

8/17/2018	SUSPENSE	ENGINEER	8/29/2018	SWD	PMAM 18232 56592
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ABOVE THIS LINE FOR DIVISION USE ONLY

**NEW MEXICO OIL CONSERVATION DIVISION**  
 - 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

**Application Acronyms:**

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]  
 [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]  
 [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]  
 [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]  
 [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]  
 [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication  
☐ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement  
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery  
☐ WFX ☐ PMX ☒ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify \_\_\_\_\_

- SWD  
 - Solaris Watch  
 Midstream  
 371643  
 - well  
 M&L Co  
 SWD #1  
 30-015-Pending  
 - Pool  
 - SWD, Devonian  
 Silurian

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ☒ Offset Operators, Leaseholders or Surface Owner

[C] ☒ Application is One Which Requires Published Legal Notice

[D] ☐ Notification and/or Concurrent Approval by BLM or SLO  
 U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ☒ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **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.

J. Daniel Arthur, P.E., SPEC  
 Print or Type Name

Signature

Consulting Engineer - ALL Consulting  
 Title

08/13/2018  
 Date

darthur@all-llc.co,  
 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: Solaris Water Midstream, LLC  
ADDRESS: 9811 Katy Freeway, Suite 900, 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: 7.31.18

E-MAIL ADDRESS: bonnie.atwater@solaris-midstream.com

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

### III. WELL DATA

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

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

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

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

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

### XIV. PROOF OF NOTICE

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

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

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

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

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

Application for Authorization to Inject

Well Name: Mad Cow 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: Mad Cow SWD #1

Well Footage: ~~2,440'~~ FSL & ~~2,467'~~ FEL

Location: S12 T24S R30E

2,441 1,135 } Publication Notice | No changes to notice  
No changes to AOR

##### (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	600'	600	Surface	Circulation
Intermediate 1	17-1/2"	13-3/8"	54.5 lb/ft	4,300'	2,600	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.5 lb/ft	13,000'	3,500	Surface	Circulation
Liner	8-1/2"	7-5/8"	39 lb/ft	16,420'	250	12,900'(TOL)	CBL

##### (3) Tubing Information:

5-1/2" (23#) Internal Plastic Coated Tubing swedged down to 5" (18#) with setting depth of 16,400'

(4) Packer Information: Lok-set or equivalent packer set at 16,400'

#### B.

(1) Injection Formation Name: e: Devonian and Silurian-Fusselman formations

(2) Injection Interval: Open-hole injection between 16,420' – 17,550'

(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 (4,320')
- Bone Springs (8,930')
- Wolfcamp (11,370')
- Atoka (13,630')
- Morrow (14,430')

Underlying Oil and Gas Zones: 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. *Source Open/Commercial*
- (3) **Proposed Maximum Injection Pressure:** 3,284 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 formations which is known to be compatible with formation water from the Wolfcamp and Bone Springs formations. Water analyses from Silurian-Fusselman could not be located; however, water analyses from the Devonian formation in the area are included in **Attachment 4**.

## (6) VIII – Geologic Description

The proposed injection interval includes the Devonian and Silurian-Fusselman formations from 16,420 – 17,550 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 575 feet. Water well depths in the area range from 25 – 600 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, no 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**.

## **II – 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 within the AOR of the proposed SWD location. A list of the 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



SURFACE ELEVATION 3,535' TOTAL DEPTH 17,650

MUD LOGGING E LOGGING/ DIRECTIONAL	CASING SIZE (IN.) CEMENT (SACKS)	RKB DRILL DEPTH MD TVD	BOPE	FORMATION	HOLE SIZE (IN.)	MUD WT.	FRAC GRAD	TUBING
GRND LEVEL	RKB	32						
GL ELEV.		3,535						
30"		120 / 120	OPEN		32"	8.8		
GROUT TO SURFACE								
					24"	8.4		
20"		575		PERMIAN RUSTLER FM (USDW)				
94# J55 BTC		600 / 600	26-3/4"-3M ANNULAR/DIVERTER			8.4		
600 SACKS, CEMENTED TO SURFACE						9.5		
					17.5"	9.5 to 10.0		
MUD LOGGING TO BEGIN AT 2500'				PERMIAN DELAWARE MTN. GROUP				
	13 3/8"	4,320	21-3/4"-5M ANNULAR			10.0		
	54.5# J-55	4,300 / 4,300	21-3/4"-5M BOP			9.4		
2,600 SACKS, CEMENTED TO SURFACE								
		8,930		PERMIAN BONE SPRING FM.	12 1/4"	9.4 to 10.0		
DV TOOL AT ±3,300' IN 9 5/8" OPEN HOLE, ECP BELOW		11,370		PERMIAN WOLFCAMP FM.				
								12,800
		12,900 / 12,900						
	9 5/8"							
	53.5# P110 BTC	13,000 / 13,000	13-5/8"-10M ANNULAR			10.0		
3,500 SACKS, CEMENTED TO SURFACE IN TWO STAGES			13-5/8"-10M BOP			12.5		
		13,450		PENNSYLVANIAN STRAWN FM.				
		13,630		PENNSYLVANIAN ATOKA FM.	8 1/2"	12.5 to 14.6		
		14,430		PENNSYLVANIAN MORROW FM.				
		16,420		DEVONIAN				
	7 5/8"	16,420 / 16,420	13-5/8"-10M ANNULAR			14.6		
	39# P110, ST-L		13-5/8"-10M BOP					
250 SACKS, EST. TOC 12,900' BACK UP INTO THE 9 5/8" CASING (VERIFIED WITH RADIAL CEMENT BOND LOG)								16,400'
					6 1/2"	9.0		
RUN #1 GR/NEUTRON	17,650 - 0		13-5/8"-10M ANNULAR	Base of FUSSELMAN FM				
USIT/CBL	16,420 - 0	DUAL 0"	13-5/8"-10M BOP					
		TD 17,650 / 17,650						

## MAD COW SWD #1

SECTION 12T-24-S, R-30-E  
2441' FSL & 1135' FEL  
EDDY COUNTY, NEW MEXICO

PN # 1680.NM.00

JULY 2018



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

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SIZE

A

SCALE

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.

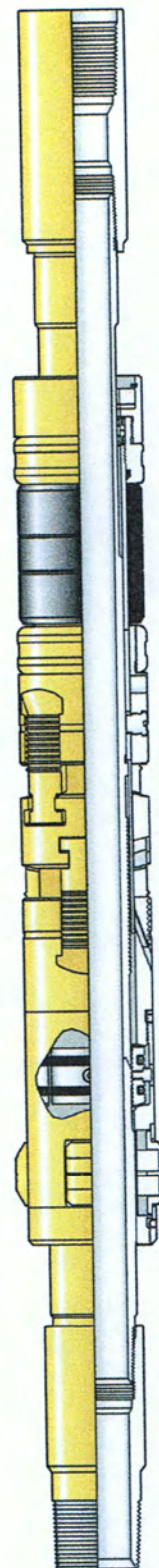
### Advantages

- 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
7	177.8	17-20	47A4	2.441	62.0	5.827	148.0
		38	47A2	2.441	62.0	5.671	144.0
		32-35	47A4			5.827	148.0
		26-29	47B2			5.983	152.0
7-5/8	193.7	23-26	47B4			6.093	154.8
		17-20	47C2			6.281	159.5
		33.7-39	47C4	2.441	62.0	6.468	164.3
		24-29.7	47D2			6.687	169.9
8-5/8	219.1	20-24	47D4			6.827	173.4
		44-49	49A2	3.500	88.9	7.327	186.1
		32-40	49A4			7.546	191.7
9-5/8	244.5	20-28	49B			7.796	198.0
		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	mm
5-1/2	139.7	20	45A2 x 2-3/8	2.375	60.3	4.562	115.9	4.592
		15.5-17	45A4 x 2-3/8			4.656	118.3	4.750
		13	45B x 2-3/8			4.796	121.8	4.902
6	152.4	26	45B x 2-3/8	2.375	60.3	4.796	121.8	4.902

