

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

February 14, 2019

Blake Ford

Extraction Oil&Gas

370 17th Street Suite 5300

Denver, CO 80202

RE: BWSE/GWA\_Coyote\_Trails

Enclosed are the results of analyses for samples received by Summit Scientific on 01/25/19 14:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink on a light blue background. The signature is cursive and reads "Muri Premier".

Muri Premier For Ben Shrewsbury

Laboratory Manager



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

Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BW_Front_Range_Landfill_Surface_Water_SW_SWSE_28_1N_68W	1901327-01	Water	01/25/19 12:32	01/25/19 14:00

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

1901327

# Summit Scientific

S<sub>2</sub>

741 Corporate Circle, Suite J ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933

Page 1 of 1

**Client:** Extraction Oil and Gas (XOG)    **Report to:** Apex Companies, LLC    **Project Manager:** Heather Shideman  
**Address:** 2234 117th Ave, Ste 106    **E-Mail:** Rochelle.Carlisle@apexcos.com, Heather.Shideman@apexcos.com  
**City/State/Zip:** Greeley, CO 80634    **cc:** bford@extractionog.com  
**Phone:** (970) 576-3446    **Project Name:** BWSE/GWA\_Coyote\_Trails  
**Sampler Name:** Josue Sanchez    **Project No.:** AFE # 17031; Code 961.15    **Facility ID** 7574310

ID	Field ID / Point of Collection	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested								Special Instructions				
					HCl	HNO <sub>3</sub>	None	Wascy	Surface Water	Soil	Air-Canister #	Other (Specify)	COGCC 609 minus Isotopes												
1	BW_Front_Range_Landfill_Surface_Water_SW	1/25/19	12:32	11	6		4		X					X	X	X									Sample Frequency: Q1
	SWSE_28_IN_68W																								
	Temperature, field:	4.14	°C																						
	pH, field:	6.39	s.u.																						
	Conductivity, field:	754.7	uS/cm																						
	ORP, field:	165.5	mV																						
	Dissolved Oxygen, field:	7.69	mg/L																						
	Turbidity, field:	16.3	NTU																						
Relinquished by:		Date/Time:		Received by:		Date/Time:		Turn Around Time (Check)																Notes:	
[Signature]		1/25/19 14:00		[Signature]		1.25.19 1400		Same Day _____ 72 hours _____ 24 hours _____ <u>X</u> Standard _____ 48 hours _____																	
Relinquished by:		Date/Time:		Received by:		Date/Time:		Sample Integrity:																	
								Temperature Upon Receipt: 60																	
Relinquished by:		Date/Time:		Received by:		Date/Time:		Intact: <u>Yes</u> No																	

# Sample Receipt Checklist

S2 Work Order

1901327

Client: XOG

Client Project ID:

BWSE/GWA-Coyote Trails

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other H.D.

Airbill #:

Matrix (check all that apply):

Air

Soil/Solid

☒ Water

Other:

(Describe)

Temp (°C)

6.0

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HCl, H2SO4
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	pH 0
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Custodian Printed Name or Initials

Signature of Custodian

1.28.19 1630  
Date/Time



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

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

**BW\_Front\_Range\_Landfill\_Surface\_Water\_SW\_SWSE\_28\_1N\_68W**  
**1901327-01 (Water)**

**Summit Scientific**

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

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0010	mg/L	1	1901348	01/29/19	01/31/19	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: **01/25/19 12:32**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		127 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		106 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.1 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	0.100	mg/L	1	1901417	01/31/19	02/01/19	EPA 8015M	

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		113 %	44.8-129		"	"	"	"	

**Dissolved Gases by RSK-175 mod**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							

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Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

**BW\_Front\_Range\_Landfill\_Surface\_Water\_SW\_SWSE\_28\_1N\_68W**  
**1901327-01 (Water)**

**Summit Scientific**

**Dissolved Gases by RSK-175 mod**

Methane	0.066	0.010	mg/kg	1	1902025	02/01/19	02/01/19	RSK-175 mod
Ethane	ND	0.010	"	"	"	"	"	"
Propane	ND	0.010	"	"	"	"	"	"

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: Ethene		28.8 %	70-130		"	"	"	"	S-04

**Dissolved Metals by EPA Method 200.8**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	44.9	0.0500	mg/L	1	1901414	01/31/19	01/31/19	EPA 200.8	
Iron	0.609	0.0100	"	"	"	"	"	"	
Magnesium	18.4	0.0500	"	"	"	"	"	"	
Manganese	0.414	0.00100	"	"	"	"	"	"	
Potassium	10.2	0.0500	"	"	"	"	"	"	
Sodium	115	0.0500	"	"	"	"	"	"	
Barium	0.103	0.00100	"	"	"	"	"	"	
Boron	0.108	0.0100	"	"	"	"	"	"	
Selenium	ND	0.00100	"	"	"	"	"	"	
Strontium	0.694	0.0100	"	"	"	"	"	"	

**Anions by EPA Method 300.0**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromide	0.238	0.200	mg/L	1	1901286	01/25/19	01/25/19	EPA 300.0	
Chloride	29.7	0.100	"	"	"	"	"	"	
Fluoride	0.835	0.200	"	"	"	"	"	"	
Sulfate	81.5	0.300	"	"	"	"	"	"	
Nitrate as N	ND	0.100	"	"	"	"	"	"	
Nitrite as N	ND	0.100	"	"	"	"	"	"	
Nitrate/Nitrite as N	ND	0.200	"	"	"	"	"	"	

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Denver CO, 80202

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

**BW\_Front\_Range\_Landfill\_Surface\_Water\_SW\_SWSE\_28\_1N\_68W**  
**1901327-01 (Water)**

**Summit Scientific**

**Anions by EPA Method 300.0**

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

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Total Alkalinity</b>	<b>350</b>	10.0	mg/L as CaCO <sub>3</sub>	1	1901405	01/31/19	02/01/19	SM2320-B	
Carbonate	ND	10.0	"	"	"	"	"	"	
<b>Bicarbonate</b>	<b>350</b>	10.0	"	"	"	"	"	"	

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

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Phosphorus - Total	ND	0.0500	mg/L	1	1902008	02/01/19	02/01/19	SM4500-P-E	

**Specific Conductance by SM2510B**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Specific Conductance (EC)</b>	<b>980</b>	1.00	umhos/cm	1	1901376	01/30/19	01/30/19	SM2510B	

**Total Dissolved Solids by SM2540C**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Total Dissolved Solids</b>	<b>480</b>	10.0	mg/L	1	1901374	01/30/19	01/30/19	SM2540C	

**pH by SM4500**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

**BW\_Front\_Range\_Landfill\_Surface\_Water\_SW\_SWSE\_28\_1N\_68W**  
**1901327-01 (Water)**

**Summit Scientific**

**pH by SM4500**

pH	7.55	1.00	pH Units	1	1901333	01/25/19	01/25/19	SM4500-H+ B
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**Biological Activity Reaction Test**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Iron Related Bacteria	9000	25.0	CFU/ml	1	1901339	01/28/19	02/01/19	BART	
Sulfate Reducing Bacteria	115000	200	"	"	"	"	"	"	
Slime Forming Bacteria	2500	500	"	"	"	"	"	"	

**Field Data**

Date Sampled: **01/25/19 12:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	754.7		uS/cm	1	1901328	01/25/19	01/25/19	Field Method	
Temperature	4.14		Degrees C	"	"	"	"	"	
Oxidation/Reduction Potential	165.5		mv	"	"	"	"	"	
Dissolved Oxygen	7.69		mg/L	"	"	"	"	"	
Turbidity	163		NTU	"	"	"	"	"	
pH	6.39		SU	"	"	"	"	"	

