

UNORTHODOX LOCATION

ATS-13-916

HOBBS OCD

SEP 19 2013

RECEIVED

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Hobbs

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

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of Work: ☒ DRILL ☐ REENTER		7. If Unit or CA Agreement, Name and No.	
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		8. Lease Name and Well No. <40143> Windward Federal #4H	
2. Name of Operator COG Production LLC. <217955>		9. API Well No. 38-025-41412	
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940	10. Field and Pool, or Exploratory WK-025 G-DB 5253206m Artesia, Bone Spring 197894	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FNL & 430' FEL Unit Letter A (NENE) SHL Sec. 30 - T24S - R32E At proposed prod. Zone 330' FSL & 380' FEL Unit Letter P (SESE) BHL Sec. 31 - T24S - R32E		11. Sec., T.R.M. or Blk and Survey of Area Sec. 30 - T24S - R32E	
14. Distance in miles and direction from nearest town or post office* Approximately 20 miles from Malaga		12. County or Parish Lea County	13. State NM
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	17. Spacing Unit dedicated to this well 320	
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1670' (Windward Fed #3H) BHL: 3042'	19. Proposed Depth TVD: 10,390' MD: 20,253'	20. BLM/BIA Bond No. on file NMB000845 & NMB000860	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3550.3' 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
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Regulatory Analyst	
Approved by (Signature) /s/ STEPHEN J. CAFFEY	Name (Printed/Typed) Office CARLSBAD FIELD OFFICE
Title FIELD MANAGER	Date SEP 17 2013

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

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

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

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Controlled Water Basin

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

Approval Subject to General Requirements
& Special Stipulations Attached

SEP 23 2013

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Windward Federal 4H
SHL: 190' FNL & 430' FEL of section 30
BHL: 330' FSL & 380' FEL 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	794'	
Top of Salt	1126'	
Base of Salt	4400'	
Delaware	4641'	Oil
Bone Spring	8515'	Oil
Wolfcamp	11,439'	
TD TVD	10,390'	
TD MD	20,253'	

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 825' 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

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 825'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 4600'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
8 3/4"	0' - 20,253'	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: 400 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

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

5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8 with annular preventer tested to 50% of rating 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 = 4515 psi

Lateral TD = 152°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' – 825'	Fresh Water	8.4	29	N.C.
825' – 4600'	Brine	10	29	N.C.
4600' – 20,253' (Lateral)	Cut Brine	8.9 – 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 totalizer, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. Auxiliary Well Control and Monitoring Equipment:

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

*See
CEA*

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

#4H

OH

Plan: Design #1

Standard Planning Report

15 July, 2013



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #4H
Company:	COG Production LLC	TVD Reference:	WELL @ 3580.3usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3580.3usft (Original Well Elev)
Site:	Windward 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	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	#4H		
Well Position	+N/-S	30.3 usft	Northing:
	+E/-W	3,307.2 usft	Easting:
Position Uncertainty	3.0 usft	Wellhead Elevation:	Ground Level:
			3,550.3 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/15/2013	7.39	60.09	48,375

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	179.30

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	
9,943.0	0.00	0.00	9,943.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,694.6	90.18	179.30	10,420.5	-479.0	5.9	12.00	12.00	0.00	179.30	
20,253.5	90.18	179.30	10,390.5	-10,037.1	122.6	0.00	0.00	0.00	0.00	PBHL(Windward#4H)



Wellplanning Planning Report

Database: EDM 5000.1 Single User Db
Company: COG Production LLC
Project: Lea County, NM
Site: Windward Federal
Well: #4H
Wellbore: OH
Design: Design #1

Local Co-ordinate Reference: Well #4H
TVD Reference: WELL @ 3580.3usft (Original Well Elev)
MD Reference: WELL @ 3580.3usft (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



Wellplanning Planning Report

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Project:	Lea County, NM	MD Reference:	WELL @ 3580.3usft (Original Well Elev)
Site:	Windward 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)
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
9,943.0	0.00	0.00	9,943.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 9943.0 'MD, 0.00° INC, 0.00° AZI									
9,950.0	0.84	179.30	9,950.0	-0.1	0.0	0.1	12.00	12.00	0.00
9,975.0	3.84	179.30	9,975.0	-1.1	0.0	1.1	12.00	12.00	0.00
10,000.0	6.84	179.30	9,999.9	-3.4	0.0	3.4	12.00	12.00	0.00
10,025.0	9.84	179.30	10,024.6	-7.0	0.1	7.0	12.00	12.00	0.00
10,050.0	12.84	179.30	10,049.1	-11.9	0.1	11.9	12.00	12.00	0.00



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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)
10,075.0	15.84	179.30	10,073.3	-18.1	0.2	18.1	12.00	12.00	0.00
10,100.0	18.84	179.30	10,097.2	-25.6	0.3	25.6	12.00	12.00	0.00
10,125.0	21.84	179.30	10,120.6	-34.3	0.4	34.3	12.00	12.00	0.00
10,150.0	24.84	179.30	10,143.6	-44.2	0.5	44.2	12.00	12.00	0.00
10,175.0	27.84	179.30	10,166.0	-55.3	0.7	55.3	12.00	12.00	0.00
10,200.0	30.84	179.30	10,187.8	-67.5	0.8	67.5	12.00	12.00	0.00
10,225.0	33.84	179.30	10,208.9	-80.9	1.0	80.9	12.00	12.00	0.00
10,250.0	36.84	179.30	10,229.3	-95.3	1.2	95.3	12.00	12.00	0.00
10,275.0	39.84	179.30	10,248.9	-110.8	1.4	110.8	12.00	12.00	0.00
10,300.0	42.84	179.30	10,267.7	-127.3	1.6	127.4	12.00	12.00	0.00
10,325.0	45.84	179.30	10,285.5	-144.8	1.8	144.8	12.00	12.00	0.00
10,350.0	48.84	179.30	10,302.5	-163.2	2.0	163.2	12.00	12.00	0.00
10,375.0	51.84	179.30	10,318.4	-182.4	2.2	182.4	12.00	12.00	0.00
10,400.0	54.84	179.30	10,333.4	-202.5	2.5	202.5	12.00	12.00	0.00
10,425.0	57.84	179.30	10,347.2	-223.3	2.7	223.3	12.00	12.00	0.00
10,450.0	60.84	179.30	10,360.0	-244.8	3.0	244.8	12.00	12.00	0.00
10,475.0	63.83	179.30	10,371.6	-266.9	3.3	266.9	12.00	12.00	0.00
10,500.0	66.83	179.30	10,382.0	-289.6	3.5	289.7	12.00	12.00	0.00
10,525.0	69.83	179.30	10,391.2	-312.9	3.8	312.9	12.00	12.00	0.00
10,550.0	72.83	179.30	10,399.2	-336.5	4.1	336.6	12.00	12.00	0.00
10,575.0	75.83	179.30	10,406.0	-360.6	4.4	360.6	12.00	12.00	0.00
10,600.0	78.83	179.30	10,411.5	-385.0	4.7	385.0	12.00	12.00	0.00
10,625.0	81.83	179.30	10,415.7	-409.6	5.0	409.7	12.00	12.00	0.00
10,650.0	84.83	179.30	10,418.6	-434.5	5.3	434.5	12.00	12.00	0.00
10,675.0	87.83	179.30	10,420.2	-459.4	5.6	459.4	12.00	12.00	0.00
10,694.6	90.18	179.30	10,420.5	-479.0	5.9	479.0	12.00	12.00	0.00
EOC- 10694.6 'MD, 90.18° INC, 179.30° AZI									
10,700.0	90.18	179.30	10,420.5	-484.4	5.9	484.4	0.00	0.00	0.00
10,800.0	90.18	179.30	10,420.2	-584.4	7.1	584.4	0.00	0.00	0.00
10,900.0	90.18	179.30	10,419.9	-684.4	8.4	684.4	0.00	0.00	0.00
11,000.0	90.18	179.30	10,419.5	-784.4	9.6	784.4	0.00	0.00	0.00
11,100.0	90.18	179.30	10,419.2	-884.4	10.8	884.4	0.00	0.00	0.00
11,200.0	90.18	179.30	10,418.9	-984.4	12.0	984.4	0.00	0.00	0.00
11,300.0	90.18	179.30	10,418.6	-1,084.4	13.2	1,084.4	0.00	0.00	0.00
11,400.0	90.18	179.30	10,418.3	-1,184.4	14.5	1,184.4	0.00	0.00	0.00
11,500.0	90.18	179.30	10,418.0	-1,284.3	15.7	1,284.4	0.00	0.00	0.00
11,600.0	90.18	179.30	10,417.7	-1,384.3	16.9	1,384.4	0.00	0.00	0.00
11,700.0	90.18	179.30	10,417.3	-1,484.3	18.1	1,484.4	0.00	0.00	0.00
11,800.0	90.18	179.30	10,417.0	-1,584.3	19.4	1,584.4	0.00	0.00	0.00
11,900.0	90.18	179.30	10,416.7	-1,684.3	20.6	1,684.4	0.00	0.00	0.00
12,000.0	90.18	179.30	10,416.4	-1,784.3	21.8	1,784.4	0.00	0.00	0.00
12,100.0	90.18	179.30	10,416.1	-1,884.3	23.0	1,884.4	0.00	0.00	0.00
12,200.0	90.18	179.30	10,415.8	-1,984.3	24.2	1,984.4	0.00	0.00	0.00
12,300.0	90.18	179.30	10,415.5	-2,084.3	25.5	2,084.4	0.00	0.00	0.00
12,400.0	90.18	179.30	10,415.1	-2,184.3	26.7	2,184.4	0.00	0.00	0.00
12,500.0	90.18	179.30	10,414.8	-2,284.3	27.9	2,284.4	0.00	0.00	0.00
12,600.0	90.18	179.30	10,414.5	-2,384.3	29.1	2,384.4	0.00	0.00	0.00
12,700.0	90.18	179.30	10,414.2	-2,484.2	30.4	2,484.4	0.00	0.00	0.00
12,800.0	90.18	179.30	10,413.9	-2,584.2	31.6	2,584.4	0.00	0.00	0.00
12,900.0	90.18	179.30	10,413.6	-2,684.2	32.8	2,684.4	0.00	0.00	0.00
13,000.0	90.18	179.30	10,413.3	-2,784.2	34.0	2,784.4	0.00	0.00	0.00
13,100.0	90.18	179.30	10,412.9	-2,884.2	35.2	2,884.4	0.00	0.00	0.00
13,200.0	90.18	179.30	10,412.6	-2,984.2	36.5	2,984.4	0.00	0.00	0.00
13,300.0	90.18	179.30	10,412.3	-3,084.2	37.7	3,084.4	0.00	0.00	0.00



