

May 24, 2023

Caerus Oil and Gas

Sample Delivery Group: L1615557
Samples Received: 05/12/2023
Project Number:
Description: EL12 12-11D Flowline

Report To: Brett M. , Jake J. , Blair R.
143 Diamond Avenue
Parachute, CO 81635

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.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Pace Analytical National

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SAMPLE SUMMARY

20230510-CHEVRONEL12697-(FCFL1211DWHBASE L1615557-01
Solid

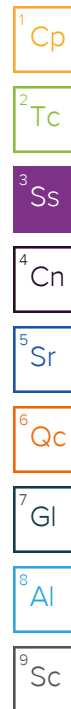
Collected by C. Mace Collected date/time 05/10/23 13:15 Received date/time 05/12/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2060185	1	05/23/23 14:05	05/23/23 14:05	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2059551	1	05/17/23 07:09	05/17/23 14:22	SET	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2059229	1	05/15/23 10:32	05/15/23 15:48	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2060737	1	05/19/23 08:00	05/19/23 09:46	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2060187	2	05/22/23 18:38	05/23/23 14:44	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2059199	5	05/13/23 04:25	05/15/23 20:37	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2061684	1000	05/16/23 11:53	05/17/23 23:02	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2063302	10	05/16/23 11:53	05/21/23 19:05	ACG	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2061267	25	05/17/23 15:12	05/18/23 10:12	JAS	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2061267	5	05/17/23 15:12	05/18/23 04:53	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2061638	1	05/18/23 22:06	05/19/23 02:39	KLZ	Mt. Juliet, TN

20230510-CHEVRONEL12697-(FCFL1211DSEPBAS L1615557-02
Solid

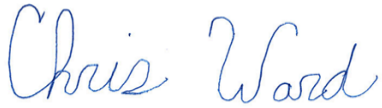
Collected by C. Mace Collected date/time 05/10/23 13:45 Received date/time 05/12/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2060185	1	05/23/23 14:03	05/23/23 14:03	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2059551	1	05/17/23 07:09	05/17/23 14:27	SET	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2059229	1	05/15/23 10:32	05/15/23 15:48	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2060737	1	05/19/23 08:00	05/19/23 09:46	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2060187	2	05/22/23 18:38	05/23/23 14:46	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2059199	5	05/13/23 04:25	05/15/23 20:40	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2061681	1	05/16/23 11:53	05/17/23 20:29	KSD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2061386	1	05/16/23 11:53	05/17/23 13:26	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2061267	1	05/17/23 15:12	05/18/23 04:03	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2061638	1	05/18/23 22:06	05/19/23 02:58	KLZ	Mt. Juliet, TN



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	1.44		1	05/23/2023 14:05	WG2060185

1
Cp

2
Tc

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	05/17/2023 14:22	WG2059551

3
Ss

4
Cn

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.03	T8	1	05/15/2023 15:48	WG2059229

5
Sr

6
Qc

Sample Narrative:

L1615557-01 WG2059229: 8.03 at 22.8C

7
Gl

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	440		10.0	1	05/19/2023 09:46	WG2060737

8
Al

9
Sc

Sample Narrative:

L1615557-01 WG2060737: at 25C

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.449	B	0.400	2	05/23/2023 14:44	WG2060187

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	13.5		1.00	5	05/15/2023 20:37	WG2059199
Barium	246		2.50	5	05/15/2023 20:37	WG2059199
Cadmium	ND		1.00	5	05/15/2023 20:37	WG2059199
Copper	19.0		5.00	5	05/15/2023 20:37	WG2059199
Lead	14.0		2.00	5	05/15/2023 20:37	WG2059199
Nickel	15.9		2.50	5	05/15/2023 20:37	WG2059199
Selenium	ND		2.50	5	05/15/2023 20:37	WG2059199
Silver	ND		0.500	5	05/15/2023 20:37	WG2059199
Zinc	60.2		25.0	5	05/15/2023 20:37	WG2059199

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	570		100	1000	05/17/2023 23:02	WG2061684
(S) a,a,a-Trifluorotoluene(FID)	100		77.0-120		05/17/2023 23:02	WG2061684

