

Operator Copy

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

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

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM107392
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 Operating LLC. <i>< 229137 ></i>		7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. Nightcap 6 Federal #3H <i>(40118)</i>
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-025-41589
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 330' FNL & 2020' FWL Unit Letter C (NENW) SHL At proposed prod. Zone 330' FSL & 1980' FWL Unit Letter N (SESW) BHL		10. Field and Pool, or Exploratory Lusk; Bone Spring, South <i>(41460)</i>
14. Distance in miles and direction from nearest town or post office* About 14 miles from Loco Hills		11. Sec., T.R.M. or Blk and Survey or Area Sec. 6 - T20S - R32E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'	16. No. of acres in lease 636.47	17. Spacing Unit dedicated to this well 160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 339' BHL: 3250'	19. Proposed Depth TVD: 9460' MD: 13,800'	20. BLM/BIA Bond No. on file NMB000740
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3514.2 GL	22. Approximate date work will start* 7/1/2013	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 8/25/2011
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Regulatory Analyst Approved by (Signature) <i>John J. Juen</i>	Name (Printed/Typed) John J. Juen	Date 8/27/13
Title STATE DIRECTOR	Office NM STATE OFFICE	

Application approval does not warrant or certify that the applicant holds legal 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)

Capitan Controlled Water Basin

Instructions on page

Approval Subject to General Requirements
& Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

732 days to
Permit

JAN 09 2014

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Nightcap 6 Federal 3H
SHL: 330' FNL & 2020' FWL
BHL: 330' FSL & 1980' FWL
Section 6 T20S R32E
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	~ 225'	
Rustler	841'	
Top of Salt	935'	
Base of Salt	2406'	
Yates	2775'	
7 Rivers	3036'	
Capitan Reef	3064'	
Delaware	4389'	Oil
Bone Spring	7329'	Oil
2 nd BoneSpring	9032'	Oil
TD TVD	9460'	
TD MD	13,800'	

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 16" casing at 866' 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 50' above Capitan Reef.

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
20"	0' - 866' 935'	Surface	16"	New	65#	STC	H-40	1.125	1.125	1.6
1 3/4"	0' - 2998' 3050'	Int'rmd	11 3/4"	New	47#	STC	J-55	1.125	1.125	1.6
5/8"	0' - 4300'	Int'rmd	8 5/8"	New	32#	BTC	J-55	1.125	1.125	1.6
7/8"	0' - 13,800'	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

- The above cement volumes could be revised pending the caliper measurement.
- The 11-3/4" & 8-5/8" intermediate strings are designed to circulate to surface.
- The production string will tie back a minimum of 50' above the Capitan Reef.

5. Control:

Nipple up on 11 3/4" with 13 5/8" 2M annular preventer tested to 50% of rated working pressure by independent tester and the rest of the 2M system tested to 2000 psi.

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 four sheets. A 2" kill line and a minimum 3" choke line will be included in the drilling spool located below the ram-type BOP. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold with 3000 psi WP rating. A remotely operated choke will be installed before drilling out intermediate shoe.

6. Estimated BHP & BHT:

Lateral TD = 4329 psi

Lateral TD= 150°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' - 866'	Fresh Water	8.4	29	N.C.
866' - 2900' 2050'	Brine	10	29	N.C.
2900' - 4,300'	Fresh Water	8.4	29	N.C.
4,300' - 13,800' (Lateral)	Cut Brine	8.8 - 9.2	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume total, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting the 8-5/8" 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 16" casing shoe until the 5 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 16" 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:

- See COA
- 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 Nightcap 6 Federal #3H Rev0 MDT 12Mar13 Proposal Geodetic Report

PATHFINDER
A Schlumberger Company

(Def Plan)

