SITE INFORMATION

Report Type: Closure Report 1RP-5103

General Site Information:						
Site:	**Vaca Draw 20-17 Fed 1H**					
Company:	**Cimarex Energy**					
Section, Township and Range	**Unit M**	**Sec. 20**	**T 25S**	**R 33E**		
Lease Number:	**API No. 30-025-44135**					
County:	**Lea County**					
GPS:	**32.109787º**			**-103.600849º**		
Surface Owner:	Federal					
Mineral Owner:	Federal					
Directions:	From the intersection of J-1 and Pipeline Rd head east on Pipeline Rd for 5.05 miles,, turn hard left (northwest) onto unnamed lease road and go 0.7 miles, turn right (northeast) and and go 0.4 miles, turn left (northwest) and go 0.12 miles, turn right (northeast and go 1.08 miles, keep left at the fork in the road and go 1 mile, turn left (west) and go 0.64 miles, arrive at location. Work area is 400 feet to the north in the pasture.					

Release Data:	
Date Released:	6/18/2018
Type Release:	Produced Water
Source of Contamination:	Poly tubing failed
Fluid Released:	150 bbls
Fluids Recovered:	5 bbls

Official Communication:			
Name:	Gloria Garza		Clair Gonzales
Company:	Cimarex Energy		Tetra Tech
Address:	600 N. Marienfield St.		901 W. Wall St.
	Ste 400		Ste 100
City:	Midland Texas, 79701		Midland, Texas, 79701
Phone number:	(432) 234-3204		(432) 687-8123
Fax:			
Email:	ggarza@cimarex.com		Clair.Gonzales@Tetratech.com

Site Characterization	
Depth to Groundwater:	*204' below surface*

Recommended Remedial Action Levels (RRALs)				
Benzene	***Total BTEX***	***TPH (GRO+DRO)***	***TPH (GRO+DRO+MRO)***	***Chlorides***
10 mg/kg	*50 mg/kg*	*1,000 mg/kg*	*2,500 mg/kg*	*20,000 mg/kg*

TETRA TECH

April 25, 2019

Gloria Garza
ESH Specialist – Permian Basin
Cimarex Energy
600 N. Marienfeld St.
Midland, Texas 79701

Re: Closure Report for the Cimarex Energy, Vaca Draw 20-17 Fed 1H, Unit M, Section 20, Township 25 South, Range 33 East, Lea County, New Mexico. 1RP-5103.

Ms. Garza:

Tetra Tech, Inc. (Tetra Tech) was contacted by Cimarex Energy (Cimarex) to assess a spill at the Vaca Draw 20-17 Fed 1H, Unit M, Section 20, Township 25 South, Range 33 East, Lea County, New Mexico (site). The spill site coordinates are 32.109787º, -103.600849º. The site location is shown on Maps 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the release was discovered on June 17, 2017, and released approximately 150 barrels of treated produced water due to a poly tubing failure. Vacuum trucks were dispatched to remove the freestanding fluids, recovering approximately 5 barrels of produced water. As a part of the emergency response, Cimarex scraped the release area to approximately 3"-4" below surface. The release occurred in the pasture along the lease road and impacted areas measuring approximately 30' x 55' and 40' x 300'. The initial C-141 Form is included in Appendix A.

Site Characterization

A site characterization was performed for the site and no watercourses, lakebeds, sinkholes, playa lakes, residences, schools, hospitals, institutions, churches, springs, private domestic water wells, springs, wetlands, incorporated municipal boundaries, subsurface mines, or floodplains are located within the specified distances and the site is in a low karst potential area. No water wells were listed within Section 20 on the New Mexico Office of the State Engineer's website. However, two (2) wells are listed in Section 20 on the USGS National Water Information System with reported depths to groundwater of 204' and 212' below surface. Additionally, one well is listed in the Geology and Groundwater Conditions in Southern Lea County, NM (Report 6) with a reported depth to groundwater of 200' below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in the area is between 150' and 175' below surface. The groundwater data is shown in Appendix B.

TETRA TECH

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, updated August 14, 2018. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (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 1,000 mg/kg (GRO + DRO) and 2,500 mg/kg (GRO + DRO + MRO). Additionally, based on the reported depth to groundwater in the area, the proposed RRAL for chlorides is 20,000 mg/kg.

Soil Assessment and Analytical Results

On June 29, 2018, Tetra Tech personnel were onsite to evaluate and sample the release area. Five (5) auger holes (AH-1, AH-2, AH-3, AH-4, and AH-5) were installed in the release area as well as one (1) background auger hole (Background) to evaluate the native soils. Selected samples were analyzed for TPH by EPA method 8015 modified, BTEX by EPA method 8021B, and chloride by EPA method 300.0. Copies of the laboratory analysis and chain-of-custody documentation are included. The results of the sampling are summarized in Table 1. The sample locations are shown in Plat 3.

Referring to Table 1, none of the samples analyzed showed benzene, total BTEX, or TPH concentrations above the laboratory reporting limits. Additionally, the areas of auger holes (AH-1, AH-2, AH-3, AH-4, and AH-5) showed chloride concentrations below the RRALs with chloride highs of 18.7 mg/kg at 0-1', 6,600 mg/kg at 1'-1.5', 189 mg/kg at 0-1', 1,360 mg/kg at 0-1', and 23.4 mg/kg at 0-1', respectively.

Remediation and Analytical Results

Tetra Tech personnel were onsite April 1-2, 2019, to supervise the remediation activities in the southeast pasture area. The area of auger hole (AH-2) was excavated to 4' below surface. Sidewall (North Sidewall 1, East Sidewall 1, South Sidewall 1 and 2, and West Sidewall 1 and 2) and bottom hole confirmation samples (Bottom Hole 1 to Bottom Hole 6) were then collected from the excavation. Additionally, the area of auger hole (AH-2) was trenched with a backhoe (T-1), per BLM's request for further delineation of the chlorides in the area.

The 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 sample locations are shown in Plat 3.

Referring to Lab Analysis Table 1, all analyzed confirmation samples showed benzene, total BTEX, and TPH below the laboratory reporting limit. Additionally, all samples showed chloride concentrations below the RRAL.

The samples collected at the trench (T-1) showed a chloride high of 4,080 mg/kg at 6' below surface. The concentrations then declined with depth to below the RRAL at 8' below ground surface.

Approximately 230 cubic yards of material was removed and hauled to proper disposal. The excavation was then backfilled with clean material and returned to surface grade. The excavation area and depth are shown on Plat 4.

Revegetation

Reseeding will be performed in June 2019 to coincide with the rainy season in Southeastern New Mexico and aid in revegetation. Based on the soils at the site, the BLM Seed Mixture 2, for Sandy Sites, will be used and will be planted in the amount specified in the pounds pure live seed (PLS) per acre. The seed mixture will be spread by a drill equipped with a depth regulator or a handheld broadcaster and raked. If a hand-held broadcaster is used for dispersal, the pounds PLS per acre will be doubled.

Site inspections will be performed to assess the revegetation progress and evaluate the site for the presence of primary or secondary noxious weeds. If noxious weeds are identified, the BLM will be contacted to determine an effective method for eradication. If the site does not show revegetation after one growing season, the area will be reseeded as appropriate. The BLM seed mixture details and corresponding pounds PLS per acre are included in Appendix C.

Conclusion

Based on the laboratory results and the location of the release on the facilities pad, Cimarex requests closure of this spill issue. The final C-141 is enclosed in Appendix A. If you have any questions or comments concerning the assessment activities for this site, please call at (432) 682-4559.

