13-498

Form 3160-3
(March 2012)

HOBBS OCD
SEP 04 2013
RECEIVED

RECEIVED
OCD Artesia
AUG 12 2013
NMOCD ARTESIA

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: NMNM092771
BHL: NMNM095641

6. If Indian, Allotee or Tribe Name

1a. Type of Work: [✓] DRILL [ ] REENTER

7. If Unit or CA Agreement, Name and No.

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

8. Lease Name and Well No. <40109>
King Air 8 Federal Com #4H

2. Name of Operator
COG Operating LLC. <229137>

9. API Well No.
30-025-42200

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

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

10. Field and Pool, or Exploratory
Lusk; Bone Sprimg <41440>

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 58' FSL & 982' FWL Unit Letter M (SWSW) SHL Sec 8-T19S-R32E
At proposed prod. Zone 330' FNL & 660' FWL Unit Letter D (NWNW) BHL Sec 8-T19S-R32E

11. Sec., T.R.M. or Blk and Survey or Area
Sec.8 - T19S - R32E

14. Distance in miles and direction from nearest town or post office*
Approximately 11 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)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
58'	SHL: 680 BHL: 160	160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. on file
SHL: 690' BHL: 1090' Closest to wellbore: 0'	TVD: 9,235' MD: 13,977'	NMB000740 &NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3610.5' GL	6/1/2013	30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature	Name *(Printed/Typed)*	Date
Mayte Reyes	Mayte Reyes	3/8/2013

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/s/George MacDonell	/s/George MacDonell	AUG - 7 2013

Title	Office
FIELD MANAGER	CARLSBAD FIELD OFFICE

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

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

KZ 10/21/14 Capitan Controlled Water Basin

*(Instructions on page 2)

pm

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM
King Air 8 Fed 4H
SHL: 58' FSL & 982' FWL
BHL: 330' FNL & 660' FWL
Section 8 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	885'	
Top of Salt	963'	
Base of Salt	2,403'	
Yates	2,662'	
Seven Rivers	2,872'	
Capitan Reef	2,965'	
Base of Reef	**3,712'**	
Delaware	4,624'	Oil
Bone Spring	7,024'	Oil
TD TVD	9,235'	
TD MD	**13,977'**	

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 1000 ~~910~~ 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.

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

Hole Size	Depths See COA 1000	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' – ~~910'~~	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
7 7/8"	0' – 13,977'	Production Curve & Lateral	5 ½"	New	17#	LTC	P-110	1.125	1.125	1.6

- While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.

4. Proposed Cement Program

a. 13-3/8" Surface

Lead: 375 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:

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% $CaCl_2$
(14.8 ppg / 1.34 cuft/sx)
2nd Stage: DVT/ECP @ +/- 2850'
Lead: 600 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: 850 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 cement to surface.
- The production string will tie back a minimum of 50' above Capitan Reef.

5. 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 = 4226 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)
0' – ~~910'~~ 1000	Fresh Water	8.4	29	N.C.
~~910'~~ – 4,500'	Brine	10	29	N.C.
4,500' – 13,977' (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 ½" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

9. Testing, Logging and Coring Program: See COA

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.

11. Anticipated starting date and Duration of Operations:

a. Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.

COG King Air 8 Federal #4H REV1 MDT 6May13 Proposal Geodetic Report

PATHFINDER
A Schlumberger Company

(Non-Def Plan)

Report Date:	May 06, 2013 - 02:52 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG	**Vertical Section Azimuth:**	355.854 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG King Air 8 Federal #4H / COG King Air 8 Federal #4H	**TVD Reference Datum:**	RKB
Well:	COG King Air 8 Federal #4H	**TVD Reference Elevation:**	3628.500 ft above
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3610.500 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.598 °
Survey Name:	COG King Air 8 Federal #4H REV1 MDT 6May13	**Total Gravity Field Strength:**	998.5039mgn (9.80665 Based)
Survey Date:	May 06, 2013	**Total Magnetic Field Strength:**	48661.309 nT
Tort / AHD / DDI / ERD Ratio:	110.754 ° / 4946.801 ft / 5.919 / 0.536	**Magnetic Dip Angle:**	60.505 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	May 06, 2013
Location Lat / Long:	N 32° 40' 3.98012", W 103° 47' 35.92098"	**Magnetic Declination Model:**	BGGM 2013
Location Grid N/E Y/X:	N 607069.400 ftUS, E 666180.400 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2915 °	**Grid Convergence Used:**	0.2915 °
Grid Scale Factor:	0.99994072	**Total Corr Mag North->Grid North:**	7.3066 °
		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	339.25	0.00	0.00	0.00	0.00	N/A	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	100.00	0.00	339.25	100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	200.00	0.00	339.25	200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	300.00	0.00	339.25	300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	400.00	0.00	339.25	400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	500.00	0.00	339.25	500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	600.00	0.00	339.25	600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	700.00	0.00	339.25	700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	800.00	0.00	339.25	800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	900.00	0.00	339.25	900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1000.00	0.00	339.25	1000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1100.00	0.00	339.25	1100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1200.00	0.00	339.25	1200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1300.00	0.00	339.25	1300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1400.00	0.00	339.25	1400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1500.00	0.00	339.25	1500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1600.00	0.00	339.25	1600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1700.00	0.00	339.25	1700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1800.00	0.00	339.25	1800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	1900.00	0.00	339.25	1900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2000.00	0.00	339.25	2000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2100.00	0.00	339.25	2100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2200.00	0.00	339.25	2200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2300.00	0.00	339.25	2300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2400.00	0.00	339.25	2400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2500.00	0.00	339.25	2500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2600.00	0.00	339.25	2600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2700.00	0.00	339.25	2700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2800.00	0.00	339.25	2800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	2900.00	0.00	339.25	2900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3000.00	0.00	339.25	3000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3100.00	0.00	339.25	3100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3200.00	0.00	339.25	3200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3300.00	0.00	339.25	3300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3400.00	0.00	339.25	3400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3500.00	0.00	339.25	3500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3600.00	0.00	339.25	3600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3700.00	0.00	339.25	3700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3800.00	0.00	339.25	3800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	3900.00	0.00	339.25	3900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4000.00	0.00	339.25	4000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4100.00	0.00	339.25	4100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4200.00	0.00	339.25	4200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4300.00	0.00	339.25	4300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4400.00	0.00	339.25	4400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4500.00	0.00	339.25	4500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4600.00	0.00	339.25	4600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4700.00	0.00	339.25	4700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4800.00	0.00	339.25	4800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	4900.00	0.00	339.25	4900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5000.00	0.00	339.25	5000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5100.00	0.00	339.25	5100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5200.00	0.00	339.25	5200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5300.00	0.00	339.25	5300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5400.00	0.00	339.25	5400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5500.00	0.00	339.25	5500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5600.00	0.00	339.25	5600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5700.00	0.00	339.25	5700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5800.00	0.00	339.25	5800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	5900.00	0.00	339.25	5900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6000.00	0.00	339.25	6000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6100.00	0.00	339.25	6100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6200.00	0.00	339.25	6200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6300.00	0.00	339.25	6300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6400.00	0.00	339.25	6400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92

