



APTIM
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January 17, 2025

Mr. John Heil
Environmental Protection Specialist
Colorado Energy & Carbon Management Commission
1120 Lincoln Street, Suite 801
Denver, Colorado 80203

RE: November 2024 Biannual Groundwater Monitoring Report
Cottonwood Compressor Station
Garfield County, Colorado
ECMC Facility No.: 424537

Dear Mr. Heil:

On behalf of Bargath LLC, Aptim Environmental & Infrastructure, LLC (APTIM) is pleased to present this November 2024 Biannual Groundwater Monitoring Report for Cottonwood Compressor Station located in Garfield County, Colorado.

Site Background

The Cottonwood Compressor Station (site) – Facility Number 424537 is an active compressor station operated by Williams (Bargath, LLC). During installation of cathodic protection borings at the site in January 2023, hydrocarbon impacts were observed to the west of the compressor building. While the cathodic protection borings were advanced to 30 feet below grade, the extent of impacts vertically and horizontally was not known. Investigation activities were completed with the objective of defining the extent of hydrocarbon impacts.

The Cottonwood Compressor Station is a natural gas gathering and compression facility located in the southwest quarter (SW $\frac{1}{4}$) of the northwest quarter (NW $\frac{1}{4}$) of Section 34, Township 6 South, Range 95 West of the 6th Principal Meridian, Garfield County, Colorado east-northeast of Parachute, Colorado at latitude 39.481880 and longitude -107.991962.

The site is located in an area of southwest-sloping topography at an elevation of approximately 5,248 feet above mean sea level (ft-msl). The area south of the site is generally undeveloped land with oil and gas developments and undeveloped land to the east of the site. The area to the west is Cottonwood Gulch followed by oil and gas developments. North of the site is generally undeveloped land followed by a mountainous area. An access road adjoins the site to the east.

Previous investigations have included site characterization, well installation, and groundwater monitoring.

Groundwater Monitoring and Sampling Activities

The 2024 bi-annual groundwater monitoring event was completed November 4 through November 5, 2024. Prior to groundwater sample collection, the following field parameters were collected and recorded:



- Depth to groundwater using an interface probe capable of measuring the depth to groundwater or product to an accuracy of 0.01 feet;
- Dissolved oxygen (DO), Oxygen Reduction Potential (ORP), Conductivity, Temperature and pH concentrations utilizing a multi-parameter probe capable of measuring accurate data.

The November 2024 groundwater depth measurements were correlated to the established top of casing (TOC) elevations to determine the elevation of the groundwater beneath the site. Groundwater was encountered in monitoring wells MW-01 through MW-09 at depths ranging from 56.13 (MW-03) to 67.47 (MW-06). Two monitoring wells: MW-04 and MW-05 were dry. The groundwater flow direction beneath the site is generally to the south-southeast with an average hydrologic gradient of 0.0536 vertical feet per horizontal foot across the site (measured from MW-03 to MW-09). A summary of the groundwater elevation data is summarized in **Table 1**, and the groundwater gradient is shown in **Figure 1**.

Groundwater monitoring wells MW-01 through MW-03 and MW-7 through MW-09 were purged and sampled during the groundwater monitoring event conducted in March 2024. A duplicate sample was collected from MW-02. Monitoring wells MW-04 and MW-05 were dry, and there was insufficient water to purge and sample from monitoring well MW-06. The collected groundwater samples were submitted for laboratory analysis for benzene, toluene, ethylbenzene, total xylenes (BTEX), 1,2,4 and 1,3,5-trimethylbenzene (TMB), naphthalene, chloride, total dissolved solids (TDS) and sulfate. The groundwater samples were placed in an iced and insulated cooler, under standard chain-of-custody (COC) procedures, for shipment to ALS Environmental – Holland and were received within QA/QC parameters.

Groundwater Analytical Results

The November 2024 groundwater analytical results document that each groundwater monitoring well sampled did not contain compounds above the Colorado Energy and Carbon Management Commission (ECMC) guidelines, with the exception of monitoring well MW-01. This well contained benzene and TMB concentrations above the MCL during the November 2024 groundwater monitoring event. Toluene, ethylbenzene, total xylenes, naphthalene and remaining compounds were below their respective MCLs. Groundwater analytical data for the November 2024 groundwater sampling event is summarized in **Table 2** and illustrated in **Figure 2**. Laboratory analytical results are included in Appendix A.

Conclusions

Based upon the information presented in this report, APTIM concludes the following:

- Groundwater flow direction beneath the site is generally to the south-southeast with an average hydrologic gradient of 0.0536 vertical feet per horizontal foot across the site (measured from MW-03 to MW-09).
- The groundwater sample collected from monitoring well MW-01 contained concentrations of benzene and TMB exceeding the ECMC MCLs.
- The groundwater samples collected from the remaining groundwater monitoring wells at the site, did not contain concentrations exceeding their respective laboratory reporting limits. Three of the nine monitoring wells were either dry or did not have sufficient groundwater for purging and sampling.



- Based on the site characterization and 2024 biannual groundwater monitoring events conducted at the facility, soil and groundwater impacts appear to be delineated at the time of this report.

Recommendations

Based upon the information presented in this report, APTIM concludes the following:

- Continue semi-annual groundwater monitoring activities.
- Evaluate active remedial approaches to address soil and groundwater impacts.

If you have any questions or comments, please feel free to contact me at (303) 910-7478.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jason Dowdy', is written over a blue circular scribble.

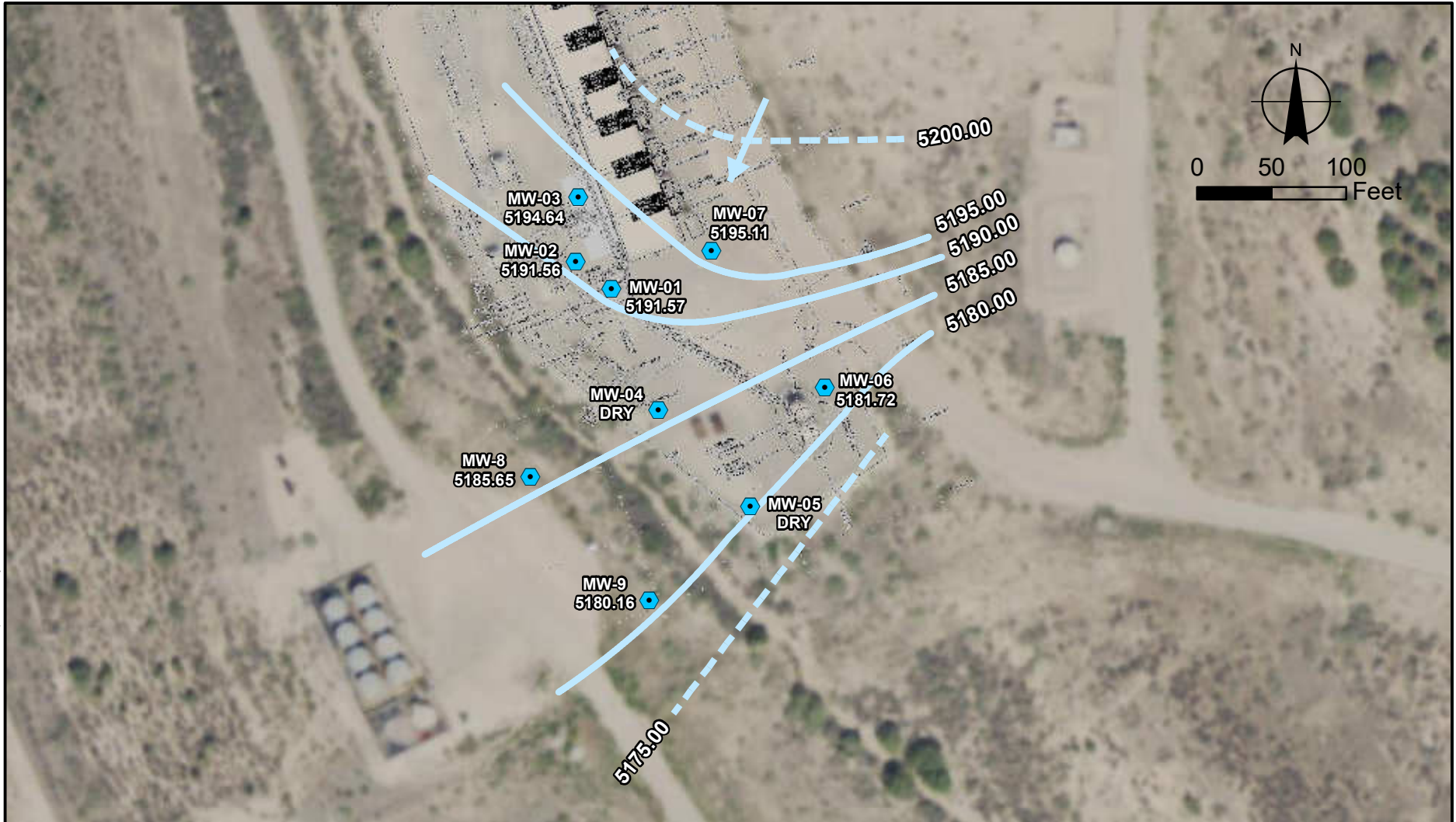
Jason Dowdy, REM
Geologist/Project Manager
Aptim Environmental & Infrastructure, LLC.

Cc: Aaron Galer
David Way




Attachments

Figures

F:\Projects\Williams\Callahan\GIS_Documents\Project_Maps\Cottonwood Groundwater November 2024 Map.mxd; Analyst: Heather Vollmer; Date: 1/9/2025 8:31:06 AM



Legend:

-  Monitoring Well
-  Groundwater Contour
-  Inferred Groundwater Contour

Notes:

1. Background imagery is the 2017 USGS National Imagery Imagery Program.
2. Ground water levels were measured November 4, 2024.

Williams (Bargath, LLC)

Cottonwood Compressor
Garfield, CO

FIGURE
NUMBER

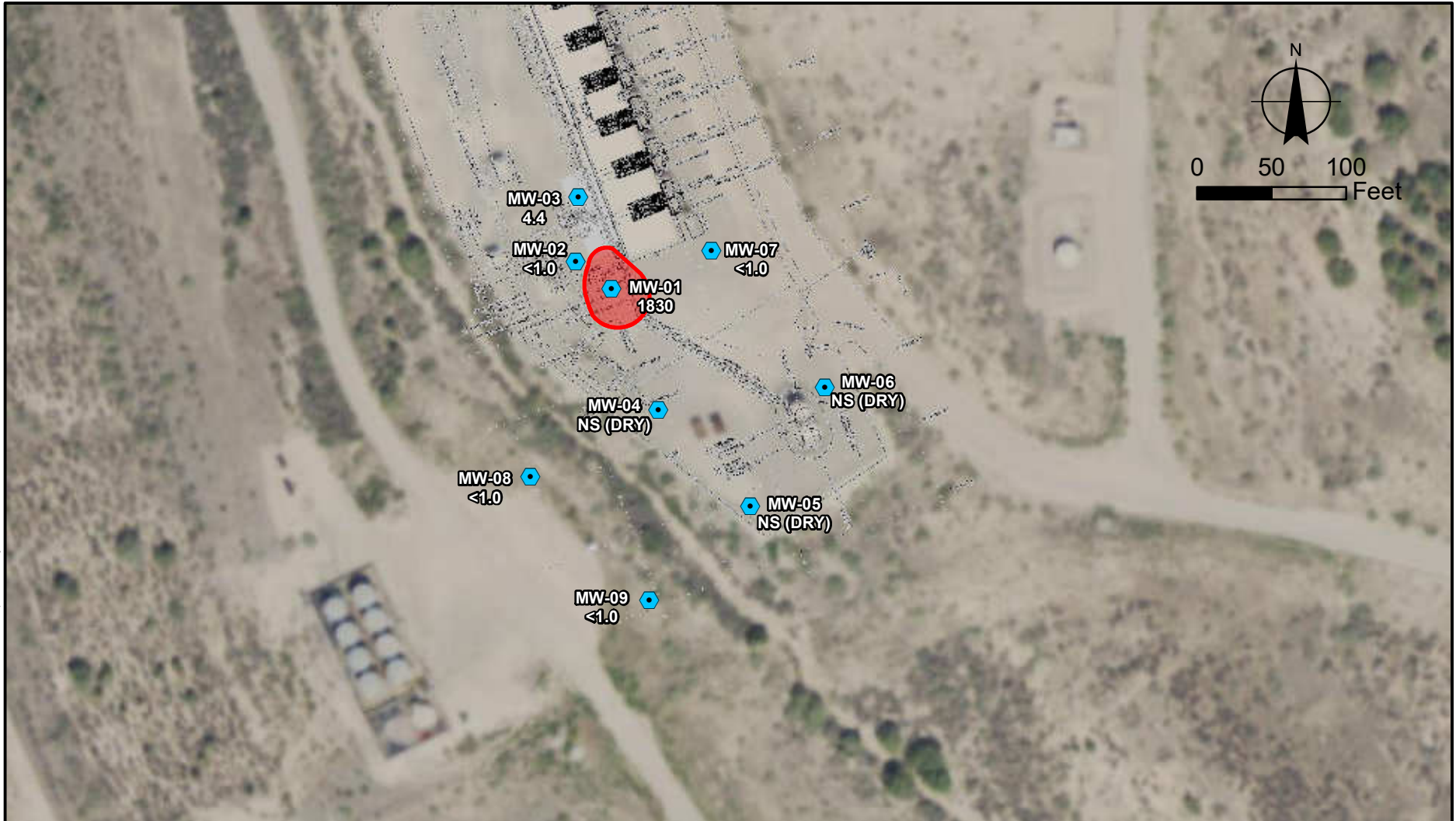
1

**Groundwater Gradient
November 2024**



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Legend:

- Monitoring Well
- COGCC Benzene Target Concentration Line >5.0 µg/L
- Inferred Benzene Target Concentration Line >5.0 µg/L
- Estimated Benzene Target Contamination Exceedance Zone 5.0 µg/L

Notes:

1. Background imagery is the 2017 USGS National Imagery Imagery Program.
2. Benzene samples were collected November 5, 2024.
3. Colorado Energy and Carbon Management (ECMC) Table 915-1 Concentration Level for Benzene = 5 µg/L.

Williams (Bargath, LLC)

Cottonwood Compressor
Garfield, CO

FIGURE
NUMBER

2

**November 2024
Benzene Isoconcentration Map**



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Tables

Table 1
 Bargath LLC - Cottonwood CS
 Comprehensive Liquid Level Data

Well ID	LATITUDE NAD83 DEGREES	LONGITUDE NAD83 DEGREES	Ground Elevation (ft BM)	Top of Casing Elevation (ft BM)	Date	Depth to Groundwater (Ft from TOC)	Depth to Product (ft below TOC)	Product Thickness (ft)	Corrected GW Elevation (ft BM) (1)
MW-01	39.48165887	-107.9919979	99.27	99.00	1/29/2023	DRY @ 59.85			
MW-01	39.48165887	-107.9919979	99.27	99.00	4/3/2023	DRY @ 59.85			
MW-01	39.48165887	-107.9919979	5250.53	5250.26	7/10/2023	45.72			5204.54
MW-01	39.48165887	-107.9919979	5250.53	5250.26	3/25/2024	53.65			5196.61
MW-01	39.48165887	-107.9919979	5250.53	5250.26	11/4/2024	58.69			5191.57
MW-02	39.4817069	-107.992085	98.89	98.58	1/29/2023	60.33			38.25
MW-02	39.4817069	-107.992085	98.89	98.58	4/3/2023	58.07			40.51
MW-02	39.4817069	-107.992085	5250.15	5249.84	7/10/2023	44.24			5205.60
MW-02	39.4817069	-107.992085	5250.15	5249.84	3/25/2024	51.71			5198.13
MW-02	39.4817069	-107.992085	5250.15	5249.84	11/4/2024	58.28			5191.56
MW-03	39.48182622	-107.9920829	99.98	99.51	1/29/2023	57.48			42.03
MW-03	39.48182622	-107.9920829	5251.24	5250.77	7/10/2023	41.63			5209.14
MW-03	39.48182622	-107.9920829	5251.24	5250.77	3/25/2024	48.81			5201.96
MW-03	39.48182622	-107.9920829	5251.24	5250.77	11/4/2024	56.13			5194.64
MW-04	39.48143804	-107.9918788	5248.81	5248.50	7/10/2023	50.26			5198.24
MW-04	39.48143804	-107.9918788	5248.81	5248.50	3/25/2024	58.67			5189.83
MW-04	39.48143804	-107.9918788	5248.81	5248.50	11/4/2024	DRY			
MW-05	39.48126589	-107.9916541	5247.86	5247.53	7/10/2023	68.23			5179.30
MW-05	39.48126589	-107.9916541	5247.86	5247.53	3/25/2024	DRY			
MW-05	39.48126589	-107.9916541	5247.86	5247.53	11/4/2024	DRY			
MW-06	39.4814881	-107.9914848	5249.85	5249.19	7/10/2023	64.11			5185.08
MW-06	39.4814881	-107.9914848	5249.85	5249.19	3/25/2024	66.14			5183.05
MW-06	39.4814881	-107.9914848	5249.85	5249.19	11/4/2024	67.47			5181.72
MW-07	39.48173458	-107.9917633	5250.43	5250.05	7/10/2023	43.96			5206.09
MW-07	39.48173458	-107.9917633	5250.43	5250.05	3/25/2024	50.27			5199.78
MW-07	39.48173458	-107.9917633	5250.43	5250.05	11/4/2024	54.94			5195.11
MW-08	39.48130822	-107.9921779	5244.40	5247.47	3/28/2024	56.32			5191.15
MW-08	39.48130822	-107.9921779	5244.40	5247.47	11/4/2024	61.82			5185.65
MW-09	39.4810873	-107.9918882	5241.47	5244.44	3/27/2024	59.79			5184.65
MW-09	39.4810873	-107.9918882	5241.47	5244.44	11/4/2024	64.28			5180.16

Table 2
Bargath LLC - Cottonwood CS
Comprehensive Groundwater Analytical Summary

Sample Location	Media	COGCC Table 915-1 Concentration Levels	5 µg/L	1000 µg/L	700 µg/L	10,000 µg/L	67 µg/L	67 µg/L	140 µg/L	250 mg/l or <1.25 X Background	<1.25 X Background	250 mg/l or <1.25 X Background	Field Parameters						
													Sampling Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	1,2,4-Trimethylbenzene (µg/L)	1,3,5-Trimethylbenzene (µg/L)
MW01	Groundwater	1/29/2023	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW01	Groundwater	7/11/2023	2000	260	310	2600	230	240	<50	37.1	890	73	1.76	-119.2	1.400	18.0	7.32		
MW01	Groundwater	3/25/2024	1900	56	470	790	350	370	<120	34.9	850	<1.0	2.01	-119.3	1.448	12.7	7.44		
MW01	Groundwater	11/5/2024	1830	2.05	425	3440	248	288	9.65	40.3	833	<1.0	2.21	-109.8	1.455	11.8	7.34		
MW02	Groundwater	1/29/2023	7.2	14	<1.0	13	<1.0	<1.0	<5.0	36.9	1100	300	NT	NT	NT	NT	NT	NT	
MW02	Groundwater	7/11/2023	2.5	1.8	<1.0	<3.0	<1.0	<1.0	<5.0	32.9	950	290	1.39	-106.9	1.341	16.5	7.29		
MW02	Groundwater	3/25/2024	1.8	<1.0	<1.0	<3.0	<1.0	<1.0	<5.0	39.9	930	348	2.21	-100.3	1.588	10.9	7.44		
MW02	Groundwater	11/5/2024	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<5.0	36.1	1030	317	2.01	-97.8	1.504	11.4	7.51		
MW02(DUP)	Groundwater	11/5/2024	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<5.0	36.3	1010	320	2.01	-97.8	1.504	11.4	7.51		
MW03	Groundwater	1/29/2023	190	7.1	90	700	67	80	<5.0	43.9	890	58	NT	NT	NT	NT	NT	NT	
MW03	Groundwater	7/11/2023	160	<1.0	69	240	64	78	<5.0	34.2	1000	290	1.79	-114.5	1.619	16.8	7.22		
MW03	Groundwater	3/25/2024	80	<1.0	4.3	22	2.8	30	<5.0	39.9	910	294	2.47	-97.4	1.817	11.2	7.49		
MW03	Groundwater	11/5/2024	4.4	<1.0	<1.0	<2.0	<1.0	1.06	<5.0	36.8	1030	268	2.33	-101.3	1.788	11.6	7.53		
MW03 DUP	Groundwater	7/11/2023	170	<1.0	73	200	68	82	<5.0	34.4	1100	280	1.79	-114.5	1.619	16.8	7.22		
MW03 DUP	Groundwater	3/25/2024	62	<1.0	2.9	9.5	1.6	22	<5.0	39.1	990	356	2.47	-97.4	1.817	11.2	7.49		
MW04	Groundwater	7/11/2023	790	<1.0	<1.0	<1.0	<1.0	1.3	<5.0	41.3	940	180	2.02	-64.1	1.445	16.9	7.07		
MW04	Groundwater	3/25/2024	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0	<5.0	10.0	990	281	2.84	-10.5	1.545	12.8	7.10		
MW04	Groundwater	11/5/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
MW05	Groundwater	7/11/2023	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	42.7	1100	320	3.01	-39.4	1.580	17.6	7.06		
MW05	Groundwater	3/25/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
MW05	Groundwater	11/5/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
MW06	Groundwater	7/11/2023	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	38.7	1400	550	3.08	5.8	1.802	17.5	7.07		
MW06	Groundwater	3/25/2024	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<25	53.2	1400	849	2.59	25.2	1.924	12.8	7.12		
MW06	Groundwater	11/5/2024	NOT ENOUGH WATER TO COLLECT SAMPLE																
MW07	Groundwater	7/11/2023	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<5.0	38.7	1000	330	1.43	-1.0	1.514	18.2	7.10		
MW07	Groundwater	3/25/2024	<1.0	1.0	<1.0	<3.0	<1.0	<1.0	<5.0	38.5	1000	534	3.14	34.1	1.599	13.2	7.21		
MW07	Groundwater	11/5/2024	<1.0	1.0	<1.0	<2.0	<1.0	<1.0	<5.0	37.4	1010	324	3.10	-45.5	1.599	11.8	7.16		
MW08	Groundwater	3/28/2024	<1.0	1.0	<1.0	<3.0	<1.0	<1.0	<5.0	41.4	1100	394	2.07	-76.6	1.655	14.2	7.09		
MW08	Groundwater	11/5/2024	<1.0	1.0	<1.0	<2.0	<1.0	<1.0	<5.0	30.6	1300	462	3.97	-3.0	1.755	11.2	7.25		
MW09	Groundwater	3/27/2024	<1.0	12	<1.0	11	<1.0	<1.0	<5.0	3.11	1700	331	2.05	-55.1	1.558	14.1	7.13		
MW09	Groundwater	11/5/2024	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<5.0	33.5	1090	364	2.69	4.0	1.624	10.7	7.20		

Note:
J - Indicates an estimated value below laboratory reporting limit
S - Spike Recovery outside laboratory control limits
U - Analyzed but not detected above the MDL
NS = Not Sampled
NT = Not Tested
µg/L - Micrograms per Liter
mg/L - Milligrams per Liter
Above ECMC (formerly COGCC) Table 915-1 Concentration Level

Attachment A
Laboratory Analytical Reports