

ATS-13-914

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

OCD Hobbs

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

UNORTHODOX
LOCATION

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.		7. If Unit or CA Agreement, Name and No.	
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. 40133 Windward Federal #2H	
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-025-41408	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FNL & 1750' FWL Unit Letter C (NENW) SHL Sec. 30 - T24S - R32E At proposed prod. Zone 330' FSL & 2290' FWL Unit Letter N (SESW) BHL Sec. 31 - T24S - R32E		10. Field and Pool, or Exploratory 97899 WC-025 G-06 3253206Mj Wildcat Bone Spring	
14. Distance in miles and direction from nearest town or post office* Approximately 20 miles from Malaga		11. Sec., T.R.M. or Blk and Survey or Area Sec. 30 - T24S - R32E	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'		12. County or Parish Lea County	
16. No. of acres in lease 1891.72		13. State NM	
17. Spacing Unit dedicated to this well 320			
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1320' (Windward Federal #1H) BHL: 2720'		20. BLM/BIA Bond No. on file NMB000845 & NMB000860	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3543.9' GL		22. Approximate date work will start* 10/1/2013	
		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 <i>Mayte Reyes</i>	Name (Printed/Typed) Mayte Reyes	Date 8/1/2013
Title Regulatory Analyst		
Approved by (Signature) /S/ STEPHEN J. CAFFEY	Name (Printed/Typed)	Date SEP 12 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.

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)

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Approval Subject to General Requirements
& Special Stipulations Attached

SEP 19 2013

Carlsbad Controlled Water Basin

PM

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Windward Federal 2H
SHL: 190' FNL & 1750' FWL of section 30
BHL: 330' FSL & 2290' FWL of section 31
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	~ 371'	
Rustler	750'	
Top of Salt	1083'	
Base of Salt	4357'	
Delaware	4598'	Oil
Bone Spring	8472'	Oil
Wolfcamp	11,396'	
PHTD	11,250'	
TD TVD	10,330'	
TD MD	20,212'	

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' 775' 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 9-5/8" csg shoe.

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' - 800'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 4550'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
8 3/4"	0' - 20,212'	Production Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6

See COA

- 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: 350 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx)
- Cmt: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/50% excess on OH volumes
- b. 9 5/8" Intermediate:
- Lead: 1050 sx 35:65:6 C +Salt+Gilsonite+CFR-3+ HR601
(12.8 ppg / 1.89 cuft/sx)
- Tail: 250 sx Class C
(14.8 ppg / 1.35 cuft/sx)
- **Calculated w/35% excess on OH volumes
- d. 5 1/2" Production
- Lead: 1250 sx 50:50:10 C +Salt+Gilsonite+CFR-3+ HR601
(11.9 ppg / 2.5 cuft/sx)
- Tail: 2850 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg / 1.25 cuft/sx)
- **Calculated w/35% excess on OH volumes

- o The above cement volumes could be revised pending the caliper measurements.
- o The 9-5/8" intermediate cement is designed to circulate cement to surface.
- o The production TOC will tie back a minimum 500' into previous shoe
- o Pilot hole will be plugged back with the following cmt plugs:

See COA

- PHTD – 10,550' with 300 sx Class H @ 17.2 ppg/0.98 yeild
- 10,550' – 9850' with 300 sx Class H @ 17.2 ppg/0.98 yeild

5. Minimum Specifications for Pressure Control:

See COA

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 5M 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.

6. Estimated BHP & BHT:

Lateral TD = 4512 psi

Lateral TD = 152°F

PHTD = 4914 psi

PHTD = 160°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' - 775' 800'	Fresh Water	8.4	29	N.C.
775' - 4550'	Brine	10	29	N.C.
4550' - 11,225 (PH)	Cut Brine	8.9 - 9.2	29	N.C.
4550' - 20,212' (Lateral)	Cut Brine	8.9 - 9.2	29	N.C.

- o The necessary mud products for weight addition and fluid loss control will be on location at all times.
- o 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.
- o 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.
- o 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:

- See COA
- 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 preformed, 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.



COG Production LLC

**Lea County, NM
Windward Federal
#2H**

OH

Plan: Design #1

Standard Planning Report

17 July, 2013



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #2H
Company:	COG Production LLC	TVD Reference:	WELL @ 3573.9usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3573.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#2H	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	Windward Federal		
Site Position:		Northing:	435,194.10 usft
From:	Map	Easting:	690,707.10 usft
Position Uncertainty:	3.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 11' 41.866 N
		Longitude:	103° 43' 0.609 W
		Grid Convergence:	0.33 °

Well	#2H		
Well Position	+N/-S	0.0 usft	Northing: 435,194.10 usft
	+E/-W	0.0 usft	Easting: 690,707.10 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level: 3,543.9 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	7/15/2013	7.39	60.11	48,419

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	176.57

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	
9,882.5	0.00	0.00	9,882.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,634.1	90.18	176.57	10,360.0	-478.1	28.7	12.00	12.00	0.00	176.57	
20,212.1	90.18	176.57	10,329.9	-10,039.0	601.7	0.00	0.00	0.00	0.00	PBHL(Windward#2H)



Wellplanning Planning Report

Database: EDM 5000.1 Single User Db
Company: COG Production LLC
Project: Lea County, NM
Site: Windward Federal
Well: #2H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3573.9usft (Original Well Elev)
MD Reference: WELL @ 3573.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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

Local Co-ordinate Reference: Well #2H
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Survey Calculation Method: Minimum Curvature

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
9,882.5	0.00	0.00	9,882.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 9882.5 'MD, 0.00° INC, 0.00° AZI									
9,900.0	2.10	176.57	9,900.0	-0.3	0.0	0.3	12.00	12.00	0.00
9,925.0	5.10	176.57	9,924.9	-1.9	0.1	1.9	12.00	12.00	0.00
9,950.0	8.10	176.57	9,949.8	-4.8	0.3	4.8	12.00	12.00	0.00
9,975.0	11.10	176.57	9,974.4	-8.9	0.5	8.9	12.00	12.00	0.00
10,000.0	14.10	176.57	9,998.8	-14.4	0.9	14.4	12.00	12.00	0.00
10,025.0	17.10	176.57	10,022.9	-21.1	1.3	21.1	12.00	12.00	0.00



