

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

**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
FOR APPROVAL OF SALT WATER
DISPOSAL WELL IN LEA COUNTY,
NEW MEXICO**

CASE NO. 20985

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

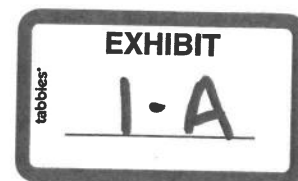
**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN LEA
COUNTY, NEW MEXICO.**

CASE NO. _____

APPLICATION

NGL Water Solutions Permian, LLC ("NGL"), OGRID No. 372338, through its undersigned attorneys, hereby makes this application to the Oil Conservation Division pursuant to the provisions of N.M. Stat. Ann. § 70-2-12, for an order approving drilling of a salt water disposal well in Lea County, New Mexico. In support of this application, NGL states as follows:

- (1) NGL proposes to drill the Striker 4 SWD #1 well at a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico for the purpose of operating a salt water disposal well.
- (2) NGL seeks authority to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'.
- (3) NGL intends to use 5.5 inch tubing and NGL requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day.
- (4) NGL anticipates using an average pressure of 815 psi for this well, and it requests that a maximum pressure of 1,087 psi be approved for the well.
- (5) A proposed C-108 for the subject well is attached hereto in Attachment A.
- (6) The granting of this application will avoid the drilling of unnecessary wells, will prevent waste, and will protect correlative rights.



WHEREFORE, NGL requests that this application be set for hearing before an Examiner of the Oil Conservation Division on January 9, 2020; and that after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

MODRALL, SPERLING, ROEHL, HARRIS
& SISK, P.A.

By: Deana H. Bennett
Deana Bennett
Post Office Box 2168
500 Fourth Street NW, Suite 1000
Albuquerque, New Mexico 87103-2168
Telephone: 505.848.1800
Attorneys for Applicant

CASE NO. _____: Application of NGL Water Solutions Permian, LLC for approval of salt water disposal well in Lea County, New Mexico. Applicant seeks an order approving the Striker 4 SWD #1 well, with a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico. Applicant requests authorization to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'. Applicant requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day. Said location is approximately 15 miles west of Jal, New Mexico.

Revised March 23, 2017

RECEIVED	REVIEWER	TYPE	APP NO
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NEW MEXICO OIL CONSERVATION DIVISION
- Geological & Engineering Bureau -
1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THE 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: INEL WATER SOLUTIONS PERMIAN LLC OGRID Number: 12548
Well Name: STRUKER 4 SWD #1 APl: SWDS-TBD
Pool: SWD, DELAWARE Pool Code: 9405

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 (REGULATORY UNIT) ☐ SD
- B. Check one only for (I) or (II)
- (I) Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ CLM
- (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 SLD
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 OGD 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

CHAS REYNOLD

Print or Type Name

Date

9/25/2019

312-466-1764

Phone Number

Signature



CHAS@LONQUEST.COM
e-mail Address

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery _____ Pressure Maintenance X Disposal _____ Storage _____
Application qualifies for administrative approval? X Yes _____ No _____
- II. OPERATOR: NGL WATER SOLUTIONS PERMIAN, LLC
ADDRESS: 1505 W WALL ST # STE 306 # MIDLAND, TEXAS 79701
CONTACT PARTY: SARAH JORDAN PHONE: (432) 665-1001 x1895
- 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 _____ No X
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 data.
- 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 re-injected produced water; and,
 5. If injection is for disposal purposes into a zone not productive of oil or gas as 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.).
- *VII. 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: Christopher W. Long TITLE: Consulting Engineer
SIGNATURE: _____ DATE: 9/25/2017
E-MAIL ADDRESS: chris@longust.co
- * If the information required under Sections VI, VII, 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.

Side 2

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: NGL WATER SOLUTIONS PERMIAN, LLCWELL NAME & NUMBER: STRIKER 4 SWD #1WELL LOCATION: 850' FSL & 174' FWL M UNIT LETTER 24 SECTION 24S TOWNSHIP 34E RANGEWELLBORE SCHEMATICWELL CONSTRUCTION DATASurface Casing

Hole Size: 17.500" Casing Size: 13.375"
Cemented with: 907 sx. or ft³
Top of Cement: surface Method Determined: circulation

Production Casing

Hole Size: 12.250" Casing Size: 9.625"
Cemented with: 1,886 sx. or ft³
Top of Cement: surface Method Determined: circulation

Injection Interval5,437 feet to 7,200 feet

(Perforated)

INJECTION WELL DATA SHEET

Tubing Size: 5.500" 17 lb/ft L-80 LTC from 0' - 5,390'

Lining Material: NOV TK805 IPC & KC CBR

Type of Packer: Arrowset I-XS 10k mechanical Nickel coated injection packer

Packer Setting Depth: 5,390'

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

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

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

2. Name of the Injection Formation: Bell and Cherry Canyon

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

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. No, new drill.

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

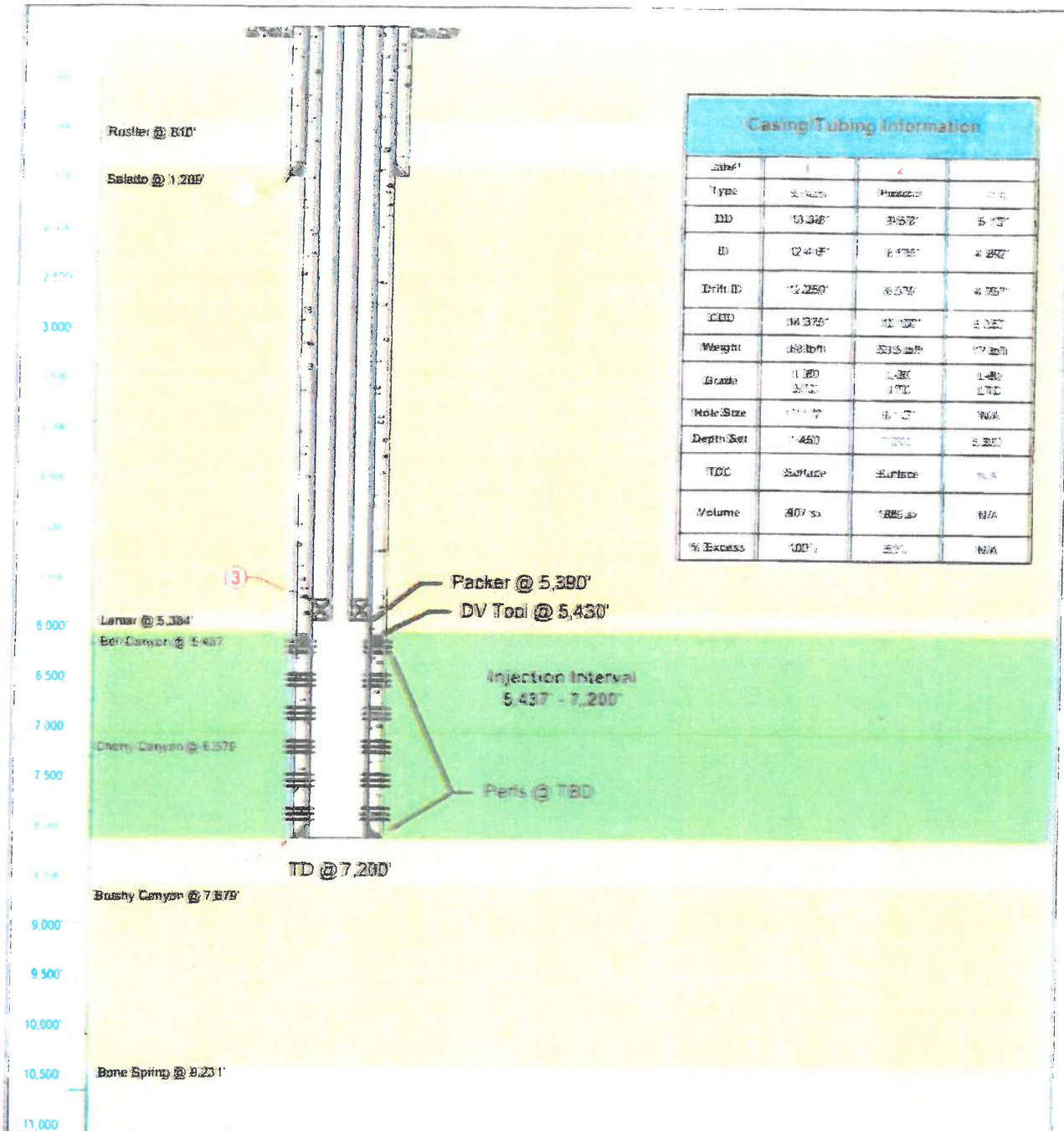
Bone Spring: 9,231'

Wolfcamp: 12,280'

Strawn: 12,542'

Atoka: 12,617'

Morrow: 12,796'



Casing/Tubing Information			
Casing	1	4	5
Type	Surface	Production	Production
OD	13.375"	9.875"	5.513"
ID	12.413"	8.937"	4.952"
Drift ID	12.250"	8.875"	4.757"
ICOD	14.375"	11.187"	6.312"
Weight	68.00 lb/ft	50.15 lb/ft	27.20 lb/ft
Grade	L-80	L-80	L-80
	API	API	API
Hole Size	11.75"	8.125"	N/A
Depth Set	1,450'	7,200'	8,250'
TDC	Surface	Surface	N/A
Volume	807 cu	1,885 cu	N/A
% Excess	100%	25%	N/A

CONQUEST & CO. INC. PETROLEUM ENGINEERS ENERGY SERVICES	NSL Water Solutions Partner LLC		Striker 4 - SWD No. 1	
	Country: USA	State/Province: New Mexico	County/Parish: Eddy	
	Location:	Site:	Survey: STR 24 245 24E	
	API No:	Field:	Well Type/Status: SWD	
Texas License F 39147	State ID No:	Project No: 14771	Date: 03/26/2012	
2012 A - (Company) 3-10-12 11:27 Austin Texas 78738 Tel: 512 732 2800 Fax: 512 732 5815	Drawn: JAW	Reviewed: CW	Approved: CW	
	Rev No: 1	Notes:		

NGL Water Solutions Permian, LLC

Striker 4 SWD No. 1

FORM C-108 Supplemental Information

III. Well Data

A Wellbore Information

1.

Well information	
Lease Name	Striker 4 SWD
Well No.	1
County	Lea
Location	S-24 T-24S R-34E
Footage Location	850' FSL & 174' FWL

2.

a. Wellbore Description

Casing Information		
Type	Surface	Production
OD	13.375"	9.625"
WT	0.480"	0.545"
ID	12.415"	8.535"
Drift ID	12.259"	8.379"
COD	14.375"	10.100"
Weight	68 lb/ft	53.5 lb/ft
Grade	L-80	L-80
Hole Size	17.5"	12.25"
Depth Set	1,450'	7,200'

b. Cementing Program

Cement Information		
Casing String	Surface	Production
Cement Type	C	C
Cement Yield	2.22 ft3/sk	1.69 ft3/sk
Total Cement Volume	907 sks	1886 sks
Cement Excess	100%	50%
TOC	Surface	Surface
Method	Circulate to Surface	Circulate to Surface

3. Tubing Description

Tubing Information	
OD	5.500"
WT	0.304"
ID	4.98"
Drift ID	3.875"
COD	5.000"
Weight	11.6 lb/ft
Grade	L-80
Depth Set	0'-5,390'

Lining Material: NOV TK805 IPC & KC CBR

4. Packer Description

Arrowset 1-XS 10k mechanical nickel-coated injection packer

B. Completion Information

1. Injection Formation: Bell and Cherry Canyon
2. Gross Injection Interval: 5,437' – 7,200'

Completion Type: Perforated

3. Drilled for injection.
4. See the attached wellbore schematic.
5. Oil and Gas Bearing Zones within area of well:

Formation	Depth
Bone Spring	9,231'
Wolfcamp	12,280'
Strawn	12,542'
Atoka	12,617'
Morrow	12,796'

VI. Area of Review

All wells that penetrate the proposed injection interval within the ½-Mile AOR are horizontally completed in deeper formations and have been cemented across the proposed injection interval.

VII. Proposed Operation Data

1. Proposed Daily Rate of Fluids to be Injection:

Average Volume: 10,000 BPD
Maximum Volume: 20,000 BPD

2. Closed System

3. Anticipated Injection Pressure:

Average Injection Pressure: 815 PSI (surface pressure)
Maximum Injection Pressure: 1,087 PSI (surface pressure)

4. The injection fluid is to be locally produced water. Attached are produced water sample analyses taken from the closest wells that feature samples from the Delaware, Bone Spring, Wolfcamp, Strawn, Atoka, and Morrow formations.
5. The disposal interval is non-productive. No water samples are available from the surrounding area.

VIII. Geological Data

The Delaware Mountain Group (DMG) of the Delaware Basin comprises of Guadalupian-age arkosic to subarkosic sandstone, siltstone, and detrital limestone that was deposited in deep water, mainly during lowstand and early transgressive sea-level stages. The basin succession is formally divided into the Brushy Canyon, Cherry Canyon, and Bell Canyon Formations (descending order). Stratigraphic divisions within the Delaware Mountain Group are somewhat uncertain due to lithologic similarity and thus a lack of clear boundaries between the major formational intervals. The Delaware Basin during deposition of the Delaware Mountain Group was a deep-water basin bounded by carbonate-ramp (San Andres and Grayburg) and carbonate-rim (Goat Seep and Capitan) margins that developed on the western edge of the Central Basin Platform, the Northwest Shelf, and the Diablo Platform. The top of the interval is designated by another carbonate, the Lamar limestone included in the Bell Canyon Formation. The Bell Canyon contains carbonaceous silty sandstone along with clean, fine grained, massive friable sand. The Brushy Canyon and Cherry Canyon intervals consist of the following: (1) very fine to fine-grained arkosic to subarkosic sandstones, mostly massive in character, (2) very fine grained sandstones microlaminated with siltstones, (3) dark-colored organic siltstones (lutites), (4) carbonate beds (limestone or dolomite) more prevalent near shelf margins, and (5) black to dark gray, calcareous shales. Shale is notably rare in the section and is virtually absent from the Brushy Canyon Formation. Carbonate units (mainly limestone) are present in the upper Cherry Canyon and, especially, Bell Canyon intervals. Porosities and permeabilities in productive intervals range from 12–25% and 1–5 md, respectively, but occasional “streaks” of permeability of up to 200 md are sometimes present. These good porosities indicate a rock that is capable of taking water injection.

A. Injection Zone: Bell and Cherry Canyon

Formation	Depth
Rustler Anhydrite	810'
Salado	1,209'
Delaware	5,384'
Bell Canyon	5,437'
Cherry Canyon	6,379'
Brushy Canyon	7,679'
Bone Spring	9,231'
Wolfcamp	12,280'

B. Underground Sources of Drinking Water

The most closely offsetting water wells were drilled to 610' or shallower, generally producing from the Santa Rosa. Fresh water depth appears to vary from 40' to 475' (300' on average) in the area in the form of sporadic alluvial sources and the Santa Rosa. In general, any USDWs (i.e. Upper Rustler) would be expected to fall above the salt and will be protected. The top of the Rustler Anhydrite is estimated at approximately 810'.

IX. Proposed Stimulation Program

No proposed stimulation program planned at this time.

X. Logging and Test Data on the Well

There are no logs or test data on the well. During the process of drilling and completion resistivity, gamma ray, and density logs will be run.

XI. Chemical Analysis of Fresh Water Wells

The only fresh water well (C-03580) within one mile of the well location as shown on the attached map could not be located. As a result, fresh water samples were not obtained for analysis purposes.

XII. Affirmative Statement of Examination of Geologic and Engineering Data

Based on the available engineering and geologic data we find no evidence of open faults or any other hydrologic connection between the disposal zone (of the proposed Striker 4 SWD #1) and any underground sources of drinking water.

NAME: John C. Webb

TITLE: Sr. Geologist

SIGNATURE: _____

John C. Webb

DATE: Sept. 27, 2019

Office:
1625 N. Fourth St., Suite 200, Midland, TX 79701
Phone: (409) 797-4666 Fax: (409) 797-0730

Branch:
1671 S. Main St., Suite 200, Midland, TX 79701
Phone: (409) 797-4666 Fax: (409) 797-0730

Field:
1671 S. Main St., Suite 200, Midland, TX 79701
Phone: (409) 797-4666 Fax: (409) 797-0730

Regional:
1671 S. Main St., Suite 200, Midland, TX 79701
Phone: (409) 797-4666 Fax: (409) 797-0730

Corporate:
1671 S. Main St., Suite 200, Midland, TX 79701
Phone: (409) 797-4666 Fax: (409) 797-0730

State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form O-401
Revised July 15, 2011

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

¹ Operator Name and Address NCS WATER SOLUTIONS PERMANENT 1309 W. WALL ST. STE 306 MIDLAND, TEXAS 79701		² OGRID Number 32258 ³ API Number 10-025-7180
⁴ Property Code	⁵ Property Name STRIKER 4 SWD	⁶ Well No.

⁷ Surface Location									
¹¹ Line 10	¹² Section 20	¹³ Township 24S	¹⁴ Range 30E	¹⁵ Loc. 10	¹⁶ Feet from 820	¹⁷ N/S Line S041.0E	¹⁸ Feet from 174	¹⁹ E/W Line W089.0E	²⁰ County BFEA

⁸ Proposed Bottom Hole Location									
¹¹ Line 10	¹² Section 20	¹³ Township 24S	¹⁴ Range 30E	¹⁵ Loc. 10	¹⁶ Feet from 820	¹⁷ N/S Line S041.0E	¹⁸ Feet from 174	¹⁹ E/W Line W089.0E	²⁰ County BFEA

⁹ Pool Information	
²¹ Pool Name SWD-Deleware	²² Pool Code 06000

¹⁰ Additional Well Information					
²³ Well Type IS	²⁴ Well Type SWD	²⁵ Casing/Runway IR	²⁶ Cement Type Private	²⁷ Ground Level Elevation 3422	²⁸ Input Date 10/10/11
²⁹ Multiple 10	³⁰ Proposed Depth 7230	³¹ Formation Deleware	³² Cement TSD	³³ Input Date 10/10/11	³⁴ Input Date 10/10/11
³⁵ Depth to Ground water 4810		³⁶ Distance from casing to bottom water 2260		³⁷ Distance to nearest surface water 1 mile	

☒ We will be using a closed-loop system in lieu of lined pits

³⁸ Proposed Casing and Cement Program						
Type	Hole Size	Casing Size	Casing Weight/lb	Setting Depth	Sacks of Cement	Estimated TOC
Surface	17.5"	13.375"	68 lb/l	1,000'	977	Surface
Production	12.25"	9.625"	50.5 lb/l	7,200'	1,885	Surface

³⁹ Casing/Cement Program: Additional Comments
See attached comments

⁴⁰ Proposed Blowout Prevention Program			
Type	Working Pressure	Test Pressure	Manufacturer
Double Hydraulic Block, Pop	5,000 psi	8,000 psi	TBD - Schaeffer Cameron

⁴¹ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.

I further certify that I have complied with 49.15.14.9 (A) NMAC ☐ another 49.15.14.9 (B) ☒ applicable

Signature: *Chris Wayland*

Printed name: Chris Wayland

Title: Consulting Engineer

E-mail Address: cwayland@nps.com

Date: 9/20/11

Phone: 512-680-1764

OIL CONSERVATION DIVISION

Approved By:	Title:
Approved Date:	Expiration Date:
Conditions of Approval Attached	

Oil & Gas Division
 Bureau of Energy, Minerals & Natural Resources
 Department of Energy, Minerals & Natural Resources
 1220 South St. Francis Dr.
 Santa Fe, NM 87505
 (505) 824-1100
 (505) 824-1101
 (505) 824-1102
 (505) 824-1103
 (505) 824-1104
 (505) 824-1105
 (505) 824-1106
 (505) 824-1107
 (505) 824-1108
 (505) 824-1109
 (505) 824-1110

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

Form OCM-1
 Revised August 1, 2011
 Submit one copy to appropriate
 District Office
☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

Well Number		Well Code		Well Name	
		96100		SWD; Delaware	
Property Code		Property Name		Well Section	
		STRIKER 4 SWD		1	
Operator No		Operator Name		Section	
372333		NCA WATER SOLUTIONS PERMIAH, LLC		3,422	
Surface Location					
UTM Zone	Section	Township	Range	Lot No	East from the
M	24	24 S	34 E	850	SOUTH
					174
					WEST
					County
					1 SA
Bottom Hole Location if Different From Surface					
UTM Zone	Section	Township	Range	Lot No	East from the
					North/South line
					East from the
					East/West line
					County
Dedication Name					
Dedication Code					
Dedication No					

This plat will be assigned to this completion until all interests have been consolidated or a new standard well has been approved by the Division.

UTM DATA
 UTM 12 24S 34E 850 174

STRIKER 4 SWD
 Y=3000000.00
 X=3000000.00
 LAT=31.000000
 LONG=-105.000000

UTM DATA
 UTM 12 24S 34E 850 174

STRIKER 4 SWD
 Y=3000000.00
 X=3000000.00
 LAT=31.000000
 LONG=-105.000000

OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and correct to the best of my knowledge and belief, and that the operator has taken all necessary steps to ensure that the information is true and correct to the best of my knowledge and belief, and that the operator has taken all necessary steps to ensure that the information is true and correct to the best of my knowledge and belief.

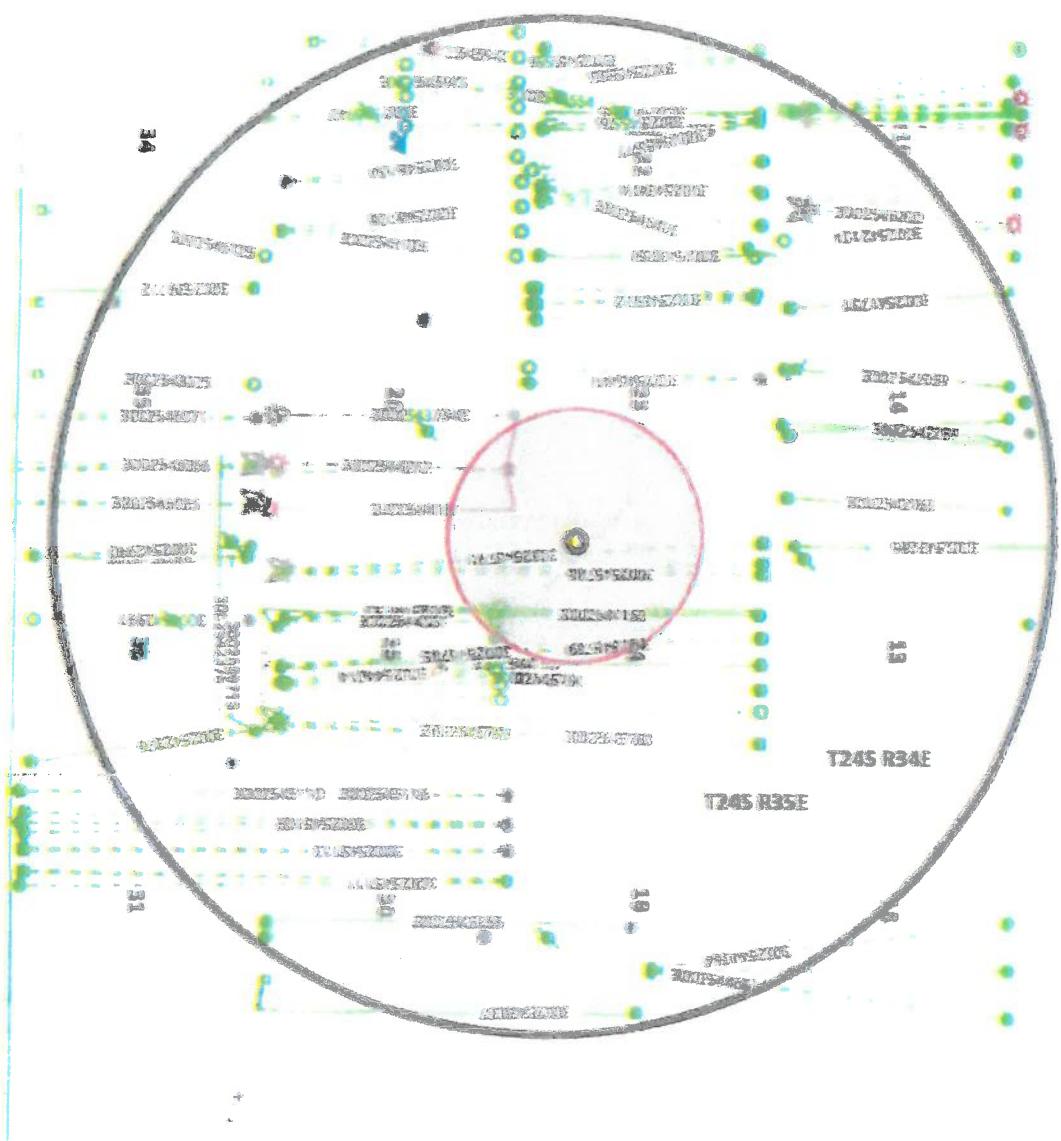
Chris Weyand
 chris@longquist.com
 9/25/2019

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was determined from field notes of a well survey made in the presence of the operator, and that the same is true and correct to the best of my belief.

Surveyor Name
 Surveyor License No.

Surveyor Seal



Striker & SWC #1 2 mile Area in Review

Lee County, OK

NE 1/4, Section 10, Township 24N, Range 34E



- Oil
- Gas
- Disposal
- Striker & SWC #1
- Well Symbol
- Gas
- Gas Abandoned
- Injection
- Location
- Oil
- Oil Abandoned
- 1/2 mile Radius
- 2 mile Radius

Map Scale

Map Scale

Striper & SWD #1
1/2 mile Area of Review
 IBER COUNTY NM

NEL Water Pollution Permit: 116

Permitted Well: 116
 1/2 mile radius
 1/2 mile radius
 1/2 mile radius

1/2 mile radius

1/2 mile radius

1/2 mile radius

Sinker & SWD #1

Gas Well

Oil Well

Permitted Oil Well

Prohibited Oil Well

SWD Well

1/2 mile Radius

2 mile Radius

Section Boundary

Township Boundary



MAP EX-1001
 IBER COUNTY NM

1245 R24E
 1245 R35E

23 24
 25 26

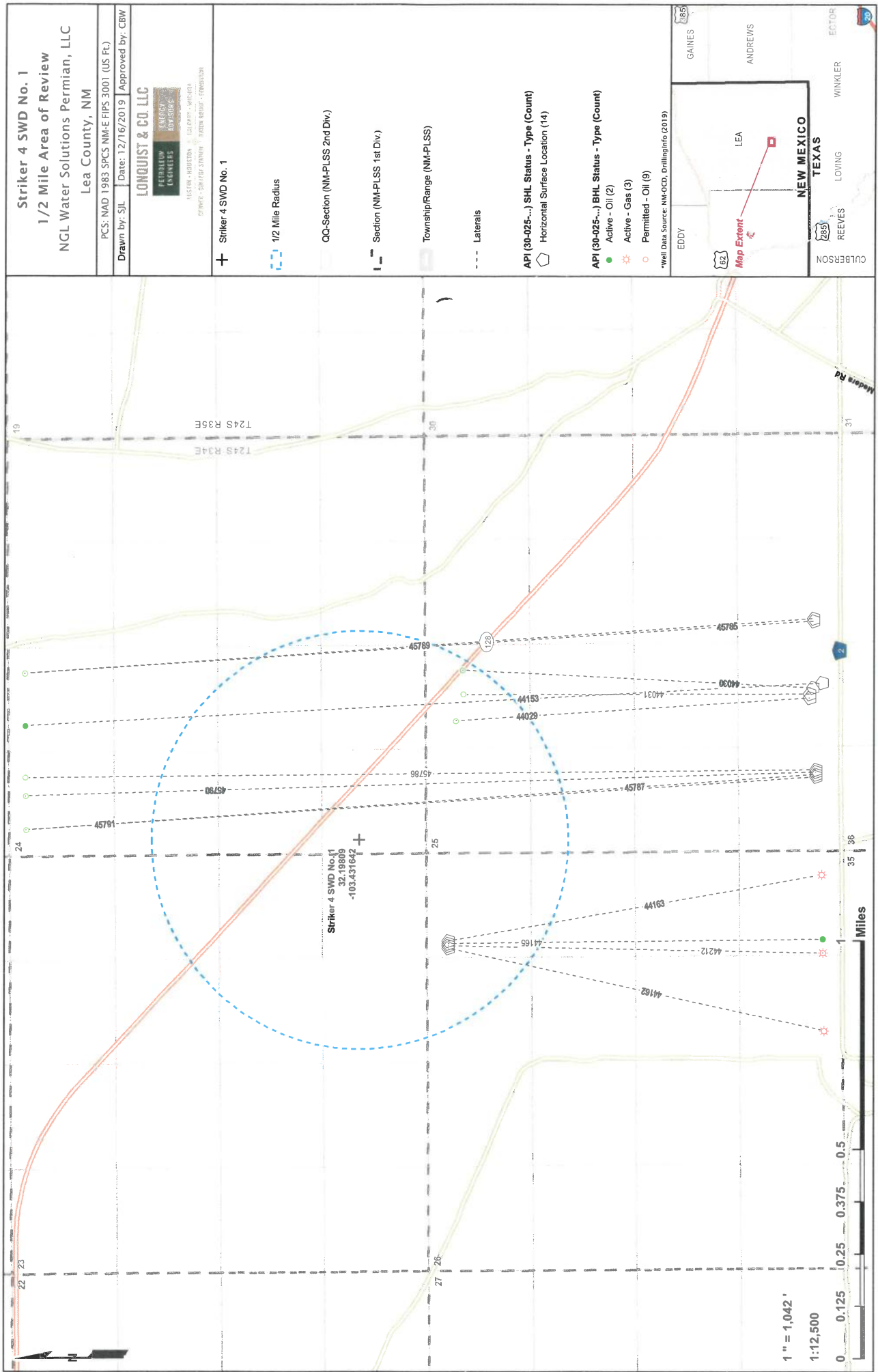
27 28

29 30

31

32

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19
Supp

[illegible]



Wellbore Schematic

Well Name: DEE BOOT FEE 24 34 26 TB 7H

State/Province NEW MEXICO	Prospect Area RED HILLS	Field Name	Well Subtype	Lat/Long Datum NAD27	Latitude (°) 32.194893	Longitude (°) -103.435442
Well Configuration Type HORIZONTAL	Well Objective EXPLOITATION	Well Status DRILLING	Ground Elevation (ft) 3,447.00	MD Course Accuracy 26.50		

HORIZONTAL - DEE BOOT FEE 24 34 26 TB 7H, 7/26/2018 3:54:31 PM

MD (ftKB)	TVD (ftKB)	Incl (°)	Vertical schematic (actual)	
-6.2	-6.2	0.5		
26.6	26.6	0.5		
27.9	27.9	0.5		
28.2	28.2	0.5		
27.4	37.4	0.5		
60.0	60.0	0.5		
66.6	66.6	0.5		
1,034.5	1,034.7	1.1		
1,036.1	1,036.1	1.1		
1,077.4	1,077.4	1.0		
1,079.1	1,079.0	1.0		
5,510.5	5,509.1	1.1		
5,511.8	5,510.4	1.1		
5,553.5	5,552.1	1.1		
5,555.1	5,553.7	1.1		
11,216.6	11,297.1	0.7		
11,223.1	11,306.6	0.7		
11,323.5	11,307.3	0.7		
11,343.2	11,323.7	0.8		
11,348.5	11,326.3	0.8		
11,352.0	11,332.6	0.9		
11,353.7	11,334.2	0.9		
11,543.4	11,623.8	1.6		
11,544.7	11,625.1	1.6		
11,529.5	11,670.0	2.2		
11,591.3	11,671.7	2.2		
11,701.1	11,681.5	2.3		
17,192.9	12,370.0	90.9		
17,196.5	12,369.9	90.9		
17,244.1	12,369.2	90.4		
17,246.1	12,369.2	90.4		
17,248.0	12,369.2	90.4		
17,294.9	12,368.8	90.4		
17,296.9	12,368.8	90.4		

Des: Conductor Cement; Depth MD: 26.5-66.5 ftKB; Date: 3/1/2018

Des: Surface Casing Cement; Depth MD: 26.5-1,079.0 ftKB; Date: 4/6/2018

Des: Intermediate Casing Cement; Depth MD: 26.5-5,555.0 ftKB; Date: 5/23/2018

Des: Intermediate Casing Cement; Depth MD: 26.5-11,701.0 ftKB; Date: 5/30/2018

Des: Liner Cement; Depth MD: 11,326.0-17,297.0 ftKB; Date: 7/19/2018

No.: 1; Des: Conductor 1; OD: 20.000 in; ID: 19.000 in; Depth MD: 26.5-66.5 ftKB; Length: 40.00 ft

No.: 2; Des: Surface; OD: 13.375 in; ID: 12.615 in; Depth MD: 26.5-1,079.0 ftKB; Length: 1,052.55 ft

No.: 3; Des: Intermediate 1; OD: 9.625 in; ID: 8.835 in; Depth MD: 26.5-5,555.0 ftKB; Length: 5,528.50 ft

No.: 4; Des: Intermediate 2; OD: 7.000 in; ID: 6.184 in; Depth MD: 6.2-11,691.3 ftKB; Length: 11,697.49 ft

No.: 5; Des: Liner 1; OD: 4.500 in; ID: 3.920 in; Depth MD: 11,316.7-17,297.0 ftKB; Length: 5,980.31 ft

Directions to Well: From the intersection of State Highway 128 (East Kansas Ave) and State Highway 18 in the city of Jal, NM, travel west on State Highway 128 for 14.1 miles to County Road #2 (Battle Axe Road) on the left. Travel southwest on Battle Axe Road for 1.5 miles to proposed well 5,009 feet on the right.

Form C-105
Revised April 3, 2017

Submit To Appropriate District Office
Two Copies
District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

4. Reason for filing:
☒ **COMPLETION REPORT** (Fill in boxes #1 through #31 for State and Fee wells only)
☐ **C-144 CLOSURE ATTACHMENT** (Fill in boxes #1 through #9, #15 Date Rig Released and #32 and/or #33; attach this and the plat to the C-144 closure report in accordance with 19.15.17.13.K NMAC)

5. Lease Name or Unit Agreement Name
DEE BOOT FEE 24 34 26 TB

6. Well Number:
7H

7. Type of Completion:
☒ **NEW WELL** ☐ **WORKOVER** ☐ **DEEPENING** ☐ **PLUGBACK** ☐ **DIFFERENT RESERVOIR** ☐ **OTHER**

8. Name of Operator
Marathon Oil Permian LLC

9. OGRID
372098

10. Address of Operator
5555 San Felipe St., Houston, TX 77056

11. Pool name or Wildcat
RED HILLS; BONE SPRING, NORTH

12. Location	Unit Ltr	Section	Township	Range	Lot	Feet from the	N/S Line	Feet from the	E/W Line	County
Surface:	A	26	24S	34E		271	N	1145	E	LEA
BH:	P	26	24S	34E		105	S	955	E	LEA

13. Date Spudded
4/1/2018

14. Date T.D. Reached
7/18/2108

15. Date Rig Released
7/20/2018

16. Date Completed (Ready to Produce)
10/15/2018

17. Elevations (DF and RKB, RT, GR, etc.)
3447' GR

18. Total Measured Depth of Well
17280' / 12434'

19. Plug Back Measured Depth

20. Was Directional Survey Made?
Yes

21. Type Electric and Other Logs Run
MUD GR

22. Producing Interval(s), of this completion - Top, Bottom, Name
12,458' - 17,158'; BONE SPRING

CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB/FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	54.5 / J55	1052'	17 1/2"	1170	464
9 5/8"	40 / J55	5528'	12 1/4"	5528	454
7"	29 / P110-IC	11664'	8 3/4"	902	38
4 1/2"	13.5 / P110-IC	17270'	6 1/8"	600	124

24. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
4 1/2"	11290'	17270'	600	

25. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2.875	11,305'	11,291'

26. Perforation record (interval, size, and number)
12,458' - 17,158'; 0.36", 900 shots

27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,458' - 17,158'	11,918,680 lbs - 40/70; 100 Mesh
	14,522 gal - 15% HCl Acid

28. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping - Size and type pump)	Well Status (Prod. or Shut-in)
10/15/2018	Flowing	Producing

Date of Test	Hours Tested	Choke Size	Prod'n For Test Period	Oil - Bbl	Gas - MCF	Water - Bbl.	Gas - Oil Ratio
10/23/2018	24	64		1226	1043	3957	

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API - (Corr.)
850	725					

29. Disposition of Gas (Sold, used for fuel, vented, etc.)
sold

30. Test Witnessed By

31. List Attachments

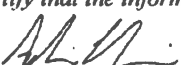
32. If a temporary pit was used at the well, attach a plat with the location of the temporary pit.

33. Rig Release Date:

34. If an on-site burial was used at the well, report the exact location of the on-site burial:

Latitude Longitude NAD83

I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief

Signature  Printed Name **Adrian Covarrubias** Title **CTR - Technician HES** Date **11/1/2018**

E-mail Address **acovarrubias@marathonoil.com**

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well and not later than 60 days after completion of closure. When submitted as a completion report, this shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, items 11, 12 and 26-31 shall be reported for each zone.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn A"
T. Salt	T. Strawn	T. Kirtland	T. Penn. "B"
B. Salt	T. Atoka	T. Fruitland	T. Penn. "C"
T. Yates	T. Miss	T. Pictured Cliffs	T. Penn. "D"
T. 7 Rivers	T. Devonian	T. Cliff House	T. Leadville
T. Queen	T. Silurian	T. Menefee	T. Madison
T. Grayburg	T. Montoya	T. Point Lookout	T. Elbert
T. San Andres	T. Simpson	T. Mancos	T. McCracken
T. Glorieta	T. McKee	T. Gallup	T. Ignacio Otzte
T. Paddock	T. Ellenburger	Base Greenhorn	T. Granite
T. Blinbry	T. Gr. Wash	T. Dakota	
T. Tubb	T. Delaware Sand	T. Morrison	
T. Drinkard	T. Bone Springs	T. Todilto	
T. Abo	T.	T. Entrada	
T. Wolfcamp	T.	T. Wingate	
T. Penn	T.	T. Chinle	
T. Cisco (Bough C)	T.	T. Permian	

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....
No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology

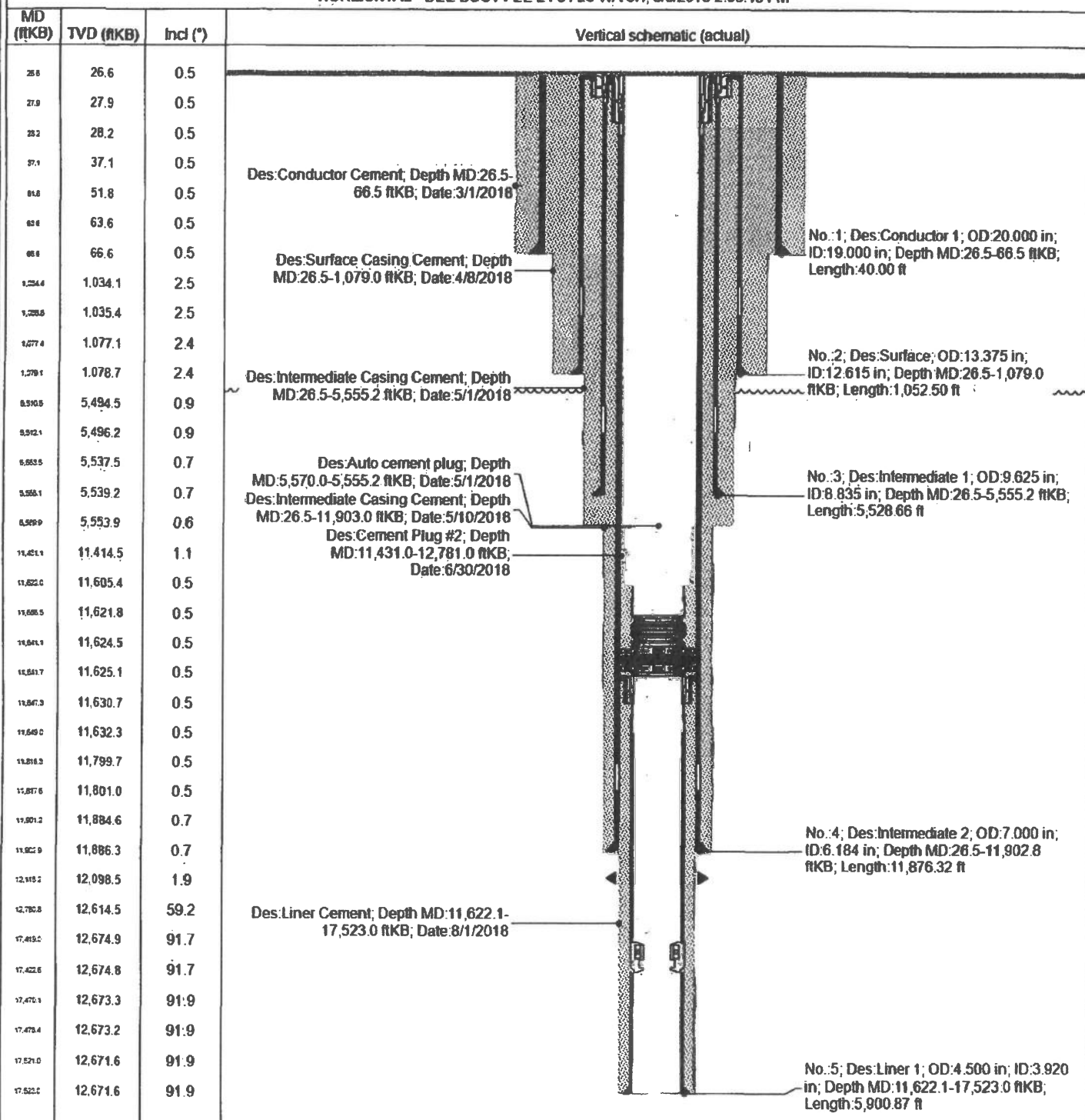


Wellbore Schematic

Well Name: DEE BOOT FEE 24 34 26 WA 6H

State/Province NEW MEXICO	Prospect Area RED HILLS	Field Name	Well Subtype	Lat, orig Datum NAD27	Latitude (°) 32.194893	Longitude (°) -103.435539
Well Configuration Type HORIZONTAL	Well Objective EXPLOITATION	Well Status DRILLING	Ground Elevation (ft) 3,447.00	KB- Ground Distance (ft) 26.50		

HORIZONTAL - DEE BOOT FEE 24 34 26 WA 6H, 8/6/2018 2:03:43 PM



Directions to Well: From the intersection of State Highway 128 (East Kansas Ave) and State Highway 18 in the city of Jal, NM, travel west on State Highway 128 for 14.1 miles to County Road #2 (Battle Axe Road) on the left. Travel southwest on Battle Axe Road for 1.5 miles to proposed well 5,009 feet on the right.

20-A.4

Submit To Appropriate District Office Two Copies District I 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88201 District III 1000 Rio Brazos Rd., Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505						State of New Mexico Energy, Minerals and Natural Resources Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505						Form C-105 Revised April 3, 2017			
WELL COMPLETION / RECOMPLETION REPORT AND LOG															
4. Reason for filing: ☒ COMPLETION REPORT (Fill in boxes #1 through #31 for State and Fee wells only) ☐ C-144 CLOSURE ATTACHMENT (Fill in boxes #1 through #9, #15 Date Rig Released and #32 and/or #33; attach this and the plat to the C-144 closure report in accordance with 19.15.17.13.K NMAC)								5. Lease Name or Unit Agreement Name DEE BOOT FEE 24 34 26 WA							
7. Type of Completion: ☒ NEW WELL ☐ WORKOVER ☐ DEEPENING ☐ PLUGBACK ☐ DIFFERENT RESERVOIR ☐ OTHER								6. Well Number: 6H							
8. Name of Operator Marathon Oil Permian LLC								9. OGRID 372098							
10. Address of Operator 5555 San Felipe St., Houston, TX 77056								11. Pool name or Wildcat ANTELOPE RIDGE; WOLFCAMP							
12. Location	Unit Ltr	Section	Township	Range	Lot	Feet from the	N/S Line	Feet from the	E/W Line	County					
Surface:	A	26	24S	34E		271	N	1175	E	LEA					
BH:	P	26	24S	34E		90	S	1356	E	LEA					
13. Date Spudded 4/6/2018	14. Date T.D. Reached 7/30/2018		15. Date Rig Released 8/2/2018		16. Date Completed (Ready to Produce) 10/15/2018			17. Elevations (DF and RKB, RT, GR, etc.) 3447' GR							
18. Total Measured Depth of Well 17523' / 12729'			19. Plug Back Measured Depth		20. Was Directional Survey Made? Yes			21. Type Electric and Other Logs Run MUD GR							
22. Producing Interval(s), of this completion - Top, Bottom, Name 12,566' - 17,382'; WOLFCAMP															
23. CASING RECORD (Report all strings set in well)															
CASING SIZE		WEIGHT LB./FT.		DEPTH SET		HOLE SIZE		CEMENTING RECORD		AMOUNT PULLED					
12 1/4"		54.5 / J55		1079'		17 1/2"		1465		464					
9 5/8"		40 / J55		5555'		12 1/4"		1797		538					
7"		29 / P110		11903'		8 3/4"		947		286					
4 1/2"		13.5 / P110-IC		17523'		6 1/8"		561		0					
24. LINER RECORD															
SIZE	TOP	BOTTOM	SACKS CEMENT		SCREEN		25. TUBING RECORD								
4 1/2"	11622'	17523'	561				SIZE		DEPTH SET	PACKER SET					
							2.875		11574'	11560'					
26. Perforation record (interval, size, and number) 12,566' - 17,382'; 0.36", 900 shots						27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC. DEPTH INTERVAL AMOUNT AND KIND MATERIAL USED 12,566' - 17,382' 10,822,290 lbs - 40/70; 100 Mesh 16,286 gal - 15% HCl Acid									
28. PRODUCTION															
Date First Production 10/15/2018		Production Method (Flowing, gas lift, pumping - Size and type pump) Flowing					Well Status (Prod. or Shut-in) Producing								
Date of Test 10/22/2018	Hours Tested 24	Choke Size 62	Prod'n For Test Period	Oil - Bbl 1984	Gas - MCF 1897	Water - Bbl 2135	Gas - Oil Ratio								
Flow Tubing Press. 800	Casing Pressure 750	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API - (Corr.)									
29. Disposition of Gas (Sold, used for fuel, vented, etc.) sold								30. Test Witnessed By							
31. List Attachments															
32. If a temporary pit was used at the well, attach a plat with the location of the temporary pit.								33. Rig Release Date:							
34. If an on-site burial was used at the well, report the exact location of the on-site burial:															
Latitude			Longitude			NAD83									
I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief															
Signature		Printed Name		Adrian Covarrubias		Title		CTR - Technician HES		Date					
										11/1/2018					
E-mail Address acovarrubias@marathonoil.com															

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well and not later than 60 days after completion of closure. When submitted as a completion report, this shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, items 11, 12 and 26-31 shall be reported for each zone.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn A"
T. Salt	T. Strawn	T. Kirtland	T. Penn. "B"
B. Salt	T. Atoka	T. Fruitland	T. Penn. "C"
T. Yates	T. Miss	T. Pictured Cliffs	T. Penn. "D"
T. 7 Rivers	T. Devonian	T. Cliff House	T. Leadville
T. Queen	T. Silurian	T. Menefee	T. Madison
T. Grayburg	T. Montoya	T. Point Lookout	T. Elbert
T. San Andres	T. Simpson	T. Mancos	T. McCracken
T. Glorieta	T. McKee	T. Gallup	T. Ignacio Otzte
T. Paddock	T. Ellenburger	Base Greenhorn	T.Granite
T. Blinebry	T. Gr. Wash	T. Dakota	
T.Tubb	T. Delaware Sand	T. Morrison	
T. Drinkard	T. Bone Springs	T.Todilto	
T. Abo	T.	T. Entrada	
T. Wolfcamp	T.	T. Wingate	
T. Penn	T.	T. Chinle	
T. Cisco (Bough C)	T.	T. Permian	

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....
No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology



Wellbore Schematic

Well Name: DEE BOOT FEE 24 34 26 WXY 3H

State/Province NEW MEXICO	Prospect Area RED HILLS	Field Name	Well Subtype NAD21	Latitude (N) 32.194893	Longitude (W) 103.435526
Well Configuration Type HORIZONTAL	Well Objective EXPLOITATION	Well Status DRILLING	Ground Elevation (ft) 3,447.00	MS - OILFIELD DEPARTMENT 2650	

HORIZONTAL - DEE BOOT FEE 24 34 26 WXY 3H BP01; 8/20/2018 10:41:40 AM

MD (ftKB)	TVD (ftKB)	Incl (°)	Vertical schematic (actual)	
-5.902.2	-5.902.2	0.2		
-62.8	-92.8	0.2		
-45.8	-45.6	0.2		
0.0	0.0	0.2		
26.6	26.6	0.2		
27.6	27.6	0.2		
28.2	28.2	0.2		
37.7	37.7	0.2		
60.0	60.0	0.2		
66.6	66.6	0.2		
1,034.4	1,034.4	0.6	Des: Conductor Cement; Depth MD:26.5-66.5 ftKB; Date:3/1/2018	No.:2; Des: Conductor 1; OD:20.000 in; ID:19.000 in; Depth MD:26.5-66.5 ftKB; Length:40.00 ft
1,035.3	1,036.7	0.6	Des: Surface Casing Cement; Depth MD:26.5-1,079.0 ftKB; Date:3/28/2018	
1,077.4	1,077.4	0.6		No.:3; Des: Surface; OD:13.375 in; ID:12.615 in; Depth MD:26.5-1,079.0 ftKB; Length:1,052.53 ft
1,079.1	1,079.1	0.6	Des: Intermediate Casing Cement; Depth MD:26.5-5,551.8 ftKB; Date:6/3/2018	
5,507.2	5,487.6	13.3		No.:4; Des: Intermediate 1; OD:9.625 in; ID:8.835 in; Depth MD:26.5-5,551.8 ftKB; Length:5,525.34 ft
5,508.5	5,488.9	13.2	Des: Intermediate Casing Cement; Depth MD:26.5-11,976.7 ftKB; Date:6/8/2018	
5,520.2	5,529.6	12.5		
5,551.3	5,531.2	12.5		
11,788.5	11,526.2	4.1		
11,788.7	11,536.3	4.1		
11,777.9	11,546.5	4.2		
11,788.1	11,552.7	4.2		
11,787.7	11,556.3	4.2		
11,794.0	11,561.5	4.3		
11,799.6	11,563.1	4.3		
11,818.3	11,582.8	4.2		
11,829.8	11,797.1	3.0		
11,851.1	11,798.4	3.0		
11,876.7	11,843.9	2.8		
11,978.8	11,845.6	2.8	Des: Liner Cement; Depth MD:11,778.0-17,491.0 ftKB; Date:8/16/2018	No.:5; Des: Intermediate 2; OD:7.000 in; ID:6.184 in; Depth MD:26.5-11,978.3 ftKB; Length:11,951.79 ft
17,389.1	2,504.0	90.8		
17,392.7	2,503.9	90.8		
17,440.0	2,503.2	91.5		
17,441.9	2,503.2	91.5		
17,443.2	2,503.2	91.5		
17,438.8	2,502.0	91.5		
17,491.1	2,501.9	91.5		No.:6; Des: Liner 1; OD:4.500 in; ID:3.920 in; Depth MD:11,758.5-17,491.0 ftKB; Length:5,732.52 ft

Directions to Well: From the intersection of State Highway 128 (East Kansas Ave) and State Highway 18 in the city of Jal, NM, travel west on State Highway 128 for 14.1 miles to County Road #2 (Battle Axe Road) on the left. Travel southwest on Battle Axe Road for 1.5 miles to proposed well 5,009 feet on the right.

W.A.7

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-105
Revised April 3, 2017

HOBBS OCD
NOV 05 2018
RECEIVED

1. WELL API NO.
30-025-44162

2. Type of Lease
☐ STATE ☒ FEE ☐ FED/INDIAN

3. State Oil & Gas Lease No.

5. Lease Name or Unit Agreement Name
DEE BOOT FEE 24 34 26 WXY

6. Well Number:
3H

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

4. Reason for filing:
☒ **COMPLETION REPORT** (Fill in boxes #1 through #31 for State and Fee wells only)
☐ **C-144 CLOSURE ATTACHMENT** (Fill in boxes #1 through #9, #15 Date Rig Released and #32 and/or #33; attach this and the plat to the C-144 closure report in accordance with 19.15.17.13.K NMAC)

7. Type of Completion:
☒ NEW WELL ☐ WORKOVER ☐ DEEPENING ☐ PLUGBACK ☐ DIFFERENT RESERVOIR ☐ OTHER

8. Name of Operator Marathon Oil Permian LLC

9. OGRID 372098

10. Address of Operator 5555 San Felipe St., Houston, TX 77056

11. Pool name or Wildcat ANTELOPE RIDGE; WOLFCAMP

12. Location	Unit Ltr	Section	Township	Range	Lot	Feet from the	N/S Line	Feet from the	E/W Line	County
Surface:	A	26	24S	34E		271	N	1205	E	LEA
BH:	O	26	24S	34E		106	S	2286	E	LEA

13. Date Spudded 3/26/2018	14. Date T.D. Reached 8/14/2018	15. Date Rig Released 8/18/2018	16. Date Completed (Ready to Produce) 10/15/2018	17. Elevations (DF and RKB, RT, GR, etc.) 3447' GR
18. Total Measured Depth of Well 17496'	19. Plug Back Measured Depth	20. Was Directional Survey Made? Yes	21. Type Electric and Other Logs Run MUD GR	

22. Producing Interval(s), of this completion - Top, Bottom, Name
12,659' - 17,359'; WOLFCAMP

23. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
12 1/4"	54.5 / J55	1079'	17 1/2"	1465	717
9 5/8"	40 / J55	5552'	12 1/4"	1797	301
7"	29 / P110	11978'	8 3/4"	947	177
4 1/2"	13.5 / P110-IC	17491'	6 1/8"	580	138

24. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
4 1/2"	11759'	17491'	580	

25. TUBING RECORD

SIZE	DEPTH SET	PACKER SET

26. Perforation record (interval, size, and number)
12,659' - 17,359'; 0.36", 900 shots

27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,659' - 17,359'	11,751,680 lbs - 40/70; 100 Mesh
	15,593 gal - 15% HCl Acid

28. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping - Size and type pump)	Well Status (Prod. or Shut-in)
10/15/2018	Flowing	Producing

Date of Test	Hours Tested	Choke Size	Prod'n For Test Period	Oil - Bbl	Gas - MCF	Water - Bbl.	Gas - Oil Ratio
10/24/2018	24	64		1735	3612	3281	

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API - (Corr.)
	1200					

29. Disposition of Gas (Sold, used for fuel, vented, etc.)
sold

30. Test Witnessed By

31. List Attachments

32. If a temporary pit was used at the well, attach a plat with the location of the temporary pit.

33. Rig Release Date:

34. If an on-site burial was used at the well, report the exact location of the on-site burial:

Latitude Longitude NAD83

I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief

Signature Printed Name Adrian Covarrubias Title CTR - Technician HES Date 11/1/2018

E-mail Address acovarrubias@marathonoil.com

K3

2012.8

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well and not later than 60 days after completion of closure. When submitted as a completion report, this shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, items 11, 12 and 26-31 shall be reported for each zone.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn A"
T. Salt	T. Strawn	T. Kirtland	T. Penn. "B"
B. Salt	T. Atoka	T. Fruitland	T. Penn. "C"
T. Yates	T. Miss	T. Pictured Cliffs	T. Penn. "D"
T. 7 Rivers	T. Devonian	T. Cliff House	T. Leadville
T. Queen	T. Silurian	T. Menefee	T. Madison
T. Grayburg	T. Montoya	T. Point Lookout	T. Elbert
T. San Andres	T. Simpson	T. Mancos	T. McCracken
T. Glorieta	T. McKee	T. Gallup	T. Ignacio Otzte
T. Paddock	T. Ellenburger	Base Greenhorn	T. Granite
T. Blinberry	T. Gr. Wash	T. Dakota	
T. Tubb	T. Delaware Sand	T. Morrison	
T. Drinkard	T. Bone Springs	T. Todilto	
T. Abo	T.	T. Entrada	
T. Wolfcamp	T.	T. Wingate	
T. Penn	T.	T. Chinle	
T. Cisco (Bough C)	T.	T. Permian	

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....
No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology

20:49

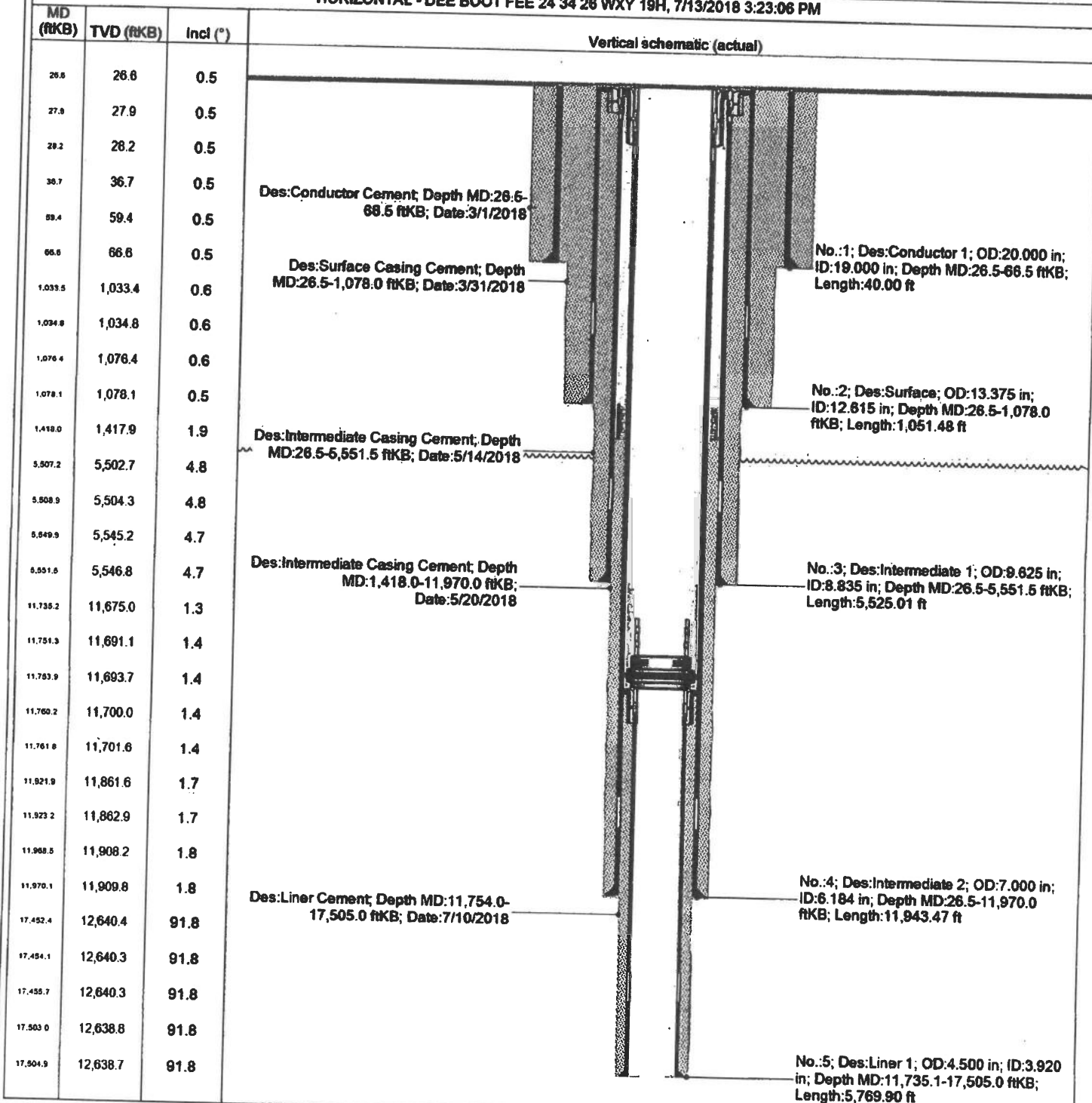


Wellbore Schematic

Well Name: DEE BOOT FEE 24 34 26 WXY 19H

State/Province NEW MEXICO	Prospect Area RED HILLS	Field Name	Well Subtype	Lat/Long Datum NAD83	Latitude (°) 32.164893	Longitude (°) -103.436346
Well Configuration Type HORIZONTAL	Well Objective EXPLOITATION	Well Status DRILLING	Ground Elevation (ft) 3,446.00	Ground Distance (ft) 26.50		

HORIZONTAL - DEE BOOT FEE 24 34 26 WXY 19H, 7/13/2018 3:23:06 PM



Directions to Well: From the intersection of State Highway 128 (East Kansas Ave) and State Highway 18 in the city of Jal, NM, travel west on State Highway 128 for 14.1 miles to County Road #2 (Battle Axe Road) on the left. Travel southwest on Battle Axe Road for 1.5 miles to proposed well 5,009 feet on the right.

Submit To Appropriate District Office Two Copies District I 1625 N. French Dr., Hobbs, NM 88240 District II 811 S. First St., Artesia, NM 88210 District III 1000 Rio Brazos Rd., Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505		State of New Mexico Energy, Minerals and Natural Resources Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505				Form C-105 Revised April 3, 2017				
		1. WELL API NO. 30-025-44163								
		2. Type of Lease ☐ STATE ☒ FEE ☐ FED/INDIAN								
		3. State Oil & Gas Lease No.								
WELL COMPLETION OR RECOMPLETION REPORT AND LOG										
4. Reason for filing: ☒ COMPLETION REPORT (Fill in boxes #1 through #31 for State and Fee wells only) ☐ C-144 CLOSURE ATTACHMENT (Fill in boxes #1 through #9, #15 Date Rig Released and #32 and/or #33; attach this and the plat to the C-144 closure report in accordance with 19.15.17.13.K NMAC)						5. Lease Name or Unit Agreement Name DEE BOOT FEE 24 34 26 WXY				
7. Type of Completion: ☒ NEW WELL ☐ WORKOVER ☐ DEEPENING ☐ PLUGBACK ☐ DIFFERENT RESERVOIR ☐ OTHER						6. Well Number: 19H				
8. Name of Operator Marathon Oil Permian LLC						9. OGRID 372098				
10. Address of Operator 5555 San Felipe St., Houston, TX 77056						11. Pool name or Wildcat ANTELOPE RIDGE; WOLFCAMP				
12. Location	Unit Ltr	Section	Township	Range	Lot	Feet from the	N/S Line	Feet from the	E/W Line	County
Surface:	A	26	24S	34E		271	N	1115	E	LEA
BH:	P	26	24S	34E		330	S	330	E	LEA
13. Date Spudded 3/29/2018	14. Date T.D. Reached 7/9/2018		15. Date Rig Released 7/11/2018		16. Date Completed (Ready to Produce) 10/15/2018			17. Elevations (DF and RKB, RT, GR, etc.) 3446' GR		
18. Total Measured Depth of Well 17515' / 12671'			19. Plug Back Measured Depth		20. Was Directional Survey Made? Yes			21. Type Electric and Other Logs Run MUD GR		
22. Producing Interval(s), of this completion - Top, Bottom, Name 12,708' - 17,427'; WOLFCAMP										
23. CASING RECORD (Report all strings set in well)										
CASING SIZE		WEIGHT LB./FT.		DEPTH SET		HOLE SIZE		CEMENTING RECORD		AMOUNT PULLED
13 3/8"		54.5 / J55		1051'		17 1/2"		1170		464
9 5/8"		40 / J55		5525'		12 1/4"		1797		570
7"		29 / P110-IC		11943'		8 3/4"		947		0
4 1/2"		13.5 / P110-IC		17478'		6 1/8"		623		0
24. LINER RECORD						25. TUBING RECORD				
SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN		SIZE	DEPTH SET	PACKER SET		
4 1/2"	11708'	17478'	623			2.875	11663'	11655'		
26. Perforation record (interval, size, and number) 12,708' - 17,427'; 0.36", 900 shots						27. ACID, SHOT, FRACTURE, CEMENT, SQUEEZE, ETC.				
						DEPTH INTERVAL		AMOUNT AND KIND MATERIAL USED		
						12,708' - 17,427'		11,918,540 lbs - 40/70; 100 Mesh		
								15,435 gal - 15% HCl Acid		
28. PRODUCTION										
Date First Production 10/18/2018		Production Method (Flowing, gas lift, pumping - Size and type pump) Flowing				Well Status (Prod. or Shut-in) Producing				
Date of Test 10/27/2018	Hours Tested 24	Choke Size 64	Prod'n For Test Period	Oil - Bbl 1616	Gas - MCF 3816	Water - Bbl 3111	Gas - Oil Ratio			
Flow Tubing Press. 825	Casing Pressure 800	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API - (Corr.)				
29. Disposition of Gas (Sold, used for fuel, vented, etc.) sold						30. Test Witnessed By				
31. List Attachments										
32. If a temporary pit was used at the well, attach a plat with the location of the temporary pit.						33. Rig Release Date:				
34. If an on-site burial was used at the well, report the exact location of the on-site burial:										
Latitude			Longitude			NAD83				
I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief										
Signature 		Printed Name Adrian Covarrubias		Title CTR - Technician HES			Date 11/1/2018			
E-mail Address acovarrubias@marathonoil.com										

20-A-11

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Division not later than 20 days after the completion of any newly-drilled or deepened well and not later than 60 days after completion of closure. When submitted as a completion report, this shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, items 11, 12 and 26-31 shall be reported for each zone.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn A"
T. Salt	T. Strawn	T. Kirtland	T. Penn. "B"
B. Salt	T. Atoka	T. Fruitland	T. Penn. "C"
T. Yates	T. Miss	T. Pictured Cliffs	T. Penn. "D"
T. 7 Rivers	T. Devonian	T. Cliff House	T. Leadville
T. Queen	T. Silurian	T. Menefee	T. Madison
T. Grayburg	T. Montoya	T. Point Lookout	T. Elbert
T. San Andres	T. Simpson	T. Mancos	T. McCracken
T. Glorieta	T. McKee	T. Gallup	T. Ignacio Otzte
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T. Drinkard	T. Bone Springs	T. Todilto	
T. Abo	T.	T. Entrada	
T. Wolfcamp	T.	T. Wingate	
T. Penn	T.	T. Chinle	
T. Cisco (Bough C)	T.	T. Permian	

OIL OR GAS SANDS OR ZONES

No. 1, from.....to.....
No. 2, from.....to.....

No. 3, from.....to.....
No. 4, from.....to.....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from.....to.....feet.....
 No. 2, from.....to.....feet.....
 No. 3, from.....to.....feet.....

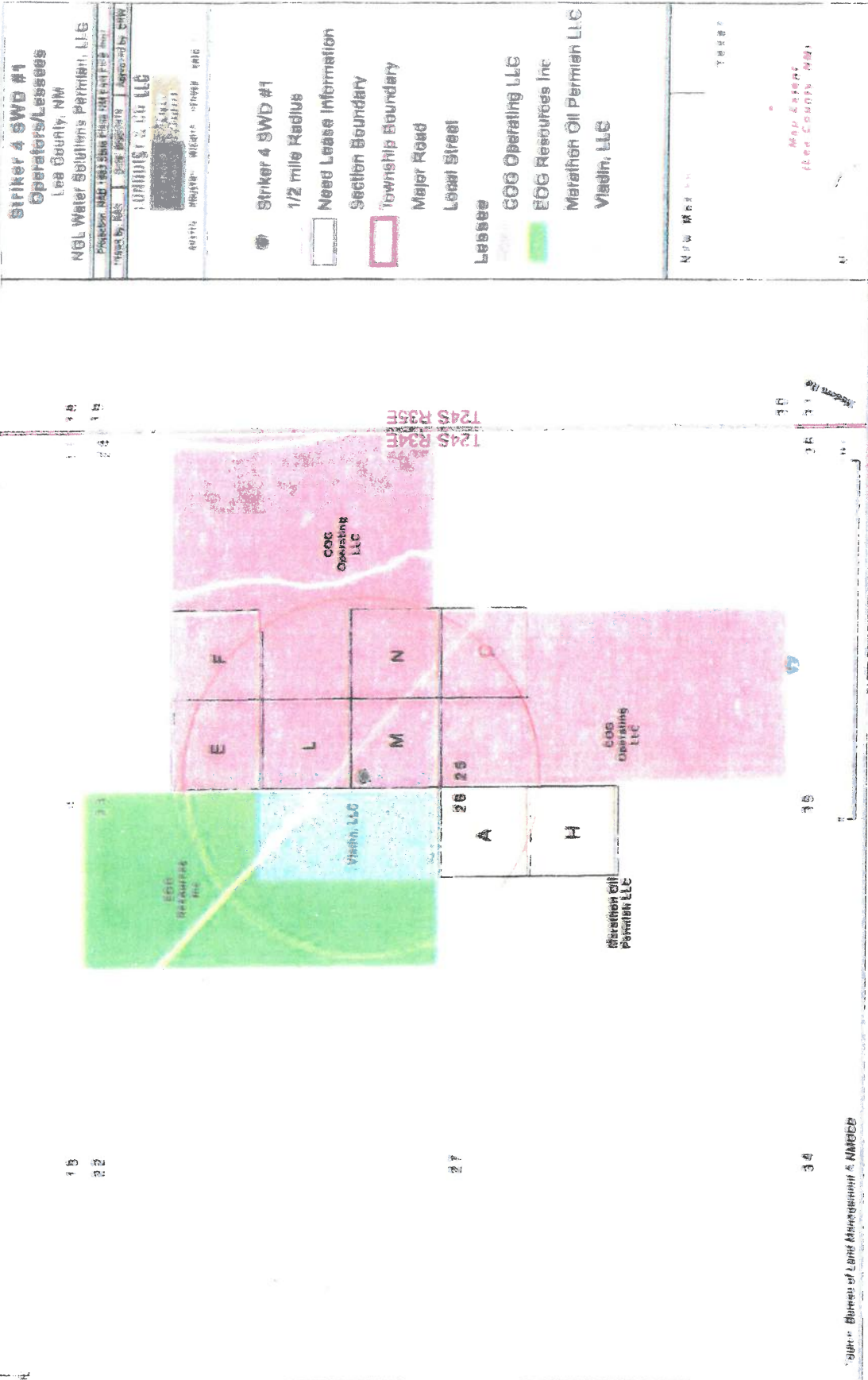
No. 2, from.....to.....feet.....
No. 3, from.....to.....feet.....

No. 3, from.....to.....feet.....

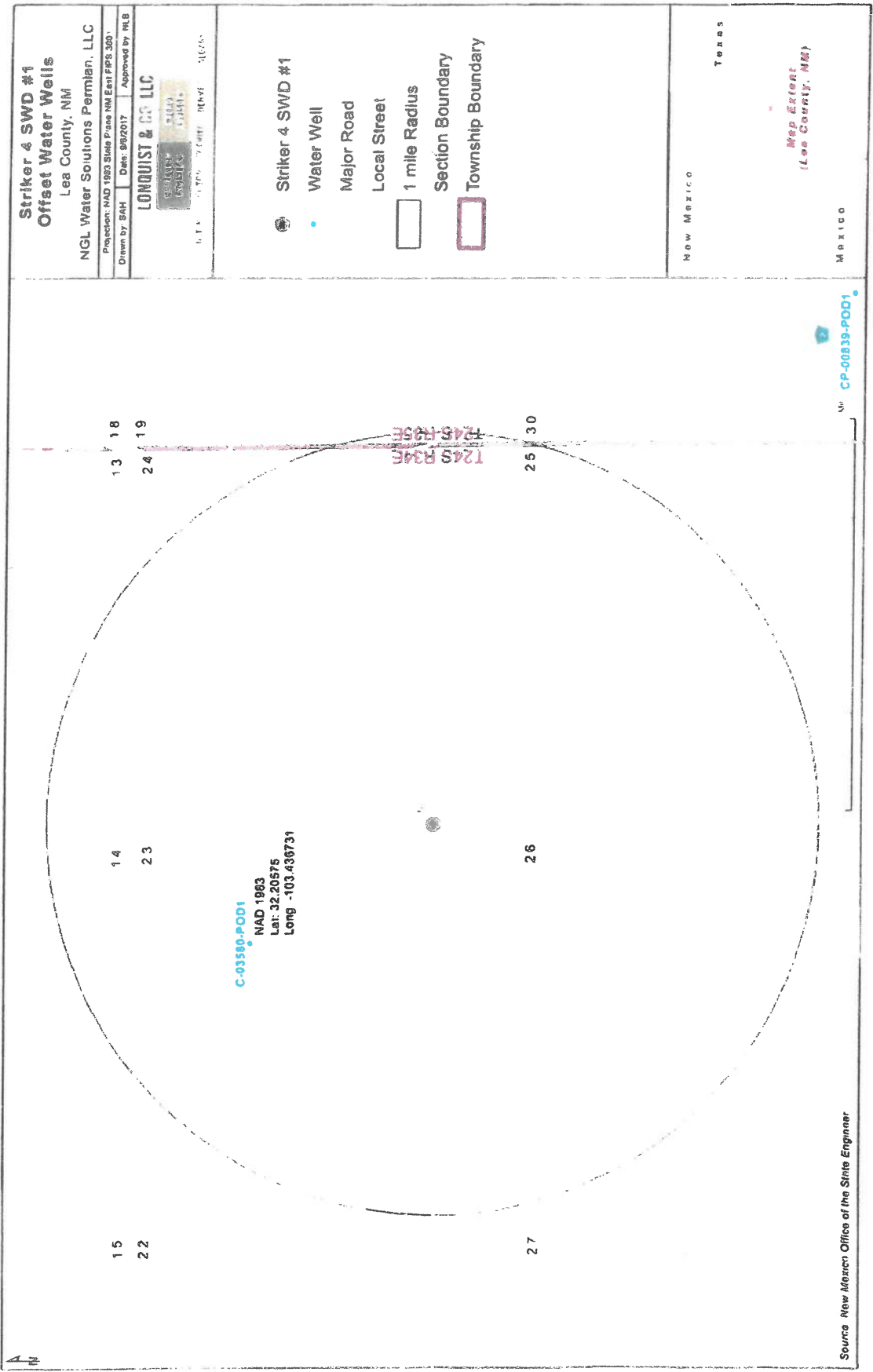
LITHOLOGY RECORD (Attach additional sheet if necessary)

From	To	Thickness In Feet	Lithology

From	To	Thickness In Feet	Lithology



Striker 4 SWD #1: Offsetting Produced Water Analysis														
wellname	api	county	formation	ph	ids_mgl	sodium_mgl	calcium_mgl	iron_mgl	magnesium_mgl	manganese_mgl	chloride_mgl	bicarbonate_mgl	sulfate_mgl	co2_mgl
ANTELOPE RIDGE UNIT #002	3002520444	LEA	ATOKA	6.7	51475							31000	317	340
BELL LAKE UNIT #009	3002520261	LEA	BONE SPRING	5.6	204652	171476.3	55363.2	9140	40.4			130000	512	260
THISTLE UNIT #071H	3002542425	Lea	BONE SPRING 1ST SAND	6.2			47148	6419	15	1023	1.1	104576.4	244	560
BELL LAKE 19 STATE #002H	3002541515	Lea	BONE SPRING 2ND SAND	6.2			47537	6950	11	854	0	86572	232	770
BELL LAKE 19 STATE #004H	3002541517	Lea	BONE SPRING 2ND SAND	6.3			60725	8703	52	886	0	88389	171	240
BELL LAKE 19 STATE #001H	3002541024	Lea	BONE SPRING 2ND SAND	7						1020	0.88	113193	145	210
BELL LAKE UNIT A #007	3002508367	LEA	DELAWARE		87686							53920	700	100
BELL LAKE UNIT #002	3002508489	LEA	DELAWARE		52115							32200	391	749
MARSHALL #001	3002508358	LEA	DELAWARE		238931							451	529	
THISTLE UNIT #017H	3002539893	Lea	DELAWARE-BRUSHY CANYON	6		89832		22107	15	4443	3	148600	127	156
THISTLE UNIT #018H	3002540010	Lea	DELAWARE-BRUSHY CANYON	5.7	282741	93485		22643	31	4570	3.2	189304	73	200
CLUSTER MOUNTAIN UNIT #001	3002520756	LEA	MORROW									19532	73	270
PRONGHORN AHO FEDERAL #001	3002526496	LEA	STRAWN	5.5				20.1	0	12.2		176800	161	650
BELLOQ 2 STATE #002H	3001542895	EDDY	WOLF CAMP	6.8	119471.8	37359.2		5659.1	22.4	746.1		35.5	61.1	48.8
												73172.5		1035.5
														250





New Mexico Office of the State Engineer Water Right Summary



WR File Number: C 03580

Subbasin: -

Cross Reference: -

Primary Purpose: EXP EXPLORATION

Primary Status:

Total Acres:

Subfile: -

Total Diversion: 0

Cause/Case: -

Owner: INTERCONTINENTAL POTASH CORP

Contact: TOM COPE

Documents on File

Trn #	Doc	File/Act	Status		Transaction Desc.	From/To		Acres	Diversion	Consumptive
			1	2						
515225	EXPL	2012 10 17	PMT	APR	C 03580 (2 BOREHOLES- MIN EXPL)	T		0	0	

Current Points of Diversion

POD Number	Source	Q Q Q				(NAD83 UTM in meters)		Other Location Desc
		64	16	4	Sec Tws Rng	X	Y	
C 03580 POD1		3	2	23	24S 34E	647336	3564313	ICP-011
C 03580 POD2		3	1	24	24S 33E	638123	3563932	ICP-097

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.

9/6/17 1:40 PM

WR SUMMARY - C 03580

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

**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN LEA
COUNTY, NEW MEXICO.**

CASE NO. 20985

AFFIDAVIT OF NEEL DUNCAN

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

I, Neel Duncan, make the following affidavit based upon my own personal knowledge.

1. I am over eighteen (18) years of age and am otherwise competent to make the statements contained herein.

2. I am the Managing Director at Integrated Petroleum Technologies. I am a consultant for NGL Water Solutions Permian, LLC and my responsibilities include planning, assisting with permitting, drilling and completing salt water disposal wells and slurry injection wells.

3. I am familiar with the application NGL submitted in this case for a slurry injection well in Lea County.

4. I have also worked with NGL before on slurry injection wells in Colorado. I have worked with NGL on drilling, completing, and working over slurry wells.

5. NGL currently operates a slurry injection facility in Colorado, called the C-9. It is located in Northern Colorado.



6. I visited the injection facility on Friday, January 3, 2020, and took the attached photos.

7. I attest that the information provided herein is correct and complete to the best of my knowledge and belief.

[Signature page follows]



Neel Duncan

SUBSCRIBED AND SWORN to before me this 8th day of January, 2020 by Neel Duncan.



Notary Public

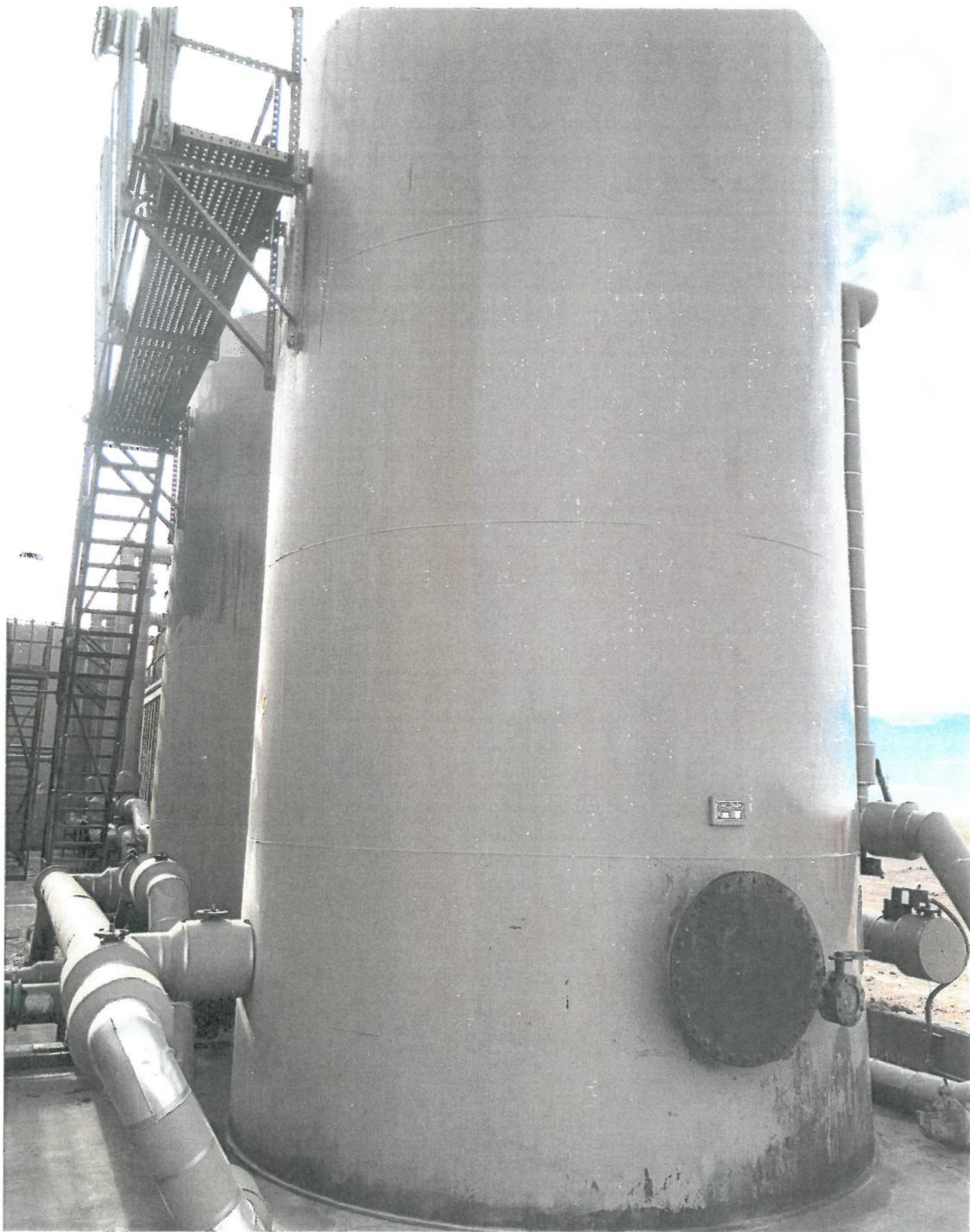
My commission expires: 02-27-21

















33A

NGL Mud Plant Conceptual

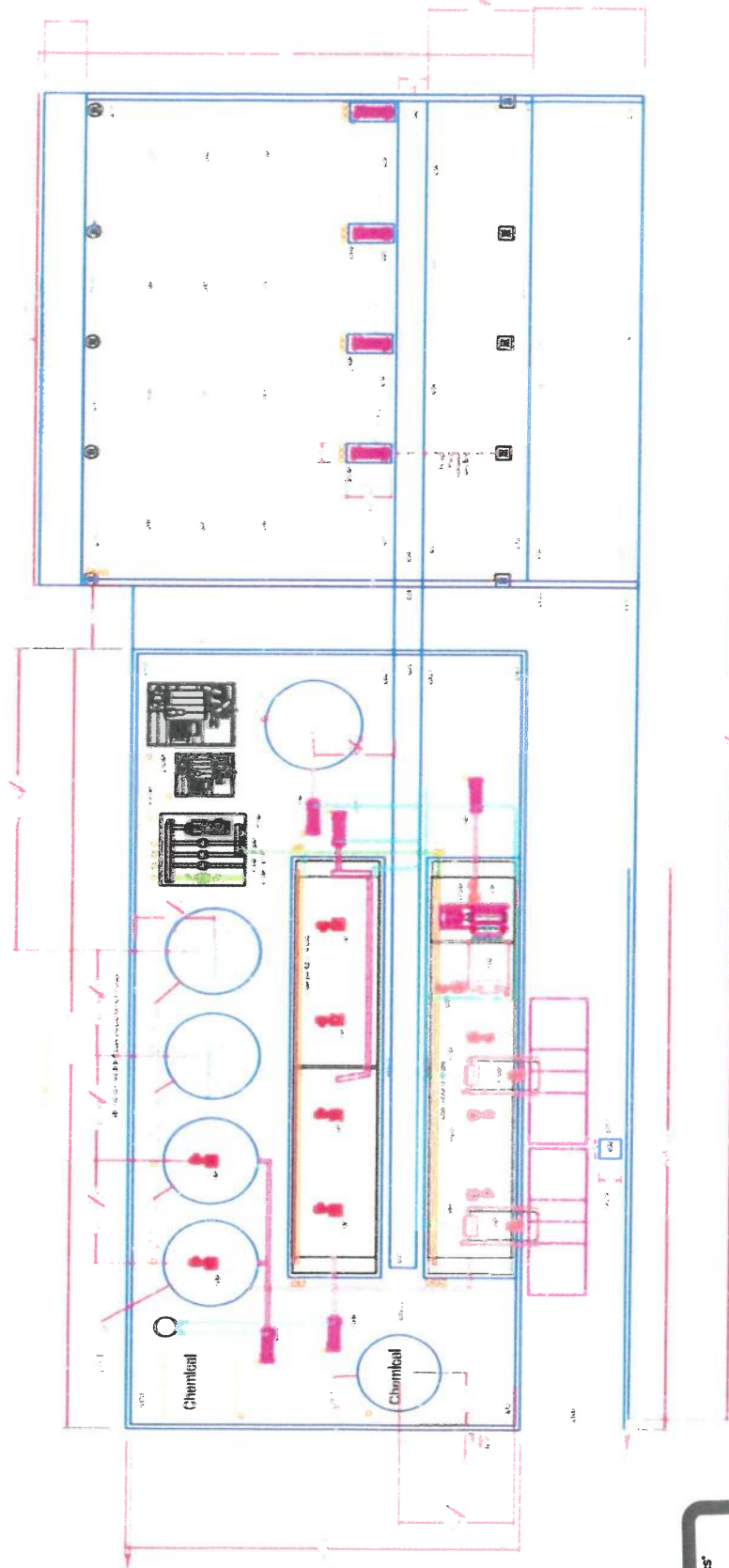
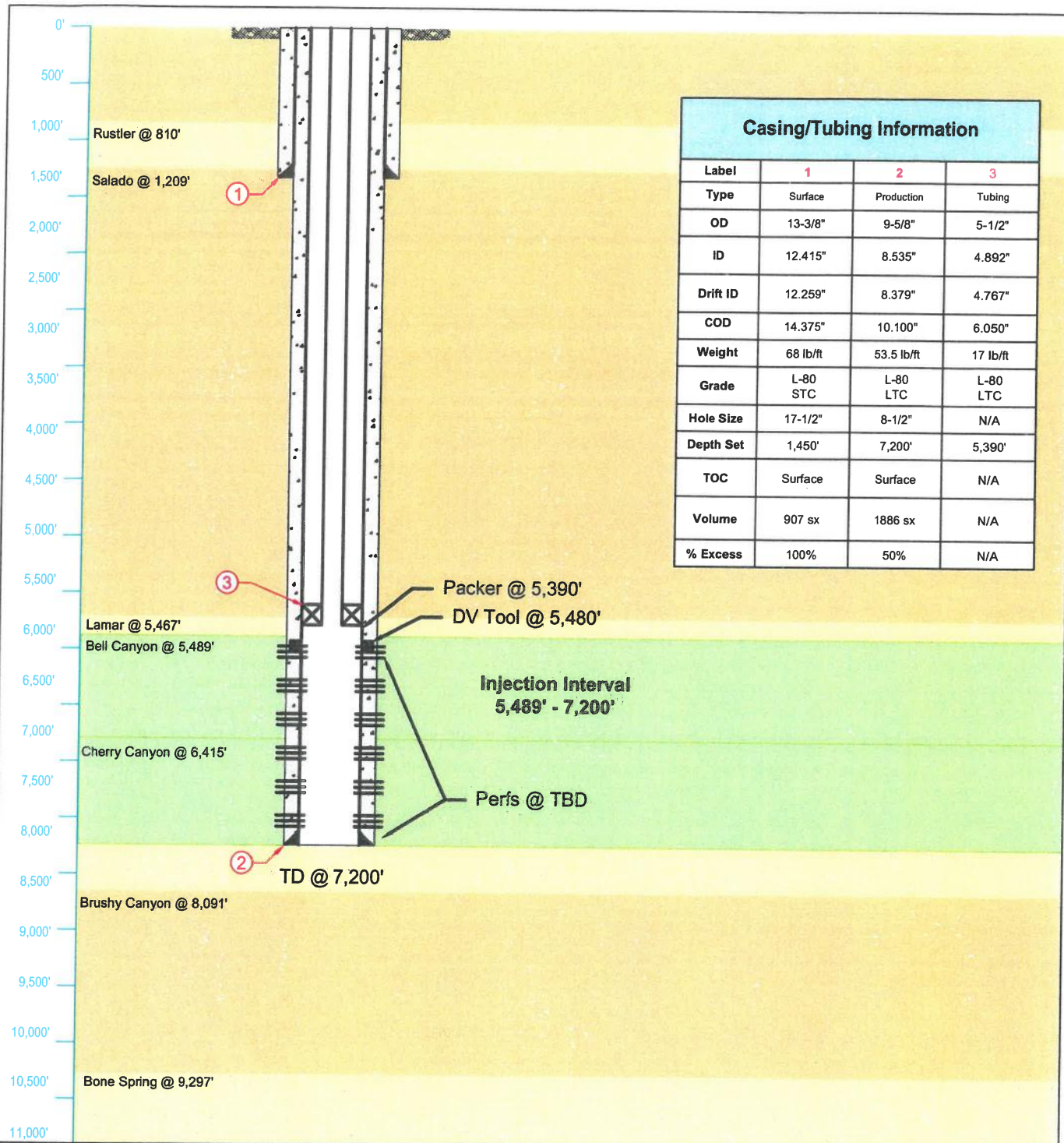
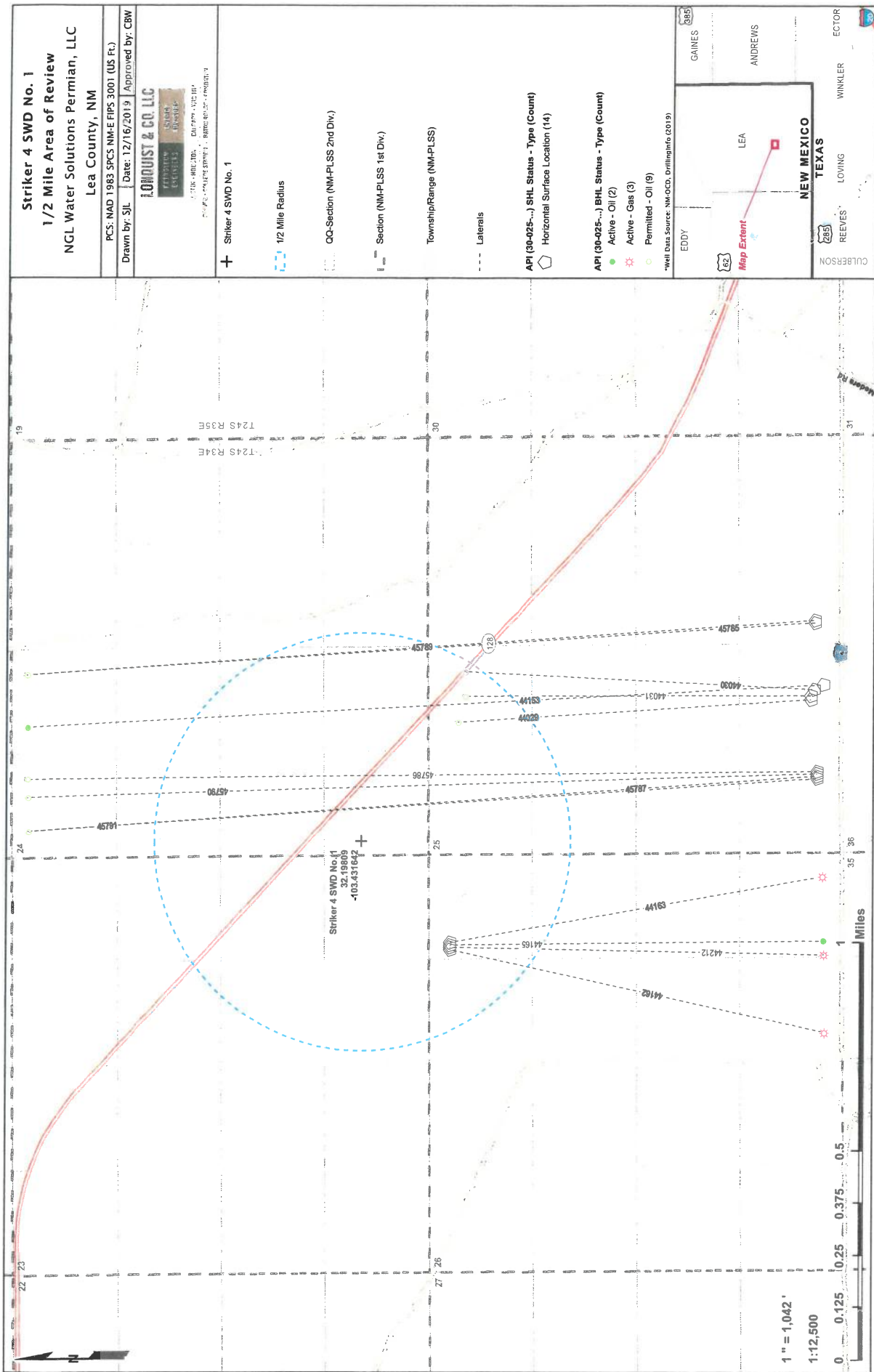


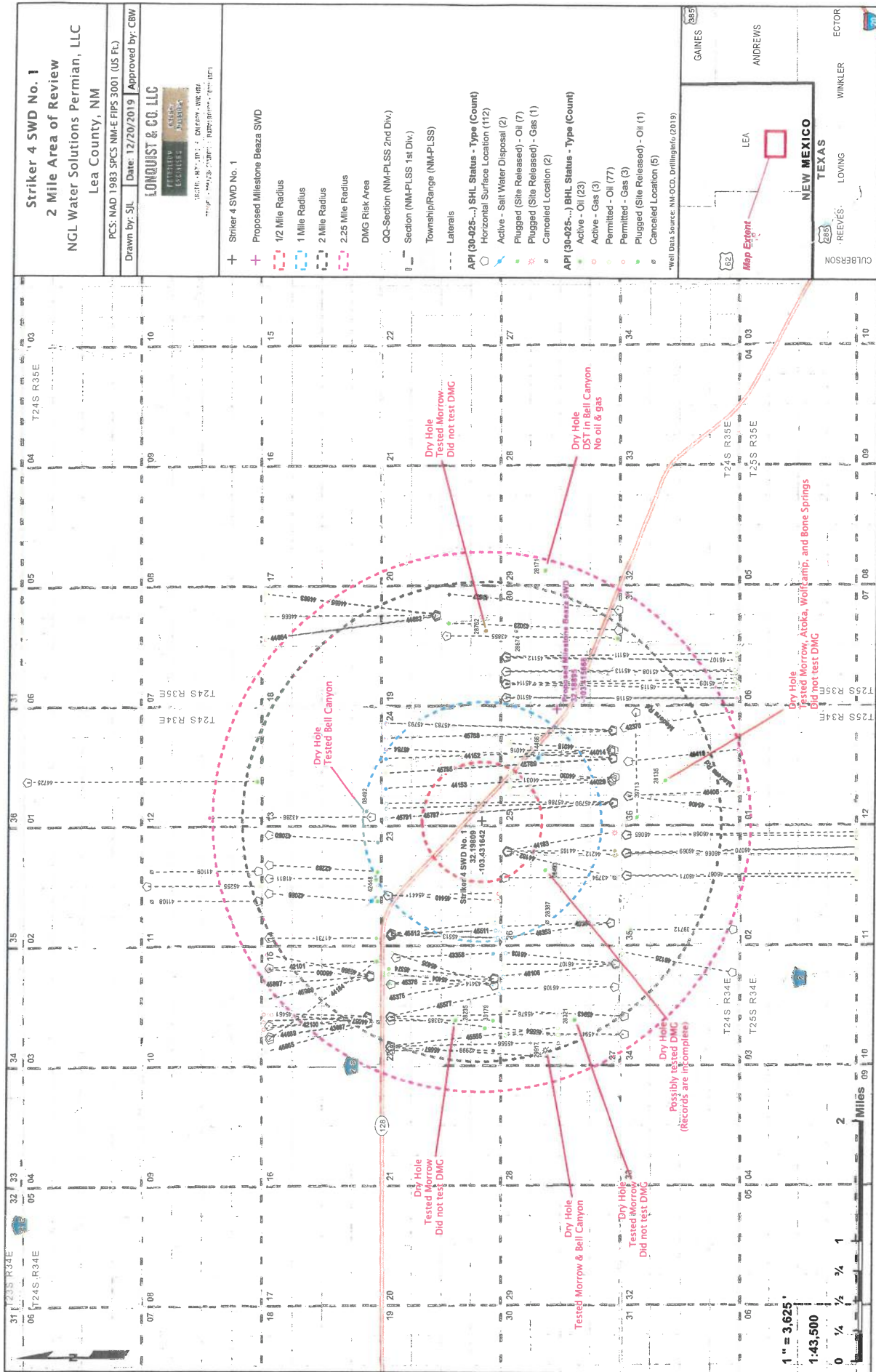
EXHIBIT
1-C



LONQUIST & CO. LLC PETROLEUM ENGINEERS ENERGY ADVISORS HOUSTON, CALGARY, AUSTIN, WICHITA, DENVER Texas License F-9147 12912 Hill Country Blvd. Ste F-200 Austin, Texas 78738 Tel: 512.732.9812 Fax: 512.732.9816	NGL Water Solutions Permian LLC		Striker 4 - SWD No. 1	
	Country: USA		State/Province: New Mexico	County/Parish: Eddy
	Location:		Site:	Survey/STR: 24-24S-34E
	API No:		Field:	Well Type/Status: SWD
	State ID No:		Project No: 1470	Date: 01/03/2022
	Drawn: JAM		Reviewed: CW	Approved: C
	Rev No: 2		Notes:	

EXHIBIT
1-D
 35





Striker 4 SWD No. 1

API (30-025-...)	WELL NAME	WELL TYPE	STATUS	OPERATOR	TWD (FT.)	LATITUDE (NAD83 DD)	LONGITUDE (NAD83 DD)	DATE DRILLED	FIELD
08492	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	6455	32.2111240	-103.4306500	1/7/1900	
08493	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	4738	32.1903340	-103.4385910	1/7/1900	
07681	PRE-ONGARD WELL #001	O	C	PRE-ONGARD WELL OPERATOR	0	32.1716705	-103.447709764	12/31/1999	
51135	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	16300	32.17579650	-103.425778880	1/7/1900	
51131	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	5436	32.13030760	-103.39500450	1/7/1900	
28235	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	15525	32.20212670	-103.45995330	1/7/1900	
24121	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	15530	32.18671420	-103.45993040	1/7/1900	
11912	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	0	32.19005347	-103.44604208	12/31/1999	
35596	MOORE 34 COM #001	O	P	JOHNNY G JONES	15376	32.17582320	-103.45564270	2/13/1984	[50374] PITCHCOCK RANCH, STRAWN
26762	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	15800	32.19757460	-103.40444950	1/7/1900	
28874	PRE-ONGARD WELL #001	O	C	PRE-ONGARD WELL OPERATOR	0	32.19393586	-103.40447512	1/7/1900	
29317	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	15142	32.190334960	-103.46420280	1/7/1900	[84230] PITCHCOCK RANCH, MORROW (GAS)
50179	PRE-ONGARD WELL #001	O	P	PRE-ONGARD WELL OPERATOR	15500	32.19760510	-103.46101380	1/7/1900	
39712	ORANGE RAIDER BPH STATE #001H	O	P	COG OPERATING LLC	9453	32.16764070	-103.44710540	4/1/2010	
39713	YELLOW RAIDER BPH STATE COM #001	O	P	ENCLOSURE RESOURCES LLC	525	32.16764070	-103.44710540	4/1/2010	
40098	BLACK RAIDER BPH STATE #001H	O	A	EOG RESOURCES INC	9335	32.16762540	-103.44710540	10/6/2012	[96403] WHIDCAT MOUNTAIN (GAS) WC-025 G-06 5234324M, DELAWARE
41064	SALVADOR FEE #001H	O	A	COG PRODUCTION, LLC	10779	32.22524260	-103.45140080	1/27/2014	
41108	VAN GOGH FEE #001H	O	A	COG OPERATING LLC	0	32.22521880	-103.44276350	12/31/1999	
41109	VAN GOGH FEE #002C	O	C	COG OPERATING LLC	0	32.22521880	-103.44276350	12/31/1999	
47331	GRAMMA RIDGE 14 24 34 #002H	O	A	CHEVRON U S A INC	11.266	32.22332270	-103.43861390	12/31/1999	
41811	GRAMMA RIDGE 14 24 34 #001H	O	A	CHEVRON U S A INC	11.252	32.22332270	-103.44481650	12/31/2014	
47059	GRAMMA RIDGE 14 24 34 #005H	O	A	CHEVRON U S A INC	9.553	32.22191510	-103.441179530	9/8/2014	
47060	GRAMMA RIDGE 14 24 34 #008H	O	A	CHEVRON U S A INC	12.284	32.22191510	-103.441179530	6/24/2015	
47100	MEDLIN WIDOW 15 24 34 #001C	O	C	CHEVRON U S A INC	0	32.22191510	-103.462942350	12/7/2014	
47101	MEDLIN WIDOW 15 24 34 #007C	O	C	CHEVRON U S A INC	0	32.22191510	-103.462942350	12/7/2014	
47289	GRAMMA RIDGE 14 24 34 #007C	O	C	CHEVRON U S A INC	0	32.22191510	-103.462942350	12/7/2014	
47316	GRAMMA RIDGE 14 24 34 #008H	O	A	CHEVRON U S A INC	12.294	32.22191510	-103.462942350	12/7/2014	
47378	ANTELOPE RIDGE 11 24 34 FEDERAL #003H	O	A	CHEVRON MIDCONTINENT, L.P.	10.944	32.21727231	-103.45172957	3/16/2015	
42376	TELECASTER BASIN 36 STATE #004H	O	A	COG OPERATING LLC	12.792	32.180737421	-103.47181592	2/10/2015	
42448	MADRAVA SWID #001	S	A	OWI SWD OPERATING, LLC	19.222	32.21448421	-103.442848450	4/21/2015	[96434] RED HILLS, BONE SPRING, NORTH; [98116] WC-025 G-09 5234302N, WOLF-CAMP
47513	SALVADOR FEE #005H	O	A	COG OPERATING LLC	9.202	32.21734057	-103.442848450	3/4/2015	[96102] SWD, DEVONIAN
47390	TELECASTER BASIN 36 STATE #001C	O	A	COG OPERATING LLC	0	32.18033760	-103.45108920	1/7/1999	[96434] RED HILLS, BONE SPRING, NORTH
47391	TELECASTER BASIN 36 STATE #002C	O	C	COG OPERATING LLC	0	32.18033760	-103.45108920	1/7/1999	[96434] RED HILLS, BONE SPRING, NORTH
47399	ROVETO FEDERAL COM #001H	O	A	CENTENNIAL RESOURCE PRODUCTION, LLC	11.210	32.20919210	-103.47138010	12/31/1999	[96434] RED HILLS, BONE SPRING, NORTH
43023	FASCINATOR FEE COM #002H	O	A	COG OPERATING LLC	12.360	32.18150750	-103.46423440	12/7/2017	[98098] WC-025 G-09 5243532M, WOLF-BONE
43025	ORANGE RAIDER BPH STATE #004C	O	C	COG OPERATING LLC	0	32.18148957	-103.44726460	4/24/2016	[2200] ANTELOPE RIDGE, BONE SPRING, [97369] RED HILLS, BONE SPRING, EAST
43037	FASCINATOR FEE #001H	O	C	COG OPERATING LLC	0	32.18148957	-103.44726460	10/17/2016	[98098] WC-025 G-09 5243532M, WOLF-BONE
43286	SOMMER FEDERAL COM #004H	O	A	COG OPERATING LLC	53.292	32.21153304	-103.43096590	12/17/2016	[96434] RED HILLS, BONE SPRING, NORTH
43158	SHERA FEDERAL COM #001H	O	A	CENTENNIAL RESOURCE PRODUCTION, LLC	5.312	32.20192750	-103.45101130	8/18/2016	[2220] ANTELOPE RIDGE, WOLF-CAMP; [96434] RED HILLS, BONE SPRING, NORTH
43165	JULET FEDERAL COM #001H	O	A	CENTENNIAL RESOURCE PRODUCTION, LLC	12.490	32.20587950	-103.45995790	12/31/2017	[2220] ANTELOPE RIDGE, WOLF-CAMP; [96434] RED HILLS, BONE SPRING, NORTH
43414	SOLOMON FEDERAL COM #001H	O	A	CENTENNIAL RESOURCE PRODUCTION, LLC	11.227	32.22858930	-103.45477590	12/31/1999	[96434] RED HILLS, BONE SPRING, NORTH
43665	FLORMASTER 24 31 S 15 #00H	O	A	MARATHON OIL PERMIAN LLC	11.194	32.22385867	-103.46223870	3/8/2018	[2220] ANTELOPE RIDGE, WOLF-CAMP; [96434] RED HILLS, BONE SPRING, NORTH
43667	FLORMASTER 24 31 S 15 #00H	O	A	MARATHON OIL PERMIAN LLC	11.194	32.22385867	-103.46223870	3/8/2018	[2220] ANTELOPE RIDGE, WOLF-CAMP; [96434] RED HILLS, BONE SPRING, NORTH
43734	KNIFE FIGHTER FEE #001C	O	C	MARATHON OIL PERMIAN LLC	0	32.19528520	-103.43196726	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
43853	FASCINATOR FEE #024H	O	C	COG OPERATING LLC	12.831	32.20740300	-103.40521100	8/5/2017	[98098] WC-025 G-09 5234332M, WOLF-BONE; [98233] WC-025 G-09 52435191, WOLF-CAMP
44014	VENING FEE WCA #001H	O	A	COG OPERATING LLC	0	32.18743900	-103.42174700	1/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44015	VENING FEE WCA #002H	O	A	COG OPERATING LLC	0	32.18743900	-103.42174700	1/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44016	VENING FEE WCA #003H	O	N	COG OPERATING LLC	0	32.18743900	-103.42142200	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44019	SUPER FEE WCA #001H	O	N	COG OPERATING LLC	0	32.18743900	-103.47158300	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44020	SUPER FEE WCA #002H	O	N	COG OPERATING LLC	0	32.18743900	-103.42597800	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44030	SUPER FEE WCA #003H	O	N	COG OPERATING LLC	0	32.19470600	-103.42480300	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44031	SUPER FEE WCA #004H	O	N	COG OPERATING LLC	0	32.18743900	-103.421581700	12/31/1999	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44132	JACINTO FEDERAL COM #004H	O	A	COG OPERATING LLC	12.629	32.18200200	-103.42159100	6/24/2018	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44133	BASEBALL CAP FEDERAL COM #026H	O	A	COG OPERATING LLC	12.615	32.18190800	-103.42159100	12/9/2017	[98116] WC-025 G-09 5234302N, WOLF-CAMP
44162	DEE BRUNT FEE 24 36 WXY #003H	G	A	MARATHON OIL PERMIAN LLC	12.843	32.19502156	-103.43861029	3/26/2018	[2220] ANTELOPE RIDGE, WOLF-CAMP
44163	DEE BRUNT FEE 24 36 WXY #004H	G	A	MARATHON OIL PERMIAN LLC	12.671	32.19501949	-103.43861029	3/29/2018	[2220] ANTELOPE RIDGE, WOLF-CAMP
44164	FLOWMASTER FEE 24 34 15 TBU #003H	G	A	MARATHON OIL PERMIAN LLC	11.932	32.22386089	-103.46259211	3/7/2018	[96434] RED HILLS, BONE SPRING, NORTH
44165	DEE BOOT FEE 24 36 TB #00H	G	A	MARATHON OIL PERMIAN LLC	12.434	32.19502018	-103.43860735	4/1/2018	[96434] RED HILLS, BONE SPRING, NORTH
44172	DEE BOOT FEE 24 36 TB #00H	G	A	MARATHON OIL PERMIAN LLC	12.729	32.19502087	-103.43860735	4/6/2018	[96434] RED HILLS, BONE SPRING, NORTH
44261	MOONMAY SWD #001	S	A	DELAWARE ENERGY, LLC	19.820	32.19502087	-103.43860735	4/16/2019	[97869] SWD, DEVONIAN-SULBUR
44262	BLUEBERRY HILL 19 TB FEE #003H	O	A	MARATHON OIL PERMIAN LLC	0	-107.4024110	41.16/2019	[98098] WC-025 G-09 5243532M, WOLF-BONE	
44263	BLUEBERRY HILL 19 TB FEE #010H	O	A	MARATHON OIL PERMIAN LLC	0	-107.4024110	41.16/2019	[98098] WC-025 G-09 5243532M, WOLF-BONE	
44264	BLUEBERRY HILL 19 WA FEE #005H	O	N	MARATHON OIL PERMIAN LLC	0	32.20364492	-103.407221705	4/14/2019	[98098] WC-025 G-09 5243532M, WOLF-BONE
44265	BLUEBERRY HILL 19 WA FEE #005H	O	N	MARATHON OIL PERMIAN LLC	0	32.20364492	-103.407221705	4/14/2019	[98098] WC-025 G-09 5243532M, WOLF-BONE

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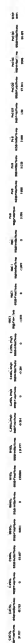
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44655	BLUEBERRY HILL 19 WAY FEE #006H	O	N		MARATHON OIL PERMIAN LLC	-103.402172007	4/12/2019	960981	WC-025 G-09 S2435332M, WOLFBOONE
44666	FLOWMASTER 115 WAY FEE #004H	O			MARATHON OIL PERMIAN LLC	32.203645210	4/15/2019	960981	WC-025 G-09 S2435332M, WOLFBOONE
44683	FLOWMASTER 15 WAY FEE #000H	O	A		MARATHON OIL PERMIAN LLC	0	12/21/15	960981	WC-025 G-09 S2435332M, WOLFBOONE
44684	FLOWMASTER FEE 24 15 TB #007H	O	A		MARATHON OIL PERMIAN LLC	32.223496507	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44685	FLOWMASTER 15 TB FEE #007H	O	A		MARATHON OIL PERMIAN LLC	32.211900511	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44686	FLOWMASTER FEE 24 34 15 TB #009C	O	C		MARATHON OIL PERMIAN LLC	32.22386640	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44687	FLOWMASTER FEE 24 34 15 WAY #014H	O	A		MARATHON OIL PERMIAN LLC	32.21120671	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44688	FLOWMASTER 15 WAY FEE #003H	O	A		MARATHON OIL PERMIAN LLC	32.21190496	5/16/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44689	FLOWMASTER 15 WAY FEE #003H	O	A		MARATHON OIL PERMIAN LLC	32.223496507	5/16/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44725	MORTENBAND FEDERAL COM #013H	O	A		MARATHON OIL PERMIAN LLC	32.223496507	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44754	STONEWALL 28 FEDERAL COM #313H	O	A		COG OPERATING LLC	32.211900511	10/27/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
44873	STONEWALL 28 FEDERAL COM #314H	O	A		COG OPERATING LLC	32.25323400	11/8/60	960981	WC-025 G-09 S2435332M, WOLFBOONE
44930	STONEWALL 28 FEDERAL COM #715H	O	N		COG RESOURCES INC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45057	BONARD FEDERAL COM #015H	O	N		COG RESOURCES INC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45107	FASCINATOR FEDERAL COM #601H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45108	FASCINATOR FEDERAL COM #602H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45109	FASCINATOR FEDERAL COM #603H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45110	FASCINATOR FEDERAL COM #604H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45111	FASCINATOR FEDERAL COM #701H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45112	FASCINATOR FEDERAL COM #702H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45113	FASCINATOR FEDERAL COM #703H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45114	FASCINATOR FEDERAL COM #704H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45115	FASCINATOR FEDERAL COM #705H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45116	FASCINATOR FEDERAL COM #706H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45255	VAN GOGH FEE #010H	O	N		COG OPERATING LLC	32.19524110	12/21/17	960981	WC-025 G-09 S2435332M, WOLFBOONE
45274	SHERA FEDERAL COM #711H	O	N		CENTENNIAL RESOURCE PRODUCTION, LLC	32.23927400	10/18/2018	960981	WC-025 G-09 S2435332M, WOLFBOONE
45275	SOLOMON FEDERAL COM #709H	O	A		CENTENNIAL RESOURCE PRODUCTION, LLC	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45276	SOLOMON FEDERAL COM #710H	O	A		CENTENNIAL RESOURCE PRODUCTION, LLC	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45304	SHERA FEDERAL COM #508H	O	A		CENTENNIAL RESOURCE PRODUCTION, LLC	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45405	SHERA FEDERAL COM #507H	O	N		CENTENNIAL RESOURCE PRODUCTION, LLC	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45440	BRAD LUMMIS COM #122H	O	N		MATADOR PRODUCTION COMPANY	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45441	BRAD LUMMIS COM #123H	O	N		MATADOR PRODUCTION COMPANY	32.19669500	12/31/1999	960981	WC-025 G-09 S2435332M, WOLFBOONE
45460	FLOWMASTER 15 WB FEE #011H	O	N		MATADOR PRODUCTION COMPANY	32.19669500	12/31		

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45943	PERGRIENE 27 FEDERAL COM #705H	O	N	EOG RESOURCES INC	0	32.18086260	-103.45943870	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
45965	FLOWMASTER 15 FB FEE #015H	O	N	MARATHON OIL PERMIAN LLC	0	32.21190671	-103.46037336	5/22/2019	194341 RED HILLS, BONE SPRING, NORTH
45997	WILL KANE 15 WA FEE #066H	O	N	MARATHON OIL PERMIAN LLC	0	32.21170365	-103.46367498	6/18/2019	12220 ANTELOPE RIDGE WOLF CAMP
45998	WILL KANE 15 WA FEE #011H	O	N	MARATHON OIL PERMIAN LLC	0	32.21170261	-103.46348100	6/9/2019	12220 ANTELOPE RIDGE WOLF CAMP
45999	WILL KANE 15 WAY FEE #033H	O	N	MARATHON OIL PERMIAN LLC	0	32.21170462	-103.46377177	6/23/2019	12220 ANTELOPE RIDGE WOLF CAMP
46000	WILL KANE 15 WAY FEE #010H	G	N	MARATHON OIL PERMIAN LLC	0	32.21170309	-103.45357799	6/11/2019	12220 ANTELOPE RIDGE WOLF CAMP
46065	BROT HELM FEDERAL COM #601H	O	N	COG OPERATING LLC	0	32.18056000	-103.43355600	12/31/9999	1973691 RED HILLS, BONE SPRING, EAST
46066	BROT HELM FEDERAL COM #602H	O	N	COG OPERATING LLC	0	32.18056000	-103.43362000	12/31/9999	1973691 RED HILLS, BONE SPRING, EAST
46067	BROT HELM FEDERAL COM #603H	O	N	COG OPERATING LLC	0	32.18056000	-103.43363000	12/31/9999	1973691 RED HILLS, BONE SPRING, EAST
46068	BROT HELM FEDERAL COM #701H	O	N	COG OPERATING LLC	0	32.18056000	-103.43361000	12/31/9999	1981161 WC-025 G-09 S253402N, WOLF CAMP
46069	BROT HELM FEDERAL COM #702H	O	N	COG OPERATING LLC	0	32.18056000	-103.43362000	12/31/9999	1981161 WC-025 G-09 S253402N, WOLF CAMP
46070	BROT HELM FEDERAL COM #703H	O	N	COG OPERATING LLC	0	32.18056000	-103.43363000	12/31/9999	1981161 WC-025 G-09 S253402N, WOLF CAMP
46071	BROT HELM FEDERAL COM #704H	O	N	COG OPERATING LLC	0	32.18056000	-103.43364000	12/31/9999	1981161 WC-025 G-09 S253402N, WOLF CAMP
46104	PERGRIENE 27 FEDERAL COM #706H	O	N	EOG RESOURCES INC	0	32.18207770	-103.45526220	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
46105	PERGRIENE 27 FEDERAL COM #707H	O	N	EOG RESOURCES INC	0	32.18198700	-103.45526230	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
46106	PERGRIENE 27 FEDERAL COM #708H	O	N	EOG RESOURCES INC	0	32.18181960	-103.45211140	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
46107	PERGRIENE 27 FEDERAL COM #709H	O	N	EOG RESOURCES INC	0	32.18181950	-103.45200470	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
46108	PERGRIENE 27 FEDERAL COM #710H	O	N	EOG RESOURCES INC	0	32.18181950	-103.45189810	12/31/9999	12220 ANTELOPE RIDGE WOLF CAMP
46125	FIGHTENED TURTLE FEE #134H	O	N	TAP ROCK OPERATING, LLC	0	32.16769770	-103.45325280	12/31/9999	1503751 PITCHFORK RANCH, WOLF CAMP

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Sample ID	Test Req.	Location	Sample Point	API	Analysis Date	Region	Treatment1	Treatment2	Lease	Date Sampled
1200106001	CWA	Orla 1	Pre Injection						Orla 1	1/3/2020 0:00
ATP (pg/mL)	Density (g/cm ³)	pH	CaCO ₃ SI@FinalTemp	CaCO ₃ SI@InitialTemp	CaSO ₄ SI@FinalTemp	CaSO ₄ SI@InitialTemp	BaSO ₄ SI@FinalTemp	BaSO ₄ SI@InitialTemp	SrSO ₄ SI@FinalTemp	SrSO ₄ SI@InitialTemp
	1.0497	6.76	0.653	0.994	-0.612	0.0444	0.0333	-0.538	0.425	0.405
Amine Residual (ppm)	Amine Chemical	Phosphate (mg/L)	PO4 as Chem (mg/L)	TDS (mg/L)	Bicarbonate [HCO ₃] ⁻ (mg/L)	Sulfate [SO ₄] ²⁻ (mg/L)	Chloride [Cl ⁻] (mg/L)	Hydrogen Sulfide [H ₂ S] (mg/L)	Carbon Dioxide [CO ₂] (mg/L)	
		230.14		75065	295.24	1560	41200	4.42	212	
Dissolved Oxygen [O ₂]	Iron [Fe] (mg/L)	Manganese [Mn] (mg/L)	Sodium [Na] (mg/L)	Calcium [Ca] (mg/L)	Magnesium [Mg] (mg/L)	Potassium [K] (mg/L)	Barium [Ba] (mg/L)	Strontium [Sr] (mg/L)	Initial Temperature (°F)	
	589.031	3.47	26091.1	3390.99	367.187	415.735	0.251923	312.635	190	
Dissolved Oxygen [O ₂]	Iron [Fe] (mg/L)	Manganese [Mn] (mg/L)	Sodium [Na] (mg/L)	Calcium [Ca] (mg/L)	Magnesium [Mg] (mg/L)	Potassium [K] (mg/L)	Barium [Ba] (mg/L)	Strontium [Sr] (mg/L)	Initial Temperature (°F)	
	589.031	3.47	26091.1	3390.99	367.187	415.735	0.251923	312.635	190	80

Initial Pressure (psia)	Final Pressure (psia)	PO4 Product	BQ (Units)			Coupon #	Coupon Type	K Factor	Initial Weight (g)	Final Weight (g)
1250	15									
Day In	Day Out	Corrosion Rate (mpy)	TPH (ppm)	TOG (ppm)	Turbidity (NTU)	Resistivity (Ωcm)	Conductivity (mS/cm)	TSS (mg/L)	Pore Size	Time
Pressure (psi)	Dissolved O2 Y/N	Dissolved O2 Value	Hydrocarbon Soluble (mg/L)	Acid Soluble (mg/L)	Acid Insoluble (mg/L)	Carbonate (mg/L)	Oxide/Sulfide (mg/L)	Filtered Volume (mL)	APB	SRB
API Gravity (°)	Pour Point (°C)	Cloud Point (°C)	% Paraffin	% Asphaltene	% Filterable Solids	% C10	% C11	% C12	% C13	% C14
% C15	% C16	% C17	% C18	% C19	% C20	% C21	% C22	% C23	% C24	% C25
% C26										
% C27	% C28	% C29	% C30	% C31	% C32	% C33	% C34	% C35	% C36	% C37
% C38	% C39	% C40	% C42	% C44	% C46	% C48	% C50	% C54	% C58	% C60
Aluminum [Al] (mg/L)	Lithium [Li] (mg/L)	Zinc [Zn] (mg/L)	Lead [Pb] (mg/L)	Borate [H ₃ BO ₃] (mg/L)	Silicon [Si] (mg/L)					
15.179	14.116	1.639	0.285997	392.4426	91.247					

Methane L%	Ethane M%	Ethane W%	Ethane L%	Propane M%	Propane W%	Propane L%	iso-Butane M%	iso-Butane W%	iso-Butane L%	n-Butane M%
n-Butane W%										
n-Butane L%	iso-Pentane M%	iso-Pentane W%	iso-Pentane L%	n-Pentane M%	n-Pentane W%	n-Pentane L%	Cyclopentane M%	Cyclopentane W%	Cyclopentane L%	n-Hexane M%
n-Hexane W%	n-Hexane L%	Cyclohexane M%	Cyclohexane W%	Cyclohexane L%	Other Hexanes M%	Other Hexanes W%	Other Hexanes L%	Heptanes M%	Heptanes W%	Heptanes L%
Methylcyclohexane M%	Methylcyclohexane W%	Methylcyclohexane L%	2,2,4-Trimethylpentane M%	2,2,4-Trimethylpentane W%	2,2,4-Trimethylpentane L%	Benzenes M%	Benzene W%	Benzene L%	Toluenes M%	Toluene W%
Toluene L%	Ethylbenzene M%	Ethylbenzene W%	Ethylbenzene L%	Xylenes M%	Xylenes W%	Xylenes L%	Octanes M%	Octanes W%	Octanes L%	Nonanes M%
Nonanes W%										

Nonanes L%	Decanes+ M%	Decanes + W%	Decanes+ L%		Hydrogen Sulfide ppm	Specific Gravity @ 60/60 F	Total GPM (Ethane Inc)	Calculated BTU (Dry)	Calculated BTU (Wet)	Avg Mol Wt
Molar Mass Ratio	Relative Density (calculated)	Ideal Gross Heating Value	Compressibility Factor (z)	Propane GPM	Butane GPM	Gasoline GPM (Ethane and Heavier)	VOC Weight Fraction	Higher Heating Value (BTU/ft ³)	Lower Heating Value (BTU/ft ³)	Sample Temperature (F):
Sample Temperature (PSI):	C6+ M%	C6+ W%	C6+ L%		2,2-Dimethylbutane M%	2,2-Dimethylbutane W%	2,2-Dimethylbutane L%	2-Methylpentane M%	2-Methylpentane W%	2-Methylpentane L%
3-Methylpentane W%	3-Methylpentane L%	Methylcyclopentane M%	Methylcyclopentane W%	Methylcyclopentane L%	Other Heptanes M%	Other Heptanes W%	Other Heptanes L%	n-Heptane M%	n-Heptane W%	n-Heptane L%

n-Octane M%	n-Octane W%	n-Octane L%	m/p - Xylene Composite M%	m/p - Xylene Composite W%	m/p - Xylene Composite L%	O- Xylene M%	o-Xylene W%	o-Xylene L%	n- Nonane M%	n-Nonane W%
n-Nonane L%	Decanes M%	Decanes W%	Decanes L%	n- Decane M%	n-Decane W%	n- Decane L%	Undecanes (C11) M%	Undecanes (C11) W%	Undecanes (C11) L%	Dodecanes (C12) M%
Dodecanes (C12) W%										
Dodecanes (C12) L%	Tridecane s (C13) M%	Tridecane s (C13) W%	Tridecane s (C13) L%	Tetradecanes (C14) M%	Tetradecanes (C14) W%	Tetradecanes (C14) L%	Pentadecane s (C15) M%	Pentadecane s (C15) W%	Pentadecane s (C15) L%	Hexadecanes (C16) M%
Hexadecanes (C16) W%										
Hexadecanes (C16) L%	Heptadecanes (C17) M%	Heptadecanes (C17) W%	Heptadecanes (C17) L%	Octadecanes (C18) M%	Octadecanes (C18) W%	Octadecanes (C18) L%	Nonadecane s (C19) M%	Nonadecane s (C19) W%	Nonadecane s (C19) L%	Eicosanes (C20) M%
Eicosanes (C20) W%										
Eicosanes (C20) L%	Heneicosanes (C21) M%	Heneicosanes (C21) W%	Heneicosanes (C21) L%	Docosanes (C22) M%	Docosanes (C22) W%	Docosanes (C22) L%	Tricosanes (C23) M%	Tricosanes (C23) W%	Tricosanes (C23) L%	Tetracosanes (C24) M%

[illegible]



Oilfield Labs of America
3302 Pilot Ave.
Midland, Texas 79706
432-789-1860

Report Date: 1/6/2020

Complete Water Analysis

Customer:	NGL Water Solutions LLC	Account Rep:	Steven Duvall
Operator:	NGL	Sample ID:	01200106001
Lease:	Orla 1	Sample Date:	1/3/2020
Sample Point:	Pre Injection	Received Date:	1/6/2020
Region:	West Texas	Log Out Date:	1/6/2020

NGL Water Solutions LLC, NGL, Orla 1, Pre Injection

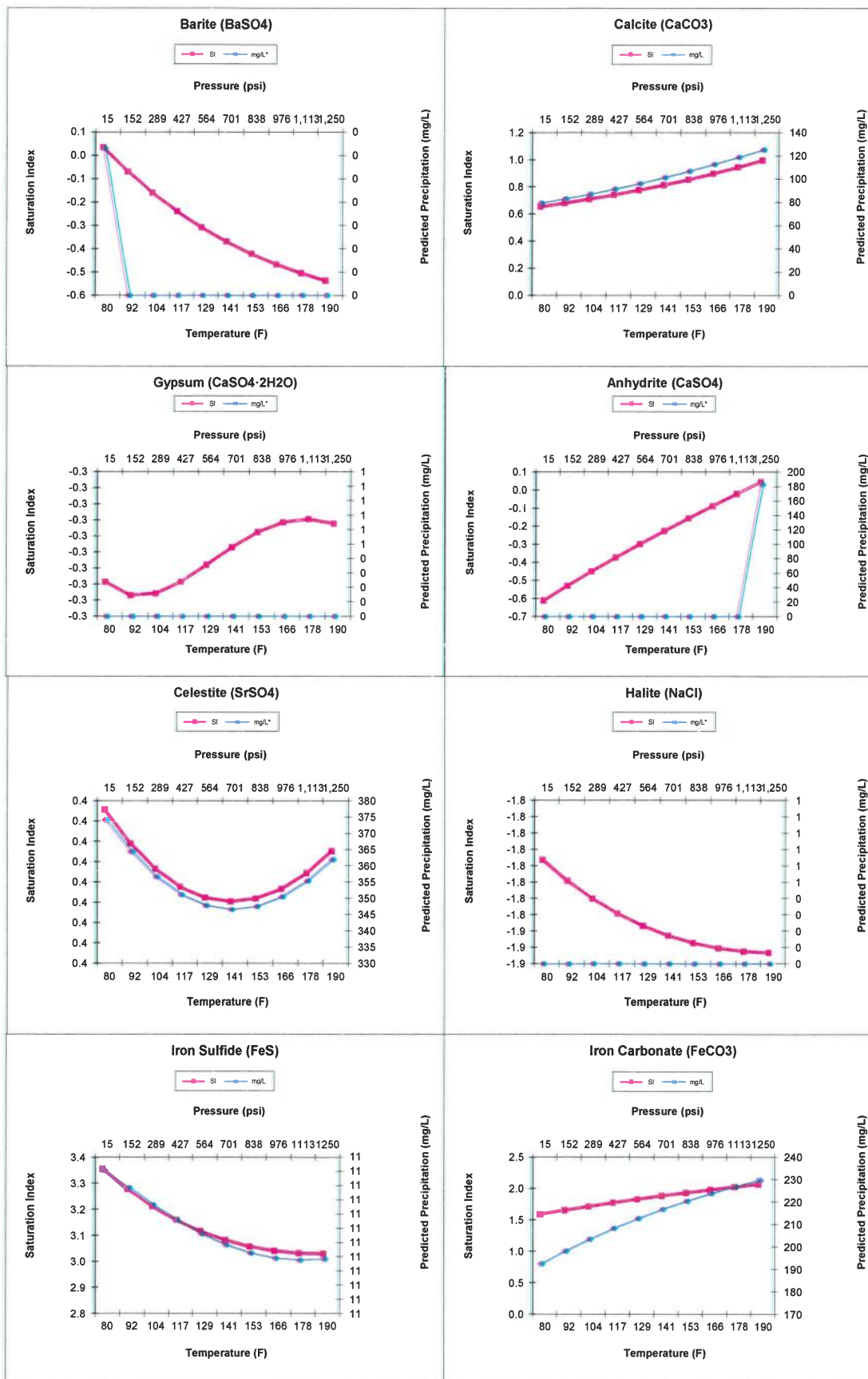
Field Data		Analysis of Sample					
		Anions:		mg/L		meq/L	
						Cations:	
						mg/L	
						meq/L	
Initial Temperature (°F):	190	Chloride (Cl ⁻):	41200	1162.2	Sodium (Na ⁺):	26091	1135.4
Final Temperature (°F):	80	Sulfate (SO ₄ ²⁻):	1560	32.5	Potassium (K ⁺):	416	10.6
Initial Pressure (psi):	1250	Bicarbonate (HCO ₃ ⁻):	295	4.8	Magnesium (Mg ²⁺):	367	30.2
Final Pressure (psi):	15	Carbonate (CO ₃ ²⁻):	ND		Calcium (Ca ²⁺):	3391	169.2
Dissolved Gases		Hydroxide (OH ⁻):	ND		Strontium (Sr ²⁺):	313	7.1
Dissolved CO ₂ (ppm):	212	Phosphate (PO ₄ ³⁻):	230	7.3	Barium (Ba ²⁺):	0.3	0.0
Dissolved H ₂ S (ppm):	4.4	Borate (H ₃ BO ₃):	393	6.4	Iron (Fe, Total):	589	21.1
Sample Parameters		Silica (SiO ₂):	195	3.3	Manganese (Mn ²⁺):	3.5	0.1
pH:	6.8				Lead (Pb ²⁺):	0.3	0.0
Calculated TDS (mg/L):	75065				Zinc (Zn ²⁺):	1.6	0.1
Calculated Density (g/cm ³):	1.0497				Lithium (Li ⁺):	14.1	2.0
Total Hardness (mg/L CaCO ₃):	10343				Aluminum (Al ³⁺):	15.2	1.7
Total Alkalinity (mg/L CaCO ₃):	242						
		Anion EPM Total:		1216	Cation EPM Total:		1378
N/A - Not Analyzed		% RPD of Cations/Anions:		12.4%	ND = Not Detected		

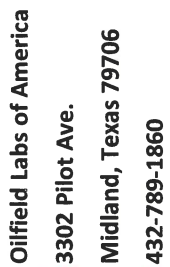
Conditions		Barite (BaSO ₄)		Calcite (CaCO ₃)		Gypsum (CaSO ₄ ·2H ₂ O)		Anhydrite (CaSO ₄)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.03	0.011	0.65	27.767	-0.28	0.000	-0.61	0.000
92°F	152 psi	-0.07	0.000	0.68	29.058	-0.29	0.000	-0.53	0.000
104°F	289 psi	-0.16	0.000	0.71	30.468	-0.29	0.000	-0.45	0.000
117°F	427 psi	-0.24	0.000	0.74	32.002	-0.28	0.000	-0.37	0.000
129°F	564 psi	-0.31	0.000	0.77	33.667	-0.28	0.000	-0.30	0.000
141°F	701 psi	-0.37	0.000	0.81	35.464	-0.27	0.000	-0.23	0.000
153°F	838 psi	-0.42	0.000	0.85	37.387	-0.27	0.000	-0.16	0.000
166°F	976 psi	-0.47	0.000	0.90	39.425	-0.27	0.000	-0.09	0.000
178°F	1113 psi	-0.51	0.000	0.94	41.563	-0.26	0.000	-0.02	0.000
190°F	1250 psi	-0.54	0.000	0.99	43.783	-0.27	0.000	0.04	63.987

Conditions		Celestite (SrSO ₄)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate (FeCO ₃)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.43	130.896	-1.81	0.000	3.35	3.988	1.59	67.364
92°F	152 psi	0.41	127.497	-1.82	0.000	3.28	3.988	1.66	69.376
104°F	289 psi	0.40	124.815	-1.83	0.000	3.21	3.987	1.72	71.228
117°F	427 psi	0.39	122.877	-1.84	0.000	3.16	3.987	1.78	72.914
129°F	564 psi	0.38	121.701	-1.85	0.000	3.12	3.987	1.83	74.455
141°F	701 psi	0.38	121.285	-1.85	0.000	3.08	3.986	1.88	75.866
153°F	838 psi	0.38	121.612	-1.86	0.000	3.06	3.986	1.93	77.161
166°F	976 psi	0.39	122.652	-1.86	0.000	3.04	3.986	1.98	78.351
178°F	1113 psi	0.39	124.360	-1.86	0.000	3.03	3.986	2.03	79.447
190°F	1250 psi	0.41	126.677	-1.86	0.000	3.03	3.986	2.07	80.455

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 eight (8) scales.
Note 3: Saturation Index predictions on this sheet use pH and alkalinity. %CO₂ is not included in the calculations.

Comments:





432-789-1860

Total Suspended Solids by Membrane Filtration Report

[illegible]

40.C.3

Search Earthquake Catalog

Search results are limited to 20,000 events. To get URL for a search, click the search button, then copy the URL from the browser address bar.

- [Help](#)
- [ANSS Comprehensive Earthquake Catalog \(ComCat\) Documentation](#)
- [Developer's Corner - bulk access to catalog, tools for obtaining specific products](#)
- [Significant Earthquakes Archive](#)

Basic Options

Magnitude	Date & Time	Geographic Region
2.5+	Past 7 Days	World
4.5+	Past 30 Days	Conterminous U.S. ¹
Custom	Custom	Custom
Minimum	Start (UTC)	Custom Circle
2	1900-01-01 00:00:00	• 32.19809 Latitude • -103.431642 Longitude • 9.08 Radius (km)
Maximum	End (UTC)	
	2019-12-20 23:59:59	Expand this Custom Circle Map

- Advanced Options

Geographic Region

Decimal degree coordinates. North must be greater than South. East must be greater than West.

North	
West	East
South	

Depth (km)

Minimum	Maximum

Azimuthal Gap

Minimum	Maximum

Circle

Center Latitude	Center Longitude
32.19809	-103.431642
Outer Radius (km)	
9.08	

Review Status

- Any
- Automatic
- Reviewed

+ Event Type

+ Impact (PAGER, ShakeMap, DYFI)

+ Catalog





Search Results

0 of - earthquakes in map area.

▼ Click for more information

There are no events in the current feed.

Didn't find what you were looking for?

- Check your [Settings](#).
- [Which earthquakes are included on the map and list?](#)
- [Felt something not shown -- report it here.](#)



Caution



The current selection does not currently include any earthquakes.

Earthquakes happen around the world all the time. Change your options to view more earthquakes.

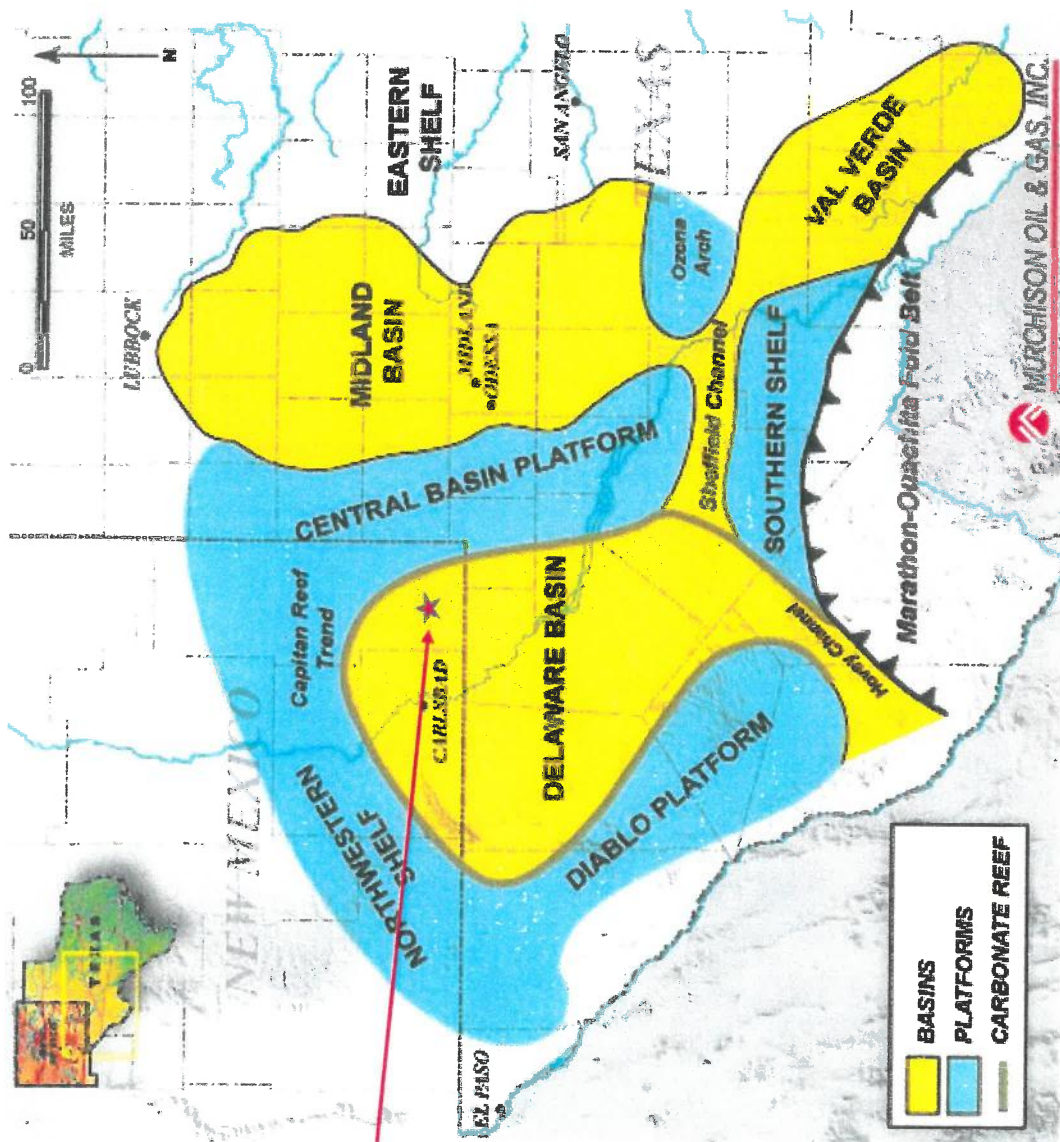
[Continue](#)

Earthquakes loading

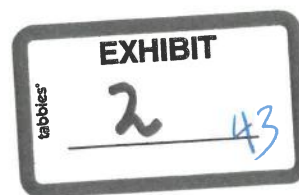


42

Exhibits of Parker Jessee (Geology)
On Behalf of NGL Water Solutions Permian, LLC



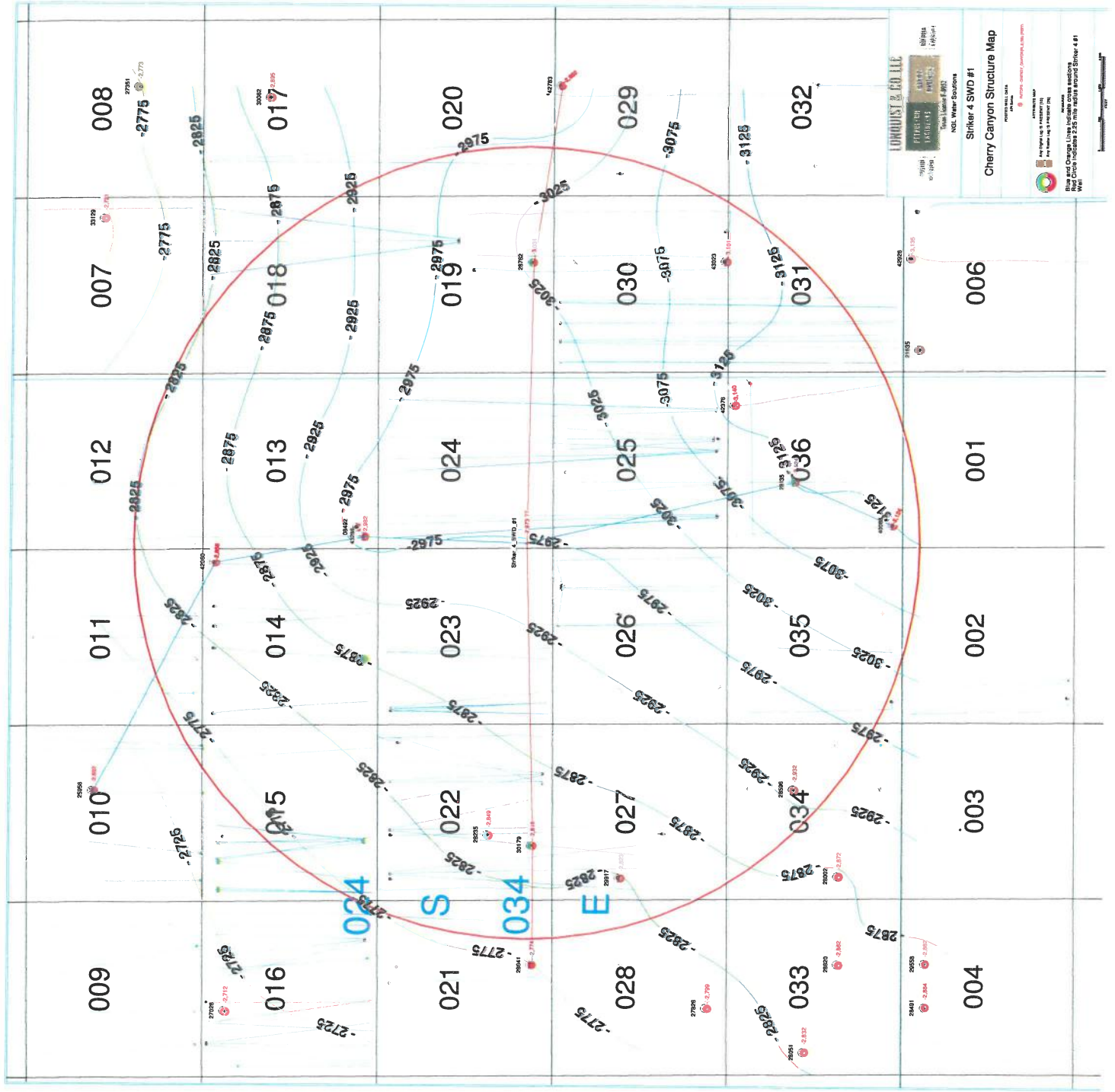
Striker 4
Location

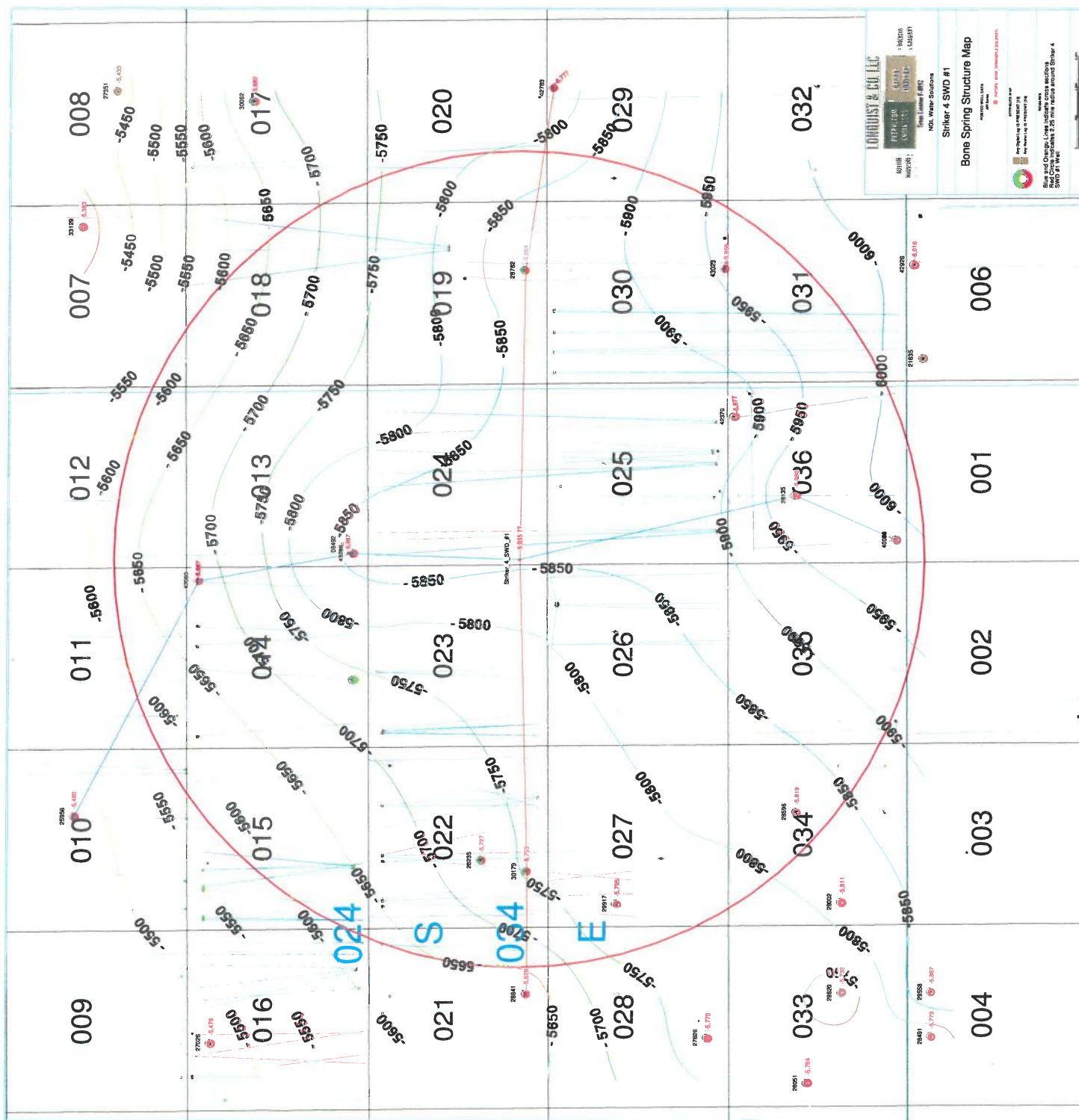


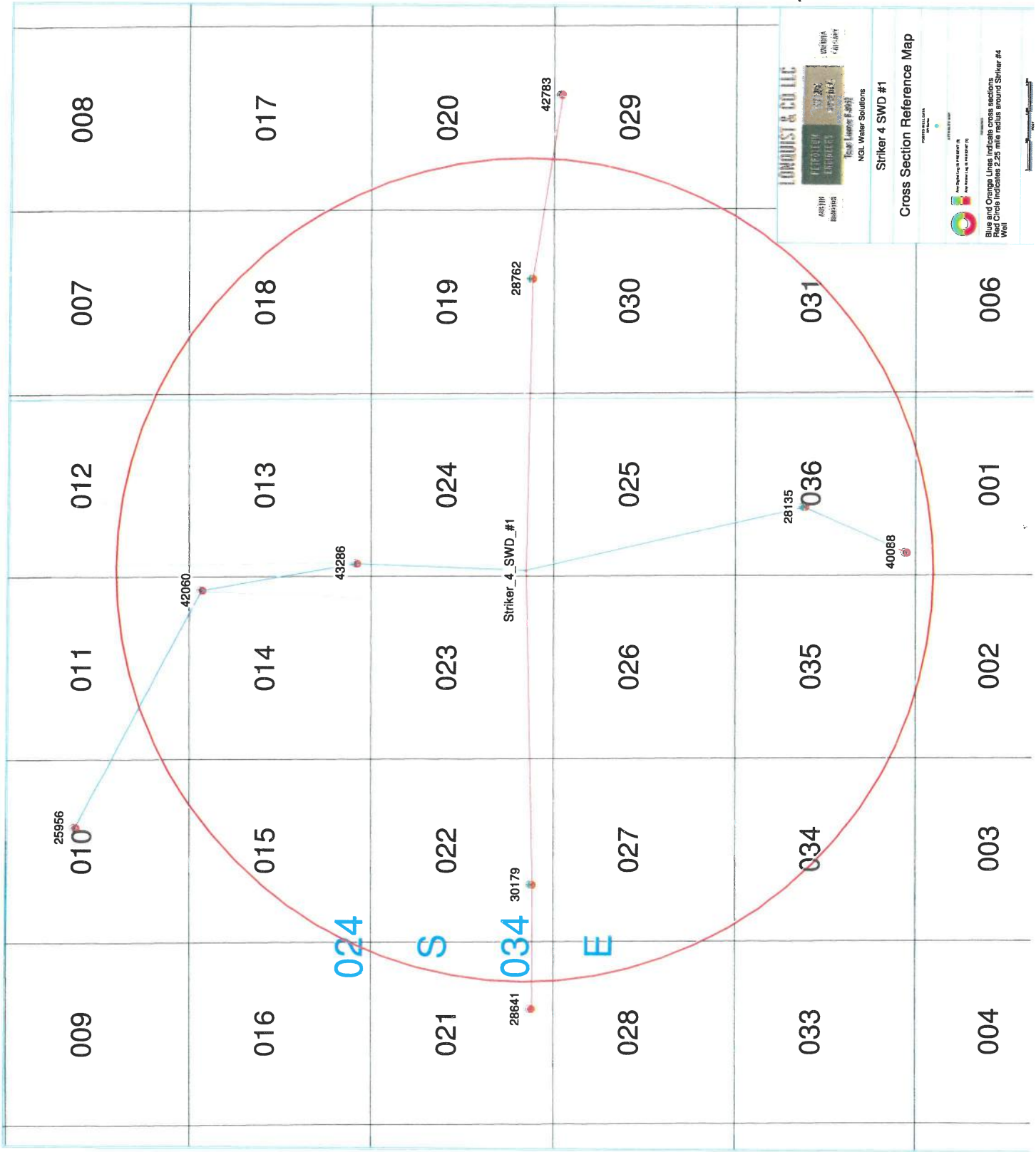
Age		Stratigraphic Unit		Key Feature	Estimated Depth BLS*	
Triassic		Chinle		Freshwater Resources		
		Santa Rosa				
		Dewey Lake				
Permian	Ochoan	Rustler		Permeability Barrier: Salt/Anhydrite	1,480'	
		Salado				
		Castile			5,489'	
		Guadalupian	Delaware Mtn. Grp.	Bell Canyon	Target Injection Interval	
				Cherry Canyon		7,200'
	Leonardian			Brushy Canyon	Permeability Barrier, Tight Sands/Siltstone/Shale	9,297'
	Wolfcampian	Bone Spring				
		Wolfcamp				
	Pennsylvanian	Virgilian	Cisco		Current Petroleum Zone	
		Missourian	Canyon			
Des Moinesian		Strawn				
Atokan		Atoka				
Morrowan		Morrow				
Mississ.	Upper	Barnett				
	Lower	limestones				
Devon.	Upper	Woodford				
	Middle					
Lower	Thirtyone					
	Silur.	Upper	Wristen			
		Middle	Fusselman			
Lower	Montoya					
	Ordov.	Upper	Simpson			
		Middle	Ellenburger			
Lower	Bliss					
	Cambrian					
Precambrian		basement				

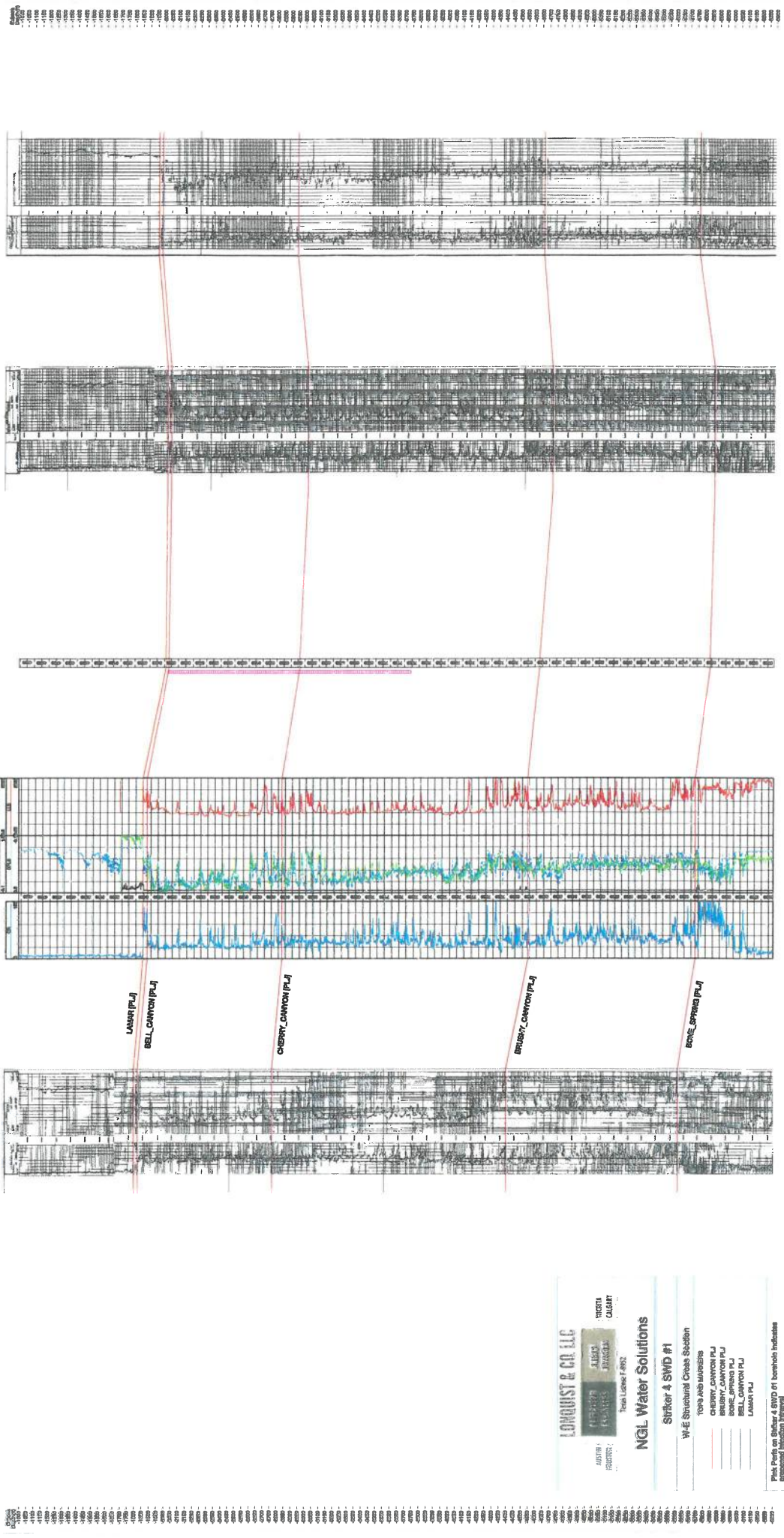
Stratigraphic chart for the Delaware Basin from Broadhead (2017).

*Based on data from PLJ structure maps for the area.



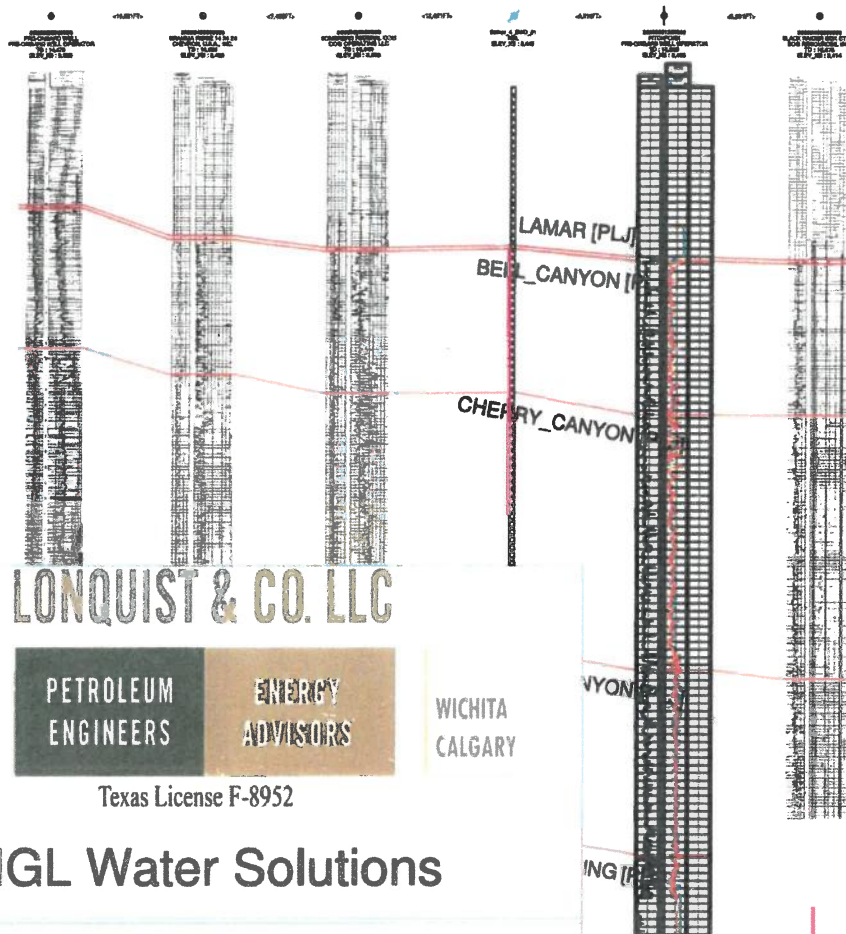






N

Subsea
Depth(ft)
-1000 -
-1150 -
-1300 -
-1450 -
-1600 -
-1750 -
-1900 -
-2050 -
-2200 -
-2350 -
-2500 -
-2650 -
-2800 -
-2950 -
-3100 -
-3250 -
-3400 -
-3550 -
-3700 -
-3850 -
-4000 -
-4150 -
-4300 -
-4450 -
-4600 -
-4750 -
-4900 -
-5050 -
-5200 -
-5350 -
-5500 -
-5650 -
-5800 -
-5950 -
-6100 -
-6250 -
-6400 -



Subsea
Depth(ft)
-1000
-1150
-1300
-1450
-1600
-1750
-1900
-2050
-2200
-2350
-2500
-2650
-2800
-2950
-3100
-3250
-3400
-3550
-3700
-3850
-4000
-4150
-4300
-4450
-4600
-4750
-4900
-5050
-5200
-5350
-5500
-5650
-5800
-5950
-6100
-6250
-6400

NGL Water Solutions

Striker 4 SWD #1

N-S Structural Cross Section

Horizontal Scale = 50.0
Vertical Scale = 50.0
Vertical Exaggeration = 1.0x

TOPS AND MARKERS

CHERRY_CANYON PLJ
BRUSHY_CANYON PLJ
BELL_CANYON PLJ
BONE_SPRING PLJ
LAMAR PLJ



Well Name

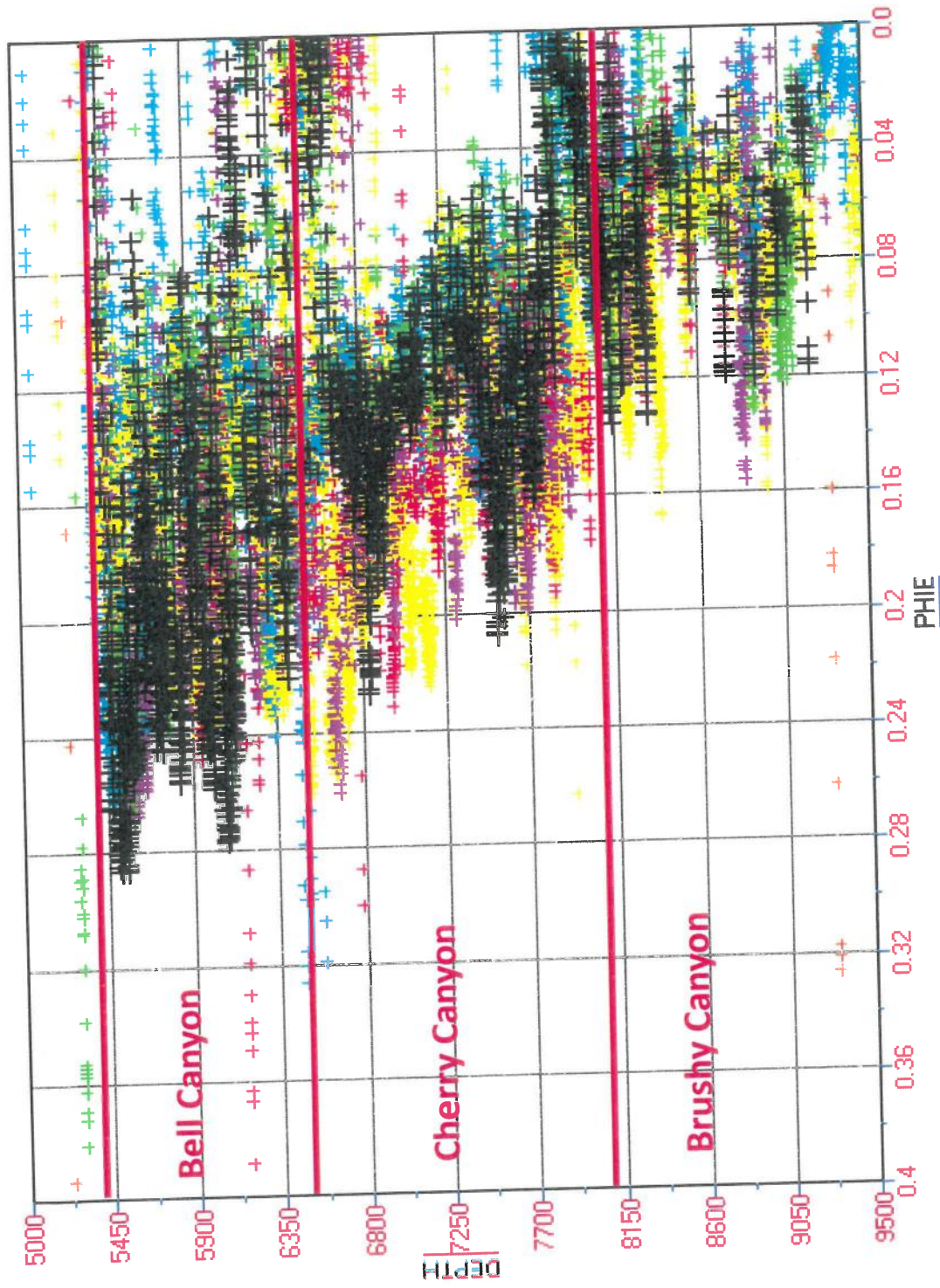
Operator

WELL - TD

WELL - ELEV_KB

Pink Perfs on Striker 4 SWD #1 borehole indicates
proposed injection interval

6 Wells Porosity Vs Depth Trend



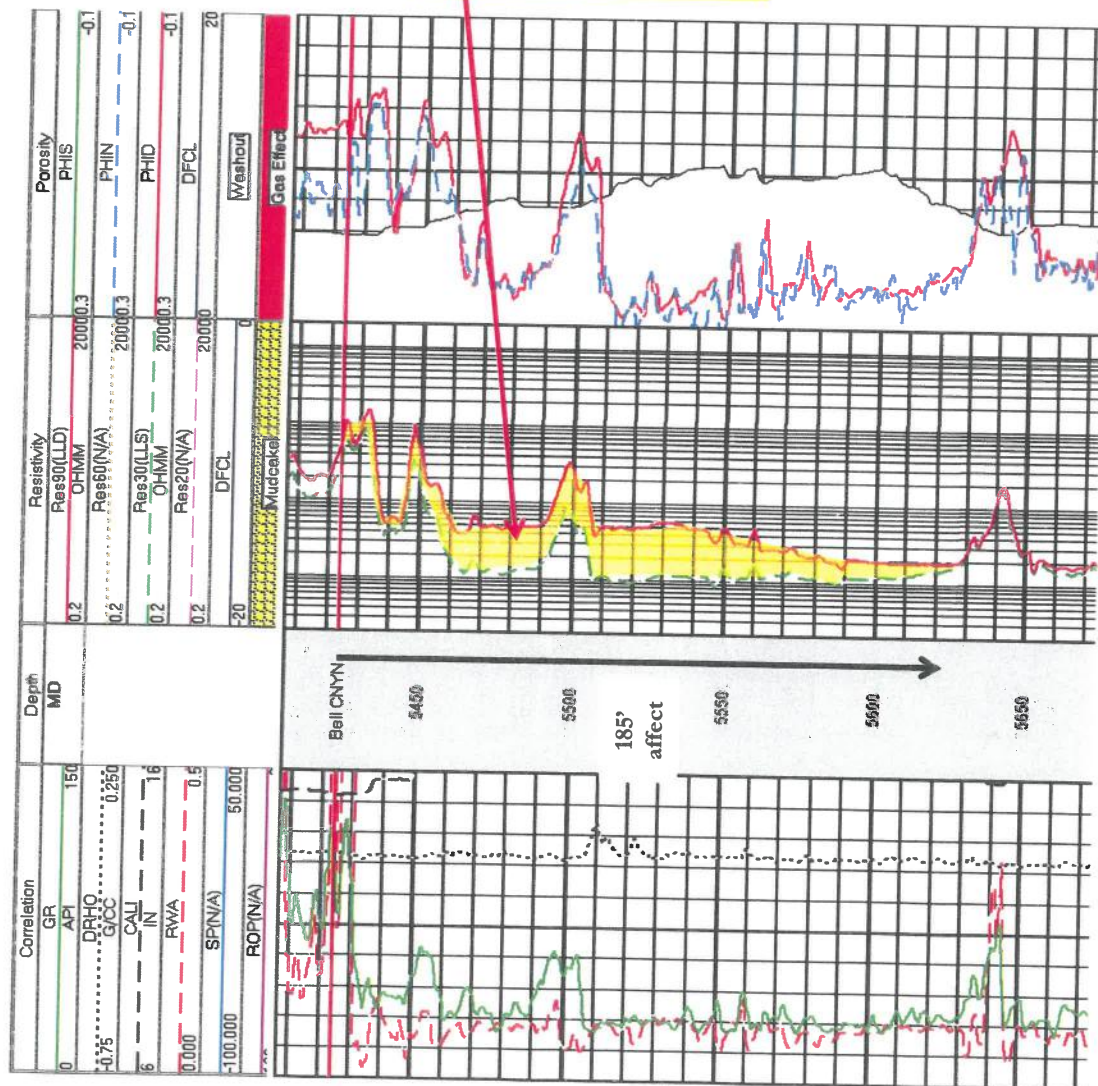
Exhibits of Brian Davis (Petrophysics)
On Behalf of NGL Water Solutions Permian, LLC

Laterolog anomalies

The Groningen effect was named after the large Dutch gas field where the anomaly was first identified. The effect^[6] is an anomalously high resistivity reading that occurs for approximately 100 ft [30 m] below a thick, highly resistive bed such as the thick evaporitic Zechstein caprock at the Groningen field. The effect is maximum around 1 ohm•m. Because the DLL measure current is AC (albeit very low frequency), skin effect reduces the volume around the well where the measure and focusing current can flow. Little of the current is able to return to the remote electrodes through the highly resistive formation, with the majority flowing in the conductive mud in the borehole. This creates a negative potential at the far reference electrode used as the potential reference for the laterolog measurement. If casing has been set in or below the resistive zone, it accentuates the "short circuit" effect of the borehole, and the Groningen effect is more pronounced. Drill pipe conveyance produces the same effect, with the drill pipe becoming the "short circuit." This problem severely limits the use of drill pipe conveyance of the DLL in high-angle or horizontal wells in many reservoirs.

A mild Groningen effect may be difficult to identify from the LLD curve alone. The Schlumberger DLL has a modified-geometry measurement that can also be recorded. This provides an LLG curve that separates from the LLD curve when Groningen effect is present. If the Groningen effect is positively identified, an estimate of its magnitude can be made by analyzing the signal phases in the tool, and an approximate correction can be applied to the log. The LLs measurement uses different current paths and does not suffer from the Groningen effect.

3002530179 well Example of Groningen effect

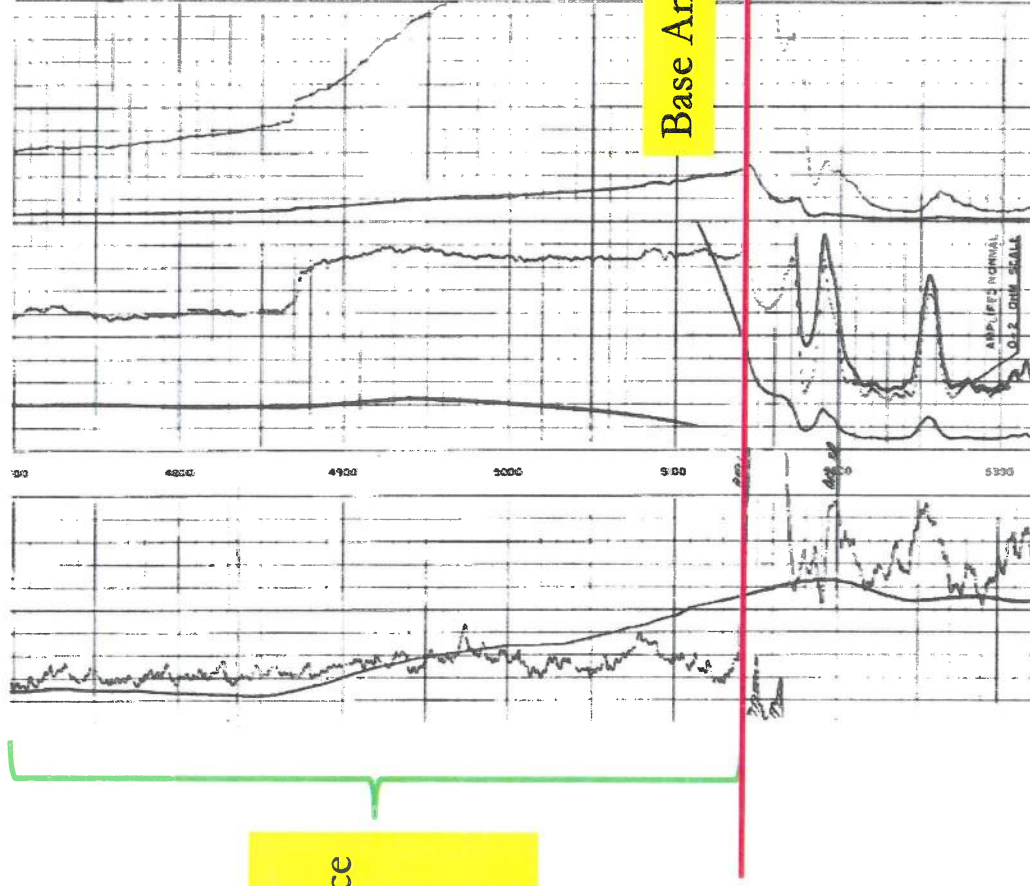


Groningen effect on LLD logs

30025301790000
30025282350000
30025300620000
30025275720000

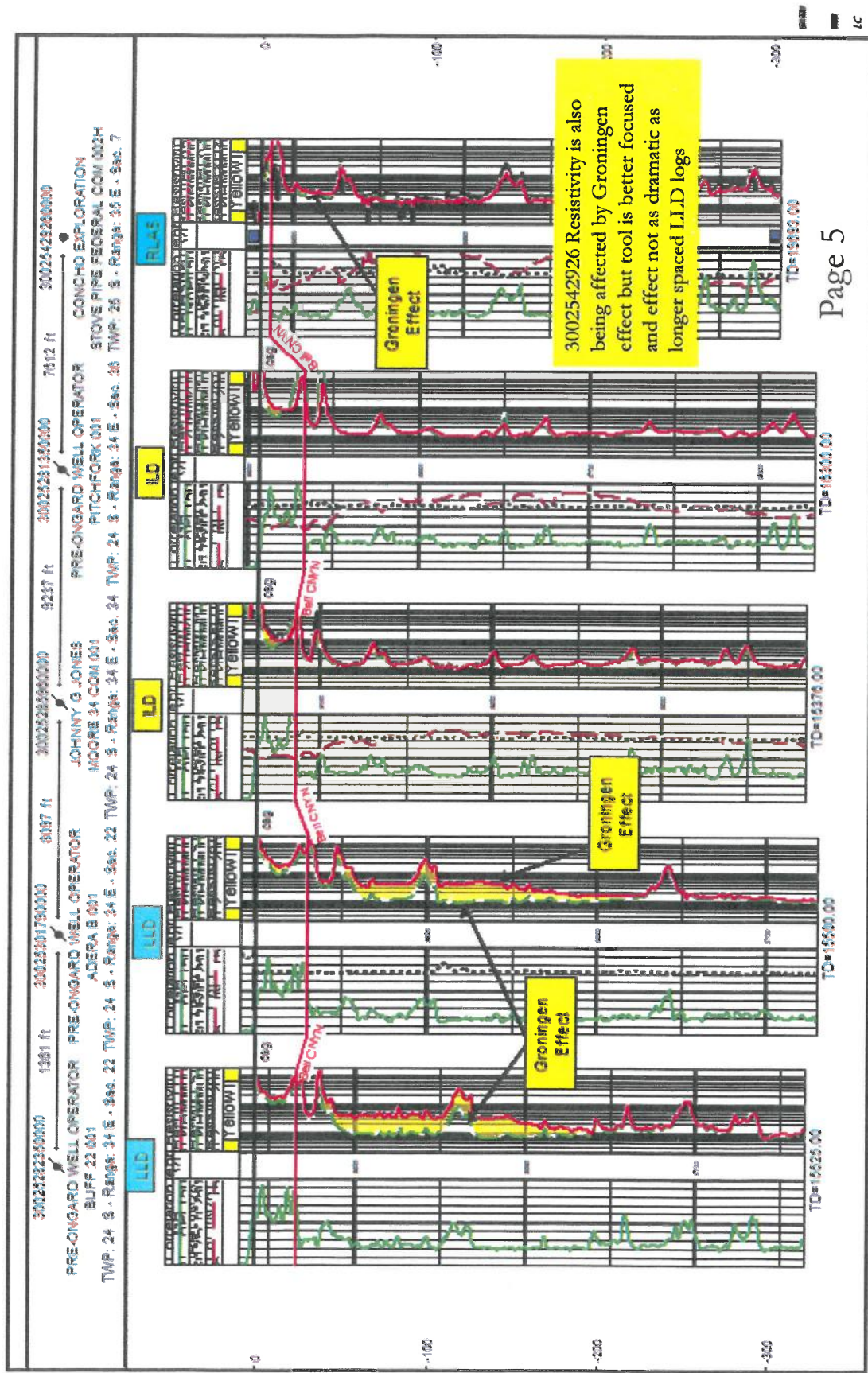
All three wells with LLD curves and the RLA5 saw the same effect immediately below casing set. LLS log was used to negate the effect on these four wells and RLA3 on the more modern Laterolog.

Well 3002508488 Anhydrite sequence



Extremely thick
Anhydrite Sequence
overlying Bell
Canyon causing
Groningen effect

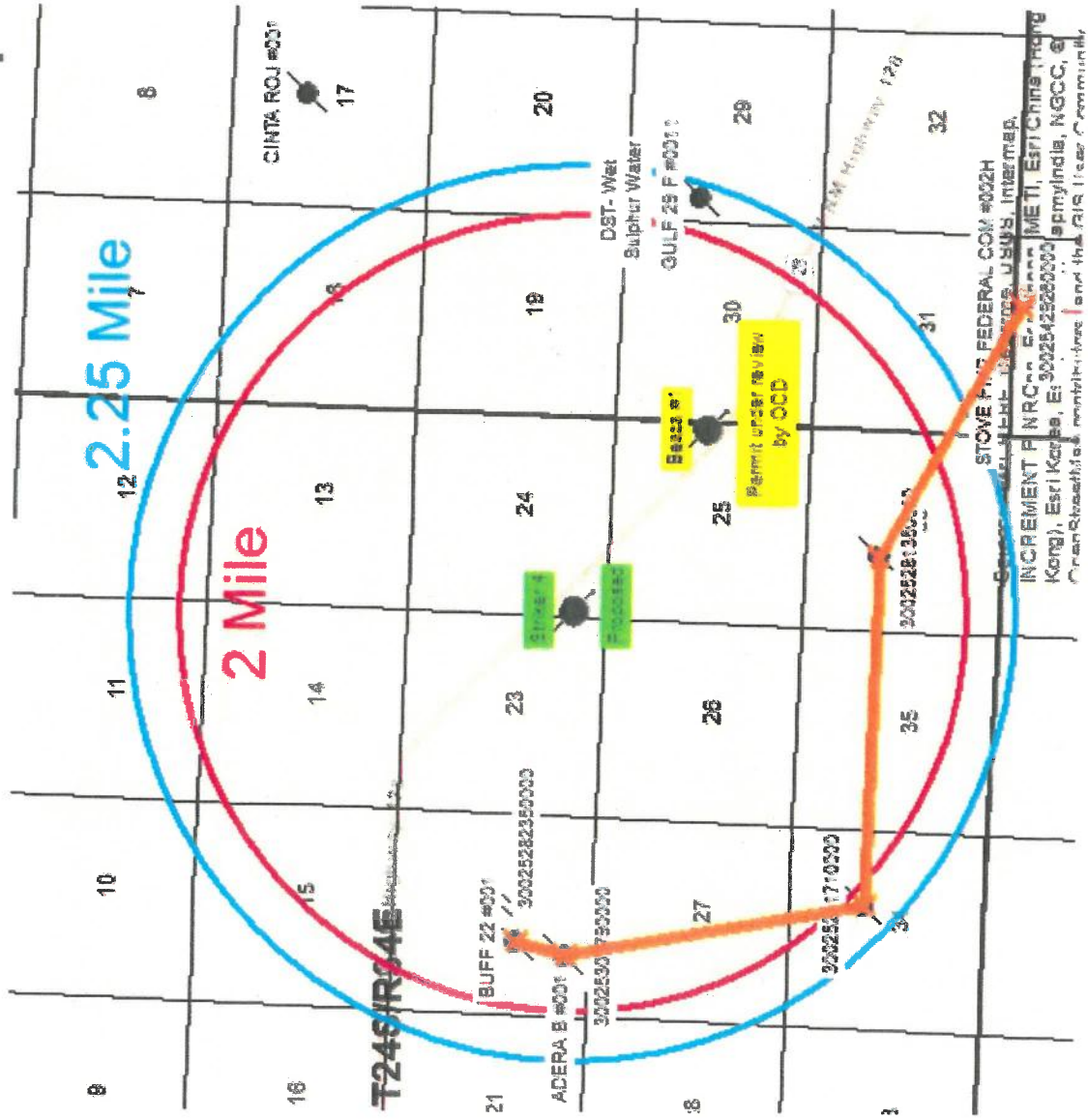
Cross section affected laterolog wells with Groningen effect



Petrophysical Methodology

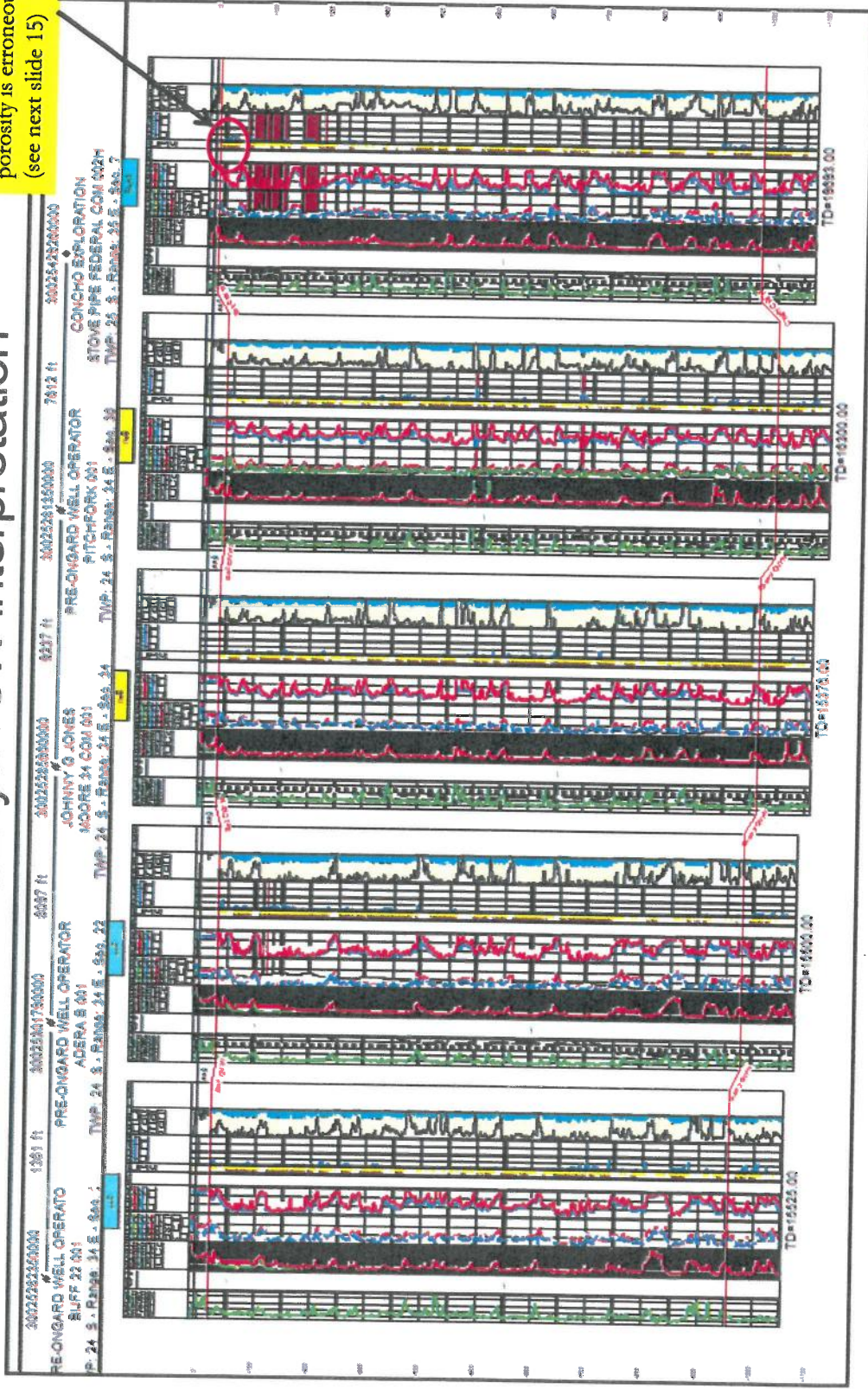
- Calculated total porosity from Gas correction algorithm.
 - PHIA curve **Black**
- Calculated shale volume from GR with Steiber correction
 - $V_{shl} \text{ GR} = (GR - GR_{cln}) / (GR_{shl} - GR_{cln})$ **Black**
- Calculated effective porosity from following equation.
 - $PHIE = PHIA * (1 - V_{shl})$ **Red**
- Calculated water saturation using Modified Simandoux
 - SwMS curve **Black**
- Cut off used were as follows:
 - V Shale cut off = 40%
 - Effective Porosity cut off = 15%
 - Water Saturation cut off = 65%
- Constant Parameters;
 - $R_w = .12$ at FT Deg F at formation Temperature
 - $A=1, M = 2, N = 2$
 - R_w corrected for temperature with depth temperature gradient
- Hierarchy is as follows for nomenclature;
 - **Gross** ($V_{shale} < \text{Cut Off } 40\%$) **Yellow**
 - **Net** ($V_{shale} < \text{Cut Off } 40\%$ and $PHIE > \text{Cut Off } 15\%$) **Brown**
 - **Pay** ($V_{shale} < 40\%$ and $PHIE > \text{Cut Off } 15\%$ and $SwMS < 65\%$) **Black**

Cross section Reference Map



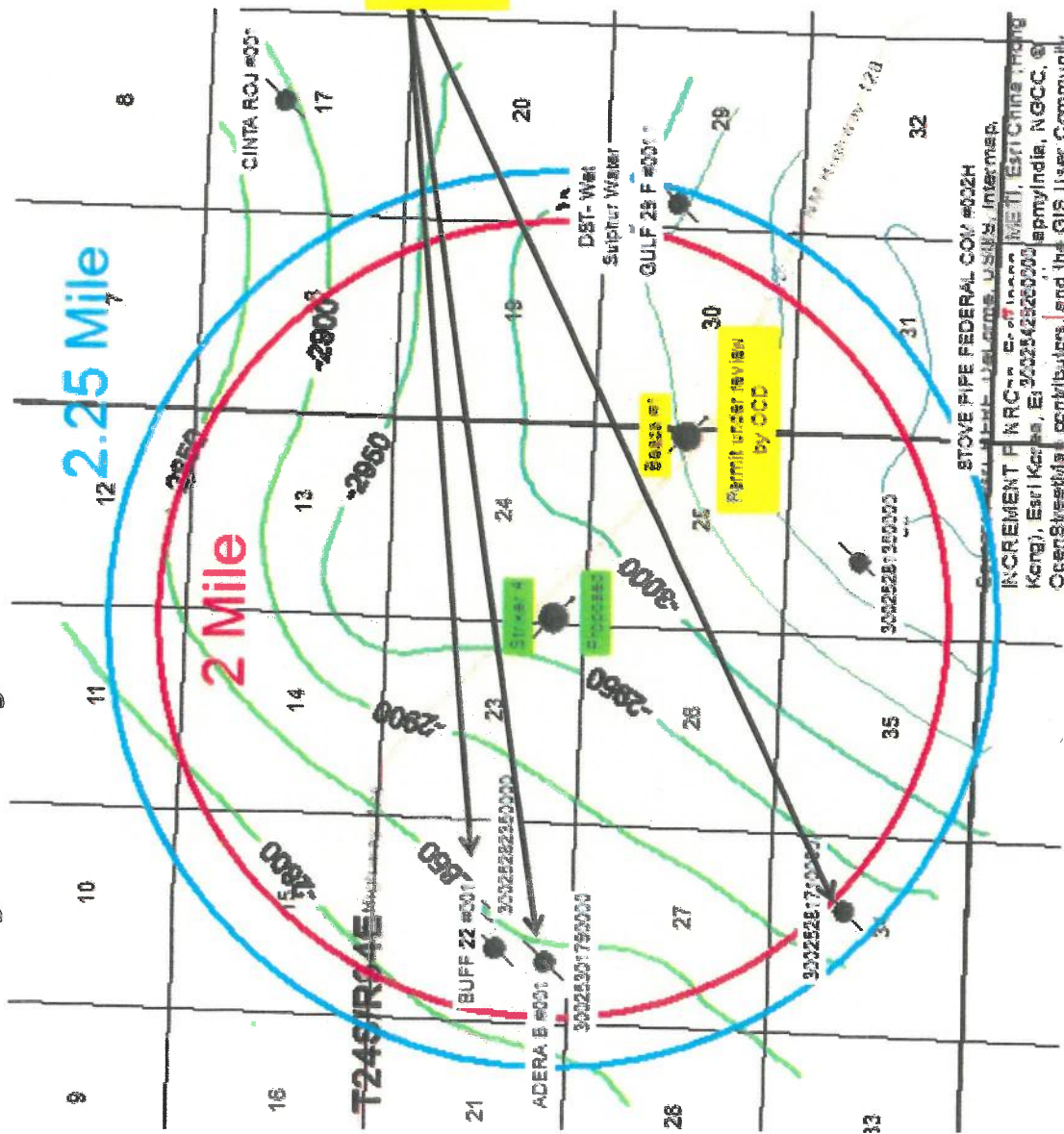
Cross section of Bell Canyon SW interpretation

Water saturation is incorrect due to borehole washout and porosity is erroneously high (see next slide 15)

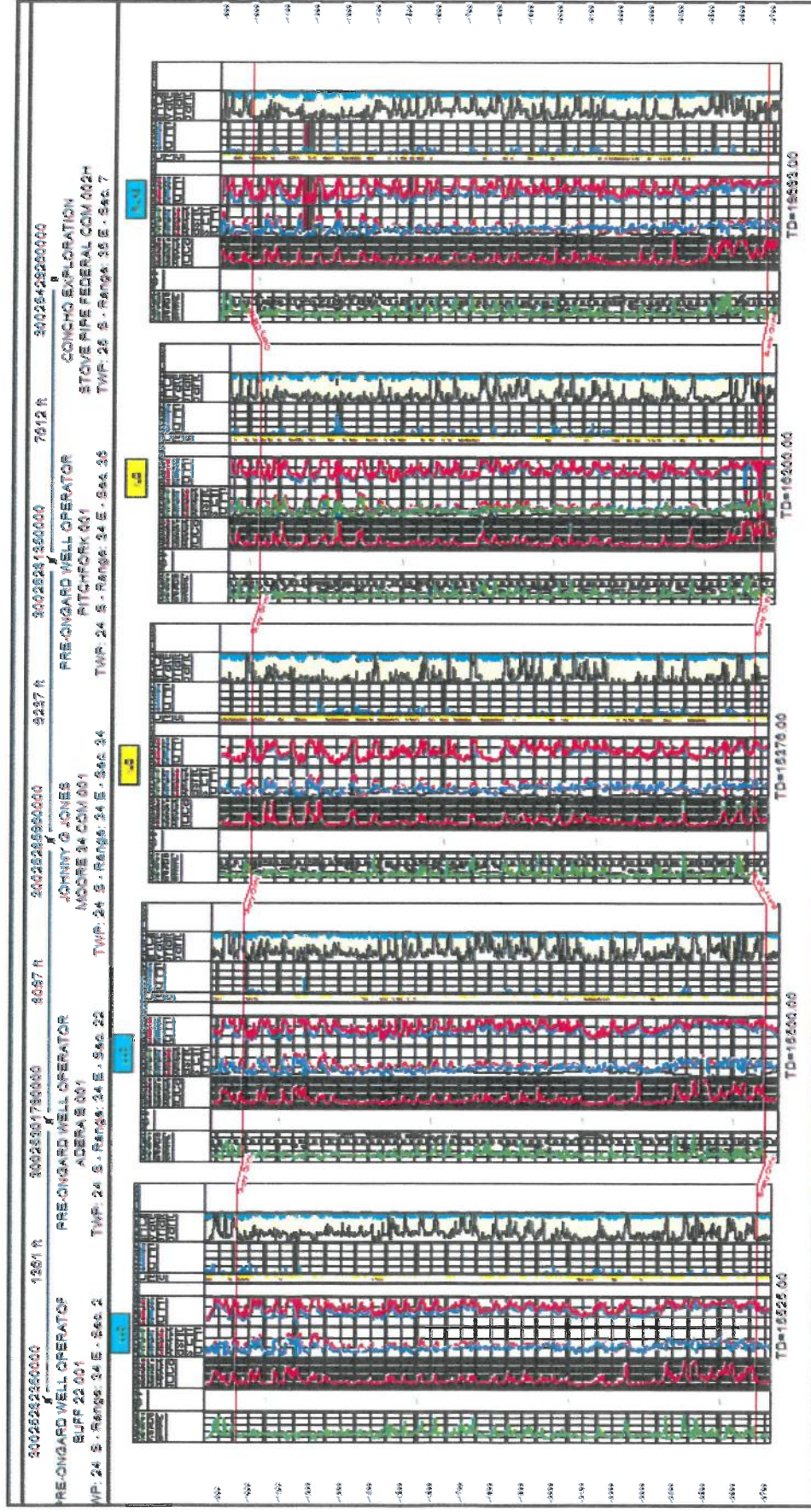


Wells calculate wet and there are no indications of Hydrocarbons

Cherry Canyon Structure with Petrophysics

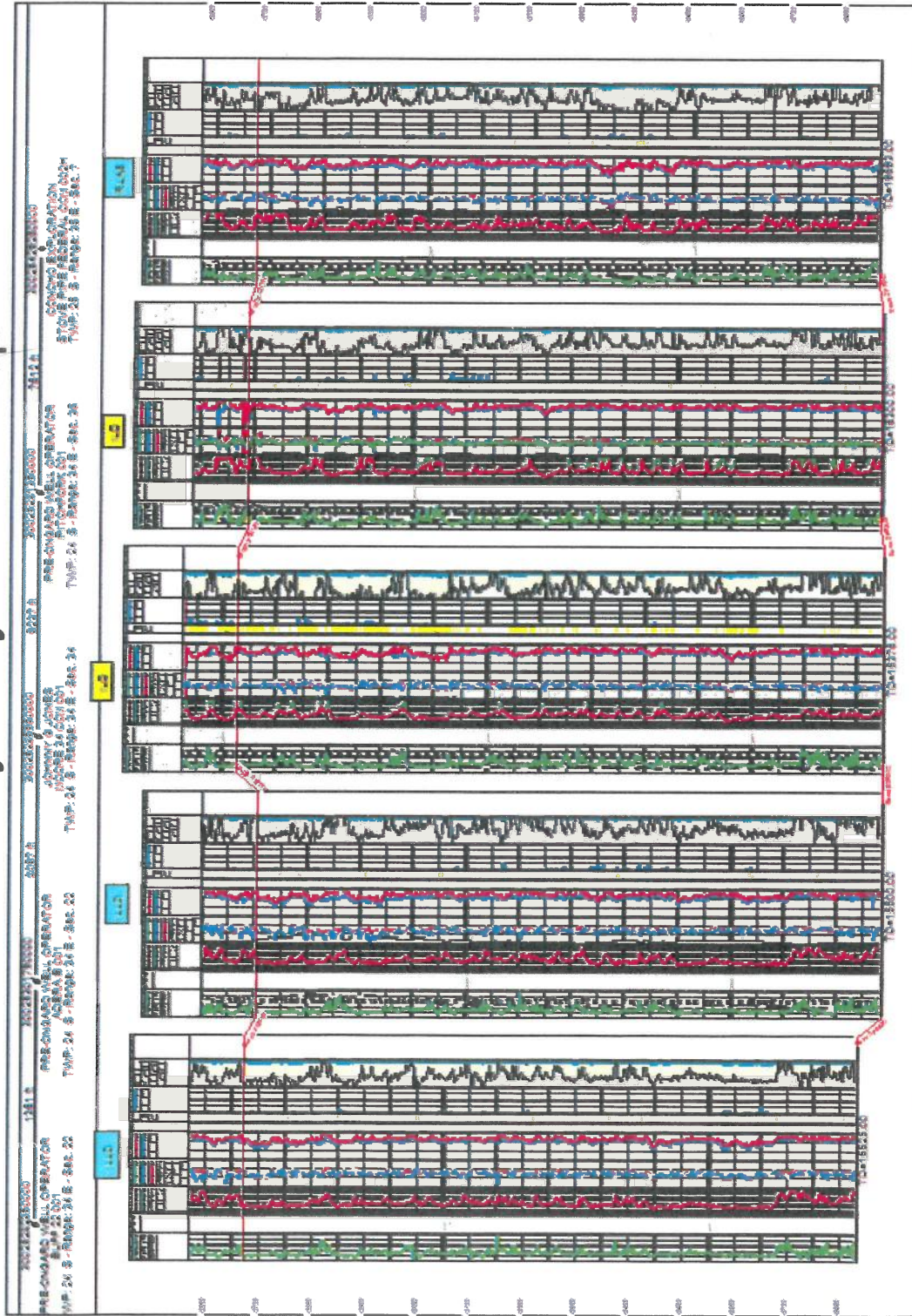


Cross section of Cherry Canyon SW interpretation



Wells calculate wet and there are no indications of Hydrocarbons

Cross section of Brushy Canyon SW interpretation



Wells calculate wet and
there are no indications of
Hydrocarbons

Exhibits of Dr. Peter Jordan (Reservoir Engineer)
On Behalf of NGL Water Solutions Permian, LLC

The following comments were prepared in support of the testimony of Peter W. Jordan, Ph.D., Lonquist & Co., LLC, regarding computer modeling to project pressurization of the injection zone and plume migration associated with waste water injection via the proposed NGL Striker 4, SWD No. 1 (Striker 4, SWD No. 1), Lea County, New Mexico.

SWIFT Model and Implementation for this Study

The model program “Sandia Waste Isolation, Flow and Transport” (SWIFT) was used for predictive modeling of plume migration in the injection interval, during the 20-year service life of the Striker 4, SWD No. 1. The following subsections describe the SWIFT model and input parameters.

Brief Description of the SWIFT for Windows Model

The following description of the SWIFT model is extracted from the manual for the Windows implementation of SWIFT, “Theory and Implementation for SWIFT for Windows, the Sandia Waste-Isolation Flow and Transport Model for Fractured Media”, HSI GeoTrans, February 21, 2000.

SWIFT for Windows (Sandia Waste Isolation, Flow and Transport Code) is a fully transient, three-dimensional, finite difference code that solves the coupled equations for transport in geologic media. The processes considered are:

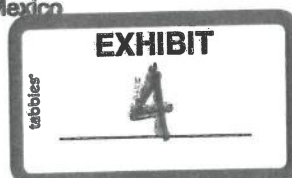
- fluid flow
- heat transport
- dominant-species miscible displacement (referred to as “brine”)
- trace-species miscible displacement (referred to as “radionuclides”)

The first three processes are coupled via fluid density and viscosity. Together they provide the velocity field required in the third and fourth processes. This document describes the extensions of the capabilities of SWIFT (Reeves and Cranwell, 1981) and SWIFT II (Reeves, et al., 1984) to include fractured media.

APPLICATIONS OF SWIFT FOR WINDOWS

Because the SWIFT for Windows code is general, it has many possible applications. They include, but are not limited to, the following:

- nuclear waste isolation in both fractured and porous geologic media
- injection of industrial wastes into saline aquifers
- heat storage in aquifers
- in-situ solution mining
- migration of contaminants from landfills
- disposal of municipal wastes
- salt-water intrusion in coastal region brine disposal from petroleum-storage facilities



- brine disposal as a byproduct of methane production from geopressured aquifers
- determination of aquifer transport parameters from well-test data

The SWIFT model solves for mass and energy transport and accumulation among (for the option using Cartesian coordinates) rectangular "grid cells". Temperature, concentration of dissolved constituents and pressure are predicted across the grid, based on the initial state, analytical boundary conditions imposed at the surfaces, and mass / energy inputs (injection).

Projections from the SWIFT model are accepted by the Federal US EPA, as part of the process to petition for an exemption to operate a hazardous waste disposal well, and by the Railroad Commission of Texas, in support of permitting for both acid gas and conventional brine injection wells.

SWIFT IMPLEMENTATION FOR THE MODELING STUDY

The process to complete predictive modeling of Striker 4, SWD No. 1 consisted of the following steps:

- Determine geometric size and configuration of the model space, including:
 - Number of layers and vertical height of injection interval(s)

Seven (7) geological formations were represented in the model, in order to provide spatially focused estimates of the effects of injection via the Striker 4, SWD No. 1, in strata of interest to near-by operators. Of particular interest is the Brushy Canyon, located below the Bell / Cherry completion interval. Information presented by the Lonquist geologist and utilized as inputs for the model is tabulated below in Table 1:

Layer Description	Top (Striker 4, SWD No. 1; KB)	Gross Thickness (ft)	Porosity (%)	Permeability (md)
Bell Canyon	5489	926	12.7%	41.751
Cherry Canyon Upper Permeable Section	6415	733	8.8%	0.110
Cherry Canyon Middle Less Permeable Section	7148	47	3.6%	0.010
Cherry Canyon Lower Permeable Section	7195	894	8.0%	0.083
Organic Rich Siltstone, Top of Brushy Canyon	8089	28	2.7%	0.005
Brushy Canyon	8117	1010	5.1%	0.019
Avalon Shale	9126	152	2.2%	0.005

Table 1. Model Parameters by Geological Formation

The above estimates are based primarily on a log analysis of a well (3002528235) just over a mile to the southwest of the NGL Striker 4 location. This was a digital log purchased from

Drilling Info with the full suite of log curves. The permeability values were derived from the Dutton equation, an empirical correlation that synthesizes published correlations between permeability and porosity for core recovered from wells completed in the Delaware Mountain group. For this analysis, readings from the log were utilized that indicated a clean, porous sand, with less than 60 GR API units and shale percentage < 30%.

- **Horizontal dimensions of the grid.**

The model grid was a square, centered on the proposed location of the Striker 4, SWD No. 1, and extending 19,885 feet (3.77 miles) in each direction.

The model grid is comprised of rectangular “cells” or spatial increments for which flows of fluid and energy are calculated at each face. Dimensions of cells were increased progressively outward from the central cell where the SWD well was located, in order to represent the required horizontal dimensions. The central cell was 83 feet by 83 feet, and the most peripheral cells at the corners were 830 feet by 830 feet.

- **Geo-Reference of the Model Space, Relative to Factors Driving Plume Drift**

- **Density Drift and Geological Structure:**

Fluid to be injected into the Striker 4, SWD No. 1 is less dense than the connate brine of the injection zone. This density difference causes the plume to migrate slowly up-dip. Up-dip on the geological structure is in a roughly northwest direction, with an azimuth of 57° CCW from north (north 57° west), and an average slope of 0.84°. The positive Y-direction of the grid was oriented in this direction, and the depth of the center of each cell was adjusted, relative to the completion zone of the SWD well, according to this 0.84° slope.

Nominal directions along the grid axis are termed northwest, northeast, southeast, and southwest in this report.

- **Displacement of the Plume from Injection via Wells Located within a 5-Mile Radius**

Active brine disposal wells completed in the DMG were researched, within a 2-mile radius, and no injection was identified that would displace the plume.

- Define boundary conditions imposed at the lateral surfaces of the grid.
 - For Striker 4, SWD No. 1, the analytical “Carter-Tracy” representation of an infinite-acting aquifer is utilized at each vertical surface, at the edge of the grid.
 - The top of the Bell Canyon and the bottom the base of the Avalon Shale are no-flow boundaries.

MODEL PARAMETERS

Model parameters are listed below:

Parameter (units)	Value
Formation Temperature at Top of Bell Canyon (°F)	106°F at 5,489'
Brine Density (lb / ft ³)	70.15
Viscosity (cP):	1.22
Original Pore Pressure at Top of the Bell Canyon (psi)	2,341 psi at 5,489'
Matrix Compressibility (psi ⁻¹)*	3.00E-06
Brine Compressibility (psi ⁻¹)*	3.40E-06
Table 2. Model Formation Parameters	

* R.C. Earlougher Jr., 1977 "Advances in Well Test Analysis", Society of Petroleum Engineers

Operating Parameters and Physical Properties of Injected Fluid

The Milestone Environmental facility has been designed to produce a relatively uniform stream of weak brine.

The following physical properties were estimated for injected fluid, under conditions listed in Table 2.

Parameter (units)	Value
Injection Rate (BPD)	20,000
Total Volume Injected Over 20 Years (bbl)	146,100,000
Density of Injected Fluid (g/cm ³)	1.0665
Viscosity (cP)	0.7769
Table 3. Model Operational Parameters	

Model Results: Pressure Influence and Plume Dimensions

Pressure Rise (ΔP) Striker 4, SWD #1 Wellbore and Formations below TD

The attached exhibit "Pressure Rise (ΔP) NGL Striker 4, SWD #1 Wellbore and Formations Above and Below Completion at 5,467', Plotted over SWD #1 Service Life and By Formation" depicts the rise in pressure (ΔP) in each of the seven (7) modeled formations, extending from (at the top) the Bell Canyon, through the Avalon shale. The reported pressure rise in each layer is that of the wellbore, for the completion zone, and at a point outside the wellbore for the seven (7) formations modeled. Initiation of injection

(nominally on 7/1/2020) leads to an initial rapid rise in pressure that evolves to a slower, steady trend during the first year and extends to the end of the 20-year service life. The maximum rise in in any portion of the model was the 1,412 psi (within wellbore), indicated in the legend of Exhibit 1.

Extents of Pressure Influence

The attached exhibit “Pressure Rise (psi), 20 Years Continuous Injection” depicts the lateral extent of pressure influence. The zone where pressure rise might be deemed significant, was selected to be that where ΔP exceeded 216 psi. This “Critical Pressure”, or $\Delta P_{\text{Critical}}$, is an estimate of pressurization at the top of the injection zone (5,489 feet) that would potentially drive fluids from the injection zone to the base of the Underground Source of Drinking Water (USDW), via a hypothetical, unplugged wellbore. For the study area in Lea County, this may be assumed to be equivalent to the pressure required to drive a column of formation brine up an open conduit to the base of the USDW. The basis of the estimate of 216 psi, $\Delta P_{\text{Critical}}$, is outlined below:

$$\Delta P_{\text{Critical}} = P_{\text{Column}} - P_{\text{Injection Zone}}$$

Equation (1)

where:

P_{Critical} is defined above (psig);

P_{Column} = pressure at the top of the injection zone, required to raise connate fluid to the base of the USDW (psig);

$P_{\text{Injection Zone}}$ = original pore pressure at the top of the injection zone (psig).

Equation (1) states the minimum condition for connate fluid in the injection zone to rise to the base of the USDW. Estimates for the terms P_{Column} and $P_{\text{Injection Zone}}$ will be detailed below.

P_{Column} is pressure at the top of the injection zone, required to raise connate fluid to the base of the USDW. This equals the sum of two “stacked” hydrostatic column segments:

- Connate brine from the top of the injection zone to the base of the USDW, and
- USDW fluid from the base of the USDW to the water table.

These are expressed, respectively, as the first and second terms in square brackets in Equation (2), below:

$$P_{\text{Column}} = 0.052 \left(\frac{\text{psi}}{\text{ft}} \right) \times \left\{ \left[Wt_{\text{Connate Brine}} \left(\frac{\text{lb}}{\text{gal}} \right) \times (D_{\text{Injection Zone}}(\text{ft}) - D_{\text{USDW Base}}(\text{ft})) \right] + \left[Wt_{\text{USDW Fluid}} \left(\frac{\text{lb}}{\text{gal}} \right) \times (D_{\text{USDW Base}}(\text{ft}) - D_{\text{Water Table}}(\text{ft})) \right] \right\}$$

Equation (2)

Modeling Plume Migration in Support of the Permit Application for the Proposed NGL Striker 4, SWD No. 1, Lea County, New Mexico

where:

- $W_{\text{Connate brine}}$ = weight of connate brine in the injection zone (9.378 lb/gallon);
- $D_{\text{Injection Zone}}$ = depth of the top of the injection zone (5,489 feet);
- $D_{\text{USDW Base}}$ = depth of the base of the USDW (968 feet);
- $W_{\text{USDW Fluid}}$ = weight of fluid in the USDW, assumed to be water (8.332 lb/gallon);
- $D_{\text{Water Table}}$ = depth of the water table, assumed to be the depth of an unconfined water surface (155 feet); and
- 0.052 = unit conversion from fluid weight in lb/gal to hydraulic gradient in psi/foot.

Substituting values:

$$P_{\text{Column}} = 0.052 \left(\frac{\text{psi/ft}}{\text{lb/gal}} \right) \times \left\{ \left[9.378 \left(\frac{\text{lb}}{\text{gal}} \right) \times (5,489 \text{ ft} - 968 \text{ ft}) \right] + \left[8.332 \left(\frac{\text{lb}}{\text{gal}} \right) \times (968 \text{ ft} - 155 \text{ ft}) \right] \right\} = 2,556.9 \text{ psi}$$

Equation (3)

$P_{\text{Injection Zone}}$ is the original pore pressure at the top of the injection zone in psi. This pressure is estimated from records of weights of drilling mud recorded on the headers of open-hole logs for the locality of the Striker 4, SWD No. 1. The minimum mud weight of the five logs utilized for petrophysical analysis, for this permit was 8.7 lb / gallon. Common drilling practice is to design a drilling mud system so that it is over-pressured, relative to the pore pressures of formations intersected. This margin of overpressure is equivalent to 0.5 psi per foot gradient in pressure. Accordingly, a mud system of 8.7 lb / gallon would be designed to be over-pressured, relative to an original pore pressure gradient of (8.7 – 0.5) or 8.2 lb / gallon. This gradient is converted to pressure at the depth of the top of the injection zone in the following Equation (4):

$$P_{\text{Column}} = 0.052 \left(\frac{\text{psi/ft}}{\text{lb/gal}} \right) \times (8.7 - 0.5) \left(\frac{\text{lb}}{\text{gal}} \right) \times 5,489 \text{ (ft)} = 2,340.5 \text{ psi}$$

Equation (4)

Substituting values into Equation (1) to estimate $\Delta P_{\text{Critical}}$:

$$\Delta P_{\text{Critical}} = 2,556.9 \text{ psi} - 2,340.5 \text{ psi} = 216.4 \text{ psi}$$

Equation (5)

Modeling Plume Migration in Support of the Permit Application for the Proposed NGL Striker 4, SWD No. 1, Lea County, New Mexico

Dimensions of the 216.4-psi contour in ΔP are listed in Table 4 below:

Direction / Azimuth (° CCW from East)	Distance from SWD Well to 216.4 psi Contour in ΔP at 20 Years	
	Bell Canyon Completion Interval	Upper Cherry Canyon Completion Interval
Northwest ¹ / 149°	3,953', 0.749 miles	3,014', 0.571 miles
Northeast ² / 59°	3,953', 0.749 miles	3,014', 0.571 miles
Southeast / -31°	3,952', 0.748 miles	3,015', 0.571 miles
Southwest / -121°	3,952', 0.748 miles	3,014', 0.571 miles
Table 4. Extents of Pressure Rise Contour ($\Delta P = 216.4$ psi)		

- ¹ Direction of increasing Y-coordinate for model grid; up-dip with respect to geological structure of the Bell Canyon.
- ² Direction of increasing X-coordinate for model grid; along local strike with respect to geological structure of the Bell Canyon.

Pressures were not projected to exceed 216.4 psi in any of the deeper intervals.

The greatest extent of the 216.4 psi contour was 3,953 feet is 0.749 miles from the Striker 4, SWD No. 1.

Projected Extents of the Plume at the End of the Service Life of the Well

Projected extents of the plume at the end of the service life of the well, 20 years are depicted in the attached figure "Injected Brine Plume – 1% Concentration Contour".

Plume dimensions are listed in Table 5, below:

Direction / Azimuth (° CCW from East)	Distance from SWD Well to 1% Concentration Contour at 20 Years	
	Bell Canyon Completion Interval	Upper Cherry Canyon Completion Interval
Northwest ¹ / 149°	1,443', 0.273 miles	273', 0.052 miles
Northeast ² / 59°	1,477', 0.280 miles	273', 0.052 miles
Southeast / -31°	1,477', 0.280 miles	273', 0.052 miles
Southwest / -121°	1,477', 0.280 miles	273', 0.052 miles
Table 5. Extents of 1% Concentration Contour		

- ¹ Direction of increasing Y-coordinate for model grid; up-dip with respect to geological structure of the Bell Canyon.

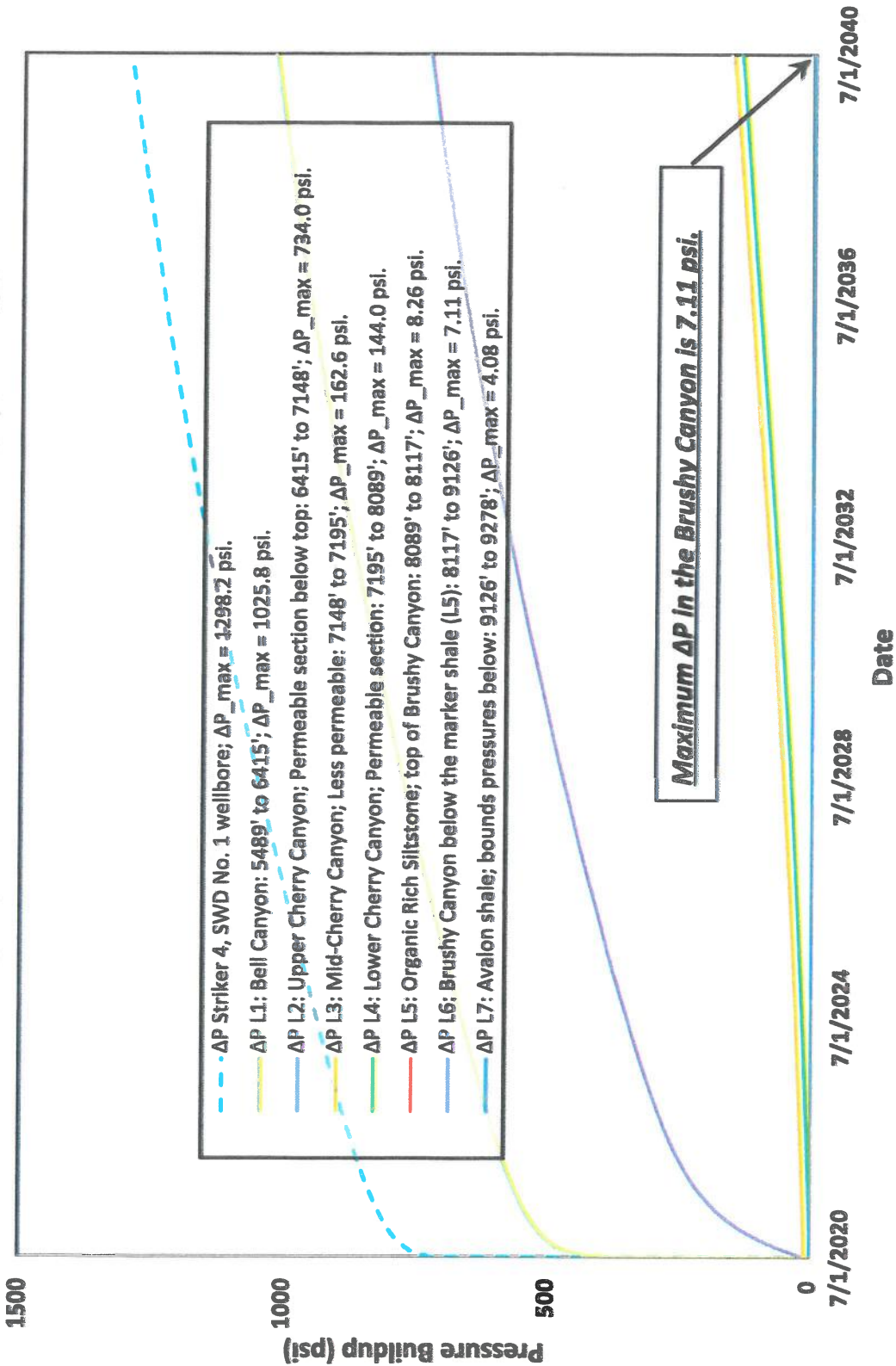
Modeling Plume Migration in Support of the Permit Application for the Proposed NGL Striker 4, SWD No. 1, Lea County, New Mexico

- ² Direction of increasing X-coordinate for model grid; along local strike with respect to geological structure of the Bell Canyon.

Plume concentrations were not projected to exceed 1% in any of the deeper intervals.

The greatest extent of the 1% concentration contour was 1,495 feet (0.280 miles) from the Striker 4, SWD No. 1.

Pressure Rise (ΔP) NGL Striker 4, SWD #1 Wellbore and Formations Below Completion at 5,467', Plotted over SWD #1 Service Life and By Formation



ht

300252081700

300252595600

30025

300253

300252823500

300252864100

300252876100

300254278300

300252941100

300254302300

300254237600

300252859600

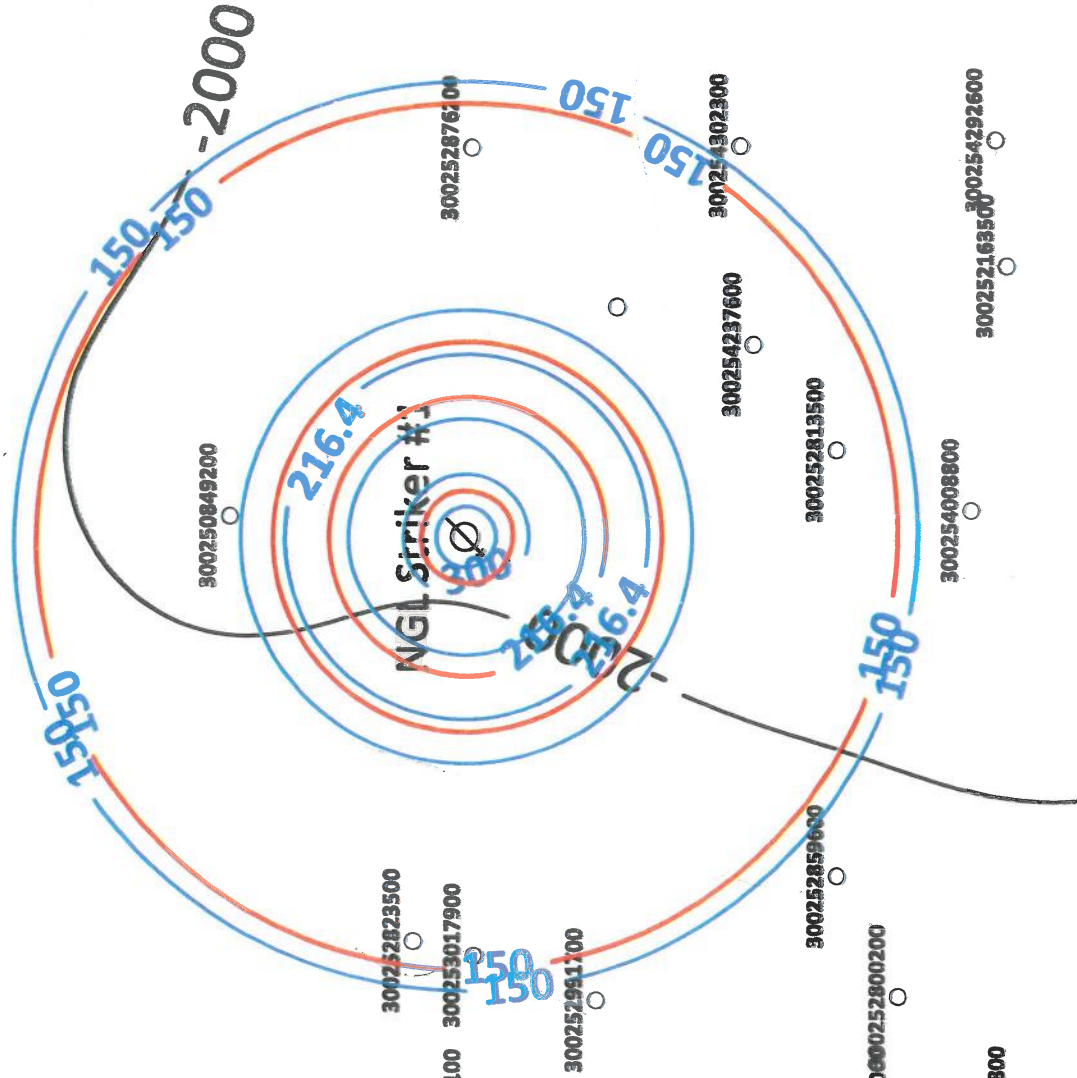
300252813500

3002528620300252800200

300252955800

300254008800

300252183500 300254292600



Legend

Bell Canyon section of Completion Interval

Radius of 150 psi Contour:
9,894' (1.874 miles)

Cherry Canyon section of Completion Interval

Radius of 150 psi Contour:
9,422' (1.785 miles)

Maximum ΔP is less than 7.11 psi in the Brushy Canyon.

Geological structure is for the Bell Canyon.

LONQUIST & CO. LLC

PETROLEUM
ENGINEERS

GEOLOGY
ADVISORS

20010 - HOUSTON 50000 - OKLAHOMA
60000 - OKLAHOMA 60000 - OKLAHOMA

NGL Striker 4, SWD No. 1

Lea County

Pressure Rise (psi)

20 Years Continuous Injection

Peter W. Jordan, Ph.D.: 1/7/2020

75

300252081700

300252595600

300250949200

300252823500

300252864100 300253017900

300252991700

300252859600

300252862000 300252800200

300252955800

NGL Striker #1



300252876200

300254278300

300254237600

300254302300

300252813500

300254008800

300252163500 300254292600

Legend

Bell Canyon section of Completion Interval
Radius of 1% Contour: 1,443' (0.28 miles)
Cherry Canyon section of Completion Interval
Radius of 1% Contour: 273' (0.05 miles)
No concentrations below the Cherry Canyon exceed 1%.
Geological structure is for the Bell Canyon.

LONGHIST & CO. LLC



OWNER: MOUNTAIN CANYON ENERGY
CLIENT: MOUNTAIN CANYON ENERGY
PROJECT: CHERRY CANYON

NGL Striker 4, SWD No. 1

Lea County

Injected Brine Plume: 1%
Concentration Contour

20 Years Continuous Injection

Peter W. Jordan, Ph.D.: 1/7/2020

Notice Affidavit & Back-Up Documentation

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

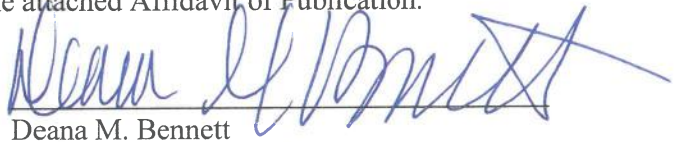
**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN LEA
COUNTY, NEW MEXICO.**

CASE NO. 20985

AFFIDAVIT

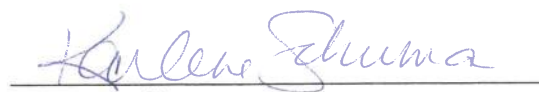
STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

Deana M. Bennett, attorney in fact and authorized representative of NGL Water Solutions Permian, LLC, the Applicant herein, being first duly sworn, upon oath, states that the above-referenced Application was provided under a notice letter, attached, and that proof of receipt is attached hereto. I also state that notice of the January 9, 2020 hearing was published in the Hobbs News-Sun on December 21, 2019, as reflected in the attached Affidavit of Publication.


Deana M. Bennett

SUBSCRIBED AND SWORN to before me this 8th day of January, 2020 by Deana M. Bennett.

My commission expires: 2-27-21


Notary Public

OFFICIAL SEAL
Karlene Schuman
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 2-27-21





MODRALL SPERLING

L A W Y E R S

December 18, 2019

Deana M. Bennett
Deana.bennett@modrall.com
505-848-1834

VIA CERTIFIED MAIL

**Re: APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN LEA
COUNTY, NEW MEXICO**

CASE NO. 20985

TO: AFFECTED PERSONS

This letter is to advise you that NGL Water Solutions Permian, LLC ("NGL") has filed the enclosed application, which seeks an order approving the Striker 4 SWD #1 well, with a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico. Applicant requests authorization to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'. Applicant requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day.

This case is currently set for a hearing before a Division Examiner on January 9, 2020, starting at 8:15 a.m. The hearing will be held in Porter Hall in the Oil Conservation Division's Santa Fe Office located at 1220 South Saint Francis Drive, Santa Fe, New Mexico 87505. As a party who may be affected by this application, we are notifying you of your right to appear at the hearing and participate in the case, including the right to present evidence either in support of or in opposition to the application. Failure to appear at the hearing may preclude you from any involvement in the case at a later date.

You are further notified that if you desire to appear in this case, then you are requested to file a Pre-Hearing Statement with the Division at least four business days in advance of a scheduled hearing before the Division or the Commission, but in no event later than 5:00 p.m. mountain time, on the Thursday preceding the scheduled hearing date, with a copy delivered to the undersigned.

Modrall Sperling
Roehl Harris & Sisk P.A.

500 Fourth Street NW
Suite 1000
Albuquerque,
New Mexico 87102

PO Box 2168
Albuquerque,
New Mexico 87103-2168

Tel: 505.848.1800
www.modrall.com

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Page 2

Sincerely,

Deana M. Bennett

Deana M. Bennett

Attorney for Applicant

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

**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN LEA
COUNTY, NEW MEXICO.**

CASE NO. 20985

APPLICATION

NGL Water Solutions Permian, LLC ("NGL"), OGRID No. 372338, through its undersigned attorneys, hereby makes this application to the Oil Conservation Division pursuant to the provisions of N.M. Stat. Ann. § 70-2-12, for an order approving drilling of a salt water disposal well in Lea County, New Mexico. In support of this application, NGL states as follows:

- (1) NGL proposes to drill the Striker 4 SWD #1 well at a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico for the purpose of operating a salt water disposal well.
- (2) NGL seeks authority to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'.
- (3) NGL intends to use 5.5 inch tubing and NGL requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day.
- (4) NGL anticipates using an average pressure of 815 psi for this well, and it requests that a maximum pressure of 1,087 psi be approved for the well.
- (5) A proposed C-108 for the subject well is attached hereto in Attachment A.
- (6) The granting of this application will avoid the drilling of unnecessary wells, will prevent waste, and will protect correlative rights.

WHEREFORE, NGL requests that this application be set for hearing before an Examiner of the Oil Conservation Division on January 9, 2020; and that after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

MODRALL, SPERLING, ROEHL, HARRIS
& SISK, P.A.

By: *Deana M. Bennett*
Deana Bennett
Post Office Box 2168
500 Fourth Street NW, Suite 1000
Albuquerque, New Mexico 87103-2168
Telephone: 505.848.1800
Attorneys for Applicant

CASE NO. ____: Application of NGL Water Solutions Permian, LLC for approval of salt water disposal well in Lea County, New Mexico. Applicant seeks an order approving the Striker 4 SWD #1 well, with a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico. Applicant requests authorization to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'. Applicant requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day. Said location is approximately 15 miles west of Jal, New Mexico.

Revised March 23, 2017

RECEIVED

RECEIVED

DATE

APP NO.

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: NGL WATER SOLUTIONS PELLERIN LLC

OGRID Number: 372337

Well Name: STRIKER 4 SWD #1

API: 30-425-TB1

Pool: SWD, DELAWARE

Pool Code: 96100

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 (PROFITABLE UNIT)

☐ SD

B. Check one only for (I) or (II)

(I) Commingling - Storage - Measurement

☐ DHC

☐ CTB

☐ PLC

☐ PC

☐ OLS

☐ OLM

(II) Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☐ WFX

☐ PMX

☒ SWD

☐ IPI

☐ EOR

☐ PPR

FOR OCD ONLY

2) NOTIFICATION REQUIRED TO: Check those which apply

A. ☒ Offset operator 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

☐ 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.

DATE: 04/25/2017

Date

Print or Type Name

Signature

Signature of Applicant

Signature

EXHIBIT

e-mail Address

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

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

FORM C-408
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery: _____ Pressure Maintenance: ☒ Disposal: _____ Storage: _____
Application qualifies for administrative approval: ☒ Yes _____ No
- II. OPERATOR: NGL WATER SOLUTIONS PERMIAN, LLC
ADDRESS: 1509 W WALL ST // STE 306 // MIDLAND, TEXAS 79701
CONTACT PARTY: SARAH JORDAN PHONE: (432) 685-0005 x1289
- 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 ☒ 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 and 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: Christopher B. Weiland TITLE: Consulting Engineer
SIGNATURE: _____ DATE: 11/23/09
E-MAIL ADDRESS: chris@longviewco.net
- * 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 submission:

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office.

INJECTION WELL DATA SHEET

OPERATOR: NGL WATER SOLUTIONS, PERMIAN, LLC

WELL NAME & NUMBER: STRIKER # SWD #1

WELL LOCATION: 850 FSL & 174 FWH
FOOTAGE LOCATION

WELL PORT SCHEMATIC

UNIT LETTER: M SECTION: 24 TOWNSHIP: 24S RANGE: 14E

WELL CONSTRUCTION DATA

Surface Casing

Flow Size: 1 1/2" ID
Cemented with: 400 lbs
Top of Cement: 400 lbs
Method: Cement, grout, gravel
Production Casing

Flow Size: 1 1/2" ID
Cemented with: 400 lbs
Top of Cement: 400 lbs
Method: Cement, grout, gravel

Method: Cement, grout, gravel

INJECTION HISTORY

Well ID: 174 FWH

Performance

INJECTION WELL DATA SHEET

Tubing Size: 1.315" ID 17.125' L 1.315" LTC from 0' to 5.300'

Lining Material: NOV TENS 100 PC & KC CBR

Type of Packer: Arrowset 100 10% mechanical Nickel coated / 100% in place

Packer Setting Depth: 5.300'

Other Type of Tubing/Casing Seal (if applicable):

Additional Data

Is this a new well drilled for injection? Yes No

If no, for what purpose was the well originally drilled? None

1. Name of the Injection Formation: Bell and Cherry Canyon

2. Name of Field or Area (if applicable): SWD, Delaware

3. Has the well ever been perforated in any other zones? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plugs used, etc. new drill

4. Give the name and density of any oil or gas zone underlying or overlying the proposed injection zone for this area

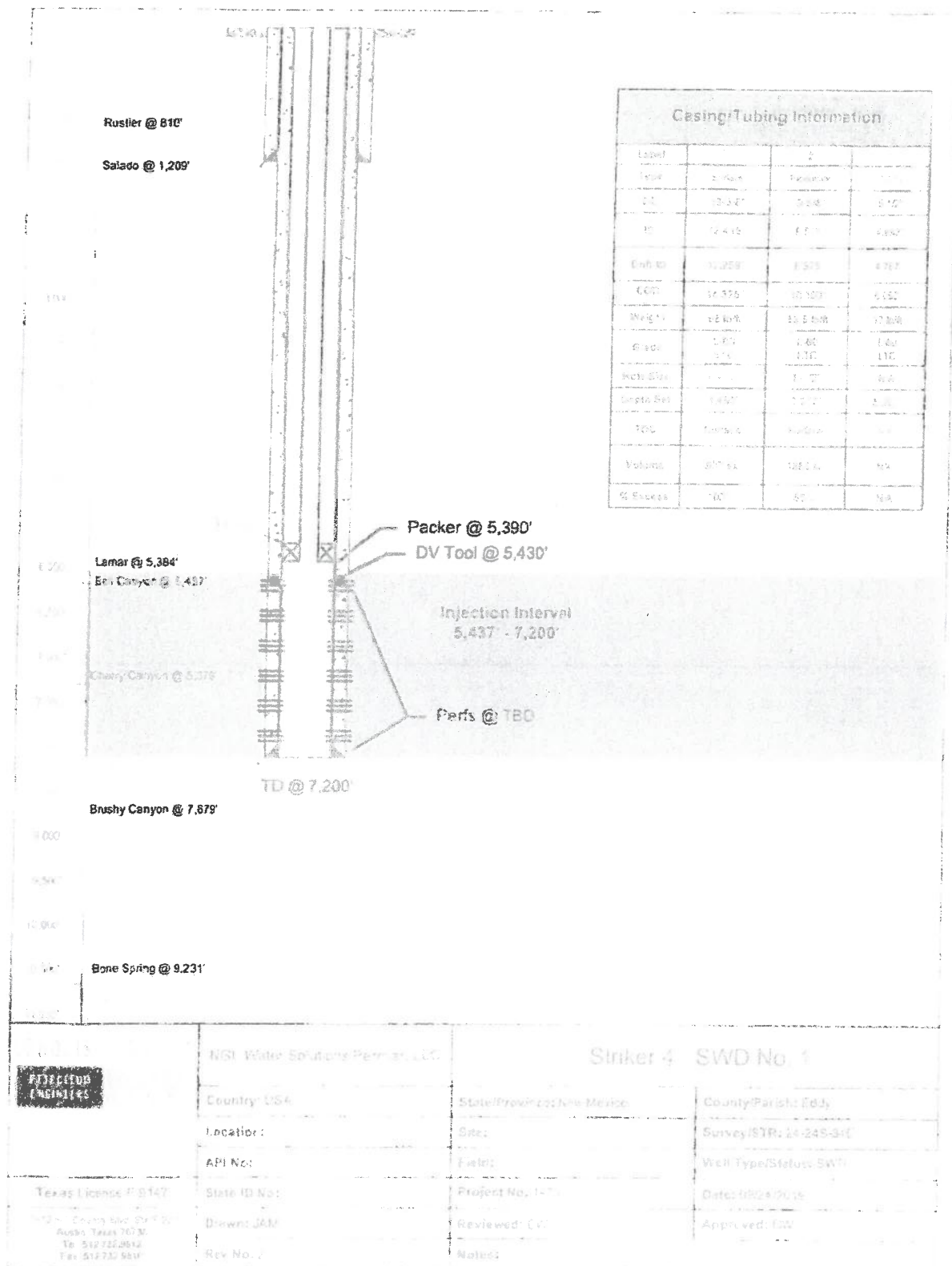
Bone Springs 0.83

Wolfcamp 1.25

Sargass 1.25

Stokes 1.25

Minnow 1.25



Sticker 2 54127-6 2

Well Data

Table 10: Cement Information

Cement Information		
Casing String	Surface	Production
Cement Type	C ₁	C ₂
Cement Yield	2.27 ft ³ /sk	1.69 ft ³ /sk
Total Cement Volume	907 sks	1286 sks
Cement Excess	100%	90%
TOC	Surface	Surface
Method	Circulate to Surface	Circulate to Surface

Table 11: Tubing Information

Tubing Information	
OD	5.500"
WT	0.304"
ID	4.896"
Left in	1.572"
COD	5.500"
Weight	13.6 lb/ft
Grade	L-80
Depth Set	6' 5.380"

Casing Material: NOV T-805 IPC & KC CBR

4. Packer Description

Assessment of fluid movement of the cement packer is based on the following:

a. Cemented packer methods

1. Isolation of the fluid flow from the packer to the casing?
2. Cemented packer is required to prevent leakage?
3. Is the packer fluid flow from the packer to the casing?
4. Is the packer fluid flow from the packer to the casing?
5. Is the packer fluid flow from the packer to the casing?

$$d = \frac{1}{2} \left(\frac{1}{\rho_1} + \frac{1}{\rho_2} \right) \frac{\partial \rho}{\partial x} \quad \text{or} \quad \frac{\partial \rho}{\partial x} = \frac{2d}{\frac{1}{\rho_1} + \frac{1}{\rho_2}}$$

$$\frac{\partial \rho}{\partial x} = \frac{2d}{\frac{1}{\rho_1} + \frac{1}{\rho_2}}$$

W. Page (1957) (p. 107) (1957) (p. 107)

The program should be able to handle changes in the flow.

Ex. 1. (p. 107) (p. 107) (p. 107)

These values are not necessarily the same, but they are the same for the same flow. The values of the flow are the same for the same flow.

Ex. 2. (p. 107) (p. 107) (p. 107)

The flow is the same for the same flow. The flow is the same for the same flow. The flow is the same for the same flow.

Division I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-6730
Division II
811 S. First St., Ansoie, NM 88241
Phone: (575) 748-1253 Fax: (575) 748-4730
Division III
7000 Main Business Road, Amarillo, NM 89101
Phone: (505) 334-6175 Fax: (505) 334-4170
Division IV
1226 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-101
Revised July 14, 2013

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

¹ Operator Name and Address NG2 WATER SOLUTIONS PERMIAN, LLC 1509 W. WALL ST. STE 306 MIDLAND, TEXAS 79701		² OGRID Number 372338
		³ API Number 10-021-TBD
⁴ Property Code	⁵ Property Name STB/KR 4 SWD	⁶ Well No. 1

⁷ Surface Location									
1/4 - Lot A1	Section 24	Township 24S	Range 4E	Lot Idn	Feet from 650	N S Line SOUTH	Feet from 174	E/W Line WEST	County LEA

⁸ Proposed Bottom Hole Location									
1/4 - Lot	Section	Township	Range	Lot Idn	Feet from	N S Line	Feet from	E/W Line	County

⁹ Pool Information	
Pool Name SWD, Delaware	Pool Code 94100

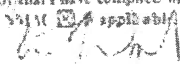
Additional Well Information				
¹⁰ Work Type N	¹¹ Well Type SWD	¹² Cable Rotary R	¹³ Lease Type Private	¹⁴ Ground Level Elevation 3,422'
¹⁵ Multiple N	¹⁶ Proposed Depth 7,200'	¹⁷ Formation Delaware	¹⁸ Contractor TSD	¹⁹ Spud Date ASAP
Depth to Ground water <810'		Distance from nearest fresh water well 2,963'		Distance to nearest surface water > 1 mile

☒ We will be using a closed-loop system in lieu of lined pits

²⁰ Proposed Casing and Cement Program						
Type	Hole Size	Casing Size	Casing Weight/lb	Setting Depth	Sacks of Cement	Estimated TOC
Surface	17.5"	13.375"	68 lb/lb	1,450'	907	Surface
Production	12.25"	9.625"	53.5 lb/lb	7,200'	1,886	Surface

Casing/Cement Program: Additional Comments
See attached schematic

²¹ Proposed Blowout Prevention Program			
Type	Working Pressure	Test Pressure	Manufacturer
Double Hydraulic Blind Pipe	5,000 psi	8,000 psi	TBD - Schellier Cameron

²² I hereby certify that the information given above is true and complete to the best of my knowledge and belief.
I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☒ applicable
Signature: 

Printed name: Chris Weyand

Title: Consulting Engineer

E-mail Address: chris@lenquist.com

Date: 9/24/2019

Phone: 512-666-1764

OIL CONSERVATION DIVISION

Approved By:

Title:

Approved Date:

Expiration Date:

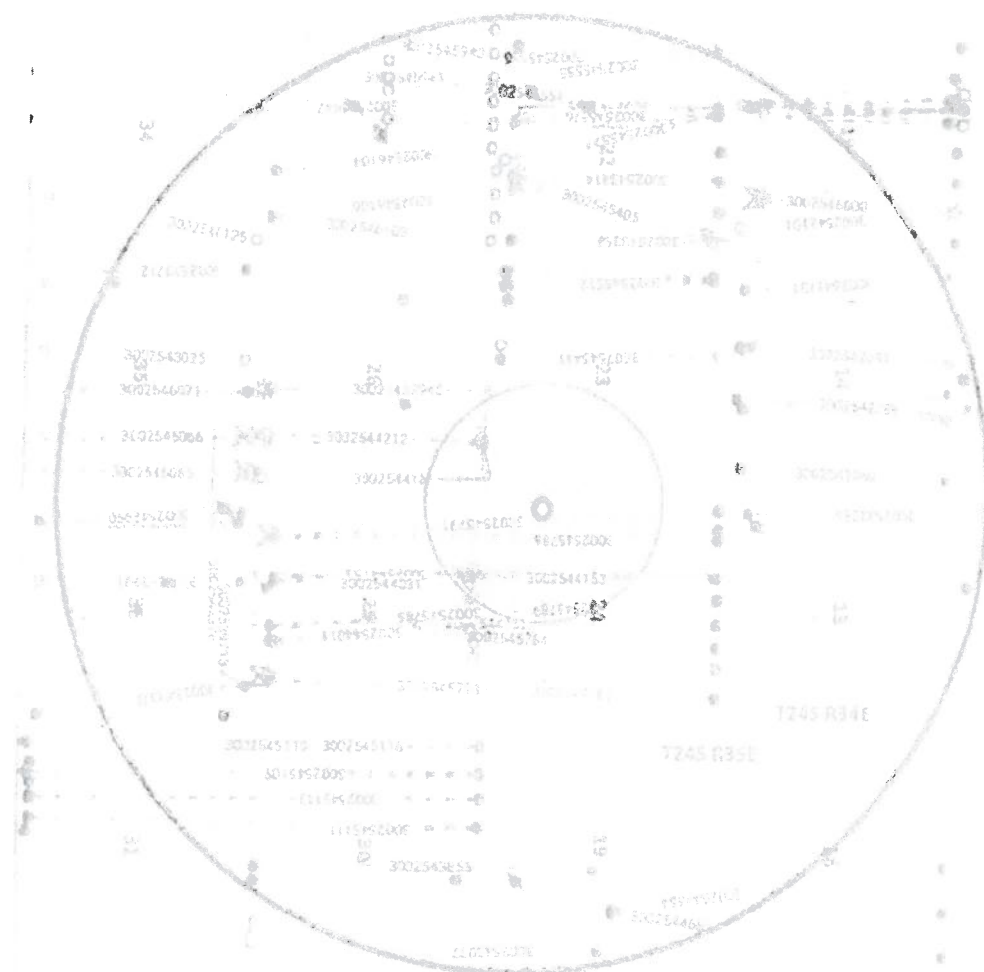
Conditions of Approval Attached

95

3,422'

850

96

[illegible]

Appendix

1980

Striker 4 SWD #1
 1/2 Mile Area of Review
 Lee County NM
 BOC Water Solutions Permian LLC
 10000 Highway 100 Box 100000
 Amarillo, TX 79106
 806.372.1111
 806.372.1111
 806.372.1111

Striker 4 SWD #1
 Gas Well
 Oil Well
 Perforated Oil Well
 Plugged Oil Well
 SWD Well
 1/2 Mile Radius
 2 Mile Radius
 Section Boundary
 Township Boundary

30' Buffer
 Lee County, NM

22
 27
 40.8
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 2.0
 3.0
 4.0
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 6.0
 7.0
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 100.0

[illegible][illegible]

1954年10月1日

Striker 4 SWD #1
Operators/Lessees

Lea County, NM

NOG Water Solutions Permian, LLC

Operator: NOG Water Solutions Permian, LLC
Created by: MPT Date: 08/09/2018 Approved by: CHW

NOG LLC

SECTION: 26 TOWNSHIP: NORTH RANGE: 4

Striker 4 SWD #1

1/2 mile Radius

☐ Need Lease Information

☐ Section Boundary

☐ Township Boundary

Major Road

Local Street

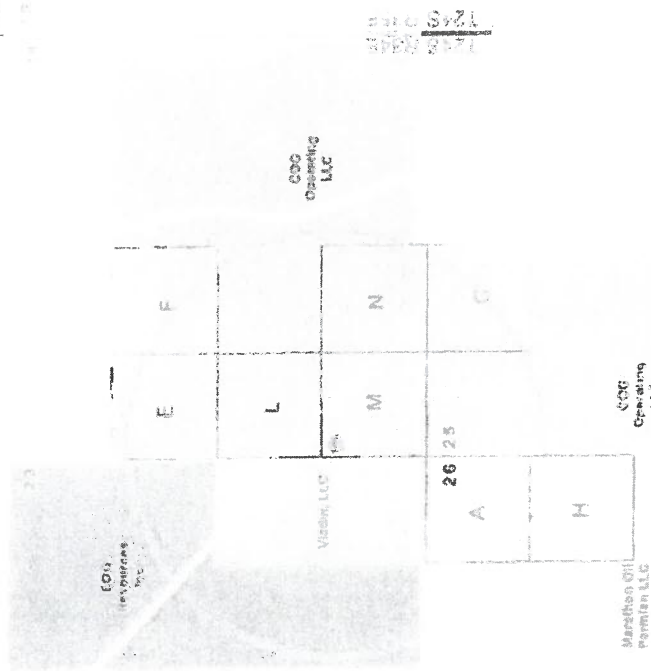
Lessee

COG Operating LLC

EOG Resources Inc

Marathon Oil Permian LLC

Viadrin, LLC

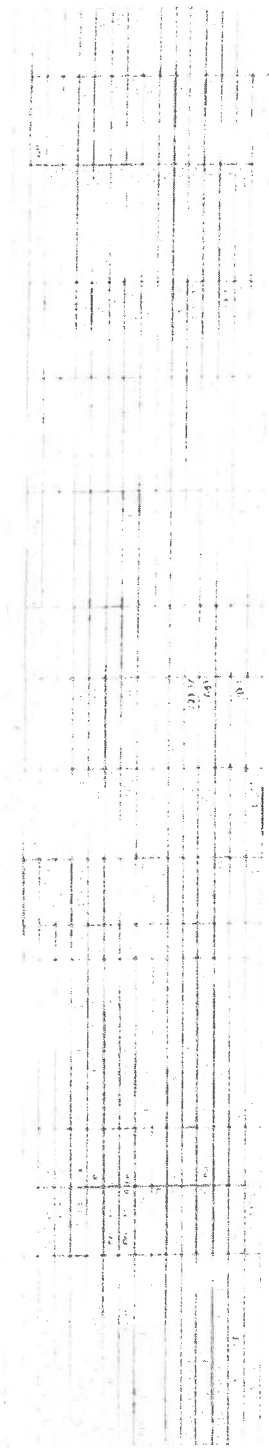


27

NOG Water Solutions

Texas

Operator: NOG Water Solutions Permian, LLC
Created by: MPT Date: 08/09/2018 Approved by: CHW



Striker 4 SWD #1
Offset Water Wells
 Lea County, NM
 HGL Water Solutions Permittee, LLC
 Permittee NAD 1983 State Plane North Zone FIPS 500
 Drawn by: SAM Date: 06/20/17 Approved by: [Signature]
 LONGHUIST & CO. LLC

- Striker 4 SWD #1
- Water Well
- Major Road
- Local Street
- 1 mile Radius
- Section Boundary
- Township Boundary

NAD 1983
 Lat: 32.20575
 Long: -103.436731

TEXAS

HGL Water Solutions
 Lea County, NM



New Mexico Office of the State Engineer Water Right Summary



WR File Number: C 03580

Subbasin: -

Cross Reference: -

Primary Purpose: EXP EXPLORATION

Primary Status:

Total Acres:

Subfile: -

Total Diversion:

Cause/Case: -

Owner: INTERCONTINENTAL POTASH CORP

Contact: TOM COPE

Documents on File

Trn #	Doc	File/Act	Status		Transaction Desc.	From To	Acres	Diversion	Consumptive
			1	2					
			PM1	APR	C 03580 (2 BOREHOLE ES- MIN EXPL)	T	0	0	

Current Points of Diversion

POD Number	Source	Q Q Q			(NAD83 UTM in meters)		Other Location Desc
		6416	4	Sec1wsRng	X	Y	
		3	2	23 24S 34E	647336	3564313	ICP B11
		3	1	24 24S 33E	628123	3563832	ICP 087

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

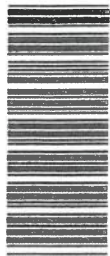
9/6/17 1:40 PM

WR SUMMARY - C 03580

Karlene Schuman
 Modrall Sperling Roehl Harris & Sisk P.A.
 500 Fourth Street, Suite 1000
 Albuquerque NM 87102

PS Form 3877

Type of Mailing: CERTIFIED MAIL
 12/18/2019



Firm Mailing Book ID: 181167

Line	USPS Article Number	Name, Street, City, State, Zip	Postage	Service Fee	RR Fee	Rest.Del.Fee	Reference Contents
1	9314 8699 0430 0066 8445 43	Oil Conservation Division District IV 1220 South St. Francis Drive Santa Fe NM 87505	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
2	9314 8699 0430 0066 8445 50	Oil Conservation Division District I - Hobbs 1625 N. French Drive Hobbs NM 88240	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
3	9314 8699 0430 0066 8445 67	NGL WATER SOLUTIONS PERMIAN, LLC 1509 W Wall St., Ste. 306 Midland TX 79701	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
4	9314 8699 0430 0066 8445 74	BUREAU OF LAND MGMT 301 Dinosaur Trail Santa Fe NM 87508	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
5	9314 8699 0430 0066 8445 81	EOG RESOURCES INC P.O. Box 2267 Midland TX 79705	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
6	9314 8699 0430 0066 8445 98	VLADIN, LLC P.O. Box 100 Artesia NM 88211	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
7	9314 8699 0430 0066 8446 04	COG Operating LLC 600 W Illinois Ave Midland TX 79701	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
8	9314 8699 0430 0066 8446 11	Marathon Oil Permian LLC 5555 San Felipe St. Houston TX 77056	\$1.45	\$3.50	\$1.60	\$0.00	87806.0014. Notice
Totals:			\$11.60	\$28.00	\$12.80	\$0.00	
						Grand Total:	\$52.40

List Number of Pieces Listed by Sender: Total Number of Pieces Received at Post Office: Postmaster: Name of receiving employee: Dated:

8

DEC 18 2019

104

Transaction Report Details - CertifiedPro.net
 Firm Mail Book ID= 181167
 Generated: 1/7/2020 12:51:27 PM

USPS Article Number	Date Created	Reference Number	Name 1	City	State	Zip	Mailing Status	Service Options	Mail Delivery Date
9314869904300066844611	2019-12-18 12:12 PM	87806.0014.	Marathon Oil Permian LLC	Houston	TX	77056	Undelivered	Return Receipt - Electronic, Certified Mail	12-23-2019
9314869904300066844604	2019-12-18 12:12 PM	87806.0014.	COG Operating LLC	Midland	TX	79701	Delivered	Return Receipt - Electronic, Certified Mail	12-23-2019
9314869904300066844598	2019-12-18 12:12 PM	87806.0014.	VLADIN, LLC	Artesia	NM	88211	Delivered	Return Receipt - Electronic, Certified Mail	12-23-2019
9314869904300066844581	2019-12-18 12:12 PM	87806.0014.	EOG RESOURCES INC	Midland	TX	79705	Delivered	Return Receipt - Electronic, Certified Mail	12-20-2019
9314869904300066844574	2019-12-18 12:12 PM	87806.0014.	BUREAU OF LAND MGMT	Santa Fe	NM	87508	Delivered	Return Receipt - Electronic, Certified Mail	12-21-2019
9314869904300066844567	2019-12-18 12:12 PM	87806.0014.	NGL WATER SOLUTIONS PERMIAN, LLC	Midland	TX	79701	Lost	Return Receipt - Electronic, Certified Mail	12-21-2019
9314869904300066844550	2019-12-18 12:12 PM	87806.0014.	Oil Conservation Division District I - Hobbs	Hobbs	NM	88240	Delivered	Return Receipt - Electronic, Certified Mail	12-20-2019
9314869904300066844543	2019-12-18 12:12 PM	87806.0014.	Oil Conservation Division District IV	Santa Fe	NM	87505	Delivered	Return Receipt - Electronic, Certified Mail	12-20-2019

Affidavit of Publication

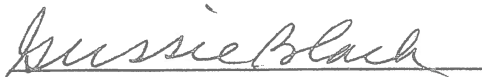
STATE OF NEW MEXICO
COUNTY OF LEA

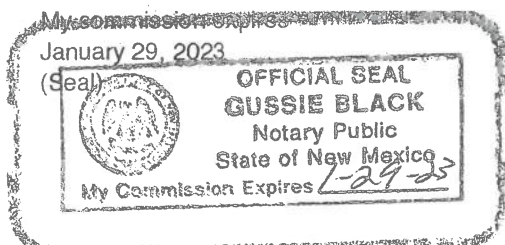
I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
December 21, 2019
and ending with the issue dated
December 21, 2019.


Publisher

Sworn and subscribed to before me this
21st day of December 2019.


Business Manager



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 NOTICE
DECEMBER 21, 2019

CASE NO. 20985:
Notice to all affected parties, as well as the heirs and devisees of Oil Conservation Division District IV, Oil Conservation Division District 1 - Hobbs, Bureau of Land Management, EOG Resources Inc., Vladin, LLC, COG Operating LLC, Marathon Oil Permian LLC of NGL Water Solutions Permian, LLC's application for approval of salt water disposal well in Lea County, New Mexico. The State of New Mexico, through its Oil Conservation Division, hereby gives notice that the Division will conduct a public hearing at 8:15 a.m. on January 9, 2020, to consider this application. Applicant seeks an order approving the Striker 4 SWD #1 well, with a surface location 850 feet from the South line and 174 feet from the West line of Section 24, Township 24 South, Range 34 East, NMPM, Lea County, New Mexico. Applicant requests authorization to inject salt water into the Bell and Cherry Canyon formations at a depth of 5,437 to 7,200'. Applicant requests that the Division approve a maximum daily injection rate for the well of 20,000 bbls per day. Said location is approximately 15 miles west of Jal, New Mexico. #35013

01104570

00237465

DOLORES SERNA
MODRALL, SPERLING, ROEHL, HARRIS &
P. O. BOX 2168
ALBUQUERQUE, NM 87103-2168