



2021 Annual Groundwater Monitoring and Corrective Action Report

CCR Annual Monitoring Report

Fly Ash Area Landfill and Bottom Ash Area Landfill

Bonanza Power Plant Vernal, Utah

Prepared for
Deseret Power Electric Cooperative

January 2022

2021 Annual Groundwater Monitoring and Corrective Action Report

Fly Ash Area Landfill and Bottom Ash Area Landfill

Bonanza Power Plant Vernal, Utah

January 2022

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Acronyms

Acronym	Description
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
FGD	Flue Gas Desulfurization
SSI	Statistically Significant Increase

Summary for CCR Unit §257.90(e)(6)

At the beginning, end, and throughout 2021, the CCR unit was operating under a detection monitoring program as described in 40 CFR 257.94. Pursuant to §257.94, statistically significant increases (SSIs) were determined for fluoride in monitoring well FA-DG4 during the fall 2020, spring 2021, and fall 2021 sampling events and for pH in monitoring well BA-DG3 in spring 2021 and fall 2021. The 2021 monitoring data are shown on the (oversized) Large Table 1.

An alternative source demonstration (ASD) has been completed for these well/parameters for the fall 2020 and spring 2021 events as summarized in Appendix B. The results of the fall 2021 are pending. Therefore, no assessment monitoring program (§257.95), or related corrective or remedial measures (§§257.96, 257.97, and 257.98), were necessary for 2021.

1 Introduction

Deseret Power Electric Cooperative (Deseret) operates Bonanza Power Plant, a 500 MW coal-fired generation unit near Vernal, Utah. Coal combustion residuals (CCR) from the generating station are placed in two on-site CCR units: the Fly Ash Area Landfill and the Bottom Ash Landfill as shown on Figure 1.

These landfills are existing CCR landfills that are 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). The Fly Ash Area landfill contains primarily fly ash and flue gas desulfurization (FGD) solids. The Bottom Ash Area landfill is used to manage bottom ash and boiler slag from the facility.

The location of each of the landfills and their associated groundwater monitoring systems are depicted in Figure 1. These systems are not considered Multiunit Groundwater Monitoring Systems.

1.1 Purpose

As stated in §257.90(e), the purpose of the Annual Groundwater Monitoring and Corrective Action Report (Annual Report) is to:

- Document the status of the monitoring and corrective action program for the CCR units
- Summarize key actions completed
- Describe any problems encountered
- Discuss actions to resolve the problems
- Highlight key activities for the upcoming year

1.2 Status of the Groundwater Monitoring and Corrective Action Program

- Both CCR units were in detection monitoring
- All wells in the CCR groundwater monitoring system were sampled and analyzed for Appendix III parameters

1.3 CCR Rule Requirements

This Annual Report has been prepared in accordance with the requirements of §257.90(e) of the CCR Rule, as outlined in the following Table 1-1.

Table 1-1 CCR Rule Requirements

CCR Rule Reference	Content Required in Report	Location
§257.90(e)(1)	Map showing the CCR unit and all monitoring wells that are part of the groundwater monitoring system	Section 2.1.1 Documentation - see Figure 1
§257.90(e)(2)	Discuss any new or decommissioned monitoring wells	Section 2.1.2 Changes to Monitoring System
§257.90(e)(3)	Provide the number and date groundwater samples were collected, and the monitoring (i.e., detection or assessment)	Section 2.2 Monitoring and Analytical Results
§257.90(e)(4)	Discuss any transition between monitoring programs	Not applicable- no transition between monitoring programs has occurred.
§257.90(e)(5)	Other information specified in §257.90 through §257.98	Section 2.3 Key Actions Completed/Problems Encountered
§257.90(e)(6)	Overview at beginning of annual report	Summary for CCR Unit §257.90(e)(6)

2 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR units for 2021. The groundwater monitoring system is described in Section 2.1, the monitoring and analytical results are described in Section 2.2, groundwater direction, flow and rates in Section 2.3, key actions completed and problems encountered are described in Section 2.4, and key activities planned for 2022 are described in Section 2.5.

2.1 Groundwater Monitoring System

2.1.1 Documentation

Figure 1 shows an aerial image of the CCR units and all background (or upgradient) and downgradient monitoring wells, including the well identification numbers, that are part of the groundwater monitoring program, as required by §257.90(e)(1).

2.1.2 Changes to Monitoring System

No changes were made to the monitoring system in 2021.

2.2 Monitoring and Analytical Results

2.2.1 Existing Monitoring System Wells

As shown in Table 2-1 below, a total of 9 detection monitoring groundwater samples were collected during each semiannual sampling event from the monitoring system wells. Relevant sampling events occurred in spring 2021 and fall 2021. Results from the 2021 sampling events are included in Tables 2-2, 2-3, Large Table 1, and Appendix A.

Table 2-1 Semiannual Detection Monitoring Well Sample Events

Well	Spring 2021 Semiannual Monitoring Date	Spring 2021 Resampling Date	Fall 2021 Semiannual Monitoring Date	Fall 2021 Resampling Date
FA-UG1	4/29/2021	--	10/18/2021	--
FA-UG2 (PZ-11)	4/29/2021	--	10/18/2021	--
FA-DG2	4/29/2021	--	10/18/2021	--
FA-DG3	4/29/2021	--	10/18/2021	--
FA-DG4	4/29/2021	--	10/18/2021	--
BA-UG1	4/30/2021	--	10/19/2021	--
BA-DG1	4/30/2021	7/21/2021	10/19/2021	--
BA-DG2	4/30/2021	--	10/19/2021	--
BA-DG3	4/30/2021	7/21/2021	10/20/2021	10/27/2021

Fall 2020 SSI and Subsequent ASD

Sampling for the fall 2020 monitoring event was conducted on October 5 and 6, 2020. A potential SSI for fluoride SSI in monitoring well FA-DG4 was identified. This information was included in the 2020 Annual Report (Barr, 2021).

An Alternative Source Demonstration (ASD) memorandum regarding the fall 2020 SSI was completed on April 13, 2021. The results of the ASD concluded that the SSI was attributable to a source other than the CCR units listed in this report. The ASD is provided in Appendix B.

Spring 2021 Sampling Event

Table 2-2 summarizes the verified SSIs determined from the spring 2021 event. During the April 29 and 30, 2021, sampling event, a potential SSI for fluoride was again identified at the Fly Ash Landfill Area for monitoring well FA-DG4. No verification sampling was conducted because this SSI follows a pattern of similarly elevated fluoride addressed in a previous ASD. Therefore, this SSI was assumed to be verified and was re-evaluated for an ASD as included in Appendix B. The ASD concluded that the SSI was not the result of a release from the Fly Ash Landfill.

A potential SSI for pH was identified in the Bottom Ash Landfill Area for monitoring well BA-DG3. Verification resampling was conducted on July 21, 2021. The complete dataset for the detection monitoring event can be found in Large Table 1.

Table 2-2 Verified SSI for the Spring 2021 Event

Well	Constituent/SSI
FA-DG4	Fluoride
BA-DG3	pH

An ASD was completed with regard to the SSI for pH identified in Table 2-2 on November 30, 2021. The result of the ASD is included in Appendix B and concluded that the SSI was attributable to a source other than the CCR units.

Fall 2021 Sampling Event

Sampling for the fall 2021 monitoring event was conducted on October 18-20, 2021. Statistical assessment of the fall 2021 results again indicated the same two potential SSIs as were noted for the spring 2021 event: an elevated pH at monitoring well BA-DG3 and elevated fluoride levels in FA-DG4 (Large Table 1).

On October 27, 2021, a verification resample was taken from well BA-DG3 to verify the potential pH SSI identified from the Fall 2021 event. Table 2-3 summarizes the verified SSIs determined from the fall event.

Table 2-3 Verified SSI for the Fall 2021 Event

Well	Constituent/SSI
FA-DG4	Fluoride
BA-DG3	pH

2.2.2 Wells Installed/Added in 2021

No new wells were installed during 2021.

2.3 Groundwater Flow Direction and Rates

Groundwater flow rates and gradients were calculated using the data collected from the 2021 water level measurements and from aquifer property data presented in the 2017 Burns & McDonnell Groundwater Monitoring System Certification document. The calculated tables for groundwater flow rates, directions and gradients are located in Appendix C.

The groundwater in the Fly Ash Landfill area generally flows in the southeast direction (Figure 1) at rates ranging from a low of 0.002 ft/day to a high of 0.097 ft/day with an average horizontal gradient of 0.004. Groundwater in the Bottom Ash Landfill area generally flows south (Figure 1) at rates ranging from 0.005 ft/day to 0.046 ft/day with an average horizontal gradient of 0.004 (Appendix C)

2.4 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 2021:

- Completed semiannual detection monitoring sampling for each background and downgradient well.
- Prepared a successful ASD for fall 2020 event for fluoride at FA-DG4.
- Conducted statistical evaluation of the spring 2021 and fall 2021 groundwater detection monitoring data.
- Determined, pursuant to §257.93(h), that an SSI over background levels did not occur for any of the constituents listed in Appendix III at any downgradient monitoring well during the spring 2021 and fall 2021 events with the exception of fluoride at FA-DG4 and pH at BA-DG3, as shown in Table 2-2 and Table 2-3.
- Successful ASDs concluded that the source of the SSIs in fall 2020 and spring 2021 was not the CCR unit. The ASDs for fall 2020 and spring 2021 are provided in Appendix B.

2.5 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2022:

- Continue semiannual detection monitoring according to the Sampling and Analysis Program (Deseret, 2016).
- Evaluate analytical results from two 2022 semiannual detection monitoring events for SSIs according to the CCR Selected Statistical Method Certification (Burns & McDonnell, 2017).
- Review the conceptual site model and provide recommendations for improvements to the monitoring well network if needed.
- The fall 2021 SSIs will be evaluated against previous ASDs, and a new ASD will be generated for the fall 2021 results per the CCR rule and included in the 2022 Annual CCR Report.

3 References

Barr, 2021, 2020 Annual Groundwater Monitoring and Corrective Action Report, Bonanza Power Plant. Prepared for Deseret Power Electric Cooperative. January 2021.

Burns & McDonnell, 2017, Groundwater Monitoring System Certification – Bonanza Power Plant, Vernal, Utah. October 2017.

Burns & McDonnell, 2017, Selected Statistical Method Certification, Deseret Generation and Transmission Cooperative – Bonanza Power Plant, Vernal, Utah. October 2017.

Deseret Power Electric Cooperative, 2016, Bonanza Power Plant CCR Groundwater Monitoring Wells Sampling and Analysis Program. May 2016.

Loughlin Water Associates, 2017. Bonanza Power Plant, Coal Combustion Residuals, Monitoring Well Installation Report. January 2017.

US EPA, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance, EPA 530-R-09-007. March 2009.

Large Tables

Large Table 1 Analytical Data of 2021 Sample Events

Large Table 1
Water Quality Analytical Data Summary
2021 CCR Annual Report
Deseret Power Cooperative

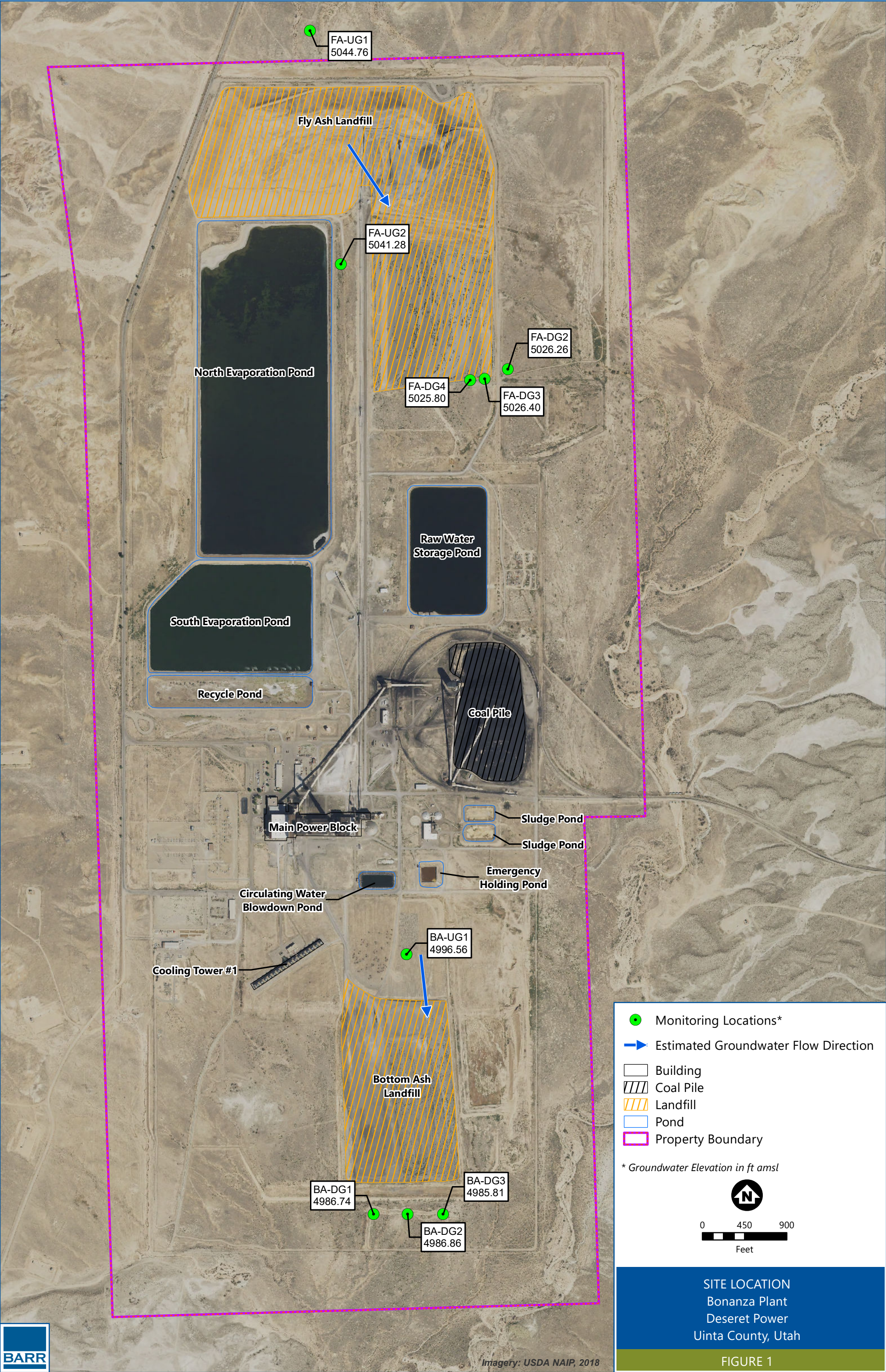
Appendix III Parameters Analysis Location Units			Boron, total Lab mg/l	Calcium, total Lab mg/l	Chloride Lab mg/l	Fluoride Lab mg/l	pH ¹ Field pH units	Solids, total dissolved Lab mg/l	Sulfate, as SO ₄ Lab mg/l
Location	Date	Sample Type							
Bottom Ash Landfill									
BA - DG1	4/30/2021	N	7.67	143	622	5.7	7.1	7140	4160
BA - DG1	7/21/2021	Resample	--	--	--	--	7.4	--	--
BA - DG1	10/19/2021	N	8.15	162	561	3.9	7.3	8240	4820
BA - DG2	4/30/2021	N	36.6	386	724	7.0	7.0	12200	7510
BA - DG2	10/19/2021	N	37.6	402	644	2.5	7.1	12800	8600
BA - DG3	4/30/2021	N	12.6	68.6	467	12.0	7.9	6180	3520
BA - DG3	7/21/2021	Resample	--	--	--	--	8.0	--	--
BA - DG3	10/20/2021	N	12.2	65.2	453	11.1	8.0	6240	3400
BA - DG3	10/27/2021	Resample	--	--	--	--	7.9	--	--
BA - UG1	4/30/2021	N	144	419	1480	9.3	7.1	19900	11500
BA - UG1	10/19/2021	N	138	410	1380	6.0	7.2	19700	11700
Fly Ash Landfill									
FA - DG2	4/29/2021	N	6.84	1.0	684	47.5	9.2	13800	5400
FA - DG2	10/18/2021	N	7.51	1.2	594	46.2	9.1	13500	5940
FA - DG3	4/29/2021	N	2.26	2.4	231	9.0	9.0	3490	1570
FA - DG3	10/18/2021	N	2.49	3.5	189	6.8	8.7	3800	1750
FA - DG4	4/29/2021	N	12.0	43.4	908	7.7	7.6	8200	4320
FA - DG4	10/18/2021	N	11.8	58.4	846	4.7	7.5	8900	4070
FA - UG1	4/29/2021	N	0.78	7.3	35.2	2.0	8.0	1020	354
FA - UG1	10/18/2021	N	0.73	14.2	32.5	1.8	8.1	1600	399
FA - UG1	10/18/2021	FD	0.69	13.5	33.5	1.7 J+	--	1600	391
FA - UG2	4/29/2021	N	45.8	487	1610	0.9	7.1	14700	8250
FA - UG2	4/29/2021	FD	45.7	518	1610	0.8	--	14400	8200
FA - UG2	10/18/2021	N	42.6	519	1460	< 0.1 U	7.0	15000	9160

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
J+	The result is an estimated quantity and may be biased high.
U	The analyte was analyzed for, but was not detected.
1	pH was rounded to the nearest tenth for statistical analysis due to instrument precision

Figures

Figure 1 Site Location



Appendices

Appendix A

Laboratory Reports and Field Sheets

Appendix A Laboratory Reports and Field Sheets

Spring 2021 Sampling Event: April 2021



6/3/2021

Work Order: 21E0153
Project: Bonanza - CCR Biannual

Deseret Power Electric Cooperative

Attn: Tyler Esplin

12500 East 25500 South

Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.



Approved By:

Reed Hendricks, Senior Project Manager



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Certificate of Analysis

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Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: CCR-QA Dup

Matrix: Water

Date Sampled: 4/29/21 11:13

Sampled By: Trenton Keller

Lab ID: 21E0153-01

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	1610	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Fluoride	0.8	mg/L	0.5	EPA 300.0	5/5/21	5/5/21	
Sulfate	8200	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	14400	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	45.7	mg/L	0.25	EPA 200.7	5/4/21	5/5/21	
Calcium, Total	518	mg/L	1.0	EPA 200.7	5/4/21	5/5/21	



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Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG1

Matrix: Water

Date Sampled: 4/30/21 13:21

Sampled By: Trenton Keller

Lab ID: 21E0153-02

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	622	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	5.7	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	4160	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	7140	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	7.67	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	143	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG2

Matrix: Water

Date Sampled: 4/30/21 10:39

Sampled By: Trenton Keller

Lab ID: 21E0153-03

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	724	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	7.0	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	7510	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	12200	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	36.6	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	386	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG3

Matrix: Water

Date Sampled: 4/30/21 9:35

Sampled By: Trenton Keller

Lab ID: 21E0153-04

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	467	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	12.0	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	3520	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	6180	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	12.6	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	68.6	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - UG1

Matrix: Water

Lab ID: 21E0153-05

Date Sampled: 4/30/21 8:20

Sampled By: Trenton Keller

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	1480	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Fluoride	9.3	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	11500	mg/L	200	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	19900	mg/L	500	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	144	mg/L	0.25	EPA 200.7	5/4/21	5/5/21	
Calcium, Total	419	mg/L	1.0	EPA 200.7	5/4/21	5/5/21	



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PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG2

Matrix: Water

Date Sampled: 4/29/21 13:24

Sampled By: Trenton Keller

Lab ID: 21E0153-06

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	684	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	47.5	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	5400	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	13800	mg/L	500	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	6.84	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	1.0	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG3

Matrix: Water

Date Sampled: 4/29/21 16:08

Sampled By: Trenton Keller

Lab ID: 21E0153-07

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	231	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	9.0	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	1570	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	3490	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	2.26	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	2.4	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG4

Matrix: Water

Date Sampled: 4/29/21 14:30

Sampled By: Trenton Keller

Lab ID: 21E0153-08

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	908	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	7.7	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	4320	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	8200	mg/L	50	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	12.0	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	43.4	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - UG1

Matrix: Water

Date Sampled: 4/29/21 9:32

Sampled By: Trenton Keller

Lab ID: 21E0153-09

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	35.2	mg/L	1.0	EPA 300.0	5/5/21	5/5/21	
Fluoride	2.0	mg/L	0.1	EPA 300.0	5/5/21	5/5/21	
Sulfate	354	mg/L	5.0	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	1020	mg/L	20	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	0.78	mg/L	0.05	EPA 200.7	5/6/21	5/6/21	
Calcium, Total	7.3	mg/L	0.2	EPA 200.7	5/6/21	5/6/21	



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Certificate of Analysis

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Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - UG2

Matrix: Water

Date Sampled: 4/29/21 10:37

Sampled By: Trenton Keller

Lab ID: 21E0153-10

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	1610	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Fluoride	0.9	mg/L	0.5	EPA 300.0	5/6/21	5/6/21	
Sulfate	8250	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	14700	mg/L	500	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	45.8	mg/L	0.25	EPA 200.7	5/4/21	5/5/21	
Calcium, Total	487	mg/L	1.0	EPA 200.7	5/4/21	5/5/21	



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PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Sample ID: NEP

Matrix: Water

Date Sampled: 4/30/21 14:24

Sampled By: Trenton Keller

Lab ID: 21E0153-11

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	2500	mg/L	100	EPA 300.0	5/5/21	5/5/21	
Fluoride	29.9	mg/L	10.0	EPA 300.0	5/5/21	5/5/21	
Sulfate	13000	mg/L	200	EPA 300.0	5/5/21	5/5/21	
Total Dissolved Solids (TDS)	23800	mg/L	500	SM 2540 C	5/5/21	5/5/21	
Metals							
Boron, Total	89.8	mg/L	0.25	EPA 200.7	5/4/21	5/5/21	
Calcium, Total	490	mg/L	1.0	EPA 200.7	5/4/21	5/5/21	



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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 179685
Receipt: 5/4/21 11:52 @ 5.0 °C
Date Reported: 6/3/2021
Project Name: Bonanza - CCR Biannual

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).