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	339.25	6500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6600.00	0.00	339.25	6600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6700.00	0.00	339.25	6700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6800.00	0.00	339.25	6800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	6900.00	0.00	339.25	6900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7000.00	0.00	339.25	7000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7100.00	0.00	339.25	7100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7200.00	0.00	339.25	7200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7300.00	0.00	339.25	7300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7400.00	0.00	339.25	7400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7500.00	0.00	339.25	7500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7600.00	0.00	339.25	7600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7700.00	0.00	339.25	7700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7800.00	0.00	339.25	7800.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	7900.00	0.00	339.25	7900.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8000.00	0.00	339.25	8000.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8100.00	0.00	339.25	8100.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8200.00	0.00	339.25	8200.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8300.00	0.00	339.25	8300.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8400.00	0.00	339.25	8400.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8500.00	0.00	339.25	8500.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8600.00	0.00	339.25	8600.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8700.00	0.00	339.25	8700.00	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
KOP Build @ 12° DLS	8757.54	0.00	339.25	8757.54	0.00	0.00	0.00	0.00	607069.40	666180.40	N 32 40 3.98	W 103 47 35.92
	8800.00	5.10	339.25	8799.94	1.81	1.76	-0.67	12.00	607071.16	666179.73	N 32 40 4.00	W 103 47 35.93
	8900.00	17.10	339.25	8897.90	20.22	19.73	-7.47	12.00	607089.13	666172.93	N 32 40 4.18	W 103 47 36.01
	9000.00	29.10	339.25	8989.71	57.74	56.34	-21.35	12.00	607125.74	666159.06	N 32 40 4.54	W 103 47 36.17
	9100.00	41.10	339.25	9071.38	112.73	110.01	-41.68	12.00	607179.40	666138.72	N 32 40 5.07	W 103 47 36.40
	9200.00	53.10	339.25	9139.34	182.80	178.38	-67.58	12.00	607247.77	666112.82	N 32 40 5.75	W 103 47 36.70
	9300.00	65.10	339.25	9190.60	264.88	258.47	-97.93	12.00	607327.86	666082.48	N 32 40 6.54	W 103 47 37.05
	9400.00	77.10	339.25	9222.94	355.37	346.78	-131.38	12.00	607416.16	666049.02	N 32 40 7.42	W 103 47 37.44
	9500.00	89.10	339.25	9234.94	450.33	439.45	-166.49	12.00	607508.82	666013.92	N 32 40 8.34	W 103 47 37.84
Landing Point/ Turn @ 2° DLS	9507.53	90.00	339.25	9235.00	457.55	446.49	-169.16	12.00	607515.86	666011.25	N 32 40 8.41	W 103 47 37.87
	9600.00	90.00	341.10	9235.00	546.57	533.47	-200.52	2.00	607602.84	665979.89	N 32 40 9.27	W 103 47 38.23
	9700.00	90.00	343.10	9235.00	643.70	628.63	-231.25	2.00	607697.99	665949.16	N 32 40 10.21	W 103 47 38.59
	9800.00	90.00	345.10	9235.00	741.60	724.80	-258.65	2.00	607794.15	665921.77	N 32 40 11.16	W 103 47 38.90
	9900.00	90.00	347.10	9235.00	840.15	821.86	-282.67	2.00	607891.21	665897.74	N 32 40 12.13	W 103 47 39.18
	10000.00	90.00	349.10	9235.00	939.23	919.71	-303.29	2.00	607989.05	665877.13	N 32 40 13.10	W 103 47 39.41
	10100.00	90.00	351.10	9235.00	1038.72	1018.21	-320.49	2.00	608087.55	665859.93	N 32 40 14.07	W 103 47 39.61
	10200.00	90.00	353.10	9235.00	1138.50	1117.26	-334.23	2.00	608186.59	665846.19	N 32 40 15.05	W 103 47 39.76
	10300.00	90.00	355.10	9235.00	1238.45	1216.72	-344.51	2.00	608286.05	665835.91	N 32 40 16.04	W 103 47 39.88
	10400.00	90.00	357.10	9235.00	1338.44	1316.49	-351.31	2.00	608385.81	665829.11	N 32 40 17.02	W 103 47 39.95
	10500.00	90.00	359.10	9235.00	1438.36	1416.43	-354.63	2.00	608485.74	665825.79	N 32 40 18.01	W 103 47 39.99
	10545.25	90.00	0.00	9235.00	1483.52	1461.68	-354.98	2.00	608530.99	665825.44	N 32 40 18.46	W 103 47 39.99
	10600.00	90.00	0.00	9235.00	1538.12	1516.43	-354.98	0.00	608585.73	665825.44	N 32 40 19.00	W 103 47 39.98
	10700.00	90.00	0.00	9235.00	1637.86	1616.43	-354.97	0.00	608685.73	665825.45	N 32 40 19.99	W 103 47 39.98
	10800.00	90.00	0.00	9235.00	1737.60	1716.43	-354.96	0.00	608785.72	665825.46	N 32 40 20.98	W 103 47 39.97
	10900.00	90.00	0.00	9235.00	1837.34	1816.43	-354.96	0.00	608885.71	665825.47	N 32 40 21.97	W 103 47 39.97
	11000.00	90.00	0.00	9235.00	1937.07	1916.43	-354.95	0.00	608985.71	665825.47	N 32 40 22.96	W 103 47 39.96
	11100.00	90.00	0.00	9235.00	2036.81	2016.43	-354.94	0.00	609085.70	665825.48	N 32 40 23.95	W 103 47 39.95
	11200.00	90.00	0.00	9235.00	2136.55	2116.43	-354.93	0.00	609185.70	665825.49	N 32 40 24.94	W 103 47 39.95
	11300.00	90.00	0.00	9235.00	2236.29	2216.43	-354.93	0.00	609285.69	665825.50	N 32 40 25.93	W 103 47 39.94
	11400.00	90.00	0.00	9235.00	2336.02	2316.43	-354.92	0.00	609385.68	665825.50	N 32 40 26.92	W 103 47 39.94
	11500.00	90.00	0.00	9235.00	2435.76	2416.43	-354.91	0.00	609485.68	665825.51	N 32 40 27.91	W 103 47 39.93
	11600.00	90.00	0.00	9235.00	2535.50	2516.43	-354.90	0.00	609585.67	665825.52	N 32 40 28.90	W 103 47 39.92
	11700.00	90.00	0.00	9235.00	2635.24	2616.43	-354.90	0.00	609685.67	665825.53	N 32 40 29.89	W 103 47 39.92
	11800.00	90.00	0.00	9235.00	2734.98	2716.43	-354.89	0.00	609785.66	665825.53	N 32 40 30.88	W 103 47 39.91
	11900.00	90.00	0.00	9235.00	2834.71	2816.43	-354.88	0.00	609885.65	665825.54	N 32 40 31.87	W 103 47 39.90
	12000.00	90.00	0.00	9235.00	2934.45	2916.43	-354.87	0.00	609985.65	665825.55	N 32 40 32.85	W 103 47 39.90
	12100.00	90.00	0.00	9235.00	3034.19	3016.43	-354.87	0.00	610085.64	665825.56	N 32 40 33.84	W 103 47 39.89
	12200.00	90.00	0.00	9235.00	3133.93	3116.43	-354.86	0.00	610185.64	665825.56	N 32 40 34.83	W 103 47 39.89
	12300.00	90.00	0.00	9235.00	3233.66	3216.43	-354.85	0.00	610285.63	665825.57	N 32 40 35.82	W 103 47 39.88
	12400.00	90.00	0.00	9235.00	3333.40	3316.43	-354.84	0.00	610385.62	665825.58	N 32 40 36.81	W 103 47 39.87
	12500.00	90.00	0.00	9235.00	3433.14	3416.43	-354.83	0.00	610485.62	665825.59	N 32 40 37.80	W 103 47 39.87
	12600.00	90.00	0.00	9235.00	3532.88	3516.43	-354.83	0.00	610585.61	665825.59	N 32 40 38.79	W 103 47 39.86
	12700.00	90.00	0.00	9235.00	3632.62	3616.43	-354.82	0.00	610685.60	665825.60	N 32 40 39.78	W 103 47 39.86
	12800.00	90.00	0.00	9235.00	3732.35	3716.43	-354.81	0.00	610785.60	665825.61	N 32 40 40.77	W 103 47 39.85
	12900.00	90.00	0.00	9235.00	3832.09	3816.43	-354.80	0.00	610885.59	665825.62	N 32 40 41.76	W 103 47 39.84
	13000.00	90.00	0.00	9235.00	3931.83	3916.43	-354.80	0.00	610985.59	665825.63	N 32 40 42.75	W 103 47 39.84
	13100.00	90.00	0.00	9235.00	4031.57	4016.43	-354.79	0.00	611085.58	665825.63	N 32 40 43.74	W 103 47 39.83
	13200.00	90.00	0.00	9235.00	4131.30	4116.43	-354.78	0.00	611185.57	665825.64	N 32 40 44.73	W 103 47 39.83
	13300.00	90.00	0.00	9235.00	4231.04	4216.43	-354.77	0.00	611285.57	665825.65	N 32 40 45.72	W 103 47 39.82
	13400.00	90.00	0.00	9235.00	4330.78	4316.43	-354.77	0.00	611385.56	665825.66	N 32 40 46.71	W 103 47 39.81
	13500.00	90.00	0.00	9235.00	4430.52	4416.43	-354.76	0.00	611485.56	665825.66	N 32 40 47.70	W 103 47 39.81
	13600.00	90.00	0.00	9235.00	4530.25	4516.43	-354.75	0.00	611585.55	665825.67	N 32 40 48.69	W 103 47 39.80
	13700.00	90.00	0.00	9235.00	4629.99	4616.43	-354.74	0.00	611685.54	665825.68	N 32 40 49.68	W 103 47 39.80
	13800.00	90.00	0.00	9235.00	4729.73	4716.43	-354.74	0.00	611785.54	665825.69	N 32 40 50.67	W 103 47 39.79
	13900.00	90.00	0.00	9235.00	4829.47	4816.43	-354.73	0.00	611885.53	665825.69	N 32 40 51.65	W 103 47 39.78
COG King Air 8 Federal #4H PBHL	13976.87	90.00	0.00	9235.00	4906.14	4893.30	-354.72	0.00	611962.40	665825.70	N 32 40 52.42	W 103 47 39.78

Survey Type: Non-Def Plan

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

Survey Program:

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 ° ' ")

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 King Air 8 Federal #4H REV1 MDT
	18.000	13976.874		1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / COG King Air 8 Federal #4H REV1 MDT

CONCHO

COG Rev1

PATHFINDER
A Schlumberger Company

WELL	FIELD	STRUCTURE
COG King Air 8 Fed Com #4H	NM Lea County (NAD 27)	Patriot 6

Magnetic Parameters				Surface Location					Miscellaneous			
Model:	HDGM 2012	Dip:	60.481°	Lat:	N 32 40 5.284	Northing:	607201.90 flUS	Grid Conv:	0.292°	Slot:	King Air 8 Fed Com #4H	TVD Ref:	RKB(3629.70 above)
		Mag Dec:	7.622°	Lon:	W 103 47 34.197	Easting:	666327.10 flUS	Scale Fact:	0.99994077	Plan:	REV0 MDT 20Feb13	Srvy Date:	February 20, 2013

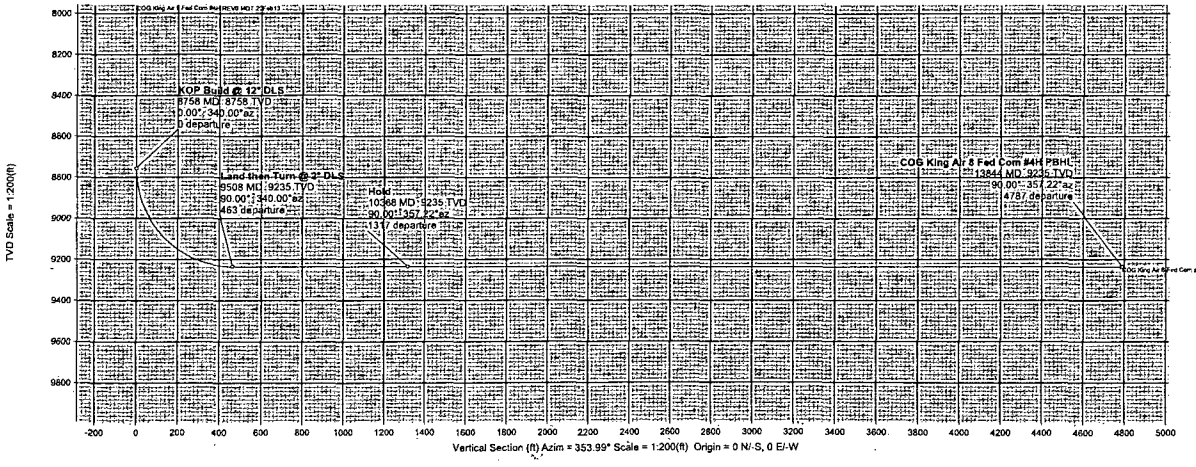
NAD27 New Mexico State Plane, Eastern Zone, US Feet

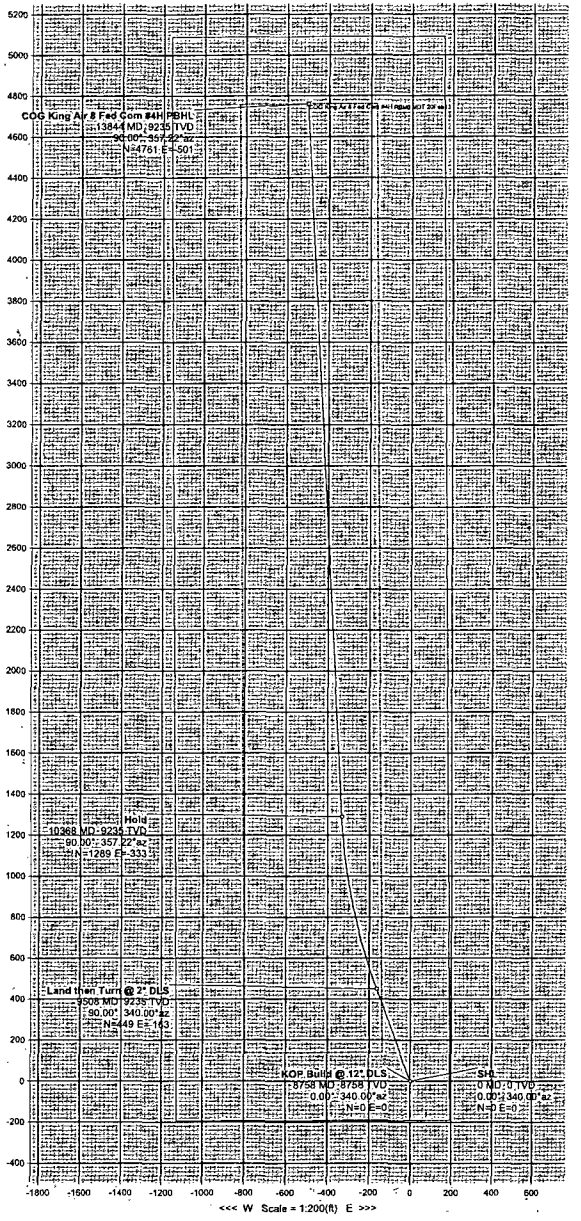
Legend

COG King Air 8 Fed Com #4H PBHL

Grid North
Tot Corr (M->G 7.3302°)
Mag Dec (7.622°)
Grid Conv (0.292°)

Comments	Survey MDft	Inclination(deg)	Azimuth(deg)	TVD ft	Sub-Sea TVD	VSft	NS ft	EW ft	Longitude deg	Latitude deg	Easting flUS	Northing flUS	Closure ft	Closure Azimuth deg	DLS /100ft	Tool Face deg
SHL	0.00	0.00	340.00	0.00	-3629.70	0.00	0.00	0.00	W 103 47 34.197	N 32 40 5.284	666327.10	607201.90	0.00	0.00		340.00
KOP Build @ 12° DLS	8757.54	0.00	340.00	8757.54	5127.84	0.00	0.00	0.00	W 103 47 34.197	N 32 40 5.284	666327.10	607201.90	0.00	0.00	0.00	340.00
Land then Turn @ 2° DLS	9507.53	90.00	340.00	9235.00	5605.30	463.30	448.67	-163.30	W 103 47 36.080	N 32 40 9.731	666163.81	607650.54	477.46	340.00	12.00	90.00
Hold	10368.39	90.00	357.22	9235.00	5605.30	1317.15	1289.39	-332.69	W 103 47 38.012	N 32 40 18.059	665994.43	608491.21	1331.62	345.53	2.00	0.00
COG King Air 8 Fed Com #4H PBHL	13843.89	90.00	357.22	9235.00	5605.30	4787.13	4760.79	-501.43	W 103 47 39.780	N 32 40 52.415	665825.70	611962.40	4787.13	353.99	0.00	





Drawn By:	Current User
Date Created:	March 08, 2013 11:05:20 AM
Checked By:	
Checked Date:	
Approved By:	
Approved Date:	

COG King Air 8 Fed Com #4H REV0 MDT 20Feb13 Proposal Geodetic Report

(Def Plan)

PATHFINDER
A Schlumberger Company

Report Date:	March 08, 2013 - 11:16 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	COG	**Vertical Section Azimuth:**	353.987 ° (Grid North)
Field:	NM Lea County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	COG King Air 8 Fed Com #4H / COG King Air 8 Fed Com #4H	**TVD Reference Datum:**	RKB
Well:	COG King Air 8 Fed Com #4H	**TVD Reference Elevation:**	3629.700 ft above
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3611.700 ft above
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.622 °
Survey Name:	COG King Air 8 Fed Com #4H REV0 MDT 20Feb13	**Total Gravity Field Strength:**	999.1814 mgn (9.8 based)
Survey Date:	February 20, 2013	**Total Magnetic Field Strength:**	48668.591 nT
Tort / AHD / DDI / ERD Ratio:	107.217 ° / 4813.814 ft / 5.889 / 0.521	**Magnetic Dip Angle:**	60.481 °
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Declination Date:**	February 20, 2013
Location Lat / Long:	N 32° 40' 5.28385", W 103° 47' 34.19697"	**Magnetic Declination Model:**	BGGM 2012
Location Grid N/E Y/X:	N 607201.900 ftUS, E 666327.100 ftUS	**North Reference:**	Grid North
CRS Grid Convergence Angle:	0.2918 °	**Grid Convergence Used:**	0.2918 °
Grid Scale Factor:	0.99994077	**Total Corr Mag North->Grid North:**	7.3302 °
		Local Coord Referenced To:	Structure Reference Point

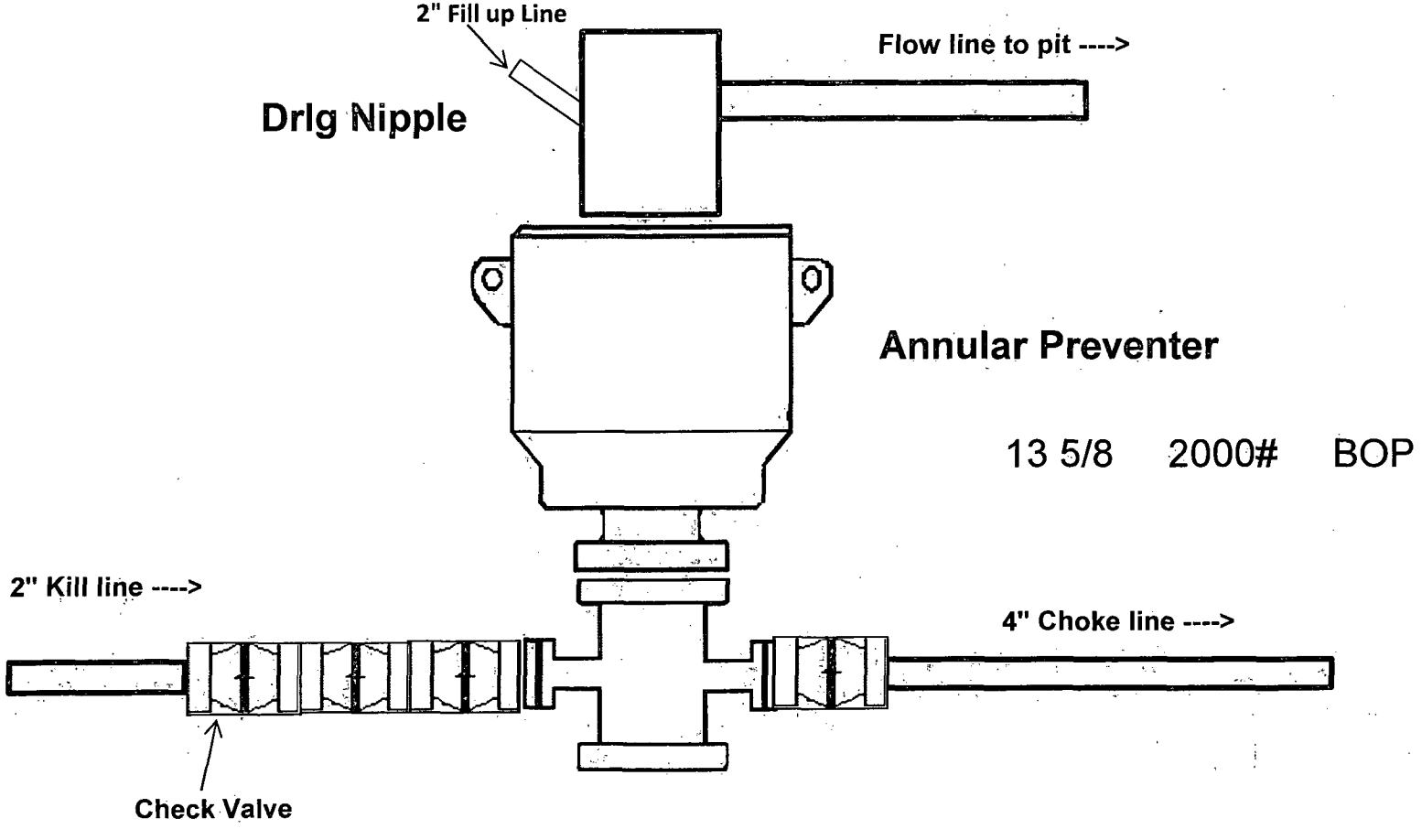
Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	340.00	0.00	0.00	0.00	0.00	N/A	607201.90	666327.10	N 32 40 5.28	W 103 47 34.20
KOP Build @ 12° DLS	8757.54	0.00	340.00	8757.54	0.00	0.00	0.00	0.00	607201.90	666327.10	N 32 40 5.28	W 103 47 34.20
Land then Turn @ 2° DLS	9507.53	90.00	340.00	9235.00	463.30	448.67	-163.30	12.00	607650.54	666163.81	N 32 40 9.73	W 103 47 36.08
Hold	10368.39	90.00	357.22	9235.00	1317.15	1289.39	-332.69	2.00	608491.21	665994.43	N 32 40 18.06	W 103 47 38.01
COG King Air 8 Fed Com #4H PBHL	13843.89	90.00	357.22	9235.00	4787.13	4760.79	-501.43	0.00	611962.40	665825.70	N 32 40 52.42	W 103 47 39.78

Survey Type: Def Plan

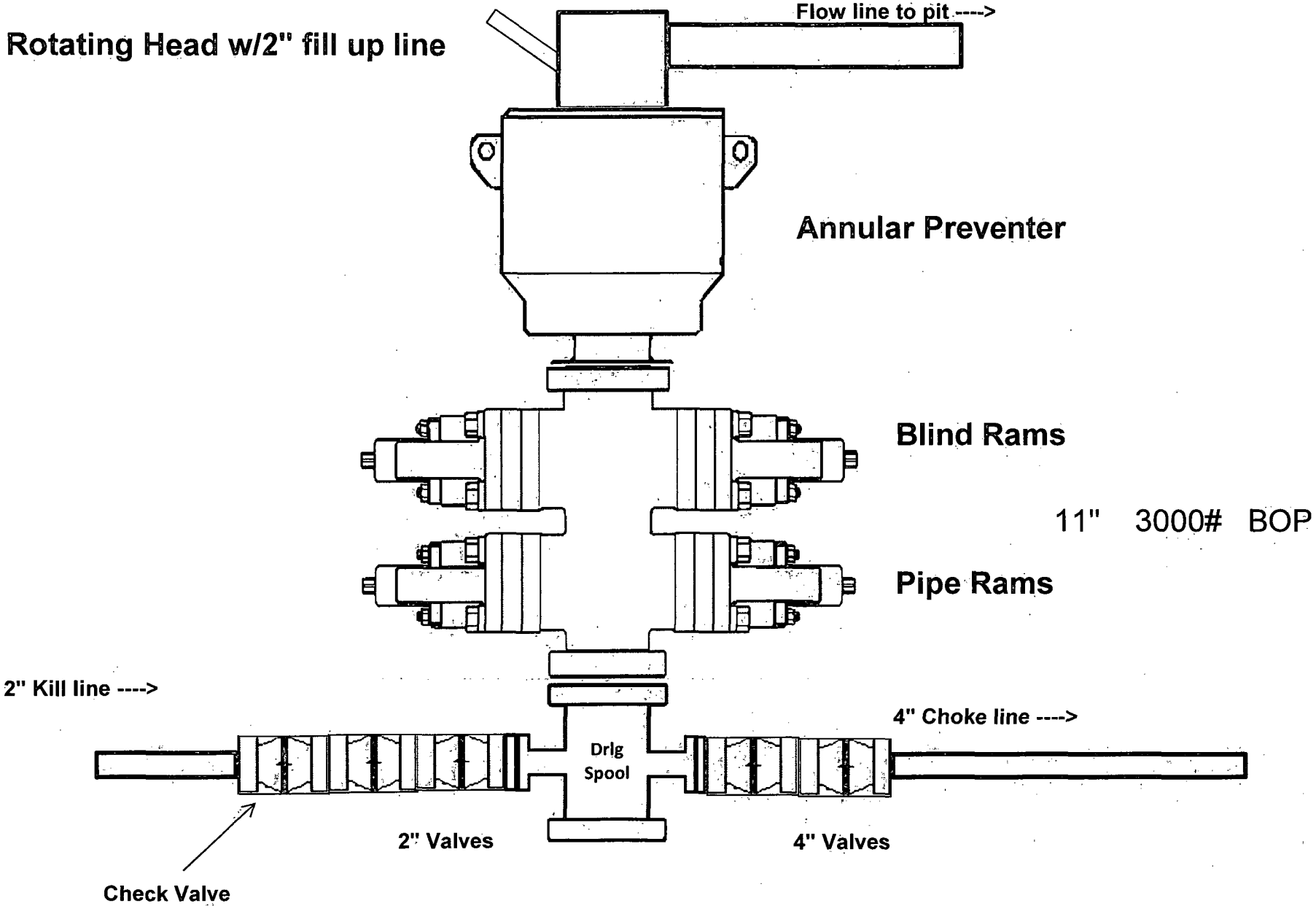
Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

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 King Air 8 Fed Com #4H REV0 MDT
	18.000	13843.887	1/100.000	30.000	30.000	SLB_MWD-STD	Original Borehole / COG King Air 8 Fed Com #4H REV0 MDT

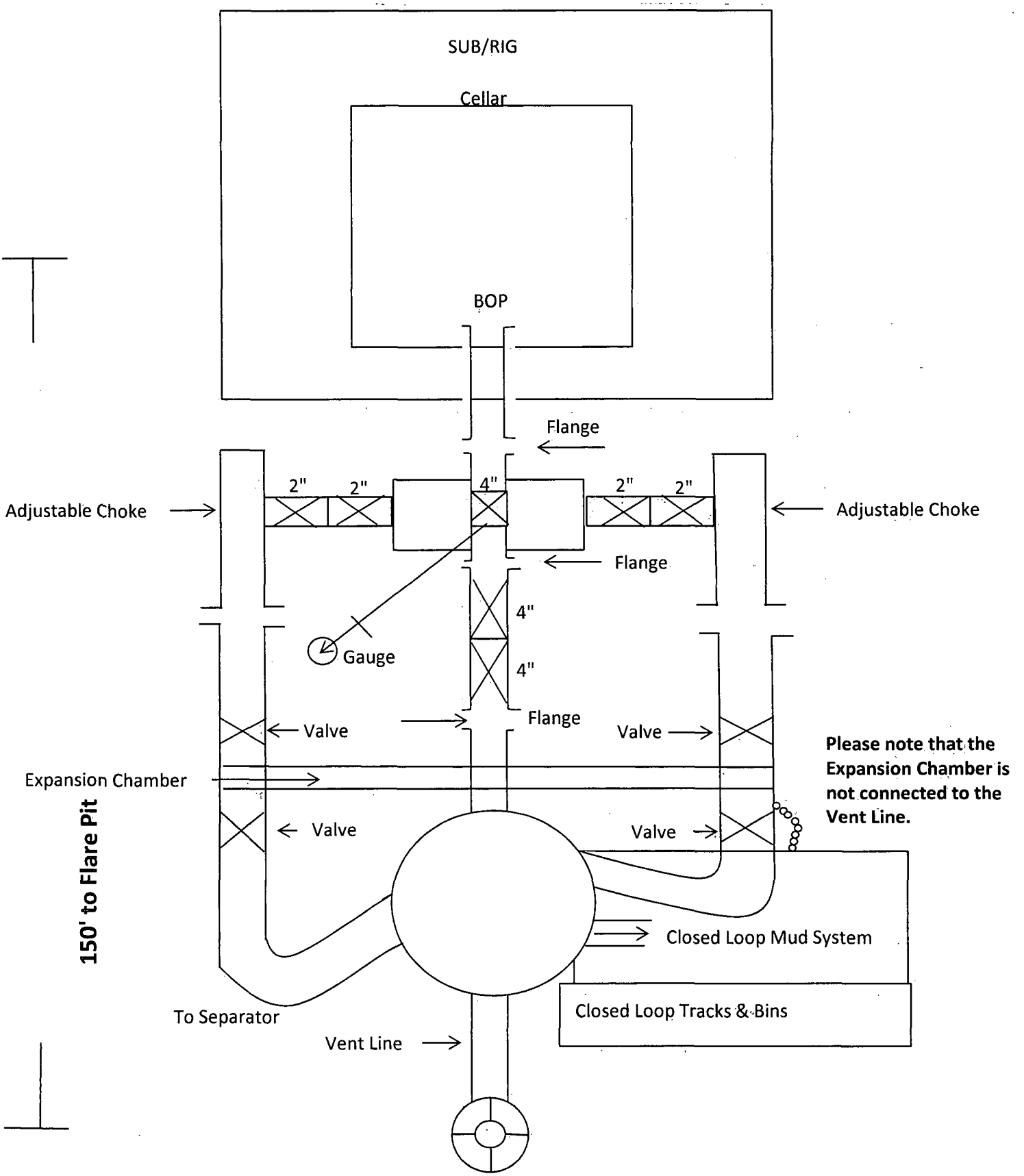
2,000 psi BOP Schematic



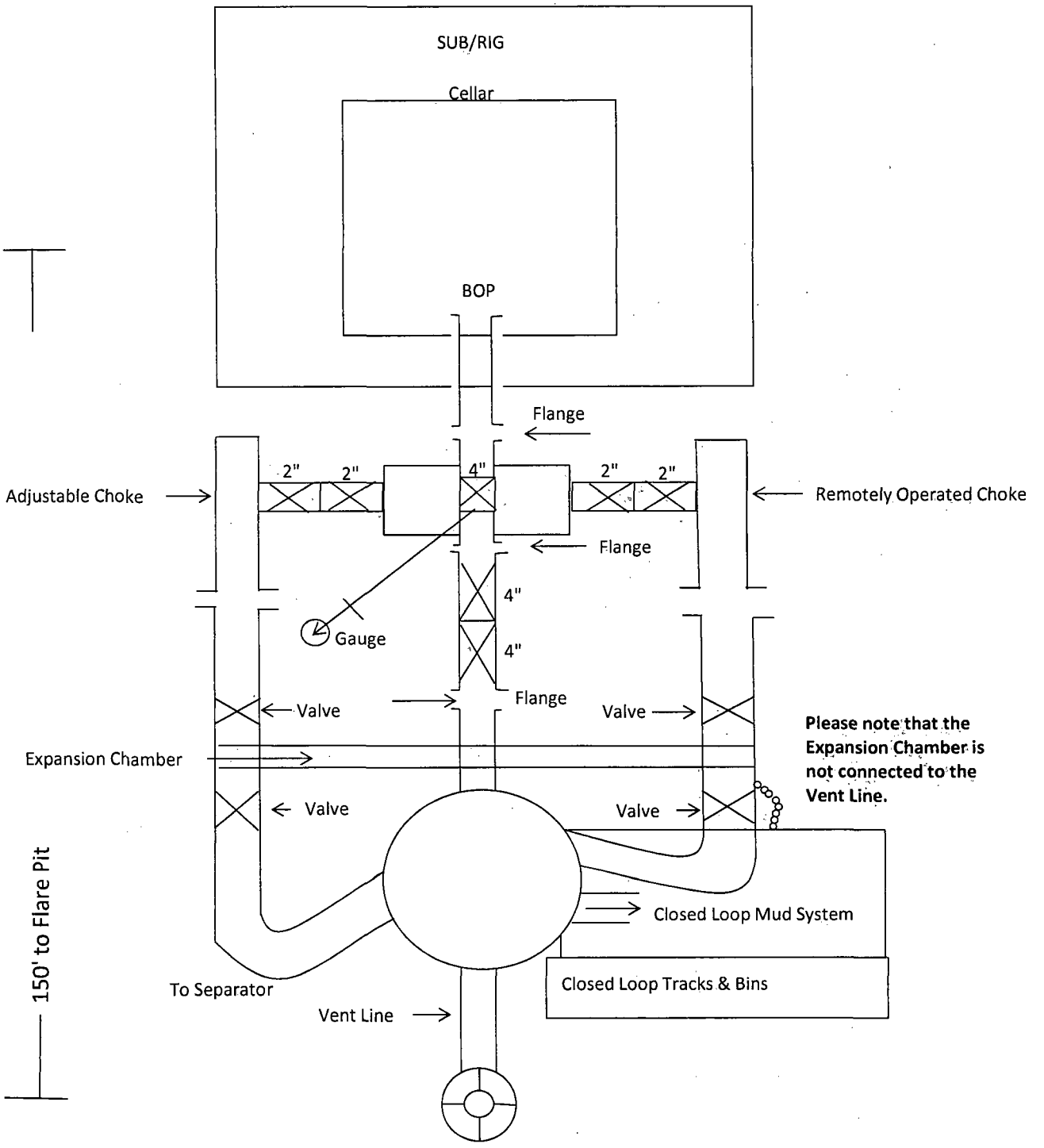
3,000 psi BOP Schematic



2M Choke Manifold Equipment



3M Choke Manifold Equipment



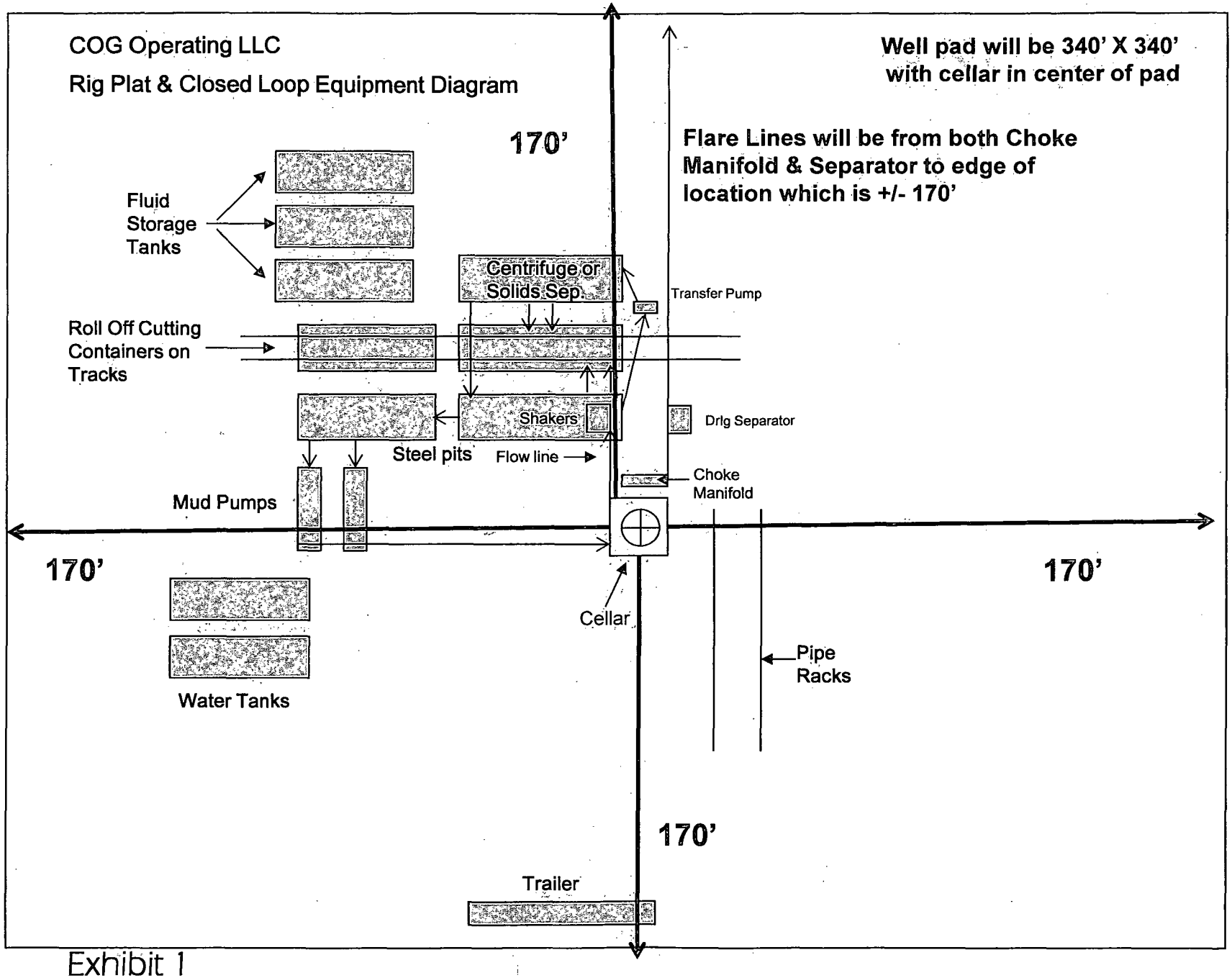

COG Operating LLC
Rig Plat & Closed Loop Equipment Diagram
Well pad will be 340' X 340' with cellar in center of pad
Flare Lines will be from both Choke Manifold & Separator to edge of location which is +/- 170'
170'
Fluid Storage Tanks
Centrifuge or Solids Sep
Transfer Pump
Roll Off Cutting Containers on Tracks
Shakers
Drlg Separator
Steel pits
Flow line
Choke Manifold
Mud Pumps
170'
170'
Cellar
Pipe Racks
Water Tanks
170'
Trailer

Exhibit 1