Form 3160-3
(August 2007)

HOBBS OCD
APR 22 2013
RECEIVED

OCD Hobbs

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM55953; NMNM90812

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.: 39836
Bimini 8 Federal Com #2H

2. Name of Operator: COG Production LLC. 217955

9. API Well No.: 30-025-41130

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

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

10. Field and Pool, or Exploratory: 96191
Mesa Verde; Delaware

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface: 330' FNL & 1655' FEL Unit Letter B NWNE Section 8-T24S-R32E
At proposed prod. Zone: 330' FSL & 1705' FEL Unit Letter O SWSE Section 8-T24S-R32E

11. Sec., T.R.M. or Blk and Survey or Area: Section 8-T24S-R32E

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

12. County or Parish: Lea

13. State: New Mexico

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
330'	SHL: NM-55953: 1080 BHL:NM-90812: 439.13	160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.		**20. BLM/BIA Bond No. on file**
SHL: 2983' BHL: 1501	TVD: 8535' MD: 12941'	NMB000215 &NMB000860
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	**22. Approximate date work will start***	**23. Estimated duration**
3650'	12/1/2012	30 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
Mayte Reyes	Mayte Reyes	5/16/2012

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/s/George MacDonell	/s/George MacDonell	APR 19 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)

Carlsbad Controlled Water Basin

(Instructions on page 2)

KZ 04/23/13

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

APR 24 2013

HOBBS OCD

APR 22 2013

RECEIVED

COG Production LLC
DRILLING AND OPERATIONS PROGRAM
Bimini 8 Federal Com #2H
SHL: 330' FNL & 1655' FEL
BHL: 330' FSL & 1705' FEL
Section 8 T24S R32E
Lea County, New Mexico

In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Production 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	205'	
Rustler	984'	
Top of Salt	1318'	
Base of Salt	4522'	
Delaware	4714'	Oil
Bone Spring	8572'	Oil
TD TVD	8535'	
TD MD	12,941'	

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 1010' and circulating cement back to surface. All intervals will be isolated by setting 5 ½" casing to total depth and tying back cement to a minimum of 500' into 9-5/8" csg.

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

Hole Size	Depths See COA	Section	OD Casing	New/ Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 ½"	0' - ~~1010'~~ 1100	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' – 4650'	Intrmd	9 5/8"	New	40#	BTC	J-55	1.125	1.125	1.6
7 7/8"	0' – 12,941'	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: 600 sx Class C + 4% Gel + 2% $CaCl_2$
(13.5 ppg /1.75 cuft/sx)
Tail: 250 sx Class C + 2% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/50% excess on OH volumes

b. 9 5/8" Intermediate:
Lead: 900 sx Class C + 4% Gel
(13.5 ppg /1.75 cuft/sx)
Tail: 250 sx Class C + 1% $CaCl_2$
(14.8 ppg / 1.35 cuft/sx)
**Calculated w/35% excess on OH volumes

d. 5 ½" Production
Lead: 600 sx 50:50:10 H + Salt+Gilsonite+CFR-3+ HR601
(11.8 ppg / 2.5 cuft/sx)
Tail: 950 sx 50:50:2 H +Salt+GasStop +HR601 +CFR-3
(14.4 ppg /1.25 cuft/sx)
**Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending the caliper measurement from the open hole logs.
- The 9-5/8" intermediate string is designed to circulate to surface.
- The production string will at least tie back 500' into 9-5/8" shoe

5. Minimum Specifications for Pressure Control:

Nipple up on 13 3/8 with annular preventer tested to 50% of 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.

6. Estimated BHP:

Lateral TD = 3750 psi

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

See COA

Depth	Type System	Mud Weight	Viscosity (sec)	Waterloss (cc)
0' – ~~1010'~~ 1100	Fresh Water	8.4	29	N.C.
~~1010'~~ – 4650'	Brine	10	29	N.C.
4650' – 12,941' (Lateral)	Cut Brine	8.9 – 9.2	29	N.C.

The necessary mud products for weight addition and fluid loss control will be on location at all times.

8. Auxiliary Well Control and Monitoring Equipment:

a. A Kelly cock will be in the drill string at all times.
b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 5 ½" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

9. Testing, Logging and Coring Program: 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 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 Production LLC

Lea County, NM (NAD-83)
Bimini 8 Federal Com
#2H

OH

Plan: Plan #2

Standard Planning Report

26 October, 2012

Database:	Houston R5000 Database	**Local Co-ordinate Reference:**	Well #2H
Company:	COG Production LLC	**TVD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Site:	Bimini 8 Federal Com	**North Reference:**	Grid
Well:	#2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Project	Lea County, NM (NAD-83)		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Bimini 8 Federal Com				
Site Position:		**Northing:**	451,040.25 usft	**Latitude:**	32° 14' 18.118 N
From:	Map	**Easting:**	739,148.78 usft	**Longitude:**	103° 41' 36.791 W
Position Uncertainty:	2.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.34 °

Well	#2H					
Well Position	**+N/-S**	0.0 usft	**Northing:**	451,040.25 usft	**Latitude:**	32° 14' 18.118 N
	+E/-W	0.0 usft	**Easting:**	739,148.78 usft	**Longitude:**	103° 41' 36.791 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,650.0 usft

Wellbore	OH				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	5/8/2012	7.52	60.18	48,560

Design	Plan #2				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	180.21	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
8,044.5	0.00	0.00	8,044.5	0.0	0.0	0.00	0.00	0.00	0.00	
8,793.1	89.82	180.21	8,522.0	-476.0	-1.7	12.00	12.00	0.00	180.21	
12,941.6	89.82	180.21	8,535.0	-4,624.5	-16.9	0.00	0.00	0.00	0.00	PBHL (B8FC#2H)

Database:	Houston R5000 Database	**Local Co-ordinate Reference:**	Well #2H
Company:	COG Production LLC	**TVD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Site:	Bimini 8 Federal Com	**North Reference:**	Grid
Well:	#2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	Houston R5000 Database	**Local Co-ordinate Reference:**	Well #2H
Company:	COG Production LLC	**TVD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Site:	Bimini 8 Federal Com	**North Reference:**	Grid
Well:	#2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,044.5	0.00	0.00	8,044.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 8044.5' MD, 8044.5' TVD, 0.00° INC, 0.00° AZI, 0.0' VS									
8,050.0	0.66	180.21	8,050.0	0.0	0.0	0.0	12.00	12.00	0.00
8,075.0	3.66	180.21	8,075.0	-1.0	0.0	1.0	12.00	12.00	0.00
8,100.0	6.66	180.21	8,099.9	-3.2	0.0	3.2	12.00	12.00	0.00
8,125.0	9.66	180.21	8,124.6	-6.8	0.0	6.8	12.00	12.00	0.00
8,150.0	12.66	180.21	8,149.1	-11.6	0.0	11.6	12.00	12.00	0.00
8,175.0	15.66	180.21	8,173.4	-17.7	-0.1	17.7	12.00	12.00	0.00
8,200.0	18.66	180.21	8,197.3	-25.1	-0.1	25.1	12.00	12.00	0.00
8,225.0	21.66	180.21	8,220.7	-33.7	-0.1	33.7	12.00	12.00	0.00
8,250.0	24.66	180.21	8,243.7	-43.5	-0.2	43.5	12.00	12.00	0.00
8,275.0	27.66	180.21	8,266.2	-54.6	-0.2	54.6	12.00	12.00	0.00
8,300.0	30.66	180.21	8,288.0	-66.7	-0.2	66.7	12.00	12.00	0.00
8,325.0	33.66	180.21	8,309.1	-80.0	-0.3	80.0	12.00	12.00	0.00
8,350.0	36.66	180.21	8,329.6	-94.4	-0.3	94.4	12.00	12.00	0.00
8,375.0	39.66	180.21	8,349.2	-109.9	-0.4	109.9	12.00	12.00	0.00
8,400.0	42.66	180.21	8,368.1	-126.3	-0.5	126.3	12.00	12.00	0.00
8,425.0	45.66	180.21	8,386.0	-143.7	-0.5	143.7	12.00	12.00	0.00
8,450.0	48.66	180.21	8,403.0	-162.1	-0.6	162.1	12.00	12.00	0.00
8,475.0	51.66	180.21	8,419.0	-181.3	-0.7	181.3	12.00	12.00	0.00
8,500.0	54.66	180.21	8,434.0	-201.3	-0.7	201.3	12.00	12.00	0.00
8,525.0	57.66	180.21	8,447.9	-222.0	-0.8	222.0	12.00	12.00	0.00
8,550.0	60.66	180.21	8,460.7	-243.5	-0.9	243.5	12.00	12.00	0.00
8,575.0	63.65	180.21	8,472.4	-265.6	-1.0	265.6	12.00	12.00	0.00
8,600.0	66.65	180.21	8,482.9	-288.3	-1.1	288.3	12.00	12.00	0.00
8,625.0	69.65	180.21	8,492.2	-311.5	-1.1	311.5	12.00	12.00	0.00

Database:	Houston R5000 Database	**Local Co-ordinate Reference:**	Well #2H
Company:	COG Production LLC	**TVD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Site:	Bimini 8 Federal Com	**North Reference:**	Grid
Well:	#2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,650.0	72.65	180.21	8,500.3	-335.1	-1.2	335.1	12.00	12.00	0.00
8,675.0	75.65	180.21	8,507.1	-359.2	-1.3	359.2	12.00	12.00	0.00
8,700.0	78.65	180.21	8,512.7	-383.6	-1.4	383.6	12.00	12.00	0.00
8,725.0	81.65	180.21	8,516.9	-408.2	-1.5	408.2	12.00	12.00	0.00
8,750.0	84.65	180.21	8,519.9	-433.0	-1.6	433.0	12.00	12.00	0.00
8,775.0	87.65	180.21	8,521.6	-457.9	-1.7	457.9	12.00	12.00	0.00
8,793.1	89.82	180.21	8,522.0	-476.0	-1.7	476.0	11.97	11.97	0.00
EOC - 8793.1' MD, 8522.0' TVD, 89.82° INC, 180.21° AZI, 476.0' VS									
8,800.0	89.82	180.21	8,522.0	-482.9	-1.8	482.9	0.00	0.00	0.00
8,900.0	89.82	180.21	8,522.3	-582.9	-2.1	582.9	0.00	0.00	0.00
9,000.0	89.82	180.21	8,522.6	-682.9	-2.5	682.9	0.00	0.00	0.00
9,100.0	89.82	180.21	8,523.0	-782.9	-2.9	782.9	0.00	0.00	0.00
9,200.0	89.82	180.21	8,523.3	-882.9	-3.2	882.9	0.00	0.00	0.00
9,300.0	89.82	180.21	8,523.6	-982.9	-3.6	982.9	0.00	0.00	0.00
9,400.0	89.82	180.21	8,523.9	-1,082.9	-4.0	1,082.9	0.00	0.00	0.00
9,500.0	89.82	180.21	8,524.2	-1,182.9	-4.3	1,182.9	0.00	0.00	0.00
9,600.0	89.82	180.21	8,524.5	-1,282.9	-4.7	1,282.9	0.00	0.00	0.00
9,700.0	89.82	180.21	8,524.8	-1,382.9	-5.1	1,382.9	0.00	0.00	0.00
9,800.0	89.82	180.21	8,525.2	-1,482.9	-5.4	1,482.9	0.00	0.00	0.00
9,900.0	89.82	180.21	8,525.5	-1,582.9	-5.8	1,582.9	0.00	0.00	0.00
10,000.0	89.82	180.21	8,525.8	-1,682.9	-6.2	1,682.9	0.00	0.00	0.00
10,100.0	89.82	180.21	8,526.1	-1,782.9	-6.5	1,782.9	0.00	0.00	0.00
10,200.0	89.82	180.21	8,526.4	-1,882.9	-6.9	1,882.9	0.00	0.00	0.00
10,300.0	89.82	180.21	8,526.7	-1,982.9	-7.3	1,982.9	0.00	0.00	0.00
10,400.0	89.82	180.21	8,527.0	-2,082.9	-7.6	2,082.9	0.00	0.00	0.00
10,500.0	89.82	180.21	8,527.4	-2,182.9	-8.0	2,182.9	0.00	0.00	0.00
10,600.0	89.82	180.21	8,527.7	-2,282.9	-8.4	2,282.9	0.00	0.00	0.00
10,700.0	89.82	180.21	8,528.0	-2,382.9	-8.7	2,382.9	0.00	0.00	0.00
10,800.0	89.82	180.21	8,528.3	-2,482.9	-9.1	2,482.9	0.00	0.00	0.00
10,900.0	89.82	180.21	8,528.6	-2,582.9	-9.5	2,582.9	0.00	0.00	0.00
11,000.0	89.82	180.21	8,528.9	-2,682.9	-9.8	2,682.9	0.00	0.00	0.00
11,100.0	89.82	180.21	8,529.2	-2,782.9	-10.2	2,782.9	0.00	0.00	0.00
11,200.0	89.82	180.21	8,529.6	-2,882.9	-10.6	2,882.9	0.00	0.00	0.00
11,300.0	89.82	180.21	8,529.9	-2,982.9	-10.9	2,982.9	0.00	0.00	0.00
11,400.0	89.82	180.21	8,530.2	-3,082.9	-11.3	3,082.9	0.00	0.00	0.00
11,500.0	89.82	180.21	8,530.5	-3,182.9	-11.7	3,182.9	0.00	0.00	0.00
11,600.0	89.82	180.21	8,530.8	-3,282.9	-12.0	3,282.9	0.00	0.00	0.00
11,700.0	89.82	180.21	8,531.1	-3,382.9	-12.4	3,382.9	0.00	0.00	0.00
11,800.0	89.82	180.21	8,531.4	-3,482.9	-12.8	3,482.9	0.00	0.00	0.00
11,900.0	89.82	180.21	8,531.8	-3,582.9	-13.1	3,582.9	0.00	0.00	0.00
12,000.0	89.82	180.21	8,532.1	-3,682.9	-13.5	3,682.9	0.00	0.00	0.00
12,100.0	89.82	180.21	8,532.4	-3,782.9	-13.9	3,782.9	0.00	0.00	0.00
12,200.0	89.82	180.21	8,532.7	-3,882.9	-14.2	3,882.9	0.00	0.00	0.00
12,300.0	89.82	180.21	8,533.0	-3,982.9	-14.6	3,982.9	0.00	0.00	0.00
12,400.0	89.82	180.21	8,533.3	-4,082.9	-15.0	4,082.9	0.00	0.00	0.00
12,500.0	89.82	180.21	8,533.6	-4,182.9	-15.3	4,182.9	0.00	0.00	0.00
12,600.0	89.82	180.21	8,534.0	-4,282.9	-15.7	4,282.9	0.00	0.00	0.00
12,700.0	89.82	180.21	8,534.3	-4,382.9	-16.1	4,382.9	0.00	0.00	0.00
12,800.0	89.82	180.21	8,534.6	-4,482.9	-16.4	4,482.9	0.00	0.00	0.00
12,900.0	89.82	180.21	8,534.9	-4,582.9	-16.8	4,582.9	0.00	0.00	0.00
12,941.6	89.82	180.21	8,535.0	-4,624.5	-16.9	4,624.5	0.00	0.00	0.00
TD @ 12941.6' MD, 8535.0' TVD									

Database:	Houston R5000 Database	**Local Co-ordinate Reference:**	Well #2H
Company:	COG Production LLC	**TVD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Site:	Bimini 8 Federal Com	**North Reference:**	Grid
Well:	#2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL (B8FC#2H)	0.00	0.00	8,535.0	-4,624.5	-16.6	446,415.76	739,132.13	32° 13' 32.357 N	103° 41' 37.305 W
- plan misses target center by 0.3usft at 12941.6usft MD (8535.0 TVD, -4624.5 N, -16.9 E)									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
8,044.5	8,044.5	0.0	0.0	KOP - 8044.5' MD, 8044.5' TVD, 0.00° INC, 0.00° AZI, 0.0' VS
8,793.1	8,522.0	-476.0	-1.7	EOC - 8793.1' MD, 8522.0' TVD, 89.82° INC, 180.21° AZI, 476.0' VS
12,941.6	8,535.0	-4,624.5	-16.9	TD @ 12941.6' MD, 8535.0' TVD

COG Production LLC
Project: Lea County, NM (NAD-83)
Site: Bimini 8 Federal Com
Well: #2H
Wellbore: OH
Plan: Plan #2 (#2H/OH)

CONCHO

Azimuths to Grid North
True North: -0.34°
Magnetic North: 7.18°

Magnetic Field
Strength: 48560.3snT
Dip Angle: 60.18°
Date: 5/8/2012
Model: IGRF200510

WELL DETAILS: #2H

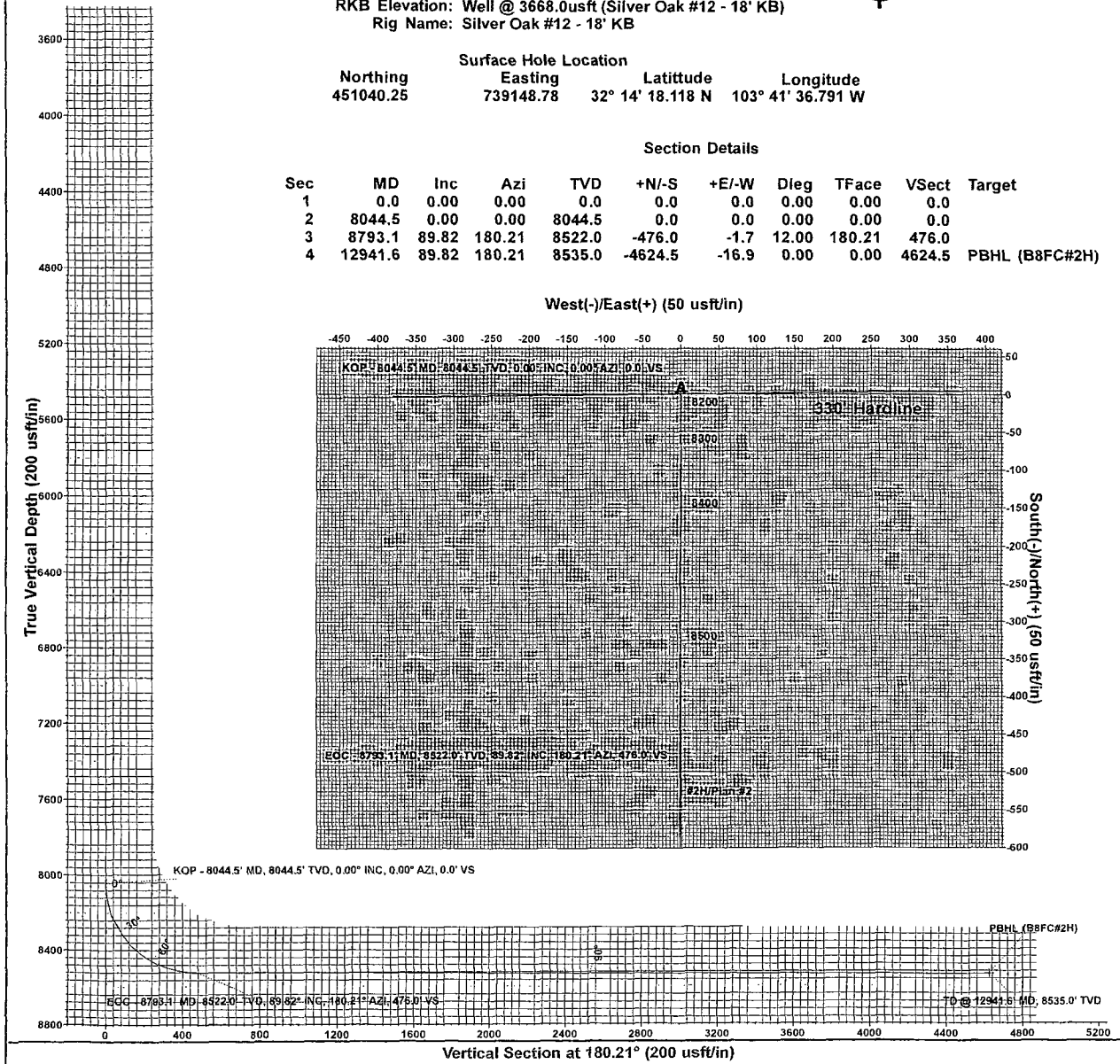
Ground Elevation:: 3650.0
RKB Elevation: Well @ 3668.0usft (Silver Oak #12 - 18' KB)
Rig Name: Silver Oak #12 - 18' KB

Surface Hole Location

Northing	Easting	Latitude	Longitude
451040.25	739148.78	32° 14' 18.118 N	103° 41' 36.791 W

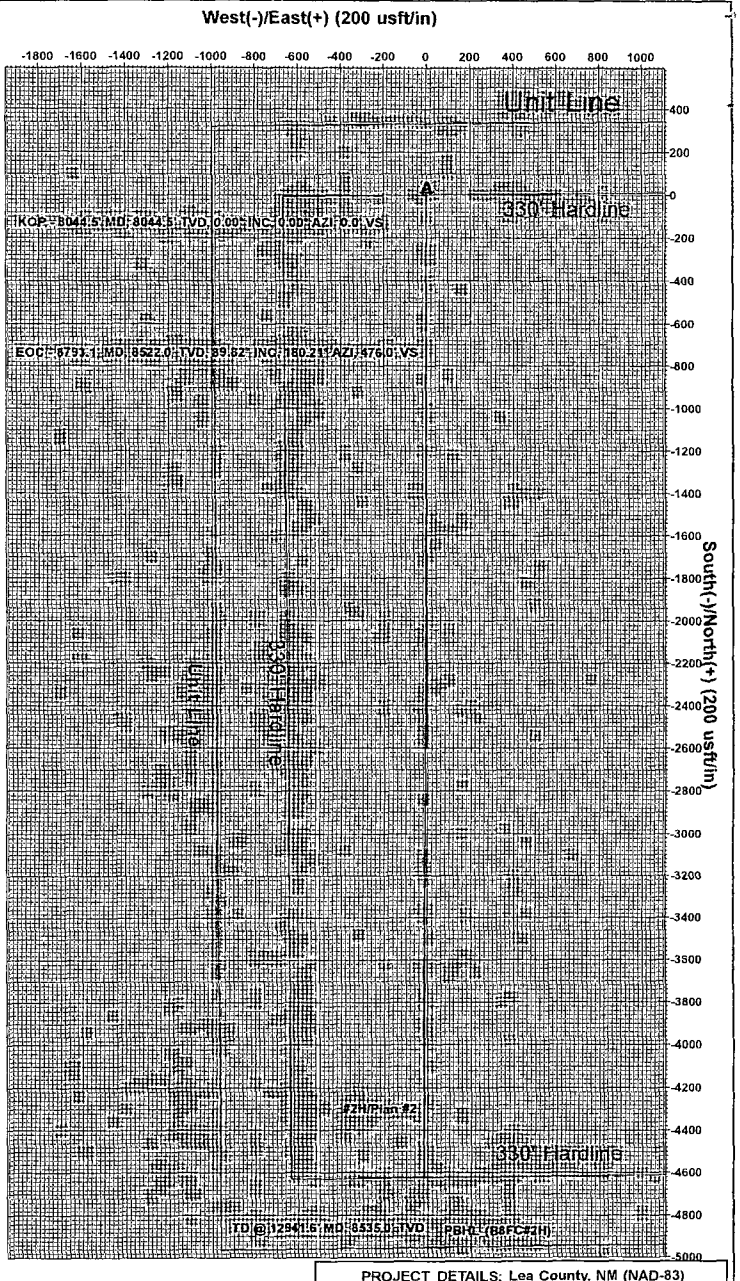
Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	8044.5	0.00	0.00	8044.5	0.0	0.0	0.00	0.00	0.0	
3	8793.1	89.82	180.21	8522.0	-476.0	-1.7	12.00	180.21	476.0	
4	12941.6	89.82	180.21	8535.0	-4624.5	-16.9	0.00	0.00	4624.5	PBHL (B8FC#2H)



West(-)/East(+) (50 usft/in)

West(-)/East(+) (200 usft/in)

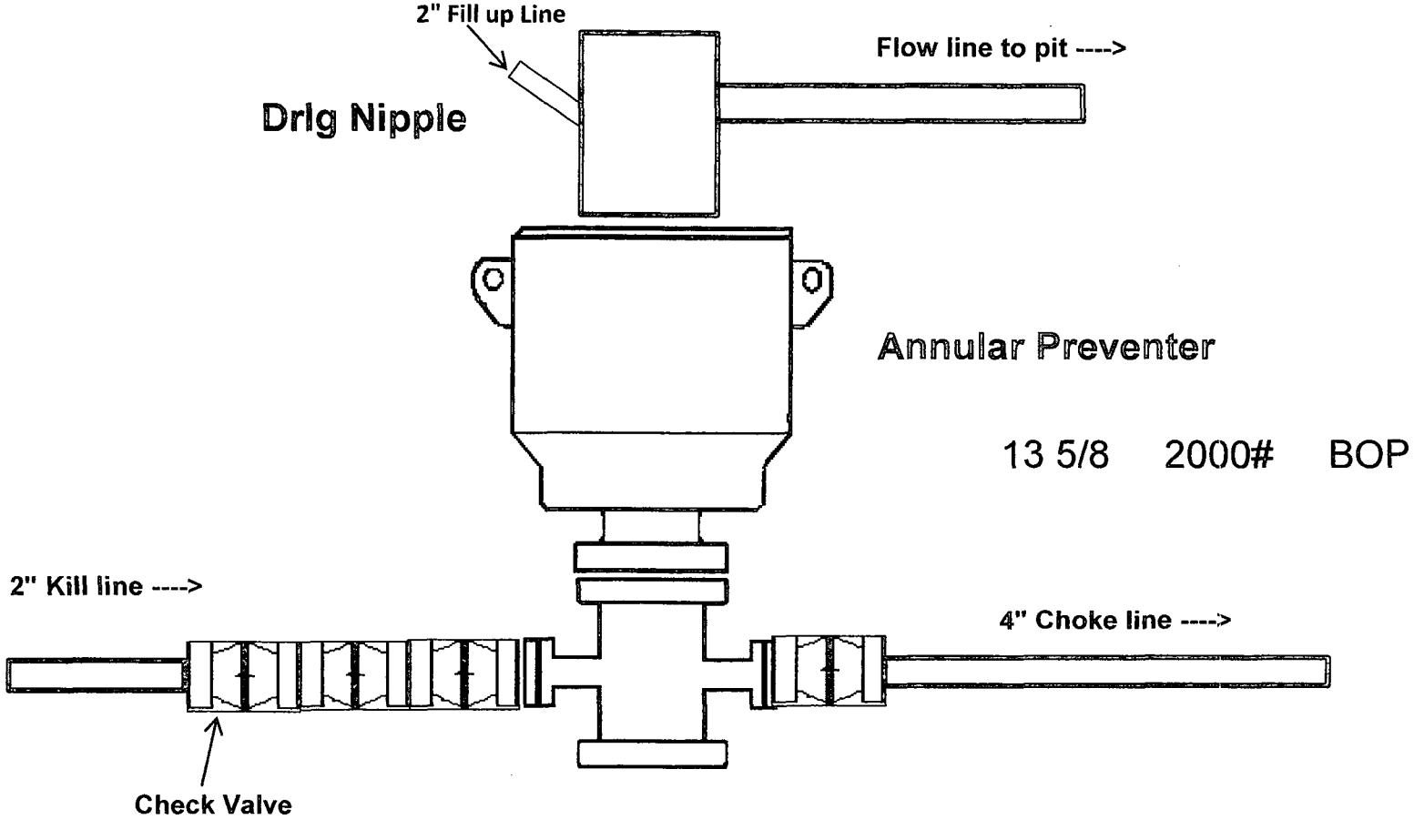


PROJECT DETAILS: Lea County, NM (NAD-83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid

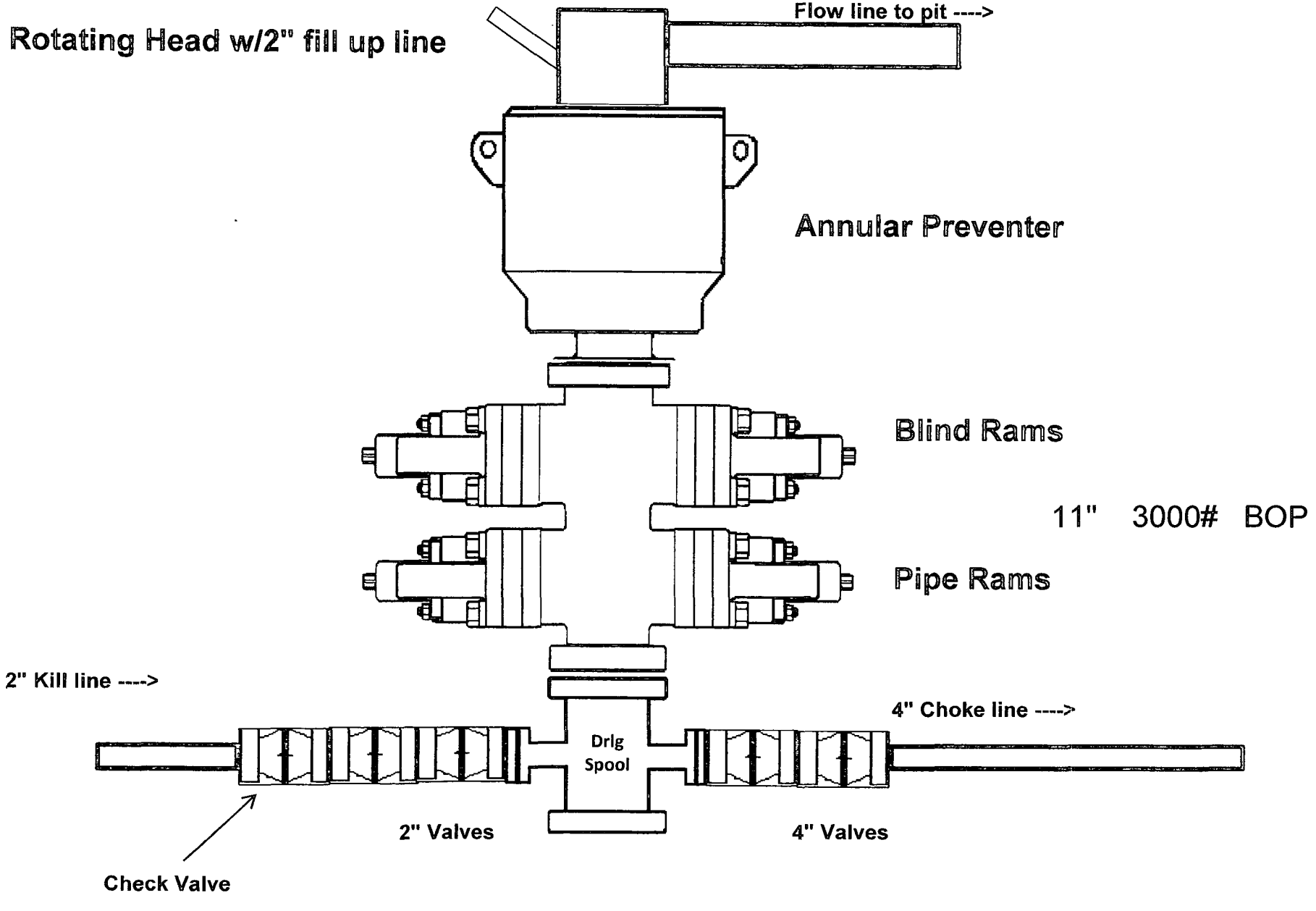
Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #2 (#2H/OH)
Created By: Matt Higgins Date: 10:26, October 26 2012

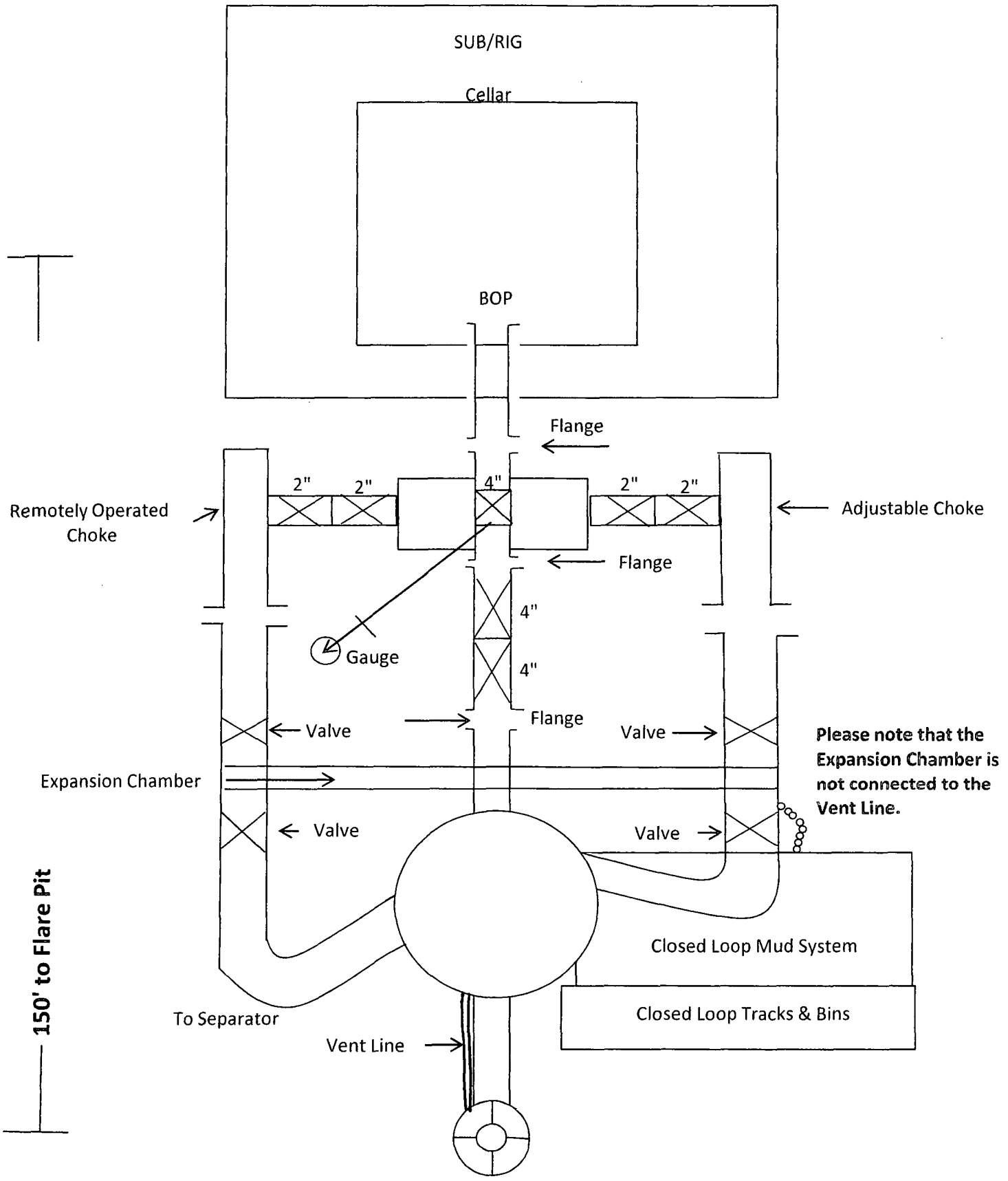
2,000 psi BOP Schematic



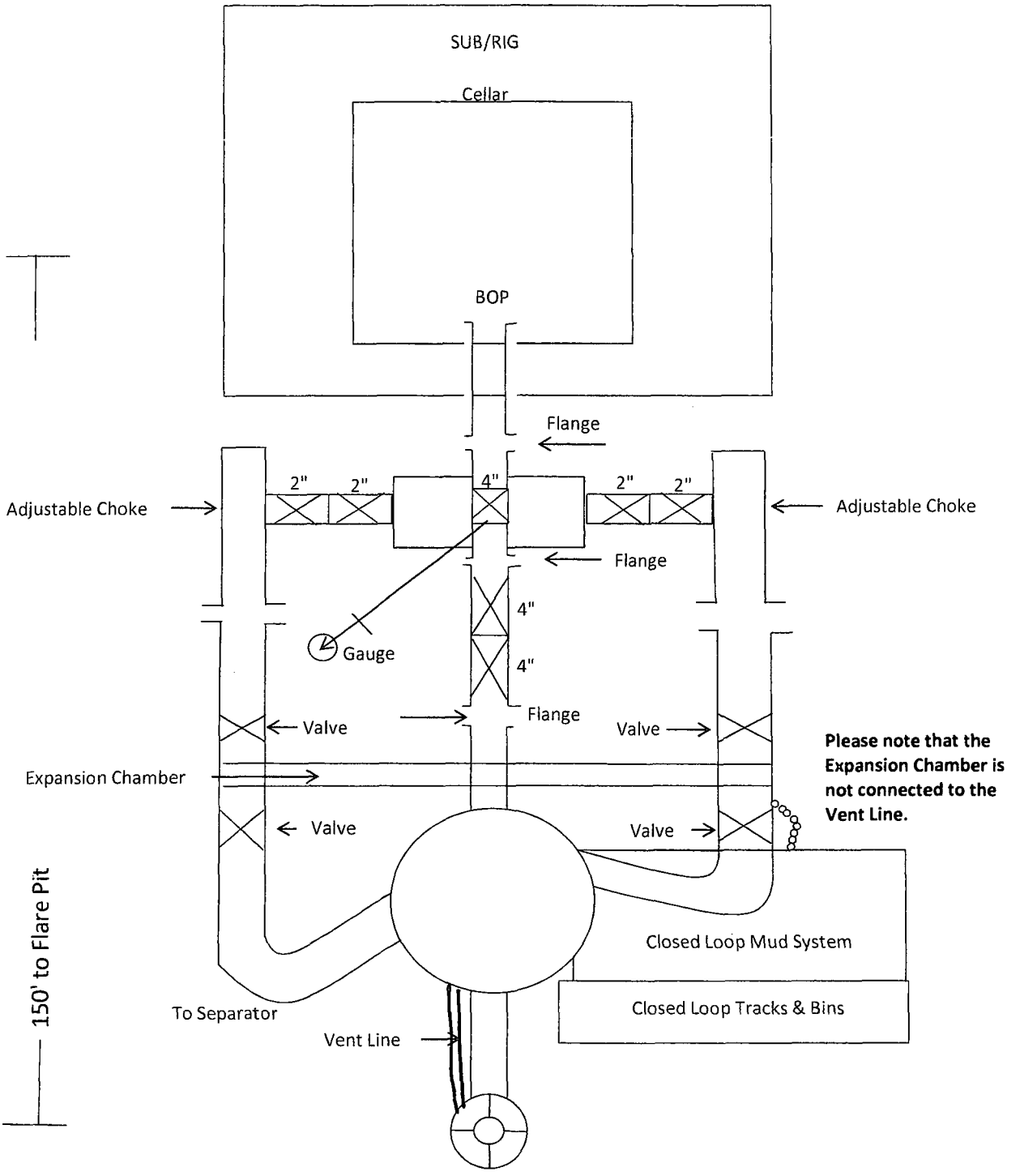
3,000 psi BOP Schematic



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'

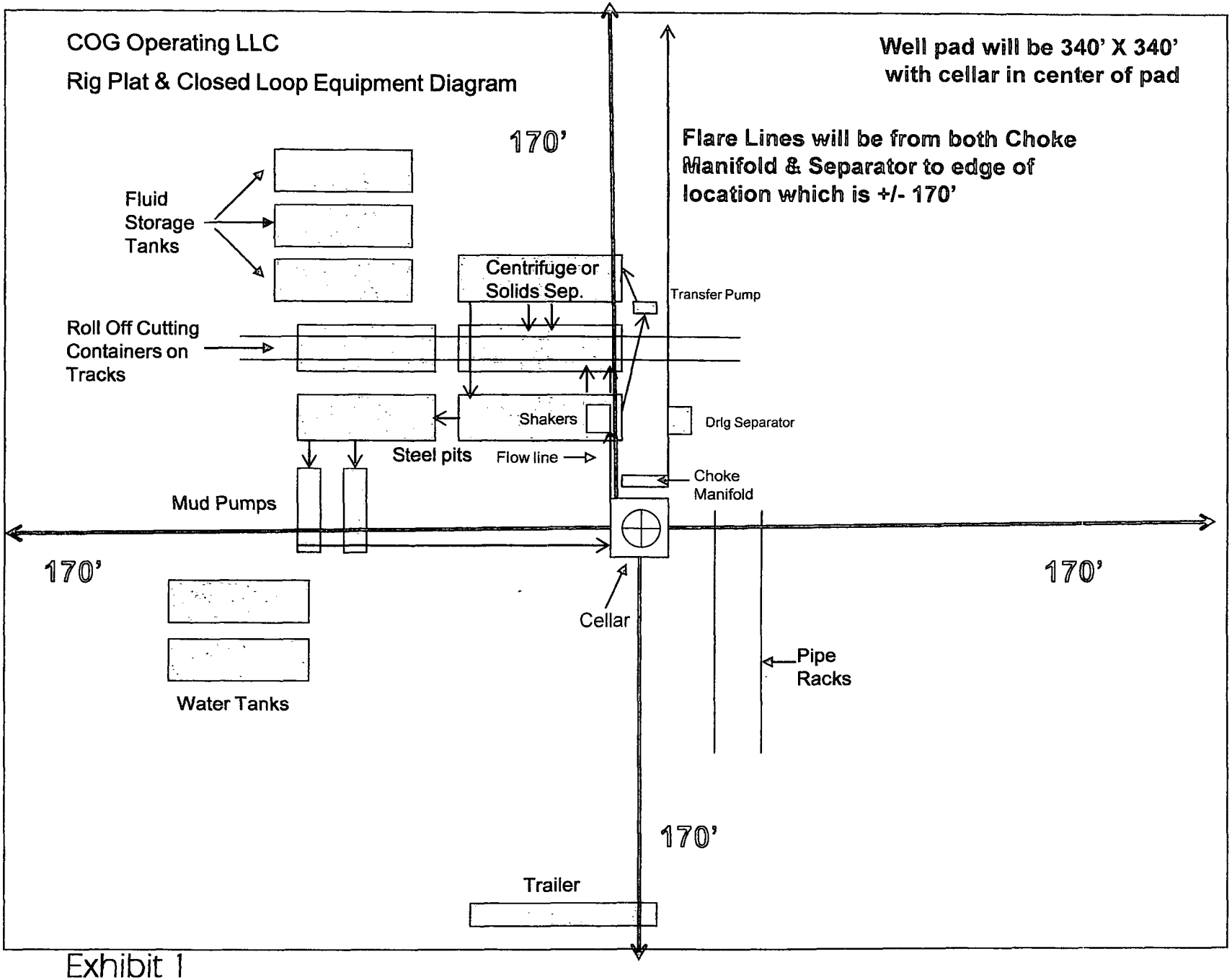


Exhibit 1