

January 16, 2018

Colorado Oil & Gas Conservation

Sample Delivery Group: L961847
Samples Received: 01/09/2018
Project Number: LONE PINE MS2
Description:

Report To: Kris Neidel
5405 Sacramento Pl.
Colorado Springs, CO 80917

Entire Report Reviewed By:



Daphne Richards
Technical Service Representative

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



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¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



201801081300 L961847-01 Solid

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 13:00	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1060871	1	01/09/18 11:22	01/10/18 09:41	TRB
Calculated Results	WG1060877	1	01/09/18 13:53	01/09/18 21:43	ST
Total Solids by Method 2540 G-2011	WG1062299	1	01/15/18 10:27	01/15/18 10:36	KDW
Wet Chemistry by Method 3060A/7196A	WG1060702	1	01/09/18 14:14	01/09/18 17:22	ER
Wet Chemistry by Method 9045D	WG1061836	1	01/11/18 15:34	01/11/18 16:02	GB
Wet Chemistry by Method 9050AMod	WG1060907	1	01/09/18 13:01	01/09/18 14:34	TH
Wet Chemistry by Method 9056A	WG1062016	1	01/11/18 17:47	01/11/18 21:34	MAJ
Mercury by Method 7471A	WG1060941	1	01/09/18 14:22	01/10/18 08:54	ABL
Metals (ICP) by Method 6010B	WG1060877	1	01/09/18 13:53	01/09/18 21:43	ST
Metals (ICP) by Method 6010B	WG1061385	1	01/10/18 14:17	01/10/18 23:00	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1060995	1	01/09/18 11:36	01/10/18 06:23	BMB
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1061083	25	01/09/18 11:36	01/10/18 21:28	BMB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1061077	1	01/09/18 11:36	01/10/18 02:10	JHH
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1061008	2	01/09/18 17:25	01/09/18 22:43	DMW
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1061301	1	01/10/18 14:02	01/11/18 20:06	ADF

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

201801081300 L961847-02 Waste

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 13:00	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1311	WG1061146	1	01/10/18 08:38	01/10/18 08:38	TM
Metals (ICP) by Method 6010B	WG1061623	1	01/11/18 07:59	01/11/18 12:28	CCE

201801081315BG L961847-03 Solid

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 13:15	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1060871	1	01/09/18 11:22	01/10/18 09:44	TRB
Metals (ICP) by Method 6010B	WG1060877	1	01/09/18 13:47	01/09/18 21:46	ST

201801081400 L961847-04 Solid

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 14:00	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1060995	1	01/09/18 11:36	01/10/18 05:39	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1061008	10	01/09/18 17:25	01/09/18 23:53	DMW

201801081405 L961847-05 Solid

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 14:05	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1060995	1	01/09/18 11:36	01/10/18 06:01	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1061008	10	01/09/18 17:25	01/09/18 23:31	DMW

201801081420BG L961847-06 Solid

			Collected by	Collected date/time	Received date/time
			Kris Neidel	01/08/18 14:20	01/09/18 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1060871	1	01/09/18 11:22	01/10/18 09:46	TRB

ACCOUNT:

Colorado Oil & Gas Conservation

PROJECT:

LONE PINE MS2

SDG:

L961847

DATE/TIME:

01/16/18 09:59

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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 radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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.

Daphne Richards
Technical Service Representative

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.0757		1	01/10/2018 09:41	WG1060871

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Trivalent	15.4		1.00	1	01/09/2018 21:43	WG1060877

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	80.5		1	01/15/2018 10:36	WG1062299

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	01/09/2018 17:22	WG1060702

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.70	T8	1	01/11/2018 16:02	WG1061836

Sample Narrative:

L961847-01 WG1061836: 7.7 at 20.6C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	98.6		10.0	1	01/09/2018 14:34	WG1060907

Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	69.9		10.0	1	01/11/2018 21:34	WG1062016
Sulfate	ND		50.0	1	01/11/2018 21:34	WG1062016

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	01/10/2018 08:54	WG1060941

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	3.20		2.00	1	01/09/2018 21:43	WG1060877
Barium	130		0.500	1	01/09/2018 21:43	WG1060877
Cadmium	ND		0.500	1	01/09/2018 21:43	WG1060877
Chromium	15.4		1.00	1	01/09/2018 21:43	WG1060877
Copper	9.05		2.00	1	01/10/2018 23:00	WG1061385
Lead	7.53		0.500	1	01/09/2018 21:43	WG1060877
Selenium	ND		2.00	1	01/09/2018 21:43	WG1060877
Silver	ND		1.00	1	01/09/2018 21:43	WG1060877

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Zinc	46.3		5.00	1	01/10/2018 23:00	WG1061385

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC) by Method 8015/8015D/8021/GRO

