LMS/GUP/S31483

2020 Verification Monitoring Report for the Gunnison, Colorado, Processing Site

January 2021

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Contents

Table

Attachments

Abbreviations

COPC	contaminants of potential concern
DOE	U.S. Department of Energy
DWEL	drinking water equivalent level
EPA	U.S. Environmental Protection Agency
GCAP	Groundwater Compliance Action Plan
IC	institutional control
LM	Office of Legacy Management
MCL	maximum concentration limit
NRC	U.S. Nuclear Regulatory Commission
VMR	Verification Monitoring Report

1.0 Introduction

This Verification Monitoring Report (VMR) documents the results of the 2020 risk-informed groundwater and surface water sampling event for the Gunnison, Colorado, Processing Site (Gunnison site). The COVID-19 pandemic necessitated a risk-informed sampling approach in 2020. In 2015, the U.S. Nuclear Regulatory Commission (NRC) accepted the Groundwater Compliance Action Plan (GCAP), which documented the selection of the natural flushing compliance strategy with continued groundwater and surface water monitoring and institutional controls (ICs). Previous VMRs and the GCAP for the Gunnison site are available on the U.S. Department of Energy (DOE) Office of Legacy Management (LM) website at https://www.lm.doe.gov/Gunnison/Processing/Documents.aspx. Sampling data is available on the Geospatial Environmental Mapping System (GEMS) website at https://gems.lm.doe.gov/#site=GUP.

2.0 Background

The Gunnison site is in Gunnison County, Colorado, approximately 0.5 mile southwest of the City of Gunnison. The site is primarily defined by the IC boundary encompassing an area of approximately 1030 acres, which includes the former mill site and the area downgradient of the former mill site (Attachment 1, Figure 1). Uranium and manganese are the two contaminants of potential concern (COPCs) in the groundwater at the Gunnison site.

- Uranium: The maximum concentration limit (MCL) for uranium in groundwater and surface water is 0.044 milligrams per liter (mg/L). Standards for uranium in groundwater and surface water at Uranium Mill Tailings Radiation Control Act sites were established by the U.S. Environmental Protection Agency (EPA) in Title 40 *Code of Federal Regulations* Section 192 (40 CFR 192).
- Manganese: Manganese is also a COPC in groundwater and surface water at the Gunnison site although manganese has no established MCL. Therefore, manganese is monitored and compared to the EPA drinking water equivalent level (DWEL) of 1.6 mg/L found in the *2018 Edition of the Drinking Water Standards and Health Advisories Tables* (EPA 2018). The DWEL is a lifetime-exposure concentration protective of adverse, noncancer health effects that assumes all the exposure to a contaminant is from drinking water.

Due to circumstances surrounding the COVID-19 pandemic, a risk-informed sampling approach was implemented for the 2020 annual sampling that differed from the monitoring requirements described in the GCAP. The risk-informed sampling approach included sampling of five domestic wells and six surface water locations shown in Table 1.

Table 1. Domestic Well and Surface Water Sample Locations at the Gunnison Site

Sample Point	Aquifer Zone	Use	Location	Rationale (Uranium)
Domestic Wells				
0476	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0477	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0478	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0667	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
0683	Shallow	Potable	West of Gunnison River	Verify low COPC concentrations
Surface Water				
0248	N/A		Tomichi Creek	Downstream of gravel pit pond
0250	N/A		Gunnison River – South Fork	Monitor potential aquifer discharge
0251	N/A		Tomichi Creek	Monitor potential aquifer discharge
0777	N/A		Gravel Pit Pond	Gravel pit discharge
0780	N/A		Gunnison River	Upstream of IC boundary
0795	N/A		Gunnison River	Downstream of IC boundary

DOE informed NRC of this 2020 risk-informed sampling approach in a letter dated April 6, 2020, and in meetings prior. DOE and NRC agreed that the 2020 monitoring event would be limited to the domestic wells and surface locations. The data presented in the 2020 VMR is limited to the domestic wells and surface water locations. For the 2020 sampling event, all samples were collected in July 2020 and sampled for uranium and manganese.

The analysis and conclusions in this VMR summary are supported by the following attached materials and links:

- Attachment 1: Site Figures
- Attachment 2: Time vs. Concentration Plots
- Attachment 3: Groundwater Quality Data by Parameter for Domestic Wells
- Attachment 4: Surface Water Quality Data by Parameter

3.0 Data Analysis

Analytical data for the Gunnison site is summarized and presented in the following three areas: Section 3.1, "Domestic Wells," Section 3.2, "Surface Water," and Section 4.0, "Conclusions."

3.1 Domestic Wells

Results from the 2020 sampling event indicate that uranium concentrations in sampled domestic wells were below the MCL (Attachment 2, Plot 1). Concentrations of manganese in sampled domestic wells were below the DWEL of 1.6 mg/L (Attachment 2, Plot 2). In notification letters dated November 13, 2020, DOE sent sample results to each domestic well owner with a courtesy copy to the Colorado Department of Public Health and Environment.

3.2 Surface Water

Concentrations of uranium in surface water in the Gunnison River during 2020 ranged from 0.0011 to 0.0012 mg/L and were consistent with historical results (Attachment 2, Plot 3). Downstream uranium concentrations (locations 0250 and 0795) were within 0.001 mg/L of the upstream (location 0251) concentrations, indicating that discharge of alluvial groundwater has no impact on river water quality. The concentration of uranium (0.047 mg/L) in surface water in the gravel-pit pond (0780) continued to be 1 order of magnitude above background groundwater (0.0029 to 0.0038 mg/L; from 2019 sample data, background wells were not sampled in 2020) and 2 orders of magnitude above Gunnison River surface water. Uranium concentrations in the gravel-pit pond continue to exceed background indicating the gravel-pit pond continues to receive discharge of alluvial groundwater (DOE 2010).

Surface water sampling location 0248, approximately 1500 feet downstream of the gravel-pit pond discharge point, is on the abandoned channel of Tomichi Creek. In 2020, the concentration of uranium in the sample collected from location 0248 (0.011 mg/L) was elevated compared to background because it receives some water from the gravel-pit pond (0.047 mg/L at location 0780). The concentration of uranium in the sample collected farther downstream on Tomichi Creek at location 0777 was lower (0.003 mg/L) indicating Tomichi Creek is not affected by potential aquifer discharge (DOE 2010). Concentrations of manganese in samples collected from all surface water locations were below the DWEL of 1.6 mg/L (Attachment 2, Plot 4).

4.0 Conclusions

Uranium concentrations in the domestic wells sampled at the Gunnison site were all below the MCL (Attachment 2, Plot 1), and manganese concentrations in these wells were all below the DWEL (Attachment 2, Plot 2).

The lower uranium concentrations in the Gunnison River samples indicate no measurable impact on river water quality (DOE 2010). The uranium concentration at the gravel-pit pond (location 0780) continues to be above background in groundwater and surface water and above the groundwater MCL at 0.047 mg/L, which indicates that the gravel-pit pond continues to be an expression of contaminated alluvial groundwater (DOE 2010).

5.0 References

40 CFR 192. U.S. Environmental Protection Agency, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings,” *Code of Federal Regulations*.

DOE (U.S. Department of Energy), 2010. *Final Groundwater Compliance Action Plan for the Gunnison, Colorado, Processing Site*, LMS/GUP/S06004, Office of Legacy Management, April.

EPA (U.S. Environmental Protection Agency), 2018. *2018 Edition of the Drinking Water Standards and Health Advisories*, EPA 822-F-18-001, Office of Water, March.

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Attachment 1

Site Figures

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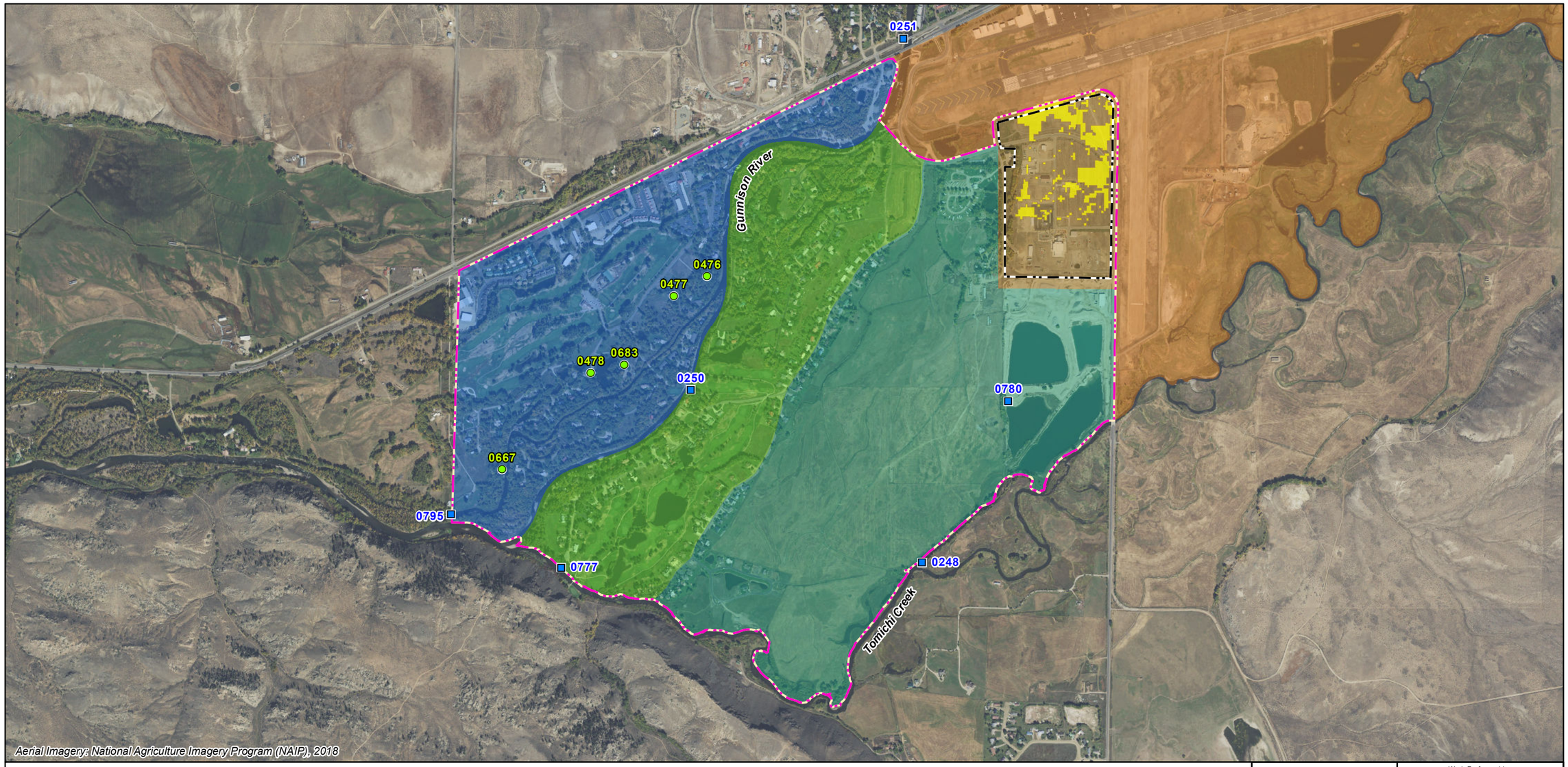

Figure 1. Domestic Wells, Surface Water Monitoring Locations, and Monitoring Areas

Figure 2. Uranium and Manganese Distribution

Attachment 2

Time vs. Concentration Plots

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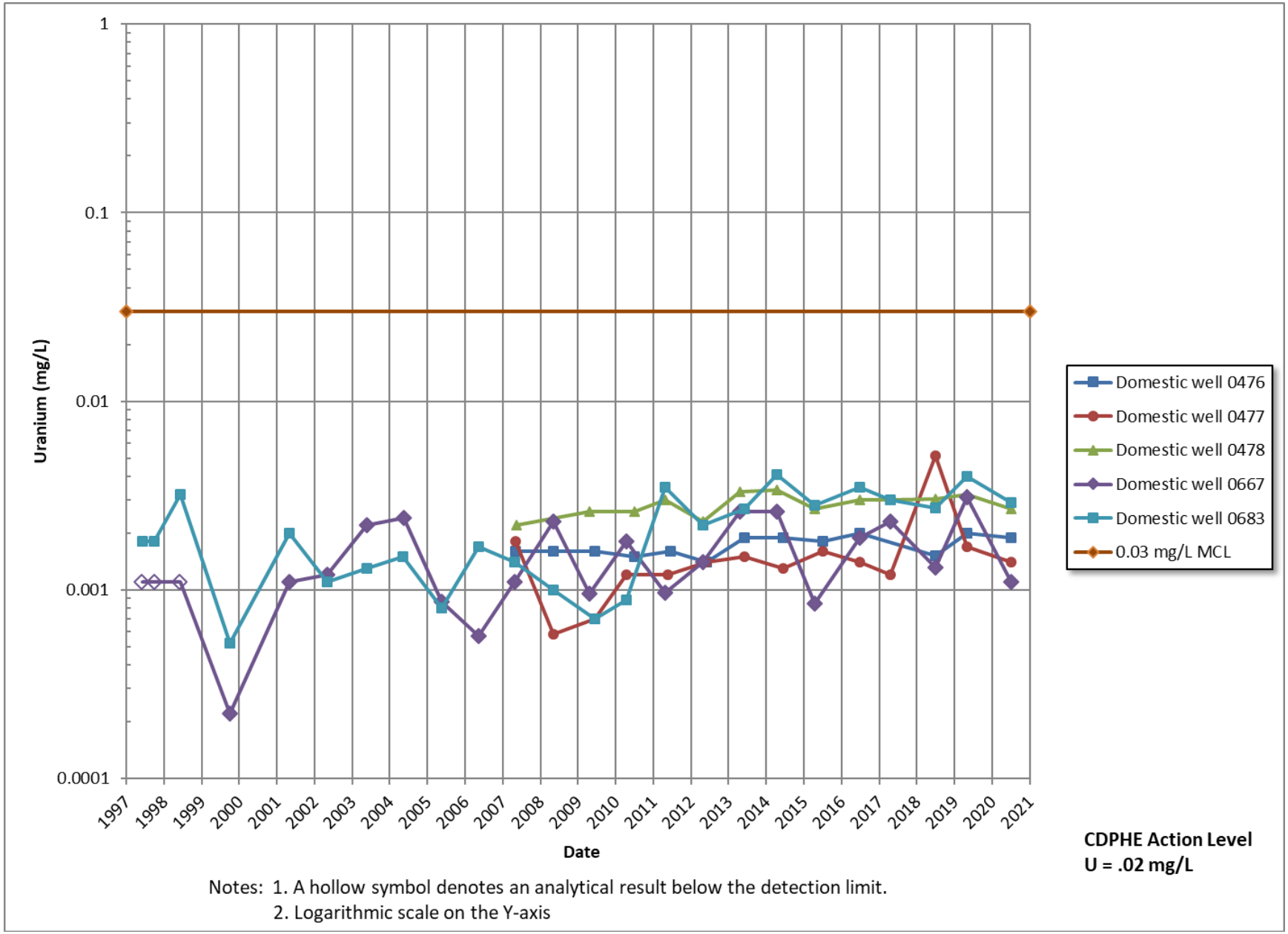
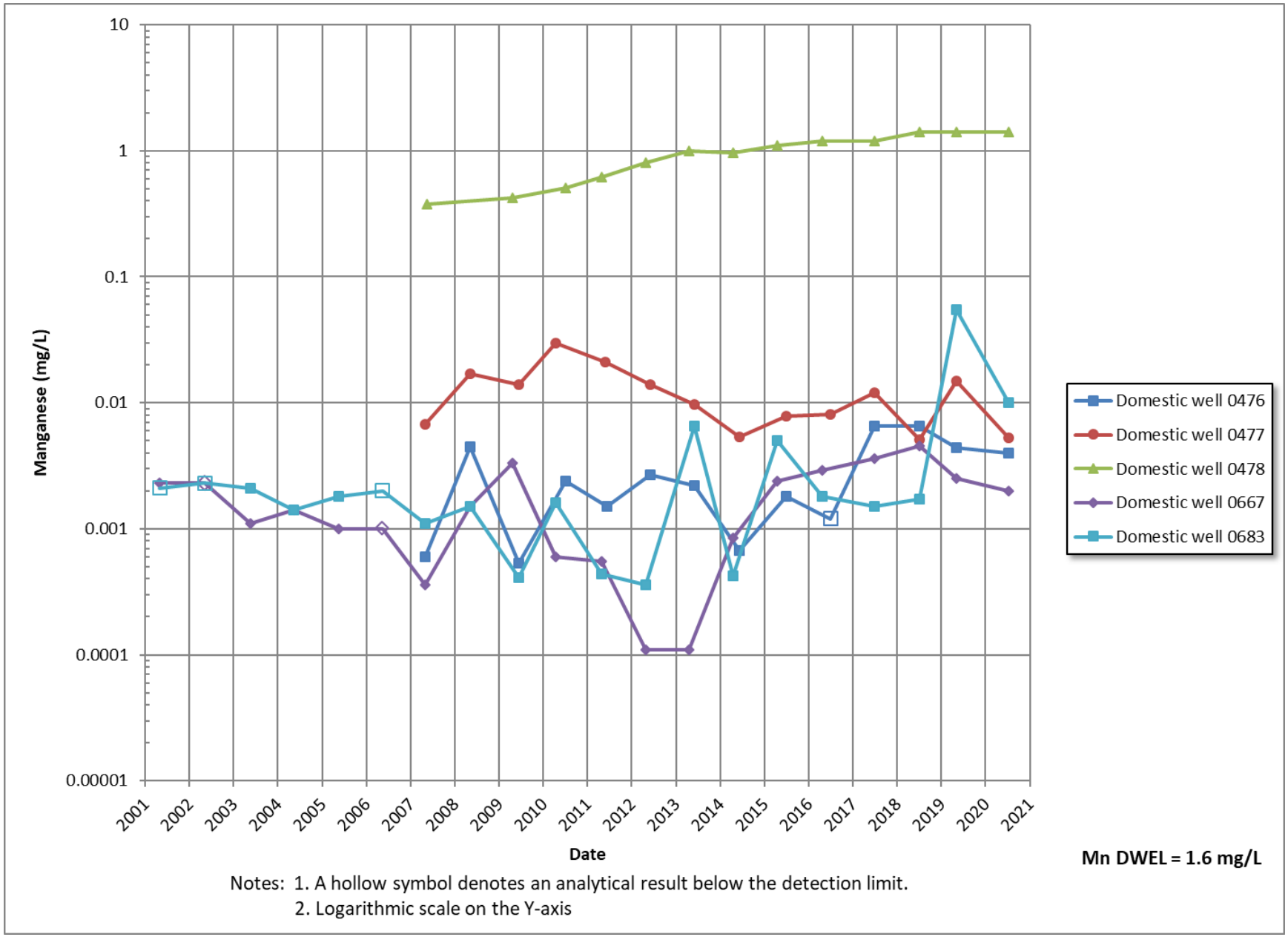
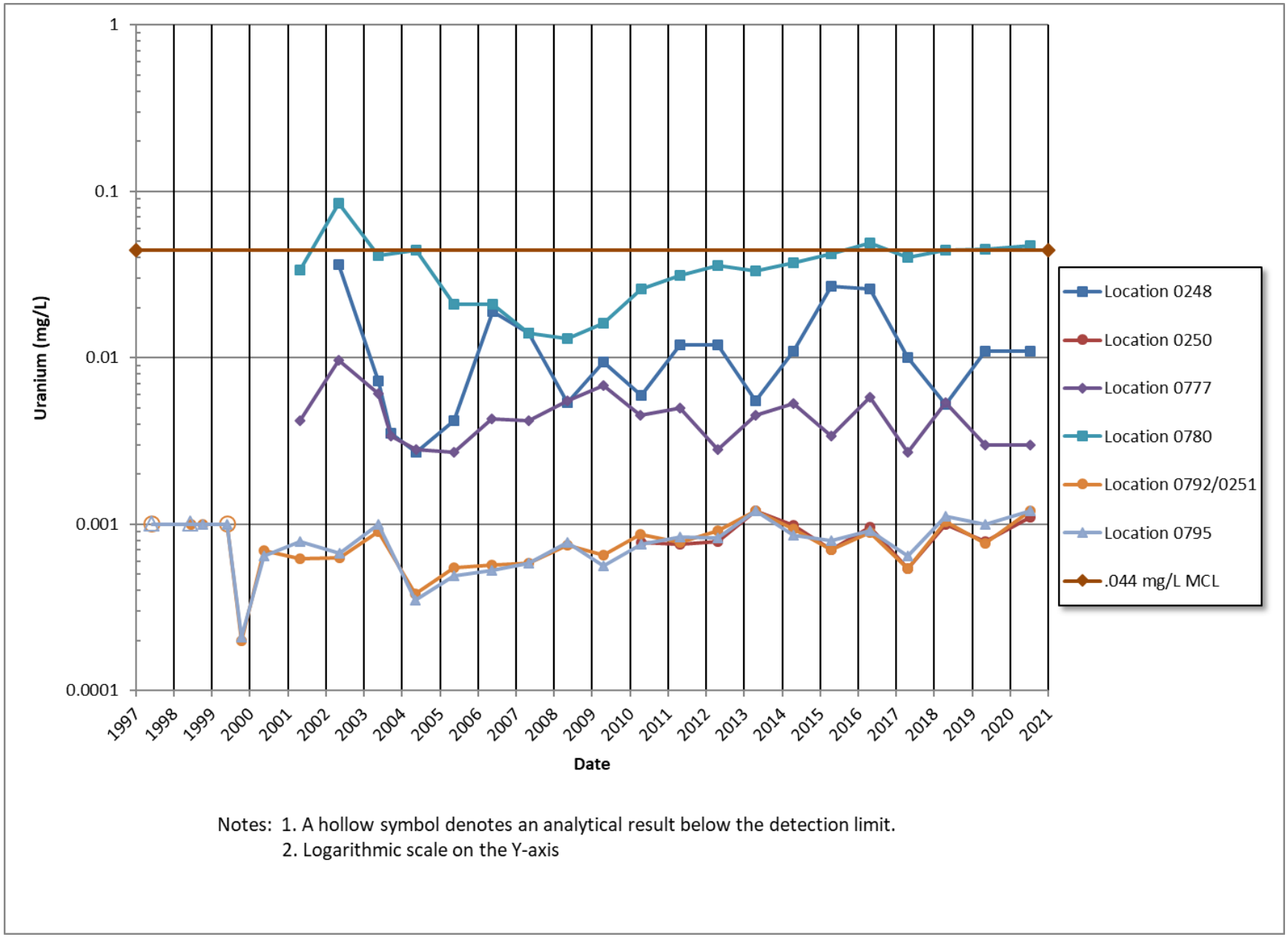


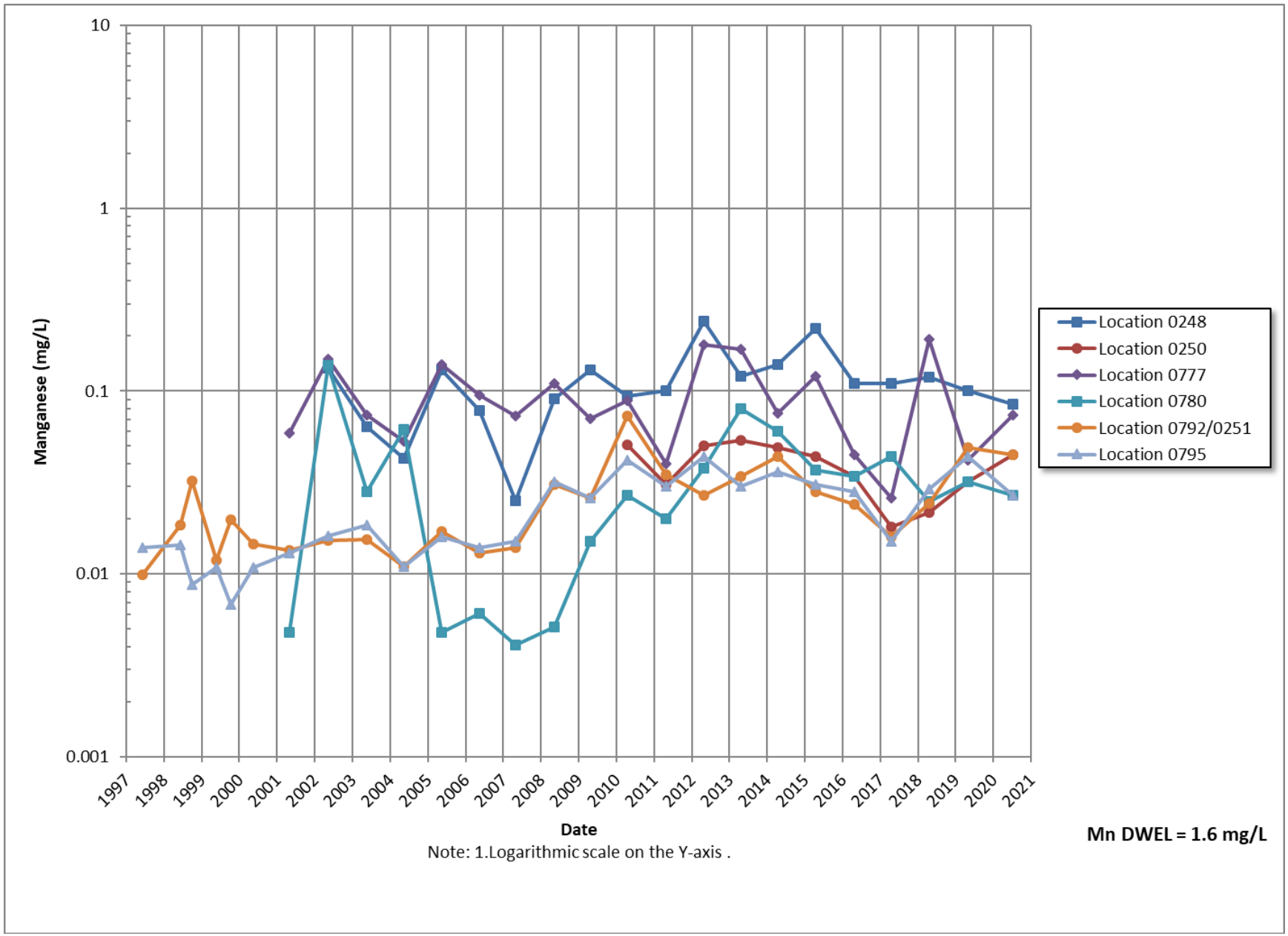
Plot 1. Uranium Concentrations in Groundwater, Domestic Wells Downgradient of the Former Mill Site (West of Gunnison River)



Plot 2. Manganese Concentrations in Groundwater, Domestic Wells Downgradient of the Former Mill Site (West of Gunnison River)



Plot 3. Uranium Concentrations in Surface Water near the Gunnison Site



Plot 4. Manganese Concentrations in Surface Water near the Gunnison Site

Attachment 3

Groundwater Quality Data by Parameter for Domestic Wells

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GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Alkalinity, Total (As CaCO3)														
Alkalinity, Total (As CaCO3)	0477	WL	DOM	6/11/2019	(N)F			116	mg/L			#	-	-
Alkalinity, Total (As CaCO3)	0683	WL	DOM	6/11/2019	(N)F			125	mg/L			#	-	-
Manganese														
Manganese	0476	WL	DOM	7/3/2018	(T)F			0.00652	mg/L			#	0.0005	-
Manganese	0476	WL	DOM	5/2/2019	(T)F			0.0044	mg/L	J		#	0.00049	-
Manganese	0476	WL	DOM	7/7/2020	(T)F			0.004	mg/L	J		#	0.00074	-
Manganese	0477	WL	DOM	7/3/2018	(T)D			0.00513	mg/L			#	0.0005	-
Manganese	0477	WL	DOM	7/3/2018	(T)F			0.00509	mg/L			#	0.0005	-
Manganese	0477	WL	DOM	6/11/2019	(T)F			0.015	mg/L			#	0.00049	-
Manganese	0477	WL	DOM	7/7/2020	(T)F			0.0053	mg/L	J		#	0.00074	-
Manganese	0478	WL	DOM	4/18/2018	(T)F			1.42	mg/L	D		#	0.001	-
Manganese	0478	WL	DOM	4/18/2018	(T)D			1.42	mg/L	D		#	0.001	-
Manganese	0478	WL	DOM	5/1/2019	(T)F			1.4	mg/L			#	0.00049	-
Manganese	0478	WL	DOM	7/7/2020	(T)F			1.4	mg/L			#	0.00074	-
Manganese	0667	WL	DOM	4/18/2018	(T)F			0.00452	mg/L			#	0.0001	-
Manganese	0667	WL	DOM	5/1/2019	(T)F			0.0025	mg/L	J		#	0.00049	-
Manganese	0667	WL	DOM	7/7/2020	(T)F			0.002	mg/L	J		#	0.00074	-
Manganese	0683	WL	DOM	7/3/2018	(T)F			0.00173	mg/L			#	0.0005	-
Manganese	0683	WL	DOM	6/11/2019	(T)D			0.055	mg/L			#	0.00049	-
Manganese	0683	WL	DOM	6/11/2019	(T)F			0.054	mg/L			#	0.00049	-
Manganese	0683	WL	DOM	7/7/2020	(T)F			0.01	mg/L			#	0.00074	-
Oxidation Reduction Potential														
Oxidation Reduction Potential	0476	WL	DOM	7/3/2018	(N)F			218	mV			#	-	-
Oxidation Reduction Potential	0476	WL	DOM	5/2/2019	(N)F			220.1	mV			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Oxidation Reduction Potential	0476	WL	DOM	7/7/2020	(N)F			236.9	mV			#	-	-
Oxidation Reduction Potential	0477	WL	DOM	7/3/2018	(N)F			244	mV			#	-	-
Oxidation Reduction Potential	0477	WL	DOM	6/11/2019	(N)F			54	mV			#	-	-
Oxidation Reduction Potential	0477	WL	DOM	7/7/2020	(N)F			147	mV			#	-	-
Oxidation Reduction Potential	0478	WL	DOM	4/18/2018	(N)F			181	mV			#	-	-
Oxidation Reduction Potential	0478	WL	DOM	5/1/2019	(N)F			57.1	mV			#	-	-
Oxidation Reduction Potential	0478	WL	DOM	7/7/2020	(N)F			180.1	mV			#	-	-
Oxidation Reduction Potential	0667	WL	DOM	4/18/2018	(N)F			205.3	mV			#	-	-
Oxidation Reduction Potential	0667	WL	DOM	5/1/2019	(N)F			111.2	mV			#	-	-
Oxidation Reduction Potential	0667	WL	DOM	7/7/2020	(N)F			195.4	mV			#	-	-
Oxidation Reduction Potential	0683	WL	DOM	7/3/2018	(N)F			201	mV			#	-	-
Oxidation Reduction Potential	0683	WL	DOM	6/11/2019	(N)F			155	mV			#	-	-
Oxidation Reduction Potential	0683	WL	DOM	7/7/2020	(N)F			157.6	mV			#	-	-
pH														
pH	0476	WL	DOM	7/3/2018	(N)F			7.27	s.u.			#	-	-
pH	0476	WL	DOM	5/2/2019	(N)F			7.55	s.u.			#	-	-
pH	0476	WL	DOM	7/7/2020	(N)F			7.15	s.u.			#	-	-
pH	0477	WL	DOM	7/3/2018	(N)F			6.92	s.u.			#	-	-
pH	0477	WL	DOM	6/11/2019	(N)F			6.75	s.u.			#	-	-
pH	0477	WL	DOM	7/7/2020	(N)F			7.31	s.u.			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
pH	0478	WL	DOM	4/18/2018	(N)F			7.59	s.u.			#	-	-
pH	0478	WL	DOM	5/1/2019	(N)F			6.64	s.u.			#	-	-
pH	0478	WL	DOM	7/7/2020	(N)F			6.81	s.u.			#	-	-
pH	0667	WL	DOM	4/18/2018	(N)F			6.94	s.u.			#	-	-
pH	0667	WL	DOM	5/1/2019	(N)F			6.85	s.u.			#	-	-
pH	0667	WL	DOM	7/7/2020	(N)F			7.05	s.u.			#	-	-
pH	0683	WL	DOM	7/3/2018	(N)F			7.75	s.u.			#	-	-
pH	0683	WL	DOM	6/11/2019	(N)F			6.82	s.u.			#	-	-
pH	0683	WL	DOM	7/7/2020	(N)F			7.59	s.u.			#	-	-
Specific Conductance														
Specific Conductance	0476	WL	DOM	7/3/2018	(N)F			233	umhos/cm			#	-	-
Specific Conductance	0476	WL	DOM	5/2/2019	(N)F			244	umhos/cm			#	-	-
Specific Conductance	0476	WL	DOM	7/7/2020	(N)F			259	umhos/cm			#	-	-
Specific Conductance	0477	WL	DOM	7/3/2018	(N)F			249	umhos/cm			#	-	-
Specific Conductance	0477	WL	DOM	6/11/2019	(N)F			258	umhos/cm			#	-	-
Specific Conductance	0477	WL	DOM	7/7/2020	(N)F			232	umhos/cm			#	-	-
Specific Conductance	0478	WL	DOM	4/18/2018	(N)F			286	umhos/cm			#	-	-
Specific Conductance	0478	WL	DOM	5/1/2019	(N)F			287	umhos/cm			#	-	-
Specific Conductance	0478	WL	DOM	7/7/2020	(N)F			266	umhos/cm			#	-	-
Specific Conductance	0667	WL	DOM	4/18/2018	(N)F			226	umhos/cm			#	-	-
Specific Conductance	0667	WL	DOM	5/1/2019	(N)F			248	umhos/cm			#	-	-
Specific Conductance	0667	WL	DOM	7/7/2020	(N)F			235	umhos/cm			#	-	-
Specific Conductance	0683	WL	DOM	7/3/2018	(N)F			270	umhos/cm			#	-	-
Specific Conductance	0683	WL	DOM	6/11/2019	(N)F			331	umhos/cm			#	-	-
Specific Conductance	0683	WL	DOM	7/7/2020	(N)F			264	umhos/cm			#	-	-

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Temperature														
Temperature	0476	WL	DOM	7/3/2018	(N)F			16.3	C			#	-	-
Temperature	0476	WL	DOM	5/2/2019	(N)F			13.45	C			#	-	-
Temperature	0476	WL	DOM	7/7/2020	(N)F			17.52	C			#	-	-
Temperature	0477	WL	DOM	7/3/2018	(N)F			17.95	C			#	-	-
Temperature	0477	WL	DOM	6/11/2019	(N)F			9.51	C			#	-	-
Temperature	0477	WL	DOM	7/7/2020	(N)F			10.73	C			#	-	-
Temperature	0478	WL	DOM	4/18/2018	(N)F			13.06	C			#	-	-
Temperature	0478	WL	DOM	5/1/2019	(N)F			14.75	C			#	-	-
Temperature	0478	WL	DOM	7/7/2020	(N)F			18.48	C			#	-	-
Temperature	0667	WL	DOM	4/18/2018	(N)F			10.62	C			#	-	-
Temperature	0667	WL	DOM	5/1/2019	(N)F			11.98	C			#	-	-
Temperature	0667	WL	DOM	7/7/2020	(N)F			19.73	C			#	-	-
Temperature	0683	WL	DOM	7/3/2018	(N)F			11.3	C			#	-	-
Temperature	0683	WL	DOM	6/11/2019	(N)F			10.44	C			#	-	-
Temperature	0683	WL	DOM	7/7/2020	(N)F			12.51	C			#	-	-
Turbidity														
Turbidity	0476	WL	DOM	7/3/2018	(N)F			8.66	NTU			#	-	-
Turbidity	0476	WL	DOM	5/2/2019	(N)F			4.63	NTU			#	-	-
Turbidity	0476	WL	DOM	7/7/2020	(N)F			1.6	NTU			#	-	-
Turbidity	0477	WL	DOM	7/3/2018	(N)F			2.42	NTU			#	-	-
Turbidity	0477	WL	DOM	6/11/2019	(N)F			7.22	NTU			#	-	-
Turbidity	0477	WL	DOM	7/7/2020	(N)F			4.3	NTU			#	-	-
Turbidity	0478	WL	DOM	4/18/2018	(N)F			0.4	NTU			#	-	-
Turbidity	0478	WL	DOM	5/1/2019	(N)F			1.38	NTU			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Turbidity	0478	WL	DOM	7/7/2020	(N)F			2.52	NTU			#	-	-
Turbidity	0667	WL	DOM	4/18/2018	(N)F			3	NTU			#	-	-
Turbidity	0667	WL	DOM	5/1/2019	(N)F			0.45	NTU			#	-	-
Turbidity	0667	WL	DOM	7/7/2020	(N)F			1.17	NTU			#	-	-
Turbidity	0683	WL	DOM	7/3/2018	(N)F			1.99	NTU			#	-	-
Turbidity	0683	WL	DOM	6/11/2019	(N)F			1.47	NTU			#	-	-
Turbidity	0683	WL	DOM	7/7/2020	(N)F			2.52	NTU			#	-	-

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PARAMETER	LOCATION CODE/TYPE/SUBTYPE			SAMPLE DATE	SAMPLE TYPE	DEPTH RANGE (FT BLS)		RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECTION LIMIT	UNCERTAINTY
Uranium														
Uranium	0476	WL	DOM	7/3/2018	(T)F			0.00152	mg/L			#	0.00005	-
Uranium	0476	WL	DOM	5/2/2019	(T)F			0.002	mg/L			#	0	-
Uranium	0476	WL	DOM	7/7/2020	(T)F			0.0019	mg/L			#	0.00004	-
Uranium	0477	WL	DOM	7/3/2018	(T)D			0.00155	mg/L			#	0.00005	-
Uranium	0477	WL	DOM	7/3/2018	(T)F			0.00153	mg/L			#	0.00005	-
Uranium	0477	WL	DOM	6/11/2019	(T)F			0.0017	mg/L			#	0	-
Uranium	0477	WL	DOM	7/7/2020	(T)F			0.0014	mg/L			#	0.00004	-
Uranium	0478	WL	DOM	4/18/2018	(T)D			0.00304	mg/L			#	0.00003	-
Uranium	0478	WL	DOM	4/18/2018	(T)F			0.00279	mg/L			#	0.00003	-
Uranium	0478	WL	DOM	5/1/2019	(T)F			0.0032	mg/L			#	0	-
Uranium	0478	WL	DOM	7/7/2020	(T)F			0.0027	mg/L			#	0.00004	-
Uranium	0667	WL	DOM	4/18/2018	(T)F			0.00132	mg/L			#	0.00003	-
Uranium	0667	WL	DOM	5/1/2019	(T)F			0.0031	mg/L			#	0	-
Uranium	0667	WL	DOM	7/7/2020	(T)F			0.0011	mg/L			#	0.00004	-
Uranium	0683	WL	DOM	7/3/2018	(T)F			0.00272	mg/L			#	0.00005	-
Uranium	0683	WL	DOM	6/11/2019	(T)D			0.0038	mg/L			#	0	-
Uranium	0683	WL	DOM	6/11/2019	(T)F			0.004	mg/L			#	0	-
Uranium	0683	WL	DOM	7/7/2020	(T)F			0.0029	mg/L			#	0.00004	-

LOCATION TYPE:

WL WELL

LOCATION SUBTYPES:

DOM Domestic Well

GENERAL WATER QUALITY DATA BY PARAMETER (EQuIS205) FOR SITE GUN01, Gunnison Processing Site

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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	Tentatively identified compound (TIC).
Q	Qualitative result due to sampling technique
R	Unusable result.
U	Parameter analyzed for but was not detected.
X	Location is undefined.

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 Value.
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 Aroclor concentrations between 2 columns.
S	Result determined by method of standard addition (MSA).
U	Parameter analyzed for but was not detected.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.

X	Laboratory defined qualifier, see case narrative.
Y	Laboratory defined qualifier, see case narrative.
Z	Laboratory defined qualifier, see case narrative.

SAMPLE TYPES:

Fraction:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes:

F-Field Sample	R-Replicate	FR-Field Sample with Replicates
D-Duplicate	N-Not Known	S-Split Sample

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

Attachment 4

Surface Water Quality Data by Parameter

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SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

REPORT DATE: 9/22/2020 2:32:43 PM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Manganese										
Manganese	0248	4/17/2018	(T)F	0.119	mg/L			#	0.0001	-
Manganese	0248	5/2/2019	(T)F	0.1	mg/L			#	0.00049	-
Manganese	0248	7/7/2020	(T)F	0.085	mg/L			#	0.00074	-
Manganese	0250	4/18/2018	(T)F	0.0218	mg/L			#	0.0001	-
Manganese	0250	5/2/2019	(D)F	0.032	mg/L			#	0.00049	-
Manganese	0250	7/7/2020	(T)F	0.045	mg/L			#	0.00074	-
Manganese	0250	7/7/2020	(T)D	0.039	mg/L			#	0.00074	-
Manganese	0251	4/16/2018	(T)F	0.0244	mg/L			#	0.0001	-
Manganese	0251	5/2/2019	(T)F	0.049	mg/L			#	0.00049	-
Manganese	0251	7/7/2020	(T)F	0.035	mg/L			#	0.00074	-
Manganese	0777	4/18/2018	(T)F	0.193	mg/L			#	0.0001	-
Manganese	0777	5/2/2019	(D)F	0.042	mg/L			#	0.00049	-
Manganese	0777	7/7/2020	(T)F	0.074	mg/L			#	0.00074	-
Manganese	0780	4/17/2018	(T)F	0.0249	mg/L			#	0.0001	-
Manganese	0780	5/1/2019	(T)F	0.032	mg/L			#	0.00049	-
Manganese	0780	7/7/2020	(T)F	0.027	mg/L			#	0.00074	-
Manganese	0795	4/18/2018	(T)F	0.0292	mg/L			#	0.0001	-
Manganese	0795	5/2/2019	(T)F	0.044	mg/L			#	0.00049	-
Manganese	0795	7/7/2020	(T)F	0.027	mg/L			#	0.00074	-
Oxidation Reduction Potential										
Oxidation Reduction Potential	0248	4/17/2018	(N)F	132	mV			#	-	-
Oxidation Reduction Potential	0248	5/2/2019	(N)F	91.7	mV			#	-	-
Oxidation Reduction Potential	0248	7/7/2020	(N)F	237.6	mV			#	-	-
Oxidation Reduction Potential	0250	4/18/2018	(N)F	68.2	mV			#	-	-
Oxidation Reduction Potential	0250	5/2/2019	(N)F	223.8	mV			#	-	-
Oxidation Reduction Potential	0250	7/7/2020	(N)F	190.6	mV			#	-	-
Oxidation Reduction Potential	0251	4/16/2018	(N)F	108	mV			#	-	-
Oxidation Reduction Potential	0251	5/2/2019	(N)F	184.2	mV			#	-	-
Oxidation Reduction Potential	0251	7/7/2020	(N)F	181.1	mV			#	-	-
Oxidation Reduction Potential	0777	4/18/2018	(N)F	94	mV			#	-	-
Oxidation Reduction Potential	0777	5/2/2019	(N)F	179.9	mV			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

REPORT DATE: 9/22/2020 2:32:43 PM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Oxidation Reduction Potential	0777	7/7/2020	(N)F	192.2	mV			#	-	-
Oxidation Reduction Potential	0780	4/17/2018	(N)F	76.3	mV			#	-	-
Oxidation Reduction Potential	0780	5/1/2019	(N)F	204.5	mV			#	-	-
Oxidation Reduction Potential	0780	7/7/2020	(N)F	211.5	mV			#	-	-
Oxidation Reduction Potential	0795	4/18/2018	(N)F	90.3	mV			#	-	-
Oxidation Reduction Potential	0795	5/2/2019	(N)F	126.7	mV			#	-	-
Oxidation Reduction Potential	0795	7/7/2020	(N)F	204.4	mV			#	-	-
pH										
pH	0248	4/17/2018	(N)F	8.28	s.u.			#	-	-
pH	0248	5/2/2019	(N)F	8.03	s.u.			#	-	-
pH	0248	7/7/2020	(N)F	6.76	s.u.			#	-	-
pH	0250	4/18/2018	(N)F	8.46	s.u.			#	-	-
pH	0250	5/2/2019	(N)F	7.44	s.u.			#	-	-
pH	0250	7/7/2020	(N)F	8.36	s.u.			#	-	-
pH	0251	4/16/2018	(N)F	8.86	s.u.			#	-	-
pH	0251	5/2/2019	(N)F	7.99	s.u.			#	-	-
pH	0251	7/7/2020	(N)F	7.78	s.u.			#	-	-
pH	0777	4/18/2018	(N)F	8.35	s.u.			#	-	-
pH	0777	5/2/2019	(N)F	7.74	s.u.			#	-	-
pH	0777	7/7/2020	(N)F	8.17	s.u.			#	-	-
pH	0780	4/17/2018	(N)F	8.42	s.u.			#	-	-
pH	0780	5/1/2019	(N)F	7.27	s.u.			#	-	-
pH	0780	7/7/2020	(N)F	8.01	s.u.			#	-	-
pH	0795	4/18/2018	(N)F	8.5	s.u.			#	-	-
pH	0795	5/2/2019	(N)F	7.81	s.u.			#	-	-
pH	0795	7/7/2020	(N)F	8	s.u.			#	-	-
Specific Conductance										
Specific Conductance	0248	4/17/2018	(N)F	314	umhos/cm			#	-	-
Specific Conductance	0248	5/2/2019	(N)F	302	umhos/cm			#	-	-
Specific Conductance	0248	7/7/2020	(N)F	421	umhos/cm			#	-	-
Specific Conductance	0250	4/18/2018	(N)F	217	umhos/cm			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Specific Conductance	0250	5/2/2019	(N)F	245	umhos/cm			#	-	-
Specific Conductance	0250	7/7/2020	(N)F	248	umhos/cm			#	-	-
Specific Conductance	0251	4/16/2018	(N)F	233	umhos/cm			#	-	-
Specific Conductance	0251	5/2/2019	(N)F	198	umhos/cm			#	-	-
Specific Conductance	0251	7/7/2020	(N)F	253	umhos/cm			#	-	-
Specific Conductance	0777	4/18/2018	(N)F	308	umhos/cm			#	-	-
Specific Conductance	0777	5/2/2019	(N)F	227	umhos/cm			#	-	-
Specific Conductance	0777	7/7/2020	(N)F	355	umhos/cm			#	-	-
Specific Conductance	0780	4/17/2018	(N)F	578	umhos/cm			#	-	-
Specific Conductance	0780	5/1/2019	(N)F	560	umhos/cm			#	-	-
Specific Conductance	0780	7/7/2020	(N)F	604	umhos/cm			#	-	-
Specific Conductance	0795	4/18/2018	(N)F	215	umhos/cm			#	-	-
Specific Conductance	0795	5/2/2019	(N)F	209	umhos/cm			#	-	-
Specific Conductance	0795	7/7/2020	(N)F	247	umhos/cm			#	-	-
Temperature										
Temperature	0248	4/17/2018	(N)F	6.13	C			#	-	-
Temperature	0248	5/2/2019	(N)F	10.7	C			#	-	-
Temperature	0248	7/7/2020	(N)F	22.91	C			#	-	-
Temperature	0250	4/18/2018	(N)F	4.3	C			#	-	-
Temperature	0250	5/2/2019	(N)F	3.15	C			#	-	-
Temperature	0250	7/7/2020	(N)F	18.07	C			#	-	-
Temperature	0251	4/16/2018	(N)F	10	C			#	-	-
Temperature	0251	5/2/2019	(N)F	6.9	C			#	-	-
Temperature	0251	7/7/2020	(N)F	16.43	C			#	-	-
Temperature	0777	4/18/2018	(N)F	9.23	C			#	-	-
Temperature	0777	5/2/2019	(N)F	6.38	C			#	-	-
Temperature	0777	7/7/2020	(N)F	19.9	C			#	-	-
Temperature	0780	4/17/2018	(N)F	10.29	C			#	-	-
Temperature	0780	5/1/2019	(N)F	8.67	C			#	-	-
Temperature	0780	7/7/2020	(N)F	21.75	C			#	-	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

REPORT DATE: 9/22/2020 2:32:44 PM

PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Temperature	0795	4/18/2018	(N)F	5.69	C			#	-	-
Temperature	0795	5/2/2019	(N)F	7.19	C			#	-	-
Temperature	0795	7/7/2020	(N)F	16.54	C			#	-	-
Turbidity										
Turbidity	0248	4/17/2018	(N)F	9.21	NTU			#	-	-
Turbidity	0248	5/2/2019	(N)F	7.68	NTU			#	-	-
Turbidity	0248	7/7/2020	(N)F	1.55	NTU			#	-	-
Turbidity	0250	4/18/2018	(N)F	2.34	NTU			#	-	-
Turbidity	0250	5/2/2019	(N)F	16.1	NTU			#	-	-
Turbidity	0250	7/7/2020	(N)F	2.13	NTU			#	-	-
Turbidity	0251	4/16/2018	(N)F	4.11	NTU			#	-	-
Turbidity	0251	5/2/2019	(N)F	9.17	NTU			#	-	-
Turbidity	0251	7/7/2020	(N)F	2.97	NTU			#	-	-
Turbidity	0777	4/18/2018	(N)F	7.17	NTU			#	-	-
Turbidity	0777	5/2/2019	(N)F	14.7	NTU			#	-	-
Turbidity	0777	7/7/2020	(N)F	4.47	NTU			#	-	-
Turbidity	0780	4/17/2018	(N)F	6.69	NTU			#	-	-
Turbidity	0780	5/1/2019	(N)F	9.8	NTU			#	-	-
Turbidity	0780	7/7/2020	(N)F	6.3	NTU			#	-	-
Turbidity	0795	4/18/2018	(N)F	5.82	NTU			#	-	-
Turbidity	0795	5/2/2019	(N)F	9.04	NTU			#	-	-
Turbidity	0795	7/7/2020	(N)F	1.93	NTU			#	-	-
Uranium										
Uranium	0248	4/17/2018	(T)F	0.00525	mg/L			#	0.000025	-
Uranium	0248	5/2/2019	(T)F	0.011	mg/L			#	0.0000049	-
Uranium	0248	7/7/2020	(T)F	0.011	mg/L			#	0.00004	-
Uranium	0250	4/18/2018	(T)F	0.000991	mg/L			#	0.000025	-
Uranium	0250	5/2/2019	(D)F	0.00079	mg/L			#	0.0000049	-
Uranium	0250	7/7/2020	(T)F	0.0011	mg/L			#	0.00004	-
Uranium	0250	7/7/2020	(T)D	0.0011	mg/L			#	0.00004	-
Uranium	0251	4/16/2018	(T)F	0.00103	mg/L			#	0.000025	-
Uranium	0251	5/2/2019	(T)F	0.00077	mg/L			#	0.0000049	-
Uranium	0251	7/7/2020	(T)F	0.0012	mg/L			#	0.00004	-
Uranium	0777	4/18/2018	(T)F	0.00539	mg/L			#	0.000025	-
Uranium	0777	5/2/2019	(D)F	0.003	mg/L			#	0.0000049	-
Uranium	0777	7/7/2020	(T)F	0.003	mg/L			#	0.00004	-

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

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PARAMETER	LOCATION CODE	SAMPLE DATE	SAMPLE TYPE	RESULT	UNITS	QUALIFIERS LAB/DATA		QA	DETECT. LIMIT	UNCERTAINTY
Uranium	0780	4/17/2018	(T)F	0.044	mg/L			#	0.000025	-
Uranium	0780	5/1/2019	(T)F	0.045	mg/L			#	0.0000049	-
Uranium	0780	7/7/2020	(T)F	0.047	mg/L			#	0.00004	-
Uranium	0795	4/18/2018	(T)F	0.00111	mg/L			#	0.000025	-
Uranium	0795	5/2/2019	(T)F	0.00099	mg/L			#	0.0000049	-
Uranium	0795	7/7/2020	(T)F	0.0012	mg/L			#	0.00004	-

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 Tentatively identified compound (TIC).
Q Qualitative result due to sampling technique
R Unusable result.
U Parameter analyzed for but was not detected.
X Location is undefined.

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 Value.
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 Aroclor concentrations between 2 columns.
S Result determined by method of standard addition (MSA).
U Parameter analyzed for but was not detected.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X Laboratory defined qualifier, see case narrative.
Y Laboratory defined qualifier, see case narrative.
Z Laboratory defined qualifier, see case narrative.

SURFACE WATER QUALITY DATA BY PARAMETER (EQuIS800) FOR SITE GUN01, Gunnison Processing Site

REPORT DATE: 9/22/2020 2:32:44 PM

SAMPLE TYPES:
(T) Total (for metal concentrations)
(D) Dissolved (for dissolved or filtered metal concentrations)
(N) Organic (or other) constituents for which neither total nor dissolved is applicable

Type Codes: F-Field Sample R-Replicate FR-Field Sample with Replicates
D-Duplicate N-Not Known S-Split Sample

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