



May 30, 2018

Blake Ford  
Environmental Coordinator  
Extraction Oil & Gas  
370 17<sup>th</sup> Street, Suite 5300  
Denver, Colorado 80202

**Subject: Work Completion Report – Remedial Investigation**

State MRJV Tank Battery  
COGCC Location ID: 446013  
SWNW, Section 36, T7N-R67W  
40.530894/-104.847485  
Unincorporated Weld County, Colorado

Dear Mr. Ford:

Apex Companies LLC (Apex) has prepared this work completion report to document remedial investigation activities conducted at State MRJV TB location (446013) in Unincorporated Weld County, Colorado. These efforts included soil field screening and sampling of disturbed soils to support closure of a partially buried produced water vessel. These efforts were completed under an approved Form 27 (Site Investigation and Remediation Workplan), and remediation project number 11037, assigned by the Colorado Oil and Gas Conservation Commission (COGCC).

**Remedial Investigation**

On February 26, 2018, an Apex Field Coordinator collected and field-screened eight soil samples from the sidewalls and bottom of the excavation completed to remove a partially buried produced water vessel. The excavation was approximately 68 feet (68') by 47', with a depth of six and a half feet. No odor or visual staining was noted at the extent of the excavation, and field-screening of collected soil with a photoionization detector (PID) yielded results of less than 70 parts per million (ppm) for all eight collected samples. The eight collected soil samples were submitted for laboratory analysis to confirm field observations.

In addition to characterization efforts at the site of the excavation, in support of the larger reclamation effort, the Apex Field Coordinator completed a visual assessment of the site. The assessment looked for soil staining, salt accumulation, stressed vegetation, or other signs of soil impacts at the surface or near any recently disturbed soils.

## Results

Laboratory results from all soil samples were below laboratory detection limits for the organic constituents of concern (BTEX and TPH). All soil samples were consistent with typical background levels for analyzed inorganics (pH, SAR, EC).

No other indications of soil impacts were noted after the site investigation.

## Conclusions

Based on field observations and laboratory results, there is no evidence of any recent or historic release of produced water associated with the operation of the removed partially buried produced water vessel, or other onsite evidence of impacts related to the operation of this well pad.

If you have any questions about this report, onsite activities, or anything else related to this effort, please don't hesitate to contact me at 970-261-1127.

Sincerely,  
Apex Companies, LLC

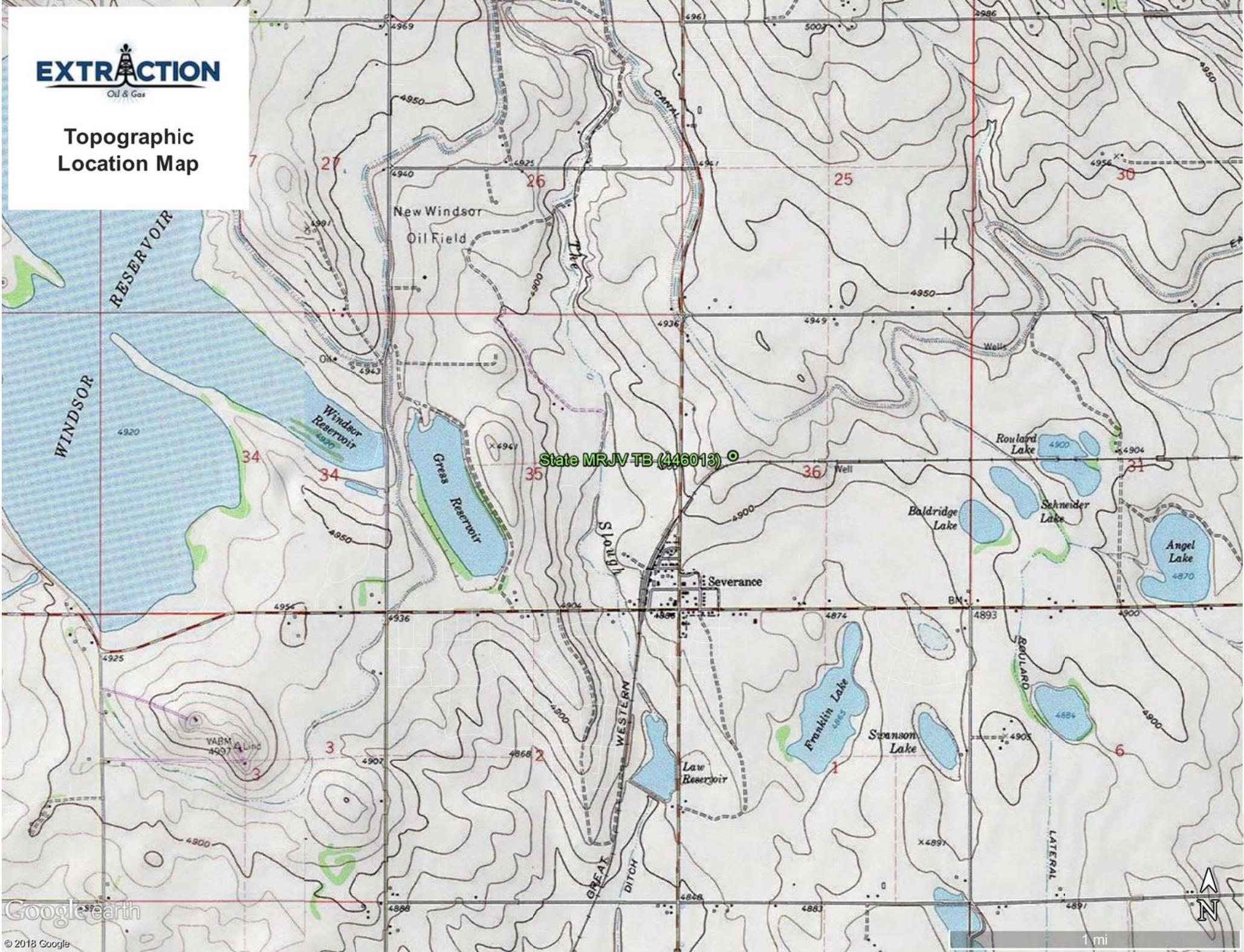


Chris Hines  
Project Manager

## Attachments:

1. Topographic Location Map
2. Site Diagram
3. Laboratory Results Summary Table
4. Laboratory Report

**Topographic  
Location Map**





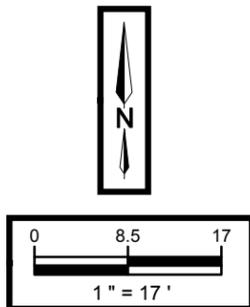
**Extraction Oil & Gas  
State MRJV Tank Battery  
COGCC Location ID: 446013  
Site Diagram**

Legal Description: SWNW, Sec 36, T7N R67W  
County: Weld  
Land Use: Cropland  
Topography: 1-3% Slopes  
Run-Off Risk: Very low  
Soil Type: Kim loam  
Receiving Waters: Eaton Ditch



- Soil Sample (2/26/2018)
- Excavation Extent (2/26/2018)
- Former Crude Oil Tank
- Former Sump
- Former Secondary Containment

Sample ID	Latitude NAD83	Longitude NAD83
N02@4'	40.530944	-104.847539
N01@4'	40.530937	-104.847474
E01@4'	40.530895	-104.847453
B01@6.5'	40.530894	-104.847485
S01@4'	40.530855	-104.847485
S02@3'	40.530860	-104.847551
B02@4'	40.530890	-104.847558
W01@3'	40.530886	-104.847626



		SOIL SAMPLE RESULTS						
		Organic Compounds in Soil (mg/kg [ppm])						
COGCC Allowable Concentration -->		500	50	50	0.17	85	100	175
Sample Date:	Matrix Notes (Sample Point - Depth)	TPH (total volatile and extractable petroleum hydrocarbons)	TPH-GRO (G6-C10) Low Fraction	TPH-DRO (C10-C36) High Fraction	Benzene	Toluene	Ethylbenzene	Xylenes - total
2/26/18	N01@4'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	E01@4'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	B01@6.5'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	B02@4'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	W01@3'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	N02@4'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	S01@4'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050
2/26/18	S02@3'	<0.50	<0.50	<50	<0.0020	<0.0050	<0.0050	<0.0050

