20-Dec-2019

Jake Janicek
Caerus Oil and Gas LLC
143 Diamond Ave.
Parachute, CO 81635

Re: **L19-595 Dumpline** Work Order: **19120802**

Dear Jake,

ALS Environmental received 1 sample on 11-Dec-2019 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 20.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

ALS Group, USA

Date: 20-Dec-19

Client: Caerus Oil and Gas LLC
Project: L19-595 Dumpline
Work Order: **19120802**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
19120802-01	2019210-L19-595-PH01@ 14'	Soil		12/10/2019 10:45	12/11/2019 10:00	☐

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
°C	Degrees Celcius
mg/Kg	Milligrams per Kilogram
mg/Kg-dry	Milligrams per Kilogram Dry Weight
mg/L	Milligrams per Liter
mmhos/cm @25°C	Millimhos-Centimeter at 25 Degrees Celcius
none	

s.u. Standard Units

ALS Group, USA

Date: *20-Dec-19*

Client: Caerus Oil and Gas LLC
Project: L19-595 Dumpline
Sample ID: 2019210-L19-595-PH01@ 14'
Collection Date: 12/10/2019 10:45 AM

Work Order: 19120802
Lab ID: 19120802-01
Matrix: SOIL

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **SW8015M**			Prep: SW3550 / 12/13/19		Analyst: **BCM**
DRO (C10-C28)	**19**		**4.4**	**7.8**	**mg/Kg-dry**	1	12/17/2019 12:20
Surr: 4-Terphenyl-d14	*65.7*			*33-111*	*%REC*	1	12/17/2019 12:20
GASOLINE RANGE ORGANICS BY GC-FID		Method: **SW8015D**			Prep: SW5035 / 12/12/19		Analyst: **BCM**
GRO (C6-C10)	U		1.6	3.7	mg/Kg	1	12/13/2019 07:33
Surr: Toluene-d8	*80.8*			*71-123*	*%REC*	1	12/13/2019 07:33
MERCURY BY CVAA		Method: **SW7471B**			Prep: SW7471 / 12/18/19		Analyst: **RSH**
Mercury	**0.018**	J	**0.0022**	**0.022**	**mg/Kg-dry**	1	12/18/2019 11:52
METALS BY ICP-MS		Method: **SW6020A**			Prep: SW3050B / 12/16/19		Analyst: **STP**
Arsenic	**11**		**0.043**	**0.36**	**mg/Kg-dry**	1	12/16/2019 21:37
Barium	**340**		**3.3**	**3.6**	**mg/Kg-dry**	10	12/17/2019 14:22
Cadmium	**0.49**		**0.022**	**0.14**	**mg/Kg-dry**	1	12/16/2019 21:37
Chromium	**26**		**0.16**	**0.36**	**mg/Kg-dry**	1	12/16/2019 21:37
Copper	**29**		**3.6**	**3.6**	**mg/Kg-dry**	10	12/17/2019 14:22
Lead	**20**		**0.17**	**0.36**	**mg/Kg-dry**	1	12/16/2019 21:37
Nickel	**24**		**1.9**	**3.6**	**mg/Kg-dry**	10	12/17/2019 14:22
Selenium	**0.54**		**0.33**	**0.36**	**mg/Kg-dry**	1	12/16/2019 21:37
Silver	**0.067**	J	**0.048**	**0.36**	**mg/Kg-dry**	1	12/16/2019 21:37
Zinc	**63**		**0.71**	**0.72**	**mg/Kg-dry**	1	12/16/2019 21:37
SOLUBLE CATIONS FOR SAR		Method: **SW6020A**			Prep: USDA Method 20B / 12/17/19		Analyst: **STP**
Calcium	**140**		**2.5**	**5.0**	**mg/L**	10	12/17/2019 15:32
Magnesium	**200**		**0.50**	**2.0**	**mg/L**	10	12/17/2019 15:32
Sodium	**150**		**0.45**	**2.0**	**mg/L**	10	12/17/2019 15:32
SODIUM ADSORPTION RATIO		Method: **USDA H60 METHOD 2**			Prep: USDA Method 20B / 12/17/19		Analyst: **STP**
Sodium Adsorption Ratio	**1.9**		**0.010**	**0.010**	**none**	1	12/17/2019
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)		Method: **SW846 8270D**			Prep: SW3546 / 12/17/19		Analyst: **EEW**
Acenaphthene	U		0.0014	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Anthracene	U		0.0025	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Benzo(a)anthracene	U		0.0030	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Benzo(a)pyrene	U		0.0020	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Benzo(b)fluoranthene	U		0.0018	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Benzo(k)fluoranthene	U		0.0022	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Chrysene	U		0.0015	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Dibenzo(a,h)anthracene	U		0.0017	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Fluoranthene	U		0.0014	0.0074	mg/Kg-dry	1	12/20/2019 16:04

