

## Caerus Oil and Gas

Sample Delivery Group: L1504169  
Samples Received: 06/11/2022  
Project Number: RA11 PAD  
Description: RA11 Flowline Investigation

Report To: Brett Middleton  
143 Diamond Avenue  
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward  
Project Manager

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**Pace Analytical National**

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [www.pacenational.com](http://www.pacenational.com)

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<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

# SAMPLE SUMMARY

20220610\_RA11\_POR@5FT L1504169-01 Solid

Collected by  
Jordan Veith

Collected date/time  
06/10/22 09:45

Received date/time  
06/11/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1883524	1	06/27/22 00:55	06/27/22 00:55	CCE	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1882511	1	06/20/22 19:00	06/22/22 11:12	ERP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1880560	1	06/16/22 08:00	06/18/22 09:30	GI	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1880273	1	06/19/22 07:57	06/20/22 11:10	ARD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1881973	1	06/20/22 07:12	06/21/22 00:09	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1887976	1	06/30/22 20:04	07/05/22 14:38	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1881977	5	06/20/22 07:02	06/20/22 23:04	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1881456	100	06/16/22 11:38	06/18/22 11:22	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1881396	8	06/16/22 11:38	06/18/22 08:15	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1883632	1	06/23/22 00:22	06/23/22 09:53	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1883627	1	06/22/22 18:14	06/23/22 07:38	AGW	Mt. Juliet, TN

<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

# CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, 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.



Chris Ward  
Project Manager



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	14.3		1	06/27/2022 00:55	WG1883524

## Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	0.319	J	0.255	1.00	1	06/22/2022 11:12	<a href="#">WG1882511</a>

## Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.79	T8	1	06/18/2022 09:30	<a href="#">WG1880560</a>

## Sample Narrative:

L1504169-01 WG1880560: 7.79 at 21.5C

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	1940		10.0	1	06/20/2022 11:10	<a href="#">WG1880273</a>

## Sample Narrative:

L1504169-01 WG1880273: at 25C

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	1190		0.0852	0.500	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Cadmium	0.331	J	0.0471	0.500	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Copper	18.7		0.400	2.00	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Lead	9.23		0.208	0.500	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Nickel	11.3		0.132	2.00	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Selenium	U		0.764	2.00	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Silver	U		0.127	1.00	1	06/21/2022 00:09	<a href="#">WG1881973</a>
Zinc	44.5		0.832	5.00	1	06/21/2022 00:09	<a href="#">WG1881973</a>

## Metals (ICP) by Method 6010B-NE493 Ch 2

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.389		0.0167	0.200	1	07/05/2022 14:38	<a href="#">WG1887976</a>

## Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	3.12		0.100	1.00	5	06/20/2022 23:04	<a href="#">WG1881977</a>

## Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	457		2.17	10.0	100	06/18/2022 11:22	<a href="#">WG1881456</a>
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	79.5			77.0-120		06/18/2022 11:22	<a href="#">WG1881456</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.0986		0.00374	0.00800	8	06/18/2022 08:15	<a href="#">WG1881396</a>
Toluene	1.43		0.0104	0.0400	8	06/18/2022 08:15	<a href="#">WG1881396</a>
Ethylbenzene	0.345		0.00590	0.0200	8	06/18/2022 08:15	<a href="#">WG1881396</a>
Xylenes, Total	8.75		0.00704	0.0520	8	06/18/2022 08:15	<a href="#">WG1881396</a>
1,2,4-Trimethylbenzene	2.04		0.0126	0.0400	8	06/18/2022 08:15	<a href="#">WG1881396</a>
1,3,5-Trimethylbenzene	2.14		0.0160	0.0400	8	06/18/2022 08:15	<a href="#">WG1881396</a>
(S) Toluene-d8	96.1			75.0-131		06/18/2022 08:15	<a href="#">WG1881396</a>
(S) 4-Bromofluorobenzene	104			67.0-138		06/18/2022 08:15	<a href="#">WG1881396</a>
(S) 1,2-Dichloroethane-d4	90.4			70.0-130		06/18/2022 08:15	<a href="#">WG1881396</a>

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

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	222		1.61	4.00	1	06/23/2022 09:53	<a href="#">WG1883632</a>
C28-C36 Motor Oil Range	5.64		0.274	4.00	1	06/23/2022 09:53	<a href="#">WG1883632</a>
(S) o-Terphenyl	59.0			18.0-148		06/23/2022 09:53	<a href="#">WG1883632</a>

## Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.00209	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Anthracene	U		0.00230	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Benzo(a)anthracene	U		0.00173	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Benzo(b)fluoranthene	U		0.00153	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Benzo(k)fluoranthene	U		0.00215	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Benzo(a)pyrene	U		0.00179	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Chrysene	U		0.00232	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Dibenz(a,h)anthracene	U		0.00172	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Fluoranthene	U		0.00227	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Fluorene	0.0155		0.00205	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
1-Methylnaphthalene	0.200		0.00449	0.0200	1	06/23/2022 07:38	<a href="#">WG1883627</a>
2-Methylnaphthalene	0.609	<a href="#">J4</a>	0.00427	0.0200	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Naphthalene	0.269		0.00408	0.0200	1	06/23/2022 07:38	<a href="#">WG1883627</a>
Pyrene	U		0.00200	0.00600	1	06/23/2022 07:38	<a href="#">WG1883627</a>
(S) p-Terphenyl-d14	82.3			23.0-120		06/23/2022 07:38	<a href="#">WG1883627</a>
(S) Nitrobenzene-d5	587	<a href="#">J1</a>		14.0-149		06/23/2022 07:38	<a href="#">WG1883627</a>
(S) 2-Fluorobiphenyl	59.4			34.0-125		06/23/2022 07:38	<a href="#">WG1883627</a>

## Sample Narrative:

L1504169-01 WG1883627: Surrogate failure due to matrix interference

Method Blank (MB)

(MB) R3806158-1 06/22/22 10:02

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Hexavalent Chromium	U		0.255	1.00

L1504138-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1504138-01 06/22/22 10:35 • (DUP) R3806158-3 06/22/22 10:41

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Hexavalent Chromium	0.757	0.592	1	24.4	J P1	20

L1504175-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1504175-01 06/22/22 12:09 • (DUP) R3806158-8 06/22/22 12:14

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Hexavalent Chromium	0.592	0.487	1	19.4	J	20

Laboratory Control Sample (LCS)

(LCS) R3806158-2 06/22/22 10:09

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Hexavalent Chromium	10.0	9.77	97.7	80.0-120	

L1504171-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1504171-01 06/22/22 11:17 • (MS) R3806158-5 06/22/22 11:27 • (MSD) R3806158-6 06/22/22 11:32

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Hexavalent Chromium	20.0	1.14	12.2	4.36	55.2	16.1	1	75.0-125	J6	J3 J6	94.5	20

L1504171-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1504171-01 06/22/22 11:17 • (MS) R3806158-9 06/22/22 11:38

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Hexavalent Chromium	682	1.14	505	74.1	50	75.0-125	J6

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1500823-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1500823-01 06/18/22 09:30 • (DUP) R3804583-2 06/18/22 09:30

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	su	su		%		%
pH	7.19	7.20	1	0.139		1

Sample Narrative:

OS: 7.19 at 22C

DUP: 7.2 at 22C

Laboratory Control Sample (LCS)

(LCS) R3804583-1 06/18/22 09:30

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	su	su	%	%	
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 21.9C

<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



Method Blank (MB)

(MB) R3804957-1 06/20/22 11:10

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

Sample Narrative:

BLANK: at 25C

L1502452-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1502452-02 06/20/22 11:10 • (DUP) R3804957-3 06/20/22 11:10

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	1980	1980	1	0.000		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1504180-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1504180-02 06/20/22 11:10 • (DUP) R3804957-4 06/20/22 11:10

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	880	829	1	5.97		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3804957-2 06/20/22 11:10

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	268	280	105	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3805291-1 06/21/22 00:04

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

Laboratory Control Sample (LCS)

(LCS) R3805291-2 06/21/22 00:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	101	101	80.0-120	
Cadmium	100	98.5	98.5	80.0-120	
Copper	100	100	100	80.0-120	
Lead	100	99.2	99.2	80.0-120	
Nickel	100	99.6	99.6	80.0-120	
Selenium	100	99.3	99.3	80.0-120	
Silver	20.0	18.9	94.5	80.0-120	
Zinc	100	97.4	97.4	80.0-120	

L1504169-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1504169-01 06/21/22 00:09 • (MS) R3805291-5 06/21/22 00:17 • (MSD) R3805291-6 06/21/22 00:19

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 %
Barium	100	1190	1290	1220	103	26.5	1	75.0-125		V	6.12	20
Cadmium	100	0.331	109	105	109	104	1	75.0-125			4.50	20
Copper	100	18.7	126	121	107	103	1	75.0-125			3.66	20
Lead	100	9.23	117	112	108	103	1	75.0-125			4.20	20
Nickel	100	11.3	120	116	109	104	1	75.0-125			4.13	20
Selenium	100	U	105	101	105	101	1	75.0-125			4.42	20
Silver	20.0	U	21.3	20.4	106	102	1	75.0-125			4.21	20
Zinc	100	44.5	154	148	109	103	1	75.0-125			3.96	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3811065-1 07/05/22 14:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hot Water Sol. Boron	U		0.0167	0.200

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

(LCS) R3811065-2 07/05/22 14:33 • (LCSD) R3811065-3 07/05/22 14:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.04	1.02	104	102	80.0-120			1.75	20

<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

Method Blank (MB)

(MB) R3805314-1 06/20/22 22:58

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.100	1.00

Laboratory Control Sample (LCS)

(LCS) R3805314-2 06/20/22 23:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	97.4	97.4	80.0-120	

L1504169-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1504169-01 06/20/22 23:04 • (MS) R3805314-6 06/20/22 23:28 • (MSD) R3805314-5 06/20/22 23:18

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 %
Arsenic	100	3.12	105	98.6	102	95.5	5	75.0-125			6.72	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3804679-3 06/18/22 06:14

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.543	2.50
(S) a,a,a-Trifluorotoluene(FID)	96.4			77.0-120

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

(LCS) R3804679-1 06/18/22 04:44 • (LCSD) R3804679-2 06/18/22 05:05

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	6.29	5.63	114	102	72.0-127			11.1	20
(S) a,a,a-Trifluorotoluene(FID)				113	111	77.0-120				

L1504475-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1504475-01 06/18/22 07:11 • (MS) R3804679-4 06/18/22 12:03 • (MSD) R3804679-5 06/18/22 12:23

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	138	U	163	157	118	114	25	10.0-151			3.75	28
(S) a,a,a-Trifluorotoluene(FID)					113	112		77.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3804787-3 06/18/22 03:22

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
Toluene	U		0.00130	0.00500
Ethylbenzene	U		0.000737	0.00250
Xylenes, Total	U		0.000880	0.00650
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
(S) Toluene-d8	101			75.0-131
(S) 4-Bromofluorobenzene	102			67.0-138
(S) 1,2-Dichloroethane-d4	91.2			70.0-130

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

(LCS) R3804787-1 06/18/22 02:03 • (LCSD) R3804787-2 06/18/22 02:23

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	0.125	0.130	0.136	104	109	70.0-123			4.51	20
Toluene	0.125	0.118	0.120	94.4	96.0	75.0-121			1.68	20
Ethylbenzene	0.125	0.128	0.128	102	102	74.0-126			0.000	20
Xylenes, Total	0.375	0.373	0.372	99.5	99.2	72.0-127			0.268	20
1,2,4-Trimethylbenzene	0.125	0.119	0.117	95.2	93.6	70.0-126			1.69	20
1,3,5-Trimethylbenzene	0.125	0.120	0.117	96.0	93.6	73.0-127			2.53	20
(S) Toluene-d8				97.1	97.5	75.0-131				
(S) 4-Bromofluorobenzene				100	101	67.0-138				
(S) 1,2-Dichloroethane-d4				96.0	99.6	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3806540-1 06/23/22 09:36

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C36 Motor Oil Range	U		0.274	4.00
(S) o-Terphenyl	88.3			18.0-148

Laboratory Control Sample (LCS)

(LCS) R3806540-2 06/23/22 09:50

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	47.5	95.0	50.0-150	
(S) o-Terphenyl			106	18.0-148	

L1504138-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1504138-02 06/23/22 10:06 • (MS) R3806602-1 06/23/22 10:19 • (MSD) R3806602-2 06/23/22 10:31

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 %
C10-C28 Diesel Range	48.9	6.07	32.4	33.7	53.8	56.5	1	50.0-150			3.93	20
(S) o-Terphenyl					26.2	28.7		18.0-148				

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

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Qc

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Gl

8  
Al

9  
Sc

Method Blank (MB)

(MB) R3806628-2 06/23/22 06:59

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00209	0.00600
Anthracene	U		0.00230	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
Pyrene	U		0.00200	0.00600
(S) p-Terphenyl-d14	98.8			23.0-120
(S) Nitrobenzene-d5	52.4			14.0-149
(S) 2-Fluorobiphenyl	62.4			34.0-125

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3806628-1 06/23/22 06:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0412	51.5	50.0-120	
Anthracene	0.0800	0.0461	57.6	50.0-126	
Benzo(a)anthracene	0.0800	0.0500	62.5	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0500	62.5	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0500	62.5	49.0-125	
Benzo(a)pyrene	0.0800	0.0409	51.1	42.0-120	
Chrysene	0.0800	0.0505	63.1	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0542	67.8	47.0-125	
Fluoranthene	0.0800	0.0512	64.0	49.0-129	
Fluorene	0.0800	0.0449	56.1	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0532	66.5	46.0-125	
1-Methylnaphthalene	0.0800	0.0427	53.4	51.0-121	
2-Methylnaphthalene	0.0800	0.0393	49.1	50.0-120	J4
Naphthalene	0.0800	0.0417	52.1	50.0-120	
Pyrene	0.0800	0.0475	59.4	43.0-123	



Laboratory Control Sample (LCS)

(LCS) R3806628-1 06/23/22 06:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
(S) p-Terphenyl-d14			82.7	23.0-120	
(S) Nitrobenzene-d5			40.2	14.0-149	
(S) 2-Fluorobiphenyl			45.9	34.0-125	

L1505123-26 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1505123-26 06/23/22 13:37 • (MS) R3806628-3 06/23/22 13:57 • (MSD) R3806628-4 06/23/22 14:17

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Acenaphthene	0.0776	U	0.0250	0.0270	32.2	34.6	1	14.0-127			7.69	27
Anthracene	0.0776	U	0.0356	0.0388	45.9	49.7	1	10.0-145			8.60	30
Benzo(a)anthracene	0.0776	U	0.0412	0.0453	53.1	58.1	1	10.0-139			9.48	30
Benzo(b)fluoranthene	0.0776	U	0.0366	0.0409	47.2	52.4	1	10.0-140			11.1	36
Benzo(k)fluoranthene	0.0776	U	0.0372	0.0428	47.9	54.9	1	10.0-137			14.0	31
Benzo(a)pyrene	0.0776	U	0.0354	0.0397	45.6	50.9	1	10.0-141			11.5	31
Chrysene	0.0776	U	0.0422	0.0484	54.4	62.1	1	10.0-145			13.7	30
Dibenz(a,h)anthracene	0.0776	U	0.0236	0.0261	30.4	33.5	1	10.0-132			10.1	31
Fluoranthene	0.0776	U	0.0398	0.0418	51.3	53.6	1	10.0-153			4.90	33
Fluorene	0.0776	U	0.0307	0.0316	39.6	40.5	1	11.0-130			2.89	29
Indeno(1,2,3-cd)pyrene	0.0776	U	0.0286	0.0309	36.9	39.6	1	10.0-137			7.73	32
1-Methylnaphthalene	0.0776	U	0.0262	0.0308	33.8	39.5	1	10.0-142			16.1	28
2-Methylnaphthalene	0.0776	U	0.0243	0.0276	31.3	35.4	1	10.0-137			12.7	28
Naphthalene	0.0776	U	0.0254	0.0305	32.7	39.1	1	10.0-135			18.2	27
Pyrene	0.0776	U	0.0386	0.0414	49.7	53.1	1	10.0-148			7.00	35
(S) p-Terphenyl-d14					69.5	86.7		23.0-120				
(S) Nitrobenzene-d5					43.5	54.7		14.0-149				
(S) 2-Fluorobiphenyl					38.3	39.9		34.0-125				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

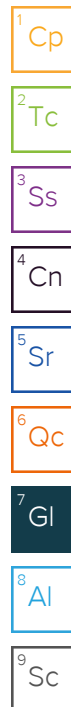
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(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.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
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.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

### Qualifier Description

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.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.



# ACCREDITATIONS & LOCATIONS

## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1 6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
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>6</sup> Wastewater n/a Accreditation not applicable

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

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