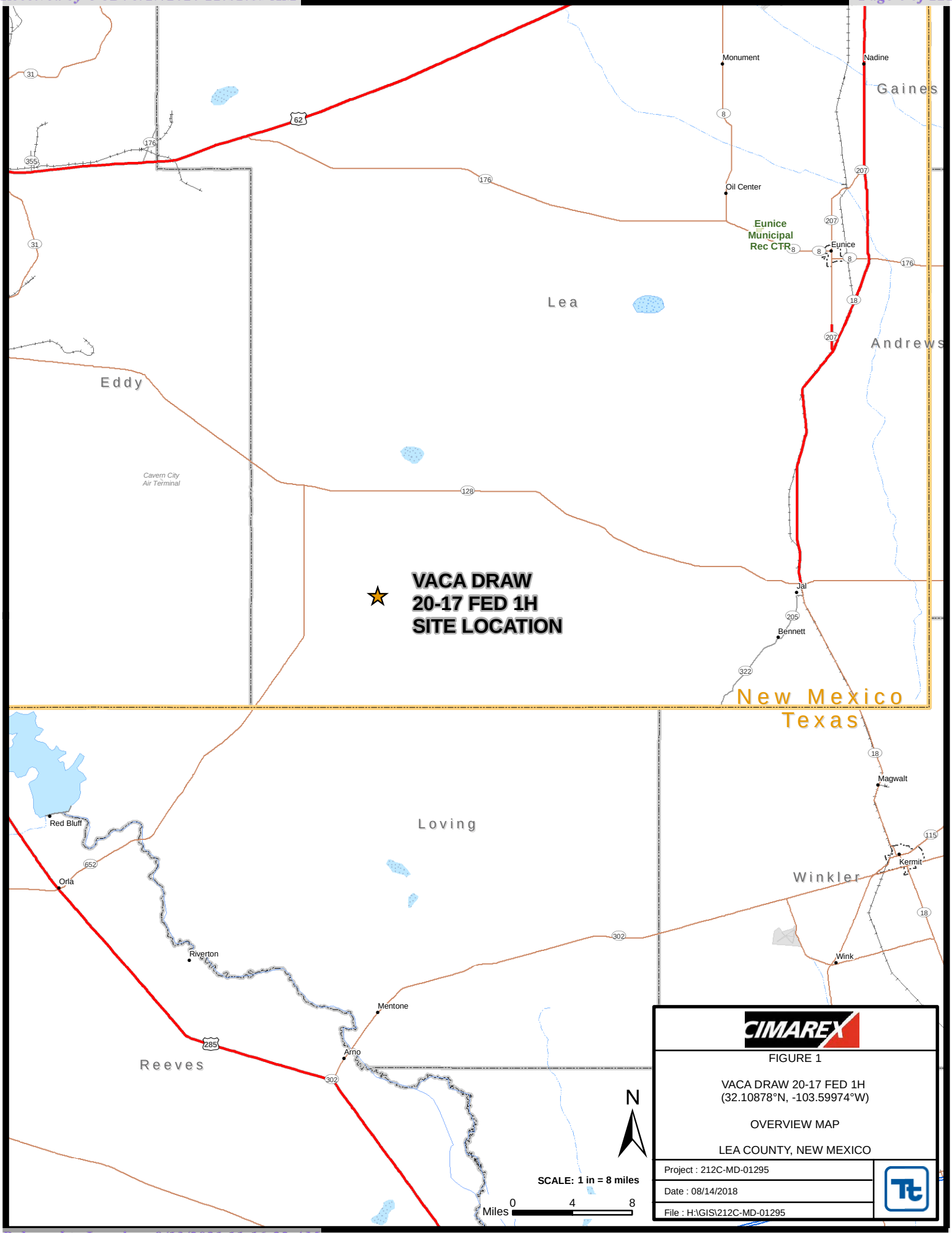
Respectfully submitted,
TETRA TECH

Clair Gonzales,
Project Manager

Johnathon Kell,
Geologist

cc: Shelly Tucker – BLM

Maps/Plats



CIMAREX

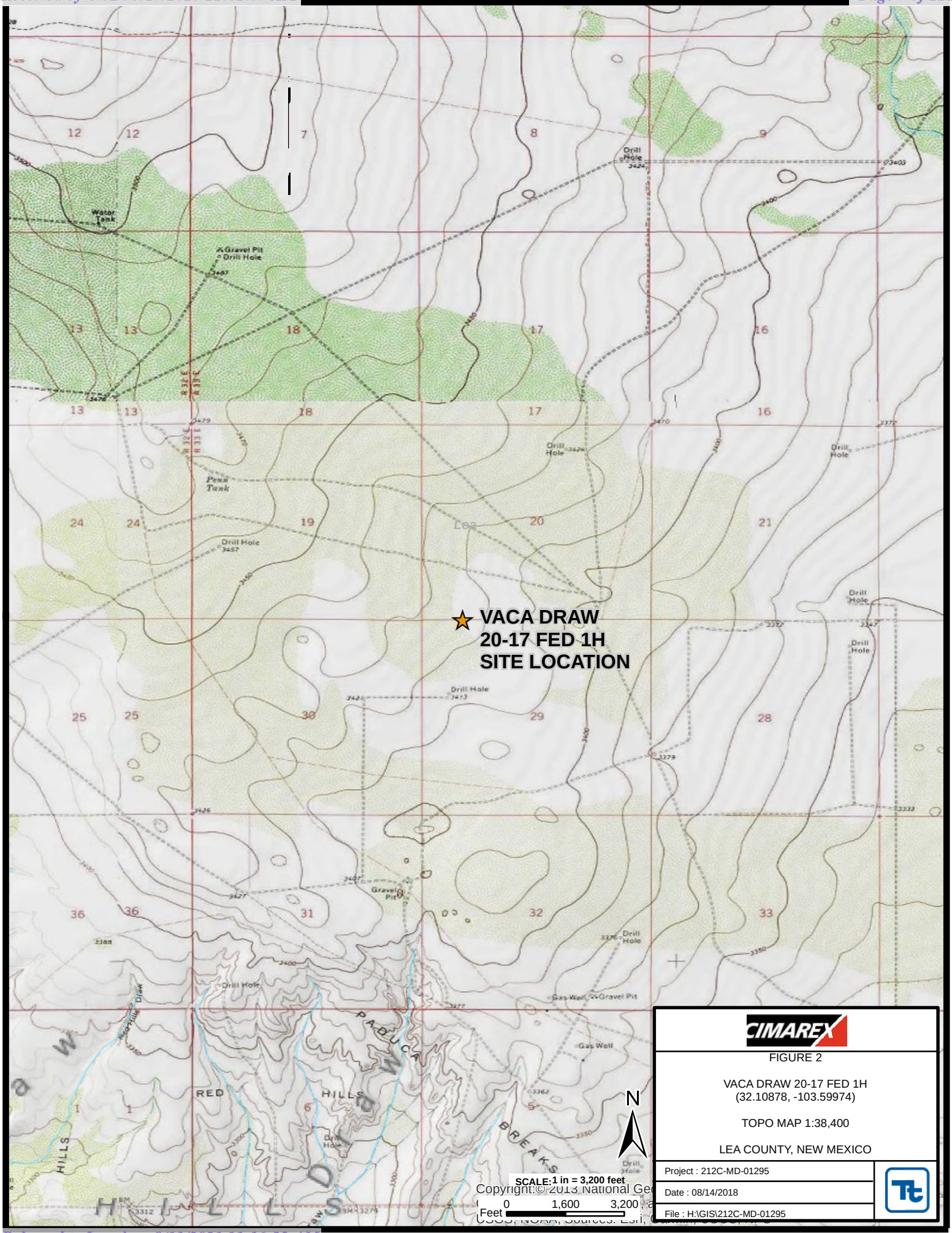
FIGURE 1

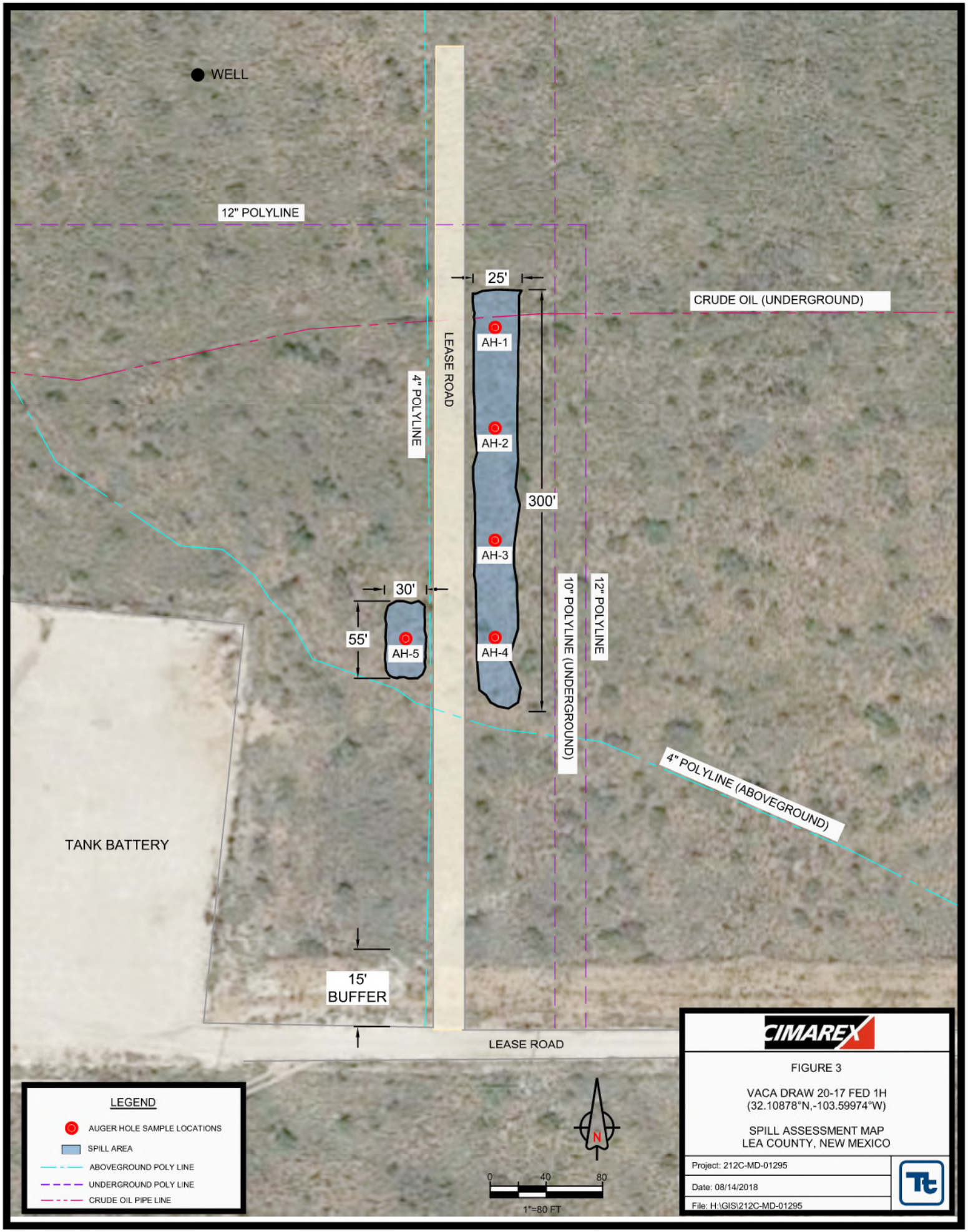
VACA DRAW 20-17 FED 1H
(32.10878°N, -103.59974°W)

OVERVIEW MAP

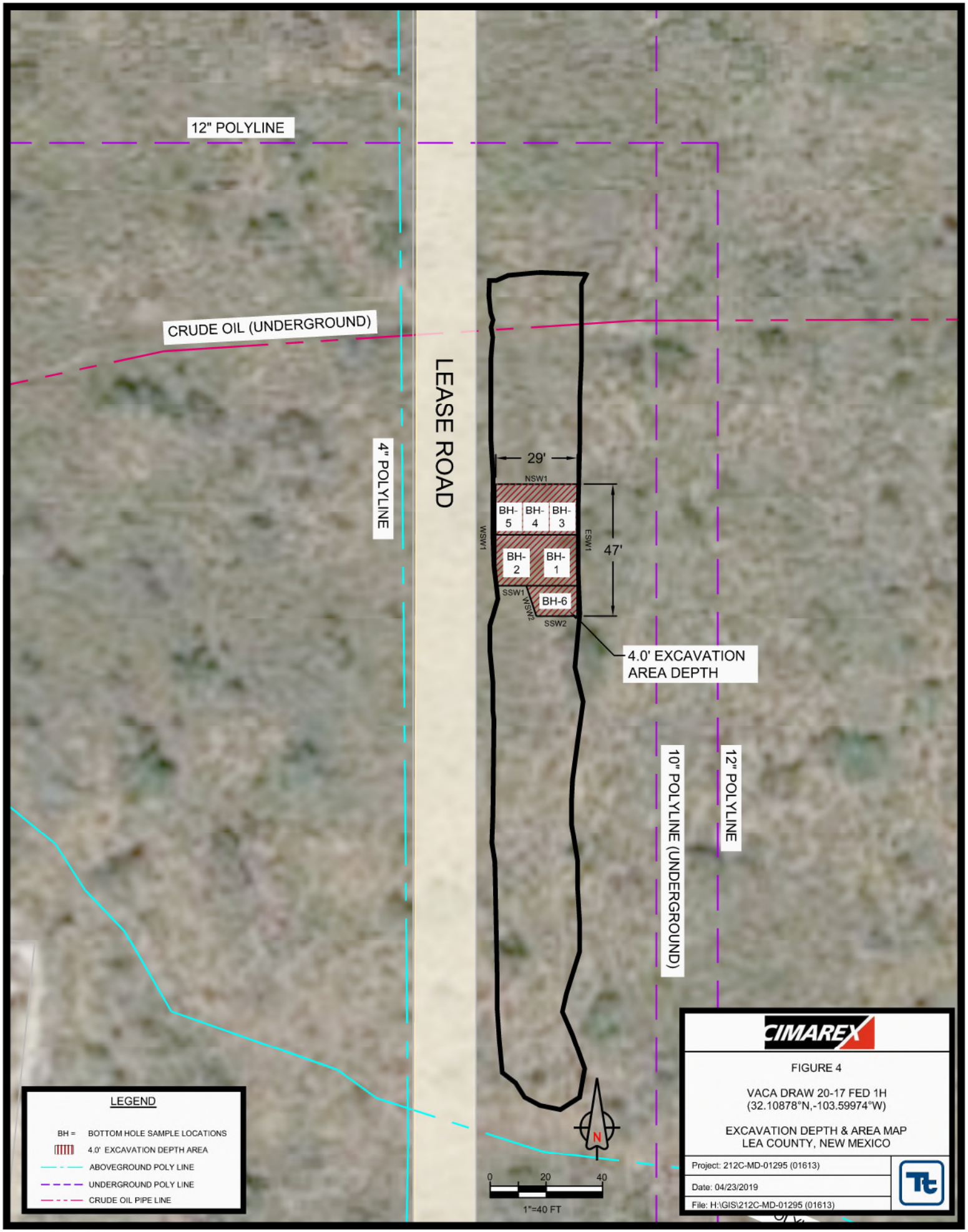
LEA COUNTY, NEW MEXICO

Project : 212C-MD-01295	
Date : 08/14/2018	
File : H:\GIS\212C-MD-01295	


VACA DRAW
20-17 FED 1H
SITE LOCATION
N
SCALE: 1 in = 3,200 feet
0
1,600
3,200
Feet
Copyright:© 2013 National Ge
CIMAREX
FIGURE 2
VACA DRAW 20-17 FED 1H
(32.10878, -103.59974)
TOPO MAP 1:38,400
LEA COUNTY, NEW MEXICO
Project : 212C-MD-01295
Date : 08/14/2018
File : H:\GIS\212C-MD-01295



Drawn By: MISTI MORGAN


12" POLYLINE
CRUDE OIL (UNDERGROUND)
LEASE ROAD
4" POLYLINE
29'
NSW1
BH-5
BH-4
BH-3
WSW1
ESW1
47'
BH-2
BH-1
SSW1
WSW2
BH-6
SSW2
4.0' EXCAVATION AREA DEPTH
10" POLYLINE (UNDERGROUND)
12" POLYLINE
N
0
20
40
1"=40 FT
LEGEND
BH = BOTTOM HOLE SAMPLE LOCATIONS
4.0' EXCAVATION DEPTH AREA
ABOVEGROUND POLY LINE
UNDERGROUND POLY LINE
CRUDE OIL PIPE LINE
CIMAREX
FIGURE 4
VACA DRAW 20-17 FED 1H
(32.10878°N,-103.59974°W)
EXCAVATION DEPTH & AREA MAP
LEA COUNTY, NEW MEXICO
Project: 212C-MD-01295 (01613)
Date: 04/23/2019
File: H:\GIS\212C-MD-01295 (01613)
Drawn By: MISTI MORGAN

Lab Analysis

Table 1
Cimarex Energy
Vaca Draw 20-17 Fed 1H
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	ORO	Total						
AH-1	6/29/2018	0-1	3"-4"	X		<15.0	<15.0	<15.0	<15.0	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	18.7
	"	1-1.5	"	X		-	-	-	-	-	-	-	-	-	<4.97
	"	2-2.5	"	X		-	-	-	-	-	-	-	-	-	<4.97
AH-2	6/29/2018	0-1	3"-4"		X	<15.0	<15.0	<15.0	<15.0	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	4,900
	"	1-1.5	"		X	-	-	-	-	-	-	-	-	-	6,600
	"	2-2.5	"		X	-	-	-	-	-	-	-	-	-	5,710
T-1	4/1/2019	0-1	3"-4"		X	-	-	-	-	-	-	-	-	-	64.0
	"	2	"		X	-	-	-	-	-	-	-	-	-	144
	"	3	"		X	-	-	-	-	-	-	-	-	-	608
	"	4	"		X	-	-	-	-	-	-	-	-	-	2,760
	"	5	"	X		-	-	-	-	-	-	-	-	-	4,040
	"	6	"	X		-	-	-	-	-	-	-	-	-	4,080
	"	7	"	X		-	-	-	-	-	-	-	-	-	832
	"	8	"	X		-	-	-	-	-	-	-	-	-	144
	"	9	"	X		-	-	-	-	-	-	-	-	-	64.0
Bottom Hole #1	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	4,000
Bottom Hole #2	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	3,080
Bottom Hole #3	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,730
Bottom Hole #4	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	2,840
Bottom Hole #5	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	112
Bottom Hole #6	4/1/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,360
North #1 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,720
East #1 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	3,920
South #1 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	16.0
South #2 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	64.0
West #1 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,460
West #2 Sidewall	4/1/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0

Table 1
Cimarex Energy
Vaca Draw 20-17 Fed 1H
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	ORO	Total						
AH-3	6/29/2018	0-1	3"-4"	X		<15.0	<15.0	<15.0	<15.0	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	189
	"	1-1.5	"	X		-	-	-	-	-	-	-	-	-	64.8
	"	2-2.5	"	X		-	-	-	-	-	-	-	-	-	16.1
AH-4	6/29/2018	0-1	3"-4"	X		<14.9	<14.9	<14.9	<14.9	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	1,360
	"	1-1.5	"	X		-	-	-	-	-	-	-	-	-	74.0
	"	2-2.5	"	X		-	-	-	-	-	-	-	-	-	28.7
	"	3-3.5	"	X		-	-	-	-	-	-	-	-	-	110
AH-5	6/29/2018	0-1	3"-4"	X		<15.0	<15.0	<15.0	<15.0	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	23.4
	"	1-1.5	"	X		-	-	-	-	-	-	-	-	-	11.1
Background	6/29/2018	0-1	-	X		-	-	-	-	-	-	-	-	-	<4.90
	"	1-1.5	-	X		-	-	-	-	-	-	-	-	-	<4.90
	"	2-2.5	-	X		-	-	-	-	-	-	-	-	-	<4.95

(-) Not Analyzed
BEB Below Excavation Bottom
Proposed Excavation Depths

Certificate of Analysis Summary 591085

Tetra Tech- Midland, Midland, TX

Project Name: Cimarex-Vaca Draw 20-17 Fed. 1H

Project Id: 212C-MD-01295
Contact: Ike Tavarez
Project Location: Lea County, New Mexico

Date Received in Lab: Mon Jul-02-18 02:05 pm
Report Date: 10-JUL-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	591085-001		591085-002		591085-003		591085-004		591085-005		591085-006	
	Field Id:	AH#1 (0-1) 3"-4" BEB		AH#1 (1'-1.5') 3"-4" BEB		AH#1 (2'-2.5') 3"-4" BEB		AH#2 (0-1) 3"-4" BEB		AH#2 (1'-1.5') 3"-4" BEB		AH#2 (2-2.5') 3"-4" BEB	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00	
BTEX by EPA 8021B	***Extracted:***	Jul-09-18 15:00						Jul-08-18 08:00					
	Analyzed:	Jul-10-18 00:40						Jul-08-18 12:15					
	Units/RL:	mg/kg	RL					mg/kg	RL				
Benzene		<0.00200	0.00200					<0.00200	0.00200				
Toluene		<0.00200	0.00200					<0.00200	0.00200				
Ethylbenzene		<0.00200	0.00200					<0.00200	0.00200				
m,p-Xylenes		<0.00399	0.00399					<0.00401	0.00401				
o-Xylene		<0.00200	0.00200					<0.00200	0.00200				
Total Xylenes		<0.00200	0.00200					<0.00200	0.00200				
Total BTEX		<0.00200	0.00200					<0.00200	0.00200				
Chloride by EPA 300	***Extracted:***	Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45	
	Analyzed:	Jul-07-18 00:48		Jul-07-18 01:04		Jul-07-18 01:09		Jul-07-18 01:15		Jul-07-18 01:20		Jul-07-18 01:25	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		18.7	5.00	<4.97	4.97	<4.97	4.97	4900	49.2	6600	49.7	5710	50.0
TPH By SW8015 Mod	***Extracted:***	Jul-07-18 11:00						Jul-07-18 11:00					
	Analyzed:	Jul-08-18 01:51						Jul-08-18 02:11					
	Units/RL:	mg/kg	RL					mg/kg	RL				
Gasoline Range Hydrocarbons (GRO)		<15.0	15.0					<15.0	15.0				
Diesel Range Organics (DRO)		<15.0	15.0					<15.0	15.0				
Oil Range Hydrocarbons (ORO)		<15.0	15.0					<15.0	15.0				
Total TPH		<15.0	15.0					<15.0	15.0				

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Version: 1.%

Kelsey Brooks
Project Manager

Final 1.000

Certificate of Analysis Summary 591085

Tetra Tech- Midland, Midland, TX

Project Name: Cimarex-Vaca Draw 20-17 Fed. 1H

Project Id: 212C-MD-01295
Contact: Ike Tavarez
Project Location: Lea County, New Mexico

Date Received in Lab: Mon Jul-02-18 02:05 pm
Report Date: 10-JUL-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	591085-007		591085-008		591085-009		591085-010		591085-011		591085-012	
	Field Id:	AH#3 (0-1) 3"-4" BEB		AH#3 (1'-1.5') 3"-4" BEB		AH#3 (2'-2.5') 3"-4" BEB		AH#4 (0-1) 3"-4" BEB		AH#4 (1'-1.5') 3"-4" BEB		AH#4 (2'-2.5') 3"-4" BEB	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00	
BTEX by EPA 8021B	***Extracted:***	Jul-08-18 08:00						Jul-08-18 08:00					
	Analyzed:	Jul-08-18 12:33						Jul-08-18 12:51					
	Units/RL:	mg/kg	RL					mg/kg	RL				
Benzene		<0.00200	0.00200					<0.00199	0.00199				
Toluene		<0.00200	0.00200					<0.00199	0.00199				
Ethylbenzene		<0.00200	0.00200					<0.00199	0.00199				
m,p-Xylenes		<0.00399	0.00399					<0.00398	0.00398				
o-Xylene		<0.00200	0.00200					<0.00199	0.00199				
Total Xylenes		<0.00200	0.00200					<0.00199	0.00199				
Total BTEX		<0.00200	0.00200					<0.00199	0.00199				
Chloride by EPA 300	***Extracted:***	Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45	
	Analyzed:	Jul-07-18 01:31		Jul-07-18 01:47		Jul-07-18 01:52		Jul-07-18 02:09		Jul-07-18 02:14		Jul-07-18 02:19	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		189	4.92	64.8	4.98	16.1	4.91	1360	4.99	74.0	4.98	28.7	4.97
TPH By SW8015 Mod	***Extracted:***	Jul-07-18 11:00						Jul-07-18 11:00					
	Analyzed:	Jul-08-18 02:30						Jul-08-18 02:50					
	Units/RL:	mg/kg	RL					mg/kg	RL				
Gasoline Range Hydrocarbons (GRO)		<15.0	15.0					<14.9	14.9				
Diesel Range Organics (DRO)		<15.0	15.0					<14.9	14.9				
Oil Range Hydrocarbons (ORO)		<15.0	15.0					<14.9	14.9				
Total TPH		<15.0	15.0					<14.9	14.9				

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Version: 1.%

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 591085

Tetra Tech- Midland, Midland, TX

Project Name: Cimarex-Vaca Draw 20-17 Fed. 1H

Project Id: 212C-MD-01295
Contact: Ike Tavarez
Project Location: Lea County, New Mexico

Date Received in Lab: Mon Jul-02-18 02:05 pm
Report Date: 10-JUL-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	591085-013		591085-014		591085-015		591085-016		591085-017		591085-018	
	Field Id:	AH#4 (3'-3.5') 3"-4" BEB		AH#5 (0-1) 3"-4" BEB		AH#5 (1'.5'-1) 3"-4" BEB		Background (0-1) 3"-4" BEB		Background (1'-5') 3"-4" BE		Background (2'-2.5') 3"-4" Bl	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00		Jun-29-18 00:00	
BTEX by EPA 8021B	***Extracted:***			Jul-08-18 08:00									
	Analyzed:			Jul-08-18 13:45									
	Units/RL:			mg/kg	RL								
Benzene				<0.00201	0.00201								
Toluene				<0.00201	0.00201								
Ethylbenzene				<0.00201	0.00201								
m,p-Xylenes				<0.00402	0.00402								
o-Xylene				<0.00201	0.00201								
Total Xylenes				<0.00201	0.00201								
Total BTEX				<0.00201	0.00201								
Chloride by EPA 300	***Extracted:***	Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-06-18 13:45		Jul-07-18 11:30		Jul-07-18 11:30	
	Analyzed:	Jul-07-18 02:25		Jul-07-18 02:30		Jul-07-18 02:36		Jul-07-18 02:41		Jul-07-18 12:40		Jul-07-18 12:56	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		110	4.94	23.4	4.92	11.1	4.96	<4.90	4.90	<4.90	4.90	<4.95	4.95
TPH By SW8015 Mod	***Extracted:***			Jul-07-18 11:00									
	Analyzed:			Jul-08-18 03:09									
	Units/RL:			mg/kg	RL								
Gasoline Range Hydrocarbons (GRO)				<15.0	15.0								
Diesel Range Organics (DRO)				<15.0	15.0								
Oil Range Hydrocarbons (ORO)				<15.0	15.0								
Total TPH				<15.0	15.0								

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Version: 1.%

Kelsey Brooks
Project Manager

Analytical Report 591085

for

Tetra Tech- Midland

Project Manager: Ike Tavarez

Cimarex-Vaca Draw 20-17 Fed. 1H

212C-MD-01295

10-JUL-18

Collected By: Client

1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab Code: TX00122):
Texas (T104704215-18-26), 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 (T104704400-18-15)
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)
Xenco-Tampa: Florida (E87429)
Xenco-Lakeland: Florida (E84098)

10-JUL-18

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

Reference: XENCO Report No(s): **591085**
Cimarex-Vaca Draw 20-17 Fed. 1H
Project Address: Lea County, New Mexico

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) 591085. 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. 591085 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

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 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
AH#1 (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-001
AH#1 (1'-1.5') 3"-4" BEB	S	06-29-18 00:00		591085-002
AH#1 (2'-2.5') 3"-4" BEB	S	06-29-18 00:00		591085-003
AH#2 (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-004
AH#2 (1'-1.5') 3"-4" BEB	S	06-29-18 00:00		591085-005
AH#2 (2-2.5') 3"-4" BEB	S	06-29-18 00:00		591085-006
AH#3 (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-007
AH#3 (1'-1.5') 3"-4" BEB	S	06-29-18 00:00		591085-008
AH#3 (2'-2.5') 3"-4" BEB	S	06-29-18 00:00		591085-009
AH#4 (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-010
AH#4 (1'-1.5') 3"-4" BEB	S	06-29-18 00:00		591085-011
AH#4 (2'-2.5') 3"-4" BEB	S	06-29-18 00:00		591085-012
AH#4 (3'-3.5') 3"-4" BEB	S	06-29-18 00:00		591085-013
AH#5 (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-014
AH#5 (1'.5'-1) 3"-4" BEB	S	06-29-18 00:00		591085-015
Background (0-1) 3"-4" BEB	S	06-29-18 00:00		591085-016
Background (1'-5') 3"-4" BEB	S	06-29-18 00:00		591085-017
Background (2'-2.5') 3"-4" BEB	S	06-29-18 00:00		591085-018

Version: 1.%

CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: Cimarex-Vaca Draw 20-17 Fed. 1H

Project ID: *212C-MD-01295*
Work Order Number(s): *591085*

Report Date: *10-JUL-18*
Date Received: *07/02/2018*

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3055735 Inorganic Anions by EPA 300
Lab Sample ID 591085-007 was randomly selected for Matrix Spike/Matrix Spike Duplicate (MS/MSD). Chloride recovered above QC limits in the Matrix Spike. Outlier/s are due to possible matrix interference. Samples in the analytical batch are: 591085-001, -002, -003, -004, -005, -006, -007, -008, -009, -010, -011, -012, -013, -014, -015, -016.
The Laboratory Control Sample for Chloride is within laboratory Control Limits, therefore the data was accepted.

Batch: LBA-3055798 BTEX by EPA 8021B
Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Batch: LBA-3055856 BTEX by EPA 8021B
Soil samples were not received in Terracore kits and therefore were prepared by method 5030.

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#1 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-001	Date Collected:	06.29.18 00.00		

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**18.7**	5.00	mg/kg	07.07.18 00.48		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	TX1005P
Tech:	ARM			% Moisture:	
Analyst:	ARM	Date Prep:	07.07.18 11.00	Basis:	Wet Weight
Seq Number:	3055923				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<15.0	15.0	mg/kg	07.08.18 01.51	U	1
Diesel Range Organics (DRO)	C10C28DRO	<15.0	15.0	mg/kg	07.08.18 01.51	U	1
Oil Range Hydrocarbons (ORO)	PHCG2835	<15.0	15.0	mg/kg	07.08.18 01.51	U	1
Total TPH	PHC635	<15.0	15.0	mg/kg	07.08.18 01.51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	90	%	70-135	07.08.18 01.51	
o-Terphenyl	84-15-1	92	%	70-135	07.08.18 01.51	

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#1 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-001	Date Collected:	06.29.18 00.00		
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	ALJ			% Moisture:	
Analyst:	ALJ	Date Prep:	07.09.18 15.00	Basis:	Wet Weight
Seq Number:	3055856				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	07.10.18 00.40	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1
Total BTEX		<0.00200	0.00200	mg/kg	07.10.18 00.40	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	102	%	70-130	07.10.18 00.40	
4-Bromofluorobenzene	460-00-4	106	%	70-130	07.10.18 00.40	

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#1 (1'-1.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-002	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.97	4.97	mg/kg	07.07.18 01.04	U	1

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#1 (2'-2.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-003	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.97	4.97	mg/kg	07.07.18 01.09	U	1

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#2 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-004	Date Collected:	06.29.18 00.00		

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**4900**	49.2	mg/kg	07.07.18 01.15		10

Analytical Method:	TPH By SW8015 Mod			Prep Method:	TX1005P
Tech:	ARM			% Moisture:	
Analyst:	ARM	Date Prep:	07.07.18 11.00	Basis:	Wet Weight
Seq Number:	3055923				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<15.0	15.0	mg/kg	07.08.18 02.11	U	1
Diesel Range Organics (DRO)	C10C28DRO	<15.0	15.0	mg/kg	07.08.18 02.11	U	1
Oil Range Hydrocarbons (ORO)	PHCG2835	<15.0	15.0	mg/kg	07.08.18 02.11	U	1
Total TPH	PHC635	<15.0	15.0	mg/kg	07.08.18 02.11	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-135	07.08.18 02.11	
o-Terphenyl	84-15-1	98	%	70-135	07.08.18 02.11	

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#2 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-004	Date Collected:	06.29.18 00.00		
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	ALJ			% Moisture:	
Analyst:	ALJ	Date Prep:	07.08.18 08.00	Basis:	Wet Weight
Seq Number:	3055798				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1
m,p-Xylenes	179601-23-1	<0.00401	0.00401	mg/kg	07.08.18 12.15	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1
Total BTEX		<0.00200	0.00200	mg/kg	07.08.18 12.15	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	73	%	70-130	07.08.18 12.15	
4-Bromofluorobenzene	460-00-4	122	%	70-130	07.08.18 12.15	

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#2 (1'-1.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-005	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**6600**	49.7	mg/kg	07.07.18 01.20		10

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#2 (2-2.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-006	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**5710**	50.0	mg/kg	07.07.18 01.25		10

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#3 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-007	Date Collected:	06.29.18 00.00		

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**189**	4.92	mg/kg	07.07.18 01.31		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	TX1005P
Tech:	ARM			% Moisture:	
Analyst:	ARM	Date Prep:	07.07.18 11.00	Basis:	Wet Weight
Seq Number:	3055923				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<15.0	15.0	mg/kg	07.08.18 02.30	U	1
Diesel Range Organics (DRO)	C10C28DRO	<15.0	15.0	mg/kg	07.08.18 02.30	U	1
Oil Range Hydrocarbons (ORO)	PHCG2835	<15.0	15.0	mg/kg	07.08.18 02.30	U	1
Total TPH	PHC635	<15.0	15.0	mg/kg	07.08.18 02.30	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	92	%	70-135	07.08.18 02.30	
o-Terphenyl	84-15-1	92	%	70-135	07.08.18 02.30	

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#3 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-007	Date Collected:	06.29.18 00.00		
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	ALJ			% Moisture:	
Analyst:	ALJ	Date Prep:	07.08.18 08.00	Basis:	Wet Weight
Seq Number:	3055798				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1
Toluene	108-88-3	<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1
Ethylbenzene	100-41-4	<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1
m,p-Xylenes	179601-23-1	<0.00399	0.00399	mg/kg	07.08.18 12.33	U	1
o-Xylene	95-47-6	<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1
Total Xylenes	1330-20-7	<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1
Total BTEX		<0.00200	0.00200	mg/kg	07.08.18 12.33	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	103	%	70-130	07.08.18 12.33	
1,4-Difluorobenzene	540-36-3	101	%	70-130	07.08.18 12.33	

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#3 (1'-1.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-008	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**64.8**	4.98	mg/kg	07.07.18 01.47		1

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#3 (2'-2.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-009	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**16.1**	4.91	mg/kg	07.07.18 01.52		1

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Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#4 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-010	Date Collected:	06.29.18 00.00		

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**1360**	4.99	mg/kg	07.07.18 02.09		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	TX1005P
Tech:	ARM			% Moisture:	
Analyst:	ARM	Date Prep:	07.07.18 11.00	Basis:	Wet Weight
Seq Number:	3055923				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<14.9	14.9	mg/kg	07.08.18 02.50	U	1
Diesel Range Organics (DRO)	C10C28DRO	<14.9	14.9	mg/kg	07.08.18 02.50	U	1
Oil Range Hydrocarbons (ORO)	PHCG2835	<14.9	14.9	mg/kg	07.08.18 02.50	U	1
Total TPH	PHC635	<14.9	14.9	mg/kg	07.08.18 02.50	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	97	%	70-135	07.08.18 02.50	
o-Terphenyl	84-15-1	100	%	70-135	07.08.18 02.50	

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#4 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-010	Date Collected:	06.29.18 00.00		
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	ALJ			% Moisture:	
Analyst:	ALJ	Date Prep:	07.08.18 08.00	Basis:	Wet Weight
Seq Number:	3055798				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1
Toluene	108-88-3	<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1
Ethylbenzene	100-41-4	<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1
m,p-Xylenes	179601-23-1	<0.00398	0.00398	mg/kg	07.08.18 12.51	U	1
o-Xylene	95-47-6	<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1
Total Xylenes	1330-20-7	<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1
Total BTEX		<0.00199	0.00199	mg/kg	07.08.18 12.51	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
4-Bromofluorobenzene	460-00-4	97	%	70-130	07.08.18 12.51	
1,4-Difluorobenzene	540-36-3	110	%	70-130	07.08.18 12.51	

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#4 (1'-1.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-011	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**74.0**	4.98	mg/kg	07.07.18 02.14		1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#4 (2'-2.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-012	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**28.7**	4.97	mg/kg	07.07.18 02.19		1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#4 (3'-3.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-013	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**110**	4.94	mg/kg	07.07.18 02.25		1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#5 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-014	Date Collected:	06.29.18 00.00		

Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**23.4**	4.92	mg/kg	07.07.18 02.30		1

Analytical Method:	TPH By SW8015 Mod			Prep Method:	TX1005P
Tech:	ARM			% Moisture:	
Analyst:	ARM	Date Prep:	07.07.18 11.00	Basis:	Wet Weight
Seq Number:	3055923				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Gasoline Range Hydrocarbons (GRO)	PHC610	<15.0	15.0	mg/kg	07.08.18 03.09	U	1
Diesel Range Organics (DRO)	C10C28DRO	<15.0	15.0	mg/kg	07.08.18 03.09	U	1
Oil Range Hydrocarbons (ORO)	PHCG2835	<15.0	15.0	mg/kg	07.08.18 03.09	U	1
Total TPH	PHC635	<15.0	15.0	mg/kg	07.08.18 03.09	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1-Chlorooctane	111-85-3	95	%	70-135	07.08.18 03.09	
o-Terphenyl	84-15-1	94	%	70-135	07.08.18 03.09	

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#5 (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-014	Date Collected:	06.29.18 00.00		
Analytical Method:	BTEX by EPA 8021B			Prep Method:	SW5030B
Tech:	ALJ			% Moisture:	
Analyst:	ALJ	Date Prep:	07.08.18 08.00	Basis:	Wet Weight
Seq Number:	3055798				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Benzene	71-43-2	<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1
Toluene	108-88-3	<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1
Ethylbenzene	100-41-4	<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1
m,p-Xylenes	179601-23-1	<0.00402	0.00402	mg/kg	07.08.18 13.45	U	1
o-Xylene	95-47-6	<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1
Total Xylenes	1330-20-7	<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1
Total BTEX		<0.00201	0.00201	mg/kg	07.08.18 13.45	U	1

Surrogate	Cas Number	% Recovery	Units	Limits	Analysis Date	Flag
1,4-Difluorobenzene	540-36-3	118	%	70-130	07.08.18 13.45	
4-Bromofluorobenzene	460-00-4	112	%	70-130	07.08.18 13.45	

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**AH#5 (1'.5'-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-015	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	**11.1**	4.96	mg/kg	07.07.18 02.36		1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**Background (0-1) 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-016	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.06.18 13.45	Basis:	Wet Weight
Seq Number:	3055735				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.90	4.90	mg/kg	07.07.18 02.41	U	1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**Background (1'-5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-017	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.07.18 11.30	Basis:	Wet Weight
Seq Number:	3055789				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.90	4.90	mg/kg	07.07.18 12.40	U	1

Certificate of Analytical Results 591085

Tetra Tech- Midland, Midland, TX

Cimarex-Vaca Draw 20-17 Fed. 1H

Sample Id:	**Background (2'-2.5') 3"-4" BEB**	Matrix:	Soil	Date Received:	07.02.18 14.05
Lab Sample Id:	591085-018	Date Collected:	06.29.18 00.00		
Analytical Method:	Chloride by EPA 300			Prep Method:	E300P
Tech:	SCM			% Moisture:	
Analyst:	SCM	Date Prep:	07.07.18 11.30	Basis:	Wet Weight
Seq Number:	3055789				

Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	<4.95	4.95	mg/kg	07.07.18 12.56	U	1

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

SMP Client Sample **BLK** Method Blank

BKS/LCS Blank Spike/Laboratory Control Sample **BKSD/LCSD** Blank Spike Duplicate/Laboratory Control Sample Duplicate

MD/SD Method Duplicate/Sample Duplicate **MS** Matrix Spike **MSD:** Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

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

QC Summary 591085

Tetra Tech- Midland

Cimarex-Vaca Draw 20-17 Fed. 1H

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3055735 — Matrix: Solid — Date Prep: 07.06.18
MB Sample Id: 7657953-1-BLK — LCS Sample Id: 7657953-1-BKS — LCSD Sample Id: 7657953-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<4.99	250	258	103	263	105	90-110	2	20	mg/kg	07.07.18 00:04	

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3055789 — Matrix: Solid — Date Prep: 07.07.18
MB Sample Id: 7657954-1-BLK — LCS Sample Id: 7657954-1-BKS — LCSD Sample Id: 7657954-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.00	250	250	100	252	101	90-110	1	20	mg/kg	07.07.18 12:29	

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3055735 — Matrix: Soil — Date Prep: 07.06.18
Parent Sample Id: 591054-007 — MS Sample Id: 591054-007 S — MSD Sample Id: 591054-007 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	258	250	525	107	521	105	90-110	1	20	mg/kg	07.07.18 00:21	

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3055735 — Matrix: Soil — Date Prep: 07.06.18
Parent Sample Id: 591085-007 — MS Sample Id: 591085-007 S — MSD Sample Id: 591085-007 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	189	246	469	114	455	108	90-110	3	20	mg/kg	07.07.18 01:36	X

Analytical Method: Chloride by EPA 300 — Prep Method: E300P
Seq Number: 3055789 — Matrix: Soil — Date Prep: 07.07.18
Parent Sample Id: 591085-017 — MS Sample Id: 591085-017 S — MSD Sample Id: 591085-017 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<4.90	245	242	99	242	99	90-110	0	20	mg/kg	07.07.18 12:45	

MS/MSD Percent Recovery — [D] = 100*(C-A) / B — LCS = Laboratory Control Sample — MS = Matrix Spike
Relative Percent Difference — RPD = 200* | (C-E) / (C+E) | — A = Parent Result — B = Spike Added
LCS/LCSD Recovery — [D] = 100 * (C) / [B] — C = MS/LCS Result — D = MSD/LCSD % Rec
Log Difference — Log Diff. = Log(Sample Duplicate) - Log(Original Sample) — E = MSD/LCSD Result

QC Summary 591085

Tetra Tech- Midland

Cimarex-Vaca Draw 20-17 Fed. 1H

Analytical Method: **Chloride by EPA 300** Prep Method: E300P
Seq Number: 3055789 Matrix: Soil Date Prep: 07.07.18
Parent Sample Id: 591157-004 MS Sample Id: 591157-004 S MSD Sample Id: 591157-004 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	14.7	249	258	98	257	97	90-110	0	20	mg/kg	07.07.18 14:01	

Analytical Method: **TPH By SW8015 Mod** Prep Method: TX1005P
Seq Number: 3055923 Matrix: Solid Date Prep: 07.07.18
MB Sample Id: 7658082-1-BLK LCS Sample Id: 7658082-1-BKS LCSD Sample Id: 7658082-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	1000	100	991	99	70-135	1	20	mg/kg	07.07.18 19:22	
Diesel Range Organics (DRO)	<15.0	1000	1050	105	1030	103	70-135	2	20	mg/kg	07.07.18 19:22	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	100		119		122		70-135	%	07.07.18 19:22
o-Terphenyl	108		115		112		70-135	%	07.07.18 19:22

Analytical Method: **TPH By SW8015 Mod** Prep Method: TX1005P
Seq Number: 3055923 Matrix: Soil Date Prep: 07.07.18
Parent Sample Id: 591024-001 MS Sample Id: 591024-001 S MSD Sample Id: 591024-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Gasoline Range Hydrocarbons (GRO)	<15.0	997	952	95	948	95	70-135	0	20	mg/kg	07.07.18 20:20	
Diesel Range Organics (DRO)	<15.0	997	1070	107	1060	106	70-135	1	20	mg/kg	07.07.18 20:20	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1-Chlorooctane	118		116		70-135	%	07.07.18 20:20
o-Terphenyl	98		98		70-135	%	07.07.18 20:20

MS/MSD Percent Recovery [D] = 100*(C-A) / B LCS = Laboratory Control Sample MS = Matrix Spike
Relative Percent Difference RPD = 200* | (C-E) / (C+E) | A = Parent Result B = Spike Added
LCS/LCSD Recovery [D] = 100 * (C) / [B] C = MS/LCS Result D = MSD/LCSD % Rec
Log Difference Log Diff. = Log(Sample Duplicate) - Log(Original Sample) E = MSD/LCSD Result

QC Summary 591085

Tetra Tech- Midland

Cimarex-Vaca Draw 20-17 Fed. 1H

Analytical Method: BTEX by EPA 8021B — Prep Method: SW5030B
Seq Number: 3055798 — Matrix: Solid — Date Prep: 07.08.18
MB Sample Id: 7658000-1-BLK — LCS Sample Id: 7658000-1-BKS — LCSD Sample Id: 7658000-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.104	104	0.0859	85	70-130	19	35	mg/kg	07.08.18 08:22	
Toluene	<0.00200	0.100	0.107	107	0.0893	88	70-130	18	35	mg/kg	07.08.18 08:22	
Ethylbenzene	<0.00200	0.100	0.108	108	0.0885	88	70-130	20	35	mg/kg	07.08.18 08:22	
m,p-Xylenes	<0.00401	0.200	0.221	111	0.181	90	70-130	20	35	mg/kg	07.08.18 08:22	
o-Xylene	<0.00200	0.100	0.104	104	0.0863	85	70-130	19	35	mg/kg	07.08.18 08:22	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	107		91		93		70-130	%	07.08.18 08:22
4-Bromofluorobenzene	73		85		82		70-130	%	07.08.18 08:22

Analytical Method: BTEX by EPA 8021B — Prep Method: SW5030B
Seq Number: 3055856 — Matrix: Solid — Date Prep: 07.09.18
MB Sample Id: 7658027-1-BLK — LCS Sample Id: 7658027-1-BKS — LCSD Sample Id: 7658027-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.0998	0.0927	93	0.102	102	70-130	10	35	mg/kg	07.09.18 20:10	
Toluene	<0.00200	0.0998	0.101	101	0.106	106	70-130	5	35	mg/kg	07.09.18 20:10	
Ethylbenzene	<0.00200	0.0998	0.0928	93	0.103	103	70-130	10	35	mg/kg	07.09.18 20:10	
m,p-Xylenes	<0.00399	0.200	0.199	100	0.214	106	70-130	7	35	mg/kg	07.09.18 20:10	
o-Xylene	<0.00200	0.0998	0.0941	94	0.104	104	70-130	10	35	mg/kg	07.09.18 20:10	

Surrogate	MB %Rec	MB Flag	LCS %Rec	LCS Flag	LCSD %Rec	LCSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	83		117		116		70-130	%	07.09.18 20:10
4-Bromofluorobenzene	71		84		96		70-130	%	07.09.18 20:10

Analytical Method: BTEX by EPA 8021B — Prep Method: SW5030B
Seq Number: 3055798 — Matrix: Soil — Date Prep: 07.08.18
Parent Sample Id: 591031-011 — MS Sample Id: 591031-011 S — MSD Sample Id: 591031-011 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00202	0.101	0.0980	97	0.0845	85	70-130	15	35	mg/kg	07.08.18 08:58	
Toluene	<0.00202	0.101	0.0955	95	0.0816	82	70-130	16	35	mg/kg	07.08.18 08:58	
Ethylbenzene	<0.00202	0.101	0.0927	92	0.0836	84	70-130	10	35	mg/kg	07.08.18 08:58	
m,p-Xylenes	<0.00403	0.202	0.192	95	0.171	85	70-130	12	35	mg/kg	07.08.18 08:58	
o-Xylene	<0.00202	0.101	0.0887	88	0.0788	79	70-130	12	35	mg/kg	07.08.18 08:58	

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	103		126		70-130	%	07.08.18 08:58
4-Bromofluorobenzene	90		104		70-130	%	07.08.18 08:58

MS/MSD Percent Recovery — [D] = 100*(C-A) / B — LCS = Laboratory Control Sample — MS = Matrix Spike
Relative Percent Difference — RPD = 200* | (C-E) / (C+E) | — A = Parent Result — B = Spike Added
LCS/LCSD Recovery — [D] = 100 * (C) / [B] — C = MS/LCS Result — D = MSD/LCSD % Rec
Log Difference — Log Diff. = Log(Sample Duplicate) - Log(Original Sample) — E = MSD/LCSD Result

QC Summary 591085

Tetra Tech- Midland

Cimarex-Vaca Draw 20-17 Fed. 1H

Analytical Method: **BTEX by EPA 8021B** Prep Method: SW5030B

Seq Number: 3055856 Matrix: Soil Date Prep: 07.09.18

Parent Sample Id: 591178-002 MS Sample Id: 591178-002 S MSD Sample Id: 591178-002 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Benzene	<0.00200	0.100	0.0805	81	0.0774	77	70-130	4	35	mg/kg	07.09.18 20:46	
Toluene	<0.00200	0.100	0.0771	77	0.0742	73	70-130	4	35	mg/kg	07.09.18 20:46	
Ethylbenzene	<0.00200	0.100	0.0640	64	0.0644	64	70-130	1	35	mg/kg	07.09.18 20:46	X
m,p-Xylenes	<0.00401	0.200	0.126	63	0.131	65	70-130	4	35	mg/kg	07.09.18 20:46	X
o-Xylene	<0.00200	0.100	0.0635	64	0.0617	61	70-130	3	35	mg/kg	07.09.18 20:46	X

Surrogate	MS %Rec	MS Flag	MSD %Rec	MSD Flag	Limits	Units	Analysis Date
1,4-Difluorobenzene	124		88		70-130	%	07.09.18 20:46
4-Bromofluorobenzene	101		95		70-130	%	07.09.18 20:46

MS/MSD Percent Recovery	[D] = 100*(C-A) / B	LCS = Laboratory Control Sample	MS = Matrix Spike
Relative Percent Difference	RPD = 200* | (C-E) / (C+E) |	A = Parent Result	B = Spike Added
LCS/LCSD Recovery	[D] = 100 * (C) / [B]	C = MS/LCS Result	D = MSD/LCSD % Rec
Log Difference	Log Diff. = Log(Sample Duplicate) - Log(Original Sample)	E = MSD/LCSD Result	

Analysis Request of Chain of Custody Record

~~59108~~ 591085

Page 1 of 2

Tetra Tech, Inc.

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

Client Name: Cimarex	Site Manager: Ike Tavarez
Project Name: Vaca Draw 20-17 Fed. 1H	
Project Location: (county, state) Lea County, New Mexico	Project #: 212C-MD-01295
Invoice to: Cimarex Energy - Christine Alderman	
Receiving Laboratory: Xenco	Sampler Signature: Mike Carmona/Conner M

Comments: Run deeper samples if Benzene exceeds 10 mg/kg or total BTEX exceeds 50 mg/kg.
Run deeper samples if TPH exceeds 5,000 mg/kg

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD None		# CONTAINERS	FILTERED (Y/N)	BTEX 8021B	TPH TX1005 (Ext to C35)	TPH 8015M (GRO - DRO - ORO)	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
	AH #1 (0-1) 3"-4" BEB	6/29/2018			X				X			1	N	X		X												X					
	AH #1 (1'-1.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #1 (2'-2.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #2 (0-1) 3"-4" BEB	6/29/2018			X				X			1	N	X		X												X					
	AH #2 (1'-1.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #2 (2'-2.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #3 (0-1) 3"-4" BEB	6/29/2018			X				X			1	N	X		X												X					
	AH #3 (1'-1.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #3 (2'-2.5') 3"-4" BEB	6/29/2018			X				X			1	N															X					
	AH #4 (0-1) 3"-4" BEB	6/29/2018			X				X			1	N	X		X												X					

Relinquished by:	Date: 7/2/18	Time: 1405	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by:

Received by: Date: 7/2/18 Time: 1405

LAB USE ONLY

Sample Temperature 3.4/2.0 RE

REMARKS:

☒ STANDARD 5 days

☐ RUSH: Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

ORIGINAL COPY

Analysis Request of Chain of Custody Record

591085

Page 2 of 2

Tetra Tech, Inc.

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

Client Name: Cimarex | **Site Manager:** Ike Tavarez

Project Name: Vaca Draw 20-17 Fed. 1H

Project Location: (county, state) Lea County, New Mexico | **Project #:** 212C-MD-01295

Invoice to: Cimarex Energy - Christine Alderman

Receiving Laboratory: Xenco | **Sampler Signature:** Mike Carmona/Conner M

Comments: See page 1

SAMPLING YEAR: 2018

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX: WATER	MATRIX: SOIL	PRESERVATIVE: HCL	PRESERVATIVE: HNO_3	PRESERVATIVE: ICE	PRESERVATIVE: None	# CONTAINERS	FILTERED (Y/N)	(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
	AH #4 (1'-1.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	AH #4 (2'-2.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	AH #4 (3'-3.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	AH #5 (0-1') 3"-4" BEB	6/29/2018			X			X		1	N	X		X												X				
	AH #5 (1'-1.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	Backgorund (0-1') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	Backgorund (1'-.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				
	Backgorund (2'-2.5') 3"-4" BEB	6/29/2018			X			X		1	N															X				

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	7/2/18	1405	[signature]	7/2/18	1405

LAB USE ONLY
Sample Temperature: 3.4/a.o RS

REMARKS:
- [X] STANDARD 5 days
- [ ] RUSH: Same Day 24 hr 48 hr 72 hr
- [ ] Rush Charges Authorized
- [ ] Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

ORIGINAL COPY

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Tetra Tech- Midland

Date/ Time Received: 07/02/2018 02:05:00 PM

Work Order #: 591085

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)?	3.4
#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)?	**N/A**
#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: Brianna Teel Date: 07/02/2018

Brianna Teel

Checklist reviewed by: Kelsey Brooks Date: 07/05/2018

Kelsey Brooks

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512976
Customer Sample ID: AH-1 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.
pH	**8.1**	(5.8)	-	**Mod. Alkaline**						
Conductivity	**178**	(-)	umho/cm	**None**			CL*			**Fertilizer Recommended**
Nitrate-N	**6**	(-)	ppm**							**85** lbs N/acre
Phosphorus	**8**	(50)	ppm							**100** lbs P2O5/acre
Potassium	**157**	(150)	ppm							**0** lbs K20/acre
Calcium	**3,338**	(180)	ppm							**0** lbs Ca/acre
Magnesium	**120**	(50)	ppm							**0** lbs Mg/acre
Sulfur	**17**	(13)	ppm							**0** lbs S/acre
Sodium	**7**	(-)	ppm							
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										**0.00** tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	**7.2**		
Conductivity	**0.52**	mmhos/cm	
Sodium	**36**	ppm	**1.553** meq/L
Potassium	**21**	ppm	**0.545** meq/L
Calcium	**65**	ppm	**3.259** meq/L
Magnesium	**7**	ppm	**0.584** meq/L
SAR	**1.12**		
SSP	**26.15**		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
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Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512977
Customer Sample ID: AH-1 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	Level (ExLow / VLow / Low / Mod / High / VHigh / Excess.)	Fertilizer Recommended
pH	8.0	(5.8)	-	Mod. Alkaline	
Conductivity	90	(-)	umho/cm	None	
Nitrate-N	6	(-)	ppm**		85 lbs N/acre
Phosphorus	5	(50)	ppm		110 lbs P2O5/acre
Potassium	150	(150)	ppm		0 lbs K20/acre
Calcium	1,747	(180)	ppm		0 lbs Ca/acre
Magnesium	119	(50)	ppm		0 lbs Mg/acre
Sulfur	5	(13)	ppm		10 lbs S/acre
Sodium	3	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)

pH	7.0		
Conductivity	0.24	mmhos/cm	
Sodium	31	ppm	1.344 meq/L
Potassium	11	ppm	0.290 meq/L
Calcium	21	ppm	1.039 meq/L
Magnesium	2	ppm	0.174 meq/L
SAR	1.73		
SSP	47.21		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

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http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

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Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
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Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512978
Customer Sample ID: AH-2 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.	Fertilizer Recommended
pH	**7.6**	(5.8)	-	**Mod. Alkaline**							
Conductivity	**5,568**	(-)	umho/cm	**V. High**				CL*			
Nitrate-N	**6**	(-)	ppm**								**85** lbs N/acre
Phosphorus	**9**	(50)	ppm								**100** lbs P2O5/acre
Potassium	**277**	(150)	ppm								**0** lbs K20/acre
Calcium	**1,001**	(180)	ppm								**0** lbs Ca/acre
Magnesium	**98**	(50)	ppm								**0** lbs Mg/acre
Sulfur	**27**	(13)	ppm								**0** lbs S/acre
Sodium	**2,169**	(-)	ppm								
Iron											
Zinc											
Manganese											
Copper											
Boron											
Limestone Requirement											**0.00** tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	**6.8**		
Conductivity	**27.00**	mmhos/cm	
Sodium	**7448**	ppm	**324.099** meq/L
Potassium	**144**	ppm	**3.678** meq/L
Calcium	**870**	ppm	**43.410** meq/L
Magnesium	**82**	ppm	**6.714** meq/L
SAR	**64.74**		
SSP	**85.76**		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Conductivity: Salinity levels are becoming elevated, monitor levels or remove salts with 10-15 inches of clean leach water.
Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512979
Customer Sample ID: AH-2 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow / VLow / Low / Mod / High / VHigh / Excess.	Fertilizer Recommended
pH	7.6	(5.8)	-	Slightly Alkaline	
Conductivity	5,575	(-)	umho/cm	V. High	
Nitrate-N	5	(-)	ppm**		85 lbs N/acre
Phosphorus	3	(50)	ppm		115 lbs P2O5/acre
Potassium	525	(150)	ppm		0 lbs K20/acre
Calcium	946	(180)	ppm		0 lbs Ca/acre
Magnesium	122	(50)	ppm		0 lbs Mg/acre
Sulfur	35	(13)	ppm		0 lbs S/acre
Sodium	3,328	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)

pH	7.1	
Conductivity	25.70 mmhos/cm	
Sodium	10938 ppm	475.957 meq/L
Potassium	212 ppm	5.421 meq/L
Calcium	1162 ppm	57.980 meq/L
Magnesium	107 ppm	8.772 meq/L
SAR	82.39	
SSP	86.83	

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Conductivity: Salinity levels are becoming elevated, monitor levels or remove salts with 10-15 inches of clean leach water.
Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

**New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html**

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512980
Customer Sample ID: AH-3 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.
pH	**7.8**	(5.8)	-	**Mod. Alkaline**						
Conductivity	**405**	(-)	umho/cm	**None**			CL*			**Fertilizer Recommended**
Nitrate-N	**6**	(-)	ppm**							**85** lbs N/acre
Phosphorus	**6**	(50)	ppm							**105** lbs P2O5/acre
Potassium	**139**	(150)	ppm							**15** lbs K20/acre
Calcium	**1,373**	(180)	ppm							**0** lbs Ca/acre
Magnesium	**110**	(50)	ppm							**0** lbs Mg/acre
Sulfur	**13**	(13)	ppm							**5** lbs S/acre
Sodium	**129**	(-)	ppm							
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										**0.00** tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	**7.3**		
Conductivity	**1.73**	mmhos/cm	
Sodium	**200**	ppm	**8.688** meq/L
Potassium	**24**	ppm	**0.606** meq/L
Calcium	**132**	ppm	**6.588** meq/L
Magnesium	**19**	ppm	**1.559** meq/L
SAR	**4.30**		
SSP	**49.81**		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates. http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512981
Customer Sample ID: AH-3 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow VLow Low Mod High VHigh Excess.	Fertilizer Recommended
pH	**7.4**	(5.8)	-	**Slightly Alkaline**	
Conductivity	**123**	(-)	umho/cm	**None**	
Nitrate-N	**6**	(-)	ppm**		**85** lbs N/acre
Phosphorus	**5**	(50)	ppm		**110** lbs P2O5/acre
Potassium	**130**	(150)	ppm		**30** lbs K20/acre
Calcium	**1,411**	(180)	ppm		**0** lbs Ca/acre
Magnesium	**153**	(50)	ppm		**0** lbs Mg/acre
Sulfur	**5**	(13)	ppm		**15** lbs S/acre
Sodium	**25**	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					**0.00** tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	**7.4**		
Conductivity	**0.74**	mmhos/cm	
Sodium	**80**	ppm	**3.499** meq/L
Potassium	**13**	ppm	**0.337** meq/L
Calcium	**65**	ppm	**3.243** meq/L
Magnesium	**10**	ppm	**0.820** meq/L
SAR	**2.45**		
SSP	**44.29**		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates. http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

Soil, Water and Forage Testing Laboratory
Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512982
Customer Sample ID: AH-4 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow VLow Low Mod High VHigh Excess.	Fertilizer Recommended
pH	**7.2**	(5.8)	-	**Slightly Alkaline**	
Conductivity	**1,604**	(-)	umho/cm	**High**	
Nitrate-N	**6**	(-)	ppm**		**85** lbs N/acre
Phosphorus	**4**	(50)	ppm		**115** lbs P2O5/acre
Potassium	**147**	(150)	ppm		**5** lbs K20/acre
Calcium	**1,233**	(180)	ppm		**0** lbs Ca/acre
Magnesium	**151**	(50)	ppm		**0** lbs Mg/acre
Sulfur	**13**	(13)	ppm		**0** lbs S/acre
Sodium	**381**	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					**0.00** tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	**6.4**		
Conductivity	**9.65**	mmhos/cm	
Sodium	**1163**	ppm	**50.611** meq/L
Potassium	**41**	ppm	**1.047** meq/L
Calcium	**938**	ppm	**46.803** meq/L
Magnesium	**125**	ppm	**10.258** meq/L
SAR	**9.48**		
SSP	**46.55**		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Conductivity: Salinity levels are becoming elevated, monitor levels or remove salts with 10-15 inches of clean leach water.
Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

Soil Analysis Report

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TEXAS A&M AGRILIFE EXTENSION

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512983
Customer Sample ID: AH-4 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	Level (ExLow / VLow / Low / Mod / High / VHigh / Excess.)	Fertilizer Recommended
pH	7.3	(5.8)	-	Slightly Alkaline	
Conductivity	145	(-)	umho/cm	None	
Nitrate-N	5	(-)	ppm**		85 lbs N/acre
Phosphorus	2	(50)	ppm		115 lbs P2O5/acre
Potassium	119	(150)	ppm		50 lbs K20/acre
Calcium	1,112	(180)	ppm		0 lbs Ca/acre
Magnesium	167	(50)	ppm		0 lbs Mg/acre
Sulfur	3	(13)	ppm		15 lbs S/acre
Sodium	35	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)

pH	6.9		
Conductivity	0.91	mmhos/cm	
Sodium	76	ppm	3.314 meq/L
Potassium	11	ppm	0.290 meq/L
Calcium	75	ppm	3.752 meq/L
Magnesium	13	ppm	1.054 meq/L
SAR	2.14		
SSP	39.40		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

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Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512984
Customer Sample ID: AH-5 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.	
pH	**7.6**	(5.8)	-	**Slightly Alkaline**							
Conductivity	**138**	(-)	umho/cm	**None**			CL*			**Fertilizer Recommended**	
Nitrate-N	**11**	(-)	ppm**							**75**	lbs N/acre
Phosphorus	**4**	(50)	ppm							**110**	lbs P2O5/acre
Potassium	**152**	(150)	ppm							**0**	lbs K20/acre
Calcium	**1,036**	(180)	ppm							**0**	lbs Ca/acre
Magnesium	**127**	(50)	ppm							**0**	lbs Mg/acre
Sulfur	**7**	(13)	ppm							**10**	lbs S/acre
Sodium	**12**	(-)	ppm								
Iron											
Zinc											
Manganese											
Copper											
Boron											
Limestone Requirement										**0.00**	tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)				
pH	**7.1**			
Conductivity	**0.63**	mmhos/cm		
Sodium	**50**	ppm	**2.190**	meq/L
Potassium	**23**	ppm	**0.585**	meq/L
Calcium	**58**	ppm	**2.908**	meq/L
Magnesium	**10**	ppm	**0.823**	meq/L
SAR	**1.60**			
SSP	**33.66**			

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates. http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

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Soil Analysis Report

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Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
979-845-5958 (FAX)
Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512985
Customer Sample ID: AH-5 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow / VLow / Low / Mod / High / VHigh / Excess.	Fertilizer Recommended
pH	7.4	(5.8)	-	Slightly Alkaline	
Conductivity	96	(-)	umho/cm	None	
Nitrate-N	6	(-)	ppm**		85 lbs N/acre
Phosphorus	3	(50)	ppm		115 lbs P2O5/acre
Potassium	133	(150)	ppm		25 lbs K20/acre
Calcium	1,404	(180)	ppm		0 lbs Ca/acre
Magnesium	199	(50)	ppm		0 lbs Mg/acre
Sulfur	3	(13)	ppm		15 lbs S/acre
Sodium	10	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)

pH	6.9		
Conductivity	0.26	mmhos/cm	
Sodium	31	ppm	1.362 meq/L
Potassium	6	ppm	0.155 meq/L
Calcium	18	ppm	0.903 meq/L
Magnesium	2	ppm	0.198 meq/L
SAR	1.84		
SSP	52.03		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

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Soil Analysis Report

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College Station, TX 77843-2478
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Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512986
Customer Sample ID: Background 0-1'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow / VLow / Low / Mod / High / VHigh / Excess.	Fertilizer Recommended
pH	7.6	(5.8)	-	Mod. Alkaline	
Conductivity	114	(-)	umho/cm	None	
Nitrate-N	6	(-)	ppm**	IIII	85 lbs N/acre
Phosphorus	6	(50)	ppm	IIIIIIIIIIIII	105 lbs P2O5/acre
Potassium	142	(150)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	10 lbs K20/acre
Calcium	1,417	(180)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	0 lbs Ca/acre
Magnesium	153	(50)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	0 lbs Mg/acre
Sulfur	4	(13)	ppm	IIIIIIIIIIIIIIIIIIII	15 lbs S/acre
Sodium	2	(-)	ppm		
Iron					
Zinc					
Manganese					
Copper					
Boron					
Limestone Requirement					0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)

pH	7.0	
Conductivity	0.19 mmhos/cm	
Sodium	26 ppm	1.137 meq/L
Potassium	7 ppm	0.188 meq/L
Calcium	15 ppm	0.724 meq/L
Magnesium	1 ppm	0.116 meq/L
SAR	1.75	
SSP	52.51	

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

New online fertilizer calculators have been placed on the laboratory's website to determine appropriate fertilizers to purchase and determine their application rates.
http://soiltesting.tamu.edu/webpages/calculator.html

Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

TEXAS A&M AGRILIFE EXTENSION

Soil Analysis Report

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Department of Soil and Crop Sciences
2478 TAMU
College Station, TX 77843-2478
979-845-4816 (phone)
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Visit our website: http://soiltesting.tamu.edu

Report generated for:
Clair Gonzales
Cimarex-Vaca Draw 20-17
4000 N Big Spring St Ste 401
Midland, TX 79705

Sample received on: 7/3/2018
Printed on: 7/26/2018
Area Represented: not provided

Outside TX County
Laboratory Number: 512987
Customer Sample ID: Background 1-1.5'
Crop Grown: IMPROVED AND HYBRID BERMUDA GRASS (3 HAY CUTTINGS-2 TONS/A AVG.)

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.
pH	7.6	(5.8)	-	Slightly Alkaline						
Conductivity	44	(-)	umho/cm	None				CL*		Fertilizer Recommended
Nitrate-N	5	(-)	ppm**	IIII						85 lbs N/acre
Phosphorus	3	(50)	ppm	IIIIIII						115 lbs P2O5/acre
Potassium	112	(150)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII						60 lbs K20/acre
Calcium	1,347	(180)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII						0 lbs Ca/acre
Magnesium	155	(50)	ppm	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII						0 lbs Mg/acre
Sulfur	3	(13)	ppm	IIIIIIIIIIII						15 lbs S/acre
Sodium	2	(-)	ppm							
Iron										
Zinc										
Manganese										
Copper										
Boron										
Limestone Requirement										0.00 tons 100ECCE/acre

Detailed Salinity Test (Saturated Paste Extract)			
pH	6.8		
Conductivity	0.11	mmhos/cm	
Sodium	24	ppm	1.030 meq/L
Potassium	8	ppm	0.211 meq/L
Calcium	4	ppm	0.216 meq/L
Magnesium	2	ppm	0.197 meq/L
SAR	2.27		
SSP	62.29		

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Nitrogen: Apply an additional 100 lbs/A of nitrogen for each subsequent hay cuttings.

Sulfur: Available sulfur may be found deeper in soil profile, thus limiting any response to added sulfur.

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Methods: pH and conductivity/ 2:1; nitrate-N/Cd-red.; P, K, Ca, Mg, Na, and S/Mehlich 3 by ICP; Fe, Zn, Mn, and Cu/DTPA by ICP; and B/hot water by ICP.

ProAnalysisVer. 2.19i

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
1400 Rankin Hwy
Midland, TX 79701

PBELAB

Analytical Report

Prepared for:

Christine Alderman

Cimarex

600 N. Marinfeld, Ste. 600

Midland, TX 79701

Project: Vaca Draw

Project Number: 212C-MD-01602

Location: Lea County, New Mexico

Lab Order Number: 9B18007

NELAP ACCREDITED TNI LABORATORY

NELAP/TCEQ # T104704516-18-9

Report Date: 02/27/19

Cimarex
600 N. Marinfeld, Ste. 600
Midland TX, 79701

Project: Vaca Draw
Project Number: 212C-MD-01602
Project Manager: Christine Alderman

Fax: (432) 571-7832

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AH #2 (0-1')	9B18007-01	Soil	02/15/19 00:00	02-15-2019 15:37
AH #2 (1-1.5')	9B18007-02	Soil	02/15/19 00:00	02-15-2019 15:37
AH #2 (2-2.5')	9B18007-03	Soil	02/15/19 00:00	02-15-2019 15:37
AH #2 (3-3.5')	9B18007-04	Soil	02/15/19 00:00	02-15-2019 15:37
AH #2 (4-4.5')	9B18007-05	Soil	02/15/19 00:00	02-15-2019 15:37
AH #2 (5-5.5')	9B18007-06	Soil	02/15/19 00:00	02-15-2019 15:37

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (0-1')

9B18007-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**137**	1.08	mg/kg dry	1	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**7.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (1-1.5')

9B18007-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**678**	5.49	mg/kg dry	5	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (2-2.5')

9B18007-03 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**5680**	27.8	mg/kg dry	25	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (3-3.5')

9B18007-04 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**8080**	28.4	mg/kg dry	25	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (4-4.5')

9B18007-05 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**9030**	27.8	mg/kg dry	25	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**10.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

AH #2 (5-5.5')

9B18007-06 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**5960**	27.5	mg/kg dry	25	P9B2005	02/20/19	02/21/19	EPA 300.0	
% Moisture	**9.0**	0.1	%	1	P9B2003	02/20/19	02/20/19	ASTM D2216	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P9B2003 - * DEFAULT PREP *** **										
Blank (P9B2003-BLK1)				Prepared & Analyzed: 02/20/19						
% Moisture	ND	0.1	%							
Duplicate (P9B2003-DUP1)	**Source: 9B18009-05**			Prepared & Analyzed: 02/20/19						
% Moisture	13.0	0.1	%		12.0			8.00	20	
Duplicate (P9B2003-DUP2)	**Source: 9B18019-02**			Prepared & Analyzed: 02/20/19						
% Moisture	15.0	0.1	%		15.0			0.00	20	
Duplicate (P9B2003-DUP3)	**Source: 9B18020-21**			Prepared & Analyzed: 02/20/19						
% Moisture	19.0	0.1	%		19.0			0.00	20	
Duplicate (P9B2003-DUP4)	**Source: 9B18021-26**			Prepared & Analyzed: 02/20/19						
% Moisture	6.0	0.1	%		7.0			15.4	20	
Duplicate (P9B2003-DUP5)	**Source: 9B18021-28**			Prepared & Analyzed: 02/20/19						
% Moisture	5.0	0.1	%		5.0			0.00	20	
Batch P9B2005 - * DEFAULT PREP *** **										
Blank (P9B2005-BLK1)				Prepared: 02/20/19 Analyzed: 02/21/19						
Chloride	ND	1.00	mg/kg wet							
LCS (P9B2005-BS1)				Prepared & Analyzed: 02/20/19						
Chloride	416	1.00	mg/kg wet	400		104	80-120			
LCS Dup (P9B2005-BSD1)				Prepared & Analyzed: 02/20/19						
Chloride	419	1.00	mg/kg wet	400		105	80-120	0.695	20	

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P9B2005 - * DEFAULT PREP *** **										
Duplicate (P9B2005-DUP1)		**Source: 9B15002-31**		Prepared & Analyzed: 02/20/19						
Chloride	1740	36.2	mg/kg dry		980			55.9	20	R3
Duplicate (P9B2005-DUP2)		**Source: 9B18007-06**		Prepared: 02/20/19 Analyzed: 02/21/19						
Chloride	6030	27.5	mg/kg dry		5960			1.10	20	
Matrix Spike (P9B2005-MS1)		**Source: 9B15002-31**		Prepared & Analyzed: 02/20/19						
Chloride	4500	36.2	mg/kg dry	3620	980	97.1	80-120			

Cimarex	Project: Vaca Draw	Fax: (432) 571-7832
600 N. Marinfeld, Ste. 600	Project Number: 212C-MD-01602	
Midland TX, 79701	Project Manager: Christine Alderman	

Notes and Definitions

R3	The RPD exceeded the acceptance limit due to sample matrix effects.
BULK	Samples received in Bulk soil containers
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 2/27/2019

Brent Barron, Laboratory Director/Technical Director

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-686-7235.

Analysis Request of Chain of Custody Record #9B18007

Tetra Tech, Inc.

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

Client Name: Cimarex	**Site Manager:** Clair Gonzales
Project Name: Vaca Draw	
Project Location: (county, state) Lea Co, NM	**Project #:** 212C-MD-01602
Invoice to: Cimarex - Christine Alderman	
Receiving Laboratory: Permian Basin	**Sampler Signature:** Conner Moehring
Comments:	

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE (YEAR: 2019)	SAMPLING TIME	MATRIX: WATER	MATRIX: SOIL	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO_3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: None	# CONTAINERS	FILTERED (Y/N)	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	Sulfate TOS	Chloride	General Water Chemistry (see attached list)	Anion/Cation Balance	Hold
1	AH #2 (0-1')	2/15/2019			X			X		1	N																X						
2	AH #2 (1-1.5')	2/15/2019			X			X		1	N																X						
3	AH #2 (2-2.5')	2/15/2019			X			X		1	N																X						
4	AH #2 (3-3.5')	2/15/2019			X			X		1	N																X						
5	AH #2 (4-4.5')	2/15/2019			X			X		1	N																X						
6	AH #2 (5-5.5')	2/15/2019			X			X		1	N																X						

Relinquished by: Conner Moehring	Date: 2/15/19	Time: 15:27	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by: Date: 2-15-19 Time: 15:37

ORIGINAL COPY

LAB USE ONLY
Sample Temperature

REMARKS:
- [X] STANDARD
- [ ] RUSH: Same Day 24 hr 48 hr 72 hr
- [ ] Rush Charges Authorized
- [ ] Special Report Limits or TRRP Report

S 2nd NCF

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

CARDINAL Laboratories

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

April 03, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: VACA DRAW 20-17 1H

Enclosed are the results of analyses for samples received by the laboratory on 04/02/19 13:40.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: TRENCH #1 (0-1') (H901208-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**64.0**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (2') (H901208-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (3') (H901208-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**608**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (4') (H901208-04)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2760**	16.0	04/03/2019	ND	416	104	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: TRENCH #1 (5') (H901208-05)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4040**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (6') (H901208-06)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4080**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (7') (H901208-07)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**832**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (8') (H901208-08)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	04/03/2019	ND	416	104	400	0.00	

Sample ID: TRENCH #1 (9') (H901208-09)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**64.0**	16.0	04/03/2019	ND	416	104	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

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

Analysis Request of Chain of Custody Record

Page 1 of 1

Tetra Tech, Inc.

901W Wall Street, Ste 100
Midland, Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

Client Name: CIMAREX

Site Manager: CLAIR GONZALES

Project Name: VACA DRAW 20-17 1H

Project Location (county, state): LEA CO, NM

Project #: 212C-MD-01613

Invoice to: CIMAREX- CHRISTINE ALDERMAN

Receiving Laboratory: [redacted] Cardinal

Sampler Signature: CONNER MOEHRING

Comments:

H901208

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE	SAMPLING TIME	MATRIX: WATER	MATRIX: SOIL	MATRIX:	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO_3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: None	PRESERVATIVE METHOD:	# CONTAINERS	FILTERED (Y/N)
1	TRENCH #1 (0-1')	4/1/19			X				X			1	N
2	TRENCH #1 (2')	4/1/19			X				X			1	N
3	TRENCH #1 (3')	4/1/19			X				X			1	N
4	TRENCH #1 (4')	4/1/19			X				X			1	N
5	TRENCH #1 (5')	4/1/19			X				X			1	N
6	TRENCH #1 (6')	4/1/19			X				X			1	N
7	TRENCH #1 (7')	4/1/19			X				X			1	N
8	TRENCH #1 (8')	4/1/19			X				X			1	N
9	TRENCH #1 (9')	4/1/19			X				X			1	N

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							
														X							
														X							
														X							

Relinquished by: Conner Moehring Date: 4/2/19 Time: 1338

Received by: Tamara Oldaker 4-2-19 13:40

Relinquished by: Date: Time:

Received by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

LAB USE ONLY

Sample Temperature #197

5.8°C

REMARKS:

- ☐ STANDARD
- ☒ RUSH: Same Day (24 hr) 48 hr 72 hr
- ☐ Rush Charges Authorized
- ☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

ORIGINAL COPY

CARDINAL Laboratories

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

April 03, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: VACA DRAW 20-17 1H

Enclosed are the results of analyses for samples received by the laboratory on 04/02/19 13:40.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: NORTH #1 SIDEWALL (H901207-01)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *96.0 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1720**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *81.1 %* *41-142*

Surrogate: 1-Chlorooctadecane *85.6 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: EAST #1 SIDEWALL (H901207-02)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.6 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3920**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *83.3 %* *41-142*

Surrogate: 1-Chlorooctadecane *81.1 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: SOUTH #1 SIDEWALL (H901207-03)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.9 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *78.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *75.3 %* *37.6-147*

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:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: WEST #1 SIDEWALL (H901207-04)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.0 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1460**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *84.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *81.0 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: WEST #2 SIDEWALL (H901207-05)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.1 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**32.0**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *85.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *82.9 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: SOUTH #2 SIDEWALL (H901207-06)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *93.8 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**16.0**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *83.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *81.0 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

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

Analysis Request of Chain of Custody Record

Page 1 of 1

Tetra Tech, Inc.

901W Wall Street, Ste 100
Midland, Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

Client Name: CIMAREX

Site Manager: CLAIR GONZALES

Project Name: VACA DRAW 20-17 1H

Project Location: (county, state) LEA CO, NM

Project #: 212C-MD-01613

Invoice to: CIMAREX - CHRISTINE ALDERMAN

Receiving Laboratory: [redacted] CARDINAL

Sampler Signature: CONNER MOEHRING

Comments:

H901207 LAB # (LAB USE ONLY)

	SAMPLE IDENTIFICATION	SAMPLING DATE	SAMPLING TIME	MATRIX: WATER	MATRIX: SOIL	MATRIX:	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO_3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: None	PRESERVATIVE METHOD:	# CONTAINERS	FILTERED (Y/N)
1	NORTH #1 ~~SW~~ Sidewall	4/1/19			X				X			1	2
2	EAST #1 Sidewall	4/1/19			X				X			1	2
3	South #1 Sidewall	4/1/19			X				X			1	2
4	WEST #1 Sidewall	4/1/19			X				X			1	2
5	WEST #2 Sidewall	4/2/19			X				X			1	2
6	South #2 Sidewall	4/2/19			X				X			1	2

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
1	X		X												X							
2	X		X												X							
3	X		X												X							
4	X		X												X							
5	X		X												X							
6	X		X												X							

Relinquished by: Conner Moehring Date: 4/2/19 Time: 1338

Received by: Tamara Oldaker 4-2-19 13:40

Relinquished by: Date: Time:

Received by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

LAB USE ONLY

Sample Temperature #97 5.8°

REMARKS:

- ☐ STANDARD
- ☒ RUSH: Same Day (24 hr) 48 hr 72 hr
- ☐ Rush Charges Authorized
- ☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

ORIGINAL COPY

CARDINAL Laboratories

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

April 03, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: VACA DRAW 20-17 1H

Enclosed are the results of analyses for samples received by the laboratory on 04/02/19 13:40.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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

Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 1 (4.0-4.5' BEB) (H901209-01)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.4 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4000**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *86.2 %* *41-142*

Surrogate: 1-Chlorooctadecane *83.2 %* *37.6-147*

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:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/01/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 2 (4.0-4.5' BEB) (H901209-02)

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	04/02/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/02/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/02/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/02/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/02/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.5 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3080**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *81.9 %* *41-142*

Surrogate: 1-Chlorooctadecane *76.7 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 3 (4.0-4.5' BEB) (H901209-03)

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	04/03/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/03/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/03/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/03/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/03/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *94.6 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1730**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *85.5 %* *41-142*

Surrogate: 1-Chlorooctadecane *80.6 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 4 (4.0-4.5' BEB) (H901209-04)

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	04/03/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/03/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/03/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/03/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/03/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.7 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2840**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *82.9 %* *41-142*

Surrogate: 1-Chlorooctadecane *78.7 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 5 (4.0-4.5' BEB) (H901209-05)

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	04/03/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/03/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/03/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/03/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/03/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.9 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**112**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *87.1 %* *41-142*

Surrogate: 1-Chlorooctadecane *83.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

TETRA TECH
CLAIR GONZALES
901 WEST WALL STREET , STE 100
MIDLAND TX, 79701
Fax To: (432) 682-3946

Received:	04/02/2019	Sampling Date:	04/02/2019
Reported:	04/03/2019	Sampling Type:	Soil
Project Name:	VACA DRAW 20-17 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01613	Sample Received By:	Tamara Oldaker
Project Location:	CIMAREX - LEA CO NM		

Sample ID: BOTTOM HOLE # 6 (4.0-4.5' BEB) (H901209-06)

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	04/03/2019	ND	2.08	104	2.00	4.97	
Toluene*	<0.050	0.050	04/03/2019	ND	1.97	98.6	2.00	6.40	
Ethylbenzene*	<0.050	0.050	04/03/2019	ND	2.06	103	2.00	7.54	
Total Xylenes*	<0.150	0.150	04/03/2019	ND	6.26	104	6.00	6.60	
Total BTEX	<0.300	0.300	04/03/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID *95.1 %* *73.3-129*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1360**	16.0	04/03/2019	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	04/03/2019	ND	170	85.0	200	0.823	
DRO >C10-C28*	<10.0	10.0	04/03/2019	ND	204	102	200	1.32	
EXT DRO >C28-C36	<10.0	10.0	04/03/2019	ND					

Surrogate: 1-Chlorooctane *92.6 %* *41-142*

Surrogate: 1-Chlorooctadecane *88.5 %* *37.6-147*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

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

Analysis Request of Chain of Custody Record

Page 1 of 1

Tetra Tech, Inc.

901W Wall Street, Ste 100
Midland, Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

Client Name: CIMAREX

Site Manager: CLAIR GONZALES

Project Name: VACA DRAW 20-17 1H

Project Location (county, state): LEA CO, NM

Project #: 212C-MD-01613

Invoice to: CIMAREX - CHRISTINE ALDERMAN

Receiving Laboratory: [redacted] CARDINAL

Sampler Signature: CONNER MOEHRING

Comments:

H901209

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE (YEAR: 2019)	SAMPLING TIME	MATRIX: WATER	MATRIX: SOIL	MATRIX:	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO_3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: None	PRESERVATIVE METHOD:	# CONTAINERS	FILTERED (Y/N)
1	Bottom Hole #1 (4.0-4.5' BEB)	4/1/19			X				X			1	2
2	Bottom Hole #2 (4.0-4.5' BEB)	4/1/19			X				X			1	2
3	Bottom Hole #3 (4-4.5' BEB)	4/2/19			X				X			1	2
4	Bottom Hole #4 (4-4.5' BEB)	4/2/19			X				X			1	2
5	Bottom Hole #5 (4-4.5' BEB)	4/2/19			X				X			1	2
6	Bottom Hole #6 (4-4.5' BEB)	4/2/19			X				X			1	2

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							
X		X												X							
X		X												X							
X		X												X							
X		X												X							
X		X												X							

Relinquished by: Date: 4/2/19 Time: 1358

Received by: Date: 4-2-19 Time: 13:40

Relinquished by: Date: Time:

Received by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

LAB USE ONLY

Sample Temperature #97 5.8°

REMARKS:

- ☐ STANDARD
- ☒ RUSH: Same Day (24 hr) 48 hr 72 hr
- ☐ Rush Charges Authorized
- ☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

ORIGINAL COPY

Photos

Cimarex Energy
Vaca Draw 20-17 Fed 1H
Lea County, New Mexico

TETRA TECH

View South – Areas of AH-1 and AH-2

View North – Area of AH-3

Cimarex Energy
Vaca Draw 20-17 Fed 1H
Lea County, New Mexico

TETRA TECH

View North – Area of AH-4

View East – Area of AH-5

Cimarex Energy
Vaca Draw 20-17 Fed 1H
Lea County, New Mexico

TETRA TECH

View West – Area of Background

View South – Area of Excavation

Cimarex Energy
Vaca Draw 20-17 Fed 1H
Lea County, New Mexico

TETRA TECH

View West – Area of Excavation

View Southeast – Area of Excavation

Appendix A: Agency Forms

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 Cimarex Energy	Contact Christine Alderman
Address 600 N Marienfeld Ste 600 Midland TX	Telephone No. 432-853-7059
Facility Name Vaca Draw 20-17 Fed1H	Facility Type production

Surface Owner BLM	Mineral Owner	API No. 30-025-44135

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
M	20	25S	33E	390	S	590	w	Lea

Latitude 32.109787 **Longitude** -103.600849

NATURE OF RELEASE

Type of Release treated produced water	Volume of Release 150 bbls	Volume Recovered 5 bbls
Source of Release Poly tubing	Date and Hour of Occurrence 6/17/2018	Date and Hour of Discovery 6:00 pm
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Shelly Tucker/Olivia Yu	
By Whom? Christine Alderman	Date and Hour 6/18/2018 10:40 am	
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.
While supplying water to a frac, the poly tubing failed and released approximately 150 bbls of treated produced water. The tubing was repaired and the line was put back in service. Approximately 5 bbls were recovered.

Describe Area Affected and Cleanup Action Taken.
The GPS above is for the spill area. It was on the east side (30' x 60') and west side (52' x 260') of the lease road leading into location. A back hoe removed the top 3-4 inches of the impacted area. Samples will be collected and a workplan will be submitted for approval.

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: Christine Alderman	OIL CONSERVATION DIVISION	
Printed Name: Christine Alderman	Approved by Environmental Specialist:	
Title: ESH Supervisor	Approval Date:	Expiration Date:
E-mail Address: calderman@cimarex.com	Conditions of Approval:	Attached ☐
Date: 6/18/18 Phone: 432-853-7059		

* Attach Additional Sheets If Necessary

1RP-5103

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	_____ (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☐ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☐ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☐ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☐ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☐ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☐ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☐ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☐ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☐ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☐ Field data
- ☐ Data table of soil contaminant concentration data
- ☐ Depth to water determination
- ☐ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☐ Boring or excavation logs
- ☐ Photographs including date and GIS information
- ☐ Topographic/Aerial maps
- ☐ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: _____ Title: _____

Signature: garcia garza _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of 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 OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature: gloria garza _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: Bradford Billings Date: 09/13/2021

Printed Name: Bradford Billings Title: Envi.Spec.A

Appendix B: Groundwater Data

Water Well Data
Average Depth to Groundwater (ft)
Cimarex - Vaca Draw 20-17 Fed 1H

24 South 32 East

6	5 380	4	3	2	1
7	8	9	10 20	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33 290	34	35	36

24 South 33 East

6	5	4	3	2	1
7	8	9	10 24.6	11	12
18	17	16	15	14	13
19	20	21	22	23 208	24 16.9
30	29	28	27	26	25
31	32	33 93.2	34	35	36

24 South 34 East

6 81	5	4 475	3	2	1
7	8	9	10	11 40	12
18	17	16	15	14	13
19	20	21 431	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

25 South 32 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32 290	33	34	35	36

25 South 33 East

6	5	4	3 172	2	1
7	8	9	10	11 140	12 200
18	17	16	15	14	13
19	20 212 204	21	22	23	24
30	29	28	27 125	26 110	25
31 257	32	33	34	35	36

25 South 34 East

6	5	4	3	2	1 260
7	8	9	10	11	12
18	17	16	15 135	14	13
19	20	21	22	23	24 300
30	29 128 50	28	27	26	25
31	32	33	34	35	36

26 South 32 East

6 350	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21 333 180	22	23	24
30	29	28	27	26	25
31 295	32	33	34	35	36

26 South 33 East

6	5	4	3 175	2	1
7	8	9	10	11 145	12 200
18	17	16	15	14 135	13
19	20	21 120	22 110	23	24
30	29	28	27 125	26	25
31	32	33	34	35	36

26 South 34 East

6 160 175	5	4	3	2	1
7	8	9	10	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

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
C 02312		CUB	LE	1	2	1	05	25S	33E	632241	3559687*	150	90	60
C 02313		CUB	LE	2	3	3	26	25S	33E	636971	3552098*	150	110	40
C 02373 CLW317846	O	CUB	LE	2	1	1	13	25S	33E	638518	3556544*	625	185	440
C 02373 S		CUB	LE	1	2	1	13	25S	33E	638721	3556549*	625	185	440

Average Depth to Water: **142 feet**

Minimum Depth: **90 feet**

Maximum Depth: **185 feet**

Record Count: 4

PLSS Search:

Township: 25S **Range:** 33E

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

National Water Information System: Web Interface

Click to hideNews Bulletins

- Please see news on new formats
- Full News

Groundwater levels for New Mexico

Click to hide state-specific text

Search Results -- 1 sites found

site_no list =

- 320631103351401

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

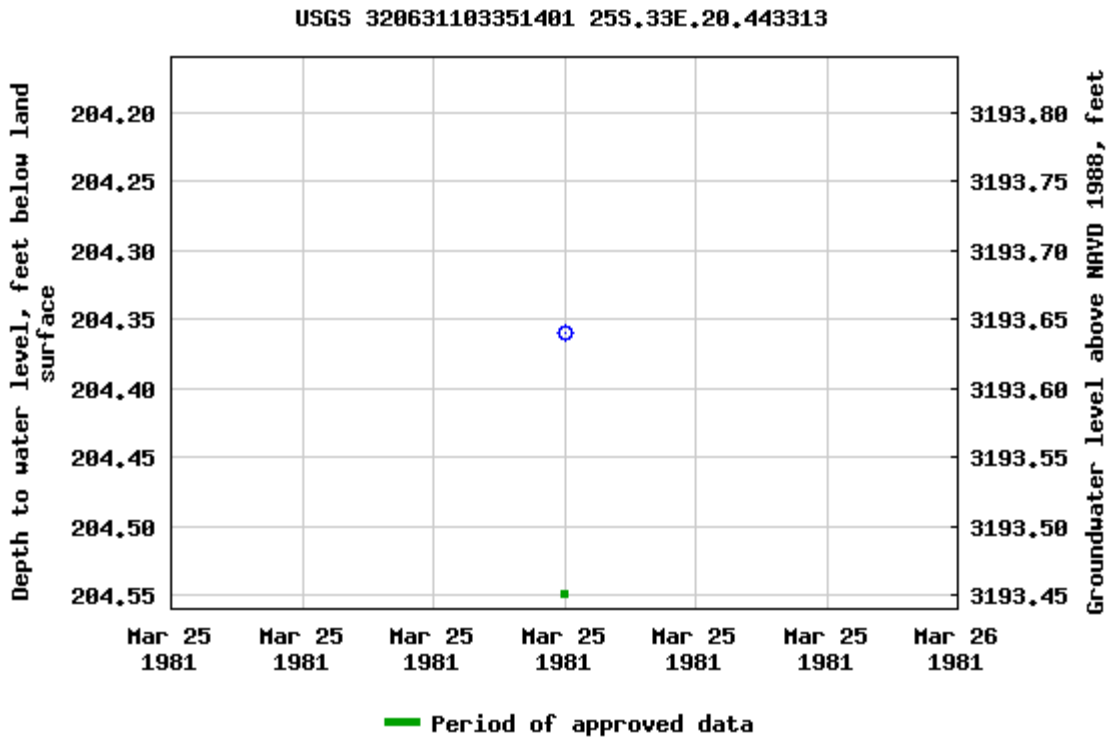
USGS 320631103351401 25S.33E.20.443313

Available data for this site Groundwater: Field measurements | GO

Lea County, New Mexico
Hydrologic Unit Code --
Latitude 32°06'31", Longitude 103°35'14" NAD27
Land-surface elevation 3,398 feet above NAVD88
This well is completed in the Chinle Formation (231CHNL) local aquifer.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
Download a presentation-quality graph

Questions about sites/data?
Feedback on this web site
Automated retrievals
Help
Data Tips
Explanation of terms
Subscribe for system changes
News

Accessibility Plug-Ins FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey

Title: Groundwater for New Mexico: Water Levels
URL: https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels?

Page Contact Information: New Mexico Water Data Maintainer
Page Last Modified: 2018-08-13 15:40:01 EDT
1.18 1.06 nadww01

National Water Information System: Web Interface

Click to hideNews Bulletins

- Please see news on new formats
- Full News

Groundwater levels for New Mexico

Click to hide state-specific text

Search Results -- 1 sites found

site_no list =

- 320615103352601

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

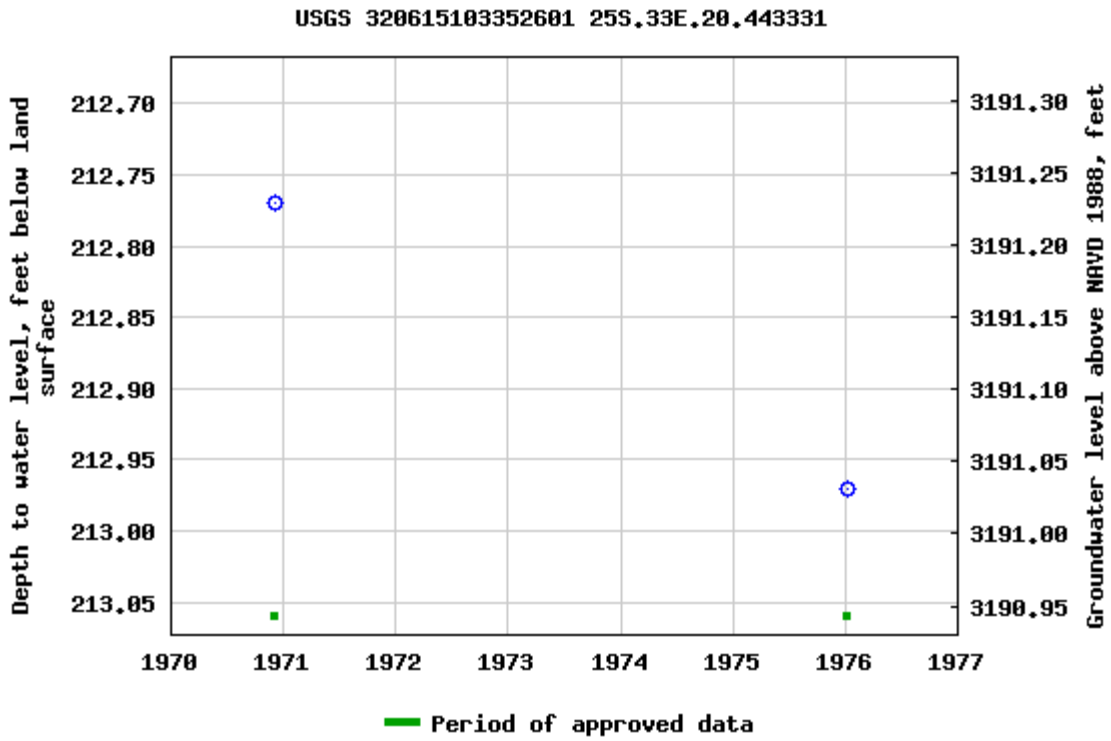
USGS 320615103352601 25S.33E.20.443331

Available data for this site Groundwater: Field measurements | GO

Lea County, New Mexico
Hydrologic Unit Code 13070007
Latitude 32°06'15", Longitude 103°35'26" NAD27
Land-surface elevation 3,404 feet above NAVD88
This well is completed in the Ogallala Formation (121OGLL) local aquifer.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
Download a presentation-quality graph

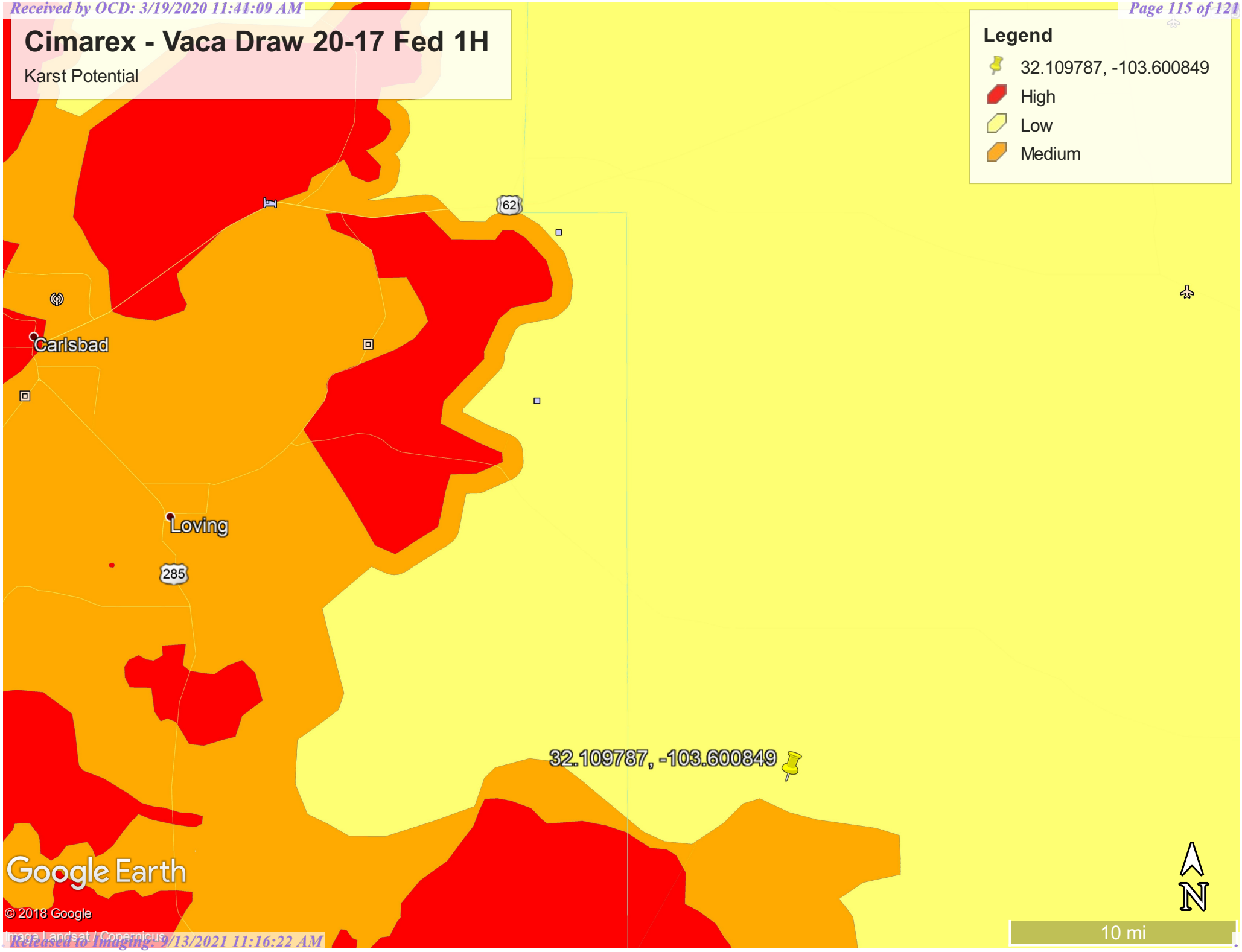
Questions about sites/data?
Feedback on this web site
Automated retrievals
Help
Data Tips
Explanation of terms
Subscribe for system changes
News

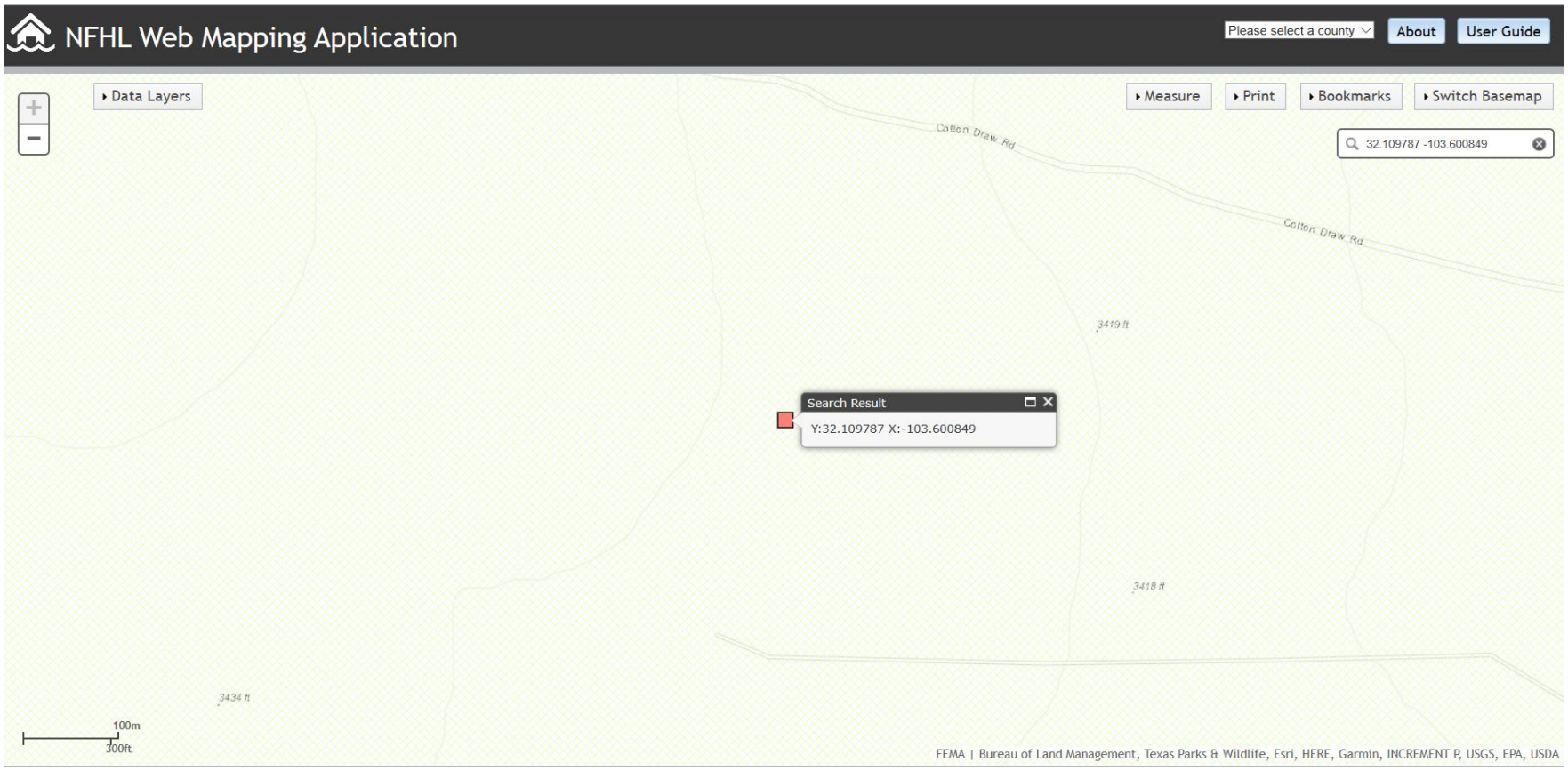
Title: Groundwater for New Mexico: Water Levels
URL: https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels?

Page Contact Information: New Mexico Water Data Maintainer
Page Last Modified: 2018-08-13 15:40:03 EDT
1.26 1.13 nadww01

Cimarex - Vaca Draw 20-17 Fed 1H

Karst Potential




NFHL Web Mapping Application
Please select a county
About
User Guide
Data Layers
Measure
Print
Bookmarks
Switch Basemap
32.109787 -103.600849
Cotton Draw Rd
Cotton Draw Rd
3419 ft
3418 ft
3434 ft
Search Result
Y:32.109787 X:-103.600849
100m
300ft
FEMA | Bureau of Land Management, Texas Parks & Wildlife, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

Appendix C:
Specific Remediation Requirements

Lea County, New Mexico

PY—Pyote soils and dune land

Map Unit Setting

National map unit symbol: dmqr
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 60 to 64 degrees F
Frost-free period: 190 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Pyote and similar soils: 45 percent
Dune land: 45 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pyote

Setting

Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 30 inches: fine sand
Bt - 30 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Description of Dune Land

Setting

Landform: Dunes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 60 inches: fine sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Kermit

Percent of map unit: 5 percent
Ecological site: Sandhills (R042XC022NM)
Hydric soil rating: No

Maljamar, fine sand

Percent of map unit: 3 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Wink

Percent of map unit: 2 percent
Ecological site: Loamy Sand (R042XC003NM)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 15, Sep 12, 2018

BLM SERIAL #:

COMPANY REFERENCE:

3.3 Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Sand dropseed (Sporobolus cryptandrus)	1.0
Sand love grass (Eragrostis trichodes)	1.0
Plains bristlegrass (Setaria macrostachya)	2.0

*Pounds of pure live seed: Pounds of seed **x** percent purity **x** percent germination = pounds pure live seed

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator: CIMAREX ENERGY CO. 600 N. Marienfeld Street Midland, TX 79701	OGRID: 215099
	Action Number: 4593
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
bbillings	None	9/13/2021