

Caerus Oil and Gas

Sample Delivery Group: L1288875
Samples Received: 11/21/2020
Project Number: N23
Description: N23 Mid Closure
Site: N23
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Entire Report Reviewed By:



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.



20201120-N23-MID-3-930 L1288875-01 Solid

Collected by
Chance Holder

Collected date/time
11/20/20 09:30

Received date/time
11/21/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1583854	1	12/02/20 16:47	12/02/20 16:47	EL	Mt. Juliet, TN
Calculated Results	WG1583783	1	11/30/20 06:16	12/03/20 01:45	KMG	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1583386	1	11/29/20 12:38	11/30/20 12:20	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1585682	1	12/04/20 16:31	12/04/20 20:45	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1584289	1	11/30/20 15:27	12/01/20 14:00	JRB	Mt. Juliet, TN
Mercury by Method 7471A	WG1584540	1	12/01/20 09:07	12/02/20 07:36	BMF	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1583783	1	11/30/20 06:16	12/03/20 01:45	KMG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1583778	5	11/29/20 12:49	11/30/20 17:04	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1583378	1	11/25/20 22:45	11/28/20 16:40	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1583180	1	11/25/20 22:45	11/28/20 15:47	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1583819	1	11/30/20 22:43	12/01/20 18:31	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1583796	1	11/29/20 17:48	11/30/20 14:57	AAT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

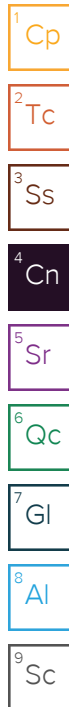


All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples 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

Report Revision History

Level II Report - Version 1: 12/03/20 14:14





Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.796		1	12/02/2020 16:47	WG1583854

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Trivalent	51.6		1.00	1	12/03/2020 01:45	WG1583783

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	11/30/2020 12:20	WG1583386

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.84	T8	1	12/04/2020 20:45	WG1585682

Sample Narrative:

L1288875-01 WG1585682: 8.84 at 19.1C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	144		10.0	1	12/01/2020 14:00	WG1584289

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0520		0.0400	1	12/02/2020 07:36	WG1584540

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	297		0.500	1	12/03/2020 01:45	WG1583783
Cadmium	1.60		0.500	1	12/03/2020 01:45	WG1583783
Chromium	51.6		1.00	1	12/03/2020 01:45	WG1583783
Copper	25.9		2.00	1	12/03/2020 01:45	WG1583783
Lead	20.2		0.500	1	12/03/2020 01:45	WG1583783
Nickel	30.6		2.00	1	12/03/2020 01:45	WG1583783
Selenium	2.13		2.00	1	12/03/2020 01:45	WG1583783
Silver	ND		1.00	1	12/03/2020 01:45	WG1583783
Zinc	71.1		5.00	1	12/03/2020 01:45	WG1583783

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	10.6		1.00	5	11/30/2020 17:04	WG1583778

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	0.102	B	0.100	1	11/28/2020 16:40	WG1583378

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



Collected date/time: 11/20/20 09:30

L1288875

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
(S) a,a,a-Trifluorotoluene(FID)	87.7		77.0-120		11/28/2020 16:40	WG1583378

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	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/28/2020 15:47	WG1583180
Toluene	ND		0.00500	1	11/28/2020 15:47	WG1583180
Ethylbenzene	ND		0.00250	1	11/28/2020 15:47	WG1583180
Total Xylenes	ND		0.00650	1	11/28/2020 15:47	WG1583180
(S) Toluene-d8	105		75.0-131		11/28/2020 15:47	WG1583180
(S) 4-Bromofluorobenzene	98.9		67.0-138		11/28/2020 15:47	WG1583180
(S) 1,2-Dichloroethane-d4	101		70.0-130		11/28/2020 15:47	WG1583180

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	ND		4.00	1	12/01/2020 18:31	WG1583819
(S) o-Terphenyl	74.1		18.0-148		12/01/2020 18:31	WG1583819

