

**Delaware Energy, LLC**  
**Application for Injection/SWD**  
**Kodiak SWD #1**

*Case 16261*

UL P, Sec. 5, T-24-S, R-27-E, 200' FSL & 250' FEL, Eddy Co., NM

May 9, 2018

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8. Planned wellbore diagram for the Kodiak SWD #1
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11. Map Identifying all Wells and Leases within Two Miles of Any Proposed Injection Well with a One Mile Radius Circle Drawn Around the Proposed Injection Well
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13. Legal Notice that was run as required in the Carlsbad Current-ARGUS
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16. Seismicity Assessment
17. Carlsbad Current-ARGUS Affidavit of publication

Case 16261

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
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MAY 29 2018 PM 04:18

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:** Delaware Energy, LLC **OGRID Number:** 371195  
**Well Name:** Kodiak SWD #1 **API:** Pending  
**Pool:** SWD; Devonian **Pool Code:** 96101

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

- 1) **TYPE OF APPLICATION:** Check those which apply for [A]  
 A. Location - Spacing Unit - Simultaneous Dedication  
 NSL  NSP (PROJECT AREA)  NSP (PRORATION UNIT)  SD  
 B. Check one only for [ I ] or [ II ]  
 [ I ] Commingling - Storage - Measurement  
 DHC  CTB  PLC  PC  OLS  OLM  
 [ II ] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery  
 WFX  PMX  SWD  IPI  EOR  PPR

- 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	
<input type="checkbox"/>	Notice Complete
<input type="checkbox"/>	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.**

Mike McCurdy

Print or Type Name

Signature

5/9/2018  
Date

432-685-7005  
Phone Number

m.mccurdy@delawareenergy.com  
e-mail Address

**APPLICATION FOR AUTHORIZATION TO INJECT**

- I. PURPOSE: \_\_\_\_\_ Secondary Recovery \_\_\_\_\_ Pressure Maintenance \_\_\_\_\_ XXX \_\_\_\_\_ Disposal \_\_\_\_\_ Storage  
Application qualifies for administrative approval? \_\_\_\_\_ XX \_\_\_\_\_ Yes \_\_\_\_\_ No
- II. OPERATOR: \_\_\_\_\_ Delaware Energy, LLC \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ 405 North Marienfeld, Suite 250, Midland TX 79701 \_\_\_\_\_  
CONTACT PARTY: \_\_\_\_\_ Mike McCurdy \_\_\_\_\_ PHONE: \_\_\_\_\_ 432-312-5251 \_\_\_\_\_
- III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection.  
Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? \_\_\_\_\_ Yes \_\_\_\_\_ XXXX No  
If yes, give the Division order number authorizing the project: \_\_\_\_\_
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
  2. Whether the system is open or closed;
  3. Proposed average and maximum injection pressure;
  4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
  5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- \*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- \*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).
- \*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: \_\_\_\_\_ Mike McCurdy \_\_\_\_\_ TITLE: \_\_\_\_\_ Vice-President \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_ 05/09/2018 \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ m.mccurdy@delawareenergy.com \_\_\_\_\_

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

### III. WELL DATA

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

- (1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

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

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

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

### XIV. PROOF OF NOTICE

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

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

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and,
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

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

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

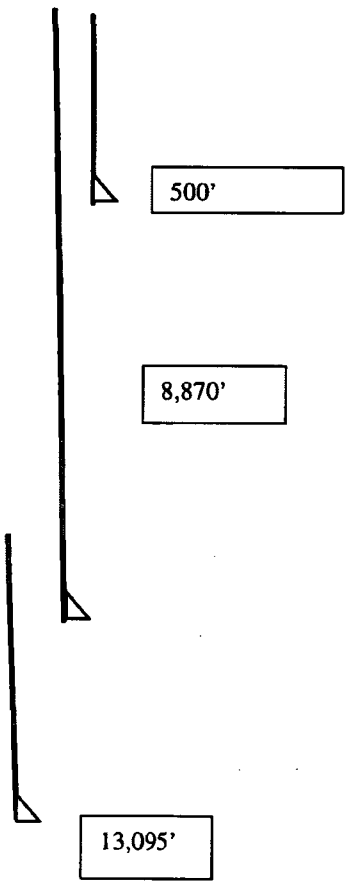
**INJECTION WELL DATA SHEET**

OPERATOR: Delaware Energy, LLC

WELL NAME & NUMBER: Kodiak SWD # 1

WELL LOCATION: 200' FSL & 250' FEL                      P                      5                      24S                      27E  
 FOOTAGE LOCATION                      UNIT LETTER                      SECTION                      TOWNSHIP                      RANGE

**WELLBORE SCHEMATIC see attached wellbore sketch**



**WELL CONSTRUCTION DATA**

Surface Casing

Hole Size: 17.5"                      Casing Size: 13-3/8", 54.5#  
 Cemented with: 500 sx.                      or \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: surface                      Method Determined: Plan to Circulate

Intermediate Casing

Hole Size: 12-1/4"                      Casing Size: 9-5/8", 47#, L-80  
 Cemented with: 3,200' sx.                      or \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: surface                      Method Determined: Plan to Circulate

Production Casing

Hole Size: 8-1/2"                      Casing Size: 7-5/8", 39#, P-110  
 Cemented with: 500 sx.                      or \_\_\_\_\_ ft<sup>3</sup>  
 Top of Cement: Top of Liner                      Method Determined: Plan to Circulate to liner top

Total Depth: 13,095'

Injection Interval

13,095' feet to 14,095'  
 (OPEN HOLE)

**INJECTION WELL DATA SHEET**

Tubing Size: 5.5" OD P-110 x 5.5" OD P-110 Liberty FJ tapered string Lining Material: Fiber Glass

Type of Packer: Weatherford Arrow Set 1X

Packer Setting Depth: 13,070'

Other Type of Tubing/Casing Seal (if applicable): none

Additional Data

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

If no, for what purpose was the well originally drilled? N/A

2. Name of the Injection Formation: Devonian

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

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

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: \_\_\_\_\_

Below: none

Next Higher: Delaware 2,070'-5,480', Bone Spring 5,480'-8,870', Wolfcamp 8,870'-10,670', Strawn 10,670'-10,845', Atoka 10,845'-11,520'

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Additional Questions on C-108

VII.

**1. Proposed average and maximum daily rate and volume of fluids to be injected;**  
Average 15,000-20,000 BWPD, Max 25,000 BWPD

**2. Whether the system is open or closed;**  
Open System, Commercial SWD

**3. Proposed average and maximum injection pressure;**  
Average 1,500-1,800 PSI, Max 2,792 PSI

**4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,**

Bone Spring, Delaware, and Wolfcamp produced water. No known incompatibility exists with these produced water types and the Devonian. Devonian formation is used as a disposal interval throughout the Delaware Basin for Wolfcamp, Bone Springs, and Delaware produced water. See attached water analysis from Bone Spring, Wolfcamp, and Delaware produced water.

**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.).**

Disposal zone produces water and no hydrocarbons, nearby Devonian test wells have only tested water in DST's. Nearby Top Gun SWD tested Sulphur water.

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

The proposed disposal interval is in the Devonian formations 13,095'-14,095'. Devonian is an impermeable organic Shale at the very top (12,995 ft, Woodford Shale) 100ft thick followed by permeable lime, dolomite, and small amount of shale 1000ft thick. There are no fresh water zones underlying the proposed injection zone. Usable water depth is from surface to 300', the water source is older alluvium (Quaternary). All of the fresh water wells in the area have an average depth to water of 35ft.

**IX. Describe the proposed stimulation program, if any.**

60,000 gallons 20% HCL acid job with packer

**X. Attach appropriate logging and test data on the well**

Mud log will be filed after the well has been drilled. All cased hole and open hole Logs will be filed following drilling operations.

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

Included in the application is a water well sample from Section 8 of T24S R27E.

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

Delaware Energy, L.L.C. has reviewed and examined available geologic and engineering data in the area of interest for the Kodiak SWD #1 and have found no evidence of faults or other hydrologic connections between Devonian disposal zone and the underground sources of drinking water. Furthermore, there exist many impermeable intervals between the injection interval and the fresh ground water from the top of the Devonian Carbonate and the base of the ground water.

Mike McCurdy Vice President 5/9/2018  
 \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**III. WELL DATA**

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

Kodiak SWD #1, Sec. 5-T24S-R27E, 200' FSL & 250' FEL, UL P, Eddy County, New Mexico

**(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.**

Casing Size	Setting Depth	Sacks of Cement	Hole Size	Top of Cement	Determined
13-3/8"	500'	500	17-1/2"	Surface	CIRC
9-5/8"	8,870'	3200	12-1/4"	Surface	CIRC
7-5/8"	8,670'-13,095'	500	8-1/2"	Surface	CIRC

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

5.5" OD P-110 X 5.5" OD P-110 Liberty FJ tapered string., Internally Fiber Glass Coated Tubing set 50 to 100ft above open hole

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

Weatherford Arrow Set 1X injection packer, nickel plated with on/off tool

**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.**

Devonian Formation  
 Pool Name: SWD (Devonian)

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

13,095' to 14,095' (OH)

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

Well is a planned new drill for SWD

**(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.**



None, well is a planned new drill

**(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.**

Next Higher: Delaware 2,070'-5,480', Bone Spring 5,480'-8,870', Wolfcamp 8,870'-10,670', Strawn 10,670'-10,845', Atoka 10,845'-11,520'

Next Lower: None

**DISTRICT I**  
 1625 N. French Dr., Hobbs, NM 88240  
 Phone (505) 533-6161 Fax (505) 533-0720

**DISTRICT II**  
 811 S. First St., Artesia, NM 88210  
 Phone (505) 745-1259 Fax (505) 745-0720

**DISTRICT III**  
 1000 Rio Brazos Rd., Artec, NM 87410  
 Phone (505) 534-6179 Fax (505) 534-3170

**DISTRICT IV**  
 1250 S. St. Francis Dr., Santa Fe, NM 87506  
 Phone (505) 479-5450 Fax (505) 479-5453

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 KODIAK SWD	Well Number 1
OGRID No.	Operator Name DELAWARE ENERGY	Elevation 3167'

**Surface Location**

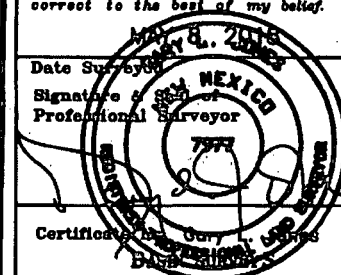
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	5	24 S	27 E		200	SOUTH	250	EAST	EDDY

**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**

N:458092.4 E:578075.5 (NAD 83)	<p><b>OPERATOR CERTIFICATION</b></p> <p><i>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.</i></p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>Email Address _____</p>	N:458143.3 E:581388.1 (NAD 83)
<p><b>SURVEYOR CERTIFICATION</b></p> <p><i>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.</i></p> <p>Date Surveyed _____</p> <p>Signature &amp; Seal of Professional Surveyor _____</p> <p>Certification No. _____ 7977</p>		
<p><b>SURFACE LOCATION</b></p> <p>Lat - N 32.23975636°          Long - W 104.20487493°          NMSPC- N 450980.8          E 581054.1          (NAD-83)</p>		
N:450748.6 E:578020.6 (NAD 83)		N:450781.9 E:581301.9 (NAD 83)



Sec 22, T25S, R28E

North Permian Basin Region

P.O. Box 740

Sundown, TX 79372-0740

(806) 229-8121

Lab Team Leader - Sheila Hernandez

(432) 495-7240

Bone Spring

Water Analysis Report by Baker Petrolite

Company:		Sales RDT:	33514.1
Region:	PERMIAN BASIN	Account Manager:	TONY HERNANDEZ (575) 910-7135
Area:	ARTESIA, NM	Sample #:	534665
Lease/Platform:	PINOCHLE 'BPN' STATE COM	Analysis ID #:	106795
Entity (or well #):	2 H	Analysis Cost:	\$90.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 534665 @ 75 F					
		Anions		Cations			
		mg/l	meq/l	mg/l	meq/l		
Sampling Date:	03/10/11	Chloride:	109618.0	3091.92	Sodium:	70275.7	3056.82
Analysis Date:	03/18/11	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	16.04
Analyst:	SANDRA GOMEZ	Carbonate:	0.0	0.	Calcium:	844.0	42.12
TDS (mg/l or g/m3):	184911.1	Sulfate:	747.0	15.55	Strontium:	220.0	5.02
Density (g/cm3, tonne/m3):	1.113	Phosphate:			Barium:	0.8	0.01
Anion/Cation Ratio:	1	Borate:			Iron:	6.3	0.23
		Silicate:			Potassium:	889.0	22.22
Carbon Dioxide:	0.50 PPM	Hydrogen Sulfide:		0 PPM	Aluminum:		
Oxygen:		pH at time of sampling:		7	Chromium:		
Comments:		pH at time of analysis:			Copper:		
		pH used in Calculation:		7	Lead:		
					Manganese:	0.100	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO <sub>3</sub>		Gypsum CaSO <sub>4</sub> ·2H <sub>2</sub> O		Anhydrite CaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Barite BaSO <sub>4</sub>		CO <sub>2</sub> Press
		Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
F	psi											psi
80	0	1.08	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.58	0.29	1.72
100	0	1.10	208.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.36
120	0	1.12	224.17	-1.36	0.00	-1.19	0.00	-0.17	0.00	0.16	0.00	3.17
140	0	1.13	243.17	-1.42	0.00	-1.18	0.00	-0.18	0.00	0.00	0.00	4.21

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

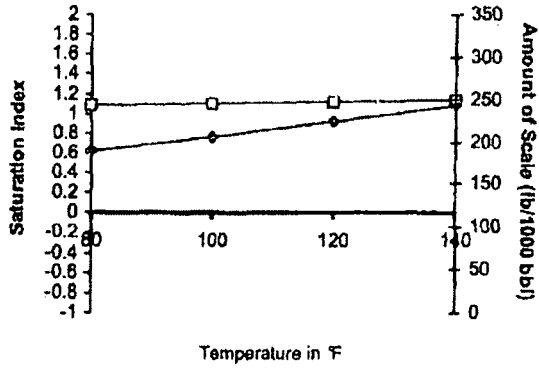
Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

# Scale Predictions from Baker Petrolite

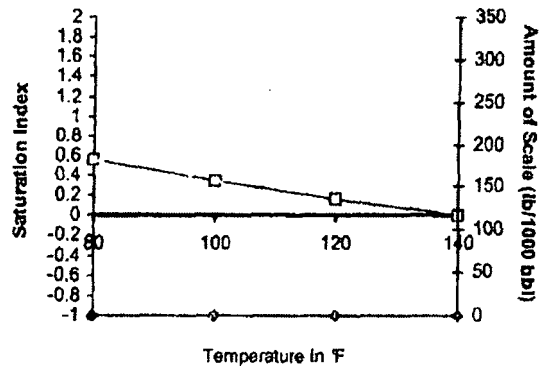
Analysis of Sample 534665 @ 75 °F for

03/18/11

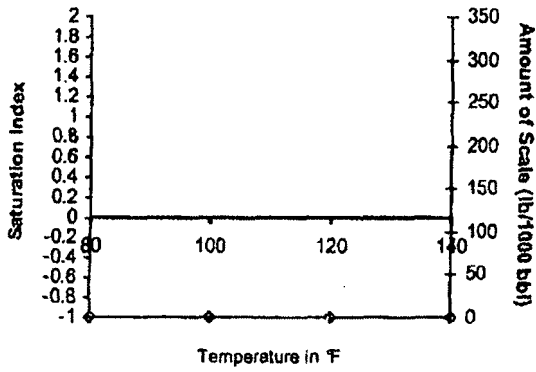
**Calcite - CaCO<sub>3</sub>**



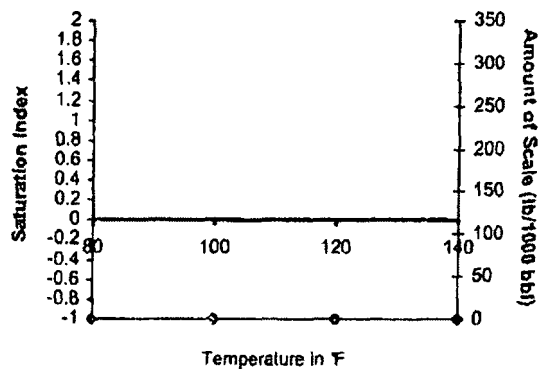
**Barite - BaSO<sub>4</sub>**



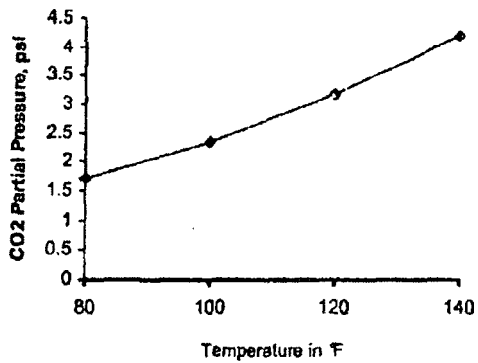
**Gypsum - CaSO<sub>4</sub>·2H<sub>2</sub>O**



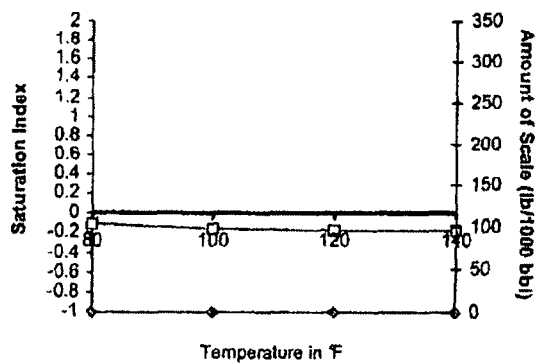
**Anhydrite - CaSO<sub>4</sub>**



**Carbon Dioxide Partial Pressure**



**Celestite - SrSO<sub>4</sub>**



Wolfcamp



Water Analysis

Date: 23-Aug-11

2708 West County Road, Hobbs NM 88240

Phone (575) 392-5556 Fax (575) 392-7307

Analyzed For

Brushy Draw 1#1

Company	Well Name	County	State
	BD	Lea	New Mexico

Sample Source	Swab Sample	Sample #	
		Eddy	1-265-295
			1

Formation	Depth

Specific Gravity	1.170	SG @ 60 °F	1.172
pH	6.30	Sulfides	Absent
Temperature (°F)	70	Reducing Agents	

Cations

Sodium (Calc)	in Mg/L	77,962	in PPM	66,520
Calcium	in Mg/L	4,000	in PPM	3,413
Magnesium	in Mg/L	1,200	in PPM	1,024
Soluble Iron (FE2)	in Mg/L	10.0	in PPM	9

Anions

Chlorides	in Mg/L	130,000	in PPM	110,922
Sulfates	in Mg/L	250	in PPM	213
Bicarbonates	in Mg/L	127	in PPM	108
Total Hardness (as CaCO3)	in Mg/L	15,000	in PPM	12,799
Total Dissolved Solids (Calc)	in Mg/L	213,549	in PPM	182,209
Equivalent NaCl Concentration	in Mg/L	182,868	in PPM	158,031

Scaling Tendencies

\*Calcium Carbonate Index 507,520

Below 500,000 Remote / 500,000 - 1,000,000 Possible / Above 1,000,000 Probable

\*Calcium Sulfate (Gyp) Index 1,000,000

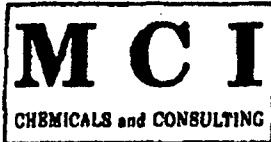
Below 500,000 Remote / 500,000 - 10,000,000 Possible / Above 10,000,000 Probable

\*This Calculation is only an approximation and is only valid before treatment of a well or several weeks after treatment.

Remarks RW=.048@70F

Report # 3188

See 16, T23S. R 28E



PRODUCTION DEPARTMENT

MILLER CHEMICALS, INC.

Post Office Box 298  
 Artesia, N.M. 88211-0298  
 (505) 746-1919 Artesia Office  
 (505) 392-2893 Hobbs Office  
 (505) 746-1918 Fax  
 mci@plateautel.net

Delaware Brushy Canyon

WATER ANALYSIS REPORT

Company :  
 Address :  
 Lease : LOVING "AIB"  
 Well : #15  
 Sample Pt. : WELLHEAD  
 Date : MARCH 17, 2008  
 Date Sampled : MARCH 17, 2008  
 Analysis No. :

ANALYSIS		mg/L		* meq/L
1. pH		6.0		
2. H2S		0		
3. Specific Gravity		1.070		
4. Total Dissolved Solids		304684.9		
5. Suspended Solids		NR		
6. Dissolved Oxygen		NR		
7. Dissolved CO2		NR		
8. Oil In Water		NR		
9. Phenolphthalein Alkalinity (CaCO3)				
10. Methyl Orange Alkalinity (CaCO3)				
11. Bicarbonate	HCO3	927.0	HCO3	15.2
12. Chloride	Cl	187440.0	Cl	5287.4
13. Sulfate	SO4	500.0	SO4	10.4
14. Calcium	Ca	37200.0	Ca	1856.3
15. Magnesium	Mg	996.3	Mg	82.0
16. Sodium (calculated)	Na	77586.6	Na	3374.8
17. Iron	Fe	35.0		
18. Barium	Ba	NR		
19. Strontium	Sr	NR		
20. Total Hardness (CaCO3)		97000.0		

PROBABLE MINERAL COMPOSITION

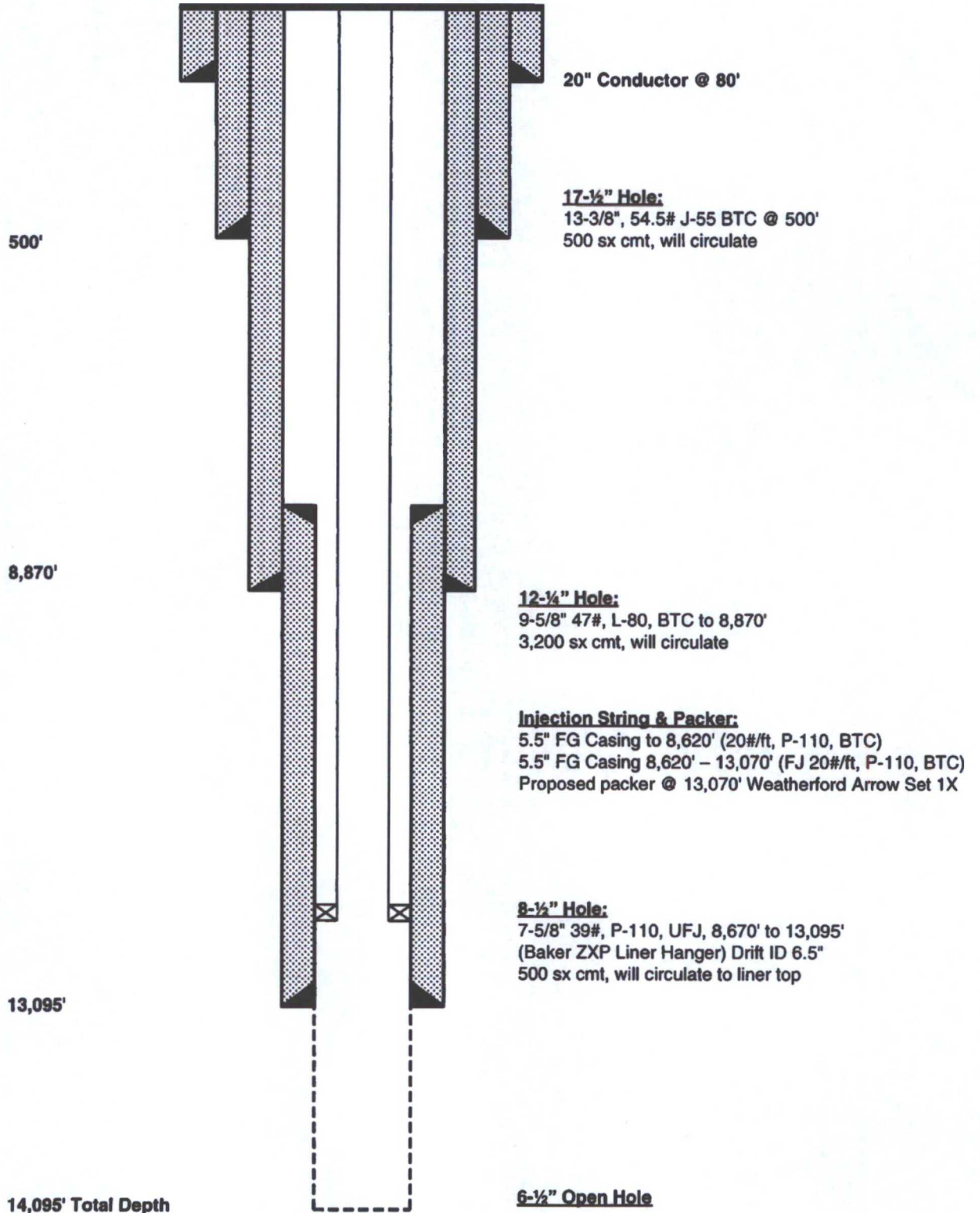
*milli equivalents per Liter	Compound	Equiv wt	* meq/L	= mg/L
1856  *Ca <---- *HCO3   15	Ca (HCO3)2	81.0	15.2	1231
-----  /----->  -----	CaSO4	68.1	10.4	709
82  *Mg -----> *SO4   10	CaCl2	55.5	1830.7	101584
-----  <-----/  -----	Mg (HCO3)2	73.2		
3375  *Na -----> *Cl   5287	MgSO4	60.2		
+-----+	MgCl2	47.6	82.0	3902
Saturation Values Dist. Water 20 C	NaHCO3	84.0		
CaCO3 13 mg/L	Na2SO4	71.0		
CaSO4 * 2H2O 2090 mg/L	NaCl	58.4	3374.8	197223
BaSO4 2.4 mg/L				

REMARKS:

**Kodiak SWD # 1**

API # PENDING  
200' FSL & 250' FEL, Sec. 5, T24S, R27E  
EDDY COUNTY, NEW MEXICO

**PROPOSED WELLBORE**





- Home
- Production Data ▶
- Well Data ▶
- NM Production ▶
- Water Data ▶
- Projects ▶
- Software ▶
- Archive ▶
- Other Links ▶
- Help ▶

**ViewGeneralInfoGWater**

North American Oil and Gas News

**2016 first half review for shale shows the bottom has been reached - What's next?**

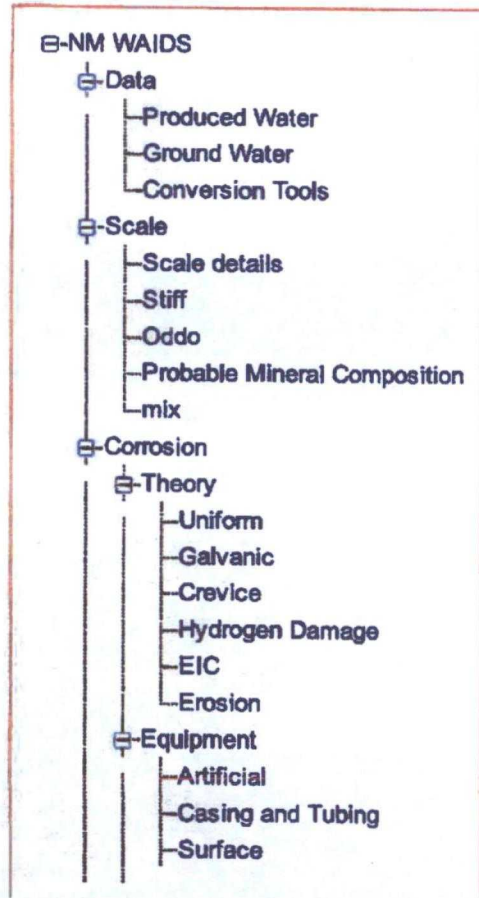
**BlackPearl Resources renews bank credit facilities, provides operations update**

**Petrocapita closes acquisition of Palliser Oil and Gas assets**

**Alaska Oil and Gas Companies Now Required to Get Bonds**

Source: Oil Voice

<b>NYMEX LS Crude</b>	<b>44.69</b>
<b>Navajo WTXI</b>	<b>0</b>
<b>Henry Hub</b>	<b>2.717</b>
Updated	7/11/2016
State Land Office Data Access	
OCD well/log image files	
<b>PRRC</b>	<b>NM-TECH</b> <b>NM-BGMR</b>



General Information About: Sample 8337			
Section/Township/Range	08 / 24S / 27E	Lat/Long	32.2319/-104.212
Elevation	3161	Depth	50
Date Collected	8/19/1997 12:00:00 AM	Chlorides	168
Collector / Point of Collection	SEO/KT	Use	Domestic
Formation	OAL	TDS	





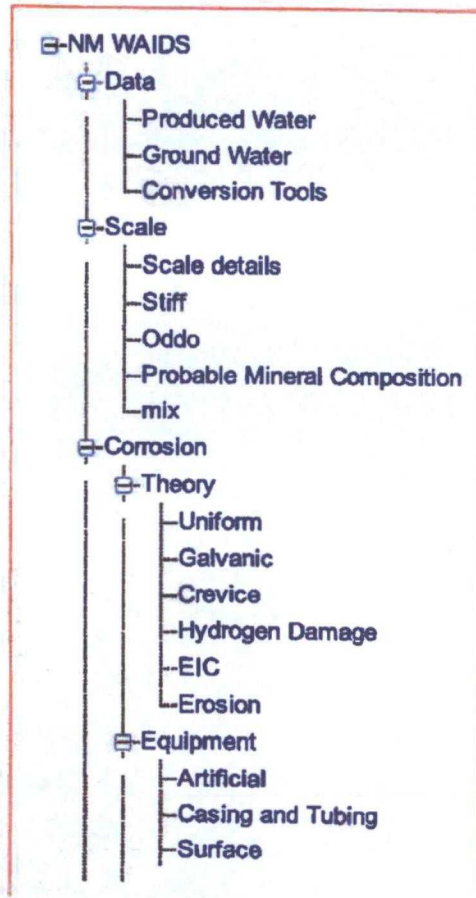
- Home
- Production Data
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- Water Data
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- Software
- Archive
- Other Links
- Help

**ViewGeneralInfoGWater**

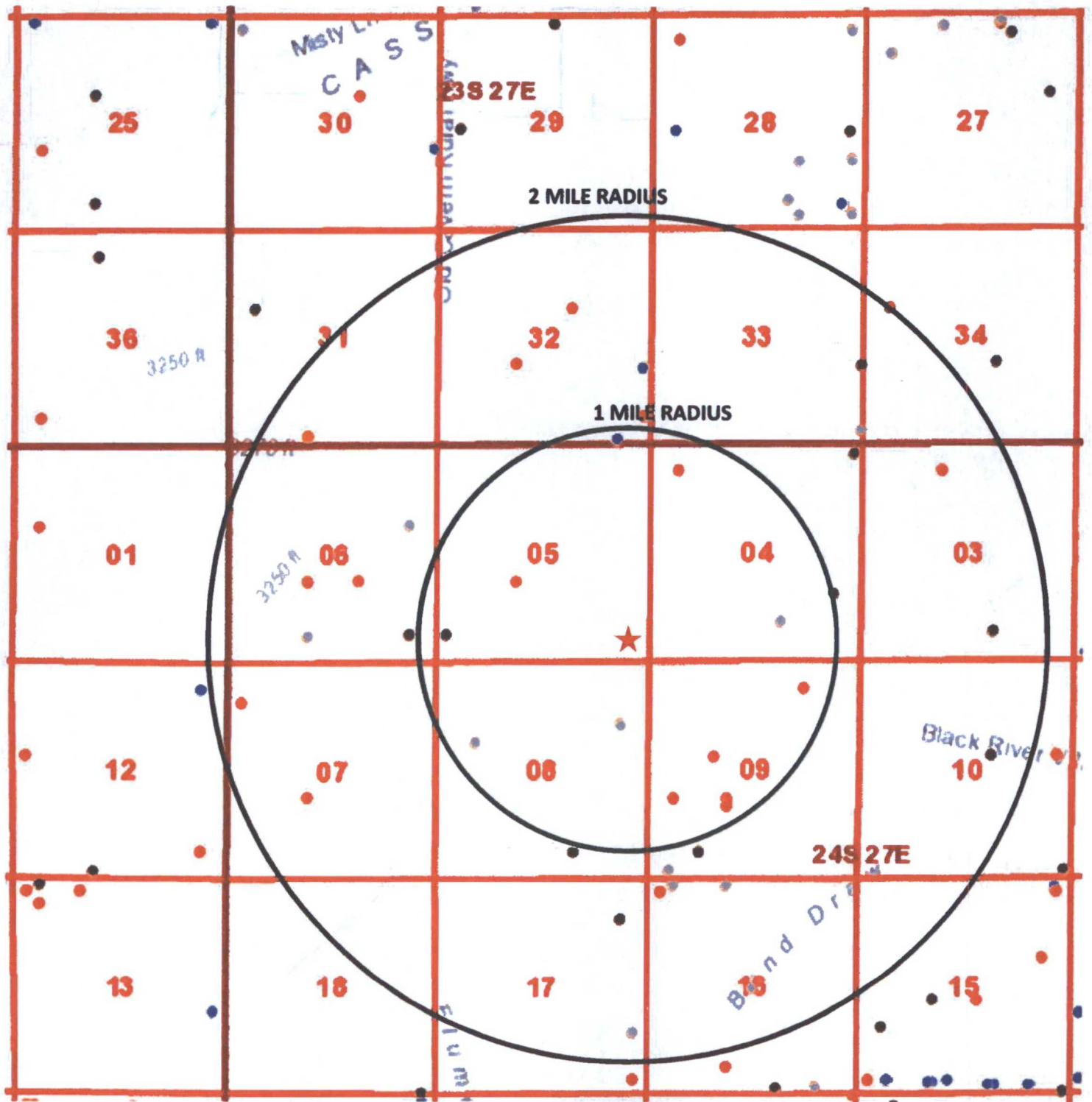
North American Oil and Gas News  
 2016 first half review for shale shows the bottom has been reached - What's next?  
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Updated	7/11/2016
State Land Office Data Access	
OCD well/log image files	
<b>PRRC</b>	<b>NM-TECH</b> <b>NM-BGMR</b>



General information About: Sample 389			
Section/Township/Range	18 / 24S / 27E	Lat/Long	32.2174/-104.2291
Elevation		Depth	
Date Collected	8/13/1997 12:00:00 AM	Chlorides	68
Collector / Point of Collection	SEO/YT	Use	
Formation		TDS	



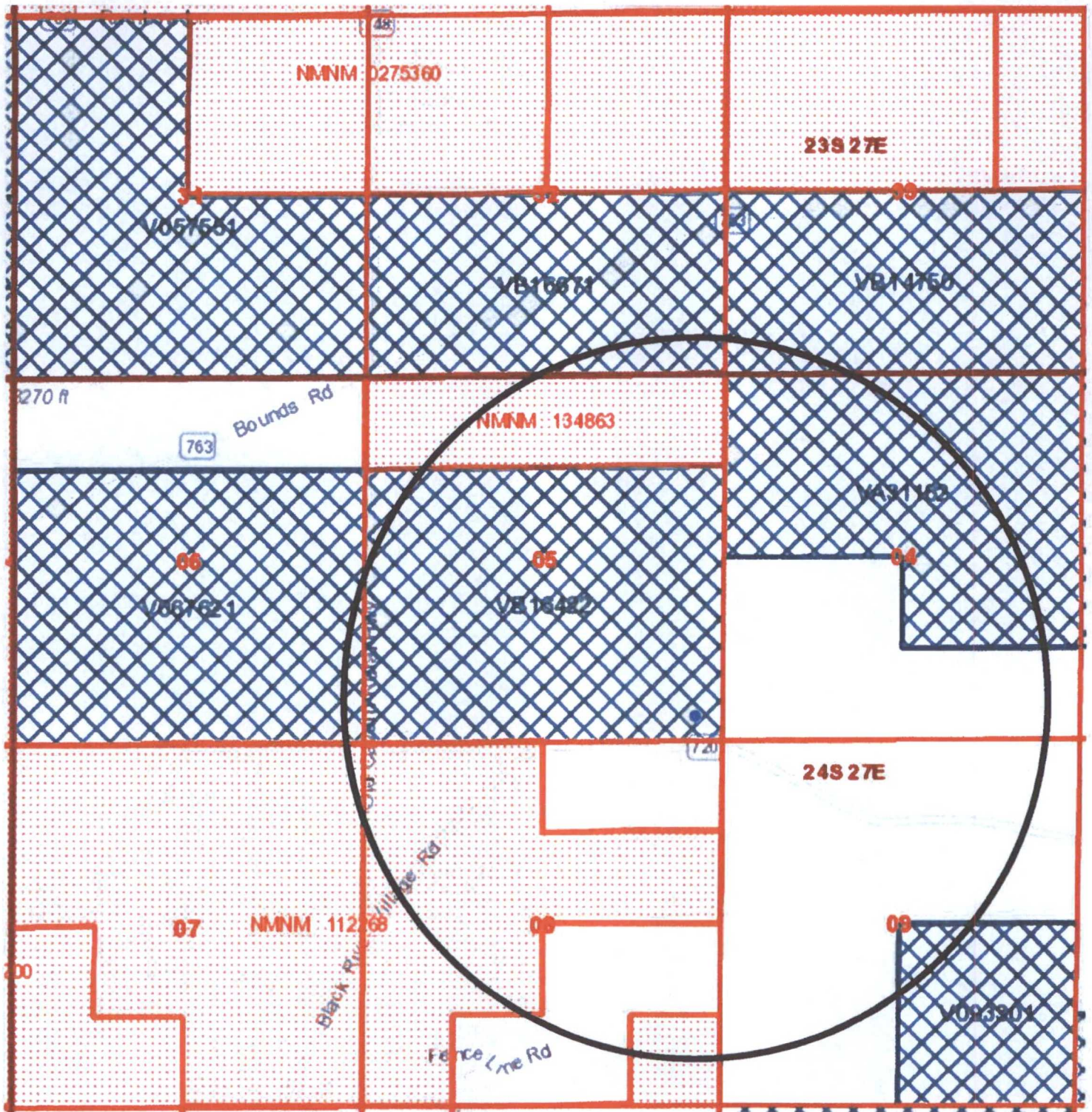
**WELLS – ONE MILE RADIUS**

**NO WELLS PENETRATE THE DEVONIAN FORMATION IN THE AOR**

**SECTION 5-T24S-R27E**

- ★ Kodiak SWD #1  
(Proposed Location)  
Delaware Energy, LLC





**LEASES – ONE MILE RADIUS**

**SECTION 32-T23S-R27E**

- STATE

**SECTION 33-T23S-R27E**

- STATE

**SECTION 4-T24S-R27E**

- FEE & STATE

**SECTION 5-T24S-R27E**

- FEE & FEDERAL

**SECTION 6-T24S-R27E**

- STATE

**SECTION 7-T24S-R27E**

- FEDERAL

**SECTION 8-T24S-R27E**

- FEE & FEDERAL

**SECTION 9-T24S-R27E**

- FEE & STATE

**SECTION 32-T23S-R27E**

- Mewbourne Oil Co.  
P.O. Box 7698  
Tyler, TX 75711

**SECTION 33-T23S-R27E**

- Devon Energy Production Company  
333 West Sheridan Ave.  
Oklahoma City, OK 73102-5015

**SECTION 4-T24S-R27E**

- COG Operating, LLC  
600 W. Illinois  
Midland, TX 79701

**SECTION 5-T24S-R27E**

- COG Operating, LLC  
600 W. Illinois  
Midland, TX 79701

**SECTION 6-T24S-R27E**

- COG Operating, LLC  
600 W. Illinois  
Midland, TX 79701

**SECTION 7-T24S-R27E**

- Devon Energy Production Company  
333 West Sheridan Ave.  
Oklahoma City, OK 73102

**SECTION 8-T24S-R27E**

- Devon Energy Production Company  
333 West Sheridan Ave.  
Oklahoma City, Ok 73102

**SECTION 9-T24S-R27E**

- COG Operating, LLC  
600 W. Illinois  
Midland, TX 79701

**Delaware Energy, L.L.C.**  
405 N. Marienfeld, Suite 250  
Midland, TX 79701  
Office: (432) 685-7005

May 9, 2018

**Surface Owner / Offset Operators**

Re: Notification of Application for Authorization to Inject  
Kodiak SWD #1 Well

Ladies and Gentlemen:

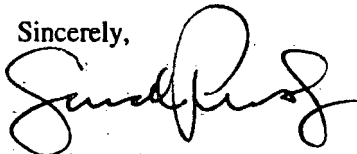
Delaware Energy, LLC is seeking administrative approval to utilize the proposed Kodiak SWD #1 as a commercial Salt Water Disposal well. As required by the New Mexico Oil Conservation Division Rules, we are notifying you of the following proposed salt water disposal well. This letter is a notice only. No action is required unless you have questions or objections.

<u>Well:</u>	Kodiak SWD #1
<u>Proposed Disposal Zone:</u>	Devonian Formation (from 13,095' - 14,095')
<u>Location:</u>	200' FSL & 250' FEL, UL P, Sec. 5, T24S, R27E, Eddy Co., NM
<u>Applicants Name:</u>	Delaware Energy, L.L.C.
<u>Applicants Address:</u>	405 N. Marienfeld, Suite 250, Midland, TX 79701

This application for water disposal well will be filed with the New Mexico Oil Conservation Division. If they determine the application complies with the applicable regulations, then it will be approved. The New Mexico Conservation Division address is 1220 South St. Francis Dr., Santa Fe, NM 87505. And their phone number is 505-476-3460.

Please call Mike McCurdy with Delaware Energy, LLC if you have any questions at 432-685-7005.

Sincerely,



Sarah Presley



**DISTRIBUTION LIST**

**Surface Owner:**

State of New Mexico  
301 Santa Fe Trail  
Santa Fe, NM 87501

**Offset Operators/Leasehold Owners:**

COG Production, LLC  
600 W. Illinois  
Midland, TX 79701

Mewbourne Oil Co.  
P.O. Box 7698  
Tyler, TX 75711

Devon Energy Production Company  
333 West Sheridan Ave.  
Oklahoma City, OK 73102-5015

State of New Mexico Oil Conservation Division  
District II  
811 S. First St.  
Artesia, NM 88210

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

CARLSBAD  
**CURRENT-ARGUS**

**AFFIDAVIT OF PUBLICATION**

**Ad No.  
0001246251**

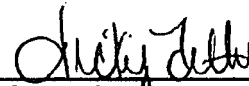
DELAWARE ENERGY, L.L.C.  
405 N. MARIENFELD  
SUITE 250  
MIDLAND TX 79701

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

05/09/18

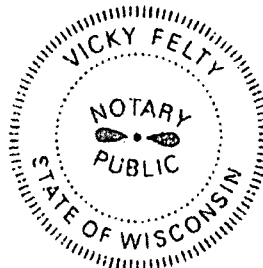
  
\_\_\_\_\_  
Legal Clerk

Subscribed and sworn before me this  
10th of May 2018.

  
\_\_\_\_\_  
State of WI, County of Brown  
NOTARY PUBLIC

9-19-21  
\_\_\_\_\_  
My Commission Expires

**LEGAL NOTICE**  
Delaware Energy, L.L.C., 405 N. Marienfeld St. Suite 250, Midland, TX 79701, has filed a form C-108 (Application for Authorization to Inject) with the Oil Conservation Division seeking administrative approval to drill the Kodiak SWD #1 as a Commercial Salt Water Disposal well. The Kodiak SWD #1 is located at 150' FSL and 175' FEL, Unit Letter P, Section 5, Township 24 South, Range 27 East, Eddy County, New Mexico. The well will dispose of water produced from oil and gas wells into the Devonian Formation from 13,650' to 14,650' at a maximum rate of 25,000 barrels of water per day at a maximum pressure of 2,730 psi. 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. Additional information can be obtained by contacting Delaware Energy, L.L.C., at (432) 685-7005.



Ad#:0001246251  
P O : 0001246251  
# of Affidavits :0.00

**Kodiak SWD #1**  
**API#: 30-015-**  
**Location: Sec. 5, T-24S, R-27E, UL P**

**Formation Tops**

Lamar	2,020'
Delaware Sand	2,070'
Bone Springs	5,480'
Wolfcamp	8,870'
Strawn	10,670'
Atoka	10,845'
Morrow	11,520'
Mississippian Lime	12,645'
Woodford Shale	12,995'
Devonian	13,095'



RUJO UU4U UUUU (7EB 7E7B

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Total Postage and Fees \$8.25

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ARTESIA, NM 88210

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Sent To  
STATE OF NEW MEXICO OIL CONSERVATION DIVISION  
Street and Apt. No., or PO Box No.  
1220 SOUTH ST. FRANCIS DR.  
City, State, ZIP+4®  
SANTA FE, NM 87505

PS Form 3800, April 2015 PSN 750-020-9007 See Reverse for Instructions

KODIAK 8900 #1

MIDLAND TX DOWNTOWN STA 79701

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PS Form 3800, April 2015 PSN 750-020-9007 See Reverse for Instructions

KODIAK 8900 #1

MIDLAND TX DOWNTOWN STA 79701

MAY 10 2018

Postmark Here

## Statement Regarding Seismicity and Well Location (Kodiak SWD #1)

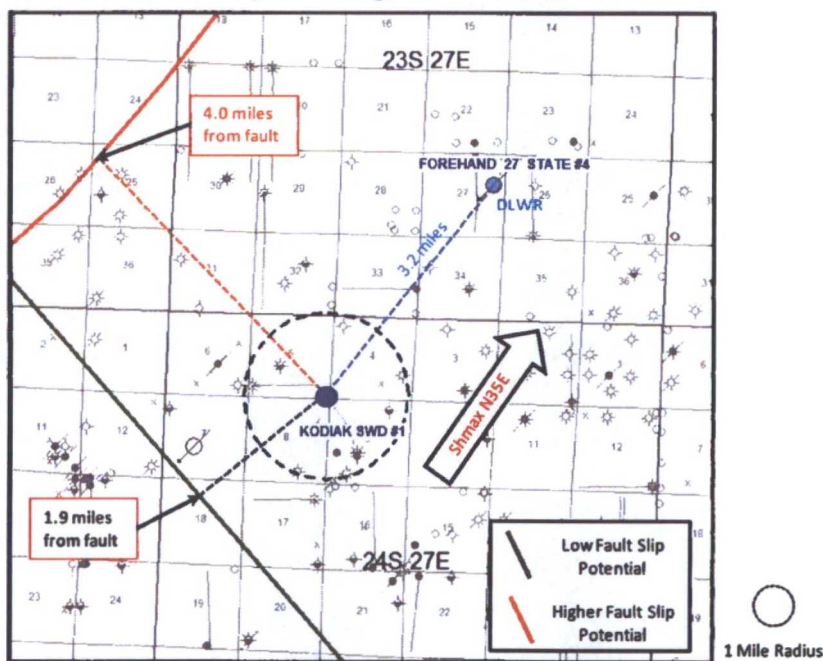
Historically, the area near the proposed Kodiak SWD #1 has seen some nearby seismic activity. There have been two seismic events (as per public data available on the USGS database) in the area. All events are over 6.0 miles from the proposed SWD location. The most recent event is 18.0 miles east, measuring 3.1, and the closest is 6.1 miles to the NE which measured 3.9 on November 24, 1978

Delaware Energy does not own 2D or 3D seismic data near the proposed SWD location therefore the fault interpretations are based on data obtained from the USGS New Mexico Faults Database (2005) and other published data. Based on these sources the closest faults would be approximately 4.0 miles northwest of the location and 1.9 miles southwest of the location. A recent technical paper written by Snee and Zoback, "State of Stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity", was published in the February 2018 edition of The Leading Edge. The study evaluates the strike-slip probability of known faults using FSP analysis. The study predicts that the NW-SE trending fault NE of the location (green) should have a very low probability of being critically stressed resulting in an induced seismicity event. The SW-NE trending fault NW and closest to the location (orange) would have a higher probability of being critically stressed, resulting in potential slip, due to the relationship of the strike of the fault and the regional  $S_{max}$  orientation (approx. N 35 deg E) in the area. The exact position of this fault relative to the proposed location, and depth of the target formation, is unknown. Risk of contact with this fault should be reduced due to the distance of the proposed SWD well from the fault (4.0 miles).

The proposed Kodiak SWD #1 location is located 3.2 miles away from the nearest active injector which is in the Delaware (see map below). The well should meet current OCD and Industry recommended practices.

Kevin J. Schepel  
Petrophysical Advisor  
[kevin.schepel@att.net](mailto:kevin.schepel@att.net)  
214-212-6540

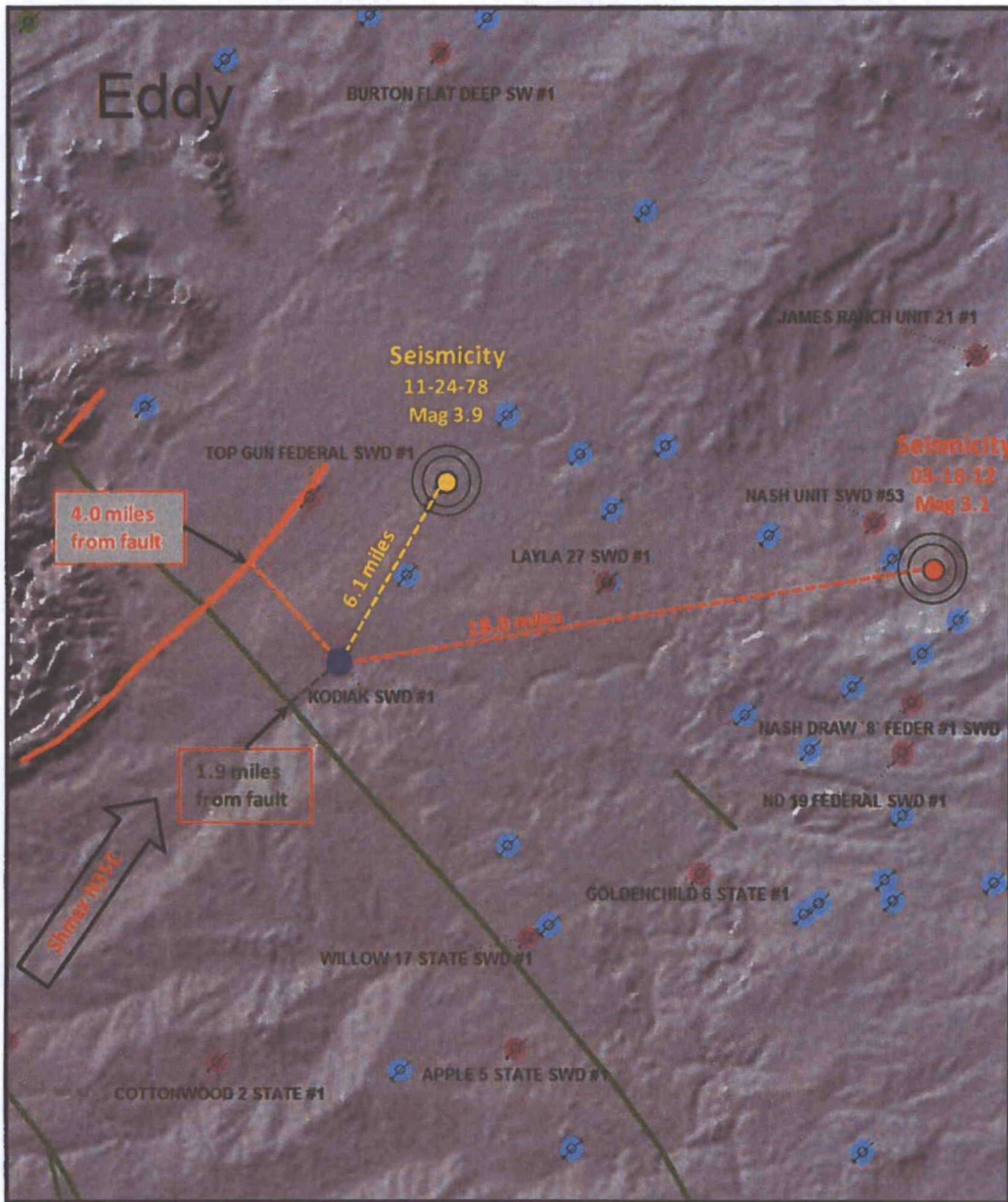
### Well Activity, Faulting, and Closest SWD



Modeled After Snee and Zoback (February 2018)



# Proximity to Historic Earthquake Activity and Faults



Modeled After Snee and Zoback (February 2018)



Data and Interpretation Disclosure - Although care has been taken to ensure that these data are up to date and accurate, this information and data is being providing as is. The data are what is believed to be the best public data available based on published documents, reports, and information available through the USGS. The user assumes all responsibility and risk for use of the data and interpretations. Users of the data agree not to misuse, add to without permission, or misrepresent the data provided in any way. In no event will the provider of this document be liable to any party for any direct, indirect, incidental, consequential, special or exemplary damages, or lost profit resulting from any use or misuse of this data. Additionally, provider is not liable for any inaccurate data. No person, entity, or user shall use the information in a manner that is in violation of any federal, state, or local law or regulation.