14-662

Form 3160-3
(March 2012)

OCD Hobbs

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM120908

6. If Indian, Allotee or Tribe Name:

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

1a. Type of Work: [✓] DRILL [ ] REENTER

8. Lease Name and Well No.: Corvo Federal #4H (313358)

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other [✓] Single Zone [ ] Multiple Zone

2. Name of Operator: COG Production LLC. (217955)

HOBBS OCD

9. API Well No.: 30-025-41913

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

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

JUN 13 2014

10. Field and Pool, or Exploratory: Paduca; Delaware, North (49490)

4. Location of Well (Report location clearly and in accordance with any State requirements.*)

At surface: 190' FSL & 560' FWL Unit Letter M (SWSW) Sec 29-T24S-R32E

At proposed prod. Zone: 330' FNL & 560' FWL Unit Letter D (NWNW) Sec 29-T24S-R32E

RECEIVED

11. Sec., T.R.M. or Blk and Survey or Area: Sec. 29 - T24S - R32E

14. Distance in miles and direction from nearest town or post office*: Approximately 21 miles from Malaga

12. County or Parish: Lea

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
190'	1891.72	160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. on file
SHL: 100' BHL: 1000'	TVD: 8,440' MD: 12,985'	NMB000860 &NMB000845

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3501.8' GL	6/1/2014	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)	Date
Mayte Reyes	Mayte Reyes	3/27/2014

Title: Regulatory Analyst

Approved by (Signature)	Name (Printed/Typed)	Date
/S/ STEPHEN J. CAFFEY		JUN 10 2014

Title	Office
FIELD MANAGER	CARLSBAD FIELD OFFICE

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 theron.

APPROVAL FOR TWO YEARS

Conditions of approval, if any, are attached.

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

KR 06/13/14

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

JUN 17 2014

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 Production 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 27th day of March, 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

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Corvo Federal 4H
SHL: 190' FSL & 560' FWL of Section 29
BHL: 330' FNL & 560' FWL of Section 29
Section 29 T24S R32E
Lea County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Production 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:

Fresh Water	~200'	
Rustler	746'	
Top of Salt	1,066'	
Fletcher	4,343'	
Delaware	4,570'	Oil
Bone Springs	8,525'	Oil
TD TVD	8,440'	
TD MD	12,985'	

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 800' and circulating cement back to surface. All intervals will be isolated by setting 5 ½" casing to total depth and tying back cement to a minimum of 500' into 9-5/8" csg.

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

Hole Size	Depths	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' – 800'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 ¼"	0' – 3500'	Intrmd	9 5/8"	New	36#	LTC	J-55	1.125	1.125	1.6
12 ¼"	3500' – 4500'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
8 ¾"	0' – 12,985'	Production Curve & Lateral	5 ½"	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.

4. Proposed Cement Program

a. 13-3/8" Surface
Lead: 300 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg/ 1.75 ctft/sx / 9.2 gal/sk)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx/ 6.3 gal/sk)
**Calculated w/ 50% excess on OH volumes

b. 9 5/8" Intermediate:
Lead: 825 sx 35:65:6 C Blend
(12.7 ppg / 2 cuft/sx / 10.6 gal/sk)
Tail: 250 sx Class C
(14.8 ppg / 1.34 cuft/sx / 6.3 gal/sk)
**Calculated w/35% excess on OH volumes

c. 5 ½" Production:
Lead: 600 sx 50:50:10 H Blend
(11.9 ppg / 2.51 cuft/sx / 14.1 gal/sk)
Tail: 1400 sx 50:50:2 H +Salt+GasStop +CFR-3
(14.4 ppg /1.24 cuft/sx / 6.4 gal/sk)
**Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending the caliper measurement.
- The 9-5/8" intermediate string is designed to circulate cement to surface.
- The production string will tie back a minimum of 500' into 9-5/8" shoe

5. Pressure Control:

See COA

Nipple up on 13 3/8 with annular preventer tested to 2000 psi by independent tester and the rest of the 2M system tested to 2000 psi.
Nipple up on 9 5/8 with 3M system tested to 3000 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 3000 psi WP rating. A remotely operated choke will be installed before drilling out intermediate shoe. If H2S is monitored with 100 ppm in the gas stream while drilling intermediate, we will shut in and install a remote operated choke.

6. Estimated BHP & BHT:

Lateral TD = 4,000 psi
Lateral TD= 141° F

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

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – 800'	Fresh Water	8.4 – 8.6	29	N.C.
800' – 4,500'	Brine	10-10.2	29	N.C.
4,500' – 12,985'	Cut Brine	8.8 – 9.2	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 total, 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 ½" 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 coring program is planned
   iv. Additional testing will be initiated subsequent to setting the 5 ½" 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 H2S in this area. If H2S 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 H2S is anticipated to be encountered.

11. Anticipated starting date and Duration of Operations:

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 35 days.

COG Production, LLC.

Lea County, N.M.
Section 29-24S-32E Corvo Federal #4H
Corvo Federal #4H

Original Hole

Plan: Plan#1

Standard Planning Report

20 March, 2014

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Corvo Federal #4H
Company:	COG Production, LLC.	**TVD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	**MD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	**North Reference:**	Grid
Well:	Corvo Federal #4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Project Lea County, N.M.

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 Section 29-24S-32E Corvo Federal #4H

Site Position:		**Northing:**	430,335.80 usft	**Latitude:**	32° 10' 53.541 N
From:	Map	**Easting:**	695,035.70 usft	**Longitude:**	103° 42' 10.568 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.34 °

Well Corvo Federal #4H

Well Position	**+N/-S**	0.0 usft	**Northing:**	430,335.80 usft	**Latitude:**	32° 10' 53.541 N
	+E/-W	0.0 usft	**Easting:**	695,035.70 usft	**Longitude:**	103° 42' 10.568 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,501.8 usft

Wellbore Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/20/2014	7.30	60.06	48,300

Design Plan#1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.63

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	
7,952.5	0.00	0.00	7,952.5	0.0	0.0	0.00	0.00	0.00	0.00	
8,701.4	89.87	359.63	8,430.0	476.3	-3.1	12.00	12.00	-0.05	359.63	
12,984.9	89.87	359.63	8,440.0	4,759.8	-30.8	0.00	0.00	0.00	0.00	PBHL Corvo Federa

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Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

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
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
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
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
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
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
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
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
5,200.0	0.00	0.00	5,200.0	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

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Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

