

DATE IN 3/22/2019	SUSPENSE	ENGINEER	LOGGED IN	TYPE SWD	APP NO. PMAM1908148579
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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



MAR 22 2019 AM 10:47

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
 -BLACK BULL RESOURCES LLC
 373619
 well
 -KEY MARK SWD#1
 30-015-Pending

- [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.

Nate Alleman
 Print or Type Name

Nate Alleman
 Signature

Regulatory Specialist - ALL Consulting 3/15/2019
 Title Date

nalleman@all-llc.com
 Date e-mail Address

March 15, 2019

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

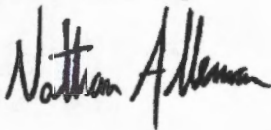
Subject: Blackbuck Resources LLC – Key Maker SWD FED 1
Application for Authorization to Inject

To Whom It May Concern,

On behalf of Blackbuck Resources LLC (Blackbuck), ALL Consulting, LLC (ALL) is submitting the enclosed Application for Authorization to Inject for the Key Maker SWD FED 1, a proposed salt water disposal well, in Eddy County, NM.

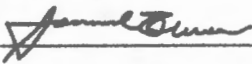
Should you have any questions regarding the enclosed application, please contact Nate Alleman at (918) 382-7581 or nalleman@all-llc.com.

Sincerely,
ALL Consulting



Nate Alleman
Sr. Regulatory Specialist

APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery Pressure Maintenance X Disposal Storage
Application qualifies for administrative approval? X Yes No
- II. OPERATOR: Blackbuck Resources LLC
ADDRESS: 2601 Westheimer Rd., Suite C210, Houston, TX 77098
CONTACT PARTY: Samuel Oliver PHONE: 1-855-432-1400
- 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: Samuel Oliver TITLE: Chief Commercial Officer
SIGNATURE:  DATE: 03/15/2019
E-MAIL ADDRESS: samuel.oliver@blackbuckresources.com
- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

III. WELL DATA

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

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

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

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

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

XIV. PROOF OF NOTICE

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

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

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

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

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

Application for Authorization to Inject
Well Name: Key Maker SWD FED 1

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

A.

(1) General Well Information:

Operator: Blackbuck Resources LLC (OGRID No.
373619) Lease Name & Well Number: Key Maker SWD
FED 1
Location Footage Calls: 1,067' FSL & 2,629' FEL
Legal Location: Unit Letter O, S17 T23S R31E
Ground Elevation: 3,334'
Proposed Injection Interval: 15,980' – 17,215'
County: Eddy

(2) Casing Information:

Type	Hole Size	Casing Size	Casing Weight	Setting Depth	Sacks of Cement	Estimated TOC	Method Determined
Surface	24"	20"	133.0 lb/ft	525'	535	Surface	Circulation
Intermediate 1	14-3/4"	13-3/8"	68.0 lb/ft	4,070'	950	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.5 lb/ft	13,120'	4,350	Surface	Circulation
Liner	8-1/2"	7-5/8"	39 lb/ft	15,980'	290	12,920'(TOL)	CBL

(3) Tubing Information:

4-1/2" (composite weight string) of fiberglass-coated tubing with setting depth of 15,960'

(4) Packer Information: Lok-set or equivalent packer set at 15,960'

B.

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

Pool Name: SWD; Devonian - Silurian

Pool Code: 97869

(2) Injection Interval: Open-hole injection between 15,980' – 17,215'

(3) Drilling Purpose: New Drill for Salt Water Disposal

(4) Other Perforated Intervals: No other perforated intervals exist.

(5) Overlying Oil and Gas Zones: Below are the approximate formation tops for known oil and gas producing zones in the area.

- Delaware (4,070')
- Bone Springs (7,950')
- Wolfcamp (11,290')
- Atoka (13,335')
- Morrow (13,820')

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

V – Well and Lease Maps

The following maps are included in **Attachment 2**:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- Potash Lease Map

VI – AOR Well List

No wells within the 1-mile AOR penetrate the proposed injection zone.

A list of the wells within the 1-mile 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:** 3,196 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 SWD will be injecting water into the Devonian and Silurian-Fusselman formations which are non-productive zones 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**.

VIII – Geologic Description

The proposed injection interval includes the Devonian and Silurian-Fusselman formations from 15,980 – 17,215 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 400 feet. Water well depths in the area range from approximately 168 – 639 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, 1 groundwater well is located within 1 mile of the proposed SWD location; however, state water well data shows that the well is a monitoring well used for routine monitoring purposes. Therefore, no groundwater samples were collected in association with this application.

A water well map and details of water wells within 1-mile are 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 within 1-mile 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 Information:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map

Attachment 3: Source Water Analyses

Attachment 4: Injection Formation Water Analyses

Attachment 5: Water Well Map and Well Data

Attachment 6: Induced Seismicity Assessment Letter

Attachment 7: Public Notice Affidavit and Notice of Application Confirmations

Attachment 1

Wellbore Diagram

MUD LOGGING E LOGGING/ DIRECTIONAL	CASING SIZE (IN.) CEMENT (SACKS)	DEPTH MD TVD	BOPE	FORMATION	HOLE SIZE (IN.)	MUD WT.	FRAC GRAD	TUBING
					SET AND GROUTED			
	30" GROUT TO SURFACE	120 / 120	OPEN		32"	8.8		
					24"	8.4		
	20" 133# J-55 BTC	400 525 / 525		PERMIAN RUSTLER FM (USDW)				
	535 SACKS, CEMENTED TO SURFACE		26-3/4"-3M ANNULAR/DIVERTER			8.4 9.5		
MUD LOGGING TO BEGIN AT 2500'					14 3/4"	9.5 to 10.0		
	13 3/8" 68# N-80 LTC	4,070 4,070 / 4,070		PERMIAN DELAWARE MTN. GROUP				
	950 SACKS, CEMENTED TO SURFACE		21-3/4"-5M ANNULAR 21-3/4"-5M BOP			10.0 9.4		
DV TOOL AT ±3,300'IN 9 5/8" OPEN HOLE, ECP BELOW		7,950 11,290		PERMIAN BONE SPRING FM. PERMIAN WOLFCAMP FM.	12 1/4"	9.4 to 10.0		
	TOL	12,920/ 12,920						12,910
	9 5/8" 53.5# L-80 LTC	13,120/ 13,120	13-5/8" -10M ANNULAR 13-5/8" -10M BOP			10.0 12.5		
	4,350 SACKS, CEMENTED TO SURFACE IN TWO STAGES	13,120		PENNSYLVANIAN STRAWN FM.				
		13,335		PENNSYLVANIAN ATOKA FM.	8 1/2"	12.5 to 14.6		
		13,820		PENNSYLVANIAN MORROW FM.				
	7 5/8" 39# P-110, ULTRA FJ	15,980 15,980 / 15,980	13-5/8" -10M ANNULAR 13-5/8" -10M BOP	DEVONIAN		14.6	LOK-SET PACKER (OR EQUIV.) AT 15,960'	
	290 SACKS, EST. TOC 12,920' BACK UP INTO THE 9 5/8" CASING (VERIFIED WITH RADIAL CEMENT BOND LOG)				6 1/2"	9.0		15,960'
RUN #1 GR/NEUTRON USIT/CBL	17,315-0 15,980-0	DUAL 0"	17,215 17,315 / 17,315	13-5/8" -10M ANNULAR 13-5/8" -10M BOP	Base of FUSSELMAN FM			

KEY MAKER SWD FED 1

EDDY COUNTY, NEW MEXICO

PN # 1715.NM.00

FEBRUARY 2019



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.

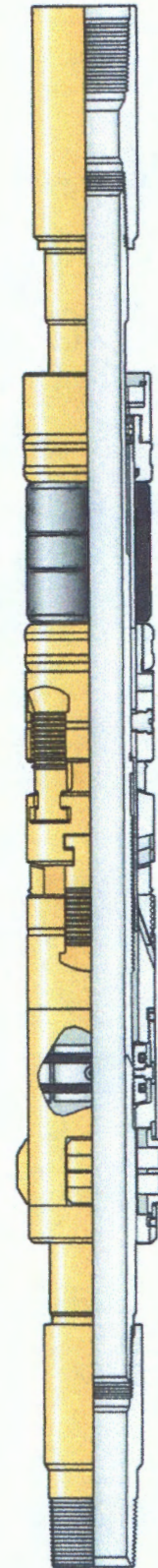
Advantages

- 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			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
		23-26	47B4			6.093	154.8
7-5/8	193.7	17-20	47C2	2.441	62.0	6.281	159.5
		33.7-39	47C4			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

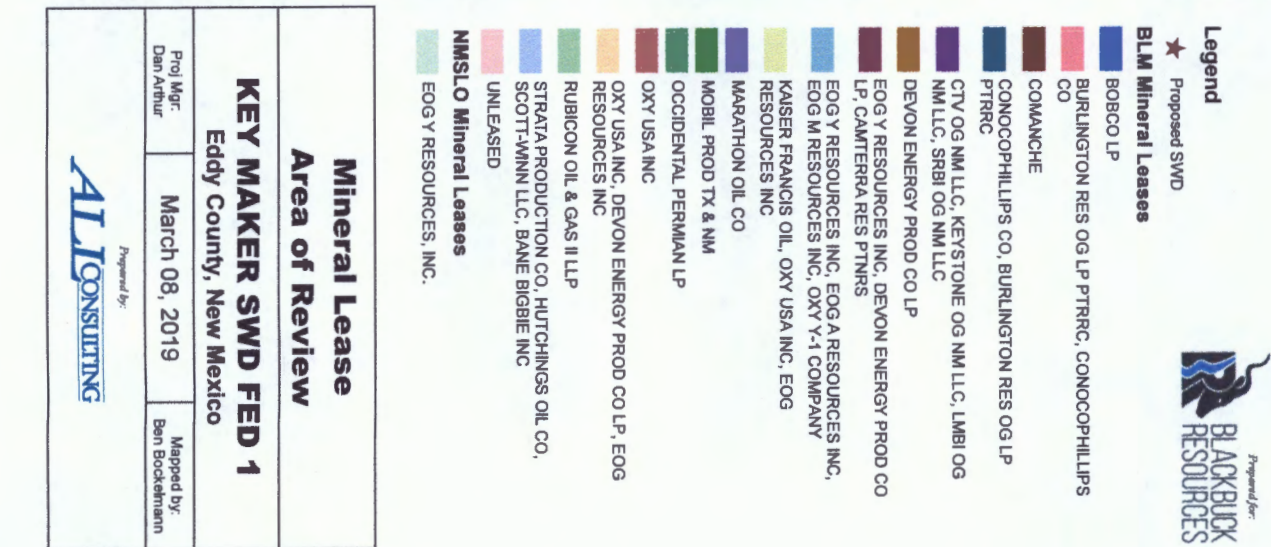
Casing			Packer						
OD		Weight *	Size	Nom ID		Max Gage Ring OD		Max Diameter of Compressed Drag Block	
in.	mm			in.	mm	in.	mm	in.	mm
5-1/2	139.7	20	45A2 x 2-3/8	2.375	60.3	4.562	115.9	4.592	116.6
		15.5-17	45A4 x 2-3/8			4.656	118.3	4.750	120.7
		13	45B x 2-3/8			4.796	121.8	4.902	124.5
6	152.4	26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

