Initial Application Part I

Received: **07/29/2019**

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

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
07/29/2019		SWD	pMAM1921055311

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: COG Operating, LLC **OGRID Number:** 229137
Well Name: Picklehaube 1 Fee SWD #1 **API:**
Pool: SWD; Devonian Silurian **Pool Code:** 97869

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

SWD-2212

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

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.

7/25/19
Date

Paul Porter
Print or Type Name

575-748-6940
Phone Number

Signature

PPorter@concho.com
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: COG Operating, LLC

ADDRESS: One Concho Center, 600 W. Illinois Ave., Midland, TX 79701

CONTACT PARTY: Paul Porter PHONE: 575-748-6940

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: Paul Porter Paul Porter TITLE: General Manager of New Mexico

SIGNATURE: DATE: 7/25/19

E-MAIL ADDRESS: PPorter@concho.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

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.

C-108 Application for Authorization to Inject
Picklehaube 1 Fee SWD 1
240' FSL, 2250' FWL
Unit N, Section 1, T25S, R34E
Lea County, NM

COG Operating, LLC, proposes to drill the captioned well to 20,300' for salt water disposal service into the Devonian/Silurian from approximately 18,050' to 20,300'.

Should this well undergo a mechanical integrity issue while in service in the future, it will be taken out of service immediately per UIC rules and repaired as quickly as possible. The water going to this well will be diverted to other SWD wells via pipeline if applicable; otherwise it will be trucked to other SWD wells. If necessary, producing wells serviced by this SWD well will be curtailed and/or shut-in until this well is repaired.

III. Well data is attached. A fishing risk assessment is attached.

IV. This is not an expansion of an existing project.

V. Map is attached.

VI. No wells within the 1 mile radius area of review penetrate the proposed injection zone.

VII. 1. Proposed average daily injection rate = 25,000 BWPD
Proposed maximum daily injection rate = 40,000 BWPD

2. Closed system

3. Proposed maximum injection pressure = 3610 psi
(0.2 psi/ft. x 18,050' ft.)

4. Source of injected water will be Delaware, Bone Spring and Wolfcamp produced water. No compatibility problems are expected. Analyses of Delaware, Bone Spring and Wolfcamp waters from analogous source wells are attached. An appropriate chemical treatment program will be put in place should scale formation become apparent.

VIII. The injection zone is the Devonian/Silurian, a mixture of non-hydrocarbon bearing limestone and dolomite from 18,050' to 20,300'. Any underground water sources will be shallower than 945', the estimated top of the Rustler Anhydrite. The estimated top of the Devonian is 18,250' and the Fusselman is 19,345'. The proposed permitted injection interval has been expanded upwards and downwards to account for geologic uncertainty.

IX. The Devonian/Silurian injection interval will be acidized with approximately 40,000 gals of 20 % HCl acid.

X. Well logs will be filed with the Division. Sections of open hole log across the Devonian from the Gulf Federal 1 located about 2.8 miles southeast in Unit D, Section 20, T25S, R35E are attached.

XI. There is one fresh water well within a mile of the proposed SWD well from the NMOSE records. Water analysis is attached for POD C-02401 located NE/4 NE/4 NW/4 Sec 1-25s-34e.

XII. After examining the available geologic and engineering data, no evidence was found of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

_____, Facilities Engineering Advisor, _____

A seismicity assessment is attached.

XIII. Proof of Notice is attached.

COG Operating LLC
Pickelhaube 1 Fee SWD #1
C-108 Attachment
May 23, 2019

Statement Regarding Seismicity and Disposal Well Location

COG Operating LLC interpreted faults based on licensed 3D seismic data in the area around our proposed SWD. Our investigation of the deep formations does not indicate nearby faults or structures in the immediate area that would increase the chances of induced seismicity.

A recent paper by Snee and Zoback titled, "State of Stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity", was published in the February 2018 edition of The Leading Edge. The authors evaluated the strike-slip probability of known Permian Basin faults. The nearest fault is located approximately 3.8 miles West of our proposed SWD (see map). The study predicts that this fault has a less than 10% probability of being critically stressed as to create an induced seismicity event. The primary reason for the low probability is the relationship of the strike of the fault to the regional maximum stress orientation (N 75 degrees E).

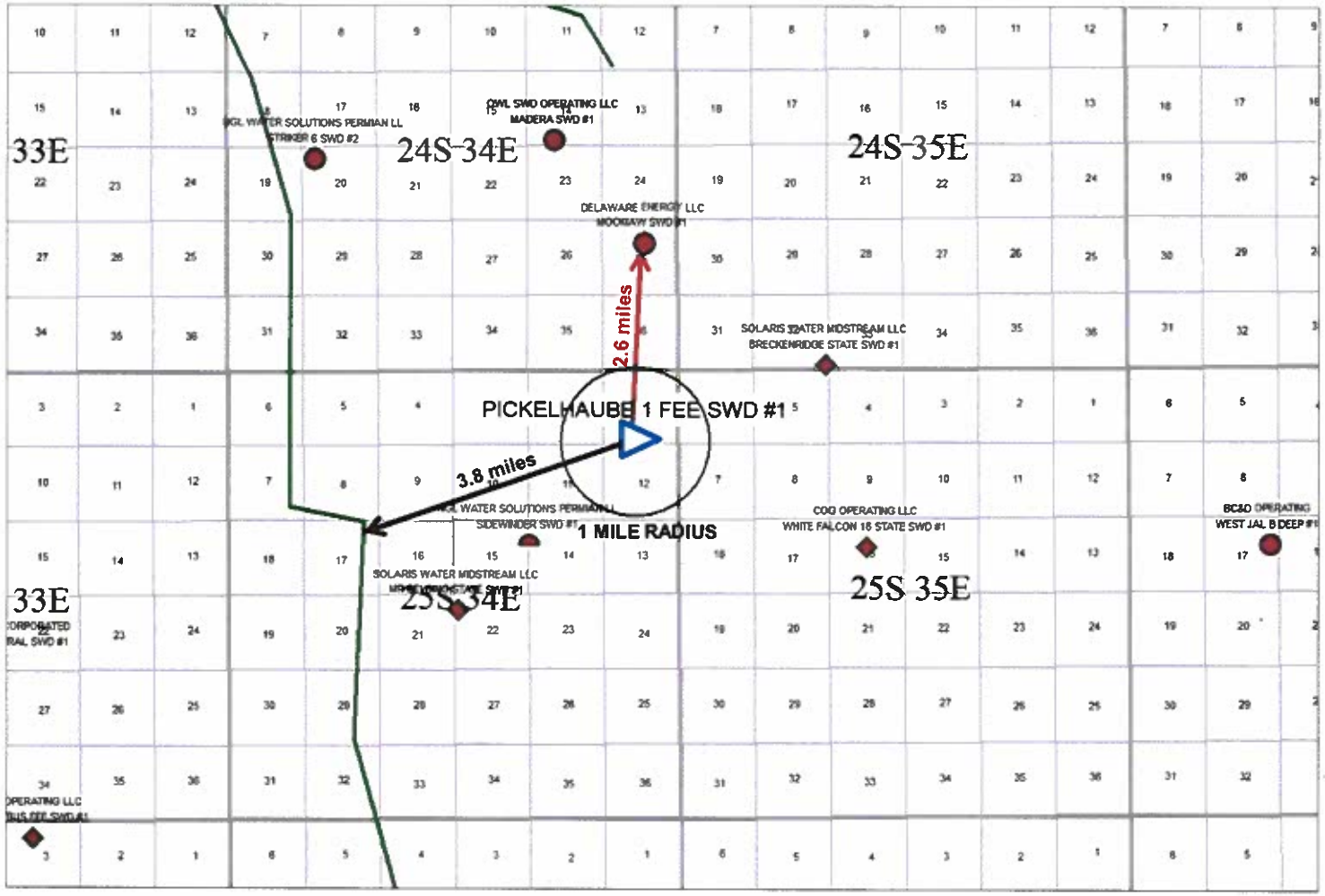
The proposed Pickelhaube 1 Fee SWD #1 is located 2.6 miles away from the nearest active Devonian SWD well (see map) and no active, permitted or pending Devonian SWD applications within the one mile radius.