1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.

1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.

1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.

CHAIN OF CUSTODY

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____

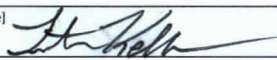
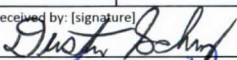


TURNAROUND REQUIRED:*

* Expedited turnaround subject to additional charge

21E0153

Page 1 of 2

Lab Use Only	CLIENT SAMPLE INFORMATION																				Total Coliform	Total Coliform	HPC (Plate Count)	E. Coli Only
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	TDS	Anions: C	ICP Metals																
01	1. CCR - QA Dup	4/29/21	11:13	Water		X	X	X																
02	2. BA - DG1	4/30/21	13:21	Water		X	X	X																
03	3. BA - DG2	4/30/21	10:39	Water		X	X	X																
04	4. BA - DG3	4/30/21	09:35	Water		X	X	X																
05	5. BA - UG1	4/30/21	08:20	Water		X	X	X																
06	6. FA - DG2	4/29/21	13:24	Water		X	X	X																
07	7. FA - DG3	4/29/21	16:08	Water		X	X	X																
08	8. FA - DG4	4/29/21	14:30	Water		X	X	X																
09	9. FA - UG1	4/29/21	09:32	Water		X	X	X																
10	10. FA - UG2	4/29/21	10:37	Water		X	X	X																
Sampled by: [print] Trenton Keller		Sampled by: [signature] 		ON ICE NOT ON ICE Temp (C°): 5.0																				
Special Instructions:				Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.																				
Relinquished by: [signature] 		Date/Time 5/3/21		Received by: [signature] 		Date/Time 5-3-2021																		
Relinquished by: [signature]		Date/Time		Received by: [signature] 		Date/Time 5/4/21 1152																		
Relinquished by: [signature]		Date/Time		Received by: [signature]		Date/Time																		

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

vps

12 849 747 01 6457 7529

CHAIN OF CUSTODY

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____



* Expedited turnaround subject to additional charges

Please fill out the fields highlighted in light blue.

21E0153

Page 2 of 2

[illegible]

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

lps 128497470164577529

QC Report for Work Order (WO) - 21E0153

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Blank - EPA 200.7

QC Sample ID: BVE0103-BLK1	Batch: BVE0103								
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00

QC Sample ID: BVE0145-BLK1	Batch: BVE0145								
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00

LCS - EPA 200.7

QC Sample ID: BVE0103-BS1	Batch: BVE0103								
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total	96.1	85 - 115			1.92	2.00		0.05	1.00
Calcium, Total	103	85 - 115			0.4	0.400		0.2	1.00

QC Sample ID: BVE0145-BS1	Batch: BVE0145								
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total	95.4	85 - 115			1.91	2.00		0.05	1.00
Calcium, Total	97.5	85 - 115			0.4	0.400		0.2	1.00

Matrix Spike - EPA 200.7

QC Sample ID: BVE0103-MS1	Batch: BVE0103	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total	97.9	70 - 130			1.97	0.01	2.00	0.05	1.00
Calcium, Total	224	70 - 130			74.2	73.3	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0103-MS2	Batch: BVE0103	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total	96.9	70 - 130			2.18	0.25	2.00	0.05	1.00
Calcium, Total	-660	70 - 130			271	273	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0145-MS1	Batch: BVE0145	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total	94.9	70 - 130			1.90	ND	2.00	0.05	1.00
Calcium, Total	-224	70 - 130			52.1	53.0	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0145-MS2	Batch: BVE0145	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total	89.2	70 - 130			5.94	4.16	2.00	0.05	1.00
Calcium, Total	-1420	70 - 130			296	302	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Matrix Spike Dup - EPA 200.7

QC Sample ID: BVE0103-MSD1	Batch: BVE0103	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total	97.8	0.152	70 - 130	20	1.97	0.01	2.00	0.05	1.00

QC Report for Work Order (WO) - 21E0153

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike Dup - EPA 200.7 (cont.)

QC Sample ID: BVE0103-MSD1	Batch: BVE0103	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Calcium, Total	222	0.00862	70 - 130	20	74.2	73.3	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0103-MSD2	Batch: BVE0103	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/04/2021	Date Analyzed: 05/05/2021								
Boron, Total	98.8	1.77	70 - 130	20	2.22	0.25	2.00	0.05	1.00
Calcium, Total	-333	0.481	70 - 130	20	272	273	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0145-MSD1	Batch: BVE0145	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total	95.5	0.583	70 - 130	20	1.91	ND	2.00	0.05	1.00
Calcium, Total	-274	0.385	70 - 130	20	51.9	53.0	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVE0145-MSD2	Batch: BVE0145	QC Source Sample: XXXXXXXX-XX							
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Boron, Total	86.6	0.879	70 - 130	20	5.89	4.16	2.00	0.05	1.00
Calcium, Total	-1690	0.372	70 - 130	20	295	302	0.400	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Report for Work Order (WO) - 21E0153

Analyte

% Rec

RPD

Limits

RPD Max

Result

Source Conc

Spk Value

MRL

DF

Blank - EPA 300.0

QC Sample ID: BVE0058-BLK1

Batch: BVE0058

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	ND	1.0	1.00
Fluoride	ND	0.1	1.00
Sulfate	ND	1.0	1.00

QC Sample ID: BVE0110-BLK1

Batch: BVE0110

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	ND	1.0	1.00
Fluoride	ND	0.1	1.00
Sulfate	ND	1.0	1.00

QC Sample ID: BVE0116-BLK1

Batch: BVE0116

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	ND	1.0	1.00
Fluoride	ND	0.1	1.00

QC Sample ID: BVE0160-BLK1

Batch: BVE0160

Date Prepared: 05/06/2021

Date Analyzed: 05/06/2021

Fluoride	ND	0.1	1.00
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LCS - EPA 300.0

QC Sample ID: BVE0058-BS1

Batch: BVE0058

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	101	90 - 110	50.4	50.0	1.0	1.00
Fluoride	105	90 - 110	5.2	5.00	0.1	1.00
Sulfate	99.1	90 - 110	49.6	50.0	1.0	1.00

QC Sample ID: BVE0110-BS1

Batch: BVE0110

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	101	90 - 110	50.5	50.0	1.0	1.00
Fluoride	105	90 - 110	5.2	5.00	0.1	1.00
Sulfate	99.3	90 - 110	49.7	50.0	1.0	1.00

QC Sample ID: BVE0116-BS1

Batch: BVE0116

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	101	90 - 110	50.4	50.0	1.0	1.00
Fluoride	105	90 - 110	5.2	5.00	0.1	1.00

QC Sample ID: BVE0160-BS1

Batch: BVE0160

Date Prepared: 05/06/2021

Date Analyzed: 05/06/2021

Fluoride	104	90 - 110	5.2	5.00	0.1	1.00
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Matrix Spike - EPA 300.0

QC Sample ID: BVE0058-MS1

Batch: BVE0058

QC Source Sample: XXXXXXXX-XX

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	101	80 - 120	18.9	7.6	11.1	1.1	1.00
Fluoride	103	80 - 120	1.4	0.2	1.11	0.1	1.00
Sulfate	101	80 - 120	29.1	17.8	11.1	1.1	1.00

QC Sample ID: BVE0058-MS2

Batch: BVE0058

QC Source Sample: XXXXXXXX-XX

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Chloride	102	80 - 120	16.3	5.0	11.1	1.1	1.00
Fluoride	105	80 - 120	1.3	0.1	1.11	0.1	1.00
Sulfate	98.4	80 - 120	91.9	81.0	11.1	1.1	1.00

QC Sample ID: BVE0110-MS1

Batch: BVE0110

QC Source Sample: XXXXXXXX-XX

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

CtF WO#: 21E0153

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QC Report for Work Order (WO) - 21E0153

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike - EPA 300.0 (cont.)

QC Sample ID: BVE0110-MS1	Batch: BVE0110	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021						
Chloride	101	80 - 120	32.3	21.1	11.1	1.1	1.00
Fluoride	103	80 - 120	1.3	0.2	1.11	0.1	1.00
Sulfate	98.6	80 - 120	156	145	11.1	1.1	1.00
QC Sample ID: BVE0110-MS2	Batch: BVE0110	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021						
Chloride	108	80 - 120	174	162	11.1	1.1	1.00
Fluoride	107	80 - 120	1.5	0.3	1.11	0.1	1.00
Sulfate	102	80 - 120	76.9	65.6	11.1	1.1	1.00
QC Sample ID: BVE0116-MS1	Batch: BVE0116	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021						
Chloride	102	80 - 120	28.5	17.3	11.1	1.1	1.00
Fluoride	108	80 - 120	2.0	0.8	1.11	0.1	1.00
QC Sample ID: BVE0116-MS2	Batch: BVE0116	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021						
Chloride	101	80 - 120	17.3	6.1	11.1	1.1	1.00
Fluoride	105	80 - 120	1.3	0.1	1.11	0.1	1.00
QC Sample ID: BVE0160-MS1	Batch: BVE0160	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021						
Fluoride	105	80 - 120	1.2	0.08	1.11	0.1	1.00
QC Sample ID: BVE0160-MS2	Batch: BVE0160	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021						
Fluoride	107	80 - 120	1.4	0.2	1.11	0.1	1.00

Matrix Spike Dup - EPA 300.0

QC Sample ID: BVE0058-MSD1	Batch: BVE0058		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	102	0.658	80 - 120	20	19.0	7.6	11.1	1.1	1.00
Fluoride	108	4.06	80 - 120	20	1.4	0.2	1.11	0.1	1.00
Sulfate	102	0.362	80 - 120	20	29.2	17.8	11.1	1.1	1.00
QC Sample ID: BVE0058-MSD2	Batch: BVE0058		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	104	1.22	80 - 120	20	16.5	5.0	11.1	1.1	1.00
Fluoride	107	1.68	80 - 120	20	1.3	0.1	1.11	0.1	1.00
Sulfate	99.1	0.0804	80 - 120	20	92.0	81.0	11.1	1.1	1.00
QC Sample ID: BVE0110-MSD1	Batch: BVE0110		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	103	0.826	80 - 120	20	32.6	21.1	11.1	1.1	1.00
Fluoride	107	2.98	80 - 120	20	1.4	0.2	1.11	0.1	1.00
Sulfate	98.1	0.0335	80 - 120	20	156	145	11.1	1.1	1.00
QC Sample ID: BVE0110-MSD2	Batch: BVE0110		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	106	0.128	80 - 120	20	173	162	11.1	1.1	1.00
Fluoride	110	2.06	80 - 120	20	1.6	0.3	1.11	0.1	1.00
Sulfate	103	0.113	80 - 120	20	77.0	65.6	11.1	1.1	1.00
QC Sample ID: BVE0116-MSD1	Batch: BVE0116		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	103	0.550	80 - 120	20	28.7	17.3	11.1	1.1	1.00

CtF WO#: 21E0153

www.ChemtechFord.com

QC Report for Work Order (WO) - 21E0153

Analyte

% Rec

RPD

Limits

RPD Max

Result

Source Conc

Spk Value

MRL

DF

Matrix Spike Dup - EPA 300.0 (cont.)

QC Sample ID: BVE0116-MSD1	Batch: BVE0116		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Fluoride	110	1.15	80 - 120	20	2.1	0.8	1.11	0.1	1.00
QC Sample ID: BVE0116-MSD2	Batch: BVE0116		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/05/2021	Date Analyzed: 05/05/2021								
Chloride	99.0	1.22	80 - 120	20	17.1	6.1	11.1	1.1	1.00
Fluoride	103	1.72	80 - 120	20	1.2	0.1	1.11	0.1	1.00
QC Sample ID: BVE0160-MSD1	Batch: BVE0160		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Fluoride	104	0.765	80 - 120	20	1.2	0.08	1.11	0.1	1.00
QC Sample ID: BVE0160-MSD2	Batch: BVE0160		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 05/06/2021	Date Analyzed: 05/06/2021								
Fluoride	108	1.42	80 - 120	20	1.4	0.2	1.11	0.1	1.00

QC Report for Work Order (WO) - 21E0153

Analyte

% Rec

RPD

Limits

RPD Max

Result

Source Conc

Spk Value

MRL

DF

Blank - SM 2540 C

QC Sample ID: BVE0109-BLK1

Batch: BVE0109

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Total Dissolved Solids (TDS)

ND

10

1.00

Duplicate - SM 2540 C

QC Sample ID: BVE0109-DUP1

Batch: BVE0109

QC Source Sample: 21E0153-10

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Total Dissolved Solids (TDS)

4

10

14100

14700

500

1.00

QC Sample ID: BVE0109-DUP2

Batch: BVE0109

QC Source Sample: 21E0153-11

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Total Dissolved Solids (TDS)

1

10

24100

23800

500

1.00

LCS - SM 2540 C

QC Sample ID: BVE0109-BS1

Batch: BVE0109

Date Prepared: 05/05/2021

Date Analyzed: 05/05/2021

Total Dissolved Solids (TDS)

93

90 - 110

372

400

20

1.00



Well number:

Field Personnel:

Sampling date:

Well condition:

Was the meter(s) calibrated prior to sampling (circle):

Water level, pre-pump installation (ft):

Water level, post-pump installation (ft):

Rate & direction of groundwater flow:

Total volume of water pumped (gal):

Clock time of sample:

Lab's name sample(s) are being sent to:

Type and size of sample bottles used:

Sample bottle(s) identification number used: _____

Was a blind sample obtained at this well (circle):

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

[illegible]



DESERET POWER

ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG2
 Field Personnel: TK, Cody B
 Sampling date: 4/29/21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (gal): 0.215
 Clock time of sample: 10:37
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: FA-UG2
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%			
						(µS/cm)	(NTU)	(%/mg/L)	(mV)	(mmHg)
	50 0.055		23.48							
10:18	0.055		23.48	58.3	7.14	15897	1.54	28.7	132.5	640.7
10:23	0.055		23.48	57.1	7.11	15885	1.57	29.8	128.4	640.6
10:28	0.055		23.48	57.7	7.13	15821	1.51	29.6	124.7	640.6



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG1
Field Personnel: TK, Cody B
Sampling date: 4/29/21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (gal): 0.258
Clock time of sample: 09:32
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-UG1
Was a blind sample obtained at this well (circle): Yes No
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
	<u>.065</u>		<u>34.61</u>							
<u>09:10</u>	<u>↓</u>		<u>34.61</u>	<u>55.3</u>	<u>8.04</u>	<u>1803</u>	<u>.38</u>	<u>33.2</u>	<u>149.8</u>	<u>640.3</u>
<u>09:15</u>	<u>↓</u>		<u>34.60</u>	<u>55.9</u>	<u>8.09</u>	<u>1810</u>	<u>.51</u>	<u>18.0</u>	<u>139.8</u>	<u>640.2</u>
<u>09:20</u>	<u>↓</u>		<u>34.59</u>	<u>56.4</u>	<u>8.03</u>	<u>1811</u>	<u>.33</u>	<u>12.5</u>	<u>130.6</u>	<u>640.2</u>



BONANZA POWER PLANT

Additional Notes:

Page 1 of _____



DESERET POWER

ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: FA-063

Field Personnel: T. Esplin, T. Keller

Sampling date: 4/29/21

Well condition: Good

Was the meter(s) calibrated prior to sampling (circle): Yes No

Water level, pre-pump installation (ft): N/A

Water level, post-pump installation (ft): N/A

Rate & direction of groundwater flow: N/A

Total volume of water pumped (gal): 0.397

Clock time of sample: 16:08

Lab's name sample(s) are being sent to: CTF

Type and size of sample bottles used: Plastic

Sample bottle(s) identification number used: FA-063

Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%			
						(µS/cm)	(NTU)	(%/mg/L)	(mV)	(mmHg)
	0.1		28.84							
15:49	0.1		28.91	60.4	9.12	5459	0.28	35.5	39.2	638.9
15:56	0.1		28.96	60.4	9.12	5427	1.05	32.8	39.0	638.9
16:02	0.1		29.00	60.3	9.04	5417	3.37	35.0	38.7	638.8



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG2
Field Personnel: T. Esplin, T. Keller
Sampling date: 4/29/21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (gal): 0.238
Clock time of sample: 13:24
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG2
Was a blind sample obtained at this well (circle): Yes (No)
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	0.06		30.75							
13:06	0.06		30.81	61.3	9.12	17650	1.13	16.1	65.1	639.9
13:11	0.06		30.87	61.3	9.13	17606	0.68	11.4	54.6	639.9
13:16	0.06		30.92	61.7	9.20	17509	2.45	10.6	45.8	639.8



DESERET POWER

ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: BA-UG1
 Field Personnel: TK, TE
 Sampling date: 4/30/21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (gal): 0.298
 Clock time of sample: 08:20
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: _____
 Was a blind sample obtained at this well (circle): Yes No
Note: If yes, label the blind sample "CCR-QA".
 Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
	<u>0.075</u>		<u>34.38</u>							
<u>08:00</u>	<u>0.075</u>		<u>34.42</u>	<u>55.8</u>	<u>7.05</u>	<u>18196</u>	<u>0.71</u>	<u>30.3</u>	<u>144.7</u>	<u>641.0</u>
<u>08:05</u>	<u>0.075</u>		<u>34.44</u>	<u>55.9</u>	<u>7.12</u>	<u>18211</u>	<u>0.92</u>	<u>32.8</u>	<u>139.7</u>	<u>641.0</u>
<u>08:10</u>	<u>0.075</u>		<u>34.45</u>	<u>56.5</u>	<u>7.08</u>	<u>18170</u>	<u>1.23</u>	<u>30.5</u>	<u>135.3</u>	<u>641.0</u>



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-063
Field Personnel: TK, TE
Sampling date: 4/30/21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (gal): 0.317
Clock time of sample: 09:35
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic, Pint & Quart
Sample bottle(s) identification number used: BA-063
Was a blind sample obtained at this well (circle): Yes No
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	0.08		16.82							
09:17	0.08		16.84	56.1	7.78	8763	0.22	52.3	81.8	641.6
09:23	0.08		16.85	56.2	7.87	8737	0.47	45.7	79.3	641.6
09:28	0.08		16.88	56.2	7.88	8695	0.23	41.5	761	641.5



BONANZA POWER PLANT

Additional Notes:

Key Indicator Parameters



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG1
Field Personnel: TK, TE
Sampling date: 4/30/21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (gal): 0.462
Clock time of sample: 13:21
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG1
Was a blind sample obtained at this well (circle): Yes No
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters							
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP	
				(°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)	
	0.07		14.30								
12:55	0.07		14.30	66.3	7.27	9297	0.35	25.3	53.2	639.4	
13:00	0.07		14.30	67.8	7.28	9398	0.75	19.5	51.2	639.3	
13:05	0.07		14.30	68.4	7.20	9665	1.08	15.1	47.8	639.2	
13:10	0.07		14.30	68.8	7.20	9763	0.42	9.5	42.4	639.1	
13:15	0.07		14.30	68.6	7.10	9836	0.30	8.5	39.1	639.1	



BONANZA POWER PLANT

Additional Notes:

Page 1 of _____

COMPANY:	Deseret Power Electric Cooperative		
ADDRESS:	12500 East 25500 South		
CITY/STATE/ZIP:	Vernal, UT 84078-8525		
PHONE #:	435-781-5706	FAX	
CONTACT:	Tyler Esplin	PROJECT:	Bonanza - CCR Biannual
EMAIL:	tesplin@deseretpower.com		

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____



TURNAROUND REQUIRED:*

* Expedited turnaround subject to additional charge

Page 1/2

Please fill out the fields highlighted in light blue.