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.0100	10	05/21/2023 19:05	WG2063302
Toluene	20.3		0.0500	10	05/21/2023 19:05	WG2063302
Ethylbenzene	0.220		0.0250	10	05/21/2023 19:05	WG2063302
Xylenes, Total	4.93		0.0650	10	05/21/2023 19:05	WG2063302
1,2,4-Trimethylbenzene	1.64		0.0500	10	05/21/2023 19:05	WG2063302
1,3,5-Trimethylbenzene	2.75		0.0500	10	05/21/2023 19:05	WG2063302
(S) Toluene-d8	95.8		75.0-131		05/21/2023 19:05	WG2063302
(S) 4-Bromofluorobenzene	90.8		67.0-138		05/21/2023 19:05	WG2063302
(S) 1,2-Dichloroethane-d4	98.2		70.0-130		05/21/2023 19:05	WG2063302

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	519		20.0	5	05/18/2023 04:53	WG2061267
C28-C36 Motor Oil Range	983		100	25	05/18/2023 10:12	WG2061267
(S) o-Terphenyl	0.000	J7	18.0-148		05/18/2023 10:12	WG2061267
(S) o-Terphenyl	64.9		18.0-148		05/18/2023 04:53	WG2061267

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Anthracene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Benzo(a)anthracene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Benzo(b)fluoranthene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Benzo(k)fluoranthene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Benzo(a)pyrene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Chrysene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Dibenz(a,h)anthracene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Fluoranthene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Fluorene	ND		0.00600	1	05/19/2023 02:39	WG2061638
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	05/19/2023 02:39	WG2061638
1-Methylnaphthalene	0.0416		0.0200	1	05/19/2023 02:39	WG2061638
2-Methylnaphthalene	0.0891		0.0200	1	05/19/2023 02:39	WG2061638
Naphthalene	0.0338		0.0200	1	05/19/2023 02:39	WG2061638
Pyrene	ND		0.00600	1	05/19/2023 02:39	WG2061638
(S) p-Terphenyl-d14	80.4		23.0-120		05/19/2023 02:39	WG2061638
(S) Nitrobenzene-d5	140		14.0-149		05/19/2023 02:39	WG2061638
(S) 2-Fluorobiphenyl	88.6		34.0-125		05/19/2023 02:39	WG2061638

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.589		1	05/23/2023 14:03	WG2060185

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	05/17/2023 14:27	WG2059551

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.29	T8	1	05/15/2023 15:48	WG2059229

Sample Narrative:

L1615557-02 WG2059229: 8.29 at 22.7C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	132		10.0	1	05/19/2023 09:46	WG2060737

Sample Narrative:

L1615557-02 WG2060737: at 25C

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	ND		0.400	2	05/23/2023 14:46	WG2060187

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	5.88		1.00	5	05/15/2023 20:40	WG2059199
Barium	315		2.50	5	05/15/2023 20:40	WG2059199
Cadmium	ND		1.00	5	05/15/2023 20:40	WG2059199
Copper	7.98		5.00	5	05/15/2023 20:40	WG2059199
Lead	18.7		2.00	5	05/15/2023 20:40	WG2059199
Nickel	9.81		2.50	5	05/15/2023 20:40	WG2059199
Selenium	ND		2.50	5	05/15/2023 20:40	WG2059199
Silver	ND		0.500	5	05/15/2023 20:40	WG2059199
Zinc	51.4		25.0	5	05/15/2023 20:40	WG2059199

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.731		0.100	1	05/17/2023 20:29	WG2061681
(S) a,a,a-Trifluorotoluene(FID)	92.5		77.0-120		05/17/2023 20:29	WG2061681

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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	05/17/2023 13:26	WG2061386
Toluene	ND		0.00500	1	05/17/2023 13:26	WG2061386
Ethylbenzene	ND		0.00250	1	05/17/2023 13:26	WG2061386
Xylenes, Total	ND		0.00650	1	05/17/2023 13:26	WG2061386
1,2,4-Trimethylbenzene	ND		0.00500	1	05/17/2023 13:26	WG2061386
1,3,5-Trimethylbenzene	ND		0.00500	1	05/17/2023 13:26	WG2061386
(S) Toluene-d8	107		75.0-131		05/17/2023 13:26	WG2061386
(S) 4-Bromofluorobenzene	83.6		67.0-138		05/17/2023 13:26	WG2061386
(S) 1,2-Dichloroethane-d4	107		70.0-130		05/17/2023 13:26	WG2061386

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	129		4.00	1	05/18/2023 04:03	WG2061267
C28-C36 Motor Oil Range	154		4.00	1	05/18/2023 04:03	WG2061267
(S) o-Terphenyl	94.3		18.0-148		05/18/2023 04:03	WG2061267

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Anthracene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Benzo(a)anthracene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Benzo(b)fluoranthene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Benzo(k)fluoranthene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Benzo(a)pyrene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Chrysene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Dibenz(a,h)anthracene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Fluoranthene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Fluorene	ND		0.00600	1	05/19/2023 02:58	WG2061638
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	05/19/2023 02:58	WG2061638
1-Methylnaphthalene	ND		0.0200	1	05/19/2023 02:58	WG2061638
2-Methylnaphthalene	ND		0.0200	1	05/19/2023 02:58	WG2061638
Naphthalene	ND		0.0200	1	05/19/2023 02:58	WG2061638
Pyrene	ND		0.00600	1	05/19/2023 02:58	WG2061638
(S) p-Terphenyl-d14	83.3		23.0-120		05/19/2023 02:58	WG2061638
(S) Nitrobenzene-d5	84.1		14.0-149		05/19/2023 02:58	WG2061638
(S) 2-Fluorobiphenyl	82.7		34.0-125		05/19/2023 02:58	WG2061638

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3926091-1 05/17/23 14:10

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

L1615558-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1615558-01 05/17/23 14:32 • (DUP) R3926091-3 05/17/23 14:38

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

L1615773-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1615773-05 05/17/23 16:31 • (DUP) R3926091-8 05/17/23 16:46

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

Laboratory Control Sample (LCS)

(LCS) R3926091-2 05/17/23 14:17

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Hexavalent Chromium	10.0	10.5	105	80.0-120	

L1615773-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1615773-03 05/17/23 15:30 • (MS) R3926091-4 05/17/23 16:02 • (MSD) R3926091-5 05/17/23 16:10

	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	ND	16.9	16.3	84.5	81.6	1	75.0-125			3.54	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1615483-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1615483-08 05/15/23 15:48 • (DUP) R3925250-2 05/15/23 15:48

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	pH	su		%		%
pH	7.04	6.94	1	1.43	J3	1

Sample Narrative:

OS: 7.04 at 22.8C

DUP: 6.94 at 23C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1615558-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1615558-01 05/15/23 15:48 • (DUP) R3925250-3 05/15/23 15:48

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	pH	su		%		%
pH	7.10	7.13	1	0.422		1

Sample Narrative:

OS: 7.1 at 23C

DUP: 7.13 at 22.8C

Laboratory Control Sample (LCS)

(LCS) R3925250-1 05/15/23 15:48

	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 at 22.6C

Method Blank (MB)

(MB) R3926802-1 05/19/23 09:46

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

L1615498-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1615498-04 05/19/23 09:46 • (DUP) R3926802-3 05/19/23 09:46

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	509	502	1	1.38		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1615773-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1615773-10 05/19/23 09:46 • (DUP) R3926802-4 05/19/23 09:46

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	559	565	1	1.07		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3926802-2 05/19/23 09:46

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1080	96.3	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3928480-1 05/23/23 14:36

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hot Water Sol. Boron	0.0811	⬇	0.0167	0.200

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

(LCS) R3928480-2 05/23/23 14:38 • (LCSD) R3928480-3 05/23/23 14:41

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	1.19	1.18	119	118	80.0-120			0.768	20

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Method Blank (MB)

(MB) R3925116-2 05/15/23 19:05

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.100	1.00
Barium	U		0.152	2.50
Cadmium	U		0.0855	1.00
Copper	U		0.133	5.00
Lead	U		0.0990	2.00
Nickel	U		0.197	2.50
Selenium	U		0.180	2.50
Silver	U		0.0865	0.500
Zinc	U		0.740	25.0

Laboratory Control Sample (LCS)

(LCS) R3925116-3 05/15/23 19:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	91.8	91.8	80.0-120	
Barium	100	88.0	88.0	80.0-120	
Cadmium	100	92.3	92.3	80.0-120	
Copper	100	83.8	83.8	80.0-120	
Lead	100	88.5	88.5	80.0-120	
Nickel	100	93.1	93.1	80.0-120	
Selenium	100	94.6	94.6	80.0-120	
Silver	20.0	17.9	89.3	80.0-120	
Zinc	100	91.2	91.2	80.0-120	

L1615483-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1615483-08 05/15/23 19:12 • (MS) R3925116-6 05/15/23 19:21 • (MSD) R3925116-7 05/15/23 19:25

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	3.83	88.0	90.0	84.2	86.1	5	75.0-125			2.19	20
Barium	100	191	283	311	92.4	120	5	75.0-125			9.33	20
Cadmium	100	ND	95.9	93.6	95.8	93.5	5	75.0-125			2.45	20
Copper	100	6.78	89.2	87.2	82.4	80.4	5	75.0-125			2.25	20
Lead	100	9.89	103	112	93.2	102	5	75.0-125			8.50	20
Nickel	100	13.1	100	97.9	87.1	84.8	5	75.0-125			2.29	20
Selenium	100	ND	99.4	93.6	99.0	93.2	5	75.0-125			6.04	20
Silver	20.0	ND	17.1	16.8	85.7	84.0	5	75.0-125			1.98	20
Zinc	100	35.6	121	118	85.1	82.4	5	75.0-125			2.25	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3926791-2 05/17/23 14:49

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)	96.9			77.0-120

Laboratory Control Sample (LCS)

(LCS) R3926791-1 05/17/23 14:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.80	105	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			109	77.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3926111-2 05/17/23 14:33

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)	97.7			77.0-120

Laboratory Control Sample (LCS)

(LCS) R3926111-1 05/17/23 12:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	6.08	111	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			102	77.0-120	

L1615557-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1615557-01 05/17/23 23:02 • (MS) R3926111-3 05/17/23 23:51 • (MSD) R3926111-4 05/18/23 00:15

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	5500	570	5600	5980	91.5	98.4	1000	10.0-151			6.56	28
(S) a,a,a-Trifluorotoluene(FID)					103	106		77.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3926267-2 05/17/23 10:19

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	105			75.0-131
(S) 4-Bromofluorobenzene	84.1			67.0-138
(S) 1,2-Dichloroethane-d4	108			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3926267-1 05/17/23 09:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.113	90.4	70.0-123	
Toluene	0.125	0.129	103	75.0-121	
Ethylbenzene	0.125	0.127	102	74.0-126	
Xylenes, Total	0.375	0.361	96.3	72.0-127	
1,2,4-Trimethylbenzene	0.125	0.125	100	70.0-126	
1,3,5-Trimethylbenzene	0.125	0.124	99.2	73.0-127	
(S) Toluene-d8			104	75.0-131	
(S) 4-Bromofluorobenzene			85.1	67.0-138	
(S) 1,2-Dichloroethane-d4			110	70.0-130	

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R3928150-3 05/21/23 12:33

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	107			75.0-131
(S) 4-Bromofluorobenzene	88.9			67.0-138
(S) 1,2-Dichloroethane-d4	87.8			70.0-130

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

(LCS) R3928150-1 05/21/23 11:14 • (LCSD) R3928150-2 05/21/23 11:34

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	0.114	0.116	91.2	92.8	70.0-123			1.74	20
Toluene	0.125	0.103	0.110	82.4	88.0	75.0-121			6.57	20
Ethylbenzene	0.125	0.106	0.113	84.8	90.4	74.0-126			6.39	20
Xylenes, Total	0.375	0.285	0.300	76.0	80.0	72.0-127			5.13	20
1,2,4-Trimethylbenzene	0.125	0.100	0.105	80.0	84.0	70.0-126			4.88	20
1,3,5-Trimethylbenzene	0.125	0.114	0.116	91.2	92.8	73.0-127			1.74	20
(S) Toluene-d8				96.6	98.9	75.0-131				
(S) 4-Bromofluorobenzene				93.9	94.9	67.0-138				
(S) 1,2-Dichloroethane-d4				103	99.3	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3926251-1 05/17/23 23:17

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	42.9			18.0-148

Method Blank (MB)

(MB) R3926434-1 05/17/23 09:34

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	44.1			18.0-148

Laboratory Control Sample (LCS)

(LCS) R3926251-2 05/17/23 23:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	29.1	58.2	50.0-150	
(S) o-Terphenyl			64.7	18.0-148	

L1615481-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1615481-01 05/18/23 02:36 • (MS) R3926251-3 05/18/23 02:49 • (MSD) R3926251-4 05/18/23 03:01

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	49.2	6.23	18.5	27.7	24.9	43.9	1	50.0-150	J6	J3 J6	39.8	20
(S) o-Terphenyl					32.3	50.0		18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3926744-2 05/19/23 00:21

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	102			23.0-120
(S) Nitrobenzene-d5	81.3			14.0-149
(S) 2-Fluorobiphenyl	89.8			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3926744-1 05/19/23 00:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0684	85.5	50.0-120	
Anthracene	0.0800	0.0596	74.5	50.0-126	
Benzo(a)anthracene	0.0800	0.0592	74.0	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0722	90.3	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0637	79.6	49.0-125	
Benzo(a)pyrene	0.0800	0.0600	75.0	42.0-120	
Chrysene	0.0800	0.0699	87.4	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0651	81.4	47.0-125	
Fluoranthene	0.0800	0.0656	82.0	49.0-129	
Fluorene	0.0800	0.0682	85.3	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0664	83.0	46.0-125	
1-Methylnaphthalene	0.0800	0.0678	84.8	51.0-121	
2-Methylnaphthalene	0.0800	0.0684	85.5	50.0-120	
Naphthalene	0.0800	0.0685	85.6	50.0-120	
Pyrene	0.0800	0.0706	88.3	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3926744-1 05/19/23 00:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
(S) p-Terphenyl-d14			99.9	23.0-120	
(S) Nitrobenzene-d5			93.2	14.0-149	
(S) 2-Fluorobiphenyl			94.6	34.0-125	

L1615558-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1615558-02 05/19/23 03:38 • (MS) R3926744-3 05/19/23 03:57 • (MSD) R3926744-4 05/19/23 04:17

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	0.0800	ND	0.0481	0.0471	60.1	58.9	1	14.0-127			2.10	27
Anthracene	0.0800	ND	0.0405	0.0360	50.6	45.0	1	10.0-145			11.8	30
Benzo(a)anthracene	0.0800	ND	0.0391	0.0326	48.9	40.8	1	10.0-139			18.1	30
Benzo(b)fluoranthene	0.0800	ND	0.0298	0.0248	37.3	31.0	1	10.0-140			18.3	36
Benzo(k)fluoranthene	0.0800	ND	0.0390	0.0329	48.8	41.1	1	10.0-137			17.0	31
Benzo(a)pyrene	0.0800	ND	0.0389	0.0322	48.6	40.3	1	10.0-141			18.8	31
Chrysene	0.0800	ND	0.0497	0.0439	62.1	54.9	1	10.0-145			12.4	30
Dibenz(a,h)anthracene	0.0800	ND	0.0465	0.0396	58.1	49.5	1	10.0-132			16.0	31
Fluoranthene	0.0800	ND	0.0366	0.0328	45.8	41.0	1	10.0-153			11.0	33
Fluorene	0.0800	ND	0.0456	0.0428	57.0	53.5	1	11.0-130			6.33	29
Indeno(1,2,3-cd)pyrene	0.0800	ND	0.0373	0.0304	46.6	38.0	1	10.0-137			20.4	32
1-Methylnaphthalene	0.0800	ND	0.0539	0.0546	67.4	68.3	1	10.0-142			1.29	28
2-Methylnaphthalene	0.0800	ND	0.0539	0.0548	67.4	68.5	1	10.0-137			1.66	28
Naphthalene	0.0800	ND	0.0630	0.0632	78.8	79.0	1	10.0-135			0.317	27
Pyrene	0.0800	ND	0.0372	0.0332	46.5	41.5	1	10.0-148			11.4	35
(S) p-Terphenyl-d14					72.4	71.8		23.0-120				
(S) Nitrobenzene-d5					94.1	94.5		14.0-149				
(S) 2-Fluorobiphenyl					64.1	66.3		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.

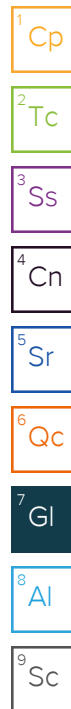
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

Abbreviations and Definitions

MDL	Method Detection Limit.
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.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
T8	Sample(s) received past/too close to holding time expiration.



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 ¹	TN00003
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}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	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 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

* 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.

