Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
04/30/2019		SWD	pMAM1912740251

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: Big Eddy Unit 26 Federal SWD 001 **API:** TBA
Pool: Devonian; SWD **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

04/25/19
Date

432-571-8220
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 XX Disposal _____ Storage
Application qualifies for administrative approval? XX Yes _____ No

II. OPERATOR: BOPCO, LP

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

CONTACT PARTY: Tracie J. Cherry, Regulatory Coordinator 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 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: Tracie J. Cherry TITLE: Regulatory Coordinator

SIGNATURE: Tracie J Cherry DATE: 04/25/19

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 26 Fed SWD**
Well #: **1** **API # TBA**
Section: **26**
Township: **21S**
Range: **29E**
Footage: **2629 FNL & 1989 FWL**

2) Casing Info:

Casing size	Set depth	Sacks cmt	Hole size	TOC	Method
18-5/8", 87.5# J-55 BTC	480'	1015 sx C	24	Surf	Circ
13-3/8" 68# HCL-80 BTC	3173'	280 sx Poz/C 760 sx C	17-1/2"	Surf	Circ
9-5/8" 53.5# HCP-110 BTC	10,860'	Stage 1 2325 sx Poz/H Stage 2 1285 sx Poz/H	12-1/4"	3400	CBL
7" 32# HCP-110 BTC	10,400'-14,370'	585 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 9,900"
4-1/2", 13.65#, P-110 IPC tubing @ 9,900'-14,295'

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, 14,370'-15,437' (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: Cherry Canyon (+/-4184') Brushy Canyon (+/-5796'),
Avalon/Bone Spring (+/-8246'), Atoka (+/-12,033)Wolfcamp (+/-7,197'), Morrow (+/-12,530')
Lower: None

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.

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.
Three (3) wells fall within the one-mile Area of Review. None of the wells penetrates the proposed dispsal zone

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, 2874 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 amouts 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:
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:	**Carbonate (Dolomites and Limestones)**
Geological Name:	**Devonian to Fusselman**
Thickness:	**Est. 1,085'**
Depth:	**Est.14,352'/15,437'**

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 358 feet below the surface in this proposed Big Eddy Unit 26 Federal 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 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, one active water well is located approximately half a mile SE of the proposed location. XTO is currently attempting to contact the owner to obtain a water sample. Results of the analysis will be forwarded as soon as available.

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.
(See attached affidavit)

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
	BIG EDDY UNIT 26 FEDERAL SWD	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
260737	XTO PERMIAN OPERATION, LLC.	3,407'

[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
F	26	21 S	29 E		2,629	NORTH	1,989	WEST	EDDY

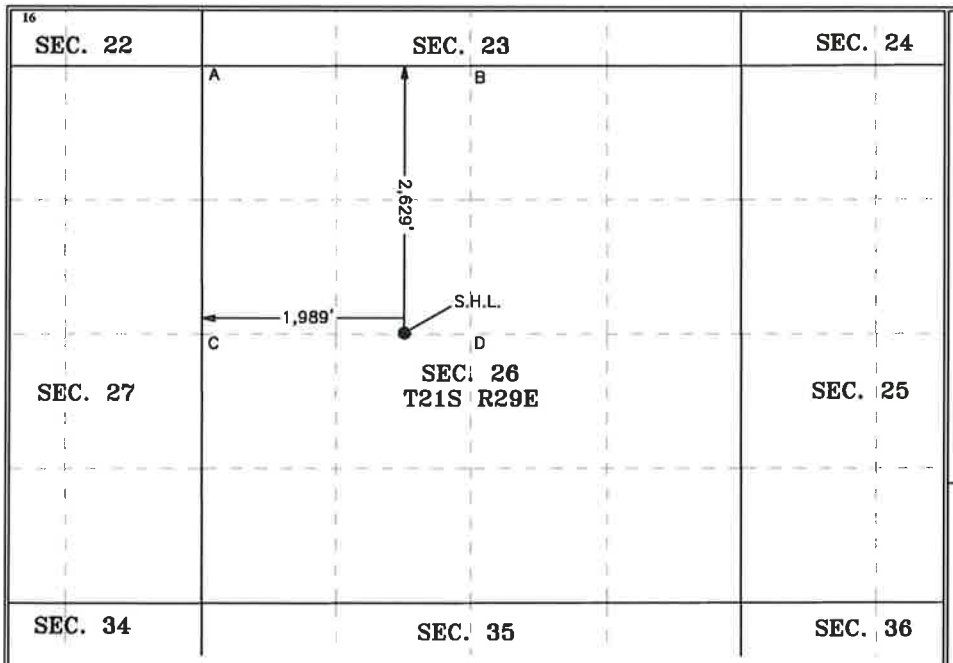
[11] Bottom Hole Location If Different From Surface

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]



GEODETIC COORDINATES
NAD 27 NME
SURFACE LOCATION
Y= 527,729.0
X= 616,105.4
LAT.= 32.450277°N
LONG.= 103.956944°W

CORNER COORDINATES TABLE
NAD 27 (NME)
A – Y= 530,353.4 N, X= 614,108.6 E
B – Y= 530,359.9 N, X= 616,747.7 E
C – Y= 527,712.0 N, X= 614,116.4 E
D – Y= 527,717.3 N, X= 616,756.5 E

GEODETIC COORDINATES
NAD 83 NME
SURFACE LOCATION
Y= 527,789.9
X= 657,286.2
LAT.= 32.450398°N
LONG.= 103.957443°W

CORNER COORDINATES TABLE
NAD 83 (NME)
A – Y= 530,414.3 N, X= 655,289.4 E
B – Y= 530,420.8 N, X= 657,928.5 E
C – Y= 527,772.9 N, X= 655,297.2 E
D – Y= 527,778.2 N, X= 657,937.3 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.

4-12-2019
Date of Survey

Signatue and Seal of Professional Surveyor:

MARK DILLON HARP NEW MEXICO 23786 PROFESSIONAL SURVEYOR

MARK DILLON HARP 23786
Certificate Number AW 2017091540

P:\PROJECTS\2017\2017091540-XTO-BIG_EDDY_UNIT_26_FEDERAL_1_SWD-EDDY\DWG\2017091540-XTO-BIG_EDDY_UNIT_26_FEDERAL_1_SWD_C-102.dwg 4/12/2019 11:00:13 AM Adobe PDF

Big Eddy Unit 26 Fed SWD #1

Proposed SWD Schematic (April 24, 2019)

County: Eddy
SHL: 2629' FNL, 1989' FWL
Sec 26, T 21S, R 29E

BHL: 2629' FNL, 1989' FWL
Sec 26, T 21S, R 29E

AFE # N/A
XTO ID # N/A

API # N/A
Elevation GL 3407', KB 3437' (30' AGL)
Rig: TBD (RKB 30')

TVD	Formation	Casing & Cement	Wellhead	Hole Size	General Notes
			(Tech Data Sheet)	24"	
358'	Rustler	*Tail (100% OH excess)* 1015 sx 14.8ppg Class C Top of Tail @ 0'			
		18-5/8" 87.5# J-55 BTC	**480' MD**		
590'	Top Salt	*Lead (150% OH excess)* 2080 sx 12.8ppg Poz/C Top of Lead @ 0		17-1/2"	
		Tail (100% OH excess) 760 sx 14.8ppg Class C Top of Tail @ 2500'			
3,011'	Base Salt				
		13-3/8" 68# HCL-80 BTC	**3173' MD**		
3,334'	Delaware	*Stg 2 Lead (200% OH excess)* 955 sx 11.5ppg Poz/H Top of Lead @ 0'		12-1/4"	
		Stg 2 Tail (75% OH excess) 330 sx 14.8ppg Poz/H Top of Tail @ 2500'			
		DV tool @ 3300'		5-1/2", 17#, P-110 IPC tbg to 9900'	
7,063'	Bone Spring	*Stg 1 Lead (100% OH excess)* 1770 sx 11.5ppg Poz/H Top of Lead @ 3300'	**10400' MD**	Crossover @ 9900'	
10,344'	Wolfcamp	*Stg 1 Tail (100% OH excess)* 555 sx 14.8ppg Poz/H Top of Tail @ 9860'			
10,714'	Wolfcamp Carbonate				
		9-5/8" 53.5# P-110 BTC	**10860' MD**		
				8-1/2"	
		Tail (40% OH excess) 585 sx 14.5ppg Poz/H Top of Tail @ 10400'			
11,806'	Strawn			4-1/2", 13.65#, P-110 IPC tbg 9900' to 14,295'	
12,033'	Atoka				
12,530'	Morrow				
13,767'	Mississippian Lm			Baker Series F Permanent Pkr at 14,295'	
14,287'	Woodford				
14,352'	Devonian				
		7" 32# P-110 BTC	**14370' MD**		
				6"	
15,437'	TVD at BHL	**Open hole completion**			
15,457'	Montoya		**15,437' MD** **15,437' TVD**		

Approvals

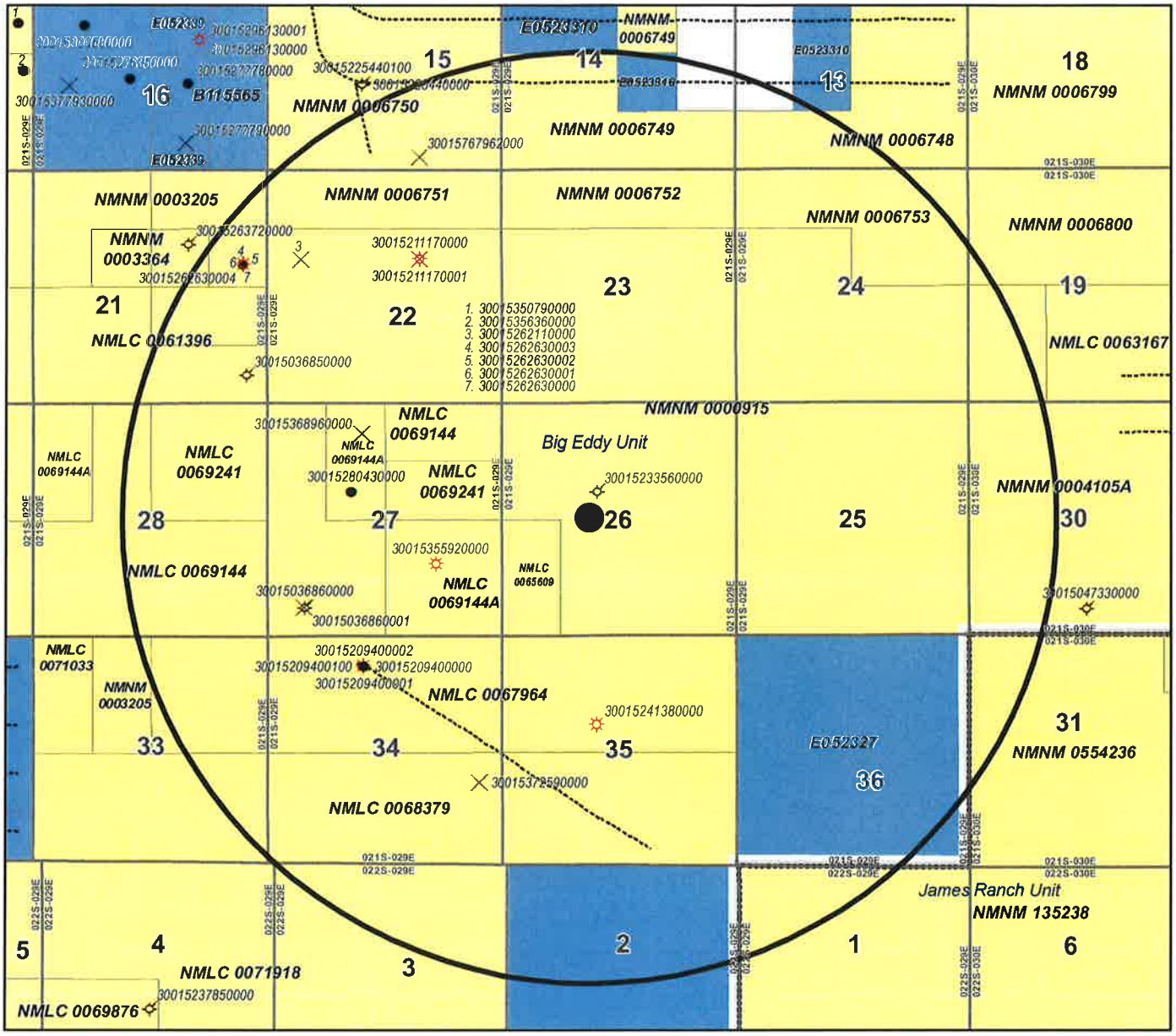
Prepared by: _____

Peer Reviewed by: _____
Date

Reviewed by: _____

Approved by: _____

Big Eddy Unit 26 Federal SWD 1
Eddy County, New Mexico
Two-Mile Radius



0 ½ 1 Mile

0 ½ 1 2 Kilometer

wellbore
State Lease
Federal Lease
two mile buffer
BLM Active Unit - James Ranch

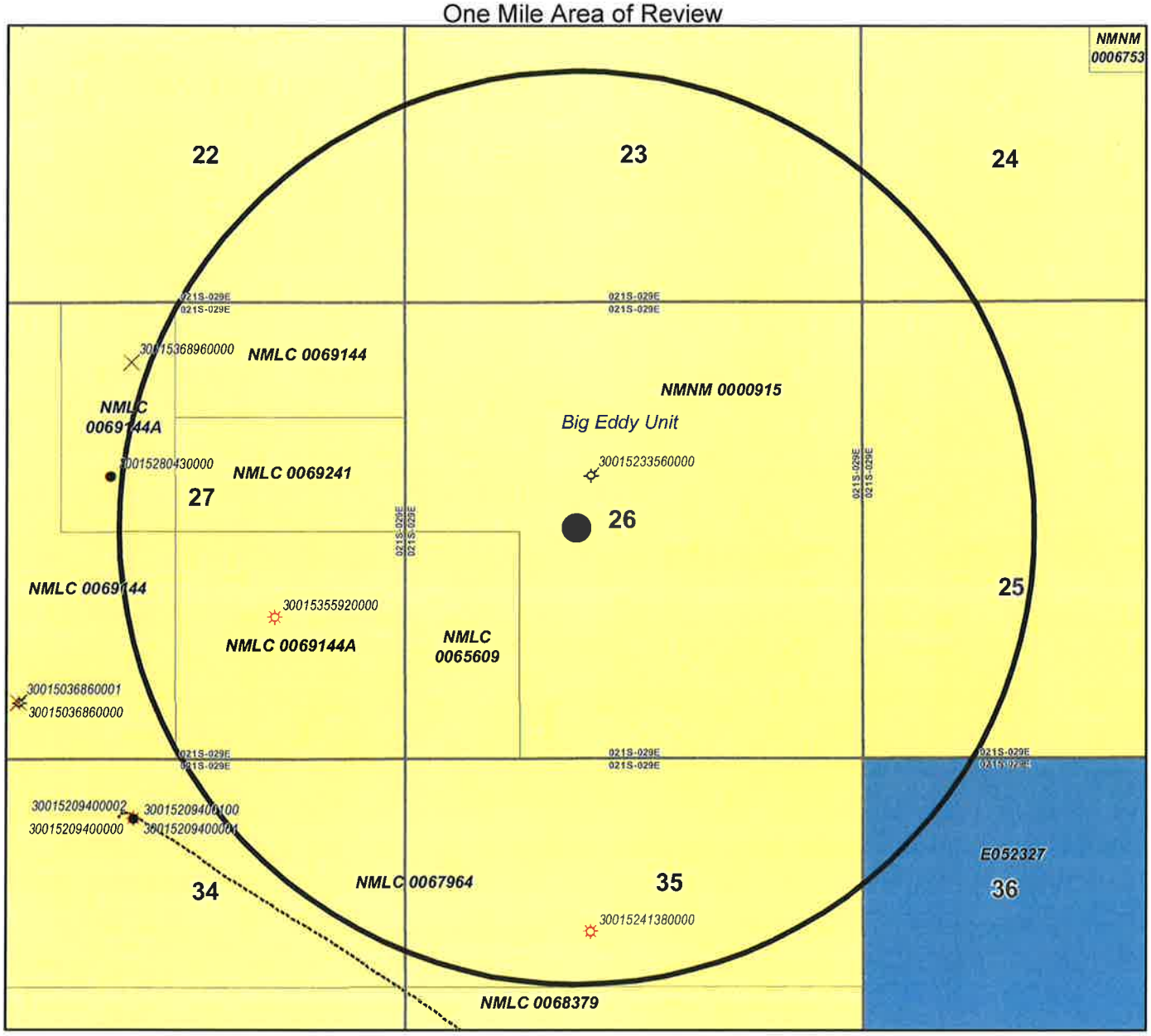
Well Status Name

- 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
BASS PERRY R
BETTIS BOYLE & STOVALL
BOPCO LP
CHI OPERATING INC
NIX RALPH

Big Eddy Unit 26 Federal SWD 1
Eddy County, New Mexico
One Mile Area of Review



0 ¼ ½ Mile

0 ¼ ½ 1 Kilometer

wellbore
State Lease
Federal Lease
one mile buffer
BLM Active Unit - James Ranch

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 PERRY R
BOPCO LP

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°	0.26	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	0.48
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.

NALCO Champion
An Ecolab Company

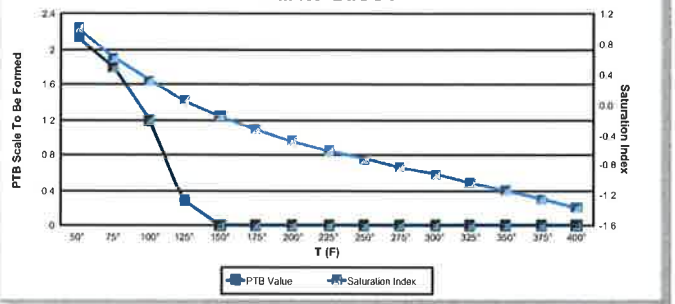
Complete Water Analysis Report

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

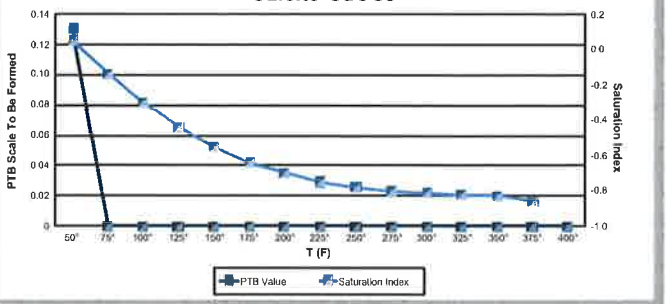
Equipment: **SWD**
Sample Point: **Inlet**
Sample ID: **AL07042**
Acct Rep Email: **Anthony.Baeza@ecolab.com**

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

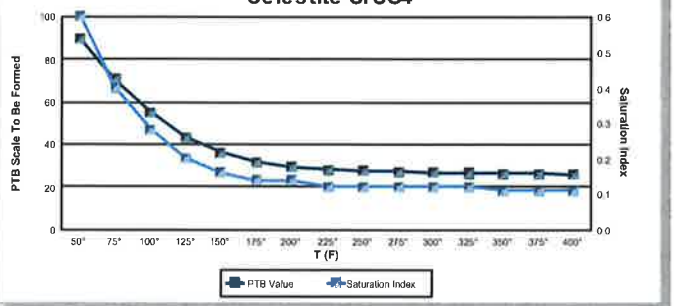
Barite BaSO4



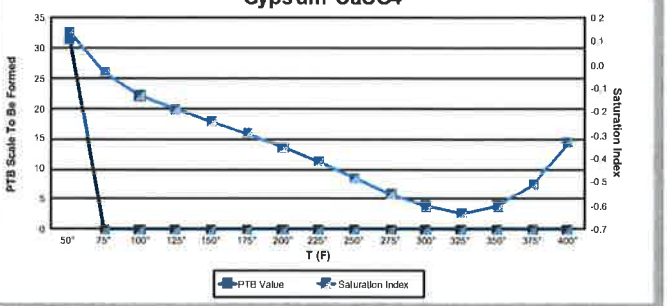
Calcite CaCO3



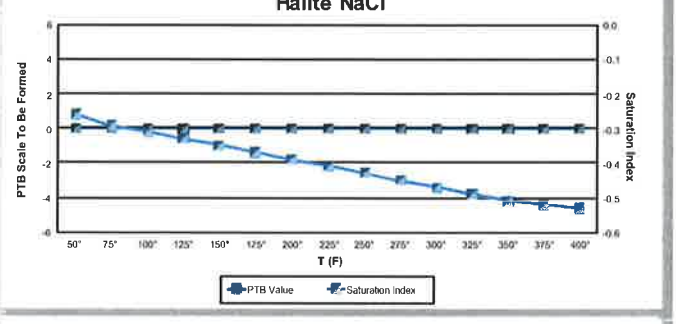
Celestite SrSO4



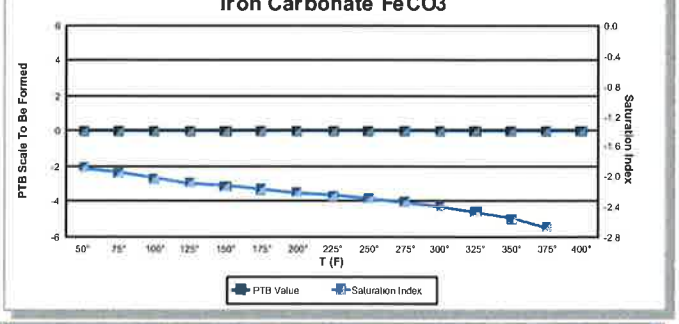
Gypsum CaSO4



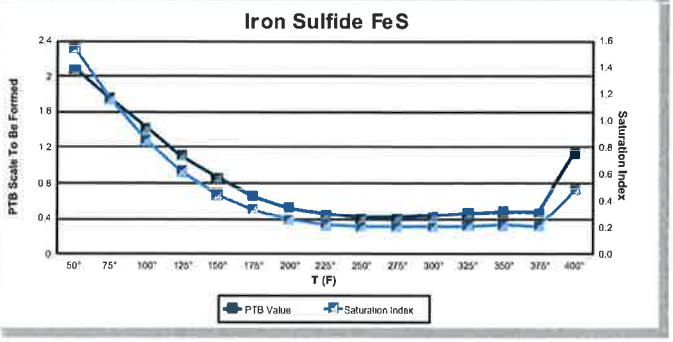
Halite NaCl



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.

April 16, 2019

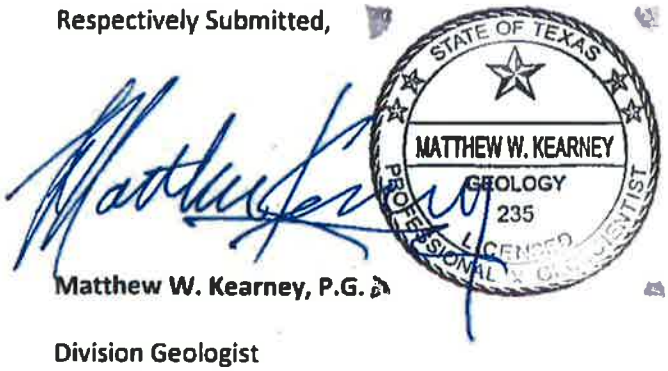
New Mexico, Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

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 26 Fed SWD #1,
Section 26, 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 2,629 feet from north line and 1,989 feet from west line of Section 26, 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 underground sources of drinking water.

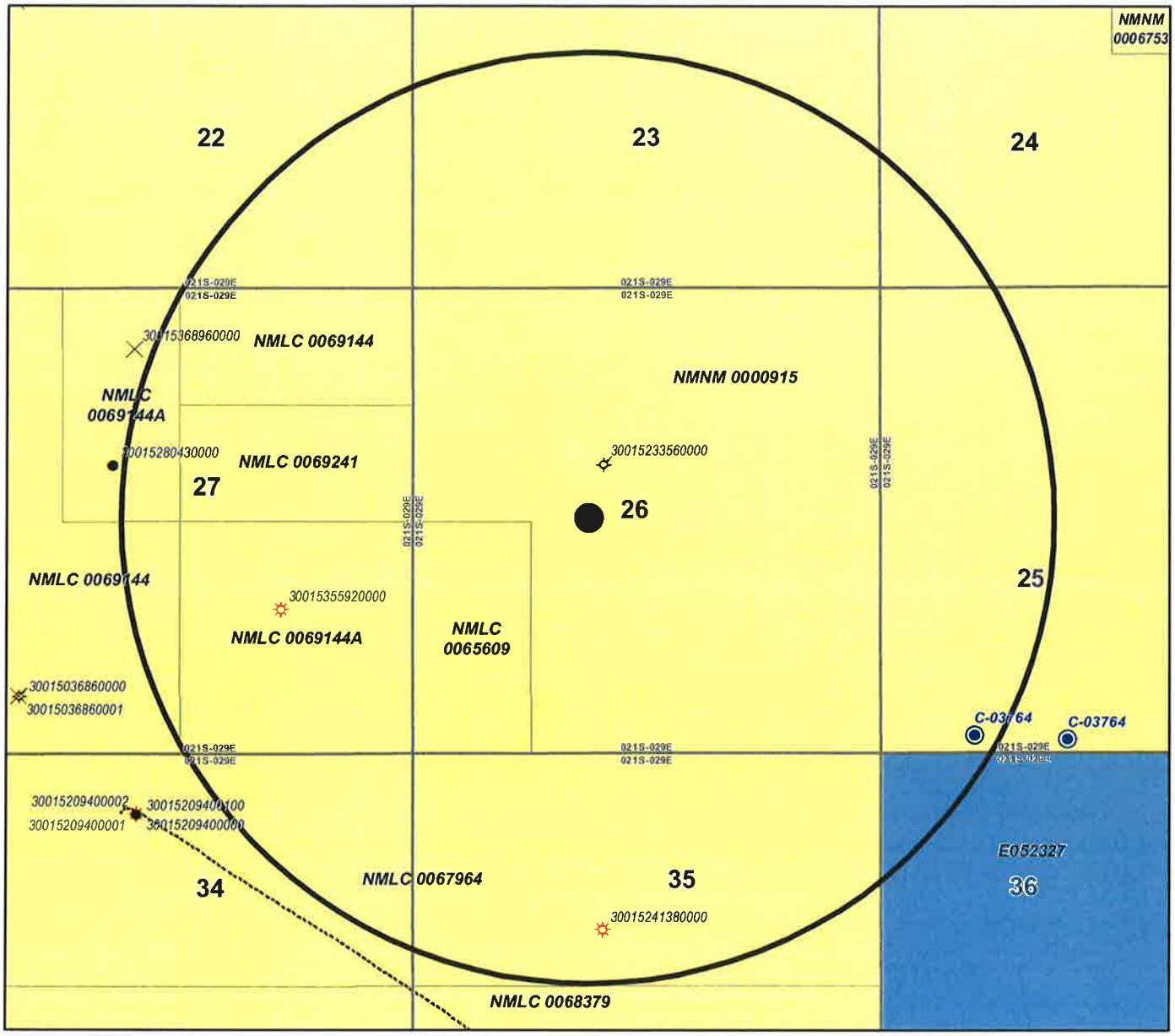
Respectively Submitted,



Matthew W. Kearney, P.G.

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

Big Eddy Unit 26 Federal 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

New Mexico Office of the State Engineer
Water Right Summary

get image list

WR File Number: C 03764 **Subbasin:** CUB **Cross Reference:** -

Primary Purpose: EXP EXPLORATION

Primary Status: PMT PERMIT

Total Acres: **Subfile:** - **Header:** -

Total Diversion: 0 **Cause/Case:** -

Agent: ROCKHOUSE RANCH INC

Contact: M STAPLETON LLC

Documents on File

	Trn #	Doc	File/Act	Status 1	Status 2	Transaction Desc.	From/ To	Acres	Diversion	Consumptive
get images	551239	EXPL	2014-07-29	PMT	LOG	C 03764 POD1-2	T	0	0	

Current Points of Diversion

(NAD83 UTM in meters)

POD Number	Well Tag	Source	Q 64	Q16	Q4	Sec	Tws	Rng	X	Y	Other Location Desc
C 03764 POD1		Shallow	4	3	3	25	21S	29E	599329	3590096	WATTS WELL #1
C 03764 POD2			4	4	3	25	21S	29E	599651	3590087	WATT WELL #2

4/15/19 3:48 PM WATER RIGHT SUMMARY

CARLSBAD
CURRENT-ARGUS

AFFIDAVIT OF PUBLICATION

Ad No.
0001284267

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:

04/25/19

Legal Clerk

Subscribed and sworn before me this
25th of April 2019.

State of WI, County of Brown
NOTARY PUBLIC

9-19-21
My Commission Expires

VICKY FELTY
NOTARY
PUBLIC
STATE OF WISCONSIN

Ad#:0001284267
P O : 1284267
# of Affidavits :0.00

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 **Big Eddy Unit 26 Federal SWD #1** (Siluro-Devonian and Fusselman Formations). The maximum injection pressure will be 2,874 psi and the maximum rate will be 40,000 bbls. produced water per day. The proposed disposal well is located approximately 16 miles East of Carlsbad, New Mexico in Section 26, T21S, R29E, 2629' FNL & 1989' FWL, Eddy County, New Mexico. The produced water will be disposed at a subsurface depth of 14,307'-15, 437'.

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: April 25, 2019 #1284267

CERTIFIED MAILING LIST
BOPCO, LP
Big Eddy Unit 26 Federal SWD 001

Certified #7018 1130 0001 5531 3913
Bureau of Land Management
620 E. Greene Street
Carlsbad, NM 88220-6292

Certified #7018 1130 0001 5531 3920
Travelstead Ranch
425 N. Canal St
Carlsbad, NM 88220

I, Tracie J Cherry, do hereby certify a copy of BOPCO, LP's application for salt water disposal, was mailed to the parties listed (via certified mail) on this date.

Signed: Tracie J. Cherry

Title: Regulatory Coordinator

Date: 04/25/19

XTO ENERGY

Statements Regarding Seismicity

XTO has performed a seismicity risk assessment associated with the proposed Big Eddy 26 Federal #1 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 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 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. Two of the mapped faults are in Stress Area 3 and two are in Stress Area 4 (Figure 1).

Geomechanical Modeling

A simple screening level geometric / geomechanical assessment of the four 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 for the faults in Stress Area 3 are shown in Figures 2a and 2b. Figures 3a and 3b have the same information for the faults in Stress Area 4.

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 35,000 BWPD beginning in 2019 and continuing at that rate until 2040. Sensitivities were performed by varying several

reservoir parameters. Deterministic models and uncertainty analysis for the faults in Stress Area 3 are shown in Figure 4a 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. Figure 4b has the same information for the faults in Stress Area 4.

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 for faults in Stress Area 3 in shown in Figure 5a and for the faults in Stress Area 4 in Figure 5b. Note the y-axis in the lower right hand colored graphs in Figures 5a and 5b 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

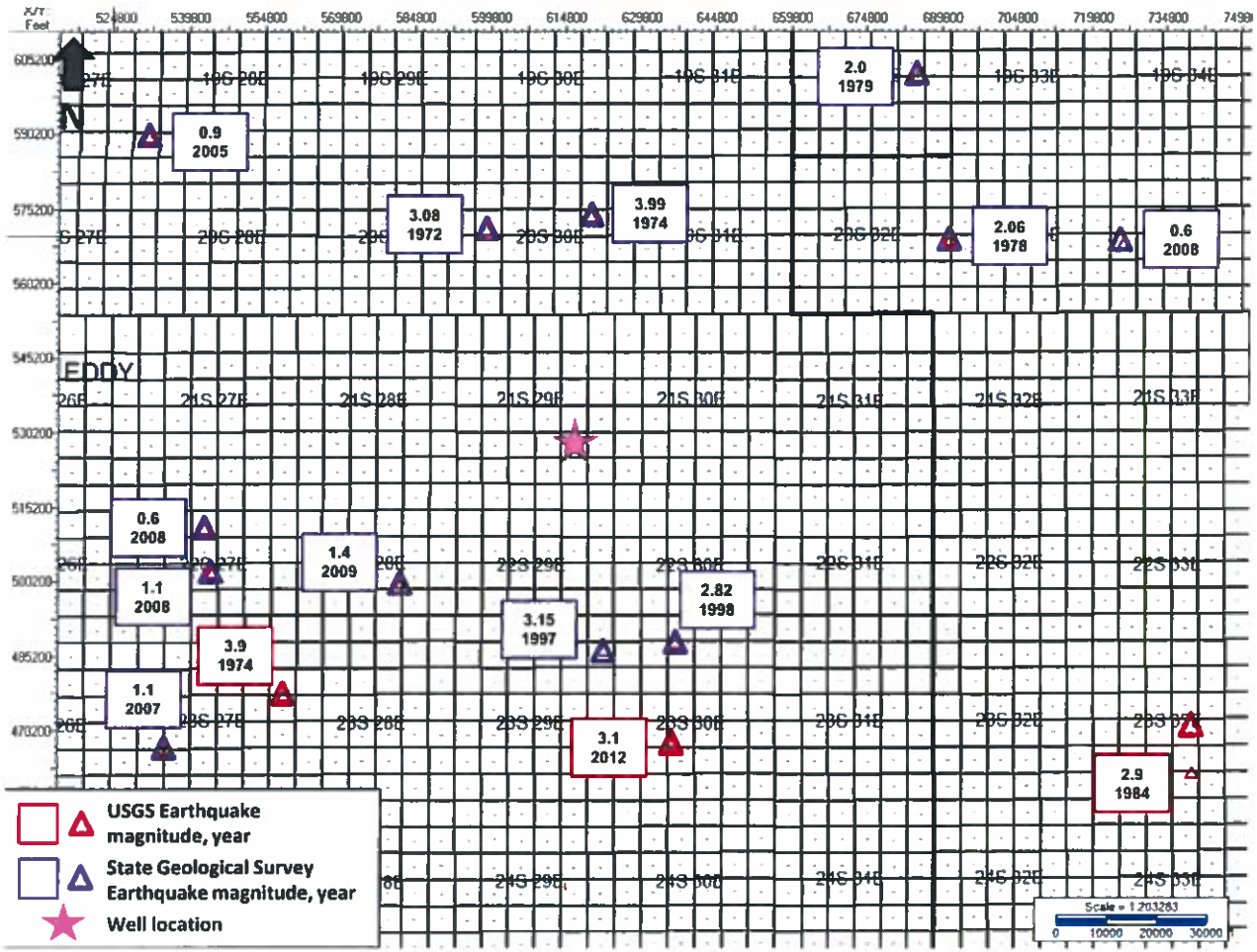
The analysis presented is a screening level approach that encompasses a range of uncertainties in several components that are difficult to individually constrain due to the limited static and dynamic data available for deep disposal wells. Accordingly, the analysis was done by varying key inputs to understand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

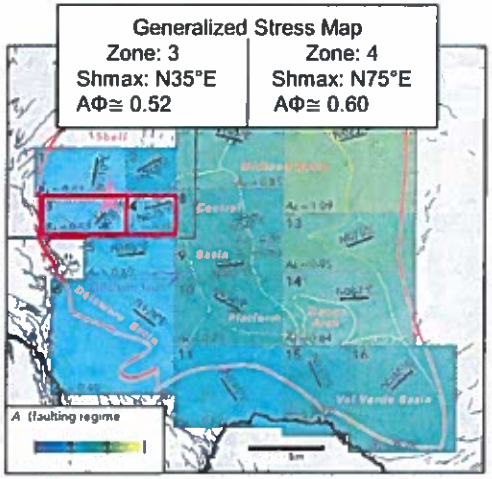
Monitoring Plan

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

Historic Seismicity





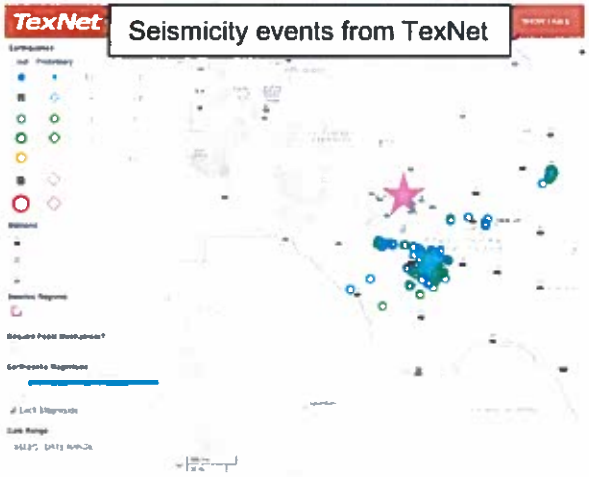


Figure 1

Geomechanical Analysis

Stress Area 3

35° Max Horizontal Stress Direction

Fault Inputs

	Strike [Deg]	Dip [Deg]
Fault 1	34	81
Fault 2	87	87

Stress Regime Inputs

◉ Use A-Phi Model	
Vertical Stress Gradient [psi/ft]	1.1
A-Phi Parameter	0.52
☐ Min Horiz Stress Grad Available [psi/ft]	
Max Hor Stress Direction [deg N CW]	35
Initial Res. Pressure Gradient [psi/ft]	0.47
Reference Depth for Calculations [ft]	14500

Stress Regime: Normal Faulting

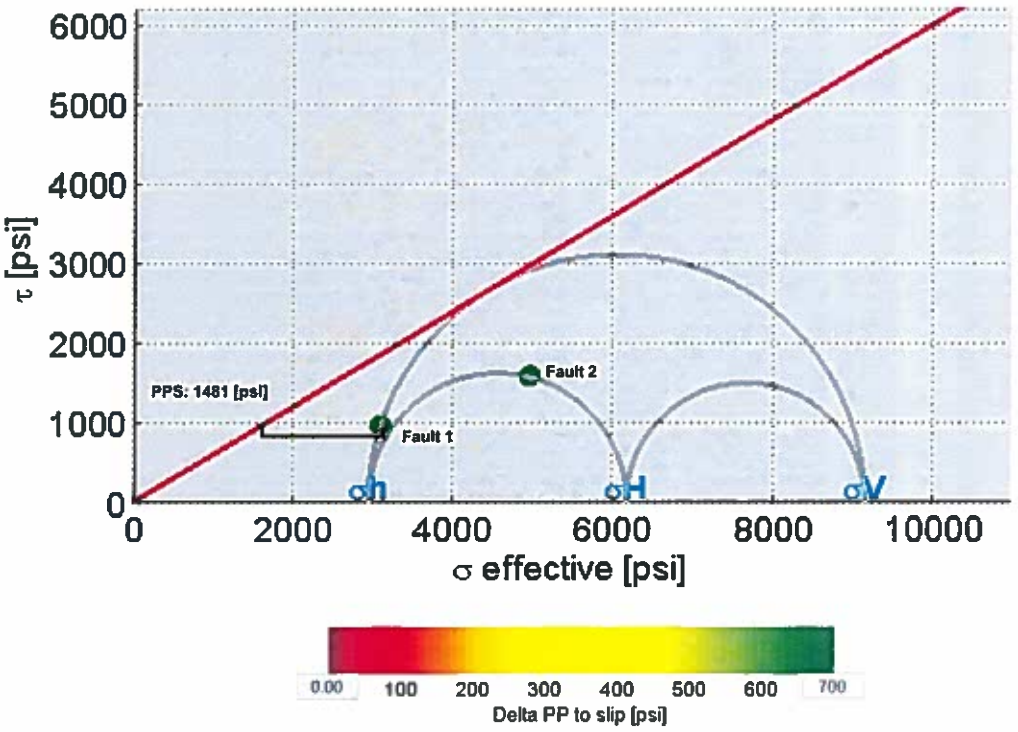


Figure 2a

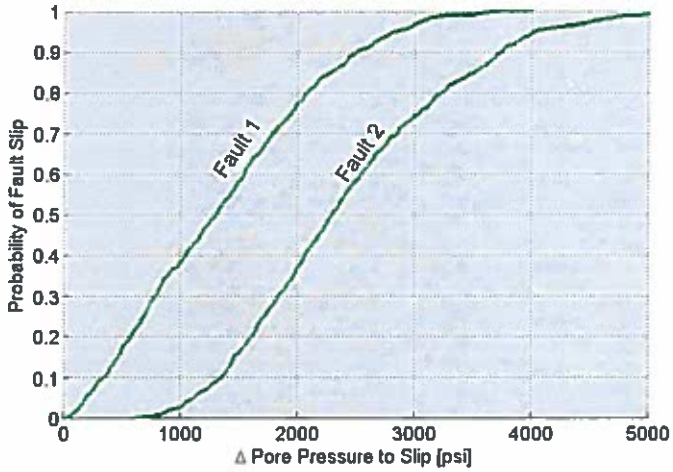
Geomechanical Analysis

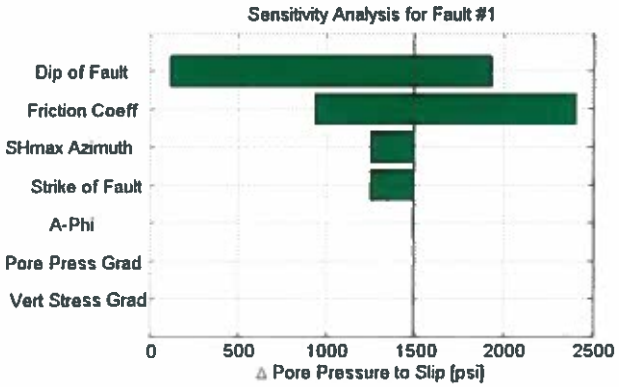
Stress Area 3

35° Max Horizontal Stress Direction

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





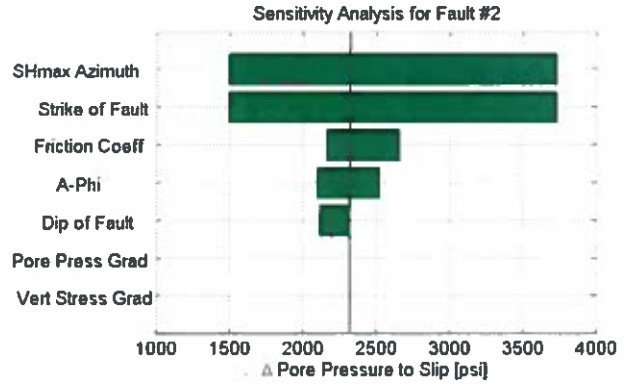


Figure 2b

Geomechanical Analysis

Stress Area 4

75° Max Horizontal Stress Direction

Fault Inputs

	Strike [Deg]	Dip [Deg]
Fault 3	157	77
Fault 4	46	84

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]	14500

Stress Regime: Normal Faulting

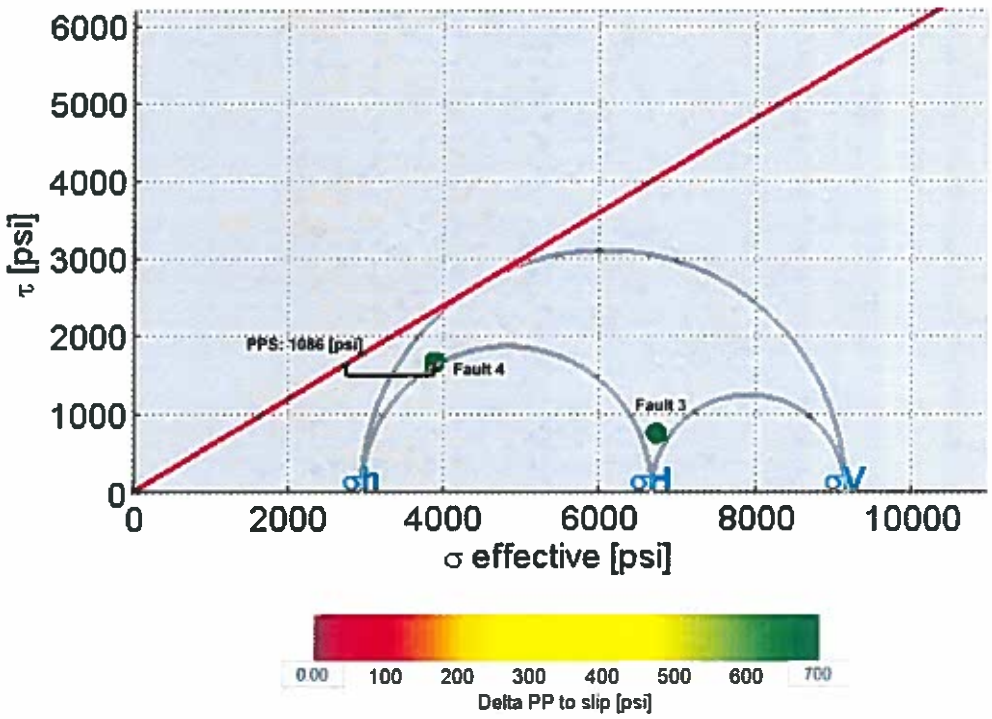


Figure 3a

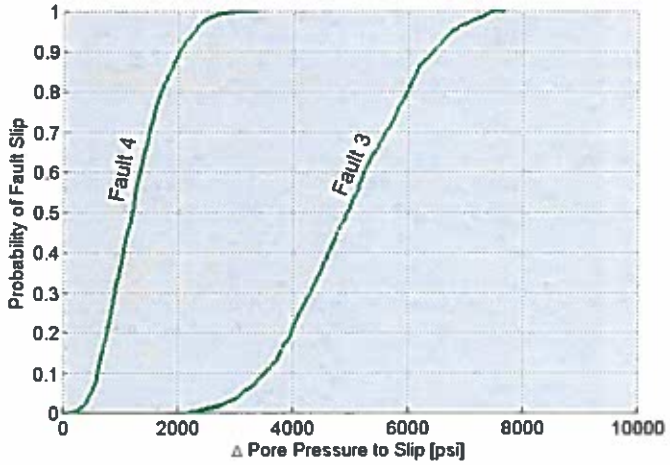
Geomechanical Analysis

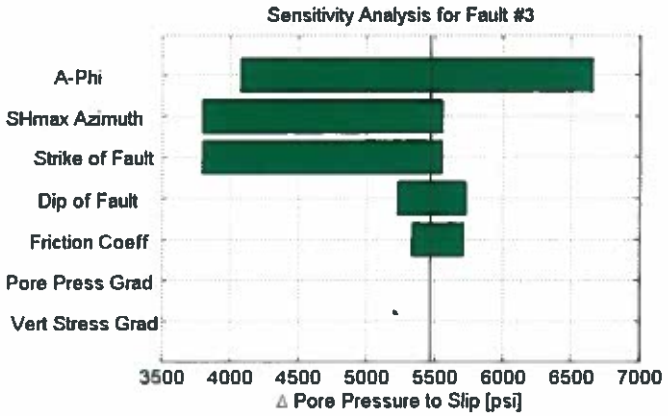
Stress Area 4

75° Max Horizontal Stress Direction

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





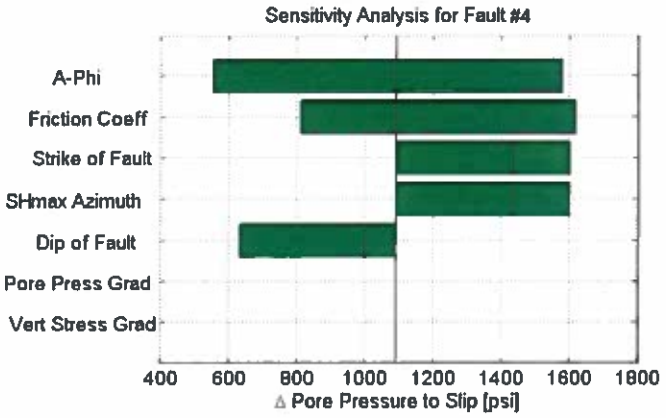


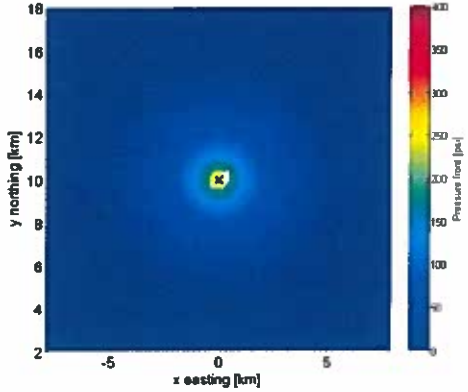
Figure 3b

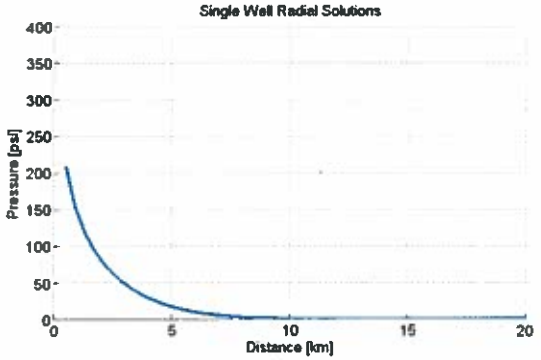
Pore Pressure Analysis

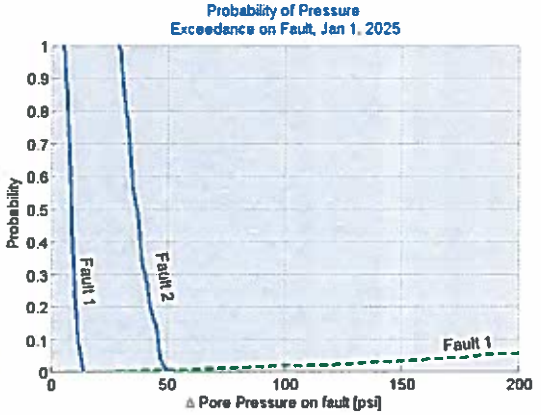
Stress Area 3

35° Max Horizontal Stress Direction

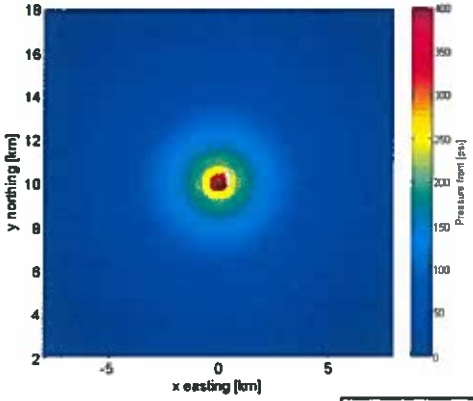
2025 Snapshot

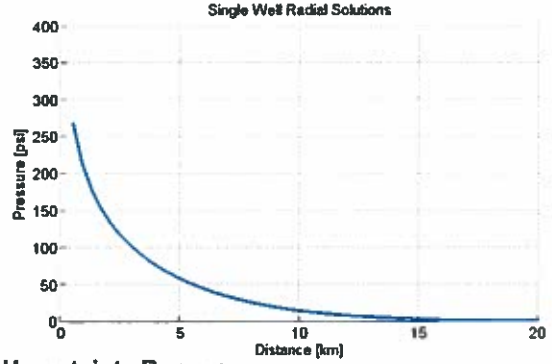


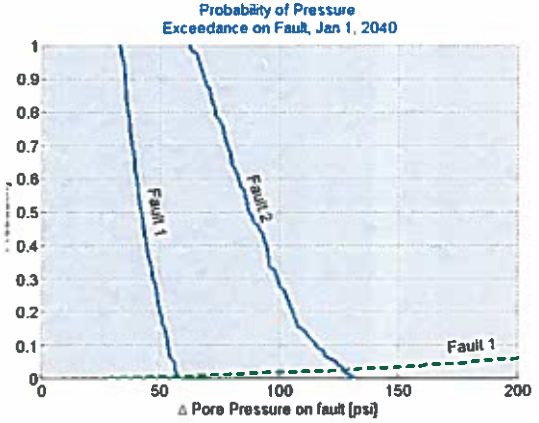




2040 Snapshot







Uncertainty Ranges

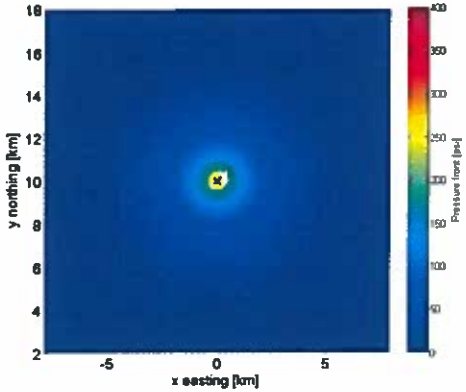
Figure 4a

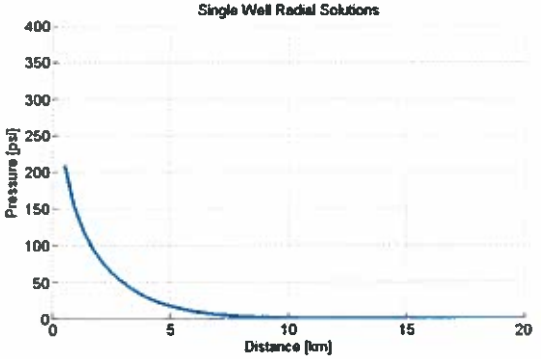
Pore Pressure Analysis

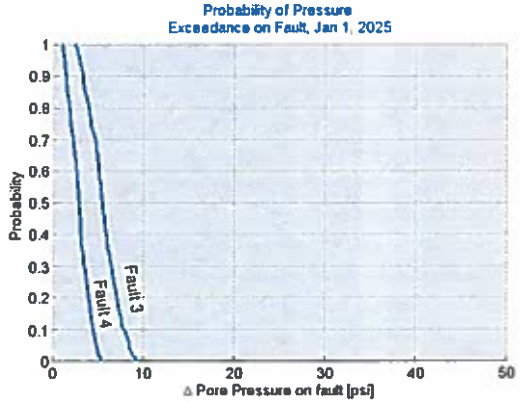
Stress Area 4

75° Max Horizontal Stress Direction

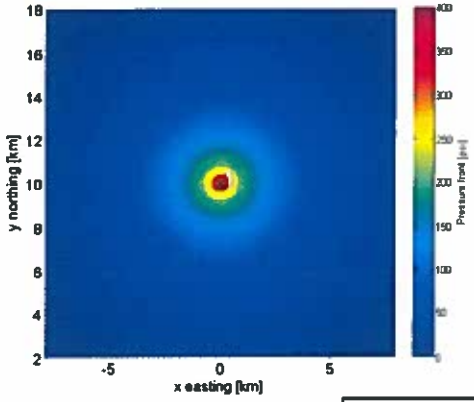
2025 Snapshot

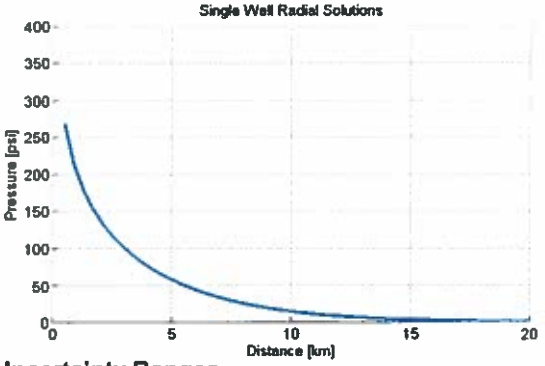


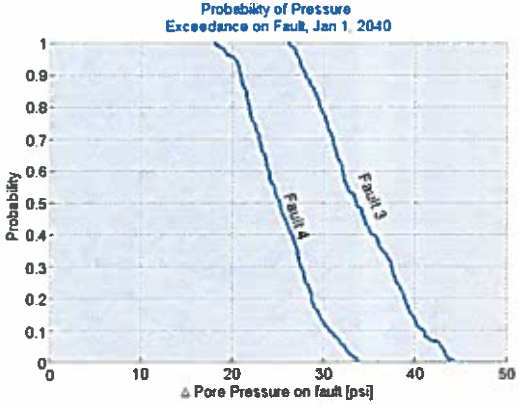




2040 Snapshot







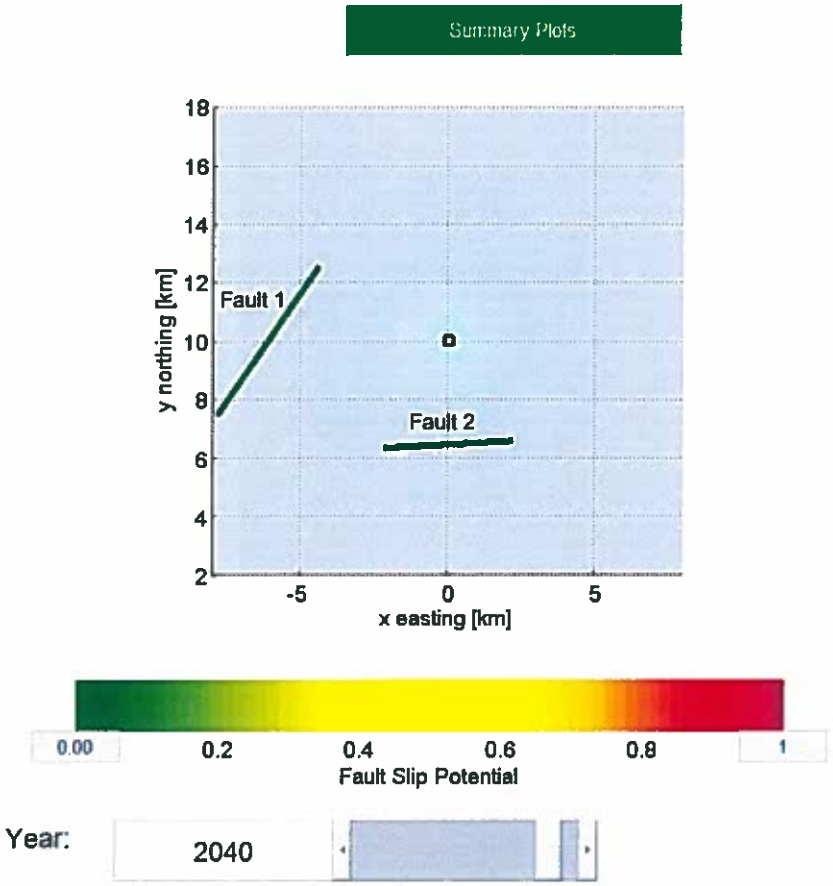
Uncertainty Ranges

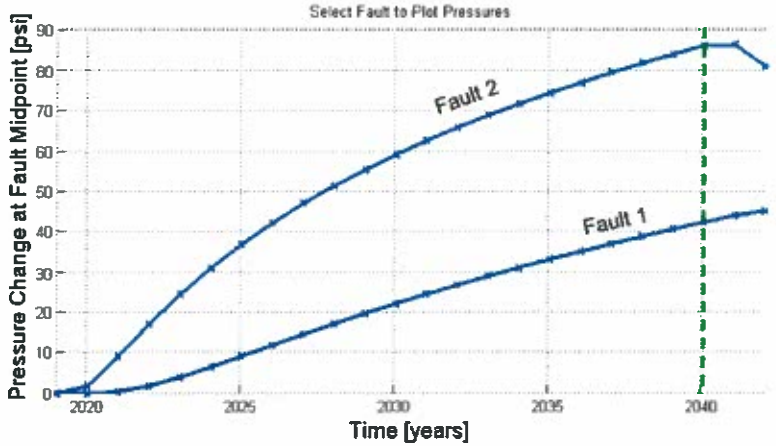
Figure 4b

Geomechanical / Pore Pressure Integration

Stress Area 3

35° Max Horizontal Stress Direction





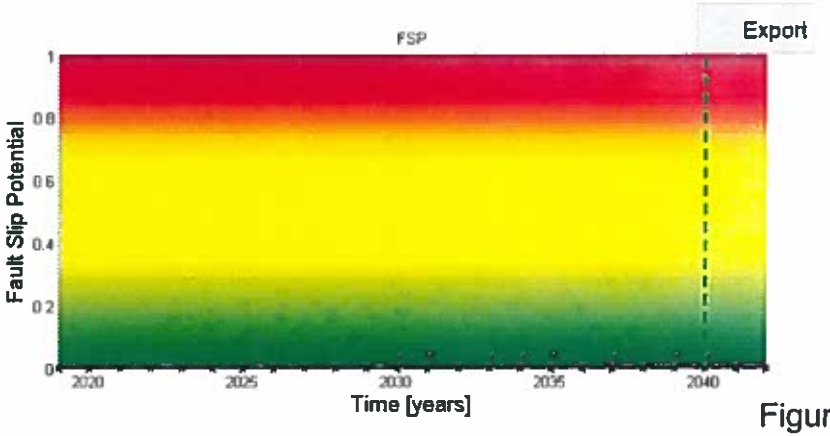
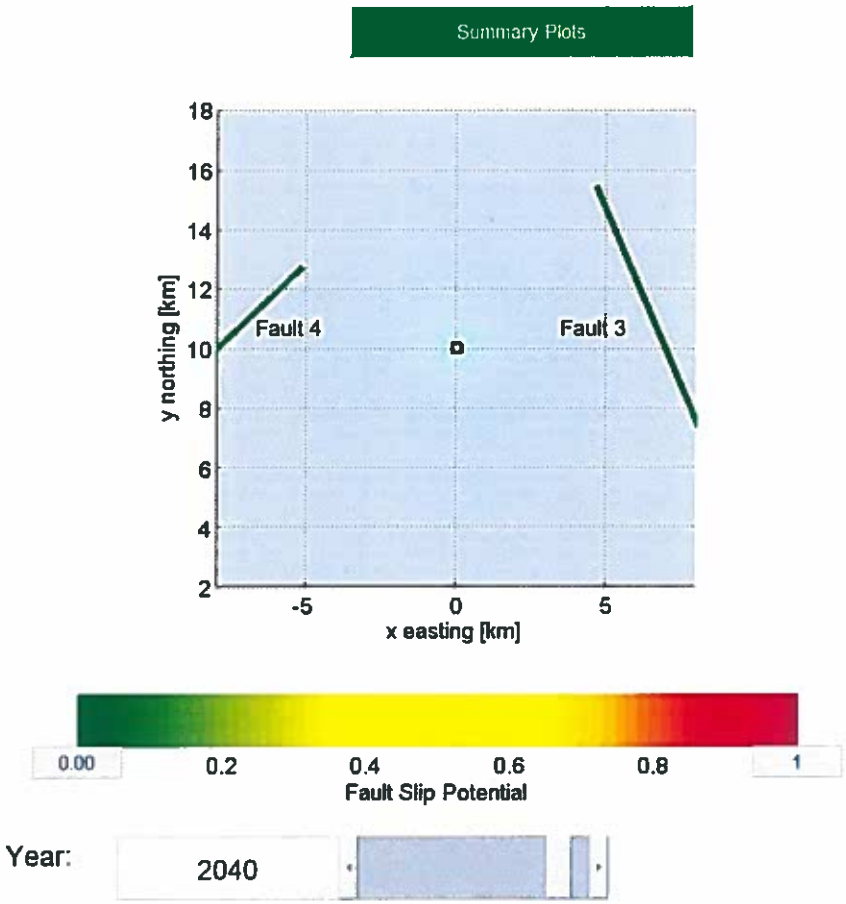


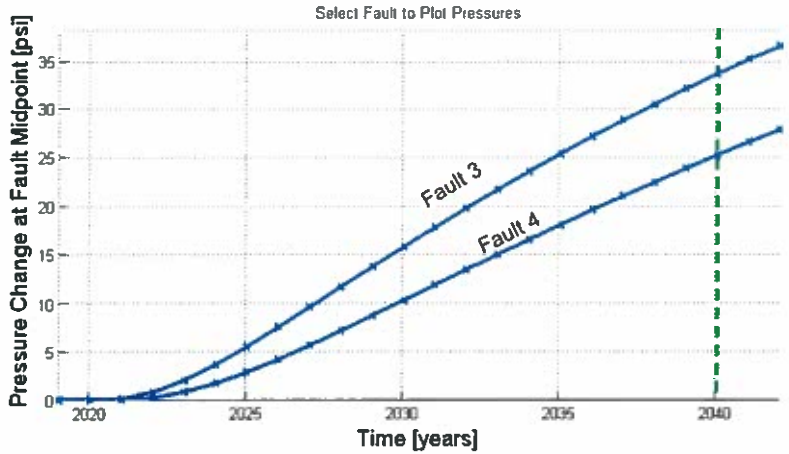
Figure 5a

Geomechanical / Pore Pressure Integration

Stress Area 4

75° Max Horizontal Stress Direction





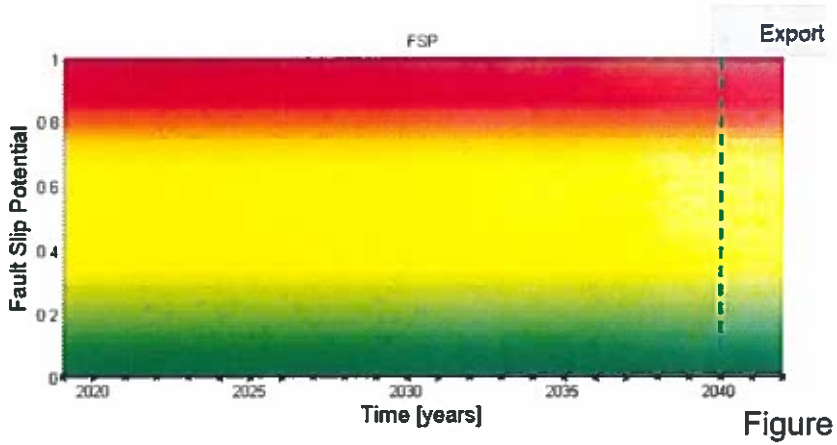


Figure 5b