

OCD-ARTESIA  
NATIONAL CONSERVATION

ARTESIA DISTRICT

MAY 18 2015

FORM APPROVED  
OMB No. 1004-0137  
Expires October 31, 2014

CRITICAL  
CAVE KARST

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

RECEIVED

5. Lease Serial No. Sec 13 NMNM112255

SHL: NMNM103595 Sec 12: NMNM113398-BHL

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.  
Glacier Federal Com #1H

9. API Well No.  
30-015-43131

10. Field and Pool, or Exploratory  
Wildcat; Wolfcamp (Gas)

11. Sec., T.R.M. or Blk and Survey or Area  
Section 24 - T26S - R25E

12. County or Parish  
Eddy County

13. State  
NM

1a. Type of Work: ☒ DRILL ☐ REENTER

ATS-14-942

1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone

2. Name of Operator

COG Operating LLC.

3a. Address  
2208 West Main Street  
Artesia, NM 88210

3b. Phone No. (include area code)  
575-748-6940

4. Location of Well (Report location clearly and in accordance with any State requirements. \*)  
At surface 330' FNL & 560' FEL (NENE) Section 24-T26S-R25E  
At proposed prod. Zone 660' FNL & 710' FEL (NENE) Section 12-T26S-R25E

14. Distance in miles and direction from nearest town or post office\*  
Approximately 10 miles south of White City

15. Distance from proposed\*  
location to nearest  
property or lease line, ft.  
(Also to nearest drig. Unit line, if any)  
330'

16. No. of acres in lease  
NMNM103595 - 600  
NMNM113398 - 640  
NMNM112255 - 640

17. Spacing Unit dedicated to this well  
640

18. Distance from location\*  
to nearest well, drilling, completed, SHL: 130' BHL: none  
applied for, on this lease, ft.

19. Proposed Depth  
TVD: 8,410' MD: 18,292'

20. BLM/BIA Bond No. on file  
NMB000740 & NMB00215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)  
3544.9' GL

22. Approximate date work will start\*  
9/15/2014

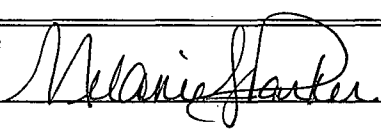
23. Estimated duration  
30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).


4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature  


Name (Printed/Typed)  
Melanie J. Parker

Date  
7/7/14

Title  
Regulatory Analyst

Approved by (Signature)  
  
Title  
FIELD MANAGER

Name (Printed/Typed)  
Office  
CARLSBAD FIELD OFFICE

Date  
MAY 12 2015

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

\*(Instructions on page 2)

Carlsbad Controlled Water Basin

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

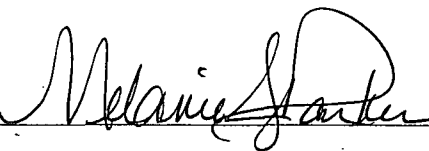
Approval Subject to General Requirements  
& Special Stipulations Attached

*Surface Use Plan  
COG Operating LLC  
Glacier Federal Com #1H  
SHL: 330' FNL & 560' FEL      UL A  
Section 24, T26S, R25E  
BHL: 660' FNL & 710' FEL      UL A  
Section 12, T26S, R25E  
Eddy County, New Mexico*

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### **OPERATOR CERTIFICATION**

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 2nd day of July, 2014.

Signed: 

Printed Name: Melanie J. Parker

Position: Regulatory Coordinator

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6940

Field Representative (if not above signatory): Rand French

E-mail: [mparker@concho.com](mailto:mparker@concho.com)

DISTRICT I  
1825 N. FRENCH DR., HOBBS, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II  
811 S. FIRST ST., ARTESIA, NM 88210  
Phone: (505) 746-1283 Fax: (505) 746-9720

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 30-015- <b>43131</b>	Pool Code <b>97920</b>	Pool Name Wildcat, Wolfcamp (Gas)
Property Code <b>314844</b>	Property Name GLACIER FEDERAL COM	Well Number 1H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3544.9

**Surface Location**

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	24	26-S	25-E		330	NORTH	560	EAST	EDDY

**Bottom Hole Location If Different From Surface**

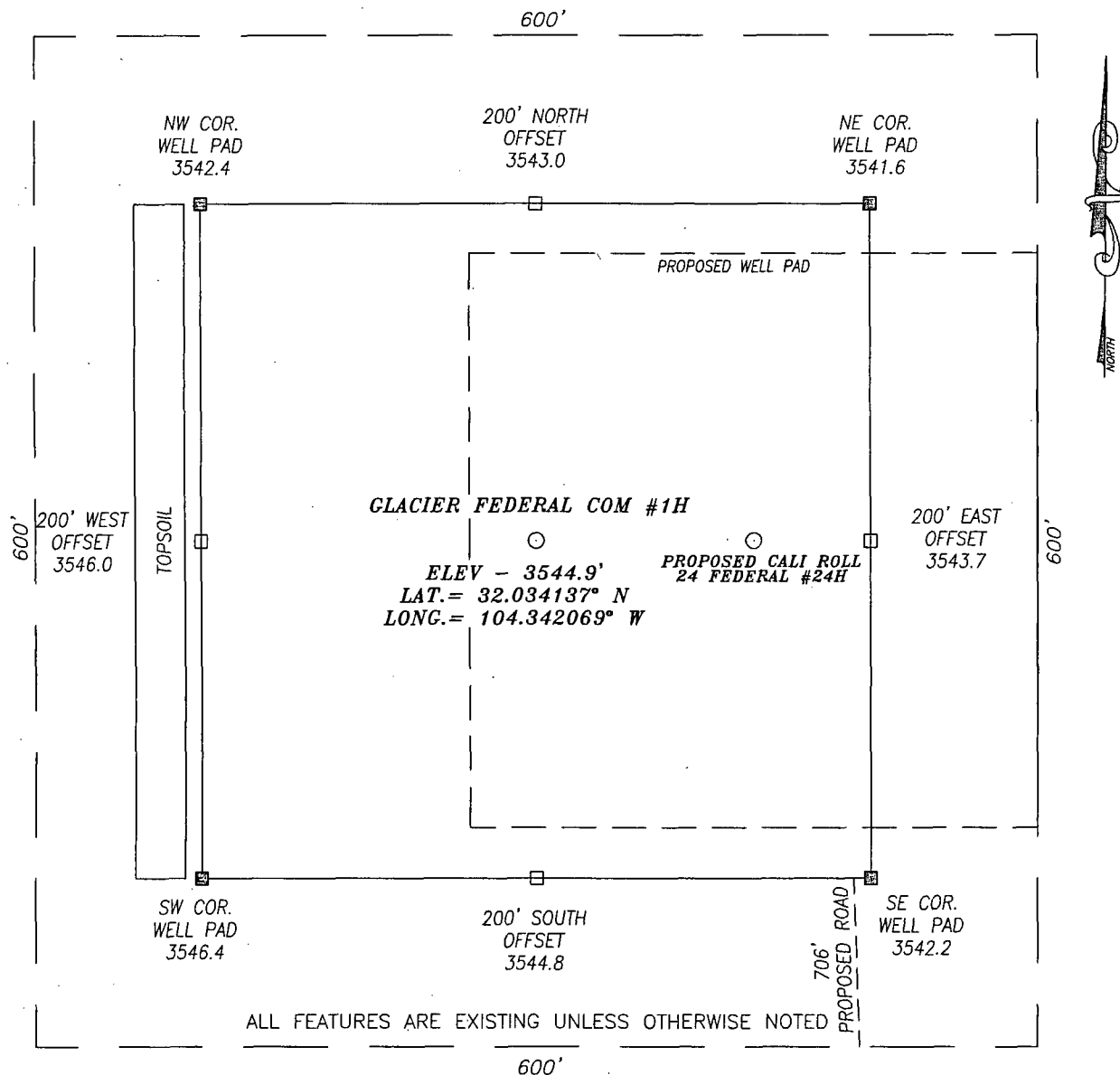
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	12	26-S	25-E		660	NORTH	710	EAST	EDDY

Dedicated Acres 640.0	Joint or Infill	Consolidation Code	Order No.
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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

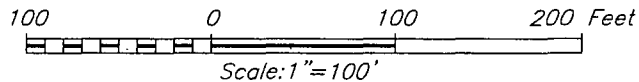
<p>NAD 27 <u>PROPOSED BOTTOM HOLE LOCATION</u> Y=386466.3 N X=497138.3 E LAT.=32.062511° N LONG.=104.342571° W</p> <p>Will penetrate the Wolfcamp formation at 61' FNL &amp; 660' FEL Section 24</p> <p>1st perf planned @ 660' FSL &amp; 709' FEL Section 13</p> <p>NAD 27 <u>SURFACE LOCATION</u> Y=376145.0 N X=497293.0 E LAT.=32.034137° N LONG.=104.342069° W</p>	<p>Y=387124.5 N X=495200.7 E</p> <p>Y=387126.9 N X=497847.9 E</p> <p>Y=376473.8 N X=495206.9 E</p> <p>Y=376475.4 N X=497852.9 E</p> <p>GRID AZ. = 359°08'29" 1087 DIST. = 10322.5</p> <p>SECTION 12 SECTION 13 SECTION 24 SECTION 25</p> <p>330' S.L. 560'</p> <p>NM-113398 NM-112255 NM-103595</p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information 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 mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Melanie J. Parker</i> 7/3/14 Signature Date</p> <p>Melanie J. Parker Printed Name mparker@concho.com E-mail Address</p> <p><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>JUNE 19, 2014 Date of Survey</p> <p>Signature &amp; Seal of Professional Surveyor.</p> <p><i>Chad L. Harcrow</i> 7/1/14 Certificate No. CHAD HARCROW 17777 W.O. # 14-571 DRAWN BY: AM</p>
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SECTION 24, TOWNSHIP 26 SOUTH, RANGE 25 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO



**DIRECTIONS TO LOCATION:**

HEADING SOUTHWEST ON 62/180 TURN LEFT (SOUTHEAST) APPROX. .9 MILES PAST MILEMARKER 6 ONTO A CALICHE ROAD. FOLLOW MEANDERING ROAD SOUTHEAST FOR APPROX. 1.7 MILES; THEN TURN LEFT (EAST) AND FOLLOW EASTERLY MEANDERING ROAD FOR APPROX. 6.4 MILES; PROPOSED WELL IS APPROX. 930' NORTH.



**HARCROW SURVEYING, LLC**  
2314 W. MAIN ST, ARTESIA, N.M. 88210  
PH: (575) 513-2570 FAX: (575) 746-2158  
chad\_harcrow77@yahoo.com



**COG OPERATING, LLC**

GLACIER FEDERAL COM #1H WELL  
LOCATED 330 FEET FROM THE NORTH LINE  
AND 560 FEET FROM THE EAST LINE OF SECTION 24,  
TOWNSHIP 26 SOUTH, RANGE 25 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO

SURVEY DATE: 6/19/2014

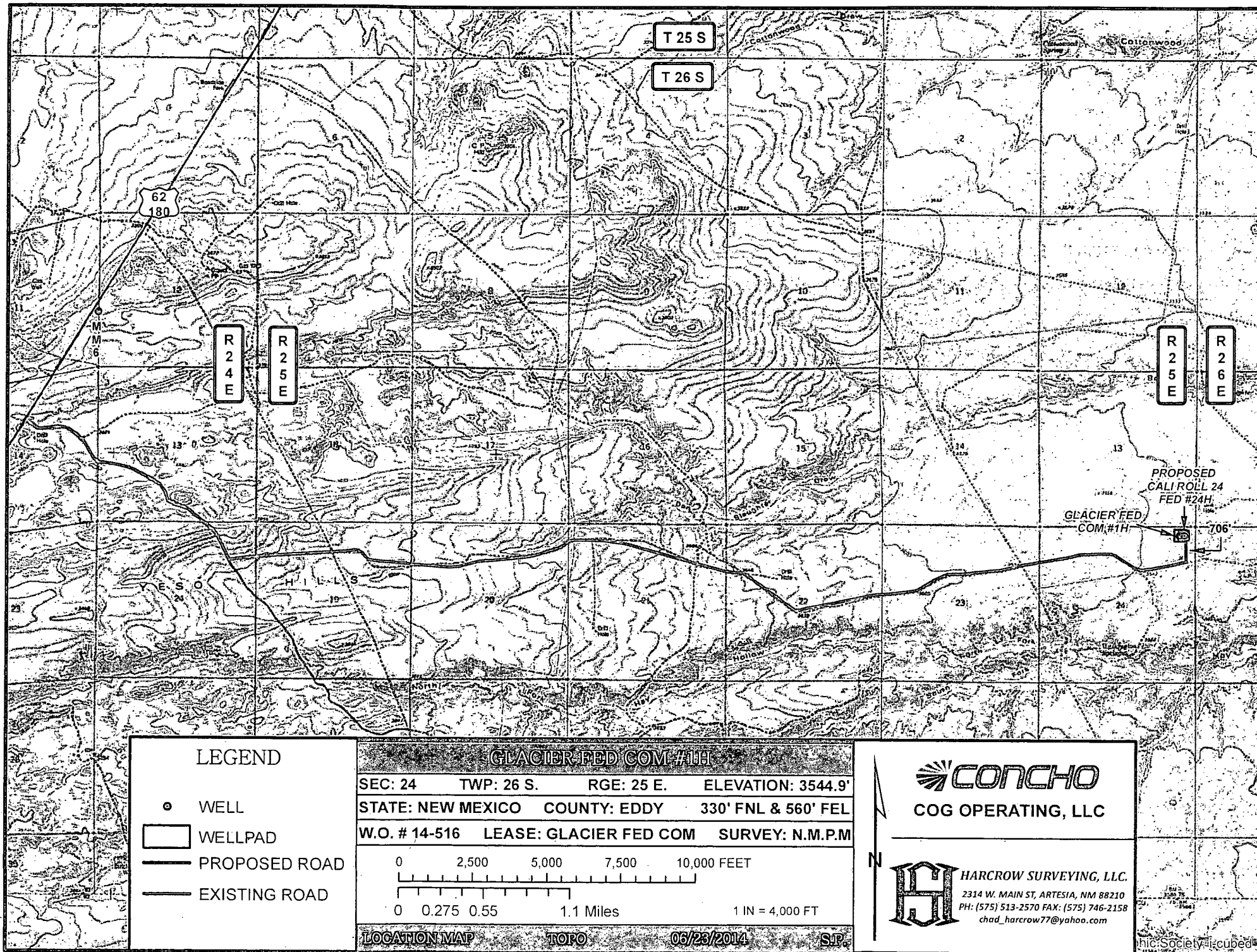
PAGE: 1 OF 1

DRAFTING DATE: 6/23/2014

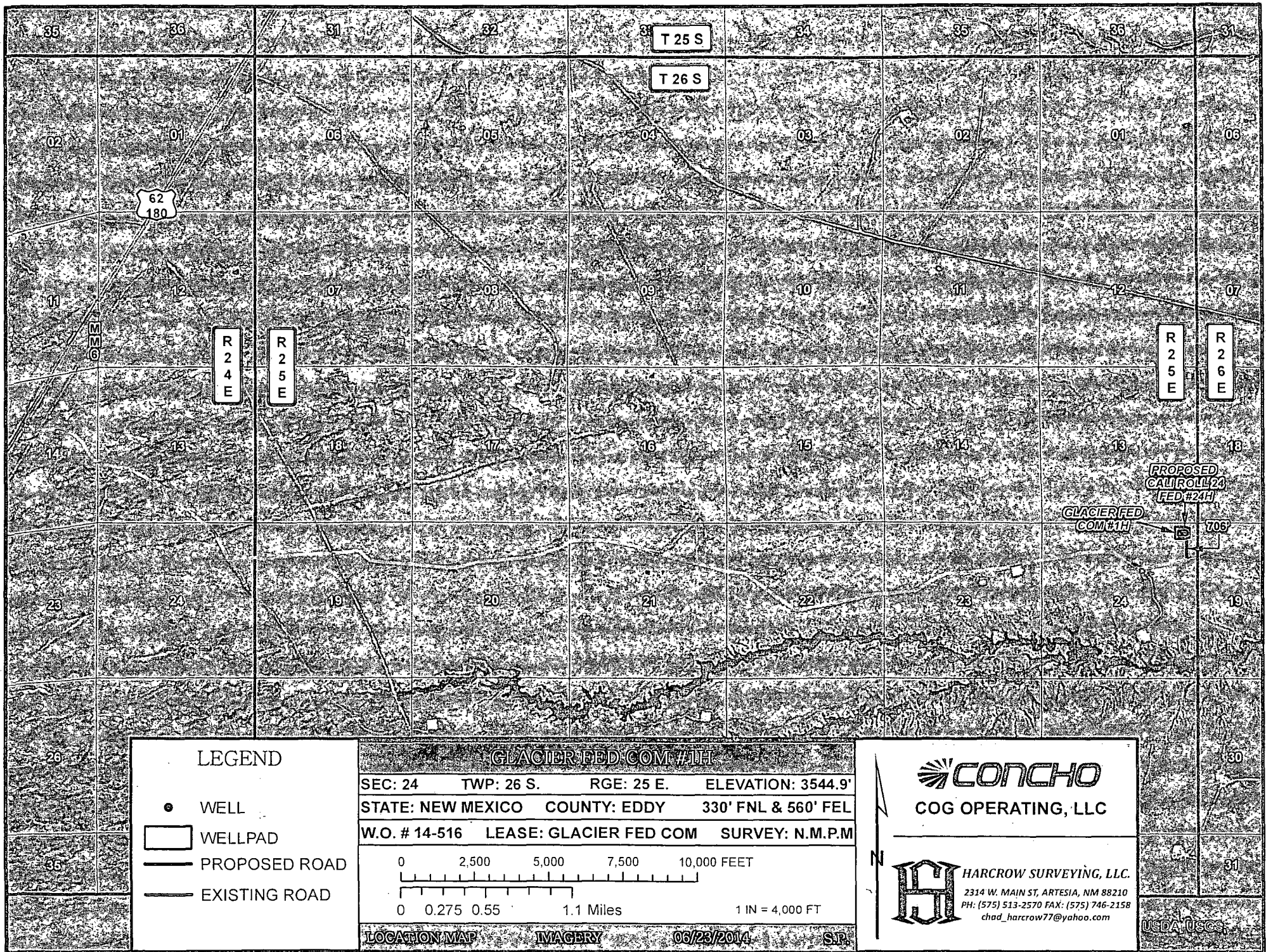
APPROVED BY: CH

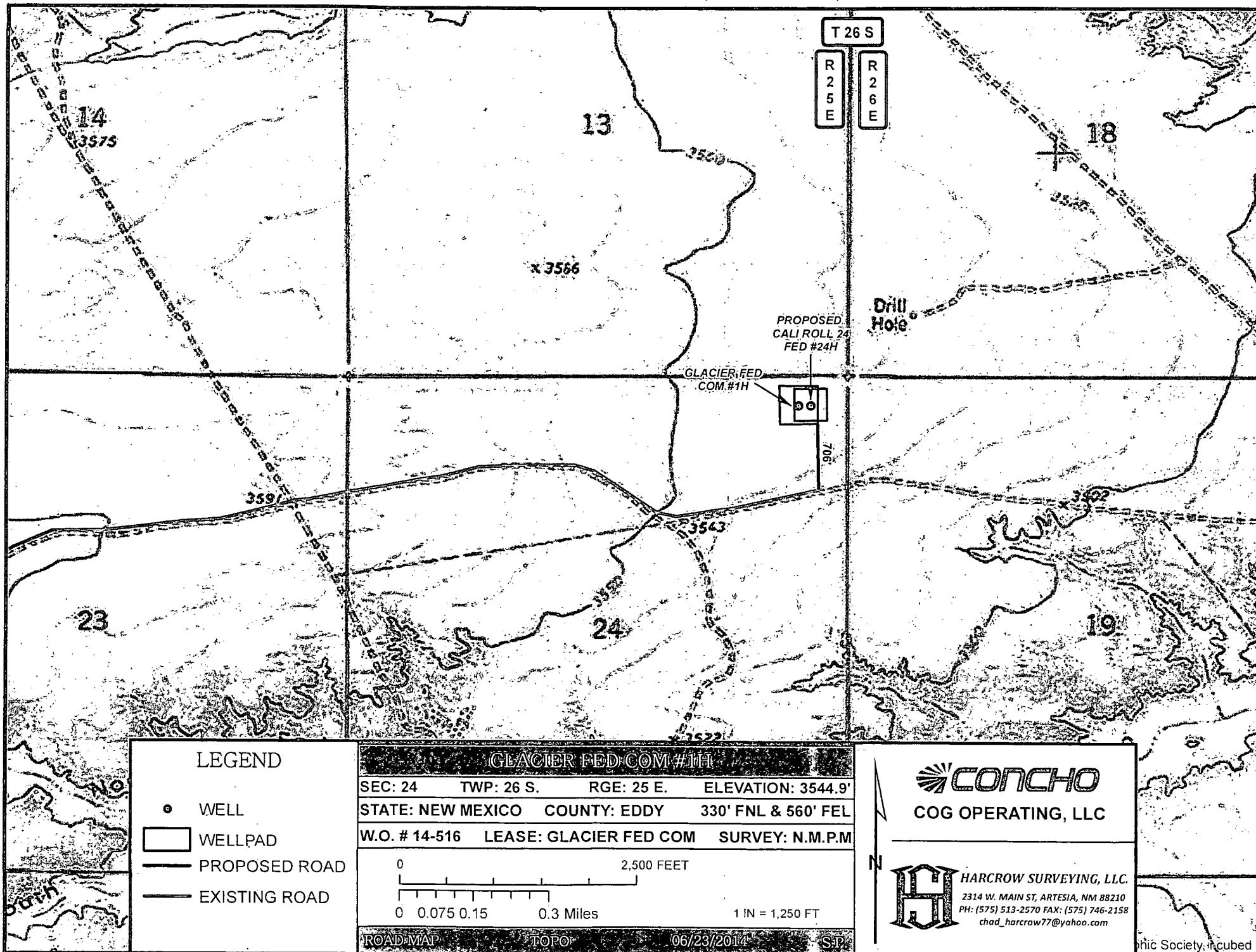
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FILE: 14-516

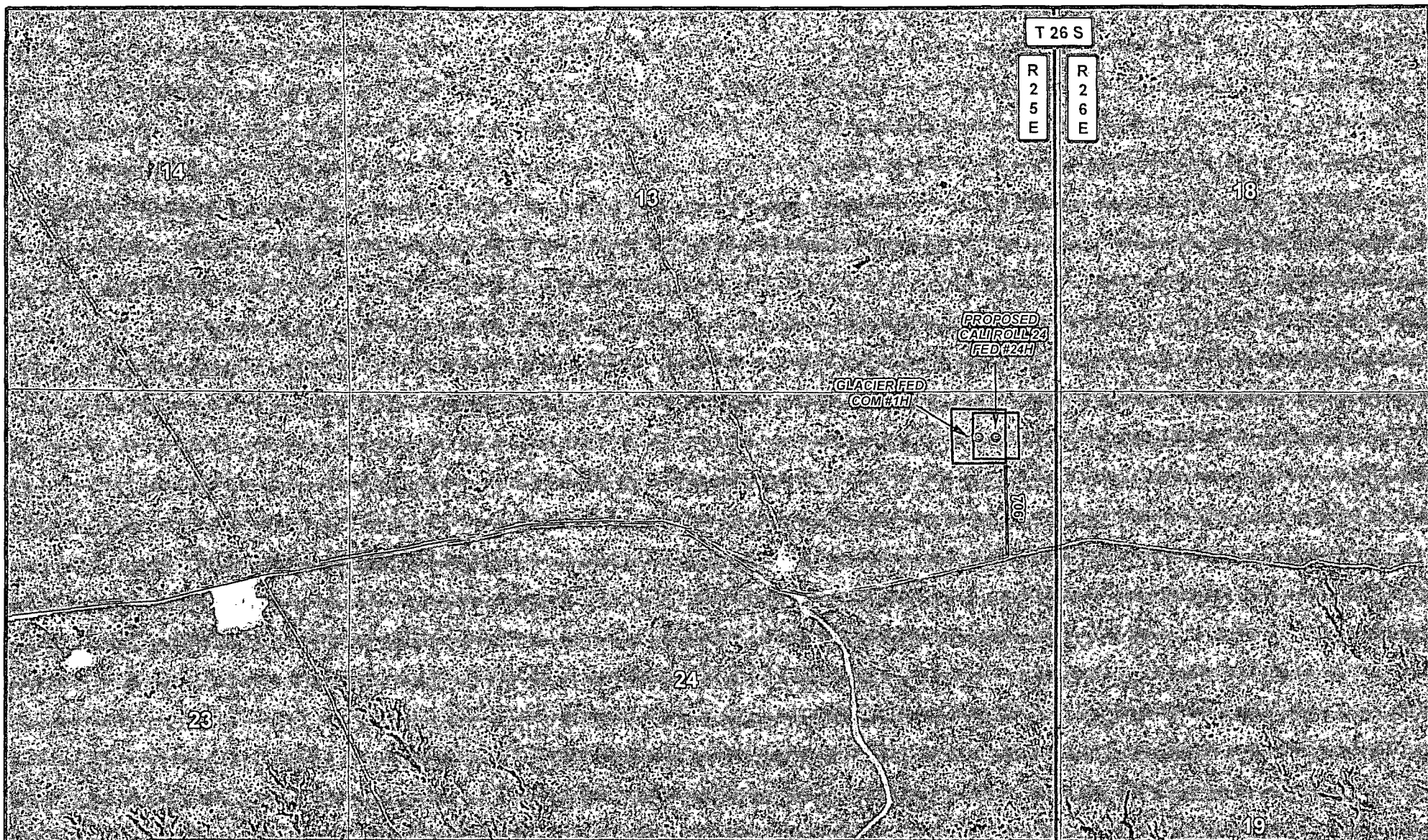










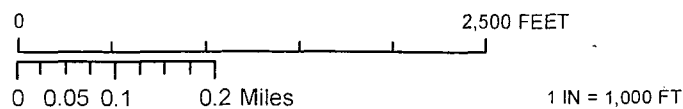


### LEGEND

- WELL
- WELLPAD
- - - PROPOSED ROAD
- EXISTING ROAD

### GLACIER FED COM #1H

SEC: 24 TWP: 26 S. RGE: 25 E. ELEVATION: 3544.9'  
STATE: NEW MEXICO COUNTY: EDDY 330' FNL & 560' FEL  
W.O. # 14-516 LEASE: GLACIER FED COM SURVEY: N.M.P.M



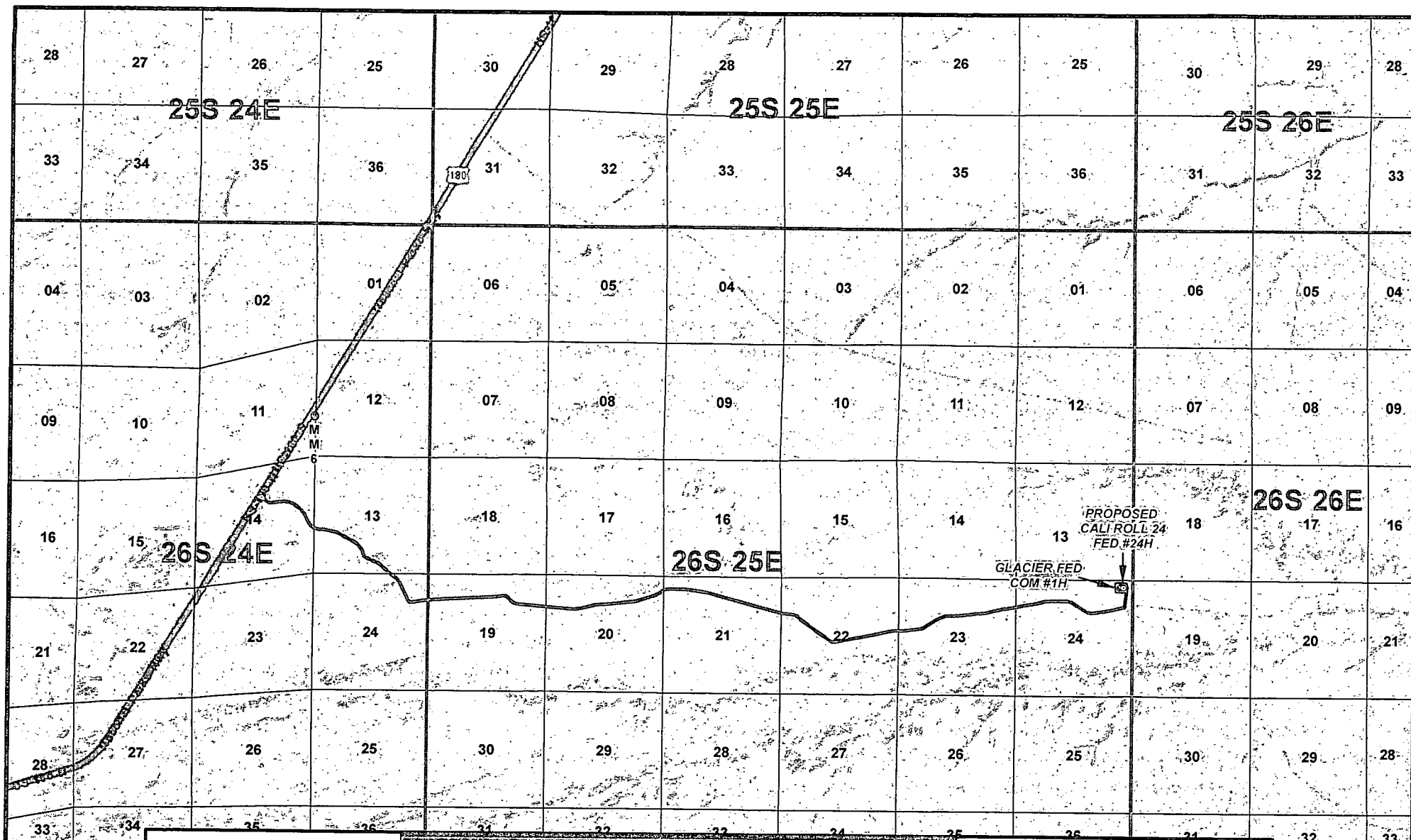
ROAD MAP IMAGERY 06/28/2014 S.R.

**CONCHO**  
COG OPERATING, LLC

**HARCROW SURVEYING, LLC.**  
2314 W. MAIN ST, ARTESIA, NM 88210  
PH: (575) 513-2570 FAX: (575) 746-2158  
chad\_harcrow77@yahoo.com

USDA-USGS





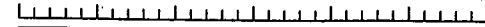
# LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- EXISTING ROAD

GLACIER FED COM #1H

SEC: 24 TWP: 26 S. RGE: 25 E. ELEVATION: 3544.9'  
 STATE: NEW MEXICO COUNTY: EDDY 330' FNL & 560' FEL  
 W.O. # 14-516 LEASE: GLACIER FED COM SURVEY: N.M.P.M

0 2,500 5,000 7,500 10,000 12,500 15,000 FEET



0 0.425 0.85 1.7 Miles

1 IN = 6,000 FT

VICINITY MAP

06/23/2014

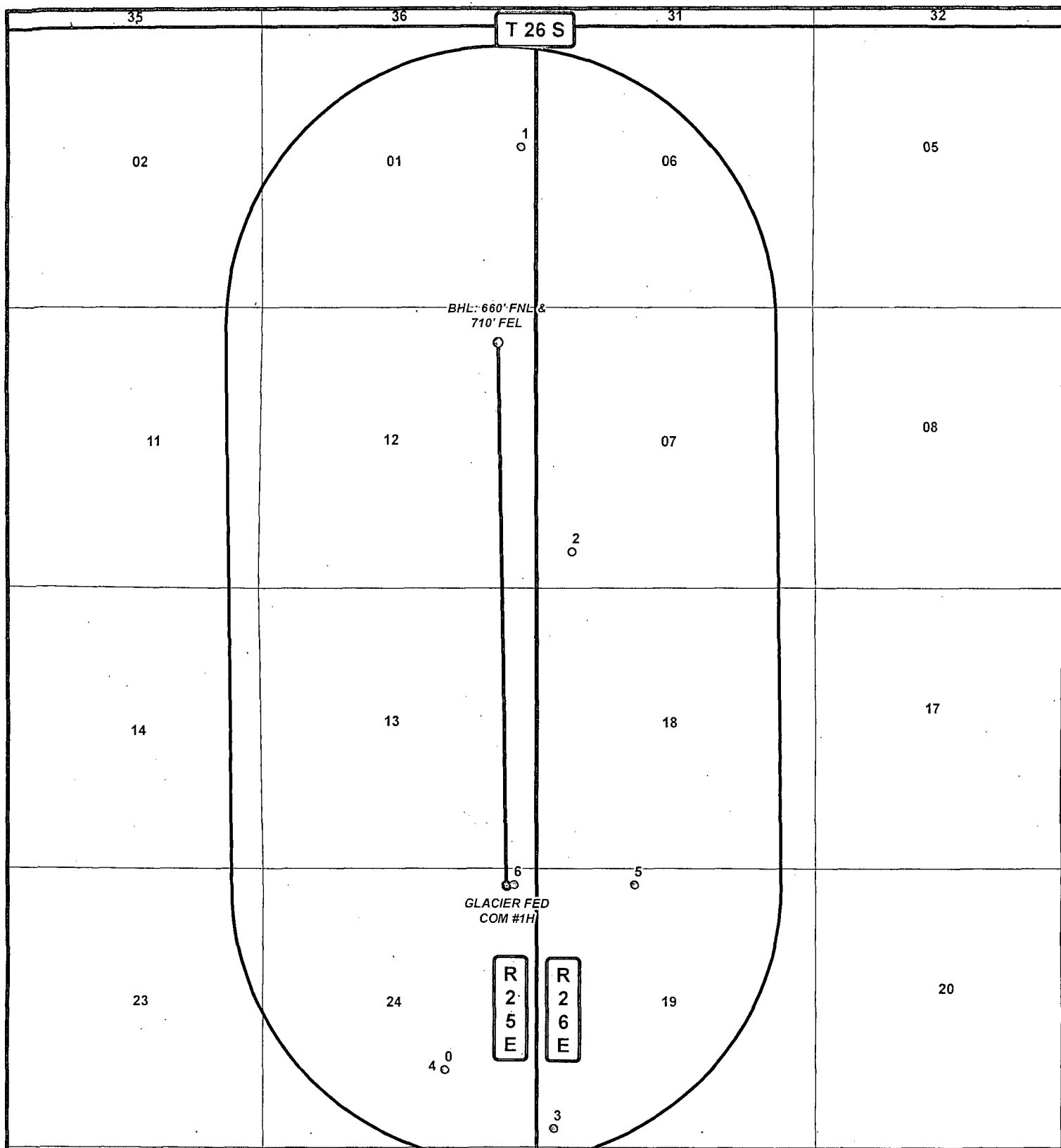
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**CONCHO**  
 COG OPERATING, LLC



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 2314 W. MAIN ST. ARTESIA, NM 88210  
 PH: (575) 513-2570 FAX: (575) 746-2158  
 chad\_harcrow77@yahoo.com

John, METI, Esri  
 tors, and the GIS



DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH MAY 15, 2014.

# LEGEND

- WELL
- ◊ BOTTOMHOLE
- ◊ WELLS WITHIN 1 MI.
- 1 MI. BUFFER

## GLACIER FED COM #1H

SEC: 24 TWP: 26 S. RGE: 25 E. ELEVATION: 3544.9'  
 STATE: NEW MEXICO COUNTY: EDDY 660' FNL & 710' FEL  
 W.O. # 14-559 LEASE: GLACIER FED COM SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.15 0.3 0.6 Miles

1 IN = 2,500 FT

1 MILE MAP

06/27/2014

SP

**CONCHO**  
 COG OPERATING, LLC



**HARCROW SURVEYING, LLC.**  
 2314 W. MAIN ST, ARTESIA, NM 88210  
 PH: (575) 513-2570 FAX: (575) 746-2158  
 chad\_harcrow77@yahoo.com

FID	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	COG OPERATING LLC	CALI ROLL FEDERAL 001H	32.024619	-104.346414	3001537267	24	26.0S	25E	1470	S	1755	E	5507	New (Not drilled or compl)
1	W E DOOLEN	MILNER FED 001	32.072864	-104.341684	3001500141	1	26.0S	25E	2310	N	330	E	0	Plugged
2	D L MCBRIDE ET AL	RANDEL FED 001	32.051712	-104.338521	3001500419	7	26.0S	26E	660	S	660	W	0	Plugged
3	W E DOOLEN	PRICE FED 001	32.021491	-104.33966	3001500422	19	26.0S	26E	330	S	330	W	0	Plugged
4	OXY USA INC	BUENA VISTA 24-25 FEDERAL 001C	32.024619	-104.346414	3001534459	24	26.0S	25E	1470	S	1755	E	0	New (Not drilled or compl)
5	COG OPERATING LLC	YELLOW FIN FEDERAL COM 002H	32.034326	-104.334605	3001541129	19	26.0S	26E	330	N	1880	W	7777	New (Not drilled or compl)
6	COG OPERATING LLC	CALI ROLL 24 FEDERAL 002H	32.034334	-104.342095	3001539388	24	26.0S	25E	330	N	430	E	0	New (Not drilled or compl)

Glacier Federal Com #1H

**COG Operating, LLC**  
**DRILLING AND OPERATIONS PROGRAM**  
**Glacier Federal Com 1H**  
**SHL: 330' FNL & 560' FEL, Section 24**  
**BHL: 660' FNL & 710' FEL, Section 12**  
**T26S, R25E**  
**Eddy County, New Mexico**

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Operating LLC submits the following eleven items of pertinent information in accordance with BLM requirements.

1. Geological surface formation: Permian
2. The estimated tops of geologic markers & estimated depths at which anticipated water, oil or gas formations are expected to be encountered are as follows:

Rustler	78'	
Fresh Water	150'	
Salado	378'	
Fletcher	1,430'	
Lamar Lime	1,617'	
Bell Canyon	1,661'	Oil
Cherry Canyon	2,520'	Oil
Brushy Canyon	3,629'	Oil
Bone Spring	5,126'	Oil
U Avalon Shale	5,233'	Oil
L Avalon Shale	5,550'	Oil
Bone Spring	5,126'	Oil
1 <sup>st</sup> BS Sand	6,014'	Oil
2 <sup>nd</sup> BS Sand	6,715'	Oil
3 <sup>rd</sup> BS Sand	7,780'	Oil
Wolfcamp	8,100'	Oil/Gas
Strawn	9,875'	Oil/Gas
Lateral TD MD	18,292'	
Lateral TD TVD	8,410'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities.

The surface fresh water sands will be protected by setting 13-3/8" casing at <sup>400'</sup>~~300'~~ and circulating cement back to surface.

The salt sections will be isolated by setting 9-5/8" casing at <sup>1550'</sup>~~1,630'~~ and circulating cement back to surface.

Other intervals will be isolated by setting 5 1/2" casing to total depth and circulating cement back to 1,130' (500' overlap with intermediate casing).



### 3. Proposed Casing Program: All casing is new and API approved

See COA

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - <sup>400'</sup> <del>300'</del>	Surface	13 3/8"	New	48#	STC	H-40	1.125	1.125	1.6
12 1/4"	0' - <sup>1550'</sup> <del>1630'</del>	Intrmd	9 5/8"	New	36#	LTC	J-55	1.125	1.125	1.6
8 3/4"	0' - 18,292'	Production, Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6

- While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.
- Will run one centralizer every other joint in lateral section of well.

### 4. Proposed Cement Program

#### a. 13-3/8" Surface

320 sx Class C + 2% CaCl<sub>2</sub>  
(14.8 ppg / 6.35 gal/sk / 1.34 ft<sup>3</sup>/sk)

\*\*Calculated w/100% excess on OH volumes

#### b. 9 5/8" Intermediate:

Lead: 360 sx Class C + 4% Gel + 1% CaCl<sub>2</sub>  
(13.5 ppg / 9.2 gal/sk / 1.75 ft<sup>3</sup>/sk)

Tail: 200 sx Class C + 2% CaCl<sub>2</sub>  
(14.8 ppg / 6.35 gal/sk / 1.34 ft<sup>3</sup>/sk)

\*\*Calculated w/85% excess on OH volumes

#### c. 5 1/2" Production

Lead: 975 sx 50:50:10 H w/ 8# salt, 5# kolseal, 0.5% Halad-322, 0.3% HR-601 & 1/4# D-Air 5000 (11.9 ppg / 14.07 gal/sk / 2.51 ft<sup>3</sup>/sk)

Tail: 3000 sx 50:50:2 H w/ 1% salt, 0.4% GasStop, 0.3% CFR-3 & 0.1% HR601, & CFR-3 (14.4 ppg / 5.66 gal/sk 1.25 ft<sup>3</sup>/sk)

\*\*Calculated w/40% excess on OH volumes

- The above cement volumes could be revised pending caliper measurements.
- The surface and intermediate casing strings are designed to circulate cement to surface.
- The production casing will be cemented 500' up into the intermediate casing.

## 5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8" with minimum 2M annular preventer. Annular will be tested to 2000 psi by independent tester.

Nipple up on 9 5/8" with minimum 5M annular and double ram preventers. Annular will be tested to 50% of WP and remainder of system tested to 5000 psi by independent tester.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

A 2" kill line and a minimum 3" choke line will be included in the drilling spool located below the ram-type BOP. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold with 5000 psi WP rating.

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string depth or 1500 psig, whichever is greater, but not to exceed 70 percent of casing's minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action will be taken.

While drilling the intermediate section, if a reading of H<sub>2</sub>S is greater than 100 ppm, well will be shut-in and a remote operated choke will be installed.

## 6. Estimated BHP & BHT:

Lateral TD = 4023 psi

Lateral TD = 137° F

## 7. Mud Program: The applicable depths and properties of this system are as follows:

See COA

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' - 300'	Fresh Water	8.4 - 9.0	29	N.C.
300' - 1,630'	Brine	10.0 - 10.3	29	N.C.
1,630' - 18,292' (Lateral)	Cut Brine	8.8 - 9.4	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume totalizer, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

**8. Auxiliary Well Control and Monitoring Equipment:**

- a. A Kelly cock will be in the drill string at all times.
- b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
- c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 5 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

**9. Testing, Logging and Coring Program:**

- a. Drill stem tests will be based on geological sample shows.
- b. If open hole electrical logging is performed, the program will be:
  - i. Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
  - ii. Total Depth to Surface: Compensated Neutron with Gamma Ray
  - iii. No cores are planned.
  - iv. Additional testing will be initiated subsequent to setting the 5 1/2" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows and drill stem tests.

**10. Potential Hazards:**

- a. No abnormal pressures or temperatures are expected. There is no known presence of H<sub>2</sub>S in this area. If H<sub>2</sub>S is encountered the operator will comply with the provisions of Onshore Oil and Gas Order No. 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. No H<sub>2</sub>S is anticipated to be encountered.

**11. Anticipated starting date and Duration of Operations:**

- a. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.

# **COG Operating, LLC**

Eddy County, NM (NAD 27)

Sec 24, T26S, R25E

Glacier Federal Com #1H

Wellbore #1

Plan: Design #2

## **DDC Well Planning Report**

30 June, 2014





**DDC**  
Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Glacier Federal Com #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Project:	Eddy County, NM (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Sec 24, T26S, R25E		
Site Position:	Northing:	376,145.00 usft	Latitude: 32° 2' 2.893 N
From: Map	Easting:	497,293.00 usft	Longitude: 104° 20' 31.448 W
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16"	Grid Convergence: 0.00 °

Well:	Glacier Federal Com #1H		
Well Position	+N/-S	0.0 usft	Northing: 376,145.00 usft
	+E/-W	0.0 usft	Easting: 497,293.00 usft
Position Uncertainty	0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 3,544.9 usft

Wellbore:	Wellbore #1		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/24/2014	7.55	59.80	48,114

Design:	Design #2		
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Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	359.14

Plan Sections:										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
7,668.6	0.00	0.00	7,668.6	0.0	0.0	0.00	0.00	0.00	0.00	
8,251.9	70.00	339.40	8,117.3	294.1	-110.5	12.00	12.00	0.00	339.40	
8,479.8	88.54	359.97	8,160.0	512.4	-149.0	12.00	8.13	9.02	49.86	
18,291.9	88.54	359.97	8,410.0	10,321.3	-154.7	0.00	0.00	0.00	0.00	PBHL Glacier Federal

**DDC**  
Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Glacier Federal Com #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Rustler</b>										
77.9	0.00	0.00	77.9	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>TOS</b>										
377.9	0.00	0.00	377.9	0.0	0.0	0.0	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>BOS (Fletcher)</b>										
1,429.9	0.00	0.00	1,429.9	0.0	0.0	0.0	0.00	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>LMAR (Top Delaware)</b>										
1,616.9	0.00	0.00	1,616.9	0.0	0.0	0.0	0.00	0.00	0.00	
<b>BLCN</b>										
1,660.9	0.00	0.00	1,660.9	0.0	0.0	0.0	0.00	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>CYCN</b>										
2,519.9	0.00	0.00	2,519.9	0.0	0.0	0.0	0.00	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>BYCN</b>										
3,628.9	0.00	0.00	3,628.9	0.0	0.0	0.0	0.00	0.00	0.00	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00	

**DDC**  
Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Glacier Federal Com #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Bone Spring (BSGL)</b>										
5,125.9	0.00	0.00	5,125.9	0.0	0.0	0.0	0.00	0.00	0.00	
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Upper Avalon Shale</b>										
5,232.9	0.00	0.00	5,232.9	0.0	0.0	0.0	0.00	0.00	0.00	
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Lower Avalon Shale</b>										
5,549.9	0.00	0.00	5,549.9	0.0	0.0	0.0	0.00	0.00	0.00	
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>FBSG_sand</b>										
6,013.9	0.00	0.00	6,013.9	0.0	0.0	0.0	0.00	0.00	0.00	
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>SBSG_sand</b>										
6,714.9	0.00	0.00	6,714.9	0.0	0.0	0.0	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>Curve KOP / Build 12°/100' / 339.4° Azm.</b>										
7,668.6	0.00	0.00	7,668.6	0.0	0.0	0.0	0.00	0.00	0.00	
7,675.0	0.77	339.40	7,675.0	0.0	0.0	0.0	12.00	12.00	0.00	
7,700.0	3.77	339.40	7,700.0	1.0	-0.4	1.0	12.00	12.00	0.00	
7,725.0	6.77	339.40	7,724.9	3.1	-1.2	3.1	12.00	12.00	0.00	

**DDC**  
Well Planning Report



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Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
7,750.0	9.77	339.40	7,749.6	6.5	-2.4	6.5	12.00	12.00	0.00	
7,775.0	12.77	339.40	7,774.1	11.1	-4.2	11.1	12.00	12.00	0.00	
TBSG_sand										
7,781.2	13.52	339.40	7,780.2	12.4	-4.7	12.4	12.00	12.00	0.00	
7,800.0	15.77	339.40	7,798.3	16.8	-6.3	16.9	12.00	12.00	0.00	
7,825.0	18.77	339.40	7,822.2	23.8	-8.9	23.9	12.00	12.00	0.00	
7,850.0	21.77	339.40	7,845.7	31.9	-12.0	32.0	12.00	12.00	0.00	
7,875.0	24.77	339.40	7,868.6	41.1	-15.5	41.3	12.00	12.00	0.00	
7,900.0	27.77	339.40	7,891.0	51.5	-19.3	51.8	12.00	12.00	0.00	
7,925.0	30.77	339.40	7,912.9	62.9	-23.6	63.3	12.00	12.00	0.00	
7,950.0	33.77	339.40	7,934.0	75.4	-28.3	75.8	12.00	12.00	0.00	
7,975.0	36.77	339.40	7,954.4	88.9	-33.4	89.4	12.00	12.00	0.00	
8,000.0	39.77	339.40	7,974.0	103.4	-38.9	104.0	12.00	12.00	0.00	
8,025.0	42.77	339.40	7,992.8	118.8	-44.7	119.5	12.00	12.00	0.00	
8,050.0	45.77	339.40	8,010.7	135.2	-50.8	135.9	12.00	12.00	0.00	
8,075.0	48.77	339.40	8,027.7	152.4	-57.3	153.2	12.00	12.00	0.00	
8,100.0	51.77	339.40	8,043.7	170.4	-64.0	171.3	12.00	12.00	0.00	
8,125.0	54.77	339.40	8,058.6	189.1	-71.1	190.1	12.00	12.00	0.00	
8,150.0	57.77	339.40	8,072.5	208.6	-78.4	209.7	12.00	12.00	0.00	
8,175.0	60.77	339.40	8,085.3	228.7	-86.0	229.9	12.00	12.00	0.00	
8,200.0	63.77	339.40	8,096.9	249.4	-93.7	250.8	12.00	12.00	0.00	
Wolfcamp										
8,223.0	66.52	339.40	8,106.5	268.9	-101.1	270.4	12.00	12.00	0.00	
8,225.0	66.77	339.40	8,107.3	270.6	-101.7	272.1	12.00	12.00	0.00	
Build & Turn @ 12°/100'										
8,251.9	70.00	339.40	8,117.3	294.1	-110.5	295.7	12.00	12.00	0.00	
8,275.0	71.80	341.63	8,124.8	314.6	-117.8	316.4	12.00	7.80	9.66	
8,300.0	73.78	343.99	8,132.2	337.4	-124.9	339.3	12.00	7.91	9.45	
8,325.0	75.78	346.30	8,138.8	360.7	-131.0	362.7	12.00	8.01	9.26	
8,350.0	77.80	348.58	8,144.5	384.5	-136.3	386.5	12.00	8.10	9.10	
8,375.0	79.85	350.82	8,149.3	408.6	-140.7	410.7	12.00	8.17	8.96	
8,400.0	81.90	353.03	8,153.3	433.1	-144.2	435.2	12.00	8.23	8.84	
8,425.0	83.97	355.22	8,156.4	457.7	-146.7	459.9	12.00	8.28	8.75	
8,450.0	86.05	357.39	8,158.6	482.6	-148.3	484.8	12.00	8.31	8.69	
8,475.0	88.14	359.55	8,159.8	507.5	-149.0	509.7	12.00	8.34	8.64	
End of Curve & Turn @ 8480' MD / 88.54° Inc. / 359.97° Azm. / 8160' TVD										
8,479.8	88.54	359.97	8,160.0	512.4	-149.0	514.6	12.00	8.34	8.63	
8,500.0	88.54	359.97	8,160.5	532.5	-149.0	534.7	0.00	0.00	0.00	
8,600.0	88.54	359.97	8,163.0	632.5	-149.1	634.7	0.00	0.00	0.00	
8,700.0	88.54	359.97	8,165.6	732.5	-149.1	734.6	0.00	0.00	0.00	
8,800.0	88.54	359.97	8,168.1	832.4	-149.2	834.6	0.00	0.00	0.00	
8,900.0	88.54	359.97	8,170.7	932.4	-149.3	934.5	0.00	0.00	0.00	
9,000.0	88.54	359.97	8,173.2	1,032.4	-149.3	1,034.5	0.00	0.00	0.00	
9,100.0	88.54	359.97	8,175.8	1,132.3	-149.4	1,134.5	0.00	0.00	0.00	
9,200.0	88.54	359.97	8,178.3	1,232.3	-149.4	1,234.4	0.00	0.00	0.00	
9,300.0	88.54	359.97	8,180.9	1,332.3	-149.5	1,334.4	0.00	0.00	0.00	
9,400.0	88.54	359.97	8,183.4	1,432.2	-149.5	1,434.3	0.00	0.00	0.00	
9,500.0	88.54	359.97	8,186.0	1,532.2	-149.6	1,534.3	0.00	0.00	0.00	
9,600.0	88.54	359.97	8,188.5	1,632.2	-149.7	1,634.2	0.00	0.00	0.00	
9,700.0	88.54	359.97	8,191.1	1,732.1	-149.7	1,734.2	0.00	0.00	0.00	
9,800.0	88.54	359.97	8,193.6	1,832.1	-149.8	1,834.2	0.00	0.00	0.00	
9,900.0	88.54	359.97	8,196.2	1,932.1	-149.8	1,934.1	0.00	0.00	0.00	
10,000.0	88.54	359.97	8,198.7	2,032.1	-149.9	2,034.1	0.00	0.00	0.00	



**DDC**  
Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Glacier Federal Com #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,100.0	88.54	359.97	8,201.2	2,132.0	-149.9	2,134.0	0.00	0.00	0.00
10,200.0	88.54	359.97	8,203.8	2,232.0	-150.0	2,234.0	0.00	0.00	0.00
10,300.0	88.54	359.97	8,206.3	2,332.0	-150.1	2,333.9	0.00	0.00	0.00
10,400.0	88.54	359.97	8,208.9	2,431.9	-150.1	2,433.9	0.00	0.00	0.00
10,500.0	88.54	359.97	8,211.4	2,531.9	-150.2	2,533.9	0.00	0.00	0.00
10,600.0	88.54	359.97	8,214.0	2,631.9	-150.2	2,633.8	0.00	0.00	0.00
10,700.0	88.54	359.97	8,216.5	2,731.8	-150.3	2,733.8	0.00	0.00	0.00
10,800.0	88.54	359.97	8,219.1	2,831.8	-150.4	2,833.7	0.00	0.00	0.00
10,900.0	88.54	359.97	8,221.6	2,931.8	-150.4	2,933.7	0.00	0.00	0.00
11,000.0	88.54	359.97	8,224.2	3,031.7	-150.5	3,033.6	0.00	0.00	0.00
11,100.0	88.54	359.97	8,226.7	3,131.7	-150.5	3,133.6	0.00	0.00	0.00
11,200.0	88.54	359.97	8,229.3	3,231.7	-150.6	3,233.6	0.00	0.00	0.00
11,300.0	88.54	359.97	8,231.8	3,331.6	-150.6	3,333.5	0.00	0.00	0.00
11,400.0	88.54	359.97	8,234.4	3,431.6	-150.7	3,433.5	0.00	0.00	0.00
11,500.0	88.54	359.97	8,236.9	3,531.6	-150.8	3,533.4	0.00	0.00	0.00
11,600.0	88.54	359.97	8,239.5	3,631.5	-150.8	3,633.4	0.00	0.00	0.00
11,700.0	88.54	359.97	8,242.0	3,731.5	-150.9	3,733.3	0.00	0.00	0.00
11,800.0	88.54	359.97	8,244.6	3,831.5	-150.9	3,833.3	0.00	0.00	0.00
11,900.0	88.54	359.97	8,247.1	3,931.4	-151.0	3,933.3	0.00	0.00	0.00
12,000.0	88.54	359.97	8,249.7	4,031.4	-151.1	4,033.2	0.00	0.00	0.00
12,100.0	88.54	359.97	8,252.2	4,131.4	-151.1	4,133.2	0.00	0.00	0.00
12,200.0	88.54	359.97	8,254.8	4,231.3	-151.2	4,233.1	0.00	0.00	0.00
12,300.0	88.54	359.97	8,257.3	4,331.3	-151.2	4,333.1	0.00	0.00	0.00
12,400.0	88.54	359.97	8,259.9	4,431.3	-151.3	4,433.0	0.00	0.00	0.00
12,500.0	88.54	359.97	8,262.4	4,531.2	-151.3	4,533.0	0.00	0.00	0.00
12,600.0	88.54	359.97	8,265.0	4,631.2	-151.4	4,633.0	0.00	0.00	0.00
12,700.0	88.54	359.97	8,267.5	4,731.2	-151.5	4,732.9	0.00	0.00	0.00
12,800.0	88.54	359.97	8,270.1	4,831.1	-151.5	4,832.9	0.00	0.00	0.00
12,900.0	88.54	359.97	8,272.6	4,931.1	-151.6	4,932.8	0.00	0.00	0.00
13,000.0	88.54	359.97	8,275.1	5,031.1	-151.6	5,032.8	0.00	0.00	0.00
13,100.0	88.54	359.97	8,277.7	5,131.0	-151.7	5,132.7	0.00	0.00	0.00
13,200.0	88.54	359.97	8,280.2	5,231.0	-151.7	5,232.7	0.00	0.00	0.00
13,300.0	88.54	359.97	8,282.8	5,331.0	-151.8	5,332.7	0.00	0.00	0.00
13,400.0	88.54	359.97	8,285.3	5,430.9	-151.9	5,432.6	0.00	0.00	0.00
13,500.0	88.54	359.97	8,287.9	5,530.9	-151.9	5,532.6	0.00	0.00	0.00
13,600.0	88.54	359.97	8,290.4	5,630.9	-152.0	5,632.5	0.00	0.00	0.00
13,700.0	88.54	359.97	8,293.0	5,730.8	-152.0	5,732.5	0.00	0.00	0.00
13,800.0	88.54	359.97	8,295.5	5,830.8	-152.1	5,832.4	0.00	0.00	0.00
13,900.0	88.54	359.97	8,298.1	5,930.8	-152.2	5,932.4	0.00	0.00	0.00
14,000.0	88.54	359.97	8,300.6	6,030.8	-152.2	6,032.4	0.00	0.00	0.00
14,100.0	88.54	359.97	8,303.2	6,130.7	-152.3	6,132.3	0.00	0.00	0.00
14,200.0	88.54	359.97	8,305.7	6,230.7	-152.3	6,232.3	0.00	0.00	0.00
14,300.0	88.54	359.97	8,308.3	6,330.7	-152.4	6,332.2	0.00	0.00	0.00
14,400.0	88.54	359.97	8,310.8	6,430.6	-152.4	6,432.2	0.00	0.00	0.00
14,500.0	88.54	359.97	8,313.4	6,530.6	-152.5	6,532.1	0.00	0.00	0.00
14,600.0	88.54	359.97	8,315.9	6,630.6	-152.6	6,632.1	0.00	0.00	0.00
14,700.0	88.54	359.97	8,318.5	6,730.5	-152.6	6,732.1	0.00	0.00	0.00
14,800.0	88.54	359.97	8,321.0	6,830.5	-152.7	6,832.0	0.00	0.00	0.00
14,900.0	88.54	359.97	8,323.6	6,930.5	-152.7	6,932.0	0.00	0.00	0.00
15,000.0	88.54	359.97	8,326.1	7,030.4	-152.8	7,031.9	0.00	0.00	0.00
15,100.0	88.54	359.97	8,328.7	7,130.4	-152.8	7,131.9	0.00	0.00	0.00
15,200.0	88.54	359.97	8,331.2	7,230.4	-152.9	7,231.8	0.00	0.00	0.00
15,300.0	88.54	359.97	8,333.8	7,330.3	-153.0	7,331.8	0.00	0.00	0.00
15,400.0	88.54	359.97	8,336.3	7,430.3	-153.0	7,431.8	0.00	0.00	0.00

# DDC Well Planning Report



Database:	EDM.5000.1 Single User Db-	Local Co-ordinate Reference:	Well Glacier Federal Com #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD.27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
15,500.0	88.54	359.97	8,338.9	7,530.3	-153.1	7,531.7	0.00	0.00	0.00	
15,600.0	88.54	359.97	8,341.4	7,630.2	-153.1	7,631.7	0.00	0.00	0.00	
15,700.0	88.54	359.97	8,344.0	7,730.2	-153.2	7,731.6	0.00	0.00	0.00	
15,800.0	88.54	359.97	8,346.5	7,830.2	-153.3	7,831.6	0.00	0.00	0.00	
15,900.0	88.54	359.97	8,349.0	7,930.1	-153.3	7,931.5	0.00	0.00	0.00	
16,000.0	88.54	359.97	8,351.6	8,030.1	-153.4	8,031.5	0.00	0.00	0.00	
16,100.0	88.54	359.97	8,354.1	8,130.1	-153.4	8,131.5	0.00	0.00	0.00	
16,200.0	88.54	359.97	8,356.7	8,230.0	-153.5	8,231.4	0.00	0.00	0.00	
16,300.0	88.54	359.97	8,359.2	8,330.0	-153.5	8,331.4	0.00	0.00	0.00	
16,400.0	88.54	359.97	8,361.8	8,430.0	-153.6	8,431.3	0.00	0.00	0.00	
16,500.0	88.54	359.97	8,364.3	8,529.9	-153.7	8,531.3	0.00	0.00	0.00	
16,600.0	88.54	359.97	8,366.9	8,629.9	-153.7	8,631.2	0.00	0.00	0.00	
16,700.0	88.54	359.97	8,369.4	8,729.9	-153.8	8,731.2	0.00	0.00	0.00	
16,800.0	88.54	359.97	8,372.0	8,829.8	-153.8	8,831.2	0.00	0.00	0.00	
16,900.0	88.54	359.97	8,374.5	8,929.8	-153.9	8,931.1	0.00	0.00	0.00	
17,000.0	88.54	359.97	8,377.1	9,029.8	-154.0	9,031.1	0.00	0.00	0.00	
17,100.0	88.54	359.97	8,379.6	9,129.7	-154.0	9,131.0	0.00	0.00	0.00	
17,200.0	88.54	359.97	8,382.2	9,229.7	-154.1	9,231.0	0.00	0.00	0.00	
17,300.0	88.54	359.97	8,384.7	9,329.7	-154.1	9,330.9	0.00	0.00	0.00	
17,400.0	88.54	359.97	8,387.3	9,429.6	-154.2	9,430.9	0.00	0.00	0.00	
17,500.0	88.54	359.97	8,389.8	9,529.6	-154.2	9,530.9	0.00	0.00	0.00	
17,600.0	88.54	359.97	8,392.4	9,629.6	-154.3	9,630.8	0.00	0.00	0.00	
17,700.0	88.54	359.97	8,394.9	9,729.6	-154.4	9,730.8	0.00	0.00	0.00	
17,800.0	88.54	359.97	8,397.5	9,829.5	-154.4	9,830.7	0.00	0.00	0.00	
17,900.0	88.54	359.97	8,400.0	9,929.5	-154.5	9,930.7	0.00	0.00	0.00	
18,000.0	88.54	359.97	8,402.6	10,029.5	-154.5	10,030.6	0.00	0.00	0.00	
18,100.0	88.54	359.97	8,405.1	10,129.4	-154.6	10,130.6	0.00	0.00	0.00	
18,200.0	88.54	359.97	8,407.7	10,229.4	-154.6	10,230.6	0.00	0.00	0.00	
PBHL @ 18292' MD / 8410' TVD										
18,291.9	88.54	359.97	8,410.0	10,321.3	-154.7	10,322.5	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
hit/miss target										
Shape										
PBHL Glacier Federal C	0.00	0.01	8,410.0	10,321.3	-154.7	386,466.30	497,138.30	32° 3' 45.039 N	104° 20' 33.256 W	
- plan hits target center										
- Point										

**DDC**  
Well Planning Report



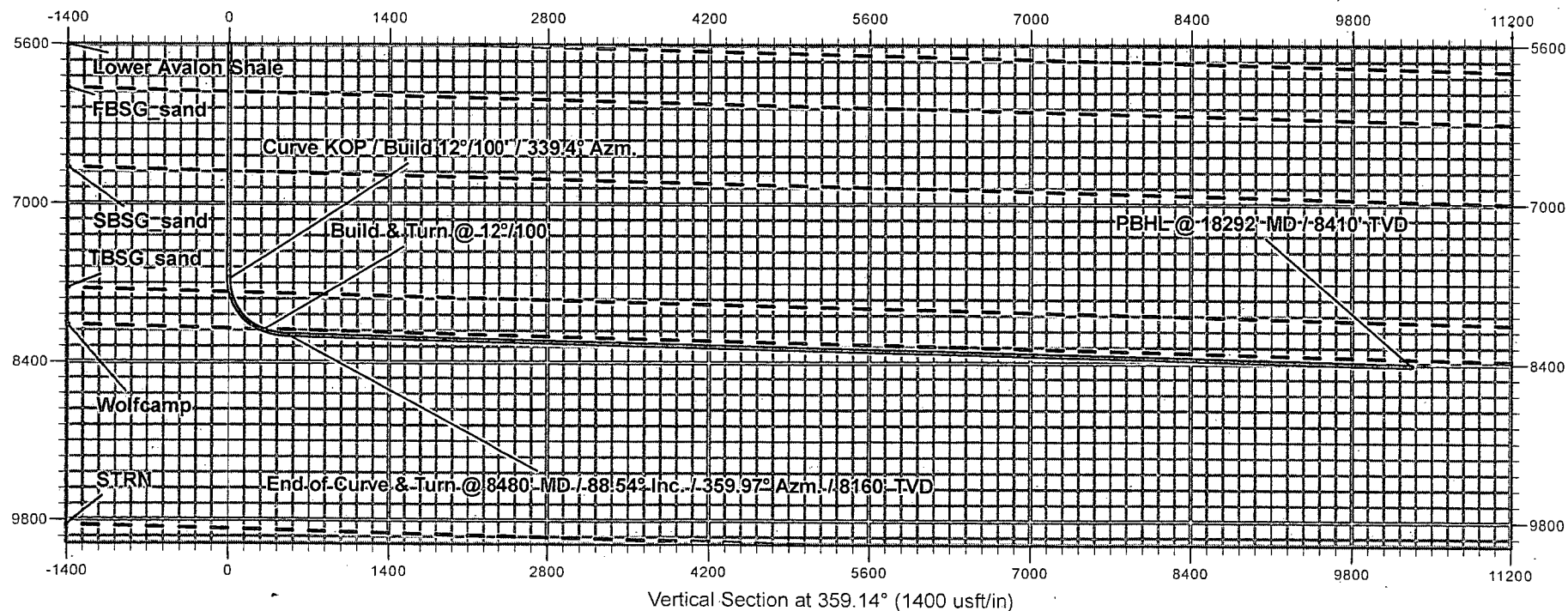
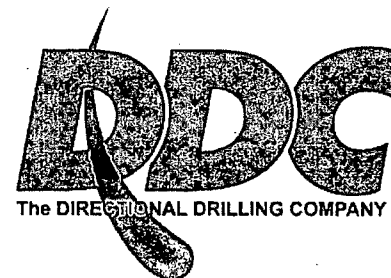
Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Glacier Federal Com #1H.
Company:	COG Operating, LLC	TVD Reference:	Well @ 3575.9usft (Ensign #772)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3575.9usft (Ensign #772)
Site:	Sec 24, T26S, R25E	North Reference:	Grid
Well:	Glacier Federal Com #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
77.9	77.9	Rustler		1.41	359.44	
377.9	377.9	TOS		1.41	359.44	
1,429.9	1,429.9	BOS (Fletcher)		1.41	359.44	
1,616.9	1,616.9	LMAR (Top Delaware)		1.41	359.44	
1,660.9	1,660.9	BLCN		1.41	359.44	
2,519.9	2,519.9	CYCN		1.41	359.44	
3,628.9	3,628.9	BYCN		1.41	359.44	
5,125.9	5,125.9	Bone Spring (BSGL)		1.41	359.44	
5,232.9	5,232.9	Upper Avalon Shale		1.41	359.44	
5,549.9	5,549.9	Lower Avalon Shale		1.41	359.44	
6,013.9	6,013.9	FBSG_sand		1.41	359.44	
6,714.9	6,714.9	SBSG_sand		1.41	359.44	
7,781.2	7,780.2	TBSG_sand		1.41	359.44	
8,223.0	8,106.5	Wolfcamp		1.41	359.44	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,668.6	7,668.6	0.0	0.0	Curve KOP / Build 12°/100' / 339.4° Azm.	
8,251.9	8,117.3	294.1	-110.5	Build & Turn @ 12°/100'	
8,479.8	8,160.0	512.4	-149.0	End of Curve & Turn @ 8480' MD / 88.54° Inc. / 359.97° Azm. / 8160' TVD	
18,291.9	8,410.0	10,321.3	-154.7	PBHL @ 18292' MD / 8410' TVD	

# COG Operating, LLC

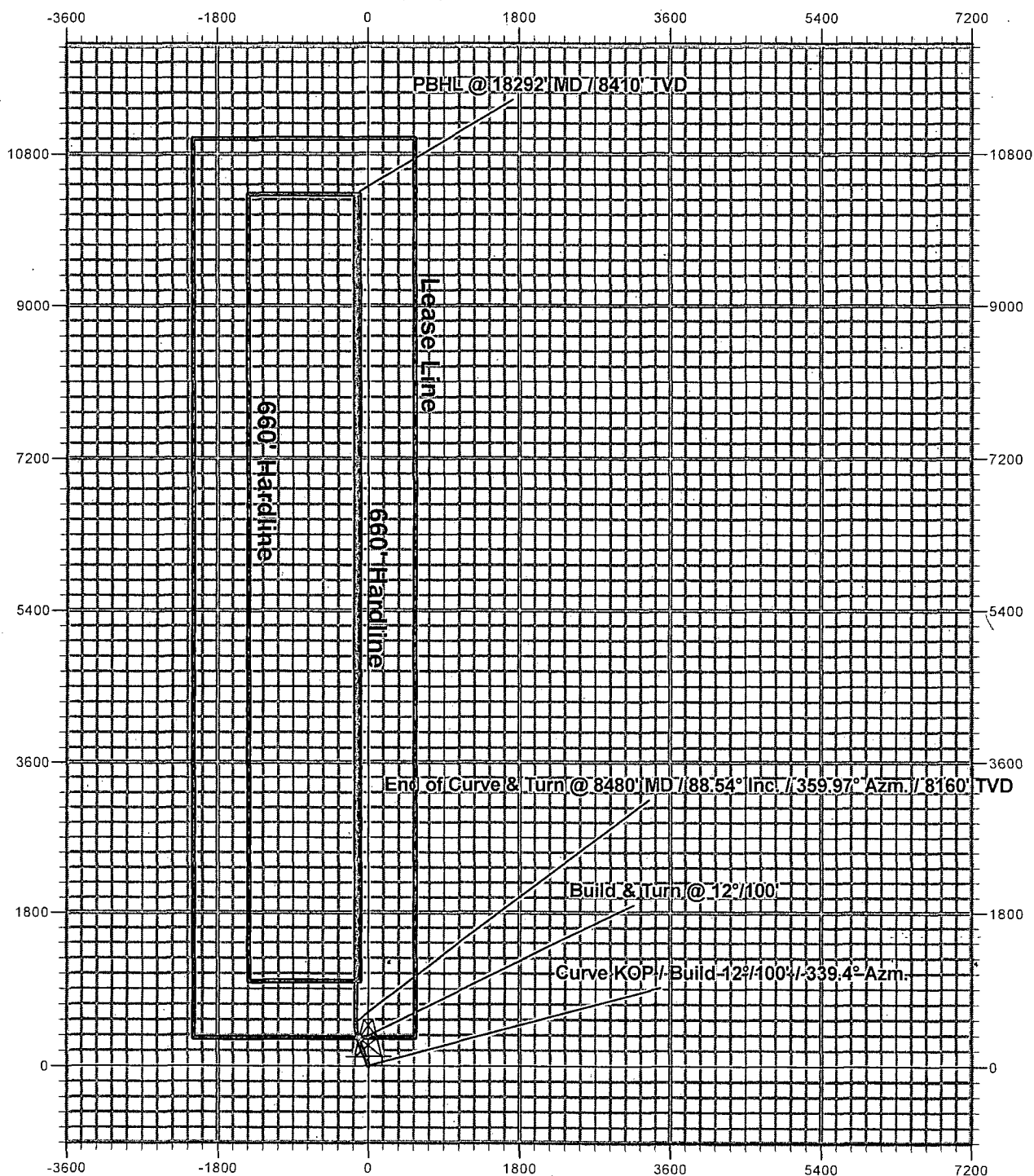
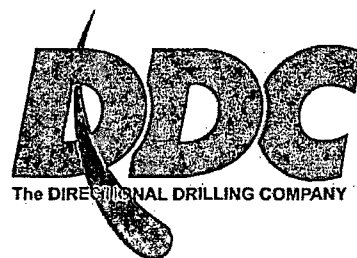
Eddy County, NM (NAD 27)  
Sec 24, T26S, R25E  
Glacier Federal Com #1H  
Design #2





# COG Operating, LLC.

Eddy County, NM (NAD 27)  
Sec 24, T26S, R25E  
Glacier Federal Com #1H  
Design #2





# New Mexico Office of the State Engineer

## Water Column/Average Depth to Water

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

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

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

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub- Code	basin	County	Q 6 4	Q 1 6	Q 4 4	Sec	Tws	Rng	X	Y	Distance	Depth	Well	Depth	Water Column
C 01351			ED	4	2	4	19	26S	26E	563772	3543411*	1927	25			
C 02366		CUB	ED		4	4	12	26S	25E	562027	3546345*	1938	80		150	-70
C 02790			ED	3	2	1	25	26S	25E	561146	3542586*	2067	100			
C 01351 X-2			ED	3	1	3	20	26S	26E	563978	3543413*	2105	25			

Average Depth to Water: 150 feet

Minimum Depth: 150 feet

Maximum Depth: 150 feet

Record Count: 4

### UTMNAD83 Radius Search (in meters):

Easting (X): 562122.67

Northing (Y): 3544408.73

Radius: 2420

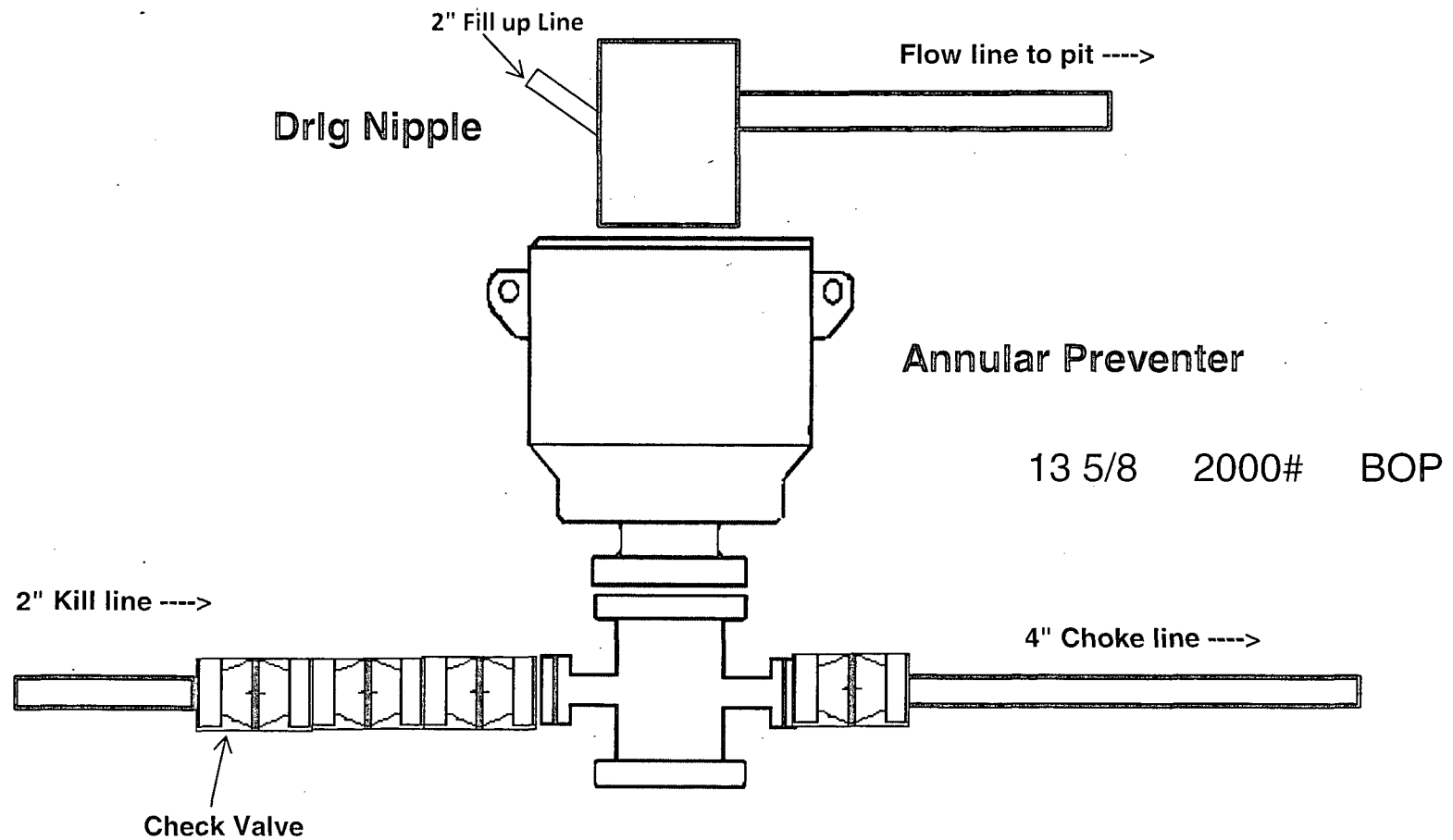
\*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

