

HOBBS OCD

NOV 21 2013

RECEIVED

Form 3160-3
(March 2012)

OCD Hobbs

ATS-13-711

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMLC 0065710A	
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.		7. If Unit or CA Agreement, Name and No. Lusk Deep Unit - NMNM 070982X	
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. (308161) Lusk Deep Unit A #30H	
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-024-41513	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 330' FSL & 360' FWL Unit Letter M (SWSW) SHL Sec 20-T19S-R32E At proposed prod. Zone 380' FSL & 330' FEL Unit Letter P (SESE) BHL Sec 20-T19S-R32E		10. Field and Pool, or Exploratory Lusk; Bone Spring (41440)	
14. Distance in miles and direction from nearest town or post office* Approximately 12 miles from Maljamar		11. Sec., T.R.M. or Blk and Survey or Area Section 20 - T19S - R32E	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 330'		12. County or Parish Lea County	
16. No. of acres in lease 640		13. State NM	
17. Spacing Unit dedicated to this well 160		18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 624' BHL: 432'	
19. Proposed Depth TVD: 9,325' MD: 13,698'		20. BLM/BIA Bond No. on file NMB000740 & NMB000215	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3563.3' GL		22. Approximate date work will start* 8/1/2013	
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 7/1/2013
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Title Regulatory Analyst	
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Approved by (Signature) <i>/s/ James Stovall</i>	Name (Printed/Typed)	Date NOV 19 2013
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Title FIELD MANAGER	Office CARLSBAD FIELD OFFICE
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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)

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

NOV 26 2013

Capitan Controlled Water Basin

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Lusk Deep Unit 30H
SHL: 330' FSL & 360' FWL
BHL: 380' FSL & 330' FEL
Section 20 T19S 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	733'	
Top of Salt	821'	
Base of Salt	2,483'	
Yates	2,515'	
Seven Rivers	2,637'	
Capitan Reef	2,807'	
Base of Reef	4,333'	
Delaware	4,619'	Oil
Bone Spring	7,150'	Oil
TD TVD	9,325'	
TD MD	13,698'	

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 840' 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 the Capitan Reef.

See COA 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' - 758'	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 3500'	Intrmd	9 5/8"	New	36#	BTC	J-55	1.125	1.125	1.6
12 1/4"	3500' - 4500'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' - 13,698'	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.
- Refer to four string casing area notes.

4. Proposed Cement Program

a. 13-3/8" Surface

Lead: 300 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg /1.75 cuft/sx)

Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.34 cuft/sx)

****Calculated w/50% excess on OH volumes**

b. 9 5/8" Intermediate:

1st Stage:

Lead: 250 sx 35:65:6 C+ Salt+ Gilsonite+ CFR-3+ HR601
(12.7 ppg /1.89 cuft/sx)

Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 1.34 cuft/sx)

2nd Stage: DVT/ECP @ +/- 2700'

Lead: 600 sx Class C + 4% Gel + 2% CaCl₂
(13.5 ppg /1.75 cuft/sx)

Tail: 100 sx Class C + 2% CaCl₂
(14.8 ppg / 1.34 cuft/sx)

**Calculated w/35% excess on OH volumes

c. 5 1/2" Production

Lead: 825 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 1.89 cuft/sx)

Tail: 925 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.
- The 9-5/8" intermediate string is designed to circulate cement to surface.
- The production string will tie back a minimum of 50' above Capitan Reef.

5. 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. A remotely operated choke will be installed before drilling out intermediate shoe.

6. Estimated BHP & BHT:

Lateral TD = 4267 psi

Lateral TD= 149°F

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

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' - 758'	Fresh Water	8.4	29	N.C.
758' - 4,500'	Brine	10	29	N.C.
4,500' - 13,698' (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 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 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.



New Mexico Office of the State Engineer Water Column/Average Depth to Water

(A CLW##### in the
POD suffix indicates the
POD has been replaced
& no longer serves a
water right file.)

