

Analytical Report 615644

for
Crestone Peak Resources

Project Manager: Brent Hedstrom

Nelson 23-32

251795

04-MAR-19

Collected By: Client



**4147 Greenbriar Dr.
Stafford, TX 77477**

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-18-28), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab Code: TX01468):
Texas (T104704295-18-17), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-18-14)
Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-18-18)
Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-18-18)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-18-4)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)
Xenco-Phoenix Mobile (EPA Lab Code: AZ00901): Arizona (AZM757)
Xenco-Atlanta (LELAP Lab ID #04176)
Xenco-Tampa: Florida (E87429), North Carolina (483)
Xenco-Lakeland: Florida (E84098)



04-MAR-19

Project Manager: **Brent Hedstrom**
Crestone Peak Resources
10188 E I-25 Frontage Road
Longmont, CO 80504

Reference: XENCO Report No(s): **615644**
Nelson 23-32
Project Address:

Brent Hedstrom:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 615644. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 615644 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Wendy Walfoort

Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America



Sample Cross Reference 615644



Crestone Peak Resources, Longmont, CO

Nelson 23-32

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Nelson 23-32	W	02-19-19 00:00		615644-001
Trip Blank	W	02-19-19 00:00		Not Analyzed



CASE NARRATIVE

Client Name: Crestone Peak Resources

Project Name: Nelson 23-32

Project ID: 251795
Work Order Number(s): 615644

Report Date: 04-MAR-19
Date Received: 02/25/2019

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Crestone Peak Resources, Longmont, CO

Nelson 23-32

Sample Id: Nelson 23-32	Matrix: Water	Date Received: 02.25.19 12.46
Lab Sample Id: 615644-001	Date Collected: 02.19.19 00.00	
Analytical Method: Anions by EPA 300		Prep Method: E300P
Tech: JYM		% Moisture:
Analyst: JYM	Date Prep: 02.28.19 12.38	
Seq Number: 3080755		

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	1160	2.50	mg/L	02.28.19 19.24		5
Sulfate	14808-79-8	<2.50	2.50	mg/L	02.28.19 19.24	U	5

Analytical Method: TDS by SM2540C
 Tech: YAV
 Analyst: YAV
 Seq Number: 3080740

% Moisture:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	1642222	2020	5.00	mg/L	02.28.19 16.14	K	1

Analytical Method: Metals per ICP by SW846 6010B
 Tech: AHI
 Analyst: DEP
 Seq Number: 3080732

Date Prep: 02.28.19 09.30

Prep Method: SW3010A
 % Moisture:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Calcium	7440-70-2	9.75	0.200	mg/L	02.28.19 20.09		1
Magnesium	7439-95-4	0.999	0.400	mg/L	02.28.19 20.09		1
Potassium	7440-09-7	3.20	0.500	mg/L	02.28.19 20.09		1
Sodium	7440-23-5	680	25.0	mg/L	02.28.19 20.29	D	50

Analytical Method: Alkalinity by SM2320B
 Tech: YAV
 Analyst: YAV
 Seq Number: 3080693

Date Prep: 02.28.19 10.00

Prep Method: SM2320P
 % Moisture:

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Alkalinity, Bicarbonate (as CaCO ₃)	471-34-1	<4.00	4.00	mg/L	02.28.19 14.12	U	1
Alkalinity, Carbonate (as CaCO ₃)	3812-32-6	<4.00	4.00	mg/L	02.28.19 14.12	U	1

Crestone Peak Resources, Longmont, CO

Nelson 23-32

Sample Id: **Nelson 23-32**

Matrix: Water

Date Received: 02.25.19 12.46

Lab Sample Id: 615644-001

Date Collected: 02.19.19 00.00

Analytical Method: BTEX by SW 8260B

Prep Method: SW5030B

Tech: KRP

% Moisture:

Analyst: KRP

Date Prep: 02.28.19 20.00

Seq Number: 3080817

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
MTBE	1634-04-4	<0.00500	0.00500	mg/L	03.01.19 04.03	U	1
Benzene	71-43-2	0.00371	0.00100	mg/L	03.01.19 04.03		1
Toluene	108-88-3	0.00497	0.00100	mg/L	03.01.19 04.03		1
Ethylbenzene	100-41-4	0.00110	0.00100	mg/L	03.01.19 04.03		1
m,p-Xylenes	179601-23-1	0.00508	0.00200	mg/L	03.01.19 04.03		1
o-Xylene	95-47-6	0.00300	0.00100	mg/L	03.01.19 04.03		1
Total Xylenes	1330-20-7	0.00808	0.00100	mg/L	03.01.19 04.03		1
			%				
Surrogate	Cas Number	Recovery	Units	Limits	Analysis Date	Flag	
Dibromofluoromethane	1868-53-7	99	%	75-131	03.01.19 04.03		
1,2-Dichloroethane-D4	17060-07-0	101	%	63-144	03.01.19 04.03		
Toluene-D8	2037-26-5	105	%	80-117	03.01.19 04.03		



Crestone Peak Resources

Nelson 23-32

Analytical Method: Anions by EPA 300

Seq Number: 3080755

MB Sample Id: 7672685-1-BLK

Matrix: Water

LCS Sample Id: 7672685-1-BKS

Prep Method: E300P

Date Prep: 02.28.19

LCSD Sample Id: 7672685-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	0.0483	10.0	9.92	99	9.86	99	90-110	1	20	mg/L	02.28.19 17:59	
Sulfate	<0.500	10.0	10.3	103	10.4	104	90-110	1	20	mg/L	02.28.19 17:59	

Analytical Method: Anions by EPA 300

Seq Number: 3080755

Parent Sample Id: 615856-001

Matrix: Water

MS Sample Id: 615856-001 S

Prep Method: E300P

Date Prep: 02.28.19

MSD Sample Id: 615856-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	52.6	10.0	61.5	89	61.5	89	90-110	0	20	mg/L	02.28.19 18:35	X
Sulfate	11.1	10.0	20.8	97	20.8	97	90-110	0	20	mg/L	02.28.19 18:35	

Analytical Method: Anions by EPA 300

Seq Number: 3080755

Parent Sample Id: 615859-001

Matrix: Water

MS Sample Id: 615859-001 S

Prep Method: E300P

Date Prep: 02.28.19

MSD Sample Id: 615859-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	186	10.0	193	70	193	70	90-110	0	20	mg/L	02.28.19 21:36	X
Sulfate	20.5	10.0	29.9	94	29.9	94	90-110	0	20	mg/L	02.28.19 21:36	

Analytical Method: TDS by SM2540C

Seq Number: 3080740

MB Sample Id: 3080740-1-BLK

Matrix: Water

LCS Sample Id: 3080740-1-BKS

LCSD Sample Id: 3080740-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	<5.00	1000	967	97	950	95	80-120	2	10	mg/L	02.28.19 16:14	

Analytical Method: TDS by SM2540C

Seq Number: 3080740

Parent Sample Id: 615644-001

Matrix: Water

MD Sample Id: 615644-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Total Dissolved Solids	2020	2030	0	10	mg/L	02.28.19 16:14	

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

[D] = 100*(C-A) / B
RPD = 200* |(C-E) / (C+E)|
[D] = 100 * (C) / [B]
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec



Crestone Peak Resources
Nelson 23-32

Analytical Method: Metals per ICP by SW846 6010B

Seq Number: 3080732 Matrix: Water Prep Method: SW3010A
 Date Prep: 02.28.19
 MB Sample Id: 7672659-1-BLK LCS Sample Id: 7672659-1-BKS LCSD Sample Id: 7672659-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	<0.0182	25.0	24.0	96	23.9	96	75-125	0	20	mg/L	02.28.19 15:31	
Magnesium	0.0113	25.0	24.0	96	23.9	96	75-125	0	20	mg/L	02.28.19 15:31	
Potassium	<0.0545	10.0	10.1	101	10.1	101	75-125	0	20	mg/L	02.28.19 15:31	
Sodium	<0.0570	25.0	24.6	98	24.6	98	75-125	0	20	mg/L	02.28.19 15:31	

Analytical Method: Metals per ICP by SW846 6010B

Seq Number: 3080732 Matrix: Solid Prep Method: SW3010A
 Date Prep: 02.28.19
 Parent Sample Id: 615559-001 MS Sample Id: 615559-001 S MSD Sample Id: 615559-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Calcium	11.8	125	116	83	116	83	75-125	0	20	mg/L	02.28.19 15:48	
Magnesium	1.69	125	106	83	106	83	75-125	0	20	mg/L	02.28.19 15:48	
Potassium	2.59	50.0	48.0	91	48.1	91	75-125	0	20	mg/L	02.28.19 15:48	
Sodium	1560	125	1480	0	1530	0	75-125	3	20	mg/L	02.28.19 15:48	X

Analytical Method: Alkalinity by SM2320B

Seq Number: 3080693 Matrix: Water Prep Method: SM2320P
 Date Prep: 02.28.19
 Parent Sample Id: 615076-001 MD Sample Id: 615076-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Alkalinity, Bicarbonate (as CaCO3)	185	182	2	20	mg/L	02.28.19 11:54	
Alkalinity, Carbonate (as CaCO3)	<4.00	<4.00	0	20	mg/L	02.28.19 11:54	U

Analytical Method: Alkalinity by SM2320B

Seq Number: 3080693 Matrix: Drinking Water Prep Method: SM2320P
 Date Prep: 02.28.19
 Parent Sample Id: 615184-004 MD Sample Id: 615184-004 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
Alkalinity, Bicarbonate (as CaCO3)	242	242	0	20	mg/L	02.28.19 13:14	
Alkalinity, Carbonate (as CaCO3)	<4.00	<4.00	0	20	mg/L	02.28.19 13:14	U

MS/MSD Percent Recovery
 Relative Percent Difference
 LCS/LCSD Recovery
 Log Difference

[D] = 100*(C-A) / B
 RPD = 200* |(C-E) / (C+E)|
 [D] = 100 * (C) / [B]
 Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
 A = Parent Result
 C = MS/LCS Result
 E = MSD/LCSD Result
 MS = Matrix Spike
 B = Spike Added
 D = MSD/LCSD % Rec



Crestone Peak Resources

Nelson 23-32

Analytical Method: BTEX by SW 8260B

Seq Number: 3080817

MB Sample Id: 7672797-1-BLK

Matrix: Water

LCS Sample Id: 7672797-1-BKS

Prep Method: SW5030B

Date Prep: 02.28.19

LCSD Sample Id: 7672797-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
MTBE	<0.00500	0.0500	0.0503	101	0.0516	103	65-135	3	20	mg/L	03.01.19 01:07	
Benzene	<0.00100	0.0500	0.0479	96	0.0491	98	66-142	2	20	mg/L	03.01.19 01:07	
Toluene	<0.00100	0.0500	0.0486	97	0.0501	100	59-139	3	20	mg/L	03.01.19 01:07	
Ethylbenzene	<0.00100	0.0500	0.0496	99	0.0509	102	75-125	3	20	mg/L	03.01.19 01:07	
m,p-Xylenes	<0.00200	0.100	0.0986	99	0.100	100	75-125	1	20	mg/L	03.01.19 01:07	
o-Xylene	<0.00100	0.0500	0.0505	101	0.0522	104	75-125	3	20	mg/L	03.01.19 01:07	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
Dibromofluoromethane	99		98		98		75-131	%	03.01.19 01:07
1,2-Dichloroethane-D4	105		100		110		63-144	%	03.01.19 01:07
Toluene-D8	103		100		100		80-117	%	03.01.19 01:07

Analytical Method: BTEX by SW 8260B

Seq Number: 3080817

Parent Sample Id: 616106-001

Matrix: Water

MS Sample Id: 616106-001 S

Prep Method: SW5030B

Date Prep: 02.28.19

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
MTBE	<0.00500	0.0500	0.0502	100	65-135	mg/L	03.01.19 01:43	
Benzene	<0.00100	0.0500	0.0489	98	66-142	mg/L	03.01.19 01:43	
Toluene	<0.00100	0.0500	0.0499	100	59-139	mg/L	03.01.19 01:43	
Ethylbenzene	<0.00100	0.0500	0.0501	100	75-125	mg/L	03.01.19 01:43	
m,p-Xylenes	<0.00200	0.100	0.100	100	75-125	mg/L	03.01.19 01:43	
o-Xylene	<0.00100	0.0500	0.0513	103	75-125	mg/L	03.01.19 01:43	

Surrogate	MS %Rec	MS Flag	Limits	Units	Analysis Date
Dibromofluoromethane	99		75-131	%	03.01.19 01:43
1,2-Dichloroethane-D4	102		63-144	%	03.01.19 01:43
Toluene-D8	99		80-117	%	03.01.19 01:43

MS/MSD Percent Recovery
Relative Percent Difference
LCS/LCSD Recovery
Log Difference

[D] = 100*(C-A) / B
RPD = 200* |(C-E) / (C+E)|
[D] = 100 * (C) / [B]
Log Diff. = Log(Sample Duplicate) - Log(Original Sample)

LCS = Laboratory Control Sample
A = Parent Result
C = MS/LCS Result
E = MSD/LCSD Result

MS = Matrix Spike
B = Spike Added
D = MSD/LCSD % Rec

015644

9748 Whithorn rive, Houston, Texas
Ma, - 281-856-9333

71

5



Chain of Custody

Project Information:

Brent Hedstrom
Crestone Peak Resources
Field Operations Technician
Mobile 303-434-3007
Authorized by:

Shipping Information:

GeoMark Research, L.P.
9748 Whithorn Drive
Houston, Texas 77095
Attn:

Sample Summary

Material Shipped/Received	# Of Samples	COGCC (Required)	Billing Information	Analysis Requested
Nelson 23-32	4	251795	16191595	See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.
				See attached form from COGCC guidelines for testing required.

Purpose for Release: Analysis on sampling

Date Released: 2/19/2019 **Date Received:**

Released by: Brent Hedstrom **Received by:**

Company: Crestone Peak Resources **Company:**

Signature: **Signature:**

FedEx
UPS
UPS 2-25-19
12:46

299UK6 7704 H1P
https://www.ups.com/ship/core/confirmation?tx=7264916635415247&loc=en_US

CRESTONE PEAK
303-774-3900
CRESTONE PEAK RESOURCES
10188 E I-25 FRONTAGE ROAD
FIRESTONE CO 80504

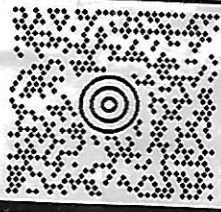
15 LBS

DWT: 16,14,12

1 O

SHIP TO:

WENDY WALFOORT
281-240-4200
XENCO HOUSTON
4147 GREENBRIAR DRIVE
STAFFORD TX 77477

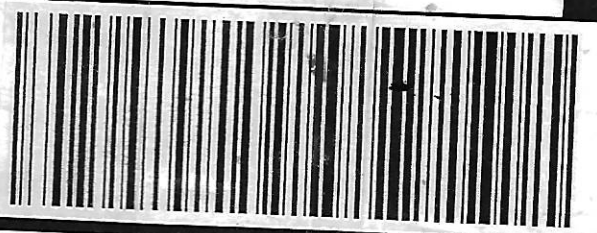


TX 774 9-05



UPS GROUND

TRACKING #: 1Z 3F8 1X8 03 9927 1860

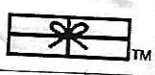


BILLING: P/P

IR ID:HOU-068 C/F: -0.1
Temp: 13.6 Corrected: 13.5

XOL 19.01.26

NV45 09.0A 01/2019



2/20

0130

TX 7749-05
TX 77477



Chain of Custody

Project Information:

Brent Hedstrom
Crestone Peak Resources
Field Operations Technician
Mobile 303-434-3007
Authorized by:

Shipping Information:

GeoMark Research, Ltd.
9748 Whithorn Drive
Houston, Texas 77095
Attn:

Sample Summary

Material Shipped/Received	# Of Samples	COGCC (Required)	Billing Information	Analysis Rec
Nelson 23-32	4	251795	16191595	See attached form from CC testing requ
				See attached form from CC testing requ
				See attached form from CC testing requ
				See attached form from CC testing requ
				See attached form from CC testing requ
				See attached form from CC testing requ
				See attached form from CC testing requ

Purpose for Release: _____ Analysis on sampling

Date Released: _____ 2/19/2019 _____

Date Received: _____

Released by: Brent Hedstrom _____

Received by: _____

Company: Crestone Peak Resources _____

Company: _____

Signature: _____

Signature: _____

BRADENHEAD TESTING AND REPORTING INSTRUCTIONS

Appendix A: Liquid and Gas Sampling

As indicated in the Bradenhead Test Procedure:

- Initial pressures should be documented prior to opening valves and prior to collecting sample(s).
- It is suggested that operators should be prepared to collect liquid and gas samples when conducting their Bradenhead tests.

All final laboratory analytical results may be submitted to the COGCC via an approved Electronic Data Deliverable (EDD) format (requirements available on COGCC's website at Help\Environmental\COGCC EDD Information) uploaded to the COGCC environmental database. Subsequent to EDD, hard copies (preferably PDF) of laboratory reports may be filed on a Sundry Notice, Form 4 submitted to the Well file by API Number.

Liquid Sampling

- Operators are encouraged to collect a "first-draw" sample when the valve is opened (in the event that liquid discharge ceases during the test) and a flowing liquid sample at the end of the test (if liquid continues to flow during a partial test or a full test).
- When liquids discharge from the annulus in quantities sufficient to allow for sampling, (meaning the flow is greater than a mist) Operators are encouraged to submit the liquids for laboratory analysis:
 - If free-phase oil is present organic liquids should be analyzed for "whole oil analysis" with biomarkers (phytane and pristane).
 - Analyze aqueous samples for major anions (chloride, carbonate, bicarbonate, and sulfate), major cations (sodium, potassium, calcium, and magnesium) total dissolved solids (TDS), benzene, toluene, ethylbenzene, and total xylenes (BTEX), diesel-range organics (DRO), and gasoline-range organics (GRO) and dissolved gasses (RSK 175).
 - If there is a limited amount of aqueous liquid available with the discharge, then BTEX, anions, and cations should be given a higher priority.
- If liquids are discharged as a mist or spray, but do not "flow," then COGCC does not expect liquid samples to be collected.
 - A mist or spray in this context will be used as fluid particles floating or falling out of the bradenhead into the atmosphere, which are in an amount too small to reasonably collect.

Crestone

