Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

August 21, 2020

Caerus Oil and Gas

Sample Delivery Group:	L1251523
Samples Received:	08/18/2020
Project Number:	
Description:	F25-496 Flowline

Report To: Jake Janicek
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager

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20200817-F25-496-POR @5.5' L1251523-01 Solid

Collected by	Collected date/time	Received date/time
	08/17/20 12:10	08/18/20 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1525853	1	08/20/20 12:21	08/20/20 12:21	CCE	Mt. Juliet, TN
Calculated Results	WG1528278	1	08/19/20 00:37	08/20/20 15:52	KEG	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1528147	1	08/19/20 09:14	08/20/20 15:52	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1528922	1	08/20/20 12:13	08/20/20 14:44	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1529229	1	08/20/20 11:03	08/20/20 14:00	SRG	Mt. Juliet, TN
Mercury by Method 7471A	WG1528239	1	08/18/20 22:27	08/19/20 07:59	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1528278	1	08/19/20 00:37	08/19/20 10:28	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1528940	5	08/20/20 06:27	08/20/20 11:04	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1528208	1	08/18/20 15:56	08/19/20 03:56	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1528526	1	08/18/20 15:56	08/19/20 12:32	BMB	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1528743	1	08/19/20 16:31	08/20/20 03:44	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1528628	1	08/19/20 12:53	08/19/20 20:06	AAT	Mt. Juliet, TN

20200817-F25-496-STOCKPI 6 L1251523-02 Solid

Collected by	Collected date/time	Received date/time
	08/17/20 12:20	08/18/20 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1525853	1	08/20/20 12:23	08/20/20 12:23	CCE	Mt. Juliet, TN
Calculated Results	WG1528278	1	08/19/20 00:37	08/20/20 15:52	KEG	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1528147	1	08/19/20 09:14	08/20/20 15:52	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1528922	1	08/20/20 12:13	08/20/20 14:44	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1529229	1	08/20/20 11:03	08/20/20 14:00	SRG	Mt. Juliet, TN
Mercury by Method 7471A	WG1528239	1	08/18/20 22:27	08/19/20 08:32	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1528278	.862069	08/19/20 00:37	08/19/20 10:36	EL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1528940	5	08/20/20 06:27	08/20/20 11:24	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1528208	1	08/18/20 15:56	08/19/20 04:17	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1528526	1	08/18/20 15:56	08/19/20 12:51	BMB	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1528743	1	08/19/20 16:31	08/20/20 07:44	TJD	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1528628	1	08/19/20 12:53	08/19/20 20:24	AAT	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	3.11		1	08/20/2020 12:21	WG1525853

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	22.9		1.00	1	08/20/2020 15:52	WG1528278

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	08/20/2020 15:52	WG1528147

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.90	T8	1	08/20/2020 14:44	WG1528922

Sample Narrative:
L1251523-01 WG1528922: 8.9 at 23.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	295		10.0	1	08/20/2020 14:00	WG1529229

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.378	J5 O1	0.0400	1	08/19/2020 07:59	WG1528239

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	925		0.500	1	08/19/2020 10:28	WG1528278
Cadmium	ND		0.500	1	08/19/2020 10:28	WG1528278
Chromium	22.9		1.00	1	08/19/2020 10:28	WG1528278
Copper	16.1		2.00	1	08/19/2020 10:28	WG1528278
Lead	12.9		0.500	1	08/19/2020 10:28	WG1528278
Nickel	15.2		2.00	1	08/19/2020 10:28	WG1528278
Selenium	ND		2.00	1	08/19/2020 10:28	WG1528278
Silver	ND		1.00	1	08/19/2020 10:28	WG1528278
Zinc	45.2		5.00	1	08/19/2020 10:28	WG1528278

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	ND		1.00	5	08/20/2020 11:04	WG1528940

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.263	B	0.100	1	08/19/2020 03:56	WG1528208

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
(S) a,a,a-Trifluorotoluene(FID)	*87.3*		*77.0-120*		*08/19/2020 03:56*	WG1528208

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	08/19/2020 12:32	WG1528526
Toluene	ND		0.00500	1	08/19/2020 12:32	WG1528526
Ethylbenzene	ND		0.00250	1	08/19/2020 12:32	WG1528526
Total Xylenes	ND		0.00650	1	08/19/2020 12:32	WG1528526
(S) Toluene-d8	*111*		*75.0-131*		*08/19/2020 12:32*	WG1528526
(S) 4-Bromofluorobenzene	*95.6*		*67.0-138*		*08/19/2020 12:32*	WG1528526
(S) 1,2-Dichloroethane-d4	*111*		*70.0-130*		*08/19/2020 12:32*	WG1528526

