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

APPLICATION OF SOLARIS WATER MIDSTREAM, LLC FOR APPROVAL OF SALT WATER DISPOSAL WELL, EDDY COUNTY, NEW MEXICO. **CASE NO.** 20577

APPLICATION

Solaris Water Midstream, LLC (Solaris), by and through undersigned counsel of record, hereby applies for an order approving a salt water disposal well in Eddy County, New Mexico. In support of this Application, Solaris states as follows:

1. Solaris proposes to drill Dillinger Fed. SWD #1, located 1656 feet from the north line and 1124 feet from the east line of Section 20, Township 24 South, Range 31 East, NMPM, Eddy County, New Mexico.

2. Solaris seeks authority to inject salt water into the Devonian and Silurian-Fusselman formations at a depth of 16,530 to 17,650 feet.

3. Form C-108, dated August 29, 2018 is attached hereto as Exhibit A.

4. The granting of this application with prevent waste and protect correlative rights.

5. A Proposed Advertisement is attached hereto.

WHEREFORE, Solaris requests that this application be set for hearing before an Examiner of the Oil Conservation Division on June 6, 2019, and that after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

Lorraine Hollingsworth

Pete Domenici
Lorraine Hollingsworth

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Attorneys for Solaris Water Midstream, LLC

I hereby affirm that a copy of the forgoing was provided via U.S. mail to the following on April 5th, 2019:

Michael H. Feldewert
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110 Guadalupe St., Suite A
Santa Fe, NM 87501
Attorney for XTO Energy, Inc.

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Lorraine Hollingsworth

PROPOSED ADVERTISEMENT

CASE NO._____. **Application of Solaris Water Midstream, LLC for approval of a salt water disposal well, Eddy County, New Mexico.** Applicant seeks an order approving disposal of salt water in the Devonian formation at depths of 16,530 to 17,650 feet through the Dillinger Fed. SWD #1 well, located 1656 feet from the north line and 1124 feet from the east line of Section 20, Township 24 South, Range 31 East, NMPM, Eddy County, New Mexico.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____ Secondary Recovery _____ Pressure Maintenance __X__ Disposal _____ Storage
Application qualifies for administrative approval? __X__ Yes _____ No

II. OPERATOR: Solaris Water Midstream, LLC

ADDRESS: 9811 Katy Freeway, Suite 700, Houston, TX 77024

CONTACT PARTY: Bonnie Atwater PHONE: 432-203-9020

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 __X__ No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

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

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

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

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

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Bonnie Atwater TITLE: Reg Tech

SIGNATURE: Bonnie Atwater DATE: 8.29.18

E-MAIL ADDRESS: bonnie.atwater@solarismidstream.com

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

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

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.

Application for Authorization to Inject

Well Name: Dillinger Fed SWD #1

III – Well Data (*The Wellbore Diagram is included as **Attachment 1***)

A.

(1) General Well Information:

Operator: Solaris Water Midstream, LLC

Lease Name & Well Number: Dillinger Fed SWD #1

Well Footage: 1,656' FNL & 1,124' FEL

Location: S20 T24S R31E

(2) Casing Information:

Type	Hole Size	Casing Size	Casing Weight	Setting Depth	Sacks of Cement	Estimated TOC	Method Determined
Surface	24"	20"	94.0 lb/ft	565'	500	Surface	Circulation
Intermediate 1	17-1/2"	13-3/8"	54.5 lb/ft	4,270'	2,550	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.50 lb/ft	13,000'	3,500	Surface	Circulation
Liner	8-1/2"	7-5/8"	39 lb/ft	16,530'	260	12,800'(TOL)	CBL

(3) Tubing Information:

5-1/2" (23#) Internal Plastic Coated Tubing swedged down to 5" (18#) with setting depth of 16,510'

(4) Packer Information: Lok-set or equivalent packer set at 16,510'

B.

(1) Injection Formation Name: Devonian and Silurian-Fusselman formations
(2) Injection Interval: Open-hole injection between 16,530' – 17,650'
(3) Drilling Purpose: New Drill for Salt Water Disposal
(4) Other Perforated Intervals: No other perforated intervals exist.
(5) Overlying Oil and Gas Zone:

- Delaware (4,270')
- Bone Springs (8,065')
- Wolfcamp (11,455')
- Atoka (13,730')
- Morrow (14,485')

Underlying Oil and Gas Zone: No underlying oil and gas zones exist.

V – Well and Lease Maps

A well map and lease map are included in ***Attachment 2***.

VI – AOR Well List

A list of the wells within the AOR is included in ***Attachment 2***.

VII – Proposed Operation

(1) **Proposed Maximum Injection Rate:** 30,000 bpd
Proposed Average Injection Rate: 15,000 bpd
(2) **A closed system will be used.**
(3) **Proposed Maximum Injection Pressure:** 3,306 psi (surface)
Proposed Average Injection Pressure: approximately 1,500 – 2,000 psi (surface)
(4) **Source Water Analysis:** It is expected that the injectate will consist of produced water from production wells completed in the Wolfcamp and Bone Springs formations. Analysis of water from these formations is included in ***Attachment 3***.
(5) **Injection Formation Water Analysis:** The proposed well will be injecting water into the Devonian and Silurian-Fusselman formation which is known to be compatible with formation water from the Wolfcamp and Bone Springs formations. Water analyses from the Silurain-Fusselman could not be located; however, water analyses from the Devonian formation in the area are included in ***Attachment 4***.

VIII – Geologic Description

The proposed injection interval includes the Devonian and Silurian-Fusselman formations from 16,530 – 17,650 feet. These formations consist of carbonates including light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of taking water are present within the subject formations in the area.

The freshwater formation is the Rustler at a depth of approximately 540 feet. Water well depths in the area range from 205 – 429 feet below ground surface.

IX – Proposed Stimulation Program

A small cleanup acid job may be used to remove mud and drill cuttings from the formation. However, no other formation stimulation is currently planned.

X – Logging and Test Data

Logs will be submitted to the Division upon completion of the well.

XI – Fresh Groundwater Samples

Based on a review of data from the New Mexico Office of the State Engineer, 0 groundwater wells are located within 1-mile of the proposed SWD location; therefore, no groundwater samples were collected in association with this application. A water well map of the area is included in ***Attachment 5***.

XII – No Hydrologic Connection Statement

No faulting is present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing program has been designed to ensure there will be no hydrologic connection between the injection interval and overlying USDWs. A letter from a knowledgeable and qualified expert stating that there is a low risk of seismic activity from the proposed injection activities is included in ***Attachment 6***.

XIII – Proof of Notice

A Public Notice was filed with the Carlsbad Current-Argus newspaper and an affidavit is included in ***Attachment 7***.

A copy of the application was mailed to the OCD District Office, landowner, and leasehold operators with the AOR of the proposed SWD location. A list of recipients, as well as delivery confirmations, are included in ***Attachment 7***.

Attachments

Attachment 1: Wellbore Diagram

Attachment 2: Area of Review Well Map, Lease Map, and Well Details

Attachment 3: Source Water Analyses

Attachment 4: Injection Formation Water Analyses

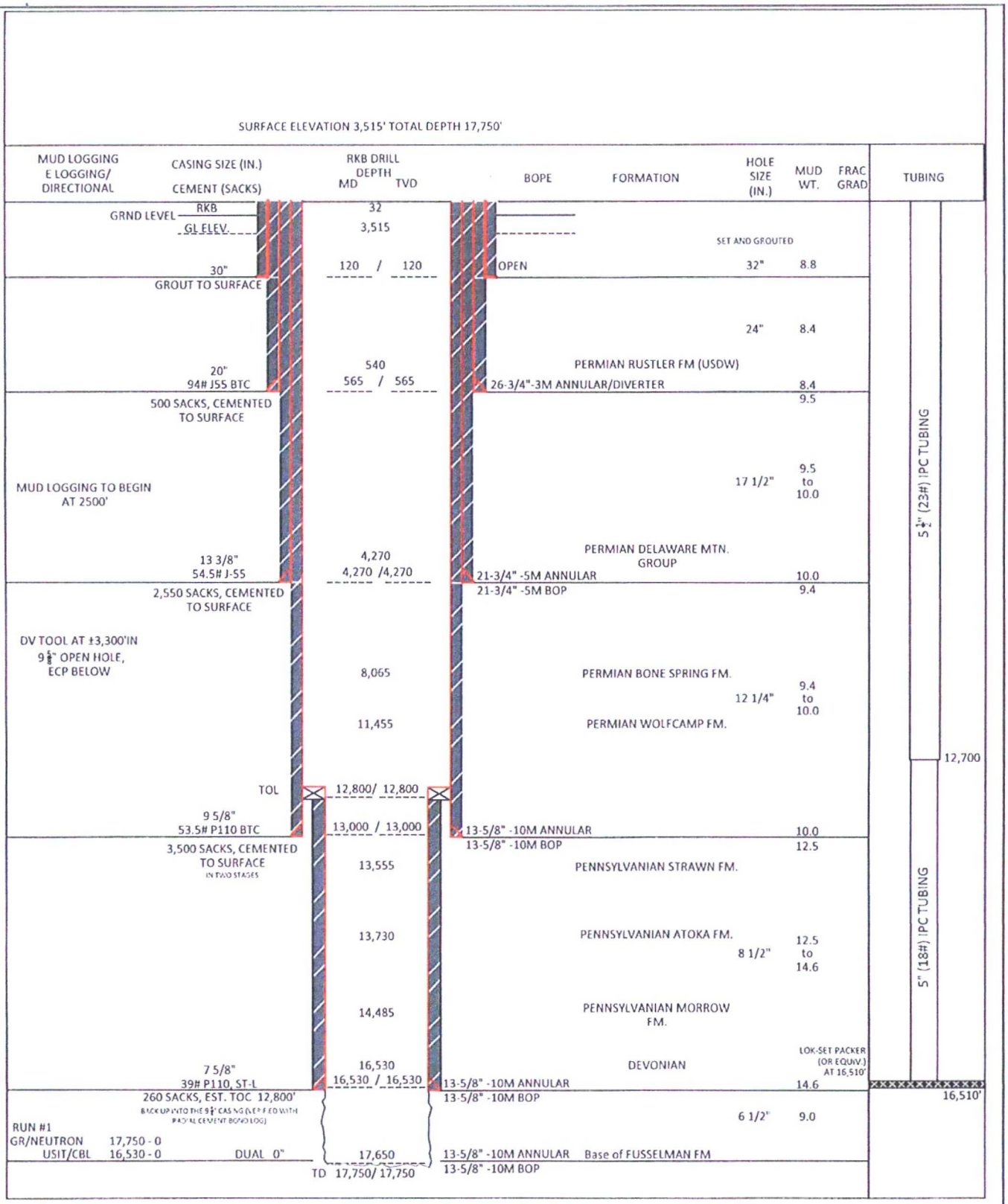
Attachment 5: Water Well Map

Attachment 6: Induced Seismicity Assessment Letter

Attachment 7: Public Notice Affidavit and Notice of Application Confirmations

Attachment 1

Wellbore Diagram



DILLINGER FED SWD #1

SECTION 20T-24-S, R-31-E
1,656' FNL & 1,124' FEL
EDDY COUNTY, NEW MEXICO

PN # 1680.NM.00 | JULY 2018

SOLARIS WATER MIDSTREAM

ALL CONSULTING
GOVERNMENT RELATIONS - ENERGY - PLANNING - TECHNOLOGY
ENGINEERING - ENVIRONMENTAL

SIZE	SCALE	
A	NTS	WELL BORE DATA SHEET

A-3 and AL-2 LOK-SET Retrievable Casing Packers

Product Family No. H64630 and H64628

APPLICATION

The A-3™ LOK-SET™ packer combines advantages of a retrievable packer with the features of a permanent packer. An ability to lock down tubing forces makes the A-3 suitable for a broad range of applications, including production, injection, zone isolation, and remedial operations. The AL-2™ LOK-SET packer is similar to the A-3, and has a larger bore.

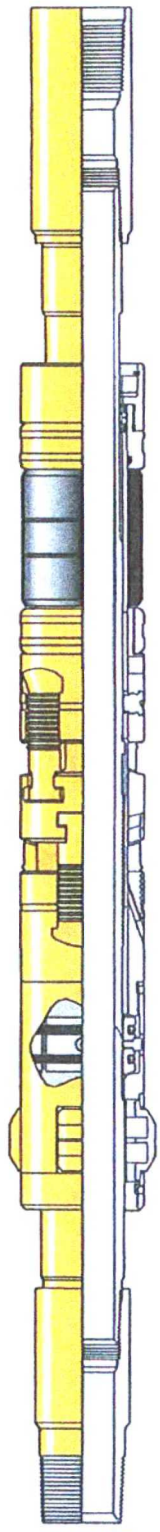
Advantages

- Holds pressure from above and below, without relying on set-down weight, tubing tension, or hydraulic hold down
- Provides tubing anchoring with tension applied, suitable for pumping wells or injection, controlling tubing forces related to change fluid temperatures
- Opposed, non-transferring, dovetail slips prevent packer movement associated with changing differential pressures, while allowing the landing of the tubing in tension, neutral or compression
- Right-hand tubing rotation controls setting and releasing
- Packing element compression locks in by ratcheting action of lock segments, which restricts rotation to one direction

Accessories

To provide a simple and reliable injection system for retrieving an injection string without having to unseat the packer:

L-10 or L-316 on-off sealing connectors, Product Family Nos. H68420 and H68422. Baker Hughes blanking plug can be used in the seating nipple profile of the on-off sealing connector to provide a means of plugging the lower zone while the tubing is being pulled.



A-3 LOK-SET Retrievable Casing Packer Product Family No. H64630

SPECIFICATION GUIDES

A-3™ LOK-SET Retrievable Casing Packer, Product Family No. H64630

Casing			Packer				
OD		Weight •	Size	Nom ID		Max Gage Ring OD	
In.	mm	lb/ft		In.	mm	In.	mm
4	101.6	9.5–12.9	41A2	1.500	38.1	3.244	82.4
4-1/2	144.3	21.6–23.6	41A2	1.500	38.1	3.244	82.4
4	101.6	9.5	41A4	1.500	38.1	3.423	112.4
4-1/2	114.3	18.8	41A4	1.500	38.1	3.423	112.4
		13.5–17.7	41B			3.578	90.9
		11.6–13.5	43A2	1.978	50.2	3.786	96.2
		9.5–10.5	43A4			3.786	96.2
5	127.0	15–18	43B	1.978	50.2	4.140	105.2
		11.5–15	43C			4.265	108.3
5-1/2	139.7	26	43C	1.978	50.2	4.265	108.3
		20–23	45A2			4.515	114.7
		15.5–20	45A4			4.656	118.3
		13–15.5	45B			4.796	121.8
6	152.4	26	45B	1.978	50.2	4.796	121.8
		20–23	45C			5.078	129.0
		15–18	45D			5.171	131.3
6-5/8	168.3	34	45E	1.978	50.2	5.421	137.7
		24–32	45F			5.499	139.7
		24	47A2	2.441	62.0	5.671	144.0
		17–24	45G	1.978	50.2	5.796	147.2
		17–20	47A4	2.441	62.0	5.827	148.0
7	177.8	38	47A2	2.441	62.0	5.671	144.0
		32–35	47A4			5.827	148.0
		26–29	47B2			5.983	152.0
		23–26	47B4			6.093	154.8
		17–20	47C2			6.281	159.5
7-5/8	193.7	33.7–39	47C4	2.441	62.0	6.468	164.3
		24–29.7	47D2			6.687	169.9
		20–24	47D4			6.827	173.4
8-5/8	219.1	44–49	49A2	3.500	88.9	7.327	186.1
		32–40	49A4			7.546	191.7
		20–28	49B			7.796	198.0
9-5/8	244.5	47–53.5	51A2	3.500	88.9	8.234	209.1
		40–47	51A4			8.452	214.7
		29.3–36	51B			8.608	218.6

AL-2™ Large Bore LOK-SET Retrievable Casing Packer Product Family No. H64628

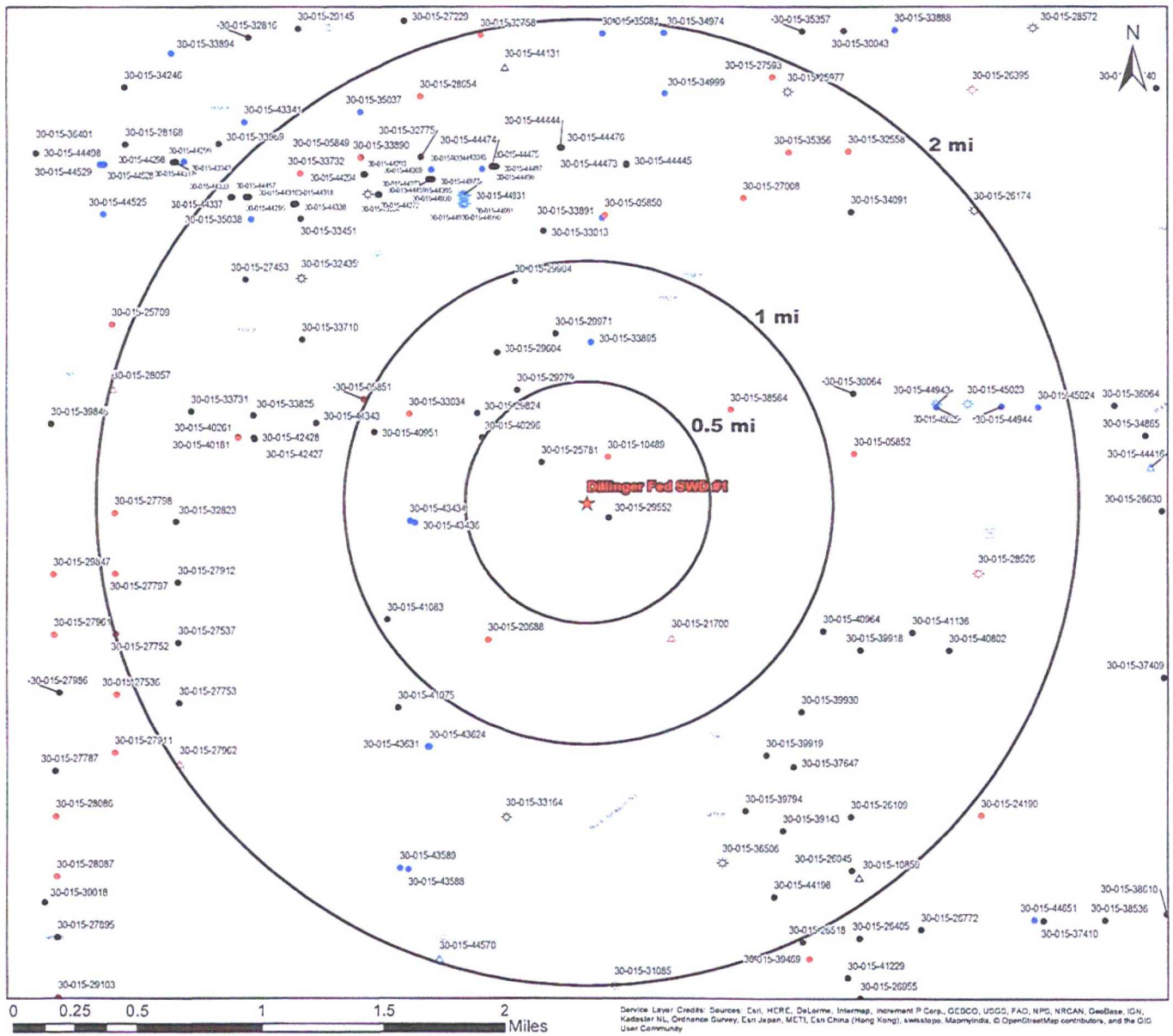
Casing		Packer							
OD		Weight •	Size	Nom ID		Max Gage Ring OD		Max Diameter of Compressed Drag Block	
In.	mm	lb/ft		In.	mm	In.	mm	In.	mm
5-1/2	139.7	20	45A2 x 2-3/8	2.375	60.3	4.562	115.9	4.592	116.6
		15.5–17	45A4 x 2-3/8			4.656	118.3	4.750	120.7
		13	45B x 2-3/8			4.796	121.8	4.902	124.5
6	152.4	26	45B x 2-3/8	2.375	60.3	4.796	121.8	4.902	124.5

• *When selecting a packer for a casing weight common to two weight ranges (same OD), choose the packer size shown for the lighter of the two weight ranges. Example: for 7-in. (177.8 mm) OD 26 lb/ft casing use packer size 47B4. Under certain circumstances the other packer size may be run, such as when running in mixed casing strings.*

Repair kits, including such items as packing elements, seal rings, etc., are available for redressing Baker Retrievable Packers. Contact your Baker Hughes representative. Use only Baker Hughes repair parts.

Attachment 2

Area of Review Well Map, Lease Map, and Well Details



Prepared for SOLARIS WATER MIDSTREAM

Legend

- Proposed SWD
- Gas, Active (8)
- Gas, New (8)
- Gas, Plugged (2)
- Oil, Active (94)
- Oil, New (29)
- Oil, Plugged (30)
- Salt Water Injection, Active (2)
- Salt Water Injection, New (2)
- Salt Water Injection, Plugged (3)

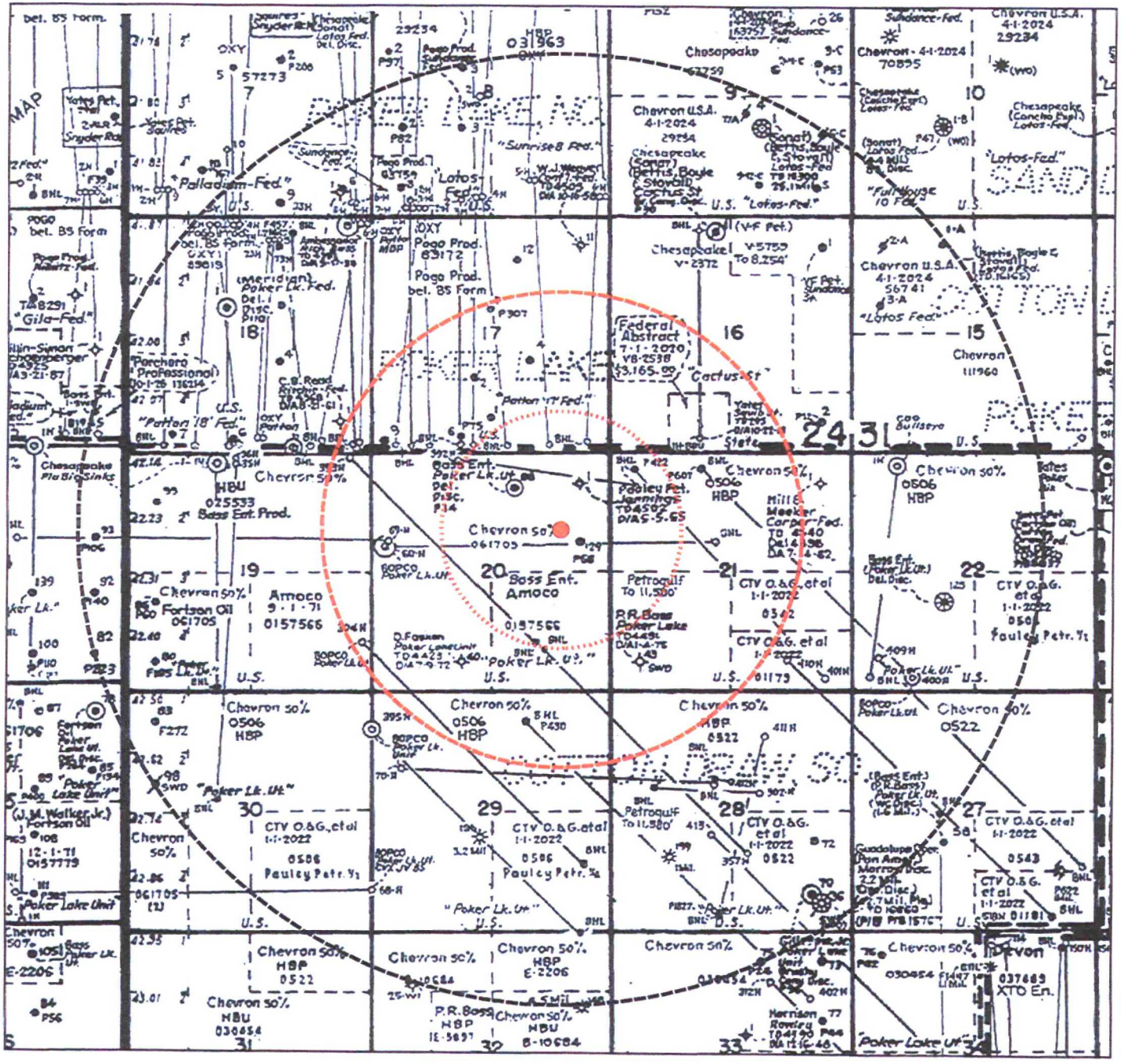
O&G Wells Area of Review

Dillinger Fed SWD #1

Eddy, New Mexico

Proj Mgr: Dan Arthur	August 16, 2018	Mapped by: Ben Bockelmann

Prepared by: ALL CONSULTING



Prepared for:
SOLARIS WATER MIDSTREAM

N

Legend

- Proposed SWD
- 1/2 - mile Radius
- 1 - mile Radius
- 2 - mile Radius

Dillinger Fed SWD #1 Offset Leases Eddy County, NM		
Proj Mgr: JDA	August 16, 2018	Mapped by: BJB

Prepared by:
ALL CONSULTING

1-mile AOR Tabulation for Dillinger Fed SWD #1 (Top of Injection Interval: 16,530)								
Well Name	API#	Well Type	Operator	Spud Date	Location (Sec., Tn., Rng.)	Footage Location	Total Depth	Penetrate Inj. Zone?
PATTON 17 FEDERAL #007	30-015-29904	O	OXY USA INC	5/23/1998	G-17-24S-31E	2,075 FNL 2,600 FEL	8320	No
PATTON 17 FEDERAL #002	30-015-29604	O	OXY USA INC	5/8/1997	K-17-24S-31E	1,650 FSL 2,250 FWL	9700	No
PATTON 17 FEDERAL #009T	30-015-33034	O	OXY USA INC	10/17/2004	M-17-24S-31E	330 FSL 330 FWL	8375	No
PATTON 17 FEDERAL #001	30-015-29279	O	OXY USA INC	12/20/1996	O-17-24S-31E	822 FSL 2,581 FEL	8280	No
PATTON 17 FEDERAL #006	30-015-29824	O	OXY USA INC	10/10/1997	N-17-24S-31E	330 FSL 1,800 FWL	8290	No
PATTON 17 FEDERAL #004	30-015-29971	O	OXY USA INC	1/15/1998	J-17-24S-31E	2,050 FSL 1,750 FEL	8320	No
PATTON 17 FEDERAL #008V	30-015-33895	O	OXY USA INC	1/10/2005	I-17-24S-31E	1,850 FSL 990 FEL	8500	No
SQUIB BQU STATE COM #001H	30-015-38564	O	EOG Y RESOURCES, INC.	3/31/2011	N-16-24S-31E	330 FSL 1,980 FWL	295	No
POKER LAKE UNIT #393H	30-015-40951	O	BOPCO, L.P.	5/27/2012	A-19-24S-31E	55 FNL 435 FEL	8127	No
POKER LAKE UNIT #394H	30-015-41083	O	BOPCO, L.P.	5/12/2013	P-19-24S-31E	1,125 FSL 200 FEL	8088	No
POKER LAKE UNIT #043	30-015-21700	S	BOPCO, L.P.	11/28/1994	M-21-24S-31E	660 FSL 660 FWL	4995	No
POKER LAKE UNIT #068	30-015-25781	O	BOPCO, L.P.	9/17/1987	B-20-24S-31E	760 FNL 2,080 FEL	4491	No
POKER LAKE UNIT #129	30-015-29552	O	BOPCO, L.P.	7/13/1997	H-20-24S-31E	1,980 FNL 660 FEL	8306	No
POKER LAKE UNIT #392H	30-015-40296	O	BOPCO, L.P.	9/20/2012	C-20-24S-31E	200 FNL 1,900 FWL	8146	No
POKER LAKE UNIT CVX JV BS #060H	30-015-43434	O	BOPCO, L.P.	Not Yet Drilled	E-20-24S-31E	2,010 FNL 330 FWL	N/A	No
PRE-ONGARD WELL #040	30-015-20688	plugged	PRE-ONGARD WELL OPERATOR	6/26/1972	N-20-24S-31E	660 FSL 1,980 FWL	4600	No
POKER LAKE #001	30-015-10489	plugged	PRE-ONGARD WELL OPERATOR	4/27/1965	A-20-24S-31E	660 FNL 660 FEL	4700	No
POKER LAKE UNIT CVX JV BS #069H	30-015-43436	O	BOPCO, L.P.	Not Yet Drilled	E-20-24S-31E	2,010 FNL 290 FWL	N/A	No

Notes:

(1) No wells within the 1-mile AOR penetrate the injection interval.

Attachment 3

Source Water Analyses

Wolfcamp

BAKER HUGHES

Water Analysis

Date: 23-Aug-11

2708 West County Road, Hobbs NM 88240
Phone (575) 392-5556 Fax (575) 392-7307

Analyzed For Brushy Draw 1 #1

Company	Well Name	County	State
	BD	~~Lea~~ Eddy	New Mexico 1-26S-29E

Sample Source Swab Sample **Sample #** 1

Formation **Depth**

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

Cations

Sodium (Calc)	In Mg/L	77,982	In PPM	66,520
Calcium	In Mg/L	4,000	In PPM	3,413
Magnesium	In Mg/L	1,200	In PPM	1,024
Soluable Iron (FE2)	In Mg/L	10.0	In PPM	9

Anions

Chlorides	In Mg/L	130,000	In PPM	110,922
Sulfates	In Mg/L	250	In PPM	213
Bicarbonates	In Mg/L	127	In PPM	108
Total Hardness (as CaCO3)	In Mg/L	15,000	In PPM	12,799
Total Dissolved Solids (Calc)	In Mg/L	213,549	In PPM	182,209
Equivalent NaCl Concentration	In Mg/L	182,668	In PPM	156,031

Scaling Tendencies

*Calcium Carbonate Index 507,520

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

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

Below 500,000 Remote / 500,000 - 10,000,00 Possible / Above 10,000,000 Probable

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

Remarks RW=.048@70F

Report # 3188

Sec 22, T25S, R28E

North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121
Lab Team Leader - Sheila Hernandez
(432) 495-7240

Bone Spring

Water Analysis Report by Baker Petrolite

Company:		Sales RDT:	33514.1
Region:	PERMIAN BASIN	Account Manager:	TONY HERNANDEZ (575) 910-7135
Area:	ARTESIA, NM	Sample #:	534665
Lease/Platform:	PINOCHLE 'BPN' STATE COM	Analysis ID #:	108795
Entity (or well #):	2 H	Analysis Cost:	$90.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	03/10/11
Analysis Date:	03/18/11
Analyst:	SANDRA GOMEZ
TDS (mg/l or g/m3):	184911.1
Density (g/cm3, tonne/m3):	1.113
Anion/Cation Ratio:	1
Carbon Dioxide:	0 50 PPM
Oxygen:	
Comments:	

Analysis of Sample 534665 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	109618.0	3091.92	Sodium:	70276.7	3056.82
Bicarbonate:	2135.0	34.99	Magnesium:	195.0	16.04
Carbonate:	0.0	0.	Calcium:	844.0	42.12
Sulfate:	747.0	15.55	Strontium:	220.0	5.02
Phosphate:			Barium:	0.8	0.01
Borate:			Iron:	6.5	0.23
Silicate:			Potassium:	869.0	22.22
			Aluminum:		
Hydrogen Sulfide:		0 PPM	Chromium:		
pH at time of sampling:		7	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		7	Manganese:	0.100	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.08	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.56	0.29	1.72
100	0	1.10	208.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.35
120	0	1.12	224.17	-1.38	0.00	-1.19	0.00	-0.17	0.00	0.16	0.00	3.17
140	0	1.13	243.17	-1.42	0.00	-1.18	0 00	-0.18	0.00	0.00	0.00	4.21

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.
Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Attachment 4

Injection Formation Water Analyses

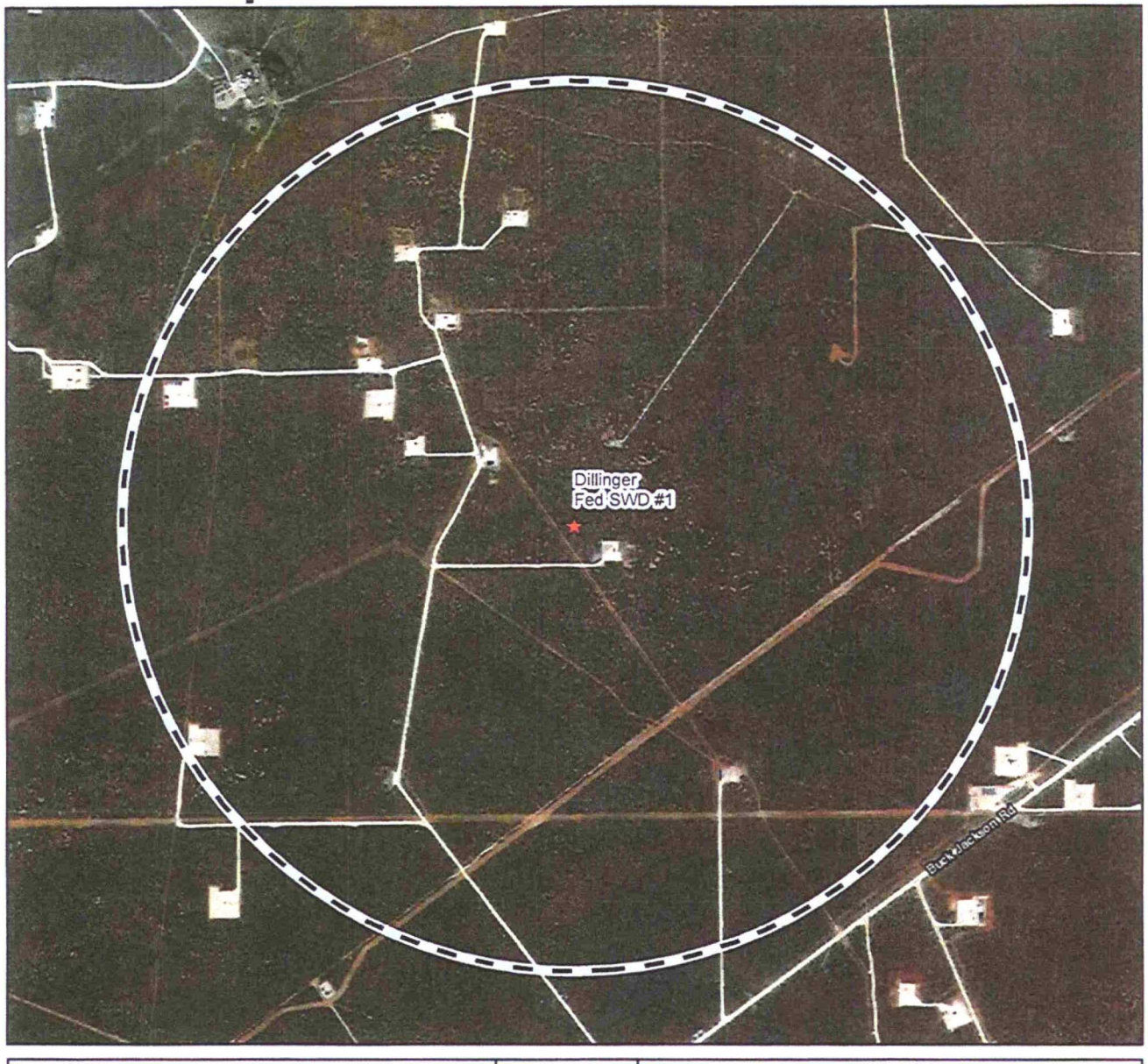
wellname	api	section	township	range	county	state	formation	sampledate	ph	specificgravity	specificgravity_temp_F	tds_mg/L	resistivity_ohm_cm	resistivity_ohm_cm_temp_F	conductivity	conductivity_temp_F	sodium_mg/L	calcium_mg/L	magnesium_mg/L	chloride_mg/L	bicarbonate_mg/L	sulfate_mg/L
AURNEGAM POINT #001	3001510280	5	24S	25E	EDDY	NM	DEVONIAN	12/14/1964 0:00	7			203100								121100	175	2220
WHITE CITY PENN GAS COM UNIT 1 #001	3001500408	29	24S	26E	EDDY	NM	DEVONIAN	3/1/1900 0:00	7	1.012	60		0.36	75	25226	64	6072	1002	152	10120	653	1336

Source: Go-Tech (http://gotech.nmt.edu/gotech/Water/producedwater.aspx)

Attachment 5

Water Well Map

Proposed SWD & Water Wells within 1 mile



Prepared for:
SOLARIS WATER MIDSTREAM

Legend

- Proposed SWD
- Proposed SWD 1-mi Buffer

Dillinger Fed SWD #1		
County: Eddy, NM	Date: 8/7/2018	
Lat: 32.205511	PM: J Daniel Arthur	
Long: -103.794883	Map: Ben Bockelmann	1:22,000

0 1,250 2,500 5,000 Feet

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Prepared by:
ALL CONSULTING

Attachment 6

Induced Seismicity Assessment Letter

ALL CONSULTING
GOVERNMENT RELATIONS · ENERGY · PLANNING · TECHNOLOGY
ENGINEERING · ENVIRONMENTAL

August 16, 2018

Mr. Phillip Goetze, P.G.
NM EMNRD – Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Subject: Induced Seismicity Potential Statement for the Dillinger Fed SWD #1

Dear Mr. Goetze,

This letter provides information regarding the seismic potential associated with injection operations associated with Solaris Water Midstream, LLC's (Solaris), proposed Dillinger Fed SWD #1, hereinafter referred to as the "Subject Well".

As outlined herein, based on my experience as an expert on the issue of induced seismicity, it is my opinion that the potential for the proposed injection well to cause injection-induced seismicity is expected to be minimal, at best. This conclusion is based on (1) the lack of historic seismic activity and faulting in the area, (2) the low fault slip potential (FSP) of Precambrian faults in the area, (3) the presence of confining layers, and (4) the overall vertical distance between the proposed injection zone and basement rock.

The Subject Well, is located 1,656' FNL & 1,124' FEL of Section 20, in T24-S and R31-E of Eddy County, New Mexico. Historically, the Eddy County area has experienced very limited recorded seismic activity (per the U.S. Geological Survey [USGS] earthquake catalog database). The closest recorded seismic event was a M3.1 that occurred on March 18, 2012, and was located approximately 7.71 miles northwest of the subject well (See Exhibit 1). The closest Class IID well injecting into the same formations (Devonian-Silurian) of the Subject Well is approximately 1.83 miles to the north (See Exhibit 1).

Solaris does not own either 2D or 3D seismic reflection data in the area of the Subject Well. Fault data from USGS indicates that the closest known fault is approximately 12.08 miles southwest of the Subject Well (See Exhibit 1).

In a recent paper written by Snee and Zoback (2018) entitled "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity,", the authors found that large groups of mostly north-south striking Precambrian basement faults, predominantly located along the Central Basin Platform, the western Delaware Basin, and large parts of the Northwest Shelf (which includes Eddy and Lea counties, New Mexico) have low FSP at the modeled fluid-pressure perturbation. The map in Exhibit 2 depicts the low probability risk of FSP for the Delaware Basin and Northwest Shelf areas (Snee and Zoback 2018).

Geologic analysis indicates that the proposed Devonian-Silurian injection zone is overlain by approximately 200 to 400 feet of Woodford Shale, which is the upper confining zone and will serve as a barrier for upward injection fluid migration. Additionally, the Simpson Group that lies directly below the Montoya Formation will act as a lower confining zone to prohibit fluids from migrating downward into the underlying Ellenberger Formation and Precambrian basement rock. See the stratigraphic column for the Delaware Basin included in Exhibit 3.

In the Eddy and Lea Counties area of New Mexico, the Simpson Group is comprised of a series of Middle to Upper Ordovician carbonates, several sandstones, and sandy shales that range from approximately 350 to 650 feet thick (Jones 2008). This group of rocks is capped by the limestones of the Bromide Formation, which is approximately 200 feet thick in this area (Jones 2008). The closest deep well drilled into the Precambrian basement was completed by the Skelly Oil Company in 1975. This well is located in Section 17, Range 36E, Township 25S of Lea County (API No.30-025-25046) and encountered 602 feet of Ellenburger Formation before reaching the top of the Precambrian granite at a depth of 18,920 feet. Based on the estimated thickness of the Simpson Group and Ellenburger Formation in this area, the Precambrian basement should be approximately 1,000 to 1,200 feet below the bottom of the proposed injection zones in the Subject Well.

Conclusion

As an expert on the issue of induced seismicity, it is my opinion that the potential for the proposed injection well to cause injection-induced seismicity is expected to be minimal, at best. This conclusion is based on (1) the lack of historic seismic activity and faulting in the area, (2) the low FSP of Precambrian faults in the area, (3) the presence of confining layers, and (4) the overall vertical distance between the proposed injection zone and basement rock.

Sincerely,
ALL Consulting

J. Daniel Arthur, P.E., SPEC
President and Chief Engineer

Enclosures
References
Exhibits

References

Ball, Mahlon M. 1995. "Permian Basin Province (044)." In *National Assessment of United States Oil and Gas Resources—Results, Methodology, and Supporting Data.* U.S. Geological Survey. https://certmapper.cr.usgs.gov/data/noga95/prov44/text/prov44.pdf (accessed June 18, 2018).

Green, G.N., and G.E. Jones. 1997. "The Digital Geologic Map of New Mexico in ARC/INFO Format." U.S. Geological Survey Open-File Report 97-0052. https://mrdata.usgs.gov/geology/state/state.php?state=NM (accessed June 14, 2018).

Jones, Rebecca H. 2008. "The Middle-Upper Ordovician Simpson Group of the Permian Basin: Deposition, Diagenesis, and Reservoir Development." http://www.beg.utexas.edu/resprog/permianbasin/PBGSP_members/writ_synth/Simpson.pdf (accessed June 19, 2018).

Snee, Jens-Erik Lund, and Mark D. Zoback. 2018. "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity." *The Leading Edge* 37, no. 2 (February 2018): 127-34.

U.S. Geological Survey (USGS). No date. Earthquakes Hazard Program: Earthquake Catalog. https://earthquake.usgs.gov/earthquakes/search/ (accessed June 14, 2018).

Exhibits

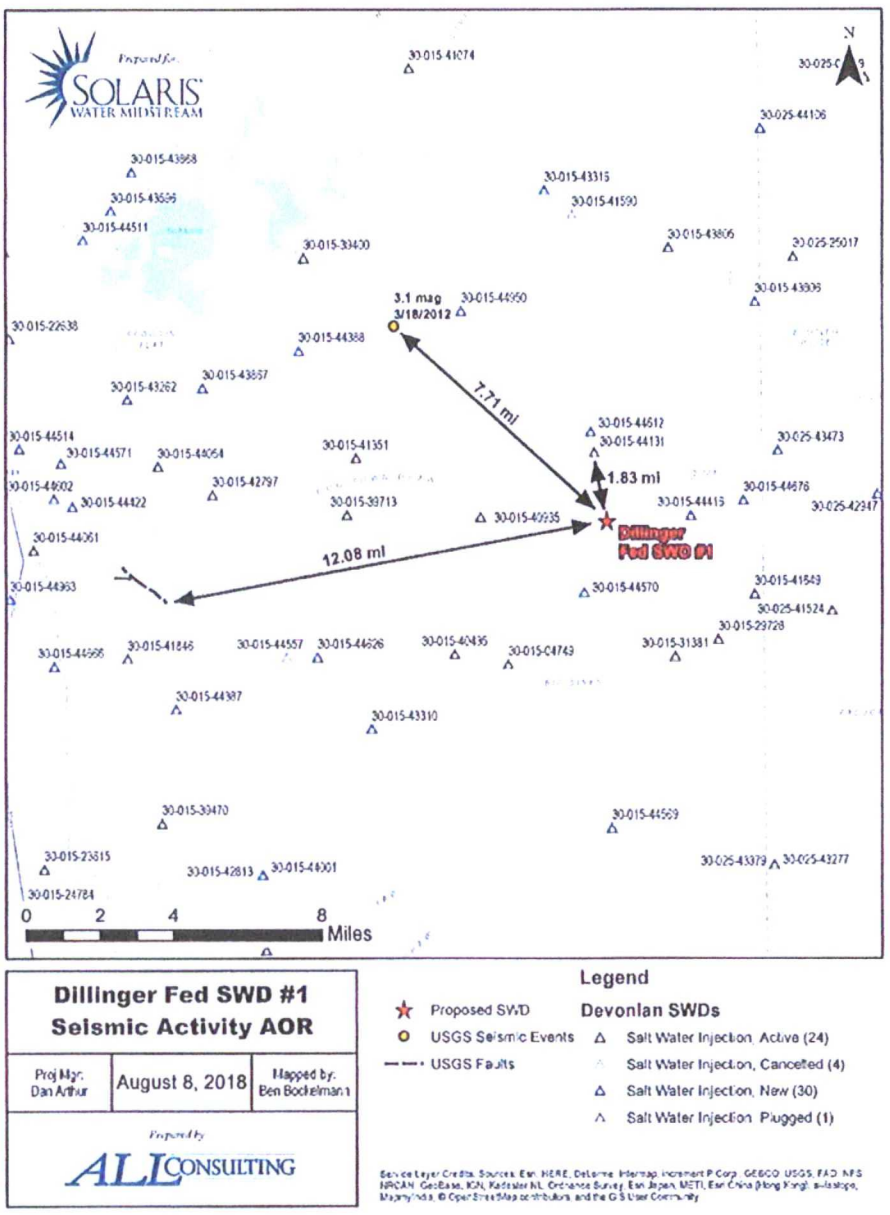


Exhibit 1. Map Showing the Distances from Known and Inferred Faults, Seismic Event, and Closest Deep Injection Well

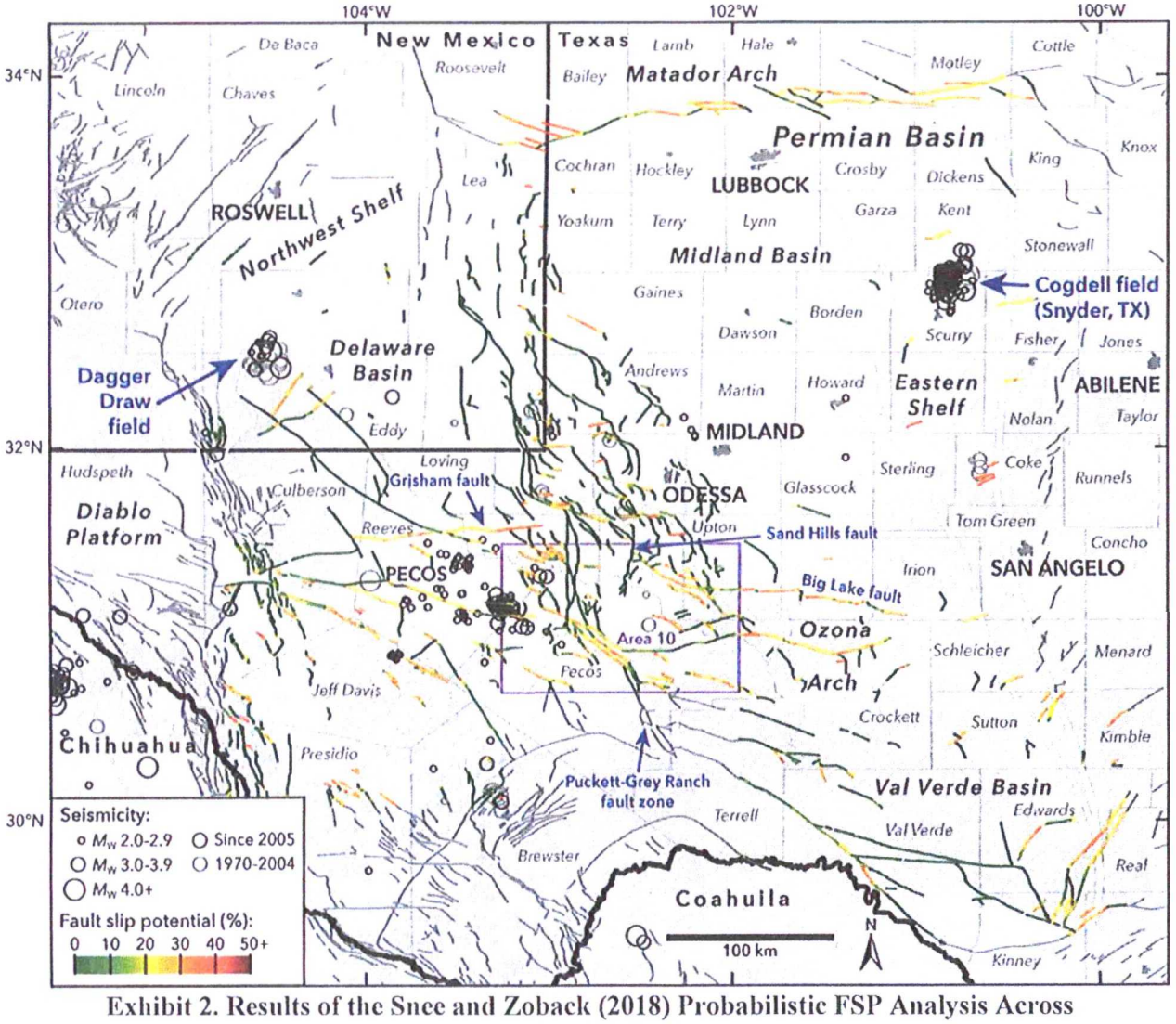


Exhibit 2. Results of the Snee and Zoback (2018) Probabilistic FSP Analysis Across the Permian Basin

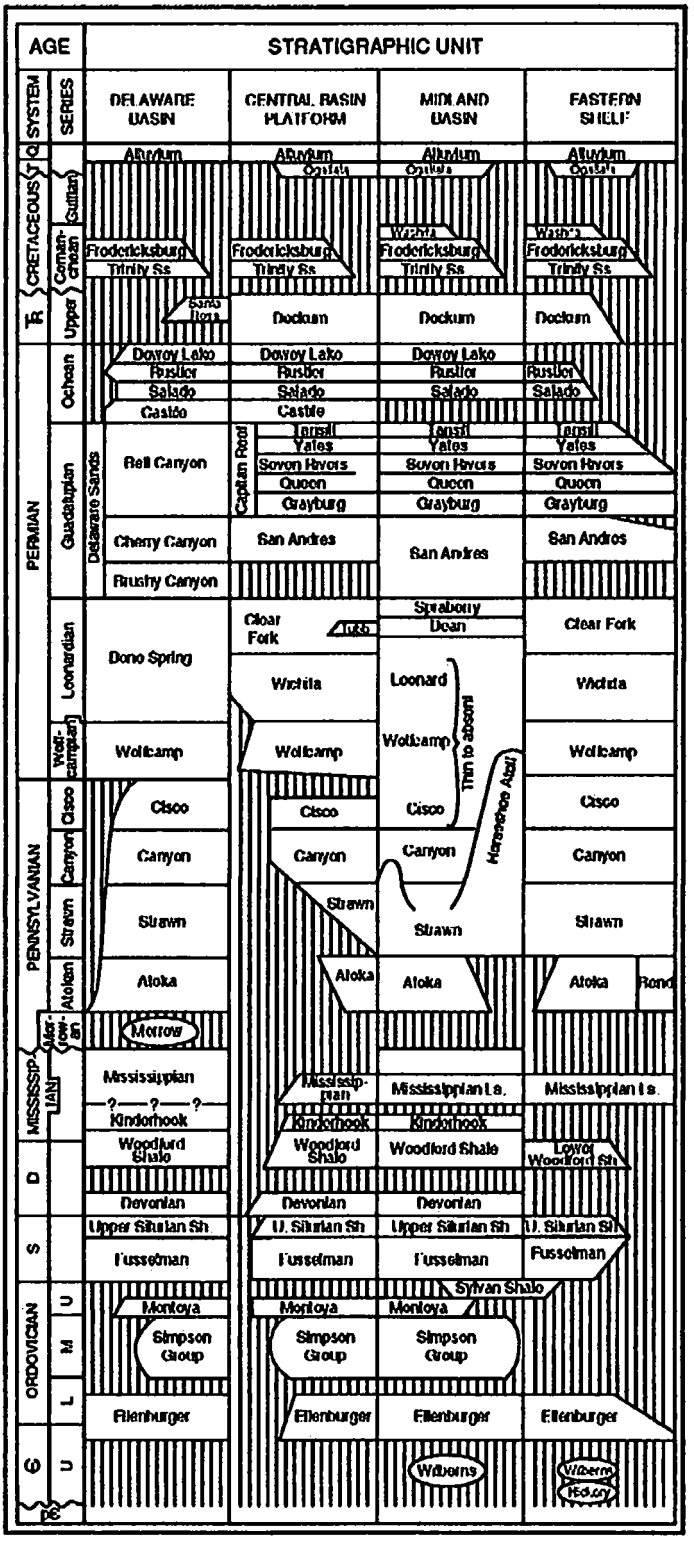


Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

Attachment 7

Public Notice Affidavit and Notice of Application Confirmations

Dillinger Fed SWD #1 Notice of Application Recipients (1/2-mile Radius)				
Entity	**Address**	**City**	**State**	**Zip Code**
Landowner				
New Mexico BLM	620 E. Greene St.	Carlsbad	NM	88220
OCD District				
OCD District 2	811 S. First St.	Artesia	NM	88210
Leasehold Operators				
Amoco Production Company	1017 Stanolind Rd.	Hobbs	NM	88240
Bass Enterprises Production Company	201 Main St., 1st City Bank Tower	Fort Worth	TX	76102
BOPCO, L.P.	6401 Holiday Hill Rd., Bldg 5, Ste 200	Midland	TX	79702
Chevron U.S.A Production Company	P.O. Box 1635	Houston	TX	78735
David Fasken	303 W. Wall Ave., Ste 1901	Midland	TX	79701
EOG Y Resources, Inc.	104 S. 4th Street	Artesia	NM	88210
OXY USA Inc.	5 Greenway Plaza, Suite 110	Houston	TX	77046
Pauly Petroleum Incorporated	10000 St. Monica Blvd.	Los Angeles	CA	90058
Perry R. Bass Trustee	201 Main Street, Ste 2700	Fort Worth	TX	76102-3131
Petrogulf Energy Company	518 17th Street, Ste. 1455	Denver	CO	80202
Pogo Producing Company	P.O. Box 2504	Houston	TX	77252

CARLSBAD
CURRENT-ARGUS

AFFIDAVIT OF PUBLICATION

Ad No.
0001260629

ALL CONSULTING- CARLSBAD
1718 SOUTH CHEYENNE AVENUE

TULSA OK 74119

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

09/06/18

Legal Clerk

Subscribed and sworn before me this
6th of September 2018.

State of WI, County of Brown
NOTARY PUBLIC

My Commission Expires

Ad#:0001260629
P O : Dillinger Fed SWD #1
# of Affidavits :0.00

TARA MONDLOCH
Notary Public
State of Wisconsin

APPLICATION FOR AUTHORIZATION TO INJECT
NOTICE IS HEREBY GIVEN: That Solaris Water Midstream, LLC, 9811 Katy Freeway, Suite 900, Houston, TX 77024, is requesting that the New Mexico Oil Conservation Division administratively approve the APPLICATION FOR AUTHORIZATION TO INJECT as follows:
PURPOSE: The intended purpose of the injection well is to dispose of salt water produced from permitted oil and gas wells.
WELL NAME AND LOCATION: Dillinger Fed SWD #1
SE ¼ NE ¼, Section 20, Township 24S, Range 31E
1,656' FNL & 1,124' FEL
Eddy County, NM
NAME AND DEPTH OF DISPOSAL ZONE:
Devonian-Silurian (16,530' - 17,650')
EXPECTED MAXIMUM INJECTION RATE:
30,000 Bbls/day
EXPECTED MAXIMUM INJECTION PRESSURE:
3,306 psi (surface)
Objections or requests for hearing must be filed with the New Mexico Oil Conservation Division within fifteen (15) days. Any objection or request for hearing should be mailed to the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505.
Additional information may be obtained by contacting Bonnie Atwater (Solaris - Regulatory Technician) at 432-203-9020.