Report Date: March 12, 2013 - 03:01 PM
Client: COG
Field: NM Lee County (NAD 83)
Structure / Slot: COG Nightcap 6 Federal #3H / COG Nightcap 6 Federal #3H
Well: COG Nightcap 6 Federal #3H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: COG Nightcap 6 Federal #3H Rev0 MDT 12Mar13
Survey Date: March 12, 2013
Tort / AHD / ODI / ERD Ratio: 88.166 / 1404.702 ft / 5.777 / 0.467
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 36' 31.49805", W 103° 48' 27.27409"
Location Grid N/E V/X: N 885593.910 RUS, E 703230.930 RUS
CRS Grid Convergence Angle: 0.2833°
Grid Scale Factor: 0.99993911

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 180.245° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3532.200 ft above MSL
Seabed / Ground Elevation: 3514.200 ft above MSL
Magnetic Declination: 7.617°
Total Gravity Field Strength: 999.1858 mgals (9.8 based)
Total Magnetic Field Strength: 48824.843 nT
Magnetic Dip Angle: 60.421°
Declination Date: March 12, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: 0.2833°
Total Corr Mag North → Grid North: 7.3341°
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
SHL	0.00	0.00	180.24	0.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	100.00	0.00	180.24	100.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	200.00	0.00	180.24	200.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	300.00	0.00	180.24	300.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	400.00	0.00	180.24	400.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	500.00	0.00	180.24	500.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	600.00	0.00	180.24	600.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	700.00	0.00	180.24	700.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	800.00	0.00	180.24	800.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	900.00	0.00	180.24	900.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1000.00	0.00	180.24	1000.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1100.00	0.00	180.24	1100.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1200.00	0.00	180.24	1200.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1300.00	0.00	180.24	1300.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1400.00	0.00	180.24	1400.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1500.00	0.00	180.24	1500.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1600.00	0.00	180.24	1600.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1700.00	0.00	180.24	1700.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1800.00	0.00	180.24	1800.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	1900.00	0.00	180.24	1900.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2000.00	0.00	180.24	2000.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2100.00	0.00	180.24	2100.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2200.00	0.00	180.24	2200.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2300.00	0.00	180.24	2300.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2400.00	0.00	180.24	2400.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2500.00	0.00	180.24	2500.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	2600.00	0.00	180.24	2600.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
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	4500.00	0.00	180.24	4500.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	4600.00	0.00	180.24	4600.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	4700.00	0.00	180.24	4700.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
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	5100.00	0.00	180.24	5100.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
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	6000.00	0.00	180.24	6000.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
	6100.00	0.00	180.24	6100.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27
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	6400.00	0.00	180.24	6400.00	0.00	0.00	0.00	0.00	585593.91	703230.93	N 32 36 31.50	W 103 48 27.27

[illegible]

Comments	MD (m)	Incl (°)	Azim Grid (°)	TVD (m)	VSEC (m)	NS (m)	EW (m)	DLB ("/100m)	Northing (mUS)	Easting (mUS)	Latitude (N/S ° ° °)	Longitude (E/W ° ° °)
	0.000		18.000		1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only			Original Borehole / COG	
	18.000		13800.262		1/100.000	30.000	30.000	SLB_MWD-STD			Nightcap 6 Federal #3H Rev0 Original Borehole / COG Nightcap 6 Federal #3H Rev0	



