Form 3160-3
(March 2012)

HOBBS OCD
OCD Hobbs
APR 20 2015
RECEIVED

ATS-14-1056

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: NMNM02556E
BHL: NMNM59045, UL "H": NMNM0107698
UL "A": NMNM101218

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. (38641)
SL East 30 Federal Com #2H

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

9. API Well No.
30-025-42524

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 Spring (41440)

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 520' FSL & 530' FEL Unit Letter P (SESE) SHL Sec 19. T19S. R32E
At proposed prod. Zone 330' FSL & 380' FEL Unit Letter P (SESE) BHL Sec 30. T19S. R32E

11. Sec., T.R.M. or Blk and Survey or Area
Sec. 19 - T19S - R32E

14. Distance in miles and direction from nearest town or post office*
Approximately 16 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
330'	SHL: 320, BHL: 160 UL "A": 120 UL "H": 120	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: 242' BHL: 330' Closest to wellbore: Approx. 167'	TVD: 9,250' MD: 14,527'	NMB000740 &NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3561.7' GL	11/1/2014	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	8-28-14

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
/S/ STEPHEN J. CAFFEY		APR 16 2015

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)

Capitan Controlled Water Basin

*(Instructions on page 2)

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

KZ 04/21/15

APPROVAL SUBJECT TO
GENERAL REQUIREMENTS &
AND SPECIAL STIPULATIONS
ATTACHED

APP 22 2015

1. Geologic Formations

TVD of target	9250	Pilot hole depth	None
MD at TD:	14527	Deepest expected fresh water:	345

Reef

Formation	Depth (TVD) from KB)	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Alluvium	Surface	Water	
Rustler	857	Water	
Top of Salt	940	Salt	
Tansill	2441		
Yates	2603	Oil	
Seven Rivers	2782		
Capitan Reef	2983	Water	Lost Circulation
Delaware Group	4135	Oil/Gas	
Bone Spring	7160	Oil/Gas	
1st Bone Spring Sd	8363	Oil/Gas	
2nd Bone Spring Sd	9057	Target Zone	
3rd Bone Spring Sd	9792	Oil/Gas	
Wolfcamp.	10271	Oil/Gas	

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program*

see COA

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	882'	13.375"	54.5	J55	STC	2.80	1.26	10.71
12.25"	0	~~4155'~~ 4400'	9.625"	40	J55	LTC	1.19	0.85	3.13
8.75"	0	9575'	5.5"	17	P110	LTC	1.62	2.30	1.80
7.875"	9575'	14527'	5.5"	17	P110	LTC	1.62	2.30	1.80
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

*All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

* BLM standard formulas where used on all SF calculations

* Assumed 9.3 ppg MW equivalent pore pressure from 9 5/8" shoe to deepest TVD in wellbore.
* Explanation for SFs below BLM's minimum standards:
  9 5/8" Burst SF @ 0.85---used BLM's frac gradiant scenario to qualify.
  3950 psi/4155 ft. = 0.95>0.7

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Is casing API approved? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	Y
If yes, does production casing cement tie back a minimum of 50' above the Reef?	Y
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	275	13.5	1.75	9.2	13	Lead: Class C + 4.0% Gel + 2% CaCl2
	400	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Inter.	600	13.5	1.75	9.2	15	1st stage Lead: Class C + 4% Gel+ 2% CaCl2
	200	14.8	1.32	6.4	6	1st stage Tail: Class C + 2% CaCl2
	DV/ECP Tool 2930'					
	1100	13.5	1.75	9.2	15	2nd stage Lead: Class C + 4 % Gel+ 2% CaCL2
	200	14.8	1.32	6.4	6	2nd stage Tail: Class C + 2% CaCL2
Prod.	1200	11.9	2.50	14.1	72	Lead: 50:50:10 H Blend (FR, Retarder, FL adds necessary)
	1150	14.4	1.25	5.7	17	Tail: 50:50:2 H Blend (FR, Retarder, FL adds as necessary)

Casing String	TOC	% Excess
Surface	0'	50%
Intermediate	0'	35%
Production	0'	35%

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.

BOP installed and tested before drilling which hole?	Size?	System Rated WP	Type		✓	Tested to:
12-1/4"	13-5/8"	2M	Annular		x	50% of working pressure
			Blind Ram			WP
			Pipe Ram			
			Double Ram			
			Other*	Chokes	x	
8-3/4"	13 5/8"	3M	Annular		x	50% of working pressure
			Blind Ram			WP
			Pipe Ram			
			Double Ram		x	
			Other*	Chokes	x	
7 7/8"	13 5/8"	3M	Annular		x	50% of working pressue
			Blind Ram			WP
			Pipe Ram			
			Double Ram		x	
			Other*	Chokes	x	

see COA

*Specify if additional ram is utilized.

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

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. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

N	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
N	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	N — Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. • Provide description here See attached schematic.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6-8.8	28-34	N/C
Surf csg	Int shoe	Saturated Brine	10.0-10.2	28-34	N/C
Int shoe	TD	Cut Brine	8.5-9.3	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Yes	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
No	Drill stem test? If yes, explain
No	Coring? If yes, explain

Additional logs planned		Interval
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
X	CBL	Production casing
X	Mud log	Intermediate shoe to TD
	PEX	

7. Drilling Conditions

Upon loss of circulation in the reef the brine drilling fluid will be replaced with fresh water, Lost circulation material will be added to this drilling fluid and drilling continued. The reef will be isolated by cementing the 9 5/8" casing in two Stages. A 9 5/8" casing packer and DV Tool will be set 50' above the top of the reef. See item #3 for cementing details.