21E0153

Page 1 of 2

Lab Use Only	CLIENT SAMPLE INFORMATION																				Total Coliform	Total Coliform	HPC (Plate Count)	E. Coli Only
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	TDS	Anions: Chloride	ICP Metals																
01	1. CCR - QA Dup	4/29/21	11:13	Water		X	X	X																
02	2. BA - DG1	4/30/21	13:21	Water		X	X	X																
03	3. BA - DG2	4/30/21	10:39	Water		X	X	X																
04	4. BA - DG3	4/30/21	09:35	Water		X	X	X																
05	5. BA - UG1	4/30/21	08:20	Water		X	X	X																
06	6. FA - DG2	4/29/21	13:24	Water		X	X	X																
07	7. FA - DG3	4/29/21	16:08	Water		X	X	X																
08	8. FA - DG4	4/29/21	14:30	Water		X	X	X																
09	9. FA - UG1	4/29/21	09:32	Water		X	X	X																
10	10. FA - UG2	4/29/21	10:37	Water		X	X	X																
Sampled by: [print] <u>Trenton Keller</u>		Sampled by: [signature] <u>[Signature]</u>		ON ICE NOT ON ICE Temp (C°): <u>5.0</u>																				
Special Instructions:				Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.																				
Relinquished by: [signature] <u>[Signature]</u>		Date/Time <u>5/3/21</u>		Received by: [signature] <u>[Signature]</u>		Date/Time <u>5-3-2021</u>																		
Relinquished by: [signature]		Date/Time		Received by: [signature] <u>[Signature]</u>		Date/Time <u>5/4/21 1152</u>																		
Relinquished by: [signature]		Date/Time		Received by: [signature]		Date/Time																		

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

vps

12 849 747 01 6457 7529

CHAIN OF CUSTODY

COMPANY:	Deseret Power Electric Cooperative		
ADDRESS:	12500 East 25500 South		
CITY/STATE/ZIP:	Vernal, UT 84078-8525		
PHONE #:	435-781-5706	FAX:	
CONTACT:	Tyler Esplin	PROJECT:	Bonanza - CCR Biannual
EMAIL:	tesplin@deseretpower.com		

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____



TURNAROUND REQUIRED:*

* Expedited turnaround subject to additional charge

Page 2/2

Please fill out the fields highlighted in light blue.

21E0153

Page 2 of 2

Lab Use Only		CLIENT SAMPLE INFORMATION																					Total Coliform	Total Coliform	HPC (Plate Count)	E. Coli Only			
		LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	TDS	Anions: C	ICP Meta																				
11	11.	NEP	4/30/21	14:24	Water		X	X	X																				
	2.																												
	3.																												
	4.																												
	5.																												
	6.																												
	7.																												
	8.																												
	9.																												
	10.																												
Sampled by: [print] Trenton Keller			Sampled by: [signature] <i>Trenton Keller</i>			☒ ON ICE ☐ NOT ON ICE Temp (C°): 5.0																							
Special Instructions:						Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.																							
Relinquished by: [signature] <i>Trenton Keller</i>			Date/Time 5/3/21			Received by: [signature] <i>Dustin Schmitz</i> Received by: [signature] <i>Dustin Schmitz</i>										Date/Time 5-3-2021 Date/Time 5/4/21 1152													
Relinquished by: [signature]			Date/Time			Received by: [signature]										Date/Time													
Relinquished by: [signature]			Date/Time			Received by: [signature]										Date/Time													

CHEMTECH-FORD
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Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

ups 128497470164577529

Spring 2021 Resampling Sampling Event: July 2021



DESERET POWER
ELECTRIC COOPERATIVE

**BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM**

Well number: BA-DG1
Field Personnel: TK
Sampling date: 7-21-21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 45
Clock time of sample: N/A
Lab's name sample(s) are being sent to: N/A
Type and size of sample bottles used: N/A
Sample bottle(s) identification number used: N/A
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
						(µS/cm)	(NTU)			
9:41	0.03		14.58	68.2	7.50	9600	1.77	20.0	90.9	637.5
9:46	0.03		14.58	71.2	7.4	9711	1.24	16.7	77.6	637.5
9:51	0.03		14.58	73.3	7.4	9757	1.9	16.9	69.1	637.6



DESERET POWER
ELECTRIC COOPERATIVE

**BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM**

Well number: BA-DG3
 Field Personnel: TK
 Sampling date: 7-21-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 162
 Clock time of sample: N/A
 Lab's name sample(s) are being sent to: N/A
 Type and size of sample bottles used: N/A
 Sample bottle(s) identification number used: N/A
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
	0.08		16.90							
08:51	0.08		16.88	70.5	8.0	8468	0.92	56.4	77.7	637.5
08:56	0.08		16.90	70.7	8.0	8516	0.77	52.7	66.5	637.5
09:01	0.08		16.91	70.8	8.0	8537	0.18	58.7	58.4	637.5

Fall 2021 Sampling Event: October 2021



11/8/2021

Work Order: 21J1150
Project: Bonanza - CCR Biannual

Deseret Power Electric Cooperative

Attn: Tyler Esplin

12500 East 25500 South

Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.



Approved By:

Dave Gayer, Laboratory Director



Chemtech-Ford Laboratories

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: CCR - QA Dup

Matrix: Water

Date Sampled: 10/18/21 10:30

Sampled By: Trenton Keller

Lab ID: 21J1150-01

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	33.5	mg/L	2.0	EPA 300.0	10/29/21	10/30/21	
Fluoride	1.7	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	391	mg/L	5.0	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	1600	mg/L	1000	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	0.69	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	13.5	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - UG1

Matrix: Water

Date Sampled: 10/19/21 15:30

Sampled By: Trenton Keller

Lab ID: 21J1150-02

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	1380	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	6.0	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	11700	mg/L	200	EPA 300.0	11/1/21	11/2/21	
Total Dissolved Solids (TDS)	19700	mg/L	50	SM 2540 C	10/25/21	10/25/21	
Metals							
Boron, Total	138	mg/L	1.00	EPA 200.7	10/26/21	10/27/21	
Calcium, Total	410	mg/L	0.2	EPA 200.7	10/26/21	10/26/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG2

Matrix: Water

Date Sampled: 10/19/21 14:55

Sampled By: Trenton Keller

Lab ID: 21J1150-03

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	644	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	2.5	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	8600	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	12800	mg/L	100	SM 2540 C	10/25/21	10/25/21	
Metals							
Boron, Total	37.6	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	402	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG3

Matrix: Water

Date Sampled: 10/20/21 10:58

Sampled By: Trenton Keller

Lab ID: 21J1150-04

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Alkalinity - Bicarbonate (as CaCO ₃)	781	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Carbonate (as CaCO ₃)	ND	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Hydroxide (as CaCO ₃)	ND	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Total (as CaCO ₃)	781	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Chloride	453	mg/L	10.0	EPA 300.0	10/21/21	10/21/21	
Fluoride	11.1	mg/L	1.0	EPA 300.0	10/21/21	10/21/21	
Nitrate as N	ND	mg/L	1.0	EPA 300.0	10/21/21 14:11	10/21/21 15:21	
Nitrite as N	ND	mg/L	1.0	EPA 300.0	10/21/21 14:11	10/21/21 15:21	
Sulfate	3400	mg/L	50.0	EPA 300.0	10/21/21	10/21/21	
Total Dissolved Solids (TDS)	6240	mg/L	50	SM 2540 C	10/25/21	10/25/21	
Metals							
Boron, Total	12.2	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	65.2	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	
Magnesium, Total	157	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	
Potassium, Total	5.7	mg/L	0.5	EPA 200.7	10/28/21	11/1/21	
Sodium, Total	1920	mg/L	10.0	EPA 200.7	10/28/21	11/1/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: BA - DG1

Matrix: Water

Date Sampled: 10/19/21 14:20

Sampled By: Trenton Keller

Lab ID: 21J1150-05

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	561	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	3.9	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	4820	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	8240	mg/L	100	SM 2540 C	10/25/21	10/25/21	
Metals							
Boron, Total	8.15	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	162	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG2

Matrix: Water

Date Sampled: 10/18/21 15:58

Sampled By: Trenton Keller

Lab ID: 21J1150-06

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	594	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	46.2	mg/L	0.5	EPA 300.0	10/30/21	10/30/21	
Sulfate	5940	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	13500	mg/L	500	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	7.51	mg/L	1.00	EPA 200.7	10/26/21	10/27/21	
Calcium, Total	1.2	mg/L	0.2	EPA 200.7	10/26/21	10/26/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG3

Matrix: Water

Date Sampled: 10/18/21 14:46

Sampled By: Trenton Keller

Lab ID: 21J1150-07

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	189	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	6.8	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	1750	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	3800	mg/L	500	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	2.49	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	3.5	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - DG4

Matrix: Water

Date Sampled: 10/18/21 13:28

Sampled By: Trenton Keller

Lab ID: 21J1150-08

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	846	mg/L	100	EPA 300.0	11/3/21	11/3/21	
Fluoride	4.7	mg/L	0.2	EPA 300.0	10/30/21	10/30/21	
Sulfate	4070	mg/L	100	EPA 300.0	11/3/21	11/3/21	
Total Dissolved Solids (TDS)	8900	mg/L	500	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	11.8	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	58.4	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - UG1

Matrix: Water

Date Sampled: 10/18/21 10:30

Sampled By: Trenton Keller

Lab ID: 21J1150-09

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	32.5	mg/L	5.0	EPA 300.0	10/29/21	10/30/21	
Fluoride	1.8	mg/L	0.5	EPA 300.0	10/30/21	10/30/21	
Sulfate	399	mg/L	5.0	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	1600	mg/L	1000	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	0.73	mg/L	0.05	EPA 200.7	10/28/21	11/1/21	
Calcium, Total	14.2	mg/L	0.2	EPA 200.7	10/28/21	11/1/21	



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Vernal, UT 84078-8525

PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: FA - UG2

Matrix: Water

Date Sampled: 10/18/21 11:42

Sampled By: Trenton Keller

Lab ID: 21J1150-10

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Chloride	1460	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Fluoride	ND	mg/L	0.1	EPA 300.0	10/30/21	10/30/21	
Sulfate	9160	mg/L	100	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	15000	mg/L	1000	SM 2540 C	10/22/21	10/22/21	
Metals							
Boron, Total	42.6	mg/L	1.00	EPA 200.7	10/26/21	10/27/21	
Calcium, Total	519	mg/L	0.2	EPA 200.7	10/26/21	10/26/21	



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Vernal, UT 84078-8525

PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Sample ID: NEP

Matrix: Water

Date Sampled: 10/19/21 13:18

Sampled By: Trenton Keller

Lab ID: 21J1150-11

	<u>Result</u>	<u>Units</u>	<u>Minimum Reporting Limit</u>	<u>Method</u>	<u>Preparation Date/Time</u>	<u>Analysis Date/Time</u>	<u>Flag(s)</u>
Inorganic							
Alkalinity - Bicarbonate (as CaCO ₃)	364	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Carbonate (as CaCO ₃)	180	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Hydroxide (as CaCO ₃)	ND	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Alkalinity - Total (as CaCO ₃)	544	mg/L	1.0	SM 2320 B	10/21/21	10/22/21	
Chloride	2330	mg/L	1000	EPA 300.0	10/29/21	10/30/21	
Fluoride	22.9	mg/L	0.5	EPA 300.0	10/30/21	10/30/21	
Sulfate	16400	mg/L	1000	EPA 300.0	10/29/21	10/30/21	
Total Dissolved Solids (TDS)	27900	mg/L	250	SM 2540 C	10/25/21	10/25/21	
Metals							
Boron, Total	107	mg/L	1.00	EPA 200.7	10/26/21	10/27/21	
Calcium, Total	650	mg/L	0.2	EPA 200.7	10/26/21	10/26/21	
Magnesium, Total	2280	mg/L	0.2	EPA 200.7	10/26/21	10/26/21	
Potassium, Total	110	mg/L	0.5	EPA 200.7	10/26/21	10/26/21	
Sodium, Total	4440	mg/L	10.0	EPA 200.7	10/26/21	10/27/21	



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PO#: 172308
Receipt: 10/21/21 10:00 @ 3.2 °C
Date Reported: 11/8/2021
Project Name: Bonanza - CCR Biannual

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).

1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.

1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.

1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
 ADDRESS: 12500 East 25500 South
 CITY/STATE/ZIP: Vernal, UT 84078-8525
 PHONE #: 435-781-5706 FAX: _____
 CONTACT: Tyler Esplin PROJECT: Bonanza - CCR Biannual
 EMAIL: tesplin@deseretpower.com

BILLING ADDRESS: _____
 BILLING CITY/STATE/ZIP: _____
 PURCHASE ORDER #: _____



TURNAROUND REQUIRED:*

* Expedited turnaround subject to additional charge

Page 1/2

Please fill out the fields highlighted in light blue.

The corrections to samples -02 and -05 were requested by Trenton on 11/8/21. km

2107150

Lab Use Only	CLIENT SAMPLE INFORMATION				
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine
01	CCR - QA Dup	10-18-21	10:30	Water	
02	BA - DG1 BA-UG1	10-19-21	7:30 15:30	Water	
03	BA - DG2	10-19-21	14:55	Water	
04	BA - DG3	10-20-21	10:58	Water	
05	BA - DG1 BD-DG1	10-19-21	14:20	Water	
06	FA - DG2	10-18-21	15:58	Water	
07	FA - DG3	10-18-21	14:46	Water	
08	FA - DG4	10-18-21	13:28	Water	
09	FA - UG1	10-18-21	10:30	Water	
10	FA - UG2	10-18-21	11:42	Water	

TESTS REQUESTED														Bacteria			
TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca	Magnesium	Potassium	Sodium	Alkalinity	Nitrate + Nitrite							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
X	X	X															
X	X	X															
X	X	X															
X	X	X	X	X	X	X	X										
X	X	X															
X	X	X															
X	X	X															
X	X	X															
X	X	X															

Sampled by: [print]

Trenton Keller

Sampled by: [signature]

Trenton Keller

Special Instructions:

ON ICE

NOT ON ICE

Temp (C°):

3.2

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]

Trenton Keller

Date/Time

10-20-21 / 11:20

Received by: [signature]

Dustin Schuch

Date/Time

10-20-2021 11:20

Relinquished by: [signature]

Dustin Schuch

Date/Time

10-20-2021 15:00

Received by: [signature]

Johanna Miller

Date/Time

10/21/21 10:00

Relinquished by: [signature]

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 Sandy, UT 84070

801.262.7299 PHONE
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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

12 849 747 01 6539 4322

(Tier 2 QC)

CHEMTECH-FORD
LABORATORIES

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____

TURNAROUND REQUIRED:*

* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

215150

[illegible]

801.262.7299 PHONE
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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

Work Order #

CHEMTECH FORD LABORATORIES

Sample Receipt



CHEMTECH-FORD
LABORATORIES

Delivery Method:

- ☒ UPS
- ☐ USPS
- ☐ FedEx
- ☐ Chemtech Courier
- ☐ Walk-in
- ☐ Customer Courier

Receiving Temperature 3.7°C

Sample Condition	Mean Value	Standard Deviation	Significance Level
Control Group	0.85	0.12	
Treatment A	0.72	0.15	$p < 0.05$
Treatment B	0.68	0.18	$p < 0.01$
Treatment C	0.91	0.10	$p < 0.001$

(check if yes)

- ☐ Custody Seals
- ☒ Containers Intact
- ☒ COC can be matched to bottles
- ☒ Received on Ice
- ☒ Correct Container(s)
- ☒ Sufficient Sample Volume
- ☐ Headspace Present (VOC)
- ☐ Temperature Blank
- ☒ Received within Holding Time

Plastic Containers

- A- Plastic Unpreserved
- B- Miscellaneous Plastic
- C- Cyanide Qt (NaOH)
- E- Coliform/Ecoli/HPC
- F- Sulfide Qt (Zn Acetate)
- L- Mercury 1631
- M- Metals Pint (HNO3)
- N- Nutrient Pint (H2SO4)
- R- Radiological (HNO3)
- S- Sludge Cups/Tubs
- Q- Plastic Bag

Glass Containers

- | |
|-----------------------------|
| D- 625 (Na2S2O3) |
| G- Glass Unpreserved |
| H- HAAs (NH4Cl) |
| J- 508/515/525 (Na2SO3) |
| K- 515.3 Herbicides |
| O- Oil & Grease (HCl) |
| P- Phenols (H2SO4) |
| T- TOC/TOX (H3PO4) |
| U- 531 (MCAA, Na2SO3) |
| V- 524/THMs (Ascorbic Acid) |
| W- 8260 VOC (1:1 HCl) |
| X- Vial Unpreserved |
| Y- 624/504 (Na2S2O3) |
| Z- Miscellaneous Glass |

[illegible]

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
---------	-------	-----	--------	---------	--------	-------------	-----------	-----	----

Blank - EPA 200.7

QC Sample ID: BVJ0753-BLK1		Batch: BVJ0753							
Date Prepared: 10/26/2021		Date Analyzed: 10/26/2021							
Boron, Total					ND		0.05	1.00	
Calcium, Total					ND		0.2	1.00	
Magnesium, Total					ND		0.2	1.00	
Potassium, Total					ND		0.5	1.00	
Sodium, Total					ND		0.5	1.00	
QC Sample ID: BVJ0841-BLK1		Batch: BVJ0841							
Date Prepared: 10/28/2021		Date Analyzed: 11/01/2021							
Boron, Total					ND		0.05	1.00	
Calcium, Total					ND		0.2	1.00	
Magnesium, Total					ND		0.2	1.00	
Potassium, Total					ND		0.5	1.00	
Sodium, Total					ND		0.5	1.00	

LCS - EPA 200.7

QC Sample ID: BVJ0753-BS1		Batch: BVJ0753							
Date Prepared: 10/26/2021		Date Analyzed: 10/26/2021							
Boron, Total	98.3	85 - 115		0.98		1.00	0.05	1.00	
Calcium, Total	101	85 - 115		0.2		0.200	0.2	1.00	
Magnesium, Total	97.2	85 - 115		0.2		0.200	0.2	1.00	
Potassium, Total	101	85 - 115		10.1		10.0	0.5	1.00	
Sodium, Total	96.2	85 - 115		1.0		1.00	0.5	1.00	
QC Sample ID: BVJ0841-BS1		Batch: BVJ0841							
Date Prepared: 10/28/2021		Date Analyzed: 11/01/2021							
Boron, Total	97.8	85 - 115		0.49		0.500	0.05	1.00	
Calcium, Total	93.0	85 - 115		9.5		10.2	0.2	1.00	
Magnesium, Total	96.6	85 - 115		9.8		10.2	0.2	1.00	
Potassium, Total	95.3	85 - 115		9.5		10.0	0.5	1.00	
Sodium, Total	95.7	85 - 115		9.6		10.0	0.5	1.00	

Matrix Spike - EPA 200.7

QC Sample ID: BVJ0753-MS1	Batch: BVJ0753	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/26/2021	Date Analyzed: 10/26/2021						
Boron, Total	102	70 - 130	1.22	0.19	1.00	0.05	1.00
Calcium, Total	-132	70 - 130	84.1	84.3	0.200	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.							
Magnesium, Total	-57.7	70 - 130	48.7	48.8	0.200	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.							
Potassium, Total	104	70 - 130	33.4	23.0	10.0	0.5	1.00
Sodium, Total	73.6	70 - 130	153	153	1.00	0.5	1.00
QC Sample ID: BVJ0753-MS2	Batch: BVJ0753	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/26/2021	Date Analyzed: 10/26/2021						
Boron, Total	100	70 - 130	1.27	0.27	1.00	0.05	1.00
Calcium, Total	-832	70 - 130	63.4	65.1	0.200	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.							

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike - EPA 200.7 (cont.)