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Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

### Summit Scientific

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

#### Batch 1901348 - EPA 5030 Water MS

##### Blank (1901348-BLK1)

Prepared: 01/29/19 Analyzed: 01/31/19

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	0.0155		"	0.0133		116	23-173			
Surrogate: Toluene-d8	0.0128		"	0.0133		95.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0135		"	0.0133		101	21-167			

##### LCS (1901348-BS1)

Prepared: 01/29/19 Analyzed: 01/31/19

Benzene	0.0267	0.0010	mg/L	0.0417		64.0	51-132			
Toluene	0.0340	0.0010	"	0.0417		81.7	51-138			
Ethylbenzene	0.0381	0.0010	"	0.0417		91.4	58-146			
m,p-Xylene	0.0670	0.0020	"	0.0833		80.4	57-144			
o-Xylene	0.0380	0.0010	"	0.0417		91.3	53-146			
Surrogate: 1,2-Dichloroethane-d4	0.0164		"	0.0133		123	23-173			
Surrogate: Toluene-d8	0.0134		"	0.0133		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0147		"	0.0133		110	21-167			

##### Matrix Spike (1901348-MS1)

Source: 1901324-24

Prepared: 01/29/19 Analyzed: 01/31/19

Benzene	0.0455	0.0010	mg/L	0.0417	ND	109	34-141			
Toluene	0.0432	0.0010	"	0.0417	ND	104	27-151			
Ethylbenzene	0.0378	0.0010	"	0.0417	ND	90.8	29-160			
m,p-Xylene	0.0734	0.0020	"	0.0833	ND	88.1	20-166			
o-Xylene	0.0396	0.0010	"	0.0417	ND	94.9	33-159			
Surrogate: 1,2-Dichloroethane-d4	0.0170		"	0.0133		128	23-173			
Surrogate: Toluene-d8	0.0130		"	0.0133		97.3	20-170			
Surrogate: 4-Bromofluorobenzene	0.0142		"	0.0133		106	21-167			

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Project: BWSE/GWA\_Coyote\_Trails  
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Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901348 - EPA 5030 Water MS**

Matrix Spike Dup (1901348-MSD1)		Source: 1901324-24			Prepared: 01/29/19 Analyzed: 01/31/19					
Benzene	0.0455	0.0010	mg/L	0.0417	ND	109	34-141	0.110	32	
Toluene	0.0440	0.0010	"	0.0417	ND	106	27-151	1.99	25	
Ethylbenzene	0.0392	0.0010	"	0.0417	ND	94.2	29-160	3.63	50	
m,p-Xylene	0.0746	0.0020	"	0.0833	ND	89.5	20-166	1.54	36	
o-Xylene	0.0399	0.0010	"	0.0417	ND	95.7	33-159	0.831	26	
Surrogate: 1,2-Dichloroethane-d4	0.0154		"	0.0133		115	23-173			
Surrogate: Toluene-d8	0.0132		"	0.0133		99.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0130		"	0.0133		97.7	21-167			

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Project Number: AFE# 17031 Code 961.15

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**Reported:**  
02/14/19 11:20

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

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

**Batch 1901417 - EPA 3520B**

**Blank (1901417-BLK1)**

Prepared: 01/31/19 Analyzed: 02/01/19

C10-C28 (DRO) ND 0.100 mg/L

Surrogate: o-Terphenyl 0.0141 " 0.0250 56.5 44.8-129

**LCS (1901417-BS1)**

Prepared: 01/31/19 Analyzed: 02/01/19

C10-C28 (DRO) 1.01 0.100 mg/L 1.00 101 70-130

Surrogate: o-Terphenyl 0.0255 " 0.0250 102 44.8-129

**Matrix Spike (1901417-MS1)**

Source: 1901327-01

Prepared: 01/31/19 Analyzed: 02/01/19

C10-C28 (DRO) 0.960 0.100 mg/L 1.00 ND 96.0 10-159

Surrogate: o-Terphenyl 0.0267 " 0.0250 107 44.8-129

**Matrix Spike Dup (1901417-MSD1)**

Source: 1901327-01

Prepared: 01/31/19 Analyzed: 02/01/19

C10-C28 (DRO) 0.924 0.100 mg/L 1.00 ND 92.4 10-159 3.87 20

Surrogate: o-Terphenyl 0.0254 " 0.0250 102 44.8-129

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Project Number: AFE# 17031 Code 961.15  
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**Reported:**  
02/14/19 11:20

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

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

**Batch 1902025 - GC**

**Blank (1902025-BLK1)**

Prepared & Analyzed: 02/01/19

Methane	ND	0.010	mg/kg							
Ethane	ND	0.010	"							
Propane	ND	0.010	"							
Surrogate: Ethene	ND		"	0.0364		14.4	70-130			

**LCS (1902025-BS1)**

Prepared & Analyzed: 02/01/19

Methane	0.040	0.010	mg/kg	0.0428		93.5	70-130			
Ethane	0.075	0.010	"	0.0798		93.7	70-130			
Propane	0.11	0.010	"	0.139		77.1	70-130			
Surrogate: Ethene	0.0725		"	0.0728		99.6	70-130			

**Duplicate (1902025-DUP1)**

Source: 1901327-01

Prepared & Analyzed: 02/01/19

Methane	0.068	0.010	mg/kg		0.066			3.00	30	
Ethane	ND	0.010	"		ND				30	
Propane	ND	0.010	"		ND				30	
Surrogate: Ethene	0.0106		"	0.0364		29.1	70-130			S-04

**Matrix Spike (1902025-MS1)**

Source: 1901327-01

Prepared & Analyzed: 02/01/19

Methane	0.096	0.010	mg/kg	0.0428	0.066	71.3	70-130			
Ethane	0.070	0.010	"	0.0798	ND	87.9	70-130			
Propane	0.10	0.010	"	0.139	ND	71.9	70-130			
Surrogate: Ethene	0.0696		"	0.0728		95.6	70-130			

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**Reported:**  
02/14/19 11:20

## Dissolved Metals by EPA Method 200.8 - Quality Control

### Summit Scientific

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

#### Batch 1901414 - EPA 200.8

##### Blank (1901414-BLK1)

Prepared & Analyzed: 01/31/19

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 (1901414-BS1)

Prepared & Analyzed: 01/31/19

Calcium	5.50	0.0500	mg/L	5.00	110	80-120
Iron	4.94	0.0100	"	5.00	98.7	80-120
Magnesium	5.10	0.0500	"	5.00	102	80-120
Manganese	0.517	0.00100	"	0.500	103	80-120
Potassium	5.91	0.0500	"	5.00	118	80-120
Sodium	5.36	0.0500	"	5.00	107	80-120
Barium	0.540	0.00100	"	0.500	108	80-120
Boron	2.45	0.0100	"	2.50	98.1	80-120
Selenium	0.0522	0.00100	"	0.0500	104	80-120
Strontium	0.515	0.0100	"	0.500	103	80-120

##### Duplicate (1901414-DUP1)

Source: 1901327-01

Prepared & Analyzed: 01/31/19

Calcium	41.5	0.0500	mg/L	44.9	7.85	20
Iron	0.616	0.0100	"	0.609	1.19	20
Magnesium	17.3	0.0500	"	18.4	5.74	20
Manganese	0.396	0.00100	"	0.414	4.27	20
Potassium	9.66	0.0500	"	10.2	5.37	20
Sodium	108	0.0500	"	115	6.43	20
Barium	0.0972	0.00100	"	0.103	5.76	20
Boron	0.0904	0.0100	"	0.108	17.7	20
Selenium	0.000489	0.00100	"	0.000728	39.3	20
Strontium	0.663	0.0100	"	0.694	4.56	20

QR-01

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901414 - EPA 200.8**

Matrix Spike (1901414-MS1)			Source: 1901327-01		Prepared & Analyzed: 01/31/19					
Calcium	48.8	0.0500	mg/L	5.00	44.9	78.9	75-125			
Iron	5.47	0.0100	"	5.00	0.609	97.2	75-125			
Magnesium	22.5	0.0500	"	5.00	18.4	83.7	75-125			
Manganese	0.950	0.00100	"	0.500	0.414	107	75-125			
Potassium	14.7	0.0500	"	5.00	10.2	90.5	75-125			
Sodium	119	0.0500	"	5.00	115	93.0	75-125			
Barium	0.659	0.00100	"	0.500	0.103	111	75-125			
Boron	2.39	0.0100	"	2.50	0.108	91.3	75-125			
Selenium	0.0555	0.00100	"	0.0500	0.000728	110	75-125			
Strontium	1.24	0.0100	"	0.500	0.694	109	75-125			

Matrix Spike Dup (1901414-MSD1)			Source: 1901327-01		Prepared & Analyzed: 01/31/19					
Calcium	50.6	0.0500	mg/L	5.00	44.9	114	75-125	3.56	25	
Iron	5.54	0.0100	"	5.00	0.609	98.7	75-125	1.41	25	
Magnesium	22.7	0.0500	"	5.00	18.4	85.9	75-125	0.486	25	
Manganese	0.889	0.00100	"	0.500	0.414	95.2	75-125	6.56	25	
Potassium	15.0	0.0500	"	5.00	10.2	96.4	75-125	1.97	25	
Sodium	120	0.0500	"	5.00	115	102	75-125	0.369	25	
Barium	0.627	0.00100	"	0.500	0.103	105	75-125	4.97	25	
Boron	2.57	0.0100	"	2.50	0.108	98.5	75-125	7.29	25	
Selenium	0.0483	0.00100	"	0.0500	0.000728	95.1	75-125	14.0	25	
Strontium	1.26	0.0100	"	0.500	0.694	112	75-125	1.38	25	

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901286 - General Preparation**

**Blank (1901286-BLK1)**

Prepared & Analyzed: 01/24/19

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 (1901286-BS1)**

Prepared & Analyzed: 01/24/19

Bromide	10.2	0.200	mg/L	10.0	102	90-110
Chloride	3.06	0.100	"	3.00	102	90-110
Fluoride	2.18	0.200	"	2.00	109	90-110
Sulfate	15.3	0.300	"	15.0	102	90-110
Nitrate as N	3.30	0.100	"	3.00	110	90-110
Nitrite as N	3.20	0.100	"	3.00	107	90-110

**Duplicate (1901286-DUP1)**

Source: 1901287-01

Prepared & Analyzed: 01/24/19

Bromide	0.345	0.200	mg/L	0.344	0.290	20	QM-02
Chloride	ND	0.100	"	493		20	
Fluoride	1.96	0.200	"	1.96	0.408	20	
Sulfate	159	0.300	"	249	44.0	20	
Nitrate as N	10.0	0.100	"	10.0	0.0500	20	
Nitrite as N	ND	0.100	"	ND		20	
Nitrate/Nitrite as N	ND	0.200	"	2.46		20	

**Matrix Spike (1901286-MS1)**

Source: 1901287-01

Prepared & Analyzed: 01/24/19

Bromide	11.5	0.200	mg/L	10.0	0.344	112	80-120	QM-02
Chloride	ND	0.100	"	3.00	493	NR	80-120	
Fluoride	4.22	0.200	"	2.00	1.96	113	80-120	QM-02
Sulfate	160	0.300	"	15.0	249	NR	80-120	
Nitrate as N	12.6	0.100	"	3.00	10.0	86.6	80-120	
Nitrite as N	3.61	0.100	"	3.00	ND	120	80-120	

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901405 - General Preparation**

**Blank (1901405-BLK1)**

Prepared: 01/31/19 Analyzed: 02/01/19

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

**LCS (1901405-BS1)**

Prepared: 01/31/19 Analyzed: 02/01/19

Total Alkalinity	90.0	10.0	mg/L as CaCO3	100	90.0	80-120
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**Duplicate (1901405-DUP1)**

Source: 1901327-01

Prepared: 01/31/19 Analyzed: 02/01/19

Total Alkalinity	350	10.0	mg/L as CaCO3	350	0.00	20
Carbonate	ND	10.0	"	ND		20
Bicarbonate	350	10.0	"	350	0.00	20

**Matrix Spike (1901405-MS1)**

Source: 1901327-01

Prepared: 01/31/19 Analyzed: 02/01/19

Total Alkalinity	420	10.0	mg/L as CaCO3	100	350	70.0	70-130
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**Matrix Spike Dup (1901405-MSD1)**

Source: 1901327-01

Prepared: 01/31/19 Analyzed: 02/01/19

Total Alkalinity	420	10.0	mg/L as CaCO3	100	350	70.0	70-130	0.00	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\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

### Summit Scientific

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

#### Batch 1902008 - General Preparation

##### Blank (1902008-BLK1)

Prepared & Analyzed: 02/01/19

Phosphorus - Total ND 0.0500 mg/L

##### LCS (1902008-BS1)

Prepared & Analyzed: 02/01/19

Phosphorus - Total 1.01 0.0500 mg/L 1.00 101 80-120

##### Duplicate (1902008-DUP1)

Source: 1901327-01

Prepared & Analyzed: 02/01/19

Phosphorus - Total 0.0110 0.0500 mg/L 0.0100 9.52 20

##### Matrix Spike (1902008-MS1)

Source: 1901327-01

Prepared & Analyzed: 02/01/19

Phosphorus - Total 1.04 0.0500 mg/L 1.00 0.0100 103 70-130

##### Matrix Spike Dup (1902008-MSD1)

Source: 1901327-01

Prepared & Analyzed: 02/01/19

Phosphorus - Total 1.10 0.0500 mg/L 1.00 0.0100 109 70-130 6.16 20

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901376 - General Preparation**

Duplicate (1901376-DUP1)		Source: 1901327-01			Prepared & Analyzed: 01/30/19						
Specific Conductance (EC)		978	1.00	umhos/cm	980			0.133	20		

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901374 - General Preparation**

**Blank (1901374-BLK1)**

Prepared & Analyzed: 01/30/19

Total Dissolved Solids ND 10.0 mg/L

**Duplicate (1901374-DUP1)**

**Source: 1901327-01**

Prepared & Analyzed: 01/30/19

Total Dissolved Solids 480 10.0 mg/L 480 0.125 20

Summit Scientific

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

Project: BWSE/GWA\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

### pH by SM4500 - Quality Control

#### Summit Scientific

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

#### Batch 1901333 - General Preparation

##### LCS (1901333-BS1)

Prepared & Analyzed: 01/25/19

pH	9.25	1.00	pH Units	9.23	100	90-110
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##### Duplicate (1901333-DUP1)

Source: 1901309-01

Prepared & Analyzed: 01/25/19

pH	7.27	1.00	pH Units	7.23	0.552	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\_Coyote\_Trails  
Project Number: AFE# 17031 Code 961.15  
Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

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

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

**Batch 1901339 - General Preparation**

**Blank (1901339-BLK1)**

Prepared: 01/28/19 Analyzed: 02/01/19

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\_Coyote\_Trails

Project Number: AFE# 17031 Code 961.15

Project Manager: Blake Ford

**Reported:**  
02/14/19 11:20

### Notes and Definitions

S-04	A sample matrix effect prevented complete surrogate recovery.
QR-01	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit. QC batch accepted based on LCS and/or LCSD QC results.
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