



REPORT

Annual Groundwater Monitoring Report – 2023

Nucla Station Ash Disposal Facility

Nucla, Colorado

Submitted to:

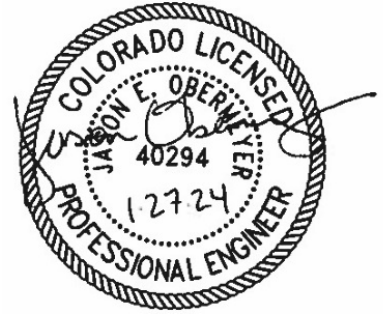
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21453425.003-003-R-0

January 27, 2024



Executive Summary

This report summarizes the 2023 groundwater monitoring activities and results for the detection monitoring program for the closed coal combustion residuals (CCR) landfill that served the former Nucla Station, along with the comparative statistical analysis. The CCR landfill, which is owned by Tri-State Generation and Transmission Association, Inc., is currently in detection monitoring. No program transitions occurred in 2023.

Field-measured pH at MO-1 was identified as a verified statistically significant increase (SSI) following the first semi-annual detection monitoring sampling event in 2023. An alternative source demonstration (ASD) previously conducted for field-measured pH at MO-1 is applicable to this result, and it was recommended that the facility remain in detection monitoring.

Field-measured pH at MO-5 was identified as a verified SSI following the first semi-annual detection monitoring sampling event in 2023. A demonstration of natural variability previously conducted for field-measured pH at MO-5 is applicable to this result, and it was recommended that the facility remain in detection monitoring.

No other potential exceedances or false-positive SSIs were identified for the 2023 detection monitoring program.

As described in the Groundwater Monitoring System Certification (Golder 2019) and the Groundwater Statistical Method Certification (Golder 2020b), the groundwater monitoring and analytical procedures for the program meet the requirements of 40 CFR 257 Subpart D (the CCR Rule), and modifications to the monitoring network and sampling program are not recommended at this time.

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Figure 1: Monitoring Well Locations and Groundwater Elevations (First Semi-Annual 2023 Sampling Event)

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1.0 INTRODUCTION

WSP USA Inc. (WSP) prepared this report to describe the 2023 groundwater monitoring activities and comparative statistical analysis for the Nucla Station Ash Disposal Facility (the Facility), which is a coal combustion residuals (CCR) landfill owned by Tri-State Generation and Transmission Association, Inc. (Tri-State) and subject to regulation under 40 CFR 257 Subpart D (the CCR Rule). This report was prepared to meet the requirements of 40 CFR 257.90(e).

1.1 Facility Information

The Facility serves as the location for containment of CCRs generated at Tri-State's Nucla Station, a 110-megawatt coal-fired electric generation plant that was located near Nucla, Colorado. Nucla Station was retired from service in September 2019 and subsequently demolished. Within the 81.65-acre property of the Facility, the CCR disposal footprint comprises approximately 61 acres. Closure of the Facility was completed in 2022.

1.2 Purpose

The CCR Rule establishes specific requirements for reporting of groundwater monitoring activities and corrective action in 40 CFR 257.90. Per 40 CFR 257.90(e), no later than January 31, 2018, and annually thereafter, owners or operators of CCR units must prepare an annual groundwater monitoring and corrective action report.

2.0 GROUNDWATER MONITORING PROGRAM STATUS

The groundwater monitoring system for the Facility consists of five monitoring wells, as described in the Groundwater Monitoring System Certification (Golder 2019). The two upgradient monitoring wells are MO-1 and MO-2. The three downgradient monitoring wells are MO-3, MO-4, and MO-5.

2.1 Completed Key Actions in 2023

The following key actions were completed in 2023:

- The 2022 Annual Groundwater Monitoring Report (WSP 2023) was finalized and placed within the operating record and on Tri-State's publicly accessible CCR website.
- Detection monitoring sampling events were performed in the second quarter, between April 18 and May 2, and in the fourth quarter, on October 17.

Additionally, a statistical baseline update was conducted in October 2023. This update included well-constituent pairs with previously identified statistically significant increases (SSIs) where a demonstration was made that the SSI was not related to a release from the Facility, but rather was caused by an alternative source or reflected natural variability not captured during the initial baseline period. Whenever possible, either a parametric or non-parametric method was used to generate the updated baseline statistical limit for each constituent. The method varied between well-constituent pairs and was based on the percentage of non-detect values in the baseline period and the baseline data distribution for the well-constituent pair, consistent with the Unified Guidance (USEPA 2009). For well-consistent pairs that exhibited statistically significant decreasing trends, a trend analysis will be used to assess the data for statistical significance of the parameter until a limit based on non-trending data can be established. A full description of the steps taken for the baseline update can be found in the Groundwater Statistical Method Certification (Golder 2020b), which is available on Tri-State's publicly accessible CCR website.

2.2 Installation and Decommissioning of Monitoring Wells

No monitoring wells were installed or decommissioned for the Facility in 2023.

2.3 Problems and Resolutions

No problems were identified in 2023.

2.4 Proposed Key Activities for 2024

The following key actions are expected to be completed in 2024:

- Detection monitoring sampling events are planned to occur in the second and fourth quarters of 2024.

3.0 GROUNDWATER MONITORING RESULTS AND ANALYSIS

Results from the groundwater monitoring program in 2023 are described in this section.

3.1 Groundwater Flow

The groundwater elevation was measured in each monitoring well prior to purging during each sampling event. Groundwater elevations are presented in Table 1 through Table 5. Groundwater elevations from the first semi-annual and second-semi annual sampling events are shown in Figure 1 and Figure 2, respectively.

The Morrison aquifer is characterized as highly heterogeneous with zones that are variably transmissive and/or subjected to variable amounts of confining pressure. This characterization is supported by the significant differences in groundwater levels, water column heights, and recovery times observed in the monitoring wells that have been installed to serve as the groundwater monitoring system for the Facility. Sandstone lenses in the Morrison aquifer vary considerably with respect to transmissivity (i.e., thickness and hydraulic conductivity) and horizontal extent due to the alluvial, shoreline, and lacustrine environments that deposited the Salt Wash and Brushy Basin Members of the Morrison Formation, resulting in interbedded siltstone, mudstone, claystone, and shale units. Groundwater elevation data suggest a general southerly groundwater flow direction in the Morrison aquifer near the Facility. However, the heterogeneity and interbedded nature of the Morrison Formation beneath the Facility and the significant differences in recharge characteristics between monitoring wells suggest a lack of horizontal continuity and confound the ability to precisely discern groundwater flow direction and rate.

3.2 Monitoring Data (Analytical Results)

Analytical results from detection monitoring in 2023 are shown in Table 1 through Table 5.

3.3 Samples Collected

The detection monitoring sampling events were conducted in April and May 2023 (first semi-annual 2023 sampling event) and October 2023 (second semi-annual 2023 sampling event).

3.4 Comparative Statistical Analysis

The comparative statistical analysis is summarized below. As discussed in Section 2.1, a baseline update was conducted in October 2023; therefore, statistical limits were different for the first and second semi-annual 2023 sampling events. The results of the comparative statistical analysis for the first semi-annual event are presented in Table 6 through Table 10. The results of the comparative statistical analysis for the second semi-annual event are presented in Table 11 through Table 15. A full description of the steps taken for the comparative statistical analysis can be found in the Groundwater Statistical Method Certification (Golder 2020b).

3.4.1 Definitions

The following definitions are used in discussion of the comparative statistical analysis:

- SSI – is a statistically significant increase and is defined as an analytical result that exceeds the parametric or non-parametric statistical limit established by the baseline statistical analysis.
- Potential Exceedance – is defined as an initial analytical result that exceeds the parametric or non-parametric statistical limit established by the baseline statistical analysis. Confirmatory resampling is used to determine whether the potential exceedance is a false-positive SSI or a verified SSI.
- False-positive SSI – is defined as an analytical result that exceeds the statistical limit but can clearly be attributed to laboratory error or changes in analytical precision or is invalidated through confirmatory resampling.
- Confirmatory resampling – is designated as the resampling event that occurs within 90 days of identifying an SSI over the statistical limit for determination of a verified SSI¹.
- Verified SSI – is interpreted as two consecutive SSIs (the original sample and the confirmatory resample for analytical results) for the same constituent at the same monitoring well.

If the data are assessed with a trend test, confirmatory resampling is generally not applicable, and a verified SSI is defined as a statistically significant increasing trend in the eight most recent results.

3.4.2 Potential Exceedances

No potential exceedances were identified from the 2023 detection monitoring program.

3.4.3 False-positive Statistically Significant Increases

No false-positive SSIs were identified from the 2023 detection monitoring program.

3.4.4 Verified Statistically Significant Increases

The field-measured pH value for the sample collected from MO-1 during the first semi-annual detection monitoring event indicated a verified SSI². The detrended pH value at MO-1 was less than the lower statistical limit during the semi-annual compliance event in May 2023. In December 2019, an alternative source demonstration (ASD) was prepared for field-measured pH at MO-1, and it was recommended that the Facility remain in detection monitoring (Golder 2020a). The ASD is applicable to the SSI identified for the first semi-annual 2023 sampling event.

The field-measured pH value for the sample collected from MO-5 during the first semi-annual 2023 detection monitoring event indicated a verified SSI. In October 2021, a demonstration of natural variability was prepared for field-measured pH at MO-5, and it was recommended that the Facility remain in detection monitoring (Golder 2022). The demonstration of natural variability is applicable to the SSI identified for the first semi-annual 2023 sampling event.

¹ Resampling might not occur within 90 days of the sampling event that resulted in the potential exceedance because of the additional time required for activities that must occur before a potential exceedance can be identified. These activities include sample delivery, analytical testing, review of results, and comparative statistical analysis.

² The term SSI is used to be consistent with generally accepted language. However, the SSI is for a value less than the lower limit for field-measured pH (which has a two-tailed limit).

No verified SSIs were identified for the second semi-annual 2023 detection monitoring event.

4.0 PROGRAM TRANSITIONS

In the fourth quarter of 2017, the groundwater monitoring program for the Facility transitioned from the baseline period to detection monitoring. The Facility remains in detection monitoring, and no program transitions occurred in 2023.

4.1 Detection Monitoring

Samples for the detection monitoring program are collected on a semi-annual basis, beginning with the sample collected in October 2017. Tri-State plans to collect samples for the detection monitoring program in the second and fourth quarters of 2024.

4.2 Assessment Monitoring

The groundwater monitoring program for the Facility is not in assessment monitoring. Assessment monitoring has not been triggered as described in 40 CFR 257.95. As such, no ASDs have been made under an assessment monitoring program, and no actions are required.

4.3 Corrective Measures and Assessment

The groundwater monitoring program for the Facility does not indicate the need for corrective measures. An assessment of corrective measures, as described in 40 CFR 257.96, is not required.

5.0 RECOMMENDATIONS AND CLOSING

This report presents the groundwater monitoring activities and results for the 2023 detection monitoring program for the Nucla Station Ash Disposal Facility, along with the comparative statistical analysis. The significant findings from the 2023 monitoring activities and comparative statistical analysis are as follows:

- Field-measured pH at MO-1 was identified as a verified SSI² for the first semi-annual detection monitoring event. An ASD conducted in December 2019 is applicable to this result, and it was recommended that the Facility remain in detection monitoring. No further actions are required.
- Field-measured pH at MO-5 was identified as a verified SSI for the first semi-annual detection monitoring event. A demonstration of natural variability conducted in October 2021 is applicable to this result, and it was recommended that the Facility remain in detection monitoring. No further actions are required.
- No other potential exceedances, false-positive SSIs, or verified SSIs were identified for the 2023 detection monitoring program. As described in the Groundwater Monitoring System Certification (Golder 2019) and the Groundwater Statistical Method Certification (Golder 2020b), the groundwater monitoring and analytical procedures meet the requirements of the CCR Rule, and modifications to the monitoring network and sampling program are not recommended at this time.