Regards,

Carrie M. Martin

Staff Geologist
COG Operating LLC
cmartin@concho.com
432-221-0479

PICKELHAUBE 1 FEE SWD #1



LEGEND

Devonian SWD Status

- SWD
- PLUGGED
- ABANDONED
- DRILLING
- LOC
- TA
- PROPOSED SWD
- Snee, Zoback Faults (Low Fault Slip Potential)

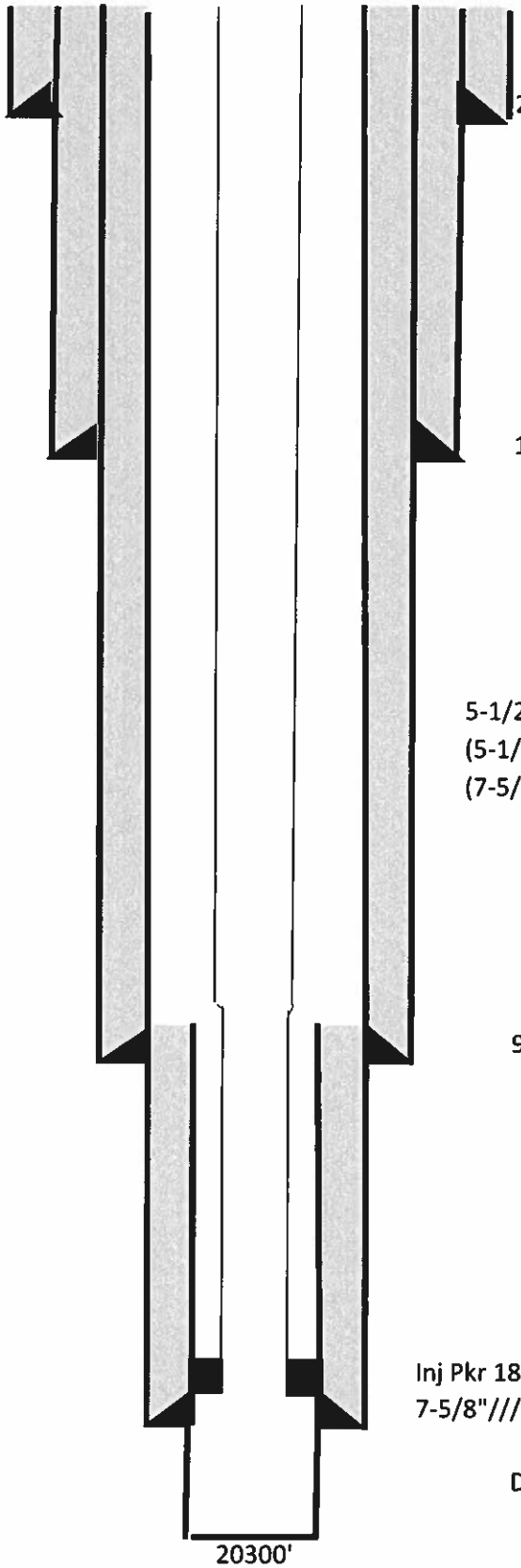
CONCHO

III.

WELL DATA

Picklehaube 1 Fee SWD 1
240' FSL, 2250' FWL
N-1-25s-34e
Lea, NM
30-025-xxxxx

Zero:
KB elev:
GL elev: 3405'



26"

20"/// @ 950'

2850 CF Cmt (circ to surf)
Rustler top 945'

17.5"

13-3/8"/// @ 5575'

7725 CF Cmt (circ to surf)
Top Lamar Lm 5550'

12.25"

5-1/2" x 5" Inj Tbg 0-18000'
(5-1/2" 0-12600' inside 9-5/8", 5" 12600-18000' inside 7-5/8")
(7-5/8" liner top 12700')

9-5/8"/// @ 12900'

6050 CF Cmt (circ to surf)
Top Wolfcamp 12706'

8.5"

Inj Pkr 18000'
7-5/8"/// FJ liner 12700-18050'

550 CF Cmt (circ to liner top)
Set in top Devonian

6.5"

Devonian/Silurian OH

20300'

kbcollins 1-May-19

INJECTION WELL DATA SHEET

Operator: COG Operating, LLC
Well Name & Number: Picklehaube 1 Fee SWD 1
Well Location: 240' FSL, 2250' FWL, Unit N, Section 1, T25S, R34E

Wellbore Schematic: See attached schematic

Surface Casing:

Hole Size: 26"
Casing Size: 20" @ 950'
Cemented with: 2850 cubic feet
Top of Cement: Surface by design

Intermediate Casing:

Hole Size: 17-1/2"
Casing Size: 13-3/8" @ 5575'
Cemented with: 7725 cubic feet
Top of Cement: Surface by design

Intermediate Casing:

Hole Size: 12-1/4"
Casing Size: 9-5/8" @ 12900'
Cemented with: 6050 cubic feet
Top of Cement: Surface by design

Production Casing:

Hole Size: 8-1/2"
Casing Size: 7-5/8" flush joint liner @ 12700-18050'
Cemented with: 550 cubic feet
Top of Cement: Liner top by design

Injection Interval:

18050' to 20300' (6-1/2" open hole)

Injection Tubing/Packer:

Tubing Size: 5-1/2" 0-12600' inside 9-5/8" casing, 5" from 12600-18000' inside 7-5/8" casing
Lining Material: Internally fiberglass lined
Type of Packer: Nickel plated or CRA 10K permanent packer
Packer Setting Depth: 18000'
Other Type of Tubing/Casing Seal: Not Applicable

Additional Data:

1. Is this a new well drilled for injection? Yes
   If no, for what purpose was well originally drilled? N/A

2. Name of Injection Formation: Devonian/Silurian

3. Name of Field or Pool (if applicable): SWD: Devonian

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. No

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

   Overlying: Possible Delaware 5700-9450', Bone Spring 9500-12700', Wolfcamp 12700-14200', possible Strawn 14425'+, possible Atoka 14600'+, possible Morrow 15460'+

   Underlying: None

Fishing Risk Assessment
Picklehaube 1 Fee SWD 1

Note: All fishing procedures are subject to well conditions. Expert judgement and experience are required and there are too many combinations of possible fishing operations options to list below. Fishing techniques are determined on a case-by-case, day-by-day basis.

5" Injection Tubing Inside of 7-5/8" Casing

7-5/8"/39ppf casing: ID = 6.625", Drift ID = 6.500"
5"/18ppf/L80/TCPC FG-lined injection tubing: Tube/body OD = 5.000", Cplg OD = 5.700"
Clearance between body OD of tubing and drift ID of casing = 1.500"

The proposed downhole configuration allows for effective, straightforward tubing fishing operations.

Tubing will have a floating seal assembly landed in seal bore extensions below the packer which will allow a simple straight pull to separate the tubing from the packer.

For washover operations:

- 6-3/8" washpipe: OD = 6.375", ID = 5.625", Drift ID = 5.500"
- OD of washpipe is less than drift ID of casing (6.500" drift ID vs 6.375" washpipe OD)
- Drift ID of washpipe is greater than OD of 5" tubing (5.500" drift ID vs 5.000" Tubing OD)
- Drift ID of washpipe is slightly less than coupling OD of 5" tubing (washpipe 5.500" drift ID vs 5.700" tubing coupling OD---0.200" difference). If necessary to wash over the coupling, would use a mill on the end of the washpipe to mill off the 0.200" dimensional difference in such a way:

    1. To allow a 6.625" Series 150 spiral grapple overshot turned down from 6.625" OD to 6.5" OD to catch the milled down coupling (mill coupling to 5.5" or less OD).
    2. To allow a 5.875" OD Series 150 spiral grapple overshot to catch the 5" body of the tubing (mill coupling to 5" tube OD).

For fishing operations with overshot:

- 5" tube/body can be fished with 5.875" OD Series 150 spiral grapple overshot (5.875" overshot OD vs 6.5" casing drift ID).
- 5.700" OD TCPC coupling can be milled down and fished as described above in "washover operations."

For fishing operations with spear:

- Fiberglass liner can be milled out, or torn out with a spear, to allow a releasable spear assembly to grasp the ID of the injection tubing.

Fishing Risk Assessment
Picklehaube 1 Fee SWD 1

Note: All fishing procedures are subject to well conditions. Expert judgement and experience are required and there are too many combinations of possible fishing operations options to list below. Fishing techniques are determined on a case-by-case, day-by-day basis.

5-1/2" Injection Tubing Inside of 9-5/8" Casing

9-5/8"/53.5 ppf casing: ID = 8.535", Drift ID = 8.379"
5-1/2"/20ppf/P110/TCPC FG-lined injection tubing: Tube/body OD = 5.500", Cplg OD = 6.250"
Clearance between body OD of tubing and drift ID of casing = 2.879"

The proposed downhole configuration allows for effective, straightforward tubing fishing operations.

Tubing will have a floating seal assembly landed in seal bore extensions below the packer which will allow a simple straight pull to separate the tubing from the packer.

For washover operations:

- 7-3/8" washpipe: OD = 7.375", ID = 6.625", Drift ID = 6.500"
- OD of washpipe is less than drift ID of casing (8.379" drift ID vs 7.375" washpipe OD)
- Drift ID of washpipe is greater than OD of 5-1/2" tubing (6.500" drift ID vs 5.500" Tubing OD)
- Drift ID of washpipe greater than OD of 5-1/2" tubing coupling (6.500" drift ID vs 6.250" Tubing Coupling OD)

For fishing operations with overshot:

- 5-1/2" tube/body can be fished with 6.625" OD Series 150 spiral grapple overshot (6.625" overshot OD vs 8.379" casing drift ID).
- 6.250" OD TCPC coupling can be fished with 7.375" OD Series 150 spiral grapple overshot (7.375" overshot OD vs 8.379" casing drift ID).