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)
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
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
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
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
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,952.5	0.00	0.00	7,952.5	0.0	0.0	0.0	0.00	0.00	0.00
7952.5' MD KOP									
7,975.0	2.70	359.63	7,975.0	0.5	0.0	0.5	12.00	12.00	0.00
8,000.0	5.70	359.63	7,999.9	2.4	0.0	2.4	12.00	12.00	0.00
8,025.0	8.70	359.63	8,024.7	5.5	0.0	5.5	12.00	12.00	0.00
8,050.0	11.70	359.63	8,049.3	9.9	-0.1	9.9	12.00	12.00	0.00
8,075.0	14.70	359.63	8,073.7	15.6	-0.1	15.6	12.00	12.00	0.00
8,100.0	17.70	359.63	8,097.7	22.6	-0.1	22.6	12.00	12.00	0.00
8,125.0	20.70	359.63	8,121.3	30.8	-0.2	30.8	12.00	12.00	0.00
8,150.0	23.70	359.63	8,144.4	40.3	-0.3	40.3	12.00	12.00	0.00
8,175.0	26.70	359.63	8,167.0	50.9	-0.3	50.9	12.00	12.00	0.00
8,200.0	29.70	359.63	8,189.1	62.7	-0.4	62.7	12.00	12.00	0.00
8,225.0	32.70	359.63	8,210.4	75.7	-0.5	75.7	12.00	12.00	0.00
8,250.0	35.70	359.63	8,231.1	89.7	-0.6	89.7	12.00	12.00	0.00
8,275.0	38.70	359.63	8,251.0	104.8	-0.7	104.8	12.00	12.00	0.00
8,300.0	41.70	359.63	8,270.1	121.0	-0.8	121.0	12.00	12.00	0.00
8,325.0	44.70	359.63	8,288.3	138.1	-0.9	138.1	12.00	12.00	0.00
8,350.0	47.70	359.63	8,305.6	156.1	-1.0	156.1	12.00	12.00	0.00
8,375.0	50.70	359.63	8,322.0	175.0	-1.1	175.0	12.00	12.00	0.00
8,400.0	53.70	359.63	8,337.3	194.8	-1.3	194.8	12.00	12.00	0.00
8,425.0	56.70	359.63	8,351.6	215.3	-1.4	215.3	12.00	12.00	0.00
8,450.0	59.70	359.63	8,364.7	236.6	-1.5	236.6	12.00	12.00	0.00
8,475.0	62.70	359.63	8,376.8	258.5	-1.7	258.5	12.00	12.00	0.00
8,500.0	65.70	359.63	8,387.7	281.0	-1.8	281.0	12.00	12.00	0.00
8,525.0	68.70	359.63	8,397.3	304.0	-2.0	304.0	12.00	12.00	0.00
8,550.0	71.70	359.63	8,405.8	327.5	-2.1	327.5	12.00	12.00	0.00
8,575.0	74.70	359.63	8,413.0	351.5	-2.3	351.5	12.00	12.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Corvo Federal #4H
Company:	COG Production, LLC.	TVD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	MD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

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)
8,600.0	77.70	359.63	8,419.0	375.7	-2.4	375.8	12.00	12.00	0.00
8,625.0	80.70	359.63	8,423.7	400.3	-2.6	400.3	12.00	12.00	0.00
8,650.0	83.70	359.63	8,427.1	425.1	-2.8	425.1	12.00	12.00	0.00
8,675.0	86.70	359.63	8,429.2	450.0	-2.9	450.0	12.00	12.00	0.00
8,701.4	89.87	359.63	8,430.0	476.4	-3.1	476.4	11.99	11.99	0.00
8701.4' MD LP									
8,800.0	89.87	359.63	8,430.2	575.0	-3.7	575.0	0.00	0.00	0.00
8,900.0	89.87	359.63	8,430.4	675.0	-4.4	675.0	0.00	0.00	0.00
9,000.0	89.87	359.63	8,430.7	774.9	-5.0	775.0	0.00	0.00	0.00
9,100.0	89.87	359.63	8,430.9	874.9	-5.7	875.0	0.00	0.00	0.00
9,200.0	89.87	359.63	8,431.1	974.9	-6.3	975.0	0.00	0.00	0.00
9,300.0	89.87	359.63	8,431.4	1,074.9	-7.0	1,075.0	0.00	0.00	0.00
9,400.0	89.87	359.63	8,431.6	1,174.9	-7.6	1,175.0	0.00	0.00	0.00
9,500.0	89.87	359.63	8,431.8	1,274.9	-8.2	1,275.0	0.00	0.00	0.00
9,600.0	89.87	359.63	8,432.1	1,374.9	-8.9	1,375.0	0.00	0.00	0.00
9,700.0	89.87	359.63	8,432.3	1,474.9	-9.5	1,475.0	0.00	0.00	0.00
9,800.0	89.87	359.63	8,432.5	1,574.9	-10.2	1,575.0	0.00	0.00	0.00
9,900.0	89.87	359.63	8,432.8	1,674.9	-10.8	1,675.0	0.00	0.00	0.00
10,000.0	89.87	359.63	8,433.0	1,774.9	-11.5	1,775.0	0.00	0.00	0.00
10,100.0	89.87	359.63	8,433.2	1,874.9	-12.1	1,875.0	0.00	0.00	0.00
10,200.0	89.87	359.63	8,433.5	1,974.9	-12.8	1,975.0	0.00	0.00	0.00
10,300.0	89.87	359.63	8,433.7	2,074.9	-13.4	2,075.0	0.00	0.00	0.00
10,400.0	89.87	359.63	8,433.9	2,174.9	-14.1	2,175.0	0.00	0.00	0.00
10,500.0	89.87	359.63	8,434.2	2,274.9	-14.7	2,275.0	0.00	0.00	0.00
10,600.0	89.87	359.63	8,434.4	2,374.9	-15.4	2,375.0	0.00	0.00	0.00
10,700.0	89.87	359.63	8,434.6	2,474.9	-16.0	2,475.0	0.00	0.00	0.00
10,800.0	89.87	359.63	8,434.9	2,574.9	-16.7	2,575.0	0.00	0.00	0.00
10,900.0	89.87	359.63	8,435.1	2,674.9	-17.3	2,675.0	0.00	0.00	0.00
11,000.0	89.87	359.63	8,435.3	2,774.9	-18.0	2,775.0	0.00	0.00	0.00
11,100.0	89.87	359.63	8,435.6	2,874.9	-18.6	2,875.0	0.00	0.00	0.00
11,200.0	89.87	359.63	8,435.8	2,974.9	-19.3	2,975.0	0.00	0.00	0.00
11,300.0	89.87	359.63	8,436.1	3,074.9	-19.9	3,075.0	0.00	0.00	0.00
11,400.0	89.87	359.63	8,436.3	3,174.9	-20.5	3,175.0	0.00	0.00	0.00
11,500.0	89.87	359.63	8,436.5	3,274.9	-21.2	3,275.0	0.00	0.00	0.00
11,600.0	89.87	359.63	8,436.8	3,374.9	-21.8	3,375.0	0.00	0.00	0.00
11,700.0	89.87	359.63	8,437.0	3,474.9	-22.5	3,475.0	0.00	0.00	0.00
11,800.0	89.87	359.63	8,437.2	3,574.9	-23.1	3,575.0	0.00	0.00	0.00
11,900.0	89.87	359.63	8,437.5	3,674.9	-23.8	3,675.0	0.00	0.00	0.00
12,000.0	89.87	359.63	8,437.7	3,774.9	-24.4	3,775.0	0.00	0.00	0.00
12,100.0	89.87	359.63	8,437.9	3,874.9	-25.1	3,875.0	0.00	0.00	0.00
12,200.0	89.87	359.63	8,438.2	3,974.9	-25.7	3,975.0	0.00	0.00	0.00
12,300.0	89.87	359.63	8,438.4	4,074.9	-26.4	4,075.0	0.00	0.00	0.00
12,400.0	89.87	359.63	8,438.6	4,174.9	-27.0	4,175.0	0.00	0.00	0.00
12,500.0	89.87	359.63	8,438.9	4,274.9	-27.7	4,275.0	0.00	0.00	0.00
12,600.0	89.87	359.63	8,439.1	4,374.9	-28.3	4,375.0	0.00	0.00	0.00
12,700.0	89.87	359.63	8,439.3	4,474.9	-29.0	4,475.0	0.00	0.00	0.00
12,800.0	89.87	359.63	8,439.6	4,574.9	-29.6	4,575.0	0.00	0.00	0.00
12,900.0	89.87	359.63	8,439.8	4,674.9	-30.3	4,675.0	0.00	0.00	0.00
12,984.9	89.87	359.63	8,440.0	4,759.8	-30.8	4,759.9	0.00	0.00	0.00
12984.9' MD PBHL									

