AMS-12-787

Form 3160-3
(August 2007)

OCD-HOBBS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OCD
OCT 01 2012
RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No 1004-013
Expires July 31, 2010

5 Lease Serial No: NMNM115422

6 If Indian, Allotee or Tribe Name:

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: Sol 28 Federal #2H <39325>

2. Name of Operator: COG Production LLC <217955>

9 API Well No.: 30-025-40803

3a Address: 2208 West Main Street, Artesia, NM 88210

3b Phone No. *(include area code)*: 575-748-6940

10 Field and Pool, or Exploratory: Jennings; Bone Spring Lower/Avalon Shale Upper <97838>

4 Location of Well *(Report location clearly and in accordance with any State requirements *)*

At surface: 2160' FSL & 330' FEL Unit Letter I NESE Section 28-T25S-R32E

At proposed prod Zone: 2160' FNL & 330' FWL Unit Letter L NWSW Section 28-T25S-R32E

11. Sec., T R M or Blk and Survey or Area: Section 28-T25S-R32E

14 Distance in miles and direction from nearest town or post office*: About 23 miles from Malaga

12. County or Parish: Lea

13. State: New Mexico

15 Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig Unit line, if any)	16. No of acres in lease	17 Spacing Unit dedicated to this well
330'	320	160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.	20 BLM/BIA Bond No. on file
150'	NMB000845 / 860
TVD 9345' MD 13885'	

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3384'	9/1/2012	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.
2. A Drilling Plan
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)
4 Bond to cover the operations unless covered by an existing bond on file (see Item 20 above)
5 Operator certification
6 Such other site specific information and/or plans as may be required by the authorized officer.

25 Signature	Name *(Printed/Typed)*	Date
Mayte Reyes	Mayte Reyes	6/1/2012

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/s/ Don Peterson	/s/ Don Peterson	SEP 28 2012

Title	Office
FIELD MANAGER	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 theron

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

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

OCT 02 2012

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Sol 28 Federal Com #2H
SHL: 2160' FSL & 330' FEL
BHL: 2160' FNL & 330' FWL
Section 28 T25S 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	Not Present	
Rustler	1002'	
Top of Salt	1591'	
Base of Salt	4492'	
Delaware	4710'	Oil
Bone Spring	8722'	Oil
TD TVD	9345'	
TD MD	13,885'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities. The surface sands will be protected by setting 13-3/8" casing at 1030' and circulating cement back to surface. All intervals will be isolated by setting 5 ½" 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	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' - 1030'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 ¼"	0' – 3500'	Intrmd	9 5/8"	New	36#	BTC	J-55	1.125	1.125	1.6
12 ¼"	3500' – 4600'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' – 13,885'	Production Curve & Lateral	5 ½"	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: 450 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/50% excess on OH volumes

b. 9 5/8" Intermediate:
Lead: 1150 sx Class C + 4% Gel
(13.5 ppg /1.75 cuft/sx)
Tail: 250 sx Class C + 1% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/35% excess on OH volumes

d. 5 ½" Production
Lead: 600 sx 50:50:10 H + Salt+Gilsonite+CFR-3+ HR601
(11.8 ppg / 2.5 cuft/sx)
Tail: 950 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 measurement from the open hole logs.
- 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 rating 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 3000 psi to 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:

Lateral TD = 4050 psi

7. Mud Program: The applicable depths and properties of this system are as follows:

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – 1030'	Fresh Water	8.4	29	N.C.
1030' – 4600'	Brine	10	29	N.C.
4600' – 13,885' (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.

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 ½" 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 ½" 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

Lea County, NM
Sol 28 Federal 2H
Sol 28 Federal 2H

Wellbore #1

Plan: Plan #1

Standard Planning Report

21 May, 2012

Crescent Directional Drilling

Planning Report

Database:	R5000 Houston DB	**Local Co-ordinate Reference:**	Site Sol 28 Federal 2H
Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3404 50ft (Original Well Elev)
Project:	Lea County, NM	**MD Reference:**	WELL @ 3404 50ft (Original Well Elev)
Site:	Sol 28 Federal 2H	**North Reference:**	Grid
Well:	Sol 28 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project	Lea County, NM		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sol 28 Federal 2H				
Site Position:		**Northing:**	400,730 40 ft	**Latitude:**	32 100586
From	Map	**Easting:**	704,768 00 ft	**Longitude:**	-103 805549
Position Uncertainty:	0 00 ft	**Slot Radius:**	13 200 in	**Grid Convergence:**	0 28 °

Well	Sol 28 Federal 2H				
Well Position	**+N/-S**	0 00 ft	**Northing:**	400,730 40 ft	**Latitude:**	32 100586
	+E/-W	0 00 ft	**Easting:**	704,768 00 ft	**Longitude:**	-103 805549
Position Uncertainty		0 00 ft	**Wellhead Elevation:**		**Ground Level:**	3,384 00 ft

Wellbore	Wellbore #1				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	5/21/2012	7 56	60 03	48,464

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0 00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0 00	0 00	0 00	269 43	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	
8,957 65	0 00	0 00	8,957 65	0 00	0 00	0 00	0 00	0 00	0 00	
9,717 96	91 24	269 43	9,435 00	-4 89	-487 75	12 00	12 00	0 00	269 43	
13,885 09	91 24	269 43	9,345 00	-46 70	-4,653 70	0 00	0 00	0 00	0 00	PBHL (Sol 28 Federal

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Site:	Sol 28 Federal 2H	**North Reference:**	Grid
Well:	Sol 28 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,957 65	0 00	0 00	8,957 65	0 00	0 00	0 00	0 00	0 00	0 00
KOP - Start Build @ 12 00°/100'									
9,000 00	5 08	269 43	8,999 94	-0 02	-1 88	1 88	12 00	12 00	0 00
9,100 00	17 08	269 43	9,097 90	-0 21	-21 06	21 06	12 00	12 00	0 00
9,200 00	29 08	269 43	9,189 73	-0 60	-60 19	60 20	12 00	12 00	0 00
9,300 00	41 08	269 43	9,271 41	-1 18	-117 56	117 57	12 00	12 00	0 00
9,400 00	53 08	269 43	9,339 38	-1 91	-190 66	190 67	12 00	12 00	0 00
9,500 00	65 08	269 43	9,390 67	-2 77	-276 28	276 30	12 00	12 00	0 00
9,600 00	77 08	269 43	9,423 03	-3 72	-370 71	370 72	12 00	12 00	0 00
9,700 00	89 08	269 43	9,435 05	-4 71	-469 79	469 81	12 00	12 00	0 00
9,717 96	91 24	269 43	9,435 00	-4 89	-487 75	487 78	12 00	12 00	0 00
Landing Point - Hold @ 91.24° INC, 269.43° AZ									
9,800 00	91 24	269 43	9,433 23	-5 72	-569 77	569 79	0 00	0 00	0 00
9,900 00	91 24	269 43	9,431 07	-6 72	-669 74	669 77	0 00	0 00	0 00
10,000 00	91 24	269 43	9,428 91	-7 72	-769 71	769 75	0 00	0 00	0 00
10,100 00	91 24	269 43	9,426 75	-8 73	-869 68	869 72	0 00	0 00	0 00
10,200 00	91 24	269 43	9,424 59	-9 73	-969 65	969 70	0 00	0 00	0 00
10,300 00	91 24	269 43	9,422 43	-10 73	-1,069 62	1,069 68	0 00	0 00	0 00
10,400 00	91 24	269 43	9,420 27	-11 74	-1,169 60	1,169 65	0 00	0 00	0 00
10,500 00	91 24	269 43	9,418 11	-12 74	-1,269 57	1,269 63	0 00	0 00	0 00
10,600 00	91 24	269 43	9,415 95	-13 74	-1,369 54	1,369 61	0 00	0 00	0 00
10,700 00	91 24	269 43	9,413 79	-14 75	-1,469 51	1,469 58	0 00	0 00	0 00
10,800 00	91 24	269 43	9,411 63	-15 75	-1,569 48	1,569 56	0 00	0 00	0 00
10,900 00	91 24	269 43	9,409 47	-16 75	-1,669 45	1,669 54	0 00	0 00	0 00
11,000 00	91 24	269 43	9,407 31	-17 76	-1,769 43	1,769 51	0 00	0 00	0 00
11,100 00	91 24	269 43	9,405 15	-18 76	-1,869 40	1,869 49	0 00	0 00	0 00
11,200 00	91 24	269 43	9,402 99	-19 76	-1,969 37	1,969 47	0 00	0 00	0 00
11,300 00	91 24	269 43	9,400 83	-20 77	-2,069 34	2,069 44	0 00	0 00	0 00
11,400 00	91 24	269 43	9,398 67	-21 77	-2,169 31	2,169 42	0 00	0 00	0 00
11,500 00	91 24	269 43	9,396 51	-22 77	-2,269 28	2,269 40	0 00	0 00	0 00
11,600 00	91 24	269 43	9,394 35	-23 78	-2,369 26	2,369 37	0 00	0 00	0 00
11,700 00	91 24	269 43	9,392 19	-24 78	-2,469 23	2,469 35	0 00	0 00	0 00
11,800 00	91 24	269 43	9,390 04	-25 78	-2,569 20	2,569 33	0 00	0 00	0 00
11,900 00	91 24	269 43	9,387 88	-26 79	-2,669 17	2,669 30	0 00	0 00	0 00
12,000 00	91 24	269 43	9,385 72	-27 79	-2,769 14	2,769 28	0 00	0 00	0 00
12,100 00	91 24	269 43	9,383 56	-28 79	-2,869 11	2,869 26	0 00	0 00	0 00
12,200 00	91 24	269 43	9,381 40	-29 79	-2,969 09	2,969 23	0 00	0 00	0 00
12,300 00	91 24	269 43	9,379 24	-30 80	-3,069 06	3,069 21	0 00	0 00	0 00
12,400 00	91 24	269 43	9,377 08	-31 80	-3,169 03	3,169 19	0 00	0 00	0 00
12,500 00	91 24	269 43	9,374 92	-32 80	-3,269 00	3,269 16	0 00	0 00	0 00
12,600 00	91 24	269 43	9,372 76	-33 81	-3,368 97	3,369 14	0 00	0 00	0 00
12,700 00	91 24	269 43	9,370 60	-34 81	-3,468 94	3,469 12	0 00	0 00	0 00
12,800 00	91 24	269 43	9,368 44	-35 81	-3,568 92	3,569 09	0 00	0 00	0 00
12,900 00	91 24	269 43	9,366 28	-36 82	-3,668 89	3,669 07	0 00	0 00	0 00
13,000 00	91 24	269 43	9,364 12	-37 82	-3,768 86	3,769 05	0 00	0 00	0 00
13,100 00	91 24	269 43	9,361 96	-38 82	-3,868 83	3,869 02	0 00	0 00	0 00
13,200 00	91 24	269 43	9,359 80	-39 83	-3,968 80	3,969 00	0 00	0 00	0 00
13,300 00	91 24	269 43	9,357 64	-40 83	-4,068 77	4,068 98	0 00	0 00	0 00
13,400 00	91 24	269 43	9,355 48	-41 83	-4,168 74	4,168 95	0 00	0 00	0 00
13,500 00	91 24	269 43	9,353 32	-42 84	-4,268 72	4,268 93	0 00	0 00	0 00
13,600 00	91 24	269 43	9,351 16	-43 84	-4,368 69	4,368 91	0 00	0 00	0 00
13,700 00	91 24	269 43	9,349 00	-44 84	-4,468 66	4,468 88	0 00	0 00	0 00
13,800 00	91 24	269 43	9,346 84	-45 85	-4,568 63	4,568 86	0 00	0 00	0 00
13,885 09	91 24	269 43	9,345 00	-46 70	-4,653 70	4,653 93	0 00	0 00	0 00

Crescent Directional Drilling

Planning Report

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Company:	COG Operating LLC	**TVD Reference:**	WELL @ 3404 50ft (Original Well Elev)
Project:	Lea County, NM	**MD Reference:**	WELL @ 3404 50ft (Original Well Elev)
Site:	Sol 28 Federal 2H	**North Reference:**	Grid
Well:	Sol 28 Federal 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
TD @ 13885.09' MD, 9345.00' TVD - PBHL (Sol 28 Federal 2H Plan 1)									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
PBHL (Sol 28 Federal 2I - plan hits target center - Point	0 00	0 00	9,345 00	-46 70	-4,653 70	400,683 70	700,114 30	32 100519	-103 820578

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
8,957 65	8,957 65	0 00	0 00	KOP - Start Build @ 12 00°/100'
9,717 96	9,435 00	-4 89	-487 75	Landing Point - Hold @ 91 24° INC, 269 43° AZ
13,885 09	9,345 00	-46 70	-4,653 70	TD @ 13885 09' MD, 9345 00' TVD

CRESCENT DIRECTIONAL DRILLING

COG Operating LLC
Sol 28 Federal 2H
Lea County, NM
Plan #1

CONCHO

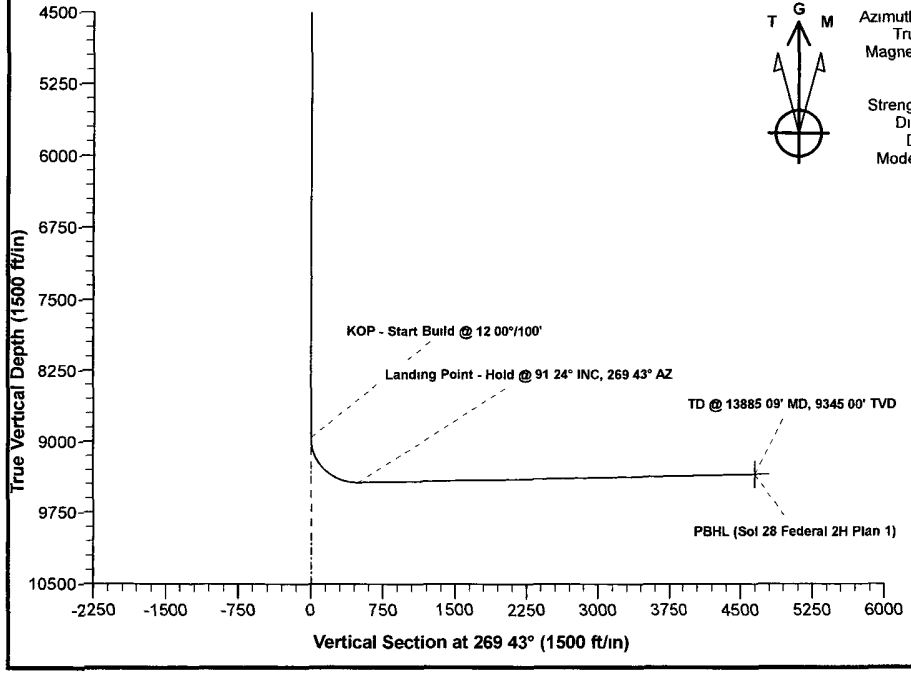
Surface Location		Ground Elev. 3384 00 WELL @ 3404 50ft (Original Well Elev)			
+N/-S	+E/-W	Northing	Easting	Latittude	Longitude
0.00	0 00	400730 40	704768 00	32 100585	-103 805549

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL (Sol 28 Federal 2H Plan 1)	9345 00	-46 70	-4653 70	400683 70	700114 30	32 100519	-103 820578

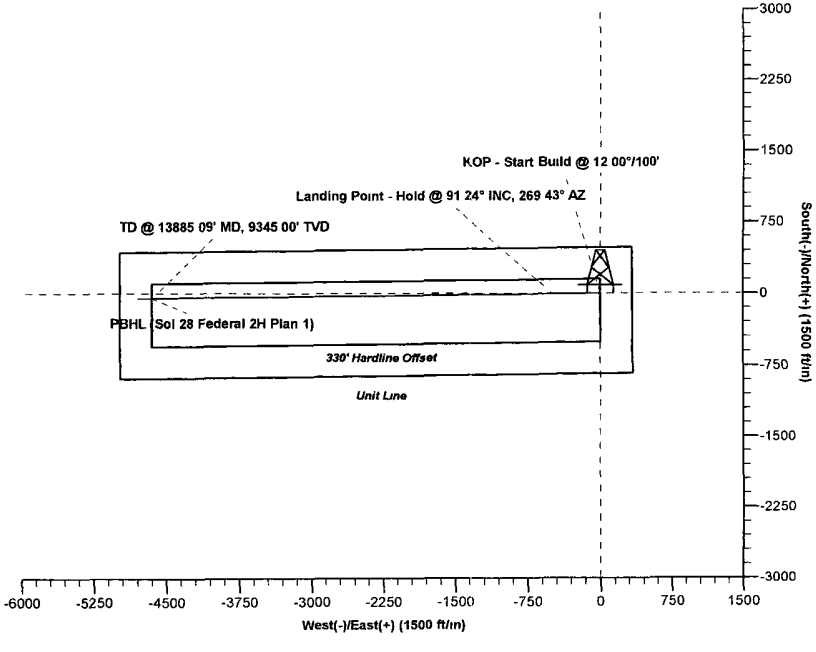
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	
2	8957 65	0 00	0 00	8957 65	0 00	0 00	0 00	0 00	0 00	KOP - Start Build @ 12 00°/100'
3	9717 96	91 24	269 43	9435 00	-4 89	-487 75	12 00	269 43	487 78	Landing Point - Hold @ 91 24° INC, 269 43° AZ
4	13885 09	91 24	269 43	9345 00	-46 70	-4653 70	0 00	0 00	4653 93	TD @ 13885 09' MD, 9345 00' TVD

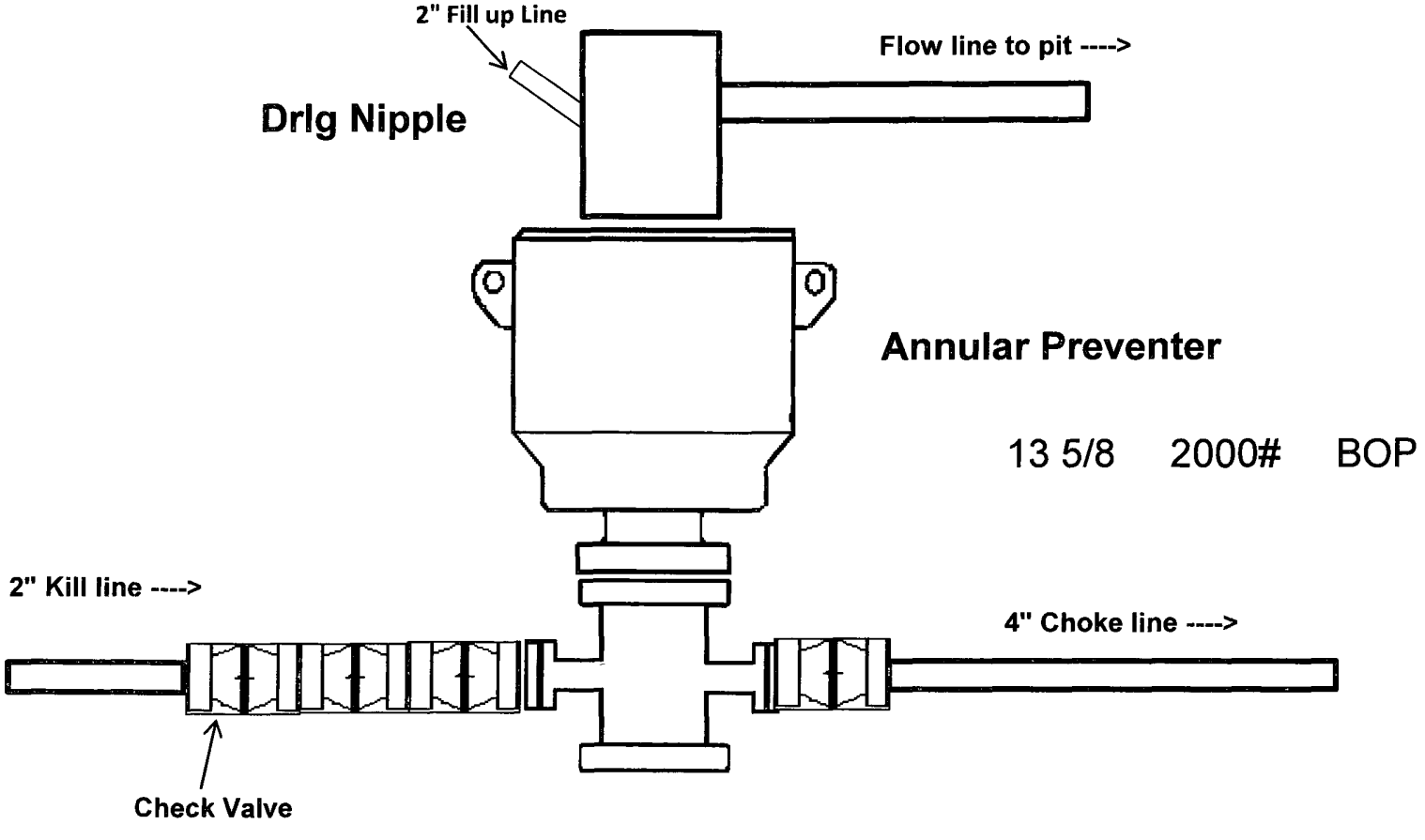


Azimuths to Grid North
True North -0 28°
Magnetic North 7 28°

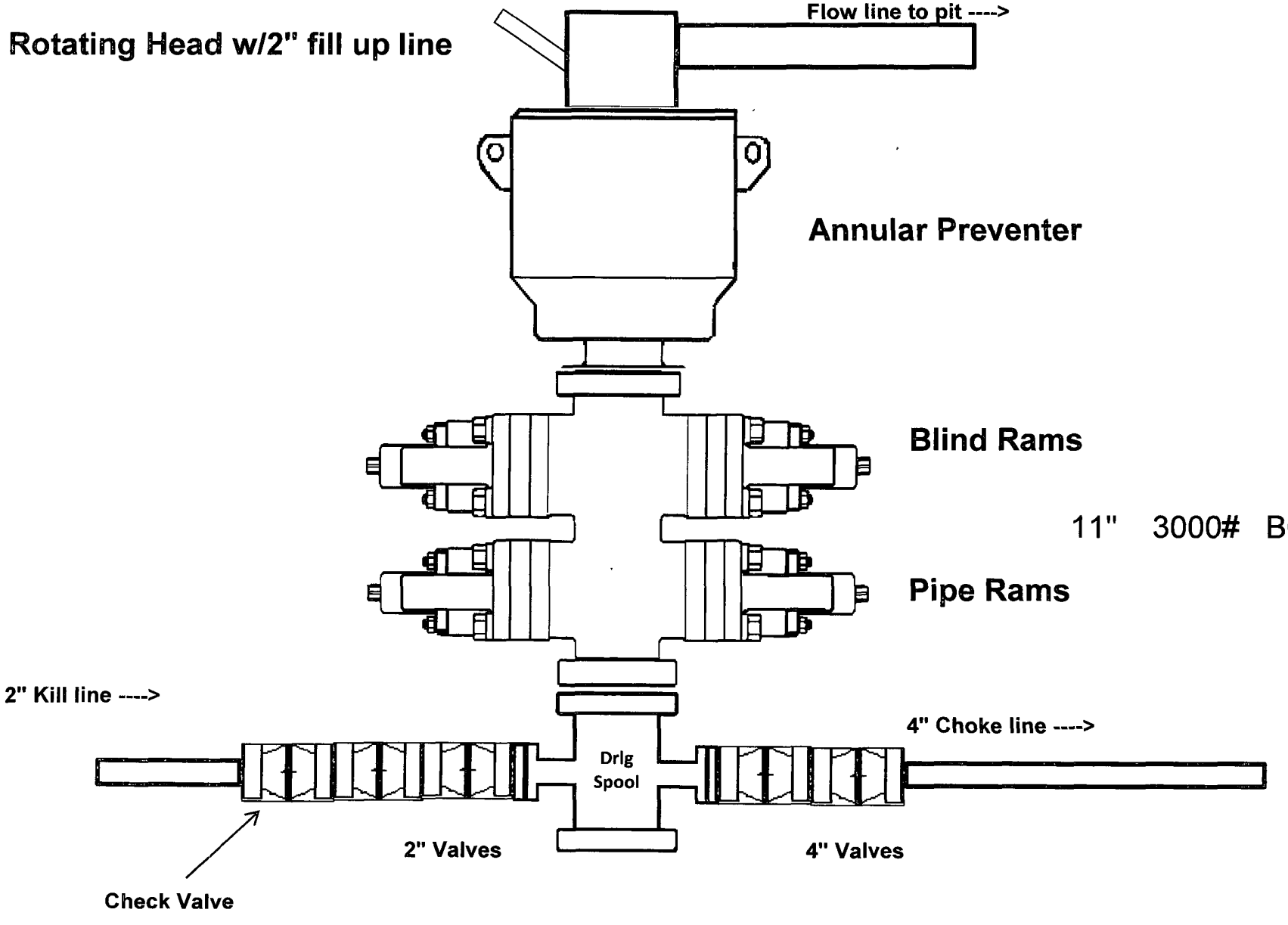
Magnetic Field
Strength 48463 9snT
Dip Angle 60 03°
Date 5/21/2012
Model IGRF200510



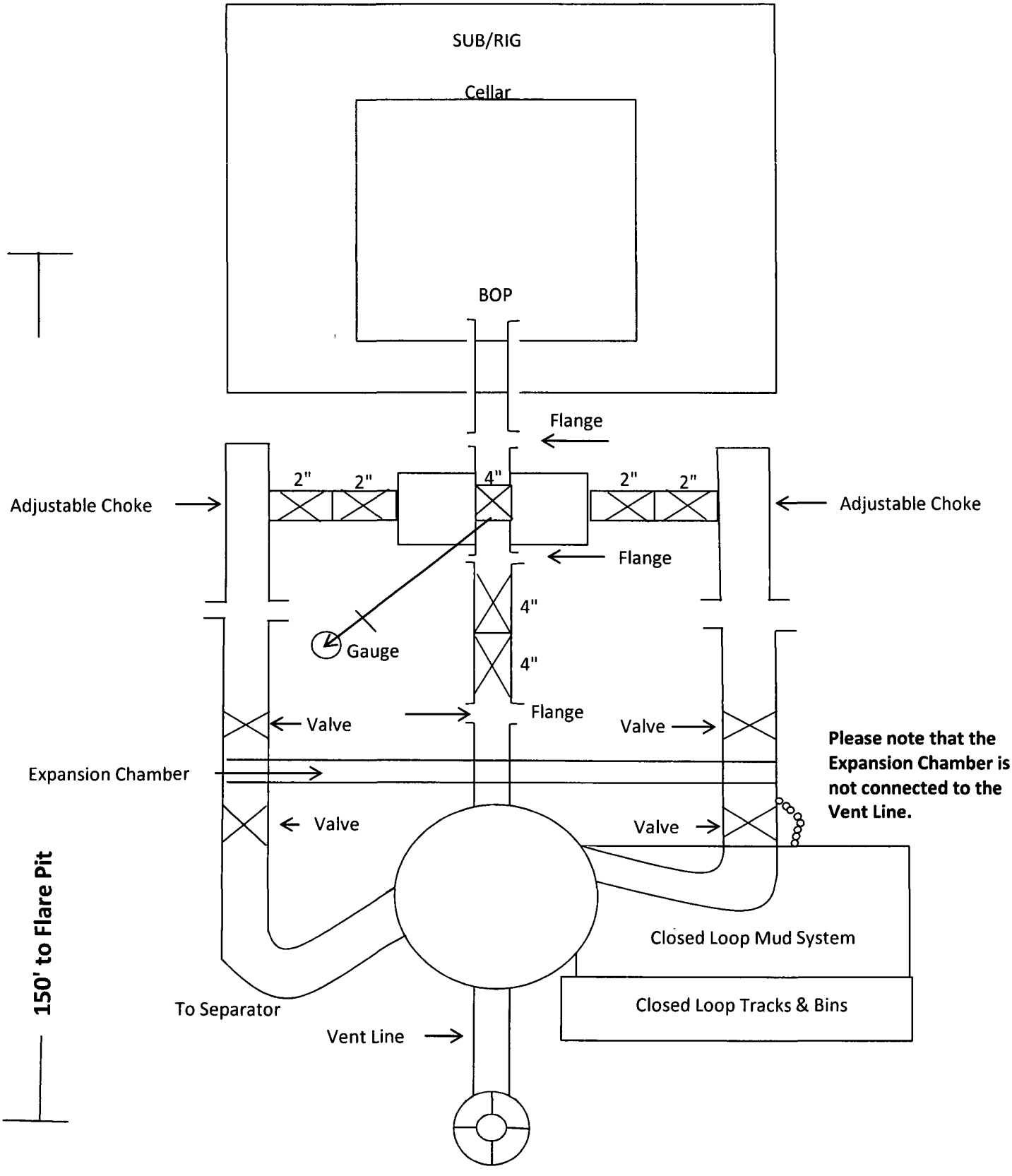
2,000 psi BOP Schematic



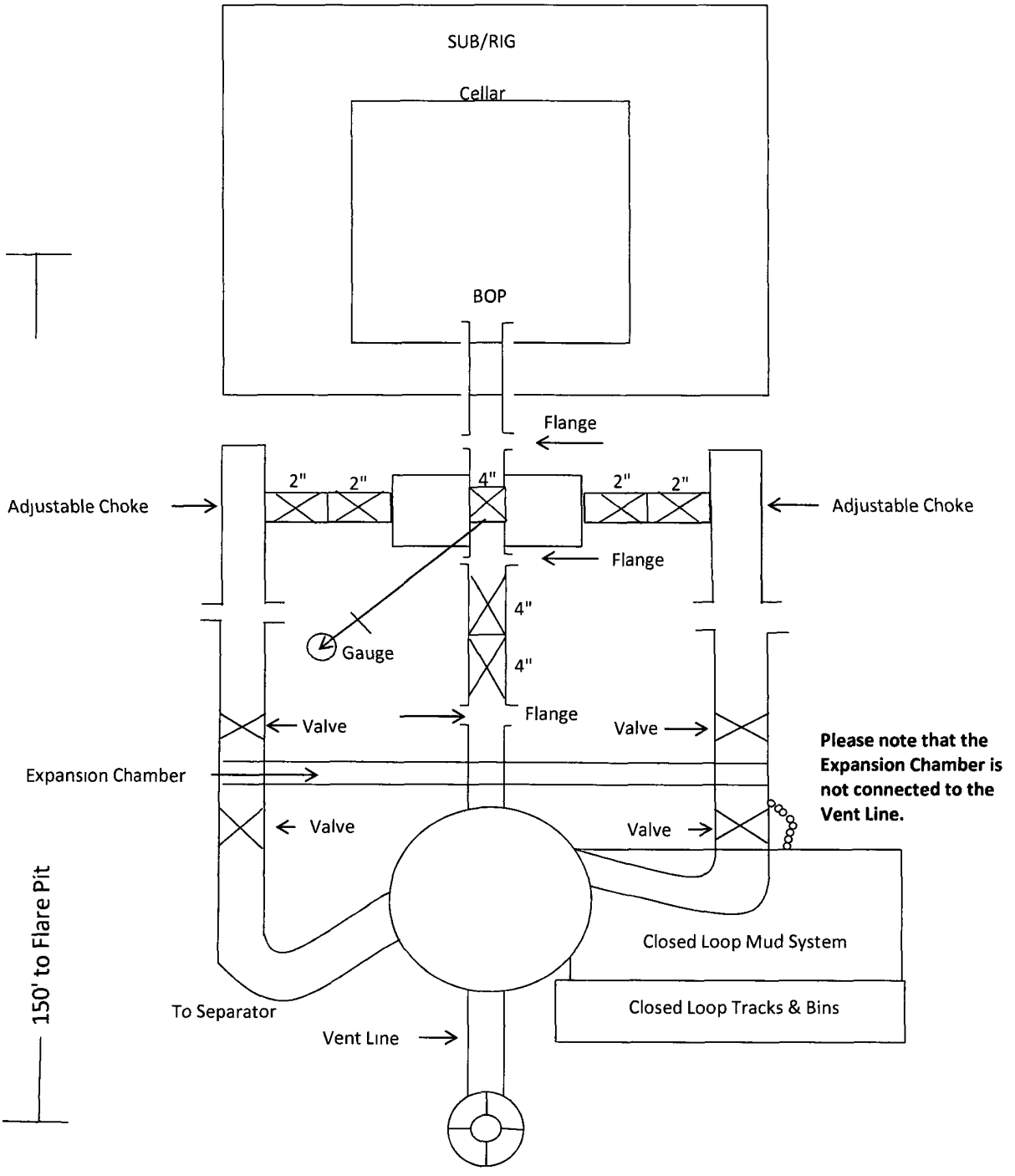
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



Design Plan
Operating and Maintenance Plan
Closure Plan

Sol 28 Federal Com #2H
SHL: 2160' FSL & 330' FEL
BHL: 2160' FSL & 330' FWL
Section 28 T25S R32E
Lea County, New Mexico

COG Production 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.