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April 1, 2019

Phillip Goetze
NM Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

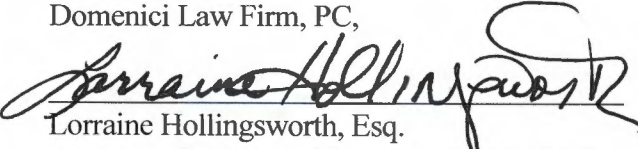
RE: Poker Lake Unit 21 TWR SWD #1
S21, T24S, R31E
Eddy, County, New Mexico
BOPCO, Inc.

Dear Mr. Goetze:

On behalf of Solaris Water Midstream, LLC, I am providing notice of Solaris's objection to the above-referenced Application for permit to dispose of produced water. Solaris requests to be notified of any further activity in regard to the application, including being provided with notice of any hearing scheduled in relation to the application.

Sincerely,

Domenici Law Firm, PC,



Lorraine Hollingsworth, Esq.
Attorneys for Solaris Water Midstream, LLC

cc: Client
Tracie J. Cherry, BOPCO, L.P.

Revised March 23, 2017

RECEIVED: 04/02/2019	REVIEWER:	TYPE: SWD	APP NO: PMAM19092 52903
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
 - Geological & Engineering Bureau -
 1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND
 REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: BOPCO, LP

OGRID Number: 260737

Well Name: Poker Lake Unit TWR 21 SWD #9

API: To be assigned

Pool: Devonian; SWD (96101)

Pool Code: 97869

**SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION
 INDICATED BELOW**

1) TYPE OF APPLICATION: Check those which apply for [A]

A. Location - Spacing Unit - Simultaneous Dedication

☐ NSL☐ NSP (PROJECT AREA)☐ NSP (PRORATION UNIT)☐ SD

B. Check one only for [I] or [II]

[I] Commingling - Storage - Measurement

☐ DHC☐ CTB☐ PLC☐ PC☐ OLS☐ OLM

[II] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☐ WFX☐ PMX☒ SWD☐ IPI☐ EOR☐ PPR

2) NOTIFICATION REQUIRED TO: Check those which apply.

A. ☒ Offset operators or lease holdersB. ☐ Royalty, overriding royalty owners, revenue ownersC. ☒ Application requires published noticeD. ☒ Notification and/or concurrent approval by SLOE. ☒ Notification and/or concurrent approval by BLMF. ☒ Surface ownerG. ☒ For all of the above, proof of notification or publication is attached, and/or,H. ☐ No notice required

FOR OCD ONLY

☐ Notice Complete☐ Application
Content
Complete

- 3) CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Tracie J. Cherry, Regulatory Coordinator

Print or Type Name

Date

03/25/19

432-571-8220

Phone Number

tracie_cherry@xtoenergy.com

e-mail Address

Signature

III. Well Data

A. 1) Lease name: **Poker Lake Unit 21 TWR SWD**
Well #: **9** API # **TBA**
Section: **21**
Township: **24S**
Range: **31E**
Footage: **650 FSL & 1250 FWL**

2) Casing Info:

Casing size	Set depth	Sacks cmt	Hole size	TOC	Method
18-5/8", 87.5# J-55 BTC	810'	1425 sx C	24	Surf	Circ
13-3/8" 68# HCL-80 BTC	4269'	2740 sx Poz/C 965 sx C	17-1/2"	Surf	Circ
9-5/8" 53.5# HCP-110 BTC	12,260	2445 sx Poz/H	12-1/4"	3400	CBL
7" 32# HCP-110 BTC	11,800'-16,940'	755 sx Poz/H	8-1/2"	10,800'	Circ

3) Tubing to be used (size, lining material, setting depth):

Tapered String

5-1/2" , 17#, P-110 IPC to 11,800"

4-1/2" , 13.65#, P-110 IPC tubing @ 11,800'-16,865'

4) Name, model, and depth of packer to be used:

Baker Series F nickle plated permanent packer @ 15,635'

B. 1) Name of the injection formation and, if applicable, the field or pool name:
SWD; Devonian

2) The injection interval and whether it is perforated or open hole:

Open hole, 16940'-118220' (or to the base of the Fusselman as determined by mud logs)

3) State if the well was drilled for injection or, if not, the original purpose of the well:

This well is being drilled for the purpose of injection

4) Give the depths of any other perforated intervals and detail on the sacks of cement or BPs used to seal off such perforations:

N/A

5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any:

**Higher: Bell Canyon (+/-4428'), Cherry Canyon (+/-5288') Brushy Canyon (+/-6538'),
Avalon/Bone Spring (+/-8246'), Wolfcamp (+/-11608'), Morrow (+/-13,809')**

Lower: None

Poker Lake Unit 21 TWR SWD #9

Proposed SWD Schematic (Mar 8, 2019)

County: Eddy
SHL: 650' FSL, 1250' FWL
Sec 21, T 24S, R 31E

BHL: 650' FSL, 1250' FWL
Sec 21, T 24S, R 31E



AFE # N/A
XTO ID # N/A
API # N/A
Elevation GL 3504', KB 3536' (32' AGL)
Rig: TBD (RKB 32')

Geology	Casing & Cement	Wellhead	Hole Size	General Notes
(Tech Data Sheet)				
TVD Formation				
631' Rustler	<u>Lead (100% OH excess)</u> 540 sx 12.8ppg Class C Top of Tail @ 0' <u>Tail (100% OH excess)</u> 885 sx 14.8ppg Class C Top of Tail @ 400' 18-5/8" 87.5# J-55 BTC	310' MD	24"	
985' Top Salt	<u>Lead (150% OH excess)</u> 2740 sx 12.8ppg Poz/C Top of Lead @ 0 <u>Tail (100% OH excess)</u> 965 sx 14.8ppg Class C Top of Tail @ 3400'	4269' MD	17-1/2"	
4,160' Base Salt	13-3/8" 68# HCL-80 BTC			
4,377' Delaware	<u>Lead (100% OH excess)</u> 1890 sx 11.5ppg Poz/H Top of Lead @ 3400'		12-1/4"	
8,246' Bone Spring	<u>Tail (100% OH excess)</u> 555 sx 14.8ppg Poz/H Top of Tail @ 11260'	11800' MD	5-1/2" 17# P-110 tbg TK-15XT @ 11,300'	Crossover
11,576' Wolfcamp			4-1/2" 13.5# P-110 tbg TK-15XT 11,300' - 16,865'	
12,111' Wolfcamp B	9-5/8" 53.5# P-110 BTC	12260' MD		
13,637' Strawn			8-1/2"	
13,980' Atoka				
14,346' Morrow	<u>Tail (40% OH excess)</u> 755 sx 14.5ppg Poz/H Top of Tail @ 11800'			
16,376' Mississippian Lm				
16,426' Woodford				
16,916' Devonian	7" 32# P-110 BTC	16940' MD		Baker Signature Series F Permanent Pkr @ 16,865'
18,220' TVD at BHL	Open hole completion	18,220' MD	6"	
18,320' Montoya		18,220' TVD		
Approvals				
Prepared by: _____	Peer Reviewed by: _____ Date _____			
Reviewed by: _____	Approved by: _____			

C-108 DATA

- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well.

Map attached.

- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each wells type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

There are no wells penetrating the proposed injection zone within the one mile area of review

There are three (3) horizontal wellbores that terminated inside the 1 mile AOR. None of the TVDs penetrates the proposed injection zone

Poker Lake Unit #402H (30-015-41229)

Delaware

Poker Lake Unit #394H (30-015-41083)

Delaware

Poker Lake Unit #393H (30-015-40951)

Delaware

- VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected:

20,000 average, 40,000 maximum BWPD

2. Whether the system is open or closed: **closed**

3. Proposed average and maximum injection pressure: **2,000 psi average, 3,388 psi maximum**

4. Sources and an appropriate analysis of injection fluid and compatibility with

the receiving formation if other than reinjected produced water: **Well will be part of a multi-well SWD system taking Permian waters. The majority of the produced water will come from Delaware, Bone Spring and Wolfcamp formations with minor amounts from Atoka and Morrow.**

An analysis of water to be disposed is attached

5. If injection is for disposal purposes into a zone not productive of oil & gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water:

One plugged and abandoned disposal well approximately 600' West completed in the Delaware formation does not penetrate the proposed disposal interval

- VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with TDS of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval:

Lithologic Detail: Carbonate (Dolomites and Limestones)

Geological Name: Devonian to Fusselman

Thickness: Est. 1,113'

Depth: Est. 16,916'/18,220'

The Capitan Reef a known drinking water aquifer is not present in this area based on published maps

The Dewey Lake Red Beds consists of alluvial siltstones, shales and sandstones which are present at the surface to the top of the Rustler Anhydrite. The top of the Rustler Anhydrite is estimated to be at 631 feet below the surface in this proposed Poker Lake Unit 32 TWR SWD 9 well. These Dewey Lake Red Beds may contain fresh water throughout this geographic area, but it is not likely of drinking water quality (TDS of 10,000 mg/L or less).

No sources of fresh water are known to exist below the proposed disposal zone.

- IX. Describe the proposed stimulation program, if any:
Acid stimulate with approximately 5000 gallons of 15% NEFE HCL acid.
- X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted.)
Logs will be submitted with completion papers when well is drilled.
- XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
According to the New Mexico Office of State Engineer database, one active water well is located approximately 2,500' SE of the proposed location. This well is owned by the BLM and used for livestock watering
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrology connection between the disposal zone and any underground sources of drinking water.
(See attached affidavit)

Complete Water Analysis Report

Customer: XTO ENERGY INC

Region: Carlsbad, NM

Location: Nash Draw 19

System: Production System

Equipment: Nash Draw 19 Federal 001 SWD

Sample Point: Transfer Pump

Sample ID: AL07043

Acct Rep Email: Anthony.Baeza@ecolab.com

Collection Date: 06/08/2018

Receive Date: 06/21/2018

Report Date: 06/25/2018

Location Code: 375624

Field Analysis

Bicarbonate	60 mg/L	Dissolved CO2	1100 mg/L	Dissolved H2S	9 mg/L
Pressure Surface	20 psi	Temperature	96° F	pH of Water	6.3
Oil per Day	0 B/D	Gas per Day	0 Mcf/D	Water per Day	3500 B/D

Sample Analysis

Calculated Gaseous CO2	1.11 %	Calculated pH	6.30	Conductivity (Calculated)	392527 µS - cm3
Ionic Strength	5.25	Resistivity	0.025 ohms - m	Specific Gravity	1.196
Total Dissolved Solids	251270.3 mg/L				

Cations

Iron	46 mg/L	Manganese	7.14 mg/L	Barium	7.61 mg/L
Strontium	2000 mg/L	Calcium	28400 mg/L	Magnesium	4050 mg/L
Sodium	51200.00 mg/L	Potassium	1530 mg/L	Boron	28.9 mg/L
Lithium	15.1 mg/L	Copper	0.414 mg/L	Nickel	0.122 mg/L
Zinc	1.88 mg/L	Lead	0.25 mg/L	Cobalt	0.043 mg/L
Chromium	0.02 mg/L	Silicon	4.79 mg/L	Aluminum	Not Detected mg/L
Molybdenum	0.026 mg/L	Phosphorus	6.44 mg/L		

Anions

Bromide	1744.463 mg/L	Chloride	165315 mg/L	Sulfate	184.003 mg/L
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PTB Value

	Barite PTB	Calcite PTB	Celestite PTB	Gypsum PTB	Halite PTB	Iron Carbonate PTB	Iron Sulfide PTB
50°	4.29	11.73	93.75	25.67	0.00	0.00	7.10
75°	3.93	10.87	78.70	0.00	0.00	0.00	6.56
100°	3.30	10.04	66.11	0.00	0.00	0.00	6.05
125°	2.32	9.28	56.94	0.00	0.00	0.00	5.62
150°	0.96	8.63	51.03	0.00	0.00	0.00	5.29
175°	0.00	8.11	47.56	0.00	0.00	0.00	5.06
200°	0.00	7.71	45.63	0.00	0.00	0.00	4.90
225°	0.00	7.43	44.51	0.00	0.00	0.00	4.82
250°	0.00	7.26	43.71	0.00	0.00	0.00	4.79
275°	0.00	7.17	42.91	0.00	0.00	0.00	4.79
300°	0.00	7.14	42.00	0.00	0.00	0.00	4.82
325°	0.00	7.16	40.97	0.00	0.00	0.00	4.86
350°	0.00	7.22	39.85	0.00	0.00	0.00	4.90
375°	0.00	7.27	38.56	0.00	0.00	0.00	4.94
400°	0.00	9.14	36.83	0.00	0.00	0.00	6.24

Saturation Index

	Barite SI	Calcite SI	Celestite SI	Gypsum SI	Halite SI	Iron Carbonate SI	Iron Sulfide SI
50°	1.28	1.32	0.65	0.11	-0.52	-0.16	2.19
75°	0.88	1.18	0.47	-0.06	-0.54	-0.19	1.87
100°	0.57	1.06	0.35	-0.16	-0.56	-0.21	1.62
125°	0.32	0.96	0.29	-0.23	-0.58	-0.23	1.43
150°	0.11	0.88	0.25	-0.29	-0.60	-0.25	1.30
175°	-0.07	0.81	0.23	-0.35	-0.61	-0.27	1.21
200°	-0.23	0.76	0.23	-0.41	-0.63	-0.30	1.15
225°	-0.36	0.73	0.21	-0.49	-0.65	-0.32	1.12
250°	-0.48	0.70	0.20	-0.57	-0.66	-0.36	1.11
275°	-0.59	0.68	0.20	-0.64	-0.68	-0.40	1.12
300°	-0.70	0.67	0.19	-0.71	-0.69	-0.45	1.12
325°	-0.81	0.66	0.19	-0.74	-0.71	-0.52	1.14
350°	-0.92	0.65	0.18	-0.73	-0.72	-0.60	1.15
375°	-1.04	0.63	0.17	-0.66	-0.73	-0.71	1.15
400°	-1.17	0.81	0.17	-0.49	-0.74	-0.83	1.56

Scaling predictions calculated using Scale Soft Pitzer 2017

Scaling predictions dependent on provided field data. Incomplete/partial field data may impact results generated by scaling software.