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	73.6		4.00	1	08/20/2020 03:44	WG1528743
(S) o-Terphenyl	*52.6*		*18.0-148*		*08/20/2020 03:44*	WG1528743

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	08/19/2020 20:06	WG1528628
Acenaphthene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Acenaphthylene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Benzo(a)anthracene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Benzo(a)pyrene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Benzo(b)fluoranthene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Benzo(g,h,i)perylene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Benzo(k)fluoranthene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Chrysene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Dibenz(a,h)anthracene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Fluoranthene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Fluorene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Naphthalene	ND		0.0200	1	08/19/2020 20:06	WG1528628
Phenanthrene	ND		0.00600	1	08/19/2020 20:06	WG1528628
Pyrene	ND		0.00600	1	08/19/2020 20:06	WG1528628
1-Methylnaphthalene	ND		0.0200	1	08/19/2020 20:06	WG1528628
2-Methylnaphthalene	ND		0.0200	1	08/19/2020 20:06	WG1528628
2-Chloronaphthalene	ND		0.0200	1	08/19/2020 20:06	WG1528628
(S) p-Terphenyl-d14	*83.6*		*23.0-120*		*08/19/2020 20:06*	WG1528628
(S) Nitrobenzene-d5	*83.2*		*14.0-149*		*08/19/2020 20:06*	WG1528628
(S) 2-Fluorobiphenyl	*77.9*		*34.0-125*		*08/19/2020 20:06*	WG1528628

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.79		1	08/20/2020 12:23	WG1525853

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Trivalent	30.9		0.862	1	08/20/2020 15:52	WG1528278

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	08/20/2020 15:52	WG1528147

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.07	T8	1	08/20/2020 14:44	WG1528922

Sample Narrative:

L1251523-02 WG1528922: 9.07 at 23.2C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	245		10.0	1	08/20/2020 14:00	WG1529229

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.123		0.0400	1	08/19/2020 08:32	WG1528239

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	1200		0.431	.862069	08/19/2020 10:36	WG1528278
Cadmium	ND		0.431	.862069	08/19/2020 10:36	WG1528278
Chromium	30.9		0.862	.862069	08/19/2020 10:36	WG1528278
Copper	18.1		1.72	.862069	08/19/2020 10:36	WG1528278
Lead	12.7		0.431	.862069	08/19/2020 10:36	WG1528278
Nickel	17.1		1.72	.862069	08/19/2020 10:36	WG1528278
Selenium	ND		1.72	.862069	08/19/2020 10:36	WG1528278
Silver	ND		0.862	.862069	08/19/2020 10:36	WG1528278
Zinc	40.0		4.31	.862069	08/19/2020 10:36	WG1528278

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.34		1.00	5	08/20/2020 11:24	WG1528940

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	ND		0.100	1	08/19/2020 04:17	WG1528208

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
(S) a,a,a-Trifluorotoluene(FID)	*84.0*		*77.0-120*		*08/19/2020 04:17*	WG1528208

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	08/19/2020 12:51	WG1528526
Toluene	ND		0.00500	1	08/19/2020 12:51	WG1528526
Ethylbenzene	ND		0.00250	1	08/19/2020 12:51	WG1528526
Total Xylenes	ND		0.00650	1	08/19/2020 12:51	WG1528526
(S) Toluene-d8	*111*		*75.0-131*		*08/19/2020 12:51*	WG1528526
(S) 4-Bromofluorobenzene	*97.8*		*67.0-138*		*08/19/2020 12:51*	WG1528526
(S) 1,2-Dichloroethane-d4	*112*		*70.0-130*		*08/19/2020 12:51*	WG1528526

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	24.9		4.00	1	08/20/2020 07:44	WG1528743
(S) o-Terphenyl	*57.5*		*18.0-148*		*08/20/2020 07:44*	WG1528743

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	08/19/2020 20:24	WG1528628
Acenaphthene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Acenaphthylene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Benzo(a)anthracene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Benzo(a)pyrene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Benzo(b)fluoranthene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Benzo(g,h,i)perylene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Benzo(k)fluoranthene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Chrysene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Dibenz(a,h)anthracene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Fluoranthene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Fluorene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Naphthalene	ND		0.0200	1	08/19/2020 20:24	WG1528628
Phenanthrene	ND		0.00600	1	08/19/2020 20:24	WG1528628
Pyrene	ND		0.00600	1	08/19/2020 20:24	WG1528628
1-Methylnaphthalene	ND		0.0200	1	08/19/2020 20:24	WG1528628
2-Methylnaphthalene	ND		0.0200	1	08/19/2020 20:24	WG1528628
2-Chloronaphthalene	ND		0.0200	1	08/19/2020 20:24	WG1528628
(S) p-Terphenyl-d14	*83.8*		*23.0-120*		*08/19/2020 20:24*	WG1528628
(S) Nitrobenzene-d5	*81.5*		*14.0-149*		*08/19/2020 20:24*	WG1528628
(S) 2-Fluorobiphenyl	*77.1*		*34.0-125*		*08/19/2020 20:24*	WG1528628

Method Blank (MB)

(MB) R3562056-1 08/20/20 15:02

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

L1250209-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1250209-11 08/20/20 15:05 • (DUP) R3562056-3 08/20/20 15:06

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

L1251523-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1251523-02 08/20/20 15:52 • (DUP) R3562056-8 08/20/20 15:53

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

Laboratory Control Sample (LCS)

(LCS) R3562056-2 08/20/20 15:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chromium,Hexavalent	24.0	24.9	104	80.0-120	

L1250455-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1250455-01 08/20/20 15:49 • (MS) R3562056-4 08/20/20 15:50 • (MSD) R3562056-5 08/20/20 15:50

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	7.46	7.36	37.3	36.8	1	75.0-125	J6	J6	1.32	20

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3562033-2 08/20/20 14:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		su		%		%
pH		8.60	1	0.116		1

Sample Narrative:

DUP: 8.6 at 24.4C

L1251782-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1251782-01 08/20/20 14:44 • (DUP) R3562033-3 08/20/20 14:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	9.15	9.16	1	0.109		1

Sample Narrative:

OS: 9.15 at 23.2C

DUP: 9.16 at 23.1C

Laboratory Control Sample (LCS)

(LCS) R3562033-1 08/20/20 14:44

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

Sample Narrative:

LCS: 10.03 at 22.3C

Method Blank (MB)

(MB) R3562082-1 08/20/20 14:00

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

L1250209-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1250209-01 08/20/20 14:00 • (DUP) R3562082-3 08/20/20 14:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	5780	5490	1	5.15		20

L1250278-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1250278-01 08/20/20 14:00 • (DUP) R3562082-4 08/20/20 14:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	183	181	1	1.43		20

Laboratory Control Sample (LCS)

(LCS) R3562082-2 08/20/20 14:00

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

Method Blank (MB)

(MB) R3561385-1 08/19/20 07:54

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

Laboratory Control Sample (LCS)

(LCS) R3561385-2 08/19/20 07:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.500	0.516	103	80.0-120	

L1251523-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1251523-01 08/19/20 07:59 • (MS) R3561385-3 08/19/20 08:01 • (MSD) R3561385-4 08/19/20 08:04

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 %
Mercury	0.500	0.378	1.22	1.25	169	174	1	75.0-125	J5	J5	2.12	20

Method Blank (MB)

(MB) R3561689-1 08/19/20 10:02

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	U		0.240	0.500
Cadmium	U		0.0810	0.500
Chromium	U		0.250	1.00
Copper	U		0.506	2.00
Lead	U		0.208	0.500
Nickel	U		0.490	2.00
Selenium	U		0.617	2.00
Silver	U		0.228	1.00
Zinc	U		0.939	5.00

Laboratory Control Sample (LCS)

(LCS) R3561689-2 08/19/20 10:05

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	97.4	97.4	80.0-120	
Cadmium	100	93.0	93.0	80.0-120	
Chromium	100	95.6	95.6	80.0-120	
Copper	100	92.6	92.6	80.0-120	
Lead	100	96.8	96.8	80.0-120	
Nickel	100	98.9	98.9	80.0-120	
Selenium	100	92.5	92.5	80.0-120	
Silver	20.0	17.7	88.3	80.0-120	
Zinc	100	96.0	96.0	80.0-120	

L1251680-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1251680-02 08/19/20 10:08 • (MS) R3561689-5 08/19/20 10:16 • (MSD) R3561689-6 08/19/20 10:19

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	100	125	196	186	71.0	61.8	1	75.0-125	J6	J6	4.84	20
Cadmium	100	ND	89.1	88.1	89.1	88.1	1	75.0-125			1.07	20
Chromium	100	4.56	94.2	93.7	89.7	89.2	1	75.0-125			0.535	20
Copper	100	11.1	94.0	94.9	82.9	83.7	1	75.0-125			0.949	20
Lead	100	6.15	99.2	98.1	93.1	91.9	1	75.0-125			1.16	20
Nickel	100	4.34	100	99.6	96.1	95.2	1	75.0-125			0.872	20
Selenium	100	ND	69.3	67.4	69.3	67.4	1	75.0-125	J6	J6	2.65	20
Silver	20.0	ND	17.0	16.8	85.2	84.1	1	75.0-125			1.34	20
Zinc	100	31.0	109	111	77.8	80.1	1	75.0-125			2.09	20

Method Blank (MB)

(MB) R3561871-1 08/20/20 10:58

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.422	1.00

Laboratory Control Sample (LCS)

(LCS) R3561871-2 08/20/20 11:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	90.4	90.4	80.0-120	

L1251523-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1251523-01 08/20/20 11:04 • (MS) R3561871-5 08/20/20 11:14 • (MSD) R3561871-6 08/20/20 11:18

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	20.0	ND	81.8	78.3	81.3	77.8	5	75.0-125			4.38	20

Method Blank (MB)

(MB) R3561657-2 08/18/20 21:14

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0296	J	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*96.7*			*77.0-120*

Laboratory Control Sample (LCS)

(LCS) R3561657-1 08/18/20 20:32

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.44	98.9	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			*111*	*77.0-120*	

L1250955-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1250955-03 08/19/20 04:58 • (MS) R3561657-3 08/19/20 05:19 • (MSD) R3561657-4 08/19/20 05:40

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	1090	378	957	1040	53.1	60.7	200	10.0-151			8.31	28
(S) a,a,a-Trifluorotoluene(FID)					*110*	*112*		*77.0-120*				

Method Blank (MB)

(MB) R3561450-2 08/19/20 11:03

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
Ethylbenzene	U		0.000737	0.00250
Toluene	U		0.00130	0.00500
Xylenes, Total	U		0.000880	0.00650
(S) Toluene-d8	*111*			*75.0-131*
(S) 4-Bromofluorobenzene	*95.2*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*113*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3561450-1 08/19/20 09:35

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.103	82.4	70.0-123	
Ethylbenzene	0.125	0.129	103	74.0-126	
Toluene	0.125	0.115	92.0	75.0-121	
Xylenes, Total	0.375	0.388	103	72.0-127	
(S) Toluene-d8			*105*	*75.0-131*	
(S) 4-Bromofluorobenzene			*110*	*67.0-138*	
(S) 1,2-Dichloroethane-d4			*117*	*70.0-130*	

L1251519-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1251519-01 08/19/20 12:13 • (MS) R3561450-3 08/19/20 14:27 • (MSD) R3561450-4 08/19/20 14:46

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	0.125	ND	0.0951	0.116	76.1	92.8	1	10.0-149			19.8	37
Ethylbenzene	0.125	ND	0.121	0.141	96.8	113	1	10.0-160			15.3	38
Toluene	0.125	ND	0.215	0.240	172	192	1	10.0-156	J5	J5	11.0	38
Xylenes, Total	0.375	ND	0.824	0.911	220	243	1	10.0-160	J5	J5	10.0	38
(S) Toluene-d8					*111*	*110*		*75.0-131*				
(S) 4-Bromofluorobenzene					*114*	*109*		*67.0-138*				
(S) 1,2-Dichloroethane-d4					*109*	*107*		*70.0-130*				

Method Blank (MB)

(MB) R3561785-1 08/20/20 01:45

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	*67.1*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3561785-2 08/20/20 01:58

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	39.1	78.2	50.0-150	
(S) o-Terphenyl			*99.2*	*18.0-148*	

Method Blank (MB)

(MB) R3561570-2 08/19/20 14:55

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Anthracene	U		0.00230	0.00600
Acenaphthene	U		0.00209	0.00600
Acenaphthylene	U		0.00216	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(g,h,i)perylene	U		0.00177	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
Naphthalene	U		0.00408	0.0200
Phenanthrene	U		0.00231	0.00600
Pyrene	U		0.00200	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
2-Chloronaphthalene	U		0.00466	0.0200
(S) Nitrobenzene-d5	*77.7*			*14.0-149*
(S) 2-Fluorobiphenyl	*81.4*			*34.0-125*
(S) p-Terphenyl-d14	*94.5*			*23.0-120*

Laboratory Control Sample (LCS)

(LCS) R3561570-1 08/19/20 14:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.0800	0.0669	83.6	50.0-126	
Acenaphthene	0.0800	0.0695	86.9	50.0-120	
Acenaphthylene	0.0800	0.0720	90.0	50.0-120	
Benzo(a)anthracene	0.0800	0.0754	94.3	45.0-120	
Benzo(a)pyrene	0.0800	0.0669	83.6	42.0-120	
Benzo(b)fluoranthene	0.0800	0.0693	86.6	42.0-121	
Benzo(g,h,i)perylene	0.0800	0.0736	92.0	45.0-125	
Benzo(k)fluoranthene	0.0800	0.0698	87.3	49.0-125	
Chrysene	0.0800	0.0727	90.9	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0738	92.3	47.0-125	
Fluoranthene	0.0800	0.0683	85.4	49.0-129	

Laboratory Control Sample (LCS)

(LCS) R3561570-1 08/19/20 14:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Fluorene	0.0800	0.0721	90.1	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0732	91.5	46.0-125	
Naphthalene	0.0800	0.0683	85.4	50.0-120	
Phenanthrene	0.0800	0.0706	88.3	47.0-120	
Pyrene	0.0800	0.0767	95.9	43.0-123	
1-Methylnaphthalene	0.0800	0.0717	89.6	51.0-121	
2-Methylnaphthalene	0.0800	0.0679	84.9	50.0-120	
2-Chloronaphthalene	0.0800	0.0714	89.3	50.0-120	
(S) Nitrobenzene-d5			*92.1*	*14.0-149*	
(S) 2-Fluorobiphenyl			*88.5*	*34.0-125*	
(S) p-Terphenyl-d14			*96.3*	*23.0-120*	

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3561570-3 08/19/20 18:57 • (MSD) R3561570-4 08/19/20 19:15

Analyte	Spike Amount mg/kg	Original Result	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		0.0615	0.0627	76.9	78.4	1	10.0-145			1.93	30
Acenaphthene	0.0800		0.0605	0.0622	75.6	77.8	1	14.0-127			2.77	27
Acenaphthylene	0.0800		0.0661	0.0668	82.6	83.5	1	21.0-124			1.05	25
Benzo(a)anthracene	0.0800		0.0716	0.0746	77.0	80.8	1	10.0-139			4.10	30
Benzo(a)pyrene	0.0800		0.0609	0.0643	66.0	70.3	1	10.0-141			5.43	31
Benzo(b)fluoranthene	0.0800		0.0585	0.0639	57.8	64.5	1	10.0-140			8.82	36
Benzo(g,h,i)perylene	0.0800		0.0580	0.0646	59.1	67.4	1	10.0-140			10.8	33
Benzo(k)fluoranthene	0.0800		0.0572	0.0620	71.5	77.5	1	10.0-137			8.05	31
Chrysene	0.0800		0.0644	0.0677	67.6	71.8	1	10.0-145			5.00	30
Dibenz(a,h)anthracene	0.0800		0.0589	0.0623	73.6	77.9	1	10.0-132			5.61	31
Fluoranthene	0.0800		0.0683	0.0761	59.0	68.8	1	10.0-153			10.8	33
Fluorene	0.0800		0.0635	0.0637	79.4	79.6	1	11.0-130			0.314	29
Indeno(1,2,3-cd)pyrene	0.0800		0.0633	0.0677	70.3	75.8	1	10.0-137			6.72	32
Naphthalene	0.0800		0.0573	0.0603	71.6	75.4	1	10.0-135			5.10	27
Phenanthrene	0.0800		0.0643	0.0676	65.8	69.9	1	10.0-144			5.00	31
Pyrene	0.0800		0.0688	0.0744	65.4	72.4	1	10.0-148			7.82	35
1-Methylnaphthalene	0.0800		0.0619	0.0638	77.4	79.8	1	10.0-142			3.02	28
2-Methylnaphthalene	0.0800		0.0583	0.0603	72.9	75.4	1	10.0-137			3.37	28
2-Chloronaphthalene	0.0800		0.0609	0.0623	76.1	77.9	1	29.0-120			2.27	24
(S) Nitrobenzene-d5					*81.7*	*80.3*		*14.0-149*				
(S) 2-Fluorobiphenyl					*77.1*	*74.6*		*34.0-125*				
(S) p-Terphenyl-d14					*80.2*	*77.9*		*23.0-120*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

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

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
T8	Sample(s) received past/too close to holding time expiration.

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

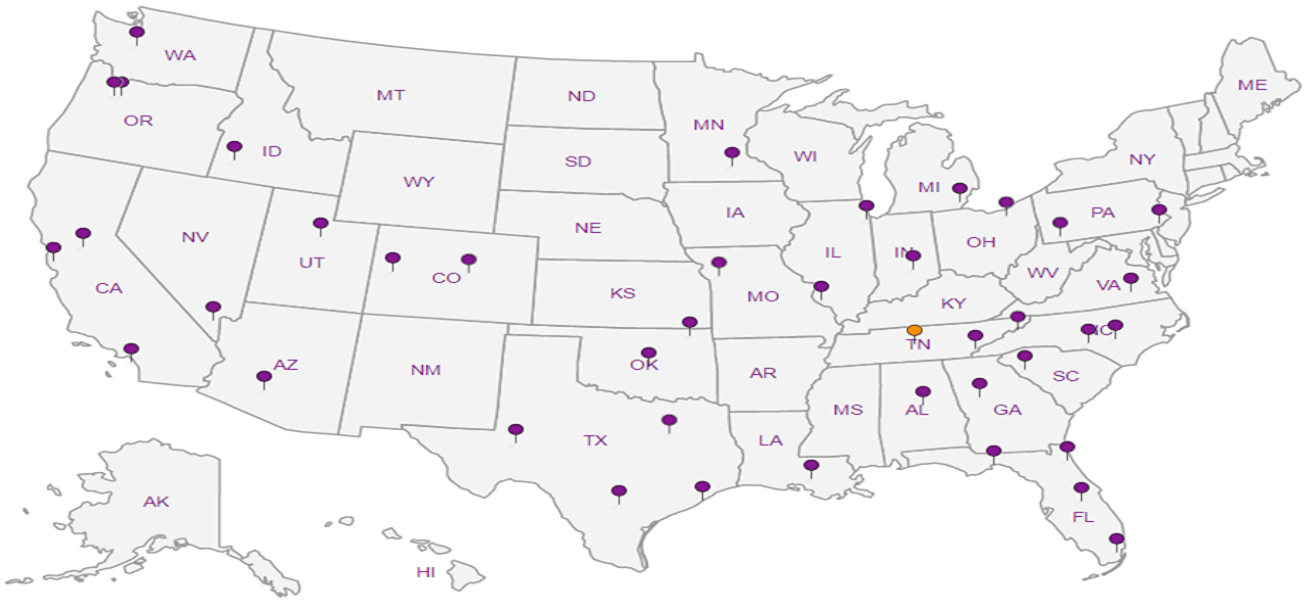
Third Party Federal Accreditations

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.



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical www.pacelabs.com

Page: 1 of 1

Section A Required Client Information:

Company:	Caerus
Address:	143 Diamond Ave
Email To:	jjanicek@caerusoilandgas.com
Phone:	970-778-2314 Fax:
Requested Due Date/TAT:	2-Day

Section B Required Project Information:

Report To:	Jake Janicek
Copy To:	Brett Middleton, Blair Rollins
Purchase Order No.:	
Project Name:	~~F25-5~~ F25-496 Flowline
Project Number:	

Section C Invoice Information:

Attention:	Jake Janicek
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: CO

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

Pace Project No./ Lab I.D.: L1251523

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	TPH - GRO/DRO	BTEX	Table 910-1 PAHs	Table 910-1 Metals	EC	SAR	pH	Benzene Only	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	20200817-F25-496-POR@5.5'					8-17-20	1210		2	X									X	X	X	X	X	X	X			-01
2	20200817-F25-496-Stockpile					〃	1220		2	X									X	X	X	X	X	X	X			-02
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

Sample Receipt Checklist
COC Seal Present/Intact: Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
RAD Screen <0.5 mR/hr: Y N
If Applicable
VOA Zero Headspace: Y N
Pres.Correct/Check: Y N

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	8-17-20	1500	[signature]			1.7.1.2			
	[signature]	8/17/20	1700	B. Banas	8-18-20	0930	1.5 AT			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jake Janicek

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-17-20

A194

TrK #1676 2750 2804

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007