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #2H
Company:	COG Production LLC	TVD Reference:	WELL @ 3573.9usft (Original Well Elev)
Project:	Léa County, NM	MD Reference:	WELL @ 3573.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#2H	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)	
10,050.0	20.10	176.57	10,046.6	-29.0	1.7	29.1	12.00	12.00	0.00	
10,075.0	23.10	176.57	10,069.8	-38.2	2.3	38.3	12.00	12.00	0.00	
10,100.0	26.10	176.57	10,092.6	-48.6	2.9	48.7	12.00	12.00	0.00	
10,125.0	29.10	176.57	10,114.7	-60.2	3.6	60.3	12.00	12.00	0.00	
10,150.0	32.10	176.57	10,136.2	-72.9	4.4	73.0	12.00	12.00	0.00	
10,175.0	35.10	176.57	10,157.0	-86.7	5.2	86.8	12.00	12.00	0.00	
10,200.0	38.10	176.57	10,177.1	-101.5	6.1	101.7	12.00	12.00	0.00	
10,225.0	41.10	176.57	10,196.4	-117.4	7.0	117.7	12.00	12.00	0.00	
10,250.0	44.10	176.57	10,214.8	-134.3	8.1	134.6	12.00	12.00	0.00	
10,275.0	47.10	176.57	10,232.3	-152.2	9.1	152.4	12.00	12.00	0.00	
10,300.0	50.10	176.57	10,248.8	-170.9	10.2	171.2	12.00	12.00	0.00	
10,325.0	53.10	176.57	10,264.3	-190.4	11.4	190.8	12.00	12.00	0.00	
10,350.0	56.10	176.57	10,278.8	-210.8	12.6	211.1	12.00	12.00	0.00	
10,375.0	59.10	176.57	10,292.2	-231.8	13.9	232.3	12.00	12.00	0.00	
10,400.0	62.10	176.57	10,304.5	-253.6	15.2	254.0	12.00	12.00	0.00	
10,425.0	65.09	176.57	10,315.6	-275.9	16.5	276.4	12.00	12.00	0.00	
10,450.0	68.09	176.57	10,325.5	-298.8	17.9	299.4	12.00	12.00	0.00	
10,475.0	71.09	176.57	10,334.2	-322.2	19.3	322.8	12.00	12.00	0.00	
10,500.0	74.09	176.57	10,341.7	-346.0	20.7	346.6	12.00	12.00	0.00	
10,525.0	77.09	176.57	10,347.9	-370.2	22.2	370.9	12.00	12.00	0.00	
10,550.0	80.09	176.57	10,352.9	-394.6	23.7	395.4	12.00	12.00	0.00	
10,575.0	83.09	176.57	10,356.5	-419.3	25.1	420.1	12.00	12.00	0.00	
10,600.0	86.09	176.57	10,358.9	-444.2	26.6	445.0	12.00	12.00	0.00	
10,625.0	89.09	176.57	10,359.9	-469.1	28.1	469.9	12.00	12.00	0.00	
10,634.1	90.18	176.57	10,360.0	-478.1	28.7	479.0	12.00	12.00	0.00	
EOC- 10634.1 'MD, 90.18° INC, 176.57° AZI										
10,700.0	90.18	176.57	10,359.8	-544.0	32.6	544.9	0.00	0.00	0.00	
10,800.0	90.18	176.57	10,359.5	-643.8	38.6	644.9	0.00	0.00	0.00	
10,900.0	90.18	176.57	10,359.2	-743.6	44.6	744.9	0.00	0.00	0.00	
11,000.0	90.18	176.57	10,358.9	-843.4	50.6	844.9	0.00	0.00	0.00	
11,100.0	90.18	176.57	10,358.5	-943.2	56.5	944.9	0.00	0.00	0.00	
11,200.0	90.18	176.57	10,358.2	-1,043.1	62.5	1,044.9	0.00	0.00	0.00	
11,300.0	90.18	176.57	10,357.9	-1,142.9	68.5	1,144.9	0.00	0.00	0.00	
11,400.0	90.18	176.57	10,357.6	-1,242.7	74.5	1,244.9	0.00	0.00	0.00	
11,500.0	90.18	176.57	10,357.3	-1,342.5	80.5	1,344.9	0.00	0.00	0.00	
11,600.0	90.18	176.57	10,357.0	-1,442.4	86.4	1,444.9	0.00	0.00	0.00	
11,700.0	90.18	176.57	10,356.7	-1,542.2	92.4	1,544.9	0.00	0.00	0.00	
11,800.0	90.18	176.57	10,356.3	-1,642.0	98.4	1,644.9	0.00	0.00	0.00	
11,900.0	90.18	176.57	10,356.0	-1,741.8	104.4	1,744.9	0.00	0.00	0.00	
12,000.0	90.18	176.57	10,355.7	-1,841.6	110.4	1,844.9	0.00	0.00	0.00	
12,100.0	90.18	176.57	10,355.4	-1,941.5	116.4	1,944.9	0.00	0.00	0.00	
12,200.0	90.18	176.57	10,355.1	-2,041.3	122.3	2,044.9	0.00	0.00	0.00	
12,300.0	90.18	176.57	10,354.8	-2,141.1	128.3	2,144.9	0.00	0.00	0.00	
12,400.0	90.18	176.57	10,354.5	-2,240.9	134.3	2,244.9	0.00	0.00	0.00	
12,500.0	90.18	176.57	10,354.1	-2,340.7	140.3	2,344.9	0.00	0.00	0.00	
12,600.0	90.18	176.57	10,353.8	-2,440.6	146.3	2,444.9	0.00	0.00	0.00	
12,700.0	90.18	176.57	10,353.5	-2,540.4	152.3	2,544.9	0.00	0.00	0.00	
12,800.0	90.18	176.57	10,353.2	-2,640.2	158.2	2,644.9	0.00	0.00	0.00	
12,900.0	90.18	176.57	10,352.9	-2,740.0	164.2	2,744.9	0.00	0.00	0.00	
13,000.0	90.18	176.57	10,352.6	-2,839.8	170.2	2,844.9	0.00	0.00	0.00	
13,100.0	90.18	176.57	10,352.3	-2,939.7	176.2	2,944.9	0.00	0.00	0.00	
13,200.0	90.18	176.57	10,351.9	-3,039.5	182.2	3,044.9	0.00	0.00	0.00	
13,300.0	90.18	176.57	10,351.6	-3,139.3	188.2	3,144.9	0.00	0.00	0.00	
13,400.0	90.18	176.57	10,351.3	-3,239.1	194.1	3,244.9	0.00	0.00	0.00	



Wellplanning Planning Report

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Project: Lea County, NM
Site: Windward Federal
Well: #2H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3573.9usft (Original Well Elev)
MD Reference: WELL @ 3573.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
13,500.0	90.18	176.57	10,351.0	-3,338.9	200.1	3,344.9	0.00	0.00	0.00
13,600.0	90.18	176.57	10,350.7	-3,438.8	206.1	3,444.9	0.00	0.00	0.00
13,700.0	90.18	176.57	10,350.4	-3,538.6	212.1	3,544.9	0.00	0.00	0.00
13,800.0	90.18	176.57	10,350.1	-3,638.4	218.1	3,644.9	0.00	0.00	0.00
13,900.0	90.18	176.57	10,349.7	-3,738.2	224.1	3,744.9	0.00	0.00	0.00
14,000.0	90.18	176.57	10,349.4	-3,838.0	230.0	3,844.9	0.00	0.00	0.00
14,100.0	90.18	176.57	10,349.1	-3,937.9	236.0	3,944.9	0.00	0.00	0.00
14,200.0	90.18	176.57	10,348.8	-4,037.7	242.0	4,044.9	0.00	0.00	0.00
14,300.0	90.18	176.57	10,348.5	-4,137.5	248.0	4,144.9	0.00	0.00	0.00
14,400.0	90.18	176.57	10,348.2	-4,237.3	254.0	4,244.9	0.00	0.00	0.00
14,500.0	90.18	176.57	10,347.9	-4,337.1	260.0	4,344.9	0.00	0.00	0.00
14,600.0	90.18	176.57	10,347.5	-4,437.0	265.9	4,444.9	0.00	0.00	0.00
14,700.0	90.18	176.57	10,347.2	-4,536.8	271.9	4,544.9	0.00	0.00	0.00
14,800.0	90.18	176.57	10,346.9	-4,636.6	277.9	4,644.9	0.00	0.00	0.00
14,900.0	90.18	176.57	10,346.6	-4,736.4	283.9	4,744.9	0.00	0.00	0.00
15,000.0	90.18	176.57	10,346.3	-4,836.2	289.9	4,844.9	0.00	0.00	0.00
15,100.0	90.18	176.57	10,346.0	-4,936.1	295.8	4,944.9	0.00	0.00	0.00
15,200.0	90.18	176.57	10,345.7	-5,035.9	301.8	5,044.9	0.00	0.00	0.00
15,300.0	90.18	176.57	10,345.3	-5,135.7	307.8	5,144.9	0.00	0.00	0.00
15,400.0	90.18	176.57	10,345.0	-5,235.5	313.8	5,244.9	0.00	0.00	0.00
15,500.0	90.18	176.57	10,344.7	-5,335.3	319.8	5,344.9	0.00	0.00	0.00
15,600.0	90.18	176.57	10,344.4	-5,435.2	325.8	5,444.9	0.00	0.00	0.00
15,700.0	90.18	176.57	10,344.1	-5,535.0	331.7	5,544.9	0.00	0.00	0.00
15,800.0	90.18	176.57	10,343.8	-5,634.8	337.7	5,644.9	0.00	0.00	0.00
15,900.0	90.18	176.57	10,343.5	-5,734.6	343.7	5,744.9	0.00	0.00	0.00
16,000.0	90.18	176.57	10,343.1	-5,834.4	349.7	5,844.9	0.00	0.00	0.00
16,100.0	90.18	176.57	10,342.8	-5,934.3	355.7	5,944.9	0.00	0.00	0.00
16,200.0	90.18	176.57	10,342.5	-6,034.1	361.7	6,044.9	0.00	0.00	0.00
16,300.0	90.18	176.57	10,342.2	-6,133.9	367.6	6,144.9	0.00	0.00	0.00
16,400.0	90.18	176.57	10,341.9	-6,233.7	373.6	6,244.9	0.00	0.00	0.00
16,500.0	90.18	176.57	10,341.6	-6,333.5	379.6	6,344.9	0.00	0.00	0.00
16,600.0	90.18	176.57	10,341.3	-6,433.4	385.6	6,444.9	0.00	0.00	0.00
16,700.0	90.18	176.57	10,340.9	-6,533.2	391.6	6,544.9	0.00	0.00	0.00
16,800.0	90.18	176.57	10,340.6	-6,633.0	397.6	6,644.9	0.00	0.00	0.00
16,900.0	90.18	176.57	10,340.3	-6,732.8	403.5	6,744.9	0.00	0.00	0.00
17,000.0	90.18	176.57	10,340.0	-6,832.7	409.5	6,844.9	0.00	0.00	0.00
17,100.0	90.18	176.57	10,339.7	-6,932.5	415.5	6,944.9	0.00	0.00	0.00
17,200.0	90.18	176.57	10,339.4	-7,032.3	421.5	7,044.9	0.00	0.00	0.00
17,300.0	90.18	176.57	10,339.1	-7,132.1	427.5	7,144.9	0.00	0.00	0.00
17,400.0	90.18	176.57	10,338.7	-7,231.9	433.5	7,244.9	0.00	0.00	0.00
17,500.0	90.18	176.57	10,338.4	-7,331.8	439.4	7,344.9	0.00	0.00	0.00
17,600.0	90.18	176.57	10,338.1	-7,431.6	445.4	7,444.9	0.00	0.00	0.00
17,700.0	90.18	176.57	10,337.8	-7,531.4	451.4	7,544.9	0.00	0.00	0.00
17,800.0	90.18	176.57	10,337.5	-7,631.2	457.4	7,644.9	0.00	0.00	0.00
17,900.0	90.18	176.57	10,337.2	-7,731.0	463.4	7,744.9	0.00	0.00	0.00
18,000.0	90.18	176.57	10,336.9	-7,830.9	469.4	7,844.9	0.00	0.00	0.00
18,100.0	90.18	176.57	10,336.5	-7,930.7	475.3	7,944.9	0.00	0.00	0.00
18,200.0	90.18	176.57	10,336.2	-8,030.5	481.3	8,044.9	0.00	0.00	0.00
18,300.0	90.18	176.57	10,335.9	-8,130.3	487.3	8,144.9	0.00	0.00	0.00
18,400.0	90.18	176.57	10,335.6	-8,230.1	493.3	8,244.9	0.00	0.00	0.00
18,500.0	90.18	176.57	10,335.3	-8,330.0	499.3	8,344.9	0.00	0.00	0.00
18,600.0	90.18	176.57	10,335.0	-8,429.8	505.3	8,444.9	0.00	0.00	0.00
18,700.0	90.18	176.57	10,334.7	-8,529.6	511.2	8,544.9	0.00	0.00	0.00
18,800.0	90.18	176.57	10,334.3	-8,629.4	517.2	8,644.9	0.00	0.00	0.00



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #2H
Company:	COG Production LLC	TVD Reference:	WELL @ 3573.9usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3573.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#2H	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)
18,900.0	90.18	176.57	10,334.0	-8,729.2	523.2	8,744.9	0.00	0.00	0.00
19,000.0	90.18	176.57	10,333.7	-8,829.1	529.2	8,844.9	0.00	0.00	0.00
19,100.0	90.18	176.57	10,333.4	-8,928.9	535.2	8,944.9	0.00	0.00	0.00
19,200.0	90.18	176.57	10,333.1	-9,028.7	541.1	9,044.9	0.00	0.00	0.00
19,300.0	90.18	176.57	10,332.8	-9,128.5	547.1	9,144.9	0.00	0.00	0.00
19,400.0	90.18	176.57	10,332.5	-9,228.3	553.1	9,244.9	0.00	0.00	0.00
19,500.0	90.18	176.57	10,332.1	-9,328.2	559.1	9,344.9	0.00	0.00	0.00
19,600.0	90.18	176.57	10,331.8	-9,428.0	565.1	9,444.9	0.00	0.00	0.00
19,700.0	90.18	176.57	10,331.5	-9,527.8	571.1	9,544.9	0.00	0.00	0.00
19,800.0	90.18	176.57	10,331.2	-9,627.6	577.0	9,644.9	0.00	0.00	0.00
19,900.0	90.18	176.57	10,330.9	-9,727.4	583.0	9,744.9	0.00	0.00	0.00
20,000.0	90.18	176.57	10,330.6	-9,827.3	589.0	9,844.9	0.00	0.00	0.00
20,100.0	90.18	176.57	10,330.3	-9,927.1	595.0	9,944.9	0.00	0.00	0.00
20,200.0	90.18	176.57	10,329.9	-10,026.9	601.0	10,044.9	0.00	0.00	0.00
20,212.1	90.18	176.57	10,329.9	-10,039.0	601.7	10,057.0	0.00	0.00	0.00

TD at 20212.1 - PBHL(Windward#2H)

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
PBHL(Windward#2H)	0.00	0.00	10,330.0	-10,039.0	601.1	425,155.10	691,308.20	32° 10' 2.487 N	103° 42' 54.285 W
- plan misses target center by 0.6usft at 20212.1usft MD (10329.9 TVD, -10039.0 N, 601.7 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,882.5	9,882.5	0.0	0.0	KOP - 9882.5 'MD, 0.00° INC, 0.00° AZI
10,634.1	10,360.0	-478.1	28.7	EOC- 10634.1 'MD, 90.18° INC, 176.57° AZI
20,212.1	10,329.9	-10,039.0	601.7	TD at 20212.1



Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	9882.5	0.00	0.00	9882.5	0.0	0.0	0.00	0.00	0.0
3	10634.1	90.18	176.57	10360.0	-478.1	28.7	12.00	176.57	479.0
4	20212.1	90.18	176.57	10329.9	-10039.0	601.7	0.00	0.00	10057.0

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

Well: #2H
Wellbore: OH
Plan: Design #1 (#2H/OH)

WELL DETAILS: #2H

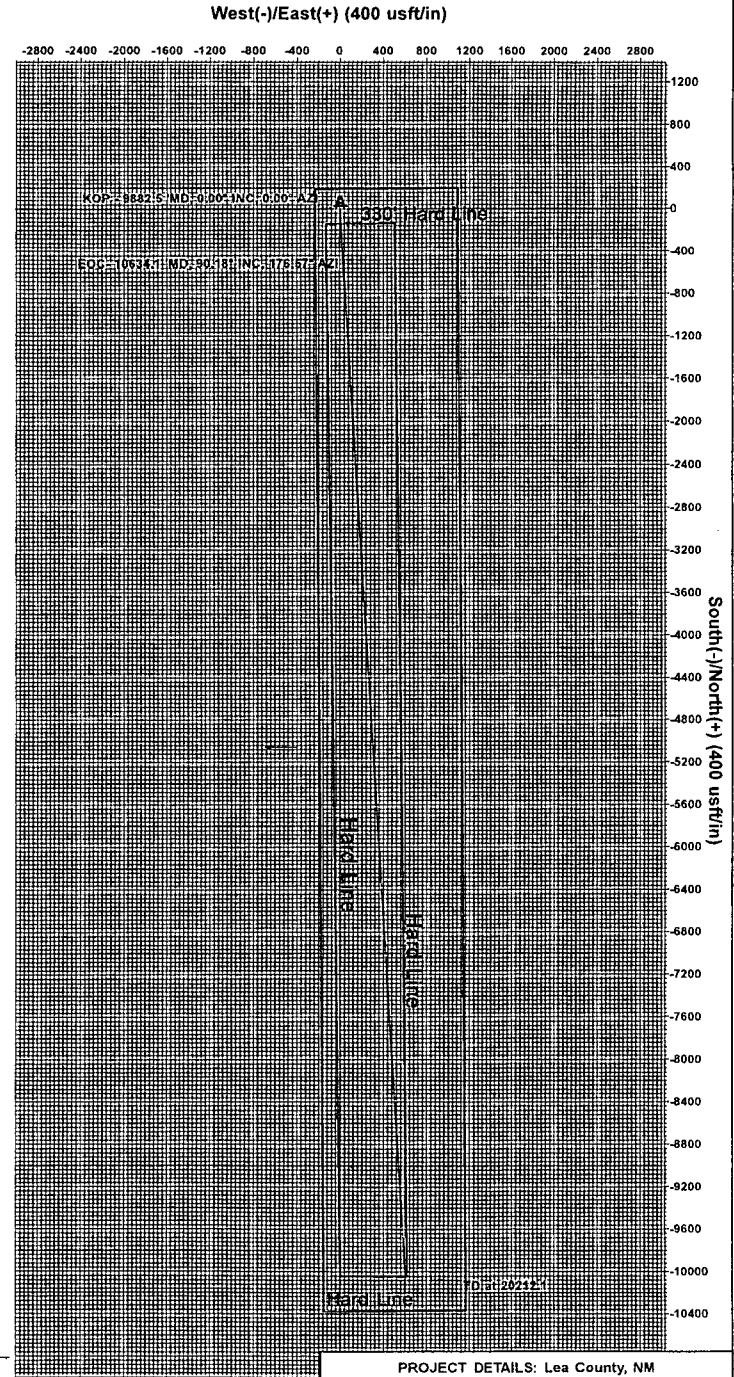
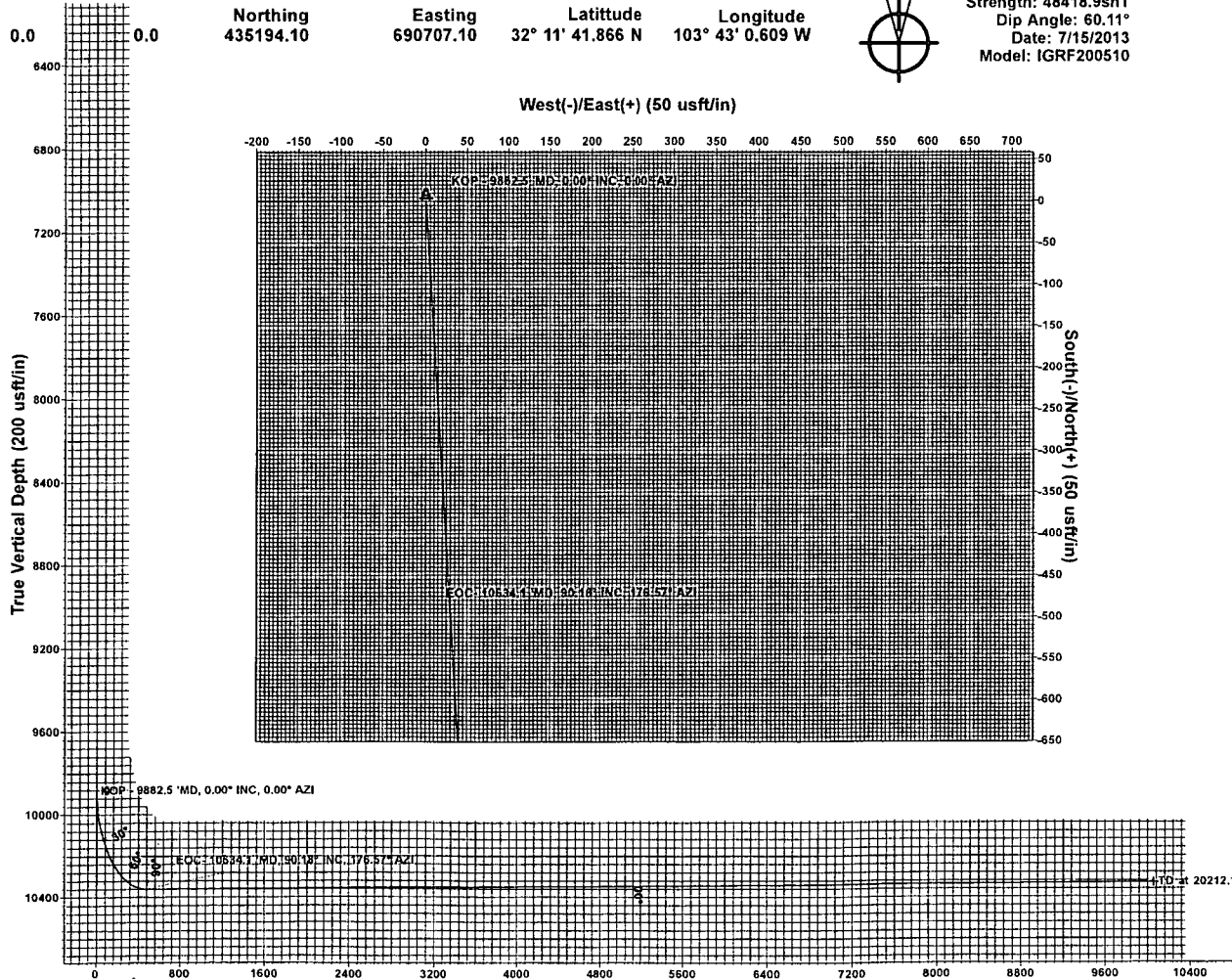
Ground Elevation:: 3543.9
RKB Elevation: WELL @ 3573.9usft (Original Well Elev)
Rig Name: Original Well Elev

Northing 435194.10 Easting 690707.10 Latitude 32° 11' 41.866 N Longitude 103° 43' 0.609 W



Azimuths to Grid North
True North: -0.33°
Magnetic North: 7.06°

Magnetic Field
Strength: 48418.9snT
Dip Angle: 60.11°
Date: 7/15/2013
Model: IGRF200510

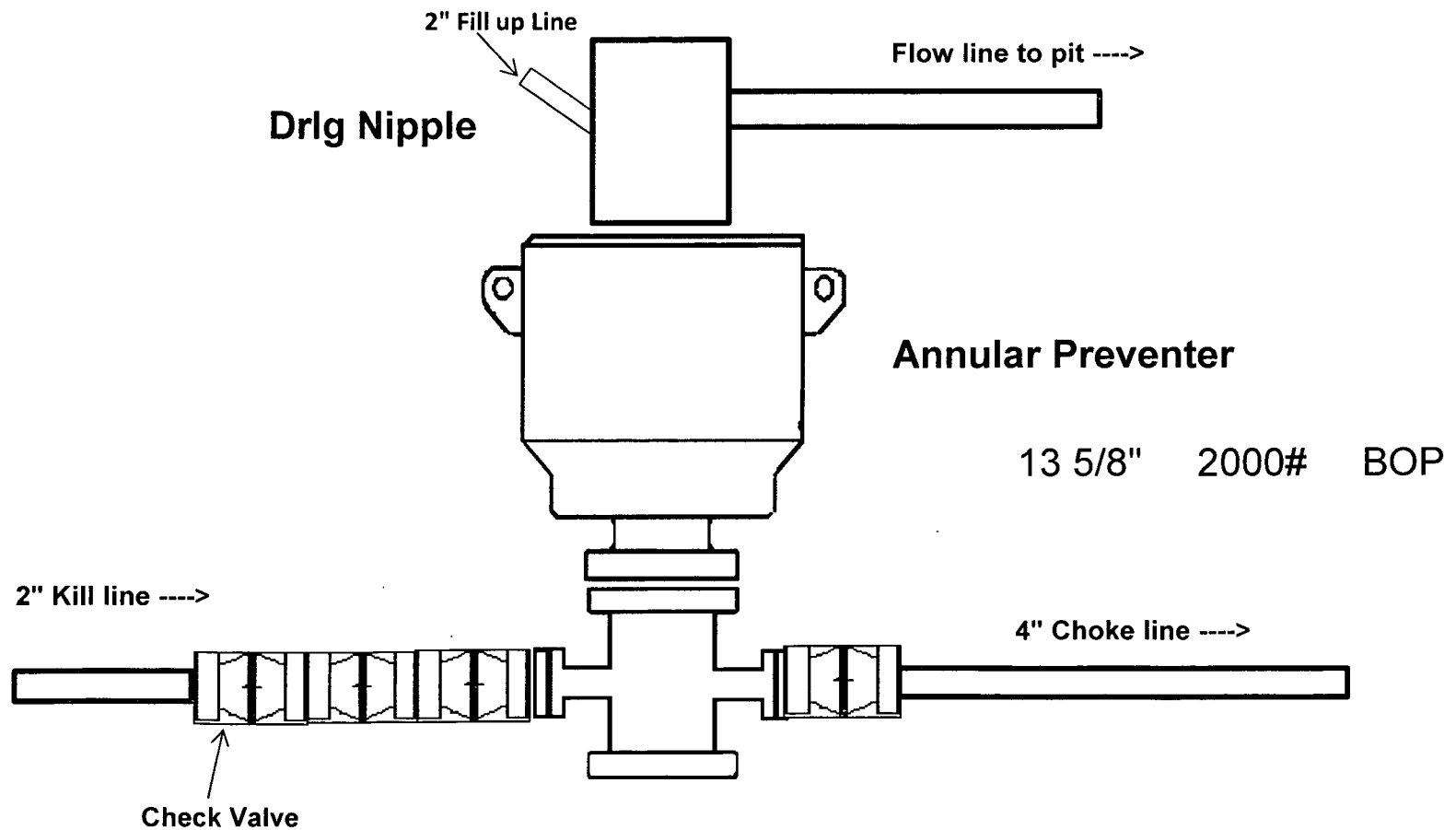


Plan: Design #1 (#2H/OH)
Created By: Well Planner Date: 19:30, July 17 2013

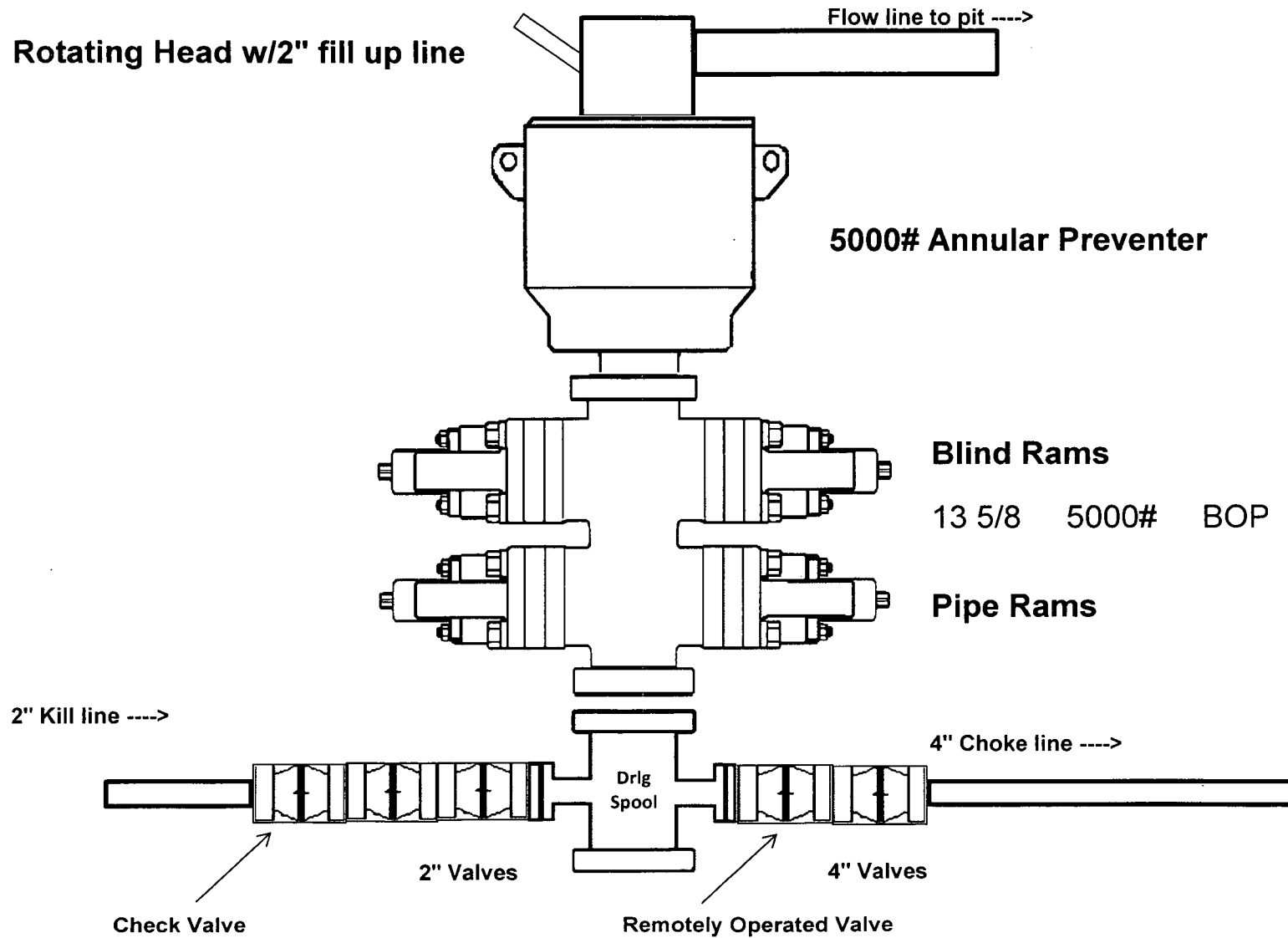
Terra Directional Services
322 Spring Hill Drive, Suite A100, Spring, Texas 77386
432.425.7532

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

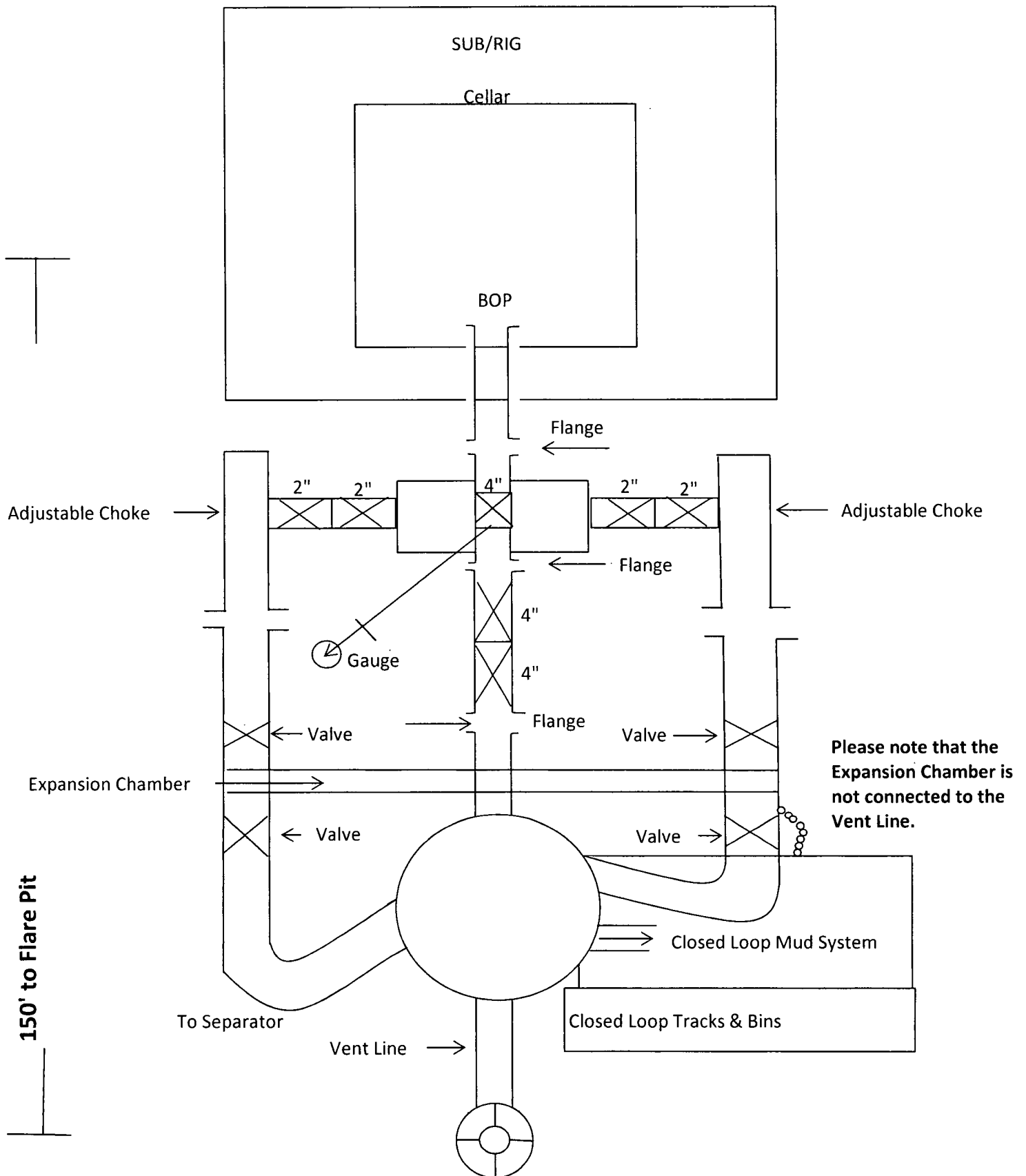
2,000 psi BOP Schematic



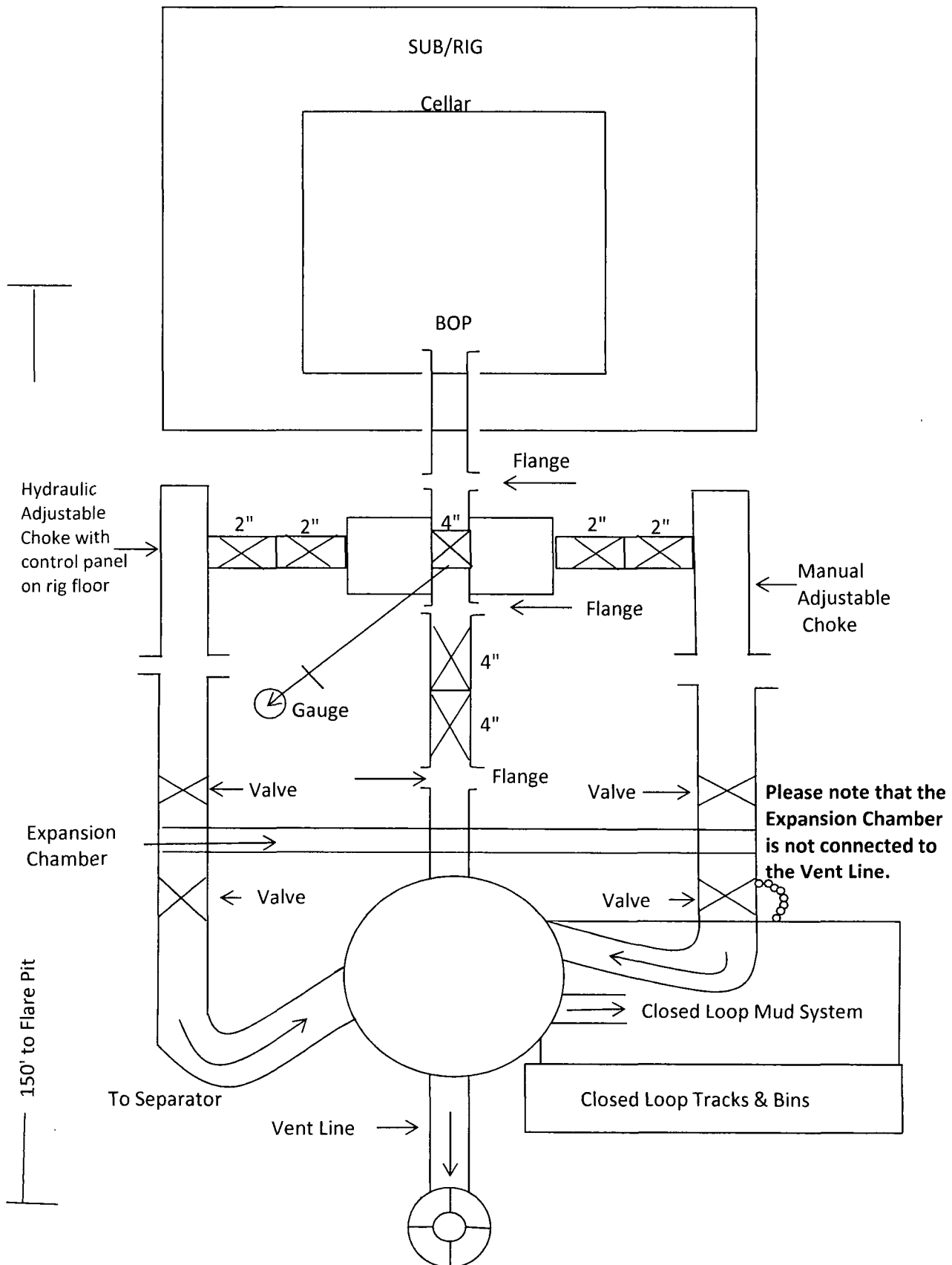
5,000 psi BOP Schematic



2M Choke Manifold Equipment



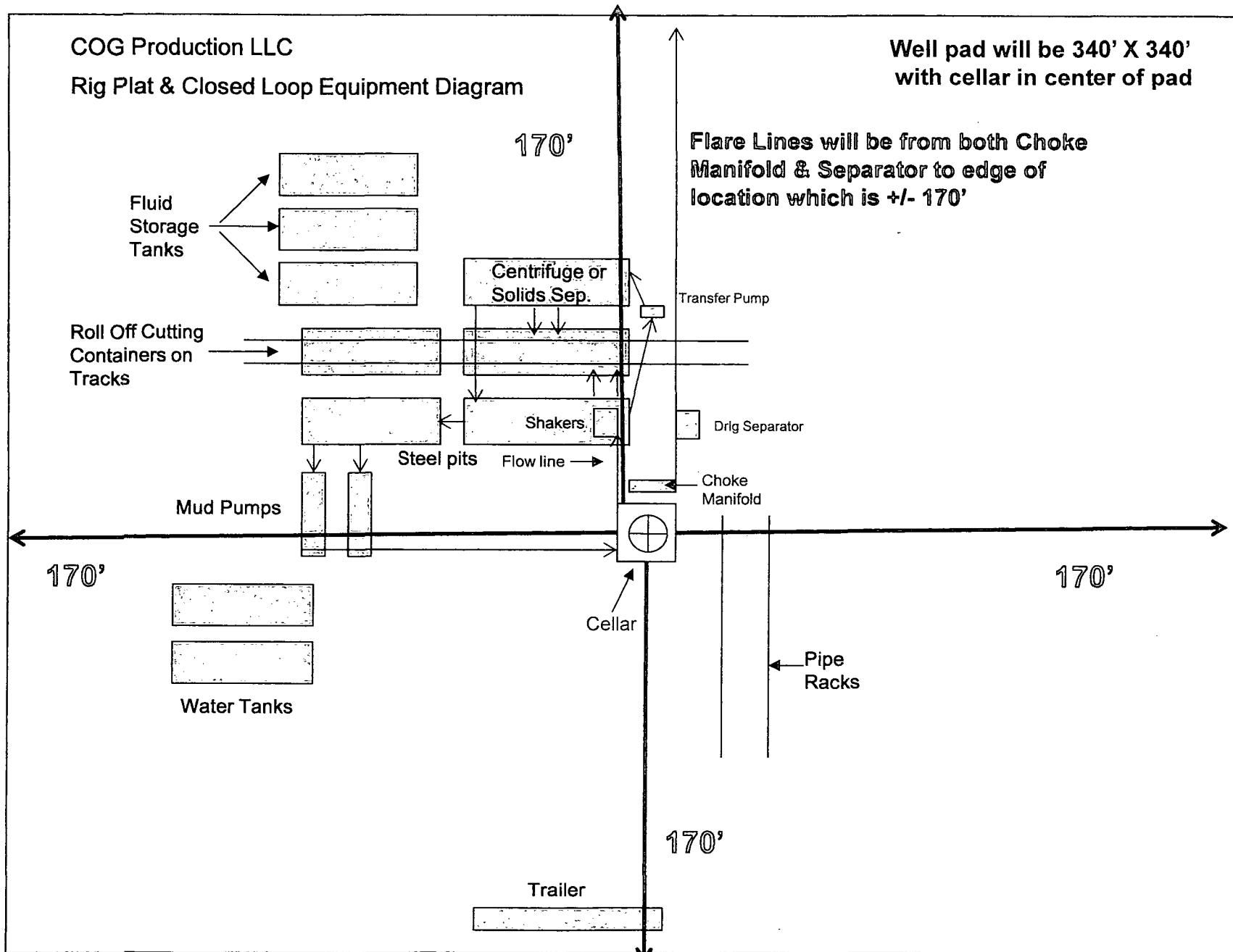
5M Choke Manifold Equipment



COG Production LLC

Rig Plat & Closed Loop Equipment Diagram

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



4
8-12-20

Exhibit 1

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