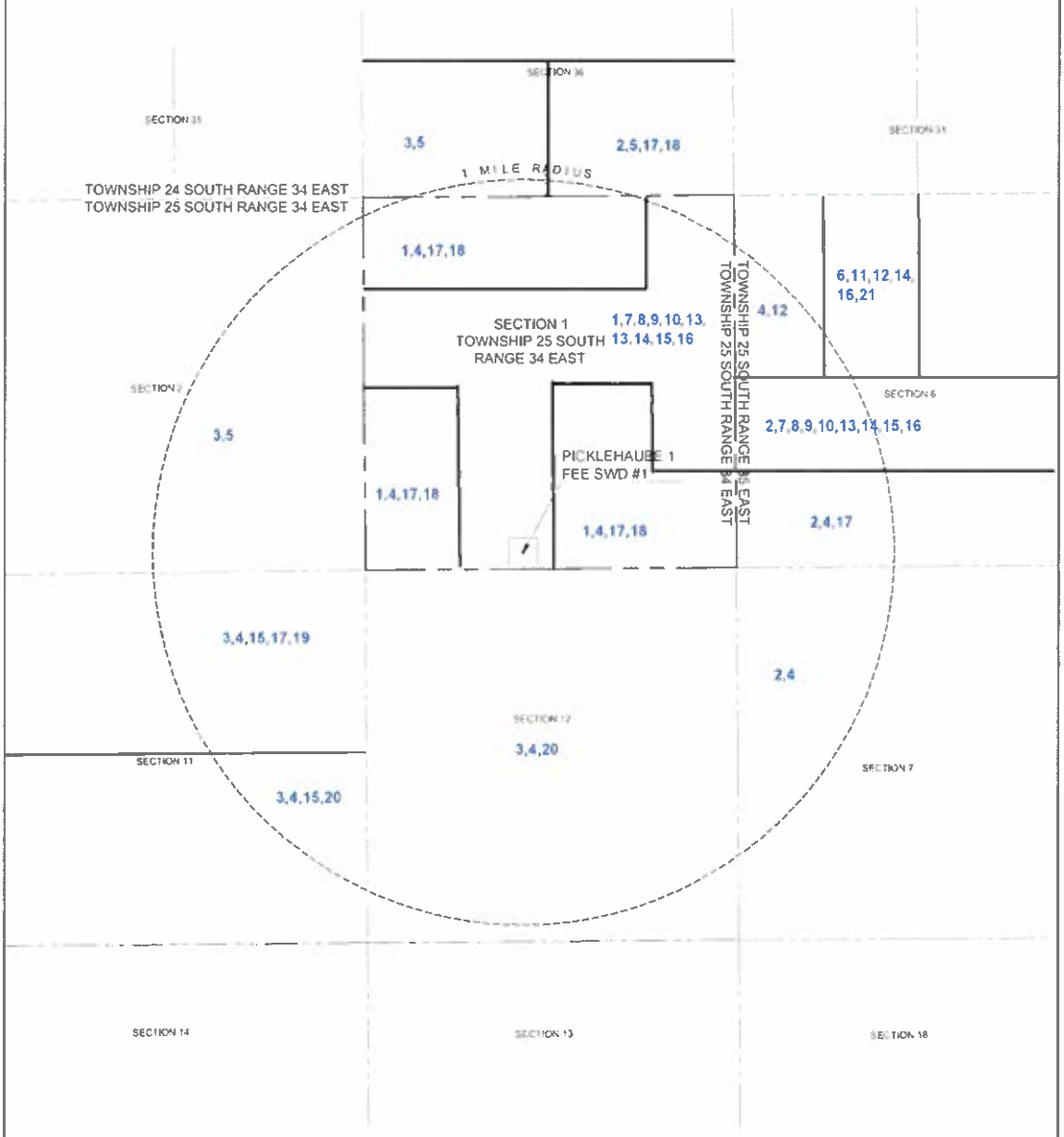
For fishing operations with spear:

- Fiberglass liner can be milled out, or torn out with a spear, to allow a releasable spear assembly to grasp the ID of the injection tubing.

V.

MAP

SECTION NO. 1
TOWNSHIP 25 SOUTH
RANGE 34 EAST
N. M. P. M. NEW MEXICO
LEA COUNTY, NEW MEXICO



NOTE: RESEARCH AND TITLE PROVIDED BY OTHERS. BISON CREEK LAND SERVICES, LLC IS NOT LIABLE AND/OR RESPONSIBLE FOR ANY TITLE ERRORS OR OMISSIONS RELATED TO THIS PLAT.

NOTE: BASIS OF BEARINGS ARE THE NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE NAD 27 AND COORDINATES AND DISTANCES ARE OF GRID VALUES. DISTANCES MUST BE MULTIPLIED BY A COMBINED SCALE FACTOR OF 0.99984743 TO OBTAIN SURFACE DISTANCES.

BLUE = CORRESPONDS TO AFFECTED PERSONS LIST

SCALE: 1" = 2000'

2000 1000 0 2000 4000

GRAPHIC SCALE

1-800-321-2537
WWW.NMB811.ORG

NEW MEXICO DAMAGE PREVENTION
CONSTRUCTION NOTE: UNDER GROUND UTILITIES MUST BE VERIFIED BY CONTRACTOR PRIOR TO EXCAVATING

SCALE: 1" = 2000'	DATE: 04/05/19
DRWN: DV	APPVD: JPK
CREW: RJR	
AFE NO:	
PROJ. NO: 19-553-PICKLEHAUBE 1 MILE	

CONCHO OPERATING, LLC.
EXHIBIT OF PROPOSED
PICKLEHAUBE 1 FEE SWD #1
(1 MILE RADIUS)
LOCATED IN
SECTION 1,
TOWNSHIP 25 SOUTH,
RANGE 35 EAST,
N. M. P. M. NEW MEXICO

CONCHO

Construction Surveying Services
PO Box 2295, Alamogordo, NM 88311
(575) 443-6202 FAX (575) 443-1151

BISON CREEK LAND SERVICES

Picklehaube 1 Fee SWD #1

located in 1-24S-34E, Lea County, New Mexico

Affected Persons

No.	Name	Address	Phone Number	Owner Type	S-T-R	Notes
1	Quail Ranch, LLC	600 W. Illinois Ave. Midland, TX 79701	432-683-7443	Surface	All of 1-25S-34E	
2	COG Operating, LLC	600 W. Illinois Ave. Midland, TX 79701	432-683-7443	Operator	S2 6-25S-35E All of 7-25S-35E SE4 36-24S-34E	APIs: 30-025-43838 30-025-42926 30-025-43839 30-025-42376
3	EOG Resources, Inc.	104 S. 4th Street Artesia, New Mexico 88210	575-748-1471	Operator	All of 2-25S-34E 11-25S-34E 12-24SS-34E SW4 36-24S-34E	APIs: 30-025-40558 30-025-41459 30-025-40088
4	United States of America, through the Bureau of Land Management	New Mexico State Office 301 Dinosaur Trail Santa Fe, NM 87508	505-954-2000 blm_nm_comments @blm.gov	Mineral	Lots 2, 3, 4, W2SW4, W2SE4, SE4SE4 1-25S-34E W2NW4 & S2S2 6-25S-35E All of 7-25S-35E All of 11-25S-34E All of 12-25S-34E	
5	State of New Mexico Commissioner of Public Lands	310 Old Santa Fe Trail Santa Fe, NM 87501	505-827-5760	Mineral	All of 2-25S-34E S2 36-24S-34E	
6	Chisos Minerals, LLC	1111 Bagby St., Suite 2150 Houston, TX 77002-2626	844-936-7847	Mineral	E2NW4 6-25S-35E	Appears Unleased
7	Estate of Sallie Knight Baird*	736 Mulberry Lane Desoto, TX 75115	Unknown Telephone Number	Mineral	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 6-25S-35E	Appears Unleased *See Title Note 5 in Fee Lands 1-25S-34E regarding Notice of Lis Pendens burdening this interest
8	Riverbend Oil & Gas IX, LLC	500 Dallas St., Ste. 1250 Houston, TX 77002	713-874-9000	Mineral	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 6-25S-35E	Appears Unleased *See Title Note 5 in Fee Lands 1-25S-34E regarding Notice of Lis Pendens burdening this interest

9	Bugling Bull Investments, LLC	4747 Research Forrest Drive #180-315 The Woodlands, TX 77381	214-435-2710	Mineral	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 6-25S-35E	Appears Unleased *See Title Note 5 in Fee Lands 1-25S-34E regarding Notice of Lis Pendens burdening this interest
10	Noroma Energy, LLC	P.O. Box 5443 Austin, TX 78763	512-472-6060	Mineral	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 6-25S-35E	Appears Unleased *See Title Note 5 in Fee Lands 1-25S-34E regarding Notice of Lis Pendens burdening this interest
11	ConocoPhillips	PO Box 2197 Houston, TX 77252	281-293-1000	Mineral	E2NW4 6-25S-35E	Appears Unleased
12	COG Operating, LLC	600 W. Illinois Ave. Midland, TX 79701	432-683-7443	Working Interest	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E E2NW4 & W2NW4 6-25S-35E	
13	COG Acreage, LP	600 W. Illinois Ave. Midland, TX 79701	432-683-7443	Working Interest	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 of 6-25S-35E	
14	MRC Permian Company	One Lincoln Centre 5400 LBJ Freeway, Suite 1500 Dallas, TX 75240	972-371-5200	Working Interest	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E E2NW4 & N2S2 6-25S-35E	
15	Marathon Oil Permian, LLC	5555 San Felipe Street Houston, TX 77056-2723	713-629-6600	Working Interest	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E N2S2 6-25S-35E All of 11-25S-35E	
16	Diamondback Energy formerly Energen Resources Corporation	500 West Texas Ave, Suite 1200 Midland, TX 79701	432-221-7400	Working Interest	Lot 1, S2N2, E2SW4 & NE4SE4 1-25S-34E E2NW4 & N2S2 6-25S-35E	
17	OXY Y-1	S Greenway Plaza Houston, Texas 77046	713-366-5121	Working Interest	Lots 2, 3, 4, W2SW4, W2SE4, SE4SE4 1-25S-34E S2S2 6-25S-35E N2 11-25S-34E SE4 36-24S-34E	
18	EOG Resources, Inc.	P.O. Box 2267 Midland, TX 79702	432-686-3689	Working Interest	Lots 2,3,4,W2SW4, W2SE4 & SE4SE4 1-25S-34E SE4 36-24S-34E	

19	Chevron USA	15 Smith Road Midland, Texas	432-498-8600	Working Interest	N2 11-25S-34E	
20	Chevron Midcontinent, L.P.	15 Smith Road Midland, Texas	432-498-8600	Working Interest	S2 11-25S-34E All of 12-25S-34E	
21	BEXP I, LP	5914 W. Courtyard Dr. Suite 340 Austin, TX 78730	512-220-1200	Working Interest	E2NW4 6-25S-35E	

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 Road, 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, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name

[4] Property Code	[5] Property Name	[6] Well Number
	PICKLEHAUBE 1 FEE SWD	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
	COG OPERATING, LLC	3405'

[10] Surface Location

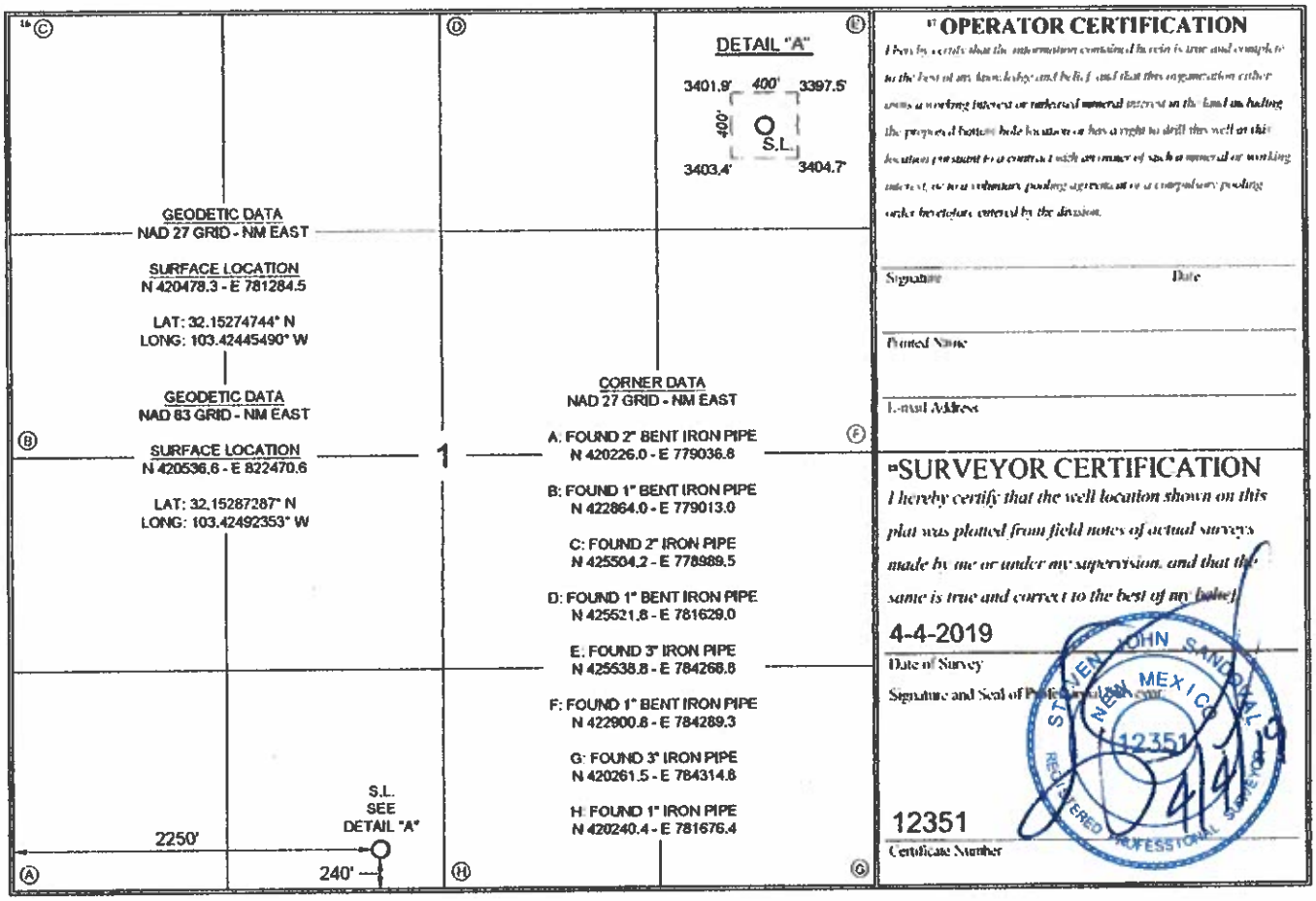
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	1	25S	34E		240	SOUTH	2250	WEST	LEA

[11] 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

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] 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.



[17] 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.

Signature Date

Printed Name

E-mail Address

[18] 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 supervision, and that the same is true and correct to the best of my belief.

4-4-2019

Date of Survey

Signature and Seal of Professional Surveyor

STEVEN JOHN SANDOVAL
NEW MEXICO
12351
REGISTERED PROFESSIONAL SURVEYOR

12351

Certificate Number

VI.

No Wells Penetrate Proposed Disposal Interval Within One Mile Area of Review

VII.

Water Analysis Produced and Receiving Formation Water

Delaware Sand

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 5/11/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	**ACCOUNT REP:**	KENNETH MORGAN
DISTRICT:	NEW MEXICO	**SAMPLE ID:**	201701012804
AREA/LEASE:	KING TUT	**SAMPLE DATE:**	3/21/2017
SAMPLE POINT NAME	KING TUT FED 3H BTRY	**ANALYSIS DATE:**	3/24/2017
SITE TYPE:	FACILITY	**ANALYST:**	SVP
SAMPLE POINT DESCRIPTION:	TRANSFER PUMP		

COG OPERATING LLC, KING TUT, KING TUT FED 3H BTRY

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	152606.2	4304.8	Sodium (Na^+):	74498.5	3241.9
Final Temperature (°F):	80	Sulfate (SO_4^{2-}):	461.4	9.6	Potassium (K^+):	1381.8	35.3
Initial Pressure (psi):	100	Borate (H_3BO_3):	170.9	2.8	Magnesium (Mg^{2+}):	2495.8	205.4
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	15329.6	765.0
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	724.2	16.5
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	1.8	0.0
pH at time of sampling:	6.8	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	43.2	1.5
		Phosphate (PO_4^{3-}):	ND		Manganese (Mn^{2+}):	2.6	0.1
		Silica (SiO_2):	ND		Lead (Pb^{2+}):	0.0	0.0
					Zinc (Zn^{2+}):	0.0	0.0
ALKALINITY BY TITRATION:	mg/L	meq/L					
Bicarbonate (HCO_3^-):	36.6	0.6			Aluminum (Al^{3+}):	0.0	0.0
Carbonate (CO_3^{2-}):	ND				Chromium (Cr^{3+}):	ND	
Hydroxide (OH^-):	ND				Cobalt (Co^{2+}):	ND	
		ORGANIC ACIDS:	mg/L	meq/L	Copper (Cu^{2+}):	0.0	0.0
aqueous CO_2 (ppm):	1050.0	Formic Acid:	ND		Molybdenum (Mo^{2+}):	0.0	0.0
aqueous H_2S (ppm):	0.0	Acetic Acid:	ND		Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND	Propionic Acid:	ND		Tin (Sn^{2+}):	ND	
		Butyric Acid:	ND		Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	247582	Valeric Acid:	ND		Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	1.1573				Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	1.1683				Lithium (Li):	ND	
Conductivity (mmhos):	ND						
Resistivity:	ND				Total Hardness:	49434	N/A
MCF/D:	No Data						
BOPD:	No Data						
BWPD:	No Data	Anion/Cation Ratio:		1.01	ND = Not Determined		

