



Moab UMTRA Project Groundwater and Surface Water Monitoring Report July through December 2023

Revision 0

April 2024



U.S. Department
of Energy

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**Moab UMTRA Project
Groundwater and Surface Water Monitoring Report July through December 2023**

Revision 0

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Revision History

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Acronyms and Abbreviations

bgs	below ground surface
CF	configuration
CFR	Code of Federal Regulations
cm	centimeter
COC	chain-of-custody
DOE	U.S. Department of Energy
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ft	feet or foot
IDL	instrument detection limit
MB	method blank
MDL	method detection limit
MESa	Moab Environmental Sampling Database
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
SDG	sample data group
UMTRA	Uranium Mill Tailings Remedial Action
yr	year

1.0 Introduction

1.1 Purpose

The purpose of this semi-annual report is to present the results and provide interpretation of the data associated with groundwater and surface water samples collected from the U.S. Department of Energy (DOE) Moab Uranium Mill Tailings Remedial Action (UMTRA) Project site during the second half of calendar year 2023. The results of the data validation process are also presented.

Groundwater samples were collected in July 2023 and November 2023 from the Interim Action Well Field Configuration (CF) 4 monitoring wells and collected from the CF5 groundwater extraction wells in November 2023. These locations are shown in Figure 1. Samples were also collected from Crescent Junction monitoring wells 0202 and 0205 in December 2023 (Figure 2).

1.2 Scope

This report presents a summary of sampling events and data assessments, including a summary of the anomalous data generated by the validation process and results for these events. Sampling and analyses were conducted in accordance with the *Moab UMTRA Project Surface Water/Groundwater Sampling and Analysis Plan* (DOE-EM/GJRAC1830). All data validation follows criteria in the *Moab UMTRA Project Standard Practice for Validation of Laboratory Data* (DOE-EM/GJRAC1855). The CF4 and 5 and Crescent Junction sampling events were validated to Level 2.

Appendix A includes the Water Sampling Field Activities Verification, Water Quality Data, Minimums and Maximums Report, Static Water Level Data, and the trip report associated with the CF4 and CF5 and sampling events. Appendix B provides similar documentation for the Crescent Junction sampling event.

The Minimums and Maximums analyses were generated by the Moab Environmental Sampling (MESa) database to determine if the applicable data were within a normal statistical range. The new data set was compared to the historical data to determine if the new data fall outside the historical range. The results are not considered anomalous if: (1) identified low concentrations are the result of low detection limits, (2) the concentration detected is less or more than 50 percent of historical minimum or maximum values, or (3) there were fewer than five historical samples for comparison. Anomalous results are provided in tables in the “Data Assessment” section for each sampling event.

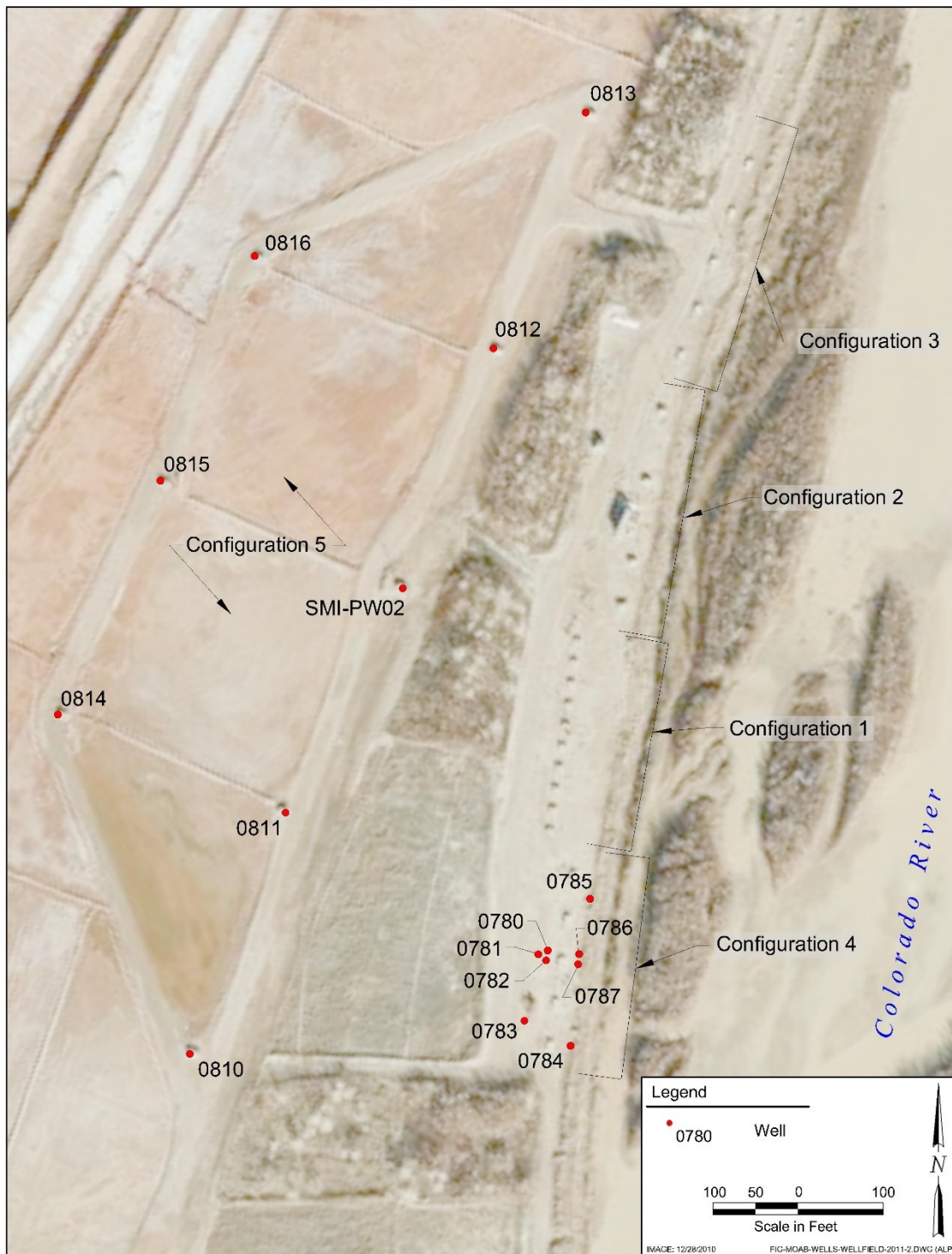


Figure 1. Second Half of 2023 CF4 and CF5 Groundwater Sampling Locations



Figure 2. Crescent Junction Sampling Locations (0202 and 0205)

1.3 Data Validation Definitions

The following definitions are associated with the data validation process. Data validation details are provided in the following sections of this report for the individual sampling events.

Method and Calibration Blanks

Method blanks (MBs) are analyzed to assess any contamination that may have occurred during sample preparation. Both initial calibration blanks and continuing calibration blanks are analyzed to assess instrument contamination before and during sample analysis. Depending on method requirements, detected sample results greater than the method detection limit (MDL) or instrument detection limit (IDL) are qualified “J” when the detections are less than five times the blank concentration. Non-detects are not qualified.

Matrix Spike and Replicate Analysis

Matrix Spike (MS) sample analysis, performed at a frequency of one per 20 samples unless otherwise noted, is a measure of the ability to recover analytes in a particular matrix. The MS sample results are required to be within the recovery limits.

Laboratory Replicate Analysis

The laboratory replicated results demonstrate acceptable laboratory precision. The relative percent difference (RPD) values for the reported matrix spike duplicate (MSD) results for all other analytes should be less than 20 percent for results greater than five times the reporting limit (RL).

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of the overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory replicates, which measure only laboratory performance. The duplicate results must meet the U.S. Environmental Protection Agency (EPA)-recommended laboratory duplicate criteria of less than 20 RPD for results that are greater than five times the reporting limit (RL).

2.0 2023 CF4 and CF5 Sampling Event

2.1 Summary

Groundwater samples were collected from six CF5 extraction wells to determine mass removal calculations for ammonia and uranium concentrations and to assess well field performance. Extraction wells 0814 and 0816 were not sampled due to submersible pump issues.

Groundwater samples were also collected from the eight CF4 monitoring wells to determine the impact of the freshwater injection system on the shallow aquifer. These ground water samples were collected to determine how the freshwater injection system impacts shallow zone ammonia concentrations, particularly downgradient of the CF4 injection wells.

2.2 2023 CF4 and CF5 Data Assessment

2.2.1 Laboratory Performance Assessment

This validation was performed according to *Standard Practice for Validation of Laboratory Data*. The procedure was applied at Level 2, Data Deliverables Examination. All analyses were successfully completed.

General Information and Validation Results

RIN 2307143
Laboratory: GEL Laboratories, Charleston, South Carolina
SDG Number: 632154 and 645475
Analysis: Metals and Inorganics
Validator: Thomas Prichard
Review Date: January 2023

The samples were prepared and analyzed using accepted procedures as shown in Table 1.

Table 1. 2023 CF4 and CF5 Sampling Events, Analytes and Methods

Analyte	Preparation Method	Analytical Method
Ammonia as N, NH ₃ -N	EPA 350.1	EPA 350.1
Uranium	SW-846- 3005A	SW-846 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to Table 3 for an explanation of the data qualifiers applied.

Table 2. 2023 CF4 and CF5 Sampling Events, Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
SDG 645475-001 thru -030	All in SDG 645475	Uranium	J	MS-1, MSD-1
SDG 632154-001 thru -016 SDG 645475-001 thru -030	All	Ammonia	J	B-1

Notes: "J" indicates results are estimated; it becomes "UJ" for analytical results lower than the detection limit.

Table 3. 2023 CF4 and CF5 Sampling Events, Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Non-detects)	Explanation
MS-1	J	UJ	The MS sample chosen was from another client.
MSD-1	J	UJ	No MSD data was included in the narrative.
B-1	J	UJ	Analyte was detected in method blank

Notes: "J" indicates results are estimated; it becomes "UJ" for analytical results lower than the detection limit. U indicates the result is below the detection limit.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina received a total of 46 samples from 14 locations for report identification number (RIN) 2307143 in two shipments. The first shipment arrived August 4, 2023 (tracking number 1ZE243120190607609) and the second arrived on November 16, 2023 (tracking number 1ZE243120190277636).

The sample data groups (SDG) was accompanied by a Chain of Custody (COC) form. The COC form was checked to confirm that all the samples were listed on the form with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt.

Preservation and Holding Times

Both SDG 632154 and 645475 were received intact with a temperature of 2.0°C. All samples were received in the correct container types and all samples were analyzed within the applicable holding times.

Case Narratives

The case narratives were reviewed, and all detects were found to be within quality-control procedures except for the following:

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory replicates, which measure only laboratory performance. One field duplicate was collected from 0782 (Lab IDs 645475007 and 645475008). The U.S. Environmental Protection Agency (EPA) has a recommended laboratory duplicate criterion of less than 20 percent relative difference (RPD) for results that are greater than 5 times the RL. The duplicate met this criterion.

Matrix Spike and Replicate Analysis

For the uranium analyses in SDG 645475, the laboratory performed a Laboratory Control Sample Duplicate (LCSD) was used. As a result, there was not an MSD or an SD sample analysis. Therefore, all uranium data in SDG 645475 are flagged “J” for reasons MS-1, MSD-1. Per the case narrative:

An LCSD was used in place of matrix QC due to limited sample volume. 1205580818 (LCSD).

Method and Calibration Blanks

Method blanks (MBs) are analyzed to assess any contamination that may have occurred during sample preparation. Both initial calibration blanks (ICB) and continuing calibration blanks (CCBs) are analyzed to assess instrument contamination prior to and during sample analysis. Detected sample results associated with blanks results greater than the MDL or IDL (depending on method requirements) would be “J” qualified when the detections were less than five times the blank concentration. Non-detects were not qualified. Ammonia was detected in the MB for SDG 632145 and 645475. Therefore, all ammonia samples are flagged “J” for reason B-1.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable Files

The Electronic Data Deliverable (EDD) files for SDGs 632154 and 645475 were received on August 22, 2023, and December 05, 2023, respectively. The contents of the EDD were manually examined to ensure all and only the requested data were delivered in compliance with requirements and that the sample results accurately reflected the data contained in the sample data package.

