13-497

Form 3160-3
(March 2012)

OCD Hobbs

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OCD

APPLICATION FOR PERMIT TO DRILL OR REENTER

JUL 23 2013

RECEIVED

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

5. Lease Serial No.
SHL: NMNM0038690
BHL: NMLC64198A

6. If Indian, Allotee or Tribe Name

1a. Type of Work: ☑ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.
Lusk Deep Unit - NMNM70982X

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.
(308167) Lusk Deep Unit A #28H

2. Name of Operator
COG Operating LLC. (229137)

9. API Well No.
30-025-41291

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

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

10. Field and Pool, or Exploratory
(41440) Lusk; Bone Sprimg

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 430' FSL & 330' FWL Lot #4 (SWSW) SHL Sec 18-T19S-R32E
At proposed prod. Zone 380' FSL & 330' FEL Unit Letter P (SESE) BHL Sec 18-T19S-R32E

11. Sec., T.R.M. or Blk and Survey or Area
Sec.18 - T19S - R32E

14. Distance in miles and direction from nearest town or post office*
Approximately 12 miles from Maljamar

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) 330'	16. No. of acres in lease SHL: 121.63 BHL: 160	17. Spacing Unit dedicated to this well 160.82
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 485' BHL: 1091'	19. Proposed Depth TVD: 9250' MD: 13696'	20. BLM/BIA Bond No. on file NMB000740 &NMB00215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3579.0' GL	22. Approximate date work will start* 6/1/2013	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.
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 Mayte Reyes	Name *(Printed/Typed)* Mayte Reyes	Date 4/23/2013
Title Regulatory Analyst		
Approved by *(Signature)* /s/George MacDonell	Name *(Printed/Typed)* /s/George MacDonell	Date JUL 16 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 theron.
APPROVAL FOR TWO YEARS
Conditions of approval, if any, are attached.

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 2)

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

KB 07/26/13

Approval Subject to General Requirements & Special Stipulations Attached

JUL 31 2013

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COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Lusk Deep Unit A 28H
SHL: 430' FSL & 330' FWL
BHL: 380' FSL & 330' FEL
Section 18 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	698'	
Top of Salt	778'	
Base of Salt	2,317'	
Yates	2,559'	
Seven Rivers	2,751'	
Capitan Reef	2,846'	
Delaware	4,556'	Oil
Bone Spring	6,982'	Oil
TD TVD	9,250'	
TD MD	13,696'	

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 800' ~~723'~~ 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 50' above the Capitan Reef.

See COA

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

Hole Size	Depths 800'	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' – ~~723~~'	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' – 4450'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' – 13,696'	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.

- If lost circulation is encountered in the Reef, we will switch to fresh water and notify BLM to witness.

4. Proposed Cement Program

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a. 13-3/8" Surface

Lead: 300 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 / 1.34 cuft/sx)
**Calculated w/50% excess on OH volumes

b. 9 5/8" Intermediate:

See COA

1st Stage:
Lead: 300 sx 35:65:6 C+ Salt+ Gilsonite+ CFR-3+ HR601
(12.7 ppg /1.89 cuft/sx)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
2nd Stage: DVT/ECP @ +/- 2750'
Lead: 575 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx)
Tail: 100 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
**Calculated w/35% excess on OH volumes

c. 5 ½" Production

Lead: 800 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 1.89 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.
- The 9-5/8" intermediate string is designed to circulate to surface.
- The production string will tie back a minimum of 50' above Capitan Reef.

5. Control:

See COA

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 = 4233 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)
See COA 0' – ~~723'~~ 800'	Fresh Water	8.4	29	N.C.
723' – 4,450'	Brine	10	29	N.C.
4,450' – 13,696' (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 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 ½" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached. See COA

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 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. See COA

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.

CONCHO

COG Operating, LLC

Rev0

PATHFINDER
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WELL	FIELD	STRUCTURE
COG Lusk Deep A Unit 28H	NM Lea County (NAD 27)	Patriot 6

Magnetic Parameters				Surface Location				NAD27 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	BGGM 2012	Dip:	60.464°	Lat:	N 32 39 15.557	Northing:	602146.20 ftUS	Grid Conv:	0.281°	Slot:	Lusk Deep A Unit 28H	TVD Ref:	RKB(3978 above)
		Mag Dec:	7.629°	Lon:	W 103 48 45.574	Easting:	660250.40 ftUS	Scale Fact:	0.99993850	Plan:	rev0 mcs 22Feb13	Srvy Date:	February 22, 2013
		Date:	February 22, 2013										
		FS:	48657.4nT										

Legend

COG Lusk Deep A Unit 28H - PBHL
COG Lusk Deep A Unit 28H - Lateral
COG Lusk Deep A Unit 28H - 22Feb13
COG Lusk Deep A Unit 28H Rev0 mcs 22Feb13

