

April 13, 2018

CALLIE KARRIGAN MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD, NM 88220

RE: SOUTHERN COMFORT 25 36 STATE X NO 001H

Enclosed are the results of analyses for samples received by the laboratory on 04/10/18 9:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keine

Celey D. Keene Lab Director/Quality Manager



H800977-02

10-Apr-18 09:30

05-Apr-18 09:45

Analytical Results For:

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received	
MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220		oject Number: N	OUTHERN COMFORT 25 36 STAT IOT GIVEN CALLIE KARRIGAN	Reported: 13-Apr-18 11:51	

Soil

Cardinal Laboratories

SAMPLE 2

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220	Project: SOUTHERI Project Number: NOT GIVE Project Manager: CALLIE KA Fax To:		Reported: 3-Apr-18 11:51
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SAMPLE 1

H800977-01 (Soil)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
			Cardina	l Laborat	ories					
Volatile Organic Compounds by I	EPA Method 8	8021								
Benzene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Toluene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Ethylbenzene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Total Xylenes*	< 0.150		0.150	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Total BTEX	< 0.300		0.300	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			96.9 %	72-1	48	8041003	MS	11-Apr-18	8021B	
Petroleum Hydrocarbons by GC	FID									
GRO C6-C10*	<10.0		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
Surrogate: 1-Chlorooctane			79.9 %	41-1	42	8041004	MS	10-Apr-18	8015B	
Surrogate: 1-Chlorooctadecane			80.7 %	37.6-	147	8041004	MS	10-Apr-18	8015B	

Green Analytical Laboratories

Soluble (DI Water Extraction)									
Chloride	31.4	10.0	mg/kg wet	10	B804083	JDA	11-Apr-18	EPA300.0	

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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Analytical Results For:

MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220			Project Nun Project Mana	nber: NO	Γ GIVEN	omfort 25 Gan	5 36 STATI	1	Reported: 13-Apr-18 11:	51
				MPLE 2 977-02 (So						
Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
			Cardina	al Laborat	ories					
Volatile Organic Compounds by l	EPA Method	8021								
Benzene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Toluene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Ethylbenzene*	< 0.050		0.050	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Total Xylenes*	< 0.150		0.150	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Total BTEX	< 0.300		0.300	mg/kg	50	8041003	MS	11-Apr-18	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			94.5 %	72-	148	8041003	MS	11-Apr-18	8021B	
Petroleum Hydrocarbons by GC	FID									
GRO C6-C10*	<10.0		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
DRO >C10-C28*	77.8		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
EXT DRO >C28-C36	23.1		10.0	mg/kg	1	8041004	MS	10-Apr-18	8015B	
Surrogate: 1-Chlorooctane			80.8 %	41-	142	8041004	MS	10-Apr-18	8015B	
Surrogate: 1-Chlorooctadecane			89.5 %	37.6	-147	8041004	MS	10-Apr-18	8015B	
			Green Anal	ytical Lab	oratories					
Soluble (DI Water Extraction) Chloride	88.9		50.0	mg/kg wet	50	B804083	JDA	11-Apr-18	EPA300.0	
	00.7		50.0		50	2001005	<i>9121</i> 1	11 / 10	2111500.0	

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220	Project: SOUTHERN Project Number: NOT GIVEN Project Manager: CALLIE KAN Fax To:		
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Volatile Organic Compounds by EPA Method 8021 - Quality Control Cardinal Laboratories

		Curun		01 4001 105						
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8041003 - Volatiles										
Blank (8041003-BLK1)				Prepared &	Analyzed:	10-Apr-18	3			
Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Surrogate: 4-Bromofluorobenzene (PID)	0.0945		mg/kg	0.100		94.5	72-148			
LCS (8041003-BS1)				Prepared &	Analyzed:	10-Apr-18	3			
Benzene	2.01	0.050	mg/kg	2.00		100	79.5-124			
Toluene	1.99	0.050	mg/kg	2.00		99.7	75.5-127			
Ethylbenzene	1.97	0.050	mg/kg	2.00		98.6	77.7-125			
Total Xylenes	6.03	0.150	mg/kg	6.00		101	70.9-124			
Surrogate: 4-Bromofluorobenzene (PID)	0.0933		mg/kg	0.100		93.3	72-148			
LCS Dup (8041003-BSD1)				Prepared &	Analyzed:	10-Apr-18	3			
Benzene	2.04	0.050	mg/kg	2.00		102	79.5-124	1.45	6.5	
Toluene	2.00	0.050	mg/kg	2.00		100	75.5-127	0.263	7.02	
Ethylbenzene	2.02	0.050	mg/kg	2.00		101	77.7-125	2.28	7.83	
Total Xylenes	6.15	0.150	mg/kg	6.00		103	70.9-124	2.01	7.78	
Surrogate: 4-Bromofluorobenzene (PID)	0.0938		mg/kg	0.100		93.8	72-148			

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MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220	Project: SOUTHERN COM Project Number: NOT GIVEN Project Manager: CALLIE KARRIGA Fax To:	13-Apr-18 11:51
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Petroleum Hydrocarbons by GC FID - Quality Control

Cardinal Laboratories

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 8041004 - General Prep - Organics										
Blank (8041004-BLK1)				Prepared &	Analyzed:	10-Apr-18				
GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C35	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
Total TPH C6-C28	ND	10.0	mg/kg							
Surrogate: 1-Chlorooctane	53.4		mg/kg	50.0		107	41-142			
Surrogate: 1-Chlorooctadecane	57.7		mg/kg	50.0		115	37.6-147			
LCS (8041004-BS1)				Prepared &	Analyzed:	10-Apr-18				
GRO C6-C10	228	10.0	mg/kg	200		114	76.5-133			
DRO >C10-C28	241	10.0	mg/kg	200		120	72.9-138			
Total TPH C6-C28	469	10.0	mg/kg	400		117	78-132			
Surrogate: 1-Chlorooctane	52.7		mg/kg	50.0		105	41-142			
Surrogate: 1-Chlorooctadecane	60.1		mg/kg	50.0		120	37.6-147			
LCS Dup (8041004-BSD1)				Prepared &	Analyzed:	10-Apr-18				
GRO C6-C10	230	10.0	mg/kg	200		115	76.5-133	0.777	20.6	
DRO >C10-C28	242	10.0	mg/kg	200		121	72.9-138	0.610	20.6	
Total TPH C6-C28	472	10.0	mg/kg	400		118	78-132	0.691	18	
Surrogate: 1-Chlorooctane	52.8		mg/kg	50.0		106	41-142			
Surrogate: 1-Chlorooctadecane	58.4		mg/kg	50.0		117	37.6-147			

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MARATHON OIL COMPANY 4111 TIDWELL ROAD CARLSBAD NM, 88220	Project Number:	SOUTHERN COMFORT 25 36 STAT NOT GIVEN CALLIE KARRIGAN	Reported: 13-Apr-18 11:51
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Soluble (DI Water Extraction) - Quality Control

Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B804083 - General Prep - Wet Chem											
Blank (B804083-BLK1)	Prepared & Analyzed: 11-Apr-18										
Chloride	ND	10.0	mg/kg wet								
LCS (B804083-BS1)	Prepared & Analyzed: 11-Apr-18										
Chloride	244	10.0	mg/kg wet	250		97.7	85-115				
LCS Dup (B804083-BSD1)	Prepared & Analyzed: 11-Apr-18										
Chloride	246	10.0	mg/kg wet	250		98.5	85-115	0.762	20		

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



Notes and Definitions

- ND
 Analyte NOT DETECTED at or above the reporting limit

 RPD
 Relative Percent Difference

 **
 Samples not received at proper temperature of 6°C or below.

 Insufficient time to reach temperature.
 - Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager

×	Relinquished by:	Relinquished by:	Relinquished by: Callie Karrigan			2	-	LAB USE ONLY	LAB #	LLboost	Comments:	Receiving Laboratory:	Invoice to:	Project Location: (county, state)	Project Name:	Client Name:	jui	nalvsis Rec
	Date: Time:	Date: Time:	MP1110			Southern Comfort 25-36 State X #1H Sample 2	Southern Comfort 25-36 State X #1H Sample 1		SAMPLE IDENTIFICATION				Callie Karrigan (cnkarrigan@marathonoil.com)	Eddy County, New Mexico	Southern Comfort 25-36 State X #1H	Marathon Oil Company		Analysis Request of Chain of Custody Record
ORIGINAL COPY	Received by:	Received by:	Received by:			4/5/2018	4/5/2018	DATE	YEAR:	SAMPLING	(Samplér Signatu		Project #:		Site Manager:		
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	tP Report	48 hr 72 hr						Genera Anion/C			emistry (ace	see att	ached I	ist)		-	Page 9	1 of