

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

April 11, 2019

Heather Shideman

Extraction Oil&Gas

370 17th Street Suite 5300

Denver, CO 80202

RE: BWSE/GWA\_Alma\_1S\_66\_2524

Enclosed are the results of analyses for samples received by Summit Scientific on 03/25/19 19:04. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large initial "M" and a long, sweeping underline.

Muri Premer For Ben Shrewsbury

Laboratory Manager



Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095

Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BW_Henry_55800_F_SESE_25_1S_66W	1903250-01	Water	03/25/19 11:05	03/25/19 19:04

Summit Scientific

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1903250

# Summit Scientific

S<sub>2</sub>

4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310 ♦ 303-374-5933

<b>Client:</b> Extraction Oil and Gas (XOG)	<b>Report to:</b> Apex Companies, LLC	<b>Project Manager:</b> Heather Shideman	
<b>Address:</b> 2234 117th Ave, Ste 106		<b>E-Mail:</b> Rochelle.Carlisle@apexcos.com, Heather.Shideman@apexcos.com	
<b>City/State/Zip:</b> Greeley, CO 80634		<b>cc:</b> bford@extractionog.com	
<b>Phone:</b> (970) 576-3446		<b>Project Name:</b> BWSE/GWA_Alma_1S_66_2524	
<b>Sampler Name:</b> Josue Sanchez		<b>Project No.:</b> ALLOC-473	<b>Facility ID</b> 750095

ID	Field ID / Point of Collection	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested				Special Instructions					
					HCl	H <sub>2</sub> O <sub>2</sub>	None	Other (Specify)	Groundwater	Soil	Air-Canister Serial #	Other (Specify)	COGCC 609 minus Isotopes									
1	BW_Henry_55800_F SESE_25_1S_66W	3/25/19	1105		6	1	4		X					X	X	X					Sample Frequency: 1SUB	
	Temperature, field:	11.19	°C																			
	pH, field:	8.04	s.u.																			
	Conductivity, field:	1107.5	uS/cm																			
	ORP, field:	-73.2	mV																			
	Dissolved Oxygen, field:	0.05	mg/L																			
	Turbidity, field:	0.29	NTU																			
Relinquished by:		Date/Time:		Received by:		Date/Time:		Turn Around Time (Check)				Notes:										
Josue Sanchez		3/25/19 1629				3-25-19 16:29		Same Day ___ 72 hours ___ 24 hours ___ <u>Standard X</u> 48 hours ___														
Relinquished by:		Date/Time:		Received by:		Date/Time:		Sample Integrity:														
								Temperature Upon Receipt: <u>64</u> Intact: <u>Yes</u> No														

1903250



ISOTECH LABORATORIES INC

1308 Parkland Court Champaign, IL 61821 • (877) 362-4190 • www.isotechlabs.com

Send Data and Invoice to

Name: Blake Ford  
 Company: Extraction Oil and Gas (XOG)  
 Address: 2234 117th Ave, Ste 106  
Greeley, CO 80634  
 Phone: (970) 576-3446  
 Email: Rochelle.Carlisle@apexcos.com, Heather.Shideman@apexcos.com  
CC:bford@extractionog.com

Project: BWSE/GWA\_Alma\_1S\_66\_2524  
 Purchase Order #: ALLOC-473  
 Location: SESE\_25\_1S\_66W  
 Sampled By: Jo Sue Sojckey

Sample Freq: 1SUB  
 Facility ID: 750095  
 Regulation: 318A.f

Circle one:

<input checked="" type="checkbox"/>	Standard
<input type="checkbox"/>	Priority
<input type="checkbox"/>	Rush

Unique ID: BW-Henry-55800-R

Analysis Requested

NG1		SIW
X		

Sample Description

Container Number	Sample Identification	Date Sampled	Time	NG1		SIW	Comments
1	BW_Henry_55800_F	3/25/19	1105	X			COGCC Compatible EDD Please report methane gas plot

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by <u>Jo Sue Sojckey</u>	Apex Companies, LLC	3/25/19	11:29
Received by <u>[Signature]</u>	Summit Sc.	3-25-19	11:40
Relinquished by			
Received by			
Relinquished by			
Received by			



Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**BW\_Henry\_55800\_F\_SESE\_25\_1S\_66W**  
**1903250-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0010	mg/L	1	1903318	03/26/19	03/31/19	EPA 8260B	
Toluene	ND	0.0010	"	"	"	"	"	"	
Ethylbenzene	ND	0.0010	"	"	"	"	"	"	
m,p-Xylene	ND	0.0020	"	"	"	"	"	"	
o-Xylene	ND	0.0010	"	"	"	"	"	"	
Xylenes (total)	ND	0.0020	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.050	"	"	"	"	"	"	

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		78.2 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		92.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.7 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	0.100	mg/L	1	1903397	03/29/19	03/30/19	EPA 8015M	

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		96.9 %	44.8-129		"	"	"	"	

**Dissolved Gases by RSK-175**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**BW\_Henry\_55800\_F\_SESE\_25\_1S\_66W**  
**1903250-01 (Water)**

**Summit Scientific**

**Dissolved Gases by RSK-175**

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	ND	0.010	mg/L	1	1903373	03/28/19	03/31/19	RSK-175 mod	
Ethane	ND	0.010	"	"	"	"	"	"	
Propane	ND	0.010	"	"	"	"	"	"	

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		106 %	70-130		"	"	"	"	

**Dissolved Metals by EPA Method 200.8**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	<b>20.8</b>	0.0500	mg/L	1	1903343	03/27/19	03/27/19	EPA 200.8	
Iron	<b>0.0182</b>	0.0100	"	"	"	"	"	"	
Magnesium	<b>1.11</b>	0.0500	"	"	"	"	"	"	
Manganese	<b>0.0361</b>	0.00100	"	"	"	"	"	"	
Potassium	<b>1.84</b>	0.0500	"	"	"	"	"	"	
Sodium	<b>342</b>	0.0500	"	"	"	"	"	"	
Barium	<b>0.0205</b>	0.00100	"	"	"	"	"	"	
Boron	<b>0.0727</b>	0.0100	"	"	"	"	"	"	
Selenium	ND	0.00100	"	"	"	"	"	"	
Strontium	<b>0.440</b>	0.0100	"	"	"	"	"	"	

**Anions by EPA Method 300.0**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromide	<b>0.454</b>	0.200	mg/L	1	1903324	03/26/19	03/26/19	EPA 300.0	
Chloride	<b>51.0</b>	2.00	"	20	"	"	"	"	
Fluoride	<b>0.551</b>	0.200	"	1	"	"	"	"	
Sulfate	<b>501</b>	6.00	"	20	"	"	"	"	
Nitrate as N	ND	0.100	"	1	"	"	"	"	
Nitrite as N	ND	0.100	"	"	"	"	"	"	
Nitrate/Nitrite as N	ND	0.200	"	"	"	"	"	"	

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Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**BW\_Henry\_55800\_F\_SESE\_25\_1S\_66W  
1903250-01 (Water)**

**Summit Scientific**

**Anions by EPA Method 300.0**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Total Alkalinity</b>	<b>180</b>	10.0	mg/L as CaCO3	1	1903384	03/29/19	04/01/19	SM2320-B	
<b>Carbonate</b>	<b>20.0</b>	10.0	"	"	"	"	"	"	
<b>Bicarbonate</b>	<b>160</b>	10.0	"	"	"	"	"	"	

**Conventional Chemistry Parameters by APHA/EPA Methods**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Phosphorus - Total	ND	0.0500	mg/L	1	1903360	03/28/19	03/29/19	SM4500-P-E	

**Specific Conductance by SM2510B**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Specific Conductance (EC)</b>	<b>1520</b>	1.00	umhos/cm	1	1903358	03/28/19	03/28/19	SM2510B	

**Total Dissolved Solids by SM2540C**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Total Dissolved Solids</b>	<b>734</b>	10.0	mg/L	1	1903359	03/28/19	03/28/19	SM2540C	

