Initial Application Part I

Received: **11/25/2019**

This application is placed in file for record. It MAY or MAY NOT have been reviewed to be determined Administratively Complete

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

November 22, 2019

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

Subject: Select Energy Services – Varys 1 Federal SWD #1
Application for Authorization to Inject

To Whom It May Concern,

On behalf of Select Energy Services (Select), ALL Consulting, LLC (ALL) is submitting the enclosed Application for Authorization to Inject for the Varys 1 Federal SWD #1, a proposed salt water disposal well, in Lea 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

HHWXT-191125-C-1080

Revised March 23, 2017

RECEIVED: 11/25/19	REVIEWER: BLL	TYPE: SWD	APP NO: pBL1933037099

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Geological & Engineering Bureau –
1220 South St. Francis Drive, Santa Fe, NM 87505

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: _____ **OGRID Number:** _____
Well Name: _____ **API:** _____
Pool: _____ **Pool Code:** _____

SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW

1) **TYPE OF APPLICATION:** Check those which apply for [A]
A. Location – Spacing Unit – Simultaneous Dedication
☐ NSL ☐ NSP(PROJECT AREA) ☐ NSP(PRORATION UNIT) ☐ SD

SWD-2331

B. Check one only for [I] or [II]
[I] Commingling – Storage – Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM
[II] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☐ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☐ Application requires published notice
D. ☐ Notification and/or concurrent approval by SLO
E. ☐ Notification and/or concurrent approval by BLM
F. ☐ Surface owner
G. ☐ For all of the above, proof of notification or publication is attached, and/or,
H. ☐ No notice required

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

_____ Date

_____ Print or Type Name

_____ Phone Number

Nathan Allemon
_____ Signature

_____ e-mail Address

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance ___X___Disposal
_____Storage Application qualifies for administrative approval? ____X____Yes _____No

II. OPERATOR: Select Energy Services

ADDRESS: 1820 N I-35, Gainesville, TX 76240

CONTACT PARTY RJ Metzler PHONE: (940)-665-7000

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: Nate Alleman TITLE: Regulatory Specialist - ALL Consulting

SIGNATURE:  DATE: 11/22/2019

E-MAIL ADDRESS: nalleman@all-llc.com

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

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

Side 2

III. WELL DATA

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

(1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

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

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

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

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

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

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

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

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

Application for Authorization to Inject
Well Name: Varys 1 Federal SWD #1

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

A.

(1) General Well Information:

Operator: Select Energy Services (OGRID No. 289068)
Lease Name & Well Number: Varys 1 Federal SWD #1
Location Footage Calls: 1,877' FSL & 2,577' FWL
Legal Location: Unit Letter K, S35 T23S R32E
Ground Elevation: 3,649'
Proposed Injection Interval: 17,085' – 18,596'
County: Lea

(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	1,235'	1,230	Surface	Circulation
Intermediate 1	14-3/4"	13-3/8"	68.0 lb/ft	4,950'	1,105	Surface	Circulation
Intermediate 2	12-1/4"	9-5/8"	53.5 lb/ft	14,050'	4,660	Surface	Circulation
Liner	8-1/2"	7-5/8"	39.0 lb/ft	17,085'	265	13,850'	CBL

(3) Tubing Information:

7" x 5.5" (composite weight tapered string) of fiberglass-coated tubing with setting depth of 17,065'

(4) Packer Information: Baker SC-2 or equivalent packer set at 17,065'

B.

(1) Injection Formation Name: Devonian and Silurian formations
Pool Name: SWD; DEVONIAN - SILURIAN
Pool Code: 97869
(2) Injection Interval: Open-hole injection between 17,085' – 18,596'
(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.

- Permian Delaware Mountain Group (4,950')
- Bone Springs (8,825')
- Wolfcamp (12,230')
- Atoka (14,210')
- Morrow (15,015')

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
- 2-mile Mineral Ownership Map
- 2-mile Surface Owernship Map
- 1.5-mile Deep SWD Map (Devonian/Silurian SWDs)
- 1-mile Well Detail List
- Potash Lease Map

VI – AOR Well List

There are no wells within the 1-mile AOR that 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 Surface Injection Pressure**: 3,417 psi (based on 0.2 psi per foot)
Proposed Average Surface Injection Pressure: approximately 1,500 – 2,000 psi

(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 formations which is a non-productive zone known to be compatible with formation water from the Wolfcamp and Bone Springs formations. Water analyses from the Devonian-Silurian formation in the area are included in ***Attachment 4*.**

VIII – Geologic Description

The proposed injection interval includes the Devonian and Silurian formations from 17,085 – 18,596 feet. These formations consist of carbonate rocks which include light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of accepting injected fluids are present within the subject formations in the area.

The base of the deepest Underground Source of Drinking Water (USDW) is at a depth of approximately 1,210 feet. Surface casing will be set at a depth of 1,235 feet, which is 25 feet below the top of the Rustler formation, which isolates the USDW. Geophysical log assessment was conducted to accurately determine the top of the Rustler formation, and the top and the base of the Salado formation in this area. Water well depths in the area range from approximately 165 - 380 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

Geophysical 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, one groundwater well is located within 1-mile of the proposed SWD location; however, according to state water well data and conversations with the water well owner the well is not currently active. Therefore, no groundwater samples were collected in association with this application.

A water well map of the area is included in ***Attachment 5***.

XII – No Hydrologic Connection Statement

ALL Consulting has examined available geologic and engineering data and has found no evidence of faulting present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing and cementing program has been designed to further 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 Hobbs News-Sun 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:

- C-102
- Wellbore Diagram

Attachment 2: Area of Review Information:

- 2-mile Oil & Gas Well Map
- 2-mile Lease Map
- 2-mile Mineral Ownership Map
- 2-mile Surface Ownership 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

- C-102
- Wellbore Diagram

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 & 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	DEVONIAN - SILURIAN

Property Code	Property Name	Well Number
	VARYS 1 FEDERAL SWD	#1

OGRID No.	Operator Name	Elevation
289068	SELECT ENERGY SERVICES, LLC	3648.7'

Surface Location

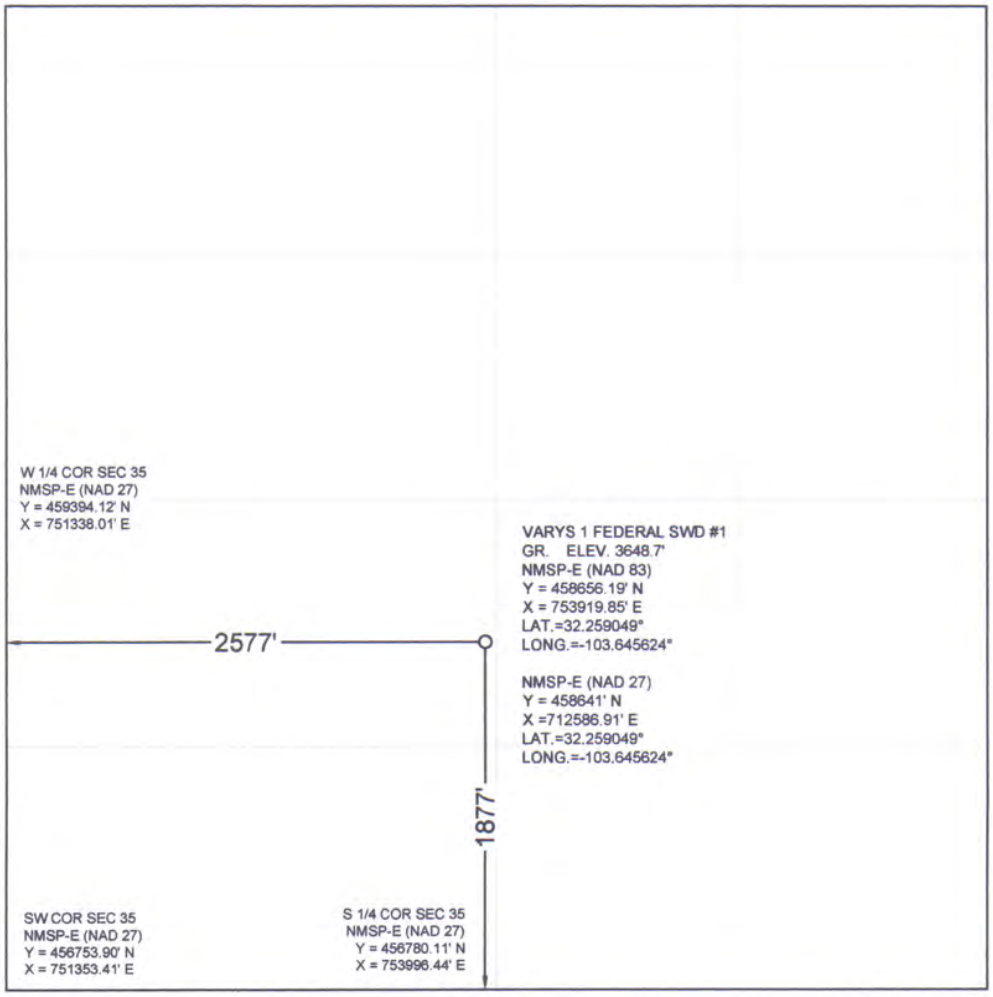
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
K	35	23 S	32 E		1877	SOUTH	2577	WEST	LEA

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	Consolidated 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 voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Print Name

E-mail Address

SURVEYORS CERTIFICATION

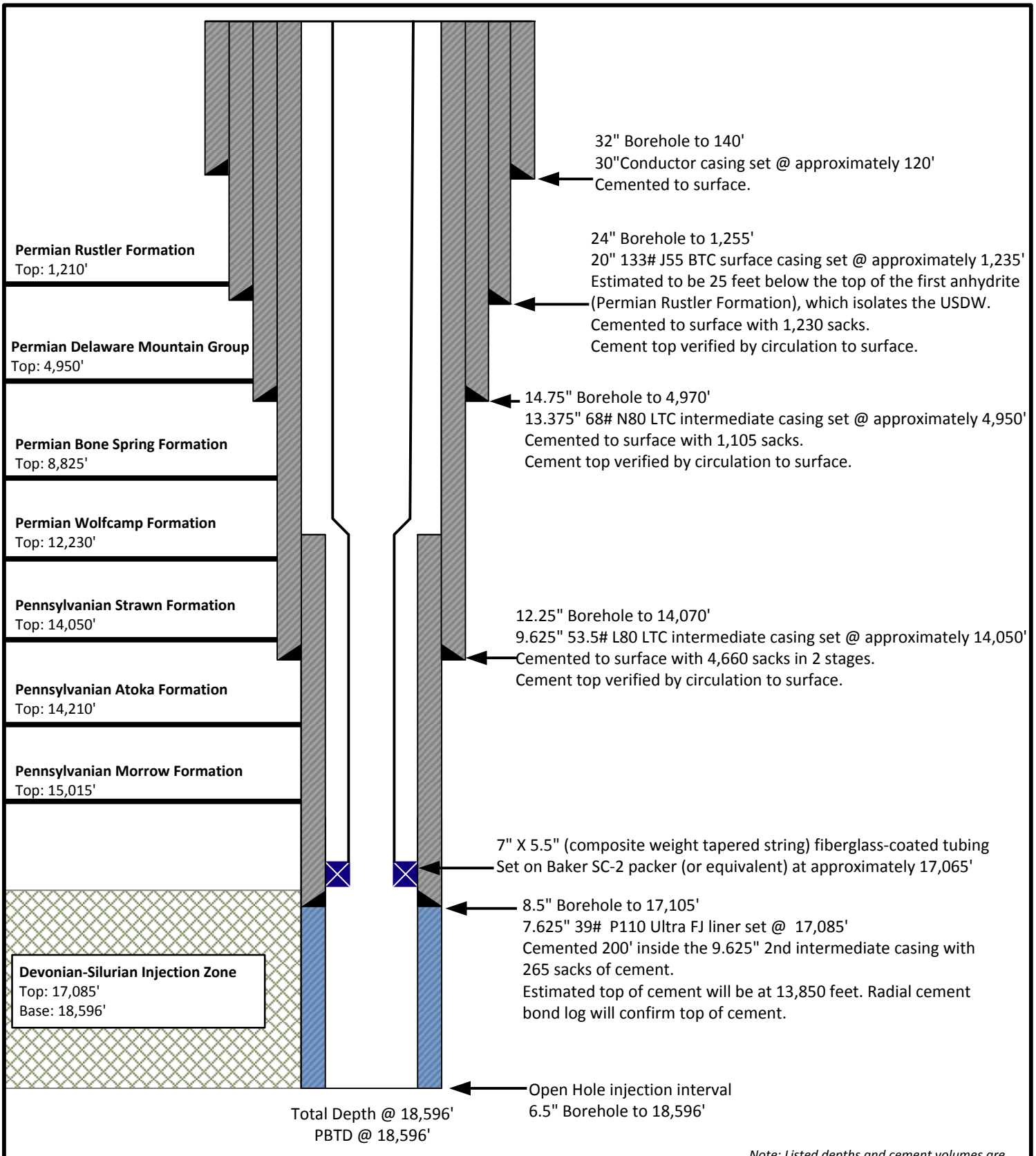
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

NOVEMBER 14, 2019
Date of Survey

Signature and Seal of Professional Surveyor:

TIM C. PAPPAS
NEW MEXICO
21209
REGISTERED PROFESSIONAL SURVEYOR

Job No.: SEL.190001
TIM C. PAPPAS, NM P.L.S.
NO.21209



Note: Listed depths and cement volumes are approximates based on available information. All cement calculations use yield of 1.18 cubic foot per sack and include 25% excess.

NOT TO SCALE

Prepared by: ALL CONSULTING	Drawn by: Joshua Ticknor	**Select Energy Services**
	Project Manager: Dan Arthur	Varys 1 Federal SWD #1
	Date: 11/14/2019	

1 Introduction

The SC-2™ packer is Baker Hughes, a GE company (BHGE)' primary packer for cased hole gravel pack and frac pack applications where a high performance retrievable packer is required.

2 Description

The SC-2 packer is a fully retrievable, high-performance retainer production packer. Although the packer was originally designed for premium gravel pack applications, it may also be used as a standard completion packer in wells where a premium retrievable production packer is required.

The SC-2 packer is fully compatible with standard BHGE sealing accessories, including retrievable and expendable plugs.

Refer to the specifications guide in the Packer Size/Model Availability Guide, Specification Guide, and Packer/Accessory Guide for SC™ and HP™ Packers (Product Family H48861), Unit 5750 under Sand Control Tools for packer/accessory size and packer size/model availability.

3 Application

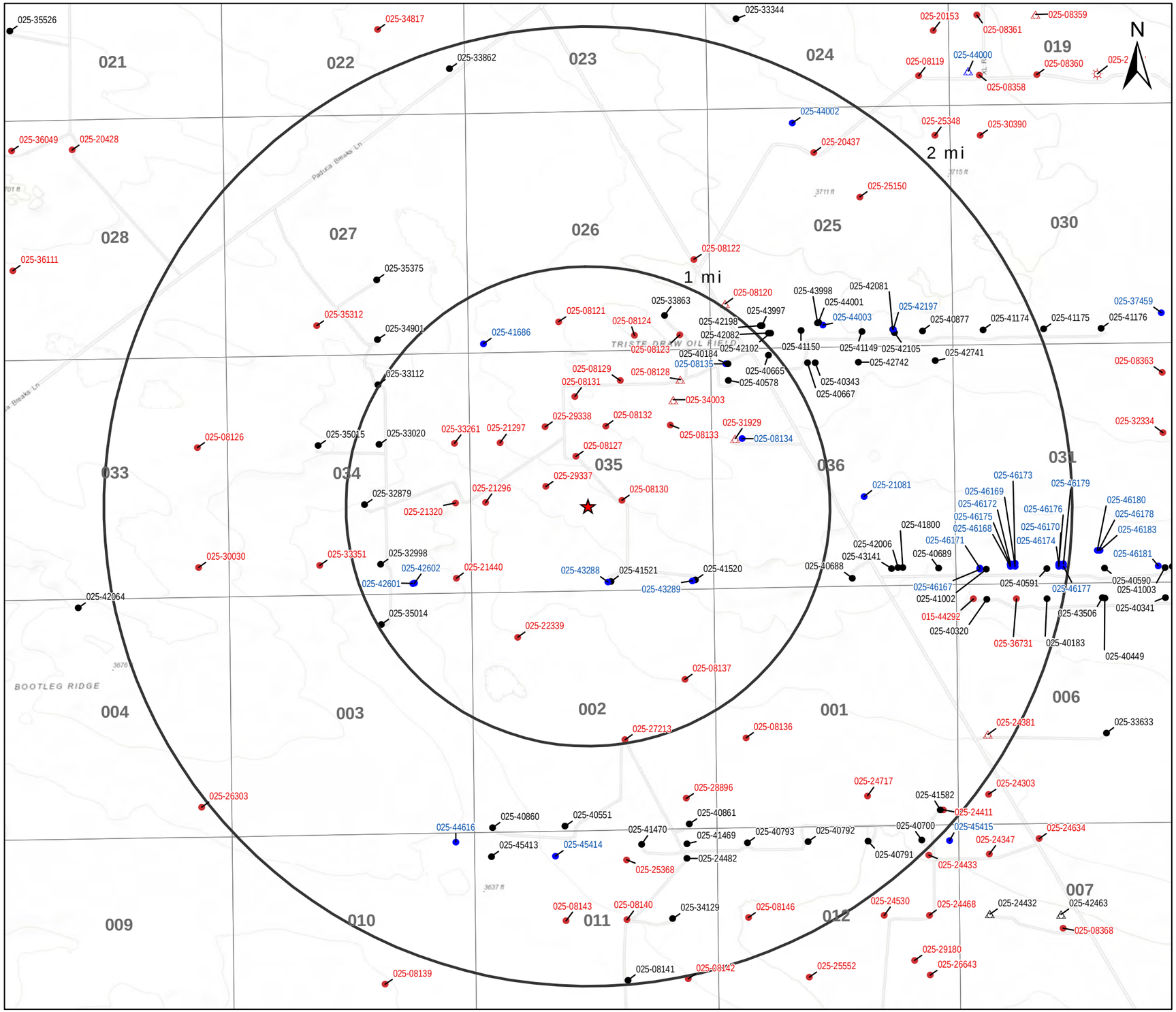
The SC-2 packer is primarily used in gravel pack or frac pack applications where a higher differential pressure production rating, treating pressure rating and temperature are required. The SC-2 may also be used as a production packer.

Drawing 662-476-1

Attachment 2

Area of Review Information:

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



0 0.5 1 2 Miles

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

Legend

- Proposed SWD
- Gas, Plugged (1)
- Oil, Active (67)
- Oil, New (31)
- Oil, Plugged (62)
- Salt Water Injection, Active (2)
- Salt Water Injection, New (1)
- Salt Water Injection, Plugged (6)

Source Info: NMOCD O&G Wells updated 7/30/2019 (http://www.emnrd.state.nm.us/OCD/ocdgis.html)

O&G Wells Area of Review

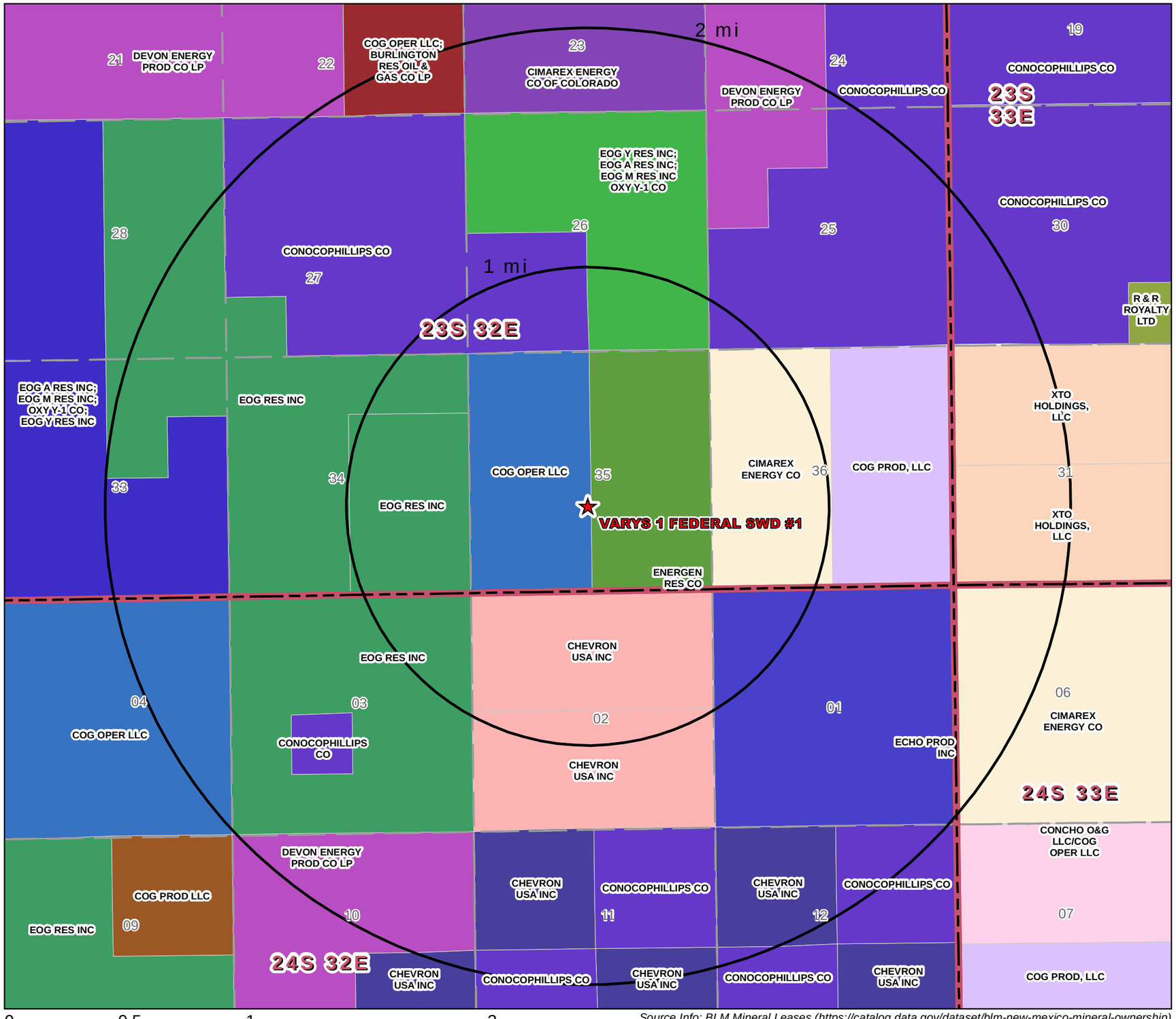
VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr: Dan Arthur	November 18, 2019	Mapped by: Ben Bockelmann

Prepared for: SELECT ENERGY SERVICES

Prepared by: ALL CONSULTING



Source Info: BLM Mineral Leases (https://catalog.data.gov/dataset/blm-new-mexico-mineral-ownership) & NMSLO O&G Leases (http://www.nmstatelands.org/maps-gis/gis-data-download/)

Legend

N

- Proposed SWD

BLM Mineral Leases

- CHEVRON USA INC
- CIMAREX ENERGY CO OF COLORADO
- COG OPER LLC
- COG OPER LLC; BURLINGTON RES OIL & GAS CO LP
- COG PROD LLC
- CONOCOPHILLIPS CO
- DEVON ENERGY PROD CO LP
- ECHO PROD INC
- ENERGEN RES CO
- EOG A RES INC; EOG M RES INC; OXY Y-1 CO; EOG Y RES INC
- EOG RES INC
- EOG Y RES INC; EOG A RES INC; EOG M RES INC OXY Y-1 CO
- R & R ROYALTY LTD

NMSLO Mineral Leases

- CHEVRON USA INC
- CIMAREX ENERGY CO
- COG PROD, LLC
- CONCHO O&G LLC/COG OPER LLC
- XTO HOLDINGS, LLC

Mineral Lease Area of Review

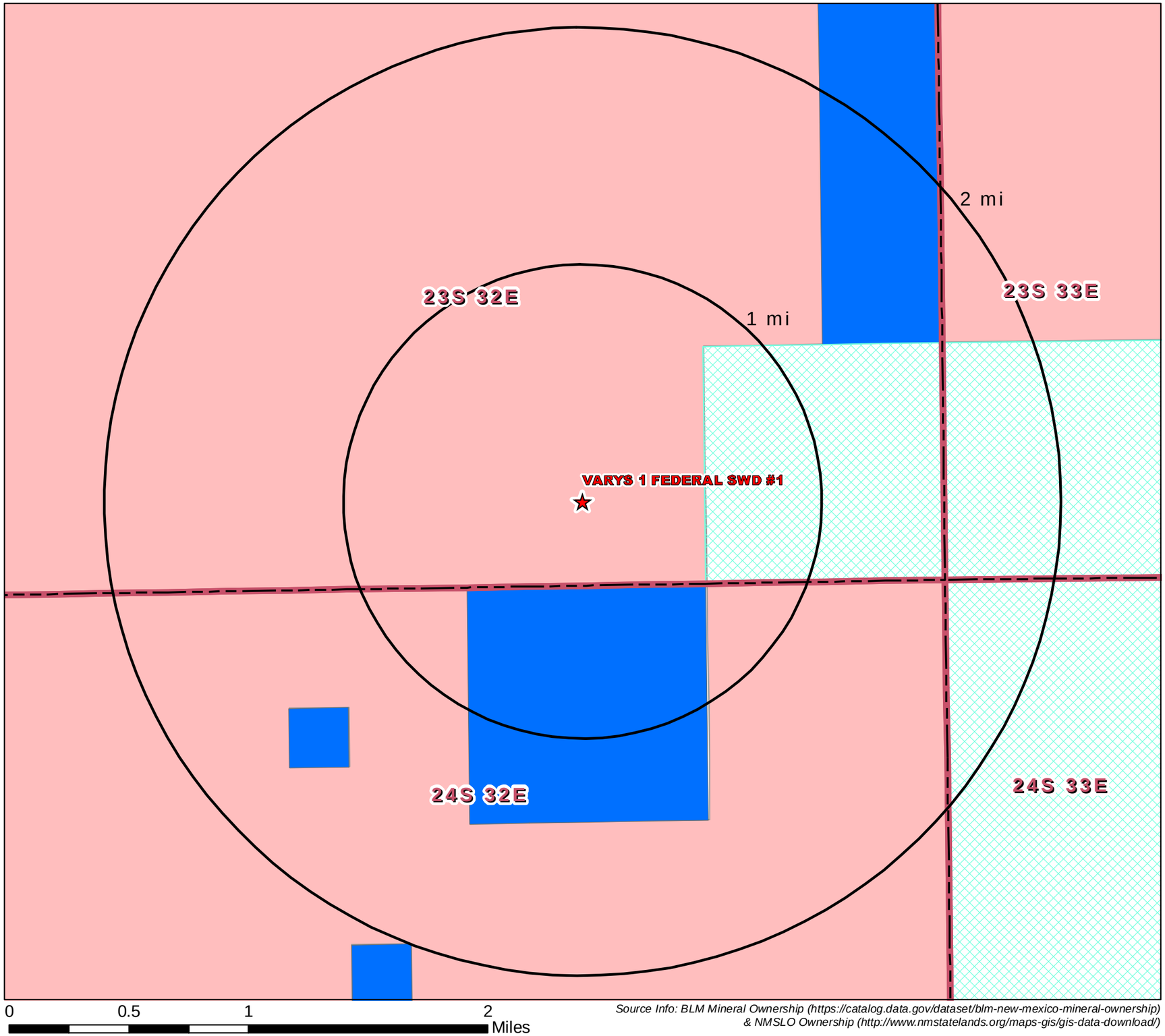
VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr: Dan Arthur	November 20, 2019	Mapped by: Ben Bockelmann

Prepared for: [redacted]

Prepared by: [redacted]



N

Legend

Proposed SWD

Mineral Ownership

- All minerals are owned by U.S. (BLM)
- Other minerals are owned by the U.S.
- Subsurface minerals (NMSLO)
- Surface and Subsurface minerals (NMSLO)
- Private minerals

Source Info: BLM Mineral Ownership (https://catalog.data.gov/dataset/blm-new-mexico-mineral-ownership) & NMSLO Ownership (http://www.nmstatelands.org/maps-gis/gis-data-download/)

Mineral Ownership
Area of Review

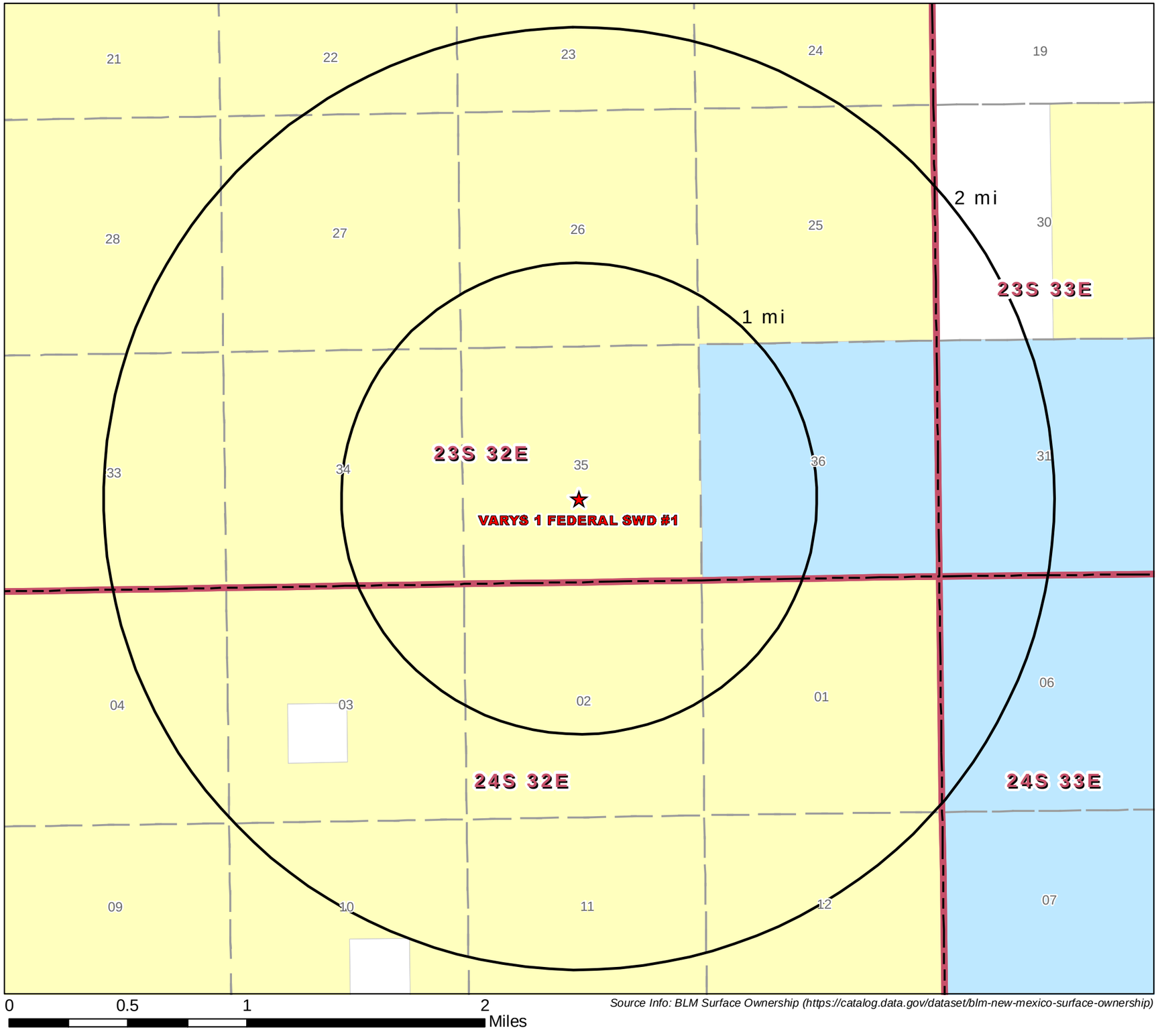
VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr: Dan Arthur	November 14, 2019	Mapped by: Ben Bockelmann

Prepared for: [redacted]

Prepared by: [redacted]



N

Legend

Proposed SWD

Surface Ownership

BLM

Private

State

Source Info: BLM Surface Ownership (https://catalog.data.gov/dataset/blm-new-mexico-surface-ownership)

Surface Ownership
Area of Review

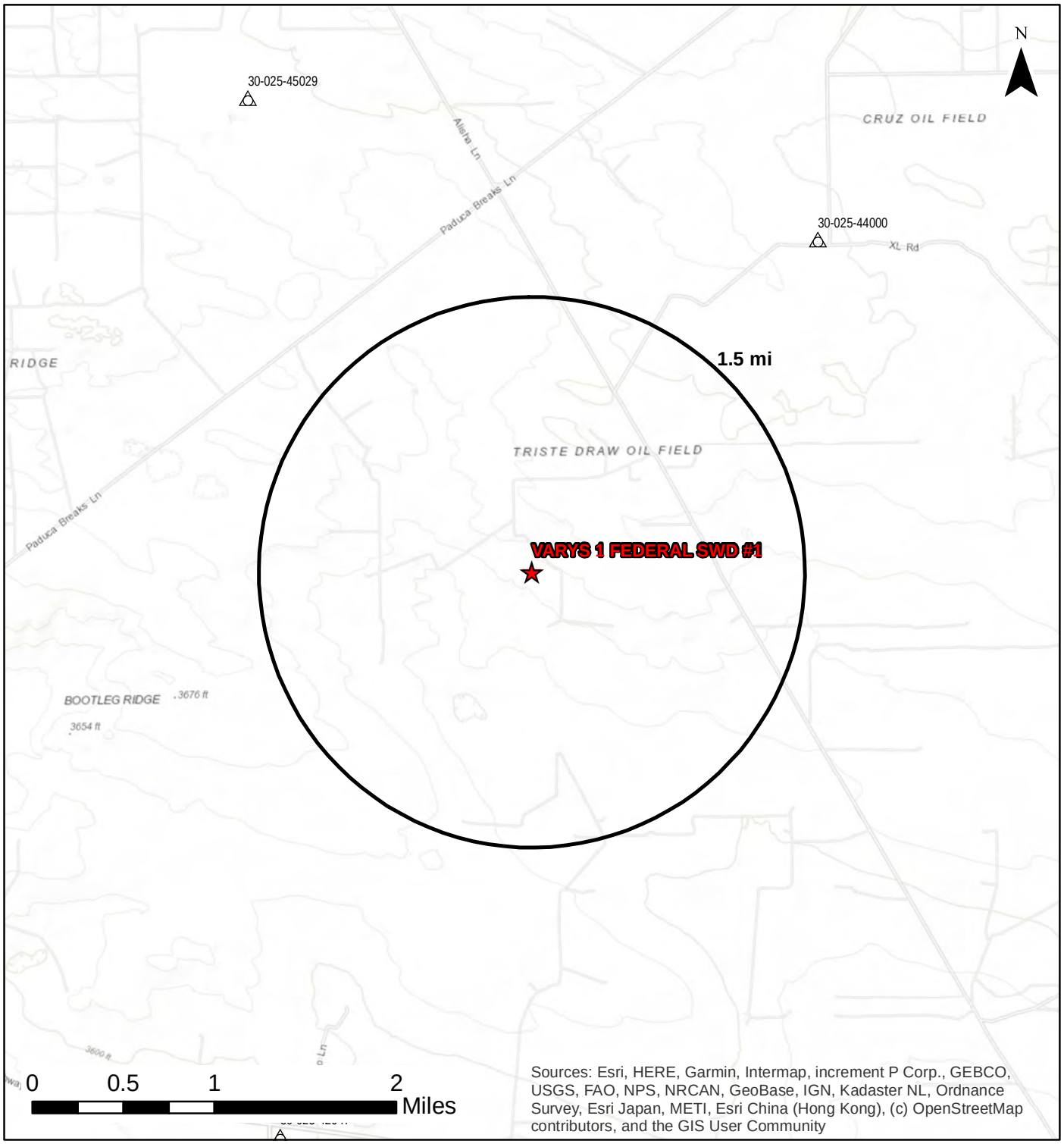
VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr: Dan Arthur	November 14, 2019	Mapped by: Ben Bockelmann

Prepared for: [redacted]

Prepared by: [redacted]



VARYS 1 FEDERAL SWD #1
Deep SWDs AOR

Proj Mgr: Dan Arthur	Nov 20, 2019	Mapped by: Ben Bockelmann

Prepared for: SELECT ENERGY SERVICES

Prepared by: ALL CONSULTING

Legend

★ Proposed SWD

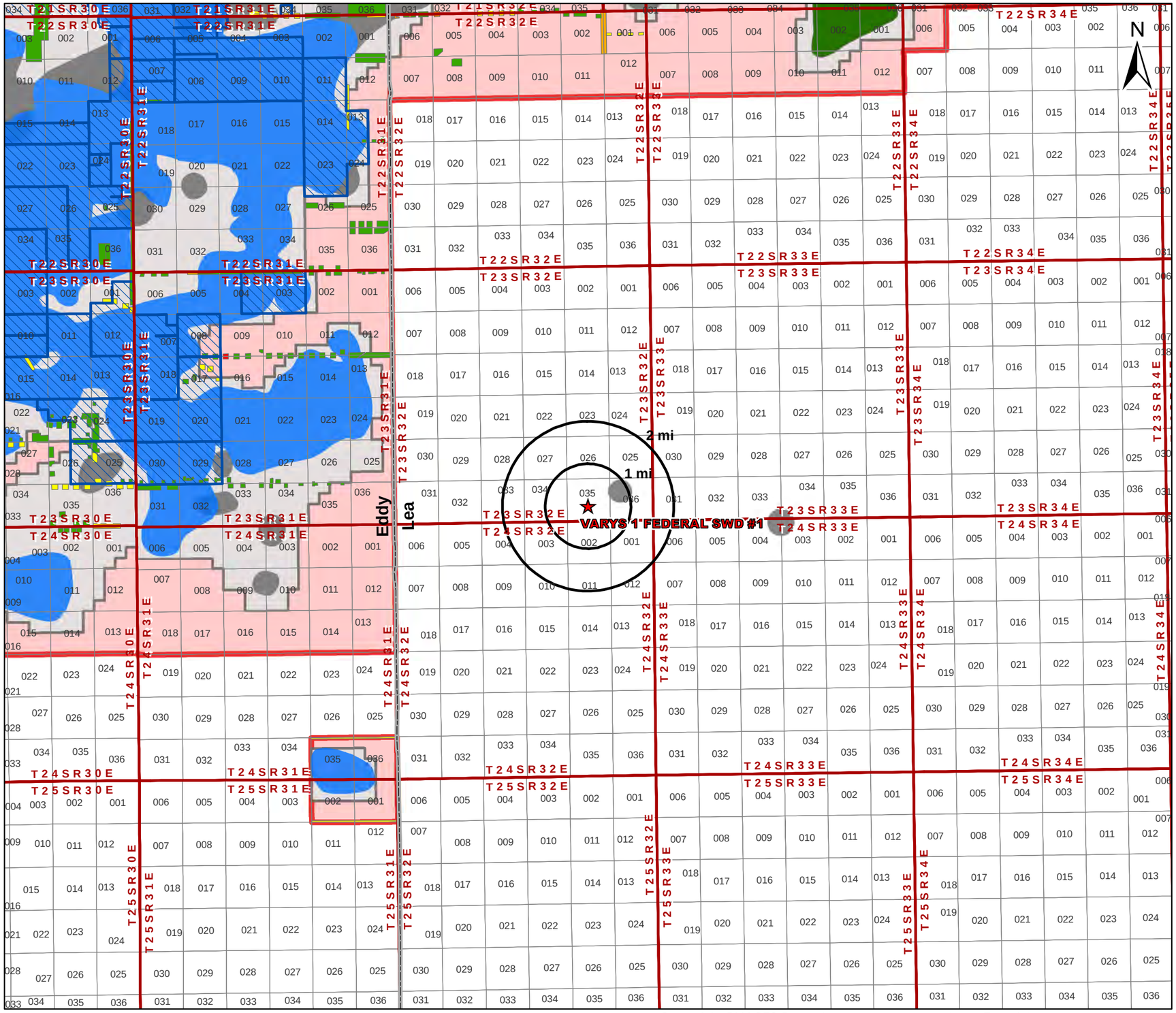
Devonian/Silurian SWDs

△ Salt Water Injection, Active (3)

Source Info: NMOCD O&G Wells updated 7/30/2019 (http://www.emnrd.state.nm.us/OCD/ocdgis.html)

AOR Tabulation for Varys 1 Federal SWD #1 (Top of Injection Interval: 17,085')							
Well Name	**API#**	**Well Type**	**Operator**	**Spud Date**	**Location (Sec., Tn., Rng.)**	**Total Vertical Depth (feet)**	**Penetrate Inj. Zone?**
COX 35 FEDERAL #001H	30-025-41520	O	CHEVRON U S A INC	7/22/2014	P-35-23S-32E	11009	No
COX 35 FEDERAL #002H	30-025-41521	O	CHEVRON U S A INC	1/11/2014	O-35-23S-32E	10927	No
COX 35 FEDERAL #004H	30-025-43288	O	CHEVRON U S A INC	Not Drilled	O-35-23S-32E	Proposed (9442)	No
COX 35 FEDERAL #003H	30-025-43289	O	CHEVRON U S A INC	Not Drilled	P-35-23S-32E	Proposed (9482)	No
TRISTE DRAW 36 STATE #001H	30-025-40184	O	CIMAREX ENERGY CO.	10/9/2011	D-36-23S-32E	9575	No
TRISTE DRAW 36 STATE #006	30-025-40578	O	CIMAREX ENERGY CO.	6/26/2012	D-36-23S-32E	11012	No
TRISTE DRAW 36 STATE #002H	30-025-40665	O	CIMAREX ENERGY CO.	1/22/2014	D-36-23S-32E	9849	No
RED RUBY 35 FEDERAL SWD #001	30-025-34003	O	ENERGEN RESOURCES CORPORATION	7/27/1997	A-35-23S-32E	Plugged (9100)	No
DIAMONDTAIL 34 FEDERAL #001	30-025-32879	O	EOG RESOURCES INC	3/19/1995	J-34-23S-32E	10215	No
DIAMONDTAIL 34 FEDERAL #002	30-025-32998	O	EOG RESOURCES INC	6/21/1995	O-34-23S-32E	10210	No
DIAMONDTAIL 34 FEDERAL #003	30-025-33020	O	EOG RESOURCES INC	9/22/1995	G-34-23S-32E	10150	No
DIAMONDTAIL 34 FEDERAL #004	30-025-33261	O	EOG RESOURCES INC	1/31/1996	H-34-23S-32E	Plugged (10200)	No
PARSLEY ARA FEDERAL #001	30-025-33863	O	EOG RESOURCES INC	2/28/1997	P-26-23S-32E	10325	No
DIAMONDTAIL 3 FEDERAL #001	30-025-35014	O	EOG RESOURCES INC	5/30/2000	2-03-24S-32E	9000	No
PARSLEY ARA FEDERAL COM #005H	30-025-41686	O	EOG RESOURCES INC	Not Drilled	M-26-23S-32E	Proposed (10883)	No
PEGASUS 34 FEDERAL #001H	30-025-42601	O	EOG RESOURCES INC	Not Drilled	P-34-23S-32E	Proposed (11030)	No
PEGASUS 34 FEDERAL #002H	30-025-42602	O	EOG RESOURCES INC	Not Drilled	P-34-23S-32E	Proposed (11030)	No
PRE-ONGARD WELL #003	30-025-21296	O	PRE-ONGARD WELL OPERATOR (A.G. McCarver)	8/6/1965	L-35-23S-32E	Plugged (5026)	No
PRE-ONGARD WELL #004	30-025-21297	O	PRE-ONGARD WELL OPERATOR (A.G. McCarver)	8/30/1965	E-35-23S-32E	Plugged (5050)	No
PRE-ONGARD WELL #001	30-025-08134	O	PRE-ONGARD WELL OPERATOR (David Fasken)	Not Drilled	E-36-23S-32E	Proposed (5206)	No
PRE-ONGARD WELL #003	30-025-08123	O	PRE-ONGARD WELL OPERATOR (Gene A. Snow)	3/26/1962	P-26-23S-32E	Plugged (5144)	No
PRE-ONGARD WELL #004	30-025-08124	O	PRE-ONGARD WELL OPERATOR (Gene A. Snow)	4/5/1962	O-26-23S-32E	Plugged (5105)	No
PRE-ONGARD WELL #001	30-025-27213	O	PRE-ONGARD WELL OPERATOR (HMH Operators)	2/13/1981	J-02-24S-32E	Plugged (5005)	No
PRE-ONGARD WELL #001	30-025-08121	O	PRE-ONGARD WELL OPERATOR (J.B. Palmer & A.G. McCarver)	4/10/1961	N-26-23S-32E	Plugged (5080)	No
PRE-ONGARD WELL #002	30-025-08129	O	PRE-ONGARD WELL OPERATOR (J.B. Palmer & A.G. McCarver)	Unknown*	B-35-23S-32E	Plugged (5145)	No
PRE-ONGARD WELL #003	30-025-08130	O	PRE-ONGARD WELL OPERATOR (J.B. Palmer & A.G. McCarver)	Unknown*	J-35-23S-32E	Plugged (5110)	No
PRE-ONGARD WELL #002	30-025-08133	O	PRE-ONGARD WELL OPERATOR (John H. Trigg)	1/14/10/1962	H-35-23S-32E	Plugged (5105)	No
PRE-ONGARD WELL #001	30-025-08135	O	PRE-ONGARD WELL OPERATOR (Penroc Oil Corporation and D.B. Baxter)	Not Drilled	D-36-23S-32E	Proposed (5190)	No
PRE-ONGARD WELL #001	30-025-22339	O	PRE-ONGARD WELL OPERATOR (T.F. Hodge)	11/16/1967	4-02-24S-32E	Plugged (4964)	No
PRE-ONGARD WELL #001	30-025-08137	O	PRE-ONGARD WELL OPERATOR (Texaco Inc.)	6/19/1961	H-02-24S-32E	Plugged (5061)	No
PRE-ONGARD WELL #001	30-025-08132	O	PRE-ONGARD WELL OPERATOR (Union Oil Company of California)	Unknown*	G-35-23S-32E	Plugged (5110)	No
PRE-ONGARD WELL #001	30-025-21320	O	PRE-ONGARD WELL OPERATOR (Union Oil Company of California)	6/16/1965	I-34-23S-32E	Plugged (5080)	No
PRE-ONGARD WELL #001	30-025-21440	O	PRE-ONGARD WELL OPERATOR (Union Oil Company of California)	9/18/1965	P-34-23S-32E	Plugged (5039)	No
PAYNE FEDERAL #001	30-025-08127	O	TEMPO ENERGY INC	5/20/1961	F-35-23S-32E	Plugged (5092)	No
JAMES FEDERAL #001	30-025-08128	S	TEMPO ENERGY INC	2/10/1961	A-35-23S-32E	Plugged (5200)	No
PAYNE FEDERAL #002	30-025-08131	O	TEMPO ENERGY INC	Unknown*	C-35-23S-32E	Plugged (5074)	No
PAYNE FEDERAL #004	30-025-29337	O	TEMPO ENERGY INC	7/31/1985	K-35-23S-32E	Plugged (5030)	No
PAYNE FEDERAL #005	30-025-29338	O	TEMPO ENERGY INC	8/14/1985	F-35-23S-32E	Plugged (5057)	No

Notes: No wells within the 1-mile AOR penetrate the injection interval.
Unknown* - Data was not available from the NMOCD Imaging - Well Files Data Base.



Legend

- Proposed SWD
- Potash Leases
- Ore Type - Measured
- Ore Type - Indicated
- Ore Type - Inferred
- KPLA
- SOPA

Drill Islands

Status

- Approved
- Denied
- Nominated
- Withdrawn

Source Info: BLM CFO Potash (https://www.nm.blm.gov/shapeFiles/cfo/carlsbad_spatial_data.html)

Potash Leases
Area of Review

VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr: Dan Arthur	November 20, 2019	Mapped by: Ben Bockelmann

Prepared for: SELECT ENERGY SERVICES

Prepared by: ALL CONSULTING

Attachment 3

Source Water Analyses

PRDUCED WATER FROM BONE SPRING, DELAWARE, DEVONIAN, WOLFCAMP

API	SECTION	TOWNSHIP	RANGE	FORMATION	tds mgL	chloride mgL	bicarbonate mgL	sulfate mgL
3002502424	11	20S	34E	BONE SPRING	29436	16720	634	1142
3002502427	12	20S	34E	BONE SPRING	15429			
3002502427	12	20S	34E	BONE SPRING	180701	108300	1016	670
3002502429	12	20S	34E	BONE SPRING	202606	118100	5196	992
3002502429	12	20S	34E	BONE SPRING	121800			
3002502431	12	20S	34E	BONE SPRING	147229	89640	108	1038
3002531696	2	20S	34E	DELAWARE	152064	102148	404	691
3002532105	2	20S	34E	DELAWARE	296822	215237	143	294
3002532466	2	20S	34E	DELAWARE	340838	245270	229	147
3002502427	12	20S	34E	DELAWARE	214787	132700	208	1816
3002502431	12	20S	34E	DEVONIAN	33414	18570	227	1961
3002502432	13	20S	34E	DEVONIAN	45778	26440	1145	729
3002501912	16	16S	34E	WOLFCAMP	164004	102500	4204	1249
3002501922	20	16S	34E	WOLFCAMP	104541	64290	280	541
3002501922	20	16S	34E	WOLFCAMP	104033	64080	268	515
3002501922	20	16S	34E	WOLFCAMP	105175	65570	207	192
3002501925	21	16S	34E	WOLFCAMP	86355	51800	610	665
3002501928	21	16S	34E	WOLFCAMP	119102	73300	227	454
3002501928	21	16S	34E	WOLFCAMP	35422	19170	979	1949
3002501930	22	16S	34E	WOLFCAMP	30015	14800	750	3300
3002501931	22	16S	34E	WOLFCAMP	87680	53000	301	681
3002501933	28	16S	34E	WOLFCAMP	59960	35100	515	1500
3002501933	28	16S	34E	WOLFCAMP	60309	35350	586	1297
3002501940	30	16S	34E	WOLFCAMP	82422	49890	361	787
3002501944	30	16S	34E	WOLFCAMP	83960	51410	418	641
3002520222	27	16S	34E	WOLFCAMP	85457	51020	544	1201
3001542895	2	23S	31E	WOLFCAMP	119472	73173		1036

EXHIBIT F

Attachment 4

Injection Formation Water Analyses

Injection Formation Water Analysis

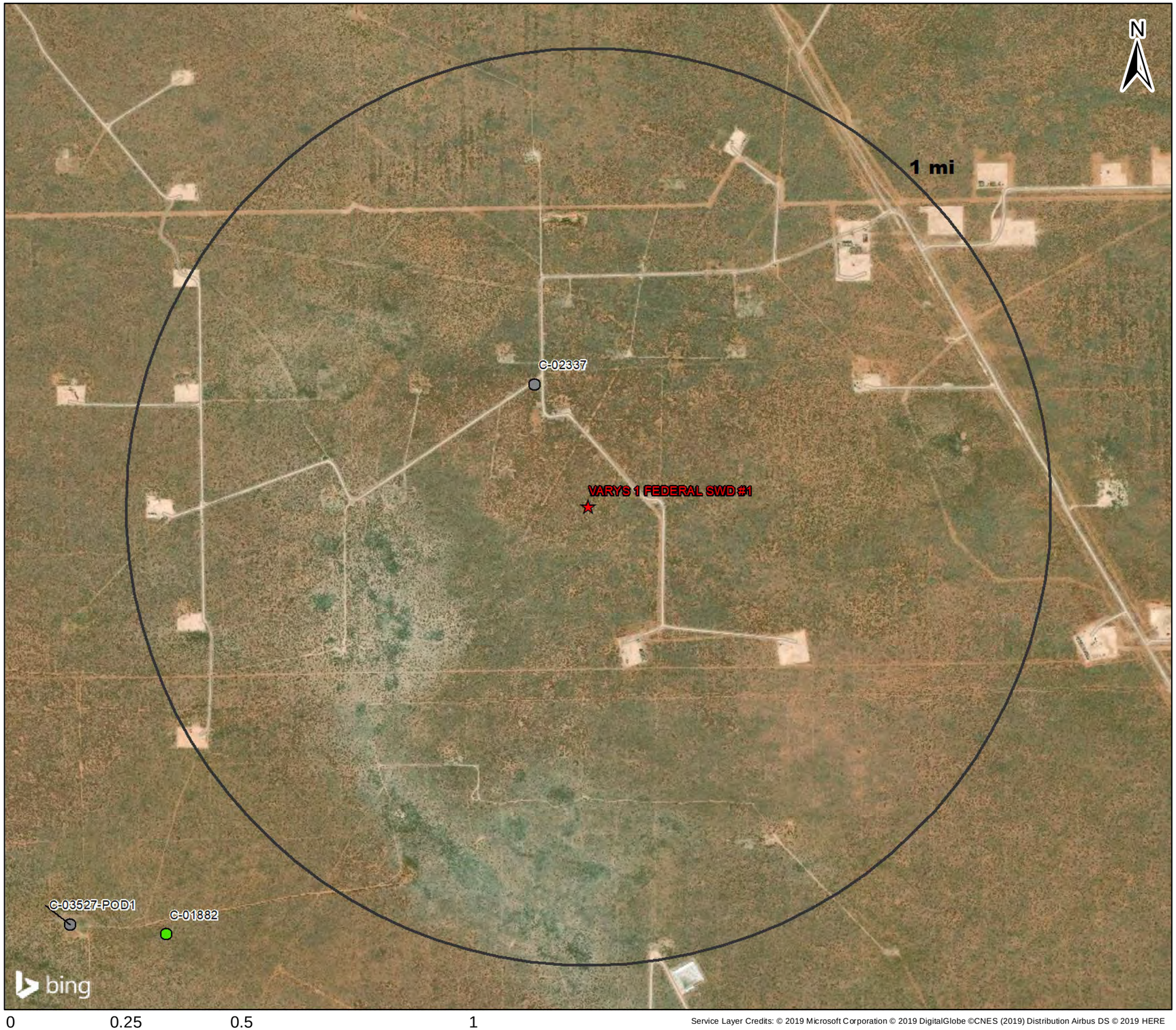
Select Energy Services - Devonian , Fusselman & Silurian formations

Wellname	API	Latitude	Longitude	Section	Township	Range	Unit	ftgns	ftgew	County	State	company	Field	Formation	Depth	tds_mgL	chloride_mgL	bicarbonate_mgL	sulfate_mgL
FARNSWORTH FEDERAL #006	3002511950	32.0777245	-103.162468	4	26S	37E	A	660N	990E	LEA	NM		CROSBY	DEVONIAN		31,931	20,450	302	591
ARNOTT RAMSAY NCT-B #003	3002511863	32.0922279	-103.1784439	32	25S	37E	A	660N	660E	LEA	NM		CROSBY	DEVONIAN	8797		100,382	476	
STATE NJ A #001	3002511398	32.1647491	-103.1273346	2	25S	37E	A	663N	660E	LEA	NM		JUSTIS NORTH	DEVONIAN		105,350	59,300	660	4,950
COPPER #001	3002511818	32.0994835	-103.1656723	28	25S	37E	J	1980S	1981E	LEA	NM		CROSBY	DEVONIAN		27,506	15,270	1,089	1,079
ARNOTT RAMSAY NCT-B #003	3002511863	32.0922279	-103.1784439	32	25S	37E	A	660N	660E	LEA	NM		CROSBY	DEVONIAN		158,761			
BELL LAKE UNIT #006	3002508483	32.3282585	-103.507103	6	23S	34E	O	660S	1980E	LEA	NM		BELL LAKE NORTH	DEVONIAN		71,078	42,200	500	1,000
CLINE FEDERAL #001	3002510717	32.3025551	-103.1358261	14	23S	37E	K	1980S	1980W	LEA	NM		CLINE	DEVONIAN		118,979	71,280	462	2,593
E C HILL B FEDERAL #001	3002510945	32.2658463	-103.1443634	34	23S	37E	A	810N	660E	LEA	NM		TEAGUE	DEVONIAN		112,959	67,390	288	2,765
E C HILL D FEDERAL #001	3002510947	32.2622147	-103.1443634	34	23S	37E	H	2131N	660E	LEA	NM		TEAGUE	DEVONIAN		35,639			
E C HILL D FEDERAL #004	3002510950	32.2653503	-103.1443634	34	23S	37E	A	990N	660E	LEA	NM		TEAGUE	DEVONIAN		236,252	147,000	129	781
ANTELOPE RIDGE UNIT #003	3002521082	32.2593155	-103.4610748	34	23S	34E	K	1980S	1650W	LEA	NM		ANTELOPE RIDGE	DEVONIAN		80,187	47,900	476	900
REMUDA BASIN UNIT #001	3001503691	32.2886238	-103.9360428	24	23S	29E	J	1980S	1980E	EDDY	NM		REMUDA	DEVONIAN		64,582	37,500	610	1,700
REMUDA BASIN UNIT #001	3001503691	32.2886238	-103.9360428	24	23S	29E	J	1980S	1980E	EDDY	NM		REMUDA	DEVONIAN		56,922	29,000	1,740	4,980
STATE B COM #001	3002509716	32.1794052	-103.2212524	36	24S	36E	C	600N	1880W	LEA	NM		CUSTER	DEVONIAN		176,234	107,400	128	1,004
WHITE CITY PENN GAS COM UNIT 1 #001	3001500408	32.1937523	-104.3088455	29	24S	26E	A	660N	660E	EDDY	NM			DEVONIAN			10,120	653	1,336
BIG EDDY UT #001	3001502475	32.4421539	-104.042305	36	21S	28E	C	660N	1980W	EDDY	NM			DEVONIAN		16,223	7,000	1,030	2,290
BIG EDDY UT #001	3001502475	32.4421539	-104.042305	36	21S	28E	C	660N	1980W	EDDY	NM			DEVONIAN		19,941	10,700	640	1,130

Source: http://gotech.nmt.edu/gotech/Water/producedwater.aspx

Attachment 5

Water Well Map and Well Data



Legend

- Proposed SWD

NMOSE PODs

Status

- Active (0)
- Pending (1)
- Change Location of Well (0)
- Capped (0)
- Plugged (0)
- Incomplete (0)
- Unknown (2)

Water Wells Area of Review

VARYS 1 FEDERAL SWD #1

Lea County, New Mexico

Proj Mgr:		Mapped by:
Dan Arthur	November 14, 2019	Ben Bockelmann

Prepared for: SELECT ENERGY SERVICES

Prepared by: ALL CONSULTING

Water Well Sampling Rationale							
Select Energy Services - Varys 1 Federal SWD #1							
SWD	**Water Wells**	**Owner**	**Available Contact Information**	**Use**	**Sampling Required**	**Location**	**Notes**
Varys 1 Federal SWD #1	C 02337	Brininstool Xl Ranch LLC	Christine Brininstool 1523 Butler Rd San Angelo Texas 76904	Livestock Water	No	Coordinates: (32.262932, -103.647543) Legal: (SE 1/4 NW 1/4 S35 T23S R32E)	Letter sent vie certified mail to request permission to sample. All available phone numbers for Christine Brininstool were disconnected.
		Bureau of Land Management	Brad Winger 575-234-5942				10-18-2019 Spoke With Brad Winger from the Carlsbad field office (Range), he is reaching out to the grazing lease holder to confirm if the well is active.
		NGL Water Solution permian LLC	Charles R Wilkin 918-236-4757				Call places to Charles R Wilkins on 10-18-2019, left a voicemail.
		Hughes Properties LLC	Trey Hughes Phone: 575-236-6012 Cell: 575-361-3217 Email: Tray@bandrinc.com Address: 4501 Grandi Rd. Carlsbad, NM 88220				Email sent to Trey Hughes requesting permission to sample well C 02337. Mr. Hughes granted permission to sample. The water sampling team met with Mr.Hughes ranch forman, who informed the team of were the water well and pump was located. The ranch forman also informed the team that while the well may be operational, it is piped directly into a water storage tank and there is no access to the tank for sampling. Additional the ranch forman stated that the water well has never been used by Mr. Hughes. After conversations with the Hughes ranch forman, this well was designated as not being an active water well, as the well has not been used by Mr. Hughes and there is no available access to sample the well.
Notes:							

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

November 21, 2019

Buck Jackson
P.O. Box 671
Pecos, TX 79772

Subject: Permission to Sample Water Well C-0002337

Mr. Jackson:

My name is Oliver Seekins and I work for ALL-Consulting, an environmental consulting firm out of Tulsa, Oklahoma. As part of the requirements to file a C-108 application with the New Mexico Oil Conservation Division, we are writing to you to request additional information pertaining to a water well that you own. Please confirm the status of the water well listed below (Active – has a functioning pump currently installed at the well; Non-active – water is removed by a manual system, or the well is not in use) and indicate if the well produces freshwater well.

- C-002337 (SE ¼ NW ¼ S35 T23S R32E)

If the water well is operational and producing freshwater, we would like to request permission to collect or have a third-party water sampling company collect a sample.

Please let me know if you need further information, or if there are any questions.

Sincerely,
ALL Consulting

Oliver W. Seekins

Oliver W. Seekins
Consultant
Email: Oseekins@all-llc.com
Work: 918-382-7581
Cell: 918-805-5037

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Attachment 6

Induced Seismicity Assessment Letter

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GOVERNMENT RELATIONS · ENERGY · PLANNING · TECHNOLOGY
ENGINEERING · ENVIRONMENTAL

November 21, 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 Varys 1 Federal SWD #1

Dear Mr. Goetze,

This letter provides information regarding the seismic potential associated with injection operations associated with Select Energy Services, LLC (Select), proposed Varys 1 Federal SWD #1, hereinafter referred to as the "Subject Well."

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

The Subject Well, is located 1,877 FSL & 2,577 FWL of Section 35, in T23-S and R32-E of Lea County, New Mexico. Historically, the Eddy and Lea Counties area has experienced very limited recorded seismic activity (per the U.S. Geological Survey [USGS] earthquake catalog database). There has been one known seismic events located within a 25-mile radius of the proposed Subject Well. The closest recorded seismic event was a M2.9 that occurred on December 4th, 1984, and was located approximately 5.3 miles east 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 3.4 miles to the southwest (See Exhibit 1).

Select does not own either 2D or 3D seismic reflection data in the area of the Subject Well. Publicly available fault data from USGS indicates that the closest known fault is approximately 7.7 miles east of the Subject Well (See Exhibit 1).

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

perturbation. The map in Exhibit 2 depicts the low probability risk of FSP for the Delaware Basin and Northwest Shelf areas (Snee and Zoback 2018).

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

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

Conclusion

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

Sincerely,
ALL Consulting

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

Enclosures
References
Exhibits

References

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

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

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

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

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

Exhibits

Induced Seismicity Potential Statement for the Varys 1 Federal SWD #1
November 21, 2019

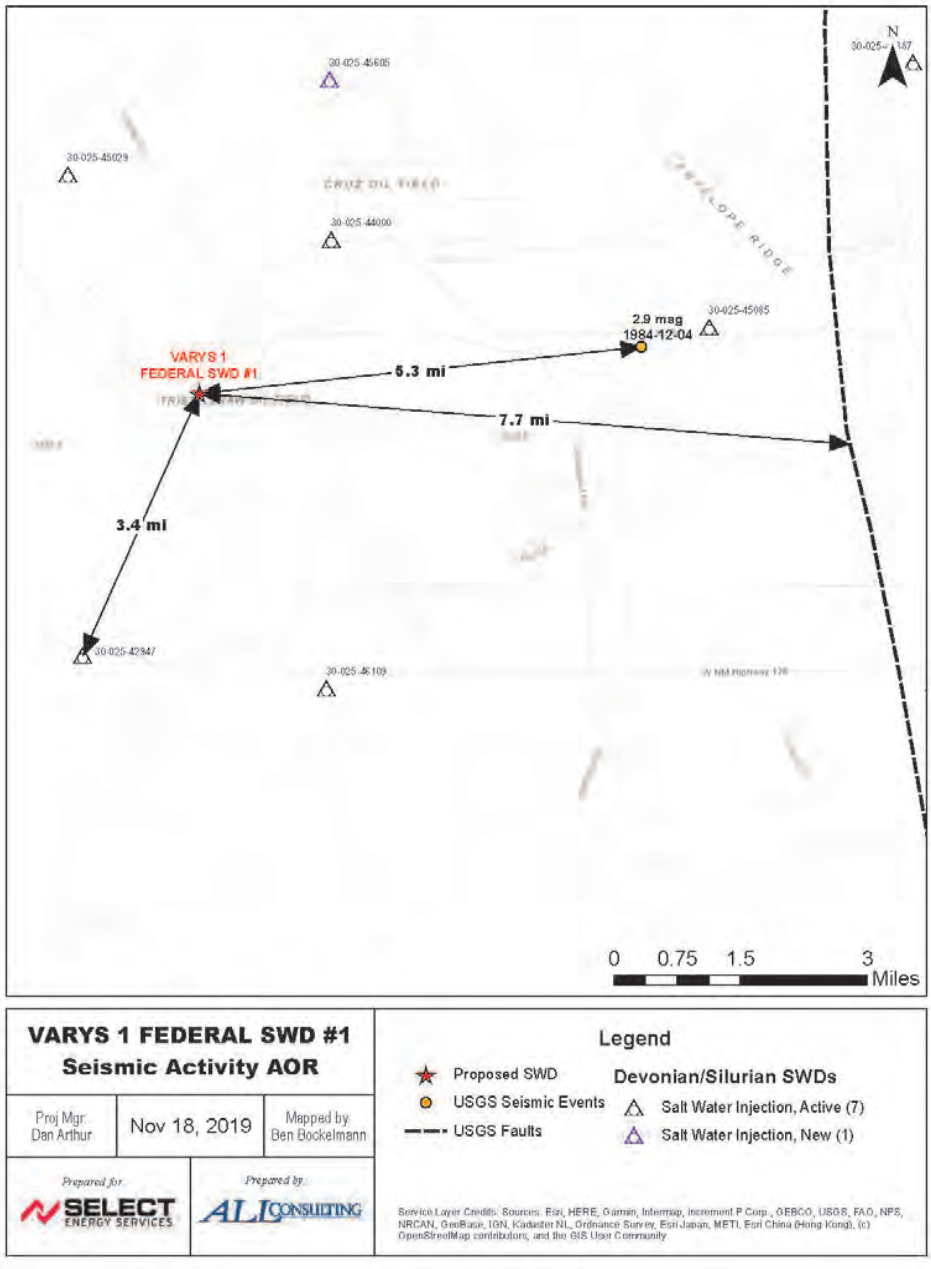

Exhibit 1. Map Showing the Distances from Known and Inferred Faults, Seismic Event, and Closest Deep Injection Well

Induced Seismicity Potential Statement for the Varys 1 Federal SWD #1
November 21, 2019

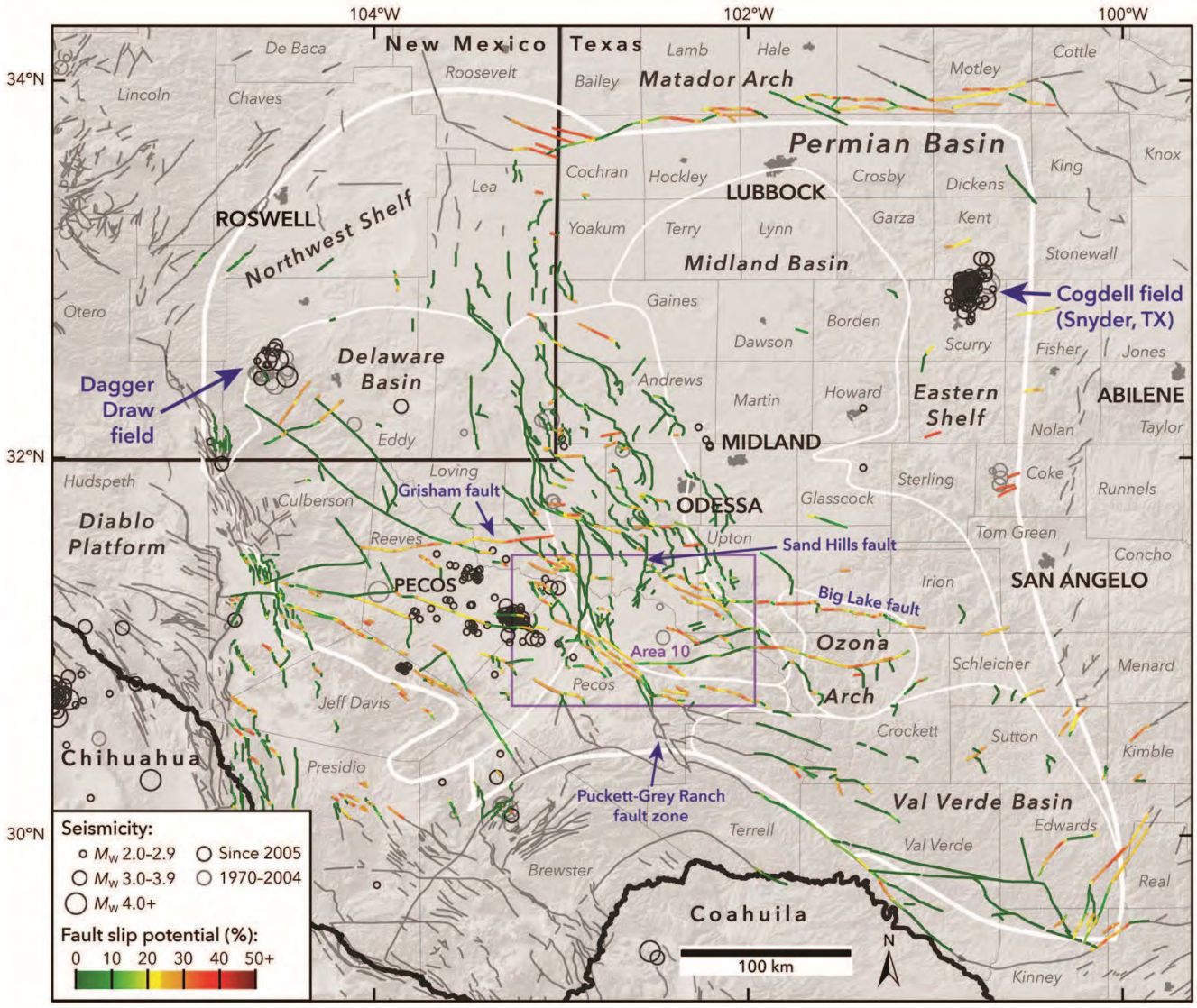

Exhibit 2. Results of the Snee and Zoback (2018) Probabilistic FSP Analysis Across the Permian Basin

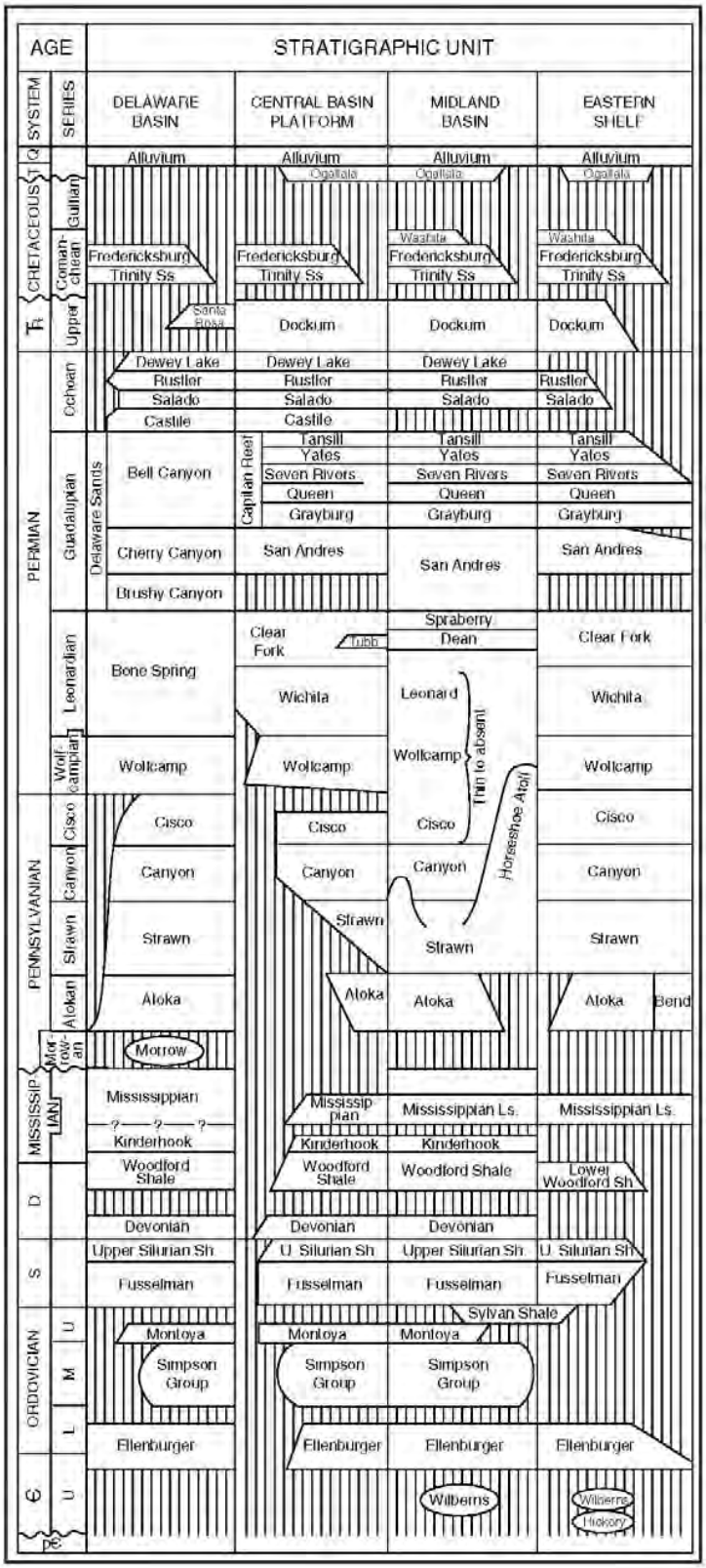

Exhibit 3. Delaware Basin Stratigraphic Chart (Ball 1995)

Attachment 7

Public Notice Affidavit and Notice of Application Confirmations

Varys 1 Federal SWD #1 - Notice of Application Recipients				
Entity	**Address**	**City**	**State**	**Zip Code**
Land & Mineral Owner				
New Mexico BLM	620 E Greene St.	Carlsbad	NM	88220
OCD District				
NMOCD District 1	1625 N. French Drive	Hobbs	NM	88240
Leasehold Operators				
Chevron USA Inc. (CHEVRON USA INC) (CHEVRON U S A INC)	6301 Deauville	Midland	TX	79706
Cimarex Energy Company (CIMAREX ENERGY CO.)	600 N. Marienfeld St., Suite 600	Midland	TX	79701
COG Operating, LLC (COG OPER LLC)	600 W. Illinois Ave.	Midland	TX	79701
Commission of Public Lands - State Land Office	310 Old Santa Fe Trail	Santa Fe	NM	87501
ConocoPhilips Company (CONOCOPHILLIPS CO)	P.O. Box 7500	Bartlesville	OK	74005
Echo Production, Inc. (ECHO PROD INC)	P.O. Box 1210	Graham	TX	76450
Energen Resources Corporation (ENERGEN RES CO)	605 Arrington Blvd. N.	Birmingham	AL	35203
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OXY Y-1 Company (OXY Y-1 CO)	P.O. Box 27570	Houston	TX	77227

Notes: The table above shows the Entities who were identified as parties of interest requiring notification on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2). The names listed above in parenthesis, are the abbreviated entity names used on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2).

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