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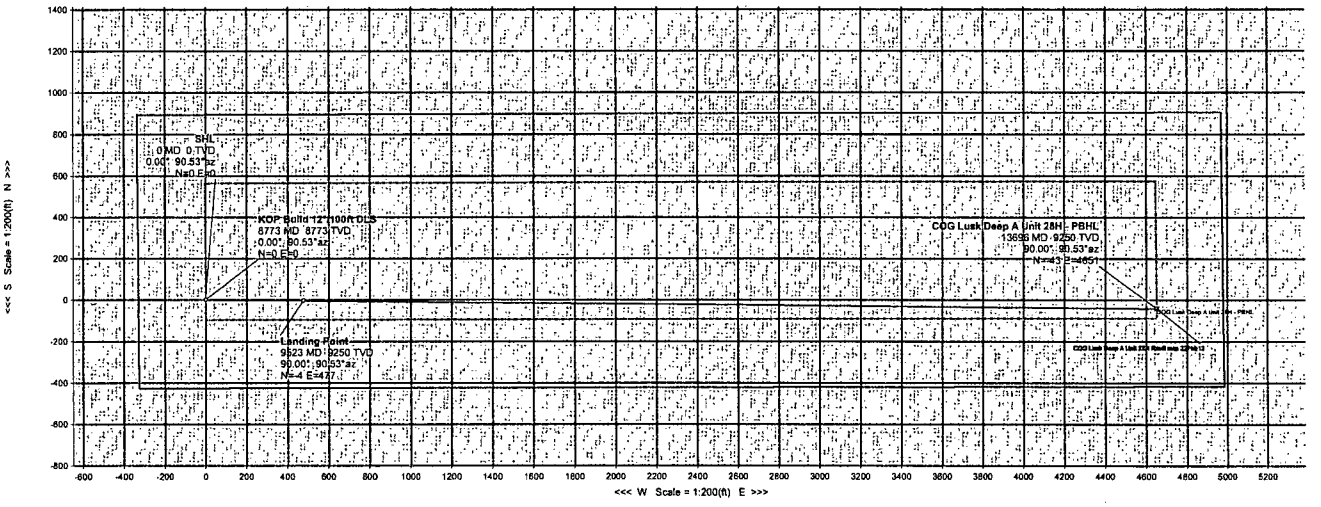
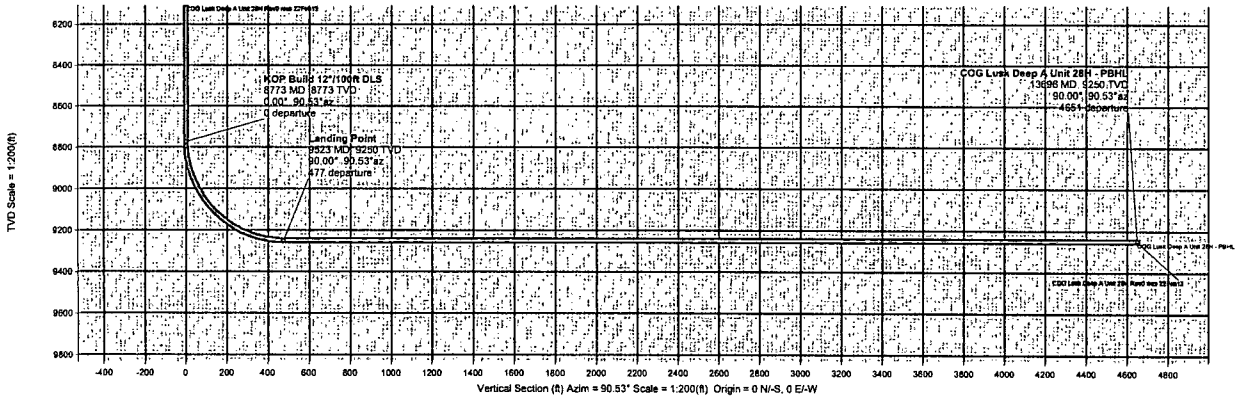
Grid North
Tot Corr (M->G 7.3486°)
Mag Dec (7.629°)
Grid Conv (0.281°)



Comments	Survey MD ft	Inclination deg	Azimuth deg	TVD ft	Sub-Sea TVD	VS ft	NS ft	EW ft	Longitude deg	Latitude deg	Easting ftUS	Northing ftUS	Closure ft	Closure Azimuth deg	DLS (°/100ft)	Tool Face deg
SHL	0.00	0.00	90.53	0.00	-3597.00	0.00	0.00	0.00	W 103 48 45.574	N 32 39 15.557	660250.40	602146.20	0.00	0.00		90.53
KOP Build 12°/100ft DLS	8772.54	0.00	90.53	8772.54	5175.54	0.00	0.00	0.00	W 103 48 45.574	N 32 39 15.557	660250.40	602146.20	0.00	0.00	0.00	90.53
Landing Point	9522.54	90.00	90.53	9250.00	5653.00	477.46	-4.42	477.44	W 103 48 39.990	N 32 39 15.490	660727.81	602141.78	477.46	90.53	12.00	-87.69
COG Lusk Deep A Unit 28H - PBHL	13696.07	90.00	90.53	9250.00	5653.00	4650.99	-42.90	4650.80	W 103 47 51.182	N 32 39 14.903	664900.90	602103.30	4650.99	90.53	0.00	



Drawn By:	Current User
Date Created:	February 26, 2013 03:22:29 PM
Checked By:	
Checked Date:	
Approved By:	
Approved Date:	

COG Lusk Deep A Unit 28H Rev0 mcs 22Feb13 Proposal Geodetic Report

(Def Plan)

Report Date:	February 26, 2013 - 03:27 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG Operating, LLC	**Vertical Section Azimuth:**	90.529 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG Lusk Deep A Unit 28H / COG Lusk Deep A Unit 28H	**TVD Reference Datum:**	RKB
Well:	COG Lusk Deep A Unit 28H	**TVD Reference Elevation:**	3597.000 ft above
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3579.000 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.629 °
Survey Name:	COG Lusk Deep A Unit 28H Rev0 mcs 22Feb13	**Total Gravity Field Strength:**	999.1834 mgn (9.8 based)
Survey Date:	February 22, 2013	**Total Magnetic Field Strength:**	48657.379 nT
Tort / AHD / DDI / ERD Ratio:	90.003 ° / 4650.993 ft / 5.792 / 0.503	**Magnetic Dip Angle:**	60.464 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	February 22, 2013
Location Lat / Long:	N 32° 39' 15.55689", W 103° 48' 45.57365"	**Magnetic Declination Model:**	BGGM 2012
Location Grid N/E Y/X:	N 602146.200 ftUS, E 660250.400 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2809 °	**Grid Convergence Used:**	0.2809 °
Grid Scale Factor:	0.9999385	**Total Corr Mag North->Grid North:**	7.3486 °
		Local Coord Referenced To:	Structure Reference Point

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 ° ' ")
SHL	0.00	0.00	90.53	0.00	0.00	0.00	0.00	N/A	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
KOP Build 12°/100ft DLS	8772.54	0.00	90.53	8772.54	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
Landing Point	9522.54	90.00	90.53	9250.00	477.46	-4.42	477.44	12.00	602141.78	660727.81	N 32 39 15.49	W 103 48 39.99
COG Lusk Deep A Unit 28H - PBHL	13696.07	90.00	90.53	9250.00	4650.99	-42.90	4650.80	0.00	602103.30	664900.90	N 32 39 14.90	W 103 47 51.18

Survey Type: Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	13696.068	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / COG Lusk Deep A Unit 28H Rev0 mcs

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COG Lusk Deep A Unit 28H Rev0 mcs 22Feb13 Proposal Geodetic Report

(Def Plan)

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Report Date:	February 26, 2013 - 03:27 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG Operating, LLC	**Vertical Section Azimuth:**	90.529 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG Lusk Deep A Unit 28H / COG Lusk Deep A Unit 28H	**TVD Reference Datum:**	RKB
Well:	COG Lusk Deep A Unit 28H	**TVD Reference Elevation:**	3597.000 ft above
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3579.000 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.629 °
Survey Name:	COG Lusk Deep A Unit 28H Rev0 mcs 22Feb13	**Total Gravity Field Strength:**	999.1834 mgn (9.8 based)
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Location Grid N/E Y/X:	N 602146.200 ftUS, E 660250.400 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2809 °	**Grid Convergence Used:**	0.2809 °
Grid Scale Factor:	0.9999385	**Total Corr Mag North->Grid North:**	7.3486 °
		Local Coord Referenced To:	Structure Reference Point

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 ° ' ")
SHL	0.00	0.00	90.53	0.00	0.00	0.00	0.00	N/A	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	100.00	0.00	90.53	100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	200.00	0.00	90.53	200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	300.00	0.00	90.53	300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	400.00	0.00	90.53	400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	500.00	0.00	90.53	500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	600.00	0.00	90.53	600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	700.00	0.00	90.53	700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	800.00	0.00	90.53	800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	900.00	0.00	90.53	900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1000.00	0.00	90.53	1000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1100.00	0.00	90.53	1100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1200.00	0.00	90.53	1200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1300.00	0.00	90.53	1300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1400.00	0.00	90.53	1400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1500.00	0.00	90.53	1500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1600.00	0.00	90.53	1600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1700.00	0.00	90.53	1700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1800.00	0.00	90.53	1800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	1900.00	0.00	90.53	1900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2000.00	0.00	90.53	2000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2100.00	0.00	90.53	2100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2200.00	0.00	90.53	2200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2300.00	0.00	90.53	2300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2400.00	0.00	90.53	2400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2500.00	0.00	90.53	2500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2600.00	0.00	90.53	2600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2700.00	0.00	90.53	2700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2800.00	0.00	90.53	2800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	2900.00	0.00	90.53	2900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3000.00	0.00	90.53	3000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3100.00	0.00	90.53	3100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3200.00	0.00	90.53	3200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3300.00	0.00	90.53	3300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3400.00	0.00	90.53	3400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3500.00	0.00	90.53	3500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3600.00	0.00	90.53	3600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3700.00	0.00	90.53	3700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3800.00	0.00	90.53	3800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	3900.00	0.00	90.53	3900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4000.00	0.00	90.53	4000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4100.00	0.00	90.53	4100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4200.00	0.00	90.53	4200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4300.00	0.00	90.53	4300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4400.00	0.00	90.53	4400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4500.00	0.00	90.53	4500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4600.00	0.00	90.53	4600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4700.00	0.00	90.53	4700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4800.00	0.00	90.53	4800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	4900.00	0.00	90.53	4900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5000.00	0.00	90.53	5000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5100.00	0.00	90.53	5100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5200.00	0.00	90.53	5200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5300.00	0.00	90.53	5300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5400.00	0.00	90.53	5400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5500.00	0.00	90.53	5500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5600.00	0.00	90.53	5600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5700.00	0.00	90.53	5700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5800.00	0.00	90.53	5800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	5900.00	0.00	90.53	5900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6000.00	0.00	90.53	6000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6100.00	0.00	90.53	6100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6200.00	0.00	90.53	6200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6300.00	0.00	90.53	6300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6400.00	0.00	90.53	6400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57

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 ° ' ")
	6500.00	0.00	90.53	6500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6600.00	0.00	90.53	6600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6700.00	0.00	90.53	6700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6800.00	0.00	90.53	6800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	6900.00	0.00	90.53	6900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7000.00	0.00	90.53	7000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7100.00	0.00	90.53	7100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7200.00	0.00	90.53	7200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7300.00	0.00	90.53	7300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7400.00	0.00	90.53	7400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7500.00	0.00	90.53	7500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7600.00	0.00	90.53	7600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7700.00	0.00	90.53	7700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7800.00	0.00	90.53	7800.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	7900.00	0.00	90.53	7900.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8000.00	0.00	90.53	8000.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8100.00	0.00	90.53	8100.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8200.00	0.00	90.53	8200.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8300.00	0.00	90.53	8300.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8400.00	0.00	90.53	8400.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8500.00	0.00	90.53	8500.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8600.00	0.00	90.53	8600.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8700.00	0.00	90.53	8700.00	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
KOP Build 12°/100ft DLS	8772.54	0.00	90.53	8772.54	0.00	0.00	0.00	0.00	602146.20	660250.40	N 32 39 15.56	W 103 48 45.57
	8800.00	3.30	90.53	8799.98	0.79	-0.01	0.79	12.00	602146.19	660251.19	N 32 39 15.56	W 103 48 45.56
	8900.00	15.30	90.53	8898.49	16.91	-0.16	16.91	12.00	602146.04	660267.31	N 32 39 15.55	W 103 48 45.38
	9000.00	27.30	90.53	8991.49	53.16	-0.49	53.16	12.00	602145.71	660303.56	N 32 39 15.55	W 103 48 44.95
	9100.00	39.30	90.53	9074.93	107.96	-1.00	107.95	12.00	602145.20	660358.35	N 32 39 15.54	W 103 48 44.31
	9200.00	51.30	90.53	9145.14	178.90	-1.65	178.89	12.00	602144.55	660429.28	N 32 39 15.53	W 103 48 43.48
	9300.00	63.30	90.53	9199.08	262.90	-2.43	262.88	12.00	602143.77	660513.27	N 32 39 15.52	W 103 48 42.50
	9400.00	75.30	90.53	9234.37	356.27	-3.30	356.25	12.00	602142.90	660606.63	N 32 39 15.51	W 103 48 41.41
	9500.00	87.30	90.53	9249.47	454.93	-4.21	454.91	12.00	602141.99	660705.28	N 32 39 15.49	W 103 48 40.25
Landing Point	9522.54	90.00	90.53	9250.00	477.46	-4.42	477.44	12.00	602141.78	660727.81	N 32 39 15.49	W 103 48 39.99
	9600.00	90.00	90.53	9250.00	554.92	-5.13	554.90	0.00	602141.07	660805.27	N 32 39 15.48	W 103 48 39.08
	9700.00	90.00	90.53	9250.00	654.92	-6.06	654.90	0.00	602140.14	660905.26	N 32 39 15.47	W 103 48 37.91
	9800.00	90.00	90.53	9250.00	754.92	-6.98	754.89	0.00	602139.22	661005.24	N 32 39 15.45	W 103 48 36.75
	9900.00	90.00	90.53	9250.00	854.92	-7.91	854.89	0.00	602138.29	661105.23	N 32 39 15.44	W 103 48 35.58
	10000.00	90.00	90.53	9250.00	954.92	-8.83	954.88	0.00	602137.37	661205.22	N 32 39 15.42	W 103 48 34.41
	10100.00	90.00	90.53	9250.00	1054.92	-9.76	1054.88	0.00	602136.44	661305.21	N 32 39 15.41	W 103 48 33.24
	10200.00	90.00	90.53	9250.00	1154.92	-10.68	1154.88	0.00	602135.52	661405.20	N 32 39 15.39	W 103 48 32.07
	10300.00	90.00	90.53	9250.00	1254.92	-11.60	1254.87	0.00	602134.60	661505.19	N 32 39 15.38	W 103 48 30.90
	10400.00	90.00	90.53	9250.00	1354.92	-12.53	1354.87	0.00	602133.67	661605.18	N 32 39 15.37	W 103 48 29.73
	10500.00	90.00	90.53	9250.00	1454.92	-13.45	1454.86	0.00	602132.75	661705.17	N 32 39 15.35	W 103 48 28.56
	10600.00	90.00	90.53	9250.00	1554.92	-14.38	1554.86	0.00	602131.83	661805.16	N 32 39 15.34	W 103 48 27.39
	10700.00	90.00	90.53	9250.00	1654.92	-15.30	1654.85	0.00	602130.90	661905.15	N 32 39 15.32	W 103 48 26.22
	10800.00	90.00	90.53	9250.00	1754.92	-16.22	1754.85	0.00	602129.98	662005.14	N 32 39 15.31	W 103 48 25.05
	10900.00	90.00	90.53	9250.00	1854.92	-17.15	1854.85	0.00	602129.06	662105.13	N 32 39 15.30	W 103 48 23.88
	11000.00	90.00	90.53	9250.00	1954.92	-18.07	1954.84	0.00	602128.13	662205.12	N 32 39 15.28	W 103 48 22.71
	11100.00	90.00	90.53	9250.00	2054.92	-18.99	2054.84	0.00	602127.21	662305.11	N 32 39 15.27	W 103 48 21.54
	11200.00	90.00	90.53	9250.00	2154.92	-19.91	2154.83	0.00	602126.29	662405.10	N 32 39 15.25	W 103 48 20.37
	11300.00	90.00	90.53	9250.00	2254.92	-20.84	2254.83	0.00	602125.36	662505.09	N 32 39 15.24	W 103 48 19.20
	11400.00	90.00	90.53	9250.00	2354.92	-21.76	2354.82	0.00	602124.44	662605.07	N 32 39 15.23	W 103 48 18.03
	11500.00	90.00	90.53	9250.00	2454.92	-22.68	2454.82	0.00	602123.52	662705.06	N 32 39 15.21	W 103 48 16.86
	11600.00	90.00	90.53	9250.00	2554.92	-23.60	2554.82	0.00	602122.60	662805.05	N 32 39 15.20	W 103 48 15.69
	11700.00	90.00	90.53	9250.00	2654.92	-24.53	2654.81	0.00	602121.68	662905.04	N 32 39 15.18	W 103 48 14.53
	11800.00	90.00	90.53	9250.00	2754.92	-25.45	2754.81	0.00	602120.75	663005.03	N 32 39 15.17	W 103 48 13.36
	11900.00	90.00	90.53	9250.00	2854.92	-26.37	2854.80	0.00	602119.83	663105.02	N 32 39 15.16	W 103 48 12.19
	12000.00	90.00	90.53	9250.00	2954.92	-27.29	2954.80	0.00	602118.91	663205.01	N 32 39 15.14	W 103 48 11.02
	12100.00	90.00	90.53	9250.00	3054.92	-28.21	3054.79	0.00	602117.99	663305.00	N 32 39 15.13	W 103 48 9.85
	12200.00	90.00	90.53	9250.00	3154.92	-29.13	3154.79	0.00	602117.07	663404.99	N 32 39 15.11	W 103 48 8.68
	12300.00	90.00	90.53	9250.00	3254.92	-30.06	3254.79	0.00	602116.15	663504.98	N 32 39 15.10	W 103 48 7.51
	12400.00	90.00	90.53	9250.00	3354.92	-30.98	3354.78	0.00	602115.23	663604.97	N 32 39 15.09	W 103 48 6.34
	12500.00	90.00	90.53	9250.00	3454.92	-31.90	3454.78	0.00	602114.30	663704.96	N 32 39 15.07	W 103 48 5.17
	12600.00	90.00	90.53	9250.00	3554.92	-32.82	3554.77	0.00	602113.38	663804.95	N 32 39 15.06	W 103 48 4.00
	12700.00	90.00	90.53	9250.00	3654.92	-33.74	3654.77	0.00	602112.46	663904.94	N 32 39 15.04	W 103 48 2.83
	12800.00	90.00	90.53	9250.00	3754.92	-34.66	3754.76	0.00	602111.54	664004.93	N 32 39 15.03	W 103 48 1.66
	12900.00	90.00	90.53	9250.00	3854.92	-35.58	3854.76	0.00	602110.62	664104.92	N 32 39 15.02	W 103 48 0.49
	13000.00	90.00	90.53	9250.00	3954.92	-36.50	3954.76	0.00	602109.70	664204.91	N 32 39 15.00	W 103 47 59.32
	13100.00	90.00	90.53	9250.00	4054.92	-37.42	4054.75	0.00	602108.78	664304.89	N 32 39 14.99	W 103 47 58.15
	13200.00	90.00	90.53	9250.00	4154.92	-38.34	4154.75	0.00	602107.86	664404.88	N 32 39 14.97	W 103 47 56.98
	13300.00	90.00	90.53	9250.00	4254.92	-39.26	4254.74	0.00	602106.94	664504.87	N 32 39 14.96	W 103 47 55.81
	13400.00	90.00	90.53	9250.00	4354.92	-40.18	4354.74	0.00	602106.02	664604.86	N 32 39 14.95	W 103 47 54.64
	13500.00	90.00	90.53	9250.00	4454.92	-41.10	4454.74	0.00	602105.10	664704.85	N 32 39 14.93	W 103 47 53.47
	13600.00	90.00	90.53	9250.00	4554.92	-42.02	4554.73	0.00	602104.18	664804.84	N 32 39 14.92	W 103 47 52.31
COG Lusk Deep A Unit 28H - PBHL	13696.07	90.00	90.53	9250.00	4650.99	-42.90	4650.80	0.00	602103.30	664900.90	N 32 39 14.90	W 103 47 51.18

HOBBS OCD

JUL 2 3 2013

RECEIVED

Survey Type: Def Plan

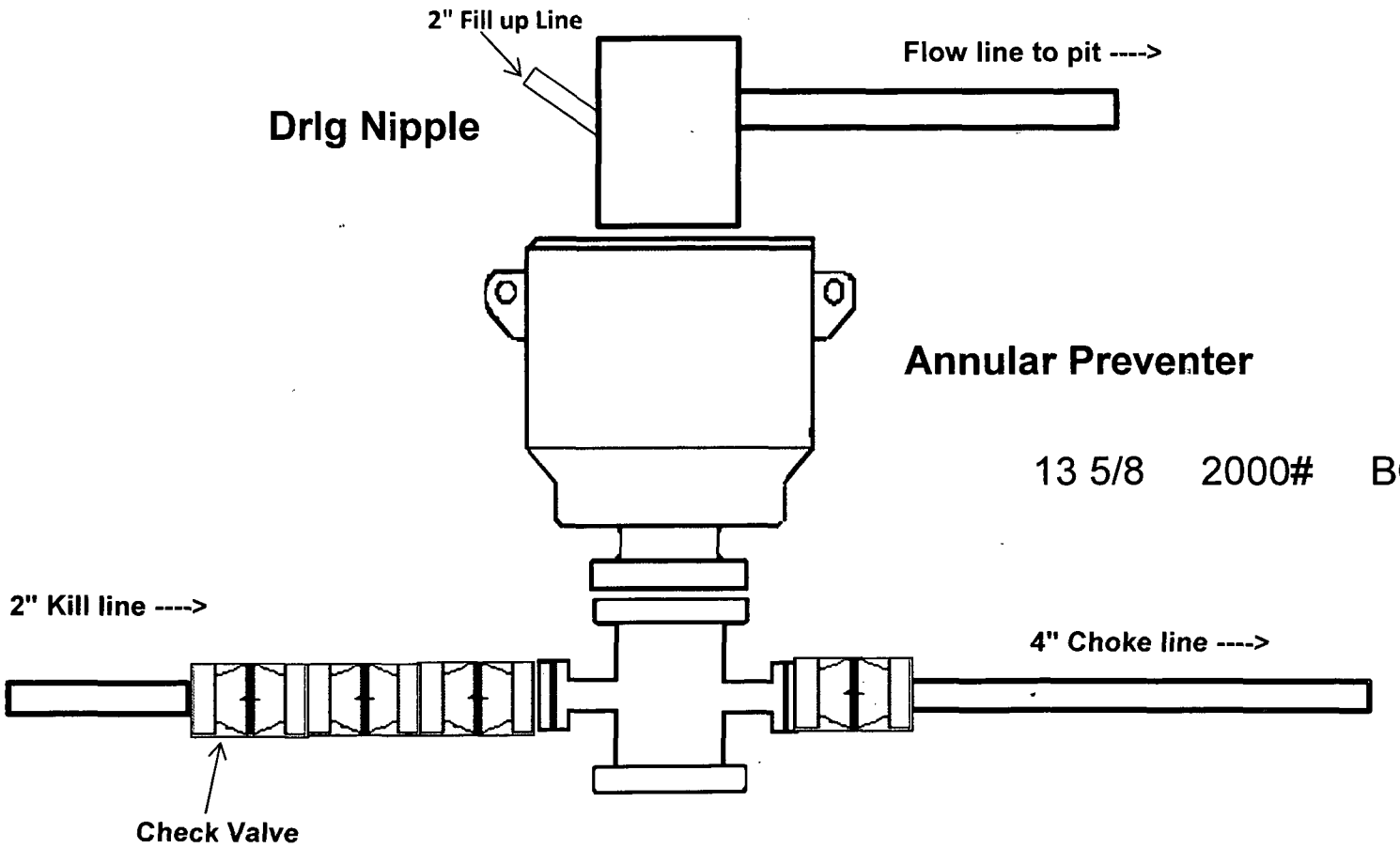
Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

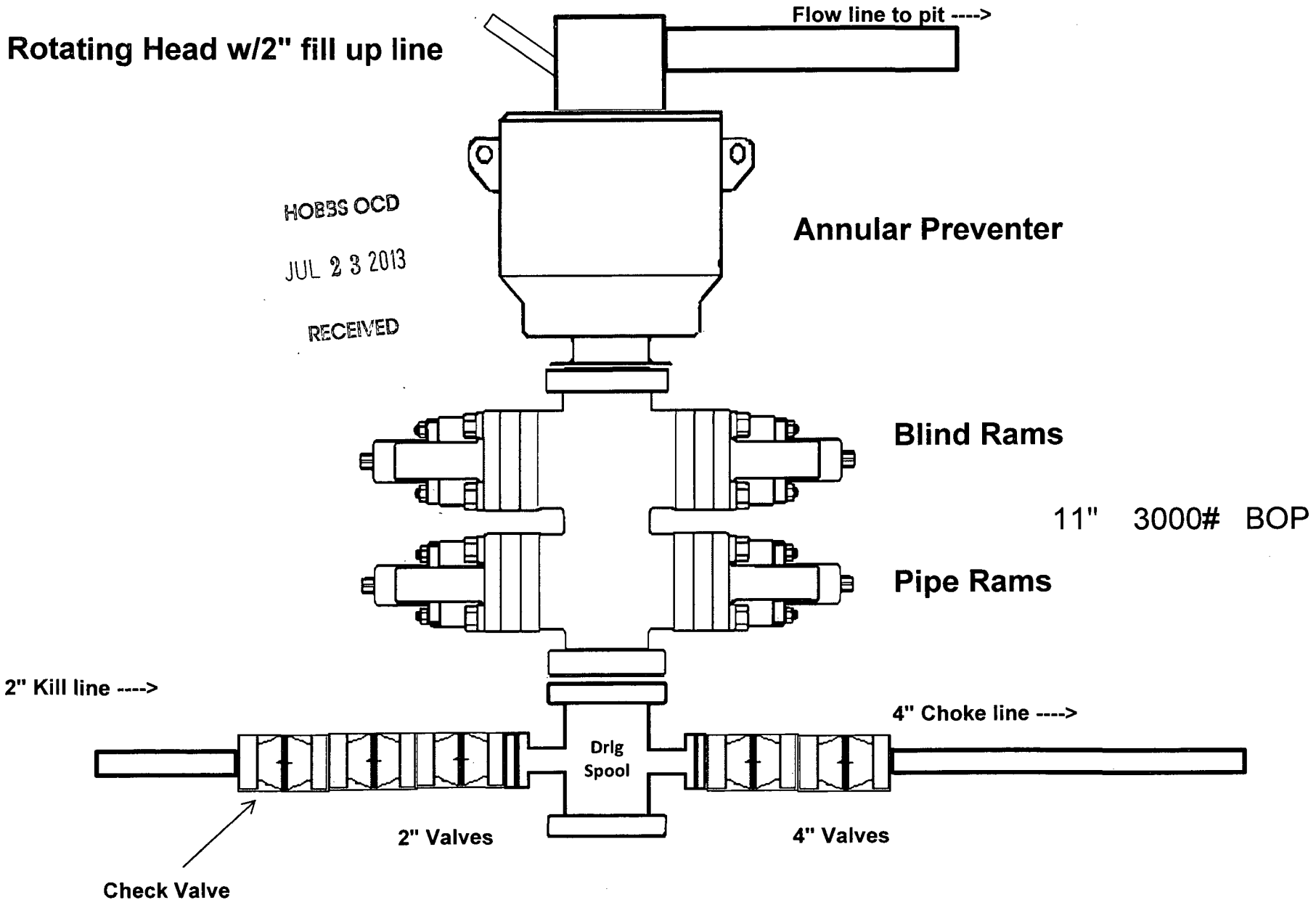
Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.000	1/100.000	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / COG Lusk Deep A Unit 28H Rev0 mcs

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 ° ' ")
		18.000	13696.068		1/100.000	30.000	30.000	SLB_MWD-STD		Original Borehole / COG Lusk Deep A Unit 28H Rev0 mcs		

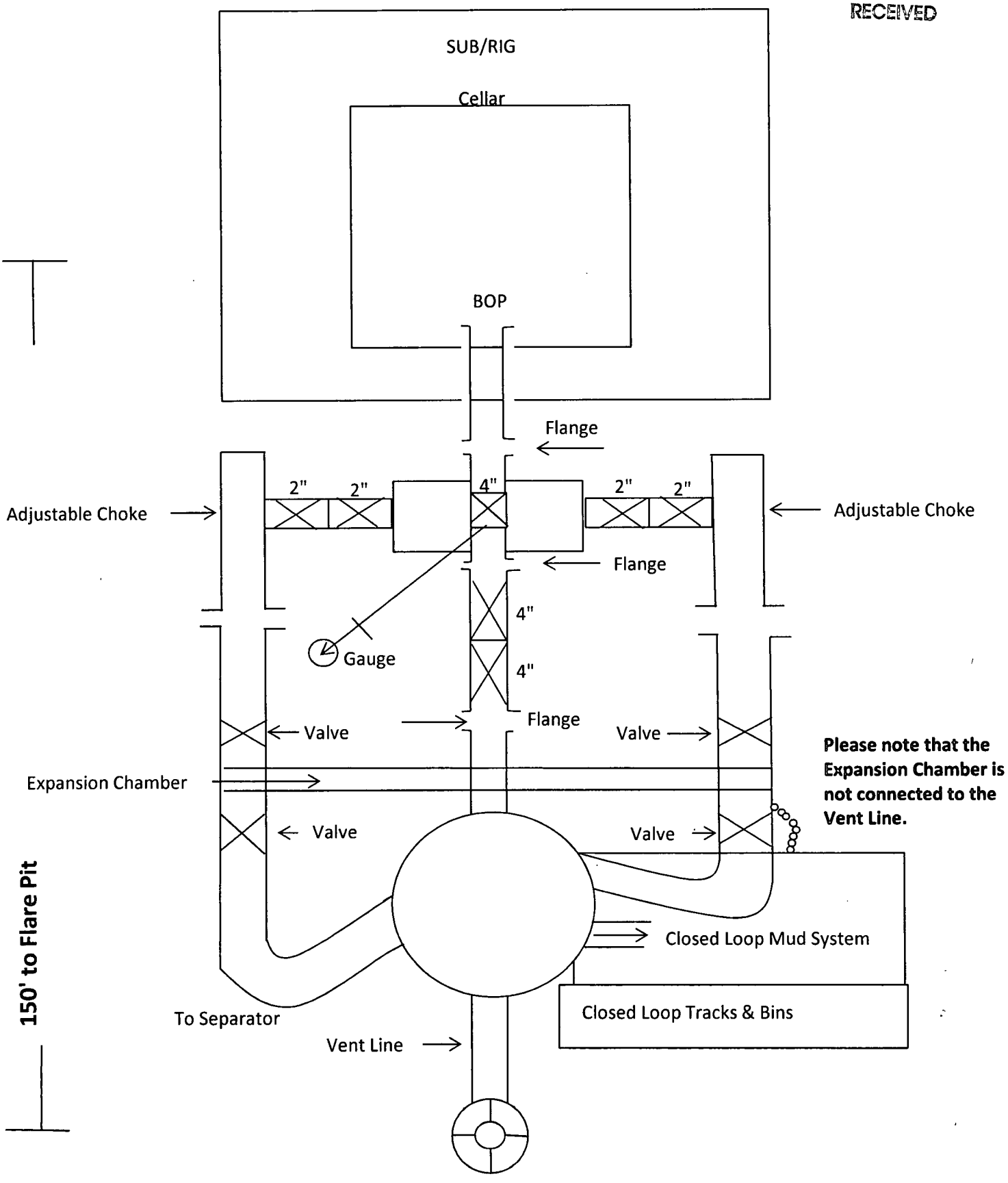
2,000 psi BOP Schematic



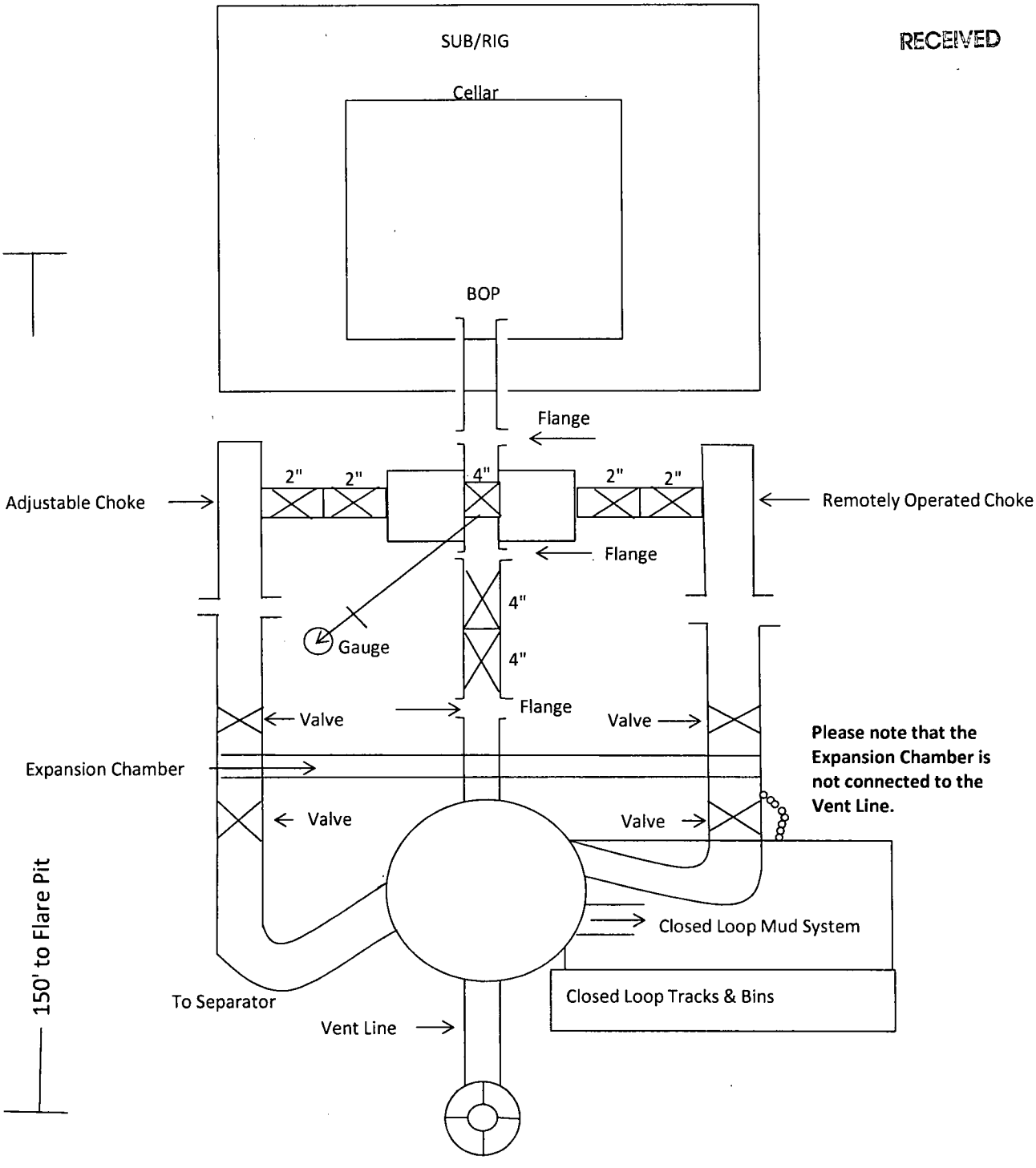
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'

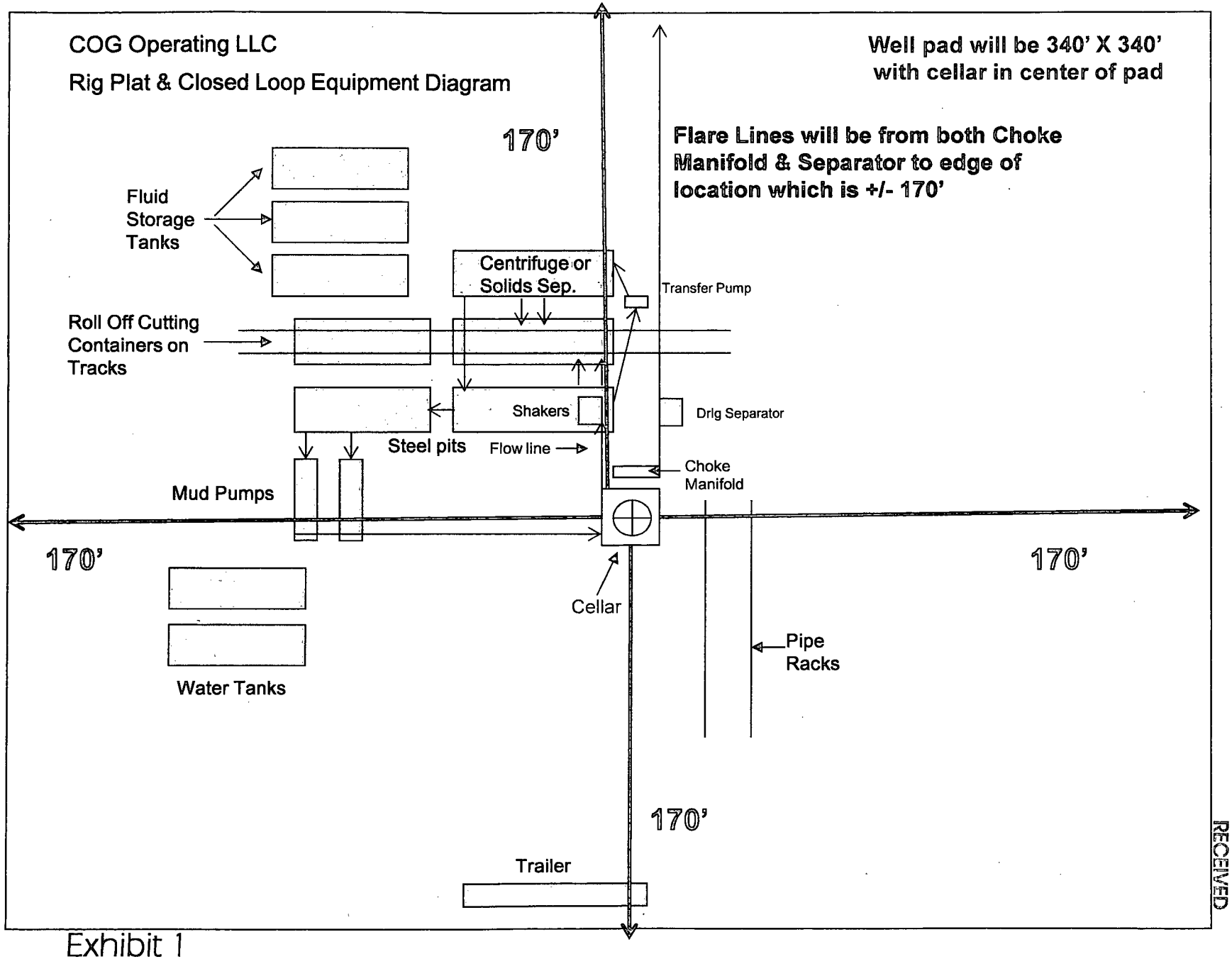


Exhibit 1