**pH by SM4500**

Date Sampled: **03/25/19 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**BW\_Henry\_55800\_F\_SESE\_25\_1S\_66W**  
**1903250-01 (Water)**

**Summit Scientific**

**pH by SM4500**

pH 8.32 1.00 pH Units 1 1903322 03/25/19 03/25/19 SM4500-H+ B

**Biological Activity Reaction Test**

Date Sampled: 03/25/19 11:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Iron Related Bacteria</b>	<b>9000</b>	25.0	CFU/ml	1	1903345	03/27/19	04/10/19	BART	
Sulfate Reducing Bacteria	ND	200	"	"	"	"	"	"	
Slime Forming Bacteria	ND	500	"	"	"	"	"	"	

**Field Data**

Date Sampled: 03/25/19 11:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Specific Conductance (EC)</b>	<b>1107.5</b>		uS/cm	1	1903313	03/25/19	03/25/19	Field Method	
<b>Temperature</b>	<b>11.19</b>		Degrees C	"	"	"	"	"	
<b>Oxidation/Reduction Potential</b>	<b>-73.2</b>		mv	"	"	"	"	"	
<b>Dissolved Oxygen</b>	<b>0.05</b>		mg/L	"	"	"	"	"	
<b>Turbidity</b>	<b>0.79</b>		NTU	"	"	"	"	"	
<b>pH</b>	<b>8.24</b>		SU	"	"	"	"	"	

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Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

### Volatile Organic Compounds by EPA Method 8260B - Quality Control

#### Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

#### Batch 1903318 - EPA 5030 Water MS

##### Blank (1903318-BLK1)

Prepared: 03/26/19 Analyzed: 03/31/19

Benzene	ND	0.0010	mg/L							
Toluene	ND	0.0010	"							
Ethylbenzene	ND	0.0010	"							
m,p-Xylene	ND	0.0020	"							
o-Xylene	ND	0.0010	"							
Xylenes (total)	ND	0.0020	"							
Gasoline Range Hydrocarbons	ND	0.050	"							
Surrogate: 1,2-Dichloroethane-d4	0.0106		"	0.0133		79.8		23-173		
Surrogate: Toluene-d8	0.0122		"	0.0133		91.4		20-170		
Surrogate: 4-Bromofluorobenzene	0.0127		"	0.0133		95.4		21-167		

##### LCS (1903318-BS1)

Prepared: 03/26/19 Analyzed: 03/31/19

Benzene	0.0318	0.0010	mg/L	0.0333		95.6		51-132		
Toluene	0.0334	0.0010	"	0.0333		100		51-138		
Ethylbenzene	0.0347	0.0010	"	0.0333		104		58-146		
m,p-Xylene	0.0726	0.0020	"	0.0667		109		57-144		
o-Xylene	0.0335	0.0010	"	0.0333		101		53-146		
Surrogate: 1,2-Dichloroethane-d4	0.0109		"	0.0133		81.7		23-173		
Surrogate: Toluene-d8	0.0124		"	0.0133		93.2		20-170		
Surrogate: 4-Bromofluorobenzene	0.0122		"	0.0133		91.8		21-167		

##### Matrix Spike (1903318-MS1)

Source: 1903250-01

Prepared: 03/26/19 Analyzed: 03/31/19

Benzene	0.0316	0.0010	mg/L	0.0333	ND	94.9		34-141		
Toluene	0.0330	0.0010	"	0.0333	ND	98.9		27-151		
Ethylbenzene	0.0349	0.0010	"	0.0333	ND	105		29-160		
m,p-Xylene	0.0720	0.0020	"	0.0667	ND	108		20-166		
o-Xylene	0.0335	0.0010	"	0.0333	ND	100		33-159		
Surrogate: 1,2-Dichloroethane-d4	0.0110		"	0.0133		82.6		23-173		
Surrogate: Toluene-d8	0.0124		"	0.0133		93.2		20-170		
Surrogate: 4-Bromofluorobenzene	0.0124		"	0.0133		93.2		21-167		

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Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source Result	%REC		RPD		Notes
		Limit	Units			%REC	Limits	RPD	Limit	

**Batch 1903318 - EPA 5030 Water MS**

Matrix Spike Dup (1903318-MSD1)	Source: 1903250-01			Prepared: 03/26/19 Analyzed: 03/31/19						
Benzene	0.0322	0.0010	mg/L	0.0333	ND	96.8	34-141	1.94	32	
Toluene	0.0337	0.0010	"	0.0333	ND	101	27-151	2.19	25	
Ethylbenzene	0.0349	0.0010	"	0.0333	ND	105	29-160	0.0860	50	
m,p-Xylene	0.0723	0.0020	"	0.0667	ND	108	20-166	0.471	36	
o-Xylene	0.0333	0.0010	"	0.0333	ND	99.8	33-159	0.719	26	
Surrogate: 1,2-Dichloroethane-d4	0.0120		"	0.0133		90.0	23-173			
Surrogate: Toluene-d8	0.0124		"	0.0133		92.9	20-170			
Surrogate: 4-Bromofluorobenzene	0.0124		"	0.0133		92.8	21-167			

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Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 1903397 - EPA 3520B**

**Blank (1903397-BLK1)**

Prepared: 03/29/19 Analyzed: 03/30/19

C10-C28 (DRO)	ND	0.100	mg/L								
Surrogate: <i>o</i> -Terphenyl	0.0194		"	0.0250		77.5	44.8-129				

**LCS (1903397-BS1)**

Prepared: 03/29/19 Analyzed: 03/30/19

C10-C28 (DRO)	0.893	0.100	mg/L	1.00		89.3	70-130				
Surrogate: <i>o</i> -Terphenyl	0.0188		"	0.0250		75.4	44.8-129				

**Matrix Spike (1903397-MS1)**

Source: 1903250-01

Prepared: 03/29/19 Analyzed: 03/30/19

C10-C28 (DRO)	0.970	0.100	mg/L	1.00	ND	97.0	10-159				
Surrogate: <i>o</i> -Terphenyl	0.0226		"	0.0250		90.5	44.8-129				

**Matrix Spike Dup (1903397-MSD1)**

Source: 1903250-01

Prepared: 03/29/19 Analyzed: 03/30/19

C10-C28 (DRO)	0.939	0.100	mg/L	1.00	ND	93.9	10-159	3.18	20		
Surrogate: <i>o</i> -Terphenyl	0.0257		"	0.0250		103	44.8-129				

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Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Dissolved Gases by RSK-175 - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

**Batch 1903373 - GC**

**Blank (1903373-BLK1)**

Prepared: 03/28/19 Analyzed: 03/31/19

Methane	ND	0.010	mg/L								
Ethane	ND	0.010	"								
Propane	ND	0.010	"								
Surrogate: Ethene	0.0322		"	0.0364		88.5	70-130				

**LCS (1903373-BS1)**

Prepared: 03/28/19 Analyzed: 04/01/19

Methane	0.039	0.010	mg/L	0.0428		92.1	70-130				
Ethane	0.078	0.010	"	0.0798		97.2	70-130				
Propane	0.12	0.010	"	0.139		86.1	70-130				
Surrogate: Ethene	0.0767		"	0.0728		105	70-130				

**Duplicate (1903373-DUP1)**

Source: 1903250-01

Prepared: 03/28/19 Analyzed: 03/31/19

Methane	ND	0.010	mg/L		ND					30	
Ethane	ND	0.010	"		ND					30	
Propane	ND	0.010	"		ND					30	
Surrogate: Ethene	0.0364		"	0.0364		100	70-130				

**Matrix Spike (1903373-MS1)**

Source: 1903250-01

Prepared: 03/28/19 Analyzed: 03/31/19

Methane	0.033	0.010	mg/L	0.0428	ND	77.4	70-130				
Ethane	0.059	0.010	"	0.0798	ND	74.0	70-130				
Propane	0.087	0.010	"	0.139	ND	62.7	70-130				QM-07
Surrogate: Ethene	0.0553		"	0.0728		76.0	70-130				

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Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Dissolved Metals by EPA Method 200.8 - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source Result	%REC		RPD		Notes
		Limit	Units			%REC	Limits	RPD	Limit	

**Batch 1903343 - EPA 200.8**

**Blank (1903343-BLK1)**

Prepared & Analyzed: 03/27/19

Calcium	ND	0.0500	mg/L							
Iron	ND	0.0100	"							
Magnesium	ND	0.0500	"							
Manganese	ND	0.00100	"							
Potassium	ND	0.0500	"							
Sodium	ND	0.0500	"							
Barium	ND	0.00100	"							
Boron	ND	0.0100	"							
Selenium	ND	0.00100	"							
Strontium	ND	0.0100	"							

**LCS (1903343-BS1)**

Prepared & Analyzed: 03/27/19

Calcium	5.52	0.0500	mg/L	5.00	110	85-115				
Iron	4.78	0.0100	"	5.00	95.6	85-115				
Magnesium	5.49	0.0500	"	5.00	110	85-115				
Manganese	0.514	0.00100	"	0.500	103	85-115				
Potassium	5.26	0.0500	"	5.00	105	85-115				
Sodium	5.51	0.0500	"	5.00	110	85-115				
Barium	0.521	0.00100	"	0.500	104	85-115				
Boron	2.58	0.0100	"	2.50	103	85-115				
Selenium	0.0529	0.00100	"	0.0500	106	85-115				
Strontium	0.527	0.0100	"	0.500	105	85-115				

**Duplicate (1903343-DUP1)**

Source: 1903250-01

Prepared & Analyzed: 03/27/19

Calcium	19.7	0.0500	mg/L	20.8	5.66	20				
Iron	0.0168	0.0100	"	0.0182	7.89	20				
Magnesium	1.13	0.0500	"	1.11	1.48	20				
Manganese	0.0367	0.00100	"	0.0361	1.74	20				
Potassium	1.84	0.0500	"	1.84	0.178	20				
Sodium	349	0.0500	"	342	1.96	20				
Barium	0.0196	0.00100	"	0.0205	4.31	20				
Boron	0.0678	0.0100	"	0.0727	6.97	20				
Selenium	ND	0.00100	"	ND		20				
Strontium	0.432	0.0100	"	0.440	1.76	20				

Summit Scientific

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Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Dissolved Metals by EPA Method 200.8 - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

**Batch 1903343 - EPA 200.8**

**Matrix Spike (1903343-MS1)**

**Source: 1903250-01**

**Prepared & Analyzed: 03/27/19**

Calcium	24.6	0.0500	mg/L	5.00	20.8	76.0	70-130			
Iron	4.74	0.0100	"	5.00	0.0182	94.5	70-130			
Magnesium	6.30	0.0500	"	5.00	1.11	104	70-130			
Manganese	0.573	0.00100	"	0.500	0.0361	107	70-130			
Potassium	6.61	0.0500	"	5.00	1.84	95.4	70-130			
Sodium	347	0.0500	"	5.00	342	97.9	70-130			
Barium	0.546	0.00100	"	0.500	0.0205	105	70-130			
Boron	2.50	0.0100	"	2.50	0.0727	97.2	70-130			
Selenium	0.0585	0.00100	"	0.0500	ND	117	70-130			
Strontium	0.978	0.0100	"	0.500	0.440	108	70-130			

**Matrix Spike Dup (1903343-MSD1)**

**Source: 1903250-01**

**Prepared & Analyzed: 03/27/19**

Calcium	24.6	0.0500	mg/L	5.00	20.8	74.8	70-130	0.254	25
Iron	4.30	0.0100	"	5.00	0.0182	85.6	70-130	9.82	25
Magnesium	5.84	0.0500	"	5.00	1.11	94.5	70-130	7.60	25
Manganese	0.562	0.00100	"	0.500	0.0361	105	70-130	1.88	25
Potassium	6.24	0.0500	"	5.00	1.84	88.1	70-130	5.65	25
Sodium	347	0.0500	"	5.00	342	97.3	70-130	0.00813	25
Barium	0.550	0.00100	"	0.500	0.0205	106	70-130	0.809	25
Boron	2.29	0.0100	"	2.50	0.0727	88.6	70-130	9.03	25
Selenium	0.0639	0.00100	"	0.0500	ND	128	70-130	8.87	25
Strontium	0.970	0.0100	"	0.500	0.440	106	70-130	0.788	25

Summit Scientific

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Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Anions by EPA Method 300.0 - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC			RPD	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

**Batch 1903324 - General Preparation**

**Blank (1903324-BLK1)**

Prepared & Analyzed: 03/26/19

Bromide	ND	0.200	mg/L							
Chloride	ND	0.100	"							
Fluoride	ND	0.200	"							
Sulfate	ND	0.300	"							
Nitrate as N	ND	0.100	"							
Nitrite as N	ND	0.100	"							
Nitrate/Nitrite as N	ND	0.200	"							

**LCS (1903324-BS1)**

Prepared & Analyzed: 03/26/19

Bromide	9.20	0.200	mg/L	10.0	92.0	90-110				
Chloride	2.76	0.100	"	3.00	91.9	90-110				
Fluoride	1.86	0.200	"	2.00	93.0	90-110				
Sulfate	14.9	0.300	"	15.0	99.6	90-110				
Nitrate as N	3.04	0.100	"	3.00	101	90-110				
Nitrite as N	2.94	0.100	"	3.00	98.1	90-110				

**Duplicate (1903324-DUP1)**

Source: 1903250-01

Prepared & Analyzed: 03/26/19

Bromide	0.475	0.200	mg/L	0.454	88.6	80-120	4.52	20		
Chloride	30.2	0.100	"	51.0	NR	80-120	51.2	20		QM-02
Fluoride	0.524	0.200	"	0.551	96.4	80-120	5.02	20		
Sulfate	125	0.300	"	501	NR	80-120	120	20		QM-02
Nitrate as N	0.0410	0.100	"	0.0480	93.4	80-120	15.7	20		
Nitrite as N	ND	0.100	"	ND	94.0	80-120		20		
Nitrate/Nitrite as N	ND	0.200	"	0.0480				20		

**Matrix Spike (1903324-MS1)**

Source: 1903250-01

Prepared & Analyzed: 03/26/19

Bromide	9.31	0.200	mg/L	10.0	0.454	88.6	80-120			
Chloride	30.2	0.100	"	3.00	51.0	NR	80-120			QM-02
Fluoride	2.48	0.200	"	2.00	0.551	96.4	80-120			
Sulfate	120	0.300	"	15.0	501	NR	80-120			QM-02
Nitrate as N	2.85	0.100	"	3.00	0.0480	93.4	80-120			
Nitrite as N	2.82	0.100	"	3.00	ND	94.0	80-120			

Summit Scientific

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Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

**Batch 1903384 - General Preparation**

**Blank (1903384-BLK1)**

Prepared: 03/29/19 Analyzed: 04/01/19

Total Alkalinity	ND	10.0	mg/L as CaCO3							
Carbonate	ND	10.0	"							
Bicarbonate	ND	10.0	"							

**LCS (1903384-BS1)**

Prepared: 03/29/19 Analyzed: 04/01/19

Total Alkalinity	120	10.0	mg/L as CaCO3	100	120	110	80-120			
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**Duplicate (1903384-DUP1)**

Source: 1903250-01

Prepared: 03/29/19 Analyzed: 04/01/19

Total Alkalinity	180	10.0	mg/L as CaCO3		180			0.00	20	
Carbonate	20.0	10.0	"		20.0			0.00	20	
Bicarbonate	160	10.0	"		160			0.00	20	

**Matrix Spike (1903384-MS1)**

Source: 1903250-01

Prepared: 03/29/19 Analyzed: 04/01/19

Total Alkalinity	290	10.0	mg/L as CaCO3	100	180	110	70-130			
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**Matrix Spike Dup (1903384-MSD1)**

Source: 1903250-01

Prepared: 03/29/19 Analyzed: 04/01/19

Total Alkalinity	280	10.0	mg/L as CaCO3	100	180	100	70-130	3.51	20	
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Summit Scientific

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Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

**Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 1903360 - General Preparation**

**Blank (1903360-BLK1)**

Prepared: 03/28/19 Analyzed: 03/29/19

Phosphorus - Total ND 0.0500 mg/L

**LCS (1903360-BS1)**

Prepared: 03/28/19 Analyzed: 03/29/19

Phosphorus - Total 1.02 0.0500 mg/L 1.00 102 80-120

**Duplicate (1903360-DUP1)**

**Source: 1903250-01**

Prepared: 03/28/19 Analyzed: 03/29/19

Phosphorus - Total ND 0.0500 mg/L ND 20

**Matrix Spike (1903360-MS1)**

**Source: 1903250-01**

Prepared: 03/28/19 Analyzed: 03/29/19

Phosphorus - Total 0.968 0.0500 mg/L 1.00 ND 96.8 70-130

**Matrix Spike Dup (1903360-MSD1)**

**Source: 1903250-01**

Prepared: 03/28/19 Analyzed: 03/29/19

Phosphorus - Total 0.900 0.0500 mg/L 1.00 ND 90.0 70-130 7.28 20

Summit Scientific

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Extraction Oil&Gas  
 370 17th Street Suite 5300  
 Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
 Project Manager: Heather Shideman

**Reported:**  
 04/11/19 12:47

**Specific Conductance by SM2510B - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 1903358 - General Preparation**

**Blank (1903358-BLK1)**

Prepared & Analyzed: 03/28/19

Specific Conductance (EC)                      ND                      1.00    umhos/cm

**Duplicate (1903358-DUP1)**

**Source: 1903250-01**

Prepared & Analyzed: 03/28/19

Specific Conductance (EC)                      1540                      1.00    umhos/cm                      1520                      1.11                      20

Summit Scientific



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Extraction Oil&Gas  
 370 17th Street Suite 5300  
 Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
 Project Manager: Heather Shideman

**Reported:**  
 04/11/19 12:47

**Total Dissolved Solids by SM2540C - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 1903359 - General Preparation**

**Blank (1903359-BLK1)**

Prepared & Analyzed: 03/28/19

Total Dissolved Solids      ND      10.0      mg/L

**Duplicate (1903359-DUP1)**

Source: 1903250-01

Prepared & Analyzed: 03/28/19

Total Dissolved Solids      750      10.0      mg/L      734      2.04      20

Summit Scientific

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Extraction Oil&Gas  
 370 17th Street Suite 5300  
 Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
 Project Manager: Heather Shideman

**Reported:**  
 04/11/19 12:47

**pH by SM4500 - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike		Source		%REC		RPD		Notes
		Limit	Units	Level	Result	Result	%REC	Limits	RPD	Limit		

**Batch 1903322 - General Preparation**

**LCS (1903322-BS1)**

Prepared & Analyzed: 03/25/19

pH	9.27	1.00	pH Units	9.23	100	90-110
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**Duplicate (1903322-DUP1)**

Source: 1903249-01

Prepared & Analyzed: 03/25/19

pH	7.24	1.00	pH Units	7.22	0.277	20
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Summit Scientific

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Extraction Oil&Gas  
 370 17th Street Suite 5300  
 Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095  
 Project Manager: Heather Shideman

**Reported:**  
 04/11/19 12:47

**Biological Activity Reaction Test - Quality Control**  
**Summit Scientific**

Analyte	Result	Reporting		Spike		Source		%REC		RPD		Notes
		Limit	Units	Level	Result	%REC	Limits	RPD	Limit			

**Batch 1903345 - General Preparation**

**Blank (1903345-BLK1)**

Prepared: 03/27/19 Analyzed: 04/10/19

Iron Related Bacteria	ND	25.0	CFU/ml								
Sulfate Reducing Bacteria	ND	200	"								
Slime Forming Bacteria	ND	500	"								

Summit Scientific

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Extraction Oil&Gas  
370 17th Street Suite 5300  
Denver CO, 80202

Project: BWSE/GWA\_Alma\_1S\_66\_2524

Project Number: ALLOC-473 Fac ID:750095

Project Manager: Heather Shideman

**Reported:**  
04/11/19 12:47

### Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- QM-02 The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference