

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 23, 2017

Blake Ford
Extraction Oil & Gas
570 17th St. Suite 550
Denver, CO 80202
RE: Mickey Spill Response

Enclosed are the results of analyses for samples received by Summit Scientific on 03/17/17 12:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury
President



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

Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
03/23/17 09:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Mickey Spill Area	1703150-01	Soil	03/17/17 10:45	03/17/17 12:25

Summit Scientific

A handwritten signature in black ink, appearing to be 'MSM'.

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

Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
03/23/17 09:47

Summit Scientific 1703/50

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

Page 1 of 1

Client:	Extraction Oil & Gas	
Address:	370 17th Street, Suite 5300	
City/State/Zip:	Denver, CO 80202	
Phone:	720-481-2362	Fax:
Sampler Name:	Blake Ford	

Project Manager:	Blake Ford
E-Mail:	bford@extractionog.com
Project Name:	Mickey Spill Response
Project Number:	

[illegible]

www.s2scientific.com

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570 17th St. Suite 550
Denver CO, 80202

Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
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Sample Receipt Checklist

S2 Work Order: 1763150

Client: Extraction Oil & Gas Client Project ID: Mickey Spill ~~Response~~ Response

Shipped Via: 4.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>7.4</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C (1)? NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.	<input checked="" type="checkbox"/>			
Were all samples received intact (1)?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided (1)?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact (1)?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely (1)?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received (1)?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC (1)?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded (1)?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) (1)? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect.			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH < 2 (1)? Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
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

NA 3-17-17
Signature or Initials of Custodian

12:05
Date/Time



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Project: Mickey Spill Response
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Reported:
03/23/17 09:47

Mickey Spill Area
1703150-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	4000	50	mg/kg	1	1703200	03/20/17	03/21/17	8015M	

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		105 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1703213	03/20/17	03/21/17	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

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

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	837	10.2	mg/kg dry	1	1703229	03/22/17	03/22/17	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	150	5.10	"	"	"	"	"	"	

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Mickey Spill Area
1703150-01 (Soil)

Summit Scientific

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

Sodium	322	5.10 mg/kg dry	1	1703229	03/22/17	03/22/17	EPA 6020/Mod. USDA60 6(2, 3A)
Sodium Adsorption Ratio	2.69	units	"	1703259	03/23/17	03/23/17	"

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **03/17/17 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	2.01	0.0100	mmhos/cm	1	1703230	03/21/17	03/21/17	SM 2510B	
% Solids	98.0		%	"	1703207	03/20/17	03/20/17	% calculation	
pH	8.32	0.100	pH Units	"	1703231	03/21/17	03/21/17	EPA 9045	

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Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
03/23/17 09:47

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 1703200 - EPA 3550A

Blank (1703200-BLK1)

Prepared & Analyzed: 03/20/17

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 12.2 " 12.5 97.3 30-150

LCS (1703200-BS1)

Prepared: 03/20/17 Analyzed: 03/21/17

C10-C28 (DRO) 618 50 mg/kg 499 124 73-134

Surrogate: o-Terphenyl 11.9 " 12.5 95.4 30-150

Matrix Spike (1703200-MS1)

Source: 1703141-01

Prepared: 03/20/17 Analyzed: 03/21/17

C10-C28 (DRO) 495 50 mg/kg 499 29.2 93.3 50-148

Surrogate: o-Terphenyl 11.3 " 12.5 90.6 30-150

Matrix Spike Dup (1703200-MSD1)

Source: 1703141-01

Prepared: 03/20/17 Analyzed: 03/21/17

C10-C28 (DRO) 511 50 mg/kg 499 29.2 96.6 50-148 3.22 20

Surrogate: o-Terphenyl 11.5 " 12.5 92.0 30-150

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Extraction Oil & Gas
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Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
03/23/17 09:47

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 1703213 - EPA 5030 Soil MS

Blank (1703213-BLK1)

Prepared: 03/20/17 Analyzed: 03/21/17

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		101	23-173			
Surrogate: Toluene-d8	0.0409		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0422		"	0.0400		106	21-167			

LCS (1703213-BS1)

Prepared: 03/20/17 Analyzed: 03/21/17

Benzene	0.0996	0.0020	mg/kg	0.100		99.6	58-130			
Toluene	0.104	0.0050	"	0.100		104	61-134			
Ethylbenzene	0.116	0.0050	"	0.0992		117	74-139			
m,p-Xylene	0.221	0.010	"	0.200		111	73-137			
o-Xylene	0.108	0.0050	"	0.0980		110	73-141			
Xylenes (total)	0.329	0.0050	"				30-150			
Gasoline Range Hydrocarbons	0.989	0.50	"				30-150			
Surrogate: 1,2-Dichloroethane-d4	0.0398		"	0.0400		99.4	23-173			
Surrogate: Toluene-d8	0.0420		"	0.0400		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0411		"	0.0400		103	21-167			

Matrix Spike (1703213-MS1)

Source: 1703150-01

Prepared: 03/20/17 Analyzed: 03/21/17

Benzene	0.108	0.0020	mg/kg	0.100	ND	108	30-131			
Toluene	0.116	0.0050	"	0.100	ND	116	30-134			
Ethylbenzene	0.123	0.0050	"	0.0992	ND	124	22-153			
m,p-Xylene	0.236	0.010	"	0.200	ND	118	10-159			
o-Xylene	0.115	0.0050	"	0.0980	ND	117	31-151			
Xylenes (total)	0.351	0.0050	"		ND		30-150			
Gasoline Range Hydrocarbons	1.07	0.50	"		ND		30-150			
Surrogate: 1,2-Dichloroethane-d4	0.0433		"	0.0400		108	23-173			
Surrogate: Toluene-d8	0.0418		"	0.0400		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0417		"	0.0400		104	21-167			

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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 1703213 - EPA 5030 Soil MS

Matrix Spike Dup (1703213-MSD1)		Source: 1703150-01			Prepared: 03/20/17		Analyzed: 03/21/17			
Benzene	0.108	0.0020	mg/kg	0.100	ND	108	30-131	0.222	34	
Toluene	0.117	0.0050	"	0.100	ND	117	30-134	0.464	30	
Ethylbenzene	0.128	0.0050	"	0.0992	ND	129	22-153	4.34	24	
m,p-Xylene	0.246	0.010	"	0.200	ND	123	10-159	4.30	68	
o-Xylene	0.121	0.0050	"	0.0980	ND	123	31-151	4.74	38	
Xylenes (total)	0.367	0.0050	"		ND		30-150	4.44	20	
Gasoline Range Hydrocarbons	1.15	0.50	"		ND		30-150	7.34	20	
Surrogate: 1,2-Dichloroethane-d4	0.0430		"	0.0400		108	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		102	21-167			

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Project: Mickey Spill Response

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

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

Batch 1703229 - General Preparation

Blank (1703229-BLK1)

Prepared & Analyzed: 03/22/17

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

LCS (1703229-BS1)

Prepared & Analyzed: 03/22/17

Calcium	585	10.0	mg/kg wet	500	117	82.9-118
Magnesium	555	5.00	"	500	111	77.1-123
Sodium	568	5.00	"	500	114	71-129

Duplicate (1703229-DUP1)

Source: 1703150-01

Prepared & Analyzed: 03/22/17

Calcium	1090	10.2	mg/kg dry	837	26.6	200
Magnesium	202	5.10	"	150	29.7	200
Sodium	323	5.10	"	322	0.459	200

Matrix Spike (1703229-MS1)

Source: 1703150-01

Prepared & Analyzed: 03/22/17

Calcium	1440	10.2	mg/kg dry	483	837	125	75-125
Magnesium	731	5.10	"	483	150	120	75-125
Sodium	868	5.10	"	483	322	113	75-125

Matrix Spike Dup (1703229-MSD1)

Source: 1703150-01

Prepared & Analyzed: 03/22/17

Calcium	1310	10.2	mg/kg dry	483	837	97.4	75-125	9.68	25
Magnesium	684	5.10	"	483	150	111	75-125	6.60	25
Sodium	822	5.10	"	483	322	103	75-125	5.48	25

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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 1703207 - General Preparation

Duplicate (1703207-DUP1)

Source: 1703150-01

Prepared & Analyzed: 03/20/17

% Solids	98.0		%		98.0			0.00	20	
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Batch 1703230 - General Preparation

Blank (1703230-BLK1)

Prepared & Analyzed: 03/21/17

Specific Conductance (EC)	ND	0.0100	mmhos/cm							
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LCS (1703230-BS1)

Prepared & Analyzed: 03/21/17

Specific Conductance (EC)	0.500	0.0100	mmhos/cm	0.500	100	90-110				
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Duplicate (1703230-DUP1)

Source: 1703150-01

Prepared & Analyzed: 03/21/17

Specific Conductance (EC)	1.97	0.0100	mmhos/cm		2.01			1.76	20	
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Batch 1703231 - General Preparation

LCS (1703231-BS1)

Prepared & Analyzed: 03/21/17

pH	6.00	0.100	pH Units	6.00	100	95-105				
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Duplicate (1703231-DUP1)

Source: 1703150-01

Prepared & Analyzed: 03/21/17

pH	8.28	0.100	pH Units		8.32			0.482	20	
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Extraction Oil & Gas
570 17th St. Suite 550
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Project: Mickey Spill Response

Project Number: [none]
Project Manager: Blake Ford

Reported:
03/23/17 09:47

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