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA, FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.40	0.646	1.16	7.579	-0.15	0.000	-0.23	0.000
99°F	24 psi	0.28	0.509	1.18	7.675	-0.14	0.000	-0.14	0.000
118°F	34 psi	0.16	0.334	1.20	7.774	-0.14	0.000	-0.06	0.000
137°F	43 psi	0.05	0.115	1.22	7.857	-0.15	0.000	0.03	13.651
156°F	53 psi	-0.06	0.000	1.23	7.925	-0.15	0.000	0.11	51.143
174°F	62 psi	-0.16	0.000	1.24	7.980	-0.16	0.000	0.20	82.865
193°F	72 psi	-0.25	0.000	1.25	8.022	-0.17	0.000	0.28	109.409
212°F	81 psi	-0.34	0.000	1.25	8.058	-0.19	0.000	0.37	131.297
231°F	91 psi	-0.42	0.000	1.26	8.083	-0.20	0.000	0.46	149.069
250°F	100 psi	-0.50	0.000	1.26	8.095	-0.22	0.000	0.55	163.281

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.34	123.094	-0.45	0.000	-7.90	0.000	0.19	1.935
99°F	24 psi	0.34	125.716	-0.46	0.000	-8.04	0.000	0.27	2.698
118°F	34 psi	0.35	126.379	-0.48	0.000	-8.15	0.000	0.34	3.330
137°F	43 psi	0.35	126.223	-0.49	0.000	-8.24	0.000	0.39	3.801
156°F	53 psi	0.35	126.022	-0.50	0.000	-8.32	0.000	0.43	4.122
174°F	62 psi	0.35	126.264	-0.51	0.000	-8.38	0.000	0.45	4.307
193°F	72 psi	0.35	127.203	-0.53	0.000	-8.43	0.000	0.45	4.367
212°F	81 psi	0.36	128.885	-0.54	0.000	-8.47	0.000	0.44	4.316
231°F	91 psi	0.36	131.186	-0.55	0.000	-8.51	0.000	0.42	4.148
250°F	100 psi	0.37	133.846	-0.56	0.000	-8.54	0.000	0.38	3.848

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity. $\%CO_2$ is not included in the calculations

ScaleSoftPitzer™ SSP2010

Comments

Bone Spring

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 5/16/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	ACCOUNT REP:	KENNETH MORGAN
DISTRICT:	NEW MEXICO	SAMPLE ID:	201501048297
AREA/LEASE:	WINDWARD	SAMPLE DATE:	12/11/2015
SAMPLE POINT NAME	WINDWARD FED 2H	ANALYSIS DATE:	12/16/2015
SITE TYPE:	WELL SITES	ANALYST:	SAMUEL NEWMAN
SAMPLE POINT DESCRIPTION:	WELL HEAD		

COG OPERATING LLC, WINDWARD, WINDWARD FED 2H

FIELD DATA

Initial Temperature (°F):	250
Final Temperature (°F):	82
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	7.1

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	170.0	2.8
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH-):	ND	

aqueous CO_2 (ppm):	240.0
aqueous H_2S (ppm):	0.0
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	146283
Density/Specific Gravity (g/cm³):	1.0934
Measured Specific Gravity	1.1045
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

ANIONS:	mg/L	meq/L
Chloride (Cl^-):	89914.5	2536.4
Sulfate (SO_4^{2-}):	1031.7	21.5
Borate (H_3BO_3):	187.2	3.0
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	ND	
Silica (SiO_2):	ND	

ORGANIC ACIDS:	mg/L	meq/L
Formic Acid:	ND	
Acetic Acid:	ND	
Proplonic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	46148.7	2008.2
Potassium (K^+):	902.9	23.1
Magnesium (Mg^{2+}):	855.0	70.4
Calcium (Ca^{2+}):	6890.6	343.8
Strontium (Sr^{2+}):	278.9	6.4
Barium (Ba^{2+}):	0.0	0.0
Iron (Fe^{2+}):	89.1	3.2
Manganese (Mn^{2+}):	1.8	0.1
Lead (Pb^{2+}):	ND	
Zinc (Zn^{2+}):	0.0	0.0
Aluminum (Al^{3+}):	ND	
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	ND	
Molybdenum (Mo^{2+}):	ND	
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Lithium (Li):	ND	
Total Hardness:	21067	N/A

Anion/Cation Ratio: 1.04

ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
82°F	15 psi		0.000	1.43	35.518	-0.18	0.000	-0.34	0.000
101°F	24 psi		0.000	1.48	36.271	-0.17	0.000	-0.25	0.000
119°F	34 psi		0.000	1.54	37.269	-0.16	0.000	-0.16	0.000
138°F	43 psi		0.000	1.60	38.261	-0.15	0.000	-0.06	0.000
157°F	53 psi		0.000	1.66	39.182	-0.15	0.000	0.04	39.216
175°F	62 psi		0.000	1.72	40.019	-0.14	0.000	0.14	133.848
194°F	72 psi		0.000	1.78	40.776	-0.13	0.000	0.24	211.707
213°F	81 psi		0.000	1.84	41.510	-0.13	0.000	0.35	274.678
231°F	91 psi		0.000	1.90	42.195	-0.13	0.000	0.45	324.816
250°F	100 psi		0.000	1.96	42.808	-0.12	0.000	0.56	364.191

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
82°F	15 psi	0.16	51.545	-1.13	0.000	-7.50	0.000	1.18	30.476
101°F	24 psi	0.17	54.187	-1.14	0.000	-7.61	0.000	1.28	32.451
119°F	34 psi	0.18	56.250	-1.15	0.000	-7.69	0.000	1.38	34.487
138°F	43 psi	0.18	58.374	-1.16	0.000	-7.75	0.000	1.47	36.277
157°F	53 psi	0.19	60.980	-1.17	0.000	-7.79	0.000	1.55	37.770
175°F	62 psi	0.21	64.301	-1.17	0.000	-7.81	0.000	1.61	38.985
194°F	72 psi	0.22	68.407	-1.18	0.000	-7.83	0.000	1.66	39.950
213°F	81 psi	0.24	73.238	-1.18	0.000	-7.84	0.000	1.70	40.777
231°F	91 psi	0.26	78.634	-1.18	0.000	-7.83	0.000	1.73	41.446
250°F	100 psi	0.29	84.362	-1.18	0.000	-7.82	0.000	1.75	41.931

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales

Note 3: Saturation Index predictions on this sheet use pH and alkalinity. $\%CO_2$ is not included in the calculations

ScaleSoftPitzer™ SSP2010

Comments:

Wolfcamp

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 5/11/2018

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	COG OPERATING LLC	ACCOUNT REP:	LARRY G HINES
DISTRICT:	WATER MANAGEMENT - PERMIAN	SAMPLE ID:	201801021234
AREA/LEASE:	VIKING HELMET STATE	SAMPLE DATE:	4/11/2018
SAMPLE POINT NAME	VIKING HELMET STATE COM 24H	ANALYSIS DATE:	4/16/2018
SITE TYPE:	WELL SITES	ANALYST:	SP
SAMPLE POINT DESCRIPTION:	WELL HEAD		

COG OPERATING LLC, VIKING HELMET STATE, VIKING HELMET STATE COM 24H

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	80548.2	2272.2	Sodium (Na^+):	46716.0	2032.9
Final Temperature (°F):	88	Sulfate (SO_4^{2-}):	1551.7	32.3	Potassium (K^+):	887.5	22.7
Initial Pressure (psi):	100	Borate (H_3BO_3):	170.8	2.8	Magnesium (Mg^{2+}):	684.8	56.4
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	5224.8	260.7
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	209.4	4.8
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	0.0	0.0
pH at time of sampling:	6.8	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	126.5	4.5
		Phosphate (PO_4^{3-}):	ND		Manganese (Mn^{2+}):	3.4	0.1
		Silica (SiO_2):	ND		Lead (Pb^{2+}):	0.0	0.0
					Zinc (Zn^{2+}):	0.0	0.0
ALKALINITY BY TITRATION:	mg/L	meq/L					
Bicarbonate (HCO_3^-):	342.0	5.6			Aluminum (Al^{3+}):	0.0	0.0
Carbonate (CO_3^{2-}):	ND				Chromium (Cr^{3+}):	ND	
Hydroxide (OH^-):	ND				Cobalt (Co^{2+}):	ND	
			ORGANIC ACIDS:	mg/L	meq/L	Copper (Cu^{2+}):	0.0	0.0
aqueous CO_2 (ppm):	220.0		Formic Acid:	ND		Molybdenum (Mo^{2+}):	0.0	0.0
aqueous H_2S (ppm):	0.0		Acetic Acid:	ND		Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND		Propionic Acid:	ND		Tin (Sn^{2+}):	ND	
			Butyric Acid:	ND		Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	136294		Valeric Acid:	ND		Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	1.0879					Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	1.0961					Lithium (Li):	ND	
Conductivity (mmhos):	ND							
Resistivity:	ND					Total Hardness:	16122	N/A
MCF/D:	No Data							
BOPD:	No Data							
BWPD:	No Data		Anion/Cation Ratio:		0.97	ND = Not Determined		

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
88°F	15 psi		0.000	1.26	69.277	-0.13	0.000	-0.27	0.000
106°F	24 psi		0.000	1.31	70.705	-0.12	0.000	-0.18	0.000
124°F	34 psi		0.000	1.38	72.857	-0.11	0.000	-0.09	0.000
142°F	43 psi		0.000	1.46	75.061	-0.10	0.000	0.00	4.176
160°F	53 psi		0.000	1.54	77.135	-0.10	0.000	0.10	142.433
178°F	62 psi		0.000	1.62	79.035	-0.09	0.000	0.20	260.388
196°F	72 psi		0.000	1.70	80.758	-0.08	0.000	0.30	359.322
214°F	81 psi		0.000	1.78	82.441	-0.08	0.000	0.40	440.907
232°F	91 psi		0.000	1.87	84.028	-0.07	0.000	0.50	507.127
250°F	100 psi		0.000	1.95	85.448	-0.07	0.000	0.61	560.114

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
88°F	15 psi	0.19	50.203	-1.20	0.000	-7.79	0.000	1.31	61.325
106°F	24 psi	0.20	52.071	-1.21	0.000	-7.88	0.000	1.40	64.099
124°F	34 psi	0.21	53.663	-1.22	0.000	-7.92	0.000	1.51	67.134
142°F	43 psi	0.22	55.383	-1.22	0.000	-7.94	0.000	1.61	69.838
160°F	53 psi	0.23	57.491	-1.23	0.000	-7.95	0.000	1.71	72.110
178°F	62 psi	0.24	60.125	-1.23	0.000	-7.94	0.000	1.79	73.969
196°F	72 psi	0.26	63.318	-1.24	0.000	-7.93	0.000	1.85	75.466
214°F	81 psi	0.28	67.017	-1.24	0.000	-7.91	0.000	1.91	76.785
232°F	91 psi	0.30	71.103	-1.24	0.000	-7.88	0.000	1.97	77.898
250°F	100 psi	0.33	75.415	-1.24	0.000	-7.84	0.000	2.01	78.761

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation index predictions on this sheet use pH and alkalinity. $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments:

Devonian (Receiving Formation)
Sec 19-19s-32e

8.0 RESERVOIR CHARACTERISTICS

8.1 FORMATION FLUID CHEMISTRY

Following the drilling of the 6-inch open-hole section the injection zone was swabbed and 10 samples were sent to Cardinal Laboratories in Hobbs, NM. The laboratory report and analysis, along with a summary table of the results that depict the concentrations of all analytes is included in Appendix D. The average concentrations for major constituents within the formation water in the entire injection interval are as follows:

Chloride: 23,700 mg/L
TDS: 42,750 mg/L
Diesel Range Organics: 5.7 mg/L
Extended Range Organics: 2.7 mg/L
pH: 6.5
Total Alkalinity: 613 mg/L

The maximum concentrations for major constituents within the formation water in the entire injection interval are as follows:

Chloride: 27,000 mg/L
TDS: 44,700 mg/L
Diesel Range Organics: 20.5 mg/L
Extended Range Organics: 5.6 mg/L
pH: 6.7
Total Alkalinity: 670 mg/L

The results of the formation water analysis support and confirm the conclusions presented from the geophysical logs, mud log, and sidewall cores that the injection zone clearly does not contain recoverable hydrocarbons. Included in Appendix D is Geolex's No Recoverable Hydrocarbon Summary report, which was required by the BLMs COA, and submitted to the BLM and NMOCD.

X.

Log Section Across Proposed Devonian Injection Interval

D-20-T25S-R35E 660FN 660FW
SOUTHLAND ROYALTY CO
GULF FEDERAL # 1
30-025-22153

COMPANY SOUTHLAND ROYALTY COMPANY

6301.1 New Mexico 045081

WELL GULF FEDERAL #1

FIELD WILDCAT

COUNTY LEA STATE NEW MEXICO

LOCATION 660'FNL & FWL

201

ROSWELL OFFICE COPY

Sec. 20 Twp. 25-S Rge. 35-E

RECEIVED AUG U.S. GEOLOGICAL SURVEY ROSWELL, NEW MEXICO

Permanent Datum G.L., Elev. 3320.8

Log Measured From K.B., 21 Ft. Above Perm. Datum

Drilling Measured From K.B.

Elev.: K.B. 3341.8
D.F.
G.L. 3320.8

Date	7-4-67	8-13-67	12-9/10-67	1-24-68
Run No.	ONE	TWO	THREE	FOUR
Depth—Driller	5300	12825	17916	20066
Depth—Logger	5297	12815	17917	20067
Btm. Log Interval	5288	12813	17916	20058
Top Log Interval	0	5288	12814	17916
Casing—Driller	@380	13 3/8@5300	10 3/4@ 12825	7 5/8 @7916
Casing—Logger		5303	12814	17909
Bit Size	17 1/2	12 1/4	9 1/2	6 1/2
Type Fluid in Hole	BRINE	BENEX	IMCO-BAR, GEL,CAUSTIC	GEL CHEM
Dens. / Visc.	10.0 / 28	8.8 / 34	13.4 / 72	9.0 / 44
pH / Fluid Loss	ml	9.5 / ml	10.5 / 4.0 ml	9.5 / 6.2 ml
Source of Sample	PIT	PIT	CIRC.	CIRC.
Rm @ Meas. Temp.	.038 @ 85 °F	1.71@77 °F	1.47 @68 °F	1.76 @60 °F
Rmf @ Meas. Temp.	.038 @ 85 °F	1.39@78 °F	.734 @63 °F	1.53 @55 °F
Rmc @ Meas. Temp.	@ °F	2.26@79 °F	2.00 @64 °F	@ °F
Source: Rmf / Rmc	M	M / M	M / M	M
Rm @ BHT	.03 @110 °F	.92 @147 °F	@ °F	@ °F
Time Since Circ.	3 HOURS	6 HOURS	8 HOURS	8 HOURS
Max. Rec. Temp.	110 °F	147 °F	°F	°F
Equip. / Location	3722 / HOBBS	3701 / HOBBS	3720 HOBBS	3721 MONA.
Recorded By	LEFLER	RATLIFF	FREEMAN	HUGGINS
Witnessed By	GRAVES	SERIGHT	SERIGHT	SERIGHT

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS INTEGRATION-AROUND 13000 THERE ARE ONLY 5 SMALL MARKS BETWEEN LARGE ONES.

Changes in Mud Type or Additional Samples				
Date / Sample No.				
Depth—Driller				
Type Fluid in Hole				
Dens. / Visc.				
ph / Fluid Loss		ml		ml
Source of Sample				
R_m @ Meas. Temp.	@	°F	@	°F
R_{mf} @ Meas. Temp.	@	°F	@	°F
R_{mc} @ Meas. Temp.	@	°F	@	°F
Source: R_{mf} / R_{mc}				
R_m @ BHT	@	°F	@	°F
R_{mf} @ BHT	@	°F	@	°F
R_{mc} @ BHT	@	°F	@	°F

Scale Changes			
Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data				
Run No.	Tool Type	Pad Type	Tool Pos.	Other

C.D. USED S.O.: SPRING GUIDE & CALIPER C.D. USED S.O.: VCD-A & CME-H
Equip. Used: CART. No. SLC-A-96 105
PANEL No. SLP-C-251 12
SONDE No. SLS-B-12 49
(RUN 1) (RUN 2)
C.D. USED S.O.: CENTRALIZER & CALIPER C.D. USED S.O.: MAX
Equip. Used: CART. No. SLH-A-105 SLH-A-131
PANEL No. [illegible]

01-58 310669

SONDE No. SLS-B-26 (RUN 3) (RUN 4) SLS-B-26 MMP-B-80

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISIONS	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	RECORDING SPEED (FT./MIN.)	
GAMMA RAY:	48	480	82.5	800	400	1	50/80	RUN 1
	20	410	82.5	800	400	1	50	RUN 2
	64	416	82.5	800	400	1	40/50/60	RUN 3
	80	480	82.5	800	400	1	50	RUN 4

Velocity (feet per second) = $\frac{1{,}000{,}000}{\text{Interval Transit Time (microseconds per foot)}}$

GAMMA RAY
API UNITS

0 — 100

100 — 200

DEPTHS

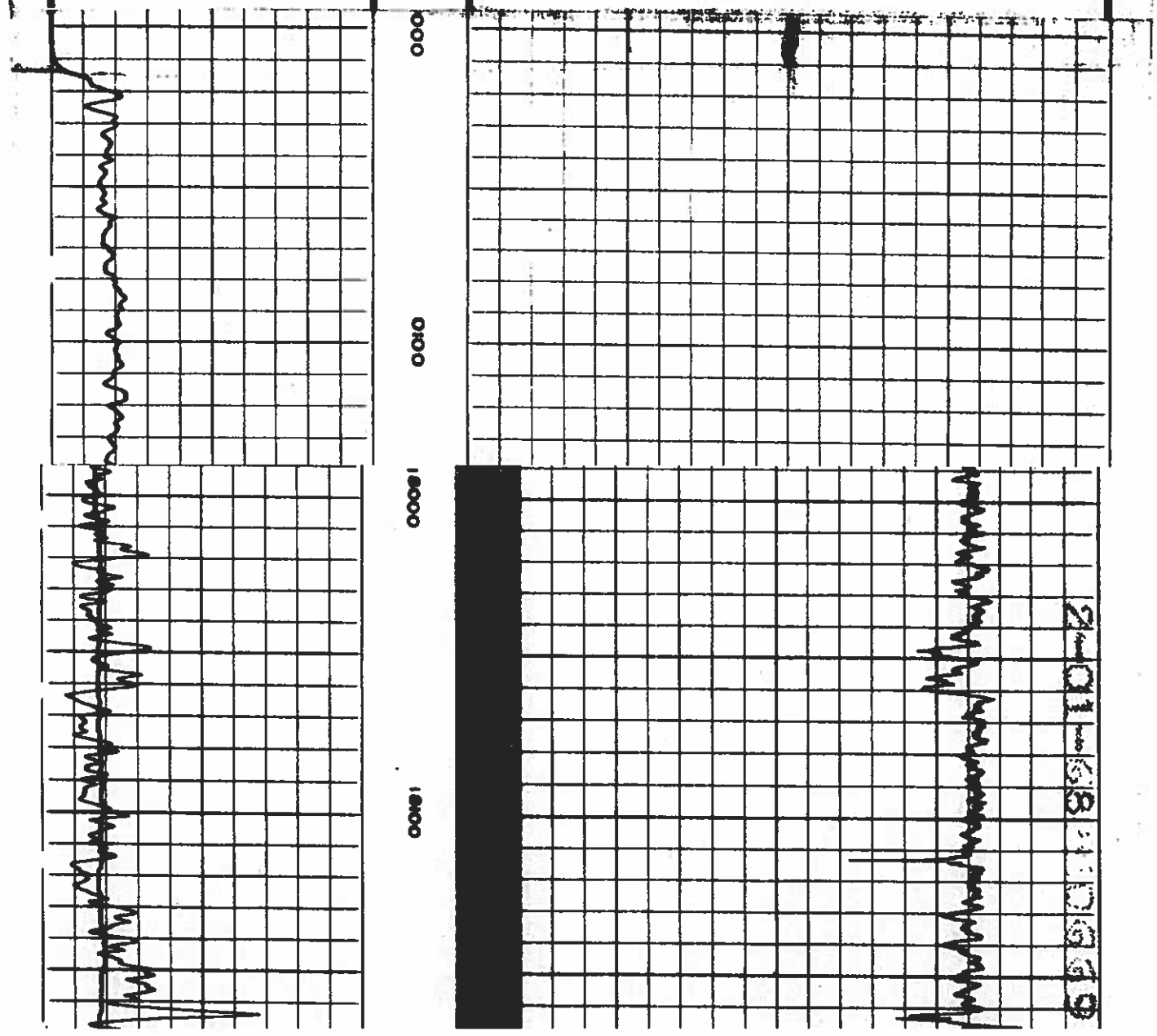
RUN 1

INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT

T 3 R, 1 R,

100 — 70 — 40

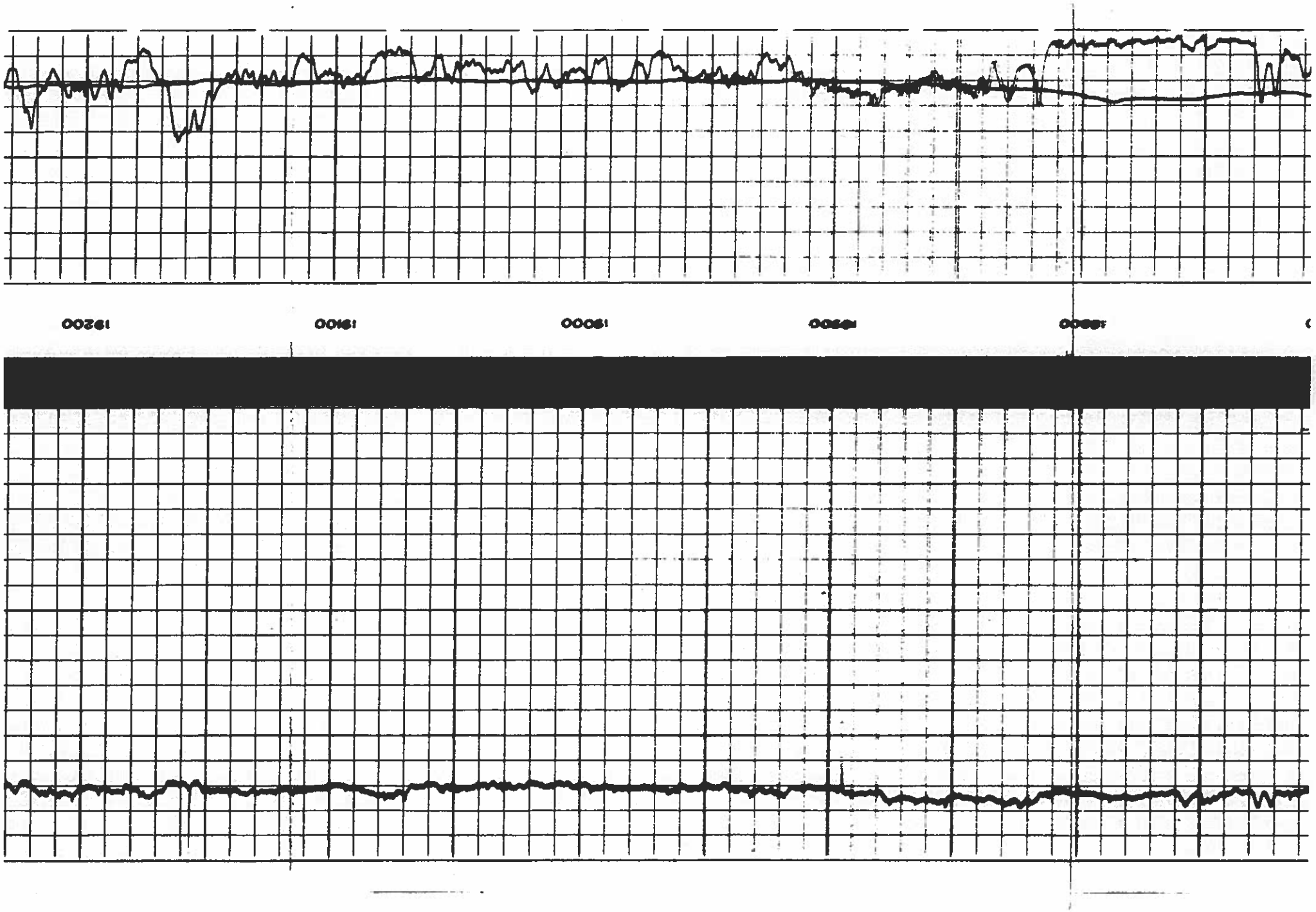
160 — 130 — 100



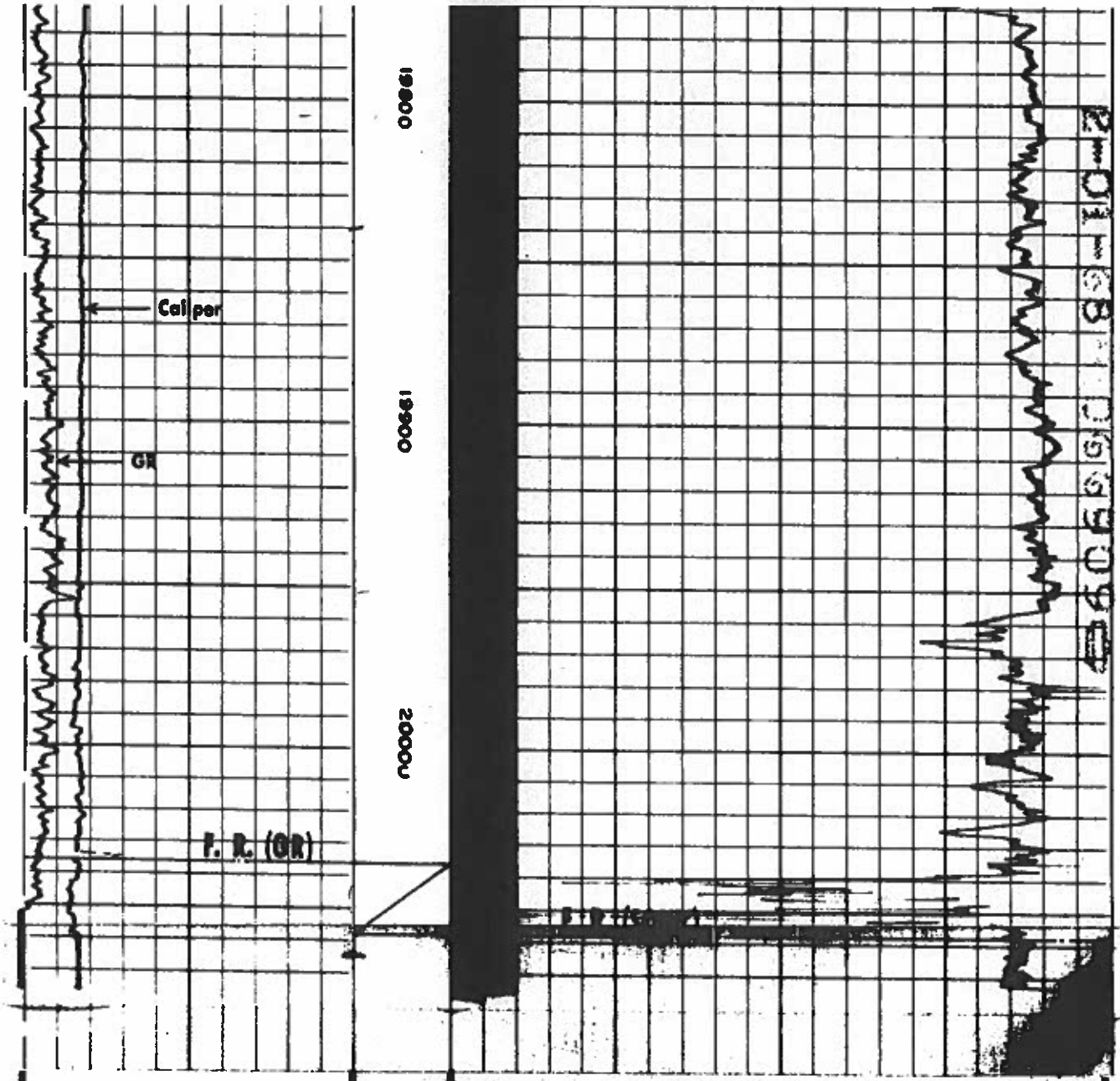
Z

DEV

H



19300
19400
19500
19600
19700



5 15

RECORDED 7' SHALLOW

CALIPER

HOLE DIAM. IN INCHES

0 100

100 200

GAMMA RAY

API UNITS

DEPTHS

T 3 R, 2 R,

100 70 40

160 130 100

INTERVAL TRANSIT TIME

MICROSECONDS PER FOOT

2-01-68

COMPANY SOUTHLAND ROYALTY COMPANY

SCHL. FR 20058

SCHL. TD 20067

6

FIELD WILDCAT

COUNTY LEA STATE NEW MEXICO

Elev:
KB 3341.8
DF
GL 3320.8

0 5 5 0 0

XI.

Fresh Water Sample Analyses There Is One FW Well Within 1 Mile from NMOSE Records

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	COG Operating LLC - NM	Sample #:	91063
Area:	Delaware Basin - South	Analysis ID #:	88200
Lease:	Water Well		
Location:	C02401 1-25S-34E 0		
Sample Point:	Stock Tank		

Sampling Date:	4/29/2019
Analysis Date:	5/7/2019
Analyst:	Catalyst
TDS (mg/l or g/m3):	1081.7
Density (g/cm3):	1.003
Hydrogen Sulfide:	
Carbon Dioxide:	
Comments:	

Anions	mg/l	meq/l
Chloride:	173.2	4.89
Bicarbonate:	324.5	5.32
Carbonate:		
Sulfate:	260.0	5.41
Borate*:	6.0	0.04
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	8.15
pH at time of analysis:	
pH used in Calculation:	**8.15**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	211.2	9.19
Magnesium:	43.0	3.54
Calcium:	55.2	2.75
Potassium:	6.8	0.18
Strontium:	1.6	0.04
Barium:	0.2	0.
Iron:	0.0	0.
Manganese:	0.006	0.

Conductivity (micro-ohms/cm):	**1450**
Resistivity (ohm meter):	**6.8966**

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.75	10.50	-1.46	0.00	-1.53	0.00	-1.29	0.00	0.92	0.00
100	0.83	12.60	-1.46	0.00	-1.46	0.00	-1.27	0.00	0.78	0.00
120	0.92	15.41	-1.45	0.00	-1.37	0.00	-1.24	0.00	0.67	0.00
140	1.01	18.56	-1.43	0.00	-1.26	0.00	-1.20	0.00	0.58	0.00
160	1.12	22.06	-1.40	0.00	-1.13	0.00	-1.16	0.00	0.51	0.00
180	1.23	25.91	-1.37	0.00	-0.99	0.00	-1.10	0.00	0.47	0.00
200	1.34	29.76	-1.33	0.00	-0.83	0.00	-1.05	0.00	0.44	0.00
220	1.46	33.61	-1.29	0.00	-0.66	0.00	-0.99	0.00	0.43	0.00

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(acre ft per annum)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q q q 64 16 4	Sec	Twn	Rng	X	Y
C 02401	CUB	STK	3	QUAIL RANCH LLC	LE	C 02401					2 2 1	01	25S	34E	648534	3559896*

Record Count: 1

PLSS Search:

Section(s): 1, 2, 11, 12 **Township:** 25S **Range:** 34E

Sorted by: File Number

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

New Mexico Office of the State Engineer

Point of Diversion Summary

Well Tag	POD Number	(quarters are 1=NW 2=NE 3=SW 4=SE) (quarters are smallest to largest) Q64	Q16	Q4	Sec	Tws	Rng	(NAD83 UTM in meters) X	Y
	C 02401	2	2	1	01	25S	34E	648534	3559896*

Driller License: **Driller Company:**

Driller Name: OTIS PRUIT

Drill Start Date:		**Drill Finish Date:**	04/30/1961	**Plug Date:**	
Log File Date:		**PCW Rcv Date:**		**Source:**	
Pump Type:		**Pipe Discharge Size:**		**Estimated Yield:**	4 GPM
Casing Size:	5.00	**Depth Well:**	275 feet	**Depth Water:**	260 feet

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

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

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(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(acre ft per annum)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q q q 6416 4	Sec	Twn	Rng	X	Y
C 04020	CUB	EXP	0	BERT MADERA	LE	C 04020 POD1					2 2 2	07	25S	35E	650917	3558310

> 1mi. away

Record Count: 1

PLSS Search:

Section(s): 6, 7 **Township:** 25S **Range:** 35E

Sorted by: File Number

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(acre ft per annum)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q 6416 q 4	Sec	Twn	Rng	X	Y
C 04042	CUB	MON	0	CONCHO RESOURCES INC	LE	C 04042 POD1					2 1 4	36	24S	34E	648827	3560637
					LE	C 04042 POD2					2 1 4	36	24S	34E	648827	3560637
C 04095	CUB	MON	0	AMERICAN SAFETY	LE	C 04095 POD1					2 1 4	36	24S	34E	648827	3560637
					LE	C 04095 POD2					2 1 4	36	24S	34E	648827	3560637

> 1 mi. away

Record Count: 4

PLSS Search:

Section(s): 36 **Township:** 24S **Range:** 34E

Sorted by: File Number

Affidavit of Publication

STATE OF NEW MEXICO
COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
May 10, 2019
and ending with the issue dated
May 10, 2019.

Publisher

Sworn and subscribed to before me this
10th day of May 2019.

Business Manager

My commission expires
January 29, 2023
(Seal)

OFFICIAL SEAL
GUSSIE BLACK
Notary Public
State of New Mexico
My Commission Expires 1-29-23

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

LEGALS

LEGAL NOTICES
MAY 10, 2019

COG Operating LLC, 2208 W. Main Street, Artesia, New Mexico, 88210, has filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Picklehaube 1 Fee SWD No. 1, is located 240' FSL and 2250' FWL, Section 1, Township 25 South, Range 34 East, Lea County, New Mexico. Disposal water will be sourced from area wells producing from the Delaware, Bone Spring and Wolfcamp formations. The disposal water will be injected into the Devonian/Silurian formation at an estimated depth of 18,050' to 20,300' at a maximum surface pressure of 3610 psi and a maximum rate of 40,000 BWPD. The proposed SWD well is located approximately 13.5 miles west/northwest of Jal. Any interested party who has an objection to this must give notice in writing to the Oil Conservation Division, 1220 South Saint Francis Street, Santa Fe, New Mexico, 87505, within fifteen (15) days of this notice. Any interested party with questions or comments may contact Brian Collins at COG Operating LLC, 2208 W. Main Street, Artesia, New Mexico 88210, or call 575-748-6940.
#34128

67112034 00228181

COG OPERATING LLC - ARTESIA
2208 W. MAIN ST.
ARTESIA, NM 88210

HOBBS NEWS-SUN
LEGAL NOTICES

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Published in the Hobbs News-Sun Hobbs, New Mexico
_____, 2019.