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00168	J3	0.000500	1	01/10/2018 06:23	WG1060995
TPH (GC/FID) Low Fraction	31.5		2.50	25	01/10/2018 21:28	WG1061083
Toluene	0.0253	J6	0.00500	1	01/10/2018 06:23	WG1060995
Ethylbenzene	0.0451	J6	0.000500	1	01/10/2018 06:23	WG1060995
Total Xylene	0.266	J6	0.00150	1	01/10/2018 06:23	WG1060995
TPH (GC/FID) Low Fraction	8.75	J6	0.100	1	01/10/2018 06:23	WG1060995
(S) a,a,a-Trifluorotoluene(FID)	100		77.0-120		01/10/2018 21:28	WG1061083
(S) a,a,a-Trifluorotoluene(FID)	84.5		77.0-120		01/10/2018 06:23	WG1060995
(S) a,a,a-Trifluorotoluene(PID)	92.3		75.0-128		01/10/2018 06:23	WG1060995

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00250	1	01/10/2018 02:10	WG1061077
Toluene	0.0388		0.00500	1	01/10/2018 02:10	WG1061077
Ethylbenzene	0.102		0.00250	1	01/10/2018 02:10	WG1061077
Total Xylenes	0.657		0.00750	1	01/10/2018 02:10	WG1061077
(S) Toluene-d8	108		80.0-120		01/10/2018 02:10	WG1061077
(S) Dibromofluoromethane	99.7		74.0-131		01/10/2018 02:10	WG1061077
(S) a,a,a-Trifluorotoluene	102		80.0-120		01/10/2018 02:10	WG1061077
(S) 4-Bromofluorobenzene	109		64.0-132		01/10/2018 02:10	WG1061077

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	591		8.00	2	01/09/2018 22:43	WG1061008
(S) o-Terphenyl	63.6		18.0-148		01/09/2018 22:43	WG1061008

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0687		0.00600	1	01/11/2018 20:06	WG1061301
Acenaphthene	0.0574		0.00600	1	01/11/2018 20:06	WG1061301
Acenaphthylene	0.0225		0.00600	1	01/11/2018 20:06	WG1061301
Benzo(a)anthracene	0.0534		0.00600	1	01/11/2018 20:06	WG1061301
Benzo(a)pyrene	ND		0.00600	1	01/11/2018 20:06	WG1061301
Benzo(b)fluoranthene	0.0177		0.00600	1	01/11/2018 20:06	WG1061301
Benzo(g,h,i)perylene	0.0123		0.00600	1	01/11/2018 20:06	WG1061301
Benzo(k)fluoranthene	ND		0.00600	1	01/11/2018 20:06	WG1061301
Chrysene	0.0528		0.00600	1	01/11/2018 20:06	WG1061301
Dibenz(a,h)anthracene	ND		0.00600	1	01/11/2018 20:06	WG1061301
Fluoranthene	0.0105		0.00600	1	01/11/2018 20:06	WG1061301
Fluorene	0.245		0.00600	1	01/11/2018 20:06	WG1061301
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	01/11/2018 20:06	WG1061301
Naphthalene	0.552		0.0200	1	01/11/2018 20:06	WG1061301
Phenanthrene	0.512		0.00600	1	01/11/2018 20:06	WG1061301
Pyrene	0.0569		0.00600	1	01/11/2018 20:06	WG1061301
1-Methylnaphthalene	1.25		0.0200	1	01/11/2018 20:06	WG1061301
2-Methylnaphthalene	1.54		0.0200	1	01/11/2018 20:06	WG1061301



Collected date/time: 01/08/18 13:00

L961847

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
2-Chloronaphthalene	ND		0.0200	1	01/11/2018 20:06	WG1061301
(S) p-Terphenyl-d14	72.2		23.0-120		01/11/2018 20:06	WG1061301
(S) Nitrobenzene-d5	97.5		14.0-149		01/11/2018 20:06	WG1061301
(S) 2-Fluorobiphenyl	93.0		34.0-125		01/11/2018 20:06	WG1061301

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		1/10/2018 8:38:35 AM	WG1061146
Fluid	2		1/10/2018 8:38:35 AM	WG1061146
Initial pH	8.64		1/10/2018 8:38:35 AM	WG1061146
Final pH	4.75		1/10/2018 8:38:35 AM	WG1061146

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Boron	ND		2.00		1	01/11/2018 12:28	WG1061623

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	0.0518		1	01/10/2018 09:44	WG1060871

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	5.32		2.00	1	01/09/2018 21:46	WG1060877

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Volatile Organic Compounds (GC) by Method 8015/8015D/8021/GRO

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	01/10/2018 05:39	WG1060995
Toluene	ND		0.00500	1	01/10/2018 05:39	WG1060995
Ethylbenzene	ND		0.000500	1	01/10/2018 05:39	WG1060995
Total Xylene	ND		0.00150	1	01/10/2018 05:39	WG1060995
TPH (GC/FID) Low Fraction	ND		0.100	1	01/10/2018 05:39	WG1060995
(S) a,a,a-Trifluorotoluene(FID)	90.8		77.0-120		01/10/2018 05:39	WG1060995
(S) a,a,a-Trifluorotoluene(PID)	96.5		75.0-128		01/10/2018 05:39	WG1060995

