

**CASE NO. 21142**

**APPLICATION OF TROVE ENERGY AND WATER, LLC FOR APPROVAL OF A  
SALT WATER DISPOSAL WELL,  
LEA COUNTY, NEW MEXICO**

**EXHIBITS**

1. Application and Proposed Ad
2. Affidavit of Ben Stone
3. Affidavit of Notice
4. Exhibit A (C-108) from Case No. 20756
- 5 Exhibits 1, 2, 3, 4, 5A, 7, 8, and 9 from Case No. 20756

BEFORE THE NEW MEXICO OIL CONSERVATION DIVISION

APPLICATION OF TROVE ENERGY AND WATER,  
LLC FOR APPROVAL OF A SALT WATER DISPOSAL  
WELL, LEA COUNTY, NEW MEXICO.

Case No. \_\_\_\_\_

APPLICATION

Trove Energy and Water, LLC applies for an order approving a salt water disposal well, and in support thereof, states:

1. Applicant proposes to drill the WLC South Fed. SWD Well No. 3, to be located 1768 feet from the south line and 240 feet from the east line of Section 26, Township 26 South, Range 33 East, N.M.P.M., Lea County, New Mexico.
2. Applicant proposes to dispose produced water into the Devonian formation in the well at approximate depths of 17750 – 19015 feet subsurface.
3. A Form C-108 for the subject well was attached as Exhibit A to the application filed in Case No. 20756, which is incorporated herein by reference. Attachment 1 submitted herewith describes the changes to the original application. The change of location is required by the Bureau of Land Management.
4. The granting of this application will prevent waste and protect correlative rights.

**WHEREFORE**, applicant requests that, after notice and hearing, the Division enter its order approving this application.

EXHIBIT

1

Respectfully submitted,

*James Bruce*

James Bruce  
Post Office Box 1056  
Santa Fe, New Mexico 87504  
(505) 982-2043

Attorney for Trove Energy and Water, LLC



January 24, 2020

**NEW MEXICO OIL CONSERVATION DIVISION**  
**Engineering Bureau – UIC Program**

Gentlemen:

Trove Energy and Water, LLC, Hobbs, New Mexico, wishes to amend the location in a previously submitted C-108 application to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the WLC South Federal SWD Well No.3. The C-108 was submitted to the OCD in April 2019, presented at hearing on September 5, 2019 and remains under review. The well will remain in Section 26, Township 26 South, Range 33 East in Lea County, New Mexico.

**AS A RESULT OF A RECENT ONSITE BLM INSPECTION, TROVE WILL RELOCATE THIS WELLSPOT APPROXIMATELY 400 FEET TO THE NORTH AND WEST OF THE ORIGINAL SPOT.**

Old Spot: 1420' FSL x 15' FEL

**NEW SPOT: 1768' FSL x 240' FEL**

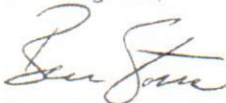
No other material changes are proposed for the subject application or well.

All affected parties were re-notice by letter via U.S. certified mail and a legal notice will be published on 1/25/2020 in the Hobbs News Sun in Hobbs, New Mexico.

We hereby request that the location be amended as supported by the documents included herein. Please don't hesitate to contact us if you have any questions.

Thank you for your attention in this matter.

Best regards,



Ben Stone, SOS Consulting, LLC  
Agent for Trove Energy and Water, LLC

ATTACHMENT **1**

Cc: Application File

## WLC South Federal SWD Well No.3

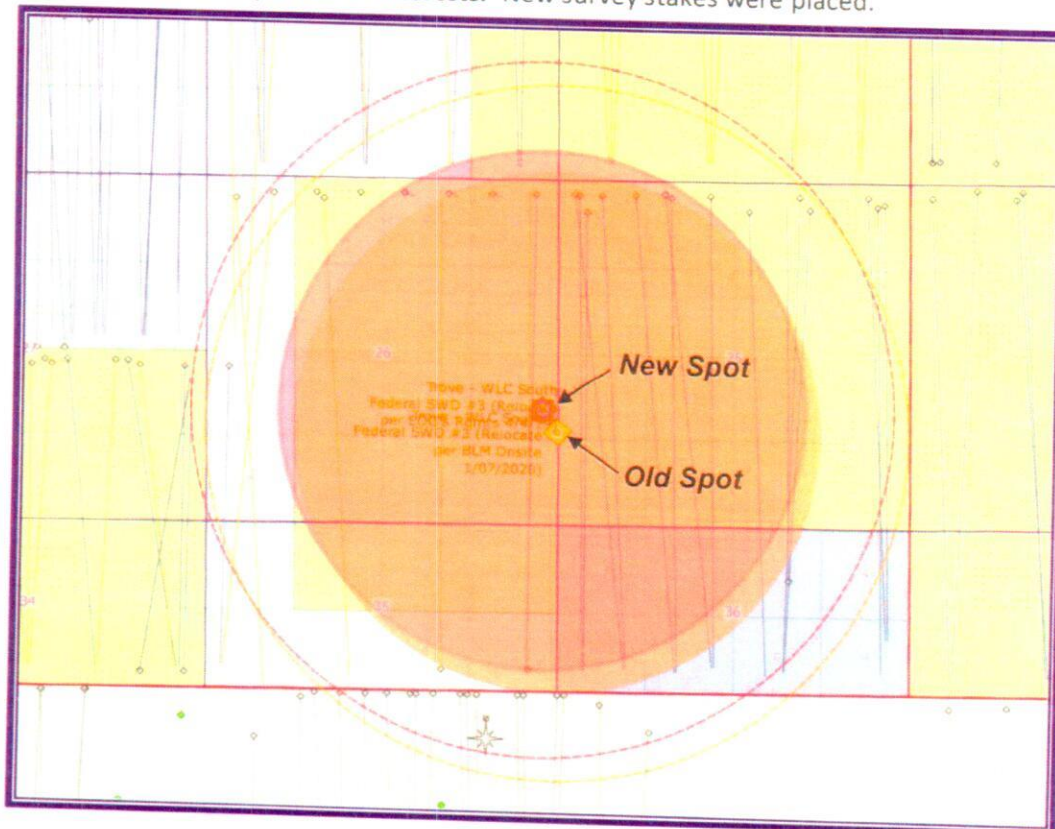
### C-108 - LOCATION AMENDMENT

On January 7, 2020 Trove Energy and Water accompanied BLM personnel from the Carlsbad Field Office to conduct an onsite inspection pursuant to Notice of Staking (NOS) requirements. On the ground, it was discovered that;

*There is a pipeline right-of-way that was narrowly overlapped by the proposed location.*

This factor forced the move of Trove's proposed SWD well spot to the north and west to accommodate the right-of-way. A site was selected based on onsite conversations with BLM personnel.

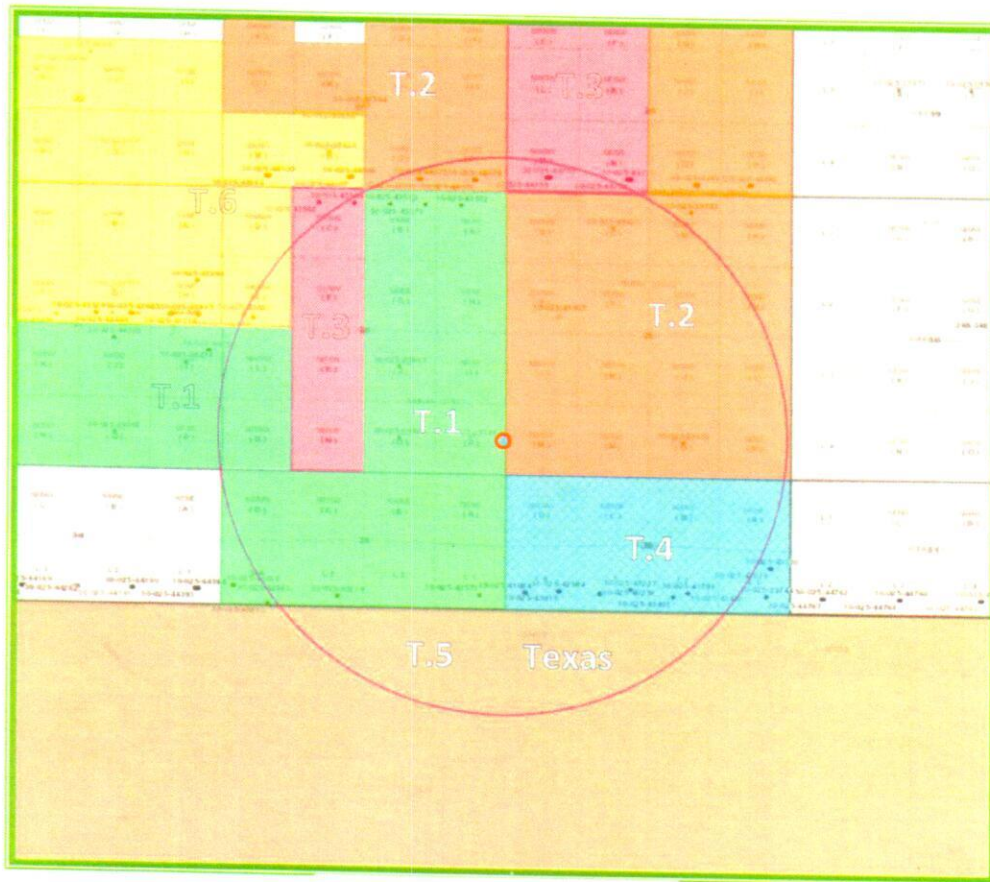
Therefore, Trove proposes moving the location from 1420' FSL x 15' FEL to 1768' FSL x 240' FEL. ***This is move does not change the AOR significantly nor does it affect any additional persons, parties or interests.*** New survey stakes were placed.





# WLC South Federal SWD Well No.3 – Affected Parties Plat

(Attachment to NMOCD Form C-108, Application for Authority to Inject.)



## LEGEND

- |  |   |
|--|---|
| T.1 – NMNM-121490 – EOG Resources, Inc.      | T.4 – VC-0025-0001 – EOG Resources, Inc.  |
| T.2 – NMNM-122622 – EOG Resources, Inc.      | T.5 – Texas – Texas Railroad Commission   |
| T.3 – NMNM-0002965A – ConocoPhillips Company | T.6 – NMNM-125653 – Battle Axe Ranch, LLC |

## DISTRICT I

1825 N. French Dr., Hobbs, NM 88240  
Phone (575) 393-8161 Fax: (575) 393-0720

## DISTRICT II

811 S. First St., Artesia, NM 88210  
Phone (575) 748-1283 Fax: (575) 748-9720

## DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410  
Phone (505) 384-8178 Fax: (505) 384-8170

## DISTRICT IV

1280 S. St. Francis Dr., Santa Fe, NM 87606  
Phone (505) 478-3480 Fax: (505) 478-3482

State of New Mexico  
Energy, Minerals and Natural Resources Department

Form C-102  
Revised August 1, 2011

Submit one copy to appropriate  
District Office

## OIL CONSERVATION DIVISION

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

## WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code	Pool Name
Property Code	Property Name WLC SOUTH FEDERAL SWD	Well Number 3
OGRID No.	Operator Name TROVE ENERGY AND WATER, LLC	Elevation 3328'

## Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
1	26	26 S	33 E		1768	SOUTH	240	EAST	LEA

## 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

Dedicated Acres	Joint or Infill	Consolidation Code	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

<p><b>SURFACE LOCATION</b> Lat - N 32.012036° Long - W 103.535370° NAD83 - N 369031.1 E 788667.7 (NAD-83)</p> <p>N: 369905.4 E: 788900.6 (NAD83)</p> <p>N: 367247.1 E: 786276.9 (NAD83)</p> <p>N: 367265.2 E: 786200.2 (NAD83)</p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>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 undivided 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.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>Email Address _____</p>
	<p><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>JANUARY 7 2012</p> <p>Date Surveyed _____</p> <p>Signature &amp; Seal of Professional Surveyor _____</p> <p>Certificate No. Gary L. Hayes 7977 Basin Surveyor</p>
	<p>0' 500' 1000' 1500' 2000'</p> <p>SCALE: 1" = 1000'</p> <p>WO Num.: 35004</p>



PROPOSED ADVERTISEMENT

Case No. \_\_\_\_\_:

*Application of Trove Energy and Water, LLC for approval of a salt water disposal well, Lea County, New Mexico.* Applicant seeks an order approving disposal of produced water at depths of approximately 17750 - 19015 feet subsurface into the proposed WLC South Fed. SWD Well No. 3, to be located 1768 feet from the south line and 240 feet from the east line of Section 26, Township 26 South, Range 33 East, NMPM. The well is located approximately 19.5 miles west-southwest of Bennett, New Mexico.

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**IN THE MATTER OF THE HEARING CALLED  
BY THE OIL CONSERVATION DIVISION FOR  
THE PURPOSE OF CONSIDERING:**

**APPLICATION OF TROVE ENERGY AND WATER,  
LLC FOR APPROVAL OF A SALT WATER DISPOSAL  
WELL, LEA COUNTY, NEW MEXICO.**

**Case No. 21142**

**SELF-AFFIRMED STATEMENT OF BEN STONE**

Ben Stone, being duly sworn upon his oath, deposes and states:

1. I am over the age of 18, and I have personal knowledge of the matters set forth herein.
2. I am a principal in SOS Consulting, LLC, which is engaged in oil and gas regulatory work in New Mexico and other states. I have been retained by applicant in this matter to help process this injection application. I have been qualified by the Division as an expert in regulatory affairs.
3. Applicant seeks an order approving disposal of produced water in the Devonian formation at depths of approximately 17750-19015 feet subsurface into the proposed WLC South Fed. SWD Well No. 3, to be located 1768 feet from the south line and 240 feet from the east line of Section 26, Township 26 South, Range 33 East, NMPM.
4. This matter was originally heard by the Division in Case No. 20756. Subsequent to the hearing in that case the Bureau of Land Management requested a change of the well's location because of an existing pipeline right-of-way which narrowly overlapped the original location.

EXHIBIT 2



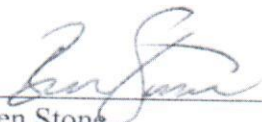
5. Attachment A is the amendment to the well's location which was originally filed administratively with the Division, but was set for hearing in this case. Other than the location change, all other evidence and testimony submitted in Case No. 20756 remains the same.

6. The revised wellbore design is included in Attachment A. Testimony on this design was presented to the Division at the original hearing.

7. The subject well's casing and completion program has been designed to ensure there will be no hydrologic connection between the injection interval and any other zone, and it will adequately protect fresh water sources.

8. I understand that this Self-Affirmed Statement will be used as written testimony in this case. I affirm that my testimony in paragraphs 1 through 7 above is true and correct, and is made under penalty of perjury under the laws of the State of New Mexico. My testimony is made as of the date handwritten next to my signature below.

Date: 3-4-2020

  
Ben Stone

January 24, 2020

**NEW MEXICO OIL CONSERVATION DIVISION**  
**Engineering Bureau – UIC Program**

Gentlemen:

Trove Energy and Water, LLC, Hobbs, New Mexico, wishes to amend the location in a previously submitted C-108 application to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the WLC South Federal SWD Well No.3. The C-108 was submitted to the OCD in April 2019, presented at hearing on September 5, 2019 and remains under review. The well will remain in Section 26, Township 26 South, Range 33 East in Lea County, New Mexico.

**AS A RESULT OF A RECENT ONSITE BLM INSPECTION, TROVE WILL RELOCATE THIS WELLSPOT APPROXIMATELY 400 FEET TO THE NORTH AND WEST OF THE ORIGINAL SPOT.**

Old Spot: 1420' FSL x 15' FEL

**NEW SPOT: 1768' FSL x 240' FEL**

No other material changes are proposed for the subject application or well.

All affected parties were re-notice by letter via U.S. certified mail and a legal notice will be published on 1/25/2020 in the Hobbs News Sun in Hobbs, New Mexico.

We hereby request that the location be amended as supported by the documents included herein. Please don't hesitate to contact us if you have any questions.

Thank you for your attention in this matter.

Best regards,



Ben Stone, SOS Consulting, LLC  
Agent for Trove Energy and Water, LLC

ATTACHMENT

A

Cc: Application File



## WLC South Federal SWD Well No.3

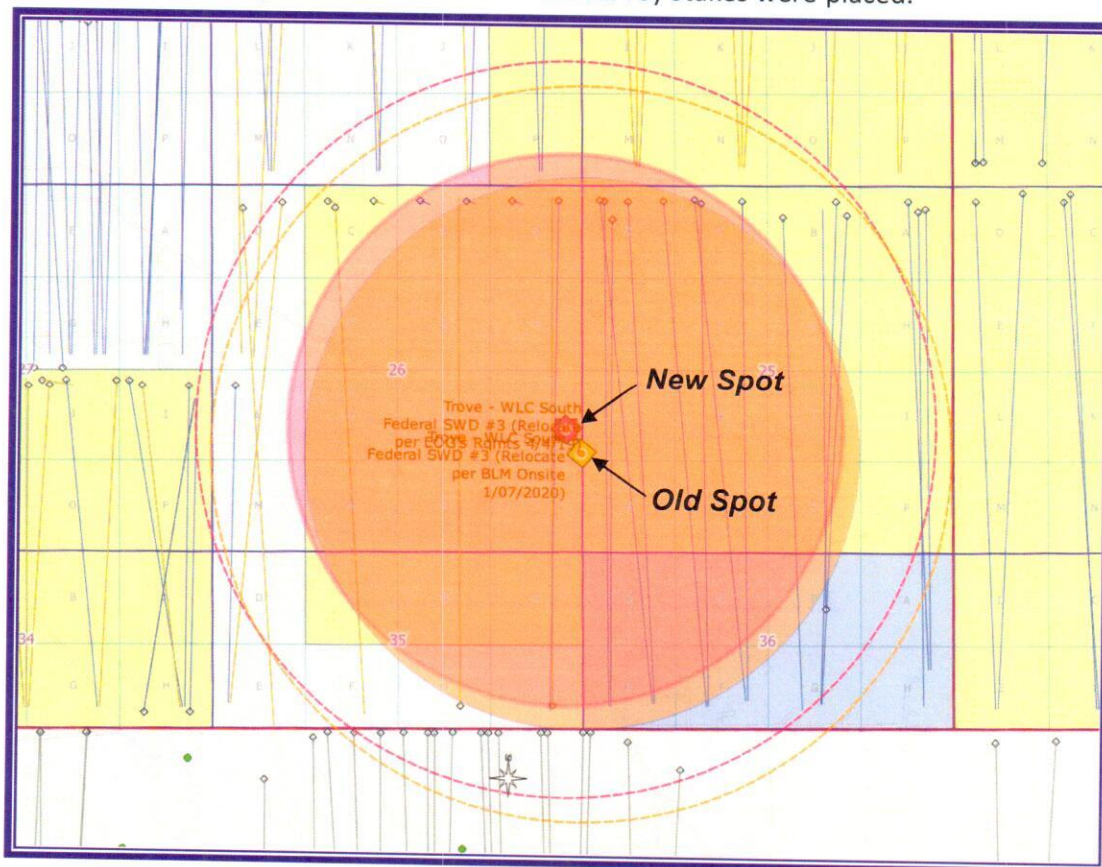
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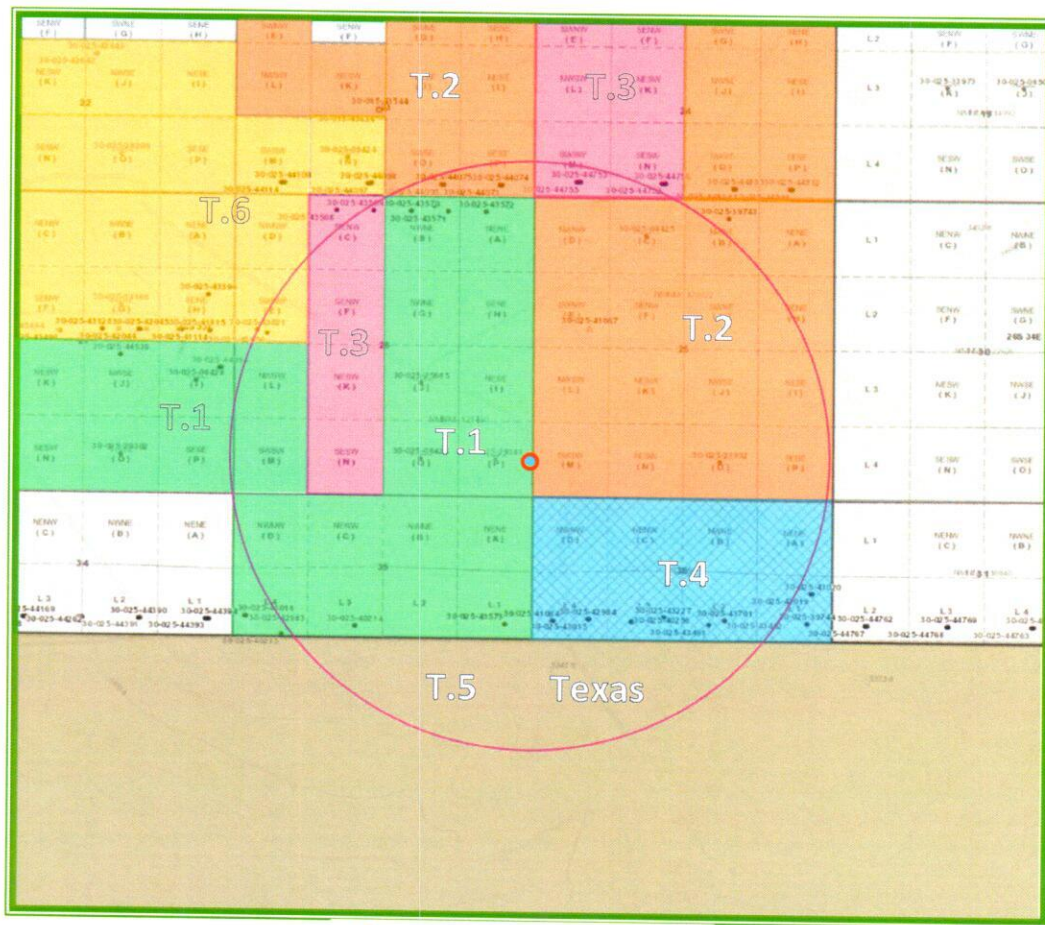
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# WLC South Federal SWD Well No.3 – Affected Parties Plat (Attachment to NMOCD Form C-108, Application for Authority to Inject.)



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|--|---|
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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-102  
Revised August 1, 2011

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☐ AMENDED REPORT

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OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	<p><b>OPERATOR CERTIFICATION</b></p> <p>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.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>Email Address _____</p>
	<p><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>JANUARY 7, 2020</p> <p>Date Surveyed _____</p> <p>Signature &amp; Seal of Professional Surveyor _____</p> <p>Certificate No. Gary L. Jones 7977</p> <p>BASIN SURVEYS</p>
	<p><b>SURFACE LOCATION</b></p> <p>Lat - N 32.012036° Long - W 103.535370° NAD83 NADSPCE - N 369031.1 E 788667.7 (NAD-83)</p>
	<p>N: 367247.1 E: 786278.9 (NAD83)</p> <p>N: 367265.2 E: 788920.2 (NAD83)</p>

0' 500' 1000' 1500' 2000'

SCALE: 1" = 1000'

WO Num.: 35004





January 23, 2020

**NOTIFICATION TO INTERESTED PARTIES**  
**via U.S. Certified Mail – Return Receipt Requested**

To Whom It May Concern:

Trove Energy and Water, LLC, Hobbs, New Mexico, is amending the location in a previously submitted C-108 application to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the WLC South Federal SWD Well No.3. The C-108 was submitted to the OCD in April 2019, presented at hearing on September 5, 2019 and remains under review. The well will remain in Section 26, Township 26 South, Range 33 East in Lea County, New Mexico.

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Old Spot: 1420' FSL x 15' FEL

**NEW SPOT: 1768' FSL x 240' FEL**

The New Mexico OCD requires this adjustment to be fully re-noticed including legal publication. The legal notice was published in the Hobbs News-Sun, Hobbs, New Mexico on or about January 24, 2018.

No other material changes are proposed for the subject application or well.

Please don't hesitate to contact us if you have any questions.

Thank you for your attention in this matter.

Best regards,

Ben Stone, SOS Consulting, LLC  
Agent for Trove Energy and Water, LLC

Cc: Application File

## C-108 – Item XIV

### Proof of Notice - Certified Mail Receipts

WLC South Fed SWD #3 – Amendment Only 1/24/2020

7018 2290 0001 2038 7015

**U.S. Postal Service™  
CERTIFIED MAIL® RECEIPT**  
Domestic Mail Only

For delivery information, visit our website at [www.usps.com](http://www.usps.com)®.

**OFFICIAL USE**

Certified Mail Fee	\$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)		
<input type="checkbox"/> Return Receipt (hardcopy)	\$	
<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	\$	
Total Postage and Fees	\$ 6.85	
Sent To	Bureau of Land Management	
Street	Oil & Gas Division	
City, State	620 E. Greene St.	
PS Form	Carlsbad, NM 88220	

7018 2290 0001 2038 7022

**U.S. Postal Service™  
CERTIFIED MAIL® RECEIPT**  
Domestic Mail Only

For delivery information, visit our website at [www.usps.com](http://www.usps.com)®.

**OFFICIAL USE**

Certified Mail Fee	\$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)		
<input type="checkbox"/> Return Receipt (hardcopy)	\$	
<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	\$	
Total Postage and Fees	\$ 6.85	
Sent To	EOG RESOURCES, INC.	
Street	Attn: Chuck Moran	
City, State	5509 Champions Drive	
PS Form	Midland, TX 79706	

7018 2290 0001 2038 7039

**U.S. Postal Service™  
CERTIFIED MAIL® RECEIPT**  
Domestic Mail Only

For delivery information, visit our website at [www.usps.com](http://www.usps.com)®.

**OFFICIAL USE**

Certified Mail Fee	\$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)		
<input type="checkbox"/> Return Receipt (hardcopy)	\$	
<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	\$	
Total Postage and Fees	\$ 6.85	
Sent To	STATE OF NEW MEXICO	
Street	Oil, Gas and Minerals Division	
City, State	310 Old Santa Fe Trail	
PS Form	Santa Fe, NM 87504	

7018 2290 0001 2038 7046

**U.S. Postal Service™  
CERTIFIED MAIL® RECEIPT**  
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For delivery information, visit our website at [www.usps.com](http://www.usps.com)®.

**OFFICIAL USE**

Certified Mail Fee	\$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)		
<input type="checkbox"/> Return Receipt (hardcopy)	\$	
<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	\$	
Total Postage and Fees	\$ 6.85	
Sent To	RAILROAD COMMISSION OF TEXAS	
Street	Technical Permitting Section - UIC Program	
City, State	P.O. Box 12967	
PS Form	Austin, TX 78711-2967	



**LEGAL NOTICE**  
**JANUARY 25, 2020**

Trove Energy and Water, LLC, 1919 North Turner, Hobbs, NM 88240, is filing an AMENDMENT to its previously filed Form C-108 (Application for Authority to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. After onsite surveys, the proposed well, the WLC South Federal SWD Well No.3 is being relocated approximately 400 feet **from** 1420' FSL x 15' FEL **to** **1768' FSL x 240 FEL**, Section 26, Township 26 South, Range 33 East, Lea County, New Mexico; approximately 21.2 miles west/ southwest of Jal, NM. There are no other material changes to the application and the area of review is identical.

Produced water from area production will be commercially disposed into the Devonian, Silurian and Fusselman formations at a maximum interval depth of 17,750' to 19,015' at a maximum surface pressure of 3550 psi and a rate limited only by such pressure. Mudlogging and e-logs will confirm final interval depths.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, NM 87505, (505)476-3460 within 15 days of the date of this notice. Additional information may be obtained from the applicant's agent, SOS Consulting, LLC, (903)488-9850 or, email [info@sosconsulting.us](mailto:info@sosconsulting.us).

**#35117**



# Advertising Invoice

## Hobbs Daily News-Sun

201 N Thorp  
P. O. Box 850  
Hobbs, NM 88241  
Phone: 575-393-2123  
Fax: 575-397-0610  
URL: www.hobbsnews.com

1

BEN STONE  
SOS CONSULTING, LLC.  
P.O. BOX 300  
COMO, TX 75431

Customer #: 67104417  
Phone: (903)488-9850  
Date: 01/24/2020  
Ad #: 00238670  
Salesperson: Ad Taker: Kayla

Class: 672  
Sort Line: 35117 SECTION 15

Ad Notes:

Description	Amount
AFF2 Affidavits (Legals)	6.25
BOLD bold	1.00
	4.45
07 07 Daily News-Sun 2020-01-25	58.08

### Ad Text:

LEGAL NOTICE  
JANUARY 25, 2020

### Payment Reference:

null

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Total: 65.33  
Tax: 4.45  
Net: 69.78  
Prepaid: null

**Total Due 69.78**

# Affidavit of Publication

STATE OF NEW MEXICO  
COUNTY OF LEA

I, Todd Bailey, Editor of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated  
January 25, 2020  
and ending with the issue dated  
January 25, 2020.

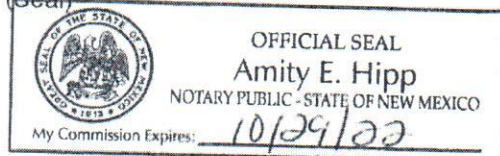
  
\_\_\_\_\_  
Editor

Sworn and subscribed to before me this  
25th day of January 2020.

  
\_\_\_\_\_  
Circulation Clerk

My commission expires  
October 29, 2022

(Seal)



This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

LEGAL	LEGAL
<b>LEGAL NOTICE</b> <b>JANUARY 25, 2020</b>	
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Produced water from area production will be commercially disposed into the Devonian, Silurian and Fusselman formations at a maximum interval depth of 17,750' to 19,015' at a maximum surface pressure of 3550 psi and a rate limited only by such pressure. Mudlogging and e-logs will confirm final interval depths.	
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67104420

00238670

BEN STONE  
SOS CONSULTING, LLC.  
P.O. BOX 300  
COMO, TX 75431



# WELL SCHEMATIC - PROPOSED WLC South Federal SWD Well No.3

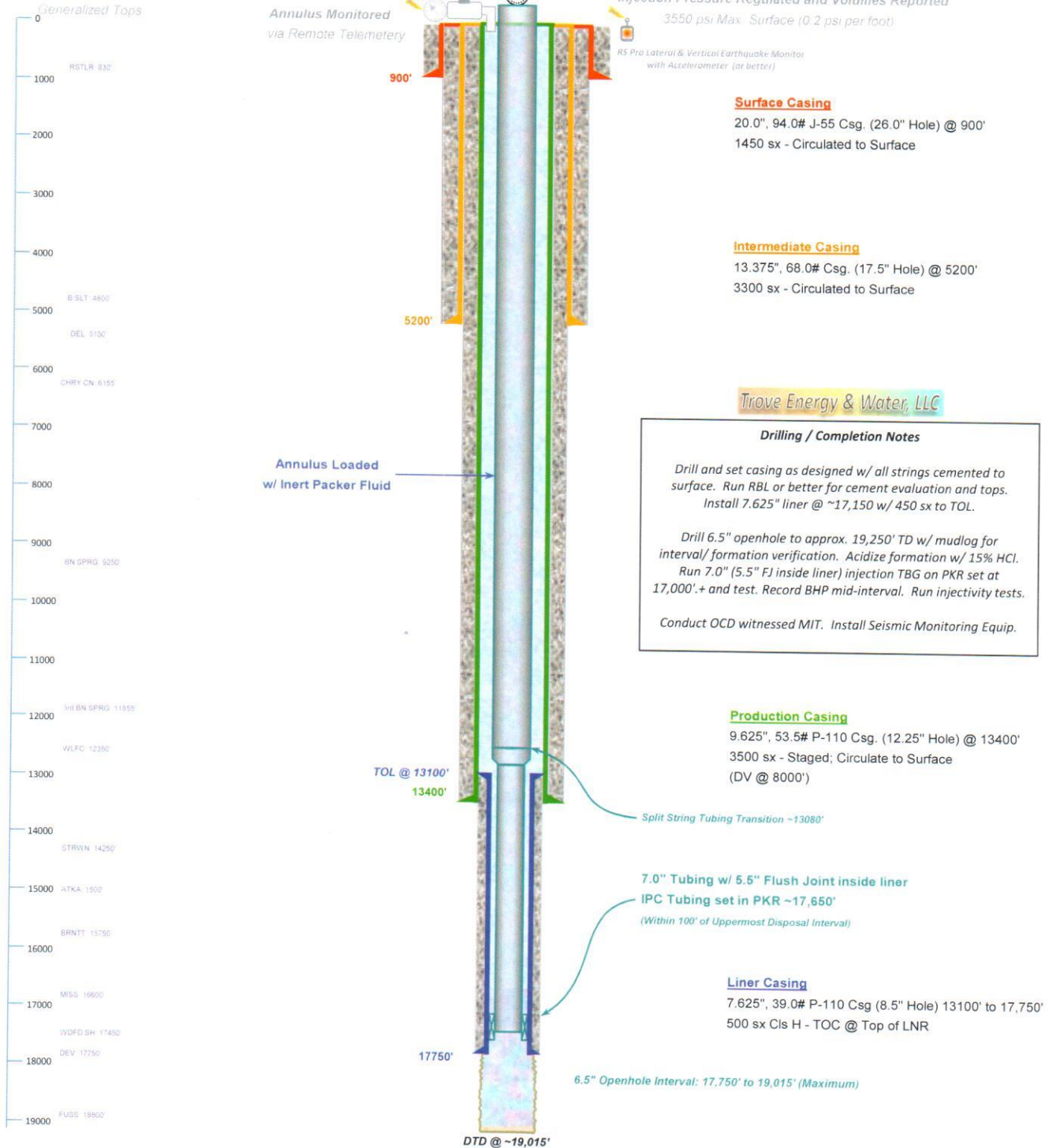
API 30-025-xxxxx

1768' FSL & 240' FEL, SEC. 26-T26S-R33E  
LEA COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)

Spud Date: 7/15/2020

SWD Config Dt: 8/30/2020



Drawn by: Ben Stone, Rvsd 2/28/2020 (Tubing size only)





**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**APPLICATION OF TROVE ENERGY AND WATER,  
LLC FOR APPROVAL OF A SALT WATER DISPOSAL  
WELL, LEA COUNTY, NEW MEXICO.**

**Case No. 21142**

**SELF-AFFIRMED STATEMENT OF NOTICE**

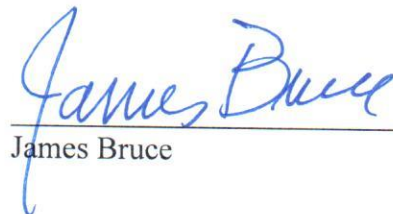
COUNTY OF SANTA FE    )  
                                  ) ss.  
STATE OF NEW MEXICO    )

James Bruce deposes and states:

1. I am over the age of 18, and have personal knowledge of the matters stated herein.
2. I am an attorney for Trove Energy and Water, LLC.
3. Trove Energy and Water, LLC has conducted a good faith, diligent effort to find the names and correct addresses of the interest owners entitled to receive notice of the application filed herein.
4. Notice of the application was provided to the interest owners, at their last known addresses, by certified mail. Copies of the notice letter and certified return receipts are attached hereto as Attachment A.
5. Trove Energy and Water, LLC has complied with the notice provisions of Division Rules.
6. I understand that this Self-Affirmed Statement will be used as written testimony in this case. I affirm that my testimony in paragraphs 1 through 5 above is true and correct and is made under penalty of perjury under the laws of the State of New Mexico. My testimony is made as of the date handwritten next to my signature below.

Date:

3/4/20

  
James Bruce

EXHIBIT

**3**

**JAMES BRUCE**  
ATTORNEY AT LAW

POST OFFICE BOX 1056  
SANTA FE, NEW MEXICO 87504

369 MONTEZUMA, NO. 213,  
SANTA FE, NEW MEXICO 87501

(505) 982-2043 (Phone)  
(505) 660-6612 (Cell)  
(505) 982-2151 (Fax)  
[jamesbruce@aol.com](mailto:jamesbruce@aol.com)

February 13, 2020

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

To: Persons on Exhibit A

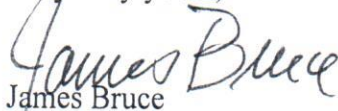
Ladies and gentlemen:

Enclosed is a copy of an application for approval of a salt water disposal well (Case No. 21142), filed with the New Mexico Oil Conservation Division by Trove Energy and Water, LLC, regarding the WLC South Fed. SWD Well No. 3, to be located 1768 feet from the south line and 240 feet from the east line of Section 26, Township 26 South, Range 33 East, Lea County, New Mexico. Applicant seeks an order approving disposal of produced water into the Devonian formation at depths of approximately 17750 - 19015 feet subsurface. This matter was originally heard in Case No. 20756, and a Form C-108 for the well was submitted to you at that time.

This matter is scheduled for hearing at 8:15 a.m. on Thursday, March 5, 2020, at the Division's offices at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505. You are not required to attend this hearing, but as an owner of an interest that may be affected by this application or as an objecting person, you may appear and present testimony. Failure to appear at that time and become a party of record will preclude you from contesting the matter at a later date.

A party appearing in a Division case is required by Division Rules to file a Pre-Hearing Statement no later than Thursday, February 27, 2020. This statement must be filed with the Division's Santa Fe office at the above address, and should include: The names of the party and its attorney; a concise statement of the case; the names of the witnesses the party will call to testify at the hearing; the approximate time the party will need to present its case; and identification of any procedural matters that need to be resolved prior to the hearing. The Pre-Hearing Statement must also be provided to the undersigned.

Very truly yours,

  
James Bruce

Attorney for Solaris Water Midstream, LLC

ATTACHMENT

A

EXHIBIT A

Commissioner of Public Lands  
310 Old Santa Fe Trail  
Santa Fe, New Mexico 87501

Attention: Andrea Antillon

Bureau of Land Management  
620 East Greene Street  
Carlsbad, New Mexico 88220

EOG Resources, Inc.  
5509 Champions Drive  
Midland, Texas 79706

Railroad Commission of Texas  
P.O. Box 12967  
Austin, Texas 78711



## SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.  
 ■ Print your name and address on the reverse so that we can return the card to you.  
 ■ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Commissioner of Public Lands  
 310 Old Santa Fe Trail  
 Santa Fe, New Mexico 87501



9590 9402 4582 8278 6087 18

2. Art

7019 1640 0000 1700 9511

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

## COMPLETE THIS SECTION ON DELIVERY

A. Signature

☒ Agent  
☐ Addressee

B. Received by (Printed Name)

 D. Is delivery address different from item 1? ☐ Yes  
 If YES, enter delivery address below: ☐ No

3. Service Type  
☐ Priority Mail Express®  
☐ Registered Mail™  
☐ Adult Signature Restricted Delivery  
☐ Certified Mail®  
☐ Return Receipt for Merchandise  
☐ Signature Confirmation™  
☐ Signature Confirmation Restricted Delivery

U.S. Postal Service™  
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Certified Mail Fee

Extra Services & Fees (check box, add fee as appropriate)  
☐ Return Receipt (hardcopy) \$  
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☐ Certified Mail Restricted Delivery \$  
☐ Adult Signature Required \$  
☐ Adult Signature Restricted Delivery \$

Postage

Total Postage and Fees

Sent To

Commissioner of Public Lands  
 310 Old Santa Fe Trail  
 Santa Fe, New Mexico 87501

City, State, ZIP+4®

PS Form 3800, April 2015 PSN 7530-02-000-9047

See Reverse for Instructions

## SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.  
 ■ Print your name and address on the reverse so that we can return the card to you.  
 ■ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Bureau of Land Management  
 620 East Greene Street  
 Carlsbad, New Mexico 88220



9590 9402 4582 8278 6087 01

2. Article Number (Transfer from certified label)

7019 1640 0000 1700 9504

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

## COMPLETE THIS SECTION ON DELIVERY

A. Signature

☒ Agent  
☐ Addressee

B. Received by (Printed Name)

C. Date of Delivery

 D. Is delivery address different from item 1? ☐ Yes  
 If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature  
☐ Adult Signature Restricted Delivery  
☒ Certified Mail®  
☐ Certified Mail Restricted Delivery  
☐ Collect on Delivery  
☐ Collect on Delivery Restricted Delivery  
☐ Priority Mail Express®  
☐ Registered Mail™  
☐ Registered Mail Restricted Delivery  
☐ Return Receipt for Merchandise  
☐ Signature Confirmation™  
☐ Signature Confirmation Restricted Delivery

Restricted Delivery

PS Form 3800, April 2015 PSN 7530-02-000-9047

Domestic Return Receipt

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Certified Mail Fee

Extra Services & Fees (check box, add fee as appropriate)  
☐ Return Receipt (hardcopy) \$  
☐ Return Receipt (electronic) \$  
☐ Certified Mail Restricted Delivery \$  
☐ Adult Signature Required \$  
☐ Adult Signature Restricted Delivery \$

Postage

Total Postage and Fees

Sent To

Bureau of Land Management  
 620 East Greene Street  
 Carlsbad, New Mexico 88220

City, State, ZIP+4®

PS Form 3800, April 2015 PSN 7530-02-000-9047

See Reverse for Instructions



# SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

EOG Resources, Inc.  
5509 Champions Drive  
Midland, Texas 79706



9590 9402 4582 8278 6086 95

7019 1640 0000 1700 9498

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

*True*

## COMPLETE THIS SECTION ON DELIVERY

- A. Signature ☒ Agent ☐ Addressee
- B. Received by (Printed Name) *R. True* C. Date of Delivery *2-18-20*
- D. Is delivery address different from item 1? ☐ Yes ☐ No  
If YES, enter delivery address below:

3. Service Type
- ☐ Adult Signature
  - ☐ Adult Signature Restricted Delivery
  - ☐ Certified Mail®
  - ☐ Certified Mail Restricted Delivery
  - ☐ Collect on Delivery
  - ☐ Collect on Delivery Restricted Delivery
  - ☐ Restricted Delivery
  - ☐ Priority Mail Express®
  - ☐ Registered Mail™
  - ☐ Registered Mail Restricted Delivery
  - ☐ Return Receipt for Merchandise
  - ☐ Signature Confirmation™
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Certified Mail Fee \$  
Extra S&F, fees & Fees (check box, add fee as appropriate)  
☐ Return Receipt (hardcopy) \$  
☐ Return Receipt (electronic) \$  
☐ Certified Mail Restricted Delivery \$  
☐ Adult Signature Required \$  
☐ Adult Signature Restricted Delivery \$  
Postage \$  
Total Postage and Fees \$  
Sent To \$  
EOG Resources, Inc.  
5509 Champions Drive  
Midland, Texas 79706  
Street and Apt. No., or P.O. Box  
City, State, ZIP+4®

Postmark  
Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

# U.S. Postal Service™ CERTIFIED MAIL® RECEIPT

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Certified Mail Fee \$

Extra S&F, fees & Fees (check box, add fee as appropriate)  
☐ Return Receipt (hardcopy) \$  
☐ Return Receipt (electronic) \$  
☐ Certified Mail Restricted Delivery \$  
☐ Adult Signature Required \$  
☐ Adult Signature Restricted Delivery \$  
Postage \$  
Total Postage and Fees \$  
Sent To \$  
Railroad Commission of Texas  
P.O. Box 12967  
Street and Apt. No., or P.O. Box  
City, State, ZIP+4®

Postmark  
Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

## SENDER: COMPLETE THIS SECTION

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Railroad Commission of Texas  
P.O. Box 12967  
Austin, Texas 78711



9590 9402 4582 8278 6086 88

2. Article Number (Transfer from service label)

7019 1640 0000 1700 9481

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

*True*

## COMPLETE THIS SECTION ON DELIVERY

- A. Signature ☒ Agent ☐ Addressee
- B. Received by (Printed Name) C. Date of Delivery
- D. Is delivery address different from item 1? ☐ Yes ☐ No  
If YES, enter delivery address below:

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FEB 20 2019

3. Service Type
- ☐ Adult Signature
  - ☐ Adult Signature Restricted Delivery
  - ☐ Certified Mail®
  - ☐ Certified Mail Restricted Delivery
  - ☐ Collect on Delivery
  - ☐ Collect on Delivery Restricted Delivery
  - ☐ Restricted Delivery
  - ☐ Priority Mail Express®
  - ☐ Registered Mail™
  - ☐ Registered Mail Restricted Delivery
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  - ☐ Signature Confirmation™
  - ☐ Signature Confirmation Restricted Delivery

7019 1640 0000 1700 9481

PS Form 3800, April 2015 PSN 7530-02-000-9047



RECEIVED:	REVIEWER:	TYPE:	APP NO:
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

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



**ADMINISTRATIVE APPLICATION CHECKLIST**

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

**Applicant:** Trove Energy and Water, LLC **OGRID Number:** 372488  
**Well Name:** WLC South Federal SWD No.3 **API:** 30-025-xxxxxx  
**Pool:** Proposed: SWD; Devonian-Silurian **Pool Code:** 97869

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

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

A. Location – Spacing Unit – Simultaneous Dedication

☐ NSL

☐ NSP (PROJECT AREA)

☐ NSP (PRORATION UNIT)

EXHIBIT

*4*  
*Case 21142*

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

[ I ] Commingling – Storage – Measurement

☐ DHC

☐ CTB

☐ PLC

☐ PC

☐ OLS

☐ OLM

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

☐ WFX

☐ PMX

☒ SWD

☐ IPI

☐ EOR

☐ PPR

**2) NOTIFICATION REQUIRED TO:** Check those which apply.

A. ☒ Offset operators or lease 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

**FOR OCD ONLY**

☐

Notice Complete

☐

Application  
Content  
Complete

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

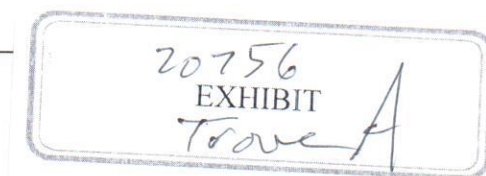
**Note: Statement must be completed by an individual with managerial and/or supervisory capacity.**

Ben Stone

Print or Type Name

*Ben Stone*

Signature



4/25/2019

Date

903-488-9850

Phone Number

ben@sosconsulting.us

e-mail Address



April 25, 2019

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

Attn: Ms. Adrienne Sandoval, Director

*Re: Application of Trove Energy and Water, LLC to permit for salt water disposal the proposed WLC South Federal SWD No.3, located in Section 26, Township 26 South, Range 33 East, NMPM, Lea County, New Mexico.*

Dear Ms. Sandoval,

Please find the enclosed form C-108 Application for Authority to Inject, supporting the above-referenced request for salt water disposal. The well will be operated as a commercial endeavor offering operators in the area additional options for produced water disposal.

Trove Energy and Water is a developing salt water disposal services to operators in southeast New Mexico and seeks to optimize efficiency, both economically and operationally, of all its operations. Approval of this application is consistent with that goal as well as the NMOCD's mission of preventing waste and protection of correlative rights.

This application for a proposed Devonian SWD interval includes the currently mandated increased One-Mile Area of Review including pertinent and available seismic information for the area and region. Published legal notice ran April 9, 2019 in the Hobbs News-Sun and all offset operators and other affected parties have been notified individually. The legal notice affidavit is included with this application. The application also includes a wellbore schematic, area of review maps, affected party plat and other required information for a complete Form C-108. The well is located on federal surface and minerals and the Bureau of Land Management CFO and offset operators have been notified of this application.

I respectfully request that the approval of this salt water disposal well proceed swiftly and if you or your staff requires additional information or has any questions, please do not hesitate to call or email me.

Best regards,

Ben Stone, Partner  
SOS Consulting, LLC  
Agent for Trove Energy and Water, LLC

Cc: Application attachment and file



**APPLICATION FOR AUTHORIZATION TO INJECT**

- I. PURPOSE: *Salt Water Disposal* and the application *QUALIFIES* for administrative approval.
- II. OPERATOR: *Trove Energy and Water, LLC*  
ADDRESS: *1919 North Turner, Hobbs, NM 88240*
- CONTACT PARTY: *Agent: SOS Consulting, LLC – Ben Stone (903) 488-9850*
- III. WELL DATA: *All well data and applicable wellbore diagrams are ATTACHED.*
- IV. *This is not an expansion of an existing project.*
- V. *A map is attached* that identifies all wells and leases within two miles of any proposed injection well with a *ONE-Mile* radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- \*VI. A tabulation is attached of data on all wells of public record within the area of review which penetrate the proposed injection zone. *There are NO (0) Wells in the subject AOR which Penetrate the proposed Devonian interval.* The data includes a description of each well's type, construction, date drilled, location, depth, and a schematic of any plugged well illustrating all plugging detail. *NO P&A Wells penetrate.*
- VII. *The following data is ATTACHED* 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. *Appropriate geologic data on the injection zone is ATTACHED* 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. *Stimulation program – a conventional acid job may be performed to clean and open the formation.*
- \*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted). *Well Logs will be filed with OCD.*
- \*XI. *There are NO water wells/ PODs within one mile of the proposed salt water disposal well. Representative analyses are ATTACHED.*
- XII. *An affirmative statement is ATTACHED that available geologic and engineering data has been examined and no evidence was found* of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. *"Proof of Notice" section on the next page of this form has been completed and ATTACHED. There are 3 offset lessees and/or mineral owners within 1 mile and state and federal minerals and the state of Texas (RRC) - all have been noticed. Well location is Federal.*
- 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: *Ben Stone* TITLE: *SOS Consulting, LLC agent for Trove Energy and Water, LLC*

SIGNATURE:  DATE: *4/25/2019*

E-MAIL ADDRESS: *ben@sosconsulting.us*

\* 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



**FORM C-108 – APPLICATION FOR AUTHORIZATION TO INJECT (cont.)**

III. WELL DATA – *The following information and data is included (See ATTACHED Wellbore Schematic):*

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 *pursuant to the following criteria is ATTACHED.*

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.**



## **C-108 - Items III, IV, V**

### **Item III - Subject Well Data**

Wellbore Diagram - PROPOSED

### **Item IV – Tabulation of AOR Wells**

NO wells penetrate the proposed injection interval.

### **Item V – Area of Review Maps**

1. Two Mile AOR Map with One-Mile Fresh Water Well Radius
2. One-Half Mile AOR Map

All Above Exhibits follow this page.



## WELL SCHEMATIC - PROPOSED WLC South Federal SWD Well No.3

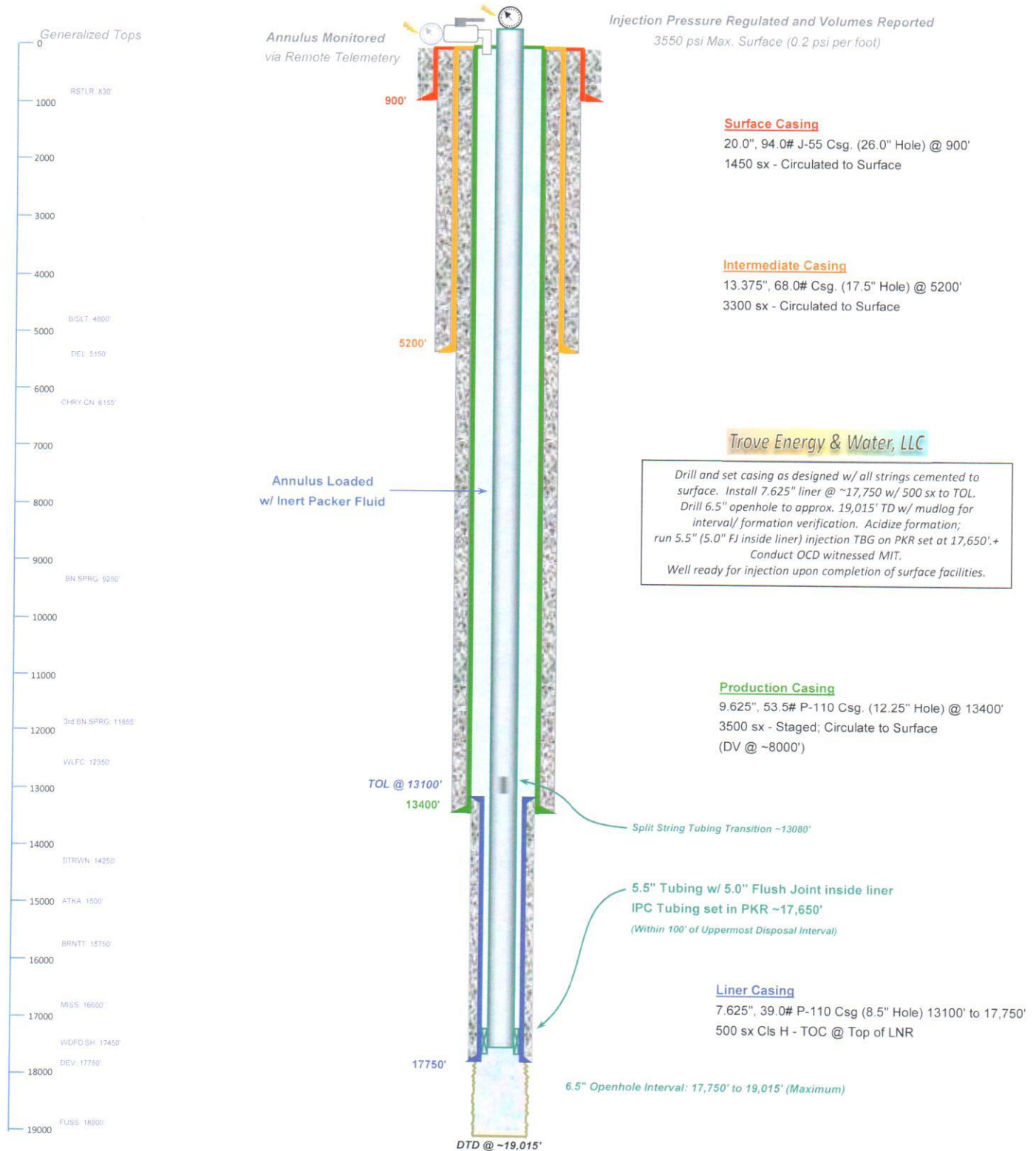
API 30-025-xxxxx

1420' FNL & 15' FEL, SEC. 26-T26S-R33E  
LEA COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)

Spud Date: 1/02/2020

SWD Config Dt: 2/15/2020



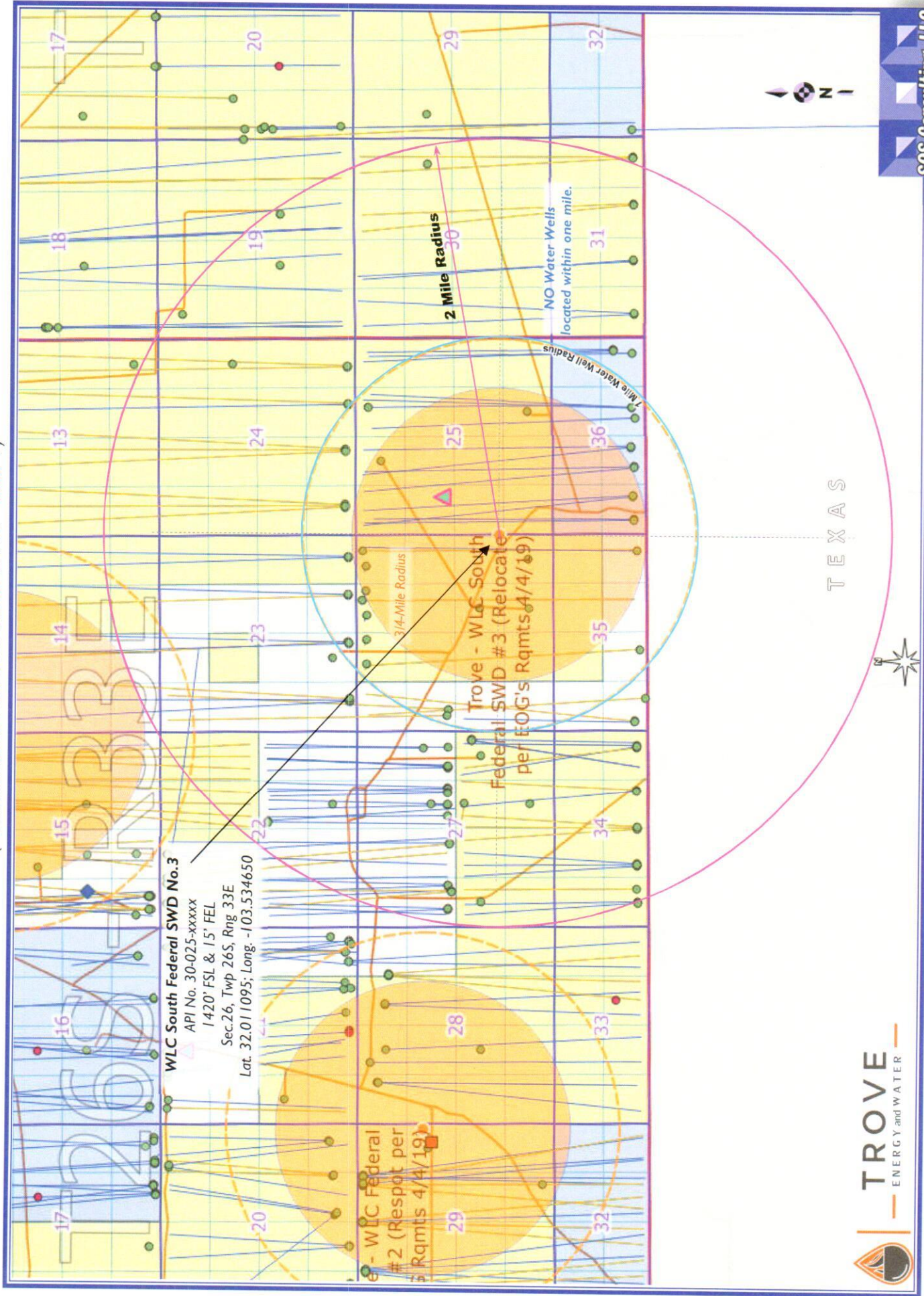
Drawn by: Ben Stone, 4/25/2019





# WLC South Federal SWD No.3 - Area of Review / 2 Miles

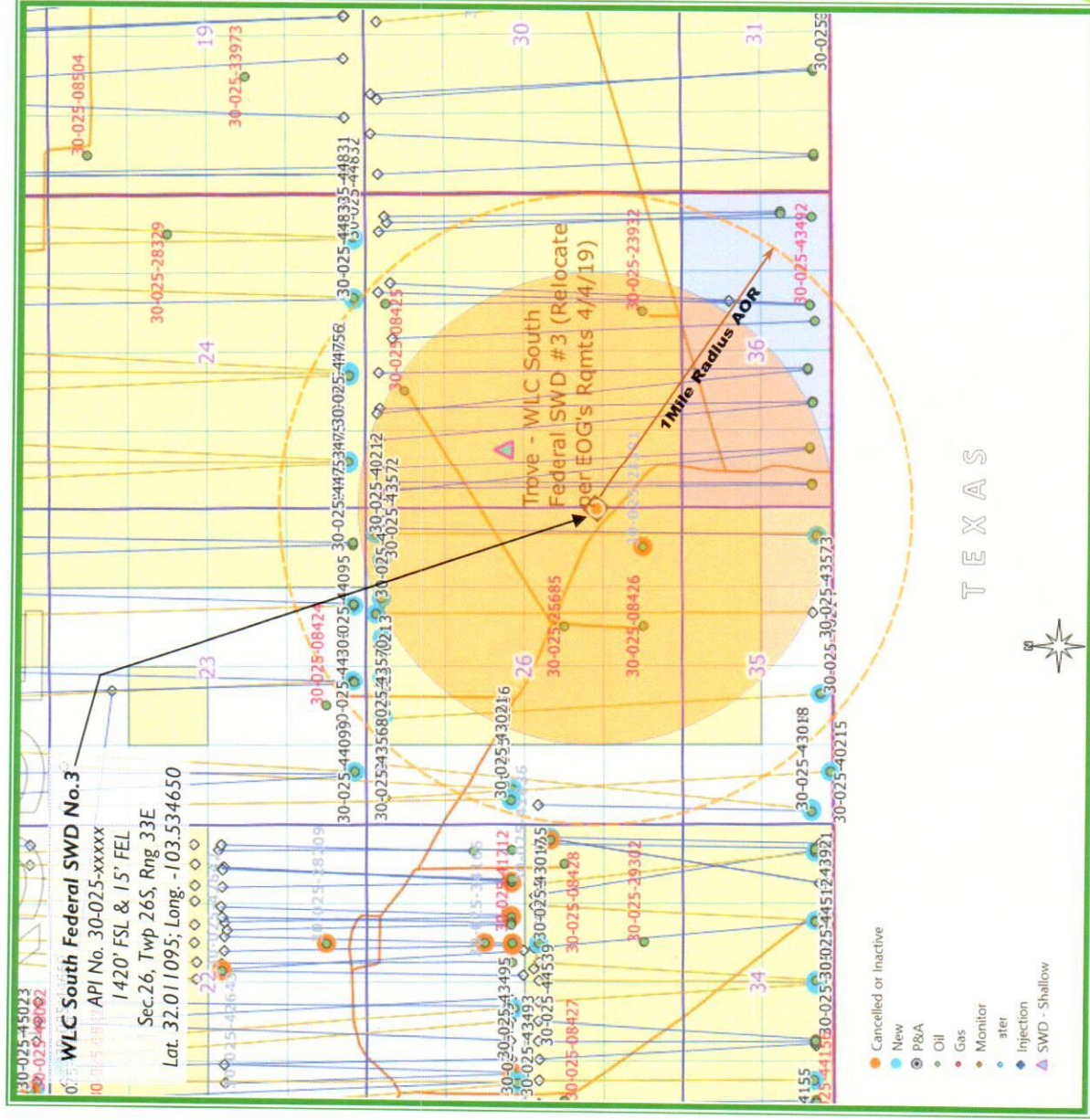
(Attachment to NMOCD Form C-108 - Item V)



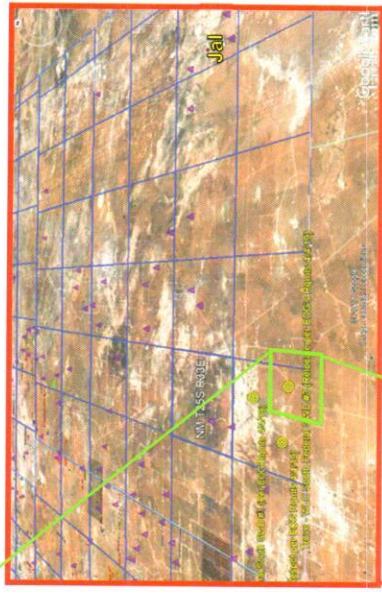


# WLC South Federal SWD Well No.3 – One Mile Area of Review / Overview Map

(Attachment to NMOCD Form C-108, Application for Authority to Inject.)



21.2 miles W/SW of Jal, NM



Lea County, New Mexico





## **C-108 - Item VI**

Area of Review Well Data

**THERE ARE NO WELLS WHICH PENETRATE THE  
PROPOSED DEVONIAN FORMATION IN THE  
ONE-HALF MILE AREA of REVIEW**

## **C-108 ITEM X**

### **LOGS and AVAILABLE TEST DATA**

A Standard Suite of Logs will be run after drilling the well and submitted to the Division.



## **C-108 ITEM VII – PROPOSED OPERATION**

*Note: All Trove Energy and Water WLC South SWD Prospects were vetted with EOG Review Team.*

### **Trove WLC South Federal SWD #3**

#### ***Commercial SWD Facility***

Upon approval of all permits for SWD, operations would begin within 30 days. Completion of the well operations will take approximately 6-8 weeks. Facility construction including installation of the tank battery, berms, plumbing and other and associated equipment would be occurring during the same interval but at a different location from the well. In any event, it is not expected for the construction phase of the project to last more than 60 days, depending on availability of contractors and equipment.

#### ***Configure for Salt Water Disposal***

Prior to commencing any work, an NOI sundry(ies) will be submitted to configure the well for SWD and will detail the completion workover including all work otherwise described above, any change to the procedure noted herein and to perform mechanical integrity pressure test per OCD test procedures. (Notify NMOCD 24 hours prior.) The casing/tubing annulus will be monitored for communication with injection fluid or loss of casing integrity.

#### ***Operational Summary***

The SWD facility will not be fenced so that trucks may access for load disposal 24/7.

Future plans would include tying the SWD into a pipeline so the well and injection equipment will be a closed system and equipped with pressure limiting devices and volume meters. The annulus, loaded with an inert, anti-corrosion packer fluid, will be monitored for pressure.

The facility and tanks will be equipped with telemetry devices and visual alarms to alert the operator and customers of full tanks or an overflow situation.

Anticipated daily maximum volume is 30,000 bpd and an average of 17,500 bpd at a maximum surface injection pressure of 3550 psi (.2 psi/ft gradient – maximum pressure will be adjusted if the top of interval is modified after well logs are run).

Potential releases will be contained and cleaned up immediately. The operator shall repair or otherwise correct the situation within 48 hours before resuming operations. OCD will be notified within 24 hours of any release greater than 5 bbls. If required, remediation will start as soon as practicable. Operator shall comply with 19.15.29 NMAC and 19.15.30 NMAC; as necessary and appropriate and OCD form C-141 will be submitted promptly.

## **C-108 ITEM VII – PRODUCED WATER ANALYSES**

### **Item VII.4 – Water Analysis of Source Zone Water**

Delaware  
Bone Spring  
Wolfcamp

### **Item VII.5 – Water Analysis of Disposal Zone Water**

Devonian

Water Analyses follow this page.



**C-108 Item VII.5 - Produced Water Data**  
**Trove Energy & Water, LLC - WLC Mid Federal Project Area**

**SOURCE ZONE**

**DELAWARE**

<b>API No</b>	3001510181	<b>Lab ID</b>	
<b>Well Name</b>	SUPERIOR STATE 002	<b>Sample ID</b>	5532
		<b>Sample No</b>	
<b>Location</b>	ULSTR 08 25 S 30 E 1980 S 660 E	<b>Lat / Long</b>	32.14281 -103.89616
		<b>County</b>	Eddy
<b>Operator (when sampled)</b>			
	Field CORRAL CANYON	<b>Unit I</b>	
<b>Sample Date</b>		<b>Analysis Date</b>	
	<b>Sample Source SWAB</b>	<b>Depth (if known)</b>	
	<b>Water Typ</b>		
ph		alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	155173	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	92820	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	122
iron_mgL		sulfate_mgL	133
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

*(Produced water data courtesy of NMT Octane NM WAIDS database.)*



**C-108 Item VII.5 - Produced Water Data**  
**Trove Energy & Water, LLC - WLC Mid Federal Project Area**

**SOURCE ZONE**

**BONE SPRING**

<b>API No</b>	3002533529	<b>Lab ID</b>	
<b>Well Name</b>	THYME APY FEDERAL 002	<b>Sample ID</b>	6681
<b>Location</b>	ULSTR 01 23 S 32 E 1650 N 1650 E	<b>Lat / Long</b>	32.33657 -103.62470
		<b>County</b>	Lea
<b>Operator (when sampled)</b>			
	Field RED TANK	<b>Unit</b>	G
<b>Sample Date</b>	11/27/2001	<b>Analysis Date</b>	
	<b>Sample Source</b>	<b>Depth (if known)</b>	
	<b>Water Typ</b>		
ph	6.1	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity	1.15	hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	172896	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	104976	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL	0	bicarbonate_mgL	781
iron_mgL	0	sulfate_mgL	1150
barium_mgL	0	hydroxide_mgL	
magnesium_mgL	2025	h2s_mgL	0
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

*(Produced water data courtesy of NMT Octane NM WAIDS database.)*





**C-108 Item VII.5 - Produced Water Data**  
**Trove Energy & Water, LLC - WLC Mid Federal Project Area**

**SOURCE ZONE**

**WOLFCAMP**

<b>API No</b> 3002501678		<b>Lab ID</b>	
<b>Well Name</b> LAGUNA PLATA FEDERAL UNIT 001		<b>Sample ID</b>	5096
		<b>Sample No</b>	
<b>Location</b> ULSTR 22 19 S 33 E	<b>Lat / Long</b> 32.64341	-103.64461	
1980 S 710 E		<b>County</b> Lea	
<b>Operator (when sampled)</b>			
	Field TONTO	Unit I	
Sample Date	Analysis Date		
Sample Source DST	Depth (if known)		
Water Typ			
ph	alkalinity_as_caco3_mgL		
ph_temp_F	hardness_as_caco3_mgL		
specificgravity	hardness_mgL		
specificgravity_temp_F	resistivity_ohm_cm		
tds_mgL 46915	resistivity_ohm_cm_temp		
tds_mgL_180C	conductivity		
chloride_mgL 27270	conductivity_temp_F		
sodium_mgL	carbonate_mgL		
calcium_mgL	bicarbonate_mgL	714	
iron_mgL	sulfate_mgL	1116	
barium_mgL	hydroxide_mgL		
magnesium_mgL	h2s_mgL		
potassium_mgL	co2_mgL		
strontium_mgL	o2_mgL		
manganese_mgL	anionremarks		
Remarks			

*(Produced water data courtesy of NMT Octane NM WAIDS database.)*



**C-108 Item VII.5 - Produced Water Data**  
**Trove Energy Water, LLC - WLC Mid Federal Project Area**

**DISPOSAL ZONE**

**DEVONIAN**

<b>API No</b>	3002521082	<b>Lab ID</b>	
		<b>Sample ID</b>	5720
<b>Well Name</b>	ANTELOPE RIDGE UNIT 003	<b>Sample No</b>	
<b>Location</b>	ULSTR 34 23 S 34 E 1980 S 1650 W	<b>Lat / Long</b>	32.25922 -103.46068
		<b>County</b>	Lea
<b>Operator (when sampled)</b>			
	<b>Field</b> ANTELOPE RIDGE	<b>Unit</b>	K
<b>Sample Date</b>	11/14/1967	<b>Analysis Date</b>	
	<b>Sample Source</b> UNKNOWN	<b>Depth (if known)</b>	
	<b>Water Typ</b>		
ph	6.9	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	80187	resistivity_ohm_cm_temp_	
tds_mgL_180C		conductivity	
chloride_mgL	47900	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	476
iron_mgL		sulfate_mgL	900
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)





## **C-108 – Item VIII**

### **Geologic Information**

The Devonian and Silurian consist of carbonates including light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of taking water are believed present within the subject formations in the area. Depth control data was inferred from deep wells to the south and east. If the base of Devonian and top of Silurian rocks come in as expected the well will only be drilled deep enough for adequate logging rathole.

At a proposed depth of 19,015' BGL (Below Ground Level) the well will TD approximately 1,265' below the estimated top of the Devonian. Mud logging through the interval will ensure the target interval remains in Devonian and Silurian. Once Devonian is determined, the casing shoe depth will be set at an approximate maximum upper depth of 17,750' BGL. Injection will occur through the resulting openhole interval. Should mud or other logs indicate depth adjustment is required to exploit the desired formation as described; sundries with appropriate data will be filed with the OCD.

The Devonian is overlain by the Woodford Shale and Mississippian Lime and underlain by the Middle and Lower Ordovician; Simpson, McKee and Ellenburger.

Fresh water in the area is generally available from the Rustler and Santa Rosa formations. State Engineer's records show water wells in the area with a depth to groundwater of 110 to 220 feet and an average depth of 157 feet.

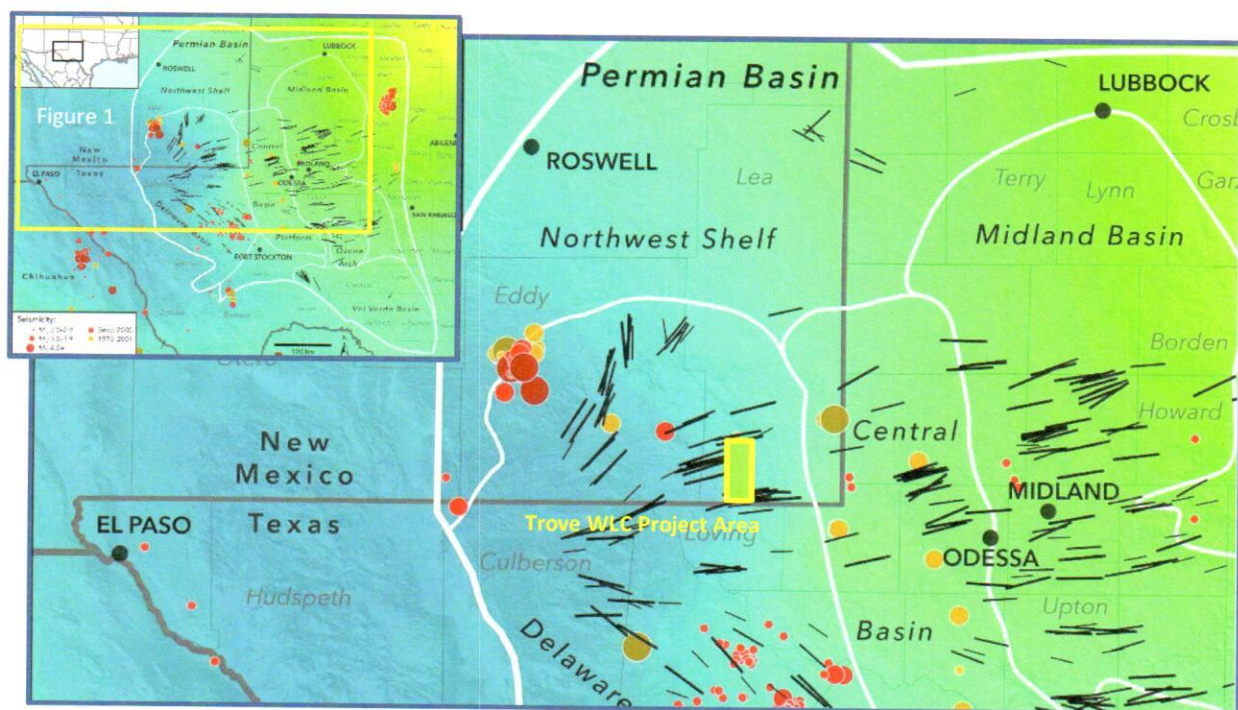
There are NO water wells located within one mile of the proposed SWD however; a representative analysis of area fresh water is included in this application.

# C-108 - Item VIII

## Geological Data

### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT

Map Source: State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity (Figure 1); Jens-Erik Lund Snee/ Mark Zoback, February 2018



#### TROVE PSE PROJECT VICINITY

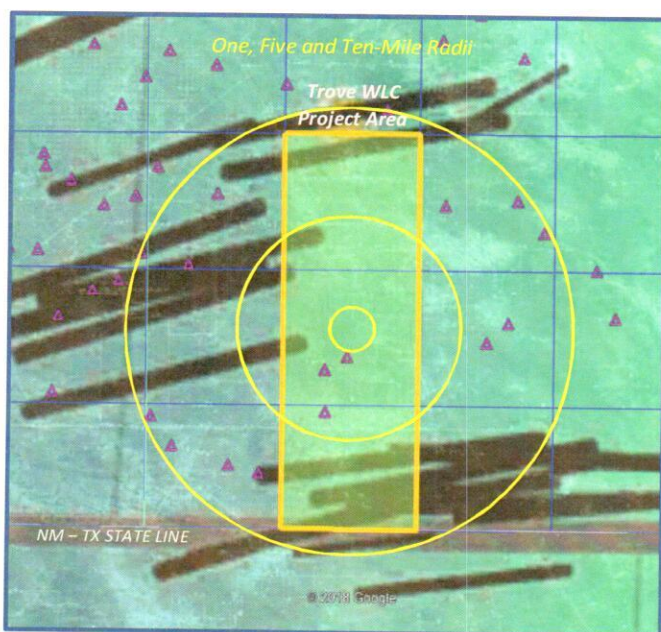


Figure 1. State of stress in the Permian Basin, Texas and New Mexico. Black lines are the measured orientations of the maximum horizontal stress (SHmax), with line length scaled by data quality. The colored background is an interpolation of measured relative principal stress magnitudes (faulting regime) expressed using the  $A_{\phi}$  parameter (see text for details) of Simpson (1997). Blue lines are fault traces known to have experienced normal-sense offset within the past 1.6 Ma, from the USGS Quaternary Faults and Folds Database (Crone and Wheeler, 2000). The boundary between the Shawnee and Mazatzal basement domains is from Lund et al. (2015), and the Precambrian Grenville Front is from Thomas (2006). The Permian Basin boundary is from the U.S. Energy Information Administration, and the subbasin boundaries are from the Texas Bureau of Economic Geology Permian Basin Geological Synthesis Project. Earthquakes are from the USGS National Earthquake Information Center, the TexNet Seismic Monitoring Program, and Gan and Frohlich (2013). Focal mechanisms are from Saint Louis University (Herrmann et al., 2011).



## C-108 - Item VIII

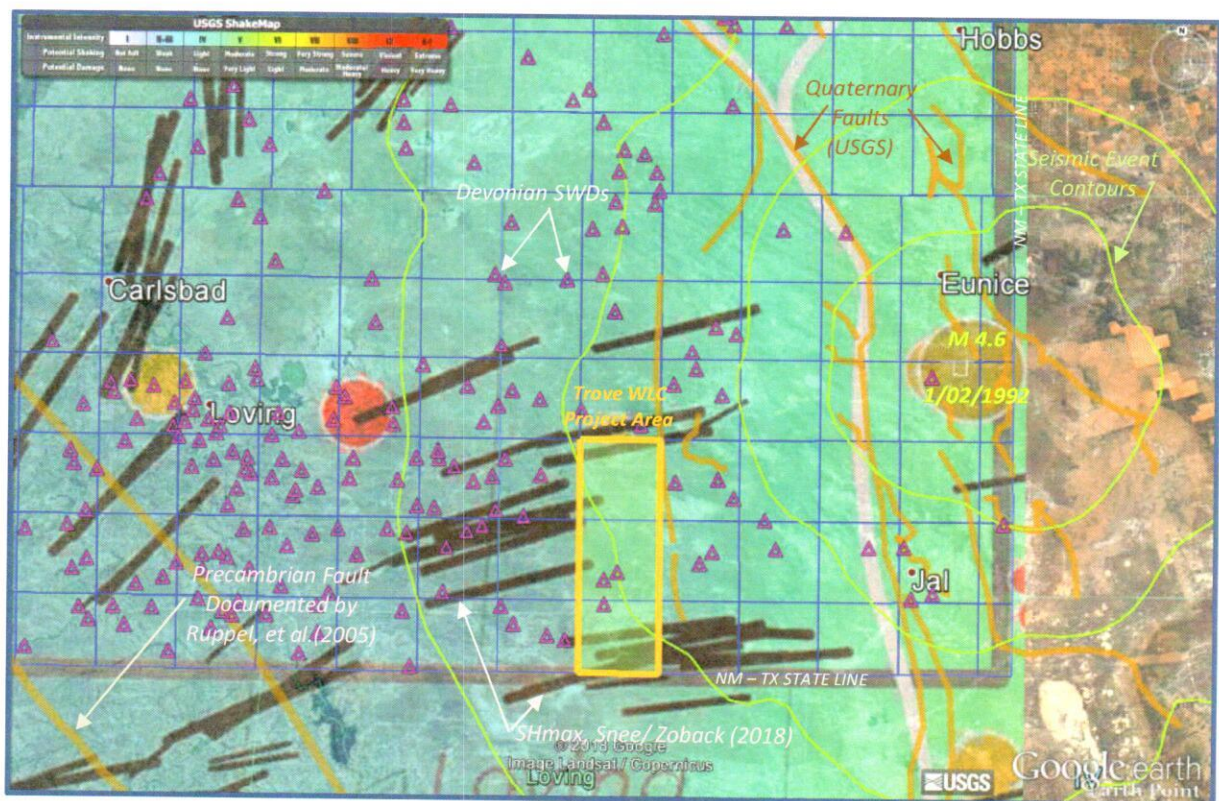
### Geological Data

#### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

In the following map, a layer with USGS historical earthquake data is overlaid and, a layer showing lines to represent Precambrian faults as documented by Ruppel, et al. (2005). Finally, a layer showing all currently permitted SWDs completed or proposed to be completed in the Devonian (Silurian) formation.

The USGS earthquakes shown are well known to the area. The 2012 quake located approximately 13 miles due east of Loving is also shown (22.4 miles). This was perhaps the most significant of the area in recent years but was determined to not be related to oil and gas activity. The best known and largest in recent history was the 1992, 4.6 magnitude quake centered south of Eunice, NM (29.5 miles).

The Precambrian faults and existing Devonian SWDs are discussed in more detail on the next page.



REGIONAL VIEW - DEVONIAN SWD LOCATIONS, PRECAMBRIAN FAULTS,  $S_{Hmax}$ , USGS MAGNITUDE



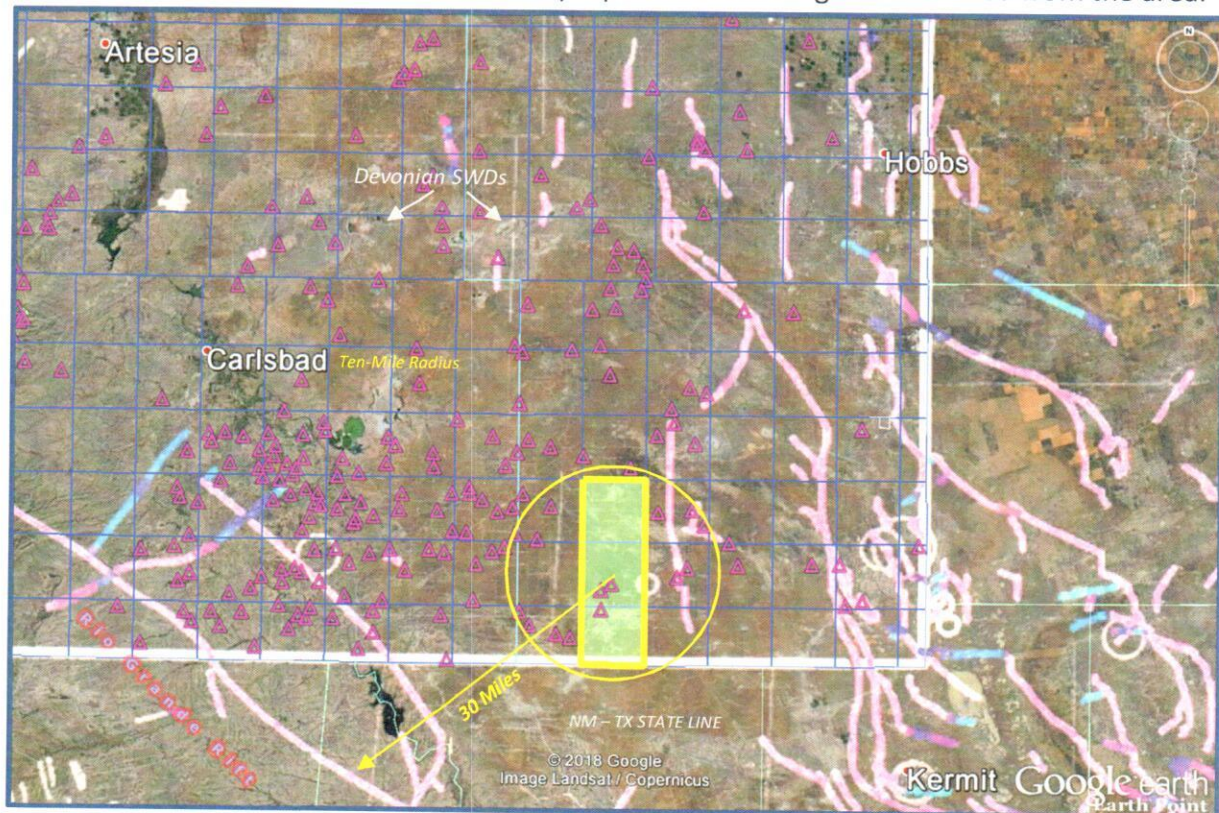
## C-108 - Item VIII

### Geological Data

#### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

The primary Precambrian faults in the area as documented by Ruppel, et al. (2005) is represented on this map by the thick, pink colored lines. The most significant of these is the fault associated with the Rio Grande Rift, running southeast to northwest and, runs adjacent to a portion of Hwy 285 however; only a small portion the associated fault which runs parallel approximately 15 miles northeast is depicted below. The Trove WLC Project SWD Area is located some 30 miles from the fault. Other documented faults (USGS, 2000) are shown for eastern Lea County and extending into west Texas. Other Devonian SWDs in the area are also shown (small purple triangles) completed or proposed to be completed in the Devonian (Silurian) formation.

The previously referenced study by Snee and Zoback (shown on previous exhibits) evaluated the strike-slip probability using probabilistic FSP (Fault Slip Potential) analysis of known faults in the Permian Basin. The study predicts that the Precambrian fault shown here has less than a 10% probability of being critically stressed to the point of creating an induced seismicity event. The main reason for the low probability is due to the relationship of the strike of the fault to the regional  $S_{Hmax}$  orientation; the proposed SWD being well removed from the area.



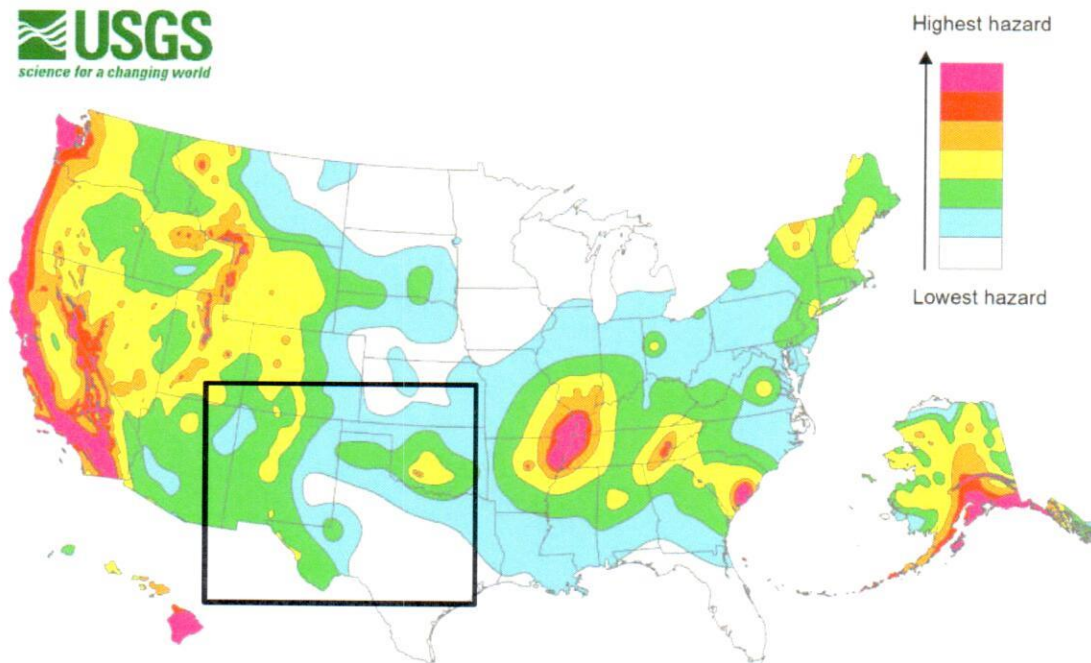
VICINITY - PERMITTED DEVONIAN SWDs, COMPOSITE FAULTS



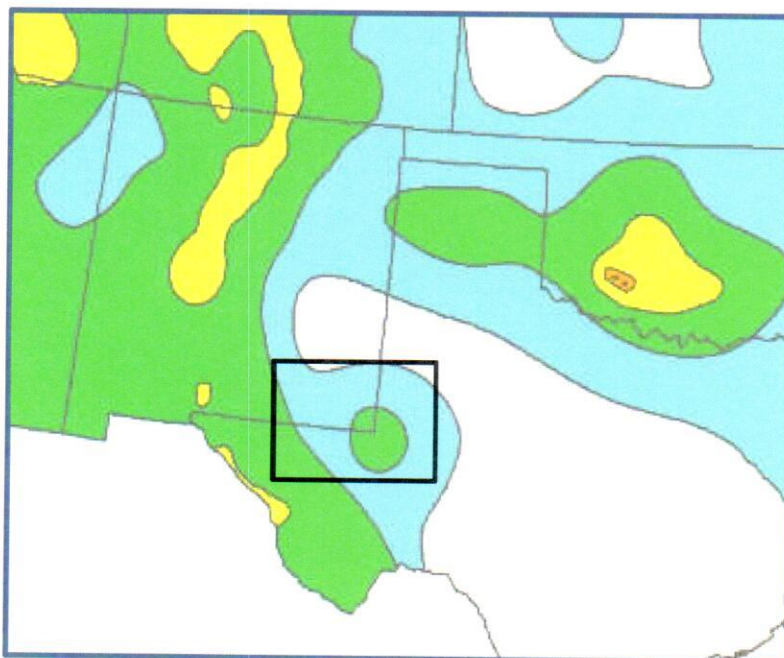
## C-108 - Item VIII

### Geological Data

#### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)



**2014 map data:** The USGS notes in its report that fracking may be to blame for a sizeable uptick in earthquakes in places like Oklahoma. "Some states have experienced increased seismicity in the past few years that may be associated with human activities such as the disposal of wastewater in deep wells," the report says. USGS hopes to use that data in future maps but it isn't included in this one. "Injection-induced earthquakes are challenging to incorporate into hazard models because they may not behave like natural earthquakes and their rates change based on man-made activities," the report says.

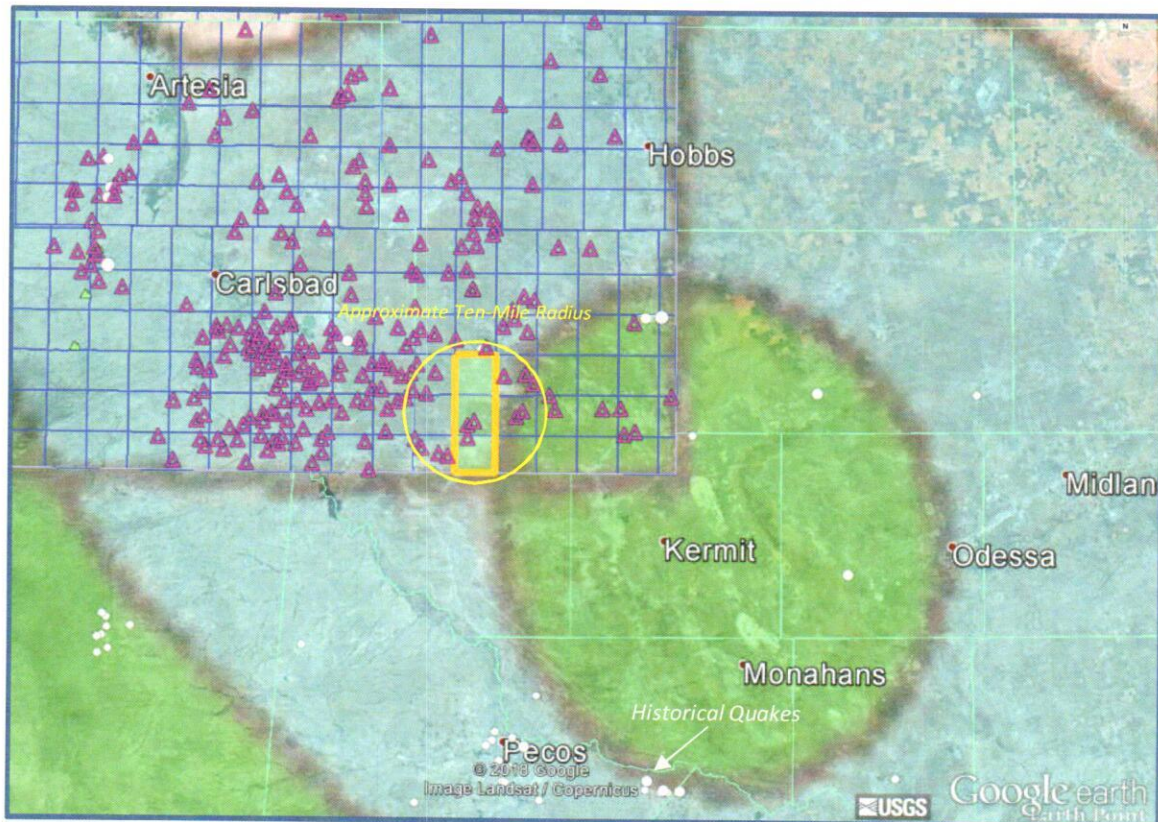


## C-108 - Item VIII

### Geological Data

#### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

USGS 2014 REGIONAL MAP DATA OVERLAY IN GOOGLE EARTH W/ HISTORICAL EARTHQUAKES



An updated USGS map for 2018 is on the next page. While methodology remained essentially the same according to USGS, the interpreted results and color-coding did have some modification. However, the subject area in southeast New Mexico on both maps remains very low and on the 2018 map, the area is assigned a value of <1% of “potentially minor-damage ground shaking”.

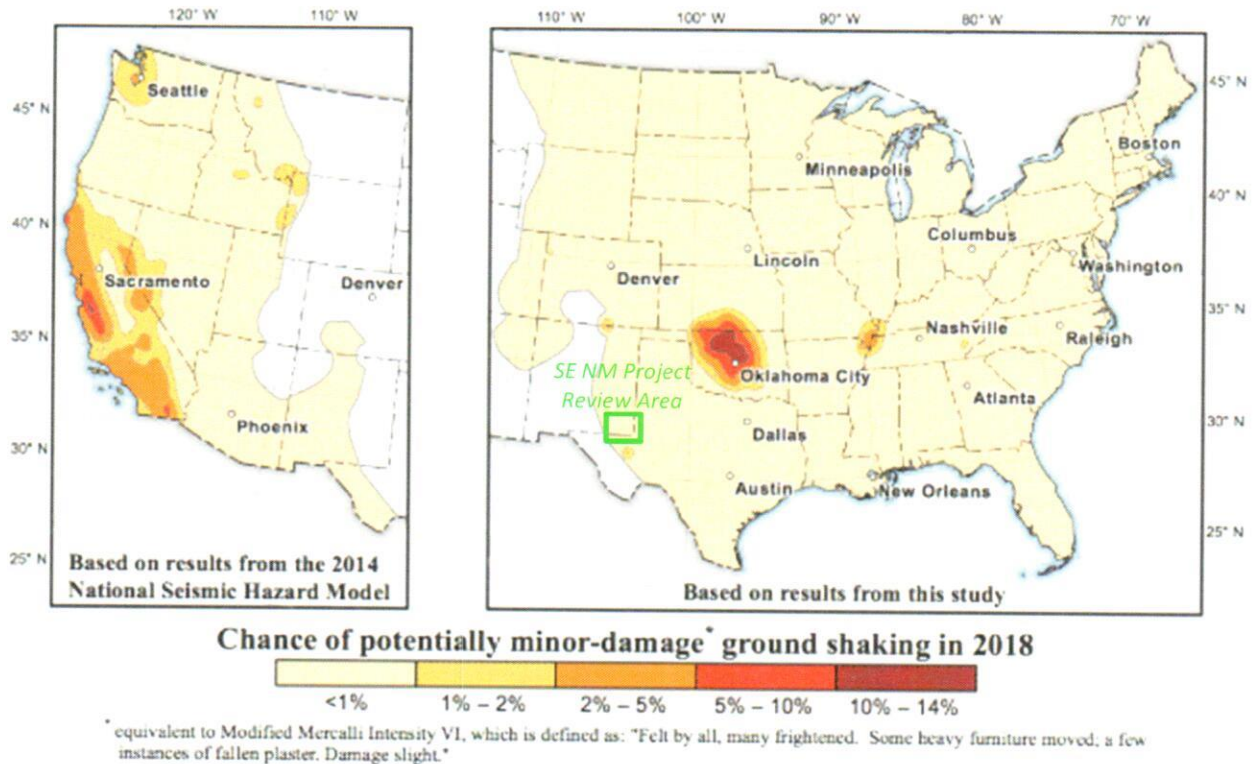


## C-108 - Item VIII

### Geological Data

#### EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

##### USGS 2018 ONE-YEAR MODEL



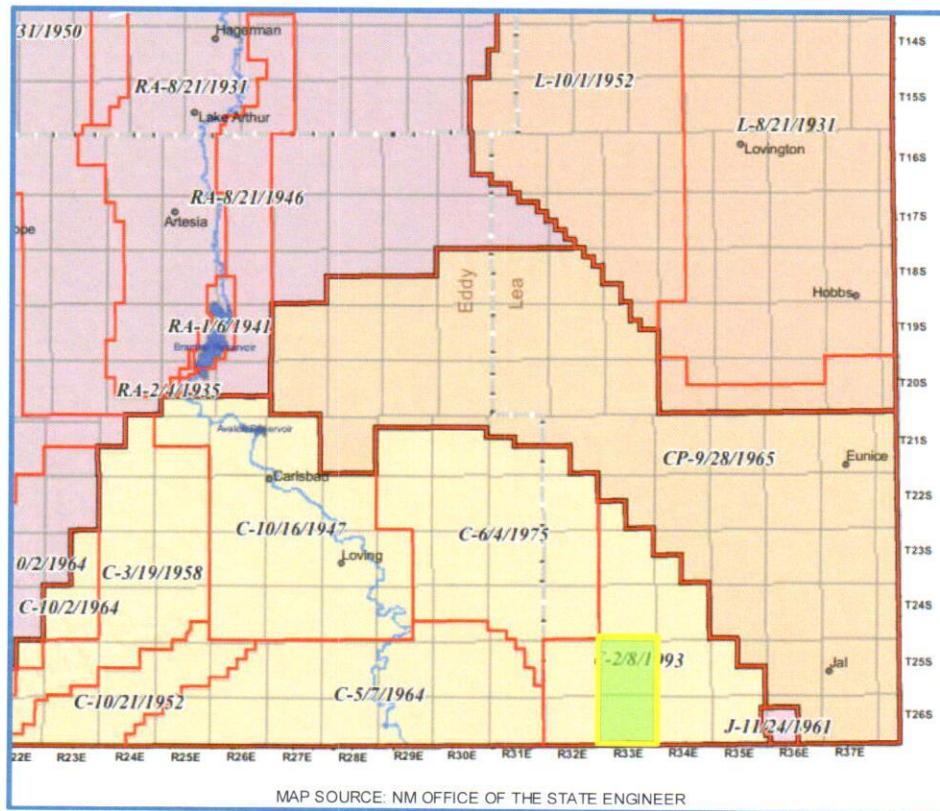
Map showing chance of damage from an earthquake in the Central and Eastern United States during 2018. Percent chances are represented as follows: pale yellow, less than 1 percent; dark yellow, 1 to 2 percent; orange, 2 to 5 percent; red, 5 to 10 percent; dark red, 10 to 12 percent. See Hazard from the western United States from the [2014 National Seismic Hazard Maps](#) (Petersen et al., 2014) for comparison.

The USGS has produced the 2018 one-year probabilistic seismic hazard forecast for the central and eastern United States from induced and natural earthquakes. For consistency, the updated 2018 forecast is developed using the same probabilistic seismicity-based methodology as applied in the two previous forecasts.

***Based on publicly available data for the subject area, it is reasonable to believe the risk of induced seismic activity due to disposal injection into this well is extremely low.***

## C-108 - Item XI

### Groundwater Basins - Water Column / Depth to Groundwater



The subject well is located within the Carlsbad Basin.

Fresh water in the area is generally available from the Rustler and Santa Rosa formations. State Engineer's records show water wells in the area with a depth to groundwater of 90 to 185 feet and an average depth of 142 feet.

There are NO water wells located within one mile of the proposed SWD.



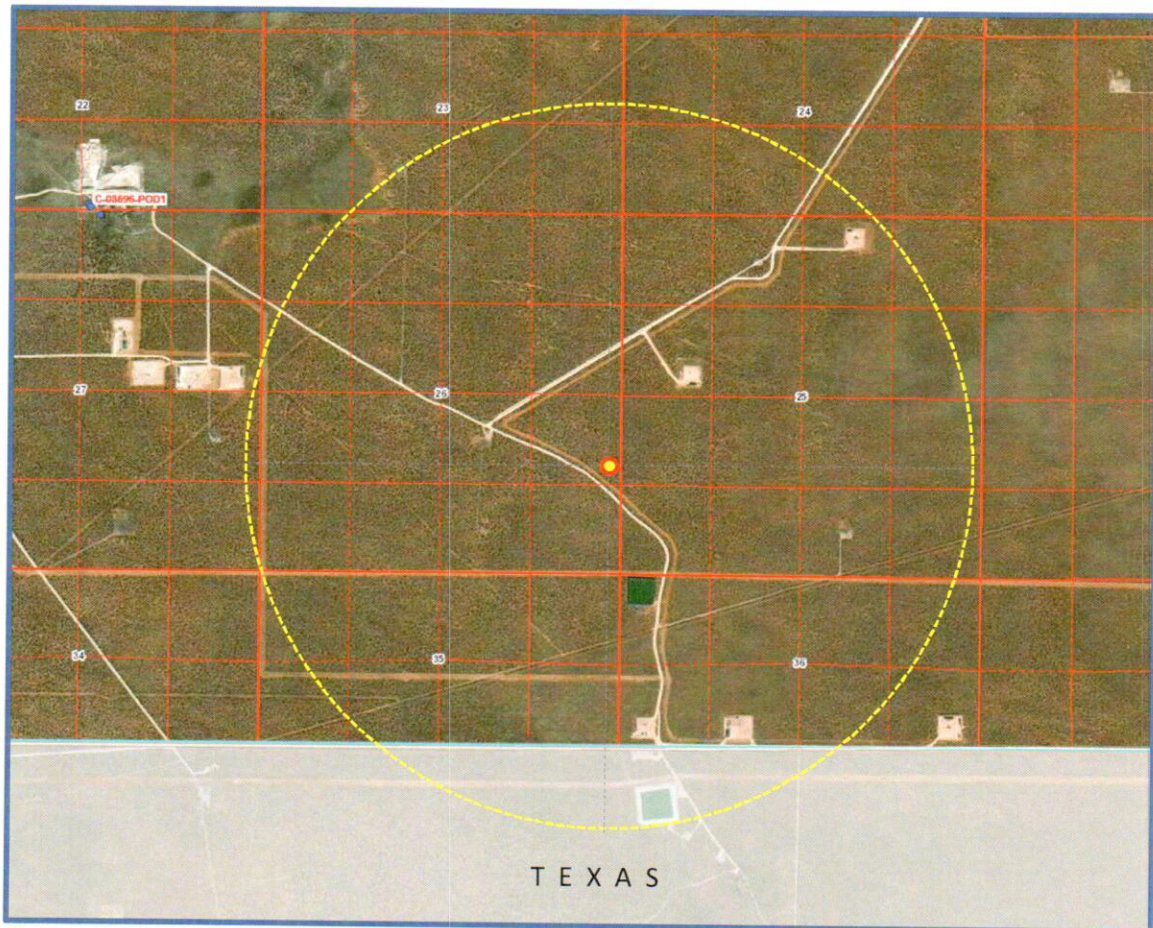
## C-108 Item XI

### Water Wells Within One Mile

#### WLC South Federal SWD No.3 - Water Well Locator Map

*There are NO water wells (PODs) within a one-mile radius of the proposed SWD.*

*A representative sample is included herein.*



*Data from NM Office of the State Engineer displayed in OSE-GIS System.*

# C-108 ITEM XI – WATER WELLS IN AOR

## Depth to Ground Water



## New Mexico Office of the State Engineer Water Column/Average Depth to Water

(A CLW##### in the  
POD suffix indicates the  
POD has been replaced  
& no longer serves a  
water right file.)

(R=POD has  
been replaced,  
O=orphaned,  
C=the file is  
closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<a href="#">C 02270</a>	CUB	LE		1	1	2	27	26S	33E	636063	3543722	150	125	25
<a href="#">C 02273</a>	CUB	LE			1	2	21	26S	33E	634549	3545134*	160	120	40
<a href="#">C 02285 POD1</a>	CUB	LE		1	4	4	03	26S	33E	636613	3548855	220	220	0
<a href="#">C 02286</a>	CUB	LE		3	4	4	03	26S	33E	636470	3548714	220	175	45
<a href="#">C 02287</a>	C	LE		3	4	4	03	26S	33E	636427	3548708	220		
<a href="#">C 02288</a>	CUB	LE		4	4	4	03	26S	33E	636646	3548758	220	180	40
<a href="#">C 02289</a>	CUB	LE		4	4	4	03	26S	33E	636612	3548675*	200	160	40
<a href="#">C 02290</a>	CUB	LE		4	4	4	03	26S	33E	636538	3548770	200	160	40
<a href="#">C 02293</a>	CUB	LE		2	2	1	14	26S	33E	637501	3546975	200	135	65
<a href="#">C 02294</a>	CUB	LE		4	4	3	11	26S	33E	637465	3547003	200	145	55
<a href="#">C 02295</a>	CUB	LE		2	2	4	12	26S	33E	639850	3547710*	250	200	50
<a href="#">C 03577 POD1</a>	CUB	LE		3	3	3	22	26S	33E	636010	3543771	750	110	640
<a href="#">C 03596 POD1</a>	C	LE		3	3	4	22	26S	33E	636017	3543756	225		

Average Depth to Water: 157 feet

Minimum Depth: 110 feet

Maximum Depth: 220 feet

Record Count: 13

PLSS Search:

Township: 26S

Range: 33E

\*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



# C-108 Item XI

## Water Wells in AOR

### Representative Fresh Water Analysis 26S-33E

#### H700792-02 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
---------	--------	-----	-----------------	-------	----------	-------	---------	----------	--------	-------

#### Cardinal Laboratories

##### Inorganic Compounds

Alkalinity, Bicarbonate	361		5.00	mg/L	1	7022210	AC	04-Apr-17	310.1	
Alkalinity, Carbonate	<1.00		1.00	mg/L	1	7022210	AC	04-Apr-17	310.1	
Chloride*	20.0		4.00	mg/L	1	7032301	AC	03-Apr-17	4500-Cl-B	
Conductivity*	803		1.00	uS/cm	1	7040708	AC	07-Apr-17	120.1	
pH*	7.68		0.100	pH Units	1	7032804	HM	28-Mar-17	150.1	
Sulfate*	118		25.0	mg/L	2.5	7032807	HM	27-Mar-17	375.4	
TDS*	486		5.00	mg/L	1	7032305	AC	03-Apr-17	160.1	
Alkalinity, Total*	296		4.00	mg/L	1	7022210	AC	04-Apr-17	310.1	

#### Green Analytical Laboratories

##### Total Recoverable Metals by ICP (E200.7)

Calcium*	28.2		0.100	mg/L	1	B704031	JLM	05-Apr-17	EPA200.7	
Magnesium*	28.1		0.100	mg/L	1	B704031	JLM	05-Apr-17	EPA200.7	
Potassium*	4.49		1.00	mg/L	1	B704031	JLM	05-Apr-17	EPA200.7	
Sodium*	96.8		2.00	mg/L	1	B704031	JLM	05-Apr-17	EPA200.7	

## **C-108 ITEM XII**

### **Geologic Affirmation**

We have examined available geologic and engineering data and have found no evidence of open faults or other hydrologic connection between the disposal interval and any underground sources of drinking water.



---

Ben Stone, Partner  
SOS Consulting, LLC

Project: Trove Energy and Water, LLC  
WLC South Project Area  
Reviewed 2/22/2019



## **C-108 ITEM XIII – PROOF OF NOTIFICATION**

### IDENTIFICATION AND NOTIFICATION OF INTERESTED PARTIES

#### **Exhibits for Section**

Affected Parties Map

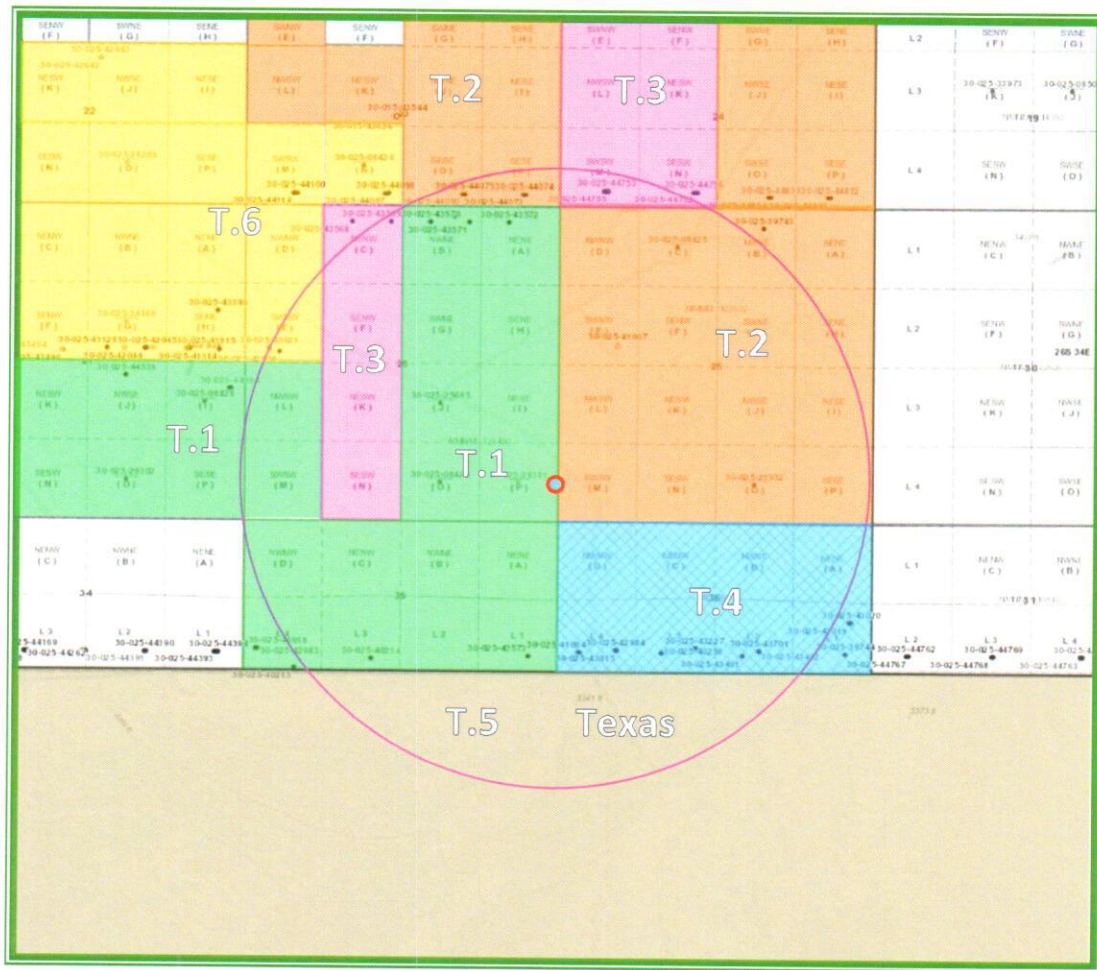
List of Interested Parties

Notification Letter to Interested Parties

Proof of Certified Mailing

Published Legal Notice

# WLC South Federal SWD Well No.3 – Affected Parties Plat (Attachment to NMOCD Form C-108, Application for Authority to Inject.)



## LEGEND

- |  |   |
|--|---|
| T.1 – NMNM-121490 – EOG Resources, Inc.      | T.4 – VC-0025-0001 – EOG Resources, Inc.  |
| T.2 – NMNM-122622 – EOG Resources, Inc.      | T.5 – Texas – Texas Railroad Commission   |
| T.3 – NMNM-0002965A – ConocoPhillips Company | T.6 – NMNM-125653 – Battle Axe Ranch, LLC |



# C-108 ITEM XIII – PROOF OF NOTIFICATION AFFECTED PARTIES LIST

**SOS Consulting is providing electronic delivery of C-108 applications.**

**ALL APPLICABLE AFFECTED PARTIES ARE PROVIDED A LINK IN THE NOTICE LETTER  
TO A SECURE SOS/ CITRIX SHAREFILE® SITE TO VIEW AND DOWNLOAD  
A FULL COPY OF THE SUBJECT C-108 APPLICATION IN PDF FORMAT.**

"AFFECTED PERSON" MEANS THE DIVISION DESIGNATED OPERATOR; IN THE ABSENCE OF AN OPERATOR, A LESSEE WHOSE INTEREST IS EVIDENCED BY A WRITTEN CONVEYANCE DOCUMENT EITHER OF RECORD OR KNOWN TO THE APPLICANT AS OF THE DATE THE APPLICANT FILES THE APPLICATION; OR IN THE ABSENCE OF AN OPERATOR OR LESSEE, A MINERAL INTEREST OWNER WHOSE INTEREST IS EVIDENCED BY A WRITTEN CONVEYANCE DOCUMENT EITHER OF RECORD OR KNOWN TO THE APPLICANT AS OF THE DATE THE APPLICANT FILED THE APPLICATION FOR PERMIT TO INJECT.; PER OCD RULES NMAC 19.15.26.7, A. AND 19.15.26.8, B.2.

## SURFACE OWNER

- 1 U.S. DEPARTMENT OF INTERIOR  
Bureau of Land Management  
Oil & Gas Division  
620 E. Greene St.  
Carlsbad, NM 88220  
Certified: 7018 0360 0001 8569 7498

## OFFSET MINERALS LESSEES and OPERATORS (All Notified via USPS Certified Mail)

### **BLM Leases NMNM-121490, 122622; State Lease V0-0025-0001 (T.1, T.2 and T.4 on Map)** ***Lessee & Operator***

- 2 EOG RESOURCES, INC.  
105 S. 4th St.  
Artesia, NM 88210  
Certified: 7018 0360 0001 8569 7504

### **BLM Lease NMNM-0002965A (T.3 on Map)**

#### ***Lessee***

CONOCOPHILLIPS COMPANY  
P.O. Box 2197  
Houston, TX 77252-2197

#### ***Operator***

EOG RESOURCES, INC.  
105 S. 4th St.  
Artesia, NM 88210

### **State of Texas (T.5 on Map)**

- 3 RAILROAD COMMISSION OF TEXAS  
Technical Permitting Section - UIC Program  
P.O. Box 12967  
Austin, TX 78711-2967  
Certified: 7018 1130 0000 8738 0595

### **BLM Lease NMNM-125623 and Split Estate – Battle Axe Ranch, LLC (T.6 on Map)**

#### ***Lessee & Operator***

EOG RESOURCES, INC.  
105 S. 4th St.  
Artesia, NM 88210

**C-108 ITEM XIII – PROOF OF NOTIFICATION**  
**AFFECTED PARTIES LIST (cont.)**

**OFFSET MINERALS OWNERS** (Notified via USPS Certified Mail)

U.S. DEPARTMENT OF INTERIOR  
Bureau of Land Management  
Oil & Gas Division  
620 E. Greene St.  
Carlsbad, NM 88220

4 STATE OF NEW MEXICO  
Oil, Gas and Minerals Division  
310 Old Santa Fe Trail  
Santa Fe, NM 87504  
Certified: 7018 1130 0000 8738 0601

**REGULATORY**

NEW MEXICO OIL CONSERVATION DIVISION (FedEx'ed original and copy)  
1220 S. St. Francis Dr.  
Santa Fe, NM 87505

NEW MEXICO OIL CONSERVATION DIVISION (FedEx'ed copy)  
1625 N. French Drive  
Hobbs, NM 88240





April 25, 2019

**NOTIFICATION TO INTERESTED PARTIES**  
**via U.S. Certified Mail – Return Receipt Requested**

To Whom It May Concern:

Trove Energy and Water, LLC, Hobbs, New Mexico, is preparing applications to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the WLC South Federal SWD Well No.3. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well will be located in Section 26, Township 26 South, Range 33 East in Lea County, New Mexico.

The published notice states that the interval will be from 17,750 feet to 19,015 feet into the Devonian, Silurian and Fusselman formations.

Following is the notice published in the Hobbs News-Sun, Hobbs, New Mexico on or about April 9, 2018.

**LEGAL NOTICE**

Trove Energy, LLC, 1919 North Turner, Hobbs, NM 88240, is filing Form C-108 (Application for Authority to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the WLC South Federal SWD Well No.3 will be located 1420' FSL and 15' FEL, Section 26, Township 26 South, Range 33 East, Lea County, New Mexico; approximately 21.2 miles west/ south-west of Jal, NM.

Produced water from area production will be commercially disposed into the Devonian, Silurian and Fusselman formations at a maximum interval depth of 17,750' to 19,015' at a maximum surface pressure of 3550 psi and a rate limited only by such pressure. Mudlogging and e-logs will confirm final interval depths.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, NM 87505, (505)476-3460 within 15 days of the date of this notice. Additional information may be obtained from the applicant's agent, SOS Consulting, LLC, (903)488-9850 or, email [info@sosconsulting.us](mailto:info@sosconsulting.us).

***You have been identified as a party who may be interested as an offset lessee or operator.***

You are entitled to a full copy of the application. A full copy in PDF format will be posted on the SOS Consulting **ShareFile** site and available for future download (posting may lag behind the notice effort).

Use the URL link: <https://sosconsulting.sharefile.com/d-se5a32a41cbf49808>  
(Please Note: The ShareFile service is powered by Citrix Systems and is completely secure.\*)

*The link to this file will be active for 60 days from the date of this letter. Your company can access and download the file a maximum of five (5) times. (One copy may be downloaded and shared as needed among your company.)*

If preferred, you may call SOS Consulting, LLC at 903-488-9850, or email [info@sosconsulting.us](mailto:info@sosconsulting.us), and the same PDF file copy will be expedited to you via email.

Please use a subject like **"WLC South Fed SWD #3 April 2019 PDF Copy Request"**.

Thank you for your attention in this matter.

Best regards,



Ben Stone, SOS Consulting, LLC  
Agent for Trove Energy and Water, LLC

Cc: Application File

*SOS Consulting is committed to providing superior quality work using technology to assist clients and affected parties in obtaining the documentation required. SOS will continue to utilize methods which are less energy and resource intensive including, the reduction of paper copies.*

*We hope you'll partner with us and appreciate these efforts.*

\* You will be asked for your email, name and company.

This will not be used by anyone except keeping track of the file downloads.

You will not be solicited by SOS or anyone else. Data is stored on Citrix Systems servers only.

**CITRIX**





# C-108 - Item XIV

## Proof of Notice (Certified Mail Receipts)

7018 0360 0001 8569 7498

<b>U.S. Postal Service™</b>	
<b>CERTIFIED MAIL® RECEIPT</b>	
Domestic Mail Only	
For delivery information, visit our website at <a href="http://www.usps.com">www.usps.com</a> ®.	
<b>OFFICIAL USE</b>	
Certified Mail Fee	\$ 3.50
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$ 2.80
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$ .55
Total Postage and Fees	\$ 4.85
Sent To	Bureau of Land Management
Street or	Oil & Gas Division
City, State	620 E. Greene St.
PS Form	Carlsbad, NM 88220

4052 6558 0001 8569 7504

<b>U.S. Postal Service™</b>	
<b>CERTIFIED MAIL® RECEIPT</b>	
Domestic Mail Only	
For delivery information, visit our website at <a href="http://www.usps.com">www.usps.com</a> ®.	
<b>OFFICIAL USE</b>	
Certified Mail Fee	\$ 3.50
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$ 2.80
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$ .55
Total Postage and Fees	\$ 4.85
Sent To	EOG RESOURCES, INC.
Street or	Attn: Chuck Moran
City, State	5509 Champions Drive
PS Form	Midland, TX 79706

7018 1130 0000 8738 0595

<b>U.S. Postal Service™</b>	
<b>CERTIFIED MAIL® RECEIPT</b>	
Domestic Mail Only	
For delivery information, visit our website at <a href="http://www.usps.com">www.usps.com</a> ®.	
<b>OFFICIAL USE</b>	
Certified Mail Fee	\$ 3.50
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$ 2.80
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$ .55
Total Postage and Fees	\$ 4.85
Sent To	RAILROAD COMMISSION OF TEXAS
Street or	Technical Permitting Section - UIC Program
City, State	P.O. Box 12967
PS Form	Austin, TX 78711-2967

7018 1130 0000 8738 0601

<b>U.S. Postal Service™</b>	
<b>CERTIFIED MAIL® RECEIPT</b>	
Domestic Mail Only	
For delivery information, visit our website at <a href="http://www.usps.com">www.usps.com</a> ®.	
<b>OFFICIAL USE</b>	
Certified Mail Fee	\$ 3.30
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$ 2.80
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$ .55
Total Postage and Fees	\$ 6.65
Sent To	STATE OF NEW MEXICO
Street or	Oil, Gas and Minerals Division
City, State	310 Old Santa Fe Trail
PS Form	Santa Fe, NM 87504

# Affidavit of Publication

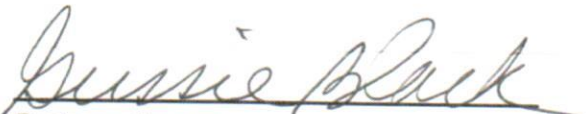
STATE OF NEW MEXICO  
COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated  
April 09, 2019  
and ending with the issue dated  
April 09, 2019.

  
Publisher

Sworn and subscribed to before me this  
9th day of April 2019.

  
Business Manager

My commission expires  
January 29, 2023

(Seal)



This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

## LEGALS

### LEGAL NOTICE APRIL 9, 2019

Trove Energy and Water, LLC, 1919 North Turner, Hobbs, NM 88240, is filing Form C-108 (Application for Authority to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the WLC South Federal SWD Well No.3 will be located 1420' FSL and 15' FEL, Section 26, Township 26 South, Range 33 East, Lea County, New Mexico, approximately 21.2 miles west/southwest of Jal, NM.

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67104420

00226853

BEN STONE  
SOS CONSULTING, LLC.  
P.O. BOX 300  
COMO, TX 75431



# Trove Energy and Water, a NM LLC

Established 2016

Net Asset Value \$55 million

\$8 million/yr revenue since inception

EXHIBIT

5

Case 2:1142

2015/  
EXHIBIT  
Trove |

# AOR (Area of Review) – 7 townships identified by Trove for water logistics development

- New water – after a comprehensive review of the area, Trove determined the injection capacity to be severely deficient to support the planned horizontal oil development of this 7 township region.
- New SWD capacity is also dramatically constrained by availability of suitable locations for SWD. All future locations are reserved.
- Even with all 24 Trove locations approved and drilled, the AOR will be chronically short of disposal capacity by 700,000 barrels/day in 2020 and 500,000 barrels/day by 2023.

23S 31E  
24S 30E  
24S 32E  
25S 31E  
24S 31E  
25S 33E

24S 33E  
25S 32E  
25S 34E

26S 31E  
26S 32E  
26S 33E  
26S 34E





# Trove Energy and Water, LLC

Prospect Development,

C-108 Preparation

And

Other Permitting Efforts and Activities

~ References LARGE FIGURE Pages ~



EXHIBIT 2

# Prospect Development

- Trove seeks to target activity-rich areas where the disposal need is forecast to be greatest

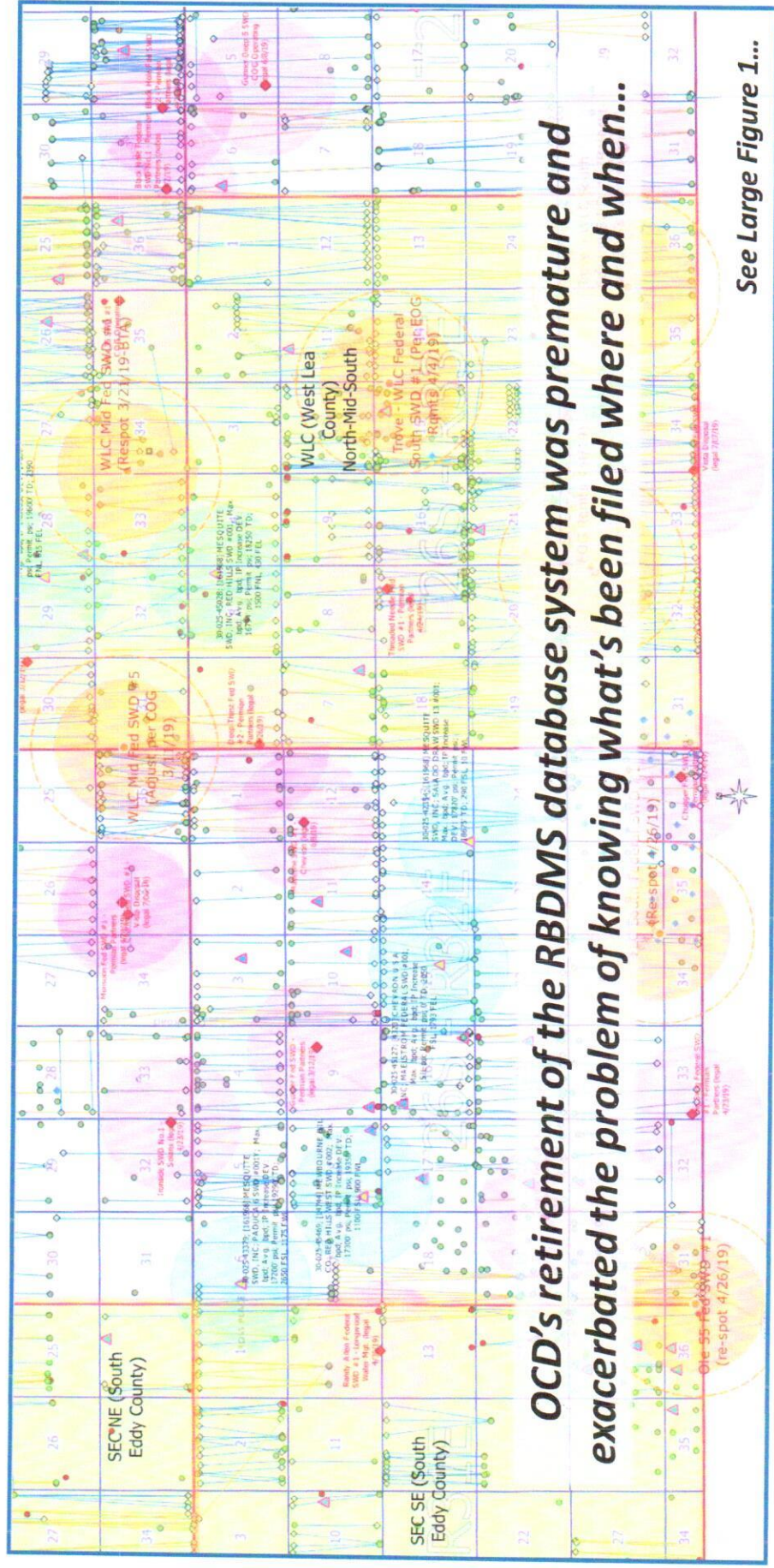
## LOCATION CRITERIA

- Current prospecting efforts are focused on Federal lands
- State and Fee lands will be prospected in future development phases
- Forward looking plans 3 to 5 years prospecting and development – 35 to 40 years facility life.
- **Proximity to Existing, Permitted or Applied-for SWD Locations**
- **Surface issues** – drainage and arroyos, other such as pipelines or electric, other infrastructure
- **Horizontal completions** – subsurface lateral runs
- Operators' & Lessees' current and future **Development Plans**
- **Road Access** when possible (minimize new roads)



# Prospecting Challenges

Trove does not consider other SWD operators **EXCEPT** to completely avoid any competitors' SWDs  $\frac{3}{4}$ -mile AOR bubble – other infrastructure is generally not known.

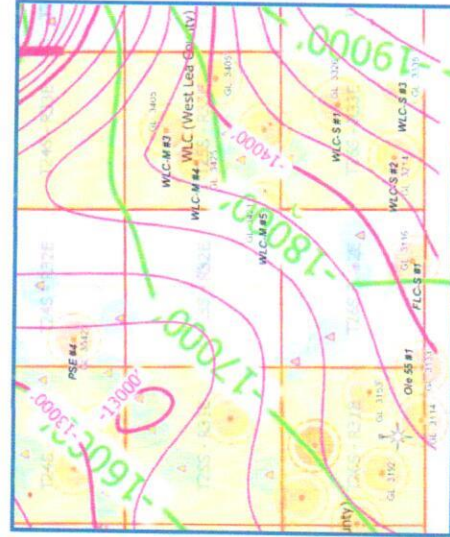
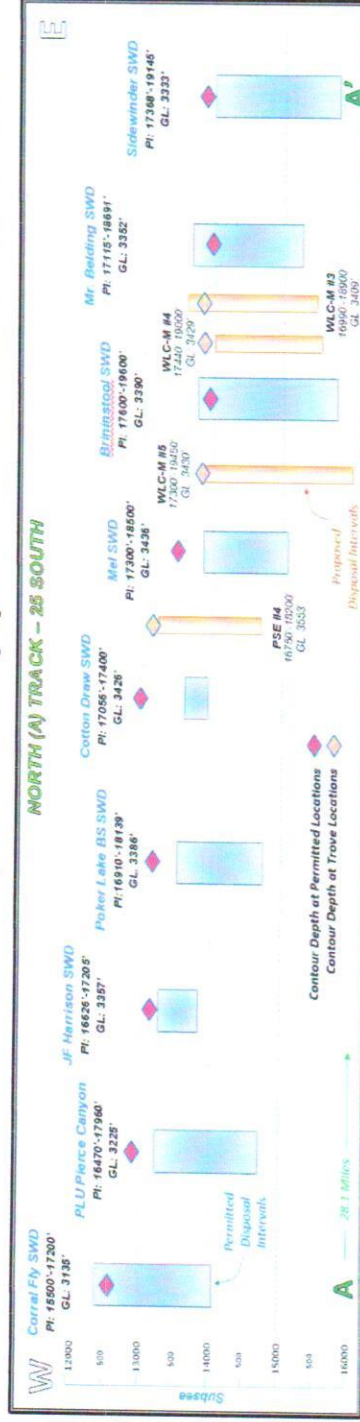




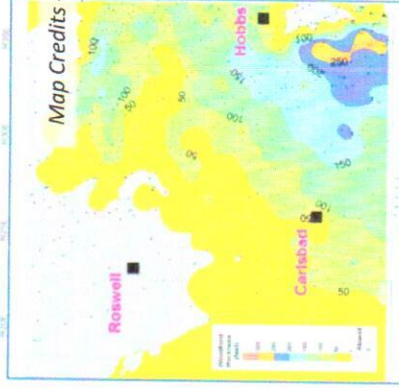
# Disposal Interval Determination

(and Confining Strata Layers)

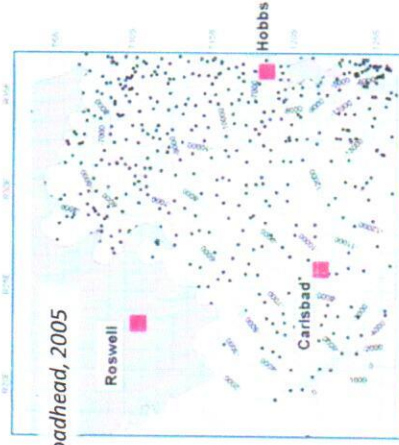
*Devonian-Silurian and Precambrian Contours and nearby SWDs were used to determine the appropriate interval for each site; Isopachs approximate thickness*



Woodford Shale Isopach Map  
Pseudo-corrected thickness



Structure on Siluro Devonian Carbonates



See Large Figures 2, 3, 4, 5...

Stratigraphic Column

Age	Strata
TRIASSIC	Chinle Santa Rosa Dawser Lake Roubler Salido Cattle
PERMIAN	Delaware Mountain Group Cherry Canyon Brushy Canyon Leonardian Cutoff Fm. Bone Spring Wolfcampian Hueco ("Wolfcamp")
PENNSYLVANIAN	Virgilan Cisco Canyon Des Moinesian Scraper Atoka Morrow Barnett Undivided limestones
MISSISSIPPIAN	Woodford
DEVONIAN	Upper Middle Lower
SILURIAN	Upper Middle Lower
ORDOVICIAN	Fossiliferous Montoya Simpson Ellenburger Bliss
CAMBRIAN	Bliss
PRECAMBRIAN	Igneous, metamorphic, volcanic



# Intense Competition

NMOCD's unwritten but currently mandated  $\frac{3}{4}$ -mile Area of Review for Devonian SWDs helped create the 'Gold Rush mentality' to lock up quickly diminishing real estate available for SWD placement.



*Trove and SOS consistently apply a Good Neighbor Policy to prospecting and negotiating SWD placement and have moved many times (even before filing) to accommodate competitors and operators...*

See Large Figures 6 & 7...

# Trove and SOS

## Permitting Effort and Approach

### *SWD Permit – NMOCD C-108*

UIC Program Centric – Authorize and Secure SWD Spot

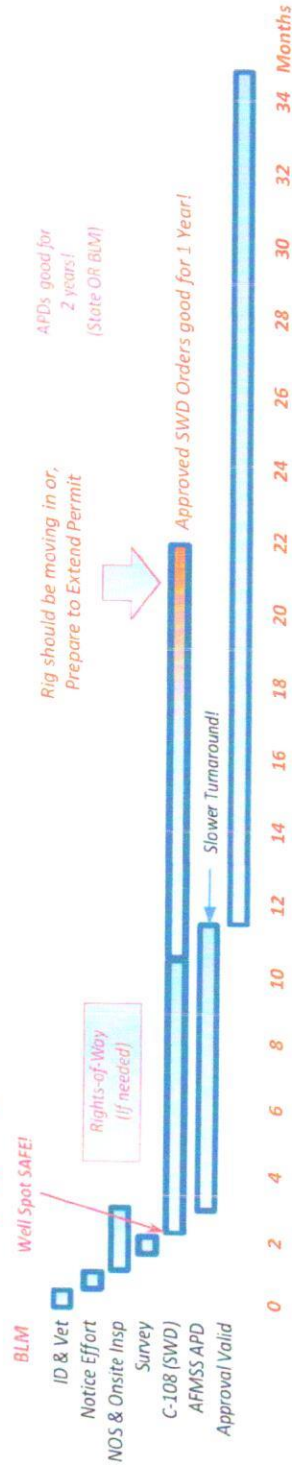
***APD – BLM Form 3160-003 – AFMSS 2***

Well & Construction Detail / Other Physical Specifics

***Rights-of-Way/ SWD Easement – SF-299***

Roads, Pipelines, Electrical **AND** SWD Facility Pad and Use

**GRAPHIC TIMELINE (Typical)**





# UIC Program Guidance

- EPA, under the auspices of the Safe Water Drinking Act's Underground Injection Control Program, awarded Primacy to NMOCD in 1981 for its existing injection well permitting and monitoring program
- Class II designation emphasizes the protection of USDWs through appropriate injection well design and,
- Protects Correlative Rights and the Environment
- Provides that casing strings be effectively cemented to prevent migration between strata
- Provides for water analyses (area fresh water and injected produced water & RCRA Exempt) and,
- Provides appropriate monitoring, inspection and corrective action compliance measures

# Trove and SOS Permitting Philosophy

- Fully support goals and intent of UIC and C-108 Requirements with appropriate\* level of detail
- C-108 focuses on Well Spot Siting, Area of Review, Zone Identification and Affected Party Notification
- Estimate formation depths for suitable and approximate casing and downhole design
- Generate supporting exhibits for AOR – identify and document wells which penetrate target zone
- ID fresh water wells if applicable – analyses, verify no probable conduit or fault for migration to USDW
- Appropriate geologic target description – additional info – cross-sections and seismic as needed

\* *Much of the C-108 well information is estimated – APDs vastly more specific*



# Trove and SOS - C-108s (cont.)

- Operational narrative should be well developed and contain appropriate detail (*pressures, rates, security, etc.*)
- Research, document and illustrate as needed to fully present the proposed operation as clearly and comprehensively as possible
- Consult and communicate with regulators and affected parties as necessary to address comments, questions or concerns - Strive to address any issues as quickly as possible
- After 'Suspense' period, ***move towards APD*** activities and requirements, surveys, etc.

# Trove and SOS - C-108s (cont.)

- Trove and SOS Consulting agree with much of industry and are concerned that NMOCD is struggling to meet its regulatory responsibilities in a timely manner
- Requirements should be promulgated as Rules
- Rules should be adhered to and consistent on both sides (*AORs and suspense dates are examples; has tubing size precedence been set?*)
- NMOCD should help to foster cooperation, good neighbor policies and communication; anti-competitive and *free-for-all* protests should be discouraged
- SLO's *Pore Space-Correlative Rights Issue* is ill-conceived and will have unintended, far-reaching consequences



# Trove and SOS - APDs

- APDs and SWD Applications are inherently different in detail – ***as they should be***
- APD Well Construction Details (*formations, pipe, cement, mud, fluids, wastes and surface issues*) are covered in **exhaustive** detail – ***as they should be***
- AFMSS 2 is utilized for Notice of Staking and leads to the full APD application effort
  - Surveys, on-site inspections (BLM and company reps) and rights-of-way needs are addressed
  - APDs at BLM go through a rigorous chain review process by many individuals with specialized areas of focus (*casing design, geology*)
- APD submittal (for Trove) is contingent upon a reasonable assurity that the SWD permit is forthcoming (***suspense x 3***)
- The \$10K BLM APD fee is NOT an insignificant amount, regardless of operator size

# Trove and SOS – Well Detail

## *Full Dataset - Circle Back to OCD Attention*

- Mud logs confirm disposal interval, other well logs (*Cement Bond, G/R, Res, Den, CNL*) provided to NMOCD
- ‘As-Built’ Well Specs documented on BLM 3160-4 (*exact depths of casing, formation, cement volumes, etc.*), cc’d OCD
- Progress (*spud, casing set*) and required adjustments reported via BLM sundry (*pipe setting depths, cement*) copied to OCD
- Upon completion, well is tested for mechanical integrity (MIT) and witnessed by OCD and BLM inspectors – BHP recorded – injectivity may be tested
- SWD Well is tied into facility and injection commences



# Trove Energy and Water, LLC

## SOS Consulting, LLC

### Summary and Conclusion

- Prospect for Appropriate and Quality SWD Sites
- Work with the Operator / Lessee to locate suitable sites that do not interfere with Development Plans
- Research and document all required data pertinent to Area of Review, Well Design and Operation
- Notify all Affected Parties and Publish Legal Notice
- Assemble a quality, easy to read C-108 presentation
- Send it to Santa Fe OCD Office, Engineering Bureau, cross fingers and hope for the best
- Move towards other permitting needs and activities



# Trove Energy and Water, LLC

Prospect Development,

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And

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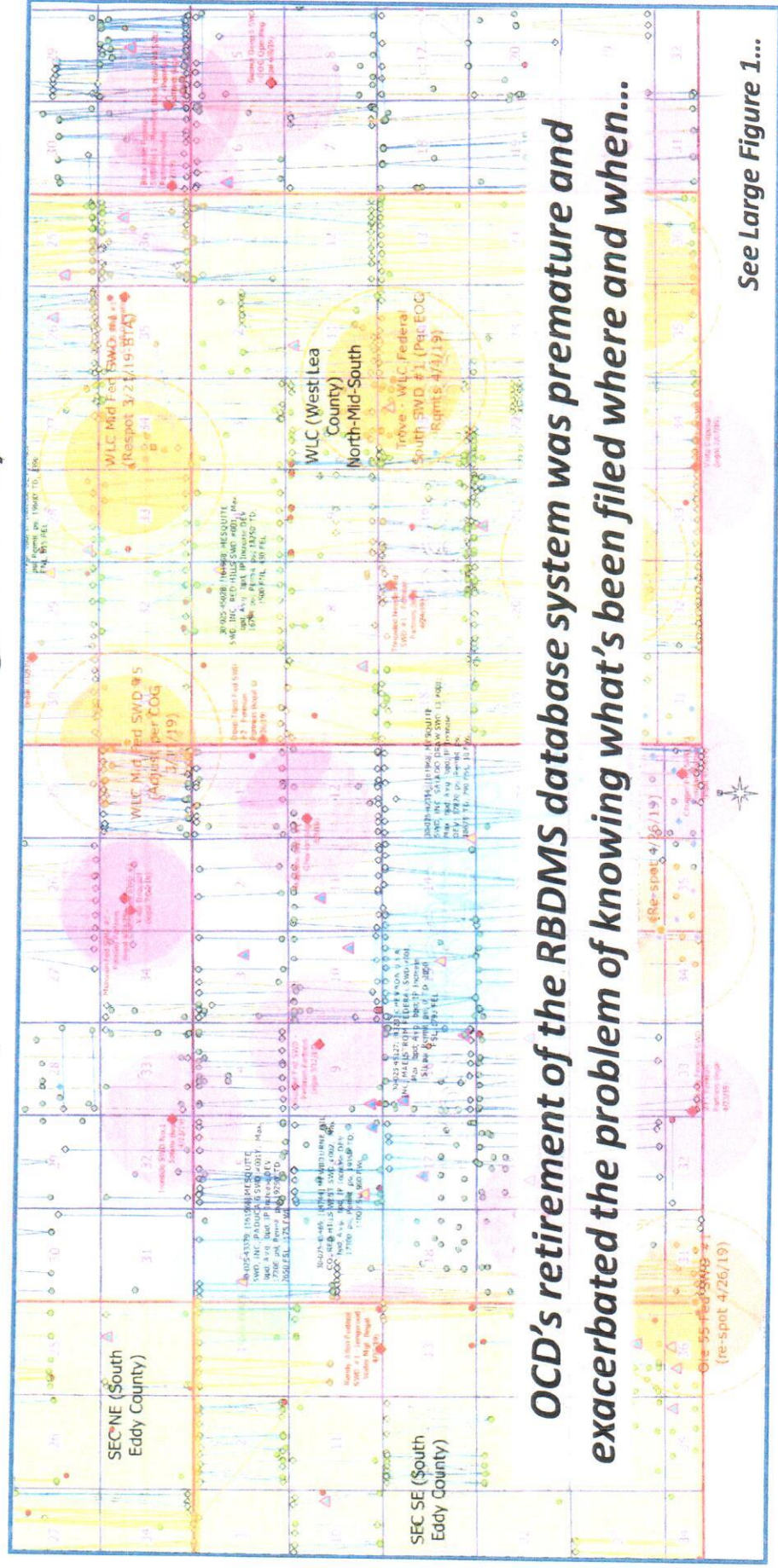
EXHIBIT 2





# Prospecting Challenges

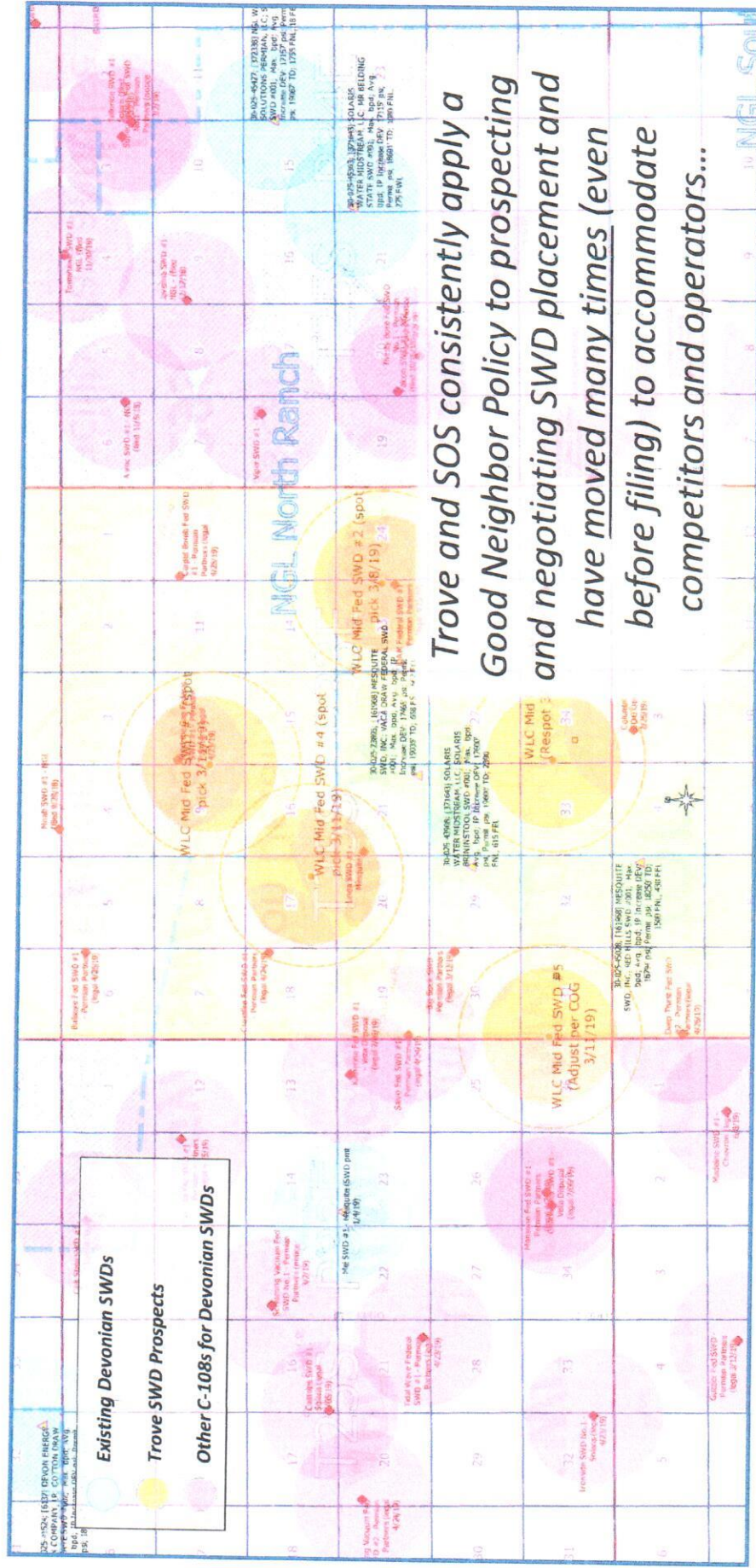
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# Trove Energy and Water, LLC

## SOS Consulting, LLC

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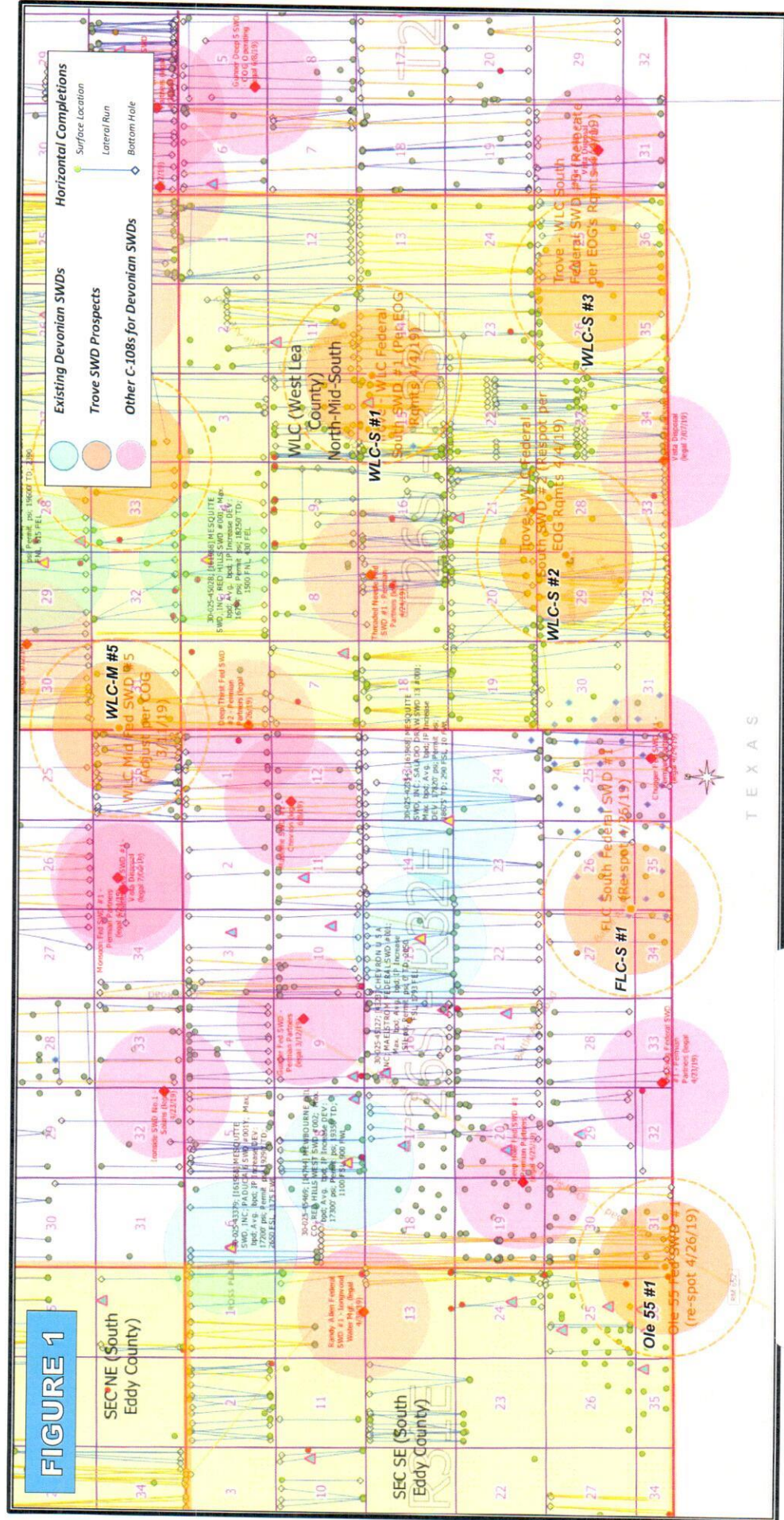
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- Research and document all required data pertinent to Area of Review, Well Design and Operation
- Notify all Affected Parties and Publish Legal Notice
- Assemble a quality, easy to read C-108 presentation
- Send it to Santa Fe OCD Office, Engineering Bureau, cross fingers and hope for the best
- Move towards other permitting needs and activities



# Trove Project Areas Prospecting Challenges

Existing Devonian SWDs,  
New C-108s and Trove Prospects

**Notes** – Southern Lea and Eddy Counties remain very active for horizontal completions in the Bone Spring and Wolfcamp plays. These prolific formations offer multiple target depths for completions and while activity has plateaued somewhat, it is expected to remain at the forefront of investments for many operators for years to come. Trove's prospecting approach was to identify available areas to maintain appropriate distances from existing SWDs and other operators' C-108s recently submitted. Trove would then communicate with the operator (lessee) to vet spots suitable to their staff and the company's future development plans. Upon approval, the C-108 application package was submitted. Trove did not consider offsetting SWD operators except to completely avoid any of their SWD ¾ - mile radius bubbles.





# Trove Project Areas

## Southeast New Mexico

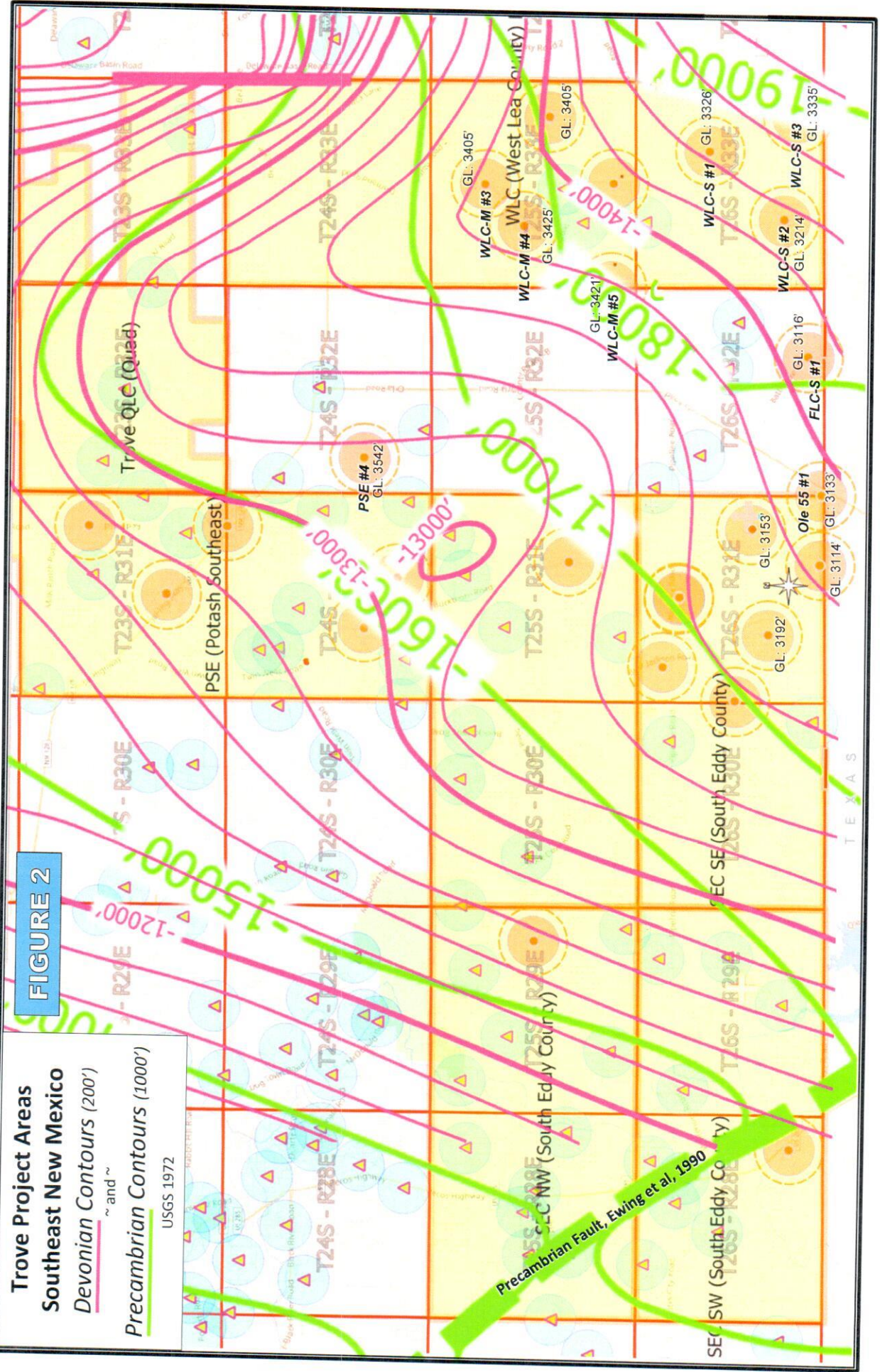
Devonian Contours (200')

~ and ~

Precambrian Contours (1000')

USGS 1972

FIGURE 2





(Devonian Contour Overlay)

These permitted intervals (top and bottom) were used in conjunction with Devonian contours and Precambrian contours to establish an approximate target interval for Trove prospects. Two tracks were run west to east across Townships 25 South (A) and 26 South (B). A 200 to 300-foot buffer was applied to the interval in most cases.

[illegible]



# Trove Project Areas Depth Graph – Cross Section

**Notes** - Recently permitted and/or completed Devonian SWDs are correlated to a depth graph adjusted to subsea. These permitted intervals (PI) are shown in conjunction with Devonian contour depths for each respective location. Trove prospect SWDs are inserted in appropriate areas relative to the permitted and/or existing SWDs.

**FIGURE 4**



## SOUTH (B) TRACK – 26 SOUTH



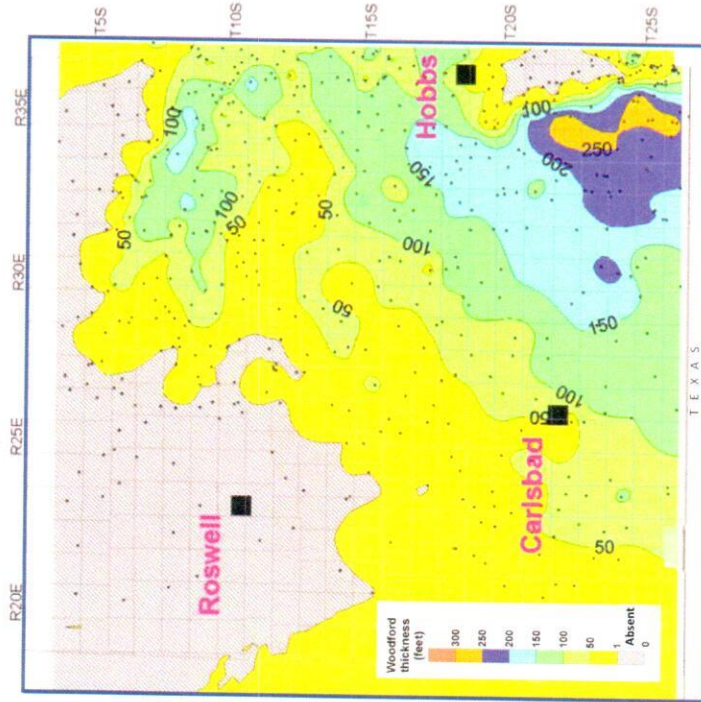


# Disposal Zone Determination – Confining Strata, Structure, Stratigraphy

FIGURE 5

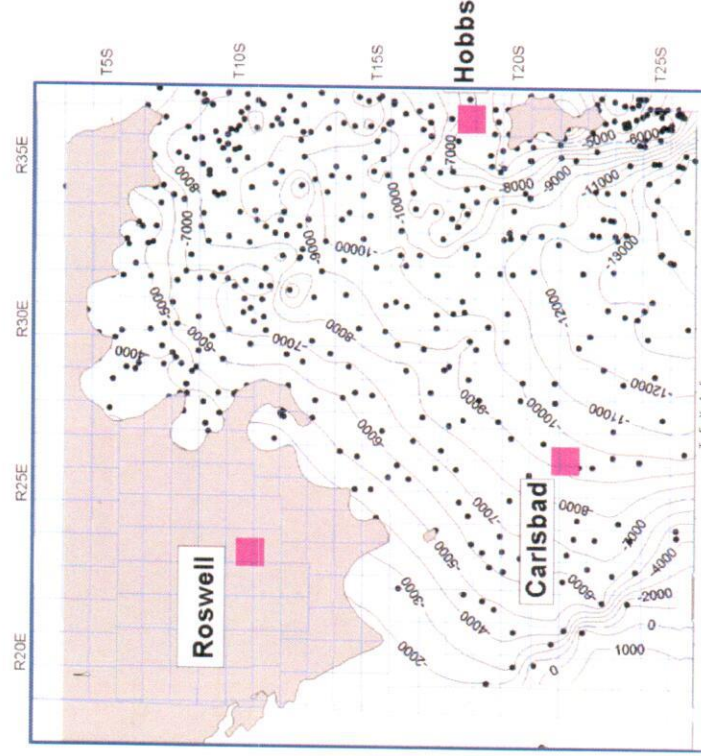
Note - All Trove SWD prospects are overlain by 100 – 200 feet of Woodford Shale followed by lower Mississippian and Barnett Shale. Some prospects MAY include the upper 20 – 90 feet of the Fusselman. All are underlain by the Montoya, Simpson and Ellenburger (Ordovician) formations.

Woodford Shale Isopach Map  
Pseudo-corrected thickness



Isopach map of the Woodford Shale constructed by correcting apparent thickness to true thickness in wells with dipmeter logs and by omitting wells with local anomalous and overly thick Woodford.

Structure on Siluro-Devonian Carbonates



Structure contours on Siluro-Devonian carbonate strata (Wristen Group and Thirtystone Formation) in southeastern New Mexico. The northerly limit of contours coincides with the northern extent of the Woodford Shale.

Above Figures from *Regional aspects of the Wristen petroleum system, southeastern New Mexico*; Ronald F. Broadhead, 2005

Stratigraphic Column

Age	Strata
TRIASSIC	Chinle
	Santa Rosa
PERMIAN	Dewey Lake
	Rustler
	Salado
	Castile
GUADALUPIAN	Mountain Group
	Bell Canyon
	Cherry Canyon
	Brushy Canyon
LEONARDIAN	Cutoff Fm.
	Bone Spring
WOLFCAMPIAN	Hueco ("Wolfcamp")
PENNSYLVANIAN	Cisco
	Canyon
	Des Moinesian
	Strawn
	Atokan
MORROWAN	Morrow
MISSISSIPPIAN	Barnett
	Undivided limestones
DEVONIAN	Woodford
	DEVONIAN/SILURIAN TARGET INTERVAL
	Woodford
SILURIAN	Fusselman
	Montoya
ORDOVICIAN	Simpson
	Ellenburger
CAMBRIAN	Bliss
	Igneous, metamorphics, volcanics
PRECAMBRIAN	

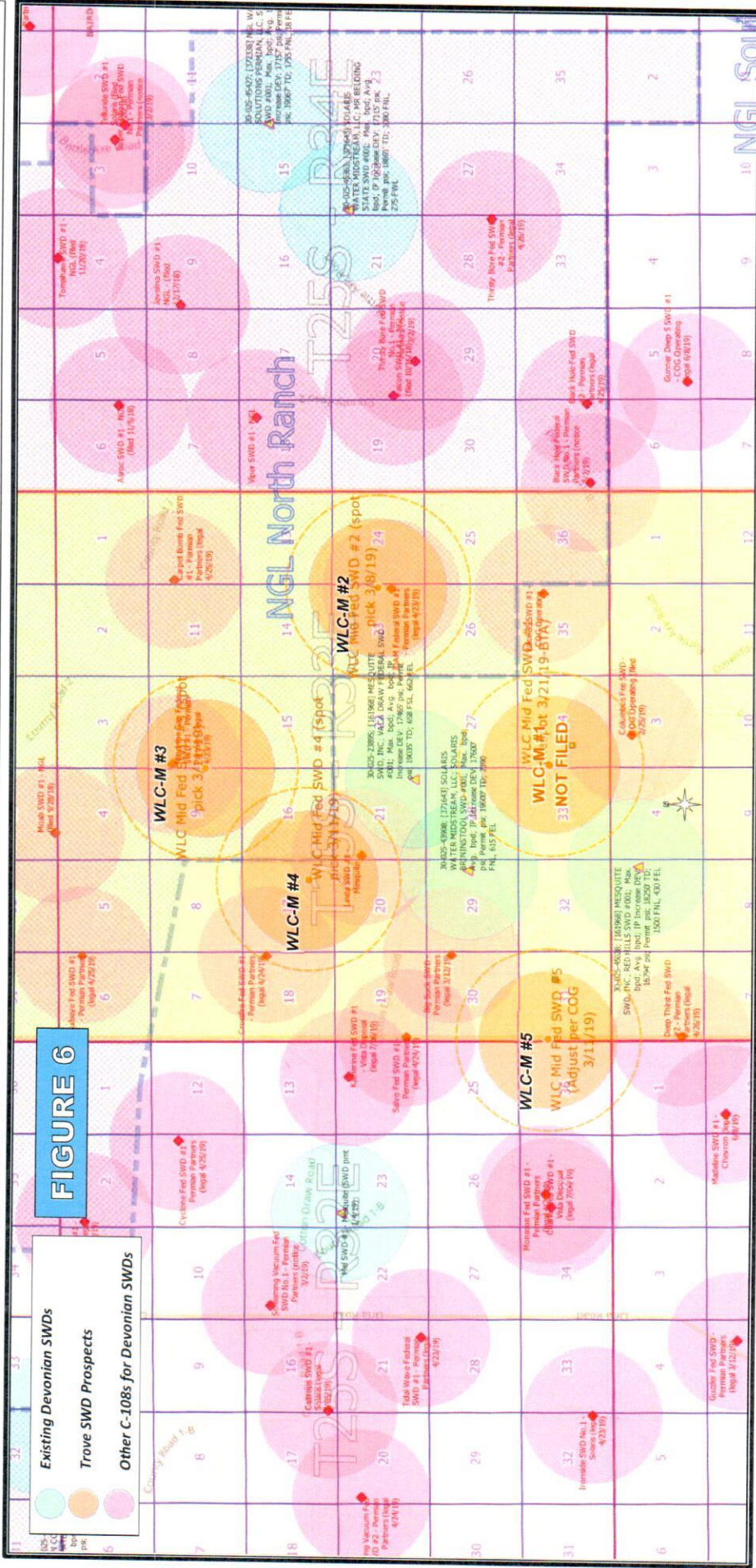


# **Trove Project Area** **WLC Mid Federal** **Prospect Locations** ~ And ~ **Competitive** **SWD Locations**

**Notes —** This view of Trove's WLC Mid Federal Project Area (25S-33E) reflects the current highly competitive nature of SWD prospecting in southeast New Mexico. The situation is fostered by demand for disposal capacity and in part by the New Mexico Oil Conservation Division's currently mandated ¾-mile Area of Review for Devonian SWDs. This mandate helped to create the 'gold rush mentality' to lock up quickly diminishing real estate available for SWD placement. Trove and SOS Consulting have documented numerous relocation efforts to avoid conflicts and overlaps in ¾-mile AOR bubbles. A more appropriate policy focused on fault location and other pertinent data might help temper the aggressive pace and more well-thought-out, good neighbor development of future salt water disposal well locations and facilities.

**FIGURE 6**

- Existing Devonian SWDs
- Trove SWD Prospects
- Other C-108s for Devonian SWDs

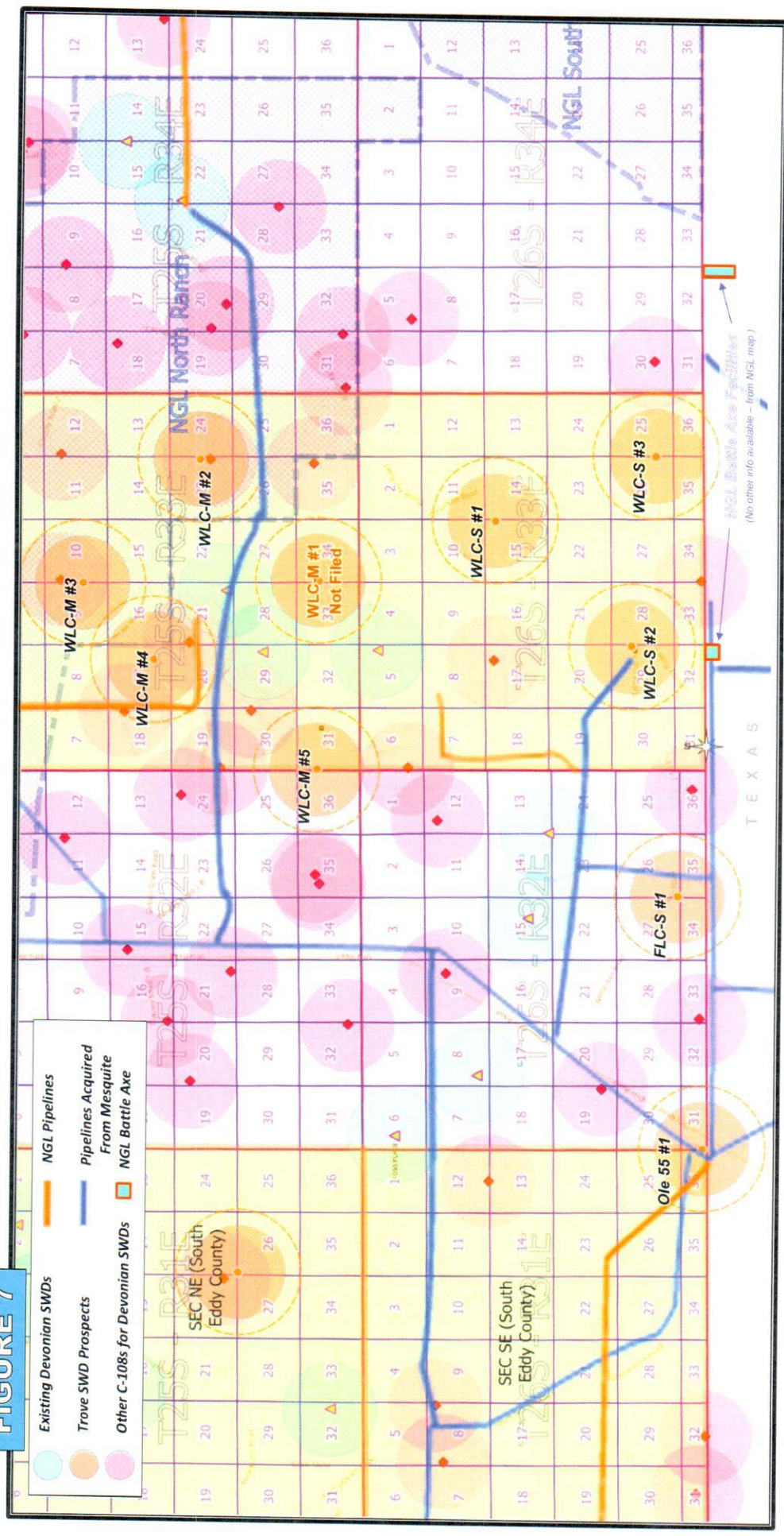




**Trove Project Areas**  
**NGL Water Permian**  
**Pipeline Infrastructure**  
~ And ~  
 NGL North and South Ranches

**Notes** — Pipeline routes depicted are an image overlay, registered as accurately as possible. The overlay was digitized from a document image file and while the routes were accurately recorded, the map geographical reference points were likely stretched and tilted on the original document. Trove and SOS Consulting acquired a portion of the information after a discussion with NGL personnel in April 2019. A subsequent search for additional supporting data turned up some 'investor presentation' materials from NGL's website. Trove SWD prospect locations were picked in late 2018/ early 2019.

**FIGURE 7**







## WELL SCHEMATIC - PROPOSED

### Trove Generic SWD Well No.123

(This illustration is based on the original Ole 55 SWD #1)

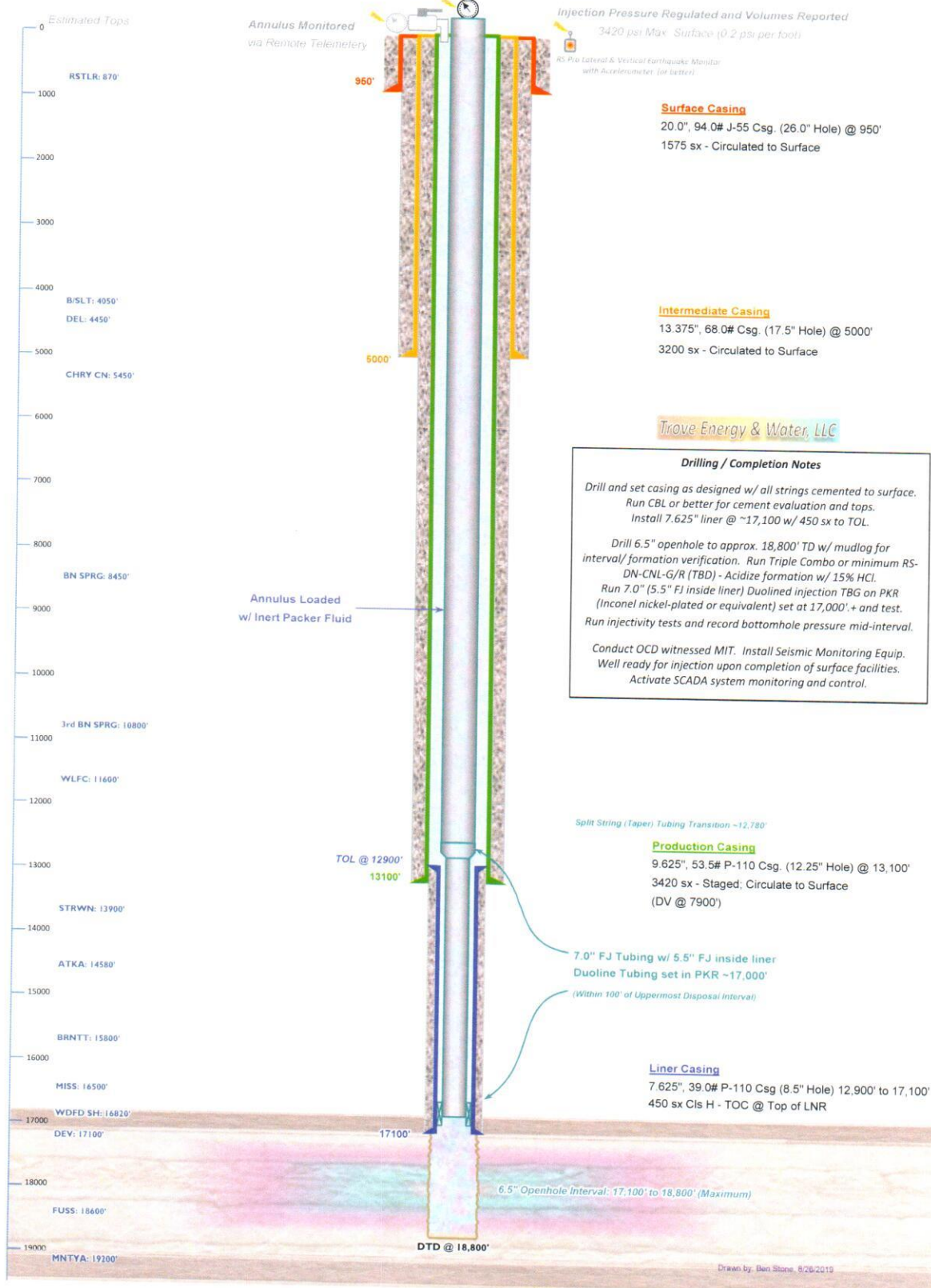
API 30-025-xxxxx

1700' FNL & 5' FWL, SEC. 31-T26S-R32E  
LEA COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)

Spud Date: 1/15/2020

SWD Config Dt: 3/01/2020





# Trove Energy and Water, LLC

## **ADDENDUM INFORMATION for Protested C-108 Applications**

**NMOCD Examiner Hearing, September 5, 2019**

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EXHIBIT

4

## Trove Energy and Water, LLC

### ***Prospect Development Overview***

Trove Energy and Water contacted SOS Consulting for a possible exclusive arrangement for prospecting SWD sites in southeast New Mexico and to file any and all necessary applications required to fully permit the wells. The agreement started in earnest in February 2019.

Trove's desire was to target activity-rich areas where the need for additional disposal capacity was anticipated to be greatest now and in the future. Initially, Trove is looking at federal lands only but will include NM state lands in an upcoming phase. Fee and private land will be considered but is becoming scarce with regards to SWD siting and the current spacing dictated by the NM Oil Conservation Division. Forward looking plans are for the 3 to 5-year range.

***Based on information from the BLM and other sources, criteria used for the Trove prospecting approach is to consider:***

- 1) Proximity to Existing, Permitted or Applied-for SWD locations<sup>1</sup> ;***
- 2) Surface issues particularly regarding arroyos and other drainage patterns and obvious obstructions such as pipelines or electrical;***
- 3) Horizontal completions below a prospective site and ultimately,***
- 4) The operators' or lessees' current and future development plans.***

All prospects were sited initially using Google Earth, internal and external GIS systems and other available data. When a satisfactory site was determined using the above parameters, a map was generated and provided to the operator and/or the lessee with pertinent information as spotted. The operator would either vet and approve or negotiate a new spot acceptable to their interests. Most operators have an *SWD Review Group* to look for geologic and other subsurface concerns, land and development plans for the lease(es) and other infrastructure that may come into play.

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<sup>1</sup> Trove and SOS are sensitive to the OCD's authority to implement a ¾-mile Area of Review for proposed Devonian SWDs and the effective 1.5 mile spacing as implied. Other than avoiding obvious pipeline rights-of-way or similarly occupied land, we did not account for competitors' other facilities or infrastructure. New Mexico regulatory agencies have no jurisdiction to accommodate competitive advantages in oil and gas leases, easements or other regulatory instruments.



Trove project areas were located and internally named as *(in order of prospect development and C-108 submittal generally)*; WLC Mid and South (West Lea Corridor), FLC South (Far Lea County), PSE (Potash Southeast), SEC SE, SW, NW and NE (South Eddy County).

It should be noted that several of the prospects were moved or otherwise adjusted to accommodate not only operators' or lessees' concerns but also to just avoid a competitor's spot that may have beat us to the punch in a certain area. (Three Trove prospects were relocated or dropped altogether based on the operator's identification of a fault very near the prospect site.)

*Trove and SOS made the decision that if a published legal notice was made for a competitor's SWD that would interfere with a prospect site being worked on, the assumption would be that the competitor was either days away from submitting or, had already submitted a C-108 application. However; if our C-108 for a prospect was already well underway and just a few days from submittal, we would go ahead with the submittal as a great deal of effort had been put into prospect development and preparation of the C-108 so, it was worth the risk of whether ours was filed first or not.*

*This approach we believed, demonstrated our desire to employ good-neighbor policies towards operators AND competitors. Many SWD operators are employing similar approaches, some are not.*

***According to our records, to date, Trove has had twenty protests on fifteen C-108s – seven have been negotiated and resolved, four are being negotiated and the remainder are the subjects of these hearings on eight Trove C-108s.***

Nine C-108s continue to move through the administrative process and are well beyond the normal suspense period of 15-days as cited in the rules and regulations of the New Mexico Oil Conservation Division.

Additional Trove SWD prospect sites are under development in accordance with applicable rules and regulations of the New Mexico Oil Conservation Division, Bureau of Land Management and the New Mexico State Land Office.



# Trove Energy and Water, LLC

## Prospect Development Overview

### WLC Mid (25S-33E) and WLC South (26S-33E) Federal Project Areas

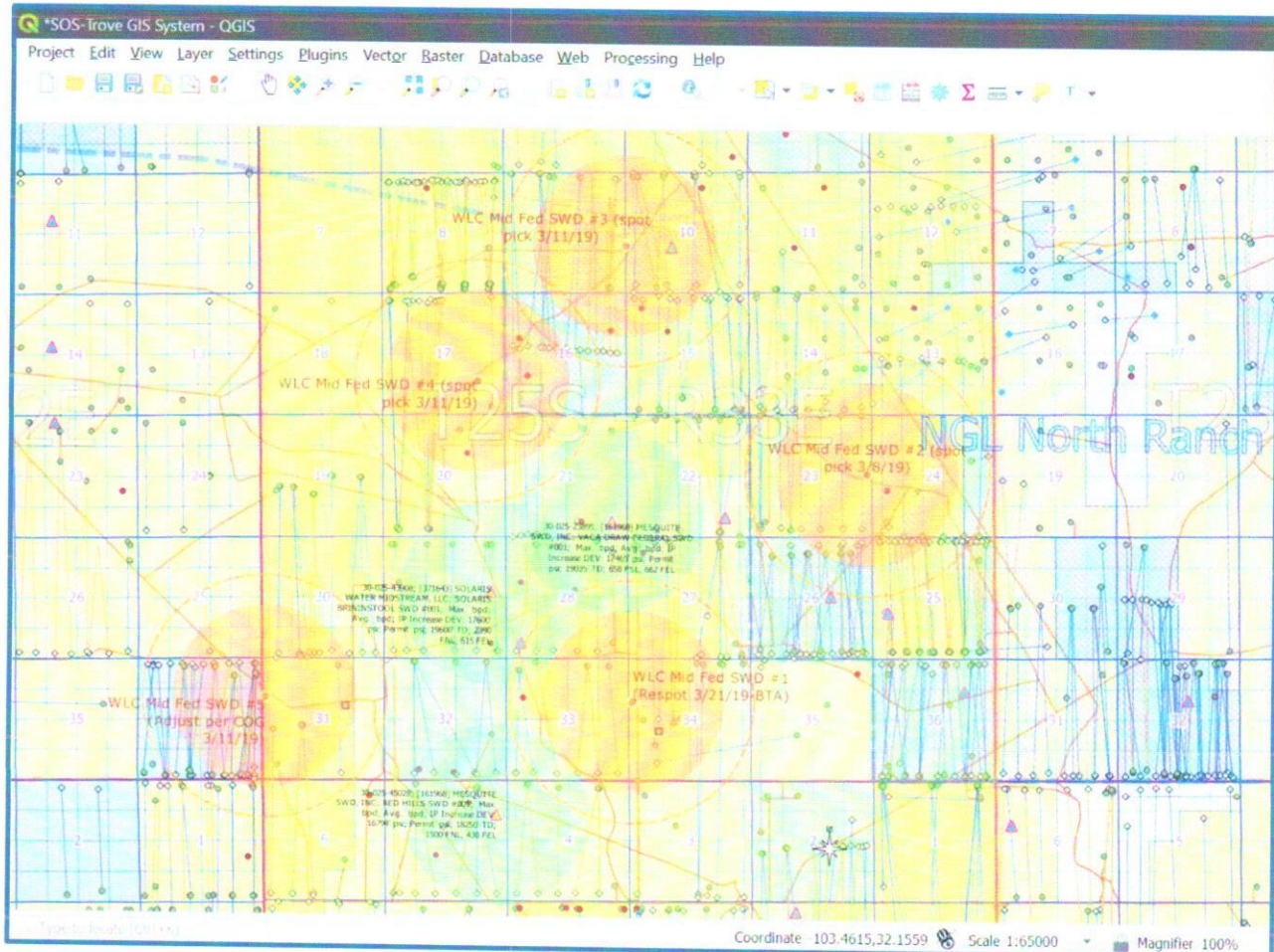
The WLC (West Lea Corridor) Project Areas were the first project defined by Trove Energy and Water. The two townships represented by the areas are currently very active and anticipated to be high growth development areas by several operators. Those include EOG Resources, BTA Oil Producers, COG Operating and others.

In addition to several producing leases, there are two permitted, commercial SWDs in 25 South (Mesquite Vaca Draw SWD #1 and Solaris Brininstool SWD #1) and one in 26 South (Mesquite Red Hills SWD #1). All three are completed in the Devonian.

#### **Basic Stats** (from OCD Online; as reported)

SWD	Start Date	Current Avg. Rate	Current Avg. Surf. Pressure
Vaca Draw	5/2017	~10K bwpd	1500 psi
Brininstool	Scheduled to Spud	n/a	n/a
Red Hills	12/2018	~17K	1650 psi

**Figure 1 – WLC Fed Project Area; Existing/ Permitted SWDs**





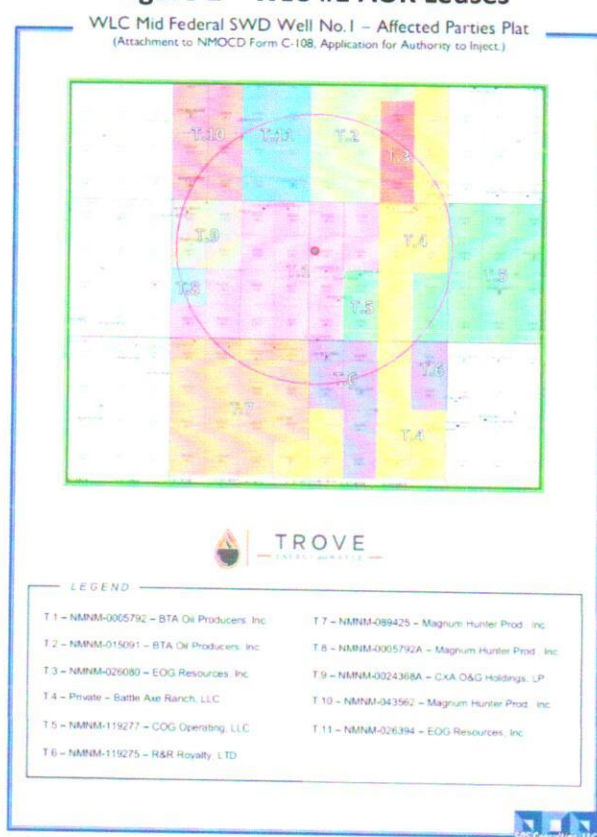
## Notes for WLC Mid Fed Project Area

The **WLC Mid Fed SWD #1** depicted in **Figure 1** was an original prospective location, vetted and adjusted to BTA Oil Producers' desires. Published legal notice was made in the Hobbs News-Sun on 3/22/19. The full C-108 application was submitted on 4/12/19. Upon reviewing the legal notice, Solaris Water Midstream contacted SOS Consulting about concerns with the location on 4/16/19, that perhaps the location was too close to their Brininstool SWD location. Mr. Drew Dixon was informed that the  $\frac{3}{4}$  mile radii of the two locations overlapped very slightly; approximately 150'. I told him that I thought OCD would possibly allow this and there was no intent to step on Solaris' already staked location and that I was willing to relocate as possible to the east if BTA Oil Producers could accommodate an adjustment. There was an element too of continued confusion on the  $\frac{3}{4}$  and 1-mile Area of Review requirements and such – I relayed to him that the current understanding is that the full AOR review has been pulled back to  $\frac{3}{4}$ -mile while notice remains at 1-mile for whatever reason.

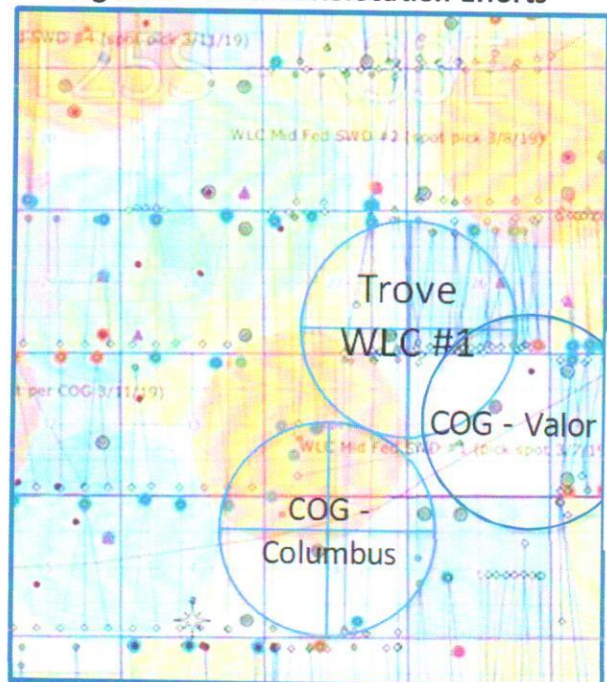
Shortly after the discussion with Solaris, Mr. Brad Holland with COG Operating called and said the WLC Mid Fed #1 location would overlap AOR radius 'bubbles' with a C-108 they filed for the Columbus Fee SWD #1 in February 2019. I told him I would look at possible alternative locations. He did recommend a possible alternative site as shown in **Figure 3**. Upon investigating this site, it was noted that COG also had the Valor SWD C-108 filed previously which effectively killed the spot.

The C-108 for the WLC Mid Federal SWD #1 was WITHDRAWN on 4/18/19; to date the prospect has not been relocated nor a new C-108 application filed.

**Figure 2 – WLC #1 AOR Leases**



**Figure 3 – WLC #1 Relocation Efforts**



Note: This view depicts the FIRST prospective location (vs. the Figure 1 view) for the WLC Mid Fed #1 – it was never applied for.

## **Protested Trove Energy and Water SWD Prospects**

*Prospect Development Details*

*for Each Protested C-108*

*Follow This Page.*



Trove Energy and Water, LLC

***Prospect Development Details***

**WLC South Federal SWD No.2**

(aka WLC-S #2)

***Location:*** 1740' FNL & 150' FEL, H-29-26S-33E

***Site vetted with:*** EOG Resources, Inc. (3 spot adjustments to get vetted/ approval and file.)

***Interval and Determination:*** 17,430' – 18,710'; Area SWDs and contours

***C-108 File Date:*** April 25, 2019

***Protest date and reason:*** April 25, 2019 (1 hour after C-108 PDF email submission)  
NGL Policy - proximity to NGL infrastructure or activities (anti-competitive.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** After communicating with NGL (Matthias Sayer) about nature of protest, I looked for whatever available information there was on NGL infrastructure, pipelines and facilities. Only source was some new publication illustrations and NGL investor slides. SOS was able to combine a couple of maps and digitize in NGL pipelines including those acquired from Mesquite for GIS display. This was the first indication of how close the WLC-S #2 spot was to a section of NGL pipeline. Positioning was coincidental as SOS had no knowledge of any NGL infrastructure during the prospecting phase.

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)

## WLC South Federal SWD No.2 (cont.)

(aka WLC-S #2)

SOS received notice of the protest from OCD on April 25, 2019. On April 26<sup>th</sup>, SOS reached out to NGL (Deana Bennett) to inquire as to the nature of the protest. Ms. Bennet replied on April 28<sup>th</sup> said she forwarded my request to NGL. On May and gave me the contact information for Matthias Sayer. Emailed Mr. Sayer on May 13<sup>th</sup>, I replied to Ms. Bennett that I has not heard from NGL – she replied that she would follow up. On May 16<sup>th</sup> I received an email from Matthias Sayer asking for a good time to visit – I was out of town and we finally communicated on May 23<sup>rd</sup> when I received the email below.

The email states that ***“NGL is protesting any commercial disposal within 1.5 miles of our facilities (regardless of depth), and the S. Fed 2 [sic] is within that distance from our Battle Axe facility (see image)”***.

I replied one time about the NGL policy and pointed out that the regulatory agencies had no jurisdiction over or concerning ‘corporate policy’. I received no further communication from NGL.

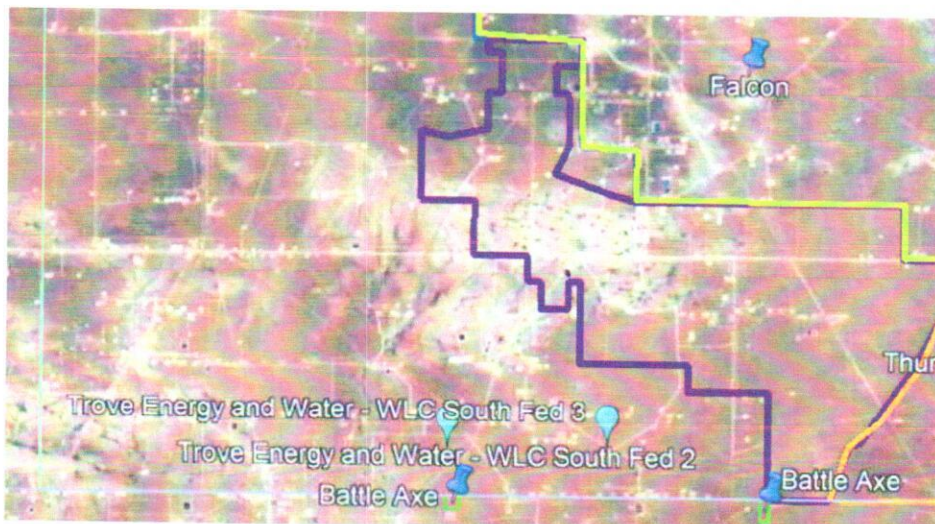
[ben@sosconsulting.us](mailto:ben@sosconsulting.us)

---

**From:** Matthias Sayer <Matthias.Sayer@nglep.com>  
**Sent:** Thursday, May 23, 2019 10:40 AM  
**To:** [ben@sosconsulting.us](mailto:ben@sosconsulting.us)  
**Cc:** Deana M. Bennett  
**Subject:** RE: NGL

Ben,

Regarding the Trove S. Fed 2 application, NGL is protesting any commercial disposal within 1.5 miles of our facilities (regardless of depth), and the S. Fed 2 is within that distance from our Battle Axe facility (see image).



Regarding the OI 55 application, that proposed facility is extremely close to assets NGL just acquired from Mesquite— pipeline and booster station, and consequently, objectionable to NGL.



Trove Energy and Water, LLC

***Prospect Development Details***

**WLC South Federal SWD No.3**

(aka WLC-S #3)

***Location:*** 1420' FSL & 15' FEL, I-29-26S-33E

***Site vetted with:*** EOG Resources, Inc. (3 spot adjustments to get approval and file.)

***Interval and Determination:*** 17,750' – 19,015'; Area SWDs and contours

***C-108 File Date:*** April 25, 2019

***Protest date and reason:*** April 25, 2019 (NGL, 1 hour after C-108 PDF email submission, NGL Policy - proximity to NGL infrastructure or activities (anti-competitive.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** Nothing additional found. ***Proximity to NGL's Battle Axe facility*** as noted previously from communications with Matthias Sayer.

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)

Trove Energy and Water, LLC

***Prospect Development Details***

**WLC Mid Federal SWD No.3**

(aka WLC-M #3)

***Location:*** 2075' FSL & 2' FWL, H-10-25S-33E

***Site vetted with:*** BTA Oil Producers, Inc. (2 spot adjustments to get approval and file.)

***Interval and Determination:*** 16,990' – 18,900'; Area SWDs and contours

***C-108 File Date:*** March 26, 2019

***Protest date and reason:*** April 18, 2019 (SLO – within ½ mile of state trust lands.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** Nothing additional found. NGL Ranches GIS layer was digitized and added to SOS-Trove GIS system on June 21, 2019. The WLC-M #3 is located on NGL grazing leases in an area acquired from McCloy Ranch and now known as NGL North Ranch. With the April addition of the NGL pipeline layer, ***this prospect is approximately 2 miles east of an NGL pipeline run.***

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)



Trove Energy and Water, LLC

***Prospect Development Details***

**WLC Mid Federal SWD No.4**

(aka WLC-M #4)

***Location:*** 1470' FSL & 1170' FEL, I-17-25S-33E

***Site vetted with:*** Reached out to Oxy on 6 attempts – made email contact w/ 3 reps – never did reply one way or the other. *(2 spot adjustments for [BLM] surface drainage, etc, filed.)*

***Interval and Determination:*** 17,440' – 19,000'; Area SWDs and contours

***C-108 File Date:*** March 22, 2019

***Protest date and reason:*** April 18, 2019 (SLO – within ½ mile of state trust lands.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** Nothing additional found. NGL Ranches GIS layer was digitized and added to SOS-Trove GIS system on June 21, 2019. The WLC-M #3 is located on NGL grazing leases in an area acquired from McCloy Ranch and now known as NGL North Ranch. With the April addition of the NGL pipeline layer, ***this prospect is approximately 1 mile east of an NGL pipeline run.*** *Note: this prospect appears to be close, but it is difficult to know without real coordinate data for the NGL infrastructure – pipeline rights-of-way are clearly evident in Google Earth but it's unknown when a pipeline may have been installed and the actual date of the satellite imagery.*

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. *(See attachment 'Hearing Notification Service List'.)*

Trove Energy and Water, LLC

***Prospect Development Details***

**WLC Mid Federal SWD No.5**

(aka WLC-M #5)

***Location:*** 1613' FNL & 150' FWL, E-31-25S-33E

***Site vetted with:*** COG Operating, LLC – (1 spot adjustment per COG and filed.)

***Interval and Determination:*** 17,350' – 19,450'; Area SWDs and contours

***C-108 File Date:*** March 22, 2019

***Protest date and reason:*** April 18, 2019 (SLO – within ½ mile of state trust lands.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** Nothing additional found. NGL Ranches GIS layer was digitized and added to SOS-Trove GIS system on June 21, 2019. The WLC-M #3 is located on NGL grazing leases in an area acquired from McCloy Ranch and now known as NGL North Ranch. With the April addition of the NGL pipeline layer, ***this prospect is approximately 1.75 miles east of an NGL pipeline run and 1.75 miles south of another run.***<sup>2</sup>

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)

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<sup>2</sup> SOS and Trove have made every effort to avoid conflict with competitor's facilities, particularly actual SWD locations and Expanded Areas of Review. Distance to pipelines or other infrastructure is based on inaccurate and incomplete data – these data are not generally available to outside parties. Above noted distances are an approximation of what is available. Care was given to layer registration but is NOT geo-referenced to coordinates.



## **Ole 55 Federal SWD No.1**

**Location:** 1700' FNL & 5' FWL, E-31-26S-32E

**Site vetted with** ConocoPhillips, LLC – Hannah Wasserman and Lakeiva Noel  
(2 spot adjustments per ConocoPhillips and then filed C-108.)

**Interval and Determination:** 17,100' – 18,800'; Area SWDs and contours

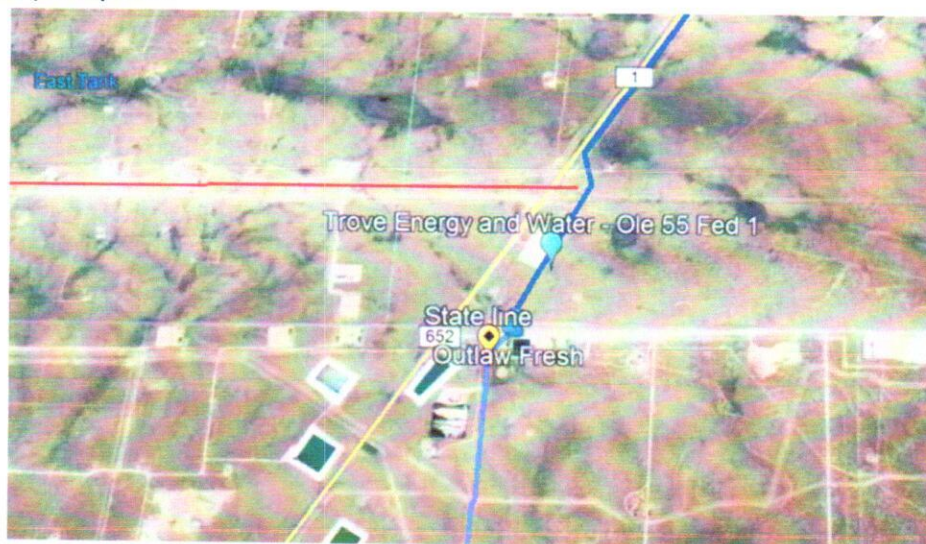
**C-108 File Date:** May 9, 2019

**Protest date and reason:** May 9, 2019; NGL – Protest is actually for the original and previous spot on the east side of the section and was based on legal notice publication as a C-108 was never filed for that location. Timing appears coincidental.

**Presentation:** Standard C-108, Seismic Evaluation, Upsize Tubing Request

**Subsequent AOR Review:** Nothing additional found.

**Protest** – May 23<sup>rd</sup> communication with Matthais Sayer. Below is a screenshot used by Mr. Sayer in addressing NGL's concerns with the Ole 55 Fed No.1 location. It was initially believed that NGL's protest was to the first location but upon further review, the spot depicted in the photo was never a proposed spot for the Ole 55 SWD prospect.



Let me know if you have any questions.

Matthias



**MATTHIAS SAYER**  
Vice President, Legal - Regulatory Compliance, Policy, and Environment  
Mobile: (307) 365-1814  
[matthias.sayer@nolep.com](mailto:matthias.sayer@nolep.com)  
[www.nolepenergypartners.com](http://www.nolepenergypartners.com)



Below is a screenshot from a current Google Earth aerial view. The Ole 55 Fed #1 prospect and filed C-108 location is 1700' FNL x 5' FWL, section 31, 26S, 32E in Lea County.

Two other locations were proposed to the ConocoPhillips SWD review team. Those were 150' FNL x 150' FEL in section 31. The second was 200' FNL x 5' FWL. ConocoPhillips asked that we move the prospect as far to the south as possible and that 5 feet off the west section line was good. The 1700' spot was proposed and accepted as a workable spot for ConocoPhillips.

This spot was given approval via email on April 30, 2019 by Hannah Wasserman in the Houston office.



***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)



Trove Energy and Water, LLC

***Prospect Development Details***

**FLC South Federal SWD No.1**

(aka FLC-S #1)

***Location:*** 225' FSL & 50' FWL, P-26-26S-32E

***Site vetted with*** ConocoPhillips, LLC – Hannah Wasserman and Lakeiva Noel (2 spot adjustments per ConocoPhillips and then filed C-108.)

This spot was given approval via email on May 6, 2019 by Hannah Wasserman in the Houston office.

***Interval and Determination:*** 17,300' – 19,000'; Area SWDs and contours

***C-108 File Date:*** May 9, 2019

***Protest date and reason:*** NO PROTEST NOTICE RECEIVED FROM OCD OR NGL. (Assumption is that NGL will protest based on similar proximity issues as Ole 55 #1.)

***Presentation:*** Standard C-108, Seismic Evaluation, Upsize Tubing Request

***Subsequent AOR Review:*** Nothing additional found.

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)

# Trove Energy and Water, LLC

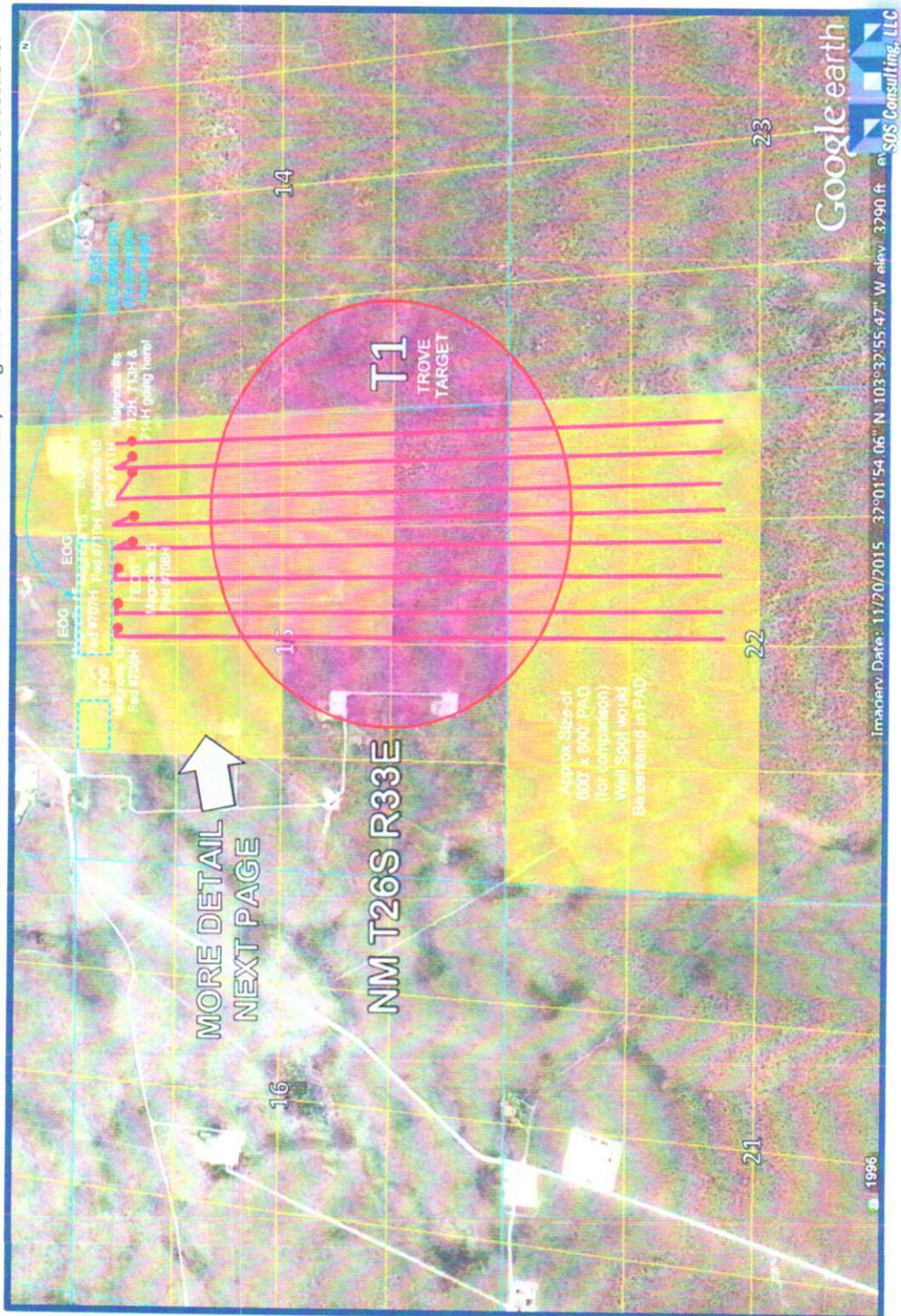
## Prospecting Challenges – Sample Documentation



### TROVE – WLC Pod 1 in 26S-33E (SOS Mapped 2/01/19, Pg.1)

#### T 1 (Sec 15) Detail View... Challenges in spotting.

When considering spacing to avoid collision w/ laterals, also must consider the well pad – well spot being centered on pad. If that happens to border private (or state) that would put our minimum distance off the lease line at 300'. This is why it's good to shoot for corners of sections.





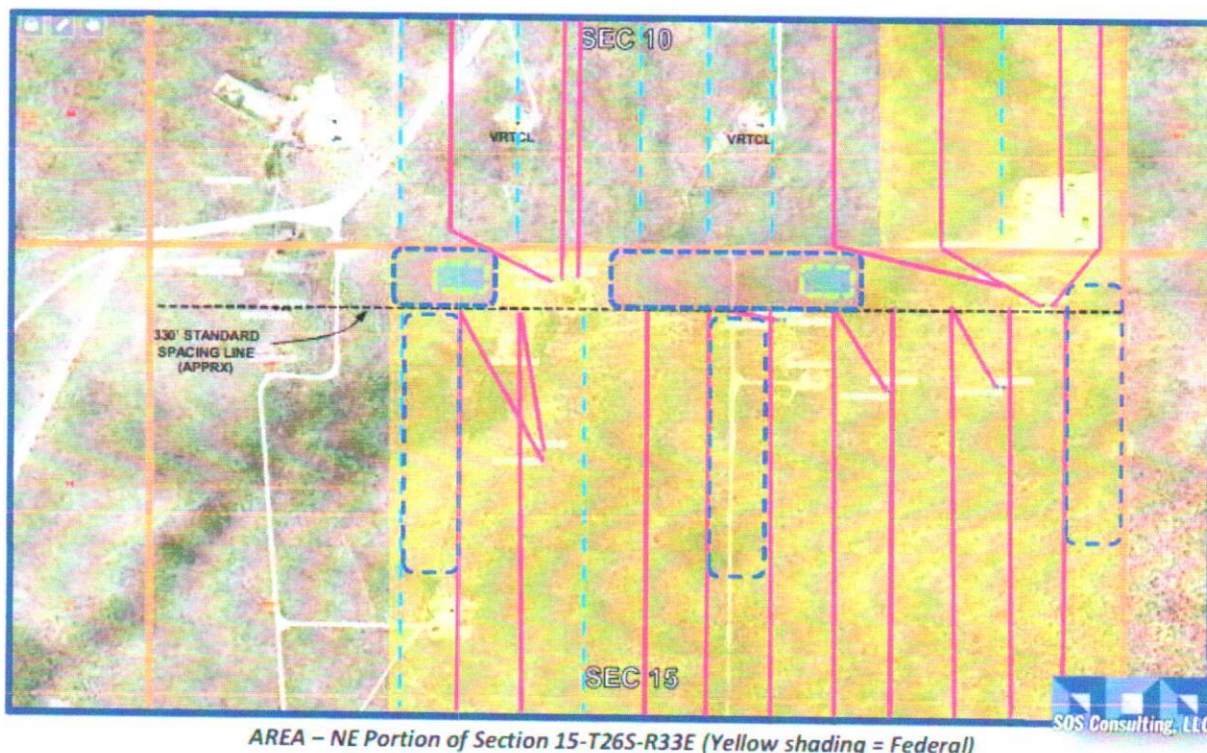
# Trove Energy and Water, LLC

## Prospecting Challenges – Sample Documentation



### TROVE – WLC Pod 1 in 26S-33E (SOS Mapped 2/03/19, Pg.2)

T 1 (Sec 15, NENE) Detail View... *Challenges in spotting.*



**Subject:** From previous page, attempt to located DEV SWD in T1 Trove Target Area.

Pink lines – Existing OR Permitted horizontal lateral runs;  
Teal dashed lines – anticipated future producing acreage exploitation.

**Mandatory:**

- 1) Locate Prospects on Federal Acreage (surface & minerals)
- 2) Keep MINIMUM 150 feet off any lateral (or future) for collision avoidance.
- 3) Well spot must be Centered on 300' x 300' Drilling Pad – No overlap of other locations.  
(not sure about overlapping road...)
- 4) Operations Pad extends to 600' x 600' but may overlap roads or other locations.
- 5) Locate near roads as possible to minimize new road rights-of-way.

**T1 Target Area Conclusion:** After identifying laterals, the available areas remaining which meet the above criteria are in the Blue-Dashed Rectangles. From the North line of Section 15, a standard 330' depth remains that should meet with operators' requirements for locating a deep SWD. Footage calls would be 150' to 180' FNL and whatever E/W footage desired to spot within rectangles.

**NOTE:** *It's conceivable to locate inside the tracks of laterals but would require analyzing the As Built Directional Surveys...*

*The Green-Dashed Rectangles within the Blue appear to be the most advantageous spots for Prospect Location...*

**Risks:** With the sharp direction turnarounds on several of the permitted wells shown, even the suggested prospect rectangles MAY interfere with operators' future development plans.

**Operators include:** EOG, Mewbourne and RKI. Others may be pulled into the full one-mile Area of Review and will be noticed for the C-108 SWD application.



# Trove Energy and Water, LLC

## Sample of Prospecting Communications with Operator

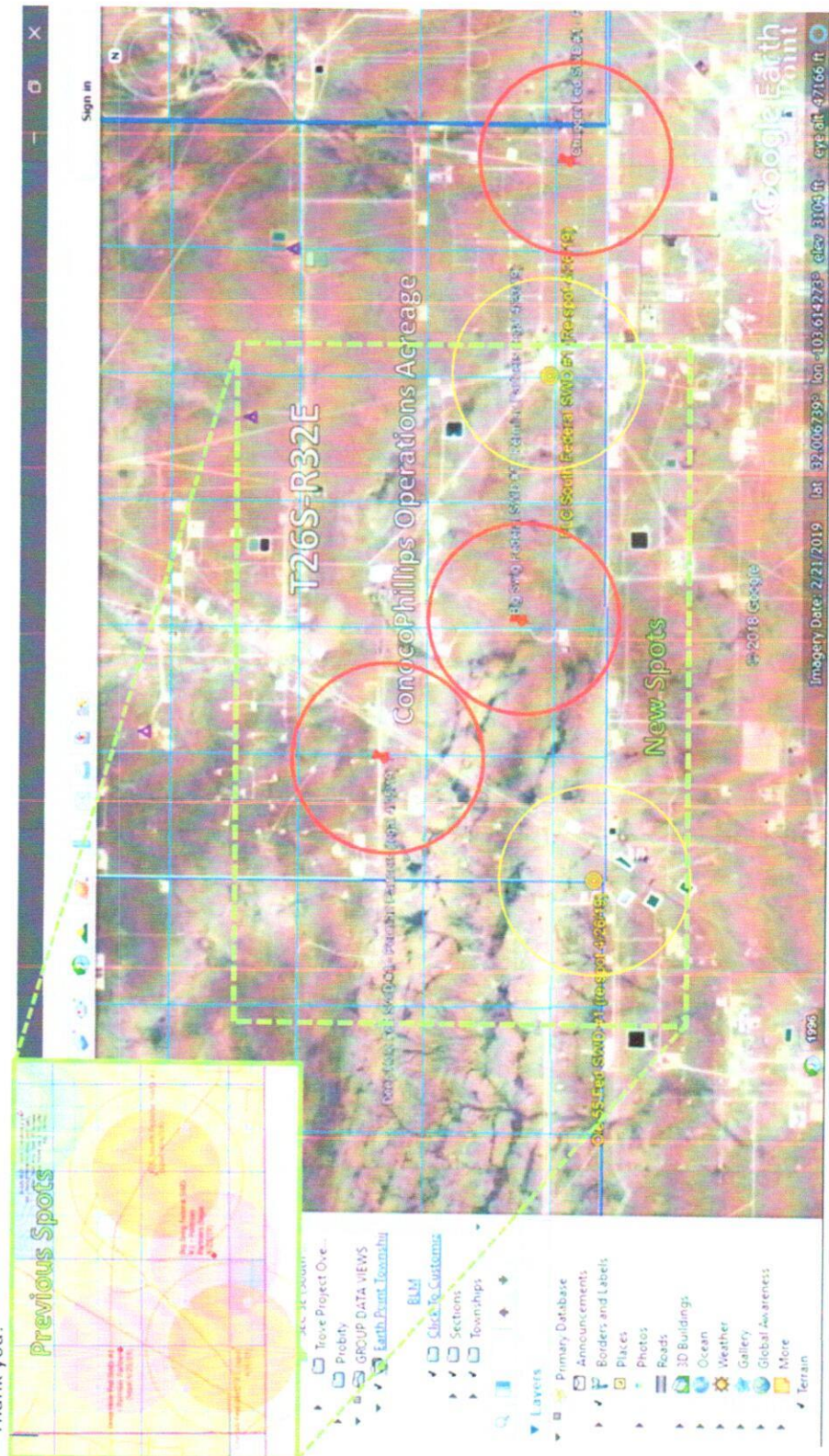
### DEVONIAN SWD PROSPECTS – NEW RE-SPOTS; Trove Energy and Water

Ole 55 Fed SWD #1 – 1700' FNL and 5' FWL, 31-26S-32E (spot pick 4/26/19)

FLC South Fed #1 – 225' FSL and 50' FWL, 26-26S-32E (spot pick 4/26/19)

Clear w/ ConocoPhillips – Hannah, if we can get a quick approval of these locations, I can get the applications in and maybe STOP the hopscotch of avoiding competitors' spotting... as advertised this week – pink bubbles in Outset View, upper left; orange circles Main View.

Please contact Ben Stone, SOS Consulting; [ben@sosconsulting.us](mailto:ben@sosconsulting.us), 903-488-9850  
Thank you!





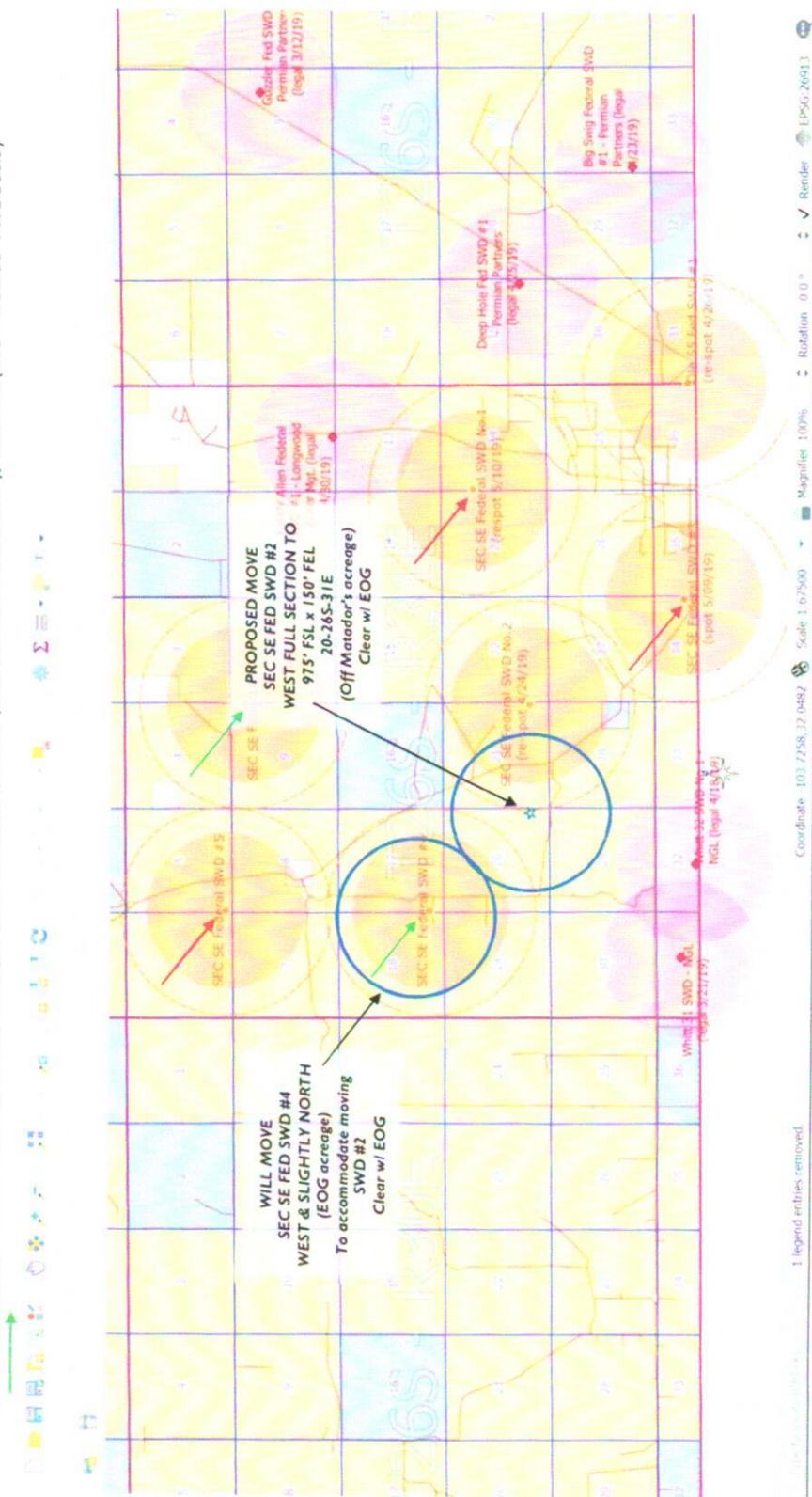
### Sample of Prospecting Communications with Operator

Request from Trove Energy and Water, LLC

**Request from Trove Energy and Water, LLC**  
*Please contact: Ben Stone, SOS Consulting, LLC 903-488-9850*  
**SWD Prospecting – Clearance Review of Locations for Future Development Plans in 26S-31E, Eddy County, NM...**

**ConocoPhillips** – Leases and/or operating acreage: **SEC 5E Federal SWD #2** (975' FSL x 150' FEL Sec.21); **SWD #3** (1600' FNL x 50' FWL Sec.34); **SWD #5** (330' FSL x 50' FWL Sec.5);

**EOG Resources** – Lease and/or operating acreage: **SEC SE Federal SWD #4** (700' FSL x 50' FWL Sec.17); **SWD #6** (700' FNL x 50' FWL Sec.9)



# Trove Energy and Water, LLC

## Sample of Prospecting Communications with Operator

**To: Hannah Wasserman, ConocoPhillips (SWD review)**  
**From: Ben Stone, SOS Consulting – Trove Energy and Water**  
**4/24/19** (In reply to Hannah's remarks via email on 4/22/19)

DEVONIAN SWD PROSPECT; Trove Energy and Water – Ole SS Fed SWD #1 - 150' FNL and 150' FEL, 31-26S-32E

- CONOCOPHILLIPS preferred location would be as close to the Stateline as you can get, preferably ~1500' to the south of the currently planned location.

Trove is very happy to accommodate ConocoPhillips' desire to adjust locations to suit future plans.

**Ole SS Fed SWD #1** - Our thinking in the original location was to not impact safety negatively – avoiding yet another turnoff off the Orla highway. The original spot is nearly ½ mile down a well-established oilfield road. If ConocoPhillips can work with this location by adjusting south by a lesser amount, that would be best from an operational/ safety point. And as you know, we're hugging the section line closely.

Alternatively, we could locate over to the east side of the section – the lease road is not as good but, Trove would assume responsibility to improve that road if and when this SWD was installed.

Additional ideas/ comments are much appreciated.





## Trove Energy and Water, LLC

### *Sample of Vetting and Approval of Prospect Sites by Operator (EOG Resources, Inc.)*

**ben@sosconsulting.us**

---

**From:** Charles Moran <Charles\_Moran@eogresources.com>  
**Sent:** Tuesday, April 23, 2019 7:03 PM  
**To:** ben@sosconsulting.us  
**Subject:** RE: Protest SWD Applications - WLC South Federal SWD #1 (15-26S-33E) and WLC South Federal SWD #2 (28-26S-33E)  
**Attachments:** image001.jpg

Ben: I went looking for email and I may have the answers on three moved SWDs.

1. On WLC South Federal SWD No. 2- revised location 1740' FNL & 150' FEL, 29-26S-33E – EOG will work with this and remove any protest.
2. On WLC South Fed SWD No. 3 – revised location 1420' FSL & 15' FEL, Sec. 26-26S-33E– EOG will work with this and remove any protest.
3. On WLC South Fed SWD No. 1 – revised location 900' FNL & 100' FEL – Sec. 15-26S-33E - EOG will work with this and remove any protest.

So in working with you,

Sorry of for the delay in getting back to you.

**Chuck Moran**

**EOG Resources, Inc. – Midland Division**  
432-686-3684

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Tuesday, April 23, 2019 1:09 PM  
**To:** Charles Moran <Charles\_Moran@eogresources.com>  
**Subject:** RE: Protest SWD Applications - WLC South Federal SWD #1 (15-26S-33E) and WLC South Federal SWD #2 (28-26S-33E)

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Chuck,

Only relevant in that we're still hoping to get EOG's sign-off on the location maps (aerials) that I had sent to you.

Last I heard was you guys had got through your quarterly meeting and the team could direction some time back to this... I think that would have been last week maybe?...

But yes, still need to get EOG clearance on these... may have others soon.

Thanks,  
Ben

## Trove Energy and Water, LLC

### *Sample of Vetting and Approval of Prospect Sites by Operator (ConocoPhillips)*

**ben@sosconsulting.us**

**From:** Wasserman, Hannah N <Hannah.N.Wasserman@conocophillips.com>  
**Sent:** Tuesday, April 30, 2019 10:17 PM  
**To:** ben@sosconsulting.us  
**Subject:** RE: [EXTERNAL]RE: SWD siting guidance on federal acreage - ConocoPhillips op areas

Ben,

The Ole 55 FED is in an approved location for ConocoPhillips.

For the FLC....can we stick as close to the New Mexico/Texas state line as possible in section 34 (federal land)? See image below....Ideally where the black circle is.



I'll be in the field tomorrow, if you would like me to quality check a revised location for the FLC.

Thanks,

**Hannah Wasserman**  
ConocoPhillips  
Senior Geologist – Delaware Basin  
925 N Eldridge Pkwy



## Trove Energy and Water, LLC

### *Sample of Vetting and Approval of Prospect Sites by Operator (BTA Oil Producers, Inc.)*

**ben sosconsulting.us**

---

**From:** Nick Eaton <NEaton@btaoil.com>  
**Sent:** Thursday, March 21, 2019 2:04 PM  
**To:** ben@sosconsulting.us  
**Subject:** RE: C108 for WLC-Mid Fed #1

This works and yes 150' would be better if the spacing allows it.

-Nick

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Thursday, March 21, 2019 2:01 PM  
**To:** Nick Eaton <NEaton@btaoil.com>  
**Subject:** RE: C108 for WLC-Mid Fed #1

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Hi Nick - I didn't post it since COG objected... this is the one I'm trying to relocate to your preferences... best I can do (to stay off the existing SWD bubbles) is ~1870' FNL and 200' FWL... I know that was your max off the west line and we could probably do 150' FWL... do you think that would work? Please see attachment...

Thanks,  
Ben

**From:** Nick Eaton <NEaton@btaoil.com>  
**Sent:** Thursday, March 21, 2019 1:52 PM  
**To:** ben@sosconsulting.us  
**Subject:** C108 for WLC-Mid Fed #1

Ben,

The C-108 for the above well isn't loading on the website, will you send a copy?

Thank you,  
Nick Eaton

# Trove Energy and Water, LLC

## Sample of Vetting and Approval of Prospect Sites by Operator (Devon Energy Production Co.)

ben@sosconsulting.us

**From:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Sent:** Wednesday, May 29, 2019 7:46 AM  
**To:** ben@sosconsulting.us  
**Cc:** Cain, James; Bruening, Josh  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Ben, we would not protest your revised proposed location for the PSE #2. On a side note we just acquired a Devonian well-bore in a trade with XTO (SEC 18 T23S R32E) not a few miles from your PSE proposal, is this something Trove would be interested in purchasing from Devon? I'm CC'ing Josh Bruening (Water Lead Engineer) and James Cain (Lead Asset Reservoir Engineer) as I am taking a new position with the company and will not be responsible for water going forward. Thanks and good luck!

Brent S.

Devon - Internal

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Tuesday, May 28, 2019 12:28 PM  
**To:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Hi Brent,

Still hoping you can clear this one for me... PSE Fed SWD #2 - I've moved the prospective location over to 6-23S-32E... HARD to tell from what's available from OCD on what's been filed but I THINK this is still open.

Please let me know if Devon can work with a location in the SW portion shown by a rectangle on the attached map. If you're generally good with the area, I'll get some footage calls to you to comply w/ Devon's specs.

Thanks,  
Ben

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Wednesday, April 24, 2019 9:03 AM  
**To:** 'Schroder, Brent' <Brent.Schroder@dvn.com>  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Dev No. 2 Devon

Hi Brent,

I thought I'd sent this to you... maybe I did but I suffered a near catastrophe actually got it sent.

Anyway, I've attached a proposed relocation for the PSE Fed SWD #2... c also. I've outlined a possible area and hope you can let me know what Dev wants the first 880' clear and then the next 880' would be for SWD placer

Take a look and let me know or if you have any questions.

Thank you,  
Ben

**From:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Sent:** Wednesday, April 17, 2019 7:31 AM  
**To:** ben@sosconsulting.us  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Ben, we reviewed possible locations for Trove a couple of times and we have no problem with the PSE 1 as long as it stays within the 330' offset of the West Section line of 27. As far as the PSE 2 we have plans to take up every square inch of the drill islands up there and we honestly don't see room for a SWD. We will continue to protest any SWD application in this area no matter the SWD company. Sorry we couldn't be more help but these drill islands are a bear... If there are any other areas you are looking at that I can help with let me know. Thanks

Brent

Devon - Internal

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Tuesday, April 16, 2019 3:05 PM  
**To:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Hi Brent - just checking in 😊 thanks!  
Ben

**From:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Sent:** Friday, April 12, 2019 3:47 PM  
**To:** ben@sosconsulting.us  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Hey Ben, sorry to push this out another day but our Reservoir Engineer was sick the later half of this week. We have a meeting Monday morning to review and I will send over what we come up with as soon as I can. Thanks

Brent

Devon - Internal

**From:** ben@sosconsulting.us <ben@sosconsulting.us>  
**Sent:** Tuesday, April 9, 2019 3:30 PM  
**To:** Schroder, Brent <Brent.Schroder@dvn.com>  
**Subject:** RE: FW: [EXTERNAL] Inquiry from Trove Energy re Devon protest of Application to Inject -PSE Federal SWD Well No. 2 Devon

Thanks for the visit Brent! If you can help me get these couple spotted up by sliding them around a little, that would be great and, I'll try not to bug you for a while!

Thanks again,  
Ben



Trove Energy and Water, LLC

***Prospect Development Details***

**PSE Federal SWD No.4**

***Location:*** 145' FNL & 5' FEL, A-30-24S-32E

***Site vetted with:*** XTO and COG Operating, LLC – (1 spot adjustments per XTO due to fault – original spot in 31E; then with COG in 32E and filed.)

***Interval and Determination:*** 16,750' – 18,200'; Area SWDs and contours

***C-108 File Date:*** April 2, 2019

***Protest date and reason:*** May 8, 2019, Blackbuck (Assumed anti-competition; emailed Ernie Padilla, attorney, to inquire about nature of protest – no reply. 36 days, full 3 weeks after suspense period.)

***Presentation:*** Standard C-108, Seismic Evaluation, ~~Upsize Tubing Request~~ Not requesting upsize tubing as the immediate area is saturated w/ SWD prospects.

***Subsequent AOR Review:*** Nothing additional found.

***Affected Party Notice:*** Full one-mile radius; initial C-108 notification and follow up for hearing notification to include protestors. (See attachment 'Hearing Notification Service List'.)

***UPDATE:*** After parsing available data as to active C-108s (administrative or hearing), SOS found that Owl SWD Operating had previously spotted a prospect known as the 'Cotton Draw SWD No.1', filed 10/25/18 and is located approximately 4225 feet from the PSE Fed SWD #4 spot.

***Blackbuck is the protestor (the Owl site and Blackbuck sites are also in conflict), SOS recommends withdrawing this application at the start of hearing proceedings.***

# Trove Energy and Water, LLC

## SWD Prospects – Protested

### Additional Groundwater and Water Well Info For OCD Examiner Hearing, September 5, 2019

#### Overview

In all areas of Trove Energy and Water, LLC's SWD prospects, fresh water is generally available from the Rustler, Santa Rosa and Cenozoic Alluvium formations. State Engineer's records show water wells in the area with a depth to groundwater of 125 to 405 feet. Several of the prospect sites have NO water wells within one mile of the proposed SWD.

<i>Trove Prospect</i>	<i>Location</i>	<i>Water Wells in AOR*</i>	<i>Analysis from Area?</i>
<b>WLC-M #3</b>	2075' FSL & 2' FWL 10-25S-33E	0	No
<b>WLC-M #4</b>	1470' FSL & 1170' FEL 17-25S-33E	0	No
<b>WLC-M #5</b>	1613' FNL & 150' FWL 31-25S-33E	0	No
<b>WLC-S #2</b>	1740' FNL & 150' FEL 29-26S-33E	0	No
<b>WLC-S #3</b>	1420' FSL & 15' FEL 26-26S-33E	0	Yes
<b>FLC-S #1</b>	225' FSL & 50' FWL 26-26S-32E	0	No
<b>Ole 55 #1</b>	1700' FNL & 5' FWL 31-26S-32E	1	Pending
<b>PSE #4</b>	5' FNL & 2494' FEL 3-24S-31E	0	No

*\*According to NM Office of the State Engineer's online data.*

The Rustler Formation is present in most of the Delaware Basin. The thickness ranges from about 200 to 500 feet. Water quality is generally poor, with total dissolved-solids (TDS) concentrations ranging from 286 milligrams per liter (mg/l) in southeast New Mexico to 157,000 mg/l in Winkler County, Texas. Chloride concentrations range from 15 mg/l in southeast New Mexico to 89,700 mg/l in Winkler County. Where the water quality is satisfactory, water can be used for irrigating salt-tolerant crops.

The Santa Rosa Sandstone is generally present in all the Delaware and usually consists of reddish-brown and gray, medium- to coarse-grained, cross-stratified sandstone. The maximum thickness is 520 feet. The Santa Rosa Sandstone in Eddy County, New Mexico, crops out in north-trending scarps a few miles to the west of the Eddy-Lea County line and in the south-facing scarps of Paduca Breaks in the extreme southwest corner of Lea County. The general dip of the Triassic rocks in Lea County is toward the south and east. In eastern Eddy County and the western third of Lea County, the Santa Rosa Sandstone is the principal aquifer. Water quality is variable. Where the Santa Rosa Sandstone is a distinct entity, chloride concentrations range from 10 mg/l to nearly 5,000 mg/l. Dissolved-solids concentrations range from 205 mg/l to nearly 3,000 mg/l.



Aquifers in Cenozoic alluvium are present in every county in the Delaware Basin. They consist of clastic deposits from surrounding uplands, Pecos River and other fluvial deposits, caliche, gypsite, conglomerates, terrace deposits, windblown sand, and playa deposits. The maximum saturated thickness can be more than 1,400 feet. The Cenozoic alluvium is used extensively throughout most of the Delaware Basin for public water supply, irrigation, industry, livestock, and rural domestic use. The water quality in aquifers in Cenozoic alluvium including the Pecos aquifer can be highly variable due to the local presence of evaporite deposits, recharge by highly mineralized water from irrigation and the Pecos River, and saline intrusion caused by extensive pumping. TDS range from 188 to 15,000 mg/l. Chloride concentrations range from 5 to 7,400 mg/l.

#### ***Average Concentrations of TDS and Chlorides***

<b>TDS</b>	<i>Rustler Formation</i>	<i>Santa Rosa SS</i>	<i>Cenozoic Alluvium</i>
Wells sampled	37	34	315
<b>Avg mg/L</b>	<b>16,110</b>	<b>984</b>	<b>2,319</b>
<b>Chlorides</b>			
Wells sampled	40	37	360
<b>Avg mg/L</b>	<b>6,472</b>	<b>258</b>	<b>327</b>

Credits: Portions of text and table excerpted and paraphrased from *Geohydrology of the Delaware Basin and Vicinity, Texas and New Mexico, USGS 1985, Richey, Wells and Stephens*

#### **Deep Injection – Threat to Groundwater**

The consensus generally is that disposal by injection at depths of Devonian SWD completions poses little to no risk to underground sources of drinking water (USDWs). In the Delaware Basin and greater Permian Basin, water typically becomes less potable with depth. With Devonian salt water disposal occurring at depths of 14,000 feet and more and with several boundaries of low permeability strata between these zones and USDWs, there's no likelihood of negative impact from disposal operations. By virtue of sheer distance/ depth (2-3 miles) and many interspersed shale layers in and between producing strata, 4-string casing design with 3 strings fully cemented to surface, these deep wells pose a significant risk reduction from older and typically much shallower injection wells. Shallow wells (Delaware and shallower) may have frequently had available conduits through poor cement or potential fracturing or, may have been in an area with high water flow, either naturally such as in the Ogallala Aquifer or as a result of long-term waterflooding, fracture jobs and poor well construction.

#### **Prospect / Well Review – Affirmative Statement**

In the process of prospect development and C-108 preparation, SOS Consulting reviews wells and other available data in the subject area of review. If there are any old waterfloods or other injection wells, additional research would be conducted to see if there was any reference to or, supporting well file documentation that may have indicated some hydrologic connection between USDWs and completed intervals. When satisfied of no historic problems and based on new Devonian SWD well design and depth, this was so signed as an affirmative statement.

**McMillan, Michael, EMNRD**

---

**From:** Antillon, Andrea <aantillon@slo.state.nm.us>  
**Sent:** Thursday, May 2, 2019 10:35 AM  
**To:** McMillan, Michael, EMNRD; Goetze, Phillip, EMNRD; Davidson, Florene, EMNRD  
**Cc:** Crosby, Faith; Marks, Allison; Kessler, Jordan  
**Subject:** RE: [EXT] SLO protest to Trove Energy and Water, LLC

The proposed well location is 1420' FSL and 15' FEL, Sec 26, T26S, R33E, Lea County, NM  
Andrea

---

**From:** McMillan, Michael, EMNRD [mailto:Michael.McMillan@state.nm.us]  
**Sent:** Thursday, May 2, 2019 10:34 AM  
**To:** Antillon, Andrea <aantillon@slo.state.nm.us>; Goetze, Phillip, EMNRD <Phillip.Goetze@state.nm.us>; Davidson, Florene, EMNRD <florene.davidson@state.nm.us>  
**Cc:** Crosby, Faith <fcrosby@slo.state.nm.us>; Marks, Allison <amarks@slo.state.nm.us>; Kessler, Jordan <jkessler@slo.state.nm.us>  
**Subject:** RE: [EXT] SLO protest to Trove Energy and Water, LLC

Trove has been known to change the well name before the time the OCD receives the application.  
An you provide footage calls for the well?

Mike

---

**From:** Antillon, Andrea <aantillon@slo.state.nm.us>  
**Sent:** Thursday, May 2, 2019 10:31 AM  
**To:** Goetze, Phillip, EMNRD <Phillip.Goetze@state.nm.us>; McMillan, Michael, EMNRD <Michael.McMillan@state.nm.us>; Davidson, Florene, EMNRD <florene.davidson@state.nm.us>  
**Cc:** Crosby, Faith <fcrosby@slo.state.nm.us>; Marks, Allison <amarks@slo.state.nm.us>; Kessler, Jordan <jkessler@slo.state.nm.us>  
**Subject:** [EXT] SLO protest to Trove Energy and Water, LLC

Hello,

The State Land Office hereby objects to the WLC South Federal SWD Well No. 3 C-108, which has been submitted to the OCD by Trove Energy and Water, LLC. Please let me know if you need any additional information.

Kind Regards,  
Andrea

**Andrea Antillon**  
*Associate Counsel*  
*Office of the General Counsel*  
Phone 505.827.5752  
New Mexico State Land Office  
310 Old Santa Fe Trail  
P.O. Box 1148  
Santa Fe, NM 87504-1148  
[aantillon@slo.state.nm.us](mailto:aantillon@slo.state.nm.us)  
[nmstatelands.org](http://nmstatelands.org)





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**McMillan, Michael, EMNRD**

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**From:** Kessler, Jordan <jkessler@slo.state.nm.us>  
**Sent:** Wednesday, April 17, 2019 5:34 PM  
**To:** Goetze, Phillip, EMNRD; Jones, William V, EMNRD; McMillan, Michael, EMNRD  
**Cc:** Davidson, Florene, EMNRD; Marks, Allison; Antillon, Andrea  
**Subject:** [EXT] Protest to Trove Energy & Water, LLC SWDs

Good evening,

The State Land Office recently received notification and hereby protests the following SWD applications filed by Trover Energy & Water, LLC:

- WLC Mid Federal SWD No. 5 (No API No. assigned)
- WLC Mid Federal SWD No. 4 (No API No. assigned)
- WLC Mid Federal SWD No. 3 (No API No. assigned)

Please let us know if you need any additional information.

Best,  
Jordan

**Jordan Lee Kessler**

*Assistant Commissioner of  
Minerals and Royalties*  
505.827.5746  
New Mexico State Land Office  
310 Old Santa Fe Trail  
P.O. Box 1148  
Santa Fe, NM 87504-1148



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**From:** Deana M. Bennett <dmb@modrall.com>  
**Sent:** Wednesday, April 10, 2019 11:14 AM  
**To:** Goetze, Phillip, EMNRD; McMillan, Michael, EMNRD; Jones, William V, EMNRD  
**Subject:** [EXT] RE: NGL Protests of Trove SWD applications  
**Attachments:** NGL running list of protests (W3401084x7A92D).docx

Hello,

I am submitting a protest on behalf of NGL for three recently filed Trove applications:

4/10/19	Trove	WLC South Federal SWD Well No.2 (1740' FNL and 150' FEL, Section 29, Township 26 South, Range 33 East, Lea County, New Mexico)
4/10/19	Trove	WLC South Federal SWD Well No.3 (1420' FSL and 15' FEL, Section 26, Township 26 South, Range 33 East, Lea County, New Mexico)
4/10/19	Trove	Ole 55 Federal SWD Well No.1 (200' FNL and 5' FWL, Section 31, Township 26 South, Range 32 East, Lea County, New Mexico)

Based on a conversation with Mike at last week's hearing, I have also attached a running list of NGL's protests. My plan is to update that list every time I submit a protest. As you will see on the attachment, these three Trove applications are highlighted at the bottom of the table in the attachment. Each time I submit a protest, I will highlight the newest protest on the attached table and include the updated table with my protest for your convenience.

To the extent the attached table may be inconsistent with the protests I have filed, the filed protests control and not the table (i.e., if I inadvertently put in the wrong date or description on the attached table).

Also, I have created a column identifying whether I have received confirmation of protests from OCD. Some of the protests pre-date me, and so Jennifer may have the confirmation email. Others that I have protested I do not have confirmation emails yet, but I imagine those will be forthcoming.

Please let me know if you have questions, and Mike, if this isn't a helpful format for you, I am happy to adjust.

Thanks,

Deana



Deana M. Bennett

Lawyer

Modrall Sperling | [www.modrall.com](http://www.modrall.com)

P.O. Box 2168 | Albuquerque, NM 87103-2168

500 4<sup>th</sup> St. NW, Ste. 1000 | Albuquerque, NM 87102

D: 505.848.1834 | O: 505.848.1800

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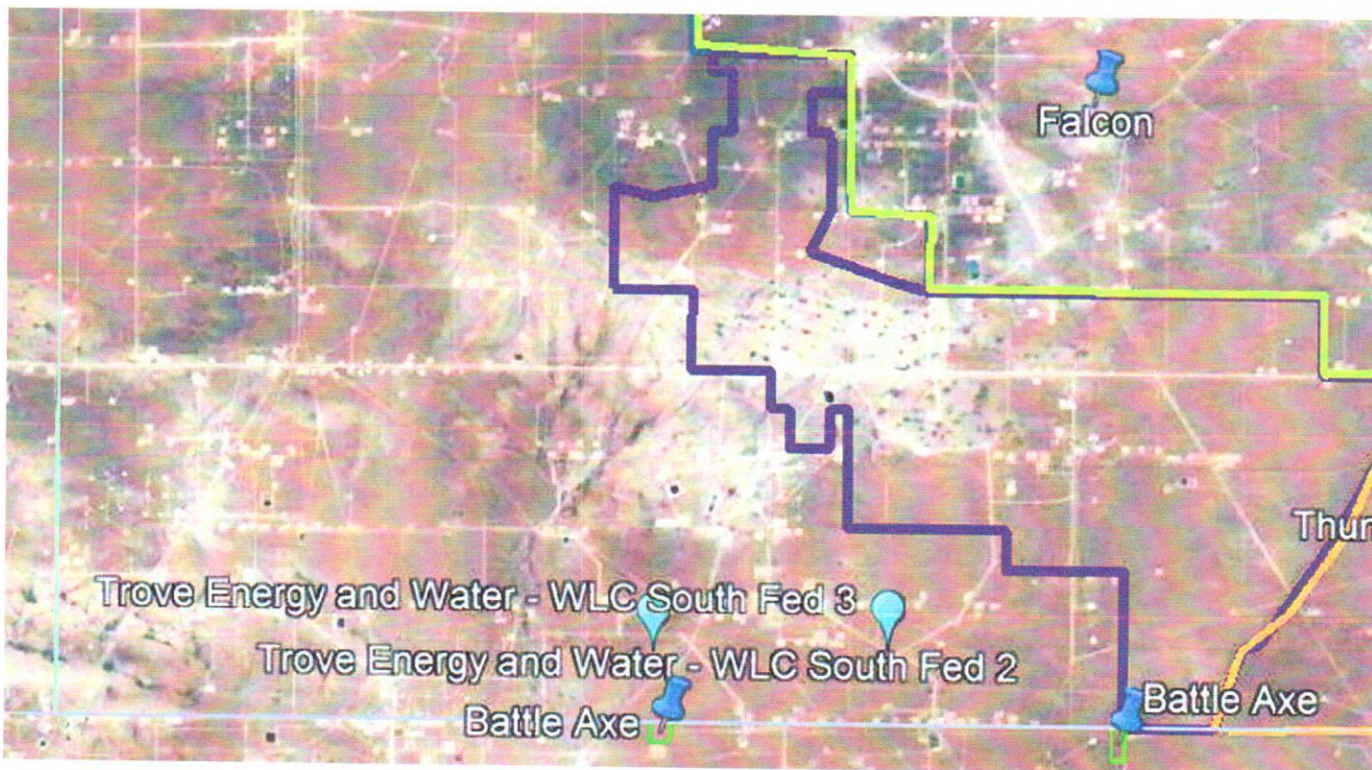
**ben@sosconsulting.us**

---

**From:** Matthias Sayer <Matthias.Sayer@nglep.com>  
**Sent:** Thursday, May 23, 2019 10:40 AM  
**To:** ben@sosconsulting.us  
**Cc:** Deana M. Bennett  
**Subject:** RE: NGL

Ben,

Regarding the Trove S. Fed 2 application, NGL is protesting any commercial disposal within 1.5 miles of our facilities (regardless of depth), and the S. Fed 2 is within that distance from our Battle Axe facility (see image).



Regarding the OI 55 application, that proposed facility is extremely close to assets NGL just acquired from Mesquite—pipeline and booster station, and consequently, objectionable to NGL.





Let me know if you have any questions.

Matthias



**MATTHIAS SAYER**

Vice President, Legal – Regulatory Compliance, Policy, and Environment

Mobile: (307) 365-1814

[matthias.sayer@nleop.com](mailto:matthias.sayer@nleop.com)

[www.nglenergypartners.com](http://www.nglenergypartners.com)

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**From:** ben@sosconsulting.us [mailto:ben@sosconsulting.us]

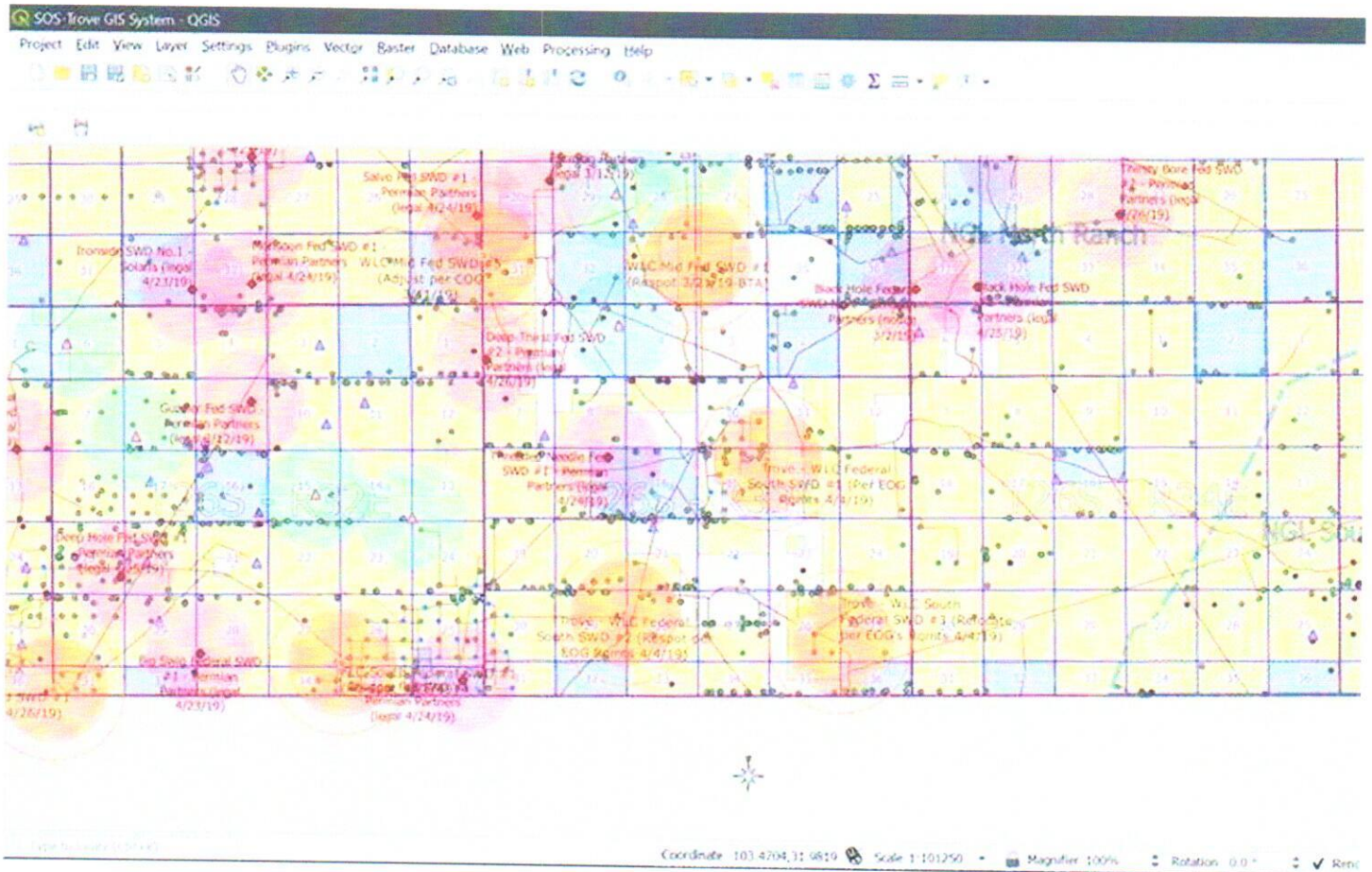
**Sent:** Tuesday, May 21, 2019 9:45 AM

**To:** Matthias Sayer

**Subject:** RE: NGL

For discussion – map attached below w/ prospects WLC #2 & 3 (center, bottom); NGL South Ranch in view...





**From:** Matthias Sayer <Matthias.Sayer@nglep.com>  
**Sent:** Tuesday, May 21, 2019 8:22 AM  
**To:** ben@sosconsulting.us  
**Subject:** Re: NGL

10:00 MDT?

Sent from my iPhone

On May 21, 2019, at 7:04 AM, "[ben@sosconsulting.us](mailto:ben@sosconsulting.us)" <[ben@sosconsulting.us](mailto:ben@sosconsulting.us)> wrote:

Good morning Matthias,

I'm back in the office – please let me know what a good time to call and visit might be.

Thanks,  
 Ben

**From:** Matthias Sayer <[Matthias.Sayer@nglep.com](mailto:Matthias.Sayer@nglep.com)>  
**Sent:** Thursday, May 16, 2019 11:59 AM  
**To:** [ben@sosconsulting.us](mailto:ben@sosconsulting.us)  
**Cc:** Deana M. Bennett <[dmb@modrall.com](mailto:dmb@modrall.com)>  
**Subject:** NGL

Ben,

Let me know if there is a time when you are available to discuss our concerns with your WLC South Fed SWDs #2 and #3 C-108s.

Thanks,

Matthias

<image001.png>

**MATTHIAS SAYER**

Vice President, Legal – Regulatory Compliance, Policy, and Environment

Mobile: (307) 365-1814

[matthias.sayer@nglep.com](mailto:matthias.sayer@nglep.com)

[www.nglenergypartners.com](http://www.nglenergypartners.com)

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**McMillan, Michael, EMNRD**

---

**From:** epadillapl@qwestoffice.net  
**Sent:** Wednesday, May 8, 2019 3:06 PM  
**To:** Goetze, Phillip, EMNRD; McMillan, Michael, EMNRD  
**Subject:** [EXT] Administrative Application of Trove Energy & Water (pMAM1910038589) PSE Federal SWD No. 4, Unit A, 145 FNL-5FEL, Section 30, T24S, R32E

Gentlemen:

Please be advised that Blackbuck Resources LLC opposes the above-referenced application.

Ernest L. Padilla  
PADILLA LAW FIRM, P.A.  
P.O. Box 2523  
Santa Fe, New Mexico 87504-2523  
T: 505-988-757  
F: 505-988-7592

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# Trove Energy and Water, LLC

## REQUEST FOR INCREASED TUBING SIZE

*Applicable to all Trove Energy and Water, LLC's C-108s  
brought to Examiner Hearing September 5, 2019*

C-108 Project	Location	Case No.
PSE #4	5' FNL & 2494' FEL 3-24S-31E	20752
WLC-M #3	2075' FSL & 2' FWL 10-25S-33E	20753
WLC-M #4	1470' FSL & 1170' FEL 17-25S-33E	20760
WLC-M #5	1613' FNL & 150' FWL 31-25S-33E	20754
WLC-S #2	1740' FNL & 150' FEL 29-26S-33E	20755
WLC-S #3	1420' FSL & 15' FEL 26-26S-33E	20756
FLC-S #1	225' FSL & 50' FWL 26-26S-32E	20751
Ole 55 #1	1700' FNL & 5' FWL 31-26S-32E	20757

### Justification

EXHIBIT

5A

#### ***Anticipated Need for Disposal Capacity***

Daily produced water will INCREASE annually and by 2025, expectations are for an additional 1.1 million barrels per day **over current volumes**. It is estimated that 50 new SWDs need to be brought online in the Delaware Basin every year to meet the demand.

#### ***More Capacity – Fewer Wells – Increased Safety***

Going from currently approved 5 ½-inch tubing strings to a full 7-inch string (5 ½" inside liner only) reduces friction by 300%; if upsizing from a 4 ½-inch string, friction is reduced by nearly 1000%. In any case, this allows operators to achieve the 40K to 50K bpd daily volumes with less horsepower and minimizing stress-induced mechanical failures from the tank battery, through the pump system and manifolds, to the well head and downhole. Lowering the chance for mechanical failure also enhances personnel safety. *(See All Figures.)*

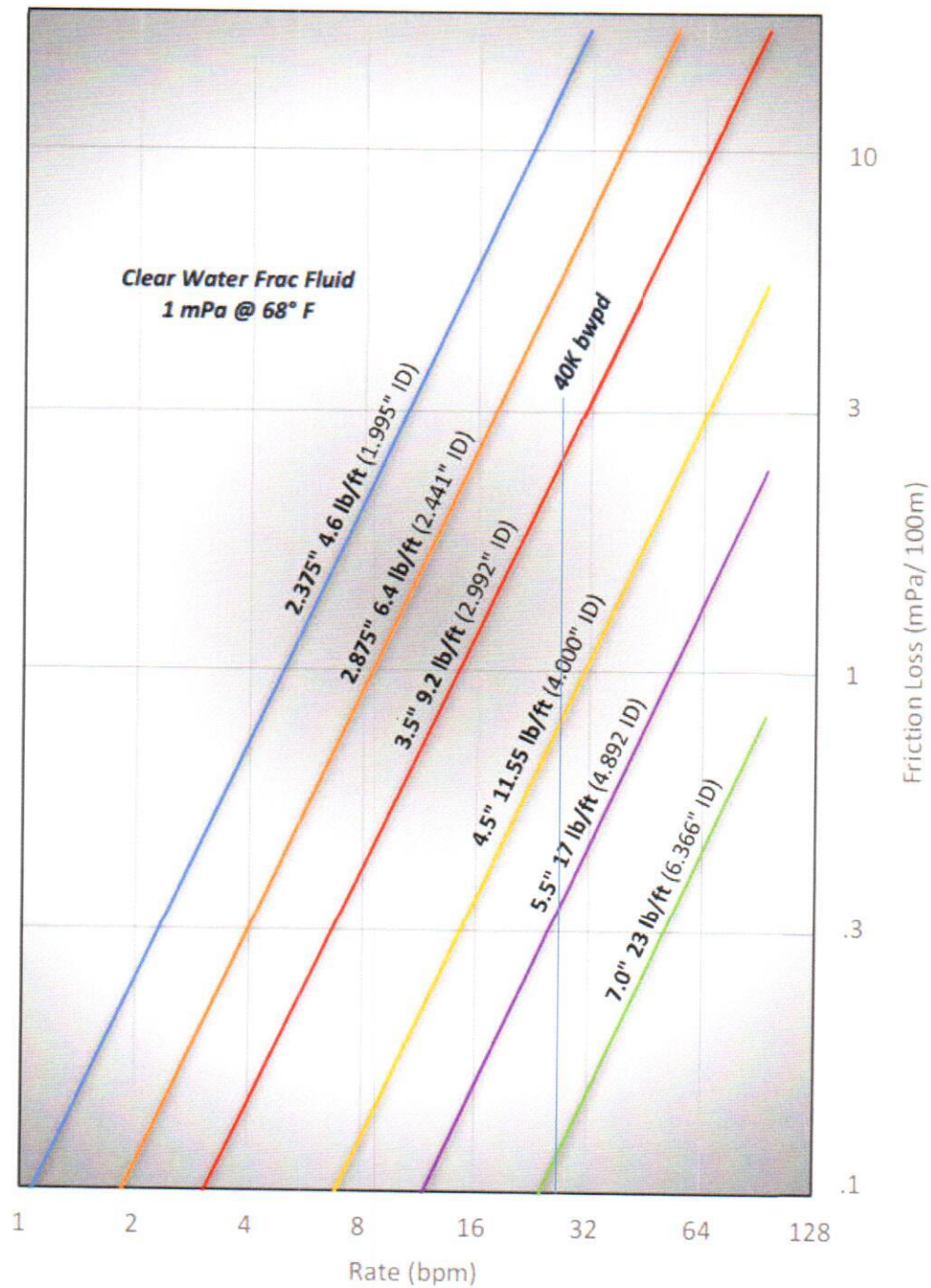
#### ***Larger Tubing Just Makes Sense for Today's Requirements***

The risk of having to fish large diameter tubing from liner with close tolerance is challenging but, it has previously been well documented to the NMOCD that it can and has been performed successfully in many scenarios. Fishing tool companies have the tools to perform these jobs should the need arise. Some fishing jobs are tricky to be sure however; a sequence of events for 5 ½" tubing to be dropped inside a 7 5/8" liner is rare – the benefits far outweigh the risks.



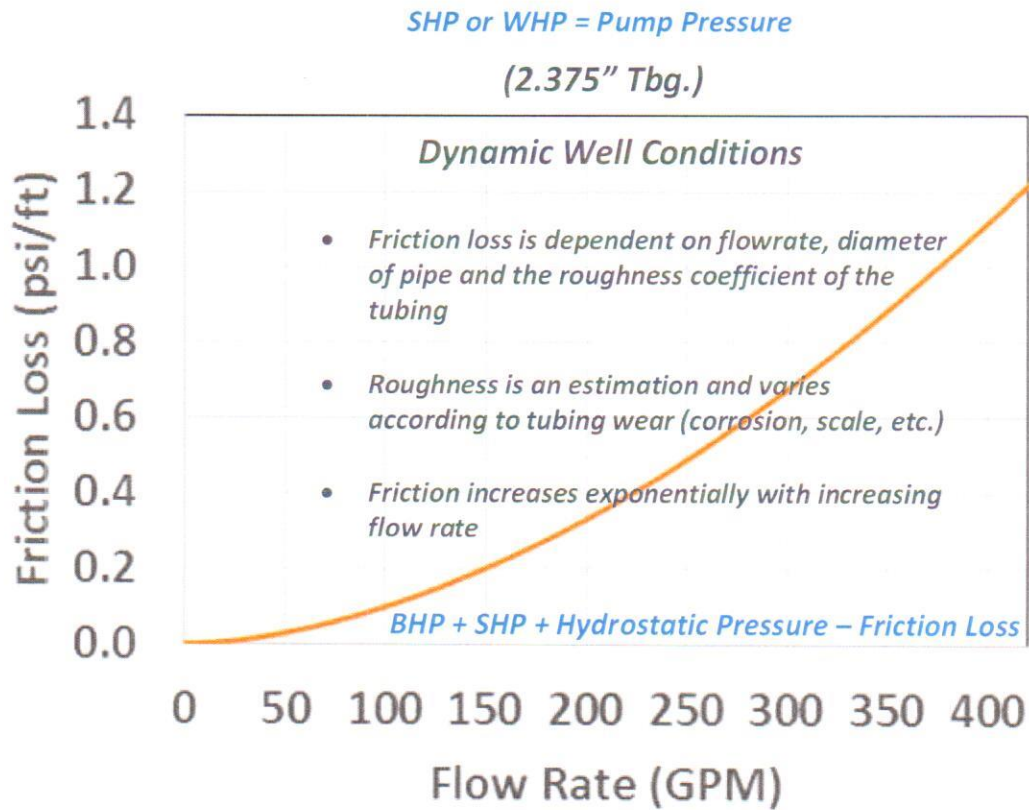
Figure 1

### Injection Tubing: Friction Loss vs Rate



Following the 40K bwpd line, it is apparent that attempting to obtain this rate even with 3.5" tubing is unrealistic – equipment failures occur. The 7.0 tubing offers minimal friction loss thereby allowing increased rates downhole and less impact to equipment. A comfortable rate for 3.5" might be about 6.5 bpm or, less than 10K bwpd as an example.

Figure 2  
Friction Loss Curve



Bourgoyne, Millhelm, Chenevert, Young, *Applied Drilling Engineering*, 1991

Figure 3

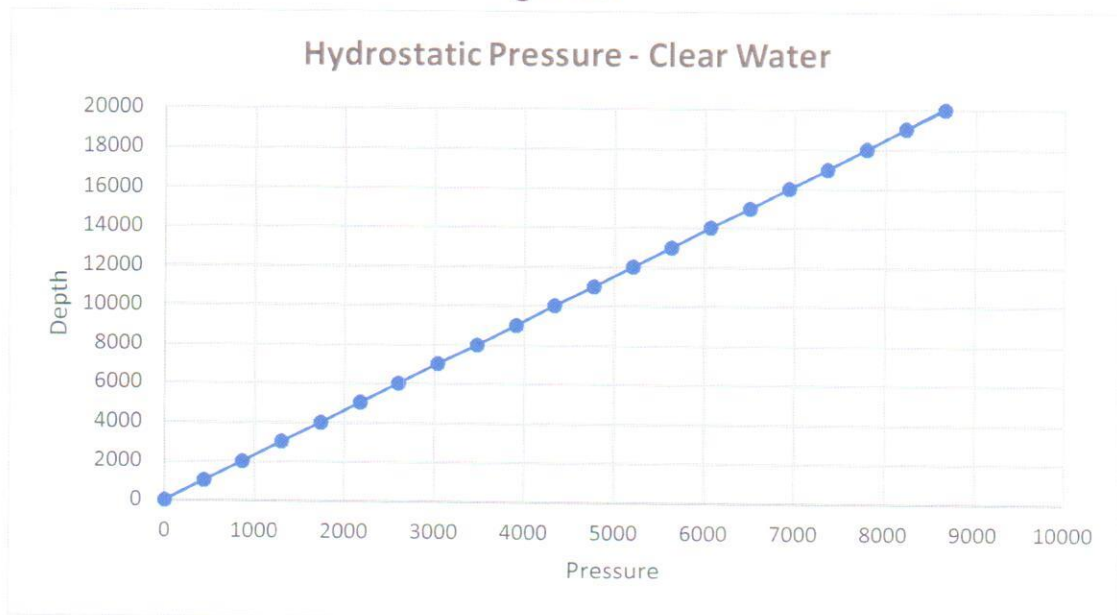
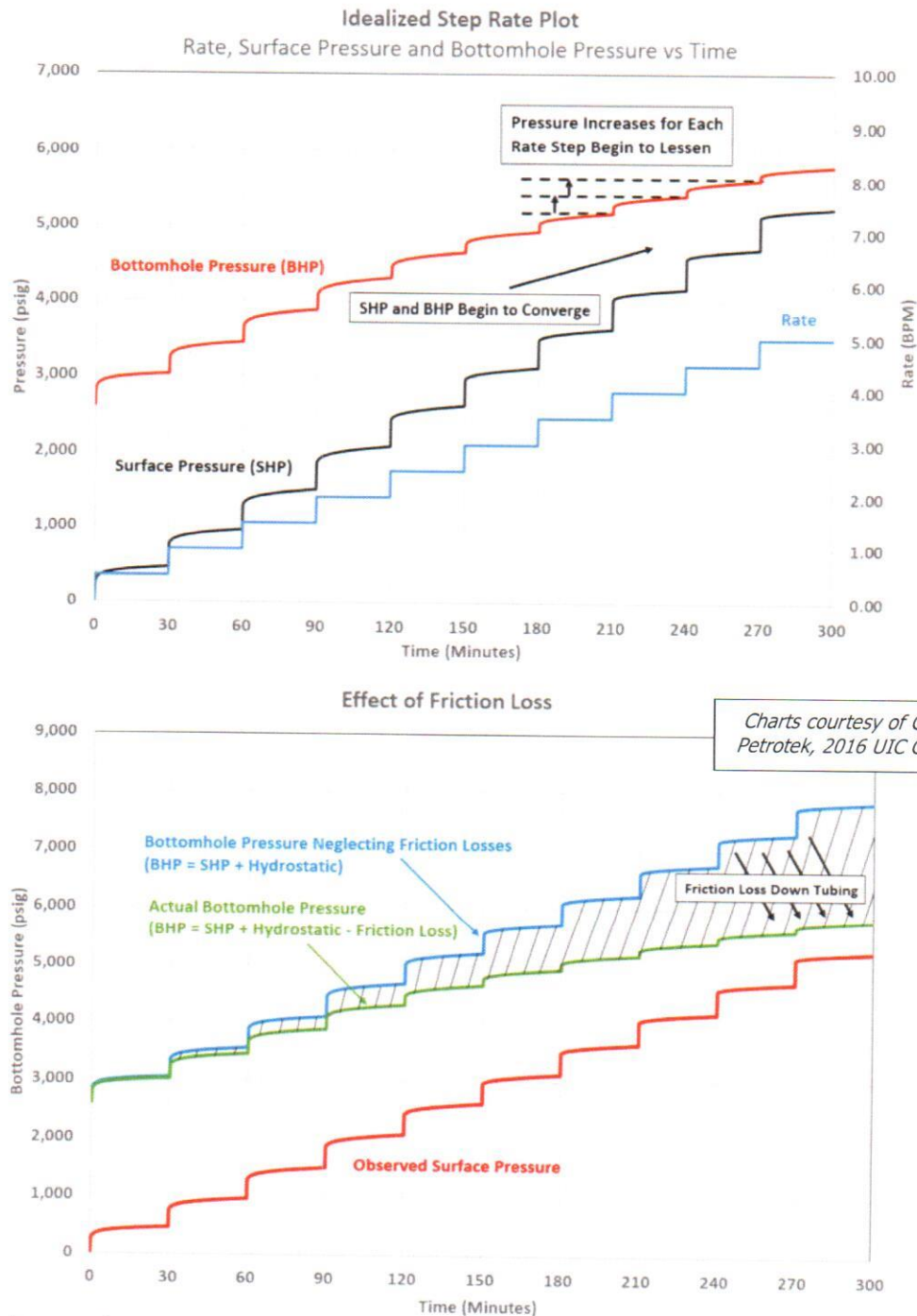




Figure 4

## Step Rate Test Charts Depict Friction Loss



The above charts are theoretical (*shallow/ 2.375" TBG*) but clearly depict the relationship between surface and bottomhole pressures; the top chart compares to rate and the bottom chart to friction loss. As shown in **Figure 1**, increasing tubing size reduces friction allowing a greater rate to reach the intended disposal interval and by using less horsepower.

## Tubing Configuration Inside Liner

The larger 7" casing is run to within 3 joints of the liner-top so the reduced friction benefits are realized. Then, to get to the packer setting depth (within 100 feet of the liner shoe; top of openhole interval) the tubing is swaged and reduced to the final 2,000 to 4000 feet. Friction goes up but, the shorter final length keeps it manageable while delivering the needed volumes. *(See Large Figure – Trove Generic Proposed Well Schematic)*

### Specs – Tubing Inside Liner

5.5" 17.0# HCP-110 FJ	OD	ID	Drift	Lined ID	Flare Drift
	5.500	4.982	4.767	4.520	4.275
				Wall Thickness	5.5" FJ Clearance
7.625" 39.0# P-110 Liner	7.625	6.625	6.500	0.500	1.125

## Fishing Procedures

A 6.625" O.D. Bowen Series 150 overshot (Assembly 8625) with a spiral grapple or equivalent would be utilized to perform an overshot operation. *(Note: The 6.625" O.D. will be turned down to 6.500" O.D. prior to commencing operation.)* Details on the overshot are shown below.

Outside Diameters 5.7/8" – 6.7/8" inclusive.

Complete Assembly with Spiral Parts	Ref.	0588	0593	0638	0651	0662	0663	0687
Type	C5171	5737	6655	4773	C4825	8625	C5174	
Maximum Catch Size (Spiral)	SH	FS	SH	SH	FS	SH	FS	
Maximum Catch Size (Basket)	5"	4.5/8"	5.1/4"	5.3/8"	5"	5.1/2"	5.1/4"	
Assembly Weight (lbs.)	4.1/2"	4"	4.5/8"	4.3/4"	4.1/4"	4.7/8"	4.1/2"	
Overshot O Dia.	140	150	176	182	192	185	211	
	5.7/8"	5.15/16"	6.3/8"	6.1/2"	6.5/8"	6.5/8"	6.7/8"	
Top Sub	0588.1	0593.1	0638.1	0651.1	0662.1	0663.1	0687.1	
	A5172	5738	6656	4774	B4826	8626	A5175	
Bowl	0588.2	0593.2	0638.2	0651.2	0662.2	0663.2	0687.2	
	B5173	5735	4503	9205	B4827	8617	B4519	
Standard Guide	0588.3	0593.3	0638.3	0651.3	0662.3	0663.3	0687.3	
	B4371	192	4504	4775	L1074	8621	A4474	
Spiral Grapple	0588.4	0593.4	0638.4	0651.4	0662.4	0663.4	0687.4	
	B4369	196	4498	9207	M1071	8619	B4472	
Spiral Grapple Control	0588.5	0593.5	0638.5	0651.5	0662.5	0663.5	0687.5	
	B4370	193	4499	9208	M1072	8620	A4473	
Packer	0588.6	0593.6	0638.6	0651.6	0662.6	0663.6	0687.6	
	L5950	195	4505	9209	L4505	8618	B4520	
Basket Grapple	0588.7	0593.7	0638.7	0651.7	0662.7	0663.7	0687.7	
	B4369	196	4498	9207	M1071	8619	B4472	
Basket Grapple Control	0588.8	0593.8	0638.8	0651.8	0662.8	0663.8	0687.8	
	B4370	193	4499	9208	M1072	8620	A4473	
Control Packer	0588.9	0593.9	0638.9	0651.9	0662.9	0663.9	0687.9	
	L5950R	195R	4505R	9209R	M4505RS	8618R	B4520R	
Mill Control Packer	0588.10	0593.10	0638.10	0651.10	0662.10	0663.10	0687.10	
	L5950R	195R	4505R	9209R	M4505RS	8618R	B4520R	

*(Note: Similar fishing tools are available from various manufactures; Bowen is a major manufacturer of many downhole tools and considered a standard.)*



## **Fishing Procedure – Other Circumstances**

### ***Connection Break***

If dressing is needed, trip in hole with a mill and mill connection to allow for turned-down overshot to be latched onto the body of the tubing. If no milling is required, trip in hole with overshot and latch onto fish. Once latched, pick up string weight and pull to release packer. Once packer is released, trip out of hole with fish.

### ***Tubing Body Break***

If dressing is needed, trip in hole with a mill and mill tubing to allow for turned-down overshot to be latched onto the body of the tubing. If no milling is required, trip in hole with turned-down overshot and latch onto fish. Once latched, pick up string weight and pull 1-2 points over hanging weight to release the packer (turn to release depending on model). Once packer is released, trip out of hole with fish. *(Note: Wash pipe and mill may be substituted for dressing-off a break to ensure pipe stabilization and that the casing is not damaged due to milling.)*

### ***Mill Cannot be Used***

If an inadequate fishing neck is looking up and a mill cannot be used to dress the fish, a cutting tool may be utilized to cut off the damaged portion of tubing and a spear used to retrieve the cut-off piece. Once the cut-off piece is retrieved, the turned-down overshot may be used to retrieve the fish and release the packer. *(Note: If pipe is severely damaged, this procedure may be repeated to retrieve the pipe in sections.)*

### ***Spear Fishing Procedure***

If a turned-down overshot cannot be used or the fishing neck is inadequate, a spear may be used to spear into the fish. In the case of insert-lined pipe, a smaller spear will be utilized to go inside the insert-liner and retrieve the lining. Once the lining has been removed, trip out of hole and pick up the proper sized spear for the subject pipe. Trip in hole with tubing spear, spear the fish, pick up string weight and pull 1-2 points over hanging weight to release the packer (turn to release depending on model). Trip out of hole with fish and packer assembly.

### ***Abandonment Procedure***

If all attempts to fish fail, the operator may decide to abandon the zone or well. The tubing would be perforated with squeeze holes. A cement retainer or other seal assemble would be set at the top of the pipe and cement pumped to fill the annulus between the tubing and liner. The zone would be abandoned and sealed from fluid migration. The operator may decide to sidetrack from an appropriate depth and retry.

### ***Summary***

An increase in tubing size to a 7" x 5.5" (inside liner) for Trove Energy and Water's above-mentioned proposed SWDs will likely NOT result in increased potential for seismic activity in the region nor cause mechanical problems in the event tubing must be fished. Upsizing tubing diameters will reduce the number of SWDs required to accommodate the disposal needs of the industry in southeastern New Mexico.

# Trove Energy and Water, LLC

## REQUEST FOR INCREASED TUBING SIZE

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brought to Examiner Hearing September 5, 2019*

C-108 Project	Location	Case No.
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FLC-S #1	225' FSL & 50' FWL 26-26S-32E	20751
Ole 55 #1	1700' FNL & 5' FWL 31-26S-32E	20757

### Justification

EXHIBIT

5A

### ***Anticipated Need for Disposal Capacity***

Daily produced water will INCREASE annually and by 2025, expectations are for an additional 1.1 million barrels per day **over current volumes**. It is estimated that 50 new SWDs need to be brought online in the Delaware Basin every year to meet the demand.

### ***More Capacity – Fewer Wells – Increased Safety***

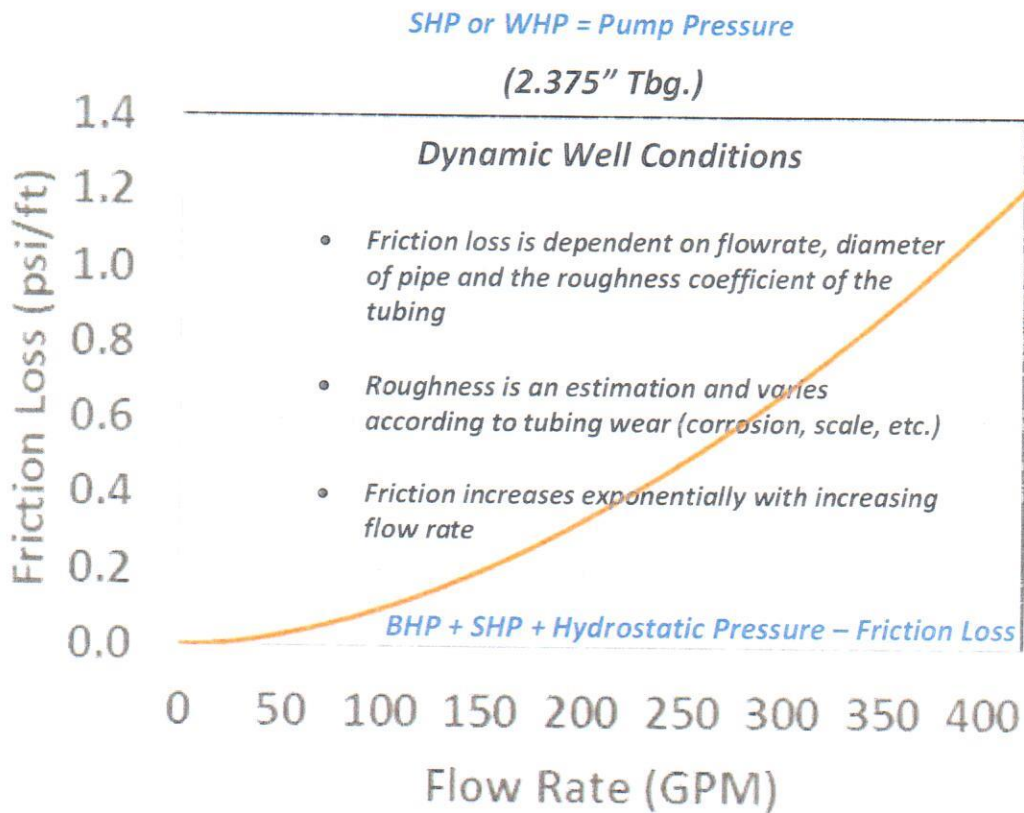
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The risk of having to fish large diameter tubing from liner with close tolerance is challenging but, it has previously been well documented to the NMOCD that it can and has been performed successfully in many scenarios. Fishing tool companies have the tools to perform these jobs should the need arise. Some fishing jobs are tricky to be sure however; a sequence of events for 5 ½" tubing to be dropped inside a 7 5/8" liner is rare – the benefits far outweigh the risks.

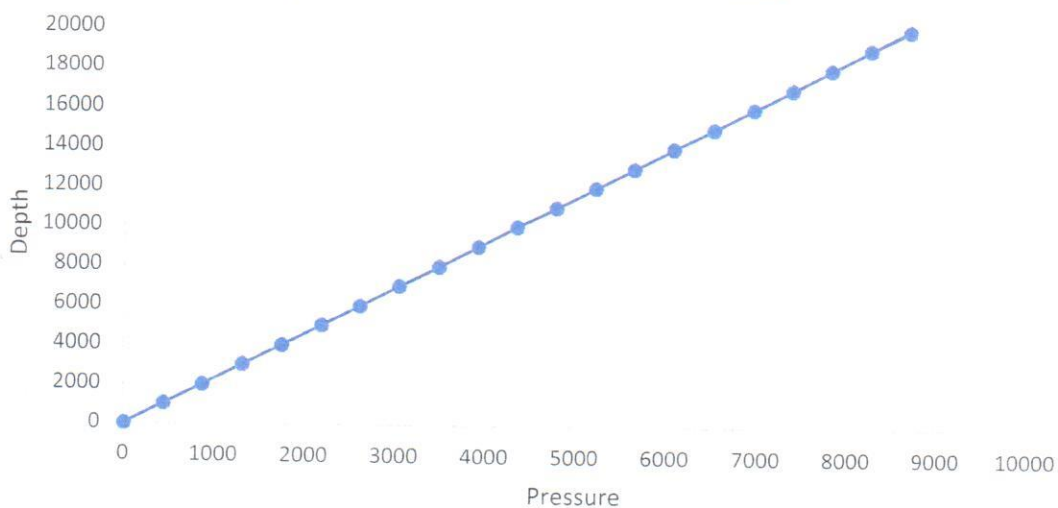


Figure 2  
Friction Loss Curve



Bourgoyne, Millhelm, Chenevert, Young, *Applied Drilling Engineering*, 1991

Figure 3  
Hydrostatic Pressure - Clear Water



## Tubing Configuration Inside Liner

The larger 7" casing is run to within 3 joints of the liner-top so the reduced friction benefits are realized. Then, to get to the packer setting depth (within 100 feet of the liner shoe; top of openhole interval) the tubing is swaged and reduced to the final 2,000 to 4000 feet. Friction goes up but, the shorter final length keeps it manageable while delivering the needed volumes. *(See Large Figure – Trove Generic Proposed Well Schematic)*

### **Specs – Tubing Inside Liner**

<b>5.5" 17.0# HCP-110 FJ</b>	<b>OD</b>	<b>ID</b>	<b>Drift</b>	<b>Lined ID</b>	<b>Flare Drift</b>
	<b>5.500</b>	<b>4.982</b>	<b>4.767</b>	<b>4.520</b>	<b>4.275</b>
				<b>Wall Thickness</b>	<b>5.5" FJ Clearance</b>
<b>7.625" 39.0# P-110 Liner</b>	<b>7.625</b>	<b>6.625</b>	<b>6.500</b>	<b>0.500</b>	<b>1.125</b>

## Fishing Procedures

A 6.625" O.D. Bowen Series 150 overshot (Assembly 8625) with a spiral grapple or equivalent would be utilized to perform an overshot operation. *(Note: The 6.625" O.D. will be turned down to 6.500" O.D. prior to commencing operation.)* Details on the overshot are shown below.

**Outside Diameters 5.7/8" – 6.7/8" inclusive.**

Complete Assembly with Spiral Parts	Ref.	0588 C5171	0593 5737	0638 6655	0651 4773	0662 C4825	0663 8625	0687 C5174
Type		SH	FS	SH	SH	FS	SH	FS
Maximum Catch Size (Spiral)		5"	4.5/8"	5.1/4"	5.3/8"	5"	5.1/2"	5.1/4"
Maximum Catch Size (Basket)		4.1/2"	4"	4.5/8"	4.3/4"	4.1/4"	4.7/8"	4.1/2"
Assembly Weight (lbs.)		140	150	176	182	192	185	211
Overshot O Dia.		5.7/8"	5.15/16"	6.3/8"	6.1/2"	6.5/8"	6.5/8"	6.7/8"
Top Sub		0588.1 A5172	0593.1 5738	0638.1 6656	0651.1 4774	0662.1 B4826	0663.1 8626	0687.1 A5175
Bowl		0588.2 B5173	0593.2 5735	0638.2 4503	0651.2 9205	0662.2 B4827	0663.2 8617	0687.2 B4519
Standard Guide		0588.3 B4371	0593.3 192	0638.3 4504	0651.3 4775	0662.3 L1074	0663.3 8621	0687.3 A4474
Spiral Grapple		0588.4 B4369	0593.4 196	0638.4 4498	0651.4 9207	0662.4 M1071	0663.4 8619	0687.4 B4472
Spiral Grapple Control		0588.5 B4370	0593.5 193	0638.5 4499	0651.5 9208	0662.5 M1072	0663.5 8620	0687.5 A4473
Packer		0588.6 L5950	0593.6 195	0638.6 4505	0651.6 9209	0662.6 L4505	0663.6 8618	0687.6 B4520
Basket Grapple		0588.7 B4369	0593.7 196	0638.7 4498	0651.7 9207	0662.7 M1071	0663.7 8619	0687.7 B4472
Basket Grapple Control		0588.8 B4370	0593.8 193	0638.8 4499	0651.8 9208	0662.8 M1072	0663.8 8620	0687.8 A4473
Control Packer		0588.9 L5950R	0593.9 195R	0638.9 4505R	0651.9 9209R	0662.9 M4505RS	0663.9 8618R	0687.9 B4520R
Mill Control Packer		0588.10 L5950R	0593.10 195R	0638.10 4505R	0651.10 9209R	0662.10 M4505RS	0663.10 8618R	0687.10 B4520R

*(Note: Similar fishing tools are available from various manufactures; Bowen is a major manufacturer of many downhole tools and considered a standard.)*





## Devonian Mapping Project

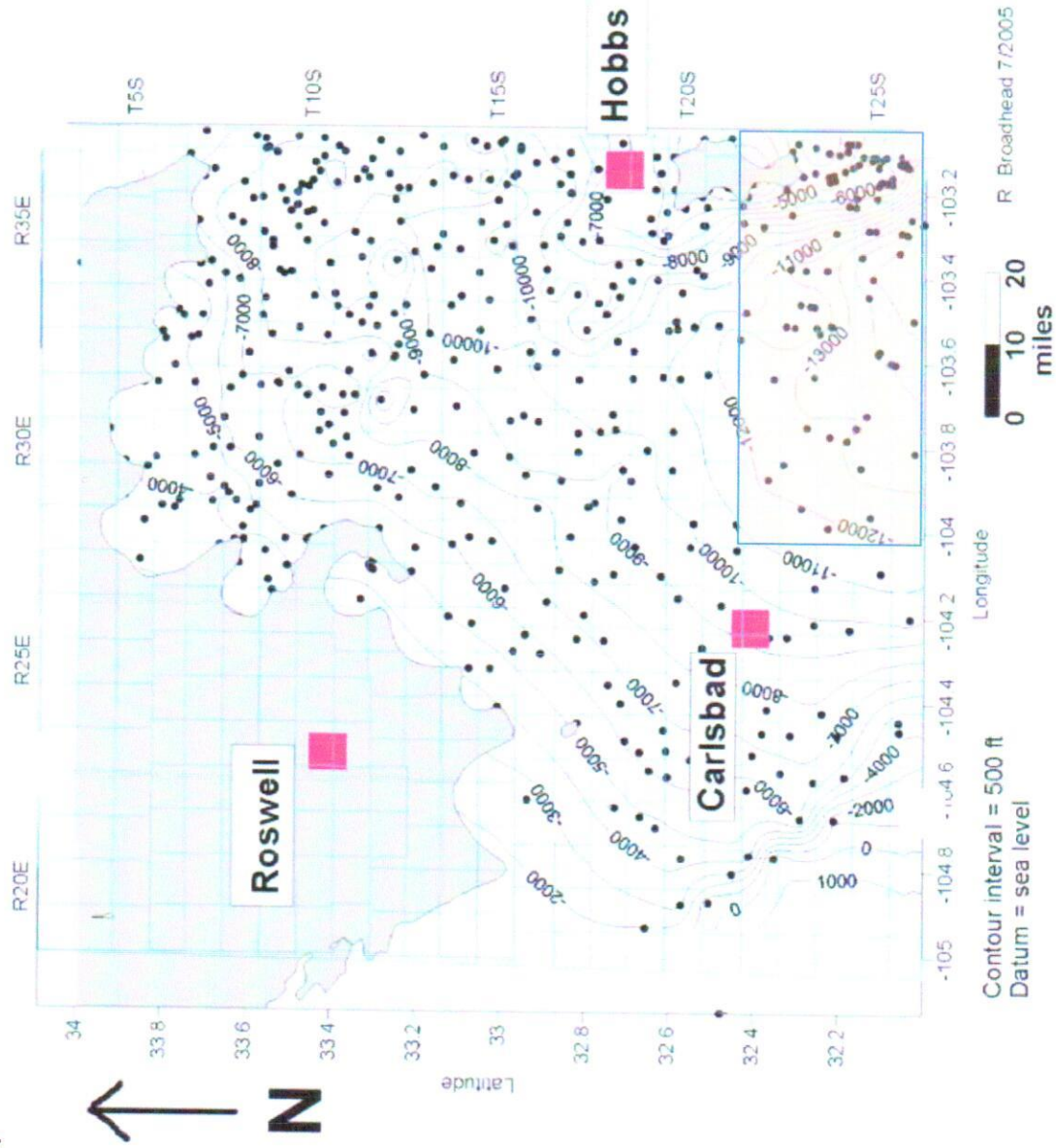


EXHIBIT

7

Prepared by:  
Howard McLaughlin  
August 2019

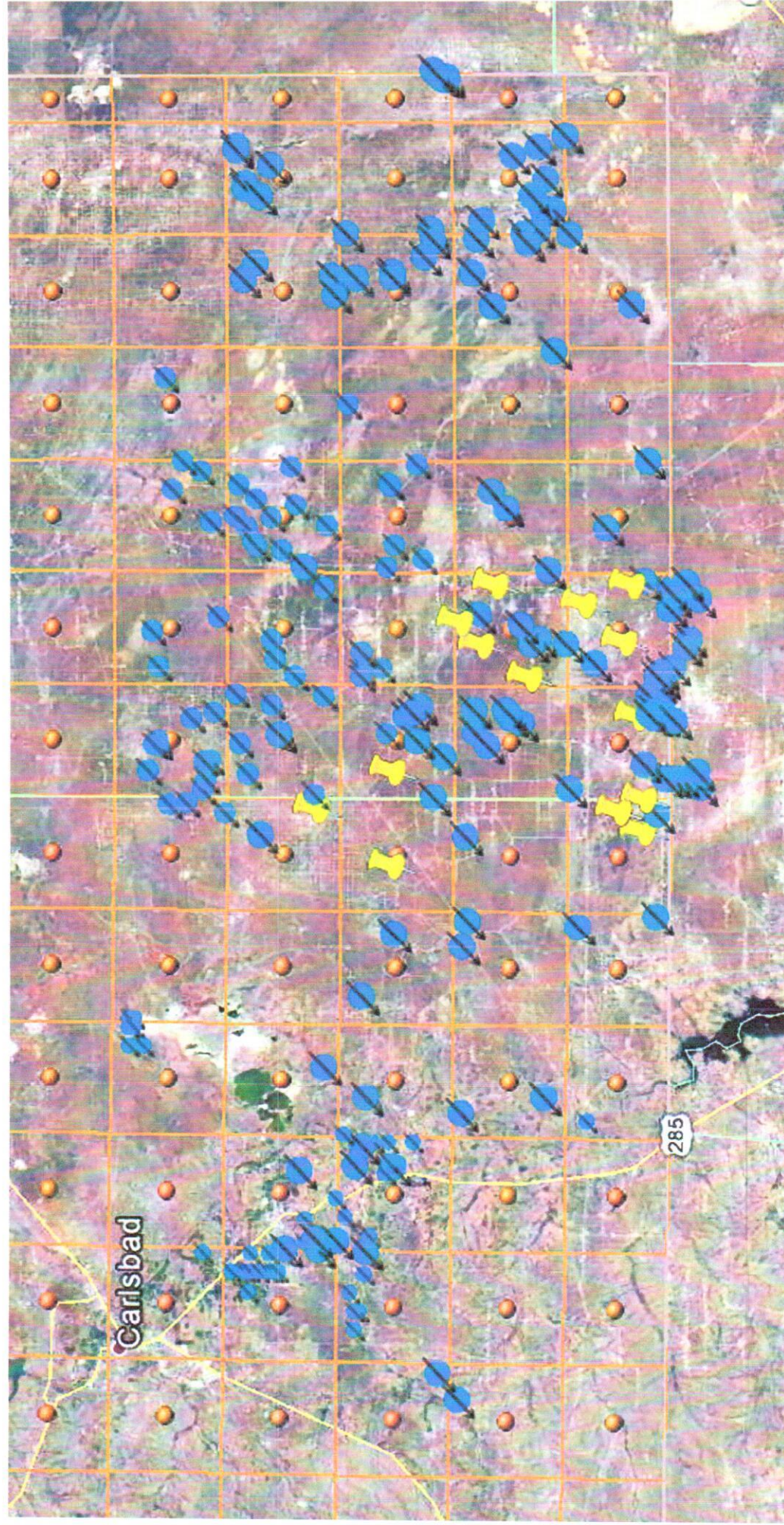
# Generalized Top Devonian Structure Map



Focus Area

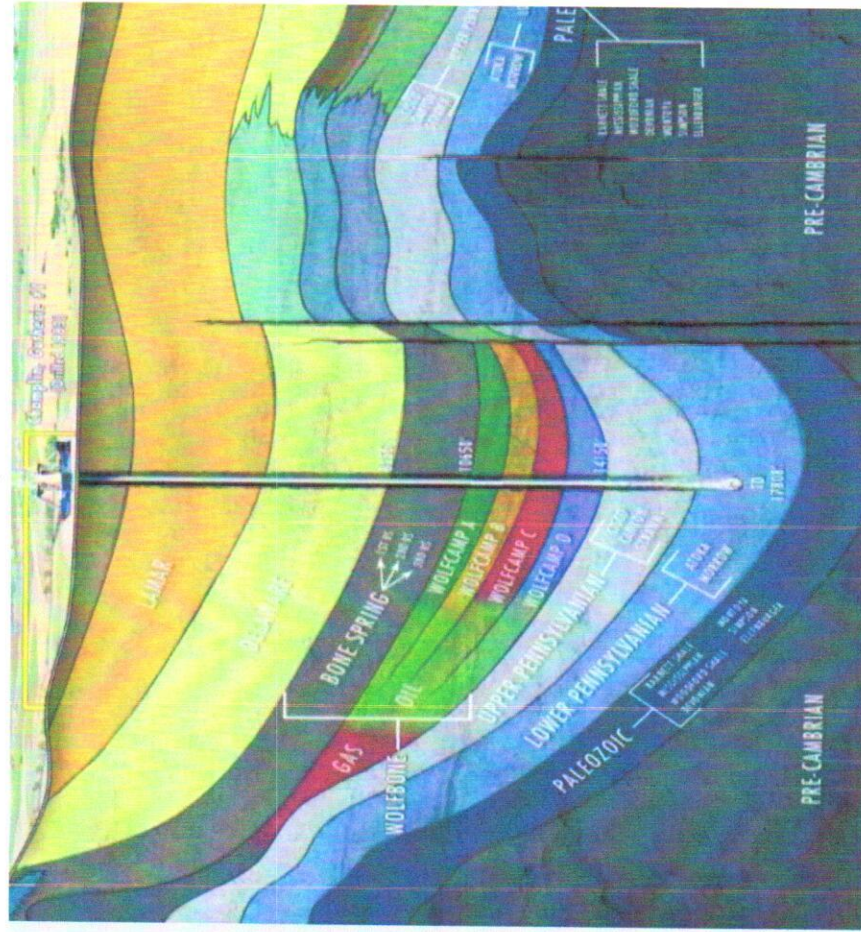
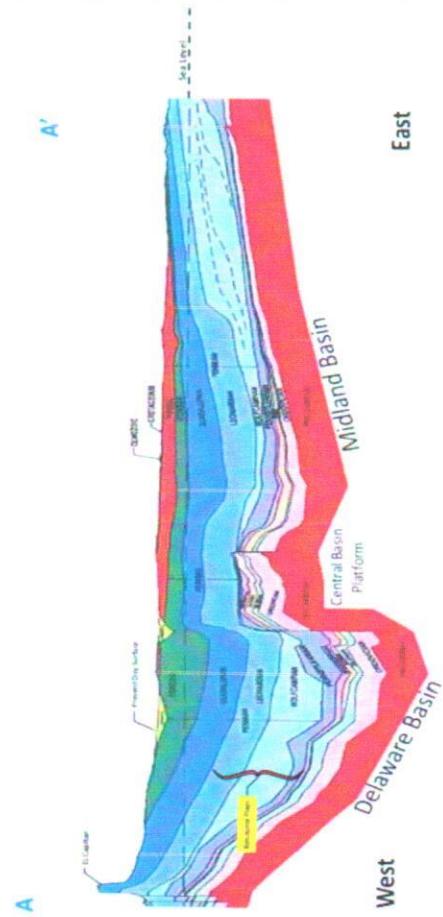
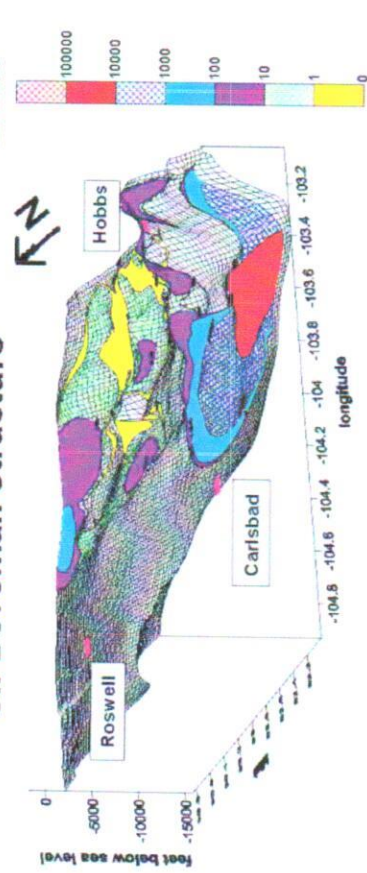


Trove Database of SWD Wells





GOR at  
cumulative production  
BCF/MBO





This is a detailed geological structure map of the Top Devonian sub-sea. The map displays a grid of well locations, each labeled with a unique identifier (e.g., 30-015-41074, 30-025-46360) and its corresponding TD (True Depth) and SWD (Subsea Well Depth) values. Key geological features include the Central Basin Platform, Rio Blanco 33 Federal, and various oil fields such as the Antelope, Woodpecker, and Rattlesnake. Structural contours are shown as solid black lines, with elevations ranging from -10,000' to -14,000'. A dashed line indicates the 12,000' contour. The map also shows the location of the Central Basin Platform, which is a large, flat area in the center. The map is oriented with North at the top, and the grid lines are labeled with coordinates (e.g., 22S 38E, 23S 38E). The map is titled 'Top Devonian - Structure Map (sub-sea)' in the top left corner.

FLC#1

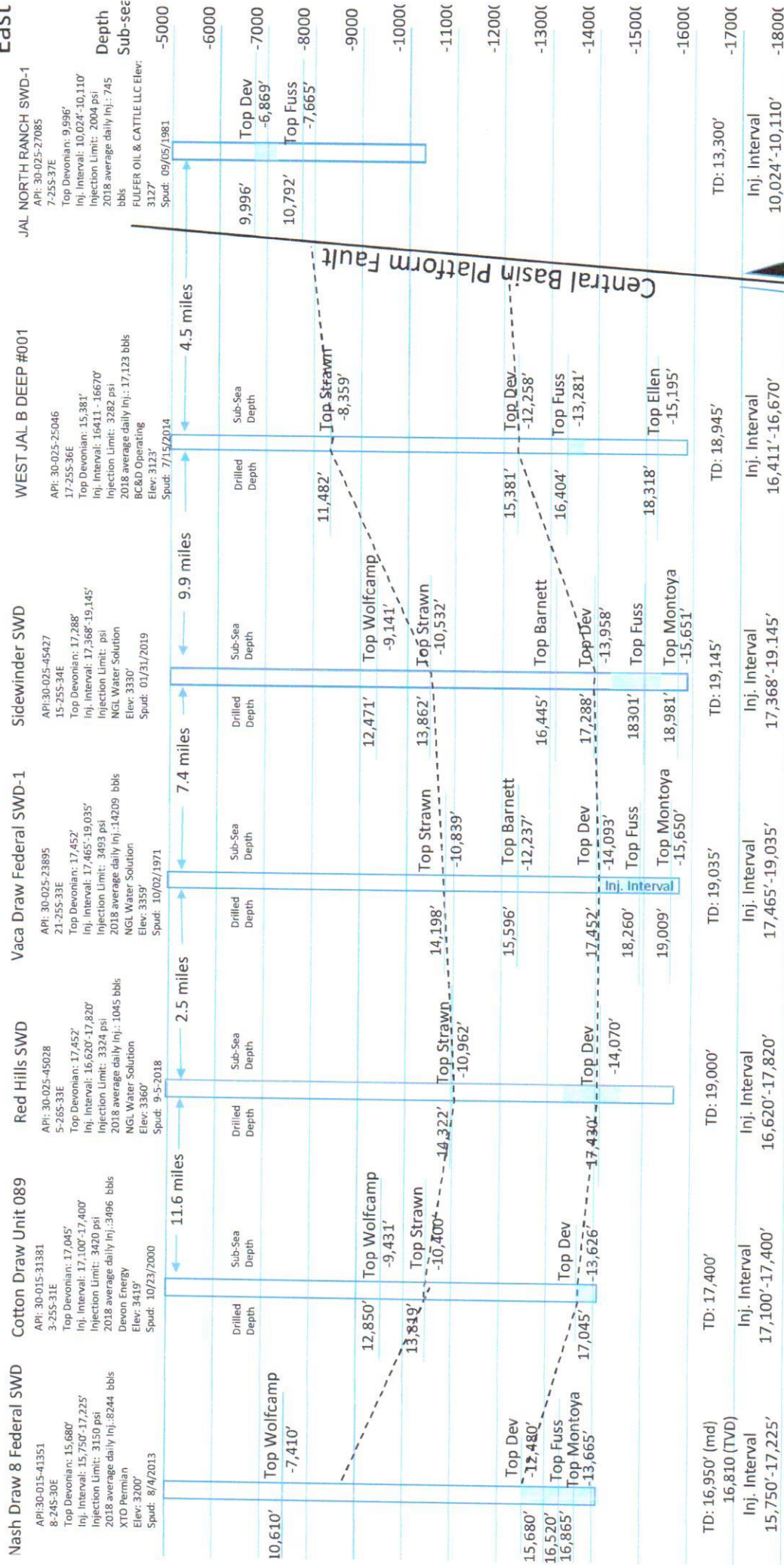
FIELD  
Ole55#1



West

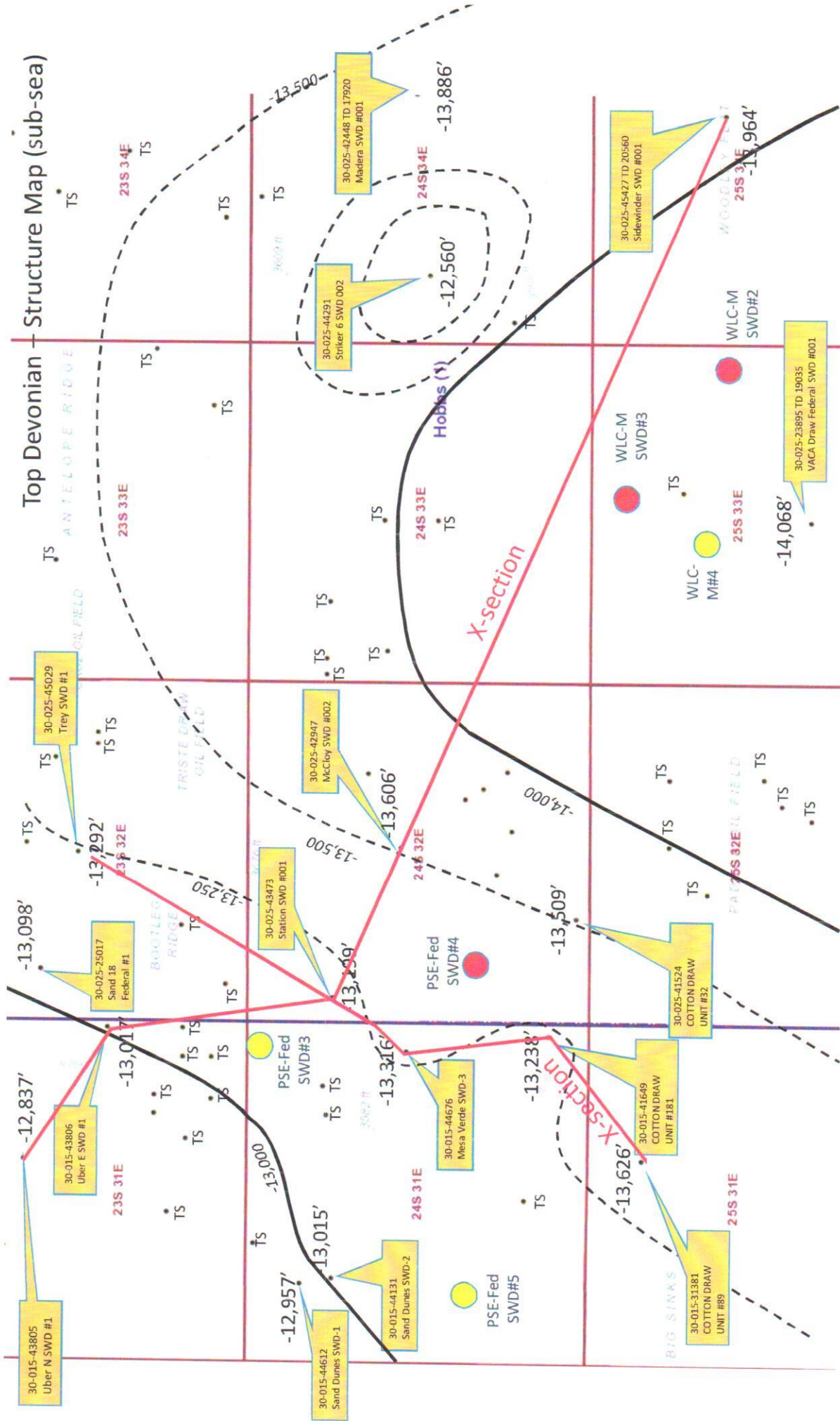
## Structural X-section - Sub-Sea Depths

East





# Top Devonian - Structure Map (sub-sea)



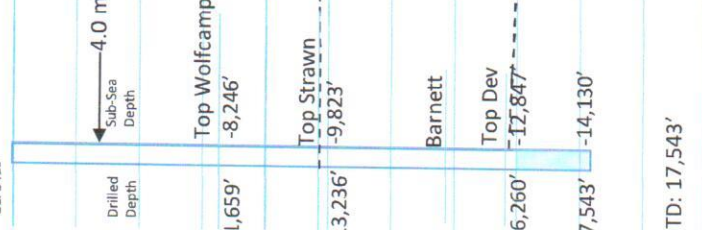
North

## Structural X-section

### Sub-Sea Depths

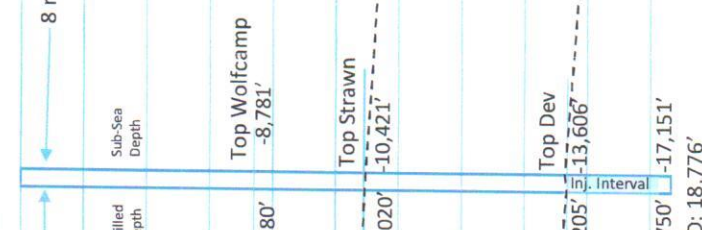
#### UBER North SWD-1

API: 30-015-43805  
15-235-31E  
Top Dev: 16,260'  
NGL Water Solutions  
Injection Interval: 16,500-18,250  
2018 average daily Inj.: 2335 bbls  
max pressure: 3300 psi  
GL: 3413'



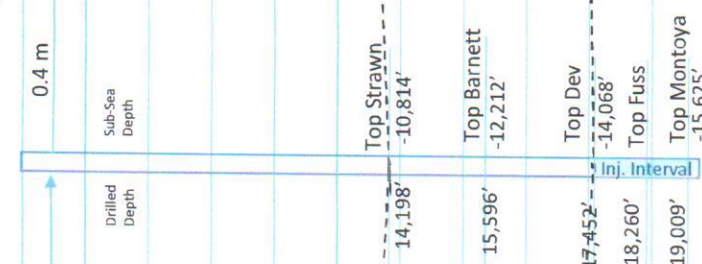
#### MCCLOY SWD-2

API: 30-015-42947  
15-245-32E  
OWL SWD  
Injection Interval: 17,221-18,750  
2018 average daily Inj.: 12,188 bbls  
max pressure: 2900 psi  
GL: 3599'



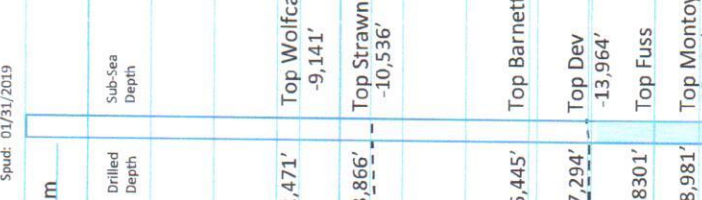
#### VACA DRAW FEDERAL SWD-1

API: 30-025-23895  
21-255-33E  
NGL Water Solutions  
Injection Interval: 17,465-19,035  
2018 average daily Inj.: 14,210 bbls  
max pressure: 3493 psi  
GL: 3359'



#### Sidewinder SWD

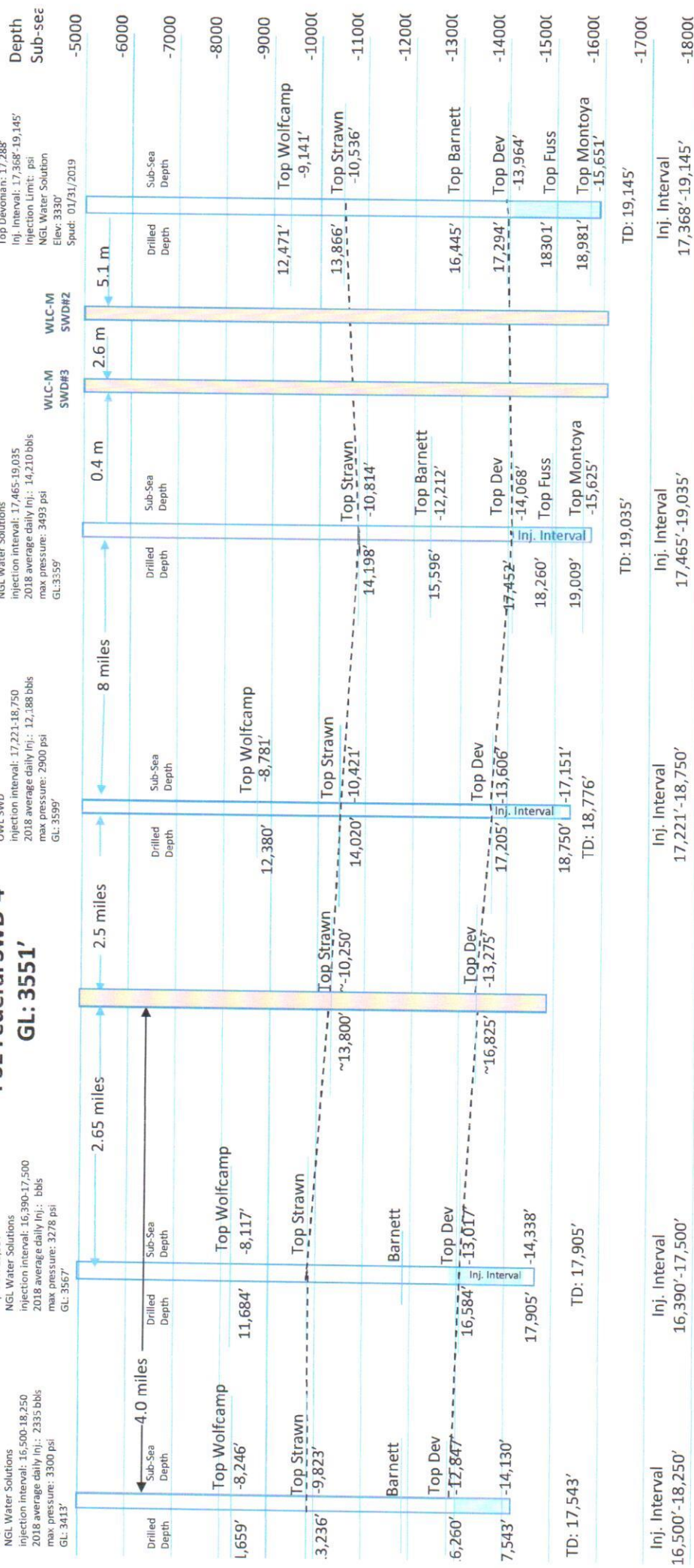
API: 30-025-45427  
15-255-34E  
Top Devonian: 17,288'  
Inj. Interval: 17,368'-19,145'  
Injection Limit: psi  
NGL Water Solution  
Elev: 3330'  
Spud: 01/31/2019



South

### PSE Federal SWD-4

GL: 3551'





# North

## Structural X-section Sub-Sea Depths

# South

Trey SWD-1

API: 30-025-45029  
21-235-32E  
NGL Water  
Injection interval: 16,737'-18,000'  
max pressure: 3347 psi  
GL: 3689'  
Spud: 3-3-2019

Station SWD-1

API: 30-025-43473  
7-245-32E  
NGL Water  
Injection interval: 16,470'-17,975'  
2018 average daily Inj.: 8495 bbls  
max pressure: 3294 psi  
GL: 3559'  
Spud: 5-6-2018

Mesa Verde SWD3

API: 30-015-44676  
13-245-31E  
NGL Water  
Injection interval: 16,620'-17,820'  
2018 average daily Inj.: 6638 bbls  
max pressure: 3324 psi  
GL: 3597'  
Spud: 2-25-2018

Cotton Draw Unit SWD 181

API: 30-015-41649  
36-245-31E  
Devon Energy  
Injection interval: 16,742'-19,185'  
2018 average daily Inj.: 14,790 bbls  
max pressure: 3348 psi  
GL: 3511'  
Spud: 10-3-2013

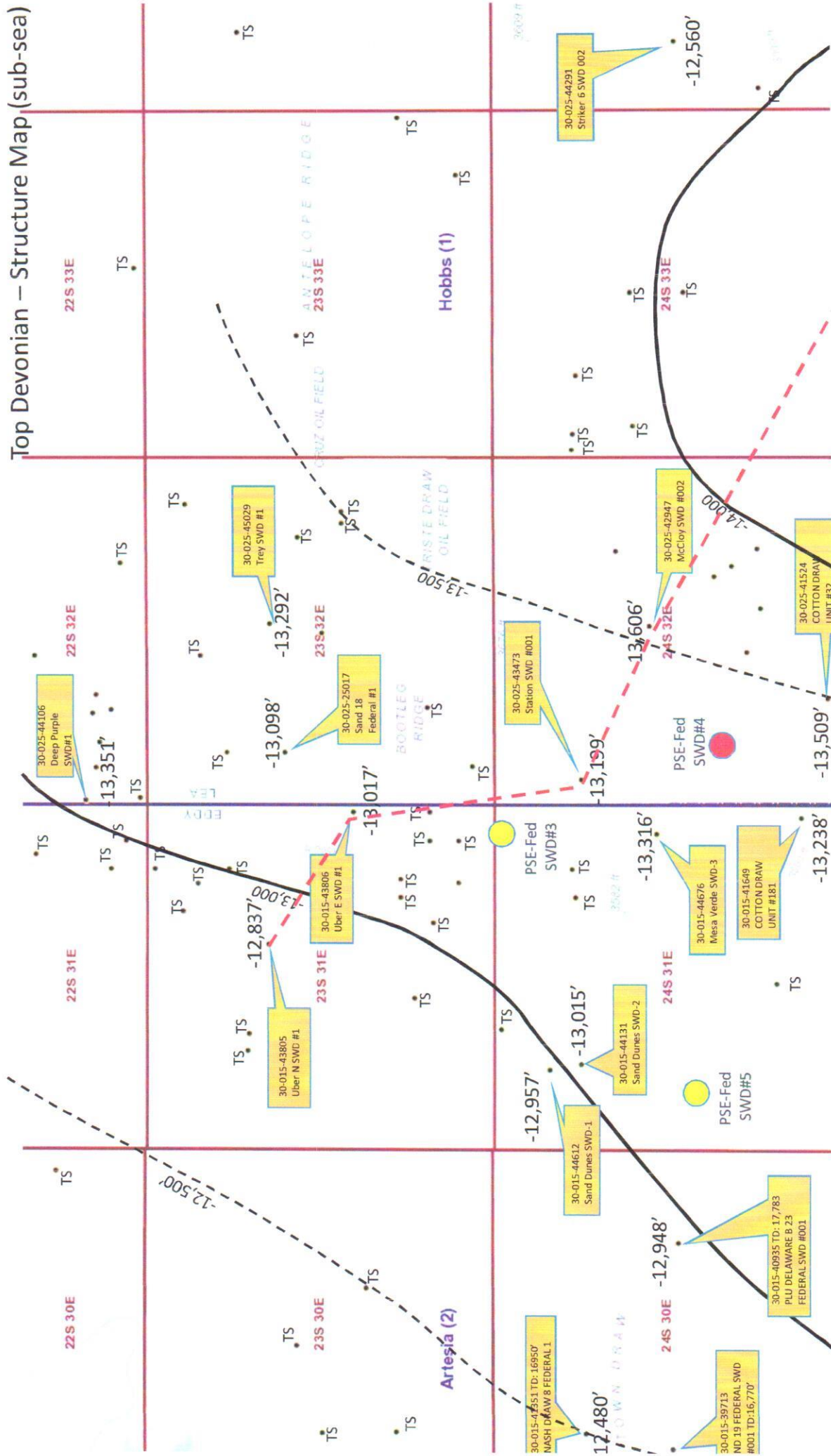
Cotton Draw Unit SWD 89

API: 30-015-31381  
3-255-31E  
Devon Energy  
Injection interval: 17,100'-17,400'  
max pressure: 3420 psi  
GL: 3419'  
Spud: 10-23-2000

## PSE Federal SWD-4 GL: 3551'

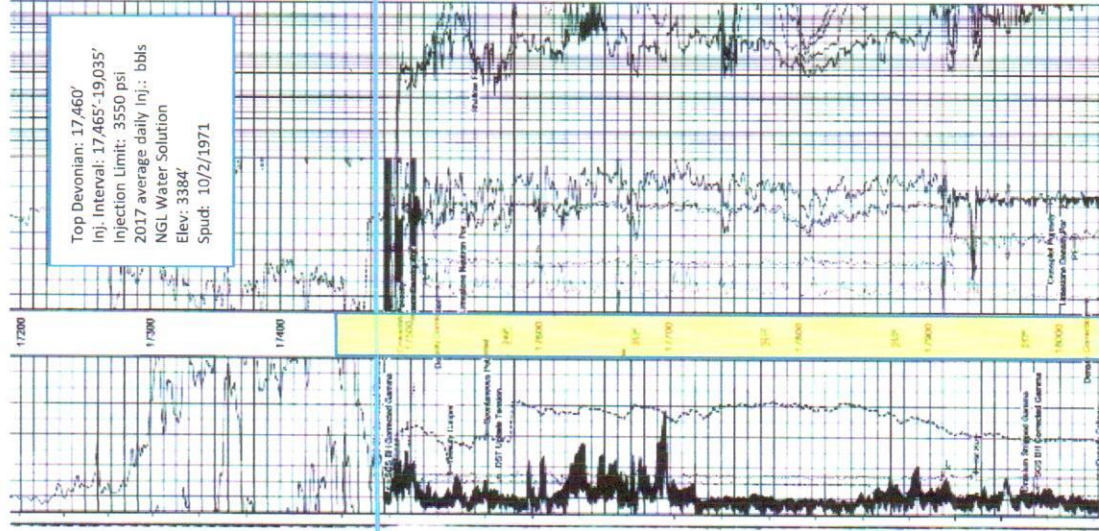


## Top Devonian – Structure Map<sub>(sub-sea)</sub>



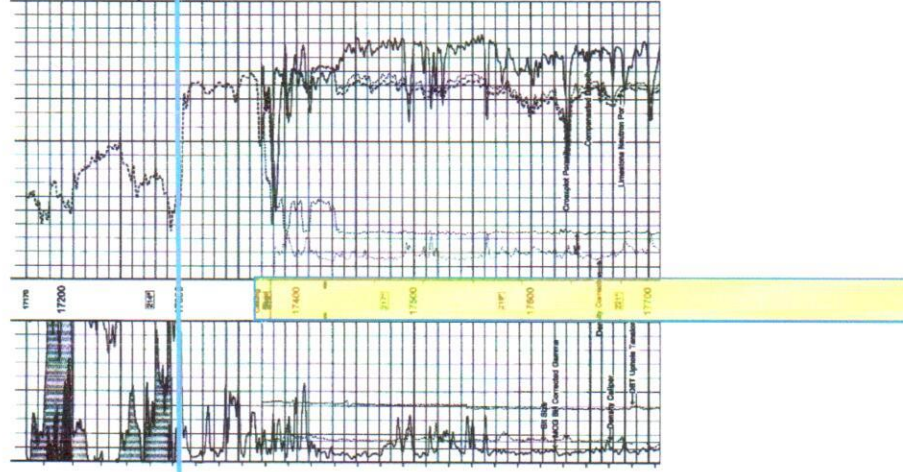


# VACA Draw Federal SWD

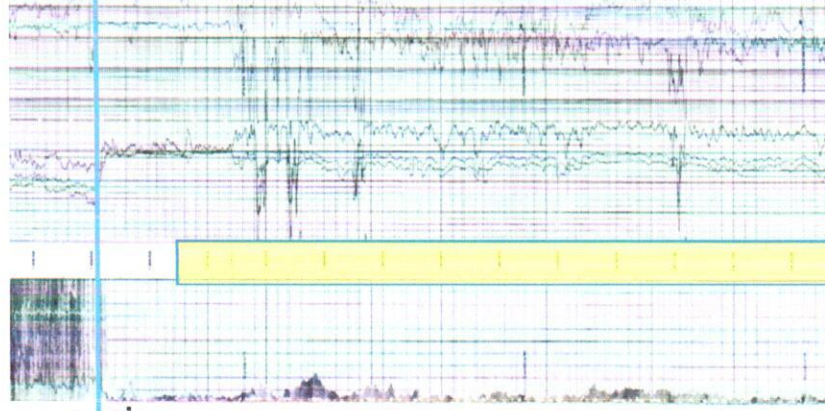


# Sidewinder SWD

Top Devonian: 17,300'  
 Inj. Interval: 17,368'-19,145'  
 Injection Limit: psi  
 2017 average daily Inj.: bbls  
 NGL Water Solution  
 Elev: 3330'  
 Spud: 01/31/2019



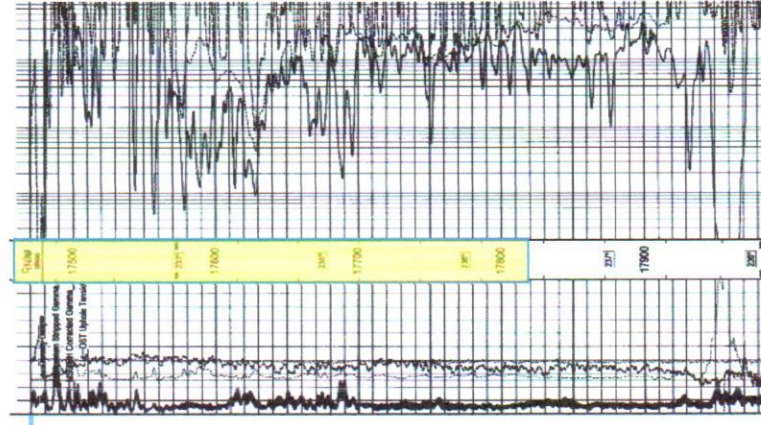
Top  
 Dev.



# Rattlesnake 16 SWD #001

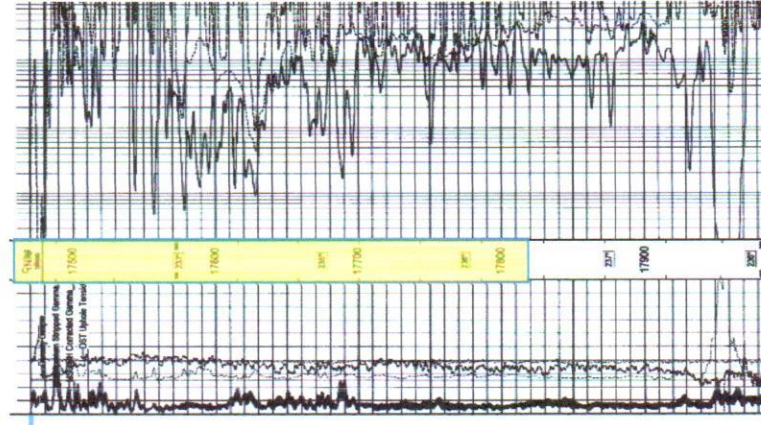
30-025-42355  
 TD: 20,335'

Top Devonian: 18,610'  
 Inj. Interval: 18,773-20,560'  
 Injection Limit: 3755 psi  
 2018 average daily Inj.: 6039 bbls  
 Devon Production Co  
 Elev: 3337'  
 Spud: 05-29-2015



# Red Hills 30-025-45028

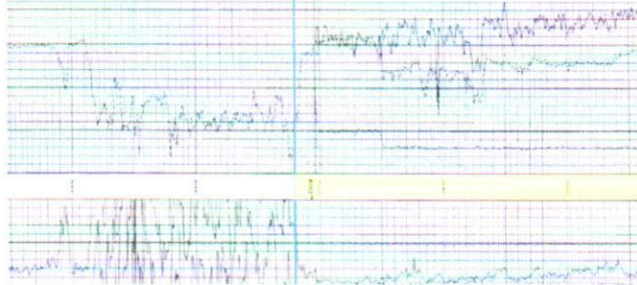
API: 30-025-45028  
 5-265-33E  
 Top Devonian: 17,452'  
 Inj. Interval: 16,620'-17,820'  
 Injection Limit: 3324 psi  
 2018 average daily Inj.: 1045  
 bbls  
 NGL Water Solution  
 Elev: 3360'  
 Spud: 9-5-2018





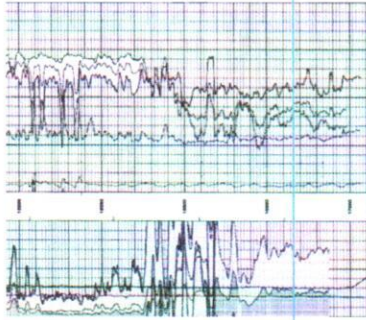
### Nash Draw 8 Federal SWD

Top Devonian: 15,680'  
 Inj. Interval: 15,680'-16,520'  
 Injection Limit: 3420 psi  
 2017 average daily Inj.: bbls  
 BOPCO LP  
 Elev: 3200'  
 Spud: 8/4/2013



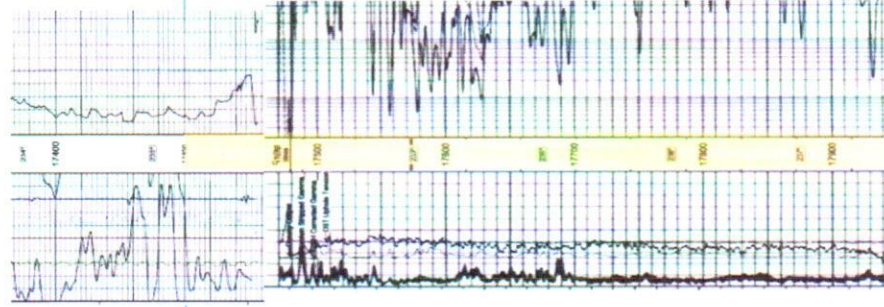
### Cotton Draw Unit 089

Top Devonian: 17,045'  
 Inj. Interval: 17,100'-17,400'  
 Injection Limit: 3420 psi  
 2017 average daily Inj.: bbls  
 Devon Energy  
 Elev: 3419'  
 Spud: 10/23/2000



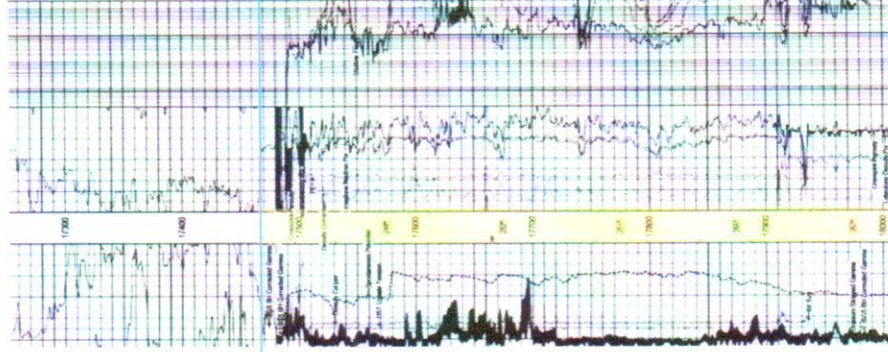
### Red Hills SWD

Top Devonian: 17,452'  
 Inj. Interval: 17,465'-19,035'  
 Injection Limit: 3350 psi  
 2017 average daily Inj.: bbls  
 NGL Water Solution  
 Elev: 3360'  
 Spud:



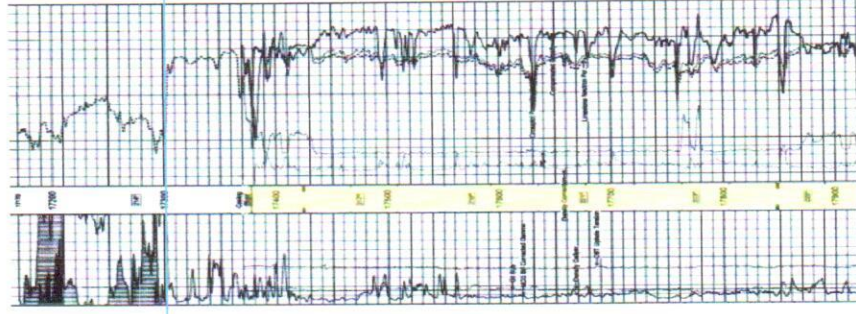
### Vaca Draw Federal

Top Devonian: 17,452'  
 Inj. Interval: 17,465'-19,035'  
 Injection Limit: 3350 psi  
 2017 average daily Inj.: bbls  
 NGL Water Solution  
 Elev: 3384'  
 Spud: 10/02/1971



### Sidewinder SWD

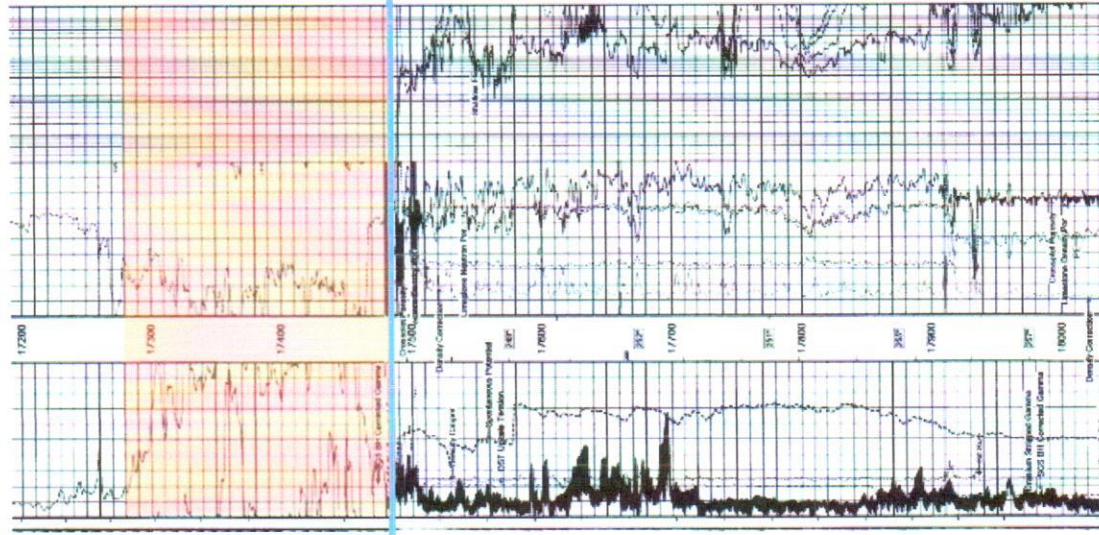
Top Devonian: 17,300'  
 Inj. Interval: 17,368'-19,145'  
 Injection Limit: psi  
 2017 average daily Inj.: bbls  
 NGL Water Solution  
 Elev: 3330'  
 Spud: 01/31/2019



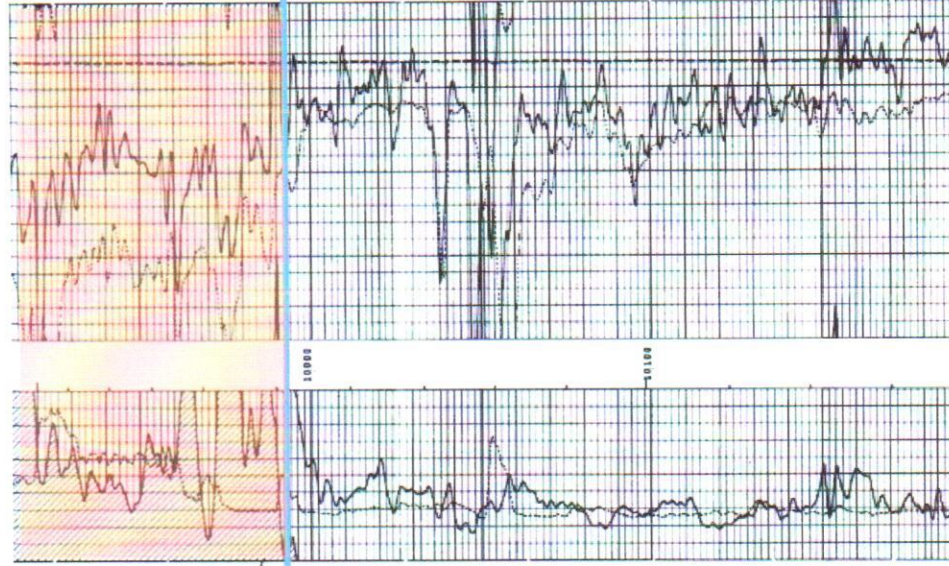
Top  
 Dev.



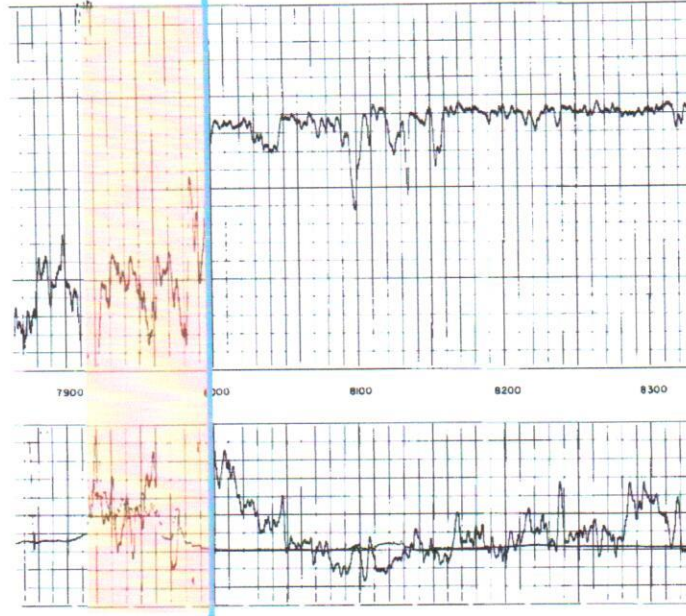
# VACA Draw Federal SWD



# JAL NORTH RANCH SWD No. 001 Operator: FULFER OIL & CATTLE LLC



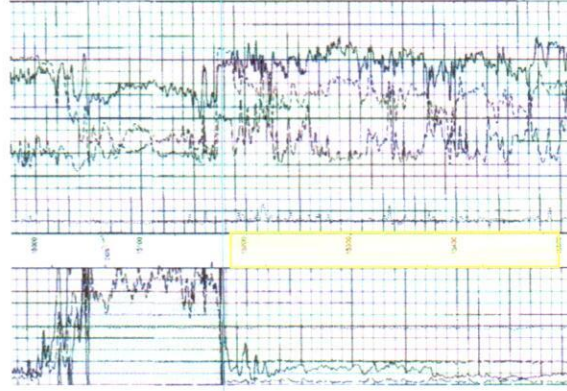
# Crosby Deep



## Top Devonian Picks

**SHOCKER SWD #001**  
**30-015-39470**  
 TD: 15,681'

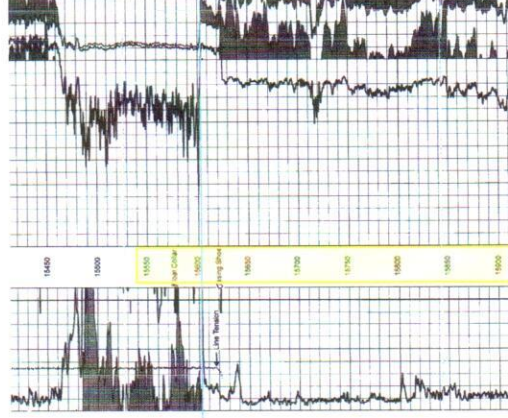
Top Devonian: 15180'  
 Inj. Interval: 15,200'-15,700'  
 Injection Limit: 3040 psi  
 2017 average daily Inj.: 3236 bbls  
 Yates Petroleum/EOG  
 Elev: 3016.5'  
 Spud: 12-2-2011



2017 average daily Inj.: 3236 bbls

**FULLER 14 FEDERAL SWD**  
**30-015-43630**  
 TD: 16540'

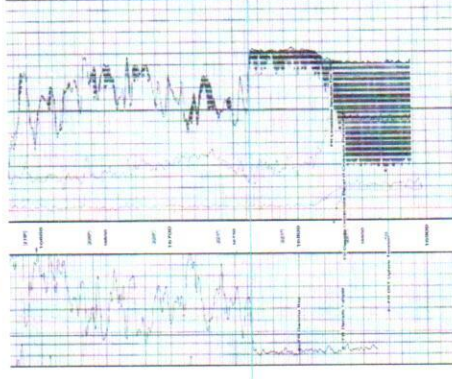
Top Devonian: 15,604'  
 Inj. Interval: 15,540'-16,540'  
 Injection Limit: 3108 psi  
 2017 average daily Inj.: 13,058 bbls  
 MEWBOURNE OIL CO  
 Elev: 2935'  
 Spud: 05/14/2016



2017 average daily Inj.: 13,058 bbls

**MADERA SWD #001**  
**30-025-42448**  
 TD: 18,200'

Top Devonian: 16,762'  
 Inj. Interval: 17,400'-19,200'  
 Injection Limit: 3480 psi  
 2017 average daily Inj.: 20,500bbls  
 OWL SWD OPERATING, LLC  
 Elev: 3464'  
 Spud: 06-24-2015



Open hole 17,200 - 19,222'  
 2017 average daily Inj.: 20,500bbls

Top Devonian





Howard McLaughlin, Geologist

## **EXPERIENCE**

### **Cheetah Energy Services, LLC; Managing Director**

*Dates Employed Dec 2016 – Present*

*Employment Duration 2 yrs 10 mos*

*Location East Texas*

Cheetah Energy Services, LLC is a fully integrated well servicing and drilling company active in North and East Texas. Multiple rigs and pump and work over packages available at competitive rates.

### **Mosman Oil & Gas; Manager US Operations**

*Dates Employed April 2017 – Present*

*Employment Duration 2 yrs 6 mos*

*Location Dallas/Fort Worth Area*

Contract Operator for production activities in Young and Dawson counties, Texas.

### **Contour Exploration & Production; Managing Director**

*Dates Employed Jun 2011 – Present*

*Employment Duration 8 yrs 4 mos*

*Location Dallas, Texas*

Engaged in exploration, production and consulting activities in the Dallas Texas area. Shallow oil development and field rehabilitation in Northern Texas. Evaluation of acquisition and re-development opportunities in the North and East Texas areas.

### **Manager of USA Operations**

#### **Cue Resources, Inc.**

*Dates Employed Jun 2015 – Nov 2016*

*Employment Duration 1 yr 6 mos*

*Location Dallas, Texas*

Technical and field operational manager of the Pine Mills oil field in Wood County, East Texas.

### **High Peak Royalties; Board Member**

*Dates Employed Sep 2009 – Nov 2016*

*Employment Duration 7 yrs 3 mos*

*Location Sydney, Australia*

ASX listed Torrens Energy to merge with unlisted Phoenix via 100% scrip takeover offer providing new growth opportunities for Torrens through the acquisition of royalty interests in Australia and internationally.

**Antares Energy; CEO & Managing Director**

*Dates Employed Jun 2003 – Jul 2008*

*Employment Duration 5 yrs 2 mos*

Antares Energy was engaged in exploration and field development in Western Turkey and Western Australia from 2003-2004. Exploration and production activities in Texas and Oklahoma 2004-2008. Based in Dallas, Texas.

**BHP Billiton Petroleum; VP Global Exploration**

*Dates Employed Apr 1983 – Jul 2002*

*Employment Duration 19 yrs 4 mos*

*Location Melbourne, London, Houston*

Exploration Team leader for West Australia Exploration & Development 1983-1989,  
Asset Team Leader Europe/Africa and the Middle East based in London 1989-92,  
Asset Team Leader for Australia/Asia 1992-1996 based in Melbourne  
VP Strategic planning Marketing Division 1996-1998;  
VP Global Exploration 1998-2002, based in Houston

**ESSO Resources Canada Ltd.; Geologist**

*Dates Employed 1978 – 1983*

*Employment Duration 5 yrs*

*Location Calgary Alberta*

Exploration and development geology in the Western Canadian Basin, Canadian Arctic and offshore Newfoundland.

**EDUCATION****Swinburne University of Technology**

*Degree Name Master's degree*

*Field Of Study Astronomy*

*Dates attended or expected graduation 2005 – 2011*

**University of Calgary**

*Degree Name BSc*

*Field Of Study Geology*

*Dates attended or expected graduation 1974 – 1977*

**Red Deer College**

*Degree Name BSc*

*Field Of Study Chemistry*

*Dates attended or expected graduation 1972 – 1975*

**University of Alberta**

*Degree Name BSc*

*Field Of Study Chemistry*

*Dates attended or expected graduation 1972 – 1975*





# Geological Evaluation of Devonian Salt Water Disposal sites for Trove Energy & Water, LLC

EXHIBIT

8

Prepared by:

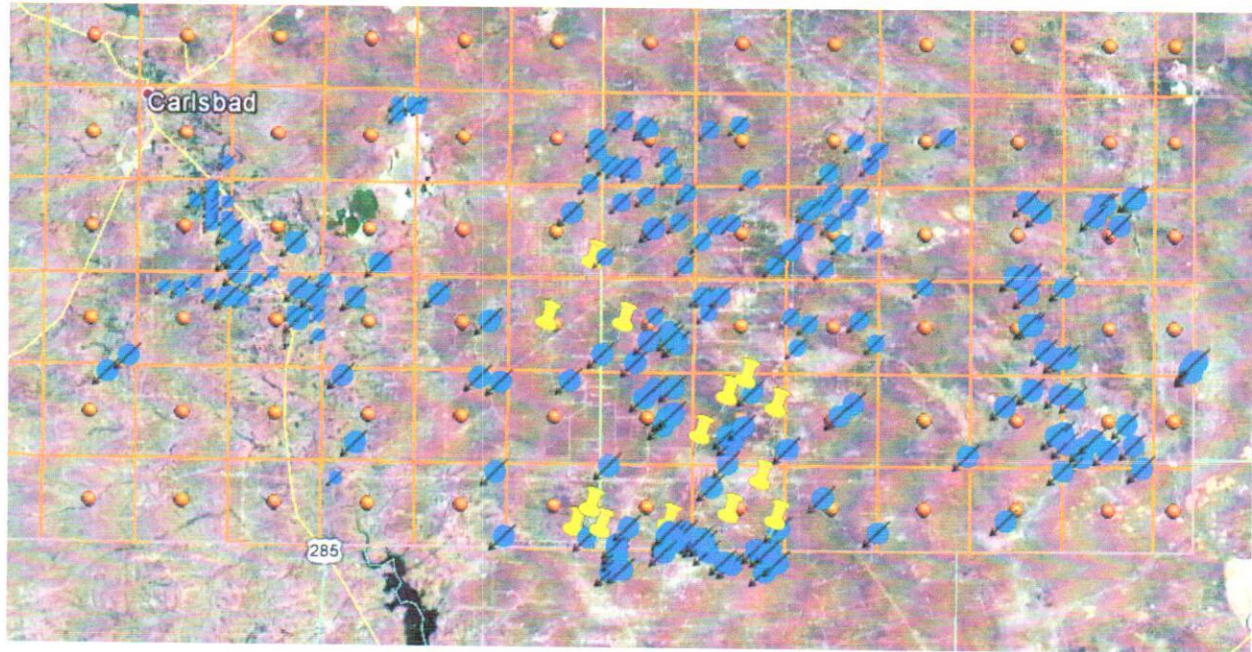
Howard McLaughlin

August 2019

## Geological Evaluation of Devonian Salt Water Disposal sites for Trove Energy & Water, LLC

### Introduction

The location of the proposed 14 injection wells are in Southern Lea & Eddy Counties New Mexico. Approximately 50 Devonian deep SWD wells were used for this evaluation. These wells are all within an area of 2000 square miles.



### Geological Setting

During most of the Paleozoic Era, sandstone, limestone, and carbonaceous shales were deposited in sedimentary basins throughout much of Texas and Southern New Mexico. These basins received sediments until the latter part of the Pennsylvanian era, when the Llano Uplift and the Ouachita Fold Belt caused regional tilting of the land surface to the west and east off the flanks of the uplifted zones.

The Silurian/Devonian section overlays the Montoya Group, which comprises a moderately thick (100 to 600 ft) Upper Ordovician carbonate ramp succession present in both outcrop and the subsurface of West Texas and southeastern New Mexico.

The Montoya Group was largely deposited on the Middle-Upper Ordovician Simpson Group but locally overlies on the Lower Ordovician Ellenburger or equivalent. The Sylvan Shale, where present, and the Fusselman Formation generally overlie the Montoya.

Available information shows that the upper Fusselman in the Midland Basin was deposited in a spectrum of shallow-water, high-energy open marine environments. The top of the upper Fusselman in a number of wells is characterized by diagenetic textures indicative of karstification and soil formation, both of which suggest a prolonged period of subaerial erosion prior to deposition of the overlying Wristen Formation.

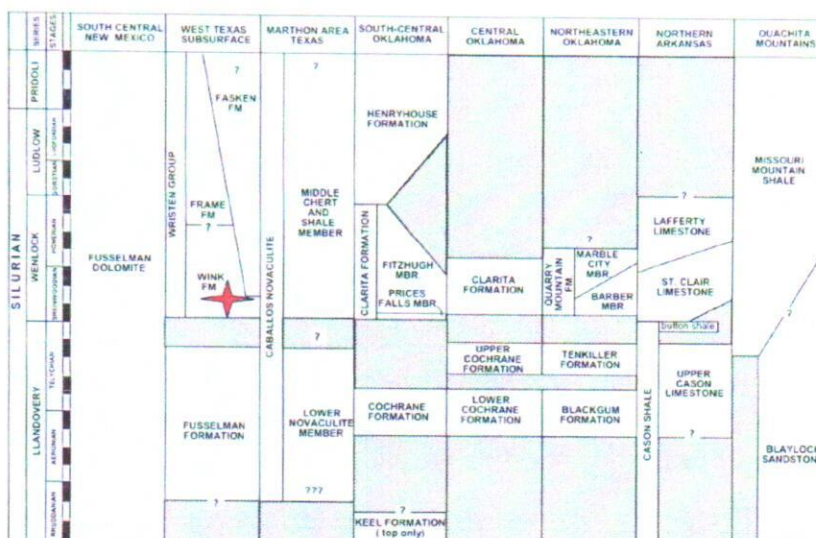
The Fusselman Formation comprises a complex series of carbonate facies, including light-colored ooid

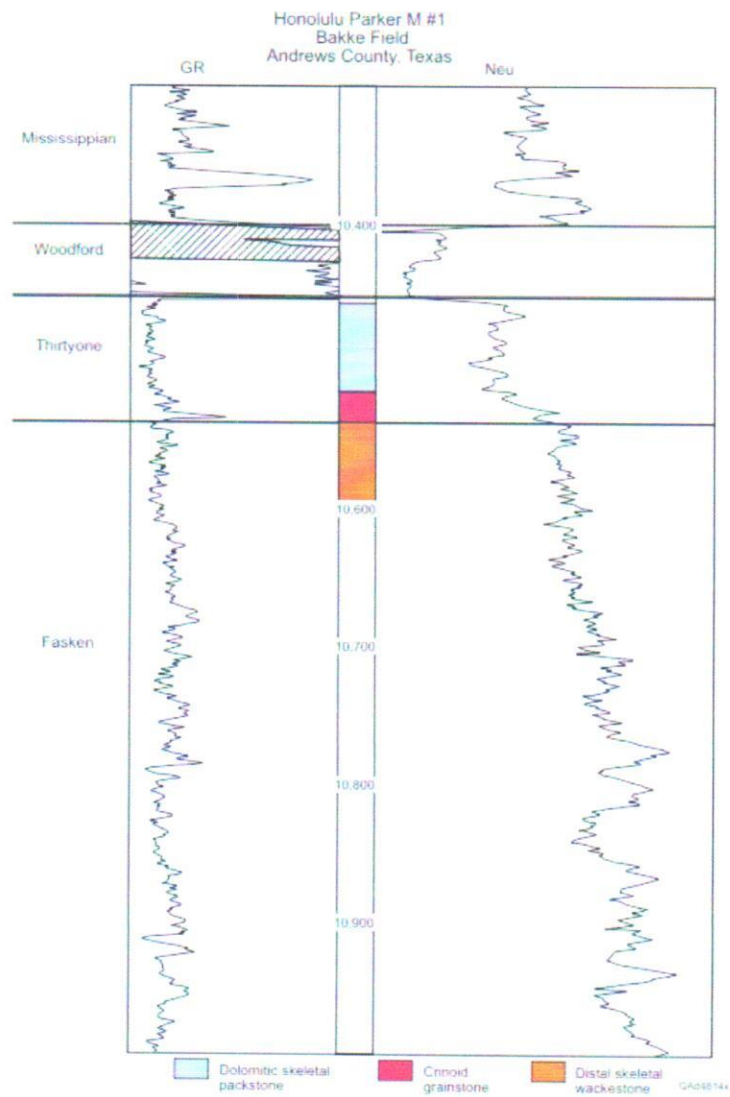


grainstones, green glauconitic and pink pelmatozoan grainstones and packstones, and sparse skeletal wackestones with minor shaly intercalations. Geesaman and Scott (1989) and Garfield and Longman (1989) divided the Fusselman into two informal units in the subsurface of the central Midland Basin, a lower Fusselman and an upper Fusselman, each of which represents a separate depositional sequence.

The age of the subsurface Fusselman is poorly known due to a lack of fossil material from only limited core studies. The upper Fusselman is dominated by widespread thick, crinoidal grainstones, and lesser amounts of dolomitic wackestone to skeletal packstone. These three lithofacies are interbedded such that they reflect minor differences in paleotopographic setting and degree of relative subsidence during deposition.

In the area being proposed for these disposal wells, the Devonian Woodford Shale overlays massive deposits of undifferentiated carbonates of Silurian/Devonian age, predominately Fusselman dolostones that are the primary deep disposal zone in this area of Southern New Mexico. Immediately beneath the Woodford the Thirtyone and Fasken formations develop porosity within skeletal packstones.



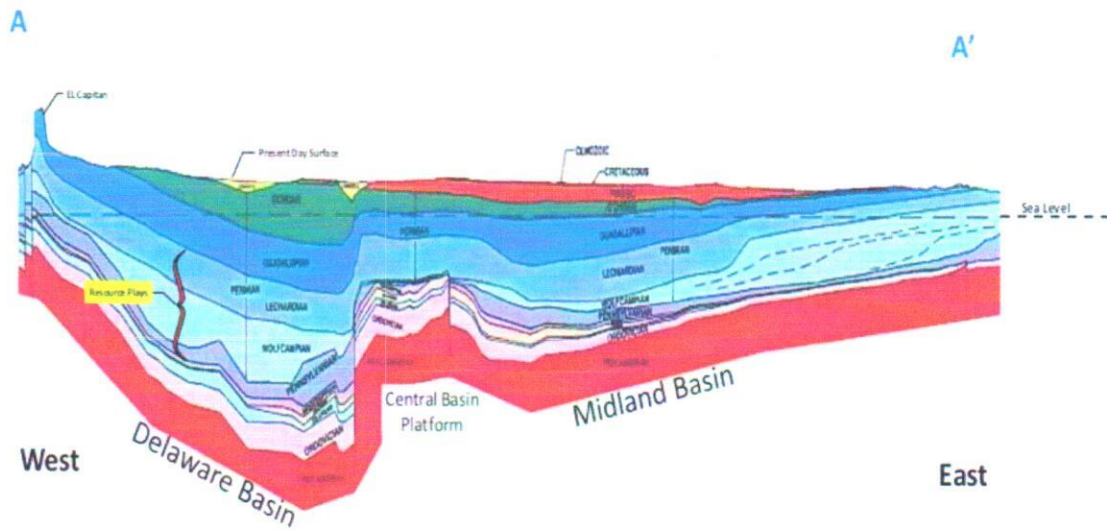


Typical type section for the area of interest.

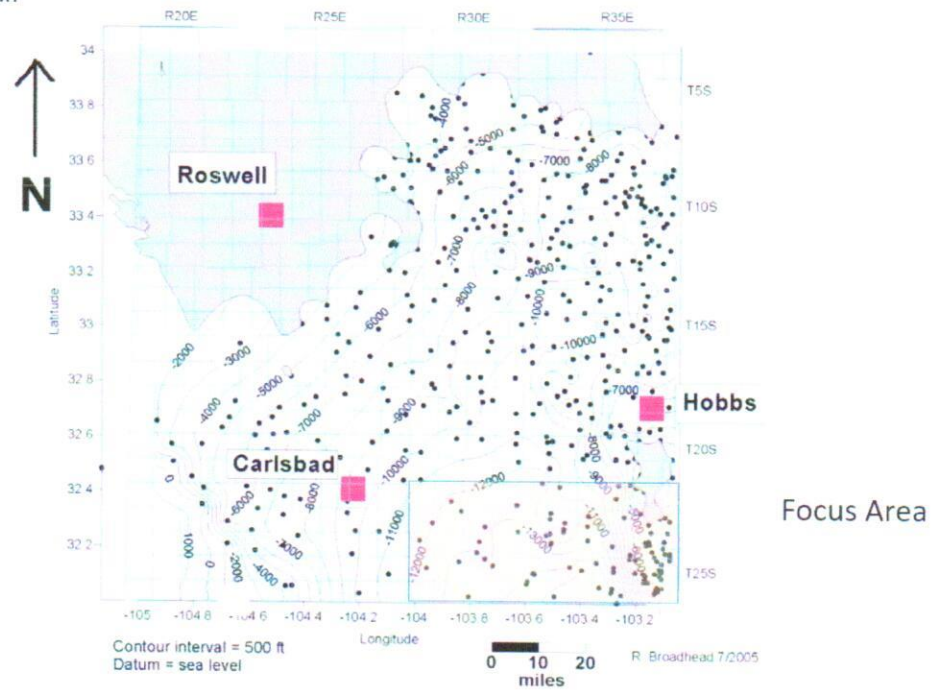
### Detailed Analysis of the location

The subsurface structure of the Devonian sediments displays a sequence of carbonates becoming shallower to the North and deeper to the South. The Central Basin Platform is a major feature that separates the Delaware basin from the Midland Basin.





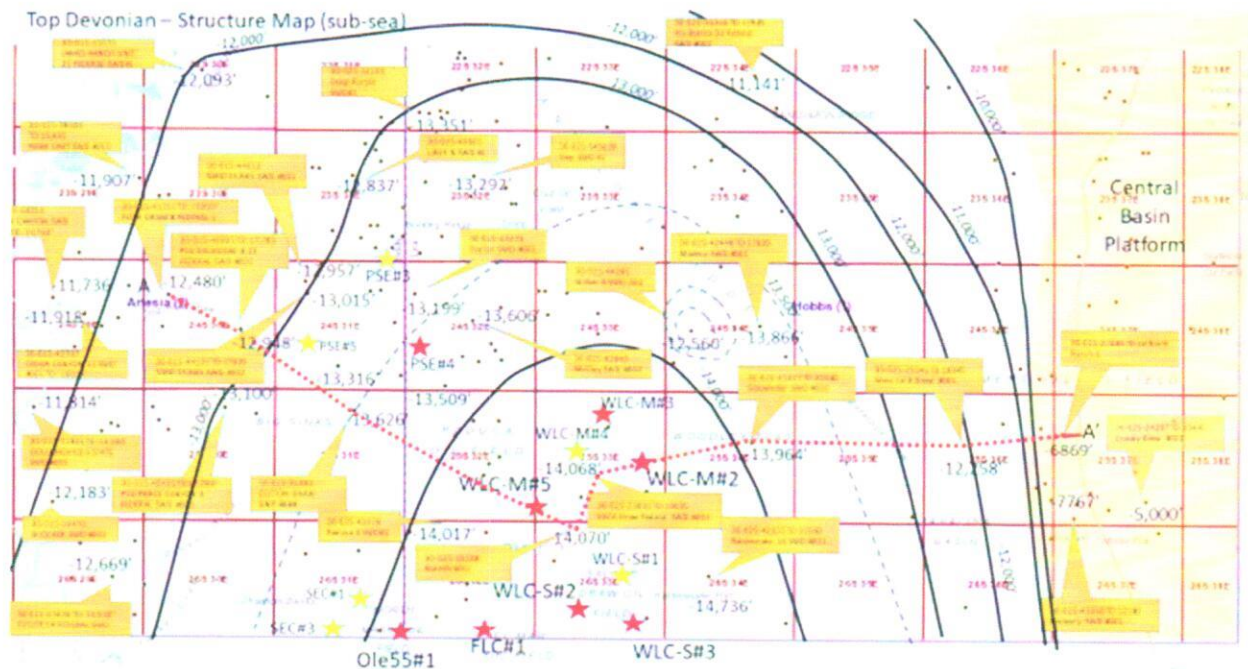
Generalized Top Devonian Structure Map



## Detailed Devonian Mapping

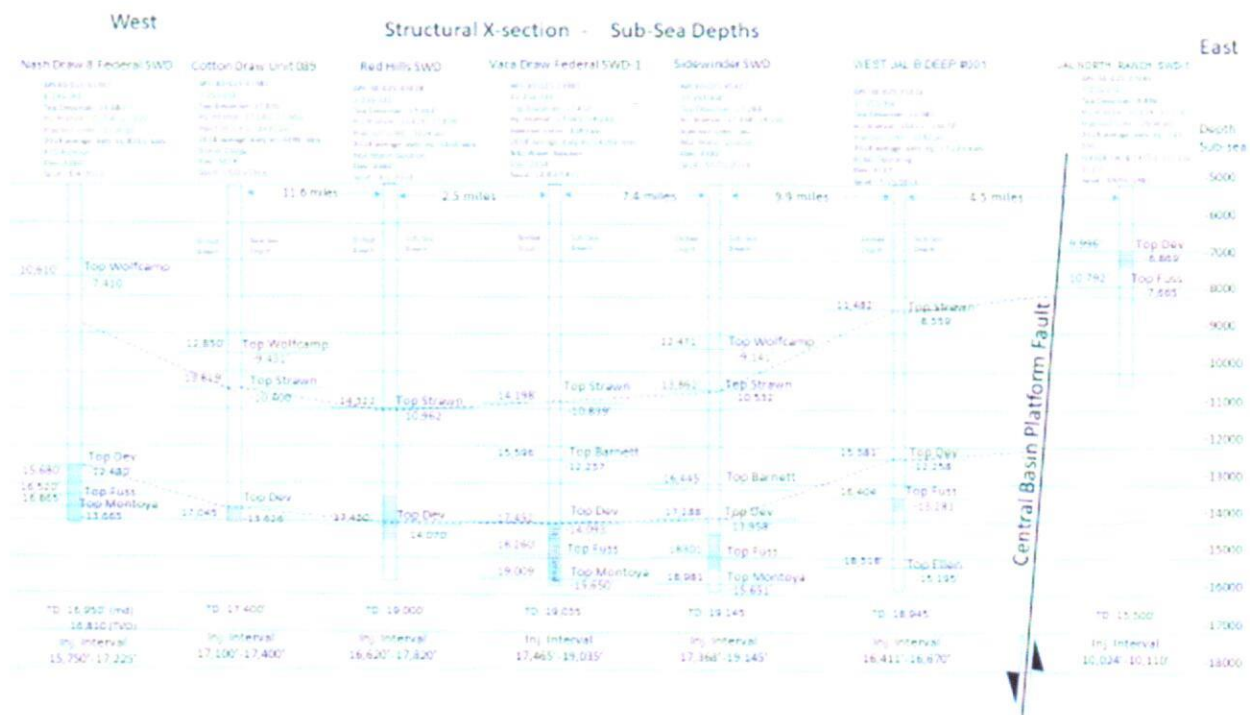
The area that contains most of the proposed Trove SWD wells is in a plunging nose that dips south into Texas. There is very little deep well control available in Texas so most the picks were from wells in Southeastern New Mexico. The Top Devonian in the central area is between 15,000-18,000 feet in depth and very few wells penetrate the complete section.

The Central Basin Platform creates a boundary to the east with the Top Devonian shallowing up to less than 10,000 feet.

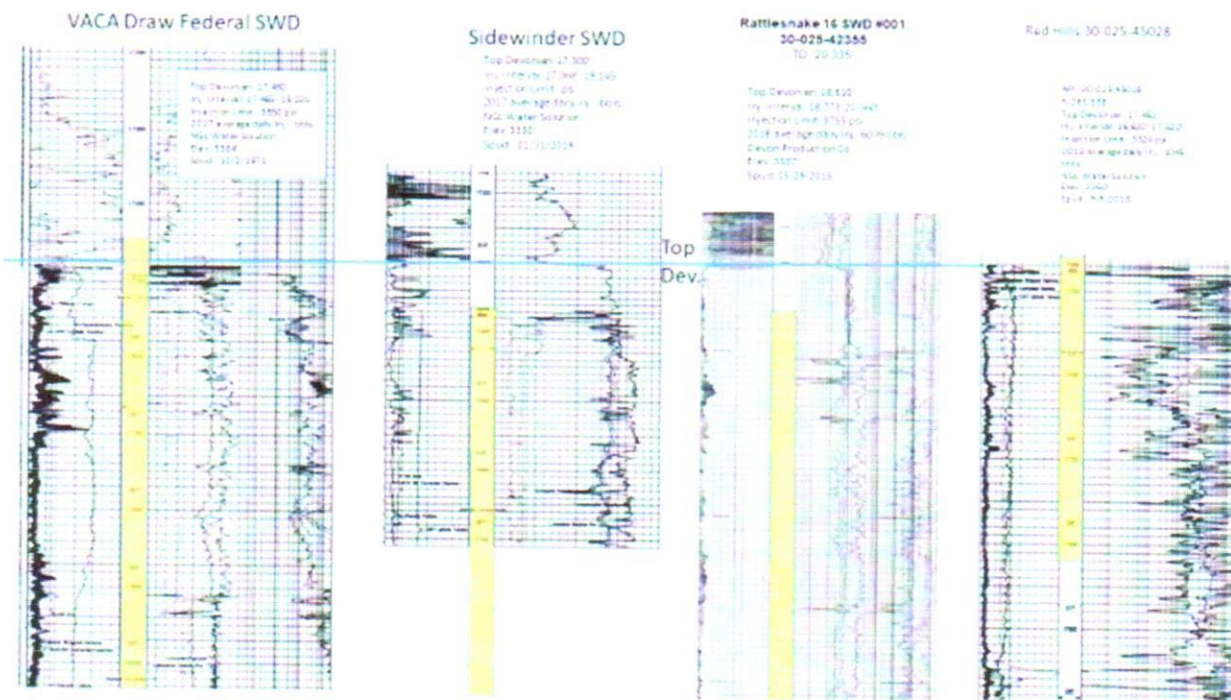


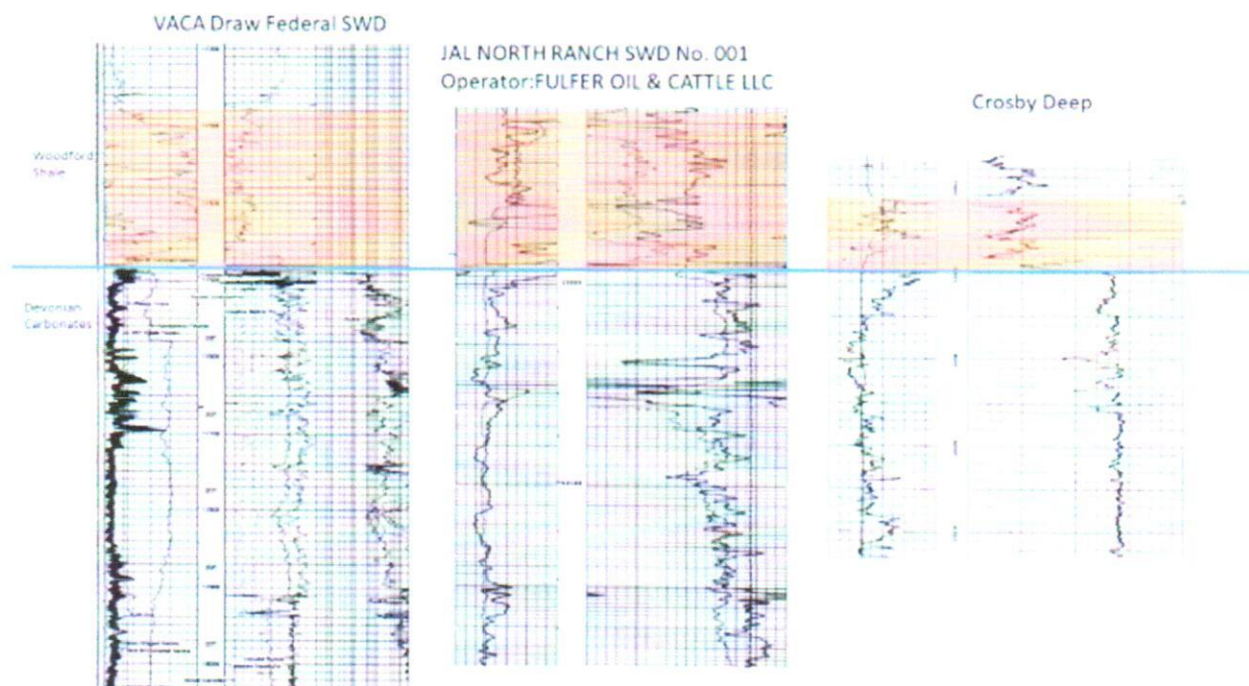
There are relatively few Devonian wells in the greater project area, so accurately contouring the top of this formation is subject to a great deal of uncertainty. Within the project area the subsea depth of the Top Devonian is between 11,000 – 15,000' subsea. The ground elevation in the area is approximately 3500-4000' above sea level, meaning that the drilling depth to the Top of the Devonian will be between 14,000 – 19,000 feet from the surface. Regionally the Devonian gets shallower towards the North and deeper towards the south. The use of seismic would help enormously in determining the general structure of the deeper formations. However for the purpose of drilling a salt water disposal well this level of detail is sufficient.



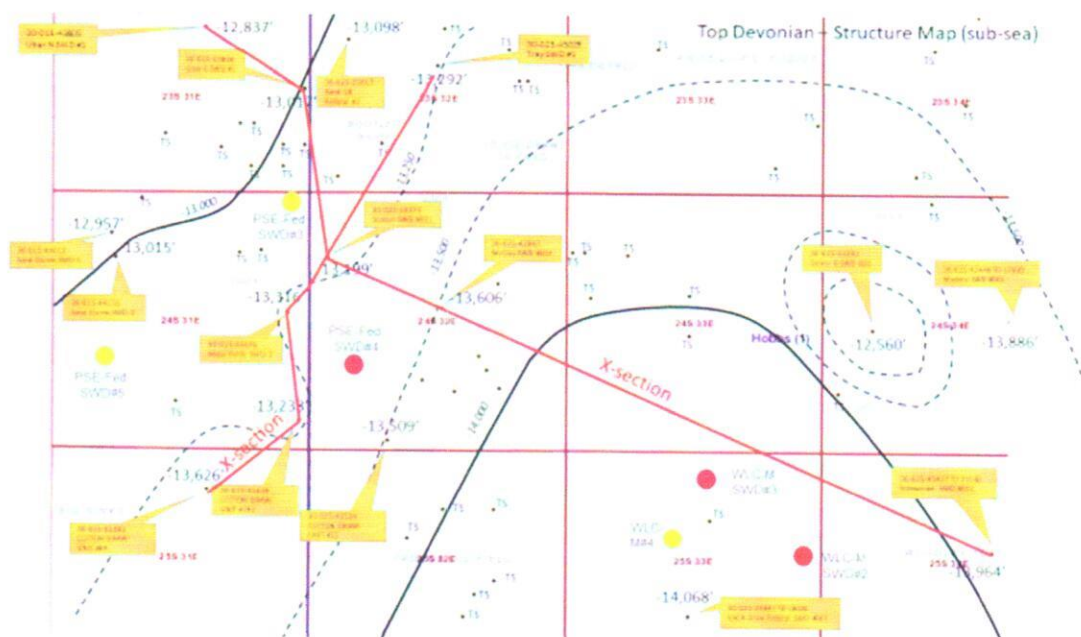


The Top Devonian Limestones/Dolomites area fairly easy to pick from logs as they generally are immediately under the Woodford Shale which gives an excellent gamma ray contrast.

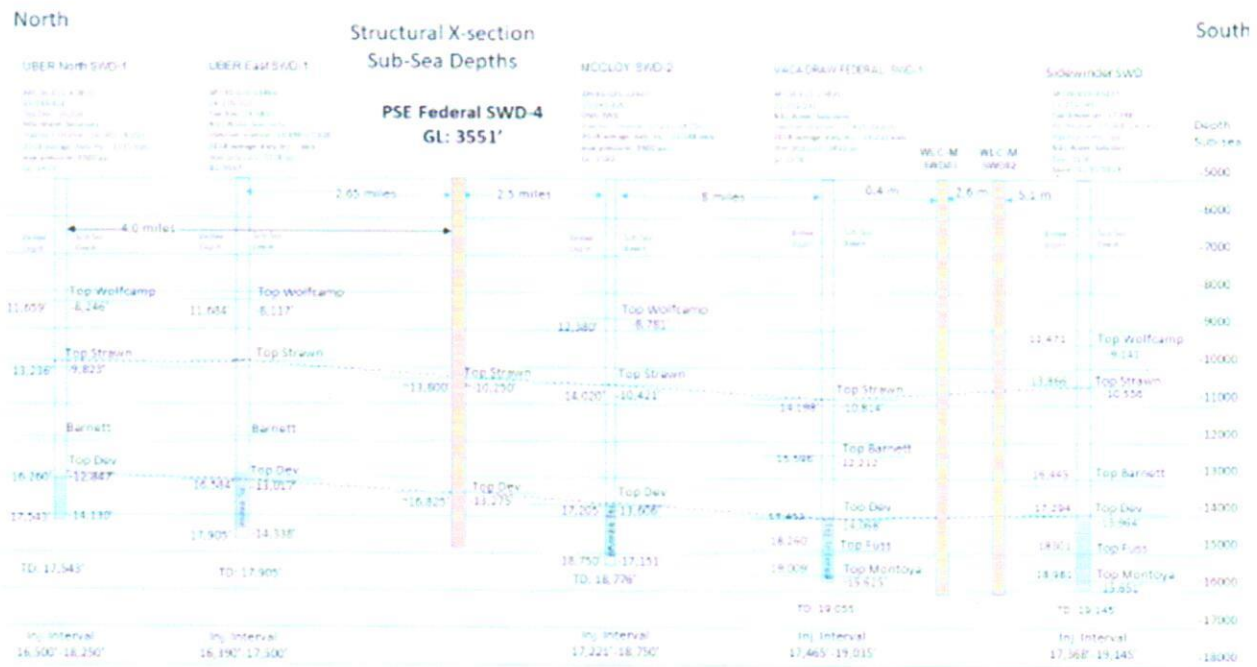




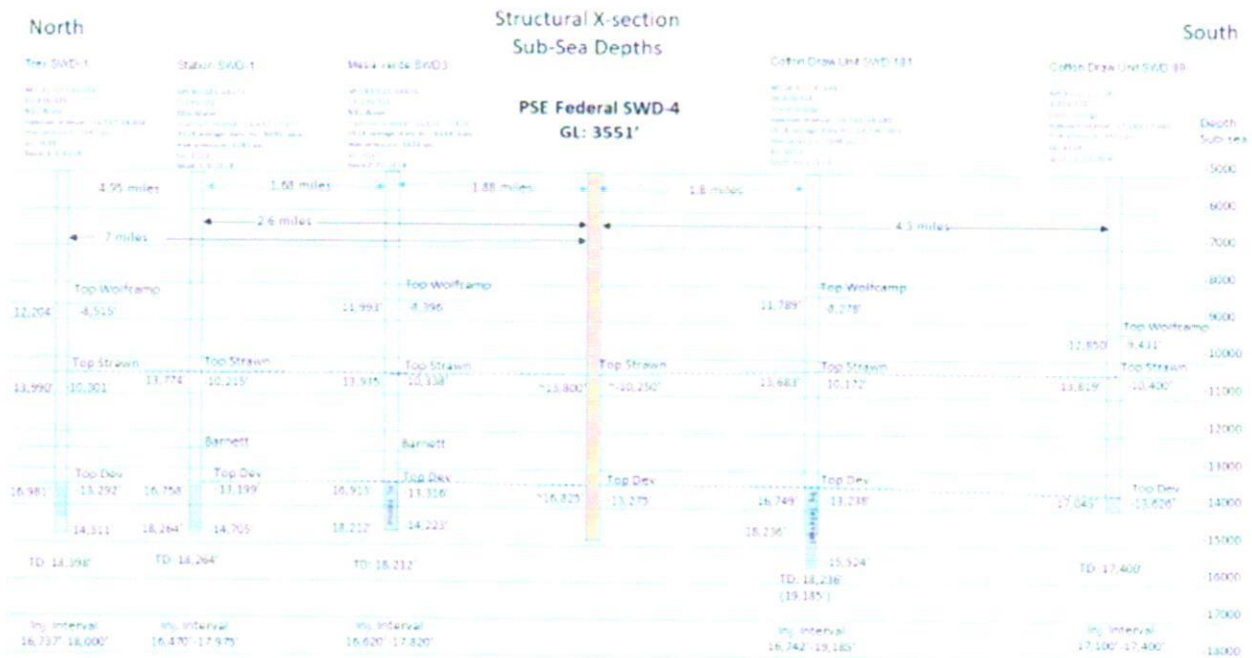
### Detailed Location Mapping

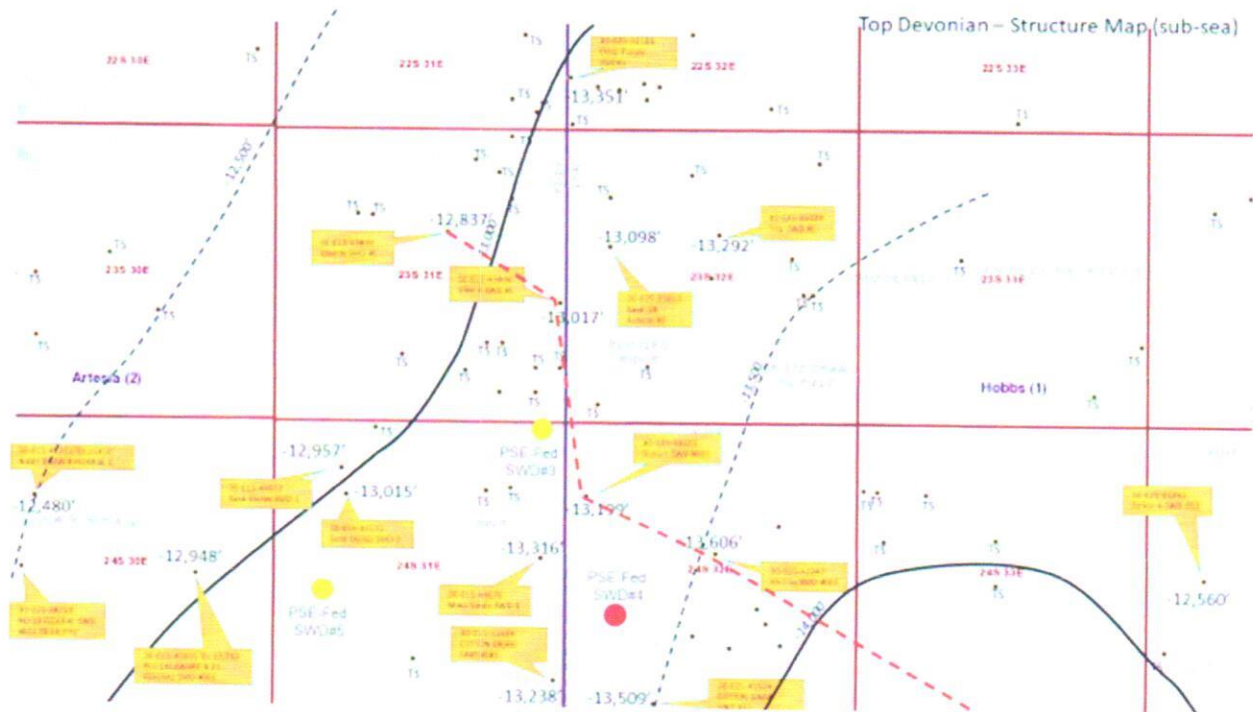






The injection depth and interval is very consistent across the deeper part of the basin. Given the thickness of the Devonian carbonates it seem difficult to create any level of interference from one well to the next.





### Disposal Intervals and Injection Pressures

Most of the Devonian/Silurian disposal wells in the area have large permitted disposal intervals starting at or near the base of the Woodford shale which overlies the Devonian dolomite, and continuing several hundred feet down. Frequently the Silurian and upper Ordovician sections are included. Commonly the operators leave the Devonian/Silurian section as open hole to eliminate the need for casing and perforations. The dolomite is very competent and generally won't cave in.

The Oil Conservation Division of New Mexico generally prohibits injection in the underlying Ellenburger formation in this area.

As with most injection wells there needs to be a packer set within 100' above the injection interval and the tubing is required to be internally coated.

The injection pressure allowed at surface is in the range of 2800-3500 psi for deep Devonian wells, depending on the top depth of the injection interval. This is well under the fracture gradient for geological formations at this depth and due to the relative porosity and permeability of the dolomite allows for a significant daily volume for disposal.



A few examples are listed below:

**Well: Moutray SWD-1 (30-015-43895)**

Permit date: 2-8-2017 (amended)

Permitted interval: 14,905 – 16,036' ( 1131')

Permitted injection pressure: 2981 psi max

Average volume: 9,840 bbls/day (first 4 months of 2018)

**Well: Madera SWD-1 (30-025-42448)**

Permit date: 5-7-2015

Permitted interval: 17,400 – 19,222' ( 1822')

Permitted injection pressure: 3480 psi max

Average volume: 20,116 bbls/day (first 5 months of 2018)

**Well: Vaca Draw Federal SWD-1 (30-025-23895)**

Permit date: 11-30-2016

Permitted interval: 17,498 – 19,842' ( 2344')

Permitted injection pressure: 3500 psi max

Average volume: 10,630 bbls/day (first 4 months of 2018)

**Well: Moomaw SWD-1 (30-025-44661)**

Permit date: 5-14-2018

Permitted interval: 17,400 – 19,200' ( 1800')

Permitted injection pressure: 3480 psi max

Average volume: ?? bbls/day (no reported injection – well not yet completed)

Restrictions: no disposal below the Silurian including the Montoya Fm.

**Well: Brininstool SWD-3 (30-025-44000)**

Permit date: 10-28-2017

Permitted interval: 17,000' – 18,500' (1500')

Permitted injection pressure: 3400 psi max

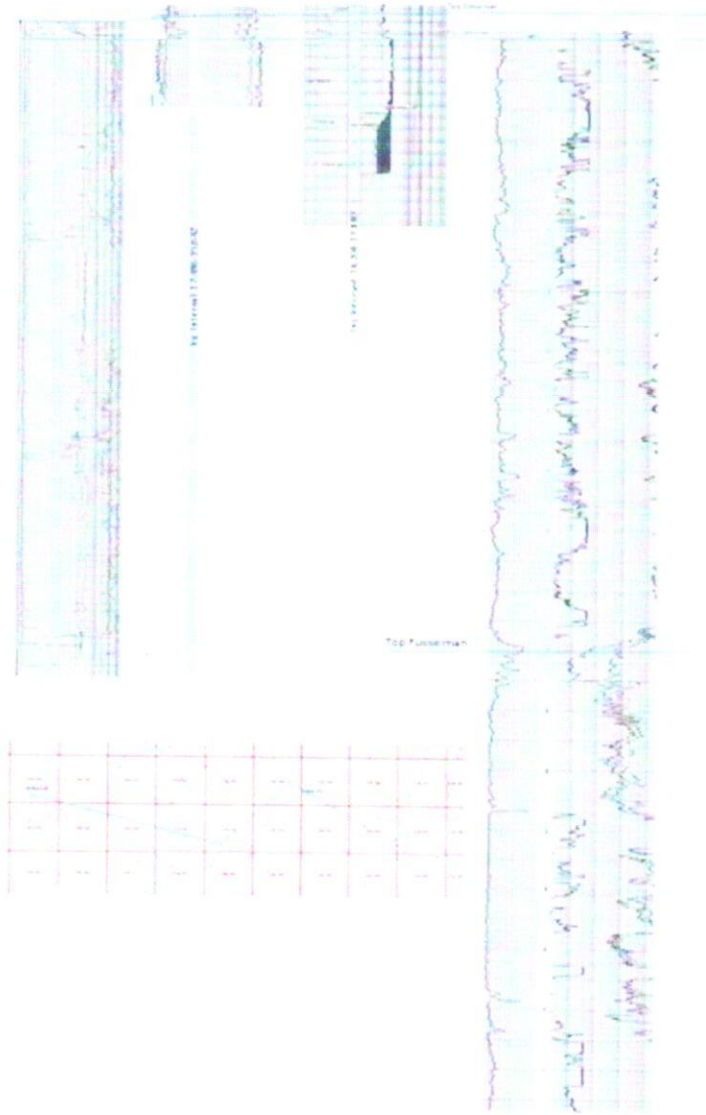
Average volume: ?? bbls/day (no reported injection – well not yet completed)

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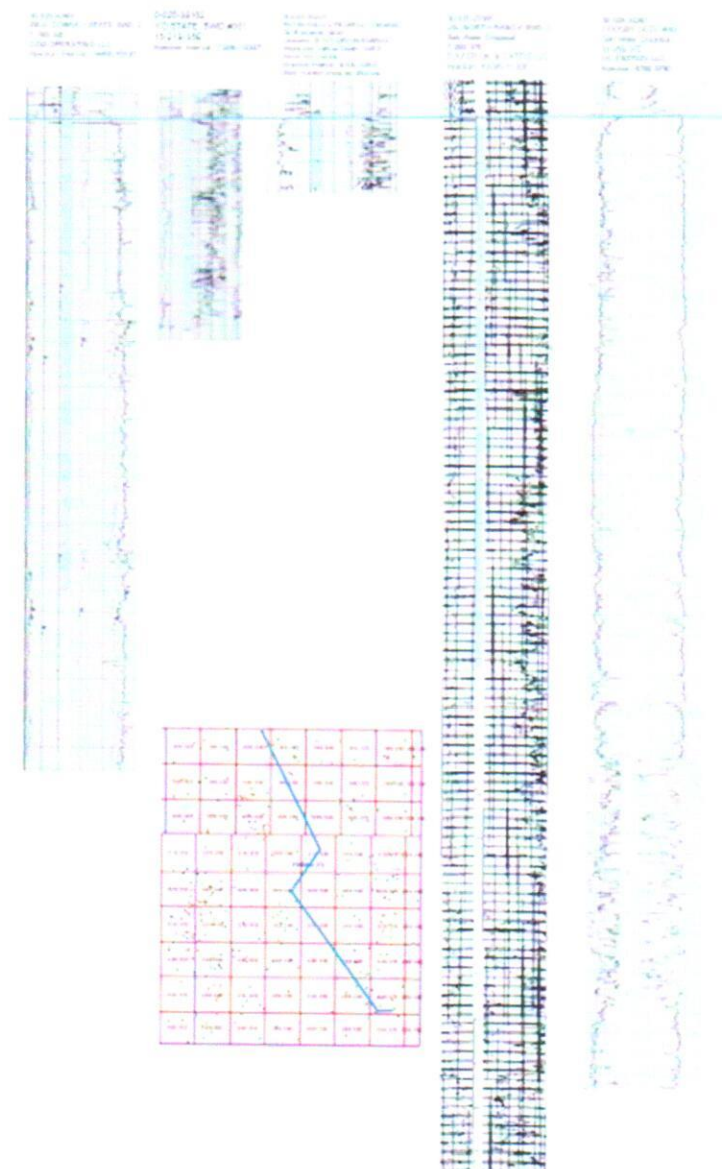
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## **Conclusions**

All of the project area is technically suitable for deep Devonian salt water disposal wells. In general the Devonian section is not a commercial hydrocarbon zone in this area and thus injection of water does not interfere with hydrocarbon production.

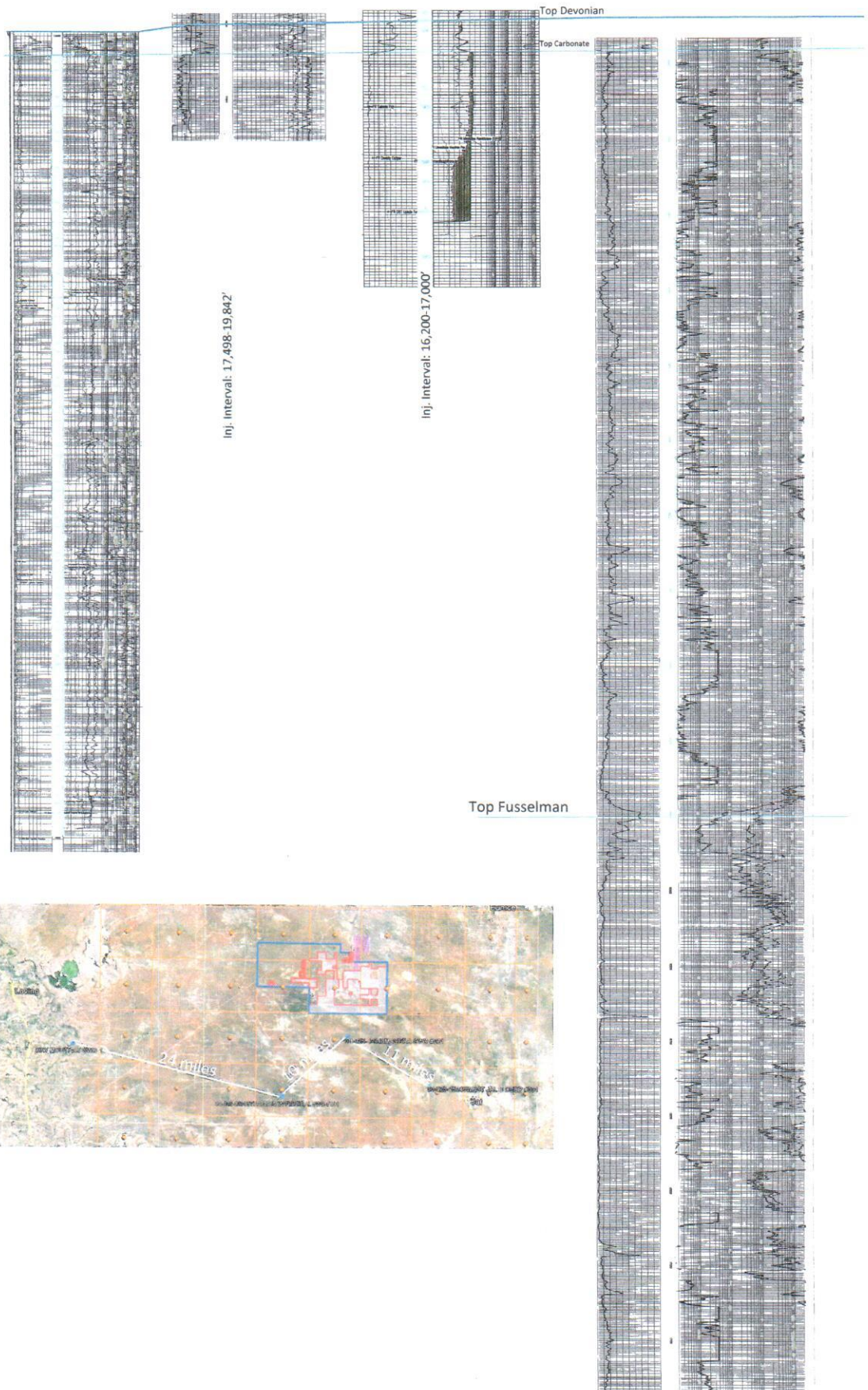
Prepared by: Howard McLaughlin – Geologist  
August 2019

3001543895  
Well Name: OXY MOUTRAY  
Operator: MESQUITE SWD,  
INC.  
MOUTRAY  
TD: 16052  
Inj. Interval: 14,905-16,036'

30-025-23895  
VACA DRAW FEDERAL SWD  
#001  
21-255-33E  
MESQUITE SWD, INC  
Open hole 17,465 - 19,035'  
Inj. Interval: 17,498-19,842'

30-025-42448  
MADERA SWD #001  
OWL SWD OPERATING, LLC  
14-245-34E  
TD: 18,200'  
Inj. Interval: 16,200-17,000'  
Open hole from 17,400-  
19,222'

30-025-25046  
WEST JAL B DEEP #001  
17-25S-36E  
Lakewood Energy  
Solutions  
Inj. Interval: 11,708-16,439'





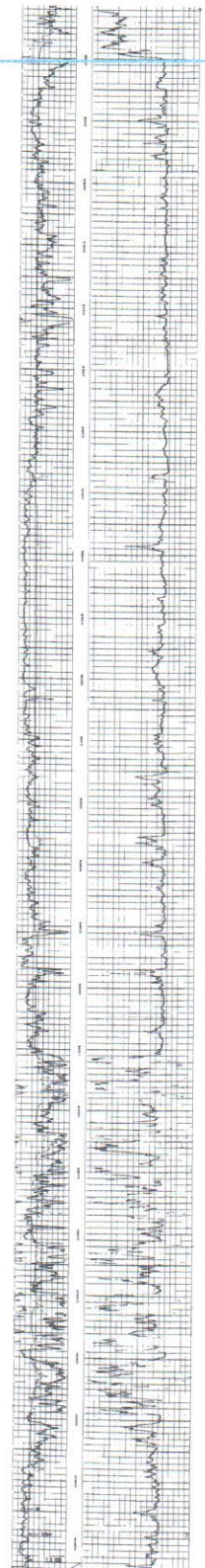
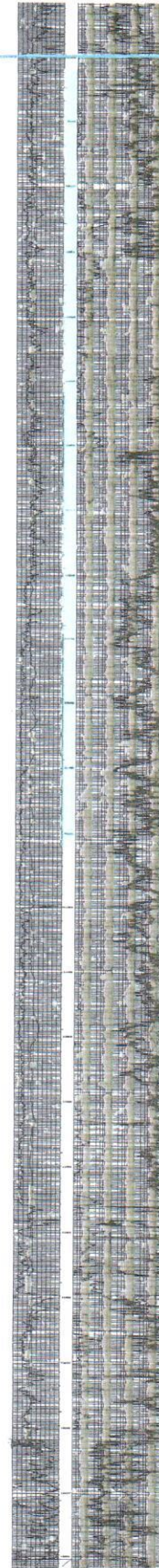
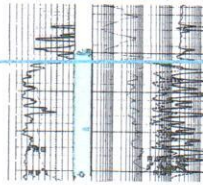
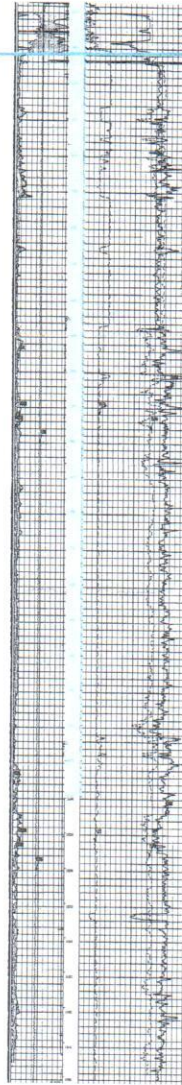
30-025-42461  
WILD COBRA 1 STATE SWD 2  
1-19S-34E  
COG OPERATING LLC  
Injection Interval: 14400-16100'

0-025-38162  
YO STATE SWD #001  
15-21S-35E  
Injection Interval: 13490-14347'

30-025-36425  
RIO BLANCO 4 FEDERAL COM #003  
GL Elevation: 3400'  
Operator: [6137] DEVON ENERGY  
Measured Vertical Depth: 14653'  
Spud: 05/11/2004  
Injection Interval: 14500-14853'  
Max injection pressure: 2900 psi

30-025-27085  
JAL NORTH RANCH SWD-1  
Salt Water Disposal  
7-25S-37E  
FULFER OIL & CATTLE LLC  
Injection: 10,020-11,220'

30-025-24287  
CROSBY DEEP #002  
Salt Water Disposal  
33-25S-37E  
DC ENERGY LLC  
Injection: 8780-8790'



# Trove Energy and Water, LLC

EXHIBIT

9

## Fault Slip Potential Analysis



# FSP Methodology

- 4 FSP areas (100 square miles each) centered on townships in southeast New Mexico to cover all proposed Trove SWDs.
- Exact geologic conditions of the FSP areas are unknown.
- Two scenarios modeled for each FSP area using range of possible geologic conditions based on nearby geophysical logs.
- Scenario 1 uses low end of possible geologic conditions.
- Scenario 2 uses high end of possible geologic conditions.
- Each scenario modeled over 25 years. Stress gradients and pore pressure gradients derived from published papers (Snee and Zoback 2018).
- Reference depth, injection interval thickness, porosity, and permeability derived from nearby geophysical logs penetrating the injection interval (New Mexico OCD 2019, see appendix).
- One mapped Precambrian fault in the 100 square mile area of review for FSP area 1. No mapped or known sedimentary or Precambrian faults in the 100 square mile area of review for FSP areas 2, 3, and 4 (USGS 2019 and Wilson 2018).
- Additional random faults generated using strike and dip consistent with known New Mexico faults (USGS 2019, Snee and Zoback 2018).
- Advanced geological parameters derived from well logs and confirmed with previous expert testimony in the region (Reynolds 2019).

# Parameters

Parameter	Value	Source
Vertical Stress Gradient (psi/ft)	1.1	Snee and Zoback (2018)
Horizontal Stress Direction (degrees azimuth)	75	Snee and Zoback (2018)
Reference Depth (ft)	16,600-17,500	Well Logs NMOCD (2019)
Initial Reservoir Pressure Gradient (psi/ft)	0.44	Snee and Zoback (2018)
A Phi	0.7	Snee and Zoback (2018)
Friction Coefficient	0.7	Snee and Zoback (2018)
Thickness with High Porosity (ft)	100-250	Well Logs NMOCD (2019)
Porosity (%)	5-10	Well Logs NMOCD (2019)
Permeability (mD)	10-100	Well Logs NMOCD (2019)
Fault Strike Minimum (degrees)	140	Snee and Zoback (2018)
Fault Strike Maximum (degrees)	190	Snee and Zoback (2018)
Fault Dip Minimum (degrees)	60	Snee and Zoback (2018)
Fault Dip Maximum (degrees)	90	Snee and Zoback (2018)
Density (kg/m <sup>3</sup> )	1000	ALL Research and Reynolds (2019)
Dynamic Viscosity (Pa*s)	0.0003	ALL Research and Reynolds (2019)
Fluid Compressibility (Pa <sup>-1</sup> )	4.70E-10	ALL Research and Reynolds (2019)
Rock Compressibility (Pa <sup>-1</sup> )	8.70E-10	ALL Research and Reynolds (2019)

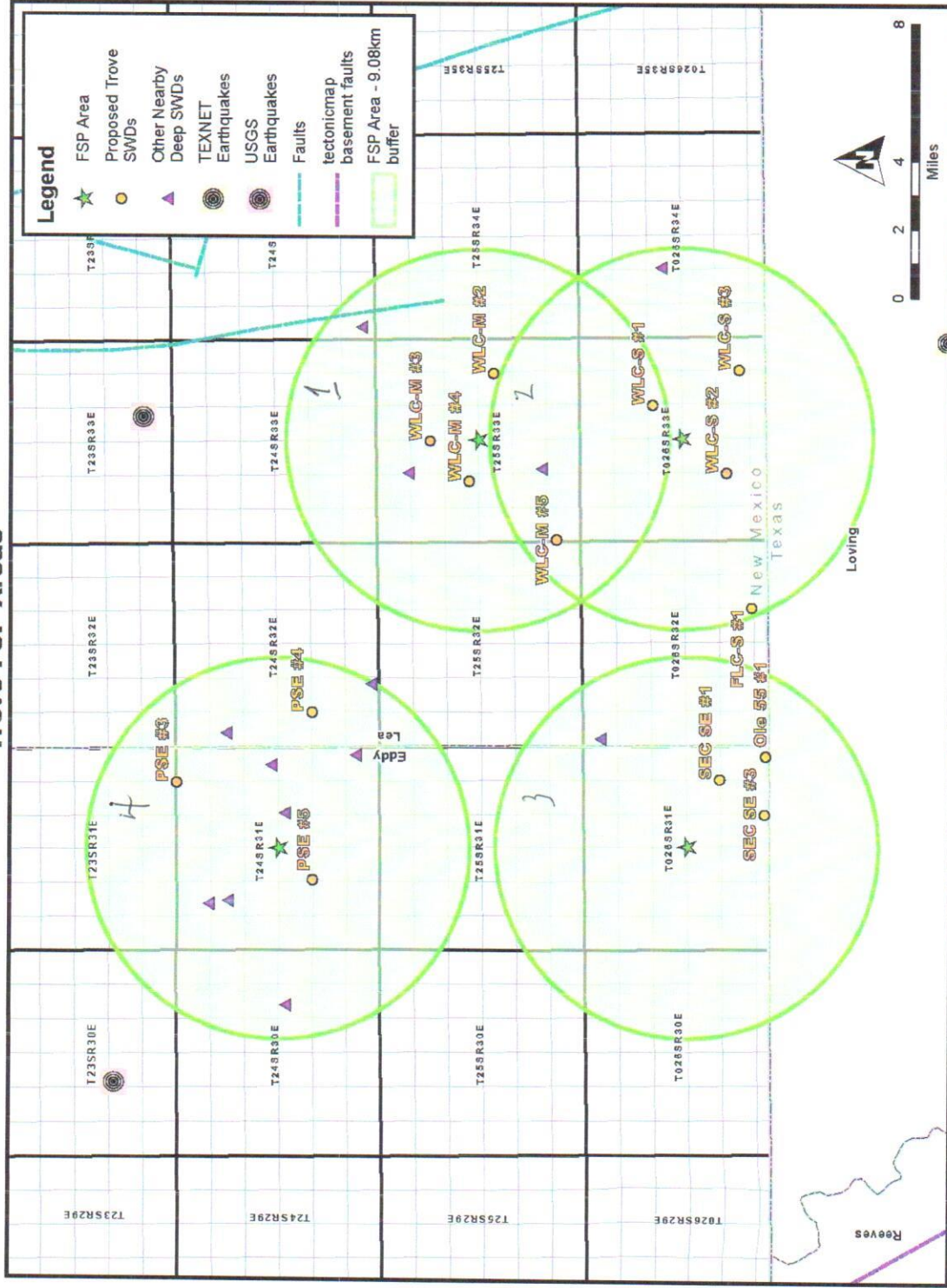


## Injection Data

- 13 deep class II injection wells active in 2019 within 4 areas of review (see appendix).
- Monthly average injection rates calculated from injection start-date through April 2019 (see appendix).
- 14 proposed Trove SWDs within 4 areas of review.
- Proposed Trove SWDs assumed to inject at proposed average rate of 40,000 bpd.

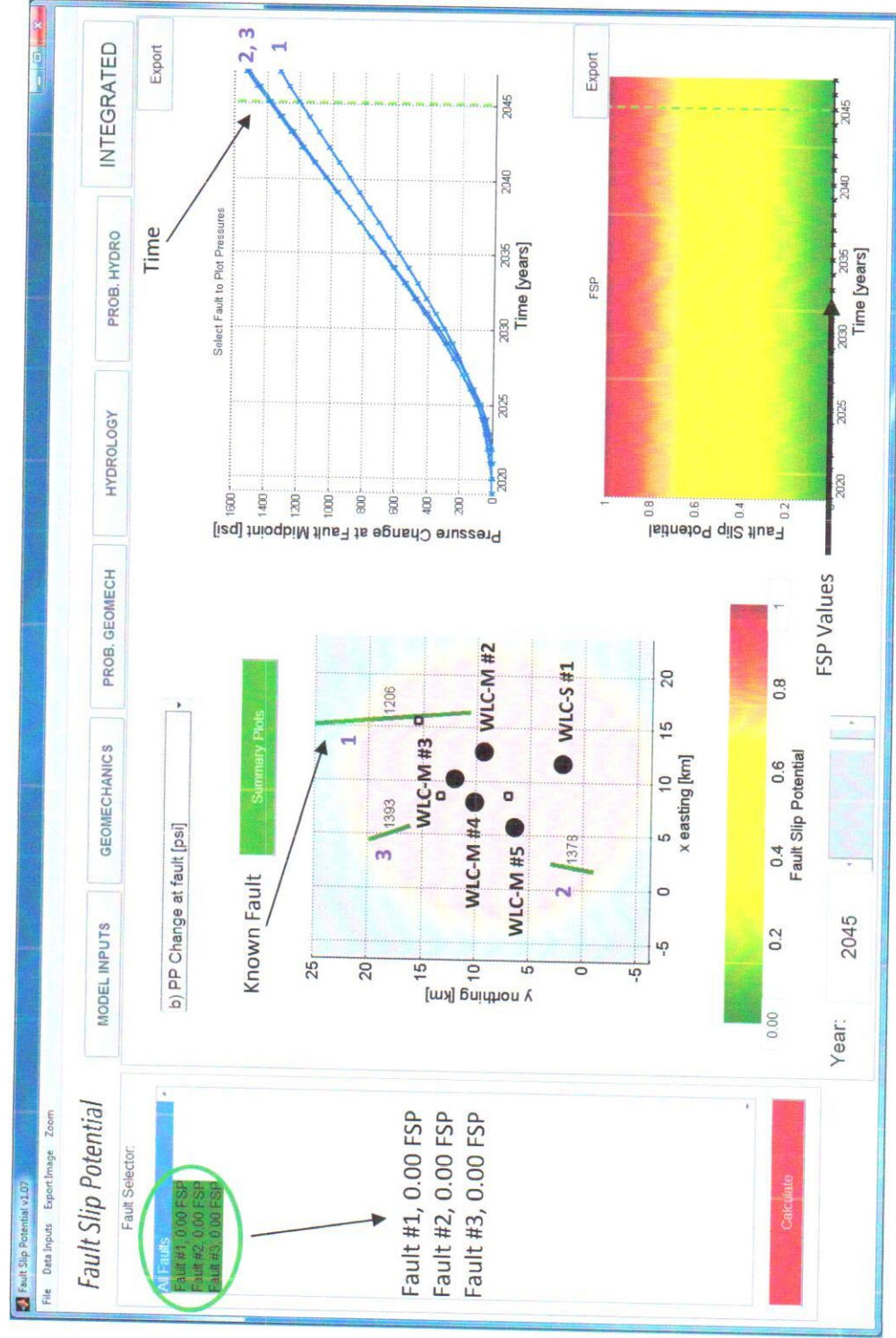
# FSP Areas

## Trove FSP Areas

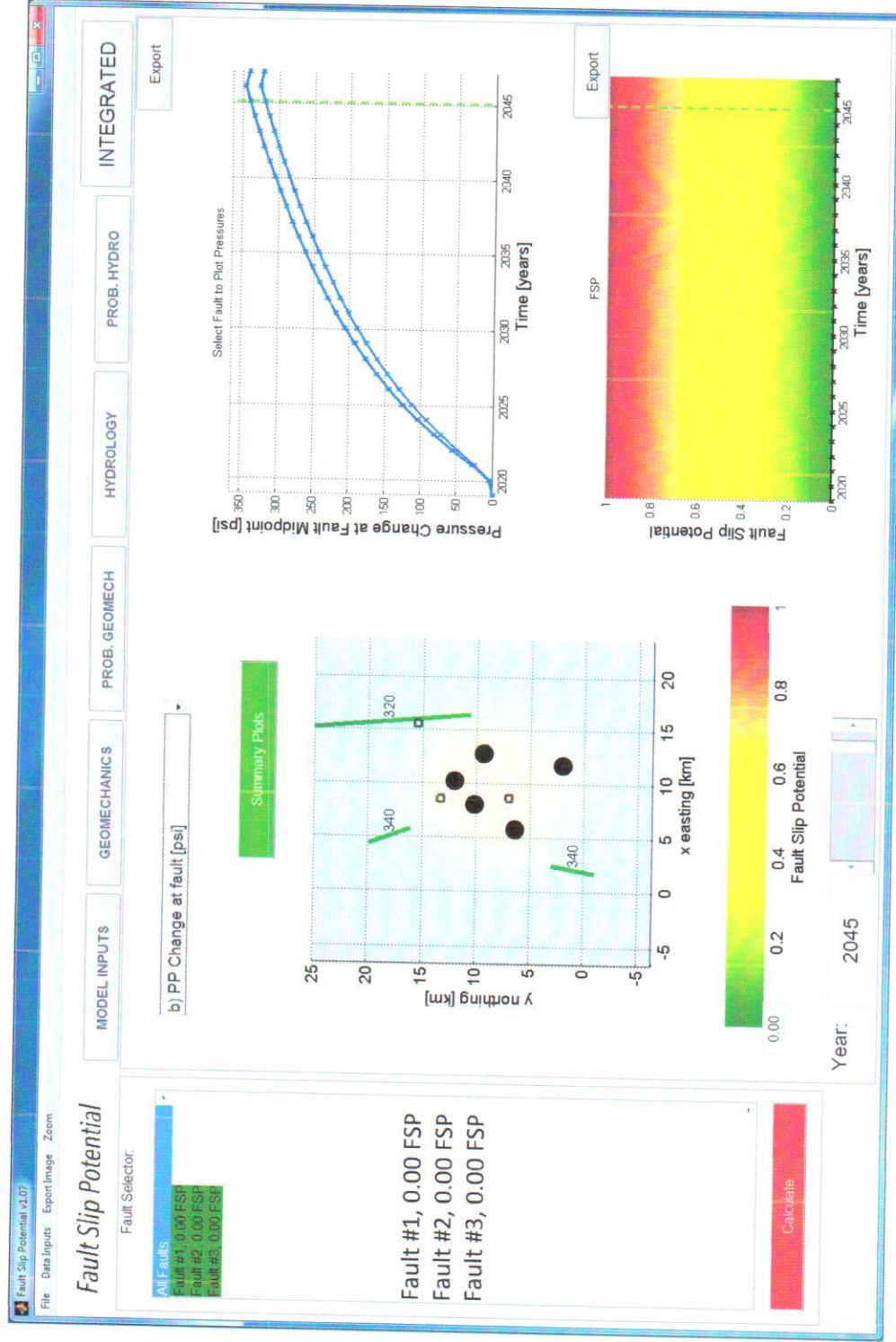




# FSP After 25 Years - Area 1 - Scenario 1

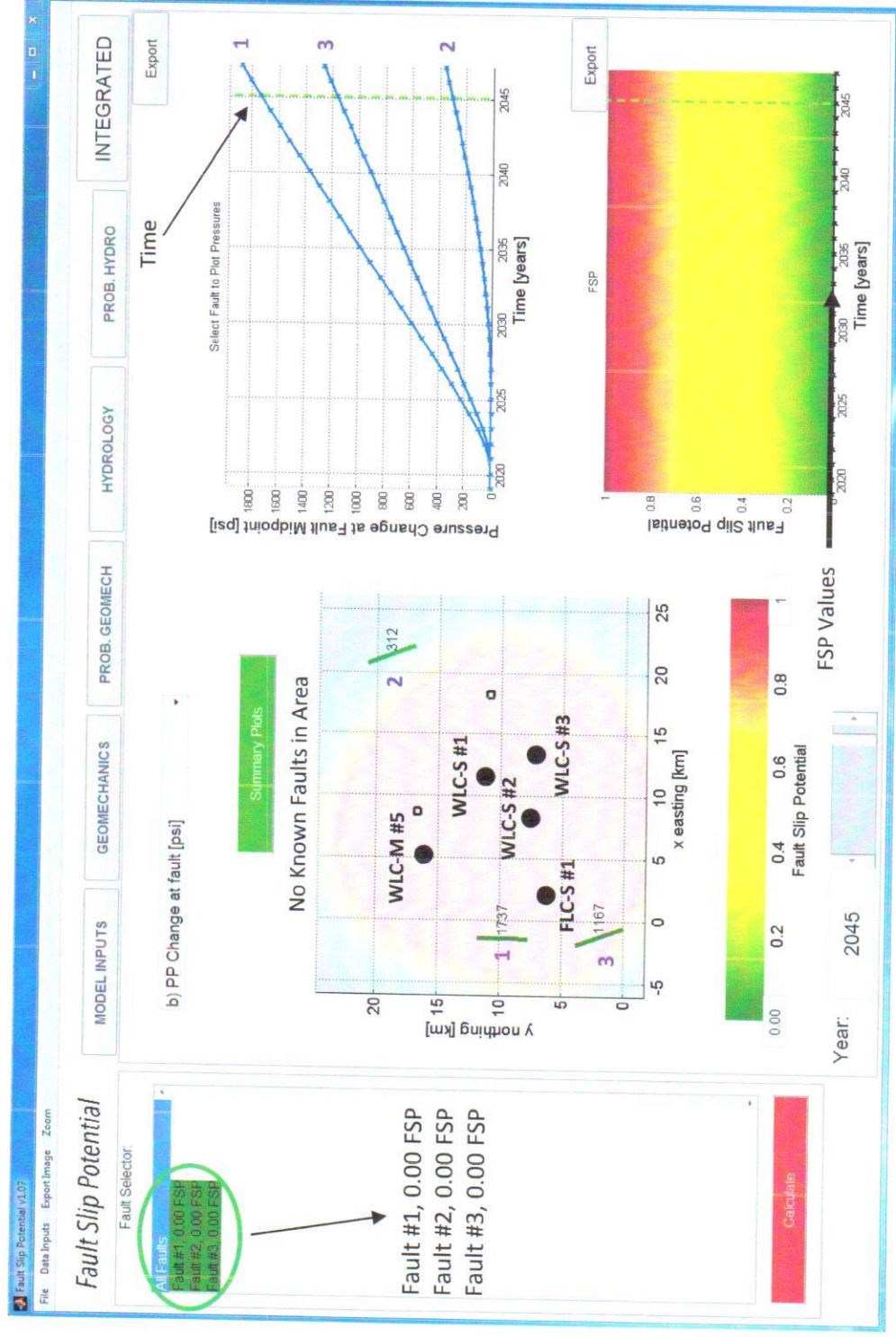


# FSP After 25 Years - Area 1 - Scenario 2

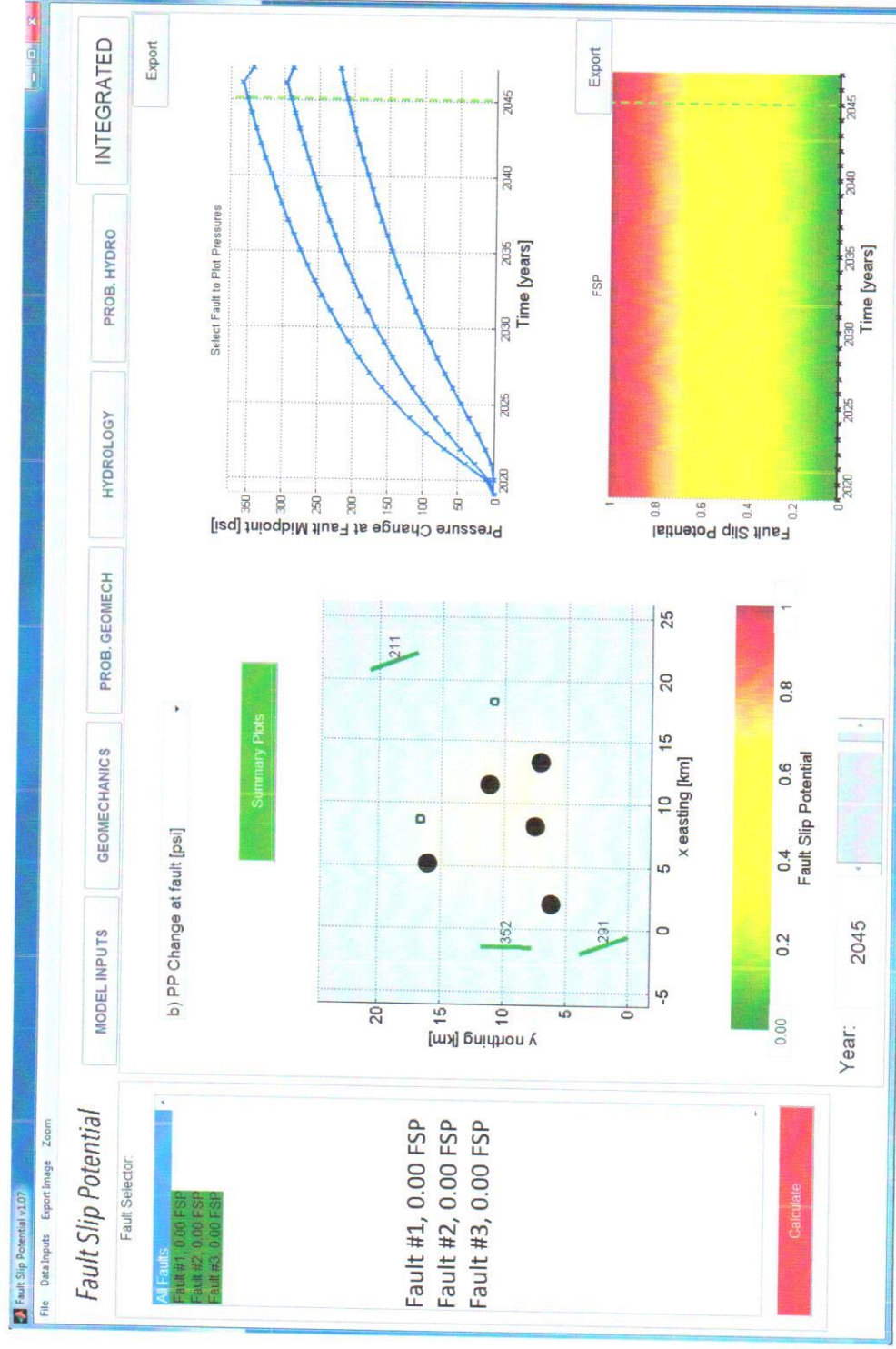




# FSP After 25 Years - Area 2 - Scenario 1



# FSP After 25 Years - Area 2 - Scenario 2



## Parameters

Estimated Porosity  
10%

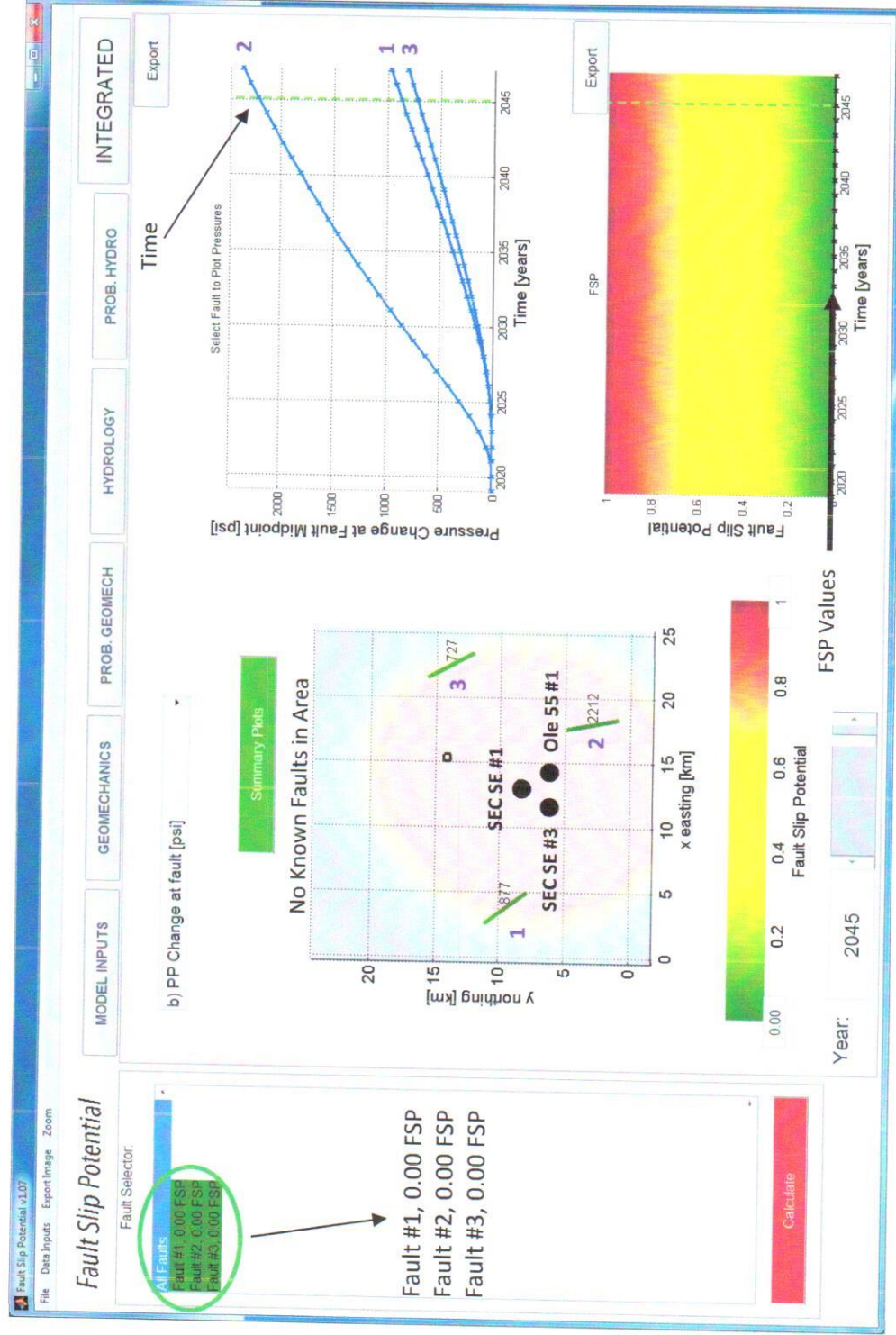
Estimated Permeability  
100 mD

Estimated Injection Interval  
17,500 – 19,100 ft

Estimated Thickness with High  
(10%) Porosity  
250 ft



# FSP After 25 Years - Area 3 - Scenario 1



## Parameters

Estimated Porosity  
5%

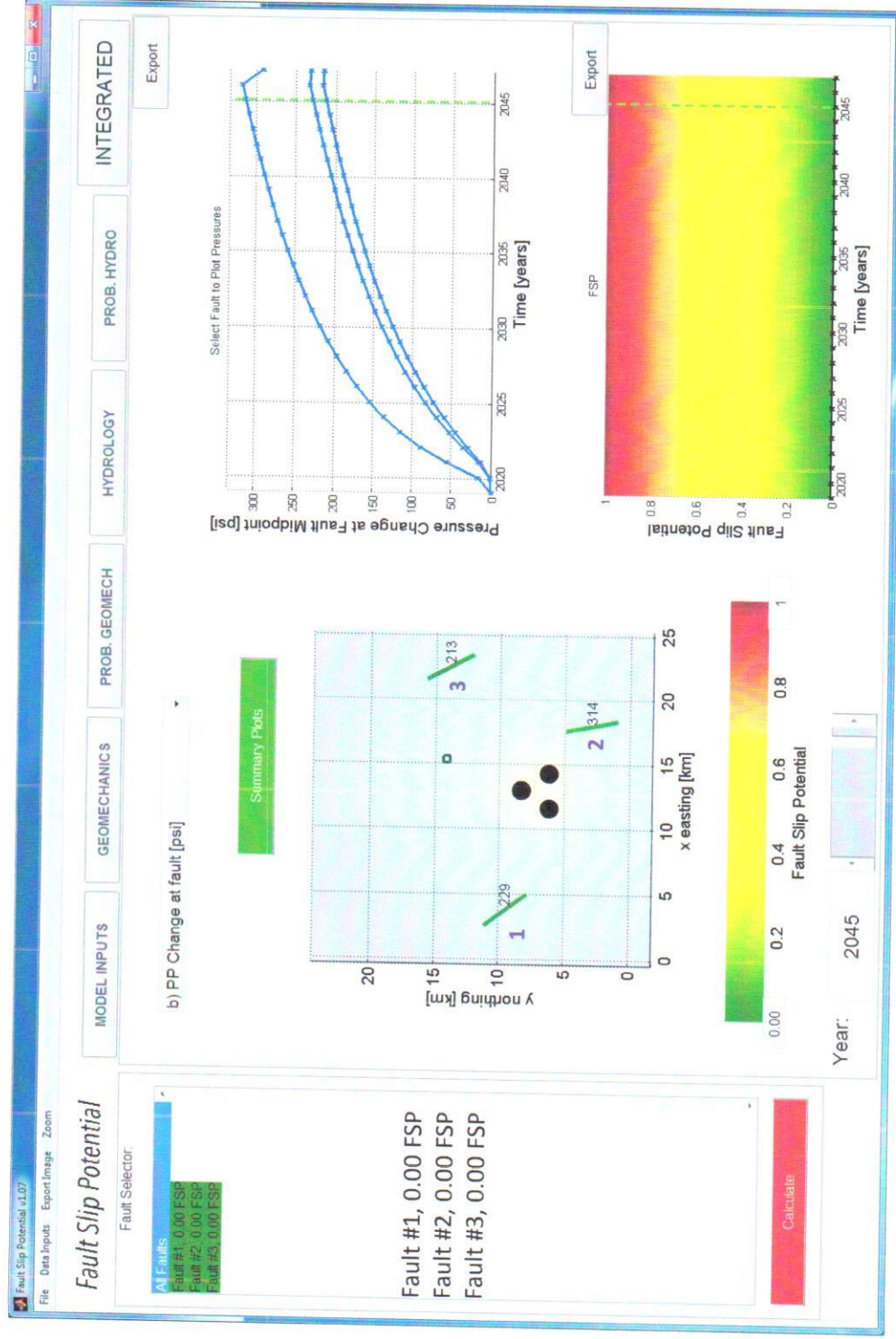
Estimated Permeability  
10 mD

Estimated Injection Interval  
16,600 – 18,500 ft

Estimated Thickness with High  
(5%) Porosity  
100 ft

- = Proposed Trove SWDs
- = Other Deep SWDs

## FSP After 25 Years - Area 3 - Scenario 2

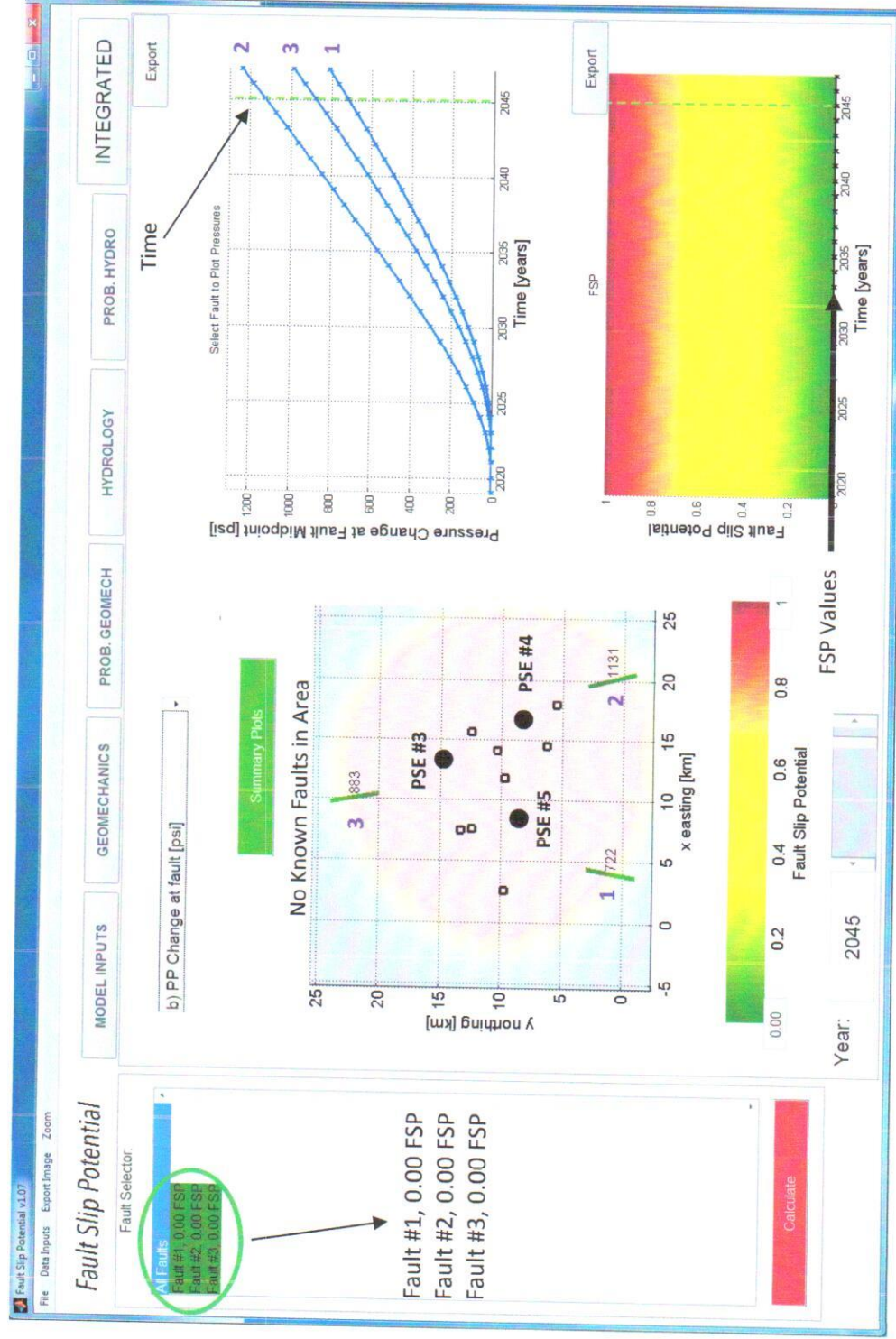


● = Proposed Trove SWDs

□ = Other Deep SWDs



# FSP After 25 Years - Area 4 - Scenario 1



## Parameters

Estimated Porosity  
5%

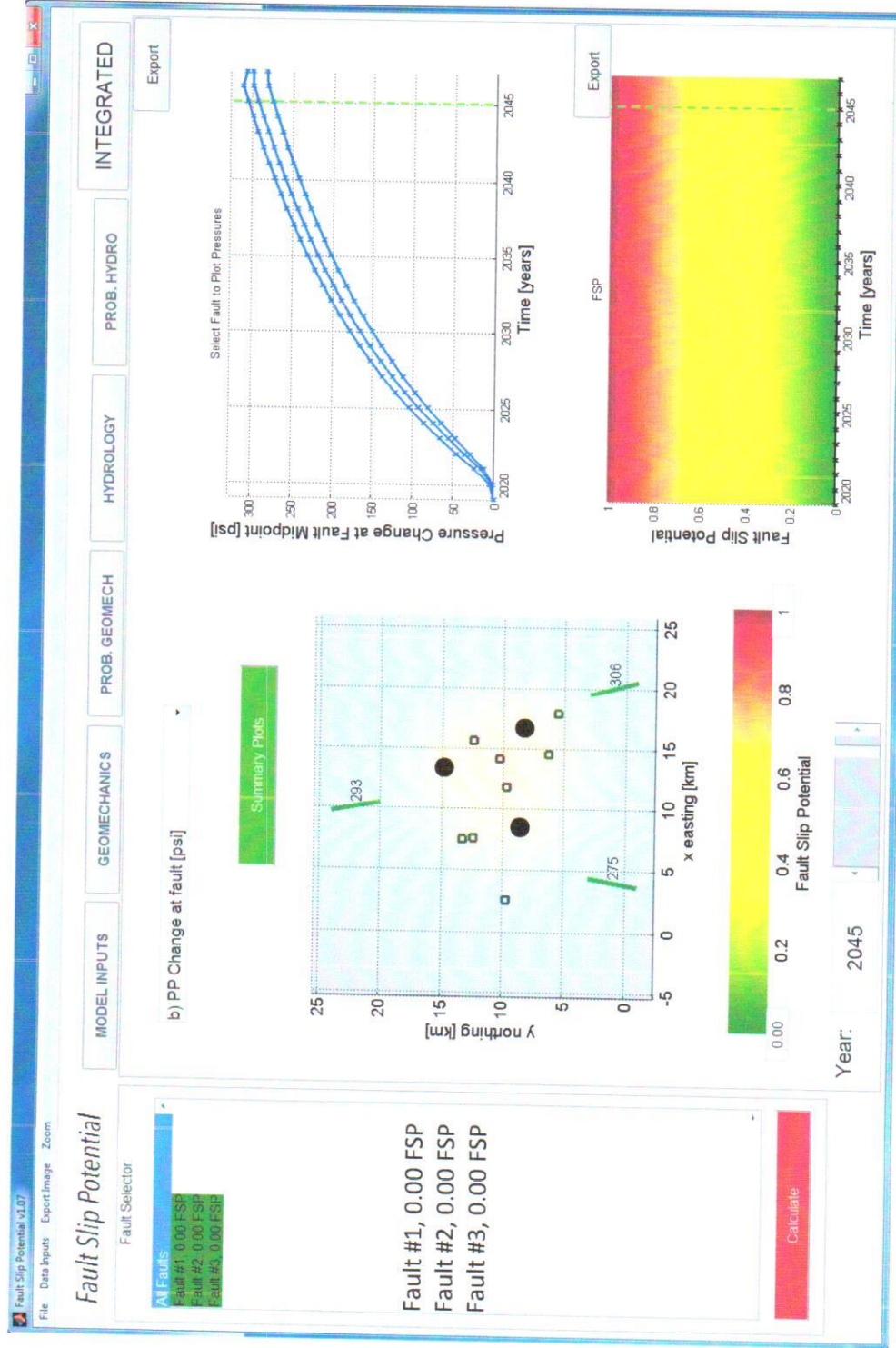
Estimated Permeability  
10 mD

Estimated Injection Interval  
16,700 – 18,200 ft

Estimated Thickness with High  
(5%) Porosity  
100 ft

- = Proposed Trove SWDs
- = Other Deep SWDs

# FSP After 25 Years - Area 4 - Scenario 2



## Parameters

Estimated Porosity  
10%

Estimated Permeability  
100 mD

Estimated Injection Interval  
16,700 – 18,200 ft

Estimated Thickness with High  
(10%) Porosity  
250 ft

- = Proposed Trove SWDs
- = Other Deep SWDs



# Conclusions

- There is one mapped Precambrian fault in the 100 square mile review of FSP area 1, which shows FSP of 0.00 over 25 years in both high and low geologic scenarios.
- Known faults in southeast New Mexico do not align with the horizontal stress field, and are not likely to slip.
- FSP modeling through 25 years, with injection rates that are likely overestimated, shows no risk of potential fault slip in the areas of review.
- These areas present little to no risk for injection induced seismicity.

# References

- U.S. Geological Survey. "Information by Region-New Mexico."  
<https://earthquake.usgs.gov/earthquakes/byregion/newmexico.php> (Accessed June 24, 2019)
- U.S. Geological Survey. "Faults." <https://earthquake.usgs.gov/hazards/qfaults/> (Accessed June 24, 2019)
- EMNRD Oil Conservation Division. "Welcome to the New Mexico Mining & Minerals Division."  
<http://www.emnrd.state.nm.us/OCD/ocdonline.html> (Accessed July 19, 2019)
- Snee, Jens-Erik Lund, and Mark D. Zoback. 2018. "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity." *The Leading Edge* 37, no. 2 (February 2018): 127-34.
- Wilson, Scott J. 2018. "Affidavit of Scott J. Wilson, Amended Applications of NGL Water Solutions Permian, LLC for Approval of Saltwater Disposal Wells in Lea County, New Mexico." New Mexico Oil Conservation Division Case No. 16438 and Case No. 16440.
- Reynolds, Todd. 2019. "FSP Analysis (Fault Slip Potential) Exhibits." New Mexico Oil Conservation Division Case No. 20313, Case No. 20314, and Case No. 20472.



# Appendix

## Control Log Well Details and Nearby Deep SWDs Injection Data

30-025-45028  
Dev/Sil logged from 17,430' to  
18,900' (partial)

**Legend**

- ★ FSP Area
- Proposed Trove
- SWDs
- Control Log Wells
- ⊙ TEXNET Earthquakes
- ⊙ USGS Earthquakes
- Faults
- tectonicmap basement faults

**Map Labels:**

- T23SR30E, T23SR31E, T23SR32E, T23SR33E, T23SR34E
- T24SR29E, T24SR30E, T24SR31E, T24SR32E, T24SR33E, T24SR34E
- T25SR29E, T25SR30E, T25SR31E, T25SR32E, T25SR33E, T25SR34E
- T26SR29E, T26SR30E, T26SR31E, T26SR32E, T26SR33E, T26SR34E

**Key Locations:**

- PSSE #3
- PSSE #4
- PSSE #5
- WLC-M #3
- WLC-M #4
- WLC-M #5
- WLC-S #1
- WLC-S #2
- WLC-S #3
- SEC SE #1
- SEC SE #2
- SEC SE #3
- OLS #1

**Geographic Features:**

- Eddy, Lea, Loving
- New Mexico, Texas
- Reeves

**Scale:** 0 2 4 Miles

Data Source: New Mexico OCD 2019



# Nearby Deep SWD Injection Data

FSP Area	API #	Well Name	Average Daily Injection Rate (BWPD)	Injection Start-Date
1	30-015-43867	CYPRESS SWD #001	8,377	Jul - 2018
1	30-025-29000	DIAMOND 31 FEDERAL COM #001	2,950	Jan - 2014
1, 2	30-025-35598	RED HILLS SWD #001	8,346	Dec - 2018
2	30-025-42355	RATTLESNAKE 16 SWD #001	5,834	Dec - 2015
3	30-025-43379	PADUCA 6 SWD #001Y	21,046	Aug - 2017
4	30-025-41524	COTTON DRAW 32 STATE SWD #002	12,724	Mar - 2017
4	30-015-41649	COTTON DRAW UNIT SWD #181	10,367	Jan - 2014
4	30-015-44676	MESA VERDE SWD #003	8,396	Sep - 2018
4	30-015-40935	PLU DELAWARE B 23 FEDERAL SWD #001	9,742	Jul - 2013
4	30-015-44612	SAND DUNES SWD #001	1,472	Nov - 2018
4	30-015-44131	SAND DUNES SWD #002	17,396	Jul - 2018
4	30-025-43473	STATION SWD #001	25,243	Aug - 2018
4	30-015-44416	STRIKER 2 SWD #001	11,584	Oct - 2018