



Tuesday, March 10, 2020

Jeff Braden
LT Environmental, Inc.
4600 West 60th Avenue
Arvada, CO 80003

Re: ALS Workorder: 2002369 Ö
Project Name: PDC Bradenhead Sampling J Clark, Clark
Project Number: 018820013

Dear Mr. Braden:

One water sample was received from LT Environmental, Inc., on 2/21/2020. The samples were scheduled for the following analyses:

Dissolved Gasses

GC/MS Volatiles

Inorganics

Metals

Total Extractable Petroleum Hydrocarbons (Diesel)

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2002369 8

GC/MS Volatiles:

The samples were analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C. The samples were also analyzed for Gasoline Range Organics (GRO).

All acceptance criteria were met.

Dissolved Gasses:

The samples were prepared and analyzed according to method RSK-175 procedures and the current revision of SOP 449.

All acceptance criteria were met.

DRO:

The samples were analyzed following the current revision of SOP 406 generally based on SW-846 Methods 8000C and 8015D. TEPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C10 to C28.

All surrogate recoveries were within acceptance criteria with the following exceptions:

Surrogate	Sample	Direction
O-terphenyl	-I	Low

The sample was re-analyzed to evaluate whether the original outlier was due to matrix effects or laboratory performance. The re-analysis also had surrogates outside the control limits, which suggests the presence of matrix effects.

All remaining acceptance criteria were met.

Metals:

The samples were analyzed following Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures. Analysis by ICPMS followed method 200.8 and the current revision of SOP 827.

All acceptance criteria were met.

**Inorganics:**

The samples were analyzed following EMSL and Standard Method procedures for the current revisions of the following SOPs and methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Alkalinity	SM2320B	1106
Bicarbonate	SM2320B	1106
Carbonate	SM2320B	1106
TDS	SM2540C	1101
Chloride	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

All acceptance criteria were met.

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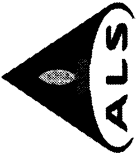
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ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202r8

PROJECT NAME PDC Bradenhead Sampling		SAMPLER SITE ID		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
PROJECT No. J Clark, Clark		EDD FORMAT COGCC EDD, LTE		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
COMPANY NAME LT Environmental, Inc.		PURCHASE ORDER N/A		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
SEND REPORT TO Jennifer Hakkarinen, Jeff Braden		BILL TO COMPANY PDC Energy		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
ADDRESS 4600 W 60th Ave		INVOICE ATTN TO Jennifer Hakkarinen		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
CITY / STATE / ZIP Arvada, CO 80003		ADDRESS 1775 Sherman Street, Suite 3000		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
PHONE 303-433-9788		CITY / STATE / ZIP Denver, Colorado		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
FAX 303-433-1432		PHONE 303.860.5815		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
E-MAIL jenifer.hakkarinen@pdce.com; jbraden@ltenv.com		E-MAIL Jennifer.Hakkarinen@pdce.com		DATE 2/21/20		TURNAROUND Standard		PAGE 1 of 1		WORKORDER # 2002369				
Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC	Dissolved Methane, Ethane, Propane	BTEX & TPH GRO	TPH DRO	Alkalinity, Carbonate, Bicarbonate, Total	Total Cations - see comments	Total Anions - see comments	Total Dissolved Solids
A 1	J Clark 14N	W	2/21/20	1200	11	1/2	-	RSK 175	SW8260_25	SW8015M	SM2320B	EPA200.7/200.8	EPA 300.0	SM2540C
B 2	J Clark 12W	W	2/21/20	1240	11	1/2	-	X	X	X	X	X	X	X
C 3	J Clark 10N	W	2/21/20	1315	11	1/2	-	X	X	X	X	X	X	X
D 4	J Clark 4C	W	2/21/20	1400	11	1/2	-	X	X	X	X	X	X	X

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	Cations/Anions:	QC PACKAGE (check below)
Calcium, Chloride, Magnesium, Potassium, Sodium, Sulfate		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
		LEVEL IV (Std QC + forms + raw data)
Samples analyzed per		
COCGCC Bradenhead Sampling Program		
Preparative Key:	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035	

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY		Jayden Brennan	2/31/20	15:25
RELINQUISHED BY		Tyler Hoss	2/21/20	15:25
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: LTE

Workorder No: 2002369 ^D

Project Manager: KMO

Initials: EE

Date: 2/21/20

1. Are airbills / shipping documents present and/or removable?		<input checked="" type="radio"/> DROP OFF	YES	NO
2. Are custody seals on shipping containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
3. Are custody seals on sample containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?		<input checked="" type="radio"/> YES		NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			YES	<input checked="" type="radio"/> NO *
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	NO *
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	NO *
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	NO *
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)			<input checked="" type="radio"/> YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A		YES	<input checked="" type="radio"/> NO *
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A		YES	<input checked="" type="radio"/> NO
13. Were the samples shipped on ice?			<input checked="" type="radio"/> YES	NO
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#3	#5	
				RAD ONLY
			YES	<input checked="" type="radio"/> NO
Cooler #:	<u>1</u>			
Temperature (°C):	<u>16.2</u>			
# of custody seals on cooler:	<u>0</u>			
External mR/hr reading:	<u>N/A</u>			
Background mR/hr reading:	<u>12</u>			
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <input checked="" type="radio"/> NA (If no, see Form 008.)				

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

5) no analyses written on sample bottles; Sample 4 bottle 6 had no info, used process of elim.
 11) ... 2369-1-11 had initial pH ~3, 1 ml HNO₃ added; Final pH <2 | lot # = 234822
 " -2-11 " " pH ~3, 1 ml " " ; " pH <2
 " -4-11 " " pH ~7, 2 ml " " ; " pH <2
 12) all vials except for ... 2369-2-1, -4, -7; -3-1, -4, -7; -4-4, -5 have significant headspace

Were unpreserved bottles pH checked? YES / ☒ NO All client bottle ID's vs ALS lab ID's double-checked by: EE
 If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____
 Project Manager Signature / Date: [Signature] 2/24/20

Client: LT Environmental, Inc.

Date: 10-Mar-20

Project: 018820013 PDC Bradenhead Sampling J Clark, Clark

Work Order: 2002369 D

Sample ID: J Clark 9C

Lab ID: 2002369-4

Legal Location:

Matrix: WATER

Collection Date: 2/21/2020 14:00

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Alkalinity as Calcium Carbonate			SM2320B		Prep Date: 3/4/2020	PrepBy: LMC
TOTAL ALKALINITY AS CaCO3	1700		20	MG/L	1	3/4/2020
BICARBONATE AS CaCO3	1100		20	MG/L	1	3/4/2020
CARBONATE AS CaCO3	620		20	MG/L	1	3/4/2020
Diesel Range Organics			SW8015M		Prep Date: 2/25/2020	PrepBy: CCL
Diesel Range Organics	19	MZ	1	MG/L	1	2/25/2020 21:24
Surr: O-TERPHENYL	41	*	63-126	%REC	1	2/25/2020 21:24
Dissolved Gasses			RSK175		Prep Date: 2/26/2020	PrepBy: CCL
METHANE	12000		5	UG/L	5	2/26/2020 12:34
ETHANE	4500		10	UG/L	5	2/26/2020 12:34
PROPANE	2000		5	UG/L	5	2/26/2020 12:34
GC/MS Volatiles			SW8260_25		Prep Date: 2/25/2020	PrepBy: JXK
BENZENE	180		25	UG/L	25	2/25/2020 22:41
TOLUENE	460		25	UG/L	25	2/25/2020 22:41
ETHYLBENZENE	22	J	25	UG/L	25	2/25/2020 22:41
M+P-XYLENE	290		25	UG/L	25	2/25/2020 22:41
O-XYLENE	74		25	UG/L	25	2/25/2020 22:41
TOTAL XYLENES	360		1	UG/L	1	2/25/2020 22:41
Surr: 4-BROMOFLUOROBENZENE	106		85-115	%REC	25	2/25/2020 22:41
Surr: DIBROMOFLUOROMETHANE	92		84-118	%REC	25	2/25/2020 22:41
Surr: TOLUENE-D8	100		85-115	%REC	25	2/25/2020 22:41
GASOLINE RANGE ORGANICS	3100		2500	UG/L	25	2/25/2020 22:41
Ion Chromatography			EPA300.0		Prep Date: 3/2/2020	PrepBy: KJS
CHLORIDE	1200		20	MG/L	100	3/2/2020 11:08
SULFATE	ND		50	MG/L	50	3/2/2020 10:55
Total Recoverable Metals by 200.8			EPA200.8		Prep Date: 3/2/2020	PrepBy: JML
CALCIUM	67		1	MG/L	10	3/3/2020 12:47
MAGNESIUM	6.6		0.1	MG/L	10	3/3/2020 12:47
POTASSIUM	43		1	MG/L	10	3/3/2020 12:47
SODIUM	1800		1	MG/L	10	3/3/2020 12:47
Total Dissolved Solids			SM2540C		Prep Date: 2/25/2020	PrepBy: LMC
TOTAL DISSOLVED SOLIDS	6800		200	MG/L	1	2/27/2020

Date: 10-Mar-20
Work Order: 2002369 D
Lab ID:
Matrix: WATER
cent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

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Client: LT Environmental, Inc.

QC BATCH REPORT

Work Order: 2002369 D

Project: 018820013 PDC Bradenhead Sampling J Clark,

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Client: LT Environmental, Inc.
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Project: 018820013 PDC Bradenhead Sampling J Clark,

QC BATCH REPORT

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QC BATCH REPORT

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VUŠNÖpÖ	Fèš	F	F€	Fè	ì èffœ						œ
ÖVpŸSÖÖpZÖpÖ	Fèš	F	F€	Fè	ì èffœ						œ
TÉÜŸŸSÖpÖ	Gèš	F	œ	Fè	ì èffœ						œ
UŸŸSÖpÖ	Fèš	F	F€	Fè	ì èffœ						œ

@ G8	Úæ] ^ŦŦK J @\$\$\$&&) !(Wj æ Ki F97	Qj æ•ã Ææ^K &#&) #\$\$\$%.\$'								
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ÄŦŦ::KÄ	d š		d	FèH	ì èffœ					G	
ÖŦŦUŦŦŠWUÛÜÖÖpZÖpÖ										G	
ÄŦŦ::KÄ	d š		d	FfF	ì èffœ						
ÖŦŦUŦŦŠWUÛÜŦŦÖVpœÖ											
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ÖÖpZÖpÖ	FG	F	F€	Fœ	ì èffœ			Fèš	F€	œ	
VUŠNÖpÖ	FFèš	F	F€	FFí	ì èffœ			Fèš	F€	œ	
ÖVpŸSÖÖpZÖpÖ	FFèš	F	F€	FFí	ì èffœ			Fèš	FF	œ	
TÉÜŸŸSÖpÖ	Gèš	F	œ	FFJ	ì èffœ			Gèš	J	œ	
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ÄŦŦ::KÄ	d š		Fè ì íèfí
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ÄŦŦ::KÄ	d š		Jí ì íèfí
ÖŦŦUŦŦŠWUÛÜŦŦÖVpœÖ			
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ÖÖpZÖpÖ	pÖ	F	
VUŠNÖpÖ	pÖ	F	
ÖVPŸSÖÖpZÖpÖ	pÖ	F	
TÉÜŸŸSÖpÖ	pÖ	F	
UŸŸSÖpÖ	pÖ	F	
VUVOŠŸŸSÖpÖÜ	pÖ	F	

H YZ`ck]b['gUa d'Yg'k YfYUbUmmYX']b'h]g'VUHW . GEEG-H J EH GEEG-H J EH

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VUŠWÖpÖ	FEB	F	F€		F€J	ì ÈÆ					OE
ÖVPÝSÖÖpZÖpÖ	FEB	F	F€		F€J	ì ÈÆ					OE
TÉÜÉÝSÖpÖ	GÈ	F	OE		F€J	ì ÈÆ					OE
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VUŠWÖpÖ	JÈI	F	F€		JÍ	ì ÈÆ		FEB	FF	OE	
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H YZ`ck|b['gUa d'Yg'k YfYUbUmmYX'jb'h jg VUHW .

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H YZ ``ck]b['gUa d'Yg'k YfYUbmYX']b'h]g'VUW .			GEEGÍ JÊ		GEEGÍ JÊG							

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G Úæ] ^K5?&\$'\$\$(!&		W) æKA;#@		Qæ•ã/Öæ^K' #&\$&\$'	
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Ô æ}óK		Û~}K5?&\$'\$\$(!% %		Ú ^] /Öæ^K' #&\$&\$	
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Óæ&ÖÖK H8 &\$ \$&&) !%&		Q•d~ { ^} öÖ 6 UÜbWV		T^oQäK GA &) (\$7	
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