SWD

Initial

Application

Received: 10/03/19

701MY-191003-C-1080

Revised March 23, 2017

RECEIVED: 10/3/19	REVIEWER:	TYPE: SWD	APP NO: pDM1927645207

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 Operating, LLC **OGRID Number:** 373075
Well Name: Big Eddy Unit 21 Seaweed Fed SWD 1 **API:** TBA
Pool: SWD; Devonian-Silurian **Pool Code:** 96101

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.

Tracie J. Cherry, Regulatory Coordinator
Print or Type Name

Signature

10/01/19
Date

432-221-7379
Phone Number

tracie_cherry@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 _____Disposal _____Storage
Application qualifies for administrative approval? XX Yes _____No

II. OPERATOR: XTO PERMIAN OPERATING, LLC

ADDRESS: 6401 HOLIDAY HILL RD., BLDG 5, MIDLAND, TX 79707

CONTACT PARTY: Tracie J. Cherry PHONE: 432-221-7379

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 X 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).

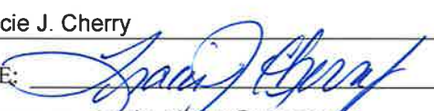
*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

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: Tracie J. Cherry TITLE: Regulatory Coordinator

SIGNATURE:  DATE: _____

E-MAIL ADDRESS: tracie_cherry@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

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.

III. Well Data

A. 1) Lease name: **BIG EDDY UNIT SEAWEED FEDERAL SWD**
Well #: **1** **API # TBA**
Section: **21**
Township: **21S**
Range: **29E**
Footage: **2300 FSL & 200 FWL**

2) Casing Info:

Casing size	Set depth	Sacks cmt	Hole size	TOC	Method
18-5/8", 87.5# J-55 BTC	430'	1520 sx C	24	Surf	Circ
13-3/8" 68# HCL-80 BTC	2,900	1970 sx Poz/C 840 sx C	17-1/2"	Surf	Circ
9-5/8" 53.5# HCP-110 BTC DV tool set @ 3000'	10,650	2165 sx Poz/H 1065 sx Poz/H	12-1/4"	Surf	Circ
7" 32# HCP-110 BTC	10,200'-13,990'	790 sx Poz/H	8-1/2"	11,700	Circ

3) Tubing to be used (size, lining material, setting depth):
Tapered String
5-1/2" , 17#, P-110 IPC to 9,700'
4-1/2", 13.65#, P-110 IPC tubing @ 9,700'-13,890'

4) Name, model, and depth of packer to be used:
Baker Series F nickle plated permanent packer @ 13,890'

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

2) The injection interval and whether it is perforated or open hole:
Open hole, 13,990'-15,134' (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 (+/- 3244') Cherry Canyon (+/-3984') Brushy Canyon (+/-5304'), Avalon/Bone Spring (+/-7804'), Atoka (+/-11779'), Morrow (+/-12226')
Lower: None

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 Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-		

[4] Property Code	[5] Property Name	[6] Well Number
	BEU 21 SEAWEED FEDERAL SWD	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
260737	XTO PERMIAN OPERATION, LLC.	3,379'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	21	21 S	29 E		2,300	SOUTH	200	WEST	EDDY

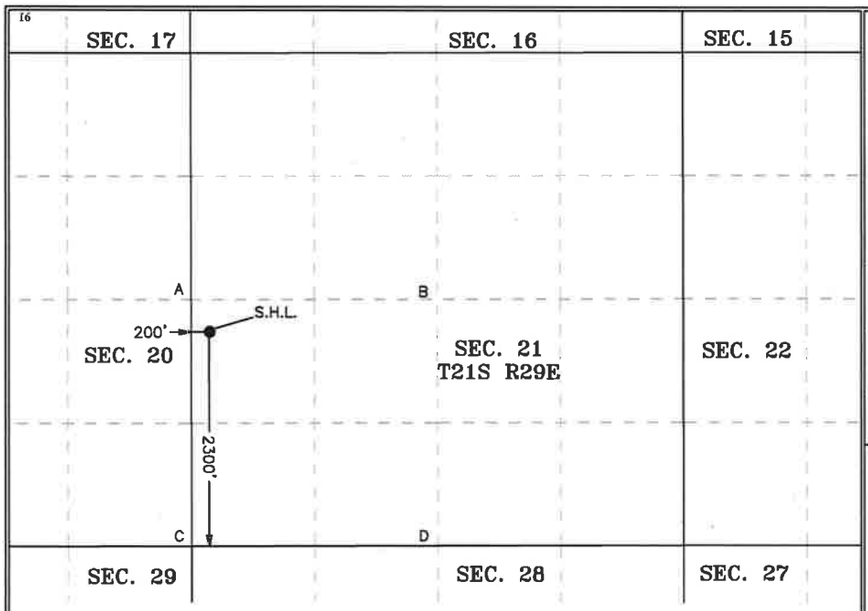
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

[16]



SHL (NAD83 NME)
Y = 532,688.5
X = 644,919.8
LAT. = 32.463976 °N
LONG. = 103.997483 °W

SHL (NAD27 NME)
Y = 532,627.4
X = 603,739.3
LAT. = 32.463856 °N
LONG. = 103.996981 °W

CORNER COORDINATES (NAD83 NME)
A - Y = 533,030.6 N , X = 644,719.0 E
B - Y = 533,039.0 N , X = 647,359.4 E
C - Y = 530,387.7 N , X = 644,725.0 E
D - Y = 530,397.9 N , X = 647,365.5 E

CORNER COORDINATES (NAD27 NME)
A - Y = 532,969.6 N , X = 603,538.5 E
B - Y = 532,977.9 N , X = 606,178.9 E
C - Y = 530,336.9 N , X = 606,184.9 E
D - Y = 530,326.7 N , X = 603,544.4 E

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

09-05-2019
Date of Survey

Signatue and Seal of Professional Surveyor:

PRELIMINARY, THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

MARK DILLON HARP 23786
Certificate Number RR 2019072479

P:\PROJECTS\2019\2019072479-XTO-BIG_EDDY_UNIT_SEAWEED_21_FED_SWD_1-EDDY\DWG\2019072479-XTO-BIG _EDDY_UNIT_SEAWEED_21_FED_SWD_1-C-102.dwg

BEU 21 Seaweed Fed SWD #1

Proposed SWD Schematic (September 13, 2019)

County: Eddy
SHL: 2300' FSL, 200' FWL
Sec 21, T 21S, R 29E

BHL: 2300' FSL, 200' FWL
Sec 21, T 21S, R 29E

API # N/A
Elevation GL 3379', KB 3411' (32' AGL)
Rig: TBD (RKB 32')

TVD	Formation	Casing & Cement	Wellhead	Hole Size	General Notes
			(Tech Data Sheet)		
		Lead (100% OH excess) 540 sx 12.8ppg Class C Top of Tail @ 0'		24"	
329'	Rustler	*Tail (100% OH excess)* 980 sx 14.8ppg Class C Top of Tail @ 400'			
		18-5/8" 87.5# J-55 BTC	**430' MD**		
				17-1/2"	
519'	Top Salt	*Lead (150% OH excess)* 1970 sx 12.8ppg Poz/C Top of Lead @ 0			
		Tail (100% OH excess) 840 sx 14.8ppg Class C Top of Tail @ 2300'			*5-1/2", 17,"#", P-110 IPC tbg to 10,200'*
2,716'	Base Salt				
		13-3/8" 68# HCL-80 BTC	**2900' MD**		
		Stg 2 Lead (100% OH excess)		12-1/4"	
3,074'	Delaware	665 sx 11.5ppg Poz/H Top of Lead @ 0'			*5-1/2" 17# P-110 IPC tbg to 9700'*
		Stg 2 Tail (100% OH excess) 400 sx 14.8ppg Poz/H Top of Tail @ 2300'			
		DV tool at 3000'			
6,779'	Bone Spring Lm.	*Stg 1 Lead (100% OH excess)* 1610 sx 11.5ppg Poz/H Top of Lead @ 3000'	**10200' MD**		*Crossover @ 9700'*
		Stg 1 Tail (100% OH excess)			
10,089'	Wolfcamp Sh.	555 sx 14.8ppg Poz/H Top of Tail @ 9650'			*4-1/2" 13.25# P-110 IPC tbg 9700' to 13890'*
10,496'	Wolfcamp Lm.				
		9-5/8" 53.5# HCP-110 BTC	**10650' MD**		
				8-1/2"	
		Tail (40% OH excess) 790 sx 14.5ppg Poz/H			
11,506'	Strawn	Top of Tail @ 10200'			
11,779'	Atoka				
12,226'	Morrow				
13,504'	Mississippian Lm				
13,862'	Woodford				*Baker Series F nickle plated permanent packer @13890'*
13,965'	Devonian				
		7" 32# HCP-110 BTC	**13990' MD**		
14,944'	Base of Fusselman			6"	
15,134'	TVD at BHL	**Open hole completion**			
			15,134' MD **15,134' 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.
Maps attached (Exhibit A & Exhibit B).

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.
(Exhibit C)
No wells within a 1-mile pendetrate the disposal interval

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, 2798 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 (Exhibit D)

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:

No disposal wells are within one mile 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 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:	**Carbonates (Dolomite and Limestone)**
Geological Name:	**Devonian (Silurian-Devonian)**
Thickness:	**Est. 1169'**
Depth:	**Est. 13965' to 15134' (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 329 feet below the surface in this BEU 21 Seaweed Fed 1 SWD 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 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 there no water wells and/or points of diversion within one mile radius of the proposed well.

XII. Applicants for disposal wells must make an affimative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydology connection between the disposal zone and any underground sources of drinking water.
(Exhibit F)

XIV. Proof of Notice
(Exhibit G)

XTO ENERGY

Statements Regarding Seismicity

XTO has performed a seismicity risk assessment associated with the proposed Big Eddy Unit Seaweed 21 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. Additionally, 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 evaluated two 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 varying fault and stress 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

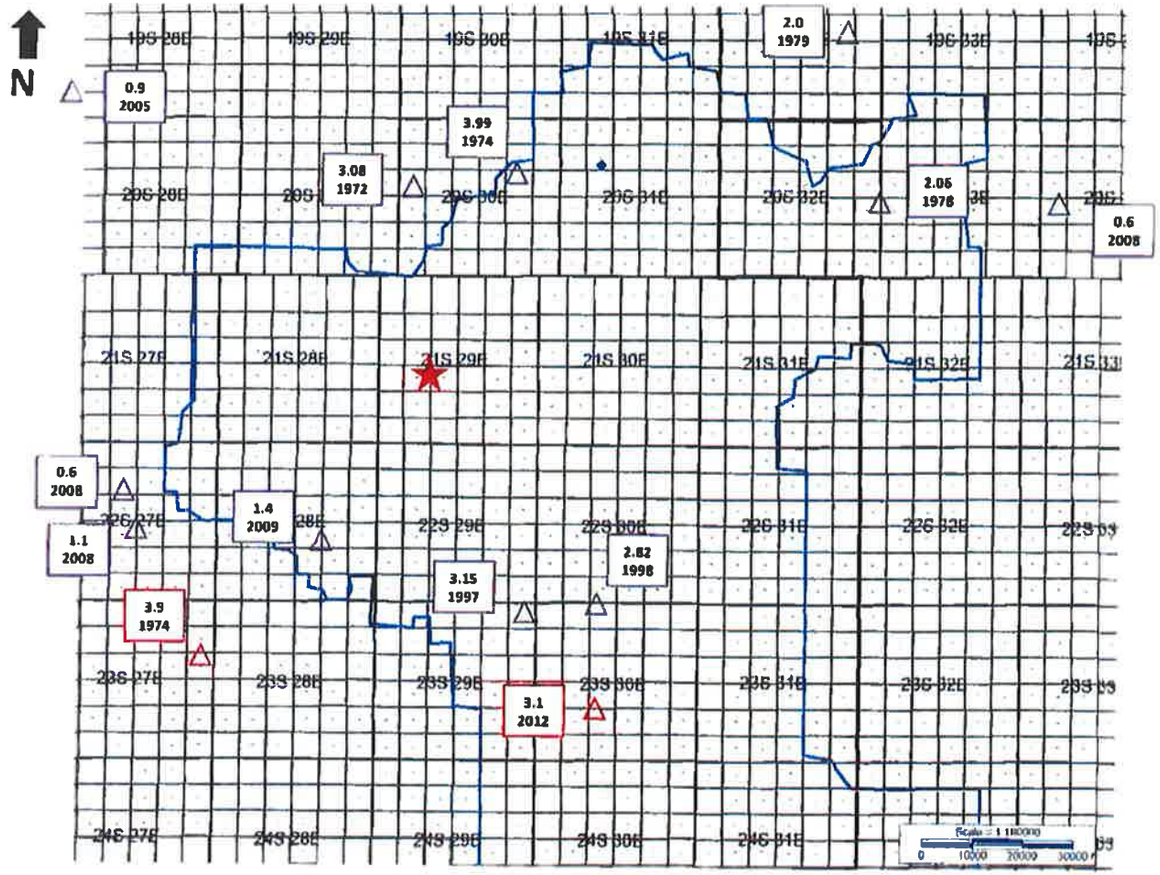
The analysis presented is a screening level approach that encompasses a range of uncertainties in several components that are difficult to individually constrain due to the limited static and dynamic data available for deep disposal wells. Accordingly, the analysis was done by varying key inputs to understand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

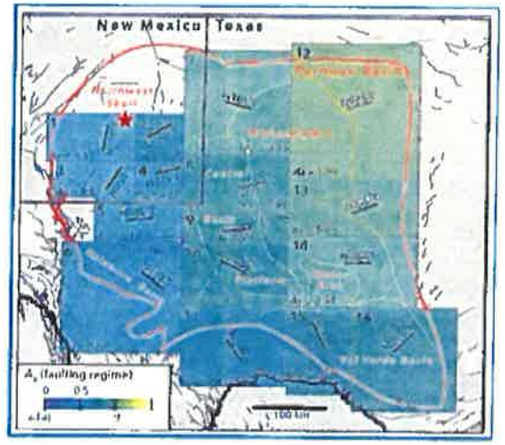
Monitoring Plan

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 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

BEU Seaweed 21 Federal SWD 1 - Historic Seismicity





Earthquake and associated magnitude, year

△ USGS

△ NM State

★ BEU Seaweed 21

Figure 1

BEU Seaweed 21 Federal SWD 1 - Geomechanics

Stress Regime: Normal Faulting

Fault Inputs

Fault 1 – Azi: 38 °; Dip 77°
Fault 2 – Azi: 88 °; Dip 64°

Uncertainty Ranges

- A-Phi stress model is being used

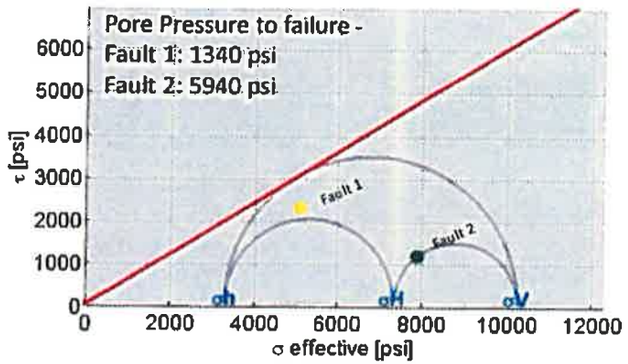
Strike Angles: +/- 15°
Dip Angles: +/- 15°
Max Horiz Stress: +/- 15°
Friction Coeff Mu: 0.6
A-Phi Parameter: 0.58 +/- 0.2

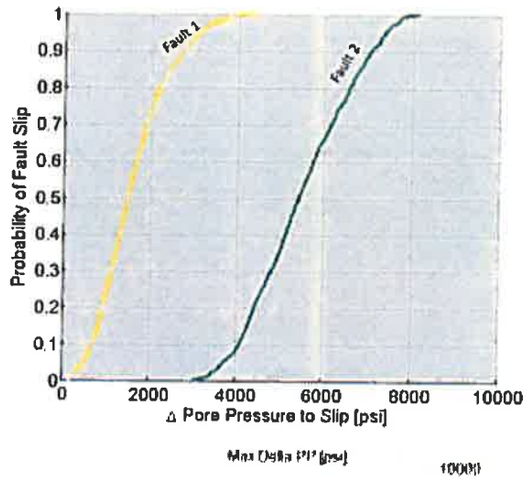
Stress Regime Inputs

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

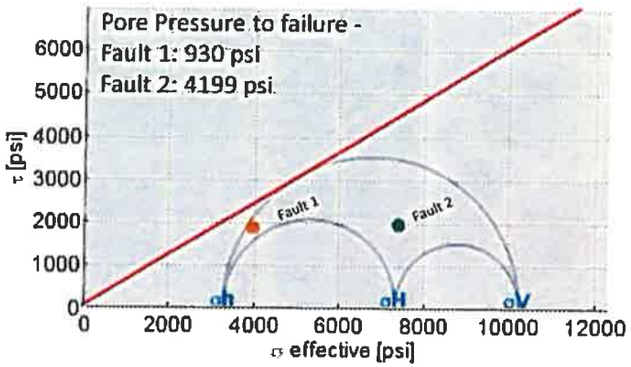
Maximum Injection Rate: 40,000 bbl/day

Shmax: N00°E





Shmax: N21°E



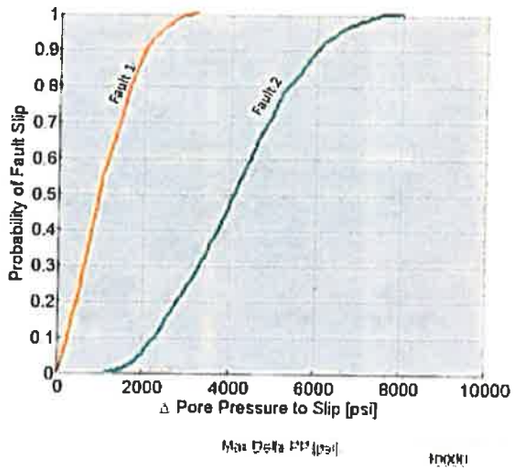


Figure 2

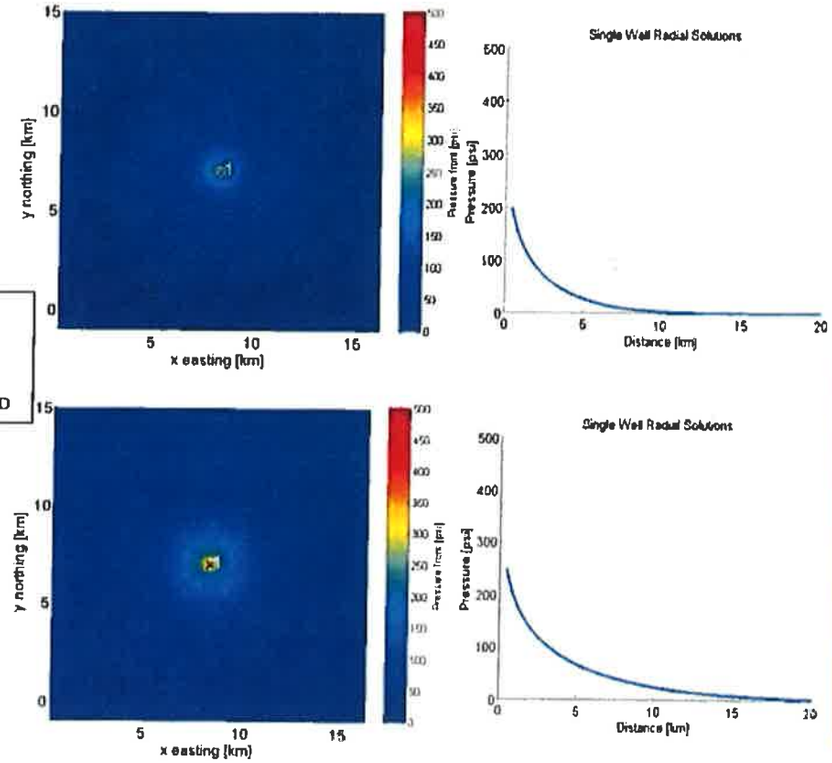
BEU Seaweed 21 Federal SWD 1 – Pore Pressure Analysis

2025 Snapshot

2040 Snapshot

Uncertainty Ranges

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



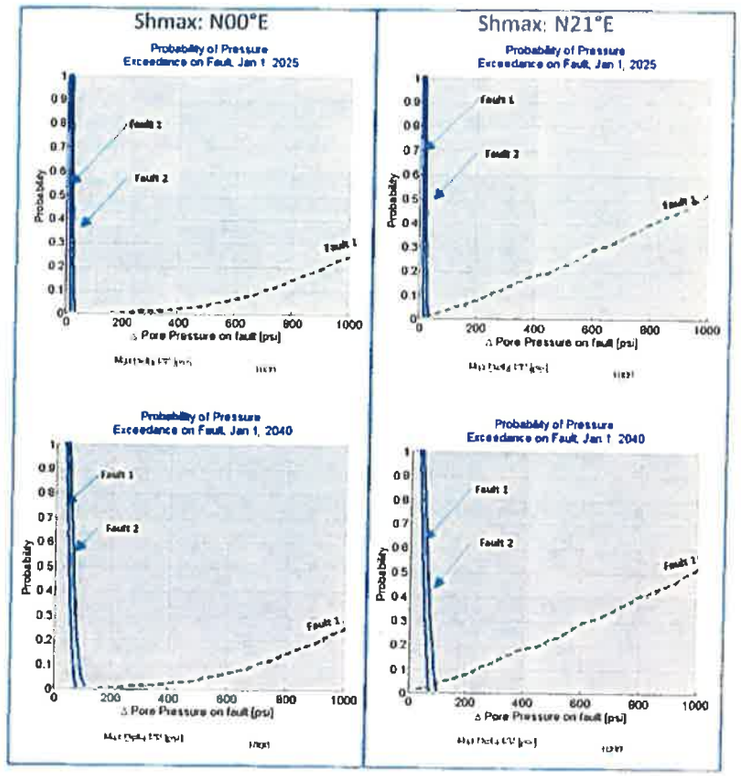
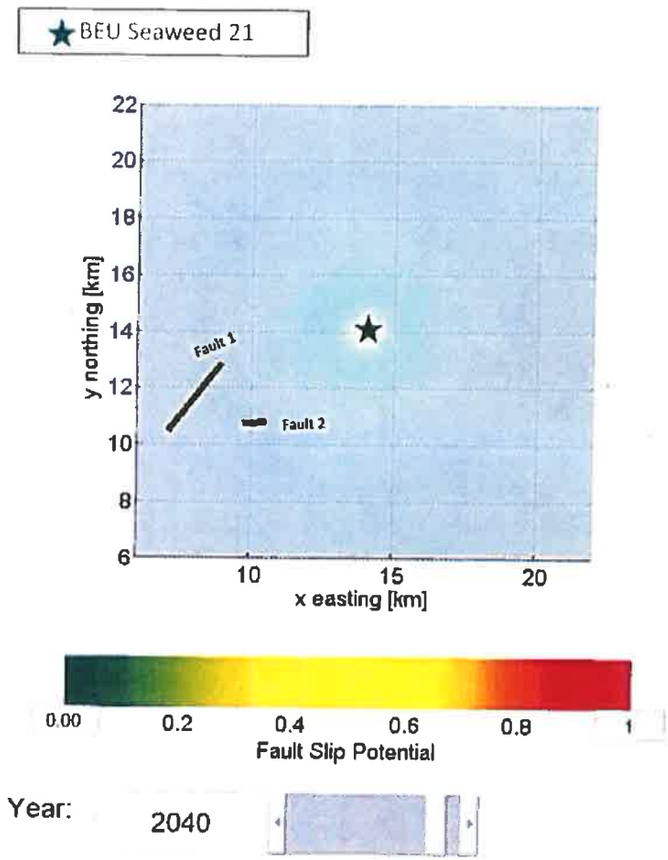
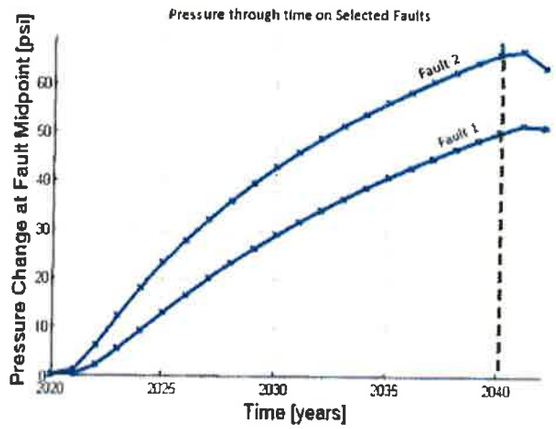


Figure 3

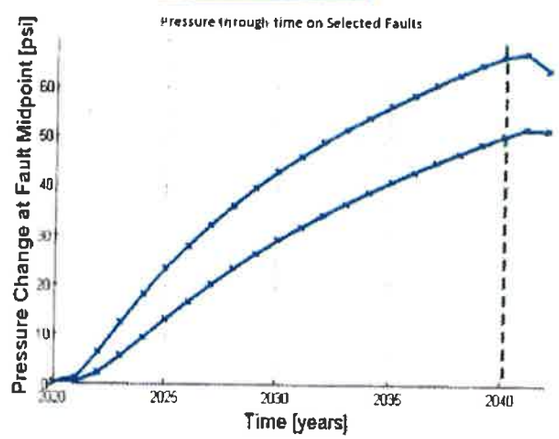
BEU Seaweed 21 Federal SWD 1 – Geomechanical / Pore Pressure Integration

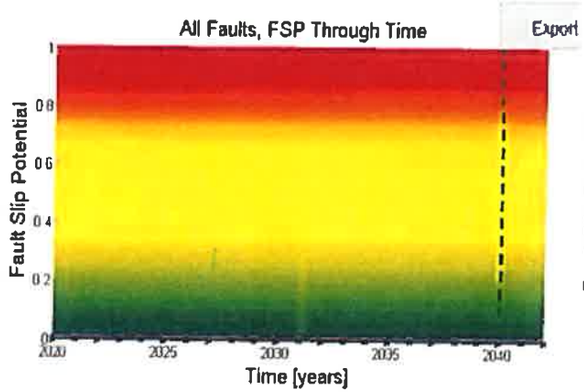


Shmax: N00°E



Shmax: N21°E





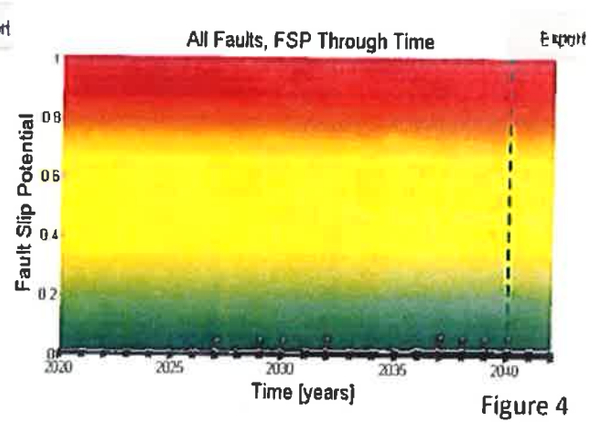
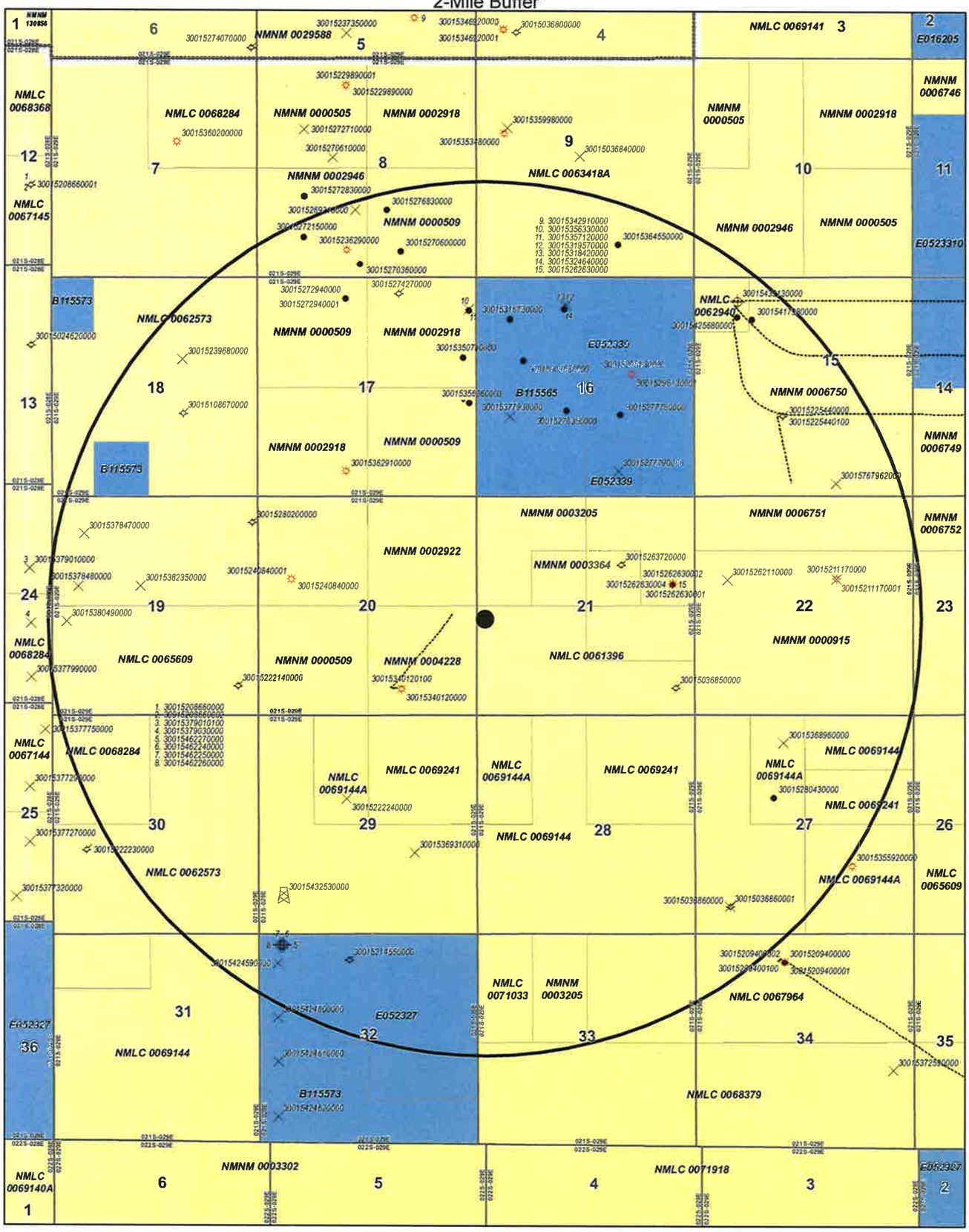


Figure 4

Big Eddy Unit 21 Seaweed Fed SWD #1

Eddy County, New Mexico

2-Mile Buffer



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

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

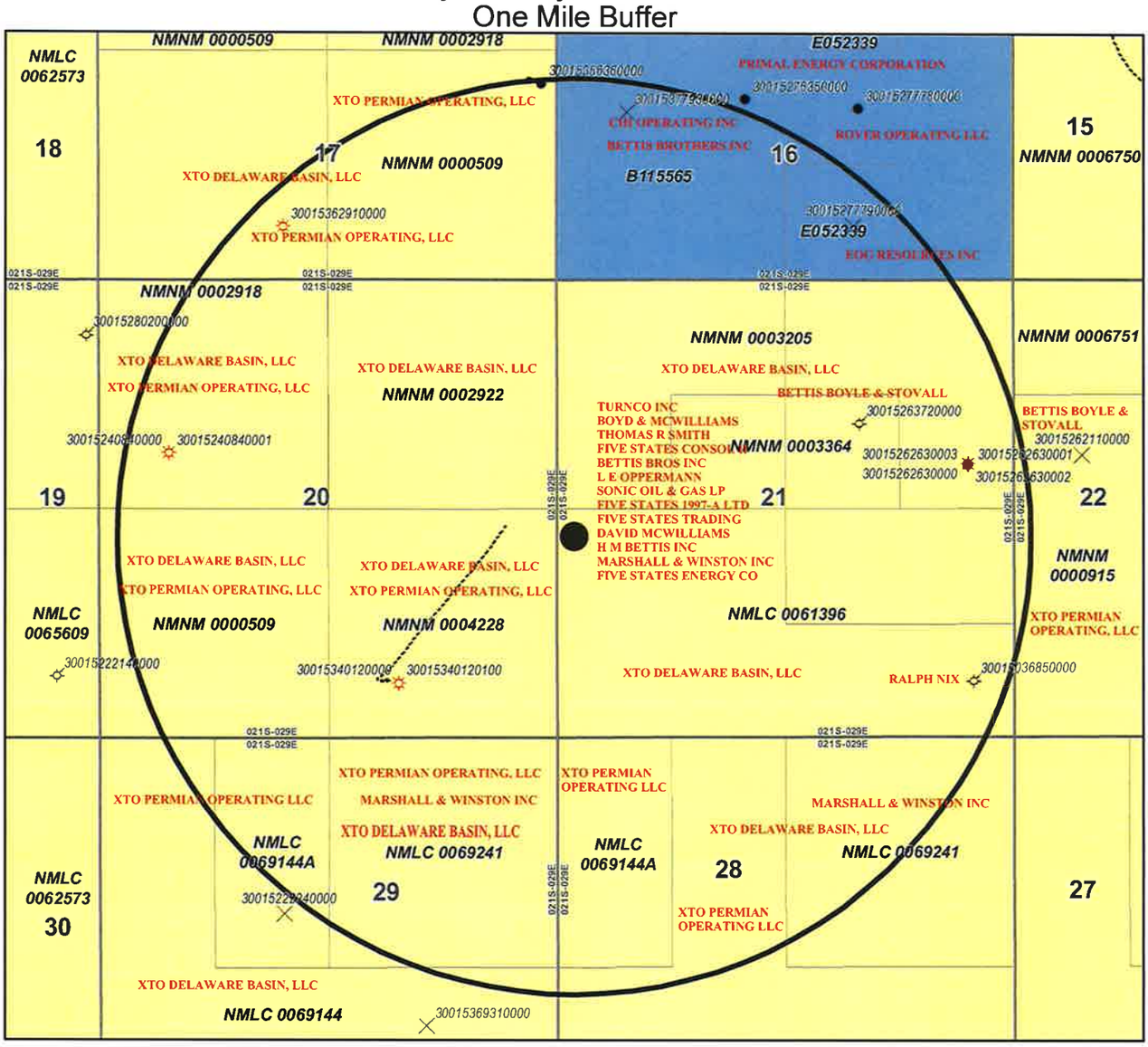
BASS ENTRPRS PROD CO	NIX RALPH
BASS PERRY R	PAN AMERICAN
BEPCO LP	PRIMAL ENERGY CORP
BETTIS BOYLE&STOVALL	ROVER OPER CO LLC
BOPCO LP	XTO PERMIAN OPER LLC
CHI OPERATING INC	

Exhibit A

Big Eddy Unit 21 Seaweed Fed SWD #1

Eddy County, New Mexico

One Mile Buffer



0 ¼ ½ Mile

0 ¼ ½ 1 Kilometer

wellbore
State Lease
Federal Lease
one mile buffer

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
BETTIS BOYLE&STOVALL
BOPCO LP
CHI OPERATING INC
NIX RALPH
XTO PERMIAN OPER LLC

Exhibit B

API	Wellname	Sec	Twn	Rng	Unit	OGRID	Pool_ID	Well Status
30-015-24084	BIG EDDY UNIT #094	20	21S	29E	E	XTO PERMIAN OPERATING LLC.	[77520] GOLDEN LANE, ATOKA (GAS); [77560] GOLDEN LANE, MORROW (GAS); [83200] QUAHADA RIDGE, ATOKA (GAS)	Active
30-015-26263	BIG EDDY UNIT #114	21	21S	29E	H	XTO PERMIAN OPERATING LLC.	[28340] GOLDEN LANE, DELAWARE, SOUTH; [77560] GOLDEN LANE, MORROW (GAS); [83200] QUAHADA RIDGE, ATOKA (GAS)	Active
30-015-27635	BIG EDDY UNIT #127	16	21S	29E	K	PRIMAL ENERGY CORPORATION	[28340] GOLDEN LANE, DELAWARE, SOUTH	Active
30-015-34012	BIG EDDY UNIT #153	20	21S	29E	O	XTO PERMIAN OPERATING LLC.	[77560] GOLDEN LANE, MORROW (GAS); [83200] QUAHADA RIDGE, ATOKA (GAS)	Active
30-015-36291	BIG EDDY UNIT #191	17	21S	29E	N	XTO PERMIAN OPERATING LLC.	[77560] GOLDEN LANE, MORROW (GAS)	Active
30-015-27779	BIG EDDY UNIT #133	16	21S	29E	O	EOG RESOURCES INC	No Data	Cancelled APD
30-015-37793	GOLDEN LANE 16 STATE #001E	16	21S	29E	L	CHI OPERATING INC	[28340] GOLDEN LANE, DELAWARE, SOUTH	Cancelled APD
30-015-03685	PRE-ONGARD WELL #001	21	21S	29E	P	PRE-ONGARD WELL OPERATOR	No Data	Plugged (Site Released)
30-015-26372	BIG EDDY FEDERAL UNIT #115	21	21S	29E	G	BETTIS, BOYLE & STOVAL	WILDCAT	Plugged (Site Released)

Exhibit C

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°	0.05	-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.

Exhibit D

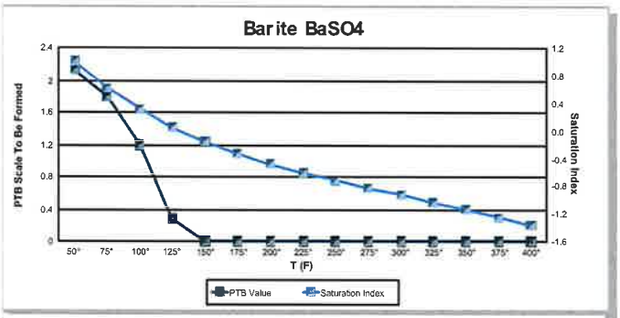
NALCO Champion
An Ecolab Company

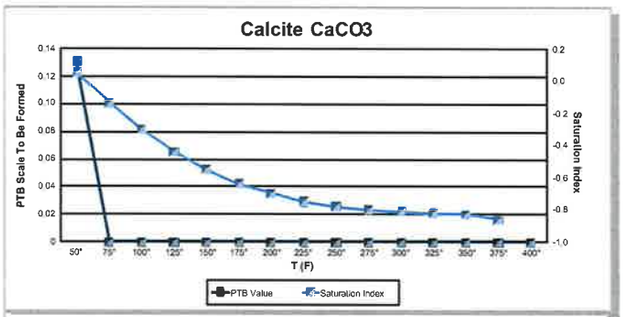
Complete Water Analysis Report

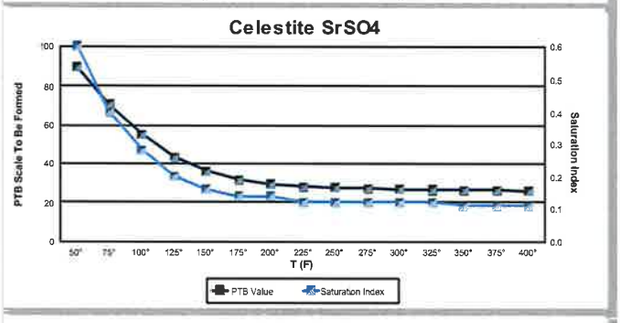
Customer: **XTO ENERGY INC**
Region: **Carlsbad, NM**
Location: **James Ranch Unit 29 Federal Lease**
System: **Production System**

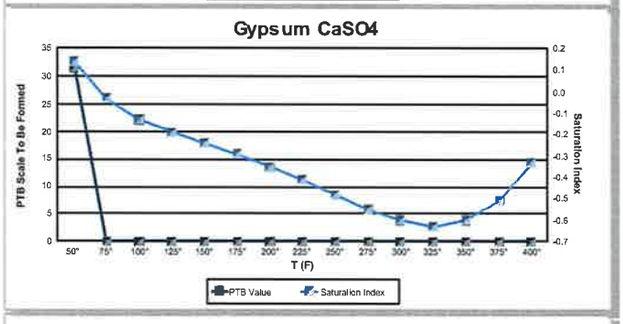
Equipment: **SWD**
Sample Point: **Inlet**
Sample ID: **AL07042**
Acct Rep Email: **Anthony.Baeza@ecolab.com**

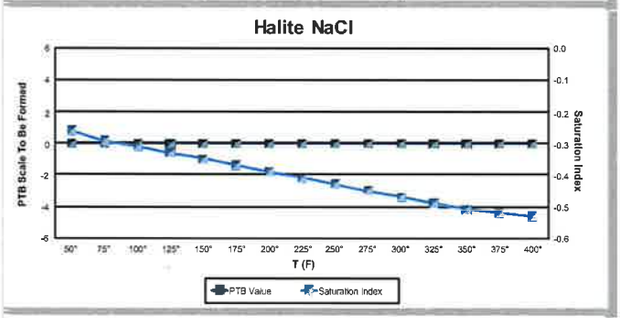
Collection Date: **06/12/2018**
Receive Date: **06/21/2018**
Report Date: **06/25/2018**
Location Code: **373826**

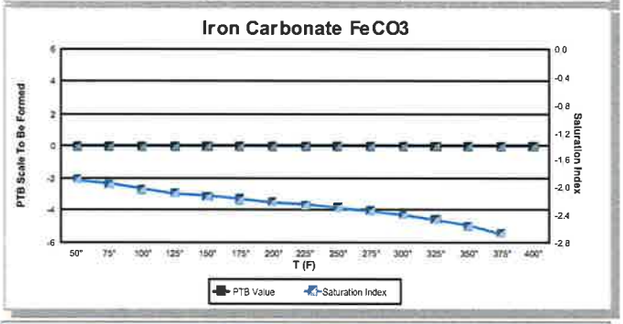


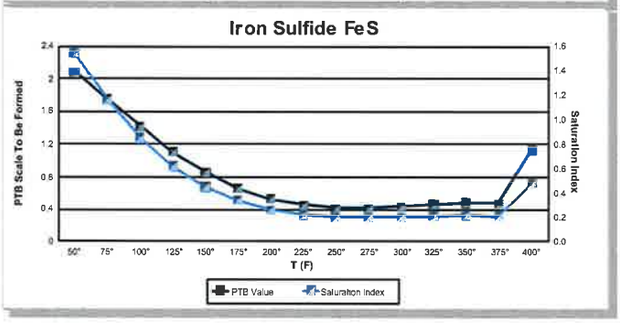












Comments

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.

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found

PLSS Search:

Section(s): 28-29 **Township:** 21S **Range:** 29E

Exhibit E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 16-17 **Township:** 21S **Range:** 29E

Exhibit E

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 20-22 **Township:** 21S **Range:** 29E

Exhibit E

October 1, 2019

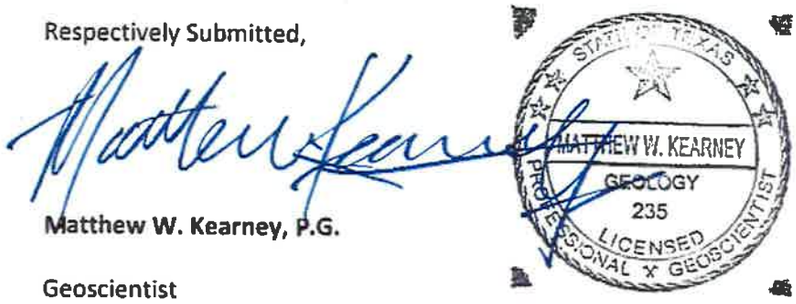
New Mexico, Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: **Geology Statement per Question XII on the Application for Authorization to Inject Form C-108 for**
XTO Energy Inc., an ExxonMobil subsidiary
BEU 21 Seaweed Federal SWD 1,
Section 21, Township 21 South, Range 29 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 2,300 feet from the south line and 200 feet from the west line of Section 21, Township 21 South, Range 29 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

Exhibit F

CARLSBAD
CURRENT-ARGUS

AFFIDAVIT OF PUBLICATION

Ad No.
0001296840

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:

09/19/19

Kathleen Allen
Legal Clerk

Subscribed and sworn before me this
19th of September 2019.

Nancy Heyrman
State of WI, County of Brown
NOTARY PUBLIC

5.15.23
My Commission Expires

Ad#:0001296840
P O : 1296840
# of Affidavits :0.00

NANCY HEYRMAN
Notary Public
State of Wisconsin

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 21 Seaweed Federal SWD #1 (Siluro-Devonian and Fusselman Formations). The maximum injection pressure will be 2798 psi and the maximum rate will be 40,000 bbls. produced water per day. The proposed disposal well is located approximately 13.9 miles northeast of Carlsbad, New Mexico in Section 21, T21S, R29E, 2300' FSL & 200' FWL, Eddy County, New Mexico. The produced water will be disposed at a subsurface depth of 13,990-15,134'.

Any questions concerning this application should be directed to Cheryl Rowell, Regulatory Coordinator, XTO Energy, Inc, 6401 Holiday Hill Rd, Bldg 5, Midland, Texas 79707, (432) 571-8205.

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.

Sept. 19, 2019

Exhibit G

Certified Mailing List of Parties Noticed
XTO Permian Operating LLC
Big Eddy Unit 21 Seaweed Fed SWD #1
Eddy County, NM

Surface Owner:	**Certified mailing #7019 0700 0001 0025 6864** BUREAU OF LAND MANAGEMENT 620 E. GREENE ST CARLSBAD, NM 88220-6292	
Grazing Lessee:	**Certified Mailing #7016 2070 0000 2967 9884** WINSTON BALLARD 1819-2 NORTH CANAL CARLSBAD, NM 88220	
Offset Notice:	**Certified Mailing #7019 0700 0001 0025 6871** NEW MEXICO STATE LAND OFFICE 310 OLD SANTA FE TRAIL SANTA FE, NM 87501	**Certified Mailing #7019 0700 0001 0025 6710** BETTIS BOYLE & STOVALL 505 5TH ST GRAHAM, TX 76450
	Certified Mailing #7019 0700 0001 0025 6434 BOYD & MCWILLIAMS ENERGY GROUP 550 W TEXAS #310 MIDLAND, TX 79701	**Certified Mailing #7019 0700 0001 0025 6741** PO BOX 1799 MIDLAND, TX 79702
	Certified Mailing #7019 0700 0001 0025 6758 DAVID MCWILLIAMS 4102 STRATTON MIDLAND, TX 79707	**Certified Mailing #7019 0700 0001 0025 6765** EOG RESOURCES INC PO BOX 2267 MIDLAND, TX 79702
	Certified Mailing #7019 0700 0001 0025 6772 L E OPPERMANN 1505 NEELY MIDLAND, TX 79705	**Certified Mailing #7019 0700 0001 0025 6789** MARSHALL & WINSTON INC PO BOX 50880 MIDLAND, TX 79710-0880
	Certified Mailing #7019 0700 0001 0025 6796 PRIMAL ENERGY CORPORATION 211 HIGHLAND CROSS SUITE 227 HOUSTON, TX 77073	**Certified Mailing #7019 0700 0001 0025 6802** RALPH NIX, A PARTNERSHIP PO BOX 440 ARTESIA, NM 88211-0440
	Certified Mailing #7019 0700 0001 0025 6819 ROVER OPERATING LLC 17304 PRESTON ROAD SUITE 300 DALLAS, TX 75252	**Certified Mailing #7019 0700 0001 0025 6826** SONIC OIL & GAS LP PO BOX 1240 GRAHAM, TX 76450
	Certified Mailing #7019 0700 0001 0025 6833 STANOLIND OIL & GAS LLC 310 W WALL ST, SUITE 1000 MIDLAND, TX 79701	**Certified Mailing #7019 0700 0001 0025 6840** THOMAS R SMITH 1505 S CNTY RD #1130 MIDLAND, TX 79701

Exhibit G

	Certified Mailing #7019 0700 0001 0025 6857 TURNCO INC PO BOX 1240 GRAHAM, TX 76450	**Certified Mailing #7019 0700 0001 0025 6871** WINSTON BALLARD 1819-2 NORTH CANAL CARLSBAD, NM 88220
Multiple companies/individuals with the same address were furnished with one copy of application	**Certified Mailing #7019 0700 0001 0025 6895** FIVE STATES 1997-A LTD FIVE STATES CONSOLIDATED II FIVE STATES ENERGY CO FIVE STATES TRADING 4925 GREENVILLE AVE #1220 DALLAS, TX 75206	**Certified Mailing #7019 0700 0001 0025 6727** BETTIS BROTHERS INC H M BETTIS INC PO BOX 1240 GRAHAM, TX 76450

I, Melanie Collins, do hereby certify the surface owner and offset parties for the well shown were furnished a copy of XTO Permian Operating, LLC's application for salt water disposal, via certified mail on this date.

Signed: Melanie Collins
Melanie Collins
Title: Regulatory Analyst
Date: 10-1-19