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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)
13,400.0	90.18	179.30	10,412.0	-3,184.2	38.9	3,184.4	0.00	0.00	0.00
13,500.0	90.18	179.30	10,411.7	-3,284.2	40.1	3,284.4	0.00	0.00	0.00
13,600.0	90.18	179.30	10,411.4	-3,384.2	41.3	3,384.4	0.00	0.00	0.00
13,700.0	90.18	179.30	10,411.1	-3,484.2	42.6	3,484.4	0.00	0.00	0.00
13,800.0	90.18	179.30	10,410.7	-3,584.2	43.8	3,584.4	0.00	0.00	0.00
13,900.0	90.18	179.30	10,410.4	-3,684.2	45.0	3,684.4	0.00	0.00	0.00
14,000.0	90.18	179.30	10,410.1	-3,784.1	46.2	3,784.4	0.00	0.00	0.00
14,100.0	90.18	179.30	10,409.8	-3,884.1	47.5	3,884.4	0.00	0.00	0.00
14,200.0	90.18	179.30	10,409.5	-3,984.1	48.7	3,984.4	0.00	0.00	0.00
14,300.0	90.18	179.30	10,409.2	-4,084.1	49.9	4,084.4	0.00	0.00	0.00
14,400.0	90.18	179.30	10,408.9	-4,184.1	51.1	4,184.4	0.00	0.00	0.00
14,500.0	90.18	179.30	10,408.5	-4,284.1	52.3	4,284.4	0.00	0.00	0.00
14,600.0	90.18	179.30	10,408.2	-4,384.1	53.6	4,384.4	0.00	0.00	0.00
14,700.0	90.18	179.30	10,407.9	-4,484.1	54.8	4,484.4	0.00	0.00	0.00
14,800.0	90.18	179.30	10,407.6	-4,584.1	56.0	4,584.4	0.00	0.00	0.00
14,900.0	90.18	179.30	10,407.3	-4,684.1	57.2	4,684.4	0.00	0.00	0.00
15,000.0	90.18	179.30	10,407.0	-4,784.1	58.5	4,784.4	0.00	0.00	0.00
15,100.0	90.18	179.30	10,406.7	-4,884.1	59.7	4,884.4	0.00	0.00	0.00
15,200.0	90.18	179.30	10,406.3	-4,984.0	60.9	4,984.4	0.00	0.00	0.00
15,300.0	90.18	179.30	10,406.0	-5,084.0	62.1	5,084.4	0.00	0.00	0.00
15,400.0	90.18	179.30	10,405.7	-5,184.0	63.3	5,184.4	0.00	0.00	0.00
15,500.0	90.18	179.30	10,405.4	-5,284.0	64.6	5,284.4	0.00	0.00	0.00
15,600.0	90.18	179.30	10,405.1	-5,384.0	65.8	5,384.4	0.00	0.00	0.00
15,700.0	90.18	179.30	10,404.8	-5,484.0	67.0	5,484.4	0.00	0.00	0.00
15,800.0	90.18	179.30	10,404.5	-5,584.0	68.2	5,584.4	0.00	0.00	0.00
15,900.0	90.18	179.30	10,404.1	-5,684.0	69.4	5,684.4	0.00	0.00	0.00
16,000.0	90.18	179.30	10,403.8	-5,784.0	70.7	5,784.4	0.00	0.00	0.00
16,100.0	90.18	179.30	10,403.5	-5,884.0	71.9	5,884.4	0.00	0.00	0.00
16,200.0	90.18	179.30	10,403.2	-5,984.0	73.1	5,984.4	0.00	0.00	0.00
16,300.0	90.18	179.30	10,402.9	-6,084.0	74.3	6,084.4	0.00	0.00	0.00
16,400.0	90.18	179.30	10,402.6	-6,184.0	75.6	6,184.4	0.00	0.00	0.00
16,500.0	90.18	179.30	10,402.3	-6,283.9	76.8	6,284.4	0.00	0.00	0.00
16,600.0	90.18	179.30	10,401.9	-6,383.9	78.0	6,384.4	0.00	0.00	0.00
16,700.0	90.18	179.30	10,401.6	-6,483.9	79.2	6,484.4	0.00	0.00	0.00
16,800.0	90.18	179.30	10,401.3	-6,583.9	80.4	6,584.4	0.00	0.00	0.00
16,900.0	90.18	179.30	10,401.0	-6,683.9	81.7	6,684.4	0.00	0.00	0.00
17,000.0	90.18	179.30	10,400.7	-6,783.9	82.9	6,784.4	0.00	0.00	0.00
17,100.0	90.18	179.30	10,400.4	-6,883.9	84.1	6,884.4	0.00	0.00	0.00
17,200.0	90.18	179.30	10,400.1	-6,983.9	85.3	6,984.4	0.00	0.00	0.00
17,300.0	90.18	179.30	10,399.7	-7,083.9	86.6	7,084.4	0.00	0.00	0.00
17,400.0	90.18	179.30	10,399.4	-7,183.9	87.8	7,184.4	0.00	0.00	0.00
17,500.0	90.18	179.30	10,399.1	-7,283.9	89.0	7,284.4	0.00	0.00	0.00
17,600.0	90.18	179.30	10,398.8	-7,383.9	90.2	7,384.4	0.00	0.00	0.00
17,700.0	90.18	179.30	10,398.5	-7,483.9	91.4	7,484.4	0.00	0.00	0.00
17,800.0	90.18	179.30	10,398.2	-7,583.8	92.7	7,584.4	0.00	0.00	0.00
17,900.0	90.18	179.30	10,397.9	-7,683.8	93.9	7,684.4	0.00	0.00	0.00
18,000.0	90.18	179.30	10,397.5	-7,783.8	95.1	7,784.4	0.00	0.00	0.00
18,100.0	90.18	179.30	10,397.2	-7,883.8	96.3	7,884.4	0.00	0.00	0.00
18,200.0	90.18	179.30	10,396.9	-7,983.8	97.5	7,984.4	0.00	0.00	0.00
18,300.0	90.18	179.30	10,396.6	-8,083.8	98.8	8,084.4	0.00	0.00	0.00
18,400.0	90.18	179.30	10,396.3	-8,183.8	100.0	8,184.4	0.00	0.00	0.00
18,500.0	90.18	179.30	10,396.0	-8,283.8	101.2	8,284.4	0.00	0.00	0.00
18,600.0	90.18	179.30	10,395.7	-8,383.8	102.4	8,384.4	0.00	0.00	0.00
18,700.0	90.18	179.30	10,395.4	-8,483.8	103.7	8,484.4	0.00	0.00	0.00



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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)
18,800.0	90.18	179.30	10,395.0	-8,583.8	104.9	8,584.4	0.00	0.00	0.00
18,900.0	90.18	179.30	10,394.7	-8,683.8	106.1	8,684.4	0.00	0.00	0.00
19,000.0	90.18	179.30	10,394.4	-8,783.7	107.3	8,784.4	0.00	0.00	0.00
19,100.0	90.18	179.30	10,394.1	-8,883.7	108.5	8,884.4	0.00	0.00	0.00
19,200.0	90.18	179.30	10,393.8	-8,983.7	109.8	8,984.4	0.00	0.00	0.00
19,300.0	90.18	179.30	10,393.5	-9,083.7	111.0	9,084.4	0.00	0.00	0.00
19,400.0	90.18	179.30	10,393.2	-9,183.7	112.2	9,184.4	0.00	0.00	0.00
19,500.0	90.18	179.30	10,392.8	-9,283.7	113.4	9,284.4	0.00	0.00	0.00
19,600.0	90.18	179.30	10,392.5	-9,383.7	114.6	9,384.4	0.00	0.00	0.00
19,700.0	90.18	179.30	10,392.2	-9,483.7	115.9	9,484.4	0.00	0.00	0.00
19,800.0	90.18	179.30	10,391.9	-9,583.7	117.1	9,584.4	0.00	0.00	0.00
19,900.0	90.18	179.30	10,391.6	-9,683.7	118.3	9,684.4	0.00	0.00	0.00
20,000.0	90.18	179.30	10,391.3	-9,783.7	119.5	9,784.4	0.00	0.00	0.00
20,100.0	90.18	179.30	10,391.0	-9,883.7	120.8	9,884.4	0.00	0.00	0.00
20,200.0	90.18	179.30	10,390.6	-9,983.7	122.0	9,984.4	0.00	0.00	0.00
20,253.5	90.18	179.30	10,390.5	-10,037.1	122.6	10,037.9	0.00	0.00	0.00

TD at 20253.5 - PBHL(Windward#4H)

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#4H)	0.00	0.01	10,390.0	-10,037.1	123.3	425,187.30	694,137.60	32° 10' 2.644 N	103° 42' 21.367 W
- plan misses target center by 0.8usft at 20253.5usft MD (10390.5 TVD, -10037.1 N, 122.6 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,943.0	9,943.0	0.0	0.0	KOP - 9943.0 'MD, 0.00° INC, 0.00° AZI
10,694.6	10,420.5	-479.0	5.9	EOC- 10694.6 'MD, 90.18° INC, 179.30° AZI
20,253.5	10,390.5	-10,037.1	122.6	TD at 20253.5



COG Production LLC
Project: Lea County, NM
Site: Windward 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	9943.0	0.00	0.00	9943.0	0.0	0.0	0.00	0.00	0.0
3	10694.6	90.18	179.30	10420.5	-479.0	5.9	12.00	179.30	479.0
4	20253.5	90.18	179.30	10390.5	-10037.1	122.6	0.00	0.00	10037.9

PBHL(Windward#4H)

WELL DETAILS: #4H

Ground Elevation:: 3550.3
RKB Elevation: WELL @ 3580.3usft (Original Well Elev)
Rig Name: Original Well Elev

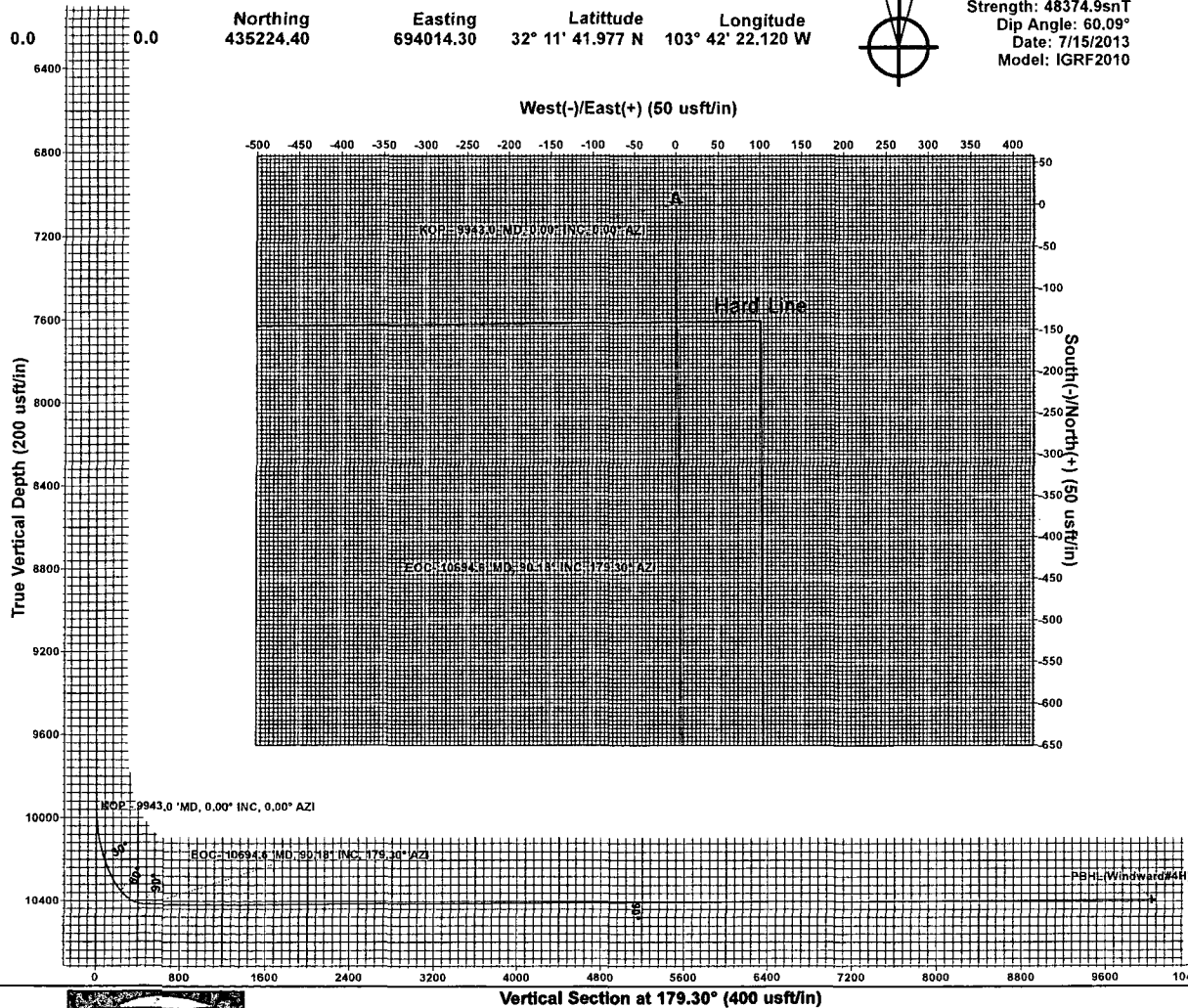


Azimuths to Grid North
True North: -0.33°
Magnetic North: 7.06°

Magnetic Field
Strength: 48374.9snT
Dip Angle: 60.09°
Date: 7/15/2013
Model: IGRF2010

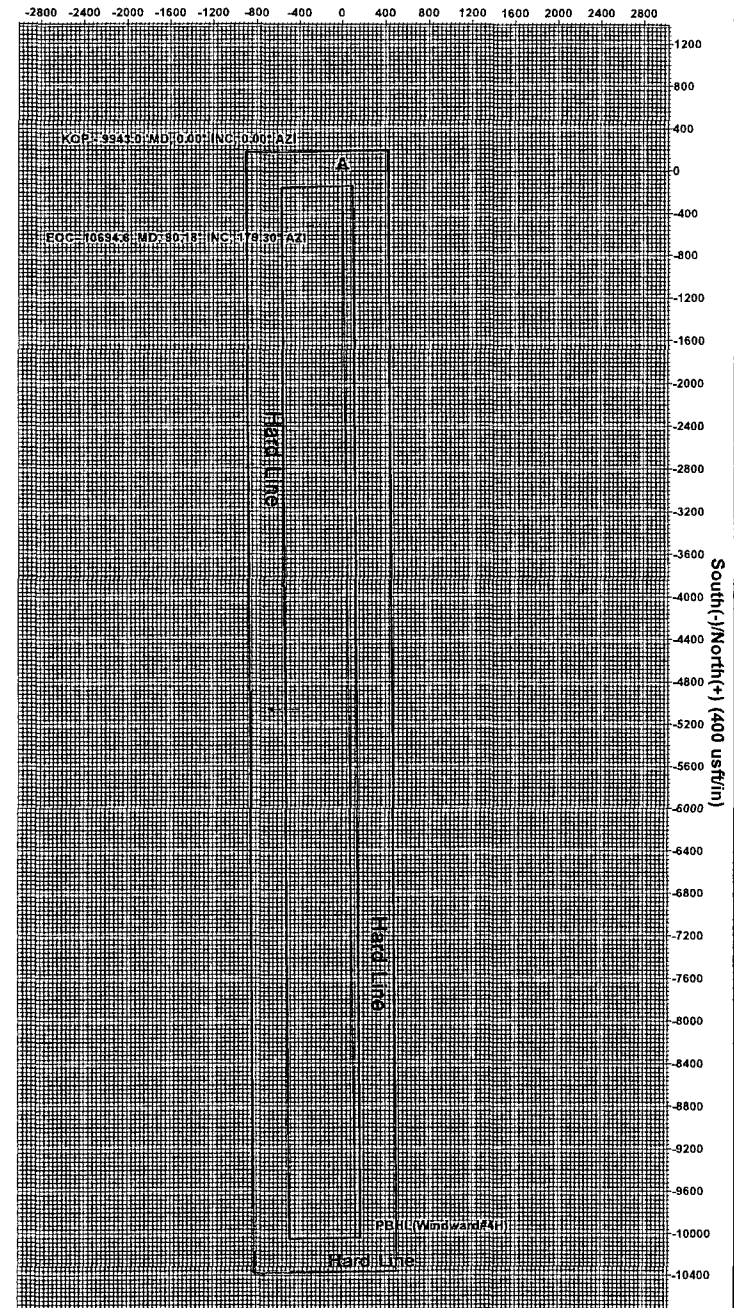
Northing 435224.40 Easting 694014.30 Latitude 32° 11' 41.977 N Longitude 103° 42' 22.120 W

West(-)/East(+) (50 usft/in)



Vertical Section at 179.30° (400 usft/in)

West(-)/East(+) (400 usft/in)

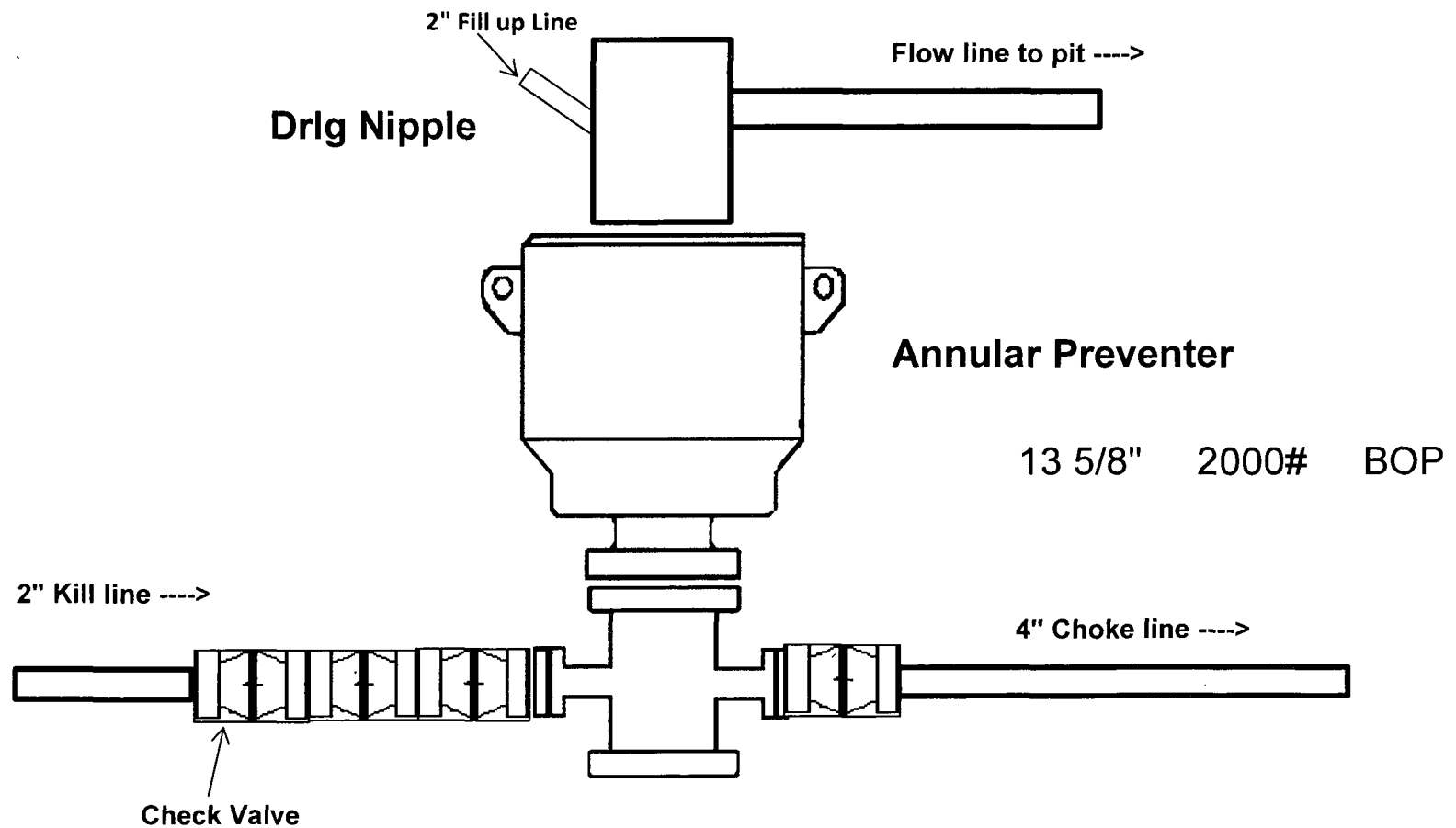


Plan: Design #1 (#4H/OH)
Created By: Well Planner Date: 22:34, July 15 2013

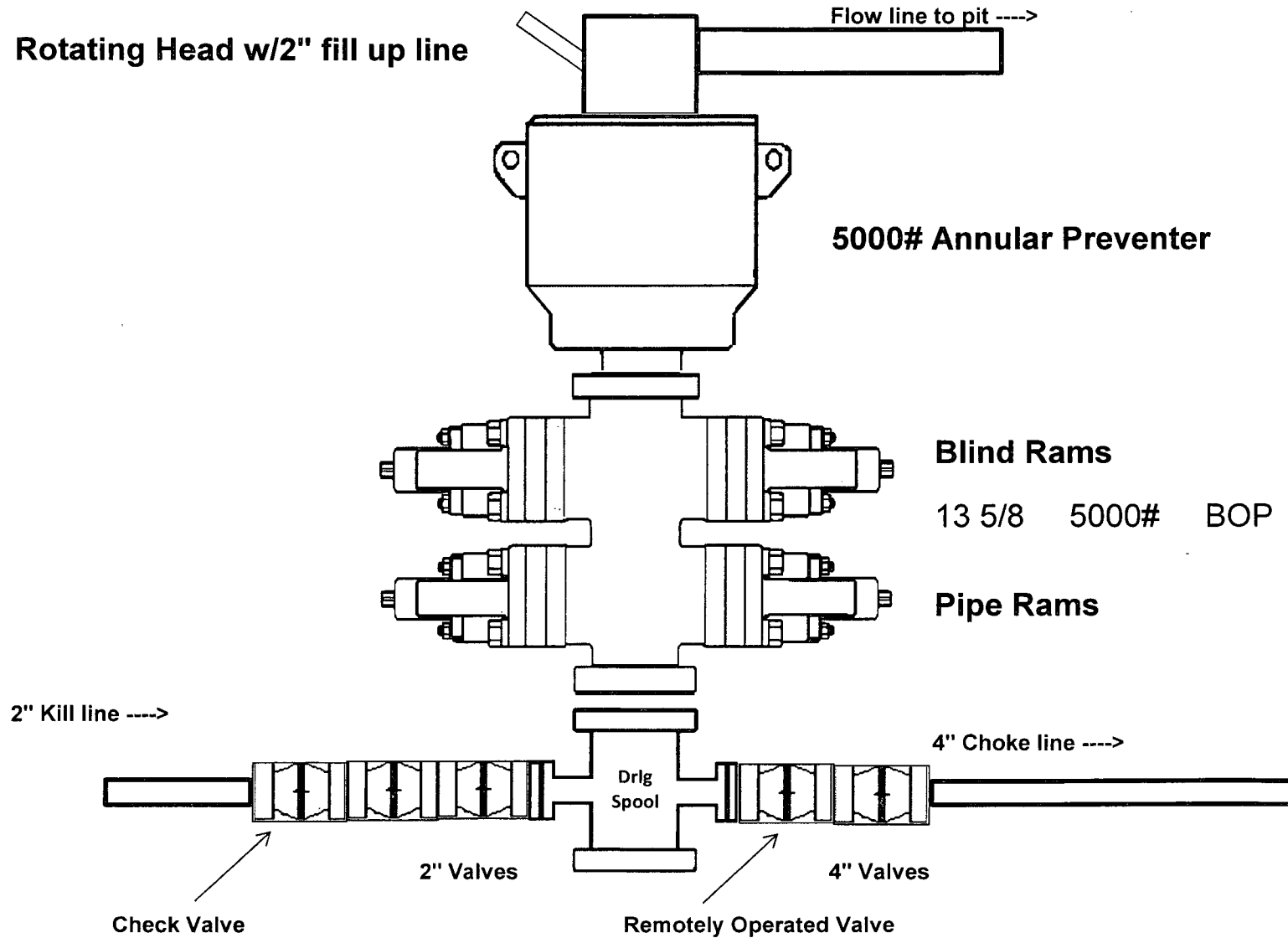
Terra Directional Services
322 Spring Hill Drive, Suite A100, Spring, Texas 77386
432.425.7532

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

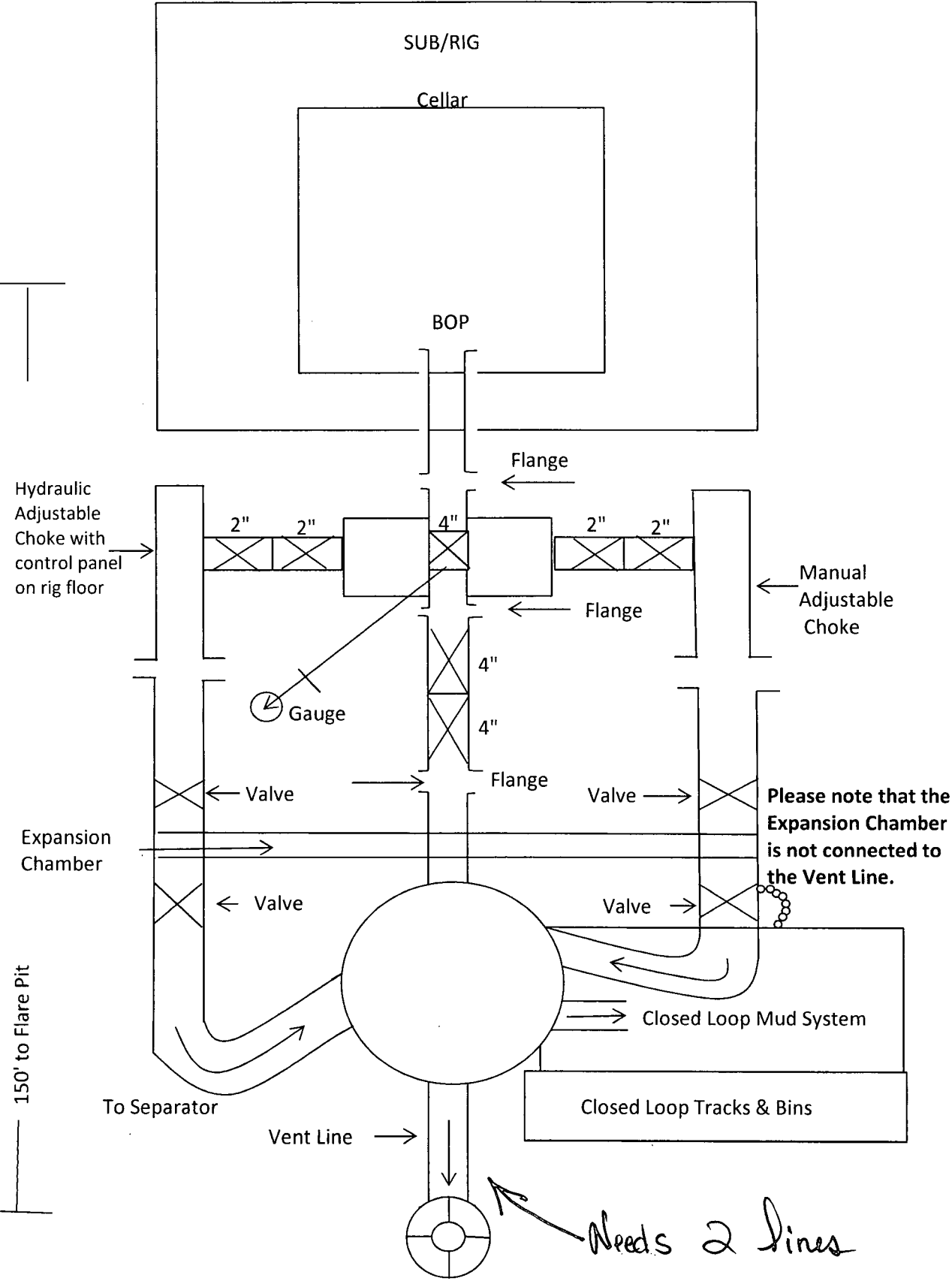


5,000 psi BOP Schematic





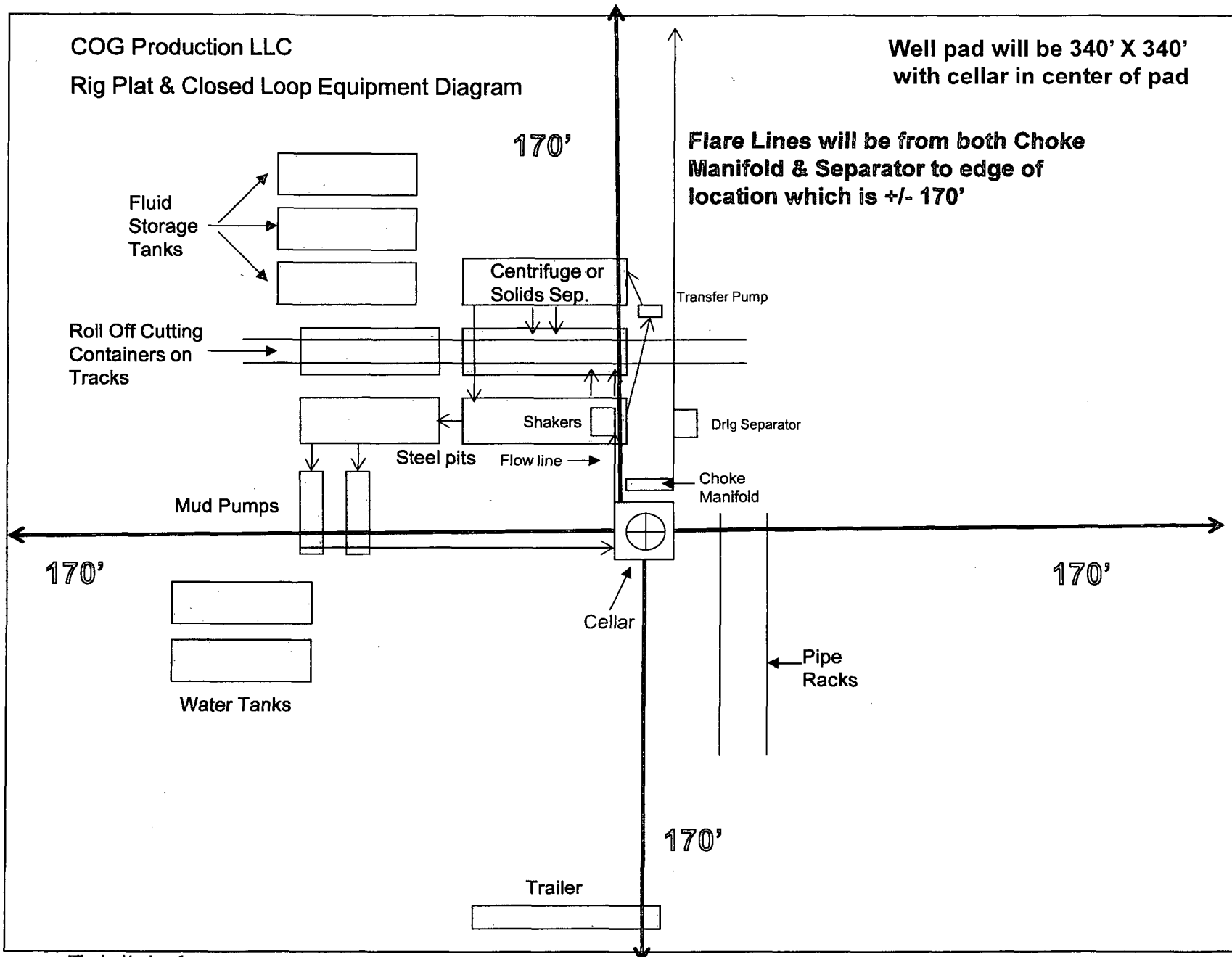
5M Choke Manifold Equipment



COG Production LLC

Rig Plat & Closed Loop Equipment Diagram

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



N
8-12-2013

Exhibit 1

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