	mg/L	0.100	ND	101	70-130	0.486	20	
Arsenic [NG]	9/28/23 13:03	0.098	0.00200	"	0.100	ND	97.8	70-130	0.619	20	
Barium [He]	9/28/23 13:03	0.101	0.00100	"	0.100	0.0002	100	70-130	0.334	20	
Beryllium [He]	9/28/23 13:03	0.104	0.00100	"	0.100	ND	104	70-130	1.33	20	
Cadmium [He]	9/28/23 13:03	0.100	0.00100	"	0.100	ND	100	70-130	0.392	20	
Chromium [He]	9/28/23 13:03	0.107	0.00100	"	0.100	ND	107	70-130	0.809	20	
Cobalt [He]	9/28/23 13:03	0.106	0.00100	"	0.100	ND	106	70-130	0.115	20	
Iron [He]	9/28/23 13:03	0.109	0.00500	"	0.100	ND	109	70-130	0.709	20	
Lead [He]	9/28/23 13:03	0.105	0.00100	"	0.100	ND	105	70-130	0.611	20	
Manganese [He]	9/28/23 13:03	0.100	0.00100	"	0.100	ND	100	70-130	0.338	20	
Molybdenum [He]	9/28/23 13:03	0.105	0.00100	"	0.100	ND	105	70-130	0.566	20	
Nickel [He]	9/28/23 13:03	0.103	0.00100	"	0.100	ND	103	70-130	0.502	20	
Selenium [NG]	9/28/23 13:03	0.100	0.00500	"	0.100	ND	100	70-130	0.549	20	
Thallium [He]	9/28/23 13:03	0.105	0.00100	"	0.100	ND	105	70-130	0.112	20	

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Metals by EPA 200 Series Methods ICP-MS [Analysis Mode] - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3I28007 - EPA 200.2 DCN 1017 Rev 10											
Matrix Spike Dup (3I28007-MSD2)			**Source: 2309435-01**								
Antimony [He]	9/28/23 12:44	0.104	0.00200	mg/L	0.100	0.0005	103	70-130	0.734	20	
Arsenic [NG]	9/28/23 12:44	0.096	0.00200	"	0.100	ND	95.7	70-130	4.36	20	
Barium [He]	9/28/23 12:44	0.108	0.00100	"	0.100	0.005	103	70-130	0.564	20	
Beryllium [He]	9/28/23 12:44	0.100	0.00100	"	0.100	ND	99.7	70-130	1.27	20	
Cadmium [He]	9/28/23 12:44	0.099	0.00100	"	0.100	ND	98.9	70-130	0.776	20	
Chromium [He]	9/28/23 12:44	0.101	0.00100	"	0.100	0.0003	100	70-130	1.76	20	
Cobalt [He]	9/28/23 12:44	0.099	0.00100	"	0.100	0.0001	99.0	70-130	1.78	20	
Iron [He]	9/28/23 12:44	0.152	0.00500	"	0.100	0.047	105	70-130	1.11	20	
Lead [He]	9/28/23 12:44	0.105	0.00100	"	0.100	ND	105	70-130	0.900	20	
Manganese [He]	9/28/23 12:44	0.099	0.00100	"	0.100	0.004	95.1	70-130	0.847	20	
Molybdenum [He]	9/28/23 12:44	0.113	0.00100	"	0.100	0.0008	112	70-130	1.16	20	
Nickel [He]	9/28/23 12:44	0.098	0.00100	"	0.100	0.0008	97.4	70-130	1.16	20	
Selenium [NG]	9/28/23 12:44	0.093	0.00500	"	0.100	ND	93.4	70-130	4.94	20	
Thallium [He]	9/28/23 12:44	0.105	0.00100	"	0.100	ND	105	70-130	0.882	20	

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Reported:
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Mercury by EPA 200 Series Methods CVAAS - Quality Control

Analyte	Analyzed	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifiers
Batch 3J02025 - EPA 245.1 DCN 1017 Rev 10											
Blank (3J02025-BLK1)											
Mercury	10/3/23 8:20	ND	0.00200	mg/L							
LCS (3J02025-BS1)											
Mercury	10/3/23 8:20	0.005	0.00200	mg/L	0.00500		104	85-115			
LCS Dup (3J02025-BSD1)											
Mercury	10/3/23 8:20	0.005	0.00200	mg/L	0.00500		100	85-115	3.92	20	
Matrix Spike (3J02025-MS1)			**Source: 2309395-05**								
Mercury	10/3/23 8:20	0.006	0.00200	mg/L	0.00500	0.0004	106	70-130			
Matrix Spike Dup (3J02025-MSD1)			**Source: 2309395-05**								
Mercury	10/3/23 8:20	0.005	0.00200	mg/L	0.00500	0.0004	82.0	70-130	23.5	20	M3

MICRO-METHODS LABORATORY, INC.

6500 Sunplex Drive
Ocean Springs, MS 39564
228-875-6420 Phone
228-875-6423 Fax

Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-23-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	10/12/2023 13:13

Certified Analyses Included in this Report

Analyte	Certification Code
ASTM D 512-12 in Water	
Chloride	C01,C02
EPA 200.7 Rev 4.4 in Water	
Aluminum 394.401 [Radial]	C01,C02
Aluminum 396.152 [Radial]	C01,C02
Antimony 206.833 [Axial]	C01,C02
Arsenic 193.759 [Axial]	C01,C02
Barium 455.403 [Radial]	C01,C02
Barium 493.409 [Radial]	C01,C02
Beryllium 313.042 [Axial]	C01,C02
Boron 249.773 [Radial]	C01,C02
Cadmium 228.802 [Axial]	C01,C02
Calcium 315.887 [Radial]	C01,C02
Chromium 283.563 [Axial]	C01,C02
Cobalt 228.616 [Axial]	C01,C02
Copper 324.754 [Axial]	C01,C02
Iron 259.940 [Axial]	C01,C02
Iron 259.940 [Radial]	C01,C02
Lead 220.353 [Axial]	C01,C02
Lithium 610.362 [Axial]	C01,C02
Magnesium 285.213 [Radial]	C01,C02
Manganese 257.610 [Axial]	C01,C02
Molybdenum 202.030 [Axial]	C01,C02
Nickel 231.604 [Axial]	C01,C02
Potassium 766.490 [Radial]	C01,C02
Phosphorus 178.284 [Axial]	C01,C02
Phosphorus 178.284 [Radial]	C01,C02
Selenium 196.090 [Axial]	C01,C02
Silver 328.068 [Axial]	C01,C02
Sodium 589.592 [Axial]	C01,C02
Sodium 589.592 [Radial]	C01,C02
Strontium 346.446 [Radial]	C01,C02
Strontium 421.552 [Radial]	C01,C02
Thallium 190.856 [Axial]	C01,C02
Vanadium 309.311 [Axial]	C01,C02
Zinc 213.856 [Axial]	C01,C02
EPA 200.8 Rev 5.4 in Water	
Aluminum [He]	C01,C02
Antimony [He]	C01,C02
Antimony [HHe]	C01,C02
Antimony [NG]	C01,C02

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-23-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	10/12/2023 13:13

Arsenic [He]	C01,C02
Arsenic [HHe]	C01,C02
Arsenic [NG]	C01,C02
Barium [He]	C01,C02
Beryllium [He]	C01,C02
Boron [NG]	C01,C02
Cadmium [He]	C01,C02
Cadmium [HHe]	C01,C02
Cadmium [NG]	C01,C02
Chromium [He]	C01,C02
Cobalt [He]	C01,C02
Copper [He]	C01,C02
Copper [NG]	C01,C02
Iron [He]	C01,C02
Lead [He]	C01,C02
Lead [NG]	C01,C02
Manganese [He]	C01,C02
Molybdenum [He]	C01,C02
Nickel [He]	C01,C02
Selenium [He]	C01,C02
Selenium [HHe]	C01,C02
Selenium [NG]	C01,C02
Silver [He]	C01,C02
Silver [NG]	C01,C02
Strontium [He]	C01,C02
Thallium [He]	C01,C02
Vanadium [He]	C01,C02
Zinc [He]	C01,C02
EPA 245.1 Rev 3.0 in Water	
Mercury	C01,C02
SM 2320B 2011 in Water	
Total Alkalinity	C01,C02
SM 2540 C-2015 in Water	
Total Dissolved Solids	C01,C02
SM 4500-SO42 E 2011 in Water	
Sulfate as SO4	C01,C02

****Only compounds included in this list are associated with accredited analyses****

MICRO-METHODS LABORATORY, INC.

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228-875-6423 Fax

Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-23-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	10/12/2023 13:13

Laboratory Accreditations/Certifications

Code	Description	Number	Expires
C01	*LA Environmental Lab Accreditation Program*	*01960*	*06/30/2024*
C02	*The NELAC Institute (NELAP)*	*TNI01397*	*06/30/2024*
C03	*MS Dept of Health (Drinking Water Microbiology)*	*MS00021*	*12/31/2023*
C04	*MS Dept of Health (Drinking Water Chemistry)*	*MS00021*	*12/31/2023*
C05	*MS DEQ Lead Firm Certification*	*PBF-00000028*	*03/31/2024*
C06	*MSDEQ Asbestos Inspector : C.D. Bingham*	*ABI-00001348*	*02/09/2024*
C07	*MSDEQ Air Monitor : C.D. Bingham*	*AM-011572*	*02/10/2024*
C08	*MSDEQ Asbestos Inspector: C. W. Meins*	*ABI-00001821*	*09/09/2022*
C09	*MSDEQ Air Monitor : C.W. Meins*	*AM-011189*	*02/10/2024*
C10	*ADEM (Drinking Water Microbiology)*	*43500*	*12/31/2023*
C11	*ADEM (Drinking Water Chemistry)*	*43500*	*12/31/2023*
C14	*MSDEQ Lead Paint Inspector : C.D. Bingham*	*PBI-00003690*	*02/07/2024*
C15	*MSDEQ Lead Paint Inspector : C.W. Meins*	*PBI-00001740*	*02/07/2024*

Report Definitions

TNC	Too Numerous To Count
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the minimum reporting limit
NR	Not Reported
RPD	Relative Percent Difference
ICV	Initial Calibration Verfiication
CCV	Continuing Calibration Verification Standard
SSV	Secondary Source Verfication Standard
LCS	Lab Control Spike - Lab matrix prepared with known concentration of analyte/s of interest analyzed by method.
MS	Matrix Spike - Sample prepared with known concentration of analyte/s of interest analyzed by method.
MSD	Matrix Spike Duplicate - Duplicate sample prepared with known concentration of analyte/s of interest analyzed by method.
MRL	Minimum Reporting Limit
%REC	Percentage Recovery of known concentration added to matrix
Batch	Group of samples prepared for analysis not to exceed 20 samples.
Matrix	Material containing analyte/s of interest
Surrogate	Analyte added to sample to determine extraction efficiency of method.

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Environmental Management Services	Project: Cooperative Energy CCR Semiannual	
PO Box 15369	Project Number: SOU2-23-001	**Reported:**
Hattiesburg MS, 39404-5369	Project Manager: Ken Ruckstuhl	10/12/2023 13:13

Analyst Initials Key

FullName	Initials
Charles L Vorhoff	CLV
Christa R Gray	CRG
Dortha L. Wells	DLW
Garrett Givhan	GWG
Jason B McCullar	JBM
Sarah E. Tomek	SET
Teresa Meins	TKM
Tina Tomek	TPT

MICRO-METHODS LABORATORY, INC.
PO Box 1410, Ocean Springs, MS 39566-1410
(228) 875-6420 FAX (228) 875-6423
www.micromethodslab.com

Chain of Custody Record

Lab ID# MS00021
LELAP ID # 01960
TNI ID # TNI01397

Print Form

M-M Lab WO # 2309395

Company Name: EMS	Project Manager: Ken Ruckstuhl
Address: 7350 US Hwy 98	Purchase Order #:
City: Hattiesburg State: MS Zip: 39402	Email Address : kruckstuhl@env-mgt.com
Phone: 601 544 3674	Sampler Name Printed: Alan Niven
Fax: 601 544 0504	Sampler Name Signed:

Turn Around Time & Reporting

Our normal turn around time is 10 working days

_x_Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

QC Level: Level 1 ☐ Level 2 ☐ Level 3 ☐

Project Name: Cooperative Energy CCR Semiannual

Project #: SOU2-23-001

List Analyses Requested

Sample Identification	Sampling Date/Time	Matrix Code	# of Containers	Grab (G) or Composite (C)	Metals (see below)	Chloride/sulfate	Total dissolved solids	Alkalinity, Total	Alkalinity, Bicarbonate	Alkalinity Carbonate	Fluoride	Radium 226/228
			Preservative									
MW-2	9-21-23 17:40	W		G	X	X	X	X	X	X	X	X
MW-3	9-21-23 16:20	W		G	X	X	X	X	X	X	X	X
MW-4	9-21-23 14:40	W		G	X	X	X	X	X	X	X	X
MW-5	9-21-23 13:15	W		G	X	X	X	X	X	X	X	X
MW-6	9-21-23 11:45	W		G	X	X	X	X	X	X	X	X
MW-10	9-21-23 10:45	W		G	X	X	X	X	X	X	X	X
BD-1	9-21-23 12:00	W		G	X	X	X	X	X	X	X	X

Field Testing

ID# Field Test	ID# Field Test	ID# Field Test	ID# Field Test

Matrix:
W = Water
DW = Drinking Water
S = Solid
SO = Soil
SE = Sediment
L = Liquid
A = Air
O = Oil
SL = Sludge

Preservation:
1= H2SO4
2= H3PO4
3=NaOH
4=ZnC4H10O6
5=ZnC4H10O6 & NaOH
6=HNO3
7=Na2S2O3
8=HCl
9=NaHSO4

Received on Ice (Y) N Thermometer# 5 Cooler #_____ Receipt Temp Corrected(°C)

Date & Time _____ By: _____ Sample _____ Blank X Cooler _____

All Temps are Corrected Values

	Printed Name	Signature	Company	Date	Time
Relinquished by	Alan Niven		EMS	9-22-23	13:30
Received by			MM	9/22/23	1337
Relinquished by					
Received by					
Relinquished by					
Received by					

Notes: cooler#685 0.6°c

See Attached Work Order: cooler#1146 0.3°c

Metals - antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium, mercury, iron, magnesium, manganese, sodium, potassium

Physical Address: 6500 Sunplex Drive, Ocean Springs MS 39564

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

October 12, 2023

Tina Tomek
Micro-Methods Lab
6500 Sunplex Drive
Ocean Springs, MS 39564

RE: Project: 2309395
Pace Project No.: 30626309

Dear Tina Tomek:

Enclosed are the analytical results for sample(s) received by the laboratory on September 28, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justin P. Horn
justin.horn@pacelabs.com
(724)850-5600
Project Manager

Enclosures

cc: Accounts Payable, Micro-Methods Lab

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 2309395
Pace Project No.: 30626309

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
ANABISO/IEC 17025:2017 Rad Cert#: L24170
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 2950
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA010
Louisiana DEQ/TNI Certification #: 04086
Maine Certification #: 2023021
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572023-03
New Hampshire/TNI Certification #: 297622
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-015
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN02867
Texas/TNI Certification #: T104704188-22-18
Utah/TNI Certification #: PA014572223-14
USDA Soil Permit #: 525-23-67-77263
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 2309395
Pace Project No.: 30626309

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30626309001	**2309395-01**	Water	09/21/23 17:40	09/28/23 09:50
30626309002	**2309395-02**	Water	09/21/23 16:20	09/28/23 09:50
30626309003	**2309395-03**	Water	09/21/23 14:40	09/28/23 09:50
30626309004	**2309395-04**	Water	09/21/23 13:15	09/28/23 09:50
30626309005	**2309395-05**	Water	09/21/23 11:45	09/28/23 09:50
30626309006	**2309395-06**	Water	09/21/23 10:45	09/28/23 09:50
30626309007	**2309395-07**	Water	09/21/23 12:00	09/28/23 09:50

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 2309395
Pace Project No.: 30626309

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30626309001	**2309395-01**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309002	**2309395-02**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309003	**2309395-03**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309004	**2309395-04**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309005	**2309395-05**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309006	**2309395-06**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1
30626309007	**2309395-07**	EPA 903.1	MAR1	1
		EPA 904.0	ZPC	1
		Total Radium Calculation	JAL	1

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2309395
Pace Project No.: 30626309

Sample: 2309395-01 **Lab ID: 30626309001** Collected: 09/21/23 17:40 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.502 (1.04) C:NA T:87%**	pCi/L	10/10/23 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.468 ± 0.399 (0.799) C:76% T:83%**	pCi/L	10/11/23 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.468 ± 0.901 (1.84)**	pCi/L	10/12/23 11:26	7440-14-4	

Sample: 2309395-02 **Lab ID: 30626309002** Collected: 09/21/23 16:20 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.484 ± 0.506 (1.18) C:NA T:97%**	pCi/L	10/10/23 13:43	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.06 ± 0.500 (0.836) C:79% T:80%**	pCi/L	10/11/23 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.06 ± 1.01 (2.02)**	pCi/L	10/12/23 11:26	7440-14-4	

Sample: 2309395-03 **Lab ID: 30626309003** Collected: 09/21/23 14:40 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0661 ± 0.430 (0.933) C:NA T:91%**	pCi/L	10/10/23 13:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.07 ± 0.493 (0.805) C:81% T:75%**	pCi/L	10/11/23 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.07 ± 0.923 (1.74)**	pCi/L	10/12/23 11:26	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2309395
Pace Project No.: 30626309

Sample: 2309395-04 **Lab ID: 30626309004** Collected: 09/21/23 13:15 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:
Comments: • Added 5.0mL HNO3 to all of sample 004.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.487 ± 0.627 (1.04) C:NA T:90%**	pCi/L	10/10/23 13:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.942 ± 0.508 (0.912) C:77% T:77%**	pCi/L	10/11/23 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.43 ± 1.14 (1.95)**	pCi/L	10/12/23 11:26	7440-14-4	

Sample: 2309395-05 **Lab ID: 30626309005** Collected: 09/21/23 11:45 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.210 ± 0.687 (1.27) C:NA T:90%**	pCi/L	10/10/23 13:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.421 ± 0.356 (0.711) C:76% T:90%**	pCi/L	10/11/23 14:30	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**0.631 ± 1.04 (1.98)**	pCi/L	10/12/23 11:26	7440-14-4	

Sample: 2309395-06 **Lab ID: 30626309006** Collected: 09/21/23 10:45 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.119 ± 0.286 (0.553) C:NA T:98%**	pCi/L	10/10/23 13:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.12 ± 0.518 (0.864) C:76% T:79%**	pCi/L	10/11/23 14:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.24 ± 0.804 (1.42)**	pCi/L	10/12/23 11:26	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 2309395
Pace Project No.: 30626309

Sample: 2309395-07 **Lab ID: 30626309007** Collected: 09/21/23 12:00 Received: 09/28/23 09:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0725 ± 0.586 (1.15) C:NA T:86%**	pCi/L	10/10/23 13:55	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.52 ± 0.547 (0.784) C:78% T:81%**	pCi/L	10/11/23 14:31	15262-20-1	
	Pace Analytical Services - Greensburg					
Total Radium	Total Radium Calculation	**1.59 ± 1.13 (1.93)**	pCi/L	10/12/23 11:26	7440-14-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 2309395
Pace Project No.: 30626309

QC Batch: 619305 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30626309001, 30626309002, 30626309003, 30626309004, 30626309005, 30626309006, 30626309007

METHOD BLANK: 3017162 Matrix: Water
Associated Lab Samples: 30626309001, 30626309002, 30626309003, 30626309004, 30626309005, 30626309006, 30626309007

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.245 ± 0.289 (0.454) C:NA T:90%	pCi/L	10/10/23 13:30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 2309395
Pace Project No.: 30626309

QC Batch: 619307 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30626309001, 30626309002, 30626309003, 30626309004, 30626309005, 30626309006, 30626309007

METHOD BLANK: 3017169 Matrix: Water
Associated Lab Samples: 30626309001, 30626309002, 30626309003, 30626309004, 30626309005, 30626309006, 30626309007

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.389 ± 0.374 (0.752) C:77% T:80%	pCi/L	10/11/23 14:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 2309395
Pace Project No.: 30626309

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WO# : 30626309

30626309

MICRO-METHODS LABORATORY, INC.

Sending Laboratory:

Micro-Methods Laboratory, Inc.
6500 Sunplex Drive
Ocean Springs, MS 39564
Phone: 228.875.6420
Fax: 228.875.6423

Project Manager: Teresa Meins

Subcontracted Laboratory:

Pace Analytical-7
1638 Roseytown Rd. Suites 2, 3, 4
Greensburg, PA 15601
Phone: (724) 850-5600
Fax: -

Received by Pace Greensburg
Therm ID — Corr Factor +/- —
Receipt Temp —
Corrected Temp —
Correct Preservation Y / N

Work Order: 2309395

Analysis	Due	Expires	Comments
Sample ID: 2309395-01 ***Water Sampled: 09/21/2023 17:40*** ***Sample Name: MW-2***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 17:40	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			001
Sample ID: 2309395-02 ***Water Sampled: 09/21/2023 16:20*** ***Sample Name: MW-3***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 16:20	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			002
Sample ID: 2309395-03 ***Water Sampled: 09/21/2023 14:40*** ***Sample Name: MW-4***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 14:40	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			003
Sample ID: 2309395-04 ***Water Sampled: 09/21/2023 13:15*** ***Sample Name: MW-5***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 13:15	
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			004
Sample ID: 2309395-05 ***Water Sampled: 09/21/2023 11:45*** ***Sample Name: MW-6***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 11:45	005

Released By	Date	Received By	Date
Sarah Jarnek	9/25/23 1630	UPS	9/25/23 1630
UPS		[signature]	9/28/23 9:50

MICRO-METHODS LABORATORY, INC.

SUBCONTRACT ORDER (Continued)

Work Order: 2309395 (Continued)

Analysis	Due	Expires	Comments
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			
Sample ID: 2309395-06 ***Water Sampled: 09/21/2023 10:45 Sample Name: MW-10***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 10:45	006
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			
Sample ID: 2309395-07 ***Water Sampled: 09/21/2023 12:00 Sample Name: BD-1***			
Radium,Total 226 & 228 by EPA 903.1 & 9C	10/02/2023	10/19/2023 12:00	007
Containers Supplied: 1000mL Plastic w/HNO3 (C) 1000mL Plastic w/HNO3 (D)			

WO#: 30626309
PM: JPH Due Date: 10/19/23
CLIENT: MICROMETHOD

Released By	Date	Received By	Date
Sarah Jarmer	9/25/23 1630	UPS	9/25/23 1630
UPS		Rup Rana	9/28/23 9:50

DC#_Title: ENV-FRM-GBUR-0088 v06_Sample Condition Upon Receipt-Pittsburgh

Effective Date: 09/20/2023

WO# : 30626309

PM: JPH **Due Date: 10/19/23**

CLIENT: MICROMETHOD

Client Name: Micro - MRthods

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other

Tracking Number: turn

Initial / Date

Examined By: TH 9/29/23

Labeled By: TH 9/29/23

Temped By: ——

Custody Seal on Cooler/Box Present: ☑ Yes ☐ No **Seals Intact:** ☑ Yes ☐ No

Thermometer Used: —— **Type of Ice:** Wet Blue (None)

Cooler Temperature: Observed Temp —— °C Correction Factor: —— °C Final Temp: —— °C

Temp should be above freezing to 6°C

Comments:	Yes	No	NA	pH paper Lot# 10008931	D.P.D. Residual Chlorine Lot #
Chain of Custody Present	J			1.	
Chain of Custody Filled Out:	J			2.	
-Were client corrections present on COC		J			
Chain of Custody Relinquished	J			3.	
Sampler Name & Signature on COC:		J		4.	
Sample Labels match COC:	J			5.	
-Includes date/time/ID Matrix:	WT				
Samples Arrived within Hold Time:	J			6.	
Short Hold Time Analysis (<72hr remaining):		J		7.	
Rush Turn Around Time Requested:		J		8.	
Sufficient Volume:	J			9.	
Correct Containers Used:	J			10.	
-Pace Containers Used		J			
Containers Intact:	J			11.	
Orthophosphate field filtered:			J	12.	
Hex Cr Aqueous samples field filtered:			J	13.	
Organic Samples checked for dechlorination			J	14:	
Filtered volume received for dissolved tests:			J	15:	
All containers checked for preservation: exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, non-aqueous matrix	J			16. Added 5.0 mL of HNO3 to 40mL of sample 004.	
All containers meet method preservation requirements:		J		Initial when completed TH	Date/Time of Preservation 9/29/23 13:15
				Lot# of added Preservative HNO3 43080063	
8260C/D: Headspace in VOA Vials (> 6mm)			J	17.	
624.1: Headspace in VOA Vials (0mm)			J	18.	
Trip Blank Present:			J	Trip blank custody seal present? YES or NO	
Rad Samples Screened <.05 mrem/hr.	/			Initial when completed PS	Date: 9/28/23 Survey Meter SN: 1563

Comments:

Note: For NC compliance samples with discrepancies, a copy of this form must be sent to the DEHNR Certification office.
PM Review is documented electronically in LIMS through the SRF Review schedule in the Workorder Edit Screen.

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-2

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 16:48	Sampling date/time	9-21-23 17:40
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	13.47	Gallons per well volume	
Top of casing to bottom	22.42	Total gallons evacuated	1.60 gal
Water level after evacuation			

Sample Data

		NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
	17:05	31.97	23.7	780	0.45	4.22	-261.5	clear
0.5	17:10	30.01	23.9	729	0.39	4.31	-274.8	"
0.75	17:15	24.93	23.7	688	0.37	4.41	-293.1	"
1.0	17:20	14.04	23.7	687	0.34	4.39	-291.6	"
1.25	17:25	8.20	23.7	682	0.33	4.35	-297.5	"
1.50	17:30	7.02	23.6	678	0.32	4.33	-320.2	

General Information

Weather Condition: Partly cloudy

Sample Characteristics:

Containers/Amounts: (2) 1L Radiological (1) 1L for wetlab (1) 500mL for Metals (1) 250mL for Alkalinity

Recommend/Observations: fine particles in purge water

Sampler/Collector: [signature]

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.16 SS	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-3

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 15:12	Sampling date/time	9-21-23 16:20
Method of evacuation	Peristaltic pump	Method of sampling	low flow
Top of casing to water	6.89	Gallons per well volume	
Top of casing to bottom	17.71	Total gallons evacuated	2.65 gal
Water level after evacuation	7.07		

Sample Data

	NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
0.5	15:33 80.68	28.6	2428	0.45	5.14	51.7	Tan, light tan bubbles
0.75	15:38 42.56	28.7	2424	0.38	5.07	37.5	
1.0	15:43 34.56	28.7	2421	0.35	5.10	14.0	
1.25	15:48 27.41	28.9	2425	0.34	5.13	-24.07	
1.5	15:54 24.63	28.5	2422	0.33	5.19	-145.9	
1.75	15:59 17.62	28.4	2417	0.32	5.24	-220.19	
2.0	16:04 8.26	28.3	2417	0.31	5.26	-239.4	
2.25	16:09 10.38	28.3	2414	0.31	5.28	-271.6	
2.5	16:14 10.58	28.4	2414	0.30	5.31	-288.4	

General Information

Weather Condition: Sunny, clear 90s

Sample Characteristics: Brown nodules in sample

Containers/Amounts: (2) 1L for Radiological (1) 1L for wetlab (1) 500mL for Metals (1) 250mL for Alkalinity

Recommend/Observations: Purged Brown nodules

Sampler/Collector: Alan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]				
1/2"=0.0205	1"=0.041	2"=0.16 SS	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-4

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 13:54	Sampling date/time	9-21-23 14:40
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	10.84	Gallons per well volume	
Top of casing to bottom	22.71	Total gallons evacuated	1.75 gal
Water level after evacuation	11.62		

Sample Data

	NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
0.5 14:08	3.19	26.5	2425	0.45	4.79	153.4	light tan
0.75 14:14	1.56	26.3	2421	0.34	4.73	159.0	clear bubbles
1.0 14:20	1.90	26.5	2414	0.31	4.72	160.0	" "
1.25 14:26	1.66	26.4	2413	0.31	4.73	160.1	" "
1.5 14:32	1.82	25.9	2413	0.31	4.78	159.7	

General Information

Weather Condition: Partly Cloudy

Sample Characteristics:

Containers/Amounts: (4) 1L for Radiological (2) 1L for Wetlab (2) 500mL for Metal (2) 250mL for Alkalinity
* Blind duplicate (BD-1 9-21-23 12:00)

Recommend/Observations: Brown nodules in purge water

Sampler/Collector: Allan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.163 S	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-5

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 12:16	Sampling date/time	9-21-23 13:15
Method of evacuation	Peristaltic pump	Method of sampling	Low flow
Top of casing to water	8.30	Gallons per well volume	
Top of casing to bottom	20.02	Total gallons evacuated	2.25 gal
Water level after evacuation	8.32		

Sample Data

	NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
0.5	12:45 8.95	28.2	3524	0.58	6.57	169.0	clear
0.75	12:51 ~~33.8~~ 3.44	26.5	3206	0.41	6.46	175.7	bubbles
1.0	12:57 1.89	26.6	2974	0.34	6.44	117.9	
1.25	13:06 1.94	28.2	2974	0.32	6.45	104.3	
1.5	13:12 1.42	27.6	3010	0.30	6.45	85.8	
1.75	13:18 0.92	27.6	3028	0.29	6.44	81.0	
2.0	13:24 0.85	27.4	3037	0.30	6.44	77.2	

General Information

Weather Condition: Sunny few clouds 90s

Sample Characteristics:

Containers/Amounts: (2) 1L for Radiological (1) 1L for Wetlab (1) 500mL for Metals (1) 250mL for Alkalinity

Recommend/Observations: tan particles in purge water

Sampler/Collector: [signature]

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]				
1/2"=0.0205	1"=0.041	2"=0.16 SS	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site: COEN Well Number: MW-6

Collector/Operator: A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 11:00	Sampling date/time	9-21-23 11:45
Method of evacuation	Peristaltic	Method of sampling	Low flow
Top of casing to water	5.76	Gallons per well volume	
Top of casing to bottom	17.76	Total gallons evacuated	1.75 gal
Water level after evacuation	6.10		

Sample Data

	NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
11:16	2.05	26.2	369.2	3.12	5.10	173.3	clear
0.5 11:21	1.60	26.6	378.7	1.75	4.82	176.4	"
0.75 11:27	1.89	26.7	382.8	1.21	4.66	177.0	"
1.0 11:33	2.32	26.9	387.1	1.11	4.62	176.1	"
1.25 11:39	5.50	27.4	389.1	1.07	4.60	174.6	"
1.5 11:45	8.18	27.8	390.1	1.06	4.59	173.5	

General Information

Weather Condition: Sunny 80s

Sample Characteristics: clear

Containers/Amounts: (2) Radiological (1) 1L for Wet Lab (1) 500mL for Metals (1) 250mL for Alkalinity

Recommend/Observations:

Sampler/Collector: Allan Niven

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	2"=0.163	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

ENVIRONMENTAL MANAGEMENT SERVICES, INC.

Groundwater Sampling Field Log

Site COEN Well Number MW-10

Collector/Operator A. Niven

Monitoring Well Information

Evacuation date/time	9-21-23 9:55	Sampling date/time	9-21-23 10:45
Method of evacuation	Peristaltic pump	Method of sampling	Low Flow
Top of casing to water	13.37	Gallons per well volume	
Top of casing to bottom	22.45	Total gallons evacuated	1.75 gal
Water level after evacuation	13.38		

Sample Data

	NTU's	Temp [°C]	Conductivity [µs/cm]	DO [mg/l]	pH	ORP	Appearance
0.25	3.57	22.2	1414	0.69	3.90	201.9	clear
0.5	3.39	21.9	1373	0.50	3.84	203.4	"
0.75	4.16	21.8	1332	0.42	3.83	204.8	"
1.0	5.48	21.5	1303	0.36	3.82	204.7	"
1.25	8.61	21.5	1271	0.34	3.81	200.7	"
1.5	11.68	21.5	1253	0.33	3.80	189.6	"

General Information

Weather Condition: Sunny 80s

Sample Characteristics:

Containers/Amounts (2)1L for Radiological (1)1L for Metlab (1)500mL Metals (1)125mL for Alkalinity

Recommend/Observations

Sampler/Collector

Stabilization recommendations: Three successive readings within +/- 0.1 for pH, +/- 3% for conductivity, +/- 10 mV for ORP, and +/- 10% for turbidity and DO. *these are rough estimates*

Well Casing Volumes[gal/ft]

1/2"=0.0205	1"=0.041	~~2"=0.16~~ PVC	3"=0.37	4"=0.65
3/4"=0.03075	1 1/2"=0.10	2 1/2"=0.24	3 1/2"=0.50	4 1/2"=1.46

Print Form

MICRO-METHODS LABORATORY, INC.
PO Box 1410, Ocean Springs, MS 39566-1410
(228) 875-6420 FAX (228) 875-6423
www.micromethodslab.com

Chain of Custody Record

Lab ID# MS00021
LELAP ID # 01960
TNI ID # TNI01397

M-M Lab WO #

Company Name:	EMS
Address:	7350 US Hwy 98
City:	Hattiesburg State: MS Zip: 39402
Phone:	601 544 3674
Fax:	601 544 0504
Project Manager:	Ken Ruckstuhl
Purchase Order #:	
Email Address :	kruckstuhl@env-mgt.com
Sampler Name Printed:	Alan Niven
Sampler Name Signed:	

Turn Around Time & Reporting

Our normal turn around time is 10 working days

×Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
__Email

QC Level: Level 1 ☐ Level 2 ☐ Level 3 ☐

Project Name: **Cooperative Energy CCR Semiannual**

Project #: SOU2-23-001

List Analyses Requested

Sample Identification	Sampling Date/Time	Matrix Code	# of Containers	Grab (G) or Composite (C)	Metals (see below)	Chloride/sulfate	Total dissolved solids	Alkalinity, Total	Alkalinity, Bicarbonate	Alkalinity Carbonate	Fluoride	Radium 226/228
			Preservative:									
MW-2	9-21-23 17:40	W		G	X	X	X	X	X	X	X	X
MW-3	9-21-23 16:20	W		G	X	X	X	X	X	X	X	X
MW-4	9-21-23 14:40	W		G	X	X	X	X	X	X	X	X
MW-5	9-21-23 13:15	W		G	X	X	X	X	X	X	X	X
MW-6	9-21-23 11:45	W		G	X	X	X	X	X	X	X	X
MW-10	9-21-23 10:45	W		G	X	X	X	X	X	X	X	X
BD-1	9-21-23 12:00	W		G	X	X	X	X	X	X	X	X

Field Testing

ID# Field Test	ID# Field Test	ID# Field Test	ID# Field Test

Matrix:
W = Water
DW = Drinking Water
S = Solid
SO = Soil
SE = Sediment
L = Liquid
A = Air
O = Oil
SL = Sludge

Preservation:
1= H2SO4
2= H3PO4
3=NaOH
4=ZnC4H10O6
5=ZnC4H10O6 & NaOH
6=HNO3
7=Na2S2O3
8=HCl
9=NaHSO4

Received on Ice? Y N Thermometer#_____ Cooler #_____ **Receipt Temp Corrected(°C)**

Date & Time _____ By: _____ Sample____Blank____Cooler_____

All Temps are Corrected Values

	Printed Name	Signature	Company	Date	Time
Relinquished by					
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by					

Notes:

See Attached Work Order:

Metals - antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium, mercury, iron, magnesium, manganese, sodium, potassium

Physical Address: 6500 Sunplex Drive, Ocean Springs MS 39564

APPENDIX B

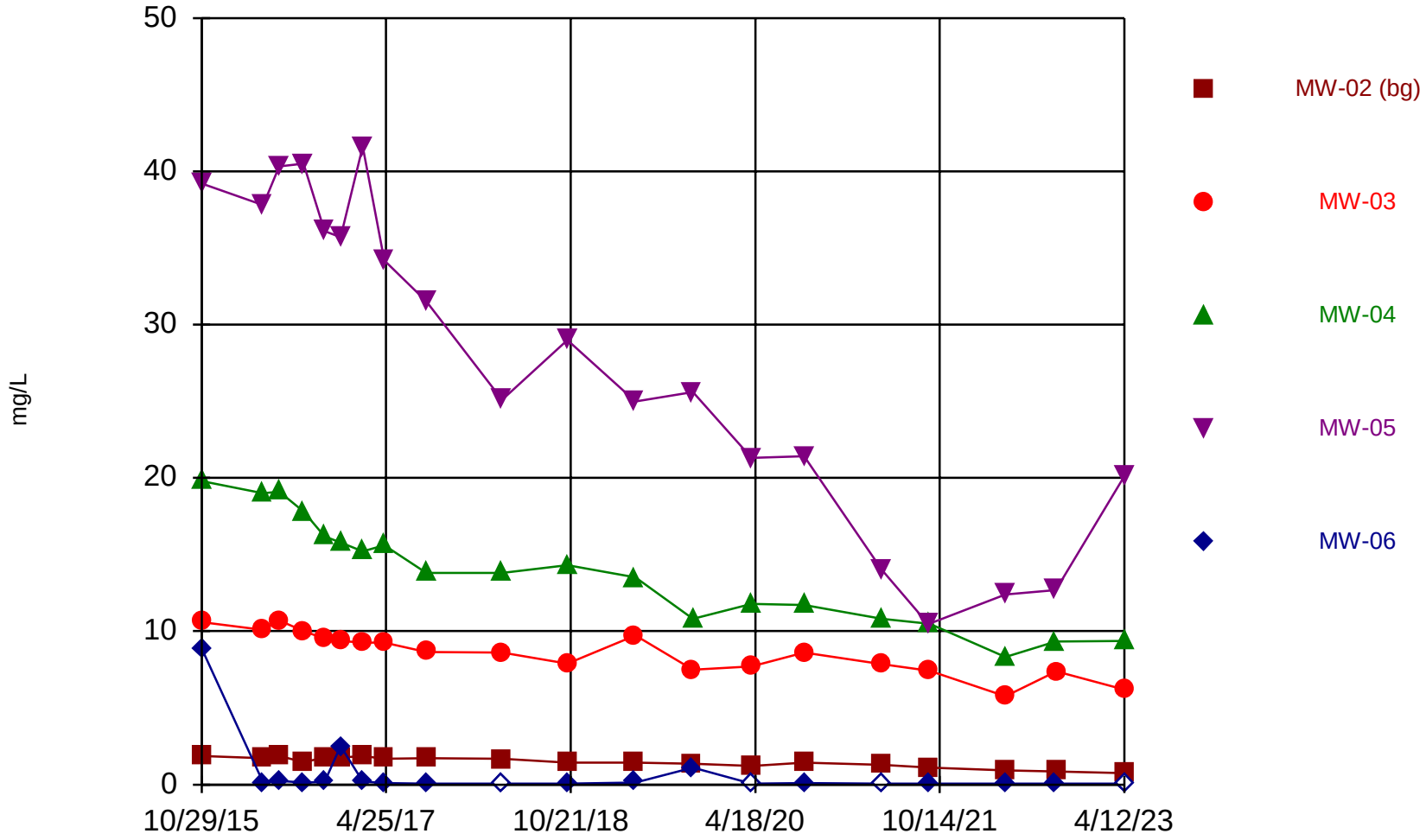
Statistical Analysis

APPENDIX B

Statistical Analysis
April 2023

Hollow symbols indicate censored values.

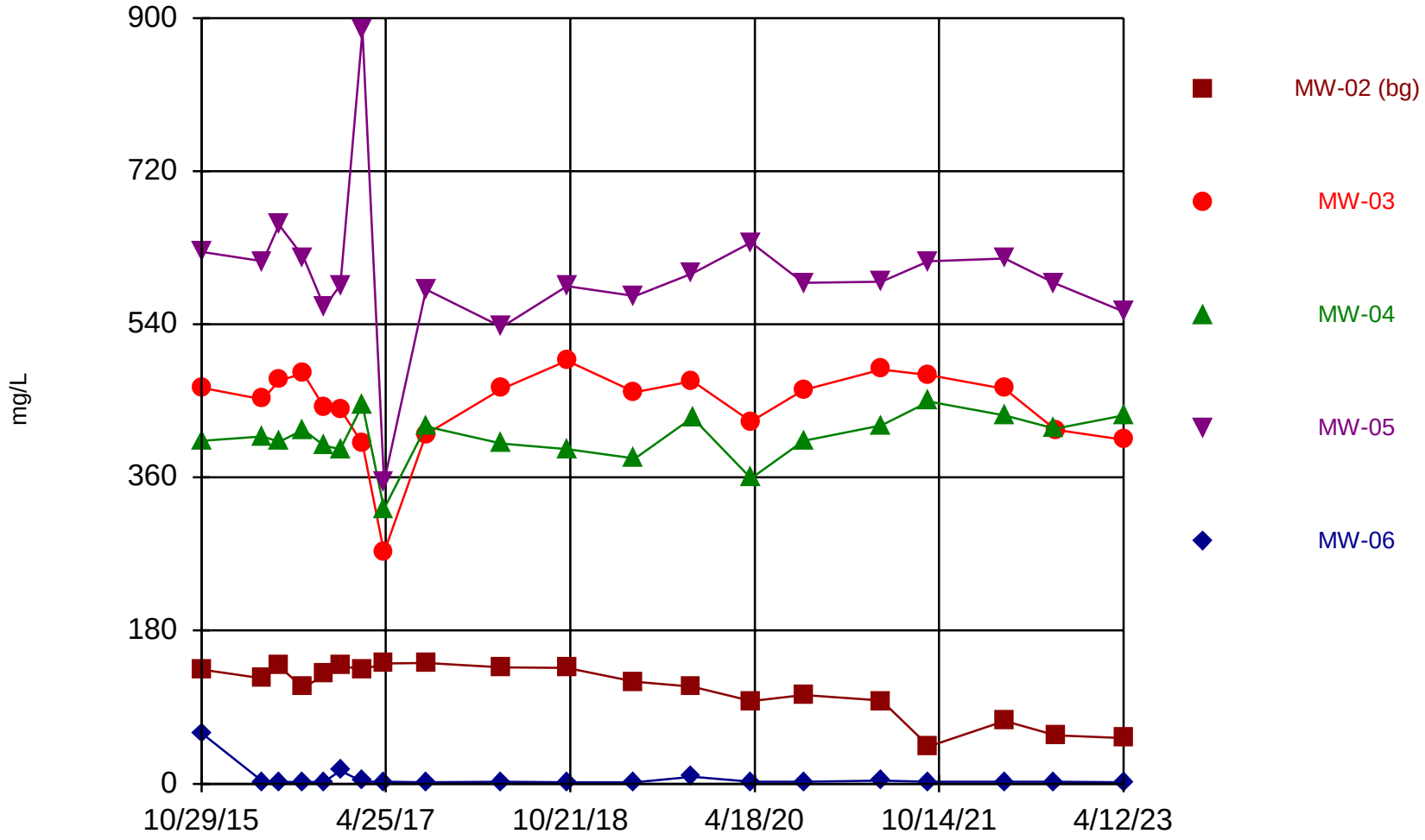
Time Series



Constituent: Boron Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

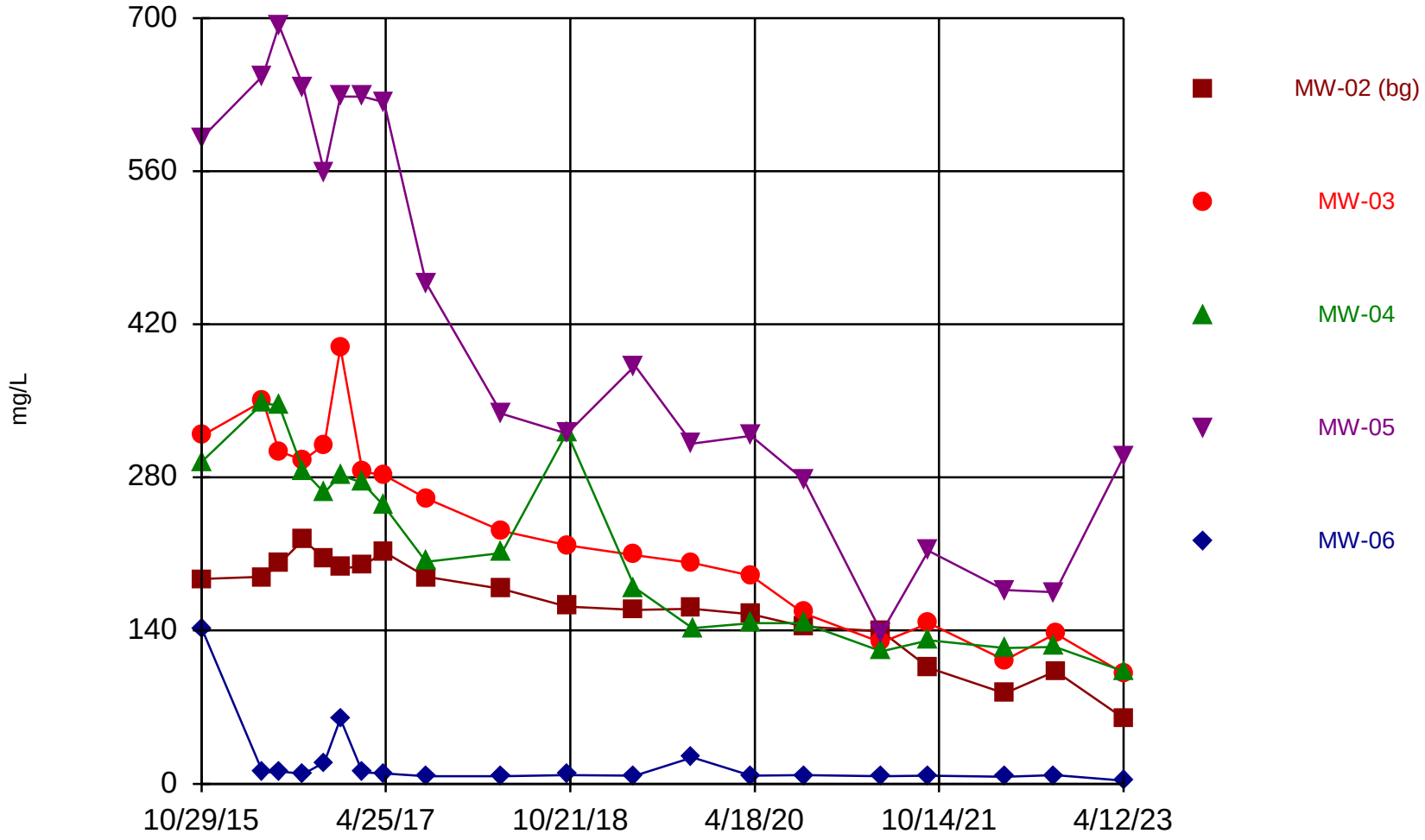
Time Series



Constituent: Calcium Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

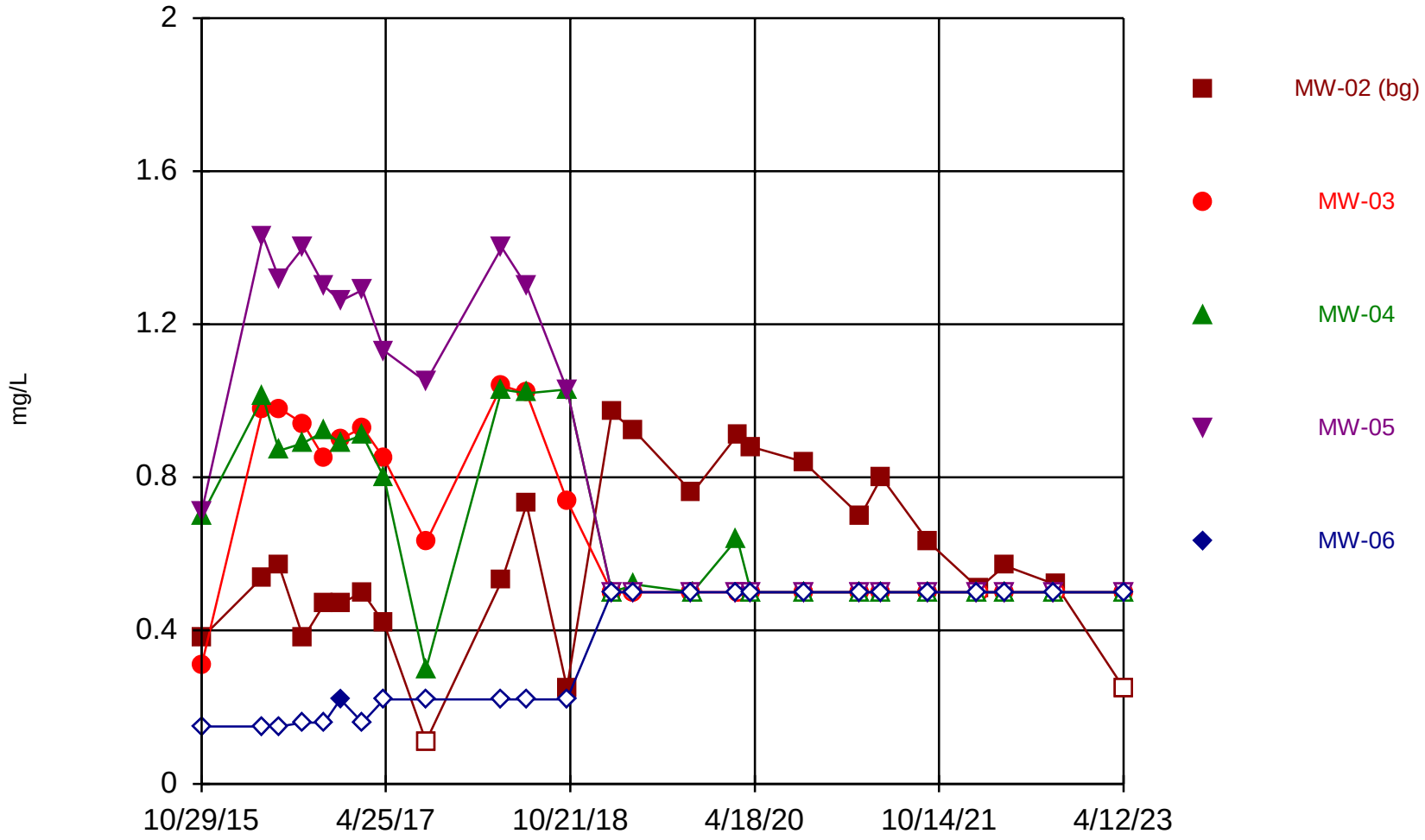


Constituent: Chloride Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

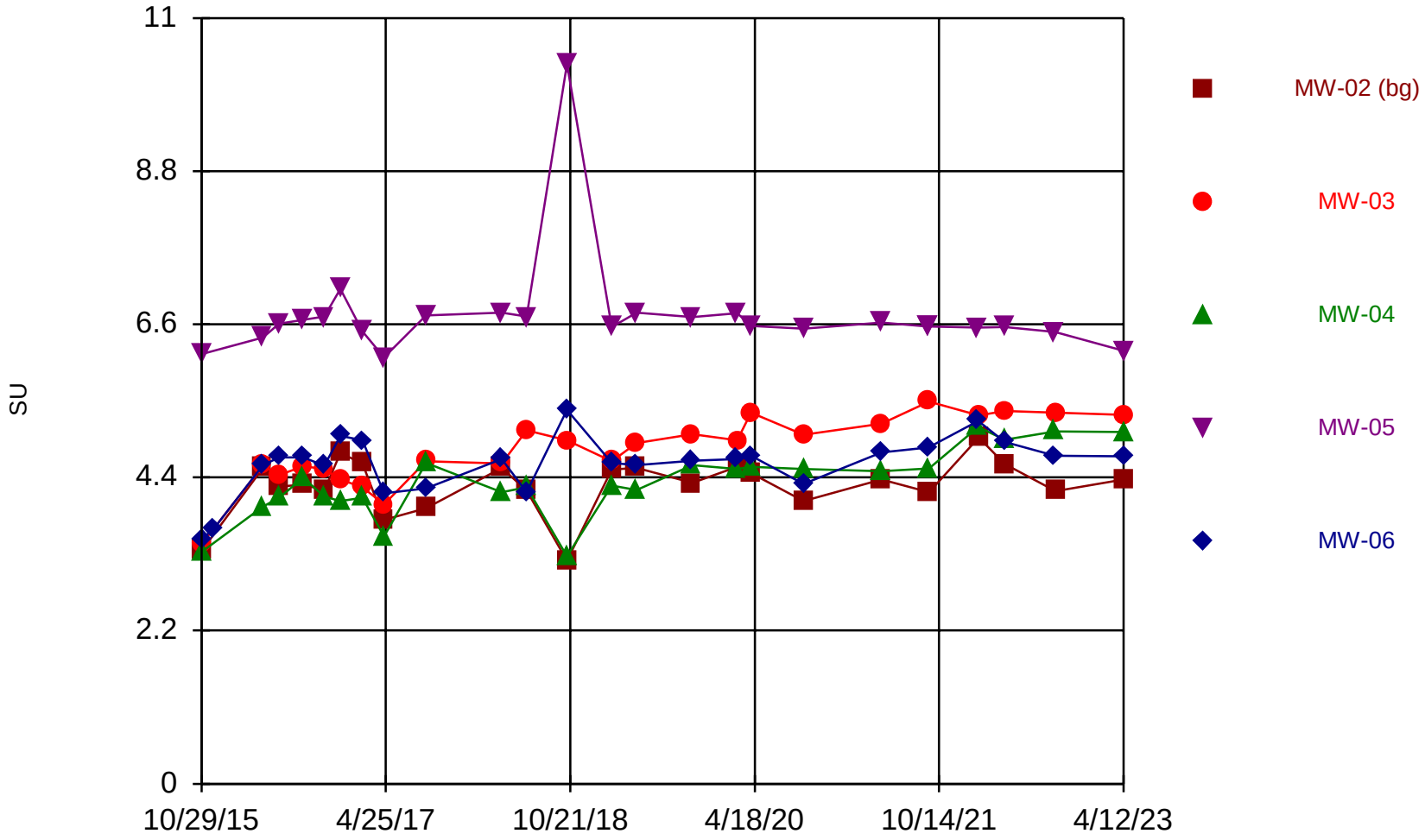
Time Series



Constituent: Fluoride Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

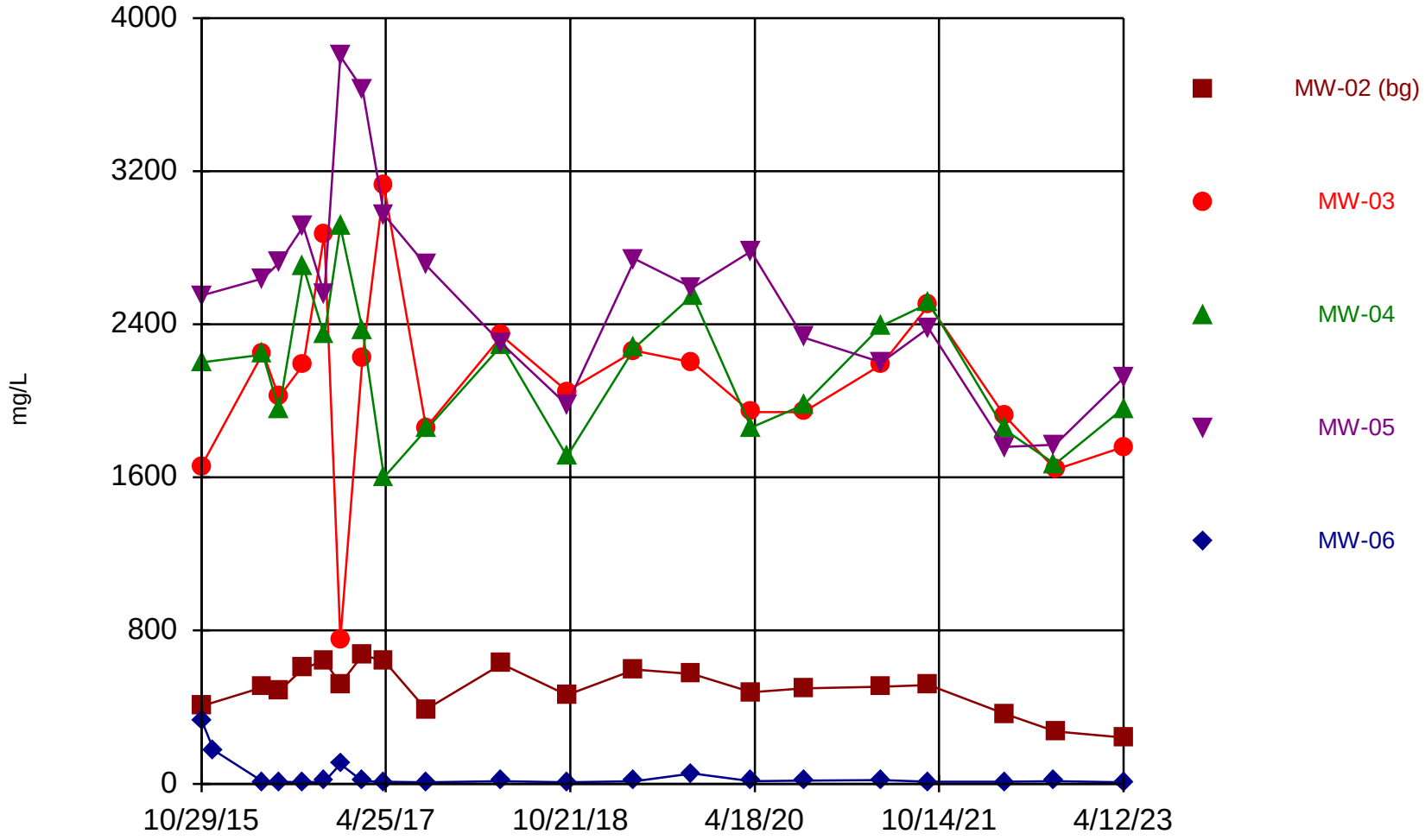
Time Series



Constituent: pH Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

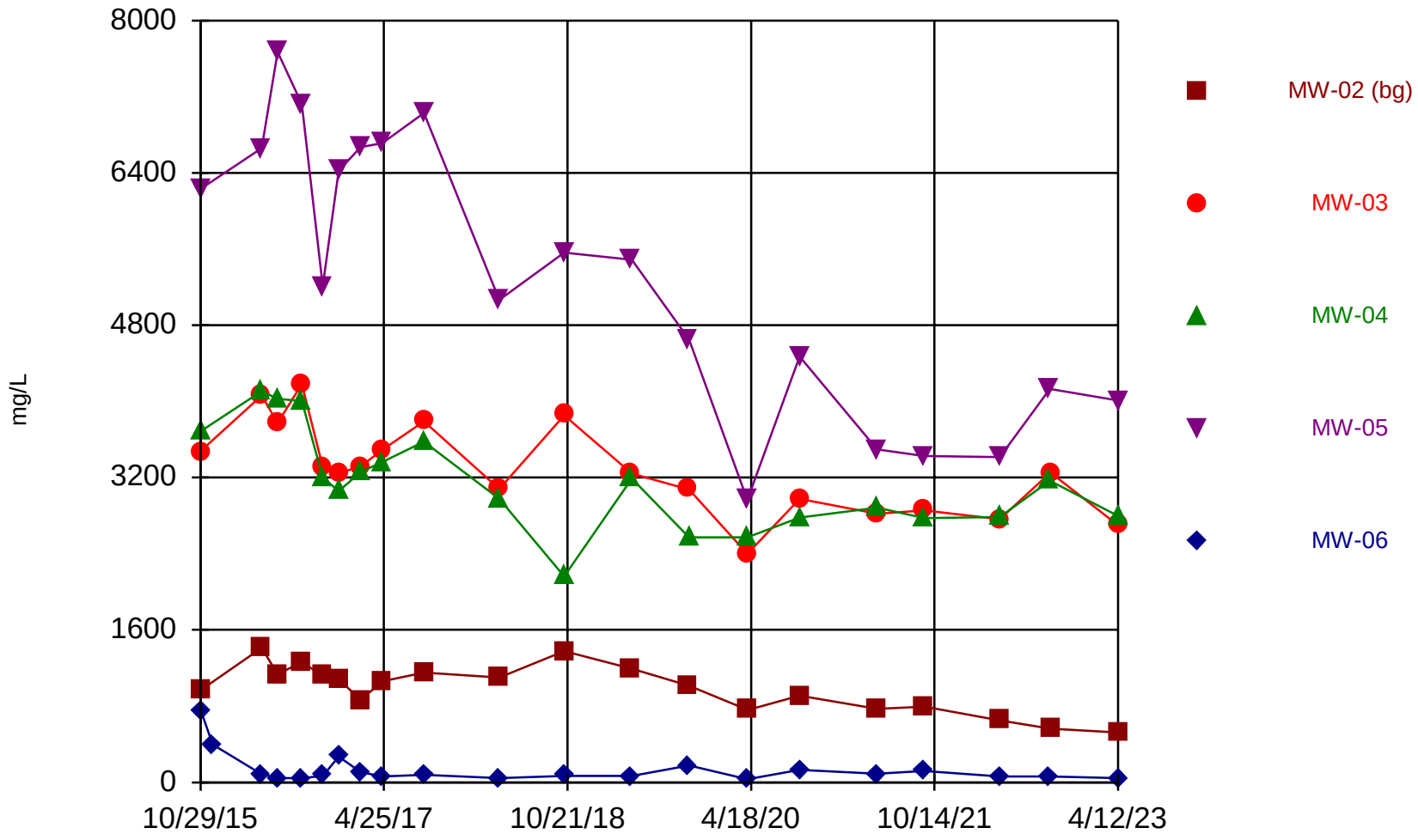
Time Series



Constituent: Sulfate Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 8/4/2023 11:19 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Prediction Limit

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 8/4/2023, 11:13 AM

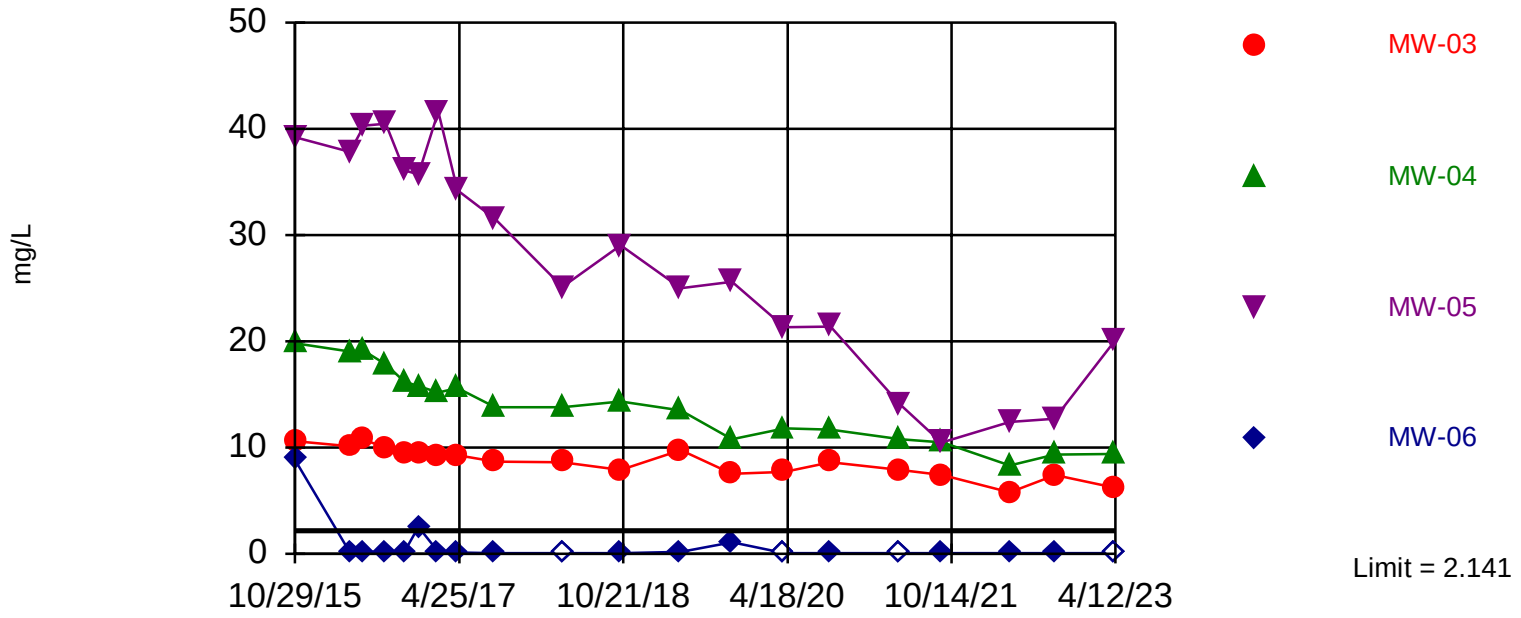
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	**MW-03**	**2.141**	**n/a**	**4/12/2023**	**6.2**	**Yes**	**20**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Boron (mg/L)	**MW-04**	**2.141**	**n/a**	**4/12/2023**	**9.37**	**Yes**	**20**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Boron (mg/L)	**MW-05**	**2.141**	**n/a**	**4/12/2023**	**20.1**	**Yes**	**20**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Boron (mg/L)	MW-06	2.141	n/a	4/12/2023	0.025ND	No	20	0	No	0.00188	Param Inter 1 of 2
Calcium (mg/L)	**MW-03**	**180.3**	**n/a**	**4/12/2023**	**404**	**Yes**	**22**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	**MW-04**	**180.3**	**n/a**	**4/12/2023**	**433**	**Yes**	**22**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	**MW-05**	**180.3**	**n/a**	**4/12/2023**	**555**	**Yes**	**22**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	MW-06	180.3	n/a	4/12/2023	1.75	No	22	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-03	252.1	n/a	4/12/2023	101	No	20	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-04	252.1	n/a	4/12/2023	103	No	20	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	**MW-05**	**252.1**	**n/a**	**4/12/2023**	**299**	**Yes**	**20**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Chloride (mg/L)	MW-06	252.1	n/a	4/12/2023	3.1	No	20	0	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-03	1.02	n/a	4/12/2023	0.25ND	No	25	8	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-04	1.02	n/a	4/12/2023	0.25ND	No	25	8	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-05	1.02	n/a	4/12/2023	0.25ND	No	25	8	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-06	1.02	n/a	4/12/2023	0.25ND	No	25	8	No	0.00188	Param Inter 1 of 2
pH (SU)	**MW-03**	**5.105**	**3.567**	**4/12/2023**	**5.3**	**Yes**	**48**	**0**	**No**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	MW-04	5.105	3.567	4/12/2023	5.05	No	48	0	No	0.000...	Param Inter 1 of 2
pH (SU)	**MW-05**	**5.105**	**3.567**	**4/12/2023**	**6.22**	**Yes**	**48**	**0**	**No**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	MW-06	5.105	3.567	4/12/2023	4.7	No	48	0	No	0.000...	Param Inter 1 of 2
Sulfate (mg/L)	**MW-03**	**795.4**	**n/a**	**4/12/2023**	**1760**	**Yes**	**44**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	**MW-04**	**795.4**	**n/a**	**4/12/2023**	**1960**	**Yes**	**44**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	**MW-05**	**795.4**	**n/a**	**4/12/2023**	**2120**	**Yes**	**44**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	MW-06	795.4	n/a	4/12/2023	8.84	No	44	0	No	0.00188	Param Inter 1 of 2
Total Dissolved Solids [TDS] (m...	**MW-03**	**1408**	**n/a**	**4/12/2023**	**2697**	**Yes**	**39**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	**MW-04**	**1408**	**n/a**	**4/12/2023**	**2800**	**Yes**	**39**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	**MW-05**	**1408**	**n/a**	**4/12/2023**	**4010**	**Yes**	**39**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	MW-06	1408	n/a	4/12/2023	44	No	39	0	No	0.00188	Param Inter 1 of 2

Hollow symbols indicate censored values.

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1.456, Std. Dev.=0.3462, n=20. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9146, critical = 0.868. Kappa = 1.978 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

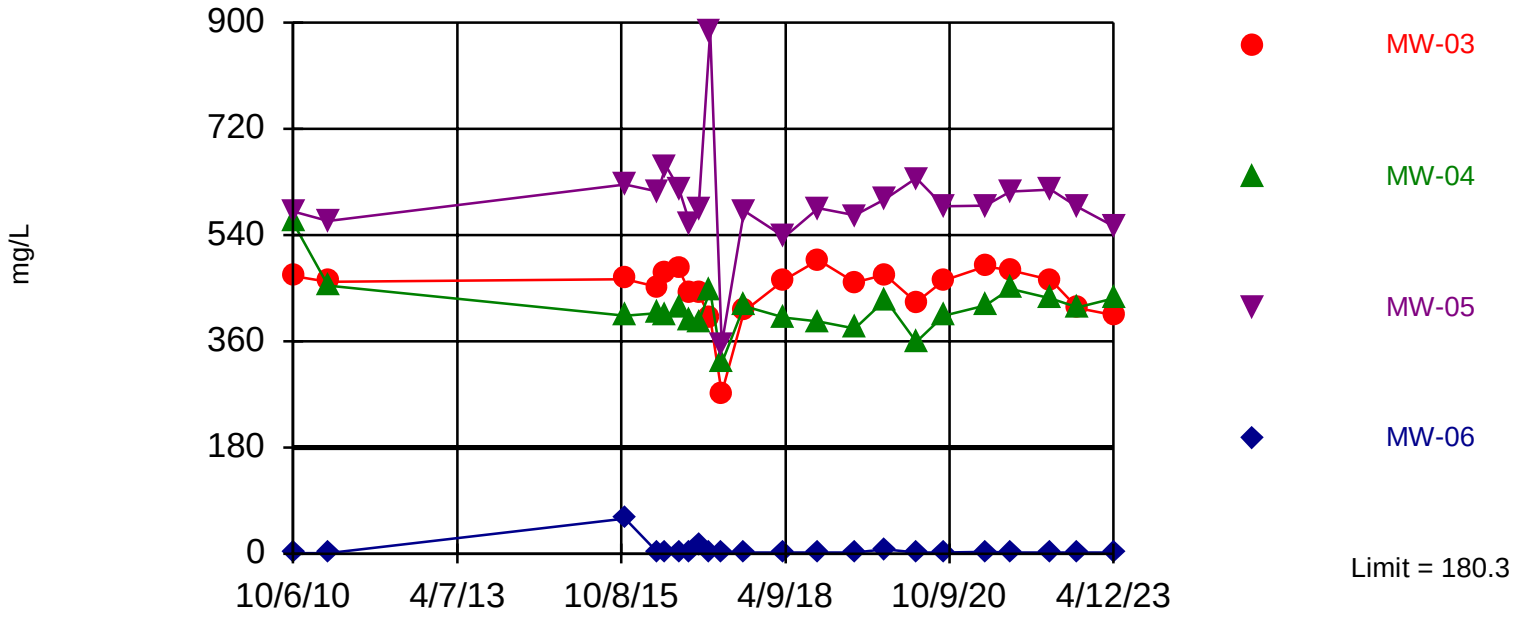
Constituent: Boron Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=114.3, Std. Dev.=33.79, n=22. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9241, critical = 0.878. Kappa = 1.952 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

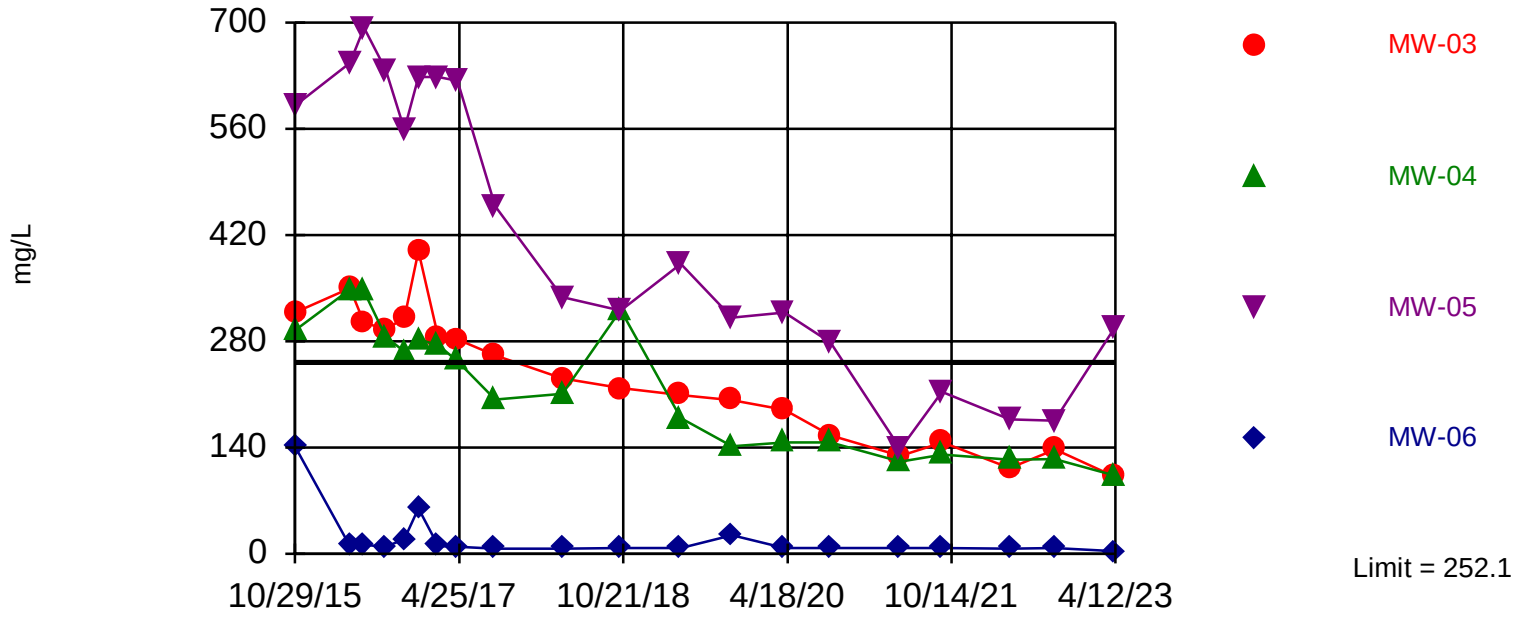
Constituent: Calcium Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limit: MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=162.6, Std. Dev.=45.24, n=20. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9202, critical = 0.868. Kappa = 1.978 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Chloride Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

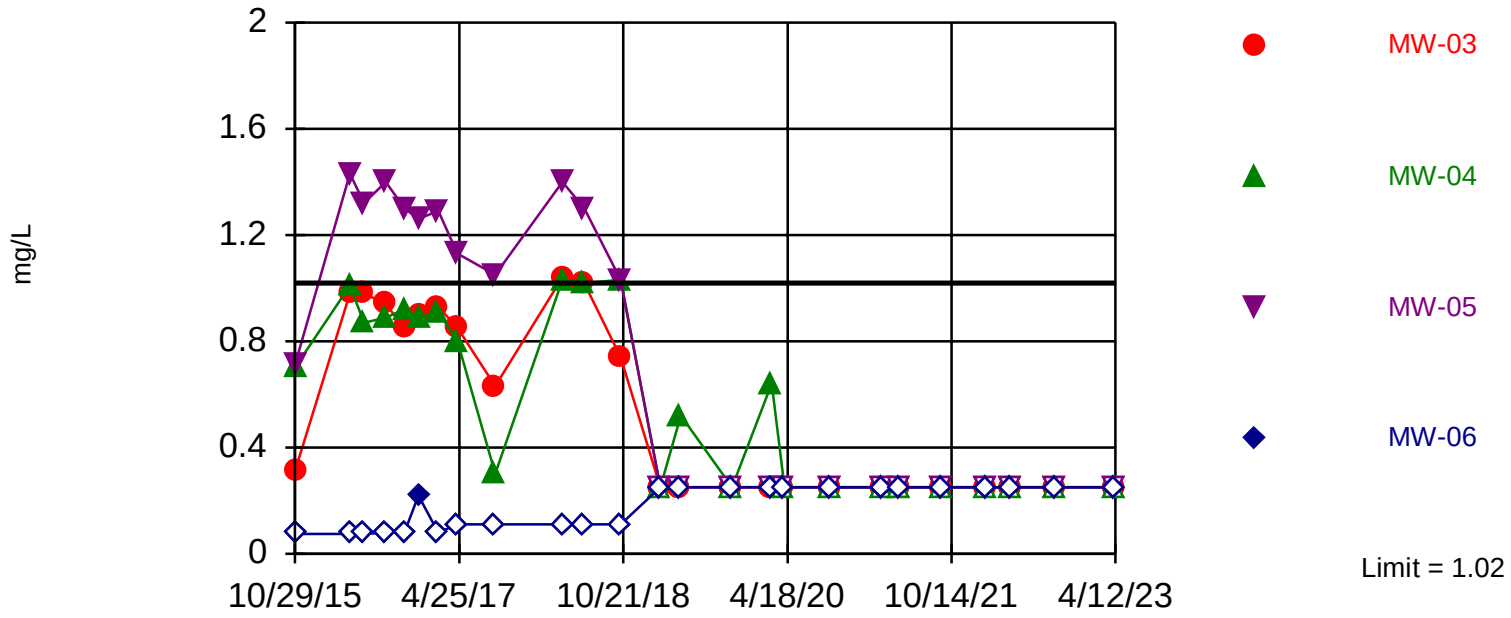
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.5844, Std. Dev.=0.2275, n=25, 8% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.969, critical = 0.888. Kappa = 1.914 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

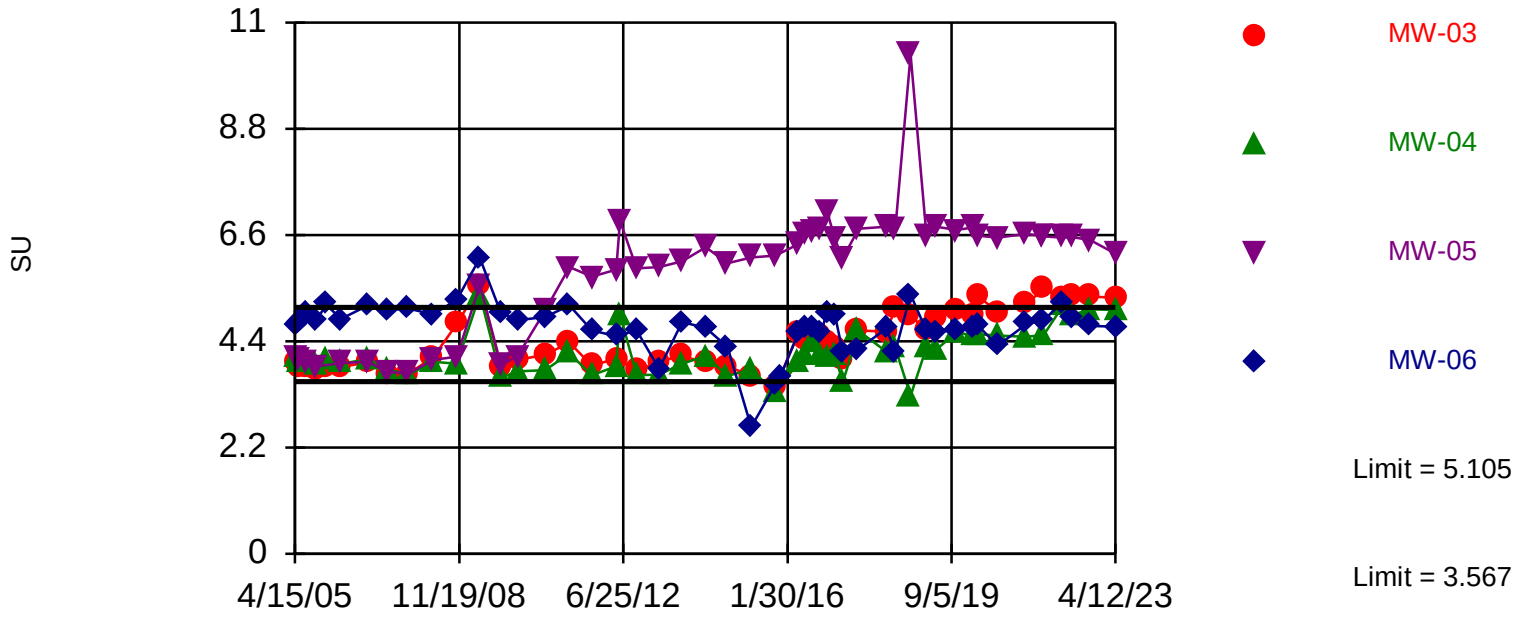
Constituent: Fluoride Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limits: MW-03, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=4.336, Std. Dev.=0.4254, n=48. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9676, critical = 0.929. Kappa = 1.808 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009398. Comparing 4 points to limit.

Constituent: pH Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

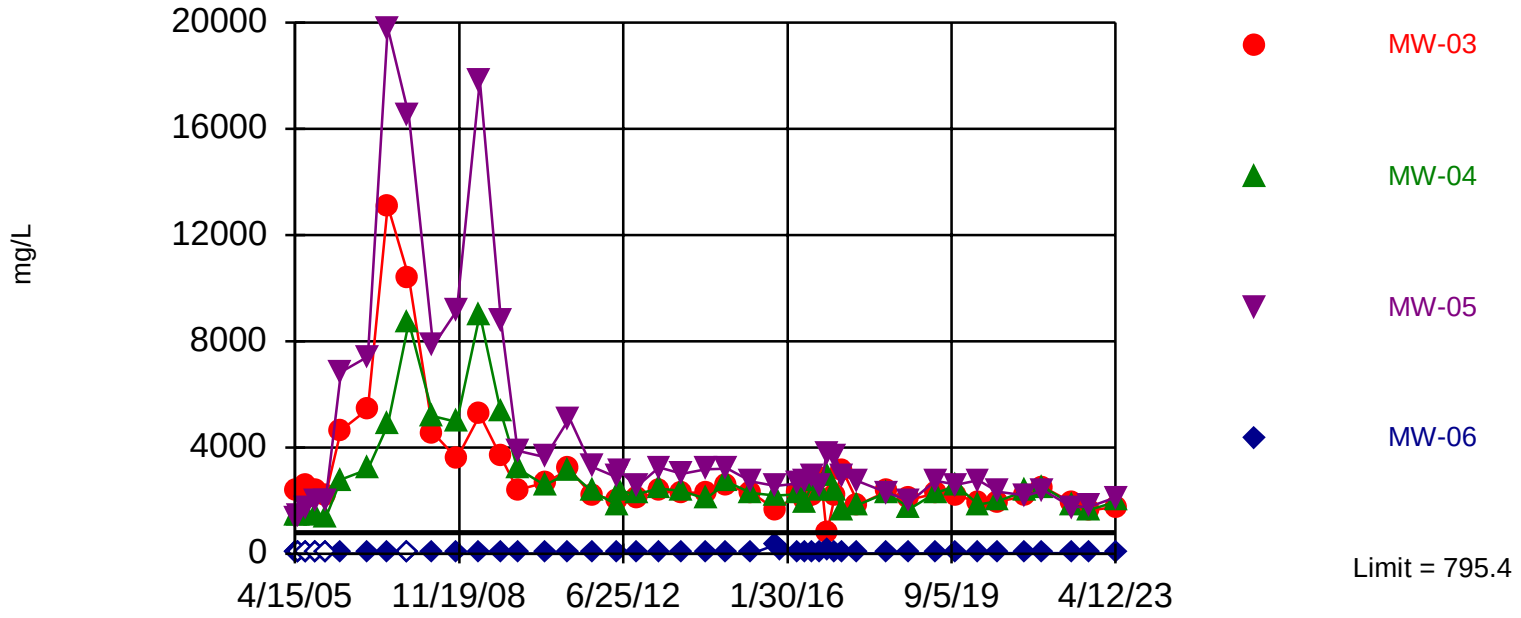
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=530.8, Std. Dev.=145.5, n=44. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9673, critical = 0.924. Kappa = 1.818 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

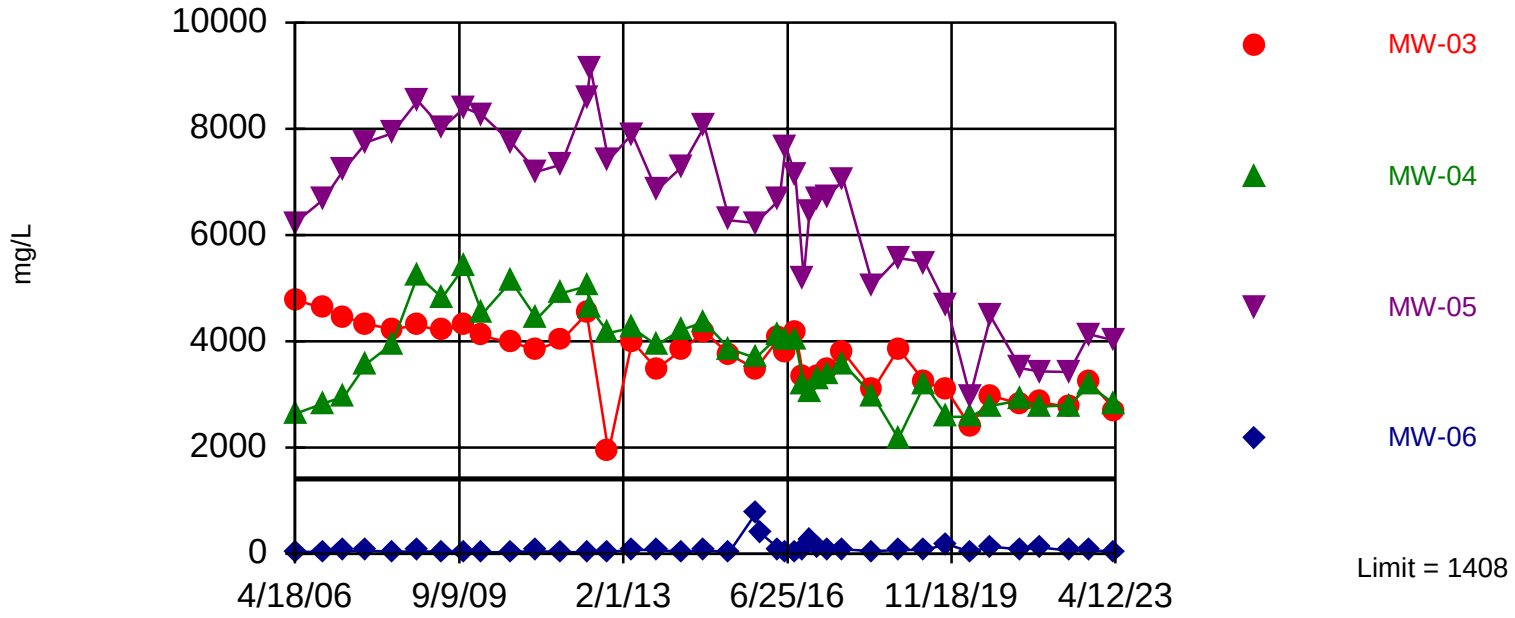
Constituent: Sulfate Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1018, Std. Dev.=213.2, n=39. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9674, critical = 0.917. Kappa = 1.831 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Total Dissolved Solids [TDS] Analysis Run 8/4/2023 11:13 AM View: Landfill AppIII

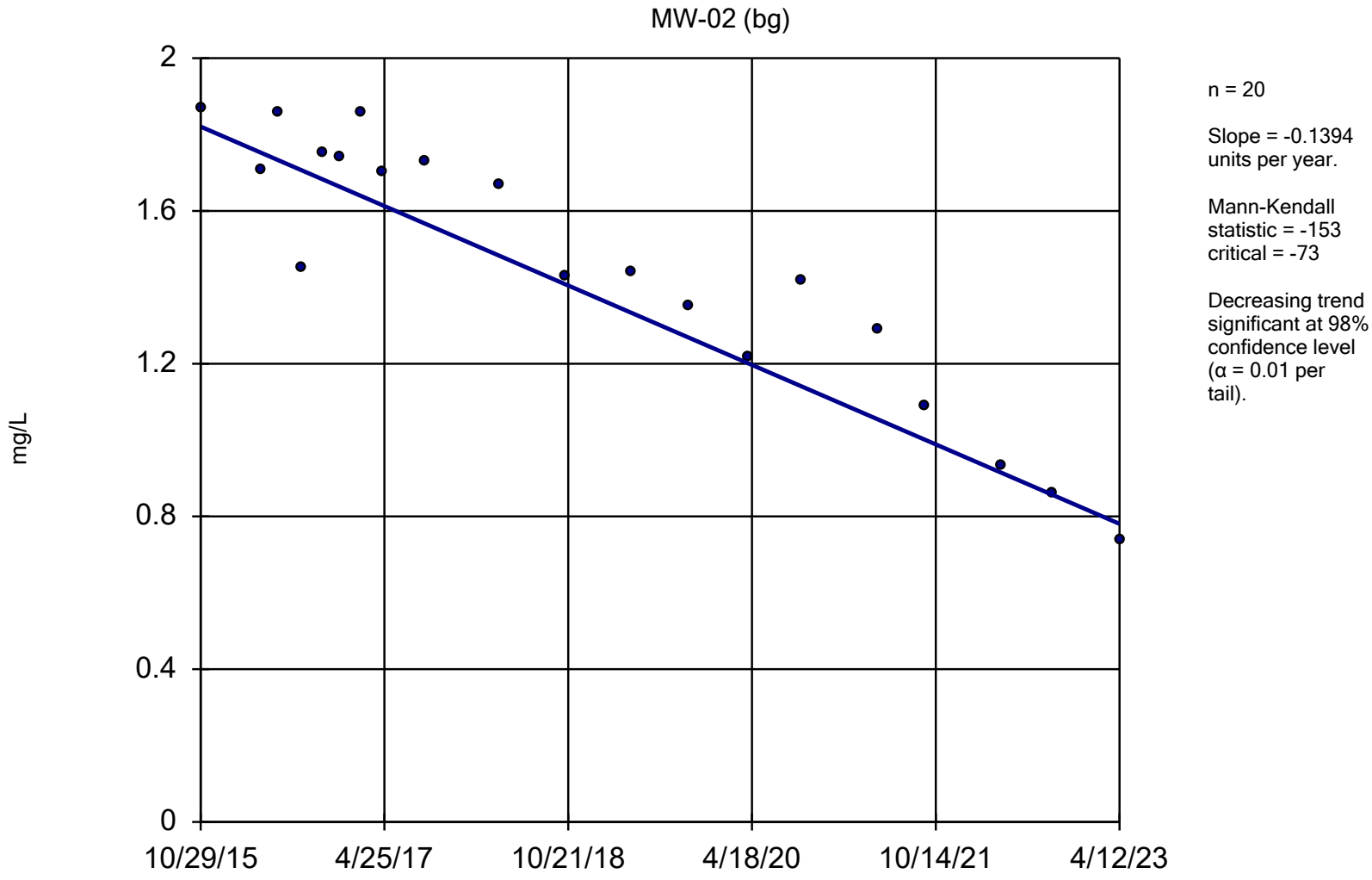
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Trend Test

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/15/2023, 8:45 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	**MW-02 (bg)**	**-0.1394**	**-153**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-03**	**-0.5783**	**-156**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-04**	**-1.393**	**-170**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-05**	**-4.295**	**-159**	**-78**	**Yes**	**21**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-06**	**-0.02615**	**-98**	**-73**	**Yes**	**20**	**20**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	**MW-02 (bg)**	**-8.667**	**-116**	**-84**	**Yes**	**22**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-03	-0.7046	-18	-84	No	22	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-04	0	0	84	No	22	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-05	0	0	84	No	22	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-06	0.005062	7	84	No	22	0	n/a	n/a	0.02	NP
Chloride (mg/L)	**MW-02 (bg)**	**-16.85**	**-143**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Chloride (mg/L)	**MW-03**	**-32.16**	**-168**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Chloride (mg/L)	**MW-04**	**-30.66**	**-151**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Chloride (mg/L)	**MW-05**	**-71.32**	**-147**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Chloride (mg/L)	**MW-06**	**-0.8211**	**-95**	**-73**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	MW-02 (bg)	-0.00...	-0.7025	-2.33	No	48	0	n/a	n/a	0.02	NP
pH (SU)	**MW-03**	**0.08516**	**5.788**	**2.33**	**Yes**	**48**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	**MW-04**	**0.04388**	**3.846**	**2.33**	**Yes**	**49**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	**MW-05**	**0.1516**	**5.863**	**2.33**	**Yes**	**49**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	MW-06	-0.01525	-1.776	-2.33	No	49	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-02 (bg)	-4.566	-0.9913	-2.33	No	44	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-03**	**-60.46**	**-4.451**	**-2.33**	**Yes**	**44**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-04	-48.81	-1.771	-2.33	No	45	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-05**	**-132.5**	**-3.18**	**-2.33**	**Yes**	**45**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-06**	**0.7652**	**5.189**	**2.33**	**Yes**	**45**	**13.33**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	MW-02 (bg)	-10.71	-89	-194	No	39	0	n/a	n/a	0.02	NP
Total Dissolved Solids [TDS] (m...	**MW-03**	**-109.2**	**-507**	**-194**	**Yes**	**39**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-04**	**-150.2**	**-367**	**-201**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-05**	**-280.6**	**-450**	**-201**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-06**	**2.612**	**261**	**201**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.02**	**NP**

Sen's Slope Estimator

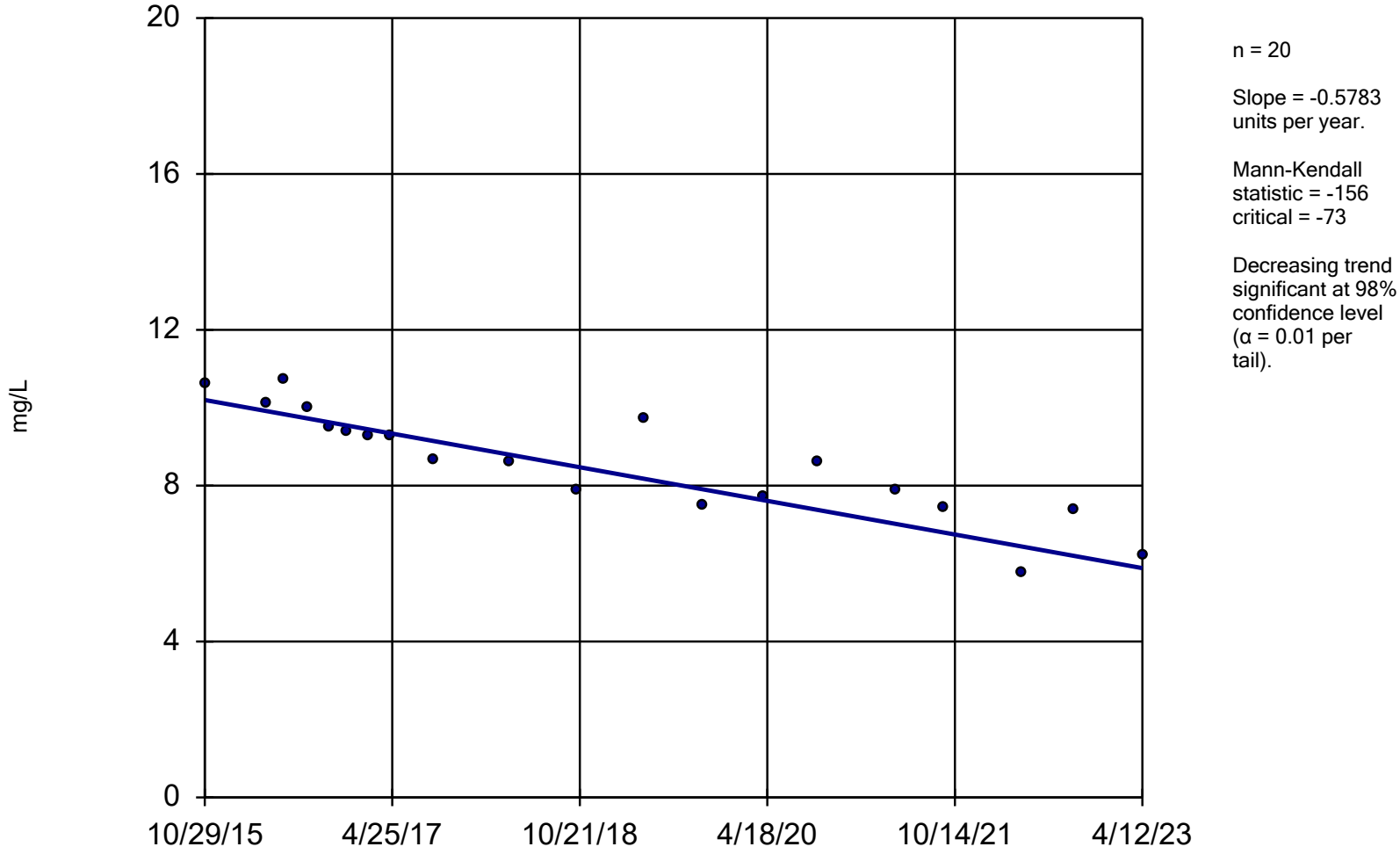


Constituent: Boron Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 20

Slope = -0.5783 units per year.

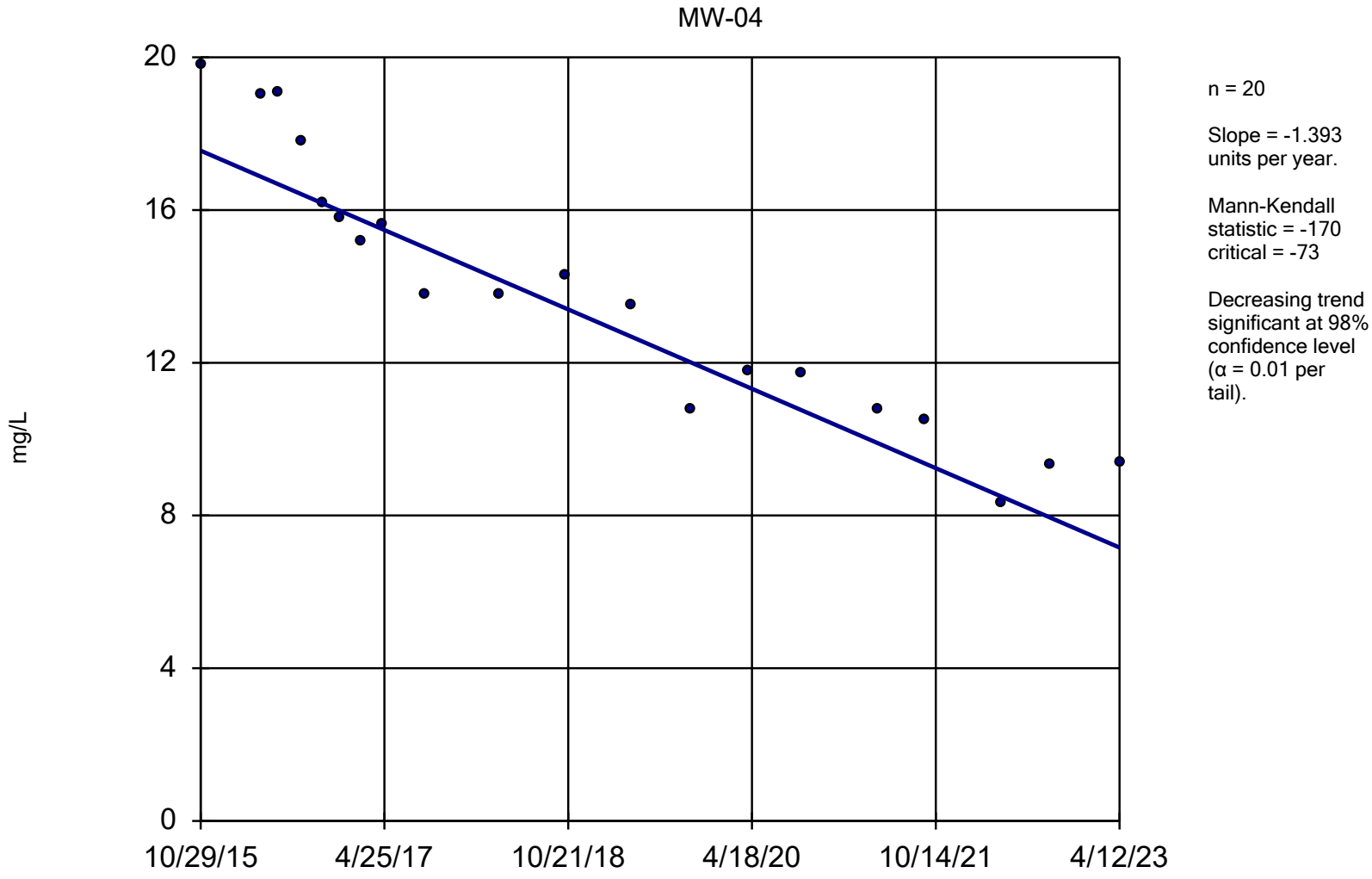
Mann-Kendall statistic = -156
critical = -73

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

Constituent: Boron Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

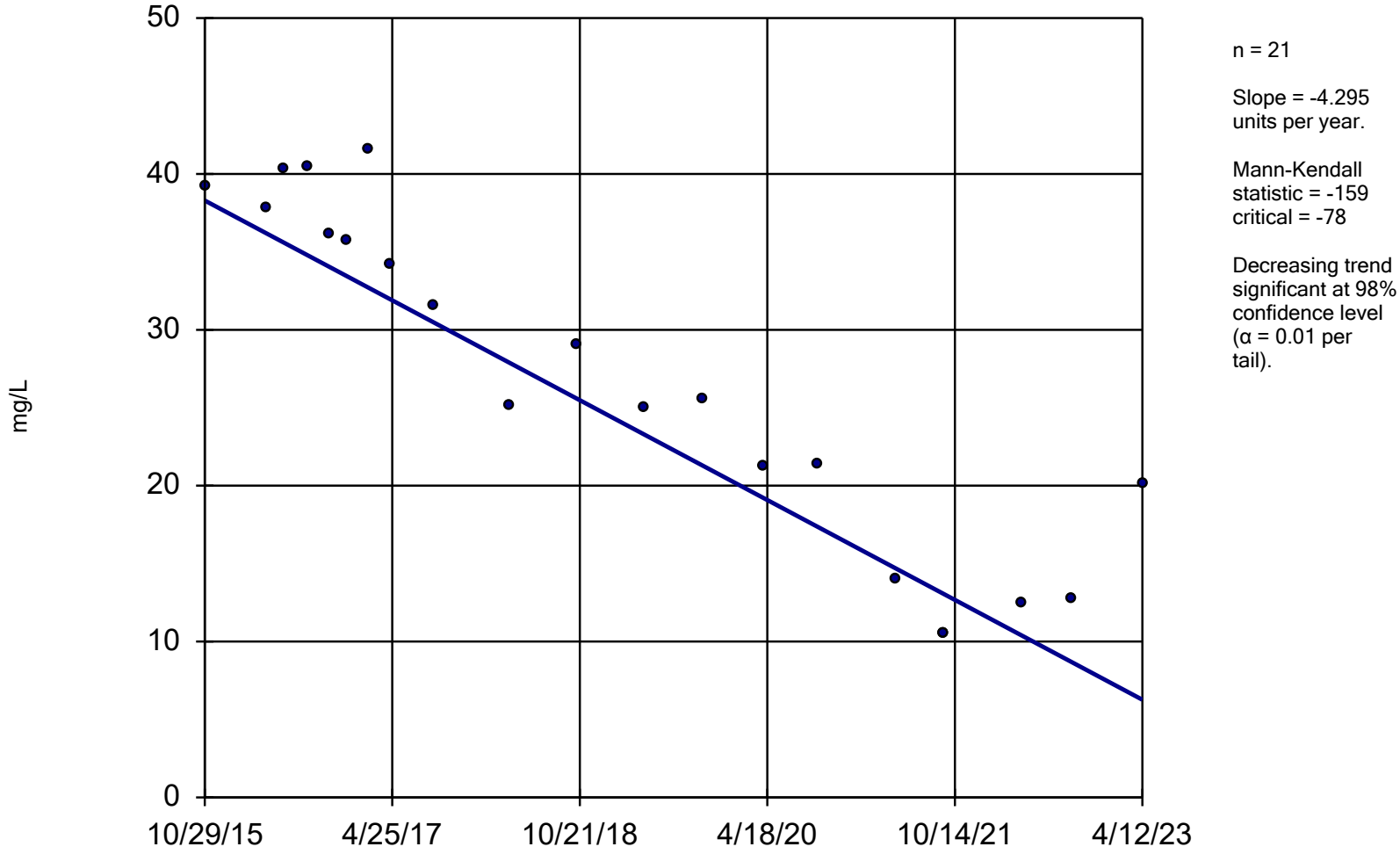


Constituent: Boron Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-05



n = 21

Slope = -4.295 units per year.

Mann-Kendall statistic = -159
critical = -78

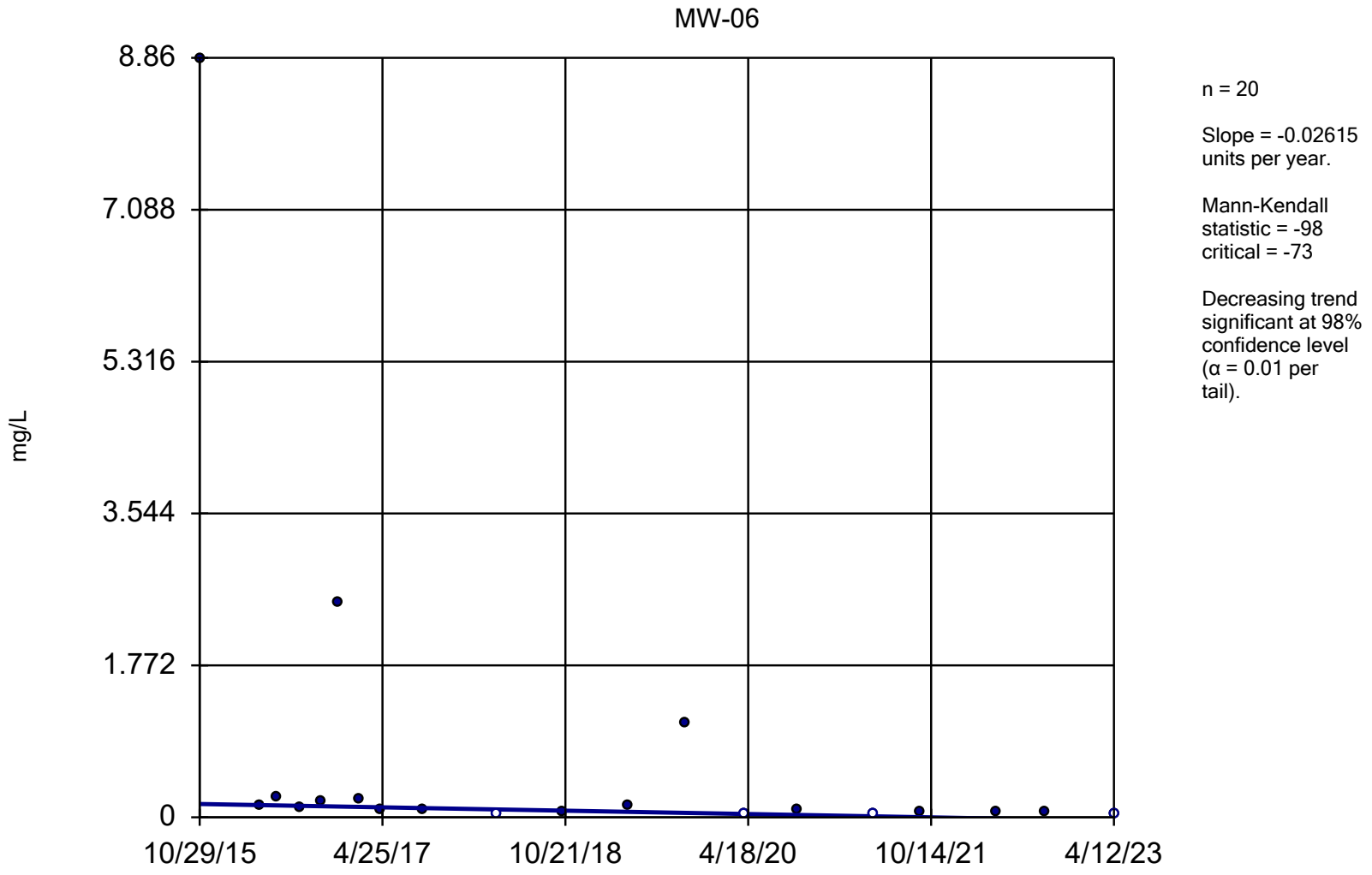
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

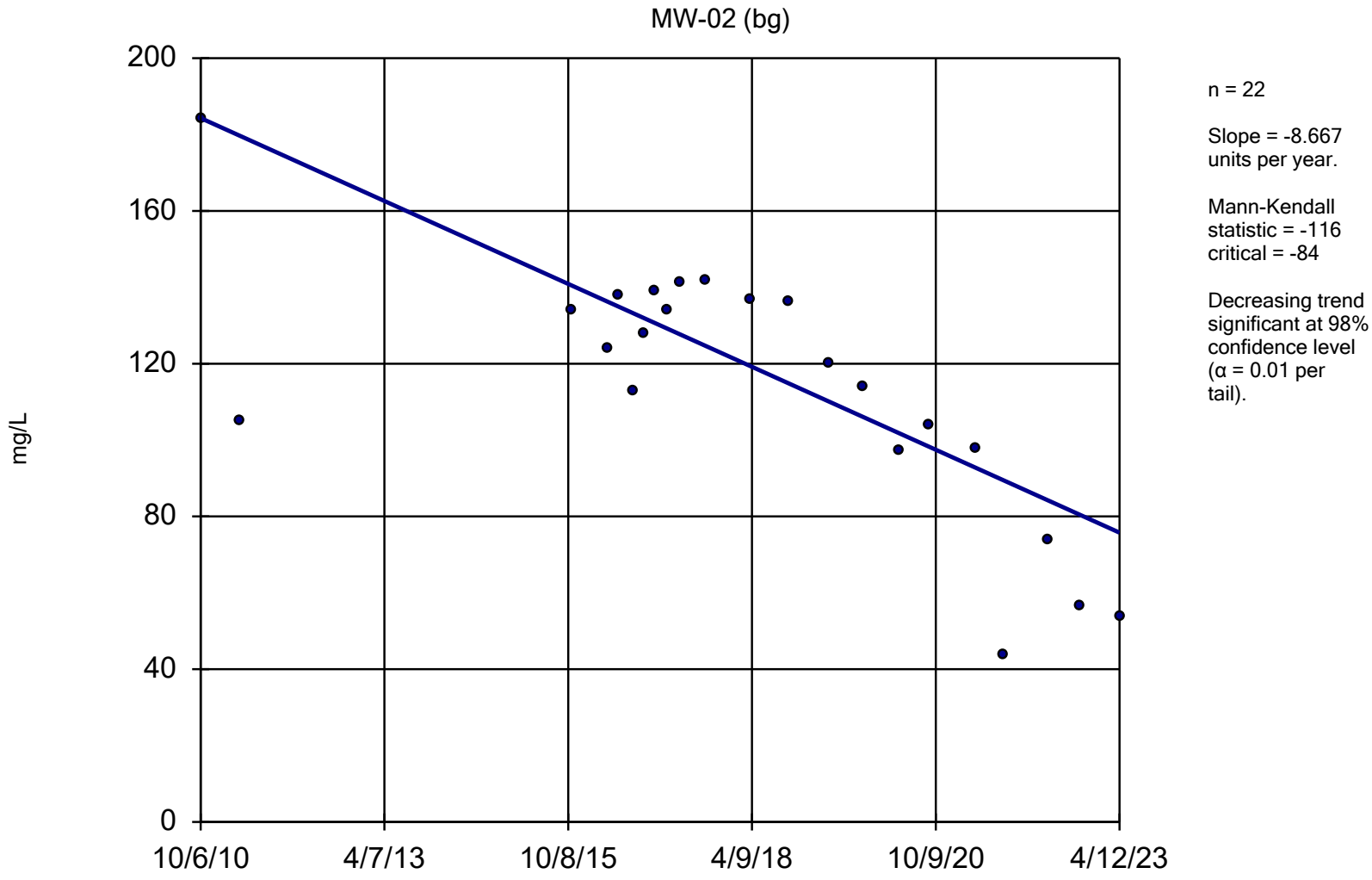
Sen's Slope Estimator



Constituent: Boron Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

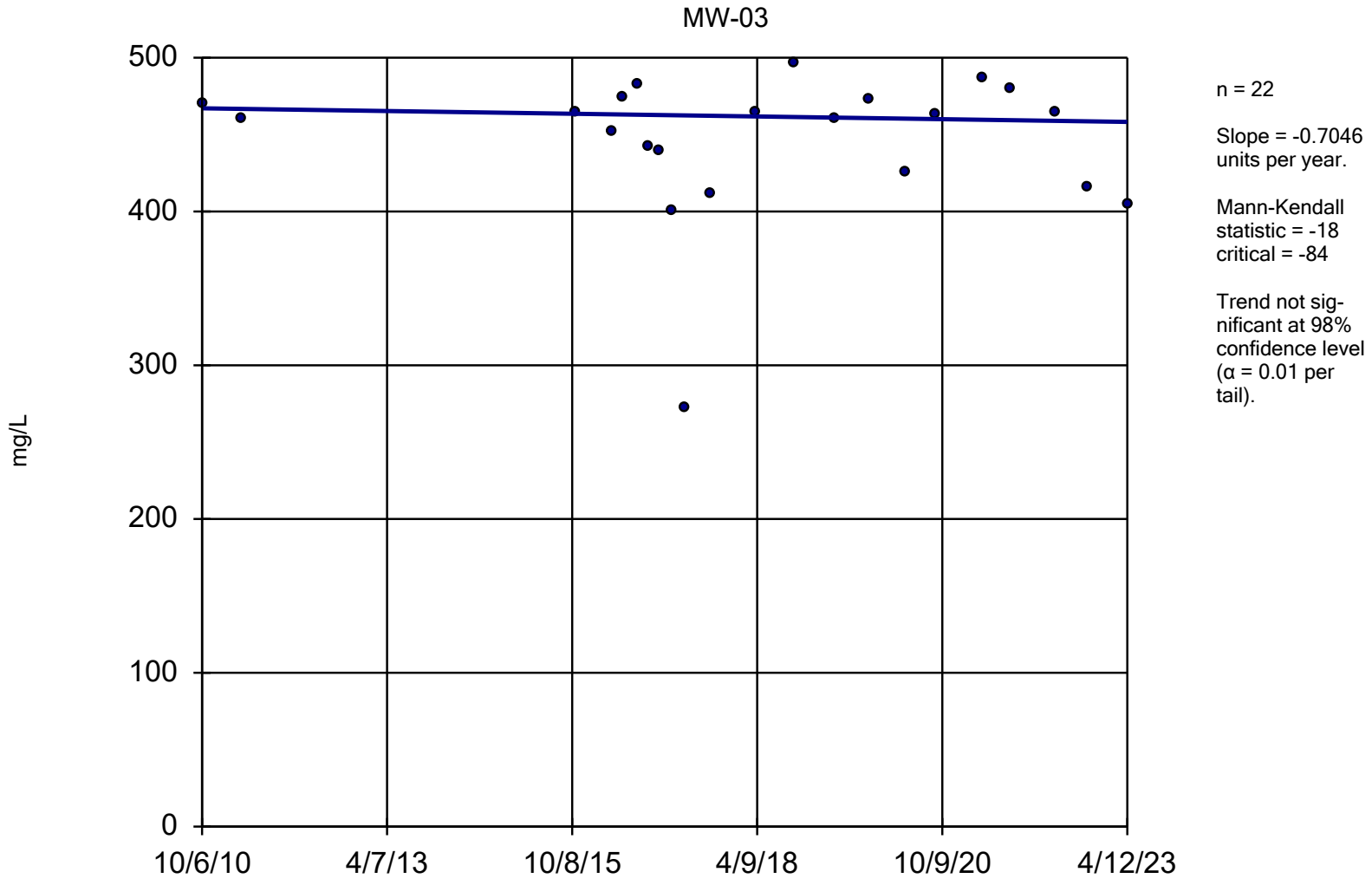
Sen's Slope Estimator



Constituent: Calcium Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

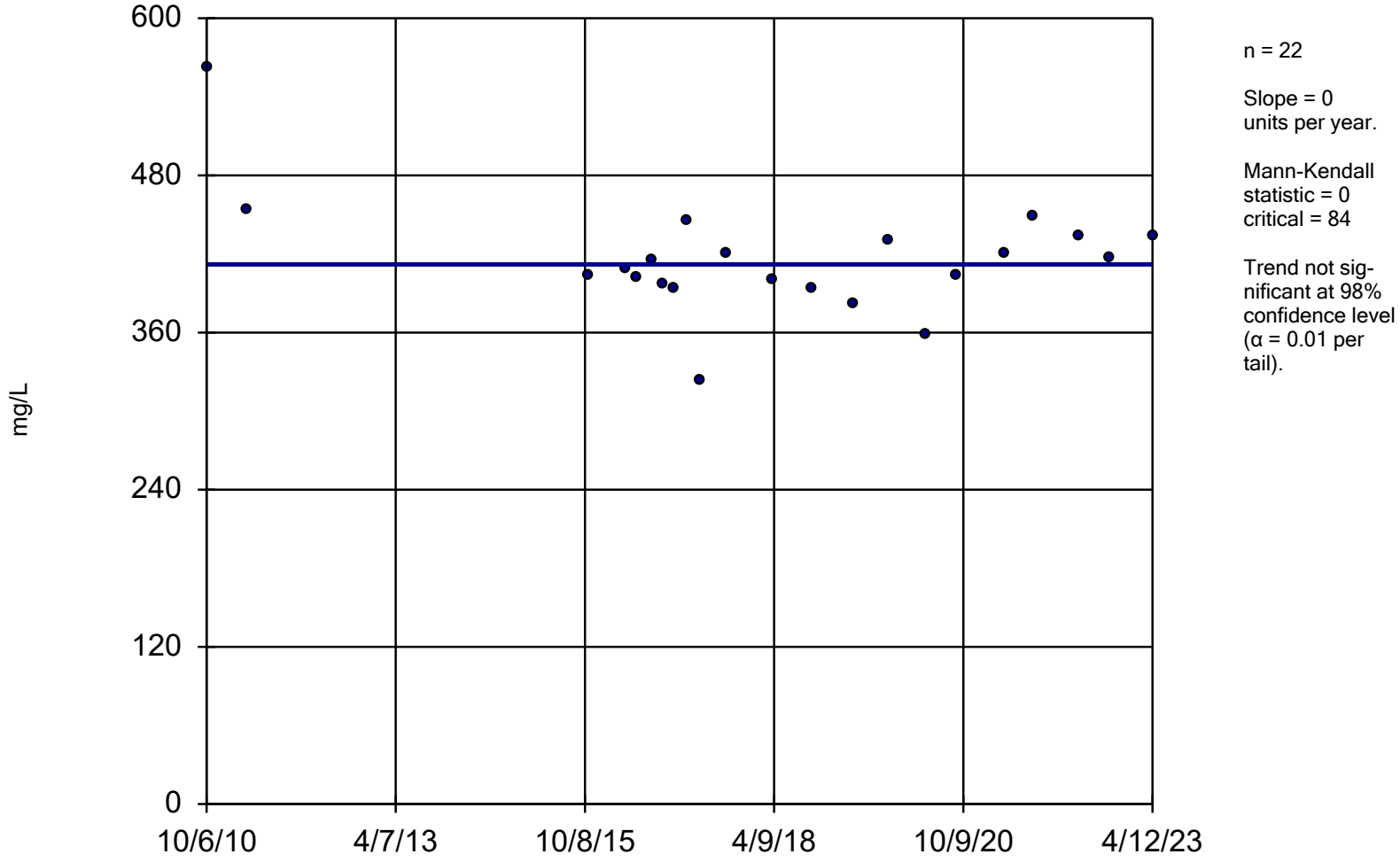


Constituent: Calcium Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 22

Slope = 0
units per year.

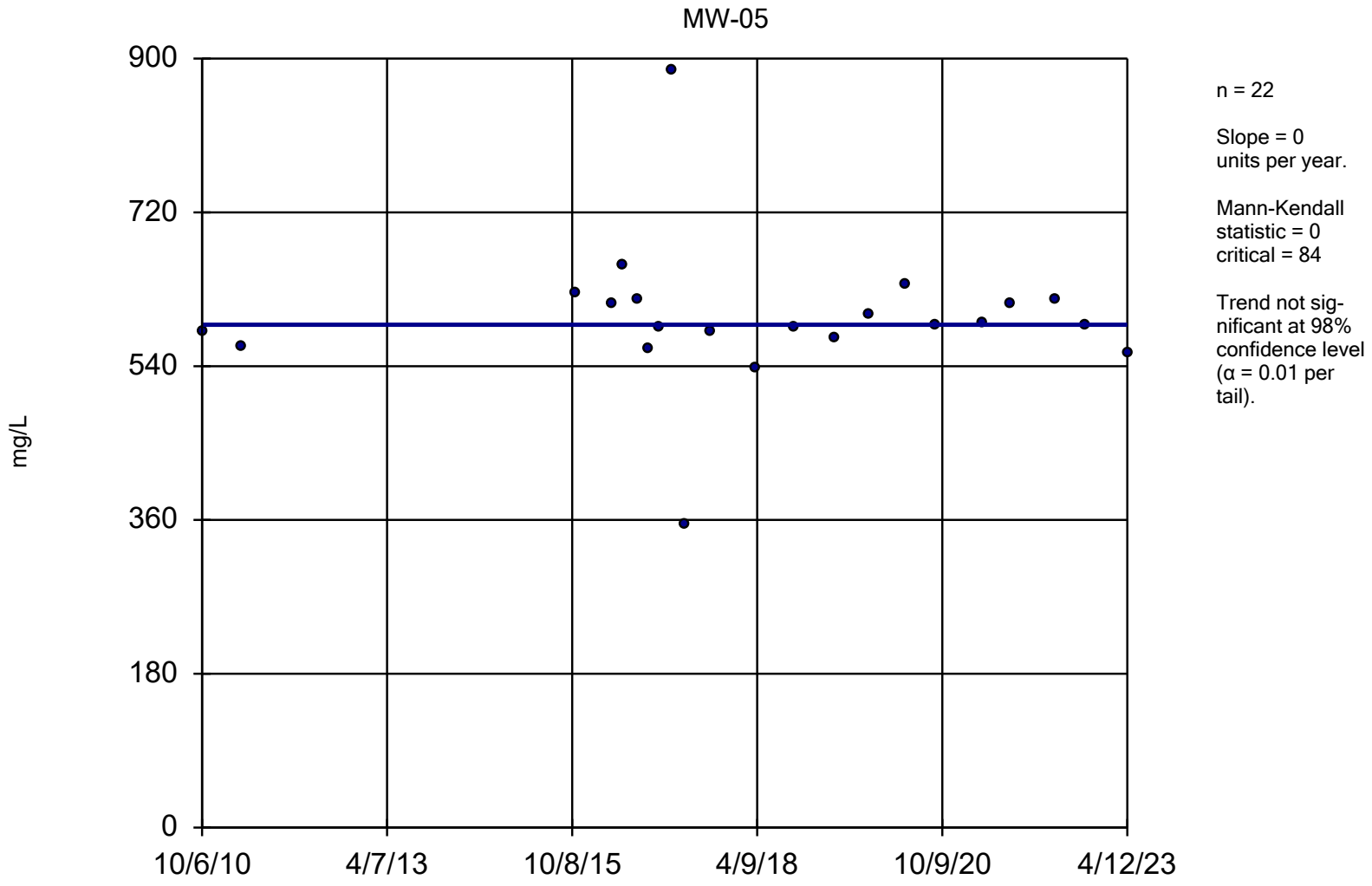
Mann-Kendall
statistic = 0
critical = 84

Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Calcium Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

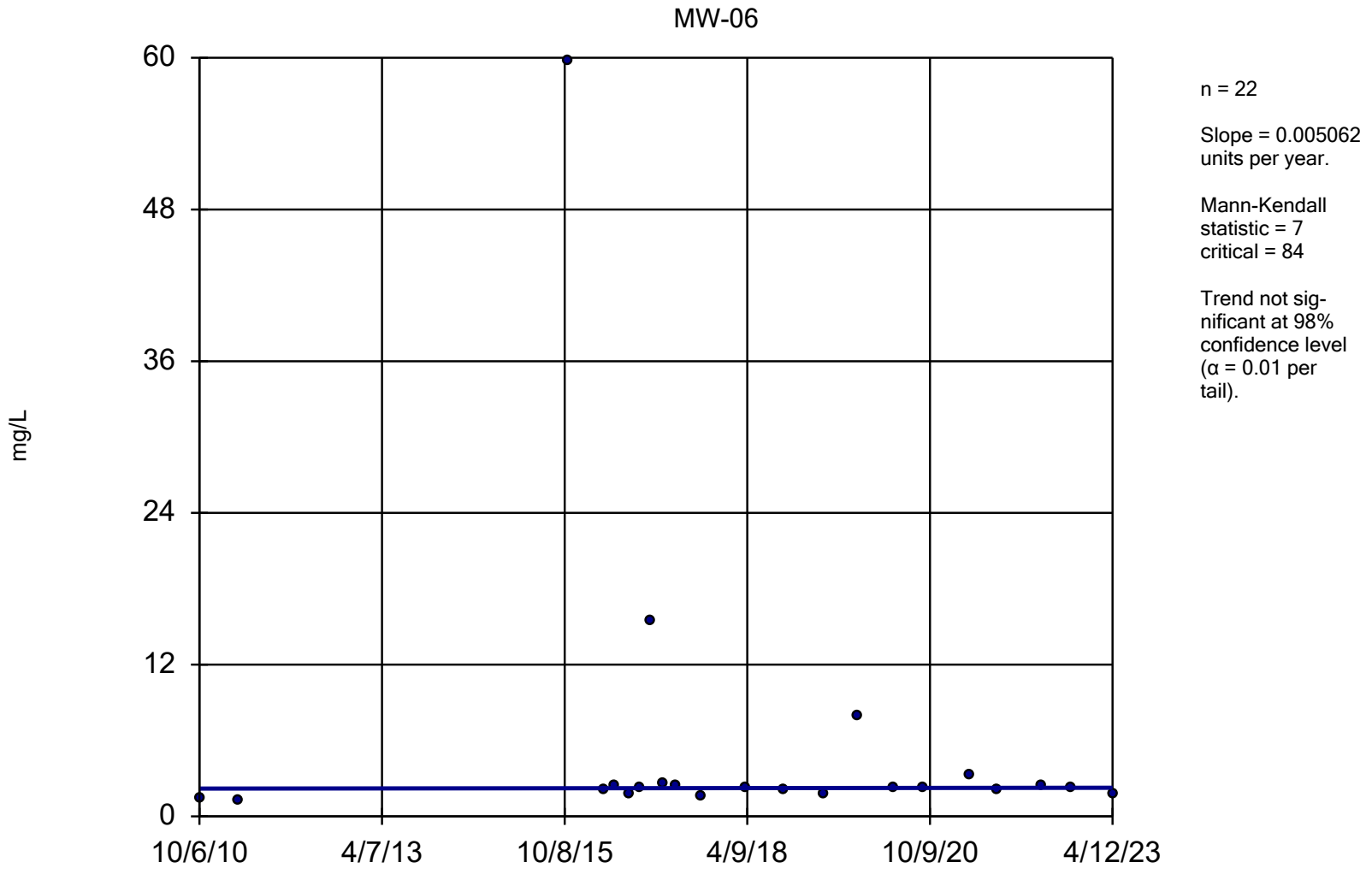
Sen's Slope Estimator



Constituent: Calcium Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

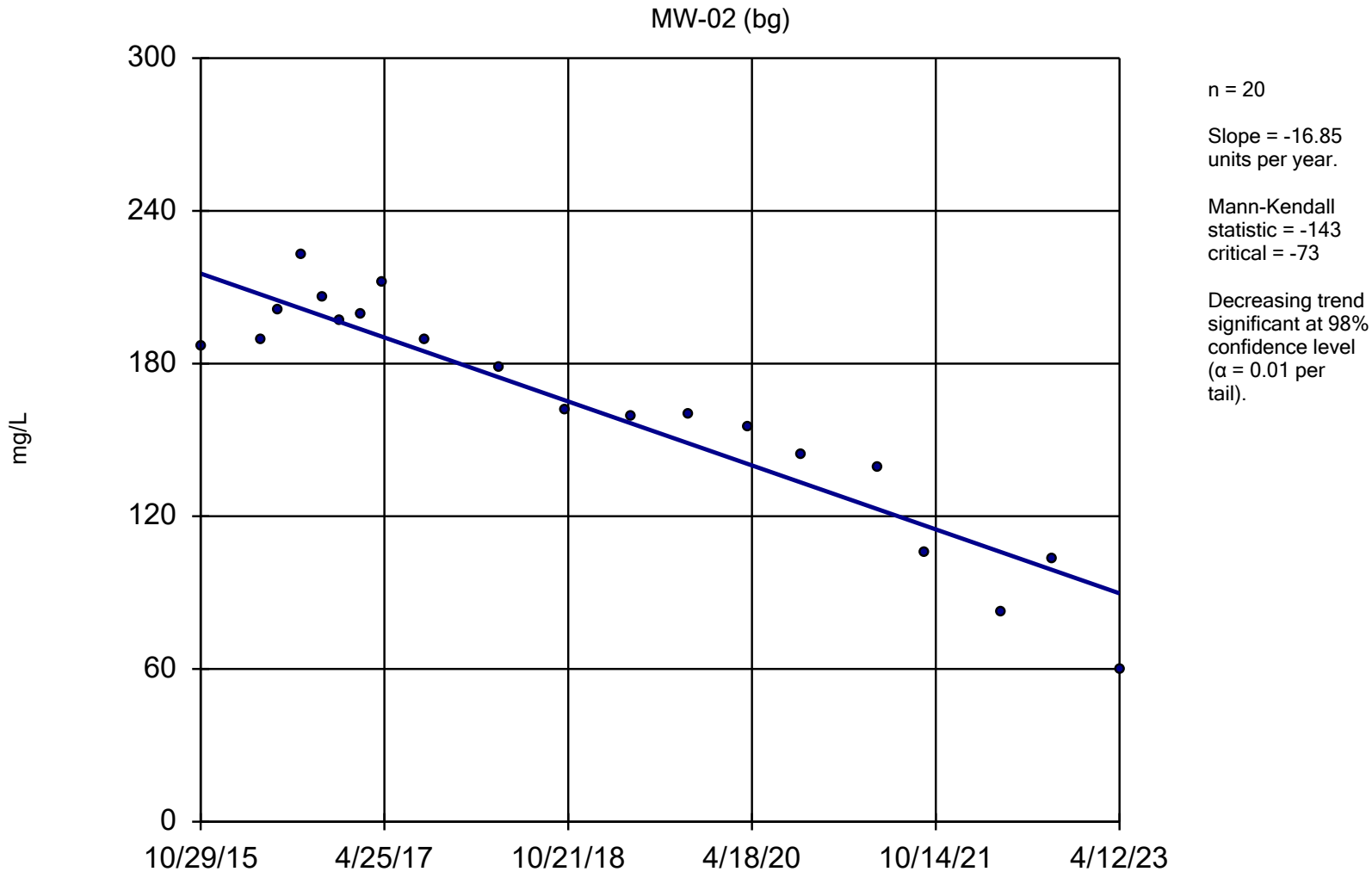
Sen's Slope Estimator



Constituent: Calcium Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

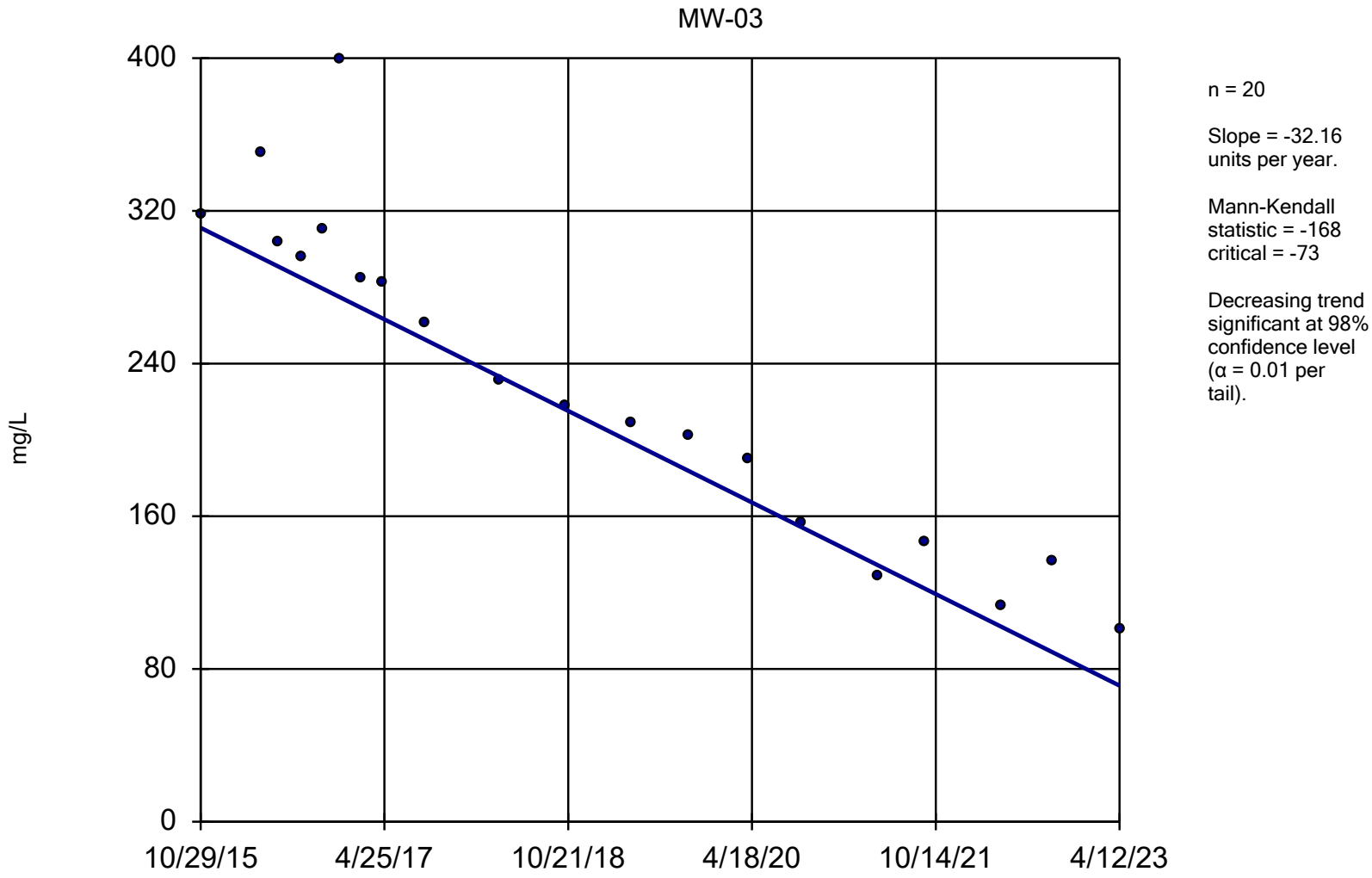
Sen's Slope Estimator



Constituent: Chloride Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

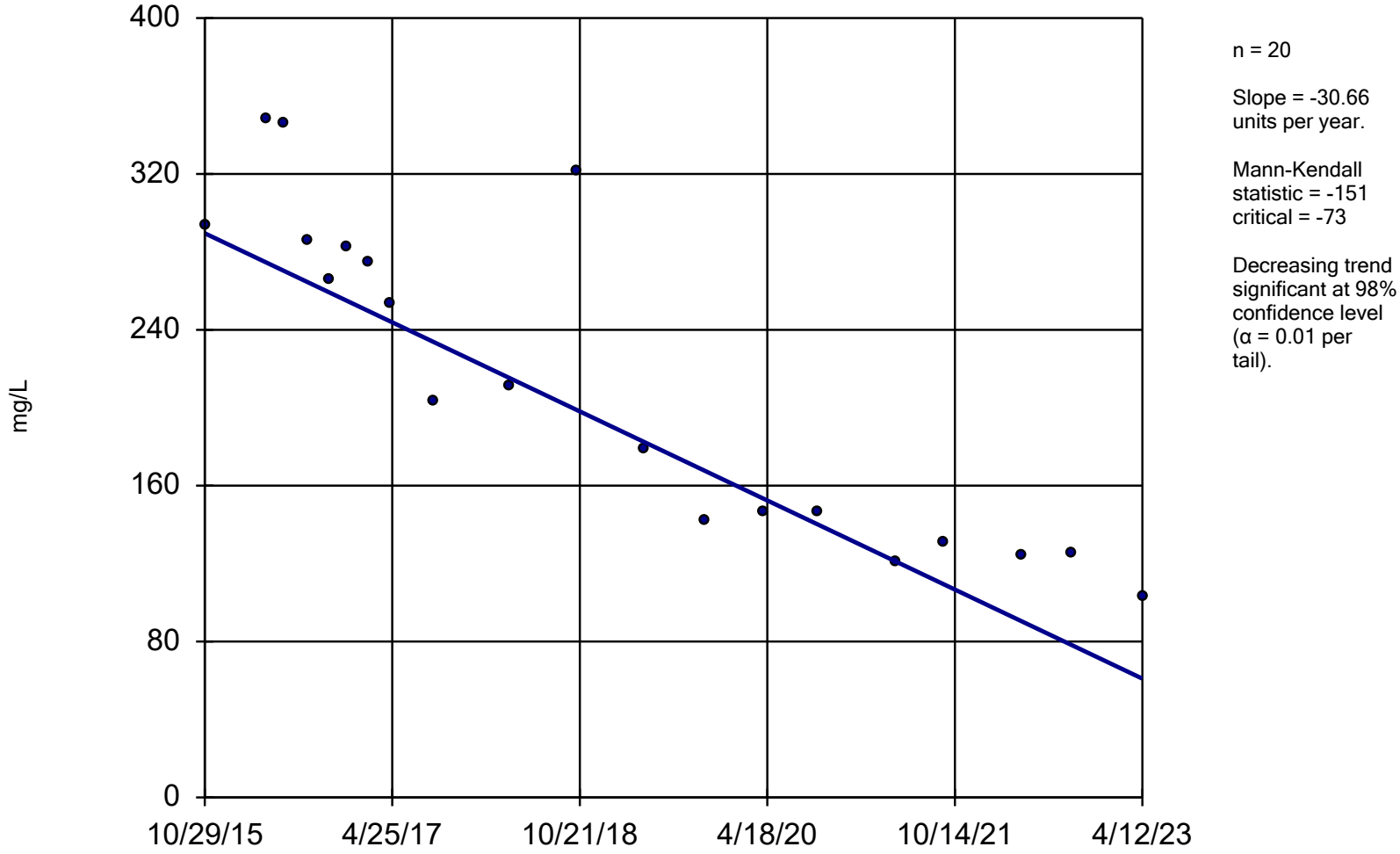


Constituent: Chloride Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 20

Slope = -30.66 units per year.

Mann-Kendall statistic = -151
critical = -73

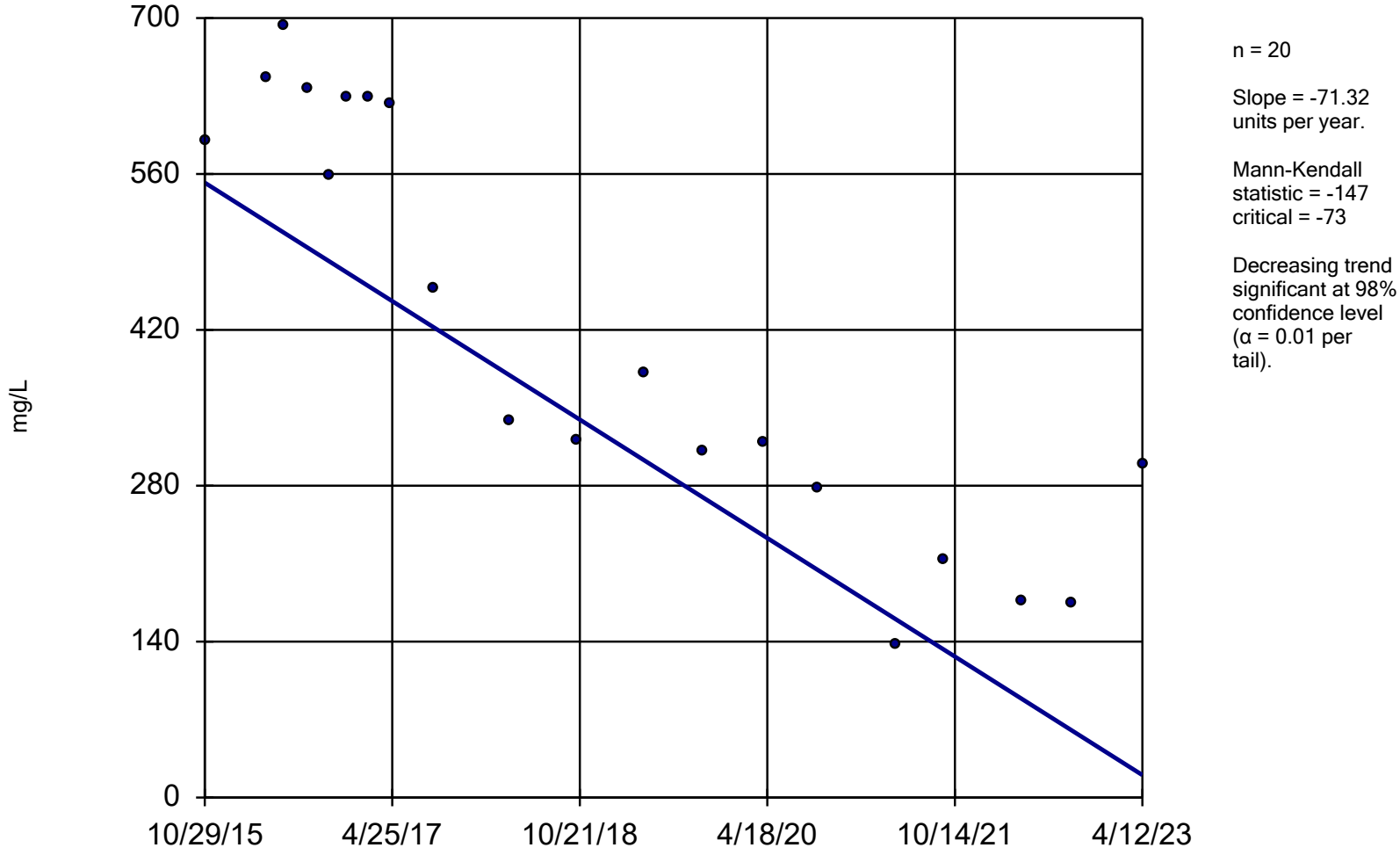
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloride Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-05



n = 20

Slope = -71.32 units per year.

Mann-Kendall statistic = -147
critical = -73

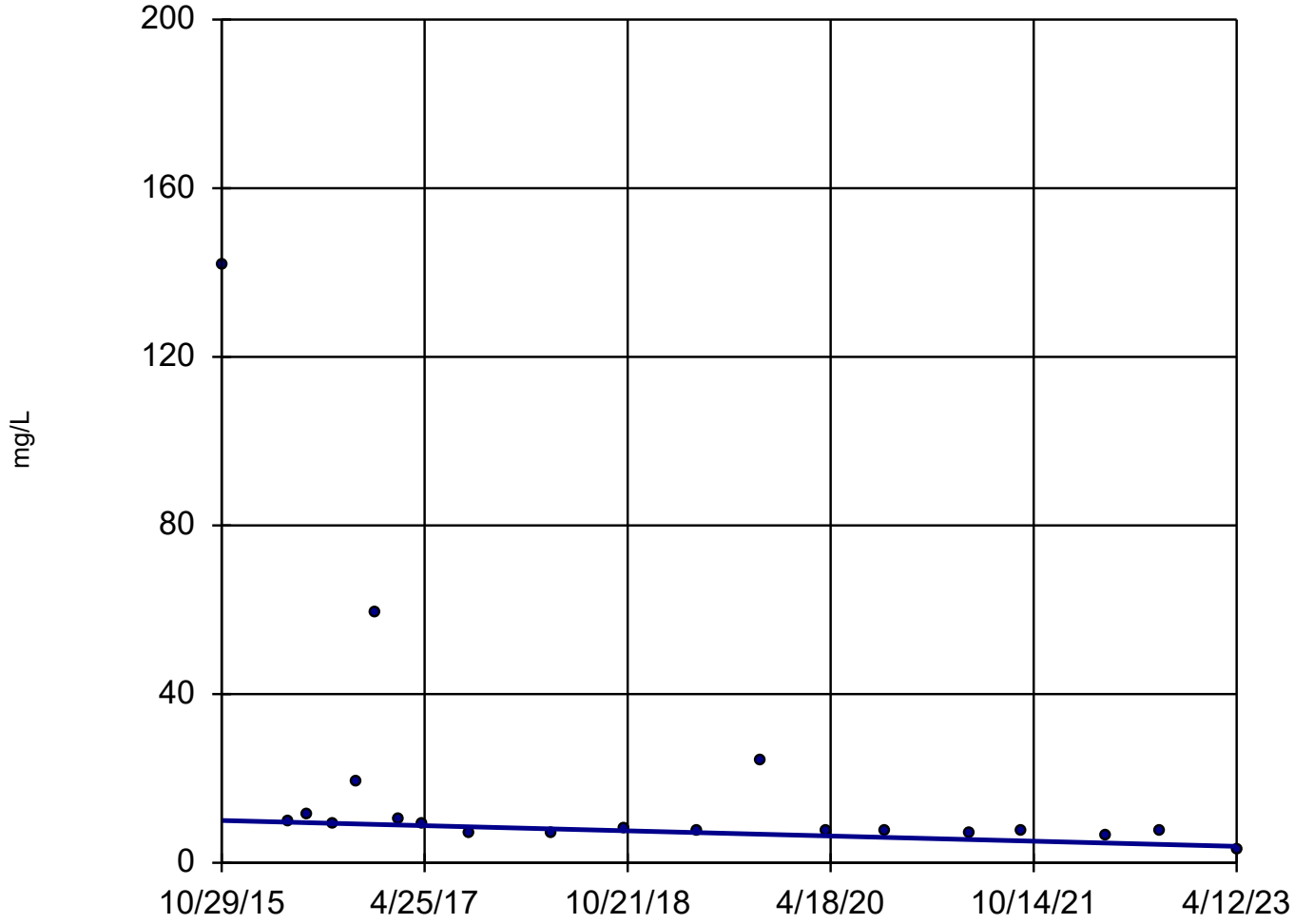
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Chloride Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-06



n = 20

Slope = -0.8211 units per year.

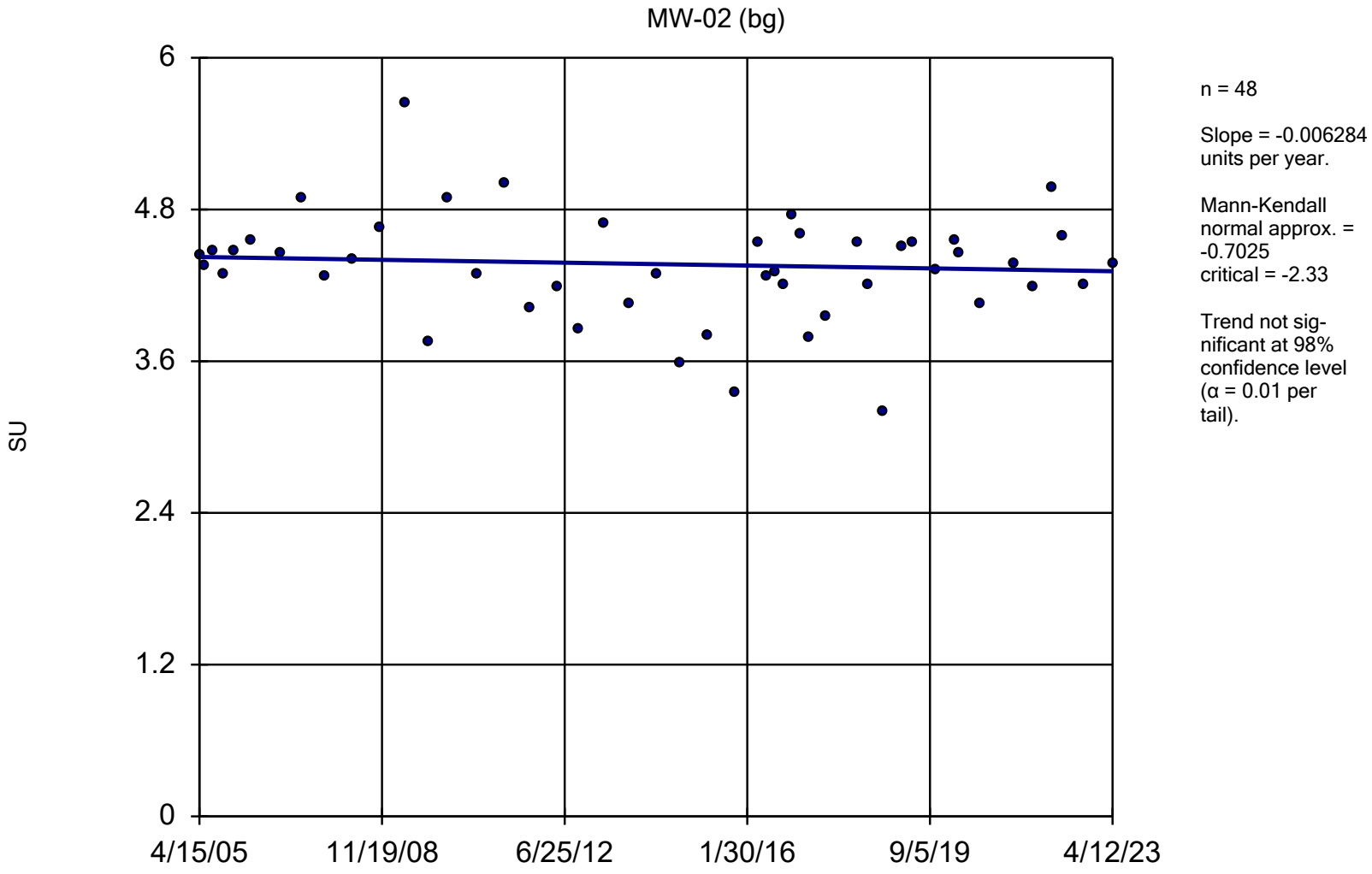
Mann-Kendall statistic = -95
critical = -73

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

Constituent: Chloride Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

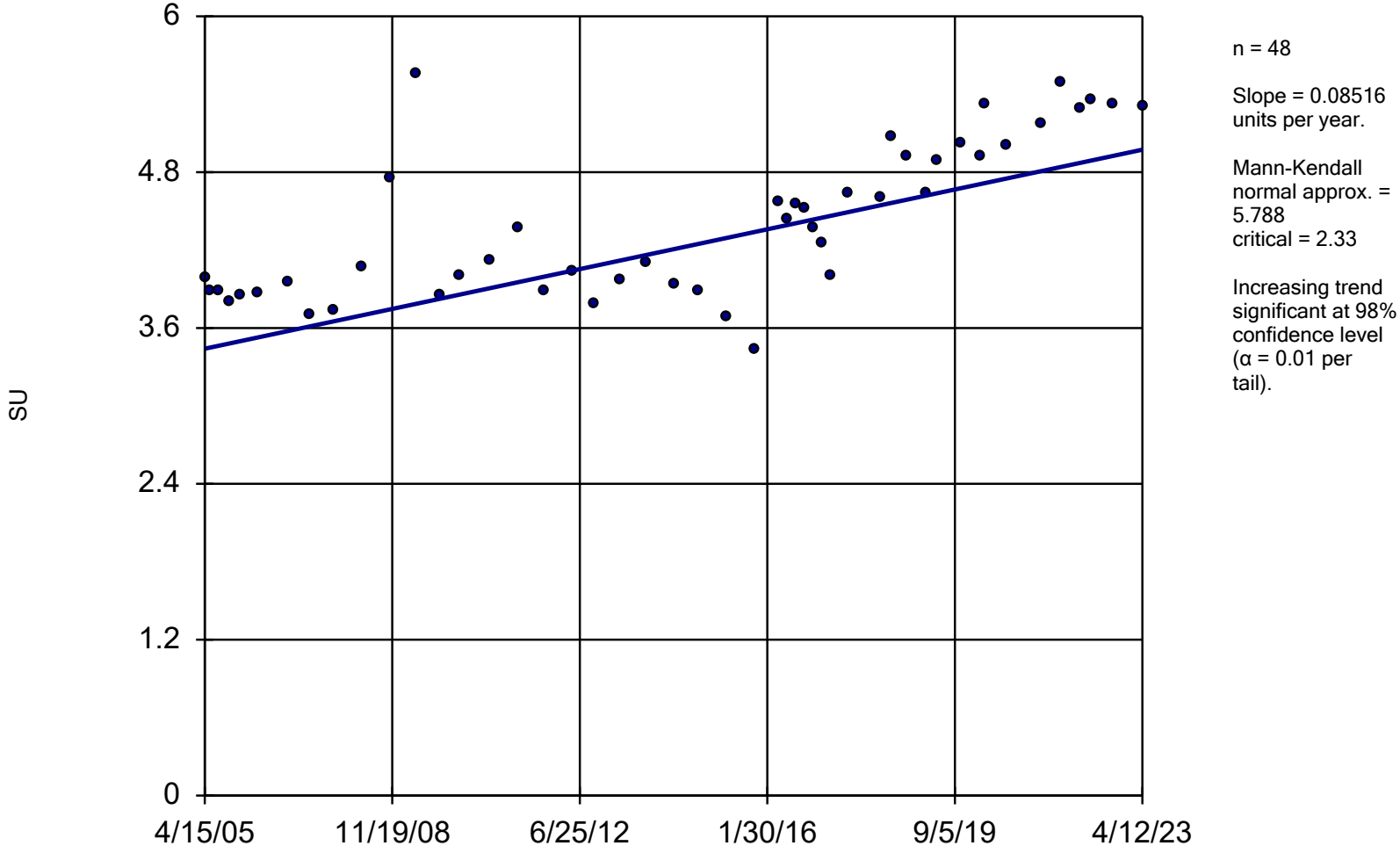


Constituent: pH Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 48

Slope = 0.08516 units per year.

Mann-Kendall normal approx. = 5.788
critical = 2.33

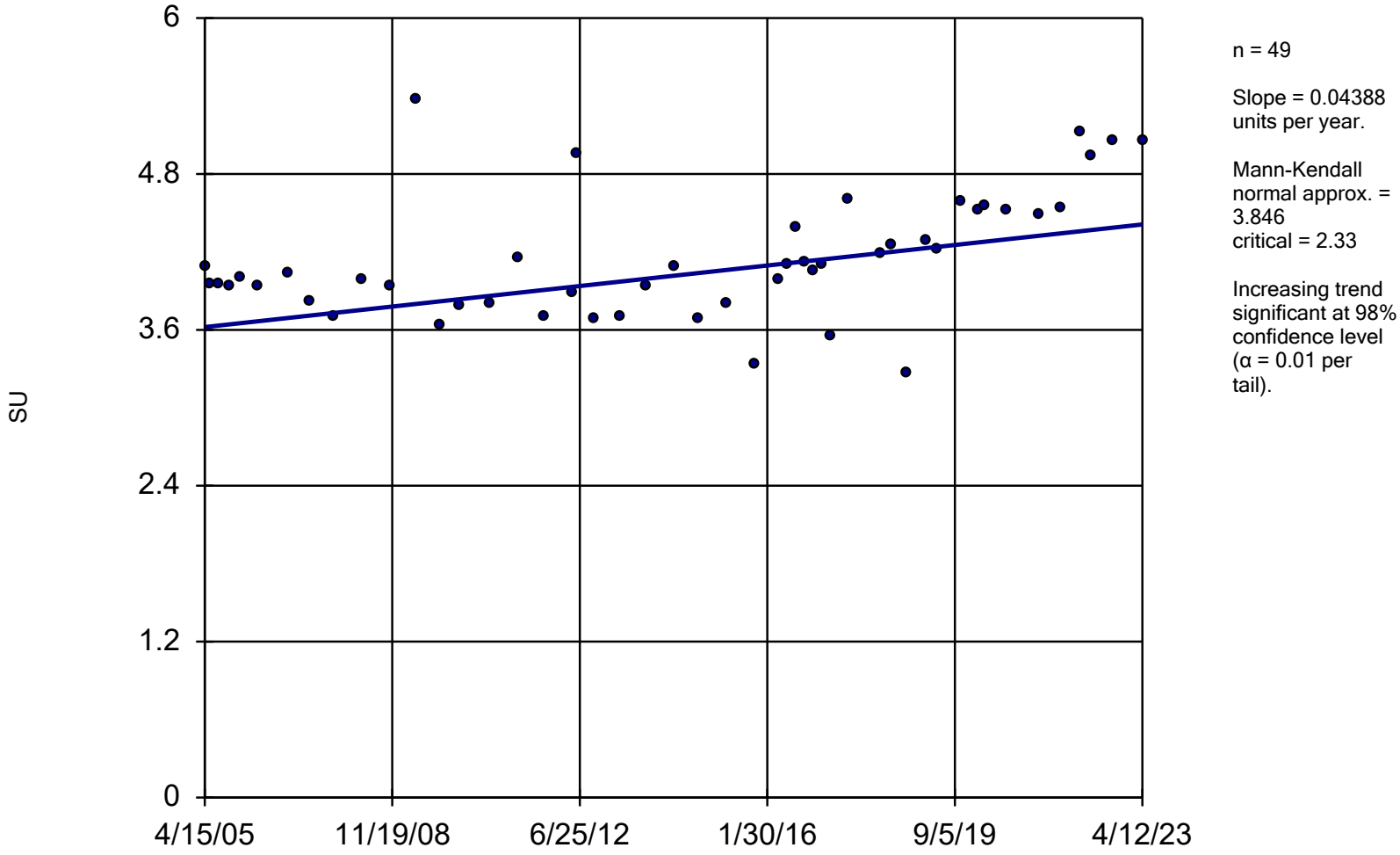
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 49

Slope = 0.04388 units per year.

Mann-Kendall normal approx. = 3.846
critical = 2.33

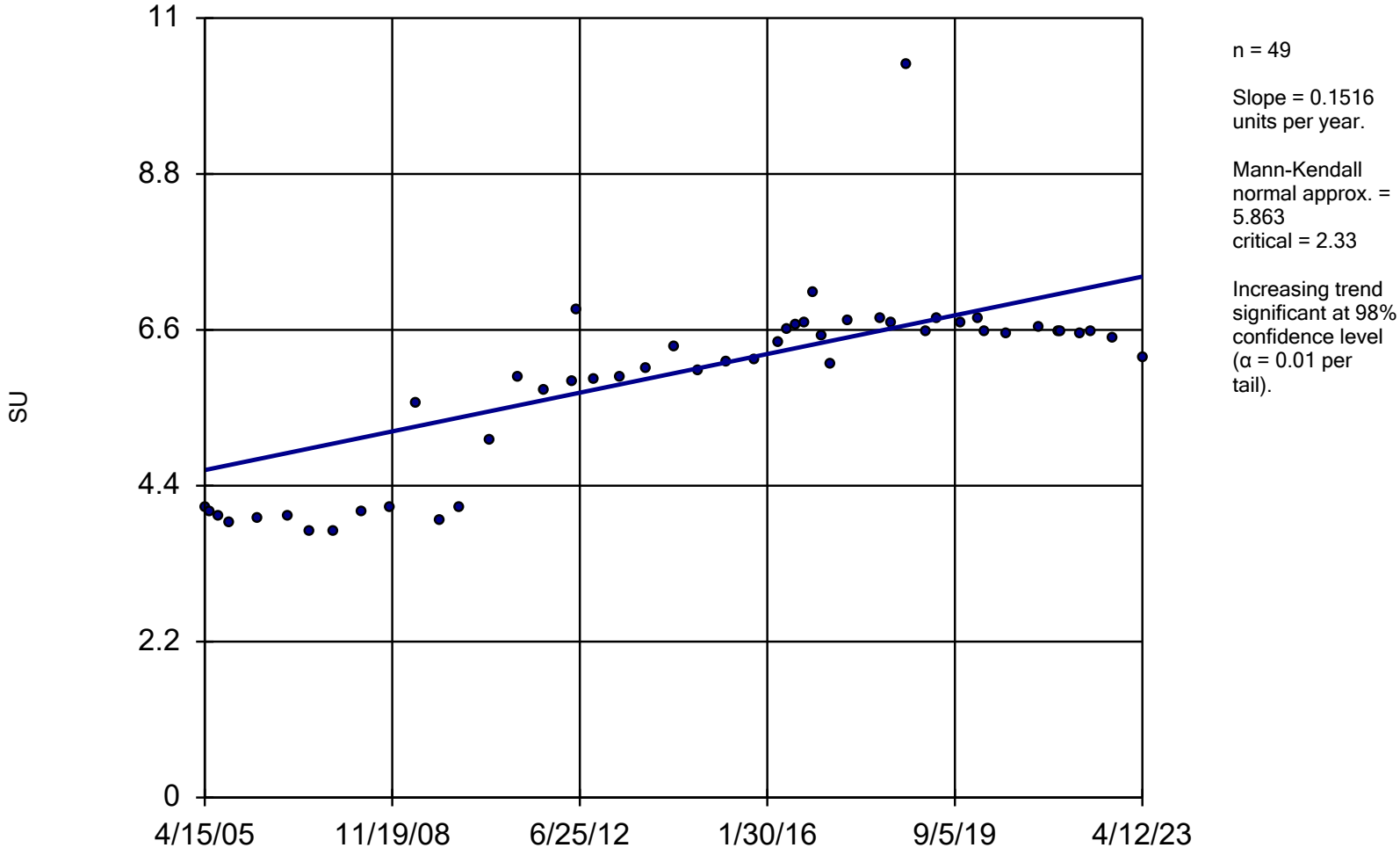
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-05



n = 49

Slope = 0.1516 units per year.

Mann-Kendall normal approx. = 5.863
critical = 2.33

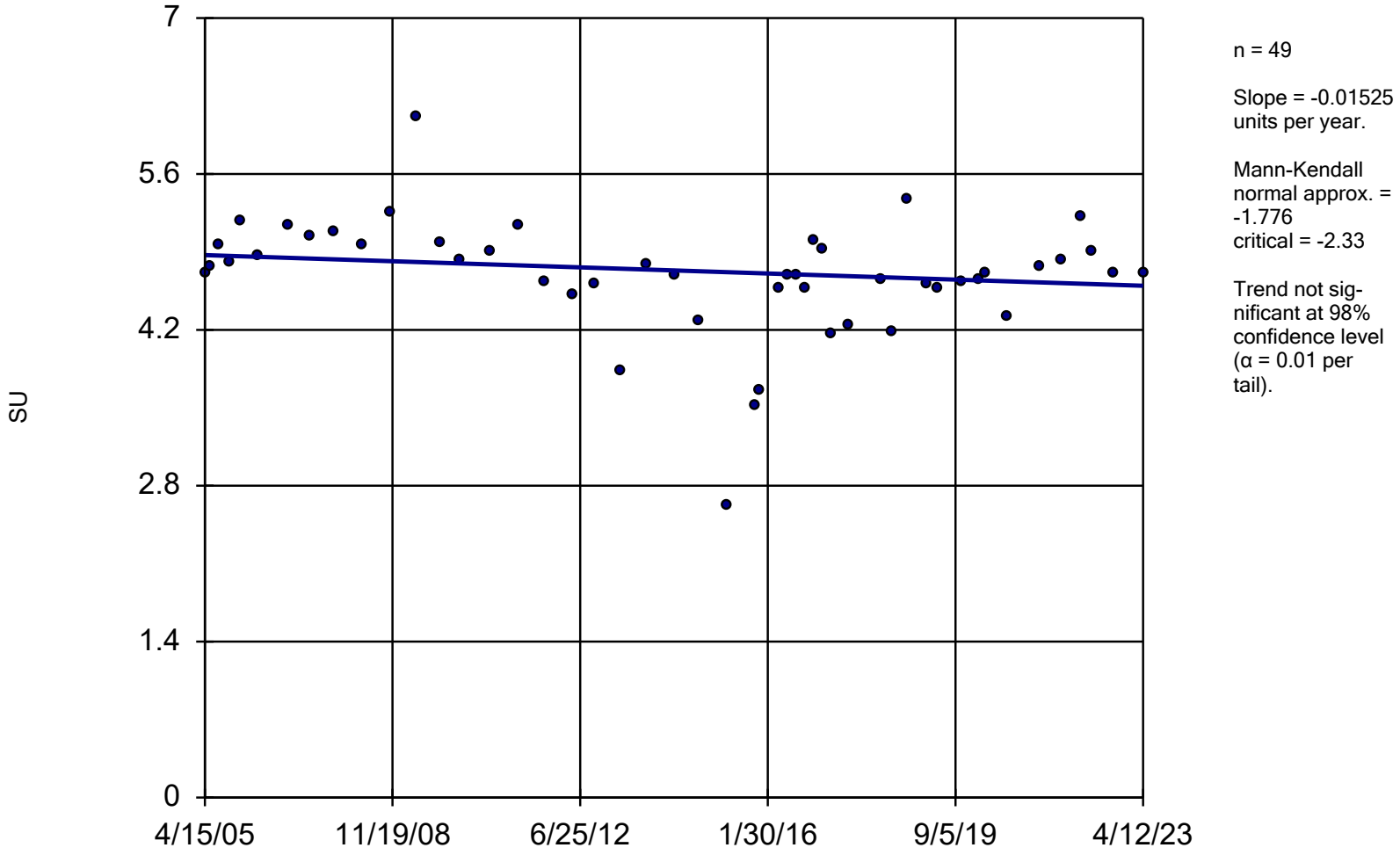
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-06



n = 49

Slope = -0.01525 units per year.

