2019 King I & II Mines Annual Hydrology Report to the Ute Mountain Ute Tribe

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GCC Energy, LLC

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RESOURCE HYDROGEOLOGIC SERVICES

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INTRODUCTION

The Annual Hydrology Report is completed at the conclusion of each year to compile and interpret hydrologic data related to GCC Energy's King I and II Mine operations. This satisfies the agreement between GCC Energy (GCC) and UMUT of the "Preliminary Hydrologic Monitoring Plan - Ute Mountain Ute Tribe MW-5 Cluster Monitoring Wells at King II Coal Mine", prepared by Resource Hydrogeologic Services, Inc. (RHS). GCC installed monitoring wells in late 2018 at two additional locations, MW-7 and MW-8 (5 wells total), on UMUT owned lands. These latter wells were installed per the 1st Addendum to Surface Use Agreement, referenced above, entered into October 26, 2016 between the UMUT and GCC.

To best support these efforts, GCC Energy (GCC) maintains a quality assurance/quality control (QA/QC) program to:

- Conduct GCC compliance staff training on water quality sampling for all GCC monitoring locations, equipment and methodologies, with detailed written procedures for each monitoring location provided.
- Collect all water quality field data with an industry-standard multi-parameter device with electronic data deliverable (EDD) output for all field and calibration data.
- Enter and document all water quality field monitoring data by mobile (digital/paperless) field sampling logs specific to surface water, groundwater and spring/seep sampling locations which are automatically distributed to a third party, Resource Hydrogeologic Services (RHS) for same-day review following sampling.
- Implement industry-standard, 10% random QA/QC lab sample submittals for duplicate and field blank water quality samples.
- Utilize EDDs produced by the contract environmental analytical laboratory for all data analyses.
- Compile and manage all water quality data in a geo-referenced Microsoft Access database.

HYDROLOGIC MONITORING

HYDROLOGIC MONITORING LOCATIONS

Eight groundwater monitoring wells were monitored for water level and quality in water year 2018 on UMUT lands. The wells are identified as MW-5-C, MW-5-A, MW-5-MI, MW-7-EAA, MW-8-EAA, MW-8-MI, MW-8-LM and MW-8-PL.

Bedrock monitoring wells were installed at the MW-5 location in the summer of 2017 to meet the requirements of UMUT, the surface owner. At the location the wells were completed in three discrete intervals in order to collect water quantity and quality information from the mining overburden (Cliff House Sandstone, designated "C"), the mined interval ("A" seam coal of the upper Menefee Formation, designated "A") and the underburden (upper Menefee Formation referred to as Menefee Interburden as it is between the A-seam and B-seam, where present, designated "MI"). The cluster of wells is oriented

in-line with the approximate direction of strata dip (210°), spaced 20 feet apart, with the MI well upgradient, C well downgradient, and A well in the middle. The MW-5 location is north and sufficiently upgradient of any current or previous King II Mine workings and thus allows monitoring of baseline conditions. These MW-5 bedrock monitoring wells are constructed as conventional 2-inch PVC, with the exception of the MW-5-C well which was installed as a 7" open hole completion (8-5/8" steel surface casing installed and cemented to 39 feet) to allow for future video logging documentation of water inflow location(s).

Bedrock monitoring wells were installed in December 2018 at the MW-8 location, located on UMUT land, to establish new CDRMS compliance sites. This location is approximately 400 feet downgradient of the proposed low cover crossing in East Alkali Gulch. At this location the Cliff House Formation and "A" coal seam have been eroded away by the gulch so the intervals monitored in stratigraphic sequence top to bottom are the Menefee Formation Interburden ("MI"), which was found to be first bedrock water, the Lower Menefee Formation ("LM") which includes water-bearing lesser coal seams including the "B" coal seam where present, and the Point Lookout Formation ("PL"), specifically the uppermost approximate 25 feet.

Alluvial monitoring wells were installed in December 2018 at the MW-7 and MW-8 locations, also as new CDRMS compliance sites. These locations are approximately 400 feet upgradient and 400 feet downgradient, respectively, of the proposed low cover crossing in East Alkali Gulch. The "EAA" designation represents well completion in the East Alkali Gulch Alluvium, composed of unconsolidated sediments from ground surface to approximately 70 feet depth.

Table 1 lists and **Figure 1** shows the eight 2019 UMUT hydrologic monitoring locations and their spatial relation to the King I and II Mines.

HYDROLOGIC MONITORING DATA COLLECTION

Hydrologic monitoring data collection was expanded in December 2018 in number of locations and continued through 2019. Protocols for establishment of new hydrologic monitoring locations, as initiated in 2016, were continued for these locations. The purpose of the expanded analytical suite was to collect water quality data in line with the CDRMS "Guidelines for the Collection of Baseline Water Quality and Overburden Geochemistry Data" (1984), which were adopted in the Mining Permit Technical Revision-26. Water samples are collected quarterly at compliance monitoring locations for laboratory analysis. Depth to water measurements are also documented for wells. This baseline data collection period is intended to characterize the pre-mining environmental conditions in order to shape the long-term monitoring plan appropriately to evaluate potential mining effects on the hydrologic system. This is intended as a one-year, four-quarter period to evaluate seasonal changes that may occur over a typical year; however, the baseline laboratory analytical suite analyses have continued through 2019 for all compliance monitoring locations. This laboratory analytical suite is approved by CDRMS in TR-26 and are presented in **Table 2**.

Most wet bedrock cluster monitoring wells are instrumented with dedicated industry-standard low-flow bladder pump groundwater sampling systems. MW-5-A is dry and does not have a pump installed. Otherwise, the pumps are set to the approximate depth of the well screen mid-points for the A, MI, LM and PL wells, and set to near bottom of the C wells to allow for micro-purge sampling methodology. The exception is for wells MW-8-MI, MW-8-LM, which have relatively high static and pumping water levels, allowing use of dedicated stainless steel 12-volt electric submersible pumps with the pump or extended pump intake set to the approximate depth of well screen mid-points. The same model 12-volt electric submersible pumps are also installed at MW-7-EAA and MW-8-EAA.

HYDROLOGIC MONITORING DATA ANALYSIS

Field parameter and analytical data from all 2016-2019 sampling is presented in summary tables in the **Attachment**. Full laboratory reports are not included here as they have been already been submitted to UMUT in the quarterly monitoring technical memorandums prepared to document and interpret hydrologic conditions of the GCC monitoring wells installed on UMUT lands. The quarterly-updated analytical summary tables for the GCC CDRMS compliance wells found in the Attachment (MW-7 and MW-8 wells) are also available in PDF format at:

http://www.gccenergy.net/water_monitoring_results.php

A graphical analysis of water quality samples from alluvial and bedrock groundwater monitoring stations, is provided below in stacked bar formats for major ions and in distribution plots for trace constituents. The natural variability of water quality in bedrock units is demonstrated in these plots. Although the King Mines have operated for many years, the monitoring data presented within this report are believed to represent natural “baseline” water.

Figures 2 and 5 through 8 show major ion concentrations through sampling history by monitoring site. Concentrations are given in milli-equivalents (milligrams of solute mass divided by ionic weight and multiplied by ionic charge) per liter so the ionic balance between positive and negative ions can be seen in each analysis. Many bedrock wells have poor yields and have been slow to purge to steady compositions. In the plots, magnesium and calcium are added together (Mg+Ca) since magnesium is usually a minor fraction of the divalent cations, and potassium is added to sodium (Na+K).

ALLUVIAL GROUNDWATER

Alluvial groundwater monitoring was initiated in East Alkali Gulch in quarter four of 2018. The purpose is for baseline data collection upgradient (MW-7-EAA) and downgradient (MW-8-EAA) of the proposed low cover crossing which would allow access from the existing King II Mine underground workings to the coal reserves within the proposed Dunn Ranch lease extension on the west side of East Alkali Gulch.

Alluvial Groundwater Quality

Figure 2 shows the major ion concentrations of the two East Alkali Gulch alluvial wells, MW-7-EAA and MW-8-EAA. The concentration axes on all alluvial well plots have the same scale, so that total salinity is readily compared. The wells have higher total dissolved solids concentrations and higher concentrations of sulfate than observed in Hay Gulch monitoring wells. East Alkali Gulch is not irrigated upgradient or in the vicinity of these wells and is therefore not subject to the relatively consistent fresh water infiltration dilution process apparently observed in Hay Gulch.

Alluvial Groundwater Level

Groundwater levels at all alluvial monitoring wells were measured and documented per CDRMS compliance requirements at the time of each sampling event. The groundwater hydrograph for East Alkali Gulch in **Figure 3** represents the first year of monitoring; the fluctuation of the water table measured in both MW-7-EAA and MW-8-EAA was within one foot. Based on this limited monitoring period, this indicates that East Alkali Gulch does not appear to be subject to the same magnitude of seasonal water table fluctuation as Hay Gulch. This may be an artifact of the additional monthly measurements at the East Alkali Gulch wells versus the quarterly measurements in Hay Gulch, however it must be reiterated that Hay Gulch is subject to fluctuating, but year-round ditch irrigation water importation and subsequent infiltration to the alluvium.

A water table elevation contour map for the alluvium in the vicinity of the King Mines is presented as **Figure 4**. This figure compiles water levels reported on CDWR Well Construction and Test Reports, converted to elevation for the associated water wells. Some of these measurements are several decades in the past, with a subset of the wells utilized in a 1983 USGS Level Survey. A significant portion of these data points are in a separate but adjacent La Plata River watershed, however several alluvial wells in the more relevant Hay Gulch and Alkali Gulch watersheds provide general water table elevation infill data to compliment the GCC compliance wells in these watersheds. The GCC monitoring well level data utilized in this figure is from 2019. Continued observations in East Alkali Gulch alluvial GCC monitoring wells will build the water table elevation data set to determine if this non-irrigated alluvial aquifer water table level trends differently than the irrigated Hay Gulch alluvium over time.

BEDROCK GROUNDWATER

Bedrock groundwater monitoring was initiated in 2017 at the MW-5 location and expanded in December 2018 at the MW-8 location. The purpose is for baseline data collection upgradient of the King II Mine (MW-5) and downgradient of the proposed low cover crossing in East Alkali Gulch (MW-8). The MW-8 location also serves as a bedrock and alluvial monitoring location upgradient from the Vista de Oro residential subdivision.

The Lower Menefee and Point Lookout hydrostratigraphic intervals were targeted for baseline monitoring in the 2018 monitoring well installation program as these are intervals included in domestic water wells in and around the Vista de Oro subdivision downgradient from the proposed King II Mine Dunn Ranch lease area. Of specific interest is the characterization of the East Alkali Gulch alluvial groundwater recharge to the underlying Menefee bedrock, as this is likely the most significant recharge area for the neighboring water wells. The MW-8 location is approximately 400 feet directly downgradient from the proposed low cover crossing in the bottom of East Alkali Gulch to monitor groundwater level and quality in all significant water-bearing intervals from surface (alluvium) to 310 feet depth (upper Point Lookout) for potential effects of King II Mine operations.

Bedrock Groundwater Quality

Stacked bar diagrams representing those major ion compositions are presented in **Figures 5 through 8.**

"C" wells completed in the Cliff House Formation typically show the greatest concentrations and most variation in major ion makeup. This variability and the elevated concentrations in the Cliff House wells indicate slow-moving (long residence time) water, and some water with variable dissolved oxygen content, leading to the non-uniform oxidation of pyrite in some rock types. Major ion concentrations of MW-5-C, the only "C" well monitored on behalf of UMUT, are shown in **Figure 5**.

"MI" wells completed in the "A" seam floor strata have total dissolved solids concentrations that are less than in the "A" coal seam, and are dominated by sodium and bicarbonate. This suggests that either the lower Menefee is recharged in different areas, or that sulfate is reduced and calcium and magnesium are exchanged for sodium along the flow path. The most likely mechanism for the reduction of sulfate is microbial metabolism of sulfate and coal methane, which can yield hydrogen sulfide and also precipitate calcium carbonate. Hydrogen sulfide is commonly observed in regional domestic water wells. Major ion concentrations of the Menefee Interburden wells are shown as stacked-bar plots in **Figure 6**. Of the newest "MI" wells, MW-8-MI is completed in East Alkali Gulch just downgradient from significant alluvial recharge; the well is screened across the first bedrock water encountered. This interval flow tested at 24 gallons per minute (gpm) at borehole total depth of 102 feet, with cemented steel casing sealing off all alluvium 73 feet to ground surface. This is in stark contrast to every other "MI" monitoring well that drilled dry and then either remained dry to date, wetted and then dried up, or wetted but demonstrates very low yield.

The "LM" well completed in the lower Menefee in East Alkali Gulch is MW-8-LM. This well yields little water and total salinity has dropped and major ions shifted in successive sampling events. Sulfate and chloride have also decreased in successive samples. Cation ratios (sodium and calcium) are also variable in this low-yielding well, illustrating the chemical discontinuity in these low permeability groundwater lenses located in minor coal seams and minor fractured intervals. The major ion concentration comparison plots are presented as **Figure 7**.

The single “PL” well completed in the upper Point Lookout is at MW-8-PL in East Alkali Gulch. As with the “LM” wells, total salinity has also been generally decreasing in successive sampling events during the first year of monitoring. Major ions concentrations of the four samples collected from the Point Lookout to date are found in **Figure 8**.

Bedrock Groundwater Level

Groundwater potentiometric surface contour maps have been prepared for each monitored hydrostratigraphic interval and are presented as **Figures 9-13**. Contouring is only possible for intervals that include three or more monitoring locations, so the “LM” and “PL” figures do not include contours to indicate groundwater flow direction or gradient. Regardless, it is expected that regional flow direction in these intervals is south-southwest in the direction of strata dip, as documented in the overlying three hydrostratigraphic intervals. Groundwater flow gradient appears to be approximately 100 feet per mile (1.89% or 1.09°) for all intervals, which is about 1/3 to 1/2 of the strata dip. The King II Mine permit area is an excellent demonstration of the formation of a multiple bedrock aquifer system in an arid basin. Dry unsaturated (vadose) rock is present at the upland outcrop basin margin areas; water infiltration must pass through initially unconfined fractured networks filling fractures and pore space while displacing gases (air), and then finally into fully confined conditions with depth towards the central part of the San Juan Basin. When the head pressure observed at any given point in the aquifer is greater than the equivalent distance from ground surface to the top of that aquifer then the aquifer is defined as confined. Significant recharge areas, inferred by buried bedrock exposure to saturated alluvium, are also displayed in these figures.

Groundwater levels, as measured from wellheads during routine compliance monitoring, are given in the GCC Hydrologic Monitoring Summary Tables, provided in this report as the Attachment.

TABLES

Table 1. GCC UMUT Hydrologic Monitoring Locations

Monitoring Location ID	Water Resource Monitored	UTM NAD 83 Zone 13N Easting (meters)	UTM NAD 83 Zone 13N Northing (meters)	Surface Elevation (ft amsl)
MW-5-A	Groundwater - Bedrock "A" coal seam	757132.319	4130205.100	8407.4
MW-5-C	Groundwater - Bedrock Cliff House overburden	757128.949	4130200.072	8407.1
MW-5-MI	Groundwater - Bedrock Menefee interburden	757135.778	4130210.290	8407.7
MW-7-EAA	Groundwater - Alluvial East Alkali Gulch	753001.888	4127319.951	7460.0
MW-8-EAA	Groundwater - Alluvial East Alkali Gulch	752916.895	4127107.544	7440.0
MW-8-MI	Groundwater - Bedrock Menefee interburden	752912.969	4127110.290	7447.0
MW-8-LM	Groundwater - Bedrock Lower Menefee	752908.636	4127106.081	7446.0
MW-8-PL	Groundwater - Bedrock Point Lookout	752904.413	4127101.783	7445.0

Table 2.
GCC Groundwater Baseline Water Quality
Parameter Suite (GCC GW Baseline)

Parameter	Units
Potassium (K)	mg/L
Chloride (Cl^-)	mg/L
Calcium (Ca^{+2})	mg/L
Magnesium (Mg^{+2})	mg/L
Sodium (Na^+)	mg/L
Sulfate (SO_4)	mg/L
Alkalinity, as $CaCO_3$	mg/L
Silica (SiO_2)	mg/L
Manganese (Mn)	mg/L
Fluoride (F)	mg/L
Iron (Fe)	mg/L
Aluminum (Al)	mg/L
Arsenic (As)	mg/L
Cadmium (Cd)	mg/L
Copper (Cu)	mg/L
Lead (Pb)	mg/L
Mercury (Hg)	mg/L
Molybdenum (Mo)	mg/L
Selenium (Se)	mg/L
Zinc (Zn)	mg/L
Uranium (U)	mg/L
Hardness, as $CaCO_3$	mg/L
Bicarbonate, as $CaCO_3$	mg/L
Carbonate, as $CaCO_3$	mg/L
Hydroxide, as $CaCO_3$	mg/L
Total Nitrogen as Nitrate-Nitrite	mg/L
pH (lab)	SU
Total Dissolved Solids (TDS)	mg/L
Total Organic Carbon (TOC)	mg/L
Temperature (field)	°C
pH (field)	SU
Specific Conductivity (field)	mS/cm
Oxygen Reduction Potential (ORP) (field)	mV
Depth to Water (field, wells only)	ft

Notes:
mg/L = milligrams per liter
SU = standard units
mS/cm millisiemens per centimeter
ft = feet
mV = millivolt

FIGURES

Figure 1. GCC 2019 UMUT hydrologic monitoring locations

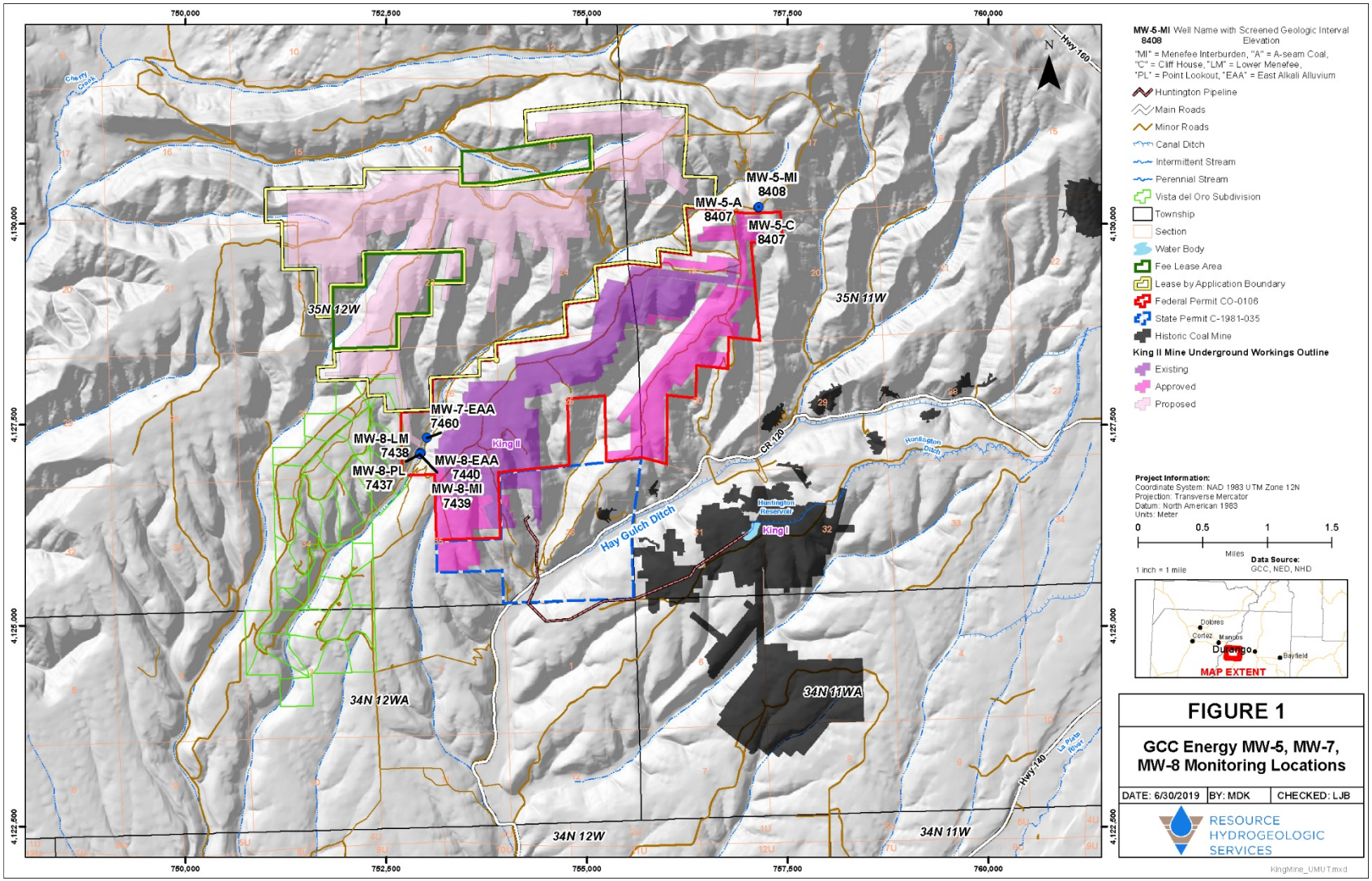
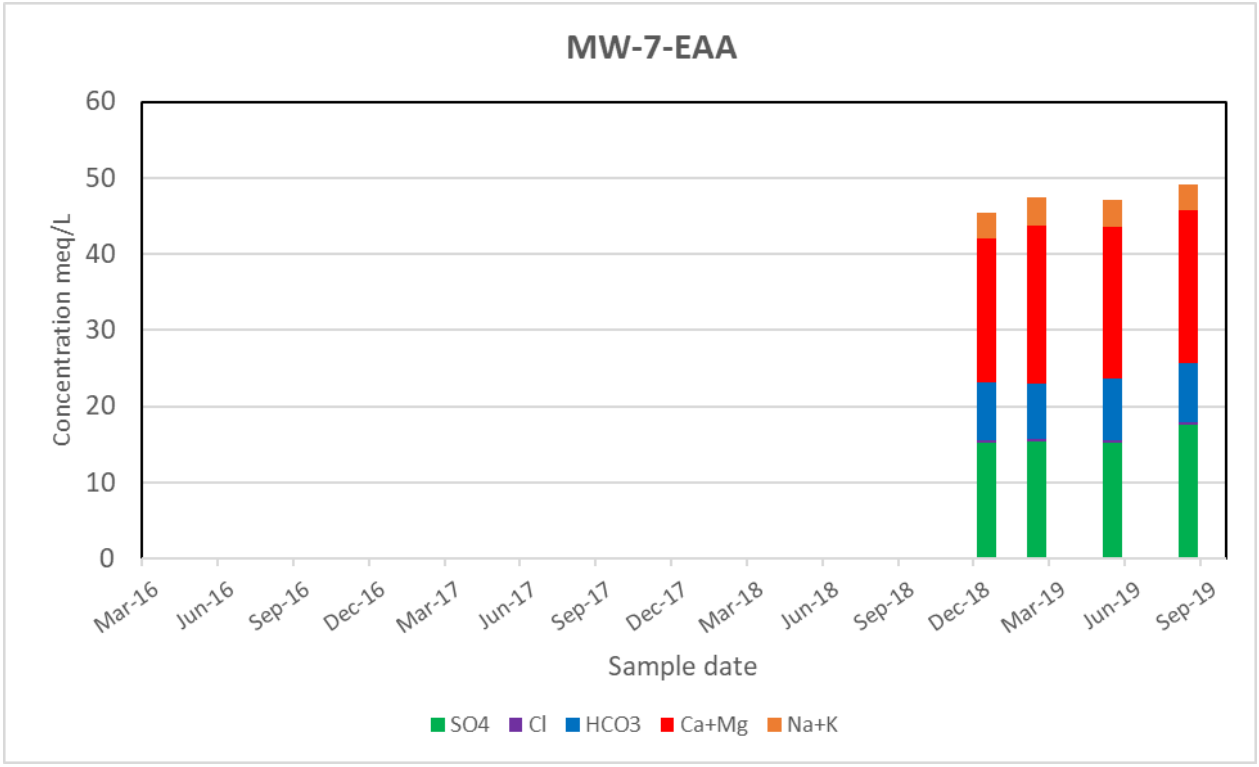


Figure 2. Comparison of major ion concentrations in alluvial monitoring wells in East Alkali Gulch Alluvium



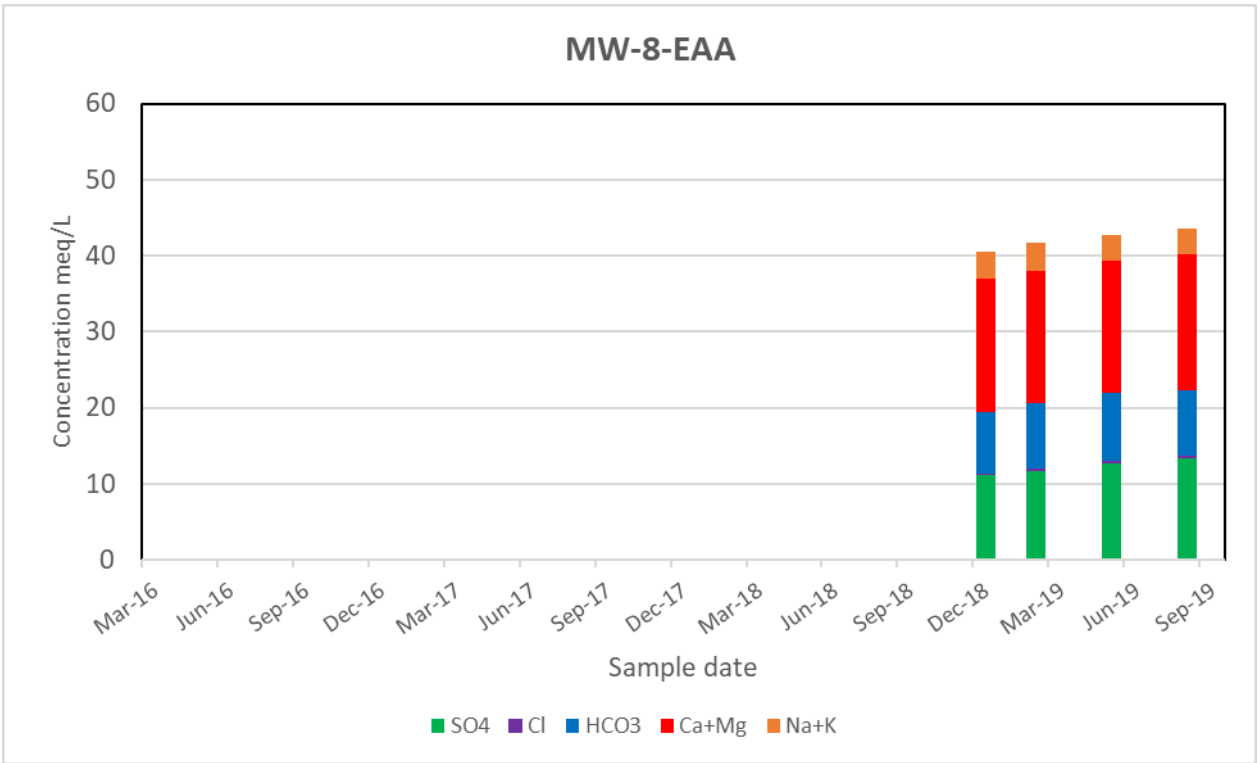


Figure 3. East Alkali Gulch Alluvial Groundwater Hydrograph

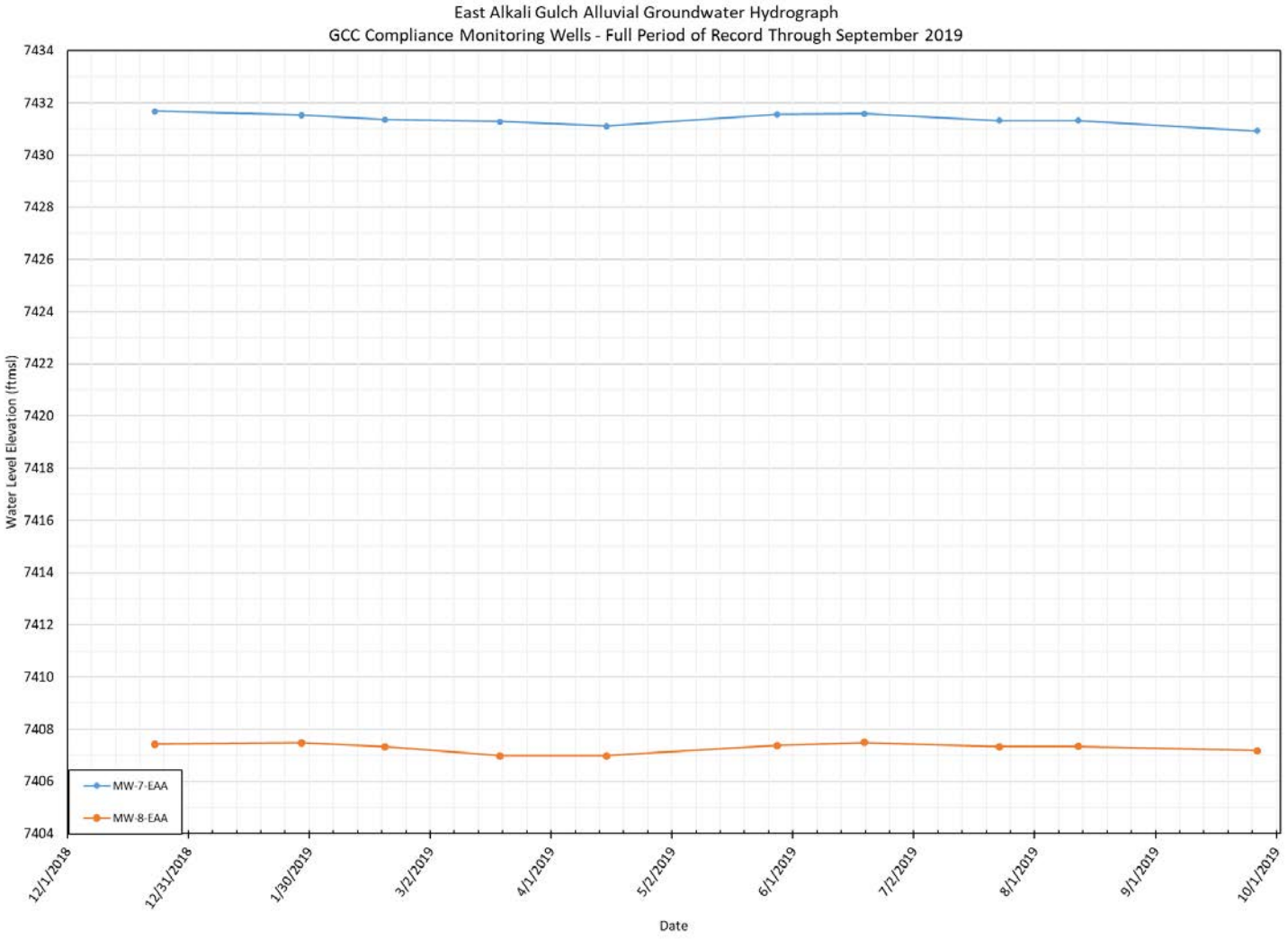


Figure 4. Alluvial Groundwater Table Contour Map

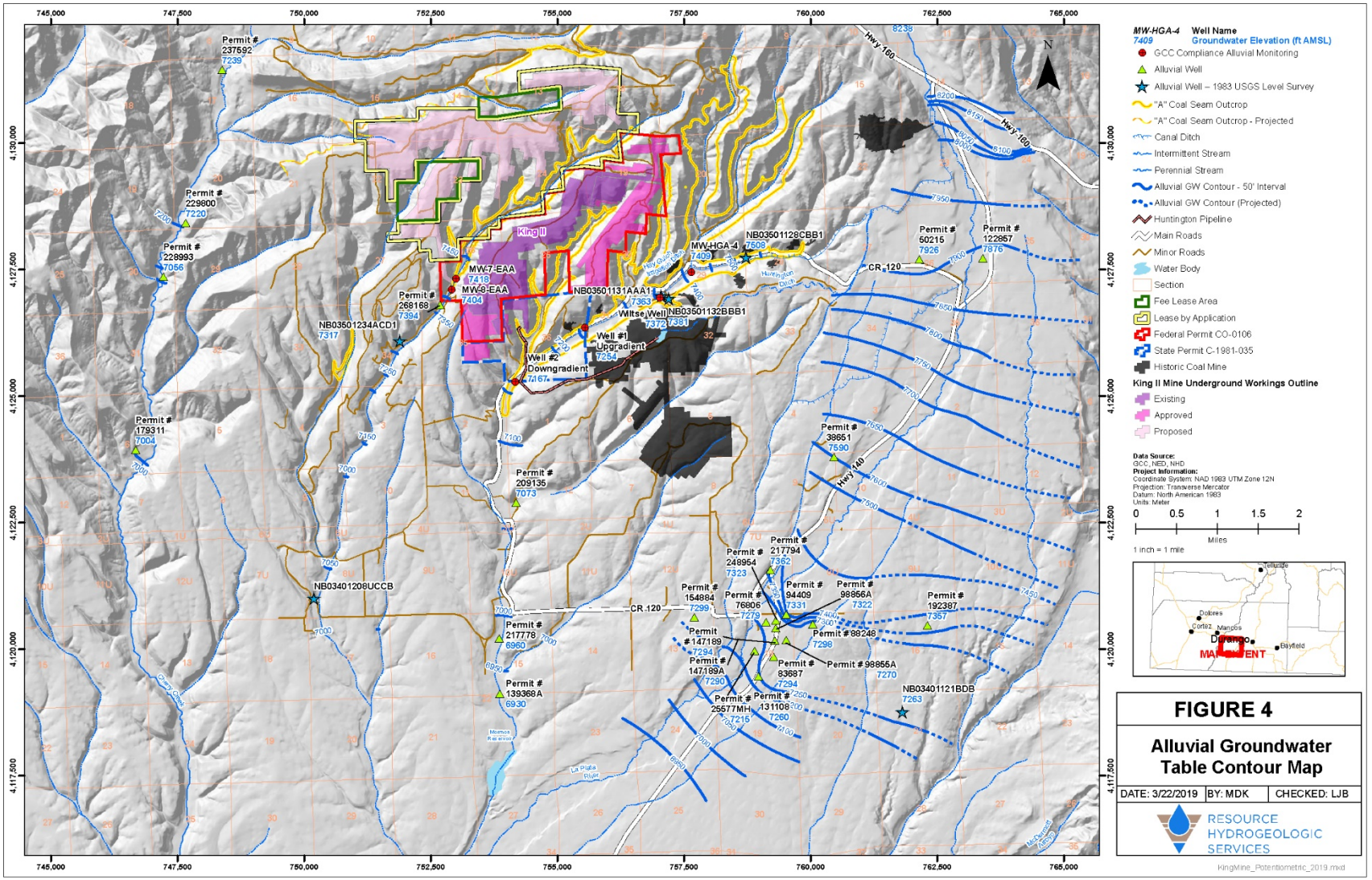


Figure 5. Major ion concentrations in Cliff House ("A" seam overburden) bedrock monitoring well.

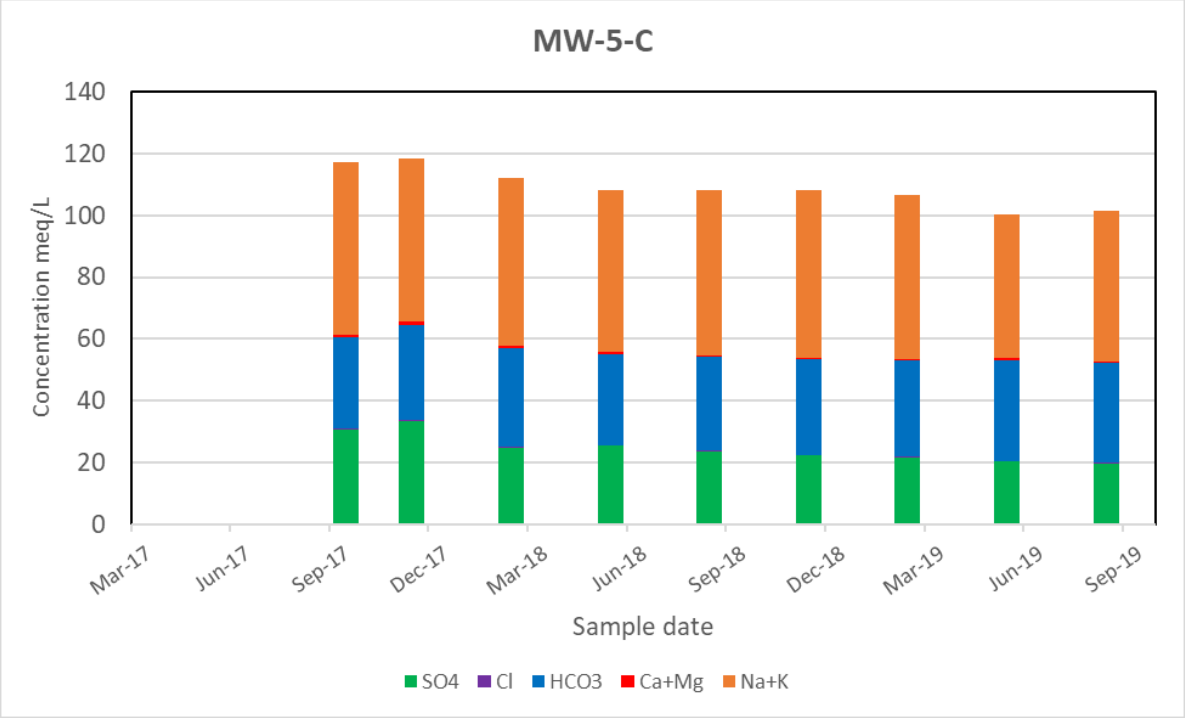


Figure 6. Comparison of major ion concentrations in Menefee Interburden ("A" seam underburden) bedrock monitoring wells.

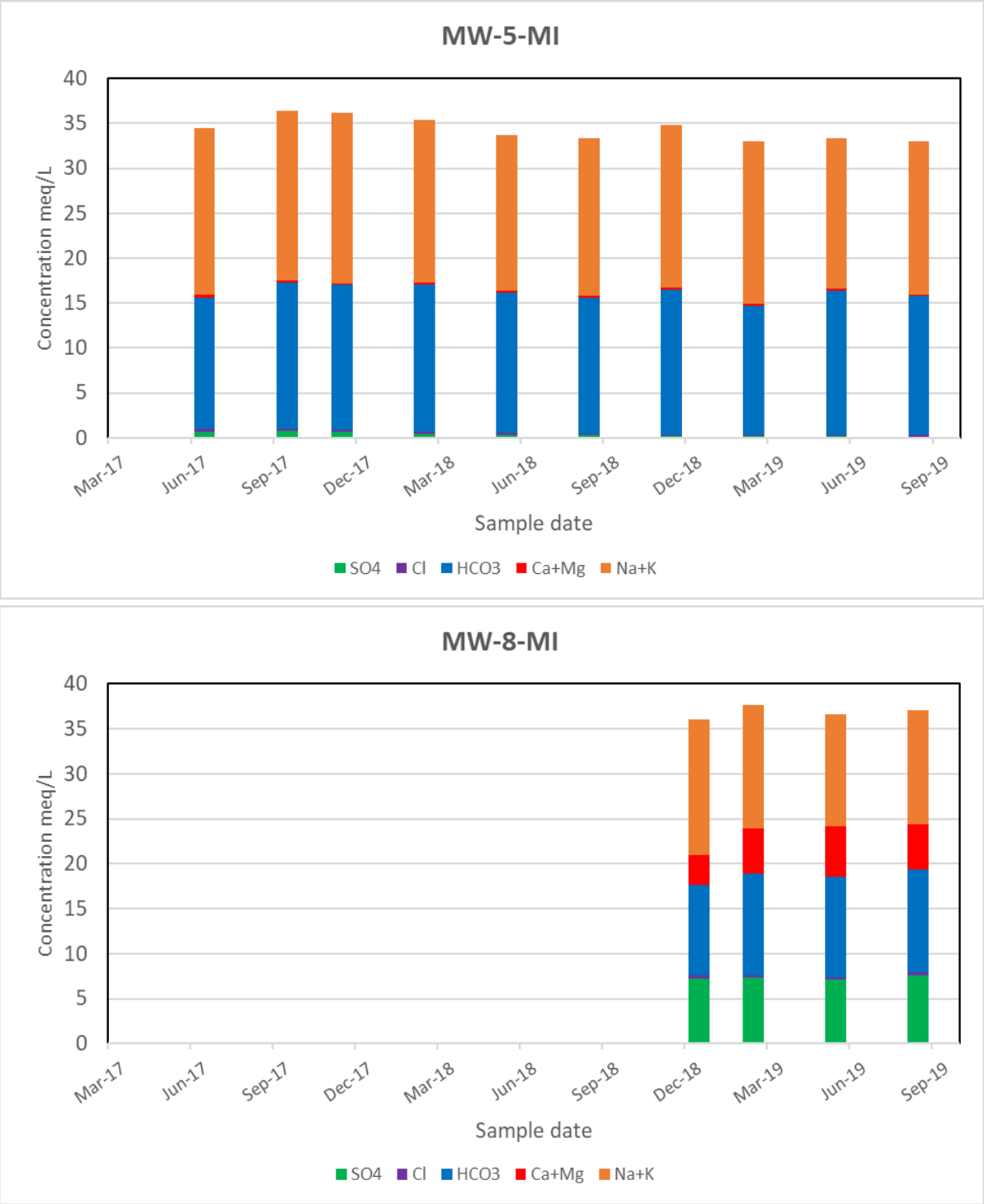


Figure 7. Major ion concentrations in Lower Menefee bedrock monitoring well.

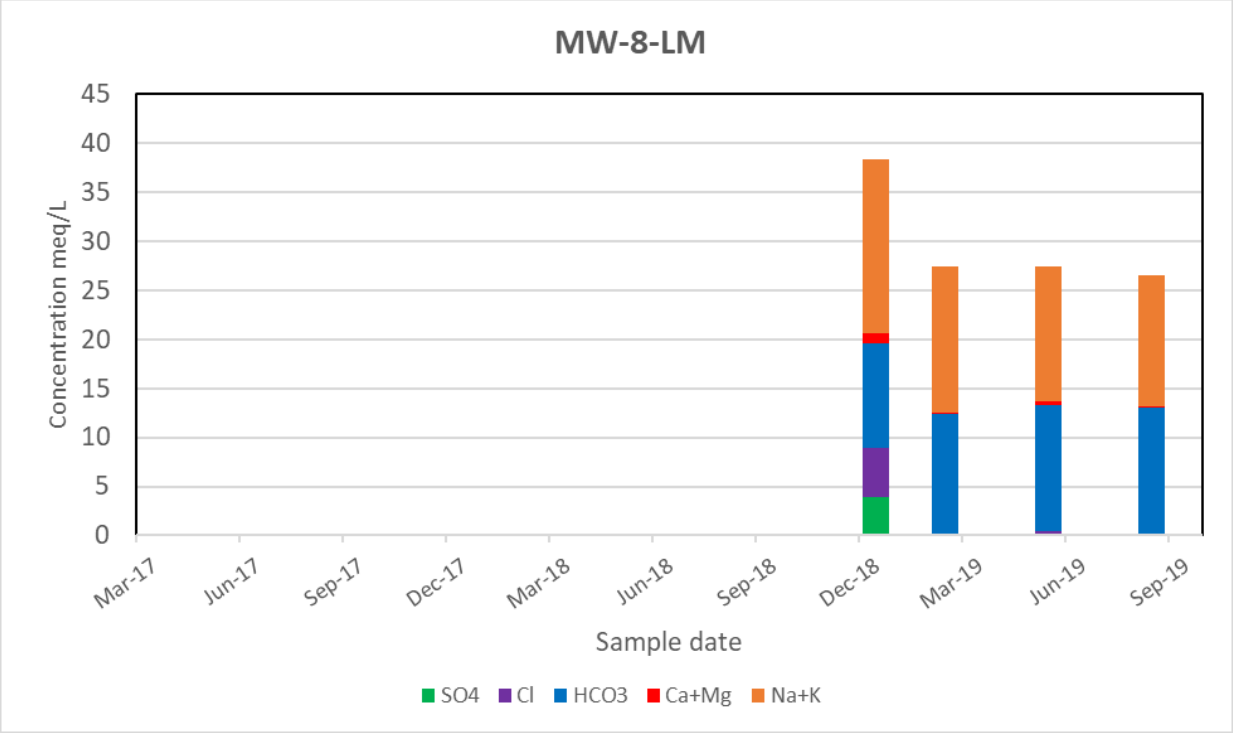


Figure 8. Major ion concentrations in the Point Lookout bedrock monitoring well.

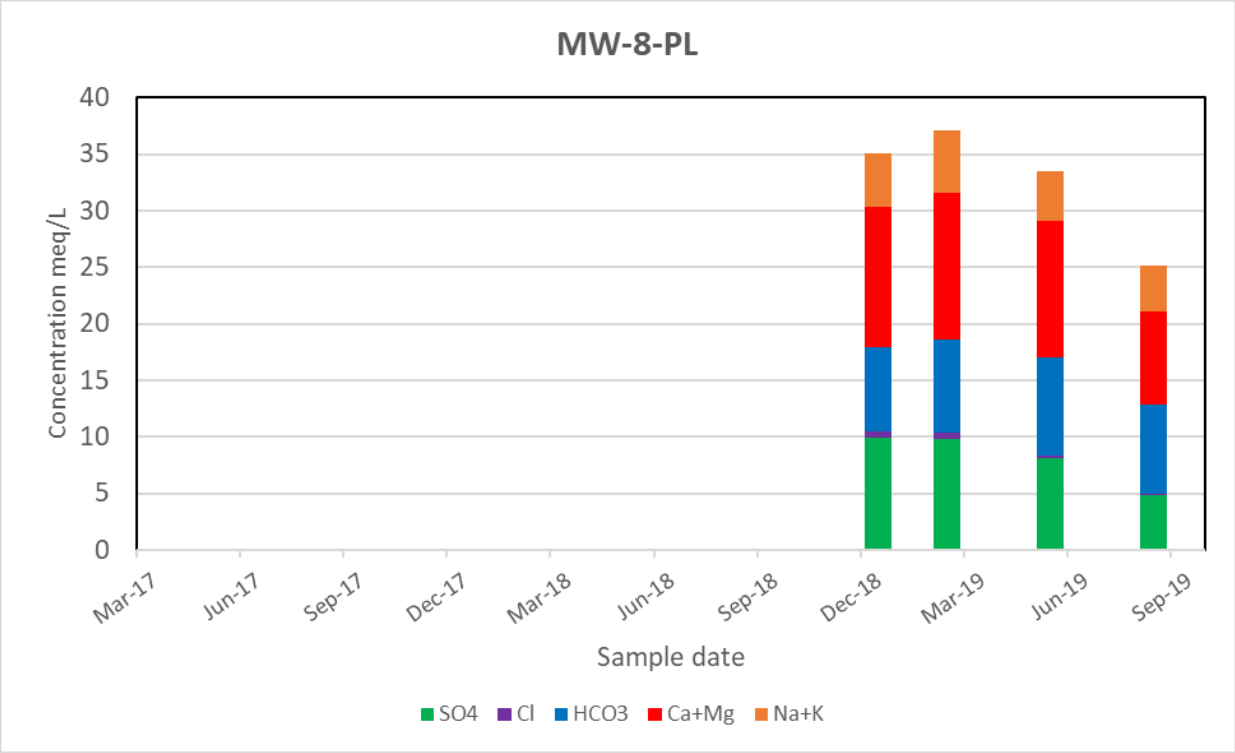


Figure 9. Cliff House groundwater potentiometric map August 2019.

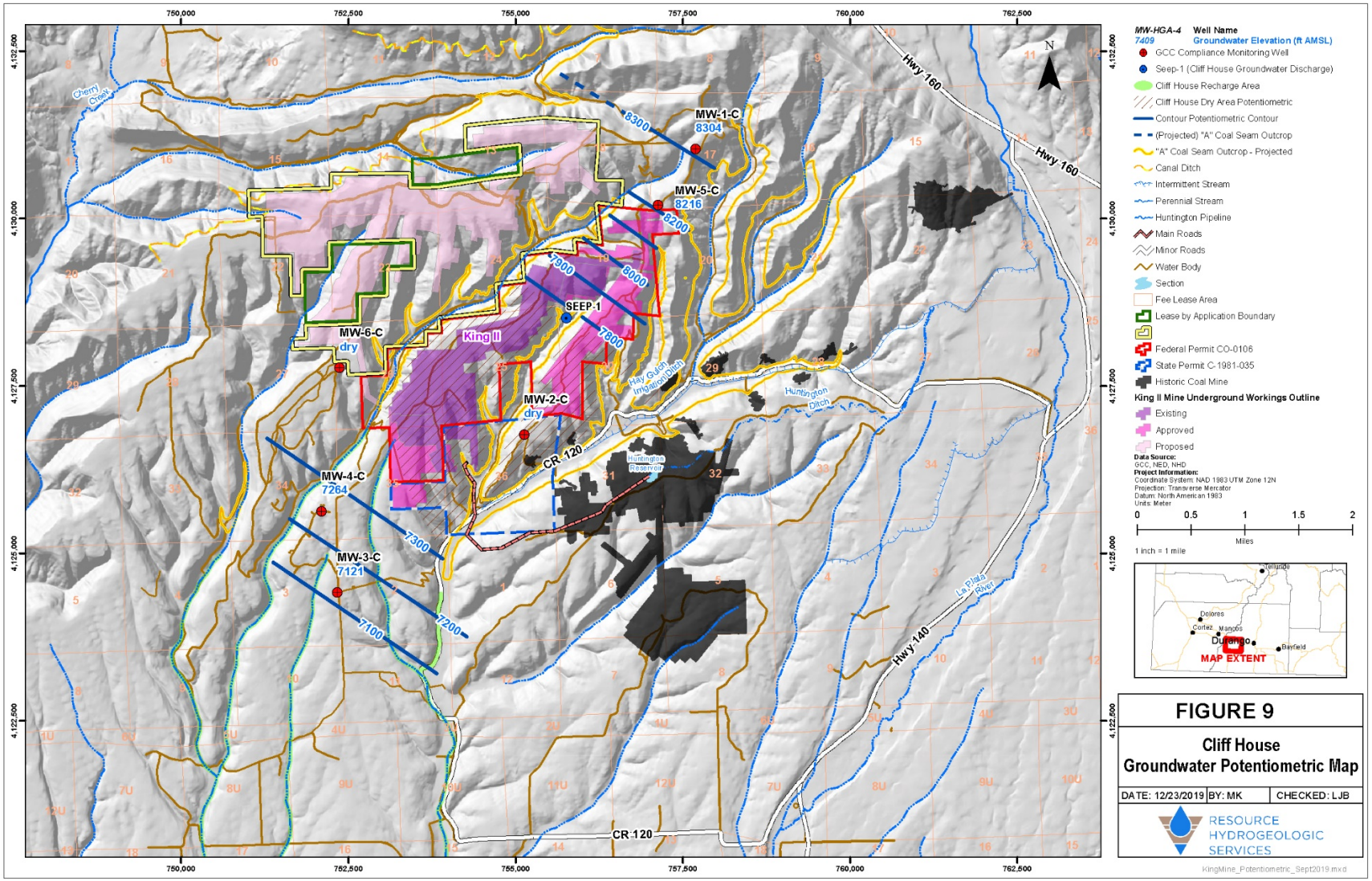


Figure 10. "A" seam coal groundwater potentiometric map August 2019.

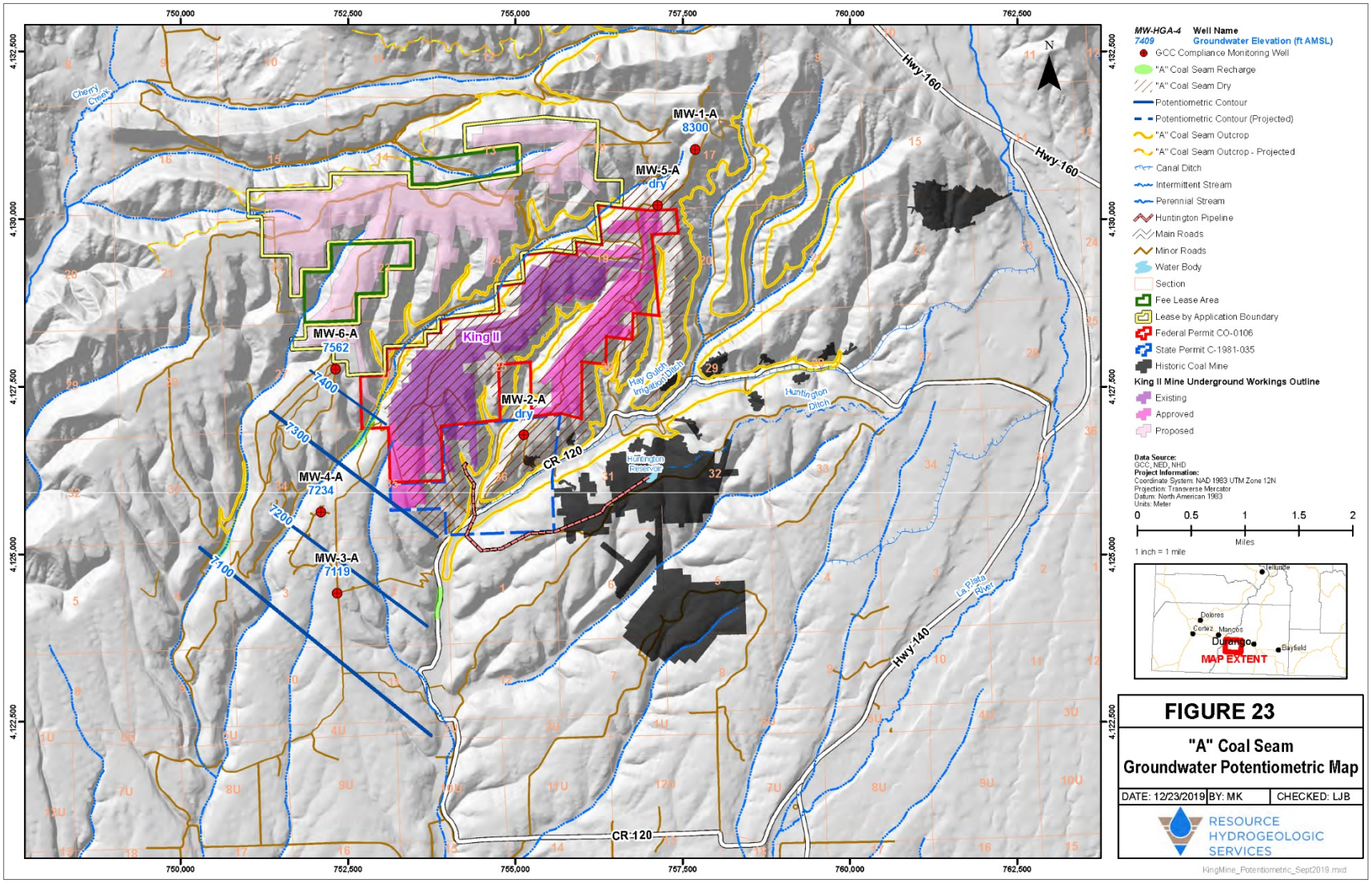


Figure 11. Menefee Interburden groundwater potentiometric map August 2019.

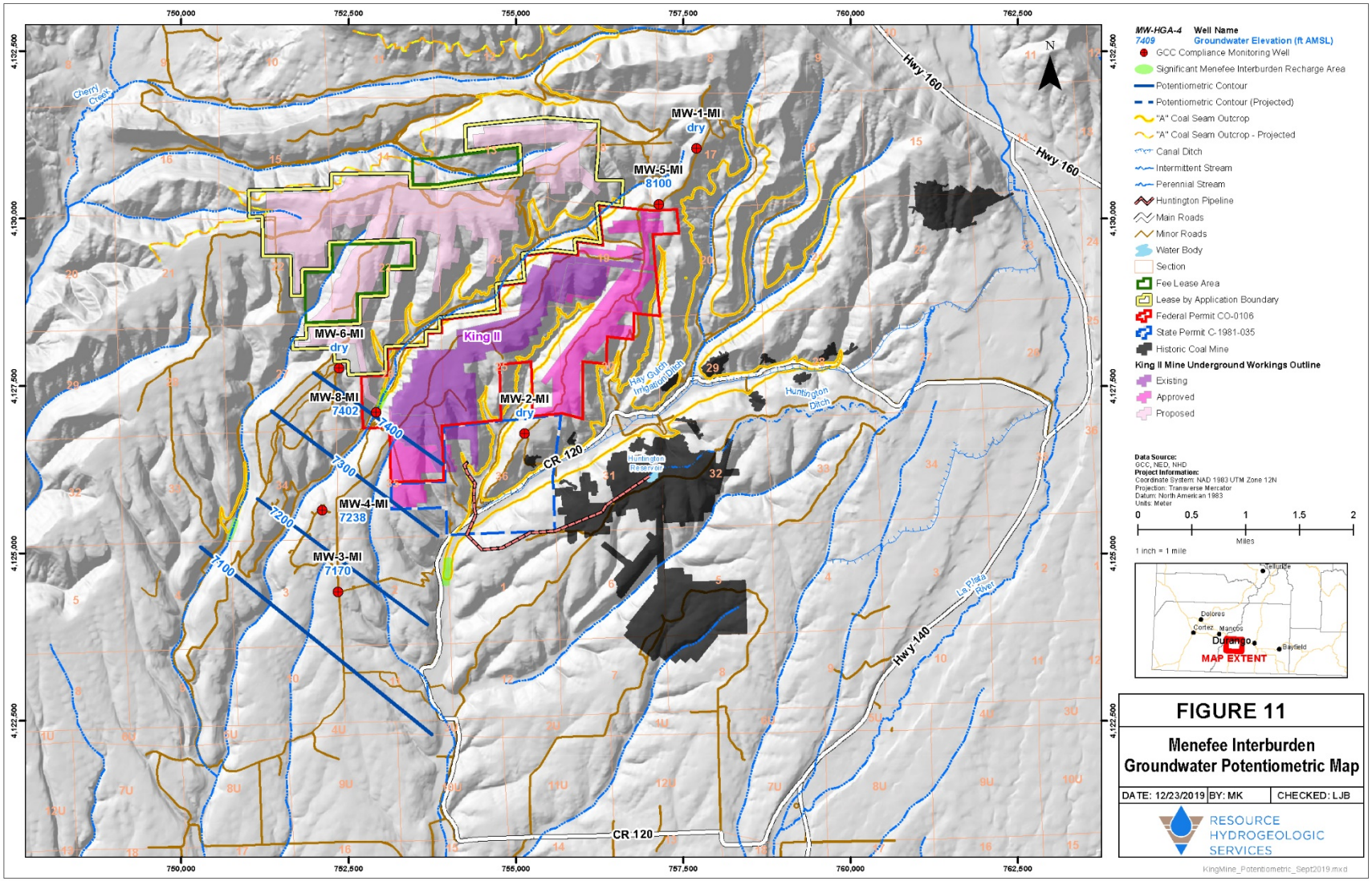


Figure 12. Lower Menefee groundwater potentiometric map August 2019.

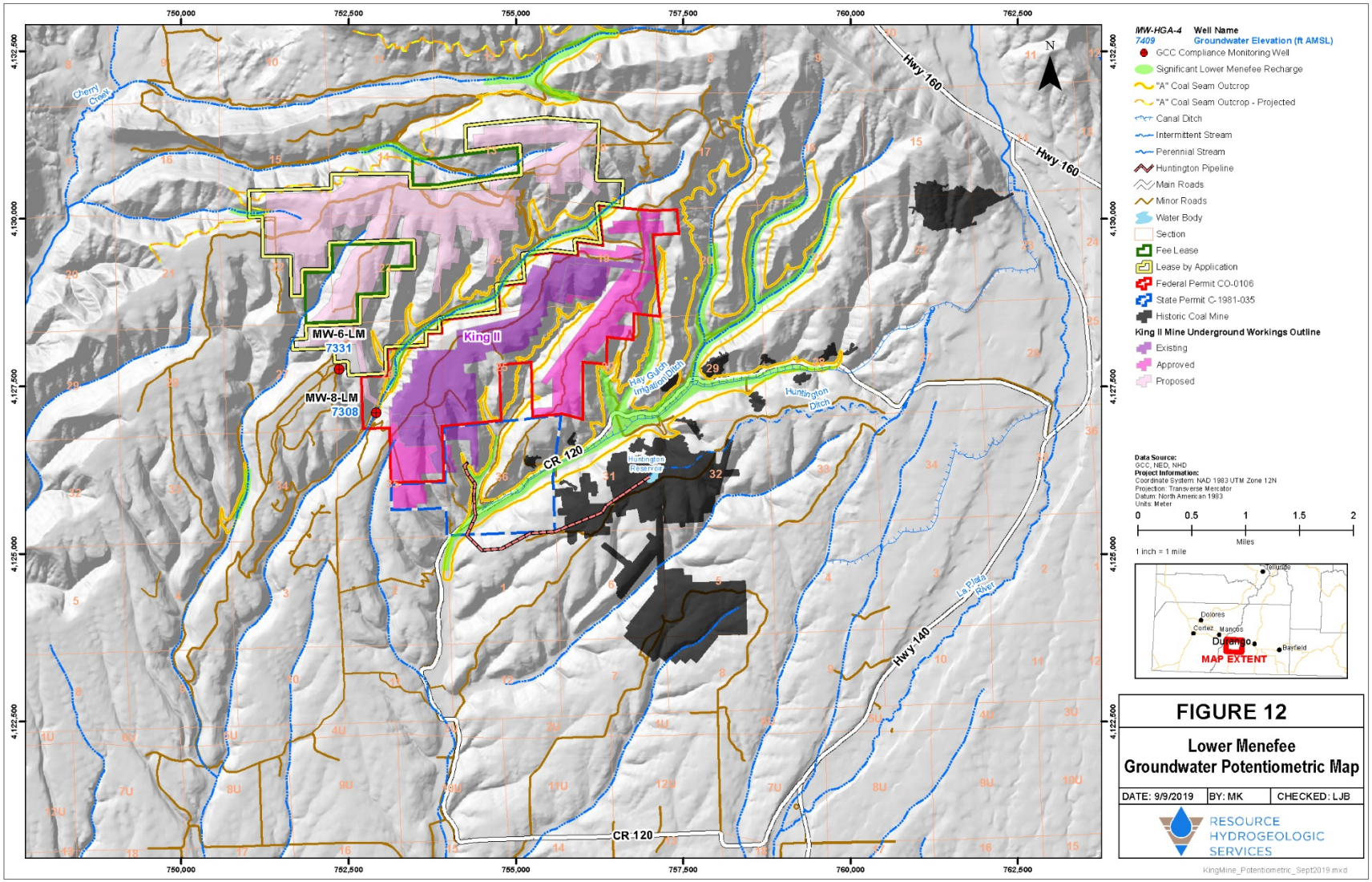
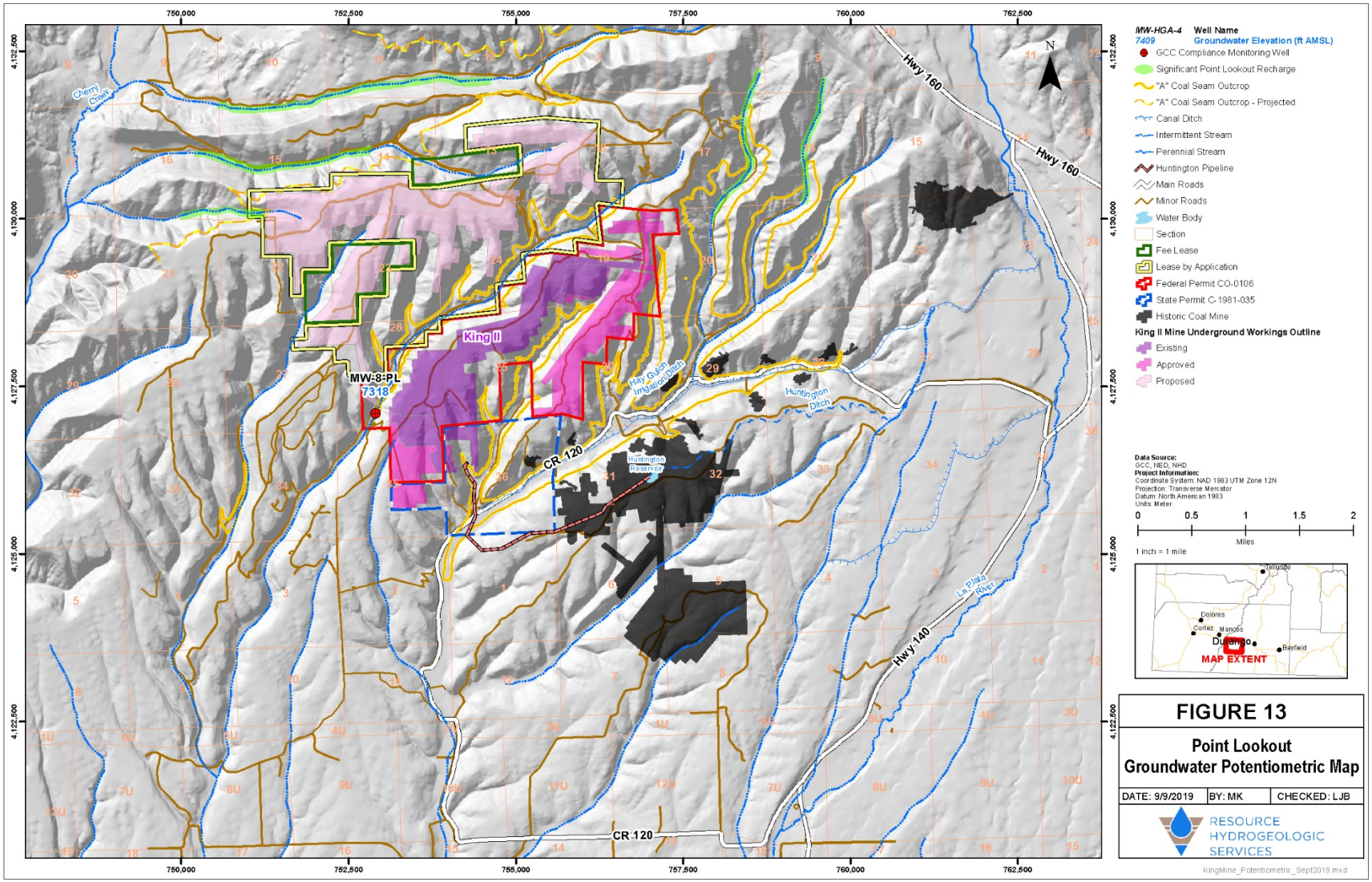


Figure 13. Point Lookout groundwater potentiometric map August 2019.



ATTACHMENT - GCC Hydrologic Monitoring Data Summary Tables

GCC Energy Hydrologic Monitoring Data

MW-5-C																							
Year		2017									2018									2019			
Quarter		Q2	Q3				Q4				Q1			Q2			Q3		Q4	Q1	Q2	Q3	
Month		6	7	8	9	9	10	11	11	12	1	2	3	4	5	6	7	8	11	2	5	8	
Sample Date		6/7	7/18	8/23	9/7	9/26	10/26	11/2	11/16	12/5	1/2	2/9	3/22	4/11	5/10	--	7/23	8/7	11/1	2/20	5/30	8/14	
Lab Analysis (Y/N)		N	N	N	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	
Field Parameters:																							
Purge Flow Rate	gpm	NM	NM	NM	NM	NM	NM	0.1	NM	NM	NM	0.1	NM	0.1	0.1	***	0.1	0.1	0.1	0.1	0.12	0.06	
Total Purged	gal	NM	NM	NM	NM	NM	NM	3.0	1.0	1.0	1.5	2.0	1.5	1.0	1.3		1.3	1.5	1.6	1.3	1.5	1.3	
Depth to Water	ft bgs	248.15	240.8	235.02	233.2	230.75	229.44	228.45	227.43	227.64	225.4	222.46	219.31	218.22	216.04		210.87	210.5	205.1	198.44	193.2	191.11	
Temperature	deg C	NM	NM	NM	35.32	11.29	NM	9.46	9.70	9.04	9.33	9.37	9.56	9.7	10.08		10.66	10.7	9.37	8.63	10.14	10.89	
pH	SU	NM	NM	NM	8.75	7.58	NM	7.59	7.63	7.64	7.65	7.68	7.77	7.56	7.6		7.52	7.61	7.55	7.72	7.72	7.74	
Specific Conductance	µS/cm	NM	NM	NM	0.1	4903	NM	4905	4827	4977	4974	4958	4285	4787	4772		4674	4687	4768	4623	4418	4355	
Oxygen Reduction Potential	mV	NM	NM	NM	48.2	-24.8	NM	7.60	-74.20	-110.50	-99.8	-90.5	-84.6	-49.6	-51.3		-59.5	-66.4	-138	-56.2	-29.9	-88.24	
Lab Analytical Results:																							
Hardness as CaCO3	mg/L					80.3			67.7			61.3			50.3			51.2	51.4	43	41.1	38.8	
pH (Lab)	SU					7.57			8.11			7.74			7.79			7.64	7.69	7.72	7.46	7.75	
Total Dissolved Solids (Lab)	mg/L					3470			3540			3480			3430			3290	3260	3160	3090	3130	
Calcium	mg/L					18.3			15.4			13.7			11.1			11.4	11.5	9.78	9.34	8.69	
Magnesium	mg/L					8.40			7.11			6.57			5.46			5.52	5.50	4.51	4.32	4.14	
Sodium	mg/L					1280			1220			1250			1200			1230	1250	1220	1070	1120	
Potassium	mg/L					4.57			<5.00			<5.00			3.6			<5.00	<5.00	<5.00	<5.00	<5.00	
Alkalinity, Total	mg/L					1480			1540			1590			1490			1520	1540	1560	1630	1620	
Alkalinity, Bicarbonate	mg/L					1480			1540			1590			1490			1520	1540	1560	1630	1620	
Alkalinity, Carbonate	mg/L					<10.0			<10.0			<10.0			<10			<10.0	<10.0	<10.0	<10	<10.0	
Alkalinity, Hydroxide	mg/L					<10.0			<10.0			<10.0			<10			<10.0	<10.0	<10.0	<10	<10.0	
Chloride	mg/L					8.66			10.6			10.1			<10			7.15	7.08	7.1	7.02	6.62	
Fluoride	mg/L					1.90			1.93			1.89			1.79			1.74	1.80	1.95	2.01	1.95	
Sulfate as SO4	mg/L					1470			1600			1190			1220			1130	1070	1040	975	948	
Total Organic Carbon (TOC)	mg/L					2.86			2.94			3.24			3.06			3.28	3.64	3.05	3.00	3.03	
Nitrate/Nitrite as N	mg/L					<0.100			<0.020			<0.020			<0.02			0.026	<0.020	<0.020	<0.020	<0.020	
Aluminum	mg/L					<0.050			<0.250			<0.250			<0.05			<0.250	<0.250	<0.250	<0.25	<0.250	
Arsenic	mg/L					<0.0025			<0.0050			<0.0025			0.0044			0.0046	0.0036	0.004	0.0013	<0.0025	
Cadmium	mg/L					<0.0005			<0.0010			<0.0005			<0.0005			<0.0005	<0.0005	<0.0005	<0.0001	<0.0005	
Copper	mg/L					0.0272			0.0161			0.0342			0.0171			0.0226	0.0178	0.0294	0.01	0.0138	
Iron	mg/L					<0.050			<0.250			0.399			0.237			<0.250	<0.250	<0.250	<0.25	<0.250	
Lead	mg/L					<0.0025			<0.0050			<0.0025			<0.0025			<0.0025	<0.0025	<0.0025	<0.0005	<0.0025	
Manganese	mg/L					0.0367			0.0283			0.0138			0.0128			0.0131	0.0117	0.0115	0.0079	0.0078	
Mercury	mg/L					<0.0002			<0.0002			<0.0002			<0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Molybdenum	mg/L					0.0376			0.0201			0.0154			0.0142			0.0127	0.0109	0.0096	0.0054	0.0041	
Selenium	mg/L					<0.0050			<0.0100			<0.0050			<0.005			<0.0050	<0.0050	<0.0050	0.0015	<0.0050	
Silica (Si02)	mg/L					6.57			<5.35			7.64			7.65			8.18	8.94	7.84	8.00	8.00	
Silicon	mg/L					3.07			<2.50			3.57			3.58			3.83	4.18	3.67	3.74	3.74	
Uranium	mg/L					0.0088			0.0054			0.0048			0.0047			0.0036	0.0035	0.0029	0.0021	0.0018	
Zinc	mg/L					<0.010			<0.020			<0.010			<0.01			<0.0100	<0.0100	<0.0100	<0.002	<0.0100	

Notes & Definitions:

*** *La Plata County stage 3 fire restrictions prevented sampling activity*

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
NA	not analyzed (lab)

1. *"<" values denote that the quantification of that analyte is below the reporting level for the analytical laboratory, acceptable by environmental water quality laboratory industry standards.*
2. *Total alkalinity is measured by titration with hydrochloric acid to a set pH point, reporting this value as an equivalent amount of calcium carbonate. This value is then partitioned into bicarbonate, carbonate and hydroxide depending on the initial pH of the sample solution, each components reported as equivalent CaCO3.*
3. *Industry standard Quality Assurance/Quality Control (QA/QC) protocol are followed for this hydrologic monitoring program by both GCC Energy and the contracted environmental water quality analytical laboratories. QA/QC results are not shown in this table.*

GCC Energy Hydrologic Monitoring Data

MW-5-A																				
Year		2017							2018									2019		
Quarter		Q2	Q3			Q4			Q1			Q2			Q3		Q4	Q1	Q2	Q3
Month		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	11	2	5	8
Sample Date		6/7	7/18	8/23	9/26	10/26	11/16	12/5	1/2	2/9	3/22	4/11	5/10	--	7/23	8/7	11/26	2/20	5/30	8/14
Lab Analysis (Y/N)		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Field Parameters:																				
Purge Flow Rate	gpm	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	***	dry	dry	dry	dry	dry	dry
Total Purged	gal																			
Depth to Water	ft bgs																			
Temperature	deg C																			
pH	SU																			
Specific Conductance	µS/cm																			
Oxygen Reduction Potential	mV																			
Lab Analytical Results:																				
Hardness as CaCO3	mg/L																			
pH (Lab)	SU																			
Total Dissolved Solids (Lab)	mg/L																			
Calcium	mg/L																			
Magnesium	mg/L																			
Sodium	mg/L																			
Potassium	mg/L																			
Alkalinity, Total	mg/L																			
Alkalinity, Bicarbonate	mg/L																			
Alkalinity, Carbonate	mg/L																			
Alkalinity, Hydroxide	mg/L																			
Chloride	mg/L																			
Fluoride	mg/L																			
Sulfate as SO4	mg/L																			
Total Organic Carbon (TOC)	mg/L																			
Nitrate/Nitrite as N	mg/L																			
Aluminum	mg/L																			
Arsenic	mg/L																			
Cadmium	mg/L																			
Copper	mg/L																			
Iron	mg/L																			
Lead	mg/L																			
Manganese	mg/L																			
Mercury	mg/L																			
Molybdenum	mg/L																			
Selenium	mg/L																			
Silica (SiO2)	mg/L																			
Silicon	mg/L																			
Uranium	mg/L																			
Zinc	mg/L																			

Notes & Definitions:

*** La Plata County stage 3 fire restrictions prevented sampling activity

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
NA	not analyzed (lab)

1. *"<" values denote that the quantification of that analyte is below the reporting level for the analytical laboratory, acceptable by environmental water quality laboratory industry standards.*
2. *Total alkalinity is measured by titration with hydrochloric acid to a set pH point, reporting this value as an equivalent amount of calcium carbonate. This value is then partitioned into bicarbonate, carbonate and hydroxide depending on the initial pH of the sample solution, each components reported as equivalent CaCO3.*
3. *Industry standard Quality Assurance/Quality Control (QA/QC) protocol are followed for this hydrologic monitoring program by both GCC Energy and the contracted environmental water quality analytical laboratories. QA/QC results are not shown in this table.*

GCC Energy Hydrologic Monitoring Data

MW-5-MI																				
Year		2017							2018									2019		
Quarter		Q2	Q3			Q4			Q1			Q2			Q3		Q4	Q1	Q2	Q3
Month		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	11	2	5	8
Sample Date		6/7	7/18	8/23	9/26	10/26	11/16	12/5	1/2	2/9	3/22	4/11	5/10	--	7/23	8/7	11/5-6	2/20	5/30	8/14
Lab Analysis (Y/N)		Y	N	N	Y	N	Y	N	N	Y	NM	N	Y	N	N	Y	Y	Y	Y	Y
Field Parameters:																				
Purge Flow Rate	gpm	NM	NM	NM	NM	NM	NM	NM	NM	0.1	NM	0.1	0.1	***	0.1	0.1	0.1	0.12	0.1	0.1
Total Purged	gal	7.5	NM	NM	NM	1.3	1	1	1	1.5	1.5	1	1.3		1.3	1	1.1	1.25	1.3	1.1
Depth to Water	ft bgs	276.48	264.03	236.52	268.98	263.77	262.82	263.78	263.77	263.67	263.65	263.69	263.74		263.9	263.92	264.68	263.45	263.7	263.92
Temperature	deg C	22.5	NM	NM	11.1	10.4	9.9	8.8	9.3	9.9	9.5	9.5	10.1		12.5	11.7	9.6	6.66	10.2	11.1
pH	SU	8.38	NM	NM	8.81	8.81	8.86	8.84	8.84	8.83	8.87	8.59	8.55		8.56	8.61	8.54	8.62	8.36	8.45
Specific Conductance	µS/cm	1355	NM	NM	1621	1647	1637	1670	1664	1622	1610	1592	1596		1553	1558	1570	1606.9	1527	1572
Oxygen Reduction Potential	mV	77.1	NM	NM	47.8	50.6	53.3	41.5	12.6	12	-33.8	5.7	-21.3		-44.7	14.5	-38.2	-39.7	-12.1	-16.01
Lab Analytical Results:																				
Hardness as CaCO3	mg/L	13.6			14.0		10.2			10.5			9.11			9.34	9.48	8.79	8.47	8.74
pH (Lab)	SU	8.80			8.66		8.58			8.62			8.67			8.60	8.50	8.54	8.14	8.37
Total Dissolved Solids (Lab)	mg/L	1160			1120		1070			1030			1010			990	975	1050	975	1010
Calcium	mg/L	3.89			3.69		2.87			2.74			2.36			2.37	2.39	2.25	2.16	2.20
Magnesium	mg/L	0.943			1.16		0.750			0.880			0.78			0.829	0.854	0.769	0.748	0.787
Sodium	mg/L	428			433		411			416			398			404	417	416	384	392
Potassium	mg/L	<5.00			1.70		<5.00			1.68			1.25			<2.00	<2.00	1.9	1.29	1.35
Alkalinity, Total	mg/L	940			985		945			1000			900			940	900	860	945	905
Alkalinity, Bicarbonate	mg/L	730			815		855			820			780			760	810	720	805	775
Alkalinity, Carbonate	mg/L	210			170		140			180			120			180	90.0	140	140	130
Alkalinity, Hydroxide	mg/L	<10.0			<10.0		<10.0			<10.0			<10			<10.0	<10.0	<10.0	<10	<10.0
Chloride	mg/L	11.4			6.32		8.60			5.93			7.48			5.23	4.98	5.17	5.3	5.11
Fluoride	mg/L	0.954			0.606		0.815			0.535			0.565			0.536	0.340	0.367	0.404	0.327
Sulfate as SO4	mg/L	32.6			38.1		32.3			21.6			17.3			13.3	9.01	7.39	7.62	6.48
Total Organic Carbon (TOC)	mg/L	6.32			3.42		3.69			3.65			3.82			3.78	3.68	3.46	3.46	3.24
Nitrate/Nitrite as N	mg/L	0.599			<0.400		<0.020			<0.020			<0.02			<0.020	<0.020	<0.020	<0.020	<0.020
Aluminum	mg/L	<0.250			<0.050		<0.250			<0.050			<0.05			<0.100	<0.100	<0.050	<0.050	<0.050
Arsenic	mg/L	0.0129			0.0200		0.0151			0.0192			0.0232			0.0234	0.0165	0.0177	0.0176	0.0194
Cadmium	mg/L	<0.0005			<0.0001		<0.0005			<0.0001			<0.0001			<0.0001	<0.0002	<0.0002	<0.0001	<0.0001
Copper	mg/L	0.0229			0.0074		0.0060			0.0076			0.0049			0.0072	0.0074	0.0103	0.0148	0.0054
Iron	mg/L	<0.250			<0.050		<0.250			<0.050			<0.05			<0.100	<0.100	<0.050	<0.050	<0.050
Lead	mg/L	<0.0025			<0.0005		<0.0025			<0.0005			<0.0005			<0.0005	<0.001	<0.0010	<0.0005	<0.0005
Manganese	mg/L	<0.0025			0.0036		0.0066			0.0082			0.0104			0.0121	0.0155	0.017	0.0146	0.0158
Mercury	mg/L	<0.0002			<0.0002		<0.0002			<0.0002			<0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L	0.0395			0.0274		0.0247			0.0158			0.0113			0.0114	0.0078	0.0066	0.0053	0.0051
Selenium	mg/L	<0.0050			0.0014		<0.0050			<0.0010			<0.001			0.0010	<0.002	<0.0020	<0.001	<0.0010
Silica (Si02)	mg/L	<5.35			9.07		<5.35			8.66			8.17			8.28	9.20	8.37	8.4	9.18
Silicon	mg/L	<2.50			4.24		<2.50			4.05			3.82			3.87	4.30	3.91	3.93	4.29
Uranium	mg/L	0.0117			0.0098		0.0104			0.0095			0.0089			0.0112	0.0099	0.0103	0.0085	0.0093
Zinc	mg/L	0.204			0.138		0.109			0.0933			0.0816			0.0801	0.0919	0.115	0.0576	0.0567

Notes & Definitions:

*** *La Plata County stage 3 fire restrictions prevented sampling activity*

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
NA	not analyzed (lab)

1. *"<" values denote that the quantification of that analyte is below the reporting level for the analytical laboratory, acceptable by environmental water quality laboratory industry standards.*
2. *Total alkalinity is measured by titration with hydrochloric acid to a set pH point, reporting this value as an equivalent amount of calcium carbonate. This value is then partitioned into bicarbonate, carbonate and hydroxide depending on the initial pH of the sample solution, each components*
3. *Industry standard Quality Assurance/Quality Control (QA/QC) protocol are followed for this hydrologic monitoring program by both GCC Energy and the contracted environmental water quality analytical laboratories. QA/QC results are not shown in this table.*

GCC Energy Hydrologic Monitoring Data

MW-7-EAA										
Year		2018	2019							
Quarter		Q4	Q1			Q2			Q3	
Month		12	1	2	3	4	5	6	7	8
Sample Date		12/23	1/29	2/19	3/20	4/16	5/29	6/20	7/24	8/13
Lab Analysis (Y/N)		Y	N	Y	N	N	Y	N	N	Y
Field Parameters:										
Purge Flow Rate	gpm	1.10	1.10	1.00	3.00	1.00	1.00	1.00	1.00	1.00
Total Purged	gal	15.0	18.0	15.0	3.0	15.0	16.0	15.3	15.3	17.0
Depth to Water	ft bgs	36.13	36.27	36.45	36.52	36.70	36.25	36.22	36.48	36.49
Temperature	deg C	10.0	10.0	10.0	9.9	10.1	10.4	10.4	10.6	10.5
pH	SU	6.99	7.01	7.04	6.93	7.00	7.06	7.07	6.28	6.95
Specific Conductance	µS/cm	2001	1910	1910	1926	1912	1767	1836	1885	1890
Oxygen Reduction Potential	mV	-68.0	-36.7	-41.4	-38.1	-48.8	14.1	-13.8	-33.9	-37.8
Lab Analytical Results:										
Hardness as CaCO3	mg/L	936		1030			982			997
pH (Lab)	SU	7.2		7.37			7.17			7.09
Total Dissolved Solids (Lab)	mg/L	1460		1480			1490			1480
Calcium	mg/L	170		179			171			173
Magnesium	mg/L	124		142			135			137
Sodium	mg/L	75.3		81.3			75.0			75.2
Potassium	mg/L	3.87		3.9			<5.00			3.74
Alkalinity, Total	mg/L	380		367			405			392
Alkalinity, Bicarbonate	mg/L	380		367			405			392
Alkalinity, Carbonate	mg/L	<10.0		<10.0			<10.0			<10.0
Alkalinity, Hydroxide	mg/L	<10.0		<10.0			<10.0			<10.0
Chloride	mg/L	11.9		10.7			10.8			10.9
Fluoride	mg/L	<0.500		0.332			0.322			0.322
Sulfate as SO4	mg/L	732		736			733			844
Total Organic Carbon (TOC)	mg/L	3.72		3.57			3.73			3.70
Nitrate/Nitrite as N	mg/L	<0.020		<0.020			<0.020			<0.020
Aluminum	mg/L	<0.050		<0.100			<0.250			<0.100
Arsenic	mg/L	0.0014		0.0015			0.0013			0.0016
Cadmium	mg/L	<0.0001		<0.0002			<0.0001			<0.0001
Copper	mg/L	0.0003		0.0018			0.0011			0.0008
Iron	mg/L	1.82		1.95			1.81			2.12
Lead	mg/L	<0.0005		<0.0010			<0.0005			<0.0005
Manganese	mg/L	3.72		4.49			4.01			4.22
Mercury	mg/L	<0.0002		<0.0002			<0.0002			<0.0002
Molybdenum	mg/L	0.0008		0.0011			0.0007			0.0009
Selenium	mg/L	<0.0020		<0.0020			<0.0010			0.0011
Silica (Si02)	mg/L	16.6		16.1			16.1			16.9
Silicon	mg/L	7.75		7.52			7.55			7.90
Uranium	mg/L	0.0021		0.0018			0.0017			0.0018
Zinc	mg/L	<0.0050		<0.0040			0.0021			0.0020

Notes & Definitions:

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
NA	not analyzed (lab)
*	Anomalous value under review

1. *"<" values denote that the quantification of that analyte is below the reporting level for the analytical laboratory, acceptable by environmental water quality laboratory industry standards.*

2. *Total alkalinity is measured by titration with hydrochloric acid to a set pH point, reporting this value as an equivalent amount of calcium carbonate. This value is then partitioned into bicarbonate, carbonate and hydroxide depending on the initial pH of the sample solution, each components reported as equivalent CaCO3.*

3. *Industry standard Quality Assurance/Quality Control (QA/QC) protocol are followed for this hydrologic monitoring program by both GCC Energy and the contracted environmental water quality analytical laboratories. QA/QC results are not shown in this table.*

GCC Energy Hydrologic Monitoring Data

MW-8-EAA										
Year		2018	2019							
Quarter		Q4	Q1			Q2			Q3	
Month		12	1	2	3	4	5	6	7	8
Sample Date		12/23	1/29	2/19	3/20	4/16	5/29	6/20	7/24	8/13
Lab Analysis (Y/N)		Y	N	Y	N	N	Y	N	N	Y
Field Parameters:										
Purge Flow Rate	gpm	0.85	1.10	0.50	3.00	0.50	0.75	1.00	1.00	0.75
Total Purged	gal	18.0	14.0	15.0	3.0	15.0	17.0	15.3	15.3	18.0
Depth to Water	ft bgs	40.00	39.95	40.10	43.45	40.44	40.05	39.94	40.10	40.08
Temperature	deg C	10.3	10.2	10.0	9.9	10.3	10.5	10.6	10.5	10.6
pH	SU	7.12	7.09	7.13	7.17	7.09	7.02	7.17	7.09	7.05
Specific Conductance	µS/cm	1781	1696	1720	1725	1729	1628	1676	1699	172
Oxygen Reduction Potential	mV	-65	-52.8	-51.8	-53.0	-59.7	11.0	-29.5	-46.6	-44.8
Lab Analytical Results:										
Hardness as CaCO3	mg/L	870		861			864			883
pH (Lab)	SU	7.28		7.36			7.13			7.05
Total Dissolved Solids (Lab)	mg/L	1220		1290			1240			1280
Calcium	mg/L	152		151			148			154
Magnesium	mg/L	119		118			120			121
Sodium	mg/L	81.7		82.6			77.2			78.6
Potassium	mg/L	3.80		3.27			3.55			3.18
Alkalinity, Total	mg/L	400		435			450			431
Alkalinity, Bicarbonate	mg/L	400		435			450			431
Alkalinity, Carbonate	mg/L	<10.0		<10.0			<10.0			<10.0
Alkalinity, Hydroxide	mg/L	<10.0		<10.0			<10.0			<10.0
Chloride	mg/L	9.83		10.5			10.3			11.1
Fluoride	mg/L	0.380		0.370			0.338			0.342
Sulfate as SO4	mg/L	533		559			606			643
Total Organic Carbon (TOC)	mg/L	3.77		3.59			3.77			3.68
Nitrate/Nitrite as N	mg/L	<0.020		<0.020			<0.020			<0.020
Aluminum	mg/L	<0.100		<0.100			<0.050			<0.100
Arsenic	mg/L	0.0020		0.0018			0.0018			0.0021
Cadmium	mg/L	<0.0001		<0.0002			<0.0001			<0.0001
Copper	mg/L	0.0004		0.0024			0.0023			0.0008
Iron	mg/L	2.12		2.13			2.42			2.46
Lead	mg/L	<0.0005		<0.0010			<0.0005			<0.0005
Manganese	mg/L	3.17		3.52			3.06			3.37
Mercury	mg/L	<0.0002		<0.0002			<0.0002			<0.0002
Molybdenum	mg/L	0.0009		0.0011			0.0008			0.0011
Selenium	mg/L	<0.0020		<0.0020			0.0010			0.0013
Silica (Si02)	mg/L	16.3		15.3			15.7			16.1
Silicon	mg/L	7.63		7.15			7.32			7.52
Uranium	mg/L	0.0021		0.0017			0.0016			0.0018
Zinc	mg/L	<0.0050		<0.0040			<0.0020			<0.0020

Notes & Definitions:

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
NA	not analyzed (lab)
*	Anomalous value under review

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GCC Energy Hydrologic Monitoring Data

MW-8-MI										
Year		2018	2019							
Quarter		Q4	Q1			Q2			Q3	
Month		12	1	2	3	4	5	6	7	8
Sample Date		12/23	1/29	2/19	3/20	4/16	5/29	6/20	7/24	8/13
Lab Analysis (Y/N)		Y	N	Y	N	N	Y	N	N	Y
Field Parameters:										
Purge Flow Rate	gpm	1.10	1.00	0.50	3.00	0.50	0.50	0.25	0.50	0.75
Total Purged	gal	27.5	18.0	1.0	3.0	1.5	2.5	2.5	2.3	3.0
Depth to Water	ft bgs	45.75	43.48	43.50	44.30	44.47	44.10	44.24	44.45	44.59
Temperature	deg C	10.8	10.8	10.6	11.2	10.4	11.1	11.4	11.0	11.4
pH	SU	7.57	7.5	7.48	7.47	7.34	7.31	7.48	7.42	7.382
Specific Conductance	µS/cm	1786	1667	1651	1658	1643	1595	1639	1645	1658
Oxygen Reduction Potential	mV	-84.4	-177.1	-122.1	-113.3	-87.2	-54.4	-97.1	-116.4	-119.4
Lab Analytical Results:										
Hardness as CaCO3	mg/L	167		249			273			253
pH (Lab)	SU	7.73		7.54			7.24			7.46
Total Dissolved Solids (Lab)	mg/L	1050		1030			1100			1110
Calcium	mg/L	34.0		48.5			52.4			49.7
Magnesium	mg/L	19.9		31.0			34.5			31.4
Sodium	mg/L	344		312			289			289
Potassium	mg/L	4.47		5.25			<5.00			4.55
Alkalinity, Total	mg/L	500		565			560			573
Alkalinity, Bicarbonate	mg/L	500		565			560			573
Alkalinity, Carbonate	mg/L	<10.0		<10.0			<10.0			<10.0
Alkalinity, Hydroxide	mg/L	<10.0		<10.0			<10.0			<10.0
Chloride	mg/L	12.7		10.0			9.33			9.06
Fluoride	mg/L	<0.500		<0.200			<0.200			<0.200
Sulfate as SO4	mg/L	347		353			343			366
Total Organic Carbon (TOC)	mg/L	2.73		2.83			2.81			2.74
Nitrate/Nitrite as N	mg/L	<0.020		<0.020			<0.020			<0.020
Aluminum	mg/L	<0.050		<0.100			<0.250			<0.100
Arsenic	mg/L	0.0008		<0.0010			0.0006			0.0005
Cadmium	mg/L	<0.0001		<0.0002			<0.0001			<0.0001
Copper	mg/L	0.0031		0.0066			0.0036			0.0035
Iron	mg/L	0.137		0.162			<0.250			0.129
Lead	mg/L	<0.0005		<0.0010			<0.0005			<0.0005
Manganese	mg/L	0.0495		0.0383			0.0327			0.0351
Mercury	mg/L	<0.0002		<0.0002			<0.0002			<0.0002
Molybdenum	mg/L	0.0005		<0.0010			<0.0005			<0.0005
Selenium	mg/L	<0.0020		<0.0020			0.0010			0.0010
Silica (Si02)	mg/L	12.1		12.4			12.8			12.5
Silicon	mg/L	5.65		5.78			5.99			5.83
Uranium	mg/L	0.0002		0.0002			0.0002			0.0001
Zinc	mg/L	<0.0050		<0.0040			<0.0020			<0.0020

Notes & Definitions:

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
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*	Anomalous value under review

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GCC Energy Hydrologic Monitoring Data

MW-8-LM										
Year		2018	2019							
Quarter		Q4	Q1			Q2			Q3	
Month		12	1	2	3	4	5	6	7	8
Sample Date		12/28	1/29	2/19	3/21	4/16	5/29	6/18	7/24	8/13
Lab Analysis (Y/N)		Y	N	Y	N	N	Y	N	N	Y
Field Parameters:										
Purge Flow Rate	gpm	NM	1.00	0.25	1.00	0.50	0.10	0.25	0.25	0.50
Total Purged	gal	30	4.0	1.5	1.0	2.0	1.3	6.8	2.0	2.0
Depth to Water	ft bgs	136.39	130.52	134.30	144.03	140.03	137.48	142.23	144.15	138.06
Temperature	deg C	4.1	13.9	13.2	8.7	13.6	13.9	12.8	13.7	13.4
pH	SU	8.37	8.7	8.71	8.41	8.7	8.5	8.66	8.64	8.58
Specific Conductance	µS/cm	2306	1274	1265	1310	1262	1234	1264	1226	1269
Oxygen Reduction Potential	mV	37.5	-114.3	112.8	77.0	-36.2	33.2	-63.9	-93.5	-103.0
Lab Analytical Results:										
Hardness as CaCO3	mg/L	45.0		7.29			16.9			6.67
pH (Lab)	SU	8.57		8.63			8.02			8.56
Total Dissolved Solids (Lab)	mg/L	1420		770			780			785
Calcium	mg/L	10.8		1.93			3.84			1.78
Magnesium	mg/L	4.39		0.600			1.77			0.541
Sodium	mg/L	382		341			317			306
Potassium	mg/L	45.7		3.49			<5.00			2.27
Alkalinity, Total	mg/L	615		720			745			731
Alkalinity, Bicarbonate	mg/L	535		610			645			645
Alkalinity, Carbonate	mg/L	80.0		110			100			86.0
Alkalinity, Hydroxide	mg/L	<10.0		<10.0			<10.0			<10.0
Chloride	mg/L	175		5.11			6.80			2.63
Fluoride	mg/L	2.06		3.91			3.95			3.97
Sulfate as SO4	mg/L	190		3.79			9.58			1.02
Total Organic Carbon (TOC)	mg/L	2.80		1.80			3.33			1.94
Nitrate/Nitrite as N	mg/L	<0.020		<0.020			<0.020			<0.020
Aluminum	mg/L	<0.050		<0.100			<0.250			<0.050
Arsenic	mg/L	0.0106		<0.0010			0.0006			0.0007
Cadmium	mg/L	<0.0001		<0.0002			<0.0001			<0.0001
Copper	mg/L	0.0337		0.0077			0.0047			0.0041
Iron	mg/L	<0.050		<0.100			<0.250			<0.050
Lead	mg/L	<0.0005		<0.0010			<0.0005			<0.0005
Manganese	mg/L	0.0258		0.0038			0.0150			0.0020
Mercury	mg/L	<0.0002		<0.0002			<0.0002			<0.0002
Molybdenum	mg/L	0.0142		<0.0010			0.0009			<0.0005
Selenium	mg/L	0.0020		<0.0020			<0.0010			<0.0010
Silica (Si02)	mg/L	9.09		8.45			8.68			8.28
Silicon	mg/L	4.25		3.95			4.06			3.87
Uranium	mg/L	0.0044		<0.0002			0.0001			0.0001
Zinc	mg/L	0.0080		<0.0040			0.0023			<0.0020

Notes & Definitions:

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
mV	millivolts
mg/L	milligram per liter
pCi/L	picocuries per liter
NM	not measured (field)
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*	Anomalous value under review

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GCC Energy Hydrologic Monitoring Data

MW-8-PL										
Year		2018	2019							
Quarter		Q4	Q1			Q2			Q3	
Month		12	1	2	3	4	5	6	7	8
Sample Date		12/27	1/29	2/19	3/20	4/16	5/29	6/20	7/24	8/13
Lab Analysis (Y/N)		Y	N	Y	N	N	Y	N	N	Y
Field Parameters:										
Purge Flow Rate	gpm	0.25	1.00	0.50	3.00	0.50	0.25	0.50	1.00	0.50
Total Purged	gal	20.0	5.0	2.0	3.0	2.0	3.0	2.5	2.3	2.5
Depth to Water	ft bgs	125.97	126.29	126.40	127.10	126.98	126.70	126.82	127.25	127.38
Temperature	deg C	10.3	14.2	13.4	12.9	13.2	14.2	14.8	14.7	14.9
pH	SU	7.50	7.30	7.49	7.30	7.29	7.31	7.57	7.56	7.52
Specific Conductance	µS/cm	1690	1531	1571	1558	1554	1411	1326	1165	1083
Oxygen Reduction Potential	mV	30.2	-116.5	97.9	-108.7	-110.6	34.2	-57.6	-74.0	-79.5
Lab Analytical Results:										
Hardness as CaCO3	mg/L	617		644			596			411
pH (Lab)	SU	7.28		7.40			7.26			7.22
Total Dissolved Solids (Lab)	mg/L	1150		1090			995			705
Calcium	mg/L	112		120			105			73.1
Magnesium	mg/L	82.1		83.8			81.4			55.4
Sodium	mg/L	106		124			102			91.7
Potassium	mg/L	5.14		5.62			<5.00			2.80
Alkalinity, Total	mg/L	370		415			435			393
Alkalinity, Bicarbonate	mg/L	370		415			435			393
Alkalinity, Carbonate	mg/L	<10.0		<10.0			<10.0			<10.0
Alkalinity, Hydroxide	mg/L	<10.0		<10.0			<10.0			<10.0
Chloride	mg/L	18.8		18.5			9.03			5.61
Fluoride	mg/L	0.505		0.474			0.290			0.291
Sulfate as SO4	mg/L	478		471			390			232
Total Organic Carbon (TOC)	mg/L	4.17		4.02			2.92			2.21
Nitrate/Nitrite as N	mg/L	<0.020		<0.020			<0.020			<0.020
Aluminum	mg/L	<0.050		<0.100			<0.250			<0.050
Arsenic	mg/L	0.0074		0.0124			0.0190			0.0156
Cadmium	mg/L	<0.0001		<0.0002			<0.0001			<0.0001
Copper	mg/L	0.0016		0.0025			0.0017			0.0011
Iron	mg/L	<0.050		0.352			<0.250			0.129
Lead	mg/L	<0.0005		<0.0010			<0.0005			<0.0005
Manganese	mg/L	1.31		1.22			0.697			0.505
Mercury	mg/L	<0.0002		<0.0002			<0.0002			<0.0002
Molybdenum	mg/L	0.0090		0.0068			0.0020			0.0021
Selenium	mg/L	0.0012		<0.0020			<0.0010			<0.0010
Silica (SiO2)	mg/L	14.1		16.3			17.7			18.5
Silicon	mg/L	6.58		7.64			8.28			8.67
Uranium	mg/L	0.0052		0.0040			0.0010			0.0009
Zinc	mg/L	0.0344		<0.0040			<0.0020			<0.0080

Notes & Definitions:

Y/N	yes or no
gpm	gallons per minute
deg C	degrees Celsius
SU	standard pH units
µS/cm	microsiemens per centimeter
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mg/L	milligram per liter
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