Spatial data collected for this project was acquired using a GPS with submeter accuracy. Illustration discrepancies may be present in this diagram due to the inherent limitations of data accuracy for both project data and the underlying aerial imagery. For consistency in data representation and adherence to spatial data correction results, illustrated data is not corrected to fit with the aerial imagery or other collected data points.

COGCC Allowable Concentration (Soil) -->			500	0.17	85	100	175	4	12	(6-9)
Location	Sample Date:	Matrix Notes [Sample Point - Depth]	TPH (total volatile and extractable petroleum hydrocarbons) (TPH-GRO + TPH-DRO)	Benzene	Toluene	Ethylbenzene	Xylenes - total	EC (<4 mmhos/cm or <b>2x background</b> )	SAR (calculation)	pH
State MRJV	2/26/18	N01@4'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050	0.451	0.0985	8.65
State MRJV	2/26/18	E01@4'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	B01@6.5'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	B02@4'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	W01@3'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	N02@4'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	S01@4'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			
State MRJV	2/26/18	S02@3'	<0.50	<0.0020	<0.0050	<0.0050	<0.0050			

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 20, 2018

Chris Hines  
Extraction Oil & Gas  
570 17th St. Suite 550  
Denver, CO 80202  
RE: State MRJV

Enclosed are the results of analyses for samples received by Summit Scientific on 02/26/18 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV

Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@6.5'	1802261-01	Soil	02/26/18 11:24	02/26/18 16:00
B02@4'	1802261-02	Soil	02/26/18 11:26	02/26/18 16:00
W01@3'	1802261-03	Soil	02/26/18 11:31	02/26/18 16:00
N01@4'	1802261-04	Soil	02/26/18 11:34	02/26/18 16:00
N02@4'	1802261-05	Soil	02/26/18 11:39	02/26/18 16:00
S01@4'	1802261-06	Soil	02/26/18 11:40	02/26/18 16:00
S02@3'	1802261-07	Soil	02/26/18 11:41	02/26/18 16:00
E01@4'	1802261-08	Soil	02/26/18 11:42	02/26/18 16:00

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV

Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

# Summit Scientific 1802201

741 Corporate Circle Suite 1 ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933 Fax

Client: Extraction Oil & Gas- Blake Ford

Page 1 of 1

Address: 370 17th Street, Suite 5300

Project Manager: Chris Hines- 970.261.1127

City/State/Zip: Denver, Colorado 80202

E-Mail: [BFord@extractionog.com](mailto:BFord@extractionog.com), [DenverRemediation@ApexCos.onmicrosoft.com](mailto:DenverRemediation@ApexCos.onmicrosoft.com)

Phone: 970.778.5956

Fax:

Project Name: State MRJV

Produced water tank closure

Sampler Name: Kennedy Whalen

Project Number: 744.1702.01 - 446013

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix		Analyze For:				Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	TPH (DRO & GRO)		BTEX	pH, SAR, EC
B010 @ 5'	2/20/18	1124	1			X									* Run if TPH>500ppm, or benzene>0.17ppm  Call Chris Hines with Questions. (970-261-1127) N01 @ 4' EC, SAR, PH On Standard- Turn.
B02 @ 4'		1120	1			X									
W01 @ 3'		1131	1												
N01 @ 4'		1134	1												
N02 @ 4'		1139	1							X	X	X			
S01 @ 4'		1140	1									X	X		
S02 @ 3'		1141	1									X	X		
E01 @ 4'		1142	1							X	X				
Relinquished by: <i>Ken Whalen</i>		Date/Time: 11:00	Received by: <i>KB</i>		Date/Time: 2-20-18 10:00	Turn Around Time (Check)		Notes:							
Relinquished by:		Date/Time:	Received by:		Date/Time:	Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/>		COGCC Table							
Relinquished by:		Date/Time:	Received in Lab by:		Date/Time:	24 Hours <input type="checkbox"/>		910-1 analytes.							
Relinquished by:		Date/Time:	Received in Lab by:		Date/Time:	48 Hours <input type="checkbox"/>		Sample Integrity:							
Relinquished by:		Date/Time:	Received in Lab by:		Date/Time:	Temperature Upon Receipt: <i>10.1</i>		Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							

www.s2scientific.com



Extraction Oil & Gas  
 570 17th St. Suite 550  
 Denver CO, 80202

Project: State MRJV

Project Number: 744.1702.01-446013  
 Project Manager: Chris Hines

Reported:  
 03/20/18 15:46

Sample Receipt Checklist

S2 Work Order: 1802261  
 Client: Extraction O&G Client Project ID: State MRJV  
 Shipped Via: H.D. on ice (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #: \_\_\_\_\_  
 Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_ (Describe)

Cooler ID				
Temp (°C)	<u>6.1</u>			

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> ?				
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	X			
Were all samples received intact <sup>(1)</sup> ?	X			
Was adequate sample volume provided <sup>(1)</sup> ?	X			
If custody seals are present, are they intact <sup>(1)</sup> ?			X	
Are short holding time analytes or samples with HTs due within 48 hours present?	X			
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	X			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	X			
For volatiles in water – is there headspace present? <b>If yes, contact client and note in narrative.</b>			X	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			X	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	
Additional Comments (if any):				

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

Muri P.  
 Custodian Printed Name

MS 2-26-18  
 Signature or Initials of Custodian

16:15  
 Date/Time



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

**B01@6.5'**  
**1802261-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/02/18	8015M	

Date Sampled: **02/26/18 11:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		82.2 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.1 %	21-167		"	"	"	"	

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**B02@4'**  
**1802261-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/02/18	8015M	

Date Sampled: **02/26/18 11:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.9 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:26**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.7 %	21-167		"	"	"	"	

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**W01@3'**  
**1802261-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/02/18	8015M	

Date Sampled: **02/26/18 11:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.4 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.6 %	21-167		"	"	"	"	

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**N01@4'**  
**1802261-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1802247	02/26/18	02/26/18	8015M	

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		88.5 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1802245	02/26/18	02/26/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.0 %	21-167		"	"	"	"	

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Calcium</b>	<b>8360</b>	11.0	mg/kg dry	1	1802255	02/27/18	02/28/18	EPA 6020/Mod. USDA60 6(2, 3A)	
<b>Magnesium</b>	<b>773</b>	5.49	"	"	"	"	"	"	

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**N01@4'**  
**1802261-04 (Soil)**

**Summit Scientific**

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium	35.1	5.49	mg/kg dry	1	1802255	02/27/18	02/28/18	EPA 6020/Mod. USDA60 6(2, 3A)	
Sodium Adsorption Ratio	0.0985		units	"	1803017	03/01/18	03/01/18	"	

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

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.65	0.100	pH Units	1	1802257	02/27/18	02/27/18	EPA 9045	
% Solids	91.0		%	"	1802259	02/27/18	03/01/18	% calculation	

**Specific Conductance by EPA120.1**

Date Sampled: **02/26/18 11:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.451	0.0100	mmhos/cm	1	1802258	02/27/18	02/27/18	EPA 120.1	

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**N02@4'**  
**1802261-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/02/18	8015M	

Date Sampled: **02/26/18 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		88.6 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %	21-167		"	"	"	"	

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**S01@4'**  
**1802261-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/03/18	8015M	

Date Sampled: **02/26/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.2 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.3 %	21-167		"	"	"	"	

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**S02@3'**  
**1802261-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1803040	03/02/18	03/03/18	8015M	

Date Sampled: **02/26/18 11:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.7 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1803039	03/02/18	03/03/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.4 %	21-167		"	"	"	"	