2.2.2 Minimums and Maximums Report and Anomalous Data Review

The Minimums and Maximums Report for this sampling event is in Appendix A. Based on the definition of an anomalous data point, there were three anomalous data points associated with this event (Table 4). Wells 0783, 0784, and 0785 all had ammonia concentrations more than 50% below the historical minimum during the July 2023 sampling. However, this is due to a lower detection limit (0.017 compared to a historical MDL of 0.1 mg/L) being used for the 2023 sampling events.

Table 4. Anomalous Data Associated with the 2023 CF4 and CF5 Sampling Events

Location	Sample Date	Analyte	Concentration (mg/L)	Historical Minimum (mg/L)	Historical Maximum (mg/L)	Disposition
0783	7/20/2023	Ammonia	0.034	0.1	380	Concentrations are less than the historical values because of lower MDLs used during the laboratory analysis.
0784	7/20/2023	Ammonia	0.024	0.1	410	
0785	7/20/2023	Ammonia	0.018	0.1	680	

2.3 July 2023 CF4 and CF5 Sampling Event Results

CF4 Sampling

Injection operations were intermittent; the system was shut down for much of the year due to an above average high-water season and necessary maintenance and repair of the system.

Configuration 4 was sampled twice, once after the flood waters had receded from the site and once at baseflow conditions.

The CF4 injection wells are screened and deliver fresh water into the subsurface from 15 to 35 feet (ft) below ground surface (bgs). July and November 2023 ammonia concentrations are presented in Table 5.

Baseline concentrations (Table 5) represent sample results from January 2019, when limited freshwater was injected (less than 750,000 gal) for the six months leading up to the sample collection. Ammonia concentrations in the shallowest wells (less than 18 ft bgs) were below the detection limits both up- and downgradient. As previously observed, concentrations increase with depth. The deepest well (0781, 46ft bgs) had the highest concentration at 769 mg/L, which is lower than the concentration measured in 2022.

Table 5. CF4 Monitoring Well Ammonia Concentrations, July and November 2023

Location	Sample Depth (ft bgs)	Upgradient or Downgradient of Injection Wells	Baseline* Concentration (mg/L)	July 20, 2023 Ammonia Concentration (mg/L)	November 14, 2023 Ammonia Concentration (mg/L)
0780	28	Upgradient	330	37.1	2.83
0781	46	Upgradient	1,900	769	678
0782	33	Upgradient	1,100	459	275
0783	18	Upgradient	20	0.03	0.03
0784	18	Downgradient	1.1	0.02	0.03
0785	18	Downgradient	17	0.02	0.15
0786	28	Downgradient	480	17.2	23.8
0787	36	Downgradient	2,100	535	581

Notes: * = Baseline concentrations taken from samples collected August 2010, prior to when the CF4 wells were used exclusively for injection purposes. (ND)= non-detect or at detection limit of 0.2 mg/L.

Figure 3 displays the ammonia concentrations in samples collected down gradient from a depth of 18 ft bgs (wells 0784 and 0785) since 2016, along with the CF4 weekly injected volume.

As the plot displays, consistent injection continues to significantly decrease the shallow groundwater system ammonia concentrations downgradient of the injection wells.

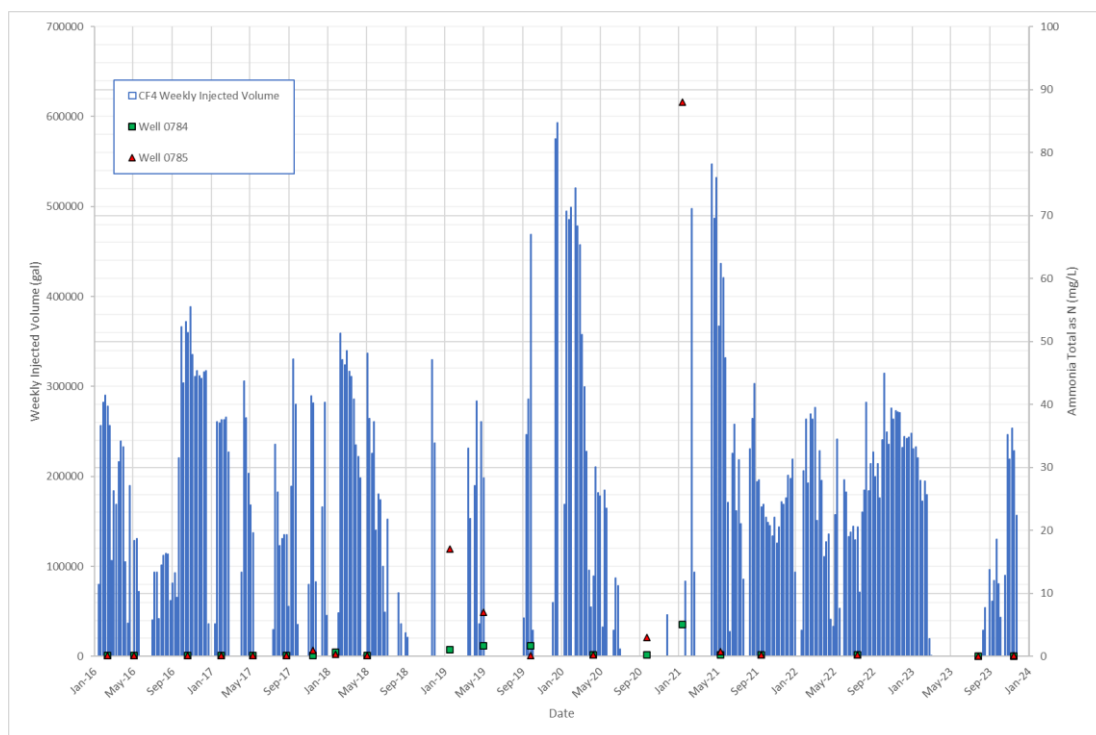


Figure 3. January 2016 through January 2024 CF4 Shallow Zone Ammonia Groundwater Concentrations in Response to Freshwater Injection

CF5 Sampling

Groundwater samples were also collected from the CF5 extraction wells (locations shown on Figure 1) in November 2023. The extraction system had been consistently operational for approximately three months prior to the sample collection, with more than 2.0 mil gal of groundwater removed from the groundwater system during that time. CF5 extraction well ammonia and uranium concentrations associated with this sampling event are displayed in Table 6.

Time versus concentration plots (Figures 4 through 7) were also generated to display the CF5 extraction well ammonia and uranium concentrations measured since July 2010. This nearly covers the timeframe these wells have been utilized to extract groundwater (they were brought online starting in April 2010). Trend lines are also included in these plots.

Table 6. 2023 CF5 Extraction Well Analytical Results

Location	Sample Date	Ammonia (mg/L)	Uranium (mg/L)
0810	11/02/2023	239	2.97
0811		271	2.73
0812		286	2.1
0813		195	1.33
0814		NA	NA
0815		92	3.35
0816		NA	NA
PW02		284	3.24

Notes: NA = Not Applicable, location not sampled due to submersible pump issues.

Table 7 provides the geometric mean, standard deviation, 95% confidence interval, and the change in ammonia concentration based on the linear trend line for the CF5 extraction wells since 2010. The trend lines applied to data collected since June 2010 from CF5 extraction wells indicate that on average the ammonia concentrations are decreasing at a rate ranging from 1.2 to 20.2 mg/L/yr. As of 2023, the CF5 extraction well geometric mean ammonia concentrations range from 149 to 447 mg/L.

Table 7. Statistical Data for CF5 Extraction Well Ammonia Data, 2010 through 2023

Ammonia Concentrations (2010 – 2023)	CF5 Extraction Well							
	0810	0811	0812	0813	0814	0815	0816	PW02
Geometric Mean (mg/L)	319.9	386.7	419.8	342.8	229.6	194.6	148.7	446.9
Standard Deviation (mg/L)	49.2	70.7	74.2	85.6	191.1	83.4	59.5	70.3
95% Confidence Interval (mg/L)	17.0	24.9	25.3	27.6	65.2	28.9	20.6	24.7
Change in Concentration (mg/L/yr)	-6.5	-13.8	-7.8	-1.2	-12.6	-20.2	-8.5	-15.8

Considering the ammonia analytical results since 2010, the concentrations decrease on average 10.8 mg/L/yr.

Statistical data for the uranium results since 2010 are presented in Table 8. Trend lines applied to the uranium results over the past 13 years for all CF5 wells indicate six wells on average are decreasing as much as 0.03 mg/L/yr, while the concentrations associated with well 0813 are increasing at up to 0.04 mg/L/yr. Well 0812 concentrations indicate no significant changes. The well associated with the highest increase is well 0813, which increased on average 0.04 mg/L/yr, located at the northern end of CF5. This increase in uranium is associated with the periodic influx of oxygenated water and its impact on the subsurface geochemical conditions.

Table 8. Statistical Data for CF5 Extraction Well Uranium Data, 2010 through 2023

Uranium Concentrations (2010 – 2023)	CF5 Extraction Well							
	0810	0811	0812	0813	0814	0815	0816	PW02
Geometric Mean (mg/L)	3.02	2.59	2.20	1.68	2.73	3.26	2.44	3.14
Standard Deviation (mg/L)	0.54	0.37	0.43	0.48	0.23	0.46	0.49	0.53
95% Confidence Interval (mg/L)	0.19	0.13	0.15	0.16	0.08	0.16	0.17	0.19
Change in Concentration (mg/L/yr)	-0.03	-0.01	0.00	+0.04	-0.01	-0.01	-0.01	-0.03

Figure 4 is the time versus ammonia concentration plot for extraction wells 0810 through 0813 and SMI-PW02, all of which are located along the CF5 southeastern boundary. Figure 5 displays a time versus uranium concentration plot for the same set of wells. Figures 6 and 7 are the time versus ammonia and uranium concentration plots, respectively, for CF5 wells 0814 through 0816 (which are located closer to the base of the tailings pile).

