**BEFORE THE NEW MEXICO OIL CONSERVATION DIVISION**

**APPLICATION OF SOLARIS WATER MIDSTREAM, LLC FOR APPROVAL OF A SALT WATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO.** **Case No.** 20465

## APPLICATION

Solaris Water Midstream, LLC applies for an order approving a salt water disposal well, and in support thereof, states:

1. Applicant proposes to drill the Predator Fed. SWD 17 Well No. 1, located 1465 feet from the north line and 1893 feet from the east line (Unit G) of Section 17, Township 24 South, Range 32 East, N.M.P.M., Lea County, New Mexico.

2. Applicant proposes to dispose of produced water into the Devonian and Silurian formations in the well at depths of 16965 – 18149 feet subsurface.

3. A Form C-108 for the subject well is attached hereto as Exhibit A.

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

**WHEREFORE**, applicant requests that, after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

James Bruce

James Bruce
Post Office Box 1056
Santa Fe, New Mexico 87504
(505) 982-2043

Attorney for Solaris Water Midstream, LLC

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

## APPLICATION FOR AUTHORIZATION TO INJECT

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

II. OPERATOR: SOLARIS WATER MIDSTREAM, LLC

ADDRESS: 907 TRADEWINDS BLVD., SUITE B, MIDLAND TX 79706

CONTACT PARTY: BRIAN WOOD (PERMITS WEST, INC.) PHONE: 505 466-8120

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 XXX 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:

**Predator Fed SWD 17**
**SWD; Devonian-Silurian**

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: BRIAN WOOD TITLE: CONSULTANT

SIGNATURE: DATE: NOV. 15, 2018

E-MAIL ADDRESS: brian@permitswest.com

* If the information required under Sections VI, VIII, X, and XI above has been previou
Please show the date and circumstances of the earlier submittal: _____

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

EXHIBIT

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.

V

Side 1

# INJECTION WELL DATA SHEET

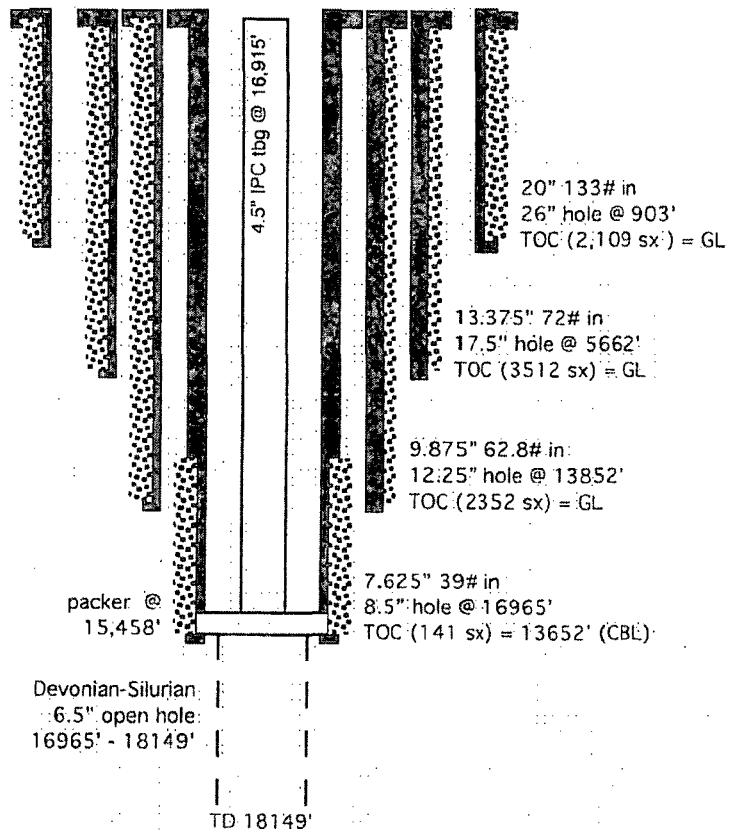
OPERATOR: SOLARIS WATER MIDSTREAM, LLC

WELL NAME & NUMBER: PREDATOR FED SWD 17

| WELL LOCATION: | 1465 FNL & 1893 FEL | G | 17 | 24 S | 32 E |
|---|---|---|---|---|---|
| | FOOTAGE LOCATION | UNIT LETTER | SECTION | TOWNSHIP | RANGE |

## *WELLBORE SCHEMATIC*

(not to scale)




## *WELL CONSTRUCTION DATA*

### Surface Casing

Hole Size: 26" Casing Size: 20"

Cemented with: 2109 sx. *or* _____ ft³

Top of Cement: SURFACE Method Determined: CIRCULATE

### Intermediate Casing

Hole Size: 17.5" 12.25" Casing Size: 13.375" @ 5662' 9.875" @ 13852'

Cemented with: 5864 sx. *or* _____ ft³

Top of Cement: SURFACE Method Determined: CIRCULATE

### Production Casing

Hole Size: 8.5" Casing Size: 7.625"

Cemented with: 141 sx. *or* _____ ft³

Top of Cement: 13652' Method Determined: CBL

Total Depth: LINER @ 16965' & TD @ 18149'

### Injection Interval

6.5" HOLE SIZE 16965 feet to 18,149'

~~(Perforated~~ or Open Hole; indicate which)

4

Side 2

## INJECTION WELL DATA SHEET

Tubing Size: 4.5" Lining Material: DUOLINE GLASSBORE

Type of Packer: NICKEL PLATED DOUBLE GRIP RETRIEVABLE

Packer Setting Depth: ≈16,915'

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

Additional Data

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

   If no, for what purpose was the well originally drilled? _____

2. Name of the Injection Formation: DEVONIAN-SILURIAN

3. Name of Field or Pool (if applicable): SWD;DEVONIAN-SILURIAN (97869)

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. NOT IN OTHER ZONES

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

   OVER: DELAWARE (4736'), BONE SPRING (8551'), & WOLFCAMP (11909')

   UNDER: NONE

I. Goal is to drill a 18,149' deep commercial saltwater disposal well. Proposed disposal interval will be 16,967' - 18,149' in the SWD; Devonian-Silurian (97869). See Exhibit A for C-102 and map.

II. Operator: Solaris Water Midstream, LLC [OGRID 371643]
Operator phone number: (432) 203-9020
Operator address: 907 Tradewinds Blvd., Suite B
Midland TX 79706
Contact for Application: Brian Wood (Permits West, Inc.)
Phone: (505) 466-8120

III. A. (1) Lease: BLM NMNM-016353
Lease Size: 1,720.00 acres
Closest Lease Line: 1465'
Lease Area: N2 Section 17, T. 24 S., R. 32 E. et al

A. (2) Surface casing (20", 133#, J-55, BTC) will be set at 903' in a 26" hole and cemented to GL with 2,109 sacks.

First intermediate casing (13.375", 72#, HCL-80, BTC) will be set at 5,662' in a 17.5" hole and cemented to GL with 3,512 sacks

Second intermediate casing (9.875", 62.8#, Q-125) will be set at 13,852' in a 12.25" hole and cemented to GL with 2,352 sacks.

Liner (7.625", 39#, P-110) will be set at 16,965' in an 8.5" hole and cemented to 13,652' (TOL) with 141 sacks.

A 6.5" open hole will be drilled to 18,149'.

A. (3) Tubing will be CLS 4.5" duoline 20 Glassbore® or its equivalent. Setting depth will be ≈16,915'. (Disposal interval will be 16,965' - 18,149'.)

A. (4) A nickel plated double grip retrievable packer will be set at ≈16,915' (or ≤100' above the top of the open hole which will be at 16,965').

B. (1) Disposal zone will be the Devonian and Silurian (SWD; Devonian-Silurian (97869) pool). Estimated fracture gradient is ≈0.65 psi/foot.

B. (2) Disposal interval will be open hole from 16,965' to 18,149'.

B. (3) Well has not been drilled. It will be drilled as a saltwater disposal well.

B. (4) No perforated intervals are in the well.

B. (5) Only zones producing in a 1-mile area of review and above the Devonian (16,967') are the Delaware (4736'), Bone Spring (8551'), Wolfcamp (11,909'), and Strawn (13,874'). No oil or gas zone is below the Silurian within 1 mile.

IV. This is not an expansion of an existing injection project. It is disposal only.

V. Exhibit B shows and tabulates the 24 wells (23 oil + 1 gas + 0 P&A + 0 SWD) within a 1-mile radius. Deepest well within a mile is 15,800' TVD. Exhibit C shows all 133 existing wells (119 oil or gas wells + 9 P & A wells + 3 injection or disposal wells + 3 water wells) within a two-mile radius.

All leases within a half-mile, one-mile, or two-mile radius are BLM or NMSLO. Exhibit D shows and tabulates all the leases within one-mile. Exhibit E shows all lessors within a two-mile radius.

VI. No Devonian penetrator is within a mile. Deepest (15,460' TVD) well (30-025-30746) within a mile bottomed in the Morrow, 1158' above the Devonian.

VII. 1. Average injection rate will be ≈25,000 bwpd.
Maximum injection rate will be 30,000 bwpd.

2. System will be open and closed. Water will both be trucked and piped.

3. Average injection pressure will be ≈2,500 psi
Maximum injection pressure will be 3,393 psi (= 0.2 psi/foot x 16,965' (top of open hole)).

4. Disposal water will be produced water, mainly from Avalon, Delaware, and Bone Spring wells. There are 67 approved Delaware and 85 approved Bone Spring wells in T. 24 S., R. 32 E. The well will take other Permian Basin waters. Abstracts of T. 24 S., R. 32 E. produced water analyses (from Go-Tech) are in Exhibit F. Devonian and Fusselman analyses from Lea County are in Exhibit G. TDS ranged from 16,740 to 107,201 mg/l.
Solaris has not experienced any compatibility problems in the first 5 months of operating its Solaris Eddy State 2 (30-015-44001) Devonian SWD well. Over 1,683,793 barrels have been disposed to date. Solaris has not experienced any compatibility problems in the first 2 months of operating its Lobo 285 State 1 (30-015-43979) Silurian Ordovician SWD well. Over 363,600 barrels have been disposed to date.

5. Closest Devonian or Silurian producer is more than half dozen miles away. Closest Devonian or Silurian SWD wells are 1.43 miles northwest (30-025-43473) and 1.48 miles southwest (30-025-42947).

VIII. The Devonian Silurian (estimated 1,189' thick) is mainly comprised of limestone and dolomite. Closest possible underground source of drinking water above the proposed disposal interval is the Quaternary at the surface. According to State Engineer records (Exhibit H), closest water well is 1.37 miles northwest. Two water wells which are closer (0.99 mile SW and 1.05 mile E), but not in the Engineer's database, were found and sampled. No underground source of drinking water is below the proposed disposal interval.