COG

Rev0

PATHFINDER
A Schlumberger Company

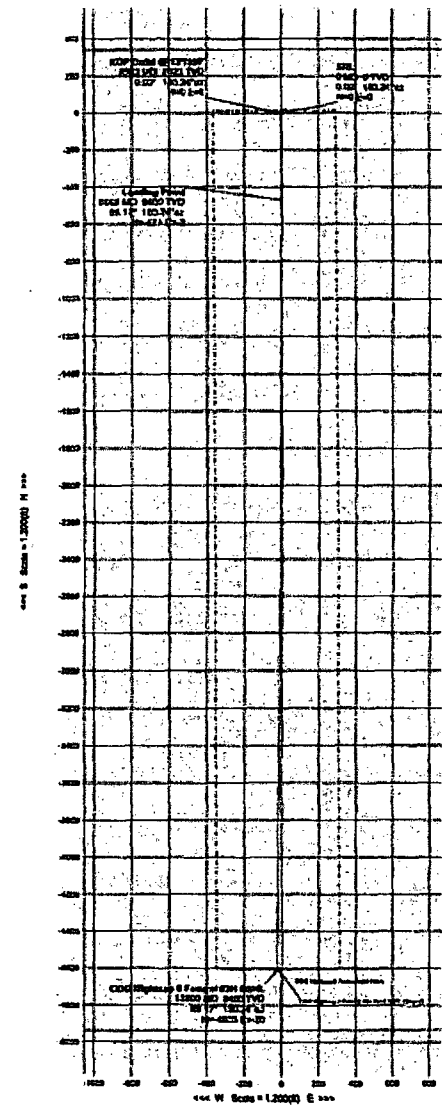
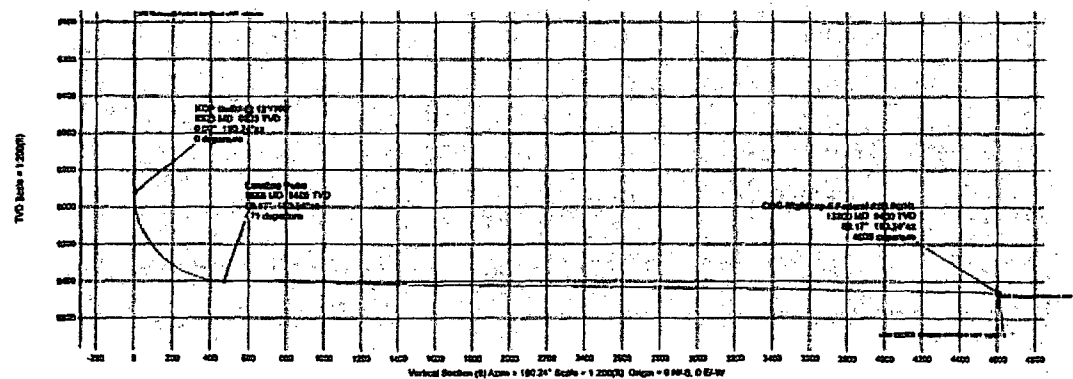
WELL				FIELD				STRECHER			
COG Nightcap 6 Federal #3H				NM Lea County (NAD 83)				Patriot 6			
Well Name	COG Nightcap 6	Top	48.42"	Base	1000.00	Surface Interval	1000.00	1000.00	1000.00	1000.00	1000.00
Well ID	COG Nightcap 6	Top	48.42"	Base	1000.00	Surface Interval	1000.00	1000.00	1000.00	1000.00	1000.00
Well ID	COG Nightcap 6	Top	48.42"	Base	1000.00	Surface Interval	1000.00	1000.00	1000.00	1000.00	1000.00

COG Nightcap 6 Federal #3H
COG Nightcap 6 Federal #3H
COG Nightcap 6 Federal #3H
COG Nightcap 6 Federal #3H



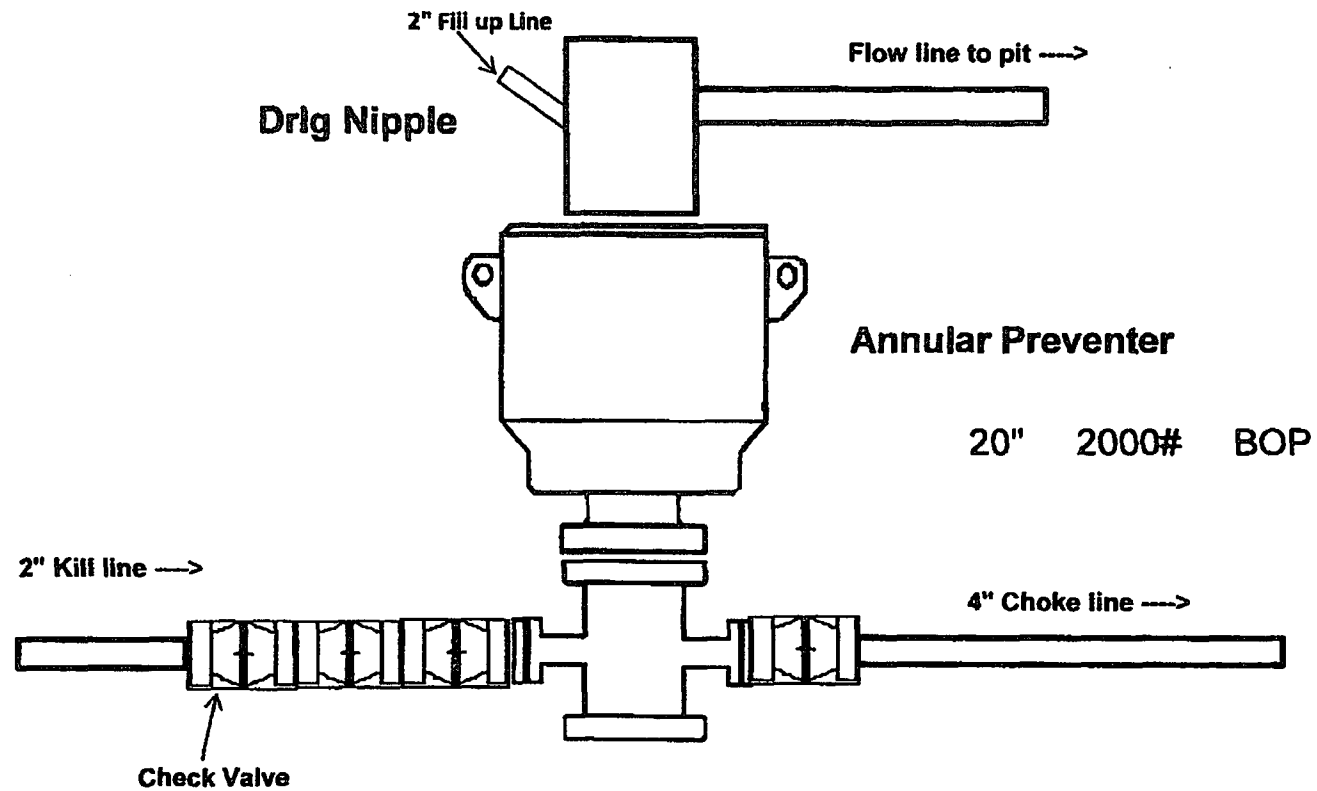
Grid North
Tot Cor (M-G)
7.3341"
Mag Dec (7.617")
Grid Conv (0.283")

SHL	0.00	0.00	180.24	0.00	3532.20	0.00	0.00	0.00	W 103 48 27.274	N 32 36 31.496	703228.93	535583.91	0.00	0.00	180.24
KOP Build @ 12710'	5922.59	0.00	180.24	5922.59	5390.39	0.00	0.00	0.00	W 103 48 27.274	N 32 36 31.496	703228.93	535583.91	0.00	0.00	180.24
Landing Point	5655.66	89.17	180.24	5490.00	5867.80	470.54	-470.53	-2.01	W 103 48 27.325	N 32 36 26.841	703228.92	535123.41	470.54	180.24	12.00
COG Nightcap 6 Federal #3H PBHL	13590.26	89.17	180.24	5490.00	5927.80	6694.70	-4694.66	-99.08	W 103 48 27.770	N 32 35 45.977	703221.25	535293.54	6694.70	180.24	0.00

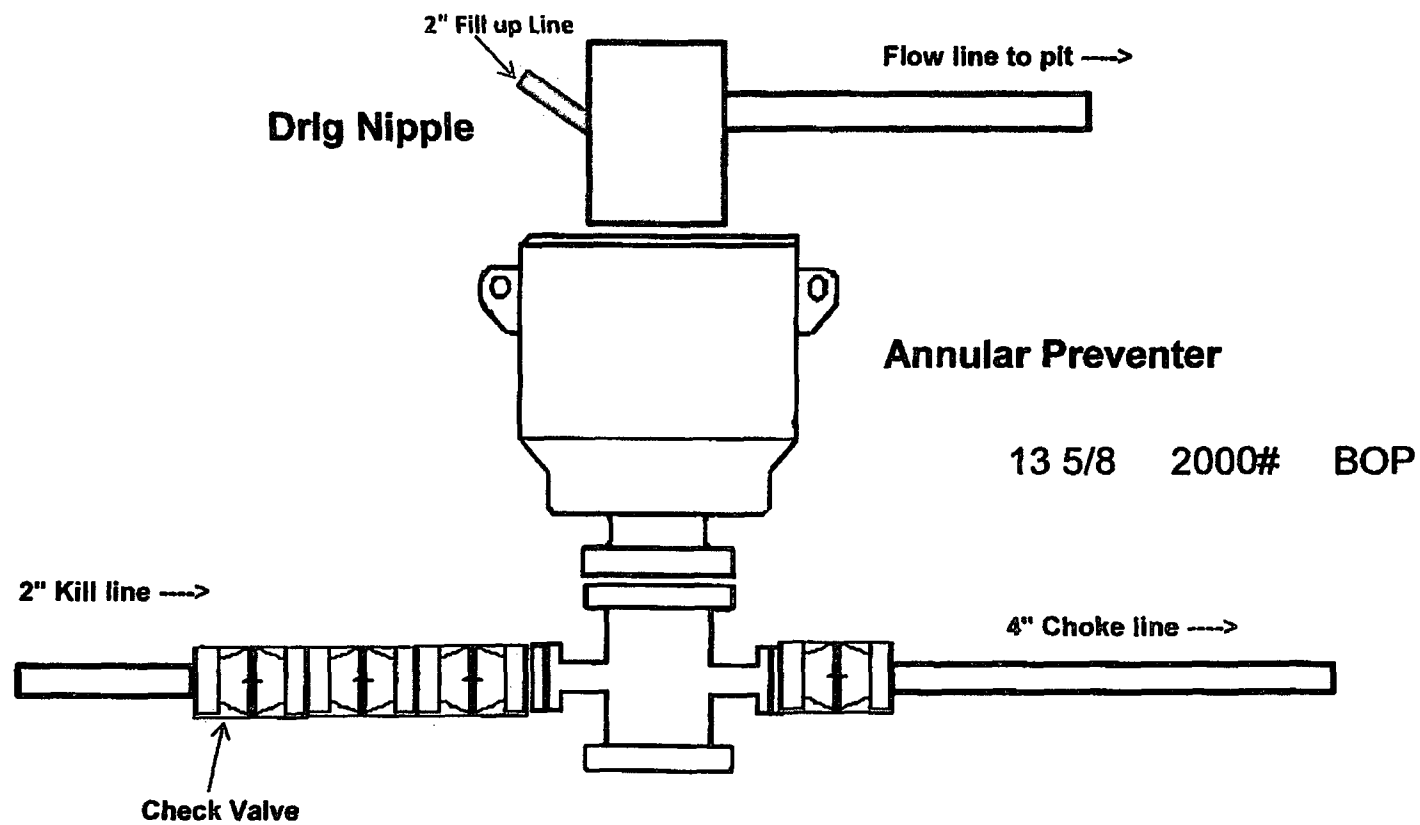


Drawn by: [Name]
Checked by: [Name]
Approved by: [Name]
Date: [Date]

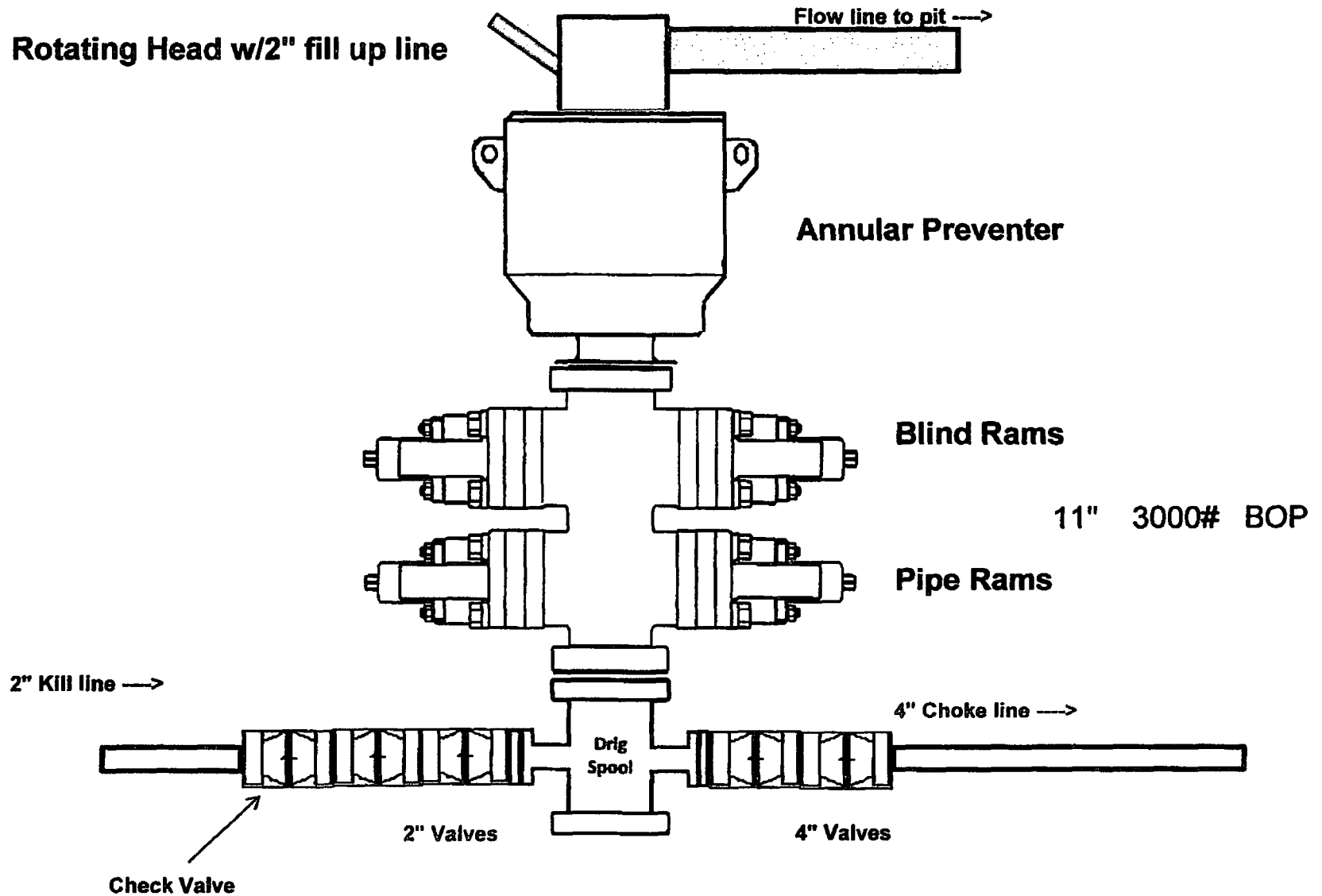
2,000 psi BOP Schematic



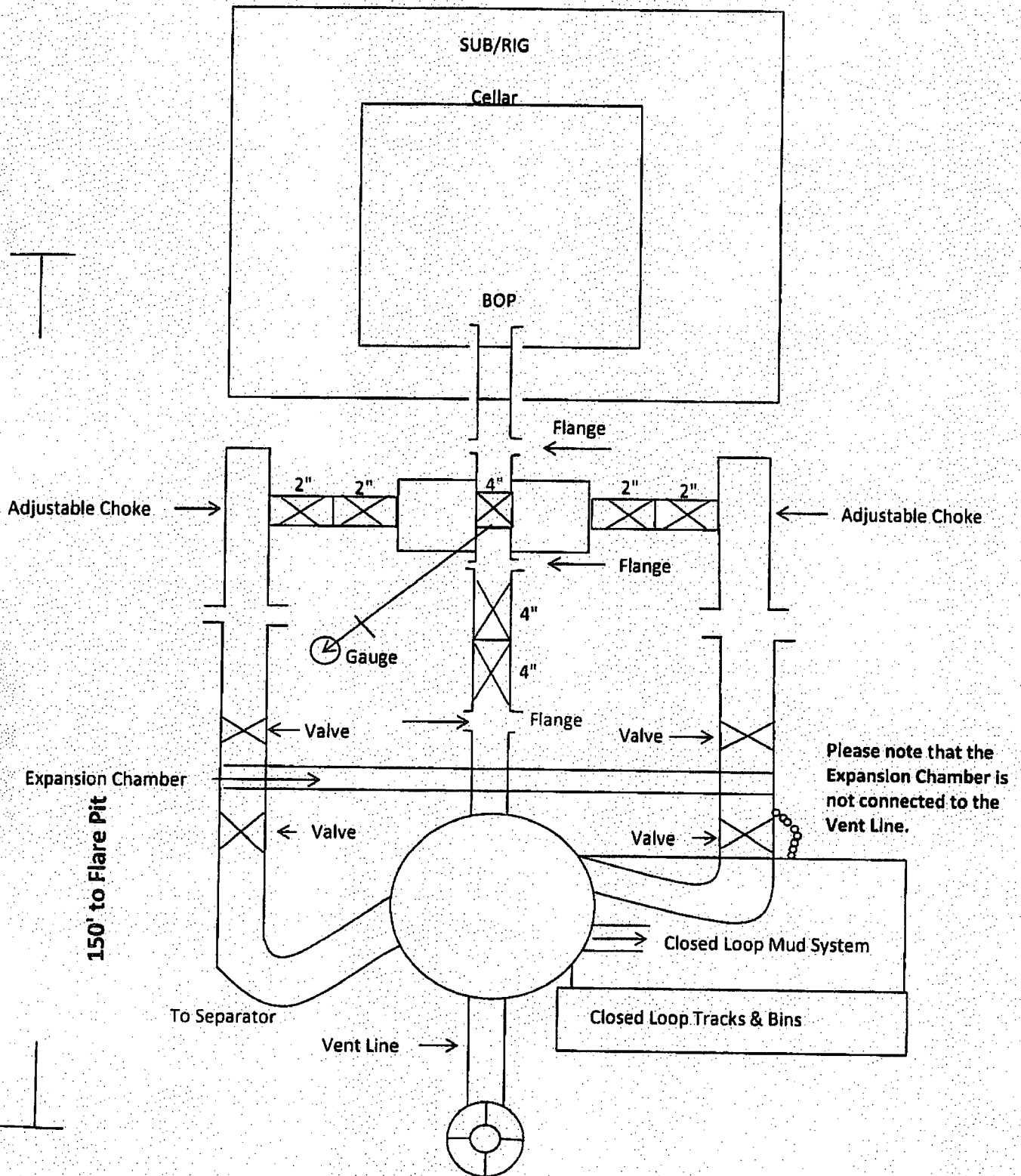
2,000 psi BOP Schematic



3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment