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	819		40.0	10	01/09/2018 23:53	WG1061008
(S) o-Terphenyl	123		18.0-148		01/09/2018 23:53	WG1061008

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8015D/8021/GRO

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	01/10/2018 06:01	WG1060995
Toluene	ND		0.00500	1	01/10/2018 06:01	WG1060995
Ethylbenzene	ND		0.000500	1	01/10/2018 06:01	WG1060995
Total Xylene	ND		0.00150	1	01/10/2018 06:01	WG1060995
TPH (GC/FID) Low Fraction	ND		0.100	1	01/10/2018 06:01	WG1060995
(S) a,a,a-Trifluorotoluene(FID)	85.2		77.0-120		01/10/2018 06:01	WG1060995
(S) a,a,a-Trifluorotoluene(PID)	91.0		75.0-128		01/10/2018 06:01	WG1060995

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	1850	<u>V</u>	40.0	10	01/09/2018 23:31	WG1061008
(S) o-Terphenyl	124		18.0-148		01/09/2018 23:31	WG1061008

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	<u>Qualifier</u>	Dilution	Analysis date / time	<u>Batch</u>
Sodium Adsorption Ratio	0.0708		1	01/10/2018 09:46	WG1060871

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Total Solids by Method 2540 G-2011

L961847-01

Method Blank (MB)

(MB) R3279457-1 01/15/18 10:36

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	%		%	%
Total Solids	0.002			

Cp

 ${}^2\text{Tc}$

Ss

Cn

⁸⁷Sr

Qc

L961895-03 Original Sample (OS) • Duplicate (DUP)

(OS) L961895-03 01/15/18 10:36 • (DUP) R3279457-3 01/15/18 10:36

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	%	%		%		%
Total Solids	76.4	76.7	1	0		5

G|

Al

Sc

Laboratory Control Sample (LCS)

(LCS) R3279457-2 01/15/18 10:36

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	%	%	%	%	
Total Solids	50.0	50.0	100	85-115	



Method Blank (MB)

(MB) R3278352-1 01/09/18 17:11

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.64	2.00

L961692-24 Original Sample (OS) • Duplicate (DUP)

(OS) L961692-24 01/09/18 17:19 • (DUP) R3278352-8 01/09/18 17:19

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0	1	0		20

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

(LCS) R3278352-2 01/09/18 17:11 • (LCSD) R3278352-3 01/09/18 17:11

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chromium,Hexavalent	56.9	33.4	39.6	58.7	69.6	30-170			17	20

L961692-22 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961692-22 01/09/18 17:14 • (MS) R3278352-4 01/09/18 17:15 • (MSD) R3278352-5 01/09/18 17:15

	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	20.4	ND	17.4	17.8	85.2	87	1	75-125			2.09	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L961847-01 Original Sample (OS) • Duplicate (DUP)

(OS) L961847-01 01/11/18 16:02 • (DUP) R3278853-3 01/11/18 16:02

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.70	7.72	1	0.259		1

Sample Narrative:

OS: 7.7 at 20.6C

DUP: 7.72 at 20.6C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L962512-09 Original Sample (OS) • Duplicate (DUP)

(OS) L962512-09 01/11/18 16:02 • (DUP) R3278853-4 01/11/18 16:02

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.61	8.63	1	0.232		1

Sample Narrative:

OS: 8.61 at 19.8C

DUP: 8.63 at 19.8C

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

(LCS) R3278853-1 01/11/18 16:02 • (LCSD) R3278853-2 01/11/18 16:02

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
pH	6.38	6.35	6.35	99.5	99.5	98.4-102			0.000	1

Sample Narrative:

LCS: 6.35 at 18.9C

LCSD: 6.35 at 18.9C



Method Blank (MB)

(MB) WG1060907-1 01/09/18 14:34

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L961750-03 Original Sample (OS) • Duplicate (DUP)

(OS) L961750-03 01/09/18 14:34 • (DUP) WG1060907-4 01/09/18 14:34

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	623	621	1	0.322		20

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

(LCS) WG1060907-2 01/09/18 14:34 • (LCSD) WG1060907-3 01/09/18 14:34

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	552	552	98.7	98.7	85.0-115			0.000	20

Method Blank (MB)

(MB) R3278985-2 01/11/18 19:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	4.4	J	0.795	10.0
Sulfate	2.79	J	0.57	50.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L962300-01 Original Sample (OS) • Duplicate (DUP)

(OS) L962300-01 01/12/18 00:17 • (DUP) R3278985-5 01/12/18 00:38

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	92.2	133	1	35.9	J3	15
Sulfate	57.0	75.5	1	28	P1	15

L962605-02 Original Sample (OS) • Duplicate (DUP)

(OS) L962605-02 01/12/18 05:44 • (DUP) R3278985-8 01/12/18 06:05

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	66.7	66.1	1	0.906		15
Sulfate	U	18.2	1	200	J P1	15

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

(LCS) R3278985-3 01/11/18 19:31 • (LCSD) R3278985-4 01/11/18 19:52

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 %
Chloride	200	201	199	101	99.5	80-120			1.27	15
Sulfate	200	208	206	104	103	80-120			0.752	15

L962600-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L962600-01 01/12/18 02:40 • (MS) R3278985-6 01/12/18 03:01 • (MSD) R3278985-7 01/12/18 04:02

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 %
Chloride	500	66.9	595	586	106	104	1	80-120			1.41	15



Method Blank (MB)

(MB) R3278451-1 01/10/18 08:36

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	0.00798	⬇	0.0028	0.0200

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3278451-2 01/10/18 08:38 • (LCSD) R3278451-3 01/10/18 08:40

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Mercury	0.300	0.322	0.324	107	108	80-120			0.568	20

L961781-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961781-01 01/10/18 08:43 • (MS) R3278451-4 01/10/18 08:45 • (MSD) R3278451-5 01/10/18 08:47

	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	%	%		%			%	%
Mercury	0.318	0.0656	0.348	0.328	88.8	82.6	1	75-125			5.82	20



Method Blank (MB)

(MB) R3278401-1 01/09/18 20:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.65	2.00
Barium	U		0.17	0.500
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Lead	0.231	J	0.19	0.500
Selenium	U		0.74	2.00
Silver	U		0.28	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3278401-2 01/09/18 20:24 • (LCSD) R3278401-3 01/09/18 20:27

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 %
Arsenic	100	95.1	98.6	95.1	98.6	80-120			3.62	20
Barium	100	101	105	101	105	80-120			3.73	20
Cadmium	100	96.0	99.9	96	99.9	80-120			3.99	20
Chromium	100	98.3	103	98.3	103	80-120			4.36	20
Lead	100	97.9	104	97.9	104	80-120			5.64	20
Selenium	100	95.0	98.3	95	98.3	80-120			3.45	20
Silver	20.0	18.7	19.4	93.5	96.8	80-120			3.5	20

L961835-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961835-01 01/09/18 20:31 • (MS) R3278401-6 01/09/18 20:40 • (MSD) R3278401-7 01/09/18 20:44

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 %
Arsenic	100	U	81.7	89.1	81.7	89.1	1	75-125			8.74	20
Barium	100	44.4	139	151	95.1	107	1	75-125			8.08	20
Cadmium	100	0.147	86.6	94.3	86.4	94.1	1	75-125			8.56	20
Chromium	100	14.0	99.6	110	85.6	96.3	1	75-125			10.2	20
Lead	100	4.06	94.6	102	90.6	98.2	1	75-125			7.76	20
Selenium	100	U	82.7	89.8	82.7	89.8	1	75-125			8.22	20
Silver	20.0	U	17.1	18.6	85.3	92.8	1	75-125			8.47	20



Method Blank (MB)

(MB) R3278668-1 01/10/18 22:34

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Copper	U		0.53	2.00
Zinc	U		0.59	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3278668-2 01/10/18 22:37 • (LCSD) R3278668-3 01/10/18 22:40

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 %
Copper	100	96.2	93.8	96.2	93.8	80-120			2.52	20
Zinc	100	102	99.8	102	99.8	80-120			1.81	20

L962227-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L962227-04 01/10/18 22:44 • (MS) R3278668-6 01/10/18 22:53 • (MSD) R3278668-7 01/10/18 22:56

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 %
Copper	118	5.16	106	109	85.9	88.4	1	75-125			2.71	20
Zinc	118	22.4	126	132	88.1	92.9	1	75-125			4.37	20



Method Blank (MB)

(MB) R3278806-1 01/11/18 12:06

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.667	2.00

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

(LCS) R3278806-2 01/11/18 12:09 • (LCSD) R3278806-3 01/11/18 12:12

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 %
Boron	10.0	10.0	10.1	100	101	80-120			0.81	20

L962163-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L962163-01 01/11/18 12:15 • (MS) R3278806-5 01/11/18 12:22 • (MSD) R3278806-6 01/11/18 12:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	10.0	2.03	12.0	12.1	100	100	1	75-125			0.205	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3278621-5 01/09/18 23:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000397	U	0.000150	0.00500
Ethylbenzene	0.000138	U	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	96.0			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	103			75.0-128

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3278621-1 01/09/18 21:30 • (LCSD) R3278621-2 01/09/18 21:52

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0450	0.0451	90.1	90.3	71.0-121			0.250	20
Toluene	0.0500	0.0466	0.0455	93.2	90.9	72.0-120			2.52	20
Ethylbenzene	0.0500	0.0494	0.0484	98.8	96.9	76.0-121			1.95	20
Total Xylene	0.150	0.148	0.144	98.5	95.9	75.0-124			2.68	20
(S) a,a,a-Trifluorotoluene(FID)				95.8	95.5	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				101	101	75.0-128				

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

(LCS) R3278621-3 01/09/18 22:14 • (LCSD) R3278621-4 01/09/18 22:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.91	5.49	107	99.7	70.0-136			7.40	20
(S) a,a,a-Trifluorotoluene(FID)				106	105	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				111	115	75.0-128				



L961847-01,04,05

L961847-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961847-01 01/10/18 06:23 • (MS) R3278621-6 01/10/18 06:45 • (MSD) R3278621-7 01/10/18 07:07

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.00168	0.0264	0.0173	49.4	31.2	1	10.0-146		J3	41.7	29
Toluene	0.0500	0.0253	0.0352	0.0281	19.9	5.68	1	10.0-143		J6	22.5	30
Ethylbenzene	0.0500	0.0451	0.0533	0.0430	16.3	0.000	1	10.0-147		J6	21.4	31
Total Xylene	0.150	0.266	0.299	0.268	22.1	1.53	1	10.0-149	J6	J6	10.9	30
(S) a,a,a-Trifluorotoluene(FID)					84.6	85.7		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					95.0	91.6		75.0-128				

L961847-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961847-01 01/10/18 06:23 • (MS) R3278621-8 01/10/18 07:29 • (MSD) R3278621-9 01/10/18 07:51

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	8.75	8.13	8.93	0.000	3.20	1	10.0-147	J6	J6	9.40	30
(S) a,a,a-Trifluorotoluene(FID)					86.6	87.7		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					96.8	95.3		75.0-128				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3278586-3 01/09/18 23:43

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)	91.9			77.0-120

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

(LCS) R3278586-1 01/09/18 22:39 • (LCSD) R3278586-2 01/09/18 23:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.70	5.36	104	97.5	70.0-136			6.07	20
(S) a,a,a-Trifluorotoluene(FID)				83.9	86.8	77.0-120				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3278429-2 01/09/18 18:20

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.00130	0.00250
Ethylbenzene	U		0.00129	0.00250
Toluene	U		0.00265	0.00500
Xylenes, Total	U		0.00125	0.00750
(S) Toluene-d8	106			80.0-120
(S) Dibromofluoromethane	98.4			74.0-131
(S) a,a,a-Trifluorotoluene	101			80.0-120
(S) 4-Bromofluorobenzene	100			64.0-132

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3278429-1 01/09/18 17:32 • (LCSD) R3278429-3 01/09/18 23:13

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	0.625	0.648	0.687	104	110	71.0-124			5.84	20
Ethylbenzene	0.625	0.546	0.620	87.4	99.2	77.0-120			12.6	20
Toluene	0.625	0.563	0.637	90.1	102	70.0-120			12.3	20
Xylenes, Total	1.88	1.63	1.86	86.7	99.3	77.0-120			13.5	20
(S) Toluene-d8				102	104	80.0-120				
(S) Dibromofluoromethane				102	102	74.0-131				
(S) a,a,a-Trifluorotoluene				101	102	80.0-120				
(S) 4-Bromofluorobenzene				103	99.9	64.0-132				

L961847-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961847-01 01/10/18 02:10 • (MS) R3278429-4 01/10/18 05:04 • (MSD) R3278429-5 01/10/18 05:20

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	0.625	ND	0.424	0.536	67.8	85.8	1	13.0-146			23.4	27
Ethylbenzene	0.625	0.102	0.575	0.628	75.6	84.1	1	10.0-147			8.82	31
Toluene	0.625	0.0388	0.492	0.547	72.6	81.3	1	10.0-144			10.5	28
Xylenes, Total	1.88	0.657	1.99	2.09	71.3	76.2	1	10.0-150			4.51	31
(S) Toluene-d8					112	105		80.0-120				
(S) Dibromofluoromethane					89.8	99.4		74.0-131				
(S) a,a,a-Trifluorotoluene					102	101		80.0-120				
(S) 4-Bromofluorobenzene					109	111		64.0-132				



Method Blank (MB)

(MB) R3278404-1 01/09/18 22:10

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	72.0			18.0-148

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3278404-2 01/09/18 22:21 • (LCSD) R3278404-3 01/09/18 22:32

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) High Fraction	60.0	47.7	43.2	79.4	72.1	50.0-150			9.73	20
(S) o-Terphenyl				81.4	79.2	18.0-148				

L961847-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L961847-05 01/09/18 23:31 • (MS) R3278404-5 01/09/18 23:42 • (MSD) R3278404-4 01/09/18 23:20

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	60.0	1850	1930	1770	149	0.000	10	50.0-150		V	9.00	20
(S) o-Terphenyl					133	127		18.0-148				