(R=POD has
been replaced,

O=orphaned,

C=the file is (quarters are 1=NW 2=NE 3=SW 4=SE)

closed)

(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code		Q Q Q			Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
	basin	County	64	16	4								
CP 00824		LE	4	1	20	19S	30E		594129	3612680*	70		

Average Depth to Water: --

Minimum Depth: --

Maximum Depth: --

Record Count: 1

PLSS Search:

Section(s): 20

Township: 19S

Range: 30E

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

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(R=POD has
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O=orphaned,
C=the file is

closed) (quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00522			ED	3	30	19S	30E	592347	3610451*			120	90	30
CP 00742			ED	3	3	31	19S	30E	592158	3608638*		223	115	108
CP 00822			LE	4	4	15	19S	30E	598148	3613516*		90		
CP 00823			LE	1	3	17	19S	30E	593715	3613885*		120		
CP 00824			LE	4	1	20	19S	30E	594129	3612680*		70		
CP 00825			LE	3	4	28	19S	30E	596164	3610282*		100		
CP 00827			LE	3	3	35	19S	30E	598596	3608694*		100		
CP 00828			LE	1	1	35	19S	30E	598585	3609900*		90		

Average Depth to Water: **102 feet**

Minimum Depth: **90 feet**

Maximum Depth: **115 feet**

Record Count: 8

PLSS Search:

Township: 19S

Range: 30E

*UTM location was derived from PLSS - see Help

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COG Lusk Deep Unit #30H Rev0 MDT 24Apr13 Proposal Geodetic Report



(Def Plan)

Report Date: April 24, 2013 - 03:12 PM
Client: COG
Field: NM Lea County (NAD 27)
Structure / Slot: COG Lusk Deep Unit #30H / COG Lusk Deep Unit #30H
Well: COG Lusk Deep Unit #30H
Borehole: Original Borehole
UWI / API#: Patriot 6 / Unknown
Survey Name: COG Lusk Deep Unit #30H Rev0 MDT 24Apr13
Survey Date: April 24, 2013
Tort / AHD / DDI / ERD Ratio: 95.531' / 4602.995 ft / 5.810 / 0.494
Coordinate Reference System: NAD27 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 38' 22.15580", W 103° 47' 42.98258"
Location Grid N/E Y/X: N 596777.400 RUS, E 665628.900 RUS
CRS Grid Convergence Angle: 0.2902°
Grid Scale Factor: 0.99994051

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 89.208° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3581.300 ft above
Seabed / Ground Elevation: 3563.300 ft above
Magnetic Declination: 7.601°
Total Gravity Field Strength: 998.5061mgn (9.80665 Based)
Total Magnetic Field Strength: 48629.202 nT
Magnetic Dip Angle: 60.448°
Declination Date: April 24, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: 0.2902°
Total Corr Mag North->Grid North: 7.3105°
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
SHL	0.00	0.00	84.12	0.00	0.00	0.00	0.00	N/A	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	100.00	0.00	84.12	100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	200.00	0.00	84.12	200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	300.00	0.00	84.12	300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	400.00	0.00	84.12	400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	500.00	0.00	84.12	500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	600.00	0.00	84.12	600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	700.00	0.00	84.12	700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	800.00	0.00	84.12	800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	900.00	0.00	84.12	900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1000.00	0.00	84.12	1000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1100.00	0.00	84.12	1100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1200.00	0.00	84.12	1200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1300.00	0.00	84.12	1300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1400.00	0.00	84.12	1400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1500.00	0.00	84.12	1500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1600.00	0.00	84.12	1600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1700.00	0.00	84.12	1700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1800.00	0.00	84.12	1800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	1900.00	0.00	84.12	1900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2000.00	0.00	84.12	2000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2100.00	0.00	84.12	2100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2200.00	0.00	84.12	2200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2300.00	0.00	84.12	2300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2400.00	0.00	84.12	2400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2500.00	0.00	84.12	2500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2600.00	0.00	84.12	2600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2700.00	0.00	84.12	2700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2800.00	0.00	84.12	2800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	2900.00	0.00	84.12	2900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3000.00	0.00	84.12	3000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3100.00	0.00	84.12	3100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3200.00	0.00	84.12	3200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3300.00	0.00	84.12	3300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3400.00	0.00	84.12	3400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3500.00	0.00	84.12	3500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3600.00	0.00	84.12	3600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3700.00	0.00	84.12	3700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3800.00	0.00	84.12	3800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	3900.00	0.00	84.12	3900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4000.00	0.00	84.12	4000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4100.00	0.00	84.12	4100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4200.00	0.00	84.12	4200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4300.00	0.00	84.12	4300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4400.00	0.00	84.12	4400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4500.00	0.00	84.12	4500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4600.00	0.00	84.12	4600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4700.00	0.00	84.12	4700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4800.00	0.00	84.12	4800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	4900.00	0.00	84.12	4900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5000.00	0.00	84.12	5000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5100.00	0.00	84.12	5100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5200.00	0.00	84.12	5200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5300.00	0.00	84.12	5300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5400.00	0.00	84.12	5400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5500.00	0.00	84.12	5500.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5600.00	0.00	84.12	5600.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5700.00	0.00	84.12	5700.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5800.00	0.00	84.12	5800.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	5900.00	0.00	84.12	5900.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	6000.00	0.00	84.12	6000.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	6100.00	0.00	84.12	6100.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	6200.00	0.00	84.12	6200.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	6300.00	0.00	84.12	6300.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98
	6400.00	0.00	84.12	6400.00	0.00	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.17	W 103 47 42.98

Comments	MD		Azim	MD To	EQU Freq	Hole Size	Casing Diameter	Survey Tool Type	Borehole / Survey	Survey Error Model:	Survey Type:	Description
	MD	Inc										
KOP Build @ 12"	6500.00	84.12	6500.00	0.00	0.00	0.00	0.00	0.00	0.00	ISOWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma	Def Plan	
	6600.00	84.12	6600.00	0.00	0.00	0.00	0.00	0.00	0.00			
DLS	6700.00	84.12	6700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	6800.00	84.12	6800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Landing Point/Turn @ 2' DLS	6900.00	84.12	6900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	7000.00	84.12	7000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Hold	7100.00	84.12	7100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	7200.00	84.12	7200.00	0.00	0.00	0.00	0.00	0.00	0.00			
COG Lusk Deep Unit #30H PBLH	7300.00	84.12	7300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	7400.00	84.12	7400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	7500.00	84.12	7500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	7600.00	84.12	7600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	7700.00	84.12	7700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	7800.00	84.12	7800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	7900.00	84.12	7900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	8000.00	84.12	8000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	8100.00	84.12	8100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	8200.00	84.12	8200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	8300.00	84.12	8300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	8400.00	84.12	8400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	8500.00	84.12	8500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	8600.00	84.12	8600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	8700.00	84.12	8700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	8800.00	84.12	8800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	8900.00	84.12	8900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	9000.00	84.12	9000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	9100.00	84.12	9100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	9200.00	84.12	9200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	9300.00	84.12	9300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	9400.00	84.12	9400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	9500.00	84.12	9500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	9600.00	84.12	9600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	9700.00	84.12	9700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	9800.00	84.12	9800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	9900.00	84.12	9900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	10000.00	84.12	10000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	10100.00	84.12	10100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	10200.00	84.12	10200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	10300.00	84.12	10300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	10400.00	84.12	10400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	10500.00	84.12	10500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	10600.00	84.12	10600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	10700.00	84.12	10700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	10800.00	84.12	10800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	10900.00	84.12	10900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	11000.00	84.12	11000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	11100.00	84.12	11100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	11200.00	84.12	11200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	11300.00	84.12	11300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	11400.00	84.12	11400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	11500.00	84.12	11500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	11600.00	84.12	11600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	11700.00	84.12	11700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	11800.00	84.12	11800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	11900.00	84.12	11900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	12000.00	84.12	12000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	12100.00	84.12	12100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	12200.00	84.12	12200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	12300.00	84.12	12300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	12400.00	84.12	12400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	12500.00	84.12	12500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	12600.00	84.12	12600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	12700.00	84.12	12700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	12800.00	84.12	12800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	12900.00	84.12	12900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	13000.00	84.12	13000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	13100.00	84.12	13100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	13200.00	84.12	13200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	13300.00	84.12	13300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	13400.00	84.12	13400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	13500.00	84.12	13500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	13600.00	84.12	13600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	13700.00	84.12	13700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	13800.00	84.12	13800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	13900.00	84.12	13900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	14000.00	84.12	14000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	14100.00	84.12	14100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	14200.00	84.12	14200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	14300.00	84.12	14300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	14400.00	84.12	14400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	14500.00	84.12	14500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	14600.00	84.12	14600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	14700.00	84.12	14700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	14800.00	84.12	14800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	14900.00	84.12	14900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	15000.00	84.12	15000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	15100.00	84.12	15100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	15200.00	84.12	15200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	15300.00	84.12	15300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	15400.00	84.12	15400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	15500.00	84.12	15500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	15600.00	84.12	15600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	15700.00	84.12	15700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	15800.00	84.12	15800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	15900.00	84.12	15900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	16000.00	84.12	16000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	16100.00	84.12	16100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	16200.00	84.12	16200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	16300.00	84.12	16300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	16400.00	84.12	16400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	16500.00	84.12	16500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	16600.00	84.12	16600.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	16700.00	84.12	16700.00	0.00	0.00	0.00	0.00	0.00	0.00			
	16800.00	84.12	16800.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	16900.00	84.12	16900.00	0.00	0.00	0.00	0.00	0.00	0.00			
	17000.00	84.12	17000.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Error Model:	17100.00	84.12	17100.00	0.00	0.00	0.00	0.00	0.00	0.00			
	17200.00	84.12	17200.00	0.00	0.00	0.00	0.00	0.00	0.00			
Survey Type:	17300.00	84.12	17300.00	0.00	0.00	0.00	0.00	0.00	0.00			
	17400.00	84.12	17400.00	0.00	0.00	0.00	0.00	0.00	0.00			
Description	17500.00	84.12	17500.00	0.00	0.00	0.00	0.00	0.00	0.00			
	17600.00	84.12	17600.00	0.00	0.00	0.00	0.00	0.00</				

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (%/100ft)	Northing (ftUS)	Easting (ftUS)	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 Lusk Deep Unit #30H Rev0 MDT	
	18.000		13698.149		1/100.000	30.000	30.000	SLB_MWD-STD			Original Borehole / COG Lusk Deep Unit #30H Rev0 MDT	



COG

Rev0

PATHFINDER
A Schlumberger Company

WELL:	COG Lusk Deep Unit #30H	FIELD:	NM Lea County (NAD 27)	STRUCTURE:	Patriot 6
Magnetic Parameters	Dip: 60.448° Mag Dec: 7.601°	Date: April 24, 2013 F5 48629 JnT	Surface Location Lat: N 32 38 22.166 Lon: W 103 47 42.983	NAD27 New Mexico State Plane, Eastern Zone, 125 Feet Northing: 596777.40 BUS Easting: 665628.90 BUS Grid Conv: 0.290° Scale Fact: 0.99994051	Miscellaneous Site: Lusk Deep Unit #30H Plan: Rev0 MDT 24Apr13 TVD Ref: RKB(1381) 3H above 1 Scrip Date: April 24, 2013

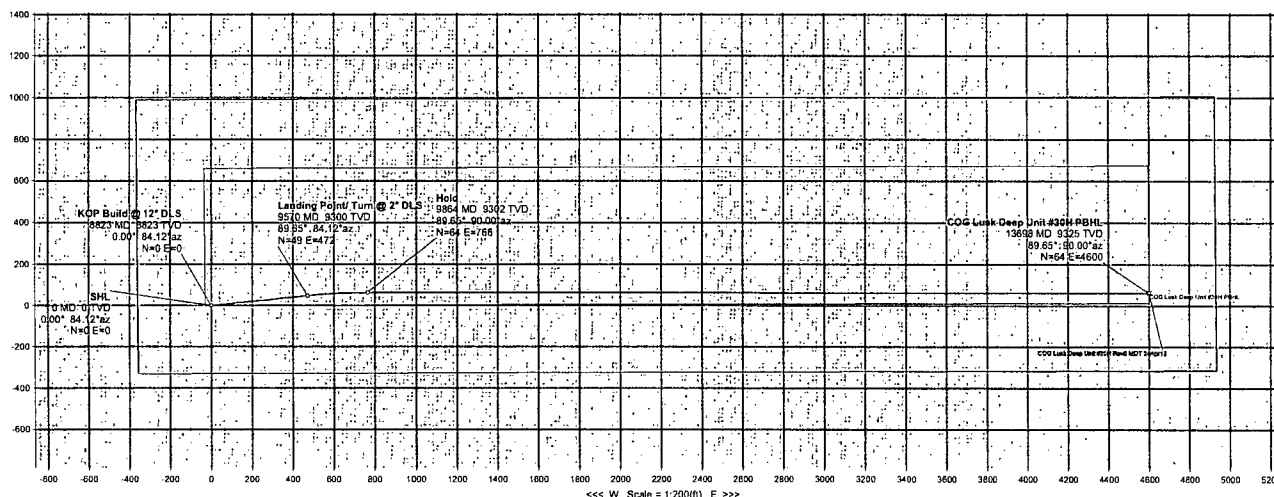
Legend

COG Lusk Deep Unit #30H PBHL
COG Lusk Deep Unit #30H PBHL
COG Lusk Deep Unit #30H PBHL
COG Lusk Deep Unit #30H PBHL



Grid North
Tot Corr (M->G)
7.3105°
Mag Dec (7.601°)
Grid Conv (0.290°)

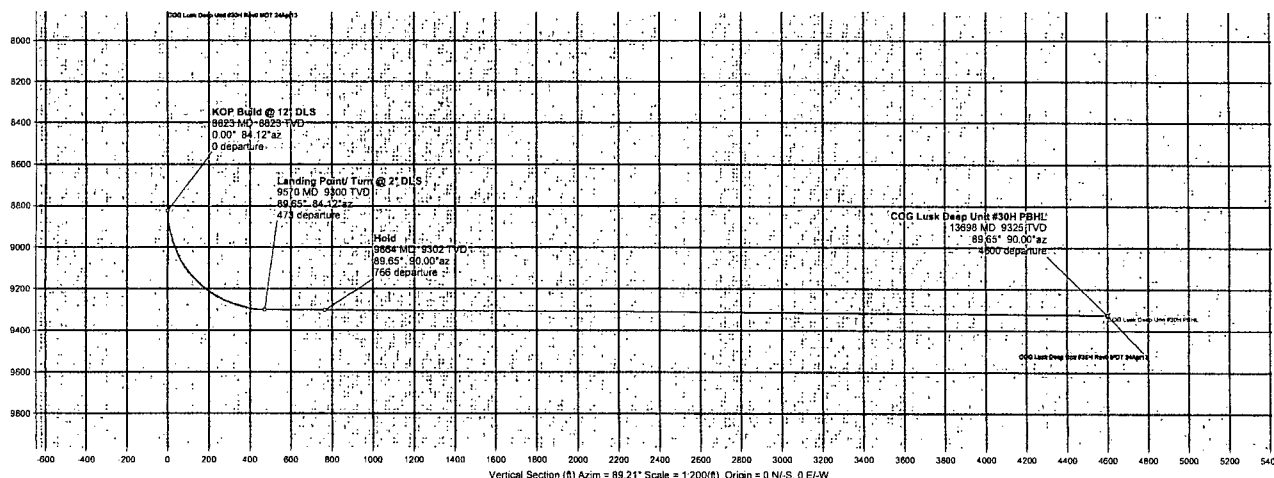
<<< S Scale = 1:200(f) N >>>



<<< W Scale = 1:200(f) E >>>

Comments	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Northing(fUS)	Easting(fUS)	Latitude(deg)	Longitude(deg)	DLS(f/100ft)	Toolface(deg)
SHL	0.00	0.00	84.12	0.00	-3581.30	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.166	W 103 47 42.983	84.12	
KOP Build @ 12° DLS	8822.54	0.00	84.12	8822.54	5241.24	0.00	0.00	0.00	596777.40	665628.90	N 32 38 22.166	W 103 47 42.983	0.00	84.12
Landing Point/ Turn @ 2° DLS	9569.63	89.65	84.12	9300.00	5718.70	472.68	48.62	472.06	596826.01	666100.93	N 32 38 22.623	W 103 47 37.460	12.00	89.99
Hold	9863.69	89.65	90.00	9301.79	5720.49	766.40	63.69	765.59	596841.08	666394.44	N 32 38 22.758	W 103 47 34.026	2.00	0.00
COG Lusk Deep Unit #30H PBHL	13698.15	89.65	90.00	9325.00	5743.70	4600.42	63.60	4599.98	596841.00	670228.60	N 32 38 22.561	W 103 46 49.188	0.00	

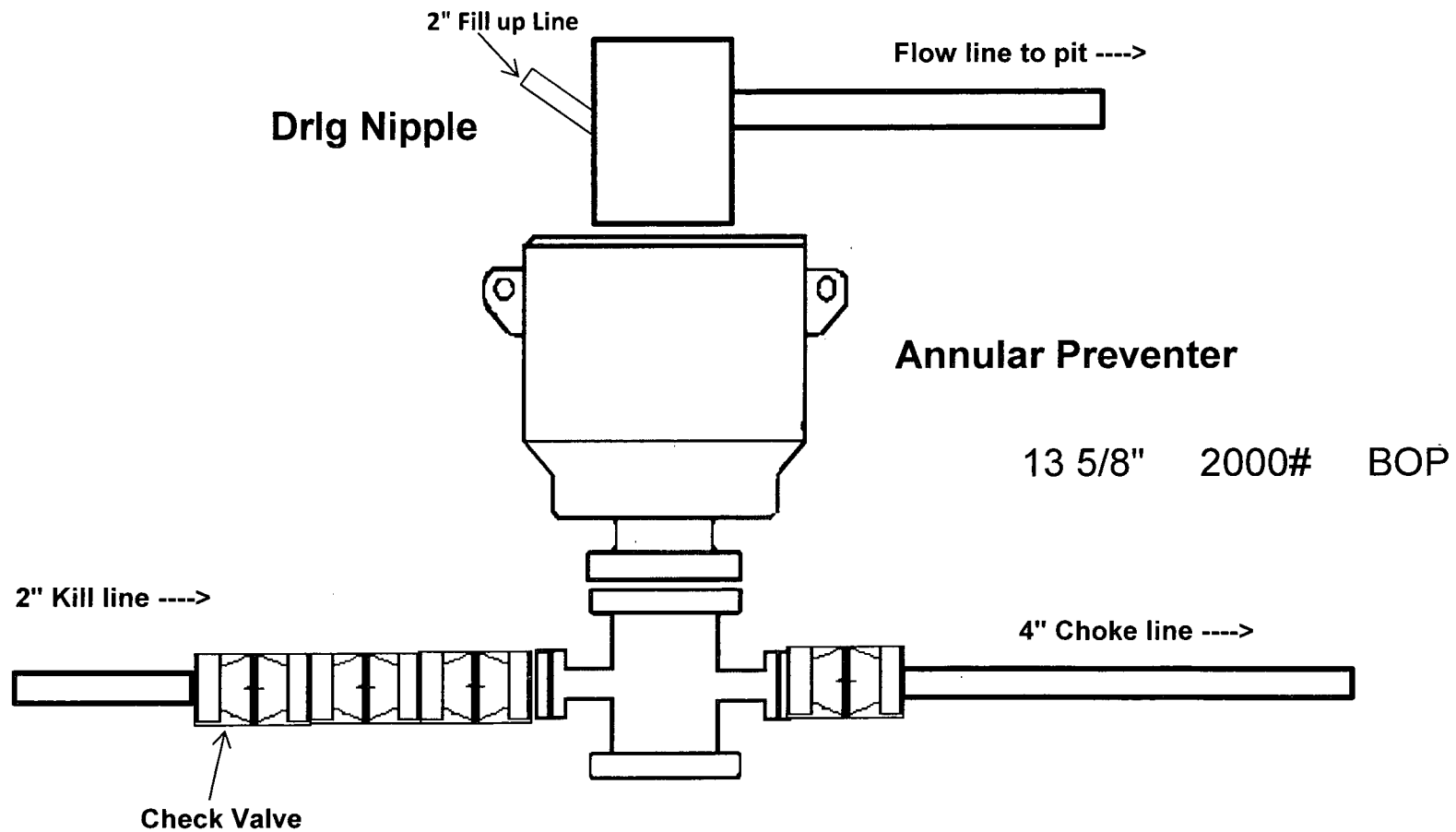
TVD Scale = 1:200(f)



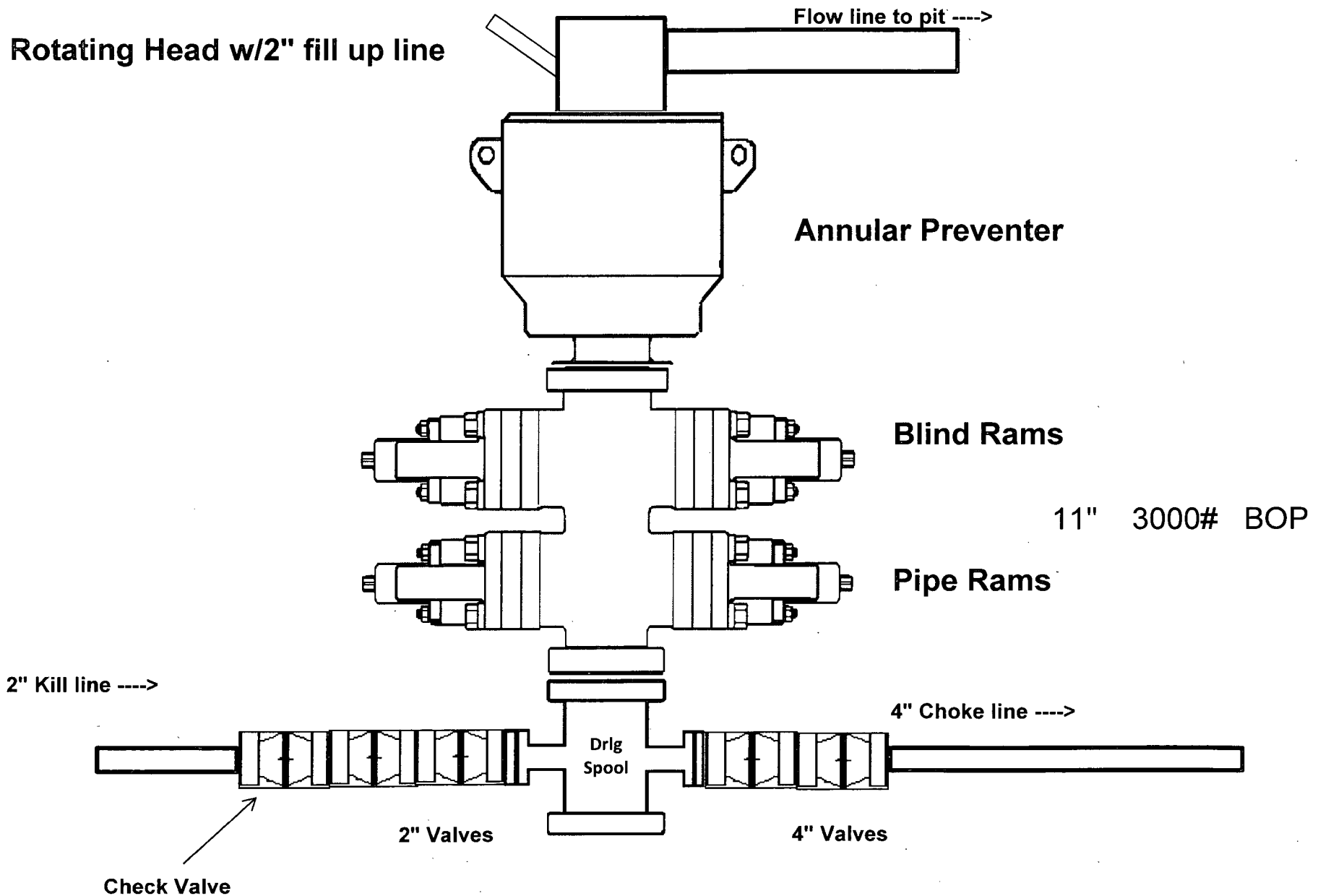
Vertical Section (ft) Azim = 89.21° Scale = 1:200(f) Origin = 0 N/S, 0 E/W

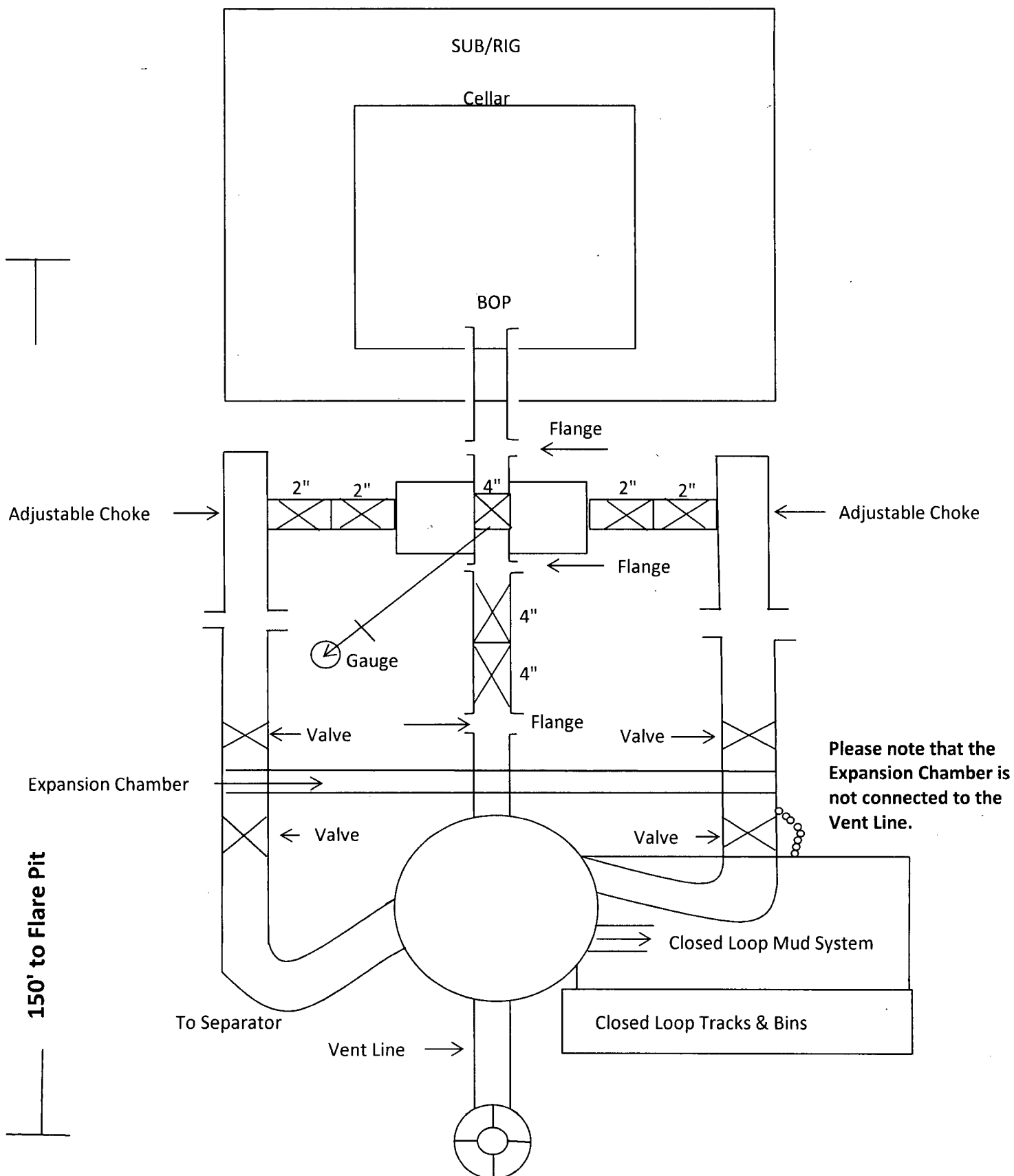
Drawn By: _____
Data Created: _____
Checked By: _____
Checked Date: _____
Approved By: _____

2,000 psi BOP Schematic



3,000 psi BOP Schematic





3M Choke Manifold Equipment