Formation tops are:

Quaternary = 0'
Rustler anhydrite = 883'
Lamar = 4690'
Cherry Canyon = 5612'
Brushy Canyon = 6935'
Bone Spring limestone = 8549'
Wolfcamp = 11907'
Strawn = 13872'
Atoka = 14046'
Morrow = 14706'
Mississippian = 16451'
Woodford shale = 16806'
Devonian/Silurian = 16965'
*disposal interval = 16965' - 18149'*
Fusselman = 17851'
TD = 18149'
(Montoya = 18349')

Three water wells are within a 2-mile radius according to State Engineer records (Exhibit H), deepest of which is 550'. There will be >15,000' of vertical separation and shale, salt, and anhydrite intervals between the bottom of the only likely underground water source (Quaternary) and the top of the Devonian.

IX. The well will be stimulated with acid.

X. A CBL will be run from production casing setting depth to surface. GR log will be run from TD to surface.

XI. Two water wells within 1.05 miles were found and sampled (Exhibit H) on August 16, 2018.

XII. Solaris Water Midstream, LLC (Exhibit I) is not aware of any geologic or engineering data that may indicate the Devonian is in hydrologic connection with any underground sources of water. Deepest water well within a 2-mile radius is 550'. There are 47 approved Devonian-Silurian SWD wells in New Mexico. Closest Quaternary fault is ≈74 miles southwest.

XIII. A legal ad (see Exhibit J) was published on November 15, 2018. Notice (this application) has been sent (Exhibit K) to the surface owner (BLM) and all well operators (COG, Devon, EOG, Oxy, XTO) regardless of depth, lessees of record (Burlington, Devon, EOG, EOG A, EOG Y, Oxy, XTO, & John Yates), and operating right holders within a mile.

TOPO! map printed on 11/11/18 from "Untitled.tpo"

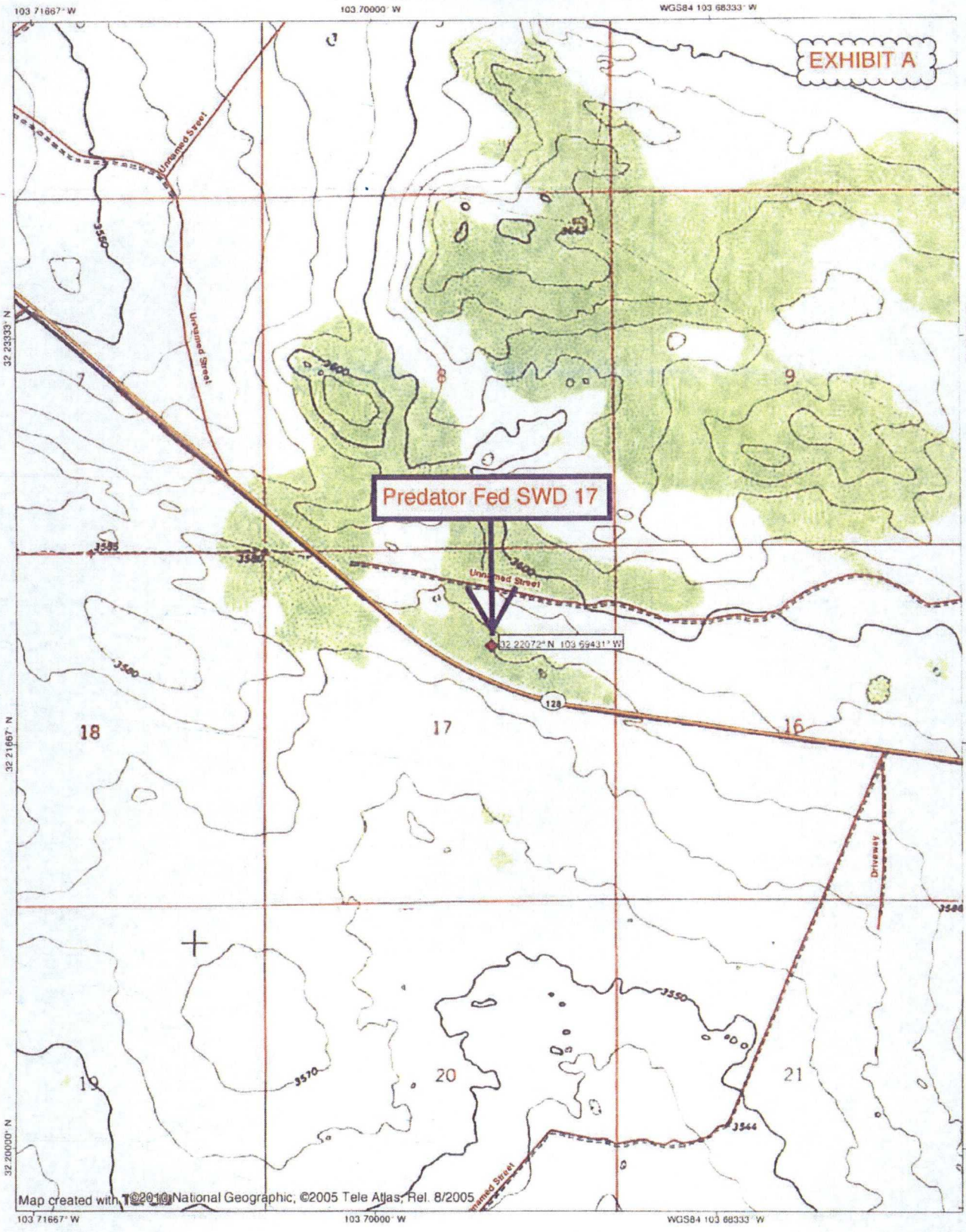



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EXHIBIT A

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone (575) 393-6161 Fax (575) 393-0720
DISTRICT II
811 S. First St., Artesia, NM 88210
Phone (575) 748-1283 Fax (575) 748-9720
DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone (505) 334-6178 Fax (505) 334-6170
DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3460 Fax (505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources Department

# OIL CONSERVATION DIVISION
*1220 South St. Francis Dr.*
*Santa Fe, New Mexico 87505*

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

| API Number | Pool Code | Pool Name |
|---|---|---|
| | 97869 | SWD; DEVONIAN-SILURIAN |

| Property Code | Property Name | Well Number |
|---|---|---|
| | PREDATOR FED SWD | 17 |

| OGRID No. | Operator Name | Elevation |
|---|---|---|
| 371643 | SOLARIS WATER MIDSTREAM, LLC | 3577' |

### Surface Location

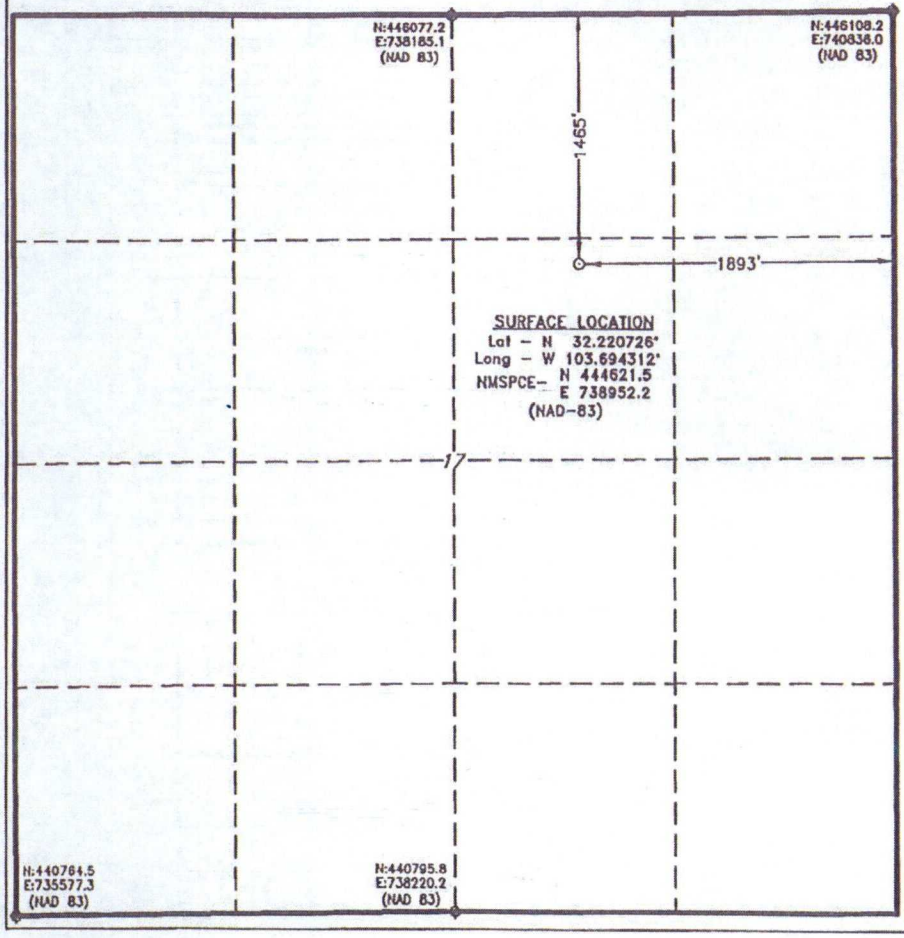
| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| G | 17 | 24 S | 32 E | | 1465 | NORTH | 1893 | EAST | LEA |

### Bottom Hole Location If Different From Surface

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |
|---|---|---|---|
| | | | |

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION




### OPERATOR CERTIFICATION

*I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.*

Bonnie Atwater 11.2.18
Signature Date

Bonnie Atwater
Printed Name

bonnie atwater@solarismidstream.com
Email Address

### SURVEYOR CERTIFICATION

*I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervison, and that the same is true and correct to the best of my belief.*

OCTOBER 8, 2018
Date Surveyed

Signature & Seal of Professional Surveyor

GARY L. JONES
NEW MEXICO
7977
REGISTERED PROFESSIONAL LAND SURVEYOR

Certificate Number GARY L. JONES 7977

0' 500' 1000' 1500' 2000'
SCALE: 1" = 1000'
WO Num.: 34109

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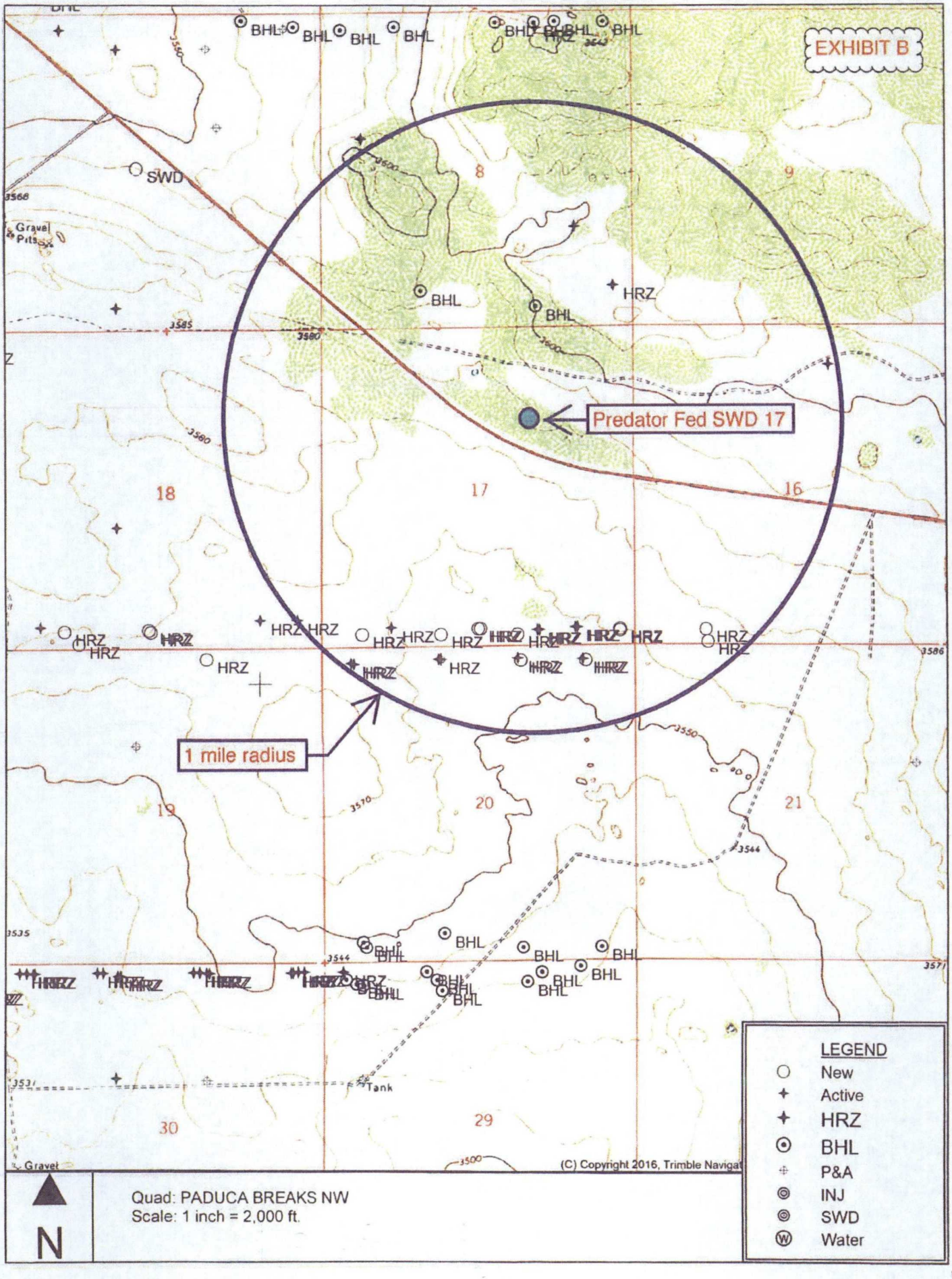
EXHIBIT B
Predator Fed SWD 17
1 mile radius
LEGEND
New
Active
HRZ
BHL
P&A
INJ
SWD
Water
Quad: PADUCA BREAKS NW
Scale: 1 inch = 2,000 ft.
N
(C) Copyright 2016, Trimble Navigat

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SORTED BY DISTANCE FROM PREDATOR FED SWD 17

| API | OPERATOR | WELL | TYPE | UNIT-SECTION | TVD | ZONE | FEET FROM PREDATOR FED SWD 17 |
|---|---|---|---|---|---|---|---|
| 3002538221 | Oxy USA | Mesa Verde 17 Federal 001 | O | A-17 | 9800 | Mesa Verde; Bone Spring | 1775 |
| 3002537914 | Oxy USA | Mesa Verde 8 Federal 002H | O | P-8 | 9764 | Mesa Verde; Bone Spring | 2676 |
| 3002533195 | Oxy USA | NAFTA 8 Federal 001 | O | I-8 | 10000 | Mesa Verde; Bone Spring | 3240 |
| 3002544183 | Oxy USA | Mesa Verde Bone Spring Unit 003H | O | O-17 | 9125 | Mesa Verde; Bone Spring | 3573 |
| 3002544196 | Oxy USA | Mesa Verde Bone Spring Unit 002H | O | O-17 | 11861 | Mesa Verde; Bone Spring | 3575 |
| 3002544042 | Oxy USA | Mesa Verde Bone Spring Unit 006H | O | O-17 | 10410 | Mesa Verde; Bone Spring | 3616 |
| 3002544065 | Oxy USA | Mesa Verde Bone Spring Unit 007H | O | N-17 | 10429 | Mesa Verde; Bone Spring | 3623 |
| 3002544185 | Oxy USA | Mesa Verde Bone Spring Unit 005H | O | P-17 | 10449 | Mesa Verde; Bone Spring | 3627 |
| 3002544064 | Oxy USA | Mesa Verde Bone Spring Unit 004H | O | P-17 | 10447 | Mesa Verde; Bone Spring | 3634 |
| 3002544101 | Oxy USA | Mesa Verde Bone Spring Unit 001H | O | P-17 | 11944 | Mesa Verde; Bone Spring | 3881 |
| 3002544195 | Oxy USA | Mesa Verde Bone Spring Unit 001H | O | P-17 | 10443 | Mesa Verde; Bone Spring | 3908 |
| 3002542996 | Devon | Rebel 20 Federal 007H | O | B-20 | 10799 | Mesa Verde; Bone Spring | 4041 |
| 3002542994 | Devon | Rebel 20 Federal 003H | O | B-20 | Plan: 8438 | Plan: Paduca; Delaware, N | 4059 |
| 3002543159 | Devon | Rebel 20 Federal 008H | O | A-20 | 10787 | Mesa Verde; Bone Spring | 4171 |
| 3002544184 | Oxy USA | Mesa Verde Bone Spring Unit 008H | O | M-17 | 10403 | Mesa Verde; Bone Spring | 4219 |
| 3002544194 | Oxy USA | Mesa Verde Bone Spring Unit 009H | O | M-17 | 10392 | Mesa Verde; Bone Spring | 4235 |
| 3002543449 | Devon | Rebel 20 Federal 006Y | O | C-20 | 10411 | Mesa Verde; Bone Spring | 4322 |
| 3002542993 | Devon | Rebel 20 Federal 002H | O | C-20 | 8381 | Mesa Verde; Bone Spring | 4337 |
| 3002544561 | Oxy USA | Mesa Verde Bone Spring Unit 024H | O | M-16 | 10511 | Mesa Verde; Bone Spring | 4710 |

SORTED BY DISTANCE FROM PREDATOR FED SWD 17

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3002544560 | Oxy USA | Mesa Verde Bone Spring Unit 023H | O | M-16 | 10517 | Mesa Verde; Bone Spring | 4730 |
| 3002544559 | Oxy USA | Mesa Verde Bone Spring Unit 022H | O | M-16 | 10524 | Mesa Verde; Bone Spring | 4750 |
| 3002542515 | Devon | Rebel 20 Federal 001H | O | D-20 | 10751 | Paduca, N; Delaware | 5079 |
| 3002542769 | Devon | Rebel 20 Federal 005H | O | D-20 | 10740 | Cotton Draw, E; Bone Spring | 5094 |
| 3002530746 | EOG | Double ABJ State 001 | G | B-16 | 15800 | Double X; Strawn (G) | 5268 |
| *3002532192* | *EOG* | *Jack Tank 8 Federal 002* | *O* | *E-8* | *15460* | *Mesa Verde; Bone Spring* | *5297* |

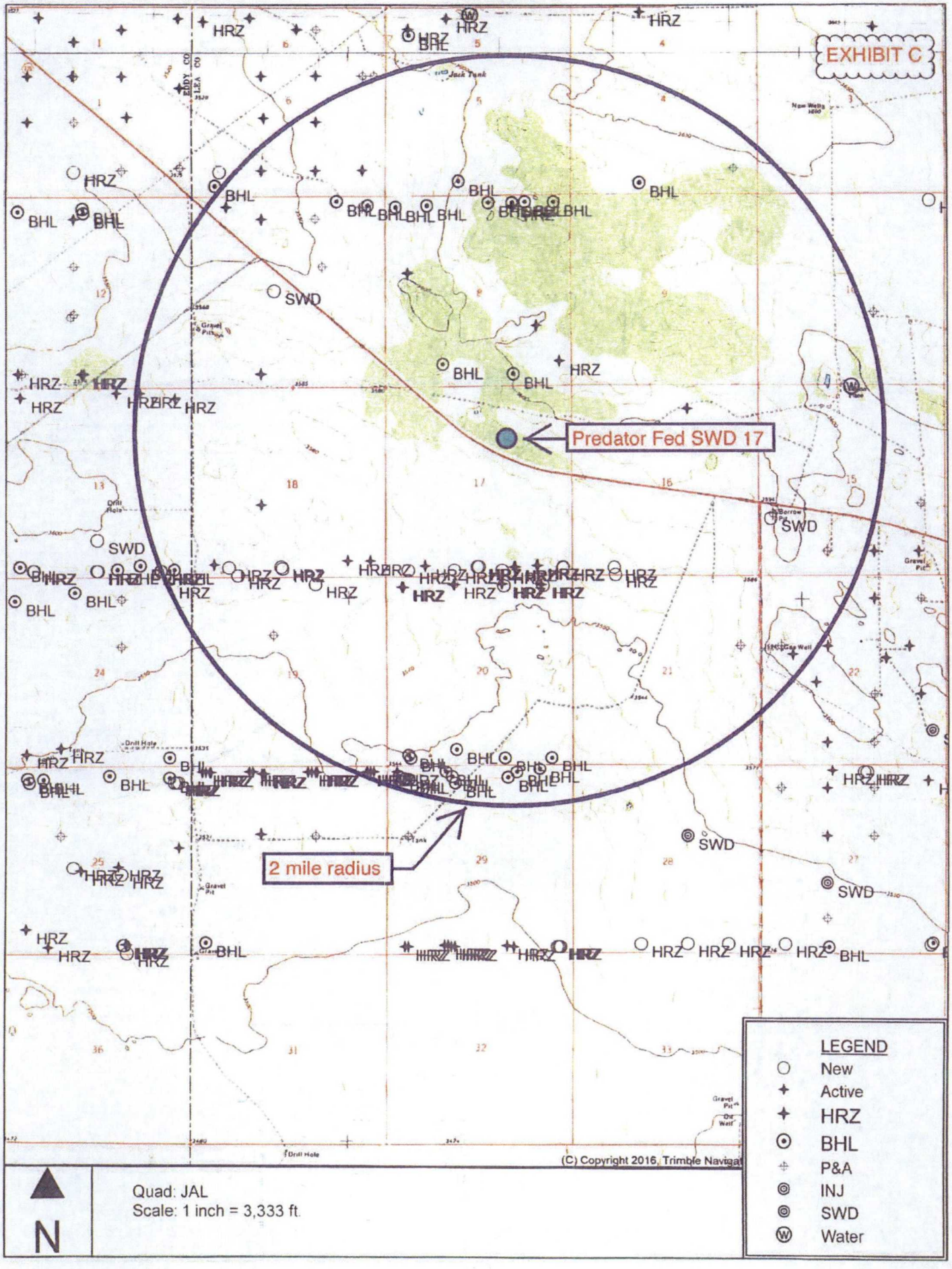
EXHIBIT C
Predator Fed SWD 17
2 mile radius
LEGEND
New
Active
HRZ
BHL
P&A
INJ
SWD
Water
N
Quad: JAL
Scale: 1 inch = 3,333 ft.
(C) Copyright 2016, Trimble Navigat

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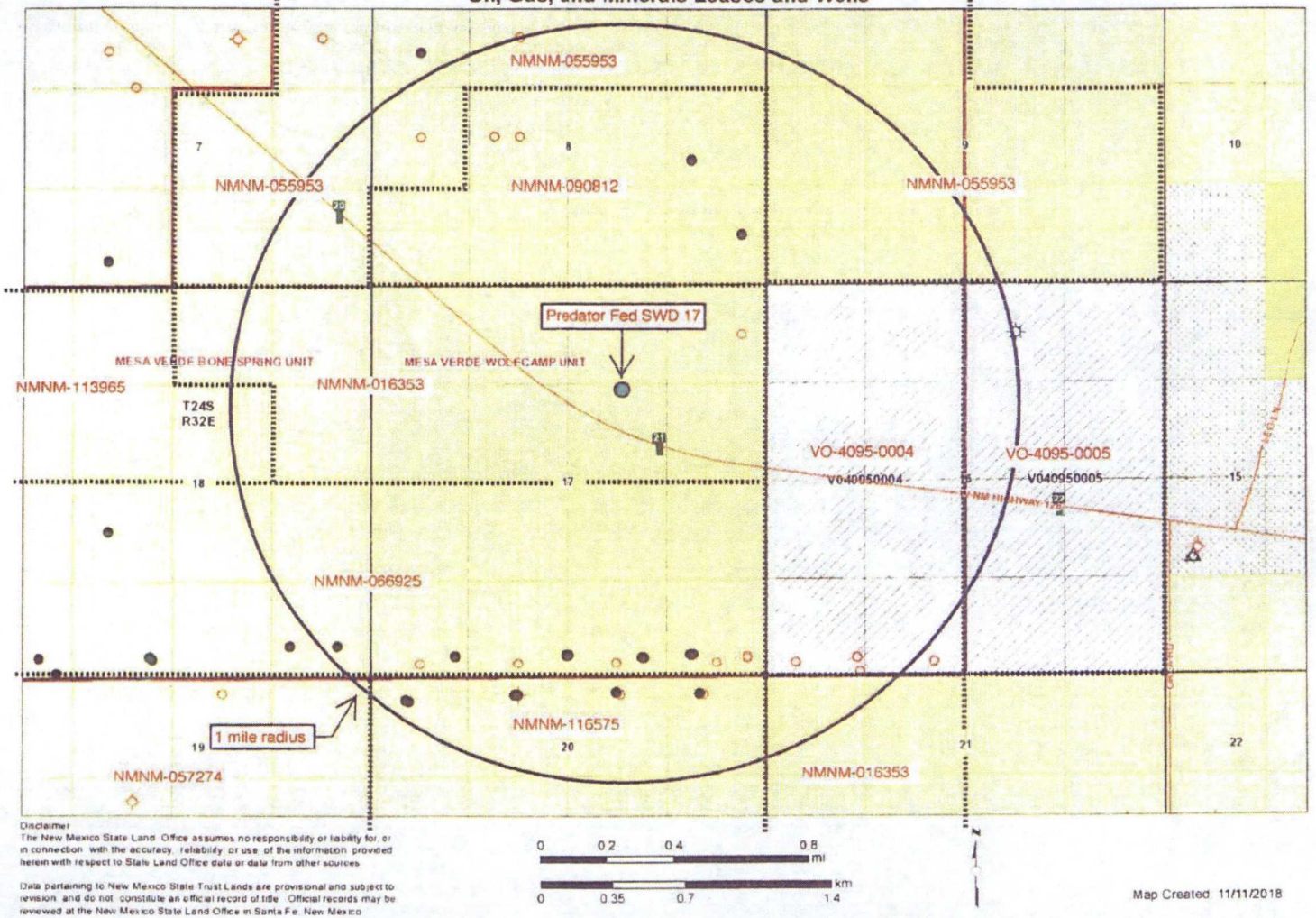
New Mexico State Land Office

EXHIBIT D

# Oil, Gas, and Minerals Leases and Wells




Legend

- Townships
- Sections
- Subdivisions
- Carbon Dioxide
- Gas
- Injection
- Oil
- Salt Water Disposal
- Water Storage
- Miscellaneous
- Plugged / Dry / Abandoned
- Cancelled / Not Drilled
- Highway Mileposts
- Detailed Roads
- Unit Agreement Boundaries
- Oil and Gas Leases
- All Minerals
- Coal Only
- Oil and Gas Only
- Oil, Gas and Coal Only
- Other Minerals

Disclaimer:
The New Mexico State Land Office assumes no responsibility or liability for, or in connection with the accuracy, reliability or use of the information provided herein with respect to State Land Office data or data from other sources.

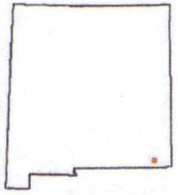
Data pertaining to New Mexico State Trust Lands are provisional and subject to revision and do not constitute an official record of title. Official records may be reviewed at the New Mexico State Land Office in Santa Fe, New Mexico.

0 0.2 0.4 0.8 mi

0 0.35 0.7 1.4 km

N

Map Created: 11/11/2018



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PREDATOR FED SWD 17 AREA OF REVIEW LEASES

| Aliquot Parts in Area of Review (T24S, R32E) | Lessor | Lease | Lessee(s) of Record | Operator (all shallower than Devonian) |
|---|---|---|---|---|
| NESE & S2SE Sec. 7 | BLM | NMNM-055953 | EOG | Oxy |
| S2N2 & NWSW Sec. 8 | BLM | NMNM-055953 | EOG | COG, EOG, |
| SE4, E2SW, SWSW Sec. 8 | BLM | NMNM-090812 | EOG | COG, Oxy |
| SWNW, SW4, SWSE* Sec. 9 | BLM | NMNM-055953 | EOG | Oxy |
| W2E2 Sec. 16 | NMSLO | VO-4095-0005 | EOG | EOG |
| W2 Sec. 16 | NMSLO | VO-4095-0004 | OXY USA | Oxy |
| N2 Sec. 17 | BLM | NMNM-016353 | XTO | Oxy |
| S2 Sec. 17 | BLM | NMNM-066925 | Burlington | Oxy |
| E2NE & NWNE Sec. 18 | BLM | NMNM-016353 | XTO | Oxy |
| N2SE & SESE Sec. 18 | BLM | NMNM-066925 | Burlington | Oxy |
| NENE Sec. 19 | BLM | NMNM-057274 | John Yates, EOG, EOG Y, EOG A | none |
| N2N2, SENW, & SWNE Sec. 20 | BLM | NMNM-116575 | Devon | Devon |
| N2NW Sec. 21 | BLM | NMNM-016353 | XTO | XTO |
| | | | | |
| *no operator currently in SWSE Sec. 9 | | | | |

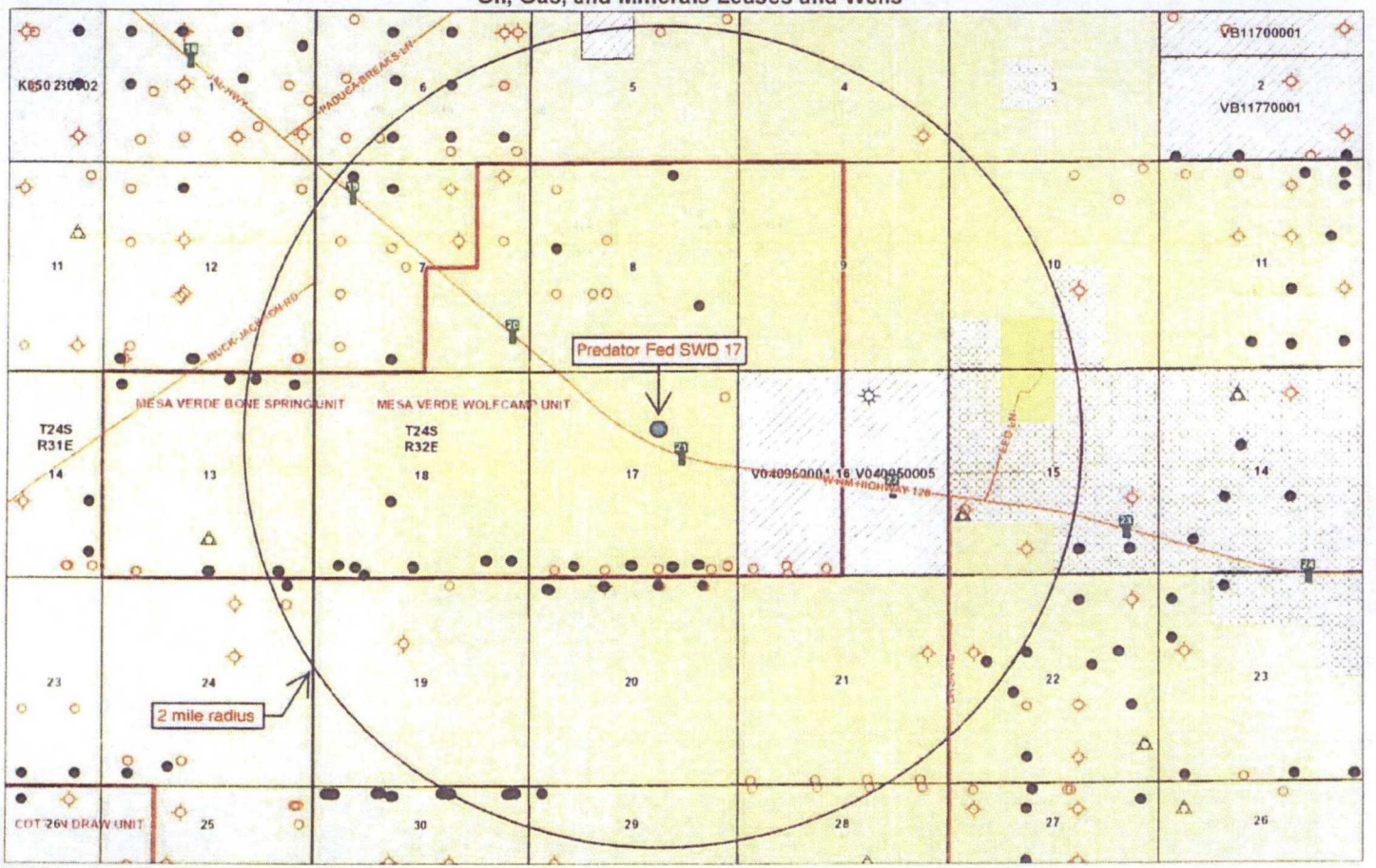
EXHIBIT D

17

New Mexico State Land Office

# Oil, Gas, and Minerals Leases and Wells

EXHIBIT E




**Legend**

- Townships
- Sections
- Carbon Dioxide
- Gas
- Injection
- Oil
- Salt Water Disposal
- Water Storage
- Miscellaneous
- Plugged / Dry / Abandoned
- Cancelled / Not Drilled
- Highway Mileposts
- Detailed Roads
- Unit Agreement Boundaries
- Oil and Gas Leases
- All Minerals
- Coal Only
- Oil and Gas Only
- Oil, Gas and Coal Only
- Other Minerals



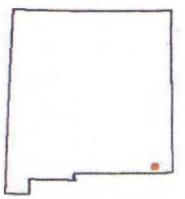
0 0.4 0.8 1.6 mi

0 0.5 1 2 km

N

EXHIBIT E

Map Created: 11/11/2018



7

PRODUCED WATER (in mg/l) FROM T24S, R32E

| API | Section | U L | Formation | TDS | Sodium | Calcium | Iron | Magnesium | Manganese | Chloride | Bicarbonate | Sulfate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3002541304 | 24 | O | Bone Spring 2nd Sand | | 49481 | 7987 | 41 | 1034 | 0 | 93721 | 110 | 670 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 49481 | 7987 | 41 | 1034 | 0 | 93721 | 110 | 670 |
| 3002541263 | 33 | D | Del. Brushy Canyon | 253483 | 72812 | 15695 | 47 | 2581 | | 159431 | | 402 |
| 3002541264 | 33 | C | Del. Brushy Canyon | 249333 | 71580 | 16716 | 39 | 2758 | | 155227 | | 406 |
| 3002508151 | 15 | O | Delaware | 229813 | 65198 | 18727 | | 3040 | | 142188 | 168 | 491 |
| 3002532751 | 6 | D | Avalon Lower | 141332 | 48380 | 556 | 215 | 214 | 3 | 86816 | 2318 | 1929 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | 144311 | 43568 | 6385 | 37 | 723 | 0 | 91353 | 244 | 0 |
| 3002540583 | 32 | I | Del. Brushy Canyon | 190416 | 52852 | 11214 | 41 | 1817 | 2 | 121155 | 1122 | 0 |
| 3002541304 | 24 | O | Bone Spring 2nd Sand | | 71342 | 6157 | 15 | 789 | 0 | 123333 | 110 | 650 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 75306 | 6201 | 20 | 822 | 0 | 128954 | 134 | 1400 |
| 3002541171 | 32 | K | Del. Brushy Canyon | 240652 | 72113 | 15674 | 42 | 2637 | 2 | 147408 | 122 | 0 |
| 3002541182 | 24 | M | Bone Spring 2nd Sand | | 49757 | 11569 | 46 | 1432 | 1 | 102546 | 1 | 590 |
| 3002541304 | 24 | O | Bone Spring 2nd Sand | | 53368 | 13208 | 41 | 1460 | 0 | 111033 | 110 | 600 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 53395 | 12985 | 69 | 1535 | 1 | 110763 | 134 | 680 |
| 3002540583 | 32 | I | Del. Brushy Canyon | 250315 | 74641 | 18096 | 33 | 3033 | 3 | 151462 | 122 | 0 |
| 3002540583 | 32 | I | Del. Brushy Canyon | 250489 | 74641 | 18096 | 33 | 3033 | 3 | 151462 | 122 | 608 |
| 3002541182 | 24 | M | Bone Spring 2nd Sand | 155546 | 52720 | 7328 | 43 | 852 | 1 | 91918 | 122 | 799 |
| 3002541182 | 24 | M | Bone Spring 2nd Sand | | 53374 | 7930 | 32 | 909 | 1 | 100444 | 146 | 56 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 55879 | 8793 | 39 | 1008 | 1 | 105774 | 146 | 640 |
| 3002541304 | 24 | O | Bone Spring 2nd Sand | | 44497 | 151 | 34 | 813 | 1 | 71541 | 61 | 640 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 44497 | 151 | 34 | 813 | 1 | 71541 | 61 | 640 |
| 3002541171 | 32 | K | Del. Brushy Canyon | 230307 | 66453 | 15494 | 56 | 2512 | 3 | 143205 | 122 | 0 |
| 3002541182 | 24 | M | Bone Spring 2nd Sand | | 49221 | 8660 | 63 | 1324 | 2 | 95000 | 195 | 113 |
| 3002541304 | 24 | O | Bone Spring 2nd Sand | | 44730 | 12294 | 38 | 1595 | 1 | 95000 | 122 | 586 |
| 3002541306 | 24 | O | Bone Spring 2nd Sand | | 48200 | 7820 | 38 | 1081 | 1 | 91000 | 171 | 436 |
| 3002508151 | 15 | O | Delaware | 229878 | | | | | | 142200 | 168 | 491 |
| 3002508151 | 15 | O | Delaware | 229709 | | | | | | 142100 | 168 | 491 |
| 3002532751 | 6 | D | Avalon Lower | 137184 | 52851 | 144 | 12 | 78 | 0 | 81306 | 220 | 1761 |
| 3002532751 | 6 | D | Avalon Lower | 150046 | 56747 | 630 | 57 | 172 | 1 | 86647 | 2928 | 2094 |

PRODUCED WATER (mg/l) FROM DEVONIAN AND FUSSELMAN

| API | Section | Township | Range | Formation | TDS | Chloride | Carbonate | Sulfate |
|---|---|---|---|---|---|---|---|---|
| 3002505150 | 26 | 14S | 37E | Devonian | 75330 | 44300 | 950 | 1350 |
| 3002505150 | 26 | 14S | 37E | Devonian | 79880 | 47600 | 480 | 1150 |
| 3002505157 | 27 | 14S | 37E | Devonian | 55652 | 32200 | 510 | 1650 |
| 3002505157 | 27 | 14S | 37E | Devonian | 58223 | 33830 | 414 | 1723 |
| 3002505157 | 27 | 14S | 37E | Devonian | 25701 | 15600 | 292 | 84 |
| 3002505161 | 27 | 14S | 37E | Devonian | 56014 | 32400 | 660 | 1530 |
| 3002505215 | 36 | 14S | 37E | Devonian | 84839 | 50557 | 379 | 1094 |
| 3002505170 | 34 | 14S | 37E | Devonian | 16740 | | | |
| 3002505167 | 34 | 14S | 37E | Devonian | 70556 | 42818 | 255 | 1539 |
| 3002505167 | 34 | 14S | 37E | Devonian | 56334 | 32978 | 377 | 1694 |
| 3002505167 | 34 | 14S | 37E | Devonian | 53954 | 31311 | 471 | 1688 |
| 3002505167 | 34 | 14S | 37E | Devonian | 55110 | 32091 | 443 | 1667 |
| 3002505177 | 35 | 14S | 37E | Devonian | 107201 | 63030 | 451 | 2664 |
| 3002505176 | 35 | 14S | 37E | Devonian | 52480 | 30176 | 578 | 1694 |
| 3002505176 | 35 | 14S | 37E | Devonian | 51823 | 29857 | 528 | 1667 |
| 3002505176 | 35 | 14S | 37E | Devonian | 56494 | 33000 | 522 | 1562 |
| 3002505176 | 35 | 14S | 37E | Devonian | 52388 | 30000 | 491 | 2040 |
| 3002505180 | 35 | 14S | 37E | Devonian | 57934 | 33720 | 586 | 1505 |
| 3002505117 | 25 | 14S | 37E | Devonian | 73208 | 44687 | 298 | 241 |
| 3002505170 | 34 | 14S | 37E | Devonian | 56969 | 32918 | 627 | 1670 |
| 3002505178 | 35 | 14S | 37E | Devonian | 60800 | 35400 | 581 | 1510 |
| 3002505177 | 35 | 14S | 37E | Devonian | 65100 | 37800 | 216 | 1540 |
| 3002505175 | 35 | 14S | 37E | Devonian | 56800 | 33000 | 511 | 1590 |
| 3002505179 | 35 | 14S | 37E | Devonian | 57500 | 35600 | 469 | 1410 |
| 3002505145 | 26 | 14S | 37E | Devonian | 62067 | 36545 | 123 | 1636 |
| 3002505149 | 26 | 14S | 37E | Devonian | 78980 | 47014 | 198 | 1632 |
| 3002506987 | 33 | 21S | 37E | Fusselman | 100876 | 59330 | 878 | 2929 |

EXHIBIT G

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EXHIBIT H

# New Mexico Office of the State Engineer

# Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

| POD Number | Code | POD Sub-basin | County | Q 64 | Q 16 | Q 4 | Sec | Twws | Rng | X | Y | Distance | Depth Well | Depth Water | Water Column |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C 03530 POD1 | | C | LE | 3 | 4 | 3 | 07 | 24S | 32E | 620886 | 3566156 | 2209 | 550 | | |
| C 02350 | | CUB | ED | | 4 | 3 | 10 | 24S | 32E | 625826 | 3566333* | 2871 | 60 | | |
| C 03528 POD1 | | C | LE | 1 | 1 | 2 | 15 | 24S | 32E | 626040 | 3566129 | 3041 | 541 | | |

Average Depth to Water: --

Minimum Depth: --

Maximum Depth: --

**Record Count:** 3

**UTMNAD83 Radius Search (in meters):**

**Easting (X):** 623037 **Northing (Y):** 3565649 **Radius:** 3220

***UTM location was derived from PLSS - see Help**





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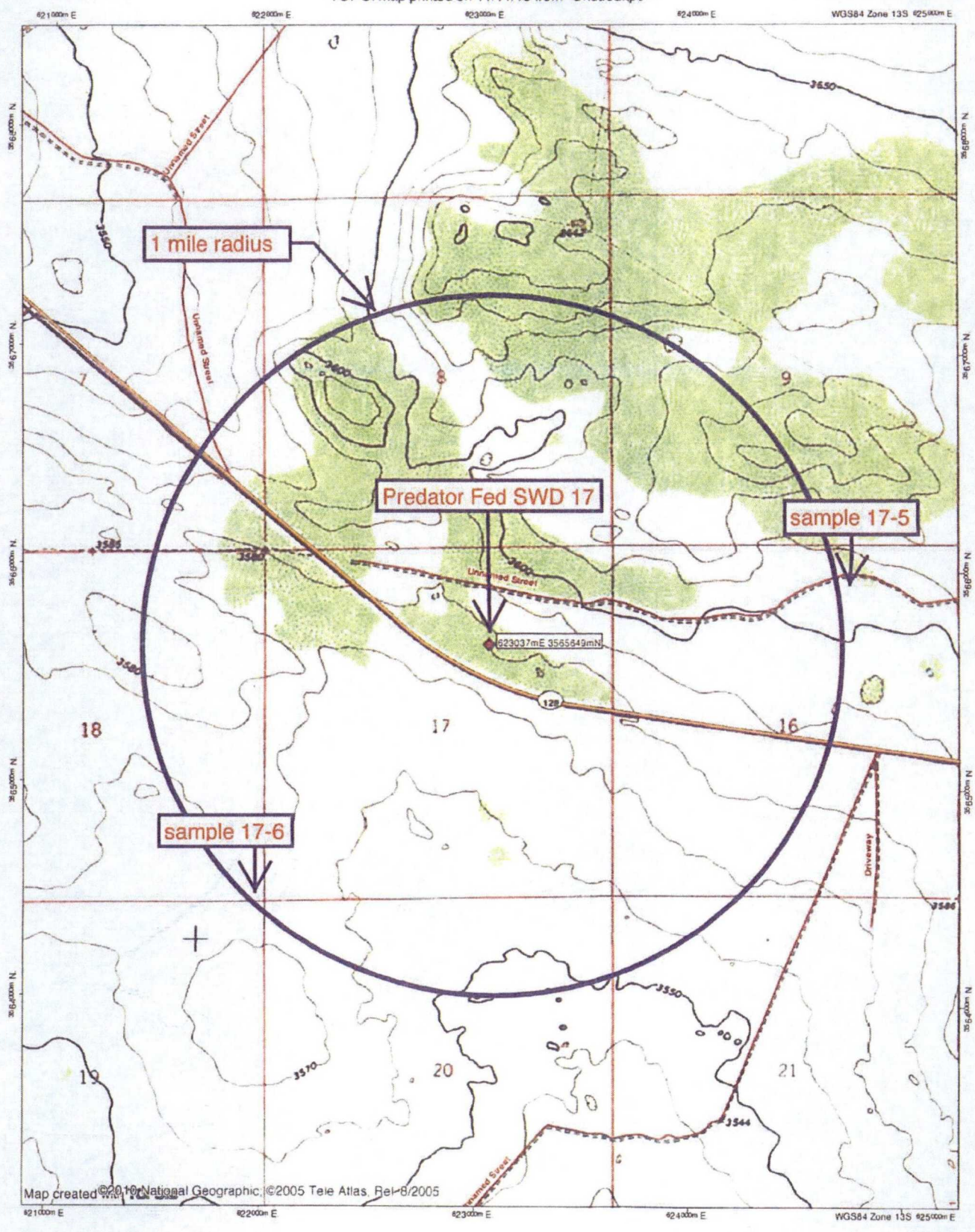
EXHIBIT H


TOPO! map printed on 11/11/18 from "Untitled.tpo"
1 mile radius
Predator Fed SWD 17
sample 17-5
sample 17-6
623037mE 3565649mN
Unnamed Street
Driveway
Map created with TOPO!
©2010 National Geographic, ©2005 Tele Atlas, Rel-8/2005
NATIONAL GEOGRAPHIC
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 miles
0.0 0.5 1.0 km
TN MN
11/11/18

2

EXHIBIT H

**Analytical Report**
Lab Order **1808B54**
Date Reported: **8/30/2018**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Permits West
**Project:** Solaris Predator 17
**Lab ID:** 1808B54-001 **Matrix:** AQUEOUS

**Client Sample ID:** Predator 17-5
**Collection Date:** 8/16/2018 12:30:00 PM
**Received Date:** 8/17/2018 8:51:00 AM

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed | Batch |
|---|---|---|---|---|---|---|---|
| **EPA METHOD 1664B** | | | | | | Analyst: **dbf** | |
| N-Hexane Extractable Material | ND | 9.58 | | mg/L | 1 | 8/22/2018 2:00:00 PM | 39900 |
| **EPA METHOD 300.0: ANIONS** | | | | | | Analyst: **smb** | |
| Chloride | 130 | 5.0 | | mg/L | 10 | 8/20/2018 1:41:30 PM | R53575 |
| **SM2540C MOD: TOTAL DISSOLVED SOLIDS** | | | | | | Analyst: **KS** | |
| Total Dissolved Solids | 1230 | 200 | *D | mg/L | 1 | 8/27/2018 12:25:00 PM | 39954 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Value above quantitation range |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Detection Limit |
| S | % Recovery outside of range due to dilution or matrix | W | Sample container temperature is out of limit as specified |



2-3

EXHIBIT H

**Analytical Report**
Lab Order **1808B54**
Date Reported: **8/30/2018**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Permits West
**Project:** Solaris Predator 17
**Lab ID:** 1808B54-002 **Matrix:** AQUEOUS

**Client Sample ID:** Predator 17-6
**Collection Date:** 8/16/2018 12:05:00 PM
**Received Date:** 8/17/2018 8:51:00 AM

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed | Batch |
|---|---|---|---|---|---|---|---|
| **EPA METHOD 1664B** | | | | | | Analyst: **dbf** | |
| N-Hexane Extractable Material | ND | 9.60 | | mg/L | 1 | 8/22/2018 2:00:00 PM | 39900 |
| **EPA METHOD 300.0: ANIONS** | | | | | | Analyst: **smb** | |
| Chloride | 37 | 5.0 | | mg/L | 10 | 8/20/2018 2:07:13 PM | R53575 |
| **SM2540C MOD: TOTAL DISSOLVED SOLIDS** | | | | | | Analyst: **KS** | |
| Total Dissolved Solids | 439 | 20.0 | | mg/L | 1 | 8/27/2018 12:25:00 PM | 39954 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Value above quantitation range |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Detection Limit |
| S | % Recovery outside of range due to dilution or matrix | W | Sample container temperature is out of limit as specified |



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EXHIBIT H

# QC SUMMARY REPORT

WO#: 1808B54

## Hall Environmental Analysis Laboratory, Inc.

*30-Aug-18*

**Client:** Permits West

**Project:** Solaris Predator 17

| Sample ID | MB-39900 | SampType: | MBLK | TestCode: | EPA Method 1664B | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | PBW | Batch ID: | 39900 | RunNo: | 53644 | | | | | |
| Prep Date: | 8/21/2018 | Analysis Date: | 8/22/2018 | SeqNo: | 1769098 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| N-Hexane Extractable Material | ND | 10.0 | | | | | | | | |

| Sample ID | LCS-39900 | SampType: | LCS | TestCode: | EPA Method 1664B | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | LCSW | Batch ID: | 39900 | RunNo: | 53644 | | | | | |
| Prep Date: | 8/21/2018 | Analysis Date: | 8/22/2018 | SeqNo: | 1769099 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| N-Hexane Extractable Material | 31.4 | 10.0 | 40.00 | 0 | 78.5 | 78 | 114 | | | |

**Qualifiers:**

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Detection Limit
- S % Recovery outside of range due to dilution or matrix
- W Sample container temperature is out of limit as specified



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EXHIBIT H

# QC SUMMARY REPORT

WO#: 1808B54

## Hall Environmental Analysis Laboratory, Inc.

*30-Aug-18*

**Client:** Permits West

**Project:** Solaris Predator 17

| Sample ID | MB | SampType: | mblk | TestCode: | EPA Method 300.0: Anions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | PBW | Batch ID: | R53575 | RunNo: | 53575 | | | | | |
| Prep Date: | | Analysis Date: | 8/20/2018 | SeqNo: | 1766164 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Chloride | ND | 0.50 | | | | | | | | |

| Sample ID | LCS | SampType: | lcs | TestCode: | EPA Method 300.0: Anions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | LCSW | Batch ID: | R53575 | RunNo: | 53575 | | | | | |
| Prep Date: | | Analysis Date: | 8/20/2018 | SeqNo: | 1766165 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Chloride | 4.6 | 0.50 | 5.000 | 0 | 91.1 | 90 | 110 | | | |

**Qualifiers:**

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Detection Limit
- S % Recovery outside of range due to dilution or matrix
- W Sample container temperature is out of limit as specified



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EXHIBIT H

# QC SUMMARY REPORT

WO#: 1808B54

## Hall Environmental Analysis Laboratory, Inc.

*30-Aug-18*

**Client:** Permits West
**Project:** Solaris Predator 17

| Sample ID | MB-39954 | SampType: | MBLK | TestCode: | SM2540C MOD: Total Dissolved Solids | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | PBW | Batch ID: | 39954 | RunNo: | 53715 | | | | | |
| Prep Date: | 8/23/2018 | Analysis Date: | 8/27/2018 | SeqNo: | 1772071 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Dissolved Solids | ND | 20.0 | | | | | | | | |

| Sample ID | LCS-39954 | SampType: | LCS | TestCode: | SM2540C MOD: Total Dissolved Solids | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Client ID: | LCSW | Batch ID: | 39954 | RunNo: | 53715 | | | | | |
| Prep Date: | 8/23/2018 | Analysis Date: | 8/27/2018 | SeqNo: | 1772072 | Units: | mg/L | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Dissolved Solids | 1030 | 20.0 | 1000 | 0 | 103 | 80 | 120 | | | |

**Qualifiers:**

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- PQL Practical Quanitative Limit
- RL Reporting Detection Limit
- S % Recovery outside of range due to dilution or matrix
- W Sample container temperature is out of limit as specified



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PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

EXHIBIT 1

# Geologic Assessment

## Solaris Water Midstream, LLC

## Predator Fed SWD No. 17

## Section 17, Township 24 South, Range 32 East

## Lea County, New Mexico

Cory Walk

Cory Walk

B.S., M.S.

Geologist

Permits West Inc.

November 13, 2018

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**Introduction**

Predator Fed SWD #17 is located in section 17, T24S, R32E, about 24 miles east-southeast of Loving, NM in the Permian Basin. Solaris Water Midstream, LLC proposes the injection zone to be within the "Devonian" (Silurian Wristen Group) and Fusselman formations through an open hole from 16,965'- 18,149' below ground surface. The lower injection limit lies 200 feet above the estimated top of the Montoya Formation (18,349'). This report assesses any potential concerns relating to induced seismicity along deep penetrating Precambrian faults or the connection between the injection zone and known underground potable water sources.

**Groundwater Sources**

Three principal aquifers are used for potable groundwater in Lea County; these geologic units include the Triassic Santa Rosa formation, Tertiary Ogallala formation, and Quaternary alluvium. Nicholson and Clebsch (1961) state, "Potable ground water is not available below the Permian and Triassic unconformity but, because this boundary is not easily defined, the top of the Rustler anhydrite formation is regarded as the effective lower limit of 'potable' ground water." Around the Predator Fed SWD #17 well, the top of the Rustler formation is located at a depth of ~876 feet bgs.

**Faults and Fractures**

Fault data from the Geologic Map of New Mexico (2003) shows the nearest surface fault to the SWD location is found 30 miles to the west (Figure 1). This fault is inferred based on a mapped discontinuity of stratigraphy. Greater than 50 miles southwest of the Predator well is a large accumulation of northwest trending Basin and Range style normal faults. This fault zone is interpreted to be a southeastern extension of the Rio Grande Rift zone (Muehlberger et al., 1978) and is the only area in the region in which deeply penetrating faults also penetrate the shallow aquifer systems.

A structure contour map (Fig. 2) of the Precambrian basement shows the Predator Fed SWD #17 well is ~10 miles from a basement-penetrating fault documented by Ewing et al (1990). Montgomery (1997) indicates that these faults do not penetrate anything above the Delaware Mountain group and therefore cannot act as a conduit for transferring deeply injected fluids to the shallow aquifer systems used for domestic, municipal or livestock purposes (Figure 3).

Induced seismicity is a growing concern of deep SWD wells. Relatively new software developed by the Stanford Center for Induced and Triggered Seismicity allows for the probabilistic screening of deeply penetrating faults near the proposed injection zone (Walsh and Zoback, 2016; Walsh et al., 2017). This software uses parameters such as stress orientations, fault strike and dip, injection rates, fault friction coefficients, etc. to estimate the potential for fault slip. Using the best available data as input parameters (Table 1), fault slip potential was modeled through the year 2040. Model results give a 0 percent (0.00) probability of slip on all nearby faults (Fig. 4), recorded or inferred by Ewing et al. (1990).

**Stratigraphy**

Thick permeability barriers exist above (Woodford shale; 160 ft thick) and below (Simpson Group; 670 ft thick) the targeted Devonian-Silurian injection zone (Plate 2, Comer et al., 1991; Fig. 8,

Frenzel et al., 1988). Approximately 16,000 feet of rock separate the top of the proposed injection zone from the previously stated lower limit of potable water at the top of the Rustler formation.

**Conclusions**

Geologic data evaluated around the Predator Fed SWD #17 well show no potential structural or stratigraphic connection between the Silurian-Devonian injection zone and any subsurface potable water sources. Based on Fault Slip Potential modeling there is no probability (0.00) of inducing seismic activity along deeply penetrating Precambrian faults.

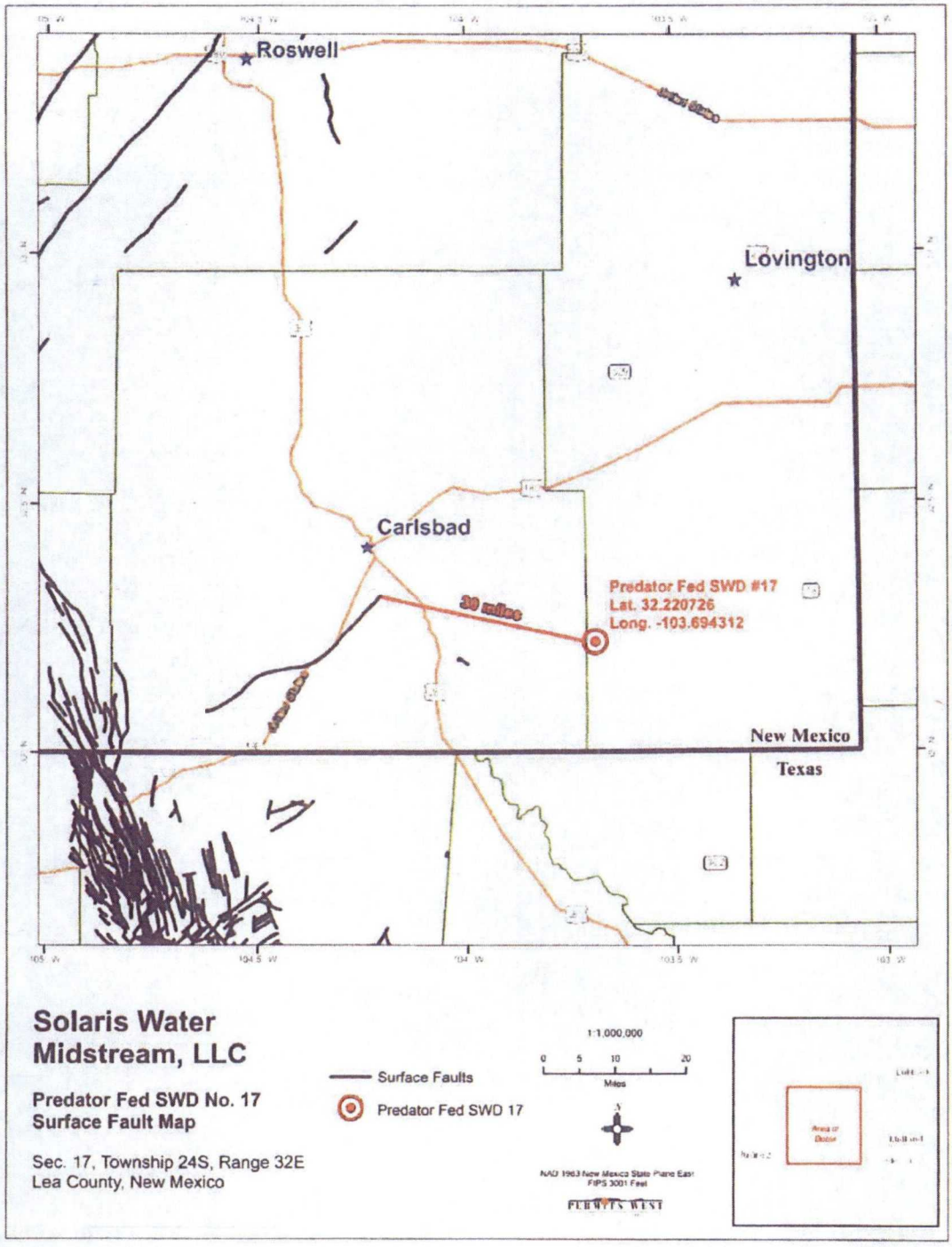


Figure 1. Shaded relief of the northwestern Permian Basin. Thick black lines represent locations of fault traces and show that the nearest faults to the proposed Predator Fed SWD #17 well lie ~30 miles away.

EXHIBIT I

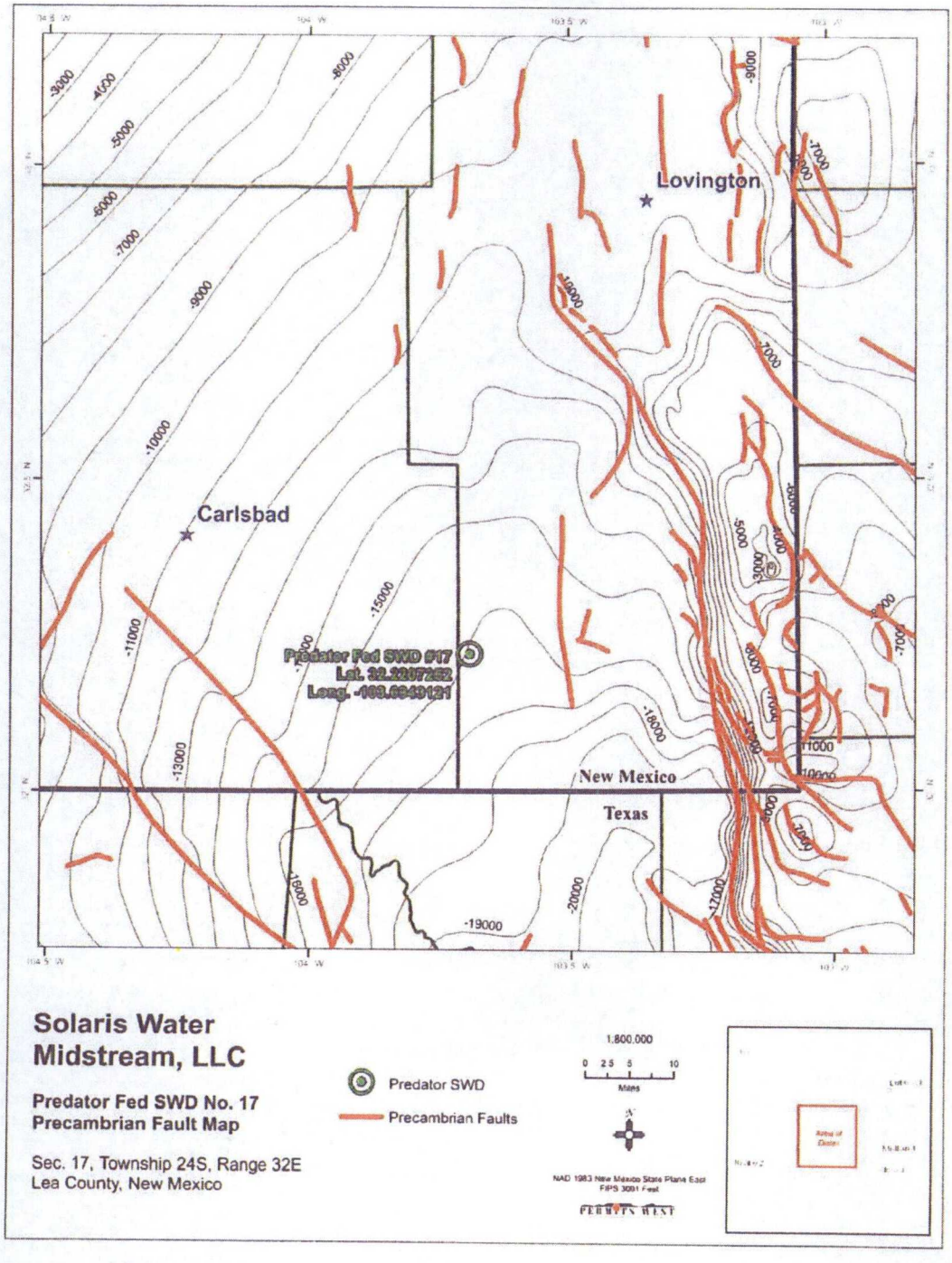


Figure 2. Structural contour map of the Precambrian basement in feet below sea level. Red lines represent the locations of Precambrian basement-penetrating faults (Ewing et al., 1990). Green lines represent county boundaries. The Predator Fed SWD #17 well lies ~10 miles W of the closest deeply penetrating fault.

EXHIBIT I

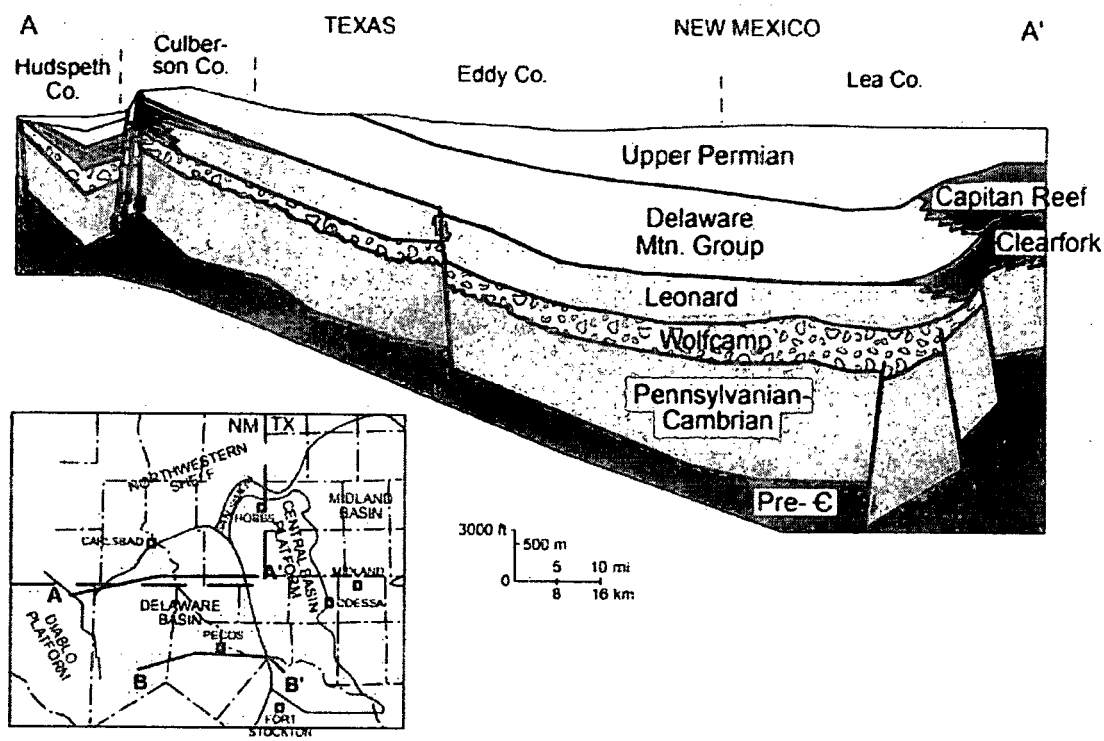


Figure 3. Cross section of the Permian Basin from Montomery (1997). Notice the majority of basement faults only penetrate through the Leonard and deeper formations and therefore cannot act as conduits to the near surface potable water sources.

EXHIBIT I

**Table 1: Fault Slip Potential model input parameters**

| Faults | Value | Notes |
|---|---|---|
| Friction Coefficient | 0.58 | Ikari et al. (2011) |
| Dip Angle (deg) | 70 | Snee and Zoback (2018) |
| **Stress** | | |
| Vertical stress gradient (psi/ft) | 1.1 | Hurd and Zoback (2012) |
| Max Horizontal Stress Direction (deg) | 75 | Snee and Zoback (2018) |
| Depth for calculations (ft) | 18000 | Proposed injection zone |
| Initial Reservoir Pressure Gradient (psi/ft) | 0.7 | calculated from mud wt (ppg) used in drilling at these depths |
| A Phi Parameter | 0.60 | Snee and Zoback (2018) |
| Reference Friction Coefficient | 0.58 | Ikari et al. (2011) |
| **Hydrology** | | |
| Aquifer thickness (ft) | 1200 | Proposed injection zone |
| Porosity (%) | 10 | |
| Permeability (mD) | 50 | |
| Injection Rate (bbl/day) | 30000 | Maximum proposed injection rate |

EXHIBIT I

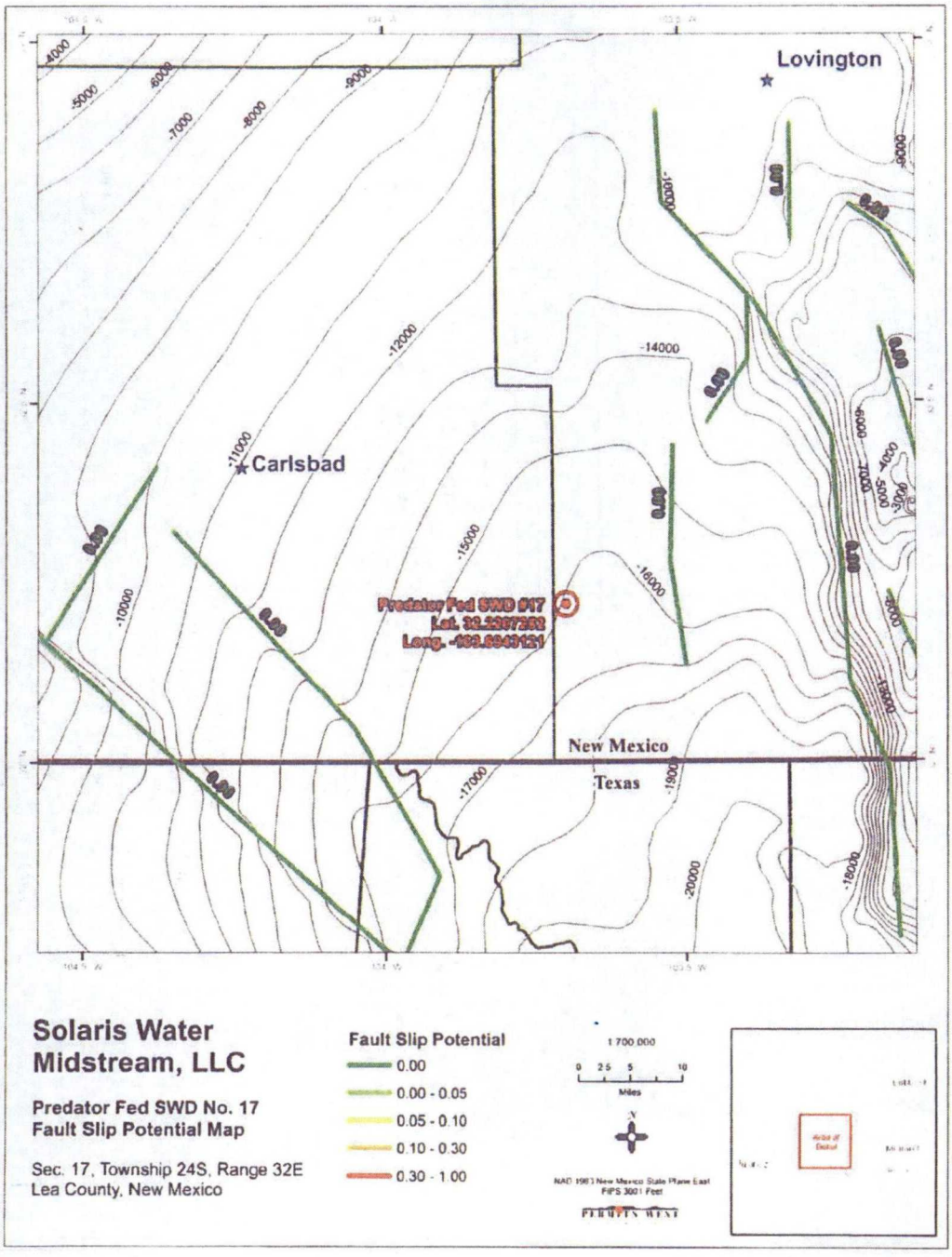


Figure 4. Precambrian fault map of southeastern New Mexico as mapped by Ewing et al. (1990). Faults are colored based on probability of fault slip as modeled using Fault Slip Potential software (Walsh and Zoback, 2016). Labeled values represent the calculated fault slip potential using the parameters indicated in Table 1. Contours show the top of the Precambrian basement in feet below sea level.

EXHIBIT I

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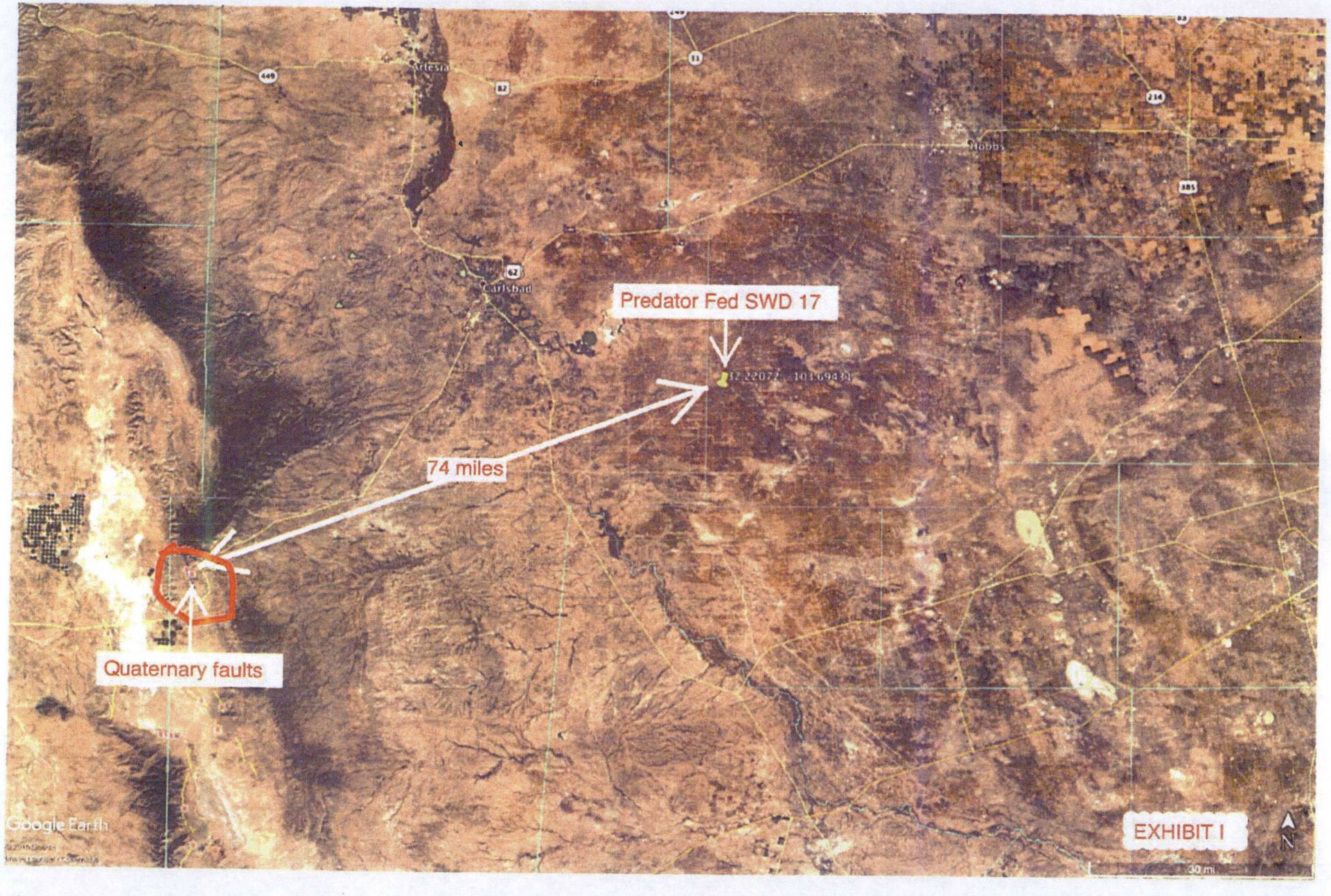
EXHIBIT I


Predator Fed SWD 17
74 miles
Quaternary faults
EXHIBIT I
Google Earth
Artesia
Carlsbad
Hobbs
N

PROPOSED ADVERTISEMENT

*Case No. _____:*

***Application of Solaris Water Midstream, LLC for approval of a salt water disposal well, Lea County, New Mexico***. Applicant seeks an order approving disposal of produced water at depths of 16965 - 18149 feet subsurface into the proposed Predator Fed. 17 SWD Well No. 1, located 1465 feet from the north line and 1893 feet from the east line of Section 17, Township 24 South, Range 32 East, NMPM. The well is located approximately 23-1/2 miles south of Halfway, New Mexico.