- 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



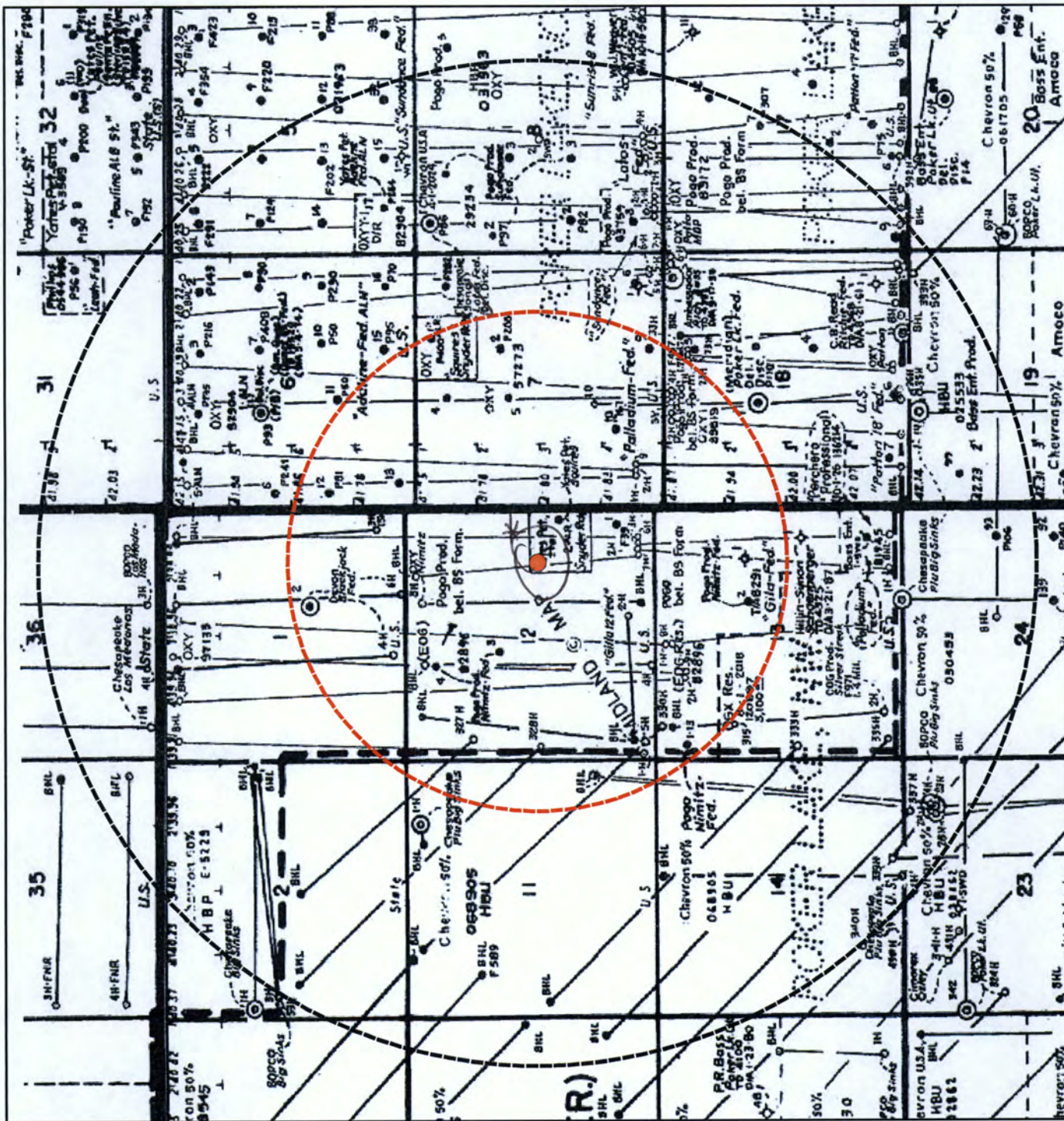


N

# Legend

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

\* Correct location based on Publication info



Mad Cow SWD #1  
Offset Leases  
Eddy County, NM

Proj Mgr:  
JDA

July 30, 2018

Mapped by:  
BJB

Prepared by:

ALICONSULTING

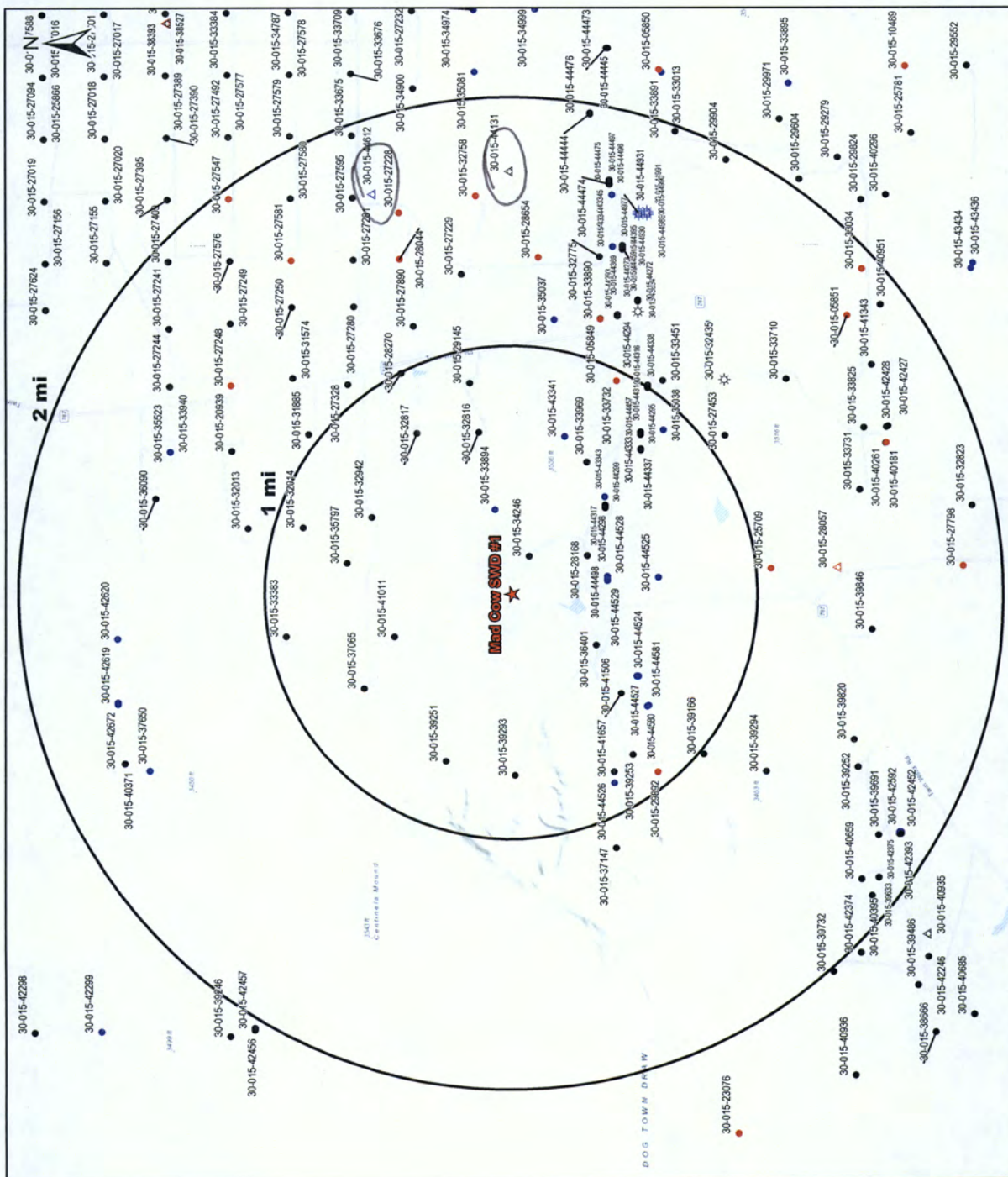


- ★ Proposed SWD
- ⚙ Gas, Active (2)
- ⚙ Gas, New (6)
- Oil, Active (137)
- Oil, New (31)
- Oil, Plugged (18)

Salt Water Injection, Active (3)  
Salt Water Injection, New (1)  
Salt Water Injection, Plugged (2)

~PNG

1 Sand One SWD 1 & 2 4 DMG



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

## O&G Wells Area of Review

**Mad Cow SWD #1**  
Eddy, New Mexico

Proj Mgr:  
Dan Arthur

July 30, 2018

Prepared by:

**AI.J CONSULTING**

AOR Tabulation for Mad Cow SWD #1 (Top of Injection Interval: 16,420')							
Well Name	API#	Well Type	Operator	Spud Date	Location (Sec., Tn., Rng.)	Footage Location	Penetrate Inj. Zone?
GILA 12 FEDERAL #001	30-015-28168	O	EOG RESOURCES INC	10/26/1994	P-12-24S-30E	800 FSL 330 FEL	No
NIMITZ 12 FED #003H	30-015-41011	O	OXY USA INC	2/9/2013	B-12-24S-30E	330 FNL 2,010 FEL	No
PATTON 18 FEDERAL #009H	30-015-43343	O	OXY USA INC	12/31/1999	4-07-24S-31E	615 FSL 907 FWL	No
BLACK JACK 1 FEDERAL #003	30-015-35797	O	DEVON ENERGY PRODUCTION COMPANY, LP	9/15/2008	P-01-24S-30E	660 FSL 430 FEL	No
NIMITZ MDP1 13 FEDERAL COM #002H	30-015-44498	O	OXY USA INC	12/31/1999	P-12-24S-30E	379 FSL 838 FEL	No
NIMITZ MDP1 12 FEDERAL COM #002H	30-015-44580	O	OXY USA INC	12/31/1999	C-13-24S-30E	450 FNL 1,760 FWL	No
PALLADIUM MDP1 7 6 FEDERAL COM #002H	30-015-44299	O	OXY USA INC	10/10/2017	4-07-24S-31E	609 FSL 742 FWL	No
NIMITZ MDP1 13 FEDERAL COM #001H	30-015-44524	O	OXY USA INC	12/31/1999	C-13-24S-30E	258 FNL 2,405 FWL	No
NIMITZ MDP1 12 FEDERAL COM #008H	30-015-44527	O	OXY USA INC	3/26/2018	C-13-24S-30E	228 FNL 2,405 FWL	No
NIMITZ MDP1 12 FEDERAL COM #009H	30-015-44581	O	OXY USA INC	12/31/1999	C-13-24S-30E	474 FNL 1,778 FWL	No
NIMITZ MDP1 13 FEDERAL COM #003H	30-015-44525	O	OXY USA INC	12/31/1999	P-12-24S-30E	379 FSL 808 FEL	No
NIMITZ MDP1 12 FEDERAL COM #006H	30-015-44528	O	OXY USA INC	12/31/1999	P-12-24S-30E	379 FSL 778 FEL	No
PATTON MDP1 18 FEDERAL #001H	30-015-44317	O	OXY USA INC	10/18/2017	4-07-24S-31E	609 FSL 712 FWL	No
BLACK JACK 1 FEDERAL #004H	30-015-37065	O	DEVON ENERGY PRODUCTION COMPANY, LP	4/1/2012	N-01-24S-30E	330 FSL 2,230 FWL	No
PALLADIUM MDP1 7 6 FEDERAL COM #001H	30-015-44298	O	OXY USA INC	10/16/2017	4-07-24S-31E	609 FSL 682 FWL	No
NIMITZ MDP1 12 FEDERAL COM #001H	30-015-44526	O	OXY USA INC	12/31/1999	M-12-24S-30E	275 FSL 102 FSL	No
NIMITZ MDP1 12 FEDERAL COM #007H	30-015-44529	O	OXY USA INC	12/31/1999	P-12-24S-30E	379 FSL 868 FEL	No
PALLADIUM 7 FEDERAL #010	30-015-33969	O	OXY USA INC	6/1/2005	N-07-24S-31E	990 FSL 1,650 FWL	No
GILA 12 FEDERAL #002H	30-015-36401	O	OXY USA INC	8/1/2008	O-12-24S-30E	630 FSL 2,240 FEL	No
PALLADIUM 7 FEDERAL #008T	30-015-33894	O	OXY USA INC	12/31/1999	2-07-24S-31E	2,310 FNL 660 FWL	No
NIMITZ 12 FED #004H	30-015-41506	O	OXY USA INC	4/14/2014	N-12-24S-30E	100 FSL 2,033 FWL	No
NIMITZ 12 FED #005H	30-015-41657	O	OXY USA INC	3/1/2014	M-12-24S-30E	275 FSL 350 FWL	No
NIMITZ 13 FEDERAL #001	30-015-29892	O	OXY USA INC	10/27/1997	D-13-24S-30E	660 FNL 330 FWL	No
ADELINE ALN FEDERAL #013A	30-015-32942	O	EOG Y RESOURCES, INC.	8/26/2006	7-06-24S-31E	330 FSL 530 FWL	No
SQUIRES ALR #002	30-015-34246	O	EOG Y RESOURCES, INC.	1/2/2006	L-12-24S-30E	2,050 FSL 330 FEL	No
POKER LAKE UNIT #333H	30-015-39294	O	BOPCO, L.P.	12/13/2011	L-13-24S-30E	2,295 FSL 325 FWL	No
POKER LAKE UNIT #330H	30-015-39253	O	BOPCO, L.P.	11/6/2011	D-13-24S-30E	130 FNL 710 FWL	No
POKER LAKE UNIT #327H	30-015-39251	O	BOPCO, L.P.	1/21/2012	E-12-24S-30E	1,400 FNL 635 FWL	No
POKER LAKE UNIT #328H	30-015-39293	O	BOPCO, L.P.	2/15/2012	L-12-24S-30E	2,400 FSL 305 FWL	No
PALLADIUM MDP1 7 6 FEDERAL COM #004H	30-015-44295	O	OXY USA INC	8/24/2017	C-18-24S-31E	169 FNL 2,285 FWL	No
BLACKJACK 1 FEDERAL #002	30-015-33383	O	DEVON ENERGY PRODUCTION COMPANY, LP	5/13/2004	J-01-24S-30E	1,980 FSL 1,980 FEL	No
PATTON 18 FEDERAL COM #010H	30-015-43341	O	OXY USA INC	12/31/1999	K-07-24S-31E	1,464 FSL 2,204 FWL	No
PALLADIUM MDP1 7 6 FEDERAL COM #003Y	30-015-44457	O	OXY USA INC	10/8/2017	C-18-24S-31E	169 FNL 2,225 FWL	No
PALLADIUM 7 FEDERAL #005	30-015-32816	O	OXY USA INC	6/3/2003	F-07-24S-31E	1,980 FNL 2,310 FWL	No
PATTON 18 FEDERAL #009	30-015-35038	O	OXY USA INC	12/31/1999	C-18-24S-31E	660 FNL 2,310 FWL	No
PATTON MDP1 18 FEDERAL #023H	30-015-44316	O	OXY USA INC	8/12/2017	B-18-24S-31E	335 FNL 2,122 FEL	No
PATTON MDP1 18 FEDERAL #002H	30-015-44337	O	OXY USA INC	9/6/2017	C-18-24S-31E	170 FNL 1,898 FWL	No
PATTON MDP1 18 FEDERAL #003H	30-015-44333	O	OXY USA INC	9/7/2017	C-18-24S-31E	170 FNL 1,928 FWL	No
PALLADIUM 7 FEDERAL #002	30-015-29145	O	OXY USA INC	12/26/1996	G-07-24S-31E	1,800 FNL 1,980 FEL	No
PALLADIUM 7 FEDERAL #009	30-015-33732	O	OXY USA INC	1/10/2005	O-07-24S-31E	330 FSL 1,980 FEL	No
PALLADIUM 7 FEDERAL #004	30-015-32817	O	OXY USA INC	2/9/2004	C-07-24S-31E	660 FNL 2,310 FWL	No
SQUIRES ALR #001	30-015-28270	O	EOG Y RESOURCES, INC.	5/13/1995	B-07-24S-31E	330 FNL 1,750 FEL	No
ADELINE ALN FEDERAL #012	30-015-32014	O	EOG Y RESOURCES, INC.	1/17/2007	6-06-24S-31E	1,800 FSL 330 FWL	No

**Notes:**

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

**Attachment 3**  
**Source Water Analyses**



Wolfcamp



## Water Analysis

Date: 23-Aug-11

2708 West County Road, Hobbs NM 88240

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

Analyzed For

Brushy Draw 1#1

Company	Well Name	County	State
	BD	Lee	New Mexico

Sample Source

Swab Sample

Sample #

Eddy  
1-265-295  
1

Formation

Depth

Specific Gravity	1.170	SG @ 60 °F	1.172
pH	8.30	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
Soluble Iron (FE2)	in Mg/L	10.0	in PPM	9

### Anions

Chlorides	in Mg/L	130,000	in PPM	110,922
Sulfates	in Mg/L	250	in PPM	213
Bicarbonates	in Mg/L	127	in PPM	108

Total Hardness (as CaCO3)	in Mg/L	15,000	in PPM	12,799
Total Dissolved Solids (Calc)	in Mg/L	213,549	in PPM	182,209
Equivalent NaCl Concentration	in Mg/L	182,868	in PPM	156,031

### Scaling Tendencies

\*Calcium Carbonate Index 507,520

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

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

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

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

Remarks RW= .048@70F

Report # 3188

Sec 22, T25S, R28E

North Permian Basin Region  
P.O. Box 740

Sundown, TX 79372-0740

(806) 228-8121

Lab Team Leader - Sheila Hernandez

(432) 495-7240

Bone Spring

## Water Analysis Report by Baker Petrolite

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

Summary		Analysis of Sample 534665 @ 75 F					
Sampling Date:	03/10/11	Anions	mg/l	meq/l	Cations	mg/l	meq/l
Analysis Date:	03/18/11	Chloride:	109618.0	3091.92	Sodium:	70275.7	3058.82
Analyst:	SANDRA GOMEZ	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	16.04
		Carbonate:	0.0	0.	Calcium:	844.0	42.12
TDS (mg/l or g/m3):	184911.1	Sulfate:	747.0	15.55	Strontium:	220.0	5.02
Density (g/cm3, tonne/m3):	1.113	Phosphate:			Barium:	0.8	0.01
Anion/Cation Ratio:	1	Borate:			Iron:	6.5	0.23
		Silicate:			Potassium:	889.0	22.22
					Aluminum:		
Carbon Dioxide:	0.50 PPM	Hydrogen Sulfide:		0 PPM	Chromium:		
Oxygen:		pH at time of sampling:		7	Copper:		
Comments:		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 <sub>3</sub>		Gypsum CaSO <sub>4</sub> ·2H <sub>2</sub> O		Anhydrite CaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Barite BaSO <sub>4</sub>		CO <sub>2</sub> Press
F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.06	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.58	0.29	1.72
100	0	1.10	208.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.36
120	0	1.12	224.17	-1.38	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 CO<sub>2</sub> pressure is actually the calculated CO<sub>2</sub> fugacity. It is usually nearly the same as the CO<sub>2</sub> partial pressure.

**Attachment 4**

Injection Formation Water Analyses

wellname	api	section	township	range	county	state	formation	sampledate	ph	specificgravity	specificgravity_temp_f	tds_mg	resistivity_ohm_cm	resistivity_ohm_cm_temp_f	sodium_mg	calcium_mg	magnesium_mg	chloride_mg	carbonate_mg	sulfate_mg
JURNEGAN POINT B001	9001510280	5	24S	25E	EDDY	NM	DEVONIAN	12/14/1964 0:00	7			2031.00						1211.00	175	2220
WHITE CITY PENN GAS COM UNIT 1 W001	9001500408	29	24S	26E	EDDY	NM	DEVONIAN	3/1/1960 0:00	7	1.012	60		0.36	75	25596	64	6072	1002	132	653
																		10120		1336

Sources: Go-Tech (<http://gotech.nmt.edu/gotech/Water/producedwater.aspx>)

**Attachment 5**  
**Water Well Map**



# Proposed SWD & Water Wells within 1 mile



## Legend

- ★ Proposed SWD
- - - Proposed SWD 1-mi Buffer



Mad Cow SWD #1				
County: Eddy, NM	Date: 7/30/2018			
Lat: 32.2318593	PM: J Daniel Arthur		1:22,000	<small>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</small>
Long: -103.8293325	Map: Ben Bockelmann			

**Attachment 6**

Induced Seismicity Assessment Letter



July 30, 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 Mad Cow 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 Mad Cow 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 2,441' FSL & 1,135' FEL of Section 12, in T24-S and R30-E of Eddy County, New Mexico. Historically, the Eddy and Lea 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 4.99 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 1.70 miles to the east (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 10.61 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 Ellenburger 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

Induced Seismicity Potential Statement for the Mad Cow SWD #1  
July 30, 2018

## **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](http://www.beg.utexas.edu/resprog/permianbasin/PBGSP_members/writ_synth/Simpson.pdf) (accessed June 19, 2018).

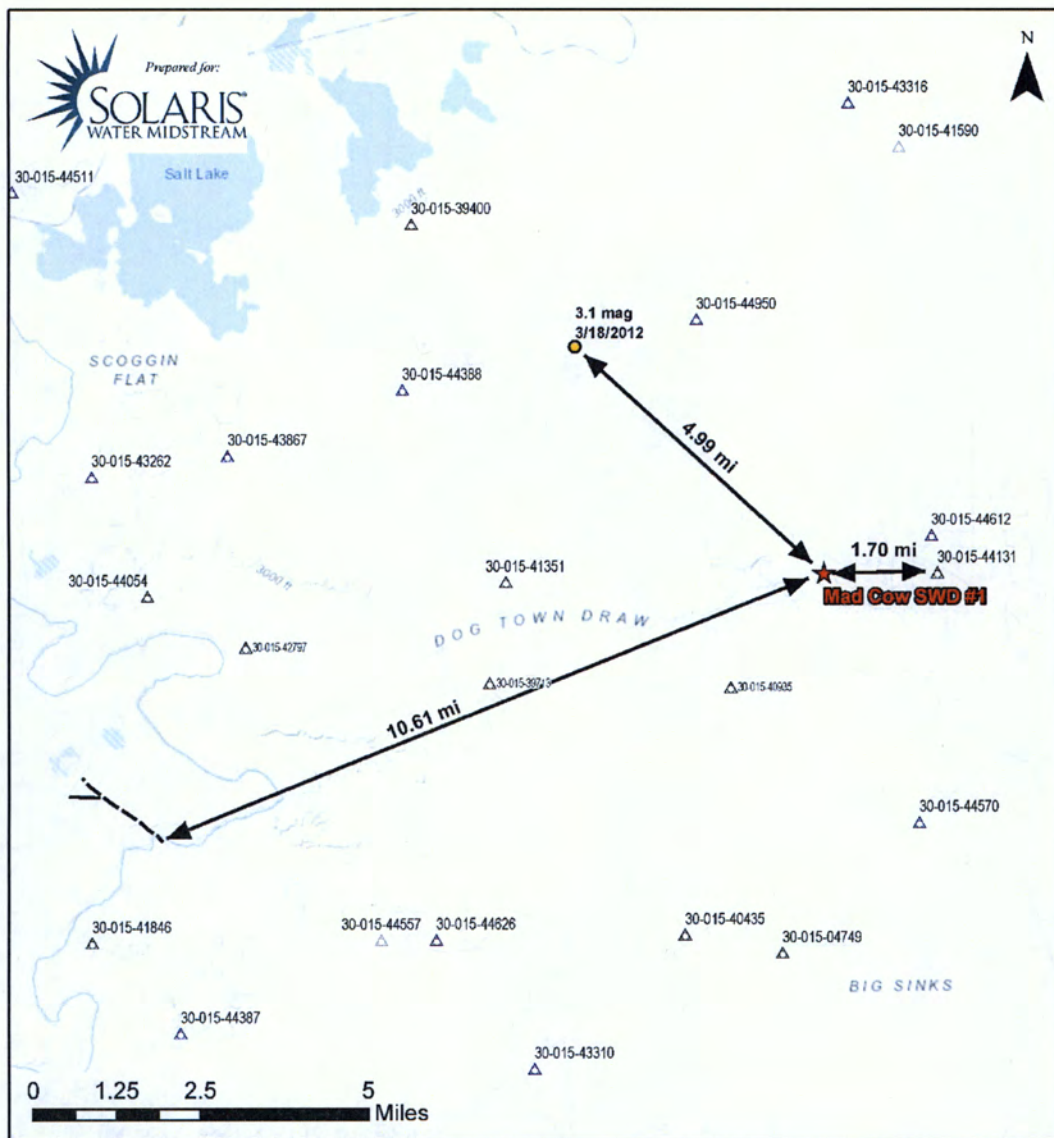
Snee, Jens-Erik Lund, and Mark D. Zoback. 2018. "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity." *The Leading Edge* 37, no. 2 (February 2018): 127-34.

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

Induced Seismicity Potential Statement for the Mad Cow SWD #1  
July 30, 2018

## **Exhibits**

Induced Seismicity Potential Statement for the Mad Cow SWD #1  
July 30, 2018



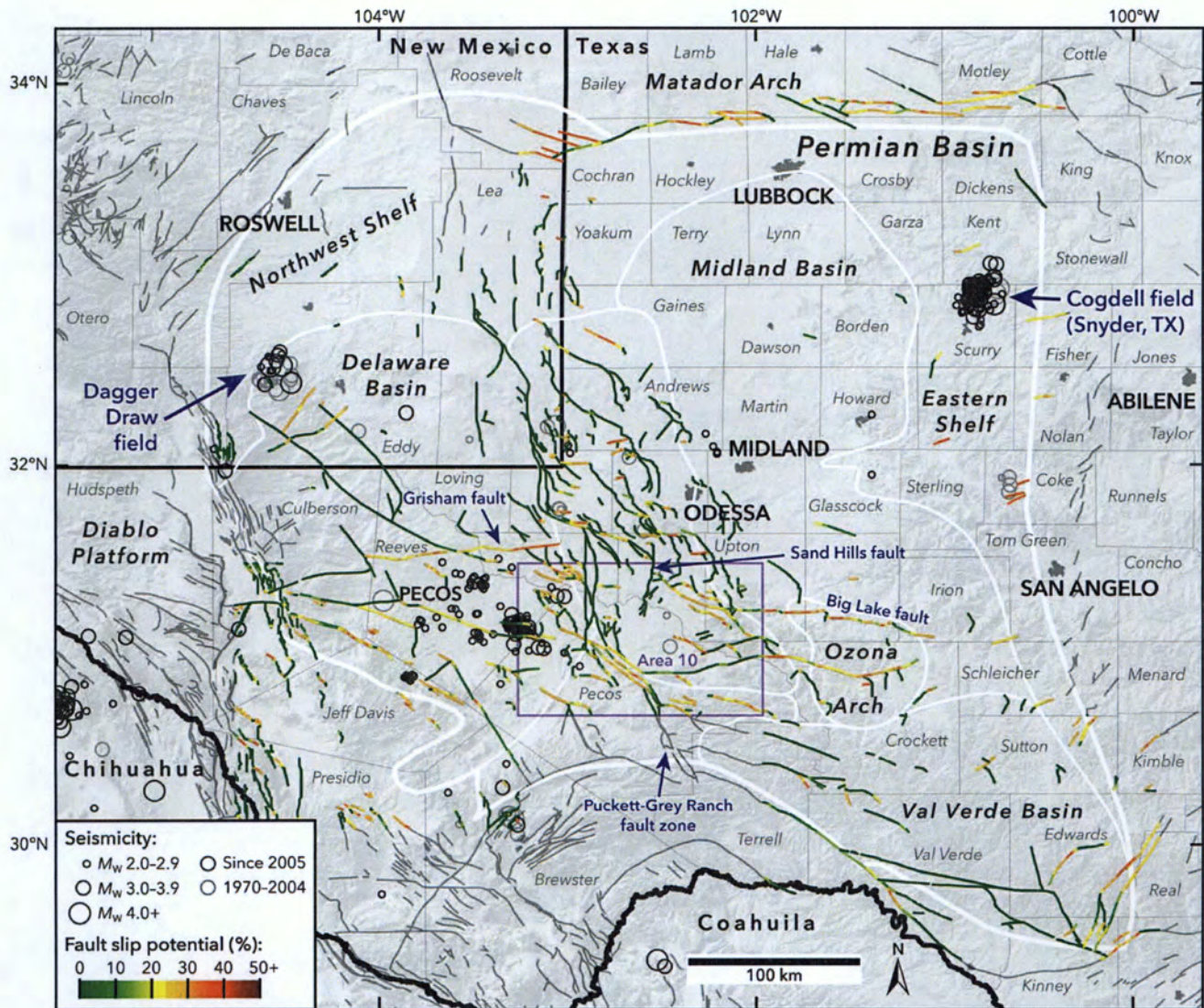
<b>Mad Cow SWD #1</b> <b>Seismic Activity AOR</b>		
Proj Mgr: Dan Arthur	July 30, 2018	Mapped by: Ben Bockelmann
Prepared by: 		

- Legend**
- ★ Proposed SWD
  - USGS Seismic Events
  - USGS Faults
  - △ Salt Water Injection, Active (10)
  - △ Salt Water Injection, Cancelled (2)
  - △ Salt Water Injection, New (13)

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**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**

Induced Seismicity Potential Statement for the Mad Cow SWD #1  
July 30, 2018

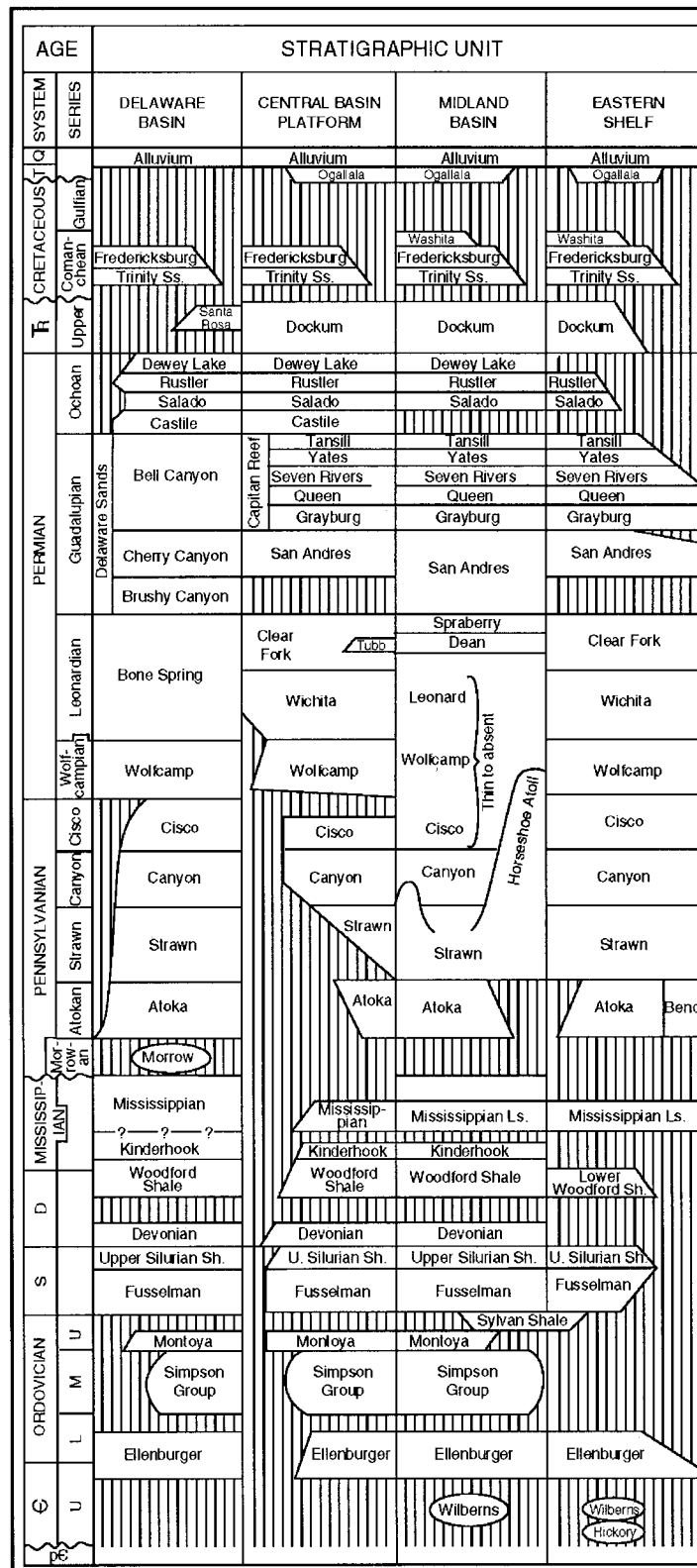


Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

# CARLSBAD CURRENT-ARGUS

## AFFIDAVIT OF PUBLICATION

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0001256967

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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:

08/03/18

  
Legal Clerk

Subscribed and sworn before me this  
3rd of August 2018.

  
State of WI, County of Brown  
NOTARY PUBLIC

  
My Commission Expires

Ad#:0001256967  
P O : Mad Cow 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 Free-  
way, Suite 900, Hous-  
ton, TX 77024, is re-  
questing that the New  
Mexico Oil Conserva-  
tion Division adminis-  
tratively approve the  
APPLICATION FOR AU-  
THORIZATION TO IN-  
JECT as follows:

PURPOSE: The intend-  
ed purpose of the in-  
jection well is to dis-  
pose of salt water pro-  
duced from permitted  
oil and gas wells.

WELL NAME AND LO-  
CATION: Mad Cow  
SWD #1  
NE ¼ SE ¼, Section  
12, Township 24S,  
Range 30E  
2,441' FSL & 1,135' FEL  
Eddy County, NM

NAME AND DEPTH OF  
DISPOSAL ZONE:  
Devonian-Silurian  
(16,420' - 17,550')  
EXPECTED MAXIMUM  
INJECTION RATE:  
30,000 Bbbls/day  
EXPECTED MAXIMUM  
INJECTION PRESSURE:  
3,284 psi (surface)

Objections or requests  
for hearing must be  
filed with the New  
Mexico Oil Conserva-  
tion Division within  
fifteen (15) days. Any  
objection or request  
for hearing should be  
mailed to the Oil Con-  
servation Division,  
1220 South St. Francis  
Dr., Santa Fe, New  
Mexico 87505.

Additional information  
may be obtained by  
contacting Bonnie At-  
water (Solaris - Regu-  
latory Technician) at  
432-203-9020.



*Contract*

Mad Cow SWD #1 Notice of Application Recipients				
Entity	Address	City	State	Zip Code
Landowner				
Richardson Cattle Company	P.O. Box 487	Carlsbad	NM	88221
OCD District				
OCD District 2	811 S. First St.	Artesia	NM	88210
Leasehold Operators				
✓ Chesapeake Operating, LLC.	P.O. Box 18496	Oklahoma City	OK	73154-0496
✓ BOPCO, L.P.	6401 Holiday Hill Rd.	Midland	TX	79707
✓ COG Production, LLC.	600 W. Illinois Ave.	Midland	TX	79701
✓ Devon Energy Production Company, LP	333 W. Sheridan Ave.	Oklahoma City	OK	73102
✓ EOG Resources, Inc.	P.O. Box 4362	Houston	TX	77210-4363
✓ EOG Y Resources, Inc.	104 S. 4th Street	Artesia	NM	88210
✓ Hillin-Simon Prime Exploration Company	P.O. Box 1552	Midland	TX	78702
✓ OGX Resources, LLC	P.O. Box 11148	Midland	TX	79702
✓ OXY USA Inc.	P.O. Box 4294	Houston	TX	77210
✓ Pogo Producing Company	P.O. Box 10340	Midland	TX	79702
✓ Yates Petroleum Corporation	105 S. Fourth Street	Artesia	NM	88210

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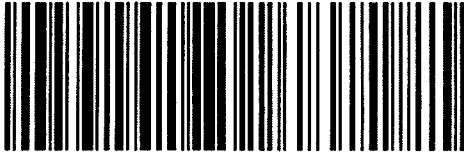
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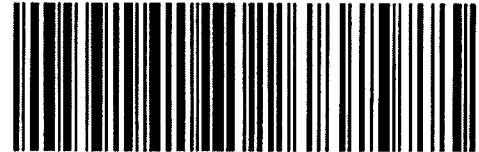
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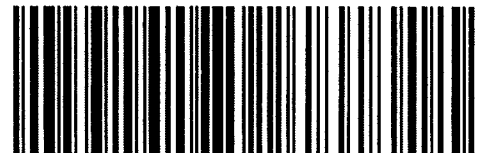
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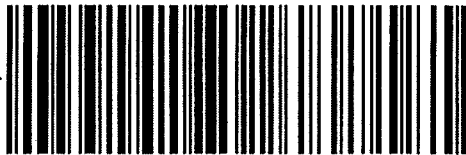
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P.O. Box 4362  
Houston TX 77210-4362

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Tulsa, OK 74119

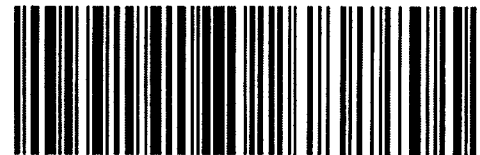
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EOG Y Resources, Inc.  
104 S. 4th Street  
Artesia NM 88210-2123

ALL Consulting  
1718 S. Cheyenne Ave.  
Tulsa, OK 74119

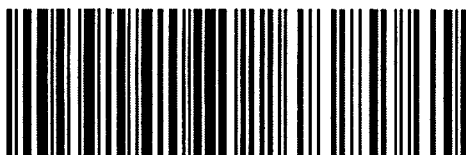
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Hillin-Simon Prime Exploration Co.  
P.O. Box 1552  
Midland TX 79702-1552

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Tulsa, OK 74119

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NMOCD District 2  
811 S. First St.  
Artesia NM 88210-2834

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OGX Resources, LLC  
P.O. Box 11148  
Midland TX 79702-8148

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Tulsa, OK 74119

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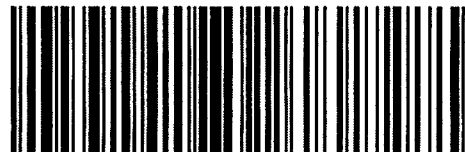
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OXY USA Inc.  
P.O. Box 4294  
Houston TX 77210-4294

ALL Consulting  
1718 S. Cheyenne Ave.  
Tulsa, OK 74119

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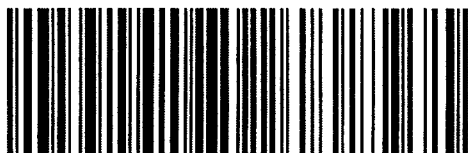
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9414 8118 9956 0164 6606 44

Pogo Producing Company  
P.O. Box 10340  
Midland TX 79702-7340

ALL Consulting  
1718 S. Cheyenne Ave.  
Tulsa, OK 74119

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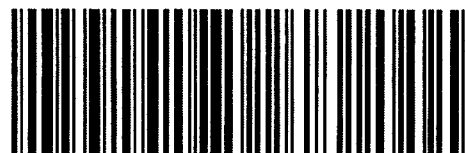
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9414 8118 9956 0164 6601 56

Richardson Cattle Company  
P.O. Box 487  
Carlsbad NM 88221-0487

ALL Consulting  
1718 S. Cheyenne Ave.  
Tulsa, OK 74119

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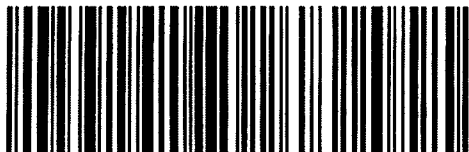


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9414 8118 9956 0164 6601 87

Yates Petroleum Corporation  
105 S. Fourth Street  
Artesia NM 88210-2177

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COG Production, LLC  
600 W. Illinois Ave.  
Midland TX 79701-4882

ALL 07 2018 741134



August 13, 2018

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

Subject: Solaris – Mad Cow SWD #1 – Application for Authorization to Inject

To Whom It May Concern,

On behalf of Solaris Water Midstream, LLC (Solaris), ALL Consulting, LLC (ALL) is submitting the enclosed Application for Authorization to Inject for the Mad Cow SWD #1, a proposed salt water disposal well, in Eddy County, NM.

Should you have any questions regarding the enclosed application, please contact Nate Alleman at (918) 382-7581 or [nalleman@all-llc.com](mailto:nalleman@all-llc.com).

Sincerely,  
ALL Consulting

Nate Alleman  
Project Manager



# FORM C-108 Technical Review Summary [Prepared by reviewer and included with application; V16.2]

DATE RECORD: First Rec: 08/17/18 Admin Complete: 08/20/18 or Suspended: — Add. Request/Reply: —

ORDER TYPE: WFX / PMX / (SWD) Number: 1755 Order Date: 09/28/18 Legacy Permits/Orders: Devonion / rulemaking proceeding

Well No. 1 Well Name(s): Mud Cow SWD

API: 30-015-45204 Spud Date: TBD\* New or Old (EPA): New (UIC Class II Primacy 03/07/1982)

Footages 2441 FSL / 1135 FEL Lot — or Unit 1 Sec 12 Tsp 243 Rge 30E County Eddy

General Location: 4.5 mi SE of Loving / north of Tim Wells Rd Pool: SWD; Devonion-Silurian Pool No.: 9786A

BLM 100K Map: Jul Operator: Solaris Water Midstream LLC OGRID: 371643 Contact: —

COMPLIANCE RULE 5.9: Total Wells: 12 Inactive: 0 Fincl Assur: Yes Compl. Order? No IS 5.9 OK? Yes Date: 09/28/18

WELL FILE REVIEWED ☒ Current Status: APD approved

WELL DIAGRAMS: NEW: Proposed ☒ or RE-ENTER: Before Conv. ☐ After Conv. ☐ Logs in Imaging: —

Planned Rehab Work to Well: [Conductor: 30' to 120'; Granted]

Well Construction Details		Sizes (in) * Borehole / Pipe	Setting Depths (ft)	Cement Sx or Cf	Cement Top and Determination Method
Planned <input checked="" type="checkbox"/> or Existing <u>—</u>	<u>Surface</u>	<u>24 / 20</u>	<u>0 to 600</u>	<u>600</u>	<u>Cir. to surf</u>
Planned <input checked="" type="checkbox"/> or Existing <u>—</u>	<u>Interm/Prod</u>	<u>17 1/2 / 13 3/8</u>	<u>0 to 4300</u>	<u>2600</u>	<u>Cir. to surf</u>
Planned <input checked="" type="checkbox"/> or Existing <u>—</u>	<u>Interm/Prod</u>	<u>12 1/4 / 9 5/8</u>	<u>0 to 13000</u>	<u>3500</u>	<u>Cir. to surf</u>
Planned <input checked="" type="checkbox"/> or Existing <u>—</u>	<u>Prod/Liner</u>	<u>8 1/2 / 7 5/8</u>	<u>12900 to 16420</u>	<u>250</u>	<u>TOL/CBL</u>
Planned <u>—</u> or Existing <u>—</u>	<u>Liner</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
Planned <input checked="" type="checkbox"/> or Existing <u>—</u>	<u>OH/PERF</u>	<u>6 1/2</u>	<u>16420 to 17650</u>	<u>Inj Length 1230</u>	

Injection Lithostratigraphic Units:	Depths (ft)	Injection or Confining Units	Tops
Adjacent Unit: Litho. Struc. Por.		<u>Mississippian</u>	<u>—</u>
Confining Unit: <u>(Litho.)</u> Struc. <u>(Por.)</u>	<u>+ D - shale capped</u>	<u>Woodford</u>	<u>16220</u>
Proposed Inj Interval TOP:	<u>16420</u>	<u>Devonion</u>	<u>16420</u>
Proposed Inj Interval BOTTOM:	<u>—</u>	<u>Silurian</u>	<u>—</u>
Confining Unit: <u>(Litho.)</u> Struc. <u>(Por.)</u>	<u>± 100 into</u>	<u>Montana</u>	<u>17550</u>
Adjacent Unit: Litho. Struc. Por.		<u>Ordovician</u>	<u>—</u>

Completion/Operation Details:	
Drilled TD <u>—</u>	PBTD <u>—</u>
NEW TD <u>17650</u>	NEW PBTD <u>—</u>
NEW Open Hole <input checked="" type="checkbox"/> or NEW Perfs <input type="checkbox"/>	
Tubing Size <u>5 1/2 x 5</u> in.	Inter Coated? <u>Yes</u>
Proposed Packer Depth <u>16400</u> ft	
Min. Packer Depth <u>16320</u> (100-ft limit)	
Proposed Max. Surface Press. <u>2000 / 3284</u> psi	
Admin. Inj. Press. <u>3284</u> (0.2 psi per ft)	

### AOR: Hydrologic and Geologic Information

POTASH: R-111-P 16 Noticed? 16 BLM Sec Ord ☒ WIPP NA Noticed? Not Required Salt/Salado T: 450 B: 4050 NW: Cliff House fm

FRESH WATER: Aquifer Alluvial / River No leases Max Depth < 400 HYDRO AFFIRM STATEMENT By Qualified Person ☒

NMOSE Basin: Catshead CAPITAN REEF: thru — adj — NA ☒ No. GW Wells in 1-Mile Radius? 0 FW Analysis? NA

Disposal Fluid: Formation Source(s) BS & WC [No DMG] Analysis? Yes On Lease ☐ Operator Only ☐ or Commercial ☒

Disposal Interval: Inject Rate (Avg/Max BWPD): 15,000 / 30,000 Protectable Waters? No Source: Historical / Area System: Closed or Open

HC Potential: Producing Interval? No Formerly Producing? No Method: Logs/DST/P&A/Other Request / Modified 2-Mi Radius Pool Map ☐

AOR Wells: me 1/2-M Radius Map and Well List? Yes No. Penetrating Wells: 0 [AOR Horizontals: 0 AOR SWDs: 0]

Penetrating Wells: No. Active Wells 0 Num Repairs? — on which well(s)? — Diagrams? —

Penetrating Wells: No. P&A Wells 0 Num Repairs? — on which well(s)? — Diagrams? —

NOTICE: Newspaper Date 08/03/18 Mineral Owner Free Surface Owner Free N. Date 08/08/18

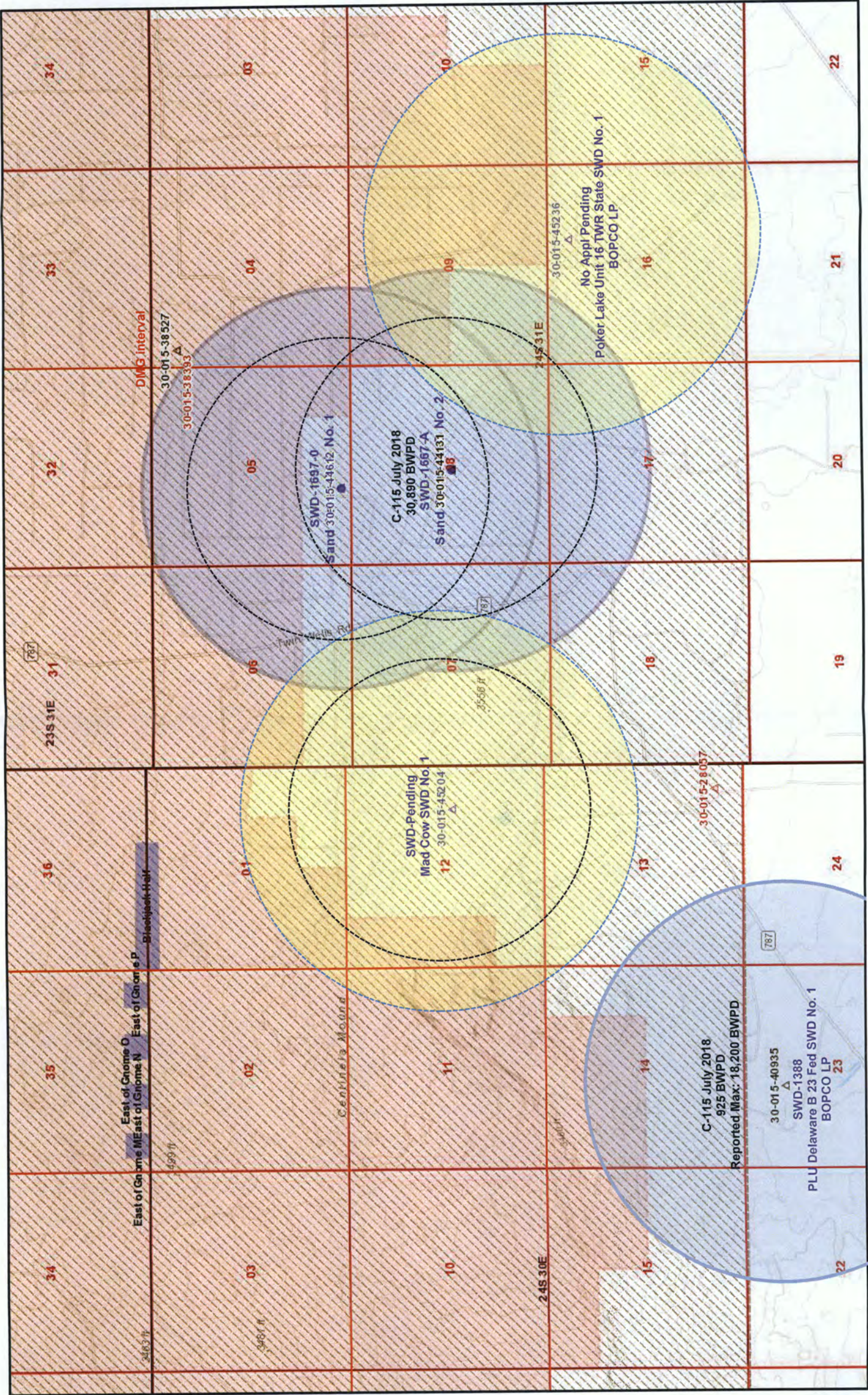
RULE 26.7(A): Identified Tracts? Yes Affected Persons: (11) - COG / OXY / OX / Devon / Chesapeake / BORCO / Payot N. Date 08/08/18

Order Conditions: Issues: 100' tie of liner to inter / HC potential / Strat Control / standard cmt placement (DV)

Additional COAs: Increase tie to 200' / mudlog - strat pics / notice to District - cmt not return



Pending Application for High-Volume Devonian Disposal Well  
C-108 Applications for Mad Cow SWD No. 1 – Solaris



**Mad Cow SWD No. 1**

API 30-015-45204; pMAM1823256592

Proposed interval: 16,420' – 17,550'

Proposed tapered tubing: 5.5-in. x 5-in.; max injection rate: 30,000 BWPD

**Closest Devonian Wells with Large-Volume Potential:** Sand Dune SWD No. 1 (30-015-44612; drilling planned for late 2018) and Sand Dune SWD No. 2 (30-015-44134; actively injecting for less than one year); both are Mesquite SWD Inc. orders. PLU Delaware B 23 Federal SWD No. 1 (30-015-40935; actively injecting since 2013); BOPCO LP order. Remaining SWD location is shallower disposal interval (DMG).



**Township 24 South Range 30 East of the New Mexico Principal Meridian, New Mexico**

**County: Eddy - 015**

**BLM Field Office: Carlsbad**

**BUREAU OF LAND MANAGEMENT  
STATUS OF PUBLIC DOMAIN  
LAND AND MINERALS**

MTP

T24S R30E

Entire Township included  
EO Wdl NM 1 Pot Res 6 (3/11/1926)  
Designated Pot Area SO 10/7/1975 (Partial)  
Cl of Public Lands NM 0560202 (Cl No 30-06-01)

LS Patent # 9 6/8/1907

(Lieu Selection)

No federal lease plat for pot.

[KPLA / outside]

No minab fed

NOTE: The Serial Numbers displayed are in the Bureau's L12000 system format.

- if there is a zero in the 7<sup>th</sup> position (from the right), the serial number has a "prefix" zero.  
example NM 0012345.
- if there is not a zero in the 7<sup>th</sup> position (from the right) then the serial number does not have a "prefix" zero;  
example NM 012345.

T 24 S  
R 30 E  
NMPM

**CAVEAT STATEMENT**

This plat is the Bureau's Record of Title, and should be used only as a graphic display of the township survey data. Records hereon do not reflect title changes which may have been affected by lateral movements of rivers or other bodies of water. Refer to the cadastral surveys for official survey information.

0 0.25 0.5 1  
Mile

**1 inch = 30 chains**  
**1 : 23,760**

9/28/2018

OCD Permitting

Inactive Well Additional Financial Assurance Report

371643 SOLARIS WATER MIDSTREAM, LLC														
Total Well Count: 11														
Printed On: Friday, September 28 2018														
Property	Well Name	Lease Type	U/L/FF	OCD Unit Label	API	Well Type	Last Prolong	Leasing Authorized End	Measured Depth	Plugged/Sealed/Abandoned	Seal Reported Meter	Sealed By Meter ID	Seal In Place	In Violation
322314	BRECKENRIDGE STATE SWD #001	S	K-32-24S-3SE	K	30-025-45151	S			Unknown				0	
320044	CORRAL FLY STATE SWD #001	S	7-06-25S-30E	M	30-015-44626	S			Unknown				0	
317150	LOBO 286 STATE SWD #001	S	A-22-25S-28E	A	30-015-43979	S			15696				0	
322165	LOVING SWD #001	P	E-34-23S-28E	E	30-015-45131	S			Unknown				0	
322286	MAD COW SWD #001	P	I-12-24S-30E	I	30-015-45204	S			Unknown				0	
321624	MOBLEY SWD #001	P	C-19-23S-30E	C	30-015-45072	S			Unknown				0	
319932	OKEANOS SWD #001	S	M-36-20S-34E	M	30-025-44189	S			Unknown				0	
321647	ROAD RUNNER SWD #001	P	O-28-25S-27E	O	30-015-45099	S			Unknown				0	
322438	ROSS DRAW SWD #001	S	J-27-26S-29E	J	30-015-45239	S			Unknown				0	
317187	SOLARIS EDDY STATE #002	S	K-02-26S-29E	K	30-015-44001	S	07/2018	08/01/2020	Unknown	Unknown			0	
320473	ZEUS SWD #001	P	P-35-21S-32E	P	30-025-44273	S			Unknown				0	

WHERE Ognd-371643