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**E01@4'**  
**1802261-08 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/26/18 11:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1802247	02/26/18	02/26/18	8015M	

Date Sampled: **02/26/18 11:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		91.1 %	30-150		"	"	"	"	

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

Date Sampled: **02/26/18 11:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1802245	02/26/18	02/26/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **02/26/18 11:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.8 %	21-167		"	"	"	"	

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

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

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	
<b>Batch 1802247 - EPA 3550A</b>										
<b>LCS (1802247-BS1)</b>					Prepared & Analyzed: 02/26/18					
C10-C28 (DRO)	565	50	mg/kg	499	113	73-134				
Surrogate: <i>o</i> -Terphenyl	14.6		"	12.5	117	30-150				
<b>Matrix Spike (1802247-MS1)</b>					Source: 1802250-01 Prepared & Analyzed: 02/26/18					
C10-C28 (DRO)	551	50	mg/kg	499	19.2	107	50-148			
Surrogate: <i>o</i> -Terphenyl	14.1		"	12.5	113	30-150				
<b>Matrix Spike Dup (1802247-MSD1)</b>					Source: 1802250-01 Prepared & Analyzed: 02/26/18					
C10-C28 (DRO)	534	50	mg/kg	499	19.2	103	50-148	3.20	20	
Surrogate: <i>o</i> -Terphenyl	13.9		"	12.5	111	30-150				
<b>Batch 1803040 - EPA 3550A</b>										
<b>Blank (1803040-BLK1)</b>					Prepared & Analyzed: 03/02/18					
C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: <i>o</i> -Terphenyl	11.5		"	12.5	92.3	30-150				
<b>LCS (1803040-BS1)</b>					Prepared & Analyzed: 03/02/18					
C10-C28 (DRO)	389	50	mg/kg	399	97.4	73-134				
Surrogate: <i>o</i> -Terphenyl	13.2		"	12.5	106	30-150				
<b>Matrix Spike (1803040-MS1)</b>					Source: 1803033-01 Prepared & Analyzed: 03/02/18					
C10-C28 (DRO)	379	50	mg/kg	399	19.1	90.2	50-148			
Surrogate: <i>o</i> -Terphenyl	13.5		"	12.5	108	30-150				
<b>Matrix Spike Dup (1803040-MSD1)</b>					Source: 1803033-01 Prepared & Analyzed: 03/02/18					
C10-C28 (DRO)	406	50	mg/kg	399	19.1	97.0	50-148	6.88	20	
Surrogate: <i>o</i> -Terphenyl	15.0		"	12.5	120	30-150				

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

**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 1802245 - EPA 5030 Soil MS**

**Blank (1802245-BLK1)**

Prepared & Analyzed: 02/26/18

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0392</i>		<i>"</i>	<i>0.0400</i>		<i>98.0</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0377</i>		<i>"</i>	<i>0.0400</i>		<i>94.4</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0378</i>		<i>"</i>	<i>0.0400</i>		<i>94.5</i>	<i>21-167</i>			

**LCS (1802245-BS1)**

Prepared & Analyzed: 02/26/18

Benzene	0.159	0.0020	mg/kg	0.150		106	58-130			
Toluene	0.156	0.0050	"	0.150		104	61-134			
Ethylbenzene	0.166	0.0050	"	0.150		111	74-139			
m,p-Xylene	0.324	0.010	"	0.300		108	73-137			
o-Xylene	0.160	0.0050	"	0.150		107	73-141			
Xylenes (total)	0.484	0.0050	"				30-150			
Gasoline Range Hydrocarbons	15.4	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0406</i>		<i>"</i>	<i>0.0400</i>		<i>102</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0388</i>		<i>"</i>	<i>0.0400</i>		<i>96.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0391</i>		<i>"</i>	<i>0.0400</i>		<i>97.6</i>	<i>21-167</i>			

**Matrix Spike (1802245-MS1)**

Source: 1802250-01

Prepared & Analyzed: 02/26/18

Benzene	0.161	0.0020	mg/kg	0.150	ND	108	30-131			
Toluene	0.159	0.0050	"	0.150	ND	106	30-134			
Ethylbenzene	0.166	0.0050	"	0.150	ND	111	22-153			
m,p-Xylene	0.322	0.010	"	0.300	ND	107	10-159			
o-Xylene	0.159	0.0050	"	0.150	ND	106	31-151			
Xylenes (total)	0.481	0.0050	"		ND		30-150			
Gasoline Range Hydrocarbons	15.5	0.50	"		ND		30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0424</i>		<i>"</i>	<i>0.0400</i>		<i>106</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0388</i>		<i>"</i>	<i>0.0400</i>		<i>97.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>98.9</i>	<i>21-167</i>			

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

**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 1802245 - EPA 5030 Soil MS**

**Matrix Spike Dup (1802245-MSD1)**

Source: 1802250-01

Prepared & Analyzed: 02/26/18

Benzene	0.157	0.0020	mg/kg	0.150	ND	105	30-131	2.66	34
Toluene	0.156	0.0050	"	0.150	ND	104	30-134	2.17	30
Ethylbenzene	0.165	0.0050	"	0.150	ND	110	22-153	0.635	24
m,p-Xylene	0.320	0.010	"	0.300	ND	107	10-159	0.748	68
o-Xylene	0.159	0.0050	"	0.150	ND	106	31-151	0.0188	38
Xylenes (total)	0.479	0.0050	"		ND		30-150	0.506	20
Gasoline Range Hydrocarbons	15.4	0.50	"		ND		30-150	0.429	20
Surrogate: 1,2-Dichloroethane-d4	0.0414		"	0.0400		104	23-173		
Surrogate: Toluene-d8	0.0386		"	0.0400		96.4	20-170		
Surrogate: 4-Bromofluorobenzene	0.0399		"	0.0400		99.8	21-167		

**Batch 1803039 - EPA 5030 Soil MS**

**Blank (1803039-BLK1)**

Prepared & Analyzed: 03/02/18

Benzene	ND	0.0020	mg/kg						
Toluene	ND	0.0050	"						
Ethylbenzene	ND	0.0050	"						
Xylenes (total)	ND	0.0050	"						
Gasoline Range Hydrocarbons	ND	0.50	"						
Surrogate: 1,2-Dichloroethane-d4	0.0406		"	0.0400		102	23-173		
Surrogate: Toluene-d8	0.0374		"	0.0400		93.4	20-170		
Surrogate: 4-Bromofluorobenzene	0.0380		"	0.0400		95.1	21-167		

**LCS (1803039-BS1)**

Prepared & Analyzed: 03/02/18

Benzene	0.0964	0.0020	mg/kg	0.100		96.4	58-130		
Toluene	0.0999	0.0050	"	0.100		99.9	61-134		
Ethylbenzene	0.114	0.0050	"	0.0992		115	74-139		
m,p-Xylene	0.209	0.010	"	0.200		105	73-137		
o-Xylene	0.103	0.0050	"	0.0980		105	73-141		
Xylenes (total)	0.312	0.0050	"				30-150		
Gasoline Range Hydrocarbons	3.27	0.50	"				30-150		
Surrogate: 1,2-Dichloroethane-d4	0.0404		"	0.0400		101	23-173		
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170		
Surrogate: 4-Bromofluorobenzene	0.0382		"	0.0400		95.5	21-167		

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.



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

**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 1803039 - EPA 5030 Soil MS**

<b>Matrix Spike (1803039-MS1)</b>	<b>Source: 1803033-01</b>			<b>Prepared &amp; Analyzed: 03/02/18</b>						
Benzene	0.0970	0.0020	mg/kg	0.100	ND	97.0	30-131			
Toluene	0.101	0.0050	"	0.100	ND	101	30-134			
Ethylbenzene	0.113	0.0050	"	0.0992	ND	114	22-153			
m,p-Xylene	0.208	0.010	"	0.200	ND	104	10-159			
o-Xylene	0.103	0.0050	"	0.0980	ND	105	31-151			
Xylenes (total)	0.312	0.0050	"		ND		30-150			
Gasoline Range Hydrocarbons	3.30	0.50	"		ND		30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0371</i>		<i>"</i>	<i>0.0400</i>		<i>92.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0390</i>		<i>"</i>	<i>0.0400</i>		<i>97.4</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0421</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

Reported:  
03/20/18 15:46

**Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control**  
**Summit Scientific**

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

**Batch 1802255 - General Preparation**

**Blank (1802255-BLK1)**

Prepared: 02/27/18 Analyzed: 02/28/18

Calcium	ND	10.0	mg/kg wet						
Magnesium	ND	5.00	"						
Sodium	ND	5.00	"						

**LCS (1802255-BS1)**

Prepared: 02/27/18 Analyzed: 02/28/18

Calcium	448	10.0	mg/kg wet	500		89.6	82.9-118		
Magnesium	478	5.00	"	500		95.7	77.1-123		
Sodium	477	5.00	"	500		95.4	71-129		

**Duplicate (1802255-DUP1)**

Source: 1802210-03

Prepared: 02/27/18 Analyzed: 02/28/18

Calcium	6270	12.7	mg/kg dry	6440				2.67	200
Magnesium	836	6.37	"	840				0.506	200
Sodium	623	6.37	"	629				0.982	200

**Matrix Spike (1802255-MS1)**

Source: 1802210-03

Prepared: 02/27/18 Analyzed: 02/28/18

Calcium	7070	12.7	mg/kg dry	637	6440	99.1	75-125		
Magnesium	1320	6.37	"	637	840	76.0	75-125		
Sodium	1200	6.37	"	637	629	89.0	75-125		

**Matrix Spike Dup (1802255-MSD1)**

Source: 1802210-03

Prepared: 02/27/18 Analyzed: 02/28/18

Calcium	7020	12.7	mg/kg dry	637	6440	92.2	75-125	0.624	25
Magnesium	1330	6.37	"	637	840	77.1	75-125	0.563	25
Sodium	1240	6.37	"	637	629	96.2	75-125	3.80	25

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.*



Extraction Oil & Gas  
 570 17th St. Suite 550  
 Denver CO, 80202

Project: State MRJV  
 Project Number: 744.1702.01-446013  
 Project Manager: Chris Hines

**Reported:**  
 03/20/18 15:46

**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 1802257 - General Preparation**

<b>LCS (1802257-BS1)</b>				Prepared & Analyzed: 02/27/18						
pH	9.17	0.100	pH Units	9.16		100	95-105			
<b>Duplicate (1802257-DUP1)</b>				<b>Source: 1802182-02</b>		Prepared & Analyzed: 02/23/18				
pH	8.76	0.100	pH Units		8.79			0.342	20	

**Batch 1802259 - General Preparation**

<b>Duplicate (1802259-DUP1)</b>				<b>Source: 1802156-01</b>		Prepared: 02/27/18 Analyzed: 03/01/18				
% Solids	97.0		%		96.8			0.206	20	

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

**Specific Conductance by EPA120.1 - Quality Control  
Summit Scientific**

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

**Batch 1802258 - General Preparation**

<b>Blank (1802258-BLK1)</b>			Prepared & Analyzed: 02/27/18								
Specific Conductance (EC)	ND	0.0100	mmhos/cm								
<b>LCS (1802258-BS1)</b>			Prepared & Analyzed: 02/27/18								
Specific Conductance (EC)	0.751	0.0100	mmhos/cm	0.750	100	90-110					
<b>Duplicate (1802258-DUP1)</b>			Source: 1802182-02 Prepared & Analyzed: 02/27/18								
Specific Conductance (EC)	0.558	0.0100	mmhos/cm	0.554			0.899	20			

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.*



Extraction Oil & Gas  
570 17th St. Suite 550  
Denver CO, 80202

Project: State MRJV  
Project Number: 744.1702.01-446013  
Project Manager: Chris Hines

**Reported:**  
03/20/18 15:46

### Notes and Definitions

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