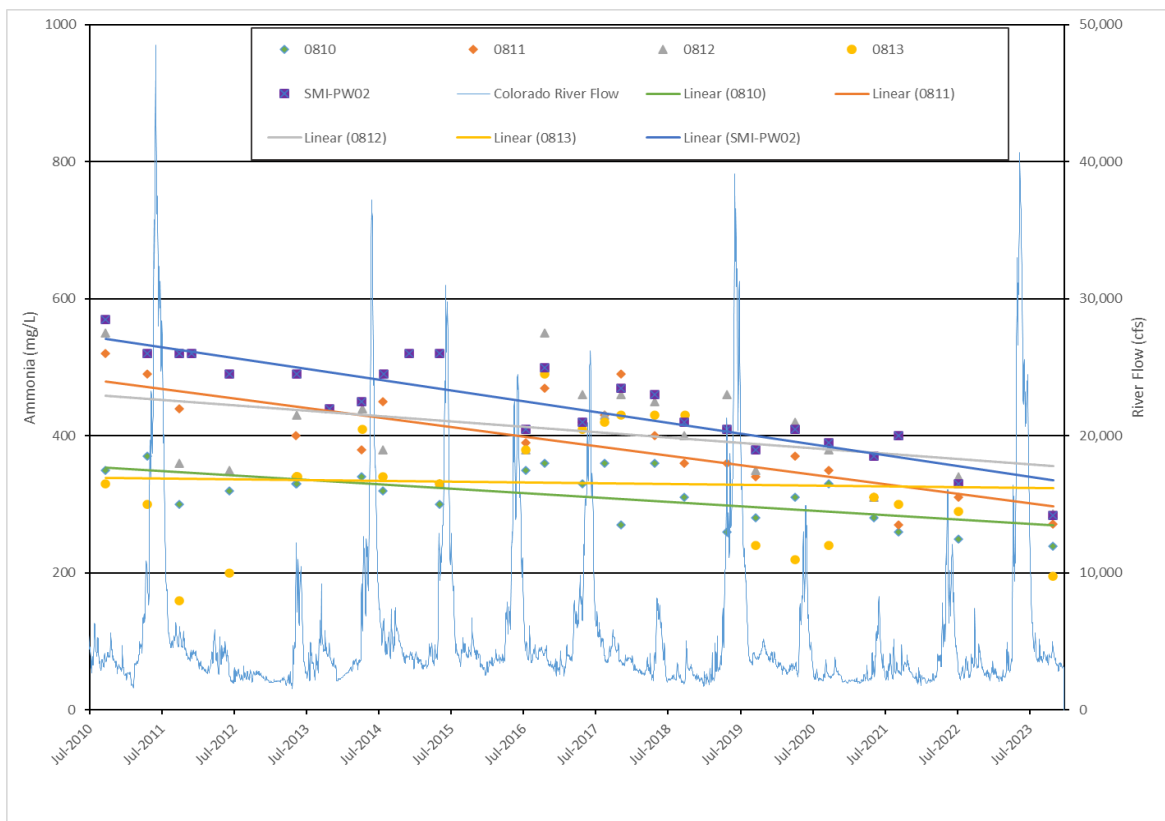


Figure 4. CF5 Extraction Wells 0810, 0811, 0812, 0813, and SMI-PW02 Time versus Ammonia Concentration Plot

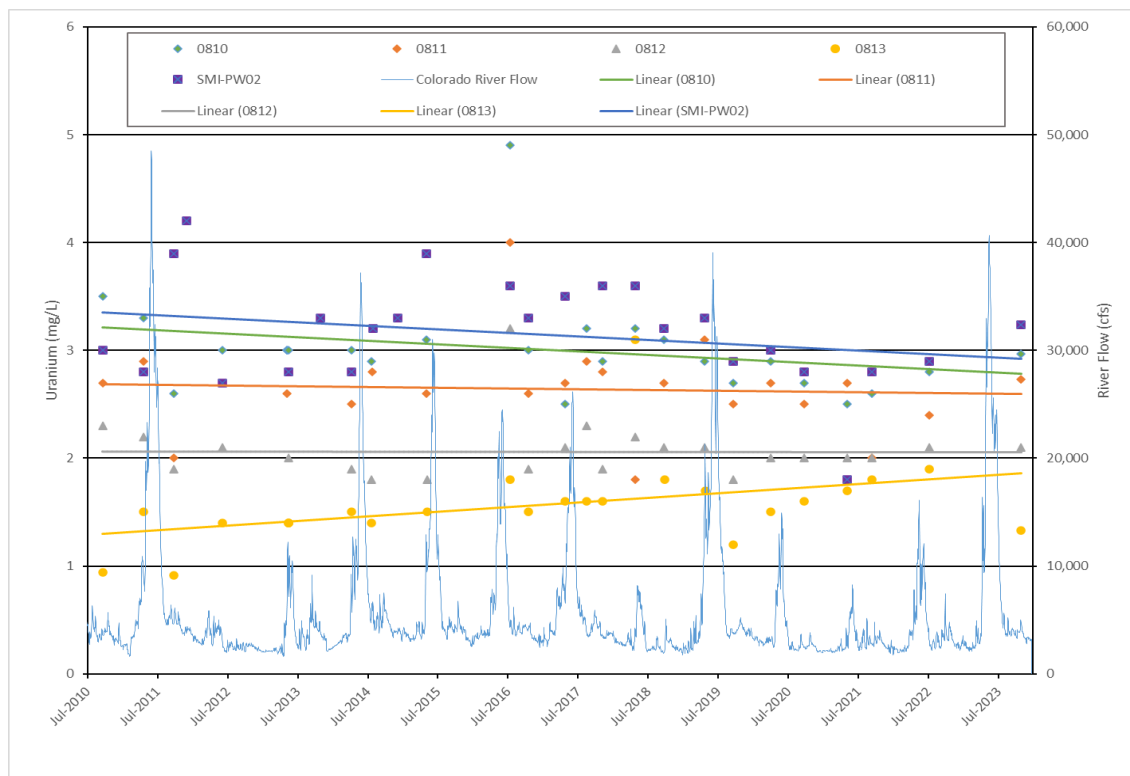
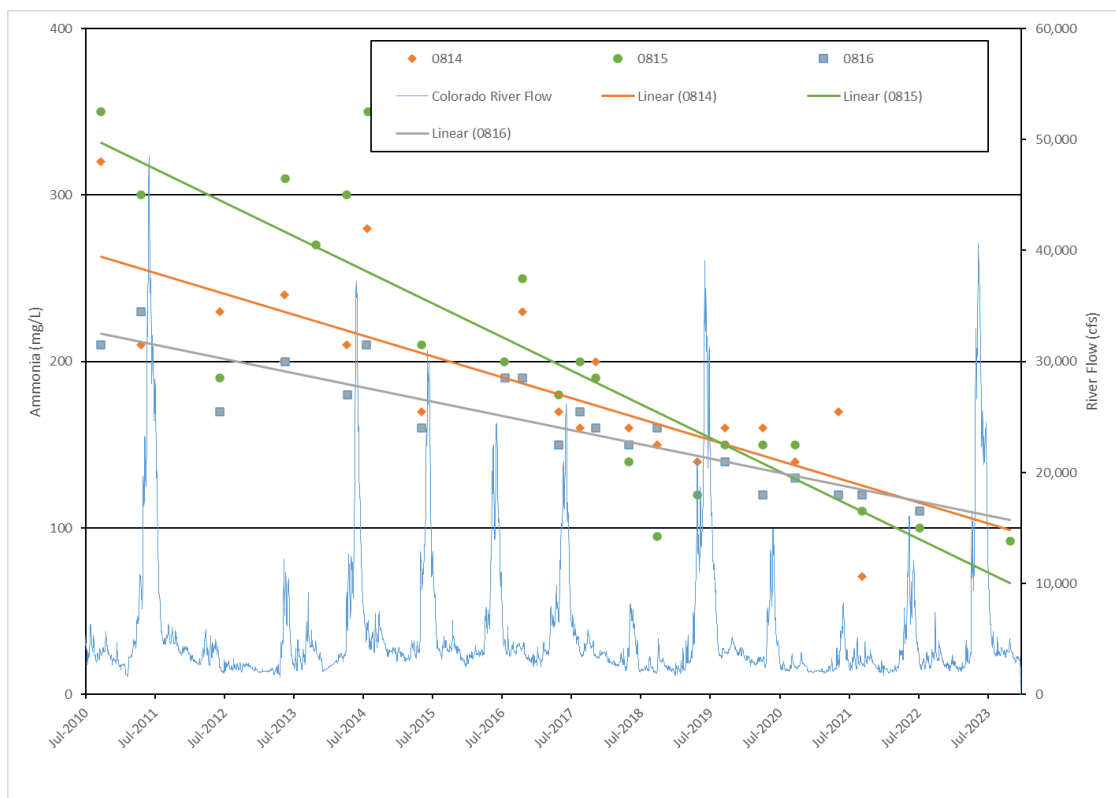
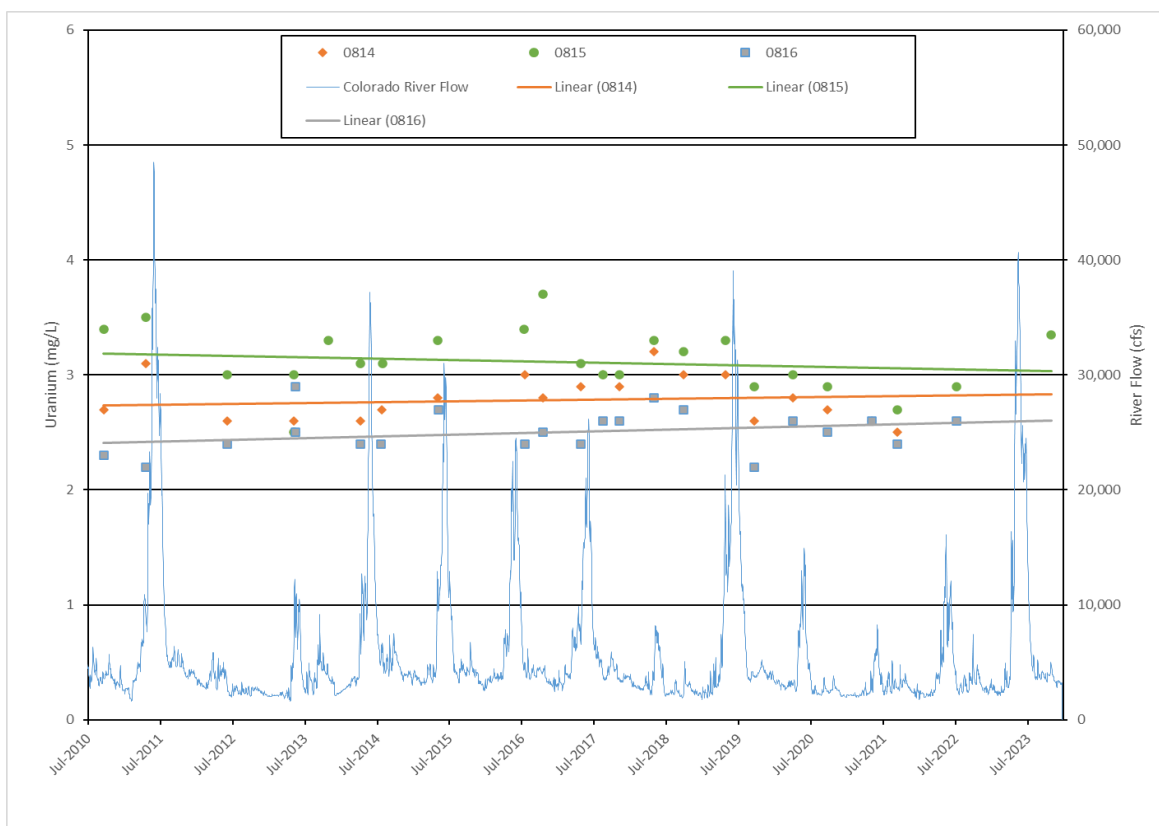


Figure 5. CF5 Extraction Wells 0810, 0811, 0812, 0813, and SMI-PW02 Time versus Uranium Concentration Plot



**Figure 6. CF5 Extraction Wells 0814, 0815, and 0816
Time versus Ammonia Concentration Plot**



**Figure 7. CF5 Extraction Wells 0814, 0815, and 0816
Time versus Uranium Concentration Plot**

3.0 2023 Crescent Junction Sampling Event

3.1 Summary

Groundwater samples were collected from wells 0202 and 0205 at Crescent Junction as part of the quarterly monitoring at the Crescent Junction Site. If water is present in any of the four monitoring wells during a monitoring event, a sample may be collected. Like previous events, these samples collected were analyzed for metals, inorganics, and isotopic uranium.

3.2 2023 Crescent Junction Data Assessment

3.2.1 Laboratory Performance Assessment

This validation was performed according to *Standard Practice for Validation of Laboratory Data*. The procedure was applied at Level 2, Data Deliverables Examination. All analyses were successfully completed.

General Information and Validation Results

RIN 2412144
Laboratory: Gel Laboratories LLC, Charleston, South Carolina
SDG Numbers: 649050
Analysis: Inorganics, Metals, Isotopic Uranium
Validator: James Ritchey
Review Date: January 2024

The samples were prepared and analyzed using accepted procedures as shown in Table 9.

