1.0 INTRODUCTION

The site is located approximately 4.5 miles north of Keenesburg (Figure 1) in portions of Sections 25 and 36, Township 3 North, Range 64 West, Sixth Principal Meridian, Weld County, Colorado (Figure 2). The area included in the permit allowing both mining and disposal operations is approximately 788.5 acres. Only 413 acres were actually disturbed by mining activities. Ash disposal occurred in two pits (the A-Pit and B-Pit) totaling about 65.6 acres.

The property was a surface coal mine (with associated support operations) from 1981 through 1987. Disposal of ash began in 1987 as part of the mine reclamation process. The site is permitted to dispose of fly and bottom ash from the coal-fired power plant located at the Molson Coors Brewing complex in Golden, Colorado. The facility also accepted waste rock from other mines on a case-by-case basis. The approved operations plan also allows demolition and disposal of on-site facilities such as the shop/office building. The disposal pit closure was completed in 2019.

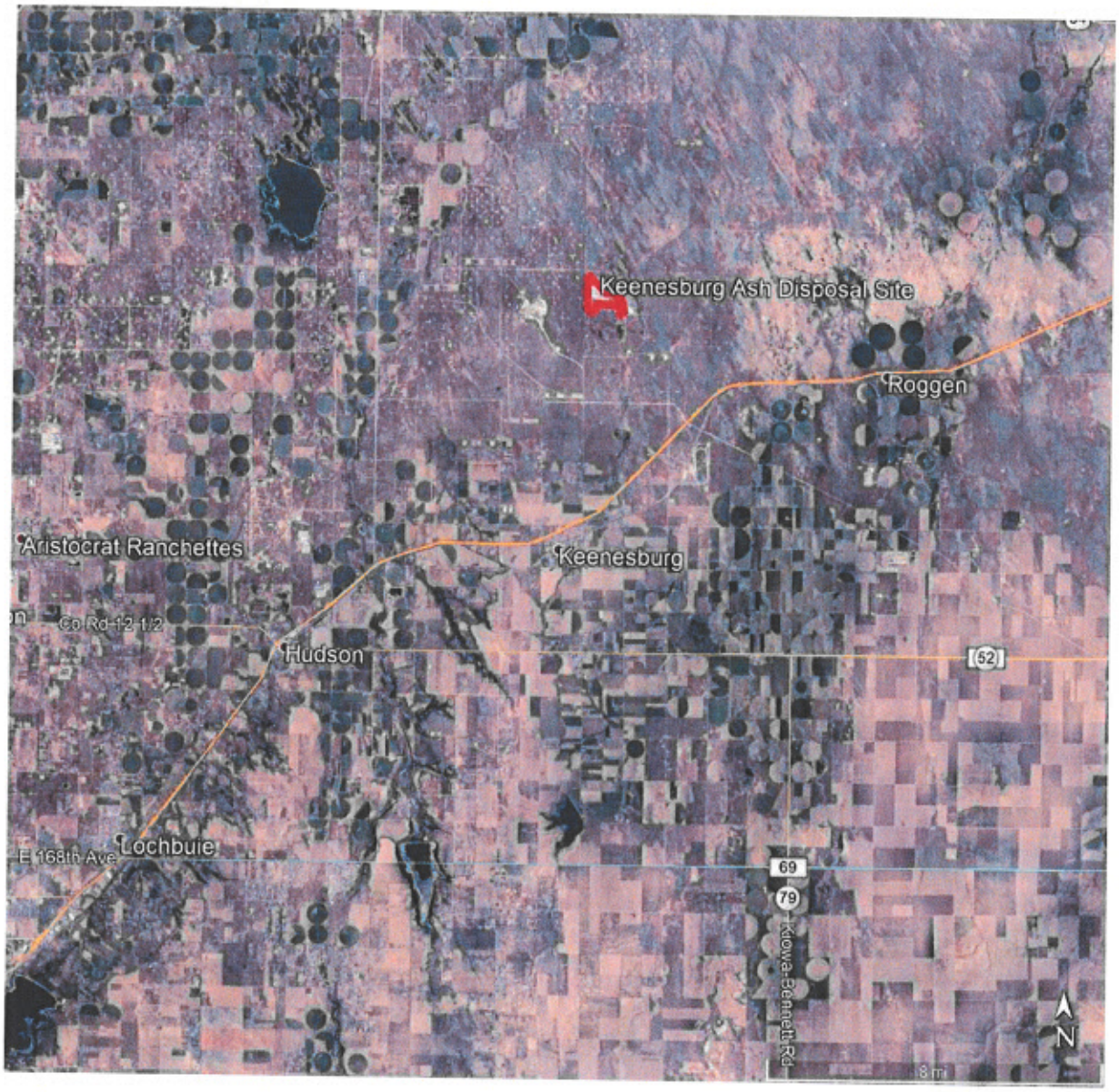
The facility began post-closure groundwater monitoring in the 4th Quarter of 2019 in accordance with the PCCP and GMP. According to the GMP, water levels will be measured quarterly and sampling is conducted semiannually. In accordance with the PCCP, four new groundwater monitoring wells were installed at the facility in July 2019 (PC-1, PC-2, PC-5 and PC-6). These new wells were sampled for the first time during the 4th Quarter 2019 groundwater monitoring event. Statistical analysis of the facility's groundwater will begin after the new wells have been sampled eight times. Statistical analyses is anticipated to begin upon receiving the sampling results of the April event in 2023.

The monitoring well network consists of seven wells including:

PC-1 PC-2 PC5 PC-6 AMW-1 AMW-2 SMW-2

The original closure plan included two additional wells, PC-3 and PC-4. PC-3 was not installed due to encountering ash and darker materials during drilling. AMW-2 is in the same area and became part of the CDPHE's post-closure monitoring program taking the place of PC-3. PC-04 also encountered similar materials during drilling and therefore was not completed to groundwater. CDPHE and CEC agreed that if a need for a well replacing the planned PC-04 well is discovered in the future we would address the location of a replacement well. Approval of these changes was noted in an email from Eric Jacobs of the CDPHE on August 29, 2019.

FIGURE 1
SITE LOCATION MAP



2.0 SAMPLING

All seven monitoring wells in the post-closure monitoring network were sampled by AEC twice in 2021. The first 2021 semiannual sampling event was conducted on April 20 & 21, 2021, and the second sampling event was conducted on September 28 and 29, 2021. All sampling activities were performed by AEC in accordance with the GMP procedures with the exception that water levels were collected immediately before each well was sampled rather than from all wells prior to commencing sampling.

Upon arriving at each monitoring well, the sampling technician first measured the static water levels and recorded the measurements on the field forms. The technician then purged the wells using the dedicated 12V pumps. At wells with adequate recharge, three wellbore storage volumes were purged prior to sampling. Wells with poor recharge were purged until dry and then sampled the following day. After each wellbore storage volume was purged, the technician measured the purged water's pH, temperature and conductivity using a portable meter that was calibrated that day. The technician recorded the water level, total volume of water purged, and field parameter measurements onto field sampling forms which are included in Attachment 1.

After each well was purged, the technician collected groundwater samples into new sample containers, containing appropriate preservatives as required, provided by Pace Analytical. A duplicate sample was collected from AMW-1 during the April and September monitoring events. All sample containers were labeled with the well name, the date and time collected, the analyses to be performed, the preservative used (if any), and the sampler's initials. The sample containers were immediately sealed and placed on ice in a cooler after collection. A chain of custody form (COC) was provided by the laboratory. The technician added each sample to the COC, along with the date and time it was collected, and the analyses to be performed.

Samples were preserved during collection activities by placing them in ice-packed coolers. After the last samples were collected on the second day of sampling during each monitoring event, the coolers were filled with fresh ice and sealed with the COCs inside. The coolers were shipped via FedEx™ overnight to the Pace Analytical laboratory in Mount Juliet, TN.

3.0 GROUNDWATER HYDROLOGY

The groundwater monitoring network at the facility is made up of seven wells: PC-1, PC-2, PC-5, PC-6, AMW-1, AMW-2, and SMW-2, and water levels in in these wells are measured quarterly. The field technician measured the depths to water in each well using an electronic water level indicator, and the indicator was decontaminated after measuring water levels in each well. Table 1 shows the depth to groundwater measurements and static water elevations during each quarterly water level monitoring event.

TABLE 1
2021 QUARTERLY WATER LEVELS

Well	ToC Elevation	2/9/2021		4/19/2021		9/28/2021		1/12/2022	
		Depth	Elev	Depth	Elev	Depth	Elev	Depth	Elev
AMW-1	4,804.55	27.87	4,776.68	28.00	4,776.55	27.36	4,777.19	27.35	4,777.20
AMW-2	4,808.88	25.85	4,783.03	25.80	4,783.08	25.41	4,783.47	24.38	4,784.50
PC-1	4,830.46	23.60	4,806.86	23.48	4,806.98	21.55	4,808.91	21.28	4,809.18
PC-2	4,819.29	38.05	4,781.24	37.96	4,781.33	37.30	4,781.99	37.11	4,782.18
PC-5	4,803.16	33.89	4,769.27	33.70	4,769.46	33.15	4,770.01	33.00	4,770.16
PC-6	4,798.63	27.41	4,771.22	27.37	4,771.26	27.08	4,771.55	27.09	4,771.54
SMW-2	4,803.80	34.27	4,769.53	34.25	4,769.55	33.50	4,770.30	33.74	4,770.06

Notes: Elevation is feet above mean sea level.
Depth measured in feet from top of casing.

AEC constructed groundwater potentiometric surface maps for each monitoring quarter in 2021 using the groundwater elevations from Table 1. Additionally, water levels were voluntarily measured in well SMW-1 during the 1st and 3rd Quarter monitoring events, and those measurements were included in those potentiometric surface maps. The potentiometric surface maps are included in Attachment 2 and are labeled Figure 2-1 through 2-4.

All four of the 2021 maps are substantially similar, and they show groundwater generally flowing east to north-northeast beneath the facility. Near the A-Pit, groundwater flows north-northeast at a gradient of approximately 2.2% to 2.4%. Near the B-Pit, groundwater flows east at a gradient of approximately 0.72% to 0.77%. The observed quarterly groundwater gradients beneath each pit are shown in Table 2 on the following page.

Groundwater flow velocities beneath both the A-Pit and B-Pit were calculated using the formula from the GMP. The GMP lists the average hydraulic conductivity beneath the site as $3x10^{-5}$ cm/s and the porosity as 0.1; however, the actual hydraulic gradient varies across the site. The formula provided in the GMP for calculating groundwater flow velocity is:

$$V_S = 2830\frac{Ki}{n_e}$$

Where:

V_s	=	groundwater seepage velocity (ft/day)
K	=	hydraulic conductivity (cm/s)
i	=	hydraulic gradient (dimensionless)
n_e	=	effective porosity (dimensionless)
2830	=	unit conversion factor ((s*ft)/(cm*day))

Using that formula, AEC calculated the groundwater flow velocity beneath both the A-Pit and B-Pit for each of the 2021 quarterly water level monitoring events, and the results are shown in Table 2 below.

TABLE 2
2021 QUARTERLY GROUNDWATER FLOW VELOCITIES

Monitoring Quarter	Pit	Gradient	Velocity	
			(ft/day)	(ft/year)
1st Quarter	A-Pit	2.19%	0.01857	6.8
	B-Pit	0.72%	0.00610	2.2
2nd Quarter	A-Pit	2.24%	0.01899	6.9
	B-Pit	0.77%	0.00657	2.4
3rd Quarter	A-Pit	2.31%	0.01965	7.2
	B-Pit	0.75%	0.00636	2.3
4th Quarter	A-Pit	2.28%	0.01933	7.1
	B-Pit	0.76%	0.00646	2.4

4.0 LABORATORY RESULTS

The samples collected by AEC for the 2nd Quarter monitoring event were received by Pace Analytical on April 23, 2021, and the 3rd Quarter monitoring event samples were received by Pace Analytical on October 4, 2021. The laboratory noted that all samples were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times for both 2021 monitoring events. Duplicate samples were collected from AMW-1 during both events. Table 3 shows the analytical results from the primary and duplicate samples and the relative percent difference (RPD) between them for both 2021 monitoring events. The primary and duplicate samples showed good agreement for both monitoring events, with nearly all parameters differing by less than 10%.

TABLE 3
PRIMARY AND DUPLICATE SAMPLE RESULTS AND COMPARISON

	Apr-21			Sep-21		
	AMW-1	DUP	RPD	AMW-1	DUP	RPD
Sodium Adsorption Ratio	1.63	1.5	8%	1.58	1.5	5%
Hardness (calculated) as CaCO3	1030	1050	2%	1240	1290	4%
Dissolved Solids	1500	1700	13%	1650	1690	2%
Alkalinity,Bicarbonate	218	215	1%	226	219	3%
Alkalinity,Carbonate	ND	ND	0%	ND	ND	0%
Chloride	29.8	30.8	3%	31.5	31.3	1%
Fluoride	0.94	0.898	5%	0.898	0.863	4%
Sulfate	791	866	9%	880	873	1%
Antimony,Dissolved	ND	ND	0%	ND	ND	0%
Arsenic,Dissolved	ND	ND	0%	ND	ND	0%
Barium,Dissolved	0.0316	0.0309	2%	0.0311	0.0322	3%
Boron,Dissolved	ND	ND	0%	ND	ND	0%
Cadmium,Dissolved	ND	ND	0%	ND	ND	0%
Calcium	286	287	0%	346	349	1%
Calcium,Dissolved	255	248	3%	268	280	4%
Iron,Dissolved	ND	ND	0%	ND	ND	0%
Lead,Dissolved	ND	ND	0%	ND	ND	0%
Magnesium	78.1	80.8	3%	90.5	102	12%
Magnesium,Dissolved	69.9	68.6	2%	74.7	77.9	4%
Manganese,Dissolved	ND	ND	0%	ND	ND	0%
Molybdenum,Dissolved	ND	ND	0%	ND	ND	0%
Potassium,Dissolved	3.09	3.27	6%	3.6	3.9	8%
Selenium,Dissolved	0.0202	0.0251	22%	0.0273	0.0313	14%
Sodium	121	112	8%	127	124	2%
Sodium,Dissolved	114	120	5%	131	136	4%

The complete laboratory analytical reports for both 2021 semiannual water quality sampling events are included in Attachment 2.

5.0 STATISTICAL ANALYSIS

The GMP specifies that the analytical data will be statistically analyzed using interwell prediction limits, which requires a minimum of eight observations in the up-gradient wells (PC-1 and PC-2). As of the end of 2021, five observations have been collected. Based on the semiannual water quality monitoring schedule, the first statistical analysis will be conducted on the April 2023 observations.

ATTACHMENT 1

FIELD FORMS

ATTACHMENT 1.1

APRIL 2021 FORMS

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-1						
Sampled by: SJE				**Date:** 4/21/2021		
Weather during sampling: Cloudy, Breezy, Light Snow, 28 deg				**Date Sampled:** 4/21/2021		
Well Condition: Good				**Time Sampled:** 1230		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 50.15'						
Depth to Groundwater from Measuring Point: 22.47'						
Height of Water Column: 27.68'						
Single Casing/Tubing Volume of Water: 4.6g						
Volume of Water to Purge Prior to Sampling: 13.9g						
Volume of Water Actually Purged Prior to Sampling: 8g				**Flow Rate:** 2.2 gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 15V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 11V Controller			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	7.26	7.13			
Temperature	**°F**	54.6	56.2			
Conductance	**mS/cm**	3.20	3.20			
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Brown					
Odor	None					
Appearance	Slightly Turbid					

NOTES:
2-inch well

45' Cord

Drew down to top of pump after 8 gallons.

Color cleared up after first casing volume was purged.

AEC *AMERICAN ENVIRONMENTAL CONSULTING, LLC*

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-2						
Sampled by: SJE				**Date:** 4/21/2021		
Weather during sampling: Cloudy, Calm, Light Snow, 28°F				**Date Sampled:** 4/21/2021		
Well Condition: Good				**Time Sampled:** 1600		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 74.78'						
Depth to Groundwater from Measuring Point: 37.14'						
Height of Water Column: 37.64'						
Single Casing/Tubing Volume of Water: 6.3g						
Volume of Water to Purge Prior to Sampling: 18.9g						
Volume of Water Actually Purged Prior to Sampling: ~6g				**Flow Rate:**		
Method of Purging/Equipment: 12V Pump			**Voltage:** 14 V			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 14 V			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	6.87	6.90			
Temperature	**°F**	57.4	55.1			
Conductance	**mS/cm**	8.79	8.78			
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Colorless					
Odor	Slight sulfuric smell					
Appearance	Clear					

NOTES:

70' Cord

Purged dry after ~ 6 gallons
Recovered for sampling

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-5						
Sampled by: SJE				**Date:** 4/21/2021		
Weather during sampling: Cloudy, Breezy, 39°F				**Date Sampled:** 4/21/2021		
Well Condition: Good				**Time Sampled:** 1330		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 50.40'						
Depth to Groundwater from Measuring Point: 33.38'						
Height of Water Column: 17.02'						
Single Casing/Tubing Volume of Water: 2.84g						
Volume of Water to Purge Prior to Sampling: 8.53g						
Volume of Water Actually Purged Prior to Sampling: 9g				**Flow Rate:**		
Method of Purging/Equipment: 12V Pump			**Voltage:** 14V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Controller			
FIELD PARAMETERS						
	Units	**1 (3g)**	**2 (6g)**	**3 (9g)**	**4**	**5**
pH	**pH units**	6.52	6.52	6.53		
Temperature	**°F**	56.0	55.3	54.7		
Conductance	**mS/cm**	3.40	3.43	3.38		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Greyish Brown					
Odor	None					
Appearance	Slightly turbid					

NOTES:
Single Casing Volume = Height of Water Column x 0.167

AEC *AMERICAN ENVIRONMENTAL CONSULTING, LLC*

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-6						
Sampled by: SJE				**Date:** 4/21/2021		
Weather during sampling: Clear, 5mph, 80°F				**Date Sampled:** 4/21/2021		
Well Condition: Good				**Time Sampled:** 1530		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well from Measuring Point: 49.00'						
Depth to Groundwater from Measuring Point: 27.31'						
Height of Water Column: 21.69'						
Single Casing/Tubing Volume of Water: 3.6g						
Volume of Water to Purge Prior to Sampling: 10.8g						
Volume of Water Actually Purged Prior to Sampling: 12g				**Flow Rate:**		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Controller			
FIELD PARAMETERS						
	Units	**1 (4g)**	**2 (8g)**	**3 (12g)**	**4**	**5**
pH	**pH units**	7.49	7.41	7.39		
Temperature	**°F**	53.6	54.2	54.7		
Conductance	**mS/cm**	2.69	2.70	2.71		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Clear					
Odor	None					
Appearance	Clear					

NOTES:
Initially yellowish grey in color. Clear at sample.

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: AMW-1						
Sampled by: SJE				**Date:** 4/20/2021		
Weather during sampling: Calm, Cold, Sunny, 23°F				**Date Sampled:** 4/20/2021		
Well Condition: Good				**Time Sampled:** 1100		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 56.85' (Measured 9/18/2020)						
Depth to Groundwater from Measuring Point: 28.13'						
Height of Water Column: 28.72'						
Single Casing/Tubing Volume of Water: 29g						
Volume of Water to Purge Prior to Sampling: 87g						
Volume of Water Actually Purged Prior to Sampling: ~90g				**Flow Rate:** 1.33gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery			
FIELD PARAMETERS						
	Units	**1 (30g)**	**2 (60g)**	**3 (90g)**	**4**	**5**
pH	**pH units**	7.50	7.51	7.56		
Temperature	**°F**	54.3	52.1	53.4		
Conductance	**mS/cm**	1.66	1.75	1.80		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Tan - Brown					
Odor	None					
Appearance	Turbid					

NOTES:
5" Well → CV = 1 g/ft

Dup Collected

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: AMW-2						
Sampled by: SJE				**Date:** 4/20/2021		
Weather during sampling: Partly Cloudy, Breezy, 30°F				**Date Sampled:** 4/21/2021		
Well Condition: Good				**Time Sampled:** 1145		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 53.60'						
Depth to Groundwater from Measuring Point: 25.09'						
Height of Water Column: 28.51'						
Single Casing/Tubing Volume of Water: 43g						
Volume of Water to Purge Prior to Sampling: 129g						
Volume of Water Actually Purged Prior to Sampling: 53g				**Flow Rate:** 1.31 gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery (truck)			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery (truck)			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	6.81	6.55			
Temperature	**°F**	59.3	59.5			
Conductance	**mS/cm**	6.02	6.24			
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Colorless					
Odor	None					
Appearance	Clear					

NOTES:
6" Well → CV = 1.5 g/ft
45' Cord

Purged on 4/20/2021 -- Field Parameters Column 1
Purged from 15:35 – 16:15 (40 min) until well was fully purged.
Sample collected 4/21/2021 -- Field Parameters Column 2

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: SMW-2						
Sampled by: SJE				**Date:** 4/20/2021		
Weather during sampling: Sunny, Calm, 30°F				**Date Sampled:** 4/20/2021		
Well Condition: Good				**Time Sampled:** 1515		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 96' (Measured 9/18/2020)						
Depth to Groundwater from Measuring Point: 33.87'						
Height of Water Column: 62.13'						
Single Casing/Tubing Volume of Water: 52g						
Volume of Water to Purge Prior to Sampling: 154.7g						
Volume of Water Actually Purged Prior to Sampling: 156g				**Flow Rate:** 0.6 – 0.8gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	6.93	6.83	6.96		
Temperature	**°F**	54.4	57.5	55.5		
Conductance	**mS/cm**	6.59	6.51	6.54		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Clear					
Odor	None					
Appearance	Clear					

NOTES:
4.5" Well → Single Casing = 0.83 g/ft

0.8gpm initial
0.61gpm after first volume
0.60gpm after second volume

ATTACHMENT 1.2

SEPTEMBER 2021 FORMS

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-1						
Sampled by: DRB				**Date:** 9/30/2021		
Weather during sampling: Sunny, Clear				**Date Sampled:** 9/30/2021		
Well Condition: Good				**Time Sampled:** 915		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 50.15'						
Depth to Groundwater from Measuring Point: 21.55'						
Height of Water Column: 28.6'						
Single Casing/Tubing Volume of Water: 4.58g						
Volume of Water to Purge Prior to Sampling: 13.9g						
Volume of Water Actually Purged Prior to Sampling: 8g				**Flow Rate:**		
Method of Purging/Equipment: 12V Pump			**Voltage:** 15V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 11V Controller			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	7.26	7.13			
Temperature	**°F**	54.6	56.2			
Conductance	**mS/cm**	3.20	3.20			
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Brown					
Odor	None					
Appearance	Slightly Turbid					

NOTES:
2-inch well

45' Cord

Drew down to top of pump after 8 gallons.

Color cleared up after first casing volume was purged.

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-2						
Sampled by: DRB				**Date:** 9/29/2021		
Weather during sampling: Sunny, Warm				**Date Sampled:** 9/29/2021		
Well Condition: Good				**Time Sampled:** 1015		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 74.78'						
Depth to Groundwater from Measuring Point: 37.3'						
Height of Water Column: 37.48'						
Single Casing/Tubing Volume of Water: 6.3g						
Volume of Water to Purge Prior to Sampling: 19g						
Volume of Water Actually Purged Prior to Sampling: ~9g				**Flow Rate:** 2gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 14 V			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 14 V			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	6.95	6.93			
Temperature	**°F**	58.4	58.1			
Conductance	**mS/cm**	9.10	8.98			
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Clear					
Odor	None					
Appearance	Clear					

NOTES:
2-inch well

70' Cord

Purged dry after ~ 9 gallons
Recovered for sampling

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-5						
Sampled by: DRB				**Date:** 9/30/2021		
Weather during sampling: Sunny, slight breeze, warm				**Date Sampled:** 9/30/2021		
Well Condition: Good				**Time Sampled:** 1115		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 50.40'						
Depth to Groundwater from Measuring Point: 33.15'						
Height of Water Column: 17.25'						
Single Casing/Tubing Volume of Water: 2.88g						
Volume of Water to Purge Prior to Sampling: 8.64g						
Volume of Water Actually Purged Prior to Sampling: 9g				**Flow Rate:**		
Method of Purging/Equipment: 12V Pump			**Voltage:** 14V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Controller			
FIELD PARAMETERS						
	Units	**1 (3g)**	**2 (6g)**	**3 (9g)**	**4**	**5**
pH	**pH units**	6.95	6.92	6.90		
Temperature	**°F**	58.4	58.3	58.4		
Conductance	**mS/cm**	3.65	3.85	3.56		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Greyish Brown					
Odor	None					
Appearance	Slightly turbid					

NOTES:
Single Casing Volume = Height of Water Column x 0.167

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: PC-6						
Sampled by: DRB				**Date:** 9/30/2021		
Weather during sampling: Sunny, Warm				**Date Sampled:** 9/30/2021		
Well Condition: Good				**Time Sampled:** 1230		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well from Measuring Point: 49.00'						
Depth to Groundwater from Measuring Point: 27.08'						
Height of Water Column: 21.92'						
Single Casing/Tubing Volume of Water: 3.66g						
Volume of Water to Purge Prior to Sampling: 11g						
Volume of Water Actually Purged Prior to Sampling: 11.5g				**Flow Rate:** 2.5 gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Controller			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Controller			
FIELD PARAMETERS						
	Units	**1 (4g)**	**2 (8g)**	**3 (12g)**	**4**	**5**
pH	**pH units**	7.46	7.42	7.38		
Temperature	**°F**	58.7	58.6	58.5		
Conductance	**mS/cm**	2.94	2.90	2.88		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Brown					
Odor	None					
Appearance	Slightly Turbid					
NOTES:						

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: AMW-1						
Sampled by: DRB				**Date:** 9/28/2021		
Weather during sampling: Sunny, light breeze, 80°F				**Date Sampled:** 9/28/2021		
Well Condition: Good				**Time Sampled:** 1455		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 56.85' (Measured 9/18/2020)						
Depth to Groundwater from Measuring Point: 27.36'						
Height of Water Column: 29.49'						
Single Casing/Tubing Volume of Water: 29.49g						
Volume of Water to Purge Prior to Sampling: 88.5g						
Volume of Water Actually Purged Prior to Sampling: ~90g				**Flow Rate:** 2.14gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery			
FIELD PARAMETERS						
	Units	**1 (30g)**	**2 (60g)**	**3 (90g)**	**4**	**5**
pH	**pH units**	7.16	7.17	7.25		
Temperature	**°F**	60.2	59.9	59.9		
Conductance	**mS/cm**	1.91	2.01	2.05		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Light Brown					
Odor	None					
Appearance	Turbid					

NOTES:
5" Well → CV = 1 g/ft

Dup Collected

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC

GROUNDWATER SAMPLING FIELD DATA FORM

OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: AMW-2						
Sampled by: DRB/MBT				**Date:** 9/29/2021		
Weather during sampling: Sunny, calm, 80°F				**Date Sampled:** 9/29/2021		
Well Condition: Good				**Time Sampled:** 1315		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 53.60'						
Depth to Groundwater from Measuring Point: 25.41'						
Height of Water Column: 28.19'						
Single Casing/Tubing Volume of Water: 42.3g						
Volume of Water to Purge Prior to Sampling: 127g						
Volume of Water Actually Purged Prior to Sampling: ~100g				**Flow Rate:** 2.0 gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery (truck)			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery (truck)			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	7.02	6.95	6.92		
Temperature	**°F**	59.8	59.3	59.3		
Conductance	**mS/cm**	6.88	6.52	6.51		
Turbidity	**NTU/FTU**	--	--			
Color of Groundwater	Colorless					
Odor	None					
Appearance	Clear					

NOTES:
6" Well → CV = 1.5 g/ft
45' Cord

Purged on 4/20/2021
Purged until well was fully purged.
Sample collected 9/29/2021

AEC *AMERICAN ENVIRONMENTAL CONSULTING, LLC*

GROUNDWATER SAMPLING FIELD DATA FORM

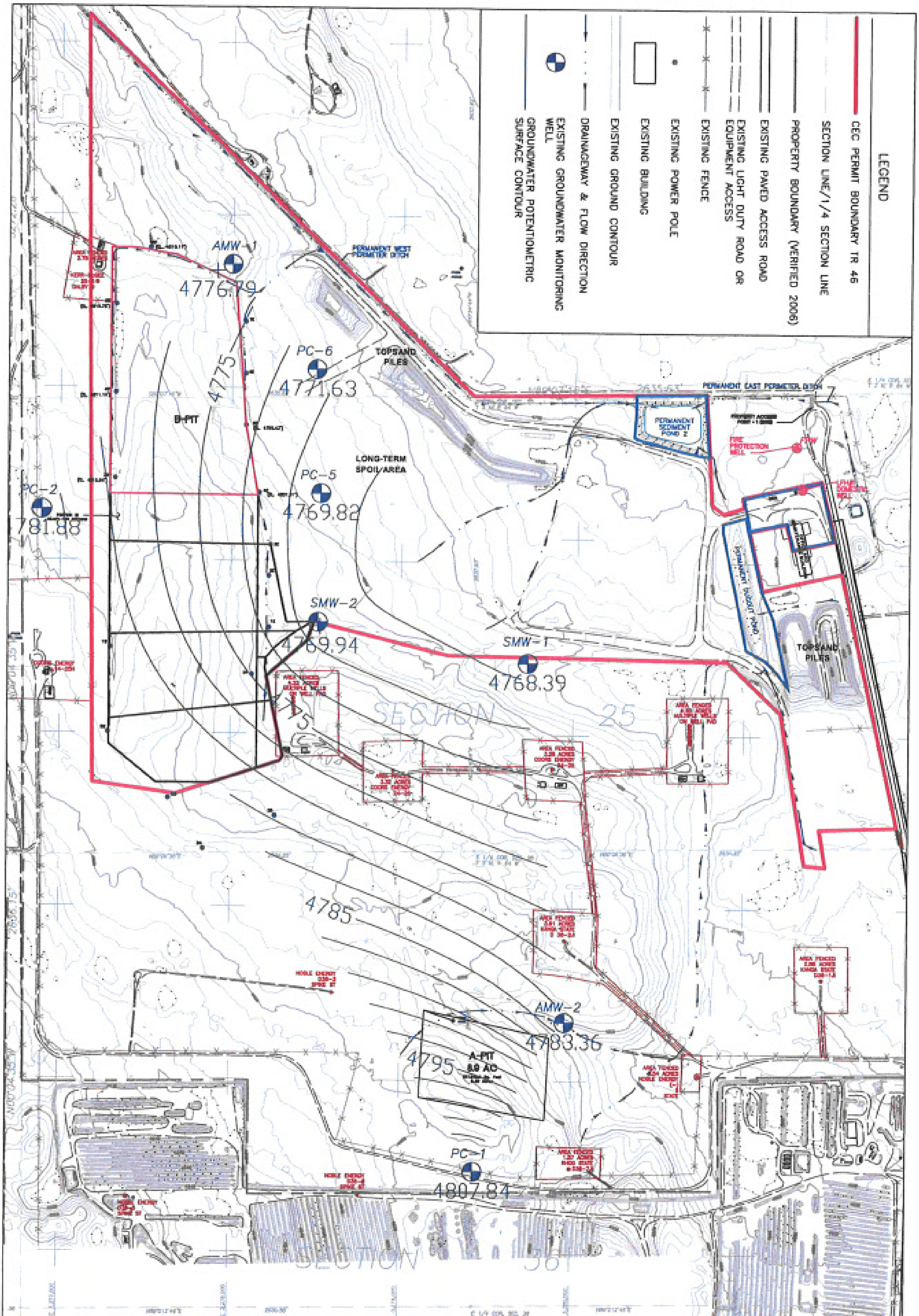
OWNER: COORS ENERGY			**LOCATION: Keenesburg Mine, Keenesburg, Colorado**			
WELL NAME: SMW-2						
Sampled by: DRB				**Date:** 9/28/2021		
Weather during sampling: Sunny, Clear				**Date Sampled:** 9/28/2021		
Well Condition: Good				**Time Sampled:** 1345		
EVACUATION DATA						
Description of Measuring Point: Top of PVC						
Depth of Well From Measuring Point: 96' (Measured 9/18/2020)						
Depth to Groundwater from Measuring Point: 33.5'						
Height of Water Column: 62.5'						
Single Casing/Tubing Volume of Water: 52g						
Volume of Water to Purge Prior to Sampling: 156g						
Volume of Water Actually Purged Prior to Sampling: 156g				**Flow Rate:** 2.2 gpm		
Method of Purging/Equipment: 12V Pump			**Voltage:** 12V Battery			
Method of Sampling/Equipment: 12V Pump			**Voltage:** 12V Battery			
FIELD PARAMETERS						
	Units	**1**	**2**	**3**	**4**	**5**
pH	**pH units**	6.55	6.67	6.30		
Temperature	**°F**	59.3	58.9	59.7		
Conductance	**mS/cm**	6.91	6.88	6.65		
Turbidity	**NTU/FTU**	--	--	--		
Color of Groundwater	Clear					
Odor	None					
Appearance	Clear					

NOTES:
4.5" Well → Single Casing = 0.83 g/ft

0.8gpm initial
0.61gpm after first volume
0.60gpm after second volume

ATTACHMENT 2

QUARTERLY POTENTIOMETRIC SURFACE CONTOUR MAPS

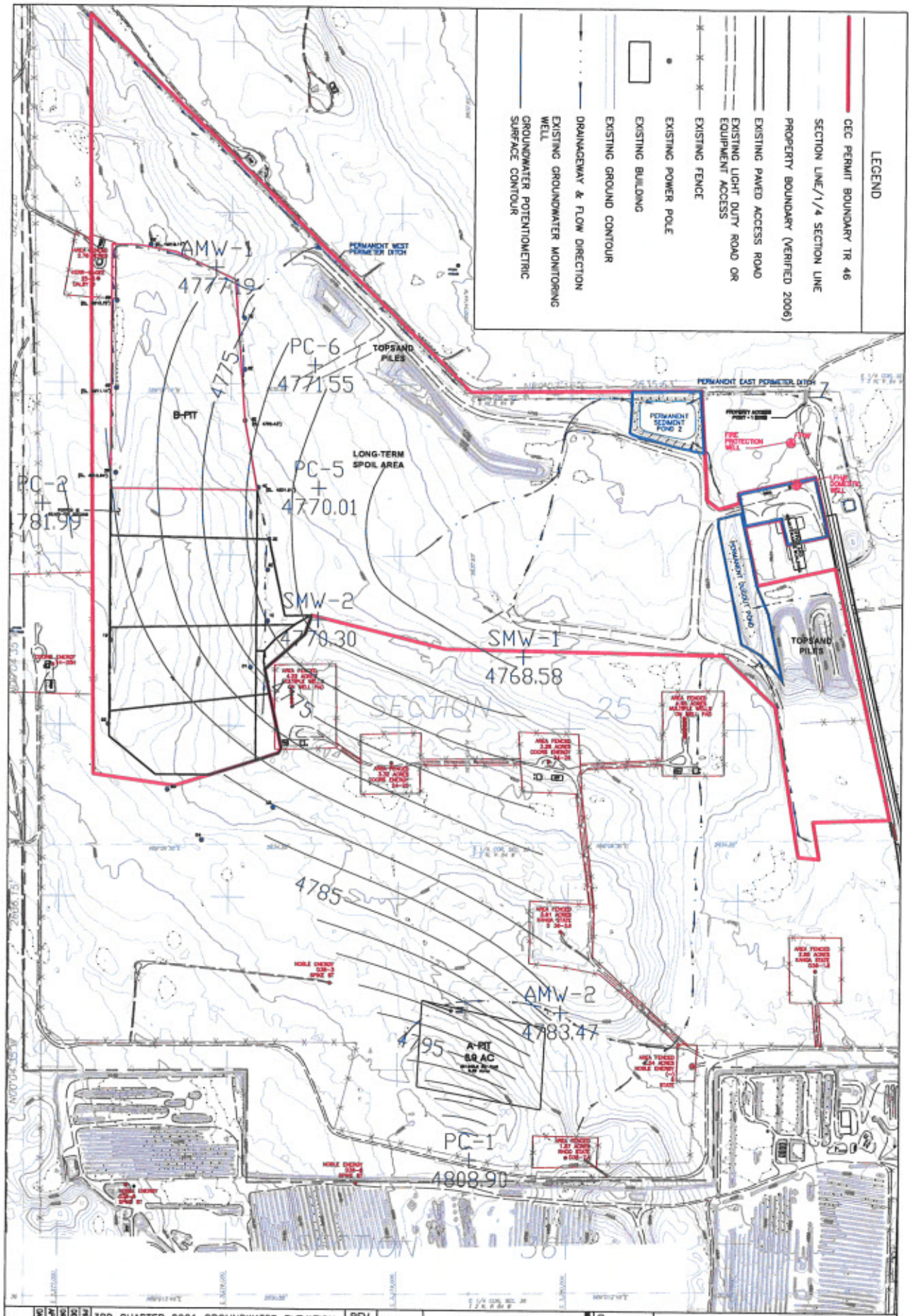


PROJECT NO: AEC	1ST QUARTER 2021 GROUNDWATER ELEVATION AND POTENTIOMETRIC SURFACE MAP	REV. NO.	DATE	REVISION DESCRIPTION	
DESIGNED BY: MRT	COORS ENERGY COMPANY	0	02/01/21	ISSUED FOR REPORT	
DRAWN BY: MRT	KEENESBURG, COLORADO — 2021 1st Qtr GW Elevation Approximate Contour Map.dwg			REVISIONS	
APPROVED BY: CJA					
DATE: 02/01/2021					
FIGURE 2-1 OF 2-4					

0 500'

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC.
8191 Southpark Lane, Suite 107, Littleton, CO 80120
phone 303-948-7733 fax 303-948-7739

2ND QUARTER 2021 GROUNDWATER ELEVATION AND POTENTIOMETRIC SURFACE MAP
COORS ENERGY COMPANY
KEENESBURG, COLORADO
2021 3rd Qtr GW Sampling
Approximate Contour Mapping
REVISIONS
REV. NO.
DATE
REVISION DESCRIPTION
0
05/18/21
ISSUED FOR REPORT
PROJECT NO: -
DESIGNED BY: AEC
DRAWN BY: MBT
APPROVED BY: CJA
DATE: 05/01/21
FIGURE 2-2 OF 2-4
AEC
AMERICAN ENVIRONMENTAL CONSULTING, LLC.
8191 Southpark Lane, Suite 107, Littleton, CO 80120
Phone 303-948-7733 Fax 303-948-7739
500'
0
LEGEND
CEC PERMIT BOUNDARY TR 46
SECTION LINE/1/4 SECTION LINE
PROPERTY BOUNDARY (VERIFIED 2006)
EXISTING PAVED ACCESS ROAD
EXISTING LIGHT DUTY ROAD OR EQUIPMENT ACCESS
EXISTING FENCE
EXISTING POWER POLE
EXISTING BUILDING
EXISTING GROUND CONTOUR
DRAINAGEWAY & FLOW DIRECTION
EXISTING GROUNDWATER MONITORING WELL
GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR
PC-1
PC-2
PC-5
PC-6
AMW-1
AMW-2
SMW-1
SMW-2
4807.98
4783.79
4795
4785
4768.40
4769.93
4769.78
4771.32
4776.42
4782.15
4775
A-FT
8.9 AC
B-FT
LONG-TERM SPOIL AREA
TOP-SOIL PILES
SECTION 25

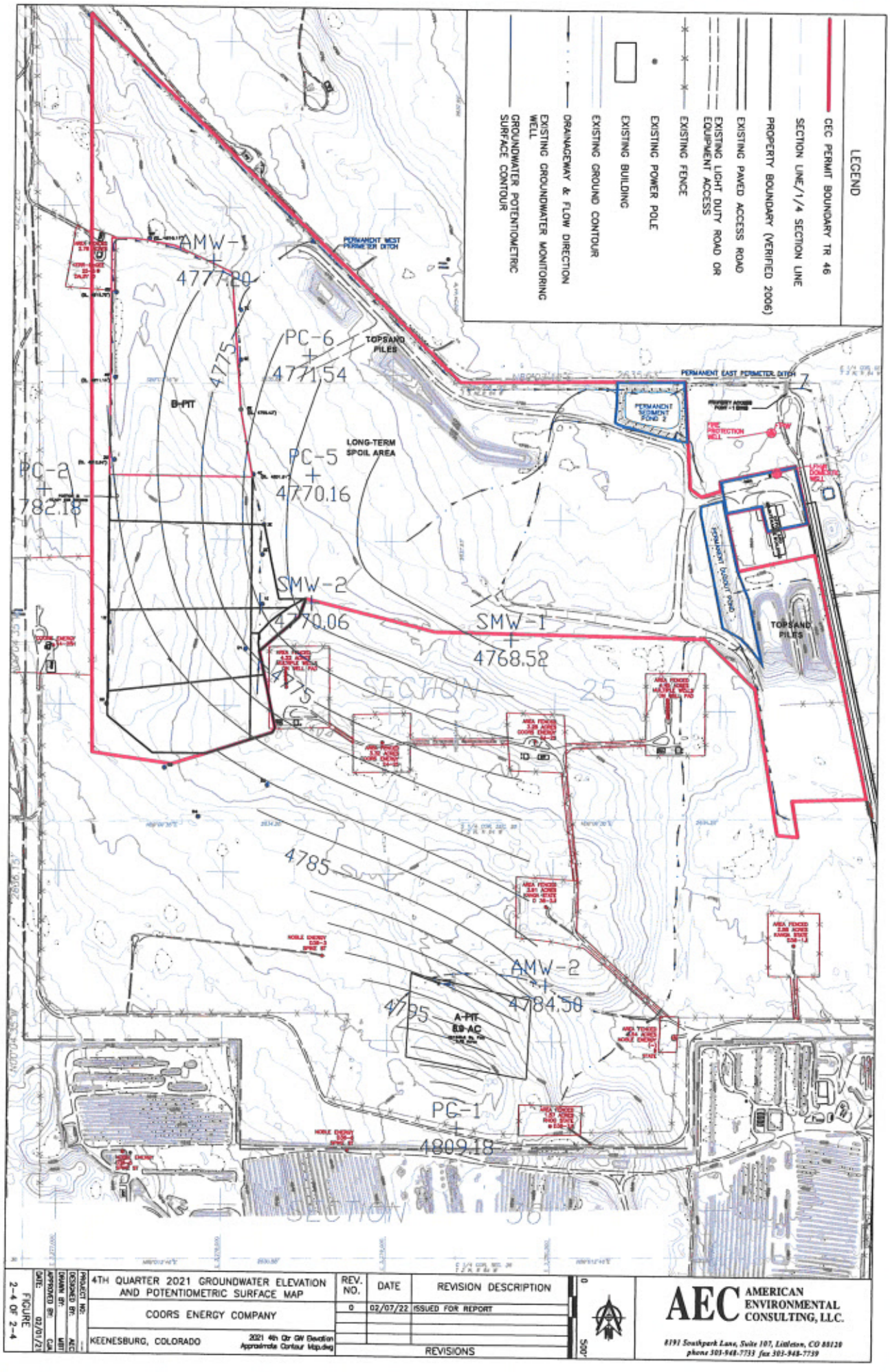


PROJECT NO.	---	3RD QUARTER 2021 GROUNDWATER ELEVATION AND POTENTIOMETRIC SURFACE MAP	REV. NO.	DATE	REVISION DESCRIPTION
DESIGNED BY:	AEC		0	02/07/22	ISSUED FOR REPORT
DRAWN BY:	MRF	COORS ENERGY COMPANY			
APPROVED BY:	CJA	KEENESBURG, COLORADO — 2021 3rd Qtr GW Elevation Approximate Contour Map.dwg			
DATE:	02/01/22				REVISIONS

FIGURE 2-3 OF 2-4

0 500'

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC.
8191 Southpark Lane, Suite 107, Littleton, CO 80120
phone 303-948-7733 fax 303-948-7739



PROJECT NO:	
DESIGNED BY:	AEC
DRAWN BY:	MBT
APPROVED BY:	CJA
DATE:	02/01/22

FIGURE 2-4 OF 2-4

4TH QUARTER 2021 GROUNDWATER ELEVATION AND POTENTIOMETRIC SURFACE MAP

COORS ENERGY COMPANY

KEENESBURG, COLORADO

2021 4th Qtr GW Elevation Approximate Contour Map.dwg

REV. NO.	DATE	REVISION DESCRIPTION
0	02/07/22	ISSUED FOR REPORT

REVISIONS

0 500'

AEC AMERICAN ENVIRONMENTAL CONSULTING, LLC.
8191 Southpark Lane, Suite 107, Littleton, CO 80120
phone 303-948-7733 fax 303-948-7739

ATTACHMENT 3

LABORATORY ANALYTICAL REPORTS

ATTACHMENT 3.1

APRIL 2021 REPORT

ANALYTICAL REPORT

May 07, 2021

American Environmental - CO

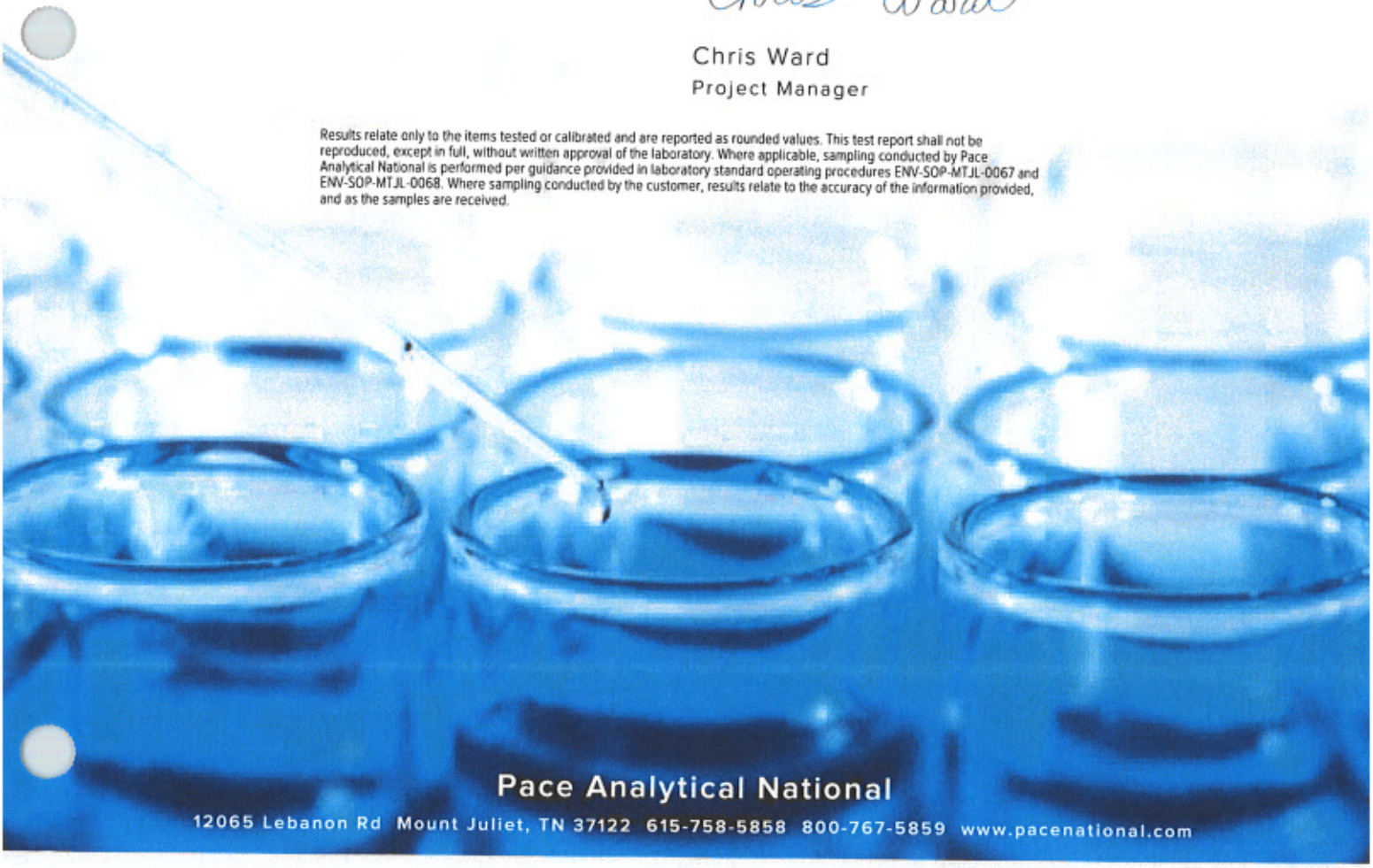
Sample Delivery Group:	L1343243
Samples Received:	04/23/2021
Project Number:	
Description:	Keenesburg Mine

Report To:

Skyler Elder
8191 Southpark Lane
Suite 107
Littleton, CO 80120

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

PC-1 L1343243-01 GW

Collected by: SJE | Collected date/time: 04/21/21 12:30 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/05/21 21:07	05/05/21 21:07	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1660262	1	04/28/21 09:30	04/28/21 12:56	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:03	04/29/21 09:03	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 03:06	04/29/21 03:06	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	100	04/29/21 03:22	04/29/21 03:22	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	1	05/05/21 14:20	05/05/21 21:07	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:39	CCE	Mt. Juliet, TN

PC-2 L1343243-02 GW

Collected by: SJE | Collected date/time: 04/21/21 16:00 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/06/21 10:00	05/06/21 10:00	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1660262	1	04/28/21 09:30	04/28/21 12:56	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:11	04/29/21 09:11	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 03:38	04/29/21 03:38	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	100	04/29/21 03:54	04/29/21 03:54	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	5	05/05/21 14:20	05/06/21 10:00	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:42	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	5	05/05/21 14:16	05/06/21 09:24	CCE	Mt. Juliet, TN

PC-5 L1343243-03 GW

Collected by: SJE | Collected date/time: 04/21/21 13:30 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/05/21 21:13	05/05/21 21:13	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1660262	1	04/28/21 09:30	04/28/21 12:56	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:18	04/29/21 09:18	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 04:10	04/29/21 04:10	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	50	04/29/21 04:26	04/29/21 04:26	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	1	05/05/21 14:20	05/05/21 21:13	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:46	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	5	05/05/21 14:16	05/06/21 09:27	CCE	Mt. Juliet, TN

PC-6 L1343243-04 GW

Collected by: SJE | Collected date/time: 04/21/21 15:30 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/05/21 21:22	05/05/21 21:22	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1660262	1	04/28/21 09:30	04/28/21 12:56	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:40	04/29/21 09:40	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 04:42	04/29/21 04:42	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	100	04/29/21 04:57	04/29/21 04:57	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	1	05/05/21 14:20	05/05/21 21:22	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:50	CCE	Mt. Juliet, TN

SAMPLE SUMMARY

AMW-1 L1343243-05 GW

Collected by: SJE | Collected date/time: 04/20/21 11:00 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/05/21 21:24	05/05/21 21:24	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1659404	1	04/27/21 10:00	04/27/21 15:55	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:49	04/29/21 09:49	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 06:01	04/29/21 06:01	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	10	04/29/21 05:13	04/29/21 05:13	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	1	05/05/21 14:20	05/05/21 21:24	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:53	CCE	Mt. Juliet, TN

AMW-2 L1343243-06 GW

Collected by: SJE | Collected date/time: 04/21/21 11:45 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/06/21 10:03	05/06/21 10:03	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1660273	1	04/28/21 09:35	04/28/21 15:26	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 09:57	04/29/21 09:57	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 06:33	04/29/21 06:33	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	100	04/29/21 06:49	04/29/21 06:49	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	5	05/05/21 14:20	05/06/21 10:03	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 20:57	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	5	05/05/21 14:16	05/06/21 09:30	CCE	Mt. Juliet, TN

SMW-2 L1343243-07 GW

Collected by: SJE | Collected date/time: 04/20/21 15:15 | Received date/time: 04/23/21 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1663695	1	05/06/21 10:06	05/06/21 10:06	CCE	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1659404	1	04/27/21 10:00	04/27/21 15:55	MMF	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1660938	1	04/29/21 10:04	04/29/21 10:04	AMH	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	1	04/29/21 07:05	04/29/21 07:05	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1660675	100	04/29/21 07:21	04/29/21 07:21	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663695	5	05/05/21 14:20	05/06/21 10:06	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	1	05/05/21 14:16	05/05/21 21:57	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1663704	5	05/05/21 14:16	05/06/21 09:33	CCE	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris Ward

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
dium Adsorption Ratio	4.21		1	05/05/2021 21:07	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	1670		2.50	1	05/05/2021 21:07	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	2910		50.0	1	04/28/2021 12:56	WG1660262

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	291		20.0	1	04/29/2021 09:03	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:03	WG1660938

Sample Narrative:
L1343243-01 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ride	17.1		1.00	1	04/29/2021 03:06	WG1660675
Fluoride	1.53		0.150	1	04/29/2021 03:06	WG1660675
Sulfate	2010		500	100	04/29/2021 03:22	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:39	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:39	WG1663704
Barium,Dissolved	0.0142		0.00500	1	05/05/2021 21:39	WG1663704
Boron,Dissolved	0.530		0.200	1	05/05/2021 21:39	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:39	WG1663704
Calcium	510		1.00	1	05/05/2021 21:07	WG1663695
Calcium,Dissolved	502		1.00	1	05/05/2021 21:39	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:39	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:39	WG1663704
Magnesium	97.1		1.00	1	05/05/2021 21:07	WG1663695
Magnesium,Dissolved	93.2		1.00	1	05/05/2021 21:39	WG1663704
Manganese,Dissolved	ND		0.0100	1	05/05/2021 21:39	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 21:39	WG1663704
Potassium,Dissolved	10.8		2.00	1	05/05/2021 21:39	WG1663704
Selenium,Dissolved	0.0795		0.0100	1	05/05/2021 21:39	WG1663704
Sodium	395		3.00	1	05/05/2021 21:07	WG1663695
Sodium,Dissolved	376		3.00	1	05/05/2021 21:39	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
ium Adsorption Ratio	20.8		1	05/06/2021 10:00	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	2410		12.5	1	05/06/2021 10:00	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	10800		200	1	04/28/2021 12:56	WG1660262

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	922		20.0	1	04/29/2021 09:11	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:11	WG1660938

Sample Narrative:
L1343243-02 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ide	814		100	100	04/29/2021 03:54	WG1660675
Fluoride	ND		0.150	1	04/29/2021 03:38	WG1660675
Sulfate	5500		500	100	04/29/2021 03:54	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:42	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:42	WG1663704
Barium,Dissolved	0.0154		0.00500	1	05/05/2021 21:42	WG1663704
Boron,Dissolved	0.274		0.200	1	05/05/2021 21:42	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:42	WG1663704
Calcium	425		5.00	5	05/06/2021 10:00	WG1663695
Calcium,Dissolved	445		1.00	1	05/05/2021 21:42	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:42	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:42	WG1663704
Magnesium	327		5.00	5	05/06/2021 10:00	WG1663695
Magnesium,Dissolved	339		1.00	1	05/05/2021 21:42	WG1663704
Manganese,Dissolved	2.08		0.0100	1	05/05/2021 21:42	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 21:42	WG1663704
Potassium,Dissolved	22.3		2.00	1	05/05/2021 21:42	WG1663704
Selenium,Dissolved	ND		0.0100	1	05/05/2021 21:42	WG1663704
Sodium	2350		15.0	5	05/06/2021 10:00	WG1663695
Sodium,Dissolved	2530		15.0	5	05/06/2021 09:24	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
ium Adsorption Ratio	2.53		1	05/05/2021 21:13	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	2190		2.50	1	05/05/2021 21:13	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	3340		50.0	1	04/28/2021 12:56	WG1660262

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	587		20.0	1	04/29/2021 09:18	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:18	WG1660938

Sample Narrative:
L1343243-03 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ide	127		50.0	50	04/29/2021 04:26	WG1660675
Fluoride	ND		0.150	1	04/29/2021 04:10	WG1660675
Sulfate	1830		250	50	04/29/2021 04:26	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:46	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:46	WG1663704
Barium,Dissolved	0.0379		0.00500	1	05/05/2021 21:46	WG1663704
Boron,Dissolved	ND		0.200	1	05/05/2021 21:46	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:46	WG1663704
Calcium	609		1.00	1	05/05/2021 21:13	WG1663695
Calcium,Dissolved	610		1.00	1	05/05/2021 21:46	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:46	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:46	WG1663704
Magnesium	164		1.00	1	05/05/2021 21:13	WG1663695
Magnesium,Dissolved	156		1.00	1	05/05/2021 21:46	WG1663704
Manganese,Dissolved	17.9		0.0500	5	05/06/2021 09:27	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 21:46	WG1663704
Potassium,Dissolved	18.8		2.00	1	05/05/2021 21:46	WG1663704
Selenium,Dissolved	ND		0.0100	1	05/05/2021 21:46	WG1663704
Sodium	272		3.00	1	05/05/2021 21:13	WG1663695
Sodium,Dissolved	251		3.00	1	05/05/2021 21:46	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.73		1	05/05/2021 21:22	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	838		2.50	1	05/05/2021 21:22	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	2040		50.0	1	04/28/2021 12:56	WG1660262

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	311		20.0	1	04/29/2021 09:40	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:40	WG1660938

Sample Narrative:
L1343243-04 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	55.1		1.00	1	04/29/2021 04:42	WG1660675
Fluoride	2.62		0.150	1	04/29/2021 04:42	WG1660675
Sulfate	1170		500	100	04/29/2021 04:57	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:50	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:50	WG1663704
Barium,Dissolved	0.0126		0.00500	1	05/05/2021 21:50	WG1663704
Boron,Dissolved	0.570		0.200	1	05/05/2021 21:50	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:50	WG1663704
Calcium	193		1.00	1	05/05/2021 21:22	WG1663695
Calcium,Dissolved	181		1.00	1	05/05/2021 21:50	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:50	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:50	WG1663704
Magnesium	86.6		1.00	1	05/05/2021 21:22	WG1663695
Magnesium,Dissolved	81.6		1.00	1	05/05/2021 21:50	WG1663704
Manganese,Dissolved	0.0131		0.0100	1	05/05/2021 21:50	WG1663704
Molybdenum,Dissolved	0.00544		0.00500	1	05/05/2021 21:50	WG1663704
Potassium,Dissolved	6.96		2.00	1	05/05/2021 21:50	WG1663704
Selenium,Dissolved	0.0665		0.0100	1	05/05/2021 21:50	WG1663704
Sodium	448		3.00	1	05/05/2021 21:22	WG1663695
Sodium,Dissolved	429		3.00	1	05/05/2021 21:50	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
dium Adsorption Ratio	1.63		1	05/05/2021 21:24	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	1030		2.50	1	05/05/2021 21:24	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	1500		20.0	1	04/27/2021 15:55	WG1659404

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	218		20.0	1	04/29/2021 09:49	WG1660938
Alkalinity,Bicarbonate	218		20.0	1	04/29/2021 09:49	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:49	WG1660938
Alkalinity,Hydroxide	ND		20.0	1	04/29/2021 09:49	WG1660938

Sample Narrative:
L1343243-05 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	29.8		1.00	1	04/29/2021 06:01	WG1660675
Fluoride	0.940		0.150	1	04/29/2021 06:01	WG1660675
Sulfate	791		50.0	10	04/29/2021 05:13	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:53	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:53	WG1663704
Barium,Dissolved	0.0316		0.00500	1	05/05/2021 21:53	WG1663704
Boron,Dissolved	ND		0.200	1	05/05/2021 21:53	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:53	WG1663704
Calcium	286		1.00	1	05/05/2021 21:24	WG1663695
Calcium,Dissolved	255		1.00	1	05/05/2021 21:53	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:53	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:53	WG1663704
Magnesium	78.1		1.00	1	05/05/2021 21:24	WG1663695
Magnesium,Dissolved	69.9		1.00	1	05/05/2021 21:53	WG1663704
Manganese,Dissolved	ND		0.0100	1	05/05/2021 21:53	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 21:53	WG1663704
Potassium,Dissolved	3.09		2.00	1	05/05/2021 21:53	WG1663704
Selenium,Dissolved	0.0202		0.0100	1	05/05/2021 21:53	WG1663704
Sodium	121		3.00	1	05/05/2021 21:24	WG1663695
ium,Dissolved	114		3.00	1	05/05/2021 21:53	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
dium Adsorption Ratio	14.2		1	05/06/2021 10:03	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	1890		12.5	1	05/06/2021 10:03	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	5170		100	1	04/28/2021 15:26	WG1660273

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	768		20.0	1	04/29/2021 09:57	WG1660938
Alkalinity,Bicarbonate	768		20.0	1	04/29/2021 09:57	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 09:57	WG1660938
Alkalinity,Hydroxide	ND		20.0	1	04/29/2021 09:57	WG1660938

Sample Narrative:
L1343243-06 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	336		100	100	04/29/2021 06:49	WG1660675
Fluoride	ND		0.150	1	04/29/2021 06:33	WG1660675
Sulfate	3640		500	100	04/29/2021 06:49	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 20:57	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 20:57	WG1663704
Barium,Dissolved	0.0188		0.00500	1	05/05/2021 20:57	WG1663704
Boron,Dissolved	0.225		0.200	1	05/05/2021 20:57	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 20:57	WG1663704
Calcium	465		5.00	5	05/06/2021 10:03	WG1663695
Calcium,Dissolved	471	V	1.00	1	05/05/2021 20:57	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 20:57	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 20:57	WG1663704
Magnesium	176		5.00	5	05/06/2021 10:03	WG1663695
Magnesium,Dissolved	174	V	1.00	1	05/05/2021 20:57	WG1663704
Manganese,Dissolved	3.48		0.0100	1	05/05/2021 20:57	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 20:57	WG1663704
Potassium,Dissolved	29.0	O1	2.00	1	05/05/2021 20:57	WG1663704
Selenium,Dissolved	ND		0.0100	1	05/05/2021 20:57	WG1663704
Sodium	1420		15.0	5	05/06/2021 10:03	WG1663695
Sodium,Dissolved	1490		15.0	5	05/06/2021 09:30	WG1663704

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
dium Adsorption Ratio	15.3		1	05/06/2021 10:06	WG1663695

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	1880		12.5	1	05/06/2021 10:06	WG1663695

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	5640		100	1	04/27/2021 15:55	WG1659404

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	1060		20.0	1	04/29/2021 10:04	WG1660938
Alkalinity,Bicarbonate	1060		20.0	1	04/29/2021 10:04	WG1660938
Alkalinity,Carbonate	ND		20.0	1	04/29/2021 10:04	WG1660938
Alkalinity,Hydroxide	ND		20.0	1	04/29/2021 10:04	WG1660938

Sample Narrative:
L1343243-07 WG1660938: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	711		100	100	04/29/2021 07:21	WG1660675
Fluoride	0.186		0.150	1	04/29/2021 07:05	WG1660675
Sulfate	3060		500	100	04/29/2021 07:21	WG1660675

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Antimony,Dissolved	ND		0.0100	1	05/05/2021 21:57	WG1663704
Arsenic,Dissolved	ND		0.0100	1	05/05/2021 21:57	WG1663704
Barium,Dissolved	0.0114		0.00500	1	05/05/2021 21:57	WG1663704
Boron,Dissolved	0.333		0.200	1	05/05/2021 21:57	WG1663704
Cadmium,Dissolved	ND		0.00200	1	05/05/2021 21:57	WG1663704
Calcium	472		5.00	5	05/06/2021 10:06	WG1663695
Calcium,Dissolved	490		1.00	1	05/05/2021 21:57	WG1663704
Iron,Dissolved	ND		0.100	1	05/05/2021 21:57	WG1663704
Lead,Dissolved	ND		0.00600	1	05/05/2021 21:57	WG1663704
Magnesium	170		5.00	5	05/06/2021 10:06	WG1663695
Magnesium,Dissolved	173		1.00	1	05/05/2021 21:57	WG1663704
Manganese,Dissolved	0.481		0.0100	1	05/05/2021 21:57	WG1663704
Molybdenum,Dissolved	ND		0.00500	1	05/05/2021 21:57	WG1663704
Potassium,Dissolved	16.6		2.00	1	05/05/2021 21:57	WG1663704
Selenium,Dissolved	ND		0.0100	1	05/05/2021 21:57	WG1663704
Sodium	1520		15.0	5	05/06/2021 10:06	WG1663695
ium,Dissolved	1590		15.0	5	05/06/2021 09:33	WG1663704