

Initial Application Part I

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

RECEIVED: <u>4-5-19</u> <u>4-17-19</u> (SD)	REVIEWER:	TYPE:	APP NO: <u>PSD1910641452</u>
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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: Delaware Energy, LLC **OGRID Number:** 371195
Well Name: Echo 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

- ☐ 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.

Sarah Presley

Print or Type Name

3/25/2019

Date

432-685-7005

Phone Number

s.presley@delawareenergy.com

e-mail Address

Signature

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: 3/25/2019
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.

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, LLCWELL NAME & NUMBER: Echo SWD # 1WELL LOCATION: 1,940' FSL & 200' FEL I 16 SECTION 26S TOWNSHIP 30E RANGEWELLBORE SCHEMATIC see attached wellbore sketchWELL CONSTRUCTION DATASurface Casing

Hole Size: 17.5" Casing Size: 13-3/8", 54.5#

Cemented with: 500 sx. or ft³

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: 2,500' sx. or ft³

Top of Cement: surface Method Determined: Plan to Circulate

Production Casing

Hole Size: 8-1/2" Casing Size: 7-5/8", 39#, P-110

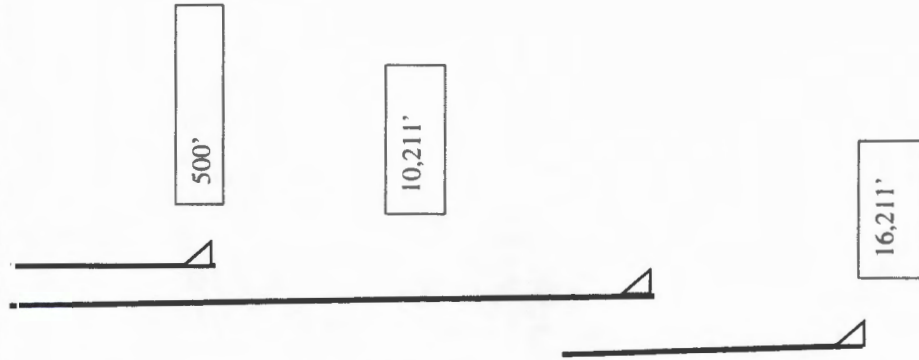
Cemented with: 650 sx. or ft³

Top of Cement: Top of Liner Method Determined: Plan to Circulate to liner top

Total Depth: 16,211'Injection Interval

16,211' feet to 17,211'

(OPEN HOLE)



INJECTION WELL DATA SHEETTubing Size: 5.5" BTC x 5.5" Flush Joint Lining Material: Fiber GlassType of Packer: Weatherford Arrow Set IXPacker Setting Depth: 16,161'Other Type of Tubing/Casing Seal (if applicable): noneAdditional Data

1. Is this a new well drilled for injection? XXXXX Yes No
 If no, for what purpose was the well originally drilled? N/A

2. Name of the Injection Formation: Devonian3. Name of Field or Pool (if applicable): SWD; Devonian4. 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 3,611' - 7,411'; Bone Springs 7,411' - 10,211'; Wolfcamp 10,211' - 13,371'; Strawn 13,371' - 13,561';
 Atoka 13,561' - 14,121'; Morrow 14,121' - 15,111'

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 1,500-2,500 PSI, Max 3,242 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 formation 16,211'-17,211'. Devonian is an impermeable organic Shale at the very top (16,086' 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 +/- 180', the water source is older alluvium (Quaternary). All the fresh water wells in the area have an average depth to water of 180ft per State Engineer.

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.

Attached is a water sample taken from 32.016180, -103.898859

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 Echo 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 3/25/2019

Title _____ Date _____

III. WELL DATA

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

Echo SWD #1, Sec. 16-T26S-R30E, 1,940' FSL & 200' FEL, UL I, 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"	10,211'	2500	12-1/4"	Surface	CIRC
7-5/8"	10,011'-16,211'	650	8-1/2"	Liner Top	CIRC & CBL

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

5-1/2" BTC X 5-1/2" Flush Joint, 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.

16,211' to 17,211' (Open hole)

(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 3,611' – 7,411'; Bone Springs 7,411' - 10,211'; Wolfcamp 10,211' - 13,371'; Strawn 13,371' – 13,561', Atoka 13,561' – 14,121'; Morrow 14,121' – 15,111'

Next Lower: None

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone (575) 393-8181 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone (575) 748-1283 Fax: (575) 748-0720

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone (505) 334-6176 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3490 Fax: (505) 476-3452

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 96101	Pool Name SWD; DEVONIAN
Property Code	Property Name ECHO SWD	Well Number 1
OGRID No. 371195	Operator Name DELAWARE ENERGY	Elevation 3111'

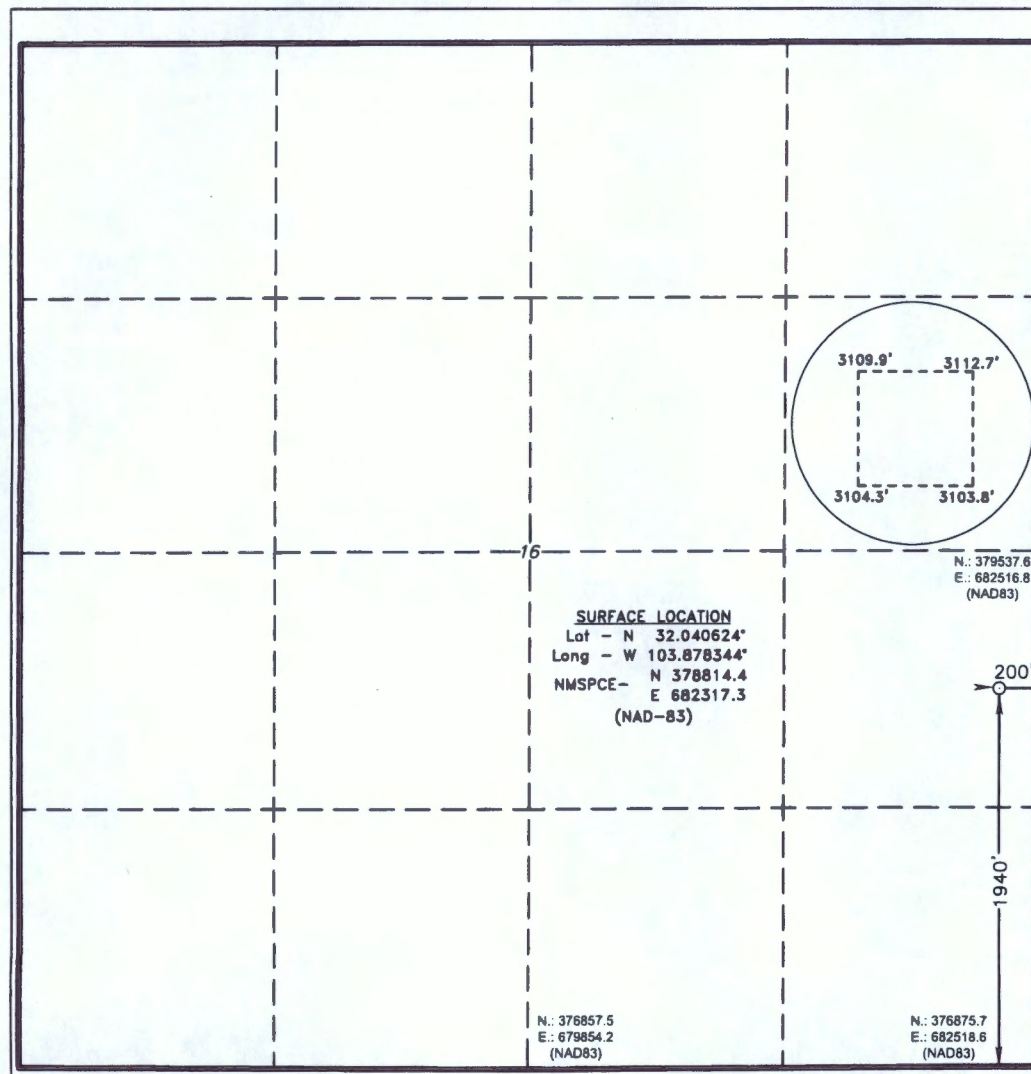
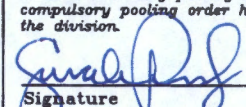
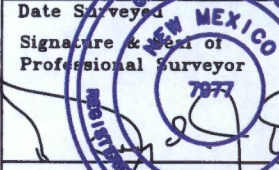
Surface Location

UL or lot No. I	Section 16	Township 26 S	Range 30 E	Lot Idn	Feet from the 1940	North/South line SOUTH	Feet from the 200	East/West line EAST	County EDDY
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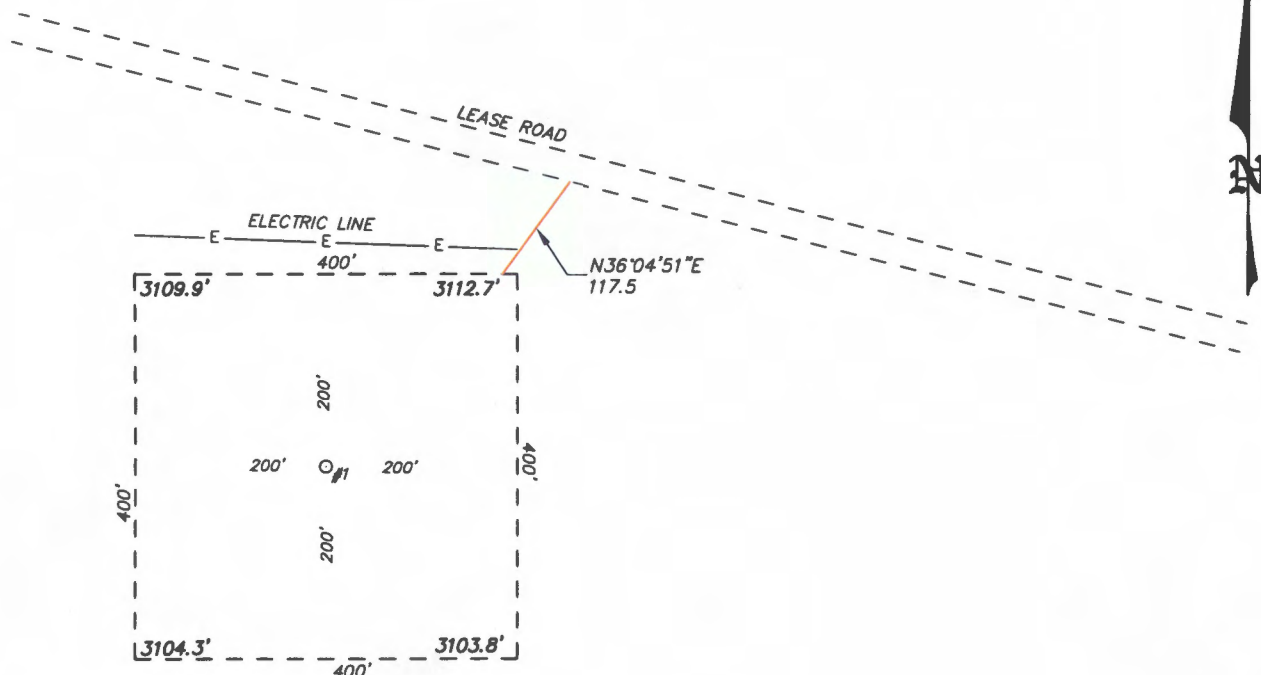
Bottom Hole Location If Different From Surface

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

	OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.  3.25.19 Signature Date Sarah Presley Printed Name s.presley@delawareenergy.com Email Address
	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. NOVEMBER 2018 Date Surveyed  Signature & Seal of Professional Surveyor Gary L. Jones 7977 Certificate No. Basin Services 0' 1000' 2000' 3000' 4000' SCALE: 1" = 2000' WO Num.: 34173

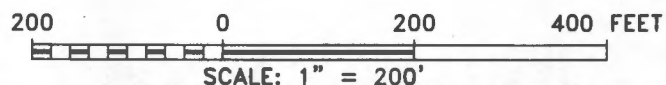
SECTION 36, TOWNSHIP 26 SOUTH, RANGE 30 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



ECHO SWD #1
ELEV. - 3111'

Lat - N 32.040624°
Long - W 103.878344°
NMSPCE- N 378814.4
E 682317.3
(NAD-83)

MALAGA, NM IS ± 17 MILES TO THE NORTHWEST OF LOCATION.



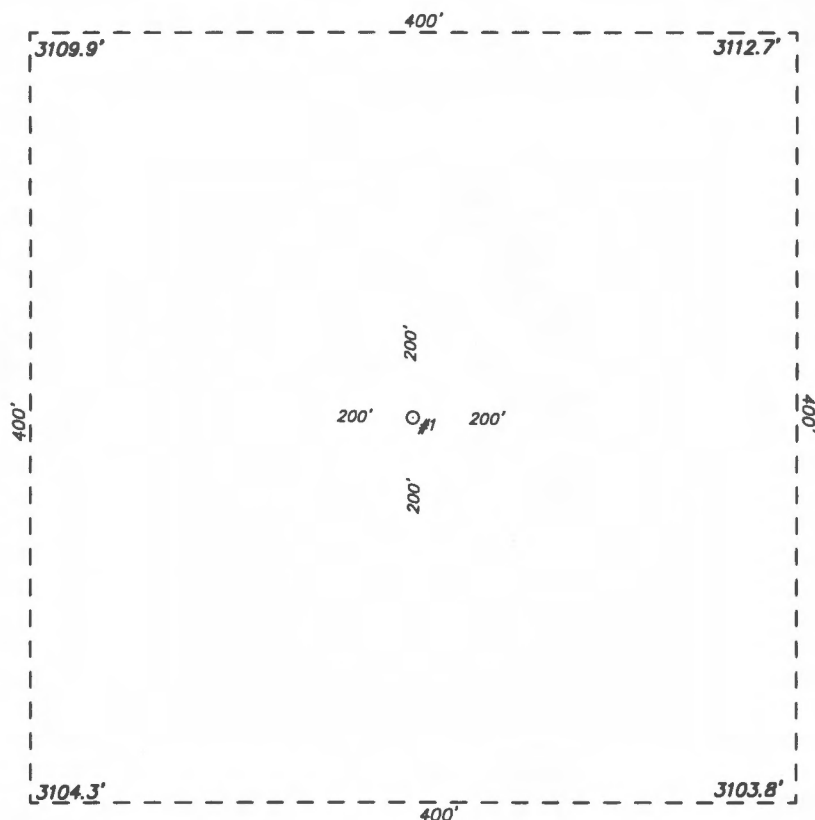
DELAWARE ENERGY

REF: ECHO SWD #1 / WELL PAD TOPO

THE ECHO SWD #1 LOCATED 1940' FROM
THE SOUTH LINE AND 200' FROM THE EAST LINE OF
SECTION 16, TOWNSHIP 26 SOUTH, RANGE 30 EAST.

N.M.P.M., EDDY COUNTY, NEW MEXICO.

**SECTION 36, TOWNSHIP 26 SOUTH, RANGE 30 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.**



DELAWARE ENERGY

REF: ECHO SWD #1 / WELL PAD TOPO

THE ECHO SWD #1 LOCATED 1940' FROM
THE SOUTH LINE AND 200' FROM THE EAST LINE OF
SECTION 16, TOWNSHIP 26 SOUTH, RANGE 30 EAST.

N.M.P.M., EDDY COUNTY, NEW MEXICO.



P.O. Box 1786 (575) 393-7316 - Office
1120 N. West County Rd. (575) 392-2206 - Fax
Hobbs, New Mexico 88241 basin-surveys.com

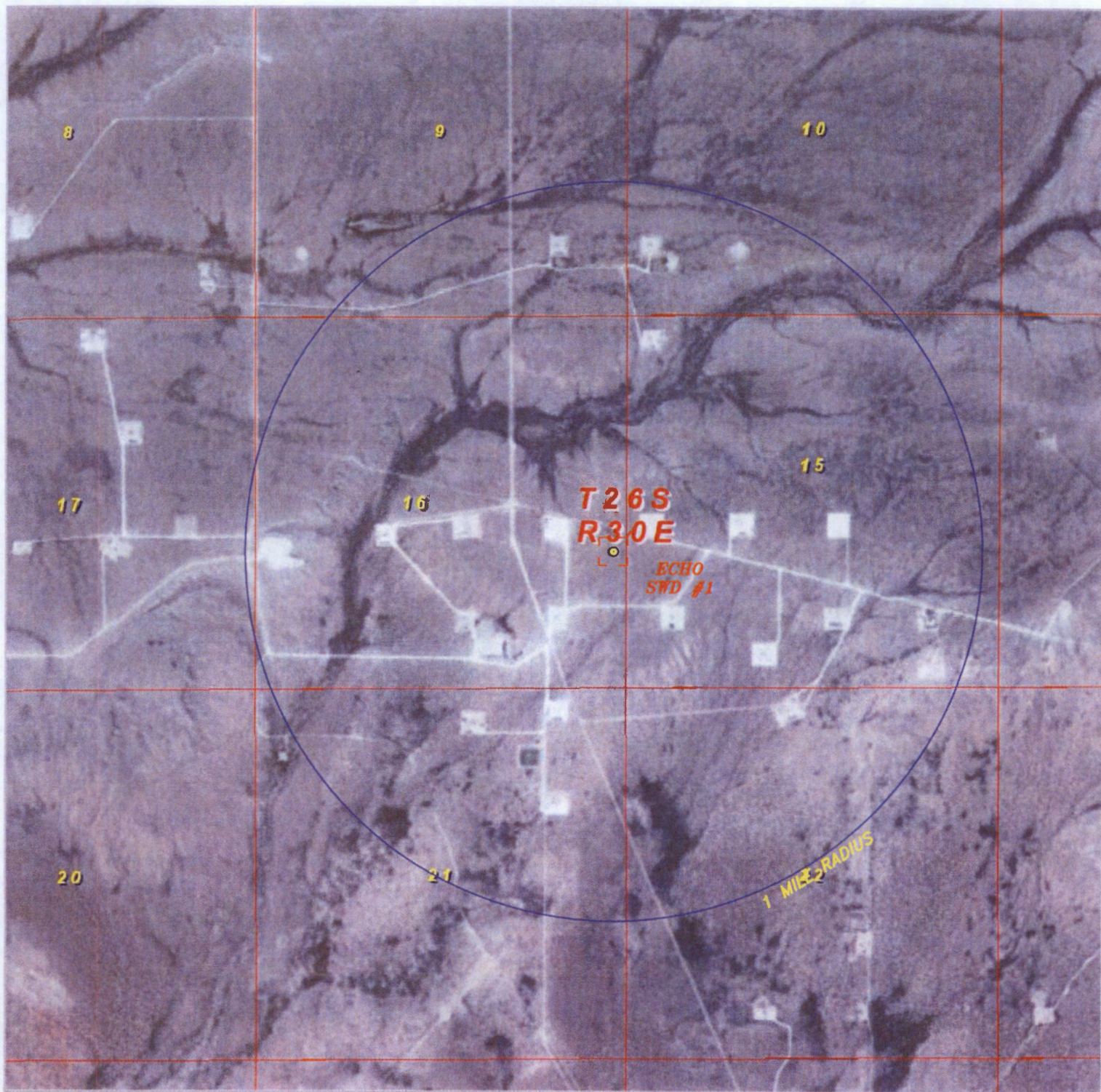
W.O. Number: 34173

Drawn By: J GOAD

Date: 11-12-2018

Survey Date: 11-7-2018

Sheet 1 of 1 Sheets



ECHO SWD #1

Located 1940' FSL and 200' FEL
 Section 16, Township 26 South, Range 30 East,
 N.M.P.M., Eddy County, New Mexico.

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surveys

focused on excellence
 in the oilfield

P.O. Box 1786
 1120 N. West County Rd.
 Hobbs, New Mexico 88241
 (575) 393-7316 - Office
 (575) 392-2206 - Fax
 basin-surveys.com

0' 1000' 2000' 3000' 4000'
 SCALE: 1" = 2000'

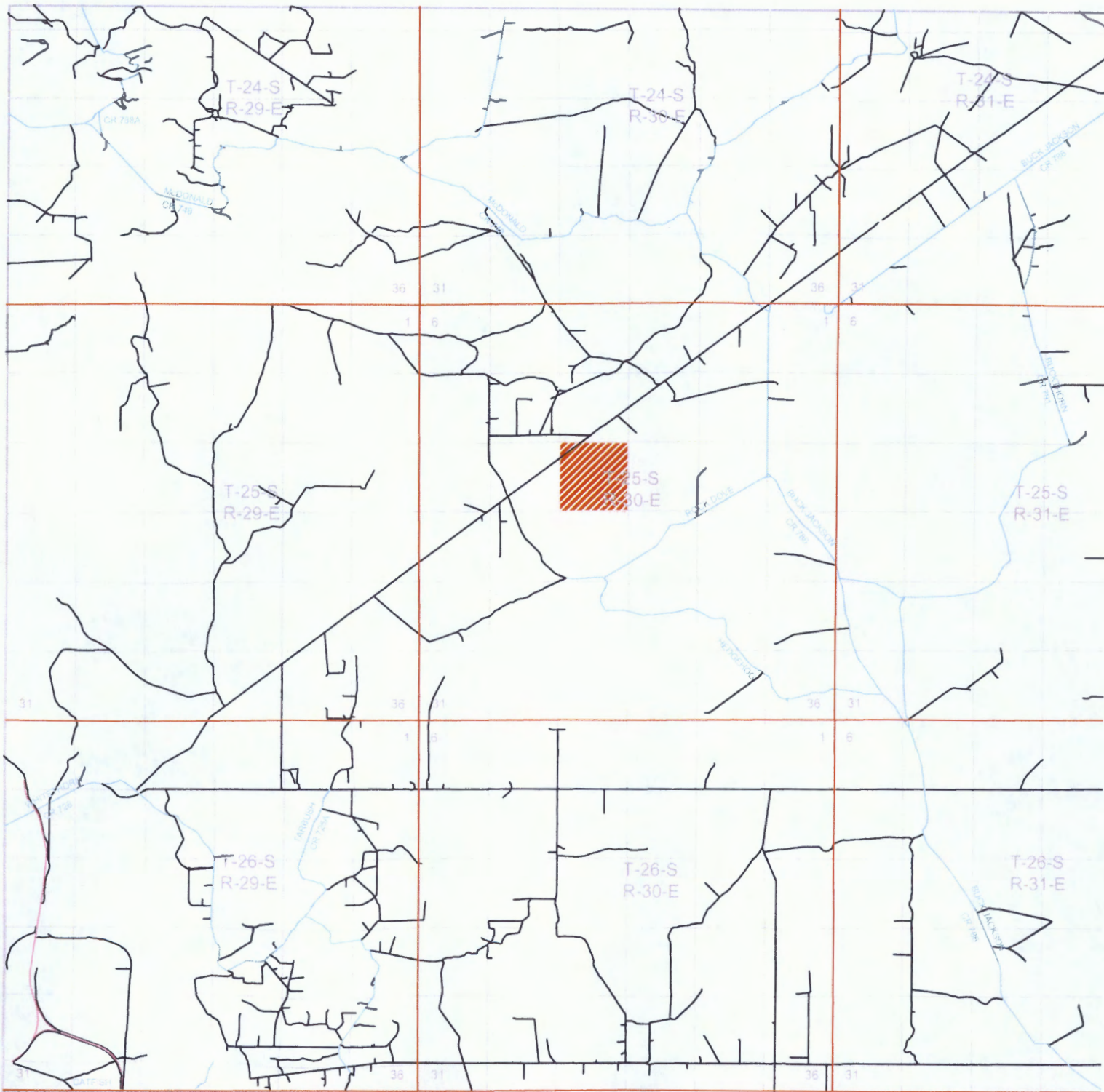
W.O. Number: JG 34173

Survey Date: 11-7-2018

YELLOW TINT - USA LAND
 BLUE TINT - STATE LAND
 NATURAL COLOR - FEE LAND



DELAWARE
ENERGY



ECHO SWD #1

Located 1940' FSL and 200' FEL
 Section 16, Township 26 South, Range 30 East,
 N.M.P.M., Eddy County, New Mexico.

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P.O. Box 1736
 1120 N. West County Rd.
 Hobbs, New Mexico 88241
 (575) 393-7316 - Office
 (575) 392-2206 - Fax
 basin-surveys.com

0' 1000' 2000' 3000' 4000'

SCALE: 1" = 2000'

W.O. Number: JG 34173

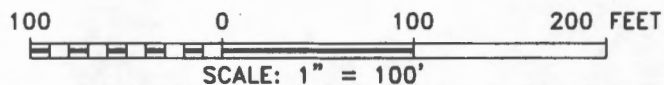
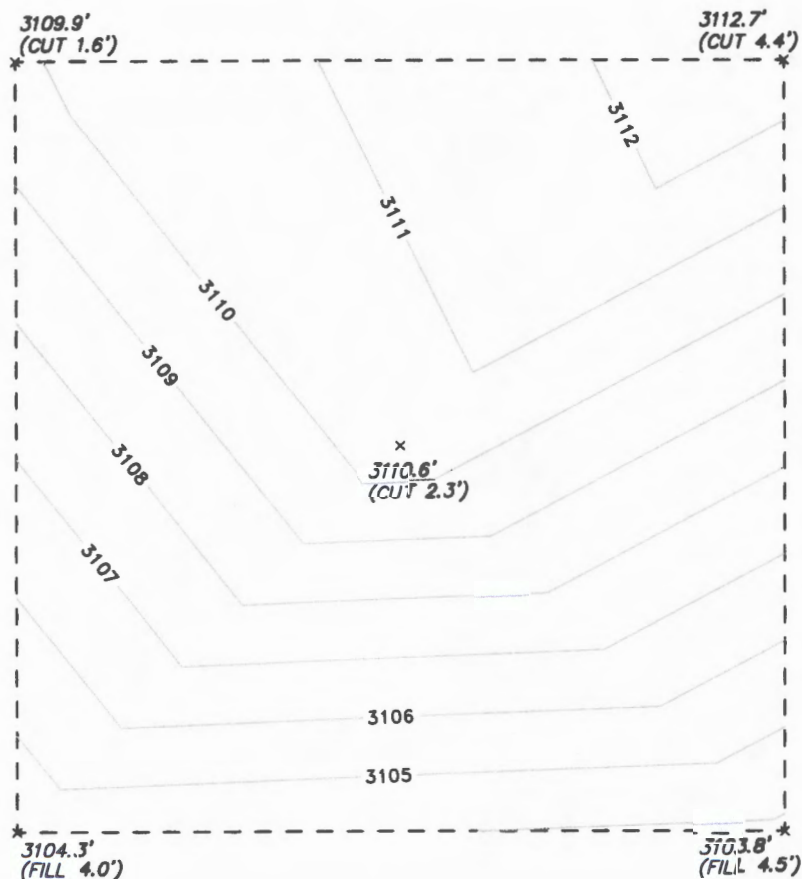
Survey Date: 11-7-2018

YELLOW TINT - USA LAND
 BLUE TINT - STATE LAND
 NATURAL COLOR - FEE LAND



DELAWARE
ENERGY

**SECTION 36, TOWNSHIP 26 SOUTH, RANGE 30 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.**



DEILWARE ENERGY

REF: ECHO SWD #1 / CUT & FILL

THE ECHO SWD #1 LOCATED 1940' FROM
THE SOUTH LINE AND 200' FROM THE EAST LINE OF
SECTION 16, TOWNSHIP 26 SOUTH, RANGE 30 EAST.

N.M.P.M., EDDY COUNTY, NEW MEXICO.



P.O. Box 1786 (575) 393-7318 - Office
1120 N. West County Rd. (575) 392-1206 - Fax
Hobbs, New Mexico 88241 basin surveys llc

W.O. Number: 34173

Drawn By: J GOAD

Date: 11-12-2018

Survey Date: 11-7-2018

Sheet 1 of 1 Sheets



P.O. Box 3394, Midland, Texas 79702
Phone (432) 684-4233 Fax (432) 684-4277

Water Analysis

Code 212478

Client Information

Sample Information

Delaware Energy		Lease/Well:	Echo/SWD
County:	Eddy	Sample Point:	Water Tank
		Date Sampled:	01/10/2019
Rep:	Lanston Cottrell	Date Reported:	01/18/2019

Results

Cations

Ion	Concentration(mg/L)
Barium (as Ba)	0
Calcium (as Ca)	486
Iron (as Fe)	0
Sodium (as Na)	803
Magnesium (as Mg)	195

Other Measurements

Measurement	Value
pH	6.98
SG	1.005
Turbidity	18
CO ₂	
Total Dissolved Solids	4703.000

Anions

Ion	Concentration(mg/L)
Chlorides (as Cl)	1520
Sulfate (as SO ₄)	1504
Carbonate (as CO ₃)	0
Bicarbonates (as HCO ₃)	195
Sulfide (as S ²⁻)	0

Scaling Indices

Temp(F)	CaCO ₃	CaSO ₄ *2H ₂ O	CaSO ₄	BaSO ₄
80	0.2024	0.0000	0.0000	-28.1704
120	0.5732	0.0000	0.0000	-28.3862
160	1.0220	0.0000	0.0000	-28.5214
200	1.4308	0.0000	0.0000	-28.5847
250	1.7981	0.0000	0.0000	-28.5430

Low = < 0.200, Moderate = 0.200-0.999, High = > 1.00

Comments

GPS coordinates: 32.016180 - 103.898859

Sec 22, T25S, R28E

North Permian Basin Region

P.O. Box 740

Sundown, TX 79372-0740

(806) 229-8121

Lab Team Leader - Shella 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					
Sampling Date:	03/10/11	Anions	mg/l	meq/l	Cations	mg/l	meq/l
Analysis Date:	03/18/11	Chloride:	109618.0	3091.92	Sodium:	70275.7	3058.82
Analyst:	SANDRA GOMEZ	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	18.04
TDS (mg/l or g/m3):	184911.1	Carbonate:	0.0	0.	Calcium:	844.0	42.12
Density (g/cm3, tonne/m3):	1.113	Sulfate:	747.0	15.55	Strontium:	220.0	5.02
Anion/Cation Ratio:	1	Phosphate:			Barium:	0.8	0.01
		Borate:			Iron:	6.5	0.23
		Silicate:			Potassium:	869.0	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 ₃		Gypsum CaSO ₄ ·2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.08	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.56	0.29	1.72
100	0	1.10	206.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.35
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.

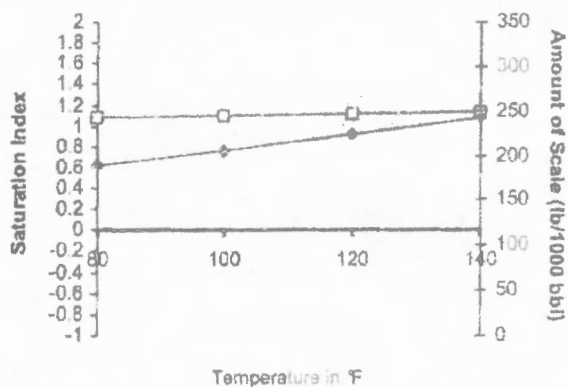
Note 3: The reported CO₂ pressure is actually the calculated CO₂ fugacity. It is usually nearly the same as the CO₂ partial pressure.

Scale Predictions from Baker Petrolite

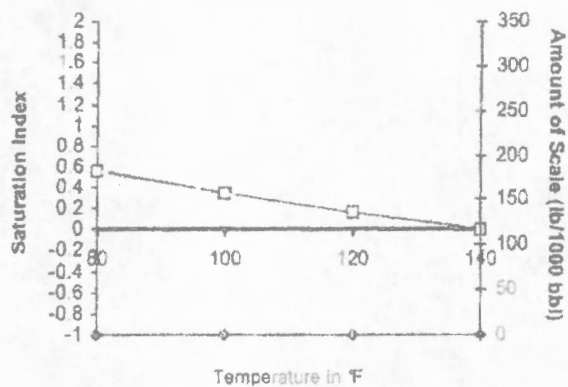
Analysis of Sample 534665 @ 75 F for

03/18/11

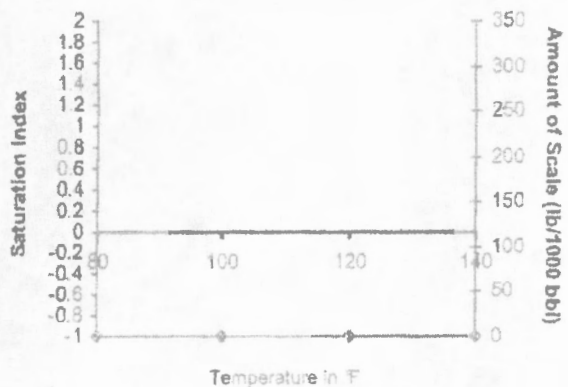
Calcite - CaCO_3



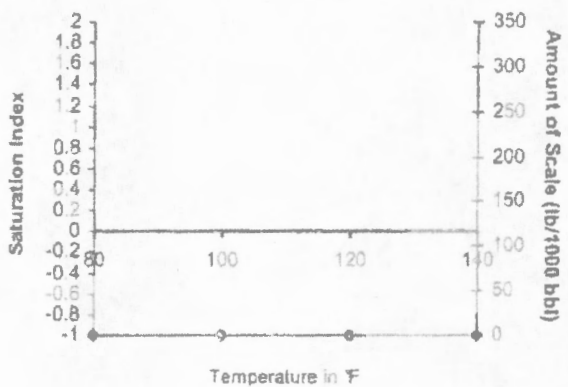
Barite - BaSO_4



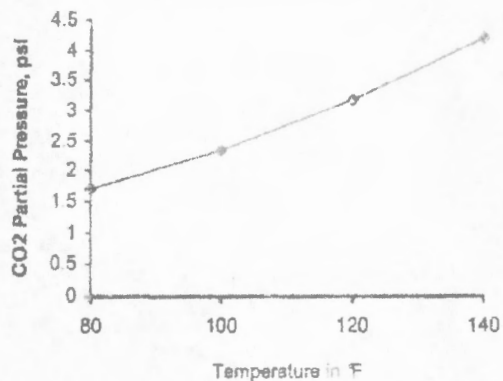
Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



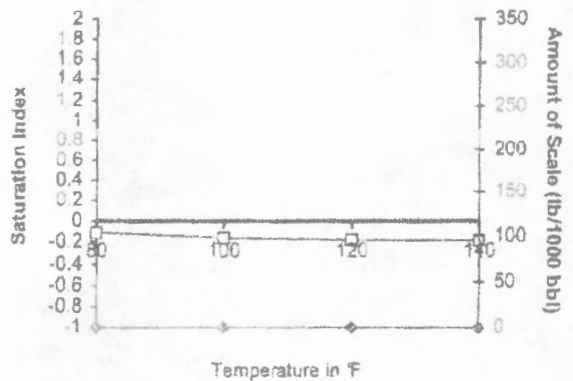
Anhydrite - CaSO_4



Carbon Dioxide Partial Pressure



Celestite - SrSO_4



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 #

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	156,031

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

Sec 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

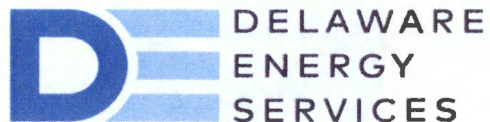
Date : MARCH 17, 2008
Date Sampled : MARCH 17, 2008
Analysis No. :

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 X 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:



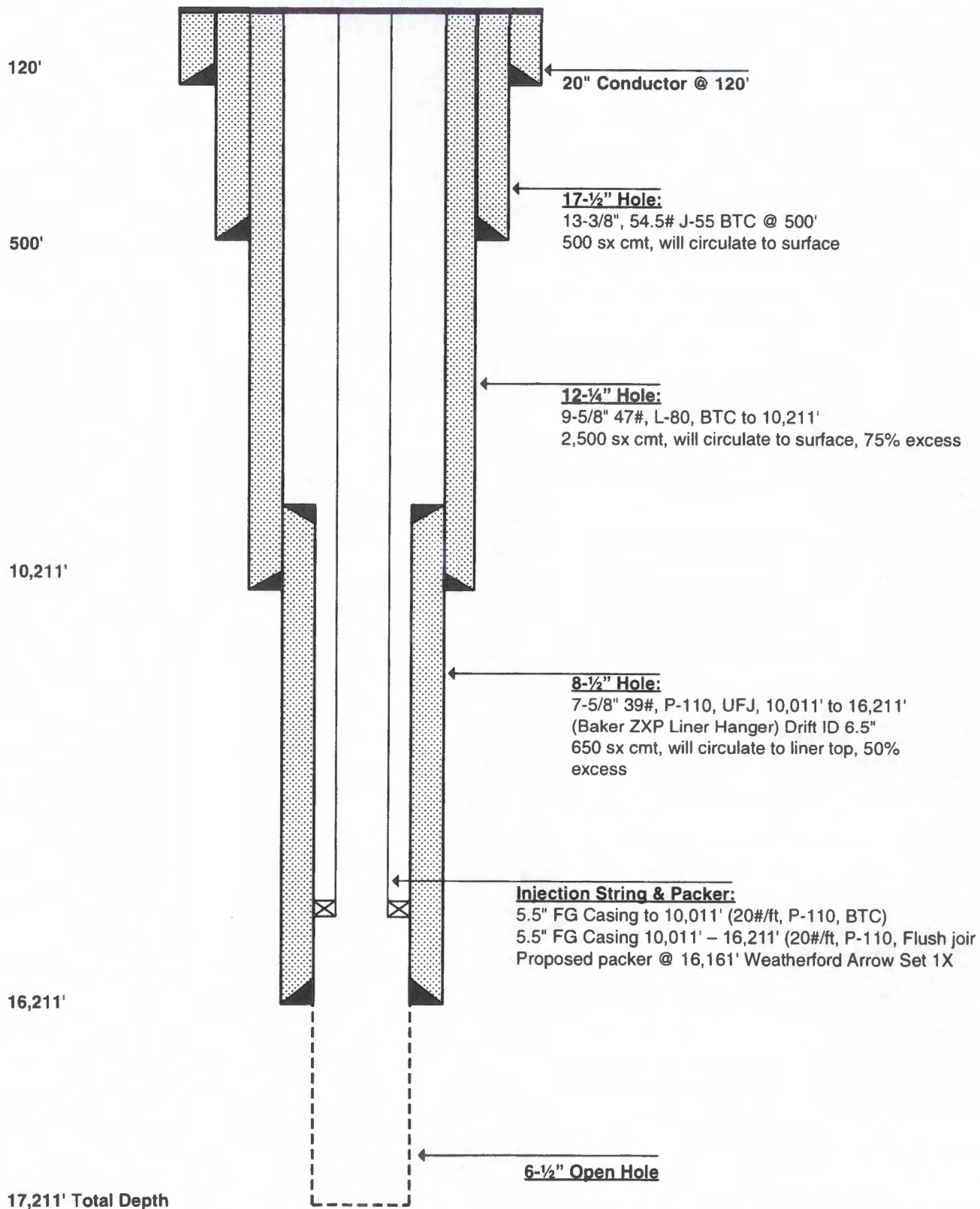
Echo SWD # 1

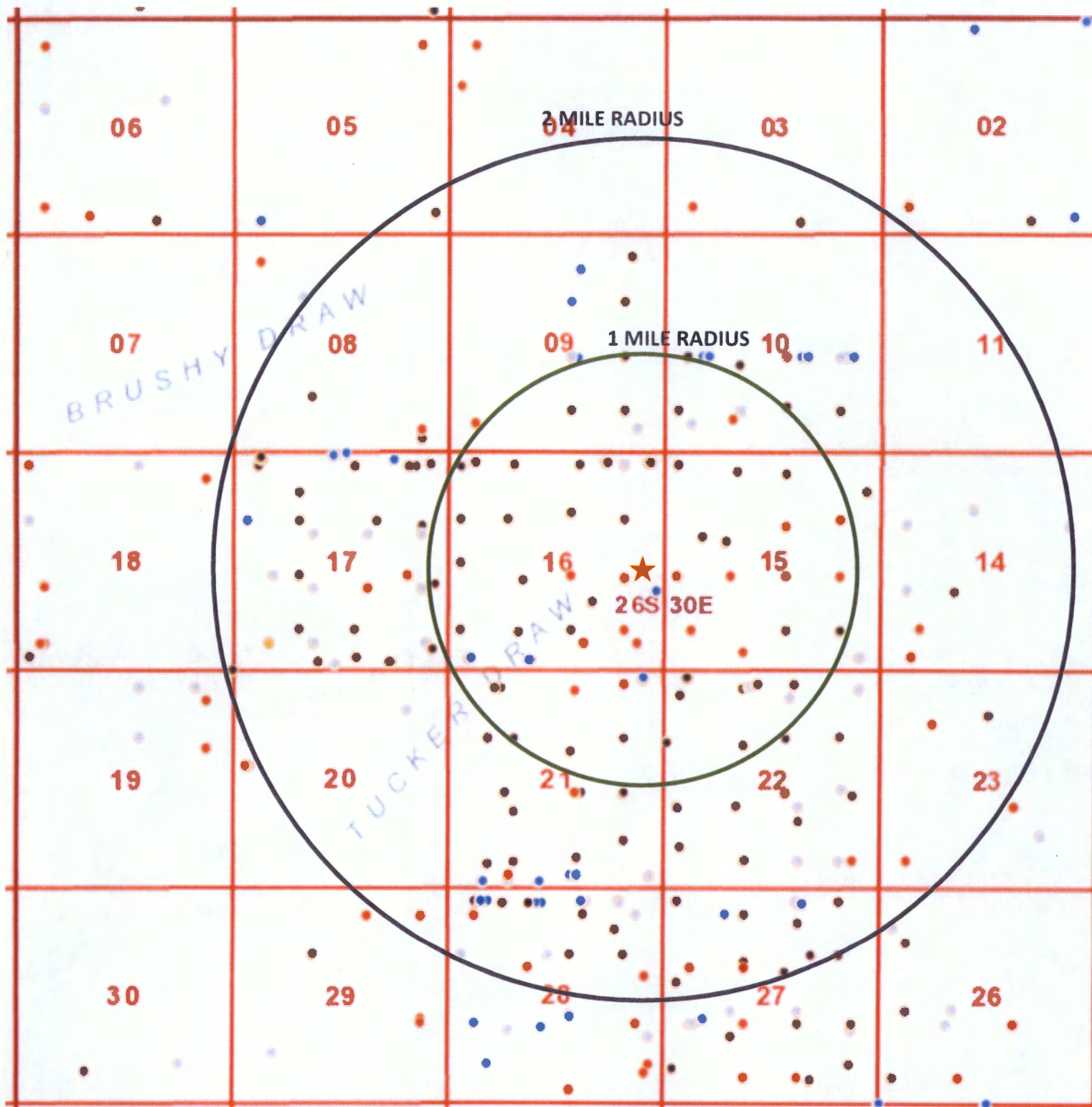
API # PENDING
1,940' FSL & 200' FEL, Sec. 16, T26S, R30E, UL "I"
EDDY COUNTY, NEW MEXICO

ELEVATION:

GL: 3,111'

PROPOSED WELLBORE





WELLS – ONE MILE RADIUS

NO WELLS PENETRATE THE DEVONIAN FORMATION IN THE AOR

SECTION 16-T26S-R30E



Echo SWD #1

(Proposed Location)

Delaware Energy, LLC

ECHO SWD #1

LEASES – ONE MILE RADIUS

Section 9, T26S-R30E

- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172
- **EOG Resources**
5509 Champions Drive
Midland, TX 79706

Section 10, T26S-R30E

- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

Section 17, T26S-R30E

- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

Section 16, T26S-R30E

- **EOG Resources**
5509 Champions Drive
Midland, TX 79706
- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

Section 15, T26S-R30E

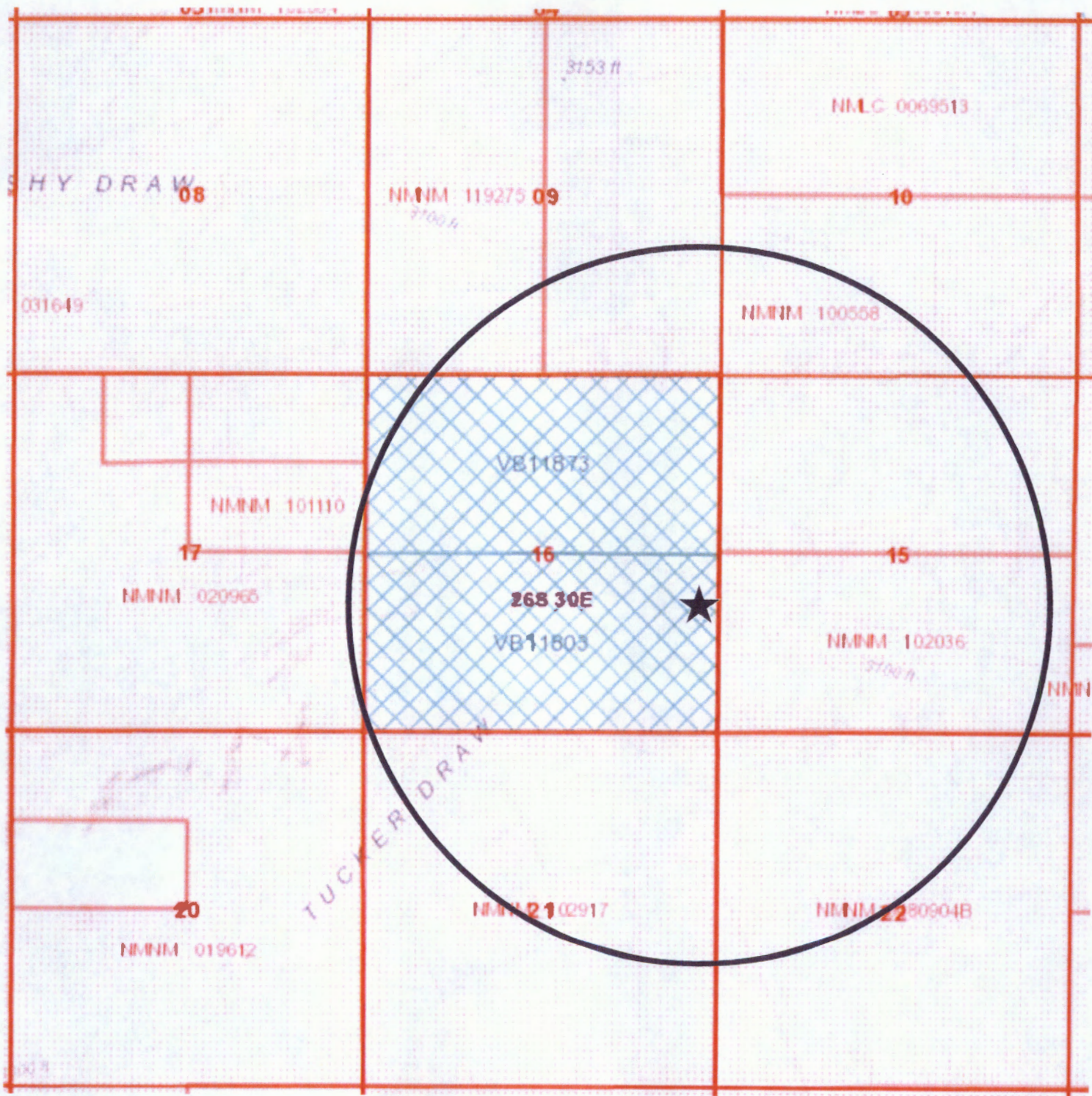
- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

Section 21, T26S-R30E

- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

Section 22, T26S-R30E

- **RKI Exploration & Production, LLC**
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172



LEASES – ONE MILE RADIUS

★ Echo SWD #1
Sec. 16-T26S-R30E
Eddy Co. NM

Echo SWD #1**Location: 1940' FSL & 200' FEL****Sec. 16, T-26-S, R-30-E****Estimated Pre-Drill Formation Tops**

Top of Salt	811'
Base Salt	3,361'
Lamar	3,561'
Delaware – Bell Canyon	3,611'
Cherry Canyon	4,486'
Brushy Canyon	5,661'
Bone Spring	7,411'
Wolfcamp	10,211'
Strawn	13,371'
Atoka	13,561'
Morrow	14,121'
Barnett	15,111'
Mississippian	15,861'
Woodford	16,086'
Devonian	16,211'

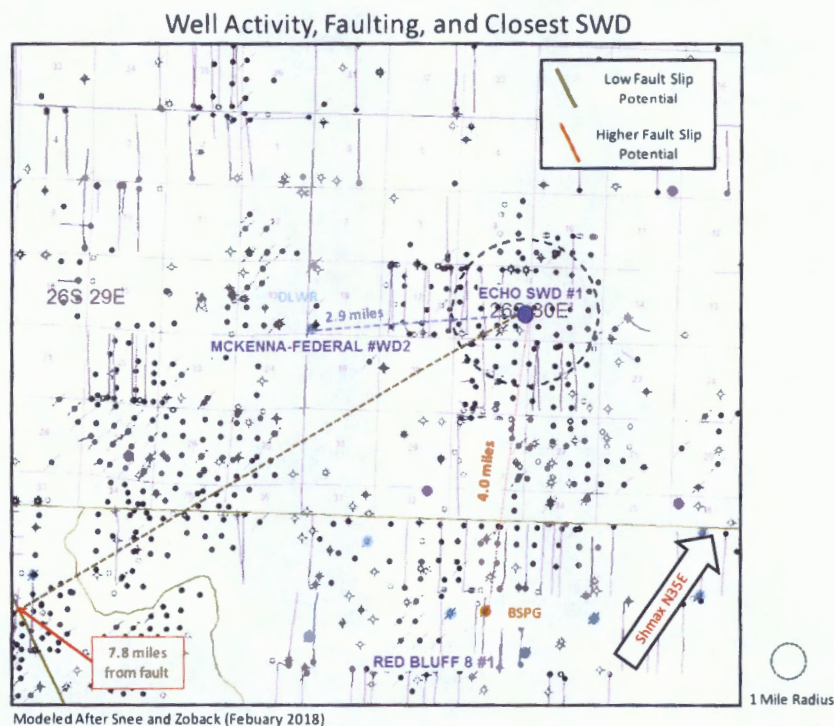
Statement Regarding Seismicity and Well Location (Echo SWD #1)

Historically, the area near the proposed Echo SWD #1 has not seen any major seismic activity. There has been one seismic event (as per public data available on the USGS database) in the area. This event is over 17 miles from the proposed SWD location. The event occurred on March 18, 2012 and is 17.1 miles north of the location, measuring 3.1.

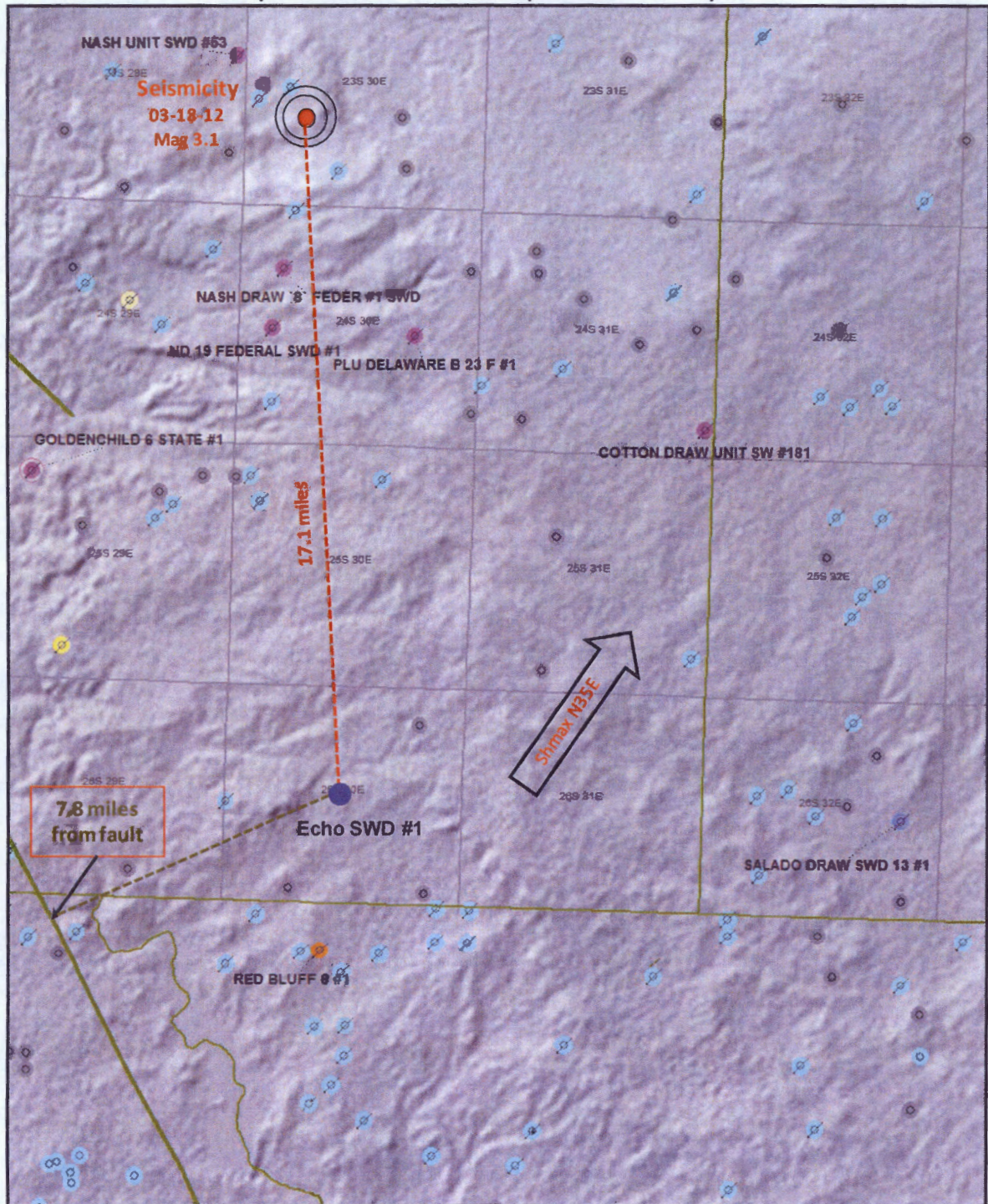
Delaware Energy does not own 2D or 3D seismic data near the proposed SWD location therefore the fault interpretations are based on data obtained from the USGS New Mexico Faults Database (2005) and other published data. Based on these sources the closest fault would be approximately 7.8 miles SW of the 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 SW of the location (green) should have a very low probability of being critically stressed resulting in an induced seismicity event, due to the strike of this fault and the regional Shmax orientation (approx. N 35 deg E) in the area. The exact position of this fault relative to the proposed location, and precise depth of the target formation, is unknown. Risk of any contact with this fault should be reduced due to the distance of the proposed SWD well from the fault (7.8 miles). There has been no nearby seismicity associated or documented with this fault found in the public domain.

The proposed Echo SWD #1 is located 4.0 miles away from the nearest active Bone Spring SWD well and 2.9 miles from the nearest active Delaware SWD well (see map below). The well should meet current OCD and Industry recommended practices.

Kevin J. Schepel
Petrophysical Advisor
kevin.schepel@att.net
214-212-6540



Proximity to Historic Earthquake Activity and Faults



Modeled After Snee and Zoback (February 2018)

● Devonian SWD ● Delaware SWD ● Morrow SWD ● Bonespring SWD ● Proposed Location ○ Permits



USGS Earthquake



Low Fault Slip Potential



Higher Fault Slip Potential

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.

CARLSBAD
CURRENT-ARGUS

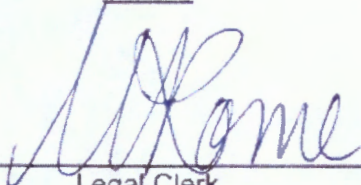
AFFIDAVIT OF PUBLICATION

Ad No.
0001272756

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

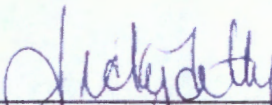
I, a legal clerk of the **Carlsbad Current-Argus**, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the State wherein legal notices and advertisements 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:

12/29/18



Legal Clerk

Subscribed and sworn before me this
31st of December 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 200, 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 Echo SWD #1 as a Commercial Salt Water Disposal well. The Echo SWD #1 is located at 1,940' FSL and 200' FEL, Unit Letter I, Section 16, Township 26 South, Range 30 East, Eddy County, New Mexico. The well will dispose of water produced from oil and gas wells into the Devonian Formation from 16,211' to 17,211' at a maximum rate of 25,000 barrels of water per day at a maximum pressure of 3,242 psi. Interested parties must file objections or requests for hearing with the Oil Conservations 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.

December 29, 2018



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☐ Adult Signature Restricted Delivery	\$0.00
Postage	\$1.75
Total Postage and Fees	\$8.05

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EOG Resources, Inc.
Street and Apt. No., or PO Box No.
3500 Champions Dr.
City, State, ZIP+4®
Midland, TX 79706

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



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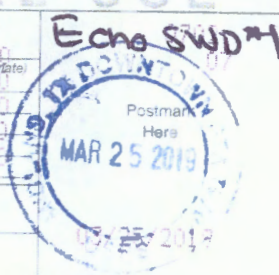
TULSA, OK 74172

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Certified Mail Fee	\$3.50
Extra Services & Fees (check box, add fee as appropriate)	\$2.80
☐ Return Receipt (hardcopy)	\$0.00
☐ Return Receipt (electronic)	\$0.00
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Total Postage and Fees	\$8.05

Sent To
RKI Exploration + Production, LLC
Street and Apt. No., or PO Box No.
3500 One Williams Center, Ste. 3500
City, State, ZIP+4®
Tulsa, OK 74172

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



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☐ Adult Signature Restricted Delivery	\$0.00
Postage	\$1.75
Total Postage and Fees	\$8.05

Sent To
NM State Land Office
Street and Apt. No., or PO Box No.
310 Old Santa Fe Trail
City, State, ZIP+4®
Santa Fe, NM 87501

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



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ARTESIA, NM 88210

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Certified Mail Fee	\$3.50
Extra Services & Fees (check box, add fee as appropriate)	\$2.80
☐ Return Receipt (hardcopy)	\$0.00
☐ Return Receipt (electronic)	\$0.00
☐ Certified Mail Restricted Delivery	\$0.00
☐ Adult Signature Required	\$0.00
☐ Adult Signature Restricted Delivery	\$0.00
Postage	\$1.75
Total Postage and Fees	\$8.05

Sent To
State of New Mexico OCD District II
Street and Apt. No., or PO Box No.
811 S. First Street
City, State, ZIP+4®
Artesia, NM 88210

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



Delaware Energy, LLC
Application for Injection/SWD
Echo SWD #1

UL I, Sec. 16, T-26-S, R-30-E, 1,940' FSL & 200' FEL, Eddy Co., NM

March 25, 2019

Contents:

1. Administrative Application Checklist
2. Form C-108: Application for Authority to Inject
3. Form C-108 Additional Questions Answered
4. Form C-102
5. Chemical Analysis of Bone Spring Formation Water Sample
6. Chemical Analysis of Wolfcamp Formation Water Sample
7. Chemical Analysis of Delaware Formation Water Sample
8. Planned wellbore diagram for the Echo SWD #1
9. ~~Tabular Data on All Wells of Public Record within the Area of Review which Penetrate the Proposed Injection Zone~~ (No applicable wells)
10. 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
11. Sample of Letter Sent with This Application Packet to Owner of Surface of the Land on Which the Well is to be Located and to each Leasehold Operator within One Mile of the Well Location
12. Formation Tops
13. Certified Mailers
14. Seismicity Assessment
15. Carlsbad Current-ARGUS Affidavit of publication

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

March 25, 2019

Surface Owner / Offset Operators

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

Ladies and Gentlemen:

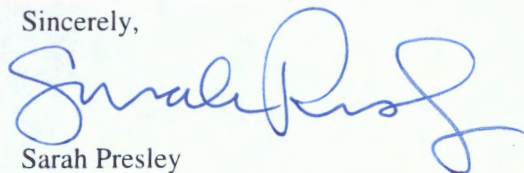
Delaware Energy, LLC is seeking administrative approval to utilize the proposed Echo SWD #1 as a commercial Salt Water Disposal well. As required by the New Mexico Oil Conservation Division Rules, we are notifying you of the following proposed salt water disposal well. This letter is a notice only. No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

<u>Well:</u>	Echo SWD #1
<u>Proposed Disposal Zone:</u>	Devonian Formation (from 16,211' - 17,211')
<u>Location:</u>	1,940' FSL & 200' FEL, UL I, Sec. 16, T26S, R30E, Eddy Co., NM
<u>Applicants Name:</u>	Delaware Energy, L.L.C.
<u>Applicants Address:</u>	405 N. Marienfeld, Suite 200, 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 Sarah Presley with Delaware Energy, LLC if you have any questions at 432-685-7005.

Sincerely,



Sarah Presley

DISTRIBUTION LIST

Surface Owner:

State of New Mexico
310 Old Santa Fe Trail
Santa Fe NM 87501

Offset Operators/Leasehold Owners:

EOG Resources, Inc
5509 Champions Dr.
Midland, TX 79706

RKI Exploration & Production, LLC
3500 One Williams Center, Ste. 3500
Tulsa, OK 74172

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

Dawson, Scott, EMNRD

From: Dawson, Scott, EMNRD
Sent: Tuesday, April 16, 2019 11:46 AM
To: s.presley@delawareenergy.com
Subject: SWD Application - Echo SWD Well No. 1

Hi Sarah,

Your application for the ECHO SWD Well No. 1 is currently suspended due to no notification to the BLM.

Please send in conformation of notification to the BLM.

Thanks,

Scott Dawson
Certified Petroleum Geologist
Petroleum Specialist Advanced

New Mexico Oil Conservation Division

<http://www.emnrd.state.nm.us/ocd/>

1220 South St. Francis Drive

Santa Fe, NM 87505

Phone: (505) 476-3480

Fax (505) 476-3462

scott.dawson@state.nm.us



Dawson, Scott, EMNRD

From: Sarah Presley <s.presley@delawareenergy.com>
Sent: Monday, April 29, 2019 2:53 PM
To: Dawson, Scott, EMNRD
Subject: [EXT] RE: SWD Application - Echo SWD Well No. 1
Attachments: echo swd.pdf

Thanks,

SP

Regards,

Sarah Presley | Operations Manager
405 N. Marienfeld, Suite 200
Midland, TX 79701
O: (432) 685-7005
C: (432) 269-3789



From: Dawson, Scott, EMNRD <Scott.Dawson@state.nm.us>
Sent: Tuesday, April 16, 2019 12:46 PM
To: Sarah Presley <s.presley@delawareenergy.com>
Subject: SWD Application - Echo SWD Well No. 1

Hi Sarah,

Your application for the ECHO SWD Well No. 1 is currently suspended due to no notification to the BLM.

Please send in conformation of notification to the BLM.

Thanks,

Scott Dawson
Certified Petroleum Geologist
Petroleum Specialist Advanced
New Mexico Oil Conservation Division
<http://www.emnrd.state.nm.us/ocd/>
1220 South St. Francis Drive
Santa Fe, NM 87505
Phone: (505) 476-3480
Fax (505) 476-3462
scott.dawson@state.nm.us

