Initial Application Part I

Received: **01/15/2020**

This application is placed in file for record. It MAY or MAY NOT have been reviewed to be determined Administratively Complete

PO# RHJHV-200115-C-1080

Revised March 23, 2017

RECEIVED: 1/15/2020	REVIEWER:	TYPE: SWD-2366	APP NO: pJAG2001552195

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: XTO Permian Operations, LLC **OGRID Number:** 373075
Well Name: Big Eddy Unit 36 Lagoon State SWD 1 **API:** To be assigned
Pool: Devonian; SWD (96101) **Pool Code:**

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

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☒ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☒ Application requires published notice
D. ☒ Notification and/or concurrent approval by SLO
E. ☐ Notification and/or concurrent approval by BLM
F. ☒ Surface owner
G. ☒ For all of the above, proof of notification or publication is attached, and/or,
H. ☐ No notice required

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.

Cassie Evans, Regulatory Analyst
Print or Type Name

Cassie Evans
Signature

January 06, 2020
Date

432.218.3671
Phone Number

cassie_evans@xtoenergy.com
e-mail Address

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: ____ Secondary Recovery ____ Pressure Maintenance XX Disposal ____ Storage
Application qualifies for administrative approval? XX Yes ____ No

II. OPERATOR: XTO Permian Operator LLC

ADDRESS: 6401 Holiday Hill Rd Bldg #5, Midland, TX 79707

CONTACT PARTY: Cassie Evans, Regulatory Analyst PHONE: 432.218.3671

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? ____ Yes XX No
If yes, give the Division order number authorizing the project: ____

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. This circle identifies the well's area of review.

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 well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*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 total dissolved solids concentrations 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.

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

*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.

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 hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Cassie Evans TITLE: Regulatory Analyst

SIGNATURE: Cassie Evans DATE: January 03, 2020

E-MAIL ADDRESS: Cassie_evans@xtoenergy.com

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: ____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

Side 2

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

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

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(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.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

Side 1

INJECTION WELL DATA SHEET

OPERATOR: XTO Permian Operating LLC

WELL NAME & NUMBER: Big Eddy Unit 36 Lagoon State SWD #1

WELL LOCATION:	312' FSL, 683' FEL	P	36	21S	28E
	FOOTAGE LOCATION	UNIT LETTER	SECTION	TOWNSHIP	RANGE

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 17 1/2" Casing Size: 13 3/8"

Cemented with: 2455 sx. ***or*** _____ ft^3

Top of Cement: Surf Method Determined: Circ

Intermediate Casing

Hole Size: 121/4" Casing Size: 9 5/8"

Cemented with: 2975 sx. ***or*** _____ ft^3

Top of Cement: Surf Method Determined: circ

Production Casing

Hole Size: 8 1/2" Casing Size: 7"

Cemented with: 630 sx. ***or*** _____ ft^3

Top of Cement: 9700' Method Determined: Circ

Total Depth: 14,020'

Injection Interval

14020' feet to 15000' Open Hole

(Perforated or Open Hole; indicate which)

Side 2

INJECTION WELL DATA SHEET

Tubing Size: 5 1/2", 17#, P-110 IPC to 10800', 4 1/2", 13.65#, P-110 IPC @ 10800' - 15830' Lining Material: _____

Type of Packer: Baker Series F Nickle plated permanent packer

Packer Setting Depth: 14000'

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? X Yes _____ No

   If no, for what purpose was the well originally drilled? _____

2. Name of the Injection Formation: Siluriam-Devonian and Fusselman

3. Name of Field or Pool (if applicable): Devonian, SWD

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. N/A

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: Higher: Bell Canyon (+/-2,889'), Cherry Canyon (+/- 3,709'), Brushyl Canyon (+/-5,210'), Bone Springs (+/- 7,504'), Wolfcamp (+/- 9,784'), Atoka (+/- 11,539'), Morrow (+/- 11,971')

   Lower: None Known

BEU 36 Lagoon State SWD #1

Proposed SWD Schematic (Dec 14, 2019)

County: Eddy
SHL: 312' FSL, 683' FEL
Sec 36, T 21S, R 28E

BHL: 312' FSecL, 683' FEL
Sec 36, T 21S, R 28E

XTO ENERGY

API # N/A
Elevation GL 3224', KB 3256' (32' AGL)
Rig: TBD (RKB 32')

Geology		Casing & Cement	Wellhead	Hole Size	General Notes
TVD	*Formation*		(Tech Data Sheet)		
				24"	
196'	Rustler				
		Tail (100% OH excess) 565 sx 14.8ppg Class C Top of Tail @ 0'			
		18-5/8" 87.5# J-55 BTC	**240' MD**		
284'	Base of Rustler			17-1/2"	
399'	Top Salt	*Lead (150% OH excess)* 1835 sx 12.8ppg Poz/C Top of Lead @ 0			
		Tail (100% OH excess) 620 sx 14.8ppg Class C Top of Tail @ 2100'			
2,464'	Base Salt				
		13-3/8" 68# HCL-80 BTC	**2640' MD**		
		Stg 2 Lead (100% OH excess)		12-1/4"	
2,801'	Delaware	535 sx 11.5ppg Poz/H Top of Lead @ 0'			
		Stg 2 Tail (100% OH excess) 305 sx 14.8ppg Poz/H Top of Tail @ 2100'			
		DV tool at 2740'			
6,419'	Bone Spring	*Stg 1 Lead (100% OH excess)* 1580 sx 11.5ppg Poz/H Top of Lead @ 2740'	**9700' MD**		
		Stg 1 Tail (100% OH excess)			
9,784'	Wolfcamp	555 sx 14.8ppg Poz/H Top of Tail @ 9290'			
10,141'	Wolfcamp B				
		9-5/8" 53.5# HCP-110 BTC	**10290' MD**		
				8-1/2"	
		Tail (40% OH excess)			
11,309'	Strawn	630 sx 14.5ppg Poz/H Top of Tail @ 9700'			
11,539'	Atoka				
11,971'	Morrow				
13,500'	Mississippian Lm				
13,791'	Woodford				
14,002'	Devonian				
		7" 32# HCP-110 BTC	**14020' MD**		
14,899'	Base of Fusselman			6"	
15,000'	TVD at BHL	**Open hole completion**			
			15,000' MD **15,000' 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 well's 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

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected; **Avg rate 20,000, max rate 40,000 bbls.**
2. Whether the system is open or closed; **Closed**
3. Proposed average and maximum injection pressure; **Avg psi 2,000, max psi is 2,804**
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 or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.). **There is no disposal well within a 1 mile radius of the proposed well.**

*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 total dissolved solids concentrations 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:	**Carbonates (Dolomite and Limestone)**
Geological Name:	**Devonian (Silurian-Devonian)**
Thickness:	**Est. 1007'**
Depth:	**Est. 14002' to 15009' (includes 100' buffer)**

The Dewey Lake Red Beds consisting of alluvial sandstones, siltstones, and shales are present from the surface to the top of the Rustler Anhydrite. The top of the Rustler Anhydrite is estimated to be at approximately 196 feet below the surface in this BEU 36 Lagoon State SWD 1 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). Based on a water well search on the New Mexico Office of the State Engineer website, there were no water wells within a mile and half radius.

Based on published maps, the Capitan Reef Aquifer is not present in this area

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 5,000 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, but prior to disposal.

*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 Engineering database there are no water well within a 1 mile radius of the proposed well.

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 hydrologic connection between the disposal zone and any underground sources of drinking water. **(See attached affidavit)**

January 2, 2019

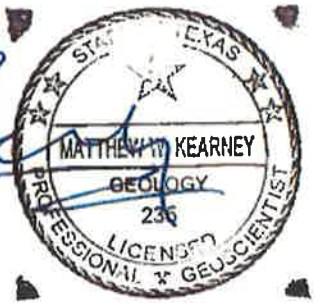
New Mexico, Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: **Geology Statement per Question XII on the Application for Authorization to Inject Form C-108 for**
XTO Energy Inc., an ExxonMobil subsidiary
Big Eddy Unit 36 Lagoon State SWD 1,
Section 36, Township 21 South, Range 28 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 312 feet from the south line and 683 feet from the east line of Section 36, Township 21 South, Range 28 East, Eddy County, New Mexico; and finds no evidence of open faults or other hydrologic connection between the disposal zone and the near surface underground sources of drinking water.

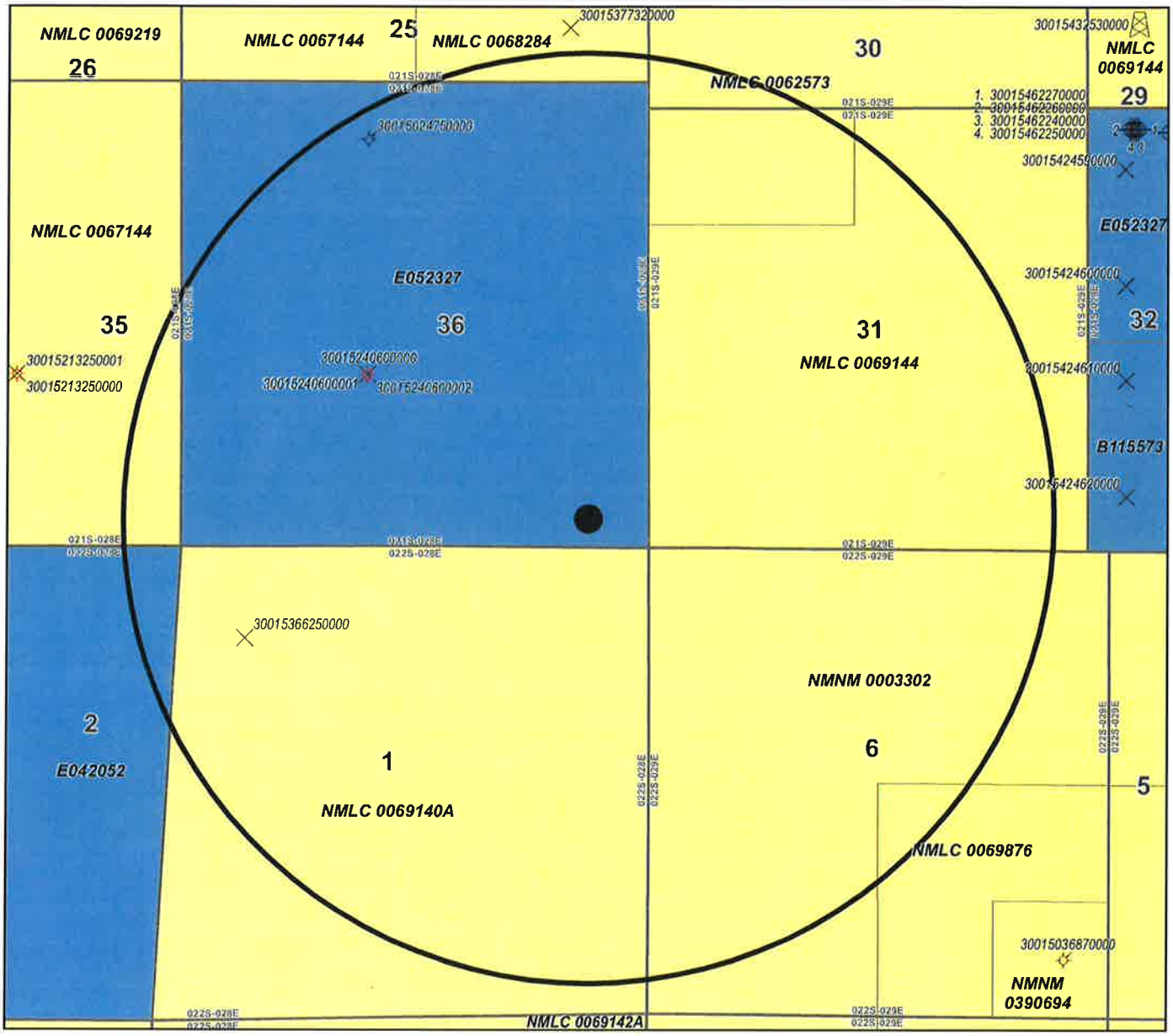
Respectively Submitted,



Matthew W. Kearney, P.G.

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

Big Eddy Unit 36 Lagoon State SWD 1
Eddy County, New Mexico



1 mile Area of Review Map

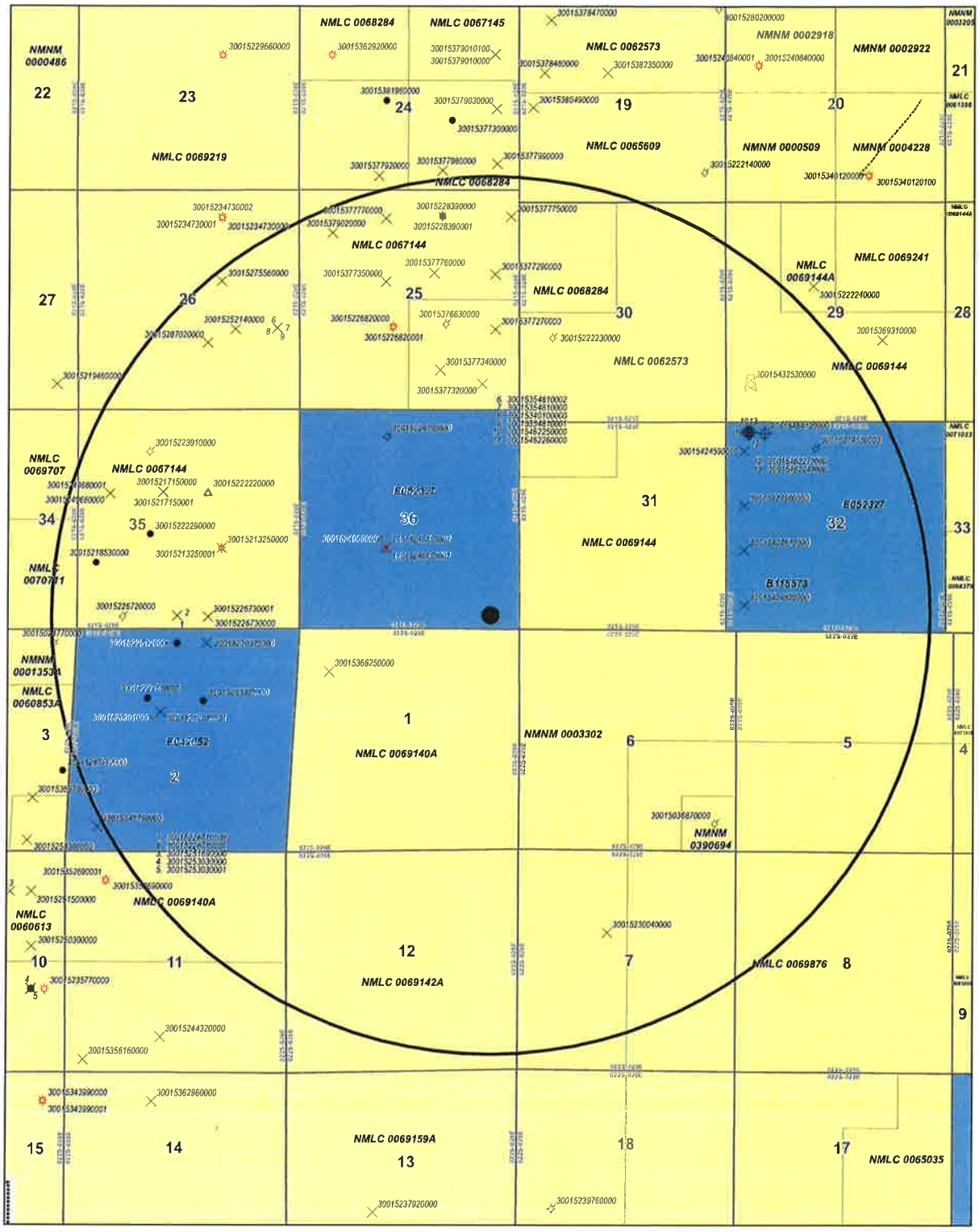
0 ¼ ½ Mile
0 ¼ ½ 1 Kilometer

wellbore
State Lease
Federal Lease
one mile buffer
BLM Active Unit - Big Eddy

Well Status Name
GAS
INJECTION
MULTI OIL AND GAS PRODUCER
OIL
OIL AND GAS PRODUCER
MULTIPLE GAS PRODUCER
MULTIPLE OIL PRODUCER
ABANDONED
DRILLING
NON-PRODUCING OTHER
CO2
DRY
STORAGE
CBM
OTHER PRODUCING
WATER SUPPLY WELL
WELL PERMIT
WELL START

known well operators in buffer
BASS ENTRPRS PROD CO
SHELL OIL CO

Big Eddy Unit 36 Lagoon State SWD 1
Eddy County, New Mexico



2 Mile Radius Map

0 ½ 1 Mile

wellbore
State Lease
Federal Lease
two mile buffer
BLM active unit - Big Eddy

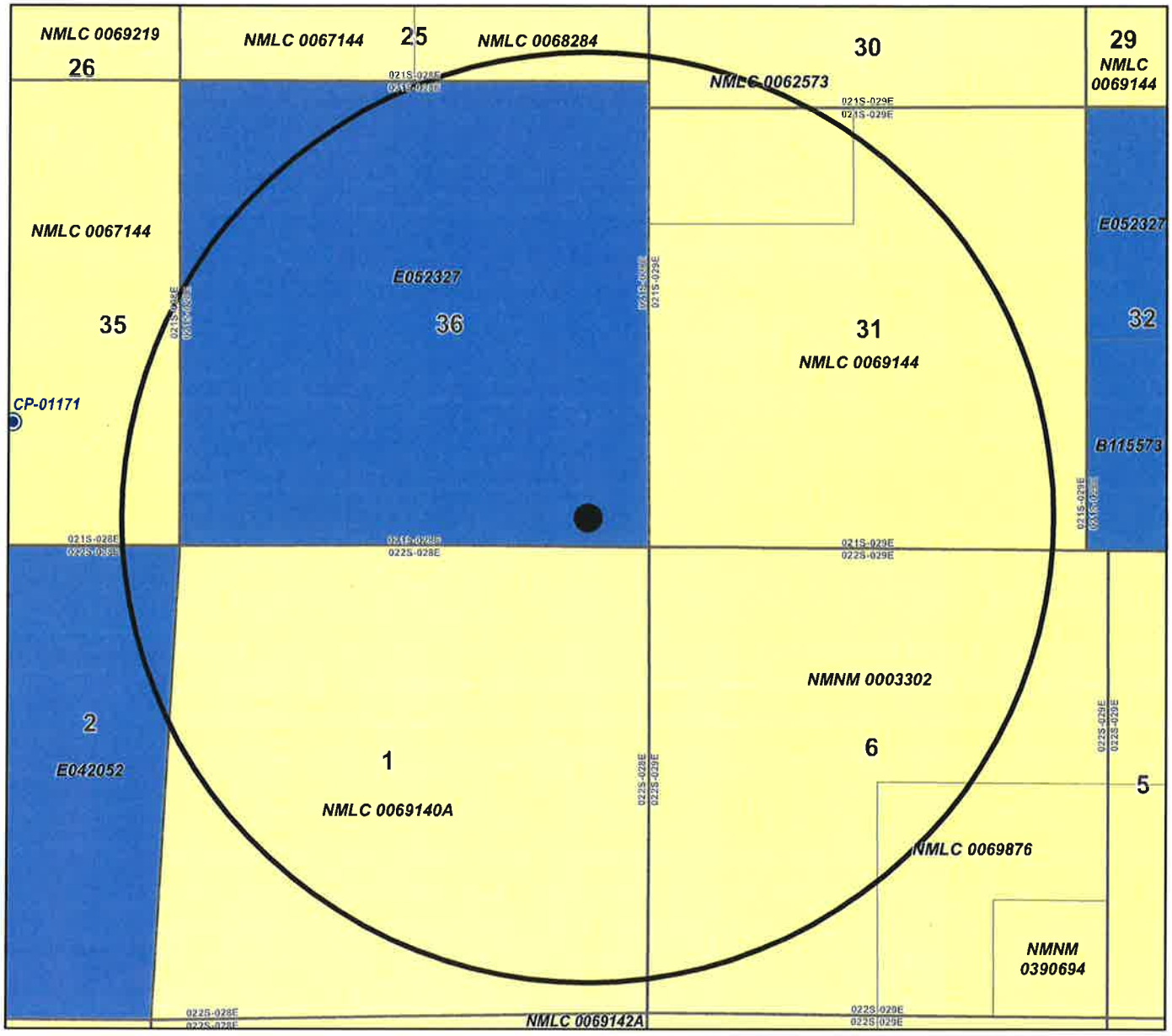
Well Status Name

GAS
INJECTION
MULTI OIL AND GAS PRODUCER
OIL
OIL AND GAS PRODUCER
MULTIPLE GAS PRODUCER
MULTIPLE OIL PRODUCER
ABANDONED
DRILLING
NON-PRODUCING OTHER
CO2
DRY
STORAGE
CBM
OTHER PRODUCING
WATER SUPPLY WELL
WELL PERMIT
WELL START

known operators in buffer

BASS ENTRPRS PROD CO
BASS PERRY R
BOPCO LP
CHEVRON U S A INC
GULF OIL CORP
HUDSON WM A&HUDSON E
I T I O OIL CO
JUDAH OIL
OGS OPER CO INC
SHELL OIL CO
XTO PERMIAN OPER LLC

Big Eddy Unit 36 Lagoon State SWD 1
Eddy County, New Mexico



Water Wells within 1 mile

0 ¼ ½ Mile

0 ¼ ½ 1 Kilometer

water well
-location
-surface declaration
-surface permit
State Lease
Federal Lease
one mile buffer
BLM Active Unit - Big Eddy

NALCO Champion
An Ecolab Company

Complete Water Analysis Report

Customer: **XTO ENERGY INC**
Region: **Carlsbad, NM**
Location: **James Ranch Unit 29 Federal Lease**
System: **Production System**

Equipment: **SWD**
Sample Point: **Inlet**
Sample ID: **AL07042**
Acct Rep Email: **Anthony.Baeza@ecolab.com**

Collection Date: **06/12/2018**
Receive Date: **06/21/2018**
Report Date: **06/25/2018**
Location Code: **373826**

Field Analysis

Bicarbonate	12 mg/L	Dissolved CO2	350 mg/L	Dissolved H2S	9 mg/L
Pressure Surface	20 psi	Temperature	98 ° F	pH of Water	6.1
Oil per Day	0 B/D	Gas per Day	0 Mcf/D	Water per Day	6500 B/D

Sample Analysis

Calculated Gaseous CO2	0.12 %	Calculated pH	6.10	Conductivity (Calculated)	437728 µS - cm3
Ionic Strength	5.82	Resistivity	0.023 ohms - m	Specific Gravity	1.200
Total Dissolved Solids	280169.9 mg/L				

Cations

Iron	15.7 mg/L	Manganese	8.03 mg/L	Barium	3.97 mg/L
Strontium	1480 mg/L	Calcium	27900 mg/L	Magnesium	4440 mg/L
Sodium	71900.00 mg/L	Potassium	1800 mg/L	Boron	28.7 mg/L
Lithium	10.8 mg/L	Copper	0.01 mg/L	Nickel	0.055 mg/L
Zinc	0.138 mg/L	Lead	0.033 mg/L	Cobalt	0.053 mg/L
Chromium	0.003 mg/L	Silicon	3.02 mg/L	Aluminum	Not Detected mg/L
Molybdenum	0.023 mg/L	Phosphorus	Not Detected mg/L		

Anions

Bromide	1832.85 mg/L	Chloride	174225 mg/L	Sulfate	184.663 mg/L

PTB Value

	Barite PTB	Calcite PTB	Celestite PTB	Gypsum PTB	Halite PTB	Iron Carbonate PTB	Iron Sulfide PTB
50°	2.13	0.13	89.54	31.55	0.00	0.00	2.08
75°	1.79	0.00	70.73	0.00	0.00	0.00	1.75
100°	1.19	0.00	54.88	0.00	0.00	0.00	1.42
125°	0.28	0.00	43.34	0.00	0.00	0.00	1.11
150°	0.00	0.00	35.91	0.00	0.00	0.00	0.86
175°	0.00	0.00	31.61	0.00	0.00	0.00	0.66
200°	0.00	0.00	29.33	0.00	0.00	0.00	0.53
225°	0.00	0.00	28.19	0.00	0.00	0.00	0.45
250°	0.00	0.00	27.59	0.00	0.00	0.00	0.41
275°	0.00	0.00	27.18	0.00	0.00	0.00	0.41
300°	0.00	0.00	26.83	0.00	0.00	0.00	0.43
325°	0.00	0.00	26.54	0.00	0.00	0.00	0.46
350°	0.00	0.00	26.37	0.00	0.00	0.00	0.48
375°	0.00	0.00	26.26	0.00	0.00	0.00	0.47
400°	0.00	0.00	25.92	0.00	0.00	0.00	1.14

Saturation Index

	Barite SI	Calcite SI	Celestite SI	Gypsum SI	Halite SI	Iron Carbonate SI	Iron Sulfide SI
50°	1.01	0.05	0.60	0.14	-0.26	-1.89	1.55
75°	0.62	-0.14	0.40	-0.03	-0.29	-1.96	1.16
100°	0.31	-0.30	0.28	-0.13	-0.31	-2.03	0.85
125°	0.06	-0.44	0.20	-0.19	-0.33	-2.09	0.62
150°	-0.15	-0.55	0.16	-0.24	-0.35	-2.14	0.45
175°	-0.33	-0.64	0.14	-0.29	-0.37	-2.18	0.34
200°	-0.48	-0.70	0.14	-0.35	-0.39	-2.22	0.26
225°	-0.61	-0.75	0.12	-0.41	-0.41	-2.26	0.22
250°	-0.72	-0.78	0.12	-0.48	-0.43	-2.30	0.20
275°	-0.83	-0.80	0.12	-0.55	-0.45	-2.35	0.20
300°	-0.93	-0.81	0.12	-0.60	-0.47	-2.40	0.20
325°	-1.04	-0.82	0.12	-0.63	-0.49	-2.47	0.21
350°	-1.14	-0.83	0.11	-0.60	-0.51	-2.56	0.22
375°	-1.25	-0.86	0.11	-0.51	-0.52	-2.67	0.21
400°	-1.37	0.00	0.11	-0.33	-0.53	0.00	0.48

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.

NALCO Champion
An Ecolab Company

Complete Water Analysis Report

Customer: **XTO ENERGY INC**
Region: **Carlsbad, NM**
Location: **James Ranch Unit 29 Federal Lease**
System: **Production System**

Equipment: **SWD**
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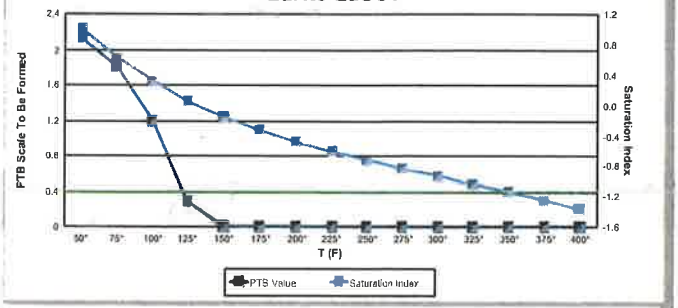
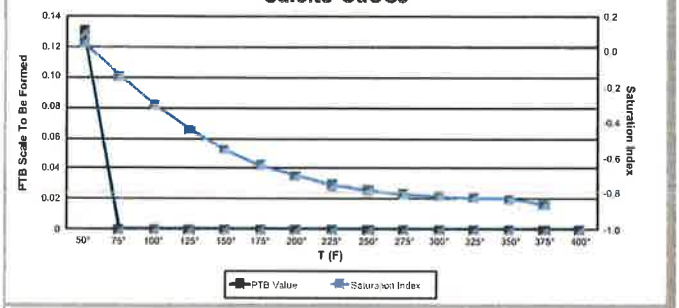
Location Code: **373826**

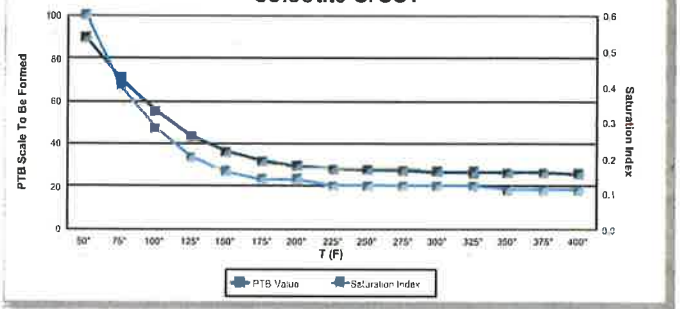
Barite BaSO4



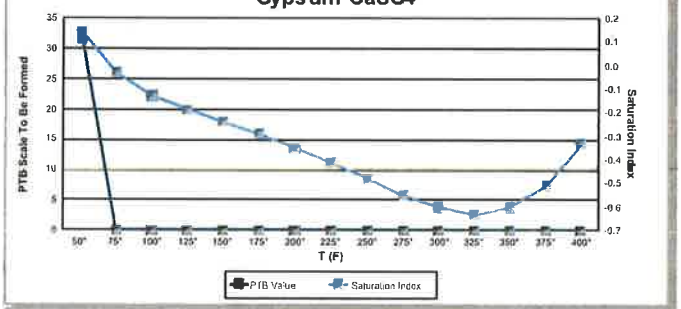
Calcite CaCO3



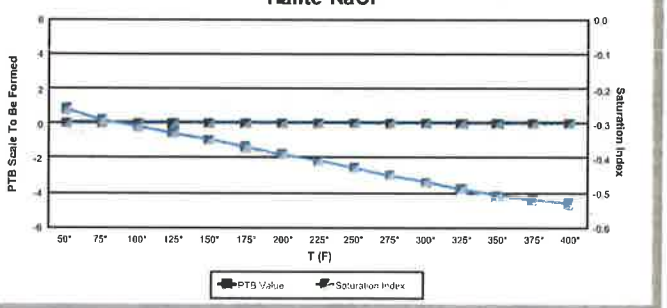
Celestite SrSO4



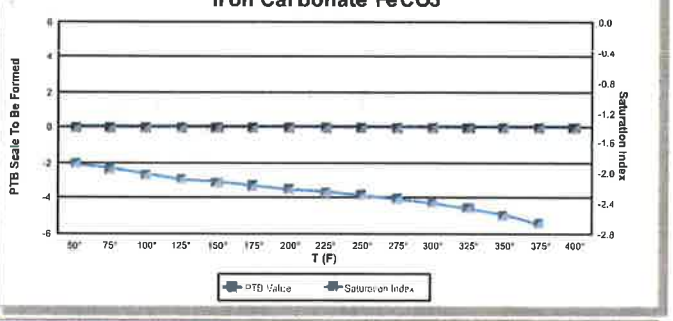
Gypsum CaSO4



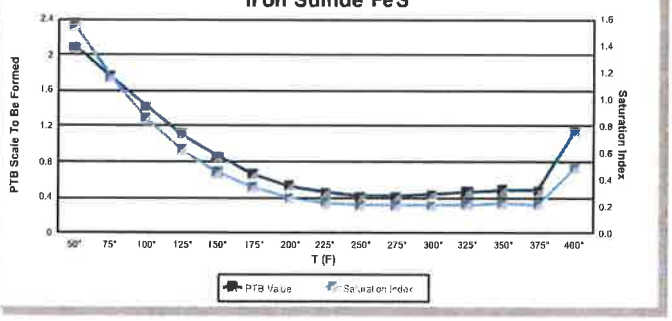
Halite NaCl



Iron Carbonate FeCO3



Iron Sulfide FeS



Comments

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.

XTO ENERGY

Statements Regarding Seismicity

XTO has performed a seismicity risk assessment associated with the proposed Big Eddy Unit Lagoon Federal SWD 1 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 seismic events reported by the USGS within ~6 miles of the proposed well. There is 1 event within ~6 miles recorded by New Mexico Tech (Figure 1).

Deep Faulting

Utilizing licensed 3D seismic data in the area of the proposed SWD well, XTO has evaluated several 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 (Figure 1).

Geomechanical Modeling

A simple screening level geometric / geomechanical assessment of the faults was performed utilizing the FSP tool. The models were 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, probabilistic scenarios were run using two Hmax orientations and associated uncertainties as well as varying fault characteristics. FSP model deterministic and uncertainty inputs and results of the modeling are shown in Figure 2

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, snap shots of the calculated pore pressure increases

in 2025 and 2040 and cross-plots of pore pressure uncertainty analysis and fault slip probabilities are shown in Figure 3.

Integration of Geomechanical and Pore Pressure Modeling

Integration of the geomechanical and hydrological elements of the assessment was performed using the FSP Integrated module. The results are shown in Figure 4. Note the y-axis in the lower right hand colored graphs in Figure 4 are labeled 'Fault Slip Potential'. This is 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

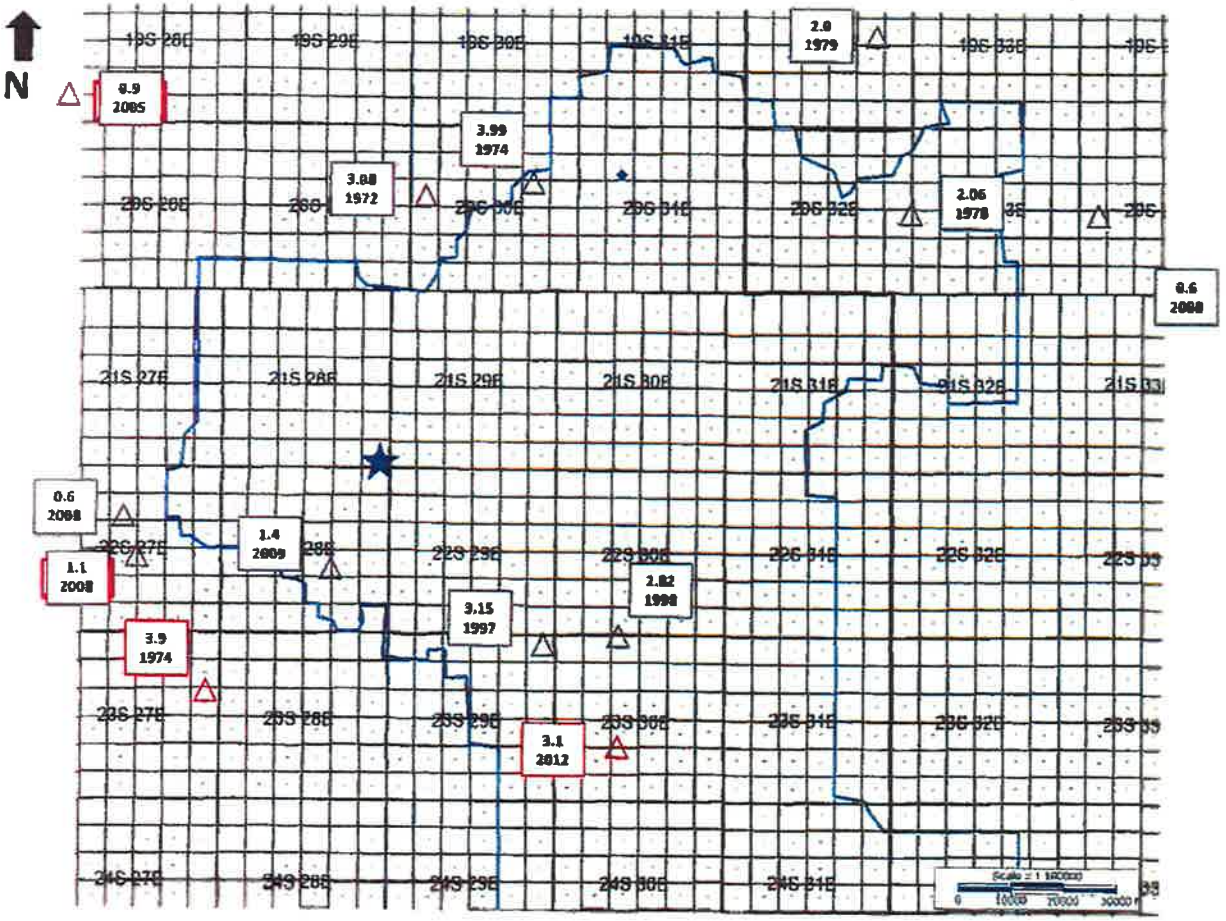
The analysis presented is a screening level approach that encompasses a range of uncertainties in several components that are difficult to individually constrain due to the limited static and dynamic data available for deep disposal wells. Accordingly, the analysis was done by varying key inputs to understand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

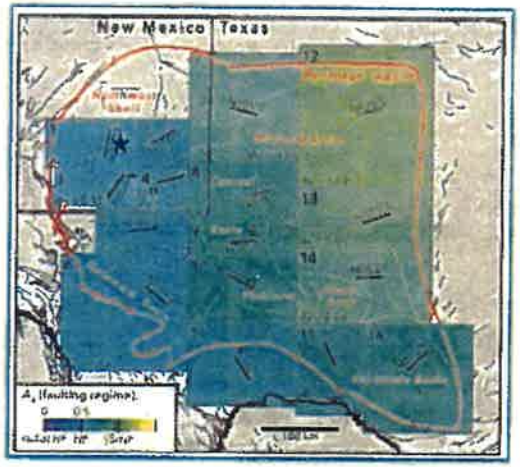
Monitoring Plan

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 monitor disposal zone reservoir pressure for a minimum period of five years to better constrain reservoir properties and pore pressure increase (if any). Upon request, XTO will share the results of this work with the EMNRD's UIC staff.

Tim Tyrrell
XTO Geoscience Technical Manager

BEU Lagoon Federal SWD 1 Wells - Historic Seismicity





Earthquake and associated magnitude, year

△ USGS

△ NM Tech

★ BEU Lagoon 1

Figure 1

BEU Lagoon Federal SWD 1 - Geomechanics

Stress Regime: Normal Faulting

Fault Inputs

Number of faults (max 500) 5

Friction Coefficient mu

○ Random Faults

● Enter Faults

	X [East feet]	Y [North feet]	Strike [Deg]	Dip [Deg]	Length [feet]
1	0	11 6000	36	77	3
2	7	10	91	57	2
3	10 1000	10 7000	86	64	0 8000
4	7	7 5000	44	72	4
5	8 5000	10	44	72	2

Stress Regime Inputs

Vertical Stress Gradient: 1.1 psi/ft
Initial Res. Pressure Gradient: 0.47 psi/ft
Reference Dep for Calculations: 16,250 ft MD

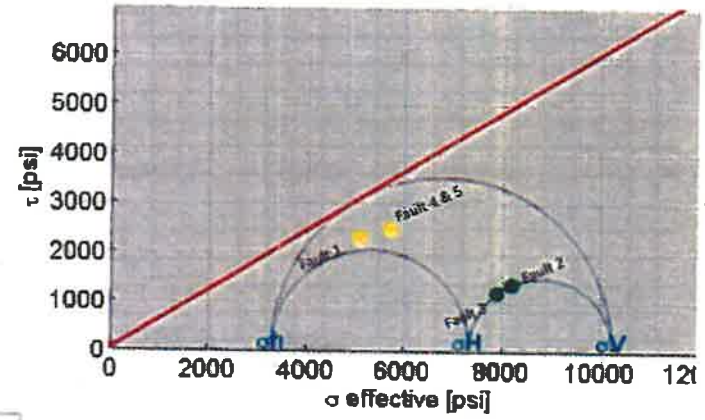
Uncertainty Ranges

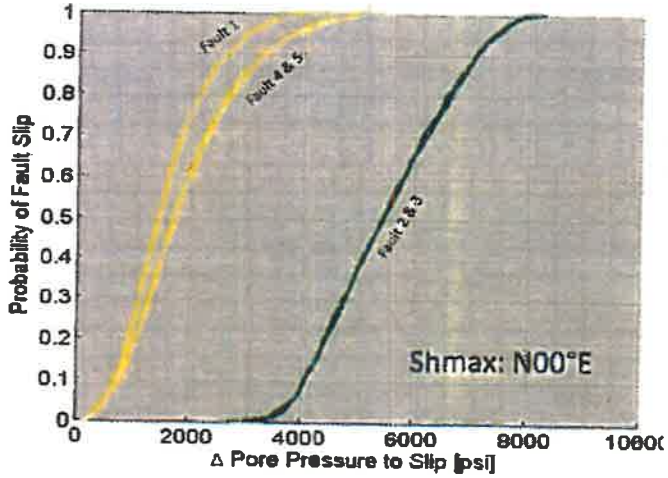
- A-Phi stress model is being used

Strike Angles: +/- 15°
Dip Angles: +/- 15°
Max Horiz Stress: +/- 15°
Friction Coeff Mu: 0.6
A-Phi Parameter: 0.58 +/- 0.2

Maximum Injection Rate: 40,000 bbl/day

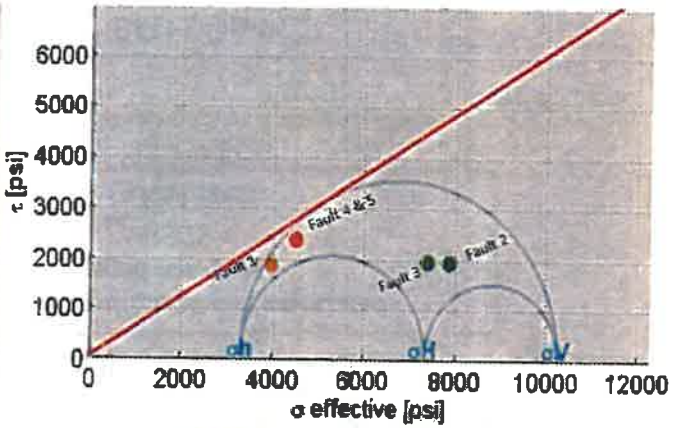
Shmax: N00°E

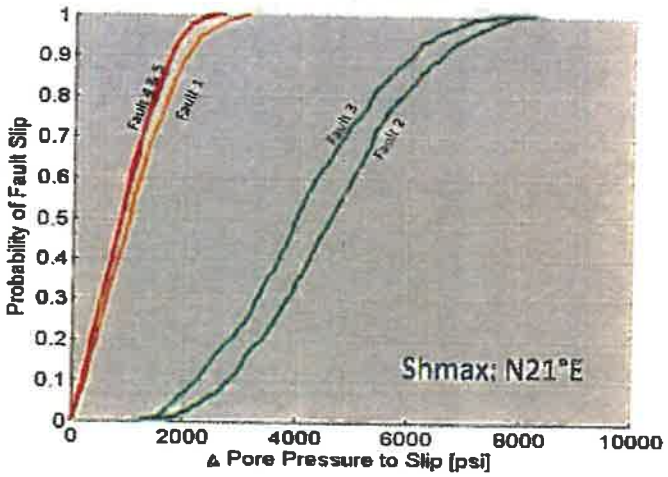




Max Delta PP [psi] 10000

Shmax: N21°E





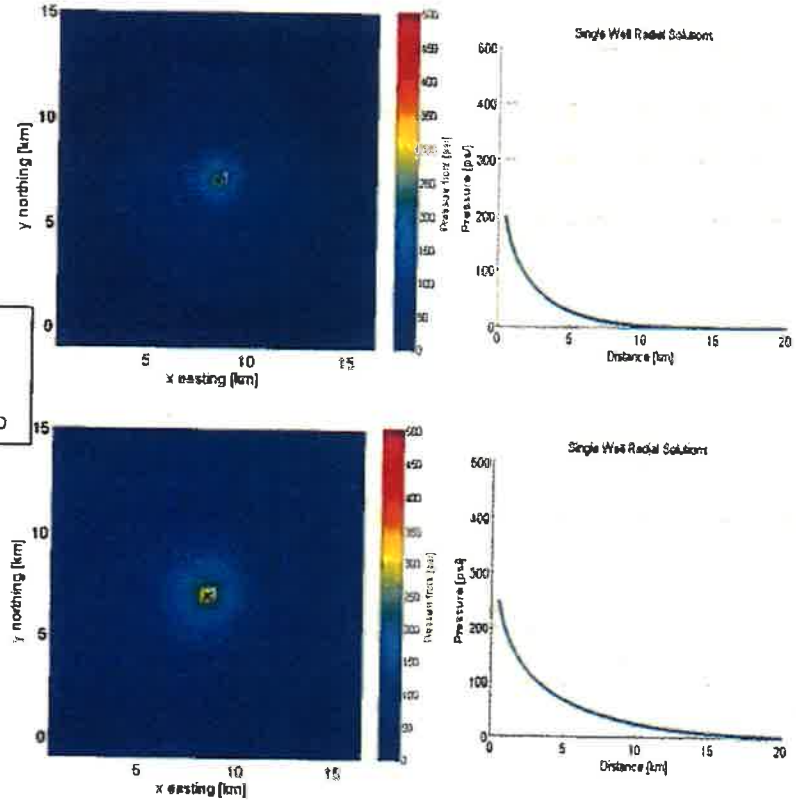
Max Delta PP [psi] 10000

BEU Lagoon Federal SWD 1 – Pore Pressure Analysis

2025 Snapshot

2040 Snapshot

Uncertainty Ranges	
Aquifer Thickness:	750ft +/- 250ft
Porosity:	5% +/- 3%
Perm:	75mD +/- 25mD



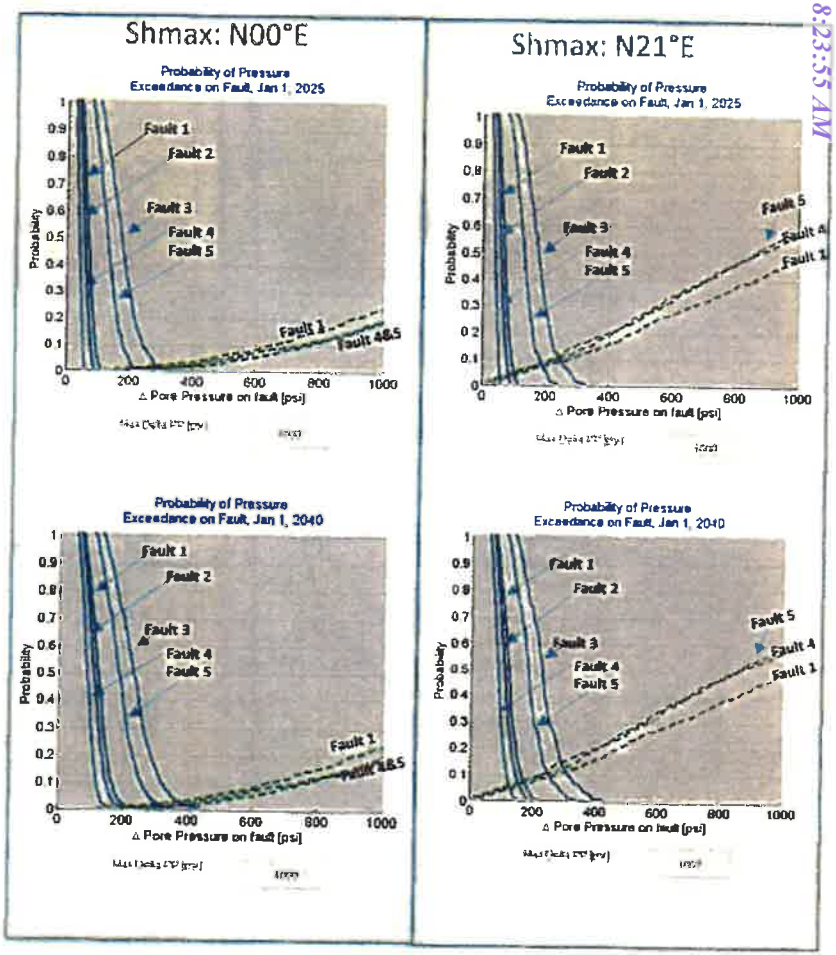
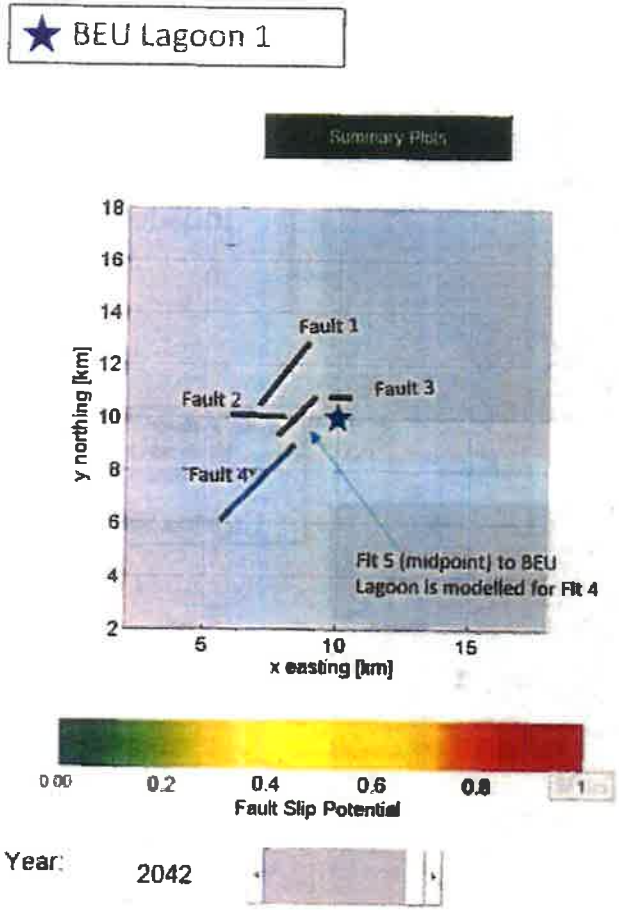


Figure 3

BEU Lagoon Federal SWD 1 – Geomechanical / Pore Pressure Integration



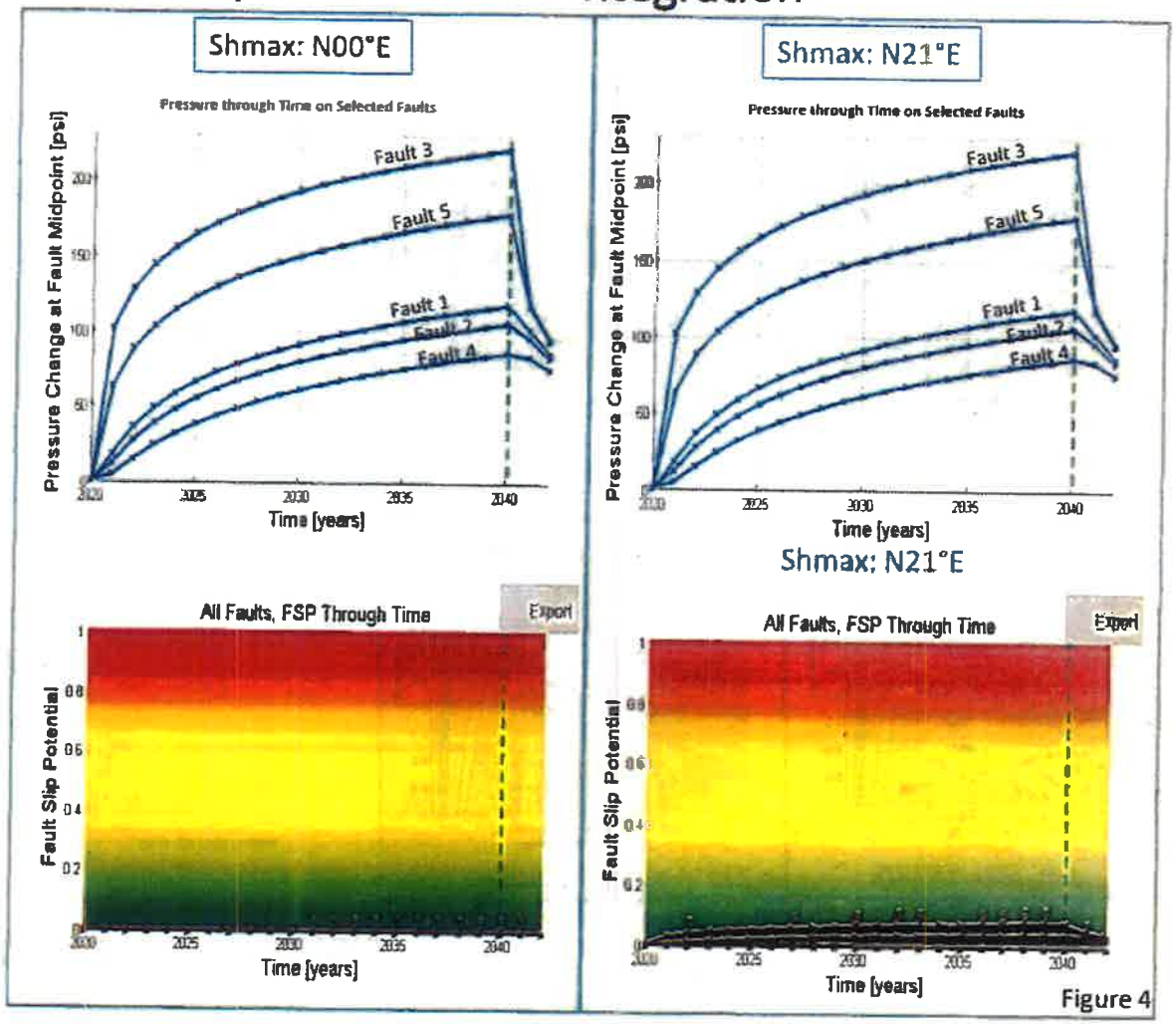


Figure 4

REC'D/MIDLAND

DEC 30 2019

Carlsbad Current Argus.

PART OF THE USA TODAY NETWORK

Affidavit of Publication

Ad # 0003966564

This is not an invoice

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:

December 27, 2019

Legal Clerk

Subscribed and sworn before me this December 27, 2019:

State of WI, County of Brown
NOTARY PUBLIC

9-19-21

My commission expires

VICKY FELTY
NOTARY PUBLIC
STATE OF WISCONSIN

Ad # 0003966564
PO #: Beu Lagoon
# of Affidavits : 1

This is not an invoice

NOTICE OF APPLICATION FOR WATER DISPOSAL WELL PERMIT

XTO Permian Operating, LLC 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 **Big Eddy Unit 36 Lagoon State SWD #1** (Siluriam-Devonian and Fusselman Formations). The maximum injection pressure will be 2,804 psi and the maximum rate will be 40,000 bbls. produced water per day. The proposed disposal well is located approximately 11.5 miles East of Carlsbad, New Mexico in Section 36, T21S, R28E, 312' FSL & 683' FEL, Eddy County, New Mexico. The produced water will be disposed at a subsurface depth of 14,020'-15,000'.

Any questions concerning this application should be directed to Cassie Evans, Regulatory Analyst XTO Permian Operating, LLC, 6401 Holiday Hill Rd, Bldg 5, Midland, Texas 79707, (432) 218-3671.

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.

3966564, Current-Argus, December 27, 2019

Offset Operator & Leaseholders	
Certified #70191640000164363085 Concho Oil & Gas LLC 600 W. Illinois Ave. Midland, TX 79701	Certified # 70191640000164363092 Delmar Hudson Lewis Living Trust P.O. Box 2546 Ft Worth, TX 76113
Certified #70191640000164363108 COG Operating LLC 600 W. Illinois Ave. Midland, TX 79701	Certified #70191640000164363115 Edward R. Hudson Jr. 616 Texas St. Ft Worth, TX 76102-4612
Certified # 70191640000164363122 Javalina Partners 616 Texas St. Ft Worth, TX 76102-4612	Certified #70191640000164363139 Zorro Partners 616 Texas St. Ft Worth, TX 76102-4612
Certified #70191640000164363146 Edward R. Hudson Trust 4 616 Texas St. Ft Worth, TX 76102-4612	Certified #70191640000164363153 Lindy's Living Trust 616 Texas St. Ft Worth, TX 76102-4612
Certified #70191640000164363160 Josephine T. Hudson Estate 616 Texas St. Ft Worth, TX 76102-4612	Certified #70191640000164363177 Albert W. Rutter Jr. P.O. Box 3186 Midland, TX 79702
Surface Owner	**Grazing Lessee**
Certified #70191640000164363184 The New Mexico State Land Office 310 Old Santa Fe Trail Santa Fe, NM 87501	Certified #70191640000164363191 Mike Carter PO Box 565 Carlsbad, NM 88221

I, Cassie Evans, do hereby certify the surface owner and offset leaseholder operator for the well shown were furnished a copy of XTO Permian Operating LLC's application for salt water disposal,

Signed: Cassie Evans

Cassie Evans

Title: Regulatory Analyst

Date: 2-Jan-20