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	11/30/2020 14:57	WG1583796
Acenaphthene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Acenaphthylene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Benzo(a)anthracene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Benzo(a)pyrene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Benzo(b)fluoranthene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Benzo(g,h,i)perylene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Benzo(k)fluoranthene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Chrysene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Dibenz(a,h)anthracene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Fluoranthene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Fluorene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Naphthalene	ND		0.0200	1	11/30/2020 14:57	WG1583796
Phenanthrene	ND		0.00600	1	11/30/2020 14:57	WG1583796
Pyrene	ND		0.00600	1	11/30/2020 14:57	WG1583796
1-Methylnaphthalene	ND		0.0200	1	11/30/2020 14:57	WG1583796
2-Methylnaphthalene	ND		0.0200	1	11/30/2020 14:57	WG1583796
2-Chloronaphthalene	ND		0.0200	1	11/30/2020 14:57	WG1583796
(S) p-Terphenyl-d14	82.3		23.0-120		11/30/2020 14:57	WG1583796
(S) Nitrobenzene-d5	86.2		14.0-149		11/30/2020 14:57	WG1583796
(S) 2-Fluorobiphenyl	72.3		34.0-125		11/30/2020 14:57	WG1583796



Method Blank (MB)

(MB) R3598475-1 11/30/20 12:16

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1288377-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1288377-01 11/30/20 12:16 • (DUP) R3598475-3 11/30/20 12:16

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	ND	1	0.000		20

L1288875-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1288875-01 11/30/20 12:20 • (DUP) R3598475-4 11/30/20 12:20

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3598475-2 11/30/20 12:16

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Chromium,Hexavalent	24.0	22.6	94.0	80.0-120	

L1290336-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1290336-01 11/30/20 12:23 • (MS) R3598475-5 11/30/20 12:23 • (MSD) R3598475-6 11/30/20 12:23

	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	%	%		%			%	%
Chromium,Hexavalent	20.0	ND	ND	ND	0.000	0.000	1	75.0-125	J6	J6	0.000	20



L1288875-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1288875-01 12/04/20 20:45 • (DUP) R3600566-2 12/04/20 20:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.84	8.79	1	0.567		1

Sample Narrative:

OS: 8.84 at 19.1C

DUP: 8.79 at 19.1C

L1290879-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1290879-01 12/04/20 20:45 • (DUP) R3600566-3 12/04/20 20:45

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.48	7.47	1	0.134		1

Sample Narrative:

OS: 7.48 at 19.4C

DUP: 7.47 at 18.6C

Laboratory Control Sample (LCS)

(LCS) R3600566-1 12/04/20 20:45

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.1	101	99.0-101	

Sample Narrative:

LCS: 10.05 at 18C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3599054-1 12/01/20 14:00

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1288377-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1288377-02 12/01/20 14:00 • (DUP) R3599054-3 12/01/20 14:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	226	225	1	0.443		20

L1288879-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1288879-03 12/01/20 14:00 • (DUP) R3599054-4 12/01/20 14:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	289	290	1	0.104		20

Laboratory Control Sample (LCS)

(LCS) R3599054-2 12/01/20 14:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	483	481	99.6	85.0-115	



Method Blank (MB)

(MB) R3599433-1 12/02/20 07:20

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.0180	0.0400

Laboratory Control Sample (LCS)

(LCS) R3599433-2 12/02/20 07:22

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Mercury	0.500	0.511	102	80.0-120	

L1288982-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1288982-01 12/02/20 07:24 • (MS) R3599433-3 12/02/20 07:26 • (MSD) R3599433-4 12/02/20 07:28

	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	0.0717	0.433	0.574	72.3	100	1	75.0-125	J6	J3	27.9	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3599771-1 12/03/20 01:22

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
Chromium	U		0.133	1.00
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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3599771-2 12/03/20 01:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	102	102	80.0-120	
Cadmium	100	97.2	97.2	80.0-120	
Chromium	100	95.2	95.2	80.0-120	
Copper	100	94.1	94.1	80.0-120	
Lead	100	92.6	92.6	80.0-120	
Nickel	100	96.2	96.2	80.0-120	
Selenium	100	98.5	98.5	80.0-120	
Silver	20.0	18.5	92.7	80.0-120	
Zinc	100	96.7	96.7	80.0-120	

L1288992-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1288992-01 12/03/20 01:28 • (MS) R3599771-5 12/03/20 01:37 • (MSD) R3599771-6 12/03/20 01:39

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 %
Barium	99.8	196	317	313	121	117	1	75.0-125			1.21	20
Cadmium	99.8	1.20	98.7	95.0	97.5	93.8	1	75.0-125			3.79	20
Chromium	99.8	17.1	115	112	97.6	94.9	1	75.0-125			2.40	20
Copper	99.8	34.3	135	133	101	98.7	1	75.0-125			1.46	20
Lead	99.8	204	311	330	106	125	1	75.0-125			5.93	20
Nickel	99.8	19.8	121	119	101	99.0	1	75.0-125			1.92	20
Selenium	99.8	ND	97.8	94.8	97.8	94.8	1	75.0-125			3.13	20
Silver	20.0	ND	19.1	18.2	95.6	90.8	1	75.0-125			5.19	20
Zinc	99.8	214	324	321	110	107	1	75.0-125			0.973	20



Method Blank (MB)

(MB) R3598265-1 11/29/20 20:37

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS)

(LCS) R3598265-2 11/29/20 20:41

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Arsenic	100	99.8	99.8	80.0-120	

⁷Gl

⁸Al

⁹Sc

L1288770-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1288770-09 11/29/20 20:44 • (MS) R3598265-5 11/29/20 20:54 • (MSD) R3598265-6 11/29/20 20:57

	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	%	%		%			%	%
Arsenic	20.0	3.50	103	104	99.4	100	5	75.0-125			0.809	20



Method Blank (MB)

(MB) R3598140-2 11/27/20 23:43

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0238	⬇	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	96.6			77.0-120

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3598140-1 11/27/20 23:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	6.37	116	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			113	77.0-120	



Method Blank (MB)

(MB) R3599035-1 11/28/20 07:22

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
Ethylbenzene	U		0.000737	0.00250
Toluene	U		0.00130	0.00500
Xylenes, Total	U		0.000880	0.00650
(S) Toluene-d8	107			75.0-131
(S) 4-Bromofluorobenzene	97.5			67.0-138
(S) 1,2-Dichloroethane-d4	99.3			70.0-130

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3599035-2 11/28/20 07:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.116	92.8	70.0-123	
Ethylbenzene	0.125	0.129	103	74.0-126	
Toluene	0.125	0.129	103	75.0-121	
Xylenes, Total	0.375	0.395	105	72.0-127	
(S) Toluene-d8			103	75.0-131	
(S) 4-Bromofluorobenzene			101	67.0-138	
(S) 1,2-Dichloroethane-d4			98.8	70.0-130	

L1288572-18 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1288572-18 11/28/20 10:46 • (MS) R3599035-3 11/28/20 16:25 • (MSD) R3599035-4 11/28/20 16:44

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	0.108	ND	0.0771	0.0566	71.4	52.4	1	10.0-149			30.7	37
Ethylbenzene	0.108	ND	0.0777	0.0600	71.9	55.6	1	10.0-160			25.7	38
Toluene	0.108	ND	0.0825	0.0606	76.4	56.1	1	10.0-156			30.6	38
Xylenes, Total	0.323	ND	0.263	0.197	81.4	61.0	1	10.0-160			28.7	38
(S) Toluene-d8					103	103		75.0-131				
(S) 4-Bromofluorobenzene					104	101		67.0-138				
(S) 1,2-Dichloroethane-d4					98.8	97.5		70.0-130				



Method Blank (MB)

(MB) R3598892-1 12/01/20 04:17

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	73.4			18.0-148

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3598892-2 12/01/20 04:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	42.7	85.4	50.0-150	
(S) o-Terphenyl			93.5	18.0-148	

L1288656-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1288656-06 12/01/20 14:31 • (MS) R3598892-3 12/01/20 14:05 • (MSD) R3598892-4 12/01/20 14:18

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) High Fraction	48.8	ND	44.0	35.9	90.2	73.4	1	50.0-150		J3	20.3	20
(S) o-Terphenyl					90.0	77.8		18.0-148				

Method Blank (MB)

(MB) R3598564-2 11/30/20 07:46

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Anthracene	U		0.00230	0.00600
Acenaphthene	U		0.00209	0.00600
Acenaphthylene	U		0.00216	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(g,h,i)perylene	U		0.00177	0.00600
Benzo(k)fluoranthene	U		0.00215	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
Naphthalene	U		0.00408	0.0200
Phenanthrene	U		0.00231	0.00600
Pyrene	U		0.00200	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
2-Chloronaphthalene	U		0.00466	0.0200
(S) Nitrobenzene-d5	94.8			14.0-149
(S) 2-Fluorobiphenyl	75.8			34.0-125
(S) p-Terphenyl-d14	83.2			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3598564-1 11/30/20 07:28

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.0800	0.0582	72.8	50.0-126	
Acenaphthene	0.0800	0.0597	74.6	50.0-120	
Acenaphthylene	0.0800	0.0679	84.9	50.0-120	
Benzo(a)anthracene	0.0800	0.0560	70.0	45.0-120	
Benzo(a)pyrene	0.0800	0.0520	65.0	42.0-120	
Benzo(b)fluoranthene	0.0800	0.0511	63.9	42.0-121	
Benzo(g,h,i)perylene	0.0800	0.0525	65.6	45.0-125	
Benzo(k)fluoranthene	0.0800	0.0569	71.1	49.0-125	
Chrysene	0.0800	0.0618	77.3	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0506	63.3	47.0-125	
Fluoranthene	0.0800	0.0648	81.0	49.0-129	

Laboratory Control Sample (LCS)

(LCS) R3598564-1 11/30/20 07:28

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Fluorene	0.0800	0.0673	84.1	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0505	63.1	46.0-125	
Naphthalene	0.0800	0.0622	77.8	50.0-120	
Phenanthrene	0.0800	0.0567	70.9	47.0-120	
Pyrene	0.0800	0.0583	72.9	43.0-123	
1-Methylnaphthalene	0.0800	0.0631	78.9	51.0-121	
2-Methylnaphthalene	0.0800	0.0588	73.5	50.0-120	
2-Chloronaphthalene	0.0800	0.0590	73.8	50.0-120	
(S) Nitrobenzene-d5			112	14.0-149	
(S) 2-Fluorobiphenyl			86.3	34.0-125	
(S) p-Terphenyl-d14			90.6	23.0-120	

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1290438-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1290438-02 11/30/20 11:13 • (MS) R3598564-3 11/30/20 11:30 • (MSD) R3598564-4 11/30/20 11:47

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 %
Anthracene	0.0796	ND	0.0450	0.0417	56.5	52.7	1	10.0-145			7.61	30
Acenaphthene	0.0796	ND	0.0438	0.0420	55.0	53.0	1	14.0-127			4.20	27
Acenaphthylene	0.0796	ND	0.0493	0.0493	61.9	62.2	1	21.0-124			0.000	25
Benzo(a)anthracene	0.0796	ND	0.0417	0.0401	52.4	50.6	1	10.0-139			3.91	30
Benzo(a)pyrene	0.0796	ND	0.0407	0.0392	51.1	49.5	1	10.0-141			3.75	31
Benzo(b)fluoranthene	0.0796	ND	0.0363	0.0351	45.6	44.3	1	10.0-140			3.36	36
Benzo(g,h,i)perylene	0.0796	ND	0.0383	0.0363	48.1	45.8	1	10.0-140			5.36	33
Benzo(k)fluoranthene	0.0796	ND	0.0417	0.0399	52.4	50.4	1	10.0-137			4.41	31
Chrysene	0.0796	ND	0.0465	0.0463	58.4	58.5	1	10.0-145			0.431	30
Dibenz(a,h)anthracene	0.0796	ND	0.0380	0.0386	47.7	48.7	1	10.0-132			1.57	31
Fluoranthene	0.0796	ND	0.0475	0.0432	59.7	54.5	1	10.0-153			9.48	33
Fluorene	0.0796	ND	0.0492	0.0485	61.8	61.2	1	11.0-130			1.43	29
Indeno(1,2,3-cd)pyrene	0.0796	ND	0.0391	0.0334	49.1	42.2	1	10.0-137			15.7	32
Naphthalene	0.0796	ND	0.0456	0.0449	57.3	56.7	1	10.0-135			1.55	27
Phenanthrene	0.0796	ND	0.0407	0.0389	51.1	49.1	1	10.0-144			4.52	31
Pyrene	0.0796	ND	0.0433	0.0397	54.4	50.1	1	10.0-148			8.67	35
1-Methylnaphthalene	0.0796	ND	0.0450	0.0428	56.5	54.0	1	10.0-142			5.01	28
2-Methylnaphthalene	0.0796	ND	0.0428	0.0422	53.8	53.3	1	10.0-137			1.41	28
2-Chloronaphthalene	0.0796	ND	0.0448	0.0445	56.3	56.2	1	29.0-120			0.672	24
(S) Nitrobenzene-d5					80.5	82.9		14.0-149				
(S) 2-Fluorobiphenyl					66.5	70.8		34.0-125				
(S) p-Terphenyl-d14					68.0	71.5		23.0-120				



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.
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

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
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.
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 ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	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 ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	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

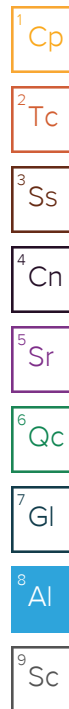
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ 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.



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