Signature Page

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6.0 REFERENCES

- Golder (Golder Associates Inc.). 2019. Coal Combustion Residuals Landfill Groundwater Monitoring System Certification, Nucla Station Ash Disposal Facility. Report prepared for Tri-State Generation and Transmission Association, Inc. May 2.
- Golder. 2020a. Annual Groundwater Monitoring Report – 2019, Coal Combustion Residuals Landfill, Nucla Station Ash Disposal Facility, Nucla, Colorado. Report prepared for Tri-State Generation and Transmission Association, Inc. January 29.
- Golder. 2020b. Coal Combustion Residuals Landfill Groundwater Statistical Method Certification, Nucla Station Ash Disposal Facility. Report prepared for Tri-State Generation and Transmission Association, Inc. June 19.
- Golder Associates USA Inc. 2022. Annual Groundwater Monitoring Report – 2021, Nucla Station Ash Disposal Facility, Nucla, Colorado. Report prepared for Tri-State Generation and Transmission Association, Inc. January 28.
- USEPA (United States Environmental Protection Agency). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. March.
- WSP (WSP USA Inc.). 2023. Annual Groundwater Monitoring Report – 2022, Nucla Station Ash Disposal Facility, Nucla, Colorado. Report prepared for Tri-State Generation and Transmission Association, Inc. January 27.

Tables

Table 1: Sample Results Summary Table – MO-1

Analytes	Units	5/2/2023	10/17/2023
		Compliance Event	Compliance Event
Static Water Level Elevation	ft amsl	5715.6	5715.5
Appendix III			
Boron, Total Recoverable	mg/L	0.415	0.387
Calcium, Total Recoverable	mg/L	11.1	11.4
Chloride	mg/L	246	235
Fluoride	mg/L	1.77 B	2.24 B
pH, Field-Measured	pH units	11.6	11.6
Sulfate	mg/L	435	427
Total Dissolved Solids	mg/L	1640	1590

Notes:

ft amsl: feet above mean sea level

mg/L: milligrams per liter

B: Analyte was detected between the method detection limit and the practical quantitation limit

Table 2: Sample Results Summary Table – MO-2

Analytes	Units	4/20/2023	10/17/2023
		Compliance Event	Compliance Event
Static Water Level Elevation	ft amsl	5735.2	5736.9
Appendix III			
Boron, Total Recoverable	mg/L	0.403 B	0.312 B
Calcium, Total Recoverable	mg/L	53.1	42.0
Chloride	mg/L	1960	1830
Fluoride	mg/L	< 12.5 U	< 25 U
pH, Field-Measured	pH units	7.9	7.9
Sulfate	mg/L	1570	1730
Total Dissolved Solids	mg/L	6120	6010

Notes:

ft amsl: feet above mean sea level

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the method detection limit

Table 3: Sample Results Summary Table – MO-3

Analytes	Units	4/18/2023	10/17/2023
		Compliance Event	Compliance Event
Static Water Level Elevation	ft amsl	5636.8	5636.6
Appendix III			
Boron, Total Recoverable	mg/L	0.728	0.649
Calcium, Total Recoverable	mg/L	19.2	17.3
Chloride	mg/L	136	143
Fluoride	mg/L	2.10 B	< 12.5 U
pH, Field-Measured	pH units	7.8	7.8
Sulfate	mg/L	659	719
Total Dissolved Solids	mg/L	2400	2350

Notes:

ft amsl: feet above mean sea level

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the method detection limit

Table 4: Sample Results Summary Table – MO-4

Analytes	Units	4/18/2023	10/17/2023
		Compliance Event	Compliance Event
Static Water Level Elevation	ft amsl	5652.2	5651.8
Appendix III			
Boron, Total Recoverable	mg/L	0.420 B	0.341 B
Calcium, Total Recoverable	mg/L	48.6	38.8
Chloride	mg/L	862	806
Fluoride	mg/L	< 12.5 U	< 25 U
pH, Field-Measured	pH units	7.6	7.7
Sulfate	mg/L	1730	1670
Total Dissolved Solids	mg/L	5180 H	4990 H

Notes:

ft amsl: feet above mean sea level

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the method detection limit

H: Analyte was analyzed outside of hold time due to laboratory reanalysis

Table 5: Sample Results Summary Table – MO-5

Analytes	Units	4/18/2023	10/17/2023
		Compliance Event	Compliance Event
Static Water Level Elevation	ft amsl	5660.6	5662.6
Appendix III			
Boron, Total Recoverable	mg/L	0.396 B	0.316 B
Calcium, Total Recoverable	mg/L	14.3	10.3
Chloride	mg/L	896	817
Fluoride	mg/L	< 5 U	< 25 U
pH, Field-Measured	pH units	8.4	8.4
Sulfate	mg/L	1700	1570
Total Dissolved Solids	mg/L	4910	4750 H

Notes:

ft amsl: feet above mean sea level

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the method detection limit

H: Analyte was analyzed outside of hold time due to laboratory reanalysis

Table 6: First Semi-Annual Event Statistics Summary Table – MO-1

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	May 2023	
				Compliance Event (5/2/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.43	0.415	No
Calcium, Total Recoverable	mg/L	Trend ⁽²⁾	NL	11.1	No
Chloride	mg/L	P-PL	341	246	No
Fluoride	mg/L	P-PL	2.8	1.77 B	No
pH, Field-Measured	pH units	P-PL	9.8, 10.0	11.6 (4.9) ⁽³⁾	Verified SSI ⁽⁴⁾
Sulfate	mg/L	Trend ⁽²⁾	NL	435	No
Total Dissolved Solids	mg/L	Trend ⁽²⁾	NL	1640	No

Notes:

NL: Statistical limit was not calculated for analytes for which the Sen's Slope methodology was selected

P-PL: Parametric Prediction Limit

mg/L: milligrams per liter

B: Analyte was detected between the method detection limit and the practical quantitation limit

1) Statistical limits are applicable to the first semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Baseline data exhibited a statistically significant decreasing trend. Therefore, a trend analysis is used for the determination of SSIs.

3) Statistical limit (two-tailed) was established using detrended data. Compliance data are detrended for comparison to the statistical limit. Detrended value is shown in parentheses.

4) Successful alternative source demonstration prepared in December 2019 is applicable, and the Facility remains in detection monitoring.

Table 7: First Semi-Annual Event Statistics Summary Table – MO-2

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	April 2023	
				Compliance Event (4/20/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.44	0.403 B	No
Calcium, Total Recoverable	mg/L	P-PL	64.0	53.1	No
Chloride	mg/L	P-PL	2361	1960	No
Fluoride	mg/L	NP-PL	12.5	< 12.5 U	No
pH, Field-Measured	pH units	P-PL	7.6, 8.7	7.9	No
Sulfate	mg/L	P-PL	2190	1570	No
Total Dissolved Solids	mg/L	P-PL	6679	6120	No

Notes:

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

1) Statistical limits are applicable to the first semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

Table 8: First Semi-Annual Event Statistics Summary Table – MO-3

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	April 2023	
				Compliance Event (4/18/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.73	0.728	No
Calcium, Total Recoverable	mg/L	P-PL	20.2	19.2	No
Chloride	mg/L	P-PL	179	136	No
Fluoride	mg/L	P-PL	3.25	2.10 B	No
pH, Field-Measured	pH units	P-PL	7.6, 8.2	7.8	No
Sulfate	mg/L	P-PL	875	659	No
Total Dissolved Solids	mg/L	P-PL	2640	2400	No

Notes:

P-PL: Parametric Prediction Limit

mg/L: milligrams per liter

B: Analyte was detected between the method detection limit and the practical quantitation limit

1) Statistical limits are applicable to the first semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

Table 9: First Semi-Annual Event Statistics Summary Table – MO-4

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	April 2023	
				Compliance Event (4/18/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.50	0.420 B	No
Calcium, Total Recoverable	mg/L	P-PL	49.2	48.6	No
Chloride	mg/L	P-PL	1086	862	No
Fluoride	mg/L	NP-PL	12.5	< 12.5 U	No
pH, Field-Measured	pH units	NP-PL	7.4, 7.6	7.6	No
Sulfate	mg/L	P-PL	2012	1730	No
Total Dissolved Solids	mg/L	P-PL	5373	5180 H	No

Notes:

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

H: Analyte was analyzed outside of hold time due to laboratory reanalysis

1) Statistical limits are applicable to the first semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

Table 10: First Semi-Annual Event Statistics Summary Table – MO-5

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	April 2023	
				Compliance Event (4/18/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.48	0.396 B	No
Calcium, Total Recoverable	mg/L	Trend ⁽²⁾	NL	14.3	No
Chloride	mg/L	P-PL	1180	896	No
Fluoride	mg/L	NP-PL	12.5	< 5 U	No
pH, Field-Measured	pH units	NP-PL	7.6, 8.3	8.4	Verified SSI ⁽³⁾
Sulfate	mg/L	P-PL	1990	1700	No
Total Dissolved Solids	mg/L	P-PL	5495	4910	No

Notes:

NL: Statistical limit was not calculated for analytes for which the Sen's Slope methodology was selected

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

1) Statistical limits are applicable to the first semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Baseline data exhibited a statistically significant decreasing trend. Therefore, a trend analysis is used for the determination of SSIs.

3) Successful demonstration of natural variability prepared in October 2021 is applicable, and the Facility remains in detection monitoring.

Table 11: Second Semi-Annual Event Statistics Summary Table – MO-1

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	October 2023	
				Compliance Event (10/17/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.45	0.387	No
Calcium, Total Recoverable	mg/L	P-PL	24	11.4	No
Chloride	mg/L	Trend ⁽²⁾	NL	235	No
Fluoride	mg/L	P-PL	2.7	2.24 B	No
pH, Field-Measured	pH units	P-PL	11.5, 12.2	11.6	No
Sulfate	mg/L	Trend ⁽²⁾	NL	427	No
Total Dissolved Solids	mg/L	P-PL	2056	1590	No

Notes:

NL: Statistical limit was not calculated for analytes for which the Sen's Slope methodology was selected

P-PL: Parametric Prediction Limit

mg/L: milligrams per liter

B: Analyte was detected between the method detection limit and the practical quantitation limit

1) Statistical limits are applicable to the second semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Baseline data exhibited a statistically significant decreasing trend. Therefore, a trend analysis is used for the determination of SSIs.

Table 12: Second Semi-Annual Event Statistics Summary Table – MO-2

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	October 2023	
				Compliance Event (10/17/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.44	0.312 B	No
Calcium, Total Recoverable	mg/L	P-PL	61	42.0	No
Chloride	mg/L	P-PL	2223	1830	No
Fluoride	mg/L	NP-PL	12.5	< 25 U ⁽²⁾	No
pH, Field-Measured	pH units	P-PL	7.6, 8.6	7.9	No
Sulfate	mg/L	P-PL	2227	1730	No
Total Dissolved Solids	mg/L	P-PL	6652	6010	No

Notes:

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

1) Statistical limits are applicable to the second semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Result is not considered an SSI because it is a non-detect with a method detection limit of 5 mg/L, which is below the statistical limit.

Table 13: Second Semi-Annual Event Statistics Summary Table – MO-3

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	October 2023	
				Compliance Event (10/17/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.72	0.649	No
Calcium, Total Recoverable	mg/L	P-PL	21	17.3	No
Chloride	mg/L	P-PL	179	143	No
Fluoride	mg/L	P-PL	3.2	< 12.5 U ⁽²⁾	No
pH, Field-Measured	pH units	NP-PL	7.8, 8.1	7.8	No
Sulfate	mg/L	P-PL	855	719	No
Total Dissolved Solids	mg/L	P-PL	2598	2350	No

Notes:

P-PL: Parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

1) Statistical limits are applicable to the second semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Result is not considered an SSI because it is a non-detect with a method detection limit of 2.5 mg/L, which is below the statistical limit.

Table 14: Second Semi-Annual Event Statistics Summary Table – MO-4

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	October 2023	
				Compliance Event (10/17/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.50	0.341 B	No
Calcium, Total Recoverable	mg/L	P-PL	51	38.8	No
Chloride	mg/L	P-PL	1072	806	No
Fluoride	mg/L	NP-PL	12.5	< 25 U ⁽²⁾	No
pH, Field-Measured	pH units	NP-PL	7.4, 7.7	7.7	No
Sulfate	mg/L	P-PL	2056	1670	No
Total Dissolved Solids	mg/L	P-PL	5328	4990 H	No

Notes:

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

H: Analyte was analyzed outside of hold time due to laboratory reanalysis

1) Statistical limits are applicable to the second semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Result is not considered an SSI because it is a non-detect with a method detection limit of 5 mg/L, which is below the statistical limit.

Table 15: Second Semi-Annual Event Statistics Summary Table – MO-5

Analytes	Units	Selected Statistical Method ⁽¹⁾	Statistical Limit ⁽¹⁾	October 2023	
				Compliance Event (10/17/2023)	SSI Determination
Appendix III					
Boron, Total Recoverable	mg/L	P-PL	0.52	0.316 B	No
Calcium, Total Recoverable	mg/L	Trend ⁽²⁾	NL	10.3	No
Chloride	mg/L	P-PL	1180	817	No
Fluoride	mg/L	NP-PL	12.5	< 25 U ⁽³⁾	No
pH, Field-Measured	pH units	P-PL	7.6, 9.3	8.4	No
Sulfate	mg/L	P-PL	1996	1570	No
Total Dissolved Solids	mg/L	P-PL	5468	4750 H	No

Notes:

NL: Statistical limit was not calculated for analytes for which the Sen's Slope methodology was selected

P-PL: Parametric Prediction Limit

NP-PL: Non-parametric Prediction Limit

mg/L: milligrams per liter

Non-detects are reported as less than the practical quantitation limit

B: Analyte was detected between the method detection limit and the practical quantitation limit

U: Analyte was not detected above the practical quantitation limit

H: Analyte was analyzed outside of hold time due to laboratory analysis

1) Statistical limits are applicable to the second semi-annual 2023 sampling event. A statistical baseline update was performed following the first semi-annual 2023 sampling event.

2) Baseline data exhibited a statistically significant decreasing trend. Therefore, a trend analysis is used for the determination of SSIs.

3) Result is not considered an SSI because it is a non-detect with a method detection limit of 5 mg/L, which is below the statistical limit.

Figures

P:\IN\TRISTATE GENERATION AND TRANSMISSION\TRISTATE\NUCLA ASH LANDFILL\99_PROJECTS\21453425.003 | File Name: CCR Well Locations-Aerial_Tops_Apr1823.dwg

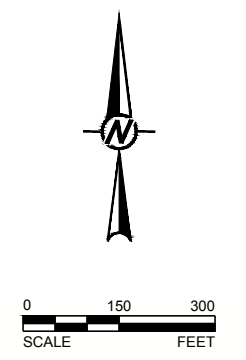


LEGEND

	PROPERTY BOUNDARY
	5990 EXISTING GROUND TOPOGRAPHY (REFERENCE 1)
	MO-1 MONITORING WELL
	5715.6 GROUNDWATER ELEVATION (NOTES 1 AND 2)

- NOTE(S)**
1. THE GROUNDWATER ELEVATION AT MO-1 WAS MEASURED ON MAY 2, 2023. THE GROUNDWATER ELEVATION AT MO-2 WAS MEASURED ON APRIL 20, 2023. THE GROUNDWATER ELEVATIONS AT MO-3, MO-4, AND MO-5 WERE MEASURED ON APRIL 18, 2023.
 2. GROUNDWATER ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.

