SITE INFORMATION

Report Type: Closure Report 1RP-4783

General Site Information:						
Site:	**Lusk Deep Unit A #22H**					
Company:	**COG Operating LLC**					
Section, Township and Range	**Unit C**	**Sec. 17**	**T 19S**	**R 32E**		
Lease Number:	**API No. 30-025-40705**					
County:	**Lea County**					
GPS:	**32.6668205º N**			**103.7912445º W**		
Surface Owner:	Federal					
Mineral Owner:						
Directions:	From intersection of 126A & Dry Lake Rd travel EAST on Dry Lake for 0.25 mi to location on south side of the road.					

Release Data:	
Date Released:	11/29/2016
Type Release:	Produced Water
Source of Contamination:	Water Line
Fluid Released:	12 bbls
Fluids Recovered:	6 bbls

Official Communication:			
Name:	Rebecca Haskell		Ike Tavarez
Company:	COG Operating, LLC		Tetra Tech
Address:	One Concho Center		4000 N. Big Spring
	600 W. Illinois Ave.		Ste 401
City:	Midland Texas, 79701		Midland, Texas
Phone number:	(432) 686-3023		(432) 687-8110
Fax:	(432) 684-7137		
Email:	rhaskell@conchoresources.com		Ike.Tavarez@tetratech.com

Ranking Criteria		
Depth to Groundwater:	***Ranking Score***	***Site Data***
<50 ft	20	
50-99 ft	10	
>100 ft.	***0***	*345'*
WellHead Protection:	***Ranking Score***	***Site Data***
Water Source <1,000 ft., Private <200 ft.	*20*	
Water Source >1,000 ft., Private >200 ft.	***0***	*0*
Surface Body of Water:	***Ranking Score***	***Site Data***
<200 ft.	*20*	
200 ft - 1,000 ft.	10	
>1,000 ft.	***0***	*0*
Total Ranking Score:	***0***	

Acceptable Soil RRAL (mg/kg)		
Benzene	***Total BTEX***	***TPH***
10	50	5,000

TETRA TECH

APPROVED
By Olivia Yu at 11:40 am, Sep 12, 2018

April 5, 2018

NMOCD approves
1RP-4783 for closure.

Ms. Olivia Yu
Environmental Engineer Specialist
Oil Conservation Division, District 1
1625 North French Drive
Hobbs, New Mexico 88240

Re: Closure Report for the COG Operating LLC., Lusk Deep Unit A #19, Unit N, Section 17, Township 19 South, Range 32 East, Lea County, New Mexico. 1RP-4783.

Ms. Yu:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC., (COG) to assess a release that occurred at the Lusk Deep Unit A #22H, Unit C, Section 17, Township 19 South, Range 32 East, Lea County, New Mexico (Site). The spill site coordinates are N 32.6668205º, W 103.7912445º. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the leak was discovered on November 29, 2016, and released approximately twelve (12) barrels of produced water due to a pinhole leak that developed in a poly water transfer line. Approximately six (6) barrels of produced water was recovered. The release occurred in the pasture and measured approximately 20' x 55'. The initial C-141 Form is included in Appendix A.

Groundwater

No water wells were listed within Section 17 on the New Mexico Office of the State Engineer's database, the USGS National Water Information System or the Geology and Groundwater Conditions in Southern Lea County (Report 6). The nearest well is located in Section 20 with a reported depth to water of approximately 345' below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is greater than 300' below surface. The groundwater data is shown in Appendix B.

Regulatory

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene

Tetra Tech
4000 North Big Spring, Suite 401, Midland, TX 79705
Tel 432.682.4559 Fax 432.682.3946 www.tetratech.com

(collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

Soil Assessment and Analytical Results

On February 22, 2017, COG personnel were onsite to evaluate and sample the release area. Using a backhoe, one (1) trench (T-1) was installed in the release area. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 1. The trench location is shown on Figure 3.

Referring to Table 1, the benzene, total BTEX, and TPH concentrations were below the laboratory reporting limits. However, the area of trench (T-1) showed elevated chloride concentrations to the shallow soils with a chloride high of 7,060 mg/kg at 2.0' below surface. The chloride concentrations then declined with depth to 560 mg/kg at 4.0' below surface. A slight chloride increase was detected at 7.0' (704 mg/kg) and 8.0' (688 mg/kg), before declining to 368 mg/kg at 9.0' below surface. Deeper samples were not collected due to the backhoe limitations.

Remediation Activities

On February 20-22, 2018, Tetra Tech personnel were onsite to supervise the excavation and remediation activities. The excavated areas and depths are shown on Figure 4 and highlighted (green) in Table 1. The area of trench (T-1) was excavated to 4.0' to 5.0' below surface and measured approximately 25' x 41'. As requested by the NMOCD, bottom hole and sidewall samples (Bottom hole, North Sidewall, South Sidewall, West Sidewall, and East Sidewall) were collected to confirm the proper removal of the impacted soils. The confirmation samples were submitted to the laboratory for chloride analysis by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 1. The sample locations are shown on Figure 4.

Referring to Table 1, the sidewall samples (North Sidewall, South Sidewall, West Sidewall, and East Sidewall) showed chloride concentrations of 70.6 mg/kg, 145 mg/kg, 151 mg/kg, and <4.99 mg/kg, respectively. However, the confirmation sample (Bottom hole) showed a chloride concentration of 8,120 mg/kg at 4.0'-5.0' below surface. As requested by the NMOCD, a 20 mil-liner was installed at 4.0'-5.0' below surface in order to prevent further vertical migration. Once completed, the excavated area was backfilled with clean material to surface grade. Approximately 200 cubic yards of material was hauled to proper disposal.

TETRA TECH

Conclusion

Based on the soil assessment and remediation work performed at the site, COG requests closure of this spill. The final C-141 is enclosed in Appendix A. If you have any questions or comments concerning the assessment or the remediation activities for this site, please call me at (432) 682-4559.

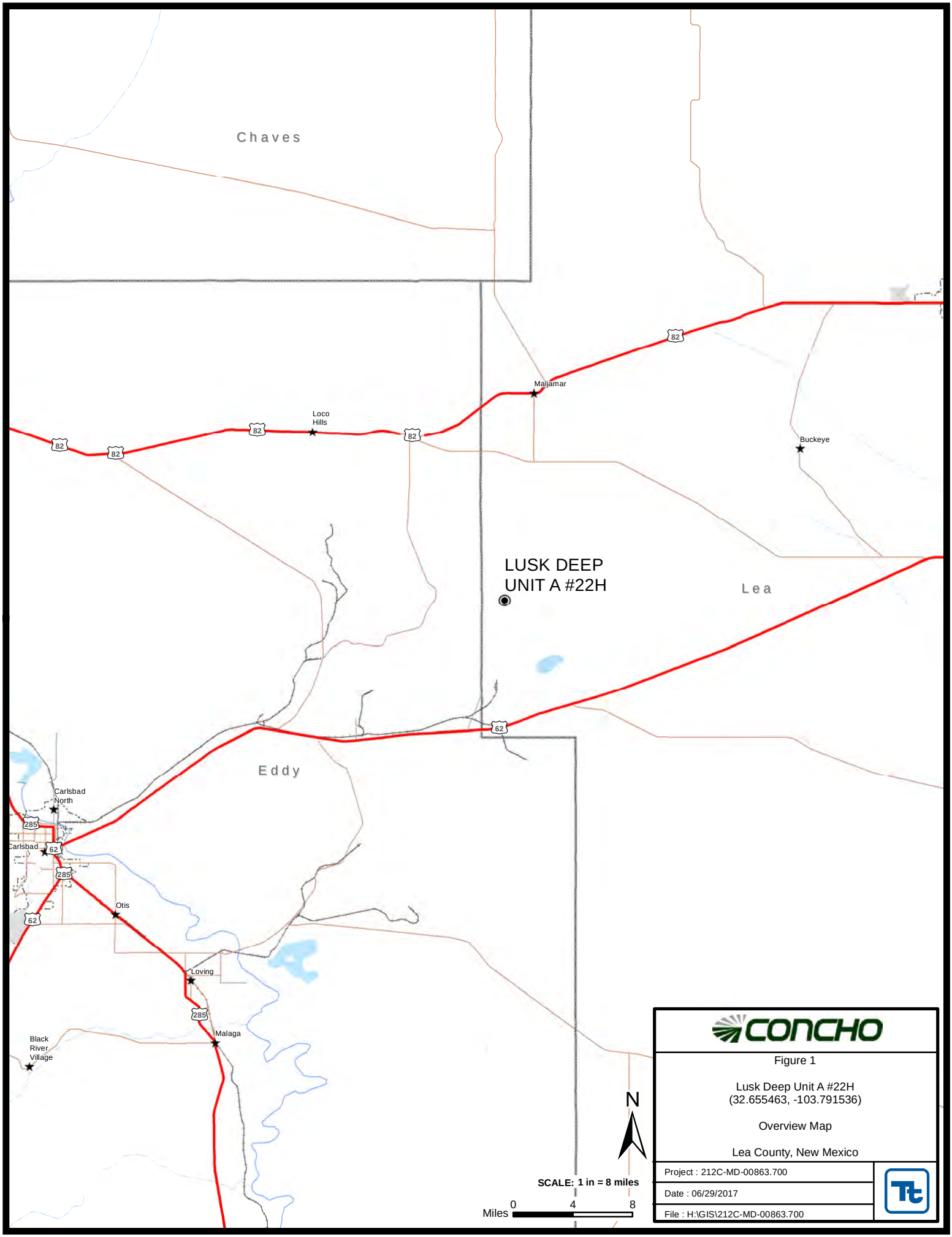
Respectfully submitted,
TETRA TECH

Clair Gonzales,
Project Manager

Ike Tavarez,
Senior Project Manager, P.G.

cc: Robert McNeill – COG
Dakota Neel – COG
Rebecca Haskell – COG
Shelly Tucker – BLM
Henryetta Price - BLM

Figures



CONCHO

Figure 1

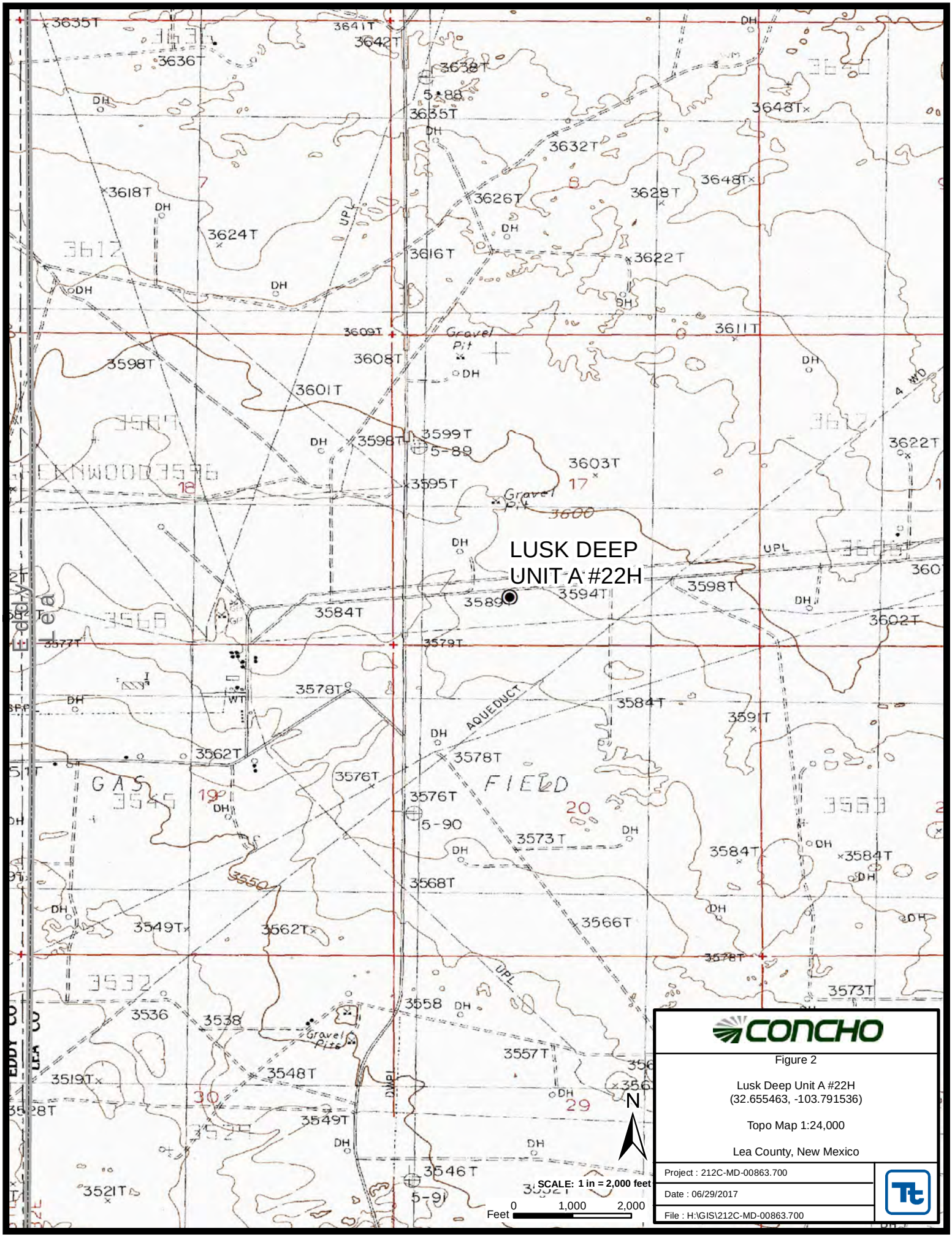
Lusk Deep Unit A #22H
(32.655463, -103.791536)

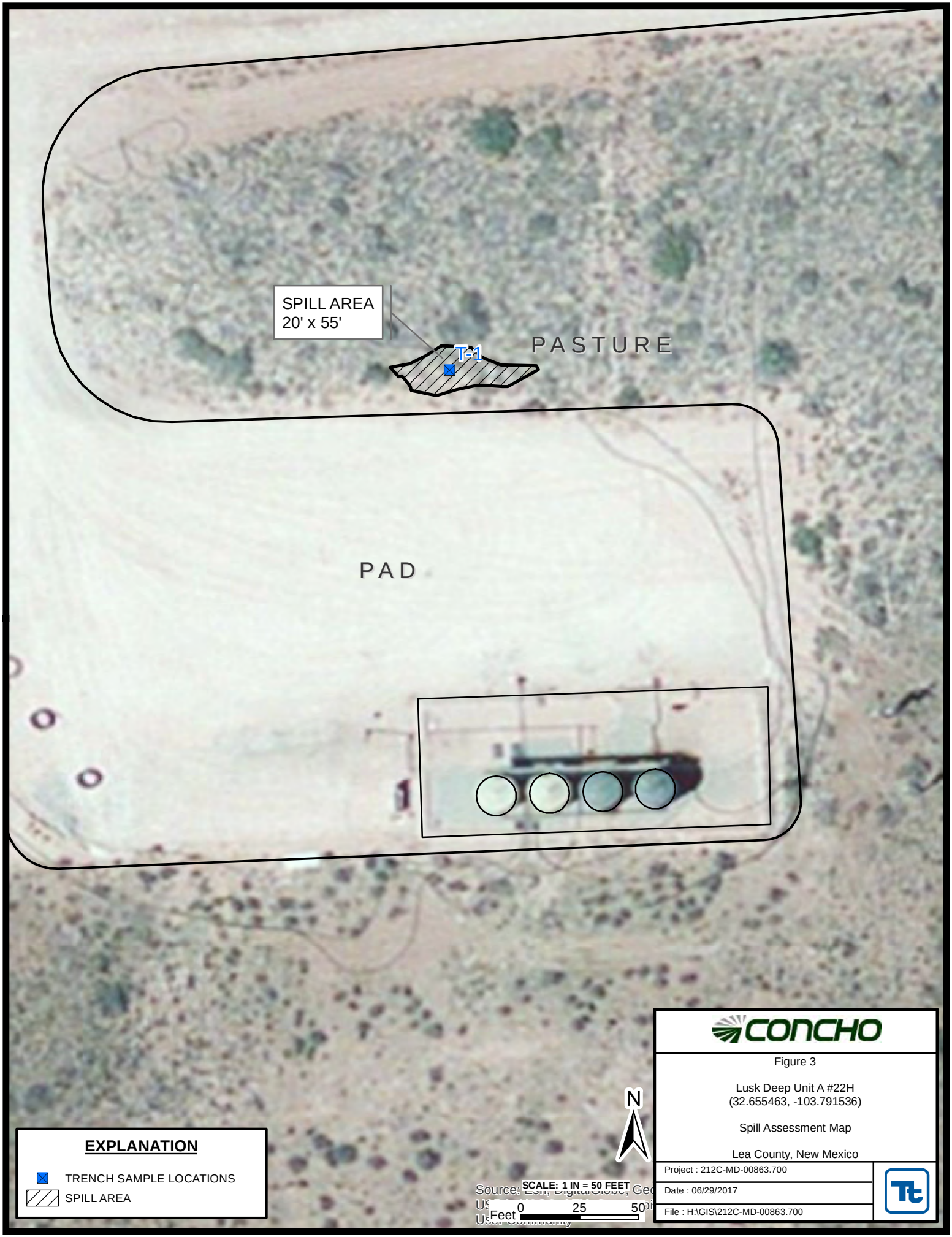
Overview Map

Lea County, New Mexico

Project : 212C-MD-00863.700	
Date : 06/29/2017	
File : H:\GIS\212C-MD-00863.700	

Mapped By: Isabel Marmolejo


LUSK DEEP
UNIT A #22H
CONCHO
Figure 2
Lusk Deep Unit A #22H
(32.655463, -103.791536)
Topo Map 1:24,000
Lea County, New Mexico
Project : 212C-MD-00863.700
Date : 06/29/2017
File : H:\GIS\212C-MD-00863.700
N
SCALE: 1 in = 2,000 feet
0 1,000 2,000
Feet
Mapped By: Isabel Marmolejo



CONCHO

Figure 3

Lusk Deep Unit A #22H
(32.655463, -103.791536)

Spill Assessment Map

Lea County, New Mexico

Project : 212C-MD-00863.700

Date : 06/29/2017

File : H:\GIS\212C-MD-00863.700

Mapped By: Isabel Marmolejo

EXPLANATION

- BOTTOMHOLE SAMPLE LOCATION
- SIDEWALL SAMPLE LOCATIONS
- EXCAVATED AREA
- INSTALLED LINER

CONCHO

Figure 4

Lusk Deep Unit A #22H
(32.655463, -103.791536)

Excavation Area & Depth Map

Lea County, New Mexico

Project : 212C-MD-00863.700

Date : 03/21/2018

File : H:\GIS\212C-MD-00863.700

Mapped By: Isabel Marmolejo

Tables

Table 1
COG Operating LLC.
Lusk Deep Unit A #22H
Lea County, New Mexico

Sample ID	Sample Date	Sample Depth (ft)	BEB (ft)	Soil Status		TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethlybenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
				In-Situ	Removed	GRO	DRO	Total						
T-1	2/22/2017	Surface	-		X	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	**3,000**
	"	1	-		X	-	-	-	-	-	-	-	-	**5,040**
	"	2	-		X	-	-	-	-	-	-	-	-	**7,060**
	"	3	-		X	-	-	-	-	-	-	-	-	**5,600**
	"	4	-		X	-	-	-	-	-	-	-	-	560
	"	5	-	X		-	-	-	-	-	-	-	-	384
	"	6	-	X		-	-	-	-	-	-	-	-	320
	"	7	-	X		-	-	-	-	-	-	-	-	704
	"	8	-	X		-	-	-	-	-	-	-	-	688
	"	9	-	X		-	-	-	-	-	-	-	-	368
Bottomhole	2/20/2018	-	4-5	X		-	-	-	-	-	-	-	-	**8,120**
North Sidewall	2/20/2018	-	-	X		-	-	-	-	-	-	-	-	70.6
South Sidewall	2/20/2018	-	-	X		-	-	-	-	-	-	-	-	145
West Sidewall	2/20/2018	-	-	X		-	-	-	-	-	-	-	-	151
East Sidewall	2/20/2018	-	-	X		-	-	-	-	-	-	-	-	<4.99

(-) Not Analyzed

Excavation Depths

BEB Below Excavation Bottom

Liner Depth

Photos

COG Operating LLC
Lusk Deep Unit A #22H
Lea County, New Mexico

View East – Excavated Area

View East – Lined Excavation

COG Operating LLC
Lusk Deep Unit A #22H
Lea County, New Mexico

View Northeast – Backfilled Excavation

View North – Backfilled Excavation

Appendix A

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr , Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company: COG Operating LLC	Contact: Robert McNeill
Address: 600 West Illinois Avenue, Midland TX 79701	Telephone No. 432-683-7443
Facility Name: Lusk Deep Unit A #22H	Facility Type: Flow Line

Surface Owner: Federal	Mineral Owner:	API No. 30-025-40705

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
C	17	19S	32E	330	North	1770	West	Lea

Latitude 32.6668205 **Longitude** 103.7912445

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: 12bbls	Volume Recovered: 6bbls
Source of Release: Water Line	Date and Hour of Occurrence: November 29, 2016 3:45 pm	Date and Hour of Discovery: November 29, 2016 3:45 pm
Was Immediate Notice Given? ☐ Yes ☒ No ☒ Not Required	If YES, To Whom?	
By Whom?	Date and Hour:	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

A pinhole developed in the transition on a poly water transfer line. The transition was repaired.

Describe Area Affected and Cleanup Action Taken.*

The release was within a pasture. Concho will have the spill area sampled to delineate any possible impact from the release and we will present a remediation work plan to the NMOCD for approval prior to any significant remediation activities.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: Rebecca Haskell	OIL CONSERVATION DIVISION	
Printed Name: Rebecca Haskell	Approved by Environmental Specialist:	
Title: Senior HSE Coordinator	Approval Date:	Expiration Date:
E-mail Address: rhaskell@concho.com	Conditions of Approval:	Attached ☐
Date: 12/2/16 Phone: 432-683-7443		

* Attach Additional Sheets If Necessary

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☒ Final Report

Name of Company **COG Operating LLC**	Contact **Rebecca Haskell**
Address **600 West Illinois Ave, Midland, TX 79701**	Telephone No. **(432) 818-2372**
Facility Name Lusk Deep Unit A #22H	Facility Type **Flowline**

Surface Owner: Federal	Mineral Owner	API No. 30-025-40705

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
C	17	19S	32E	330	North	1770	West	Lea

Latitude N 32.6668205° **Longitude** W 103.7912445°

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release 12 bbls	Volume Recovered 6 bbls
Source of Release: Water line	Date and Hour of Occurrence 11/29/16 3:45pm	Date and Hour of Discovery 11/29/16 3:45pm
Was Immediate Notice Given? ☐ Yes ☒ No ☒ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. N/A	

If a Watercourse was Impacted, Describe Fully.*

N/A

APPROVED
By Olivia Yu at 11:41 am, Sep 12, 2018

Describe Cause of Problem and Remedial Action Taken.*

A pinhole leak developed in the transition on a poly water transfer line, which has been repaired. The release occurred in the pasture.

Describe Area Affected and Cleanup Action Taken.*

Tetra Tech inspected site and collected samples to define spills extent. The area was excavated to 4'-5' to remove elevated chloride concentrations and a liner was installed at 4'-5' below surface. Site was then brought up to surface grade with clean backfill material. Tetra Tech prepared closure report and submitted to NMOCD for review.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION
Printed Name: Ike Tavarez	Approved by District Supervisor:
Title: Project Manager	Approval Date: 9/12/2018 Expiration Date: xx/xx/xxxx
E-mail Address: Ike.Tavarez@TetraTech.com	Conditions of Approval: BLM approval Attached ☐
Date: 04/05/2018 Phone: (432) 682-4559	

* Attach Additional Sheets If Necessary

1RP-4783

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
COG - Lusk Deep Unit A #22H

18 South 31 East

6	5	4	3	2	1
7	8	9	10	11	12 400
18	17	16	15 98	14 317	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35 261	36

18 South 32 East

6	5	4 65	3	2	1
7 460 82	8	9	10	11	12
18	17	16 84	15	14	13
19	20 164	21	22 429	23	24
30	29	28	27	26	25
31	32	33	34 117	35	36

18 South 33 East

6	5	4	3 60	2	1
7	8 100	9	10 62	11 46	12 143 140
18	17 85	16	15	14 36	13 60
19 >140	20	21	22	23	24 195
30 35	29	28	27	26	25
31	32	33 177	34	35	36

19 South 31 East

6	5 SITE	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19 180	20	21	22	23	24
30	29	28 180	27	26	25
31	32	33 101 140	34	35	36 130

19 South 32 East

6	5	4	3	2	1
7	8 365	9	10	11	12
18	17	16	15	14	13 135 dry
19 102	20 345	21	22	23	24
30	29	28	27	26	25
31	32	33	34 250	35	36

19 South 33 East

6	5	4	3	2	1
7	8	9	10	11	12
18 340	17 116	16	15	14	13
19	20	21	22	23	24
30	29	28 130 dry	27	26 92 85	25
31	32 185	33	34	35	36

20 South 31 East

6	5	4	3	2	1
7	8	9	10 130	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36 80

20 South 32 East

6	5	4	3	2	1 21.8
7	8	9	10	11	12
18 89	17	16	15	14	13
19	20	21	22	23	24
30 9.9	29	28	27 12.3	26	25
31	32	33	34	35	36 46

20 South 33 East

6	5 325 278	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24 +300
30	29	28	27	26	25
31	32	33	34	35	36

88 New Mexico State Engineers Well Reports

105 USGS Well Reports

90 Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6)

Geology and Groundwater Resources of Eddy County, NM (Report 3)

34 NMOCD - Groundwater Data

121 Abandoned Waterwell (recently measured)

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00075	O	CP	LE		2	4	34	19S	32E	617502	3609301	575		
CP 00563 POD1		CP	LE	1	1	2	19	19S	32E	612118	3613376*	300		
CP 00639 POD1		CP	LE		3	1	20	19S	32E	613029	3612880*	350	345	5
CP 00640 POD1		CP	LE		2	2	19	19S	32E	612621	3613280*	260	102	158
CP 00812 POD1		CP	LE		4	4	01	19S	32E	620623	3616973*	200		
CP 01656 POD1		CP	LE	3	4	3	17	19S	32E	613368	3613646	70		

Average Depth to Water: **223 feet**

Minimum Depth: **102 feet**

Maximum Depth: **345 feet**

Record Count: 6

PLSS Search:

Township: 19S **Range:** 32E

***UTM location was derived from PLSS - see Help**

Appendix C

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

January 05, 2017

DAKOTA NEEL

COG OPERATING

P. O. BOX 1630

ARTESIA, NM 88210

RE: LUSK 22

Enclosed are the results of analyses for samples received by the laboratory on 12/29/16 12:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-16-8. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
DAKOTA NEEL
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	12/29/2016	Sampling Date:	12/19/2016
Reported:	01/05/2017	Sampling Type:	Soil
Project Name:	LUSK 22	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Angela Cabrera
Project Location:	NOT GIVEN		

Sample ID: T1 - SURFACE (H602891-01)

BTEX 8021B mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/30/2016	ND	1.82	91.1	2.00	2.19	
Toluene*	<0.050	0.050	12/30/2016	ND	1.85	92.3	2.00	2.27	
Ethylbenzene*	<0.050	0.050	12/30/2016	ND	1.90	95.0	2.00	2.67	
Total Xylenes*	<0.150	0.150	12/30/2016	ND	5.54	92.3	6.00	2.61	
Total BTEX	<0.300	0.300	12/30/2016	ND					

Surrogate: 4-Bromofluorobenzene (PID *102 %* *73.6-140*

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3000**	16.0	12/31/2016	ND	416	104	400	0.00	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/30/2016	ND	184	92.0	200	3.90	
DRO >C10-C28	<10.0	10.0	12/30/2016	ND	190	95.0	200	1.29	

Surrogate: 1-Chlorooctane *101 %* *35-147*

Surrogate: 1-Chlorooctadecane *112 %* *28-171*

Sample ID: T1 - 1' (H602891-02)

Chloride, SM4500Cl-B mg/kg **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**5040**	16.0	12/31/2016	ND	416	104	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

COG OPERATING
DAKOTA NEEL
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	12/29/2016	Sampling Date:	12/19/2016
Reported:	01/05/2017	Sampling Type:	Soil
Project Name:	LUSK 22	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Angela Cabrera
Project Location:	NOT GIVEN		

Sample ID: T1 - 2' (H602891-03)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**7060**	16.0	12/31/2016	ND	416	104	400	0.00	

Sample ID: T1 - 3' (H602891-04)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**5600**	16.0	12/31/2016	ND	416	104	400	0.00	

Sample ID: T1 - 4' (H602891-05)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**560**	16.0	12/31/2016	ND	416	104	400	0.00	

Sample ID: T1 - 5' (H602891-06)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**384**	16.0	12/31/2016	ND	416	104	400	0.00	

Sample ID: T1 - 6' (H602891-07)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**320**	16.0	01/03/2017	ND	416	104	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

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Analytical Results For:

COG OPERATING
DAKOTA NEEL
P. O. BOX 1630
ARTESIA NM, 88210
Fax To: NONE

Received:	12/29/2016	Sampling Date:	12/19/2016
Reported:	01/05/2017	Sampling Type:	Soil
Project Name:	LUSK 22	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Angela Cabrera
Project Location:	NOT GIVEN		

Sample ID: T1 - 7' (H602891-08)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**704**	16.0	01/03/2017	ND	416	104	400	0.00	

Sample ID: T1 - 8' (H602891-09)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**688**	16.0	01/03/2017	ND	416	104	400	0.00	

Sample ID: T1 - 9' (H602891-10)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**368**	16.0	01/03/2017	ND	416	104	400	0.00	

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CARDINAL Laboratories

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Notes and Definitions

QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL Laboratories
101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	COG Operating LLC
Project Manager:	Dakota Neel
Address:	2208 West Main
City:	Artesia **State:** NM **Zip** 88210
Phone #:	432-215-2783 **Fax #:**
Project #:	**Project Owner:**
Project Name:	LUSK 22
Project Location:	
Sampler Name:	Dakota Neel & Aaron Lieb

BILL TO

P.O. #:	
Company:	COG Operating LLC
Attn:	Robert McNeill
Address:	600 W Illinois
City:	Midland
State: TX **Zip:** 79701
Phone #:	(432) 221-0388
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	BTEX	TPH	Chloride
H602891																	
1	T1 - SURFACE												12/19/16	1:00 PM	x	x	x
2	T1 - 1'												12/19/16	1:00 PM			x
3	T1 - 2'												12/19/16	1:00 PM			x
4	T1 - 3'												12/19/16	1:00 PM			x
5	T1 - 4'												12/19/16	1:00 PM			x
6	T1 - 5'												12/19/16	1:00 PM			x
7	T1 - 6'												12/19/16	1:00 PM			x
8	T1 - 7'												12/19/16	1:00 PM			x
9	T1 - 8'												12/19/16	1:00 PM			x
10	T1 - 9'												12/19/16	1:00 PM			x

Relinquished By:	**Date:** 12-29-16	**Received By:**	
	Time: 12:05		
Relinquished By:	**Date:**	**Received By:**	
	Time:		

Delivered By: (Circle One) Sampler - UPS - Bus - Other: #75 5.2°C

Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No

CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No **Add'l Phone #:**

Fax Result: ☐ Yes ☐ No **Add'l Fax #:**

REMARKS:

dneel2@concho.com

rgrubbs@concho.com

Please only run deeper horizons for BTEX AND TPH if Benzene exceeds 10ppm, BTEX exceeds 50ppm, and TPH exceeds 5000ppm.

FORM-006 R 2.0

3. Please fax written changes to 575-393-2476

Analytical Report 577590

for

Tetra Tech- Midland

Project Manager: Ike Tavarez

Lusk Deep 22H

212C-MD-00863

06-MAR-18

Collected By: Client

1211 W. Florida Ave, Midland TX 79701

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

Xenco-Dallas (EPA Lab code: TX01468):
Texas (T104704295-17-16), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab code: TX00127): Texas (T104704221-17-12)
Xenco-Lubbock (EPA Lab code: TX00139): Texas (T104704219-17-16)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-18-14)
Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-17-3)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco-Atlanta (LELAP Lab ID #04176)

06-MAR-18

Project Manager: **Ike Tavarez**
Tetra Tech- Midland
4000 N. Big Spring Suite 401
Midland, TX 79705

Reference: XENCO Report No(s): **577590**
Lusk Deep 22H
Project Address: Lea County NM

Ike Tavarez:

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) 577590. 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. 577590 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,

Kelsey Brooks
Project Manager

Sample Cross Reference 577590

Tetra Tech- Midland, Midland, TX

Lusk Deep 22H

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
Bottom Hole (4'-5')	S	02-20-18 12:10		577590-001
NSW-1	S	02-20-18 15:25		577590-002
SSW-1	S	02-20-18 15:30		577590-003
WSW-1	S	02-20-18 15:35		577590-004
ESW-1	S	02-20-18 15:20		577590-005

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Certificate of Analysis Summary 577590

Tetra Tech- Midland, Midland, TX

Project Name: Lusk Deep 22H

Project Id: 212C-MD-00863
Contact: Ike Tavarez
Project Location: Lea County NM

Date Received in Lab: Tue Feb-27-18 01:30 pm
Report Date: 06-MAR-18
Project Manager: Kelsey Brooks

Analysis Requested											
	Lab Id:	577590-001		577590-002		577590-003		577590-004		577590-005	
	Field Id:	Bottom Hole (4'-5')		NSW-1		SSW-1		WSW-1		ESW-1	
	Depth:										
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Feb-20-18 12:10		Feb-20-18 15:25		Feb-20-18 15:30		Feb-20-18 15:35		Feb-20-18 15:20	
Inorganic Anions by EPA 300/300.1	***Extracted:***	Mar-01-18 17:00		Mar-01-18 17:00		Mar-01-18 17:00		Mar-01-18 17:00		Mar-01-18 17:00	
	Analyzed:	Mar-01-18 19:12		Mar-01-18 19:28		Mar-01-18 19:33		Mar-01-18 19:38		Mar-01-18 19:43	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		8120	50.0	70.6	5.00	145	4.95	151	4.98	<4.99	4.99

Kelsey Brooks
Project Manager

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the quantitation limit and above the detection limit.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

	Phone	Fax
4147 Greenbriar Dr, Stafford, TX 77477	(281) 240-4200	(281) 240-4280
9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr. - Suite 102, Tempe AZ 85282	(602) 437-0330	

BS / BSD Recoveries

Project Name: Lusk Deep 22H

Work Order #: 577590 **Project ID:** 212C-MD-00863

Analyst: OJS **Date Prepared:** 03/01/2018 **Date Analyzed:** 03/01/2018

Lab Batch ID: 3042855 **Sample:** 7640021-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<5.00	250	274	110	250	274	110	0	90-110	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

Form 3 - MS / MSD Recoveries

Project Name: Lusk Deep 22H

Work Order # : 577590 **Project ID:** 212C-MD-00863

Lab Batch ID: 3042855 **QC- Sample ID:** 577565-009 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 03/01/2018 **Date Prepared:** 03/01/2018 **Analyst:** OJS

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<4.91	246	266	108	246	270	110	1	90-110	20	

Lab Batch ID: 3042855 **QC- Sample ID:** 577595-002 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 03/01/2018 **Date Prepared:** 03/01/2018 **Analyst:** OJS

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<5.00	250	267	107	250	269	108	1	90-110	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable

N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.

Analysis Request of Chain of Custody Record

Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland,Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

577590

Client Name: COG

Site Manager: Ike Tavarez

Project Name: Lusk Deep 22H

Project Location: (county, state) Lea Coutny NM

Project #: 212C-MD-00863

Invoice to:

Receiving Laboratory: Xenco

Sampler Signature: Clint Merritt

Comments:

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD	PRESERVATIVE METHOD	# CONTAINERS	FILTERED (Y/N)
	Bottom hole (4'-5')	2/20/2018	12:10		X				X			1	
	NSW-1	2/20/2018	15:25		X				X			1	
	SSW-1	2/20/2018	15:30		X				X			1	
	WSW-1	2/20/2018	15:35		X				X			1	
	ESW-1	2/20/2018	15:20		X				X			1	

ANALYSIS REQUEST
(Circle or Specify Method No.)

BTEX 8021B BTEX 8260B	TPH TX1005 (Ext to C35)	TPH 8015M (GRO - DRO - ORO - MRO)	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC/MS Vol. 8260B / 624	GC/MS Semi. Vol. 8270C/625	PCB's 8082 / 608	NORM	PLM (Asbestos)	Chloride	Chloride Sulfate TDS	General Water Chemistry (see attached list)	Anion/Cation Balance					Hold
														X								
														X								
														X								
														X								
														X								
														X								

Relinquished by: Clint Merritt Date: 2/27/18 Time: 13:30

Received by: Date: 2/27/18 Time: 1330

Relinquished by: Date: Time:

Received by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

LAB USE ONLY

Sample Temperature

REMARKS:

RUSH: Same Day 24 hr 48 hr 72 hr

Rush Charges Authorized

Special Report Limits or TRRP Report

(Circle) HA

ORIGINAL COPY

Temp: 4.8 IR ID:R-8
CF:(0-6: -0.2°C)
(6-23: +0.2°C)
Corrected Temp: 4.6

Final 1.000

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Tetra Tech- Midland

Date/ Time Received: 02/27/2018 01:30:00 PM

Work Order #: 577590

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	4.6
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**N/A**
#5 Custody Seals intact on sample bottles?	**N/A**
#6*Custody Seals Signed and dated?	**N/A**
#7 *Chain of Custody present?	**Yes**
#8 Any missing/extra samples?	**No**
#9 Chain of Custody signed when relinquished/ received?	**Yes**
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**
#11 Container label(s) legible and intact?	**Yes**
#12 Samples in proper container/ bottle?	**Yes**
#13 Samples properly preserved?	**Yes**
#14 Sample container(s) intact?	**Yes**
#15 Sufficient sample amount for indicated test(s)?	**Yes**
#16 All samples received within hold time?	**Yes**
#17 Subcontract of sample(s)?	**No**
#18 Water VOC samples have zero headspace?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Connie Hernandez Date: 02/27/2018

Checklist reviewed by: Kelsey Brooks Date: 03/01/2018