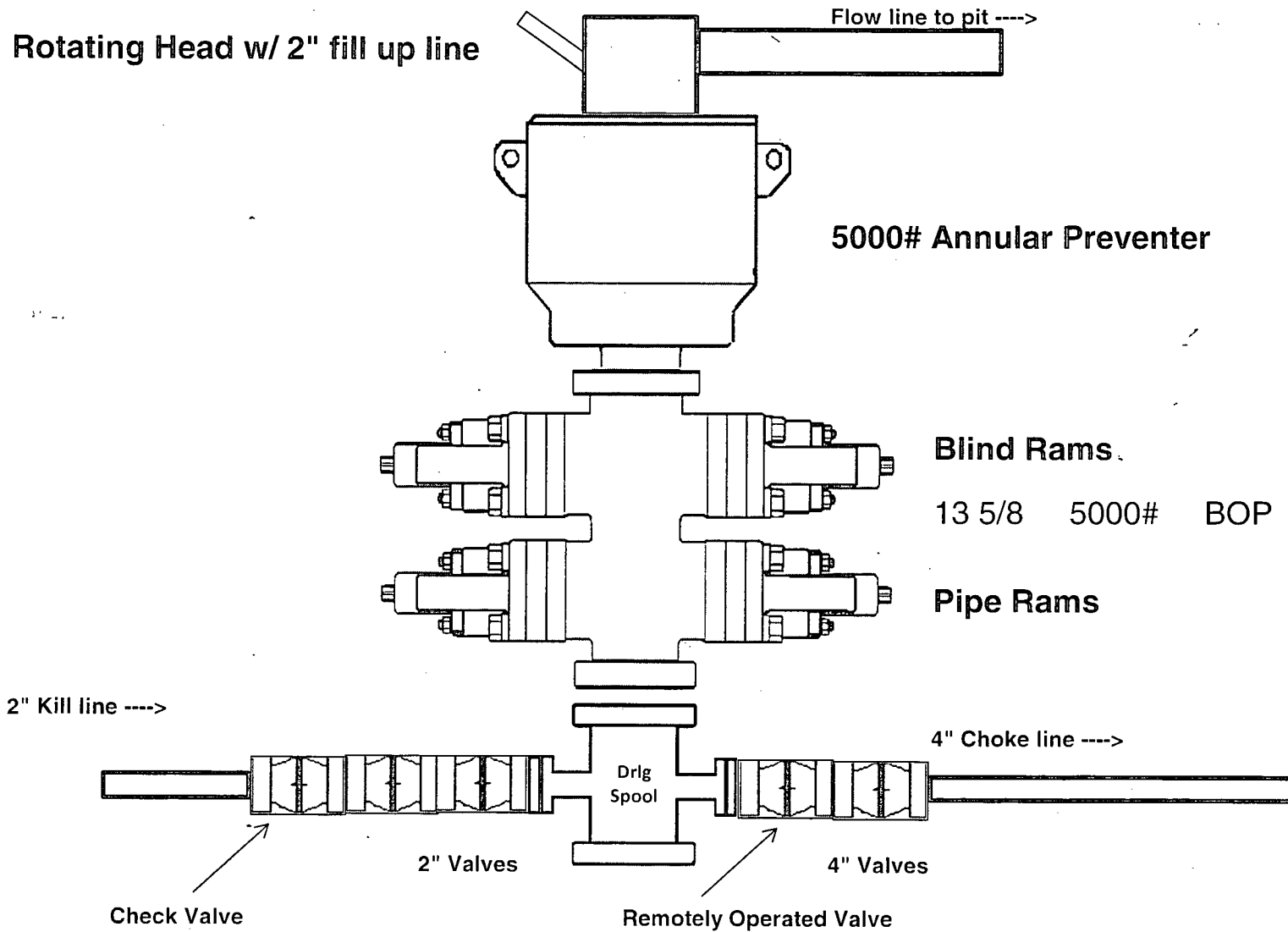
7/2/14 8:13 AM

WATER COLUMN/ AVERAGE DEPTH TO  
WATER

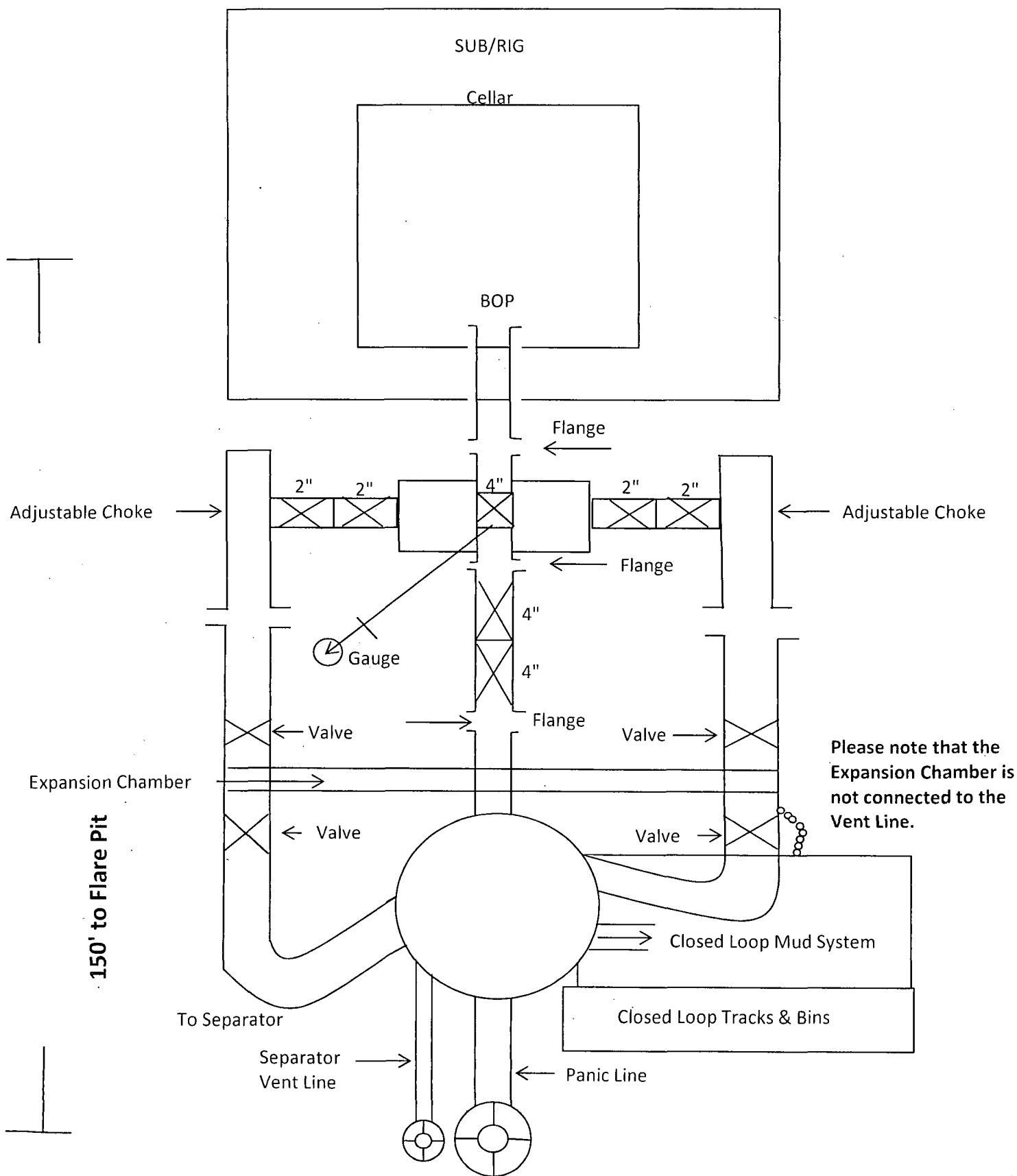
# 2,000 psi BOP Schematic



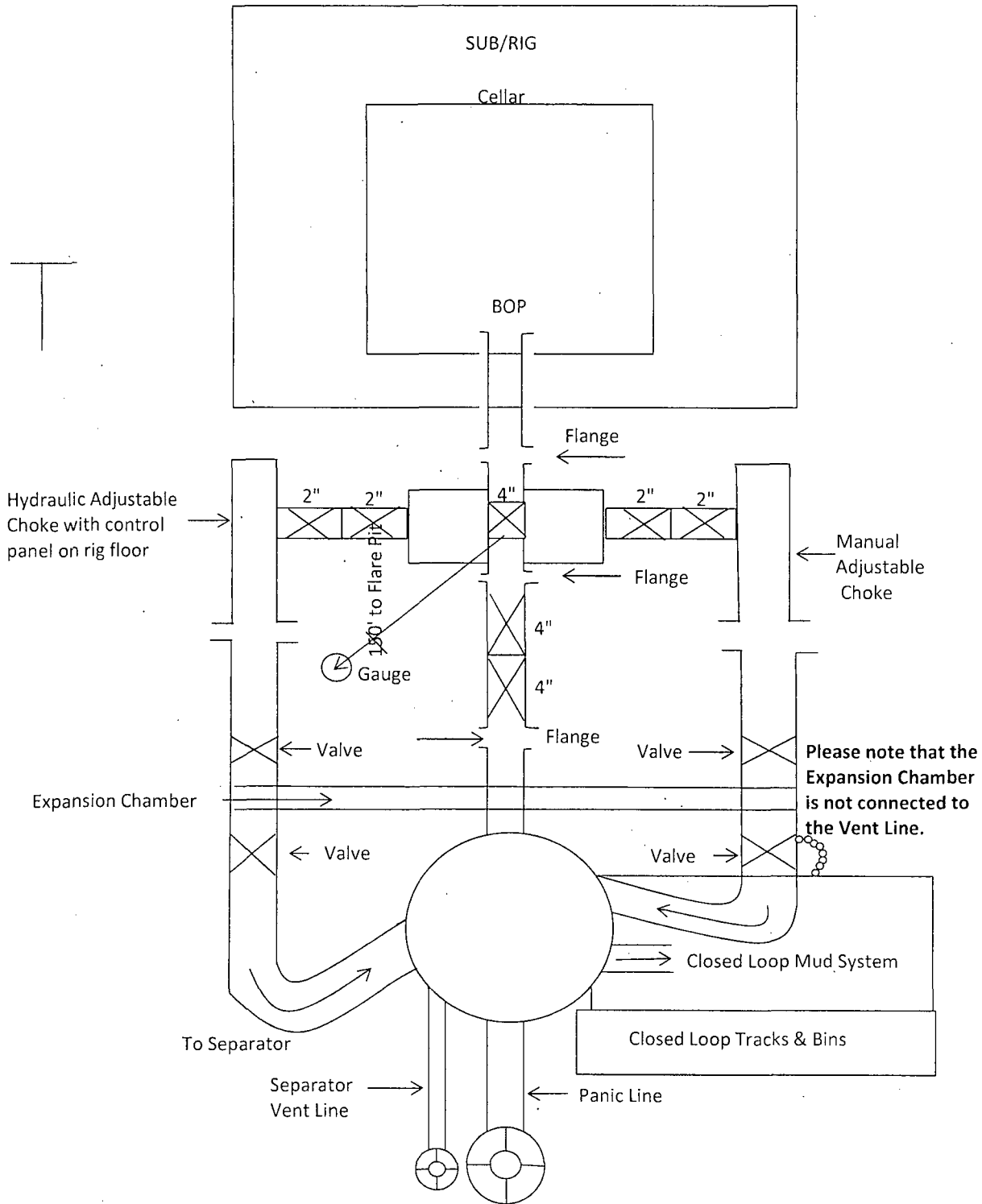
# 5,000 psi BOP Schematic



# 2M Choke Manifold Equipment



# 5M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

Well pad will be 400' X 400'  
with cellar in center of pad

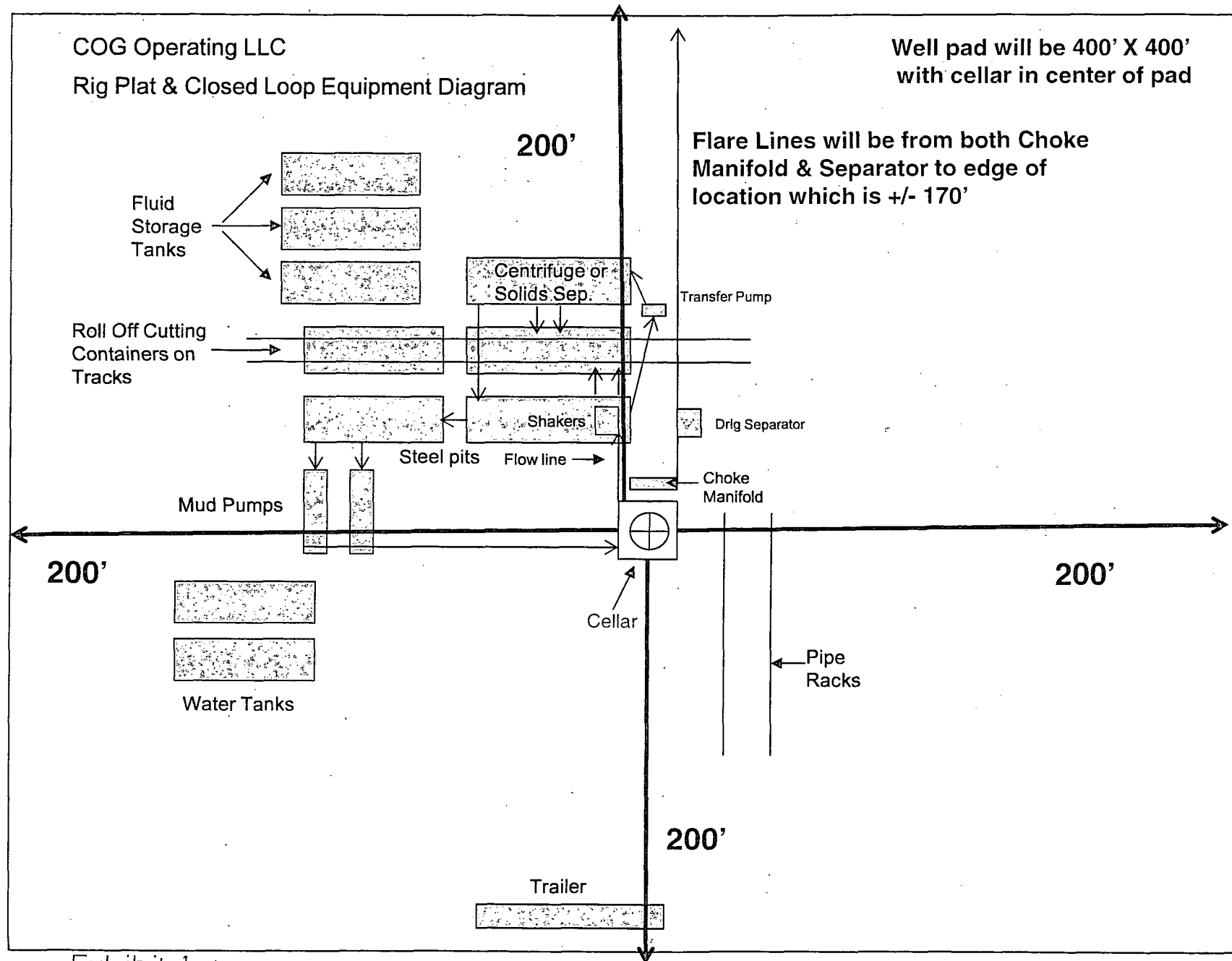
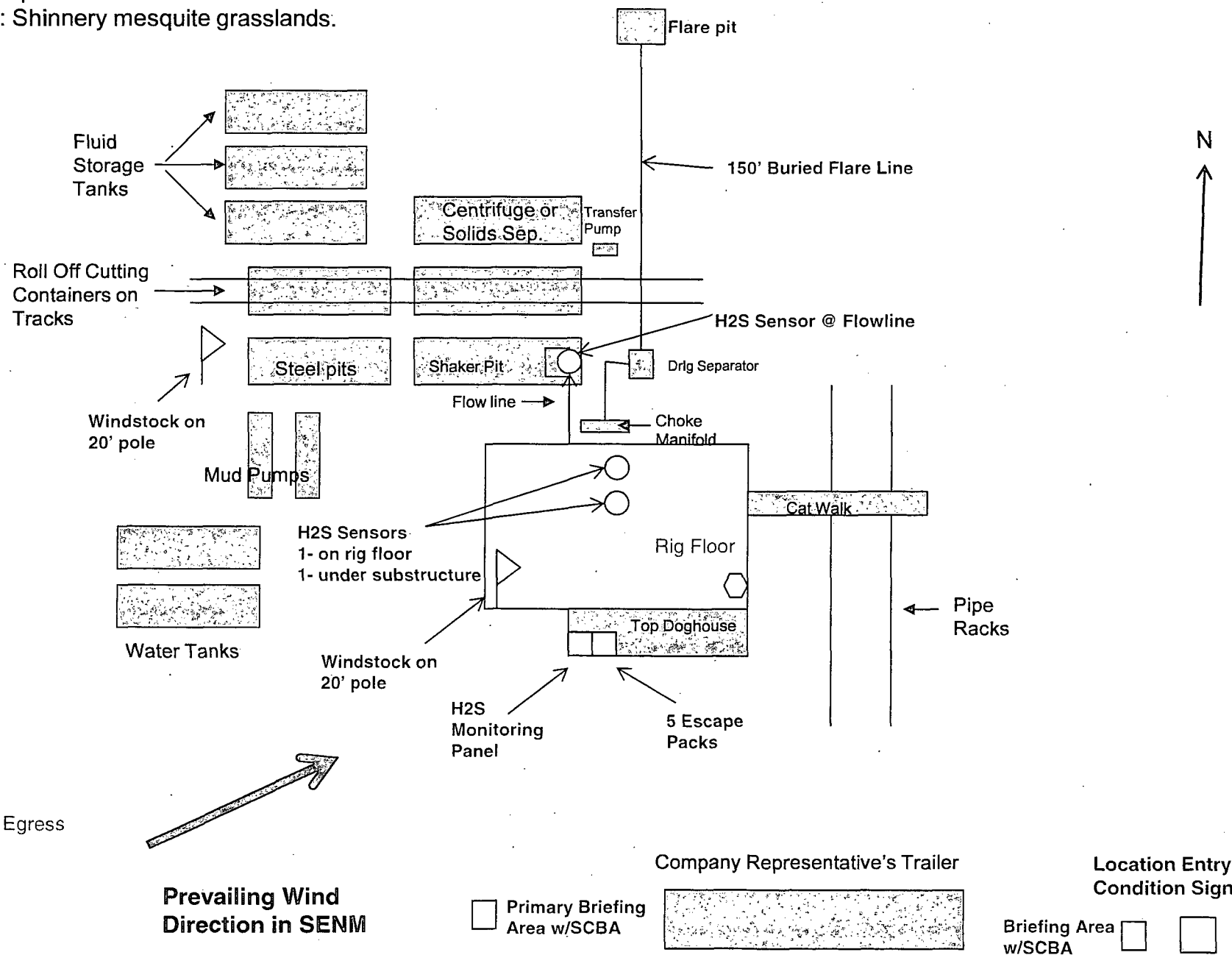


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17  
NMAC by using a Closed Loop System."

COG Operating, LLC  
H<sub>2</sub>S Equipment Schematic  
Terrain: Shinnery mesquite grasslands.

Well pad will be 340' X 340'  
with cellar in center of pad





**COG OPERATING LLC**  
**HYDROGEN SULFIDE DRILLING OPERATIONS PLAN**

**1. HYDROGEN SULFIDE TRAINING**

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

- a. The hazards and characteristics of hydrogen sulfide (H<sub>2</sub>S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H<sub>2</sub>S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
- d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

- a. The effects of H<sub>2</sub>S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
- b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
- c. The contents and requirements of the H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H<sub>2</sub>S zone (within 3 days or 500 feet) and weekly H<sub>2</sub>S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

**2. H<sub>2</sub>S SAFETY EQUIPMENT AND SYSTEMS**

Note: All H<sub>2</sub>S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H<sub>2</sub>S. If H<sub>2</sub>S greater than 100 ppm is encountered in the gas stream we will shut in and install H<sub>2</sub>S equipment.

- a. Well Control Equipment:
  - Flare line.
  - Choke manifold with remotely operated choke.
  - Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
  - Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

- b. Protective equipment for essential personnel:  
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.
- c. H2S detection and monitoring equipment:  
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.
- d. Visual warning systems:  
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.
- e. Mud Program:  
The mud program has been designed to minimize the volume of H2S circulated to the surface.
- f. Metallurgy:  
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- g. Communication:  
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

# **W A R N I N G**

**YOU ARE ENTERING AN H<sub>2</sub>S AREA  
AUTHORIZED PERSONNEL ONLY**

- 1. BEARDS OR CONTACT LENSES NOT ALLOWED***
- 2. HARD HATS REQUIRED***
- 3. SMOKING IN DESIGNATED AREAS ONLY***
- 4. BE WIND CONSCIOUS AT ALL TIMES***
- 5. CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

**COG OPERATING LLC**

**1-575-748-6940**

## **EMERGENCY CALL LIST**

	<b><u>OFFICE</u></b>	<b><u>MOBILE</u></b>
COG OPERATING LLC OFFICE	575-748-6940	
SHERYL BAKER	575-748-6940	432-934-1873
KENT GREENWAY	575-746-2010	432-557-1694
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

## **EMERGENCY RESPONSE NUMBERS**

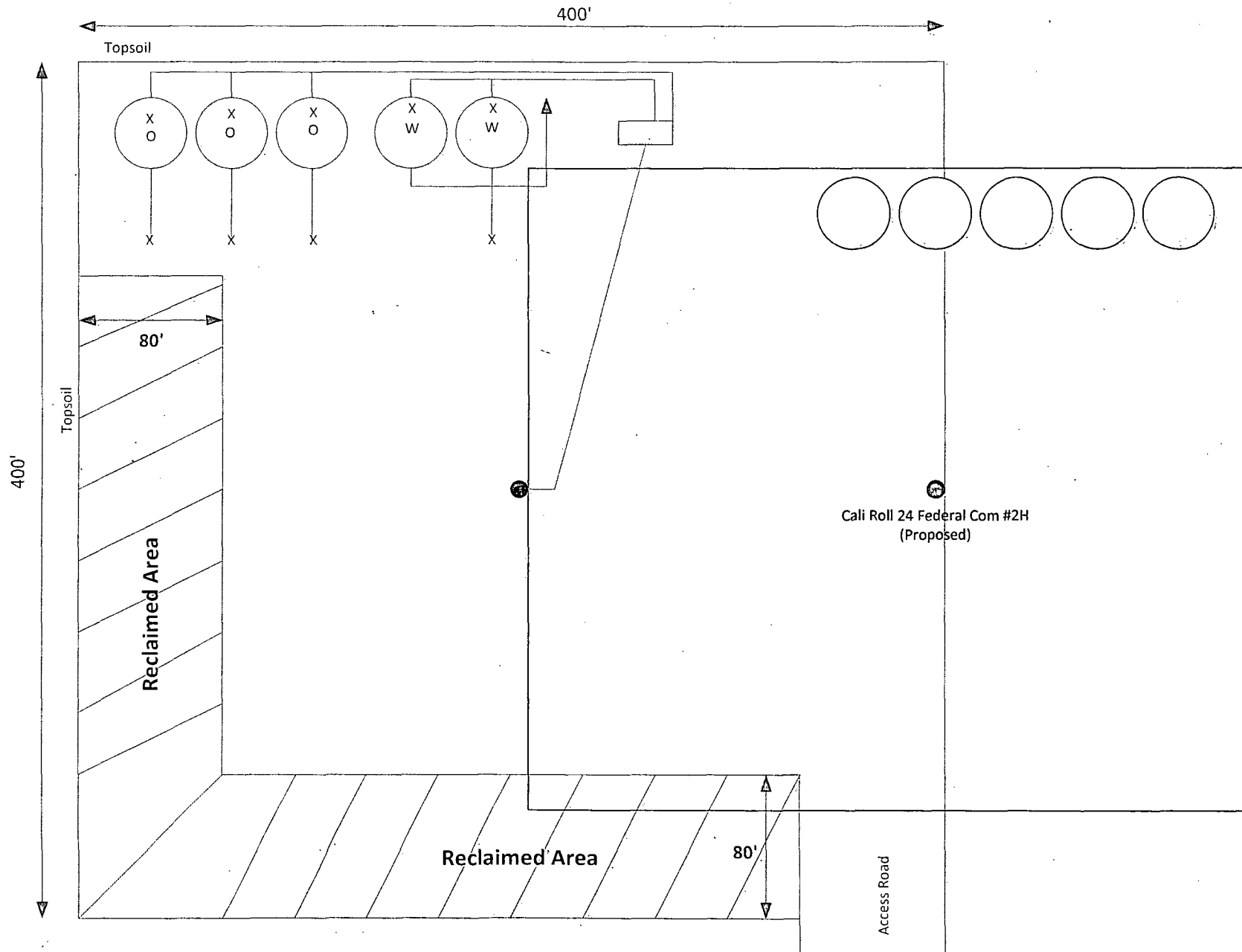
	<b><u>OFFICE</u></b>
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451



COG Operating LLC  
2208 W Main St  
Artesia, NM 88210

# EXHIBIT 3

Production Facility Layout  
Glacier Federal Com #1H  
Section 24-T26S-R25E



*Surface Use Plan  
COG Operating LLC  
Glacier Federal Com #1H  
SHL: 330' FNL & 560' FEL      UL A  
Section 24, T26S, R25E  
BHL: 660' FNL & 710' FEL      UL A  
Section 12, T26S, R25E  
Eddy County, New Mexico*

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# Surface Use & Operating Plan

## Glacier Federal Com #1H

- Surface Tenant is: Jumping Springs, LLC., P O Box 2, Malaga, NM 88263
- New Road: 706'
- Flow Line: On well pad
- Facilities: Will be constructed on well pad – see Exhibit 3

### Well Site Information

V Door: East

Topsoil: West

Interim Reclamation: South and West

### Notes

**Onsite:** On-site was done by Indra Dahal (BLM); Rand French (COG); on June 17, 2014.

## **SURFACE USE AND OPERATING PLAN**

### **1. Existing & Proposed Access Roads**

- A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.
- B. All roads to the location are shown on the Location Verification Map Exhibit 2. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in Exhibit #2. The road shown in Exhibit #2 will be used to access the well.
- C. Directions to location: See 600 x 600 plat
- D. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in section 2 of this Surface Use and Operating Plan.

### **2. Proposed Access Road:**

The Location Verification Map shows that 706' of new access road will be required for this location. If any road is required it will be constructed as follows:

The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

- A. The average grade will be less than 1%.
- B. No turnouts are planned.
- C. No culvert, cattleguard, gates, low water crossing, or fence cuts are necessary.
- D. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from the nearest BLM approved caliche pit.

### **3. Location of Existing Well:**

The One-Mile Radius Map shows existing wells within a one-mile radius of the proposed wellbore.

### **4. Location of Existing and/or Proposed Facilities:**

- A. COG Operating LLC does not operate an oil production facility on this lease.
- B. If the well is productive, contemplated facilities will be as follows:
  - 1) A tank battery and facilities will be constructed as shown Exhibit 3.
  - 2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.
  - 3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.
  - 4) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.
  - 5) If the well is productive, rehabilitation plans will include the following:
    - The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

### **5. Location and Type of Water Supply:**

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Exhibit #2. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.



**6. Source of Construction Materials and Location "Turn-Over" Procedure:**

Obtaining caliche: One primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well site. A caliche permit will be obtained from BLM prior to obtaining caliche. 2400 cubic yards is the maximum amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

- A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.
- B. An approximate 160' X 160' area is used within the proposed well site to remove caliche.
- C. Subsoil is removed and stockpiled within the surveyed well pad.
- D. When caliche is found, material will be stock piled within the pad site to build the location and road.
- E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.
- F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced.
- G. Neither caliche, nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in the Well Site Layout or survey plat.

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit or other established mineral pit. A BLM mineral material permit will be acquired prior to obtaining any mineral material from BLM pits or land.

**7. Methods of Handling Water Disposal:**

- A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.
- B. Drilling fluids will be contained in steel mud pits.
- C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.

- D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.
- E. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).
- F. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

**8. Ancillary Facilities:**

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

**9. Well Site Layout:**

- A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.
- B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

**10. Plans for Restoration of the Surface:**

- A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.

- B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recountoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be re-seeded with a BLM approved mixture and re-vegetated as per BLM orders.

**11. Surface Ownership:**

- A. The surface is owned by the U.S. Government and is administered by the Bureau of Land Management. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.
- B. The surface tenant is Jumping Springs, LLC. P O Box 2, Malaga, NM 88263.
- C. The proposed road routes and surface location will be restored as directed by the BLM.

**12. Other Information:**

- A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of NM, LLC., 2030 North Canal, Carlsbad, New Mexico, 88220, phone # 575-885-1352 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

**13. Bond Coverage:**

Bond Coverage is Statewide Bonds # NMB000740 and NMB000215

*Surface Use Plan*  
*COG Operating LLC*  
*Glacier Federal Com #1H*  
*SHL: 330' FNL & 560' FEL      UL A*  
*Section 24, T26S, R25E*  
*BHL: 660' FNL & 710' FEL      UL A*  
*Section 12, T26S, R25E*  
*Eddy County, New Mexico*

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**14. Lessee's and Operator's Representative:**

The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

Sheryl Baker  
Drilling Superintendent  
COG Operating LLC  
2208 West Main Street  
Artesia, NM 88210  
Phone (575) 748-6940 (office)  
(432) 934-1873 (cell)

Ray Peterson  
Drilling Manager  
COG Operating LLC  
One Concho Center  
600 W Illinois Ave  
Midland, TX 79701  
Phone (432) 685-4304 (office)  
(432) 818-2254 (business)

# PECOS DISTRICT CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>COG Operating, LLC</b>
<b>LEASE NO.:</b>	<b>NMNM-113398</b>
<b>WELL NAME &amp; NO.:</b>	<b>Glacier Federal Com 1H</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>0330' FNL &amp; 0560' FEL</b>
<b>BOTTOM HOLE FOOTAGE</b>	<b>0660' FNL &amp; 0710' FEL Sec. 12, T. 26 S., R 25 E.</b>
<b>LOCATION:</b>	<b>Section 24, T. 26 S., R 25 E., NMPM</b>
<b>COUNTY:</b>	<b>Eddy County, New Mexico</b>

## TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- ☐ **General Provisions**
- ☐ **Permit Expiration**
- ☐ **Archaeology, Paleontology, and Historical Sites**
- ☐ **Noxious Weeds**
- ☒ **Special Requirements**
  - Cave/Karst
  - Communitization Agreement
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Drilling**
  - Cement Requirements
  - High Cave/Karst
  - Logging Requirements
  - Waste Material and Fluids
- ☐ **Production (Post Drilling)**
  - Well Structures & Facilities
- ☐ **Interim Reclamation**
- ☐ **Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

## **II. PERMIT EXPIRATION**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **IV. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## **V. SPECIAL REQUIREMENT(S)**

- \*\* Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

### **Cave/Karst Surface Mitigation**

The following stipulations will be applied to minimize impacts during construction, drilling and production.

#### **Construction:**

In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

#### **No Blasting:**

No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

#### **Pad Berming:**

The pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the pad.

#### **Closed Mud System Using Steel Tanks with All Fluids and Cuttings Hauled Off.**

A closed mud system using steel tanks for all cuttings and fluids is required. All fluids and cuttings will be hauled off site for disposal. No pits are allowed.

#### **Tank Battery Liners and Berms:**

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

#### **Leak Detection System:**

A method of detecting leaks is required. The method could incorporate gauges to measure loss, siting valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

#### **Automatic Shut-off Systems:**

Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

### **Cave/Karst Subsurface Mitigation**

The following stipulations will be applied to protect cave/karst and ground water concerns:

#### **Rotary Drilling with Fresh Water:**

Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

**Directional Drilling:**

Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

**Lost Circulation:**

ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

**Abandonment Cementing:**

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

**Pressure Testing:**

Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

**Drilling:**

**Communitization Agreement**

A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales. In addition, the well sign shall include the surface and bottom hole lease numbers. If the Communitization Agreement number is known, it shall also be on the sign. If not, it shall be placed on the sign when the sign is replaced.



## **VI. CONSTRUCTION**

### **A. NOTIFICATION**

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

### **B. TOPSOIL**

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

### **C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

### **D. FEDERAL MINERAL MATERIALS PIT**

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

### **E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

### **F. EXCLOSURE FENCING (CELLARS & PITS)**

**Exclosure Fencing**

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

**G. ON LEASE ACCESS ROADS****Road Width**

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

**Surfacing**

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

**Crowning**

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

**Ditching**

Ditching shall be required on both sides of the road.

**Turnouts**

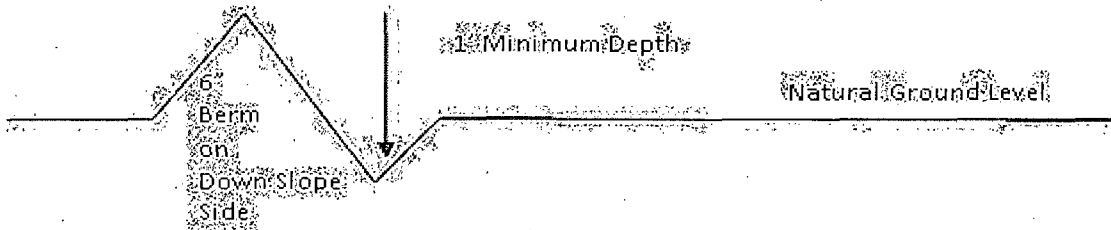
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**Drainage**

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out sloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

#### **Cross Section of a Typical Lead-off Ditch**



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

#### **Formula for Spacing Interval of Lead-off Ditches**

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

#### **Cattleguards**

An appropriately sized cattleguard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattleguards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguards that are in place and are utilized during lease operations.

#### **Fence Requirement**

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

#### **Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

### Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

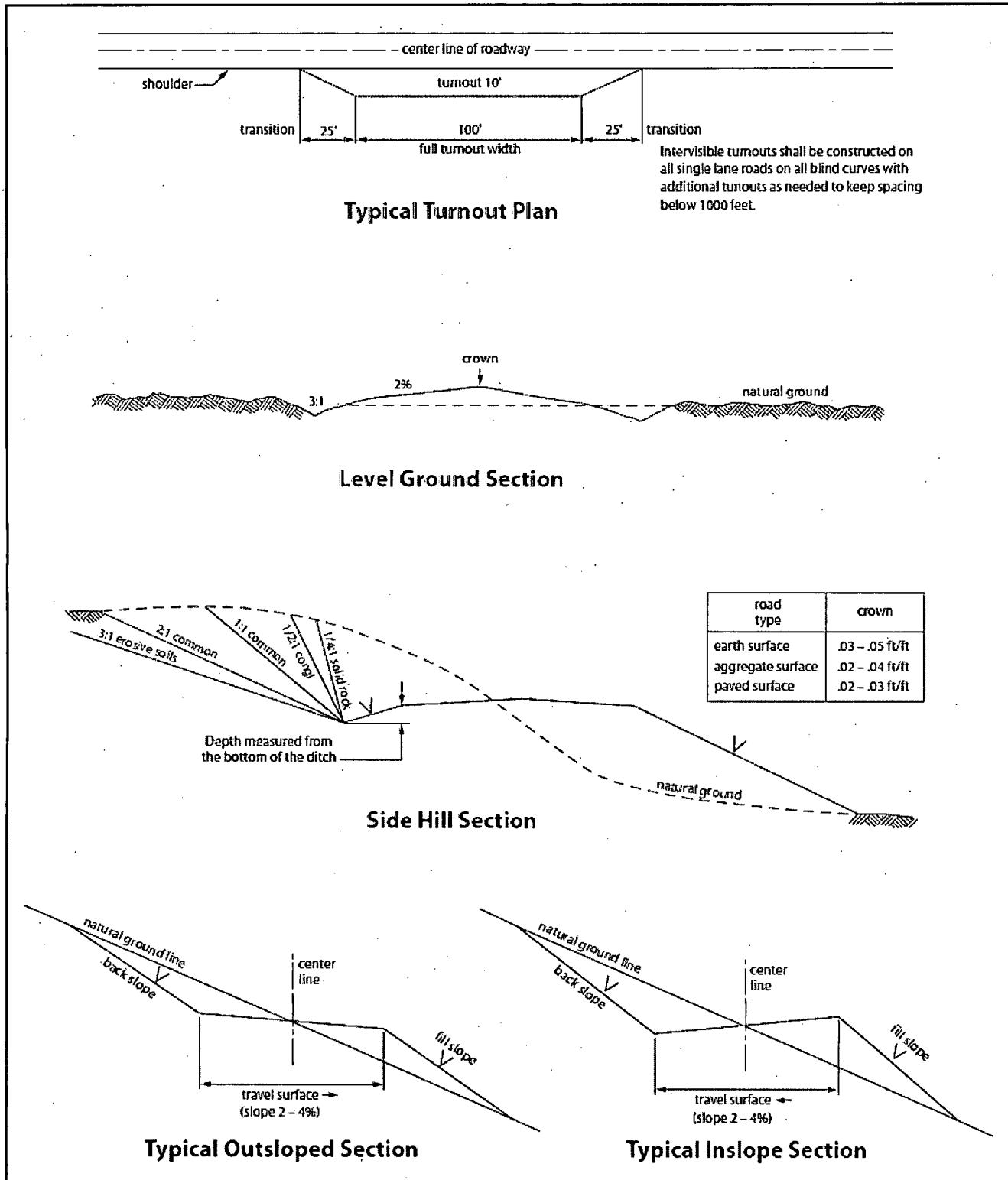


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

1. **Although Hydrogen Sulfide has not been reported in the area, it is always a potential hazard. Operator has stated that they will have monitoring equipment in place prior to drilling out of the surface shoe. If Hydrogen Sulfide is encountered, report measured amounts and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.
4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

## **B. CASING**

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

### **Wait on cement (WOC) for Water Basin:**

After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least **8 hours**. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

### **High Cave/Karst.**

Possibility of water flows in the Salado and Castile.

Possibility of lost circulation in the Rustler, Red Beds, and Delaware.

Abnormal pressure may be encountered within the 3<sup>rd</sup> Bone Spring Sandstone and Wolfcamp formation.

**A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS.** THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH. IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

1. The 13-3/8 inch surface casing shall be set at approximately **400 feet** (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing, which shall be set at approximately **1550 feet (basal anhydrite of the Castile Formation or the Lamar Limestone)**, is:
  - ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

**Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. Report results to BLM office.**

**Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.**

3. The minimum required fill of cement behind the 5-1/2 inch production casing is:
  - ☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

### C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.
2. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M) psi.**
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **5000 (5M) psi. 5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
  - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer.**
  - c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.



- d. The results of the test shall be reported to the appropriate BLM office.
- e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
- f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

#### **D. DRILLING MUD**

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

#### **E. DRILL STEM TEST**

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

#### **F. WASTE MATERIAL AND FLUIDS**

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

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## **VIII. PRODUCTION (POST DRILLING)**

### **A. WELL STRUCTURES & FACILITIES**

#### **Placement of Production Facilities**

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

#### **Exclosure Netting (Open-top Tanks)**

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### **Chemical and Fuel Secondary Containment and Exclosure Screening**

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### **Open-Vent Exhaust Stack Exclosures**

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

#### **Containment Structures**

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the

largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

#### **Painting Requirement**

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

### **IX. INTERIM RECLAMATION**

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

### **X. FINAL ABANDONMENT & RECLAMATION**

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

#### Seed Mixture 4, for Gypsum Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

Species	lb/acre
Alkali Sacaton ( <i>Sporobolus airoides</i> )	1.0
DWS□Four-wing saltbush ( <i>Atriplex canescens</i> )	5.0

DWS: DeWinged Seed

\*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed