

## Norris Environmental

Sample Delivery Group: L863518  
Samples Received: 10/04/2016  
Project Number: GREAT BASINS 1 AND 2  
Description: National Fuel Corp Great Basins 1 and 2 Pit  
Site: GB 1 AND 2 PRODUCTION PIT  
Report To: Sean Norris  
778 23rd Road  
Grand Junction, CO 81505

REM 9771

Location ID 312368

Pit Facility ID 119434

Document 2527051

Entire Report Reviewed By:



Shane Gambill

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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## NFC-GB1&amp;2-ETS-A1 L863518-01 Solid

Collected by  
Sean T. NorrisCollected date/time  
10/01/16 15:30Received date/time  
10/04/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method 8015	WG914583	10	10/06/16 07:07	10/06/16 12:37	JM
Volatile Organic Compounds (GC) by Method 8015	WG915056	1	10/07/16 08:03	10/07/16 14:39	JAH
Volatile Organic Compounds (GC) by Method 8021	WG915056	1	10/07/16 08:03	10/07/16 17:53	JAH

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## NFC-GB1&amp;2-ETS-B1 L863518-02 Solid

Collected by  
Sean T. NorrisCollected date/time  
10/01/16 15:40Received date/time  
10/04/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Semi-Volatile Organic Compounds (GC) by Method 8015	WG914583	10	10/06/16 07:07	10/06/16 12:49	JM
Volatile Organic Compounds (GC) by Method 8015	WG915056	1	10/07/16 08:03	10/07/16 15:01	JAH
Volatile Organic Compounds (GC) by Method 8021	WG915056	1	10/07/16 08:03	10/07/16 18:15	JAH



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Shane Gambill  
Technical Service Representative

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



## Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	10/07/2016 17:53	<a href="#">WG915056</a>
Toluene	ND		0.00500	1	10/07/2016 17:53	<a href="#">WG915056</a>
Ethylbenzene	ND		0.000500	1	10/07/2016 17:53	<a href="#">WG915056</a>
Total Xylene	ND		0.00150	1	10/07/2016 17:53	<a href="#">WG915056</a>
TPH (GC/FID) Low Fraction	0.386		0.100	1	10/07/2016 14:39	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(FID)	91.8		59.0-128		10/07/2016 14:39	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(PID)	91.4		54.0-144		10/07/2016 17:53	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(PID)	97.1		54.0-144		10/07/2016 14:39	<a href="#">WG915056</a>

## Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	1110		40.0	10	10/06/2016 12:37	<a href="#">WG914583</a>
(S) o-Terphenyl	104		50.0-150		10/06/2016 12:37	<a href="#">WG914583</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



## Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00138		0.000500	1	10/07/2016 18:15	<a href="#">WG915056</a>
Toluene	ND		0.00500	1	10/07/2016 18:15	<a href="#">WG915056</a>
Ethylbenzene	ND		0.000500	1	10/07/2016 18:15	<a href="#">WG915056</a>
Total Xylene	ND		0.00150	1	10/07/2016 18:15	<a href="#">WG915056</a>
TPH (GC/FID) Low Fraction	0.209	<u>B</u>	0.100	1	10/07/2016 15:01	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(FID)	99.1		59.0-128		10/07/2016 15:01	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(PID)	104		54.0-144		10/07/2016 15:01	<a href="#">WG915056</a>
(S) a,a,a-Trifluorotoluene(PID)	84.4		54.0-144		10/07/2016 18:15	<a href="#">WG915056</a>

## Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	1350		40.0	10	10/06/2016 12:49	<a href="#">WG914583</a>
(S) o-Terphenyl	167	<u>J1</u>	50.0-150		10/06/2016 12:49	<a href="#">WG914583</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3169029-3 10/07/16 12:20

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0379	⬇	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.4			59.0-128
(S) a,a,a-Trifluorotoluene(PID)	102			54.0-144

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3169166-5 10/07/16 02:13

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
(S) a,a,a-Trifluorotoluene(PID)	99.4			54.0-144

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3169029-1 10/07/16 11:14 • (LCSD) R3169029-2 10/07/16 11:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.37	6.19	116	113	63.5-137			2.88	20
(S) a,a,a-Trifluorotoluene(FID)				95.0	99.6	59.0-128				
(S) a,a,a-Trifluorotoluene(PID)				101	106	54.0-144				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3169166-3 10/07/16 01:05 • (LCSD) R3169166-4 10/07/16 01:28

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0485	0.0477	97.1	95.4	70.0-130			1.73	20
Toluene	0.0500	0.0495	0.0477	99.0	95.5	70.0-130			3.59	20
Ethylbenzene	0.0500	0.0509	0.0492	102	98.3	70.0-130			3.42	20
Total Xylene	0.150	0.153	0.147	102	97.9	70.0-130			4.03	20
(S) a,a,a-Trifluorotoluene(PID)				98.3	97.7	54.0-144				



L863353-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L863353-01 10/07/16 15:33 • (MS) R3169029-4 10/07/16 15:55 • (MSD) R3169029-5 10/07/16 16:18

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	0.320	3.56	4.63	58.9	78.3	1	28.5-138		J3	26.2	23.6
(S) a,a,a-Trifluorotoluene(FID)					87.3	92.2		59.0-128				
(S) a,a,a-Trifluorotoluene(PID)					93.3	98.2		54.0-144				

L863353-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L863353-01 10/07/16 18:38 • (MS) R3169166-1 10/07/16 19:01 • (MSD) R3169166-2 10/07/16 19:24

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.00185	0.0236	0.0124	43.5	21.1	1	49.7-127	J6	J3 J6	62.3	23.5
Toluene	0.0500	ND	0.0213	0.0107	35.6	14.6	1	49.8-132	J6	J3 J6	65.8	23.5
Ethylbenzene	0.0500	0.00123	0.0160	0.00646	29.5	10.5	1	40.8-141	J6	J3 J6	84.9	23.8
Total Xylene	0.150	ND	0.0419	0.0151	26.7	8.85	1	41.2-140	J6	J3 J6	94.2	23.7
(S) a,a,a-Trifluorotoluene(PID)					91.7	92.1		54.0-144				

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

6  
Qc

7  
Gl

8  
Al

9  
Sc



Method Blank (MB)

(MB) R3168691-1 10/06/16 11:28

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) High Fraction	U		0.769	4.00
(S) o-Terphenyl	87.9			50.0-150

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

6  
Qc

7  
Gl

8  
Al

9  
Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3168691-2 10/06/16 11:39 • (LCSD) R3168691-3 10/06/16 11:51

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) High Fraction	60.0	54.0	45.4	90.1	75.7	50.0-150			17.3	20
(S) o-Terphenyl				99.9	90.6	50.0-150				



## Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

## Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

## State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina <sup>1</sup>	DW21704
Florida	E87487	North Carolina <sup>2</sup>	41
Georgia	NELAP	North Dakota	R-140
Georgia <sup>1</sup>	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky <sup>1</sup>	90010	South Dakota	n/a
Kentucky <sup>2</sup>	16	Tennessee <sup>14</sup>	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

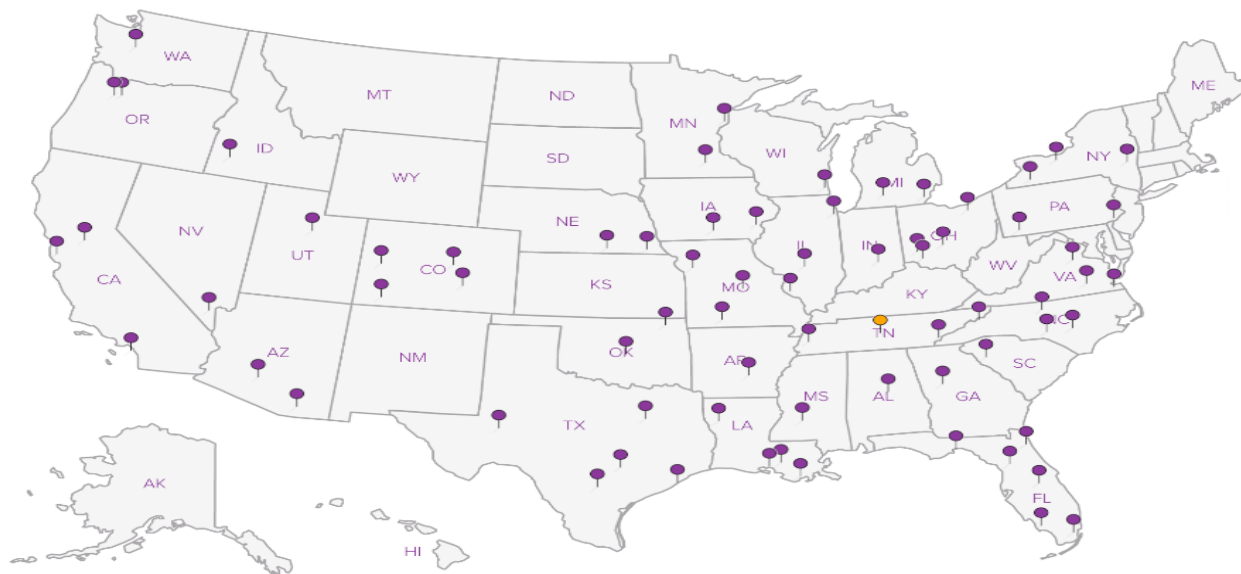
## Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>n/a</sup> Accreditation not applicable

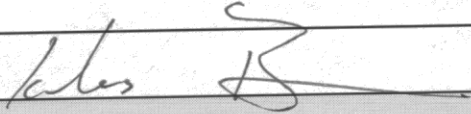
## Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



[illegible]



Cooler Receipt Form					
Client:	NORENVGSCO	SDG#	L863518		
Cooler Received/Opened On: 10/ 4 /16	Temperature Upon Receipt:		2.8 °c		
Received By: Wes Benson					
Signature: 					
Receipt Check List			Yes	No	N/A
Were custody seals on outside of cooler and intact?			-		
Were custody papers properly filled out?			-		
Did all bottles arrive in good condition?			-		
Were correct bottles used for the analyses requested?			-		
Was sufficient amount of sample sent in each bottle?			-		
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)					-
If applicable, was an observable VOA headspace present?				-	
Non Conformance Generated. (If yes see attached NCF)					