



May 14, 2018

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

Subject: Work Completion Report – Remedial Investigation

Williams 31-15 Tank Battery
COGCC Facility ID: 448613
NWNE, Section 15, T5N-R65W
40.403378/-104.647210
Weld County, Colorado

Dear Mr. Ford:

Apex Companies LLC (Apex) has prepared this work completion report to document remedial investigation activities conducted in support of final site reclamation at the Williams 31-15 Tank Battery location (448613) in Weld County, Colorado. These efforts included soil sampling to support closure of a partially buried produced water vessel, and field screening of disturbed soils following production equipment removal. These efforts were completed under an approved Form 27 (Site Investigation and Remediation Workplan), and remediation project number 10545, assigned by the Colorado Oil and Gas Conservation Commission (COGCC).

Remedial Investigation

On February 23rd, 2018, an Apex Field Coordinator used visual observation and a Photoionization Detector (PID) to field-screen a total of four sidewall samples, and one base sample, for potential soil impacts in support of excavation efforts completed to remove a partially-buried produced-water vessel. Field-screening results yielded PID readings of less than 5 parts per million (ppm). Final dimensions of the excavation were 32 feet (32') by 31', with a depth of six feet. The base sample (B01@6') was submitted for analysis of approved constituents of concern, with the sidewall samples placed on hold pending results of the base.

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. The visual assessment of the site yielded no known areas of concern.

Results

Laboratory results for the sample collected from the base of the excavation were within allowable limits for COGCC Table 910-1 constituents of concern (TPH and BTEX). The four sidewall samples were not analyzed due to the non-detect results for organics at the base.

No other indications of soil impacts were noted during the site investigation, and no groundwater was encountered during the remediation project.

Conclusions

Based on field observations and laboratory results, there is no evidence of impacts related to the operation of the partially-buried produced water vessel. No further site assessment is recommended at this time.

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

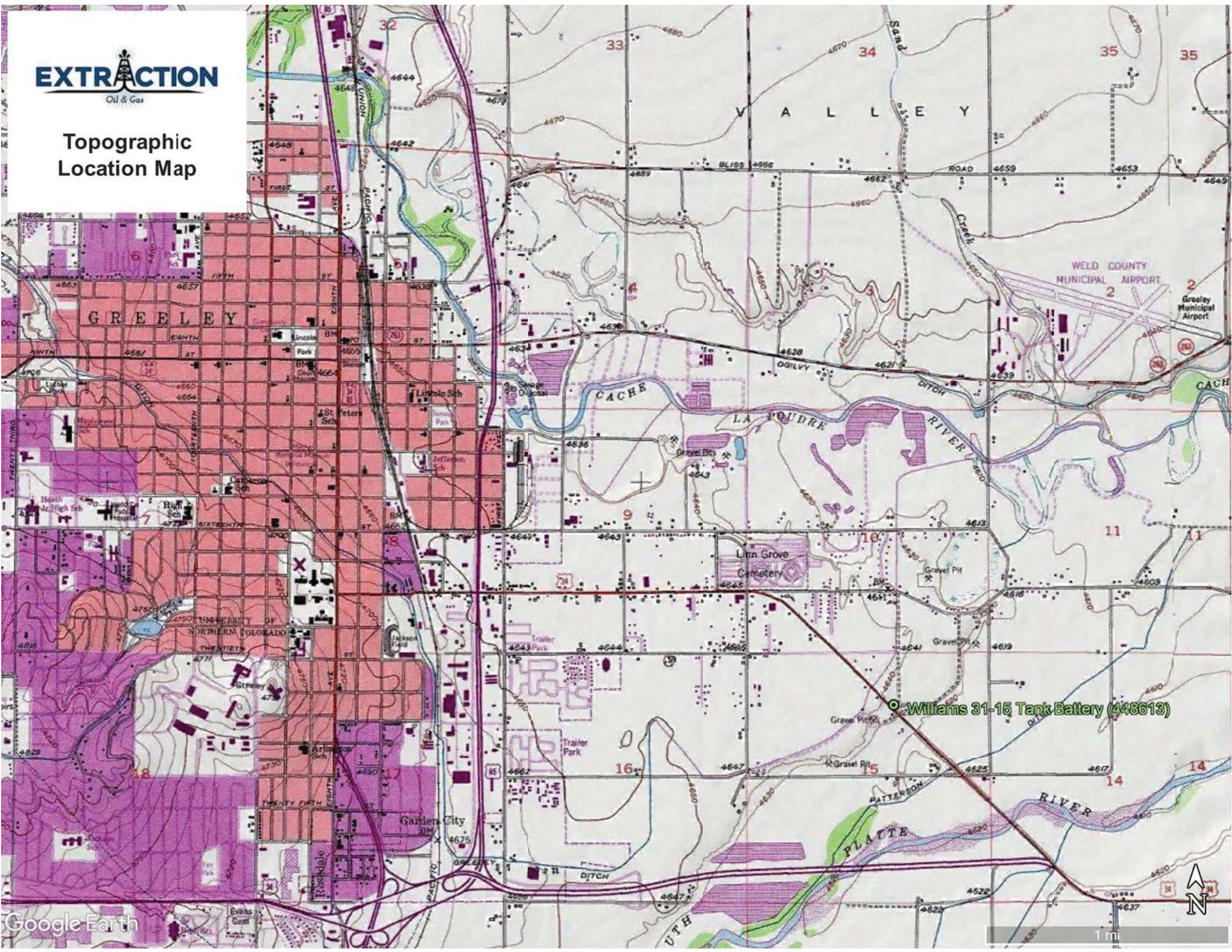


Chris Hines
Project Manager

Attachments:

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

**Topographic
Location Map**



Williams 31-15 Tank Battery (448613)



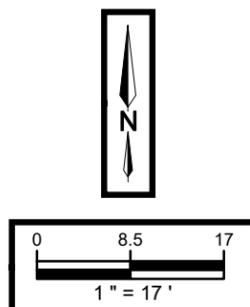
**Extraction Oil & Gas
Williams 31-15 Battery
COGCC Location ID: 448612
Site Diagram**

Legal Description: NWNE, Sec 15, T5N R65W
County: Weld
Land Use: Crop Land
Topography: 0-1% Slopes
Run-Off Risk: Low
Soil Type: Altvan loam
Receiving Waters: Patterson Ditch

- Soil Sample Analyzed (2/23/2018)
- ◆ Field Screening Soil Sample (2/23/2018)
- Excavation Extent (2/23/2018)
- Former Crude Oil Tank
- Former Sump
- Former Secondary Containment



Sample ID	Latitude NAD83	Longitude NAD83
B01@6'	40.403453	-104.647173
E01@3'	40.403415	-104.647150
N01@3'	40.403461	-104.647130
S01@3'	40.403428	-104.647218
W01@3'	40.403490	-104.647198



		SOIL SAMPLE RESULTS						
COGCC Allowable Concentration -->		Organic Compounds in Soil (mg/kg [ppm])						
Sample Date:	Matrix Notes (Sample Point - Depth)	TPH (total volatile and extractable petroleum hydrocarbons) (TPH-GRO + TPH-DRO)	TPH-GRO (C6-C10) Low Fraction	TPH-DRO (C10-C36) High Fraction	Benzene	Toluene	Ethylbenzene	Xylenes - total
02/23/18	B01@6'	<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
Location	Sample Date:	Matrix Notes [Sample Point - Depth]	TPH (total volatile and extractable petroleum hydrocarbons) (TPH-GRO + TPH-DRO)	Benzene	Toluene	Ethylbenzene	Xylenes - total
Williams 31-15	2/23/18	B01@6'	<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 04, 2018

Chris Hines
Extraction Oil & Gas
570 17th St. Suite 550
Denver, CO 80202
RE: Williams 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 02/23/18 16:20. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury For Ben Shrewsbury
Laboratory Manager



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

Project: Williams 31-15
Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@6'	1802251-01	Soil	02/23/18 11:00	02/23/18 16:20

Summit Scientific

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

Project: Williams 31-15

Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

Summit Scientific

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

Page 1 of 1

Client: Extraction Oil & Gas- Blake Ford

Address: 370 17th Street, Suite 5300

City/State/Zip: Denver, Colorado 80202

Phone: 970.778.5956

Fax:

Sampler Name: Ashley Gibbard

Project Manager: Chris Hines-970.261.1127

E-Mail: BFord@extractionog.com, DenverRemediation@ApexCos.onmicrosoft.com

Project Name: Williams 31-15

Vault Closure

Project Number: 744.1608.01 106-002

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions	
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BIEX	TPK DROGCS	Hold		
B01E6	2/23/18	1100	1			X			X			X	X	X		Report per Paul, Call Chris Hines with Questions. *Hold samples pending results of B01E6
E01E3	2/23/18	1103	1			X			X			X	X	X		
N01E3	2/23/18	1105	1			X			X			X	X	X		
S01E3	2/23/18	1107	1			X			X			X	X	X		
W01E3	2/23/18	1110	1			X			X			X	X	X		
N.F.E. 2/23/18																
Relinquished by: <u>Ashley Gibbard</u>		Date/Time: <u>2/23/18 1620</u>		Received by:		Date/Time:		Turn Around Time (Check)				Notes:				
								Same Day <input type="checkbox"/>				72 Hours <input type="checkbox"/>				
								24 Hours <input type="checkbox"/>				Standard <input checked="" type="checkbox"/>				
								48 Hours <input type="checkbox"/>				FOR APEX USE ONLY circle applicable regulating agency				
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Sample Integrity:				COGCC/CDPHE				
								Temperature Upon Receipt: <u>5.0</u>								
								Intact: Yes <input type="checkbox"/> No <input type="checkbox"/>								

www.s2scientific.com

Summit Scientific

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S₂

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

Project: Williams 31-15

Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

Sample Receipt Checklist

S2 Work Order: _____

Client: Extraction O&G Client Project ID: Williams 31-15

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>5.0</u>			

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? 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 ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✗	
Are short holding time analytes or samples with HTs due within 48 hours present?			✗	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✗			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	✗			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			✗	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , ect			✗	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			✗	
If dissolved metals are requested, were samples field filtered?			✗	
Additional Comments (if any):				

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

Muri P.
Custodian Printed Name

MS 2-23-18
Signature or Initials of Custodian

17:40
Date/Time



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

Project: Williams 31-15
Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

B01@6'
1802251-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/23/18 11:00**

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: **02/23/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/23/18 11:00**

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: **02/23/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Williams 31-15
 Project Number: 744.1608.01 106-002
 Project Manager: Chris Hines

Reported:
 03/04/18 16:36

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		

Batch 1802247 - EPA 3550A

LCS (1802247-BS1)

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				

Matrix Spike (1802247-MS1)

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				

Matrix Spike Dup (1802247-MSD1)

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				

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Project: Williams 31-15
Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

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>			

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

Project: Williams 31-15
Project Number: 744.1608.01 106-002
Project Manager: Chris Hines

Reported:
03/04/18 16:36

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	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0414</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0386</i>		<i>"</i>	<i>0.0400</i>		<i>96.4</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>21-167</i>			

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Reported:
03/04/18 16:36

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