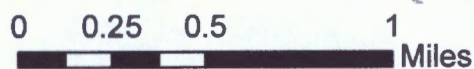
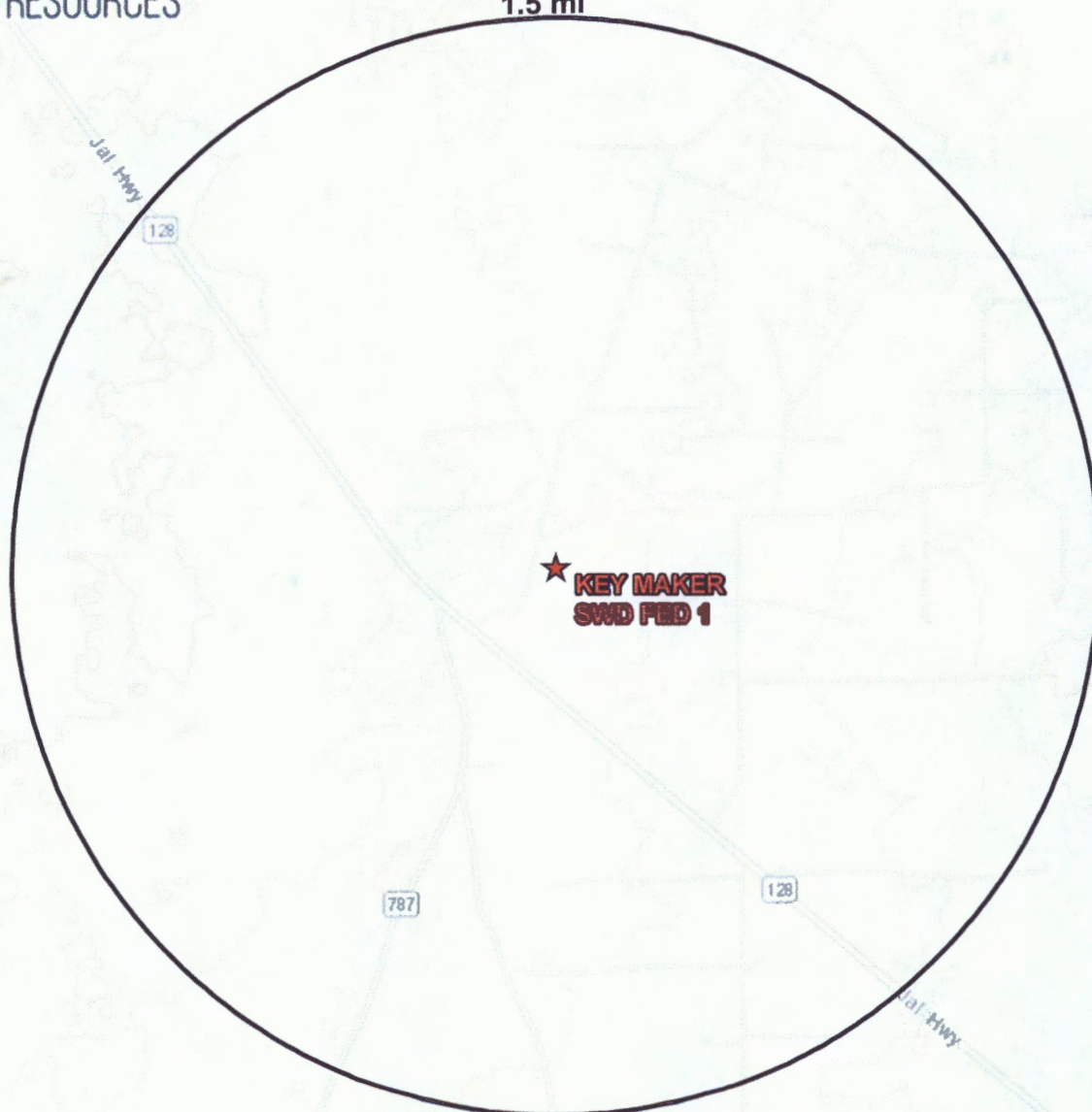
- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map





30-015-41590

1.5 mi



KEY MAKER SWD FED 1 Devonian/Silurian SWDs AOR

Proj Mgr:
Dan Arthur

Feb 26, 2019

Mapped by:
Ben Bockelmann

Prepared by:

ALLCONSULTING

Legend



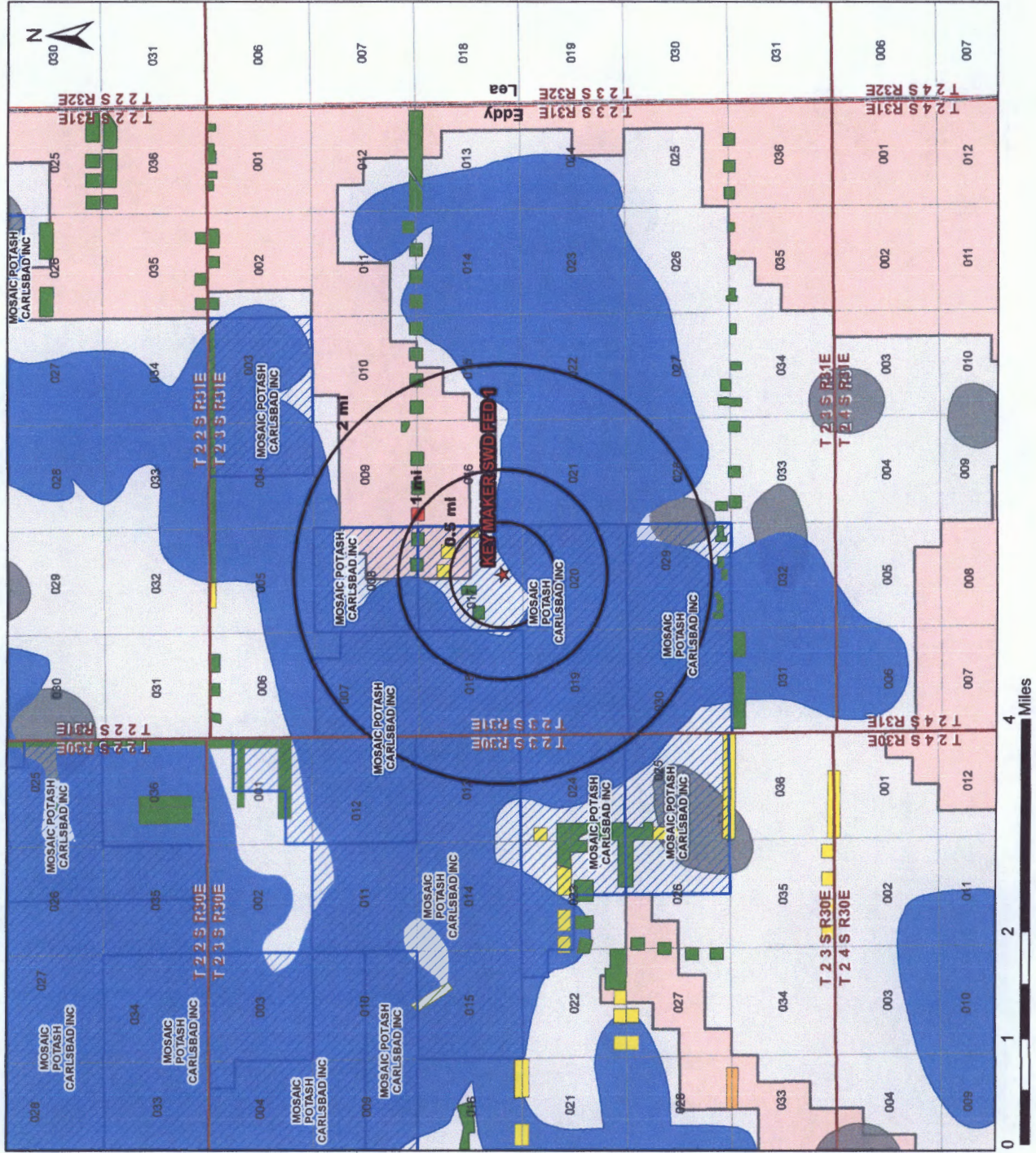
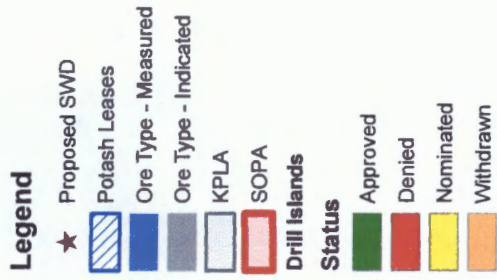
Proposed SWD **Devonian/Silurian SWDs**



Salt Water Injection, Cancelled (1)

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

* Data not available from the OCD Database



**Potash Leases
Area of Review**

KEY MAKER SWD FED 1
Eddy County, New Mexico

Proj Mgr: Dan Arthur

March 15, 2019

Mapped by:
Ben Bockelmann

Prepared by:

ALCON CONSULTING

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	Lea	New Mexico

Sample Source

Swab Sample

Sample #

1

Formation

Depth

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

Cations

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

Anions

Chlorides	in Mg/L	130,000	in PPM	110,022
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:	105618.8	3091.92	Sodium:	78278.7	3058.92
Analyst:	SANDRA GOMEZ	Bicarbonate:	2135.0	34.99	Magnesium:	195.0	18.04
TDS (mg/l or g/m3):	184911.1	Carbonate:	0.8	8.	Calcium:	844.8	42.12
Density (g/cm3, tonne/m3):	1.113	Sulfate:	747.8	15.55	Strontium:	229.8	8.02
Anion/Cation Ratio:	1	Phosphate:			Barium:	0.8	6.81
		Borate:			Iron:	6.5	0.23
		Silicate:			Potassium:	889.0	22.22
Carbon Dioxide:	0.50 PPM	Hydrogen Sulfide:		0 PPM	Aluminum:		
Oxygen:		pH at time of sampling:		7	Chromium:		
Comments:		pH at time of analysis:			Copper:		
		pH used in Calculation:		7	Lead:		
					Manganese:	0.100	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO ₃		Gypsum CaSO ₄ ·2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.06	188.52	-1.20	0.00	-1.18	0.00	-0.11	0.00	0.56	0.29	1.72
100	0	1.10	206.05	-1.29	0.00	-1.20	0.00	-0.15	0.00	0.35	0.29	2.35
120	0	1.12	224.17	-1.38	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

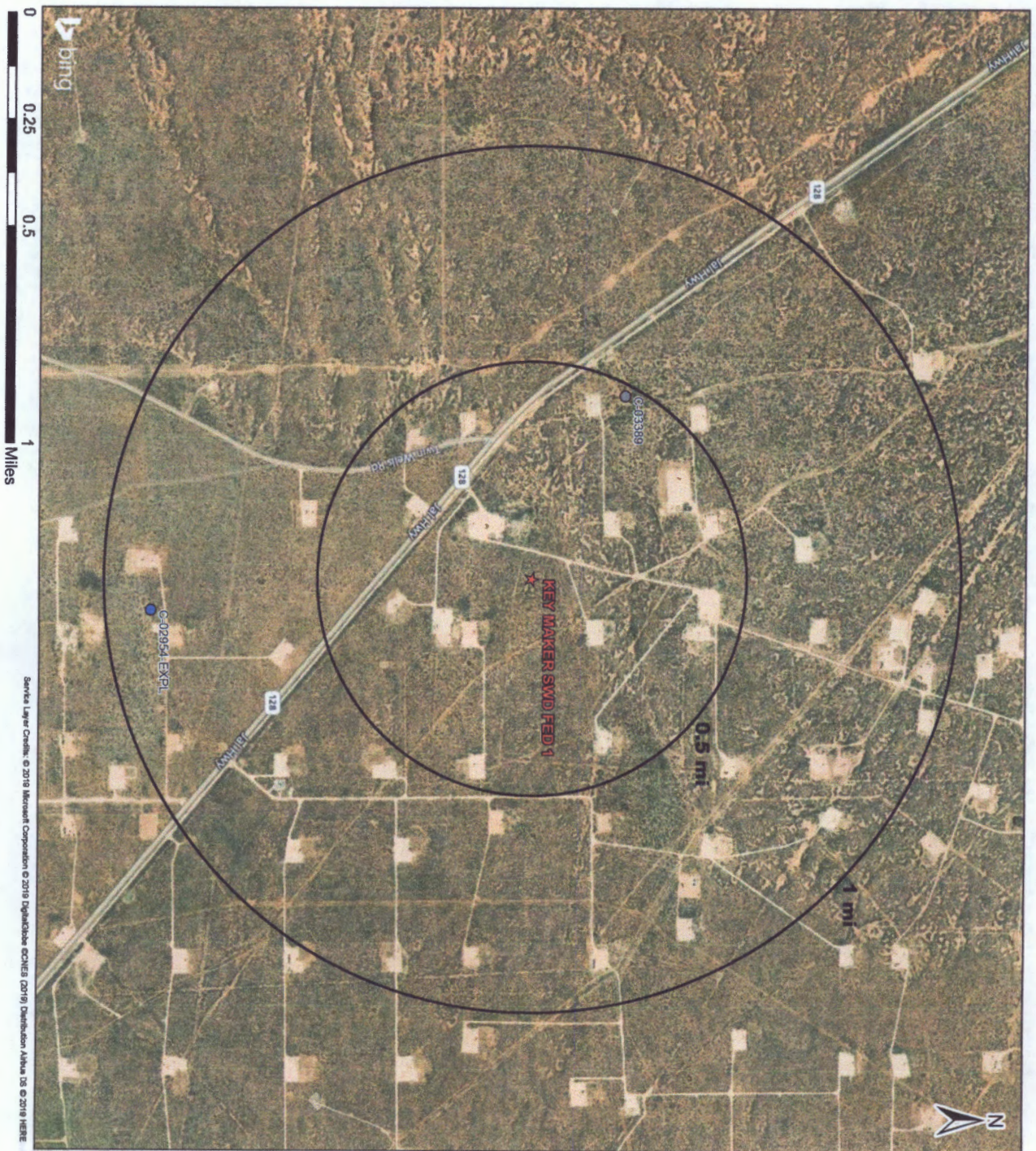
wellname	api	section	township	range	county	state	formation	completiondate	ph	specificgravity	specificgravity_hemp_f	tda_wgt	resistivity_ohm_cm	resistivity_ohm_cm_hemp_f	conductivity	conductivity_hemp_f	wtloss_wgt	wtloss_wgt_cachem_wgt	wtloss_wgt_magnesium_wgt	chloride_wgt	barium_wgt	wtloss_wgt
JUNEGAN POINT #001	3001510280	5	24S	25E	EDDY	NM	DEVONIAN	12/24/1964 0000	7	1.012	80	203100	0.36	75	25396	64	6072	1002	132	10120	175	2220
WHITE CITY PENN GAS CDMM UNIT 1 #001	3001500065	25	24S	28E	EDDY	NM	DEVONIAN	3/2/1960 0000	7	1.012	80	203100	0.36	75	25396	64	6072	1002	132	10120	653	1336

Sources: Gs-Tech (<http://getach.wmnet.edu/getach/Water/productionwater.aspx>)

Attachment 5

Water Well Map and Well Data

- Legend**
- ★ Proposed SWD
 - NMOSE PODS**
 - Status**
 - Active (1)
 - Unknown (1)



Water Wells Area of Review		
KEY MAKER SWD FED 1		
Eddy County, New Mexico		
Proj Mgr Dan Arthur	March 01, 2019	Mapped by: Ben Bockelmann
Prepared by: ALL CONSULTING		

Water Well Sampling Rationale						
Key Maker SWD FEG 1						
Water Wells	SWD	Owner	Available Contact Information	Use	Sampling Required	Notes
C 02954 Expl	Key Maker	U.S. DEPARTMENT OF ENERGY CARLSBAD FIELD OFFICE, WIPP Contact: Rick salness	US Department of Energy - Wipp P.O Box 2078 Carlsbad, New Mexico 88221 575-234-8966	Monitoring well	no	Exploratory well from the department of energy to obtain core samples, and determine production capacity of the culebra, and subsequent routine monitoring purposes. No pump on location
C 03389	Key Maker	Jimmy Mills 2005 GST Trust BLM	Stacy Mills: 575-390-2779 Susan Britt: 575-234-5945	Livestock Watering 3 Acre Feet/ Year	no	Attempted to contact the land owner several times, but have been unable to reach them. Section 17, T-23S, R-31E 32.303328, -103.807002

Attachment 6

Induced Seismicity Assessment Letter

March 12, 2019

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 Key Maker SWD FED 1

Dear Mr. Goetze,

This letter provides information regarding the seismic potential associated with injection operations associated with Blackbuck Resources LLC's (Blackbuck), Key Maker SWD FED 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 1,067 FSL & 2,629' FEL of Section 17, in T23-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). There have been one known seismic event located within a 25-mile radius of the proposed subject well. The closest recorded seismic event was a M3.1 that occurred on March 18, 2012, and was located approximately 5.6 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 2.2 miles to the northeast (See Exhibit 1).

Blackbuck 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 14.4 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).

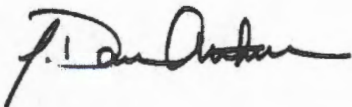
Geologic analysis indicates that the proposed Devonian-Silurian injection zone is overlain by approximately 200 to 400 feet of Woodford Shale, which is the upper confining zone and will serve as a barrier for upward injection fluid migration. Additionally, the Simpson Group that lies directly below the 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

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

Induced Seismicity Potential Statement for the Key Maker SWD FED 1
March 12, 2019

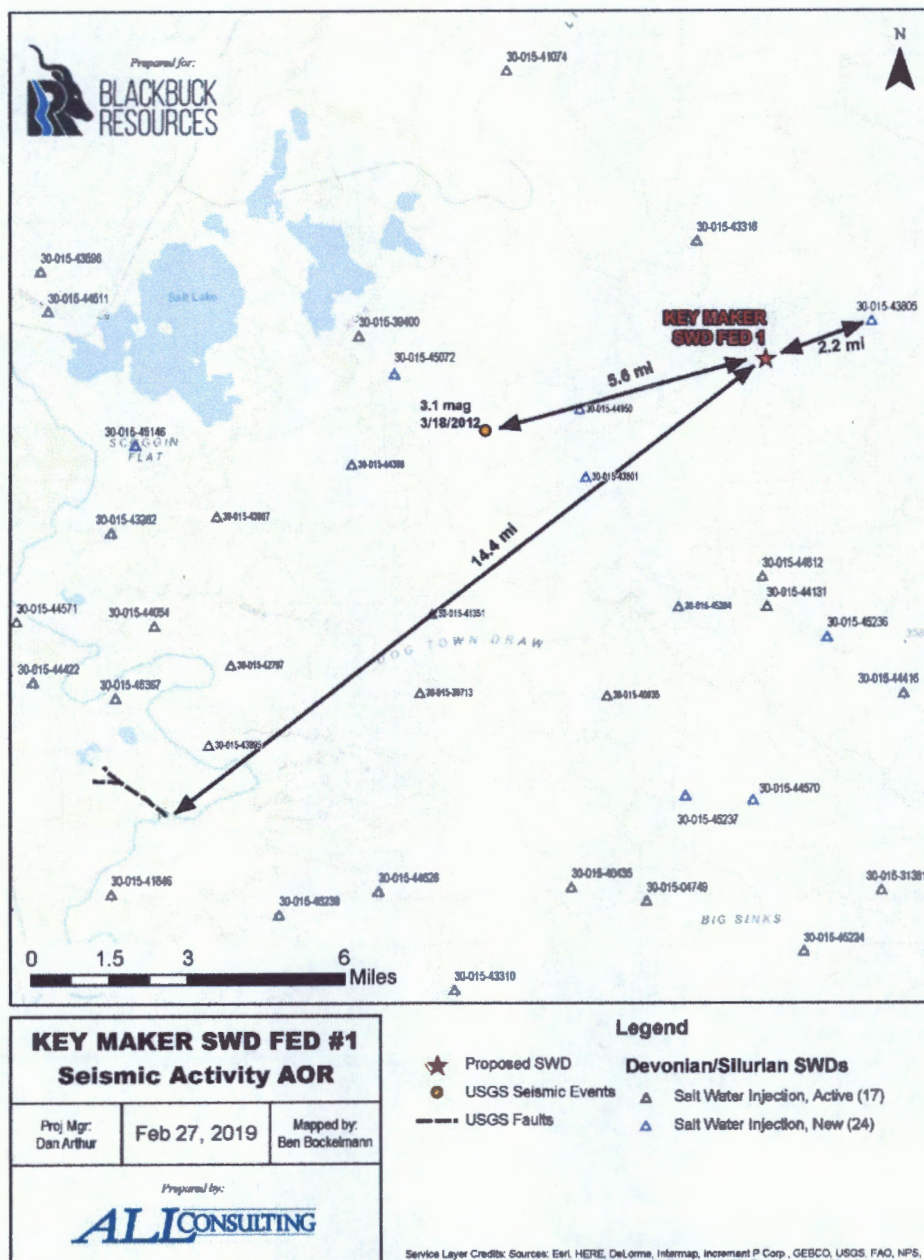


Exhibit 1. Map Showing the Distances from Known and Inferred Faults, Seismic Event, and Closest Deep Injection Well

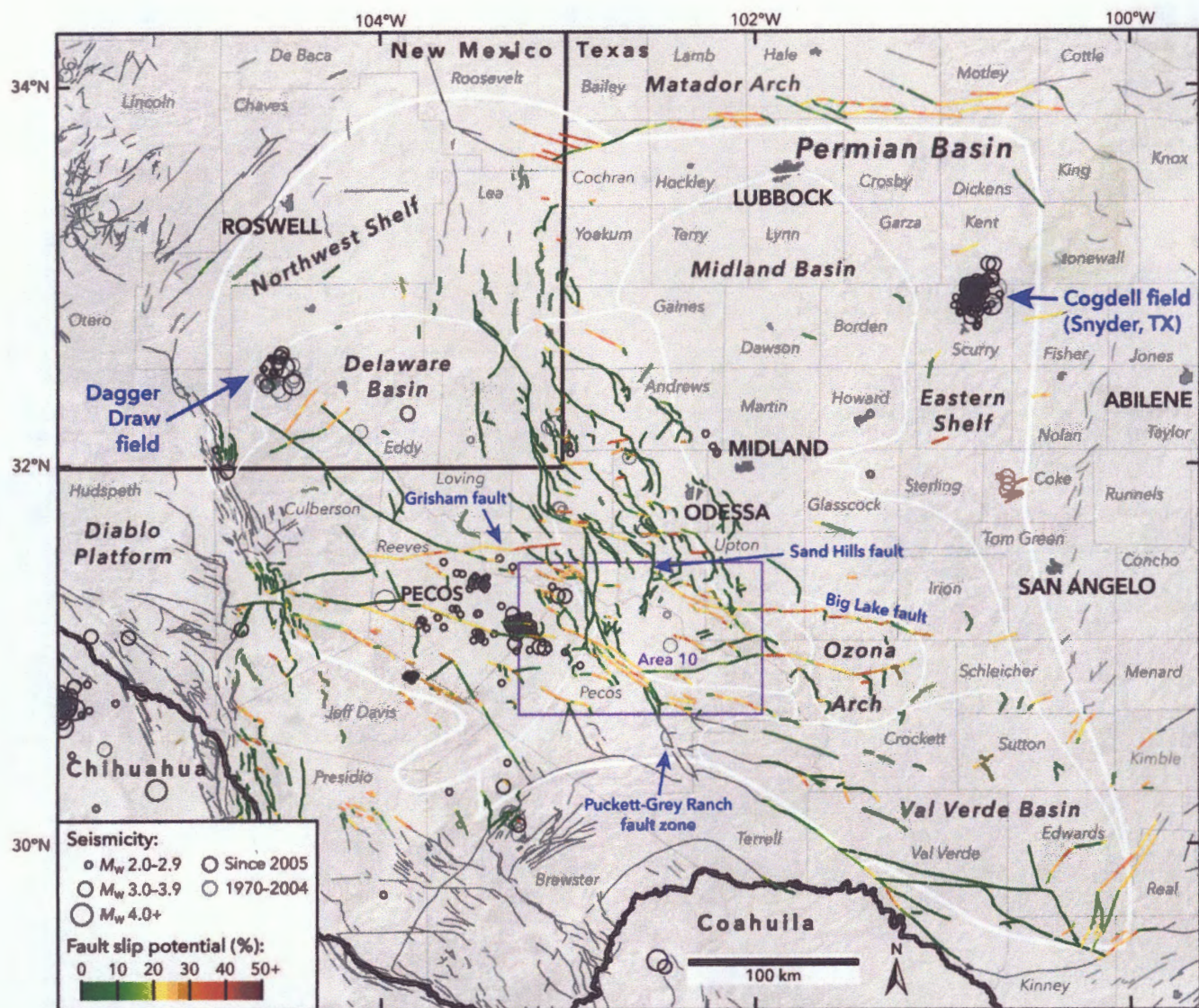


Exhibit 2. Results of the Snee and Zoback (2018) Probabilistic FSP Analysis Across the Permian Basin

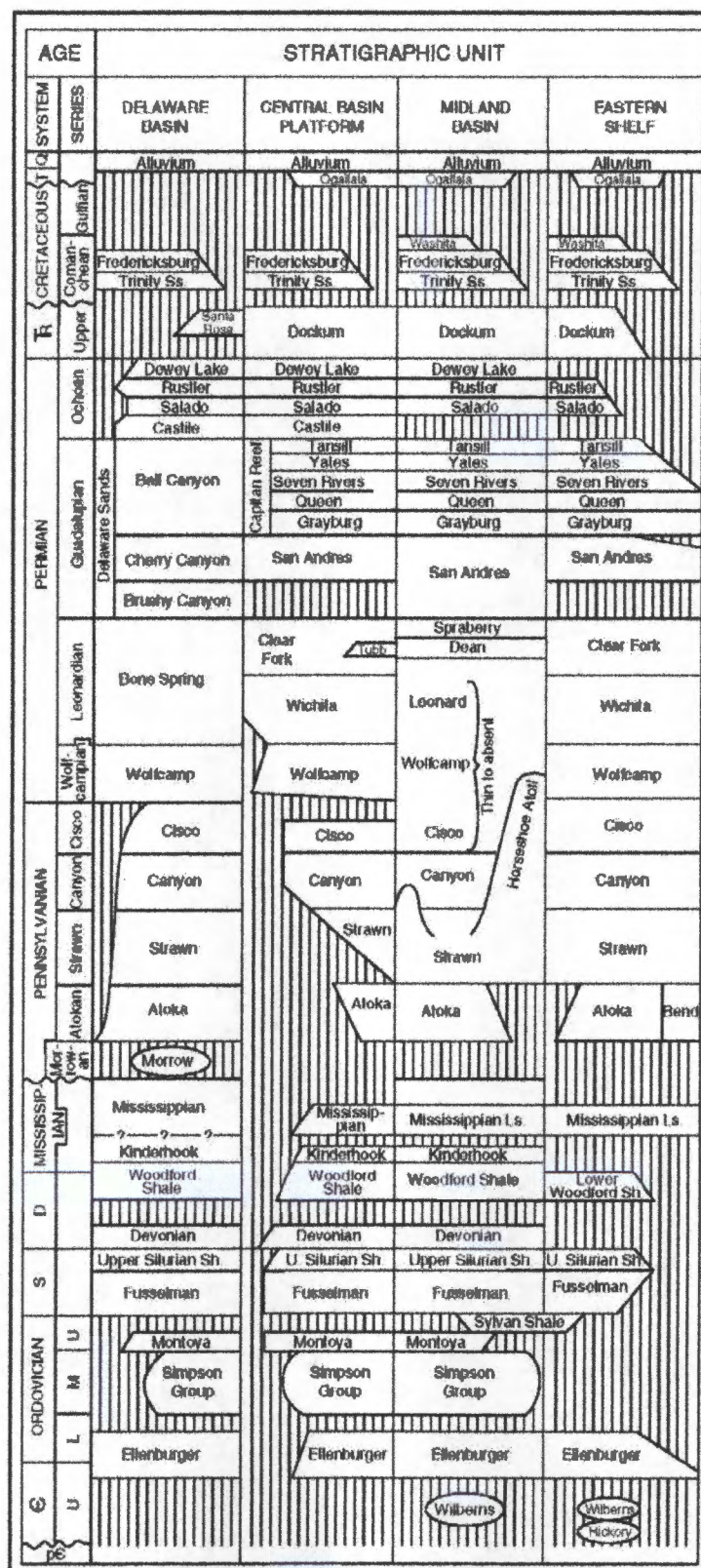


Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

Attachment 7

Public Notice Affidavit and Notice of Application Confirmations

CARLSBAD
CURRENT-ARGUS

AFFIDAVIT OF PUBLICATION

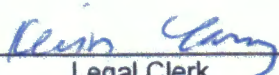
Ad No.
0001278836

ALL CONSULTING- CARLSBAD
1718 SOUTH CHEYENNE AVENUE

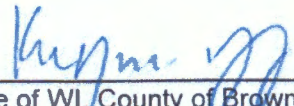
TULSA OK 74119

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:

03/02/19


Legal Clerk

Subscribed and sworn before me this
4th of March 2019.


State of WI, County of Brown
NOTARY PUBLIC

11/9/22
My Commission Expires

Ad#: 0001278836
P O : Key Maker SWD FED #1
of Affidavits : 0.00

**APPLICATION FOR AUTHORIZATION TO
INJECT**

NOTICE IS HEREBY GIVEN: That Blackbuck Resources LLC, 2601 Westheimer Rd., Suite C210, Houston, TX 77098, 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: Key Maker SWD
FED 1
SW ¼ SE ¼, Section 17, Township 23S, Range
31E
1,067' FSL & 2,629 FEL
Eddy County, NM

NAME AND DEPTH OF DISPOSAL ZONE:
Devonian-Silurian (15,980 - 17,215')

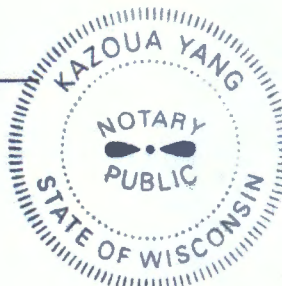
EXPECTED MAXIMUM INJECTION RATE:
30,000 Bbls/day

EXPECTED MAXIMUM INJECTION PRESSURE:
3,196 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 Samuel Oliver (Blackbuck - Chief Commercial Officer) at 855-432-1400.

March 2, 2019



Key Maker SWD FED 1 Notice of Application Recipients				
Entity	Address	City	State	Zip Code
Landowner				
New Mexico BLM	620 E. Greene St.	Carlsbad	NM	88220
OCD District				
NMOCD District 2	811 S. First St.	Artesia	NM	88210
Leasehold Operators				
BOPCO, LP	6401 Holiday Hill Rd., Bldg. 5, Ste 200	Midland	TX	79707
Burlington Resources O&G LP PTRRC	21 Desta Drive	Midland	TX	79705
Comanche Gas Gathering LTD	4431 N. Central Expressway	Dallas	TX	75205
Conoco Phillips Co.	960 Plaza Office Bldg.	Bartlesville	OK	74004
CTV O&G NM, LLC	201 Main Street, Suite 2700	Fort Worth	TX	76102
Devon Energy Production Company, LP	333 W. Sheridan Ave.	Oklahoma City	OK	73102
EOG Resources, Inc.	P.O. Box 2267	Midland	TX	79702
EOG Y Resources, Inc.	104 S. 4th St.	Artesia	NM	88210
Kaiser-Francis Oil Co.	6733 S. Yale Ave.	Tulsa	OK	74136
Keystone O&G NM, LLC	201 Main Street, Suite 2700	Fort Worth	TX	76102
LMBI O&G NM, LLC	201 Main Street, Suite 2700	Fort Worth	TX	76102
Occidental Permian, LP	5 Greenway Plaza, Suite 110	Houston	TX	77046
OXY USA Inc.	P.O. Box 4294	Houston	TX	77210
SRBI O&G NM, LLC	201 Main Street, Suite 2700	Fort Worth	TX	76102
Mosaic Potash Carlsbad Inc.	P.O. Box 71	Carlsbad	NM	88221
Note:				

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KEY MAKER S.W.D. PED #1

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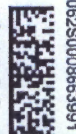
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Midland TX 79707-2157

Burlington Resources O&G LP PTRRC
21 Desta Drive
Midland TX 79705

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Dallas TX 75205

Conoco Phillips Co.
960 Plaza Office Bldg.
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Tulsa OK 74136-3330

Keystone O&G NM, LLC
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Fort Worth TX 76102-3131

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Fort Worth TX 76102-3131

New Mexico BLM
620 E. Greene St.
Carlsbad NM 88220-6292

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

Occidental Permian LP
5 Greenway Plaza, Suite 110
Houston TX 77046-0521

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

SRBI Oil & Gas New Mexico, LLC
201 Main Street, Suite 2700
Fort Worth TX 76102-3131

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Devon Energy Production Company
333 W. Sheridan Ave.
Oklahoma City OK 73102-5010