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *20-Dec-19*

Client: Caerus Oil and Gas LLC
Project: L19-595 Dumpline
Sample ID: 2019210-L19-595-PH01@ 14'
Collection Date: 12/10/2019 10:45 AM

Work Order: 19120802
Lab ID: 19120802-01
Matrix: SOIL

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Fluorene	U		0.0024	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Indeno(1,2,3-cd)pyrene	U		0.0027	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Naphthalene	U		0.0032	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Pyrene	U		0.0012	0.0074	mg/Kg-dry	1	12/20/2019 16:04
Surr: 2-Fluorobiphenyl	*92.1*			*20-140*	*%REC*	1	12/20/2019 16:04
Surr: 4-Terphenyl-d14	*75.4*			*22-172*	*%REC*	1	12/20/2019 16:04
Surr: Nitrobenzene-d5	*87.7*			*28-140*	*%REC*	1	12/20/2019 16:04
VOLATILE ORGANIC COMPOUNDS		Method:	**SW8260C**		Prep: SW5035 / 12/12/19		Analyst: **WH**
Benzene	U		0.0050	0.029	mg/Kg-dry	1	12/12/2019 22:51
Ethylbenzene	U		0.0062	0.029	mg/Kg-dry	1	12/12/2019 22:51
m,p-Xylene	U		0.039	0.059	mg/Kg-dry	1	12/12/2019 22:51
o-Xylene	U		0.011	0.029	mg/Kg-dry	1	12/12/2019 22:51
Toluene	U		0.0080	0.029	mg/Kg-dry	1	12/12/2019 22:51
Xylenes, Total	U		0.039	0.088	mg/Kg-dry	1	12/12/2019 22:51
Surr: 1,2-Dichloroethane-d4	*113*			*70-130*	*%REC*	1	12/12/2019 22:51
Surr: 4-Bromofluorobenzene	*106*			*70-130*	*%REC*	1	12/12/2019 22:51
Surr: Dibromofluoromethane	*95.2*			*70-130*	*%REC*	1	12/12/2019 22:51
Surr: Toluene-d8	*99.8*			*70-130*	*%REC*	1	12/12/2019 22:51
ELECTRICAL CONDUCTIVITY (SAR)		Method:	**USDA H60 METHOD 2**		Prep: USDA Method 20B / 12/17/19		Analyst: **QTN**
Electrical Conductivity @ Saturation	**3.4**		**0.011**	**0.10**	**mmhos/cm @25°**	20	12/17/2019 14:59
CHROMIUM, TRIVALENT		Method:	**CALCULATION**				Analyst: **JZB**
Chromium, Trivalent	**26**		**0.35**	**1.1**	**mg/Kg-dry**	1	12/18/2019 15:08
CHROMIUM, HEXAVALENT		Method:	**SW7196A**		Prep: SW3060A / 12/17/19		Analyst: **RZM**
Chromium, Hexavalent	U		0.95	1.1	mg/Kg-dry	1	12/18/2019 13:04
MOISTURE		Method:	**SW3550C**				Analyst: **KTP**
Moisture	**12**		**0.10**	**0.10**	**% of sample**	1	12/12/2019 13:36
PH		Method:	**SW9045D**		Prep: EXTRACT / 12/12/19		Analyst: **DNW**
pH	**8.33**		**0.10**	**0.100**	**s.u.**	1	12/12/2019 14:00
Temperature	**22.1**		**0.10**	**0.100**	**°C**	1	12/12/2019 14:00

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 20-Dec-19

Client: Caerus Oil and Gas LLC

Work Order: 19120802

Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **146994** Instrument ID **GC8** Method: **SW8015M**

MBLK Sample ID: **dblks1-146994-146994** Units: **mg/Kg** Analysis Date: **12/16/2019 11:37 A**

Client ID: Run ID: **GC8_191216B** SeqNo: **6135848** Prep Date: **12/13/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	5.0								
Surr: 4-Terphenyl-d14	*2.949*	0	*3.33*	0	*88.6*	*33-111*	0			

LCS Sample ID: **dlcss1-146994-146994** Units: **mg/Kg** Analysis Date: **12/16/2019 12:07 P**

Client ID: Run ID: **GC8_191216B** SeqNo: **6135849** Prep Date: **12/13/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	360.2	5.0	333	0	108	80-121	0			
Surr: 4-Terphenyl-d14	*2.603*	0	*3.33*	0	*78.2*	*33-111*	0			

LCSD Sample ID: **dlcsds1-146994-146994** Units: **mg/Kg** Analysis Date: **12/16/2019 12:36 P**

Client ID: Run ID: **GC8_191216B** SeqNo: **6135850** Prep Date: **12/13/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	328.8	5.0	333	0	98.7	80-121	360.2	9.11	30	
Surr: 4-Terphenyl-d14	*2.452*	0	*3.33*	0	*73.6*	*33-111*	2.603	*5.96*	*30*	

The following samples were analyzed in this batch: 19120802-01a

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147011** Instrument ID **GC9** Method: **SW8015D**

MBLK	Sample ID: **MBLK-147011-147011**				Units: **µg/Kg-dry**			Analysis Date: **12/13/2019 05:37 A**			
Client ID:		Run ID: **GC9_191212D**			SeqNo: **6126537**			Prep Date: **12/12/2019**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	5,000								
Surr: Toluene-d8	*3935*	0	*5000*	0	*78.7*	*71-123*	0			

LCS	Sample ID: **LCS-147011-147011**				Units: **µg/Kg-dry**			Analysis Date: **12/13/2019 04:38 A**			
Client ID:		Run ID: **GC9_191212D**			SeqNo: **6126536**			Prep Date: **12/12/2019**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	486800	5,000	500000	0	97.4	71-123	0			
Surr: Toluene-d8	*4752*	0	*5000*	0	*95*	*71-123*	0			

MS	Sample ID: **19120904-01B MS**				Units: **µg/Kg-dry**			Analysis Date: **12/13/2019 11:27 A**			
Client ID:		Run ID: **GC9_191212D**			SeqNo: **6126545**			Prep Date: **12/12/2019**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	703800	5,300	528000	0	133	71-123	0			S
Surr: Toluene-d8	*6181*	0	*5280*	0	*117*	*71-123*	0			

MSD	Sample ID: **19120904-01B MSD**				Units: **µg/Kg-dry**			Analysis Date: **12/13/2019 11:56 A**			
Client ID:		Run ID: **GC9_191212D**			SeqNo: **6126546**			Prep Date: **12/12/2019**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	675400	4,900	486900	0	139	71-123	703800	4.11	30	S
Surr: Toluene-d8	*5503*	0	*4869*	0	*113*	*71-123*	6181	*11.6*	*30*	

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147304** Instrument ID **HG4** Method: **SW7471B**

MBLK Sample ID: **MBLK-147304-147304** Units: **mg/Kg** Analysis Date: **12/18/2019 11:33 A**
Client ID: Run ID: **HG4_191218A** SeqNo: **6137967** Prep Date: **12/18/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	0.020								

LCS Sample ID: **LCS-147304-147304** Units: **mg/Kg** Analysis Date: **12/18/2019 12:06 P**
Client ID: Run ID: **HG4_191218A** SeqNo: **6137981** Prep Date: **12/18/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.1474	0.020	0.1665	0	88.5	80-120	0			

MS Sample ID: **19120851-11AMS** Units: **mg/Kg** Analysis Date: **12/18/2019 12:02 P**
Client ID: Run ID: **HG4_191218A** SeqNo: **6137979** Prep Date: **12/18/2019** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	4.625	1.8	0.1469	4.238	263	75-125	0			SO

MSD Sample ID: **19120851-11AMSD** Units: **mg/Kg** Analysis Date: **12/18/2019 12:04 P**
Client ID: Run ID: **HG4_191218A** SeqNo: **6137980** Prep Date: **12/18/2019** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	3.27	1.7	0.1452	4.238	-667	75-125	4.625	34.3	35	SO

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147192** Instrument ID **ICPMS3** Method: **SW6020A**

MBLK Sample ID: **MBLK-147192-147192** Units: **mg/Kg** Analysis Date: **12/16/2019 09:18 P**
Client ID: Run ID: **ICPMS3_191216B** SeqNo: **6131742** Prep Date: **12/16/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.25								
Barium	U	0.25								
Cadmium	U	0.10								
Chromium	U	0.25								
Copper	U	0.25								
Lead	U	0.25								
Nickel	U	0.25								
Selenium	U	0.25								
Silver	U	0.25								
Zinc	U	0.50								

LCS Sample ID: **LCS-147192-147192** Units: **mg/Kg** Analysis Date: **12/16/2019 09:20 P**
Client ID: Run ID: **ICPMS3_191216B** SeqNo: **6131743** Prep Date: **12/16/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	5.005	0.25	5	0	100	80-120	0			
Barium	4.904	0.25	5	0	98.1	80-120	0			
Cadmium	4.834	0.10	5	0	96.7	80-120	0			
Chromium	5.136	0.25	5	0	103	80-120	0			
Copper	5.137	0.25	5	0	103	80-120	0			
Lead	5.034	0.25	5	0	101	80-120	0			
Nickel	5.123	0.25	5	0	102	80-120	0			
Selenium	4.903	0.25	5	0	98.1	80-120	0			
Silver	4.936	0.25	5	0	98.7	80-120	0			
Zinc	5.273	0.50	5	0	105	80-120	0			

MS Sample ID: **19120991-06AMS** Units: **mg/Kg** Analysis Date: **12/16/2019 10:45 P**
Client ID: Run ID: **ICPMS3_191216B** SeqNo: **6131793** Prep Date: **12/16/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.926	0.36	7.184	3.807	85.2	75-125	0			
Barium	268.3	0.36	7.184	249.4	264	75-125	0			SEO
Cadmium	6.389	0.14	7.184	0.07214	87.9	75-125	0			
Chromium	30.78	0.36	7.184	25.53	73.1	75-125	0			S
Copper	15	0.36	7.184	9.032	83.1	75-125	0			
Lead	18.03	0.36	7.184	10.27	108	75-125	0			
Nickel	18.06	0.36	7.184	12.04	83.7	75-125	0			
Selenium	6.737	0.36	7.184	0.155	91.6	75-125	0			
Silver	5.952	0.36	7.184	0.03835	82.3	75-125	0			
Zinc	40.4	0.72	7.184	35.18	72.5	75-125	0			SO

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147192** Instrument ID **ICPMS3** Method: **SW6020A**

MSD Sample ID: **19120991-06AMSD** Units: **mg/Kg** Analysis Date: **12/16/2019 10:47 P**

Client ID: Run ID: **ICPMS3_191216B** SeqNo: **6131794** Prep Date: **12/16/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.716	0.36	7.225	3.807	81.8	75-125	9.926	2.14	20	
Barium	251.9	0.36	7.225	249.4	34.2	75-125	268.3	6.33	20	SEO
Cadmium	6.203	0.14	7.225	0.07214	84.8	75-125	6.389	2.96	20	
Chromium	32	0.36	7.225	25.53	89.5	75-125	30.78	3.87	20	
Copper	14.51	0.36	7.225	9.032	75.9	75-125	15	3.31	20	
Lead	17.31	0.36	7.225	10.27	97.4	75-125	18.03	4.06	20	
Nickel	18.37	0.36	7.225	12.04	87.6	75-125	18.06	1.73	20	
Selenium	6.583	0.36	7.225	0.155	89	75-125	6.737	2.32	20	
Silver	5.949	0.36	7.225	0.03835	81.8	75-125	5.952	0.0435	20	
Zinc	40.95	0.72	7.225	35.18	79.8	75-125	40.4	1.36	20	O

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **147242** Instrument ID **ICPMS3** Method: **SW6020A**

DUP Sample ID: **19120809-02CDUP** Units: **mg/L** Analysis Date: **12/17/2019 03:40 P**
Client ID: Run ID: **ICPMS3_191217A** SeqNo: **6135791** Prep Date: **12/17/2019** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	20.45	5.0	0	0	0	0-0	23.82	15.2		
Magnesium	9.757	2.0	0	0	0	0-0	11.34	15		
Sodium	52.62	2.0	0	0	0	0-0	63.49	18.7		

The following samples were analyzed in this batch: 19120802-01A

Batch ID: **147242** Instrument ID **SAR** Method: **USDA H60 Metho**

DUP Sample ID: **19120809-02CDUP** Units: **none** Analysis Date: **12/17/2019**
Client ID: Run ID: **SAR_191217A** SeqNo: **6135857** Prep Date: **12/17/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium Adsorption Ratio	2.397	0.010	0	0	0		2.681	11.2	50	

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147012** Instrument ID **VMS11** Method: **SW8260C**

MBLK Sample ID: **MBLK-147012-147012** Units: **µg/Kg-dry** Analysis Date: **12/16/2019 11:11 P**
Client ID: Run ID: **VMS11_191216B** SeqNo: **6134094** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	30								
Ethylbenzene	U	30								
m,p-Xylene	U	60								
o-Xylene	U	30								
Toluene	U	30								
Xylenes, Total	U	90								
Surr: 1,2-Dichloroethane-d4	*986.5*	0	*1000*	0	*98.6*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1023*	0	*1000*	0	*102*	*70-130*	0			
Surr: Dibromofluoromethane	*927*	0	*1000*	0	*92.7*	*70-130*	0			
Surr: Toluene-d8	*898*	0	*1000*	0	*89.8*	*70-130*	0			

LCS Sample ID: **LCS-147012-147012** Units: **µg/Kg-dry** Analysis Date: **12/16/2019 10:04 P**
Client ID: Run ID: **VMS11_191216B** SeqNo: **6134093** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	977	30	1000	0	97.7	75-125	0			
Ethylbenzene	880	30	1000	0	88	75-125	0			
m,p-Xylene	1798	60	2000	0	89.9	80-125	0			
o-Xylene	914	30	1000	0	91.4	75-125	0			
Toluene	887.5	30	1000	0	88.8	70-125	0			
Xylenes, Total	2712	90	3000	0	90.4	75-125	0			
Surr: 1,2-Dichloroethane-d4	*970.5*	0	*1000*	0	*97*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1038*	0	*1000*	0	*104*	*70-130*	0			
Surr: Dibromofluoromethane	*991.5*	0	*1000*	0	*99.2*	*70-130*	0			
Surr: Toluene-d8	*902*	0	*1000*	0	*90.2*	*70-130*	0			

MS Sample ID: **19120904-01A MS** Units: **µg/Kg-dry** Analysis Date: **12/17/2019 07:03 A**
Client ID: Run ID: **VMS11_191216B** SeqNo: **6134108** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1366	43	1448	0	94.4	75-125	0			
Ethylbenzene	1205	43	1448	0	83.2	75-125	0			
m,p-Xylene	2459	87	2895	9.471	84.6	80-125	0			
o-Xylene	1280	43	1448	0	88.4	75-125	0			
Toluene	1225	43	1448	0	84.6	70-125	0			
Xylenes, Total	3739	130	4343	0	86.1	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1381*	0	*1448*	0	*95.4*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1503*	0	*1448*	0	*104*	*70-130*	0			
Surr: Dibromofluoromethane	*1373*	0	*1448*	0	*94.8*	*70-130*	0			
Surr: Toluene-d8	*1274*	0	*1448*	0	*88*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147012** Instrument ID **VMS11** Method: **SW8260C**

MSD Sample ID: **19120904-01A MSD** Units: **µg/Kg-dry** Analysis Date: **12/17/2019 07:26 A**

Client ID: Run ID: **VMS11_191216B** SeqNo: **6134109** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1373	40	1350	0	102	75-125	1366	0.497	30	
Ethylbenzene	1231	40	1350	0	91.2	75-125	1205	2.12	30	
m,p-Xylene	2527	81	2699	9.471	93.2	80-125	2459	2.69	30	
o-Xylene	1306	40	1350	0	96.8	75-125	1280	2.02	30	
Toluene	1257	40	1350	0	93.2	70-125	1225	2.62	30	
Xylenes, Total	3832	120	4049	0	94.6	75-125	3739	2.46	30	
Surr: 1,2-Dichloroethane-d4	*1281*	0	*1350*	0	*95*	*70-130*	1381	*7.47*	*30*	
Surr: 4-Bromofluorobenzene	*1416*	0	*1350*	0	*105*	*70-130*	1503	*5.95*	*30*	
Surr: Dibromofluoromethane	*1303*	0	*1350*	0	*96.6*	*70-130*	1373	*5.23*	*30*	
Surr: Toluene-d8	*1192*	0	*1350*	0	*88.4*	*70-130*	1274	*6.61*	*30*	

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147007** Instrument ID **WETCHEM** Method: **SW9045D**

LCS Sample ID: **LCS-147007-147007** Units: **s.u.** Analysis Date: **12/12/2019 02:00 P**
Client ID: Run ID: **WETCHEM_191212O** SeqNo: **6122624** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	4.08	0.10	4	0	102	90-110	0			

DUP Sample ID: **19120788-01C DUP** Units: **s.u.** Analysis Date: **12/12/2019 02:00 P**
Client ID: Run ID: **WETCHEM_191212O** SeqNo: **6122628** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.64	0.10	0	0	0	0-0	7.88	3.09	20	
Temperature	22	0.10	0	0	0		22	0		

DUP Sample ID: **19120852-03A DUP** Units: **s.u.** Analysis Date: **12/12/2019 02:00 P**
Client ID: Run ID: **WETCHEM_191212O** SeqNo: **6122632** Prep Date: **12/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	11.79	0.10	0	0	0	0-0	11.6	1.62	20	
Temperature	22.3	0.10	0	0	0		22.6	1.34		

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147242** Instrument ID **WETCHEM** Method: **USDA H60 Metho**

DUP Sample ID: **19120809-02C DUP** Units: **mmhos/cm @25°** Analysis Date: **12/17/2019 02:59 P**

Client ID: Run ID: **WETCHEM_191217P** SeqNo: **6135949** Prep Date: **12/17/2019** DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Electrical Conductivity @ Saturation	0.498	0.10	0	0	0		0.514	3.16	50	

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **147321** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MBLK-147321-147321** Units: **mg/Kg** Analysis Date: **12/18/2019 01:04 P**
Client ID: Run ID: **WETCHEM_191218L** SeqNo: **6137991** Prep Date: **12/17/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	U	1.0								

LCS Sample ID: **LCS-147321-147321** Units: **mg/Kg** Analysis Date: **12/18/2019 01:04 P**
Client ID: Run ID: **WETCHEM_191218L** SeqNo: **6137992** Prep Date: **12/17/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.28	1.0	5	0	85.6	80-120	0			

MS Sample ID: **19120573-10C MS** Units: **mg/Kg** Analysis Date: **12/18/2019 01:04 P**
Client ID: Run ID: **WETCHEM_191218L** SeqNo: **6137998** Prep Date: **12/17/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	3.9	1.0	5	0.3	72	75-125	0			S

MS Sample ID: **19120573-10C MSI** Units: **mg/Kg** Analysis Date: **12/18/2019 01:04 P**
Client ID: Run ID: **WETCHEM_191218L** SeqNo: **6138000** Prep Date: **12/17/2019** DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	2615	100	2816	0.3	92.9	75-125	0			

MSD Sample ID: **19120573-10C MSD** Units: **mg/Kg** Analysis Date: **12/18/2019 01:04 P**
Client ID: Run ID: **WETCHEM_191218L** SeqNo: **6137999** Prep Date: **12/17/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	4.03	1.0	5	0.3	74.6	75-125	3.9	3.28	20	S

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Caerus Oil and Gas LLC
Work Order: 19120802
Project: L19-595 Dumpline

QC BATCH REPORT

Batch ID: **R277504** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R277504** Units: **% of sample** Analysis Date: **12/12/2019 01:36 P**
Client ID: Run ID: **MOIST_191212B** SeqNo: **6124465** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.10								

LCS Sample ID: **LCS-R277504** Units: **% of sample** Analysis Date: **12/12/2019 01:36 P**
Client ID: Run ID: **MOIST_191212B** SeqNo: **6124464** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.10	100	0	100	98-102	0			

DUP Sample ID: **19120851-01A DUP** Units: **% of sample** Analysis Date: **12/12/2019 01:36 P**
Client ID: Run ID: **MOIST_191212B** SeqNo: **6124441** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	19.14	0.10	0	0	0	0-0	18.87	1.42	10	

DUP Sample ID: **19120852-01A DUP** Units: **% of sample** Analysis Date: **12/12/2019 01:36 P**
Client ID: Run ID: **MOIST_191212B** SeqNo: **6124449** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.10	0	0	0	0-0	-5.48	0	10	

The following samples were analyzed in this batch: 19120802-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Chain of Custody Form

ALS Environmental

Page 1 of 1

COC ID: 123456

☐ Cincinnati, OH +1 513 733 5336 ☒ Kelso, WA +1 360 577 7222 ☐ Salt Lake City, UT +1 801 266 7700
☐ Everett, WA +1 425 356 2600 ☐ Houston, TX +1 281 530 5656 ☐ Spring City, PA +1 610 948 4903
☐ Fort Collins, CO +1 970 490 1511 ☐ Middletown, PA +1 717 944 5541 ☐ York, PA +1 717 505 5280

ALS Project Manager: | Work Order #: 1911208OL

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	L19-595 Dumpline	A	TPH GRO/DRO
Work Order		Project Number		B	BTEX
Company Name	Caerus	Bill To Company		C	Table 910 PAHs
Send Report To	Jake Janicek	Invoice Attn.		D	Table 910 Metals
Address		Address		E	EC
				F	pH
City/State/Zip		City/State/Zip		G	SAR
Phone		Phone		H	
Fax		Fax		I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	~~20191210-LP~~																
2	20191210-L19-595-Pipel@1ft'	12-10-19	1045	Soil	-	2	X	X	X	X	X	X	X				
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s): Please Print & Sign: Jake Janicek

Shipment Method:

Required Turnaround Time: ☐ STD 10 Wk Days ☒ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

	Date:	Time:		
Relinquished by:	12-10-19	1045	Received by:	Notes:
Relinquished by:	12-10-19	1820	Received by (Laboratory): 12/11/19 1700	Cooler Temp. 1.2°C SR7
Logged by (Laboratory): MG	12-11-19	14:33	Checked by (Laboratory):	

QC Package: (Check Box Below)
☐ Level II: Standard QC
☐ Level III: Std QC + Raw Data
☐ Level IV: SW846 CLP-Like
☐ Other: _____

Preservative Key: 1-HCL 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4 degrees C 9-5035

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

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Sample Receipt Checklist

Client Name: **CAERUS** Date/Time Received: **11-Dec-19 10:00**

Work Order: **19120802** Received by: **MJG**

Checklist completed by Matthew Gaylord (eSignature) 11-Dec-19 (Date) Reviewed by: Chad Whelton (eSignature) 12-Dec-19 (Date)

Matrices: Soil

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	1.2/1.2C	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	12/11/2019 2:34:05 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction: