

OCD Hobbs

FORM APPROVED
OMB No. 1004-013
Expires July 31, 2010UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

HOBBS OCD

MAY 16 2013

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. 30065 Gunner 8 Federal #5H	
2. Name of Operator COG Operating LLC.		9. API Well No. 30-025-41180	
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940	10. Field and Pool, or Exploratory Wildcat; Bone Spring, Upper Shale	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FSL & 1520' FEL Unit Letter O (SWSE) Sec. 8 - T26S - R34E SHL At proposed prod. Zone 1650' FNL & 1520' FEL Unit Letter G (SWNE) Sec. 5-T26S-R34E BHL		11. Sec., T.R.M. or Blk and Survey or Area Sec. 8 - T26S - R34E	
14. Distance in miles and direction from nearest town or post office* About 17 miles from Jal		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 1120	17. Spacing Unit dedicated to this well 280	
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1140' BHL: 3684'	19. Proposed Depth TVD: 9755' MD: 18329'	20. BLM/BIA Bond No. on file NMB000740 & NMB00215	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3342.4'	22. Approximate date work will start* 4/1/2013	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 	Name (Printed/Typed) Mayte Reyes	Date 1/4/2013
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Approved by (Signature) /s/George MacDonell		Name (Printed/Typed)	Date MAY 13 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 (Continued on page 2)

SEE ATTACHED FOR
CONDITIONS OF APPROVALApproval Subject to General Requirements
& Special Stipulations Attached

MAY 20 2013

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Gunner 8 Federal 5H
SHL: 190' FSL & 1520' FEL of Section 8
BHL: 1650' FNL & 1520' FEL of Section 5
T26S R34E
Lea County, New Mexico

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

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

Fresh Water	~ 150'	
Rustler	691'	
Top of Salt	1050'	
Base of Salt	5046'	
Delaware	5297'	Oil
Bone Spring	9543'	Oil
TD TVD	9755'	
TD MD	18,329'	

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 725' 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.

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

Hole Size	Depths <i>see COA</i>	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 725'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 5200'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 18,329'	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: 250 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg / 1.75 cuft/sx)

Tail: 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: 850 sx 35:65:6 C + Salt+Gilsonite+CFR-3+ HR601
(12.7 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: 950 sx 50:50:10 H +Salt+Gilsonite+CFR-3+ HR601
(11.8 ppg / 2.5 cuft/sx)

Tail: 1700 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 string is designed to circulate to surface.
- The production string will tie back a minimum of 500' into 9-5/8" shoe

5. Minimum Specifications for 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.

6. Estimated BHP & BHT:

Lateral TD = 4230 psi

Lateral TD = 148 °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' - 725'	Fresh Water	8.4	29	N.C.
725' - 5200'	Brine	10	29	N.C.
5200' - 18,329' (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 hourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. Auxiliary Well Control and Monitoring Equipment:

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

9. Testing, Logging and Coring Program:

- a. Drill stem tests will be based on geological sample shows.
- b. If open hole electrical logging is performed, the program will be:
 - i. Total Depth to Intermediate Casing: Dual Laterolog-Micro Laterolog and Gamma Ray. Compensated Neutron – Z Density log with Gamma Ray and Caliper.
 - ii. Total Depth to Surface: Compensated Neutron with Gamma Ray
 - iii. No 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 possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.



COG OPERATING LLC Pre-Drill Geological Prognosis
Upper Avalon Shale Single Lateral - pilotless
Field: Hardin Tank (Bone Spring)

UAV	No PH
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Gunner Federal #5H
Enter API#

Rig:	Precision #77
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Target Zone: Upper Avalon Shale					
Regular section		FNL	FSL	FEL	FWL
§-T-R (SHL)	8-26S-34E		190	1520	
§-T-R (BHL)	5-26S-34E	1650		1520	

GL:	3342	actual
KB:	3372	actual

PROPOSED WELL				REFERENCE WELL	
COG OPERATING LLC				COG OPERATING LLC	
Gunner Federal #5H				Gunner 8 Fed #8H PH	
8-26S-34E				8-26S-34E	
Lea Co., NM				Lea Co., NM	
KB:	3372	Est. MD:	18300	KB: 3382	

Formations	TVD	Subsea	Iso to Tgt	Lith	Hazards/Misc	TVD	Subsea	Iso
Rustler	691	2681		Mixed lithologies		701	2681	359
TOS	1050	2322		Salt		1060	2322	3996
BOS	5046	-1674		Salt		5056	-1674	251
Delaware (Lamar)	5297	-1925		Limestone & Sand		5307	-1925	4246
Bone Sprg (BSGL)	9543	-6171		Limestone		9553	-6171	57
☆ U Avalon Sh	9600	-6228	210	Silt, Shale & Carb		9610	-6228	414
L Avalon Sh	10014	-6642		Silt, Shale & Carb		10024	-6642	--
EOC target	9810	-6438						
EOL target	9755	-6383						

Comments

Drilling updip ~25' per mile. Confirm BSGI top (during drilling) and recalculate TVD targets.

Wireline Evaluation

CH logs only

Coring and Testing

None

Mudlogging

Log out from intermediate casing to TD with a 2-man unit keeping 2 sets of 20' samples & capturing 1' drill time.

Land (obligations and deadlines)

HBP

Version/Geologist

v1 Andrew McCarthy

DATE: 10/26/2012

S:\Delaware Basin Team\Electronic Well Files\OPERATED\GUNNER FED 5H



COG Operating LLC

**Lea County, NM
Gunner 8 Federal
#5H**

OH

Plan: Plan #1

Standard Planning Report

06 November, 2012





Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well #5H
WELL @ 3372.0usft (Precision #77 - 30' KB)
WELL @ 3372.0usft (Precision #77 - 30' KB)
Grid
Minimum Curvature

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	Gunner 8 Federal		
Site Position:		Northing:	383,338.69 usft
From:	Map	Easting:	761,964.80 usft
Position Uncertainty:	2.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 3' 3.935 N
		Longitude:	103° 29' 16.135 W
		Grid Convergence:	0.45 °

Well	#5H		
Well Position	+N/-S	0.0 usft	Northing: 383,338.69 usft
	+E/-W	0.0 usft	Easting: 761,964.80 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level: 3,342.0 usft
		Latitude:	32° 3' 3.935 N
		Longitude:	103° 29' 16.135 W

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	11/2/2012	(°)
			7.36
			Dip Angle (°)
			60.01
			Field Strength (nT)
			48,383

Design	Plan #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°)
			359.51

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	
9,332.5	0.00	0.00	9,332.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,085.7	90.38	359.51	9,810.0	480.7	-4.1	12.00	12.00	0.00	359.51	
18,329.1	90.38	359.51	9,755.3	8,723.5	-74.6	0.00	0.00	0.00	0.00	PBHL (G#5H)



Planning Report



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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



Planning Report



Database: Houston R5000 Database
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Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference:
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North Reference:
Survey Calculation Method:

Well #5H
WELL @ 3372.0usft (Precision #77 - 30' KB)
WELL @ 3372.0usft (Precision #77 - 30' KB)
Grid
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
9,332.5	0.00	0.00	9,332.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 9332.5' MD, 9332.5' TVD, 0.00° INC, 0.00° AZI, 0.0° VS									
9,350.0	2.10	359.51	9,350.0	0.3	0.0	0.3	12.00	12.00	0.00
9,375.0	5.10	359.51	9,374.9	1.9	0.0	1.9	12.00	12.00	0.00
9,400.0	8.10	359.51	9,399.8	4.8	0.0	4.8	12.00	12.00	0.00
9,425.0	11.10	359.51	9,424.4	8.9	-0.1	8.9	12.00	12.00	0.00
9,450.0	14.10	359.51	9,448.8	14.4	-0.1	14.4	12.00	12.00	0.00
9,475.0	17.10	359.51	9,472.9	21.1	-0.2	21.1	12.00	12.00	0.00
9,500.0	20.10	359.51	9,496.6	29.1	-0.2	29.1	12.00	12.00	0.00
9,525.0	23.10	359.51	9,519.8	38.3	-0.3	38.3	12.00	12.00	0.00
9,550.0	26.10	359.51	9,542.6	48.7	-0.4	48.7	12.00	12.00	0.00
9,575.0	29.10	359.51	9,564.7	60.3	-0.5	60.3	12.00	12.00	0.00
9,600.0	32.10	359.51	9,586.2	73.0	-0.6	73.0	12.00	12.00	0.00



Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #5H
TVD Reference: WELL @ 3372.0usft (Precision #77 - 30' KB)
MD Reference: WELL @ 3372.0usft (Precision #77 - 30' KB)
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)
9,625.0	35.10	359.51	9,607.0	86.8	-0.7	86.8	12.00	12.00	0.00
9,650.0	38.10	359.51	9,627.1	101.7	-0.9	101.7	12.00	12.00	0.00
9,675.0	41.10	359.51	9,646.4	117.7	-1.0	117.7	12.00	12.00	0.00
9,700.0	44.10	359.51	9,664.8	134.6	-1.2	134.6	12.00	12.00	0.00
9,725.0	47.10	359.51	9,682.3	152.4	-1.3	152.4	12.00	12.00	0.00
9,750.0	50.10	359.51	9,698.8	171.2	-1.5	171.2	12.00	12.00	0.00
9,775.0	53.09	359.51	9,714.3	190.8	-1.6	190.8	12.00	12.00	0.00
9,800.0	56.09	359.51	9,728.8	211.1	-1.8	211.1	12.00	12.00	0.00
9,825.0	59.09	359.51	9,742.2	232.2	-2.0	232.2	12.00	12.00	0.00
9,850.0	62.09	359.51	9,754.5	254.0	-2.2	254.0	12.00	12.00	0.00
9,875.0	65.09	359.51	9,765.6	276.4	-2.4	276.4	12.00	12.00	0.00
9,900.0	68.09	359.51	9,775.5	299.3	-2.6	299.4	12.00	12.00	0.00
9,925.0	71.09	359.51	9,784.2	322.8	-2.8	322.8	12.00	12.00	0.00
9,950.0	74.09	359.51	9,791.7	346.6	-3.0	346.6	12.00	12.00	0.00
9,975.0	77.09	359.51	9,797.9	370.8	-3.2	370.8	12.00	12.00	0.00
10,000.0	80.09	359.51	9,802.9	395.3	-3.4	395.3	12.00	12.00	0.00
10,025.0	83.09	359.51	9,806.5	420.1	-3.6	420.1	12.00	12.00	0.00
10,050.0	86.09	359.51	9,808.9	444.9	-3.8	445.0	12.00	12.00	0.00
10,075.0	89.09	359.51	9,810.0	469.9	-4.0	469.9	12.00	12.00	0.00
10,085.7	90.38	359.51	9,810.0	480.6	-4.1	480.6	12.00	12.00	0.00
EOC - 10085.7' MD, 9810.0' TVD, 90.38° INC, 359.51° AZI, 480.6' VS									
10,100.0	90.38	359.51	9,809.9	494.9	-4.2	494.9	0.03	0.03	0.00
10,200.0	90.38	359.51	9,809.2	594.9	-5.1	594.9	0.00	0.00	0.00
10,300.0	90.38	359.51	9,808.6	694.9	-5.9	694.9	0.00	0.00	0.00
10,400.0	90.38	359.51	9,807.9	794.9	-6.8	794.9	0.00	0.00	0.00
10,500.0	90.38	359.51	9,807.3	894.9	-7.7	894.9	0.00	0.00	0.00
10,600.0	90.38	359.51	9,806.6	994.9	-8.5	994.9	0.00	0.00	0.00
10,700.0	90.38	359.51	9,805.9	1,094.9	-9.4	1,094.9	0.00	0.00	0.00
10,800.0	90.38	359.51	9,805.3	1,194.9	-10.2	1,194.9	0.00	0.00	0.00
10,900.0	90.38	359.51	9,804.6	1,294.9	-11.1	1,294.9	0.00	0.00	0.00
11,000.0	90.38	359.51	9,803.9	1,394.9	-11.9	1,394.9	0.00	0.00	0.00
11,100.0	90.38	359.51	9,803.3	1,494.9	-12.8	1,494.9	0.00	0.00	0.00
11,200.0	90.38	359.51	9,802.6	1,594.9	-13.6	1,594.9	0.00	0.00	0.00
11,300.0	90.38	359.51	9,801.9	1,694.9	-14.5	1,694.9	0.00	0.00	0.00
11,400.0	90.38	359.51	9,801.3	1,794.8	-15.4	1,794.9	0.00	0.00	0.00
11,500.0	90.38	359.51	9,800.6	1,894.8	-16.2	1,894.9	0.00	0.00	0.00
11,600.0	90.38	359.51	9,800.0	1,994.8	-17.1	1,994.9	0.00	0.00	0.00
11,700.0	90.38	359.51	9,799.3	2,094.8	-17.9	2,094.9	0.00	0.00	0.00
11,800.0	90.38	359.51	9,798.6	2,194.8	-18.8	2,194.9	0.00	0.00	0.00
11,900.0	90.38	359.51	9,798.0	2,294.8	-19.6	2,294.9	0.00	0.00	0.00
12,000.0	90.38	359.51	9,797.3	2,394.8	-20.5	2,394.9	0.00	0.00	0.00
12,100.0	90.38	359.51	9,796.6	2,494.8	-21.3	2,494.9	0.00	0.00	0.00
12,200.0	90.38	359.51	9,796.0	2,594.8	-22.2	2,594.9	0.00	0.00	0.00
12,300.0	90.38	359.51	9,795.3	2,694.8	-23.0	2,694.9	0.00	0.00	0.00
12,400.0	90.38	359.51	9,794.7	2,794.8	-23.9	2,794.9	0.00	0.00	0.00
12,500.0	90.38	359.51	9,794.0	2,894.8	-24.8	2,894.9	0.00	0.00	0.00
12,600.0	90.38	359.51	9,793.3	2,994.8	-25.6	2,994.9	0.00	0.00	0.00
12,700.0	90.38	359.51	9,792.7	3,094.8	-26.5	3,094.9	0.00	0.00	0.00
12,800.0	90.38	359.51	9,792.0	3,194.8	-27.3	3,194.9	0.00	0.00	0.00
12,900.0	90.38	359.51	9,791.3	3,294.8	-28.2	3,294.9	0.00	0.00	0.00
13,000.0	90.38	359.51	9,790.7	3,394.8	-29.0	3,394.9	0.00	0.00	0.00
13,100.0	90.38	359.51	9,790.0	3,494.7	-29.9	3,494.9	0.00	0.00	0.00
13,200.0	90.38	359.51	9,789.3	3,594.7	-30.7	3,594.9	0.00	0.00	0.00
13,300.0	90.38	359.51	9,788.7	3,694.7	-31.6	3,694.9	0.00	0.00	0.00



Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well #5H
WELL @ 3372.0usft (Precision #77 - 30' KB)
WELL @ 3372.0usft (Precision #77 - 30' KB)
Grid
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	90.38	359.51	9,788.0	3,794.7	-32.5	3,794.9	0.00	0.00	0.00
13,500.0	90.38	359.51	9,787.4	3,894.7	-33.3	3,894.9	0.00	0.00	0.00
13,600.0	90.38	359.51	9,786.7	3,994.7	-34.2	3,994.9	0.00	0.00	0.00
13,700.0	90.38	359.51	9,786.0	4,094.7	-35.0	4,094.9	0.00	0.00	0.00
13,800.0	90.38	359.51	9,785.4	4,194.7	-35.9	4,194.9	0.00	0.00	0.00
13,900.0	90.38	359.51	9,784.7	4,294.7	-36.7	4,294.9	0.00	0.00	0.00
14,000.0	90.38	359.51	9,784.0	4,394.7	-37.6	4,394.9	0.00	0.00	0.00
14,100.0	90.38	359.51	9,783.4	4,494.7	-38.4	4,494.9	0.00	0.00	0.00
14,200.0	90.38	359.51	9,782.7	4,594.7	-39.3	4,594.8	0.00	0.00	0.00
14,300.0	90.38	359.51	9,782.1	4,694.7	-40.2	4,694.8	0.00	0.00	0.00
14,400.0	90.38	359.51	9,781.4	4,794.7	-41.0	4,794.8	0.00	0.00	0.00
14,500.0	90.38	359.51	9,780.7	4,894.7	-41.9	4,894.8	0.00	0.00	0.00
14,600.0	90.38	359.51	9,780.1	4,994.7	-42.7	4,994.8	0.00	0.00	0.00
14,700.0	90.38	359.51	9,779.4	5,094.7	-43.6	5,094.8	0.00	0.00	0.00
14,800.0	90.38	359.51	9,778.7	5,194.6	-44.4	5,194.8	0.00	0.00	0.00
14,900.0	90.38	359.51	9,778.1	5,294.6	-45.3	5,294.8	0.00	0.00	0.00
15,000.0	90.38	359.51	9,777.4	5,394.6	-46.1	5,394.8	0.00	0.00	0.00
15,100.0	90.38	359.51	9,776.7	5,494.6	-47.0	5,494.8	0.00	0.00	0.00
15,200.0	90.38	359.51	9,776.1	5,594.6	-47.8	5,594.8	0.00	0.00	0.00
15,300.0	90.38	359.51	9,775.4	5,694.6	-48.7	5,694.8	0.00	0.00	0.00
15,400.0	90.38	359.51	9,774.8	5,794.6	-49.6	5,794.8	0.00	0.00	0.00
15,500.0	90.38	359.51	9,774.1	5,894.6	-50.4	5,894.8	0.00	0.00	0.00
15,600.0	90.38	359.51	9,773.4	5,994.6	-51.3	5,994.8	0.00	0.00	0.00
15,700.0	90.38	359.51	9,772.8	6,094.6	-52.1	6,094.8	0.00	0.00	0.00
15,800.0	90.38	359.51	9,772.1	6,194.6	-53.0	6,194.8	0.00	0.00	0.00
15,900.0	90.38	359.51	9,771.4	6,294.6	-53.8	6,294.8	0.00	0.00	0.00
16,000.0	90.38	359.51	9,770.8	6,394.6	-54.7	6,394.8	0.00	0.00	0.00
16,100.0	90.38	359.51	9,770.1	6,494.6	-55.5	6,494.8	0.00	0.00	0.00
16,200.0	90.38	359.51	9,769.4	6,594.6	-56.4	6,594.8	0.00	0.00	0.00
16,300.0	90.38	359.51	9,768.8	6,694.6	-57.3	6,694.8	0.00	0.00	0.00
16,400.0	90.38	359.51	9,768.1	6,794.6	-58.1	6,794.8	0.00	0.00	0.00
16,500.0	90.38	359.51	9,767.5	6,894.5	-59.0	6,894.8	0.00	0.00	0.00
16,600.0	90.38	359.51	9,766.8	6,994.5	-59.8	6,994.8	0.00	0.00	0.00
16,700.0	90.38	359.51	9,766.1	7,094.5	-60.7	7,094.8	0.00	0.00	0.00
16,800.0	90.38	359.51	9,765.5	7,194.5	-61.5	7,194.8	0.00	0.00	0.00
16,900.0	90.38	359.51	9,764.8	7,294.5	-62.4	7,294.8	0.00	0.00	0.00
17,000.0	90.38	359.51	9,764.1	7,394.5	-63.2	7,394.8	0.00	0.00	0.00
17,100.0	90.38	359.51	9,763.5	7,494.5	-64.1	7,494.8	0.00	0.00	0.00
17,200.0	90.38	359.51	9,762.8	7,594.5	-65.0	7,594.8	0.00	0.00	0.00
17,300.0	90.38	359.51	9,762.2	7,694.5	-65.8	7,694.8	0.00	0.00	0.00
17,400.0	90.38	359.51	9,761.5	7,794.5	-66.7	7,794.8	0.00	0.00	0.00
17,500.0	90.38	359.51	9,760.8	7,894.5	-67.5	7,894.8	0.00	0.00	0.00
17,600.0	90.38	359.51	9,760.2	7,994.5	-68.4	7,994.8	0.00	0.00	0.00
17,700.0	90.38	359.51	9,759.5	8,094.5	-69.2	8,094.8	0.00	0.00	0.00
17,800.0	90.38	359.51	9,758.8	8,194.5	-70.1	8,194.8	0.00	0.00	0.00
17,900.0	90.38	359.51	9,758.2	8,294.5	-70.9	8,294.8	0.00	0.00	0.00
18,000.0	90.38	359.51	9,757.5	8,394.5	-71.8	8,394.8	0.00	0.00	0.00
18,100.0	90.38	359.51	9,756.8	8,494.5	-72.6	8,494.8	0.00	0.00	0.00
18,200.0	90.38	359.51	9,756.2	8,594.4	-73.5	8,594.8	0.00	0.00	0.00
18,300.0	90.38	359.51	9,755.5	8,694.4	-74.4	8,694.8	0.00	0.00	0.00
18,329.1	90.38	359.51	9,755.3	8,723.5	-74.6	8,723.8	0.00	0.00	0.00

TD @ 18329.1' MD, 9755.3' TVD

Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #5H
TVD Reference: WELL @ 3372.0usft (Precision #77 - 30' KB)
MD Reference: WELL @ 3372.0usft (Precision #77 - 30' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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 (G#5H)	0.00	0.00	9,755.0	8,723.5	-75.2	392,062.20	761,889.60	32° 4' 30.265 N	103° 29' 16.215 W
- plan misses target center by 0.7usft at 18329.1usft MD (9755.3 TVD, 8723.5 N, -74.6 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,332.5	9,332.5	0.0	0.0	KOP - 9332.5' MD, 9332.5' TVD, 0.00° INC, 0.00° AZI, 0.0' VS
10,085.7	9,810.0	480.6	-4.1	EOC - 10085.7' MD, 9810.0' TVD, 90.38° INC, 359.51° AZI, 480.6' VS
18,329.1	9,755.3	8,723.5	-74.6	TD @ 18329.1' MD, 9755.3' TVD



COG Operating LLC
Project: Lea County, NM
Site: Gunner 8 Federal
Well: #5H
Wellbore: OH
Plan: Plan #1 (#5H/OH)

WELL DETAILS: #5H

Ground Elevation:: 3342.0
RKB Elevation: WELL @ 3372.0usft (Precision #77 - 30' KB)
Rig Name: Precision #77 - 30' KB

Surface Hole Location
Northing Easting Latitude Longitude
38338.69 761964.80 32° 3' 3.935 N 103° 29' 16.135 W



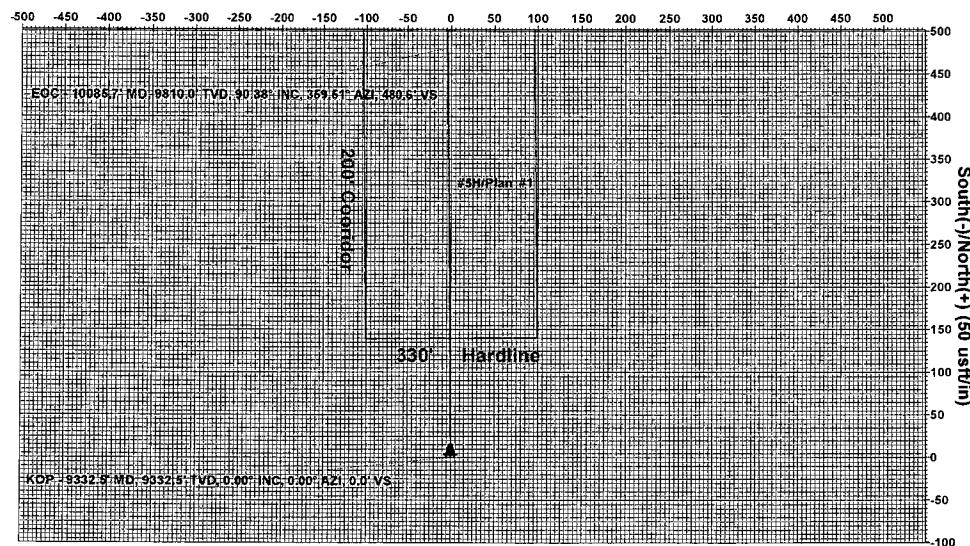
Azimuths to Grid North
True North: -0.45°
Magnetic North: 6.92°

Magnetic Field
Strength: 48383.1snT
Dip Angle: 60.01°
Date: 11/2/2012
Model: IGRF2010

Section Details

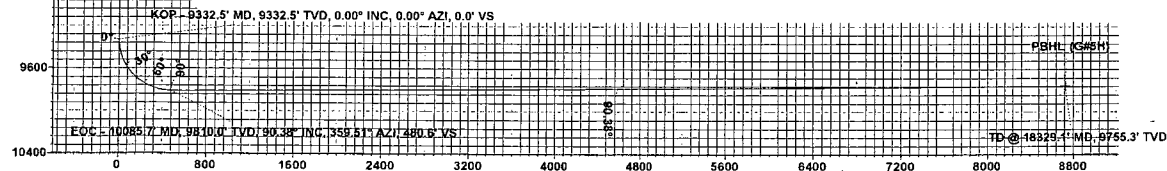
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	9332.5	0.00	0.00	9332.5	0.0	0.0	0.00	0.00	0.0	
3	10085.7	90.38	359.51	9810.0	480.7	-4.1	12.00	359.51	480.7	
4	18329.1	90.38	359.51	9755.3	8723.5	-74.6	0.00	0.00	8723.8	PBHL (G#5H)

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



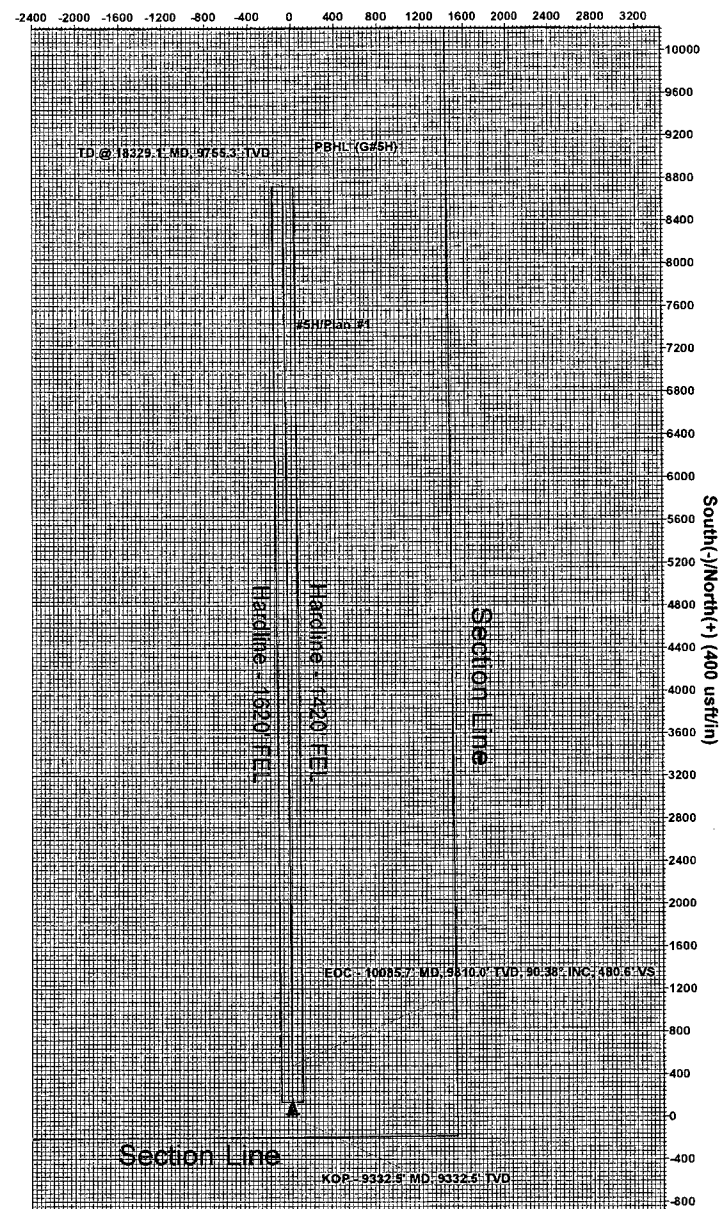
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL (G#5H)	9755.0	8723.5	-75.2	392062.20	761889.60



Vertical Section at 359.51° (400 usft/in)

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



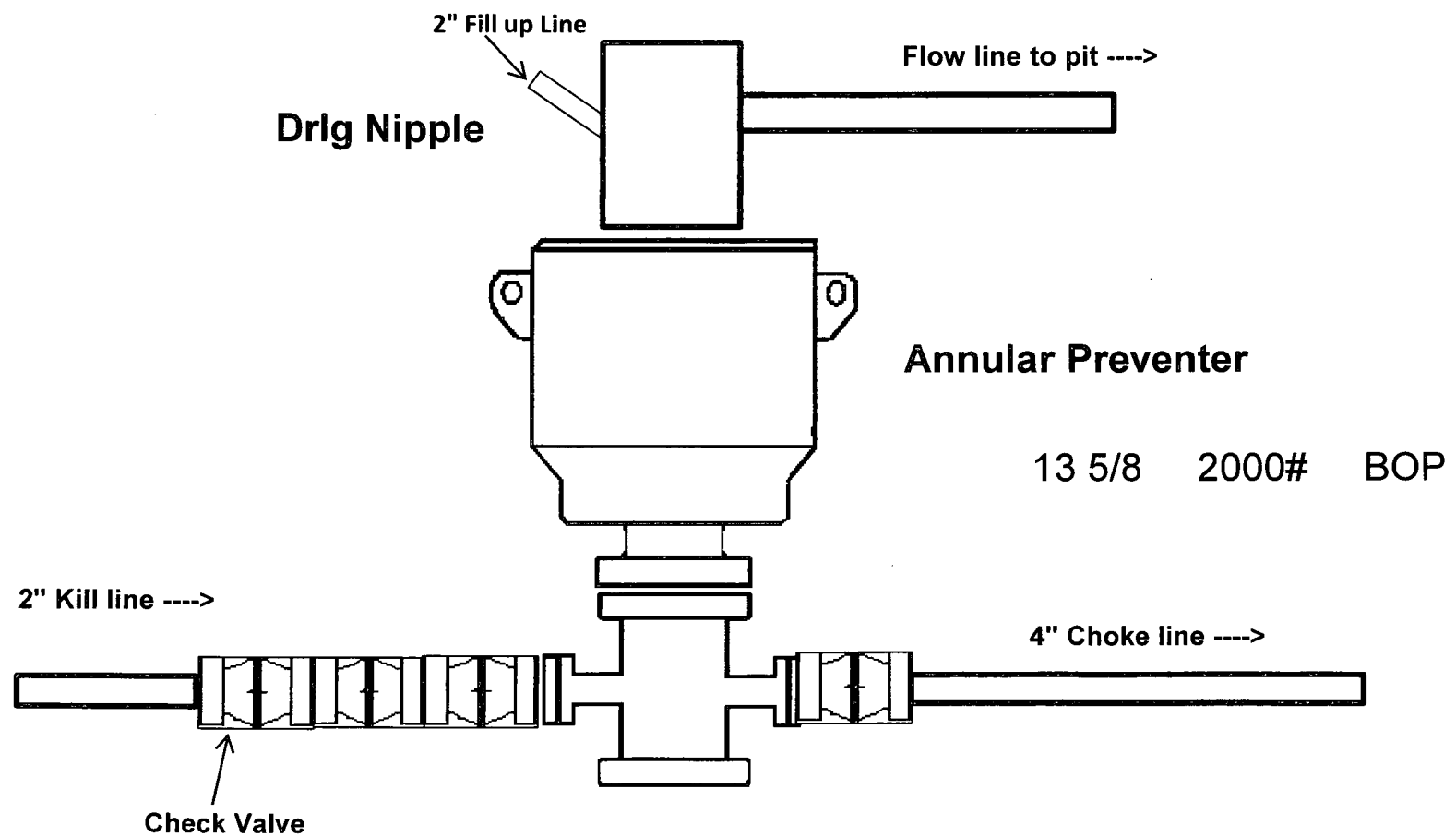
PROJECT DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



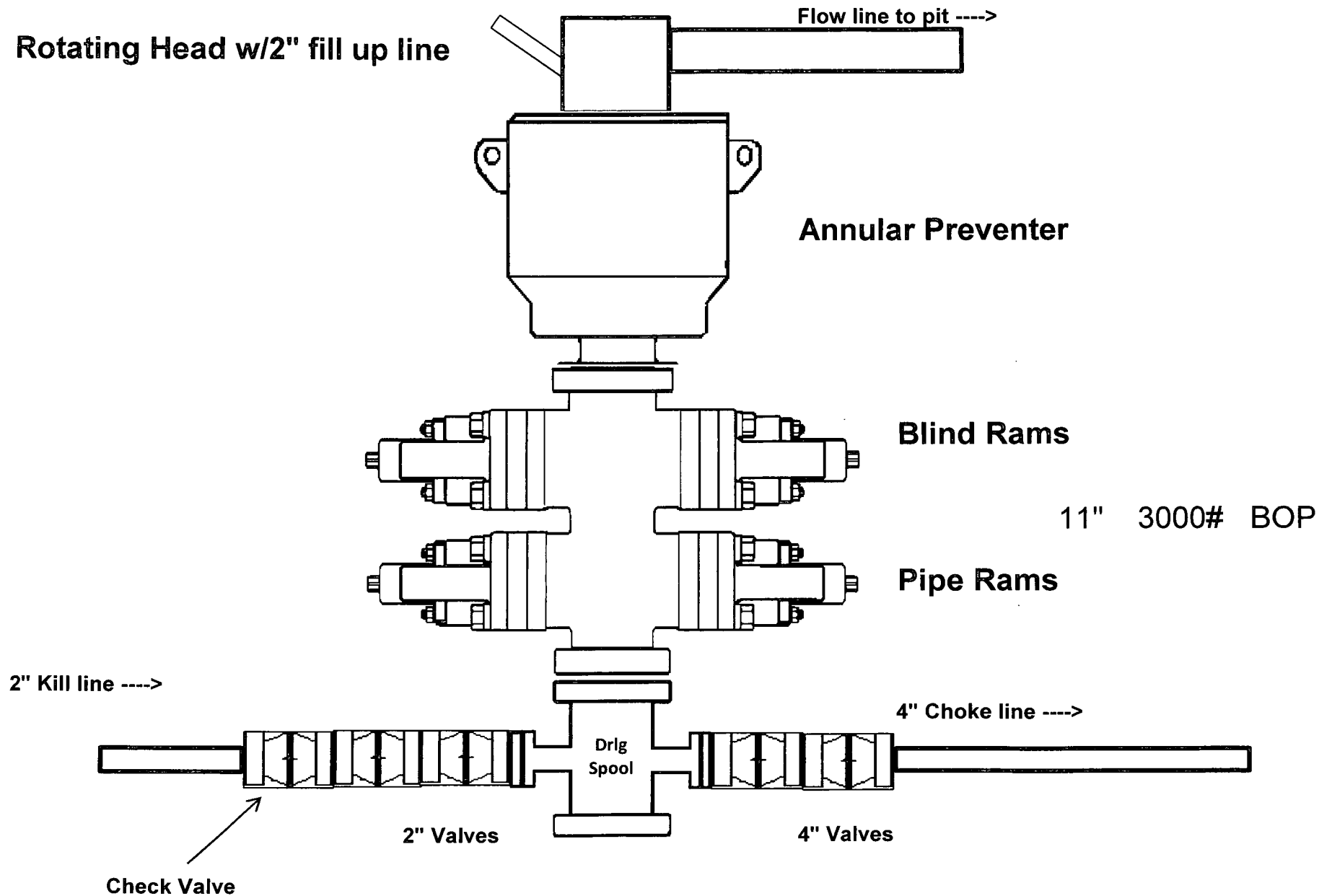
Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #1 (#5H/OH)
Created By: Matt Higgins Date: 10:36, November 06 2012

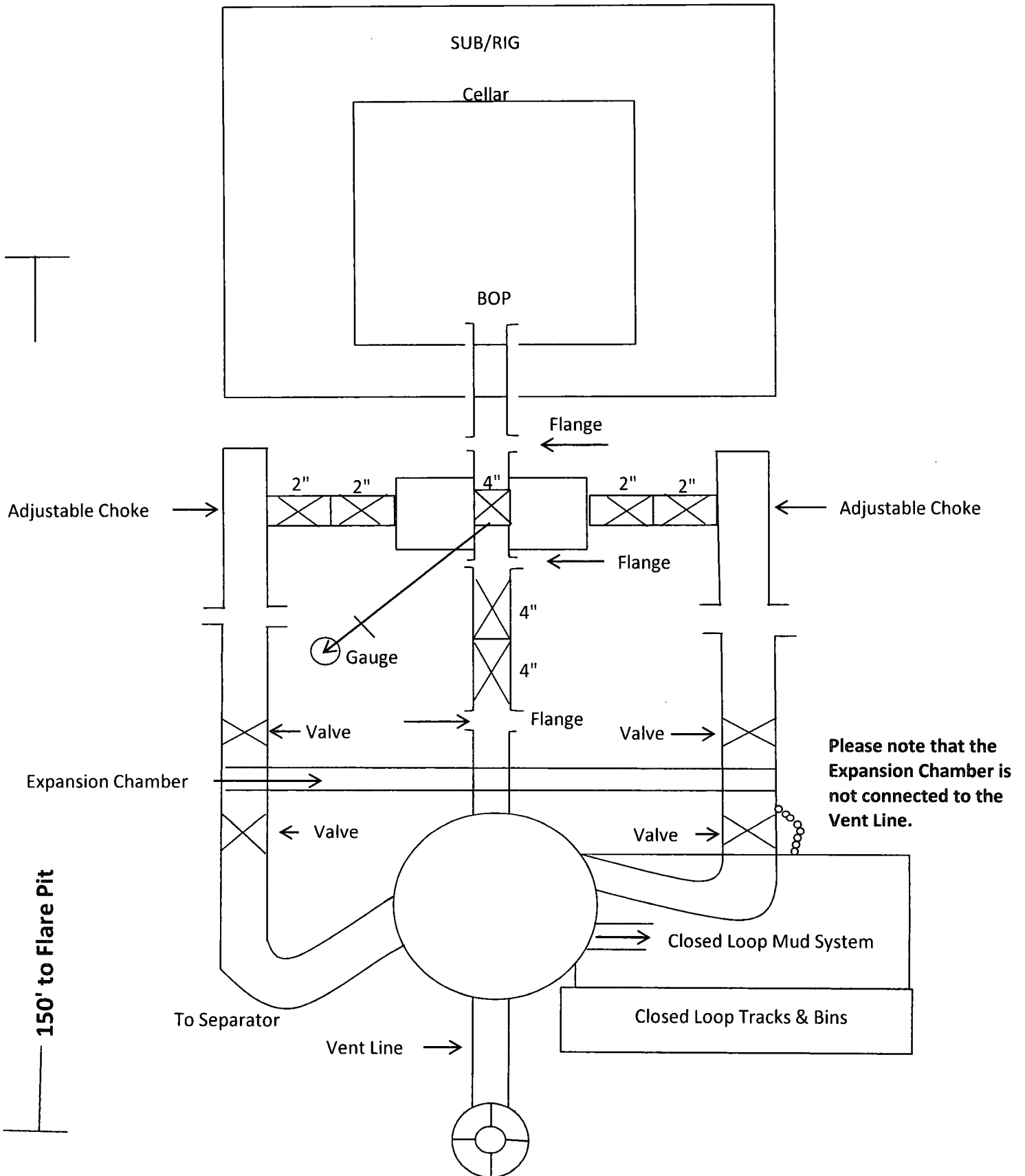
2,000 psi BOP Schematic



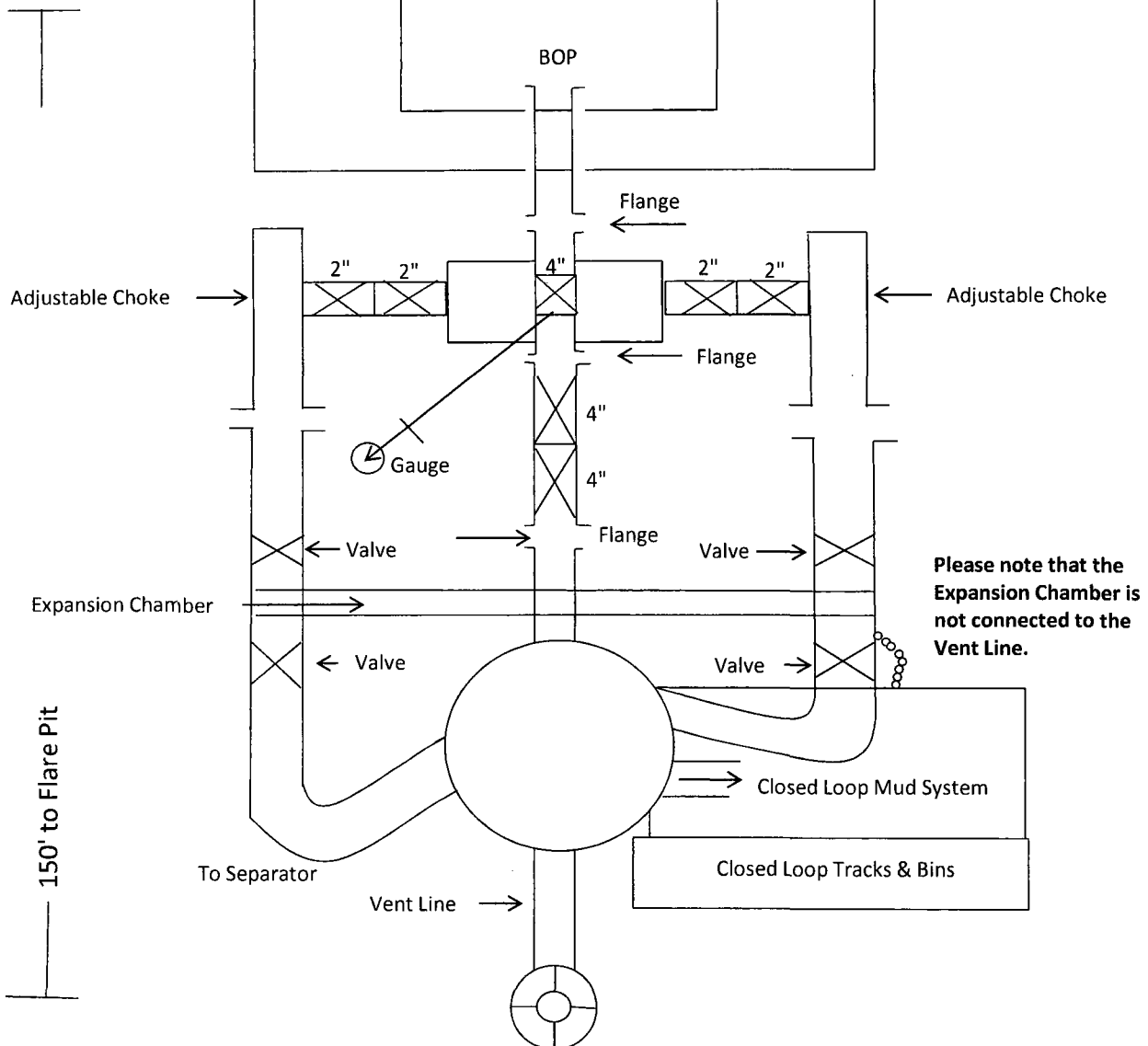
3,000 psi BOP Schematic



2M Choke Manifold Equipment



A schematic diagram of a wellhead assembly. At the top, the text "SUB/RIG" is centered. Below it, a large rectangular box is labeled "Cellar" at its top center. At the bottom center of the "Cellar" box, there is a vertical structure labeled "BOP" (Blowout Preventer). The "BOP" structure consists of a central vertical pipe with two horizontal flanges extending outwards from its base, which are connected to the bottom corners of the "Cellar" box.



**Design Plan
Operating and Maintenance Plan
Closure Plan**

**Gunner 8 Federal 5H
SHL: 190' FSL & 1520' FEL of Section 8
BHL: 1650' FNL & 1520' FEL of Section 5
T26S R34E
Lea County, New Mexico**

COG Operating LLC will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. All leaks should be kept to less than 5 barrels. Rig crews will monitor the tanks at all times.

Equipment List:

- 2- Mongoose Shale Shakers
- 1- 414 Centrifuge
- 1- 518 Centrifuge
- 2- Roll Off Bins w/ Tracks
- 2- 500 BBL Frac Tanks

During drilling operations all liquids, drilling fluids and cuttings will be hauled off via CRI (Controlled Recovery Inc.) Permit R-9166 or any other approved facility.