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Corvo Federal #4H
Company:	COG Production, LLC.	TVD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	MD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Corvo Federal - plan hits target center - Point	0.00	0.00	8,440.0	4,759.8	-30.8	435,095.60	695,004.90	32° 11' 40.645 N	103° 42' 10.601 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
7,952.5	7,952.5	0.0	0.0	7952.5' MD KOP
8,701.4	8,430.0	476.4	-3.1	8701.4' MD LP
12,984.9	8,440.0	4,759.8	-30.8	12984.9' MD PBHL

COG Production, LLC.

Lea County, N.M.
Section 29-24S-32E Corvo Federal #4H
Corvo Federal #4H

Original Hole

Plan: Plan#1

Standard Planning Report - Geographic

20 March, 2014

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Corvo Federal #4H
Company:	COG Production, LLC.	**TVD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	**MD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	**North Reference:**	Grid
Well:	Corvo Federal #4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Project Lea County, N.M.

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 Section 29-24S-32E Corvo Federal #4H

Site Position:		**Northing:**	430,335.80 usft	**Latitude:**	32° 10' 53.541 N
From:	Map	**Easting:**	695,035.70 usft	**Longitude:**	103° 42' 10.568 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.34 °

Well Corvo Federal #4H

Well Position	**+N/-S**	0.0 usft	**Northing:**	430,335.80 usft	**Latitude:**	32° 10' 53.541 N
	+E/-W	0.0 usft	**Easting:**	695,035.70 usft	**Longitude:**	103° 42' 10.568 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,501.8 usft

Wellbore Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/20/2014	7.30	60.06	48,300

Design Plan#1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.63

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	
7,952.5	0.00	0.00	7,952.5	0.0	0.0	0.00	0.00	0.00	0.00	
8,701.4	89.87	359.63	8,430.0	476.3	-3.1	12.00	12.00	-0.05	359.63	
12,984.9	89.87	359.63	8,440.0	4,759.8	-30.8	0.00	0.00	0.00	0.00	PBHL Corvo Federa

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Corvo Federal #4H
Company:	COG Production, LLC.	TVD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	MD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
100.0	0.00	0.00	100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
200.0	0.00	0.00	200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
300.0	0.00	0.00	300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
400.0	0.00	0.00	400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
500.0	0.00	0.00	500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
600.0	0.00	0.00	600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
700.0	0.00	0.00	700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
800.0	0.00	0.00	800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
900.0	0.00	0.00	900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,300.0	0.00	0.00	5,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Corvo Federal #4H
Company:	COG Production, LLC.	TVD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	MD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,500.0	0.00	0.00	5,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,600.0	0.00	0.00	6,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,700.0	0.00	0.00	6,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7,952.5	0.00	0.00	7,952.5	0.0	0.0	430,335.80	695,035.70	32° 10' 53.541 N	103° 42' 10.568 W
7952.5' MD KOP									
7,975.0	2.70	359.63	7,975.0	0.5	0.0	430,336.33	695,035.69	32° 10' 53.546 N	103° 42' 10.568 W
8,000.0	5.70	359.63	7,999.9	2.4	0.0	430,338.16	695,035.68	32° 10' 53.564 N	103° 42' 10.568 W
8,025.0	8.70	359.63	8,024.7	5.5	0.0	430,341.29	695,035.66	32° 10' 53.595 N	103° 42' 10.568 W
8,050.0	11.70	359.63	8,049.3	9.9	-0.1	430,345.72	695,035.63	32° 10' 53.639 N	103° 42' 10.568 W
8,075.0	14.70	359.63	8,073.7	15.6	-0.1	430,351.43	695,035.59	32° 10' 53.696 N	103° 42' 10.568 W
8,100.0	17.70	359.63	8,097.7	22.6	-0.1	430,358.40	695,035.55	32° 10' 53.765 N	103° 42' 10.568 W
8,125.0	20.70	359.63	8,121.3	30.8	-0.2	430,366.62	695,035.50	32° 10' 53.846 N	103° 42' 10.568 W
8,150.0	23.70	359.63	8,144.4	40.3	-0.3	430,376.07	695,035.43	32° 10' 53.939 N	103° 42' 10.568 W
8,175.0	26.70	359.63	8,167.0	50.9	-0.3	430,386.71	695,035.37	32° 10' 54.045 N	103° 42' 10.568 W
8,200.0	29.70	359.63	8,189.1	62.7	-0.4	430,398.52	695,035.29	32° 10' 54.162 N	103° 42' 10.568 W
8,225.0	32.70	359.63	8,210.4	75.7	-0.5	430,411.47	695,035.21	32° 10' 54.290 N	103° 42' 10.568 W
8,250.0	35.70	359.63	8,231.1	89.7	-0.6	430,425.52	695,035.11	32° 10' 54.429 N	103° 42' 10.568 W
8,275.0	38.70	359.63	8,251.0	104.8	-0.7	430,440.63	695,035.02	32° 10' 54.578 N	103° 42' 10.568 W
8,300.0	41.70	359.63	8,270.1	121.0	-0.8	430,456.77	695,034.91	32° 10' 54.738 N	103° 42' 10.569 W
8,325.0	44.70	359.63	8,288.3	138.1	-0.9	430,473.88	695,034.80	32° 10' 54.907 N	103° 42' 10.569 W
8,350.0	47.70	359.63	8,305.6	156.1	-1.0	430,491.92	695,034.69	32° 10' 55.086 N	103° 42' 10.569 W
8,375.0	50.70	359.63	8,322.0	175.0	-1.1	430,510.84	695,034.56	32° 10' 55.273 N	103° 42' 10.569 W
8,400.0	53.70	359.63	8,337.3	194.8	-1.3	430,530.59	695,034.44	32° 10' 55.469 N	103° 42' 10.569 W
8,425.0	56.70	359.63	8,351.6	215.3	-1.4	430,551.12	695,034.30	32° 10' 55.672 N	103° 42' 10.569 W
8,450.0	59.70	359.63	8,364.7	236.6	-1.5	430,572.37	695,034.16	32° 10' 55.882 N	103° 42' 10.569 W
8,475.0	62.70	359.63	8,376.8	258.5	-1.7	430,594.27	695,034.02	32° 10' 56.099 N	103° 42' 10.570 W
8,500.0	65.70	359.63	8,387.7	281.0	-1.8	430,616.77	695,033.88	32° 10' 56.322 N	103° 42' 10.570 W
8,525.0	68.70	359.63	8,397.3	304.0	-2.0	430,639.82	695,033.73	32° 10' 56.550 N	103° 42' 10.570 W
8,550.0	71.70	359.63	8,405.8	327.5	-2.1	430,663.34	695,033.58	32° 10' 56.782 N	103° 42' 10.570 W
8,575.0	74.70	359.63	8,413.0	351.5	-2.3	430,687.27	695,033.42	32° 10' 57.019 N	103° 42' 10.570 W
8,600.0	77.70	359.63	8,419.0	375.7	-2.4	430,711.54	695,033.26	32° 10' 57.259 N	103° 42' 10.570 W
8,625.0	80.70	359.63	8,423.7	400.3	-2.6	430,736.10	695,033.11	32° 10' 57.502 N	103° 42' 10.571 W

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Corvo Federal #4H
Company:	COG Production, LLC.	TVD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	MD Reference:	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	North Reference:	Grid
Well:	Corvo Federal #4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,650.0	83.70	359.63	8,427.1	425.1	-2.8	430,760.86	695,032.95	32° 10' 57.748 N	103° 42' 10.571 W
8,675.0	86.70	359.63	8,429.2	450.0	-2.9	430,785.77	695,032.78	32° 10' 57.994 N	103° 42' 10.571 W
8,701.4	89.87	359.63	8,430.0	476.4	-3.1	430,812.15	695,032.61	32° 10' 58.255 N	103° 42' 10.571 W
8701.4' MD LP									
8,800.0	89.87	359.63	8,430.2	575.0	-3.7	430,910.75	695,031.98	32° 10' 59.231 N	103° 42' 10.572 W
8,900.0	89.87	359.63	8,430.4	675.0	-4.4	431,010.75	695,031.33	32° 11' 0.220 N	103° 42' 10.572 W
9,000.0	89.87	359.63	8,430.7	774.9	-5.0	431,110.75	695,030.68	32° 11' 1.210 N	103° 42' 10.573 W
9,100.0	89.87	359.63	8,430.9	874.9	-5.7	431,210.75	695,030.03	32° 11' 2.200 N	103° 42' 10.574 W
9,200.0	89.87	359.63	8,431.1	974.9	-6.3	431,310.74	695,029.39	32° 11' 3.189 N	103° 42' 10.575 W
9,300.0	89.87	359.63	8,431.4	1,074.9	-7.0	431,410.74	695,028.74	32° 11' 4.179 N	103° 42' 10.575 W
9,400.0	89.87	359.63	8,431.6	1,174.9	-7.6	431,510.74	695,028.09	32° 11' 5.168 N	103° 42' 10.576 W
9,500.0	89.87	359.63	8,431.8	1,274.9	-8.2	431,610.74	695,027.45	32° 11' 6.158 N	103° 42' 10.577 W
9,600.0	89.87	359.63	8,432.1	1,374.9	-8.9	431,710.73	695,026.80	32° 11' 7.148 N	103° 42' 10.577 W
9,700.0	89.87	359.63	8,432.3	1,474.9	-9.5	431,810.73	695,026.15	32° 11' 8.137 N	103° 42' 10.578 W
9,800.0	89.87	359.63	8,432.5	1,574.9	-10.2	431,910.73	695,025.50	32° 11' 9.127 N	103° 42' 10.579 W
9,900.0	89.87	359.63	8,432.8	1,674.9	-10.8	432,010.73	695,024.86	32° 11' 10.116 N	103° 42' 10.580 W
10,000.0	89.87	359.63	8,433.0	1,774.9	-11.5	432,110.72	695,024.21	32° 11' 11.106 N	103° 42' 10.580 W
10,100.0	89.87	359.63	8,433.2	1,874.9	-12.1	432,210.72	695,023.56	32° 11' 12.096 N	103° 42' 10.581 W
10,200.0	89.87	359.63	8,433.5	1,974.9	-12.8	432,310.72	695,022.92	32° 11' 13.085 N	103° 42' 10.582 W
10,300.0	89.87	359.63	8,433.7	2,074.9	-13.4	432,410.72	695,022.27	32° 11' 14.075 N	103° 42' 10.582 W
10,400.0	89.87	359.63	8,433.9	2,174.9	-14.1	432,510.71	695,021.62	32° 11' 15.064 N	103° 42' 10.583 W
10,500.0	89.87	359.63	8,434.2	2,274.9	-14.7	432,610.71	695,020.97	32° 11' 16.054 N	103° 42' 10.584 W
10,600.0	89.87	359.63	8,434.4	2,374.9	-15.4	432,710.71	695,020.33	32° 11' 17.044 N	103° 42' 10.585 W
10,700.0	89.87	359.63	8,434.6	2,474.9	-16.0	432,810.71	695,019.68	32° 11' 18.033 N	103° 42' 10.585 W
10,800.0	89.87	359.63	8,434.9	2,574.9	-16.7	432,910.70	695,019.03	32° 11' 19.023 N	103° 42' 10.586 W
10,900.0	89.87	359.63	8,435.1	2,674.9	-17.3	433,010.70	695,018.39	32° 11' 20.012 N	103° 42' 10.587 W
11,000.0	89.87	359.63	8,435.3	2,774.9	-18.0	433,110.70	695,017.74	32° 11' 21.002 N	103° 42' 10.587 W
11,100.0	89.87	359.63	8,435.6	2,874.9	-18.6	433,210.70	695,017.09	32° 11' 21.992 N	103° 42' 10.588 W
11,200.0	89.87	359.63	8,435.8	2,974.9	-19.3	433,310.70	695,016.45	32° 11' 22.981 N	103° 42' 10.589 W
11,300.0	89.87	359.63	8,436.1	3,074.9	-19.9	433,410.69	695,015.80	32° 11' 23.971 N	103° 42' 10.589 W
11,400.0	89.87	359.63	8,436.3	3,174.9	-20.5	433,510.69	695,015.15	32° 11' 24.960 N	103° 42' 10.590 W
11,500.0	89.87	359.63	8,436.5	3,274.9	-21.2	433,610.69	695,014.50	32° 11' 25.950 N	103° 42' 10.591 W
11,600.0	89.87	359.63	8,436.8	3,374.9	-21.8	433,710.69	695,013.86	32° 11' 26.940 N	103° 42' 10.592 W
11,700.0	89.87	359.63	8,437.0	3,474.9	-22.5	433,810.68	695,013.21	32° 11' 27.929 N	103° 42' 10.592 W
11,800.0	89.87	359.63	8,437.2	3,574.9	-23.1	433,910.68	695,012.56	32° 11' 28.919 N	103° 42' 10.593 W
11,900.0	89.87	359.63	8,437.5	3,674.9	-23.8	434,010.68	695,011.92	32° 11' 29.908 N	103° 42' 10.594 W
12,000.0	89.87	359.63	8,437.7	3,774.9	-24.4	434,110.68	695,011.27	32° 11' 30.898 N	103° 42' 10.594 W
12,100.0	89.87	359.63	8,437.9	3,874.9	-25.1	434,210.67	695,010.62	32° 11' 31.888 N	103° 42' 10.595 W
12,200.0	89.87	359.63	8,438.2	3,974.9	-25.7	434,310.67	695,009.97	32° 11' 32.877 N	103° 42' 10.596 W
12,300.0	89.87	359.63	8,438.4	4,074.9	-26.4	434,410.67	695,009.33	32° 11' 33.867 N	103° 42' 10.597 W
12,400.0	89.87	359.63	8,438.6	4,174.9	-27.0	434,510.67	695,008.68	32° 11' 34.856 N	103° 42' 10.597 W
12,500.0	89.87	359.63	8,438.9	4,274.9	-27.7	434,610.66	695,008.03	32° 11' 35.846 N	103° 42' 10.598 W
12,600.0	89.87	359.63	8,439.1	4,374.9	-28.3	434,710.66	695,007.39	32° 11' 36.836 N	103° 42' 10.599 W
12,700.0	89.87	359.63	8,439.3	4,474.9	-29.0	434,810.66	695,006.74	32° 11' 37.825 N	103° 42' 10.599 W
12,800.0	89.87	359.63	8,439.6	4,574.9	-29.6	434,910.66	695,006.09	32° 11' 38.815 N	103° 42' 10.600 W
12,900.0	89.87	359.63	8,439.8	4,674.9	-30.3	435,010.66	695,005.45	32° 11' 39.804 N	103° 42' 10.601 W
12,984.9	89.87	359.63	8,440.0	4,759.8	-30.8	435,095.55	695,004.90	32° 11' 40.645 N	103° 42' 10.601 W
12984.9' MD PBHL									

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well Corvo Federal #4H
Company:	COG Production, LLC.	**TVD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Project:	Lea County, N.M.	**MD Reference:**	GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
Site:	Section 29-24S-32E Corvo Federal #4H	**North Reference:**	Grid
Well:	Corvo Federal #4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	Plan#1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Corvo Federal - plan hits target center - Point	0.00	0.00	8,440.0	4,759.8	-30.8	435,095.60	695,004.90	32° 11' 40.645 N	103° 42' 10.601 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
7,952.5	7,952.5	0.0	0.0	7952.5' MD KOP
8,701.4	8,430.0	476.4	-3.1	8701.4' MD LP
12,984.9	8,440.0	4,759.8	-30.8	12984.9' MD PBHL

COMPANY: COG Production, LLC.
WELL: Corvo Federal #4H
COUNTY: Lea County, N.M.
DATUM: NAD 1927 (NADCON CONUS)
RIG: Silver Oak #7
GRID CORRECTION: **To convert a Magnetic Direction to a Grid Direction, Add 6.97°**

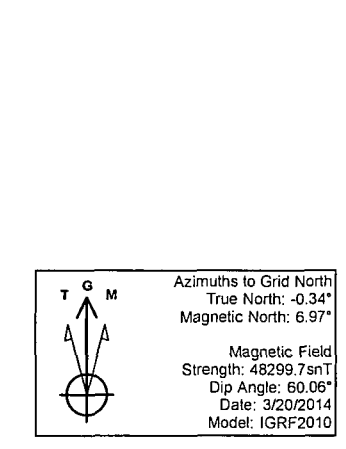
OFFICE: 936.582.7296

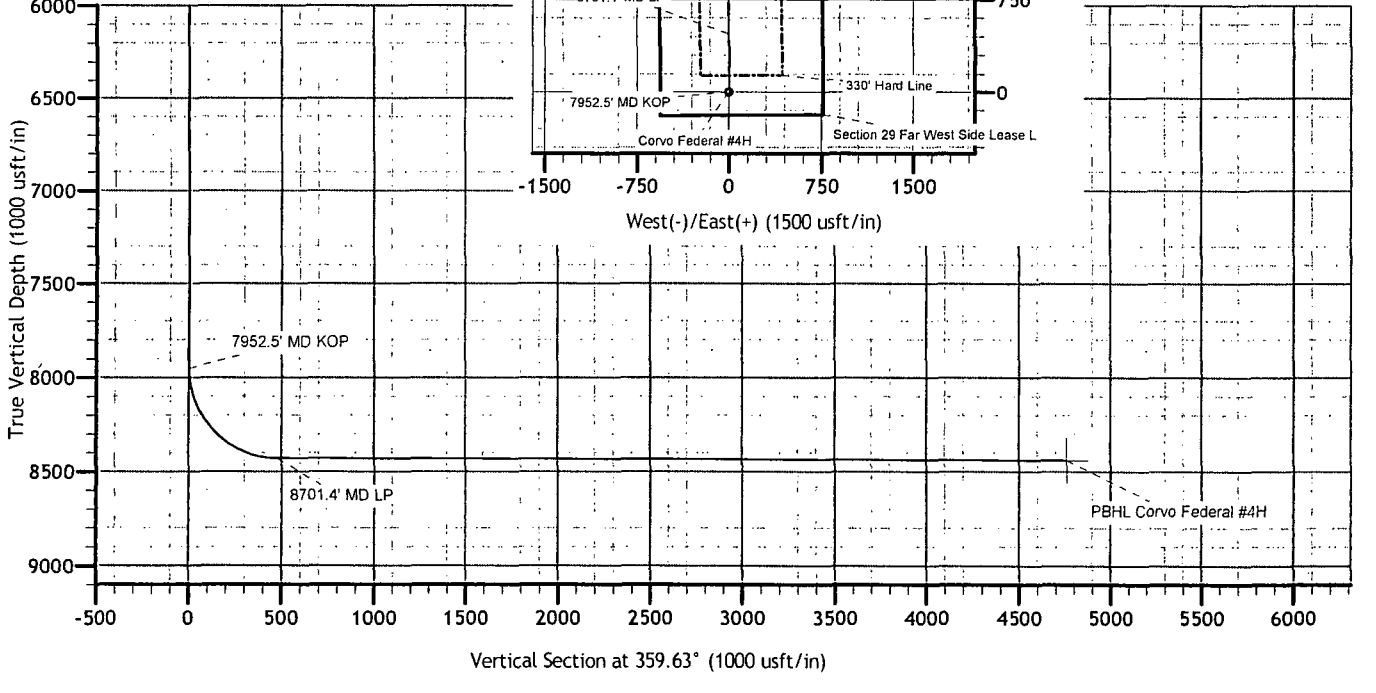
GEODETIC ZONE: New Mexico East 3001
GL 3501.8 + 18 @ 3519.8usft (Silver Oak #7)
GROUND ELEVATION: 3501.8

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	430335.80	695035.70	32° 10' 53.541 N	103° 42' 10.568 W	

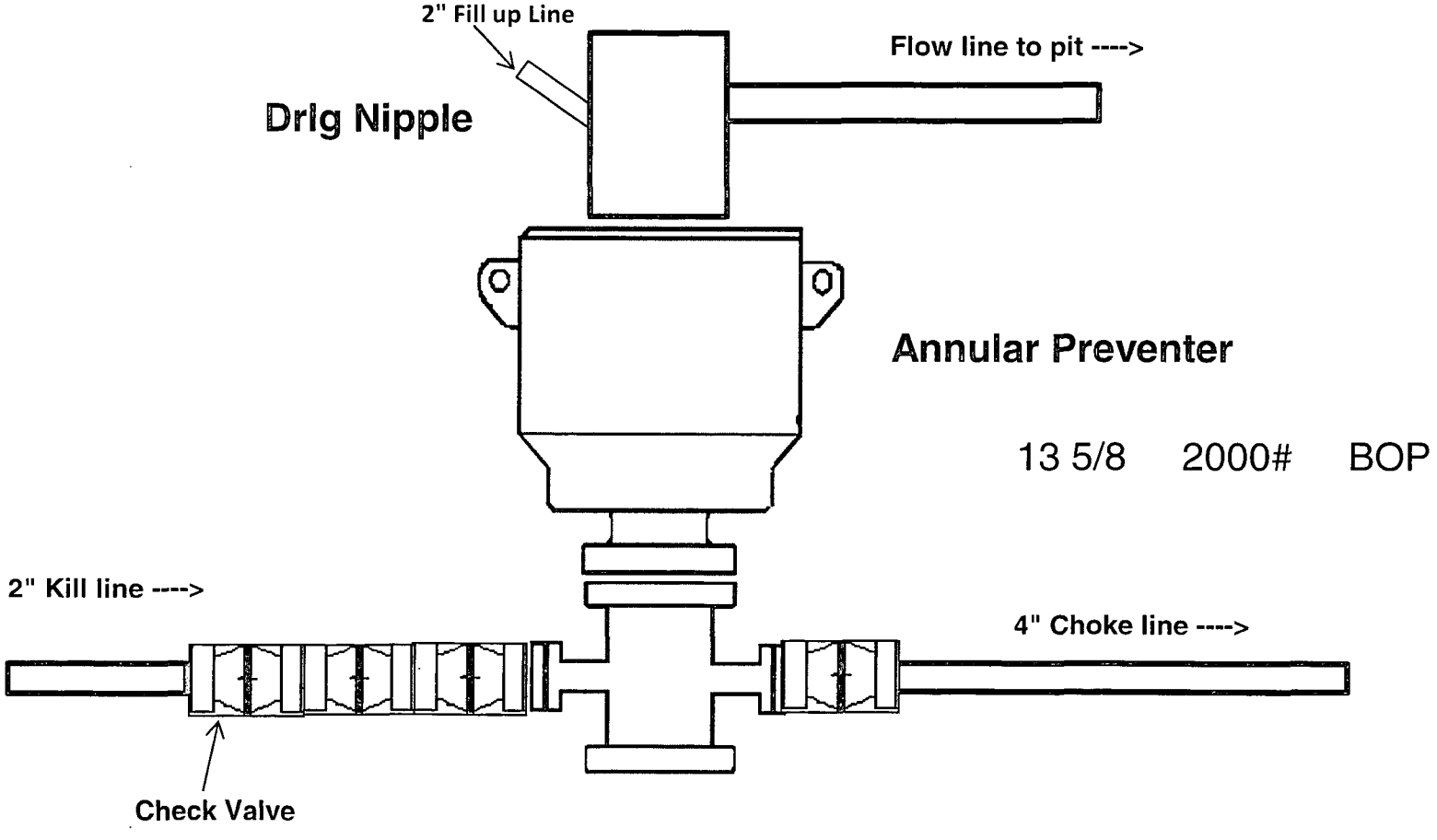
PLAN SECTIONS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	7952.5	0.00	0.00	7952.5	0.0	0.0	0.00	0.00	0.0	
3	8701.4	89.87	359.63	8430.0	476.3	-3.1	12.00	359.63	476.3	
4	12984.9	89.87	359.63	8440.0	4759.8	-30.8	0.00	0.00	4759.9	PBHL Corvo Federal #4H

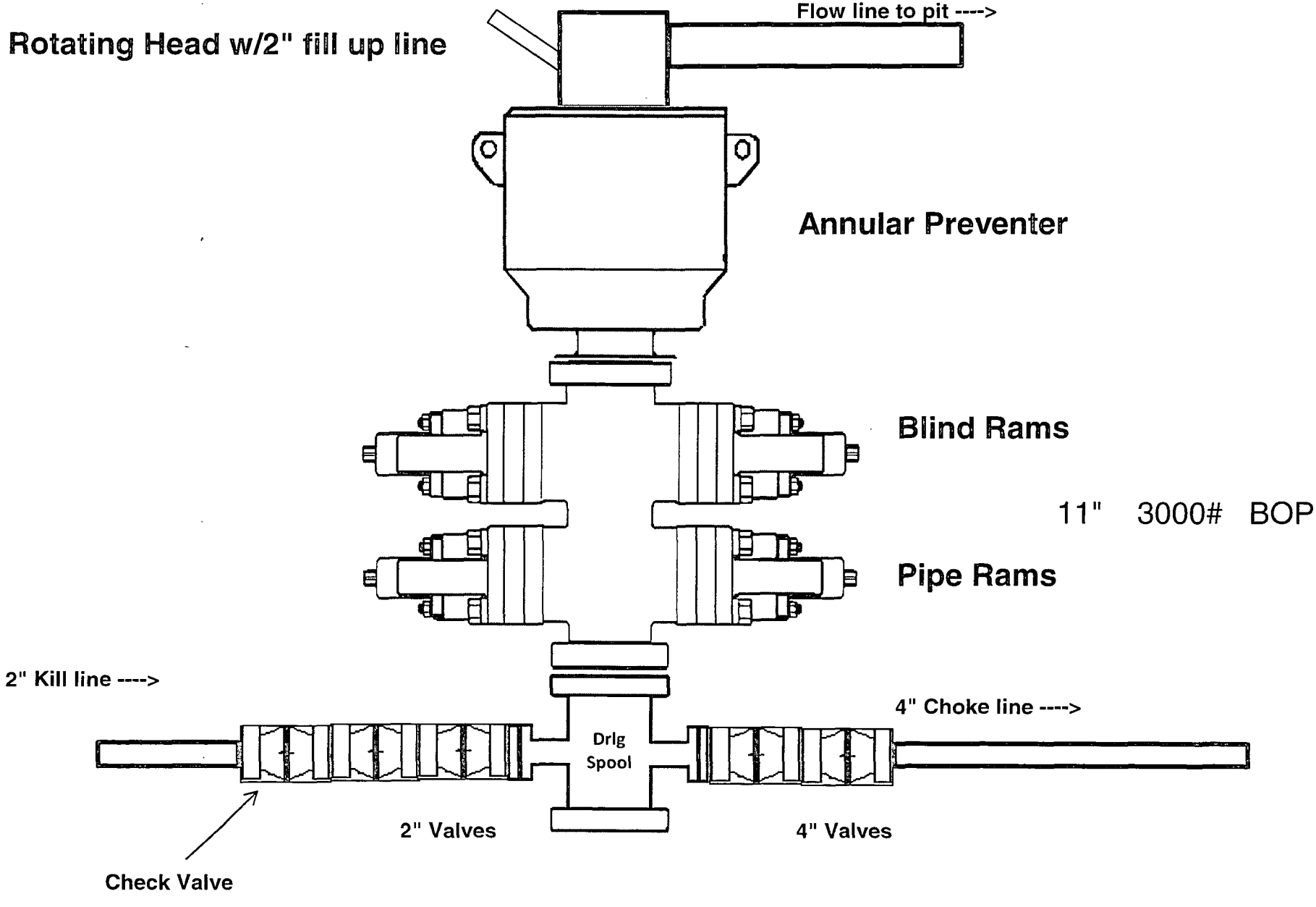




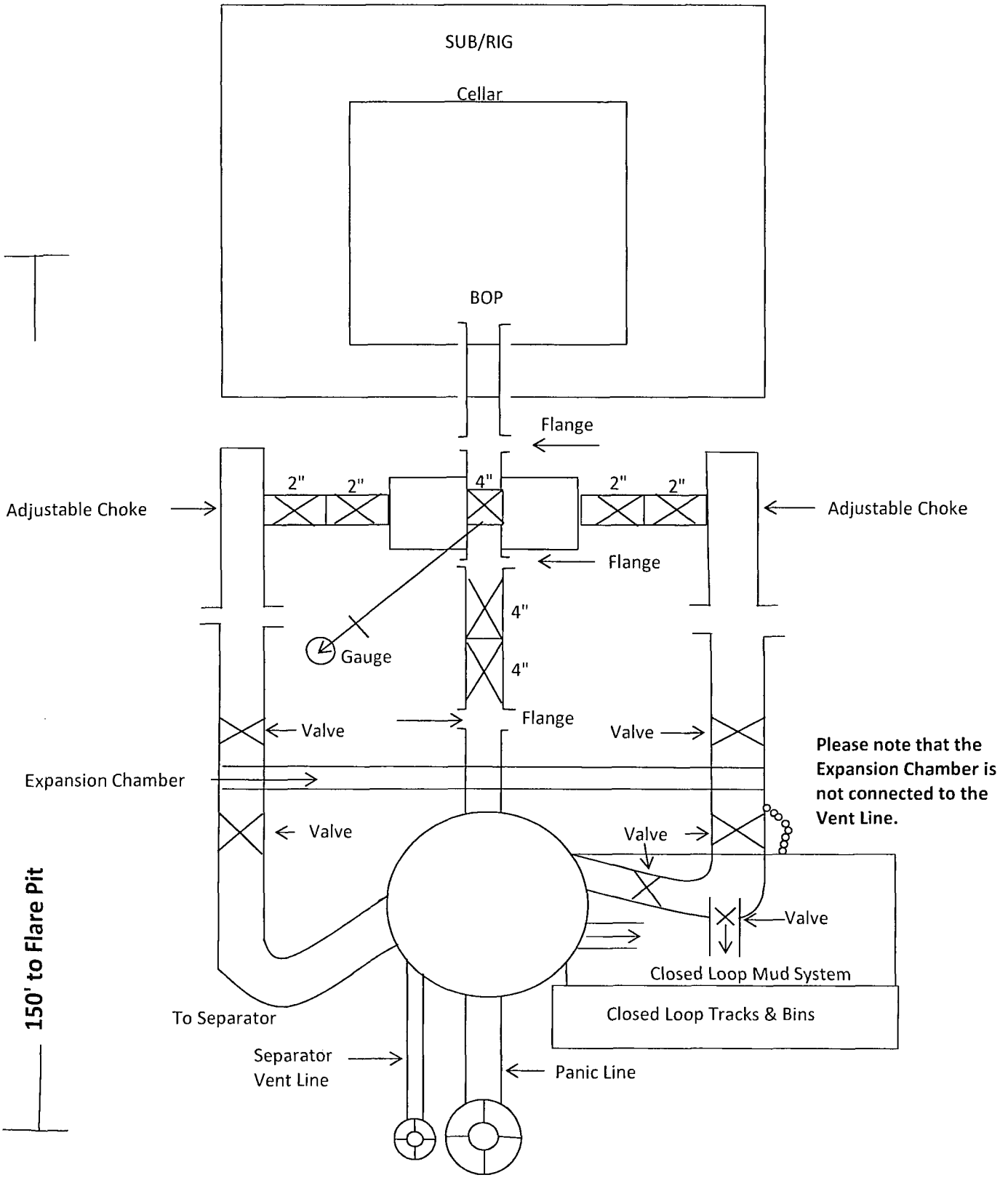
2,000 psi BOP Schematic



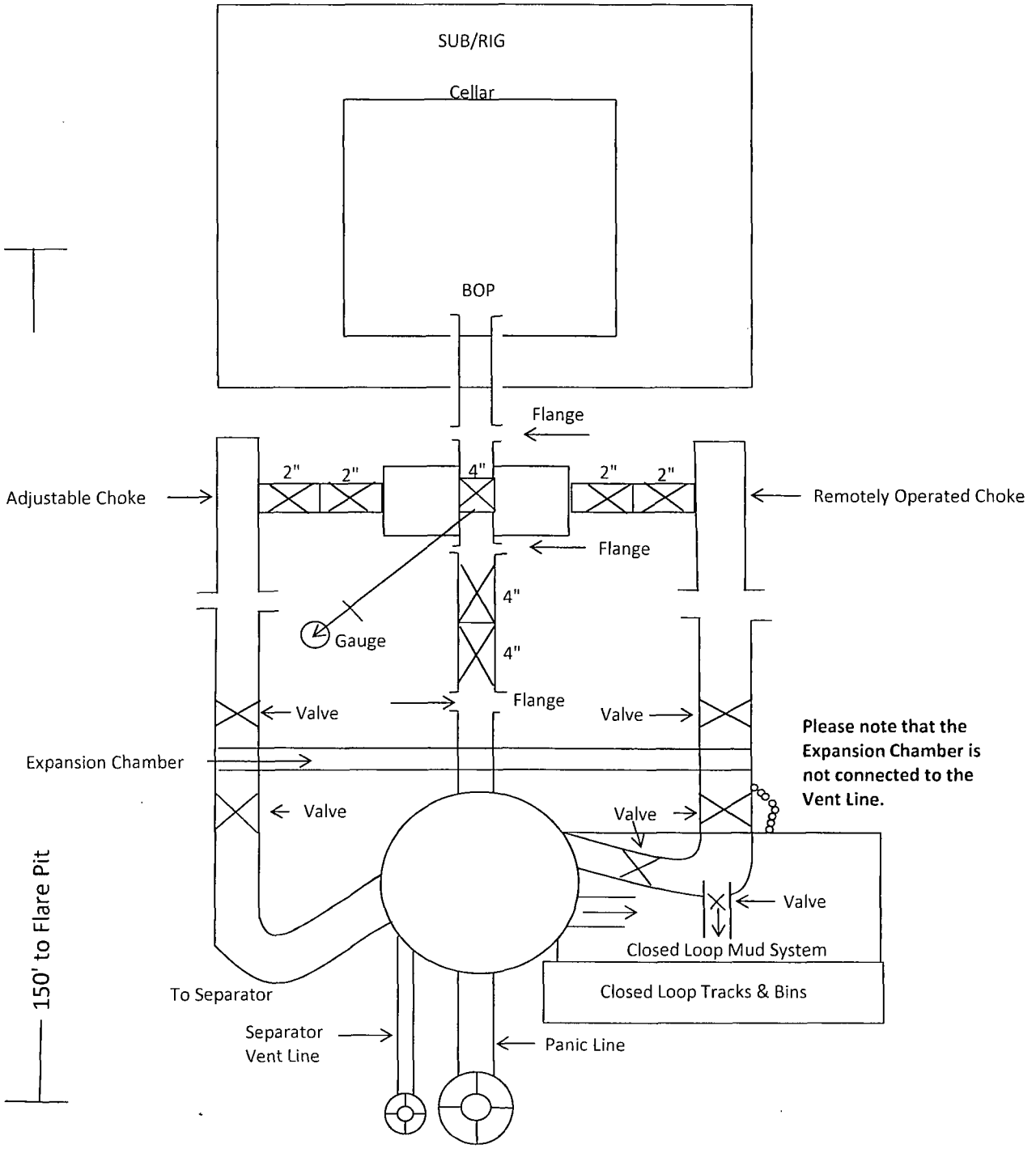
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



COG Production LLC

Rig Plat & Closed Loop Equipment Diagram

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

Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'

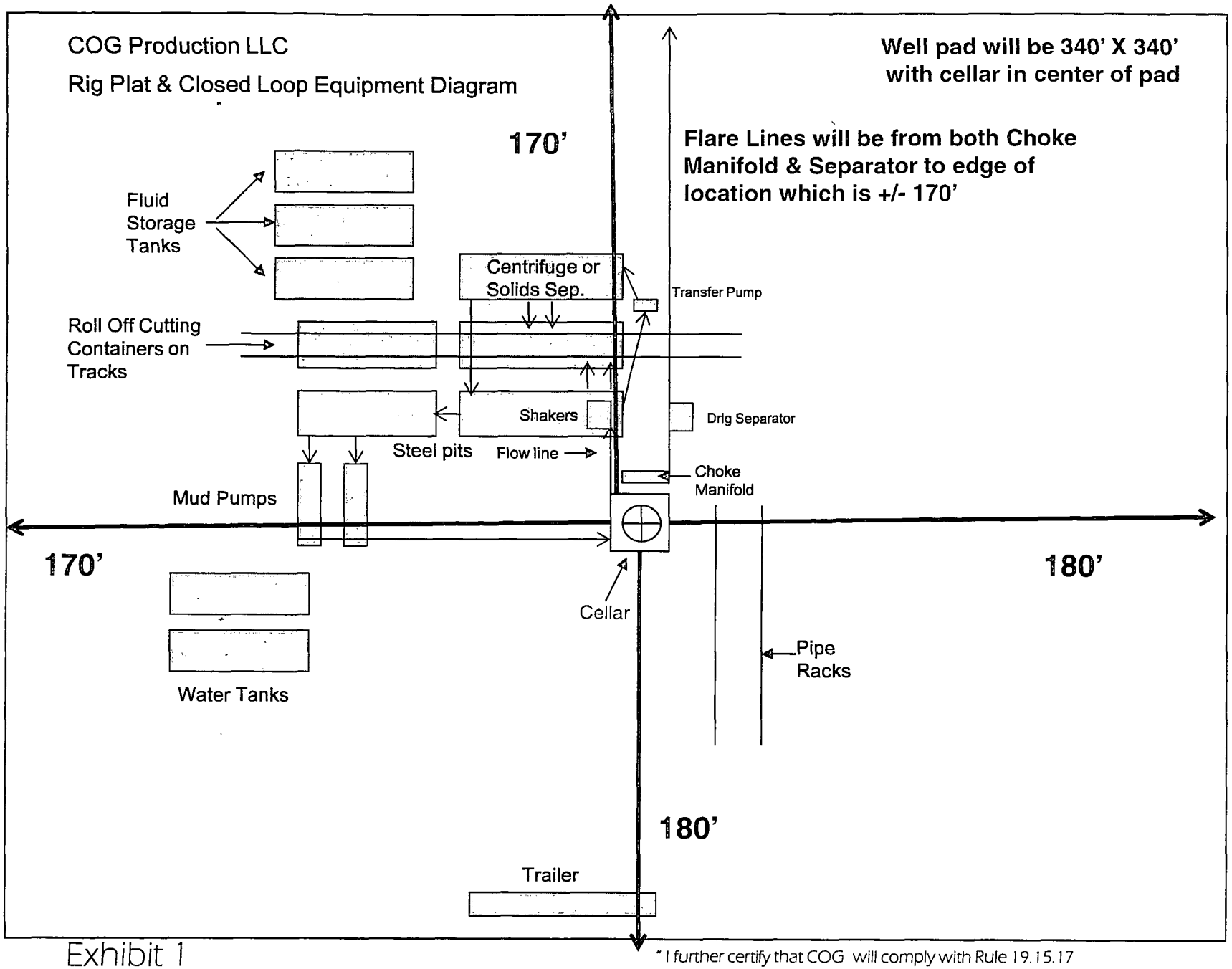


Exhibit 1

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

Secondary egress.

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

COG Production LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.