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2025 Annual Groundwater Monitoring and Corrective Action Report

AVS CCR Landfill
Antelope Valley Station, Beulah, North Dakota

Prepared for
Basin Electric Power Cooperative

Prepared by
Barr Engineering Co.

January 2026

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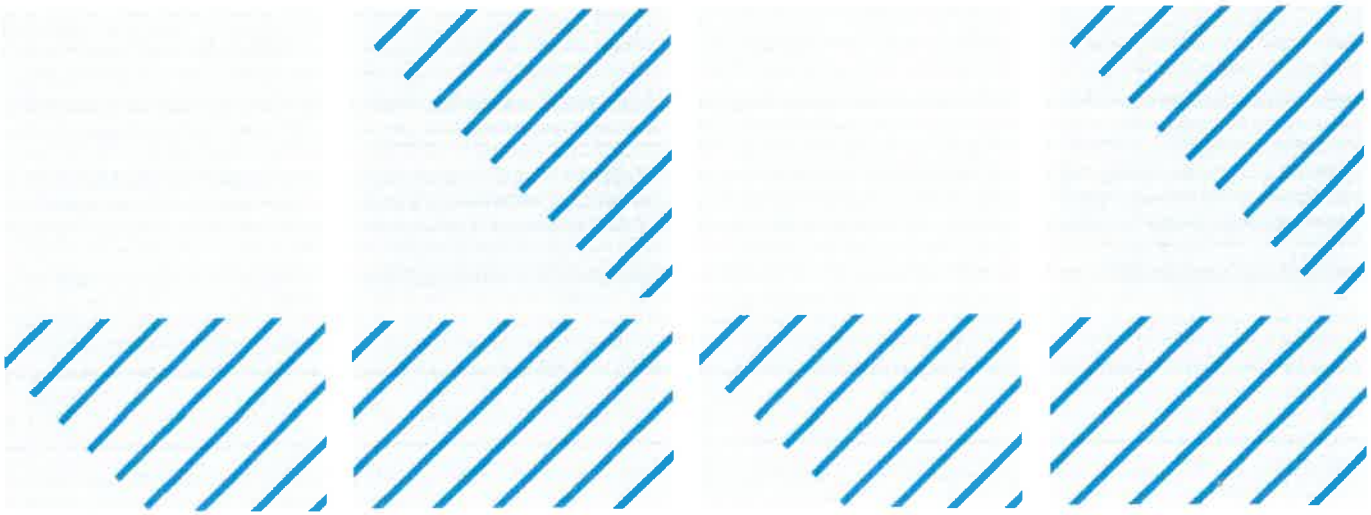

2025 Annual Groundwater Monitoring and Corrective Action Report

January 2026

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Abbreviations

asml	above mean sea level
ASD	Alternative Source Demonstration
AVS	Antelope Valley Station
bgs	below ground surface
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
cm	centimeters
EPA	Environmental Protection Agency
FGD	flue gas desulfurization
ft	feet
NDAC	North Dakota Administrative Code
NDDEQ	North Dakota Department of Environmental Quality
SAP	Sampling and Analysis Plan
sec	second
SSI	Statistically Significant Increase
TDS	Total Dissolved Solids

1 Executive Summary

This 2025 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the Coal Combustion Residuals (CCR) landfill at Basin Electric Power Cooperative's (Basin Electric) Antelope Valley Station (Site). The permitted landfill is the only CCR Unit at this Site. The content of this report is to satisfy the requirements of the federal CCR rule.

In 2018, the CCR Unit began operating under a detection monitoring program as described in 40 CFR § 257.94 and NDAC 33.1-20-08-06-04. At the beginning, end, and throughout 2025, the CCR Unit was operating under a detection monitoring program with semi-annual detection monitoring events conducted in the spring and fall. Landfill expansion required the installation of three additional monitoring wells in September 2020: background well MW-21(S) and downgradient wells MW-22(S) and MW-24(S). In late 2023, three new downgradient landfill expansion wells, MW-25(S), MW-26(S), and MW-27(S), were installed at the Site. In May 2023, CCR waste began being placed into the landfill expansion area. A successful ASD was completed in 2025 for verified SSIs at the end of the 2024 reporting period. During this report timeframe, and pursuant to § 257.94 and NDAC 33.1-20-08-06-04, statistically significant increases (SSIs) were determined for:

- June 2025: chloride at MW-16(S), MW-20(S), MW-24(S), MW-25(S), and MW-26(S) and boron, calcium, chloride, and total dissolved solids (TDS) at MW-27(S)
- October 2025: chloride at MW-16(S), MW-20(S), MW-24(S), and MW-25(S); calcium and chloride at MW-26(S); and boron, calcium, chloride, and TDS at MW-27(S)

Subsequent determinations and actions (if any) will be addressed in the 2026 Annual Report. Successful alternative source demonstrations (ASDs) were completed for the SSIs determined during the October 2024 and June 2025 sampling events. The ASD documentation for SSIs determined for both the fall 2024 and spring 2025 monitoring events are included in this report under Figure 2. An ASD for the October 2025 detection monitoring results is in progress, and results of the ASD are anticipated in 2026. Therefore, no assessment monitoring program (§ 257.95 and NDAC 33.1-20-08-06-04) or related corrective or remedial measures (§§ 257.96, 257.97, and 257.98; NDAC 33.1-20-08-06-06, -07, and -08) were necessary.

2 Introduction

Basin Electric Power Cooperative (Basin Electric) owns and operates Antelope Valley Station (AVS), comprised of a coal-fired generating station consisting of two power generating units, located in Beulah, North Dakota (Figure 1). Unit 1 coal-based operations began in 1984 and Unit 2 operations began in 1986. One coal combustion residual (CCR) unit, as defined by 40 CFR 257.53 and North Dakota Administrative Code (NDAC) 33.1-20-08-01, is located on the property. The landfill (Site or CCR Landfill) was permitted by the North Dakota Department of Environmental Quality (NDDEQ) in 1995 under Permit SP-160 (now designated 0160) and began accepting CCR in 1996. The most recent Permit 0160 was issued by NDDEQ in early 2022, and the most recent cell including a composite liner system and leachate collection system was constructed the same year.

The CCRs including fly ash, bottom ash, and flue gas desulfurization (FGD) waste are managed at the Site along with other minor wastes accepted as per the NDDEQ permit. The CCR unit is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) and the NDDEQ CCR Rule (NDAC Title 33.1, Article 20, Chapter 8).

This Annual Report describes the monitoring program and results for the CCR landfill. No corrective actions were required or conducted in 2025.

Basin Electric utilizes a consulting firm, Barr Engineering Co. (Barr) to assist in groundwater reporting and analysis. Barr is familiar with the Site and installed and certified the most recent added to the network wells (MW-25(S), MW-26(S), and MW-27(S)). Barr has reviewed the historical groundwater data, CCR information for the Site, and is knowledgeable about facility design and operation.

Additional Site monitoring information, including CCR reports and certifications can be found on Basin Electric's CCR website: Section 7 CCR Landfill - AVS - Basin Electric Power Cooperative.

2.1 Physical Setting

The geology underlying the Site includes mine spoils underlain by the Sentinel Butte Formation. This formation is comprised of continental deposits more than 1,000-feet thick, consisting of dense clay, weakly cemented sandstone, mudstone, and lignite beds.

The base of the CCR Landfill is underlain by 115 to 200 feet (approximately) of clay-rich mine spoil that overlies the Lower Sentinel Butte Formation. At the Site, the Sentinel Butte is comprised primarily of dense clay with a trace of very fine sand and lignite beds typically ranging from 6- to 9-feet thick.

The uppermost aquifer is found within the 6- to 9-foot unmined lignite bed, mapped locally as the Spaer Bed or Spaer Lignite, located at depths ranging roughly from 180 to 260 feet below ground surface (ft bgs). The elevation of the Spaer Lignite varies across the Site by approximately 35 feet from 1,844 feet above mean sea level (ft amsl) at MW-18(S) to 1,879 ft amsl at MW-23(S). The potentiometric surface reflects that variation.

Across the southern portions of the landfill, the potentiometric surface generally slopes to the east with groundwater elevations ranging from approximately 1,893 ft amsl on the western side of the CCR Landfill to 1,886 ft amsl on the eastern side. In the northern portion of the landfill, the potentiometric surface generally slopes to the northeast with groundwater elevations ranging from 1,893 ft amsl in the

southwestern corner to 1,864 ft amsl in the northeastern corner. Field hydraulic conductivity measurements from 2017 for the uppermost aquifer range from 1.65 x 10^{-4} centimeters per second (cm/sec) in MW-19(S) to 2.48 x 10^{-9} cm/sec in Well MW-16(S).

Additional Site information can be found on Basin Electric's CCR website in the CCR Groundwater Monitoring System Report (AECOM, October 2017).

2.2 Purpose

As stated in § 257.90(e) and NDAC 33.1-20-08-06-01(e), the Annual Report must:

- Document the status of groundwater monitoring and any corrective action programs for the CCR unit,
- Summarize key actions completed,
- Describe any problems encountered,
- Discuss actions to resolve the problems, and
- Project key activities for the upcoming year.

2.3 CCR Rule Requirements

Additional requirements for the Annual Report, as outlined in § 257.90(e) and NDAC 33.1-20-08-06-01(e), and this Site's compliance with the CCR Rules, are summarized in Table 1.

Table 1 CCR Rule Requirements and Compliance

EPA CCR Rule Reference (40 CFR)	NDDEQ CCR Rule Reference (NDAC)	Content Required in Report	Location
§ 257.90(e)(1)	§ 33.1-20-08-06-01(e)(1)	**Monitoring System Figure:** A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit.	Section 2.1 Groundwater Monitoring System; see 3.2
§ 257.90(e)(2)	§ 33.1-20-08-06-01(e)(2)	**Monitoring System Adjustments**: Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken.	Section 3.1.1 Changes to Groundwater Monitoring System
§ 257.90(e)(3)	§ 33.1-20-08-06-01(e)(3)	**Data and Collection Summary**: In addition to all the monitoring data obtained under § 257.90 through § 257.98 and § 33.1-20-08-06, a summary including the number of groundwater samples that were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs.	Section 3.3 Data and Collection Summary; monitoring data included in Attached Table 1, Attached Table 2, Attached Table 3, Appendix A, and Appendix C

EPA CCR Rule Reference (40 CFR)	NDDEQ CCR Rule Reference (NDAC)	Content Required in Report	Location
§ 257.90(e)(4)	§ 33.1-20-08-06-01(e)(4)	**Monitoring Program**: A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels).	Not applicable – No transition between monitoring programs was necessary
§ 257.90(e)(5)	§ 33.1-20-08-06-01(e)(5)	**Other Information**: Other information required, if applicable, to be included in the annual report as specified in § 257.90 through § 257.98 and § 33.1-20-08-06.	Section 3.2 Actions Completed/Problems Encountered; Appendix B
§ 257.90(e)(6)	N/A	**Executive Summary:** A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit.	Executive Summary

3 Groundwater Monitoring Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR unit in 2025. A description of the groundwater monitoring system is included in Section 3.1, key actions completed and problems encountered are described in Section 3.2, the monitoring and analytical results are described in Section 3.3, and key activities planned for 2025 are described in Section 0.

3.1 Groundwater Monitoring System

The certified groundwater monitoring well network around the CCR unit consists of three background wells and nine downgradient wells, sampled for groundwater analysis on a semi-annual basis as described in Table 2.

Table 2 Groundwater Monitoring System

CCR Unit	Background Wells	Downgradient Wells
Active Landfill	MW-18(S), MW-19(S)	MW-15(S), MW-16(S), MW-17(S), MW-20(S)
Landfill Expansion Area	MW-21(S)	MW-22(S), MW-24(S), MW-25(S), MW-26(S), MW-27(S)

The wells monitor the uppermost aquifer underlying the CCR unit in the lignite bed mapped locally as the Spaer Bed or the Spaer Lignite, within the Sentinel Butte Formation approximately 180 to 260 ft bgs. Well locations are shown on Figure 2. Monitoring wells MW-21(S), MW-22(S), MW-23(S), and MW-24(S) were installed in September 2020 in advance of northward landfill expansion to be used as background and downgradient monitoring wells. Wells MW-25(S), MW-26(S), and MW-27(S) were installed in late-2023 to provide enhanced downgradient coverage for the future expansion area. Background wells monitor background water quality that is not potentially influenced by the presence of the CCR unit.

Two monitoring wells, MW-14(S) and MW-23(S) have been historically excluded from the groundwater monitoring network due to insufficient water production. The wells remain in place for optional collection of groundwater level measurements for potential inclusion in the potentiometric evaluation of the Site.

Baseline monitoring was initiated in August 2016 for wells in the pre-expansion portion of the monitoring network and included sampling groundwater over ten baseline monitoring events. Baseline monitoring for wells MW-21(S), MW-22(S), MW-23(S), and MW-24(S) began in the spring of 2021 and continued through 2022. These wells were added to the well network in May 2023. The results of baseline monitoring are discussed in previous Annual Reports.

Detection monitoring events in and prior to 2025 were performed in general accordance with procedures established in the site-specific Sampling and Analysis Plan (SAP) (AECOM, January 2018), which is included in the facility's Operating Record. The CCR Landfill was placed in Detection monitoring in October 2017, with the first Detection monitoring groundwater sampling event completed in April 2018. Detection monitoring events have been completed semi-annually since April 2018. The results of previous Detection monitoring events were presented and discussed in the previous Annual Reports, which can be found on Basin Electric's CCR website.

3.1.1 Changes to Groundwater Monitoring System

Monitoring locations MW-25(S), MW-26(S), and MW-27(S) were added to the monitoring network in late 2023 in anticipation of waste placement in the landfill expansion area. Baseline monitoring and inclusion in detection monitoring began in June 2024 and will continue until at least eight samples have been collected. Baseline sampling results are included in Appendix D. The system described in Section 3.1 and shown on Figure 2 are described in the Groundwater Monitoring System Certification (Barr Engineering Co. (Barr), June 2024).

3.2 Actions Completed/Problems Encountered

The following actions were completed in 2025:

- **Baseline Sampling:** Baseline Groundwater samples were collected at MW-25(S), MW-26(S), and MW-27(S) in June and October 2025 (Appendix D).
- **Detection Monitoring Sampling:** Groundwater samples were collected from each well in the groundwater monitoring system on June 10-11 and 17-18, 2025 and August 26, October 7-8, 2025. Groundwater samples were analyzed for Appendix III constituents, per the detection monitoring program of the CCR Rules (§ 257.94 and NDAC 33.1-20-08-06-04) (Attached Table 1).
- **SSI Evaluation:** SSI evaluations were conducted in accordance with the Groundwater Statistical Method Selection Certification (AECOM, 2017) for the June 2025 and October 2025 detection monitoring events. Both detection monitoring events resulted in verified SSIs (Attached Table 2).
- **Alternative Source Demonstration (ASD):** ASDs were conducted on the verified SSIs for the October 2024 and June 2025 detection monitoring events. The October 2024 SSIs were identified in the 2024 Annual Report (Barr Engineering Co. (Barr), January 2025). Both ASDs demonstrated an alternative source, as allowed by the CCR Rules (§ 257.94(e)(2) and NDAC 33.1-20-08-06-04(e)(2)). An ASD for the October 2025 detection monitoring event is in progress and will be completed within 90 days of the SSI determination. More details are provided in Section 3.3. Subsequent determinations and actions (if any) will be addressed in the 2026 Annual Report.

Problems encountered in 2025:

- The water levels and field turbidity for samples collected at MW-27(S) suggest the well was screened in a low yielding interval of the uppermost aquifer. Groundwater may not fully recharge for the Site's semi-annual sampling frequency.

3.3 Data and Collection Summary

3.3.1 June 2025 Detection Monitoring Event

Groundwater samples were collected from the twelve groundwater monitoring network wells at the Site on June 10-11 and 17-18, 2025. Nine SSIs (chloride at MW-16(S), MW-20(S), MW-24(S), MW-25(S), MW-26(S) and boron, calcium, chloride, and total dissolved solids (TDS) at MW-27(S)) were identified. No verification resampling was performed. A summary of results is included in Attached Table 3. Field data sheets and analytical laboratory reports for detection monitoring sampling are included in Appendix A. Water level contours are shown on Figure 3, and flow calculations are included in Appendix C.

An ASD was conducted on the verified SSIs and was able to successfully demonstrate that a natural variation in groundwater quality and/or "a source other than the CCR unit" and/or statistical methods and/or sampling methods resulted in the SSIs, as allowed by § 257.94(e)(2) and NDAC 33.1-20-08-06-04(e)(2). The Alternative Source Demonstration: June 2025 Event Report is included in Appendix B.

3.3.2 October 2025 Detection Monitoring Event

Groundwater samples were collected from the twelve groundwater monitoring network wells at the Site on August 26 and October 7-8, 2025. Ten SSIs (chloride at MW-16(S), MW-20(S), MW-24(S), MW-25(S); calcium and chloride at MW-26(S); and boron, calcium, chloride, and TDS at MW-27(S)) were identified. No verification resampling was performed. A summary of results is included in Attached Table 3. Field data sheets and analytical laboratory reports for detection monitoring sampling are included in Appendix A. Water level contours are shown on Figure 4, and flow calculations are included in Appendix C.

An ASD was ongoing at the beginning of 2026. If the ASD is not successful, appropriate actions will be initiated per the CCR Rule as applicable.

3.4 Activities for Upcoming Year

The following key activities for analytical results and statistical evaluations are planned for 2026:

- Complete the ASD or assessment monitoring determination for the October 2025 detection monitoring event in accordance with the Statistical Certification (AECOM, October 2017).
- Evaluate analytical results from 2026 semi-annual detection monitoring events for SSIs according to the Statistical Certification (AECOM, October 2017).
- Continue baseline sample collection at MW-25(S), MW-26(S), and MW-27(S) until eight baseline samples have been collected.
- Evaluate sampling frequency and recharge rates at MW-27(S).
- Review the conceptual site model and consider recommendations for improvements to the monitoring well network if needed.

4 References

AECOM. (January 2018). *Sampling and Analysis Plan, CCR Monitoring Program, Antelope Valley Station. Prepared for Basin Electric Power Cooperative.* .

AECOM. (October 2017). *CCR Groundwater Monitoring System Report, Antelope Valley Station. Prepared for Basin Electric Power Cooperative.* .

Barr Engineering Co. (Barr). (January 2025). *2024 Annual Groundwater Monitoring and Corrective Action Report: AVS CCR Landfill.*

Barr Engineering Co. (Barr). (June 2024). *Groundwater Monitoring System Certification, Antelope Valley Station Landfill. Prepared for Basin Electric Power Cooperative.* .

Attached Tables

Attached Table 1
Sampling Summary
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

Event Classification and Number	Monitoring Well	Up or Down Gradient	Event date	No. Samples
Detection Monitoring Event #1	MW-15S	Down	6/10/2025	1
Detection Monitoring Event #1	MW-16S	Down	6/11/2025	1
Detection Monitoring Event #1	MW-17S	Down	6/18/2025	1
Detection Monitoring Event #1	MW-18S	Up	6/17/2025	1
Detection Monitoring Event #1	MW-19S	Up	6/19/2025	2
Detection Monitoring Event #1	MW-20S	Down	6/10/2025	1
Detection Monitoring Event #1	MW-21S	Up	6/18/2025	1
Detection Monitoring Event #1	MW-22S	Down	6/11/2025	2
Detection Monitoring Event #1	MW-24S	Down	6/17/2025	1
Detection Monitoring Event #1	MW-25S	Down	6/11/2025	1
Detection Monitoring Event #1	MW-26S	Down	6/11/2025	1
Detection Monitoring Event #1	MW-27S	Down	6/17/2025	1
Detection Monitoring Event #2	MW-15S	Down	10/7/2025	1
Detection Monitoring Event #2	MW-16S	Down	10/8/2025	1
Detection Monitoring Event #2	MW-17S	Down	10/8/2025	1
Detection Monitoring Event #2	MW-18S	Up	8/26/2025	1
Detection Monitoring Event #2	MW-19S	Up	8/26/2025	2
Detection Monitoring Event #2	MW-20S	Down	10/7/2025	1
Detection Monitoring Event #2	MW-21S	Up	8/26/2025	1
Detection Monitoring Event #2	MW-22S	Down	10/8/2025	2
Detection Monitoring Event #2	MW-24S	Down	10/8/2025	1
Detection Monitoring Event #2	MW-25S	Down	10/8/2025	1
Detection Monitoring Event #2	MW-26S	Down	10/8/2025	1
Detection Monitoring Event #2	MW-27S	Down	10/8/2025	1

Attached Table 2
Statistical Evaluation Summary
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

Spring 2025

	Appendix III Constituents						
Well	**Boron (T)**	**Calcium (T)**	**Chloride**	**Fluoride**	**pH**	**Sulfate**	**TDS**
MW-15(S)	0.12	3.79	13.2	1.32	8.0	356	1,910
MW-16(S)	0.14	5.41	26.2	2.04	8.1	107	1,200
MW-17(S)	0.12	4.05	13	1.63	7.9	293	1,740
MW-20(S)	0.12	4.65	24.6	1.16	8.0	56.1	1,760
MW-22(S)	0.12	2.49	11.1	1.75	8.1	193	1,650
MW-24(S)	0.11	4.35	49.6	1.56	8.1	62.4	1,950
MW-25(S)	0.12	4.01	39.6	1.26	8.2	29.8	1,910
MW-26(S)	0.13	11	30.6	1.28	8.1	75.9	1,820
MW-27(S)	0.68	419	64.9	1.41	8.1	230	2,500

Fall 2025

	Appendix III Constituents						
Well	**Boron (T)**	**Calcium (T)**	**Chloride**	**Fluoride**	**pH**	**Sulfate**	**TDS**
MW-15(S)	0.11	3.93	13.1	1.4	8.1	486	1,930
MW-16(S)	0.15	3.71	32.6	2.37	8.2	125	1,150
MW-17(S)	0.12	3.72	13.6	1.48	8.0	300	1,740
MW-20(S)	0.13	6.19	25.6	1.2	8.0	74.8	1,800
MW-22(S)	0.12	2.56	11.4	1.84	8.2	234	1,610
MW-24(S)	0.1	4.54	49.7	1.61	8.1	52.6	2,040
MW-25(S)	0.14	4.56	40.4	1.42	8.2	36	1,940
MW-26(S)	0.12	17.3	31.5	1.36	8.1	120	1,870
MW-27(S)	0.21	58.1	65.0	1.48	8.0	141	2,370

Sample had a value higher than the prediction limit determined from background data and is a verified SSI

Sample did not have a value higher than the prediction limit determined from background data

pH: two-sided prediction limit; color indicates sample higher and/or lower than prediction limits

No data at MW-14(S) and MW-23(S) as they have been historically dry

Attached Table 3
Water Quality Analytical Data Summary
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

	Location	MW-15S	MW-15S	MW-16S	MW-16S	MW-17S	MW-17S	MW-18S	MW-18S	MW-19S		MW-19S		MW-20S	MW-20S	MW-21S	MW-21S	MW-22S	
	Date	6/10/2025	10/07/2025	6/11/2025	10/08/2025	6/18/2025	10/08/2025	6/17/2025	8/26/2025	6/18/2025		8/26/2025		6/10/2025	10/07/2025	6/18/2025	8/26/2025	6/11/2025	
	Sample Type	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	FD
Parameter	Analysis Location	Units																	
Appendix III																			
Boron, total	Lab	mg/l	0.12	0.11	0.14	0.15	0.12	0.12	0.10	< 0.1 U	0.13	0.13	0.12	0.12	0.12	0.13	0.12	0.11	0.12	0.12
Calcium, total	Lab	mg/l	3.79	3.93	5.41	3.71	4.05	3.72	4.43	4.29	4.30	4.30	4.17	4.14	4.65	6.19	4.54	4.16	2.49	2.38
Chloride	Lab	mg/l	13.2	13.1	26.2	32.6	13.0	13.6	8.5	8.7	18.5	18.7	18.8	18.9	24.6	25.6	18.0	18.0	11.1	11.1
Fluoride	Lab	mg/l	1.32	1.40	2.04	2.37	1.63	1.48	1.32	1.23	0.77	0.73	0.66	0.68	1.16	1.20	1.65	1.53	1.75	1.65
pH	Field	pH units	8.01	8.06	8.08	8.21	7.91	8.02	9.36	9.30	8.01	--	8.01	--	8.02	7.97	7.88	7.89	8.14	--
Solids, total dissolved	Lab	mg/l	1910	1930	1200	1150	1740	1740	1780	1860	2180	2190	2170	2170	1760	1800	2030	1990	1650	1670
Sulfate, as SO4	Lab	mg/l	356	486	107	125	293	300	555	596	696	738	765	749	56.1	74.8	401	403	193	171

-- Not analyzed/Not available.
N Sample Type: Normal
FD: Sample Type: Field Duplicate
U: The analyte was analyzed for, but was not detected.

Figures

Permit Boundary

Railroad

N

0 2,500 5,000

Feet

Imagery: USDA-NAIP, 2024

Site Location
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 1

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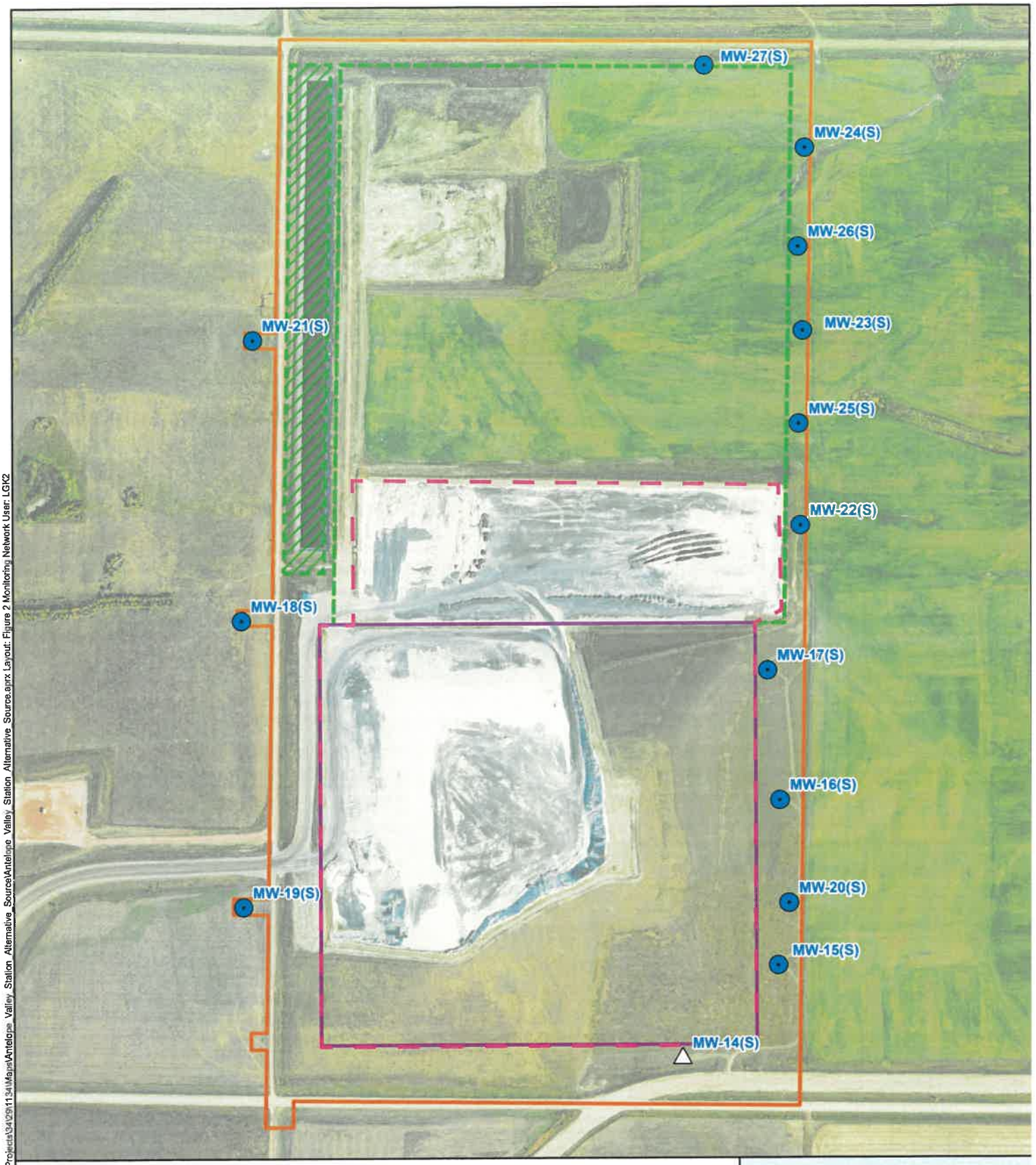
Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11\34\Maps\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 1 Site Location Map User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)

N

0 300 600
Feet

Imagery: USDA-NAIP, 2024

Monitoring Network
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 2

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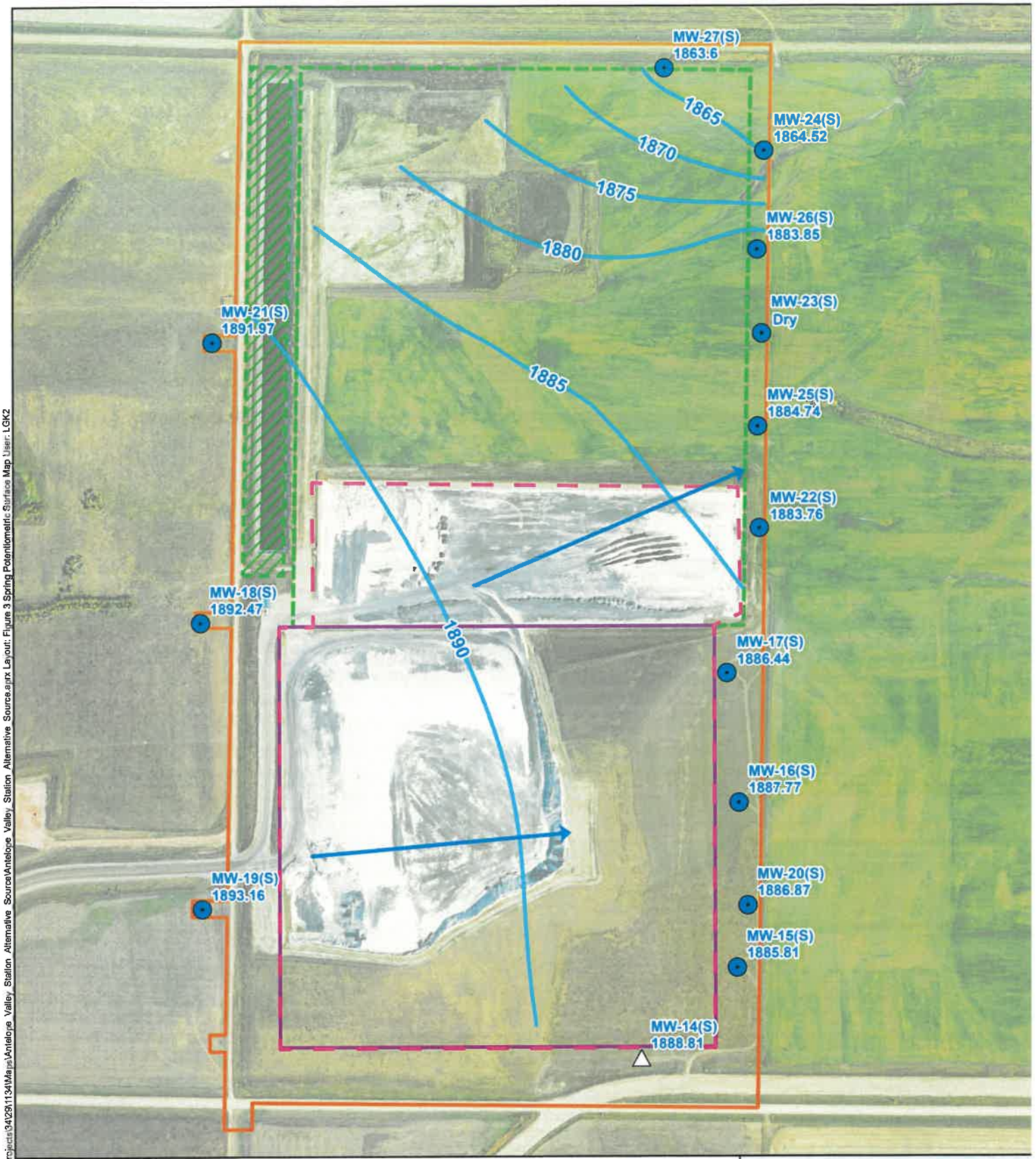
Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11\34\Maps\Antelope_Valley_Station_Alternative_Source\Antelope_Valley_Station_Alternative_Source.aprx Layout: Figure 2 Monitoring Network User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)
Groundwater Contours
Flow Direction

N

0 300 600
Feet

Imagery: USDA-NAIP, 2024

Spring 2025 Potentiometric Surface
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 3

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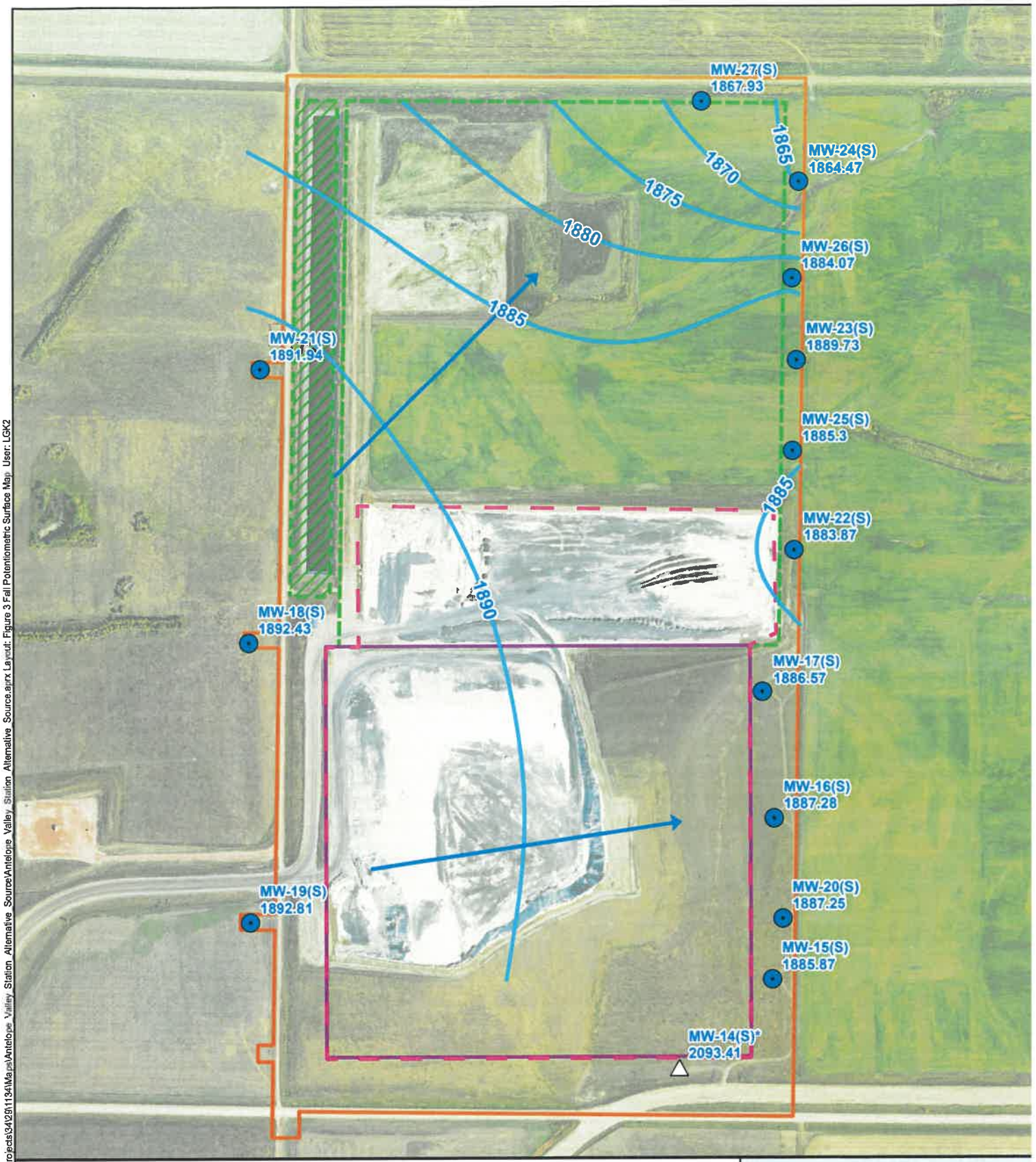
Barr Footer: ArcGISPro 3.5.3, 2025-11-25 09:57 File: I:\Projects\34\29\11\34\Maps\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 3 Spring Potentiometric Surface Map User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)
Flow Direction
Groundwater Contour

N

0 300 600
Feet

Imagery: USDA-NAIP, 2024

Fall 2025 Potentiometric Surface
Antelope Valley Station
2025 Annual Monitoring Report
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 4

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Barr Footer: ArcGISPro 3.5.3, 2025-11-18 18:22 File: I:\Projects\34\28\11\34\Maps\Antelope_Valley_Station_Alternative_Source\Antelope_Valley_Station_Alternative_Source.aprx Layout: Figure 3 Fall Potentiometric Surface Map User: LGK2

Appendices

Appendix A

Lab and Field Reports

Appendix B

Alternative Source Demonstrations

Technical Memorandum

To: Mark Dihle, Basin Electric Power Cooperative
From: Barr Engineering Co.
Subject: Alternative Source Demonstration (ASD), Antelope Valley Station (Fall 2024)
Date: March 28, 2025
Project: 34291134.00

1 Introduction

Basin Electric Power Cooperative (Basin Electric) owns and operates Antelope Valley Station (AVS), comprised of a coal-fired generating station consisting of two power generating units, located in Beulah, North Dakota (Figure 1). Unit 1 coal-based operations began in 1984, and Unit 2 operations began in 1986. The landfill (Site or CCR Landfill) was permitted by the North Dakota Department of Environmental Quality (NDDEQ) in 1995 under Permit SP-160 (now designated 0160) and began accepting coal combustion residuals (CCR) in 1996. The most recent Permit 0160 was issued by NDDEQ in early 2022, and the most recent cell including a composite liner system and leachate collection system was constructed the same year. Basin Electric utilizes a consulting firm, Barr Engineering Co. (Barr) to assist in groundwater reporting and analysis. Barr is familiar with the site and installed and certified the most recent wells (MW-25S, MW-26S, and MW-27S) added to the network. Barr has reviewed the historical groundwater data and CCR information for the site and is knowledgeable about facility design and operation.

The CCRs including fly ash, bottom ash, and flue gas desulfurization (FGD) waste are managed at the Site along with other minor wastes accepted as per the NDDEQ permit. The CCR unit is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) and the NDDEQ CCR Rule (NDAC Title 33.1, Article 20, Chapter 8).

Basin Electric has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261) for the Site. As part of the Detection Monitoring Program, statistically significant increases (SSIs) in monitored groundwater quality parameters over background were identified at the Site for the following monitoring wells during semi-annual detection monitoring completed in the fall of 2024 on October 1-2 and 8, 2024:

- MW-16S – Chloride
- MW-20S – Chloride
- MW-24S – Chloride
- MW-25S – Chloride
- MW-26S – Chloride
- MW-27S – Boron, calcium, and chloride

The CCR Rule (US EPA, 2015) § 257.94(e)(2) allows for an alternative source demonstration (ASD) in the event of an identified SSI in a water quality parameter in a downgradient monitoring well over background levels:

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.*

The purpose of this work is to evaluate the data collected as part of the October 2024 monitoring event, along with historical data, to demonstrate if the SSIs are the results of a "source other than the CCR unit" or due to natural variation in groundwater quality or an error in sampling, analysis, or statistical evaluation. Nothing in the foregoing citation of the rule requires that the owner/operator disprove any and all potential counterarguments that EPA or others may offer to refute this demonstration. Such arguments if valid, would need to follow requirements of the rule to show a basis in fact that includes rule requirements that are based on site-specific information, and must be certified by a North Dakota licensed professional engineer. This memorandum provides a science-based reason for the data results that indicate a source other than the CCR unit.

This memorandum provides written documentation of an Alternative Source Demonstration (ASD) and certification of accuracy as described in the CCR Rule (§ 257.94(e)(2)).

1.1 Background Information

Figure 1 shows the site location and Figure 2 provides well locations. A piezometric surface map showing groundwater elevations in the lignite, which represent the uppermost aquifer in the vicinity of the CCR landfill, is presented on Figure 3, using measurements from October 2024. Groundwater generally flows from southwest to northeast.

In late 2023, three new landfill expansion wells, MW-25S, MW-26S, and MW-27S, were installed at the Site. Baseline sampling was initiated in June 2024, and these wells were first evaluated in the detection monitoring program in June 2024. There is limited data at these locations for historical comparison.

A comparison of the detection monitoring groundwater results with the prediction limits calculated using the 2016-2023 background assessment data from upgradient wells MW-18S, MW-19S, and MW-21S are included in Table 1. Concentrations for Appendix III parameters observed in October 2024 are shown on time series graphs in Attachment A. Chloride concentrations at MW-16S, MW-20S, and MW-24S are consistent with those observed during baseline monitoring events. Baseline monitoring for MW-25S, MW-26S, and MW-27S is ongoing.

Table 1 SSIs Compared to Prediction Limits

Event	Well	Parameter (units)	Measured	Interwell Prediction Limit
Detection Monitoring – 2024 #2 (Fall)	MW-16S	Chloride (mg/L)	26.0	18.7
	MW-20S	Chloride (mg/L)	25.8	18.7
	MW-24S	Chloride (mg/L)	50.0	18.7
	MW-25S	Chloride (mg/L)	42.3	18.7
	MW-26S	Chloride (mg/L)	29.7	18.7
	MW-27S	Boron (mg/L)	0.40	0.17
	MW-27S	Calcium (mg/L)	206	13.0
	MW-27S	Chloride (mg/L)	62.0	18.7

1.2 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in § 257.95(g) (3):

> *Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must… Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in Appendix III and Appendix IV of this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority.*

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (January 3, 2025) following the review and analysis of the results provided in the final laboratory report which was received on October 18, 2024.

2 Potential Alternative Sources Review

The CCR Rule provides five potential alternative source categories:

1. A source other than the CCR unit
2. Sampling (or sampling equipment) methods

3. Laboratory methods
4. Statistical methods
5. Natural variation in groundwater quality

Site data were evaluated to identify potential causes for chloride concentrations in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S; and boron, calcium, and chloride concentrations in MW-27S exceeding interwell prediction limits. Chloride is naturally occurring and may not necessarily be the result of a release from a CCR unit; therefore, a source other than the CCR unit, natural variation in groundwater quality, and statistical methods were further investigated as part of the ASD. Sampling methods were further investigated for the boron, calcium, and chloride SSIs at MW-27S.

2.1 Travel Time from Source of Release

Monitoring locations MW-24S, MW-25S, MW-26S, and MW-27S were added to the monitoring network in anticipation of waste placement in the landfill expansion area (Figure 3). Waste was first placed in lined Cell 5 in the landfill expansion area in May 2023. Groundwater travel time was considered both vertically as groundwater moves through the unsaturated zone and horizontally as groundwater moves in the saturated zone.

2.1.1 Migration through the liner

Vertical migration of leachate would be controlled by the presence of a driving head on the landfill liner and then migration through the unsaturated zone.

Considering the properties of the CCR materials in landfill, that the design to eliminate head on the liner, and the facility pumping operations have been normal, there is no evidence of any leachate accumulation on the liner. However, landfill leachate depth is limited to 1 foot on the liner by rule in North Dakota. Even if the 60-mil thick synthetic liner were breached (again there is no evidence that this has ever occurred), the underlying 2-foot-thick clay liner was tested and verified to exhibit a vertical permeability of 1×10^{-7} cm/s (2.8×10^{-4} feet/day) or less. Assuming a 1-foot driving head over a 2-foot-thick liner yields a vertical hydraulic gradient of 0.5 ft/ft.

The vertical advective velocity (average linear velocity or seepage velocity) of vertical saturated groundwater flow is calculated using the following equation:

$$v = \left(\frac{Kv}{n_e}\right)\left(\frac{dHv}{dLv}\right)$$

Or, stated in a more compact form:

$v = \frac{Ki}{n_e}$, where K = hydraulic conductivity, i = gradient, and n_e = effective porosity.

Using an effective porosity for clay of 0.40, the above equation yields an advective velocity 3.5×10^{-4} ft/day. Dividing the distance by the velocity yields a travel time of 15.7 years to transit the liner.

2.1.2 Migration through the unsaturated zone

Assuming that the leachate fully breached the liner, the release would then need to transit through the entire unsaturated zone to reach the water table below the facility. Although unsaturated flow can be

complex, its calculation can be greatly simplified by making a conservative assumption that the flow is saturated. This is a conservative assumption because unsaturated flow would be characterized by a wetting front (and possible drying cycles) that would result in much lower velocities (longer travel time) than are estimated by assuming saturated flow.

The geologic cross sections and well logs suggest that the mine spoils and Sentinel Butte Formation are thinnest in the vicinity of MW-23S. Assuming that the base of the landfill is at 2050 feet (MSL), the mine spoils are about 90 feet thick at MW-23S, and the Sentinel Butte is about 80 feet thick above the Spaer Bed.

Geotechnical testing of materials at the site has shown mine spoils exhibit relatively low vertical hydraulic conductivities. The four undisturbed vertical hydraulic conductivity values for the mine spoils were 1.3 x 10^{-7} cm/sec, 4.0 x 10^{-8} cm/sec, 2.8 x 10^{-6} cm/sec, and 5.3 x 10^{-7} cm/sec (Terracon, 2020), which have a geometric mean of 3.0 x 10^{-7} cm/sec.

The maximum gradient possible would be for a constant head of 1-foot above the liner during the entire travel time through the spoils, or (1 ft / 90 ft = 0.011 ft/ft). This is a conservative estimate because it is likely that the gradient would be much lower and that there would be intervals of unsaturated transport beneath the clay liner, which is slower than saturated transport.

Using the moisture contents of the samples in the falling head hydraulic conductivity measurements and a particle specific gravity of 2.72 (Terracon, 2020), the four undisturbed porosity measurements were 0.39, 0.45, 0.43, and 0.43. Lower effective porosity results in higher flow velocity so assuming n_e = 0.39 is a conservative estimate. Using the values described above, groundwater flow velocity (v) = 3.0 x 10^{-7} cm/sec * 0.011 ft/ft / 0.39 = 8.54 x 10^{-9} cm/sec or 0.00088 ft/year. Assuming a thickness of 90 feet, travel time through the mine spoils under the clay liner is 90 ft / 0.0088 ft/year = 10,177 years.

Like the mine spoils, the sediments of the Sentinel Butte Formation are predominately native clay sediments and are expected to have lower K_v values. Five undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the WISCO Landfill (Barr, 2013) were 7.0 x 10^{-9} cm/sec, 1.1 x 10^{-8} cm/sec, 3.5 x10^{-9} cm/sec, 2.5 x 10^{-9} cm/sec, and 6.7 x 10^{-9} cm/sec. Six undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the Minnkota Coal Combustion Residuals Unit (Barr, 2012) were 3.6 x 10^{-8} cm/sec, 5.0 x 10^{-9} cm/sec, 8.8 x 10^{-8} cm/sec, 1.2 x 10^{-8} cm/sec, 1.0 x 10^{-8} cm/sec, and 1.0 x 10^{-9} cm/sec. Together, these eleven values have a geometric mean of 8.0 x 10^{-9} cm/sec.

The gradient is assumed to be a constant head of 1-foot above the liner during the entire travel time through the 80 ft thick Sentinel Butte Formation, or (1 ft / 80 ft = 0.0125 ft/ft). This is a conservative estimate because it excludes the layer of spoils above, which, if factored in, would reduce the gradient and therefore the resulting flow velocity. Using the values described above (K= 8.0 x 10^{-9} cm/sec, i = 0.0125 ft/ft and n_e = 0.39), the vertical flow velocity (v) through the Sentinel Butte Formation is estimated as v = 8.0 x10^{-9} cm/sec * 0.0125 / 0.39 = 2.564 x 10^{-8} cm/sec or 0.00265 ft/year. Given the thickness of the Sentinel Butte Formation overlying the Spaer Bed is approximately 80 feet, travel time is 80 ft / 0.00265 ft/year = 301,552 years.

Conservatively, this scenario is calculated assuming a breach in the geomembrane liner and a continuous 1 foot of head. The estimated minimum travel time for CCR leachate to travel through the unsaturated

zone and reach the Spaer Bed is 311,744 years (15 years for the clay liner, 10,177 years for the mine spoils, and 301,552 years for the Sentinel Butte Formation).

2.1.3 Horizontal Migration in Groundwater

Once a hypothetical release has migrated through the liner and unsaturated zone, it could then reach the water table in the Spaer Lignite seam and eventually reach the detection monitoring well. The velocity of horizontal groundwater flow is calculated using the following equation:

$$v = \left(\frac{K}{n_e}\right)\left(\frac{dH}{dL}\right)$$

The average hydraulic gradient $\left(\frac{dH}{dL}\right)$ between upgradient well MW-18S and downgradient wells in the expansion area (MW-24S, MW-25S, MW-26S, and MW-27S is 0.005 ft/ft based on the October 2024 piezometric surface map. The hydraulic conductivity (K) is 0.234 ft/day and the porosity is 0.185 for the Spaer Lignite according to the Site's CCR Groundwater Monitoring System Report (AECOM, 2017). Using this information in the above equation, groundwater velocity for the wells in the expansion area is 2.45 ft/year.

Since the waste was placed in the lined landfill expansion cell (300 ft to the closest well MW-25S) only a year and a half prior to the fall 2024 detection monitoring event, it is not plausible for any leachate to reach the monitoring wells.

Using a groundwater velocity of 2.45 ft/year, it would take approximately 122 years for a release to reach MW-24S, MW-25S, MW-26S, or MW-27S. CCR placement in the Landfill began in 1996 and the Landfill Expansion Area in 2023. Therefore, the elevated chloride at MW-24S, MW-25S, MW-26S, and MW-27S and elevated boron and calcium at MW-27S cannot be from the CCR unit.

Since the waste was placed in the lined landfill area started in 1996 or about 29 years ago, it is not plausible for any leachate to reach the monitoring wells given these conservative assumptions. If the distances used to calculate travel time are measured from the existing waste limit, the shortest flow path to MW-25S (located closest to the existing landfill boundary) is approximately 1170 feet downgradient. It would take approximately 477 years for leachate from the existing landfill to reach MW-25S and even longer for leachate to reach MW-27S, which is farthest from the CCR waste (approximately 2800 feet).

Assuming that some unidentified preferential flow pathway were to exist, it would have to result in an over four order of magnitude (10,000x) increase in flow rate (or some combination of rate, gradient, or porosity) to allow for a release to reach the boundary. Even in this extreme case, it would still take hundreds of years to reach the downgradient boundary. Such flow rates are not reasonably likely given the construction quality control on the liner, the thickness of the spoils, and the fine-grained nature of the geology and spoils

The long time of travel supports the hypothesis that the CCR unit is not the source of the chloride observed at MW-24S, MW-25S, and MW-26S; and boron, chloride, and calcium at MW-27S.

2.2 Natural Variability in Groundwater

Site specific chloride values are variable at the site and range from 7.84 to 16.0 mg/L at downgradient wells other than those with chloride SSIs in fall 2024 (MW-15S, MW-17S, and MW-22S) from 2016 to 2024. Chloride at upgradient wells (MW-18S, MW-19S, and MW-21S) ranged from 4.38 to 19.4 mg/L as shown on time series graphs in Attachment A.

Further evaluation of sulfate concentrations, which are a principal indicator of a CCR unit release to groundwater, demonstrate that MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S are not impacted by a release from the CCR landfill. Sulfate concentrations during the October 2024 sampling event at these locations ranged from 6.83 mg/L to 131 mg/L. The sulfate concentrations at the upgradient Landfill monitoring locations (MW-18S, MW-19S, and MW-21S) were higher and ranged from 263 to 892 mg/L from 2016 to 2024. At downgradient wells other than those with SSIs (MW-15S, MW-17S, and MW-22S), sulfate concentrations were higher and ranged from 183 to 442 mg/L from 2016 to 2024. Sulfate at MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S is much lower than both upgradient and downgradient monitoring locations.

Although MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S have elevated chloride concentrations compared to upgradient wells, sulfate concentrations are lower compared to the rest of the monitoring locations. The low sulfate at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S suggests that the chloride is unlikely to come from a CCR unit release because groundwater impacted by a release should have elevated concentrations of multiple Appendix III parameters.

Site specific historical groundwater samples have been collected from ten wells also screened in the Spaer Bed to the north and east of the landfill. These wells were installed and sampled in support of a groundwater monitoring program associated with the adjacent surface mine prior to development of the CCR landfill. Chloride concentrations within the Spaer Bed are variable ranging from 5.7 to 59 mg/L. Chloride concentrations at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S (25.8 to 50.0 mg/L) fall within the site-specific background water quality.

Therefore, because other indicators of the CCR unit release are absent and background chloride concentrations are variable within the Spaer Bed, we reject the hypothesis that the CCR unit is the source of the chloride observed at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S.

2.3 Statistical Methods

Interwell prediction limits are currently used to evaluate for SSIs. Interwell prediction limits are valid for the site if the stationarity of the mean and variance are assumed to be constant between upgradient monitoring wells MW-18S, MW-19S, and MW-21S and the downgradient wells (USEPA, 2009). The upgradient monitoring wells are not directly downgradient of a CCR unit (Figure 3). According to the EPA Unified Guidance (USEPA, 2009; page 6-31), interwell tests alone may not be suitable for sites with non-stationarity of distribution mean and variance. Non-stationarity may be expected due to historical mining activities and due to heterogeneity within the lignite documented at the Site.

Therefore, intrawell limits are also valid per the guidance. As shown in Table 2 below, using intrawell prediction limit methods indicates there are no SSIs for chloride at MW-16S, MW-20S and MW-24S (Attachment B). Using a combination of interwell and intrawell methods at the site would account for site

specific heterogeneity and historical conditions and would eliminate the SSI determination at MW-20S and MW-24S.

Table 2 SSIs Compared to Intrawell Prediction Limits

Event	Well	Parameter (units)	Measured	Intrawell Prediction Limit
Detection Monitoring – 2024 #2 (Fall)	MW-16S	Chloride (mg/L)	26.0	29.7
	MW-20S	Chloride (mg/L)	25.8	31.0
	MW-24S	Chloride (mg/L)	50.0	59.4

Intrawell methods cannot be used at MW-25S, MW-26S, and MW-27S until at least 8 baseline samples have been collected.

2.4 Trend Testing

If a release from the landfill were occurring, it is likely that the increase in mass to the flow system would cause a change in the chemical equilibrium of the flow system that would reflect changes in concentration overtime. Therefore, if the concentrations of chloride at MW-16S, MW-20S, and MW-24S were due to a release from the landfill there should be evidence of a statistically significant increasing trend.

As shown in Attachment B, each of the data sets were tested for trends using the Mann-Kendall method and no significant trend for chloride were observed at MW-16S, MW-20S, or MW-24S.

This leads to the conclusion that there is no release related to the observed concentrations of chloride at MW-16S, MW-20S, and MW-24S.

2.5 Well Sampling and Development at MW-27S

Monitoring well MW-27S was installed in November 2023, and well development was attempted in April 2024. Approximately one well volume (~4 gallons) was purged during development before the well went dry. It is unlikely that the well was completely developed after this first attempt. The well will need to recharge and be purged multiple times in order to achieve full development.

Based on field notes, low-flow sampling methods were not used during sample collection at MW-27S during the October 2024 detection monitoring event. Specifically, the well was not purged and allowed to stabilize prior to sample collection, instead a hydrasleeve was used to collect the sample due to slow groundwater recharge times.

The preamble to the CCR Rule (VI(K)(3)) notes that "Groundwater sampling should be conducted utilizing EPA protocol low stress (low-flow) purging and sampling methodology, including measurement and stabilization of key indicator parameters prior to sampling." Well stabilization is conducted prior to groundwater sampling in order to obtain a sample representative of aquifer conditions. Properly constructed and developed groundwater monitoring wells allow for the collection of representative samples with low turbidity (U.S. EPA, 1986, 1992). However, even correctly installed wells can produce turbid samples in certain geologic materials. Thus, purging and stabilization are necessary to yield reproducible sampling results. Due to limited recharge, monitoring well MW-27S was not sufficiently

purged and did not stabilize during the fall 2024 sampling. Field notes from well development are included in Attachment C.

Monitoring well MW-27S has been documented as being slow to recharge (Barr, 2024). Obtaining sufficient groundwater volume for analysis at MW-27S has proven challenging. As a result, the sample sent for laboratory chemical analysis in fall 2024 consisted of the initial draw of water from the well without stabilization. Turbidity readings were too high for the meter and the sample color was described as black, yielding a sample with a high concentration of suspended solids, which may not be representative of typical aquifer conditions. Therefore, the SSI could also be attributed to sampling error.

The CCR Rule requires measurement of "total recoverable metals" because suspended and colloidal particles can also be a means of transport for contaminants. However, the suspended solids responsible for the boron, calcium, and chloride SSIs at monitoring well MW-27S are believed to be natural aquifer material and not mobilized CCR contaminants.

Therefore, due to slow recharge times preventing full development and the well to be purged before sampling, the sample collected from MW-27S is not representative of aquifer conditions and is not a representative sample.

3 Conclusion

An alternative source demonstration for chloride at this site is supported by the following lines of evidence:

- Based on groundwater flow velocities and timing of CCR placement, the elevated chloride (and boron, calcium, and chloride at MW-27S) concentrations could not have come from the CCR unit.
- Chloride in groundwater is variable across the site. While there are somewhat elevated concentrations of chloride in many downgradient wells, there are low sulfate concentrations. Only this single detection monitoring parameter indicated an SSI in several monitoring wells. There is a relative absence of sulfate, a primary indicator of a release, in the groundwater as compared to the presence of sulfate in the water within the upgradient monitoring wells and the downgradient wells with lower chloride. Groundwater chemistry in the expansion area wells is both chemically distinct from the other monitoring wells (background and downgradient) at the CCR unit and chemically distinct from the character of the CCR unit.
- Intrawell statistical methods did not result in SSIs for chloride at MW-16S, MW-20S, and MW-24S. There are not enough baseline samples at MW-25S, MW-26S, and MW-27S for intrawell analyses.
- Well sampling and development limitations due to slow groundwater recharge resulted in high turbidity and the SSIs for boron, calcium, chloride, and TDS at MW-27S.

As this report demonstrates, the SSI analysis presented in Table 1 for monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S is attributed to a source other than the CCR Unit for chloride in the groundwater. The SSI analysis for boron, calcium, and chloride at MW-27S is attributed to sampling techniques due to non-representative aquifer conditions from slow groundwater recharge rates.

Future monitoring data will add to our understanding of the site and the results are expected to augment this ASD and conclusions.

4 References

AECOM, 2024. 2023 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2024.

Barr, 2012. Letter to Minnkota Power Cooperative, Inc., Regarding Cells 4, 5, and 6 Drilling Report. May 17, 2012.

Barr, 2013. Site Characterization Investigation Report and Environmental System Plan, WISCO Oilfield Special Waste Landfill, Williston, North Dakota. February 2013.

Barr, 2024. Coal Combustion Residuals Landfill Groundwater Monitoring Well Network Certification, Antelope Valley Station Landfill. June 2024.

Barr, 2025. 2024 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2025.

Terracon, 2020. Tests of Soils – Permeability, AVS Landfill Expansion, October 12, 2020.

United States Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. March 2009.

5 Certification

I certify that the written demonstration provided (above) for chloride in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S and boron and calcium in MW-27S is supported by the data, accurate, and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§ 257.94(e)(2)). I further certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of North Dakota.

Kevin Solie, P.E.
ND P.E. License No. 9488
Barr Engineering Company

Dated this 28th day of March 2025

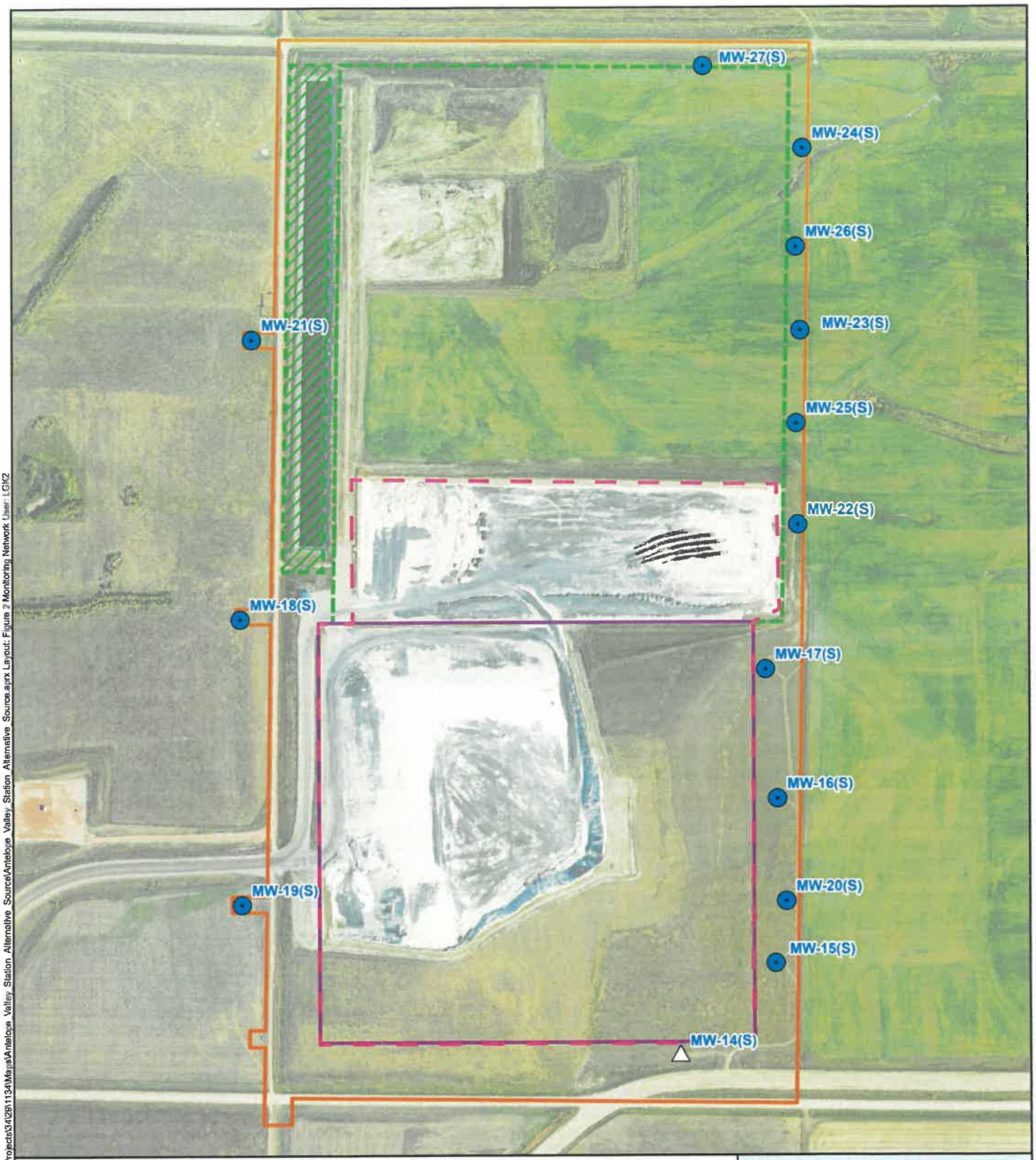
Figures

Site Location
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 1

BARR

Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\342811341\Maps\Antelope_Valley_Station_Alternative_Source\Antelope_Valley_Station_Alternative_Source.aprx Layout: Figure 1 Site Location Map User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)

N

0 300 600
Feet

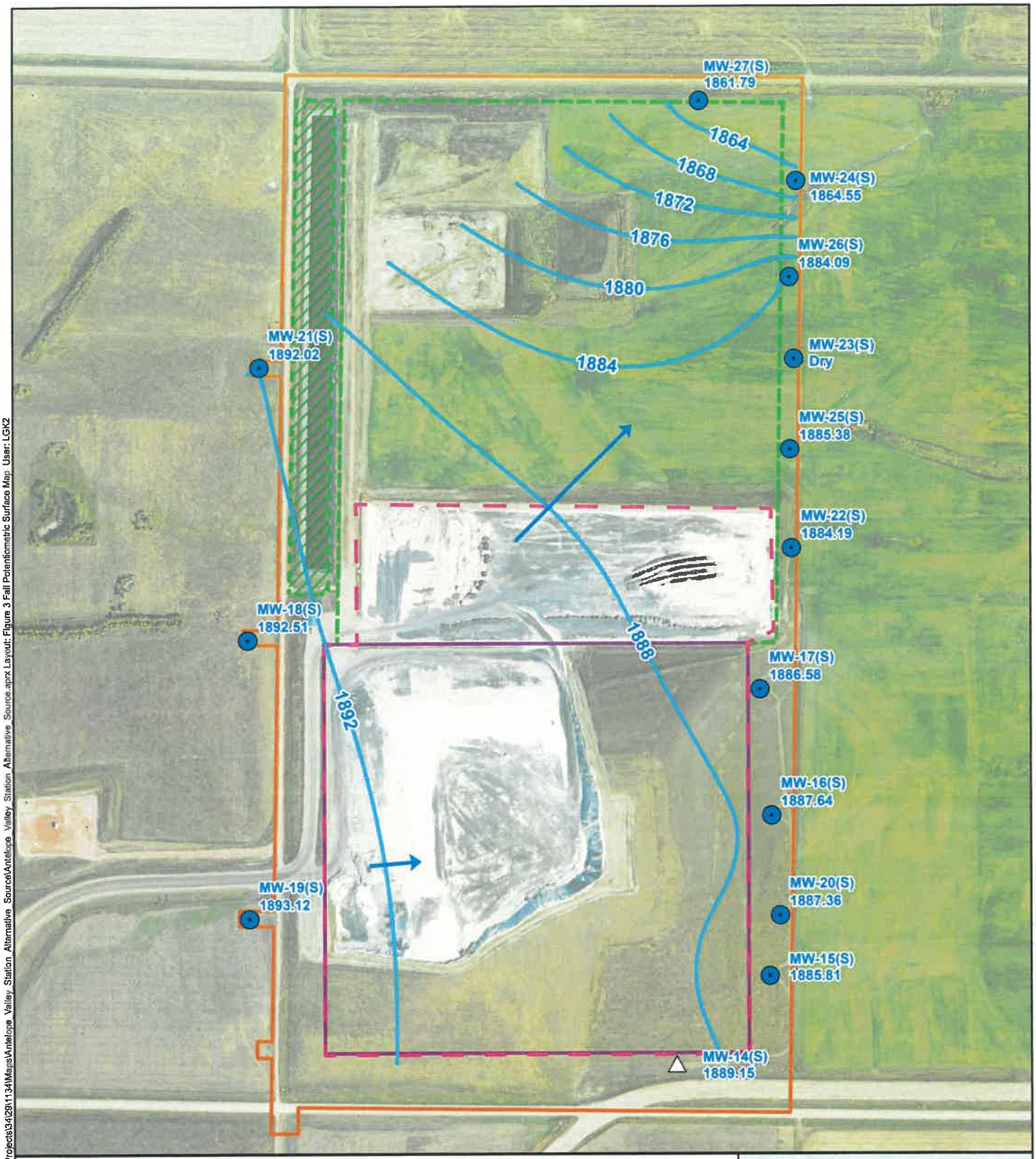
Imagery: USDA-NAIP, 2024

Monitoring Network
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 2

BARR

Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\28\11341\Mapsl\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 2 Monitoring Network User: LGK2



- Groundwater Monitoring System Wells
- Water Level Only Monitoring
- Permit Boundary
- Existing Landfill Limits
- Future Expansion Limit
- Leachate Management Area
- Limits of Ash as of 2025 (approximate)
- Flow Direction
- Groundwater Contour

N

0 300 600

Feet

Imagery: USDA-NAIP, 2024

Fall 2024 Potentiometric Surface
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 3

BARR

Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11\34\Maps\Antelope_Valley_Station_Alternative_Source\Antelope_Valley_Station_Alternative_Source.aprx Layout: Figure 3 Fall Potentiometric Surface Map User: LGK2

Attachments

Attachment A

Time Series Graphs

Basin Electric North Dakota

Site Name: AVS Landfill
Event Date: 6-9-25
Weather Conditions: Nice
Field Technician: MK

River Elevation (if applicable)
1658.2

Well ID	Time	Depth to Water*	Well Condition	Comments
MW-14S	1110	204.6	DRY	ALL IS WELL
MW-15S		218.96		
MW-20S		220.6		
MW-16S		235.82		
MW-17S		238.45		
MW-22S		210.14		
MW-25S		198.66		
MW-23S			DRY	
MW-26S		190.65		
MW-24S		206.22		
MW-27S		208		
MW-19S		149.4		
MW-18S		199.13		
MW-21S		202.75		

* Depth to water as measured from the top of PVC casing.

Well/Piezo ID: MW-155

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: 103°, cloudy
Collector(s) MK

Date: 6-10-25
Time: 0803
Finish 1009

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 218.95
c. Casing Material PVC
d. Casing Diameter _____

Pump Settings 34/260 max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
0929	INITIAL 3L	12.7	0.77	2904	8.01	89.9	1.85	Brown	223.55
0933	3.25 L	12.8	0.80	2900	8.01	97.4	2.18	↓	223.57
0936	3.5 L	12.6	0.83	2912	8.01	102.5	4.28		223.75
0940	3.75 L	12.6	0.82	2894	8.01	105.1	2.76		223.80
0944	4 L	12.7	0.81	2899	8.01	106.5	2.40		223.90
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0945
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 6-10-25

Well/Piezo ID: MW-20S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: 63° Breezy
Collector(s): MK
Date: 10.10.25
Time: 1015
Finish 1034

WATER LEVEL DATA: (measured from Top of Casing) Well ☐

a. Total Well Length _____ c. Casing Material PVC Pump Settings _____

b. Water Table Depth 220.100 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time Stabilization	Volume Removed (gal)	T° (C) +/- 0.2	DO mg/L <0.5 +/- 10%	Spec. Cond (µs/cm) +/- 3%	pH +/- 0.1	ORP +/- 10%	Turbidity (NTU) <5 +/- 10%	Color	DTW 0.33 ft
1029	INITIAL 6025	10.16	2.98	2789	5.02	-314.0	27.5	BROWN	220.60
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

_____

_____

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1029
	500mL	1	HNO3	Metals	↓

Comments _____

_____

Signature _____ Date 10-10-25

Well/Piezo ID: MW-105

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Breezy
Date: 10-10-25
Time: 1041
Finish 0940 10/11/25
Collector(s) MK

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 235.82
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 21/39 e, max PSI ~ 25mL

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1325	INITIAL 1.75	19.9	4.55	2018	8.16	34.3	11.2	Brown	238.55
1329	1.9 L	20.8	3.160	2064	8.13	87.1	9.64		238.75
1333	1.92 L	21.5	3.15	2084	8.11	113.9	8.82		238.90
1337	2 L	21.8	2.98	2117	8.09	125.9	9.82		239
1341	2.1 L	21.8	2.8	2142	8.08	132.2	9.73		239.11
1344	2.14 L	21.4	2.69	2165	8.06	137.8	8.87		239.2
1348	2.17 L	22.3	2.22	2144	8.06	142.4	8.33		239.4
1352	2.2 L	21.4	2.19	2145	8.05	144.4	8.29		239.56
	L	pumped down to 245ft.							
	L								
0830	L	13.7	4.76	1955	8.08	-365.6	8.92		
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☑	☐
Have parameters stabilized	☐	☑	☐

If no or N/A - Explain below. DTW

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0830
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10-11-25

Well/Piezo ID: MW 22S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: cloudy, smokey, cool
Collector(s): MK
Date: 6-11-25
Time: 0945
Finish 1133

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 210.14
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 40/20 @ max psi ~100mL

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1047	INITIAL 5.5	11.0	.56	2518	8.15	-352.6	5.81	yellow/	210.40
1051	6 L	11.1	.52	2513	8.14	-351.8	6.15	brown	210.40
1054	6.5 L	11.3	.49	2513	8.14	-350.5	6.75		210.46
1057	7 L	11.2	.50	2518	8.13	-349.9	5.90		210.49
1101	7.5 L	11.2	.50	2520	8.14	-350.1	6.22		210.50
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1102
	500mL	1	HNO3	Metals	↓

Comments DUP

Signature [signature] Date 6-11-25

Well/Piezo ID: MW-25S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: cloudy, smokey, cool
Collector(s): MK

Date: 10.11.25
Time: 1140
Finish 1300

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 198.106
c. Casing Material PVC
d. Casing Diameter _____

Pump Settings 44/116 e max PSI ~100mL

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1240	INITIAL 4.5	9.8	.47	2997	8.16	-368.0	16.9	Brown	201.40
1244	5 L	9.9	.42	2986	8.15	-368.4	17.6		201.37
1248	5.5 L	10.0	.40	2992	8.15	-368.0	16.2		201.30
1251	6 L	10.0	.47	3004	8.15	-368.7	16.3		201.30
	L								
	L								
	L								
	L								
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	L								
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	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1252
	500mL	1	HNO3	Metals	↓

Comments _____

Signature [signature] Date 10-11-25

Well/Piezo ID: MW-26S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: smoky cool
Date: 6.11.25
Time: 1315
Finish
Collector(s): MK

WATER LEVEL DATA: (measured from Top of Casing) Well ☒

a. Total Well Length
b. Water Table Depth 190.65
c. Casing Material PVC
d. Casing Diameter
Pump Settings 34/26 e max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time / Stabilization	Volume Removed (gal)	T° (C) +/- 0.2	DO mg/L (<0.5) +/- 10%	Spec. Cond (µs/cm) +/- 3%	pH +/- 0.1	ORP +/- 10%	Turbidity (NTU) (<5) +/- 10%	Color	DTW 0.33 ft
1403	INITIAL 4L	10.4	.77	2816	8.11	-370.7	21.0	brown	192.5
1407	4.5 L	10.5	.65	2807	8.10	-370.6	21.6		192.56
1411	5 L	10.5	.59	2803	8.10	-370.8	18.7		192.50
1415	5.5 L	10.6	.60	2812	8.09	-370.8	18.7		192.56
1419	6 L	10.5	.49	2808	8.09	-371.4	14.6		192.55
1422	6.5 L	10.6	.47	2798	8.09	-371.5	15.1		192.58
1426	7 L	10.5	.46	2801	8.09	-371.8	14.3		192.60
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1427
	500mL	1	HNO3	Metals	↓

Comments

Signature MK
Date 6-11-25

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 515-382-5486 ~ Fax 515-382-3885
www.MVTL.com

Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coope
WO: 89554
hain of Custody
Page 1 of 1

Order # Only

Company Name and Address: Basin Electric Power Coop., Leland Olds Station, 3901 Highway 200A, Stanton, ND 58571	Account # 2040
Billing Address (Indicate if different from above): Attn: Liabilities	Phone # 701-745-7238 701-557-5488
	Contact: Mark Dihle — Emails: mdihle@bepc.com akrutson@bepc.com
	Name of Sampler: Mariah Knutson
	Quote Number — Date Submitted: 6/12/2025
	Project Name/Number: AVS Landfill CCR Wells — Purchase Order #: 79070801

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of ss	Filtered	Analysis Required
001	MW-16S	GW	6/10/2025	945	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-20S	GW	6/10/2025	1029	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-16S	GW	6/11/2025	830	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-22S	GW	6/11/2025	1102	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	DUP	GW	6/11/2025	1102	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	MW-25S	GW	6/11/2025	1252	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-26S	GW	6/11/2025	1427	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
—	AVS LEACHATE POND	SW	6/10/2025	1435	2	N	Total Metals: Mn,Se,Ba,Cd,Cr,B,Mo,As,Ph,Fe,Ca,Mg,Na,K, Cl,So4, NO2, NO3,TDS,Alkalinity
		GW					

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	6/12/2025	NOON	Cynthia Kelley	12/6/25	1434	4.8C	Y/N	IR9B9
2.							Y/N	

Please submit the top copy with your samples. We will return the completed original with your results.

Well/Piezo ID: MW-17S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny Humid Warm
Collector(s): MK

Date: ~~6-17-25~~ 6-17-25
Time: 0817
Finish: 1055 6-18-25

WATER LEVEL DATA: (measured from Top of Casing) Well ☒

a. Total Well Length _____
b. Water Table Depth 238.45
c. Casing Material PVC
d. Casing Diameter _____

Pump Settings 23/37 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW· 0.33 ft
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		
0941	INITIAL 4L	12.9	19.9	2649	7.96	-20.2	4.75	Brown	~~245.25~~
0945	4.5 L	12.7	1.74	2654	7.97	10.3	5.04		~~245.90~~
0949	5 L	13.1	1.64	2648	7.97	30.0	5.05		~~246.10~~
0953	5.5 L	12.8	1.49	2642	7.97	55.4	5.22		~~246.75~~
0957	6 L	13.1	1.37	2643	7.97	88.3	5.76		~~247.1~~
1001	6.5 L	13.1	1.34	2649	7.96	106.6	6.59		~~247.55~~
	L	Pumped down to			250ft				
0948	L	19.9	4.25	2760	7.91	-212.6	1605	↓	~~243.49~~
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☐	☒	☐
Have parameters stabilized	☐	☒	☐

If no or N/A - Explain below.

DTW

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0949
	500mL	1	HNO3	Metals	↓

Comments

Signature _____ Date 6-18-25

Well/Piezo ID: MW 24S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Hot, Humid
Collector(s): ME
Date: 6-17-25
Time: 1033
Finish 1142

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 20.22
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 13/17 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1126	INITIAL 4.75	12.5	0.45	3083	8.08	-341.8	7.43	brown	20.10
1130	4.75 L	12.4	0.43	3081	8.08	-342.1	7.68	↓	20.11
1134	5.25 L	12.5	0.43	3077	8.08	-341.9	7.08	↓	20.10
	L								
	L								
	L								
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	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1135
	500mL	1	HNO3	Metals	↓

Comments _____

Signature [signature] Date 6-17-25

Well/Piezo ID: MW-27S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: sunny, warm Collector(s) MK

Date: 6-17-25
Time: 1150
Finish 1220

WATER LEVEL DATA: (measured from Top of Casing) Well ☐

a. Total Well Length _____ c. Casing Material PVC Pump Settings _____

b. Water Table Depth 208.0 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU)	Color	DTW
Stabilization		+/- 0.2	<0.5 +/- 10%	+/- 3%	+/- 0.1	+/- 10%	<5 +/- 10%		0.33 ft
	INITIAL	12.7	.28	3191	8.10	44.2	TOO High	BLACK MUCK	208.0
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1219
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 6-17-25

Well/Piezo ID: MW-18S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny Warm
Collector(s): MK
Date: 10-17-25
Time: 1250
Finish 1424

WATER LEVEL DATA: (measured from Top of Casing) Well ☒

a. Total Well Length _____
b. Water Table Depth 199.13
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 39/21 c max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1355	INITIAL 7	13.8	.72	2602	9.48	-173.9	4.69	yellow	119.55
1359	7.5 L	14.0	.70	2647	9.47	-183.0	4.77	↓	119.54
1402	8 L	13.9	.59	2670	9.44	-164.7	4.70		119.56
1406	8.5 L	13.9	.55	2679	9.41	-157.3	4.51		119.50
1410	9 L	13.9	.53	2688	9.38	-152.9	4.98		119.50
1414	9.5 L	13.8	.53	2722	9.36	-143.2	4.40	↓	119.49
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1415
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10-17-25

Well/Piezo ID: MW-19S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: cool, sunny
Collector(s): MK
Date: 6.18.25
Time: 811
Finish 0929

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 149.40
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 15/15 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO ✓mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity ✓ (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
0857	INITIAL 5L	10.0	.33	3194	8.01	-383.4	2.06	clear	149.40
0901	5.5 L	10.0	.33	3199	8.01	-383.8	1.95	↓	149.59
0905	6 L	10.1	.34	3208	8.02	-383.7	1.10	↓	149.55
0909	6.5 L	10.2	.43	3211	8.01	-383.6	1.06	↓	149.59
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0910
	500mL	1	HNO3	Metals	↓

Comments DUP

Signature [signature] Date 6-18-25

Well/Piezo ID: MW-21S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: HOT, Sunny
Collector(s): MK
Date: 10-18-25
Time: 1115
Finish 1257

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 202.75
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 28/320 max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1229	INITIAL 7L	13.0	.05	3111	7.89	104.5	2.71	Yellow/	212.0
1233	7.5 L	13.3	.01	3103	7.89	78.5	1.86	Brown	212.50
1237	8 L	13.9	.01	3090	7.87	85.6	1.94	↓	212.90
1241	8.5 L	14.0	.02	3097	7.88	91.5	1.90		213.11
1245	9 L	14.0	.02	3104	7.88	92.9	1.84		213.22
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1247
	500mL	1	HNO3	Metals	↓

Comments _____

Signature MK Date 10-18-25

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2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 515-382-5486 ~ Fax 515-382-3885
www.MVTL.com

Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coope hain of Custody
WO: 90275
Page 1 of 1

Order # (Only)

Company Name and Address: Basin Electric Power Coop., Leland Olds Station, 3901 Highway 200A, Stanton, ND 58571	Account # 2040
	Phone # 701-745-7238 701-557-5498
	Contact: Mark Dihle
	Emails: mdihle@bepc.com aknutson@bepc.com
	Name of Sampler: Mariah Knutson
Billing Address (indicate if different from above): Attn: Liabilities	Quote Number
	Date Submitted: 6/19/2025
	Project Name/Number: AVS Landfill CCR Wells
	Purchase Order #: 79070801

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-17S	GW	6/18/2025	949	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-24S	GW	6/17/2025	1135	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-27S	GW	6/17/2025	1219	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-18S	GW	6/17/2025	1415	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	MW-19S	GW	6/18/2025	910	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	DUP	GW	6/18/2025	910	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-21S	GW	6/18/2025	1247	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	6/19/2025	NOON	C. Cantrell	6/19/25	1435	3.9°C	Y/N	TM957
2.							Y/N	

Please submit the top copy with your samples. We will return the completed original with your results.

Well/Piezo ID: MW-19S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: cool, sunny
Date: 8.26.25
Time: 0801
Finish 0920
Collector(s) MF

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 149.41
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 15/15 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time / Stabilization	Volume Removed (gal)	T° (C) +/- 0.2	DO ✓ mg/L +/- 10% (<0.5)	Spec. Cond (µs/cm) +/- 3%	pH +/- 0.1	ORP +/- 10%	Turbidity ✓ (NTU) +/- 10% (<5)	Color	DTW 0.33 ft
0850	INITIAL 5L	10.2	0.48	3286	8.00	-316.2	1.05	clear	149.55
0854	5.5 L	10.3	0.48	3285	8.01	-318.1	1.00	↓	149.55
0858	6 L	10.3	0.49	3289	8.01	-325.3	0.92		149.56
0902	6.5 L	10.4	0.49	3299	8.01	-327.7	0.86		149.56
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0903
	500mL	1	HNO3	Metals	↓

Comments _____

Signature MCM Date 8.26.25

Well/Piezo ID: MW-18S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, cool → warm
Collector(s): MK
Date: 8.26.25
Time: 0933
Finish 1150

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____ c. Casing Material PVC Pump Settings 20/34 @ max PSI

b. Water Table Depth 199.20 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	✓ Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1125	INITIAL 7L	15.1	1.29	2886	9.35	111.1	2.22	yellow	199.40
1129	7.5 L	15.2	1.27	2889	9.34	110.4	2.32	↓	199.41
1132	8 L	15.3	1.28	2903	9.32	108.4	3.73		199.44
1136	8.5 L	15.1	1.27	2921	9.30	99.3	3.19		199.45
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1137
	500mL	1	HNO3	Metals	↓

Comments

Signature [signature] Date 8.26.25

Well/Piezo ID: MW-215

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, warm
Collector(s): MK
Date: 8-26-25
Time: 1200
Finish 1420

WATER LEVEL DATA: (measured from Top of Casing)

Well ☑ 20'

a. Total Well Length _____
c. Casing Material PVC
Pump Settings 40 @ max PSI

b. Water Table Depth 202.82
d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1351	INITIAL 4.5L	17.8	1.44	3192	7.90	148.7	2.03	Yellow/	208.52
1355	5 L	17.7	1.39	3199	7.90	150.4	1.99	Brown	208.53
1359	55 L	17.7	1.37	3199	7.90	152.4	2.09	↓	208.61
1402	6 L	17.9	1.39	3187	7.89	153.8	1.87	↓	208.75
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1403
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 8-26-25

Basin Electric North Dakota

Site Name: AVS Landfill
Event Date: 8/25/2025
Weather Conditions:
Field Technician: MK

River Elevation (if applicable)

Well ID	Time	Depth to Water*	Well Condition	Comments
MW-19s	800	149.41		
MW-18s		199.2		
MW-21S		202.82		
MW 15s		218.92		
MW 20s		220.28		
MW 16s		236.4		
MW 17s		238.35		
MW22s		210.12		
Mw25s		198.16		
MW23s		dry		
MW26s		190.52		
MW24s		206.3		
MW27s		203.71		

* Depth to water as measured from the top of PVC casing.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

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Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coop
WO: 97784

Chain of Custody

Page __1__ of __1___

Company Name and Address Basin Electric Power Coop. Leland Olds Station 3901 Highway 200A Stanton, ND 58571	Account # 2040	Phone # 701-745-7238 701-557-5488
	Contact Mark Dihle	Emails mdihle@bepc.com aknutson@bepc.com
	Name of Sampler Mariah Knutson	
Billing Address (indicate if different from above) Attn: Liabilities	Quote Number	Date Submitted 8/27/2025
	Project Name/Number AVS Landfill CCR	Purchase Order # 790708-01

Work Order #
Lab Use Only

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-19S	GW	8/26/2025	903	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	DUP	GW	8/26/2025	903	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-18S	GW	8/26/2025	1137	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-21S	GW	8/26/2025	1403	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	AVS LEACHATE POND	SW	8/26/2025	1435	1	N	Total Metals: Mn,Se,Ba,Cd,Cr,B,Mo,As,Pb,Fe,Ca,Mg,Na,K, Cl,So4, NO2, NO3,TDS, Alkalinity

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	8/27/2025	NOON		27Aug25	1444	1.4°C	Y / N	IR-M805
2.							Y / N	

Please submit the top copy with your samples. We will return the completed original with your results.

Well/Piezo ID: MW 15S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Cool, Sunny
Collector(s): MK
Date: 10-7-25
Time: 0817
Finish 1042

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 218.90
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 30/45 e max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) ✓	Color	DTW
Stabilization		+/- 0.2	<0.5 +/- 10%	+/- 3%	+/- 0.1	+/- 10%	<5 +/- 10%		0.33 ft
0950	INITIAL 3L	10.7	0.96	2947	8.06	-311.4	2.35	yellow brown	222.80
0954	3.25 L	10.7	0.93	2959	8.06	-313.9	2.57	↓	222.92
0958	3.5 L	10.8	0.92	2949	8.06	-314.5	1.79		223.09
1002	3.75 L	10.8	0.91	2951	8.06	-315.0	2.07	↓	223.15
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1004
	500mL	1	HNO3	Metals	↓

Comments _____

Signature MK

Date 10-7-25

Well/Piezo ID: MW-20S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, cool
Collector(s): MK
Date: 10.7.25.
Time: 1048
Finish 1108

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 220.22
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
			<0.5				<5		
1052	INITIAL	8.3	3.93	2869	7.97	-35.4	1.54	BROWN	220.22
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1052
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10.7.25

Well/Piezo ID: MW-116S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, cool
Date: 10.7.25
Time: 1110
Finish 0924 10.8.25
Collector(s)

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____ c. Casing Material PVC Pump Settings 40 use @ max PSI

b. Water Table Depth 230.31 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1303	INITIAL 1.5 L	16.5	4.00	2174	8.21	124.9	55.2	BROWN	238.99
1307	1.8 L	16.2	3.69	2139	8.21	124.8	51.8	↓	239.13
1311	1.9 L	16.1	3.13	2093	8.20	124.1	55.5	↓	239.25
1315	2 L	16.8	2.54	2085	8.19	124.2	56.2	↓	239.40
1319	2.1 L	17.0	2.40	2059	8.18	124.4	58.1	↓	239.56
	L								
	L	pumped down to 245 ft							
0816	L	9.9	4.65	1739	8.21	+304.2	55.0	Brown w/ silt	243.37
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☑	☐
Have parameters stabilized	☐	☑	☐

If no or N/A - Explain below.

DTW

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0816
	500mL	1	HNO3	Metals	↓

Comments

Signature _____ Date 10-8-25

Well/Piezo ID: MW-175

Ground Water Sample Collection Record

'ent: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, n/a
Collector(s): MK
Date: 10.7.25
Time: 1418
Finish 1002

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 238.32
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings 25/80 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1450	INITIAL 3L	12.8	4.39	2751	8.00	288.4	9.88	BROWN	243.8
1454	3.2 L	12.6	3.57	2733	8.00	289.6	9.77	↓	243.75
1458	3.4 L	12.6	3.23	2742	8.01	288.6	9.22		244.10
1502	3.6 L	12.6	3.03	2759	8.01	291.7	9.37		244.74
1506	3.8 L	12.7	1.65	2415	8.00	294.5	9.69		245.20
	L								
	L	pumped down to 250ft							
	L								
0934	L	11.3	4.83	2712	8.02	314.8	7.04	BROWN	244.51
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☑	☐
Have parameters stabilized	☐	☑	☐

If no or N/A - Explain below.
DTW

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	0934
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10.8.25

Well/Piezo ID: MW-22S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Cold, Sunny
Collector(s): MK
Date: 10.8.25
Time: 1009
Finish 1130

WATER LEVEL DATA: (measured from Top of Casing)

Well ☒

a. Total Well Length _____
b. Water Table Depth 210.03
c. Casing Material PVC
d. Casing Diameter _____

Pump Settings 22/38 @ max PSI

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time / Stabilization	Volume Removed (gal)	T° (C) +/- 0.2	DO mg/L +/- 10% (<0.5)	Spec. Cond (µs/cm) +/- 3%	pH +/- 0.1	ORP +/- 10%	Turbidity (NTU) +/- 10% (<5)	Color	DTW 0.33 ft
1100	INITIAL 5.25	10.7	1.09	2530	8.17	-326.2	5.11	Brown	210.49
1104	5.75 L	10.8	0.70	2529	8.17	-327.3	5.12	↓	210.45
1108	6.25 L	10.8	0.61	2535	8.16	-328.7	5.57		210.30
1112	6.75 L	10.9	0.57	2529	8.16	-329.3	5.65		210.30
1116	7.25 L	10.9	0.56	2532	8.17	-330.4	5.27	↓	210.29
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1116
	500mL	1	HNO3	Metals	↓

Comments DUP

Signature [signature] Date 10.8.25

Well/Piezo ID: MW-25S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Breezy
Collector(s): MK
Date: 10-8-25
Time: 1130
Finish 1225

WATER LEVEL DATA: (measured from Top of Casing) Well ☒

a. Total Well Length _____ c. Casing Material PVC Pump Settings 28/32 @ max PSI

b. Water Table Depth 198.43 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time / Stabilization	Volume Removed (gal)	T° (C) +/- 0.2	DO mg/L (<0.5) +/- 10%	Spec. Cond (µs/cm) +/- 3%	pH +/- 0.1	ORP +/- 10%	Turbidity (NTU) (<5) +/- 10%	Color	DTW 0.33 ft
1206	INITIAL 4.75	9.8	.46	3015	8.18	-314.0	9.0	yellowish brown	202.20
1210	5.25 L	9.8	.39	3021	8.19	-313.4	9.29	↓	202.15
1214	5.75 L	9.7	.35	3010	8.19	-313.5	9.17		202.25
1218	6.25 L	9.8	.31	3011	8.18	-313.8	9.08		202.19
	L								
	L								
	L								
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	L								
	L								
	L								
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	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1218
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10-8-25

Well/Piezo ID: MW-265

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Breezy
Date: 10.8.25
Time: 1229
Finish 1356
Collector(s) MK

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____ c. Casing Material PVC Pump Settings 20/45 @ max PSI

b. Water Table Depth 190.43 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1322	INITIAL 3.75	13.3	2.91	2880	8.10	-343.3	20.6	Brown	191.46
1326	4.25 L	12.0	2.42	2886	8.10	-344.0	20.7		191.5
1330	4.75 L	12.1	2.00	2894	8.09	-345.7	17.0		191.61
1334	5.25 L	11.9	1.70	2904	8.09	-347.3	12.2		191.61
1338	5.75 L	12.0	1.47	2885	8.08	-348.4	12.4		191.62
1342	6.25 L	12.1	1.46	2895	8.09	-348.5	11.6		191.63
1346	6.75 L	12.2	1.44	2884	8.08	-348.6	11.2		191.65
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1347
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10.8.25

Well/Piezo ID: MW-24S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Breezy
Date: 10.8.25
Time: 1401
Finish 1452
Collector(s) MK

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____ c. Casing Material PVC Pump Settings 20/37 @ max PSI

b. Water Table Depth 206.27 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method Dedicated Bladder Pump

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1433	INITIAL 5.75	10.0	.59	3144	8.09	-300.3	8.32	Brown	207.8
1437	6.25 L	10.1	.49	3142	8.11	-303.9	8.12	↓	207.81
1441	6.75 L	10.1	.45	3148	8.12	-307.6	8.12		207.78
1445	7.25 L	10.1	.42	3145	8.12	-299.5	8.81		207.77
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1445
	500mL	1	HNO3	Metals	↓

Comments _____

Signature _____ Date 10.8.25

Well/Piezo ID: MW-27S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: Sunny, Breezy
Collector(s): MK
Date: 10.8.25
Time: 1457
Finish 1315

WATER LEVEL DATA: (measured from Top of Casing) Well ☑

a. Total Well Length _____
b. Water Table Depth 203.67
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve
b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
1309	INITIAL	12.0	.25	3254	7.96	292.9	TOO High	BLACK mud	203.67
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

_____

_____

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1309
	500mL	1	HNO3	Metals	↓

Comments _____

_____

Signature _____ Date 10.8.25

Basin Electric North Dakota

Site Name:	AVS Landfill
Event Date:	10/6/2025
Weather Conditions:	
Field Technician:	MK

River Elevation (if applicable)

Well ID	Time	Depth to Water*	Well Condition	Comments
MW-19s	800	149.75		
MW-18s		199.17		
MW-21S		202.78		
MW 15s		218.9		
MW 20s		220.22		
MW 16s		236.31		
MW 17s		238.32		
MW22s		210.03		
Mw25s		198.1		
MW23s		190.43		
MW26s		190.43		
MW24s		206.27		
MW27s		203.67		

* Depth to water as measured from the top of PVC casing.

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 515-382-5486 ~ Fax 515-382-3885
www.MVTL.com

Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coop
WO: 103535

Chain of Custody

Page __1__ of __1__

Work Order # (Lab Use Only)

Company Name and Address: Basin Electric Power Coop. / Leland Olds Station / 3901 Highway 200A / Stanton, ND 58571	Account # 2040	Phone # 701-745-7238 701-557-5488
Billing Address (indicate if different from above): Attn: Liabilities	Contact: Mark Dihle	Emails: mdihle@bepc.com aknutson@bepc.com
	Name of Sampler: Mariah Knutson	
	Quote Number	Date Submitted: 10/9/2025
	Project Name/Number: AVS Landfill CCR Wells	Purchase Order #: 79070801

Lab Use Only Lab	Sample ID	Sample Matrix (GW - Groundwater)	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-15S	GW	10/7/2025	1004	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-20S	GW	10/7/2025	1052	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-16S	GW	10/8/2025	816	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-17S	GW	10/8/2025	934	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	MW-22S	GW	10/8/2025	1116	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	DUP	GW	10/8/2025	1116	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-25S	GW	10/8/2025	1218	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
008	MW-26S	GW	10/8/2025	1347	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
009	MW-24S	GW	10/8/2025	1445	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
010	MW-27S	GW	10/8/2025	1309	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	10/9/2025	NOON		10/9/25	1443	5.0°C	Y/N	TM959
2.							Y/N	

Please submit the top copy with your samples. We will return the completed original with your results.

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Account #: 2040 **Client:** Basin Electric Power Cooperative
Workorder: AVS Landfill CCR Wells (89554) **PO:** 790708-01

Mark Dihle
Basin Electric Power Cooperative
1717 E. Interstate Avenue
Bismarck, ND 58503

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554001 **Date Collected:** 06/10/2025 09:45 **Matrix:** Groundwater
Sample ID: MW-15S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**356**	mg/L	25	5		06/18/2025 11:56	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/12/2025 16:25	06/26/2025 10:57	
Calcium	**3.79**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Magnesium	**2.55**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Potassium	**3.82**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Sodium	**733**	mg/L	5	5	06/12/2025 16:25	06/16/2025 14:49	
Method: SM2320 B-2021							
Alkalinity, Total	**1042**	mg/L as CaCO3	20.5	1		06/13/2025 13:58	
Bicarbonate	**1042**	mg/L as CaCO3	20.5	1		06/13/2025 13:58	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 13:58	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/13/2025 13:58	*
Method: SM4500-Cl-E 2021							
Chloride	**13.2**	mg/L	2.0	1		06/17/2025 10:41	
Method: SM4500-F-C-2021							
Fluoride	**1.32**	mg/L	0.1	1		06/13/2025 13:58	
Method: USGS I-1750-85							
Total Dissolved Solids	**1910**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554002 **Date Collected:** 06/10/2025 10:29 **Matrix:** Groundwater
Sample ID: MW-20S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**56.1**	mg/L	5	1		06/18/2025 12:03	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/12/2025 16:25	06/26/2025 10:57	
Calcium	**4.65**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Magnesium	**2.90**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Potassium	**4.03**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Sodium	**698**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:54	
Method: SM2320 B-2021							
Alkalinity, Total	**1372**	mg/L as CaCO3	20.5	1		06/13/2025 14:09	
Bicarbonate	**1372**	mg/L as CaCO3	20.5	1		06/13/2025 14:09	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 14:09	
Method: SM4500 H+ B-2021							
pH	**8.1**	units	0.1	1		06/13/2025 14:09	*
Method: SM4500-Cl-E 2021							
Chloride	**24.6**	mg/L	2.0	1		06/17/2025 10:43	
Method: SM4500-F-C-2021							
Fluoride	**1.16**	mg/L	0.1	1		06/13/2025 14:09	*
Method: USGS I-1750-85							
Total Dissolved Solids	**1760**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

Fluoride

Matrix spike and/or matrix spike duplicate recovery was high; the associated laboratory fortified blank recovery was acceptable.

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554003 **Date Collected:** 06/11/2025 08:30 **Matrix:** Groundwater
Sample ID: MW-16S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**107**	mg/L	5	1		06/18/2025 12:04	
Method: EPA 6010D							
Boron	**0.14**	mg/L	0.1	1	06/12/2025 16:25	06/26/2025 10:58	
Calcium	**5.41**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:56	
Magnesium	**2.30**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:56	
Potassium	**3.32**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:56	
Sodium	**473**	mg/L	1	1	06/12/2025 16:25	06/16/2025 12:56	
Method: SM2320 B-2021							
Alkalinity, Total	**778**	mg/L as CaCO3	20.5	1		06/13/2025 14:21	
Bicarbonate	**778**	mg/L as CaCO3	20.5	1		06/13/2025 14:21	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 14:21	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		06/13/2025 14:21	*
Method: SM4500-Cl-E 2021							
Chloride	**26.2**	mg/L	2.0	1		06/17/2025 10:51	
Method: SM4500-F-C-2021							
Fluoride	**2.04**	mg/L	0.1	1		06/13/2025 14:21	
Method: USGS I-1750-85							
Total Dissolved Solids	**1200**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554004 **Date Collected:** 06/11/2025 11:02 **Matrix:** Groundwater
Sample ID: MW-22S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**193**	mg/L	25	5		06/18/2025 11:59	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/12/2025 16:25	06/26/2025 10:59	
Calcium	**2.49**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:50	
Magnesium	**1.99**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:50	
Potassium	**3.53**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:50	
Sodium	**662**	mg/L	5	5	06/12/2025 16:25	06/16/2025 14:51	
Method: SM2320 B-2021							
Alkalinity, Total	**1031**	mg/L as CaCO3	20.5	1		06/13/2025 16:37	
Bicarbonate	**1031**	mg/L as CaCO3	20.5	1		06/13/2025 16:37	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 16:37	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		06/13/2025 16:37	*
Method: SM4500-Cl-E 2021							
Chloride	**11.1**	mg/L	2.0	1		06/17/2025 10:52	
Method: SM4500-F-C-2021							
Fluoride	**1.75**	mg/L	0.1	1		06/13/2025 16:37	
Method: USGS I-1750-85							
Total Dissolved Solids	**1650**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554005 **Date Collected:** 06/11/2025 11:02 **Matrix:** Groundwater
Sample ID: DUP **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**171**	mg/L	5	1		06/18/2025 12:23	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/12/2025 16:25	06/26/2025 10:59	
Calcium	**2.38**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:52	
Magnesium	**1.94**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:52	
Potassium	**3.24**	mg/L	1	1	06/12/2025 16:25	06/16/2025 14:52	
Sodium	**648**	mg/L	5	5	06/12/2025 16:25	06/16/2025 14:53	
Method: SM2320 B-2021							
Alkalinity, Total	**1031**	mg/L as CaCO3	20.5	1		06/13/2025 16:48	
Bicarbonate	**1031**	mg/L as CaCO3	20.5	1		06/13/2025 16:48	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 16:48	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		06/13/2025 16:48	*
Method: SM4500-Cl-E 2021							
Chloride	**11.1**	mg/L	2.0	1		06/17/2025 10:53	
Method: SM4500-F-C-2021							
Fluoride	**1.65**	mg/L	0.1	1		06/13/2025 16:48	
Method: USGS I-1750-85							
Total Dissolved Solids	**1670**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554006 **Date Collected:** 06/11/2025 12:52 **Matrix:** Groundwater
Sample ID: MW-25S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**29.8**	mg/L	5	1		06/18/2025 12:24	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/13/2025 16:10	06/26/2025 11:04	
Calcium	**4.01**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:54	
Magnesium	**3.11**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:54	
Potassium	**4.04**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:54	
Sodium	**826**	mg/L	5	5	06/13/2025 16:10	06/16/2025 14:55	
Method: SM2320 B-2021							
Alkalinity, Total	**1489**	mg/L as CaCO3	20.5	1		06/13/2025 17:00	
Bicarbonate	**1489**	mg/L as CaCO3	20.5	1		06/13/2025 17:00	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 17:00	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/13/2025 17:00	*
Method: SM4500-Cl-E 2021							
Chloride	**39.6**	mg/L	2.0	1		06/17/2025 10:54	
Method: SM4500-F-C-2021							
Fluoride	**1.26**	mg/L	0.1	1		06/13/2025 17:00	
Method: USGS I-1750-85							
Total Dissolved Solids	**1910**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 89554007 **Date Collected:** 06/11/2025 14:27 **Matrix:** Groundwater
Sample ID: MW-26S **Date Received:** 06/12/2025 14:34 **Collector:** Client

Temp @ Receipt (C): 4.8 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**75.9**	mg/L	5	1		06/18/2025 12:25	
Method: EPA 6010D							
Boron	**0.13**	mg/L	0.1	1	06/13/2025 16:10	06/26/2025 11:05	
Calcium	**11.0**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:56	
Magnesium	**2.90**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:56	
Potassium	**4.72**	mg/L	1	1	06/13/2025 16:10	06/16/2025 14:56	
Sodium	**746**	mg/L	5	5	06/13/2025 16:10	06/16/2025 14:57	
Method: SM2320 B-2021							
Alkalinity, Total	**1335**	mg/L as CaCO3	20.5	1		06/13/2025 17:12	
Bicarbonate	**1335**	mg/L as CaCO3	20.5	1		06/13/2025 17:12	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/13/2025 17:12	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/13/2025 17:12	*
Method: SM4500-Cl-E 2021							
Chloride	**30.6**	mg/L	2.0	1		06/17/2025 10:56	
Method: SM4500-F-C-2021							
Fluoride	**1.28**	mg/L	0.1	1		06/13/2025 17:12	
Method: USGS I-1750-85							
Total Dissolved Solids	**1820**	mg/L	10	1		06/13/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

QC Results Summary

WO #: 89554

Sulfate — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			100	101.0		85	115		
LFB			100	97.9		85	115		
LFB			100	95.8		85	115		
LFB			100	91.1		85	115		
LFB			100	89.6		85	115		
LFB			100	85.6		85	115		
LFB			100	97.8		85	115		
LFB			100	97.5		85	115		
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MS/MSD	89364014		500	94.8	94.6	85	115	0.0	20
MS/MSD	89364024		100	94.6	94.7	85	115	0.1	20
MS/MSD	89416008		100	85.3	85.6	85	115	0.4	20
MS/MSD	89554004		500	88.8	88.9	85	115	0.0	20
MS/MSD	89584006		100	80.2	80.7	85	115	0.5	20
MS/MSD	89758001		1000	95.8	96.0	85	115	0.0	20
MS/MSD	89769002		100	97.2	97.2	85	115	0.0	20

Chloride — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			30	96.4		90	110		
LFB			30	96.8		90	110		
LFB			30	95.8		90	110		
LFB			30	95.4		90	110		

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Chloride — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			30	95.2		90	110		
LFB			30	95.6		90	110		
LFB			30	94.9		90	110		
LFB			30	95.0		90	110		
LFB			30	94.3		90	110		
LFB			30	94.4		90	110		
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MS/MSD	89364007		30	96.1	96.1	80	120	0.0	20
MS/MSD	89364028		30	98.9	97.9	80	120	0.5	20
MS/MSD	89554002		30	96.5	96.7	80	120	0.0	20
MS/MSD	89631003		30	95.7	94.7	80	120	0.6	20
MS/MSD	89761001		30	94.4	94.4	80	120	0.0	20

Boron — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-OE			0.4	101.0		85	115		
LFB-OE			0.4	102.0		85	115		
MB		<0.1							
MB		<0.1							
MS/MSD	89554005		0.4	94.5	95.3	70	130	0.6	20
PDS/PDSD	89556001		8	107.0	108.0	75	125	0.8	20
PDS/PDSD	30443002		2	82.3	83.0	75	125	0.6	20

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Calcium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	104.0		85	115		
LFB-MI			100	106.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	89196003		100	102.0	102.0	75	125	0.2	20
PDS/PDSD	89364006		100	99.5	101.0	75	125	0.7	20
PDS/PDSD	89364012		100	95.0	95.7	75	125	0.3	20
PDS/PDSD	89416005		100	102.0	102.0	75	125	0.2	20
PDS/PDSD	89416008		100	100.0	101.0	75	125	0.4	20
DUP	89423002							2.5	20
PDS/PDSD	89584004		100	102.0	102.0	75	125	0.2	20
PDS/PDSD	89584009		100	103.0	105.0	75	125	1.1	20
PDS/PDSD	89584010		100	101.0	102.0	75	125	0.5	20

Magnesium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	106.0		85	115		
LFB-MI			100	108.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	89196003		100	103.0	102.0	75	125	0.3	20
PDS/PDSD	89364006		100	102.0	103.0	75	125	0.8	20
PDS/PDSD	89364012		100	101.0	101.0	75	125	0.4	20
PDS/PDSD	89416005		100	105.0	105.0	75	125	0.4	20
PDS/PDSD	89416008		100	103.0	104.0	75	125	0.6	20
DUP	89423002							0.6	20
PDS/PDSD	89584004		100	105.0	105.0	75	125	0.2	20
PDS/PDSD	89584009		100	105.0	107.0	75	125	1.2	20
PDS/PDSD	89584010		100	105.0	106.0	75	125	0.9	20

Potassium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	105.0		85	115		

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Potassium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	108.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	89196003		100	108.0	108.0	75	125	0.4	20
PDS/PDSD	89364006		100	105.0	107.0	75	125	1.8	20
PDS/PDSD	89364012		100	104.0	103.0	75	125	0.5	20
PDS/PDSD	89416005		100	107.0	104.0	75	125	2.4	20
PDS/PDSD	89416008		100	102.0	105.0	75	125	2.4	20
DUP	89423002							1.3	20
PDS/PDSD	89584004		100	104.0	104.0	75	125	0.1	20
PDS/PDSD	89584009		100	103.0	106.0	75	125	2.6	20
PDS/PDSD	89584010		100	102.0	106.0	75	125	3.1	20

Sodium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	103.0		85	115		
LFB-MI			100	108.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	89196003		100	105.0	104.0	75	125	1.1	20
PDS/PDSD	89364006		100	105.0	105.0	75	125	0.1	20
PDS/PDSD	89364012		100	102.0	105.0	75	125	2.5	20
PDS/PDSD	89416005		100	105.0	102.0	75	125	3.1	20
PDS/PDSD	89416008		100	107.0	104.0	75	125	2.2	20
DUP	89423002							2.4	20
PDS/PDSD	89584004		100	104.0	106.0	75	125	1.6	20
PDS/PDSD	89584009		100	105.0	105.0	75	125	0.5	20
PDS/PDSD	89584010		100	106.0	105.0	75	125	0.7	20

Alkalinity, Total Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			501	89.7		80	120		
LFB			410	93.5		90	110		

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Alkalinity, Total Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			410	93.8		90	110		
LFB			410	92.3		90	110		
LFB			410	92.4		90	110		
MB		<20.5							
MB		<20.5							
MB		<20.5							
MB		<20.5							
MS/MSD	89554001		410	85.3	84.9	80	120	0.0	20
MS/MSD	89584002		410	87.9	87.5	80	120	0.4	20
MS/MSD	89584007		410	87.1	87.0	80	120	0.2	20

pH Units: units

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-PH			6	100.7					
CRM-PH			6	100.2					
CRM-PH			6	100.0					
CRM-PH			6	100.0					
DUP	89584001							0.7	20
DUP	89584009							0.1	20

Fluoride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-F			0.6	101.0		83.99	111.11		
LFB-F			0.5	92.0		90	110		
LFB-F			0.5	98.0		90	110		
LFB-F			0.5	98.0		90	110		
MB F		<0.1							
MB-F		<0.1							
MB-F		<0.1							
MS/MSD-F	89554002		0.5	102.0	122.0	80	120	5.8	20
MS/MSD-F	89554006		0.5	100.0	86.0	80	120	4.1	20

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Total Dissolved Solids Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			736	98.0		90.35	110.33		
MB		<10							
DUP	89554001							0.0	20

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Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
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Order # Only

Company Name and Address: Basin Electric Power Coop., Leland Olds Station, 3901 Highway 200A, Stanton, ND 58571	Account # 2040 / Phone # 701-745-7238 701-557-5488
Billing Address (indicate if different from above): Attn: Liabilities	Contact: Mark Dihle / Emails: mdihle@bepc.com aknutson@bepc.com
	Name of Sampler: Mariah Knutson
	Quote Number / Date Submitted: 6/12/2025
	Project Name/Number: AVS Landfill CCR Wells / Purchase Order #: 79070801

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-15S	GW	6/10/2025	945	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-20S	GW	6/10/2025	1029	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-16S	GW	6/11/2025	830	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-22S	GW	6/11/2025	1102	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	DUP	GW	6/11/2025	1102	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	MW-25S	GW	6/11/2025	1252	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-26S	GW	6/11/2025	1427	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
—	AVS LEACHATE POND	SW	6/10/2025	1435	2	N	Total Metals: Mn,Se,Ba,Cd,Cr,B,Mo,As,Pb,Fe,Ca,Mg,Na,K, Cl,So4, NO2, NO3,TDS,Alkalinity
		GW					

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	6/12/2025	NOON	Lyndsey Jolley	12 Jun 25	1434	4.8C	(Y)N	IR989
2.							Y/N	

Please submit the top copy with your samples. We will return the completed original with your results.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Sample Condition Checklist

Date: 12 Jun 25 Time: 1517 Analyst: PW

Work Order #: 89554

Containers Supplied by MVTL: ☒ Yes ☐ No (Designate customer supplied containers as "Other" in container size column)

Comments:

Number of Bottles	Container Size (mL) F-(500) = Filtered	Container Type CG = Clear Glass, P = Plastic, AG = Amber Glass	Preservation	pH	Sample IDs Preservation reagent added Date/Time Analyst	Unique ID of preservation reagent added	Sample pH after preservation	Required for HNO_3 samples only (24 hours later) Sample ID pH Recheck Result Date/Time/Analyst
1	(125) (250) (500) F-(500) **(1000)** Other	(CG) **(P)** (AG) Other	**NONE** HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
1	(125) (250) **(500)** F-(500) (1000) Other	(CG) **(P)** (AG) Other	NONE **HNO_3** H_2SO_4 NaOH NaOH/ZnAcet HCl	**<2** >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	Oil and grease	(CG) (P) (AG) Other	HCl	n/a				
	TOC Vials	(G) (AG)	H_3PO_4	n/a				
	DOC Vials	(G) (AG)	None H_3PO_4	n/a				

*All samples requiring analyses performed outside of the Bismarck laboratory (New Ulm and Sub-Contract) are not documented on this form.
*All samples requiring microbiological tests are not documented on this form.

Form #80-910025-2 M:\Documents\FORMS\Approved Templates\Bismarck\Waters\80-910025-2 Sample Condition Checklist Page 1 of 1 Effective Date : 1 July 2024

Report Date: Tuesday, July 1, 2025 2:32:47 PM

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative
Workorder: AVS Landfill CCR Wells (90275) **PO:** 790708-01

Mark Dihle
Basin Electric Power Cooperative
1717 E. Interstate Avenue
Bismarck, ND 58503

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275001 **Date Collected:** 06/18/2025 09:49 **Matrix:** Groundwater
Sample ID: MW-17S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**293**	mg/L	25	5		06/25/2025 09:17	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:30	
Calcium	**4.05**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:24	
Magnesium	**2.28**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:24	
Potassium	**3.52**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:24	
Sodium	**684**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:24	
Method: SM2320 B-2021							
Alkalinity, Total	**1097**	mg/L as CaCO3	20.5	1		06/24/2025 13:17	
Bicarbonate	**1087**	mg/L as CaCO3	20.5	1		06/24/2025 13:17	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 13:17	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		06/24/2025 13:17	*
Method: SM4500-Cl-E 2021							
Chloride	**13.0**	mg/L	2.0	1		06/24/2025 10:34	
Method: SM4500-F-C-2021							
Fluoride	**1.63**	mg/L	0.1	1		06/23/2025 15:51	
Method: USGS I-1750-85							
Total Dissolved Solids	**1740**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275002 **Date Collected:** 06/17/2025 11:35 **Matrix:** Groundwater
Sample ID: MW-24S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**62.4**	mg/L	5	1		06/25/2025 09:30	
Method: EPA 6010D							
Boron	**0.11**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:30	
Calcium	**4.35**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:27	
Magnesium	**3.46**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:27	
Potassium	**4.48**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:27	
Sodium	**881**	mg/L	5	5	06/19/2025 16:59	06/24/2025 15:13	
Method: SM2320 B-2021							
Alkalinity, Total	**1592**	mg/L as CaCO3	20.5	1		06/24/2025 13:28	
Bicarbonate	**1589**	mg/L as CaCO3	20.5	1		06/24/2025 13:28	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 13:28	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		06/24/2025 13:28	*
Method: SM4500-Cl-E 2021							
Chloride	**49.6**	mg/L	2.0	1		06/24/2025 10:35	
Method: SM4500-F-C-2021							
Fluoride	**1.56**	mg/L	0.1	1		06/23/2025 16:05	*
Method: USGS I-1750-85							
Total Dissolved Solids	**1950**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

Fluoride

Matrix spike and/or matrix spike duplicate recovery was low; the associated laboratory control sample recovery was acceptable.

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275003 **Date Collected:** 06/17/2025 12:19 **Matrix:** Groundwater
Sample ID: MW-27S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**230**	mg/L	25	5		06/25/2025 09:19	
Method: EPA 6010D							
Boron	**0.68**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:31	
Calcium	**419**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:28	
Magnesium	**152**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:28	
Potassium	**27.4**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:28	
Sodium	**1040**	mg/L	5	5	06/19/2025 16:59	06/24/2025 15:14	
Method: SM2320 B-2021							
Alkalinity, Total	**1659**	mg/L as CaCO3	20.5	1		06/24/2025 13:39	
Bicarbonate	**1659**	mg/L as CaCO3	20.5	1		06/24/2025 13:39	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 13:39	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/24/2025 13:39	*
Method: SM4500-Cl-E 2021							
Chloride	**64.9**	mg/L	10.0	5		06/24/2025 10:36	
Method: SM4500-F-C-2021							
Fluoride	**1.41**	mg/L	0.1	1		06/23/2025 18:17	
Method: USGS I-1750-85							
Total Dissolved Solids	**2500**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275004 **Date Collected:** 06/17/2025 14:15 **Matrix:** Groundwater
Sample ID: MW-18S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**555**	mg/L	25	5		06/25/2025 09:20	
Method: EPA 6010D							
Boron	**0.10**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:32	
Calcium	**4.43**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:29	
Magnesium	**1.66**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:29	
Potassium	**3.92**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:29	
Sodium	**697**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:29	
Method: SM2320 B-2021							
Alkalinity, Total	**820**	mg/L as CaCO3	20.5	1		06/24/2025 13:48	
Bicarbonate	**638**	mg/L as CaCO3	20.5	1		06/24/2025 13:48	
Carbonate	**182**	mg/L as CaCO3	20.5	1		06/24/2025 13:48	
Method: SM4500 H+ B-2021							
pH	**9.2**	units	0.1	1		06/24/2025 13:48	*
Method: SM4500-Cl-E 2021							
Chloride	**8.5**	mg/L	2.0	1		06/24/2025 10:37	
Method: SM4500-F-C-2021							
Fluoride	**1.32**	mg/L	0.1	1		06/23/2025 18:31	
Method: USGS I-1750-85							
Total Dissolved Solids	**1780**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275005 **Date Collected:** 06/18/2025 09:10 **Matrix:** Groundwater
Sample ID: MW-19S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**696**	mg/L	25	5		06/25/2025 09:21	
Method: EPA 6010D							
Boron	**0.13**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:32	
Calcium	**4.30**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:30	
Magnesium	**3.34**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:30	
Potassium	**4.26**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:30	
Sodium	**844**	mg/L	5	5	06/19/2025 16:59	06/24/2025 15:15	
Method: SM2320 B-2021							
Alkalinity, Total	**845**	mg/L as CaCO3	20.5	1		06/24/2025 14:00	
Bicarbonate	**845**	mg/L as CaCO3	20.5	1		06/24/2025 14:00	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 14:00	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		06/24/2025 14:00	*
Method: SM4500-Cl-E 2021							
Chloride	**18.5**	mg/L	2.0	1		06/24/2025 10:38	
Method: SM4500-F-C-2021							
Fluoride	**0.77**	mg/L	0.1	1		06/23/2025 18:45	
Method: USGS I-1750-85							
Total Dissolved Solids	**2180**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275006 **Date Collected:** 06/18/2025 09:10 **Matrix:** Groundwater
Sample ID: DUP **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**738**	mg/L	25	5		06/25/2025 09:22	
Method: EPA 6010D							
Boron	**0.13**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:35	
Calcium	**4.30**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:32	
Magnesium	**3.37**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:32	
Potassium	**4.30**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:32	
Sodium	**840**	mg/L	5	5	06/19/2025 16:59	06/24/2025 15:16	
Method: SM2320 B-2021							
Alkalinity, Total	**825**	mg/L as CaCO3	20.5	1		06/24/2025 14:08	
Bicarbonate	**825**	mg/L as CaCO3	20.5	1		06/24/2025 14:08	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 14:08	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/24/2025 14:08	*
Method: SM4500-Cl-E 2021							
Chloride	**18.7**	mg/L	2.0	1		06/24/2025 10:40	
Method: SM4500-F-C-2021							
Fluoride	**0.73**	mg/L	0.1	1		06/23/2025 18:58	
Method: USGS I-1750-85							
Total Dissolved Solids	**2190**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 90275007 **Date Collected:** 06/18/2025 12:47 **Matrix:** Groundwater
Sample ID: MW-21S **Date Received:** 06/19/2025 14:35 **Collector:** Client

Temp @ Receipt (C): 3.9 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**401**	mg/L	25	5		06/25/2025 09:23	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	06/19/2025 16:59	06/26/2025 11:37	
Calcium	**4.54**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:33	
Magnesium	**3.12**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:33	
Potassium	**4.19**	mg/L	1	1	06/19/2025 16:59	06/24/2025 13:33	
Sodium	**827**	mg/L	5	5	06/19/2025 16:59	06/24/2025 15:17	
Method: SM2320 B-2021							
Alkalinity, Total	**1187**	mg/L as CaCO3	20.5	1		06/24/2025 14:17	
Bicarbonate	**1187**	mg/L as CaCO3	20.5	1		06/24/2025 14:17	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		06/24/2025 14:17	
Method: SM4500 H+ B-2021							
pH	**8.2**	units	0.1	1		06/24/2025 14:17	*
Method: SM4500-Cl-E 2021							
Chloride	**18.0**	mg/L	2.0	1		06/24/2025 10:41	
Method: SM4500-F-C-2021							
Fluoride	**1.65**	mg/L	0.1	1		06/23/2025 19:12	
Method: USGS I-1750-85							
Total Dissolved Solids	**2030**	mg/L	10	1		06/24/2025 09:43	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

QC Results Summary

WO #: 90275

Sulfate — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			100	102.0		85	115		
LFB			100	102.0		85	115		
LFB			100	102.0		85	115		
LFB			100	100.0		85	115		
LFB			100	100.0		85	115		
LFB			100	100.0		85	115		
LFB			100	100.0		85	115		
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MS/MSD	90134001		1000	80.6	82.2	85	115	1.2	20
MS/MSD	90167004		100	98.1	99.5	85	115	1.4	20
MS/MSD	90304002		100000	86.5	89.8	85	115	2.7	20
MS/MSD	90443002		10000	81.1	84.2	85	115	1.5	20
MS/MSD	90446002		500	81.0	85.8	85	115	2.6	20
MS/MSD	90448004		100	98.8	98.8	85	115	0.0	20

Chloride — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			30	97.1		90	110		
LFB			30	97.4		90	110		
LFB			30	97.3		90	110		
LFB			30	96.8		90	110		
LFB			30	96.6		90	110		
LFB			30	96.2		90	110		
LFB			30	96.0		90	110		

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Chloride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MS/MSD	89806001		30	100.2	100.1	80	120	0.0	20
MS/MSD	90166003		30	105.1	103.1	80	120	0.8	20
MS/MSD	90304007		30	101.4	101.5	80	120	0.2	20

Boron Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-OE			0.4	104.0		85	115		
MB		<0.1							
PDS/PDSD	89356001		8	107.0	108.0	75	125	0.8	20
MS/MSD	90275006		0.4	95.1	96.0	70	130	0.7	20
PDS/PDSD	90443002		2	82.3	83.0	75	125	0.6	20

Calcium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	99.8		85	115		
MB		<1							
PDS/PDSD	89096001		100	103.0	103.0	75	125	0.1	20
PDS/PDSD	89760001		100	99.5	98.1	75	125	0.8	20
PDS/PDSD	89938001		100	102.0	101.0	75	125	0.6	20
PDS/PDSD	90167005		100	101.0	102.0	75	125	0.1	20
PDS/PDSD	90304006		100	95.9	95.9	75	125	0.0	20

Magnesium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	99.0		85	115		
MB		<1							
PDS/PDSD	89096001		100	105.0	105.0	75	125	0.1	20

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Magnesium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
PDS/PDSD	89760001		100	102.0	101.0	75	125	0.8	20
PDS/PDSD	89938001		100	104.0	103.0	75	125	0.8	20
PDS/PDSD	90167005		100	102.0	101.0	75	125	0.1	20
PDS/PDSD	90304006		100	97.2	97.9	75	125	0.4	20

Potassium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	101.0		85	115		
MB		<1							
PDS/PDSD	89096001		100	103.0	103.0	75	125	0.3	20
PDS/PDSD	89760001		100	103.0	102.0	75	125	0.8	20
PDS/PDSD	89938001		100	105.0	104.0	75	125	0.8	20
PDS/PDSD	90167005		100	106.0	106.0	75	125	0.3	20
PDS/PDSD	90304006		100	102.0	105.0	75	125	2.6	20

Sodium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	98.9		85	115		
MB		<1							
PDS/PDSD	89096001		100	73.6	72.8	75	125	0.2	20
PDS/PDSD	89760001		100	104.0	105.0	75	125	0.6	20
PDS/PDSD	89938001		100	107.0	101.0	75	125	4.0	20
PDS/PDSD	90167005		100	108.0	108.0	75	125	0.1	20
PDS/PDSD	90304006		100	84.8	86.7	75	125	0.5	20

Alkalinity, Total Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			501	93.1		80	120		
LFB			410	96.9		90	110		
LFB			410	96.6		90	110		
LFB			410	95.7		90	110		
LFB			410	96.5		90	110		
LFB			410	96.3		90	110		
MB		<20.5							

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Alkalinity, Total Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
MB		<20.5							
MB		<20.5							
MB		<20.5							
MB		<20.5							
MS/MSD	90275006		410	90.5	89.3	80	120	0.8	20
MS/MSD	90304008		410	92.2	87.0	80	120	3.2	20
MS/MSD	90442002		410	91.2	91.4	80	120	0.1	20
MS/MSD	90446002		410	91.7	91.7	80	120	0.0	20

pH Units: units

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-PH			6	100.5					
CRM-PH			6	100.5					
CRM-PH			6	100.5					
CRM-PH			6	100.2					
CRM-PH			6	100.0					
DUP	90275002							0.7	20
DUP	90391001							0.1	20
DUP	90440001							0.4	20
DUP	90446002							0.9	20

Fluoride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-F			0.6	99.2		83.99	111.11		
LFB-F			0.5	94.0		90	110		
LFB-F			0.5	98.0		90	110		
LFB-F			0.5	100.0		90	110		
LFB-F			0.5	104.0		90	110		
MB-F		<0.1							
MB-F		<0.1							
MB-F		<0.1							
MB-F		<0.1							
MS/MSD-F	90275002		0.5	92.0	70.0	80	120	5.6	20

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Fluoride — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
MS/MSD-F	90295007		0.5	122.0	106.0	80	120	3.2	20
MS/MSD-F	90304007		0.5	90.0	86.0	80	120	2.1	20

Total Dissolved Solids — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			736	99.0		90.35	110.33		
MB		<10							
DUP	90168002							0.6	20

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Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coope hain of Custody
WO: 90275
Page 1 of 1

Order # (Lab Only)

Company Name and Address: Basin Electric Power Coop, Leland Olds Station, 3901 Highway 200A, Stanton, ND 58571	Account # 2040	Phone # 701-745-7238 701-557-5488	
Billing Address (indicate if different from above): Attn: Liabilities	Contact: Mark Dihle	Emails: mdihle@bepc.com aknutson@bepc.com	
	Name of Sampler: Mariah Knutson		
	Quote Number	Date Submitted: 6/19/2025	
	Project Name/Number: AVS Landfill CCR Wells	Purchase Order #: 79070801	

Lab Use Only Lab	Sample ID	Sample Matrix (GW - Groundwater)	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-17S	GW	6/18/2025	949	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-24S	GW	6/17/2025	1135	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-27S	GW	6/17/2025	1219	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-18S	GW	6/17/2025	1415	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	MW-19S	GW	6/18/2025	910	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	DUP	GW	6/18/2025	910	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-21S	GW	6/18/2025	1247	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	6/19/2025	NOON	C. Conrad	6/19/25	1435	3.9°C	Y/N	TM957
2.							Y/N	

Please submit the top copy with your samples. We will return the completed original with your results.

Account #: 2040 **Client:** Basin Electric Power Cooperative

Sample Condition Checklist

Date: 19 Jun 25 Time: 1458 Analyst: PW

Work Order #: 90275

Containers Supplied by MVTL: ☒ Yes ☐ No (Designate customer supplied containers as "Other" in container size column)

Comments:

Number of Bottles	Container Size (mL) F-(500) = Filtered	Container Type CG = Clear Glass, P = Plastic, AG = Amber Glass	Preservation	pH	Sample IDs Preservation reagent added Date/Time Analyst	Unique ID of preservation reagent added	Sample pH after preservation	Required for HNO_3 samples only (24 hours later) Sample ID pH Recheck Result Date/Time/Analyst
7	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
7	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	Oil and grease	(CG) (P) (AG) Other	HCl	n/a				
	TOC Vials	(G) (AG)	H_3PO_4	n/a				
	DOC Vials	(G) (AG)	None H_3PO_4	n/a				

(Handwritten circles: row 1 — (1000), (P), NONE; row 2 — (500), (P), HNO_3, <2.)

*All samples requiring analyses performed outside of the Bismarck laboratory (New Ulm and Sub-Contract) are not documented on this form.
*All samples requiring microbiological tests are not documented on this form.

Form #80-910025-2 M:\Documents\FORMS\Approved Templates\Bismarck\Waters\80-910025-2 Sample Condition Checklist Page 1 of 1 Effective Date : 1 July 2024

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Account #: 2040 **Client:** Basin Electric Power Cooperative
Workorder: AVS Landfill CCR (97784) **PO:** 790708-01

Mark Dihle
Basin Electric Power Cooperative
1717 E. Interstate Avenue
Bismarck, ND 58503

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 97784001 **Date Collected:** 08/26/2025 09:03 **Matrix:** Groundwater
Sample ID: MW-19S **Date Received:** 08/27/2025 14:44 **Collector:** Client

Temp @ Receipt (C): 1.4 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**765**	mg/L	25	5		09/03/2025 10:55	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	08/27/2025 16:36	09/08/2025 11:59	
Calcium	**4.17**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:12	
Magnesium	**3.27**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:12	
Potassium	**4.40**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:12	
Sodium	**808**	mg/L	5	5	08/27/2025 16:36	08/29/2025 11:41	
Method: SM2320 B-2021							
Alkalinity, Total	**838**	mg/L as CaCO3	20.5	1		08/27/2025 21:58	
Bicarbonate	**838**	mg/L as CaCO3	20.5	1		08/27/2025 21:58	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		08/27/2025 21:58	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		08/27/2025 21:58	*
Method: SM4500-Cl-E 2021							
Chloride	**18.8**	mg/L	2.0	1		09/02/2025 10:49	
Method: SM4500-F-C-2021							
Fluoride	**0.66**	mg/L	0.1	1		08/27/2025 21:58	
Method: USGS I-1750-85							
Total Dissolved Solids	**2170**	mg/L	10	1		08/29/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 97784002 **Date Collected:** 08/26/2025 09:03 **Matrix:** Groundwater
Sample ID: DUP **Date Received:** 08/27/2025 14:44 **Collector:** Client

Temp @ Receipt (C): 1.4 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**749**	mg/L	25	5		09/03/2025 10:56	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	08/27/2025 16:36	09/08/2025 12:01	
Calcium	**4.14**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:13	
Magnesium	**3.28**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:13	
Potassium	**4.36**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:13	
Sodium	**827**	mg/L	5	5	08/27/2025 16:36	08/29/2025 11:42	
Method: SM2320 B-2021							
Alkalinity, Total	**851**	mg/L as CaCO3	20.5	1		08/27/2025 22:09	
Bicarbonate	**851**	mg/L as CaCO3	20.5	1		08/27/2025 22:09	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		08/27/2025 22:09	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		08/27/2025 22:09	*
Method: SM4500-Cl-E 2021							
Chloride	**18.9**	mg/L	2.0	1		09/02/2025 10:50	
Method: SM4500-F-C-2021							
Fluoride	**0.68**	mg/L	0.1	1		08/27/2025 22:09	
Method: USGS I-1750-85							
Total Dissolved Solids	**2170**	mg/L	10	1		08/29/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 97784003 **Date Collected:** 08/26/2025 11:37 **Matrix:** Groundwater
Sample ID: MW-18S **Date Received:** 08/27/2025 14:44 **Collector:** Client

Temp @ Receipt (C): 1.4 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**596**	mg/L	25	5		09/03/2025 10:57	
Method: EPA 6010D							
Boron	<0.1	mg/L	0.1	1	08/27/2025 16:36	09/08/2025 12:02	
Calcium	**4.29**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:15	
Magnesium	**1.69**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:15	
Potassium	**4.08**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:15	
Sodium	**679**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:15	
Method: SM2320 B-2021							
Alkalinity, Total	**846**	mg/L as CaCO3	20.5	1		08/27/2025 22:20	
Bicarbonate	**662**	mg/L as CaCO3	20.5	1		08/27/2025 22:20	
Carbonate	**183**	mg/L as CaCO3	20.5	1		08/27/2025 22:20	
Method: SM4500 H+ B-2021							
pH	**9.2**	units	0.1	1		08/27/2025 22:20	*
Method: SM4500-Cl-E 2021							
Chloride	**8.7**	mg/L	2.0	1		09/02/2025 10:52	
Method: SM4500-F-C-2021							
Fluoride	**1.23**	mg/L	0.1	1		08/27/2025 22:20	
Method: USGS I-1750-85							
Total Dissolved Solids	**1860**	mg/L	10	1		08/29/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 97784004 **Date Collected:** 08/26/2025 14:03 **Matrix:** Groundwater
Sample ID: MW-21S **Date Received:** 08/27/2025 14:44 **Collector:** Client

Temp @ Receipt (C): 1.4 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**403**	mg/L	25	5		09/03/2025 10:59	
Method: EPA 6010D							
Boron	**0.11**	mg/L	0.1	1	08/27/2025 16:36	09/08/2025 12:02	
Calcium	**4.16**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:18	
Magnesium	**2.96**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:18	
Potassium	**4.23**	mg/L	1	1	08/27/2025 16:36	08/29/2025 13:18	
Sodium	**794**	mg/L	5	5	08/27/2025 16:36	08/29/2025 11:46	
Method: SM2320 B-2021							
Alkalinity, Total	**1189**	mg/L as CaCO3	20.5	1		08/27/2025 22:33	
Bicarbonate	**1189**	mg/L as CaCO3	20.5	1		08/27/2025 22:33	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		08/27/2025 22:33	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		08/27/2025 22:33	*
Method: SM4500-Cl-E 2021							
Chloride	**18.0**	mg/L	2.0	1		09/02/2025 10:53	
Method: SM4500-F-C-2021							
Fluoride	**1.53**	mg/L	0.1	1		08/27/2025 22:33	
Method: USGS I-1750-85							
Total Dissolved Solids	**1990**	mg/L	10	1		08/29/2025 15:38	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 97784005 **Date Collected:** 08/26/2025 14:35 **Matrix:** Surface Water
Sample ID: AVS Leachate Pond **Date Received:** 08/27/2025 14:44 **Collector:** Client

Temp @ Receipt (C): 1.4 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**5790**	mg/L	100	20		09/03/2025 11:00	
Method: EPA 353.2							
Nitrate + Nitrite as N	**4.80**	mg/L	4	20		09/04/2025 15:39	
Method: EPA 6010D							
Boron	**0.96**	mg/L	0.5	5	08/27/2025 16:36	09/08/2025 12:03	
Calcium	**312**	mg/L	20	20	08/27/2025 16:36	08/29/2025 11:47	
Iron	**2.60**	mg/L	0.5	5	08/27/2025 16:36	08/28/2025 16:19	*
Magnesium	**72.2**	mg/L	20	20	08/27/2025 16:36	08/29/2025 11:47	
Manganese	**0.72**	mg/L	0.25	5	08/27/2025 16:36	08/28/2025 16:19	*
Potassium	**233**	mg/L	20	20	08/27/2025 16:36	08/29/2025 11:47	
Sodium	**3080**	mg/L	20	20	08/27/2025 16:36	08/29/2025 11:47	
Method: EPA 6020B							
Arsenic	**0.1657**	mg/L	0.002	5	08/27/2025 16:36	09/02/2025 11:39	
Barium	**0.2089**	mg/L	0.004	10	08/27/2025 16:36	09/02/2025 11:34	
Cadmium	**0.0021**	mg/L	0.0005	5	08/27/2025 16:36	09/02/2025 11:39	
Chromium	**0.3005**	mg/L	0.004	10	08/27/2025 16:36	09/02/2025 11:34	
Lead	**0.0019**	mg/L	0.0005	5	08/27/2025 16:36	09/02/2025 11:39	
Molybdenum	**1.962**	mg/L	0.02	50	08/27/2025 16:36	09/02/2025 11:29	
Selenium	**0.1213**	mg/L	0.005	5	08/27/2025 16:36	09/02/2025 11:39	
Method: SM2320 B-2021							
Alkalinity, Total	**293**	mg/L as CaCO3	20.5	1		08/27/2025 22:44	
Method: SM4500-Cl-E 2021							
Chloride	**368**	mg/L	20.0	10		09/02/2025 10:54	
Method: USGS I-1750-85							
Total Dissolved Solids	**11500**	mg/L	10	1		08/29/2025 15:38	

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Analysis Results Comments

Iron

Matrix spike and/or matrix spike duplicate recovery was low; the associated laboratory control sample recovery was acceptable.

Manganese

Matrix spike and/or matrix spike duplicate recovery was low; the associated laboratory control sample recovery was acceptable.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Minnesota Valley Testing Laboratories, Inc.
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coop
WO: 97784

Chain of Custody

Page __1__ of __1__

Work Order #
Lab Use Only

Company Name and Address: Basin Electric Power Coop. / Leland Olds Station / 3901 Highway 200A / Stanton, ND 58571	Account #: 2040
Billing Address (indicate if different from above): Attn: Liabilities	Phone #: 701-745-7238 701-557-5488
	Contact: Mark Dihle
	Emails: mdihle@bepc.com aknutson@bepc.com
	Name of Sampler: Mariah Knutson
	Quote Number:
	Date Submitted: 8/27/2025
	Project Name/Number: AVS Landfill CCR
	Purchase Order #: 790708-01

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-19S	GW	8/26/2025	903	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	DUP	GW	8/26/2025	903	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-18S	GW	8/26/2025	1137	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-21S	GW	8/26/2025	1403	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	AVS LEACHATE POND	SW	8/26/2025	1435	1	N	Total Metals: Mn,Se,Ba,Cd,Cr,B,Mo,As,Pb,Fe,Ca,Mg,Na,K, Cl,So4, NO2, NO3,TDS, Alkalinity

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	8/27/2025	NOON		27Aug25	1444	1.4°C	Y / N	IR805
2.							Y / N	

Please submit the top copy with your samples. We will return the completed original with your results.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Sample Condition Checklist

Date: 27 Aug 25 Time: 1543 Analyst: BW

Work Order #: 97754

Containers Supplied by MVTL: [X] Yes [ ] No (Designate customer supplied containers as "Other" in container size column)

Comments:

Number of Bottles	Container Size (mL) F-(500) = Filtered	Container Type CG = Clear Glass, P = Plastic, AG = Amber Glass	Preservation	pH	Sample IDs Preservation reagent added Date/Time Analyst	Unique ID of preservation reagent added	Sample pH after preservation	Required for HNO_3 samples only (24 hours later) Sample ID pH Recheck Result Date/Time/Analyst
6	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
6	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	Oil and grease	(CG) (P) (AG) Other	HCl	n/a				
	TOC Vials	(G) (AG)	H_3PO_4	n/a				
	DOC Vials	(G) (AG)	None H_3PO_4	n/a				

*All samples requiring analyses performed outside of the Bismarck laboratory (New Ulm and Sub-Contract) are not documented on this form.
*All samples requiring microbiological tests are not documented on this form.

Form #80-910025-2

M:\Documents\FORMS\Approved Templates\Bismarck\Waters\80-910025-2 Sample Condition Checklist
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Effective Date : 1 July 2024

Report Date: Tuesday, September 9, 2025 9:31:41 AM

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative
Workorder: AVS Landfill CCR Wells (103535) **PO:** 790708-01

Mark Dihle
Basin Electric Power Cooperative
1717 E. Interstate Avenue
Bismarck, ND 58503

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535001 **Date Collected:** 10/07/2025 10:04 **Matrix:** Groundwater
Sample ID: MW-15S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**486**	mg/L	25	5		10/15/2025 13:43	
Method: EPA 6010D							
Boron	**0.11**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:56	
Calcium	**3.93**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:35	
Magnesium	**2.70**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:35	
Potassium	**4.04**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:35	
Sodium	**727**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:35	
Method: SM2320 B-2021							
Alkalinity, Total	**1074**	mg/L as CaCO3	20.5	1		10/10/2025 18:00	
Bicarbonate	**1074**	mg/L as CaCO3	20.5	1		10/10/2025 18:00	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 18:00	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		10/10/2025 18:00	*
Method: SM4500-Cl-E 2021							
Chloride	**13.1**	mg/L	2.0	1		10/14/2025 11:55	
Method: SM4500-F-C-2021							
Fluoride	**1.40**	mg/L	0.1	1		10/10/2025 18:00	
Method: USGS I-1750-85							
Total Dissolved Solids	**1930**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535002 **Date Collected:** 10/07/2025 10:52 **Matrix:** Groundwater
Sample ID: MW-20S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**74.8**	mg/L	5	1		10/15/2025 13:44	
Method: EPA 6010D							
Boron	**0.13**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:56	
Calcium	**6.19**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:37	
Magnesium	**3.38**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:37	
Potassium	**4.56**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:37	
Sodium	**755**	mg/L	2	2	10/09/2025 16:13	10/20/2025 15:37	
Method: SM2320 B-2021							
Alkalinity, Total	**1380**	mg/L as CaCO3	20.5	1		10/10/2025 18:11	
Bicarbonate	**1380**	mg/L as CaCO3	20.5	1		10/10/2025 18:11	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 18:11	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		10/10/2025 18:11	*
Method: SM4500-Cl-E 2021							
Chloride	**25.6**	mg/L	2.0	1		10/14/2025 11:56	
Method: SM4500-F-C-2021							
Fluoride	**1.20**	mg/L	0.1	1		10/10/2025 18:11	
Method: USGS I-1750-85							
Total Dissolved Solids	**1800**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535003 **Date Collected:** 10/08/2025 08:16 **Matrix:** Groundwater
Sample ID: MW-16S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**125**	mg/L	5	1		10/15/2025 13:45	
Method: EPA 6010D							
Boron	**0.15**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:57	
Calcium	**3.71**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:38	
Magnesium	**2.35**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:38	
Potassium	**3.70**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:38	
Sodium	**657**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:38	
Method: SM2320 B-2021							
Alkalinity, Total	**739**	mg/L as CaCO3	20.5	1		10/10/2025 18:23	
Bicarbonate	**730**	mg/L as CaCO3	20.5	1		10/10/2025 18:23	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 18:23	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 18:23	*
Method: SM4500-Cl-E 2021							
Chloride	**32.6**	mg/L	2.0	1		10/14/2025 11:58	
Method: SM4500-F-C-2021							
Fluoride	**2.37**	mg/L	0.1	1		10/10/2025 18:23	
Method: USGS I-1750-85							
Total Dissolved Solids	**1150**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535004 **Date Collected:** 10/08/2025 09:34 **Matrix:** Groundwater
Sample ID: MW-17S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**300**	mg/L	25	5		10/15/2025 13:46	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:57	
Calcium	**3.72**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:42	
Magnesium	**2.28**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:42	
Potassium	**3.66**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:42	
Sodium	**674**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:42	
Method: SM2320 B-2021							
Alkalinity, Total	**1125**	mg/L as CaCO3	20.5	1		10/10/2025 18:36	
Bicarbonate	**1125**	mg/L as CaCO3	20.5	1		10/10/2025 18:36	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 18:36	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		10/10/2025 18:36	*
Method: SM4500-Cl-E 2021							
Chloride	**13.6**	mg/L	2.0	1		10/14/2025 11:59	
Method: SM4500-F-C-2021							
Fluoride	**1.48**	mg/L	0.1	1		10/10/2025 18:36	*
Method: USGS I-1750-85							
Total Dissolved Solids	**1740**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

Fluoride

Matrix spike and/or matrix spike duplicate recovery was high; the associated laboratory fortified blank recovery was acceptable.

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535005 **Date Collected:** 10/08/2025 11:16 **Matrix:** Groundwater
Sample ID: MW-22S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**234**	mg/L	25	5		10/15/2025 13:54	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:58	
Calcium	**2.56**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:43	
Magnesium	**2.03**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:43	
Potassium	**3.53**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:43	
Sodium	**641**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:43	
Method: SM2320 B-2021							
Alkalinity, Total	**1042**	mg/L as CaCO3	20.5	1		10/10/2025 18:48	
Bicarbonate	**1027**	mg/L as CaCO3	20.5	1		10/10/2025 18:48	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 18:48	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 18:48	*
Method: SM4500-Cl-E 2021							
Chloride	**11.4**	mg/L	2.0	1		10/14/2025 12:00	
Method: SM4500-F-C-2021							
Fluoride	**1.84**	mg/L	0.1	1		10/10/2025 18:48	
Method: USGS I-1750-85							
Total Dissolved Solids	**1610**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535006 **Date Collected:** 10/08/2025 11:16 **Matrix:** Groundwater
Sample ID: DUP **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**247**	mg/L	25	5		10/15/2025 13:48	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	10/09/2025 16:13	10/13/2025 15:59	
Calcium	**2.55**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:44	
Magnesium	**2.03**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:44	
Potassium	**3.47**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:44	
Sodium	**640**	mg/L	1	1	10/09/2025 16:13	10/20/2025 15:44	
Method: SM2320 B-2021							
Alkalinity, Total	**1062**	mg/L as CaCO3	20.5	1		10/10/2025 19:01	
Bicarbonate	**1047**	mg/L as CaCO3	20.5	1		10/10/2025 19:01	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 19:01	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 19:01	*
Method: SM4500-Cl-E 2021							
Chloride	**11.2**	mg/L	2.0	1		10/14/2025 12:01	
Method: SM4500-F-C-2021							
Fluoride	**1.84**	mg/L	0.1	1		10/10/2025 19:01	
Method: USGS I-1750-85							
Total Dissolved Solids	**1660**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535007 **Date Collected:** 10/08/2025 12:18 **Matrix:** Groundwater
Sample ID: MW-25S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**36.0**	mg/L	5	1		10/15/2025 14:02	
Method: EPA 6010D							
Boron	**0.14**	mg/L	0.1	1	10/10/2025 16:15	10/13/2025 16:02	
Calcium	**4.56**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:52	
Magnesium	**3.40**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:52	
Potassium	**4.50**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:52	
Sodium	**834**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:52	
Method: SM2320 B-2021							
Alkalinity, Total	**1553**	mg/L as CaCO3	20.5	1		10/10/2025 19:14	
Bicarbonate	**1529**	mg/L as CaCO3	20.5	1		10/10/2025 19:14	
Carbonate	**24**	mg/L as CaCO3	20.5	1		10/10/2025 19:14	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 19:14	*
Method: SM4500-Cl-E 2021							
Chloride	**40.4**	mg/L	2.0	1		10/14/2025 12:02	
Method: SM4500-F-C-2021							
Fluoride	**1.42**	mg/L	0.1	1		10/10/2025 19:14	
Method: USGS I-1750-85							
Total Dissolved Solids	**1940**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535008 **Date Collected:** 10/08/2025 13:47 **Matrix:** Groundwater
Sample ID: MW-26S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**120**	mg/L	5	1		10/15/2025 14:04	
Method: EPA 6010D							
Boron	**0.12**	mg/L	0.1	1	10/10/2025 16:15	10/13/2025 16:04	
Calcium	**17.3**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:53	
Magnesium	**3.31**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:53	
Potassium	**5.21**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:53	
Sodium	**746**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:53	
Method: SM2320 B-2021							
Alkalinity, Total	**1382**	mg/L as CaCO3	20.5	1		10/10/2025 19:28	
Bicarbonate	**1367**	mg/L as CaCO3	20.5	1		10/10/2025 19:28	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 19:28	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 19:28	*
Method: SM4500-Cl-E 2021							
Chloride	**31.5**	mg/L	2.0	1		10/14/2025 12:09	
Method: SM4500-F-C-2021							
Fluoride	**1.36**	mg/L	0.1	1		10/10/2025 19:28	
Method: USGS I-1750-85							
Total Dissolved Solids	**1870**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535009 **Date Collected:** 10/08/2025 14:45 **Matrix:** Groundwater
Sample ID: MW-24S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**52.6**	mg/L	5	1		10/15/2025 14:05	
Method: EPA 6010D							
Boron	**0.10**	mg/L	0.1	1	10/10/2025 16:15	10/13/2025 16:04	
Calcium	**4.54**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:55	
Magnesium	**3.48**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:55	
Potassium	**4.58**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:55	
Sodium	**841**	mg/L	2	2	10/10/2025 16:15	10/20/2025 15:55	
Method: SM2320 B-2021							
Alkalinity, Total	**1540**	mg/L as CaCO3	20.5	1		10/10/2025 21:38	
Bicarbonate	**1509**	mg/L as CaCO3	20.5	1		10/10/2025 21:38	
Carbonate	**31**	mg/L as CaCO3	20.5	1		10/10/2025 21:38	
Method: SM4500 H+ B-2021							
pH	**8.4**	units	0.1	1		10/10/2025 21:38	*
Method: SM4500-Cl-E 2021							
Chloride	**49.7**	mg/L	2.0	1		10/14/2025 12:11	
Method: SM4500-F-C-2021							
Fluoride	**1.61**	mg/L	0.1	1		10/10/2025 21:38	
Method: USGS I-1750-85							
Total Dissolved Solids	**2040**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Analytical Results

Lab ID: 103535010 **Date Collected:** 10/08/2025 13:09 **Matrix:** Groundwater
Sample ID: MW-27S **Date Received:** 10/09/2025 14:43 **Collector:** Client

Temp @ Receipt (C): 5.0 **Received on Ice:** Yes

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	Qual
Method: ASTM D516-16							
Sulfate	**141**	mg/L	25	5		10/15/2025 14:06	
Method: EPA 6010D							
Boron	**0.21**	mg/L	0.1	1	10/10/2025 16:15	10/13/2025 16:05	
Calcium	**58.1**	mg/L	5	5	10/10/2025 16:15	10/20/2025 15:56	
Magnesium	**27.4**	mg/L	5	5	10/10/2025 16:15	10/20/2025 15:56	
Potassium	**11.1**	mg/L	5	5	10/10/2025 16:15	10/20/2025 15:56	
Sodium	**952**	mg/L	5	5	10/10/2025 16:15	10/20/2025 15:56	
Method: SM2320 B-2021							
Alkalinity, Total	**1686**	mg/L as CaCO3	20.5	1		10/10/2025 21:52	
Bicarbonate	**1678**	mg/L as CaCO3	20.5	1		10/10/2025 21:52	
Carbonate	<20.5	mg/L as CaCO3	20.5	1		10/10/2025 21:52	
Method: SM4500 H+ B-2021							
pH	**8.3**	units	0.1	1		10/10/2025 21:52	*
Method: SM4500-Cl-E 2021							
Chloride	**65.0**	mg/L	10.0	5		10/14/2025 12:12	
Method: SM4500-F-C-2021							
Fluoride	**1.48**	mg/L	0.1	1		10/10/2025 21:52	
Method: USGS I-1750-85							
Total Dissolved Solids	**2370**	mg/L	10	1		10/10/2025 15:21	

Analysis Results Comments

pH

Sample analyzed beyond holding time.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

QC Results Summary — WO #: 103535

Sulfate — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			100	100.0		85	115		
LFB			100	96.9		85	115		
LFB			100	93.7		85	115		
LFB			100	96.4		85	115		
LFB			100	94.3		85	115		
LFB			100	99.3		85	115		
LFB			100	104.0		85	115		
LFB			100	110.0		85	115		
LFB			100	107.0		85	115		
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MB		<5							
MS/MSD	103146005		500	80.4	83.0	85	115	1.8	20
MS/MSD	103212003		1000	75.9	77.6	85	115	1.2	20
MS/MSD	103374004		2000	66.9	72.8	85	115	3.6	20
MS/MSD	103380005		500	93.4	93.9	85	115	0.4	20
MS/MSD	103380013		4000	72.7	69.5	85	115	1.5	20
MS/MSD	103395008		1000	99.5	103.9	85	115	2.2	20
MS/MSD	103535005		500	99.5	100.2	85	115	0.5	20
MS/MSD	103708001		1000	90.3	94.5	85	115	2.3	20
MS/MSD	103813002		100	110.0	110.2	85	115	0.0	20

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Chloride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB			30	97.3		90	110		
LFB			30	97.5		90	110		
LFB			30	97.8		90	110		
LFB			30	97.9		90	110		
LFB			30	97.3		90	110		
LFB			30	97.1		90	110		
LFB			30	97.0		90	110		
LFB			30	97.1		90	110		
LFB			30	97.3		90	110		
LFB			30	96.5		90	110		
LFB			30	97.3		90	110		
LFB			30	97.0		90	110		
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MB		<2.0							
MS/MSD	103185005		30	98.8	100.6	80	120	0.9	20
MS/MSD	103212003		30	99.7	99.0	80	120	0.5	20
MS/MSD	103380005		600	110.9	115.2	80	120	0.8	20
MS/MSD	103431001		30	88.1	95.3	80	120	1.6	20
MS/MSD	103646004		30	79.6	77.6	80	120	0.4	20

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Chloride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
MS/MSD	103708001		30	100.3	98.2	80	120	0.8	20

Boron Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-OE			0.4	93.5		85	115		
LFB-OE			0.4	104.0		85	115		
MB		<0.1							
MB		<0.1							
PDS/PDSD	102682017		8	87.5	86.8	75	125	0.3	20
PDS/PDSD	103496001		4	87.4	88.9	75	125	1.0	20
MS/MSD	103535007		0.4	92.5	91.3	70	130	1.0	20

Calcium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	107.0		85	115		
LFB-MI			100	108.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	103369003		500	105.0	105.0	75	125	0.1	20
PDS/PDSD	103380005		500	97.7	99.3	75	125	0.5	20
PDS/PDSD	103380012		500	96.6	97.0	75	125	0.2	20
DUP	103471001							0.9	20
PDS/PDSD	103502002		100	102.0	101.0	75	125	0.6	20
PDS/PDSD	103571001		100	94.5	95.2	75	125	0.3	20
PDS/PDSD	103571003		100	92.4	94.5	75	125	1.1	20
PDS/PDSD	103927008		100	101.0	102.0	75	125	0.6	20

Magnesium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	106.0		85	115		
LFB-MI			100	108.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	103369003		500	105.0	105.0	75	125	0.2	20

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Magnesium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
PDS/PDSD	103380005		500	102.0	102.0	75	125	0.5	20
PDS/PDSD	103380012		500	101.0	101.0	75	125	0.2	20
DUP	103471001							0.7	20
PDS/PDSD	103502002		100	103.0	102.0	75	125	0.6	20
PDS/PDSD	103571001		100	89.9	90.7	75	125	0.3	20
PDS/PDSD	103571003		100	86.2	89.5	75	125	1.2	20
PDS/PDSD	103927008		100	99.4	99.7	75	125	0.2	20

Potassium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	103.0		85	115		
LFB-MI			100	105.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	103369003		500	95.4	97.5	75	125	1.1	20
PDS/PDSD	103380005		500	104.0	104.0	75	125	0.5	20
PDS/PDSD	103380012		500	104.0	104.0	75	125	0.2	20
DUP	103471001							0.9	20
PDS/PDSD	103502002		100	102.0	101.0	75	125	0.5	20
PDS/PDSD	103571001		100	100.0	101.0	75	125	0.5	20
PDS/PDSD	103571003		100	97.3	99.8	75	125	1.9	20
PDS/PDSD	103927008		100	100.0	99.5	75	125	0.6	20

Sodium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
LFB-MI			100	104.0		85	115		
LFB-MI			100	106.0		85	115		
MB		<1							
MB		<1							
PDS/PDSD	103369003		500	99.5	99.0	75	125	0.3	20
PDS/PDSD	103380005		500	93.2	94.2	75	125	0.5	20
PDS/PDSD	103380012		500	102.0	102.0	75	125	0.4	20
DUP	103471001							1.9	20

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Sodium Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
PDS/PDSD	103502002		100	81.4	79.3	75	125	0.6	20
PDS/PDSD	103571001		100	78.6	79.7	75	125	0.3	20
PDS/PDSD	103571003		100	75.0	76.2	75	125	0.3	20
PDS/PDSD	103927008		100	96.8	98.5	75	125	0.9	20

Alkalinity, Total Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			501	94.0		80	120		
LFB			410	96.6		90	110		
LFB			410	96.8		90	110		
LFB			410	94.3		90	110		
LFB			410	96.1		90	110		
MB		<20.5							
MB		<20.5							
MB		<20.5							
MB		<20.5							
MS/MSD	103369004		410	82.4	86.6	80	120	1.7	20
MS/MSD	103535002		410	86.3	98.6	80	120	2.8	20
MS/MSD	103577001		410	65.5	65.6	80	120	0.3	20

pH Units: units

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-PH			6	99.7					
CRM-PH			6	99.7					
CRM-PH			6	99.5					
DUP	103502002							0.8	20

Fluoride Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM-F			3.34	103.0		83.83	111.07		
LFB-F			0.5	102.0		90	110		
LFB-F			0.5	100.0		90	110		
LFB-F			0.5	102.0		90	110		
MB-F		<0.1							

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1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 515-382-5486 ~ Fax 515-382-3885
www.MVTL.com

Member ACIL

Account #: 2040 **Client:** Basin Electric Power Cooperative

Fluoride — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
MB-F		<0.1							
MB-F		<0.1							
MS/MSD	103535004		0.5	136.0	108.0	80	120	6.7	20
MS/MSD	103583001		0.5	100.0	98.0	80	120	0.6	20

Total Dissolved Solids — Units: mg/L

QC Type	Original Sample ID	Blank Result	Spike Amount	Spike % Recovery	Spike Duplicate % Recovery	Lower Control Limit (%)	Upper Control Limit (%)	RPD (%)	RPD Limit (%)
CRM			736	100.0		90.35	110.33		
MB		<10							
DUP	103535007							0.5	20
DUP	103575001							0.7	20

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Toll Free: (800) 279-6885 Fax: (701) 258-9724

Basin Electric Power Coop
WO: 103535

Chain of Custody

Page __1__ of __1___

Work Order #
Lab Use Only

Company Name and Address Basin Electric Power Coop. Leland Olds Station 3901 Highway 200A Stanton, ND 58571	Account # 2040	Phone # 701-745-7238 701-557-5468
	Contact Mark Dihle	Emails mdihle@bepc.com aknutson@bepc.com
Billing Address (Indicate if different from above) Attn: Liabilities	Name of Sampler Mariah Knutson	
	Quote Number	Date Submitted 10/9/2025
	Project Name/Number AVS Landfill CCR Wells	Purchase Order # 79070801

Lab Use Only Lab	Sample ID	Sample Matrix GW - Groundwater	Date Sampled	Time Sampled	# of	Filtered	Analysis Required
001	MW-15S	GW	10/7/2025	1004	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
002	MW-20S	GW	10/7/2025	1052	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
003	MW-16S	GW	10/8/2025	816	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
004	MW-17S	GW	10/8/2025	934	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
005	MW-22S	GW	10/8/2025	1116	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
006	DUP	GW	10/8/2025	1116	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
007	MW-25S	GW	10/8/2025	1218	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
008	MW-26S	GW	10/8/2025	1347	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
009	MW-24S	GW	10/8/2025	1445	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,
010	MW-27S	GW	10/8/2025	1309	2	N	B, Ca, Cl, F, SO4, TDS, Mg, Na, K, Alkalinity, (Total Carbonate, Bicarbonate), pH,

Comments:

Transferred by	Date	Time	Received by	Date	Time	Temp	ROI	Therm. #
1. MILLENIUM EXPRESS	10/9/2025	NOON		10/9/25	1443	5.0°C	Y / N	TM95
2.							Y / N	

Please submit the top copy with your samples. We will return the completed original with your results.

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Account #: 2040 **Client:** Basin Electric Power Cooperative

Sample Condition Checklist

Date: 9OCT25 Time: 1550 Analyst: CC

Work Order #: 163535

Containers Supplied by MVTL: ☒ Yes ☐ No (Designate customer supplied containers as "Other" in container size column)

Comments:

Number of Bottles	Container Size (mL) F-(500) = Filtered	Container Type CG = Clear Glass, P = Plastic, AG = Amber Glass	Preservation	pH	Sample IDs Preservation reagent added Date/Time Analyst	Unique ID of preservation reagent added	Sample pH after preservation	Required for HNO_3 samples only (24 hours later) Sample ID pH Recheck Result Date/Time/Analyst
10	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
10	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	(125) (250) (500) F-(500) (1000) Other	(CG) (P) (AG) Other	NONE HNO_3 H_2SO_4 NaOH NaOH/ZnAcet HCl	<2 >12				
	Oil and grease	(CG) (P) (AG) Other	HCl	n/a				
	TOC Vials	(G) (AG)	H_3PO_4	n/a				
	DOC Vials	(G) (AG)	None H_3PO_4	n/a				

*All samples requiring analyses performed outside of the Bismarck laboratory (New Ulm and Sub-Contract) are not documented on this form.
*All samples requiring microbiological tests are not documented on this form.

Form #80-910025-2

M:\Documents\FORMS\Approved Templates\Bismarck\Waters\80-910025-2 Sample Condition Checklist.xlsx
Page 1 of 1

Effective Date : 1 July 2024

Attachment B

Statistical Evaluation

Technical Memorandum

To: Mark Dihle, Basin Electric Power Cooperative
From: Barr Engineering Co.
Subject: Alternative Source Demonstration (ASD), Antelope Valley Station (Fall 2024)
Date: March 28, 2025
Project: 34291134.00

1 Introduction

Basin Electric Power Cooperative (Basin Electric) owns and operates Antelope Valley Station (AVS), comprised of a coal-fired generating station consisting of two power generating units, located in Beulah, North Dakota (Figure 1). Unit 1 coal-based operations began in 1984, and Unit 2 operations began in 1986. The landfill (Site or CCR Landfill) was permitted by the North Dakota Department of Environmental Quality (NDDEQ) in 1995 under Permit SP-160 (now designated 0160) and began accepting coal combustion residuals (CCR) in 1996. The most recent Permit 0160 was issued by NDDEQ in early 2022, and the most recent cell including a composite liner system and leachate collection system was constructed the same year. Basin Electric utilizes a consulting firm, Barr Engineering Co. (Barr) to assist in groundwater reporting and analysis. Barr is familiar with the site and installed and certified the most recent wells (MW-25S, MW-26S, and MW-27S) added to the network. Barr has reviewed the historical groundwater data and CCR information for the site and is knowledgeable about facility design and operation.

The CCRs including fly ash, bottom ash, and flue gas desulfurization (FGD) waste are managed at the Site along with other minor wastes accepted as per the NDDEQ permit. The CCR unit is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) and the NDDEQ CCR Rule (NDAC Title 33.1, Article 20, Chapter 8).

Basin Electric has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261) for the Site. As part of the Detection Monitoring Program, statistically significant increases (SSIs) in monitored groundwater quality parameters over background were identified at the Site for the following monitoring wells during semi-annual detection monitoring completed in the fall of 2024 on October 1-2 and 8, 2024:

- MW-16S – Chloride
- MW-20S – Chloride
- MW-24S – Chloride
- MW-25S – Chloride
- MW-26S – Chloride
- MW-27S – Boron, calcium, and chloride

The CCR Rule (US EPA, 2015) § 257.94(e)(2) allows for an alternative source demonstration (ASD) in the event of an identified SSI in a water quality parameter in a downgradient monitoring well over background levels:

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.*

The purpose of this work is to evaluate the data collected as part of the October 2024 monitoring event, along with historical data, to demonstrate if the SSIs are the results of a "source other than the CCR unit" or due to natural variation in groundwater quality or an error in sampling, analysis, or statistical evaluation. Nothing in the foregoing citation of the rule requires that the owner/operator disprove any and all potential counterarguments that EPA or others may offer to refute this demonstration. Such arguments if valid, would need to follow requirements of the rule to show a basis in fact that includes rule requirements that are based on site-specific information, and must be certified by a North Dakota licensed professional engineer. This memorandum provides a science-based reason for the data results that indicate a source other than the CCR unit.

This memorandum provides written documentation of an Alternative Source Demonstration (ASD) and certification of accuracy as described in the CCR Rule (§ 257.94(e)(2)).

1.1 Background Information

Figure 1 shows the site location and Figure 2 provides well locations. A piezometric surface map showing groundwater elevations in the lignite, which represent the uppermost aquifer in the vicinity of the CCR landfill, is presented on Figure 3, using measurements from October 2024. Groundwater generally flows from southwest to northeast.

In late 2023, three new landfill expansion wells, MW-25S, MW-26S, and MW-27S, were installed at the Site. Baseline sampling was initiated in June 2024, and these wells were first evaluated in the detection monitoring program in June 2024. There is limited data at these locations for historical comparison.

A comparison of the detection monitoring groundwater results with the prediction limits calculated using the 2016-2023 background assessment data from upgradient wells MW-18S, MW-19S, and MW-21S are included in Table 1. Concentrations for Appendix III parameters observed in October 2024 are shown on time series graphs in Attachment A. Chloride concentrations at MW-16S, MW-20S, and MW-24S are consistent with those observed during baseline monitoring events. Baseline monitoring for MW-25S, MW-26S, and MW-27S is ongoing.

Table 1 SSIs Compared to Prediction Limits

Event	Well	Parameter (units)	Measured	Interwell Prediction Limit
Detection Monitoring – 2024 #2 (Fall)	MW-16S	Chloride (mg/L)	26.0	18.7
	MW-20S	Chloride (mg/L)	25.8	18.7
	MW-24S	Chloride (mg/L)	50.0	18.7
	MW-25S	Chloride (mg/L)	42.3	18.7
	MW-26S	Chloride (mg/L)	29.7	18.7
	MW-27S	Boron (mg/L)	0.40	0.17
	MW-27S	Calcium (mg/L)	206	13.0
	MW-27S	Chloride (mg/L)	62.0	18.7

1.2 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in § 257.95(g) (3):

> *Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must… Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in Appendix III and Appendix IV of this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority.*

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (January 3, 2025) following the review and analysis of the results provided in the final laboratory report which was received on October 18, 2024.

2 Potential Alternative Sources Review

The CCR Rule provides five potential alternative source categories:

1. A source other than the CCR unit
2. Sampling (or sampling equipment) methods

3. Laboratory methods
4. Statistical methods
5. Natural variation in groundwater quality

Site data were evaluated to identify potential causes for chloride concentrations in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S; and boron, calcium, and chloride concentrations in MW-27S exceeding interwell prediction limits. Chloride is naturally occurring and may not necessarily be the result of a release from a CCR unit; therefore, a source other than the CCR unit, natural variation in groundwater quality, and statistical methods were further investigated as part of the ASD. Sampling methods were further investigated for the boron, calcium, and chloride SSIs at MW-27S.

2.1 Travel Time from Source of Release

Monitoring locations MW-24S, MW-25S, MW-26S, and MW-27S were added to the monitoring network in anticipation of waste placement in the landfill expansion area (Figure 3). Waste was first placed in lined Cell 5 in the landfill expansion area in May 2023. Groundwater travel time was considered both vertically as groundwater moves through the unsaturated zone and horizontally as groundwater moves in the saturated zone.

2.1.1 Migration through the liner

Vertical migration of leachate would be controlled by the presence of a driving head on the landfill liner and then migration through the unsaturated zone.

Considering the properties of the CCR materials in landfill, that the design to eliminate head on the liner, and the facility pumping operations have been normal, there is no evidence of any leachate accumulation on the liner. However, landfill leachate depth is limited to 1 foot on the liner by rule in North Dakota. Even if the 60-mil thick synthetic liner were breached (again there is no evidence that this has ever occurred), the underlying 2-foot-thick clay liner was tested and verified to exhibit a vertical permeability of 1×10^{-7} cm/s (2.8×10^{-4} feet/day) or less. Assuming a 1-foot driving head over a 2-foot-thick liner yields a vertical hydraulic gradient of 0.5 ft/ft.

The vertical advective velocity (average linear velocity or seepage velocity) of vertical saturated groundwater flow is calculated using the following equation:

$$v = \left(\frac{Kv}{n_e}\right)\left(\frac{dHv}{dLv}\right)$$

Or, stated in a more compact form:

$v = \frac{Ki}{n_e}$, where K = hydraulic conductivity, i = gradient, and n_e = effective porosity.

Using an effective porosity for clay of 0.40, the above equation yields an advective velocity 3.5×10^{-4} ft/day. Dividing the distance by the velocity yields a travel time of 15.7 years to transit the liner.

2.1.2 Migration through the unsaturated zone

Assuming that the leachate fully breached the liner, the release would then need to transit through the entire unsaturated zone to reach the water table below the facility. Although unsaturated flow can be

complex, its calculation can be greatly simplified by making a conservative assumption that the flow is saturated. This is a conservative assumption because unsaturated flow would be characterized by a wetting front (and possible drying cycles) that would result in much lower velocities (longer travel time) than are estimated by assuming saturated flow.

The geologic cross sections and well logs suggest that the mine spoils and Sentinel Butte Formation are thinnest in the vicinity of MW-23S. Assuming that the base of the landfill is at 2050 feet (MSL), the mine spoils are about 90 feet thick at MW-23S, and the Sentinel Butte is about 80 feet thick above the Spaer Bed.

Geotechnical testing of materials at the site has shown mine spoils exhibit relatively low vertical hydraulic conductivities. The four undisturbed vertical hydraulic conductivity values for the mine spoils were 1.3×10^{-7} cm/sec, 4.0×10^{-8} cm/sec, 2.8×10^{-6} cm/sec, and 5.3×10^{-7} cm/sec (Terracon, 2020), which have a geometric mean of 3.0×10^{-7} cm/sec.

The maximum gradient possible would be for a constant head of 1-foot above the liner during the entire travel time through the spoils, or (1 ft / 90 ft = 0.011 ft/ft). This is a conservative estimate because it is likely that the gradient would be much lower and that there would be intervals of unsaturated transport beneath the clay liner, which is slower than saturated transport.

Using the moisture contents of the samples in the falling head hydraulic conductivity measurements and a particle specific gravity of 2.72 (Terracon, 2020), the four undisturbed porosity measurements were 0.39, 0.45, 0.43, and 0.43. Lower effective porosity results in higher flow velocity so assuming $n_e = 0.39$ is a conservative estimate. Using the values described above, groundwater flow velocity (v) = 3.0×10^{-7} cm/sec * 0.011 ft/ft / 0.39 = 8.54×10^{-9} cm/sec or 0.00088 ft/year. Assuming a thickness of 90 feet, travel time through the mine spoils under the clay liner is 90 ft / 0.0088 ft/year = 10,177 years.

Like the mine spoils, the sediments of the Sentinel Butte Formation are predominately native clay sediments and are expected to have lower K_v values. Five undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the WISCO Landfill (Barr, 2013) were 7.0×10^{-9} cm/sec, 1.1×10^{-8} cm/sec, 3.5×10^{-9} cm/sec, 2.5×10^{-9} cm/sec, and 6.7×10^{-9} cm/sec. Six undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the Minnkota Coal Combustion Residuals Unit (Barr, 2012) were 3.6×10^{-8} cm/sec, 5.0×10^{-9} cm/sec, 8.8×10^{-8} cm/sec, 1.2×10^{-8} cm/sec, 1.0×10^{-8} cm/sec, and 1.0×10^{-9} cm/sec. Together, these eleven values have a geometric mean of 8.0×10^{-9} cm/sec.

The gradient is assumed to be a constant head of 1-foot above the liner during the entire travel time through the 80 ft thick Sentinel Butte Formation, or (1 ft / 80 ft = 0.0125 ft/ft). This is a conservative estimate because it excludes the layer of spoils above, which, if factored in, would reduce the gradient and therefore the resulting flow velocity. Using the values described above (K= 8.0×10^{-9} cm/sec, i = 0.0125 ft/ft and $n_e = 0.39$), the vertical flow velocity (v) through the Sentinel Butte Formation is estimated as v = 8.0×10^{-9} cm/sec * 0.0125 / 0.39 = 2.564×10^{-8} cm/sec or 0.00265 ft/year. Given the thickness of the Sentinel Butte Formation overlying the Spaer Bed is approximately 80 feet, travel time is 80 ft / 0.00265 ft/year = 301,552 years.

Conservatively, this scenario is calculated assuming a breach in the geomembrane liner and a continuous 1 foot of head. The estimated minimum travel time for CCR leachate to travel through the unsaturated

zone and reach the Spaer Bed is 311,744 years (15 years for the clay liner, 10,177 years for the mine spoils, and 301,552 years for the Sentinel Butte Formation).

2.1.3 Horizontal Migration in Groundwater

Once a hypothetical release has migrated through the liner and unsaturated zone, it could then reach the water table in the Spaer Lignite seam and eventually reach the detection monitoring well. The velocity of horizontal groundwater flow is calculated using the following equation:

$$v = \left(\frac{K}{n_e}\right)\left(\frac{dH}{dL}\right)$$

The average hydraulic gradient $\left(\frac{dH}{dL}\right)$ between upgradient well MW-18S and downgradient wells in the expansion area (MW-24S, MW-25S, MW-26S, and MW-27S is 0.005 ft/ft based on the October 2024 piezometric surface map. The hydraulic conductivity (K) is 0.234 ft/day and the porosity is 0.185 for the Spaer Lignite according to the Site's CCR Groundwater Monitoring System Report (AECOM, 2017). Using this information in the above equation, groundwater velocity for the wells in the expansion area is 2.45 ft/year.

Since the waste was placed in the lined landfill expansion cell (300 ft to the closest well MW-25S) only a year and a half prior to the fall 2024 detection monitoring event, it is not plausible for any leachate to reach the monitoring wells.

Using a groundwater velocity of 2.45 ft/year, it would take approximately 122 years for a release to reach MW-24S, MW-25S, MW-26S, or MW-27S. CCR placement in the Landfill began in 1996 and the Landfill Expansion Area in 2023. Therefore, the elevated chloride at MW-24S, MW-25S, MW-26S, and MW-27S and elevated boron and calcium at MW-27S cannot be from the CCR unit.

Since the waste was placed in the lined landfill area started in 1996 or about 29 years ago, it is not plausible for any leachate to reach the monitoring wells given these conservative assumptions. If the distances used to calculate travel time are measured from the existing waste limit, the shortest flow path to MW-25S (located closest to the existing landfill boundary) is approximately 1170 feet downgradient. It would take approximately 477 years for leachate from the existing landfill to reach MW-25S and even longer for leachate to reach MW-27S, which is farthest from the CCR waste (approximately 2800 feet).

Assuming that some unidentified preferential flow pathway were to exist, it would have to result in an over four order of magnitude (10,000x) increase in flow rate (or some combination of rate, gradient, or porosity) to allow for a release to reach the boundary. Even in this extreme case, it would still take hundreds of years to reach the downgradient boundary. Such flow rates are not reasonably likely given the construction quality control on the liner, the thickness of the spoils, and the fine-grained nature of the geology and spoils

The long time of travel supports the hypothesis that the CCR unit is not the source of the chloride observed at MW-24S, MW-25S, and MW-26S; and boron, chloride, and calcium at MW-27S.

2.2 Natural Variability in Groundwater

Site specific chloride values are variable at the site and range from 7.84 to 16.0 mg/L at downgradient wells other than those with chloride SSIs in fall 2024 (MW-15S, MW-17S, and MW-22S) from 2016 to 2024. Chloride at upgradient wells (MW-18S, MW-19S, and MW-21S) ranged from 4.38 to 19.4 mg/L as shown on time series graphs in Attachment A.

Further evaluation of sulfate concentrations, which are a principal indicator of a CCR unit release to groundwater, demonstrate that MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S are not impacted by a release from the CCR landfill. Sulfate concentrations during the October 2024 sampling event at these locations ranged from 6.83 mg/L to 131 mg/L. The sulfate concentrations at the upgradient Landfill monitoring locations (MW-18S, MW-19S, and MW-21S) were higher and ranged from 263 to 892 mg/L from 2016 to 2024. At downgradient wells other than those with SSIs (MW-15S, MW-17S, and MW-22S), sulfate concentrations were higher and ranged from 183 to 442 mg/L from 2016 to 2024. Sulfate at MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S is much lower than both upgradient and downgradient monitoring locations.

Although MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S have elevated chloride concentrations compared to upgradient wells, sulfate concentrations are lower compared to the rest of the monitoring locations. The low sulfate at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S suggests that the chloride is unlikely to come from a CCR unit release because groundwater impacted by a release should have elevated concentrations of multiple Appendix III parameters.

Site specific historical groundwater samples have been collected from ten wells also screened in the Spaer Bed to the north and east of the landfill. These wells were installed and sampled in support of a groundwater monitoring program associated with the adjacent surface mine prior to development of the CCR landfill. Chloride concentrations within the Spaer Bed are variable ranging from 5.7 to 59 mg/L. Chloride concentrations at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S (25.8 to 50.0 mg/L) fall within the site-specific background water quality.

Therefore, because other indicators of the CCR unit release are absent and background chloride concentrations are variable within the Spaer Bed, we reject the hypothesis that the CCR unit is the source of the chloride observed at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S.

2.3 Statistical Methods

Interwell prediction limits are currently used to evaluate for SSIs. Interwell prediction limits are valid for the site if the stationarity of the mean and variance are assumed to be constant between upgradient monitoring wells MW-18S, MW-19S, and MW-21S and the downgradient wells (USEPA, 2009). The upgradient monitoring wells are not directly downgradient of a CCR unit (Figure 3). According to the EPA Unified Guidance (USEPA, 2009; page 6-31), interwell tests alone may not be suitable for sites with non-stationarity of distribution mean and variance. Non-stationarity may be expected due to historical mining activities and due to heterogeneity within the lignite documented at the Site.

Therefore, intrawell limits are also valid per the guidance. As shown in Table 2 below, using intrawell prediction limit methods indicates there are no SSIs for chloride at MW-16S, MW-20S and MW-24S (Attachment B). Using a combination of interwell and intrawell methods at the site would account for site

specific heterogeneity and historical conditions and would eliminate the SSI determination at MW-20S and MW-24S.

Table 2 SSIs Compared to Intrawell Prediction Limits

Event	Well	Parameter (units)	Measured	Intrawell Prediction Limit
Detection Monitoring – 2024 #2 (Fall)	MW-16S	Chloride (mg/L)	26.0	29.7
	MW-20S	Chloride (mg/L)	25.8	31.0
	MW-24S	Chloride (mg/L)	50.0	59.4

Intrawell methods cannot be used at MW-25S, MW-26S, and MW-27S until at least 8 baseline samples have been collected.

2.4 Trend Testing

If a release from the landfill were occurring, it is likely that the increase in mass to the flow system would cause a change in the chemical equilibrium of the flow system that would reflect changes in concentration overtime. Therefore, if the concentrations of chloride at MW-16S, MW-20S, and MW-24S were due to a release from the landfill there should be evidence of a statistically significant increasing trend.

As shown in Attachment B, each of the data sets were tested for trends using the Mann-Kendall method and no significant trend for chloride were observed at MW-16S, MW-20S, or MW-24S.

This leads to the conclusion that there is no release related to the observed concentrations of chloride at MW-16S, MW-20S, and MW-24S.

2.5 Well Sampling and Development at MW-27S

Monitoring well MW-27S was installed in November 2023, and well development was attempted in April 2024. Approximately one well volume (~4 gallons) was purged during development before the well went dry. It is unlikely that the well was completely developed after this first attempt. The well will need to recharge and be purged multiple times in order to achieve full development.

Based on field notes, low-flow sampling methods were not used during sample collection at MW-27S during the October 2024 detection monitoring event. Specifically, the well was not purged and allowed to stabilize prior to sample collection, instead a hydrasleeve was used to collect the sample due to slow groundwater recharge times.

The preamble to the CCR Rule (VI(K)(3)) notes that "Groundwater sampling should be conducted utilizing EPA protocol low stress (low-flow) purging and sampling methodology, including measurement and stabilization of key indicator parameters prior to sampling." Well stabilization is conducted prior to groundwater sampling in order to obtain a sample representative of aquifer conditions. Properly constructed and developed groundwater monitoring wells allow for the collection of representative samples with low turbidity (U.S. EPA, 1986, 1992). However, even correctly installed wells can produce turbid samples in certain geologic materials. Thus, purging and stabilization are necessary to yield reproducible sampling results. Due to limited recharge, monitoring well MW-27S was not sufficiently

purged and did not stabilize during the fall 2024 sampling. Field notes from well development are included in Attachment C.

Monitoring well MW-27S has been documented as being slow to recharge (Barr, 2024). Obtaining sufficient groundwater volume for analysis at MW-27S has proven challenging. As a result, the sample sent for laboratory chemical analysis in fall 2024 consisted of the initial draw of water from the well without stabilization. Turbidity readings were too high for the meter and the sample color was described as black, yielding a sample with a high concentration of suspended solids, which may not be representative of typical aquifer conditions. Therefore, the SSI could also be attributed to sampling error.

The CCR Rule requires measurement of "total recoverable metals" because suspended and colloidal particles can also be a means of transport for contaminants. However, the suspended solids responsible for the boron, calcium, and chloride SSIs at monitoring well MW-27S are believed to be natural aquifer material and not mobilized CCR contaminants.

Therefore, due to slow recharge times preventing full development and the well to be purged before sampling, the sample collected from MW-27S is not representative of aquifer conditions and is not a representative sample.

3 Conclusion

An alternative source demonstration for chloride at this site is supported by the following lines of evidence:

- Based on groundwater flow velocities and timing of CCR placement, the elevated chloride (and boron, calcium, and chloride at MW-27S) concentrations could not have come from the CCR unit.
- Chloride in groundwater is variable across the site. While there are somewhat elevated concentrations of chloride in many downgradient wells, there are low sulfate concentrations. Only this single detection monitoring parameter indicated an SSI in several monitoring wells. There is a relative absence of sulfate, a primary indicator of a release, in the groundwater as compared to the presence of sulfate in the water within the upgradient monitoring wells and the downgradient wells with lower chloride. Groundwater chemistry in the expansion area wells is both chemically distinct from the other monitoring wells (background and downgradient) at the CCR unit and chemically distinct from the character of the CCR unit.
- Intrawell statistical methods did not result in SSIs for chloride at MW-16S, MW-20S, and MW-24S. There are not enough baseline samples at MW-25S, MW-26S, and MW-27S for intrawell analyses.
- Well sampling and development limitations due to slow groundwater recharge resulted in high turbidity and the SSIs for boron, calcium, chloride, and TDS at MW-27S.

As this report demonstrates, the SSI analysis presented in Table 1 for monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S is attributed to a source other than the CCR Unit for chloride in the groundwater. The SSI analysis for boron, calcium, and chloride at MW-27S is attributed to sampling techniques due to non-representative aquifer conditions from slow groundwater recharge rates.

Future monitoring data will add to our understanding of the site and the results are expected to augment this ASD and conclusions.

4 References

AECOM, 2024. 2023 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2024.

Barr, 2012. Letter to Minnkota Power Cooperative, Inc., Regarding Cells 4, 5, and 6 Drilling Report. May 17, 2012.

Barr, 2013. Site Characterization Investigation Report and Environmental System Plan, WISCO Oilfield Special Waste Landfill, Williston, North Dakota. February 2013.

Barr, 2024. Coal Combustion Residuals Landfill Groundwater Monitoring Well Network Certification, Antelope Valley Station Landfill. June 2024.

Barr, 2025. 2024 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2025.

Terracon, 2020. Tests of Soils – Permeability, AVS Landfill Expansion, October 12, 2020.

United States Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. March 2009.

5 Certification

I certify that the written demonstration provided (above) for chloride in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S and boron and calcium in MW-27S is supported by the data, accurate, and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§ 257.94(e)(2)). I further certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of North Dakota.

Kevin Solie, P.E.
ND P.E. License No. 9488
Barr Engineering Company

Dated this 28th day of March 2025

Figures

Permit Boundary

Railroad

N

0 2,500 5,000

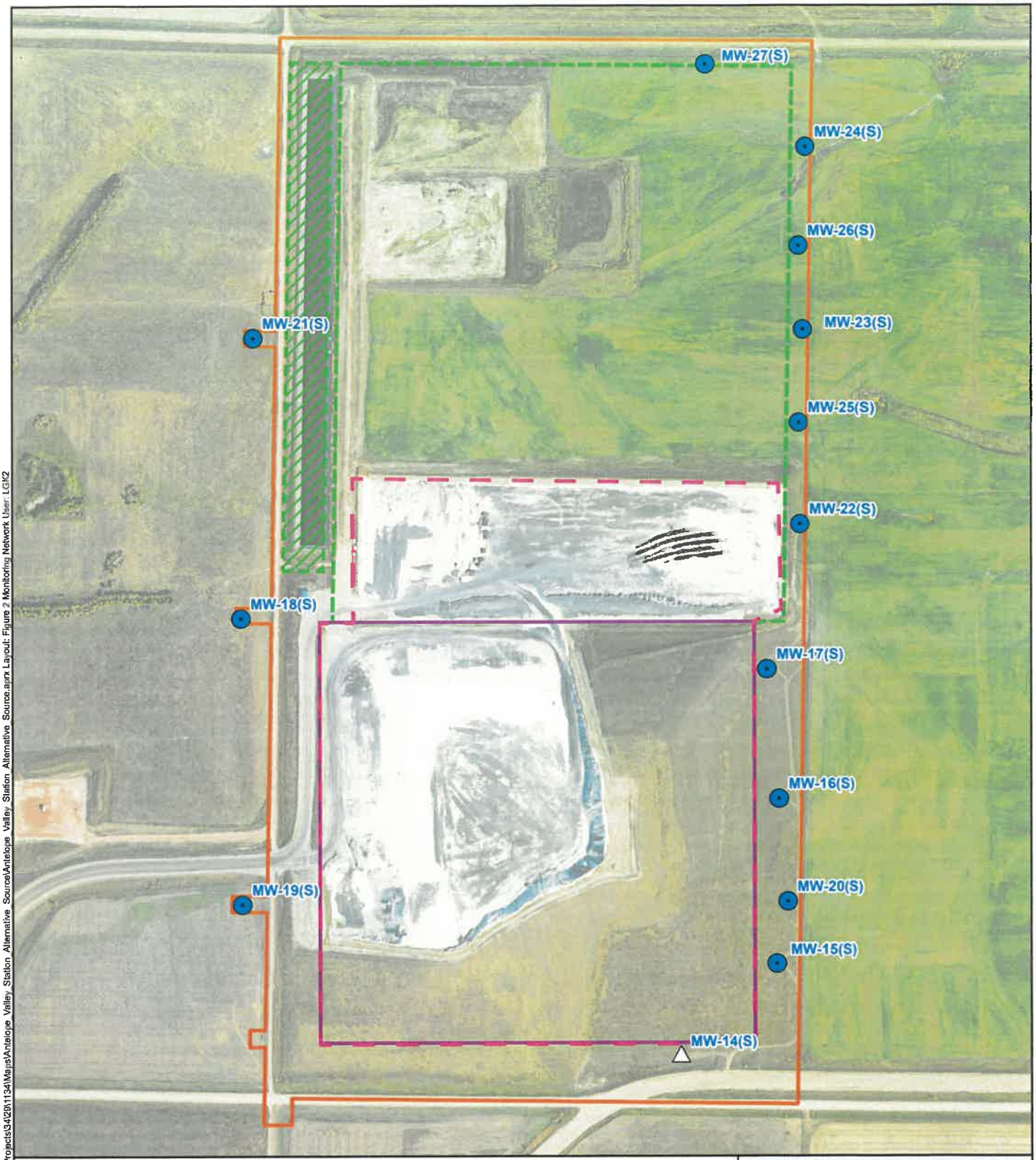
Feet

Imagery: USDA-NAIP, 2024

Site Location
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 1

BARR



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)

N

0 300 600
Feet

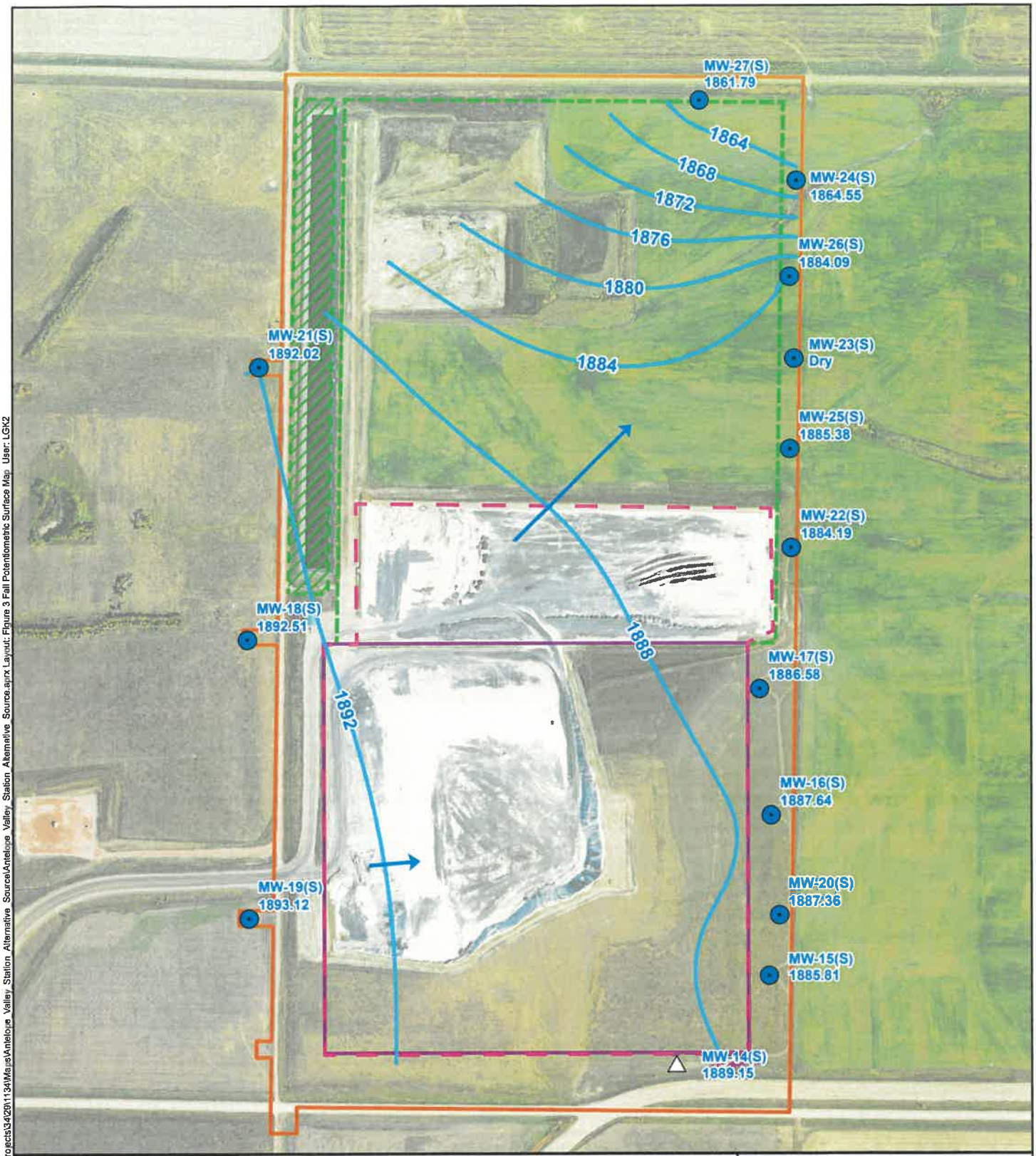
Imagery: USDA-NAIP, 2024

Monitoring Network
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 2

BARR

Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11\34\Mxd\sl\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 2 Monitoring Network User: LGK2



- Groundwater Monitoring System Wells
- Water Level Only Monitoring
- Permit Boundary
- Existing Landfill Limits
- Future Expansion Limit
- Leachate Management Area
- Limits of Ash as of 2025 (approximate)
- Flow Direction
- Groundwater Contour

N

0 300 600

Feet

Imagery: USDA-NAIP, 2024

Fall 2024 Potentiometric Surface
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 3

BARR

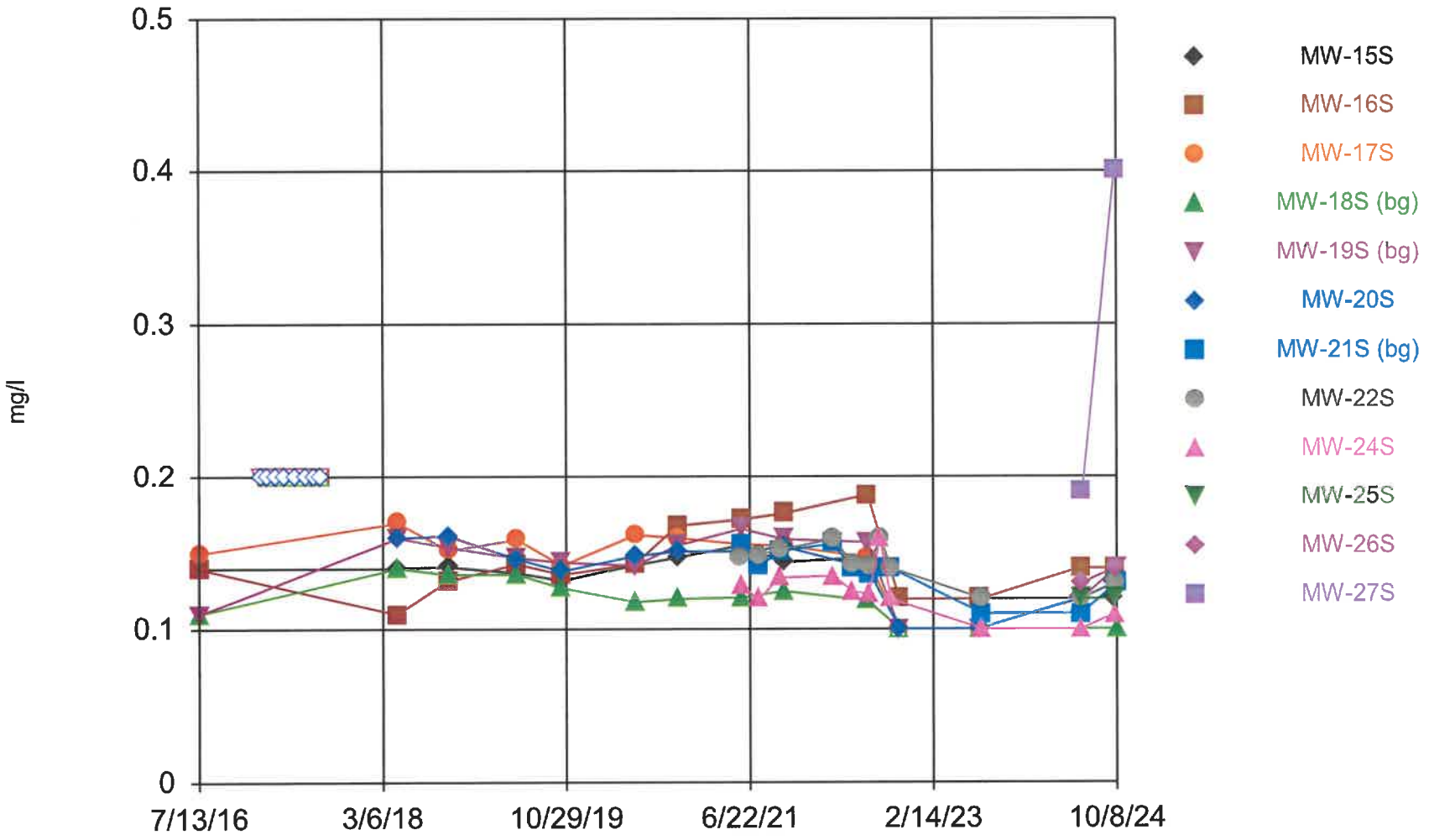
Attachments

Attachment A

Time Series Graphs

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

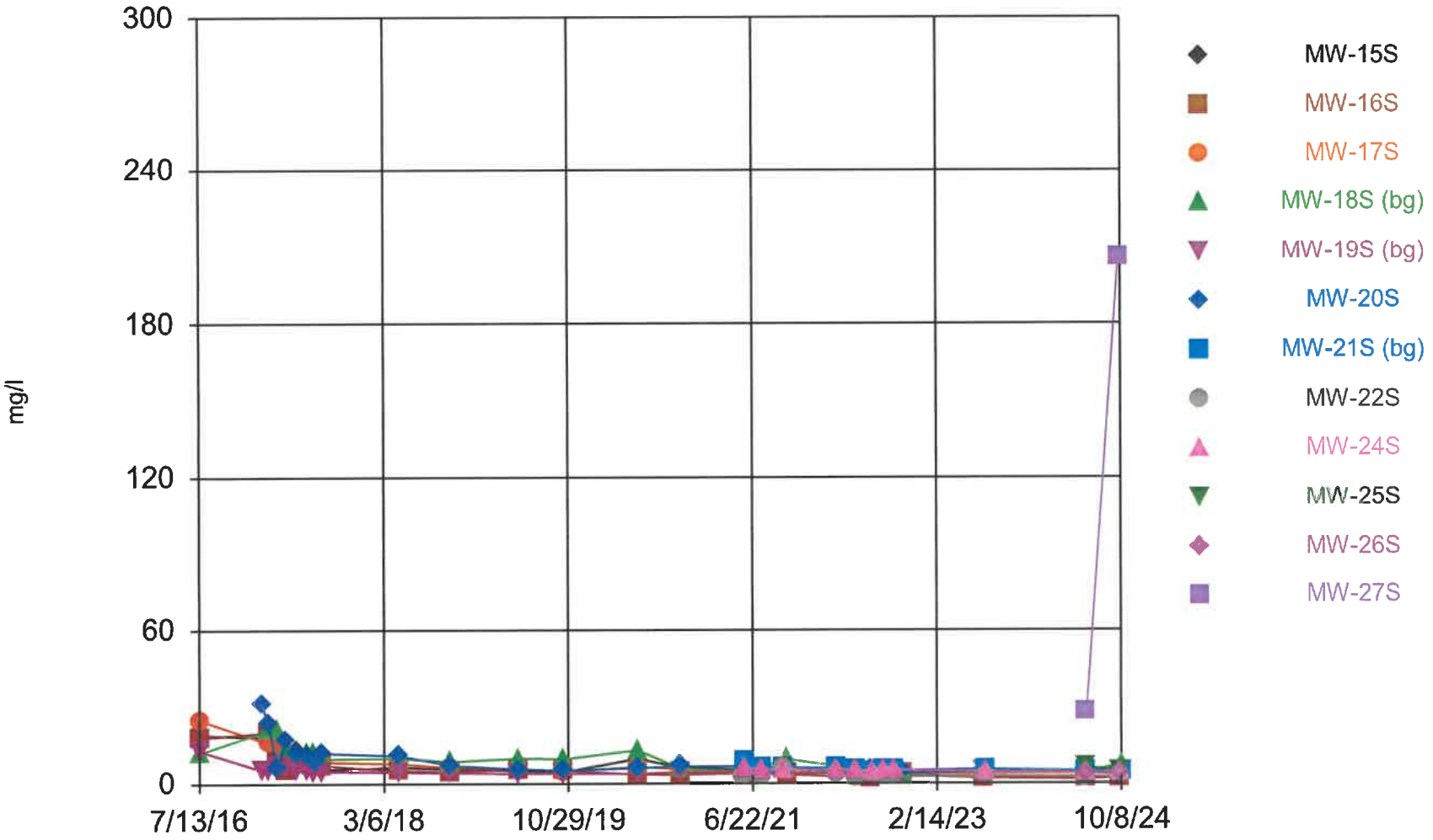
Boron, total



Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Calcium, total

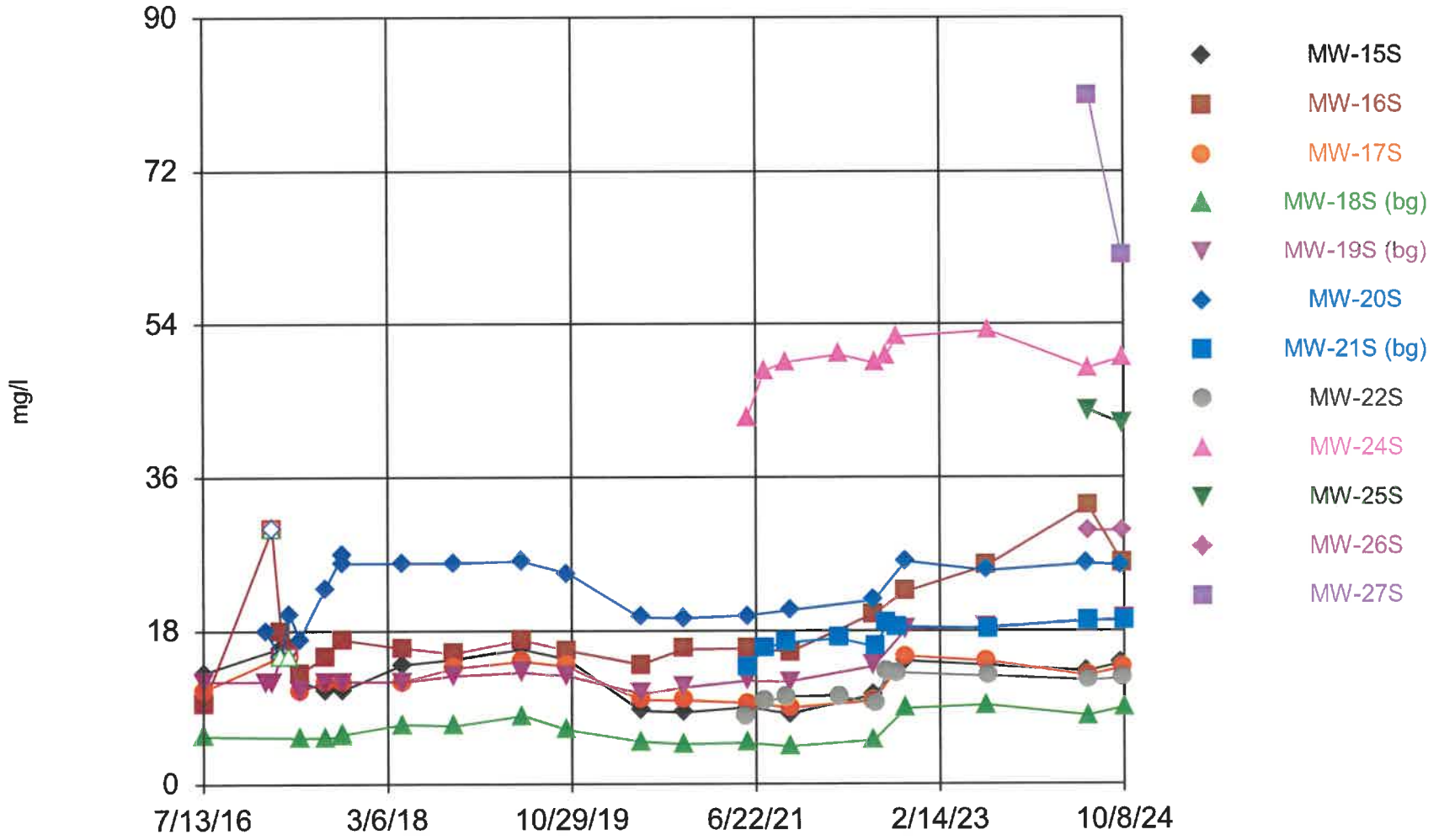


Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

Chloride

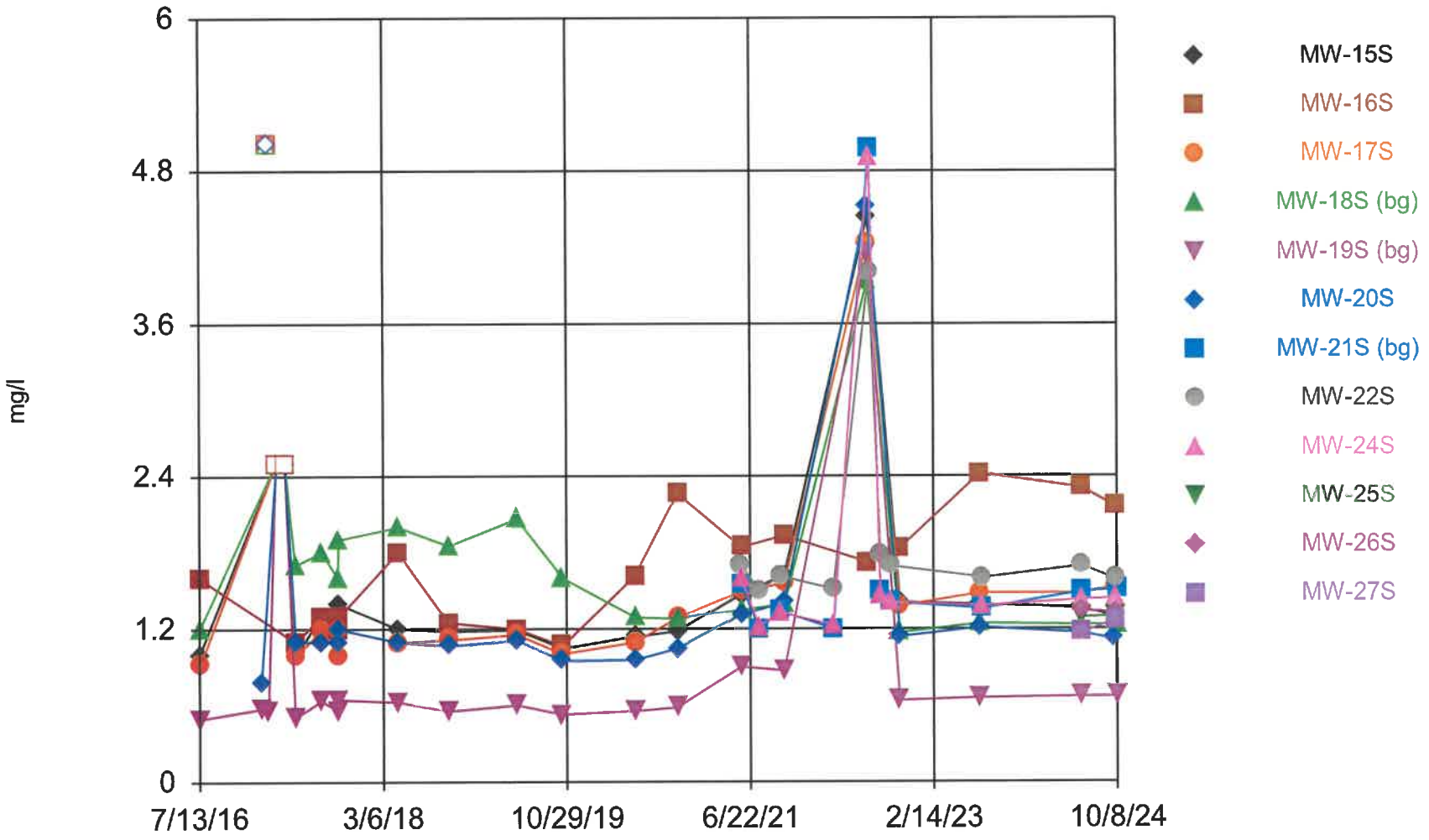


Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

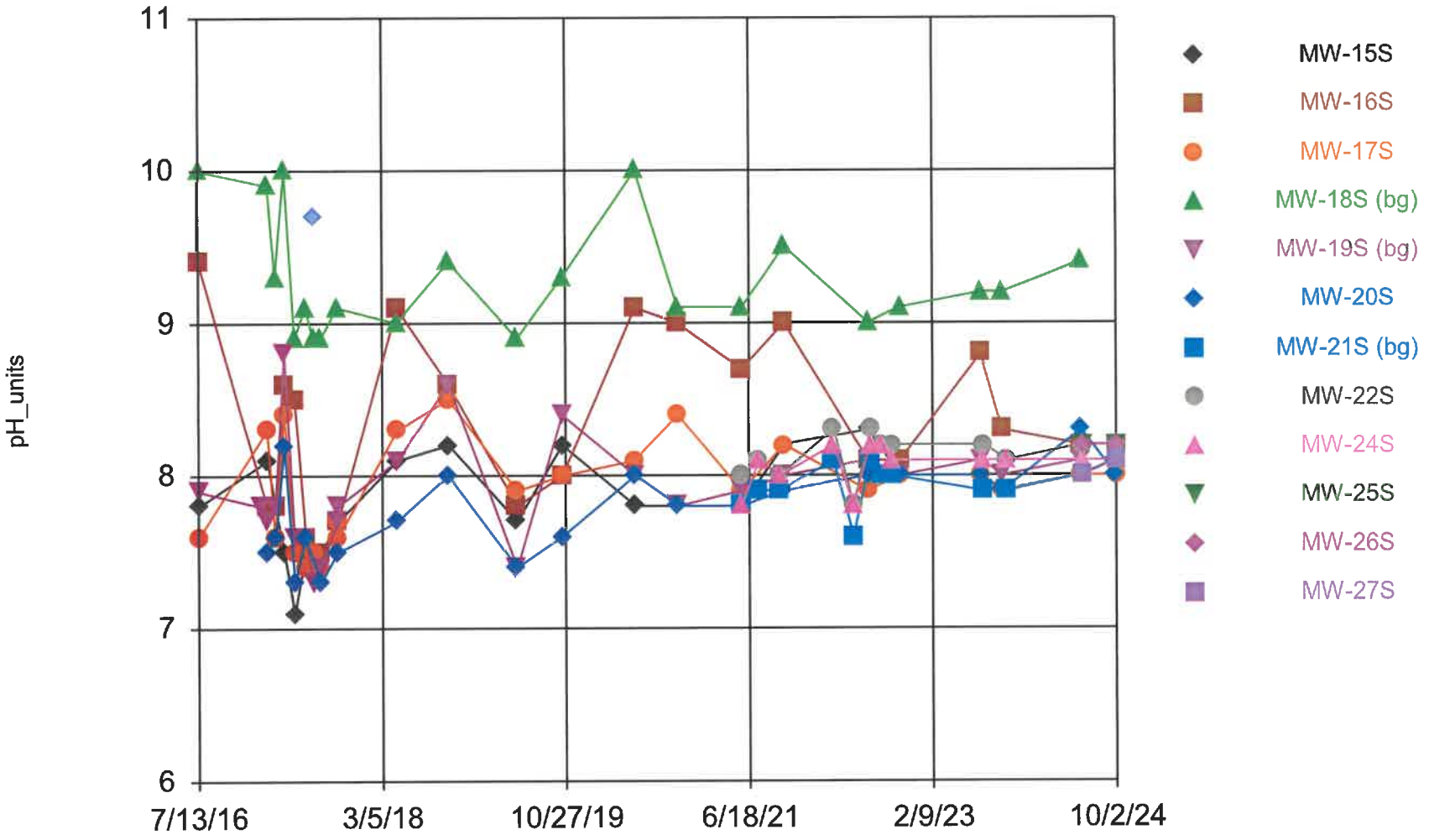
Fluoride



Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

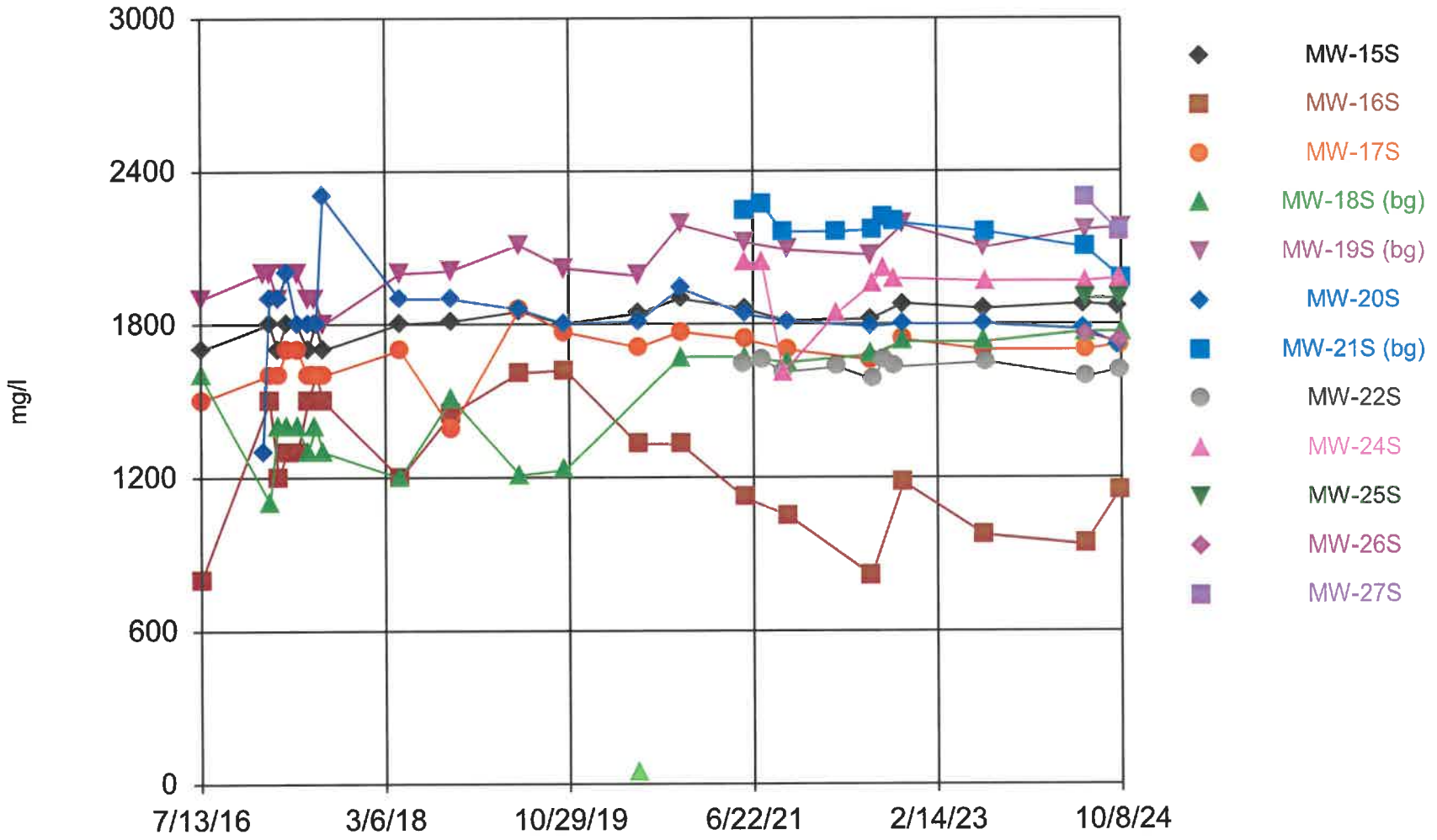
pH, field



Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

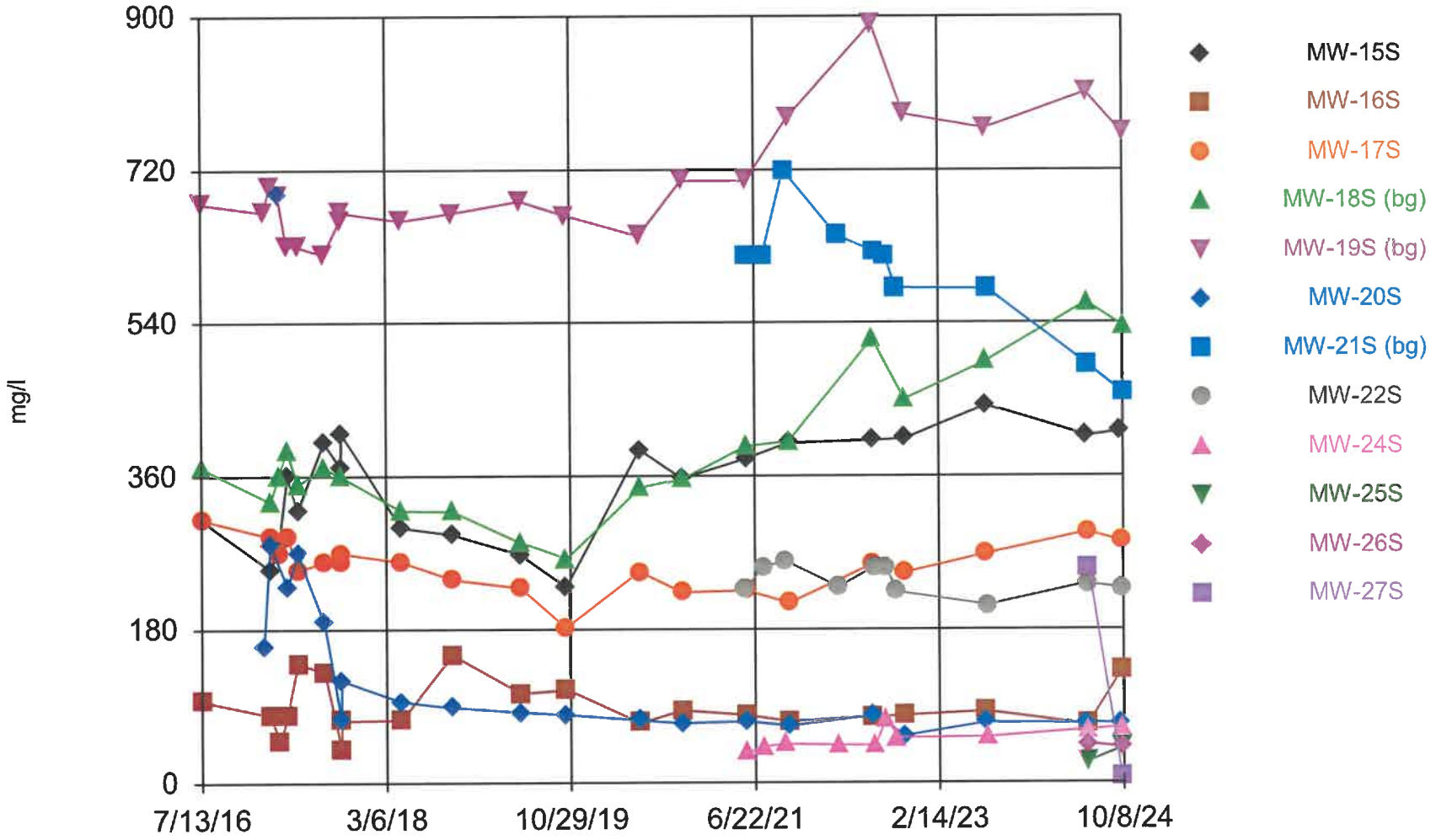
Solids, total dissolved



Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sulfate, as SO4



Time Series Analysis Run 1/3/2025 10:20 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Attachment B

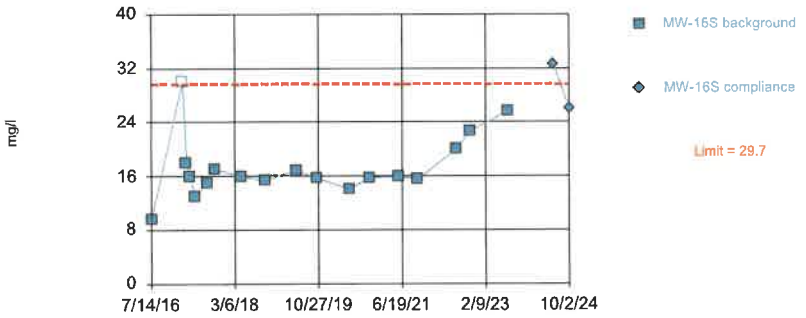
Statistical Evaluation

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

Within Limit

Chloride

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=2.821, Std. Dev.=0.2478, n=19, 5.263% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9118, critical = 0.901. Kappa = 2.301 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

Prediction Limit Analysis Run 3/27/2025 4:55 PM View: AIII

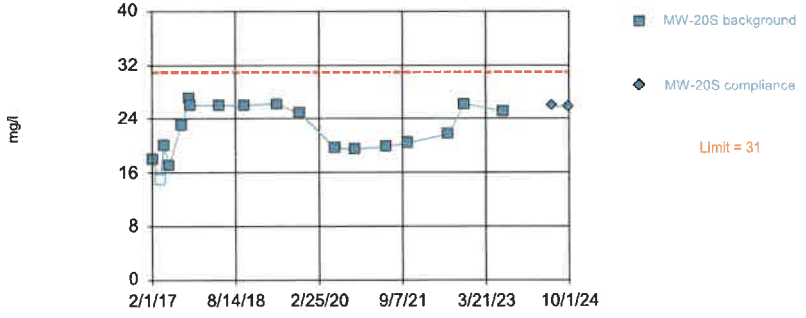
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=22.29, Std. Dev.=3.748, n=18, 5.556% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.904, critical = 0.897. Kappa = 2.33 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

Prediction Limit Analysis Run 3/27/2025 4:55 PM View: AIII

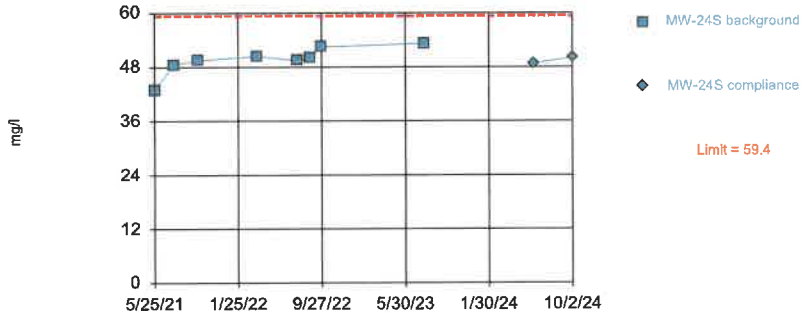
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG

Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=49.58, Std. Dev.=3.129, n=8. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8682, critical = 0.818. Kappa = 3.133 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

Prediction Limit Analysis Run 3/27/2025 4:55 PM View: AIII

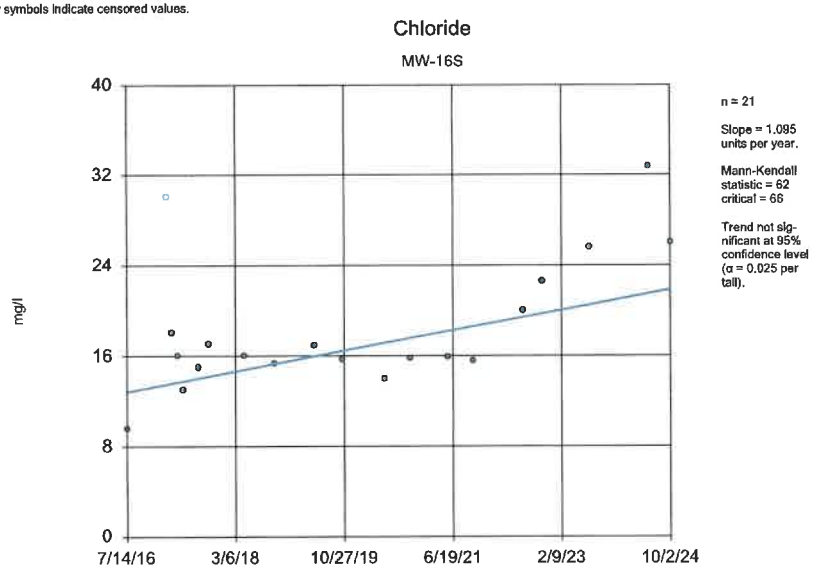
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Prediction Limit

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR Printed 3/27/2025, 4:57 PM

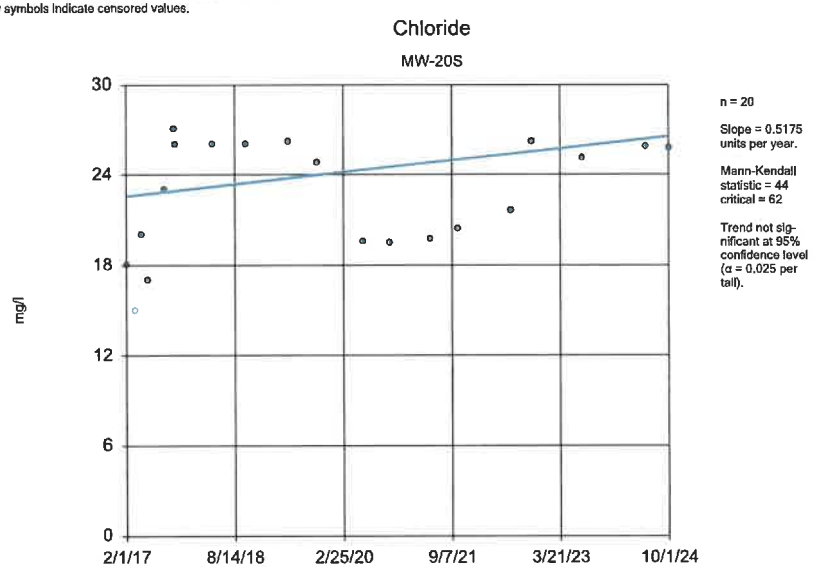
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Chloride (mg/l)	MW-16S	29.7	n/a	10/2/2024	26	No	19	5.263	ln(x)	0.000...	Param Intra 1 of 2
Chloride (mg/l)	MW-20S	31	n/a	10/1/2024	25.8	No	18	5.556	No	0.000...	Param Intra 1 of 2
Chloride (mg/l)	MW-24S	59.4	n/a	10/2/2024	50	No	8	0	No	0.000...	Param Intra 1 of 2

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.



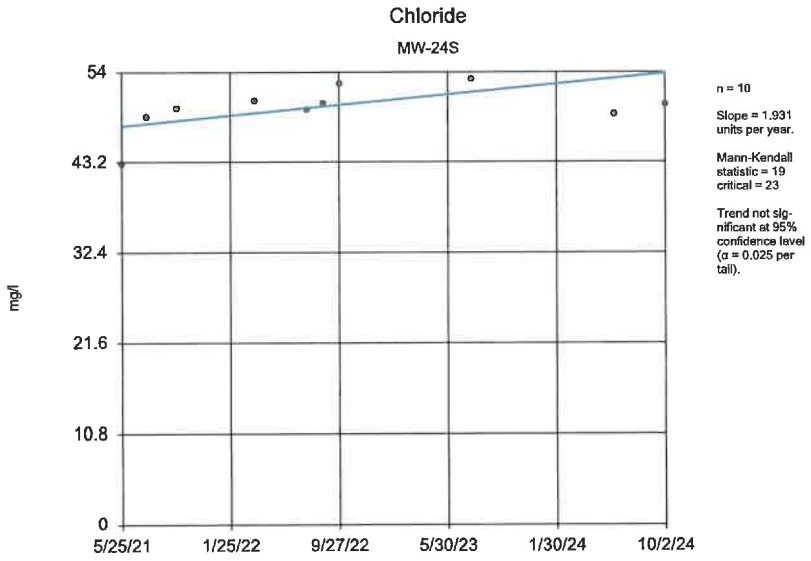
Sen's Slope and 95% Confidence Band Analysis Run 3/27/2025 4:58 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.



Sen's Slope and 95% Confidence Band Analysis Run 3/27/2025 4:58 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.0.24 Software licensed to Barr Engineering Company. UG



Sen's Slope and 95% Confidence Band Analysis Run 3/27/2025 4:58 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Trend Test

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR Printed 3/27/2025, 4:58 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride (mg/l)	MW-16S	1.095	62	66	No	21	4.762	n/a	n/a	0.05	NP
Chloride (mg/l)	MW-20S	0.5175	44	62	No	20	5	n/a	n/a	0.05	NP
Chloride (mg/l)	MW-24S	1.931	19	23	No	10	0	n/a	n/a	0.05	NP

Attachment C

Well Development

Well/Piezo ID: MW-27S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS
Weather Conds: Sunny Breezy
Collector(s): MK MLS
Date: 10.2.24
Time: 1329
Finish 1415

WATER LEVEL DATA: (measured from Top of Casing) Well ☐

a. Total Well Length _____
b. Water Table Depth 209.81
c. Casing Material PVC
d. Casing Diameter _____
Pump Settings _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
	INITIAL	11.5	1.72	3063	8.08	-116.9	N/A	BLACK	209.81
	L						TOO HIGH		
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

<0.5 <5

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1350
	500mL	1	HNO3	Metals	↓
	[redacted] 1L	1	HNO3	Radium	↓

Comments _____

Signature _____ Date 10.2.24

Barr Engineering Company
Field Log Data Sheet

Client: Basin Electric	**Monitoring Point:** MW-27
Location: AVS CCR Wells	**Date:** 4-25-2024
Project #: 34291126	**Sample Time:**

GENERAL DATA		STABILIZATION TEST						
Barr lock:	Basin			mS/cm			Mg/L	NTU
Casing diameter:	2"	Time/ Volume	Temp. °C	Cond. @ 25	pH	ORP Eh	D.O.	Turbidity Appearance
Total well depth:*	~229.40	1425 / 3.5 gal	13.5	2572	8.25	-96.3	0.83	Black OOR (Drk Brn)
Static water level:*	205.83							
Water depth:*	23.57							
Well volume: (gal)	3.84							
Purge method:	Bailer							
Sample method:	Bailer							
Start time:	X	Odor: None						
Stop time:	X	Purge Appearance: Dark Brown / Black						
Duration: (minutes)	X	Sample Appearance:						
Rate, gpm:	X	Comments: Purged dry 1 well volume "Sediment"						
Volume, purged:	~3.8 gal							
Duplicate collected?	NA							
Sample collection by:		CO2- Mn2- Fe(T)- Fe2-						
Others present:		Well Condition: New						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- nutrient- cyanide- DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- methane- filter-

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Technical Memorandum

To: Mark Dihle, Basin Electric Power Cooperative
From: Barr Engineering Co.
Subject: Alternative Source Demonstration (ASD), Antelope Valley Station (Spring 2025)
Date: December 22, 2025
Project: 34291134.00

1 Introduction

Basin Electric Power Cooperative (Basin Electric) owns and operates Antelope Valley Station (AVS), comprised of a coal-fired generating station consisting of two power generating units, located in Beulah, North Dakota (Figure 1). Unit 1 coal-based operations began in 1984, and Unit 2 operations began in 1986. The landfill (Site or CCR Landfill) was permitted by the North Dakota Department of Environmental Quality (NDDEQ) in 1995 under Permit SP-160 (now designated 0160) and began accepting coal combustion residuals (CCR) in 1996. The most recent Permit 0160 was issued by NDDEQ in early 2022, and the most recent cell including a composite liner system and leachate collection system was constructed the same year. Basin Electric utilizes a consulting firm, Barr Engineering Co. (Barr) to assist in groundwater reporting and analysis. Barr is familiar with the site and installed and certified the most recent wells (MW-25S, MW-26S, and MW-27S) added to the network. Barr has reviewed the historical groundwater data and CCR information for the site and is knowledgeable about facility design and operation.

The CCRs including fly ash, bottom ash, and flue gas desulfurization (FGD) waste are managed at the Site along with other minor wastes accepted as per the NDDEQ permit. The CCR unit is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) and the NDDEQ CCR Rule (NDAC Title 33.1, Article 20, Chapter 8).

Basin Electric has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261) for the Site. As part of the Detection Monitoring Program, statistically significant increases (SSIs) in monitored groundwater quality parameters over background were identified at the Site for the following monitoring wells during semi-annual detection monitoring completed in the spring of 2025 on June 9-11 and 17-18, 2025:

- MW-16S – Chloride
- MW-20S – Chloride
- MW-24S – Chloride
- MW-25S – Chloride
- MW-26S – Chloride
- MW-27S – Boron, calcium, chloride, and total dissolved solids (TDS)

The CCR Rule (US EPA, 2015) § 257.94(e)(2) allows for an alternative source demonstration (ASD) in the event of an identified SSI in a water quality parameter in a downgradient monitoring well over background levels:

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.*

The purpose of this work is to evaluate the data collected as part of the June 2025 monitoring event, along with historical data, to demonstrate if the SSIs are the results of a "source other than the CCR unit" or due to natural variation in groundwater quality or an error in sampling, analysis, or statistical evaluation. Nothing in the foregoing citation of the rule requires that the owner/operator disprove any and all potential counterarguments that EPA or others may offer to refute this demonstration. Such arguments if valid, would need to follow requirements of the rule to show a basis in fact that includes rule requirements that are based on site-specific information. This memorandum provides a science-based reason for the data results that indicate a source other than the CCR unit.

This memorandum provides written documentation of an Alternative Source Demonstration (ASD) and certification of accuracy as described in the CCR Rule (§ 257.94(e)(2)).

1.1 Background Information

Figure 1 shows the site location and Figure 2 provides well locations. A piezometric surface map showing groundwater elevations in the lignite, which represent the uppermost aquifer in the vicinity of the CCR landfill, is presented on Figure 3, using measurements from June 2025. Groundwater generally flows from southwest to northeast.

In late 2023, three new landfill expansion wells, MW-25S, MW-26S, and MW-27S, were installed at the Site. Baseline sampling was initiated in June 2024, and these wells were first evaluated in the detection monitoring program in June 2024. There is limited data at these locations for historical comparison.

A comparison of the detection monitoring groundwater results with the prediction limits calculated using the 2016-2023 background assessment data from upgradient wells MW-18S, MW-19S, and MW-21S are included in Table 1. Concentrations for Appendix III parameters observed in June 2025 are shown on time series graphs in Attachment A. Chloride concentrations at MW-16S, MW-20S, and MW-24S are consistent with those observed during baseline monitoring events. Baseline monitoring for MW-25S, MW-26S, and MW-27S is ongoing.

Table 1 SSIs Compared to Prediction Limits

Event	Well	Parameter (units)	Measured	Interwell Prediction Limit
	MW-16S	Chloride (mg/L)	26.0	18.7
	MW-20S	Chloride (mg/L)	25.8	18.7

Detection Monitoring – 2025 #1 (Spring)	MW-24S	Chloride (mg/L)	50.0	18.7
	MW-25S	Chloride (mg/L)	42.3	18.7
	MW-26S	Chloride (mg/L)	29.7	18.7
	MW-27S	Boron (mg/L)	0.40	0.17
	MW-27S	Calcium (mg/L)	206	13.0
	MW-27S	Chloride (mg/L)	62.0	18.7
	MW-27S	Total Dissolved Solids (mg/L)	2,500	2230

1.2 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in § 257.95(g) (3):

> *Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must… Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in Appendix III and Appendix IV of this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by §257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority.*

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (September 29, 2025) following the review and analysis of the results provided in the final laboratory report which was received on July 1, 2025.

2 Potential Alternative Sources Review

The CCR Rule provides five potential alternative source categories:

1. A source other than the CCR unit
2. Sampling (or sampling equipment) methods
3. Laboratory methods
4. Statistical methods
5. Natural variation in groundwater quality

Site data were evaluated to identify potential causes for chloride concentrations in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S; and boron, calcium, chloride, and TDS concentrations in MW-27S exceeding interwell prediction limits. Chloride is naturally occurring and may not necessarily be the result of a release from a CCR unit; therefore, a source other than the CCR unit, natural variation in groundwater quality, and statistical methods were further investigated as part of the ASD. Sampling methods were further investigated for the boron, calcium, chloride, and total dissolved solids (TDS) SSIs at MW-27S.

2.1 Travel Time from Source of Release

Monitoring locations MW-24S, MW-25S, MW-26S, and MW-27S were added to the monitoring network in anticipation of waste placement in the landfill expansion area (Figure 3). Waste was first placed in lined Cell 5 in the landfill expansion area in May 2023. Groundwater travel time was considered both vertically as groundwater moves through the unsaturated zone and horizontally as groundwater moves in the saturated zone.

2.1.1 Migration through the liner

Vertical migration of leachate would be controlled by the presence of a driving head on the landfill liner and then migration through the unsaturated zone.

Considering the properties of the CCR materials in landfill, that the design to eliminate head on the liner, and the facility pumping operations have been normal, there is no evidence of any leachate accumulation on the liner. However, landfill leachate depth is limited to 1 foot on the liner by rule in North Dakota. Even if the 60-mil thick synthetic liner were breached (again there is no evidence that this has ever occurred), the underlying 2-foot-thick clay liner was tested and verified to exhibit a vertical permeability of 1×10^{-7} cm/s (2.8×10^{-4} feet/day) or less. Assuming a 1-foot driving head over a 2-foot-thick liner yields a vertical hydraulic gradient of 0.5 ft/ft.

The vertical advective velocity (average linear velocity or seepage velocity) of vertical saturated groundwater flow is calculated using the following equation:

$$v = \left(\frac{Kv}{n_e}\right)\left(\frac{dHv}{dLv}\right)$$

Or, stated in a more compact form:

$v = \frac{Ki}{n_e}$, where K = hydraulic conductivity, i = gradient, and n_e = effective porosity.

Using an effective porosity for clay of 0.40, the above equation yields an advective velocity 3.5 x 10^{-4} ft/day. Dividing the distance by the velocity yields a travel time of 15.7 years to transit the liner.

2.1.2 Migration through the unsaturated zone

Assuming that the leachate fully breached the liner, the release would then need to transit through the entire unsaturated zone to reach the water table below the facility. Although unsaturated flow can be complex, its calculation can be greatly simplified by making a conservative assumption that the flow is saturated. This is a conservative assumption because unsaturated flow would be characterized by a wetting front (and possible drying cycles) that would result in much lower velocities (longer travel time) than are estimated by assuming saturated flow.

The geologic cross sections and well logs suggest that the mine spoils and Sentinel Butte Formation are thinnest in the vicinity of MW-23S. Assuming that the base of the landfill is at 2050 feet (MSL), the mine spoils are about 90 feet thick at MW-23S, and the Sentinel Butte is about 80 feet thick above the Spaer Bed.

Geotechnical testing of materials at the site has shown mine spoils exhibit relatively low vertical hydraulic conductivities. The four undisturbed vertical hydraulic conductivity values for the mine spoils were 1.3 x 10^{-7} cm/sec, 4.0 x 10^{-8} cm/sec, 2.8 x 10^{-6} cm/sec, and 5.3 x 10^{-7} cm/sec (Terracon, 2020), which have a geometric mean of 3.0 x 10^{-7} cm/sec.

The maximum gradient possible would be for a constant head of 1-foot above the liner during the entire travel time through the spoils, or (1 ft / 90 ft = 0.011 ft/ft). This is a conservative estimate because it is likely that the gradient would be much lower and that there would be intervals of unsaturated transport beneath the clay liner, which is slower than saturated transport.

Using the moisture contents of the samples in the falling head hydraulic conductivity measurements and a particle specific gravity of 2.72 (Terracon, 2020), the four undisturbed porosity measurements were 0.39, 0.45, 0.43, and 0.43. Lower effective porosity results in higher flow velocity so assuming n_e = 0.39 is a conservative estimate. Using the values described above, groundwater flow velocity (v) = 3.0 x 10^{-7} cm/sec * 0.011 ft/ft / 0.39 = 8.54 x 10^{-9} cm/sec or 0.00088 ft/year. Assuming a thickness of 90 feet, travel time through the mine spoils under the clay liner is 90 ft / 0.0088 ft/year = 10,177 years.

Like the mine spoils, the sediments of the Sentinel Butte Formation are predominately native clay sediments and are expected to have lower K_v values. Five undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the WISCO Landfill (Barr, 2013) were 7.0 x 10^{-9} cm/sec, 1.1 x 10^{-8} cm/sec, 3.5 x10^{-9} cm/sec, 2.5 x 10^{-9} cm/sec, and 6.7 x 10^{-9} cm/sec. Six undisturbed vertical hydraulic conductivity values for the Sentinel Butte Formation at the Minnkota Coal Combustion Residuals Unit (Barr, 2012) were 3.6 x 10^{-8} cm/sec, 5.0 x 10^{-9} cm/sec, 8.8 x 10^{-8} cm/sec, 1.2 x 10^{-8} cm/sec, 1.0 x 10^{-8} cm/sec, and 1.0 x 10^{-9} cm/sec. Together, these eleven values have a geometric mean of 8.0 x 10^{-9} cm/sec.

The gradient is assumed to be a constant head of 1-foot above the liner during the entire travel time through the 80 ft thick Sentinel Butte Formation, or (1 ft / 80 ft = 0.0125 ft/ft). This is a conservative estimate because it excludes the layer of spoils above, which, if factored in, would reduce the gradient and therefore the resulting flow velocity. Using the values described above (K= 8.0 x 10^{-9} cm/sec, i =

0.0125 ft/ft and n_e = 0.39), the vertical flow velocity (v) through the Sentinel Butte Formation is estimated as v = 8.0 x10^{-9} cm/sec * 0.0125 / 0.39 = 2.564 x 10^{-8} cm/sec or 0.00265 ft/year. Given the thickness of the Sentinel Butte Formation overlying the Spaer Bed is approximately 80 feet, travel time is 80 ft / 0.00265 ft/year = 301,552 years.

Conservatively, this scenario is calculated assuming a breach in the geomembrane liner and a continuous 1 foot of head. The estimated minimum travel time for CCR leachate to travel through the unsaturated zone and reach the Spaer Bed is 311,744 years (15 years for the clay liner, 10,177 years for the mine spoils, and 301,552 years for the Sentinel Butte Formation).

2.1.3 Horizontal Migration in Groundwater

Once a hypothetical release has migrated through the liner and unsaturated zone, it could then reach the water table in the Spaer Lignite seam and eventually reach the detection monitoring well. The velocity of horizontal groundwater flow is calculated using the following equation:

$$v = \left(\frac{K}{n_e}\right)\left(\frac{dH}{dL}\right)$$

The average hydraulic gradient $\left(\frac{dH}{dL}\right)$ between upgradient well MW-18S and downgradient wells in the expansion area (MW-24S, MW-25S, MW-26S, and MW-27S is 0.005 ft/ft based on the June 2025 piezometric surface map. The hydraulic conductivity (K) is 0.234 ft/day and the porosity is 0.185 for the Spaer Lignite according to the Site's CCR Groundwater Monitoring System Report (AECOM, 2017). Using this information in the above equation, groundwater velocity for the wells in the expansion area is 2.42 ft/year.

Since the waste was placed in the lined landfill expansion cell (300 ft to the closest well MW-25S) only two years prior to the spring 2025 detection monitoring event, it is not plausible for any leachate to reach the monitoring wells.

Using a groundwater velocity of 2.42 ft/year, it would take approximately 124 years for a release to reach MW-24S, MW-25S, MW-26S, or MW-27S. CCR placement in the Landfill began in 1996 and the Landfill Expansion Area in 2023. Therefore, the elevated chloride at MW-24S, MW-25S, MW-26S, and MW-27S and elevated boron, calcium, and TDS at MW-27S cannot be from the CCR unit.

Since the waste was placed in the lined landfill area started in 1996 or about 29 years ago, it is not plausible for any leachate to reach the monitoring wells given these conservative assumptions. If the distances used to calculate travel time are measured from the existing waste limit, the shortest flow path to MW-25S (located closest to the existing landfill boundary) is approximately 1170 feet downgradient. It would take approximately 477 years for leachate from the existing landfill to reach MW-25S and even longer for leachate to reach MW-27S, which is farthest from the CCR waste (approximately 2800 feet).

Assuming that some unidentified preferential flow pathway were to exist, it would have to result in an over four order of magnitude (10,000x) increase in flow rate (or some combination of rate, gradient, or porosity) to allow for a release to reach the boundary. Even in this extreme case, it would still take hundreds of years to reach the downgradient boundary. Such flow rates are not reasonably likely given

the construction quality control on the liner, the thickness of the spoils, and the fine-grained nature of the geology and spoils

The long time of travel supports the hypothesis that the CCR unit is not the source of the chloride observed at MW-24S, MW-25S, and MW-26S; and boron, chloride, calcium, and TDS at MW-27S.

2.2 Natural Variability in Groundwater

Site specific chloride values are variable at the site and range from 7.84 to 16.0 mg/L at downgradient wells other than those with chloride SSIs in spring 2025 (MW-15S, MW-17S, and MW-22S) from 2016 to 2025. Chloride at upgradient wells (MW-18S, MW-19S, and MW-21S) ranged from 4.38 to 19.4 mg/L as shown on time series graphs in Attachment A.

Further evaluation of sulfate concentrations, which are a principal indicator of a CCR unit release to groundwater, demonstrate that MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S are not impacted by a release from the CCR landfill. Sulfate concentrations during the June 2025 sampling event at these locations ranged from 29.8 mg/L to 230 mg/L. The sulfate concentrations at the upgradient Landfill monitoring locations (MW-18S, MW-19S, and MW-21S) were higher and ranged from 263 to 892 mg/L from 2016 to 2025. At downgradient wells other than those with SSIs (MW-15S, MW-17S, and MW-22S), sulfate concentrations were higher and ranged from 183 to 442 mg/L from 2016 to 2025. Sulfate at MW-16S, MW-20S, MW-24S, MW-25S, and MW-26S is much lower than both upgradient and downgradient monitoring locations.

Although MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S have elevated chloride concentrations compared to upgradient wells, sulfate concentrations are lower compared to the rest of the monitoring locations. The low sulfate at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S suggests that the chloride is unlikely to come from a CCR unit release because groundwater impacted by a release should have elevated concentrations of multiple Appendix III parameters.

Site specific historical groundwater samples have been collected from ten wells also screened in the Spaer Bed to the north and east of the landfill. These wells were installed and sampled in support of a groundwater monitoring program associated with the adjacent surface mine prior to development of the CCR landfill. Chloride concentrations within the Spaer Bed are variable ranging from 5.7 to 59 mg/L. Chloride concentrations at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S (24.6 to 64.9 mg/L) are similar to the site-specific background water quality.

To further test the hypothesis of a natural variability in the groundwater, a Piper diagram (Figure 4) was used to visually compare the measured groundwater quality at the Site. Piper diagrams are plots of major ion chemistry of water samples (calcium, magnesium, potassium, sodium, chloride, sulfate, and [bi]carbonate) that are used to differentiate between water types and to identify potential mixing of water types. The Piper diagram provides a means to identify or "fingerprint" water samples by their common characteristics (major ions) to assess which types of water are similar or dissimilar to potential source water types (Helsel et al., 2020). On the Piper diagram depicted in Figure 4, downgradient well compositions are shown as red symbols, and the upgradient well compositions as purple symbols using the spring 2025 sample results.

The Piper diagram shows the upgradient wells (MW-18S and MW-19S) as a sodium, sulfate and bicarbonate mixed type water. Downgradient wells and upgradient well (MW-21S) are characterized as

sodium bicarbonate type water. The upgradient wells (MW-18S and MW-19S) have a higher proportion of sulfate compared to downgradient wells. Wells MW-20S, MW-24S, MW-25S and MW-26S have the lowest proportion of sulfate. The water quality at MW-27S has a greater proportion of calcium and magnesium compared to the other monitoring locations. These differences underscore the natural variability within the groundwater system.

Therefore, because other indicators of the CCR unit release are absent and background chloride concentrations are variable within the Spaer Bed, we reject the hypothesis that the CCR unit is the source of the chloride observed at MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S.

2.4 Statistical Methods

Interwell prediction limits are currently used to evaluate for SSIs. Interwell prediction limits are valid for the site if the stationarity of the mean and variance are assumed to be constant between upgradient monitoring wells MW-18S, MW-19S, and MW-21S and the downgradient wells (USEPA, 2009). The upgradient monitoring wells are not directly downgradient of a CCR unit (Figure 3). According to the EPA Unified Guidance (USEPA, 2009; page 6-31), interwell tests alone may not be suitable for sites with non-stationarity of distribution mean and variance. Non-stationarity may be expected due to historical mining activities and due to heterogeneity within the lignite documented at the Site.

Therefore, intrawell limits are also valid per the guidance. As shown in Table 2 below, using intrawell prediction limit methods indicates there are no SSIs for chloride at MW-16S, MW-20S and MW-24S (Attachment B). Using a combination of interwell and intrawell methods at the site would account for site specific heterogeneity and historical conditions and would eliminate the SSI determination at MW-20S and MW-24S.

Table 2 SSIs Compared to Intrawell Prediction Limits

Event	Well	Parameter (units)	Measured	Intrawell Prediction Limit
Detection Monitoring – 2025 #1 (Spring)	MW-16S	Chloride (mg/L)	26.2	29.7
	MW-20S	Chloride (mg/L)	24.6	31.0
	MW-24S	Chloride (mg/L)	49.6	59.4

Intrawell methods cannot be used at MW-25S, MW-26S, and MW-27S until at least 8 baseline samples have been collected.

2.5 Well Sampling and Development at MW-27S

Monitoring well MW-27S was installed in November 2023, and well development was attempted in April 2024. Approximately one well volume (~4 gallons) was purged during development before the well went dry. It is unlikely that the well was completely developed after this first attempt. The well will need to recharge and be purged multiple times in order to achieve full development.

Based on field notes, low-flow sampling methods were not used during sample collection at MW-27S during the June 2025 detection monitoring event. Specifically, the well was not purged and allowed to

stabilize prior to sample collection, instead a hydrasleeve was used to collect the sample due to slow groundwater recharge times.

The preamble to the CCR Rule (VI(K)(3)) notes that "Groundwater sampling should be conducted utilizing EPA protocol low stress (low-flow) purging and sampling methodology, including measurement and stabilization of key indicator parameters prior to sampling." Well stabilization is conducted prior to groundwater sampling in order to obtain a sample representative of aquifer conditions. Properly constructed and developed groundwater monitoring wells allow for the collection of representative samples with low turbidity (U.S. EPA, 1986, 1992). However, even correctly installed wells can produce turbid samples in certain geologic materials. Thus, purging and stabilization are necessary to yield reproducible sampling results. Due to limited recharge, monitoring well MW-27S was not sufficiently purged and did not stabilize during the spring 2025 sampling. Field notes from well development are included in Attachment C.

Monitoring well MW-27S has been documented as being slow to recharge (Barr, 2024). Obtaining sufficient groundwater volume for analysis at MW-27S has proven challenging. As a result, the sample sent for laboratory chemical analysis in spring 2025 consisted of the initial draw of water from the well without stabilization. Turbidity readings were too high for the meter and the sample color was described as black, yielding a sample with a high concentration of suspended solids, which may not be representative of typical aquifer conditions. Therefore, the SSI could also be attributed to sampling error.

The CCR Rule requires measurement of "total recoverable metals" because suspended and colloidal particles can also be a means of transport for contaminants. However, the suspended solids responsible for the boron, calcium, chloride, and TDS SSIs at monitoring well MW-27S are believed to be natural aquifer material and not mobilized CCR contaminants.

Therefore, due to slow recharge times preventing full development and the well to be purged before sampling, the sample collected from MW-27S is not representative of aquifer conditions and is not a representative sample.

3 Conclusion

An alternative source demonstration for chloride at this site is supported by the following lines of evidence:

- Based on groundwater flow velocities and timing of CCR placement, the elevated chloride (and boron, calcium, and chloride at MW-27S) concentrations could not have come from the CCR unit.
- Chloride in groundwater is variable across the site. While there are somewhat elevated concentrations of chloride in many downgradient wells, there are low sulfate concentrations. Only this single detection monitoring parameter indicated an SSI in several monitoring wells. There is a relative absence of sulfate, a primary indicator of a release, in the groundwater as compared to the presence of sulfate in the water within the upgradient monitoring wells and the downgradient wells with lower chloride. Groundwater chemistry in the expansion area wells is both chemically distinct from the other monitoring wells (background and downgradient) at the CCR unit and chemically distinct from the character of the CCR unit.

- Intrawell statistical methods did not result in SSIs for chloride at MW-16S, MW-20S, and MW-24S. There are not enough baseline samples at MW-25S, MW-26S, and MW-27S for intrawell analyses.

- Well sampling and development limitations due to slow groundwater recharge resulted in high turbidity and the SSIs for boron, calcium, chloride, and TDS at MW-27S.

As this report demonstrates, the SSI analysis presented in Table 1 for monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S is attributed to a source other than the CCR Unit for chloride in the groundwater. The SSI analysis for boron, calcium, chloride, and TDS at MW-27S is attributed to sampling techniques due to non-representative aquifer conditions from slow groundwater recharge rates. Future monitoring data will add to our understanding of the site and the results are expected to augment this ASD and conclusions.

4 References

AECOM, 2024. 2023 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2024.

Barr, 2012. Letter to Minnkota Power Cooperative, Inc., Regarding Cells 4, 5, and 6 Drilling Report. May 17, 2012.

Barr, 2013. Site Characterization Investigation Report and Environmental System Plan, WISCO Oilfield Special Waste Landfill, Williston, North Dakota. February 2013.

Barr, 2024. Coal Combustion Residuals Landfill Groundwater Monitoring Well Network Certification, Antelope Valley Station Landfill. June 2024.

Barr, 2025. 2024 Annual Groundwater Monitoring and Corrective Action Report, AVS CCR Landfill. January 2025.

Terracon, 2020. Tests of Soils – Permeability, AVS Landfill Expansion, October 12, 2020.

United States Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance. March 2009.

5 Certification

I certify that the written demonstration provided (above) for chloride in monitoring wells MW-16S, MW-20S, MW-24S, MW-25S, MW-26S, and MW-27S and boron, calcium, and TDS in MW-27S is supported by the data, accurate, and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§ 257.94(e)(2)). I further certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of North Dakota.

Kevin Solie, P.E.
ND P.E. License No. 9488
Barr Engineering Company

Dated this 22th day of December 2025

Figures

Permit Boundary

Railroad

0 2,500 5,000

Feet

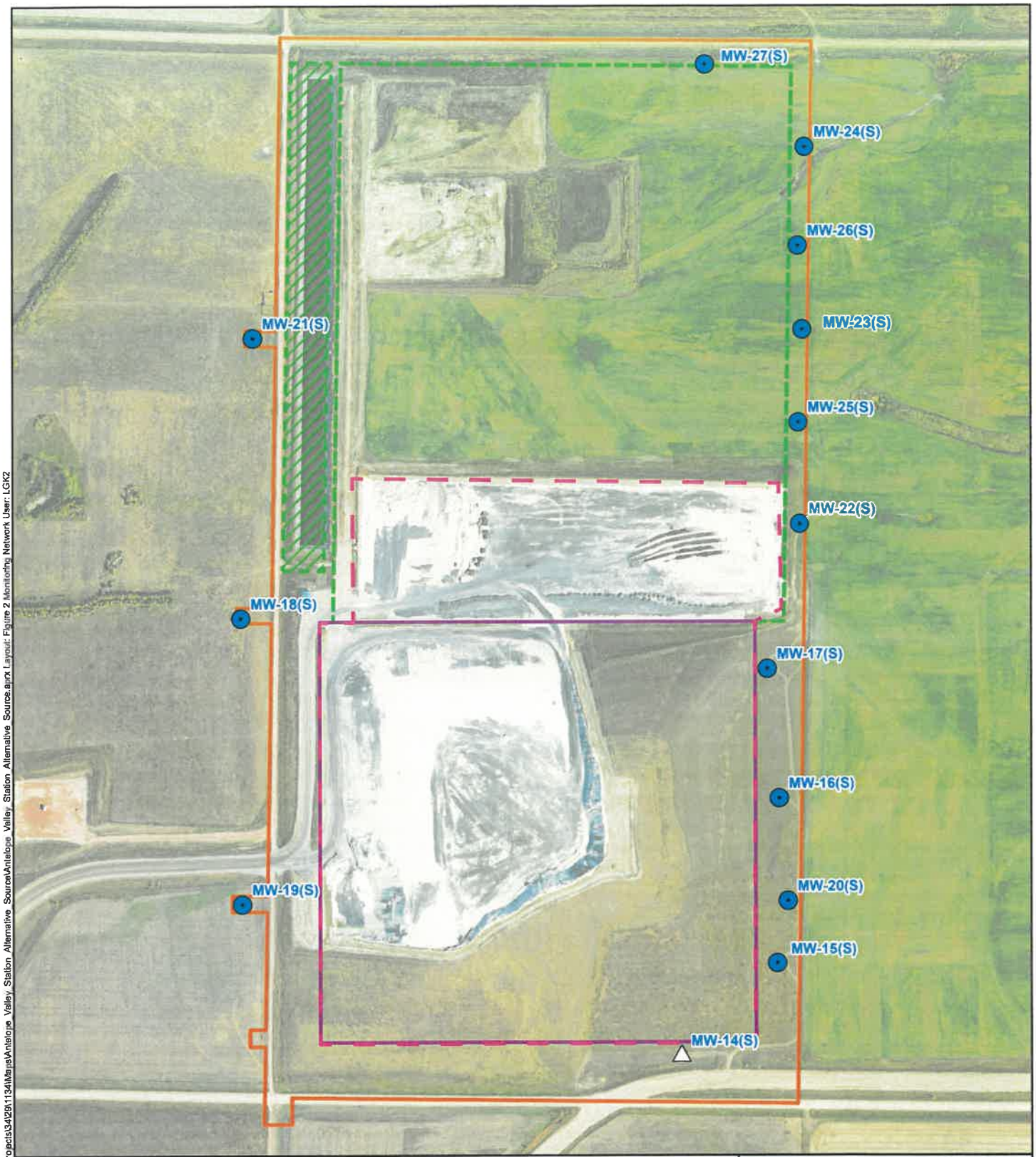
Imagery: USDA-NAIP, 2024

Site Location
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 1

BARR

Ban Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11234\Maps\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 1 Site Location Map User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)

N

0 300 600
Feet

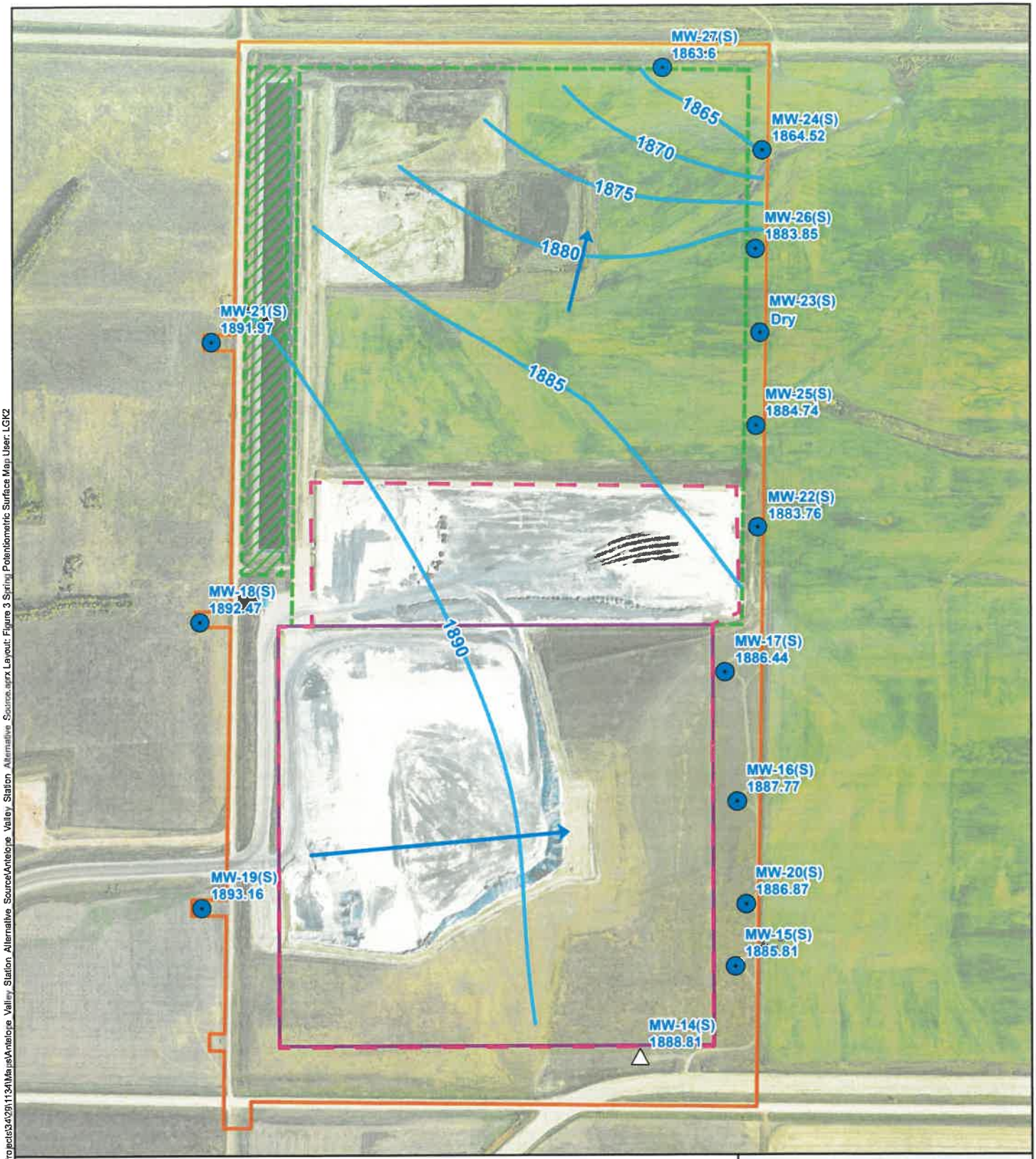
Imagery: USDA-NAIP, 2024

Monitoring Network
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 2

BARR

Barr Footer: ArcGISPro 3.3.1, 2025-03-26 11:07 File: I:\Projects\34\29\11341\Mxds\Antelope_Valley_Station_Alternative_Source\Antelope_Valley_Station_Alternative_Source.aprx Layout: Figure 2 Monitoring Network User: LGK2



Groundwater Monitoring System Wells
Water Level Only Monitoring
Permit Boundary
Existing Landfill Limits
Future Expansion Limit
Leachate Management Area
Limits of Ash as of 2025 (approximate)

N

0 300 600
Feet

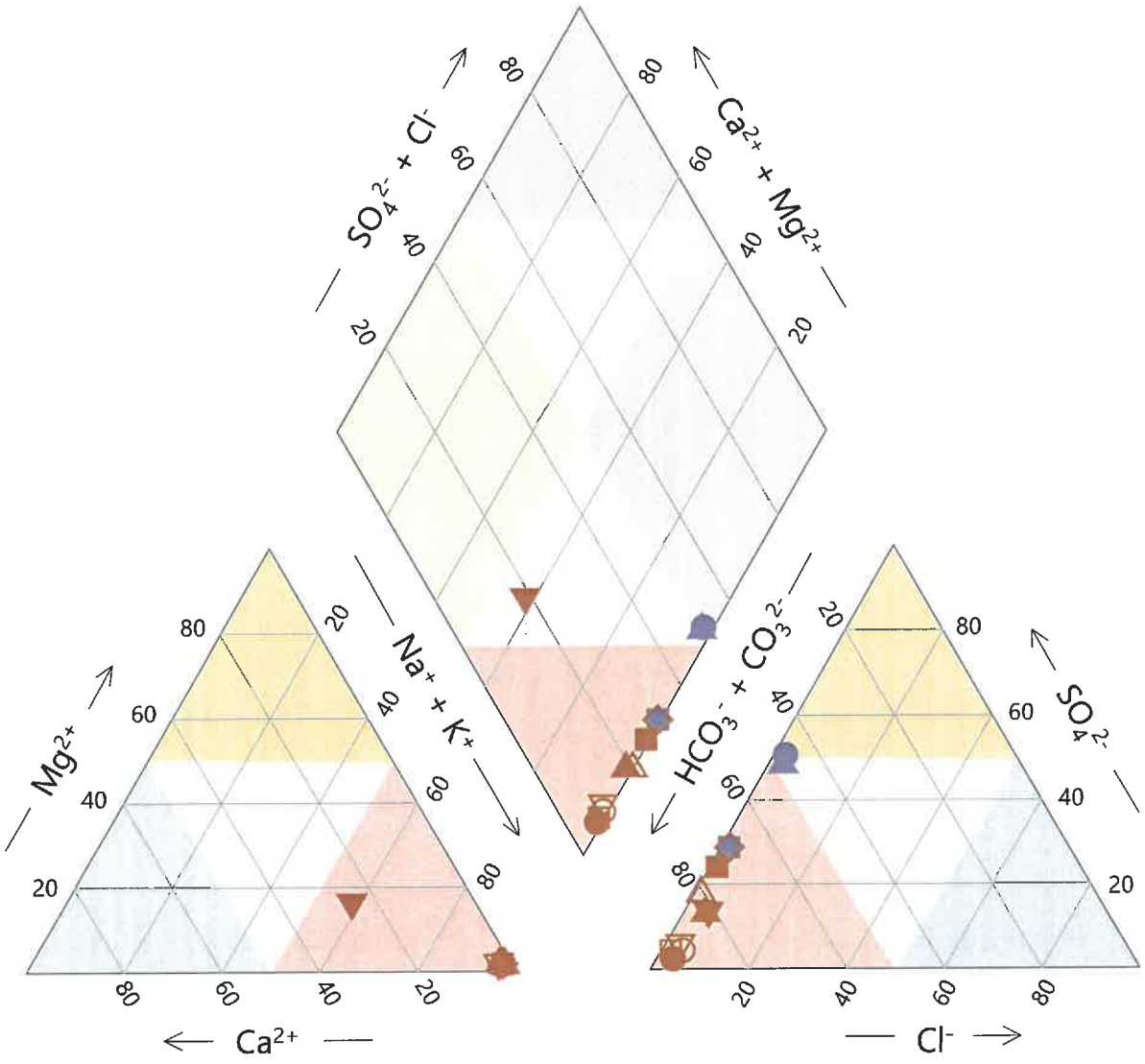
Imagery: USDA-NAIP, 2024

Spring 2025 Potentiometric Surface
Antelope Valley Station
Basin Electric Power Cooperative
Beulah, North Dakota

FIGURE 3

BARR

Barr Footer: ArcGISPro 3.5.3, 2025-11-25 09:57 File: I:\Projects\34429\1134\Maps\Antelope Valley Station Alternative Source\Antelope Valley Station Alternative Source.aprx Layout: Figure 3 Spring Potentiometric Surface Map User: LGK2



Upgradient Wells

- MW-18S
- MW-19S
- MW-21S

Downgradient Wells

- MW-15S
- MW-16S
- MW-17S
- MW-20S
- MW-22S
- MW-24S
- MW-25S
- MW-26S
- MW-27S

Piper Diagram
AVS
SPRING 2025
FIGURE 4

BARR.

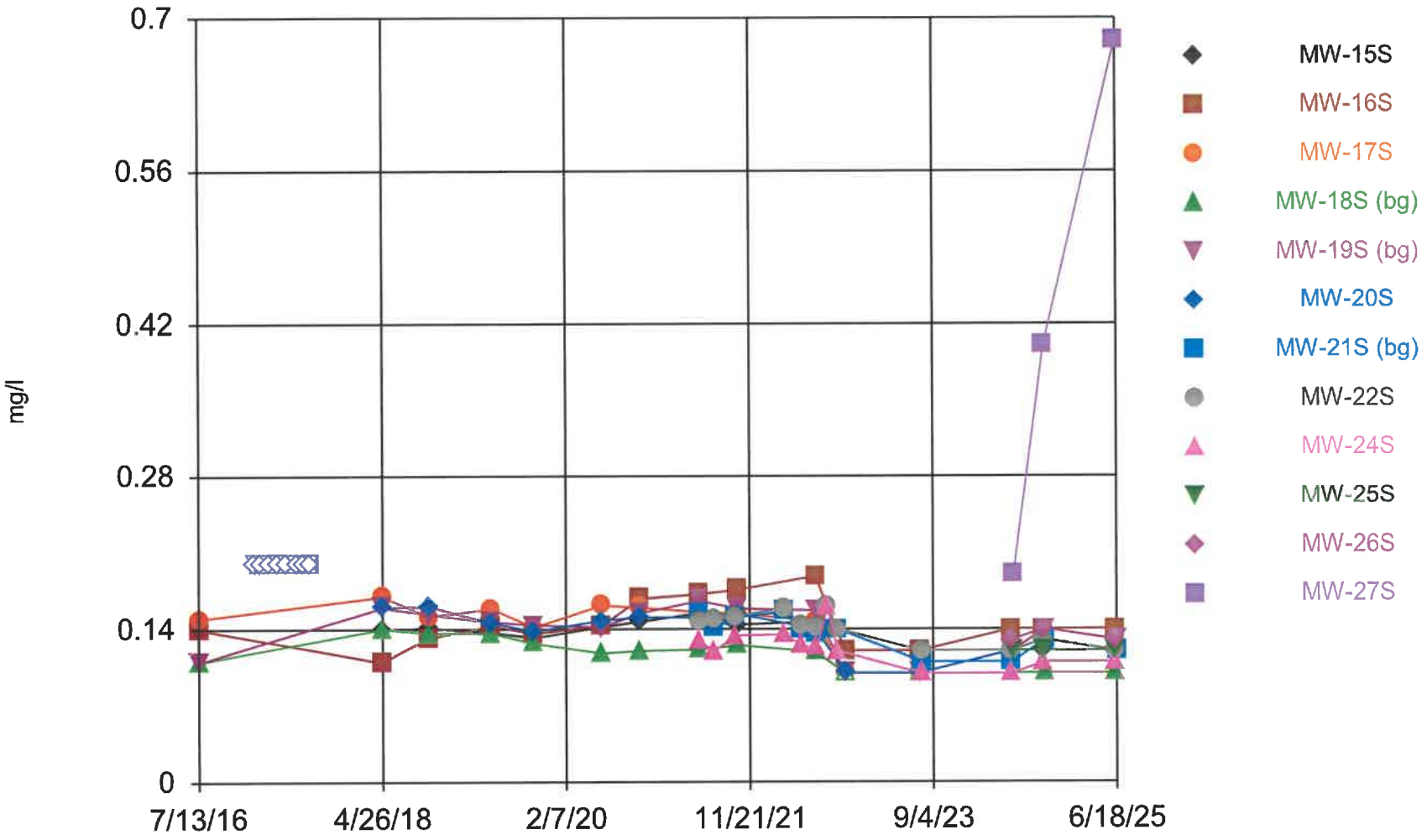
Attachments

Attachment A

Time Series Graphs

Sanitas™ v.10.1.02 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

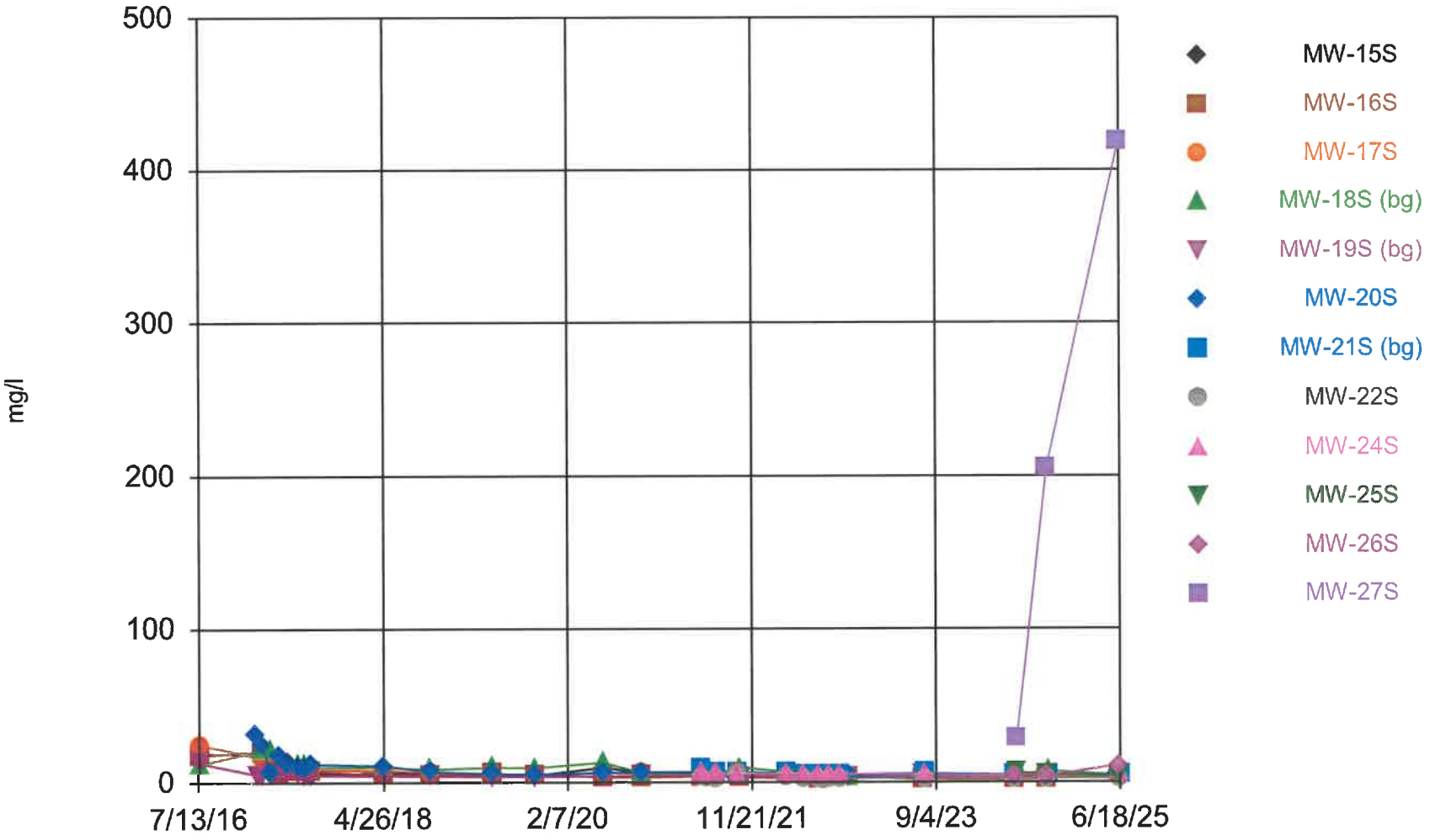
Boron, total



Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Calcium, total

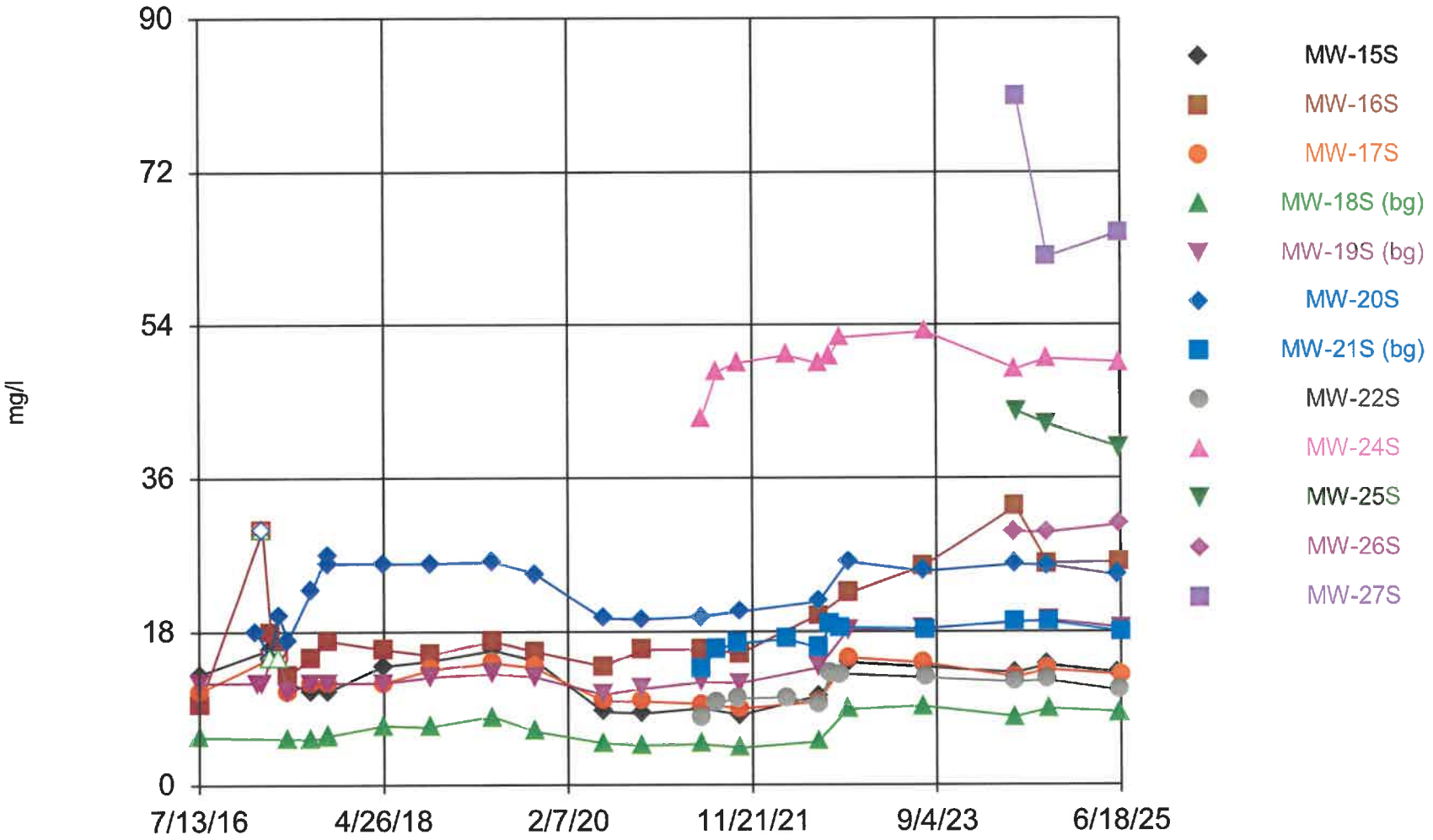


Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.1.02 Software licensed to Barr Engineering Company, UG
Hollow symbols indicate censored values.

Chloride

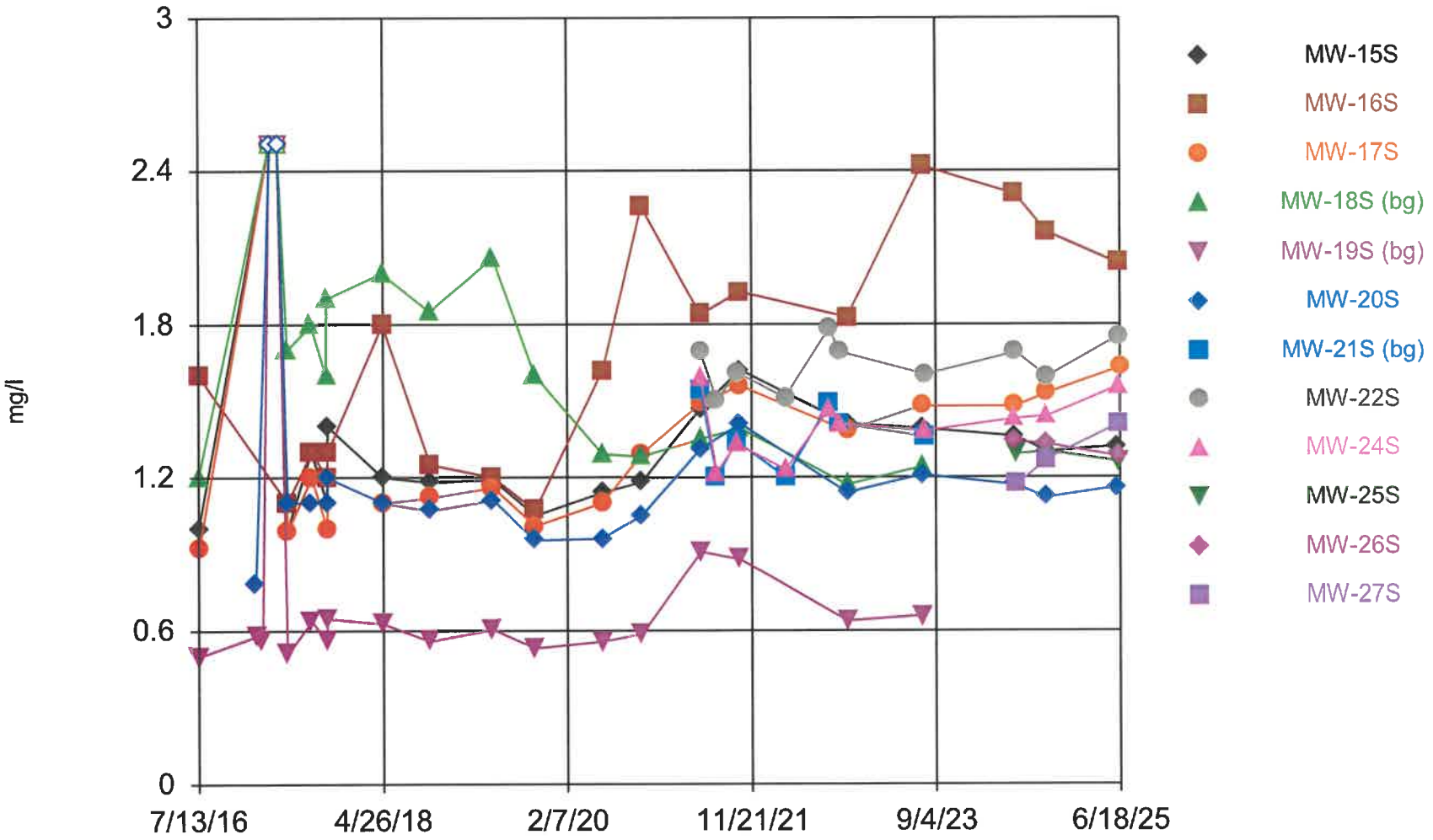


Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.1.02 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

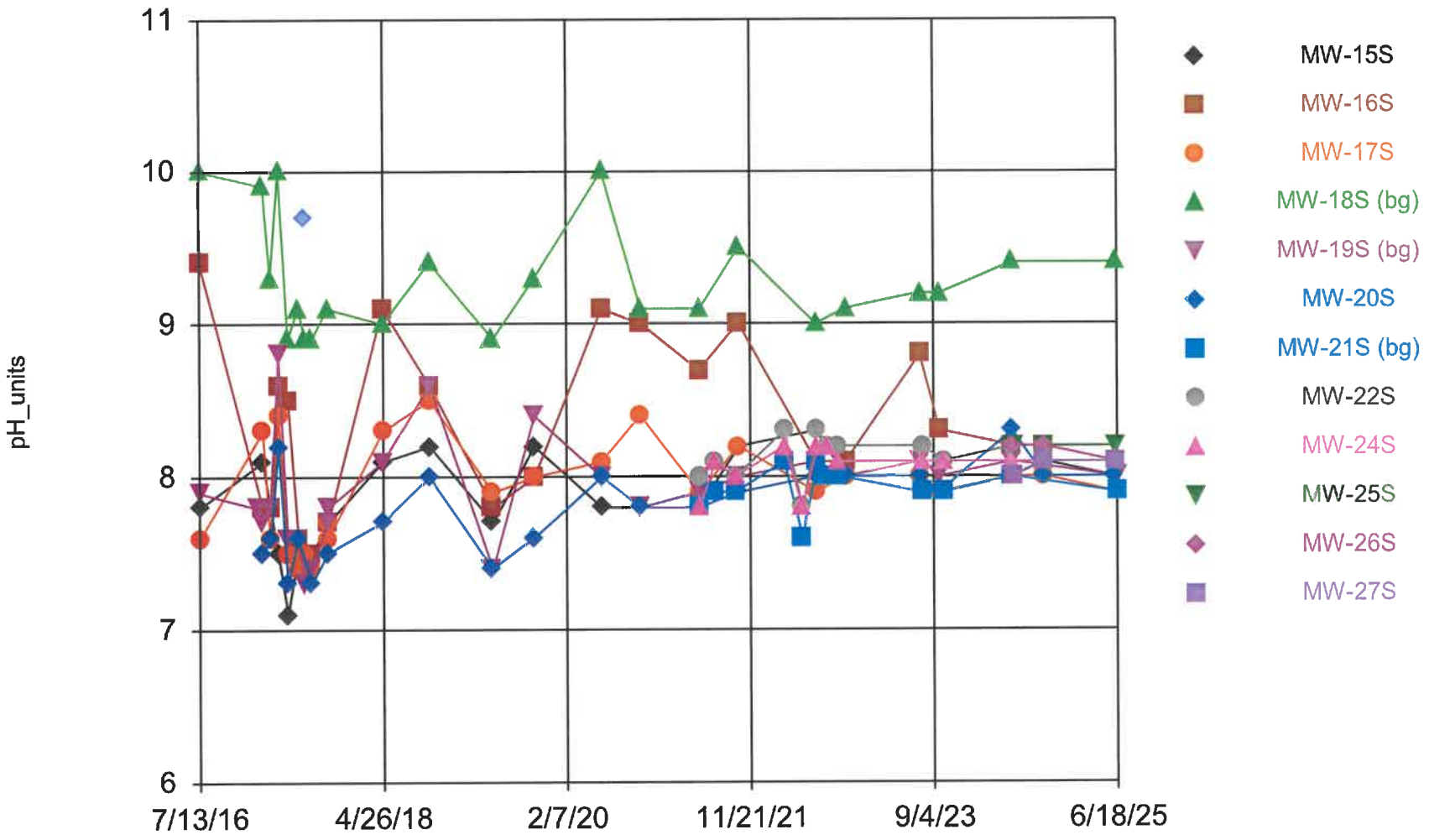
Fluoride



Time Series Analysis Run 12/2/2025 11:11 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

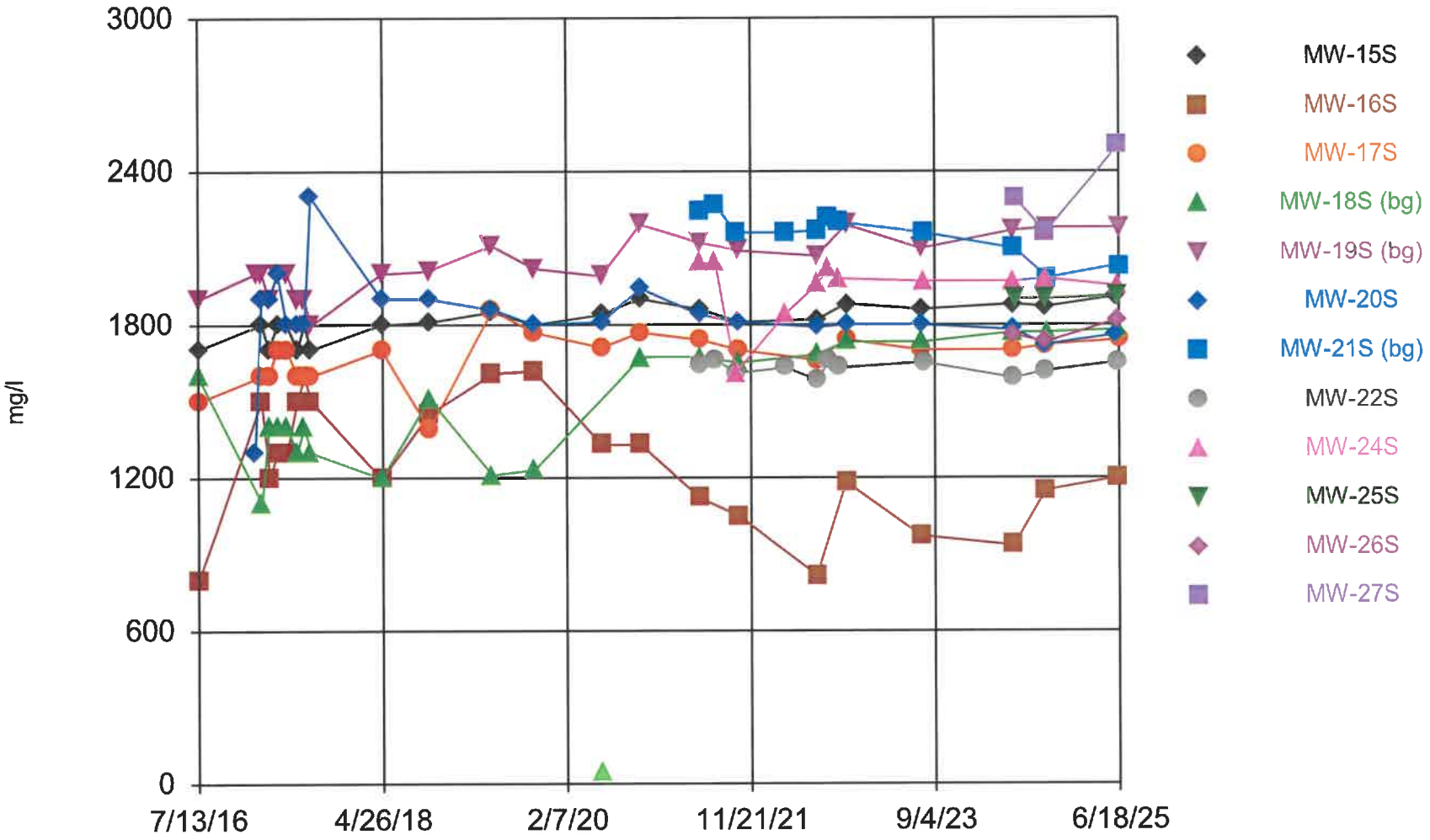
pH, field



Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

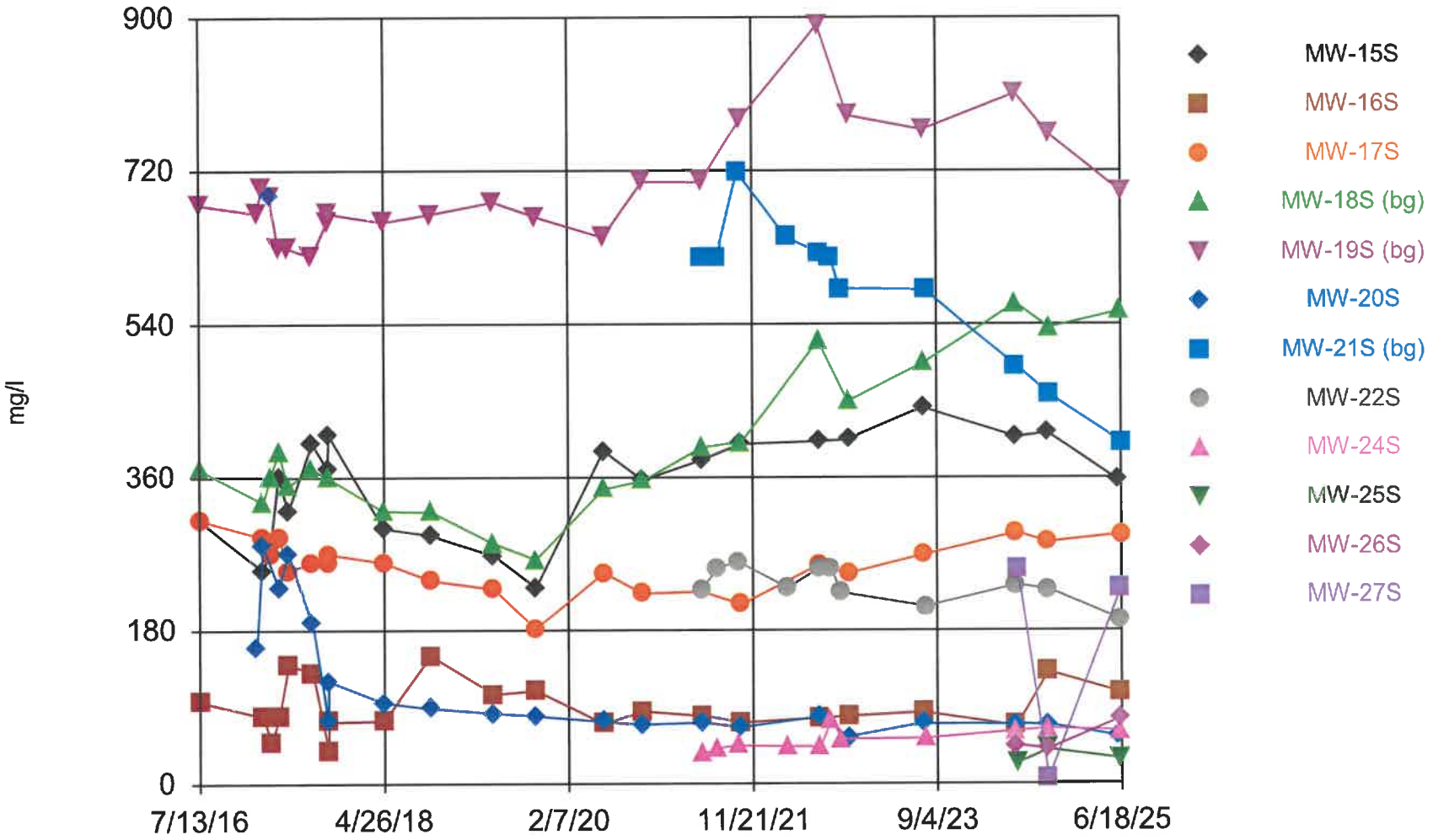
Solids, total dissolved



Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sulfate, as SO4



Time Series Analysis Run 12/3/2025 9:16 AM View: AIII

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Attachment B

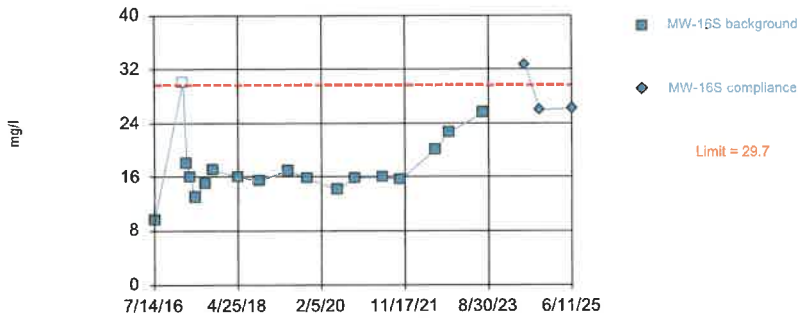
Statistical Evaluation

Sanitas™ v.10.1.02 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

Within Limit

Chloride

Intrawell Parametric



Background Data Summary (based on natural log transformation): Mean=2.821, Std. Dev.=0.2478, n=19, 5.263% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9118, critical = 0.901. Kappa = 2.301 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

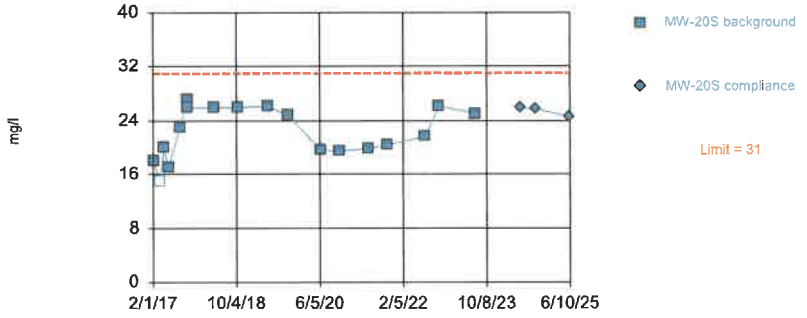
Prediction Limit Analysis Run 11/24/2025 8:35 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Sanitas™ v.10.1.02 Software licensed to Barr Engineering Company. UG
Hollow symbols indicate censored values.

Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=22.29, Std. Dev.=3.748, n=18, 5.556% NDs. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.904, critical = 0.897. Kappa = 2.33 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

Prediction Limit Analysis Run 11/24/2025 8:36 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

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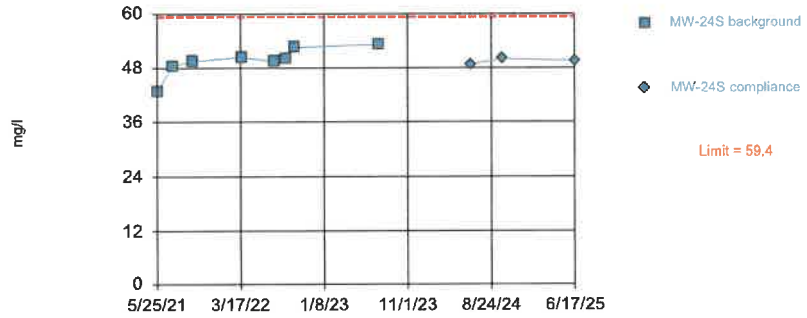
Within Limit

Chloride

Intrawell Parametric



Background Data Summary: Mean=49.58, Std. Dev.=3.129, n=8. Seasonality was not detected with 95% confidence. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8682, critical = 0.818. Kappa = 3.133 (c=7, w=10, 1 of 2, event alpha = 0.05132). Report alpha = 0.0007523.

Prediction Limit Analysis Run 11/24/2025 8:37 PM View: AIII
Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR

Intrawell Prediction Limit

Antelope Valley Station Client: Basin Electric Data: BEPC_AVS_CCR Printed 11/24/2025, 8:41 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Chloride (mg/l)	MW-20S	31	n/a	6/10/2025	24.6	No	18	5.556	No	0.000...	Param 1 of 2
Chloride (mg/l)	MW-24S	59.4	n/a	6/17/2025	49.6	No	8	0	No	0.000...	Param 1 of 2
Chloride (mg/l)	MW-16S	29.7	n/a	6/11/2025	26.2	No	19	5.263	ln(x)	0.000...	Param 1 of 2

Attachment C

Well Development

Barr Engineering Company
Field Log Data Sheet

Client: Basin Electric	**Monitoring Point:** MW-27
Location: AVS CCR Wells	**Date:** 4-25-2024
Project #: 34291126	**Sample Time:**

GENERAL DATA		STABILIZATION TEST						
Barr lock:	Basin			mS/cm			mg/L	NTU
Casing diameter:	2"	Time/ Volume	Temp. °C	Cond. @ 25	pH	ORP Eh	D.O.	Turbidity Appearance
Total well depth:*	~229.40	1425 / 3.5 gal	13.5	2572	8.25	-96.3	0.83	Black OOR (Drk Brn)
Static water level:*	205.83							
Water depth:*	23.57							
Well volume: (gal)	3.84							
Purge method:	Bailer							
Sample method:	Bailer							
Start time:	X	Odor: None						
Stop time:	X	Purge Appearance: Dark Brown / Black						
Duration: (minutes)	X	Sample Appearance:						
Rate, gpm:	X	Comments: Purged dry 1 well volume "Sediment"						
Volume, purged:	~3.8 gal							
Duplicate collected?	NA							
Sample collection by:		CO2-	Mn2-	Fe(T)-	Fe2-			
Others present:		Well Condition: New						

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- ~~semi-volatile-~~ general- nutrient- ~~cyanide-~~ DRO- Sulfide-

oil,grease- bacteria- total metal- filtered metal- ~~methane-~~ ~~filter-~~

Others:

*Measurements are referenced from top of riser pipe, unless otherwise indicated.

Well/Piezo ID: MW-27S

Ground Water Sample Collection Record

Client: BEPC
Project No:
Site Location: AVS Landfill
Weather Conds: sunny, warm
Date: 6-17-25
Time: 1150
Finish 1220
Collector(s) MK

WATER LEVEL DATA: (measured from Top of Casing) Well ☐

a. Total Well Length _____ c. Casing Material PVC Pump Settings _____

b. Water Table Depth 208.0 d. Casing Diameter _____

WELL PURGING DATA

a. Purge Method ~~Dedicated Bladder Pump~~ Hydrosleeve

b. Field Testing Equipment Used:

Make	Model	Serial Number
YSI		5320084101
HACH		20030C084551

c. Field Testing Equipment Calibration Documentation Found in Field Notebook # 1 Page # 1

Time	Volume Removed (gal)	T° (C)	DO mg/L (<0.5)	Spec. Cond (µs/cm)	pH	ORP	Turbidity (NTU) (<5)	Color	DTW
Stabilization		+/- 0.2	+/- 10%	+/- 3%	+/- 0.1	+/- 10%	+/- 10%		0.33 ft
	INITIAL	12.7	.28	3191	8.10	442	Too High	Black Muck	208.0
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								
	L								

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

SAMPLE COLLECTION: Method: Bladder Pump

Sample ID	Container Typ	No. of Containers	Preservation	Analysis	Time
	1L	1		TDS/Anions	1219
	500mL	1	HNO3	Metals	↓

Comments _____

Signature MK Date 6-17-25

Appendix C

Groundwater Flow Rate

Appendix C
Groundwater Flow Rate
2025
Annual Monitoring Report
AVS CCR Groundwater Compliance

AVS Groundwater Velocity Calculation

Date 6/10/2025

	UG: MW-19S	UG: MW-18S	
Kh (ft/d)	0.234	0.234	*CCR Groundwater Monitoring System Report (AECOM, 2017)*
porosity, n	0.185	0.185	*CCR Groundwater Monitoring System Report (AECOM, 2017)*
Average gradient, i (ft/ft)	0.002	0.004	
Average V (ft/d)	3.069E-03	5.450E-03	
Average V (ft/yr)	1.12	1.99	
Flow Direction	**E-NE**	**NE**	

	Top of Casing Elevation	Depth to Water	Water Level Elevation	
	ft amsl	ft below TOC	ft amsl	
MW-15S	2104.77	218.96	1885.81	
MW-16S	2123.59	235.82	1887.77	
MW-17S	2124.89	238.45	1886.44	
MW-18S	2091.60	199.13	1892.47	
MW-19S	2042.56	149.40	1893.16	
MW-20S	2107.47	220.60	1886.87	
MW-21S	2094.72	202.75	1891.97	
MW-22S	2093.90	210.14	1883.76	
MW-24S	2070.74	206.22	1864.52	
MW-25S	2083.40	198.66	1884.74	
MW-26S	2074.50	190.65	1883.85	
MW-27S	2071.60	208.00	1863.60	Not used for flow or gradient calculations

AVS Landfill horizontal distance, ft

	MW-19S	MW-18S
MW-15S	2640	
MW-16S	2746	
MW-17S	2904	
MW-20S	2746	
MW-22S	3379	
MW-24S		3643
MW-25S		2904
MW-26S		3326
MW-27S		3590
	*Used UG well MW-19S for MW-15S, 16S, 17S, 20S, and 22S flow calculations	*Used UG well MW-18S for MW-24S, 25S, and 26S flow calculations

Appendix C
Groundwater Flow Rate
2025
Annual Monitoring Report
AVS CCR Groundwater Compliance

AVS difference in WL elevation, ft

	MW-19S	MW-18S
MW-15S	7.35	
MW-16S	5.39	
MW-17S	6.72	
MW-20S	6.29	
MW-22S	9.40	
MW-24S		27.95
MW-25S		7.73
MW-26S		8.62

AVS horizontal gradient, ft/ft

	MW-19S	MW-18S
MW-15S	0.003	
MW-16S	0.002	
MW-17S	0.002	
MW-20S	0.002	
MW-22S	0.003	
MW-24S		0.008
MW-25S		0.003
MW-26S		0.003
Average	0.002	0.004

Appendix C
Groundwater Flow Rate
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

AVS Groundwater Velocity Calculation

Date 10/6/2025

	UG: MW-19S	UG: MW-18S	
Kh (ft/d)	0.234	0.234	*CCR Groundwater Monitoring System Report (AECOM, 2017)*
porosity, n	0.185	0.185	*CCR Groundwater Monitoring System Report (AECOM, 2017)*
Average gradient,	0.002	0.005	
Average V (ft/d)	2.900E-03	6.156E-03	
Average V (ft/yr)	1.06	2.25	
Flow Direction	**E-NE**	**NE**	

	Top of Casing Elevation	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
MW-15S	2104.77	218.90	1885.87
MW-16S	2123.59	236.31	1887.28
MW-17S	2124.89	238.32	1886.57
MW-18S	2091.60	199.17	1892.43
MW-19S	2042.56	149.75	1892.81
MW-20S	2107.47	220.22	1887.25
MW-21S	2094.72	202.78	1891.94
MW-22S	2093.90	210.03	1883.87
MW-24S	2070.74	206.27	1864.47
MW-25S	2083.40	198.10	1885.30
MW-26S	2074.50	190.43	1884.07
MW-27S	2071.60	203.67	1867.93

AVS Landfill horizontal distance, ft

	MW-19S	MW-18S
MW-15S	2640	
MW-16S	2746	
MW-17S	2904	
MW-20S	2746	
MW-22S	3379	
MW-24S		3643
MW-25S		2904
MW-26S		3326
MW-27S		3590
	MW-19S for MW-15S, 16S, 17S, 20S, and 22S flow calculations	MW-18S for MW-24S, 25S, and 26S flow calculations

Appendix C
Groundwater Flow Rate
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

AVS difference in WL elevation, ft

	MW-19S	MW-18S
MW-15S	6.94	
MW-16S	5.53	
MW-17S	6.24	
MW-20S	5.56	
MW-22S	8.94	
MW-24S		27.96
MW-25S		7.13
MW-26S		8.36
MW-27S		24.50

AVS horizontal gradient, ft/ft

	MW-19S	MW-18S
MW-15S	0.003	
MW-16S	0.002	
MW-17S	0.002	
MW-20S	0.002	
MW-22S	0.003	
MW-24S		0.008
MW-25S		0.002
MW-26S		0.003
MW-27S		0.007
Average	0.002	0.005

Appendix D

Baseline Sample Results

Appendix D
Baseline Sampling
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

		Location	MW-25S		MW-25S	MW-25S	MW-25S	MW-26S	MW-26S	MW-26S	MW-26S	MW-27S	MW-27S
		Date	6/17/2024		10/02/2024	6/11/2025	10/08/2025	6/13/2024	10/02/2024	6/11/2025	10/08/2025	6/17/2024	10/02/2024
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N
Parameter	Analysis Location	Units											
General Parameters													
Alkalinity, bicarbonate, as CaCO3	Lab	mg/l	--	--	--	1489	1529	--	--	1335	1367	--	--
Alkalinity, carbonate, as CO3	Lab	mg/l	--	--	--	< 20.5 U	24	--	--	< 20.5 U	< 20.5 U	--	--
Alkalinity, total, as CaCO3	Lab	mg/l	--	--	--	1489	1553	--	--	1335	1382	--	--
Chloride	Lab	mg/l	43.8	43.3	42.3	39.6	40.4	29.7	29.7	30.6	31.5	80.8	62.0
Fluoride	Lab	mg/l	1.29	1.29	1.30	1.26	1.42	1.34	1.33	1.28	1.36	1.17	1.27
pH	Lab	pH units	--	--	--	8.2	8.4	--	--	8.2	8.4	--	--
Solids, total dissolved	Lab	mg/l	1900	1900	1900	1910	1940	1760	1730	1820	1870	2290	2160
Sulfate, as SO4	Lab	mg/l	24.6	24.7	40.2	29.8	36.0	45.1	41.0	75.9	120	252	6.83
Dissolved oxygen	Field	mg/l	0.49	--	0.27	0.49	0.31	0.35	0.28	0.46	1.44	3.45	1.72
pH	Field	pH units	8.18	--	8.19	8.15	8.18	8.15	8.17	8.09	8.08	8.03	8.08
Redox (oxidation potential)	Field	mV	-3	--	-34	-368.7	-313.8	-43.2	-32.3	-371.8	-348.6	123.4	-116.9
Specific conductance @ 25 deg C	Field	umhos/cm	2889	--	2918	3004	3011	2665	2678	2801	2884	3016	3063
Temperature	Field	deg C	9.3	--	10.6	10.0	9.8	10.9	11.2	10.5	12.2	8.5	11.5
Turbidity	Field	NTU	37.7	--	14.3	16.3	9.08	27.9	19.7	14.3	11.2	570	--
Total Metals													
Antimony	Lab	mg/l	< 0.001 U	--	< 0.001 U	--	--	< 0.001 U	< 0.001 U	--	--	< 0.001 U	< 0.001 U
Arsenic	Lab	mg/l	< 0.002 U	--	< 0.002 U	--	--	< 0.002 U	< 0.002 U	--	--	0.0116	0.0472
Barium	Lab	mg/l	0.0994	--	0.1306	--	--	0.0486	0.0514	--	--	0.3396	1.472
Beryllium	Lab	mg/l	< 0.0005 U	--	< 0.0005 U	--	--	< 0.0005 U	< 0.0005 U	--	--	0.0015	0.0082
Boron	Lab	mg/l	0.12	0.11	0.12	0.12	0.14	0.13	0.14	0.13	0.12	0.19	0.40
Cadmium	Lab	mg/l	< 0.0005 U	--	< 0.0005 U	--	--	< 0.0005 U	< 0.0005 U	--	--	0.0007	0.0036
Calcium	Lab	mg/l	5.12	5.95	4.88	4.01	4.56	4.10	3.51	11.0	17.3	28.3	206
Chromium	Lab	mg/l	0.0025	--	< 0.002 U	--	--	< 0.002 U	< 0.002 U	--	--	0.0853	0.5667
Cobalt	Lab	mg/l	< 0.002 U	--	< 0.002 U	--	--	< 0.002 U	< 0.002 U	--	--	0.0141	0.0932
Lead	Lab	mg/l	0.0006	--	< 0.0005 U	--	--	< 0.0005 U	< 0.0005 U	--	--	0.0206	0.1238
Lithium	Lab	mg/l	0.0430	--	0.0425	--	--	0.0490	0.0483	--	--	0.0755	0.201
Magnesium	Lab	mg/l	--	--	--	3.11	3.40	--	--	2.90	3.31	--	--
Mercury	Lab	mg/l	< 0.0002 U	--	< 0.0002 U	--	--	< 0.0002 U	< 0.0002 U	--	--	< 0.0002 U	< 0.001 U
Molybdenum	Lab	mg/l	0.0033	--	0.0020	--	--	0.0052	< 0.002 U	--	--	0.1457	0.1332
Potassium	Lab	mg/l	--	--	--	4.04	4.50	--	--	4.72	5.21	--	--
Selenium	Lab	mg/l	< 0.005 U	--	< 0.005 U	--	--	< 0.005 U	< 0.005 U	--	--	< 0.005 U	0.0088
Sodium	Lab	mg/l	--	--	--	826	834	--	--	746	746	--	--
Thallium	Lab	mg/l	< 0.0005 U	--	< 0.0005 U	--	--	< 0.0005 U	< 0.0005 U	--	--	< 0.0005 U	0.0011
Radiochemical Parameters													
Radium 226	Lab	pCi/l	0.3 +/- 0.2 ND	--	0.08 +/- 0.1 ND	--	--	0.08 +/- 0.2 ND	0.1 +/- 0.1 ND	--	--	3.2 +/- 1	5.7 +/- 5.3
Radium 228	Lab	pCi/l	1.1 +/- 0.9 ND	--	0.2 +/- 0.8 ND	--	--	0.5 +/- 0.8 ND	1.6 +/- 0.9	--	--	2.9 +/- 3.5 ND	12.3 +/- 5.7
Radium, combined (226+228)	Barr Calculation	pCi/l	1.4 +/- 0.9 q	--	0.3 +/- 0.8 ND	--	--	0.58 +/- 0.8 ND	1.7 +/- 0.9 q	--	--	6.1 +/- 3.7 q	18.0 +/- 7.8

Appendix D
Baseline Sampling
2025 Annual Monitoring Report
AVS CCR Groundwater Compliance

		Location	MW-27S	MW-27S
		Date	6/17/2025	10/08/2025
		Sample Type	N	N
Parameter	Analysis Location	Units		
General Parameters				
Alkalinity, bicarbonate, as CaCO3	Lab	mg/l	1659	1678
Alkalinity, carbonate, as CO3	Lab	mg/l	< 20.5 U	< 20.5 U
Alkalinity, total, as CaCO3	Lab	mg/l	1659	1686
Chloride	Lab	mg/l	64.9	65.0
Fluoride	Lab	mg/l	1.41	1.48
pH	Lab	pH units	8.2	8.3
Solids, total dissolved	Lab	mg/l	2500	2370
Sulfate, as SO4	Lab	mg/l	230	141
Dissolved oxygen	Field	mg/l	0.28	0.25
pH	Field	pH units	8.10	7.96
Redox (oxidation potential)	Field	mV	44.2	-292.9
Specific conductance @ 25 deg C	Field	umhos/cm	3191	3254
Temperature	Field	deg C	12.7	12.0
Turbidity	Field	NTU	--	999
Total Metals				
Antimony	Lab	mg/l	--	--
Arsenic	Lab	mg/l	--	--
Barium	Lab	mg/l	--	--
Beryllium	Lab	mg/l	--	--
Boron	Lab	mg/l	0.68	0.21
Cadmium	Lab	mg/l	--	--
Calcium	Lab	mg/l	419	58.1
Chromium	Lab	mg/l	--	--
Cobalt	Lab	mg/l	--	--
Lead	Lab	mg/l	--	--
Lithium	Lab	mg/l	--	--
Magnesium	Lab	mg/l	152	27.4
Mercury	Lab	mg/l	--	--
Molybdenum	Lab	mg/l	--	--
Potassium	Lab	mg/l	27.4	11.1
Selenium	Lab	mg/l	--	--
Sodium	Lab	mg/l	1040	952
Thallium	Lab	mg/l	--	--
Radiochemical Parameters				
Radium 226	Lab	pCi/l	--	--
Radium 228	Lab	pCi/l	--	--
Radium, combined (226+228)	Barr Calculation	pCi/l	--	--