QC Sample ID: BVJ0753-MS2	Batch: BVJ0753	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/26/2021	Date Analyzed: 10/26/2021						
Magnesium, Total	-265	70 - 130	26.7	27.2	0.200	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Potassium, Total	101	70 - 130	18.2	8.1	10.0	0.5	1.00
Sodium, Total	-32.4	70 - 130	42.7	43.0	1.00	0.5	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVJ0841-MS1	Batch: BVJ0841	QC Source Sample: XXXXXXXX-XX
Date Prepared: 10/28/2021	Date Analyzed: 11/01/2021	

Boron, Total	97.6	70 - 130	0.55	0.06	0.500	0.05	1.00
Calcium, Total	0.444	70 - 130	117	117	10.2	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Magnesium, Total	57.0	70 - 130	55.5	49.7	10.2	0.2	1.00
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QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Potassium, Total	100	70 - 130	13.3	3.3	10.0	0.5	1.00
Sodium, Total	37.4	70 - 130	68.7	65.0	10.0	0.5	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Sample ID: BVJ0841-MS2	Batch: BVJ0841	QC Source Sample: 21J1150-01
Date Prepared: 10/28/2021	Date Analyzed: 11/01/2021	

Boron, Total	81.2	70 - 130	1.10	0.69	0.500	0.05	1.00
Calcium, Total	77.7	70 - 130	21.4	13.5	10.2	0.2	1.00
Magnesium, Total	77.9	70 - 130	17.4	9.4	10.2	0.2	1.00
Potassium, Total	92.5	70 - 130	10.5	1.3	10.0	0.5	1.00
Sodium, Total	-616	70 - 130	334	395	10.0	0.5	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Matrix Spike Dup - EPA 200.7

QC Sample ID: BVJ0753-MSD1	Batch: BVJ0753	QC Source Sample: XXXXXXXX-XX
Date Prepared: 10/26/2021	Date Analyzed: 10/26/2021	

Boron, Total	99.9	2.02	70 - 130	20	1.19	0.19	1.00	0.05	1.00
Calcium, Total	-294	0.386	70 - 130	20	83.7	84.3	0.200	0.2	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Magnesium, Total	-123	0.271	70 - 130	20	48.5	48.8	0.200	0.2	1.00
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QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Potassium, Total	101	0.767	70 - 130	20	33.2	23.0	10.0	0.5	1.00
Sodium, Total	28.5	0.294	70 - 130	20	153	153	1.00	0.5	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike Dup - EPA 200.7 (cont.)

QC Sample ID: BVJ0753-MSD2		Batch: BVJ0753		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/26/2021		Date Analyzed: 10/26/2021							
Boron, Total	101	0.501	70 - 130	20	1.28	0.27	1.00	0.05	1.00
Calcium, Total	-647	0.583	70 - 130	20	63.8	65.1	0.200	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Magnesium, Total	-210	0.414	70 - 130	20	26.8	27.2	0.200	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Potassium, Total	102	0.447	70 - 130	20	18.2	8.1	10.0	0.5	1.00
Sodium, Total	-10.1	0.521	70 - 130	20	42.9	43.0	1.00	0.5	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BVJ0841-MSD1		Batch: BVJ0841		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/28/2021		Date Analyzed: 11/01/2021							
Boron, Total	99.3	1.58	70 - 130	20	0.56	0.06	0.500	0.05	1.00
Calcium, Total	4.21	0.328	70 - 130	20	117	117	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Magnesium, Total	58.9	0.343	70 - 130	20	55.7	49.7	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Potassium, Total	99.6	0.335	70 - 130	20	13.3	3.3	10.0	0.5	1.00
Sodium, Total	36.7	0.0961	70 - 130	20	68.7	65.0	10.0	0.5	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BVJ0841-MSD2		Batch: BVJ0841		QC Source Sample: 21J1150-01					
Date Prepared: 10/28/2021		Date Analyzed: 11/01/2021							
Boron, Total	96.5	6.74	70 - 130	20	1.17	0.69	0.500	0.05	1.00
Calcium, Total	91.9	6.55	70 - 130	20	22.9	13.5	10.2	0.2	1.00
Magnesium, Total	91.9	7.95	70 - 130	20	18.8	9.4	10.2	0.2	1.00
Potassium, Total	107	12.7	70 - 130	20	11.9	1.3	10.0	0.5	1.00
Sodium, Total	-574	1.26	70 - 130	20	338	395	10.0	0.5	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Blank - EPA 300.0

QC Sample ID: BVJ0627-BLK1		Batch: BVJ0627							
Date Prepared: 10/21/2021		Date Analyzed: 10/21/2021							
Chloride					ND		1.0	1.00	
Fluoride					ND		0.1	1.00	
Nitrate as N					ND		0.1	1.00	
Nitrite as N					ND		0.1	1.00	
Sulfate					ND		1.0	1.00	
QC Sample ID: BVJ0909-BLK1		Batch: BVJ0909							
Date Prepared: 11/01/2021		Date Analyzed: 11/01/2021							
Chloride					ND		1.0	1.00	
Fluoride					ND		0.1	1.00	
Sulfate					ND		1.0	1.00	
QC Sample ID: BVK0015-BLK1		Batch: BVK0015							
Date Prepared: 11/01/2021		Date Analyzed: 11/01/2021							
Sulfate					ND		1.0	1.00	
QC Sample ID: BVK0094-BLK1		Batch: BVK0094							
Date Prepared: 11/03/2021		Date Analyzed: 11/03/2021							
Chloride					ND		1.0	1.00	
Sulfate					ND		1.0	1.00	

LCS - EPA 300.0

QC Sample ID: BVJ0627-BS1		Batch: BVJ0627							
Date Prepared: 10/21/2021		Date Analyzed: 10/21/2021							
Chloride	98.1	90 - 110	49.0	50.0	1.0	1.00			
Fluoride	92.9	90 - 110	4.6	5.00	0.1	1.00			
Nitrate as N	102	90 - 110	5.1	5.00	0.1	1.00			
Nitrite as N	97.4	90 - 110	4.9	5.00	0.1	1.00			
Sulfate	97.8	90 - 110	48.9	50.0	1.0	1.00			
QC Sample ID: BVJ0909-BS1		Batch: BVJ0909							
Date Prepared: 11/01/2021		Date Analyzed: 11/01/2021							
Chloride	96.5	90 - 110	48.3	50.0	1.0	1.00			
Fluoride	101	90 - 110	5.1	5.00	0.1	1.00			
Sulfate	99.4	90 - 110	49.7	50.0	1.0	1.00			
QC Sample ID: BVK0015-BS1		Batch: BVK0015							
Date Prepared: 11/01/2021		Date Analyzed: 11/01/2021							
Sulfate	104	90 - 110	52.0	50.0	1.0	1.00			
QC Sample ID: BVK0094-BS1		Batch: BVK0094							
Date Prepared: 11/03/2021		Date Analyzed: 11/03/2021							
Chloride	100	90 - 110	50.1	50.0	1.0	1.00			
Sulfate	100	90 - 110	50.2	50.0	1.0	1.00			

Matrix Spike - EPA 300.0

QC Sample ID: BVJ0627-MS1	Batch: BVJ0627	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/21/2021	Date Analyzed: 10/21/2021						
Chloride	106	80 - 120	29.9	18.1	11.1	1.1	1.00
Fluoride	108	80 - 120	1.5	0.3	1.11	0.1	1.00
Nitrate as N	80.0	80 - 120	0.9	ND	1.11	0.1	1.00
Nitrite as N	94.2	80 - 120	1.0	ND	1.11	0.1	1.00
Sulfate	113	80 - 120	114	101	11.1	1.1	1.00

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike - EPA 300.0 (cont.)

QC Sample ID: BVJ0627-MS2	Batch: BVJ0627	QC Source Sample: XXXXXXXX-XX						
Date Prepared: 10/21/2021	Date Analyzed: 10/21/2021							
Chloride	111	80 - 120	28.2	15.8	11.1	1.1	1.00	
Fluoride	103	80 - 120	1.7	0.6	1.11	0.1	1.00	
Nitrate as N	121	80 - 120	2.3	0.9	1.11	0.1	1.00	

QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.

Nitrite as N	84.7		80 - 120		0.9	ND	1.11	0.1	1.00
Sulfate	114		80 - 120		25.3	12.6	11.1	1.1	1.00

QC Sample ID: BVJ0909-MS1	Batch: BVJ0909	QC Source Sample: 21J1150-01						
Date Prepared: 10/30/2021	Date Analyzed: 10/30/2021							
Chloride	101	80 - 120	89.7	33.5	55.6	5.6	1.00	
Fluoride	139	80 - 120	9.4	1.7	5.56	0.6	1.00	

QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.

Sulfate	115		80 - 120		455	391	55.6	5.6	1.00
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QC Sample ID: BVJ0909-MS2	Batch: BVJ0909	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/30/2021	Date Analyzed: 10/30/2021						
Chloride	80.5	80 - 120	182	173	11.1	1.1	1.00
Fluoride	102	80 - 120	1.8	0.7	1.11	0.1	1.00
Sulfate	97.2	80 - 120	169	158	11.1	1.1	1.00

QC Sample ID: BVK0015-MS1	Batch: BVK0015	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/01/2021	Date Analyzed: 11/02/2021						
Sulfate	182	80 - 120	20.3	ND	11.1	1.1	1.00

QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.

QC Sample ID: BVK0015-MS2	Batch: BVK0015	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/01/2021	Date Analyzed: 11/02/2021						
Sulfate	80 - 120	ND	ND	11.1	1.1	1.00	
E, QM-4X -							

E, QM-4X -

QC Sample ID: BVK0094-MS1	Batch: BVK0094	QC Source Sample: XXXXXXXX-XX						
Date Prepared: 11/03/2021	Date Analyzed: 11/03/2021							
Chloride	99.2	80 - 120	12.3	1.3	11.1	1.1	1.00	
Sulfate	96.0	80 - 120	12.6	2.0	11.1	1.1	1.00	

QC Sample ID: BVK0094-MS2	Batch: BVK0094	QC Source Sample: XXXXXXXX-XX						
Date Prepared: 11/03/2021	Date Analyzed: 11/03/2021							
Chloride	104	80 - 120	13.5	2.0	11.1	1.1	1.00	
Sulfate	98.2	80 - 120	13.0	2.1	11.1	1.1	1.00	

Matrix Spike Dup - EPA 300.0

QC Sample ID: BVJ0627-MSD1	Batch: BVJ0627		QC Source Sample: XXXXXXXX-XX						
Date Prepared: 10/21/2021	Date Analyzed: 10/21/2021								
Chloride	111	1.64	80 - 120	20	30.4	18.1	11.1	1.1	1.00
Fluoride	113	4.03	80 - 120	20	1.5	0.3	1.11	0.1	1.00
Nitrate as N	85.0	6.06	80 - 120	20	0.9	ND	1.11	0.1	1.00
Nitrite as N	99.5	5.51	80 - 120	20	1.1	ND	1.11	0.1	1.00
Sulfate	114	0.115	80 - 120	20	114	101	11.1	1.1	1.00

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Matrix Spike Dup - EPA 300.0 (cont.)

QC Sample ID: BVJ0627-MSD2		Batch: BVJ0627		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/21/2021		Date Analyzed: 10/21/2021							
Chloride	114	1.12	80 - 120	20	28.5	15.8	11.1	1.1	1.00
Fluoride	106	2.03	80 - 120	20	1.7	0.6	1.11	0.1	1.00
Nitrate as N	124	1.66	80 - 120	20	2.3	0.9	1.11	0.1	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Nitrite as N	87.6	3.39	80 - 120	20	1.0	ND	1.11	0.1	1.00
Sulfate	117	1.37	80 - 120	20	25.6	12.6	11.1	1.1	1.00
QC Sample ID: BVJ0909-MSD1		Batch: BVJ0909		QC Source Sample: 21J1150-01					
Date Prepared: 10/30/2021		Date Analyzed: 10/30/2021							
Chloride	101	0.397	80 - 120	20	89.4	33.5	55.6	5.6	1.00
Fluoride	140	0.866	80 - 120	20	9.5	1.7	5.56	0.6	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Sulfate	104	1.34	80 - 120	20	448	391	55.6	5.6	1.00
QC Sample ID: BVJ0909-MSD2		Batch: BVJ0909		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/30/2021		Date Analyzed: 10/30/2021							
Chloride	85.5	0.307	80 - 120	20	182	173	11.1	1.1	1.00
Fluoride	112	6.16	80 - 120	20	1.9	0.7	1.11	0.1	1.00
Sulfate	95.0	0.143	80 - 120	20	168	158	11.1	1.1	1.00
QC Sample ID: BVK0015-MSD1		Batch: BVK0015		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/01/2021		Date Analyzed: 11/02/2021							
Sulfate	184	0.996	80 - 120	20	20.5	ND	11.1	1.1	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BVK0015-MSD2		Batch: BVK0015		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/01/2021		Date Analyzed: 11/02/2021							
Sulfate	15.1		80 - 120	20	1.7	ND	11.1	1.1	1.00
E, QM-4X -									
QC Sample ID: BVK0094-MSD1		Batch: BVK0094		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/03/2021		Date Analyzed: 11/03/2021							
Chloride	101	1.36	80 - 120	20	12.5	1.3	11.1	1.1	1.00
Sulfate	97.5	1.33	80 - 120	20	12.8	2.0	11.1	1.1	1.00
QC Sample ID: BVK0094-MSD2		Batch: BVK0094		QC Source Sample: XXXXXXXX-XX					
Date Prepared: 11/03/2021		Date Analyzed: 11/03/2021							
Chloride	103	0.499	80 - 120	20	13.5	2.0	11.1	1.1	1.00
Sulfate	99.1	0.799	80 - 120	20	13.1	2.1	11.1	1.1	1.00

QC Report for Work Order (WO) - 21J1150

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
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Blank - SM 2320 B

QC Sample ID: BVJ0646-BLK1		Batch: BVJ0646							
Date Prepared: 10/21/2021		Date Analyzed: 10/22/2021							
Alkalinity - Bicarbonate (as CaCO3)					ND		1.0	1.00	
Alkalinity - Carbonate (as CaCO3)					ND		1.0	1.00	
Alkalinity - Hydroxide (as CaCO3)					ND		1.0	1.00	
Alkalinity - Total (as CaCO3)					ND		1.0	1.00	

Duplicate - SM 2320 B

QC Sample ID: BVJ0646-DUP1		Batch: BVJ0646		QC Source Sample: XXXXXXXX-XX			
Date Prepared: 10/21/2021		Date Analyzed: 10/22/2021					
Alkalinity - Bicarbonate (as CaCO3)		0.486	20	144	144	1.0	1.00
Alkalinity - Carbonate (as CaCO3)			20	ND	ND	1.0	1.00
Alkalinity - Hydroxide (as CaCO3)			20	ND	ND	1.0	1.00
Alkalinity - Total (as CaCO3)		0.486	20	144	144	1.0	1.00

LCS - SM 2320 B

QC Sample ID: BVJ0646-BS1		Batch: BVJ0646							
Date Prepared: 10/21/2021		Date Analyzed: 10/22/2021							
Alkalinity - Total (as CaCO3)		98.1	90 - 110	231		236	1.0	1.00	

QC Report for Work Order (WO) - 21J1150

Analyte

% Rec

RPD

Limits

RPD Max

Result

Source Conc

Spk Value

MRL

DF

Blank - SM 2540 C

QC Sample ID: BVJ0658-BLK1	Batch: BVJ0658						
Date Prepared: 10/22/2021	Date Analyzed: 10/22/2021						
Total Dissolved Solids (TDS)			ND			10	1.00

QC Sample ID: BVJ0736-BLK1	Batch: BVJ0736						
Date Prepared: 10/25/2021	Date Analyzed: 10/25/2021						
Total Dissolved Solids (TDS)			ND			10	1.00

Duplicate - SM 2540 C

QC Sample ID: BVJ0658-DUP1	Batch: BVJ0658	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/22/2021	Date Analyzed: 10/22/2021						
Total Dissolved Solids (TDS)	0.7	10	3520	3490		20	1.00

QC Sample ID: BVJ0658-DUP2	Batch: BVJ0658	QC Source Sample: 21J1150-01					
Date Prepared: 10/22/2021	Date Analyzed: 10/22/2021						
Total Dissolved Solids (TDS)	0	10	1600	1600		20	1.00

QC Sample ID: BVJ0736-DUP1	Batch: BVJ0736	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/25/2021	Date Analyzed: 10/25/2021						
Total Dissolved Solids (TDS)	3	10	408	396		20	1.00

QC Sample ID: BVJ0736-DUP2	Batch: BVJ0736	QC Source Sample: XXXXXXXX-XX					
Date Prepared: 10/25/2021	Date Analyzed: 10/25/2021						
Total Dissolved Solids (TDS)	0.3	10	1410	1400		20	1.00

LCS - SM 2540 C

QC Sample ID: BVJ0658-BS1	Batch: BVJ0658						
Date Prepared: 10/22/2021	Date Analyzed: 10/22/2021						
Total Dissolved Solids (TDS)	97	90 - 110	388		400	20	1.00

QC Sample ID: BVJ0736-BS1	Batch: BVJ0736						
Date Prepared: 10/25/2021	Date Analyzed: 10/25/2021						
Total Dissolved Solids (TDS)	102	90 - 110	408		400	20	1.00



DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT **CCR GROUNDWATER MONITORING WELLS** **SAMPLING & ANALYSIS PROGRAM**

Well number: BA-DG3
 Field Personnel: TK, JB
 Sampling date: 10-20-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 0.75
 Clock time of sample: 10:58
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: BA-DG3
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	<u>.05</u>		<u>16.95</u>							
<u>10:40</u>	<u>↓</u>		<u>16.95</u>	<u>54.3</u>	<u>8.0</u>	<u>6497</u>	<u>.32</u>	<u>44.6</u>	<u>44.0</u>	<u>641.8</u>
<u>10:45</u>	<u>↓</u>		<u>16.96</u>	<u>54.9</u>	<u>8.0</u>	<u>6569</u>	<u>.29</u>	<u>37.2</u>	<u>41.8</u>	<u>641.8</u>
<u>10:50</u>	<u>↓</u>		<u>16.96</u>	<u>55.3</u>	<u>8.0</u>	<u>6614</u>	<u>.20</u>	<u>35.4</u>	<u>39.1</u>	<u>641.7</u>



DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG2
 Field Personnel: TK, JB
 Sampling date: 10-18-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 1.0
 Clock time of sample: 11:42
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: plastic
 Sample bottle(s) identification number used: FA-UG2
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.05		23.38							
11:14			23.38	59.4	7.2	15190	.72	45.4	63.0	629.1
11:19			23.38	60.0	7.1	15316	1.55	37.5	56.3	629.1
11:24			23.38	60.6	7.0	15442	2.49	31.7	50.1	629.0
11:29	√		23.38	60.9	7.0	15528	2.45	26.3	45.5	628.9



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG 1
 Field Personnel: TK JB
 Sampling date: 10-19-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): ~~0.5~~ 1.05
 Clock time of sample: 15:30
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: BA-DG 1
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
	.07		14.68							
15:10	.07		14.68	52.3	7.4	7554	1.01	31.9	95.9	635.9
15:15	.07		14.68	53.6	7.4	7638	0.44	31.8	88.1	635.9
15:20	.07		14.68	54.0	7.3	7756	.36	25.2	84.2	636.0



DESERET POWER
ELECTRIC COOPERATIVE

**BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM**

Well number: BA - UG 1
 Field Personnel: TK, JB
 Sampling date: 10-19-20
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 0.90
 Clock time of sample: 14:20
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: BA - UG 1
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				±0.1 (°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
	.06		34.52							
13:53	.06		34.54	49.6	7.2	13274	0.53	48.2	167.1	635.0
13:58	.06		34.55	49.4	7.2	13217	0.60	45.3	160.1	635.0
14:03	.06		34.57	49.9	7.2	13204	0.49	43.8	154.5	635.0



DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG2
Field Personnel: TK - JB
Sampling date: 10-19-21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.20
Clock time of sample: 14:55
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG2
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
	.08		15.98							
14:38	.08		15.99	54.6	7.1	9750	.55	33.5	113.4	635.7
14:43	.08		15.99	54.3	7.1	9720	.46	20.6	103.4	635.7
14:48	.08		15.99	54.8	7.1	9781	.33	15.6	99.0	635.8



DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG2
 Field Personnel: TK JB
 Sampling date: 10/18/21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 0.75
 Clock time of sample: 15:58
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: FA-DG2
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
			30.27							
	.050		30.27							
15:39	.050		30.28	61.7	9.1	17534	.78	80.1	15.7	626.6
15:44	.05		30.29	62.2	9.1	17693	.65	57.4	10.3	626.6
15:49	.05		30.30	62.6	9.1	17778	.66	56.2	7.7	626.5



DESERET POWER
ELECTRIC COOPERATIVE

**BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM**

Well number: FA - DG3
 Field Personnel: JK JB
 Sampling date: 10-18-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 0.98
 Clock time of sample: 14:46
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: FA-DG3
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				±0.1 (°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
	0.065		28.60							
14:07	0.065		28.65	61.5	8.7	5499	0.53	77.3	8.1	627.5
14:12	0.065		28.67	61.1	8.7	5514	0.50	68.3	5.2	627.4
14:17	0.065		28.69	60.8	8.7	5478	1.12	66.8	2.7	627.3



BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-1DG4
Field Personnel: TK, JB
Sampling date: 10-18-21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.125
Clock time of sample: 13:28
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-1DG4
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3% (µS/cm)	±10% (NTU)	(%/mg/L)	(mV)	(mmHg)
	.075		29.81							
12:55	.075		29.83	58.7	7.6	10982	0.91	39.9	38.1	628.7
13:00	.075		29.84	58.1	7.5	10801	2.96	24.5	23.6	628.6
13:05	.075		29.84	58.1	7.5	10762	1.95	20.0	16.0	628.5



Well number: "QA" took from FA-UG1

Field Personnel: TK, JB

Sampling date: 10-18-21

Well condition: Good

Was the meter(s) calibrated prior to sampling (circle): Yes No

Water level, pre-pump installation (ft): N/A

Water level, post-pump installation (ft): N/A

Rate & direction of groundwater flow: N/A

Total volume of water pumped (Liters): —

Clock time of sample: 10:30

Lab's name sample(s) are being sent to: CTF

Type and size of sample bottles used: Plastic

Sample bottle(s) identification number used: QA Dup

Was a blind sample obtained at this well (circle): Yes No

Additional Notes: _____

Page 1 of



DESERET POWER
ELECTRIC COOPERATIVE

**BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM**

Well number: NEP
Field Personnel: TK, SB
Sampling date: 10-19-21
Well condition: N/A
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): N/A
Clock time of sample: 13:18
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: NEP
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
					8.4					



DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT CCR GROUNDWATER MONITORING WELLS SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG1
 Field Personnel: TK, JB
 Sampling date: 10-18-21
 Well condition: Good
 Was the meter(s) calibrated prior to sampling (circle): Yes No
 Water level, pre-pump installation (ft): N/A
 Water level, post-pump installation (ft): N/A
 Rate & direction of groundwater flow: N/A
 Total volume of water pumped (Liters): 1.2
 Clock time of sample: 10:30
 Lab's name sample(s) are being sent to: CTF
 Type and size of sample bottles used: Plastic
 Sample bottle(s) identification number used: FA-UG1
 Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (gal)	Water Depth (ft)	Key Indicator Parameters						
				Temp.	pH	Conductivity	Turbidity	DO	ORP	BP
				(°F)	±0.1	±3%	±10%	(%/mg/L)	(mV)	(mmHg)
	<u>.08</u>		<u>34.69</u>							
<u>9:32</u>			<u>34.69</u>	<u>56.3</u>	<u>8.1</u>	<u>1678</u>	<u>0.47</u>	<u>32.9</u>	<u>54.8</u>	<u>629.7</u>
<u>9:37</u>			<u>34.69</u>	<u>57.0</u>	<u>8.1</u>	<u>1695</u>	<u>0.51</u>	<u>28.2</u>	<u>51.2</u>	<u>629.6</u>
<u>9:42</u>	<u>U</u>		<u>34.69</u>	<u>57.3</u>	<u>8.1</u>	<u>1709</u>	<u>0.38</u>	<u>25.1</u>	<u>47.9</u>	<u>629.5</u>

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative

ADDRESS: 12500 East 25500 South

CITY/STATE/ZIP: Vernal, UT 84078-8525

PHONE #: 435-781-5706 FAX: _____

CONTACT: Tyler Esplin PROJECT: Bonanza - CCR Biannual

EMAIL: tesplin@deseretpower.com

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____



Page 1/2

Please fill out the fields highlighted in light blue.

2107150

Lab Use Only	CLIENT SAMPLE INFORMATION				
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine
01	1. CCR - QA Dup	10-18-21	10:30	Water	
02	2. BA - DG1	10-19-21	15:30	Water	
03	3. BA - DG2	10-19-21	14:55	Water	
04	4. BA - DG3	10-20-21	10:58	Water	
05	5. BA - UG1	10-19-21	14:20	Water	
06	6. FA - DG2	10-18-21	15:58	Water	
07	7. FA - DG3	10-18-21	14:46	Water	
08	8. FA - DG4	10-18-21	13:28	Water	
09	9. FA - UG1	10-18-21	10:30	Water	
10	10. FA - UG2	10-18-21	11:42	Water	

Sampled by: [print]

Trenton Keller

Sampled by: [signature]

T Keller

Special Instructions:

Relinquished by: [signature]

T Keller

Relinquished by: [signature]

Dustin Schurz

Relinquished by: [signature]

Date/Time

10-20-21 / 11:20

Date/Time

10-20-2021 15:00

Date/Time

Received by: [signature]

Dustin Schurz

Received by: [signature]

J. Schurte Mice

Received by: [signature]

Date/Time

10-20-2021

Date/Time

10/21/21 10:00

Date/Time

ON ICE

NOT ON ICE

Temp (C°):

3.2

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

12 849 747 01 6539 4322

(Tier 2 QC)



CHEMTECH-FORD
LABORATORIES

BILLING ADDRESS: _____

BILLING CITY/STATE/ZIP: _____

PURCHASE ORDER #: _____

* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

2151150

Lab Use Only	CLIENT SAMPLE INFORMATION					Alkalinity	TDS	Anions: Cl, F, SO ₄	ICP Metals: B, Ca, Cd, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, V, Zn	Total Coliform + E. coli	Total Coliform + E. coli	HPC (Plate Count)	E. Coli Only
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine								
11	11. NEP	10-19-21	13:18	Water		X	X	X	X				
	2.												
	3.												
	4.												
	5.												
	6.												
	7.												
	8.												
	9.												
	10.												
Sampled by: [print] Trenton Keller Special Instructions:		Sampled by: [signature] <i>Trenton Keller</i>		ON ICE NOT ON ICE Temp (C°): 3.2 Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.									
Relinquished by: [signature] <i>T. Keller</i>		Date/Time 10-20-21 / 11:20		Received by: [signature] <i>Dustin Schurz</i>					Date/Time 10-20-2021 15:20				
Relinquished by: [signature] <i>Dustin Schurz</i>		Date/Time 10-20-2021 15:00		Received by: [signature] <i>Janette Mills</i>					Date/Time 10/21/21 10:00				
Relinquished by: [signature]		Date/Time		Received by: [signature]					Date/Time				

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

Fall 2021 Resampling Event: October 2021



Well number: BA-DG3
Field Personnel: TK, JB
Sampling date: 10-27-21
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 0.975
Clock time of sample: 09:40
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic & Glass (TOC, Amoria)
Sample bottle(s) identification number used: BA-DG3
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

[illegible]

Appendix B

Alternative Source Demonstration (ASD), Fly Ash Area Landfill, Bonanza Power Plant

Appendix B Alternative Source Demonstration (ASD), Fly Ash Area Landfill, Bonanza Power Plant

Fall 2020 Alternative Source Demonstration (ASD)

Technical Memorandum

To: Tyler Esplin, Deseret Power Electric Cooperative
From: Jeff Davis, P.E., Barr Engineering Co.
Subject: Fall 2020 Monitoring Event Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant
Date: April 13, 2021
Project: 44241001.07 Bonanza Power Plant CCR

1.0 Introduction

Deseret Power Electric Cooperative, Bonanza Power near Vernal, UT, has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261).

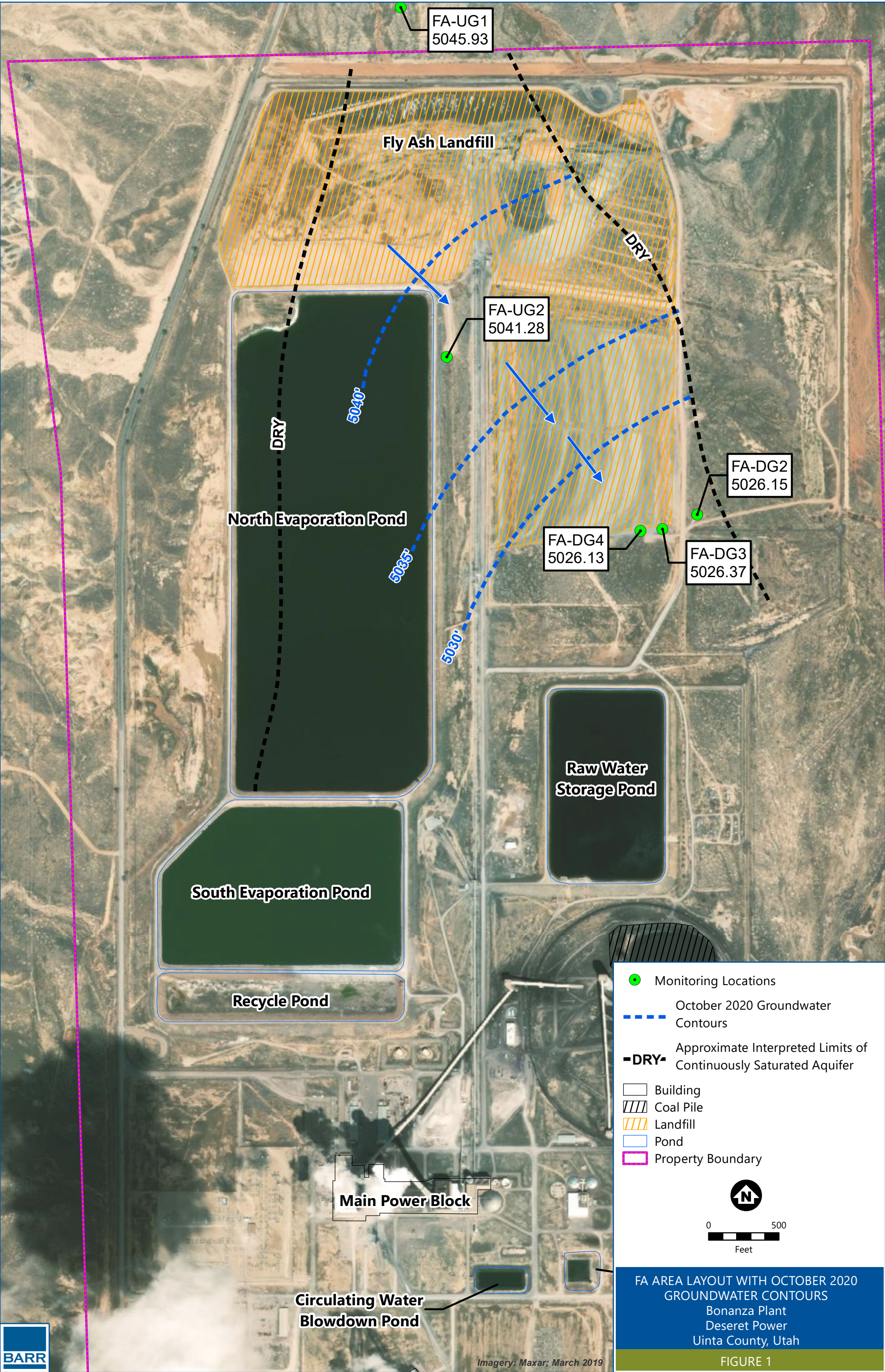
As part of the Detection Monitoring Program, a statistically significant increase (SSI) in fluoride concentration was identified at the Fly Ash (FA) Landfill Area for monitoring well FA-DG4 during the Fall 2020 event which occurred on October 5-6, 2020. The final laboratory report was received on October 29, 2020. An SSI determination memo was prepared on January 13, 2021. No verification resampling was conducted based on the presumptive ability to document a source other than the FA landfill, spatial variability, and naturally-occurring fluoride concentrations at the site and in the region.

1.1 Purpose

This memorandum is intended to provide written documentation of a site-wide Alternative Source Demonstration (ASD) for fluoride (at all wells including at FA-DG4) and certification of accuracy as described in the CCR Rule (§257.94(e)(2)).

1.2 Background Information

Figure 1 shows the location of FA-DG2, FA-DG3, and FA-DG4 and the North Evaporation Pond (NEP). The conceptual model for the site (Figure 1) consists of groundwater flowing from the northwest under the FA Area toward the south. The NEP is a non-CCR pond that receives process water from the plant. The NEP has a liner that allows seepage so that water in the pond combines with upgradient groundwater under the FA landfill. The groundwater flow is controlled by a groundwater capture system that is located downgradient of the FA Area monitoring wells. Therefore, groundwater quality is strongly influenced by the water quality in the NEP. Details on the network and conceptual model of groundwater flow are included in the Groundwater Monitoring System Certification (Burns and McDonnell, 2017) and the Annual Review of Groundwater Levels (Loughlin, 2020).



A comparison of the Fall 2020 groundwater results with the prediction limits calculated using the baseline data is included in Table 1. The EPA's Unified Guidance (USEPA, 2009) notes that parametric prediction limits can be computed using as few as three normally distributed background samples, though a minimum of eight is advised. Four samples have been collected from the NEP; two in 2018 and two in 2020. The data were found to be normally distributed and were used to calculate a parametric prediction limit.

Table 1 Comparison of SSI Parameters with NEP Concentrations

Well	Parameter (units)	Measured	InterPL	IntraPL	NEP PL
FA-DG4	Fluoride (mg/L)	6.0	1.9	2.8	107

PL: Prediction Limit

Previous ASDs were completed for FA-DG4 for fluoride (Barr, 2019; Barr, 2020a; Barr, 2020b) that concluded that the fluoride was due to a source other than the FA landfill and identified the NEP as a potential source along with natural variability as shown by both regional and site geochemical data. This ASD reinforces the findings of those earlier ASDs and provides additional information that supports a site-wide ASD that will be included by reference to address potential future SSIs should they occur at FA-DG4 or other downgradient monitoring wells.

1.3 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in §257.94(e) (2):

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

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination.

1.4 Potential Alternative Sources Review

Based on the rule (above), there are five categories that we evaluated for this ASD. These include:

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

2.0 Lines of Evidence Supporting an ASD

As part of the ASD, site data was evaluated to identify potential causes for elevated fluoride concentrations in the FA-DG4 monitoring well. The following potential sources were selected for investigation:

- Surface water data from the NEP
- Natural variation
- Results of laboratory analysis on CCR material collected from the FA landfill

A hypothesis was developed to evaluate each of the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

2.1 A “source other than the CCR unit” (North Evaporation Pond)

Groundwater flows from under the NEP toward the downgradient monitoring wells as shown on Figure 1.

- Hypothesis: The NEP, which is a non-CCR unit, is the source of elevated dissolved constituents contributing to the SSI for fluoride in the FA-DG4 monitoring well.
- Analysis: Data collected from the pond in 2018 (Barr, 2020a) and 2020 (Barr, 2020b) were compared to the groundwater concentrations. A mixing model of concentrations from an upgradient monitoring well and the NEP was used to evaluate whether the NEP could be a source.
- Result: Concentrations in the NEP were much higher than in the downgradient monitoring well. The concentrations in FA-DG4 are similar to what would be expected if waters from the NEP and upgradient were mixing. The NEP is therefore a likely source of the SSIs.

Figure 2 shows a time-series plot of fluoride concentrations in FA-DG4 collected under the CCR Rule. Dashed lines on the plot indicate the intrawell prediction limit for FA-DG4, the interwell prediction limit calculated from concentrations in FA-UG1 and FA-UG2 (PZ-11), and the interwell prediction limit calculated from the concentrations in the NEP. The prediction limit from the NEP (107 mg/L) was much higher than the concentration in FA-DG4 (6.0 mg/L). The higher concentrations in the NEP strongly suggest that it is a source of fluoride to downgradient wells.

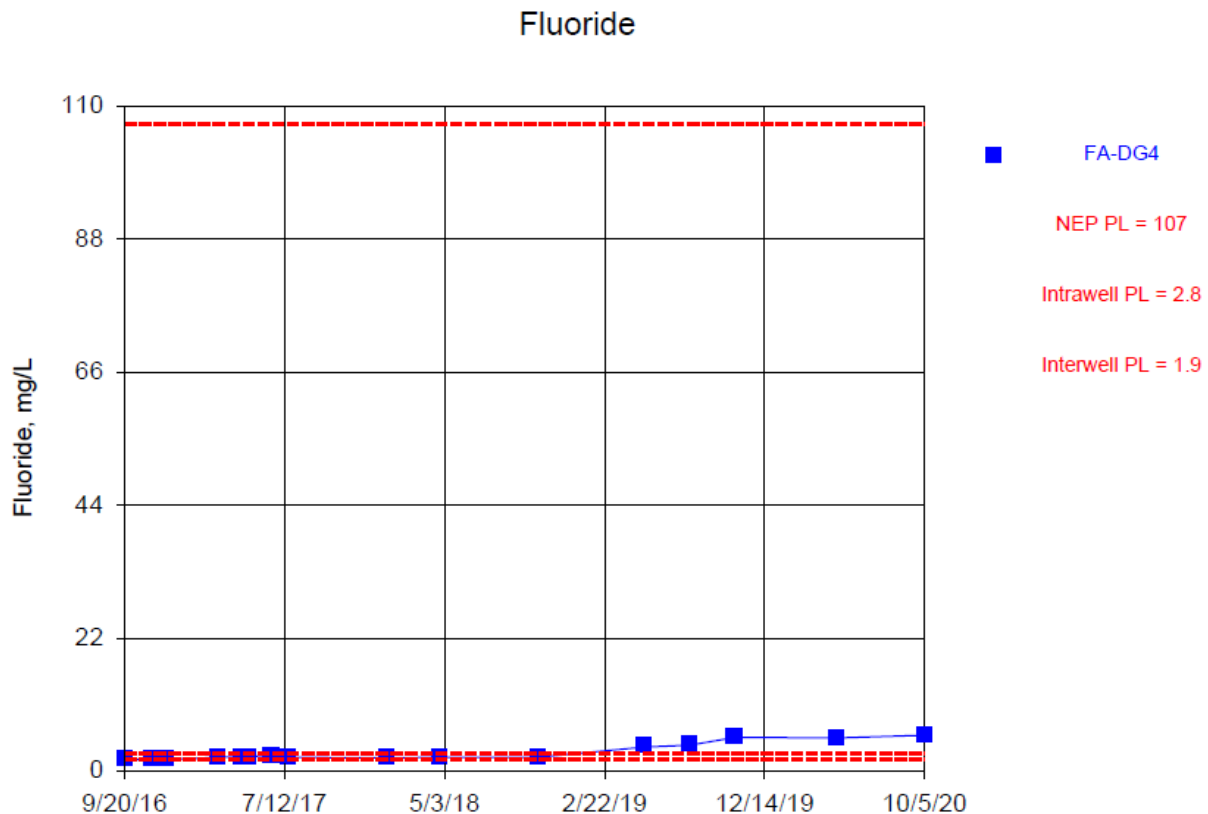


Figure 2 Time-series Plot of Fluoride Concentration in FA-DG4

To further test the hypothesis, the geochemical modeling software The Geochemist's Workbench (Bethke, 2008) was used to model what the composition of a water would be if it was the result of the mixing of waters from an upgradient well (represented by groundwater from FA-UG1) and the NEP. The model calculated incremental concentrations at every percentage combination (i.e., 100% FA-UG1 and 0% NEP through 100% NEP and 0% FA-UG1). The model accounted for formation of common minerals and predicted that calcite (CaCO_3), magnesite (MgCO_3), and fluorite (CaF_2) would be formed. Figure 3 shows the mixing model results on a Piper plot, along with the original compositions of the upgradient well, 2018 NEP samples, and FA-DG4 (Barr, 2019). The mixing model results indicate that a water similar in composition (i.e., values that are located near the predicted results on the Piper Plot) to the FA-DG4 sample could result from the mixing of waters from the NEP and upgradient wells. This is indicated by the position of the sample for FA-DG4, shown by the dark blue triangle, which plots close to the mixing path about halfway between the NEP samples and the upgradient groundwater sample on Figure 3. This indicates that values observed at FA-DG4 are consistent with the hypothesis that downgradient groundwater can be explained by the contribution of fluoride by the NEP.

