

UNORTHODOX
LOCATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

OCD H665
HOEBOCD
DEC 04 2013
RECEIVED

13-762
FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM120908
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG Production LLC. 217955		7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940	8. Lease Name and Well No. Azores Federal #4H 39881
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FSL & 660' FWL Unit Letter M (SWSW) SHL Sec 29-T24S-R32E (M) At proposed prod. Zone 330' FNL & 660' FWL Unit Letter D (NWNW) BHL Sec 29-T24S-R32E (D)		9. API Well No. 30-025-41535
14. Distance in miles and direction from nearest town or post office* Approximately 22 miles from Malaga		10. Field and Pool, or Exploratory WC-025-G06 S253206M; Bone Spring
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'	16. No. of acres in lease 1891.72	11. Sec., T.R.M. or Blk and Survey or Area Sec. 29 - T24S - R32E
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 520' BHL: 1650' Closest to the wellbore: 22'	19. Proposed Depth TVD: 10,520' MD: 15,055'	12. County or Parish Lea County
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3500.5' GL	22. Approximate date work will start* 11/1/2013	13. State NM
20. BLM/BIA Bond No. on file NMB000860 & NMB000845		
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. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan | 5. Operator certification |
| 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). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature Mayte Reyes	Name (Printed/Typed) Mayte Reyes	Date 8/27/2013
Title Regulatory Analyst		
Approved by (Signature) /s/ STEPHEN J. CAFFEY	Name (Printed/Typed)	Date DEC - 1 2013
Title FIELD MANAGER	Office 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 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)

Carlsbad Controlled Water Basin

K.B.
12/5/13

Approval Subject to General Requirements
& Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

DEC 10 2013

*(Instructions on page 2)

P.M.

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Azores Federal #4H
SHL: 190' FSL & 660' FWL
BHL: 330' FNL & 660' FWL
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	745'
Top of Salt	1,077'
Base of Salt	4,472'
Delaware	4,592' Oil
Bone Springs	8,483' Oil
TD TVD	10,520'
TD MD	15,055'

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 770' and circulating cement back to surface. All intervals will be isolated by setting 5 1/2" casing to total depth and tying back cement to a minimum of 500' into the 9-5/8" casing.

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 1/2"	0' - 770'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 3,500'	Intrmd	9 5/8"	New	36#	LTC	J-55	1.125	1.125	1.6
12 1/4"	3,500' - 4,500'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 15,055'	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.

4. Proposed Cement Program

- a. 13-3/8" Surface
- Lead: 300 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx / 9.2 gal/sk)
- Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.35 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 / 1.89 cuft/sx / 10.6 gal/sk)
- Tail: 250 sx Class C
(14.8 ppg / 1.35 cuft/sx / 6.3 gal/sk)
- **Calculated w/35% excess on OH volumes
- c. 5 1/2" Production:
- Lead: 600 sx 50:50:10 H +Salt+Gilsonite+CFR-3+ HR601
(11.9 ppg / 2.5 cuft/sx / 14.11 gal/sk)
- Tail: 950 sx 50:50:2 H +Salt+GasStop +CFR-3+HR601
(14.4 ppg / 1.25 cuft/sx / 5.66 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 the 9-5/8" casing.

5. Pressure Control:

Nipple up on 13 3/8 with annular preventer tested to 50% of rated working pressure 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 = 5,030 psi

Lateral TD= 160°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' - 770' 810'	Fresh Water	8.4	29	N.C.
770' - 4,500'	Brine	10	29	N.C.
4,500' - 15,055' (Lateral)	Cut Brine	8.8 - 9.2	29	N.C.

See
COA

- 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 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.
- See COA*

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 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 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:

- 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.



HOBBS OCD

DEC 04 2013

RECEIVED

COG Production LLC

Lea County, NM

Azores Federal

#4H

OH

Plan: Design #1

Standard Planning Report

15 August, 2013



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #4H
Company:	COG Production LLC	TVD Reference:	WELL @ 3522.5usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3522.5usft (Original Well Elev)
Site:	Azores Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project	Lea County, NM		
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	Azores Federal		
Site Position:	From: Map	Northing: 430,370.30 usft	Latitude: 32° 10' 53.703 N
		Easting: 698,107.40 usft	Longitude: 103° 41' 34.825 W
Position Uncertainty:	3.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.34 °

Well:	#4H		
Well Position	+N/-S -33.2 usft	Northing: 430,337.10 usft	Latitude: 32° 10' 53.548 N
	+E/-W -2,971.9 usft	Easting: 695,135.50 usft	Longitude: 103° 42' 9.406 W
Position Uncertainty	3.0 usft	Wellhead Elevation:	Ground Level: 3,500.5 usft

Wellbore		OH			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/15/2013	7.38	60.07	48,359

Design		Design #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	359.60

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	
10,022.5	0.00	0.00	10,022.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,770.3	89.73	359.60	10,500.0	475.2	-3.3	12.00	12.00	0.00	359.60	
15,055.0	89.73	359.60	10,520.2	4,759.8	-33.2	0.00	0.00	0.00	0.00	PBHL(Azores#4H)



Wellplanning Planning Report

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Project:	Lea County, NM	MD Reference:	WELL @ 3522.5usft (Original Well Elev)
Site:	Azores Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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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Wellbore:	OH		
Design:	Design #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
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00
10,022.5	0.00	0.00	10,022.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 10022.5 'MD, 0.00° INC, 0.00° AZI									
10,025.0	0.30	359.60	10,025.0	0.0	0.0	0.0	12.00	12.00	0.00
10,050.0	3.30	359.60	10,050.0	0.8	0.0	0.8	12.00	12.00	0.00
10,075.0	6.30	359.60	10,074.9	2.9	0.0	2.9	12.00	12.00	0.00
10,100.0	9.30	359.60	10,099.7	6.3	0.0	6.3	12.00	12.00	0.00



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #4H
Company:	COG Production LLC	TVD Reference:	WELL @ 3522.5usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3522.5usft (Original Well Elev)
Site:	Azores Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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)
10,125.0	12.30	359.60	10,124.2	11.0	-0.1	11.0	12.00	12.00	0.00
10,150.0	15.30	359.60	10,148.5	16.9	-0.1	16.9	12.00	12.00	0.00
10,175.0	18.30	359.60	10,172.4	24.1	-0.2	24.1	12.00	12.00	0.00
10,200.0	21.30	359.60	10,195.9	32.6	-0.2	32.6	12.00	12.00	0.00
10,225.0	24.30	359.60	10,219.0	42.3	-0.3	42.3	12.00	12.00	0.00
10,250.0	27.30	359.60	10,241.5	53.2	-0.4	53.2	12.00	12.00	0.00
10,275.0	30.30	359.60	10,263.4	65.2	-0.5	65.2	12.00	12.00	0.00
10,300.0	33.30	359.60	10,284.6	78.4	-0.5	78.4	12.00	12.00	0.00
10,325.0	36.30	359.60	10,305.2	92.7	-0.6	92.7	12.00	12.00	0.00
10,350.0	39.30	359.60	10,324.9	108.0	-0.8	108.0	12.00	12.00	0.00
10,375.0	42.30	359.60	10,343.8	124.3	-0.9	124.3	12.00	12.00	0.00
10,400.0	45.30	359.60	10,361.9	141.6	-1.0	141.6	12.00	12.00	0.00
10,425.0	48.30	359.60	10,379.0	159.8	-1.1	159.8	12.00	12.00	0.00
10,450.0	51.30	359.60	10,395.1	178.9	-1.2	178.9	12.00	12.00	0.00
10,475.0	54.30	359.60	10,410.3	198.8	-1.4	198.8	12.00	12.00	0.00
10,500.0	57.30	359.60	10,424.3	219.5	-1.5	219.5	12.00	12.00	0.00
10,525.0	60.29	359.60	10,437.3	240.9	-1.7	240.9	12.00	12.00	0.00
10,550.0	63.29	359.60	10,449.1	262.9	-1.8	262.9	12.00	12.00	0.00
10,575.0	66.29	359.60	10,459.7	285.5	-2.0	285.5	12.00	12.00	0.00
10,600.0	69.29	359.60	10,469.2	308.7	-2.2	308.7	12.00	12.00	0.00
10,625.0	72.29	359.60	10,477.4	332.3	-2.3	332.3	12.00	12.00	0.00
10,650.0	75.29	359.60	10,484.4	356.3	-2.5	356.3	12.00	12.00	0.00
10,675.0	78.29	359.60	10,490.1	380.6	-2.7	380.6	12.00	12.00	0.00
10,700.0	81.29	359.60	10,494.5	405.2	-2.8	405.2	12.00	12.00	0.00
10,725.0	84.29	359.60	10,497.6	430.0	-3.0	430.0	12.00	12.00	0.00
10,750.0	87.29	359.60	10,499.5	454.9	-3.2	455.0	12.00	12.00	0.00
10,770.3	89.73	359.60	10,500.0	475.2	-3.3	475.3	12.00	12.00	0.00
EOC- 10770.3 'MD, 89.73° INC, 359.60° AZI									
10,800.0	89.73	359.60	10,500.1	504.9	-3.5	504.9	0.00	0.00	0.00
10,900.0	89.73	359.60	10,500.6	604.9	-4.2	604.9	0.00	0.00	0.00
11,000.0	89.73	359.60	10,501.1	704.9	-4.9	704.9	0.00	0.00	0.00
11,100.0	89.73	359.60	10,501.6	804.9	-5.6	804.9	0.00	0.00	0.00
11,200.0	89.73	359.60	10,502.0	904.9	-6.3	904.9	0.00	0.00	0.00
11,300.0	89.73	359.60	10,502.5	1,004.9	-7.0	1,004.9	0.00	0.00	0.00
11,400.0	89.73	359.60	10,503.0	1,104.9	-7.7	1,104.9	0.00	0.00	0.00
11,500.0	89.73	359.60	10,503.4	1,204.9	-8.4	1,204.9	0.00	0.00	0.00
11,600.0	89.73	359.60	10,503.9	1,304.9	-9.1	1,304.9	0.00	0.00	0.00
11,700.0	89.73	359.60	10,504.4	1,404.9	-9.8	1,404.9	0.00	0.00	0.00
11,800.0	89.73	359.60	10,504.9	1,504.9	-10.5	1,504.9	0.00	0.00	0.00
11,900.0	89.73	359.60	10,505.3	1,604.9	-11.2	1,604.9	0.00	0.00	0.00
12,000.0	89.73	359.60	10,505.8	1,704.9	-11.9	1,704.9	0.00	0.00	0.00
12,100.0	89.73	359.60	10,506.3	1,804.9	-12.6	1,804.9	0.00	0.00	0.00
12,200.0	89.73	359.60	10,506.7	1,904.9	-13.3	1,904.9	0.00	0.00	0.00
12,300.0	89.73	359.60	10,507.2	2,004.9	-14.0	2,004.9	0.00	0.00	0.00
12,400.0	89.73	359.60	10,507.7	2,104.9	-14.7	2,104.9	0.00	0.00	0.00
12,500.0	89.73	359.60	10,508.2	2,204.9	-15.4	2,204.9	0.00	0.00	0.00
12,600.0	89.73	359.60	10,508.6	2,304.9	-16.1	2,304.9	0.00	0.00	0.00
12,700.0	89.73	359.60	10,509.1	2,404.9	-16.8	2,404.9	0.00	0.00	0.00
12,800.0	89.73	359.60	10,509.6	2,504.9	-17.5	2,504.9	0.00	0.00	0.00
12,900.0	89.73	359.60	10,510.0	2,604.9	-18.2	2,604.9	0.00	0.00	0.00
13,000.0	89.73	359.60	10,510.5	2,704.9	-18.9	2,704.9	0.00	0.00	0.00
13,100.0	89.73	359.60	10,511.0	2,804.8	-19.6	2,804.9	0.00	0.00	0.00
13,200.0	89.73	359.60	10,511.4	2,904.8	-20.3	2,904.9	0.00	0.00	0.00
13,300.0	89.73	359.60	10,511.9	3,004.8	-21.0	3,004.9	0.00	0.00	0.00



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #4H
Company:	COG Production LLC	TVD Reference:	WELL @ 3522.5usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3522.5usft (Original Well Elev)
Site:	Azores Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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)
13,400.0	89.73	359.60	10,512.4	3,104.8	-21.7	3,104.9	0.00	0.00	0.00
13,500.0	89.73	359.60	10,512.9	3,204.8	-22.4	3,204.9	0.00	0.00	0.00
13,600.0	89.73	359.60	10,513.3	3,304.8	-23.1	3,304.9	0.00	0.00	0.00
13,700.0	89.73	359.60	10,513.8	3,404.8	-23.8	3,404.9	0.00	0.00	0.00
13,800.0	89.73	359.60	10,514.3	3,504.8	-24.5	3,504.9	0.00	0.00	0.00
13,900.0	89.73	359.60	10,514.7	3,604.8	-25.2	3,604.9	0.00	0.00	0.00
14,000.0	89.73	359.60	10,515.2	3,704.8	-25.9	3,704.9	0.00	0.00	0.00
14,100.0	89.73	359.60	10,515.7	3,804.8	-26.6	3,804.9	0.00	0.00	0.00
14,200.0	89.73	359.60	10,516.2	3,904.8	-27.3	3,904.9	0.00	0.00	0.00
14,300.0	89.73	359.60	10,516.6	4,004.8	-28.0	4,004.9	0.00	0.00	0.00
14,400.0	89.73	359.60	10,517.1	4,104.8	-28.7	4,104.9	0.00	0.00	0.00
14,500.0	89.73	359.60	10,517.6	4,204.8	-29.4	4,204.9	0.00	0.00	0.00
14,600.0	89.73	359.60	10,518.0	4,304.8	-30.1	4,304.9	0.00	0.00	0.00
14,700.0	89.73	359.60	10,518.5	4,404.8	-30.8	4,404.9	0.00	0.00	0.00
14,800.0	89.73	359.60	10,519.0	4,504.8	-31.4	4,504.9	0.00	0.00	0.00
14,900.0	89.73	359.60	10,519.5	4,604.8	-32.1	4,604.9	0.00	0.00	0.00
15,000.0	89.73	359.60	10,519.9	4,704.8	-32.8	4,704.9	0.00	0.00	0.00
15,055.0	89.73	359.60	10,520.2	4,759.8	-33.2	4,759.9	0.00	0.00	0.00
TD at 15055.0 - PBHL(Azores#4H)									

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(Azores#4H)	0.00	0.00	10,520.0	4,759.8	-30.8	435,096.90	695,104.70	32° 11' 40.652 N	103° 42' 9.440 W
- plan misses target center by 2.4usft at 15055.0usft MD (10520.2 TVD, 4759.8 N, -33.2 E)									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,022.5	10,022.5	0.0	0.0	KOP - 10022.5 'MD, 0.00° INC, 0.00° AZI
10,770.3	10,500.0	475.2	-3.3	EOC- 10770.3 'MD, 89.73° INC, 359.60° AZI
15,055.0	10,520.2	4,759.8	-33.2	TD at 15055.0



COG Production LLC
Project: Lea County, NM
Site: Azores Federal

Well: #4H
Wellbore: OH
Plan: Design #1 (#4H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	10022.5	0.00	0.00	10022.5	0.0	0.0	0.00	0.00	0.0
3	10770.3	89.73	359.60	10500.0	475.2	-3.3	12.00	359.60	475.3
4	15055.0	89.73	359.60	10520.2	4759.8	-33.2	0.00	0.00	4759.9

PBHL(Azores#4H)

WELL DETAILS: #4H

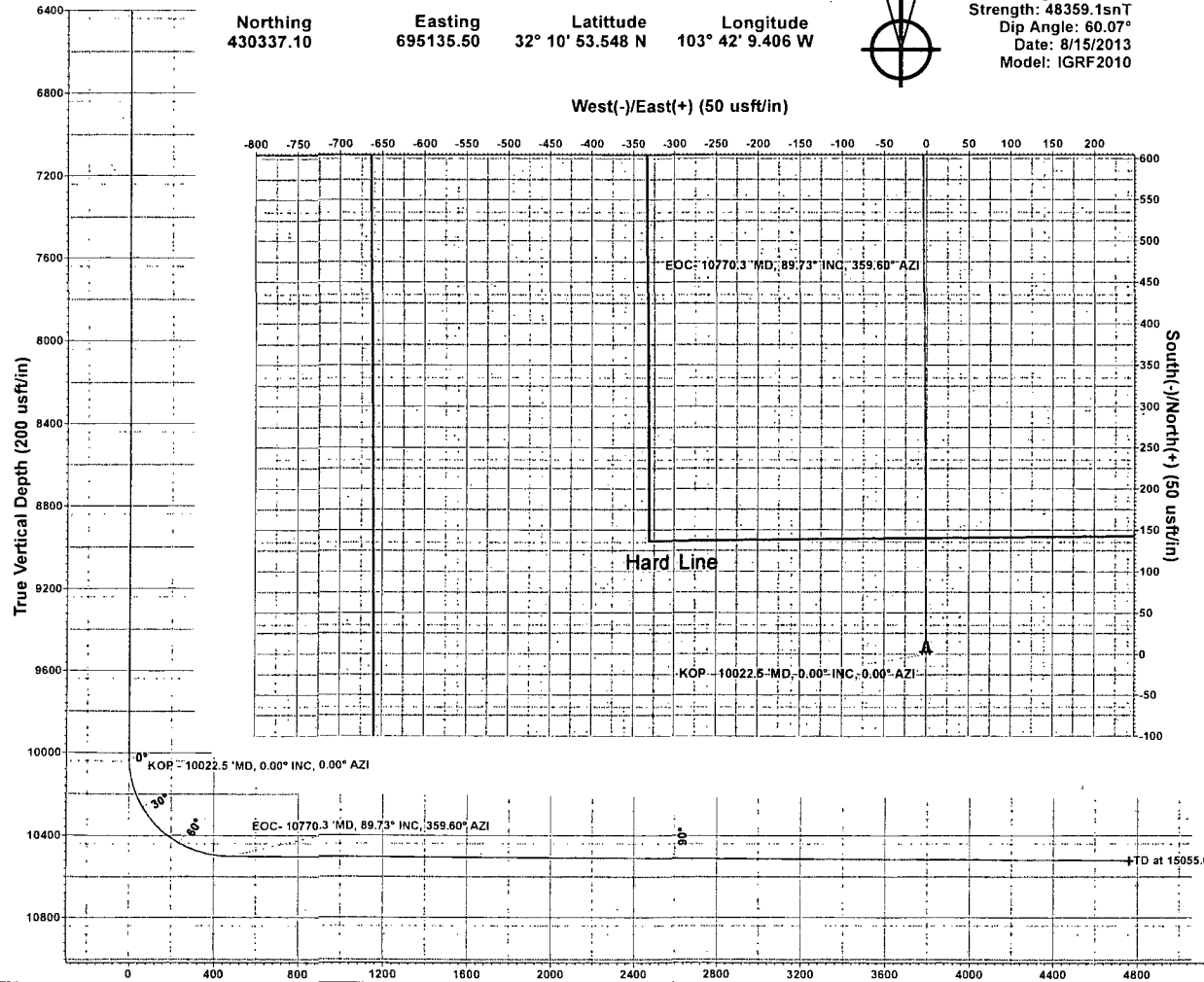
Ground Elevation:: 3500.5
RKB Elevation: WELL @ 3522.5usft (Original Well Elev)
Rig Name: Original Well Elev

Northing 430337.10 Easting 695135.50 Latitude 32° 10' 53.548 N Longitude 103° 42' 9.406 W

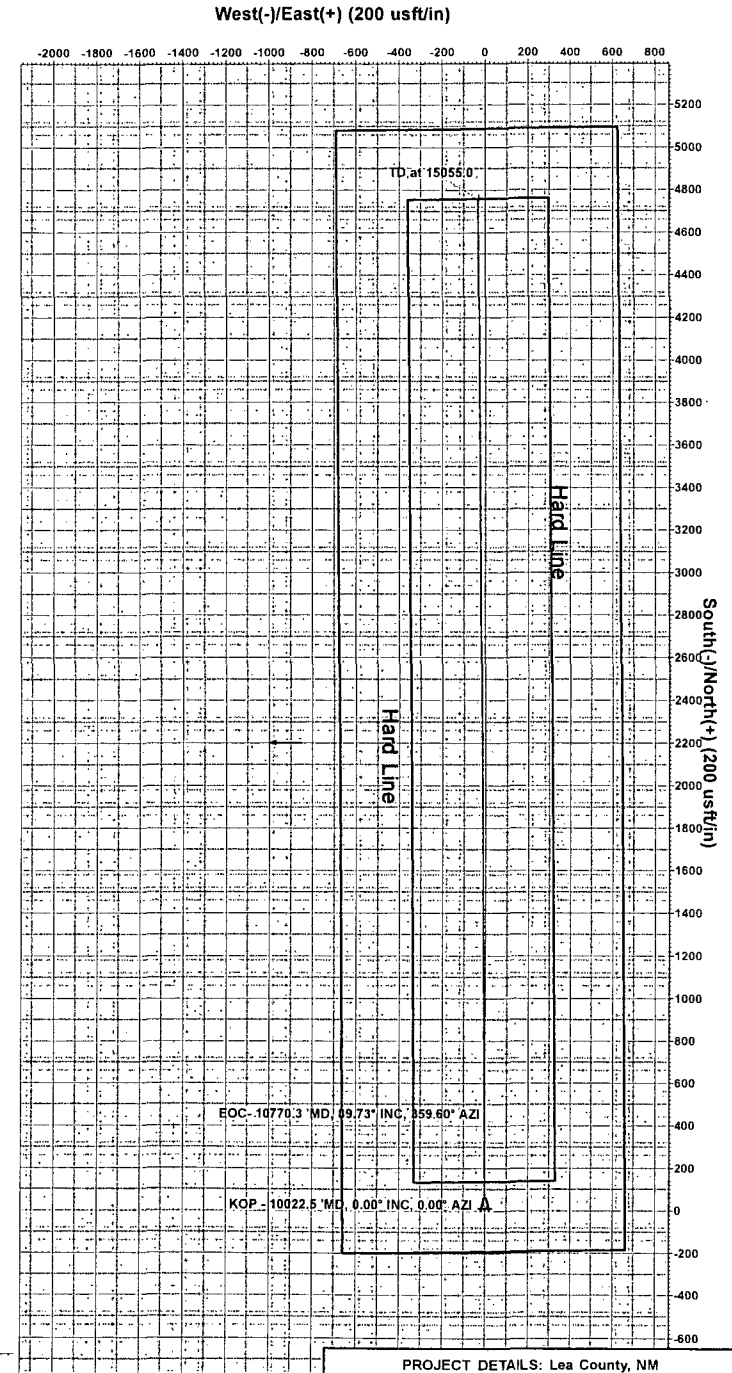


Azimuths to Grid North
True North: -0.34°
Magnetic North: 7.04°

Magnetic Field
Strength: 48359.1snT
Dip Angle: 60.07°
Date: 8/15/2013
Model: IGRF2010



Vertical Section at 359.60° (200 usft/in)

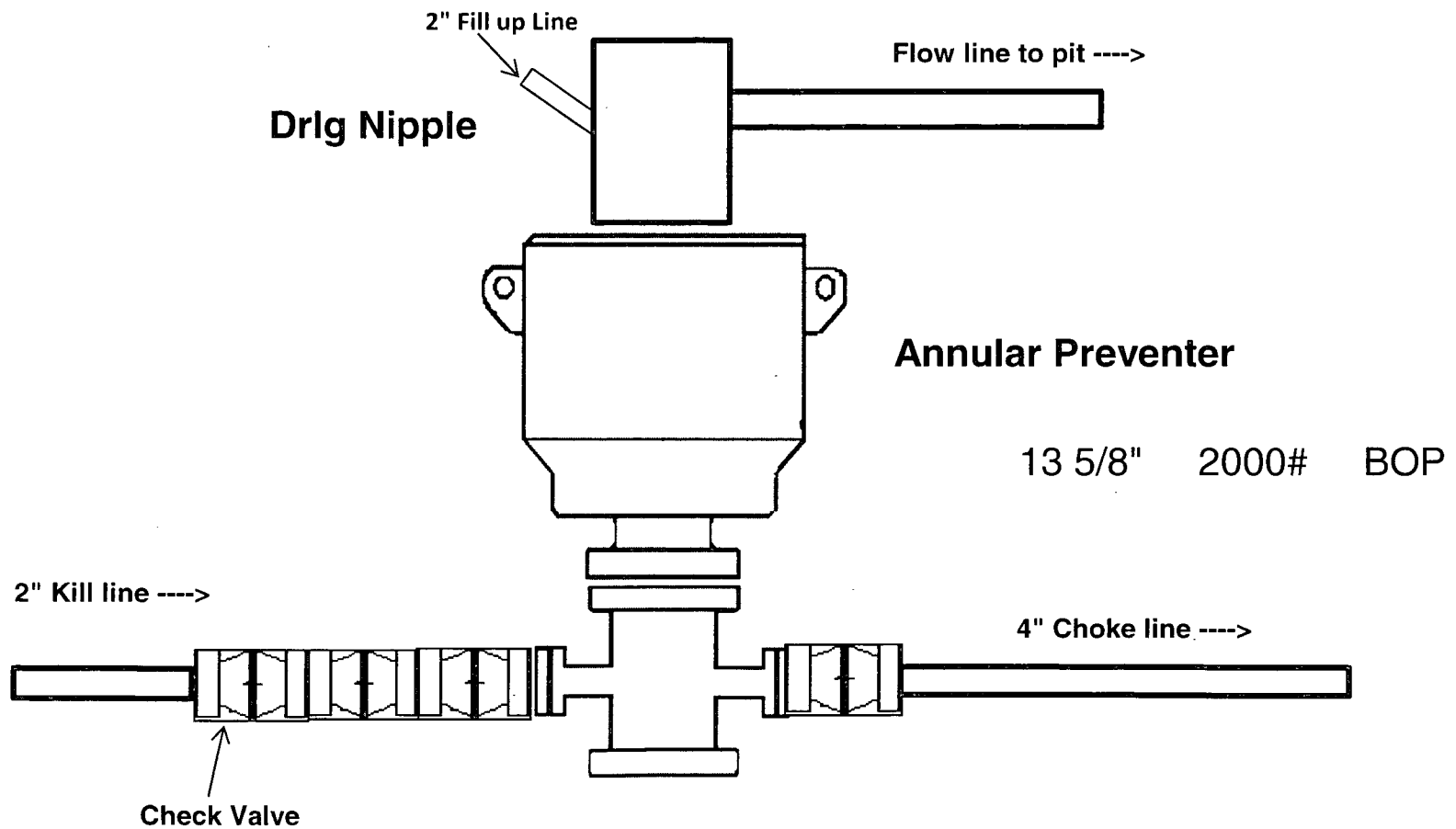


Plan: Design #1 (#4H/OH)
Created By: Well Planner Date: 18:38, August 15 2013

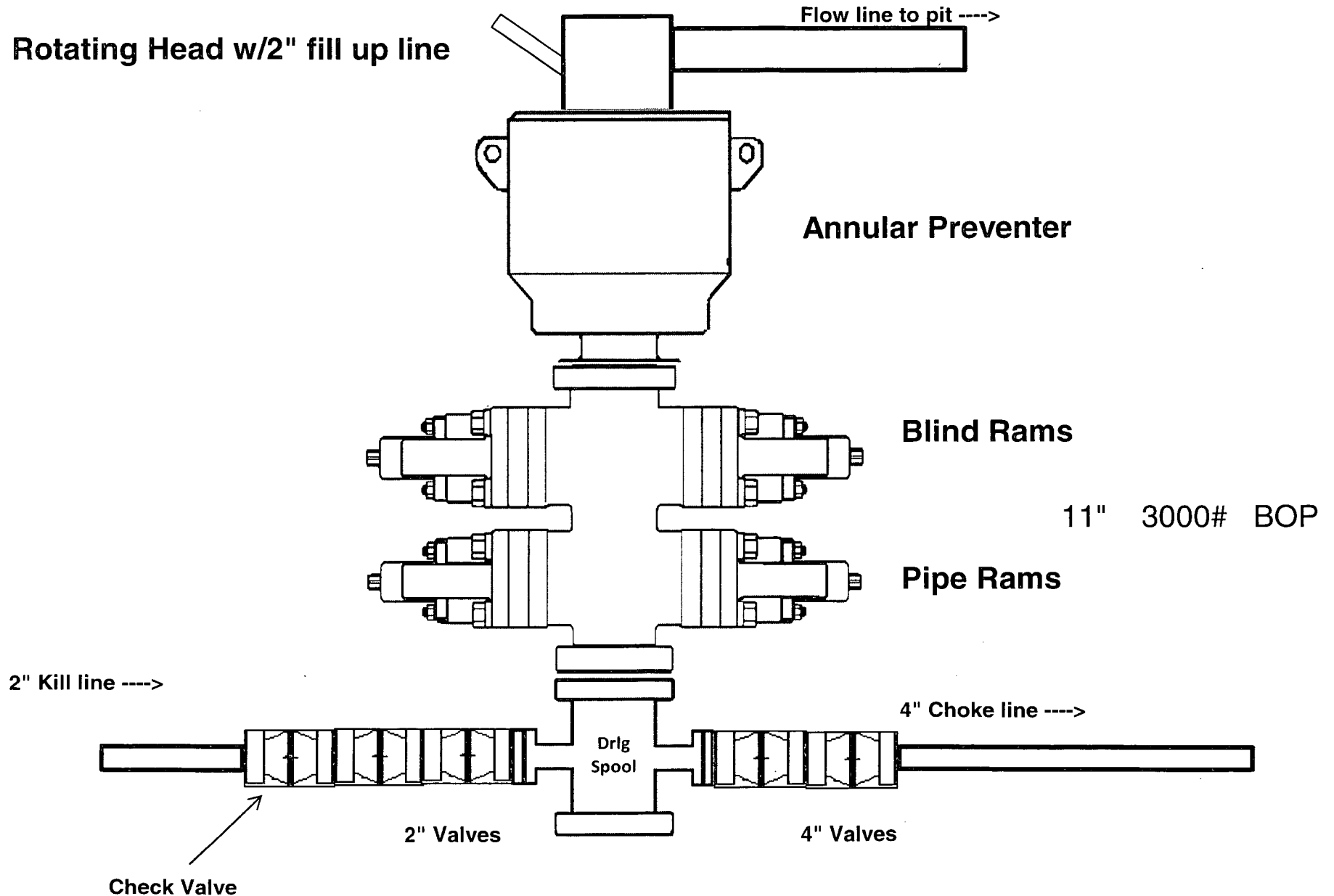
Terra Directional Services
322 Spring Hill Drive, Suite A100, Spring, Texas 77386
432.425.7532

PROJECT DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

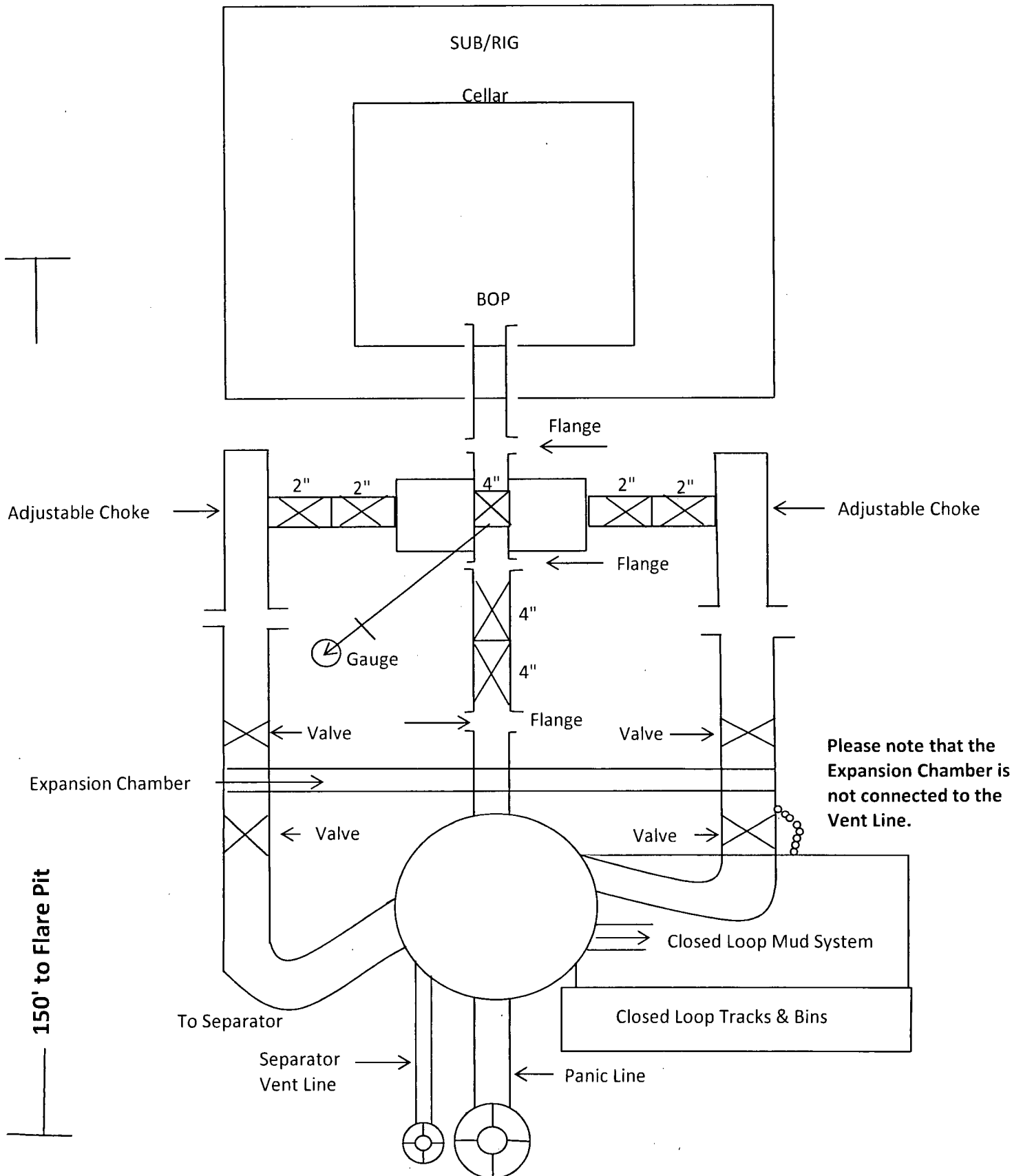
2,000 psi BOP Schematic



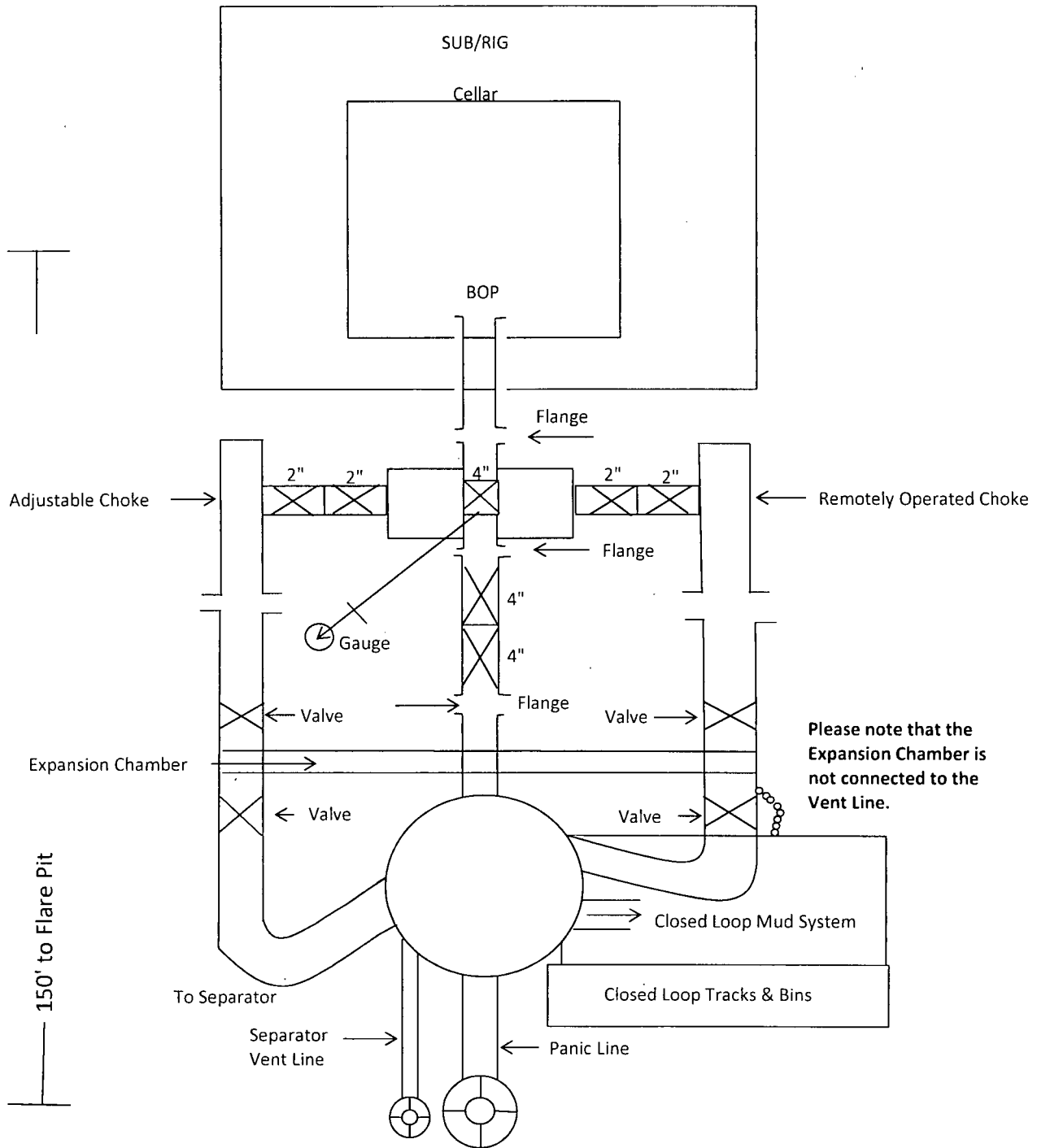
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



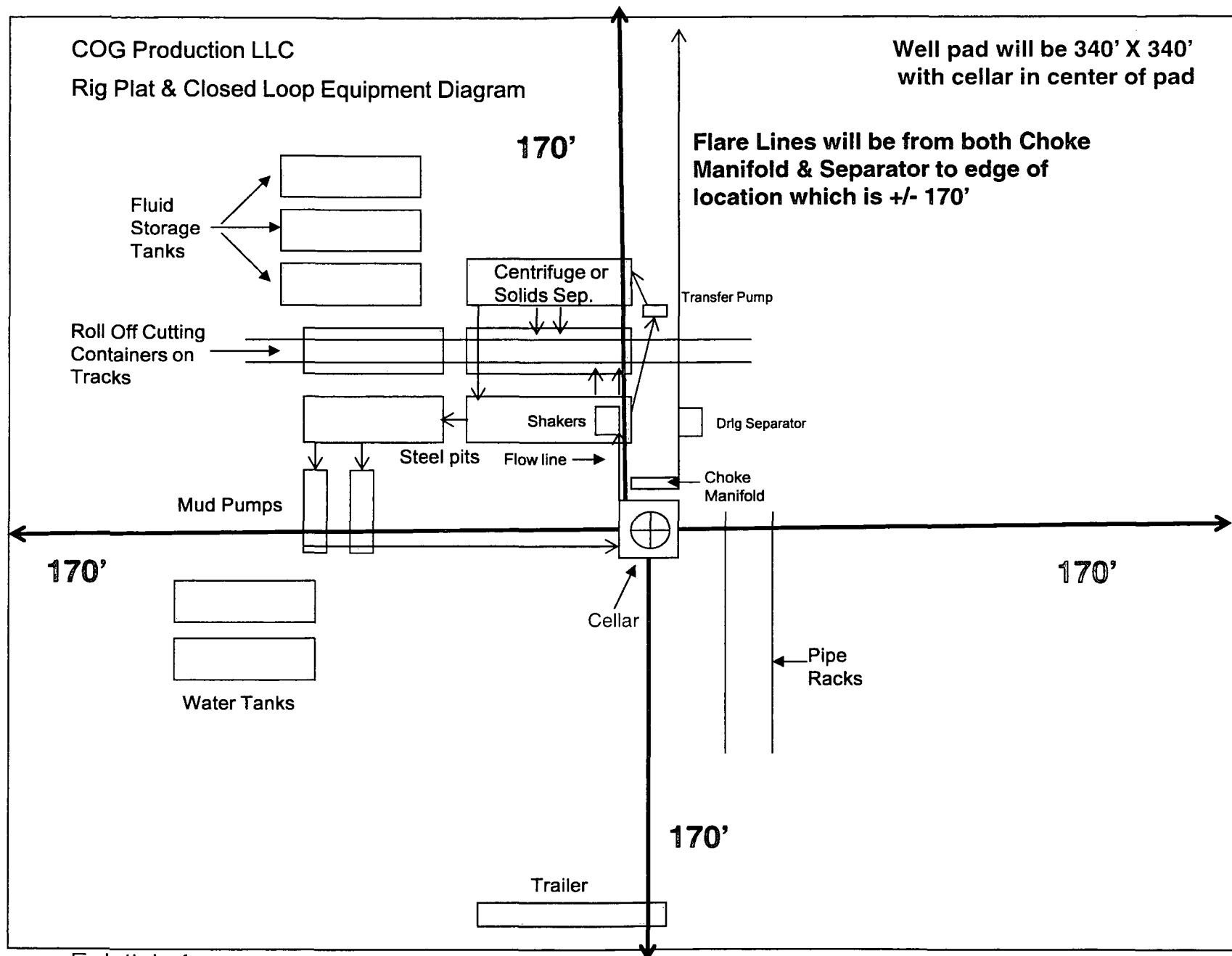


Exhibit 1

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