Condition	Specify what type and where?
BH Pressure at deepest TVD	4070 psi
Abnormal Temperature	No

see COA

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
	H2S is present
X	H2S Plan attached

8. Other facets of operation

Is this a walking operation? No.
Will be pre-setting casing? No

Attachments:
Directional Plan
BOP & Choke Schematics
Rig Plat including H2S Schematic
H2S Contingency Plan

GEG/8-12-14

COG OPERATING, LLC

Lea County, NM
SL East 30 Federal Com 2H
2H

Lateral

Plan: Plan #1

Standard Planning Report

05 August, 2014

Section Distances
Sec19,T19S,R32E
SHL - Unit P
520'FSL, 530'FEL
Sec30,T19S,R32E
PP
330'FNL, 508'FEL
PBHL - Unit P
330'FSL, 380'FEL

Archer

Planning Report

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 2H
Company:	COG OPERATING, LLC	**TVD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Project:	Lea County, NM	**MD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Site:	SL East 30 Federal Com 2H	**North Reference:**	Grid
Well:	2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	SL East 30 Federal Com 2H				
Site Position:		**Northing:**	596,965.80 usft	**Latitude:**	32° 38' 24.07 N
From:	Map	**Easting:**	664,737.60 usft	**Longitude:**	103° 47' 53.39 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.29 °

Well	2H					
Well Position	**+N/-S**	0.00 usft	**Northing:**	596,965.80 usft	**Latitude:**	32° 38' 24.07 N
	+E/-W	0.00 usft	**Easting:**	664,737.60 usft	**Longitude:**	103° 47' 53.39 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,562.00 usft

Wellbore	Lateral				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	8/5/2014	7.34	60.45	48,527

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	178.19	

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
8,754.14	0.00	0.00	8,754.14	0.00	0.00	0.00	0.00	0.00	0.00	
9,574.95	90.29	178.19	9,275.00	-523.24	16.55	11.00	11.00	0.00	178.19	
14,526.55	90.29	178.19	9,250.00	-5,472.30	173.10	0.00	0.00	0.00	0.00	SL East 2H PBHL

Archer

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Site:	SL East 30 Federal Com 2H	**North Reference:**	Grid
Well:	2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

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Wellbore:	Lateral		
Design:	Plan #1		

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)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00
8,754.14	0.00	0.00	8,754.14	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 11.00									
8,800.00	5.04	178.19	8,799.94	-2.02	0.06	2.02	11.00	11.00	0.00
8,850.00	10.54	178.19	8,849.46	-8.79	0.28	8.80	11.00	11.00	0.00
8,900.00	16.04	178.19	8,898.10	-20.28	0.64	20.29	11.00	11.00	0.00
8,950.00	21.54	178.19	8,945.42	-36.37	1.15	36.39	11.00	11.00	0.00
9,000.00	27.04	178.19	8,990.97	-56.93	1.80	56.96	11.00	11.00	0.00
9,050.00	32.54	178.19	9,034.35	-81.75	2.59	81.79	11.00	11.00	0.00
9,100.00	38.04	178.19	9,075.14	-110.61	3.50	110.67	11.00	11.00	0.00
9,150.00	43.54	178.19	9,112.98	-143.25	4.53	143.33	11.00	11.00	0.00
9,200.00	49.04	178.19	9,147.51	-179.37	5.67	179.46	11.00	11.00	0.00
9,250.00	54.54	178.19	9,178.42	-218.62	6.92	218.73	11.00	11.00	0.00
9,300.00	60.04	178.19	9,205.43	-260.66	8.25	260.79	11.00	11.00	0.00
9,350.00	65.54	178.19	9,228.28	-305.09	9.65	305.24	11.00	11.00	0.00
9,400.00	71.04	178.19	9,246.76	-351.50	11.12	351.68	11.00	11.00	0.00
9,450.00	76.54	178.19	9,260.71	-399.47	12.64	399.67	11.00	11.00	0.00
9,500.00	82.04	178.19	9,270.00	-448.56	14.19	448.78	11.00	11.00	0.00
9,550.00	87.54	178.19	9,274.53	-498.31	15.76	498.56	11.00	11.00	0.00
9,574.95	90.29	178.19	9,275.00	-523.24	16.55	523.50	11.00	11.00	0.00

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 2H
Company:	COG OPERATING, LLC	**TVD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Project:	Lea County, NM	**MD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Site:	SL East 30 Federal Com 2H	**North Reference:**	Grid
Well:	2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

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)
Start 4951.60 hold at 9574.95 MD									
9,600.00	90.29	178.19	9,274.88	-548.28	17.34	548.55	0.00	0.00	0.00
9,700.00	90.29	178.19	9,274.37	-648.23	20.50	648.55	0.00	0.00	0.00
9,800.00	90.29	178.19	9,273.87	-748.17	23.67	748.55	0.00	0.00	0.00
9,900.00	90.29	178.19	9,273.36	-848.12	26.83	848.55	0.00	0.00	0.00
10,000.00	90.29	178.19	9,272.86	-948.07	29.99	948.55	0.00	0.00	0.00
10,100.00	90.29	178.19	9,272.35	-1,048.02	33.15	1,048.54	0.00	0.00	0.00
10,200.00	90.29	178.19	9,271.85	-1,147.97	36.31	1,148.54	0.00	0.00	0.00
10,300.00	90.29	178.19	9,271.34	-1,247.92	39.47	1,248.54	0.00	0.00	0.00
10,400.00	90.29	178.19	9,270.84	-1,347.87	42.64	1,348.54	0.00	0.00	0.00
10,500.00	90.29	178.19	9,270.33	-1,447.82	45.80	1,448.54	0.00	0.00	0.00
10,600.00	90.29	178.19	9,269.83	-1,547.76	48.96	1,548.54	0.00	0.00	0.00
10,700.00	90.29	178.19	9,269.32	-1,647.71	52.12	1,648.54	0.00	0.00	0.00
10,800.00	90.29	178.19	9,268.82	-1,747.66	55.28	1,748.54	0.00	0.00	0.00
10,900.00	90.29	178.19	9,268.31	-1,847.61	58.44	1,848.53	0.00	0.00	0.00
11,000.00	90.29	178.19	9,267.81	-1,947.56	61.61	1,948.53	0.00	0.00	0.00
11,100.00	90.29	178.19	9,267.30	-2,047.51	64.77	2,048.53	0.00	0.00	0.00
11,200.00	90.29	178.19	9,266.80	-2,147.46	67.93	2,148.53	0.00	0.00	0.00
11,300.00	90.29	178.19	9,266.29	-2,247.41	71.09	2,248.53	0.00	0.00	0.00
11,400.00	90.29	178.19	9,265.79	-2,347.35	74.25	2,348.53	0.00	0.00	0.00
11,500.00	90.29	178.19	9,265.28	-2,447.30	77.41	2,448.53	0.00	0.00	0.00
11,600.00	90.29	178.19	9,264.78	-2,547.25	80.57	2,548.53	0.00	0.00	0.00
11,700.00	90.29	178.19	9,264.27	-2,647.20	83.74	2,648.52	0.00	0.00	0.00
11,800.00	90.29	178.19	9,263.77	-2,747.15	86.90	2,748.52	0.00	0.00	0.00
11,900.00	90.29	178.19	9,263.26	-2,847.10	90.06	2,848.52	0.00	0.00	0.00
12,000.00	90.29	178.19	9,262.76	-2,947.05	93.22	2,948.52	0.00	0.00	0.00
12,100.00	90.29	178.19	9,262.25	-3,047.00	96.38	3,048.52	0.00	0.00	0.00
12,200.00	90.29	178.19	9,261.75	-3,146.94	99.54	3,148.52	0.00	0.00	0.00
12,300.00	90.29	178.19	9,261.24	-3,246.89	102.71	3,248.52	0.00	0.00	0.00
12,400.00	90.29	178.19	9,260.74	-3,346.84	105.87	3,348.52	0.00	0.00	0.00
12,500.00	90.29	178.19	9,260.23	-3,446.79	109.03	3,448.51	0.00	0.00	0.00
12,600.00	90.29	178.19	9,259.73	-3,546.74	112.19	3,548.51	0.00	0.00	0.00
12,700.00	90.29	178.19	9,259.22	-3,646.69	115.35	3,648.51	0.00	0.00	0.00
12,800.00	90.29	178.19	9,258.72	-3,746.64	118.51	3,748.51	0.00	0.00	0.00
12,900.00	90.29	178.19	9,258.21	-3,846.59	121.68	3,848.51	0.00	0.00	0.00
13,000.00	90.29	178.19	9,257.71	-3,946.53	124.84	3,948.51	0.00	0.00	0.00
13,100.00	90.29	178.19	9,257.20	-4,046.48	128.00	4,048.51	0.00	0.00	0.00
13,200.00	90.29	178.19	9,256.70	-4,146.43	131.16	4,148.51	0.00	0.00	0.00
13,300.00	90.29	178.19	9,256.19	-4,246.38	134.32	4,248.50	0.00	0.00	0.00
13,400.00	90.29	178.19	9,255.69	-4,346.33	137.48	4,348.50	0.00	0.00	0.00
13,500.00	90.29	178.19	9,255.18	-4,446.28	140.64	4,448.50	0.00	0.00	0.00
13,600.00	90.29	178.19	9,254.68	-4,546.23	143.81	4,548.50	0.00	0.00	0.00
13,700.00	90.29	178.19	9,254.17	-4,646.17	146.97	4,648.50	0.00	0.00	0.00
13,800.00	90.29	178.19	9,253.67	-4,746.12	150.13	4,748.50	0.00	0.00	0.00
13,900.00	90.29	178.19	9,253.16	-4,846.07	153.29	4,848.50	0.00	0.00	0.00
14,000.00	90.29	178.19	9,252.66	-4,946.02	156.45	4,948.49	0.00	0.00	0.00
14,100.00	90.29	178.19	9,252.15	-5,045.97	159.61	5,048.49	0.00	0.00	0.00
14,200.00	90.29	178.19	9,251.65	-5,145.92	162.78	5,148.49	0.00	0.00	0.00
14,300.00	90.29	178.19	9,251.14	-5,245.87	165.94	5,248.49	0.00	0.00	0.00
14,400.00	90.29	178.19	9,250.64	-5,345.82	169.10	5,348.49	0.00	0.00	0.00
14,500.00	90.29	178.19	9,250.13	-5,445.76	172.26	5,448.49	0.00	0.00	0.00
14,526.55	90.29	178.19	9,250.00	-5,472.30	173.10	5,475.04	0.00	0.00	0.00
TD at 14526.55									

Database:	EDM R5000.1 MULTI	**Local Co-ordinate Reference:**	Well 2H
Company:	COG OPERATING, LLC	**TVD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Project:	Lea County, NM	**MD Reference:**	3562'GL+18'KB @ 3580.00usft (Planning)
Site:	SL East 30 Federal Com 2H	**North Reference:**	Grid
Well:	2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #1		

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
SL East 2H PP	0.00	0.00	0.00	-850.05	26.89	596,115.76	664,764.49	32° 38' 15.66 N	103° 47' 53.13 W
- plan misses target center by 850.47usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
SL East 2H Surface	0.00	0.00	0.00	0.00	0.00	596,965.80	664,737.60	32° 38' 24.07 N	103° 47' 53.39 W
- plan hits target center									
- Point									
SL East 2H PBHL	0.00	0.00	9,250.00	-5,472.30	173.10	591,493.50	664,910.70	32° 37' 29.92 N	103° 47' 51.69 W
- plan hits target center									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
8,754.14	8,754.14	0.00	0.00	Start Build 11.00
9,574.95	9,275.00	-523.24	16.55	Start 4951.60 hold at 9574.95 MD
14,526.55	9,250.00	-5,472.30	173.10	TD at 14526.55

COG OPERATING, LLC

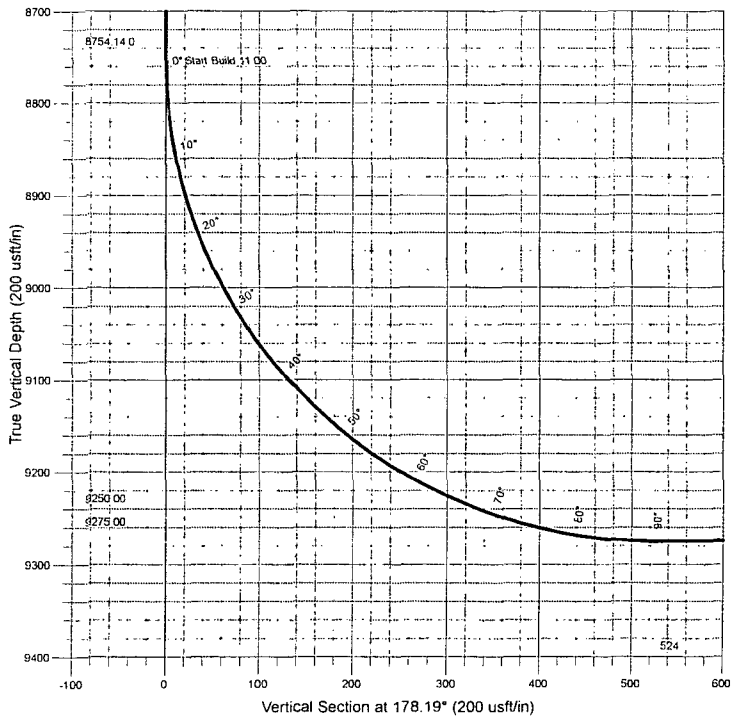
Field: Lea County, NM
Site: SL East 30 Federal Com 2H
Well: 2H
Wellbore: Lateral
Plan: Plan #1

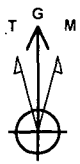
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	8754.14	0.00	0.00	8754.14	0.00	0.00	0.00	0.00	0.00	
3	9574.95	90.29	178.19	9275.00	-523.24	16.55	11.00	178.19	523.50	
4	14526.55	90.29	178.19	9250.00	-5472.30	173.10	0.00	0.00	5475.04	SL East 2H PBHL

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
SL East 2H PP	0.00	-850.05	26.89	596115.75	664764.49	32° 38' 15.66 N	103° 47' 53.13 W	Point
SL East 2H Surface	0.00	0.00	0.00	596965.80	664737.60	32° 38' 24.07 N	103° 47' 53.39 W	Point
SL East 2H PBHL	9250.00	-5472.30	173.10	591493.50	664910.70	32° 37' 29.92 N	103° 47' 51.69 W	Point





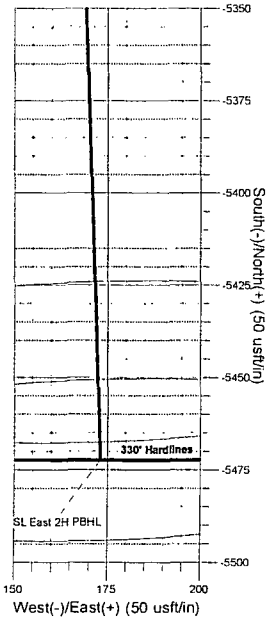
Azimuths to Grid North
True North: -0.29°
Magnetic North: 7.05°

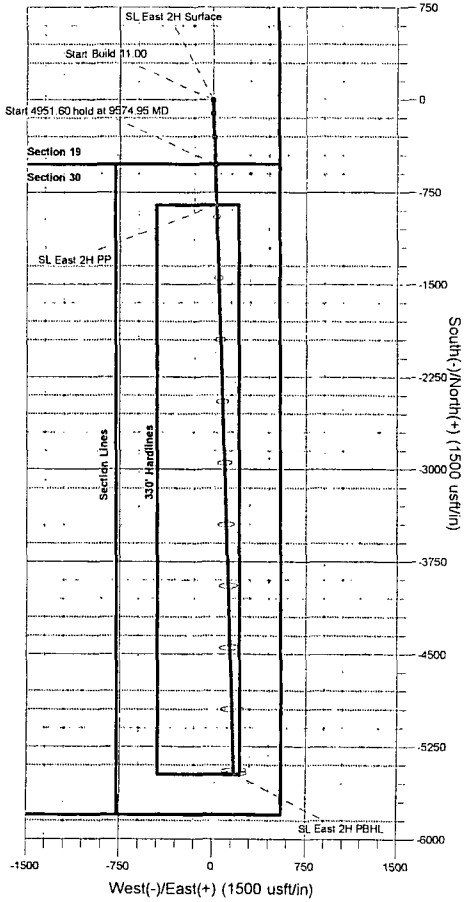
Magnetic Field
Strength: 48526.6snT
Dip Angle: 60.45°
Date: 8/5/2014
Model: IGRF2010

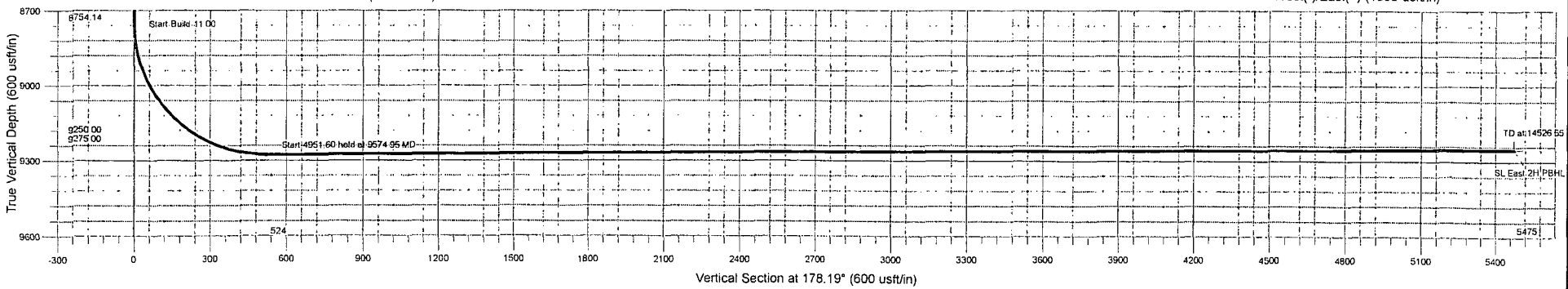
Section Distances

Sec19,T19S,R32E
SHL - Unit P
520'FSL, 530'FEL

Sec30,T19S,R32E
PP
330'FNL, 508'FEL
PBHL - Unit P
330'FSL, 380'FEL



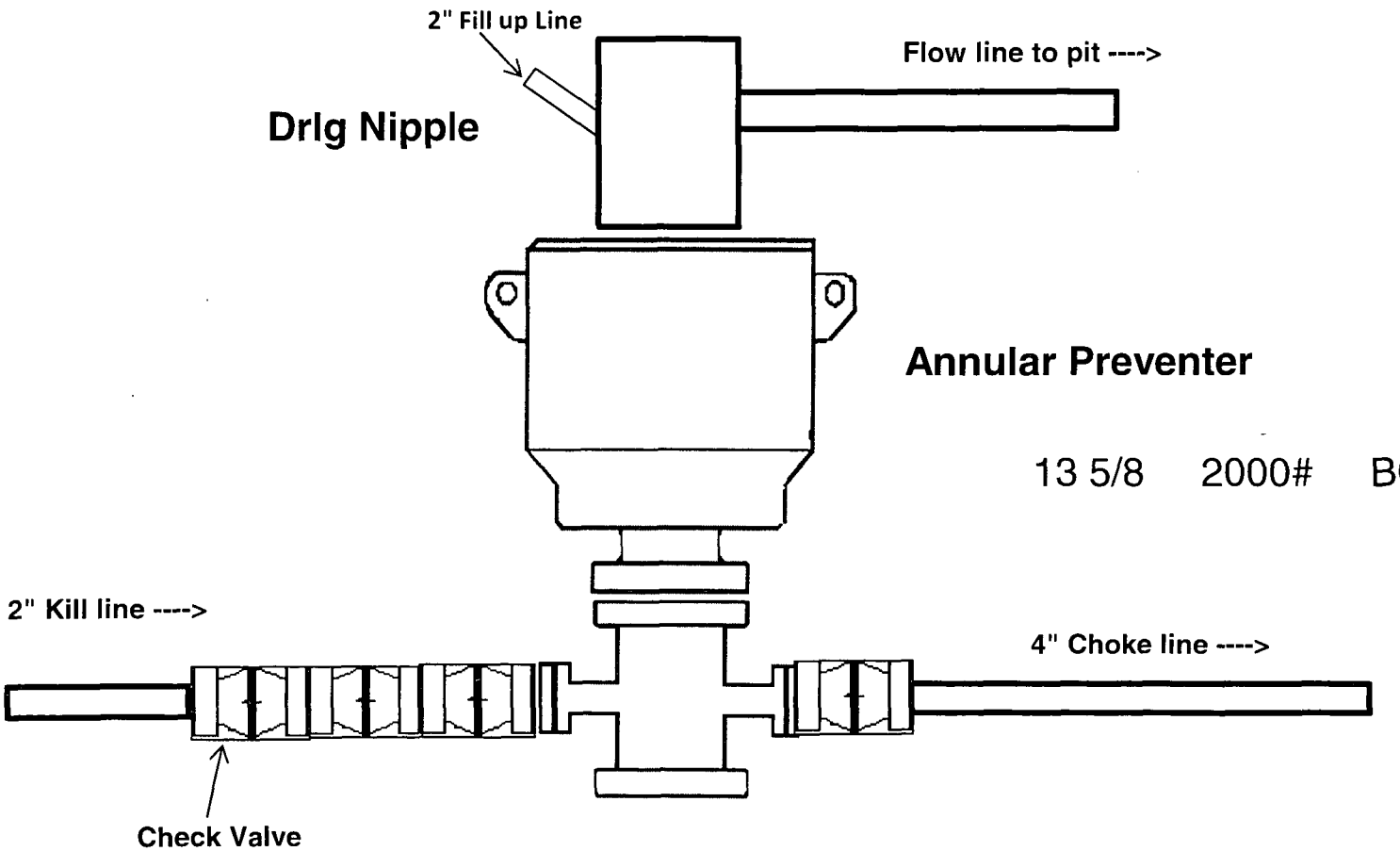




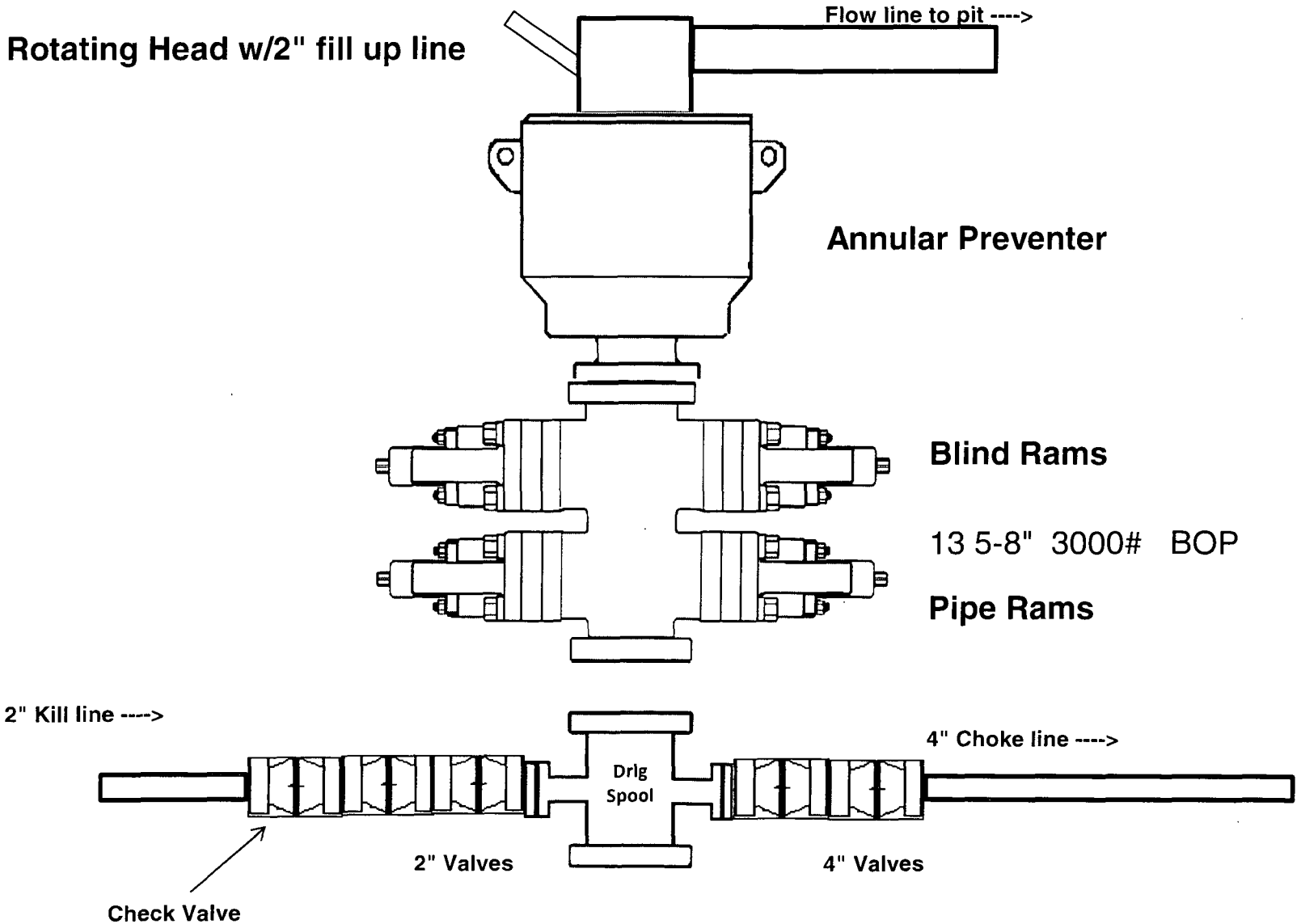
ARCHER DIRECTIONAL DRILLING SERVICES
12101 Cutten Rd. Houston, Texas 77066
Phone: 281-301-2600 Fax: 281-301-2795

Design: Plan #1 (2H/Lateral)
Created By: Ivonne Gonzalez
Date: 16:07, August 05 2014

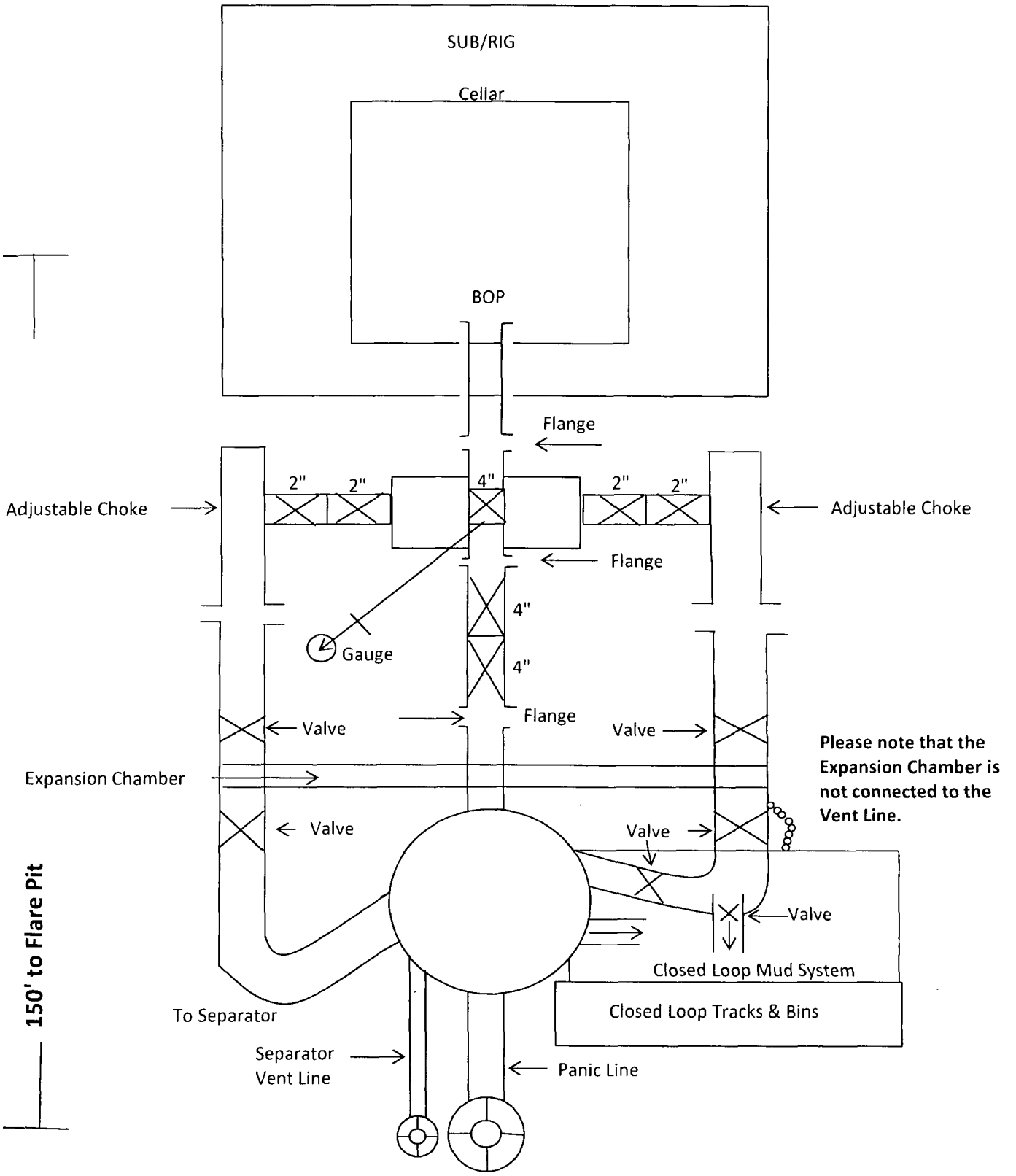
2,000 psi BOP Schematic



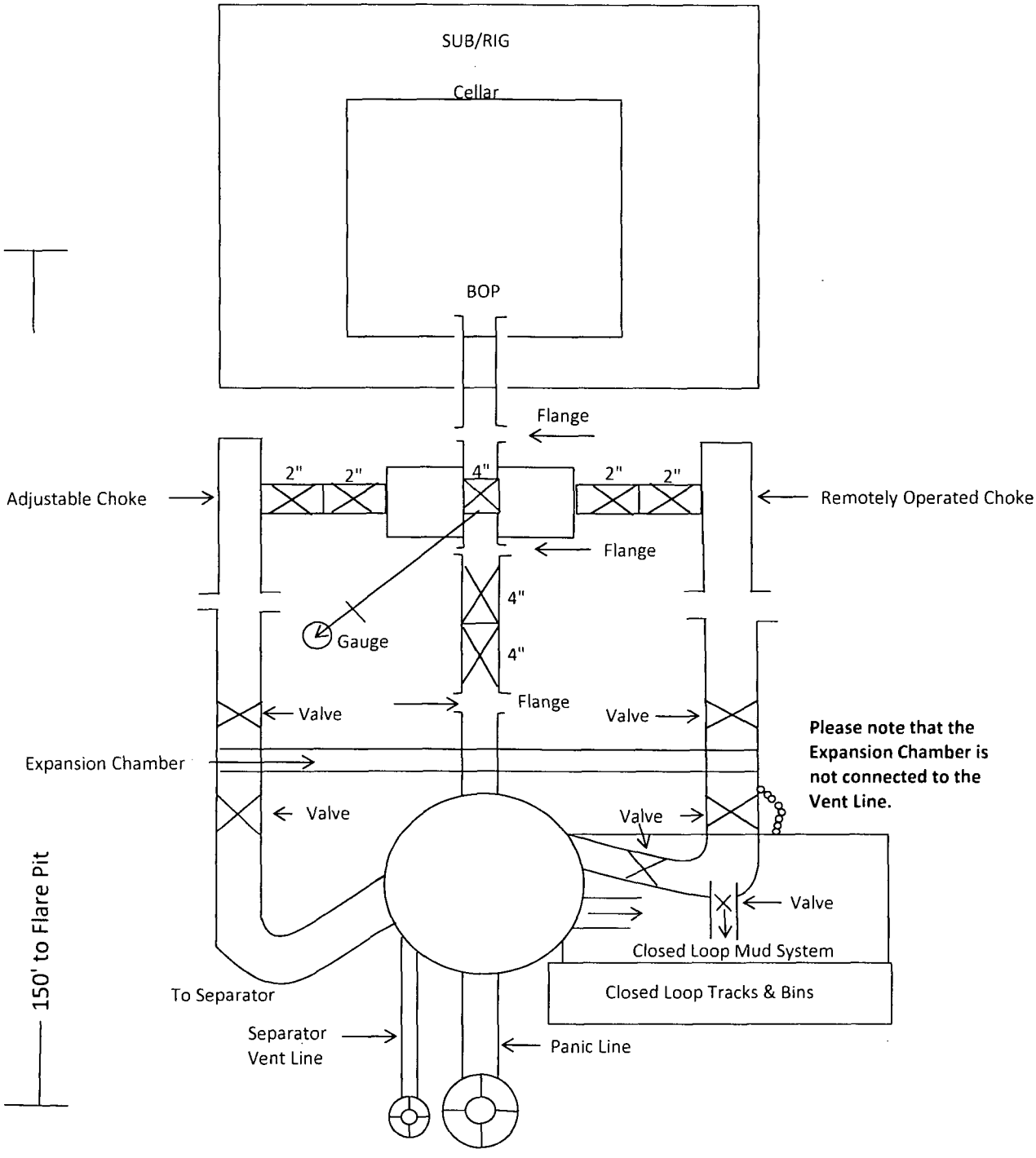
3,000 psi BOP Schematic



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'

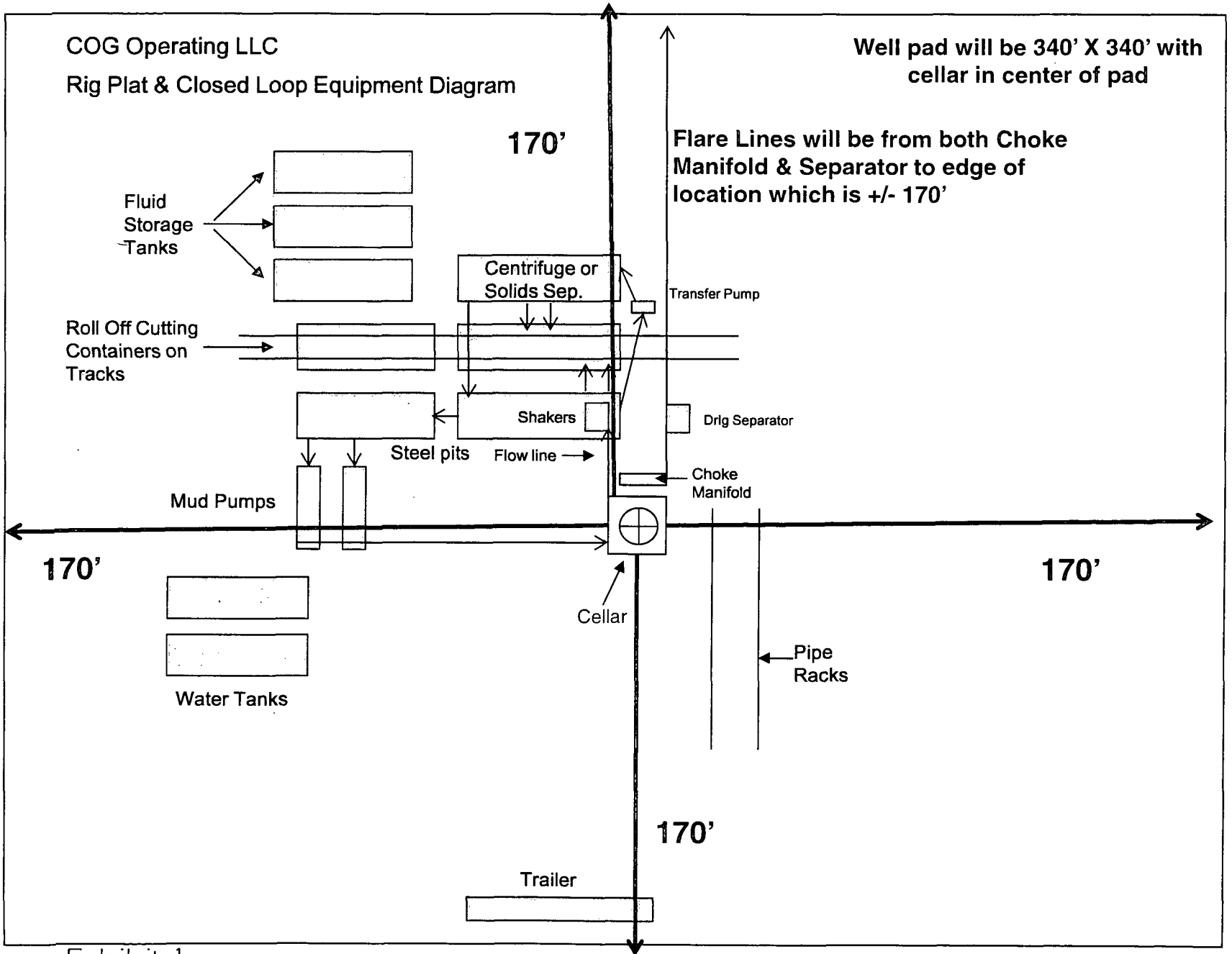


Exhibit 1

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