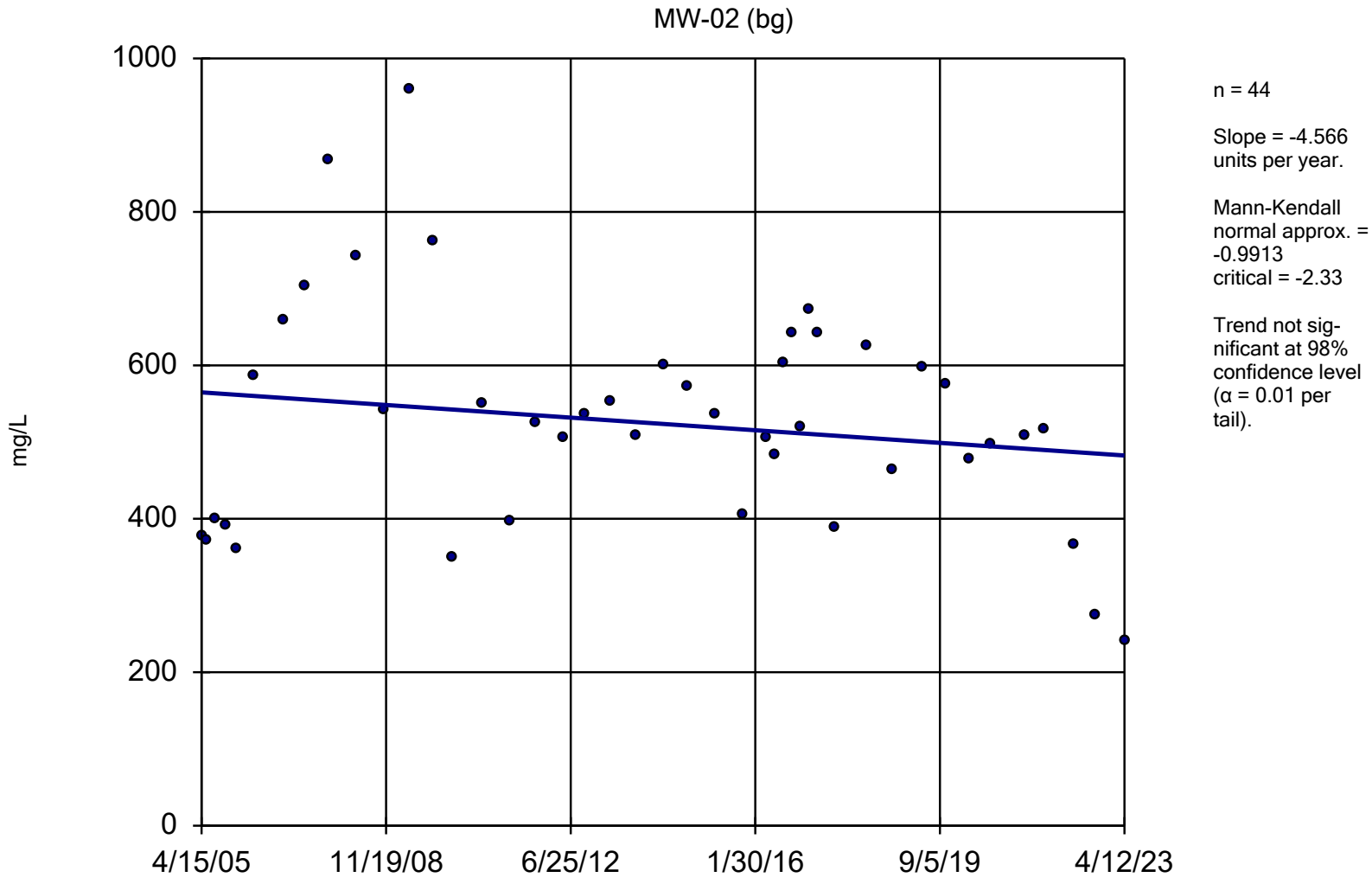
Mann-Kendall normal approx. = -1.776
critical = -2.33

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

Constituent: pH Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

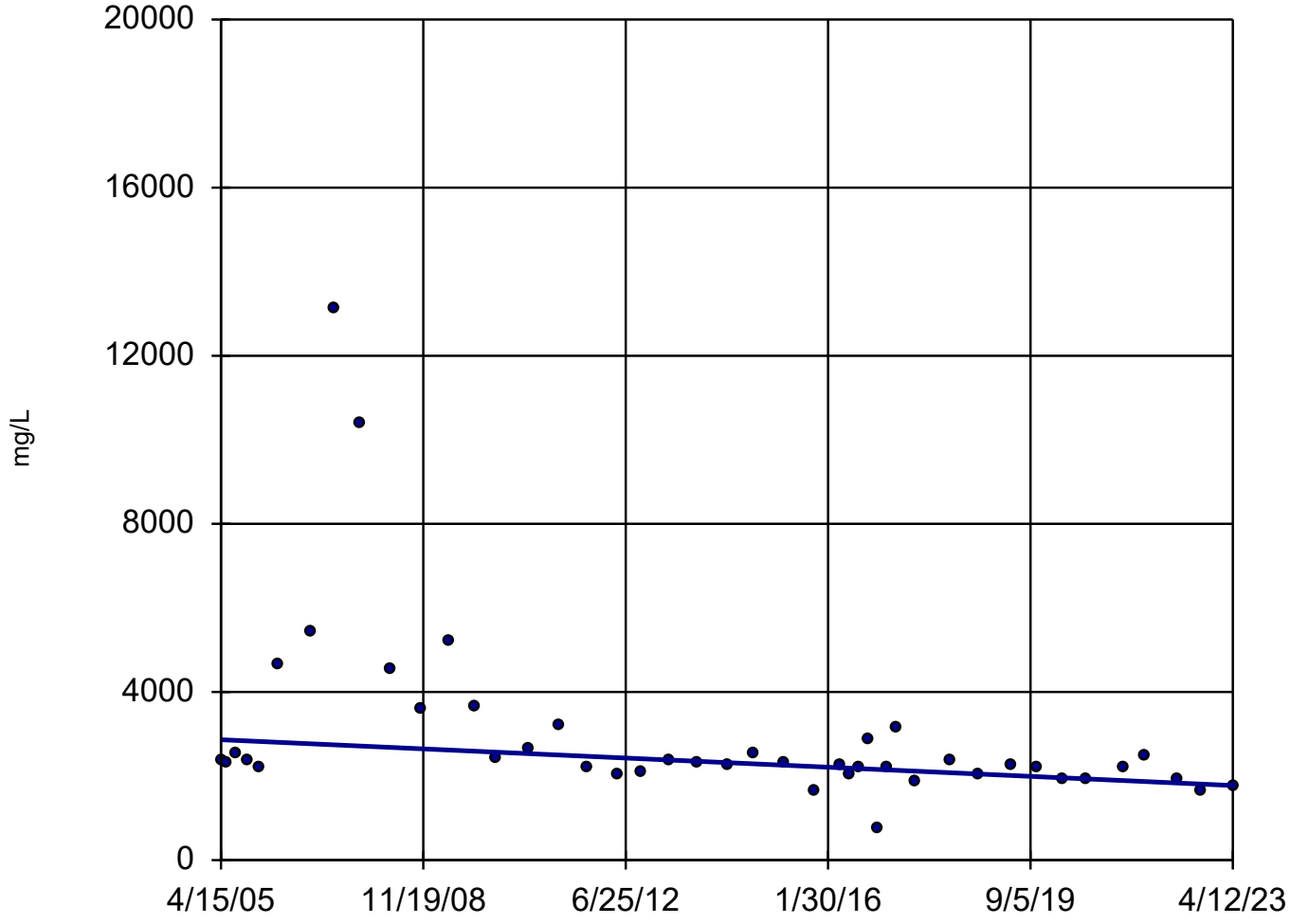


Constituent: Sulfate Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 44

Slope = -60.46 units per year.

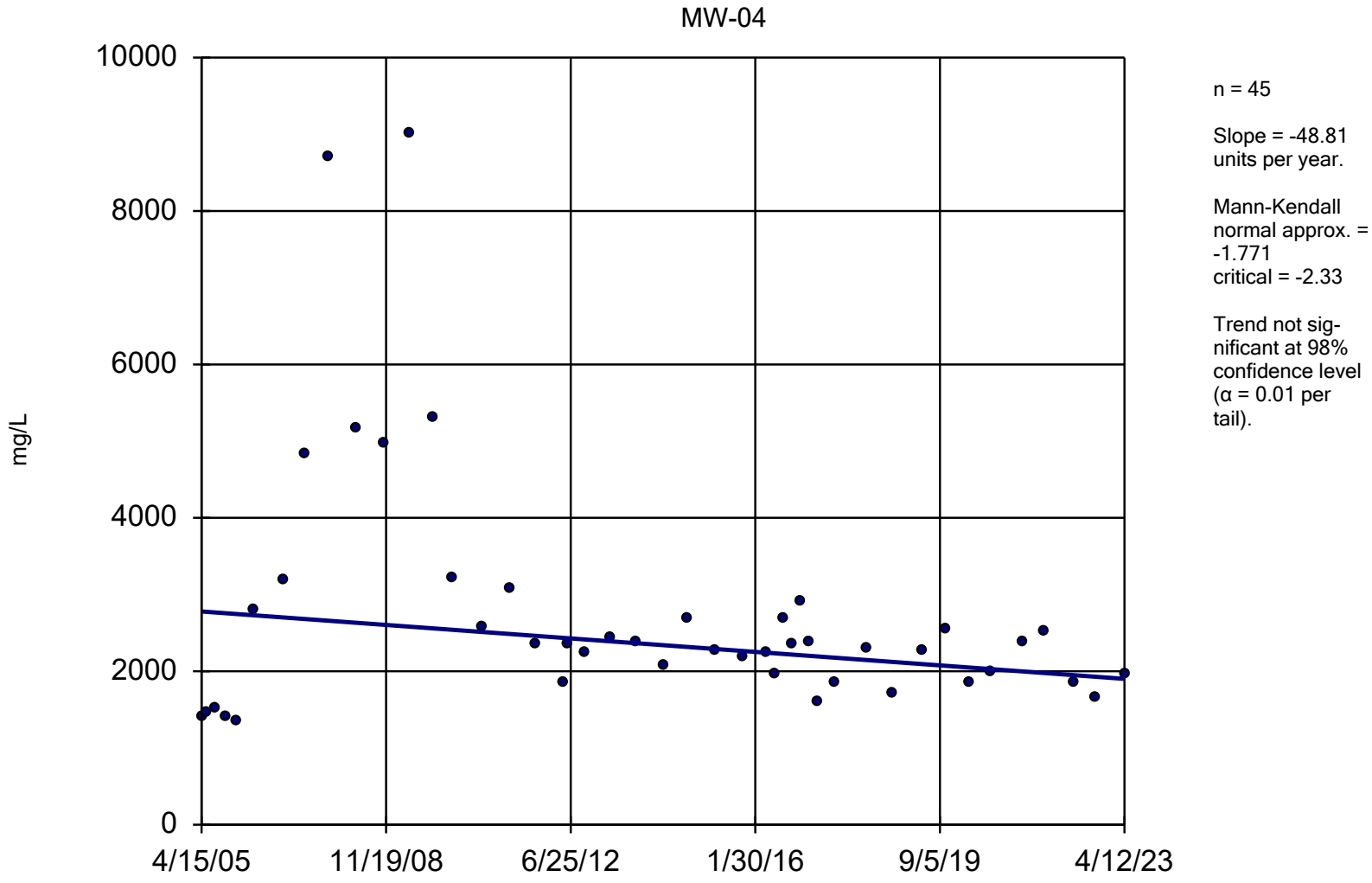
Mann-Kendall normal approx. = -4.451
critical = -2.33

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

Constituent: Sulfate Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

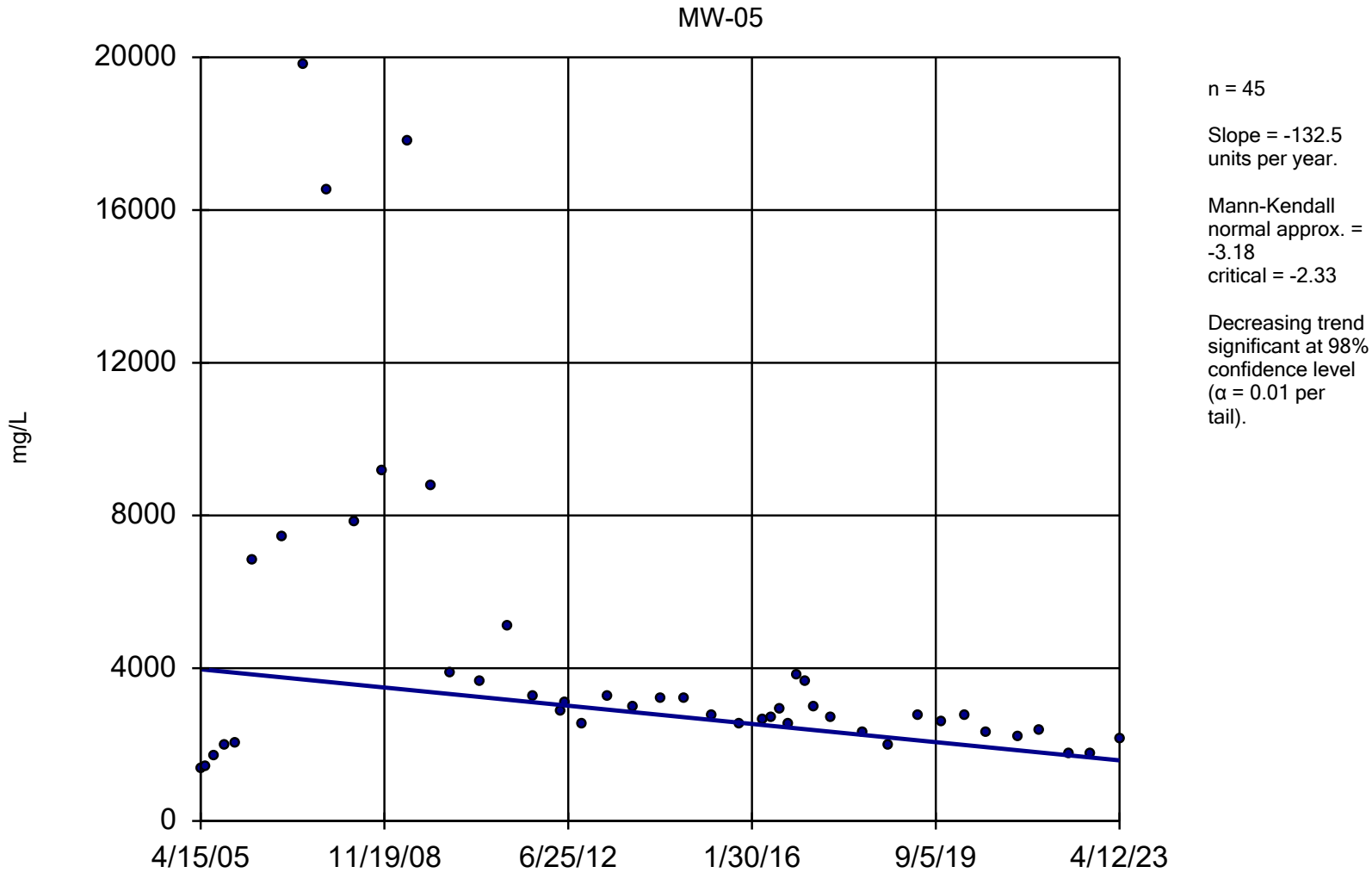
Sen's Slope Estimator



Constituent: Sulfate Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



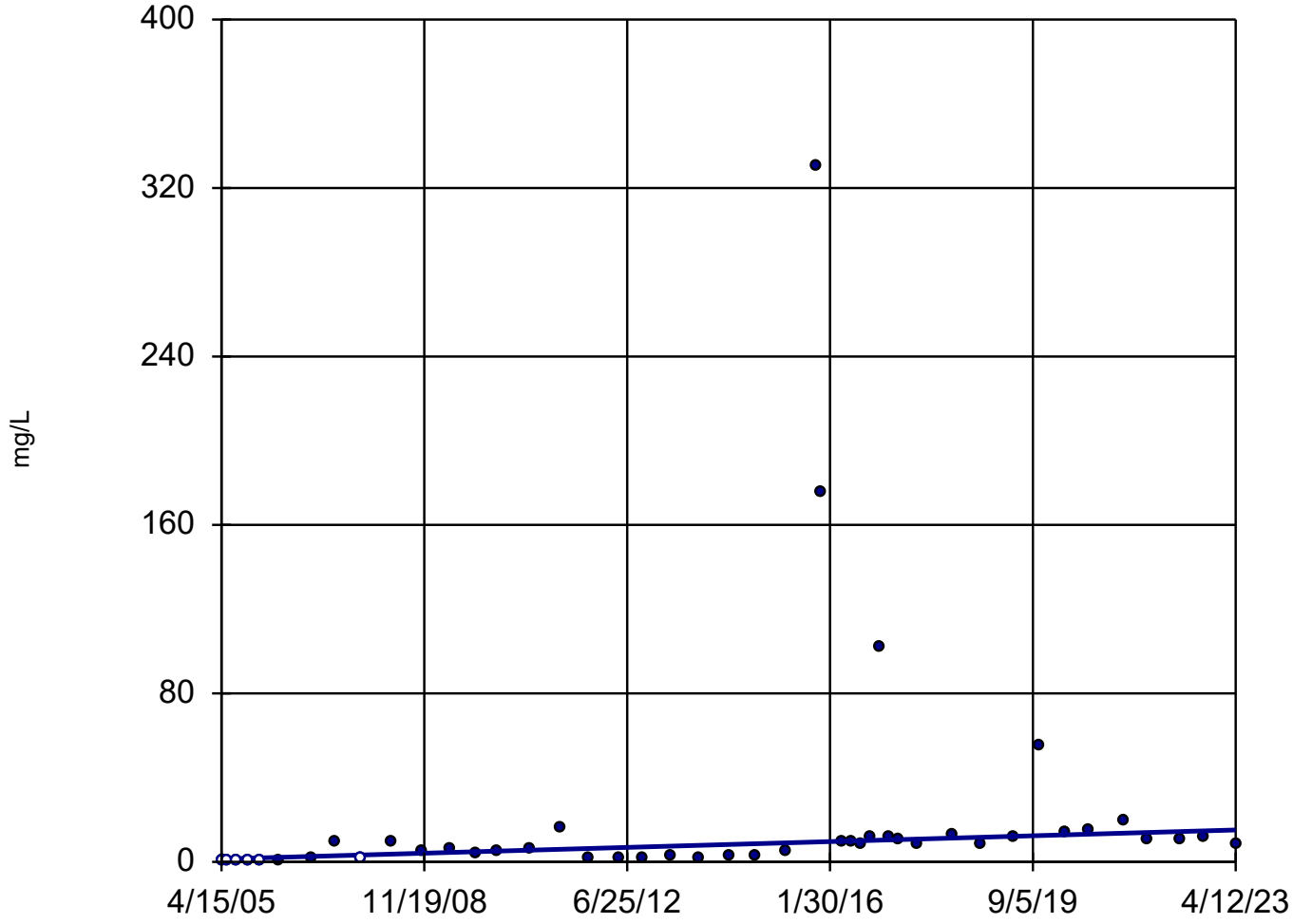
Constituent: Sulfate Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 45

Slope = 0.7652 units per year.

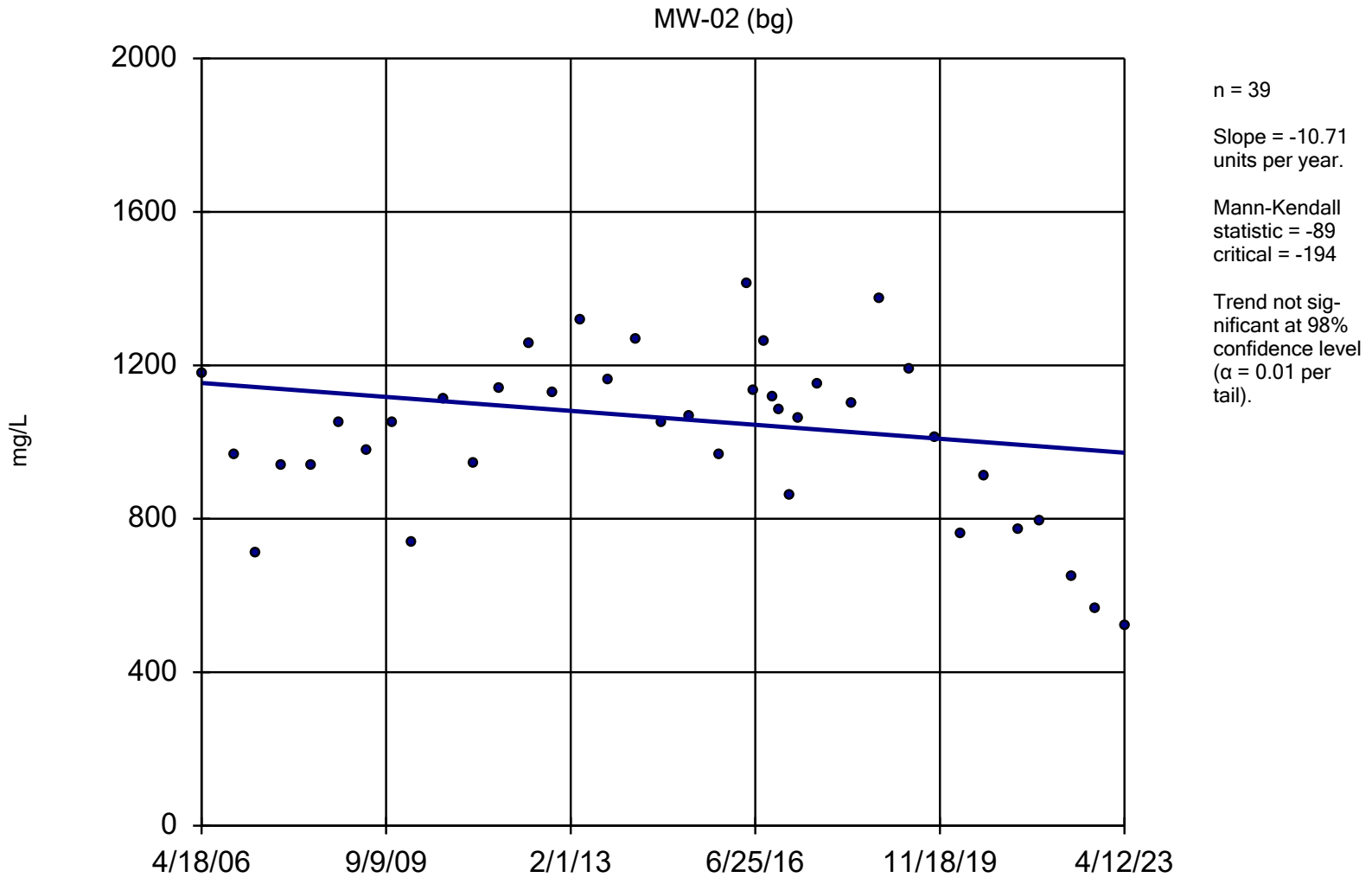
Mann-Kendall normal approx. = 5.189
critical = 2.33

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

Constituent: Sulfate Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

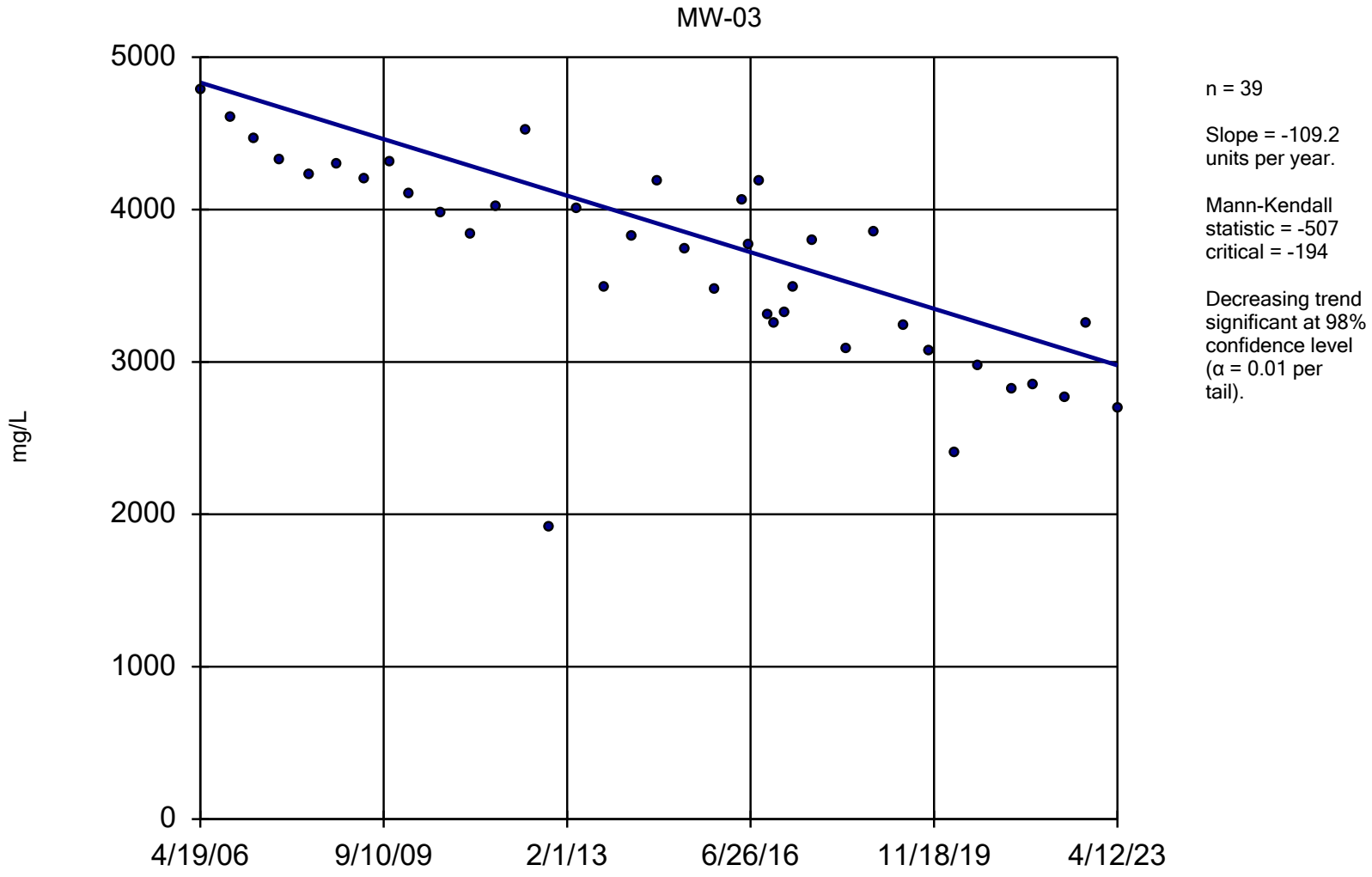
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

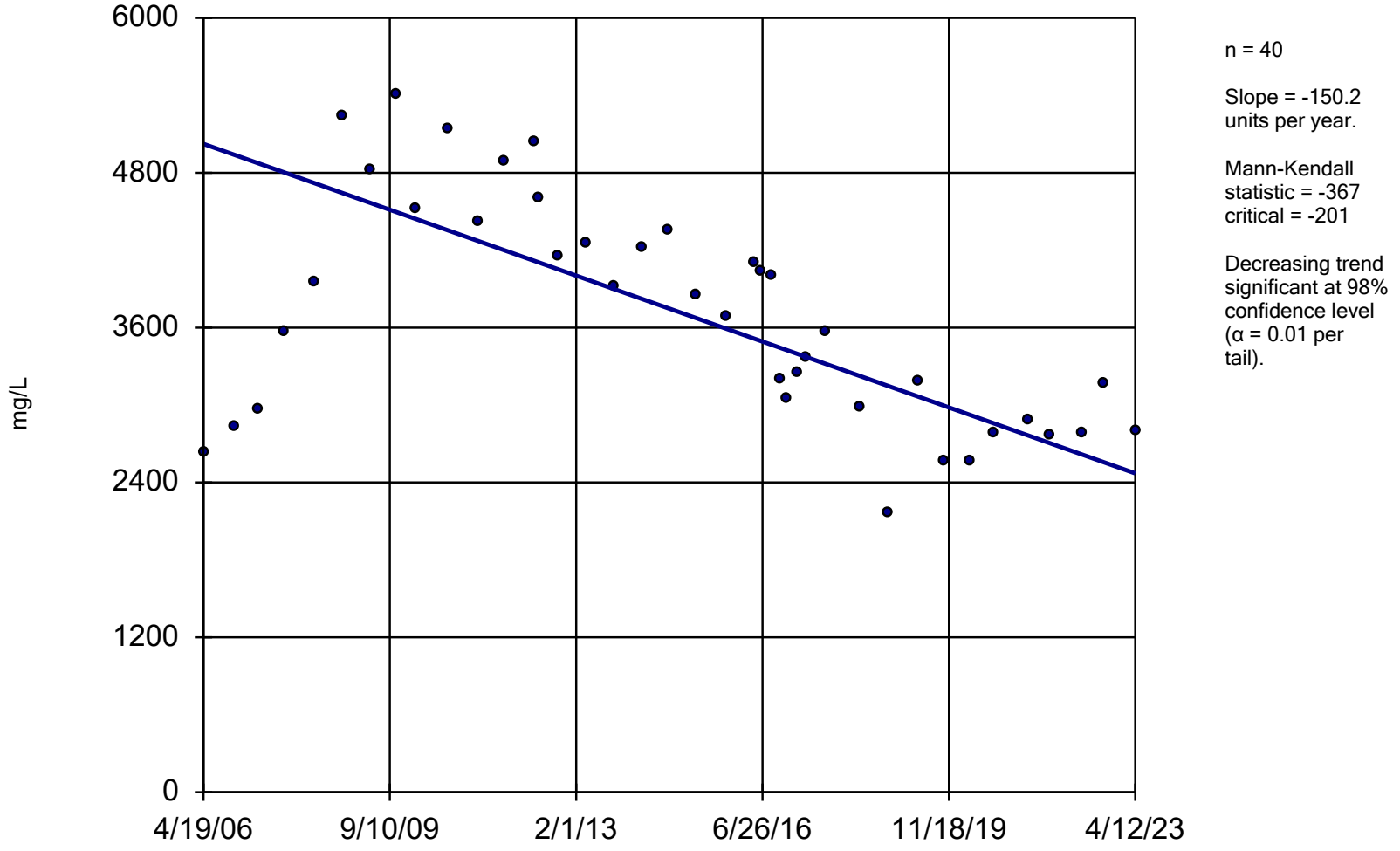


Constituent: Total Dissolved Solids [TDS] Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 40

Slope = -150.2 units per year.

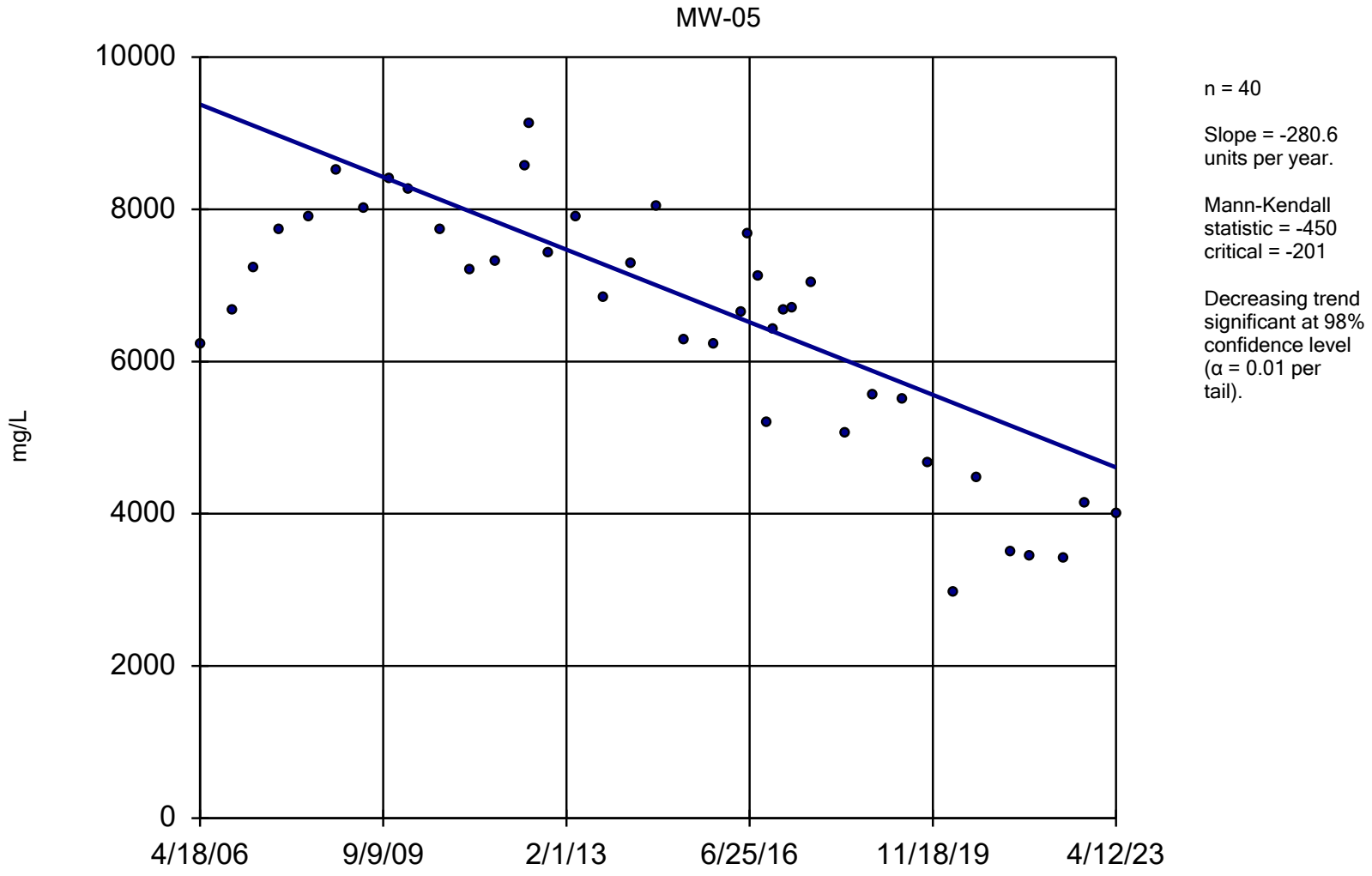
Mann-Kendall statistic = -367
critical = -201

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

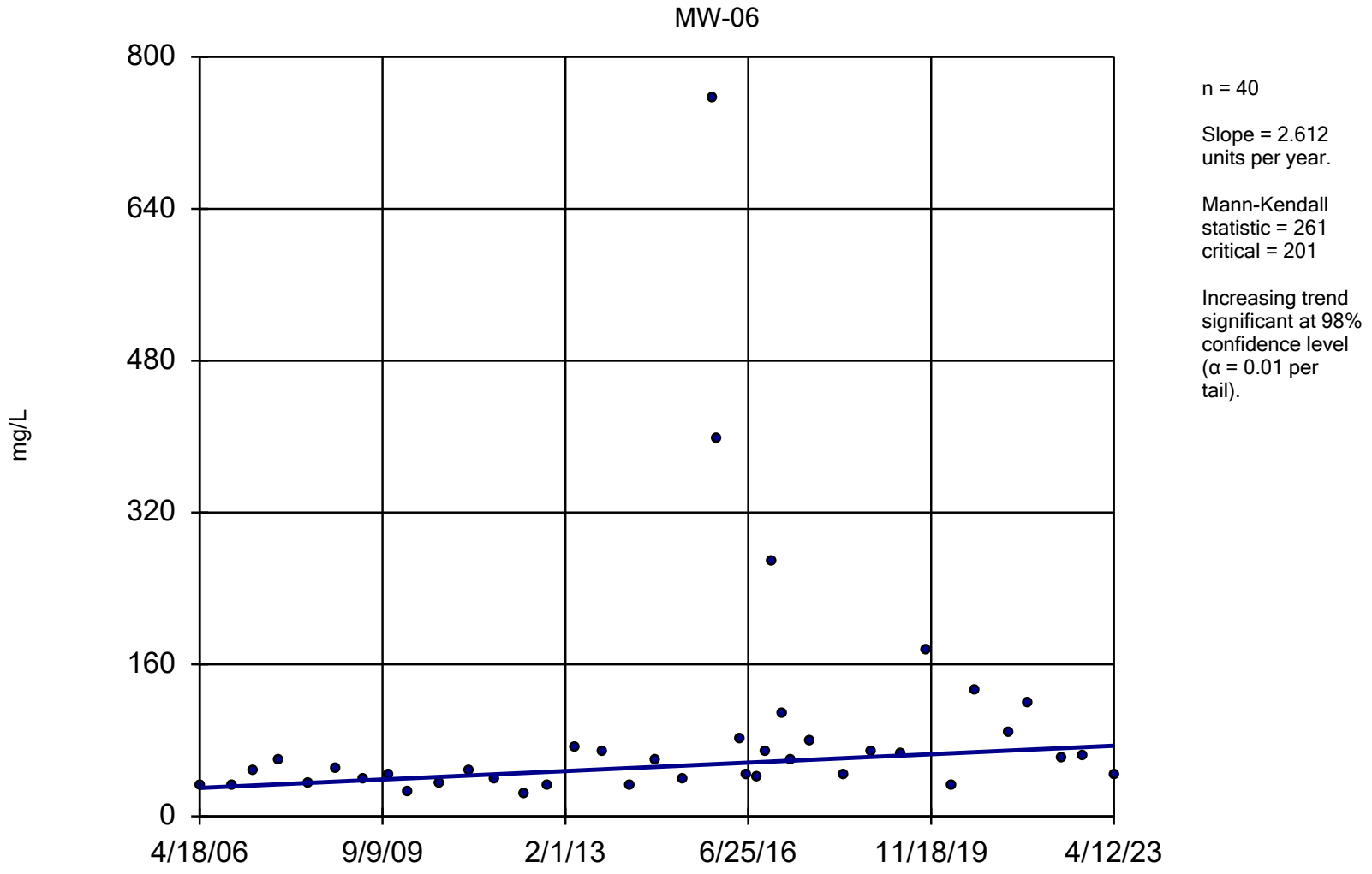
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/15/2023 8:44 AM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

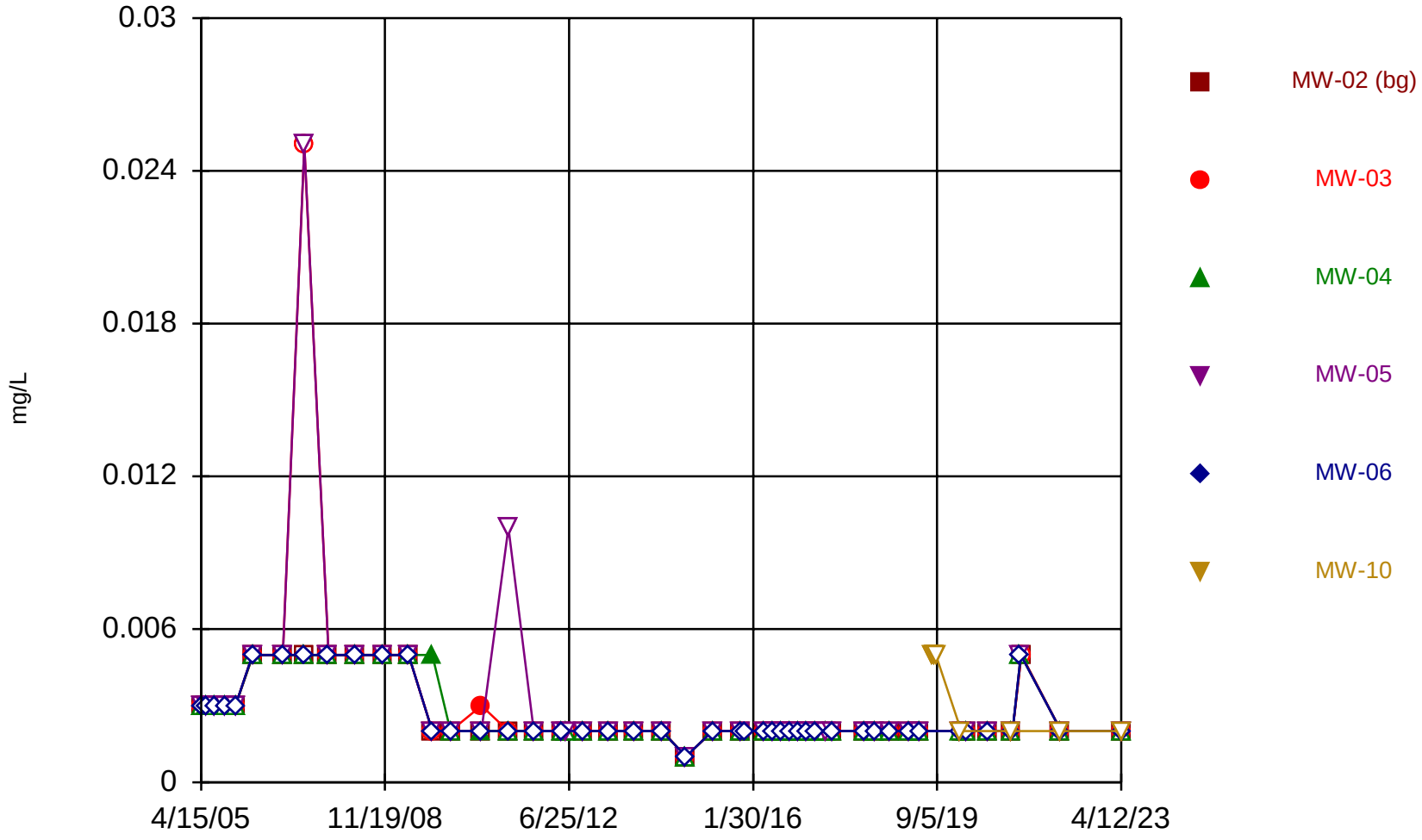
Tolerance Limit

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/1/2023, 7:32 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.001	n/a	n/a	n/a	45	100	n/a	0.09944	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.005	n/a	n/a	n/a	45	97.78	n/a	0.09944	NP Inter(NDs)
Barium (mg/L)	n/a	0.029	n/a	n/a	n/a	24	0	n/a	0.292	NP Inter(normal...
Beryllium (mg/L)	n/a	0.009709	n/a	n/a	n/a	49	6.122	x^2	0.05	Inter
Cadmium (mg/L)	n/a	0.0025	n/a	n/a	n/a	45	100	n/a	0.09944	NP Inter(NDs)
Chromium (mg/L)	n/a	0.02	n/a	n/a	n/a	45	91.11	n/a	0.09944	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.1785	n/a	n/a	n/a	24	0	No	0.05	Inter
Combined Radium (pCi/L)	n/a	2.059	n/a	n/a	n/a	24	33.33	No	0.05	Inter
Fluoride (mg/L)	n/a	1.106	n/a	n/a	n/a	25	8	No	0.05	Inter
Lead (mg/L)	n/a	0.009674	n/a	n/a	n/a	49	8.163	sqrt(x)	0.05	Inter
Lithium (mg/L)	n/a	0.189	n/a	n/a	n/a	24	91.67	n/a	0.292	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0015	n/a	n/a	n/a	17	94.12	n/a	0.4181	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.0025	n/a	n/a	n/a	24	100	n/a	0.292	NP Inter(NDs)
Selenium (mg/L)	n/a	0.025	n/a	n/a	n/a	45	97.78	n/a	0.09944	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	22	100	n/a	0.3235	NP Inter(NDs)

Hollow symbols indicate censored values.

Time Series

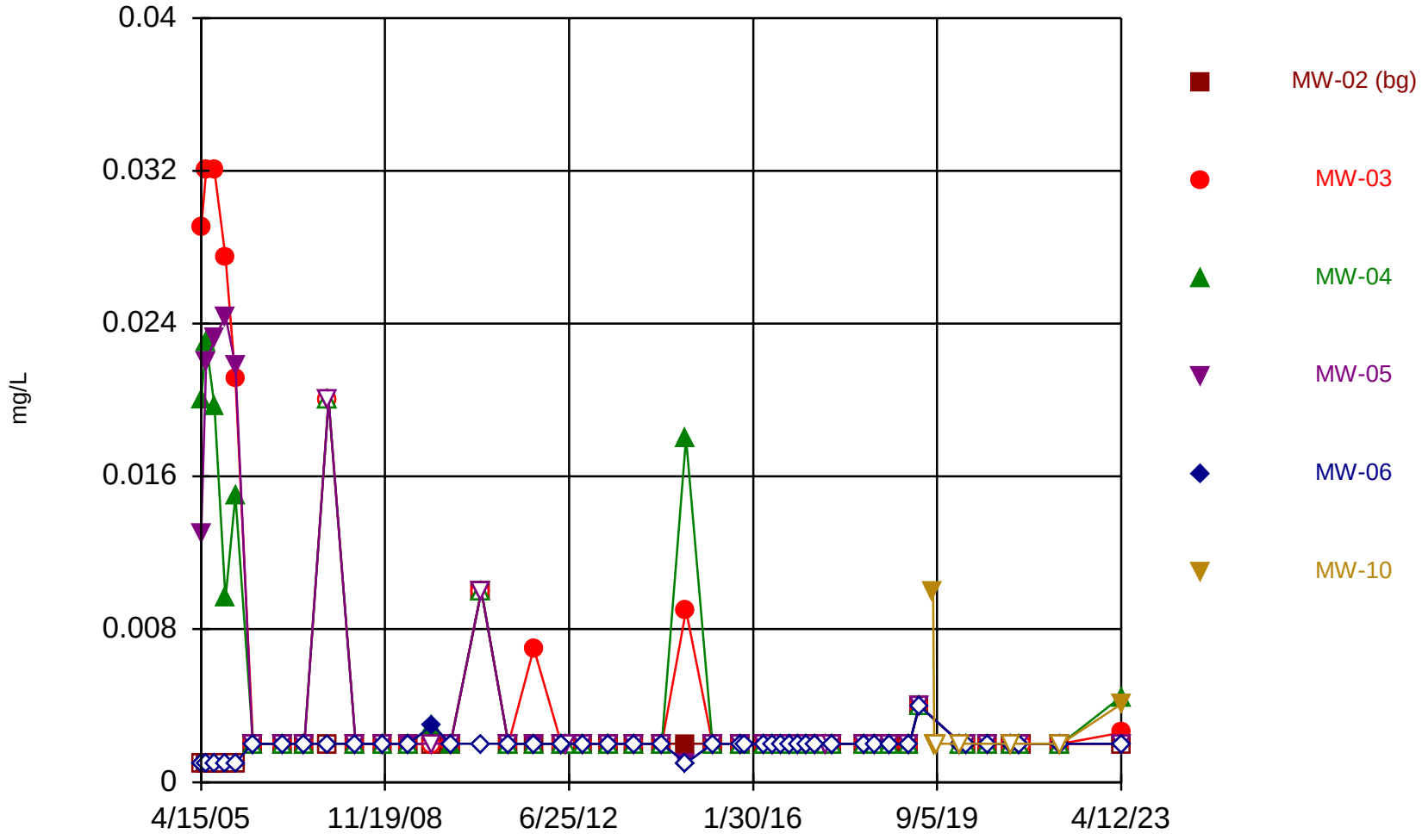


Constituent: Antimony Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

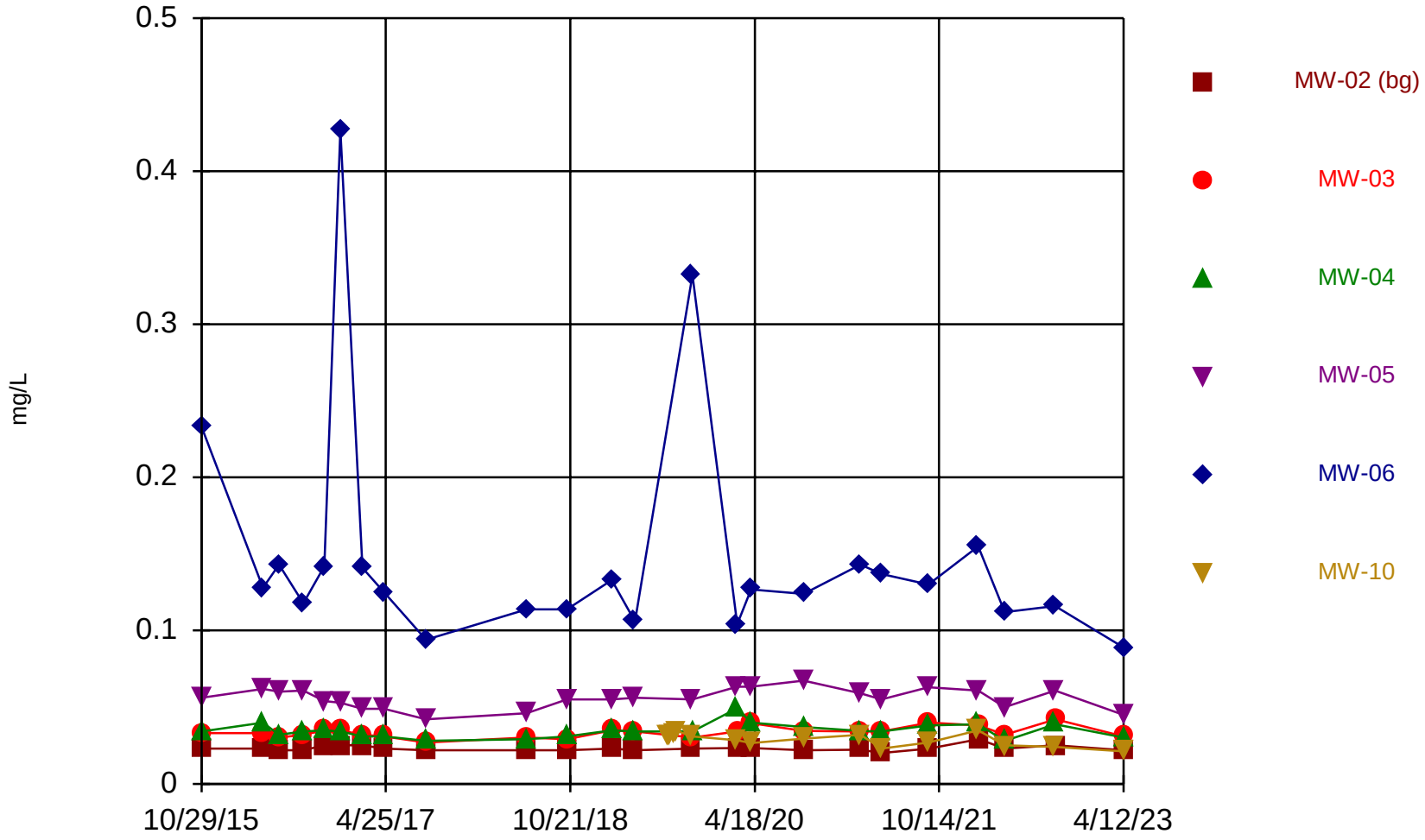
Time Series



Constituent: Arsenic Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

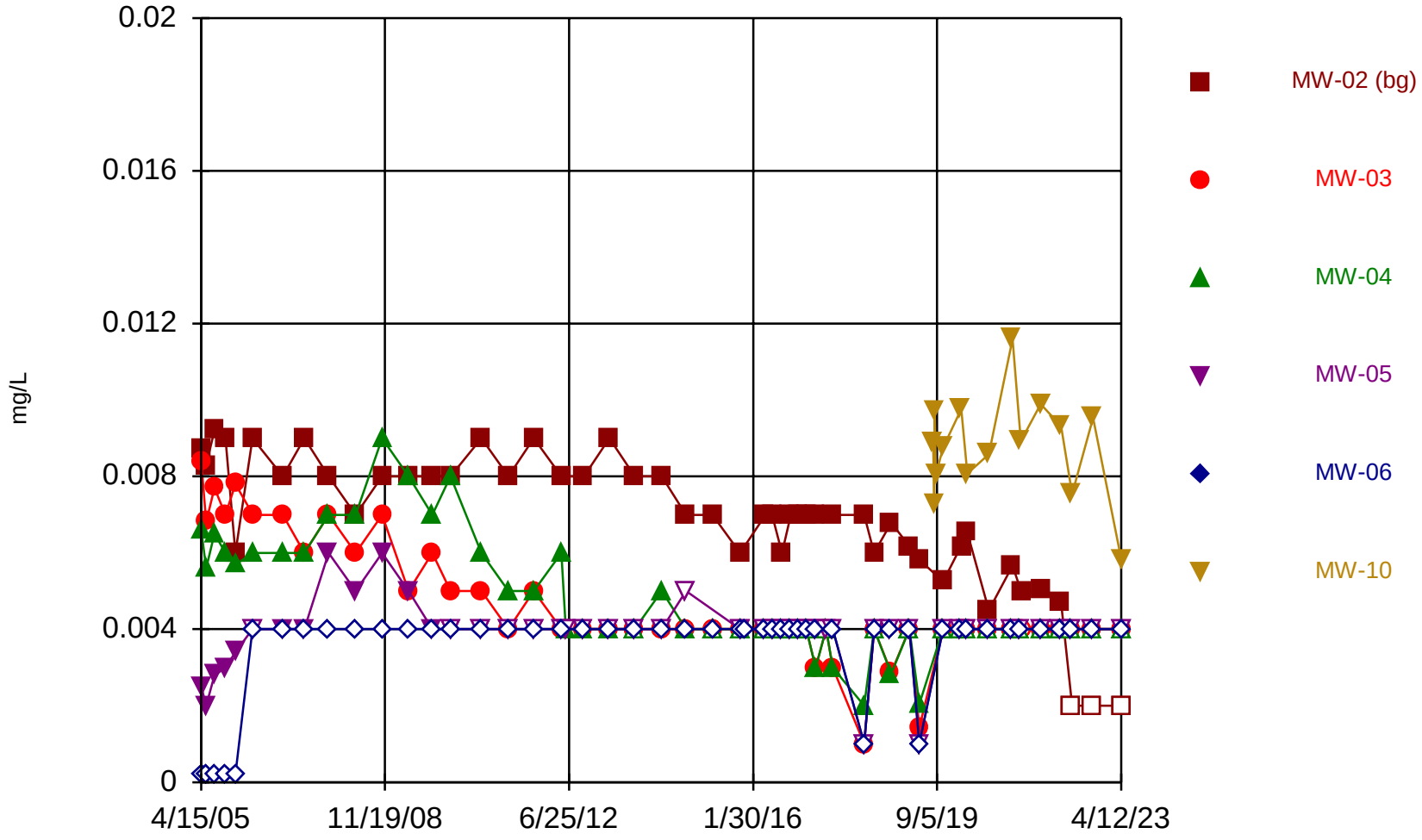


Constituent: Barium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

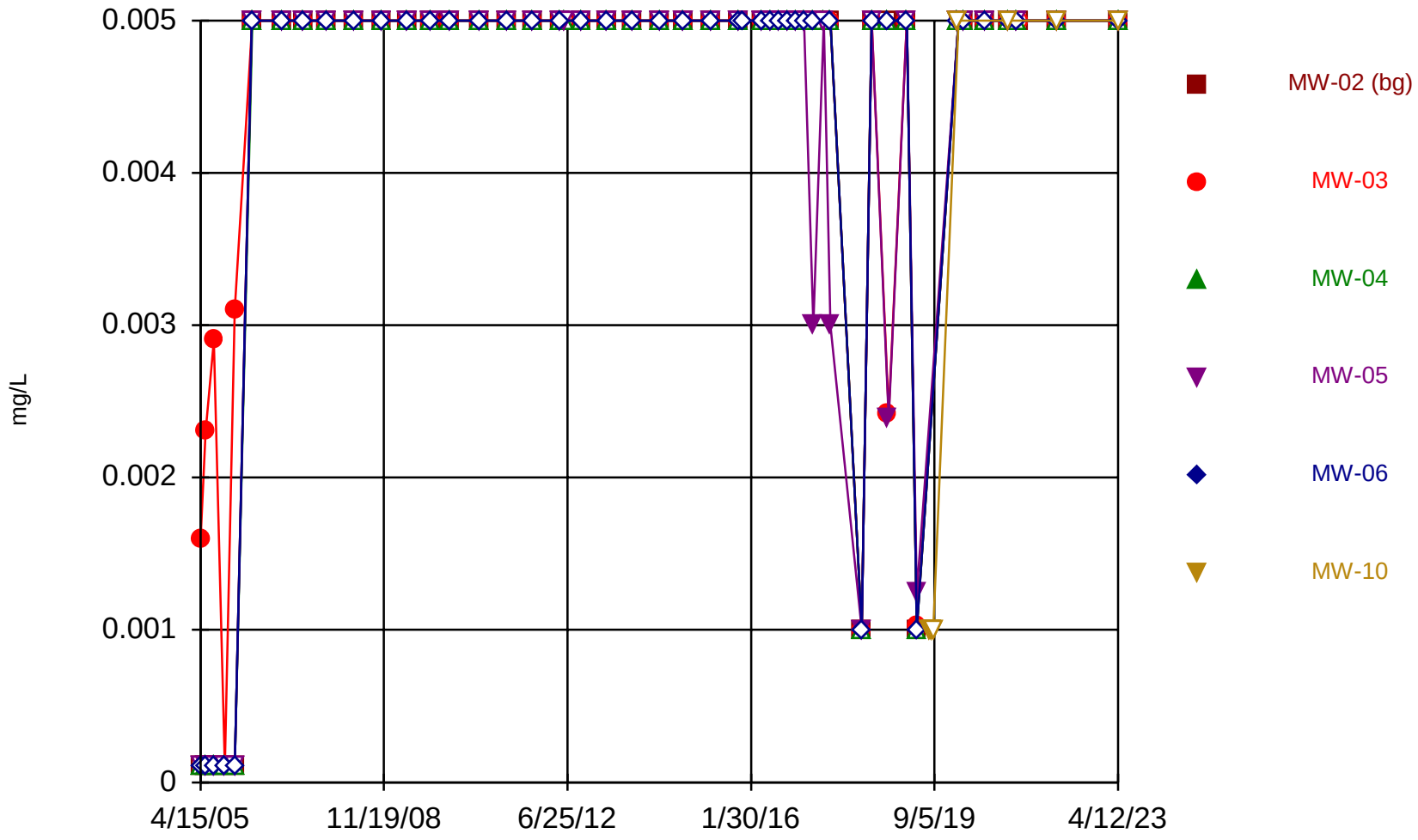


Constituent: Beryllium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

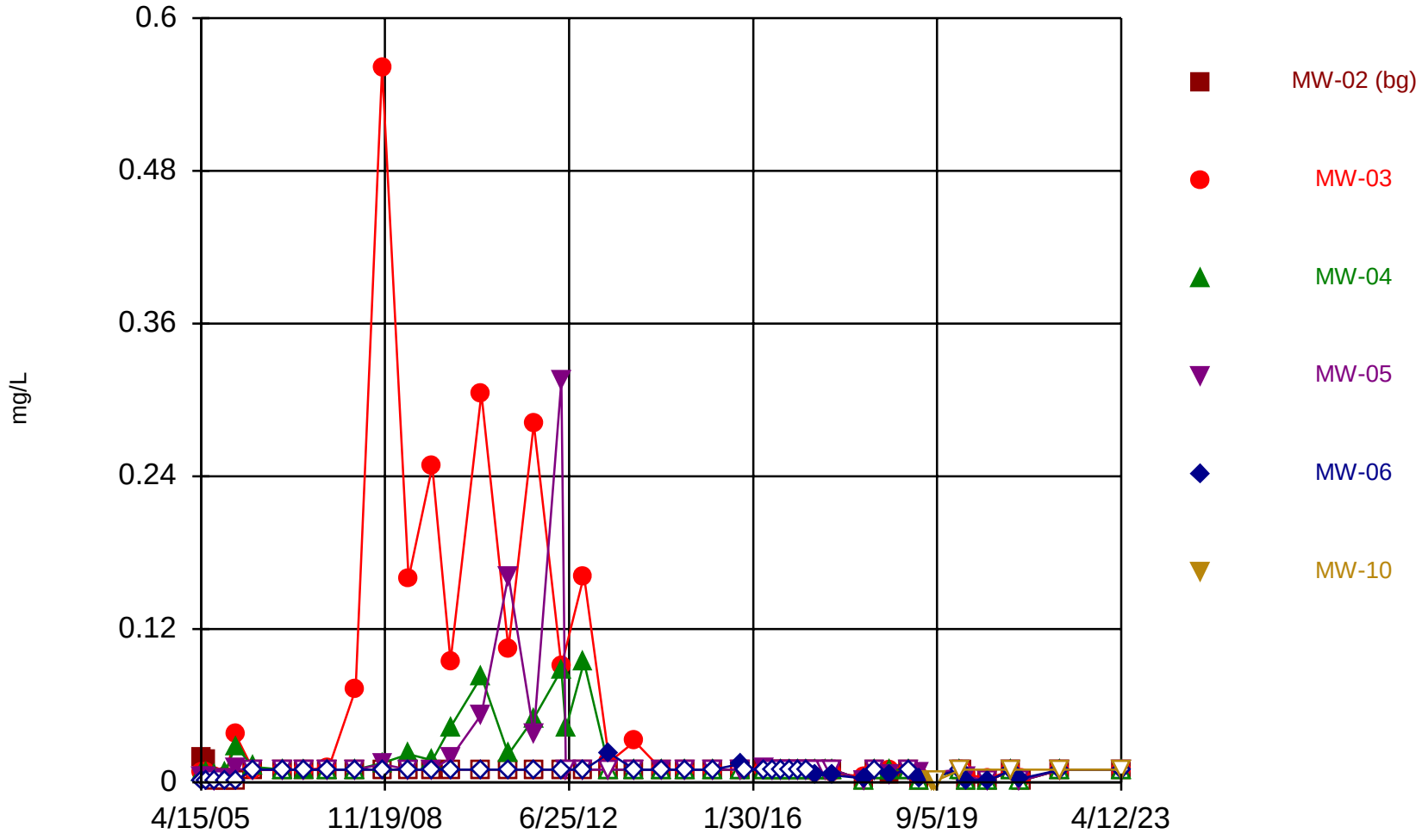


Constituent: Cadmium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

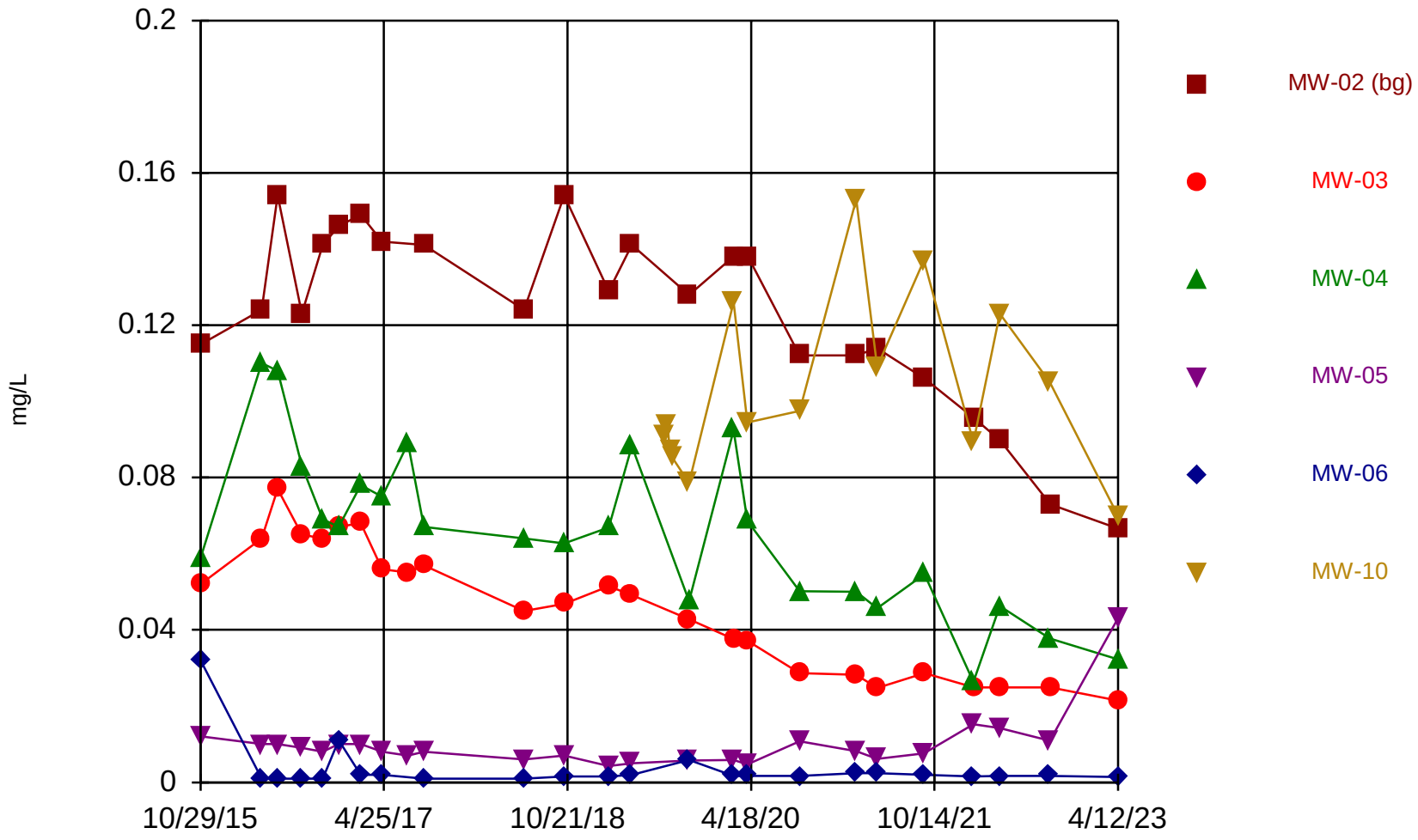
Time Series



Constituent: Chromium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

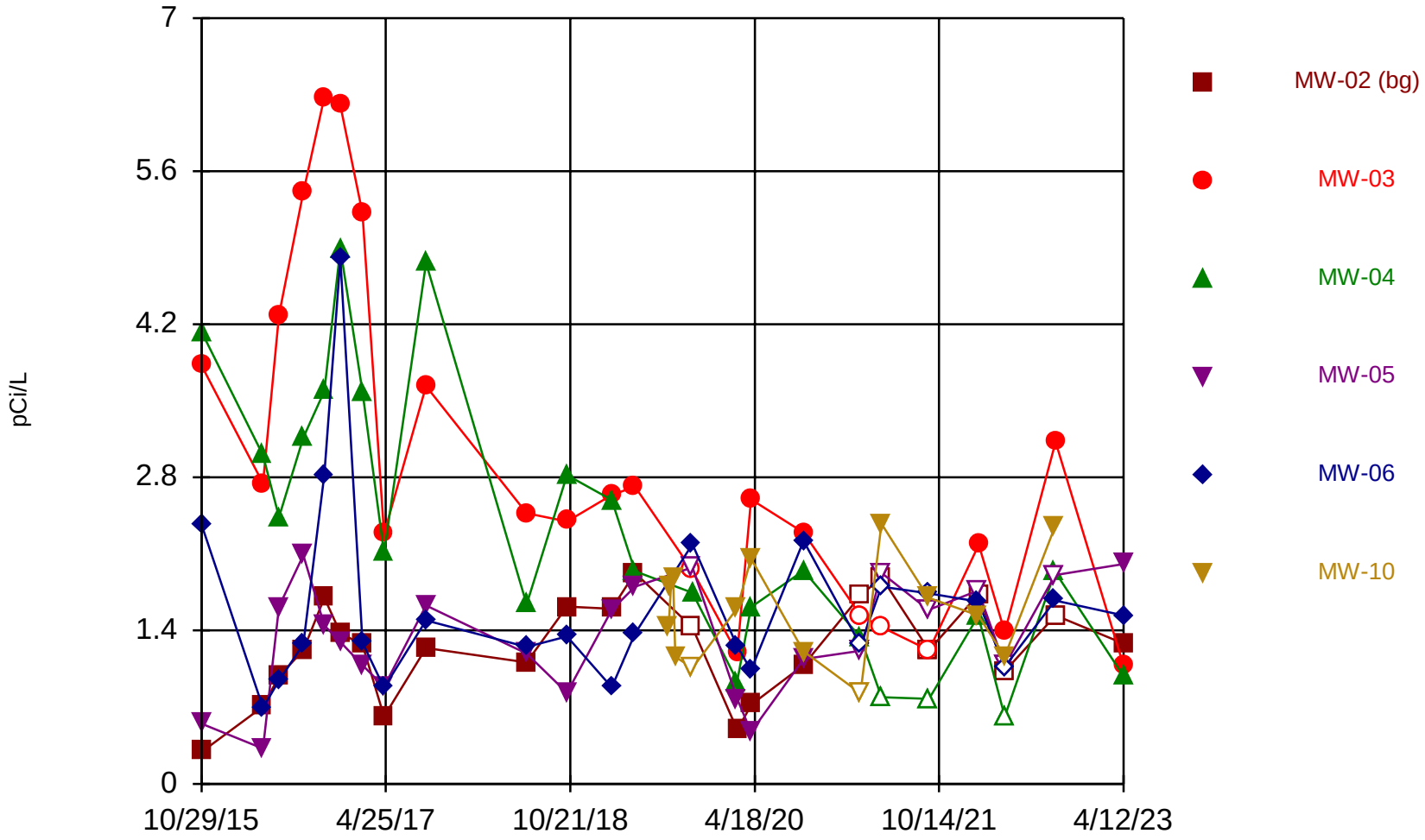


Constituent: Cobalt Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

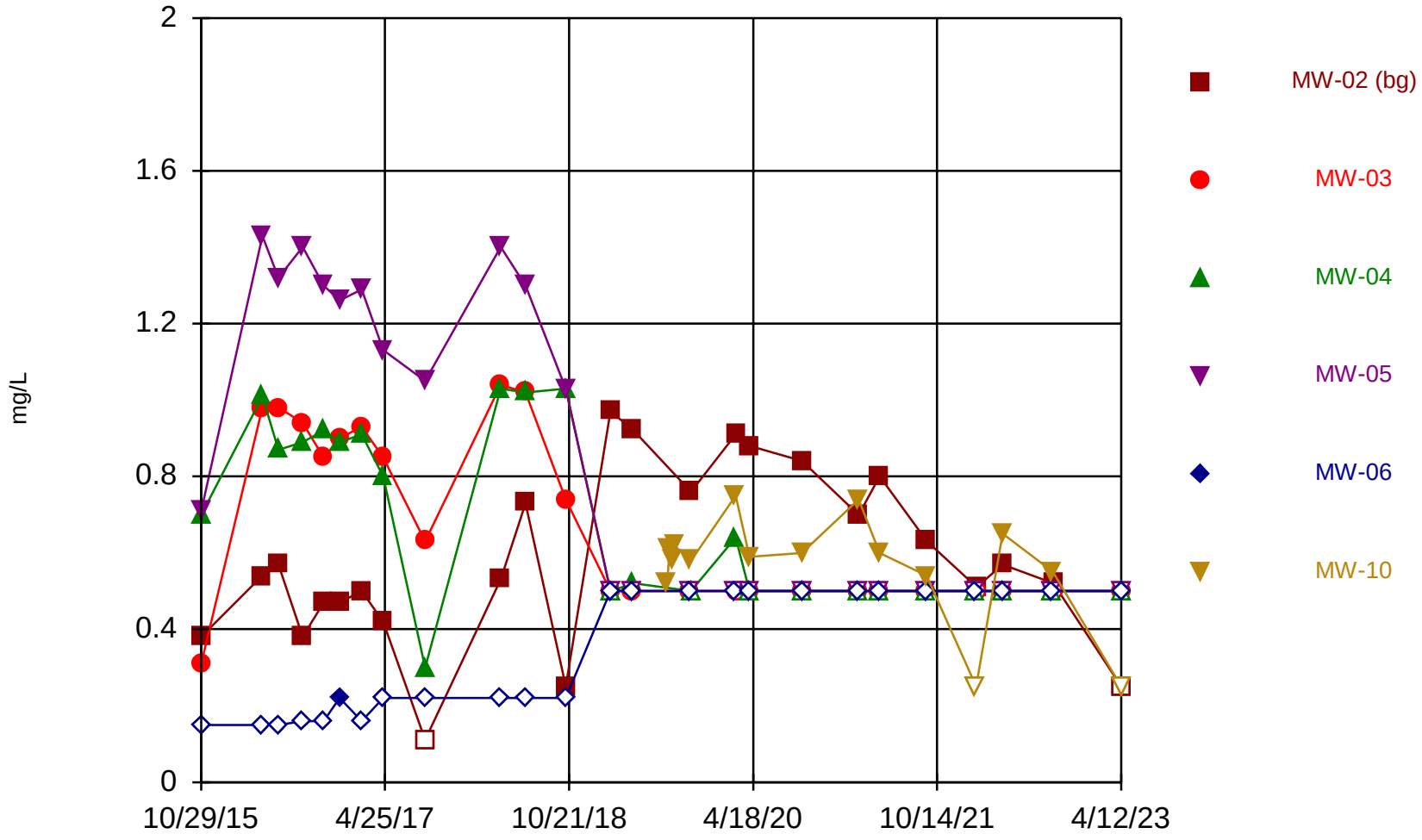


Constituent: Combined Radium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

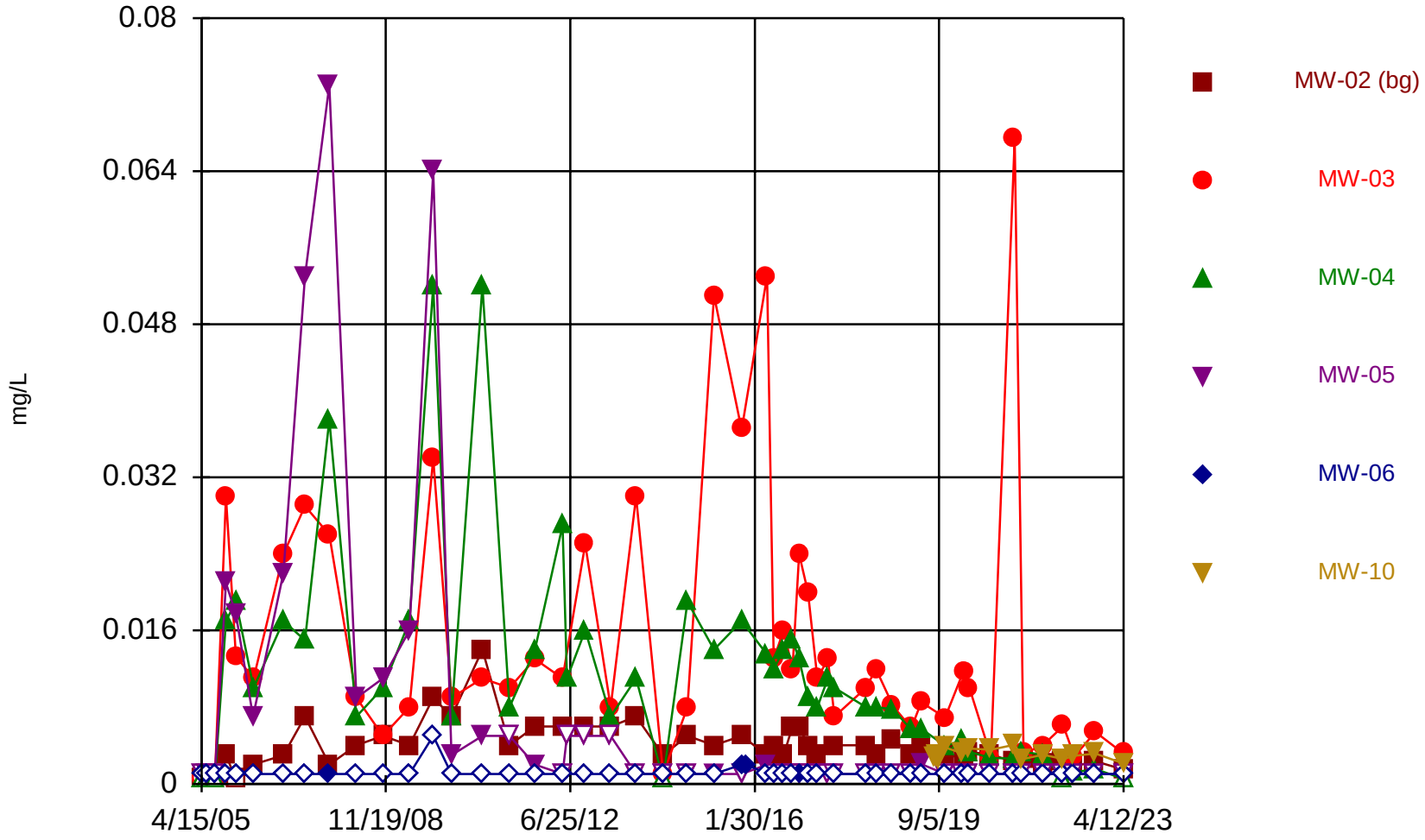


Constituent: Fluoride Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

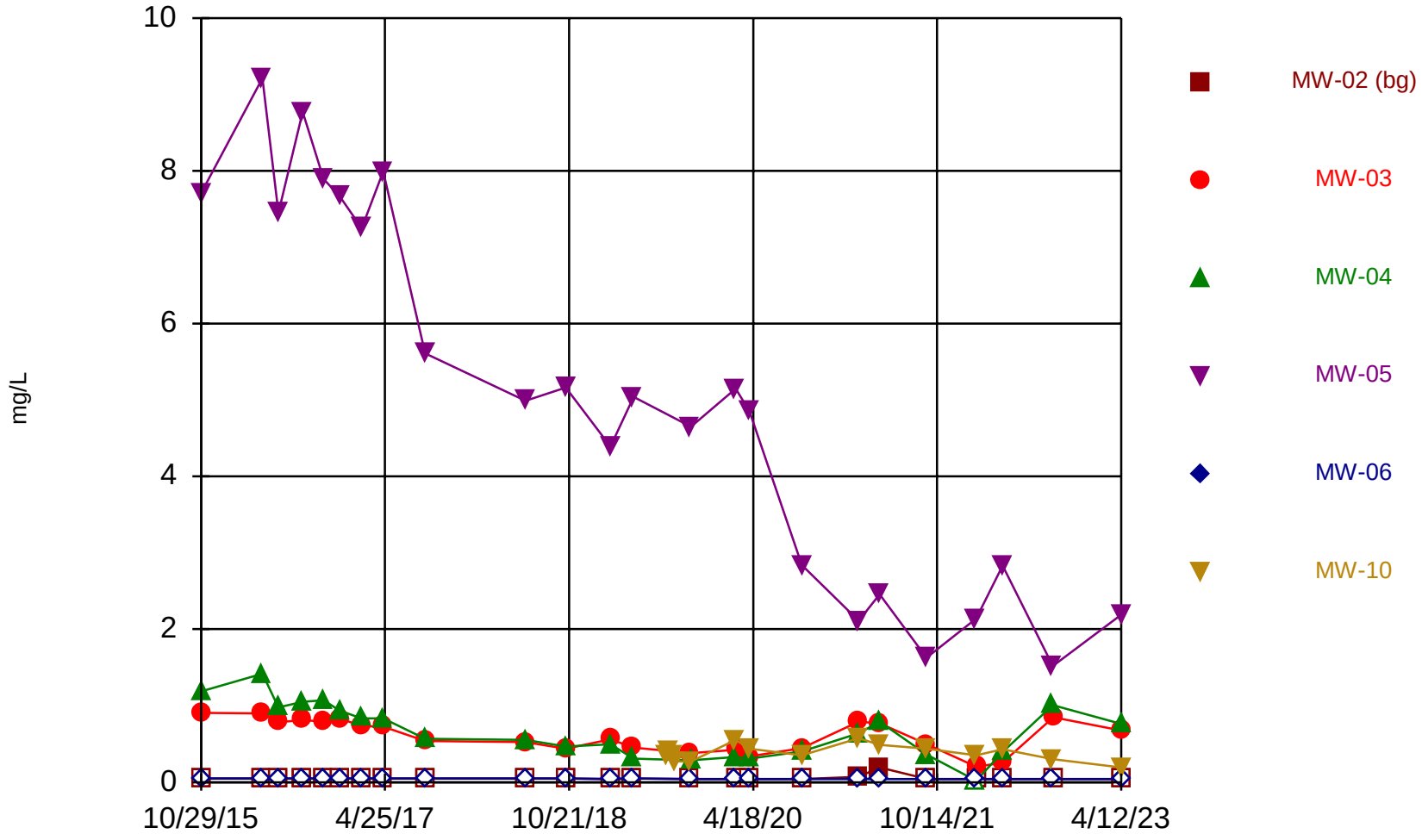


Constituent: Lead Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

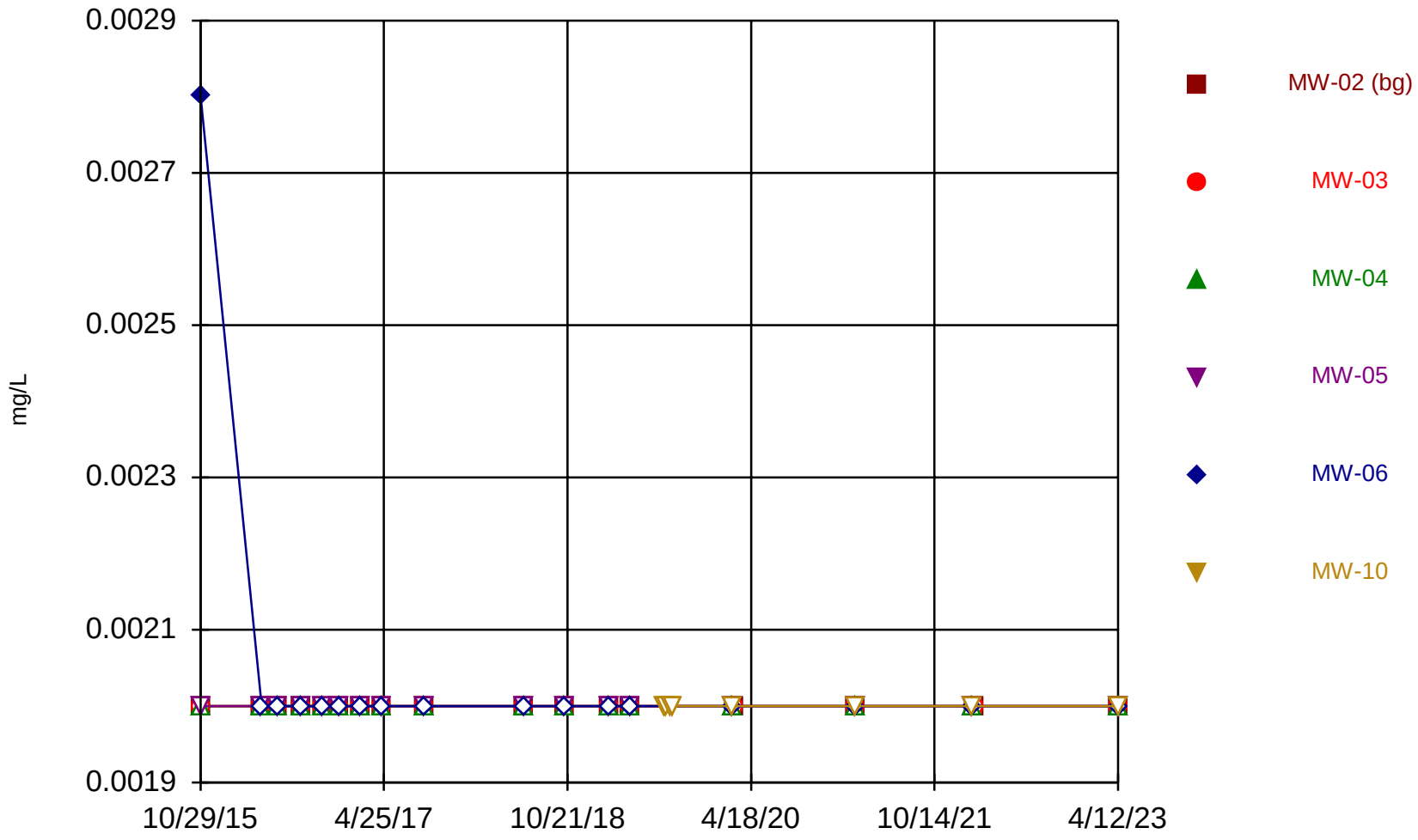


Constituent: Lithium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

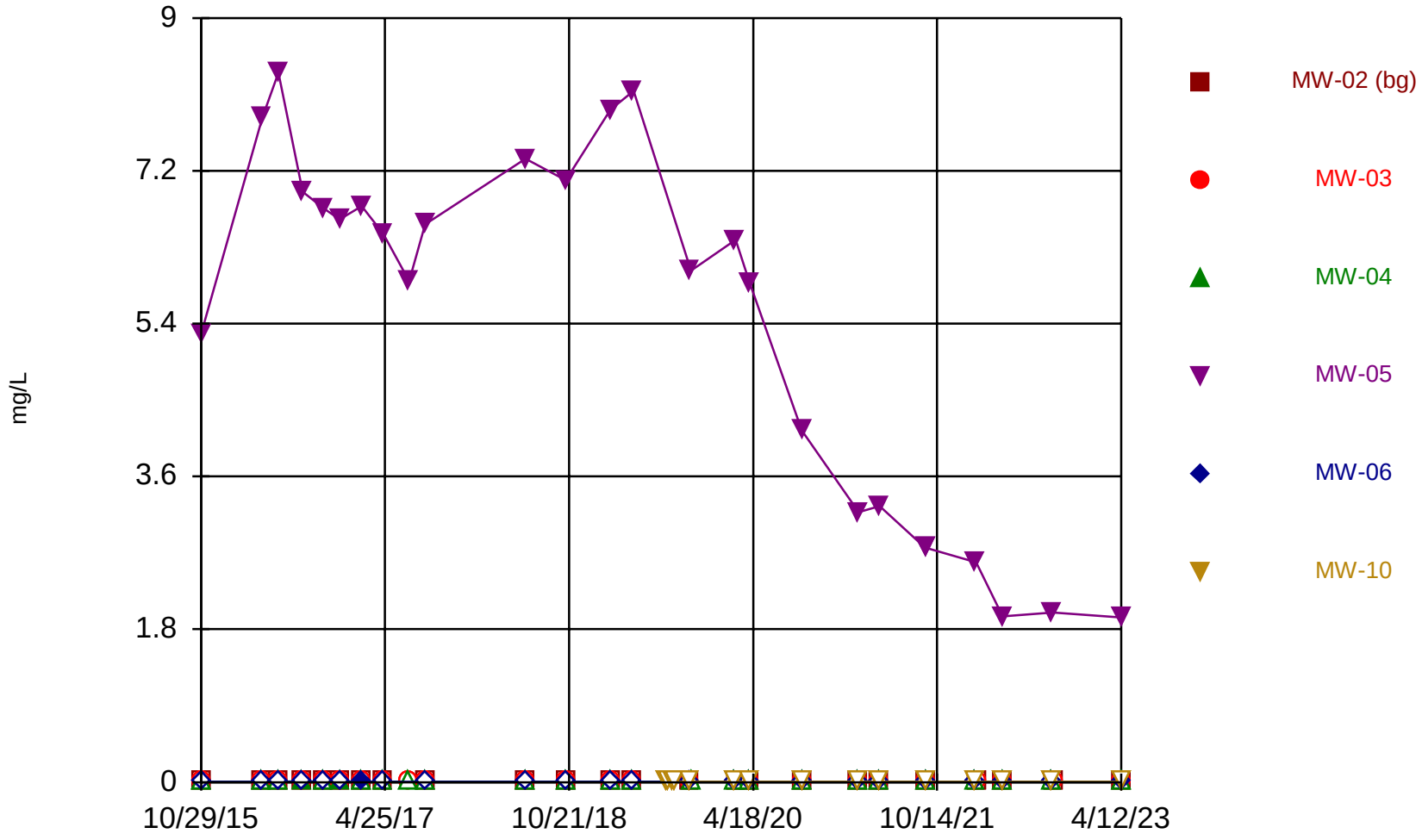


Constituent: Mercury Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

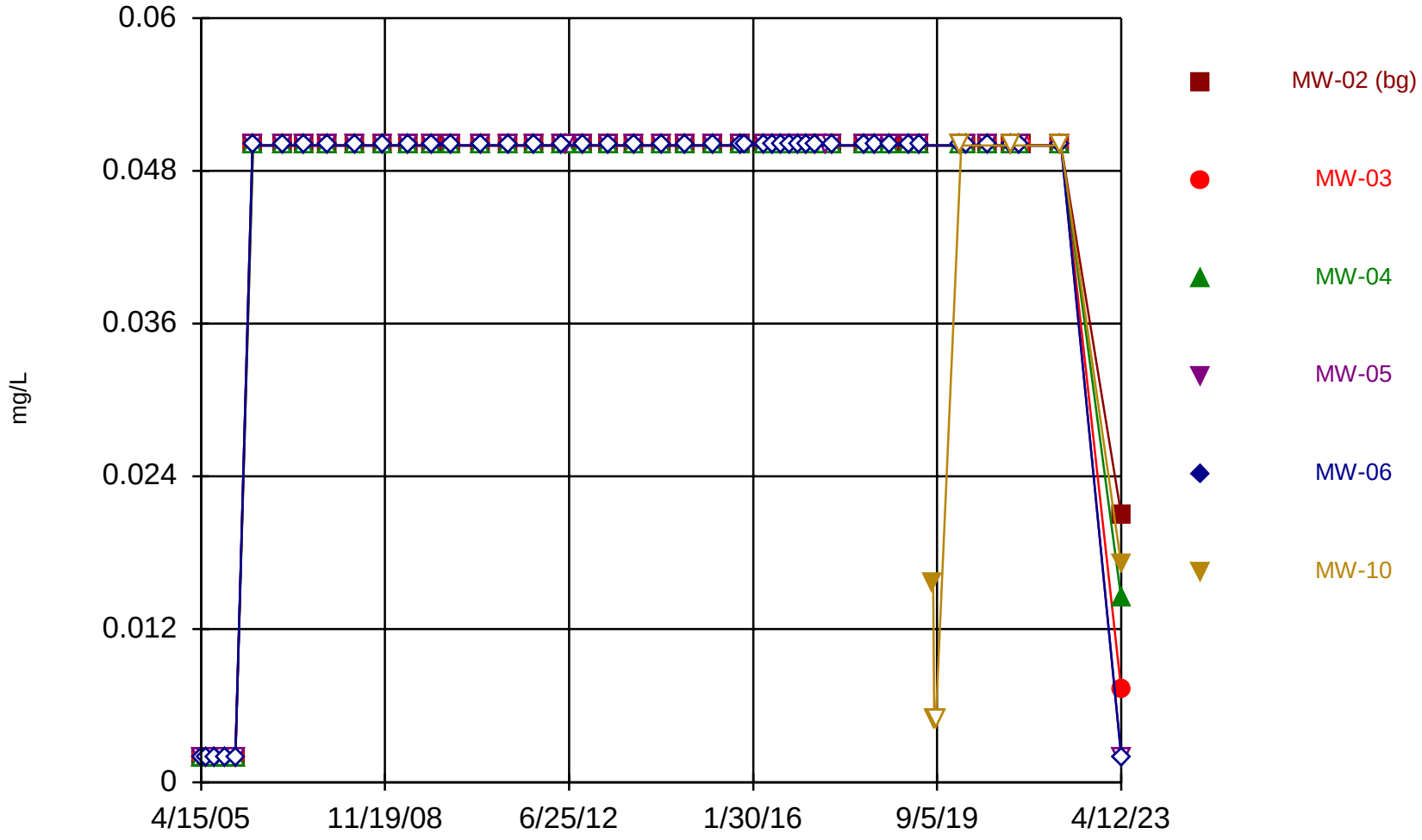


Constituent: Molybdenum Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

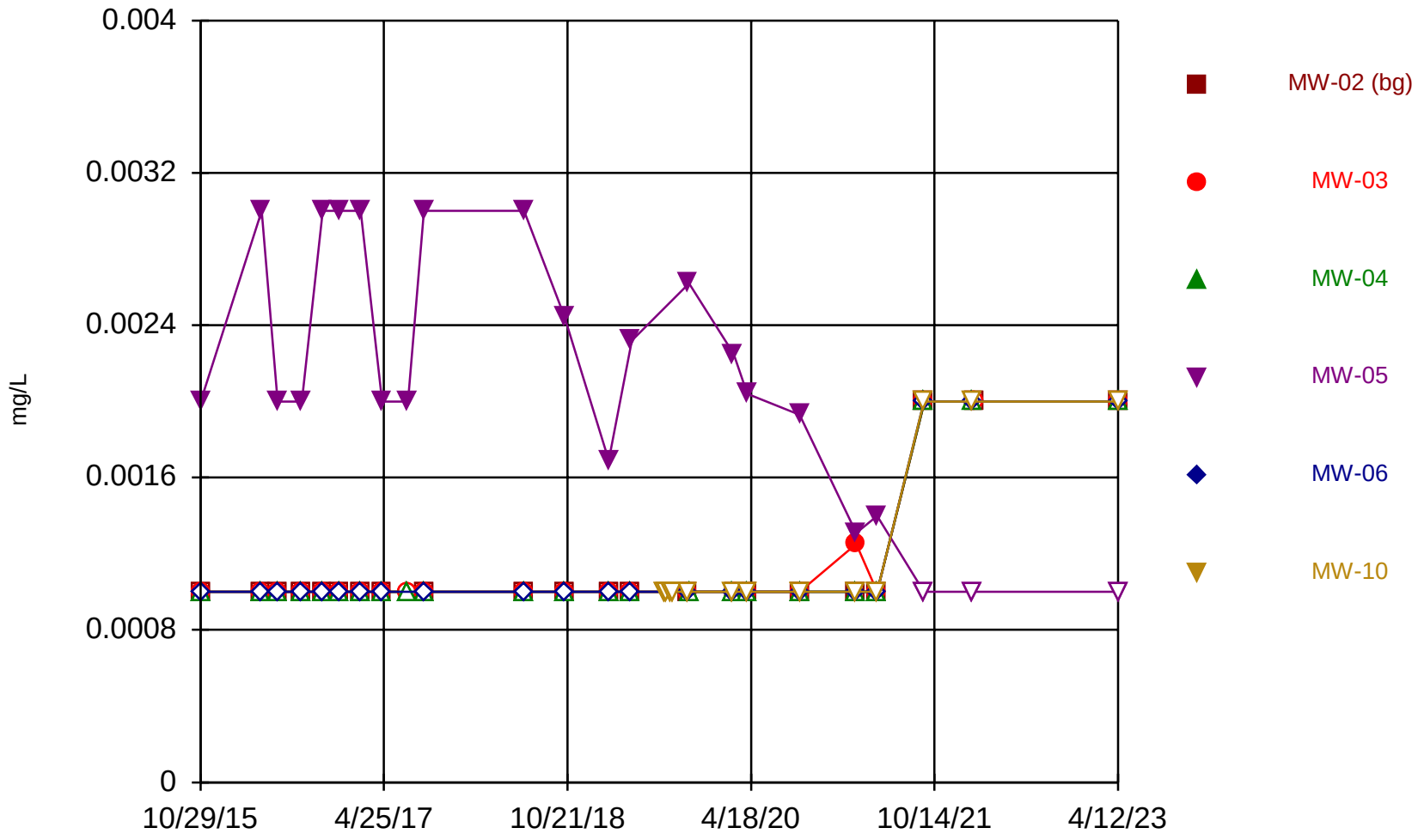


Constituent: Selenium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series



Constituent: Thallium Analysis Run 8/4/2023 8:37 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Confidence Interval

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 1/22/2024, 1:18 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Arsenic (mg/L)	MW-02 (bg)	0.001	0.001	0.01	No	45	97.78	No	0.01	NP (NDs)
Arsenic (mg/L)	MW-03	0.002	0.001	0.01	No	46	80.43	No	0.01	NP (NDs)
Arsenic (mg/L)	MW-04	0.002	0.001	0.01	No	47	80.85	No	0.01	NP (NDs)
Arsenic (mg/L)	MW-05	0.002	0.001	0.01	No	47	82.98	No	0.01	NP (NDs)
Arsenic (mg/L)	MW-06	0.001	0.001	0.01	No	46	97.83	No	0.01	NP (NDs)
Arsenic (mg/L)	MW-10	0.00999	0.001	0.01	No	8	75	No	0.004	NP (normality)
Barium (mg/L)	MW-02 (bg)	0.0234	0.022	2	No	24	0	No	0.01	NP (normality)
Barium (mg/L)	MW-03	0.0354	0.03171	2	No	24	0	No	0.01	Param.
Barium (mg/L)	MW-04	0.03702	0.0322	2	No	24	0	No	0.01	Param.
Barium (mg/L)	MW-05	0.05924	0.05253	2	No	24	0	No	0.01	Param.
Barium (mg/L)	MW-06	0.142	0.114	2	No	24	0	No	0.01	NP (normality)
Barium (mg/L)	MW-10	0.03173	0.02595	2	No	15	0	No	0.01	Param.
Beryllium (mg/L)	MW-02 (bg)	0.00759	0.006558	0.009709	No	49	6.122	x^2	0.01	Param.
Beryllium (mg/L)	MW-03	0.004	0.002	0.009709	No	50	52	No	0.01	NP (normality)
Beryllium (mg/L)	MW-04	0.005	0.002	0.009709	No	51	45.1	No	0.01	NP (normality)
Beryllium (mg/L)	MW-05	0.0025	0.002	0.009709	No	50	76	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-06	0.002	0.0005	0.009709	No	50	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-10	0.009699	0.007871	0.009709	No	15	0	No	0.01	Param.
Cobalt (mg/L)	MW-02 (bg)	0.1354	0.1109	0.1785	No	24	0	No	0.01	Param.
Cobalt (mg/L)	MW-03	0.05401	0.0373	0.1785	No	25	0	No	0.01	Param.
Cobalt (mg/L)	MW-04	0.07636	0.05472	0.1785	No	25	0	No	0.01	Param.
Cobalt (mg/L)	MW-05	0.0107	0.00614	0.1785	No	25	0	No	0.01	NP (normality)
Cobalt (mg/L)	MW-06	0.00203	0.00134	0.1785	No	24	0	No	0.01	NP (normality)
Cobalt (mg/L)	MW-10	0.1182	0.08707	0.1785	No	15	0	No	0.01	Param.
Combined Radium (pCi/L)	MW-02 (bg)	1.267	0.818	5	No	24	33.33	No	0.01	Param.
Combined Radium (pCi/L)	MW-03	3.674	2.085	5	No	24	20.83	No	0.01	Param.
Combined Radium (pCi/L)	MW-04	2.926	1.744	5	No	24	16.67	No	0.01	Param.
Combined Radium (pCi/L)	MW-05	1.391	0.8753	5	No	24	29.17	No	0.01	Param.
Combined Radium (pCi/L)	MW-06	1.853	1.126	5	No	24	16.67	sqrt(x)	0.01	Param.
Combined Radium (pCi/L)	MW-10	1.921	1.245	5	No	14	14.29	No	0.01	Param.
Lead (mg/L)	MW-02 (bg)	0.004396	0.002866	0.015	No	49	8.163	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-03	0.01637	0.008452	0.015	No	50	6	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-04	0.01235	0.006236	0.015	No	51	11.76	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-05	0.00207	0.0005	0.015	No	51	68.63	No	0.01	NP (normality)
Lead (mg/L)	MW-06	0.0005	0.0005	0.015	No	50	92	No	0.01	NP (NDs)
Lead (mg/L)	MW-10	0.003405	0.002668	0.015	No	15	0	No	0.01	Param.
Lithium (mg/L)	MW-02 (bg)	0.025	0.02	1.42	No	24	91.67	No	0.01	NP (NDs)
Lithium (mg/L)	MW-03	0.7178	0.5006	1.42	No	24	0	No	0.01	Param.
Lithium (mg/L)	MW-04	0.8442	0.4888	1.42	No	24	4.167	No	0.01	Param.
Lithium (mg/L)	**MW-05**	**6.318**	**3.807**	**1.42**	**Yes**	**24**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	MW-06	0.025	0.02	1.42	No	24	100	No	0.01	NP (NDs)
Lithium (mg/L)	MW-10	0.4555	0.3112	1.42	No	15	0	No	0.01	Param.
Molybdenum (mg/L)	MW-02 (bg)	0.0025	0.0005	0.1	No	24	100	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-03	0.00727	0.0005	0.1	No	25	96	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-04	0.006	0.0005	0.1	No	25	92	No	0.01	NP (NDs)
Molybdenum (mg/L)	**MW-05**	**6.657**	**4.826**	**0.1**	**Yes**	**26**	**0**	**x^2**	**0.01**	**Param.**
Molybdenum (mg/L)	MW-06	0.005	0.0025	0.1	No	24	87.5	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-10	0.0025	0.0005	0.1	No	15	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-02 (bg)	0.025	0.021	0.05	No	45	97.78	No	0.01	NP (NDs)
Selenium (mg/L)	MW-03	0.025	0.00725	0.05	No	46	97.83	No	0.01	NP (NDs)

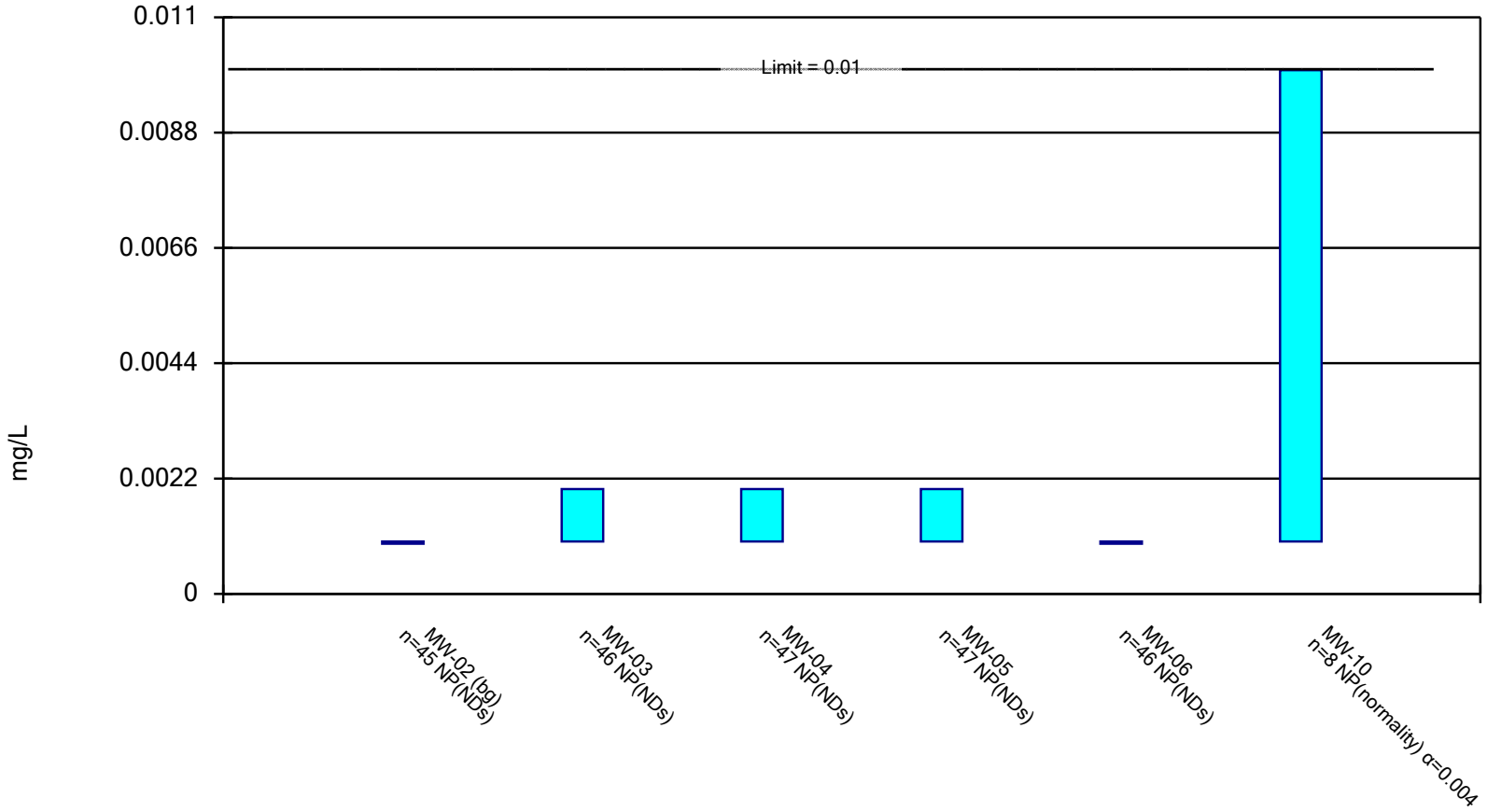
Confidence Interval

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 1/22/2024, 1:18 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Selenium (mg/L)	MW-04	0.025	0.0144	0.05	No	47	97.87	No	0.01	NP (NDs)
Selenium (mg/L)	MW-05	0.025	0.025	0.05	No	47	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-06	0.025	0.025	0.05	No	46	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-10	0.025	0.0025	0.05	No	8	75	No	0.004	NP (normality)

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

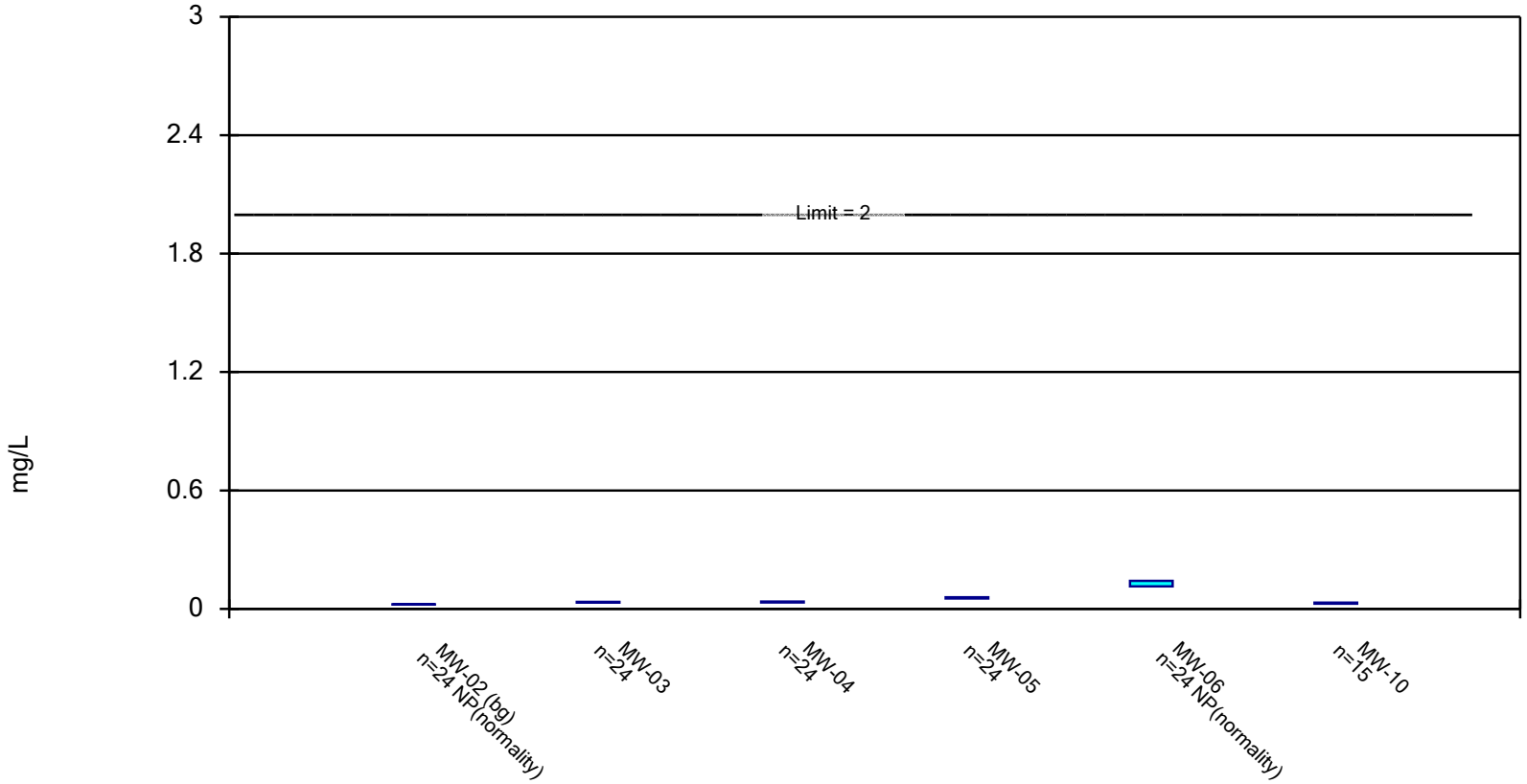


Constituent: Arsenic Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

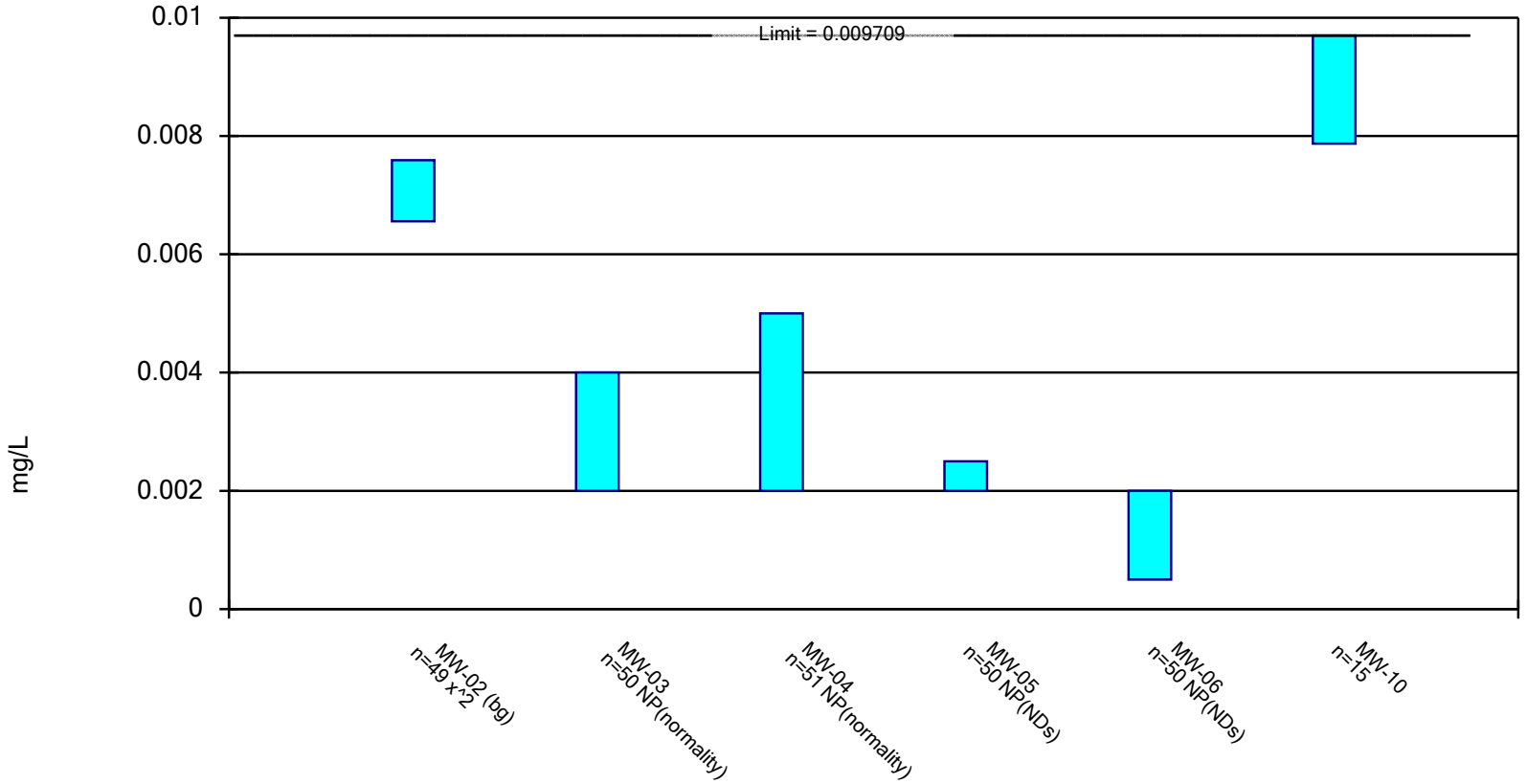


Constituent: Barium Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: multiple

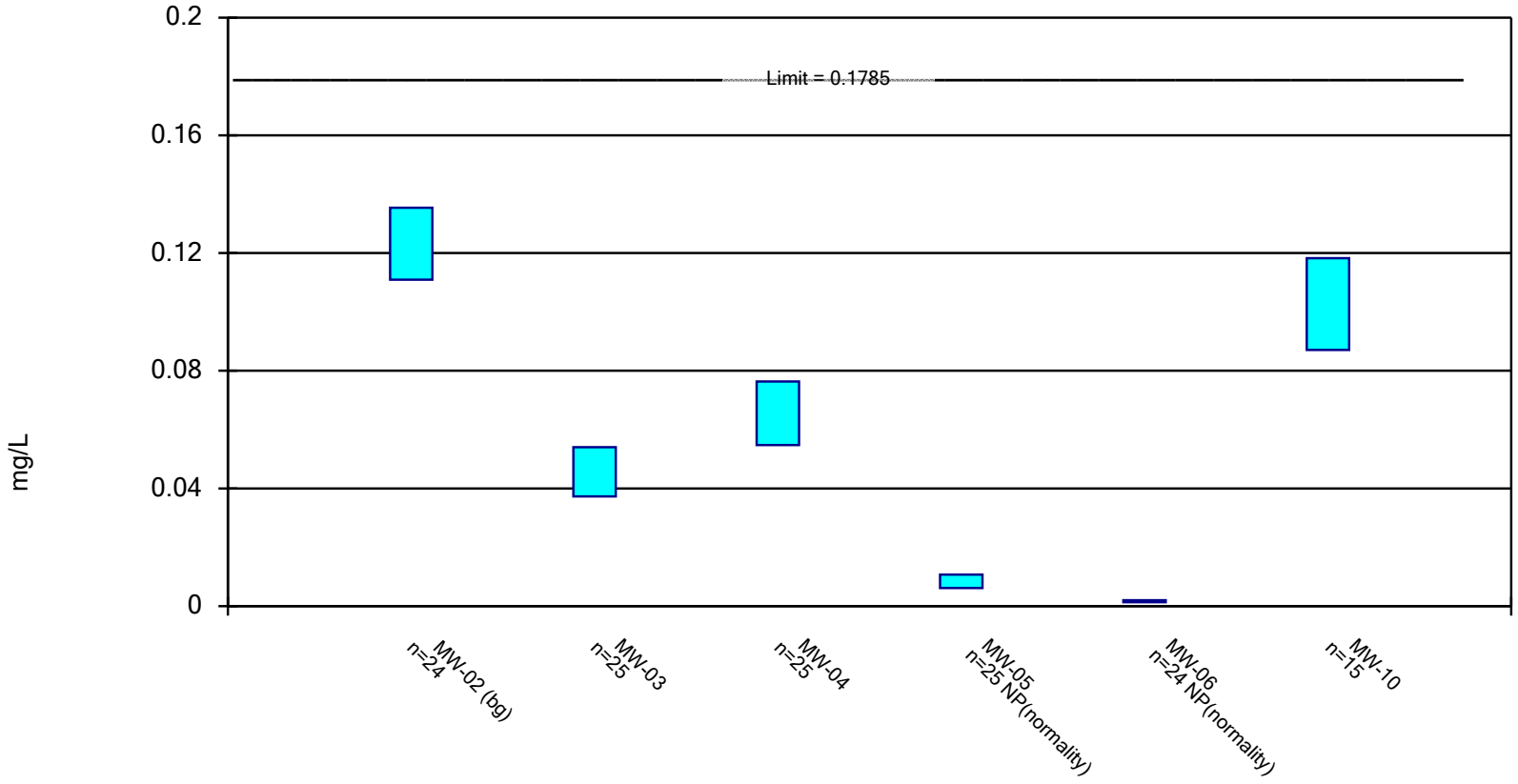


Constituent: Beryllium Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

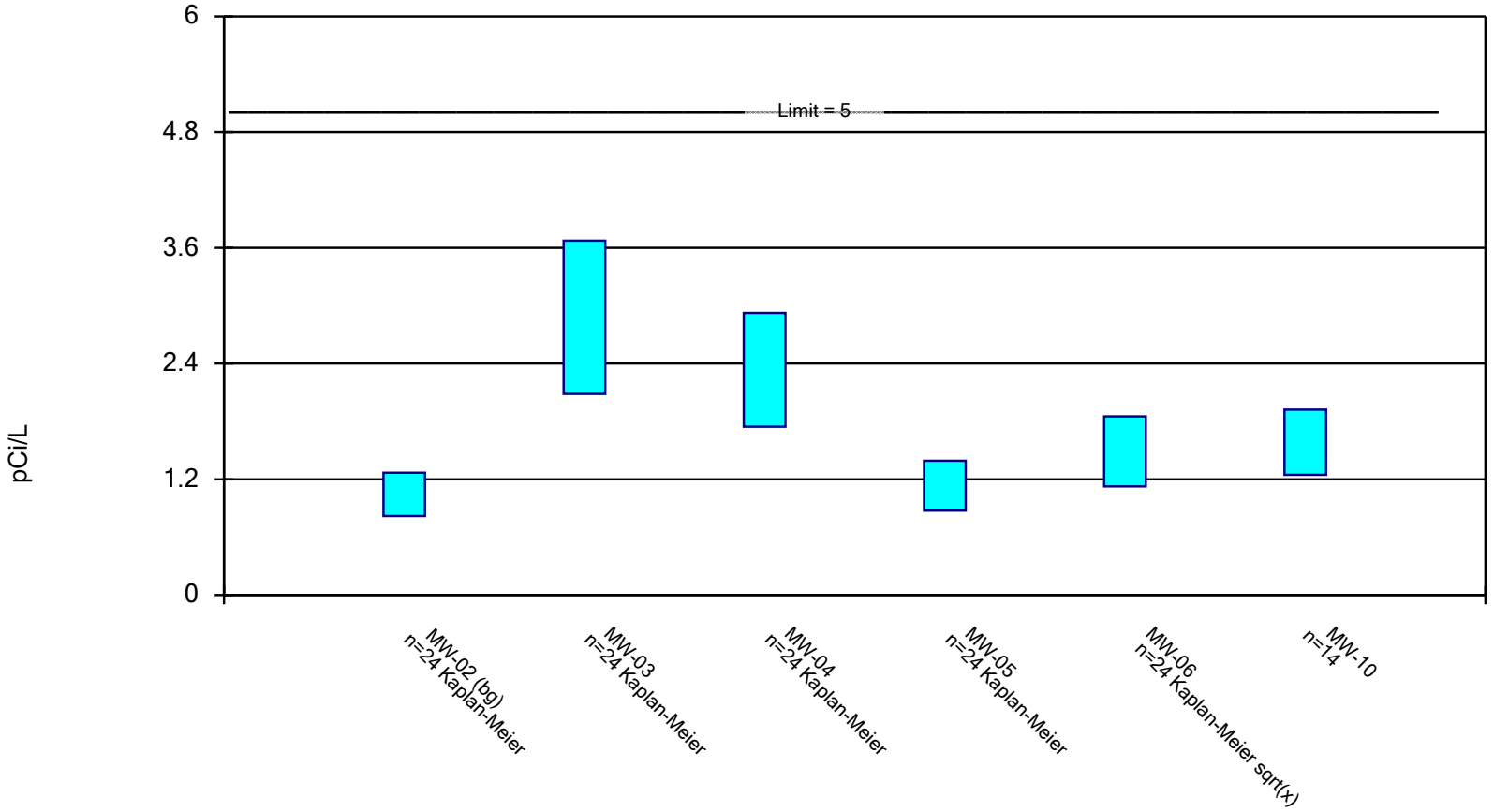


Constituent: Cobalt Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

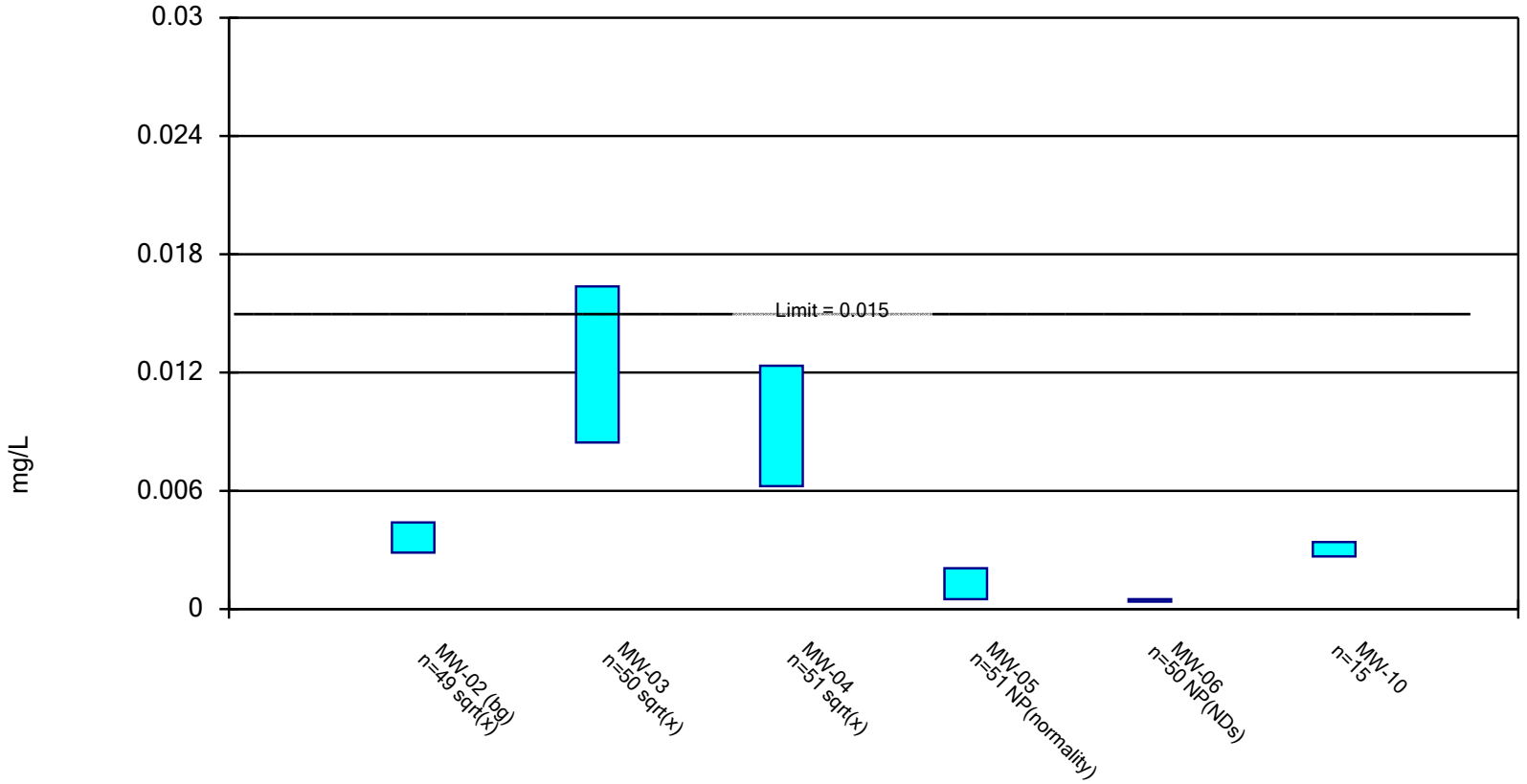


Constituent: Combined Radium Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: multiple

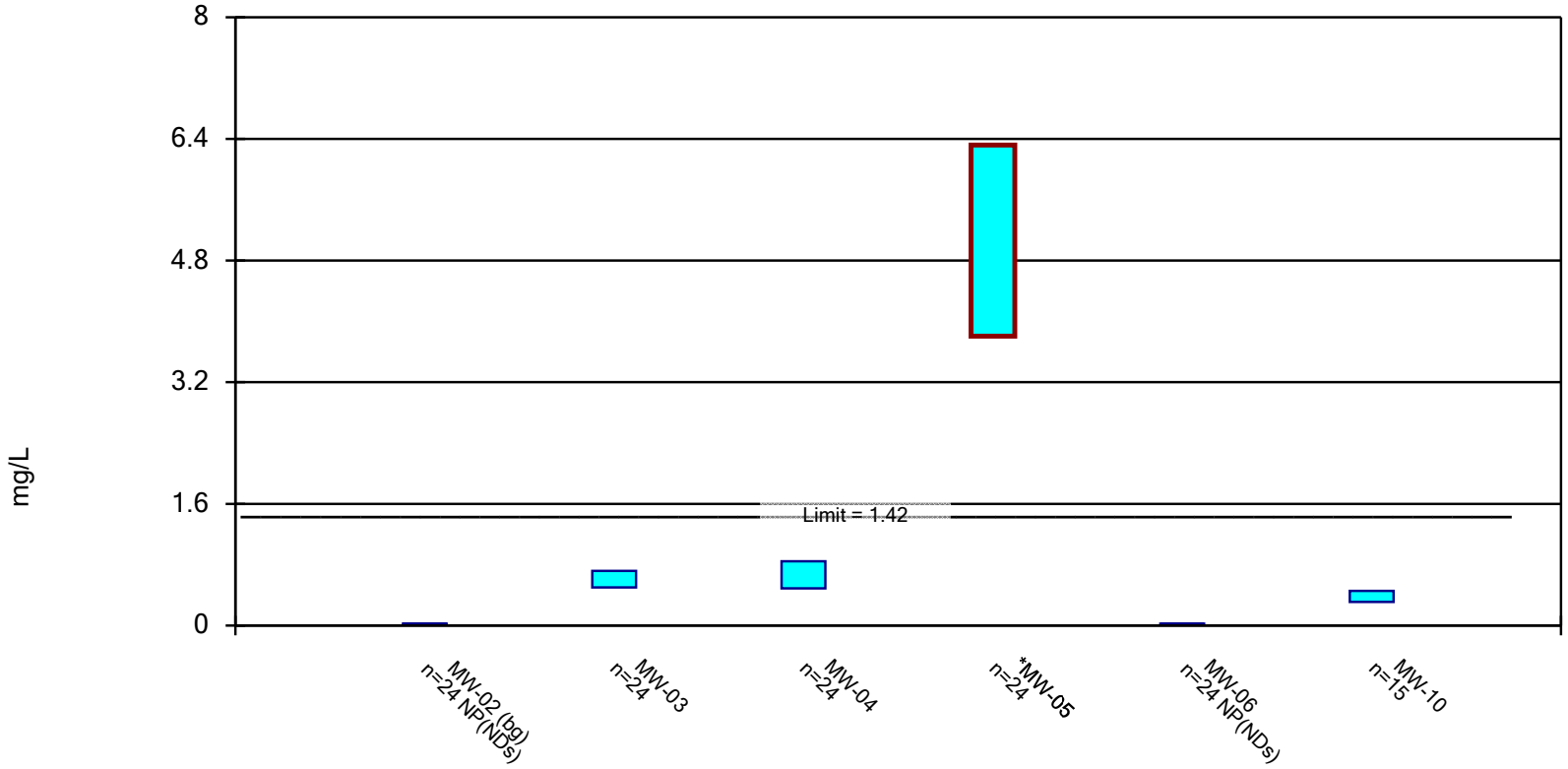


Constituent: Lead Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

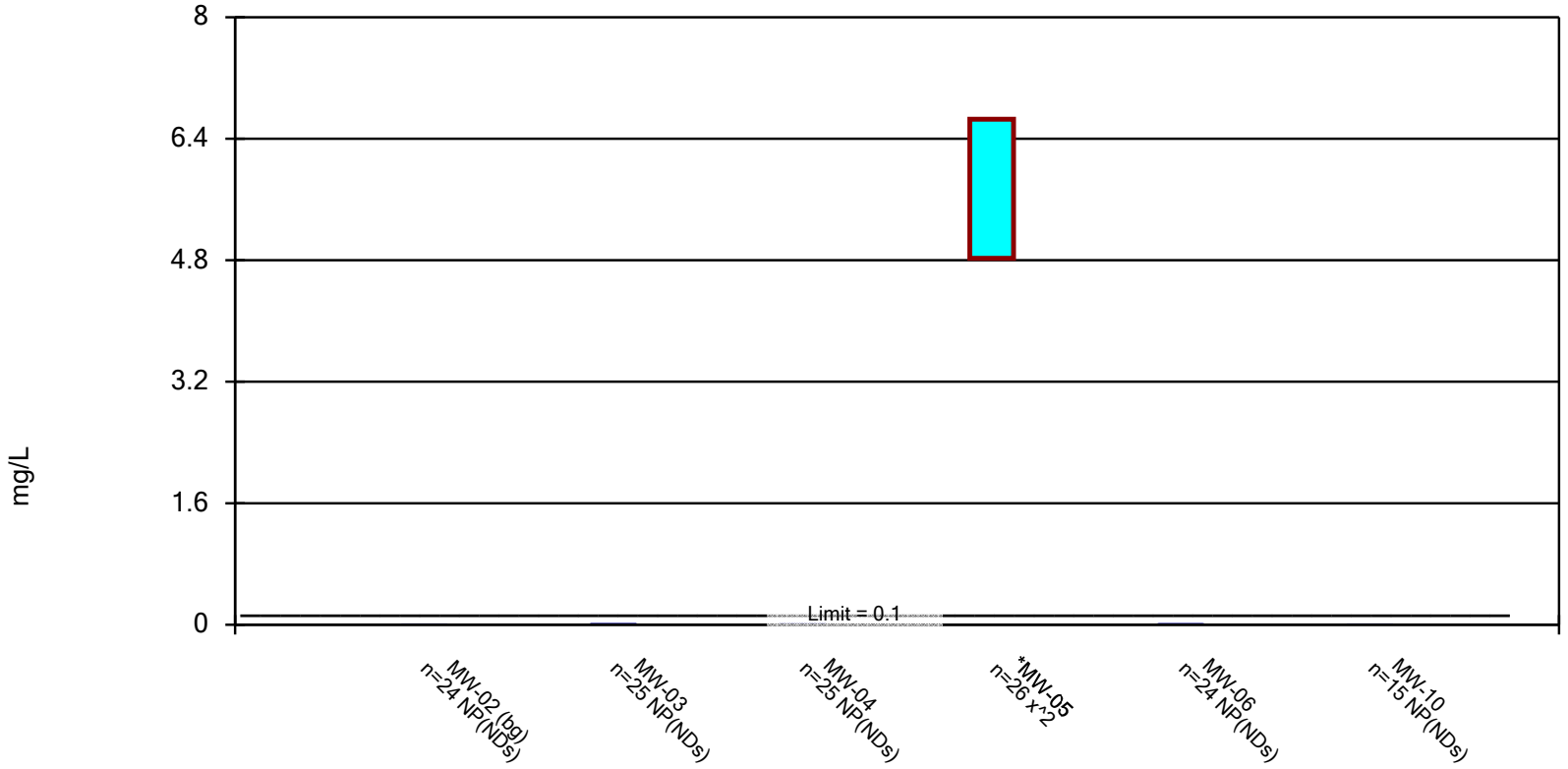


Constituent: Lithium Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

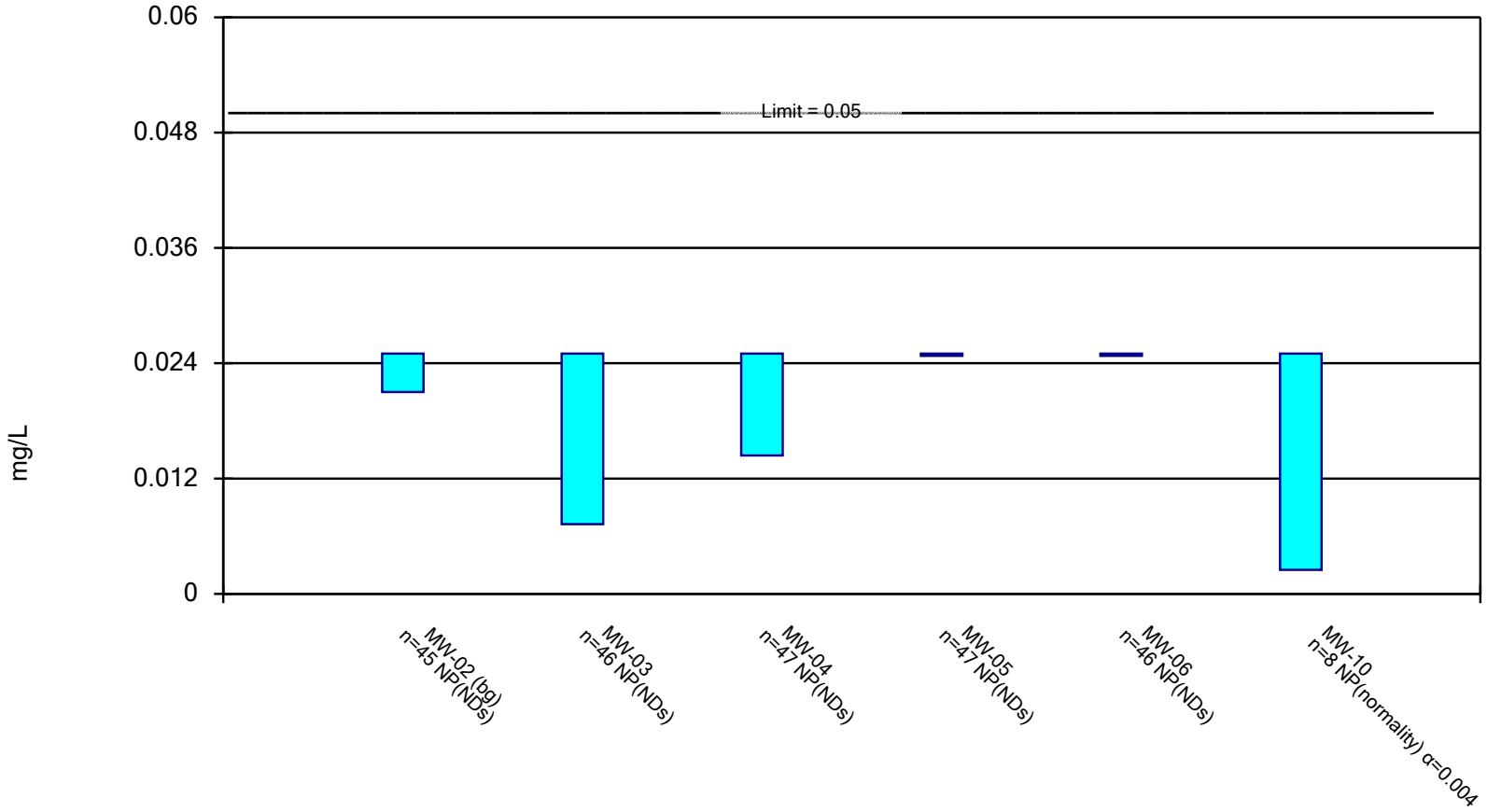


Constituent: Molybdenum Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Selenium Analysis Run 1/22/2024 1:16 PM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

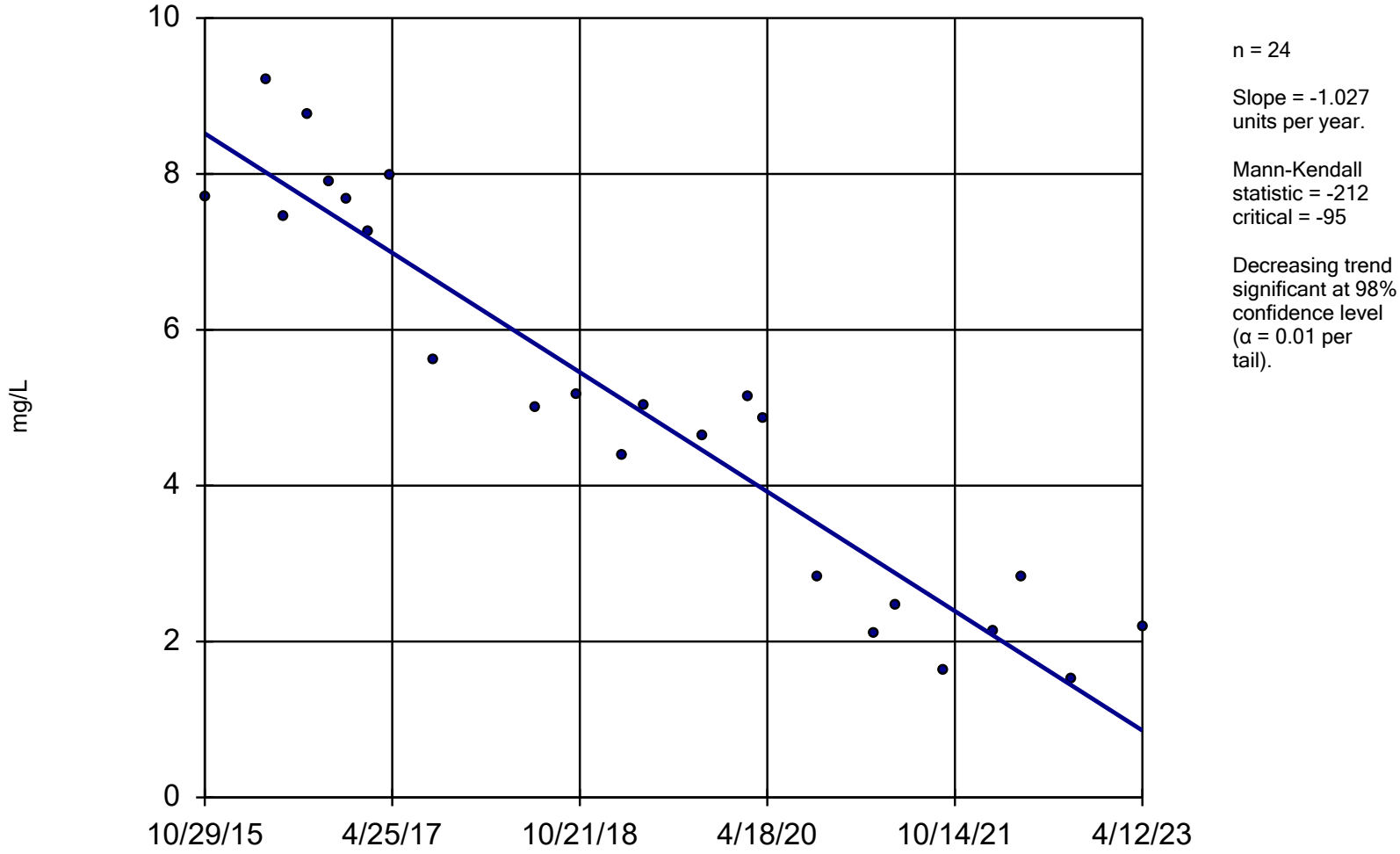
Trend Test

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/1/2023, 7:43 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium (mg/L)	**MW-05**	**-1.027**	**-212**	**-95**	**Yes**	**24**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (mg/L)	**MW-05**	**-0.8151**	**-202**	**-106**	**Yes**	**26**	**0**	**n/a**	**n/a**	**0.02**	**NP**

Sen's Slope Estimator

MW-05



n = 24

Slope = -1.027 units per year.

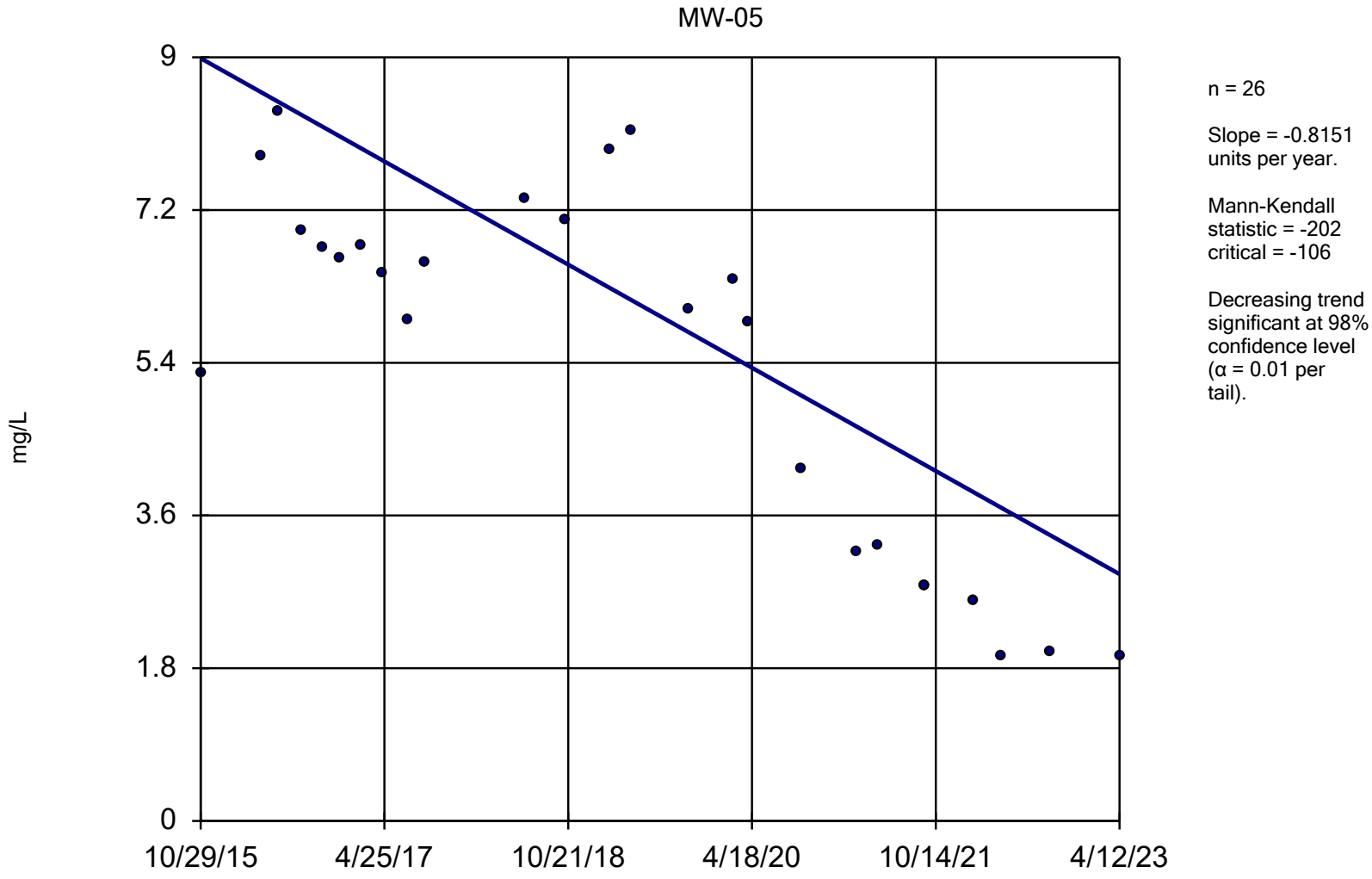
Mann-Kendall statistic = -212
critical = -95

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

Constituent: Lithium Analysis Run 12/1/2023 7:42 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



Constituent: Molybdenum Analysis Run 12/1/2023 7:42 AM View: Landfill App IV

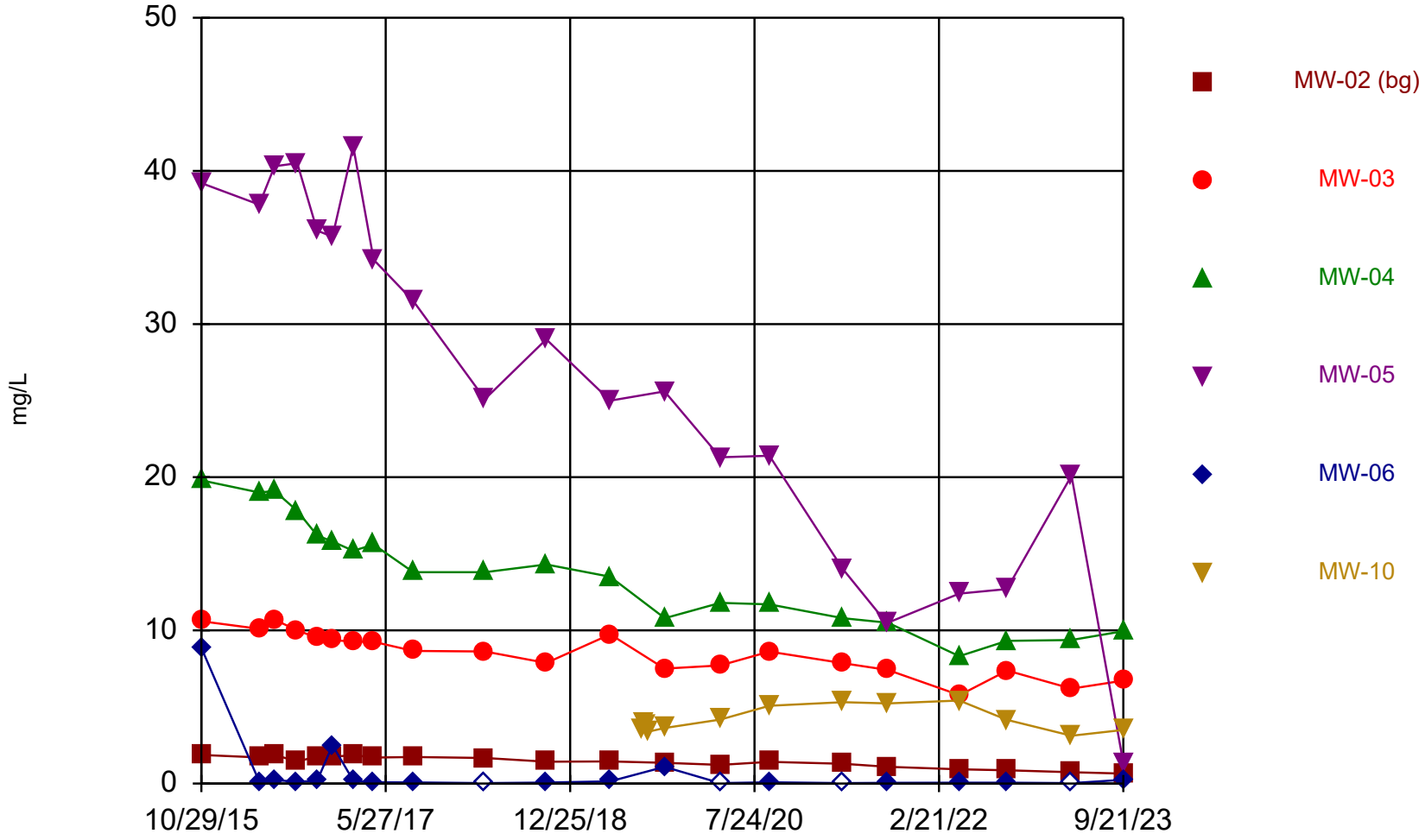
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

APPENDIX B

Statistical Analysis September 2023

Hollow symbols indicate censored values.

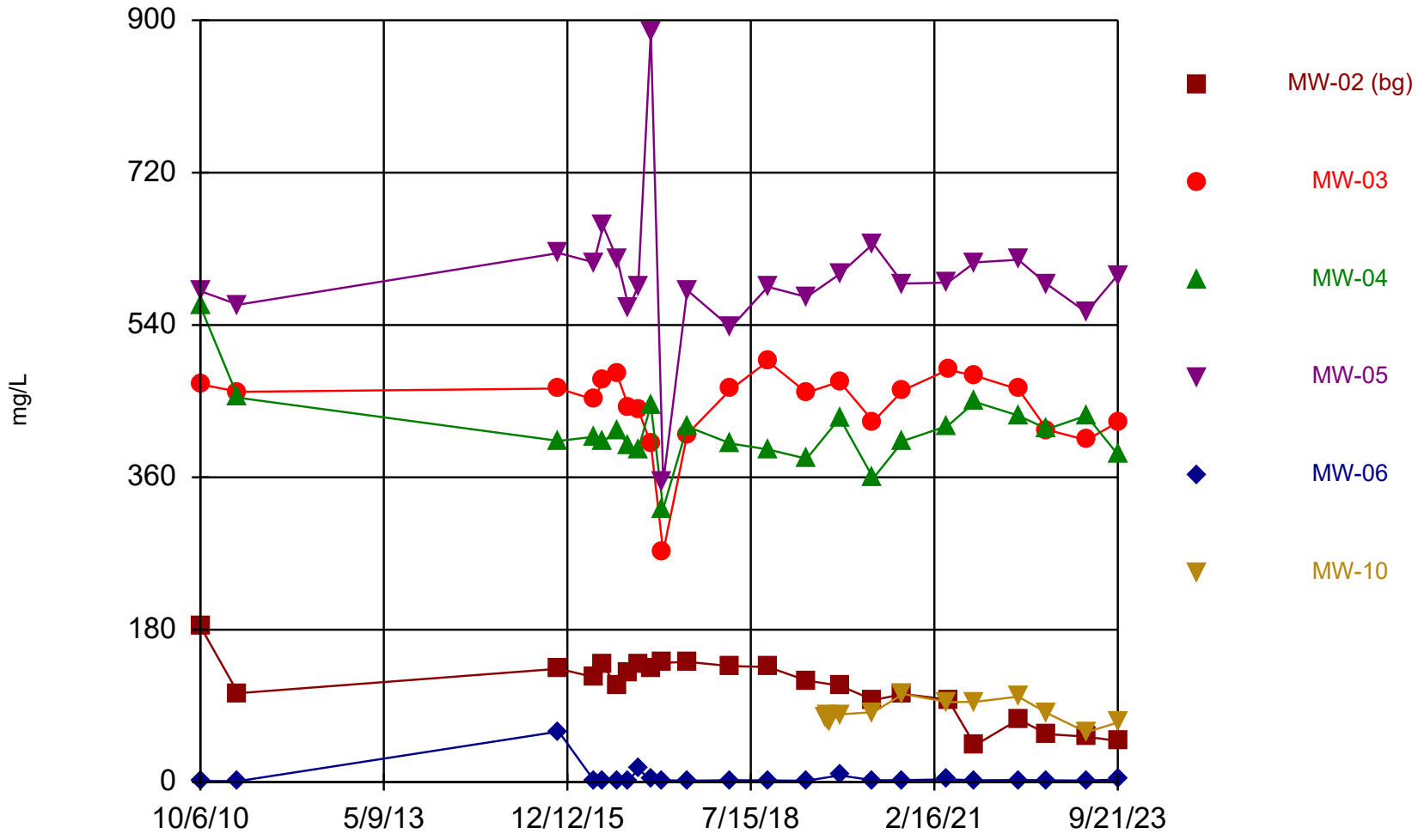
Time Series



Constituent: Boron Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

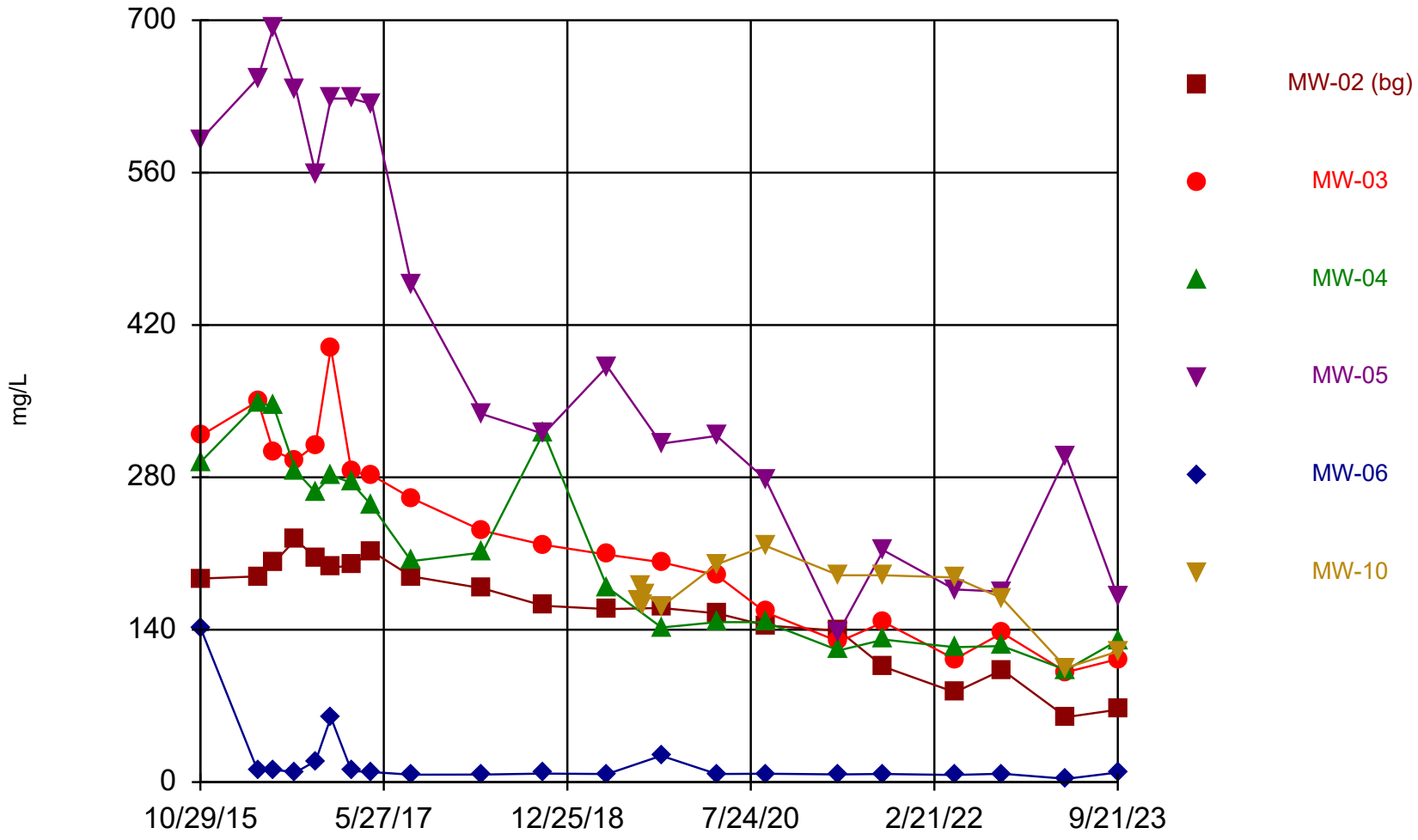
Time Series



Constituent: Calcium Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

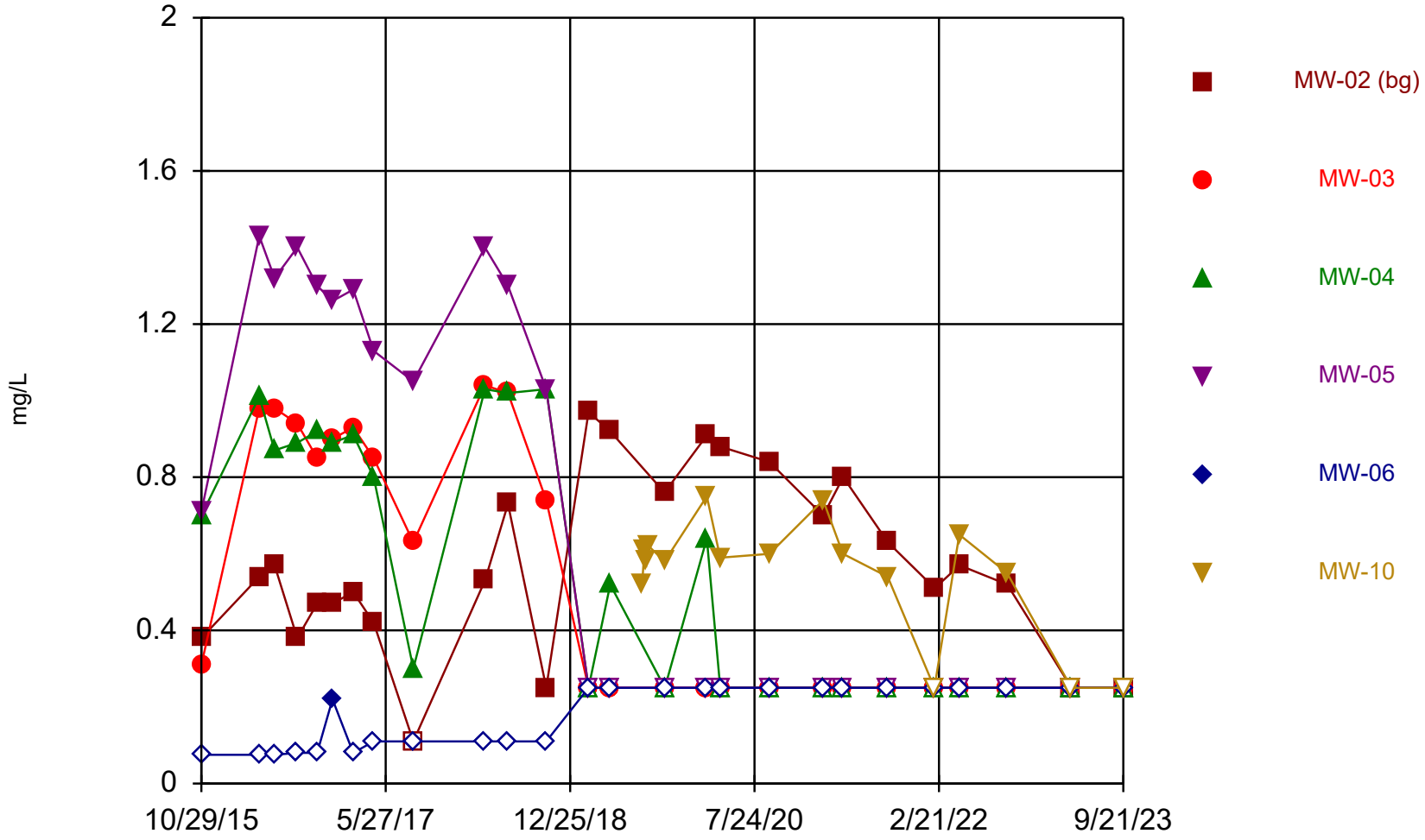


Constituent: Chloride Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

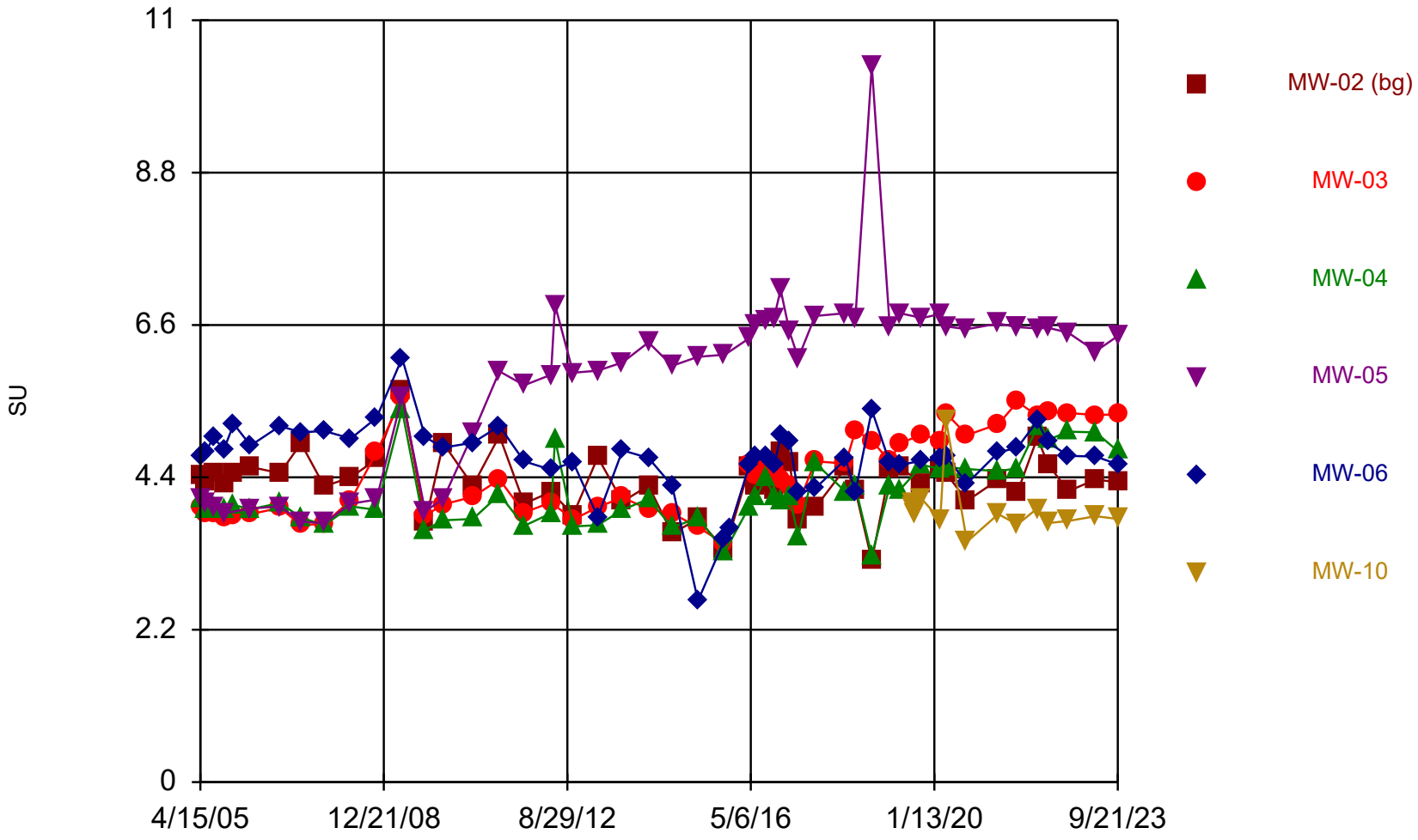
Time Series



Constituent: Fluoride Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

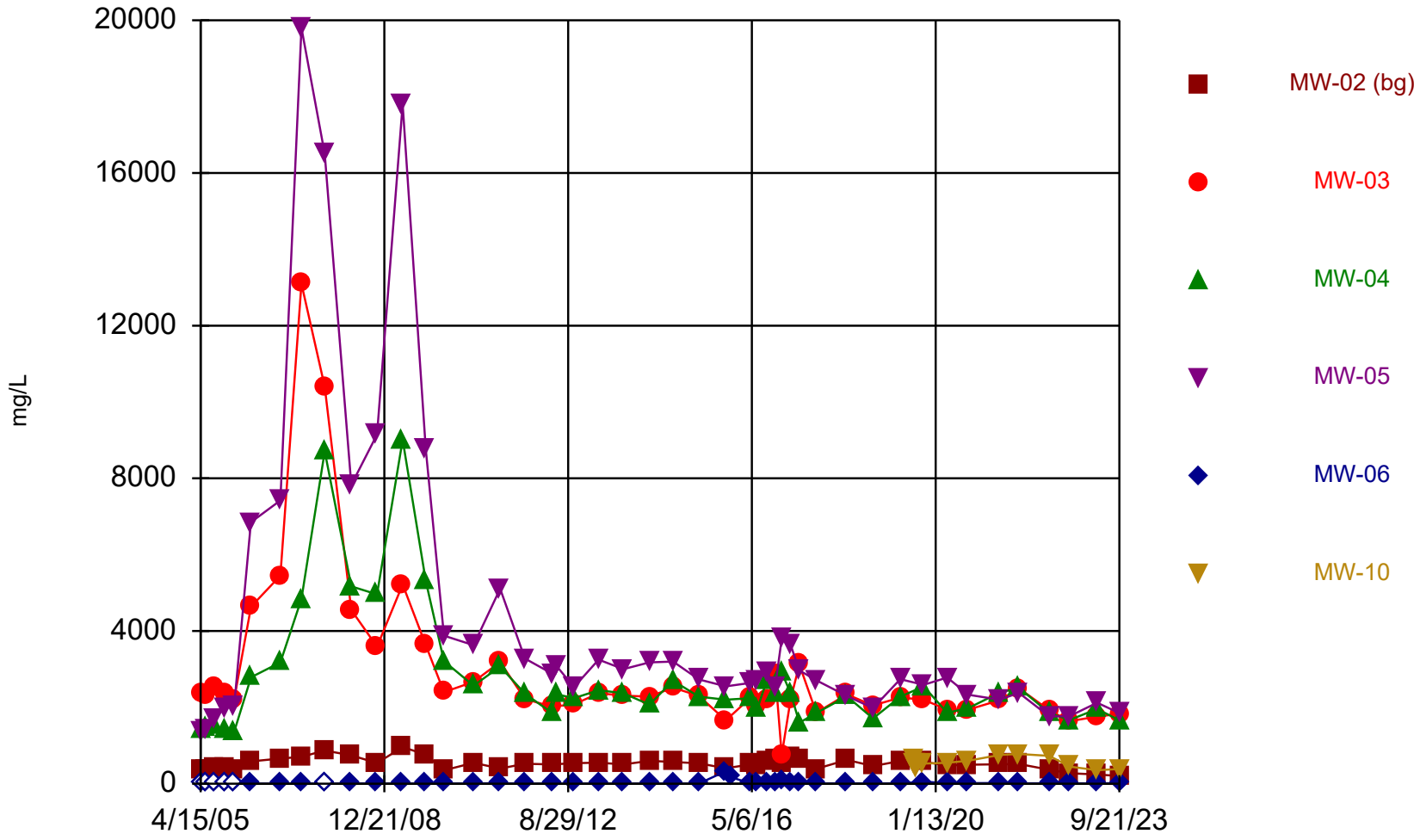


Constituent: pH Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

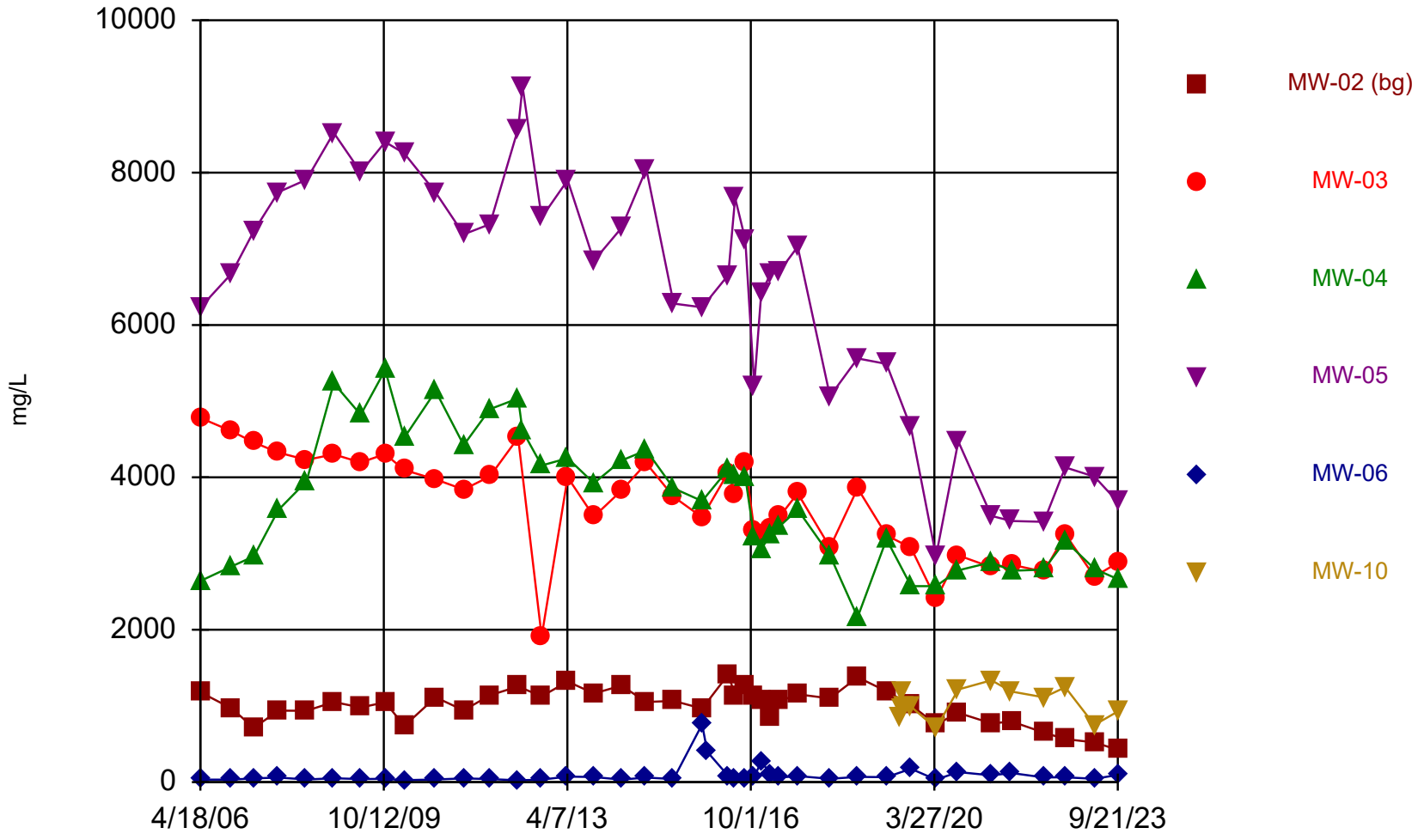
Time Series



Constituent: Sulfate Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 12:08 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Prediction Limit

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 11/30/2023, 5:52 PM

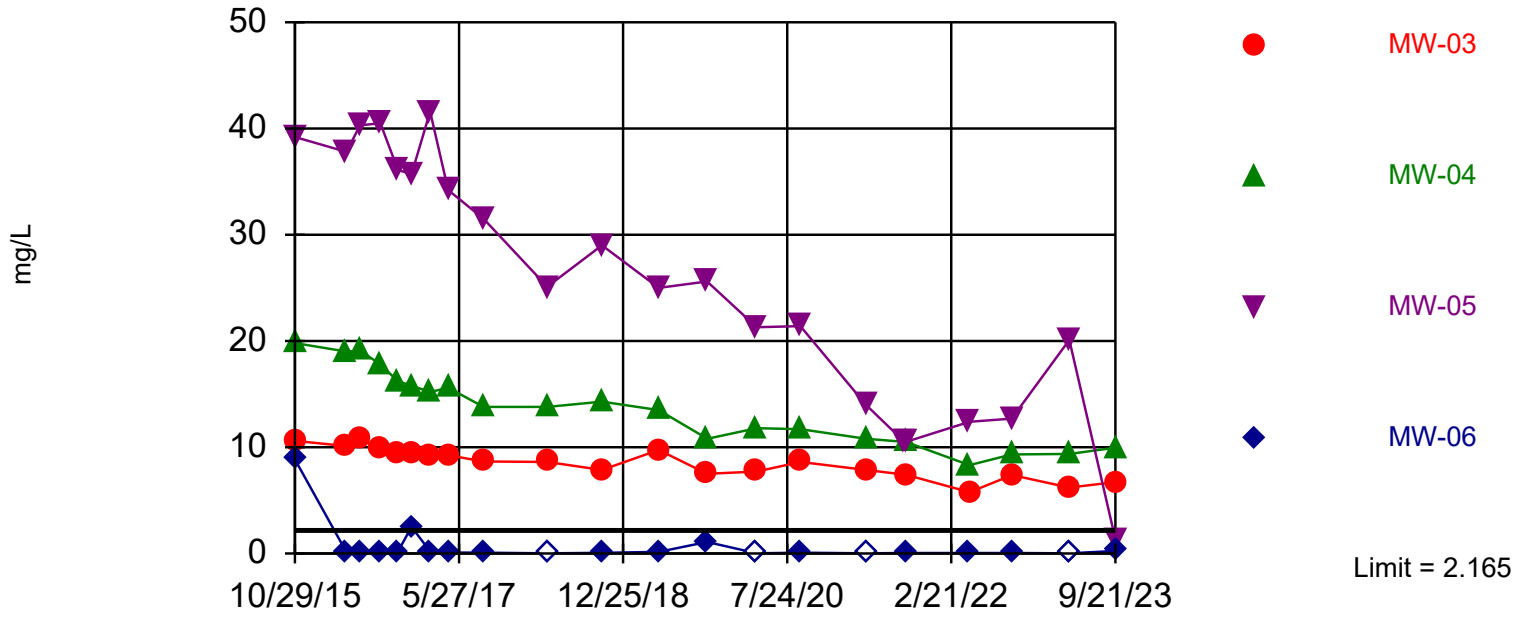
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	**MW-03**	**2.165**	**n/a**	**9/21/2023**	**6.72**	**Yes**	**21**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Boron (mg/L)	**MW-04**	**2.165**	**n/a**	**9/21/2023**	**9.95**	**Yes**	**21**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Boron (mg/L)	MW-05	2.165	n/a	9/21/2023	1.35	No	21	0	No	0.00188	Param Inter 1 of 2
Boron (mg/L)	MW-06	2.165	n/a	9/21/2023	0.244	No	21	0	No	0.00188	Param Inter 1 of 2
Calcium (mg/L)	**MW-03**	**180.8**	**n/a**	**9/21/2023**	**425**	**Yes**	**23**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	**MW-04**	**180.8**	**n/a**	**9/21/2023**	**387**	**Yes**	**23**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	**MW-05**	**180.8**	**n/a**	**9/21/2023**	**599**	**Yes**	**23**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Calcium (mg/L)	MW-06	180.8	n/a	9/21/2023	3.12	No	23	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-03	253.9	n/a	9/21/2023	113	No	21	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-04	253.9	n/a	9/21/2023	130	No	21	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-05	253.9	n/a	9/21/2023	170	No	21	0	No	0.00188	Param Inter 1 of 2
Chloride (mg/L)	MW-06	253.9	n/a	9/21/2023	8.89	No	21	0	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-03	1.015	n/a	9/21/2023	0.25ND	No	26	11.54	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-04	1.015	n/a	9/21/2023	0.25ND	No	26	11.54	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-05	1.015	n/a	9/21/2023	0.25ND	No	26	11.54	No	0.00188	Param Inter 1 of 2
Fluoride (mg/L)	MW-06	1.015	n/a	9/21/2023	0.25ND	No	26	11.54	No	0.00188	Param Inter 1 of 2
pH (SU)	**MW-03**	**5.096**	**3.576**	**9/21/2023**	**5.31**	**Yes**	**49**	**0**	**No**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	MW-04	5.096	3.576	9/21/2023	4.78	No	49	0	No	0.000...	Param Inter 1 of 2
pH (SU)	**MW-05**	**5.096**	**3.576**	**9/21/2023**	**6.44**	**Yes**	**49**	**0**	**No**	**0.000...**	**Param Inter 1 of 2**
pH (SU)	MW-06	5.096	3.576	9/21/2023	4.59	No	49	0	No	0.000...	Param Inter 1 of 2
Sulfate (mg/L)	**MW-03**	**799.5**	**n/a**	**9/21/2023**	**1830**	**Yes**	**45**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	**MW-04**	**799.5**	**n/a**	**9/21/2023**	**1660**	**Yes**	**45**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	**MW-05**	**799.5**	**n/a**	**9/21/2023**	**1850**	**Yes**	**45**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Sulfate (mg/L)	MW-06	799.5	n/a	9/21/2023	17.4	No	45	0	No	0.00188	Param Inter 1 of 2
Total Dissolved Solids [TDS] (m...	**MW-03**	**1424**	**n/a**	**9/21/2023**	**2880**	**Yes**	**40**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	**MW-04**	**1424**	**n/a**	**9/21/2023**	**2664**	**Yes**	**40**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	**MW-05**	**1424**	**n/a**	**9/21/2023**	**3677**	**Yes**	**40**	**0**	**No**	**0.00188**	**Param Inter 1 of 2**
Total Dissolved Solids [TDS] (m...	MW-06	1424	n/a	9/21/2023	94	No	40	0	No	0.00188	Param Inter 1 of 2

Hollow symbols indicate censored values.

Exceeds Limit: MW-03, MW-04

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1.418, Std. Dev.=0.3801, n=21. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9118, critical = 0.873. Kappa = 1.965 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

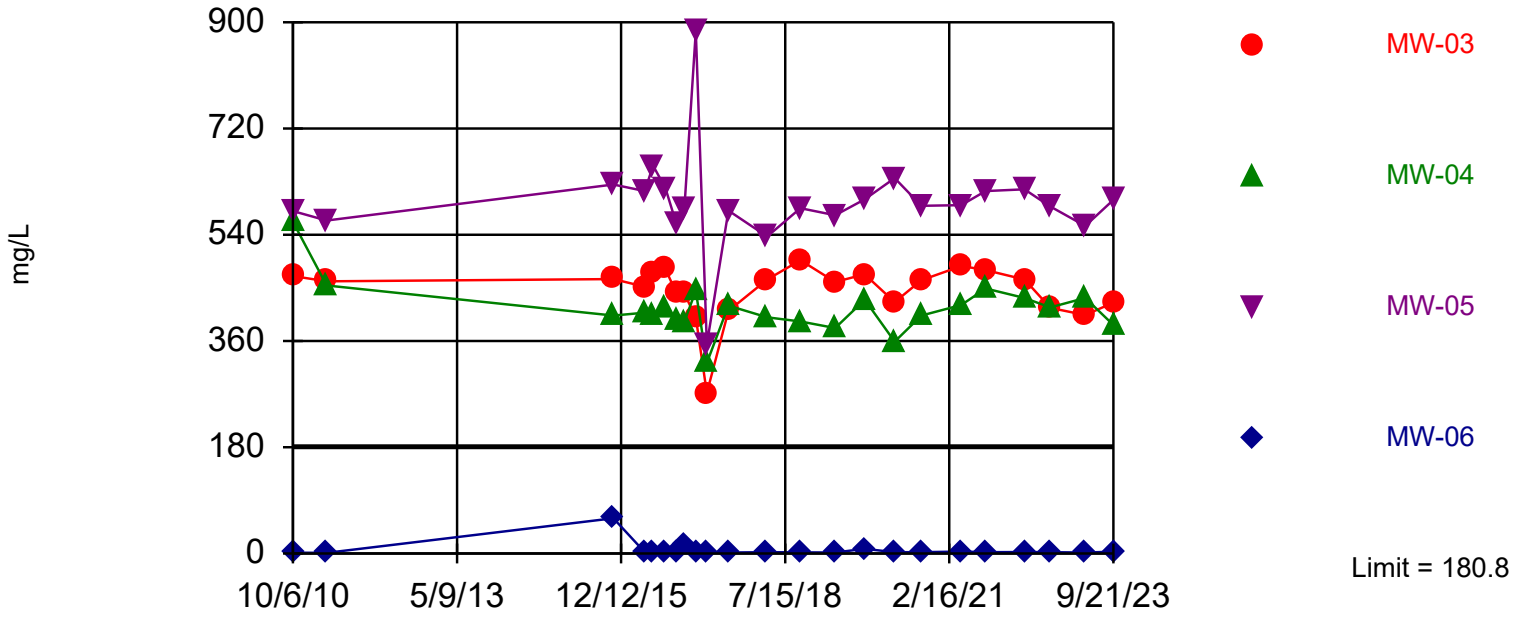
Constituent: Boron Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=111.5, Std. Dev.=35.75, n=23. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9184, critical = 0.881. Kappa = 1.94 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

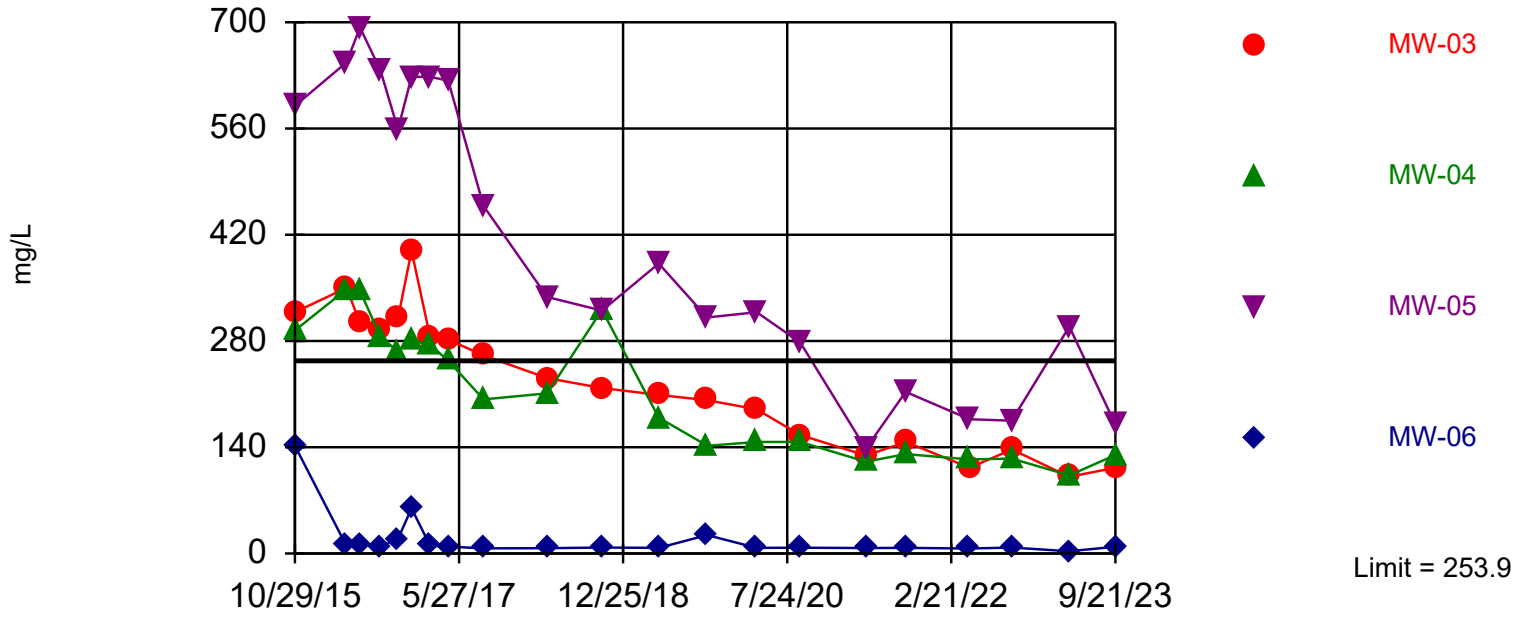
Constituent: Calcium Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=158, Std. Dev.=48.82, n=21. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9123, critical = 0.873. Kappa = 1.965 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Chloride Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

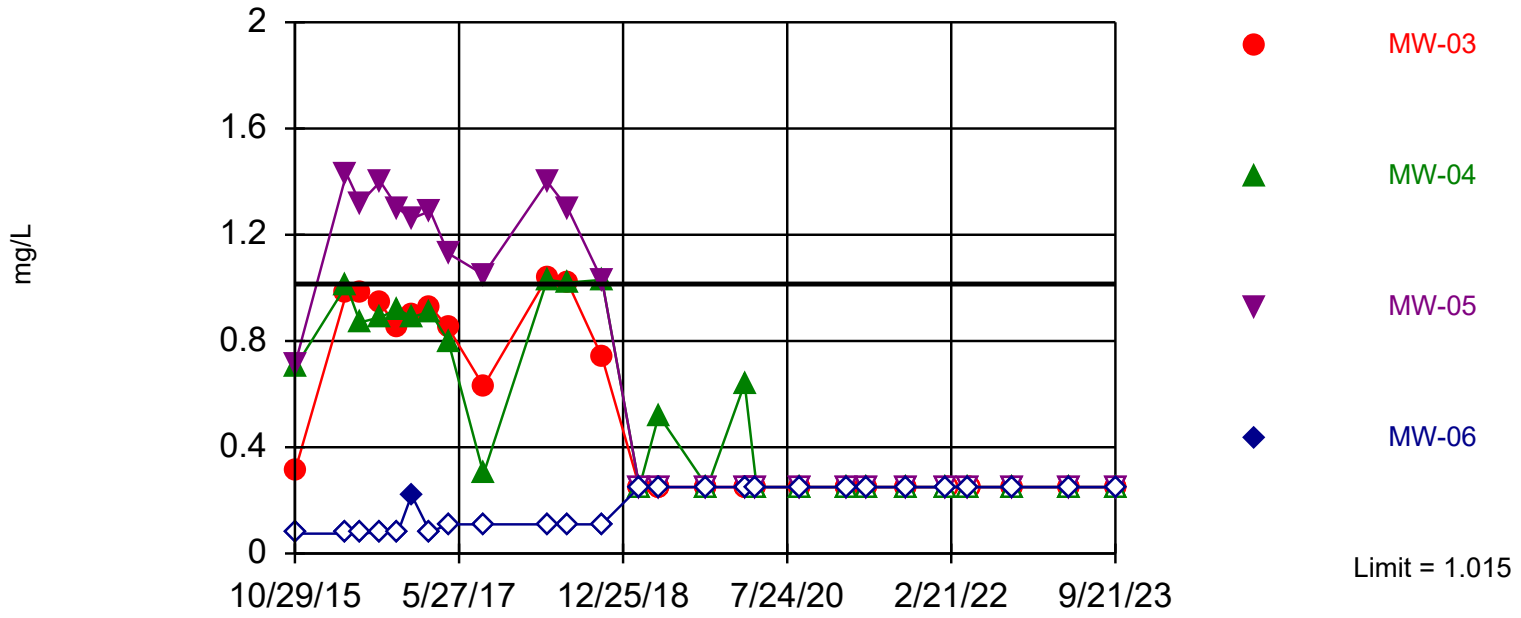
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.5715, Std. Dev.=0.2323, n=26, 11.54% NDs. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9666, critical = 0.891. Kappa = 1.907 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

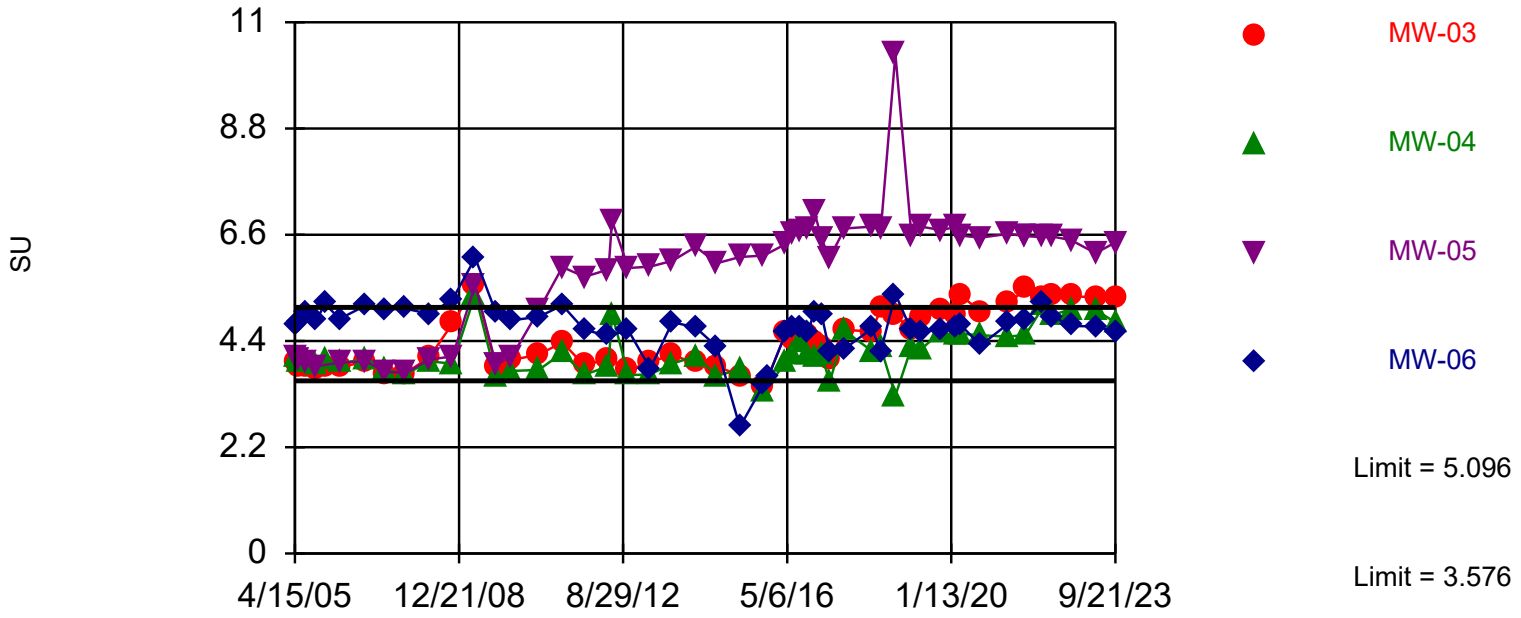
Constituent: Fluoride Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limits: MW-03, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=4.336, Std. Dev.=0.421, n=49. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9657, critical = 0.929. Kappa = 1.805 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009398. Comparing 4 points to limit.

Constituent: pH Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

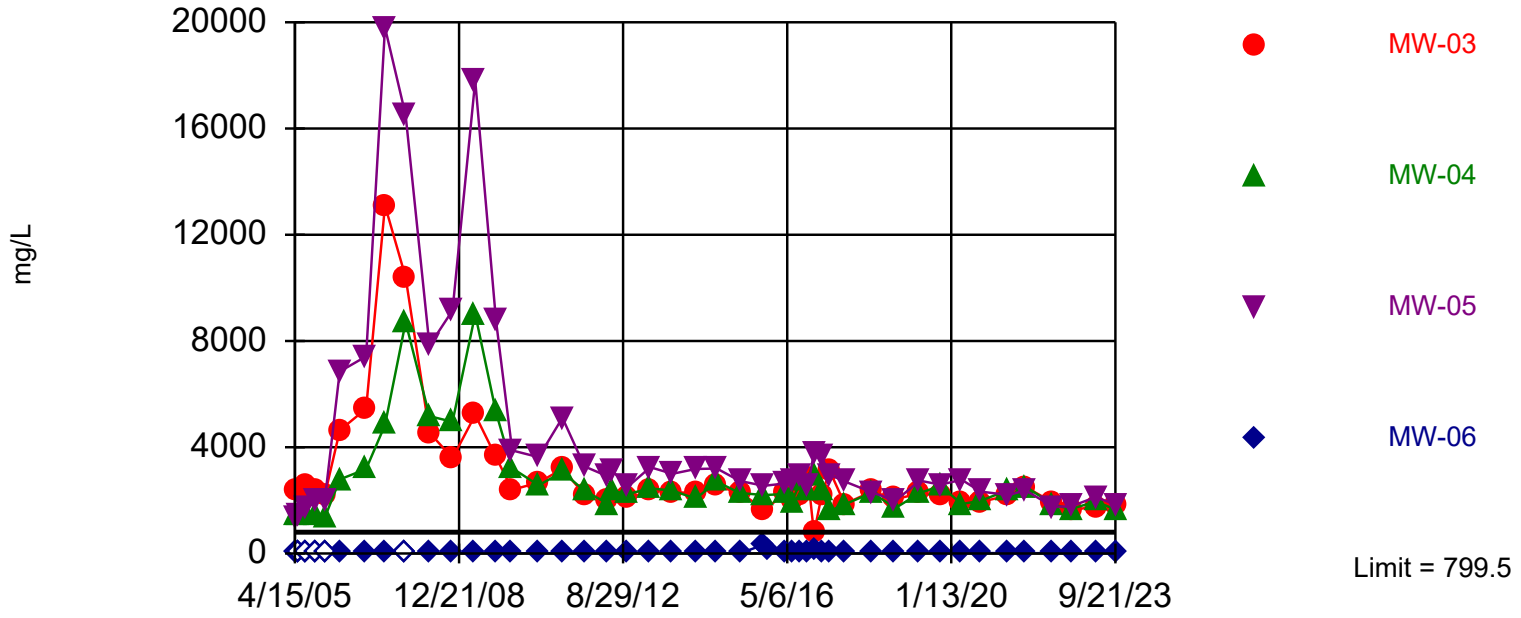
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=523.5, Std. Dev.=152, n=45. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9751, critical = 0.926. Kappa = 1.816 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

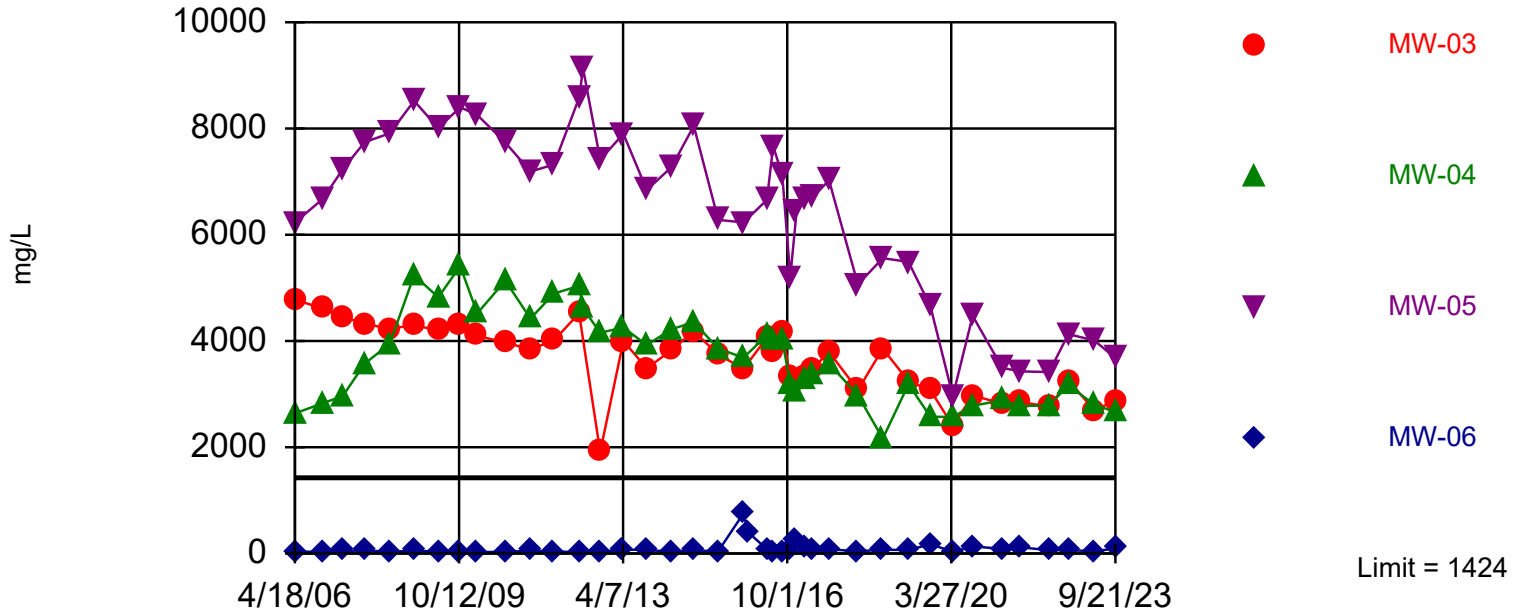
Constituent: Sulfate Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Exceeds Limit: MW-03, MW-04, MW-05

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1003, Std. Dev.=230.4, n=40. Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9602, critical = 0.919. Kappa = 1.826 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Comparing 4 points to limit.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 5:51 PM View: Landfill AppIII

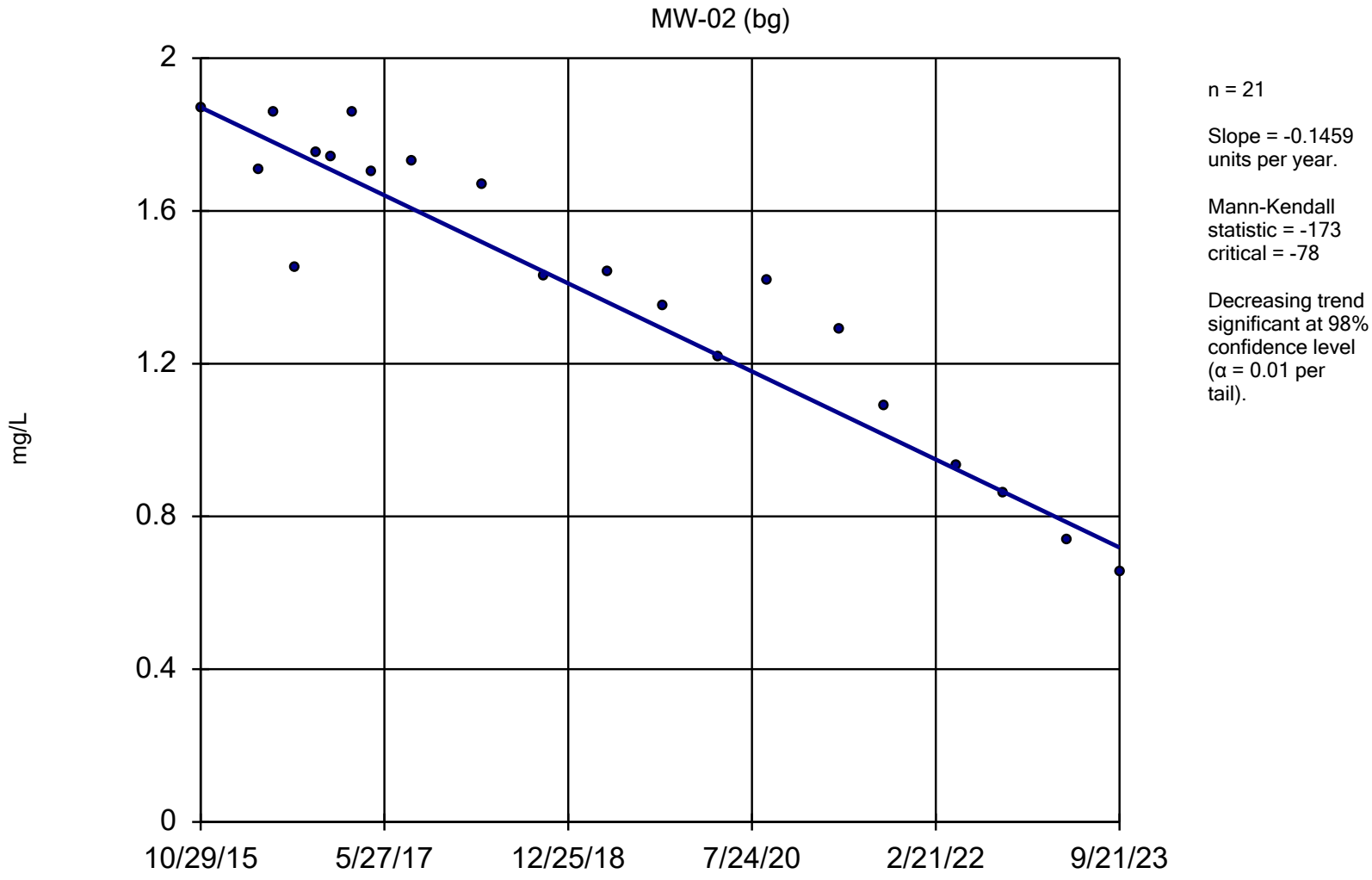
RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Trend Test

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 11/30/2023, 6:31 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	**MW-02 (bg)**	**-0.1459**	**-173**	**-78**	**Yes**	**21**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-03**	**-0.5404**	**-172**	**-78**	**Yes**	**21**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-04**	**-1.288**	**-184**	**-78**	**Yes**	**21**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-05**	**-4.418**	**-180**	**-84**	**Yes**	**22**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Boron (mg/L)	**MW-06**	**-0.02369**	**-84**	**-78**	**Yes**	**21**	**19.05**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	**MW-02 (bg)**	**-9.269**	**-136**	**-89**	**Yes**	**23**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Calcium (mg/L)	MW-03	-1.427	-30	-89	No	23	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-04	-1.234	-16	-89	No	23	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-05	0.346	4	89	No	23	0	n/a	n/a	0.02	NP
Calcium (mg/L)	MW-06	0.0246	21	89	No	23	0	n/a	n/a	0.02	NP
pH (SU)	MW-02 (bg)	-0.00...	-0.6985	-2.33	No	49	0	n/a	n/a	0.02	NP
pH (SU)	**MW-03**	**0.08559**	**5.941**	**2.33**	**Yes**	**49**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	**MW-04**	**0.04656**	**4.041**	**2.33**	**Yes**	**50**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	**MW-05**	**0.146**	**5.731**	**2.33**	**Yes**	**50**	**0**	**n/a**	**n/a**	**0.02**	**NP**
pH (SU)	MW-06	-0.01527	-1.916	-2.33	No	50	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	MW-02 (bg)	-5.913	-1.389	-2.33	No	45	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-03**	**-58.57**	**-4.657**	**-2.33**	**Yes**	**45**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	MW-04	-53.88	-2.027	-2.33	No	46	0	n/a	n/a	0.02	NP
Sulfate (mg/L)	**MW-05**	**-133.7**	**-3.409**	**-2.33**	**Yes**	**46**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Sulfate (mg/L)	**MW-06**	**0.8018**	**5.354**	**2.33**	**Yes**	**46**	**13.04**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	MW-02 (bg)	-14.13	-128	-201	No	40	0	n/a	n/a	0.02	NP
Total Dissolved Solids [TDS] (m...	**MW-03**	**-107.4**	**-534**	**-201**	**Yes**	**40**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-04**	**-148.4**	**-4.471**	**-2.33**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-05**	**-288.5**	**-5.403**	**-2.33**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Total Dissolved Solids [TDS] (m...	**MW-06**	**2.763**	**3.216**	**2.33**	**Yes**	**41**	**0**	**n/a**	**n/a**	**0.02**	**NP**

Sen's Slope Estimator



n = 21

Slope = -0.1459 units per year.

Mann-Kendall statistic = -173
critical = -78

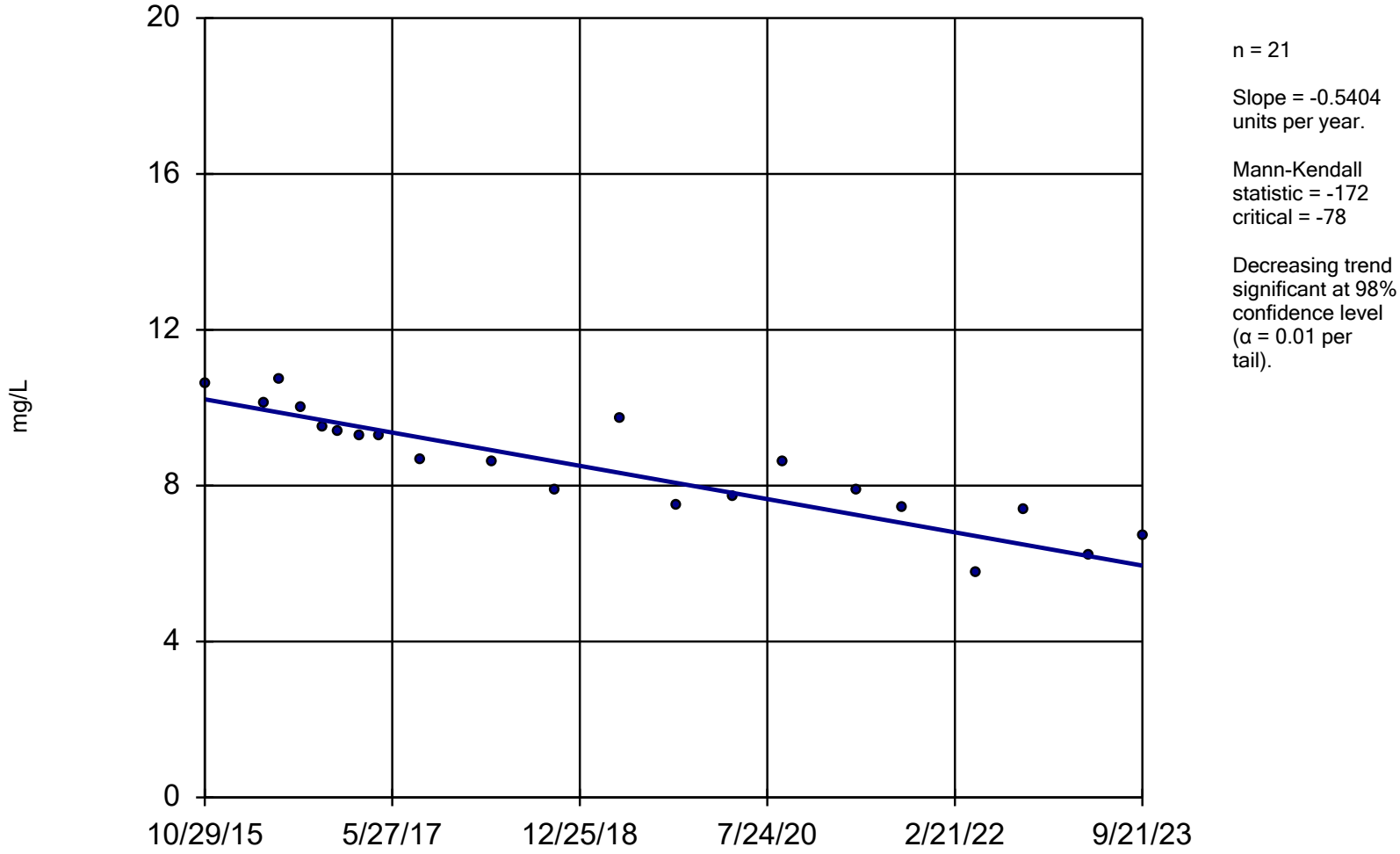
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 21

Slope = -0.5404 units per year.

Mann-Kendall statistic = -172
critical = -78

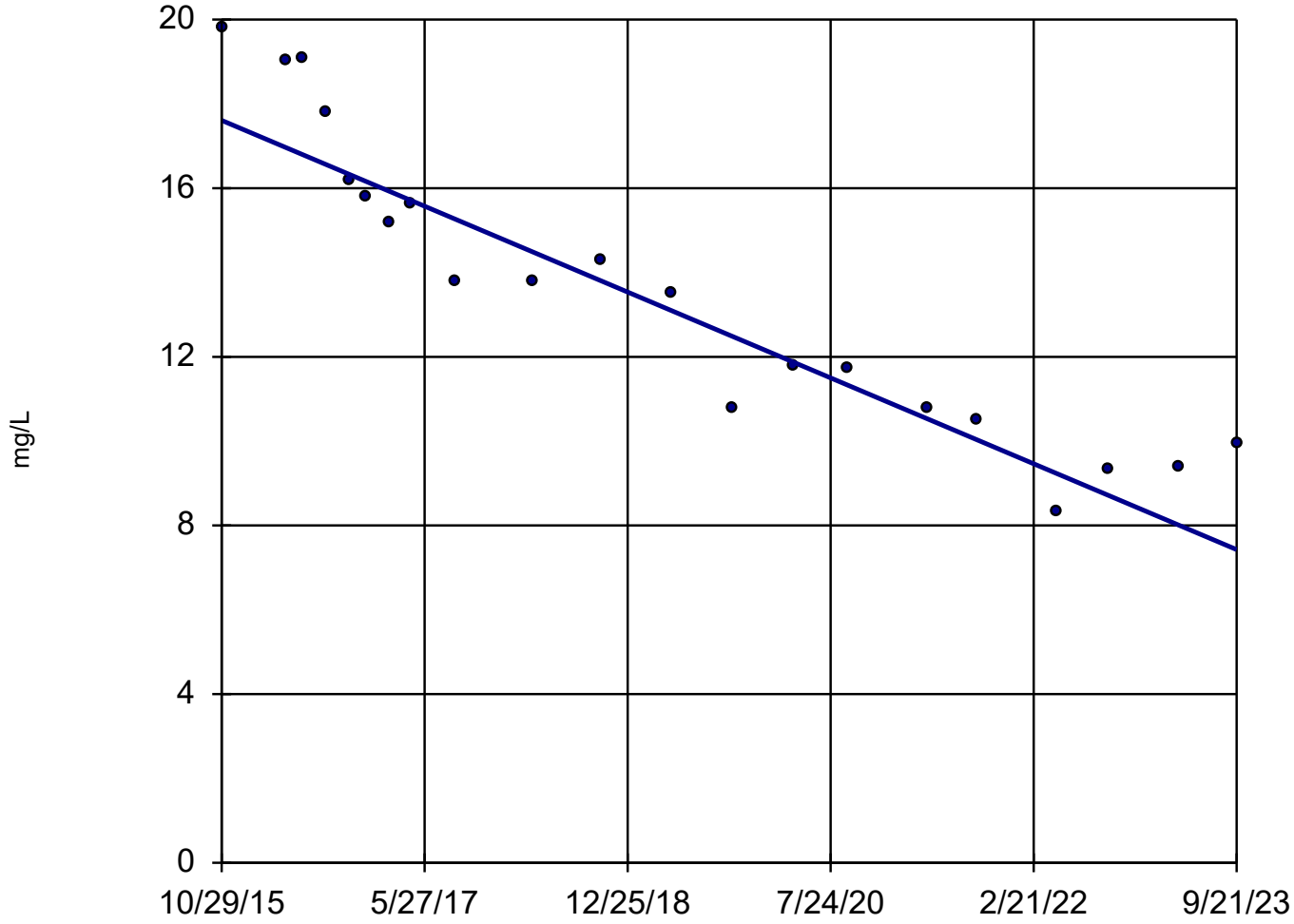
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 21

Slope = -1.288 units per year.

Mann-Kendall statistic = -184
critical = -78

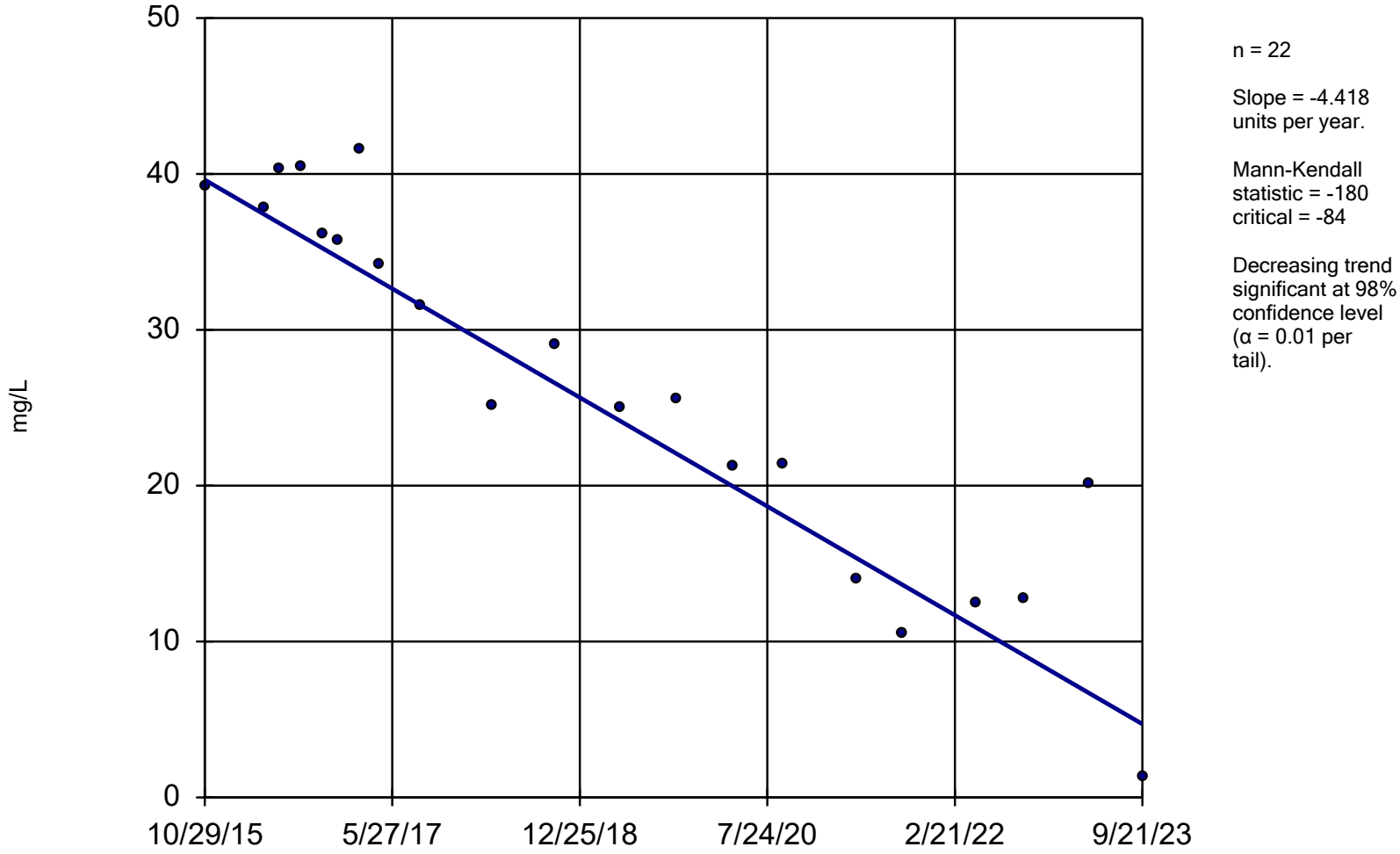
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-05



n = 22

Slope = -4.418 units per year.

Mann-Kendall statistic = -180
critical = -84

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

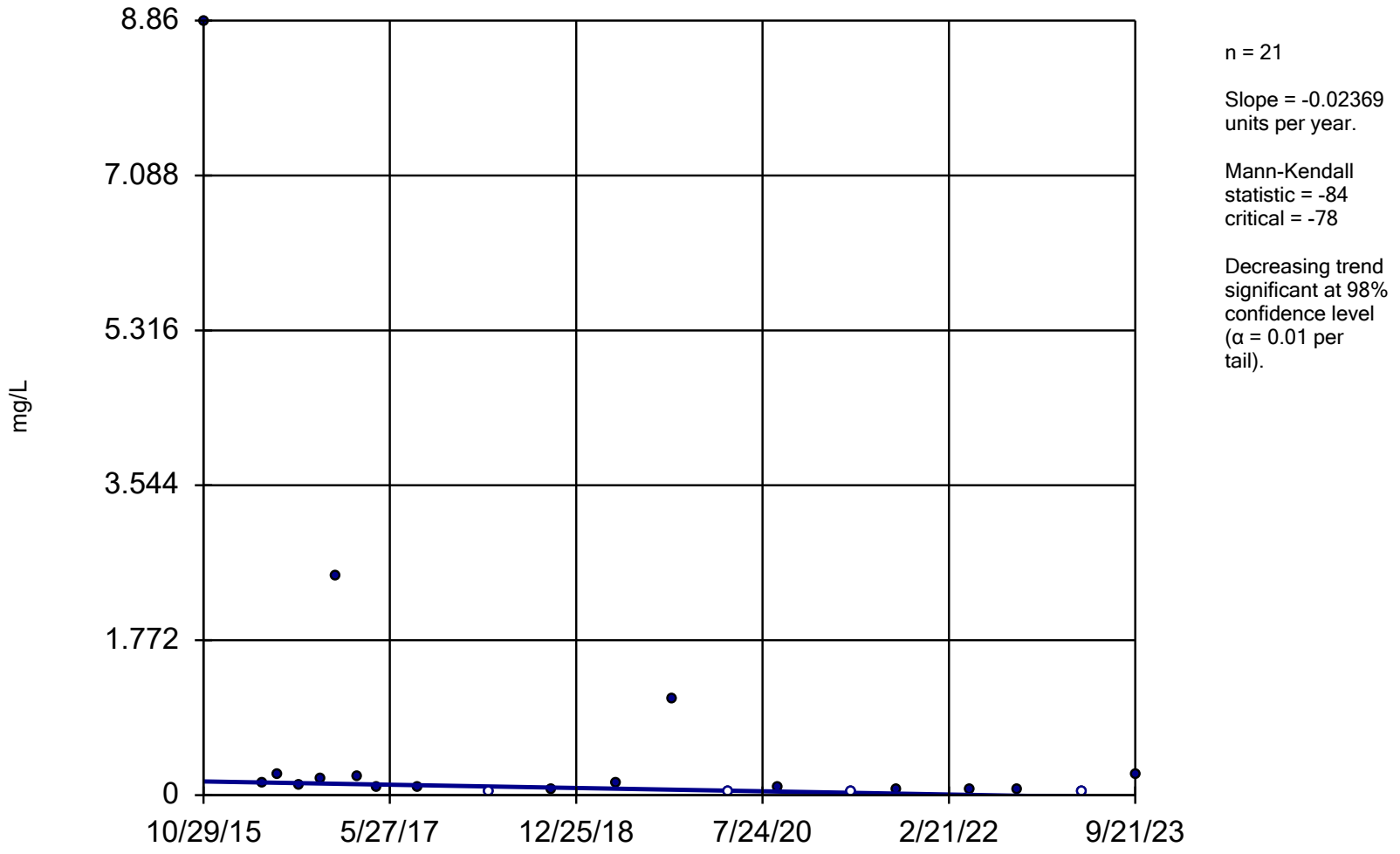
Constituent: Boron Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 21

Slope = -0.02369 units per year.

Mann-Kendall statistic = -84
critical = -78

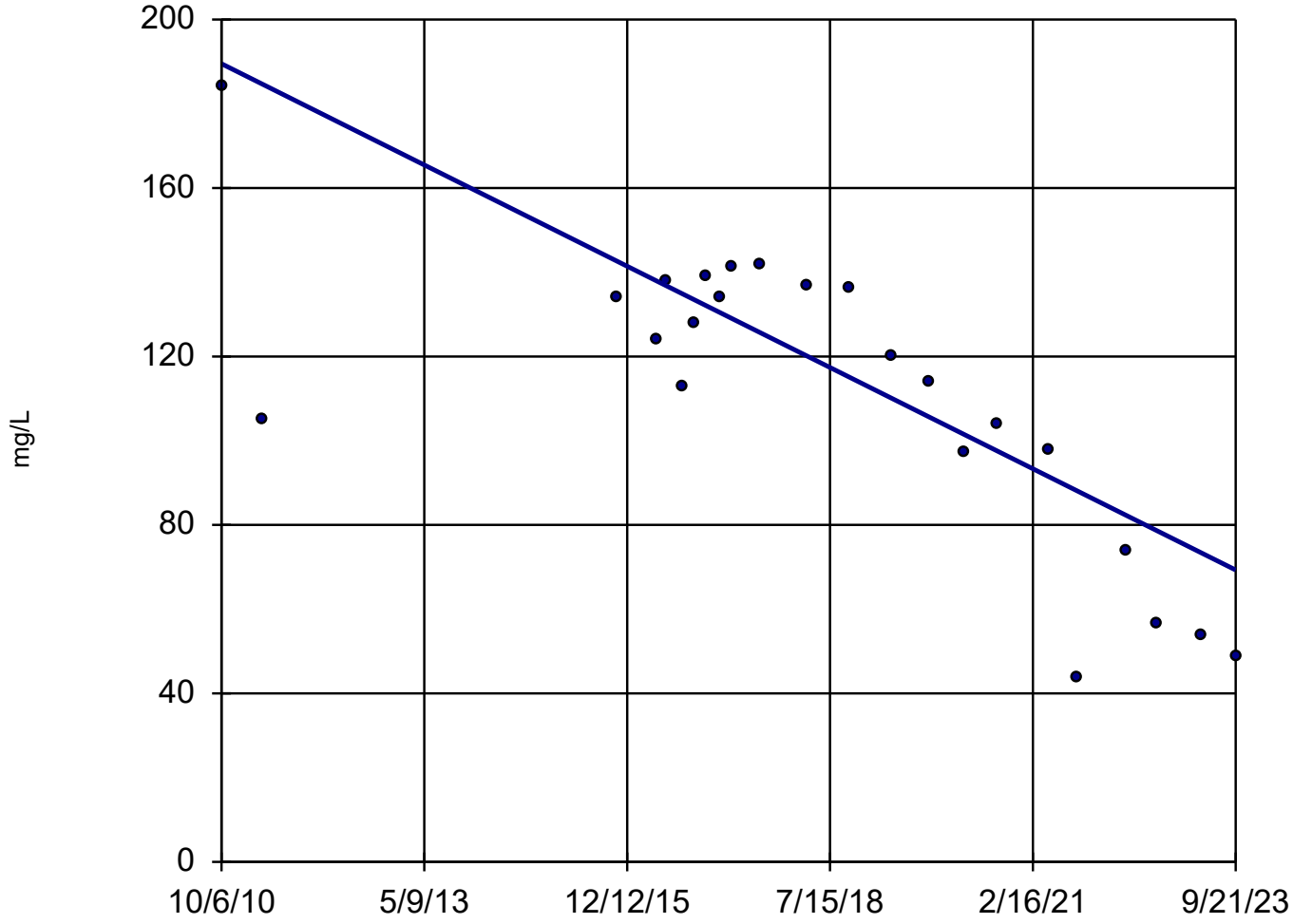
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Boron Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-02 (bg)



n = 23

Slope = -9.269 units per year.

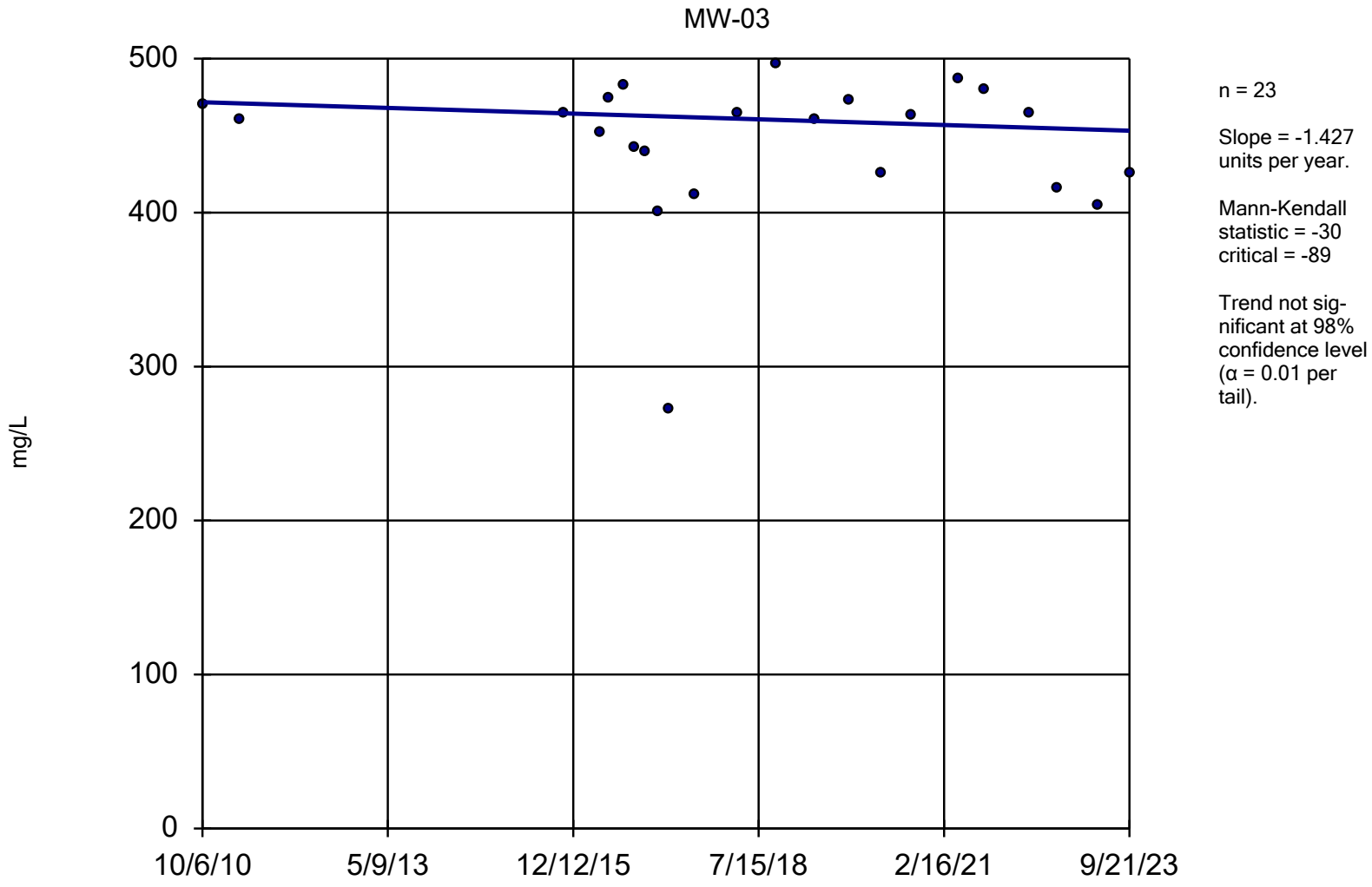
Mann-Kendall statistic = -136
critical = -89

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

Constituent: Calcium Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

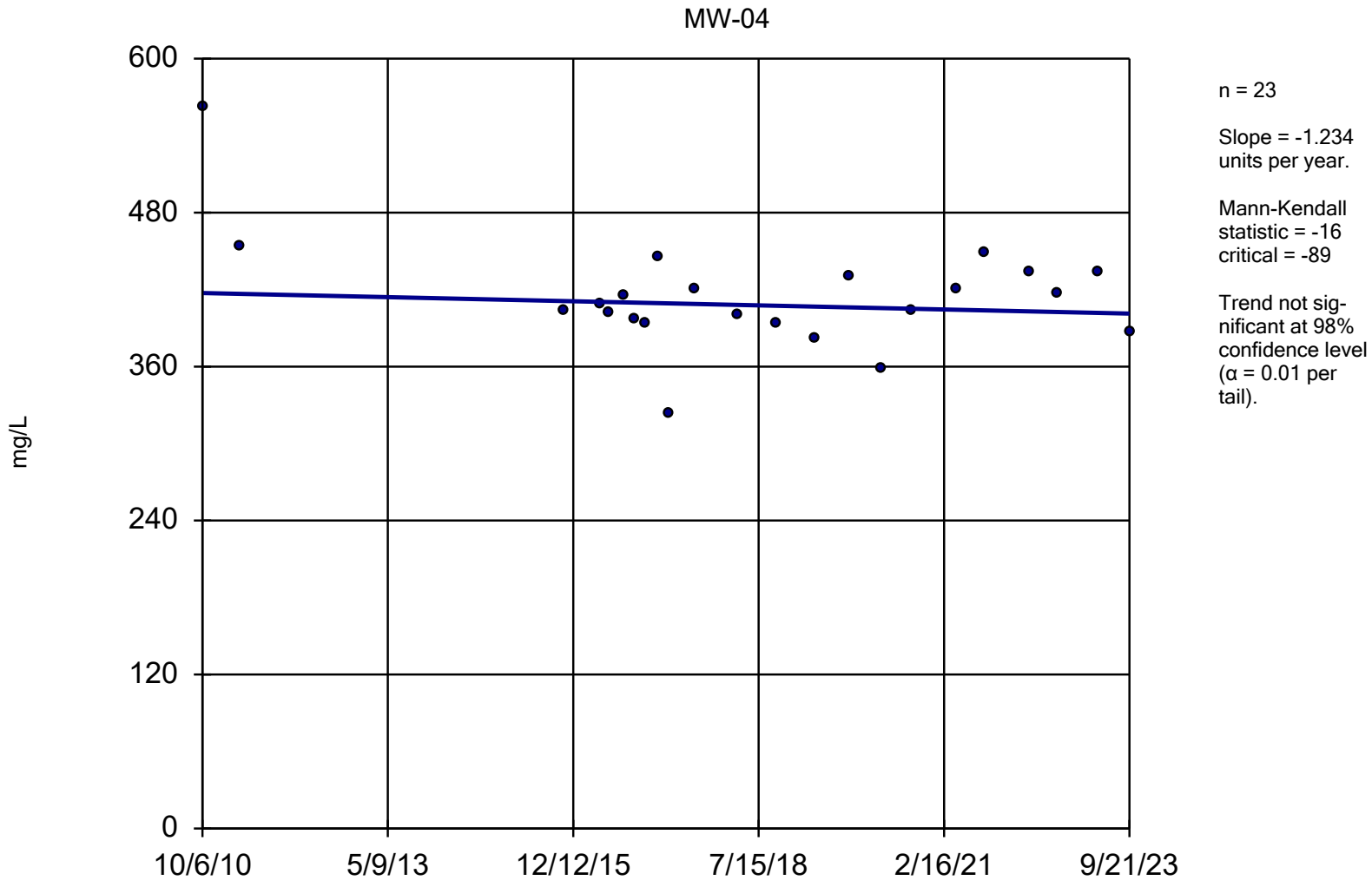
Sen's Slope Estimator



Constituent: Calcium Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

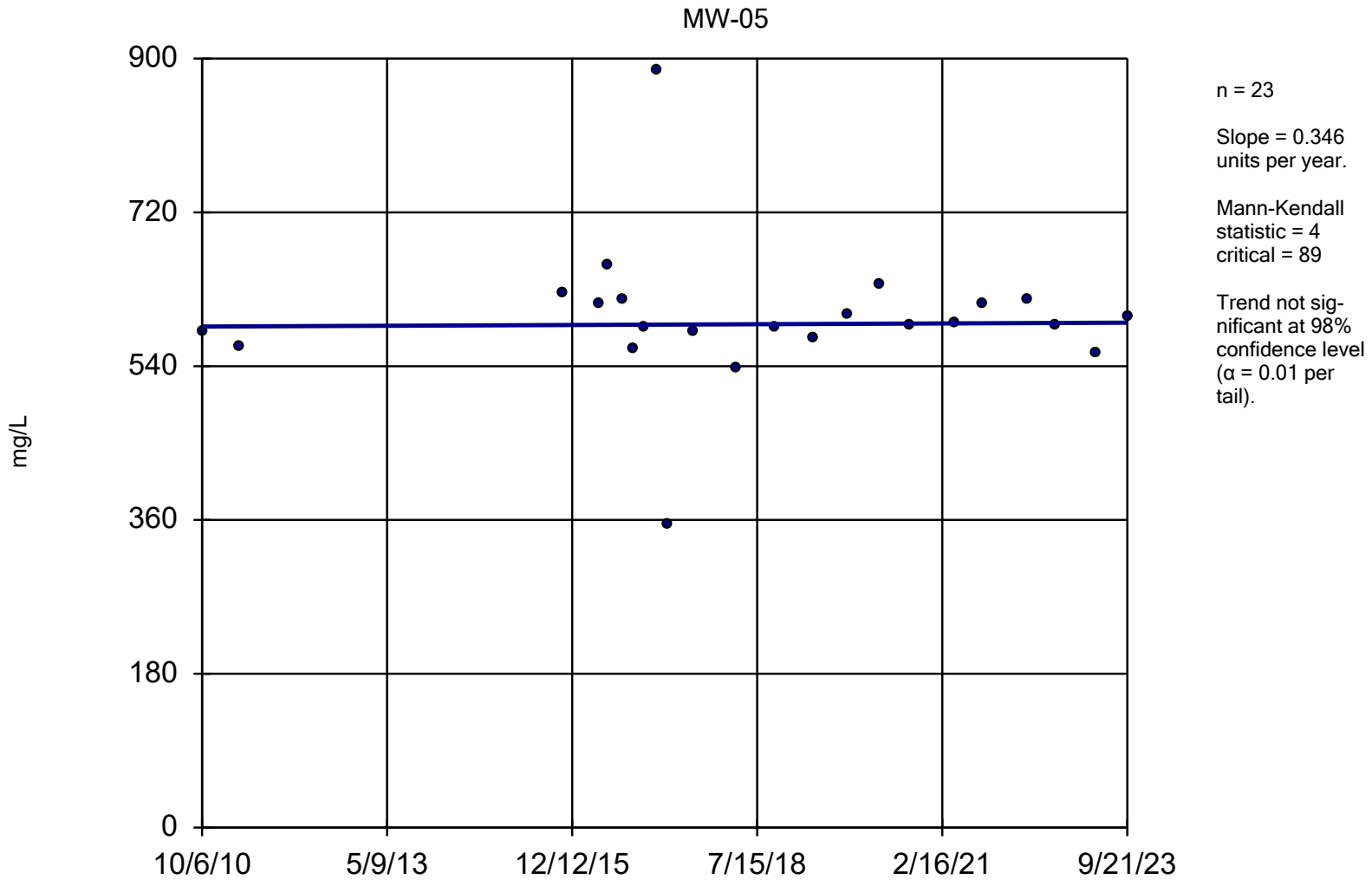
Sen's Slope Estimator



Constituent: Calcium Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

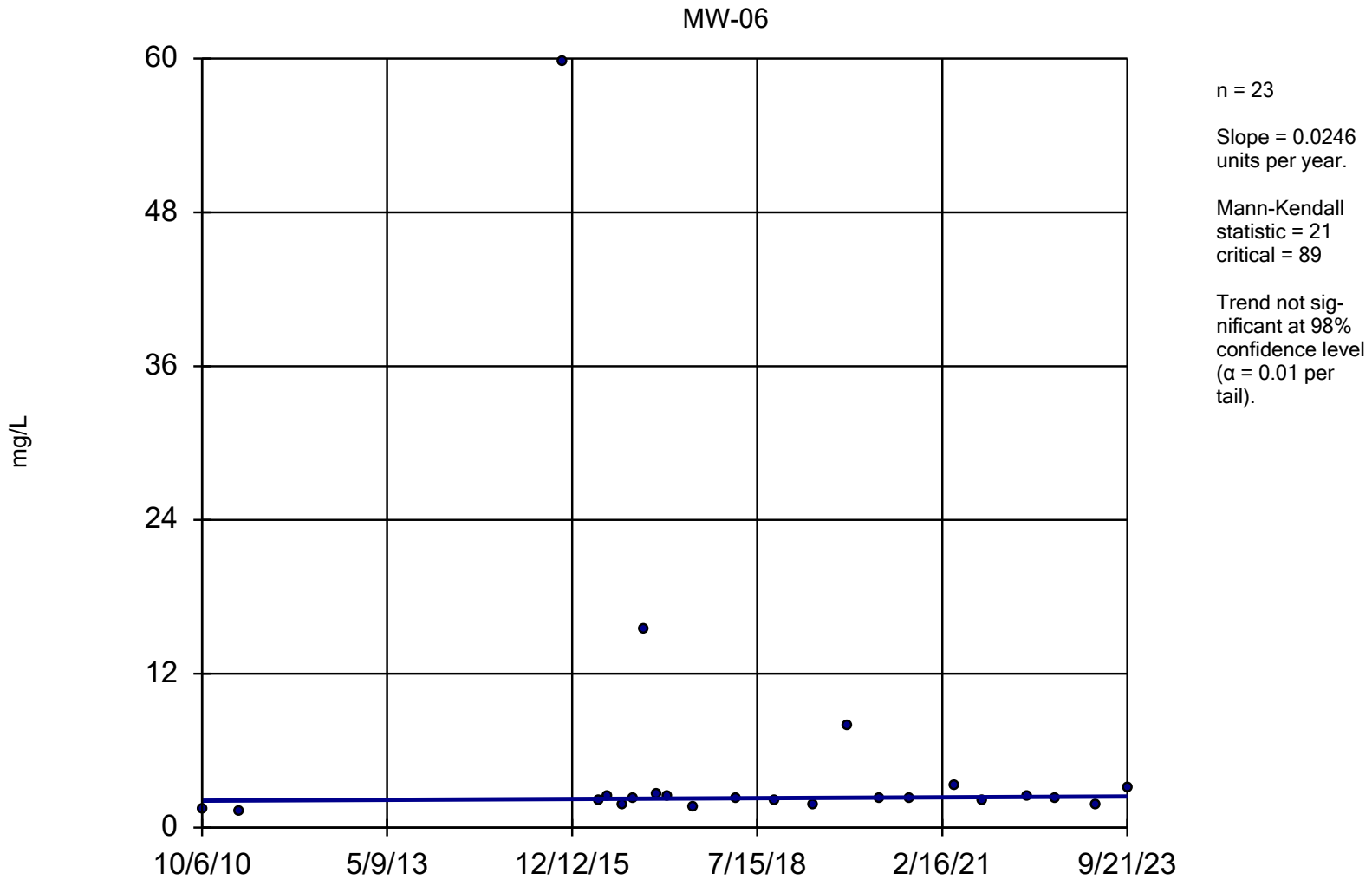
Sen's Slope Estimator



Constituent: Calcium Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

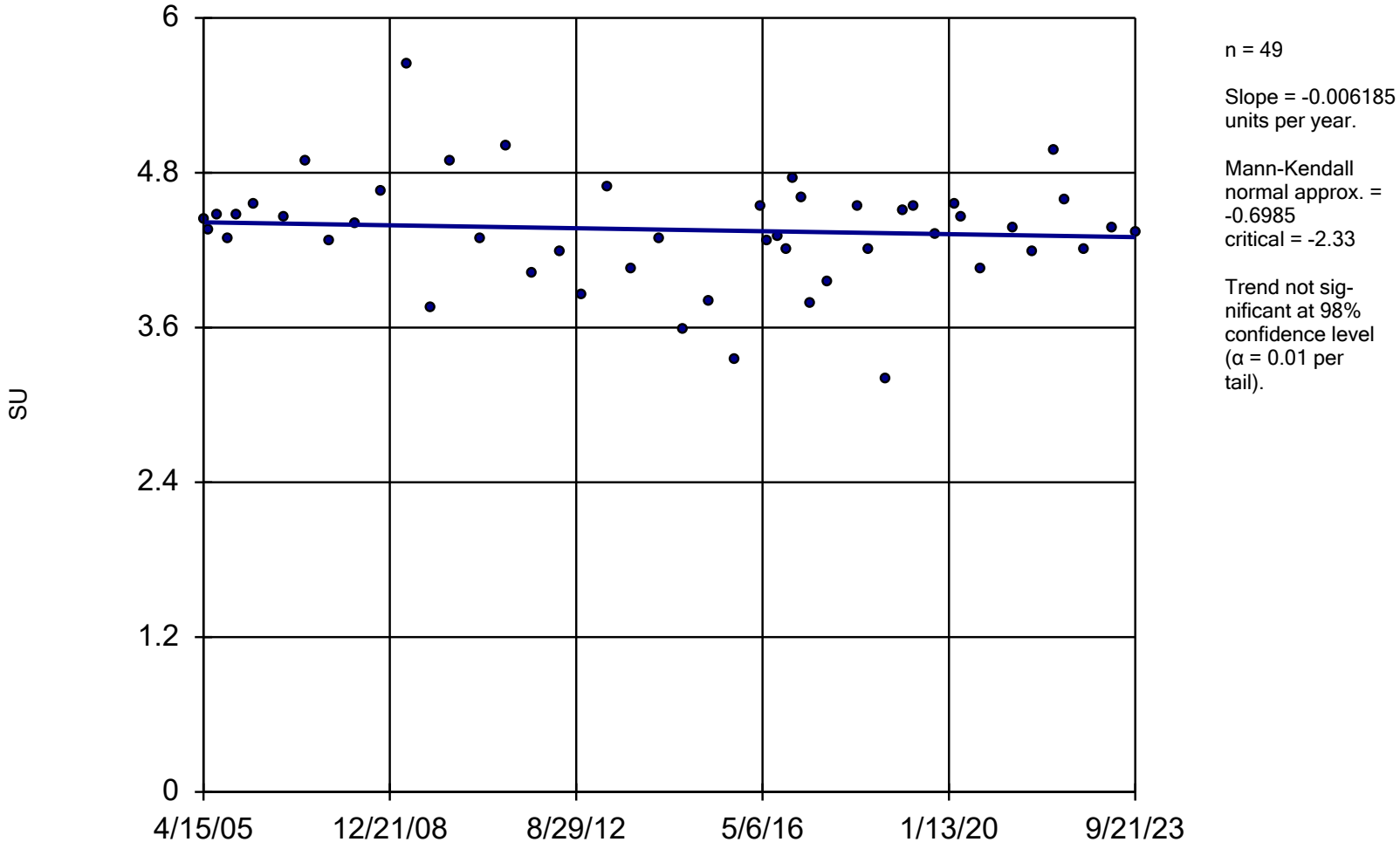


Constituent: Calcium Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-02 (bg)



n = 49

Slope = -0.006185 units per year.

Mann-Kendall normal approx. = -0.6985
critical = -2.33

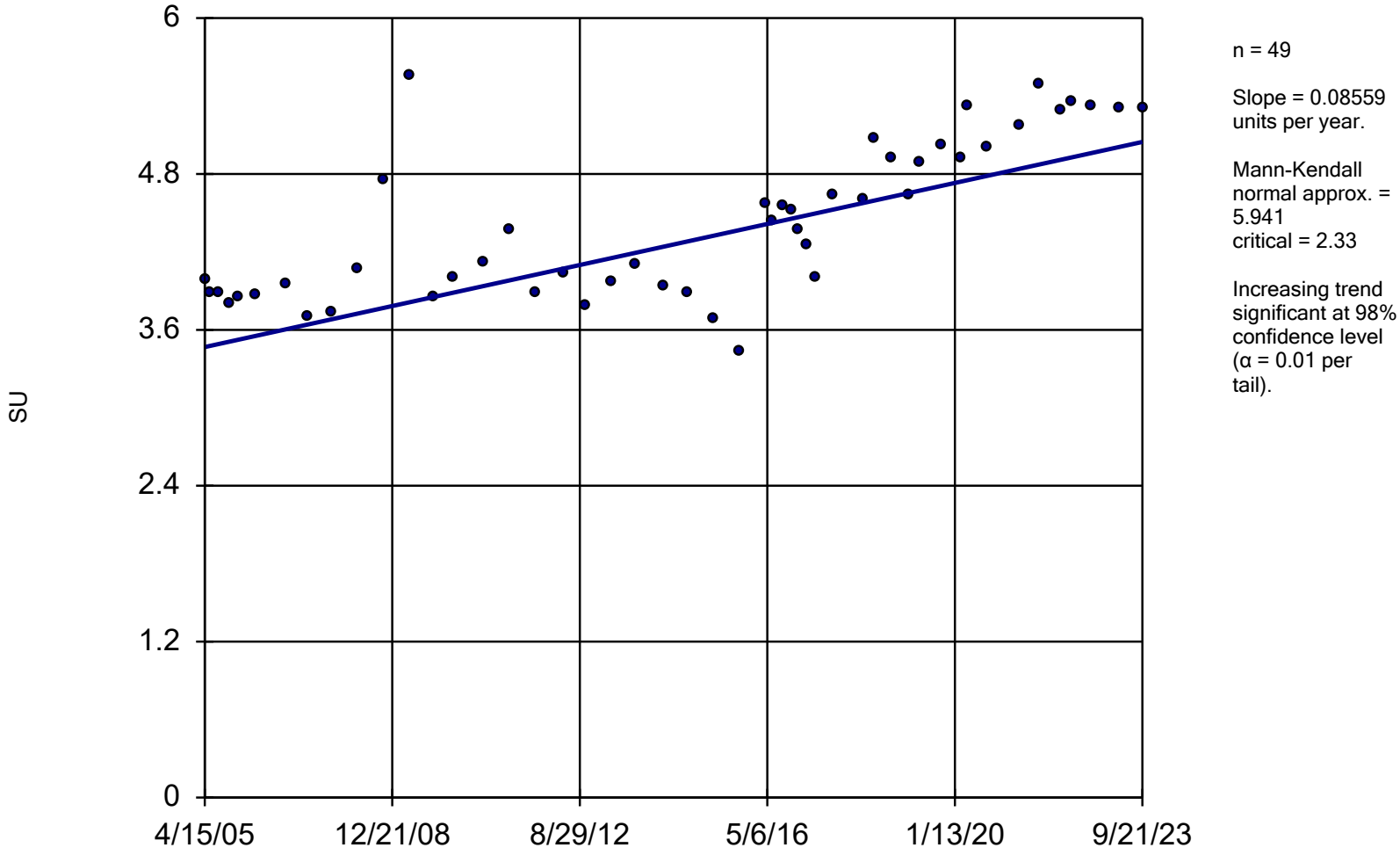
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 49

Slope = 0.08559 units per year.

Mann-Kendall normal approx. = 5.941
critical = 2.33

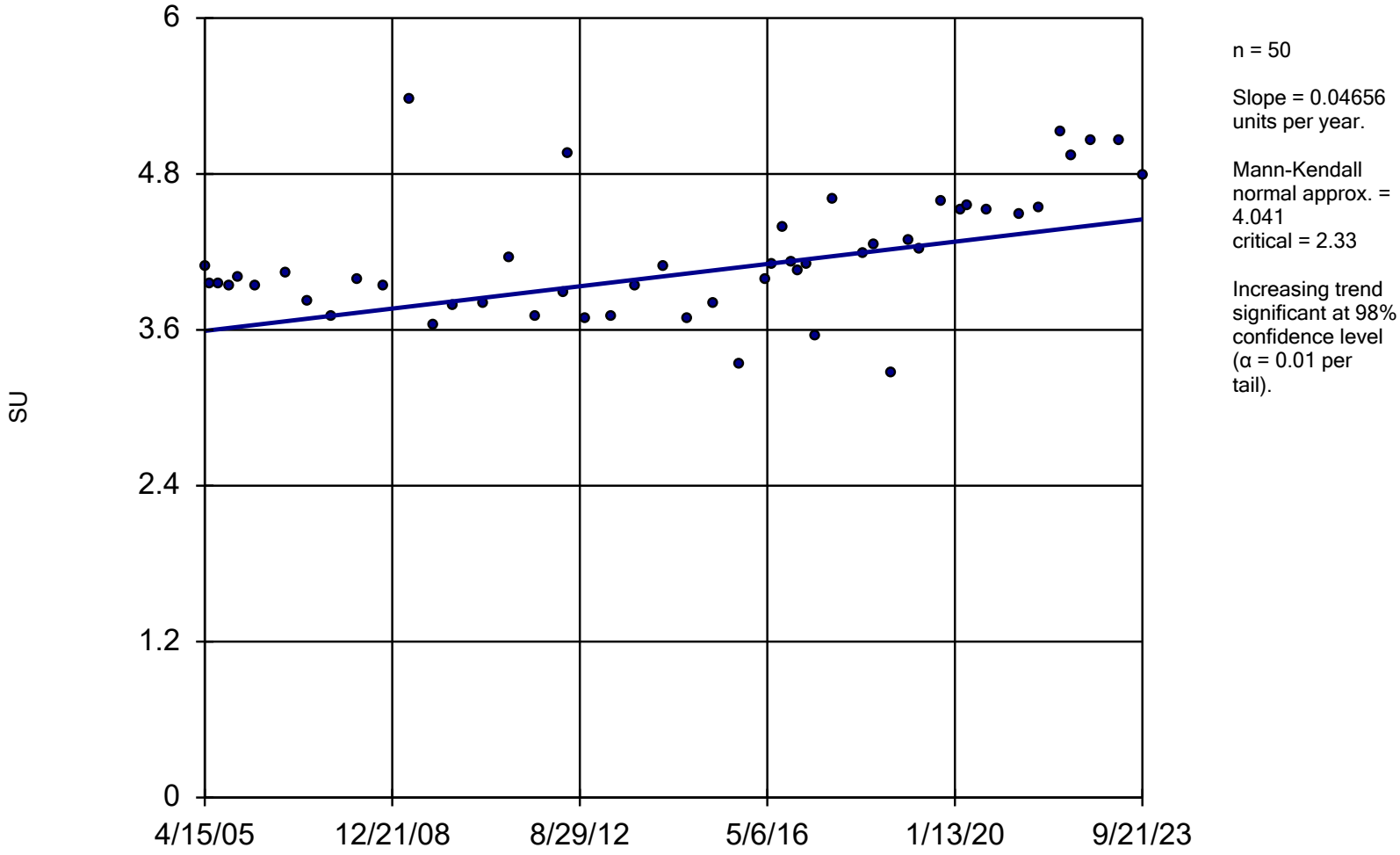
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 50

Slope = 0.04656 units per year.

Mann-Kendall normal approx. = 4.041
critical = 2.33

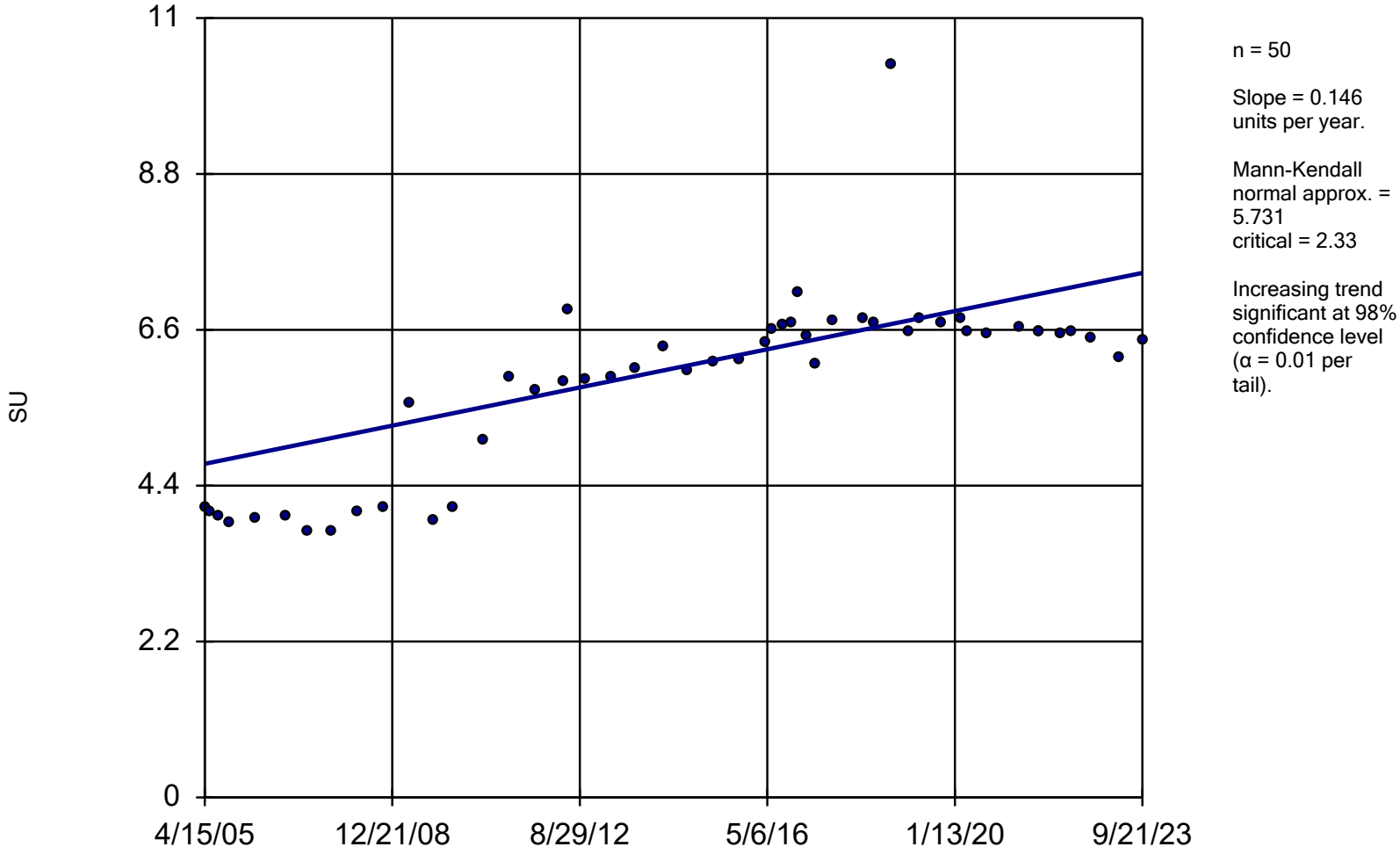
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-05



n = 50

Slope = 0.146 units per year.

Mann-Kendall normal approx. = 5.731
critical = 2.33

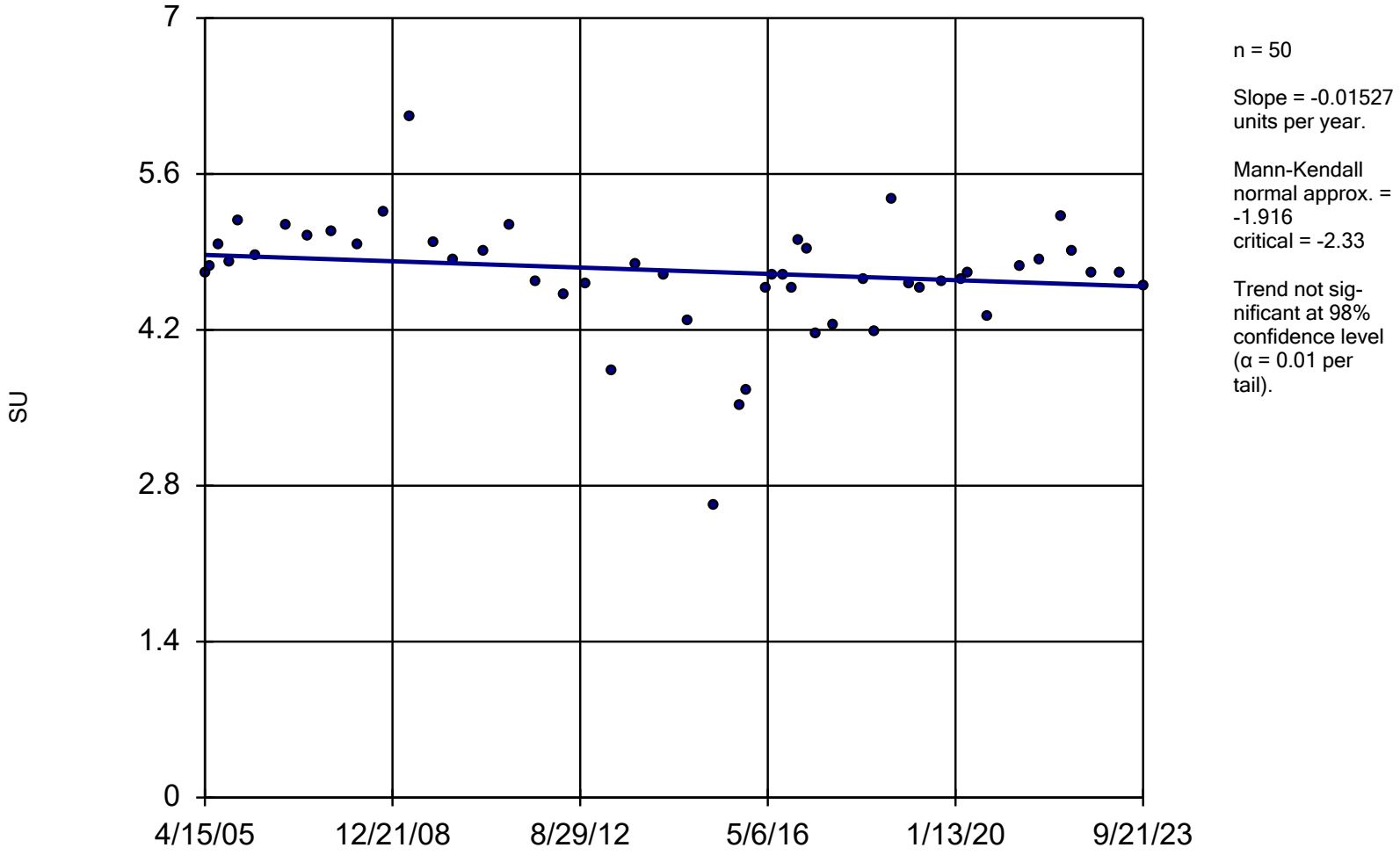
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-06



n = 50

Slope = -0.01527 units per year.

Mann-Kendall normal approx. = -1.916
critical = -2.33

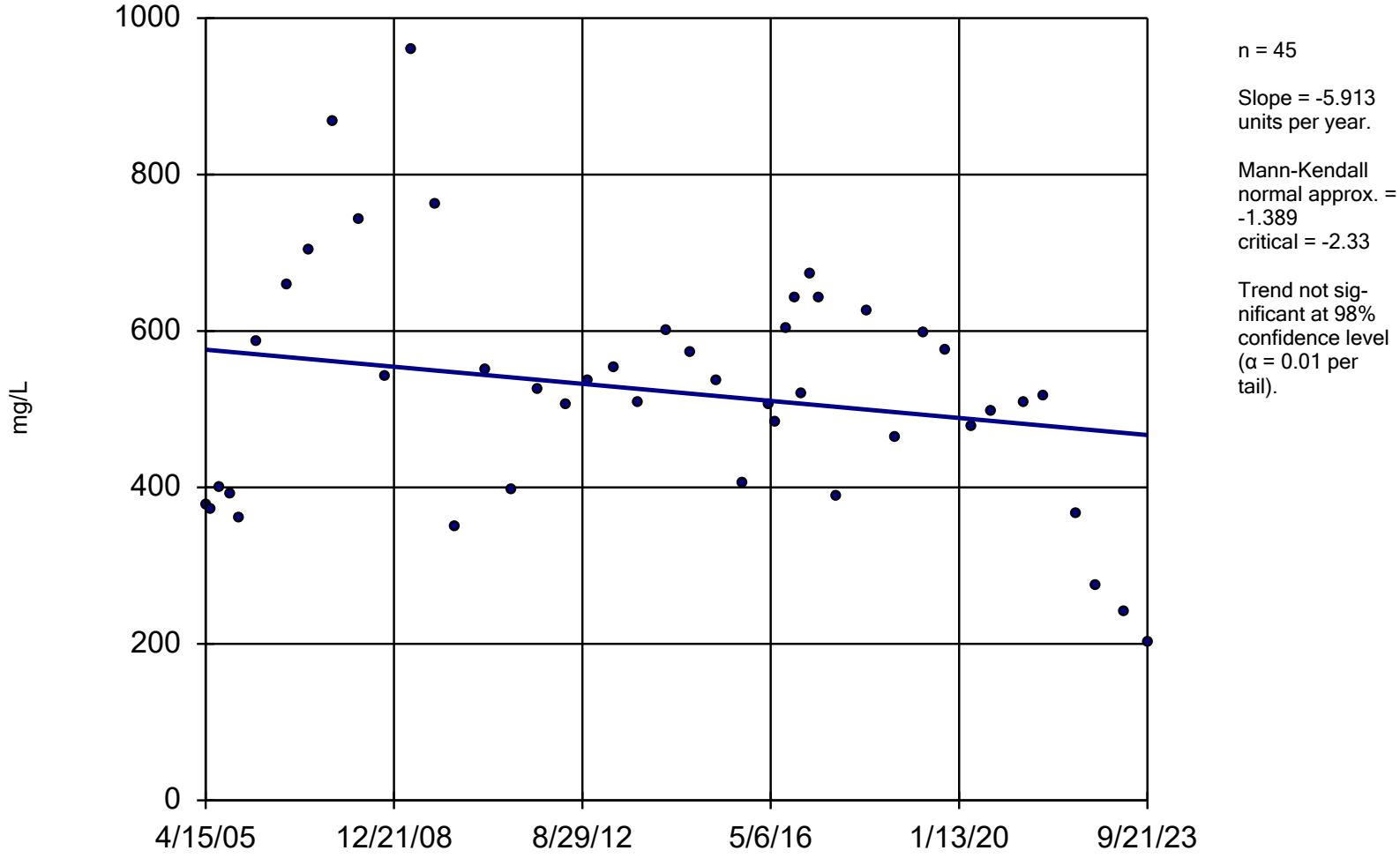
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: pH Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-02 (bg)



n = 45

Slope = -5.913 units per year.

Mann-Kendall normal approx. = -1.389
critical = -2.33

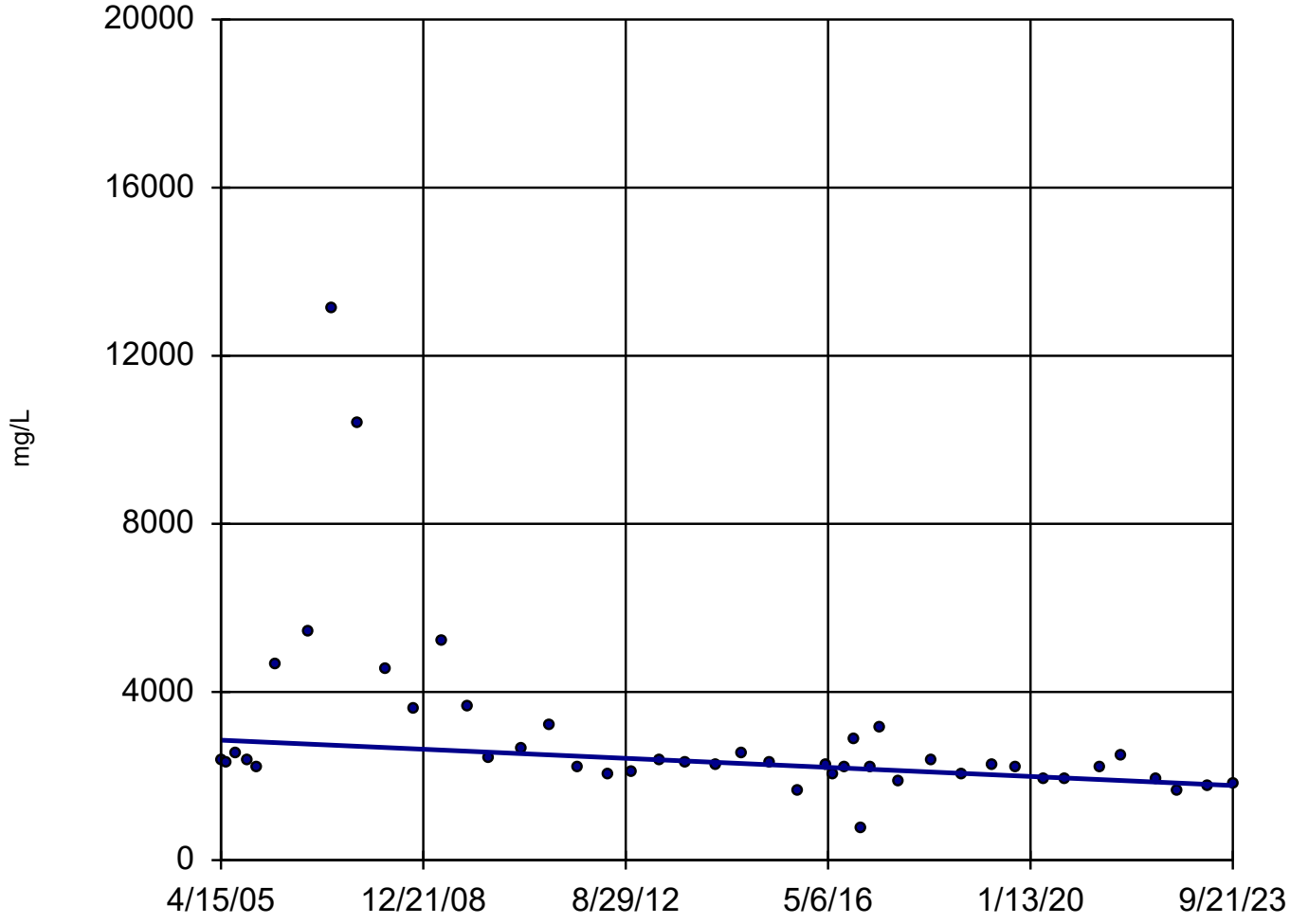
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-03



n = 45

Slope = -58.57 units per year.

Mann-Kendall normal approx. = -4.657
critical = -2.33

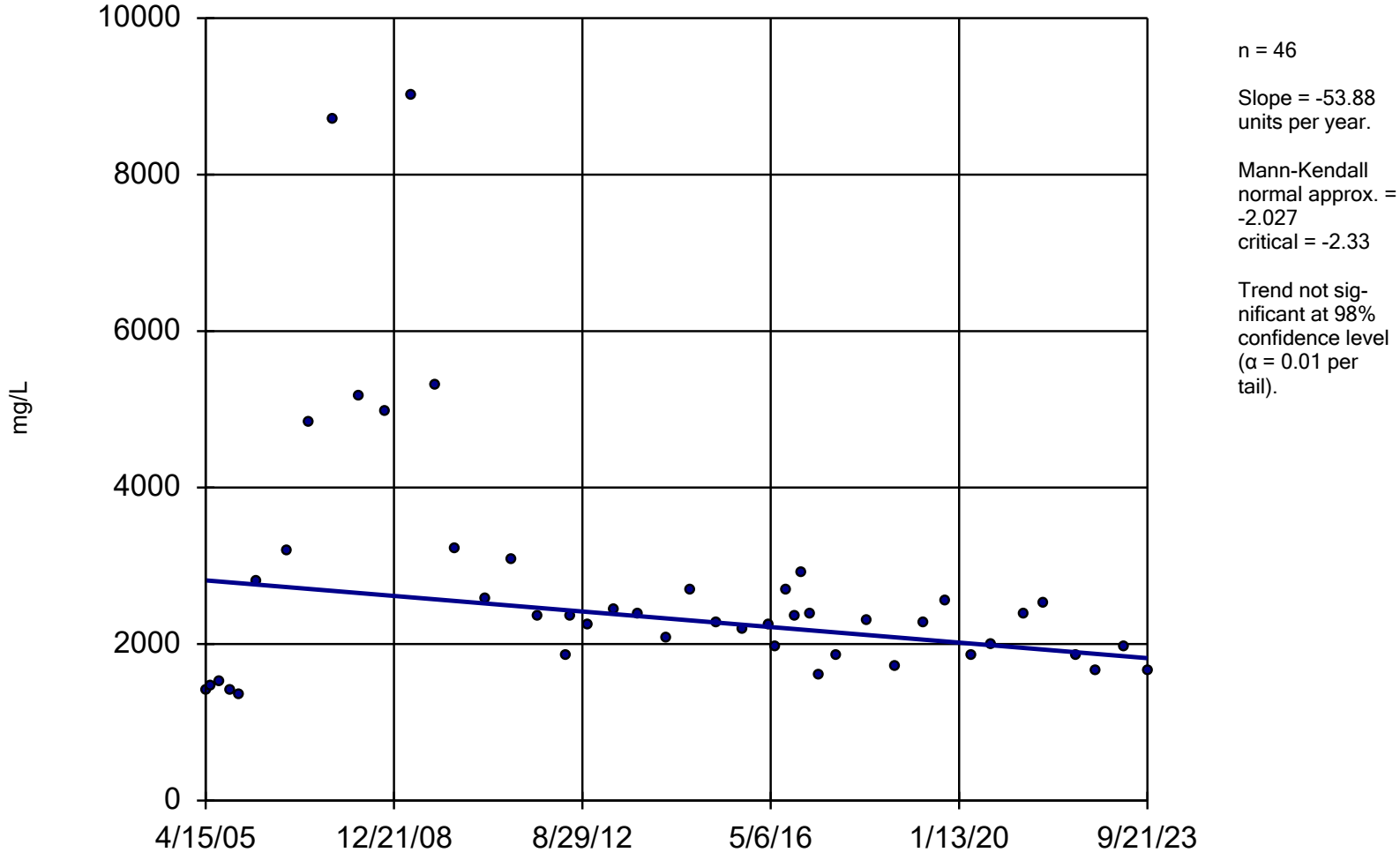
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Sulfate Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator

MW-04



n = 46

Slope = -53.88 units per year.

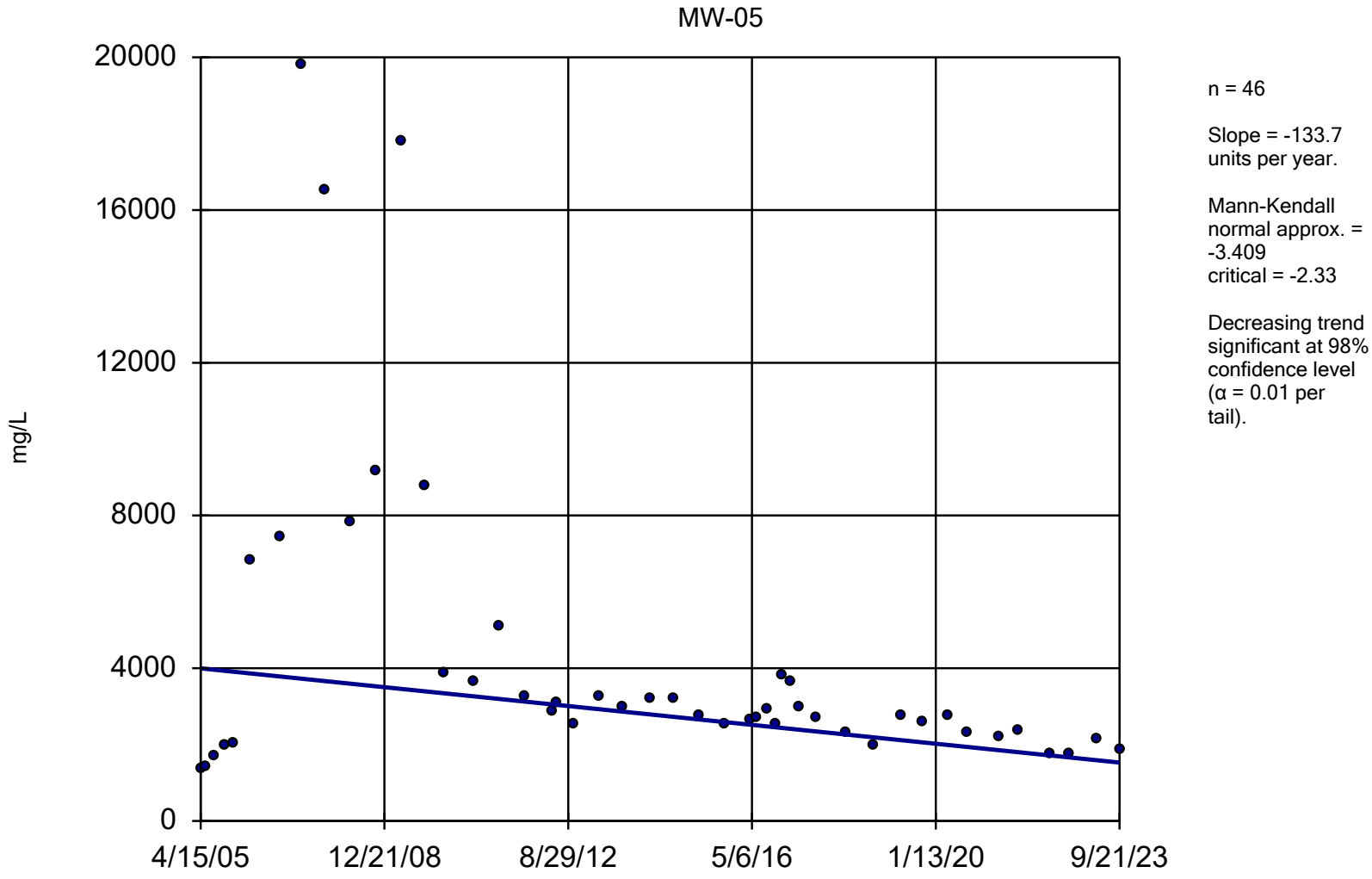
Mann-Kendall normal approx. = -2.027
critical = -2.33

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

Constituent: Sulfate Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



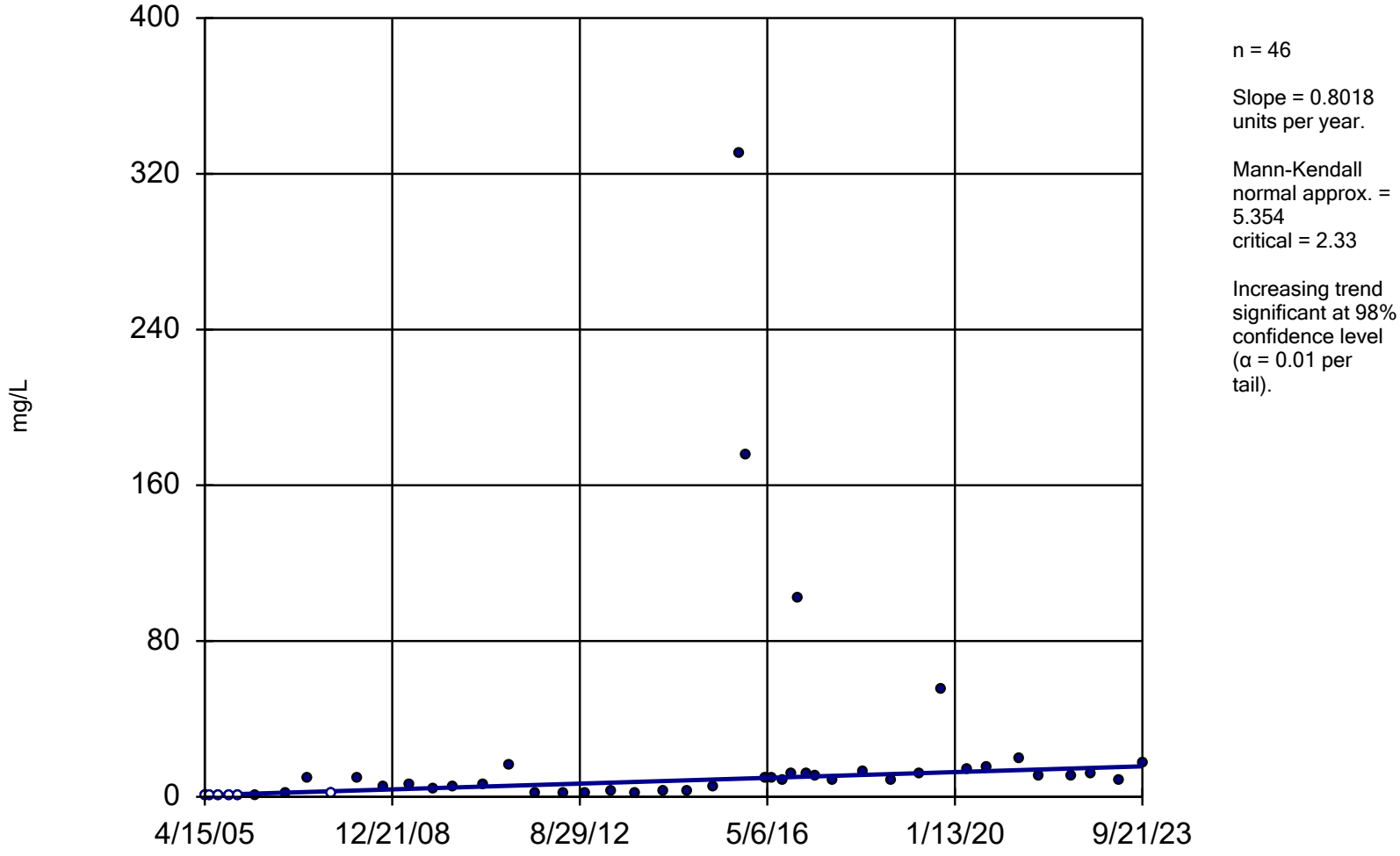
Constituent: Sulfate Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-06



n = 46

Slope = 0.8018 units per year.

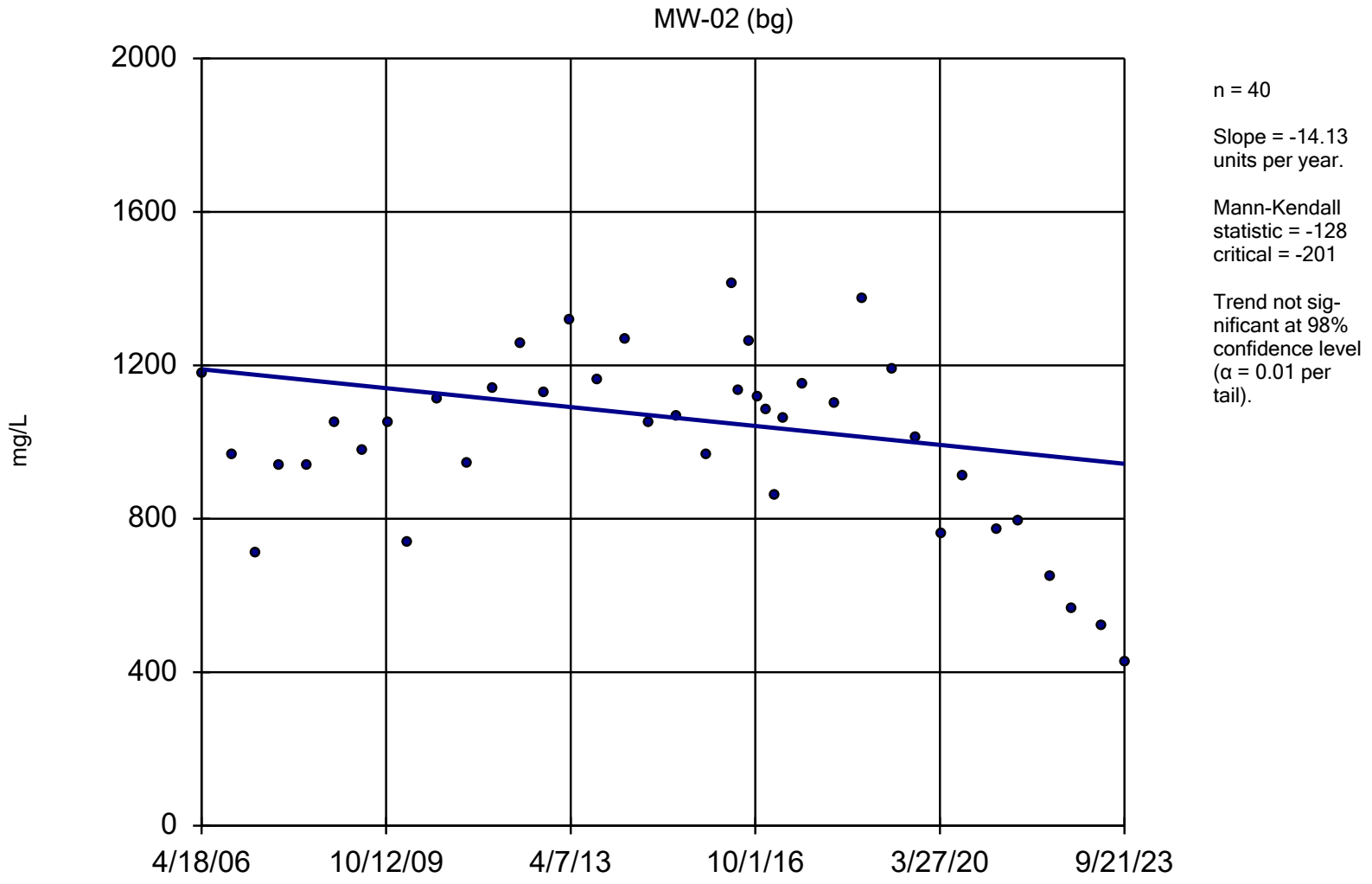
Mann-Kendall normal approx. = 5.354
critical = 2.33

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

Constituent: Sulfate Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

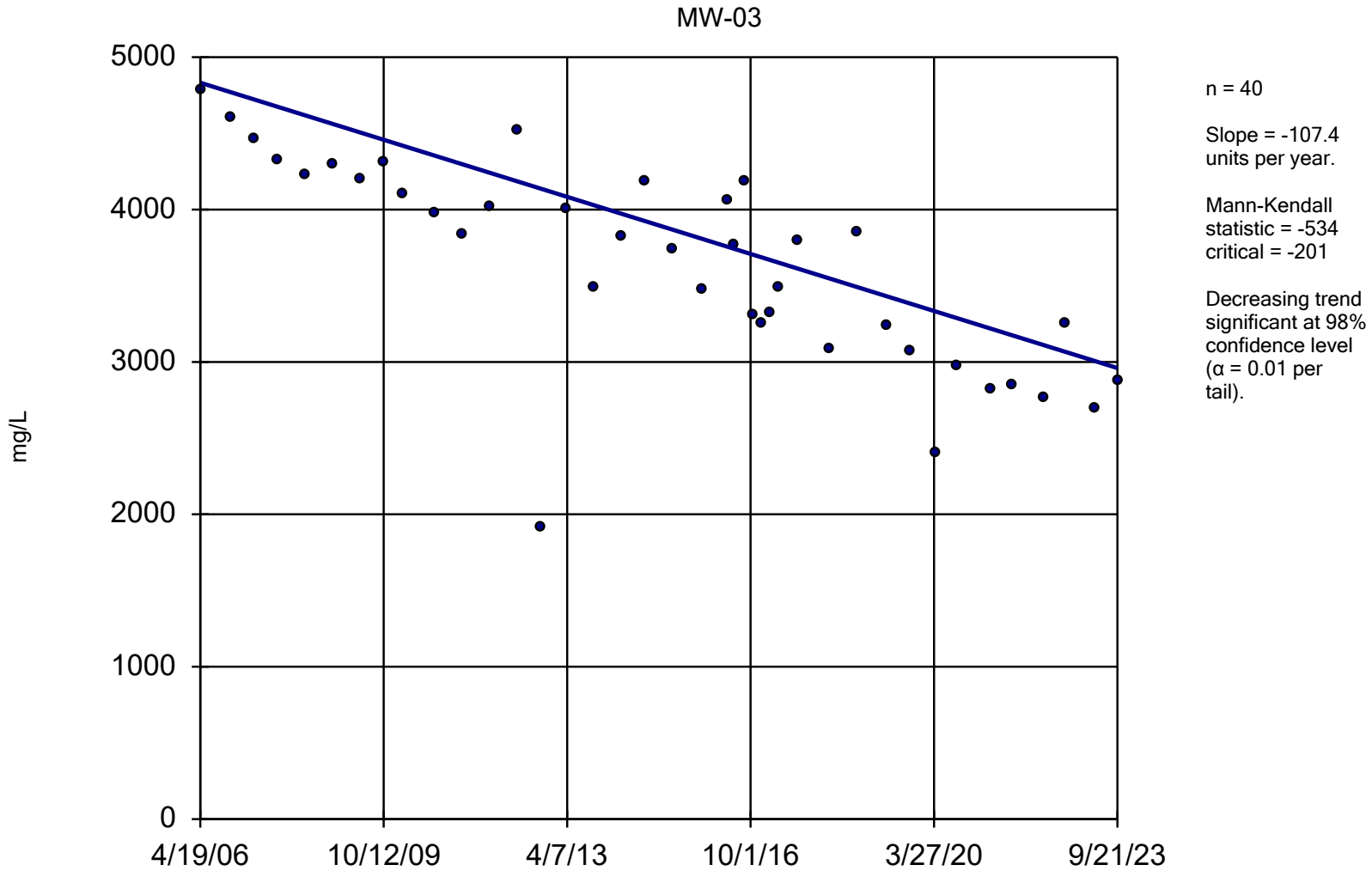
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

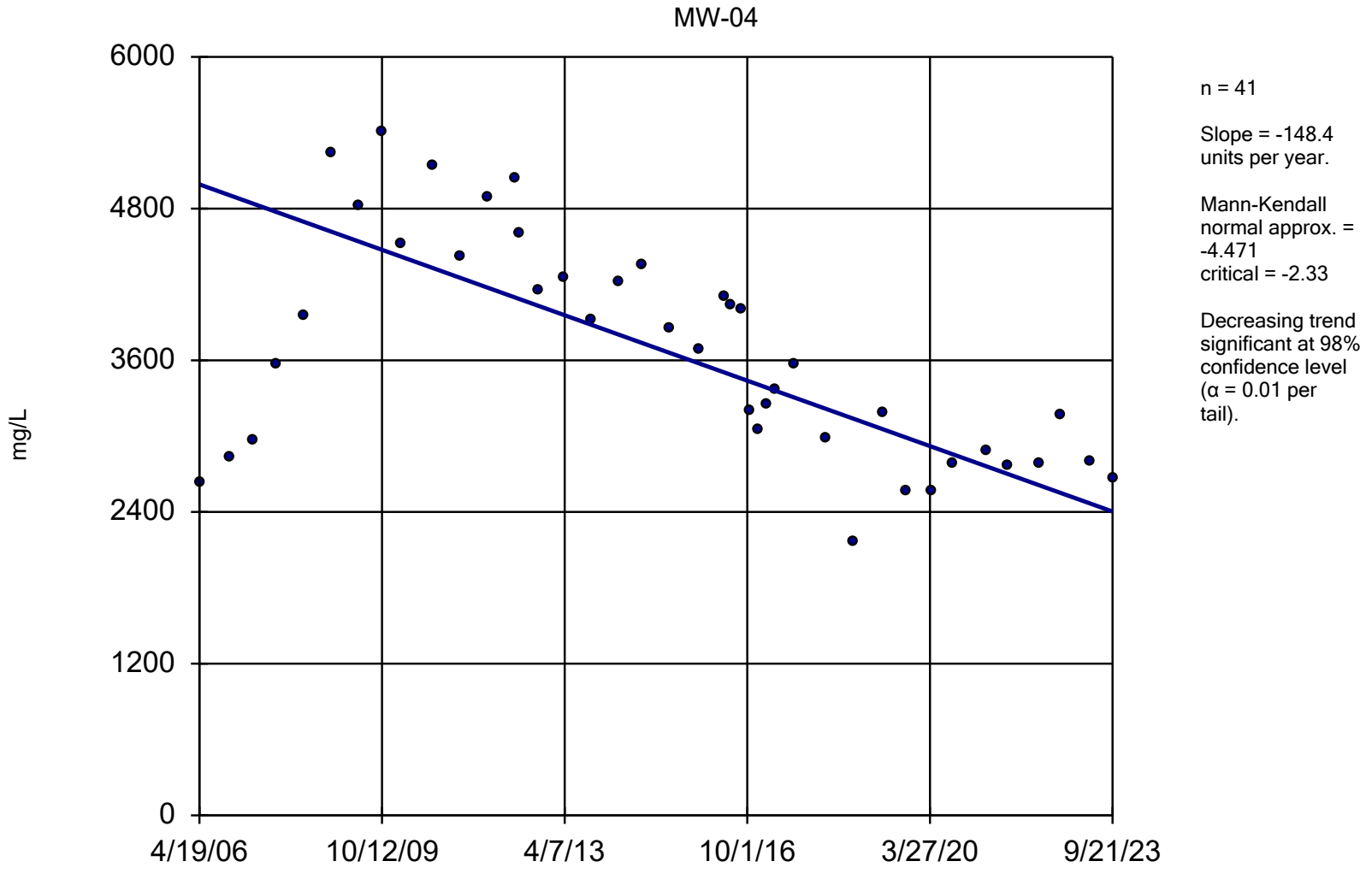
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

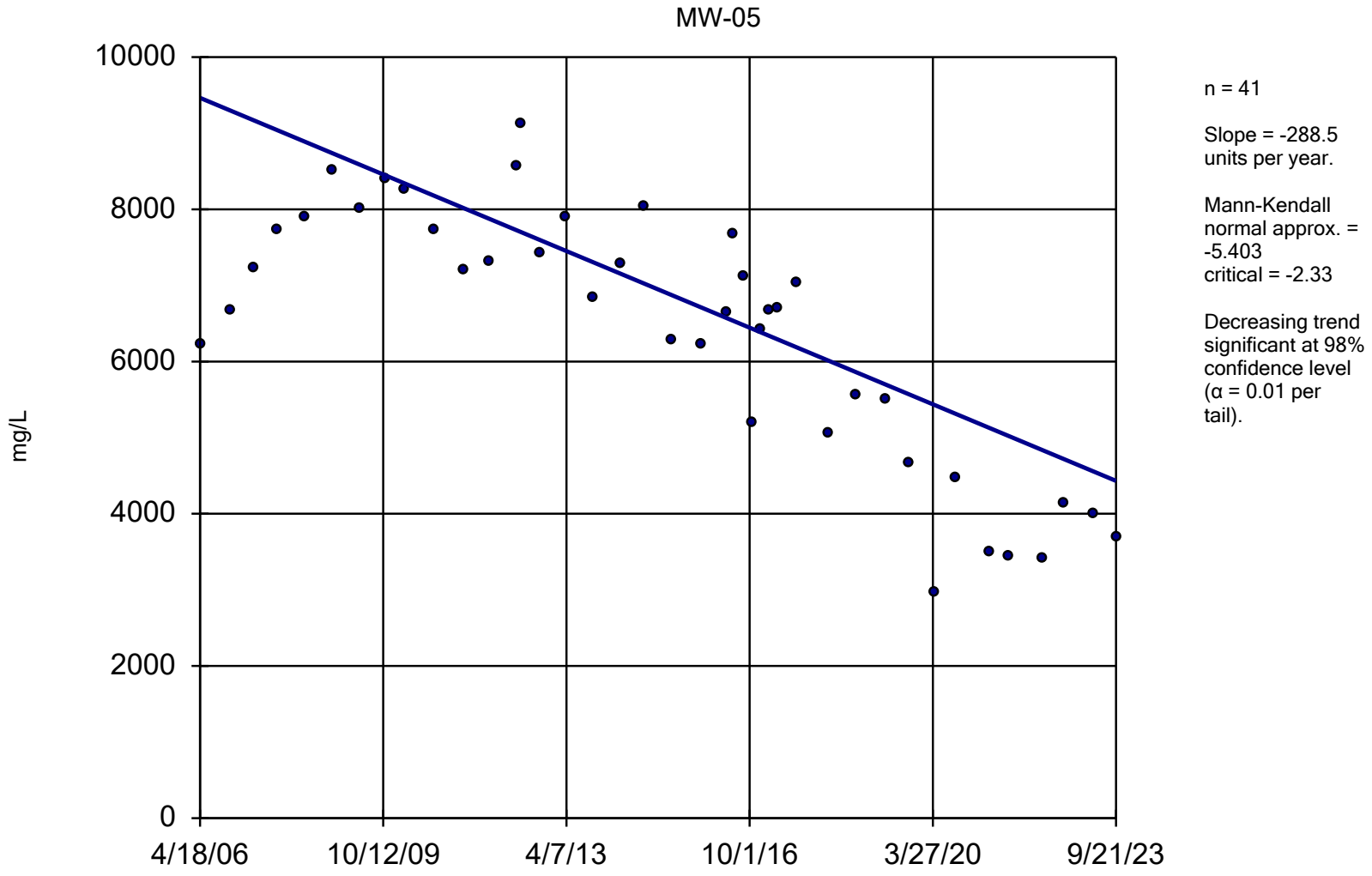
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

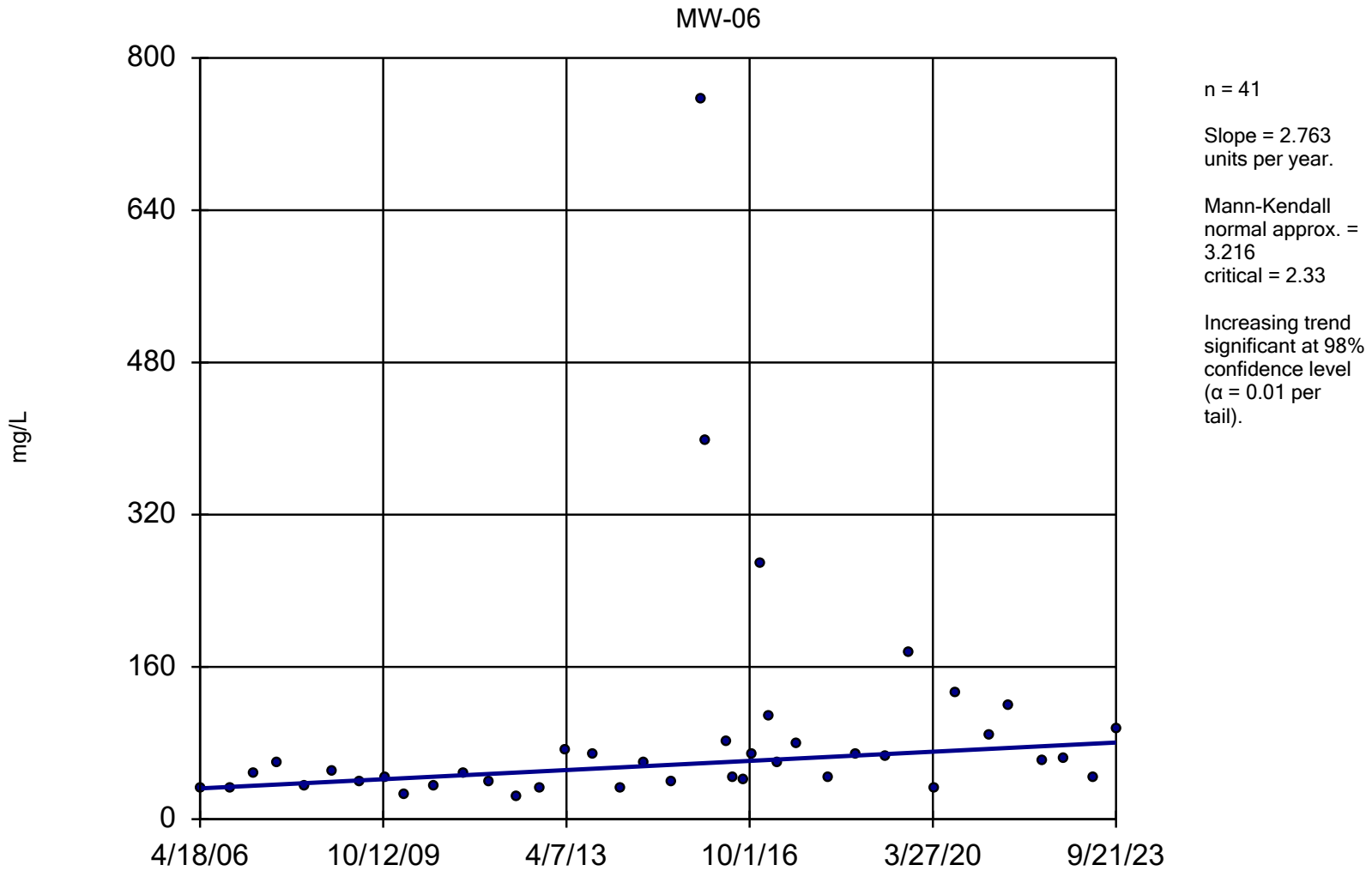
Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/30/2023 6:29 PM View: Landfill AppIII

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

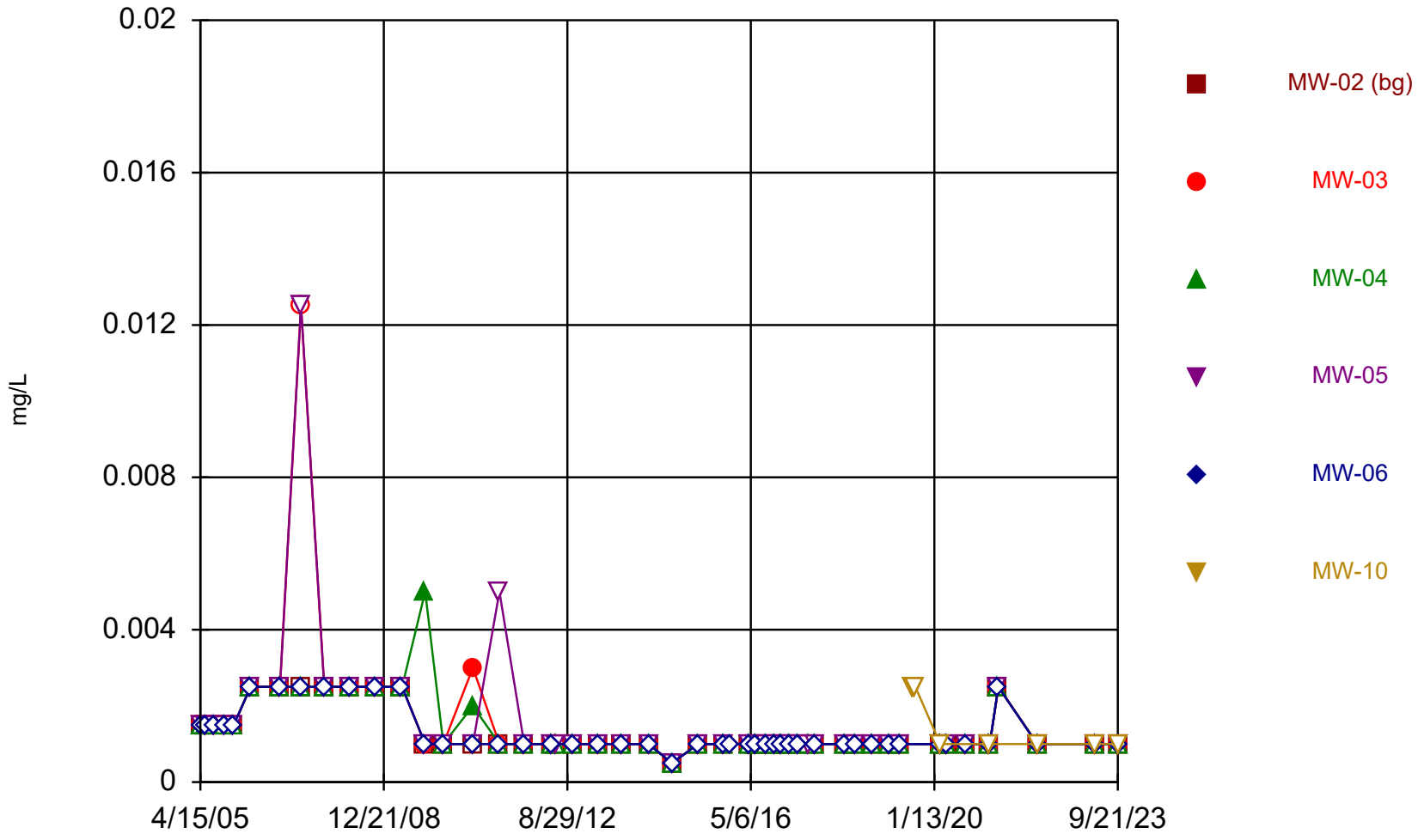
Tolerance Limit

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/1/2023, 6:28 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.001	n/a	n/a	n/a	46	100	n/a	0.09447	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.005	n/a	n/a	n/a	46	97.83	n/a	0.09447	NP Inter(NDs)
Barium (mg/L)	n/a	0.029	n/a	n/a	n/a	25	0	n/a	0.2774	NP Inter(normal...
Beryllium (mg/L)	n/a	0.009738	n/a	n/a	n/a	50	8	x^2	0.05	Inter
Cadmium (mg/L)	n/a	0.0025	n/a	n/a	n/a	46	100	n/a	0.09447	NP Inter(NDs)
Chromium (mg/L)	n/a	0.02	n/a	n/a	n/a	46	91.3	n/a	0.09447	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.1821	n/a	n/a	n/a	25	0	No	0.05	Inter
Combined Radium (pCi/L)	n/a	2.047	n/a	n/a	n/a	25	36	No	0.05	Inter
Fluoride (mg/L)	n/a	1.101	n/a	n/a	n/a	26	11.54	No	0.05	Inter
Lead (mg/L)	n/a	0.009925	n/a	n/a	n/a	50	8	sqrt(x)	0.05	Inter
Lithium (mg/L)	n/a	0.189	n/a	n/a	n/a	25	92	n/a	0.2774	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0015	n/a	n/a	n/a	18	94.44	n/a	0.3972	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.0025	n/a	n/a	n/a	25	100	n/a	0.2774	NP Inter(NDs)
Selenium (mg/L)	n/a	0.025	n/a	n/a	n/a	46	97.83	n/a	0.09447	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	23	100	n/a	0.3074	NP Inter(NDs)

Hollow symbols indicate censored values.

Time Series

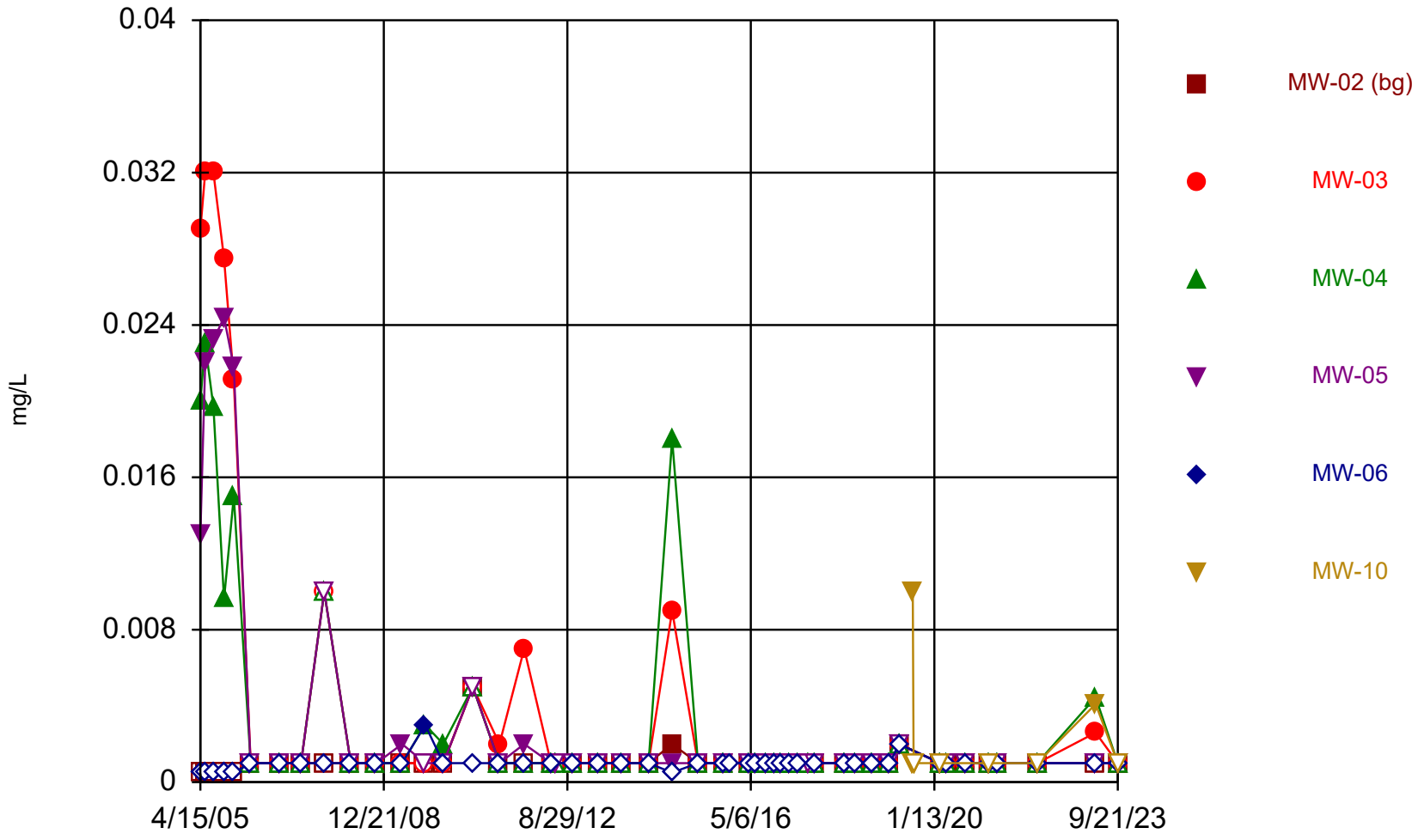


Constituent: Antimony Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

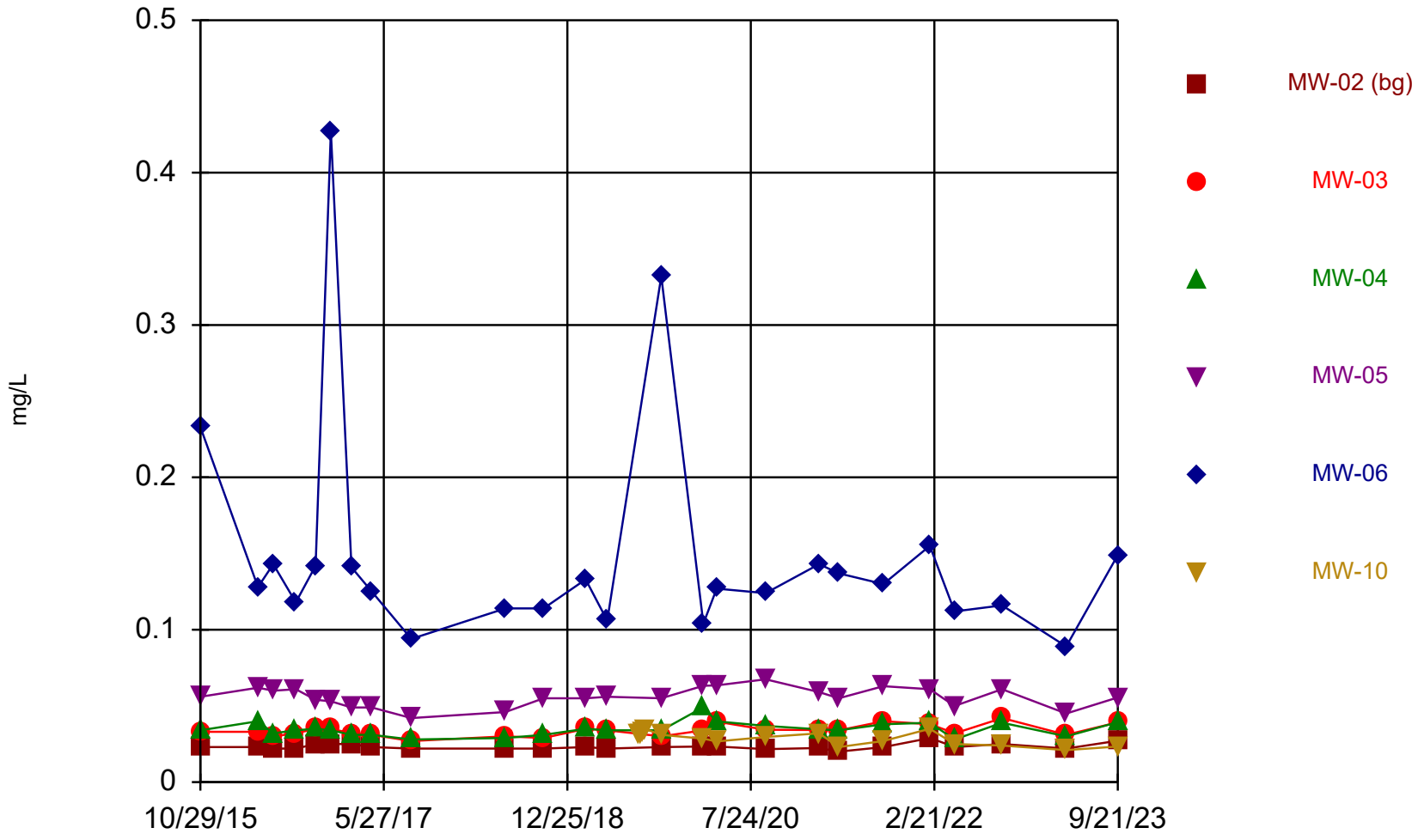
Time Series



Constituent: Arsenic Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

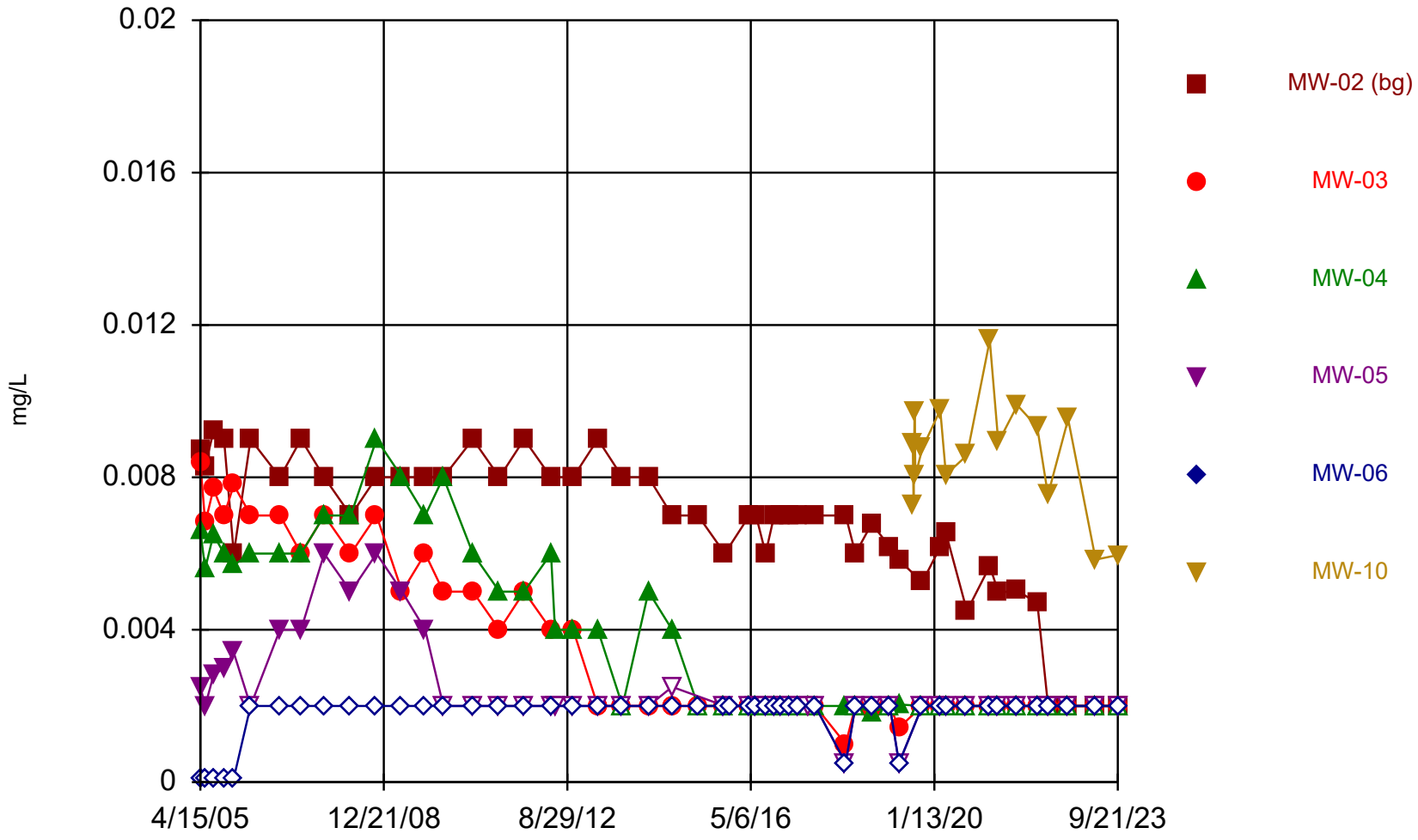


Constituent: Barium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

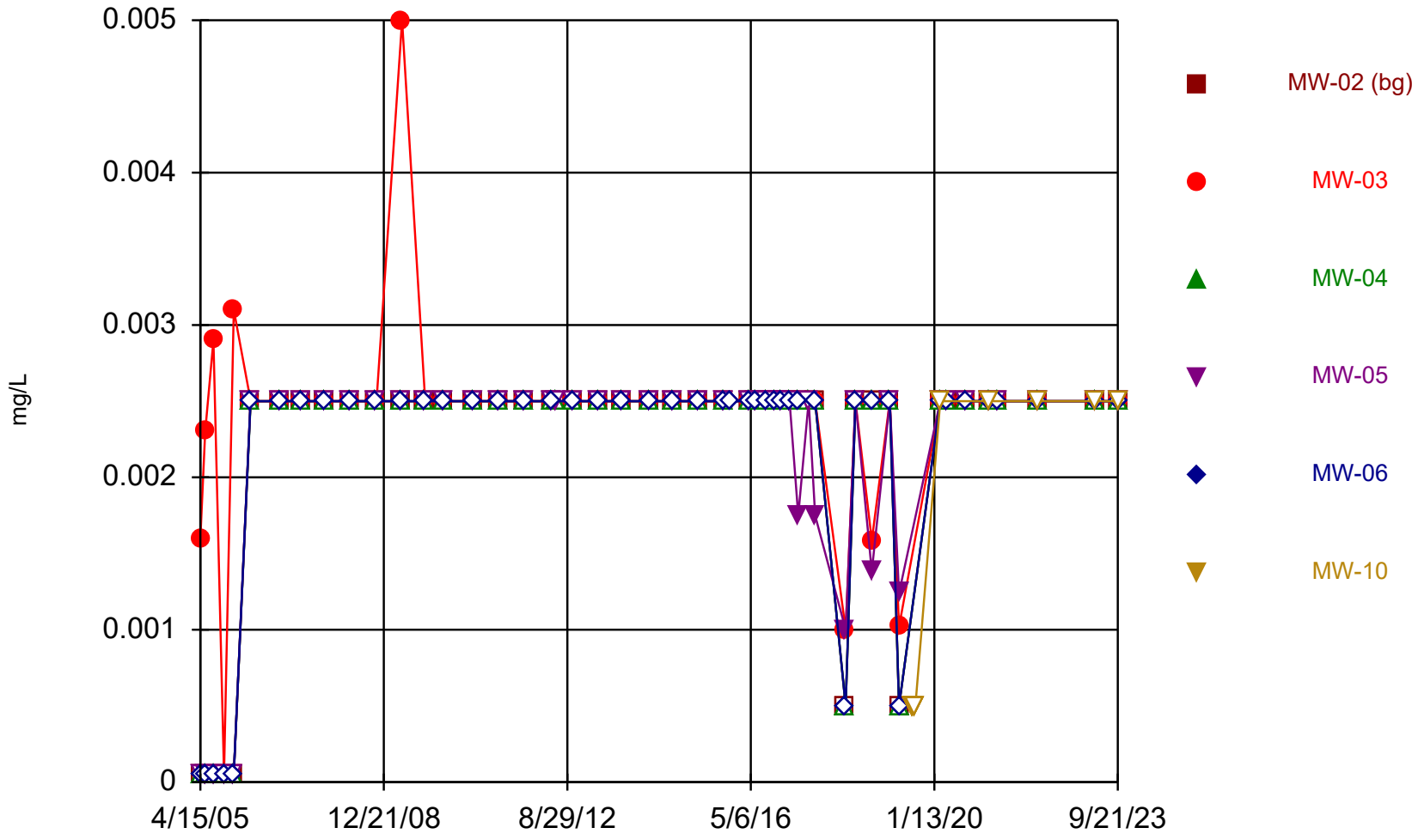


Constituent: Beryllium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

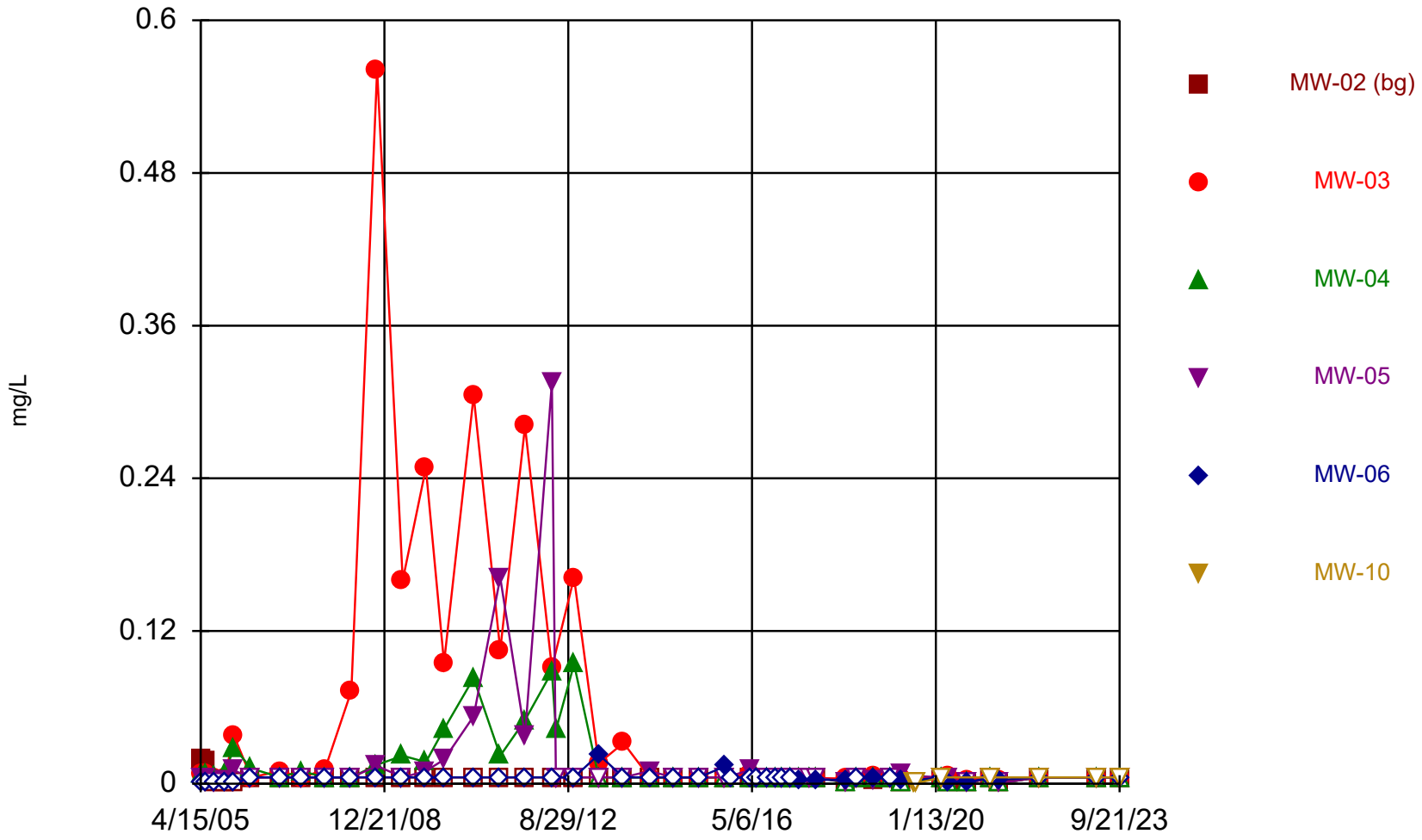


Constituent: Cadmium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

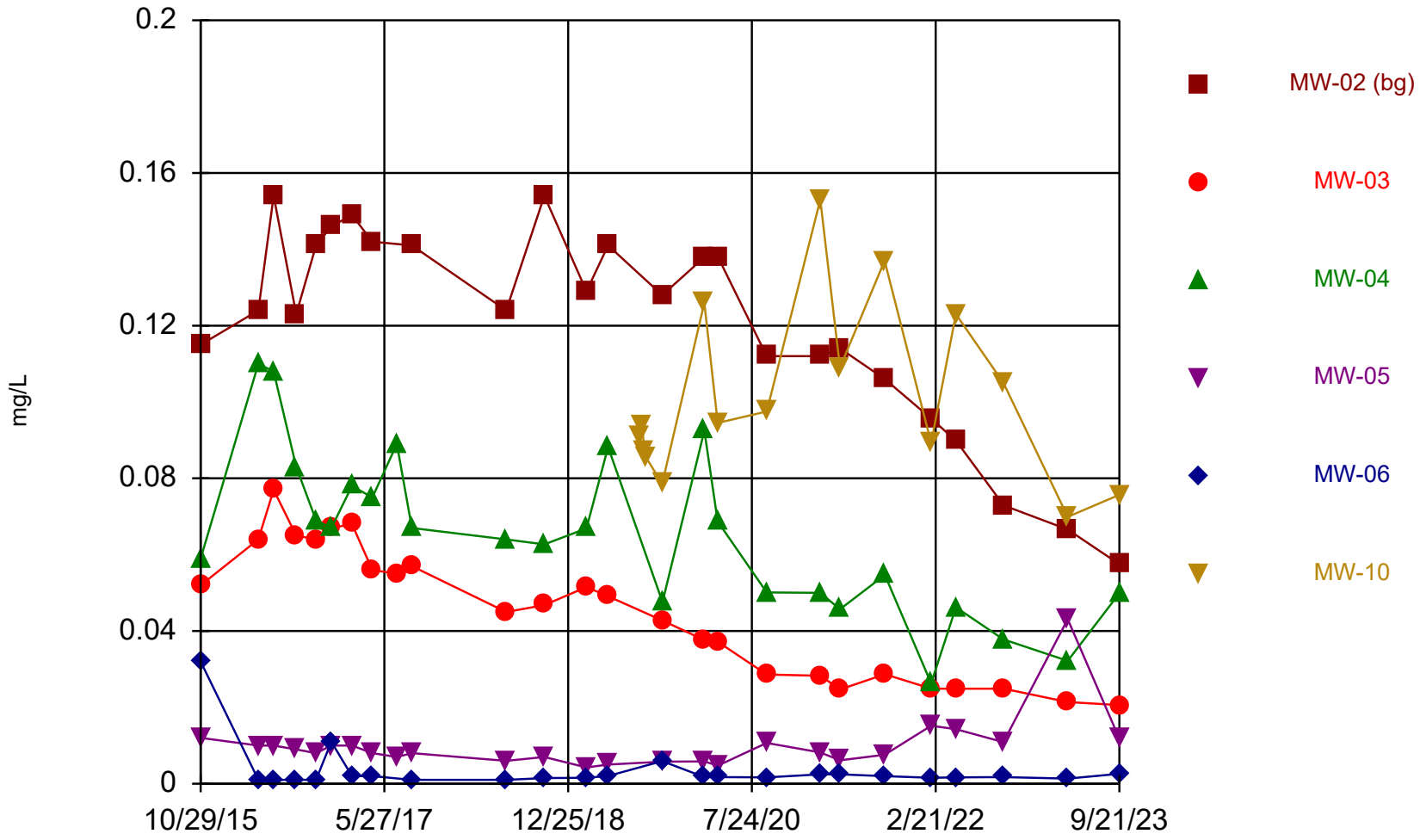
Time Series



Constituent: Chromium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Time Series

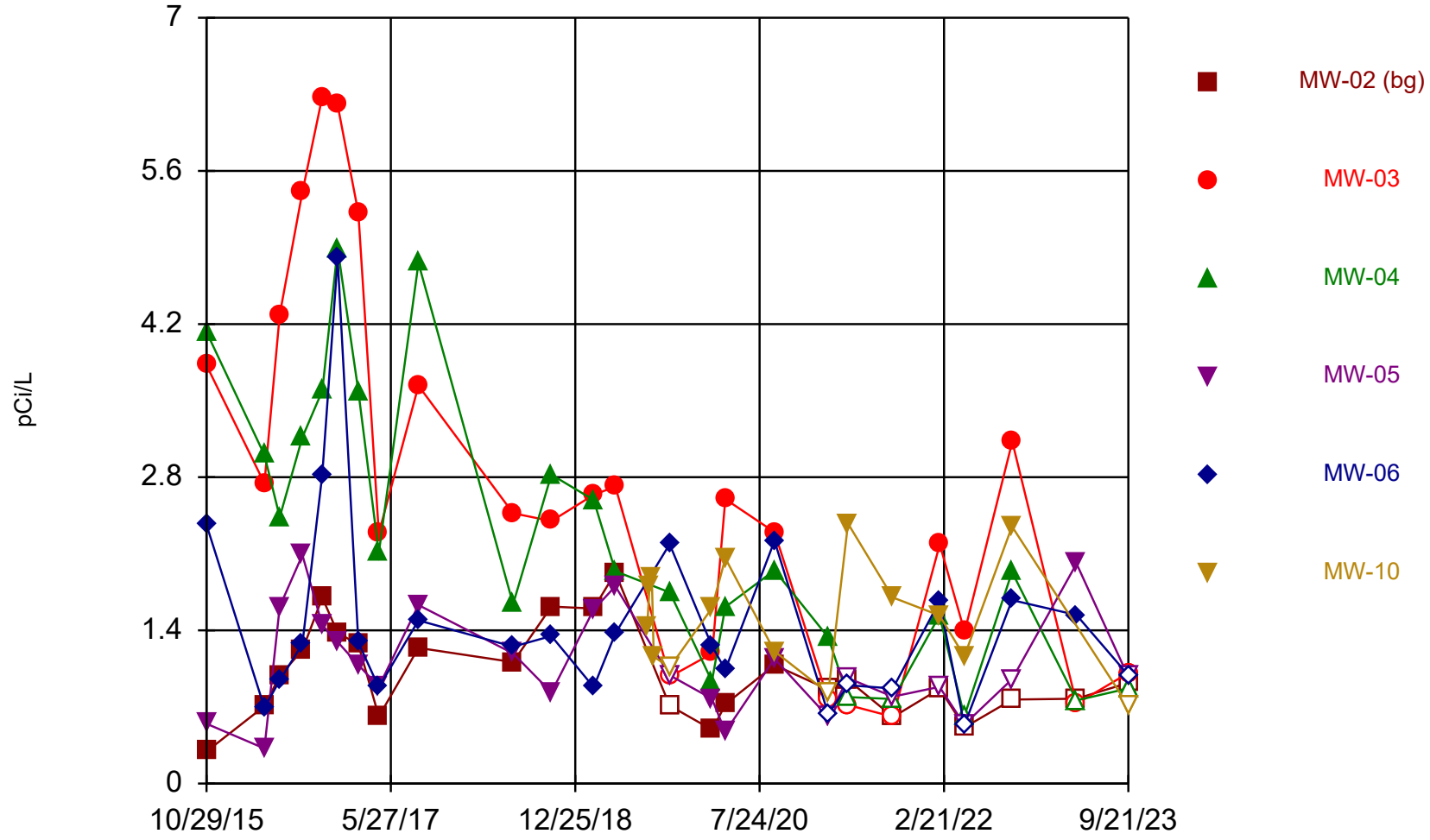


Constituent: Cobalt Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

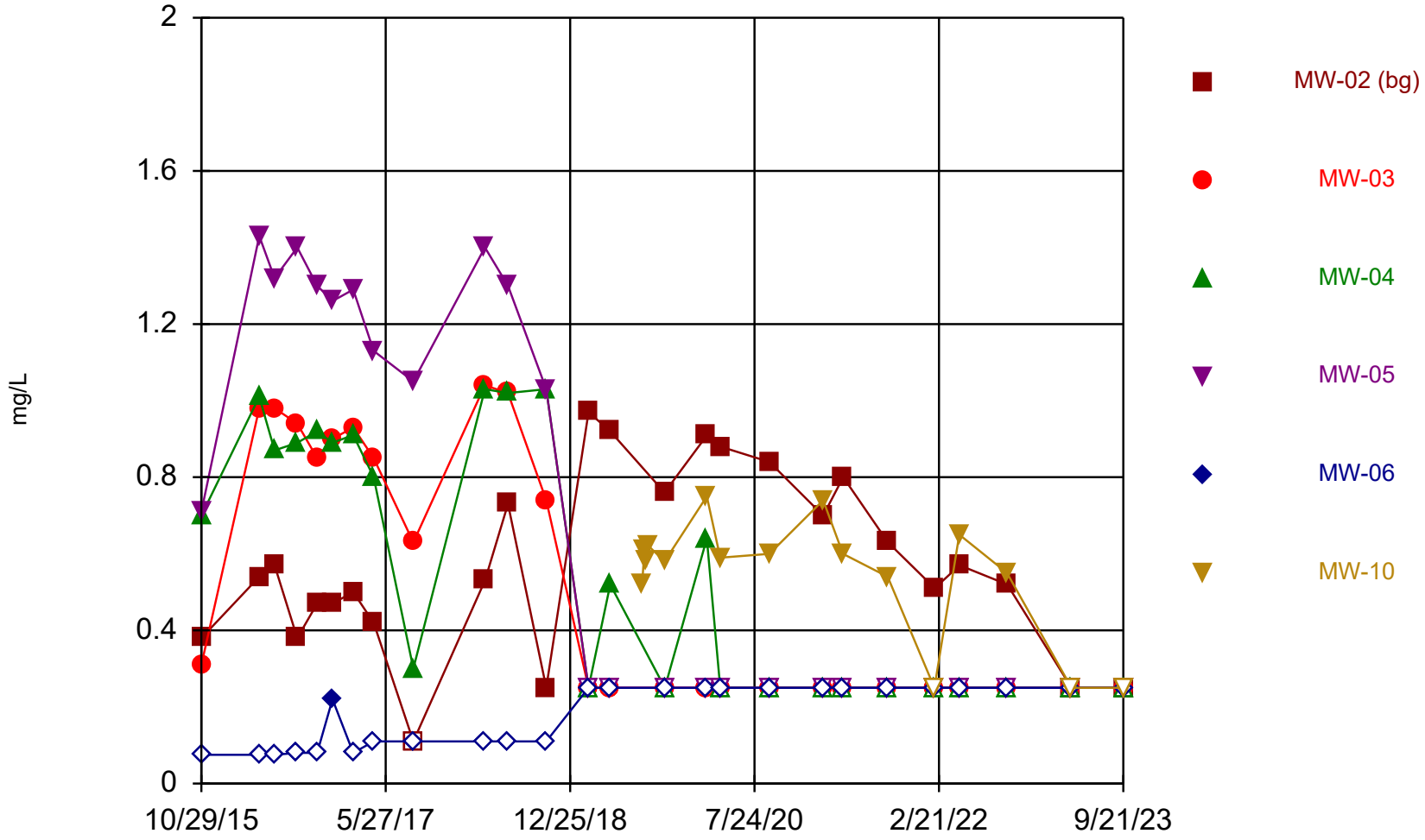


Constituent: Combined Radium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

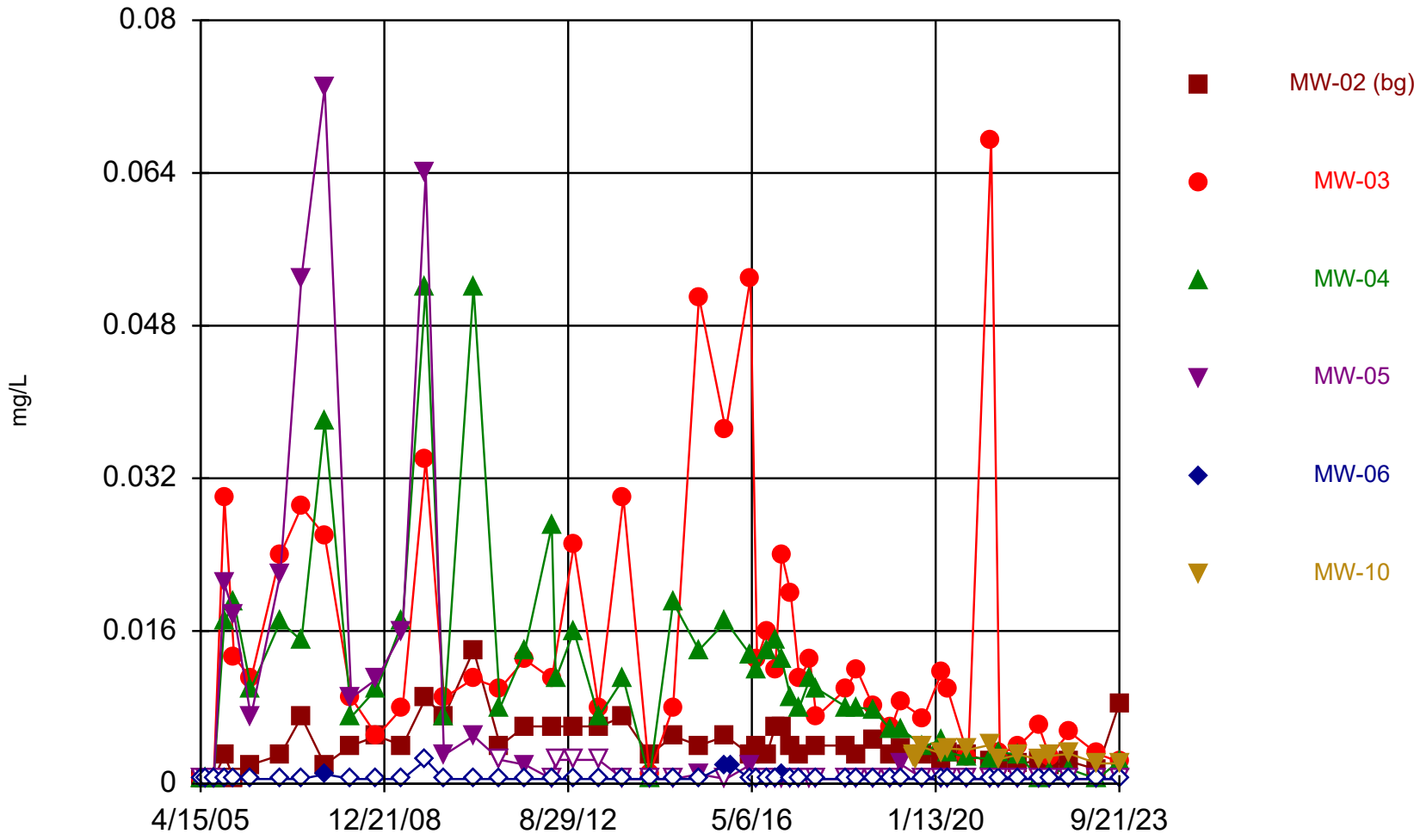


Constituent: Fluoride Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

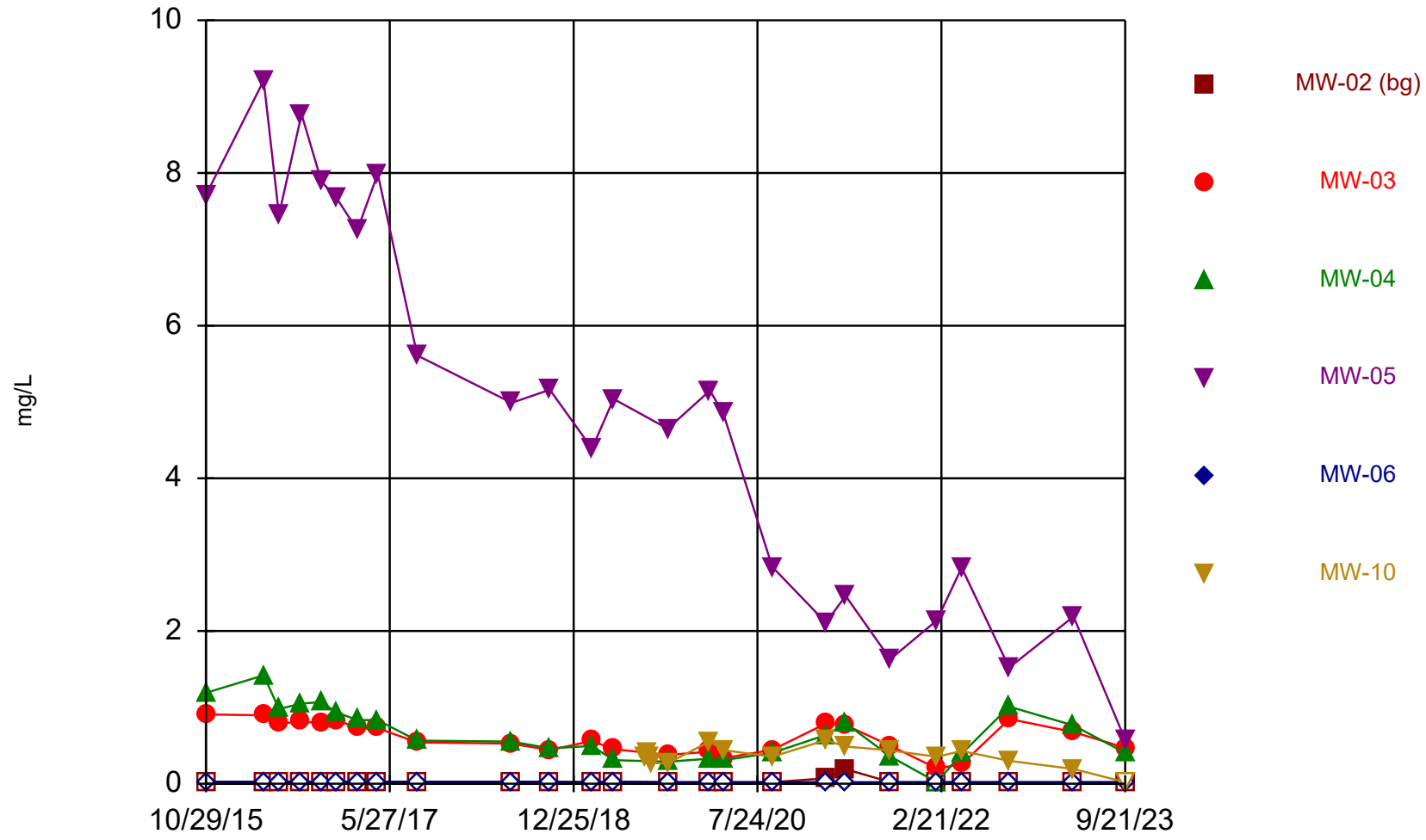


Constituent: Lead Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

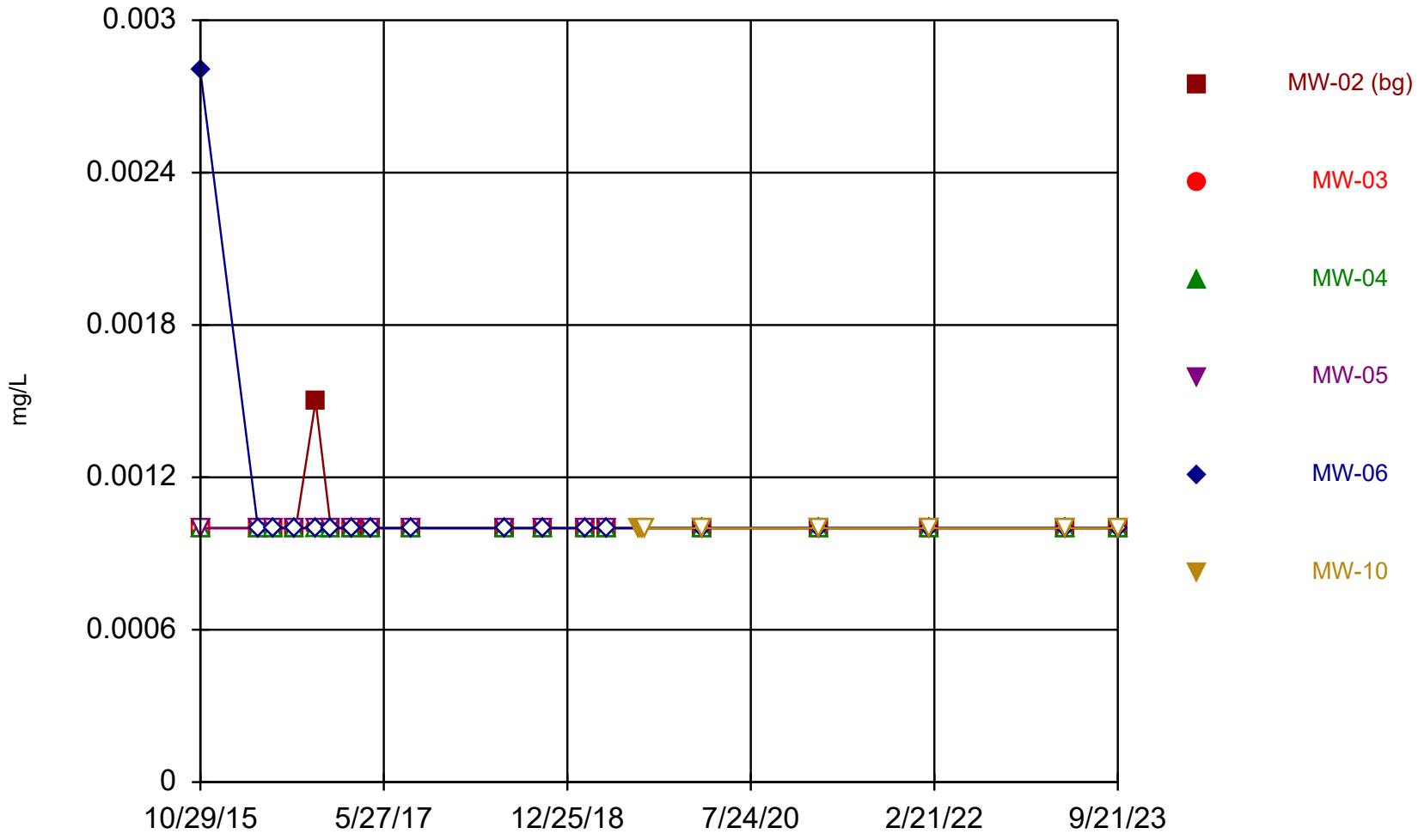


Constituent: Lithium Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

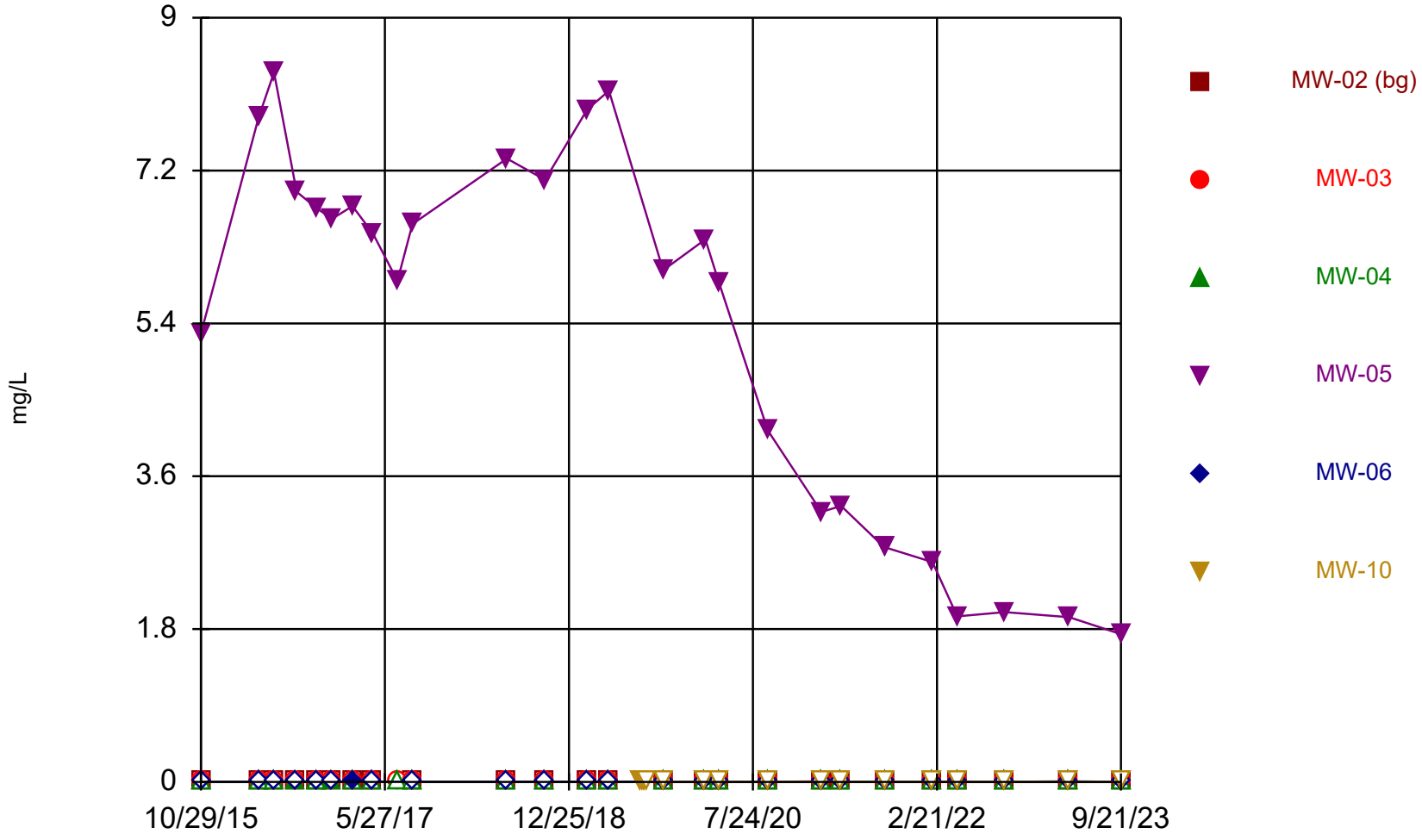


Constituent: Mercury Analysis Run 12/1/2023 6:24 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

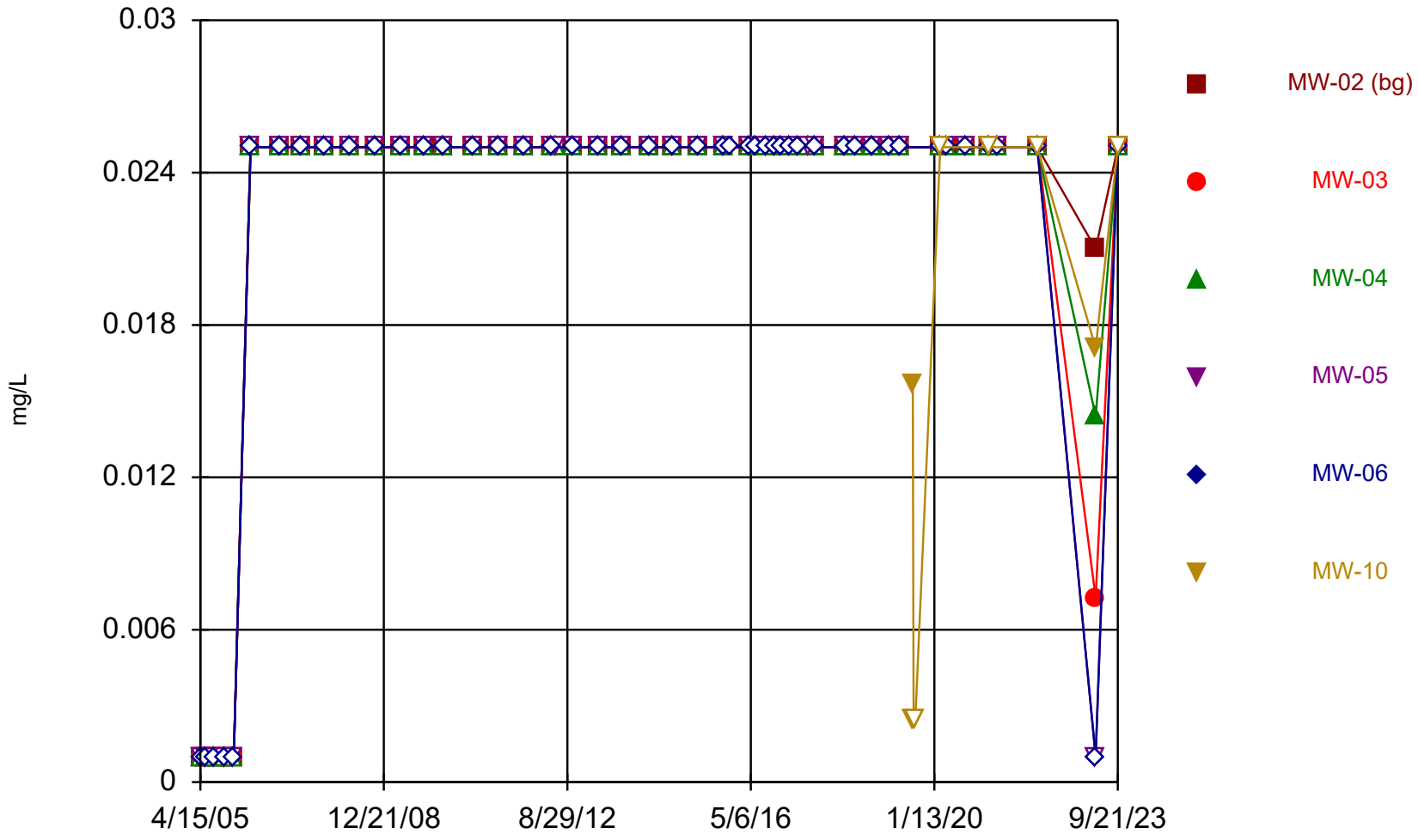


Constituent: Molybdenum Analysis Run 12/1/2023 6:25 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series

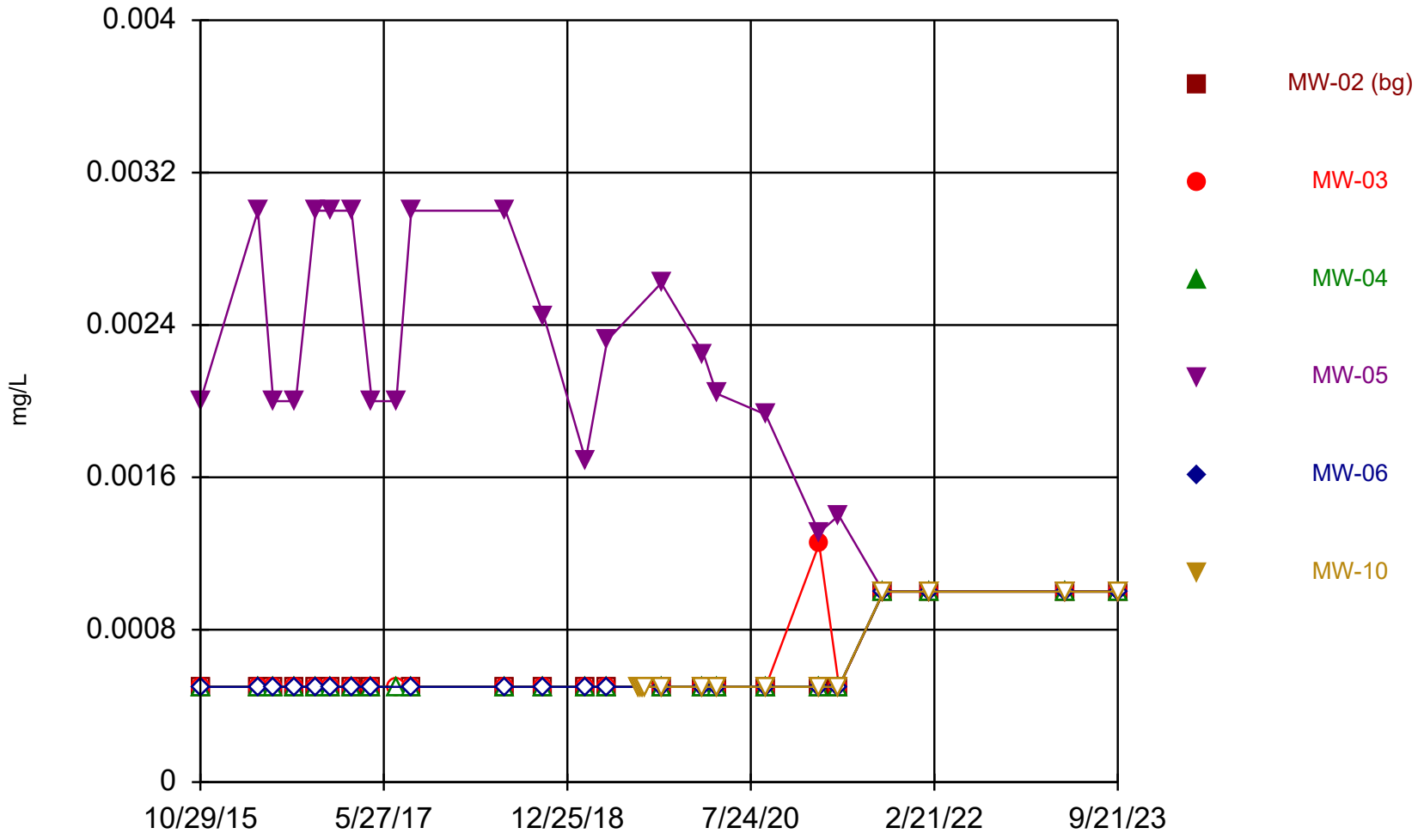


Constituent: Selenium Analysis Run 12/1/2023 6:25 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Hollow symbols indicate censored values.

Time Series



Constituent: Thallium Analysis Run 12/1/2023 6:25 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

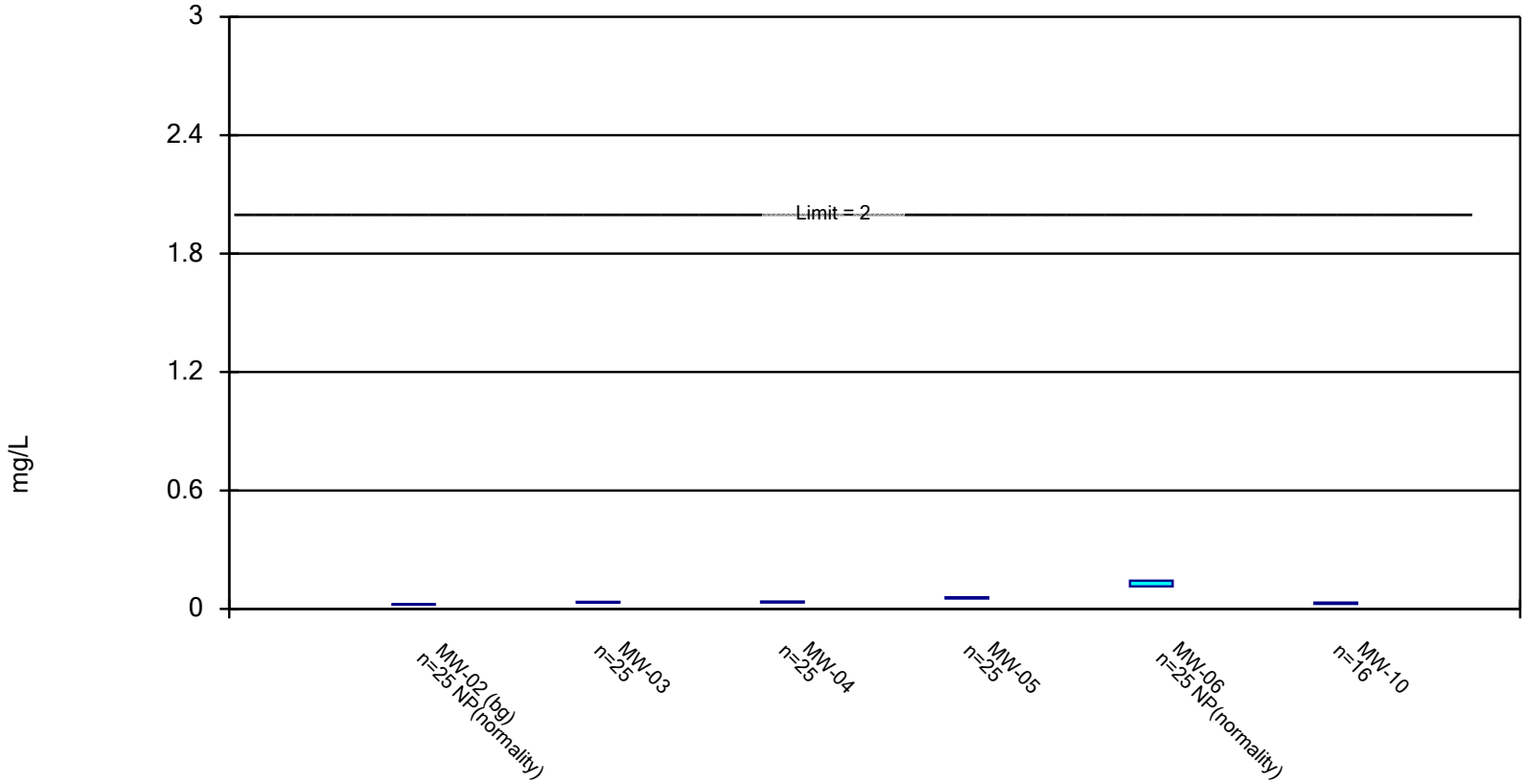
Confidence Interval

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/1/2023, 6:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Barium (mg/L)	MW-02 (bg)	0.0234	0.022	2	No	25	0	No	0.01	NP (normality)
Barium (mg/L)	MW-03	0.03563	0.03193	2	No	25	0	No	0.01	Param.
Barium (mg/L)	MW-04	0.03715	0.03244	2	No	25	0	No	0.01	Param.
Barium (mg/L)	MW-05	0.05908	0.05267	2	No	25	0	No	0.01	Param.
Barium (mg/L)	MW-06	0.143	0.114	2	No	25	0	No	0.01	NP (normality)
Barium (mg/L)	MW-10	0.03133	0.02567	2	No	16	0	No	0.01	Param.
Beryllium (mg/L)	MW-02 (bg)	0.007541	0.006473	0.009738	No	50	8	x^2	0.01	Param.
Beryllium (mg/L)	MW-03	0.004	0.002	0.009738	No	51	52.94	No	0.01	NP (normality)
Beryllium (mg/L)	MW-04	0.005	0.002	0.009738	No	52	46.15	No	0.01	NP (normality)
Beryllium (mg/L)	MW-05	0.0025	0.002	0.009738	No	51	76.47	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-06	0.002	0.0005	0.009738	No	51	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-10	0.009573	0.007644	0.009738	No	16	0	No	0.01	Param.
Cobalt (mg/L)	MW-02 (bg)	0.1339	0.1071	0.1821	No	25	0	No	0.01	Param.
Cobalt (mg/L)	MW-03	0.05305	0.03634	0.1821	No	26	0	No	0.01	Param.
Cobalt (mg/L)	MW-04	0.07542	0.05447	0.1821	No	26	0	No	0.01	Param.
Cobalt (mg/L)	MW-05	0.01092	0.006943	0.1821	No	26	0	ln(x)	0.01	Param.
Cobalt (mg/L)	MW-06	0.00203	0.00134	0.1821	No	25	0	No	0.01	NP (normality)
Cobalt (mg/L)	MW-10	0.1161	0.08586	0.1821	No	16	0	No	0.01	Param.
Combined Radium (pCi/L)	MW-02 (bg)	1.26	0.8223	5	No	25	36	No	0.01	Param.
Combined Radium (pCi/L)	MW-03	3.591	2.038	5	No	25	24	No	0.01	Param.
Combined Radium (pCi/L)	MW-04	2.868	1.717	5	No	25	20	No	0.01	Param.
Combined Radium (pCi/L)	MW-05	1.381	0.879	5	No	25	32	No	0.01	Param.
Combined Radium (pCi/L)	MW-06	1.825	1.127	5	No	25	20	sqrt(x)	0.01	Param.
Combined Radium (pCi/L)	MW-10	1.893	1.345	5	No	15	20	No	0.01	Param.
Fluoride (mg/L)	MW-02 (bg)	0.6848	0.4583	4	No	26	11.54	No	0.01	Param.
Fluoride (mg/L)	MW-03	0.9	0.25	4	No	26	53.85	No	0.01	NP (normality)
Fluoride (mg/L)	MW-04	0.89	0.25	4	No	26	46.15	No	0.01	NP (normality)
Fluoride (mg/L)	MW-05	1.29	0.25	4	No	26	53.85	No	0.01	NP (normality)
Fluoride (mg/L)	MW-06	0.25	0.11	4	No	26	96.15	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-10	0.6428	0.53	4	No	16	18.75	x^3	0.01	Param.
Lead (mg/L)	MW-02 (bg)	0.004488	0.002929	0.015	No	50	8	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-03	0.01603	0.008252	0.015	No	51	5.882	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-04	0.01211	0.006124	0.015	No	52	11.54	sqrt(x)	0.01	Param.
Lead (mg/L)	MW-05	0.00207	0.0005	0.015	No	52	69.23	No	0.01	NP (normality)
Lead (mg/L)	MW-06	0.0005	0.0005	0.015	No	51	92.16	No	0.01	NP (NDs)
Lead (mg/L)	MW-10	0.003352	0.002609	0.015	No	16	0	No	0.01	Param.
Lithium (mg/L)	MW-02 (bg)	0.025	0.02	1.42	No	25	92	No	0.01	NP (NDs)
Lithium (mg/L)	MW-03	0.7084	0.4989	1.42	No	25	0	No	0.01	Param.
Lithium (mg/L)	MW-04	0.8279	0.4841	1.42	No	25	4	No	0.01	Param.
Lithium (mg/L)	**MW-05**	**6.165**	**3.602**	**1.42**	**Yes**	**25**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	MW-06	0.025	0.02	1.42	No	25	100	No	0.01	NP (NDs)
Lithium (mg/L)	MW-10	0.4499	0.2713	1.42	No	16	6.25	No	0.01	Param.
Molybdenum (mg/L)	MW-02 (bg)	0.0025	0.0005	0.1	No	25	100	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-03	0.00727	0.0005	0.1	No	26	96.15	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-04	0.006	0.0025	0.1	No	26	92.31	No	0.01	NP (NDs)
Molybdenum (mg/L)	**MW-05**	**6.568**	**4.71**	**0.1**	**Yes**	**27**	**0**	**x^2**	**0.01**	**Param.**
Molybdenum (mg/L)	MW-06	0.005	0.0025	0.1	No	25	88	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-10	0.0025	0.0005	0.1	No	16	100	No	0.01	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

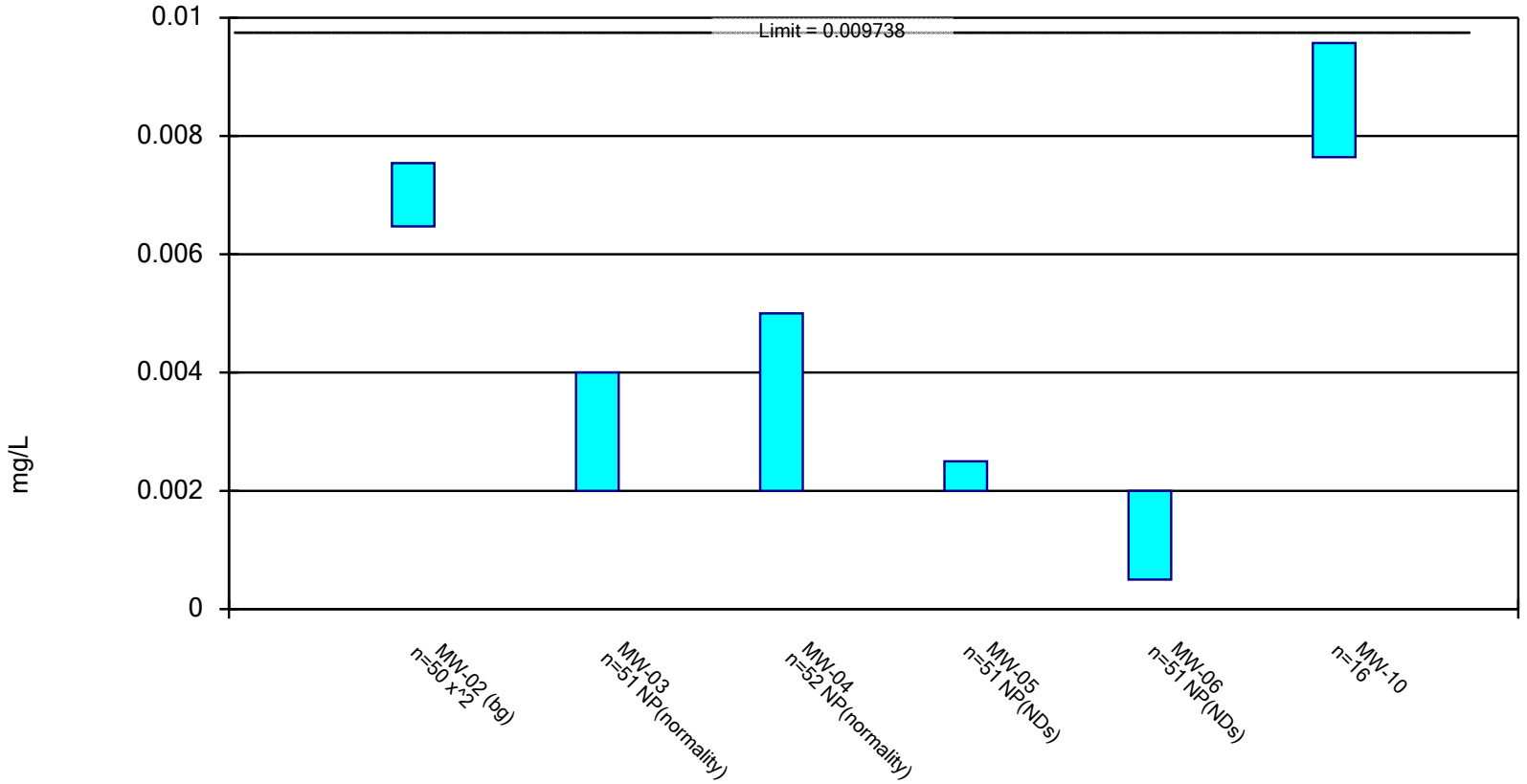


Constituent: Barium Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: multiple

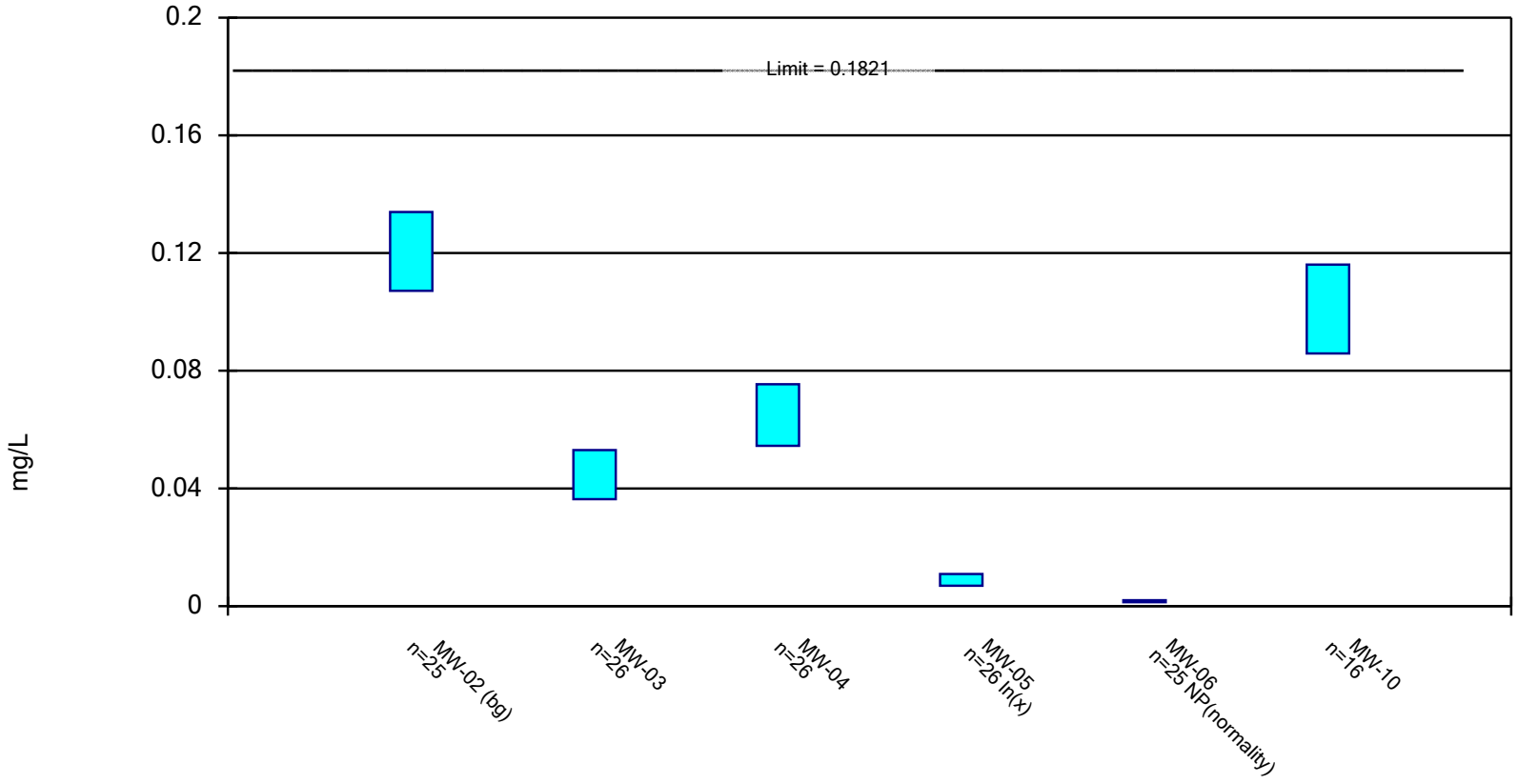


Constituent: Beryllium Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

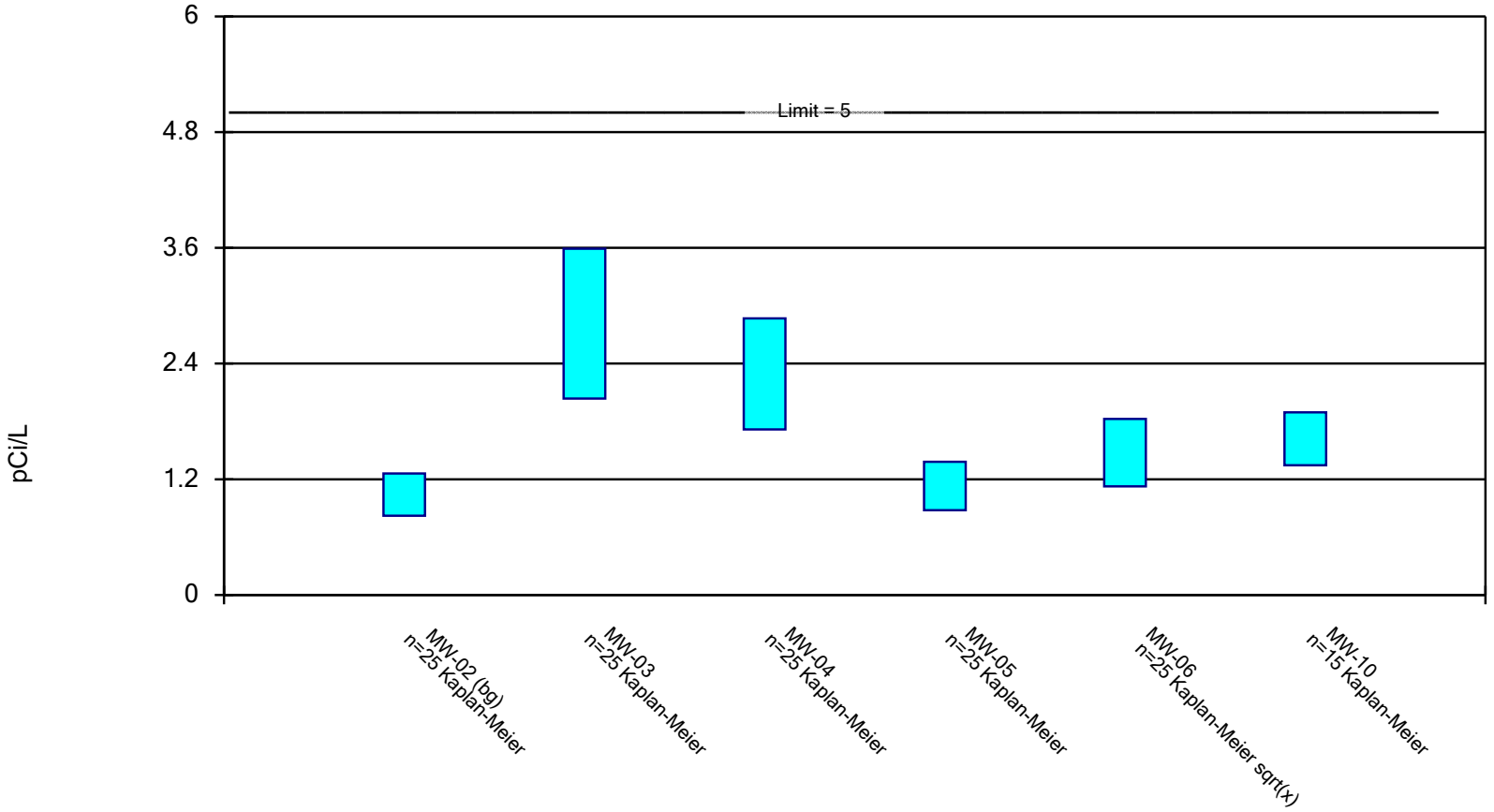


Constituent: Cobalt Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

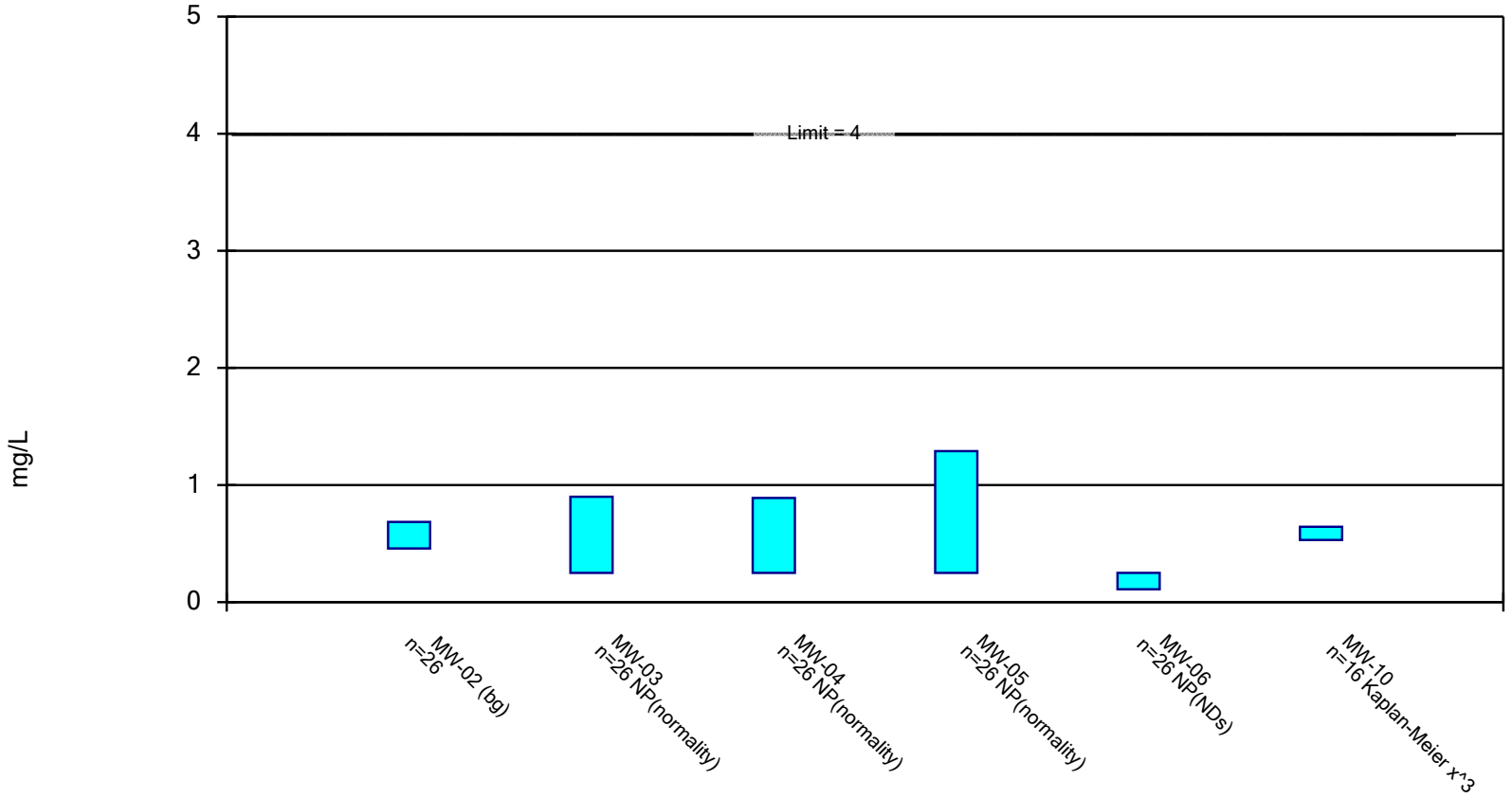


Constituent: Combined Radium Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

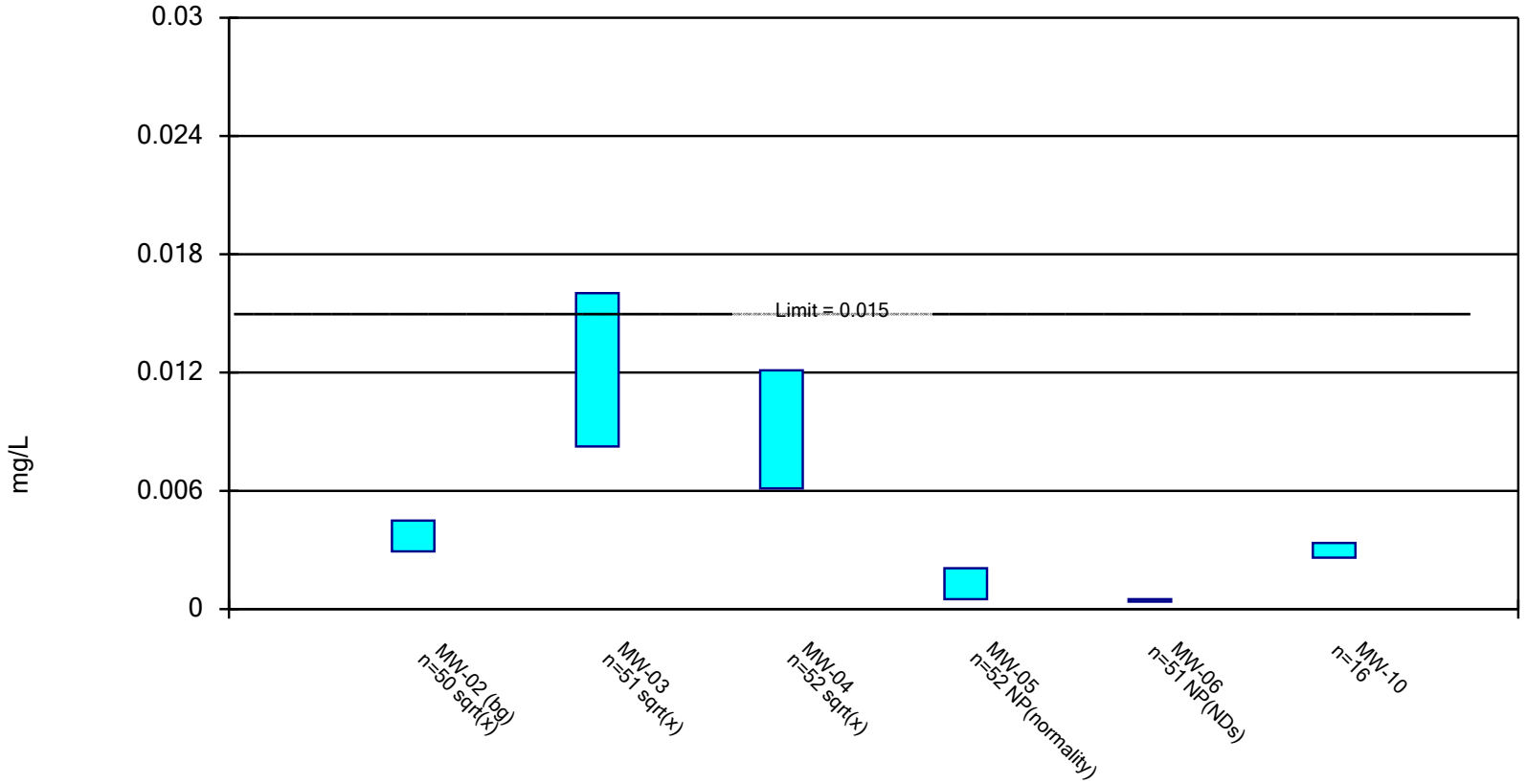


Constituent: Fluoride Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: multiple

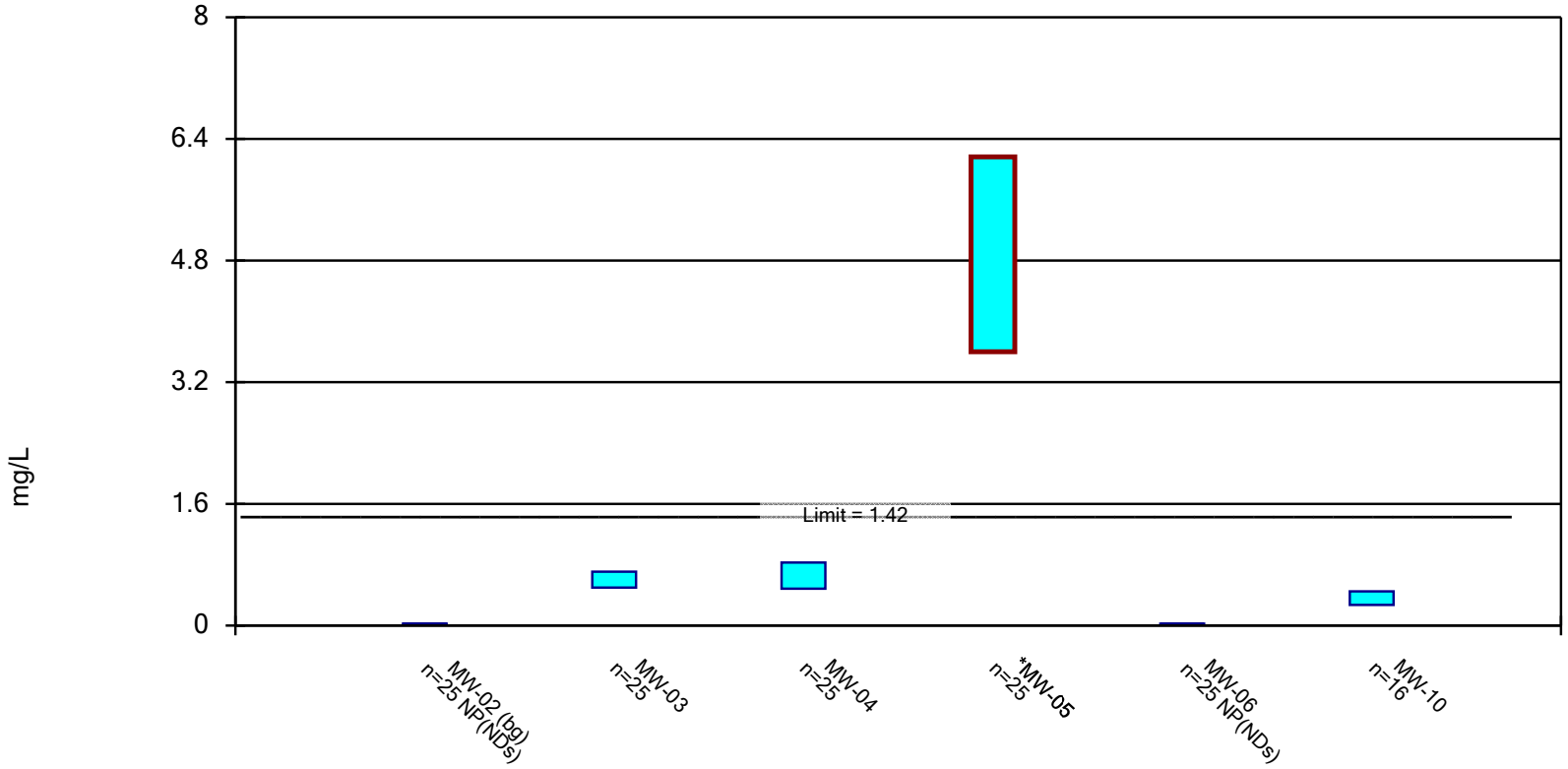


Constituent: Lead Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

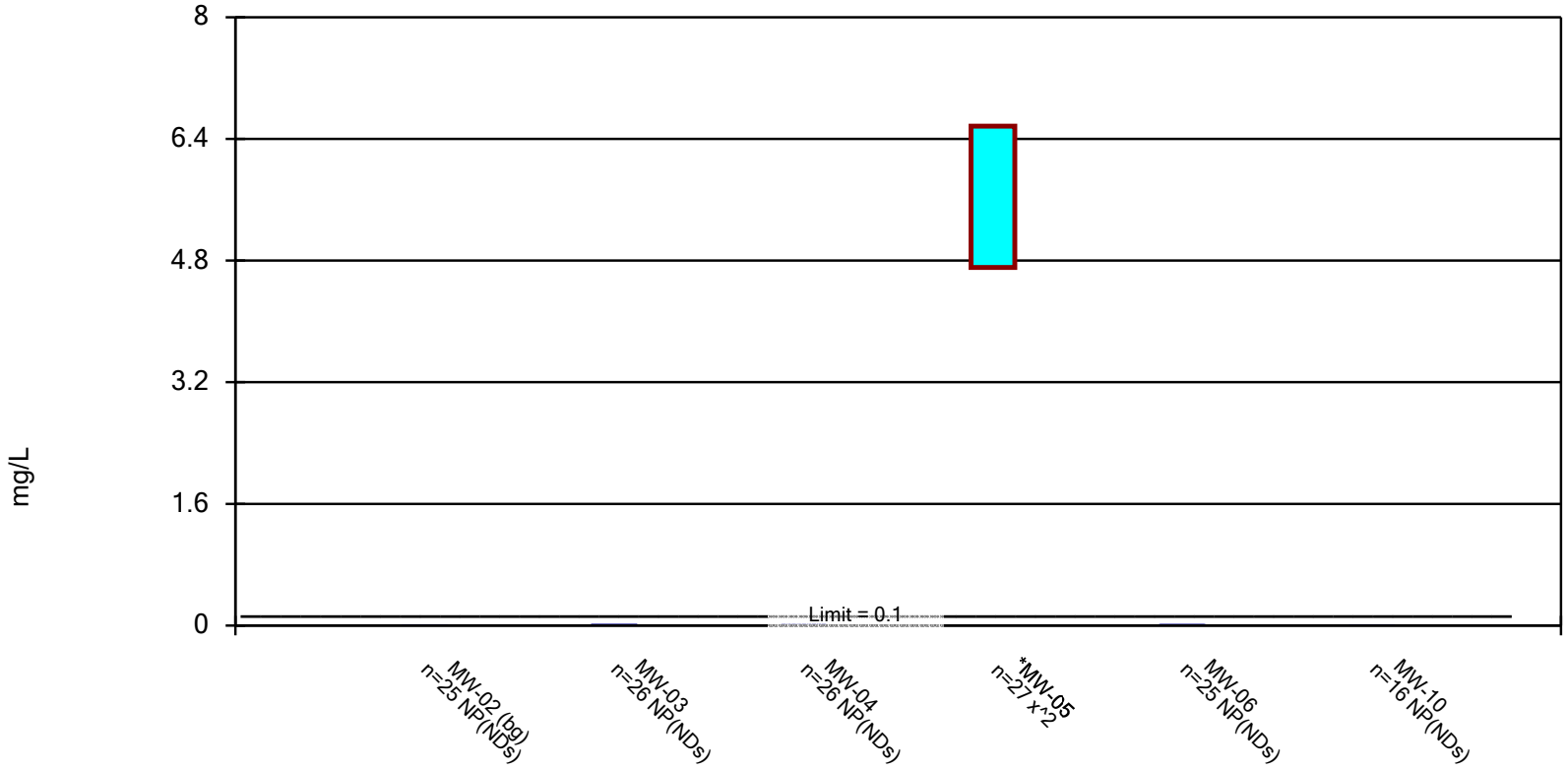


Constituent: Lithium Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 12/1/2023 6:49 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

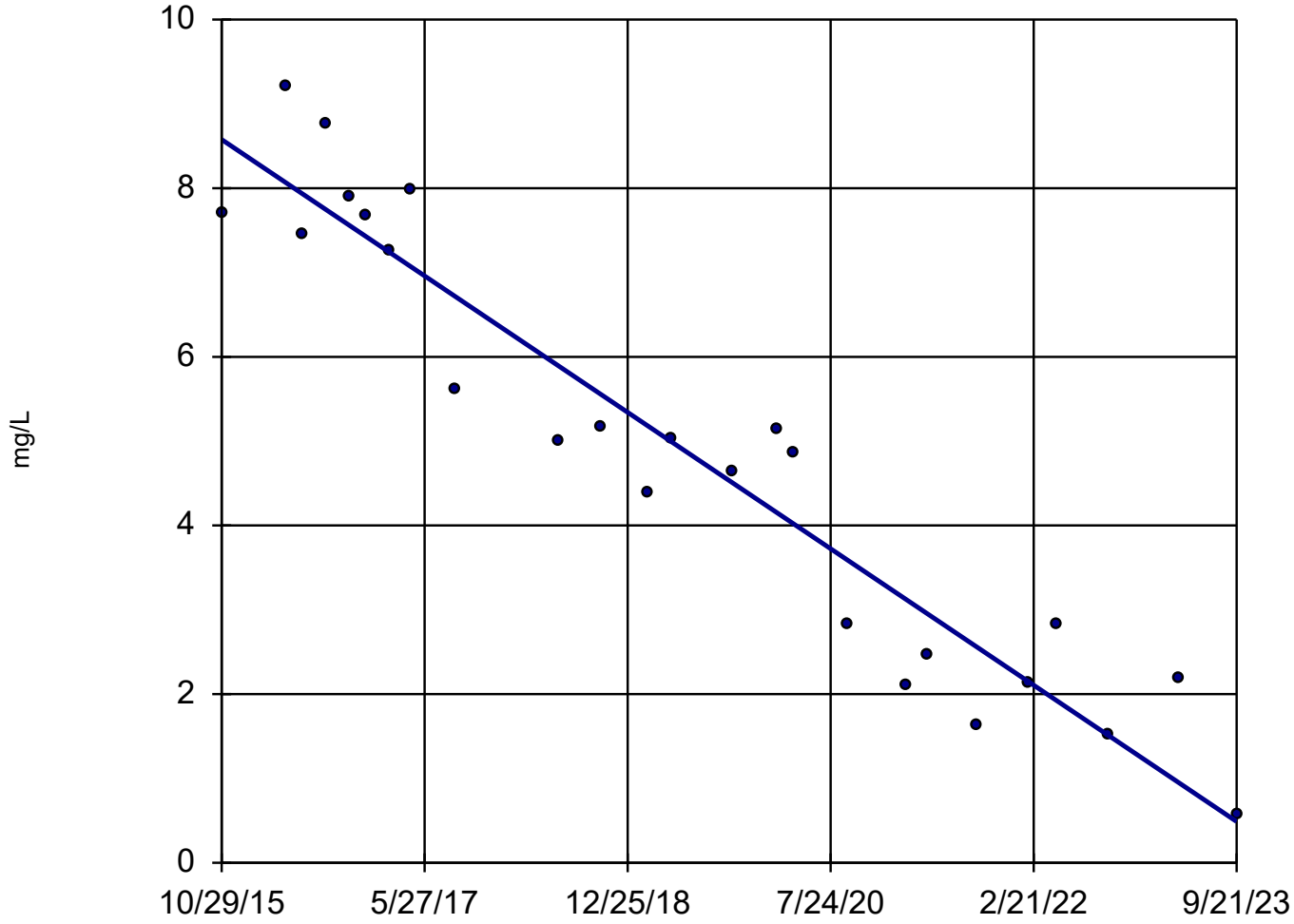
Trend Test

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen Printed 12/1/2023, 6:53 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium (mg/L)	**MW-05**	**-1.024**	**-236**	**-101**	**Yes**	**25**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Molybdenum (mg/L)	**MW-05**	**-0.8051**	**-228**	**-112**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.02**	**NP**

Sen's Slope Estimator

MW-05



n = 25

Slope = -1.024 units per year.

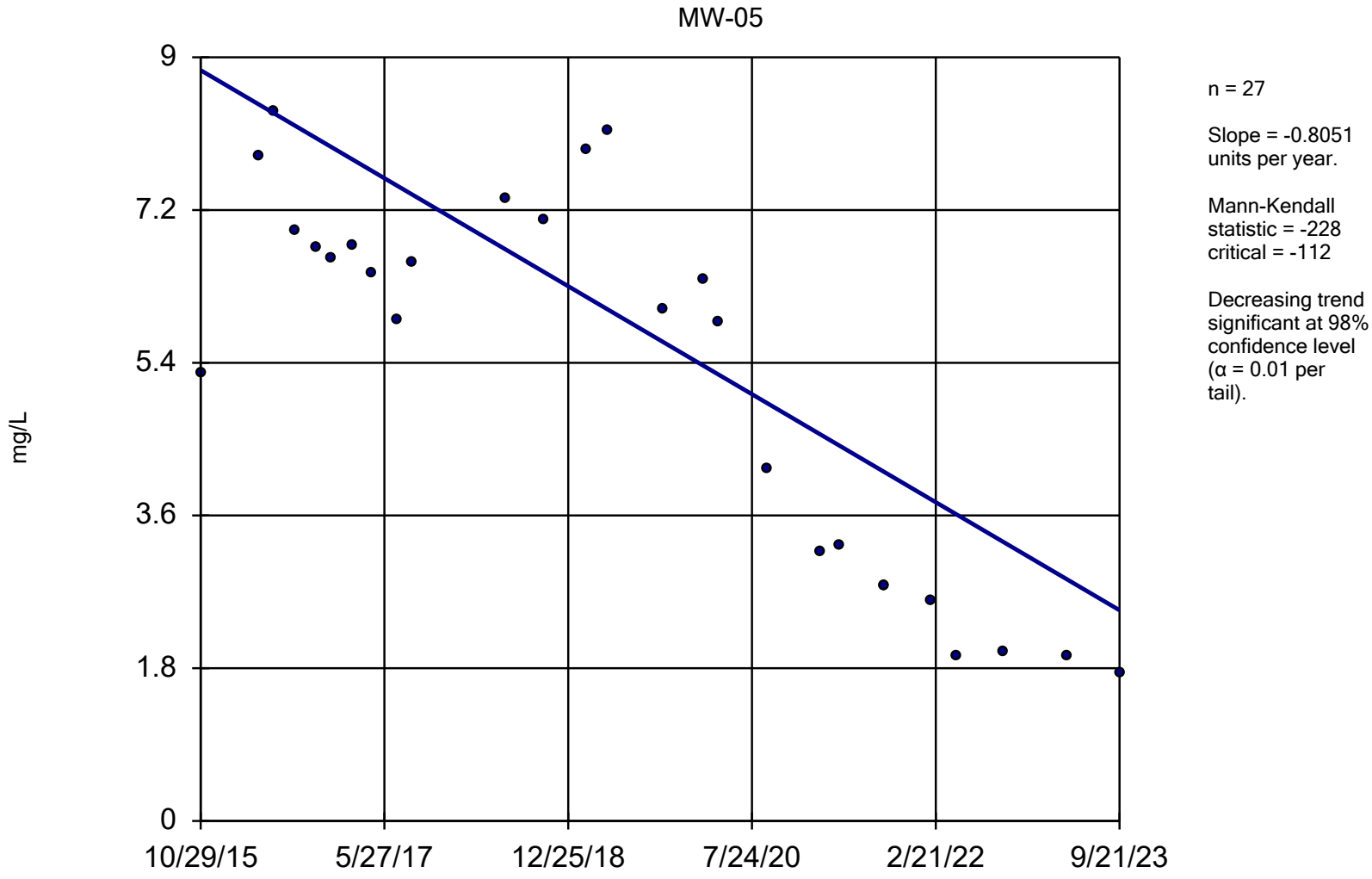
Mann-Kendall statistic = -236
critical = -101

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

Constituent: Lithium Analysis Run 12/1/2023 6:52 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

Sen's Slope Estimator



Constituent: Molybdenum Analysis Run 12/1/2023 6:52 AM View: Landfill App IV

RD Morrow Generating Facility Client: WSP Data: RD Morrow Gen

APPENDIX C

Supplemental Alternate Source Demonstration

REPORT

Supplemental Alternate Source Demonstration

Cooperative Energy RD Morrow CCR Landfill

Submitted to:

304 Old Okahola School Road, Purvis Mississippi 39475

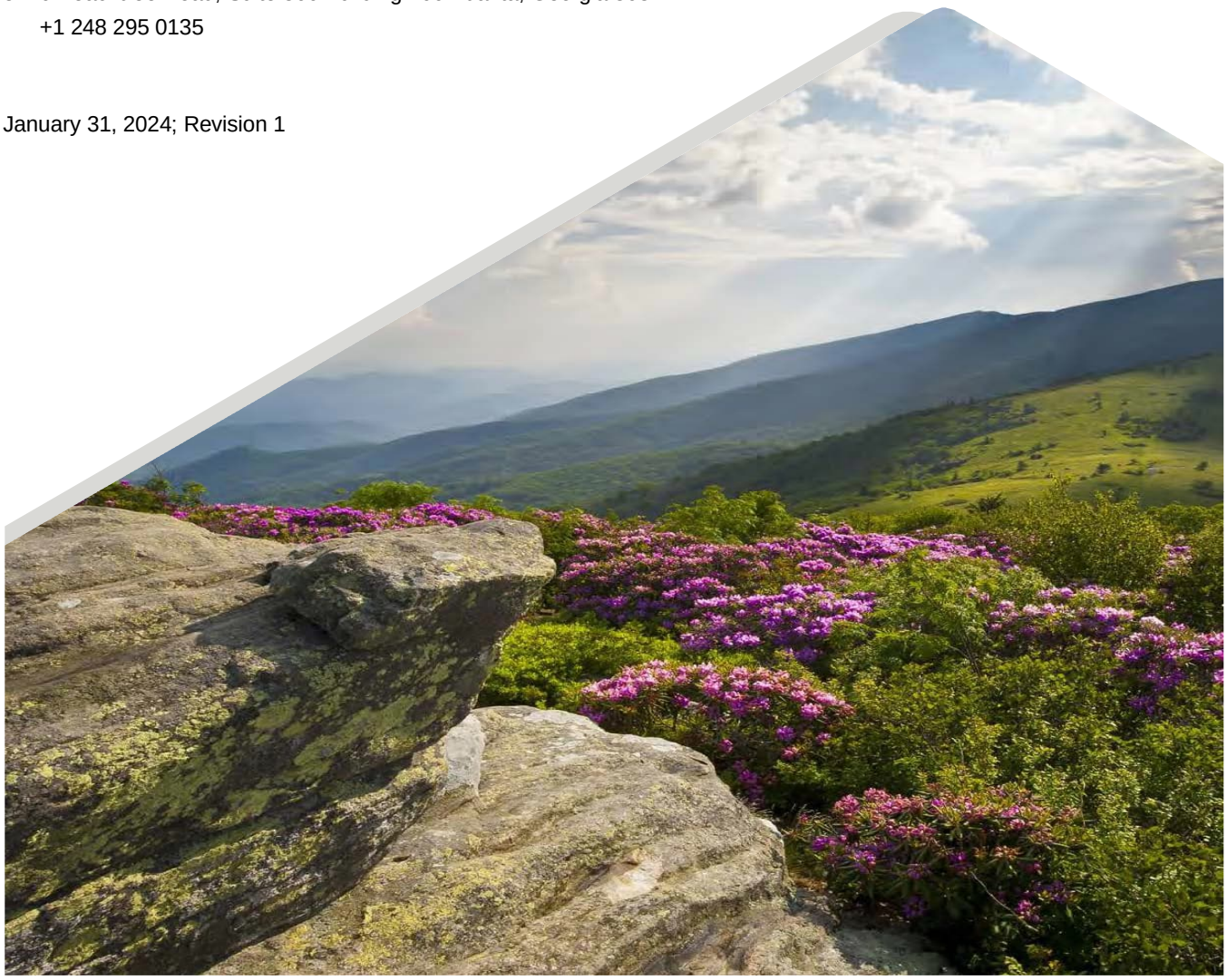
Submitted by:

WSP USA Inc.

5170 Peachtree Road, Suite 300 Building 100 Atlanta, Georgia 30341

+1 248 295 0135

January 31, 2024; Revision 1



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Appendix

Certification

This *Supplemental Alternate Source Demonstration* for the Cooperative Energy, RD Morrow CCR Landfill in Purvis, Lamar County, Mississippi, has been prepared in compliance with 40 CFR Part 257, Subpart D; published in 80 Fed. Reg 21302 (April 17, 2015) under the direction of a licensed professional engineer with WSP USA Inc.

WSP USA Inc.

Cole Mayer
Project Geochemist

PJ Nolan, PhD
Technical Principal, Geochemist

I hereby certify that this *Supplemental Alternate Source Demonstration* for the Cooperative Energy RD Morrow CCR Landfill, located at 304 Old Okahola School Road Purvis, Mississippi, has been prepared to meet the requirements of 40 CFR § 257.95(g)(3)(ii).

Daniel Smith, PE
Senior Associate, Engineer-Civil
Mississippi PE No. 32180

1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residuals (CCR) rule 40 CFR § 257.50 et seq., 80 Fed. Reg. 21302 (April 17, 2015) (the CCR Rule or the Rule), this Supplemental *Alternate Source Demonstration* for Cooperative Energy's RD Morrow (RD Morrow) CCR Landfill Unit (the CCR Landfill Unit) has been prepared to provide additional documentation demonstrating that an alternate source has caused Statistically Significant Levels (SSLs) of lithium at MW-03 and MW-04 at the RD Morrow CCR Landfill. This document further satisfies the requirements of Section § 257.95(g)(3)(ii), which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused an SSL and that it was the result of an alternate source or resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

As documented by this report and the previous *Alternate Source Demonstration* for RD Morrow Generating Station – Landfill CCR Unit, Purvis, Mississippi prepared by Golder for Cooperative Energy, Inc. dated September 11, 2020 (the 2020 ASD), the historical SSLs of lithium at monitoring wells MW-03 and MW-04 result from naturally-occurring lithium in subsurface aquifer materials due to the depositional environment and are not the result of a release from the CCR Unit.

2.0 ALTERNATE SOURCE DEMONSTRATION

As allowed under § 257.95(g)(3)(ii), this supplemental alternate source demonstration (ASD) summarizes the lines of evidence previously presented in *Alternate Source Demonstration* (Golder, 2020) and presents additional data to further support the conclusions of the 2020 ASD that the SSLs of lithium at MW-03 and MW-04 are the result of natural variability in site groundwater and not the result of a release from the CCR Landfill Unit.

2.1 Summary of 2020 ASD

As presented in the 2020 ASD, multiple lines of evidence were identified to support the conclusion that the SSLs of lithium at monitoring wells MW-03 and MW-04 are caused by an alternate source. Specifically, the lithium concentrations observed in groundwater at these two wells are due to naturally-occurring lithium in aquifer materials at the site. The following lines of evidence were presented to support the conclusion that the SSLs of lithium at MW-03 and MW-04 are not the result of a release from the CCR Landfill Unit:

- Porewater and Groundwater: Concentrations of some parameters, such as chloride, sulfate, and total dissolved solids (TDS), are higher in groundwater samples from downgradient wells MW-03 and MW-04 as compared to their upgradient CCR porewater equivalents (LF-P-6 and LF-P-7); concentrations of other CCR indicator parameters, such as calcium, are lower in downgradient samples. The pH of groundwater in downgradient wells MW-03, MW-04, MW-10, MW-11 and MW-12 (3.27 to 5.55 standard units) also shows a substantial difference from that of porewater (7.34 and 7.15 S.U.), while upgradient background groundwater pH is also acidic (4.54), indicating minimal impacts, if any, from the CCR Landfill Unit at MW-03 and MW-04. For these reasons, these parameters indicate that the groundwater at MW-03, MW-04, MW-10, MW-11 and MW-12 is not the result of a mixture of CCR leachate and ambient groundwater. Additionally, groundwater at MW-03, MW-04, MW-10, MW-11, MW-12, and P-B is nearly identical to that of groundwater at MW-02 (background monitoring well) based on major ion abundance. The relative major ion abundances in groundwater at downgradient and upgradient wells are different than those of CCR porewater samples (LF-P-6 and LF-P-7)

- Soil Sampling Results: Results of sequential extraction procedure (SEP) testing indicated the presence of naturally-occurring lithium in soils at RD Morrow in the acid/sulfide soluble and residual fractions at each of the three soil borings (SB-02, SB-106, and SB-107; Golder 2020). Lithium is reported in soils at concentrations ranging from 2.2 to 4.6 milligrams per kilogram (as a sum total from SEP) and is predominantly (85 to 100%) present in the residual and sulfide component of the soil, i.e. the non-environmentally-available fractions. The absence of lithium in the environmentally-available fractions (specifically exchangeable and carbonate fractions) indicates a general lack of lithium transport and attenuation in the aquifer (e.g., through sorption and/or co-precipitation).
- Regional Presence of Lithium: Naturally-occurring lithium is present in groundwater across the United States (US), ranging from non-detect to approximately 1.2 mg/L. Based on available data, Mississippi is one of fifteen states in the US with higher concentrations of lithium observed in groundwater (Ayotte 2011, Huber et al. 2014). Naturally-occurring lithium can be found in nearly all rock and soil types and is most commonly found to be associated with silicate minerals (Tomazscak 2015). Site-specific test results (i.e., SEP results) confirm this finding for the RD Morrow site and areas surrounding the CCR Landfill Unit. The weathering of silicate minerals is widely known to cause the release of naturally-occurring lithium into groundwater (Tomazscak 2015).

2.2 Supplemental Sampling Activities

In October 2022, additional soil samples were collected to further demonstrate an alternate source for the reported concentrations of lithium in groundwater at RD Morrow. Soil samples were collected from soil borings SB-02, (adjacent to MW-02), SB-04 (adjacent to MW-04), SB-05 (adjacent MW-5), and SB-10 (adjacent to MW-10). Samples were collected at depths corresponding to the elevation of the Stratum IV – Green Silty Clay present at each monitoring well location, as summarized below. Monitoring wells MW-03, MW-04, MW-05, and MW-10 are screened directly in contact with the Stratum IV clay; whereas, MW-02 (the background monitoring location) is set more than 3 feet above the Stratum IV clay. The boring locations were chosen to provide a comparison of the Stratum IV Clay both upgradient (SB-02) and downgradient (SB-04, SB-05, and SB-10) of the CCR Landfill Unit. Samples from the borings were analyzed by Electron Micro Probe Analysis (EMPA) and TESCAN Integrated Mineral Analysis (TIMA, an updated version of QEMSCAN) with Laser Ablation-Inductively Coupled Plasma Mass Spectrometry (LA-ICPMS) methods to evaluate if the subsurface material is a host for naturally occurring lithium in the aquifer. These methods have been widely used and accepted in the mining industry to determine the provenance of rare earth and trace metals and association with mineral deposits (Aylmore et al., 2018; Grammatikopoulos and Downing, 2020; Layton-Matthews and McClenaghan, 2021; Vermeesch et al., 2017).

October 2022 Soil Boring Locations and Depths

Borehole ID	Corresponding Monitoring Well	Boring Depth (FT BGS)	Sample Depth (FT BGS)	Sample Elevation (FT MSL)	Geologic Unit Sampled
SB-02	MW-02	28	24 – 28	211 – 215	Stratum IV – Green Silty Clay
SB-04	MW-04	20	16.5 – 20	212 – 215.5	Stratum IV – Green/Light Gray Clay

Borehole ID	Corresponding Monitoring Well	Boring Depth (FT BGS)	Sample Depth (FT BGS)	Sample Elevation (FT MSL)	Geologic Unit Sampled
SB-05	MW-05	24	19 – 24	208 – 213	Stratum IV – Green/Light Gray Clay
SB-10	MW-10	28	24 - 28	196 – 200	Stratum IV – Green Silty Clay

Notes:
1. FT BGS – Feet Below Ground Surface.
2. FT MSL – Feet Above Mean Sea Level.
3. Sample elevations are approximated based on original monitoring well installation ground elevation survey data. Sample intervals are rounded to nearest foot.

To further evaluate the mineralogy of subsurface materials in greater detail and the associated lithium content, select samples were evaluated as described below:

TESCAN Integrated Mineral Analyzer: TESCAN Integrated Mineral Analyzer (TIMA-X) is based on four Energy Dispersive X-Ray (EDX) silicon drift detectors (SDD) attached to a TESCAN MIRA (field-emission gun – FEG) platform which also includes backscattered electron (BSE) and secondary electron (SE) detectors. The TIMA system utilizes both the EDX and BSE signals to identify minerals at each measurement point (or each homogenous segment of a grain, depending upon the analysis mode). It is optimized to deal with rapidly acquired low-count spectra. These EDX (and BSE) spectra (and BSE data) are compared to entries in a mineral library on a first-match principle to identify the mineral phase. The mineral library is based on theoretical mineral/phase composition or created by the user based on BSE, X-ray spectral windows counts and ratios. TIMA-X has four X-ray analysis scanning modes to identify minerals/compounds: High-Resolution Mapping (THRM), Point Spectrometry (TPS), Line Mapping (TLM), and Dot Mapping (TDM). The preferred analysis mode for this compound is THRM which collects a BSE signal and an X-Ray spectrum at a set resolution (3 µm) to map the particles. It collects modal and textural information, such as liberation or exposure analysis of grains of interest.

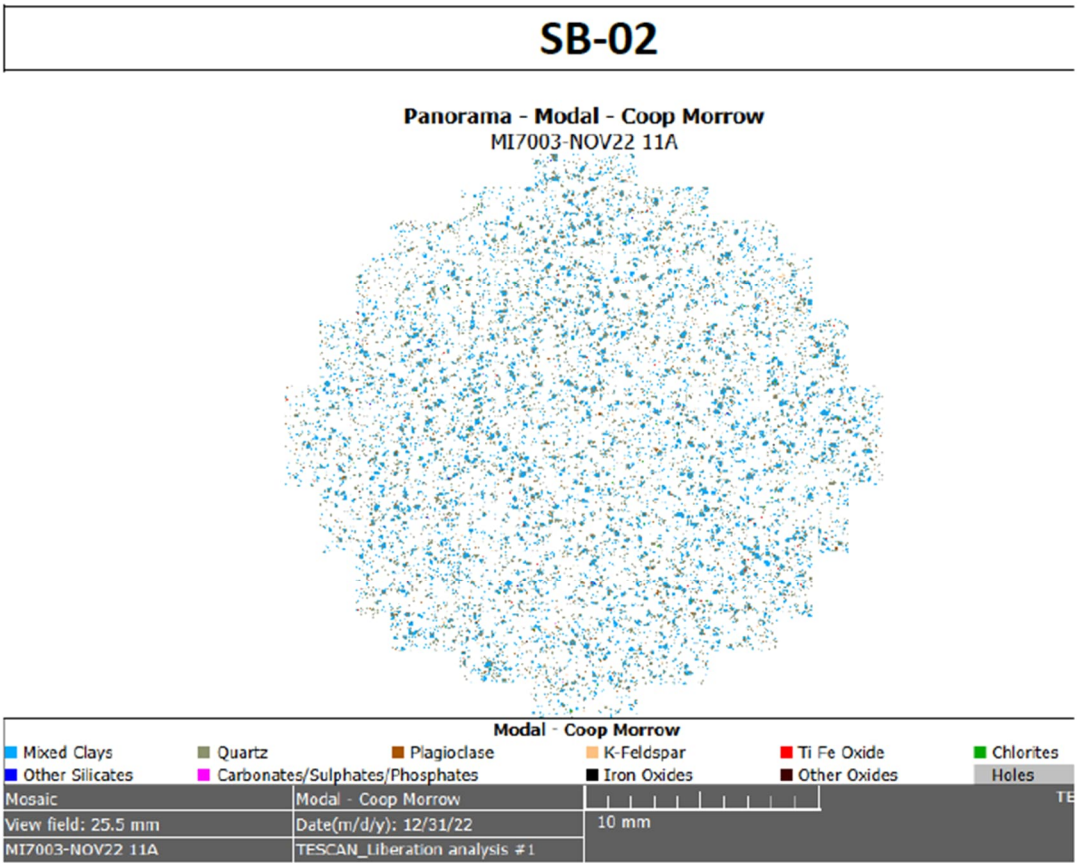
EMPA AND LA-ICP-MS: The polished sections for each sample were submitted for EMPA and LA-ICP-MS at the University of New Brunswick, Microscopy and Microanalysis Facility. Selected minerals of interest (clay; K-feldspar; mica etc.) were analyzed with EMPA to quantify the chemical composition of the major and minor elements. It is well known that many minerals display compositional variations. Therefore, EMPA is necessary to determine the chemistry of the minerals and identify the minerals correctly. LA-ICP-MS combined with the EMPA identifies the lithium content in the silicates and clay minerals; the clay phases were specifically targeted. The results, in conjunction with the TIMA-X data, indicate possible sources of deleterious elements.

Modal percentages of minerals quantified by EMPA are provided in Appendix A (EMPA and TIMA-X Modals Summary). The analysis indicates that the majority of the lithium is carried in the mixed-clay phases. Lithium was below detection in quartz and feldspars; however, only a minimal number of grains were analyzed. An example EMPA image is provided below (inset figure, Modal Image of SB-02 Mineralogy). The analytical report is presented in Appendix A. Based on these results, as summarized below, the highest concentration of lithium is observed at upgradient soil boring SB-02. These results further demonstrate that the lithium associated with the clay minerals is naturally occurring.

Concentrations of Lithium Associated with Illite/Mixed Clays by LA-ICPMS Analysis

Boring	Lithium Concentration (mg/kg)
SB-02 (upgradient)	50.99
SB-04	31.41
SB-05	39.68
SB-10	39.54

Note:
[1] Sample elevations are approximated based on original monitoring well installation ground elevation survey data. Sample intervals are rounded to nearest foot.
[2] The soil sample at SB-2 was collected in the clay materials at an elevation below the well screen of MW-02. MW-02 is screened considerably above (>3ft) the Stratum IV – Green Silty Clay; whereas all the other well screens sit directly in contact with the clay materials that were analyzed in October 2022. If MW-02 were completed with the well screen in contact with the clay materials similar to the other site monitoring wells, we expect the resulting groundwater quality would show higher concentrations of lithium similar to the downgradient monitoring wells.



INSET FIGURE: Modal image of sample from SB-02 showing the mineralogical analysis of the sample.

3.0 CONCLUSION

Based on the evaluation of the soil sampling data, the SSLs for lithium identified in the groundwater results at MW-03 and MW-04 are the result of naturally-occurring lithium present in soils and not due to a release from the CCR Landfill Unit. Wells MW-03 and MW-04 are screened on top of the clay material leading to naturally-occurring elevated lithium concentrations in groundwater. However, upgradient well MW-02 does not exhibit elevated lithium concentrations in groundwater as compared to other wells because it is screened considerably above the clay material in which the natural source of lithium is located, as confirmed by the soil sample at SB-02. The naturally-occurring lithium within the clays (silicate minerals) has likely been released into the aquifer due to weathering caused by low pH groundwater in areas across the site. The weathering of silicate minerals has been well documented to cause the release of naturally-occurring lithium into groundwater (Tomazscak 2015). The highest lithium measured in the Site soil materials was in soil boring SB-02 (adjacent to upgradient background well MW-02) confirming lithium is not from the CCR Unit. As such, based on available geochemical data, evidence supports the conclusion that naturally-occurring lithium in soils the source of lithium in groundwater at MW-03 and MW-04, not the CCR Landfill Unit.

In summary, this analysis of soil sampling data supports the conclusion that naturally-occurring lithium present in soils is the source of the SSLs of lithium in MW-03 and MW-04. This Supplemental Alternate Source Demonstration adds a new line of evidence as further support for the conclusions in the 2020 ASD prepared for RD Morrow in accordance with § 257.95(g)(3)(ii).

4.0 REFERENCES

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APPENDIX A

Results of XRD, EMPA, TIMA-X, and LA-ICPMS Sample Analysis

Semi-Quantitative X-Ray Diffraction

Report Prepared for:	*WSP (Golder Associates Inc.)*
Project Number/ LIMS No.	*19465-04/MI7003-NOV22*
Sample Receipt:	*October 24, 2022*
Sample Analysis:	*November 29, 2022*
Reporting Date:	*January 13, 2023*

Instrument:	Panalytical X'pert Pro Diffractometer
Test Conditions:	Co radiation, 40 kV, 45 mA Regular Scanning: Step: 0.033°, Step time:0.15s, 2θ range: 6-70°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Landon Kapusianyk, B.Sc.
Junior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involve matching the diffraction pattern of a test sample material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) and released on software as a database of Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (Whole Rock Analysis, Inductively Coupled Plasma - Optical Emission Spectroscopy, etc.).

Semi-Quantitative Analysis:

The Semi-Quantitative analysis (RIR method) is performed based on each mineral's relative peak heights and of their respective I/Icor values, which are available from the PDF database. Mineral abundances for the bulk sample (in weight %) are generated by Bruker-EVA Software. These data are reconciled with a bulk chemistry (e.g. whole rock analysis including SiO_2, Al_2O_3, Na_2O, K_2O, CaO, MgO, Fe_2O_3, Cr_2O_3, MnO, TiO_2, P_2O_5, V_2O_5 or other chemical data). A chemical balance table shows the difference between the assay results and elemental concentrations determined by XRD.