- REFERENCE(S)**
1. THE EXISTING GROUND TOPOGRAPHY AND AERIAL IMAGE IN THE LANDFILL AREA WERE OBTAINED BY EPP & ASSOCIATES ON MAY 13, 2022.
 2. THE SURROUNDING AERIAL IMAGERY IS FROM THE NATIONAL AGRICULTURAL IMAGERY PROGRAM, UNITED STATES DEPARTMENT OF AGRICULTURE, 2019.



CLIENT		PROJECT	
TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION		NUCLA STATION ASH DISPOSAL FACILITY	
1100 WEST 116TH AVENUE		COAL COMBUSTION RESIDUALS LANDFILL	
WESTMINSTER, COLORADO 80234		ANNUAL GROUNDWATER MONITORING REPORT	
CONSULTANT		YYYY-MM-DD	2023-12-27
	DESIGNED	BJP	
	PREPARED	HNE	
	REVIEWED	SAH	
	APPROVED	JEO	

TITLE	
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS (FIRST SEMI-ANNUAL 2023 SAMPLING EVENT)	
PROJECT NO.	21453425.003

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4S D

P:\IN\TRISTATE GENERATION AND TRANSMISSION\TRISTATE\NUCLA ASH LANDFILL\99_PROJECTS\GL21453425.003 | File Name: CCR Well Locations Aerial Topo_October23.dwg

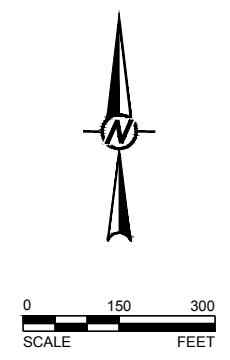


LEGEND

	PROPERTY BOUNDARY
	5990 EXISTING GROUND TOPOGRAPHY (REFERENCE 1)
	MO-1 MONITORING WELL
5715.5	GROUNDWATER ELEVATION (NOTES 1 AND 2)

- NOTE(S)**
1. THE GROUNDWATER ELEVATIONS AT MO-1, MO-2, MO-3, MO-4, AND MO-5 WERE MEASURED ON OCTOBER 17, 2023.
 2. GROUNDWATER ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.

- REFERENCE(S)**
1. THE EXISTING GROUND TOPOGRAPHY AND AERIAL IMAGE IN THE LANDFILL AREA WERE OBTAINED BY EPP & ASSOCIATES ON MAY 13, 2022.
 2. THE SURROUNDING AERIAL IMAGERY IS FROM THE NATIONAL AGRICULTURAL IMAGERY PROGRAM, UNITED STATES DEPARTMENT OF AGRICULTURE, 2019.



CLIENT		PROJECT	
TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION		NUCLA STATION ASH DISPOSAL FACILITY	
1100 WEST 116TH AVENUE		COAL COMBUSTION RESIDUALS LANDFILL	
WESTMINSTER, COLORADO 80234		ANNUAL GROUNDWATER MONITORING REPORT	
CONSULTANT		YYYY-MM-DD	2023-12-27
	DESIGNED	BJP	
	PREPARED	HNE	
	REVIEWED	SAH	
	APPROVED	JEO	

TITLE		PROJECT NO.	REV.	FIGURE
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS (SECOND SEMI-ANNUAL 2023 SAMPLING EVENT)		21453425.003	A	2

1" IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A NS D



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