Method Blank (MB)

(MB) R3278847-1 01/11/18 15:11

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	106			14.0-149
(S) 2-Fluorobiphenyl	109			34.0-125
(S) p-Terphenyl-d14	100			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3278847-2 01/11/18 15:32 • (LCSD) R3278847-3 01/11/18 15:53

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 %
Anthracene	0.0800	0.0973	0.0912	122	114	50.0-125			6.41	20
Acenaphthene	0.0800	0.0905	0.0820	113	102	52.0-120			9.90	20
Acenaphthylene	0.0800	0.0952	0.0859	119	107	51.0-120			10.3	20
Benzo(a)anthracene	0.0800	0.0891	0.0827	111	103	46.0-121			7.43	20
Benzo(a)pyrene	0.0800	0.0872	0.0822	109	103	42.0-121			5.88	20
Benzo(b)fluoranthene	0.0800	0.0859	0.0822	107	103	42.0-123			4.38	20
Benzo(g,h,i)perylene	0.0800	0.0974	0.0909	122	114	43.0-128			6.85	20
Benzo(k)fluoranthene	0.0800	0.0960	0.0871	120	109	45.0-128			9.76	20
Chrysene	0.0800	0.0899	0.0848	112	106	48.0-127			5.88	20
Dibenz(a,h)anthracene	0.0800	0.0997	0.0934	125	117	43.0-132			6.62	20
Fluoranthene	0.0800	0.0964	0.0898	120	112	49.0-129			7.03	20

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

(LCS) R3278847-2 01/11/18 15:32 • (LCSD) R3278847-3 01/11/18 15:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Fluorene	0.0800	0.0912	0.0846	114	106	50.0-120			7.49	20
Indeno(1,2,3-cd)pyrene	0.0800	0.101	0.0931	126	116	44.0-131			7.68	20
Naphthalene	0.0800	0.0875	0.0795	109	99.3	50.0-120			9.59	20
Phenanthrene	0.0800	0.0882	0.0823	110	103	48.0-120			6.97	20
Pyrene	0.0800	0.0888	0.0849	111	106	48.0-135			4.42	20
1-Methylnaphthalene	0.0800	0.0907	0.0828	113	103	52.0-122			9.08	20
2-Methylnaphthalene	0.0800	0.0878	0.0804	110	101	52.0-120			8.81	20
2-Chloronaphthalene	0.0800	0.0906	0.0829	113	104	50.0-120			8.85	20
(S) Nitrobenzene-d5				112	101	14.0-149				
(S) 2-Fluorobiphenyl				115	101	34.0-125				
(S) p-Terphenyl-d14				106	97.9	23.0-120				

L962106-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L962106-02 01/11/18 10:40 • (MS) R3278847-4 01/11/18 11:01 • (MSD) R3278847-5 01/11/18 11:22

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	0.0800	ND	0.0842	0.0827	105	103	1	20.0-136			1.71	24
Acenaphthene	0.0800	ND	0.0762	0.0766	95.3	95.8	1	29.0-124			0.483	20
Acenaphthylene	0.0800	ND	0.0816	0.0830	102	104	1	35.0-120			1.61	20
Benzo(a)anthracene	0.0800	ND	0.0794	0.0770	98.2	95.2	1	13.0-132			3.05	27
Benzo(a)pyrene	0.0800	ND	0.0831	0.0805	103	99.7	1	14.0-138			3.15	27
Benzo(b)fluoranthene	0.0800	ND	0.0785	0.0740	96.1	90.5	1	10.0-129			5.89	31
Benzo(g,h,i)perylene	0.0800	ND	0.0876	0.0816	108	101	1	10.0-133			7.07	30
Benzo(k)fluoranthene	0.0800	ND	0.0800	0.0781	100	97.6	1	15.0-131			2.46	27
Chrysene	0.0800	ND	0.0784	0.0771	96.5	94.9	1	15.0-137			1.66	25
Dibenz(a,h)anthracene	0.0800	ND	0.0899	0.0871	112	109	1	15.0-132			3.16	27
Fluoranthene	0.0800	ND	0.0860	0.0832	105	101	1	13.0-139			3.33	28
Fluorene	0.0800	ND	0.0780	0.0786	97.5	98.3	1	27.0-122			0.816	22
Indeno(1,2,3-cd)pyrene	0.0800	ND	0.0886	0.0841	110	104	1	11.0-133			5.25	29
Naphthalene	0.0800	ND	0.0761	0.0775	95.1	96.9	1	18.0-136			1.84	21
Phenanthrene	0.0800	ND	0.0770	0.0753	94.2	92.1	1	15.0-133			2.22	25
Pyrene	0.0800	ND	0.0763	0.0729	93.3	89.0	1	11.0-146			4.61	29
1-Methylnaphthalene	0.0800	ND	0.0826	0.0788	103	98.5	1	24.0-137			4.63	22
2-Methylnaphthalene	0.0800	ND	0.0806	0.0751	101	93.9	1	23.0-136			7.04	22
2-Chloronaphthalene	0.0800	ND	0.0779	0.0790	97.3	98.8	1	36.0-120			1.44	20
(S) Nitrobenzene-d5					103	98.9		14.0-149				
(S) 2-Fluorobiphenyl					99.4	95.9		34.0-125				
(S) p-Terphenyl-d14					89.4	88.1		23.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



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.

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, 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.
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.
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.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



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

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

State Accreditations

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

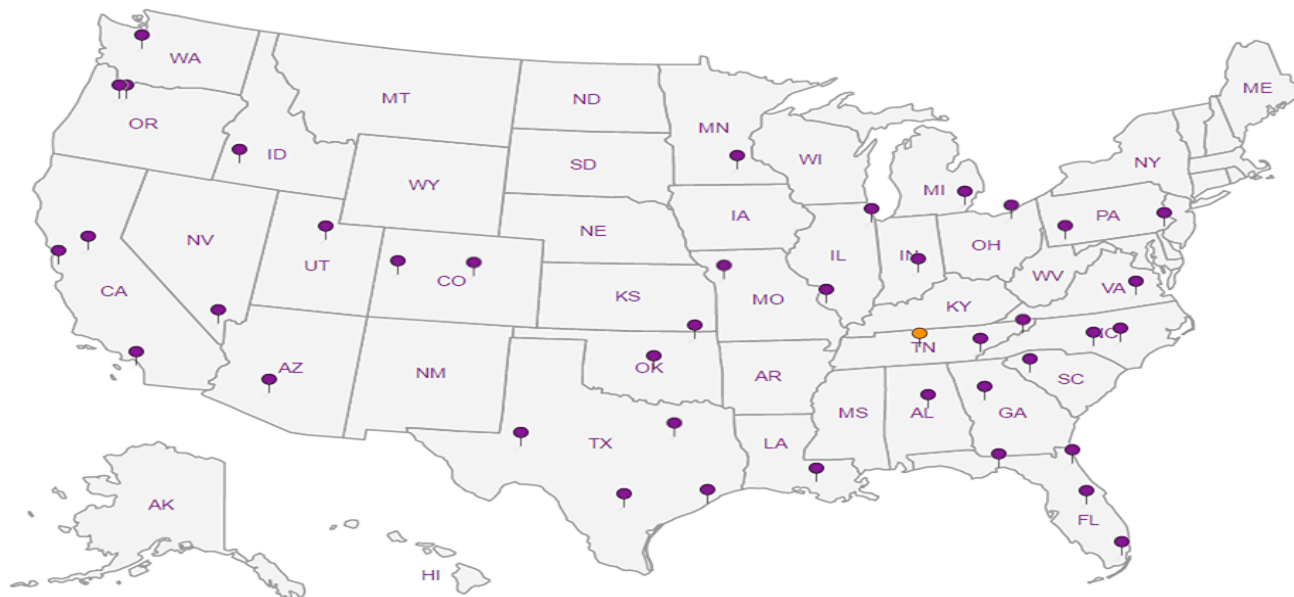
Third Party & Federal Accreditations



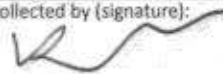
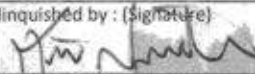
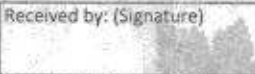
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

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



Company Name/Address: COGCC 213 Corundum Rd. Trinidad, CO 81082				Billing Information: Attn: Accounts Payable 1120 Lincoln St., Suite 801 Denver, CO 80203				Analysis / Container / Preservative <div style="display: flex; justify-content: space-between;"> <div>Cl.pH, Sulfate, TSS, SPCON - 4oz Soil Jar</div> <div>CR6, RCRA8 Metals, CR3 - 4oz Soil Jar</div> <div>SAR - 4oz Soil Jar</div> <div>BTEX/GRO, DRO - 4oz Soil Jar</div> <div>TCLP Boron - 8oz Soil Jar</div> <div>Arsenic</div> </div>								Chain of Custody Page <u> </u> of <u> </u>  L.A.B S.C.I.E.N.C.E.S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859  L# 961847 Tab G115 Acctnum: COILGASRCO Template: Prelogin: TSR: 288 - Daphne R Cooler: Shipped Via: <div style="display: flex; justify-content: space-between;"> <div>Rem./Contaminant</div> <div>Sample # (lab only)</div> </div>																																																																													
Report to: Kris Neidel Project Description: Phone: 719-846-3091 Fax: Collected by (print): Kris Neidel Collected by (signature):  Immediately Packed on Ice N <u> </u> Y <u> </u>				Email To: Kris.Neidel@State.CO.US City/State Collected: Client Project # LOVE RINE WS2 Site/Facility ID # Lab Project # P.O. # Date Results Needed Rush? (Lab MUST Be Notified) Same Day200% Next Day100% Two Day50% Three Day25% Email? <u> </u> No <u> </u> Yes FAX? <u> </u> No <u> </u> Yes No. of Cntrs				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Sample ID</th> <th>Comp/Grab</th> <th>Matrix *</th> <th>Depth</th> <th>Date</th> <th>Time</th> <th>No. of Cntrs</th> <th>Cl.pH, Sulfate, TSS, SPCON - 4oz Soil Jar</th> <th>CR6, RCRA8 Metals, CR3 - 4oz Soil Jar</th> <th>SAR - 4oz Soil Jar</th> <th>BTEX/GRO, DRO - 4oz Soil Jar</th> <th>TCLP Boron - 8oz Soil Jar</th> <th>Arsenic</th> </tr> </thead> <tbody> <tr> <td>201801081300</td> <td>Comp</td> <td>Soil</td> <td>0-2"</td> <td>1/8/18</td> <td>1300</td> <td>5</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>201801081315</td> <td>Grab</td> <td>Soil</td> <td>0-2"</td> <td>1/8/18</td> <td>1315</td> <td>2</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>201801081400</td> <td>Grab</td> <td>Soil</td> <td>0-1"</td> <td>1/8/18</td> <td>1400</td> <td>1</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>201801081405</td> <td>Grab</td> <td>Soil</td> <td>0-1"</td> <td>1/8/18</td> <td>1405</td> <td>1</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> </tr> <tr> <td>201801081420</td> <td>Grab</td> <td>Soil</td> <td>0-1"</td> <td>1/8/18</td> <td>1420</td> <td>1</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>								Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Cl.pH, Sulfate, TSS, SPCON - 4oz Soil Jar	CR6, RCRA8 Metals, CR3 - 4oz Soil Jar	SAR - 4oz Soil Jar	BTEX/GRO, DRO - 4oz Soil Jar	TCLP Boron - 8oz Soil Jar	Arsenic	201801081300	Comp	Soil	0-2"	1/8/18	1300	5	X	X	X	X	X		201801081315	Grab	Soil	0-2"	1/8/18	1315	2			X			X	201801081400	Grab	Soil	0-1"	1/8/18	1400	1				X			201801081405	Grab	Soil	0-1"	1/8/18	1405	1				X			201801081420	Grab	Soil	0-1"	1/8/18	1420	1			X			
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* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____							pH _____ Temp _____ Flow _____ Other _____																																																																																						
Remarks:							Hold # _____																																																																																						
Relinquished by: (Signature) 		Date: 1/8/18		Time: 430		Received by: (Signature) 		Samples returned via: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____		Condition: (lab use only)																																																																																			
Relinquished by: (Signature)		Date:		Time:		Received by: (Signature)		Temp: 14.4 °C Bottles Received: 10		COC Seal Intact: <u> </u> Y <u> </u> N <u> </u> NA																																																																																			
Relinquished by: (Signature)		Date:		Time:		Received for lab by: (Signature) B. J. J. 802		Date: 01.04.18 Time: 875		pH Checked: NCF: Yes																																																																																			

4196-3254 6463

ESC LAB SCIENCES Cooler Receipt Form

Client: <u>COIL GAS CO</u>	SDG#		
Cooler Received/Opened On: <u>01/09/18</u>	Temperature:	<u>1.9</u>	°C
Received by : Branford Shaw			
Signature: <u>B. Shaw</u>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	<input checked="" type="checkbox"/>		
COC Signed / Accurate?		<input checked="" type="checkbox"/>	
Bottles arrive intact?		<input checked="" type="checkbox"/>	
Correct bottles used?		<input checked="" type="checkbox"/>	
Sufficient volume sent?		<input checked="" type="checkbox"/>	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

ESC Lab Sciences

Non-Conformance Form

Login #:961847	Client:COLLGASRCO	Date:01/09/18	Evaluated by: Matthew Lockhart
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Non-Conformance (check applicable items)

Sample Integrity	Chain of Custody Clarification	
Parameter(s) past holding time	X Login Clarification Needed	If Broken Container:
Improper temperature	Chain of custody is incomplete	Insufficient packing material around container
Improper container type	Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation	Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courier)
Insufficient sample volume.	Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.	Trip Blank not received.	If no Chain of Custody:
Broken container	Client did not "X" analysis.	Received by:
Broken container:	Chain of Custody is missing	Date/Time:
Sufficient sample remains		Temp./Cont. Rec./pH:
		Carrier:
		Tracking#

Login Comments: Client wants to run TSS for soil samples, but we do not have TSS analysis under the soil matrix.

Client informed by:	Call	Email	Voice Mail	Date: 01/09/18	Time: 1143
TSR Initials: DR	Client Contact: KN				

Login Instructions:

Notified client

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