Summary of Semi-Quantitative X-Ray Diffraction Results

Crystalline Mineral Assemblage (relative proportions based on peak height)

Sample	Major (>30% Wt)	Moderate (10% -30% Wt)	Minor (2% -10% Wt)	Trace (<2% Wt)
(1) SB-02	quartz	muscovite, montmorillonite, illite	kaolinite, albite, epidote	*orthoclase, *magnetite, *rutile
(2) SB-04	quartz	montmorillonite, muscovite, illite	kaolinite, albite	*orthoclase, *magnetite, *epidote, *rutile, *clinochlore
(3) SB-05	quartz	montmorillonite, illite, kaolinite	albite, biotite	*muscovite, *orthoclase, *epidote, *magnetite, *rutile
(4) SB-10	quartz	illite	kaolinite, montmorillonite,, muscovite, albite	*biotite, *orthoclase, *rutile, *epidote

** tentative identification due to low concentrations, diffraction line overlap or poor crystallinity*

Mineral	Composition
Quartz	SiO_2
Albite	$NaAlSi_3O_8$
Orthoclase	$KAlSi_3O_8$
Magnetite	Fe_3O_4
Rutile	TiO_2
Epidote	$Ca_2(Al,Fe)Al_2O(SiO_4)(Si_2O_7)(OH)$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot 10H_2O$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Clinochlore	$(Fe,Mg)_5Al(Si_3Al)O_{10}(OH)_8$

Semi-Quantitative X-ray Diffraction Results

Mineral	SB-02 (wt %)	SB-04 (wt %)	SB-05 (wt %)	SB-10 (wt %)
Quartz	44.3	49.1	48.3	58.8
Albite	3.0	3.1	2.9	4.8
Orthoclase	0.8	0.4	0.6	1.3
Magnetite	0.9	0.7	0.8	-
Rutile	0.9	0.9	0.8	0.9
Epidote	2.9	0.8	1.6	0.5
Muscovite	16.9	10.1	0.5	2.9
Biotite	-	-	2.2	1.1
Montmorillonite	11.7	15.1	13.2	7.5
Kaolinite	8.4	8.2	16.3	8.4
Illite	10.3	10.4	12.9	13.8
Clinochlore	-	1.1	-	-
TOTAL	100	100.0	100.0	100.0

Chemical Balance

SB-02

Name	Assay[1]	SQD[2]	Delta	Status
Oxygen	-	50.1	-	SQD
Silicon	32.3	33.2	-0.89	Both
Aluminum	6.83	9.28	-2.45	Both
Iron	3.39	3.16	0.23	Both
Potassium	1.62	2.55	-0.93	Both
Magnesium	0.70	-	-	Both
Titanium	0.46	0.55	-0.09	Both
Calcium	0.44	0.48	-0.04	Both
Sodium	0.24	0.21	0.03	Both
Manganese	0.06	-	-	XRF
Barium	0.04	-	-	XRF
Phosphorus	0.03	-	-	XRF
Hydrogen	-	0.29	-	SQD
Fluorine	-	0.21	-	SQD

1. Values measured by chemical assay. Reported in weight percent.

2. Values calculated based on mineral/compound formulas and quantites identified by semi-quantitative XRD.

SB-04

Name	Assay[1]	SQD[2]	Delta	Status
Oxygen	-	42.9	-	SQD
Silicon	32.7	29.9	2.83	Both
Aluminum	6.70	5.90	0.79	Both
Iron	3.41	2.88	0.53	Both
Potassium	0.97	1.88	-0.91	Both
Magnesium	0.57	0.20	0.37	Both
Titanium	0.57	0.55	0.02	Both
Calcium	0.36	0.14	0.22	Both
Sodium	0.09	0.21	-0.12	Both
Barium	0.03	-	-	XRF
Manganese	0.02	0.00	0.02	Both
Phosphorus	0.02	-	-	XRF
Vanadium	0.01	-	-	XRF
Hydrogen	-	0.27	-	SQD
Fluorine	-	0.13	-	SQD

Chemical Balance

SB-05

Name	Assay[1]	SQD[2]	Delta	Status
Oxygen	-	50.7	-	SQD
Silicon	31.7	34.4	-2.64	Both
Aluminum	7.62	8.21	-0.60	Both
Iron	3.28	3.77	-0.49	Both
Potassium	1.49	1.36	0.14	Both
Magnesium	0.56	0.24	0.32	Both
Titanium	0.50	0.47	0.03	Both
Calcium	0.36	0.26	0.10	Both
Sodium	0.14	0.20	-0.06	Both
Barium	0.04	-	-	XRF
Phosphorus	0.02	-	-	XRF
Manganese	0.01	-	-	XRF
Vanadium	0.01	-	-	XRF
Hydrogen	-	0.37	-	SQD
Fluorine	-	0.01	-	SQD

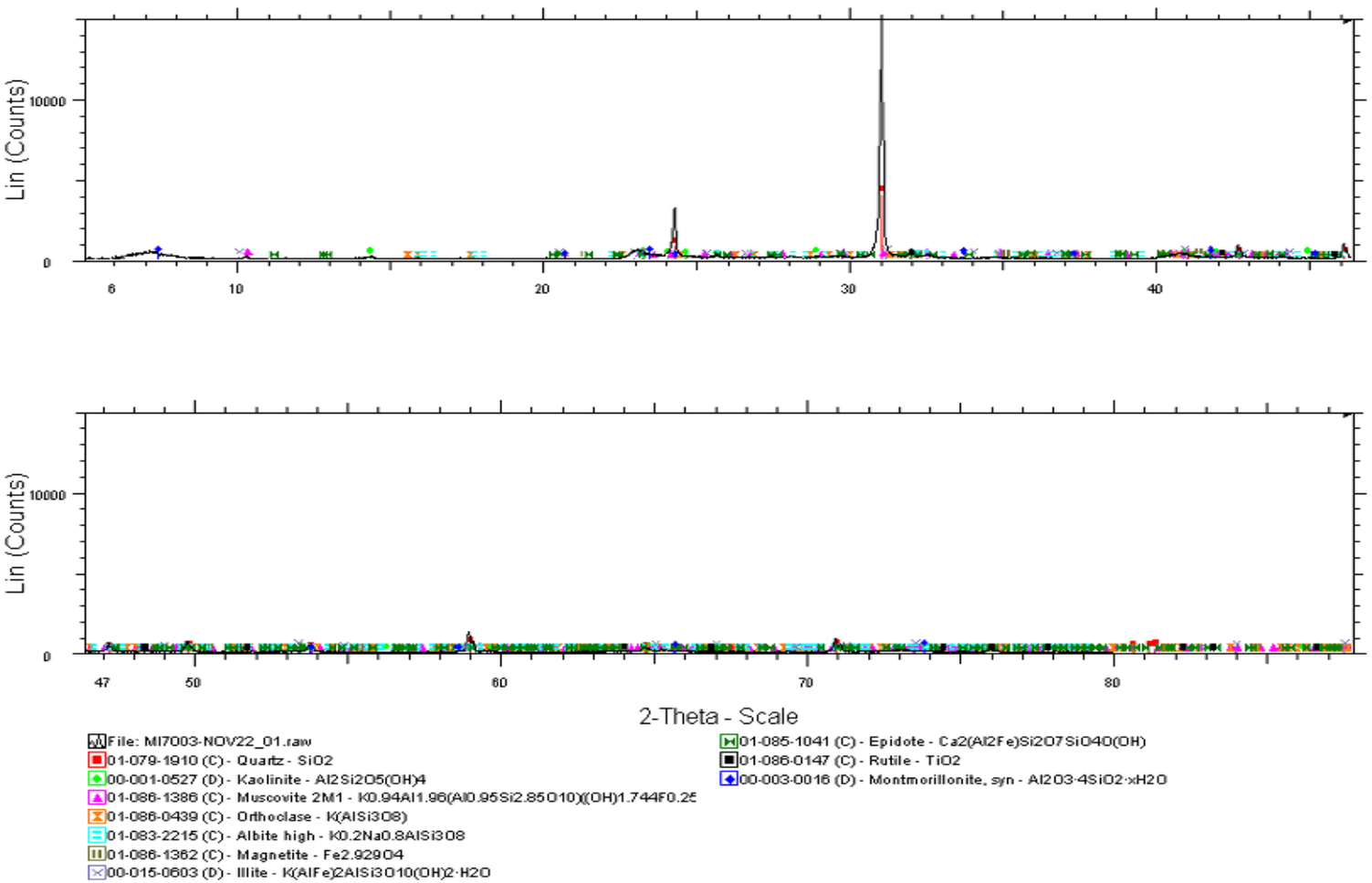
SB-10

Name	Assay[1]	SQD[2]	Delta	Status
Oxygen	-	50.6	-	SQD
Silicon	35.4	36.8	-1.33	Both
Aluminum	5.71	6.38	-0.67	Both
Iron	2.63	3.13	-0.50	Both
Potassium	1.34	1.73	-0.40	Both
Titanium	0.45	0.53	-0.08	Both
Magnesium	0.42	0.12	0.30	Both
Sodium	0.27	0.32	-0.05	Both
Calcium	0.26	0.09	0.17	Both
Barium	0.04	-	-	XRF
Phosphorus	0.02	-	-	XRF
Manganese	0.01	-	-	XRF
Vanadium	0.01	-	-	XRF
Hydrogen	-	0.26	-	SQD
Fluorine	-	0.04	-	SQD

1. Values measured by chemical assay. Reported in weight percent.

2. Values calculated based on mineral/compound formulas and quantites identified by semi-quantitative XRD.

SB-02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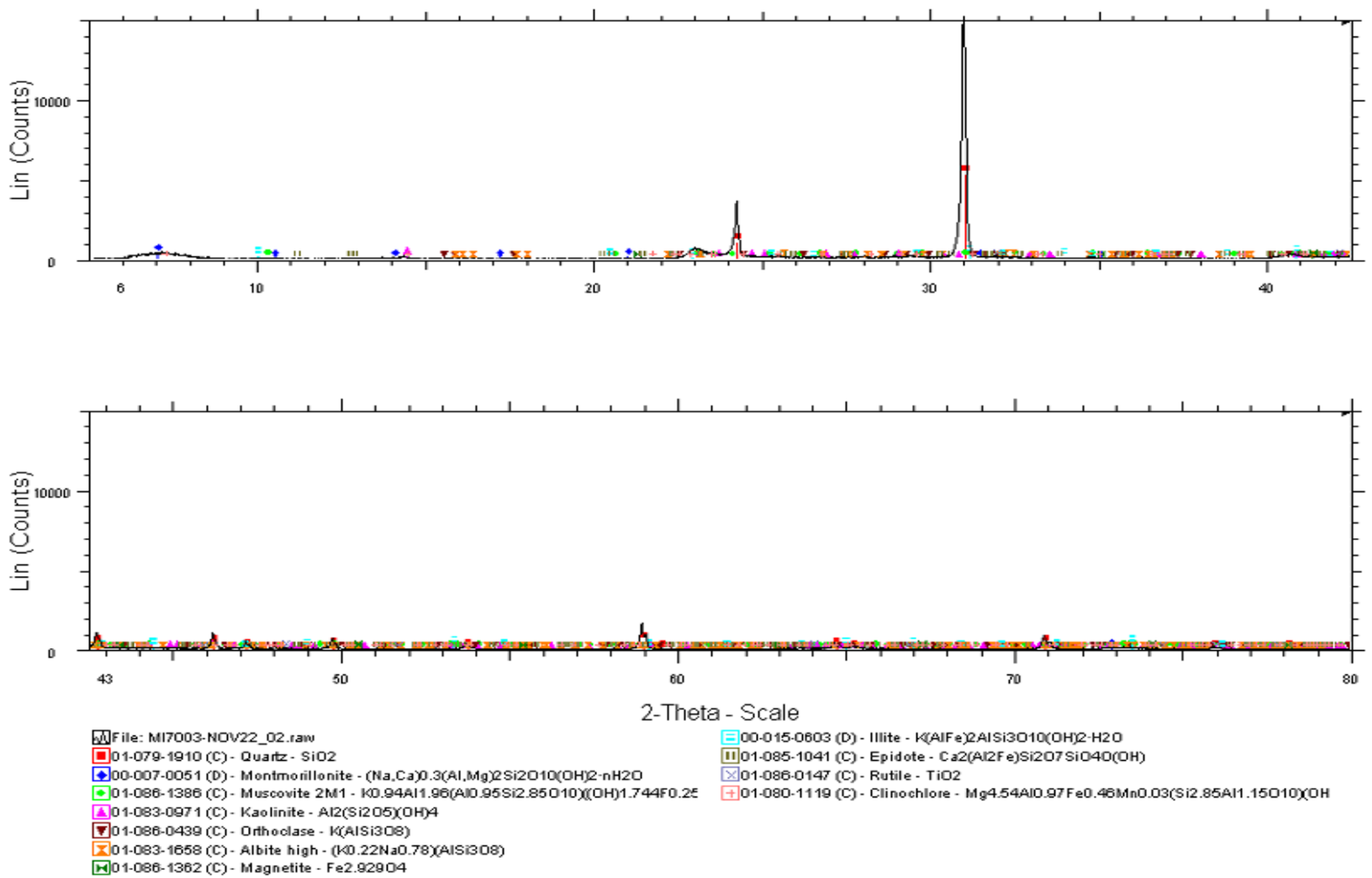
00-001-0527 (D) - Kaolinite - Al2Si2O5(OH)4
01-086-1386 (C) - Muscovite 2M1 - K0.94Al1.96(Al0.95Si2.85O10)(OH)1.744F0.25
01-086-0439 (C) - Orthoclase - K(AlSi3O8)
01-083-2215 (C) - Albite high - K0.2Na0.8AlSi3O8
01-086-1362 (C) - Magnetite - Fe2.929O4
00-015-0603 (D) - Illite - K(AlFe)2AlSi3O10(OH)2·H2O
01-085-1041 (C) - Epidote - Ca2(Al2Fe)Si2O7SiO4O(OH)
01-086-0147 (C) - Rutile - TiO2
00-003-0016 (D) - Montmorillonite, syn - Al2O3·4SiO2·xH2O

SB-04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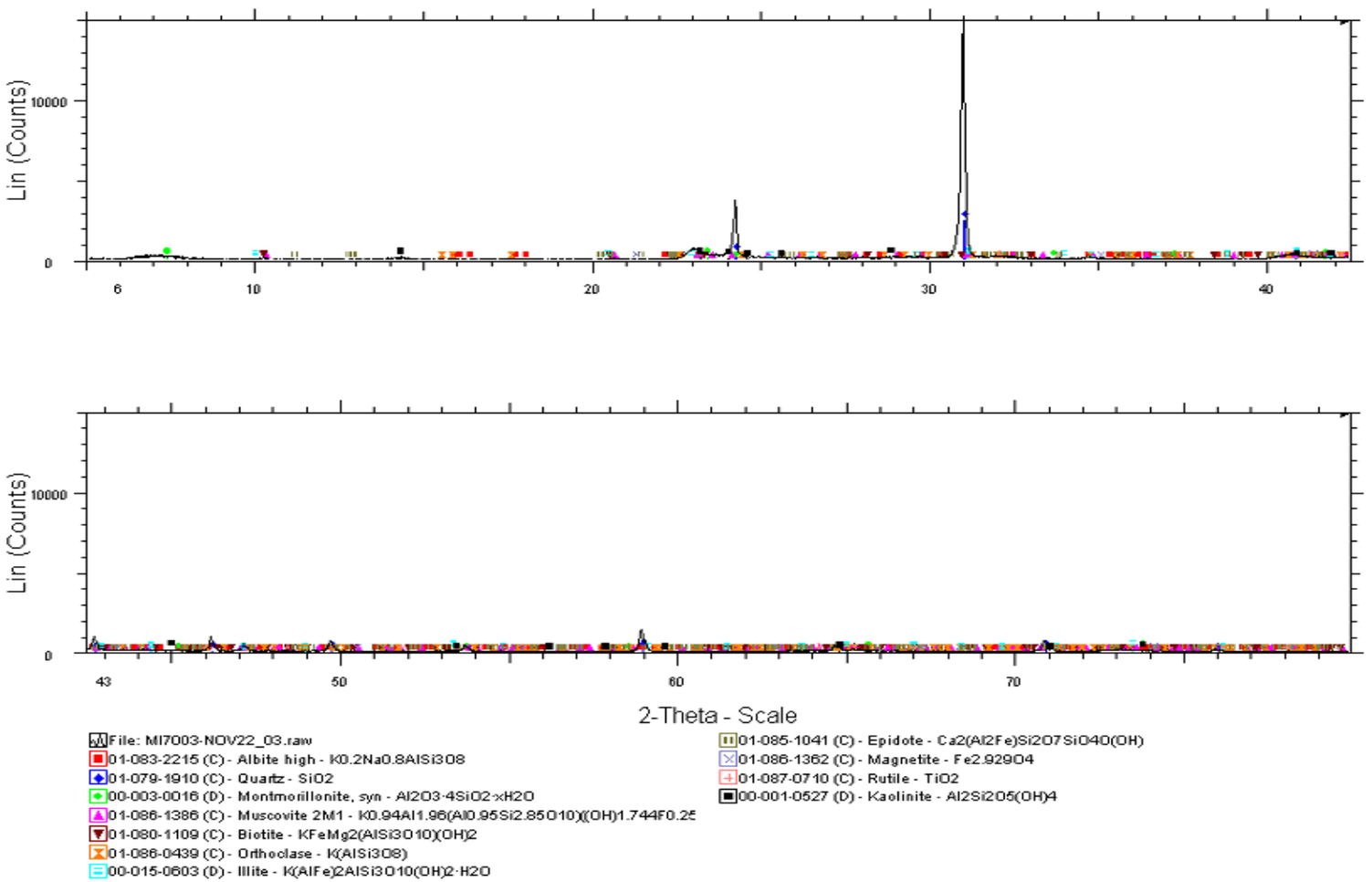
01-086-1386 (C) - Muscovite 2M1 - K0.94Al1.96(Al0.95Si2.85O10)((OH)1.744F0.25
01-083-0971 (C) - Kaolinite - Al2(Si2O5)(OH)4
01-086-0439 (C) - Orthoclase - K(AlSi3O8)
01-083-1658 (C) - Albite high - (K0.22Na0.78)(AlSi3O8)
01-086-1362 (C) - Magnetite - Fe2.929O4
00-015-0603 (D) - Illite - K(AlFe)2AlSi3O10(OH)2-H2O
01-085-1041 (C) - Epidote - Ca2(Al2Fe)Si2O7SiO4O(OH)
01-086-0147 (C) - Rutile - TiO2
01-080-1119 (C) - Clinochlore - Mg4.54Al0.97Fe0.46Mn0.03(Si2.85Al1.15O10)(OH

SB-05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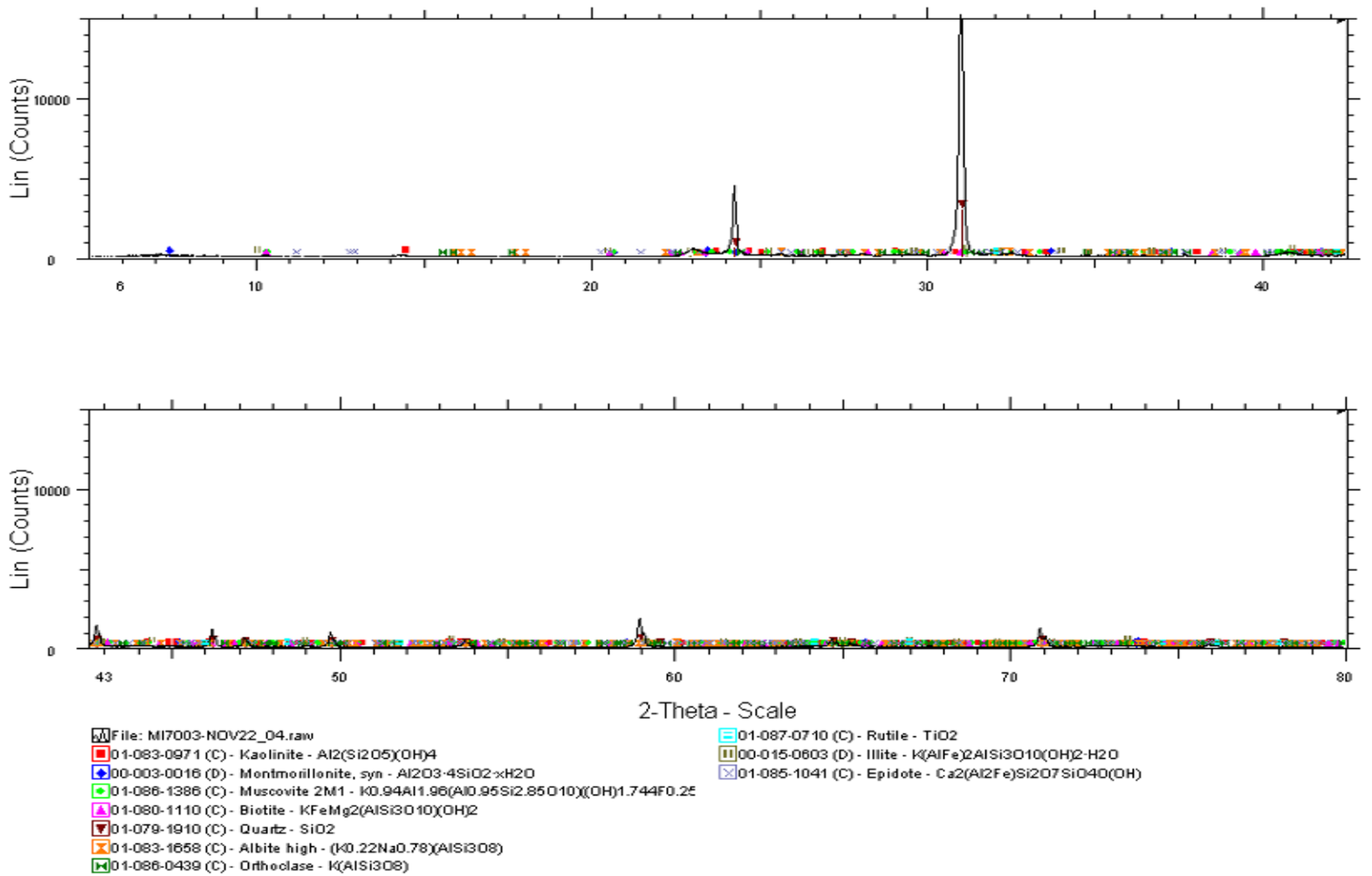
00-003-0016 (D) - Montmorillonite, syn - Al2O3·4SiO2·xH2O
01-086-1386 (C) - Muscovite 2M1 - K0.94Al1.96(Al0.95Si2.85O10)((OH)1.744F0.25
01-080-1109 (C) - Biotite - KFeMg2(AlSi3O10)(OH)2
01-086-0439 (C) - Orthoclase - K(AlSi3O8)
00-015-0603 (D) - Illite - K(AlFe)2AlSi3O10(OH)2·H2O
01-085-1041 (C) - Epidote - Ca2(Al2Fe)Si2O7SiO4O(OH)
01-086-1362 (C) - Magnetite - Fe2.929O4
01-087-0710 (C) - Rutile - TiO2
00-001-0527 (D) - Kaolinite - Al2Si2O5(OH)4

SB-10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00-003-0016 (D) - Montmorillonite, syn - Al2O3·4SiO2·xH2O
01-086-1386 (C) - Muscovite 2M1 - K0.94Al1.96(Al0.95Si2.85O10)(OH)1.744F0.25
01-080-1110 (C) - Biotite - KFeMg2(AlSi3O10)(OH)2
01-079-1910 (C) - Quartz - SiO2
01-083-1658 (C) - Albite high - (K0.22Na0.78)(AlSi3O8)
01-086-0439 (C) - Orthoclase - K(AlSi3O8)
01-087-0710 (C) - Rutile - TiO2
00-015-0603 (D) - Illite - K(AlFe)2AlSi3O10(OH)2·H2O
01-085-1041 (C) - Epidote - Ca2(Al2Fe)Si2O7SiO4O(OH)

MINERALOGY DATA

prepared for:

WSP - Cooperative Engergy

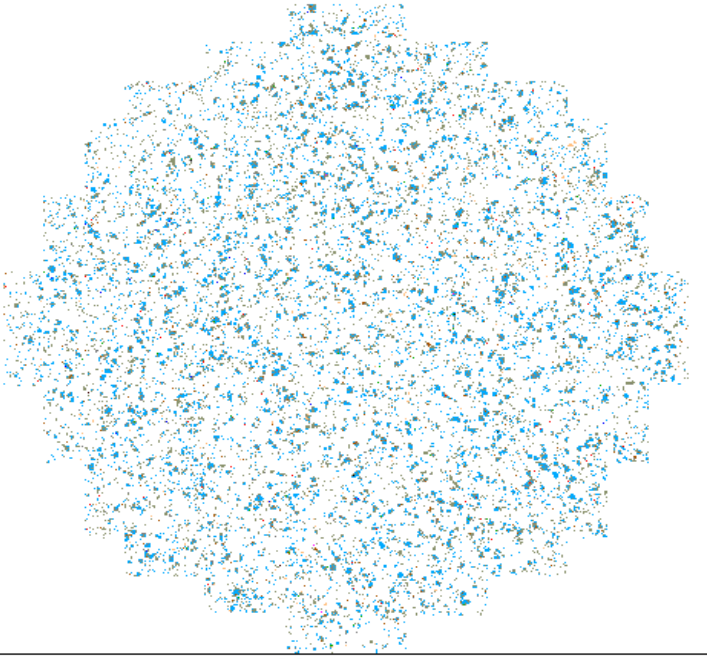
19465-004
MI7003-NOV22
March 8, 2023

Prepared by:

Michelle Kelvin/Lain Glossop
Senior Mineralogist/Senior Mineralogist

SB-02

Panorama - Modal - Coop Morrow
MI7003-NOV22 11A



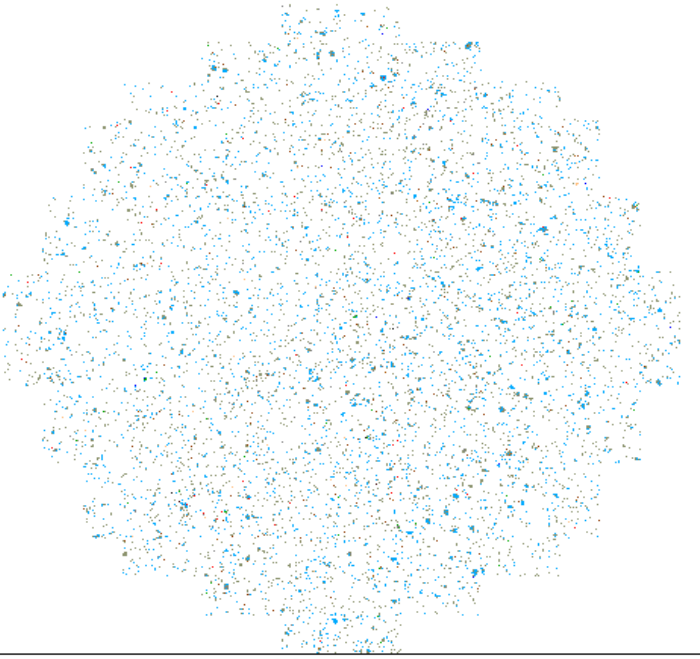
Modal - Coop Morrow

Mixed Clays	Quartz	Plagioclase	K-Feldspar	Ti Fe Oxide	Chlorites
Other Silicates	Carbonates/Sulphates/Phosphates		Iron Oxides	Other Oxides	Holes

Mosaic	Modal - Coop Morrow		TESCAN TIMA
View field: 25.5 mm	Date(m/d/y): 12/31/22	10 mm	
MI7003-NOV22 11A	TESCAN_Liberation analysis #1		

SB-04

Panorama - Modal - Coop Morrow
MI7003-NOV22 21A



Modal - Coop Morrow

Quartz	Mixed Clays	Plagioclase	Chlorites	Ti Fe Oxide	K-Feldspar
Other Silicates	Iron Oxides	Carbonates/Sulphates/Phosphates		Holes	

Mosaic	Modal - Coop Morrow		TESCAN TIMA
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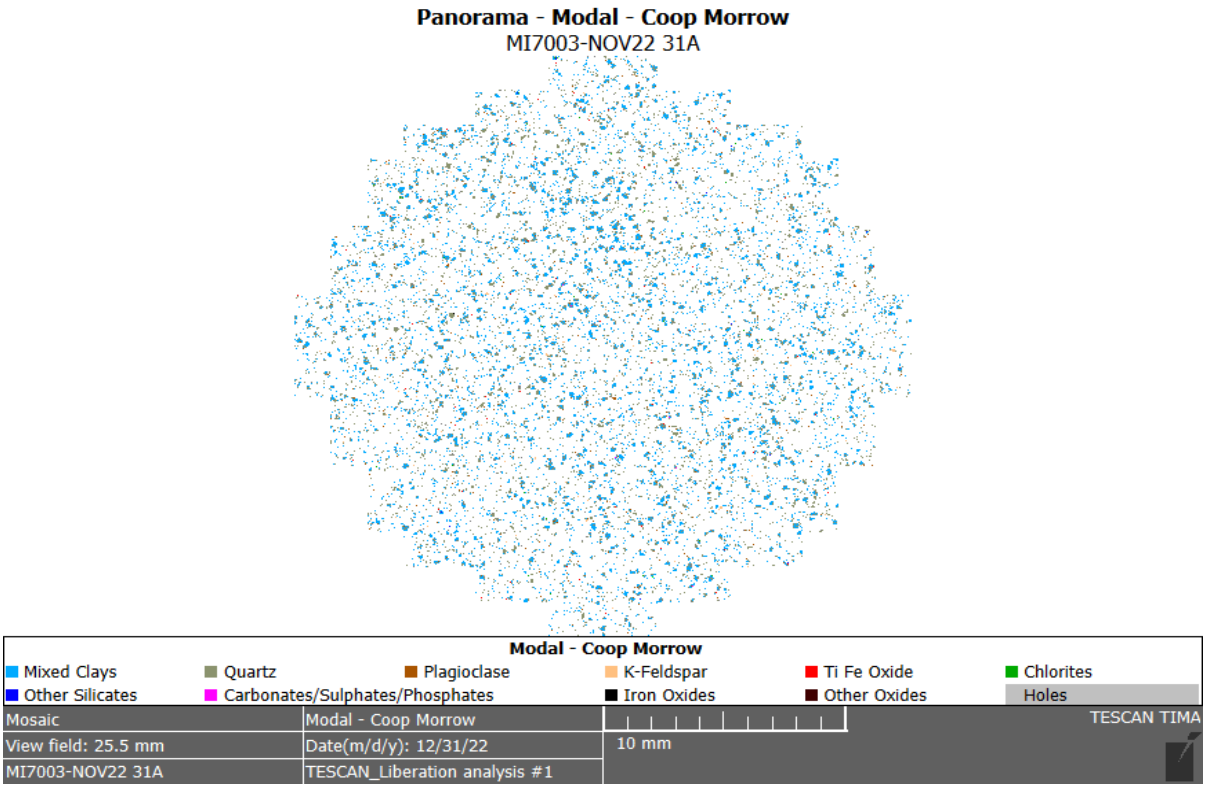
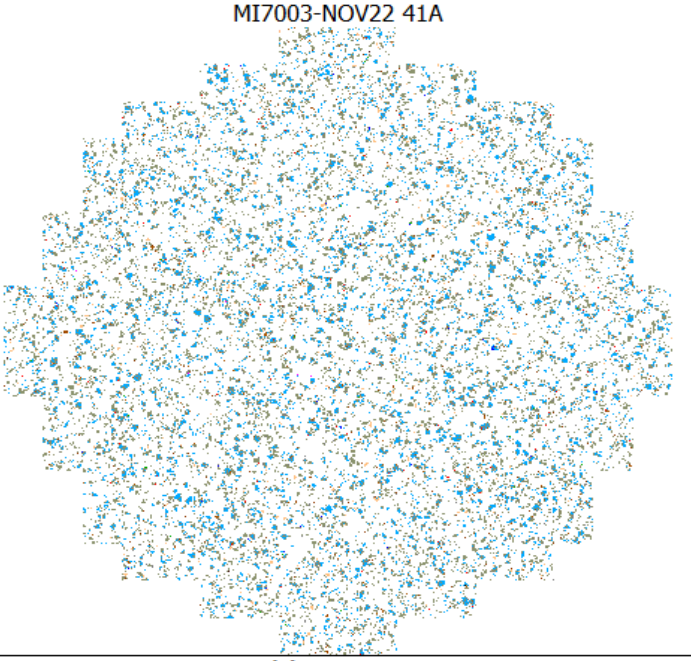
MI7003-NOV22 21A	TESCAN_Liberation analysis #1		

SB-05


Panorama - Modal - Coop Morrow
MI7003-NOV22 31A
Modal - Coop Morrow
Mixed Clays
Quartz
Plagioclase
K-Feldspar
Ti Fe Oxide
Chlorites
Other Silicates
Carbonates/Sulphates/Phosphates
Iron Oxides
Other Oxides
Holes
Mosaic
Modal - Coop Morrow
TESCAN TIMA
View field: 25.5 mm
Date(m/d/y): 12/31/22
10 mm
MI7003-NOV22 31A
TESCAN_Liberation analysis #1

SB-10

Panorama - Modal - Coop Morrow
MI7003-NOV22 41A



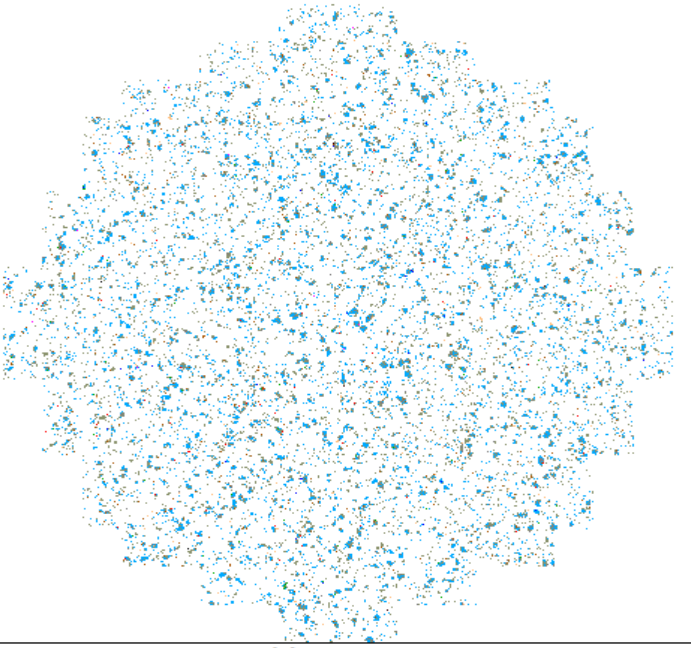
Modal - Coop Morrow

Quartz	Mixed Clays	Plagioclase	K-Feldspar	Ti Fe Oxide	Chlorites
Other Silicates	Other	Iron Oxides	Carbonates/Sulphates/Phosphates		Holes

Mosaic	Modal - Coop Morrow		TESCAN TIMA
View field: 25.5 mm	Date(m/d/y): 12/31/22	10 mm	
MI7003-NOV22 41A	TESCAN_Liberation analysis #1		

SB-02

Panorama - Modal - Coop Morrow
MI7003-NOV22 11B



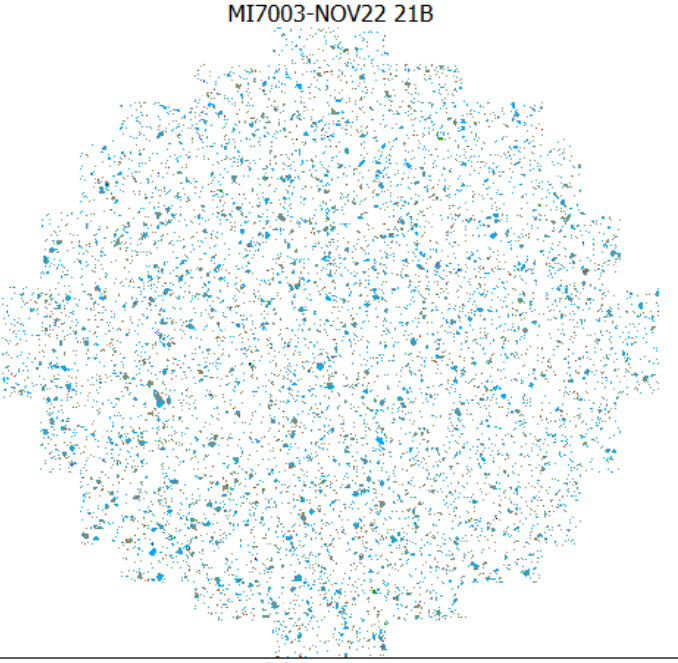
Modal - Coop Morrow

Mixed Clays	Quartz	Plagioclase	K-Feldspar	Ti Fe Oxide	Chlorites
Other Silicates	Iron Oxides	Carbonates/Sulphates/Phosphates		Holes	

Mosaic	Modal - Coop Morrow		TESCAN TIMA
View field: 25.5 mm	Date(m/d/y): 12/31/22	10 mm	
MI7003-NOV22 11B	TESCAN_Liberation analysis #1		

SB-04

Panorama - Modal - Coop Morrow
MI7003-NOV22 21B



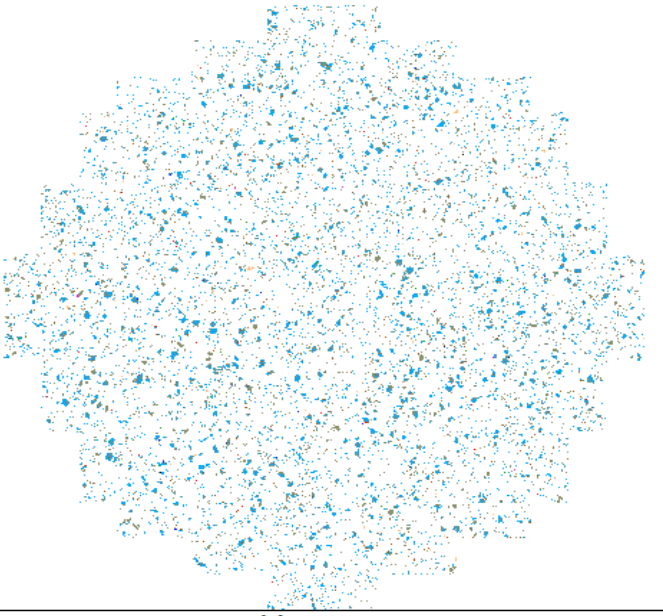
Modal - Coop Morrow

Quartz	Mixed Clays	Plagioclase	Chlorites	Ti Fe Oxide	K-Feldspar
Other Silicates	Iron Oxides	Carbonates/Sulphates/Phosphates		Other Oxides	Holes

Mosaic	Modal - Coop Morrow	10 mm	TESCAN TIMA
View field: 25.5 mm	Date(m/d/y): 12/31/22		
MI7003-NOV22 21B	TESCAN_Liberation analysis #1		

SB-05

Panorama - Modal - Coop Morrow
MI7003-NOV22 31B

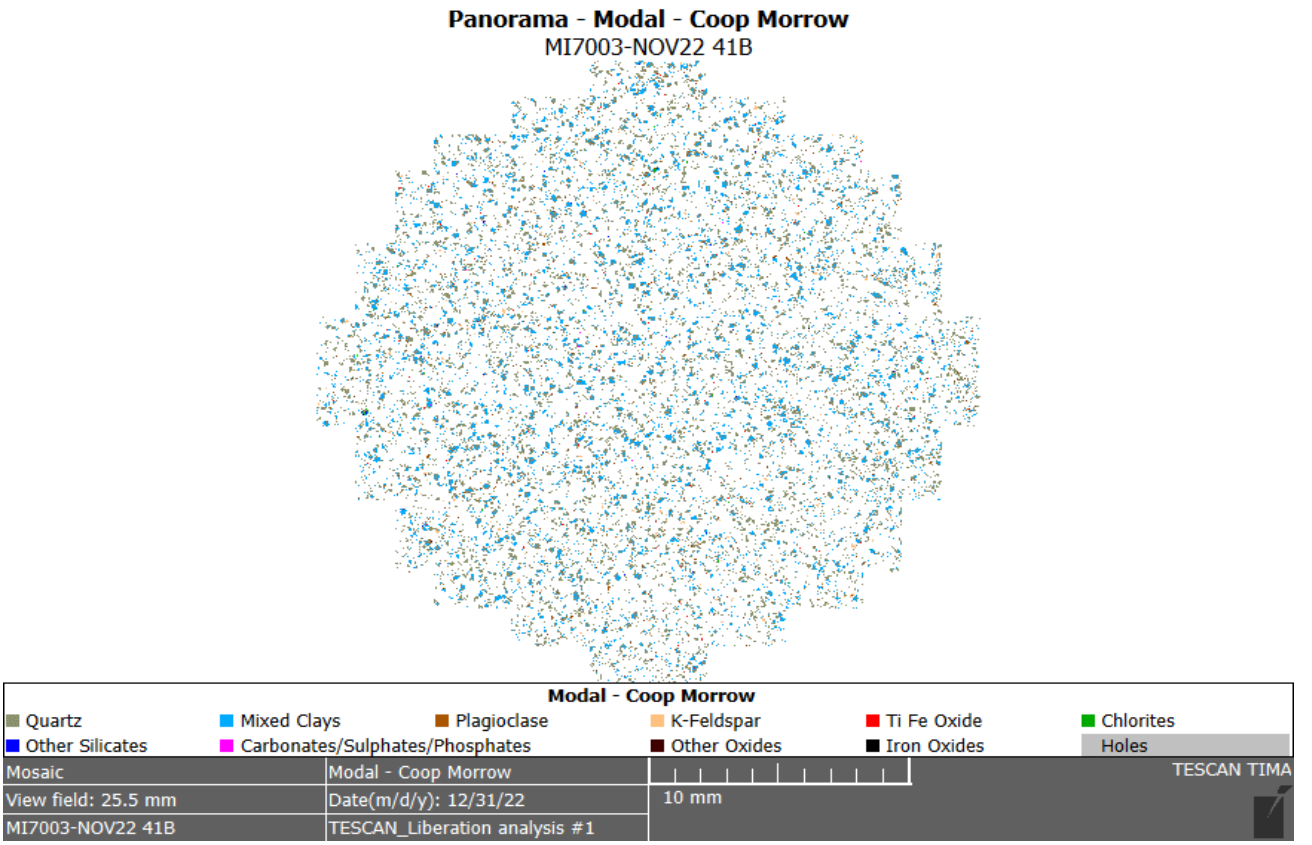


Modal - Coop Morrow

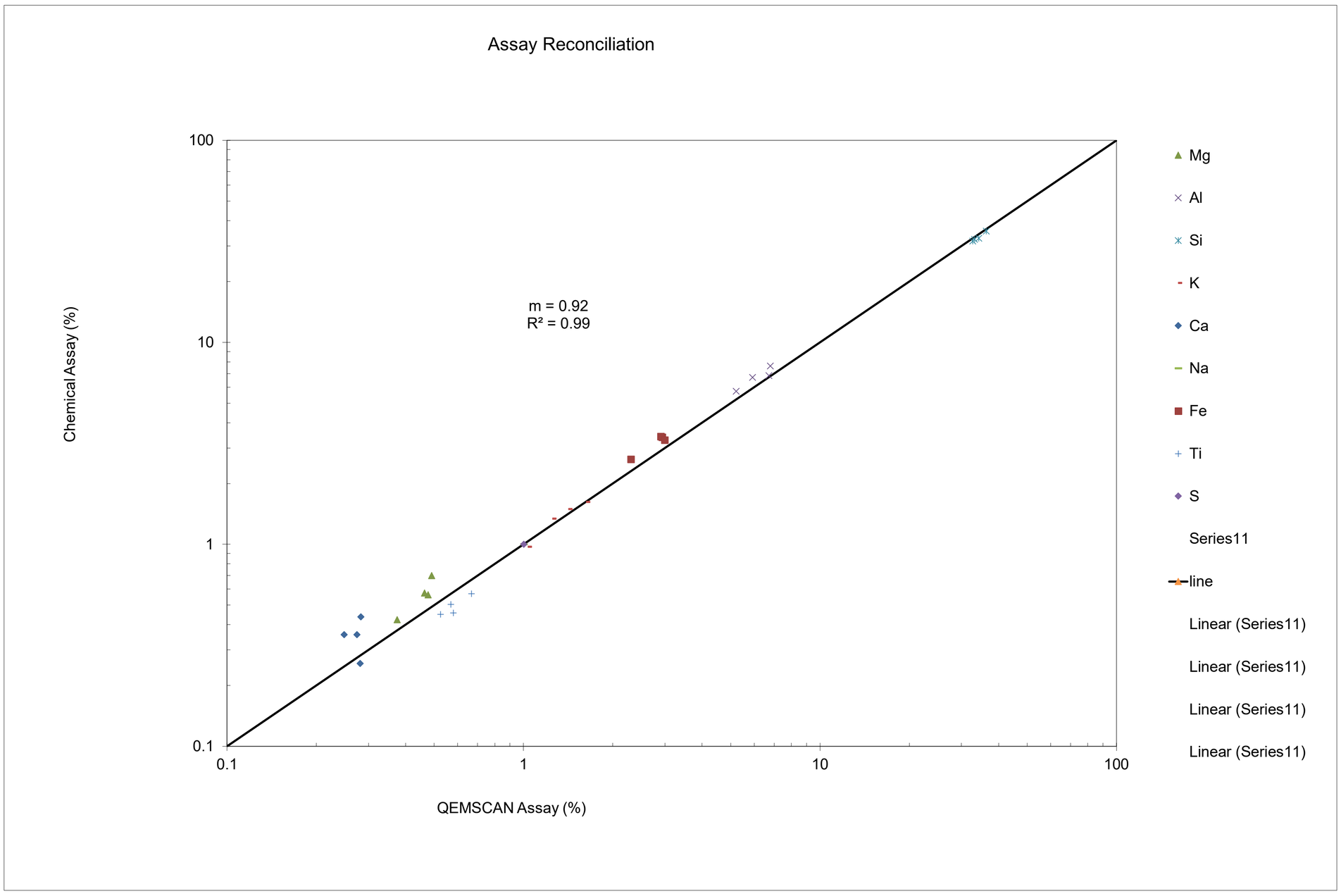
Mixed Clays	Quartz	Plagioclase	K-Feldspar	Ti Fe Oxide	Chlorites
Other Silicates	Carbonates/Sulphates/	Iron Oxides	Other	Other Oxides	Holes

Mosaic	Modal - Coop Morrow	TESCAN TIMA
View field: 25.5 mm	Date(m/d/y): 12/31/22	10 mm
MI7003-NOV22 31B	TESCAN_Liberation analysis #1	

SB-10


Panorama - Modal - Coop Morrow
MI7003-NOV22 41B
Modal - Coop Morrow
Quartz
Mixed Clays
Plagioclase
K-Feldspar
Ti Fe Oxide
Chlorites
Other Silicates
Carbonates/Sulphates/Phosphates
Other Oxides
Iron Oxides
Holes
Mosaic
Modal - Coop Morrow
TESCAN TIMA
View field: 25.5 mm
Date(m/d/y): 12/31/22
10 mm
MI7003-NOV22 41B
TESCAN_Liberation analysis #1

Elemental Mass (%)



Elemental Mass (%) Absolute

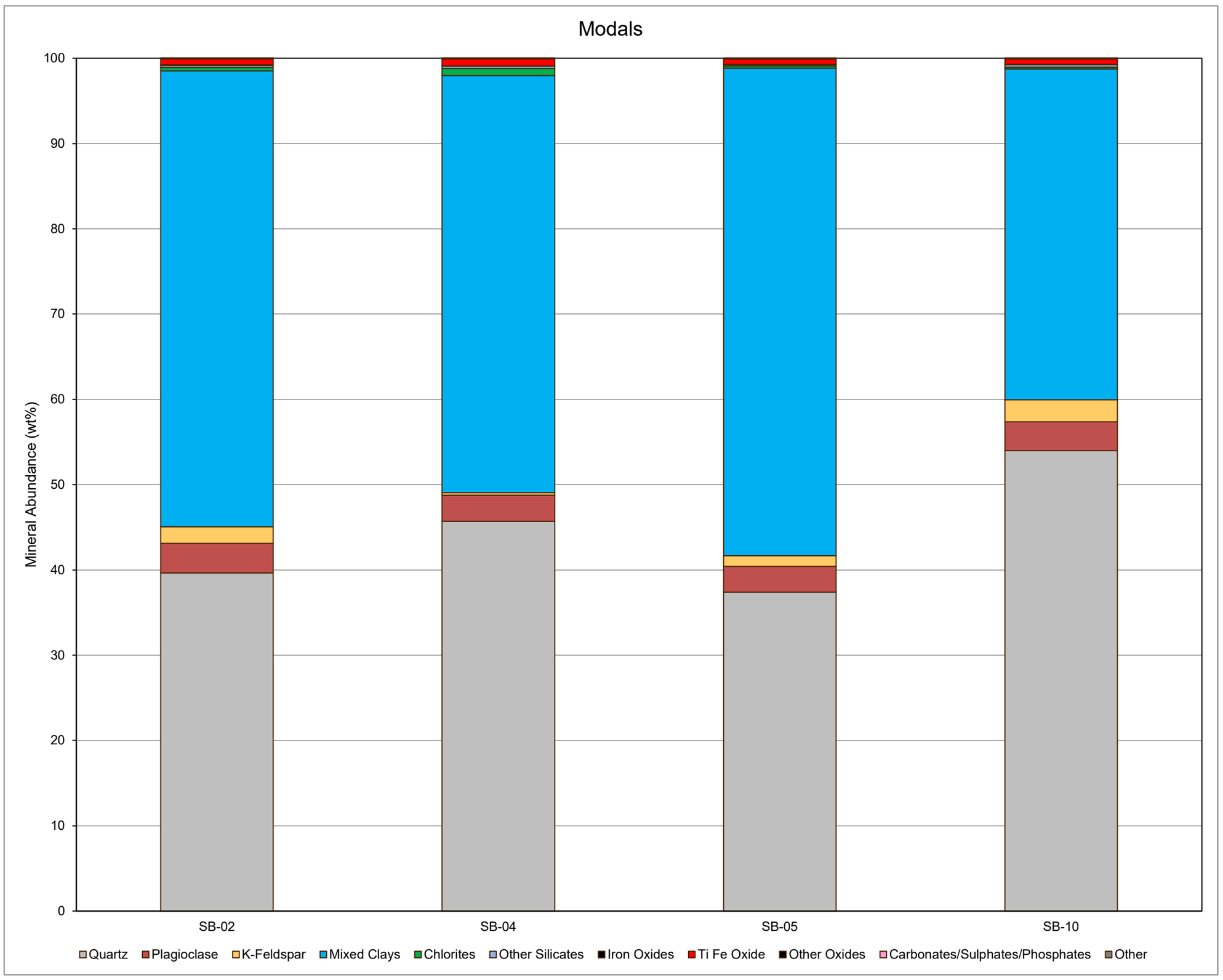
	Magnesium		Aluminum		Silicon		Potassium	
Mineral Name	Mg (Calculated)	Mg (Assay)	Al (Calculated)	Al (Assay)	Si (Calculated)	Si (Assay)	K (Calculated)	K (Assay)
SB-02	0.49	0.70	6.71	6.83	33.1	32.3	1.63	1.62
SB-04	0.46	0.57	5.92	6.70	34.3	32.7	1.04	0.97
SB-05	0.48	0.56	6.80	7.62	32.7	31.7	1.42	1.49
SB-10	0.38	0.42	5.20	5.71	36.3	35.4	1.25	1.34

	Calcium		Iron		Titanium	
Mineral Name	Ca (Calculated)	Ca (Assay)	Fe (Calculated)	Fe (Assay)	Ti (Calculated)	Ti (Assay)
SB-02	0.28	0.44	2.94	3.39	0.58	0.46
SB-04	0.25	0.36	2.90	3.41	0.67	0.57
SB-05	0.27	0.36	2.99	3.28	0.57	0.50
SB-10	0.28	0.26	2.30	2.63	0.52	0.45

WSP - Cooperative Energy
19465-04
MI7003-NOV22

Modals

Mineral (%)	SB-02	SB-04	SB-05	SB-10
Quartz	39.7	45.7	37.4	54.0
Plagioclase	3.47	3.06	3.04	3.41
K-Feldspar	1.93	0.28	1.22	2.58
Mixed Clays	53.5	48.9	57.2	38.8
Chlorites	0.42	0.81	0.23	0.23
Other Silicates	0.27	0.25	0.15	0.27
Iron Oxides	0.05	0.07	0.05	0.03
Ti Fe Oxide	0.69	0.84	0.63	0.65
Other Oxides	0.02	0.02	0.03	0.03
Carbonates/Sulphates/F	0.04	0.02	0.04	0.03
Other	0.01	0.01	0.01	0.02
Total	100	100	100	100



WSP - Cooperative Energy
19465-04
MI7003-NOV22

Summary Major and Trace Element Compositions Determined by EPMA (element wt%)

	Na	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Rb	Cs	Ba	Cl	F
Mean DL	***0.013***	***0.010***	***0.008***	***0.009***	***0.008***	***0.010***	***0.035***	***0.035***	***0.048***	***0.029***	***0.042***	***0.174***	***0.033***	***0.041***
Illite/Clays - SB-02	0.11	0.87	9.15	24.25	1.78	0.34	0.37	0.04	5.45	0.03	0.00	0.06	0.15	0.09
Illite/Clays - SB-04	0.07	0.72	8.82	26.40	1.33	0.31	0.33	0.03	4.88	0.04	0.00	0.04	0.10	0.09
Illite/Clays - SB-05	0.11	0.69	10.19	25.91	1.75	0.24	0.38	0.02	4.43	0.04	0.00	0.04	0.11	0.11
Illite/Clays - SB-10	0.11	0.65	9.78	24.14	1.67	0.24	0.34	0.02	5.08	0.03	0.00	0.05	0.17	0.10
Ortholcase	0.37	0.00	9.66	30.53	13.24	0.00	0.03	0.00	0.03	0.04	0.00	0.21	0.02	0.00
Quartz/Fine Textures	0.06	0.13	1.17	43.91	0.20	0.22	0.04	0.03	0.41	0.06	0.00	0.04	0.05	0.12

Summary Major and Trace Element Compositions Determined by EPMA (element wt%)

	O	Total	*n*
Mean DL			
Illite/Clays - SB-02	38.64	81.33	*36*
Illite/Clays - SB-04	40.40	83.57	*37*
Illite/Clays - SB-05	41.01	85.04	*36*
Illite/Clays - SB-10	38.73	81.13	*37*
Ortholcase	46.28	100.4	*1*
Quartz/Fine Textures	51.41	97.87	*1*

Summary Trace Element Compositions Determined by LA-ICP-MS (ppm)

	Li	Be	B	Al	Ca	Sc	Ti	V	Cr	Rb	Sr	Cs	Ba	*n*
Mean DL	***1.82***	***0.57***	***17.75***	***2.70***	***521.31***	***0.47***	***2.41***	***0.32***	***6.72***	***0.41***	***0.03***	***0.15***	***0.06***	
Illite/Clays - SB-02	50.99	3.63	51.49	92274	3892	12.83	3615	126	92.76	155.3	94.94	9.52	456.6	*36*
Illite/Clays - SB-04	31.41	2.35	48.19	87543	3418	11.95	4292	115	72.38	124.3	62.04	8.58	299.9	*37*
Illite/Clays - SB-05	39.68	2.77	59.32	100412	2773	13.41	3743	129	77.41	156.9	65.32	9.66	335.3	*36*
Illite/Clays - SB-10	39.54	3.23	58.31	92703	3041	12.91	3409	141	75.29	150.8	70.77	9.45	364.1	*37*
Ortholcase	BD	BD	46.08	106077	BD	0.81	25.67	1.01	BD	311.6	190.8	0.95	3053	*1*

Major and Trace Element Compositions by EPMA and LA-ICP-MS (wt%)																	
Sample	**Mineral**	**EPMA**															**LA-ICP-MS**
		Na	**Mg**	**Al**	**Si**	**K**	**Ca**	**Ti**	**Mn**	**Fe**	**Rb**	**Cs**	**Ba**	**Cl**	**F**	**O**	**Total**	**Li**
	Mean DL	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.03***	***0.03***	***0.05***	***0.03***	***0.04***	***0.17***	***0.03***	***0.04***			***0.0002***
SB-02	**Illite/Clays**	0.06	1.12	9.90	25.61	1.60	0.45	0.19	0.05	8.90	0.03	0.00	0.11	0.04	0.13	41.9	90.09	0.004
	Illite/Clays	0.06	1.02	12.32	22.73	2.42	0.24	0.46	0.00	4.72	0.03	0.02	0.16	0.08	0.10	39.8	84.13	0.004
	Illite/Clays	0.09	1.00	9.96	22.11	1.45	0.24	0.21	0.03	5.00	0.03	0.00	0.00	0.13	0.12	36.5	76.87	0.004
	Illite/Clays	0.10	0.97	9.11	26.02	1.68	0.32	0.23	0.04	5.03	0.03	0.00	0.03	0.12	0.10	40.5	84.24	0.006
	Illite/Clays	0.07	0.87	7.68	28.84	1.28	0.27	0.26	0.03	4.89	0.04	0.01	0.06	0.17	0.12	42.2	86.77	0.005
	Illite/Clays	0.08	0.59	6.81	29.17	1.59	0.42	0.35	0.03	4.98	0.04	0.00	0.08	0.19	0.06	41.8	86.21	0.006
	Illite/Clays	0.06	0.73	8.20	23.90	1.69	0.15	0.33	0.04	4.97	0.03	0.00	0.08	0.32	0.08	37.0	77.62	0.006
	Illite/Clays	0.06	0.96	7.76	24.12	1.28	0.71	0.33	0.06	7.33	0.03	0.00	0.00	0.16	0.09	37.9	80.74	0.005
	Illite/Clays	0.07	0.90	7.77	23.76	1.19	0.31	0.20	0.03	6.67	0.04	0.00	0.12	0.26	0.11	37.0	78.39	0.004
	Illite/Clays	0.05	0.77	8.10	29.52	1.70	0.20	0.28	0.02	2.86	0.04	0.00	0.07	0.13	0.10	42.8	86.59	0.006
	Illite/Clays	0.08	0.92	9.57	21.06	1.37	0.58	0.21	0.00	6.14	0.02	0.00	0.06	0.23	0.09	35.5	75.83	0.005
	Illite/Clays	0.06	0.92	10.59	21.32	1.64	0.37	0.48	0.05	6.98	0.02	0.00	0.12	0.13	0.11	37.1	79.91	0.005
	Illite/Clays	0.07	0.61	7.43	28.65	1.85	0.25	0.12	0.02	4.14	0.04	0.00	0.06	0.11	0.09	41.4	84.84	0.005
	Illite/Clays	0.09	1.04	10.10	21.82	1.93	0.38	0.27	0.04	4.44	0.04	0.00	0.05	0.14	0.06	36.5	76.95	0.004
	Illite/Clays	0.07	0.93	9.39	23.88	1.72	0.46	0.29	0.01	4.99	0.04	0.00	0.00	0.12	0.05	38.3	80.28	0.005
	Illite/Clays	0.10	0.82	9.43	22.33	1.76	0.49	0.20	0.06	6.40	0.03	0.00	0.00	0.11	0.10	36.9	78.75	0.004
	Illite/Clays	0.13	0.62	7.86	27.80	1.97	0.23	0.39	0.07	5.48	0.04	0.00	0.04	0.15	0.08	41.4	86.26	0.007
	Illite/Clays	0.04	0.63	6.91	29.84	1.10	0.29	0.47	0.04	2.92	0.03	0.00	0.00	0.08	0.06	42.0	84.47	0.007
	Illite/Clays	0.05	1.01	8.97	29.31	1.38	0.23	0.18	0.04	5.95	0.04	0.00	0.03	0.05	0.15	44.2	91.62	0.011
	Illite/Clays	0.72	0.80	8.51	23.21	1.38	0.45	0.16	0.03	5.14	0.05	0.00	0.00	0.15	0.05	36.8	77.44	0.004
	Illite/Clays	0.08	0.74	7.61	24.96	1.41	0.26	0.27	0.02	5.12	0.03	0.00	0.09	0.18	0.05	37.7	78.53	0.006
	Illite/Clays	0.05	0.75	7.04	21.89	1.19	0.44	0.27	0.25	13.43	0.02	0.00	0.06	0.19	0.15	36.1	81.88	0.004
	Illite/Clays	0.88	0.02	8.31	26.08	9.72	0.10	0.01	0.00	0.10	0.01	0.02	0.26	0.16	0.00	39.5	85.17	0.001
	Illite/Clays	0.08	0.92	8.79	23.10	1.52	0.26	0.60	0.04	5.28	0.03	0.00	0.10	0.24	0.08	37.1	78.09	0.006
	Illite/Clays	0.06	1.02	9.59	21.51	1.31	0.44	0.57	0.02	4.41	0.03	0.01	0.03	0.06	0.14	35.8	74.96	0.004
	Illite/Clays	0.09	0.93	8.65	22.37	1.76	0.40	0.44	0.10	9.85	0.03	0.00	0.00	0.17	0.12	37.4	82.33	0.006
	Illite/Clays	0.09	0.99	8.53	24.87	1.81	0.35	0.27	0.03	5.07	0.03	0.00	0.07	0.17	0.11	38.7	81.09	0.005
	Illite/Clays	0.08	1.00	8.75	26.26	1.49	0.32	0.18	0.04	5.32	0.06	0.00	0.00	0.14	0.09	40.4	84.16	0.005
	Illite/Clays	0.07	0.95	9.89	20.94	1.93	0.27	0.19	0.06	4.80	0.04	0.01	0.04	0.28	0.15	35.2	74.85	0.005
	Illite/Clays	0.09	1.90	10.21	22.79	1.38	0.26	0.23	0.07	3.99	0.05	0.00	0.06	0.11	0.13	38.0	79.25	0.006
	Illite/Clays	0.07	0.78	8.14	23.50	1.56	0.37	0.32	0.02	4.76	0.06	0.00	0.00	0.18	0.06	36.6	76.37	0.005
	Illite/Clays	0.07	0.94	8.98	19.93	1.93	0.50	2.92	0.03	5.72	0.03	0.00	0.00	0.10	0.14	35.5	76.77	0.003
	Illite/Clays	0.08	1.21	12.02	24.69	1.70	0.40	0.34	0.02	6.55	0.02	0.00	0.06	0.05	0.14	42.2	89.51	0.005
	Illite/Clays	0.02	0.13	19.32	21.55	0.10	0.07	0.05	0.00	0.54	0.01	0.00	0.01	0.03	0.05	42.0	83.92	0.000
	Illite/Clays	0.08	0.90	8.18	19.19	1.45	0.35	0.61	0.05	7.82	0.03	0.00	0.04	0.31	0.05	32.8	71.82	0.003
	Average	0.114	0.869	9.154	24.246	1.779	0.338	0.369	0.042	5.448	0.034	0.002	0.055	0.150	0.095	38.6	81.334	0.005
	Orthoclase	0.373	0.000	9.665	30.532	13.239	0.004	0.028	0.001	0.034	0.040	0.000	0.213	0.019	0.000	46.3	100.43	BD

Sample	Mineral	EPMA															LA-ICP-MS
		Na	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Rb	Cs	Ba	Cl	F	O	Total	Li
		0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.03*	*0.03*	*0.05*	*0.03*	*0.04*	*0.17*	*0.03*	*0.04*			*0.0002*
SB-04	Illite/Clays	0.04	0.61	9.90	27.71	0.93	0.32	0.37	0.01	5.31	0.05	0.00	0.02	0.00	0.08	42.87	88.22	0.004
	Illite/Clays	0.05	0.89	10.20	23.51	1.30	0.39	0.25	0.04	6.05	0.03	0.01	0.06	0.10	0.06	38.77	81.72	0.003
	Illite/Clays	0.10	1.30	12.58	27.30	1.89	0.40	0.26	0.02	6.07	0.04	0.00	0.02	0.05	0.15	45.61	95.80	0.003
	Illite/Clays	0.10	1.31	11.73	24.26	2.31	0.31	0.38	0.05	5.91	0.03	0.02	0.10	0.08	0.13	41.49	88.19	0.003
	Illite/Clays	0.08	1.14	11.63	25.39	2.66	0.38	0.43	0.03	5.61	0.03	0.01	0.16	0.05	0.15	42.60	90.34	0.004
	Illite/Clays	0.11	0.89	11.06	24.91	2.08	0.46	0.34	0.02	5.98	0.06	0.00	0.00	0.03	0.11	41.36	87.40	0.003
	Illite/Clays	0.05	0.69	9.37	24.34	1.45	0.32	0.40	0.03	5.17	0.04	0.02	0.09	0.17	0.12	38.66	80.93	0.003
	Illite/Clays	0.06	0.51	6.63	27.06	0.88	0.25	0.37	0.04	4.16	0.04	0.00	0.02	0.12	0.12	38.75	79.02	0.004
	Illite/Clays	0.05	0.55	7.81	28.93	0.99	0.33	0.41	0.03	3.67	0.04	0.00	0.00	0.04	0.03	41.95	84.83	0.003
	Illite/Clays	0.06	0.97	10.42	26.47	1.50	0.30	0.30	0.03	6.22	0.05	0.01	0.15	0.07	0.09	42.50	89.13	0.003
	Illite/Clays	0.09	0.57	11.36	26.88	1.34	0.19	0.24	0.00	4.09	0.04	0.00	0.02	0.06	0.04	42.81	87.72	0.003
	Illite/Clays	0.06	0.52	6.38	20.44	1.16	0.32	0.25	0.03	3.09	0.04	0.00	0.12	0.17	0.06	30.71	63.35	0.002
	Illite/Clays	0.05	0.58	7.94	28.22	0.87	0.24	0.42	0.03	4.80	0.04	0.00	0.05	0.11	0.09	41.51	84.95	0.004
	Illite/Clays	0.05	0.44	7.13	29.04	0.66	0.20	0.26	0.01	4.04	0.04	0.00	0.02	0.13	0.11	41.22	83.36	0.003
	Illite/Clays	0.05	0.37	5.37	28.35	0.65	0.41	0.27	0.03	5.68	0.04	0.00	0.00	0.12	0.15	39.37	80.87	0.003
	Illite/Clays	0.04	0.70	6.68	24.64	1.05	0.32	0.21	0.03	4.20	0.04	0.00	0.10	0.27	0.12	36.09	74.47	0.003
	Illite/Clays	0.06	1.03	11.87	25.11	1.79	0.35	0.52	0.02	5.53	0.04	0.00	0.01	0.03	0.08	42.30	88.74	0.003
	Illite/Clays	0.06	0.96	9.58	21.93	1.59	0.40	0.33	0.05	4.41	0.04	0.00	0.00	0.12	0.08	36.09	75.64	0.003
	Illite/Clays	0.05	0.69	6.39	29.76	0.92	0.28	0.60	0.02	4.23	0.03	0.00	0.00	0.14	0.09	41.92	85.11	0.000
	Illite/Clays	0.11	0.74	10.51	25.32	1.84	0.27	0.42	0.03	4.67	0.04	0.00	0.12	0.06	0.02	40.83	84.97	0.003
	Illite/Clays	0.11	0.71	8.45	25.31	2.11	0.24	0.27	0.04	3.82	0.04	0.00	0.01	0.14	0.03	38.64	79.90	0.003
	Illite/Clays	0.05	0.45	5.78	34.95	0.62	0.29	0.16	0.01	2.14	0.06	0.01	0.00	0.17	0.05	46.19	90.94	0.000
	Illite/Clays	0.08	0.64	9.58	26.75	0.99	0.45	0.49	0.02	4.16	0.04	0.00	0.04	0.09	0.05	41.34	84.71	0.003
	Illite/Clays	0.06	0.44	6.33	27.07	1.04	0.25	0.41	0.02	3.45	0.02	0.00	0.03	0.05	0.04	38.33	77.53	0.003
	Illite/Clays	0.05	0.45	6.36	30.53	0.60	0.32	0.28	0.03	2.77	0.04	0.01	0.00	0.12	0.00	41.98	83.55	0.003
	Illite/Clays	0.06	0.50	7.22	24.51	0.81	0.27	0.42	0.00	5.03	0.04	0.00	0.00	0.18	0.06	36.63	75.72	0.003
	Illite/Clays	0.07	0.59	7.97	30.36	0.97	0.28	0.24	0.03	4.65	0.05	0.00	0.04	0.14	0.08	43.86	89.33	0.004
	Illite/Clays	0.08	0.62	8.38	25.70	0.99	0.39	0.21	0.03	4.27	0.03	0.03	0.00	0.13	0.05	38.88	79.79	0.003
	Illite/Clays	0.08	1.01	9.90	26.69	1.72	0.16	0.44	0.04	5.86	0.04	0.00	0.03	0.10	0.07	42.28	88.42	0.003
	Illite/Clays	0.07	0.68	8.27	23.33	1.16	0.26	0.20	0.06	11.15	0.04	0.00	0.04	0.15	0.15	38.01	83.58	0.002
	Illite/Clays	0.06	0.78	9.51	24.85	1.11	0.18	0.37	0.02	6.05	0.03	0.00	0.09	0.07	0.09	39.56	82.77	0.003
	Illite/Clays	0.09	0.58	7.94	21.72	1.86	0.30	0.41	0.03	6.01	0.03	0.00	0.01	0.06	0.07	34.68	73.78	0.002
	Illite/Clays	0.15	0.90	12.28	24.33	2.84	0.38	0.28	0.04	4.84	0.05	0.00	0.11	0.07	0.15	41.56	87.96	0.003
	Illite/Clays	0.06	0.67	8.06	29.45	0.94	0.35	0.24	0.03	3.78	0.06	0.00	0.08	0.10	0.08	42.73	86.63	0.003
	Illite/Clays	0.06	0.71	9.88	27.59	1.15	0.36	0.22	0.02	4.44	0.03	0.00	0.02	0.08	0.19	42.43	87.18	0.003
	Illite/Clays	0.04	0.73	7.16	27.52	0.99	0.42	0.23	0.05	4.47	0.03	0.01	0.01	0.17	0.15	39.95	81.94	0.004
	Average	0.07	0.72	8.82	26.40	1.33	0.31	0.33	0.03	4.88	0.04	0.00	0.04	0.10	0.09	40.40	83.57	0.003

Sample	Mineral	EPMA															LA-ICP-MS
		Na	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Rb	Cs	Ba	Cl	F	O	Total	Li
		0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.03*	*0.03*	*0.05*	*0.03*	*0.04*	*0.17*	*0.03*	*0.04*			*0.0002*
SB-05	Quartz (fine?)	0.06	0.13	1.17	43.91	0.20	0.22	0.04	0.03	0.41	0.06	0.00	0.04	0.05	0.12	51.41	97.87	0.000
	Illite/Clays	0.09	0.58	10.81	22.29	1.33	0.18	2.54	0.00	4.41	0.04	0.00	0.05	0.03	0.05	38.71	81.10	0.003
	Illite/Clays	0.10	0.76	11.84	25.67	1.47	0.37	0.35	0.00	4.92	0.05	0.00	0.03	0.09	0.08	42.37	88.10	0.004
	Illite/Clays	0.05	0.56	7.95	24.00	1.13	0.41	0.21	0.04	3.64	0.04	0.00	0.02	0.22	0.08	36.32	74.66	0.004
	Illite/Clays	0.07	0.51	9.08	22.87	1.49	0.30	0.27	0.02	4.76	0.02	0.00	0.02	0.09	0.07	36.44	76.02	0.004
	Illite/Clays	0.09	0.69	9.74	27.45	1.58	0.23	0.21	0.01	4.71	0.05	0.00	0.07	0.08	0.16	42.27	87.35	0.004
	Illite/Clays	0.10	0.81	9.88	25.37	1.62	0.28	0.31	0.02	4.65	0.05	0.00	0.00	0.08	0.09	40.20	83.46	0.004
	Illite/Clays	0.10	0.77	10.80	23.60	1.87	0.18	0.30	0.03	4.76	0.03	0.00	0.06	0.06	0.28	38.96	81.81	0.006
	Illite/Clays	0.06	0.62	8.01	27.98	1.35	0.35	0.25	0.02	3.33	0.05	0.00	0.02	0.26	0.10	40.89	83.31	0.005
	Illite/Clays	0.07	0.65	9.27	26.79	1.27	0.30	0.19	0.02	4.02	0.04	0.00	0.04	0.11	0.09	40.85	83.70	0.004
	Illite/Clays	0.09	0.64	8.92	25.53	1.41	0.41	0.18	0.00	3.95	0.04	0.00	0.00	0.15	0.10	39.12	80.53	0.004
	Illite/Clays	0.11	0.63	9.80	24.31	2.25	0.34	0.59	0.02	3.85	0.02	0.00	0.00	0.08	0.11	38.92	81.02	0.004
	Illite/Clays	0.11	0.64	10.78	25.08	1.38	0.40	0.52	0.02	4.35	0.06	0.00	0.10	0.13	0.09	40.61	84.27	0.005
	Illite/Clays	0.13	0.66	11.14	27.88	2.00	0.26	0.29	0.01	4.46	0.03	0.00	0.00	0.07	0.11	44.08	91.12	0.004
	Illite/Clays	0.13	0.90	12.56	26.92	2.14	0.21	0.33	0.06	4.93	0.04	0.00	0.01	0.01	0.07	44.64	92.95	0.003
	Illite/Clays	0.10	0.57	9.81	24.66	1.55	0.23	0.25	0.03	4.31	0.05	0.00	0.13	0.06	0.10	39.02	80.88	0.004
	Illite/Clays	0.10	0.81	11.11	23.73	1.99	0.13	0.26	0.04	5.16	0.05	0.00	0.00	0.11	0.10	39.57	83.16	0.003
	Illite/Clays	0.09	0.64	9.72	23.62	1.78	0.20	0.60	0.04	4.41	0.05	0.00	0.00	0.09	0.11	38.07	79.41	0.003
	Illite/Clays	0.11	0.88	11.88	25.07	2.18	0.14	0.41	0.07	4.83	0.02	0.00	0.02	0.07	0.18	41.87	87.72	0.003
	Illite/Clays	0.08	0.64	10.60	27.88	1.87	0.34	0.29	0.02	4.28	0.05	0.00	0.07	0.07	0.09	43.55	89.83	0.004
	Illite/Clays	0.09	0.50	10.06	23.86	2.42	0.18	0.23	0.02	4.20	0.04	0.00	0.12	0.10	0.09	38.38	80.28	0.004
	Illite/Clays	0.08	0.66	8.83	26.94	1.72	0.15	0.19	0.07	6.85	0.03	0.00	0.05	0.11	0.12	41.47	87.28	0.003
	Illite/Clays	0.12	1.31	13.39	27.99	2.02	0.21	0.49	0.05	5.73	0.04	0.00	0.07	0.04	0.15	47.14	98.74	0.005
	Illite/Clays	0.07	0.68	11.01	22.64	1.70	0.32	0.40	0.03	4.37	0.03	0.00	0.00	0.16	0.08	38.01	79.47	0.004
	Illite/Clays	0.06	0.57	9.34	27.30	1.82	0.19	0.27	0.02	3.65	0.03	0.00	0.00	0.06	0.14	41.43	84.87	0.004
	Illite/Clays	0.05	0.47	9.82	28.83	2.80	0.20	0.30	0.00	3.49	0.04	0.00	0.00	0.10	0.10	43.71	89.90	0.004
	Illite/Clays	0.07	0.52	7.68	33.43	1.07	0.21	0.21	0.01	3.78	0.05	0.00	0.07	0.07	0.10	46.78	94.05	0.004
	Illite/Clays	0.14	0.62	9.15	26.47	1.55	0.33	0.35	0.03	4.13	0.03	0.00	0.07	0.11	0.17	40.56	83.71	0.004
	Illite/Clays	0.14	0.80	10.51	23.45	1.86	0.11	0.26	0.05	4.65	0.03	0.00	0.09	0.13	0.13	38.51	80.71	0.005
	Illite/Clays	0.12	0.61	9.59	25.19	1.63	0.15	0.23	0.01	4.05	0.03	0.00	0.06	0.20	0.06	39.32	81.26	0.004
	Illite/Clays	0.23	0.61	11.35	24.63	2.09	0.15	0.44	0.02	3.96	0.03	0.00	0.20	0.28	0.12	40.50	84.62	0.004
	Illite/Clays	0.10	0.64	8.75	31.29	1.48	0.11	0.34	0.01	4.08	0.05	0.00	0.00	0.05	0.16	45.58	92.64	0.004
	Illite/Clays	0.09	1.08	10.34	32.15	1.78	0.41	0.33	0.02	4.13	0.03	0.00	0.00	0.04	0.16	48.46	99.03	0.005
	Illite/Clays	0.08	0.83	12.35	25.34	1.89	0.19	0.22	0.01	3.95	0.02	0.00	0.01	0.10	0.12	42.13	87.26	0.004
	Illite/Clays	0.39	0.72	10.34	22.26	1.84	0.15	0.49	0.03	5.55	0.04	0.00	0.02	0.17	0.07	37.47	79.54	0.004
	Illite/Clays	0.20	0.64	10.35	24.40	1.90	0.11	0.23	0.02	4.93	0.05	0.00	0.11	0.16	0.11	39.45	82.65	0.004
	Average	0.11	0.69	10.19	25.91	1.75	0.24	0.38	0.02	4.43	0.04	0.00	0.04	0.11	0.11	41.01	85.04	0.004

Sample	Mineral	EPMA																LA-ICP-MS
		Na	Mg	Al	Si	K	Ca	Ti	Mn	Fe	Rb	Cs	Ba	Cl	F	O	Total	Li
		0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.03*	*0.03*	*0.05*	*0.03*	*0.04*	*0.17*	*0.03*	*0.04*			*0.0002*
SB-10	Illite/Clays	0.12	0.78	9.58	22.51	1.80	0.32	0.56	0.03	7.76	0.04	0.00	0.13	0.17	0.08	37.78	81.66	0.004
	Illite/Clays	0.05	0.65	8.96	26.87	1.23	0.26	0.32	0.04	4.81	0.04	0.00	0.09	0.19	0.04	40.96	84.50	0.004
	Illite/Clays	0.09	0.81	11.10	22.71	1.60	0.18	0.20	0.02	7.07	0.03	0.00	0.00	0.16	0.08	38.83	82.89	0.004
	Illite/Clays	0.05	0.73	8.80	19.14	1.62	0.26	0.49	0.03	5.59	0.02	0.00	0.00	0.08	0.01	32.50	69.33	0.003
	Illite/Clays	0.14	0.63	11.07	24.80	2.29	0.17	0.21	0.02	3.89	0.04	0.00	0.05	0.16	0.10	40.30	83.86	0.003
	Illite/Clays	0.10	0.48	9.63	26.33	1.71	0.25	0.27	0.00	4.04	0.03	0.00	0.10	0.13	0.08	40.67	83.83	0.004
	Illite/Clays	0.10	0.73	11.96	25.60	1.79	0.21	0.42	0.00	4.73	0.04	0.00	0.06	0.12	0.15	42.34	88.24	0.004
	Illite/Clays	0.08	0.55	10.21	23.95	1.35	0.19	0.21	0.01	4.56	0.02	0.00	0.00	0.15	0.15	38.47	79.90	0.003
	Illite/Clays	0.14	0.78	11.48	22.76	2.81	0.33	0.35	0.02	3.40	0.02	0.00	0.07	0.18	0.06	38.60	81.00	0.004
	Illite/Clays	0.11	0.69	10.45	25.72	1.50	0.23	0.27	0.04	3.99	0.05	0.01	0.09	0.25	0.14	40.74	84.28	0.004
	Illite/Clays	0.05	0.65	8.11	23.75	1.21	0.38	0.48	0.04	4.60	0.03	0.00	0.05	0.25	0.08	36.70	76.39	0.004
	Illite/Clays	0.38	0.52	9.97	26.60	2.06	0.24	0.16	0.02	5.67	0.04	0.00	0.00	0.14	0.04	41.87	87.70	0.004
	Illite/Clays	0.09	0.66	9.01	27.19	1.31	0.25	0.17	0.04	4.86	0.04	0.00	0.02	0.14	0.15	41.27	85.22	0.004
	Illite/Clays	0.08	0.44	7.13	27.74	1.23	0.23	1.17	0.01	2.94	0.04	0.01	0.01	0.14	0.02	40.21	81.42	0.004
	Illite/Clays	0.09	0.66	10.36	21.23	1.54	0.22	0.21	0.00	5.40	0.02	0.00	0.01	0.26	0.18	35.84	76.03	0.004
	Illite/Clays	0.08	0.55	8.23	18.96	3.05	0.22	0.35	0.01	5.74	0.02	0.01	0.07	0.21	0.03	31.86	69.39	0.004
	Illite/Clays	0.10	0.78	9.91	20.32	1.45	0.28	0.32	0.02	9.29	0.03	0.00	0.08	0.24	0.11	35.72	78.65	0.003
	Illite/Clays	0.11	0.51	5.66	31.01	1.14	0.27	0.22	0.04	3.68	0.04	0.00	0.00	0.14	0.12	42.23	85.19	0.004
	Illite/Clays	0.11	0.64	9.35	27.02	1.41	0.25	0.46	0.03	5.14	0.02	0.00	0.00	0.12	0.26	41.62	86.43	0.004
	Illite/Clays	0.21	0.62	12.37	22.20	3.22	0.17	0.60	0.01	3.73	0.04	0.00	0.02	0.17	0.11	38.90	82.36	0.004
	Illite/Clays	0.06	0.64	9.44	23.21	1.35	0.25	0.51	0.01	5.45	0.03	0.01	0.02	0.20	0.09	37.50	78.79	0.004
	Illite/Clays	0.06	0.61	7.24	29.40	1.20	0.21	0.15	0.03	4.11	0.05	0.00	0.09	0.13	0.14	41.92	85.33	0.005
	Illite/Clays	0.05	0.42	5.32	27.21	0.84	0.12	0.08	0.04	2.96	0.03	0.01	0.01	0.24	0.10	37.07	74.52	0.004
	Illite/Clays	0.11	0.83	11.07	24.99	1.86	0.25	0.34	0.01	4.99	0.06	0.00	0.11	0.10	0.19	40.97	85.86	0.004
	Illite/Clays	0.06	0.79	10.28	25.11	1.49	0.23	0.34	0.02	3.99	0.07	0.00	0.01	0.15	0.09	40.01	82.64	0.005
	Illite/Clays	0.44	0.70	12.01	24.46	2.28	0.30	0.31	0.03	5.36	0.04	0.00	0.02	0.12	0.07	41.47	87.63	0.004
	Illite/Clays	0.06	0.60	10.18	20.58	1.71	0.31	0.33	0.00	5.57	0.02	0.00	0.00	0.18	0.10	35.15	74.82	0.004
	Illite/Clays	0.07	0.74	8.68	19.39	1.93	0.20	0.35	0.06	6.79	0.01	0.00	0.01	0.08	0.16	32.92	71.39	0.003
	Illite/Clays	0.09	0.81	11.80	22.17	1.61	0.29	0.37	0.03	4.72	0.03	0.00	0.13	0.31	0.10	38.31	80.77	0.004
	Illite/Clays	0.08	0.82	11.01	21.07	1.51	0.36	0.35	0.03	8.81	0.02	0.00	0.00	0.19	0.05	37.53	81.83	0.003
	Illite/Clays	0.08	0.68	10.61	20.81	1.76	0.22	0.21	0.07	6.49	0.03	0.00	0.11	0.31	0.08	36.02	77.47	0.004
	Illite/Clays	0.11	0.62	10.27	25.46	1.64	0.23	0.40	0.00	4.49	0.04	0.00	0.00	0.20	0.08	40.50	84.05	0.005
	Illite/Clays	0.09	0.75	10.82	22.97	1.64	0.28	0.52	0.06	7.00	0.03	0.01	0.07	0.14	0.16	39.06	83.59	0.003
	Illite/Clays	0.05	0.56	8.16	26.60	1.60	0.17	0.18	0.00	3.06	0.02	0.00	0.06	0.18	0.16	39.25	80.05	0.004
	Illite/Clays	0.08	0.54	8.55	26.11	1.51	0.20	0.30	0.03	4.93	0.04	0.01	0.07	0.13	0.08	39.70	82.28	0.005
	Illite/Clays	0.06	0.51	13.27	22.96	0.91	0.24	0.19	0.00	3.26	0.01	0.01	0.10	0.23	0.03	39.62	81.40	0.004
	Average	0.11	0.65	9.78	24.14	1.67	0.24	0.34	0.02	5.08	0.03	0.00	0.05	0.17	0.10	38.73	81.13	0.004

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