Table 9. 2023 Crescent Junction Sampling Event, Analytes and Methods

Analyte	Preparation Method	Analytical Method
Ammonia as N, NH ₃ -N	EPA 350.1	EPA 350.1
Alkalinity	EPA 310.1	EPA 310.1
Bicarbonate	EPA 310.1	EPA 310.1
Carbonate	EPA 310.1	EPA 310.1
Nitrate/Nitrite as N	EPA 353.2	EPA 353.2
Bromide	EPA 300.0 Rev 2.1	300.0 Rev 2.1
Chloride	EPA 300.0 Rev 2.1	300.0 Rev 2.1
Fluoride	EPA 300.0 Rev 2.1	300.0 Rev 2.1
Sulfate	EPA 300.0 Rev 2.1	300.0 Rev 2.1
Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Potassium, Selenium, Silver, Sodium	SW-6010B	EPA 6010B
Uranium	SW-846 3005A	SW-846 6020A
Total Dissolved Solids	EPA 160.1	540 C
Isotopic Uranium	SOP 776/778	SOP 714

Data Qualifier Summary

None of the data associated with this sampling event required a data qualifier.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina received the two sample sets for RIN 2412144 in cooler received on December 15, 2023. The temperature of the cooler was 1°C (tracking number UPS 1ZE243121392100737).

The COC forms were checked to confirm that all the samples were listed on the form with sample collection dates and times, and signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions.

Preservation and Holding Times

The samples were received in the correct container types and had been preserved correctly for the requested analyses.

Case Narratives

The case narratives were reviewed, and all defects were found to be within quality-control procedures.

The SDG passed all checks for level two validation.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Electronic Data Deliverable File

The EDD files arrived on January 4, 2024. The contents of the EDD were manually examined to ensure all and only the requested data were delivered in compliance with requirements and that the sample results accurately reflected the data contained in the sample data package.

3.2.2 Minimums and Maximums Report and Anomalous Data Review

There were two anomalous data points that lay outside of the historical result range (Table 10). The sample collected from 0202 contained selenium and uranium concentrations more than 50% above the historic maximum. Results from well 0202 are limited and a representative historical range is still being established for this location.

Table 10. Anomalous Data Associated with the 2023 Crescent Junction Sampling Event

Location	Analyte	12/13/2023 Concentration (mg/L)	Historical Minimum (mg/L)	Historical Maximum (mg/L)	Disposition
Well 0202	Selenium	0.802	0.027 (U)	0.0847	Limited number of samples collected, still establishing concentration range.
	Total Uranium	0.0465	0.0218	0.029	

(U) – Results are below the detection limit.

3.3 December 2023 Crescent Junction Sampling Event Results

Groundwater samples are collected from Crescent Junction monitoring wells 0202 and 0205 to determine if there were any changes to the source of the water recharging at these locations. Figure 8 compares water elevations in wells 0202 and 0205 with precipitation recorded at the Crescent Junction site since 2019.

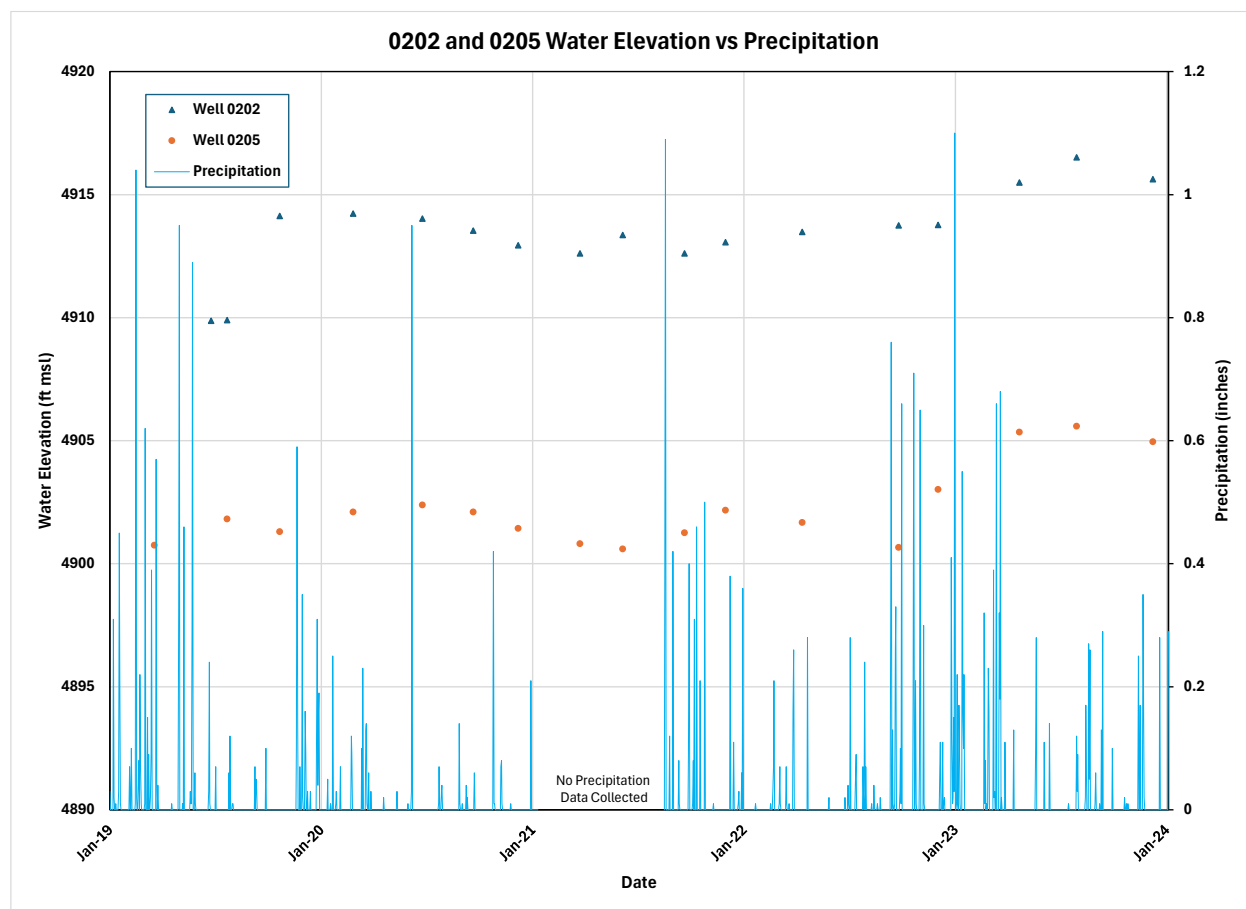


Figure 8. Precipitation vs Groundwater Elevation (2019 – 2023)
*No precipitation data 11/17/20 to 12/30/20

Both samples were collected in December, during the fourth quarterly monitoring event of 2023 (Table 11). Analytes are consistent with what has been run since 2019. Monitoring will continue to determine if the groundwater in the wells is from the same source.

Table 11. Analytical Results from Crescent Junction Wells 0202 and 0205, December 2023

Analyte	Location	Result (mg/L)
Bicarbonate as CaCO ₃	0202	910
	0205	842
Total Alkalinity as CaCO ₃	0202	910
	0205	842
Ammonia as N	0202	5.10
	0205	8.55
Nitrate/Nitrite as N	0202	630
	0205	486
Total Dissolved Solids	0202	43,400
	0205	40,400
Chloride	0202	5090
	0205	2100
Bromide	0202	18.6
	0205	4.59
Sulfate	0202	19,900
	0205	22,700
Arsenic	0202	0.009
	0205	0.008
Barium	0202	0.019
	0205	0.013
Calcium	0202	415
	0205	388
Chromium	0202	0.001
	0205	0.001
Copper	0202	0.013
	0205	0.010
Lead	0202	0.010
	0205	0.004
Magnesium	0202	1480
	0205	1280
Manganese	0202	0.47
	0205	0.41
Selenium	0202	0.802
	0205	3.010
Sodium	0202	11,300
	0205	9010
Total Uranium	0202	0.0465
	0205	0.0391
Uranium-234	0202	51.8 ±5.76 (pCi/L)
	0205	36.6 ± 5.21 (pCi/L)
Uranium-235	0202	1.37 ±1.13 (pCi/L)
	0205	1.12 ±0.81 (pCi/L)
Uranium-238	0202	15.2 ±3.13 (pCi/L)
	0205	14.6 ±3.28 (pCi/L)

*Only analytes above the detection limit are listed

Figures 9 through 12 show concentrations and trends for ammonia, nitrate/nitrite, uranium and isotopic uranium in the Crescent Junction wells. Ammonia concentrations are trending down, and nitrite and nitrate are natural products of the biological breakdown of ammonia. Nitrate/Nitrate concentrations trending up in well 0202.

Total uranium and isotopic uranium have increased in both wells. Samples will be collected on a

more frequent basis to determine if the increasing concentration trend continues. Historical records for wells drilled at the Crescent Junction site indicate that natural uranium concentrations at depth ranged from 0.00018 to 0.031 mg/L. A study completed in 2011 found that natural uranium concentrations associated with the Mancos Shale ranged from 0.0002 to 1.922 mg/L. Natural Mancos shale seeps had a geometric mean of 0.083 mg/L uranium (DOE 2011).

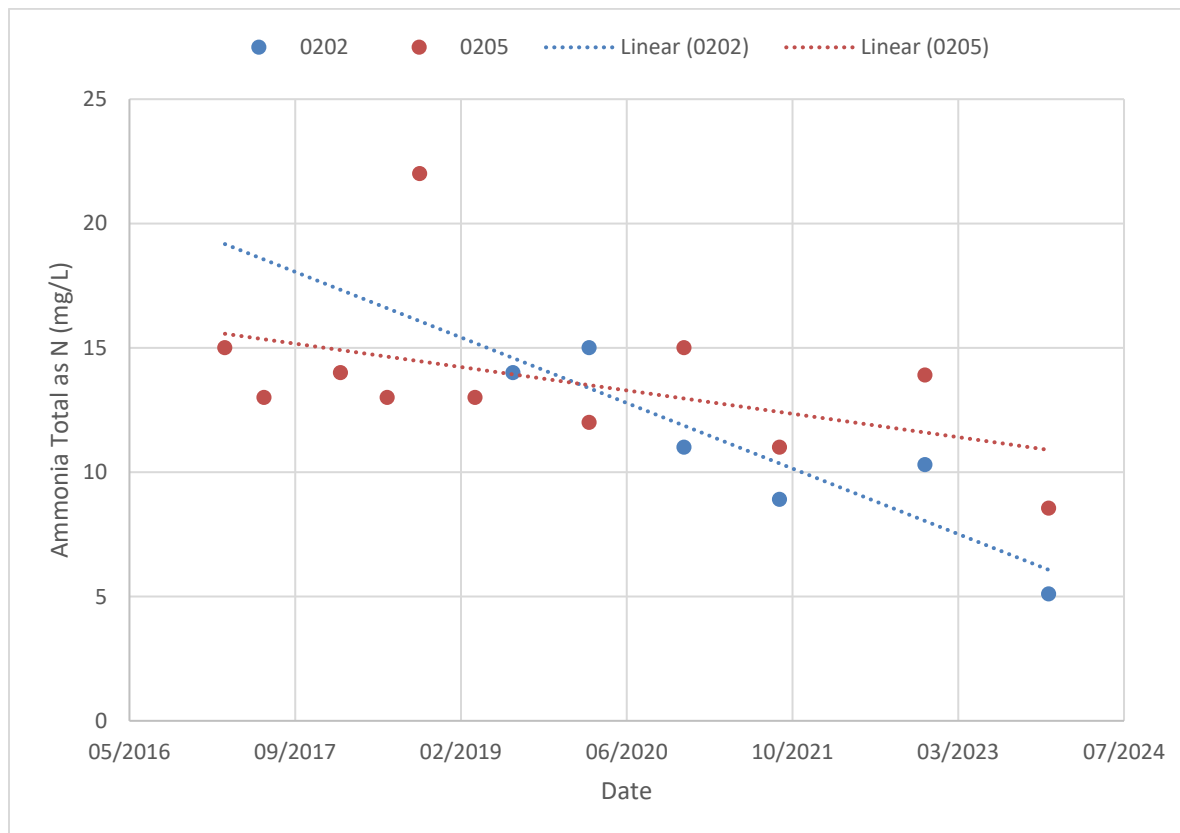


Figure 9. Ammonia Total as N Concentration in Well 0202 and Well 0205

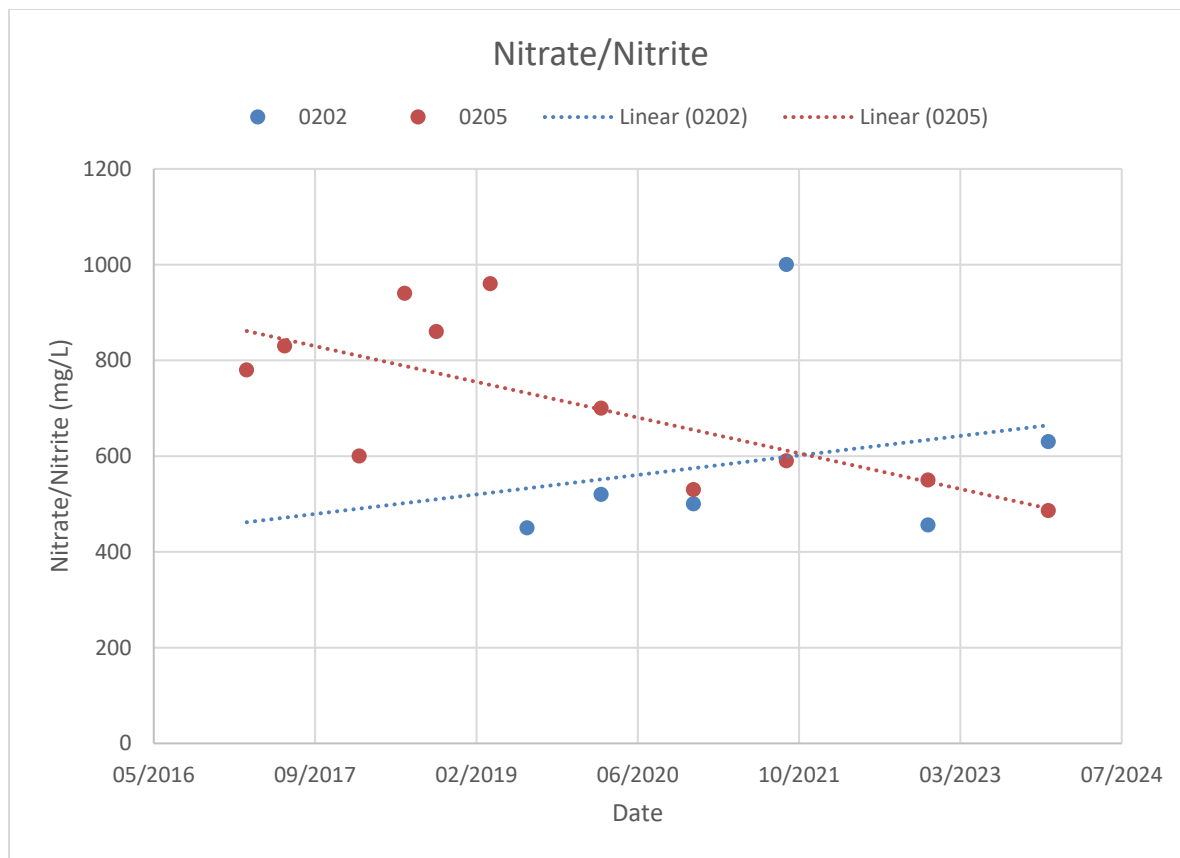


Figure 10. Nitrate/Nitrite Concentration in Well 0202 and Well 0205

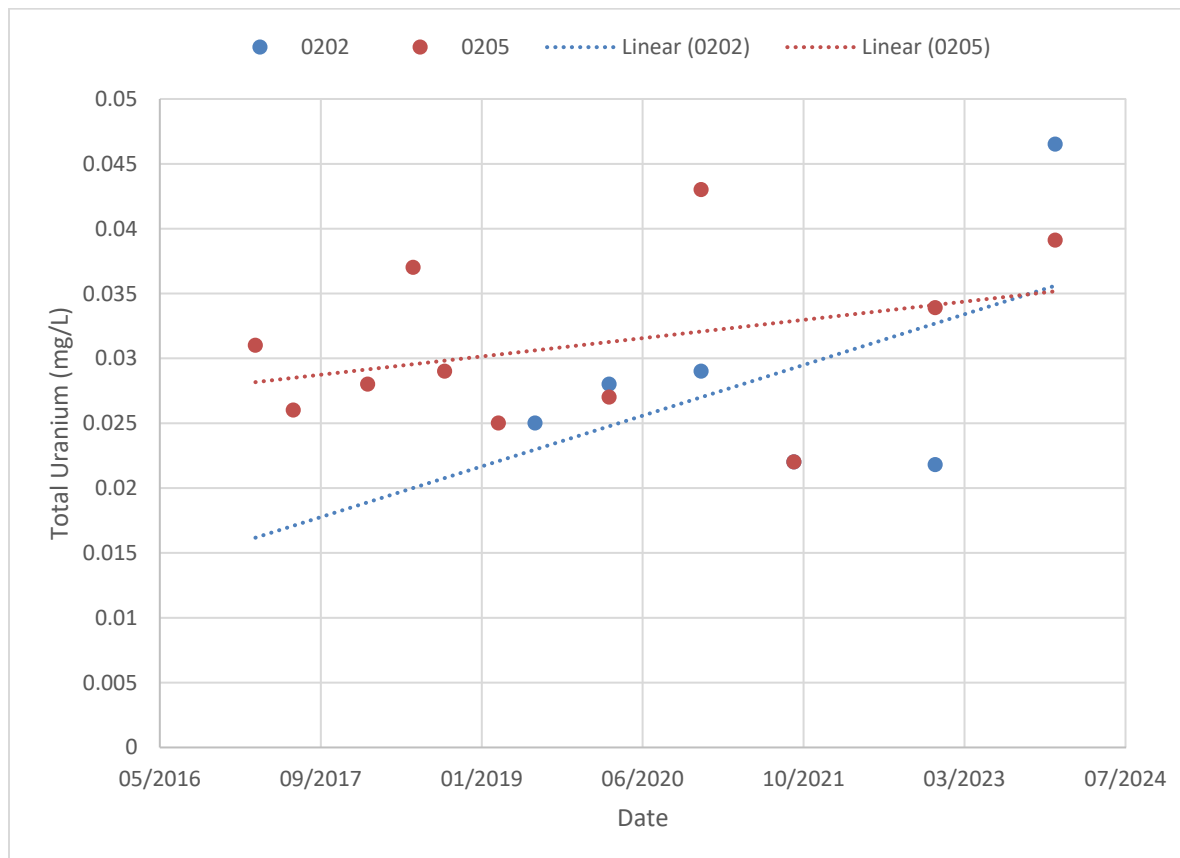


Figure 11. Total Uranium Concentration in Well 0202 and Well 0205

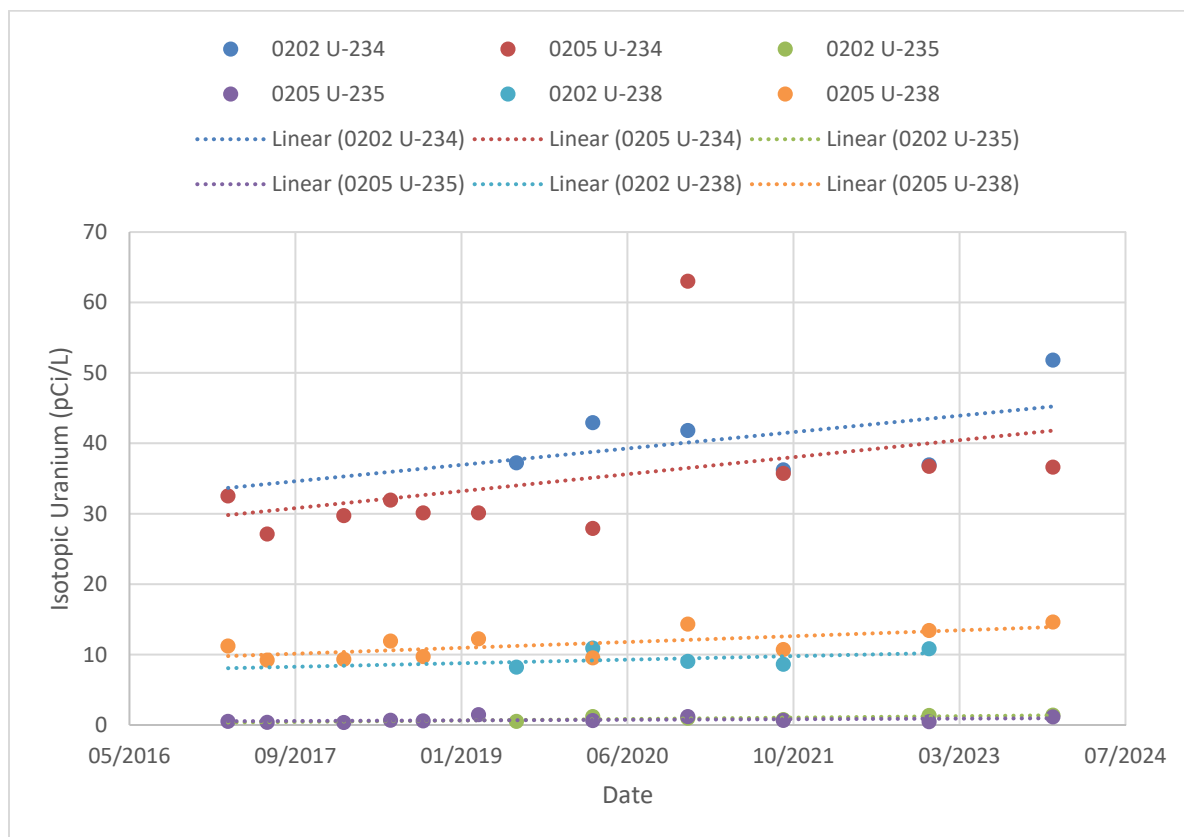


Figure 12. Isotopic Uranium Radioactivity for Well 0202 and Well 0205

4.0 Conclusions

4.1 July 2023 CF4 and CF5 Sampling Event

Ground water samples were collected from the CF4 observation wells in July and November 2023 and the CF5 extraction wells in November 2023. Analytical results show that the injection system is effective at lowering the ammonia and uranium concentrations, especially in downgradient monitoring wells.

Ammonia sample results were lower than or consistent with previous results. Uranium sample results increased in some wells from 2022 but this was likely due to the influx of surface water altering the geochemistry. In general, the ammonia and uranium concentrations are decreasing in most of the extraction wells. The exception is 0813, where the trend analysis indicates the uranium concentrations are increasing.

4.2 December 2023 Crescent Junction Sampling Event

The groundwater in wells 0202 and 0205 have a similar geochemistry and will continue to be monitored on an annual basis (at a minimum) for fluctuations in analyte concentrations. Current data indicates a downward trend in ammonia concentration and an upward trend in uranium concentration. Uranium and nitrate concentrations are still within natural levels for the underlying Mancos Shale.

5.0 References

40 CFR 192A (Code of Federal Regulations) Subpart A, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, Standards for the Control of Residual Radioactive Materials from Inactive Uranium Processing Sites.”

DOE (U.S. Department of Energy), *Characterization of Groundwater Brine Zones at the Moab Project Site (Phase 1)* (GJO-2002-333-TAR, GJO-MOA 19.1.2-3), June 2002.

DOE (U.S. Department of Energy), *Natural Contamination from the Mancos Shale* (Doc. No. S07480), April 2011.

DOE (U.S. Department of Energy), *Moab UMTRA Project Surface Water/Groundwater Sampling and Analysis Plan* (DOE-EM/GJRAC1830).

DOE (U.S. Department of Energy), *Moab UMTRA Project Standard Practice for Validation of Laboratory Data* (DOE-EM/GJRAC1855).

Appendix A.
2023 CF4 and CF5 Sampling Events

Water Sampling Field Activities Verification
Trip Report
Water Quality Data
Minimums and Maximums Report
Static Water Levels

Appendix A. July 2023 CF4 and CF5 Sampling Event Water Sampling Field Activities Verification

Sampling Event/RIN	July 2023 CF4/CF5 Sampling Event /2307143	Date(s) of Water Sampling	July 20, Nov 2, Nov 14 2023
Date(s) of Verification	1/25/2024	Name of Verifier	Thomas Prichard
		Response (Yes, No, NA)	Comments
1. Is the Sampling Analysis Plan (SAP) the primary document directing field procedures?		Yes	
List other documents, standard operating procedures, instructions.		NA	
2. Were the sampling locations specified in the planning documents sampled?		Yes	
3. Was a pre-trip calibration conducted as specified in the aforementioned documents?		Yes	
4. Was an operational check of the field equipment conducted in accordance with the SAP?		Yes	
Did the operational checks meet criteria?		Yes	
5. Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, oxidation reduction potential) of field measurements taken as specified?		Yes	Field measurements for temperature, pH, turbidity, oxidation reduction potential, and conductivity were collected.
6. Was the category of the well documented?		Yes	
7. Were the following conditions met when purging a Category I well:			
Was one pump/tubing volume purged before sampling?		Yes	
Did the water level stabilize before sampling?		Yes	
Did pH, specific conductance, and turbidity measurements stabilize before sampling?		Yes	
Was the flow rate less than 500 milliliters per minute?		Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?		Yes	
8. Were the following conditions met when purging a Category II well:			
Was the flow rate less than 500 milliliters per minute?		Yes	
Was one pump/tubing volume removed before sampling?		Yes	
9. Were duplicates taken at a frequency of one per 20 samples?		No	One duplicate sample was collected for 22 samples (location 0782)

Appendix A. July 2023 CF4 and CF5 Sampling Event (continued)
Water Sampling Field Activities Verification (continued)

Sampling Event/RIN	July 2023 CF4/CF5 Sampling Event /2307143	Date(s) of Water Sampling	July 20, Nov 2, Nov 14 2023
Date(s) of Verification	01/25/2024	Name of Verifier	Thomas Prichard
		Response (Yes, No, NA)	Comments
10. Were EBs taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?		NA	All samples were collected using dedicated equipment.
11. Were trip blanks prepared and included with each shipment of volatile organic compound samples?		NA	
12. Were quality-control samples assigned a fictitious site identification number?		Yes	Duplicate for 0782 was given location 2000
13. Was the identity of the samples recorded on the quality assurance sample log?		Yes	
14. Were samples collected in the containers specified?		Yes	
15. Were samples filtered and preserved as specified?		Yes	
16. Were the number and types of samples collected as specified?		Yes	
17. Were COC records completed, and was sample custody maintained?		Yes	
18. Are field data sheets signed and dated by both team members?		Yes	
19. Was all other pertinent information documented on the field data sheets?		Yes	
20. Was the presence or absence of ice in the cooler documented at every sample location?		Yes	
21. Were water levels measured at the locations specified in the planning documents?		Yes	

Appendix A. 2023 CF4 and CF5 Sampling Event (continued) Trip Report

Date: January 24, 2024
To: Ken Pill
From: James Ritchey
Subject: July 2023 Sampling Event Trip Report

Site: Moab –Sampling Event – July 2023

Date of Sampling Event: July 20, November 2, November 14, 2023

Team Members: T. Prichard, J. Ritchey

RIN Number Assigned: All samples were assigned to RIN 2307143.

Sample Shipment: One sample cooler was shipped overnight UPS to GEL Laboratories from Moab, Utah on August 3, 2023 (Tracking number 1ZE243120190607609). One sample cooler was shipped overnight UPS to GEL Laboratories from Moab, Utah on November 15, 2023 (Tracking number 1ZE243120190277636).

July and November 2023 Configuration 4 Sampling

Number of Locations Sampled: Eight observation wells (0780, 0781, 0782, 0783, 0784, 0785, 0786, and 0787) and one duplicate were sampled during the July 2023 Sampling Event.

Locations Not Sampled: None.

Field Variance: None.

Quality Control Sample Cross Reference: Following are the false identifications assigned to the quality control samples:

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2000	0782	Duplicate from 32 ft bgs	Ground Water	JUL 018

Location Specific Information – Observation Wells: All observation wells were sampled using micro-purge techniques with a peristaltic pump and dedicated pump-head and downhole tubing. Sample depths and water levels for each observation well are listed below.

Appendix A. 2023 CF4 and CF5 Sampling Event (continued)
Trip Report (continued)

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0780	7/20/2023	08:35	13.30	28
	11/14/2023	14:35	15.38	
0781	7/20/2023	08:50	13.13	46
	11/14/2023	14:50	15.21	
0782	7/20/2023	09:05	13.29	32
	11/14/2023	15:10	15.41	
0783	7/20/2023	09:25	11.13	18
	11/14/2023	15:30	13.58	
0784	7/20/2023	09:40	13.87	18
	11/14/2023	15:45	16.15	
0785	7/20/2023	10:25	13.60	18
	11/14/2023	16:40	15.83	
0786	7/20/2023	10:10	13.14	28
	11/14/2023	16:20	16.21	
0787	7/20/2023	10:00	13.31	36
	11/14/2023	16:05	16.43	

November 2023 Configuration 5 Sampling

Number of Locations Sampled: Six extraction wells (0810, 0811, 0812, 0813, 0815, and SMI-PW02) were sampled during the July 2022 Monthly Sampling Event.

Locations Not Sampled: Wells 0814 and 0816 were not sampled due to inoperable submersible pumps.

Field Variance: None.

Quality Control Sample Cross Reference: None.

Location Specific Information – Extraction Wells: Extraction wells were sampled using dedicated submersible pumps. Samples were filtered and collected into open containers using dedicated flexible tubing. Sample depths and water levels for each extraction well are listed below.

Well No.	Date	Time	Pump Intake Depth (ft bgs)
0810	11/02/2023	09:55	10.4 – 40.4
0811	11/02/2023	10:10	8.6 – 38.6
0812	11/02/2023	10:35	14.2 – 44.2
0813	11/02/2023	10:45	14.4 – 44.4
0815	11/02/2023	11:25	21.7 – 51.7
SMI-PW02	11/02/2023	10:20	20.0 – 60.0

*Depth to water were not collected for wells.

Appendix A. 2023 CF4 and CF5 Sampling Event (*continued*)
Trip Report (*continued*)

Site Issues: According to the USGS Cisco Gaging Station (Station No. 09180700), the mean daily Colorado River flows during these sampling events are provided below:

Date	Daily Mean Flow (cfs)
07/20/2023	6,620
11/02/2023	4,570
11/14/2023	3,710

Equipment Issues: None.

Corrective Action Required/Taken: None.

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0780 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	20.32 - 30.09	37.1		1.7	-
	mg/L	11/14/2023	0001	20.32 - 30.09	2.83		0.085	-
Oxidation Reduction Potential	mV	11/14/2023	N001	20.32 - 30.09	88		-	-
pH	s.u.	11/14/2023	N001	20.32 - 30.09	8.52		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	20.32 - 30.09	1491		-	-
Temperature	C	11/14/2023	N001	20.32 - 30.09	14.40		-	-
Turbidity	NTU	11/14/2023	N001	20.32 - 30.09	4.87		-	-
Uranium	mg/L	07/20/2023	0001	20.32 - 30.09	0.377		6.7E-05	-
	mg/L	11/14/2023	0001	20.32 - 30.09	0.0514		6.7E-05	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0781 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	44.75 - 54.52	769		8.5	-
	mg/L	11/14/2023	0001	44.75 - 54.52	678		17	-
Oxidation Reduction Potential	mV	11/14/2023	N001	44.75 - 54.52	122		-	-
pH	s.u.	11/14/2023	N001	44.75 - 54.52	12.34		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	44.75 - 54.52	54552		-	-
Temperature	C	11/14/2023	N001	44.75 - 54.52	15.20		-	-
Turbidity	NTU	11/14/2023	N001	44.75 - 54.52	8.01		-	-
Uranium	mg/L	07/20/2023	0001	44.75 - 54.52	3.240		0.00168	-
	mg/L	11/14/2023	0001	44.75 - 54.52	3.960		0.000335	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data (continued)

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0782 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	31.01 - 40.78	459		8.5	-
	mg/L	11/14/2023	0001	31.01 - 40.78	275		8.5	-
	mg/L	11/14/2023	0002	31.01 - 40.78	289		8.5	-
Oxidation Reduction Potential	mV	11/14/2023	N001	31.01 - 40.78	137		-	-
pH	s.u.	11/14/2023	N001	31.01 - 40.78	9.82		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	31.01 - 40.78	18395		-	-
Temperature	C	11/14/2023	N001	31.01 - 40.78	14.30		-	-
Turbidity	NTU	11/14/2023	N001	31.01 - 40.78	4.95		-	-
Uranium	mg/L	07/20/2023	0001	31.01 - 40.78	2.220		0.000335	-
	mg/L	11/14/2023	0001	31.01 - 40.78	2.690		0.000335	-
	mg/L	11/14/2023	0002	31.01 - 40.78	2.620		0.000335	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0783 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	8.60 - 18.60	0.0340	J	0.017	-
	mg/L	11/14/2023	0001	8.60 - 18.60	0.0300	J	0.017	-
Oxidation Reduction Potential	mV	11/14/2023	N001	8.60 - 18.60	97		-	-
pH	s.u.	11/14/2023	N001	8.60 - 18.60	9.44		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	8.60 - 18.60	2567		-	-
Temperature	C	11/14/2023	N001	8.60 - 18.60	14.10		-	-
Turbidity	NTU	11/14/2023	N001	8.60 - 18.60	9.74		-	-
Uranium	mg/L	07/20/2023	0001	8.60 - 18.60	0.0427		6.7E-05	-
	mg/L	11/14/2023	0001	8.60 - 18.60	0.0898		6.7E-05	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data (continued)

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0784 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	9.38 - 19.38	0.0240	J	0.017	-
	mg/L	11/14/2023	0001	9.38 - 19.38	0.0300	J	0.017	-
Oxidation Reduction Potential	mV	11/14/2023	N001	9.38 - 19.38	118		-	-
pH	s.u.	11/14/2023	N001	9.38 - 19.38	8.53		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	9.38 - 19.38	1251		-	-
Temperature	C	11/14/2023	N001	9.38 - 19.38	15.40		-	-
Turbidity	NTU	11/14/2023	N001	9.38 - 19.38	5.27		-	-
Uranium	mg/L	07/20/2023	0001	9.38 - 19.38	0.0343		6.7E-05	-
	mg/L	11/14/2023	0001	9.38 - 19.38	0.0182		6.7E-05	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0785 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	9.60 - 19.60	0.0180	J	0.017	-
	mg/L	11/14/2023	0001	9.60 - 19.60	0.152		0.017	-
Oxidation Reduction Potential	mV	11/14/2023	N001	9.60 - 19.60	20		-	-
pH	s.u.	11/14/2023	N001	9.60 - 19.60	7.34		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	9.60 - 19.60	1369		-	-
Temperature	C	11/14/2023	N001	9.60 - 19.60	16.00		-	-
Turbidity	NTU	11/14/2023	N001	9.60 - 19.60	7.87		-	-
Uranium	mg/L	07/20/2023	0001	9.60 - 19.60	0.0473		6.7E-05	-
	mg/L	11/14/2023	0001	9.60 - 19.60	0.0190		6.7E-05	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data (continued)

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0786 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	20.49 - 30.26	17.2		0.17	-
	mg/L	11/14/2023	0001	20.49 - 30.26	23.8		0.85	-
Oxidation Reduction Potential	mV	11/14/2023	N001	20.49 - 30.26	106		-	-
pH	s.u.	11/14/2023	N001	20.49 - 30.26	8.51		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	20.49 - 30.26	2530		-	-
Temperature	C	11/14/2023	N001	20.49 - 30.26	14.70		-	-
Turbidity	NTU	11/14/2023	N001	20.49 - 30.26	7.78		-	-
Uranium	mg/L	07/20/2023	0001	20.49 - 30.26	0.199		0.000335	-
	mg/L	11/14/2023	0001	20.49 - 30.26	0.139		6.7E-05	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0787 <well> Configuration 4

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	07/20/2023	0001	35.44 - 45.21	535		8.5	-
	mg/L	11/14/2023	0001	35.44 - 45.21	581		17	-
Oxidation Reduction Potential	mV	11/14/2023	N001	35.44 - 45.21	174		-	-
pH	s.u.	11/14/2023	N001	35.44 - 45.21	8.00		-	-
Specific Conductance	umhos/cm	11/14/2023	N001	35.44 - 45.21	42082		-	-
Temperature	C	11/14/2023	N001	35.44 - 45.21	13.90		-	-
Turbidity	NTU	11/14/2023	N001	35.44 - 45.21	10.10		-	-
Uranium	mg/L	07/20/2023	0001	35.44 - 45.21	1.630		0.00168	-
	mg/L	11/14/2023	0001	35.44 - 45.21	2.610		0.000335	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data (continued)

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0810 <well> Configuration 5

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	10.40 - 40.40	239		17	-
Oxidation Reduction Potential	mV	11/02/2023	N001	10.40 - 40.40	246		-	-
pH	s.u.	11/02/2023	N001	10.40 - 40.40	7.10		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	10.40 - 40.40	26860		-	-
Temperature	C	11/02/2023	N001	10.40 - 40.40	17.20		-	-
Turbidity	NTU	11/02/2023	N001	10.40 - 40.40	4.72		-	-
Uranium	mg/L	11/02/2023	0001	10.40 - 40.40	2.970		0.000335	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0811 <well> Configuration 5

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	8.60 - 38.60	271		17	-
Oxidation Reduction Potential	mV	11/02/2023	N001	8.60 - 38.60	245		-	-
pH	s.u.	11/02/2023	N001	8.60 - 38.60	7.10		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	8.60 - 38.60	18470		-	-
Temperature	C	11/02/2023	N001	8.60 - 38.60	16.80		-	-
Turbidity	NTU	11/02/2023	N001	8.60 - 38.60	5.80		-	-
Uranium	mg/L	11/02/2023	0001	8.60 - 38.60	2.730		0.000335	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) **Water Quality Data (continued)**

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0812 <well> Configuration 5

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	14.20 - 44.20	286		17	-
Oxidation Reduction Potential	mV	11/02/2023	N001	14.20 - 44.20	246		-	-
pH	s.u.	11/02/2023	N001	14.20 - 44.20	7.10		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	14.20 - 44.20	15940		-	-
Temperature	C	11/02/2023	N001	14.20 - 44.20	16.50		-	-
Turbidity	NTU	11/02/2023	N001	14.20 - 44.20	8.65		-	-
Uranium	mg/L	11/02/2023	0001	14.20 - 44.20	2.100		6.7E-05	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0813 <well> Configuration 5

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	14.40 - 44.40	195		17	-
Oxidation Reduction Potential	mV	11/02/2023	N001	14.40 - 44.40	236		-	-
pH	s.u.	11/02/2023	N001	14.40 - 44.40	7.18		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	14.40 - 44.40	10250		-	-
Temperature	C	11/02/2023	N001	14.40 - 44.40	19.00		-	-
Turbidity	NTU	11/02/2023	N001	14.40 - 44.40	5.56		-	-
Uranium	mg/L	11/02/2023	0001	14.40 - 44.40	1.330		6.7E-05	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued) Water Quality Data (continued)

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: 0815 <well> Configuration 5

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	21.70 - 51.70	92.0		1.7	-
Oxidation Reduction Potential	mV	11/02/2023	N001	21.70 - 51.70	180		-	-
pH	s.u.	11/02/2023	N001	21.70 - 51.70	7.20		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	21.70 - 51.70	19855		-	-
Temperature	C	11/02/2023	N001	21.70 - 51.70	16.70		-	-
Turbidity	NTU	11/02/2023	N001	21.70 - 51.70	5.46		-	-
Uranium	mg/L	11/02/2023	0001	21.70 - 51.70	3.350		0.000335	-

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE MOA01, Moab Site

LOCATION: SMI-PW02 <well>

REPORT DATE: 1/25/2024 9:00 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	11/02/2023	0001	20.04 - 60.04	284		17	-
Oxidation Reduction Potential	mV	11/02/2023	N001	20.04 - 60.04	247		-	-
pH	s.u.	11/02/2023	N001	20.04 - 60.04	7.09		-	-
Specific Conductance	umhos/cm	11/02/2023	N001	20.04 - 60.04	22780		-	-
Temperature	C	11/02/2023	N001	20.04 - 60.04	16.30		-	-
Turbidity	NTU	11/02/2023	N001	20.04 - 60.04	2.93		-	-
Uranium	mg/L	11/02/2023	0001	20.04 - 60.04	3.240		0.000335	-

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Event (continued)

Water Quality Data (continued)

RECORDS: SELECTED FROM USEE105 WHERE RIN = '2207137' AND (DataValidationQualifiers IS NULL OR (DataValidationQualifiers NOT LIKE '%N%' AND DataValidationQualifiers NOT LIKE '%R%' AND DataValidationQualifiers NOT LIKE '%X%'))

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | |
|--|--|--|
| F Low flow sampling method used. | G Possible grout contamination, pH > 9. | J Estimated value. |
| L Less than 3 bore volumes purged prior to sampling. | N Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q Qualitative result due to sampling technique |
| R Unusable result. | U Parameter analyzed for but was not detected. | X Location is undefined. |

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Events (*continued*) Minimums and Maximums Report

Site Code	Location Code	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Count	
				Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect
MOA01	0781	11/14/2023	Uranium	3.96			3.4			0.032	J		54	0
MOA01	0783	11/14/2023	Ammonia Total as N	0.03	J		380		F	0.034	J		36	4
MOA01	0783	07/20/2023	Ammonia Total as N	0.034	J		380		F	0.1	U		35	4
MOA01	0784	07/20/2023	Ammonia Total as N	0.024	J		410		J	0.1			38	16
MOA01	0785	07/20/2023	Ammonia Total as N	0.018	J		680		J	0.1	U		41	14
MOA01	0810	11/02/2023	Ammonia Total as N	239			450		J	250			31	0
MOA01	0812	11/02/2023	Ammonia Total as N	286			620			310			32	0
MOA01	SMI-PW02	11/02/2023	Ammonia Total as N	284			4400			330			60	0

Note: all concentrations are in mg/L

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Events (*continued*) Minimums and Maximums Report (*continued*)

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> F Low flow sampling method used. L Less than 3 bore volumes purged prior to sampling. R Unusable result. | <ul style="list-style-type: none"> G Possible grout contamination, pH > 9. N Presumptive evidence that analyte is present. The analyte is "tentatively identified". U Parameter analyzed for but was not detected. | <ul style="list-style-type: none"> J Estimated value. Q Qualitative result due to sampling technique X Location is undefined. |
|--|--|--|

Appendix A. 2023 CF4 and CF5 Sampling Event Sampling Events (*continued*)

Static Water Levels

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site

REPORT DATE: 3/25/2024 12:07 PM

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			
0784		3968.73	07/20/2023		13.87	3954.86	
		3968.73	11/14/2023		16.15	3952.58	
0785		3969.24	07/20/2023		13.60	3955.64	
		3969.24	11/14/2023		15.83	3953.41	
0786		3968.14	07/20/2023		13.14	3955.00	
		3968.14	11/14/2023		16.21	3951.93	
0787		3968.43	07/20/2023		13.31	3955.12	
		3968.43	11/14/2023		16.43	3952.00	
0810		3961.96	11/02/2023		0.00	3961.96	
0811		3962.88	11/02/2023		0.00	3962.88	
0812		3961.50	11/02/2023		0.00	3961.50	
0813		3963.55	11/02/2023		0.00	3963.55	
0815		3963.16	11/02/2023		0.00	3963.16	
0780		3968.45	07/20/2023		13.30	3955.15	
		3968.45	11/14/2023		15.38	3953.07	
0781		3968.56	07/20/2023		13.13	3955.43	
		3968.56	11/14/2023		15.21	3953.35	
0782		3968.46	07/20/2023		13.29	3955.17	
		3968.46	11/14/2023		15.41	3953.05	
0783		3966.16	07/20/2023		11.13	3955.03	
		3966.16	11/14/2023		13.58	3952.58	

RECORDS: SELECTED FROM USEE700 WHERE RIN = '2307143'

FLOW CODES:

O : ON-SITE

WATER LEVEL FLAGS

Appendix B.
2023 Crescent Junction Sampling Event

Water Sampling Field Activities Verification
Trip Report
Water Quality Data
Minimums and Maximums Report
Static Water Levels

Appendix B. 2023 Crescent Junction Sampling Event Water Sampling Field Activities Verification

Sampling Event/RIN	December 2023 CJ Sampling Event/RIN 2312144	Date(s) of Water Sampling	December 13, 2023
Date(s) of Verification	03/15/2023	Name of Verifier	James Ritchey
		Response (Yes, No, NA)	Comments
1. Is the Sampling Analysis Plan (SAP) the primary document directing field procedures?	Yes		
2. List other documents, standard operating procedures, instructions.	NA		
3. Were the sampling locations specified in the planning documents sampled?	Yes		
4. Was a pre-trip calibration conducted as specified in the aforementioned documents?	Yes		
5. Was an operational check of the field equipment conducted in accordance with the SAP?	Yes		
6. Did the operational checks meet criteria?	Yes		
7. Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, oxidation reduction potential) of field measurements taken as specified?	Yes	Field measurements for temperature, pH, turbidity, oxidation reduction potential, and conductivity were collected.	
8. Was the category of the well documented?	Yes		
9. Were the following conditions met when purging a Category I well:			
Was one pump/tubing volume purged before sampling?	NA	Low flow method was utilized.	
Did the water level stabilize before sampling?	Yes		
Did pH, specific conductance, and turbidity measurements stabilize before sampling?	Yes		
Was the flow rate less than 500 milliliters per minute?	Yes		
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	No		

Appendix B. 2023 Crescent Junction Sampling Event (*continued*)
Water Sampling Field Activities Verification (*continued*)

10. Were the following conditions met when purging a Category II well:	
Was the flow rate less than 500 milliliters per minute?	Yes
Was one pump/tubing volume removed before sampling?	No
11. Were duplicates taken at a frequency of one per 20 samples?	NA Only 2 samples were collected during this event.
12. Were EBs taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA The samples were collected using the same bladder pump and was externally cleaned with DI between locations. Well water at next location was run through before sampling.
13. Were trip blanks prepared and included with each shipment of volatile organic compound samples?	NA
14. Were quality-control samples assigned a fictitious site identification number?	NA
Was the identity of the samples recorded on the quality assurance sample log?	NA
15. Were samples collected in the containers specified?	Yes
16. Were samples filtered and preserved as specified?	Yes
17. Were the number and types of samples collected as specified?	Yes
18. Were COC records completed, and was sample custody maintained?	Yes
19. Are field data sheets signed and dated by both team members?	Yes
20. Was all other pertinent information documented on the field data sheets?	Yes
21. Was the presence or absence of ice in the cooler documented at every sample location?	Yes
22. Were water levels measured at the locations specified in the planning documents?	Yes

**Appendix B. 2023 Crescent Junction Sampling Event (*continued*)
Trip Report**

Date: December 28, 2023
To: Ken Pill
From: James Ritchey
Subject: December 2023 CJ Sampling Event Trip Report

Site: Crescent Junction – Well 0202 and 0205 Sampling Event – December 2023

Date of Sampling Event: December 13, 2023

Team Members: T. Prichard and J. Ritchey

RIN Number Assigned: All samples were assigned to RIN 2312144.

Sample Shipment: The sample was shipped overnight UPS to ALS Laboratory from Moab, Utah on December 14 of 2023 (Tracking number: 1ZE243121392100737).

Number of Locations Sampled: One sample was collected from each well 0202 and well 0205 during the December 2023 CJ sampling event.

Locations Not Sampled/Reason: None.

Field Variance: None.

Quality Control Sample Cross Reference: None.

Location Specific Information: Wells 0202 and 0205 were sampled using a non-dedicated submersible pump with non-dedicated tubing. The table below provides additional information:

Location	Date	Sample Depth (ft btoc)	Depth to Water (ft btoc)	Comments
0202	12/13/2023	60	47.19	Water is yellow.
0205	12/13/2023	60	48.59	Water is yellow. Well recovery test was performed 12/12/23. 18 gallons were pumped out. WL = 48.59 before installing pump.

Notes: ft btoc = feet below top of casing.

Well Inspection Summary: A well inspection was not conducted.

Equipment: None.

Regulatory: None.

Site Issues: None.

Corrective Action Required/Taken: None.

Appendix B. 2023 Crescent Junction Sampling Event (*continued*) Water Quality Data

GENERAL WATER QUALITY DATA BY LOCATION (USEE105) FOR SITE CRJ01, Crescent Junction Site

LOCATION: 0202 <well>

REPORT DATE: 3/6/2024 10:10 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	12/13/2023	0001	60.00	5.10		0.85	-
Arsenic	mg/L	12/13/2023	0001	60.00	0.00862	J	0.005	-
Barium	mg/L	12/13/2023	0001	60.00	0.0185		0.001	-
BICARBONATE AS CaCO ₃	mg/L	12/13/2023	0001	60.00	910		0.725	-
Bromide	mg/L	12/13/2023	0001	60.00	18.6		3.35	-
Cadmium	mg/L	12/13/2023	0001	60.00	0.00100	U	0.001	-
Calcium	mg/L	12/13/2023	0001	60.00	415.000		0.05	-
CARBONATE AS CaCO ₃	mg/L	12/13/2023	0001	60.00	0.725	U	0.725	-
Chloride	mg/L	12/13/2023	0001	60.00	5090		134	-
Chromium	mg/L	12/13/2023	0001	60.00	0.00907	J	0.001	-
Cobalt	mg/L	12/13/2023	0001	60.00	0.00100	U	0.001	-
Copper	mg/L	12/13/2023	0001	60.00	0.0132	J	0.003	-
Fluoride	mg/L	12/13/2023	0001	60.00	1.65	U	1.65	-
Iron	mg/L	12/13/2023	0001	60.00	0.0300	U	0.03	-
Lead	mg/L	12/13/2023	0001	60.00	0.00947	J	0.0033	-
Magnesium	mg/L	12/13/2023	0001	60.00	1480.000		11	-
Manganese	mg/L	12/13/2023	0001	60.00	0.470		0.002	-
MOLYBDENUM	ug/L	12/13/2023	0001	60.00	2.00	U	2	-
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2023	0001	60.00	630		8.5	-
Oxidation Reduction Potential	mV	12/13/2023	N001	60.00	260		-	-
pH	s.u.	12/13/2023	N001	60.00	7.06		-	-
Selenium	mg/L	12/13/2023	0001	60.00	0.802		0.006	-
Sodium	mg/L	12/13/2023	0001	60.00	11300.000		10	-
Specific Conductance	umhos/cm	12/13/2023	N001	60.00	42455		-	-
Sulfate	mg/L	12/13/2023	0001	60.00	19900		266	-
Temperature	C	12/13/2023	N001	60.00	13.00		-	-
TOTAL ALKALINITY AS CaCO ₃	mg/L	12/13/2023	0001	60.00	910		0.725	-
Total Dissolved Solids	mg/L	12/13/2023	0001	60.00	43400		23.8	-
Turbidity	NTU	12/13/2023	N001	60.00	6.77		-	-
Uranium	mg/L	12/13/2023	0001	60.00	0.0465		0.000335	-
Uranium-234	pCi/L	12/13/2023	0001	60.00	51.8		1.53	± 5.76
Uranium-235	pCi/L	12/13/2023	0001	60.00	1.37		0.974	± 1.13
Uranium-238	pCi/L	12/13/2023	0001	60.00	15.2		0.911	± 3.13

Appendix B. 2023 Crescent Junction Sampling Event (continued)

Water Quality Data (continued)

GENERAL WATER QUALITY DATA BY LOCATION (USEE105) FOR SITE CRJ01, Crescent Junction

Site

LOCATION: 0205 <well>

REPORT DATE: 3/6/2024 10:10 AM

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Ammonia Total as N	mg/L	12/13/2023	0001	68.00	8.55		0.85	-
Arsenic	mg/L	12/13/2023	0001	68.00	0.00847	J	0.005	-
Barium	mg/L	12/13/2023	0001	68.00	0.0130		0.001	-
BICARBONATE AS CaCO3	mg/L	12/13/2023	0001	68.00	842		0.725	-
Bromide	mg/L	12/13/2023	0001	68.00	4.59	J	3.35	-
Cadmium	mg/L	12/13/2023	0001	68.00	0.00100	U	0.001	-
Calcium	mg/L	12/13/2023	0001	68.00	388.000		0.05	-
CARBONATE AS CaCO3	mg/L	12/13/2023	0001	68.00	0.725	U	0.725	-
Chloride	mg/L	12/13/2023	0001	68.00	2110		33.5	-
Chromium	mg/L	12/13/2023	0001	68.00	0.00817	J	0.001	-
Cobalt	mg/L	12/13/2023	0001	68.00	0.00100	U	0.001	-
Copper	mg/L	12/13/2023	0001	68.00	0.00983	J	0.003	-
Fluoride	mg/L	12/13/2023	0001	68.00	1.65	U	1.65	-
Iron	mg/L	12/13/2023	0001	68.00	0.0300	U	0.03	-
Lead	mg/L	12/13/2023	0001	68.00	0.00405	J	0.0033	-
Magnesium	mg/L	12/13/2023	0001	68.00	1280.000		11	-
Manganese	mg/L	12/13/2023	0001	68.00	0.411		0.002	-
MOLYBDENUM	ug/L	12/13/2023	0001	68.00	2.00	U	2	-
Nitrate + Nitrite as Nitrogen	mg/L	12/13/2023	0001	68.00	486		8.5	-
Oxidation Reduction Potential	mV	12/13/2023	N001	68.00	2		-	-
pH	s.u.	12/13/2023	N001	68.00	7.03		-	-
Selenium	mg/L	12/13/2023	0001	68.00	3.010		0.006	-
Sodium	mg/L	12/13/2023	0001	68.00	9010.000		10	-
Specific Conductance	umhos/cm	12/13/2023	N001	68.00	365200		-	-
Sulfate	mg/L	12/13/2023	0001	68.00	22700		266	-
Temperature	C	12/13/2023	N001	68.00	14.00		-	-
TOTAL ALKALINITY AS CaCO3	mg/L	12/13/2023	0001	68.00	842		0.725	-
Total Dissolved Solids	mg/L	12/13/2023	0001	68.00	40400		23.8	-
Turbidity	NTU	12/13/2023	N001	68.00	18.40		-	-
Uranium	mg/L	12/13/2023	0001	68.00	0.0391		0.000335	-
Uranium-234	pCi/L	12/13/2023	0001	68.00	36.6		1.87	± 5.21
Uranium-235	pCi/L	12/13/2023	0001	68.00	1.12	U	1.12	± 0.81
Uranium-238	pCi/L	12/13/2023	0001	68.00	14.6		1.04	± 3.28

Appendix B. 2023 Crescent Junction Sampling Event (*continued*)

Water Quality Data

RECORDS: SELECTED FROM USEE105 WHERE RIN = '2212139' AND (DataValidationQualifiers IS NULL OR (DataValidationQualifiers NOT LIKE '%N%' AND DataValidationQualifiers NOT LIKE '%R%' AND DataValidationQualifiers NOT LIKE '%X%'))

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | |
|--|--|--|
| F Low flow sampling method used. | G Possible grout contamination, pH > 9. | J Estimated value. |
| L Less than 3 bore volumes purged prior to sampling. | N Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q Qualitative result due to sampling technique |
| R Unusable result. | U Parameter analyzed for but was not detected. | X Location is undefined. |

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix B. 2023 Crescent Junction Sampling Event (*continued*) Minimums and Maximums Report

Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: GEL Laboratories of Ohio LLC

RIN: 2312144

Comparison: All Historical Data

Report Date: 3/25/2024 11:34 AM

Site Code	Location Code	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Count	
				Result	Lab	Qualifiers Data	Result	Lab	Qualifiers Data	Result	Lab	Qualifiers Data	N	N Below Detect
CRJ01	0202	12/13/2023	Ammonia Total as N	5.1			17			8.9			8	0
CRJ01	0202	12/13/2023	BICARBONATE AS CaCO3	910			1200			980			5	0
CRJ01	0202	12/13/2023	Selenium	0.802			0.0847			0.0054			8	3
CRJ01	0202	12/13/2023	TOTAL ALKALINITY AS CaCO3	910			1200			980			5	0
CRJ01	0202	12/13/2023	Uranium	0.0465			0.029		J	0.00041		LQ	8	1
CRJ01	0202	12/13/2023	Uranium-234	51.8			42.9	M3		36.2	M3		5	0
CRJ01	0202	12/13/2023	Uranium-235	1.37			1.32	U		0.49	M3		5	1
CRJ01	0202	12/13/2023	Uranium-238	15.2			10.9	M3		8.2	M3		5	0
CRJ01	0205	12/13/2023	Ammonia Total as N	8.55			22			11			19	0
CRJ01	0205	12/13/2023	BICARBONATE AS CaCO3	842			1100			890		J	15	0
CRJ01	0205	12/13/2023	Bromide	4.59	J		130			8	U		19	15
CRJ01	0205	12/13/2023	Chloride	2110			28000			2900			19	0
CRJ01	0205	12/13/2023	Magnesium	1280			1100			140			19	0
CRJ01	0205	12/13/2023	TOTAL ALKALINITY AS CaCO3	842			1100			890		J	15	0
CRJ01	0205	12/13/2023	Uranium-238	14.6			14.3	M3	J	9.2			12	0

Note: all concentrations are in mg/L

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of

Appendix B. 2023 Crescent Junction Sampling Event *(continued)*

Minimums and Maximums Report *(continued)*

the GC-MS.

- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- | | | |
|--|--|--|
| F Low flow sampling method used. | G Possible grout contamination, pH > 9. | J Estimated value. |
| L Less than 3 bore volumes purged prior to sampling. | N Presumptive evidence that analyte is present. The analyte is "tentatively identified". | Q Qualitative result due to sampling technique |
| R Unusable result. | U Parameter analyzed for but was not detected. | X Location is undefined. |

Appendix B. 2023 Crescent Junction Sampling Event (*continued*)

Static Water Levels

STATIC WATER LEVELS (USEE700) FOR SITE CRJ01, Crescent Junction Site

REPORT DATE: 3/25/2024 12:06 PM

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			
0202		-	12/13/2023		47.19	(47.19)	
0205		-	12/13/2023		48.59	(48.59)	

RECORDS: SELECTED FROM USEE700 WHERE RIN = '2312144'

FLOW CODES:

WATER LEVEL FLAGS: