

April 07, 2020

## Caerus Oil and Gas

Sample Delivery Group: L1204030  
Samples Received: 03/31/2020  
Project Number: K22 CPD  
Description: K22 CDP  
Site: K22 CDP  
Report To: Blair Rollins  
143 Diamond Avenue  
Parachute, CO 81635

<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

Entire Report Reviewed By:

*Chris Ward*

Chris Ward  
Project Manager

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 Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20200330-K22CPD-POR L1204030-01 Solid

Collected by  
Chance Holder

Collected date/time  
03/30/20 11:30

Received date/time  
03/31/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1453386	1	04/03/20 09:27	04/03/20 09:27	TRB	Mt. Juliet, TN
Calculated Results	WG1453418	1	03/31/20 17:19	04/01/20 09:54	CCE	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1452656	1	03/31/20 11:30	03/31/20 16:49	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1453268	1	04/01/20 09:27	04/01/20 13:04	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1455579	1	04/04/20 15:00	04/04/20 17:00	MJA	Mt. Juliet, TN
Mercury by Method 7471A	WG1453592	1	03/31/20 21:39	04/01/20 07:08	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1453418	1	03/31/20 17:19	04/01/20 09:54	CCE	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1453960	100	04/01/20 00:48	04/03/20 09:29	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1454079	8	04/01/20 00:48	04/02/20 09:47	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1453627	1	04/01/20 08:25	04/02/20 10:45	KME	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1454174	1	04/02/20 01:14	04/03/20 00:27	LEA	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



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

<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



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	20.8		1	04/03/2020 09:27	WG1453386

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Trivalent	11.9		1.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>

## Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	03/31/2020 16:49	<a href="#">WG1452656</a>

## Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.92	<a href="#">T8</a>	1	04/01/2020 13:04	<a href="#">WG1453268</a>

## Sample Narrative:

L1204030-01 WG1453268: 8.92 at 20.4C

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	1030		10.0	1	04/04/2020 17:00	<a href="#">WG1455579</a>

## Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.127		0.0300	1	04/01/2020 07:08	<a href="#">WG1453592</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	5.76		2.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Barium	308		0.500	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Cadmium	ND		0.500	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Chromium	11.9		1.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Copper	12.8		2.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Lead	9.36		0.500	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Nickel	10.2		2.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Selenium	ND		2.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Silver	ND		1.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>
Zinc	34.5		5.00	1	04/01/2020 09:54	<a href="#">WG1453418</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	76.8		10.0	100	04/03/2020 09:29	<a href="#">WG1453960</a>
(S) a,a,a-Trifluorotoluene(FID)	98.8		77.0-120		04/03/2020 09:29	<a href="#">WG1453960</a>



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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00840		0.00800	8	04/02/2020 09:47	<a href="#">WG1454079</a>
Toluene	0.106		0.0400	8	04/02/2020 09:47	<a href="#">WG1454079</a>
Ethylbenzene	0.0324		0.0200	8	04/02/2020 09:47	<a href="#">WG1454079</a>
Total Xylenes	0.629		0.0520	8	04/02/2020 09:47	<a href="#">WG1454079</a>
(S) Toluene-d8	104		75.0-131		04/02/2020 09:47	<a href="#">WG1454079</a>
(S) 4-Bromofluorobenzene	107		67.0-138		04/02/2020 09:47	<a href="#">WG1454079</a>
(S) 1,2-Dichloroethane-d4	103		70.0-130		04/02/2020 09:47	<a href="#">WG1454079</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## 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	185		4.00	1	04/02/2020 10:45	<a href="#">WG1453627</a>
(S) o-Terphenyl	50.2		18.0-148		04/02/2020 10:45	<a href="#">WG1453627</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Acenaphthene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Acenaphthylene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Benzo(a)anthracene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Benzo(a)pyrene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Benzo(b)fluoranthene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Benzo(g,h,i)perylene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Benzo(k)fluoranthene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Chrysene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Dibenz(a,h)anthracene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Fluoranthene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Fluorene	0.0644		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Naphthalene	0.136		0.0200	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Phenanthrene	0.0934		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
Pyrene	0.00981		0.00600	1	04/03/2020 00:27	<a href="#">WG1454174</a>
1-Methylnaphthalene	0.134		0.0200	1	04/03/2020 00:27	<a href="#">WG1454174</a>
2-Methylnaphthalene	0.394		0.0200	1	04/03/2020 00:27	<a href="#">WG1454174</a>
2-Chloronaphthalene	ND		0.0200	1	04/03/2020 00:27	<a href="#">WG1454174</a>
(S) p-Terphenyl-d14	98.1		23.0-120		04/03/2020 00:27	<a href="#">WG1454174</a>
(S) Nitrobenzene-d5	165	J1	14.0-149		04/03/2020 00:27	<a href="#">WG1454174</a>
(S) 2-Fluorobiphenyl	83.5		34.0-125		04/03/2020 00:27	<a href="#">WG1454174</a>



Method Blank (MB)

(MB) R3514405-1 03/31/20 16:42

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.640	2.00

L1203669-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1203669-01 03/31/20 16:44 • (DUP) R3514405-3 03/31/20 16:45

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	U	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3514405-2 03/31/20 16:44

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Chromium,Hexavalent	24.0	23.1	96.3	80.0-120	

L1203669-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1203669-03 03/31/20 16:46 • (MS) R3514405-4 03/31/20 16:47 • (MSD) R3514405-5 03/31/20 16:47

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chromium,Hexavalent	25.8	U	3.19	3.12	12.4	12.1	1	75.0-125	J6	J6	2.02	20

L1203669-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1203669-03 03/31/20 16:46 • (MS) R3514405-6 03/31/20 16:47

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Chromium,Hexavalent	851	U	730	85.8	50	75.0-125	

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Cp

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Tc

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Ss

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Cn

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Sr

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Qc

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Sc

L1204030-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1204030-01 04/01/20 13:04 • (DUP) R3514642-2 04/01/20 13:04

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.92	9.00	1	0.893		1

Sample Narrative:  
OS: 8.92 at 20.4C  
DUP: 9 at 20.3C

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

6  
Qc

7  
Gl

8  
Al

9  
Sc

L1204283-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1204283-01 04/01/20 13:04 • (DUP) R3514642-3 04/01/20 13:04

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.46	6.39	1	1.09	J3	1

Sample Narrative:  
OS: 6.46 at 20C  
DUP: 6.39 at 20.3C

Laboratory Control Sample (LCS)

(LCS) R3514642-1 04/01/20 13:04

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:  
LCS: 10.03 at 18.2C



Method Blank (MB)

(MB) R3515991-1 04/04/20 17:00

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

L1204283-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1204283-01 04/04/20 17:00 • (DUP) R3515991-3 04/04/20 17:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	48.9	52.7	1	7.48		20

Laboratory Control Sample (LCS)

(LCS) R3515991-2 04/04/20 17:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	445	442	99.3	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3514482-1 04/01/20 06:45

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.00280	0.0300

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

Laboratory Control Sample (LCS)

(LCS) R3514482-2 04/01/20 06:47

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Mercury	0.500	0.499	99.9	80.0-120	

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

L1203450-64 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1203450-64 04/01/20 06:50 • (MS) R3514482-3 04/01/20 06:52 • (MSD) R3514482-4 04/01/20 06:55

	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	%	%		%			%	%
Mercury	0.500	0.00409	0.427	0.445	84.7	88.1	1	75.0-125			3.98	20



Method Blank (MB)

(MB) R3514589-1 04/01/20 09:24

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.460	2.00
Barium	U		0.170	0.500
Cadmium	U		0.0700	0.500
Chromium	U		0.140	1.00
Copper	1.13	J	0.530	2.00
Lead	U		0.190	0.500
Nickel	U		0.490	2.00
Selenium	U		0.620	2.00
Silver	U		0.120	1.00
Zinc	1.22	J	0.590	5.00

<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

Laboratory Control Sample (LCS)

(LCS) R3514589-2 04/01/20 09:26

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	95.8	95.8	80.0-120	
Barium	100	105	105	80.0-120	
Cadmium	100	95.3	95.3	80.0-120	
Chromium	100	98.5	98.5	80.0-120	
Copper	100	97.5	97.5	80.0-120	
Lead	100	98.3	98.3	80.0-120	
Nickel	100	98.3	98.3	80.0-120	
Selenium	100	100	100	80.0-120	
Silver	20.0	17.8	88.9	80.0-120	
Zinc	100	97.6	97.6	80.0-120	

L1204075-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204075-01 04/01/20 09:29 • (MS) R3514589-5 04/01/20 09:36 • (MSD) R3514589-6 04/01/20 09:39

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	4.40	93.4	95.5	89.0	91.1	1	75.0-125			2.25	20
Barium	100	169	301	258	132	88.4	1	75.0-125	J5		15.5	20
Cadmium	100	U	90.0	92.1	90.0	92.1	1	75.0-125			2.33	20
Chromium	100	6.93	98.3	102	91.4	95.2	1	75.0-125			3.83	20
Copper	100	5.80	97.6	101	91.8	95.1	1	75.0-125			3.33	20
Lead	100	5.27	99.2	101	93.9	96.0	1	75.0-125			2.08	20
Nickel	100	3.45	96.9	101	93.5	97.9	1	75.0-125			4.43	20



L1204075-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204075-01 04/01/20 09:29 • (MS) R3514589-5 04/01/20 09:36 • (MSD) R3514589-6 04/01/20 09:39

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 %
Selenium	100	U	95.5	96.8	95.5	96.8	1	75.0-125			1.36	20
Silver	20.0	U	17.1	17.6	85.4	88.2	1	75.0-125			3.20	20
Zinc	100	11.9	99.5	105	87.6	93.3	1	75.0-125			5.54	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) R3515260-2 04/03/20 01:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	98.4			77.0-120

1

Cp

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Tc

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Ss

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Cn

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Sr

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Qc

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Gl

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Al

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Sc

Laboratory Control Sample (LCS)

(LCS) R3515260-1 04/03/20 00:19

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.41	98.4	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			106	77.0-120	

L1204030-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204030-01 04/03/20 09:29 • (MS) R3515260-3 04/03/20 11:05 • (MSD) R3515260-4 04/03/20 11:29

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	550	76.8	561	667	88.0	107	100	10.0-151			17.3	28
(S) a,a,a-Trifluorotoluene(FID)					107	107		77.0-120				



Method Blank (MB)

(MB) R3515629-2 04/02/20 02:47

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	104			75.0-131
(S) 4-Bromofluorobenzene	105			67.0-138
(S) 1,2-Dichloroethane-d4	100			70.0-130

<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

Laboratory Control Sample (LCS)

(LCS) R3515629-1 04/02/20 01:51

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.123	98.4	70.0-123	
Ethylbenzene	0.125	0.117	93.6	74.0-126	
Toluene	0.125	0.134	107	75.0-121	
Xylenes, Total	0.375	0.358	95.5	72.0-127	
(S) Toluene-d8			103	75.0-131	
(S) 4-Bromofluorobenzene			103	67.0-138	
(S) 1,2-Dichloroethane-d4			106	70.0-130	

L1204259-29 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204259-29 04/02/20 06:35 • (MS) R3515629-3 04/02/20 10:06 • (MSD) R3515629-4 04/02/20 10:26

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.142	U	0.136	0.136	95.2	95.2	1	10.0-149			0.000	37
Ethylbenzene	0.142	U	0.141	0.132	99.2	92.8	1	10.0-160			6.67	38
Toluene	0.142	U	0.156	0.149	110	105	1	10.0-156			4.48	38
Xylenes, Total	0.427	U	0.410	0.393	96.0	92.0	1	10.0-160			4.26	38
(S) Toluene-d8					105	103		75.0-131				
(S) 4-Bromofluorobenzene					101	99.0		67.0-138				
(S) 1,2-Dichloroethane-d4					95.6	96.9		70.0-130				



Method Blank (MB)

(MB) R3514781-1 04/01/20 17:49

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	65.0			18.0-148

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3514781-2 04/01/20 18:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	31.6	63.2	50.0-150	
(S) o-Terphenyl			56.3	18.0-148	

L1204240-23 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204240-23 04/01/20 18:15 • (MS) R3514781-3 04/01/20 18:28 • (MSD) R3514781-4 04/01/20 18:41

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) High Fraction	50.0	U	35.5	30.8	71.0	61.6	1	50.0-150			14.2	20
(S) o-Terphenyl					57.2	57.1		18.0-148				

Method Blank (MB)

(MB) R3515414-2 04/03/20 00:05

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Anthracene	U		0.000600	0.00600
Acenaphthene	U		0.000600	0.00600
Acenaphthylene	U		0.000600	0.00600
Benzo(a)anthracene	U		0.000600	0.00600
Benzo(a)pyrene	U		0.000600	0.00600
Benzo(b)fluoranthene	U		0.000600	0.00600
Benzo(g,h,i)perylene	U		0.000600	0.00600
Benzo(k)fluoranthene	U		0.000600	0.00600
Chrysene	U		0.000600	0.00600
Dibenz(a,h)anthracene	U		0.000600	0.00600
Fluoranthene	U		0.000600	0.00600
Fluorene	U		0.000600	0.00600
Indeno(1,2,3-cd)pyrene	U		0.000600	0.00600
Naphthalene	U		0.00200	0.0200
Phenanthrene	U		0.000600	0.00600
Pyrene	U		0.000600	0.00600
1-Methylnaphthalene	U		0.00200	0.0200
2-Methylnaphthalene	U		0.00200	0.0200
2-Chloronaphthalene	U		0.00200	0.0200
(S) Nitrobenzene-d5	93.4			14.0-149
(S) 2-Fluorobiphenyl	96.0			34.0-125
(S) p-Terphenyl-d14	100			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3515414-1 04/02/20 23:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.0800	0.0793	99.1	50.0-126	
Acenaphthene	0.0800	0.0809	101	50.0-120	
Acenaphthylene	0.0800	0.0885	111	50.0-120	
Benzo(a)anthracene	0.0800	0.0808	101	45.0-120	
Benzo(a)pyrene	0.0800	0.0738	92.3	42.0-120	
Benzo(b)fluoranthene	0.0800	0.0736	92.0	42.0-121	
Benzo(g,h,i)perylene	0.0800	0.0785	98.1	45.0-125	
Benzo(k)fluoranthene	0.0800	0.0829	104	49.0-125	
Chrysene	0.0800	0.0789	98.6	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0741	92.6	47.0-125	
Fluoranthene	0.0800	0.0773	96.6	49.0-129	



Laboratory Control Sample (LCS)

(LCS) R3515414-1 04/02/20 23:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Fluorene	0.0800	0.0812	102	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0784	98.0	46.0-125	
Naphthalene	0.0800	0.0727	90.9	50.0-120	
Phenanthrene	0.0800	0.0790	98.8	47.0-120	
Pyrene	0.0800	0.0844	105	43.0-123	
1-Methylnaphthalene	0.0800	0.0818	102	51.0-121	
2-Methylnaphthalene	0.0800	0.0758	94.8	50.0-120	
2-Chloronaphthalene	0.0800	0.0807	101	50.0-120	
(S) Nitrobenzene-d5			95.7	14.0-149	
(S) 2-Fluorobiphenyl			97.8	34.0-125	
(S) p-Terphenyl-d14			101	23.0-120	

L1204525-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1204525-02 04/03/20 04:55 • (MS) R3515414-3 04/03/20 05:16 • (MSD) R3515414-4 04/03/20 05:36

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Anthracene	0.0978	U	0.0374	0.0346	38.2	35.4	1	10.0-145			7.75	30
Acenaphthene	0.0978	U	0.0390	0.0369	39.9	37.7	1	14.0-127			5.68	27
Acenaphthylene	0.0978	U	0.0436	0.0412	44.6	42.1	1	21.0-124			5.68	25
Benzo(a)anthracene	0.0978	U	0.0405	0.0362	41.5	37.0	1	10.0-139			11.2	30
Benzo(a)pyrene	0.0978	U	0.0389	0.0347	39.8	35.5	1	10.0-141			11.4	31
Benzo(b)fluoranthene	0.0978	U	0.0364	0.0331	37.2	33.8	1	10.0-140			9.49	36
Benzo(g,h,i)perylene	0.0978	U	0.0378	0.0342	38.6	35.0	1	10.0-140			9.86	33
Benzo(k)fluoranthene	0.0978	U	0.0395	0.0347	40.4	35.5	1	10.0-137			13.0	31
Chrysene	0.0978	U	0.0384	0.0341	39.2	34.8	1	10.0-145			11.9	30
Dibenz(a,h)anthracene	0.0978	U	0.0378	0.0333	38.6	34.1	1	10.0-132			12.5	31
Fluoranthene	0.0978	U	0.0383	0.0356	39.1	36.4	1	10.0-153			7.20	33
Fluorene	0.0978	U	0.0397	0.0371	40.5	38.0	1	11.0-130			6.60	29
Indeno(1,2,3-cd)pyrene	0.0978	U	0.0380	0.0342	38.9	35.0	1	10.0-137			10.5	32
Naphthalene	0.0978	U	0.0373	0.0365	38.1	37.3	1	10.0-135			2.06	27
Phenanthrene	0.0978	U	0.0373	0.0348	38.1	35.6	1	10.0-144			6.68	31
Pyrene	0.0978	0.00121	0.0402	0.0378	39.8	37.4	1	10.0-148			6.18	35
1-Methylnaphthalene	0.0978	U	0.0394	0.0389	40.3	39.8	1	10.0-142			1.29	28
2-Methylnaphthalene	0.0978	0.00500	0.0380	0.0367	33.7	32.4	1	10.0-137			3.39	28
2-Chloronaphthalene	0.0978	U	0.0390	0.0374	39.9	38.2	1	29.0-120			4.31	24
(S) Nitrobenzene-d5					43.7	40.4		14.0-149				
(S) 2-Fluorobiphenyl					43.4	39.5		34.0-125				
(S) p-Terphenyl-d14					44.8	39.5		23.0-120				

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

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Qc

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Gl

8

Al

9

Sc



## 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

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National 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.

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

## State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico <sup>1</sup>	n/a
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>	90010	South Carolina	84004
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana <sup>1</sup>	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

## Third Party Federal Accreditations

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

## Our Locations

Pace National 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. Pace National performs all testing at our central laboratory.



Condition:  
NCF / OK