Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 21, 2019

Caerus Oil and Gas

Sample Delivery Group:	L1160511
Samples Received:	11/14/2019
Project Number:	K10-596 GAS LIFT REL
Description:	K10-596 Gas Lift Release
Site:	K10-596
Report To:	Jake Janicek 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager

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20191112-K10(W. WALL)@9' L1160511-01 Solid

Collected by: Steve S.
Collected date/time: 11/12/19 12:30
Received date/time: 11/14/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1380962	1	11/19/19 00:14	11/19/19 00:14	EL	Mt. Juliet, TN
Calculated Results	WG1380916	1	11/15/19 08:33	11/16/19 14:44	EL	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1380458	1	11/14/19 14:00	11/14/19 21:48	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1381007	1	11/15/19 13:00	11/15/19 14:00	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1383074	1	11/19/19 13:00	11/19/19 16:00	SL	Mt. Juliet, TN
Mercury by Method 7471A	WG1380678	1	11/17/19 13:30	11/18/19 14:21	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1380916	1	11/15/19 08:33	11/16/19 14:44	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1381863	1	11/14/19 14:02	11/17/19 18:36	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1381535	1	11/14/19 14:02	11/16/19 02:40	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1381793	20	11/16/19 14:30	11/17/19 07:36	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1381314	1	11/15/19 21:08	11/16/19 17:14	DMG	Mt. Juliet, TN

20191112-K10(S. WALL)@9' L1160511-02 Solid

Collected by: Steve S.
Collected date/time: 11/12/19 12:40
Received date/time: 11/14/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1380962	1	11/19/19 00:17	11/19/19 00:17	EL	Mt. Juliet, TN
Calculated Results	WG1380916	1	11/15/19 08:33	11/16/19 14:47	EL	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1380458	1	11/14/19 14:00	11/14/19 21:50	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1381007	1	11/15/19 13:00	11/15/19 14:00	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1383074	1	11/19/19 13:00	11/19/19 16:00	SL	Mt. Juliet, TN
Mercury by Method 7471A	WG1380678	1	11/17/19 13:30	11/18/19 14:23	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1380916	1	11/15/19 08:33	11/16/19 14:47	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1381863	1	11/14/19 14:02	11/17/19 18:58	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1381535	1	11/14/19 14:02	11/16/19 02:59	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1382019	10	11/17/19 06:13	11/17/19 21:24	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1381314	1	11/15/19 21:08	11/16/19 17:35	DMG	Mt. Juliet, TN

20191113-K10(BASE)@14' L1160511-03 Solid

Collected by: Steve S.
Collected date/time: 11/13/19 10:30
Received date/time: 11/14/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1380962	1	11/19/19 00:21	11/19/19 00:21	EL	Mt. Juliet, TN
Calculated Results	WG1380916	1	11/15/19 08:33	11/16/19 14:50	EL	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1380458	1	11/14/19 14:00	11/14/19 21:52	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1381007	1	11/15/19 13:00	11/15/19 14:00	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1383074	1	11/19/19 13:00	11/19/19 16:00	SL	Mt. Juliet, TN
Mercury by Method 7471A	WG1380678	1	11/17/19 13:30	11/18/19 14:25	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1380916	1	11/15/19 08:33	11/16/19 14:50	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1381863	1	11/14/19 14:02	11/17/19 19:21	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1381535	1	11/14/19 14:02	11/16/19 03:18	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1382019	10	11/17/19 06:13	11/17/19 21:38	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1381314	1	11/15/19 21:08	11/16/19 17:56	DMG	Mt. Juliet, TN

20191113-K10(E. WALL)@10' L1160511-04 Solid

Collected by: Steve S.
Collected date/time: 11/13/19 11:30
Received date/time: 11/14/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1380962	1	11/19/19 00:23	11/19/19 00:23	EL	Mt. Juliet, TN
Calculated Results	WG1380916	1	11/15/19 08:33	11/16/19 14:53	EL	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1380458	1	11/14/19 14:00	11/14/19 21:53	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1381007	1	11/15/19 13:00	11/15/19 14:00	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1383074	1	11/19/19 13:00	11/19/19 16:00	SL	Mt. Juliet, TN

20191113-K10(E. WALL)@10' L1160511-04 Solid

Collected by: Steve S.
Collected date/time: 11/13/19 11:30
Received date/time: 11/14/19 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Mercury by Method 7471A	WG1380678	1	11/17/19 13:30	11/18/19 14:28	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1380916	1	11/15/19 08:33	11/16/19 14:53	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1381863	1	11/14/19 14:02	11/17/19 19:43	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1381535	1	11/14/19 14:02	11/16/19 03:37	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1382019	10	11/17/19 06:13	11/17/19 22:59	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1381314	1	11/15/19 21:08	11/16/19 18:16	DMG	Mt. Juliet, TN

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	0.687		1	11/19/2019 00:14	WG1380962

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	19.0		1.00	1	11/16/2019 14:44	WG1380916

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	11/14/2019 21:48	WG1380458

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.04	T8	1	11/15/2019 14:00	WG1381007

Sample Narrative:
L1160511-01 WG1381007: 8.04 at 21.1C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	842		10.0	1	11/19/2019 16:00	WG1383074

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0300	1	11/18/2019 14:21	WG1380678

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	12.3		2.00	1	11/16/2019 14:44	WG1380916
Barium	256		0.500	1	11/16/2019 14:44	WG1380916
Cadmium	ND		0.500	1	11/16/2019 14:44	WG1380916
Chromium	19.0		1.00	1	11/16/2019 14:44	WG1380916
Copper	18.1		2.00	1	11/16/2019 14:44	WG1380916
Lead	11.8		0.500	1	11/16/2019 14:44	WG1380916
Nickel	15.0		2.00	1	11/16/2019 14:44	WG1380916
Selenium	ND		2.00	1	11/16/2019 14:44	WG1380916
Silver	ND		1.00	1	11/16/2019 14:44	WG1380916
Zinc	45.1		5.00	1	11/16/2019 14:44	WG1380916

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	1.42		0.100	1	11/17/2019 18:36	WG1381863
(S) a,a,a-Trifluorotoluene(FID)	*89.9*		*77.0-120*		*11/17/2019 18:36*	WG1381863

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00117		0.00100	1	11/16/2019 02:40	WG1381535
Toluene	0.00680		0.00500	1	11/16/2019 02:40	WG1381535
Ethylbenzene	ND		0.00250	1	11/16/2019 02:40	WG1381535
Total Xylenes	0.0458		0.00650	1	11/16/2019 02:40	WG1381535
(S) Toluene-d8	*102*		*75.0-131*		*11/16/2019 02:40*	WG1381535
(S) 4-Bromofluorobenzene	*91.3*		*67.0-138*		*11/16/2019 02:40*	WG1381535
(S) 1,2-Dichloroethane-d4	*102*		*70.0-130*		*11/16/2019 02:40*	WG1381535

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	153		80.0	20	11/17/2019 07:36	WG1381793
(S) o-Terphenyl	*88.1*	J7	*18.0-148*		*11/17/2019 07:36*	WG1381793

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	11/16/2019 17:14	WG1381314
Acenaphthene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Acenaphthylene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Benzo(a)anthracene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Benzo(a)pyrene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Benzo(b)fluoranthene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Benzo(g,h,i)perylene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Benzo(k)fluoranthene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Chrysene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Dibenz(a,h)anthracene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Fluoranthene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Fluorene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Naphthalene	ND		0.0200	1	11/16/2019 17:14	WG1381314
Phenanthrene	ND		0.00600	1	11/16/2019 17:14	WG1381314
Pyrene	ND		0.00600	1	11/16/2019 17:14	WG1381314
1-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:14	WG1381314
2-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:14	WG1381314
2-Chloronaphthalene	ND		0.0200	1	11/16/2019 17:14	WG1381314
(S) p-Terphenyl-d14	*106*		*23.0-120*		*11/16/2019 17:14*	WG1381314
(S) Nitrobenzene-d5	*95.4*		*14.0-149*		*11/16/2019 17:14*	WG1381314
(S) 2-Fluorobiphenyl	*91.6*		*34.0-125*		*11/16/2019 17:14*	WG1381314

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.681		1	11/19/2019 00:17	WG1380962

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	27.1		1.00	1	11/16/2019 14:47	WG1380916

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	11/14/2019 21:50	WG1380458

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.05	T8	1	11/15/2019 14:00	WG1381007

Sample Narrative:
L1160511-02 WG1381007: 8.05 at 20.8C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	662		10.0	1	11/19/2019 16:00	WG1383074

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0300	1	11/18/2019 14:23	WG1380678

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	11.6		2.00	1	11/16/2019 14:47	WG1380916
Barium	281		0.500	1	11/16/2019 14:47	WG1380916
Cadmium	ND		0.500	1	11/16/2019 14:47	WG1380916
Chromium	27.1		1.00	1	11/16/2019 14:47	WG1380916
Copper	18.7		2.00	1	11/16/2019 14:47	WG1380916
Lead	11.5		0.500	1	11/16/2019 14:47	WG1380916
Nickel	18.0		2.00	1	11/16/2019 14:47	WG1380916
Selenium	ND		2.00	1	11/16/2019 14:47	WG1380916
Silver	ND		1.00	1	11/16/2019 14:47	WG1380916
Zinc	53.6		5.00	1	11/16/2019 14:47	WG1380916

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	1.58		0.100	1	11/17/2019 18:58	WG1381863
(S) a,a,a-Trifluorotoluene(FID)	*84.4*		*77.0-120*		*11/17/2019 18:58*	WG1381863

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	11/16/2019 02:59	WG1381535
Toluene	ND		0.00500	1	11/16/2019 02:59	WG1381535
Ethylbenzene	ND		0.00250	1	11/16/2019 02:59	WG1381535
Total Xylenes	0.00808		0.00650	1	11/16/2019 02:59	WG1381535
(S) Toluene-d8	*101*		*75.0-131*		*11/16/2019 02:59*	WG1381535
(S) 4-Bromofluorobenzene	*88.8*		*67.0-138*		*11/16/2019 02:59*	WG1381535
(S) 1,2-Dichloroethane-d4	*96.6*		*70.0-130*		*11/16/2019 02:59*	WG1381535

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	129		40.0	10	11/17/2019 21:24	WG1382019
(S) o-Terphenyl	*130*		*18.0-148*		*11/17/2019 21:24*	WG1382019

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	11/16/2019 17:35	WG1381314
Acenaphthene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Acenaphthylene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Benzo(a)anthracene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Benzo(a)pyrene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Benzo(b)fluoranthene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Benzo(g,h,i)perylene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Benzo(k)fluoranthene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Chrysene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Dibenz(a,h)anthracene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Fluoranthene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Fluorene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Naphthalene	ND		0.0200	1	11/16/2019 17:35	WG1381314
Phenanthrene	ND		0.00600	1	11/16/2019 17:35	WG1381314
Pyrene	ND		0.00600	1	11/16/2019 17:35	WG1381314
1-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:35	WG1381314
2-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:35	WG1381314
2-Chloronaphthalene	ND		0.0200	1	11/16/2019 17:35	WG1381314
(S) p-Terphenyl-d14	*90.5*		*23.0-120*		*11/16/2019 17:35*	WG1381314
(S) Nitrobenzene-d5	*88.8*		*14.0-149*		*11/16/2019 17:35*	WG1381314
(S) 2-Fluorobiphenyl	*80.2*		*34.0-125*		*11/16/2019 17:35*	WG1381314

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.60		1	11/19/2019 00:21	WG1380962

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	18.7		1.00	1	11/16/2019 14:50	WG1380916

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	11/14/2019 21:52	WG1380458

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.34	T8	1	11/15/2019 14:00	WG1381007

Sample Narrative:

L1160511-03 WG1381007: 8.34 at 20.6C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	969		10.0	1	11/19/2019 16:00	WG1383074

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0300	1	11/18/2019 14:25	WG1380678

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	18.6		2.00	1	11/16/2019 14:50	WG1380916
Barium	594		0.500	1	11/16/2019 14:50	WG1380916
Cadmium	ND		0.500	1	11/16/2019 14:50	WG1380916
Chromium	18.7		1.00	1	11/16/2019 14:50	WG1380916
Copper	23.2		2.00	1	11/16/2019 14:50	WG1380916
Lead	10.4		0.500	1	11/16/2019 14:50	WG1380916
Nickel	17.0		2.00	1	11/16/2019 14:50	WG1380916
Selenium	ND		2.00	1	11/16/2019 14:50	WG1380916
Silver	ND		1.00	1	11/16/2019 14:50	WG1380916
Zinc	44.4		5.00	1	11/16/2019 14:50	WG1380916

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	3.16		0.100	1	11/17/2019 19:21	WG1381863
(S) a,a,a-Trifluorotoluene(FID)	*95.0*		*77.0-120*		*11/17/2019 19:21*	WG1381863

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	11/16/2019 03:18	WG1381535
Toluene	0.00543		0.00500	1	11/16/2019 03:18	WG1381535
Ethylbenzene	ND		0.00250	1	11/16/2019 03:18	WG1381535
Total Xylenes	0.218		0.00650	1	11/16/2019 03:18	WG1381535
(S) Toluene-d8	*101*		*75.0-131*		*11/16/2019 03:18*	WG1381535
(S) 4-Bromofluorobenzene	*94.6*		*67.0-138*		*11/16/2019 03:18*	WG1381535
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*11/16/2019 03:18*	WG1381535

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	214		40.0	10	11/17/2019 21:38	WG1382019
(S) o-Terphenyl	*116*		*18.0-148*		*11/17/2019 21:38*	WG1382019

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	11/16/2019 17:56	WG1381314
Acenaphthene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Acenaphthylene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Benzo(a)anthracene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Benzo(a)pyrene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Benzo(b)fluoranthene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Benzo(g,h,i)perylene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Benzo(k)fluoranthene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Chrysene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Dibenz(a,h)anthracene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Fluoranthene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Fluorene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Naphthalene	ND		0.0200	1	11/16/2019 17:56	WG1381314
Phenanthrene	ND		0.00600	1	11/16/2019 17:56	WG1381314
Pyrene	ND		0.00600	1	11/16/2019 17:56	WG1381314
1-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:56	WG1381314
2-Methylnaphthalene	ND		0.0200	1	11/16/2019 17:56	WG1381314
2-Chloronaphthalene	ND		0.0200	1	11/16/2019 17:56	WG1381314
(S) p-Terphenyl-d14	*87.5*		*23.0-120*		*11/16/2019 17:56*	WG1381314
(S) Nitrobenzene-d5	*81.1*		*14.0-149*		*11/16/2019 17:56*	WG1381314
(S) 2-Fluorobiphenyl	*76.8*		*34.0-125*		*11/16/2019 17:56*	WG1381314

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.436		1	11/19/2019 00:23	WG1380962

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	23.8		1.00	1	11/16/2019 14:53	WG1380916

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	11/14/2019 21:53	WG1380458

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.27	T8	1	11/15/2019 14:00	WG1381007

Sample Narrative:

L1160511-04 WG1381007: 8.27 at 20.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	500		10.0	1	11/19/2019 16:00	WG1383074

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0300	1	11/18/2019 14:28	WG1380678

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	13.9		2.00	1	11/16/2019 14:53	WG1380916
Barium	310		0.500	1	11/16/2019 14:53	WG1380916
Cadmium	ND		0.500	1	11/16/2019 14:53	WG1380916
Chromium	23.8		1.00	1	11/16/2019 14:53	WG1380916
Copper	20.1		2.00	1	11/16/2019 14:53	WG1380916
Lead	12.3		0.500	1	11/16/2019 14:53	WG1380916
Nickel	18.1		2.00	1	11/16/2019 14:53	WG1380916
Selenium	ND		2.00	1	11/16/2019 14:53	WG1380916
Silver	ND		1.00	1	11/16/2019 14:53	WG1380916
Zinc	43.3		5.00	1	11/16/2019 14:53	WG1380916

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	7.02		0.100	1	11/17/2019 19:43	WG1381863
(S) a,a,a-Trifluorotoluene(FID)	*88.8*		*77.0-120*		*11/17/2019 19:43*	WG1381863

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	11/16/2019 03:37	WG1381535
Toluene	0.0130		0.00500	1	11/16/2019 03:37	WG1381535
Ethylbenzene	0.00430		0.00250	1	11/16/2019 03:37	WG1381535
Total Xylenes	2.01		0.00650	1	11/16/2019 03:37	WG1381535
(S) Toluene-d8	*101*		*75.0-131*		*11/16/2019 03:37*	WG1381535
(S) 4-Bromofluorobenzene	*90.4*		*67.0-138*		*11/16/2019 03:37*	WG1381535
(S) 1,2-Dichloroethane-d4	*99.4*		*70.0-130*		*11/16/2019 03:37*	WG1381535

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	86.4		40.0	10	11/17/2019 22:59	WG1382019
(S) o-Terphenyl	*137*		*18.0-148*		*11/17/2019 22:59*	WG1382019

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	11/16/2019 18:16	WG1381314
Acenaphthene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Acenaphthylene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Benzo(a)anthracene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Benzo(a)pyrene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Benzo(b)fluoranthene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Benzo(g,h,i)perylene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Benzo(k)fluoranthene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Chrysene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Dibenz(a,h)anthracene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Fluoranthene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Fluorene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Naphthalene	ND		0.0200	1	11/16/2019 18:16	WG1381314
Phenanthrene	ND		0.00600	1	11/16/2019 18:16	WG1381314
Pyrene	ND		0.00600	1	11/16/2019 18:16	WG1381314
1-Methylnaphthalene	ND		0.0200	1	11/16/2019 18:16	WG1381314
2-Methylnaphthalene	ND		0.0200	1	11/16/2019 18:16	WG1381314
2-Chloronaphthalene	ND		0.0200	1	11/16/2019 18:16	WG1381314
(S) p-Terphenyl-d14	*86.9*		*23.0-120*		*11/16/2019 18:16*	WG1381314
(S) Nitrobenzene-d5	*87.6*		*14.0-149*		*11/16/2019 18:16*	WG1381314
(S) 2-Fluorobiphenyl	*76.0*		*34.0-125*		*11/16/2019 18:16*	WG1381314

Method Blank (MB)

(MB) R3472168-1 11/14/19 21:29

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

L1160045-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1160045-01 11/14/19 21:30 • (DUP) R3472168-3 11/14/19 21:31

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

L1160511-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1160511-04 11/14/19 21:53 • (DUP) R3472168-8 11/14/19 21:57

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

Laboratory Control Sample (LCS)

(LCS) R3472168-2 11/14/19 21:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chromium,Hexavalent	24.0	22.0	91.8	80.0-120	

L1160045-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160045-02 11/14/19 21:32 • (MS) R3472168-4 11/14/19 21:32 • (MSD) R3472168-5 11/14/19 21:33

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 %
Chromium,Hexavalent	20.0	ND	13.7	15.0	68.7	75.0	1	75.0-125	J6		8.77	20

L1160045-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1160045-02 11/14/19 21:32 • (MS) R3472168-6 11/14/19 21:33

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chromium,Hexavalent	651	ND	489	75.1	50	75.0-125	

L1160511-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1160511-04 11/15/19 14:00 • (DUP) R3472514-2 11/15/19 14:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.27	8.28	1	0.121		1

Sample Narrative:

OS: 8.27 at 20.5C

DUP: 8.28 at 20.5C

Laboratory Control Sample (LCS)

(LCS) R3472514-1 11/15/19 14:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.93	99.3	99.0-101	

Sample Narrative:

LCS: 9.93 at 17.2C

Method Blank (MB)

(MB) R3473782-1 11/19/19 16:00

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

L1160511-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1160511-02 11/19/19 16:00 • (DUP) R3473782-3 11/19/19 16:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	662	705	1	6.29		20

L1161380-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1161380-09 11/19/19 16:00 • (DUP) R3473782-4 11/19/19 16:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	3910	4050	1	3.52		20

Laboratory Control Sample (LCS)

(LCS) R3473782-2 11/19/19 16:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	umhos/cm	umhos/cm	%	%	
Specific Conductance	475	475	100	85.0-115	

Method Blank (MB)

(MB) R3473239-1 11/18/19 13:30

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

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

(LCS) R3473239-2 11/18/19 13:33 • (LCSD) R3473239-3 11/18/19 13:35

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Mercury	0.500	0.573	0.537	115	107	80.0-120			6.61	20

L1160206-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160206-02 11/18/19 13:37 • (MS) R3473239-4 11/18/19 13:39 • (MSD) R3473239-5 11/18/19 13:46

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Mercury	0.500	0.00617	0.502	0.502	99.1	99.1	1	75.0-125			0.000	20

Method Blank (MB)

(MB) R3472862-1 11/16/19 13:57

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

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

(LCS) R3472862-2 11/16/19 13:59 • (LCSD) R3472862-3 11/16/19 14:02

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	94.4	96.2	94.4	96.2	80.0-120			1.86	20
Barium	100	102	103	102	103	80.0-120			1.93	20
Cadmium	100	95.9	97.9	95.9	97.9	80.0-120			1.99	20
Chromium	100	97.5	99.8	97.5	99.8	80.0-120			2.31	20
Copper	100	97.5	99.6	97.5	99.6	80.0-120			2.09	20
Lead	100	95.6	96.9	95.6	96.9	80.0-120			1.34	20
Nickel	100	96.8	98.6	96.8	98.6	80.0-120			1.85	20
Selenium	100	95.7	97.5	95.7	97.5	80.0-120			1.86	20
Silver	20.0	18.6	19.0	92.8	94.8	80.0-120			2.14	20
Zinc	100	95.5	97.2	95.5	97.2	80.0-120			1.81	20

L1160535-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160535-03 11/16/19 14:04 • (MS) R3472862-6 11/16/19 14:12 • (MSD) R3472862-7 11/16/19 14:14

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	2.18	88.4	88.0	86.2	85.8	1	75.0-125			0.458	20
Barium	100	80.7	175	174	94.4	93.1	1	75.0-125			0.723	20
Cadmium	100	ND	93.1	92.8	93.1	92.8	1	75.0-125			0.286	20
Chromium	100	16.5	112	109	95.2	92.8	1	75.0-125			2.12	20
Copper	100	13.1	111	109	97.7	96.3	1	75.0-125			1.31	20
Lead	100	11.2	110	110	98.5	99.1	1	75.0-125			0.504	20
Nickel	100	12.7	115	114	102	102	1	75.0-125			0.286	20

L1160535-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160535-03 11/16/19 14:04 • (MS) R3472862-6 11/16/19 14:12 • (MSD) R3472862-7 11/16/19 14:14

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 %
Selenium	100	ND	89.8	89.5	89.8	89.5	1	75.0-125			0.269	20
Silver	20.0	ND	18.5	18.1	92.5	90.6	1	75.0-125			2.06	20
Zinc	100	35.0	127	125	91.6	90.5	1	75.0-125			0.879	20

Method Blank (MB)

(MB) R3474276-3 11/17/19 13:42

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0457	J	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*103*			*77.0-120*

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

(LCS) R3474276-1 11/17/19 12:35 • (LCSD) R3474276-2 11/17/19 12:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.21	6.32	113	115	72.0-127			1.76	20
(S) a,a,a-Trifluorotoluene(FID)				*107*	*107*	*77.0-120*				

L1161103-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1161103-01 11/17/19 14:04 • (MS) R3474276-4 11/17/19 22:45 • (MSD) R3474276-5 11/17/19 23:08

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 %
TPH (GC/FID) Low Fraction	7.18	0.120	5.08	4.79	69.1	65.1	1	10.0-151			5.82	28
(S) a,a,a-Trifluorotoluene(FID)					*101*	*97.4*		*77.0-120*				

Method Blank (MB)

(MB) R3473261-2 11/16/19 00:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	*103*			*75.0-131*
(S) 4-Bromofluorobenzene	*89.2*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*95.6*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3473261-1 11/15/19 23:04

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.139	111	70.0-123	
Ethylbenzene	0.125	0.109	87.2	74.0-126	
Toluene	0.125	0.117	93.6	75.0-121	
Xylenes, Total	0.375	0.330	88.0	72.0-127	
(S) Toluene-d8			*97.7*	*75.0-131*	
(S) 4-Bromofluorobenzene			*93.0*	*67.0-138*	
(S) 1,2-Dichloroethane-d4			*105*	*70.0-130*	

L1160142-28 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160142-28 11/16/19 07:04 • (MS) R3473261-3 11/16/19 07:23 • (MSD) R3473261-4 11/16/19 07:41

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	10.0	2.22	15.7	15.4	135	132	80	10.0-149			1.93	37
Ethylbenzene	10.0	5.62	16.8	17.1	112	115	80	10.0-160			1.77	38
Toluene	10.0	17.3	32.0	31.6	147	143	80	10.0-156			1.26	38
Xylenes, Total	30.0	34.5	71.9	72.2	125	126	80	10.0-160			0.416	38
(S) Toluene-d8					*98.3*	*98.3*		*75.0-131*				
(S) 4-Bromofluorobenzene					*92.6*	*91.3*		*67.0-138*				
(S) 1,2-Dichloroethane-d4					*102*	*105*		*70.0-130*				

Method Blank (MB)

(MB) R3472912-1 11/16/19 20:16

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	*71.5*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3472912-2 11/16/19 20:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	41.2	82.4	50.0-150	
(S) o-Terphenyl			*94.1*	*18.0-148*	

L1160434-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160434-06 11/16/19 21:32 • (MS) R3472912-3 11/16/19 21:44 • (MSD) R3472912-4 11/16/19 21:57

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	49.2	ND	42.1	38.6	85.6	78.5	1	50.0-150			8.67	20
(S) o-Terphenyl					*77.3*	*71.3*		*18.0-148*				

Method Blank (MB)

(MB) R3472893-1 11/17/19 15:47

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	*69.4*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3472893-2 11/17/19 16:00

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	41.0	82.0	50.0-150	
(S) o-Terphenyl			*100*	*18.0-148*	

L1160829-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160829-01 11/18/19 15:22 • (MS) R3473102-1 11/18/19 16:15 • (MSD) R3473102-2 11/18/19 16:28

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) High Fraction	50.0	ND	41.0	37.2	82.0	74.4	1	50.0-150			9.72	20
(S) o-Terphenyl					*99.1*	*89.6*		*18.0-148*				

Method Blank (MB)

(MB) R3472886-2 11/16/19 11:01

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	*87.1*			*14.0-149*
(S) 2-Fluorobiphenyl	*83.5*			*34.0-125*
(S) p-Terphenyl-d14	*91.8*			*23.0-120*

Laboratory Control Sample (LCS)

(LCS) R3472886-1 11/16/19 10:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.0800	0.0547	68.4	50.0-126	
Acenaphthene	0.0800	0.0569	71.1	50.0-120	
Acenaphthylene	0.0800	0.0595	74.4	50.0-120	
Benzo(a)anthracene	0.0800	0.0571	71.4	45.0-120	
Benzo(a)pyrene	0.0800	0.0498	62.3	42.0-120	
Benzo(b)fluoranthene	0.0800	0.0530	66.3	42.0-121	
Benzo(g,h,i)perylene	0.0800	0.0593	74.1	45.0-125	
Benzo(k)fluoranthene	0.0800	0.0579	72.4	49.0-125	
Chrysene	0.0800	0.0576	72.0	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0597	74.6	47.0-125	
Fluoranthene	0.0800	0.0622	77.8	49.0-129	

Laboratory Control Sample (LCS)

(LCS) R3472886-1 11/16/19 10:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Fluorene	0.0800	0.0578	72.3	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0610	76.3	46.0-125	
Naphthalene	0.0800	0.0555	69.4	50.0-120	
Phenanthrene	0.0800	0.0539	67.4	47.0-120	
Pyrene	0.0800	0.0474	59.3	43.0-123	
1-Methylnaphthalene	0.0800	0.0569	71.1	51.0-121	
2-Methylnaphthalene	0.0800	0.0539	67.4	50.0-120	
2-Chloronaphthalene	0.0800	0.0557	69.6	50.0-120	
(S) Nitrobenzene-d5			*77.9*	*14.0-149*	
(S) 2-Fluorobiphenyl			*74.2*	*34.0-125*	
(S) p-Terphenyl-d14			*78.9*	*23.0-120*	

L1160389-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1160389-01 11/16/19 11:22 • (MS) R3472886-3 11/16/19 11:43 • (MSD) R3472886-4 11/16/19 12:04

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 %
Anthracene	0.0800	U	0.0603	0.0612	75.4	76.5	1	10.0-145			1.48	30
Acenaphthene	0.0800	0.0107	0.0661	0.0677	69.3	71.3	1	14.0-127			2.39	27
Acenaphthylene	0.0800	U	0.0635	0.0655	79.4	81.9	1	21.0-124			3.10	25
Benzo(a)anthracene	0.0800	0.00142	0.0583	0.0597	71.1	72.9	1	10.0-139			2.37	30
Benzo(a)pyrene	0.0800	U	0.0576	0.0589	72.0	73.6	1	10.0-141			2.23	31
Benzo(b)fluoranthene	0.0800	U	0.0540	0.0556	67.5	69.5	1	10.0-140			2.92	36
Benzo(g,h,i)perylene	0.0800	0.000865	0.0601	0.0611	74.0	75.3	1	10.0-140			1.65	33
Benzo(k)fluoranthene	0.0800	U	0.0557	0.0568	69.6	71.0	1	10.0-137			1.96	31
Chrysene	0.0800	0.000710	0.0553	0.0561	68.2	69.2	1	10.0-145			1.44	30
Dibenz(a,h)anthracene	0.0800	U	0.0597	0.0606	74.6	75.8	1	10.0-132			1.50	31
Fluoranthene	0.0800	0.00188	0.0638	0.0652	77.4	79.2	1	10.0-153			2.17	33
Fluorene	0.0800	U	0.0717	0.0732	89.6	91.5	1	11.0-130			2.07	29
Indeno(1,2,3-cd)pyrene	0.0800	U	0.0612	0.0624	76.5	78.0	1	10.0-137			1.94	32
Naphthalene	0.0800	2.45	2.88	2.94	538	613	1	10.0-135	V	V	2.06	27
Phenanthrene	0.0800	0.0187	0.0719	0.0731	66.5	68.0	1	10.0-144			1.66	31
Pyrene	0.0800	0.00367	0.0493	0.0510	57.0	59.2	1	10.0-148			3.39	35
1-Methylnaphthalene	0.0800	1.31	1.50	1.52	238	263	1	10.0-142	V	V	1.32	28
2-Methylnaphthalene	0.0800	2.34	2.66	2.69	400	438	1	10.0-137	V	V	1.12	28
2-Chloronaphthalene	0.0800	U	0.0548	0.0565	68.5	70.6	1	29.0-120			3.05	24
(S) Nitrobenzene-d5					*54.8*	*58.0*		*14.0-149*				
(S) 2-Fluorobiphenyl					*79.6*	*80.1*		*34.0-125*				
(S) p-Terphenyl-d14					*87.5*	*88.8*		*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

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

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
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.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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	LAO00356
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

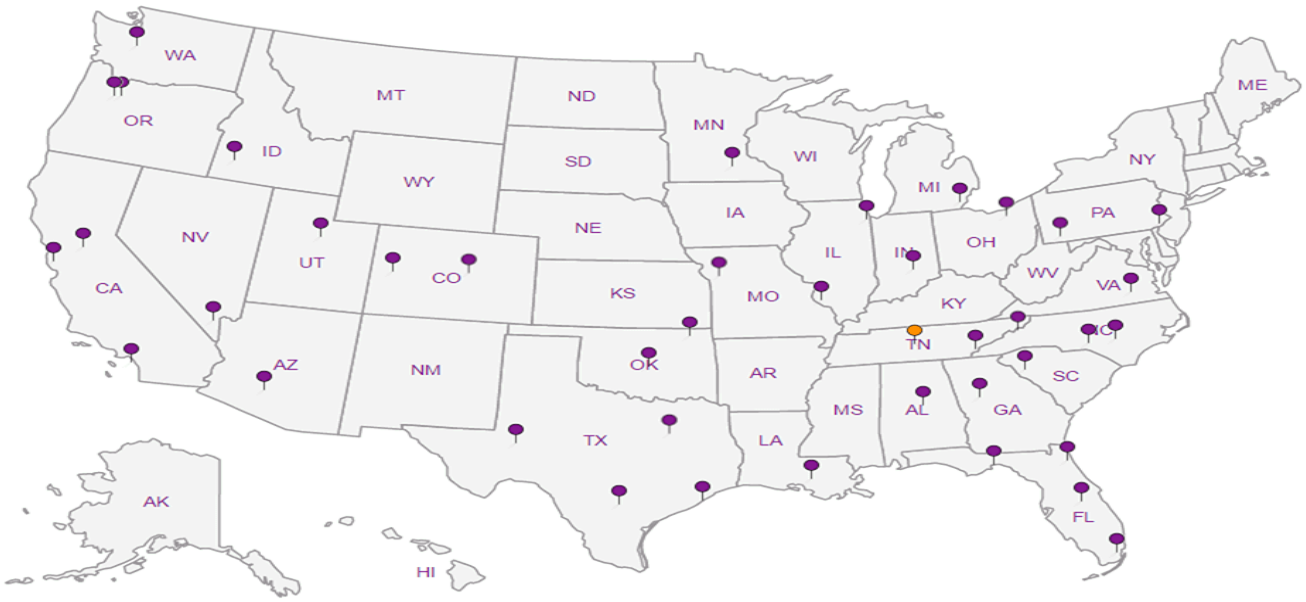
Third Party Federal Accreditations

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.



Caerus Oil & Gas LLC
143 Diamond Avenue
Parachute, CO 81635
970-285-9606

Billing Information: **Same as above**

Report to: **bmiddleton@caerusoilandgas.com**

Email To: **jjanicek@caerusoilandgas.com**

Project Description: K10-596 Gas Lift Release

City/State Collected: Parachute, CO

Phone:
Fax:

Client Project #: K10-596 Gas Lift Release

Lab Project #: K10-596 Gas Lift Release

Collected by (print): ~~Sign for Steve S.~~ ~~Dusty Haar~~ Steve Sivigliano

Site/Facility ID #: K10-596

P.O. #: K10-596 Gas Lift Release

Collected by (signature): Sign for Steve S. ~~Dusty Haar~~ Steve Sivigliano

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
X Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: ~~Standard TAT~~

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	TPH- GRO/DRO (Rush)	BTEX (Rush)	TABLE 910- PAH's (Standard)	SAR, EC, pH (Standard)	TABLE 910- Metals (Standard)	Pres Chk	Remarks	Sample # (lab only)
20191112-K10(W.Wall)@9'	G	S	9'	11-12-19	12:30	3	X	X	X	X	X			-01
20191112-K10(S.Wall)@9'	G	S	9'	11-12-19	12:40	3	X	X	X	X	X			02
20191113-K10(Base)@14'	G	S	14	11-13-19	10:30	3	X	X	X	X	X			03
20191113-K10(E.Wall)@10'	G	S	10'	11-13-19	11:30	3	X	X	X	X	X			04

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L # L116611

T D147

Acctnum:
Template:
Prelogin:
TSR:
PB:
Shipped Via:

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 451016634028

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
~~Dusty Haar~~ Steve Sivigliano	11-13-19	13:45		0	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 0.6+.2=0.8 °C Bottles Received: 12	
	11/13/19	1700			
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	Hold:	Condition: NCF / OK
			Eduardo Lara	11/14/19	9:30		