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06/27/2018

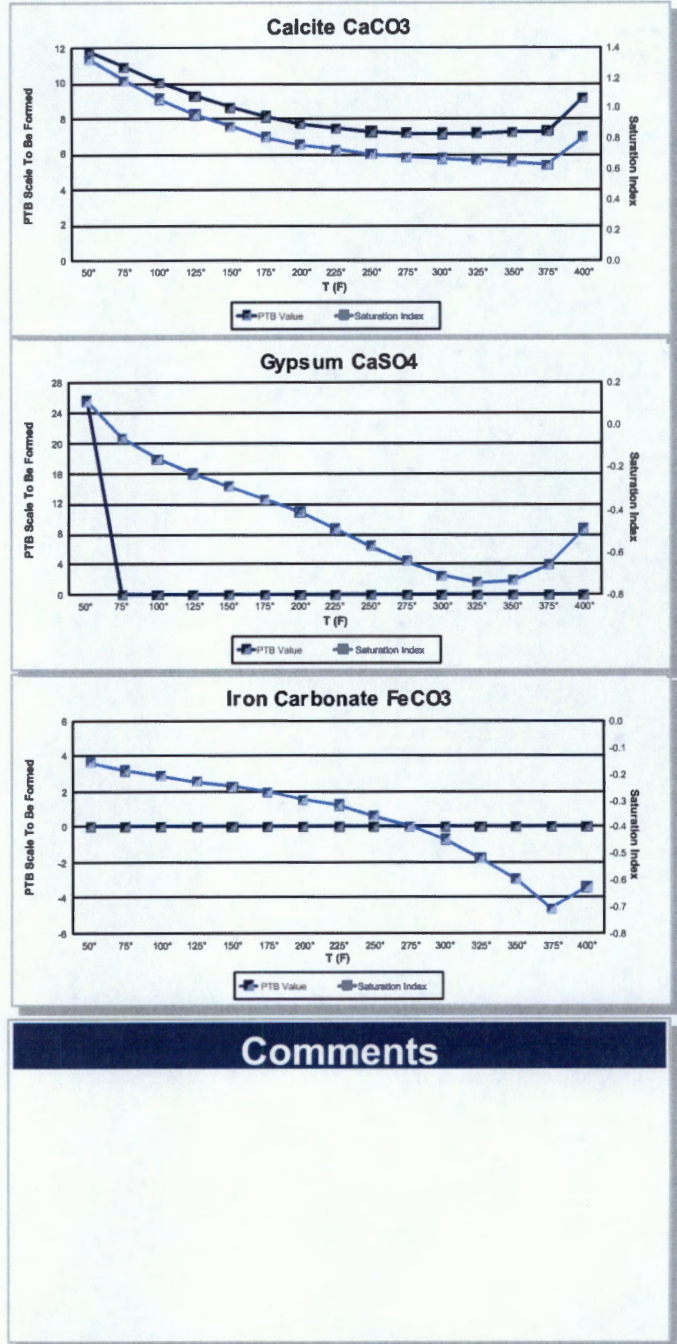
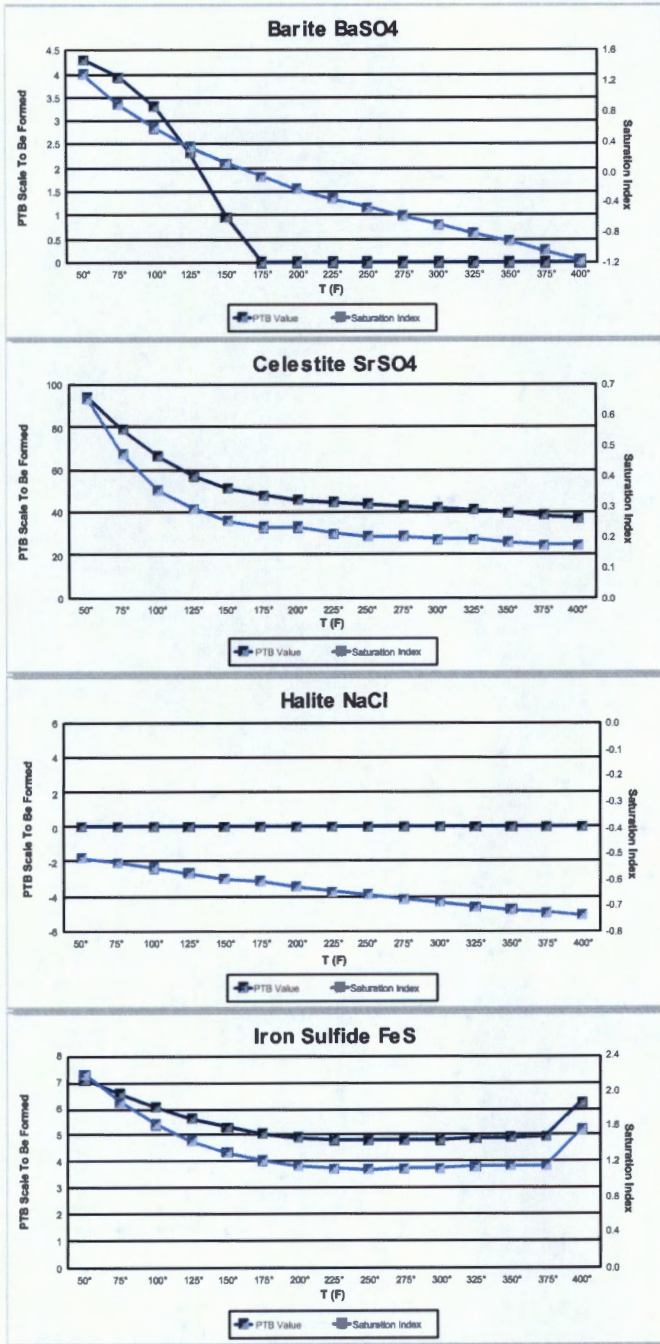
Page 1 of 2

Complete Water Analysis Report

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Location: Nash Draw 19
System: Production System

Equipment: Nash Draw 19 Federal 001 SWD
Sample Point: Transfer Pump
Sample ID: AL07043
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Scaling predictions calculated using Scale Soft Pitzer 2017

Scaling predictions dependent on provided field data. Incomplete/partial field data may impact results generated by scaling software.

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06/27/2018

March 12, 2019

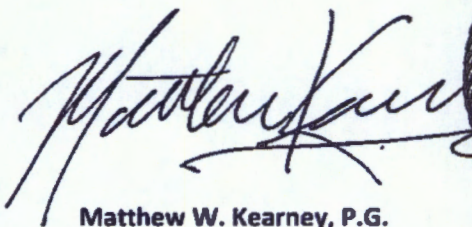
New Mexico, Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: **Geology Statement per Question XII on the Application for Authorization to Inject Form C-108 for**
XTO Energy Inc., an ExxonMobil subsidiary
Poker Lake Unit 32 Platy State SWD 1,
Section 32, Township 23 South, Range 30 East,
Eddy County, New Mexico

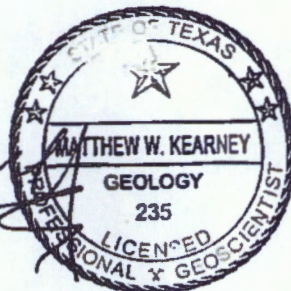
To whom it may concern:

XTO Energy, Inc., an ExxonMobil subsidiary, has examined available geological data at the above-mentioned well located at 283 feet from the south line and 1,151 feet from the west of Section 32, Township 32 South, Range 30 East, Eddy County, New Mexico; and finds no evidence of open faults or other hydrologic connection between the disposal zone and the underground sources of drinking water.

Respectively Submitted,



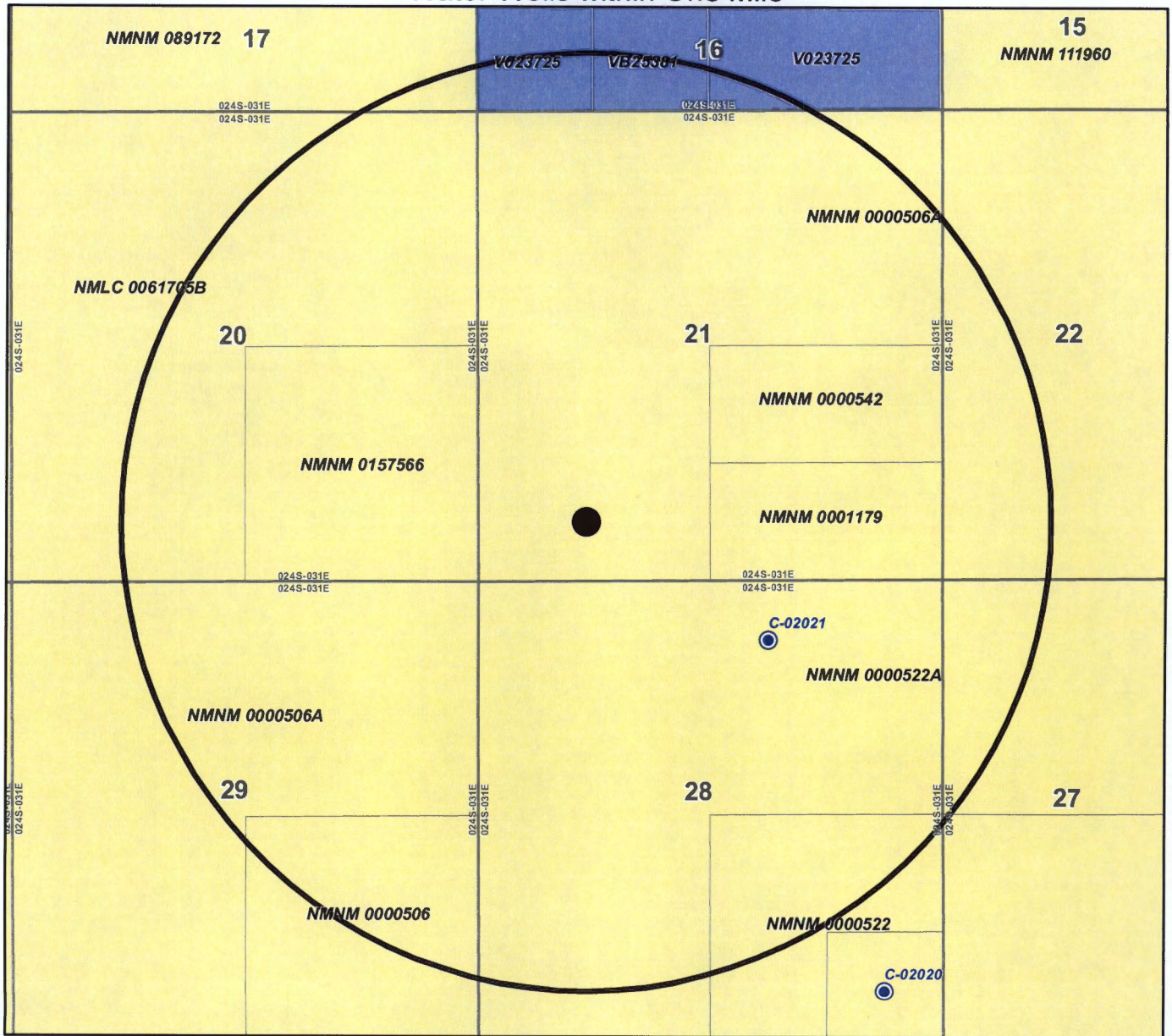
Matthew W. Kearney, P.G.



Division Geologist

XTO Energy Inc., an ExxonMobil subsidiary
22777 Springwoods Village Parkway
Spring, Texas 77389

Poker Lake Unit 21 TWR SWD Eddy County, New Mexico Water Wells within One Mile



-  water well
 - location
 - surface declaration
 - surface permit
-  State Lease
-  Federal Lease
-  one mile buffer



New Mexico Office of the State Engineer

Water Right Summary



WR File Number: C 02021 **Subbasin:** C **Cross Reference:-**
Primary Purpose: STK 72-12-1 LIVESTOCK WATERING
Primary Status: PMT PERMIT
Total Acres: **Subfile:** -
Total Diversion: 3 **Cause/Case:** -
Owner: BUREAU OF LAND MANAGEMENT

Documents on File

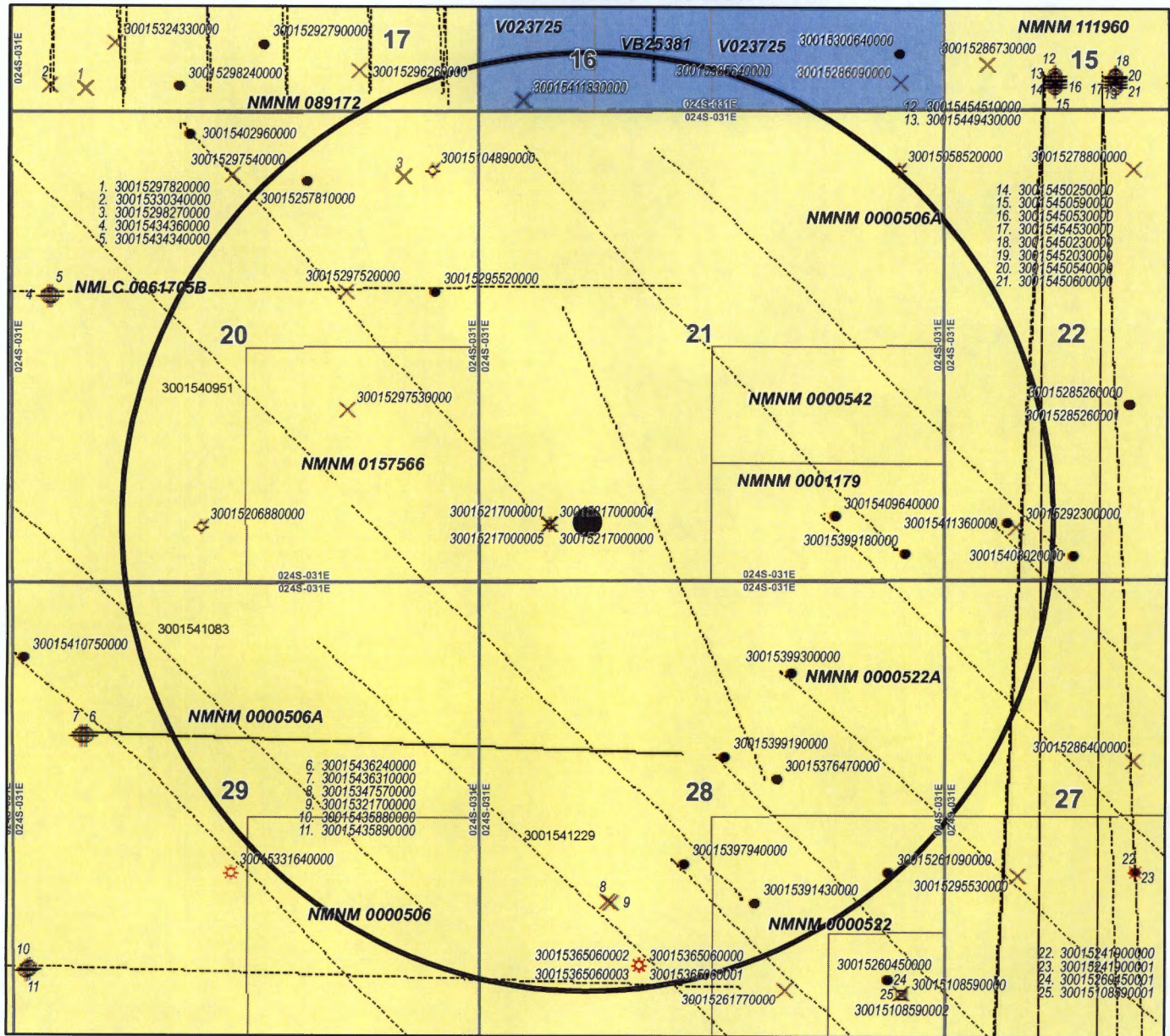
	Trn #	Doc	File/Act	Status		Transaction Desc.	From/		Acres	Diversion	Consumptive
				1	2		To				
 get images	465190	72121	1982-07-07	PMT	APR	C 02021	T			3	

Current Points of Diversion

POD Number	Well Tag	Source	Q Q Q			(NAD83 UTM in meters)			Other Location Desc
			6416	4	SecTwsRng	X	Y		
C 02021			1	2	28 24S 31E	614944	3562559*		

An () after northing value indicates UTM location was derived from PLSS - see Help

Poker Lake Unit 21 TWR SWD #9 Eddy County, New Mexico One Mile Area of Review



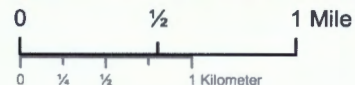
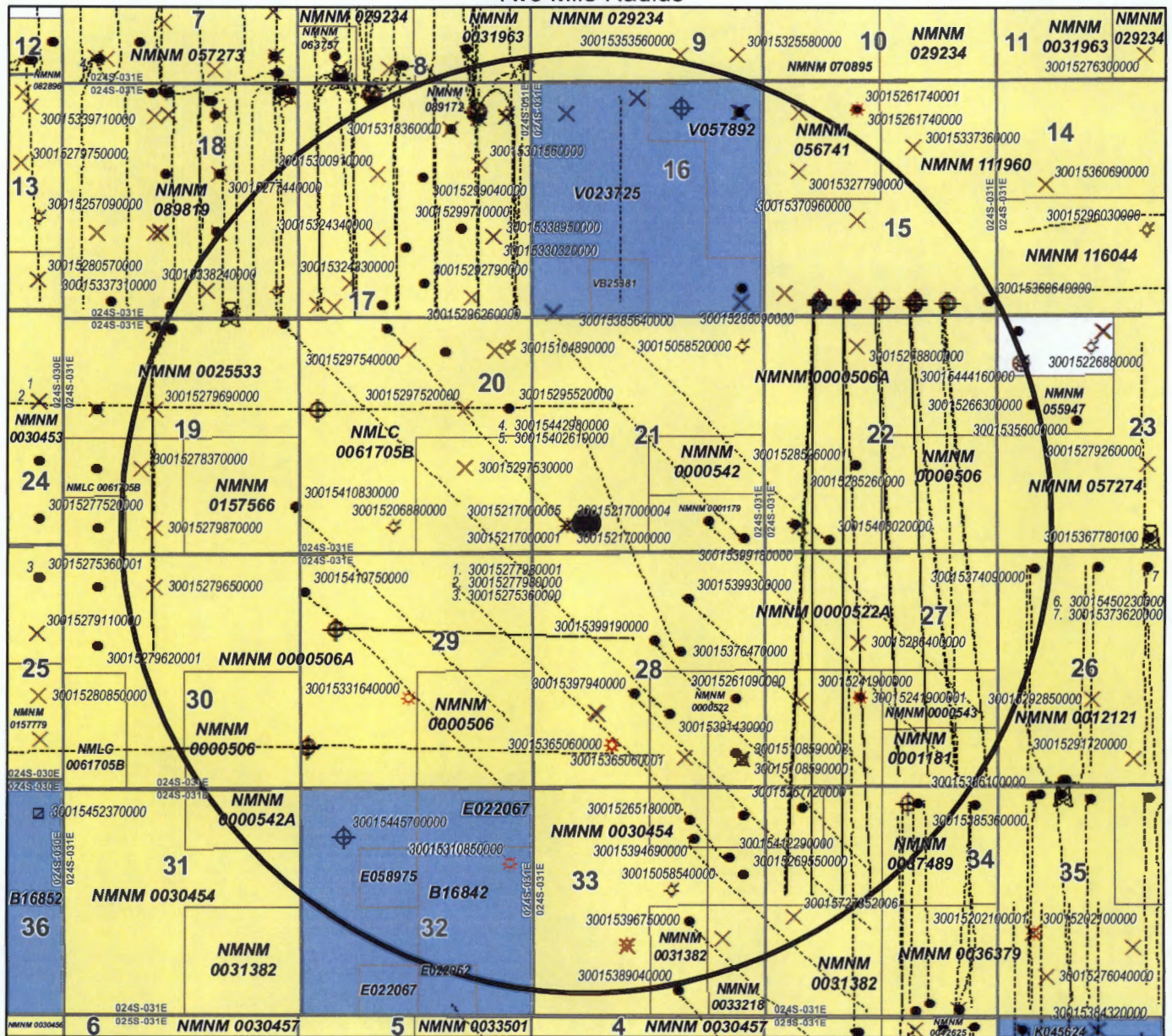
----- wellbore	Well Status Name	☐ NON-PRODUCING OTHER
State Lease	☀ GAS	○ CO2
Federal Lease	☀ INJECTION	☒ DRY
One Mile Buffer	☀ MULTI OIL AND GAS PRODUCER	☒ STORAGE
	● OIL	☀ CBM
	☀ OIL AND GAS PRODUCER	☀ OTHER PRODUCING
	☀ MULTIPLE GAS PRODUCER	☀ WATER SUPPLY WELL
	☀ MULTIPLE OIL PRODUCER	☀ WELL PERMIT
	☒ ABANDONED	☒ WELL START
	☀ DRILLING	

Known Well Operator in Buffer
BASS ENTRPRS PROD CO
BASS PERRY R
BOPCO LP
CHEVRON USA INC
FASKEN DAVID
GILLESPIE CHAS B JR
PAULEY PETROLEUM INC
YATES PETROLEUM CORP

Poker Lake Unit 21 TWR SWD #9

Eddy County, New Mexico

Two Mile Radius

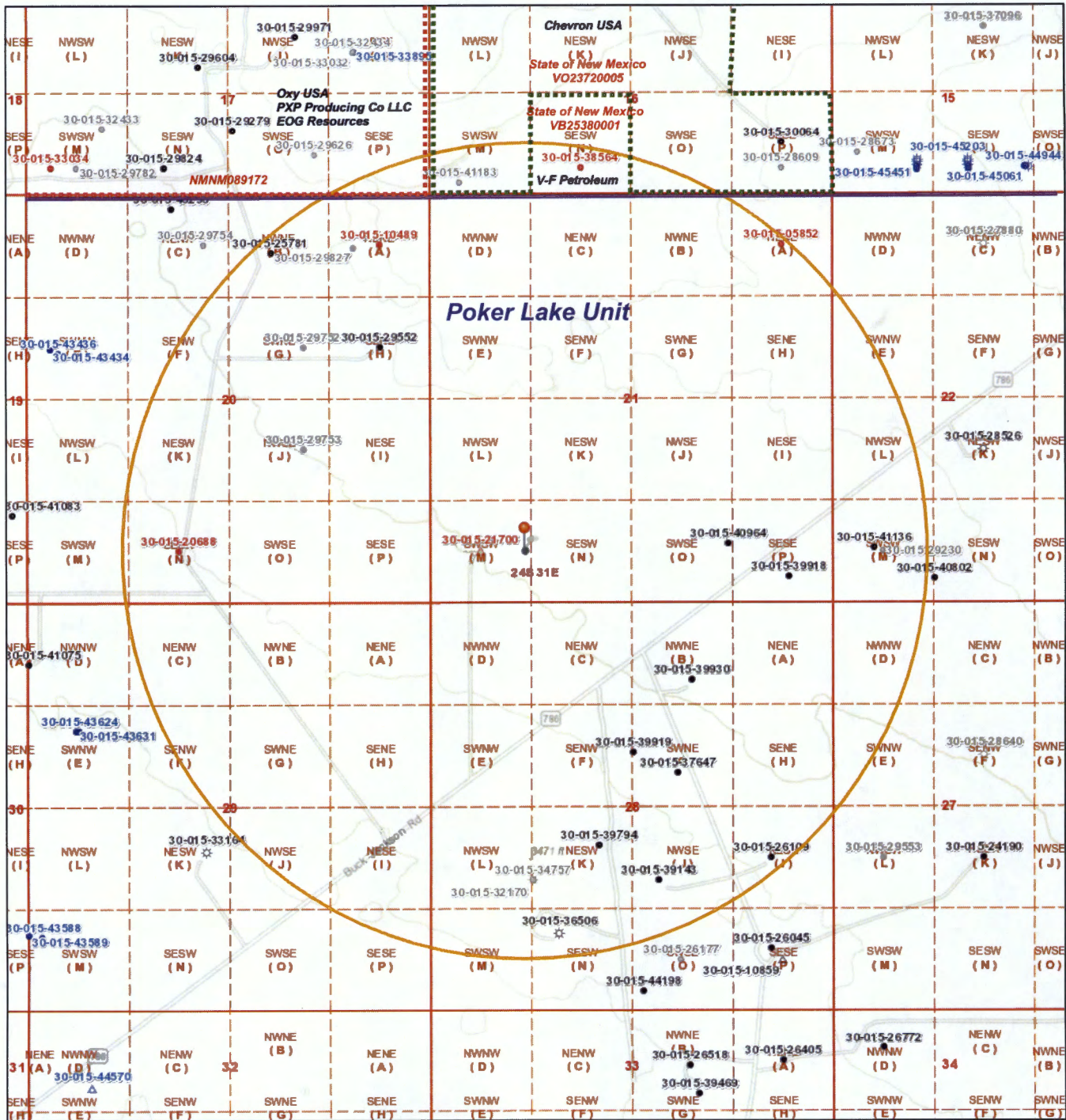


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|-----------------|------------------------------|-----------------------|
| ----- wellbore | Well Status Name | ☐ NON-PRODUCING OTHER |
| State Lease | ★ GAS | ○ CO2 |
| Federal Lease | ⚡ INJECTION | ☼ DRY |
| Two Mile Buffer | ⊙ MULTI OIL AND GAS PRODUCER | ⬢ STORAGE |
| | ● OIL | ☼ CBM |
| | ★ OIL AND GAS PRODUCER | ⚡ OTHER PRODUCING |
| | ⊙ MULTIPLE GAS PRODUCER | ⚡ WATER SUPPLY WELL |
| | ⊙ MULTIPLE OIL PRODUCER | ⚡ WELL PERMIT |
| | ✕ ABANDONED | ⊗ WELL START |
| | ⚡ DRILLING | |

Known Well Operator in Buffer

BASS ENTRPRS PROD CO	HILL & MEEKER
BASS PERRY R	NGL WATER SOLU PERMN
BETTIS BOYLE & STOVALL	OXY USA INC
BOPCO LP	PAN AMERICAN PETROLE
CHESAPEAKE OPERG INC	PAULEY PETROLEUM INC
CHEVRON USA INC	POGO PRODUCING CO
DEVON ENERGY PROD	READ CHARLS B
FASKEN DAVID	SONAT EXPL INC
FORTSON OIL CO	V-F PETROLEUM INC
GILLESPIE CHAS B JR	WEAVER W J TRUSTEE
HARRISON RL	YATES PETROLUEUM CORP

Poker Lake Unit TWR 21 SWD #9 One Mile Notice



3/14/2019 11:39:37 AM

1:18,056

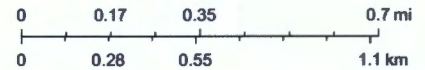
Well Locations - Large Scale

- Miscellaneous
- ★ CO2 Active
- ★ CO2 Cancelled
- ★ CO2 New
- ★ CO2 Plugged
- ★ CO2 Temporarily Abandoned
- ★ Gas Active
- ★ Gas Cancelled, Never Drilled
- ★ Gas New
- ★ Gas Plugged
- ★ Gas Temporarily Abandoned
- ★ Injection, Active
- ★ Injection, Cancelled
- ★ Injection, New
- ★ Injection, Plugged
- ★ Injection, Temporarily Abandoned
- Oil, Active
- Oil, Cancelled
- Oil, New
- Oil, Plugged
- Oil, Temporarily Abandoned
- ▲ Salt Water Injection, Active
- ▲ Salt Water Injection, Cancelled
- ▲ Salt Water Injection, New
- ▲ Salt Water Injection, Plugged
- ▲ Salt Water Injection Temporarily Abandoned

- Water, Active
- Water, Cancelled
- Water, New
- Water, Plugged
- Water, Temporarily Abandoned

Well Locations - Small Scale

- Active
- New
- Plugged
- Cancelled
- Temporarily Abandoned
- OCD Districts
- ★ OCD District Offices
- PLSS First Division



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User

CARLSBAD
CURRENT-ARGUS

AFFIDAVIT OF PUBLICATION

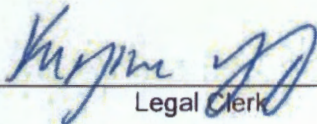
Ad No.
0001280759

Tracie J Cherry
XTO ENERGY
6401 HOLIDAY HILL RD. BLDG 5

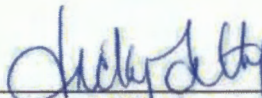
MIDLAND TX 79707

I, a legal clerk of the **Carlsbad Current-Argus**, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the State wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

03/21/19


Legal Clerk

Subscribed and sworn before me this
21st of March 2019.


State of WI, County of Brown
NOTARY PUBLIC

9-19-21
My Commission Expires

**NOTICE OF APPLICATION FOR WATER
DISPOSAL WELL PERMIT**

BOPCO, L.P. has applied to the New Mexico Oil Conservation Division for a permit to dispose of produced water into a porous formation not productive of oil or gas.

The applicant proposes to dispose of produced water into the Poker Lake Unit 21 TWR SWD #1 (Siluro-Devonian and Fusselman Formations). The maximum injection pressure will be 3,388 psi and the maximum rate will be 40,000 bbls. produced water per day. The proposed disposal well is located approximately 18 miles ESE of Malaga, New Mexico in Section 21, T24S, R31E, 650' FSL & 1,250' FWL, Eddy County, New Mexico. The produced water will be disposed at a subsurface depth of 16,940'-18,220'.

Any questions concerning this application should be directed to Tracie J Cherry, Regulatory Coordinator, BOPCO, L.P., 6401 Holiday Hill Rd, Bldg 5, Midland, Texas 79707, (432) 221-7379.

Interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, New Mexico 87505 within 15 days.

Pub: March 21, 2019 #1280759





Statements Regarding Seismicity

XTO has performed a seismicity risk assessment associated with the proposed Poker Lake Unit 21 Twin Wells Ranch #9 SWD Well by investigating historic seismicity, the presence of deep faulting, orientation of faults relative to the current stress regime and the potential for pore pressure build up that might cause a fault to slip. The analysis was done utilizing Stanford's Fault Slip Potential Tool version 2.0 (FSP; Walsh et al. 2017). To accommodate the tool's analytics, a simplified spatial relationship between the proposed well and possible faulting was established.

As part of our risk assessment we also consider mitigation options to address inherent uncertainties associated with the evaluation of possible seismicity. XTO has developed and will implement, as a precautionary measure, a seismicity monitoring plan to address the inherent uncertainty in the subsurface characterization, future rates of disposal and reservoir response.

A summary of the evaluation and seismicity monitoring plan follows:

Historic Seismicity

There are no reported USGS events within 6 miles of the proposed well and the Texas Bureau of Economic Geology's TexNet website shows no recent earthquakes in Texas within ~25 miles of the New Mexico border in the Delaware Basin (Figure 1).

Deep Faulting

Utilizing licensed 3D seismic data in the area of the proposed SWD well, XTO has interpreted four faults and/or linear features. Additionally, there are several seismic discontinuities that are interpreted as karst features in the Devonian section that do not appear to have significant lateral continuity.

Stress Regime

Utilizing data and analysis from Snee and Zoback, 'State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity' (Feb 2018, The Leading Edge) the region of the proposed well is primarily a normal faulting regime and the subject well is in stress area four (Figure 1).

Geomechanical Modeling

A simple screening level geometric / geomechanical assessment of the four faults was performed utilizing the FSP tool. The model was run using the Aphi option which makes a simplifying and conservative assumption that faults are critically stressed and thus close to failure. Additionally, given the uncertainties in the geophysical interpretation and stress information, a probabilistic scenario was run varying fault and stress characteristics. FSP model deterministic and uncertainty inputs and results of the modeling are shown in Figures 2a and 2b.

Pore Pressure Modeling

A screening level investigation of possible pore pressure increases due to the proposed SWD well was performed utilizing the FSP tool and a range of reservoir parameters. For this screening level analysis a 'high-side', flat rate model was run assuming disposal of 40,000 BWPD beginning in 2019 and continuing at that rate until 2040. Sensitivities were performed by varying several reservoir parameters. Deterministic models and uncertainty analysis are shown in Figure 3 which

contains deterministic and probabilistic model inputs, snap shots of the calculated pore pressure increases in 2025 and 2040 and cross-plots of pore pressure uncertainty and fault slip probabilities.

Integration of Geomechanical and Pore Pressure Modeling

Integration of the geomechanical and hydrological elements of the assessment was performed using the FSP Integrated module and are shown in Figure 4. Note the y-axis in the lower right hand colored graph in Figure 4 is labeled 'Fault Slip Potential'. This a labeling convention within the tool but overstates the efficacy of the analysis. The FSP output should not be taken as calculating a reliable probability of a fault slipping but rather a screening method for assessing the relative potential of faults to slip.

Uncertainty

The analysis presented is a screening level approach that encompasses a range of uncertainties in several components that are difficult to individually constrain due to the limited static and dynamic data available for deep disposal wells. Accordingly, the analysis was done by varying key inputs to understand the relative importance of each and guide the focus of future data collection efforts.

Monitoring Plan

To manage the inherent uncertainty, XTO has contracted with a third party to provide seismicity monitoring using public seismometers augmented by a private array in the area of the proposed well. This will allow for a better determination of baseline seismicity as well as early detection should there be anomalous events. Additionally, XTO will determine the original pore pressure of the disposal interval prior to initiating operations. Upon request, XTO will share the results of this work with the EMNRD's UIC staff.



Tim Tyrrell
XTO Geoscience Technical Manager

USGS Earthquake magnitude, year

State Geological Survey Earthquake magnitude, year

Well location



Geomechanical Analysis

Fault Inputs

	Strike [Deg]	Dip [Deg]
Fault 1	133	73
Fault 2	104	73
Fault 3	13	71
Fault 4	3	66

Stress Regime Inputs

* Use A-Phi Model	
Vertical Stress Gradient [psi/ft]	1.1
A-Phi Parameter	0.6
☐ Min Horiz Stress Grad Available [psi/ft]	
Max Hor Stress Direction [deg N CW]	75
Initial Res Pressure Gradient [psi/ft]	0.47
Reference Depth for Calculations [ft]	16475

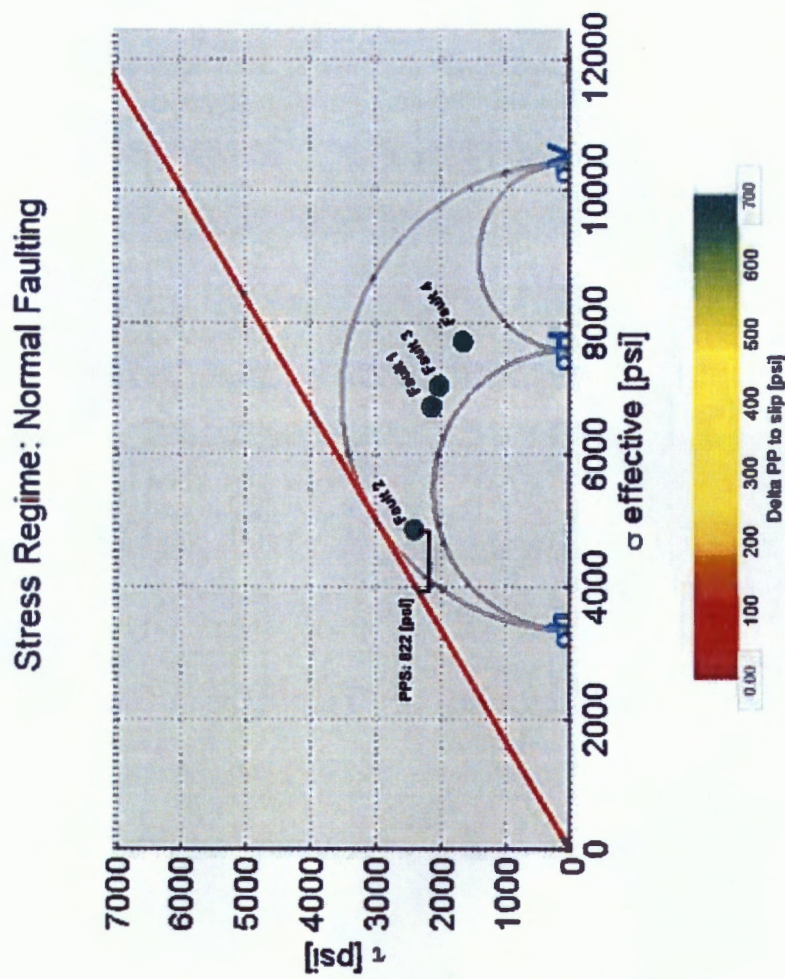


Figure 2a

Geomechanical Analysis

Uncertainty Ranges

Strike Angles [varying, degrees]	15
Dip Angles [varying, degrees]	15
Max Horiz. Stress Dir [75 degrees]	15
Friction Coeff Mu [0.6]	0.2
A-Phi Parameter [0.6]	0.2

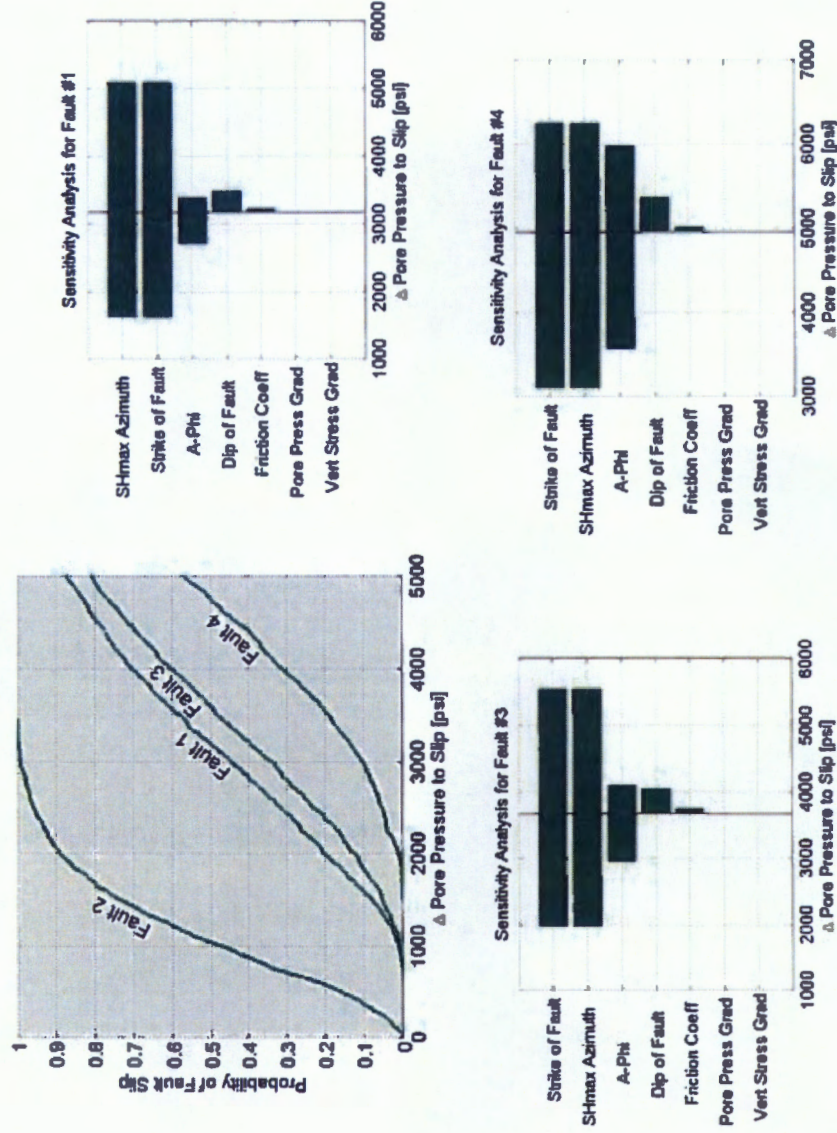
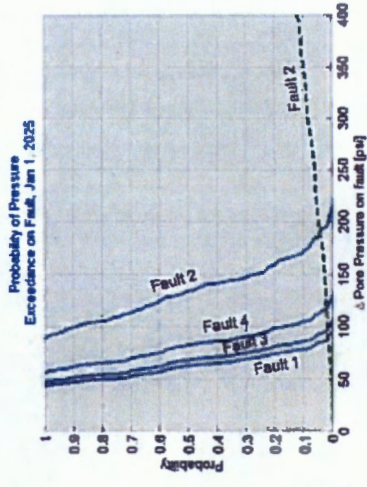
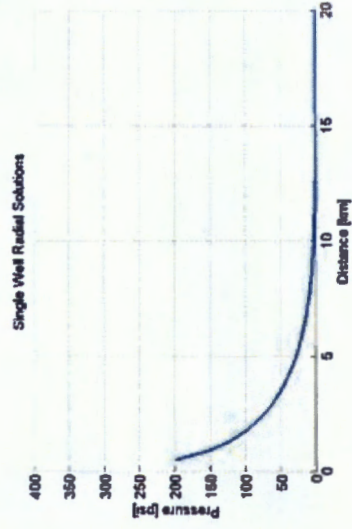
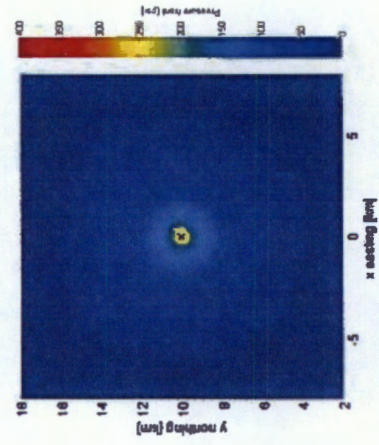


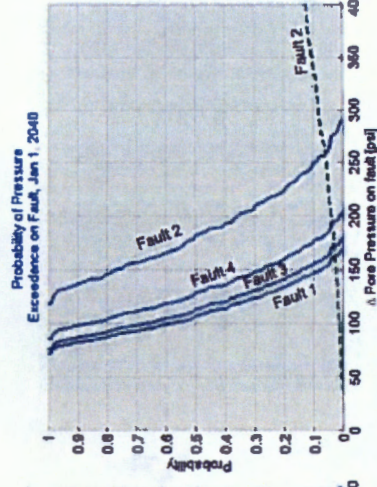
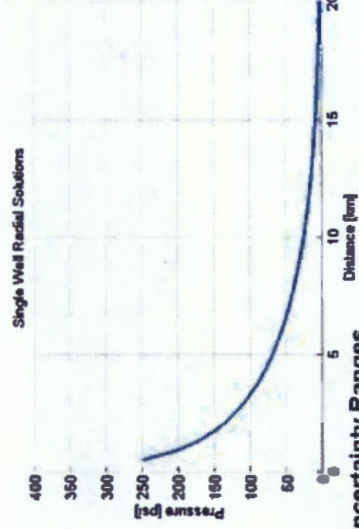
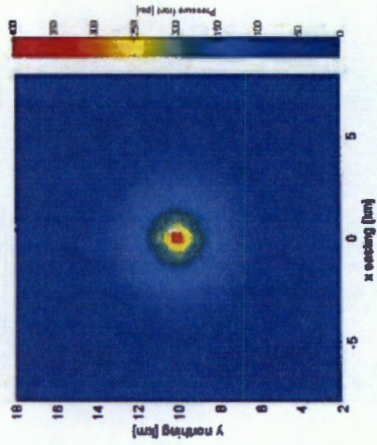
Figure 2b

Pore Pressure Analysis

2025 Snapshot



2040 Snapshot



Uncertainty Ranges

Parameter	Uncertainty
Aquifer Thickness [150 ft]	±20
Porosity [%]	±3
Permeability [15 mD]	±15

Figure 3

Geomechanical / Pore Pressure Integration

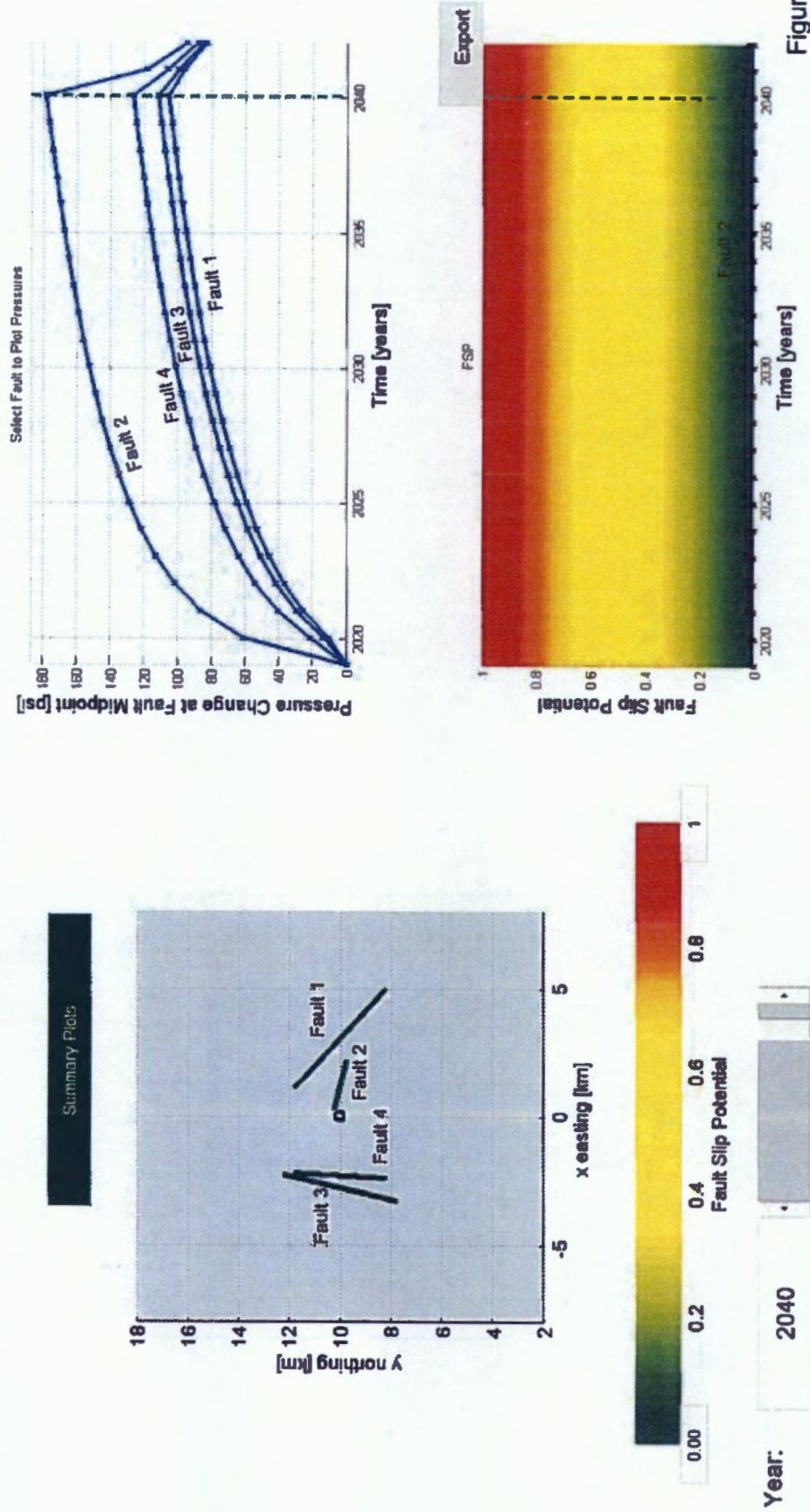


Figure 4

CERTIFIED MAILING LIST
BOPCO, LP
Poker Lake Unit 21 TWR SWD #1

Certified #7018 2290 0001 1289 5757

Bureau of Land Management
620 E. Greene Street
Carlsbad, NM 88220-6292

Certified #7018 2290 0001 1289 5740

W.L. Mobly JR.
3515 Standpipe Rd
Carlsbad, NM 88220

Certified #7018 2290 0001 1289 5733

Freeport MacMoRan
Formerly PXP Producing Co., LLC
11450 Compaq Center Dr W Ste 450
Houston, TX 77070

Certified #7018 2290 0001 1289 5726

The New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe, NM 87501

Certified #7018 2290 0001 1289 5719

EOG Resources Inc
PO Box 2267
Midland, TX 79702

Certified #7018 2290 0001 1289 5702

Oxy USA Inc
PO Box 27570
Houston, TX 77227-7570

Certified #7018 2290 0001 1289 5696

Oxy USA Inc
5 Greenway Plz #110
Houston, TX 77227-7570

Certified #7018 2290 0001 1289 5764

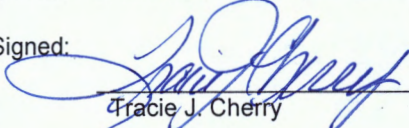
Chevron USA
Attn: Linda McMurry
6301 Deauville Blvd
Midland, TX 79706

Certified #7018 2290 0001 1289 5771

V-F Petroleum
Eric Sprinkle
PO Box 2889
Midland, TX 79702

I, Tracie J Cherry, do hereby certify the surface owner for the well(s) shown were furnished a copy of BOPCO, LP's application for salt water disposal, via certified mail.

Signed:


Tracie J. Cherry

Title: Regulatory Coordinator

Date:

03/25/19