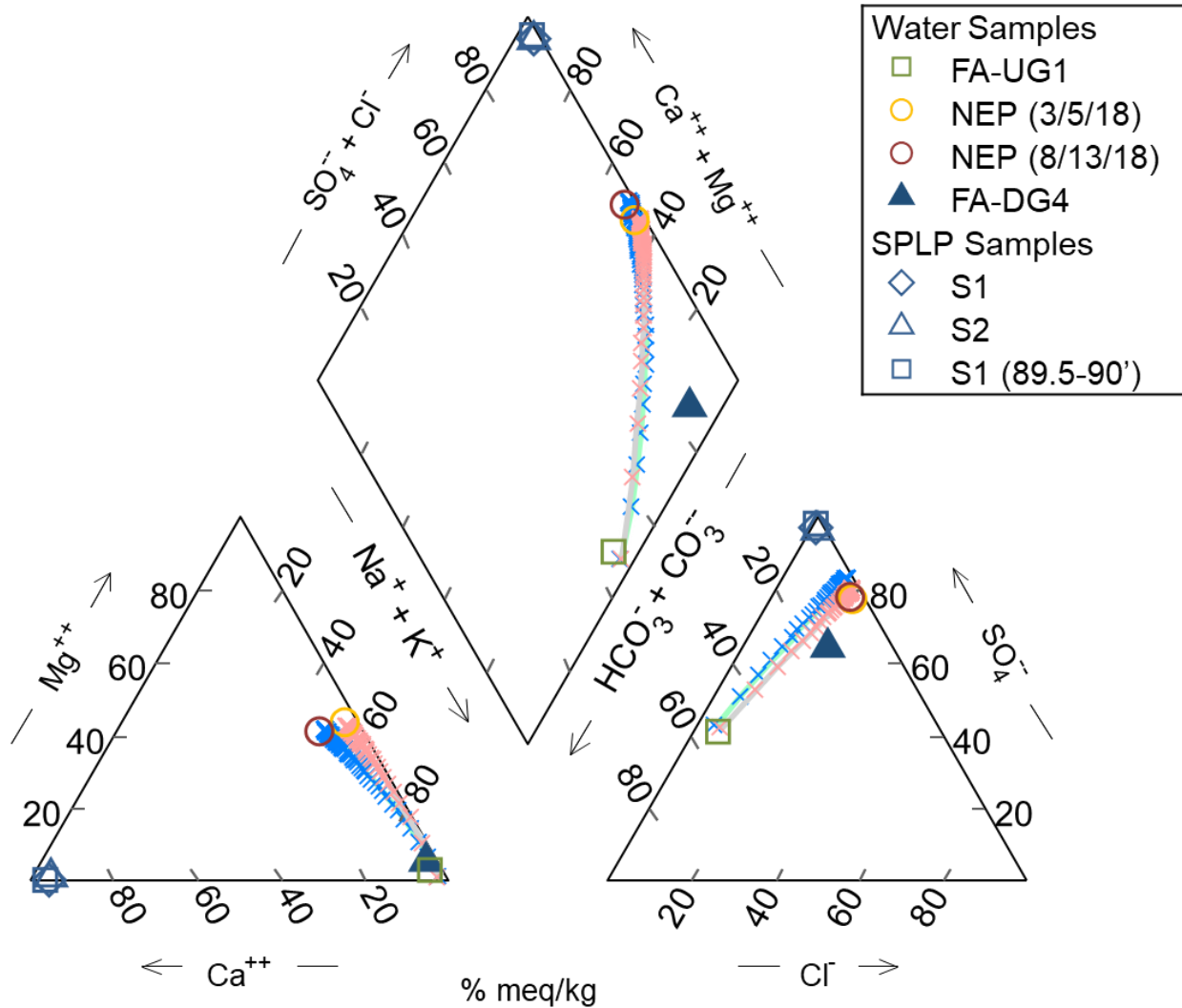


Figure 3 Piper Plot of Mixing Model Results

2.2 A “source other than the CCR unit” (inconsistent with CCR Unit)

- Hypothesis: Groundwater samples from FA-DG4 should have chemical signatures similar to fly ash leachate if the impacts were the result of leaching from the CCR unit.
- Analysis: Synthetic precipitation leaching tests were performed on samples collected from borings advanced into the CCR unit, and the resulting samples were analyzed for major and CCR parameters.
- Result: The CCR material in the FA landfill has a different composition than what would be expected if it were the source of a release affecting FA-DG4 based on the SPLP analysis designed to simulate leaching.

Borings were advanced within the Fly Ash Landfill in December 2019 at the locations shown on Figure 1. Composite samples from the CCR material was collected from several intervals between the surface and the bottom of the borings (90 feet below the surface) at locations S1 and S2. A grab sample from the

bottom of boring S1 (89.5 to 90 feet below the surface) was also collected to represent ash from a previously closed non-CCR unit within the landfill footprint. These three samples were leached using the Synthetic Precipitation Leaching Procedure (SPLP), in which the samples were mixed with a slightly acidic solution designed to simulate rainwater that might percolate through the ash. The liquid from this procedure was analyzed for the same parameters used to evaluate groundwater. The results of the analysis are included in Table 2 of this report and in Attachment A of the Fall 2019 ASD (Barr, 2020a).

The major ion compositions of the SPLP leachate samples are shown on the Piper plot in Figure 3, which also shows samples from FA-UG1 and FA-DG4. The plot indicates that the SPLP samples from S1, S2, and S1 (89.5-90') have very similar compositions and shows that sulfate (SO_4) and calcium (Ca) are the dominant ions. From the plot, it is also apparent that the composition of the sample collected from downgradient monitoring well FA-DG4 is notably different from the composition of the SPLP leachate from the CCR material. In particular, the sample from FA-DG4 has sodium as the dominant cation ($\text{Na} > \text{Mg} > \text{Ca}$), whereas the SPLP samples exhibit calcium as the dominant cation ($\text{Ca} > \text{Na} > \text{Mg}$).

Fluoride concentrations in the SPLP samples were measured at less than 0.4 mg/L, whereas the fluoride concentrations that have been measured in FA-DG4 range from 1.9 to 6.0 mg/L. Although absolute concentrations may not be comparable between groundwater samples and SPLP leachate, fluoride makes up approximately 0.1% of the total anionic charge concentration in the FA-DG4 sample, whereas fluoride comprises only 0.03 to 0.06% of the anionic charge in the SPLP samples. The relative lack of fluoride in the SPLP samples means that the CCR unit is unlikely to be the source of fluoride to groundwater responsible for previous SSIs. These data refute the hypothesis that the release is due to the CCR unit.

2.3 Natural variation

- Hypothesis: Natural variation in fluoride concentrations within native geology at the site and in the region contributes to the elevated fluoride concentrations observed in FA-DG4.
- Analysis: Fluoride concentrations in all wells within the groundwater monitoring network were evaluated using publicly available data and published studies of regional geology and groundwater chemistry. A simple geochemical model for dissolution/precipitation of minerals helps explain the observed differences across the site in fluoride concentrations.
- Result: Fluoride concentrations in site wells and regionally vary widely due to the geology of the region and are likely to be affected by geochemical processes expected from interaction with the mineralogy of the subsurface. Therefore, natural variation is likely a significant cause of the SSI observed in FA-DG4.

Table 2 Synthetic Precipitation Leaching Procedure Results, Deseret Power Bonanza Plant

Location Depth Date	S1 89.5 - 90 ft 12/17/2019	S1 0 - 90 ft 12/17/2019	S2 0 - 90 ft 12/17/2019
Parameter [mg/l unless otherwise noted]			
SPLP General Parameters			
Alkalinity, Bicarbonate, as CaCO ₃ (reprep)	26.0	25.0	20.0
Alkalinity, Carbonate as CaCO ₃ (reprep)	< 10.0	12.0	20.0
Alkalinity, Hydroxide as CaCO ₃ (reprep)	< 10.0	< 10.0	< 10.0
Alkalinity, Total, as CaCO ₃ (reprep)	30.0	37.0	40.0
Chloride	3.05	8.93	11.4
Fluoride	0.185	0.288	0.380
pH (reprep) [pH units]	8.59	8.65	9.19
Sulfate	1,500	1,500	1,580
SPLP Metals			
Antimony	< 0.0300	< 0.0300	< 0.0300
Arsenic	< 0.0200	< 0.0200	< 0.0200
Beryllium	< 0.0100	< 0.0100	< 0.0100
Boron	0.554	1.00	2.00
Cadmium	< 0.00350	< 0.00350	< 0.00350
Calcium	652	622	656
Calcium (reprep)	708	633	677
Chromium	< 0.100	< 0.100	< 0.100
Cobalt	< 0.0200	< 0.0200	< 0.0200
Lead	< 0.0100	< 0.0100	< 0.0100
Lithium	< 0.100	< 0.100	< 0.100
Magnesium	< 1.00	1.15	5.15
Mercury	< 0.00100	< 0.00100	< 0.00100
Molybdenum	0.322	0.0623	0.104
Potassium	< 1.00	1.24	1.45
Selenium	0.0137	< 0.0100	0.0306
Sodium	24.6	27.1	30.9
Thallium	< 0.0100	< 0.0100	< 0.0100

As shown on Figure 4, the fluoride concentrations in site wells vary by approximately an order of magnitude. The concentration is lowest in the upgradient fly ash wells (averages of 1.8 and 0.6 mg/L in FA-UG1 and FA-UG2, respectively) and are the highest in FA-DG2 (average of 60 mg/L). Average concentrations in the other downgradient wells (FA-DG2 and FA-DG3) exceed the fluoride concentrations measured in FA-DG4 (Figure 4). Because other wells at the site had higher concentrations of fluoride that were not indicative of an SSL, it is concluded that there is high variability in fluoride concentrations in the area.

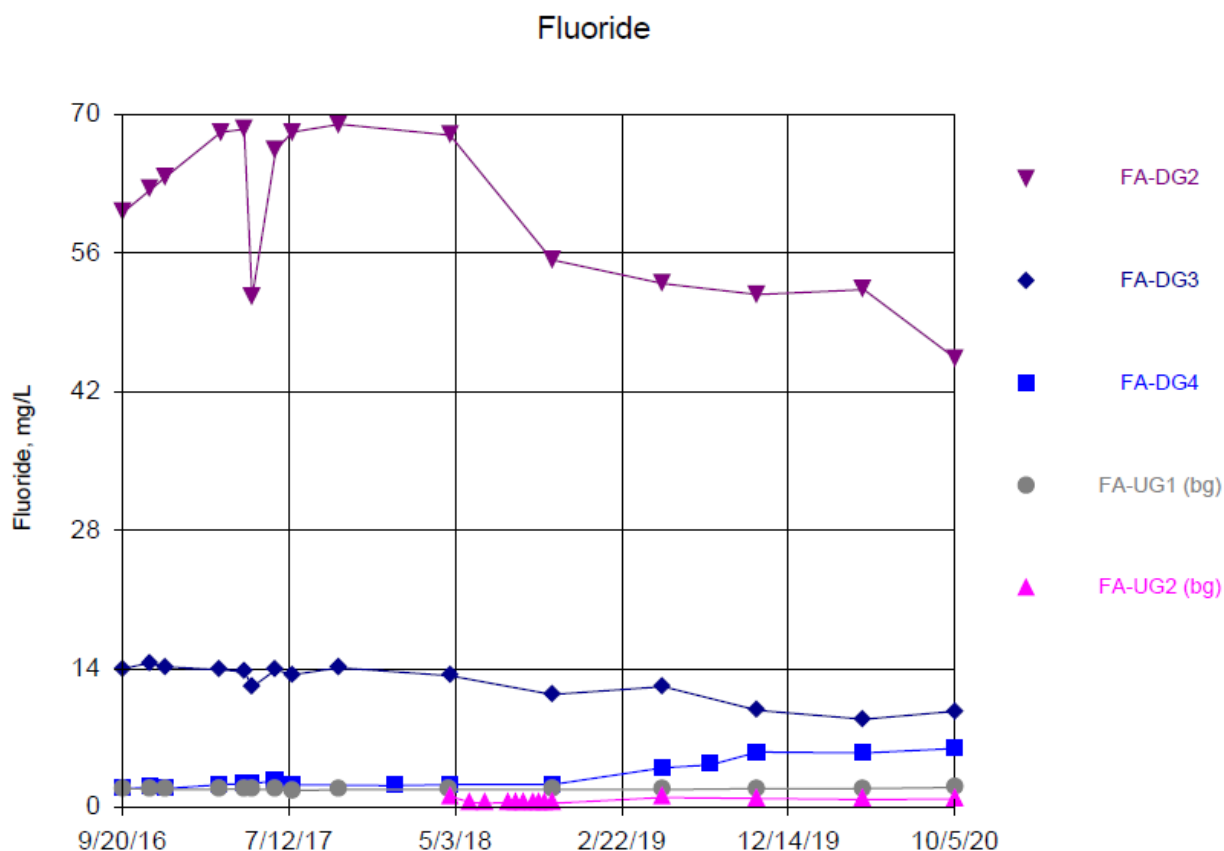


Figure 4 Time-Series Plot of Fluoride Concentrations in Monitoring Wells

To test the hypothesis of natural variation as an explanation for the concentrations at FA-DG4, evidence of natural sources of fluoride and/or plausible explanations for the differences in concentrations between downgradient wells were evaluated as described below.

The geology of the upper 20 feet of soil logged by Dames & Moore in 1991 consists primarily of very fine-grained sands and silt with occasional traces of clay. These sediments are geologically recent deposits, having been transported by alluvial and colluvial processes from the surrounding hills and cliffs of the Uinta Formation. The first and second hypersaline phases of the ancient Lake Uinta caused large depositions of Eocene-aged evaporites, particularly in the area of the Bonanza Power Plant (Vanden Berg and Birgenheier, 2017; Birdwell et al., 2019). Evaporites consist of readily soluble minerals, such as halite (NaCl) and nahcolite (NaHCO_3 , a source of baking soda), which can rapidly dissolve into groundwater.

A search for fluoride concentrations in groundwater within 50 miles of the site yielded 965 records from the Water Quality Portal (NWQMC et al., 2019). Concentrations ranged from below detection to 450 mg/L, with a lowest detected value of 0.03 mg/L and a 95th percentile of approximately 18 mg/L. Because these concentrations indicate naturally occurring levels of fluoride are elevated well above the concentrations observed at FA-DG4, it appears to confirm the hypothesis that natural variability is a likely contributor to the SSI at this well.

In addition, the natural variation hypothesis is also supported by a number of studies that have noted the spatial variability of groundwater compositions in this area (Wallace, 2012; Naftz, 1996; Holmes and Kimball, 1987; Lindskov and Kimball, 1984). The studies describe mineralogical controls on groundwater composition in the region that seem to explain the differences observed between the samples from different wells at the site.

For instance, calcium concentrations can decrease in groundwater when calcium carbonate minerals precipitate out of solution, leaving the groundwater undersaturated with respect to calcium- and fluoride-bearing minerals (e.g., fluorite and apatite). In this condition, the fluoride-bearing minerals may dissolve, increasing groundwater fluoride concentrations. This geochemical relationship appears to explain changes in concentration along the flow path between upgradient and downgradient wells at the site.

For example, low calcium (<5 mg/L) and high fluoride (>10 mg/L) concentrations can occur in areas near where naturally-occurring fluoride minerals are dissolving and calcium carbonate is precipitating. In groundwater with this composition, calcium is the limiting constituent in fluorite saturation. This is an explanation for calcium and fluoride concentrations observed in downgradient monitoring wells FA-DG2 and FA-DG3.

In contrast, where there are high calcium concentrations (>200 mg/L) and low fluoride (<2 mg/L) concentrations in groundwater (e.g., at FA-UG2), fluoride is the limiting constituent in fluorite saturation. This scenario is found where calcium minerals such as calcite are readily dissolving, increasing calcium concentrations in groundwater. Calculations made with The Geochemist's Workbench (Bethke, 2008; Table 3) indicate that calcite (calcium carbonate) is near saturation in the five fly ash monitoring wells, whereas the low-fluoride wells (FA-UG1, FA-UG2, and FA-DG4) are undersaturated with respect to fluorite. The calculations were made using data from April 2018, which is the most recent event where alkalinity (bicarbonate) was measured. When fluoride concentrations increase from 2018 concentrations to the concentration measured in fall 2020 (6.0 mg/L), FA-DG4 becomes near saturation with respect to fluorite. These observations indicate the low concentrations of fluoride are likely due to equilibration with fluorite in the subsurface as water from the NEP migrates toward the downgradient wells.

As groundwater is depleted in calcium due to mineral precipitation or mixes with more calcium-depleted water from upgradient of the landfill, the amount of calcium available to precipitate with fluoride into a mineral phase decreases. As a result, less fluoride is removed from groundwater, and concentrations can increase as groundwater contacts additional fluoride-bearing rocks. The results from FA-DG4 appear to match the conditions expected as part of this process.

Table 3 Calcite and Fluorite Saturation Indices for Monitoring Wells

Location	Calcite	Fluorite
	log Q/K	log Q/K
FA-DG2	0.42	0.52
FA-DG3	0.13	-0.34
FA-DG4	0.13	-0.60
FA-UG1	-0.03	-1.02
FA-UG2	0.33	-1.63
FA-DG4 (F=6.0 mg/L)	0.14	0.25

Samples collected in April 2018

Thermodynamic data from The Geochemist's Workbench thermo.tdat (Bethke, 2008)

Values in the approximate range of -0.5 to 0.5 are assumed to be near equilibrium saturation.

Values <-0.5 are undersaturated, and values >0.5 are supersaturated.

The processes of mineral precipitation and dissolution are not necessarily instantaneous. As a result, they are more likely to occur in systems with lower flow and longer contact times with aquifer minerals, which also provide nucleation sites for mineral formation. Therefore, these processes are less likely to occur in surface waters like those sampled from the NEP because the pond is subjected to frequent disturbances such as wave action, pump circulation to misting machines, and discharges into the pond from operations which may prevent precipitation reactions from proceeding to equilibrium. In addition, nucleation sites for mineral formation are less prevalent in surface water than in groundwater.

The geochemical relationships described above also explain an apparent contradiction in that the NEP is a source of fluoride for FA-DG4 while samples from FA-UG2 (located next to the NEP) exhibit a lower concentration of fluoride. The geochemical conceptual model described above suggests that lower fluoride concentrations are expected where high concentrations of calcium from the NEP are resulting in precipitation of fluorite within the geologic matrix and reducing the concentration in groundwater at this location.

3.0 Conclusion

The results of the ASD assessment show that there are multiple lines of evidence supporting the ASD for fluoride that can be applied to any of the downgradient wells based primarily on the presence of elevated fluoride in the NEP as well as regional geologic and geochemical data that show fluoride concentrations that are much greater in natural groundwater than those observed from the fly ash. The ASD is also supported by the observation that the fly ash does not contain sufficient mobile fluoride to result in the elevated concentrations observed in downgradient wells. Therefore, the foregoing ASD establishes lines of evidence that meet the alternative source requirements of the CCR Rule §257.94(e)(2). Specifically, the SSI for fluoride from the Fall 2020 monitoring event at FA-DG4 is due to either a "source other than" the Fly Ash Landfill and/or to natural variation based on both site-specific and regional data.

4.0 Certification

I certify that the written demonstration provided above for fluoride observed in monitoring well FA-DG4 as well as other downgradient wells are supported by the data that is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§257.94(e)(2))).

A handwritten signature in blue ink, appearing to read 'JD', is written over a faint, circular blue stamp or seal.

Jeff Davis, P.E.
Barr Engineering Co.

5.0 References

- Barr Engineering Co., 2019. Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant. Technical Memorandum from Jeff Davis and James Aiken to Tyler Esplin, December 23, 2019. Included as Appendix B in 2019 Annual Groundwater Monitoring and Corrective Action Report.
- Barr Engineering Co., 2020a. Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, May 19, 2020. Included as Appendix B in 2020 Annual Groundwater Monitoring and Corrective Action Report.
- Barr Engineering Co., 2020b. Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, November 7, 2020. Included as Appendix B in 2020 Annual Groundwater Monitoring and Corrective Action Report.
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- Burns & McDonnell, 2017. Groundwater Monitoring System Certification, Deseret Generation and Transmission Cooperative – Bonanza Power Plant, Vernal, Utah. Letter to Tyler Esplin from Block Andrews and Wayne Weber, October 12, 2017.
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- Vanden Berg, M.D., and L.P. Birgenheier, 2017. An examination of the hypersaline phases of Eocene Lake Uinta, upper Green River Formation, Uinta Basin, Utah. *Journal of Paleolimnology* 58, 353–371.
- Wallace, Janae, 2012. Baseline Water Quality and Estimated Quantity for Selected Sites in the Southeastern Uinta Basin, Utah. Utah Geological Survey Open-File Report 59.

Spring 2021 Alternative Source Demonstration (ASD)

Technical Memorandum

To: Tyler Esplin, Deseret Power Electric Cooperative
From: Jeff Davis, P.E., Barr Engineering Co.
Subject: Spring 2021 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant
Date: November 30, 2021
Project: 44241001.07 Bonanza Power Plant CCR

1.0 Introduction

Deseret Power Electric Cooperative, Bonanza Power near Vernal, UT, has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261).

The spring 2021 detection monitoring event occurred on April 29-30, 2021. Statistically significant increases (SSI) were identified for the fluoride concentration at well FA-DG4 at the Fly Ash (FA) Landfill Area and for pH at well BA-DG3 at the Bottom Ash (BA) Landfill Area. The final laboratory report was received on June 3, 2021. Verification resampling was conducted on July 21, 2021, to verify the BA-DG3 pH SSI. No resampling was conducted for the FA-DG4 fluoride SSI based on previous work that demonstrated that a source other than the FA landfill, spatial variability, and naturally-occurring fluoride concentrations at the site and in the region. An SSI determination memo was prepared on September 1st, 2021.

1.1 Purpose

This memorandum is intended to provide written documentation of a site-wide Alternative Source Demonstration (ASD) for fluoride (at all wells including at FA-DG4) and a well-specific ASD for pH in well BA-DG3. It also provides a certification of accuracy for these ASDs as described in the CCR Rule (§257.94(e)(2)).

1.2 Background Information

Figure 1 shows the location of FA-DG2, FA-DG3, and FA-DG4 and the North Evaporation Pond (NEP). The conceptual model for the site (Figure 1) consists of groundwater flowing from the northwest under the FA Area toward the south. The NEP is a non-CCR pond that receives process water from the plant. The NEP has a liner that allows seepage so that water in the pond combines with upgradient groundwater under the FA landfill. The groundwater flow is controlled by a groundwater capture system that is located downgradient of the FA Area monitoring wells. Therefore, groundwater quality is strongly influenced by the water quality in the NEP. Details on the network and conceptual model of groundwater flow are included in the Groundwater Monitoring System Certification (Burns and McDonnell, 2017) and the Annual Review of Groundwater Levels (Loughlin, 2020).

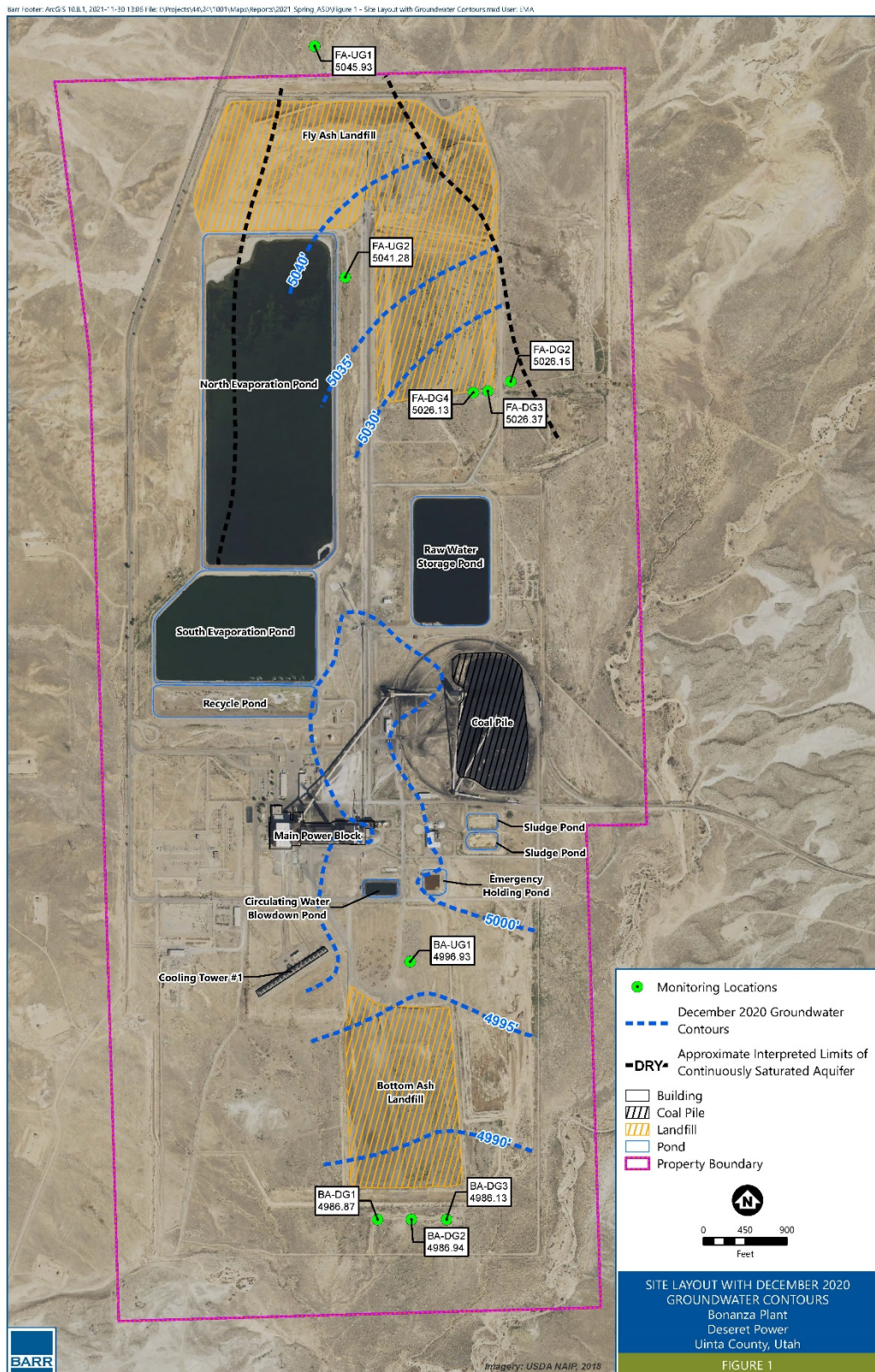


Figure 1 Site Layout with October 2020 Groundwater Contours

A comparison of the spring 2021 groundwater results with the prediction limits calculated using the baseline data is included in Table 1. The EPA's Unified Guidance (USEPA, 2009) notes that parametric prediction limits can be computed using as few as three normally distributed background samples, though a minimum of eight is advised. Four samples have been collected from the NEP; two in 2018 and two in 2020. The data were found to be normally distributed and were used to calculate a parametric prediction limit for fluoride. No prediction limit was calculated for pH from the NEP because the NEP is located adjacent to the FA landfill but is spatially and hydraulically distant from the BA landfill.

Table 1 Comparison of SSI Parameters with Prediction Limits and NEP Concentrations

Well	Parameter (units)	Measured	Resample	InterPL	IntraPL	NEP PL
FA-DG4	Fluoride (mg/L)	7.7	n/a	1.9	2.8	107
BA-DG3	pH	7.9	8.0	7.0 – 7.3	7.0 – 7.7*	n/a

PL: Prediction Limit

*Intrawell prediction limit may not be appropriate due to trending data.

Previous ASDs were completed for FA-DG4 for fluoride (Barr, 2019; Barr, 2020a; Barr, 2020b) that concluded that the fluoride was due to a source other than the FA landfill and identified the NEP as a potential source along with natural variability as shown by both regional and site geochemical data. This ASD reinforces the findings of those earlier ASDs and provides additional information that supports a site-wide ASD that will be included by reference to address potential future fluoride SSIs should they occur at FA-DG4 or other downgradient monitoring wells.

1.3 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in §257.94(e) (2):

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

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (September 1, 2021).

1.4 Potential Alternative Sources Review

Based on the rule (above), there are five categories that we evaluated for this ASD. These include:

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

2.0 Lines of Evidence Supporting an ASD: Fluoride at FA-DG4

As part of the ASD, site data was evaluated to identify potential causes for elevated fluoride concentrations in the FA-DG4 monitoring well. The following potential sources were selected for investigation:

- Surface water data from the NEP
- Natural variation
- Results of laboratory analysis on CCR material collected from the FA landfill

A hypothesis was developed to evaluate each of the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

2.1 A “source other than the CCR unit” (North Evaporation Pond)

Groundwater flows from under the NEP toward the downgradient monitoring wells as shown on Figure 1.

- Hypothesis: The NEP, which is a non-CCR unit, is the source of elevated dissolved constituents contributing to the SSI for fluoride in the FA-DG4 monitoring well.
- Analysis: Data collected from the pond in 2018 (Barr, 2020a) and 2020 (Barr, 2020b) were compared to the groundwater concentrations. A mixing model of concentrations from an upgradient monitoring well and the NEP was used to evaluate whether the NEP could be a source.
- Result: Concentrations in the NEP were much higher than in the downgradient monitoring well. The concentrations in FA-DG4 are similar to what would be expected if waters from the NEP and upgradient were mixing. The NEP is therefore a likely source of the SSIs.

Figure 2 shows a time-series plot of fluoride concentrations in FA-DG4 collected under the CCR Rule. Dashed lines on the plot indicate the intrawell prediction limit for FA-DG4, the interwell prediction limit calculated from concentrations in FA-UG1 and FA-UG2 (PZ-11), and the interwell prediction limit calculated from the concentrations in the NEP. The prediction limit from the NEP (107 mg/L) was much higher than the concentration in FA-DG4 (7.7 mg/L). The higher concentrations in the NEP strongly suggest that it is a source of fluoride to downgradient wells.

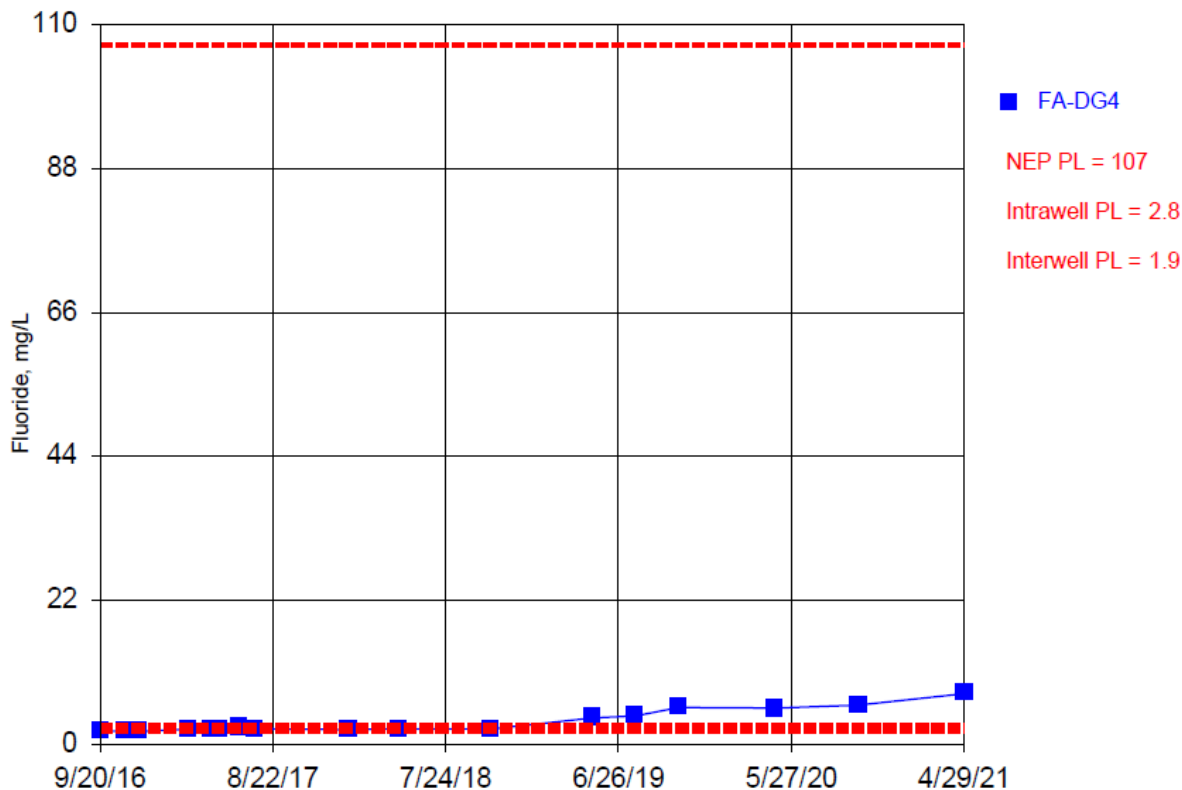


Figure 2 Time-series Plot of Fluoride Concentration in FA-DG4

To further test the hypothesis, the geochemical modeling software The Geochemist's Workbench (Bethke, 2008) was used to model what the composition of a water would be if it was the result of the mixing of waters from an upgradient well (represented by groundwater from FA-UG1) and the NEP. The model calculated incremental concentrations at every percentage combination (i.e., 100% FA-UG1 and 0% NEP through 100% NEP and 0% FA-UG1). The model accounted for formation of common minerals and predicted that calcite (CaCO_3), magnesite (MgCO_3), and fluorite (CaF_2) are formed.

Figure 3 shows the mixing model results on a Piper plot, along with the original compositions of the upgradient well, 2018 NEP samples, and FA-DG4 (Barr, 2019). The mixing model results indicate that a water similar in composition (i.e., values that are located near the predicted results on the Piper Plot) to the FA-DG4 sample could result from the mixing of waters from the NEP and upgradient wells. This is indicated by the position of the sample for FA-DG4, shown by the dark blue triangle, which plots close to the mixing path about halfway between the NEP samples and the upgradient groundwater sample on Figure 3. This indicates that values observed at FA-DG4 are consistent with the hypothesis that downgradient groundwater can be explained by the contribution of fluoride by the NEP.

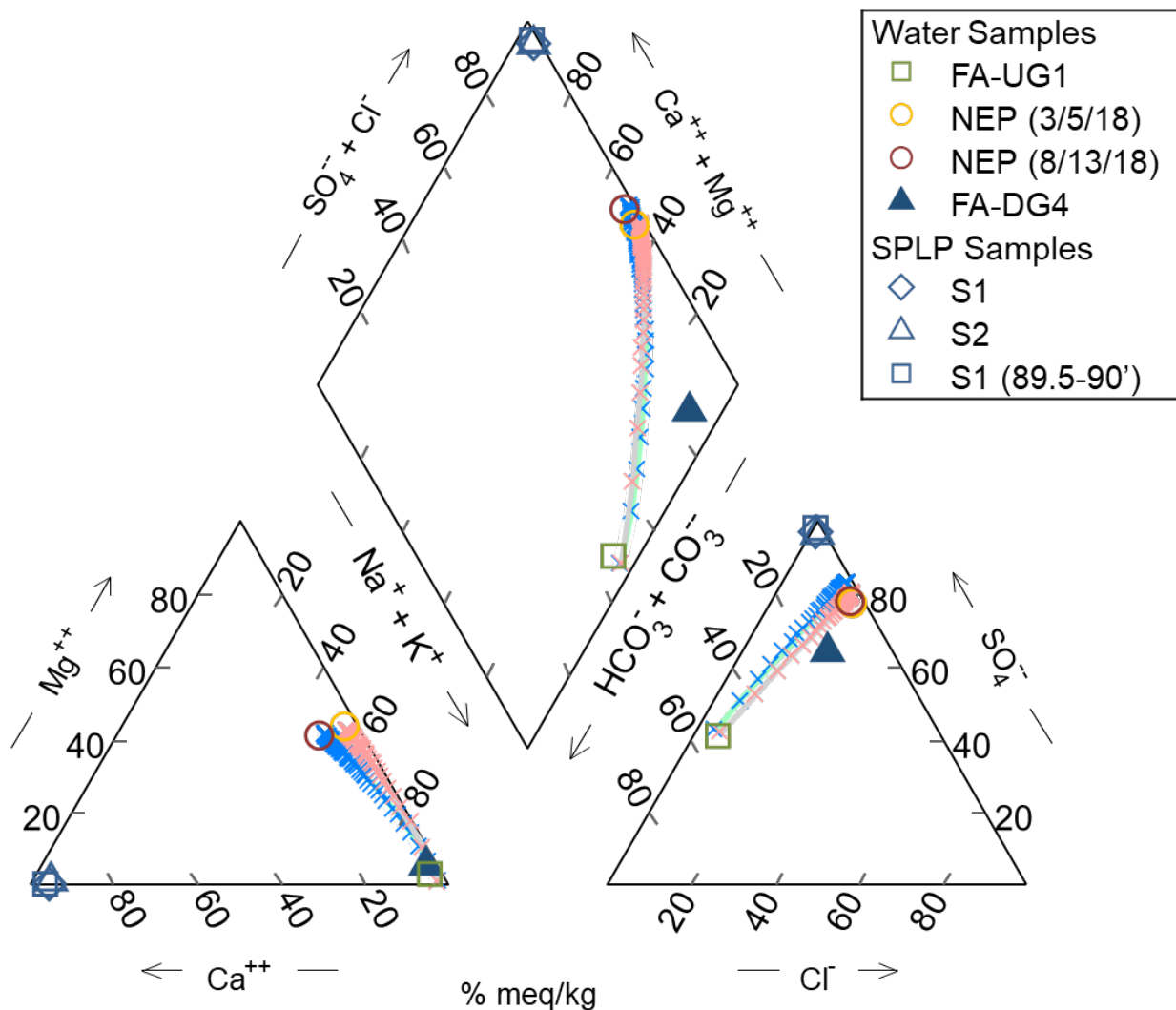


Figure 3 Piper Plot of Mixing Model Results

2.2 A “source other than the CCR unit” (inconsistent with CCR Unit)

- Hypothesis: Groundwater samples from FA-DG4 should have chemical signatures similar to fly ash leachate if the impacts were the result of leaching from the CCR unit.
- Analysis: Synthetic precipitation leaching tests were performed on samples collected from borings advanced into the CCR unit, and the resulting samples were analyzed for major and CCR parameters.
- Result: The CCR material in the FA landfill has a different composition than what would be expected if it were the source of a release affecting FA-DG4 based on the SPLP analysis designed to simulate leaching.

Borings were advanced within the Fly Ash Landfill in December 2019 at the locations shown on Figure 1. Composite samples from the CCR material were collected from several intervals between the surface and the bottom of the borings (90 feet below the surface) at locations S1 and S2. A grab sample from the

bottom of boring S1 (89.5 to 90 feet below the surface) was also collected to represent ash from a previously closed non-CCR unit within the landfill footprint. These three samples were leached using the Synthetic Precipitation Leaching Procedure (SPLP), in which the samples were mixed with a slightly acidic solution designed to simulate rainwater that might percolate through the ash. The liquid from this procedure was analyzed for the same parameters used to evaluate groundwater. The results of the analysis were included in Table 2 and Attachment A of the Fall 2019 ASD (Barr, 2020a).

The major ion compositions of the SPLP leachate samples are shown on the Piper plot in Figure 3, which also shows samples from FA-UG1 and FA-DG4. The plot indicates that the SPLP samples from S1, S2, and S1 (89.5-90') have very similar compositions but are very different from the composition of the sample collected from downgradient monitoring well FA-DG4. In particular, the sample from FA-DG4 has sodium as the dominant cation ($\text{Na} > \text{Mg} > \text{Ca}$), whereas the SPLP samples exhibit calcium as the dominant cation ($\text{Ca} > \text{Na} > \text{Mg}$).

Fluoride concentrations in the SPLP samples were measured at less than 0.4 mg/L, whereas the fluoride concentrations that have been measured in FA-DG4 range from 1.9 to 7.7 mg/L. Although absolute concentrations may not be comparable between groundwater samples and SPLP leachate, fluoride makes up approximately 0.1% of the total anionic charge concentration in the FA-DG4 sample, whereas fluoride comprises only 0.03 to 0.06% of the anionic charge in the SPLP samples. The relative lack of fluoride in the SPLP samples means that the CCR unit is unlikely to be the source of fluoride to groundwater responsible for previous SSIs. These data refute the hypothesis that the release is due to the CCR unit.

2.3 Natural variation

- Hypothesis: Natural variation in fluoride concentrations within native geology at the site and in the region contributes to the elevated fluoride concentrations observed in FA-DG4.
- Analysis: Fluoride concentrations in all wells within the groundwater monitoring network were evaluated using publicly available data and published studies of regional geology and groundwater chemistry. A simple geochemical model for dissolution/precipitation of minerals helps explain the observed differences across the site in fluoride concentrations.
- Result: Fluoride concentrations in site wells and regionally vary widely due to the geology of the region and are likely to be affected by geochemical processes expected from interaction with the mineralogy of the subsurface. Therefore, natural variation is likely a significant cause of the SSI observed in FA-DG4.

Table 2 Synthetic Precipitation Leaching Procedure Results, Deseret Power Bonanza Plant

Location Depth Date	S1 89.5 - 90 ft 12/17/2019	S1 0 - 90 ft 12/17/2019	S2 0 - 90 ft 12/17/2019
Parameter [mg/l unless otherwise noted]			
SPLP General Parameters			
Alkalinity, Bicarbonate, as CaCO ₃ (reprep)	26.0	25.0	20.0
Alkalinity, Carbonate as CaCO ₃ (reprep)	< 10.0	12.0	20.0
Alkalinity, Hydroxide as CaCO ₃ (reprep)	< 10.0	< 10.0	< 10.0
Alkalinity, Total, as CaCO ₃ (reprep)	30.0	37.0	40.0
Chloride	3.05	8.93	11.4
Fluoride	0.185	0.288	0.380
pH (reprep) [pH units]	8.59	8.65	9.19
Sulfate	1,500	1,500	1,580
SPLP Metals			
Antimony	< 0.0300	< 0.0300	< 0.0300
Arsenic	< 0.0200	< 0.0200	< 0.0200
Beryllium	< 0.0100	< 0.0100	< 0.0100
Boron	0.554	1.00	2.00
Cadmium	< 0.00350	< 0.00350	< 0.00350
Calcium	652	622	656
Calcium (reprep)	708	633	677
Chromium	< 0.100	< 0.100	< 0.100
Cobalt	< 0.0200	< 0.0200	< 0.0200
Lead	< 0.0100	< 0.0100	< 0.0100
Lithium	< 0.100	< 0.100	< 0.100
Magnesium	< 1.00	1.15	5.15
Mercury	< 0.00100	< 0.00100	< 0.00100
Molybdenum	0.322	0.0623	0.104
Potassium	< 1.00	1.24	1.45
Selenium	0.0137	< 0.0100	0.0306
Sodium	24.6	27.1	30.9
Thallium	< 0.0100	< 0.0100	< 0.0100

As shown on Figure 4, the fluoride concentrations in site wells vary by approximately an order of magnitude. The concentration is lowest in the upgradient fly ash wells (averages of 1.8 and 0.6 mg/L in FA-UG1 and FA-UG2, respectively) and are the highest in FA-DG2 (average of 59 mg/L). Average concentrations in the other downgradient wells (FA-DG3 and FA-DG4) exceed the fluoride concentrations measured in FA-DG4 (Figure 4). Because other wells at the site had higher concentrations of fluoride that were not indicative of an SSI, it is concluded that there is high variability in fluoride concentrations in the area.

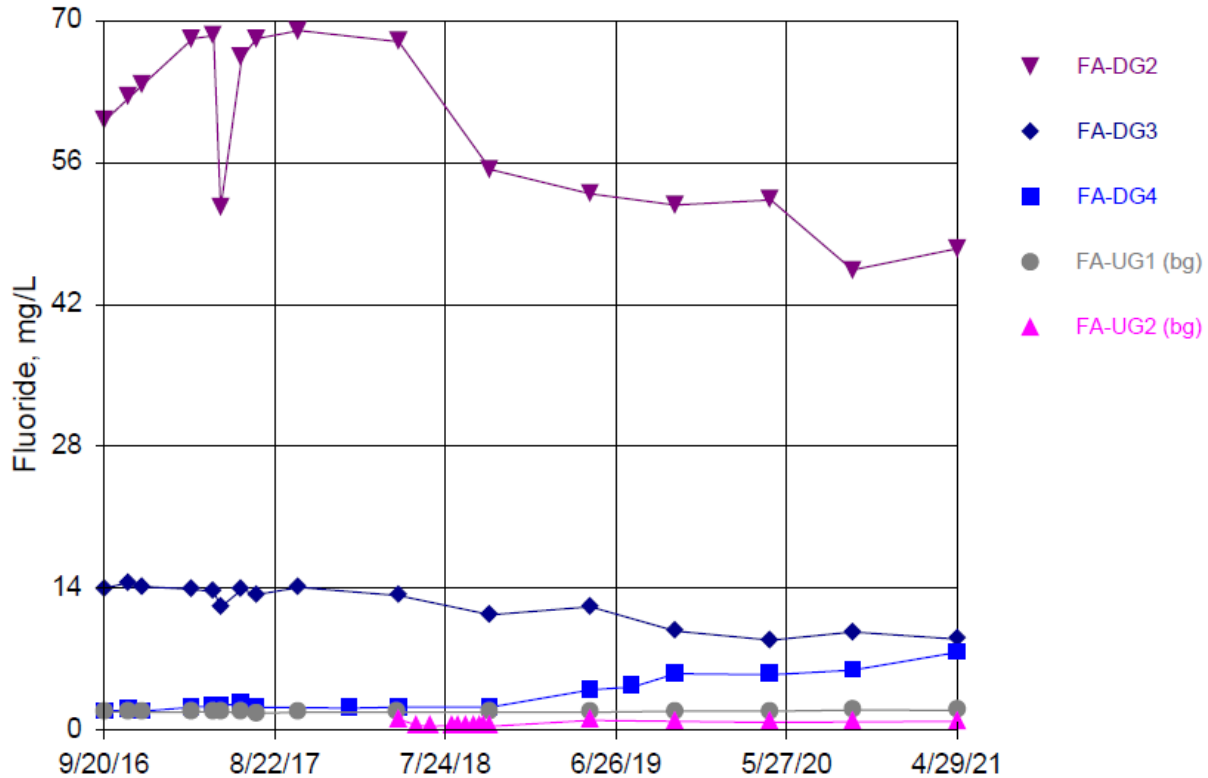


Figure 4 Time-Series Plot of Fluoride Concentrations in Monitoring Wells

To test the hypothesis of natural variation as an explanation for the concentrations at FA-DG4, evidence of natural sources of fluoride and/or plausible explanations for the differences in concentrations between downgradient wells were evaluated as described below.

The geology of the upper 20 feet of soil logged by Dames & Moore in 1991 consists primarily of very fine-grained sands and silt with occasional traces of clay. These sediments are geologically recent deposits, having been transported by alluvial and colluvial processes from the surrounding hills and cliffs of the Uinta Formation. The first and second hypersaline phases of the ancient Lake Uinta caused large depositions of Eocene-aged evaporites, particularly in the area of the Bonanza Power Plant (Vanden Berg and Birgenheier, 2017; Birdwell et al., 2019). Evaporites consist of readily soluble minerals, such as halite (NaCl) and nahcolite (NaHCO_3 , a source of baking soda), which can rapidly dissolve into groundwater.

A search for fluoride concentrations in groundwater within 50 miles of the site yielded 965 records from the Water Quality Portal (NWQMC et al., 2019). Concentrations ranged from below detection to 450 mg/L, with a lowest detected value of 0.03 mg/L and a 95th percentile of approximately 18 mg/L. Because these concentrations indicate naturally occurring levels of fluoride are elevated well above the concentrations observed at FA-DG4, it appears to confirm the hypothesis that natural variability is a likely contributor to the SSI at this well.

In addition, the natural variation hypothesis is also supported by a number of studies that have noted the spatial variability of groundwater compositions in this area (Wallace, 2012; Naftz, 1996; Holmes and Kimball, 1987; Lindskov and Kimball, 1984). The studies describe mineralogical controls on groundwater composition in the region that seem to explain the differences observed between the samples from different wells at the site.

For instance, calcium concentrations can decrease in groundwater when calcium carbonate minerals precipitate out of solution, leaving the groundwater undersaturated with respect to calcium- and fluoride-bearing minerals (e.g., fluorite and apatite). In this condition, the fluoride-bearing minerals may dissolve, increasing groundwater fluoride concentrations. This geochemical relationship appears to explain changes in concentration along the flow path between upgradient and downgradient wells at the site.

For example, low calcium (<5 mg/L) and high fluoride (>10 mg/L) concentrations can occur in areas near where naturally-occurring fluoride minerals are dissolving and calcium carbonate is precipitating. In groundwater with this composition, calcium is the limiting constituent in fluorite saturation. This is an explanation for calcium and fluoride concentrations observed in downgradient monitoring wells FA-DG2 and FA-DG3.

In contrast, where there are high calcium concentrations (>200 mg/L) and low fluoride (<2 mg/L) concentrations in groundwater (e.g., at FA-UG2), fluoride is the limiting constituent in fluorite saturation. This scenario is found where calcium minerals such as calcite are readily dissolving, increasing calcium concentrations in groundwater. Calculations made with The Geochemist's Workbench (Bethke, 2008; Table 3) indicate that calcite (calcium carbonate) is near saturation in the five fly ash monitoring wells, whereas the low-fluoride wells (FA-UG1, FA-UG2, and FA-DG4) are undersaturated with respect to fluorite. The calculations were made using data from April 2018, which is the most recent event where alkalinity (bicarbonate) was measured. When fluoride concentrations increase from 2018 concentrations to the concentration measured in spring 2021 (7.7 mg/L), FA-DG4 becomes slightly oversaturated with respect to fluorite. These observations indicate the low concentrations of fluoride are likely due to equilibration with fluorite in the subsurface as water from the NEP migrates toward the downgradient wells.

As groundwater is depleted in calcium due to mineral precipitation or mixes with more calcium-depleted water from upgradient of the landfill, the amount of calcium available to precipitate with fluoride into a mineral phase decreases. As a result, less fluoride is removed from groundwater, and concentrations can increase as groundwater contacts additional fluoride-bearing rocks. The results from FA-DG4 appear to match the conditions expected as part of this process.

Table 3 Calcite and Fluorite Saturation Indices for Monitoring Wells

Location	Calcite	Fluorite
	log Q/K	log Q/K
FA-DG2	0.42	0.52
FA-DG3	0.13	-0.34
FA-DG4	0.13	-0.60
FA-UG1	-0.03	-1.02
FA-UG2	0.33	-1.63
FA-DG4 (F=7.7 mg/L)	0.14	0.47

Samples collected in April 2018

Thermodynamic data from The Geochemist's Workbench thermo.tdat (Bethke, 2008)

Values in the approximate range of -0.5 to 0.5 are assumed to be near equilibrium saturation.

Values <-0.5 are undersaturated, and values >0.5 are supersaturated.

The processes of mineral precipitation and dissolution are not necessarily instantaneous. As a result, they are more likely to occur in systems with lower flow and longer contact times with aquifer minerals, which also provide nucleation sites for mineral formation. Therefore, these processes are less likely to occur in surface waters like those sampled from the NEP because the pond is subjected to frequent disturbances such as wave action, pump circulation to misting machines, and discharges into the pond from operations which may prevent precipitation reactions from proceeding to equilibrium. In addition, nucleation sites for mineral formation are less prevalent in surface water than in groundwater.

The geochemical relationships described above also explain an apparent contradiction in that the NEP is a source of fluoride for FA-DG4 while samples from FA-UG2 (located next to the NEP) exhibit a lower concentration of fluoride. The geochemical conceptual model described above suggests that lower fluoride concentrations are expected where high concentrations of calcium from the NEP are resulting in precipitation of fluorite within the geologic matrix and reducing the concentration in groundwater at this location.

3.0 Lines of Evidence Supporting an ASD: pH at BA-DG3

As part of the ASD, site data was evaluated to identify potential causes for elevated pH in the BA-DG3 monitoring well. The following potential source were selected for investigation:

- A source other than the CCR unit

A hypothesis was developed to evaluate the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

3.1 A source other than the CCR unit

- Hypothesis: If the BA Landfill (the CCR Unit) is the source of a release to groundwater that caused the SSI for pH at BA-DG3, the expected concentrations of other parameters indicative of a CCR release should appear elevated in samples from BA-DG3 at about the same time.
- Analysis: Concentrations of other Appendix III parameters in BA-DG3 samples were evaluated.
- Result: Concentrations of the other six Appendix III parameters indicated that other elevated parameters were not present and were observed to have significantly decreasing trends. Decreasing trends for these parameters are the opposite of what would be expected if a pH increase were indicative of a release from the CCR Unit. Therefore, the hypothesis that the CCR Unit is the source of the elevated pH is rejected.

If the CCR Unit is the source of a release to groundwater that caused the SSI for pH at BA-DG3, elevated concentrations of other parameters indicative of a CCR release should appear at about the same time. This is because the CCR Unit water would contain a mixture of all of the Appendix III parameters. Conversely, if concentrations in BA-DG3 are not elevated for the remaining Appendix III parameters, the hypothesis above would be rejected, leading to the conclusion that the SSI is not the result of a release from the CCR Unit.

Time-series plots of the six Appendix III parameters other than pH are shown in Figure 5. Over the period of record, from 2016 to 2021, concentrations of all six parameters are significantly decreasing. These decreasing concentrations are not consistent with a release from the CCR Unit. Therefore, a release is unlikely and the source of the pH SSI is not the CCR Unit.

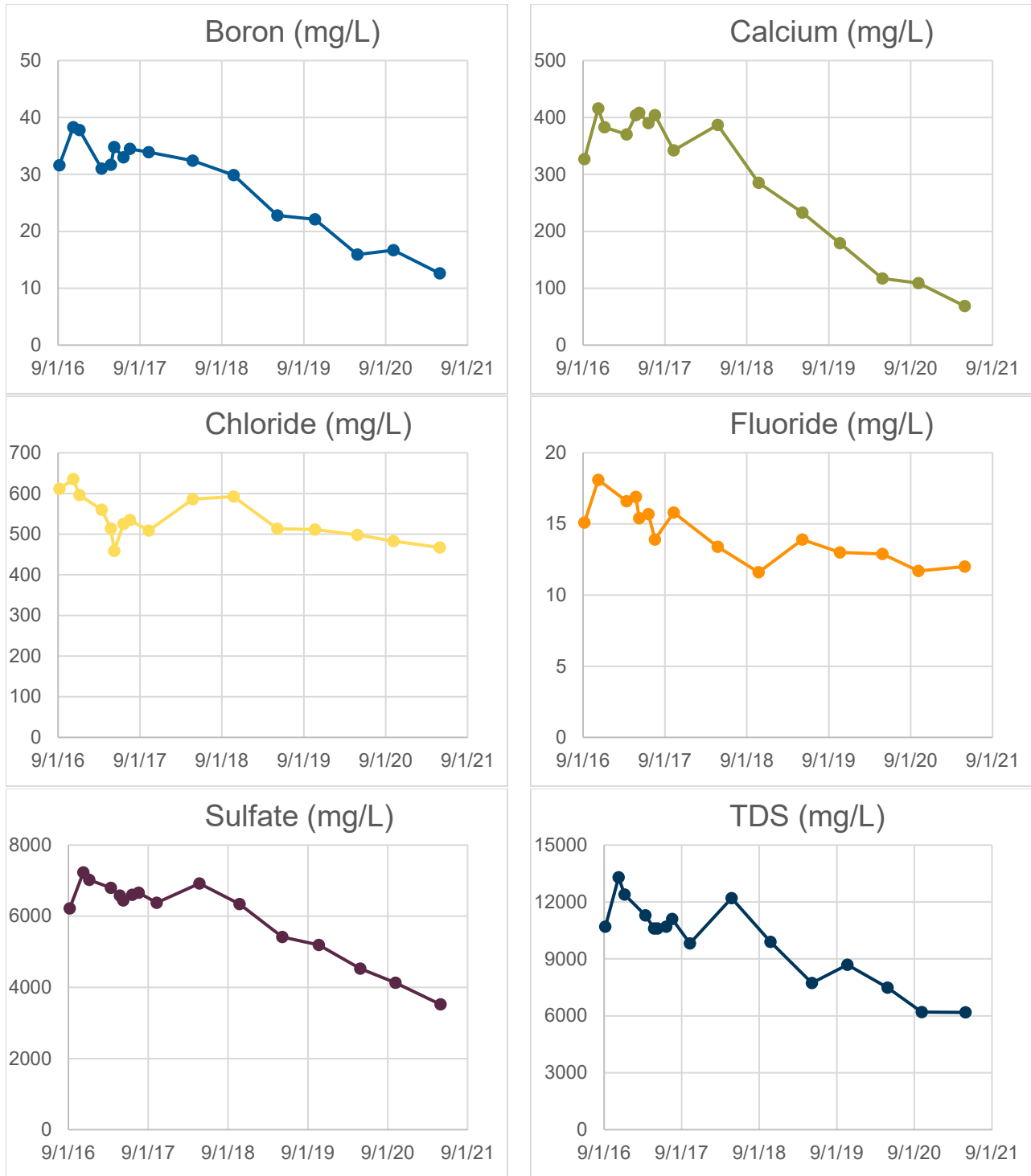


Figure 5 Time-series plots of non-pH Appendix III parameters in BA-DG3

4.0 Conclusion

The foregoing ASD establishes lines of evidence that meet the alternative source requirements of the CCR Rule §257.94(e)(2). Specifically, the SSI for fluoride from the spring 2021 monitoring event at FA-DG4 is due to either a "source other than" the Fly Ash Landfill and/or to natural variation based on both site-

specific and regional data. The elevated pH in BA-DG3 is due to a source other than the CCR unit because all of the other parameters are decreasing in concentration which is opposite of what would be expected if a presumed release from the CCR unit had occurred.

5.0 Certification

I certify that the written demonstration provided above are supported by the data that is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§257.94(e)(2))).

A handwritten signature in blue ink, appearing to read 'JD', with a large, stylized flourish extending from the bottom left.

Jeff Davis, P.E.
Barr Engineering Co.

6.0 References

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Appendix C

Groundwater Flow Direction and Flow Rates

Deseret Power Fly Ash Area Groundwater Velocity Calculation

Date

1/19/2022

Kh low (ft/d)	0.2	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
Kh high (ft/d)	8.8	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
n	0.4	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
I	0.004	
V low (ft/d)	0.002	
V high (ft/d)	0.097	
V low (ft/yr)	0.807	
V high (ft/yr)	35.508	
Flow Direction	Southeast	

	Top of Casing Elevation	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
FA-UG1	5079.35	34.59	5044.76
FA-UG2	5064.89	23.61	5041.28
FA-DG2	5056.55	30.29	5026.26
FA-DG3	5055.02	28.62	5026.40
FA-DG4	5055.67	29.87	5025.80

Fly Ash Landfill horizontal distance, ft

	FA-UG1	FA-UG2
FA-DG2	4178	2105
FA-DG3	4152	1964
FA-DG4	4096	1853

Fly Ash Landfill difference in WL elevation, ft

	FA-UG1	FA-UG2
FA-DG2	18.50	15.02
FA-DG3	18.36	14.88
FA-DG4	18.96	15.48

Fly Ash Landfill horizontal gradient, ft/ft

	FA-UG1	FA-UG2
FA-DG2	0.004	0.007
FA-DG3	0.004	0.008
FA-DG4	0.005	0.008

Deseret Power Bottom Ash Area Groundwater Velocity Calculation

Date

1/19/2022

Kh low (ft/d)	0.6	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
Kh high (ft/d)	5.2	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
n	0.4	Groundwater Monitoring System Certification (Burns & McDonnell, 2017)
l	0.004	
V low (ft/d)	0.005	
V high (ft/d)	0.046	
V low (ft/yr)	1.916	
V high (ft/yr)	16.608	
Flow Direction	South	

	Top of Casing Elevation	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
BA-UG1	5030.63	34.07	4996.56
BA-DG1	5001.28	14.54	4986.74
BA-DG2	5002.65	15.79	4986.86
BA-DG3	5002.61	16.80	4985.81

Bottom Ash Landfill horizontal distance, ft

	BA-UG1
BA-DG1	2796
BA-DG2	2773
BA-DG3	2801

Bottom Ash Landfill difference in WL elevation, ft

	BA-UG1
BA-DG1	9.82
BA-DG2	9.70
BA-DG3	10.75

Bottom Ash Landfill horizontal gradient, ft/ft

	BA-UG1
BA-DG1	0.004
BA-DG2	0.003
BA-DG3	0.004