ATS-13-710

Form 3160-3
(March 2012)

HOBBS OCD
DEC 17 2013
RECEIVED

OCD Hobbs

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

5. Lease Serial No.
SHL: NMNM0036100, BHL: NMNM0001088
Unit Letter "L": NMNM0001087

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 - NMNM070982X

1b. Type of Well: [✓] Oil Well [ ] Gas Well [ ] Other [✓] Single Zone [ ] Multiple Zone

8. Lease Name and Well No. (308161)
Lusk Deep Unit A #29H

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

9. API Well No.
30-025-41563

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

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

10. Field and Pool, or Exploratory (59475)
Tonto ~~Lusk~~; Bone Spring

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 355' FNL & 660' FWL Unit Letter D (NWNW) SHL Sec 17-T19S-R32E
At proposed prod. Zone 330' FSL & 660' FWL Unit Letter M (SWSW) BHL Sec 17-T19S-R32E

11. Sec., T.R.M. or Blk and Survey or Area
Section 17 - T19S - R32E

14. Distance in miles and direction from nearest town or post office*
Approximately 13 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: 160
UL "L": 280
BHL: 120

17. Spacing Unit dedicated to this well
160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.
SHL: 449' BHL: 1043'
Closest to the wellbore: 330'

19. Proposed Depth
TVD: 1st Lateral: 9,270' 2nd: 8,400'
MD: 1st Lateral: 13,632' 2nd: 12,782'

20. BLM/BIA Bond No. on file
NMB000740 &NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3609.2' GL

22. Approximate date work will start*
11/1/2013

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: 9/20/2013

Title: Regulatory Analyst

Approved by *(Signature)*: /S/ STEPHEN J. CAFFEY
Name *(Printed/Typed)*:
Date: DEC 13 2013

Title: FIELD MANAGER
Office: CARLSBAD FIELD OFFICE

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations theron.
Conditions of approval, if any, are attached.

KZ, 12/19/13 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)

Capitan Controlled Water Basin

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

DEC 30 2013

STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

The undersigned accepts all applicable terms, conditions, stipulations, and restrictions concerning operations conducted on the leased land or portion thereof, as described below:

Date: September 20, 2013

Lease #: SHL: NMNM0036100, Unit Letter "L" NMNM0001087 and
BHL: NMNM0001088
Lusk Deep Unit A #29H

Legal Description: Sec. 17 – T19S – R32E
Lea County, New Mexico

Formation(s): Bone Spring

Bond Coverage: Statewide

BLM Bond File #: NMB000740 & NMB000215

COG OPERATING LLC

Mayte Reyes
Regulatory Analyst

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
Lusk Deep Unit A 29H
SHL: 355' FNL & 660' FWL
BHL: 330' FSL & 660' FWL
Section 17 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	859'	
Top of Salt	937'	
Base of Salt	2,450'	
Yates	2,664'	
Seven Rivers	2,874'	
Capitan Reef	2,967'	
Base of Reef	3,714'	
Delaware	4,626'	Oil
Bone Spring	7,027'	Oil
TD TVD	9,270'	
TD MD	13,632'	
Sidetrack1 TVD	8'400'	
Sidetrack1 MD	12,782'	

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 ~~885~~ 960' and circulating cement back to surface. All intervals will be isolated by setting 7" - 4 ½" tapered casing string to total depth and tying back cement to a minimum of 50' above the Capitan Reef. Sidetrack 1 will be isolated by setting 4-1/2" drop off liner within 40' of window milled in 7".

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

See COA

Hole Size	Depths	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' – ~~885~~ 960'	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' – 4500'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
8 ¾"	0' – 8600'	Production Vertical	7"	New	29#	LTC	P-110	1.125	1.125	1.6
7 7/8"	8600' – 13,632'	Production Curve & Lateral	4 ½"	New	11.6#	LTC	P-110	1.125	1.125	1.6
6 1/8"	7900' – 12,782'	Production Sidetrack 1 Curve & Lateral	4 ½"	New	11.6#	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: 350 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx / 9.2 gal/sk)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx / 6.3 gal/sk)
**Calculated w/50% excess on OH volumes

b. 9 5/8" Intermediate:
1st Stage:
Lead: 200 sx 35:65:6 C+ Salt+ Gilsonite+ CFR-3+ HR601
(12.7 ppg /1.89 cuft/sx / 10.6 gal/sk)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx / 6.3 gal/sk)
2nd Stage: DVT/ECP @ +/- 2850'
Lead: 600 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx / 9.2 gal/sk)
Tail: 100 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx / 6.3 gal/sk)
**Calculated w/35% excess on OH volumes

c. 7" - 4 ½" Production — Lead: 500 sx 35:65:6 H + Salt+Gilsonite+CFR-3+ HR601
(12.7 ppg / 2 cuft/sx / 10.6 gal/sk)
Tail: 1400 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg /1.25 cuft/sx / 6.4 gal/sk)
**Calculated w/35% excess on OH volumes

d. 4 ½" Sidetrack 1 Production Drop Off Liner
Cmt: 250 sx Halliburton Acid Soluble Cement
(15.0 ppg/ 2.6 cuft/sk)
**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 7" - 4 ½" tapered production string will tie back a minimum of 50' above Capitan Reef.
- The 4 ½" drop off liner will be cemented back to the top of the liner.

5. Pressure 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. See COA
Nipple up on 9 5/8" & 7" 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. If H2S is monitored with 100 ppm in the gas stream while drilling intermediate, we will shut in and install a remote operated choke. A retrievable bridge plug will be left in the 7" casing above the window for well control purposes after we finish cementing the 4 ½" drop off liner. This will make the well secure when the drilling rig moves off.

See COA

6. Estimated BHP & BHT:

Lateral TD = 4338 psi
Lateral TD= 148°F
Sidetrack 1 TD= 3931 psi
Sidetrack 1 TD= 141°F

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

See COA

Depth 960'	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – ~~885'~~	Fresh Water	8.4	29	N.C.
~~885'~~ – 4,500'	Brine	10	29	N.C.
4,500' – 13,632' (Lateral)	Cut Brine	8.8 – 9.2	29	N.C.
7,900'–12,782'(Sidetrack1)	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 7" - 4 ½" casing is cemented. Hydrogen Sulfide detection equipment will be in operation after milling out the 7" window until the 4 ½" drop off liner 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 45 days.

LUSK DEEP UNIT A #29H

Deficiencies addressed:

1. Attached is schematic of dual lateral with more details on the drop off liner.

2. Completion plan for the Lusk Deep Unit A #29H:

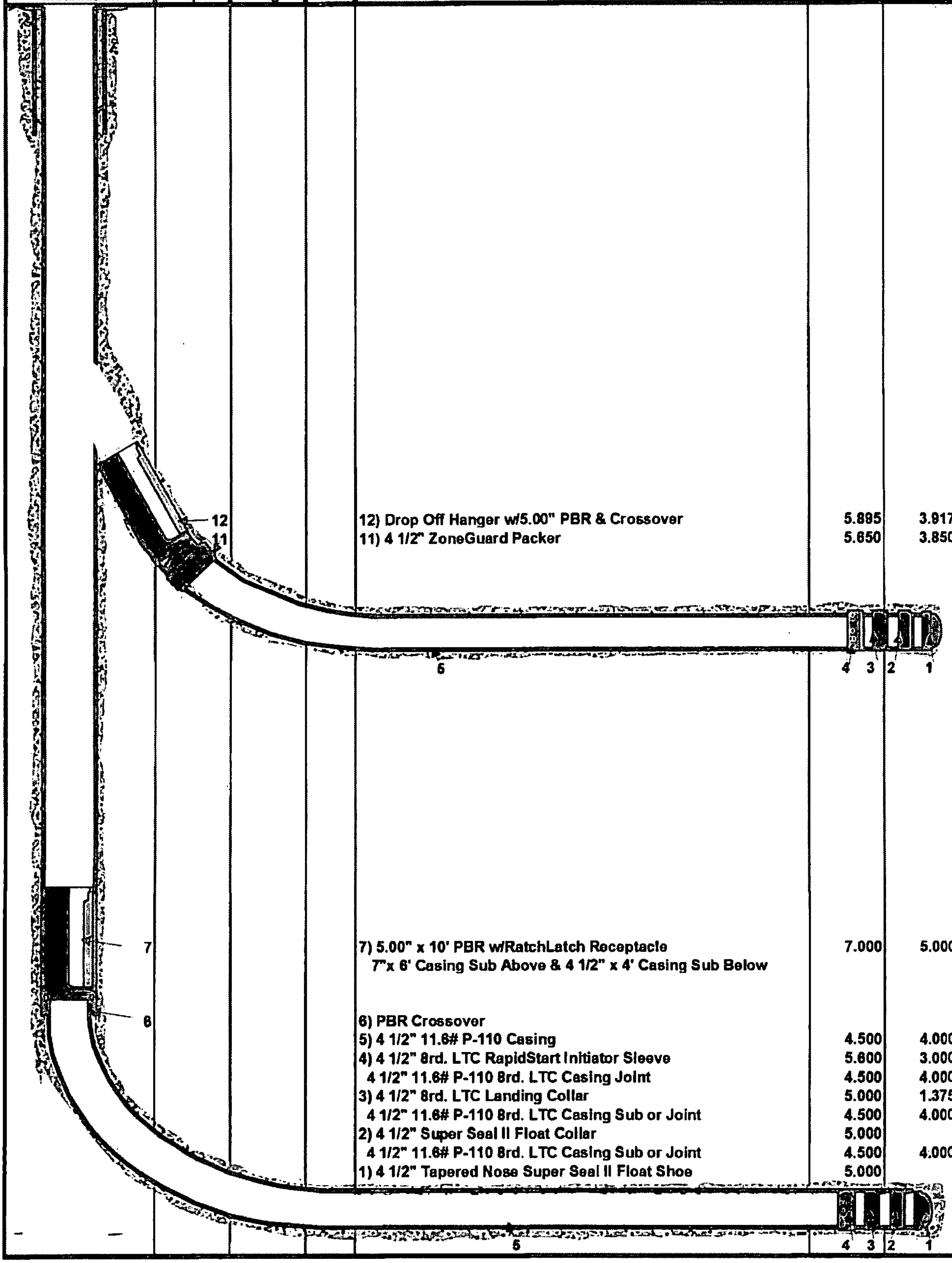
   Will complete the upper lateral in the 1st BSS first. This is accomplished by:
   Running 4-1/2" junction and 7"x4-1/2" packer assembly.
   Frac the upper lateral.
   Flowback and drill out frac plugs (upper lateral is ready to produce but won't until lower lateral is completed).
   Pull 4-1/2" junction and 7'x4-1/2" packer assembly from upper lateral.

   Now complete the lower lateral in the 2nd BSS. This is accomplished by:
   Pull retrievable whipstock.
   Install 4-1/2" straddle assembly to isolate the upper lateral from the lower lateral. This is done with a 4-1/2" seal bore assembly stinging into the 4-1/2" liner PBR, enough 4-1/2" casing to reach above upper lateral window and a 7"x4-1/2" hydraulic set packer.
   Frac the lower lateral.
   Flowback and drill out frac plugs (lower lateral is now ready to produce).
   Pull 4-1/2" straddle assembly.
   Well is now ready for production lift installation.

HALLIBURTON **CONCHO**

Lusk Deep Unit A #29H	Company Rep.	Craig Rohwer
Eddy County New Mexico	Sales Rep.	Lynn Talley
20-Aug-13	Office	432-682-4305

Installation



Installation	Depth	Length	Jts.	Description	OD	ID
				12) Drop Off Hanger w/5.00" PBR & Crossover	5.895	3.917
				11) 4 1/2" ZoneGuard Packer	5.650	3.850
				7) 5.00" x 10' PBR w/RatchLatch Receptacle	7.000	5.000
				7"x 6' Casing Sub Above & 4 1/2" x 4' Casing Sub Below		
				6) PBR Crossover		
				5) 4 1/2" 11.6# P-110 Casing	4.500	4.000
				4) 4 1/2" 8rd. LTC RapidStart Initiator Sleeve	5.600	3.000
				4 1/2" 11.6# P-110 8rd. LTC Casing Joint	4.500	4.000
				3) 4 1/2" 8rd. LTC Landing Collar	5.000	1.375
				4 1/2" 11.6# P-110 8rd. LTC Casing Sub or Joint	4.500	4.000
				2) 4 1/2" Super Seal II Float Collar	5.000	
				4 1/2" 11.6# P-110 8rd. LTC Casing Sub or Joint	4.500	4.000
				1) 4 1/2" Tapered Nose Super Seal II Float Shoe	5.000	

COG Lusk Deep Unit A #29H Rev0 MDT 15Apr13 Proposal Geodetic Report

(Def Plan)

PATHFINDER
A Schlumberger Company

Report Date:	April 15, 2013 - 05:00 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG	**Vertical Section Azimuth:**	179.607 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG Lusk Deep Unit A #29H / COG Lusk Deep Unit A #29H	**TVD Reference Datum:**	RKB
Well:	COG Lusk Deep Unit A #29H	**TVD Reference Elevation:**	3627.200 ft above
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3609.200 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.605 °
Survey Name:	COG Lusk Deep Unit A #29H Rev0 MDT 15Apr13	**Total Gravity Field Strength:**	998.5040mgn (9.80665 Based)
Survey Date:	April 15, 2013	**Total Magnetic Field Strength:**	48648.503 nT
Tort / AHD / DDI / ERD Ratio:	89.583 ° / 4596.590 ft / 5.782 / 0.496	**Magnetic Dip Angle:**	60.474 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	April 15, 2013
Location Lat / Long:	N 32° 39' 59.89566", W 103° 47' 39.69719"	**Magnetic Declination Model:**	BGGM 2012
Location Grid N/E Y/X:	N 606655.000 ftUS, E 665859.700 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2909 °	**Grid Convergence Used:**	0.2909 °
Grid Scale Factor:	0.99994059	**Total Corr Mag North->Grid North:**	7.3144 °
		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	179.61	0.00	0.00	0.00	0.00	N/A	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	100.00	0.00	179.61	100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	200.00	0.00	179.61	200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	300.00	0.00	179.61	300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	400.00	0.00	179.61	400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	500.00	0.00	179.61	500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	600.00	0.00	179.61	600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	700.00	0.00	179.61	700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	800.00	0.00	179.61	800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	900.00	0.00	179.61	900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1000.00	0.00	179.61	1000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1100.00	0.00	179.61	1100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1200.00	0.00	179.61	1200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1300.00	0.00	179.61	1300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1400.00	0.00	179.61	1400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1500.00	0.00	179.61	1500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1600.00	0.00	179.61	1600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1700.00	0.00	179.61	1700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1800.00	0.00	179.61	1800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	1900.00	0.00	179.61	1900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2000.00	0.00	179.61	2000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2100.00	0.00	179.61	2100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2200.00	0.00	179.61	2200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2300.00	0.00	179.61	2300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2400.00	0.00	179.61	2400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2500.00	0.00	179.61	2500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2600.00	0.00	179.61	2600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2700.00	0.00	179.61	2700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2800.00	0.00	179.61	2800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	2900.00	0.00	179.61	2900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3000.00	0.00	179.61	3000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3100.00	0.00	179.61	3100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3200.00	0.00	179.61	3200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3300.00	0.00	179.61	3300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3400.00	0.00	179.61	3400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3500.00	0.00	179.61	3500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3600.00	0.00	179.61	3600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3700.00	0.00	179.61	3700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3800.00	0.00	179.61	3800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	3900.00	0.00	179.61	3900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4000.00	0.00	179.61	4000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4100.00	0.00	179.61	4100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4200.00	0.00	179.61	4200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4300.00	0.00	179.61	4300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4400.00	0.00	179.61	4400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4500.00	0.00	179.61	4500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4600.00	0.00	179.61	4600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4700.00	0.00	179.61	4700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4800.00	0.00	179.61	4800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	4900.00	0.00	179.61	4900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5000.00	0.00	179.61	5000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5100.00	0.00	179.61	5100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5200.00	0.00	179.61	5200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5300.00	0.00	179.61	5300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5400.00	0.00	179.61	5400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5500.00	0.00	179.61	5500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5600.00	0.00	179.61	5600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5700.00	0.00	179.61	5700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5800.00	0.00	179.61	5800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	5900.00	0.00	179.61	5900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6000.00	0.00	179.61	6000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6100.00	0.00	179.61	6100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6200.00	0.00	179.61	6200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6300.00	0.00	179.61	6300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6400.00	0.00	179.61	6400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70

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	179.61	6500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6600.00	0.00	179.61	6600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6700.00	0.00	179.61	6700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6800.00	0.00	179.61	6800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	6900.00	0.00	179.61	6900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7000.00	0.00	179.61	7000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7100.00	0.00	179.61	7100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7200.00	0.00	179.61	7200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7300.00	0.00	179.61	7300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7400.00	0.00	179.61	7400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7500.00	0.00	179.61	7500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7600.00	0.00	179.61	7600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7700.00	0.00	179.61	7700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7800.00	0.00	179.61	7800.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	7900.00	0.00	179.61	7900.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8000.00	0.00	179.61	8000.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8100.00	0.00	179.61	8100.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8200.00	0.00	179.61	8200.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8300.00	0.00	179.61	8300.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8400.00	0.00	179.61	8400.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8500.00	0.00	179.61	8500.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8600.00	0.00	179.61	8600.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8700.00	0.00	179.61	8700.00	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
KOP Build @ 12° DLS	8762.55	0.00	179.61	8762.55	0.00	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8800.00	4.49	179.61	8799.96	1.47	-1.47	0.01	12.00	606653.53	665859.71	N 32 39 59.88	W 103 47 39.70
	8900.00	16.49	179.61	8898.11	19.65	-19.65	0.13	12.00	606635.35	665859.83	N 32 39 59.70	W 103 47 39.70
	9000.00	28.49	179.61	8990.33	57.84	-57.84	0.40	12.00	606597.17	665860.10	N 32 39 59.32	W 103 47 39.70
	9100.00	40.49	179.61	9072.60	114.37	-114.36	0.78	12.00	606540.64	665860.48	N 32 39 58.76	W 103 47 39.69
	9200.00	52.49	179.61	9141.32	186.76	-186.76	1.28	12.00	606468.25	665860.98	N 32 39 58.05	W 103 47 39.69
	9300.00	64.49	179.61	9193.48	271.87	-271.86	1.86	12.00	606383.16	665861.56	N 32 39 57.21	W 103 47 39.69
	9400.00	76.49	179.61	9226.81	365.95	-365.95	2.51	12.00	606289.08	665862.21	N 32 39 56.27	W 103 47 39.69
	9500.00	88.49	179.61	9239.85	464.92	-464.91	3.19	12.00	606190.12	665862.89	N 32 39 55.30	W 103 47 39.69
Landing Point	9509.08	89.58	179.61	9240.00	473.99	-473.98	3.25	12.00	606181.05	665862.95	N 32 39 55.21	W 103 47 39.69
	9600.00	89.58	179.61	9240.66	564.91	-564.90	3.87	0.00	606090.14	665863.57	N 32 39 54.31	W 103 47 39.69
	9700.00	89.58	179.61	9241.39	664.91	-664.89	4.56	0.00	605990.15	665864.26	N 32 39 53.32	W 103 47 39.68
	9800.00	89.58	179.61	9242.12	764.91	-764.89	5.24	0.00	605890.16	665864.94	N 32 39 52.33	W 103 47 39.68
	9900.00	89.58	179.61	9242.85	864.90	-864.88	5.93	0.00	605790.17	665865.63	N 32 39 51.34	W 103 47 39.68
	10000.00	89.58	179.61	9243.57	964.90	-964.88	6.61	0.00	605690.18	665866.31	N 32 39 50.35	W 103 47 39.68
	10100.00	89.58	179.61	9244.30	1064.90	-1064.87	7.30	0.00	605590.19	665867.00	N 32 39 49.36	W 103 47 39.68
	10200.00	89.58	179.61	9245.03	1164.90	-1164.87	7.98	0.00	605490.20	665867.68	N 32 39 48.37	W 103 47 39.67
	10300.00	89.58	179.61	9245.76	1264.89	-1264.86	8.67	0.00	605390.21	665868.37	N 32 39 47.38	W 103 47 39.67
	10400.00	89.58	179.61	9246.48	1364.89	-1364.86	9.35	0.00	605290.22	665869.05	N 32 39 46.39	W 103 47 39.67
	10500.00	89.58	179.61	9247.21	1464.89	-1464.85	10.04	0.00	605190.24	665869.74	N 32 39 45.40	W 103 47 39.67
	10600.00	89.58	179.61	9247.94	1564.89	-1564.85	10.72	0.00	605090.25	665870.42	N 32 39 44.41	W 103 47 39.66
	10700.00	89.58	179.61	9248.67	1664.88	-1664.84	11.41	0.00	604990.26	665871.11	N 32 39 43.42	W 103 47 39.66
	10800.00	89.58	179.61	9249.40	1764.88	-1764.84	12.10	0.00	604890.27	665871.79	N 32 39 42.43	W 103 47 39.66
	10900.00	89.58	179.61	9250.12	1864.88	-1864.83	12.78	0.00	604790.28	665872.48	N 32 39 41.44	W 103 47 39.66
	11000.00	89.58	179.61	9250.85	1964.88	-1964.83	13.47	0.00	604690.29	665873.17	N 32 39 40.45	W 103 47 39.66
	11100.00	89.58	179.61	9251.58	2064.87	-2064.82	14.15	0.00	604590.30	665873.85	N 32 39 39.46	W 103 47 39.65
	11200.00	89.58	179.61	9252.31	2164.87	-2164.82	14.84	0.00	604490.31	665874.54	N 32 39 38.47	W 103 47 39.65
	11300.00	89.58	179.61	9253.03	2264.87	-2264.81	15.52	0.00	604390.32	665875.22	N 32 39 37.49	W 103 47 39.65
	11400.00	89.58	179.61	9253.76	2364.86	-2364.81	16.21	0.00	604290.34	665875.91	N 32 39 36.50	W 103 47 39.65
	11500.00	89.58	179.61	9254.49	2464.86	-2464.80	16.89	0.00	604190.35	665876.59	N 32 39 35.51	W 103 47 39.65
	11600.00	89.58	179.61	9255.22	2564.86	-2564.80	17.58	0.00	604090.36	665877.28	N 32 39 34.52	W 103 47 39.64
	11700.00	89.58	179.61	9255.94	2664.86	-2664.79	18.26	0.00	603990.37	665877.96	N 32 39 33.53	W 103 47 39.64
	11800.00	89.58	179.61	9256.67	2764.85	-2764.79	18.95	0.00	603890.38	665878.65	N 32 39 32.54	W 103 47 39.64
	11900.00	89.58	179.61	9257.40	2864.85	-2864.78	19.63	0.00	603790.39	665879.33	N 32 39 31.55	W 103 47 39.64
	12000.00	89.58	179.61	9258.13	2964.85	-2964.78	20.32	0.00	603690.40	665880.02	N 32 39 30.56	W 103 47 39.64
	12100.00	89.58	179.61	9258.85	3064.85	-3064.77	21.00	0.00	603590.41	665880.70	N 32 39 29.57	W 103 47 39.63
	12200.00	89.58	179.61	9259.58	3164.84	-3164.77	21.69	0.00	603490.43	665881.39	N 32 39 28.58	W 103 47 39.63
	12300.00	89.58	179.61	9260.31	3264.84	-3264.76	22.38	0.00	603390.44	665882.07	N 32 39 27.59	W 103 47 39.63
	12400.00	89.58	179.61	9261.04	3364.84	-3364.76	23.06	0.00	603290.45	665882.76	N 32 39 26.60	W 103 47 39.63
	12500.00	89.58	179.61	9261.76	3464.84	-3464.75	23.75	0.00	603190.46	665883.44	N 32 39 25.61	W 103 47 39.63
	12600.00	89.58	179.61	9262.49	3564.83	-3564.75	24.43	0.00	603090.47	665884.13	N 32 39 24.62	W 103 47 39.62
	12700.00	89.58	179.61	9263.22	3664.83	-3664.74	25.12	0.00	602990.48	665884.81	N 32 39 23.63	W 103 47 39.62
	12800.00	89.58	179.61	9263.95	3764.83	-3764.74	25.80	0.00	602890.49	665885.50	N 32 39 22.64	W 103 47 39.62
	12900.00	89.58	179.61	9264.68	3864.83	-3864.73	26.49	0.00	602790.50	665886.19	N 32 39 21.65	W 103 47 39.62
	13000.00	89.58	179.61	9265.40	3964.82	-3964.73	27.17	0.00	602690.51	665886.87	N 32 39 20.66	W 103 47 39.61
	13100.00	89.58	179.61	9266.13	4064.82	-4064.72	27.86	0.00	602590.53	665887.56	N 32 39 19.68	W 103 47 39.61
	13200.00	89.58	179.61	9266.86	4164.82	-4164.72	28.54	0.00	602490.54	665888.24	N 32 39 18.69	W 103 47 39.61
	13300.00	89.58	179.61	9267.59	4264.81	-4264.71	29.23	0.00	602390.55	665888.93	N 32 39 17.70	W 103 47 39.61
	13400.00	89.58	179.61	9268.31	4364.81	-4364.71	29.91	0.00	602290.56	665889.61	N 32 39 16.71	W 103 47 39.61
	13500.00	89.58	179.61	9269.04	4464.81	-4464.70	30.60	0.00	602190.57	665890.30	N 32 39 15.72	W 103 47 39.60
	13600.00	89.58	179.61	9269.77	4564.81	-4564.70	31.28	0.00	602090.58	665890.98	N 32 39 14.73	W 103 47 39.60
COG Lusk Deep Unit A #29H	13631.78	89.58	179.61	9270.00	4596.59	-4596.48	31.50	0.00	602058.80	665891.20	N 32 39 14.41	W 103 47 39.60

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 Unit A #29H Rev0 MDT
	18.000	13631.784	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / COG Lusk Deep Unit A #29H Rev0 MDT

CONCHO

COG

Rev0

PATHFINDER
A Schlumberger Company

WELL	FIELD	STRUCTURE
COG Lusk Deep Unit A #29H	NM Lea County (NAD 27)	Patriot 6

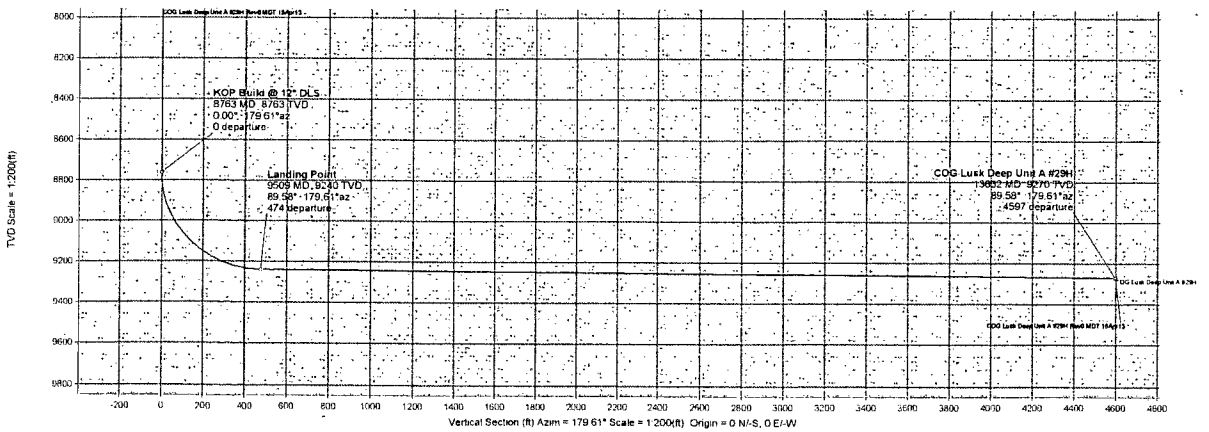
Magnetic Parameters					Surface Location		NAD27 New Mexico State Plane, Eastern Zone, US Feet			Miscellaneous				
Model	IHFR2M 2012	Dip	60.173°	Date	April 15, 2013	Lat	N 32 39 59.896	Northing	606655.00	Slot	Lusk Deep Unit A #29H	TVD Ref	RKB(3627.20 above)	
		Mag Dec	7.605°	FS	996.18 nT	Lon	W 103 47 39.697	Easting	665859.70	Plan	Rev0 MDT 15Apr13	Srvy Date	April 15, 2013	

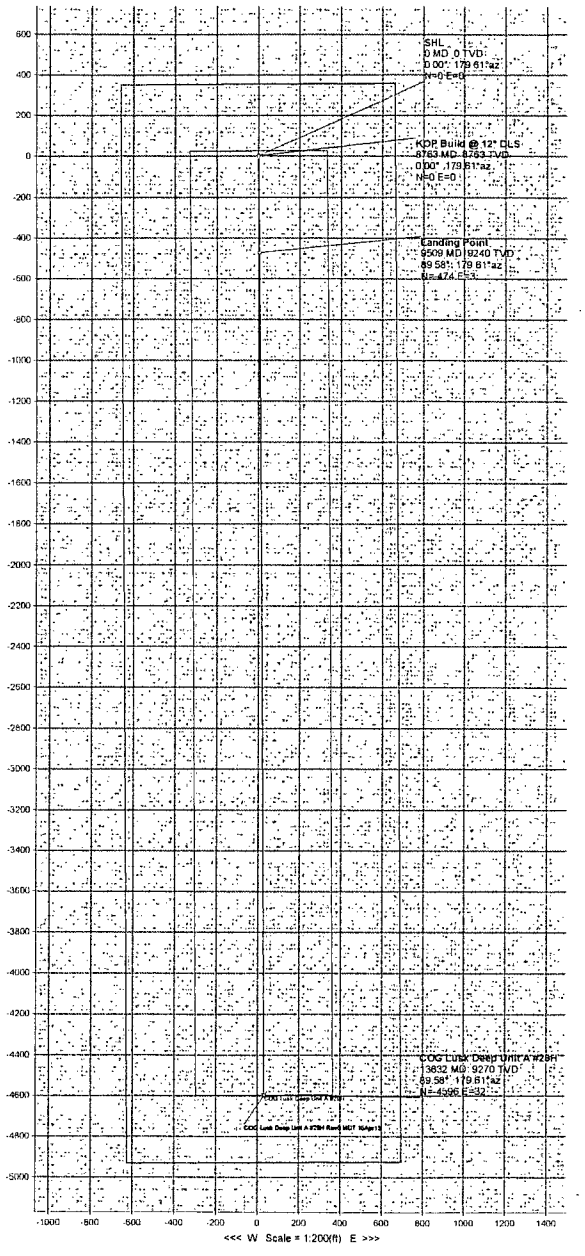
Legend

COG Lusk Deep Unit A #29H SHL Hardline
COG Lusk Deep Unit A #29H
COG Lusk Deep Unit A #29H Landing Point
COG Lusk Deep Unit A #29H Rev0 MDT 15Apr13

Grid North
Tot Corr (M->G 7.3144°)
Mag Dec (7.605°)
Grid Conv (0.291°)

Comments	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Northing(ftUS)	Easting(ftUS)	Latitude(deg)	Longitude(deg)	Closure(ft)	Closure Azimuth(deg)	DLS(°/100ft)	Tool Face(deg)
SHL	0.00	0.00	179.61	0.00	-3627.20	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.896	W 103 47 39.697	0.00	0.00		179.61
KOP Build @ 12° DLS	8762.55	0.00	179.61	8762.55	5135.35	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.896	W 103 47 39.697	0.00	0.00	0.00	179.61
Landing Point	9509.08	89.58	179.61	9240.00	5612.80	473.99	-473.98	3.25	606181.05	665862.95	N 32 39 55.206	W 103 47 39.687	473.99	179.61	12.00	0.00
COG Lusk Deep Unit A #29H	13631.78	89.58	179.61	9270.00	5642.80	4596.59	-4596.48	31.50	602058.80	665891.20	N 32 39 14.414	W 103 47 39.602	4596.59	179.61	0.00	





Drawn By	Current User
Date Created	April 15, 2013 04:40:44 PM
Checked By	
Checked Date	
Approved By	
Approved Date	

PATHFINDER
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COG Lusk Deep Unit A #29H ST01 Rev1 MDT 11Jul13 Proposal Geodetic Report

(Def Plan)

CONCHO

Report Date:	July 11, 2013 - 01:39 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG	**Vertical Section Azimuth:**	179.607 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG Lusk Deep Unit A #29H / COG Lusk Deep Unit A #29H	**TVD Reference Datum:**	RKB
Well:	COG Lusk Deep Unit A #29H	**TVD Reference Elevation:**	3627.200 ft above
Borehole:	ST01	**Seabed / Ground Elevation:**	3609.200 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.578 °
Survey Name:	COG Lusk Deep Unit A #29H ST01 Rev1 MDT 11Jul13	**Total Gravity Field Strength:**	998.5040mgn (9.80665 Based)
Survey Date:	July 11, 2013	**Total Magnetic Field Strength:**	48639.446 nT
Tort / AHD / DDI / ERD Ratio:	89.861 ° / 4596.590 ft / 5.798 / 0.547	**Magnetic Dip Angle:**	60.498 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	July 11, 2013
Location Lat / Long:	N 32° 39' 59.89566", W 103° 47' 39.69719"	**Magnetic Declination Model:**	BGGM 2013
Location Grid N/E Y/X:	N 606655.000 ftUS, E 665859.700 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2909 °	**Grid Convergence Used:**	0.2909 °
Grid Scale Factor:	0.99994059	**Total Corr Mag North->Grid North:**	7.2876 °
		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	179.61	0.00	0.00	0.00	0.00	N/A	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
Tie-In/ Kop build @ 12° DLS	7912.54	0.00	179.61	7912.54	0.00	0.00	0.00	N/A	606655.00	665859.70	N 32 39 59.90	W 103 47 39.70
	8000.00	10.50	179.61	7999.51	7.99	-7.99	0.05	12.00	606647.01	665859.75	N 32 39 59.82	W 103 47 39.70
	8100.00	22.50	179.61	8095.22	36.33	-36.33	0.25	12.00	606618.67	665859.95	N 32 39 59.54	W 103 47 39.70
	8200.00	34.50	179.61	8182.95	83.95	-83.95	0.58	12.00	606571.06	665860.28	N 32 39 59.06	W 103 47 39.70
	8300.00	46.50	179.61	8258.85	148.77	-148.77	1.02	12.00	606506.24	665860.72	N 32 39 58.42	W 103 47 39.69
	8400.00	58.50	179.61	8319.62	227.96	-227.95	1.56	12.00	606427.06	665861.26	N 32 39 57.64	W 103 47 39.69
	8500.00	70.50	179.61	8362.60	318.05	-318.04	2.18	12.00	606336.98	665861.88	N 32 39 56.75	W 103 47 39.69
	8600.00	82.50	179.61	8385.91	415.10	-415.09	2.84	12.00	606239.93	665862.54	N 32 39 55.79	W 103 47 39.69
Landing Point	8661.38	89.86	179.61	8390.00	476.31	-476.30	3.26	12.00	606178.73	665862.96	N 32 39 55.18	W 103 47 39.69
	8700.00	89.86	179.61	8390.10	514.92	-514.91	3.53	0.00	606140.12	665863.23	N 32 39 54.80	W 103 47 39.69
	8800.00	89.86	179.61	8390.34	614.92	-614.91	4.21	0.00	606040.13	665863.91	N 32 39 53.81	W 103 47 39.68
	8900.00	89.86	179.61	8390.58	714.92	-714.91	4.90	0.00	605940.14	665864.60	N 32 39 52.82	W 103 47 39.68
	9000.00	89.86	179.61	8390.82	814.92	-814.90	5.58	0.00	605840.15	665865.28	N 32 39 51.83	W 103 47 39.68
	9100.00	89.86	179.61	8391.07	914.92	-914.90	6.27	0.00	605740.15	665865.97	N 32 39 50.84	W 103 47 39.68
	9200.00	89.86	179.61	8391.31	1014.92	-1014.90	6.96	0.00	605640.16	665866.66	N 32 39 49.85	W 103 47 39.68
	9300.00	89.86	179.61	8391.55	1114.92	-1114.90	7.64	0.00	605540.17	665867.34	N 32 39 48.86	W 103 47 39.67
	9400.00	89.86	179.61	8391.80	1214.92	-1214.89	8.33	0.00	605440.18	665868.03	N 32 39 47.87	W 103 47 39.67
	9500.00	89.86	179.61	8392.04	1314.92	-1314.89	9.01	0.00	605340.19	665868.71	N 32 39 46.88	W 103 47 39.67
	9600.00	89.86	179.61	8392.28	1414.92	-1414.89	9.70	0.00	605240.20	665869.40	N 32 39 45.90	W 103 47 39.67
	9700.00	89.86	179.61	8392.52	1514.92	-1514.89	10.38	0.00	605140.21	665870.08	N 32 39 44.91	W 103 47 39.67
	9800.00	89.86	179.61	8392.77	1614.92	-1614.88	11.07	0.00	605040.22	665870.77	N 32 39 43.92	W 103 47 39.66
	9900.00	89.86	179.61	8393.01	1714.92	-1714.88	11.75	0.00	604940.22	665871.45	N 32 39 42.93	W 103 47 39.66
	10000.00	89.86	179.61	8393.25	1814.92	-1814.88	12.44	0.00	604840.23	665872.14	N 32 39 41.94	W 103 47 39.66
	10100.00	89.86	179.61	8393.49	1914.92	-1914.88	13.12	0.00	604740.24	665872.82	N 32 39 40.95	W 103 47 39.66
	10200.00	89.86	179.61	8393.74	2014.92	-2014.87	13.81	0.00	604640.25	665873.51	N 32 39 39.96	W 103 47 39.66
	10300.00	89.86	179.61	8393.98	2114.92	-2114.87	14.49	0.00	604540.26	665874.19	N 32 39 38.97	W 103 47 39.65
	10400.00	89.86	179.61	8394.22	2214.92	-2214.87	15.18	0.00	604440.27	665874.88	N 32 39 37.98	W 103 47 39.65
	10500.00	89.86	179.61	8394.46	2314.92	-2314.87	15.86	0.00	604340.28	665875.56	N 32 39 36.99	W 103 47 39.65
	10600.00	89.86	179.61	8394.71	2414.92	-2414.86	16.55	0.00	604240.29	665876.25	N 32 39 36.00	W 103 47 39.65
	10700.00	89.86	179.61	8394.95	2514.92	-2514.86	17.24	0.00	604140.29	665876.93	N 32 39 35.01	W 103 47 39.64
	10800.00	89.86	179.61	8395.19	2614.92	-2614.86	17.92	0.00	604040.30	665877.62	N 32 39 34.02	W 103 47 39.64
	10900.00	89.86	179.61	8395.43	2714.92	-2714.85	18.61	0.00	603940.31	665878.31	N 32 39 33.03	W 103 47 39.64
	11000.00	89.86	179.61	8395.68	2814.92	-2814.85	19.29	0.00	603840.32	665878.99	N 32 39 32.04	W 103 47 39.64
	11100.00	89.86	179.61	8395.92	2914.92	-2914.85	19.98	0.00	603740.33	665879.68	N 32 39 31.05	W 103 47 39.64
	11200.00	89.86	179.61	8396.16	3014.92	-3014.85	20.66	0.00	603640.34	665880.36	N 32 39 30.06	W 103 47 39.63
	11300.00	89.86	179.61	8396.41	3114.92	-3114.84	21.35	0.00	603540.35	665881.05	N 32 39 29.07	W 103 47 39.63
	11400.00	89.86	179.61	8396.65	3214.92	-3214.84	22.03	0.00	603440.36	665881.73	N 32 39 28.08	W 103 47 39.63
	11500.00	89.86	179.61	8396.89	3314.92	-3314.84	22.72	0.00	603340.36	665882.42	N 32 39 27.10	W 103 47 39.63
	11600.00	89.86	179.61	8397.13	3414.92	-3414.84	23.40	0.00	603240.37	665883.10	N 32 39 26.11	W 103 47 39.63
	11700.00	89.86	179.61	8397.38	3514.92	-3514.83	24.09	0.00	603140.38	665883.79	N 32 39 25.12	W 103 47 39.62
	11800.00	89.86	179.61	8397.62	3614.92	-3614.83	24.77	0.00	603040.39	665884.47	N 32 39 24.13	W 103 47 39.62
	11900.00	89.86	179.61	8397.86	3714.92	-3714.83	25.46	0.00	602940.40	665885.16	N 32 39 23.14	W 103 47 39.62
	12000.00	89.86	179.61	8398.10	3814.92	-3814.83	26.14	0.00	602840.41	665885.84	N 32 39 22.15	W 103 47 39.62
	12100.00	89.86	179.61	8398.35	3914.91	-3914.82	26.83	0.00	602740.42	665886.53	N 32 39 21.16	W 103 47 39.62
	12200.00	89.86	179.61	8398.59	4014.91	-4014.82	27.52	0.00	602640.43	665887.21	N 32 39 20.17	W 103 47 39.61
	12300.00	89.86	179.61	8398.83	4114.91	-4114.82	28.20	0.00	602540.44	665887.90	N 32 39 19.18	W 103 47 39.61
	12400.00	89.86	179.61	8399.07	4214.91	-4214.81	28.89	0.00	602440.44	665888.58	N 32 39 18.19	W 103 47 39.61
	12500.00	89.86	179.61	8399.32	4314.91	-4314.81	29.57	0.00	602340.45	665889.27	N 32 39 17.20	W 103 47 39.61
	12600.00	89.86	179.61	8399.56	4414.91	-4414.81	30.26	0.00	602240.46	665889.95	N 32 39 16.21	W 103 47 39.61
	12700.00	89.86	179.61	8399.80	4514.91	-4514.81	30.94	0.00	602140.47	665890.64	N 32 39 15.22	W 103 47 39.60
COG Lusk Deep Unit A 29H ST01 PBHL	12781.68	89.86	179.61	8400.00	4596.59	-4596.48	31.50	0.00	602058.80	665891.20	N 32 39 14.41	W 103 47 39.60

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

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 A #29H Rev0 MDT		
		18.000	7912.540		1/100.000	30.000	30.000	SLB_MWD-STD		Original Borehole / COG Lusk Deep Unit A #29H Rev0 MDT		
		7912.540	12781.677		1/100.000	30.000	30.000	SLB_MWD-STD		ST01 / COG Lusk Deep Unit A #29H ST01 Rev1 MDT 11Jul13		

CONCHO

COG

ST01 Rev1

PATHFINDER
A Schlumberger Company

WELL	FIELD	STRUCTURE
COG Lusk Deep Unit A #29H	NM Lea County (NAD 27)	Patriot 6

Magnetic Parameters
Model: BGGM 2013 | Dip: 60.398° | Date: July 11, 2013 | Mag Dec: 7.578° | FS: 48619.3nT

Surface Location
Lat: N 32 39 59.896 | Northing: 606655.00 (US) | NAD27 New Mexico State Plane, Eastern Zone, US Feet | Grid Conv: 0.291°
Lon: W 103 47 39.697 | Easting: 665859.70 (US) | Scale Factor: 0.99994259

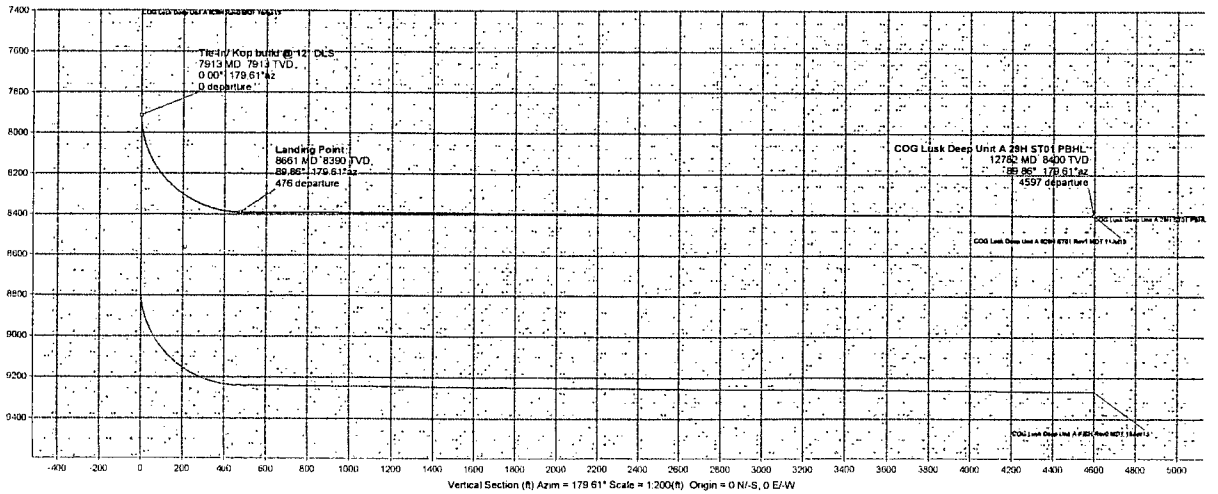
Miscellaneous
Slot: Lusk Deep Unit A #29H | TVD Ref: RKB(3627.28 above) | Plan: ST01 Rev1 MDT 11Jul13 | Survey Date: July 11, 2013

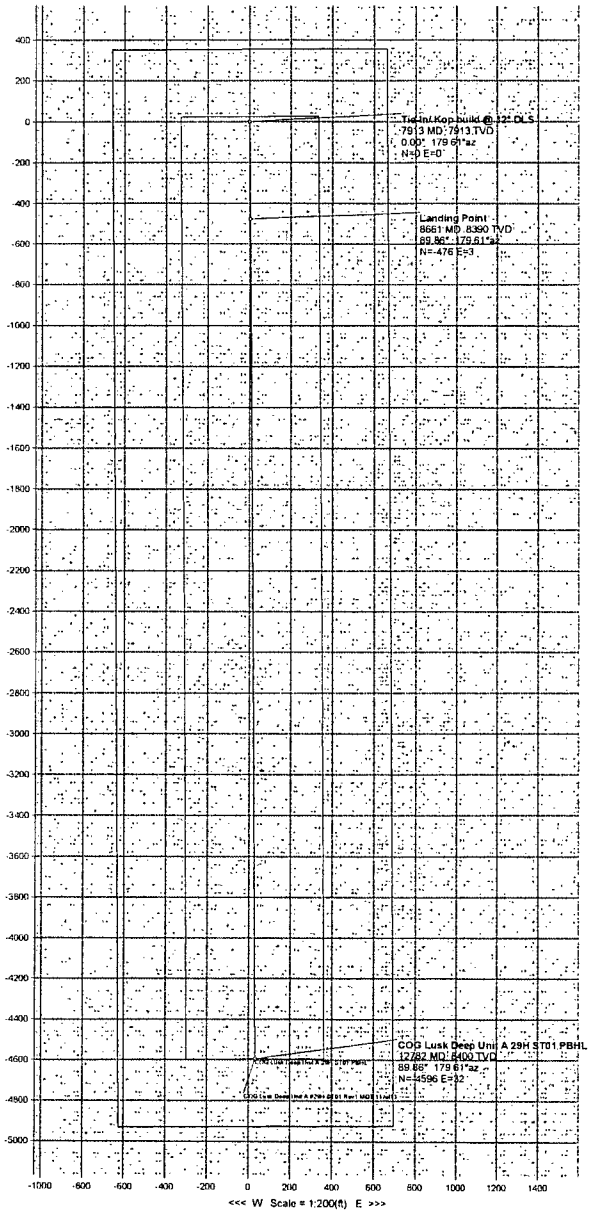
Legend

COG Lusk Deep Unit A #29H 330' Horizon
COG Lusk Deep Unit A #29H ST01 PBHL
COG Lusk Deep Unit A #29H ST01 Lease Line
COG Lusk Deep Unit A #29H ST01 Rev1 MDT 11Jul13
COG Lusk Deep Unit A #29H Rev0 ST01Apr13

Grid North
Tot Corr (M->G 7.2876°)
Mag Dec (7.578°)
Grid Conv (0.291°)

Comments	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Northing(ftUS)	Easting(ftUS)	Latitude(deg)	Longitude(deg)	DLS(°/100ft)	Tool Face(deg)
SHL	0.00	0.00	179.61	0.00	-3627.20	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.896	W 103 47 39.697		179.61
Tie-In/ Kop build @ 12° DLS	7912.54	0.00	179.61	7912.54	4285.34	0.00	0.00	0.00	606655.00	665859.70	N 32 39 59.896	W 103 47 39.697	0.00	179.61
Landing Point	8661.38	89.86	179.61	8390.00	4762.80	476.31	-476.30	3.26	606178.73	665862.96	N 32 39 55.183	W 103 47 39.687	12.00	0.00
COG Lusk Deep Unit A 29H ST01 PBHL	12781.68	89.86	179.61	8400.00	4772.80	4596.59	-4596.48	31.50	602058.80	665891.20	N 32 39 14.414	W 103 47 39.602	0.00	





Drawn By	Current User
Date Created	July 11, 2013 01:07:49 PM
Checked By	
Checked Date	
Approved By	
Approved Date	

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 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-basin Code	County	Q 64	Q 16	Q 4	Sec	Twws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00073		LE	2	4	34	19S	32E		617502	3609301*	575		
CP 00075		LE	2	4	34	19S	32E		617502	3609301*	575		
CP 00639 EXPL		LE	3	1	20	19S	32E		613029	3612880*	350	345	5
CP 00640 EXPL		LE	2	2	19	19S	32E		612621	3613280*	260	102	158

Average Depth to Water: **223 feet**

Minimum Depth: **102 feet**

Maximum Depth: **345 feet**

Record Count: 4

PLSS Search:

Township: 19S **Range:** 32E

***UTM location was derived from PLSS - see Help**

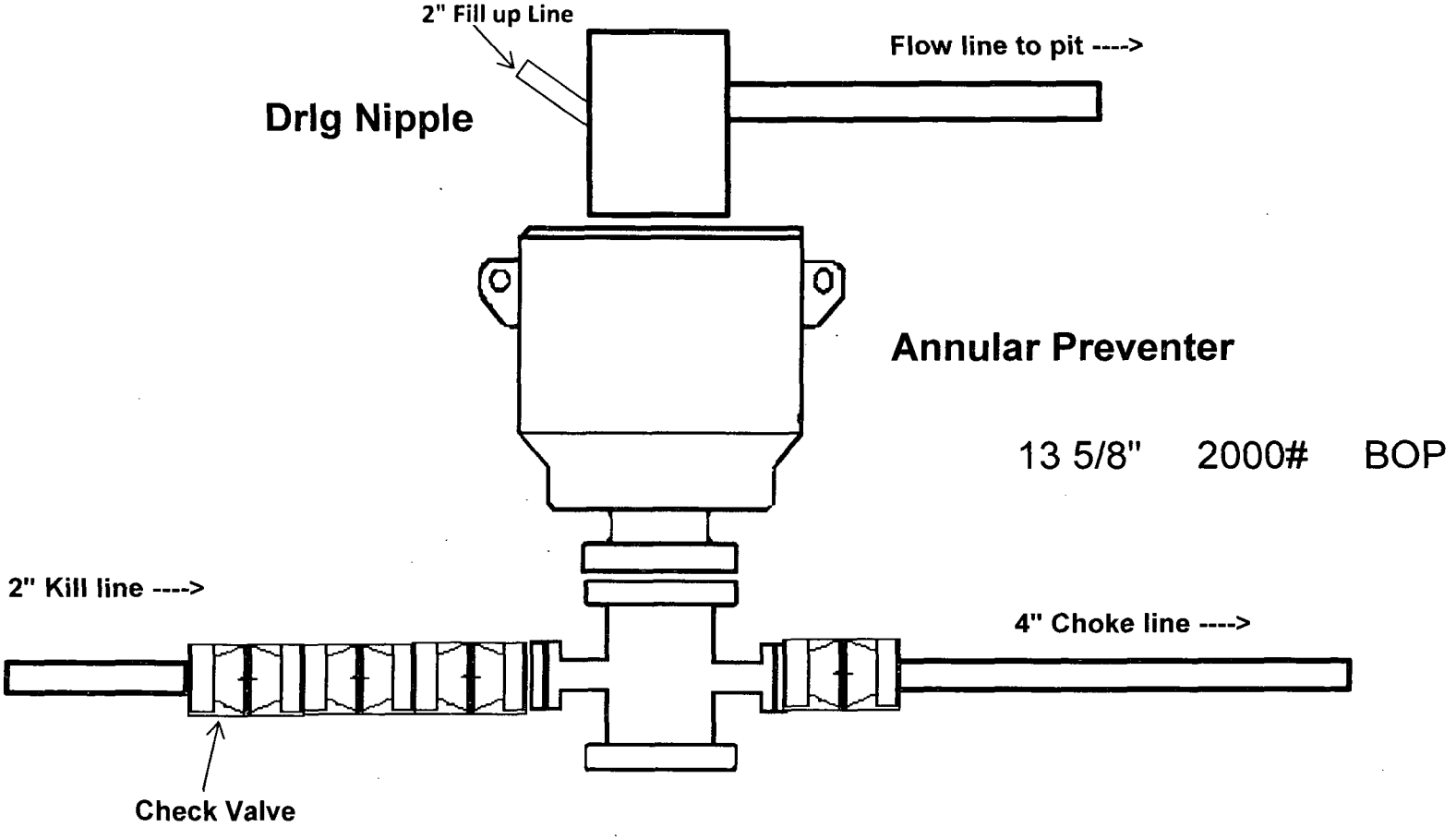
New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

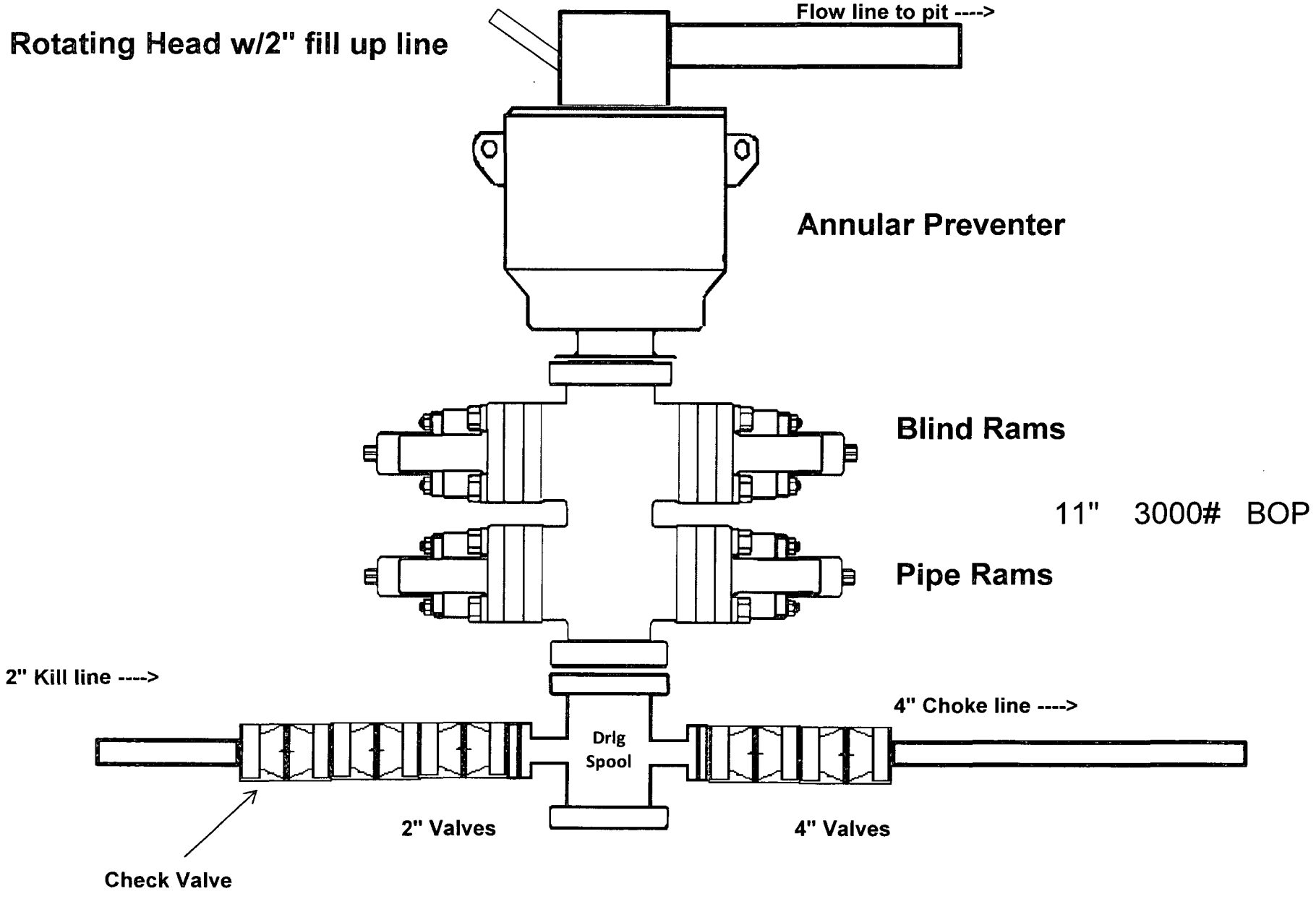
PLSS Search:

Section(s): 17 **Township:** 19S **Range:** 32E

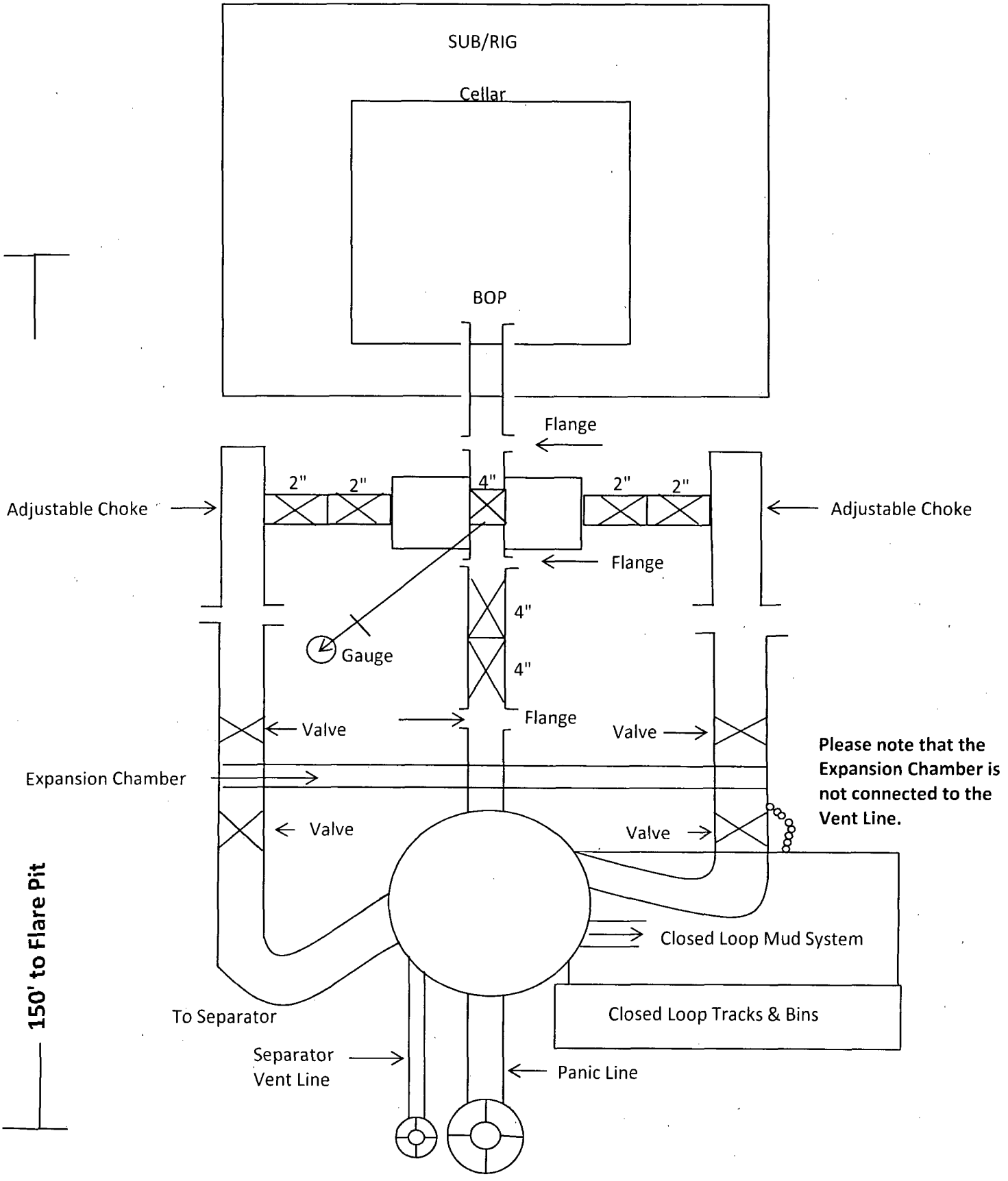
2,000 psi BOP Schematic



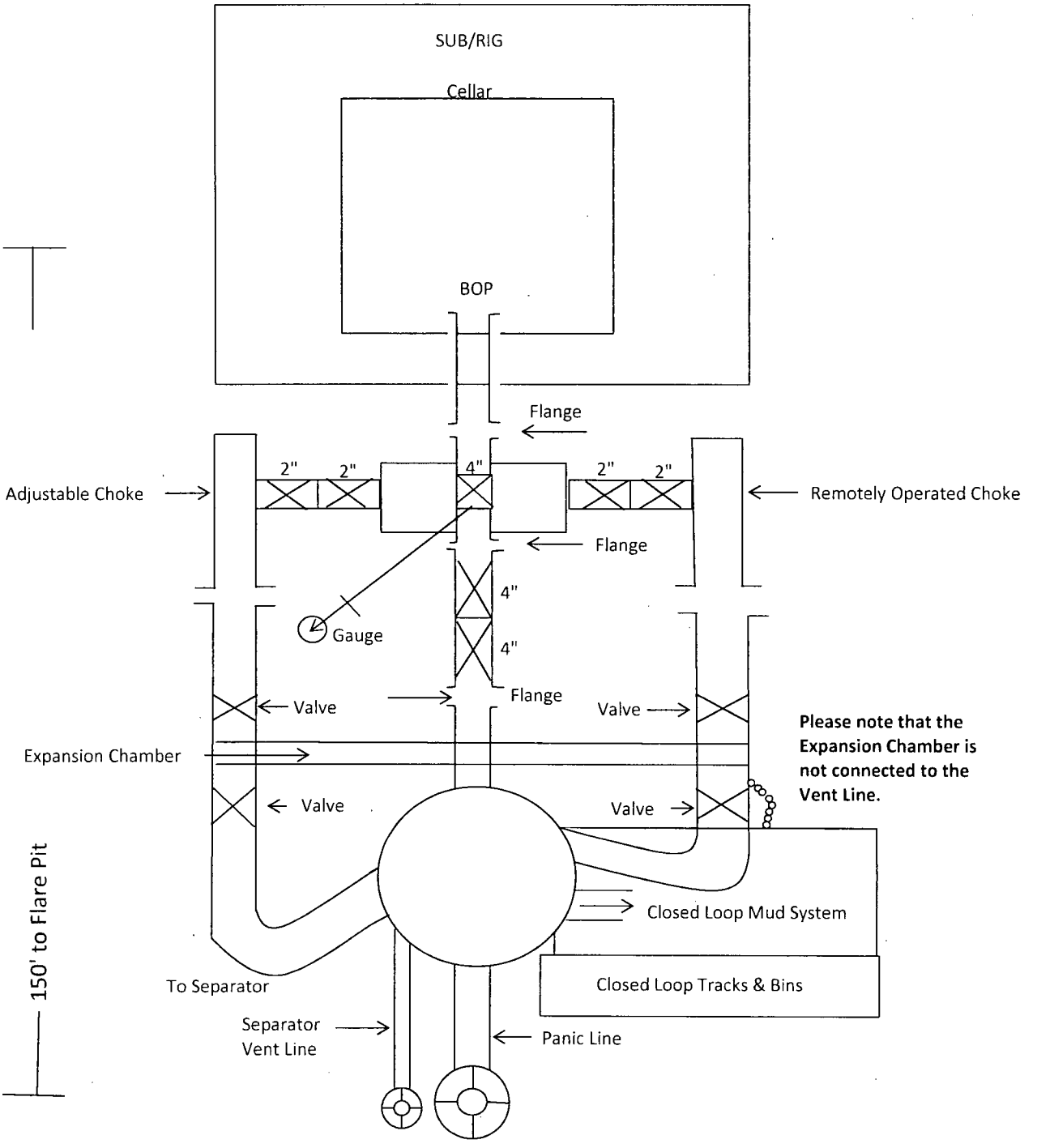
3,000 psi BOP Schematic



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'

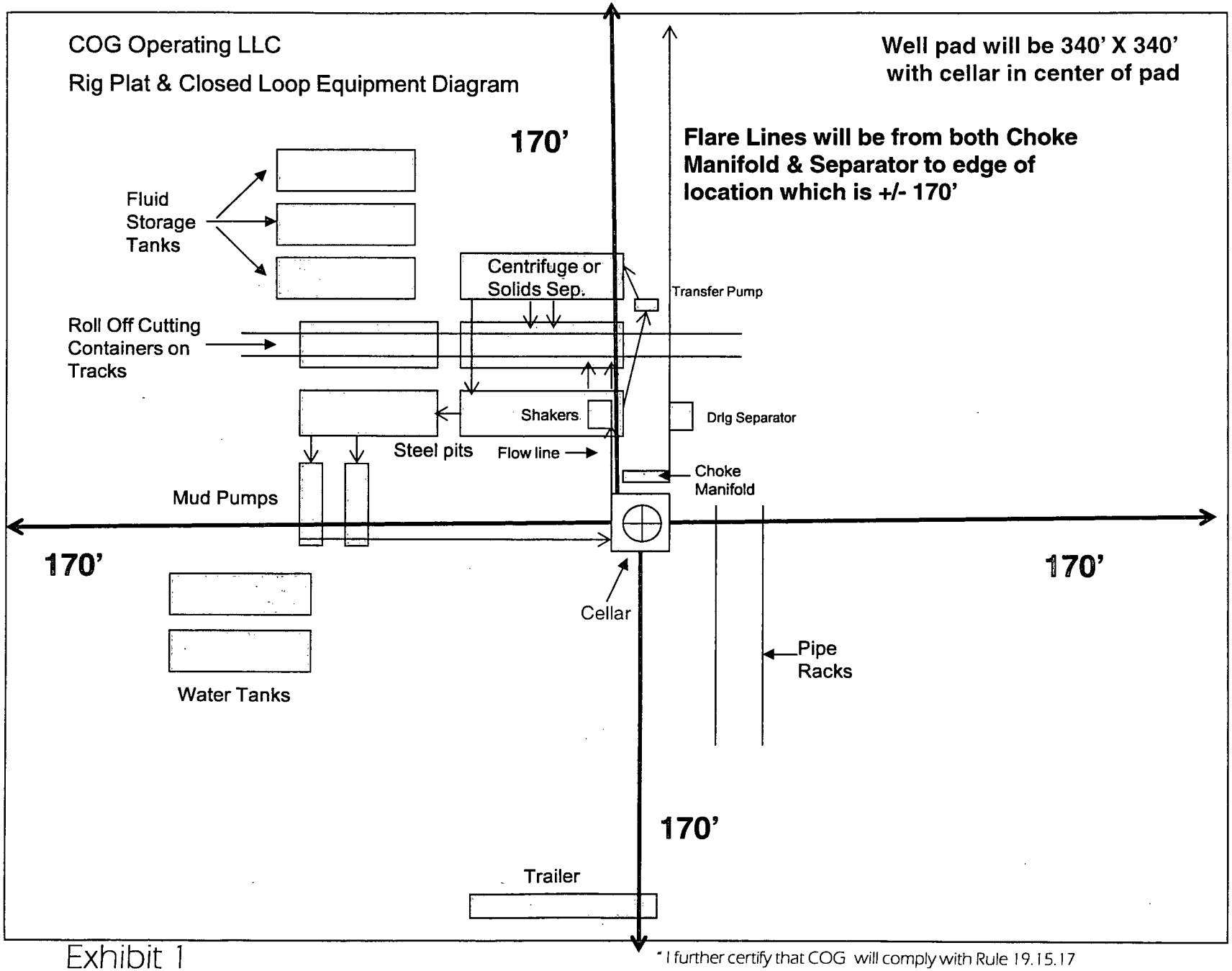


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

Secondary egress.

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

COG Operating LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.